Lessard-Sams Outdoor Heritage Council
Fiscal Year 2018 / ML 2017 Request for Funding

Date: May 26, 2016

Program or Project Title: Minnesota Trout Unlimited Coldwater Fish Habitat Enhancement and Restoration (HRE01)

Funds Requested: $3,260,000

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County Locations: Carlton, Clearwater, Cook, Fillmore, Goodhue, Lake, St. Louis, Wabasha, and Winona.

Regions in which work will take place:

- Northern Forest
- Southeast Forest

Activity types:

- Enhance

Priority resources addressed by activity:

- Habitat

Abstract:

Minnesota Trout Unlimited will enhance and restore habitat for fish and wildlife in and along priority coldwater streams located on existing Aquatic Management Areas and public lands around the state. Accelerating habitat work to reduce the backlog of degraded streams is urgent given the increasing threats to these scarce coldwater fisheries. Population outcomes will be maximized by improving the connectivity of habitat and fish and wildlife populations, and building upon earlier work on adjacent stream segments. Durable habitat improvements will be completed on more than a dozen streams, creating more productive, self-sustaining fisheries.

Design and scope of work:

Just six percent of Minnesota's streams are capable of supporting any trout, and degraded habitat conditions severely limit the productivity of many, or even most, of them. The riparian corridors of many streams are largely protected from future harm, but this protection cannot reverse past habitat degradation. Minnesota Trout Unlimited ("MNTU") proposes to directly restore or enhance degraded habitat on more than a dozen priority streams with existing protections under the Aquatic Management Area system or public ownership. MNTU, our members, and partners have demonstrated our capacity to complete these projects with FY 2018 funding from the Outdoor Heritage Fund. We propose to partner with the Lessard-Sams Outdoor Heritage Council and the citizens of Minnesota to restore or enhance habitat in and along the following public waters (in these counties):

1. Sucker Brook (Clearwater)
2. Keene Creek (St. Louis)
3. Miller Creek (St. Louis)
4. Stewart River (Lake)
5. Fiddle Creek (Cook)
6. Timber Creek (Cook)
7. West Indian Creek (Wabasha)
8. Wisel Creek (Fillmore)

9. Rush Creek (Winona)
10. Long Creek (Wabasha)
11. South Branch of Whitewater River (Winona)
12. Numerous streams statewide (prioritized maintenance list)

Since these projects are so varied, individual project descriptions are provided in an attachment.

Goals and scope of work.
The goals of each project are to increase the carrying capacity and trout population of the stream, increase angling access and participation, improve water quality and provide other benefits to aquatic and terrestrial wildlife. Each project will accomplish one or more of these objectives: (a) increase adult trout abundance, (b) reduce stream bank erosion and associated sedimentation downstream, (c) reconnect streams to their floodplains to reduce negative impacts from severe flooding, (d) increase natural reproduction of trout and other aquatic organisms, (e) increase habitat for invertebrates and non-game species, (f) improve connectivity of habitat along aquatic and riparian (terrestrial) corridors, (g) improve angler access and participation, and (h) protect productive trout waters from invasive species. The scope of work and methods utilized vary by project and are discussed in the individual project descriptions provided in the attachment.

How priorities were set.
MNTU focuses on those watersheds likely to continue to support viable, fishable populations of naturally reproducing trout and steelhead fifty years and more from now. Work is done only where degraded habitat is a limiting factor for a quality, sustainable fishery. Priority locations are determined using MNTU members' extensive knowledge of the watersheds, MNDNR management plans and surveys, other habitat and conservation planning efforts, consultations with MNDNR professionals, and science based criteria. All things being equal, we consider the potential to draw new anglers outdoors, increase public awareness, engage landowners in conservation, foster partnerships, and increase public support for OHF projects.

Stakeholder support.
We continue to receive strong support for these projects from landowners, rural communities, and local civic and sporting organizations. We will continue gathering local input and developing partnerships in the planning and implementation stages. Landowners typically become very enthusiastic partners, working alongside TU volunteers, and donating materials.

