



Lessard-Sams Outdoor Heritage Council

Silver Lake Dam Fish Passage Modification
ML 2024 Request for Funding

General Information

Date: 05/31/2023

Proposal Title: Silver Lake Dam Fish Passage Modification

Funds Requested: \$3,000,000

Confirmed Leverage Funds: \$2,500,000

Is this proposal Scalable?: No

Manager Information

Manager's Name: Matt Crawford

Title: Project Development Manager

Organization: City of Rochester - Public Works Department

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City: Rochester, MN 55901

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Fax Number:

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Location Information

County Location(s): Olmsted.

Eco regions in which work will take place:

- Southeast Forest

Activity types:

- Restore

Priority resources addressed by activity:

- Habitat

Narrative

Abstract

The City of Rochester is proposing to modify the Silver Lake Dam with a fish passage rock arch rapids in 2025. This project is the first step in a comprehensive, long-term approach to modify all low head dams in the City to improve habitat connectivity in the South Fork Zumbro River network. The existing dam will be moved 700-ft upstream from the Broadway Avenue bridge, and fish passage ramp and wave pools constructed downstream of the dam crest. The dam conversion will add 16 miles of connected habitat and benefit state-threatened and native mussel species, as well as smallmouth bass.

Design and Scope of Work

The Silver Lake Dam was constructed in 1937 and is located at the Broadway Avenue bridge over the South Fork Zumbro River. Nine other low head dams were constructed in the 1990's as flood control structures within the City of Rochester. These dams form fish barriers between the South Fork Zumbro River, Cascade Creek, Silver Creek, and Bear Creek.

The City of Rochester is proposing to modify the Silver Lake Dam with a fish passage rock arch rapids and wave pool channel by 2025. This project is the first step in a comprehensive, long-term approach to modify all low head dams in the City of Rochester for habitat connectivity. The existing concrete dam will be removed, and 700-ft of the upstream river channel will be shaped with rock fill with a cutoff wall control section at the upstream end of the fill. The City has an agreement with U.S. Army Corps of Engineers to maintain Silver Lake as a flow channel. The City will construct a 120-ft wide rock ramp in the existing riverbed directly downstream of the cutoff wall control section based on DNR guidance for Natural Channel Design in Dam Removals and Fish Passage. The fish passage channel will include a ramp slope no steeper than 3 percent, a series of 12-14 rock arch weirs with drops no greater than 0.8-ft between each weir, randomly placed fish gaps between weir stones, and a low flow channel to maintain fish movement under low flow conditions. Adjacent to the rock arch rapids fish ramp, the City will construct a series of 4-5 stepped, plunge pools formed by stone weirs that create wave features for tubers and kayakers, as well as fish habitat pools.

The proposed project was identified as a priority based on: 1) safety hazard of the recirculating currents that trap boaters and swimmers at the base of the dam, 2) increasing maintenance requirements of the aging Silver Lake Dam originally built in 1937, and 3) public support for environmental improvements to Silver Lake.

The proposed project is urgently needed to address the safety hazard the Silver Lake Dam poses to river users. The Silver Lake Dam is #23 on the 2021 MN DNR Dam Safety Project Priority List Legislative Report as a dam modification to restore fish passage. Modification of the largest dam in Rochester for fish passage is also a publicly visible first step to modifying all low head dams in Rochester and reconnecting river habitat along the South Fork Zumbro River network.

The City has used many different media events to get input on the project from a diverse and large number of community members: March 2019 open house attended by 80 people, November 2020 virtual open house attended by 1,607 people, post card mailings to 480 residents around Silver Lake, and social media posts viewed by 15,000 people. More than 500 people have responded to online surveys with an overwhelming majority supporting the project. An EAW was approved in 2021.

Explain how the proposal addresses habitat protection, restoration, and/or enhancement for fish, game & wildlife, including threatened or endangered species conservation

This proposal addresses habitat restoration and connectivity for fish and mussels in the South Fork Zumbro River network.

The proposed project replaces 700 linear feet of stagnant water and silt substrate with free-flowing water, pools, and diverse rock/cobble substrate that supports filter feeders, spawning, and refuge. Movement of water over the rock arch rapids fish passage ramp has added benefits of decreasing water temperatures and increasing aeration of the Silver Lake reservoir discharge.