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:

- Driftless Area Restoration Effort
- Strategic Plan for Coldwater Resources Management in Southeastern Minnesota

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

The plans call for increasing the protection, improvement, and restoration of coldwater aquatic habitats and fish communities, by increasing the amount of stream habitat improved and maintained. MNTU's proposed projects will directly restore or enhance approximately 17 miles of trout streams and benefit a far larger number of miles of trout water.

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

Southeast Forest:

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

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:

We will directly restore or enhance habitat for fish, game, and nongame wildlife on key segments of coldwater streams and rivers

around the state. The projects will restore or enhance habitat in and along 17 miles of streams and rivers, and connect much larger corridors of habitat, while also extending myriad benefits (including water quality improvements, reduced sedimentation, etc.) far downstream of each project site.

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:

In selecting project sites, MNTU reviews MNDNR watershed specific fisheries management plans and other conservation planning efforts, consults with MNDNR professionals, and applies ranking criteria developed by the MNDNR. Projects must have the potential to increase the carrying capacity (fish numbers), the streams have natural reproduction, and the public have access to them. Improving the connectivity of good aquatic and riparian habitat is an important consideration and the projects selected address this. We are increasingly targeting stream segments which build off earlier habitat or protection work in the same stream or watershed.

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:

The projects will restore or enhance degraded habitat for fish and wildlife in and along coldwater streams and rivers which historically supported naturally reproducing trout or steelhead populations enjoyed by generations of anglers. While trout are the apex predator and key indicator species in coldwater systems, a host of rare aquatic species are uniquely associated with these systems. Well-functioning coldwater aquatic ecosystem are far less “common” than the 6% of Minnesota’s total stream and river miles which theoretically can still support trout. They are very rare in the western half of the state. Even many streams considered to be the best remaining trout streams have badly degraded segments which disrupt connectivity and have significant impacts on the productivity and long term resilience (and self-sustainability) of the overall trout population. Our trout streams face growing threats from warming temperatures, increased frequency of severe flooding, and rising demand for groundwater pumping from the aquifers which sustain cold stream flows. The proposed projects are focused on streams and stream segments which will benefit from improved connectivity and help ensure Minnesota retains at least some high quality coldwater fisheries into the future.

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

The various trout species (brook, brown and rainbow) are the key indicator species for our habitat projects. Our activities restore and/or enhance habitat that typically support a biomass of 100 to 130 pounds per acre of brook or brown trout in southeast Minnesota trout streams, and 40 pounds per acre of trout in northern Minnesota trout streams. These averages are generated from available data and published sources, and do not capture the variability inherent in populations of fish. Natural populations, including healthy populations with good habitat, vary among locations, and also rise and fall within lakes and rivers based upon weather, climatic conditions, etc. Most fish surveys conducted by DNR produce an index of abundance (catch per unit effort) rather than a population estimate.

Outcomes:

Programs in the northern forest region:

- Improved aquatic habitat indicators *Measured through surveys of fish, macro invertebrates and/or exposed substrates. Abundance, size structure and species diversity are considered.*

Programs in southeast forest region:

- Rivers, streams, and surrounding vegetation provide corridors of habitat *Enhancement of in-stream and riparian corridor habitat creates miles of connected habitat. Outcomes in aquatic life are measured through surveys of fish, macro invertebrates and/or exposed substrates. Abundance, size structure and species diversity are considered.*

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

MNTU’s coldwater aquatic habitat restoration and enhancement projects are designed for long-term ecological and hydraulic stability. Once in-stream work is completed and riparian vegetation well established, no significant maintenance is usually required in order to sustain the habitat outcomes for several decades. Reconnected floodplains allow floodwater to quickly spread out and dissipate energy, reducing the destructive impact of a flood. Flood waters typically flatten streamside vegetation temporarily and do not damage the in-stream structures. The tenfold increase in trout populations and threefold increase in large trout which are common following completion of a southeast Minnesota project, are gains which are sustainable long-term through natural reproduction.

We anticipate that long-term monitoring of the integrity of the improvements will be done in conjunction with routine inspections and biological monitoring conducted by local MNDNR staff, MNTU members, or landowners as appropriate. This monitoring will not require separate OHF or other constitutional funding. In the event that there are other maintenance costs, potential sources of funding and volunteer labor include MNTU, MNDNR AMA maintenance funding, and other grant funds and organizations. MNTU volunteers will help

provide long-term monitoring and periodic labor.

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

Year	Source of Funds	Step 1	Step 2	Step 3
Year after grant ends	volunteer or part of regular agency visit	Inspect structural elements and vegetation	Alert DNR and devise actions needed	Conduct maintenance with volunteers or contractors if DNR does not
Every 3 years thereafter	volunteer or agnecy staff	Inspect structural elements and vegetation	Develop action plan if needed	Perform/assist with maintenance if DNR does not

What is the degree of timing/opportunistic urgency and why it is necessary to spend public money for this work as soon as possible:

While Minnesota's trout streams are among the highest quality aquatic systems remaining in the state, and prized by anglers and the general public because of this, a majority have badly degraded habitat. The impacts of leaving degraded segments untreated extend throughout the stream or complex of streams. These degraded sections are no longer providing habitat, clean water benefits, angling opportunities, or other enticements which increase outdoor recreation and encourage public appreciation and stewardship of aquatic ecosystems. In several cases critical spawning and nursery habitat has been destroyed or blocked by flooding or other abuses, leaving these streams vulnerable to complete population loss. Even where riparian corridors are protected from future harm, this protection alone cannot reverse existing degraded conditions without intervention. The state must continue restoring or enhancing degraded habitat to safeguard and improve the productivity and long-term sustainability of these rare wild fisheries for future generations to enjoy.

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

We anticipate that a number of the individual projects will leverage substantial other funding, including especially federal NRCS funding on the southeast Minnesota projects. Our partner on the Miller Creek project in Duluth believes it will secure approximately $400,000 in federal funding for this project. It is also likely that we will leverage USFWS grants on several projects. We will also leverage not only volunteer labor from TU members and others, but several partners (MNDNR, SWCD offices, etc.) will contribute significant amounts of time and/or dollars assisting on the projects.

Relationship to other funds:

- Not Listed

Describe the relationship of the funds:

Not Listed

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

Appropriation Year	Source	Amount
n/a	n/a - each project proposed is a new stand alone project	0

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 activity on permanently protected land per 97A.056, subd 13(f), tribal lands, and/or public waters per MS 103G.005, Subd. 15 - **Yes (WMA, AMA, 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 projct planning, design and permitting work following the July 2017 appropriation availability	Begin July 2017
Begin habitat enhancements during 2018 fieldwork season	2018 field work season
Habitat enhancement, including establishment of riparian vegetation	June 2022

Budget Spreadsheet

Total Amount of Request: $3,260,000

Budget and Cash Leverage

Budget Name	LSOHC Request	Anticipated Leverage	Leverage Source	Total
Personnel	$120,000	$0		$120,000
Contracts	$1,586,000	$300,000	SWCD, NRCS, USFWS	$1,886,000
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	$10,000	$0		$10,000
Professional Services	$525,000	$50,000	DNR	$575,000
Direct Support Services	$24,000	$24,000	TU	$48,000
DNR Land Acquisition Costs	$0	$0		$0
Capital Equipment	$0	$0		$0
Other Equipment/Tools	$20,000	$0		$20,000
Supplies/Materials	$975,000	$300,000	SWCD, NRCS, USFWS	$1,275,000
DNR IDP	$0	$0		$0
Total	$3,260,000	$674,000	-	$3,934,000

Personnel

Position	FTE	Over # of years	LSOHC Request	Anticipated Leverage	Leverage Source	Total
Program manager	0.40	3.00	$70,000	$0		$70,000
Watershed coordinator	0.10	3.00	$10,000	$0		$10,000
Program assistant	0.25	3.00	$30,000	$0		$30,000
Field work interns	0.20	3.00	$10,000	$0		$10,000
Total	0.95	12.00	$120,000	$0	-	$120,000

Amount of Request:	$3,260,000
Amount of Leverage:	$674,000
Leverage as a percent of the Request:	20.67%
DSS + Personnel:	$144,000
As a % of the total request:	4.42%
Easement Stewardship:	$0
As a % of the Easement Acquisition:	-%

How did you determine which portions of the Direct Support Services of your shared support services is direct to this program:

It is based only upon personnel costs.

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

Yes, 100%

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; all is for traditional travel costs.