Based on independent mussel surveys conducted by Dr. Brett Ostby within the last five years, the river reach directly downstream of the Silver Lake Dam supports a biologically significant mussel assemblage, including two state-threatened species and possibly as many as 10 native species. Dr. Ostby has compared his survey findings with two comprehensive mussel surveys of the watershed (Bright et al. 1988, Ward et al. 2014) and DNR mussel survey records. Repeated surveys conducted by Dr. Ostby directly downstream of the Silver Lake Dam have demonstrated that this reach supports one of the better mussel assemblages in the Zumbro River Watershed compared to observations from the past 32 years. Few sites across the watershed had a comparable combination of both live richness and abundance. Improved habitat connectivity throughout the City of Rochester will benefit migration of native mussel hosts to upstream portions of the Zumbro River and its tributaries.

Silver Lake supports bluegill, black crappie, yellow perch, and largemouth bass. Recent biological assessments of Silver Lake, South Fork Zumbro River, and other tributaries (Cascade Creek, Silver Creek, and Bear Creek) reported smallmouth bass downstream of the Silver Lake Dam but not upstream. Modification of the Silver Lake Dam for fish passage would increase recruitment and the habitat range of smallmouth bass in the South Fork Zumbro River.

What are the elements of this proposal that are critical from a timing perspective?

Completion of this project is critical from a timing perspective because of the number of significant capital improvements needed to maintain the Silver Lake Dam which was built in 1937. The dam is approaching 100 years old and will require ongoing stringent maintenance and monitoring into the future. The City is seeking the proposed project to replace the aging mechanical dam with a low-maintenance fish passage rock arch rapids and wave pools that also improve connectivity and habitat. The timing of the proposed project coordinates with other maintenance activities and projects in Silver Lake Park, such as a sewer replacement, Silver Lake sediment removal, and pedestrian trail and bridge improvements.

Describe how the proposal expands habitat corridors or complexes and/or addresses habitat fragmentation:

The South Fork Zumbro River is a tributary to the Mississippi River in southeastern Minnesota. Currently, low head dams disconnect habitat in the South Fork Zumbro River and its tributaries: Silver Creek, Cascade Creek, Salem Creek, Willow Creek, and Bear Creek. Poor habitat and lack of connectivity were identified as primary stressors to impaired fish communities in the South Fork Zumbro River and tributaries in the Minnesota Pollution Control Agency 2016 Zumbro River Watershed Stressor Identification report.

Modification of the Silver Lake Dam will increase the length of connected river upstream of Lake Zumbro along the South Fork Zumbro River network by 16 miles (from 19 to 35 miles). Future modification of all low head dams in the City of Rochester will eliminate all major fish barriers and result in a total of over 190 miles of connected habitat in the South Fork Zumbro River watershed.

Which Conservation Plans referenced in MS97A.056, subd. 3a are most applicable to this project?

- Long Range Plan for Fisheries Management
- State Comprehensive Outdoor Recreation Plan

Explain how this proposal will uniquely address habitat resilience to climate change and its anticipated effects on game, fish & wildlife species utilizing the protected or restored/enhanced habitat this proposal targets.

Greater connectivity of stream habitat improves fish community resilience to aquatic life stressors resulting from future climate change. High imperviousness within urban areas and more extreme rainfall events predicted under future climate change are expected to increase the severity of stressors to aquatic life. Several streams come together in the City of Rochester and the removal of fish barriers will allow fish and macroinvertebrate populations to respond more quickly and be more resilient to stressors on aquatic life.

Which LSOHC section priorities are addressed in this proposal?

Southeast Forest

- Protect, enhance, and restore habitat for fish, game, and nongame wildlife in rivers, cold-water streams, and associated upland habitat

Describe how this project/program will produce and demonstrate a significant and permanent conservation legacy and/or outcomes for fish, game, and wildlife, and if not permanent outcomes, why it is important to undertake at this time:

Modifying the Silver Lake Dam with a fish passage rock arch rapids and wave pools will create permanent fish and mussel habitat and provide connectivity between the lower and upper South Fork Zumbro River and its tributaries. Dr. Brett Ostby reported in a mussel survey for two low head dams on the Winnebago River in Iowa that some research suggests that mussel density, species richness and growth rates can be higher immediately downstream of small dams. This improvement is because of the role dams play to concentrate fish, create local riverbed stability, and boost primary productivity in the upstream reservoir. The river reach directly downstream of the Silver Lake Dam supports a biologically significant mussel assemblage, including two state-threatened species and possibly as many as ten native species.