Describe and explain leverage source and confirmation of funds:

The leverage estimates are estimates only. We anticipate at least $400,000 in federal funds to be secured by our SWCD partner. We anticipate that NRCS funding on several projects totaling $150,000 to $200,000 or more. We anticipate USFWS funding on several projects totaling approximately $50,000.

Does this proposal have the ability to be scalable? - Yes

Tell us how this project would be scaled and how administrative costs are affected, describe the "economy of scale" and how outputs would change with reduced funding, if applicable:

Each of the 12 projects is a stand alone project. Most work is contracted, so administrative costs would not be affected much. Personnel costs are billed hourly and any unused amount budgeted for personnel will be redirected to additional habitat work on the ground as projects are completed.

Output Tables

Table 1a. Acres by Resource Type

Type	Wetlands	Prairies	Forest	Habitats	Total
Restore	0	0	0	0	0
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	201	201
Total	0	0	0	201	201

Table 2. Total Requested Funding by Resource Type

Type	Wetlands	Prairies	Forest	Habitats	Total
Restore	$0	$0	$0	$0	$0
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	$3,260,000	$3,260,000
Total	$0	$0	$0	$3,260,000	$3,260,000

Table 3. Acres within each Ecological Section

Type	Metro/Urban	Forest/Prairie	SE Forest	Prairie	Northern Forest	Total
Restore	0	0	0	0	0	0
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	107	0	94	201
Total	0	0	107	0	94	201

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	$0	$0
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	$1,936,000	$0	$1,324,000	$3,260,000
Total	$0	$0	$1,936,000	$0	$1,324,000	$3,260,000

Table 5. Average Cost per Acre by Resource Type

Type	Wetlands	Prairies	Forest	Habitats
Restore	$0	$0	$0	$0
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	$16,219

Table 6. Average Cost per Acre by Ecological Section

Type	Metro/Urban	Forest/Prairie	SE Forest	Prairie	Northern Forest
Restore	$0	$0	$0	$0	$0
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	$18,093	$0	$14,085

Target Lake/Stream/River Feet or Miles

17

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:

Project sites are selected from among a list of high priority candidate stream segments suggested to us by DNR Fisheries Area managers, based upon there familiarity with the coldwater resources in their local area. MNTU filters the list to focuses only in those watersheds likely to continue to support viable, fishable populations of naturally reproducing trout or steelhead fifty years and more from now. Work is done only where degraded habitat is a limiting factor for a quality, sustainable fishery. Priority locations are determined using MNTU members' extensive knowledge of the watersheds, MNDNR management plans and surveys, other habitat and conservation planning efforts, consultations with MNDNR professionals, and science based criteria. All things being equal, we consider the potential to draw new anglers outdoors, increase public awareness, engage landowners in conservation, foster partnerships, and increase public support for OHF projects.

Section 1 - Restore / Enhance Parcel List

Carlton

Name	TRDS	Acres	Est Cost	Existing Protection?
Numerous streams - northern	04616204	36	$0	Yes

Clearwater

Name	TRDS	Acres	Est Cost	Existing Protection?
Sucker Brook	14436233	3	$0	Yes

Cook

Name	TRDS	Acres	Est Cost	Existing Protection?
Fiddle Creek	06301210	12	$0	Yes
Timber Creek	06301136	12	$0	Yes

Fillmore

Name	TRDS	Acres	Est Cost	Existing Protection?
Wisel Creek	10208232	16	$0	Yes

Goodhue

Name	TRDS	Acres	Est Cost	Existing Protection?
Numerous streams - southern	11316234	48	$0	Yes

Lake

Name	TRDS	Acres	Est Cost	Existing Protection?
Stewart River	05411234	5	$0	Yes

St. Louis

Name	TRDS	Acres	Est Cost	Existing Protection?
Keene Creek	05015236	5	$0	Yes
Miller Creek	05014218	9	$0	Yes

Wabasha

Name	TRDS	Acres	Est Cost	Existing Protection?
Long Creek	10912222	18	$0	Yes
West Indian Creek	10911216	12	$0	Yes

Winona

Name	TRDS	Acres	Est Cost	Existing Protection?
Rush Creek	10508229	7	$0	Yes
S. Branch Whitewater River	10710214	18	$0	Yes

Section 2 - Protect Parcel List

No parcels with an activity type protect.