The proposed dam modification will improve habitat connectivity and migration of native mussel hosts while also maintaining the characteristics of low head dams that benefit mussel assemblages. Modification of the Silver Lake Dam for fish passage may also increase recruitment and the habitat range of smallmouth bass in the South Fork Zumbro River. Modification of the Silver Lake Dam will increase the length of connected river upstream of Lake Zumbro along the South Fork Zumbro River network by 16 miles (from 19 to 35 miles). Future modification of all low head dams in the City of Rochester will eliminate all major fish barriers and result in a total of over 190 miles of connected habitat in the South Fork Zumbro River watershed.

Outcomes

Programs in southeast forest region:

- Rivers, streams, and surrounding vegetation provide corridors of habitat ~ *The outcome of the proposed habitat corridor will be measured by the removal of the habitat barrier at the Silver Lake Dam and the miles of river habitat reconnected by the Silver Lake fish passage dam modification. The outcome of the proposed habitat corridor will be evaluated by partnering with MN DNR and other local mussel and fish biologists to*

complete pre- and post-construction mussel and fish species richness and abundance surveys to better quantify the benefits of fish passage dam modifications to native mussel assemblages and fish populations.

What other dedicated funds may collaborate with or contribute to this proposal?

- N/A

Per MS 97A.056, Subd. 24, Please explain 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.

The proposed request does not supplant previous funding for the project. Rochester Public Utilities and the City of Rochester have committed a portion of the total budget. The proposed request would provide the remainder of funds needed. No other grant applications have been awarded to or submitted for this project.

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

This project will be maintained through the City Flood Control Program which is funded through user fees and a local sales tax. Public Works Department staff will visually inspect and remove debris from the project on a bi-annual basis. After construction, the City will also fund a 3-year vegetation establishment and maintenance plan and solicit contractors as needed to modify the position of weir stones to maintain passable velocities for fish once the project has experienced a range of flow conditions.

Actions to Maintain Project Outcomes

Year	Source of Funds	Step 1	Step 2	Step 3
2027	City Flood Control Program	Spring/fall visual inspection and debris removal	Native vegetation establishment and maintenance - Year 1	Weir stone adjustments to maintain velocities passable by fish
2028	City Flood Control Program	Spring/fall visual inspection and debris removal	Native vegetation establishment and maintenance - Year 2	-
2029	City Flood Control Program	Spring/fall visual inspection and debris removal	Native vegetation establishment and maintenance - Year 3	-
2030+	City Flood Control Program	Spring/fall visual inspection and debris removal	-	-

Provide an assessment of how your program may celebrate cultural diversity or reach diverse communities in Minnesota, including reaching low- and moderate-income households:

The Silver Lake Dam Modification project is located within Silver Lake Park which spans 134 acres around Silver Lake. The Silver Lake Park 2022 Master Plan community engagement process included a Diversity, Equity, Inclusion and Accessibility Focus Group and an East African Focus Group. These Focus Groups identified a desire for facilities to accommodate prayer in the park, which will promote access to the dam modification project by Muslim and East African community groups.

The Silver Lake Dam Modification project is also centrally located in Rochester and directly adjacent to Minnesota Pollution Control Agency-identified environmental justice census tracts with at least 40% of people reported income less than 185% of the federal poverty level and within 1-mile of environmental justice census tracts with 50% or more people of color. The proximity of the project to the urban core of Rochester provides diverse communities and low- and moderate- income households access to this habitat feature.

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 or on lands to be acquired in this program?

Yes

Where does the activity take place?

- County/Municipal
- Public Waters

Land Use

Will there be planting of any crop on OHF land purchased or restored in this program?

No

Will neonicotinoid pesticide products be used within any activities of this proposal?

No

Other OHF Appropriation Awards

Have you received OHF dollars in the past through LSOHC that are current OPEN appropriations?

No

Timeline

Activity Name	Estimated Completion Date
Activity 1 – pre-construction mussel and fish survey	September 2024
Activity 2 – design, engineering, and permitting complete	June 2025
Activity 3 – construction complete	June 2026
Activity 4 – post-construction mussel and fish survey	September 2026

Budget

Totals

Item	Funding Request	Total Leverage	Leverage Source	Total
Personnel	-	-	-	-
Contracts	\$3,000,000	\$2,000,000	City of Rochester Flood Control Program, Rochester Public Utilities	\$5,000,000
Fee Acquisition w/ PILT	-	-	-	-
Fee Acquisition w/o PILT	-	-	-	-
Easement Acquisition	-	-	-	-
Easement Stewardship	-	-	-	-
Travel	-	-	-	-
Professional Services	-	\$500,000	City of Rochester Flood Control Program	\$500,000
Direct Support Services	-	-	-	-
DNR Land Acquisition Costs	-	-	-	-
Capital Equipment	-	-	-	-
Other Equipment/Tools	-	-	-	-
Supplies/Materials	-	-	-	-
DNR IDP	-	-	-	-
Grand Total	\$3,000,000	\$2,500,000	-	\$5,500,000

Amount of Request: \$3,000,000

Amount of Leverage: \$2,500,000

Leverage as a percent of the Request: 83.33%

DSS + Personnel: -

As a % of the total request: 0.0%

Easement Stewardship: -

As a % of the Easement Acquisition: -

Total Leverage (from above)	Amount Confirmed	% of Total Leverage	Amount Anticipated	% of Total Leverage
\$2,500,000	\$2,500,000	100.0%	-	0.0%

Detail leverage sources and confirmation of funds:

Rochester Public Utilities is committing \$1,200,000 for the proposed project, and the City of Rochester is committing \$1,300,000 for the proposed project from its Flood Control Program which is funded through user fees and a local sales tax.

Does this proposal have the ability to be scalable?

No

Please explain why this project can NOT be scaled:

The length of the dam modification project is set by the maximum slope of the rock arch rapids needed to

maintain velocities and drops passable by fish, and the height of the dam modification project is controlled by the existing Silver Lake water level.

Contracts

What is included in the contracts line?

Construction contract awarded through a public bidding process to remove the existing concrete structure, construct the rock arch rapids for fish passage and rock weir wave pools, construct the cutoff wall control section, and stabilize the river banks and seed with native vegetation.

Federal Funds

Do you anticipate federal funds as a match for this program?

No

Output Tables

Acres by Resource Type (Table 1)

Type	Wetland	Prairie	Forest	Habitat	Total Acres
Restore	0	0	0	5	5
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	5	5

Total Requested Funding by Resource Type (Table 2)

Type	Wetland	Prairie	Forest	Habitat	Total Funding
Restore	-	-	-	\$3,000,000	\$3,000,000
Protect in Fee with State PILT Liability	-	-	-	-	-
Protect in Fee w/o State PILT Liability	-	-	-	-	-
Protect in Easement	-	-	-	-	-
Enhance	-	-	-	-	-
Total	-	-	-	\$3,000,000	\$3,000,000

Acres within each Ecological Section (Table 3)

Type	Metro/Urban	Forest/Prairie	SE Forest	Prairie	N. Forest	Total Acres
Restore	0	0	5	0	0	5
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	5	0	0	5

Total Requested Funding within each Ecological Section (Table 4)

Type	Metro/Urban	Forest/Prairie	SE Forest	Prairie	N. Forest	Total Funding
Restore	-	-	\$3,000,000	-	-	\$3,000,000
Protect in Fee with State PILT Liability	-	-	-	-	-	-
Protect in Fee w/o State PILT Liability	-	-	-	-	-	-
Protect in Easement	-	-	-	-	-	-
Enhance	-	-	-	-	-	-
Total	-	-	\$3,000,000	-	-	\$3,000,000

Average Cost per Acre by Resource Type (Table 5)

Type	Wetland	Prairie	Forest	Habitat
Restore	-	-	-	\$600,000
Protect in Fee with State PILT Liability	-	-	-	-
Protect in Fee w/o State PILT Liability	-	-	-	-
Protect in Easement	-	-	-	-
Enhance	-	-	-	-

Average Cost per Acre by Ecological Section (Table 6)

Type	Metro/Urban	Forest/Prairie	SE Forest	Prairie	N. Forest
Restore	-	-	\$600,000	-	-
Protect in Fee with State PILT Liability	-	-	-	-	-

Protect in Fee w/o State PILT Liability	-	-	-	-	-
Protect in Easement	-	-	-	-	-
Enhance	-	-	-	-	-

Target Lake/Stream/River Feet or Miles

700 feet

Parcels

Sign-up Criteria?

No

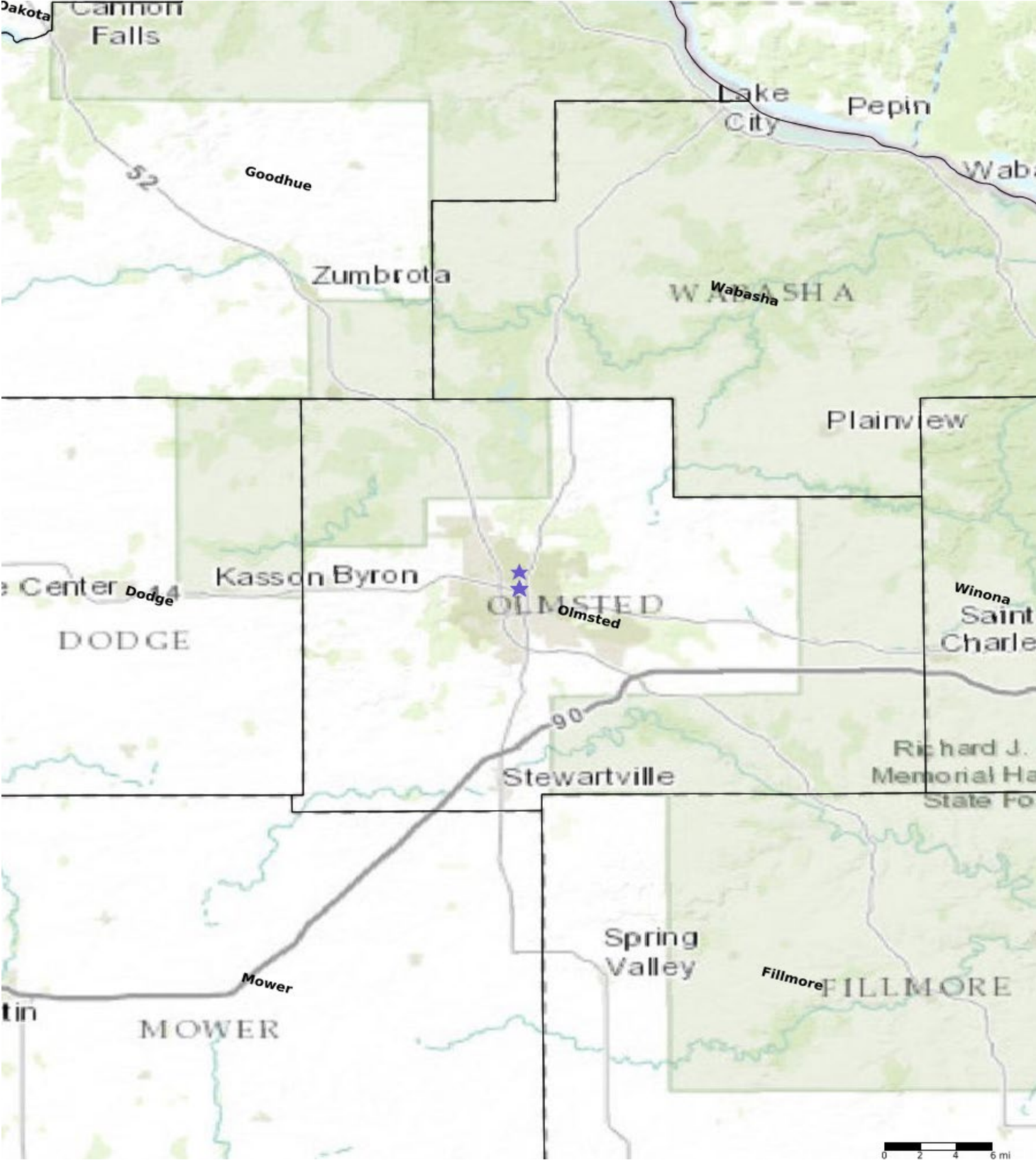
Explain the process used to identify, prioritize, and select the parcels on your list:

The City of Rochester owns the parcels containing the proposed project.

Restore / Enhance Parcels

Name	County	TRDS	Acres	Est Cost	Existing Protection
Parcel ID 743511016143	Olmsted	10714235	9	-	No
Parcel ID 742644016208	Olmsted	10714226	2	-	No
Parcel ID 743511016209	Olmsted	10714235	1	-	No
Parcel ID 743511016196	Olmsted	10714235	1	-	No

Parcel Map



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

Silver Lake Dam Fish Passage Modification

Project Needs:

- Dam acting as barrier to fish
- High costs needed to maintain Silver Lake Dam originally built in 1937
- Protect mussel assemblage downstream of dam
- Reconnect fish habitat in lower and upper South Fork Zumbro River



Benefitted Species:

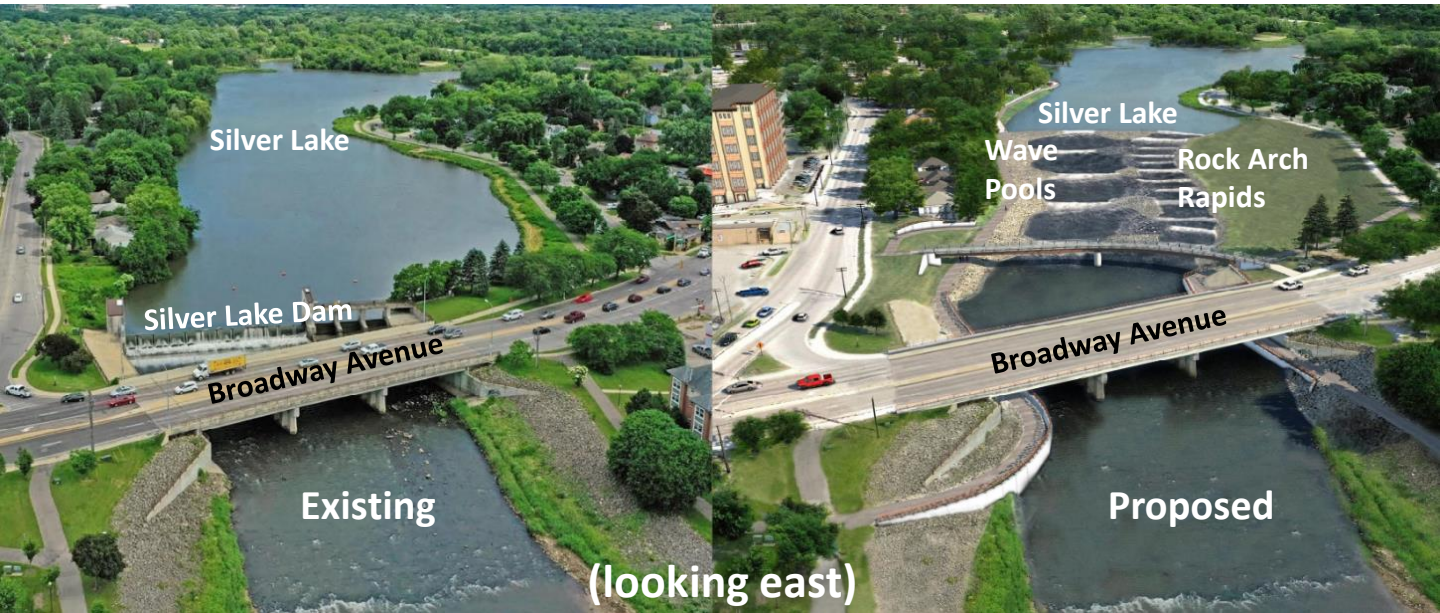
- 2 state-threatened mussels
- 10 native mussels
- Smallmouth bass

Image courtesy of Dr. Brett Ostby

Project Goals:

1. Improve fish and mussel habitat
2. Increase connectivity in the South Fork Zumbro River network

Added Length of Connected River Habitat = **16 miles**



Project Components:

- Remove existing concrete dam structure
- Construct rock arch rapids for fish passage, rock weir wave pools, and cutoff wall control section
- Stabilize banks and seed with native vegetation

\$ 3M = LSOHC-OHF Request
\$1.2M = Rochester Public Utilities Leverage
\$1.3M = City of Rochester Leverage
\$5.5M = Total Project Cost

Project Timeline:

- 2024: Pre-construction mussel/fish survey
- 2024/2025: Design & permitting
- 2025/2026: Construction
- 2026: Post-construction mussel/fish survey