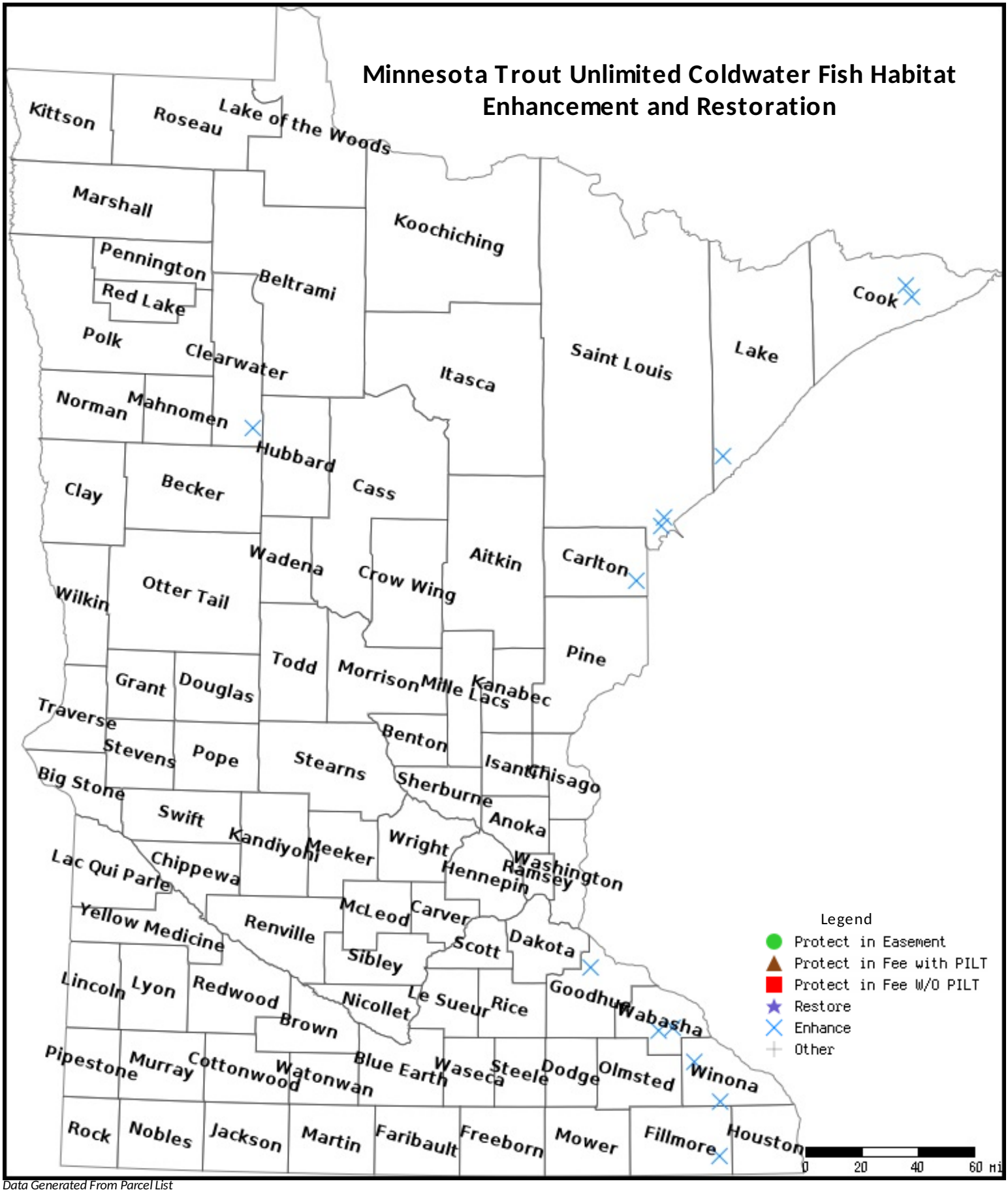
Section 2a - Protect Parcel with Bldgs

No parcels with an activity type protect and has buildings.

Section 3 - Other Parcel Activity

No parcels with an other activity type.

Parcel Map

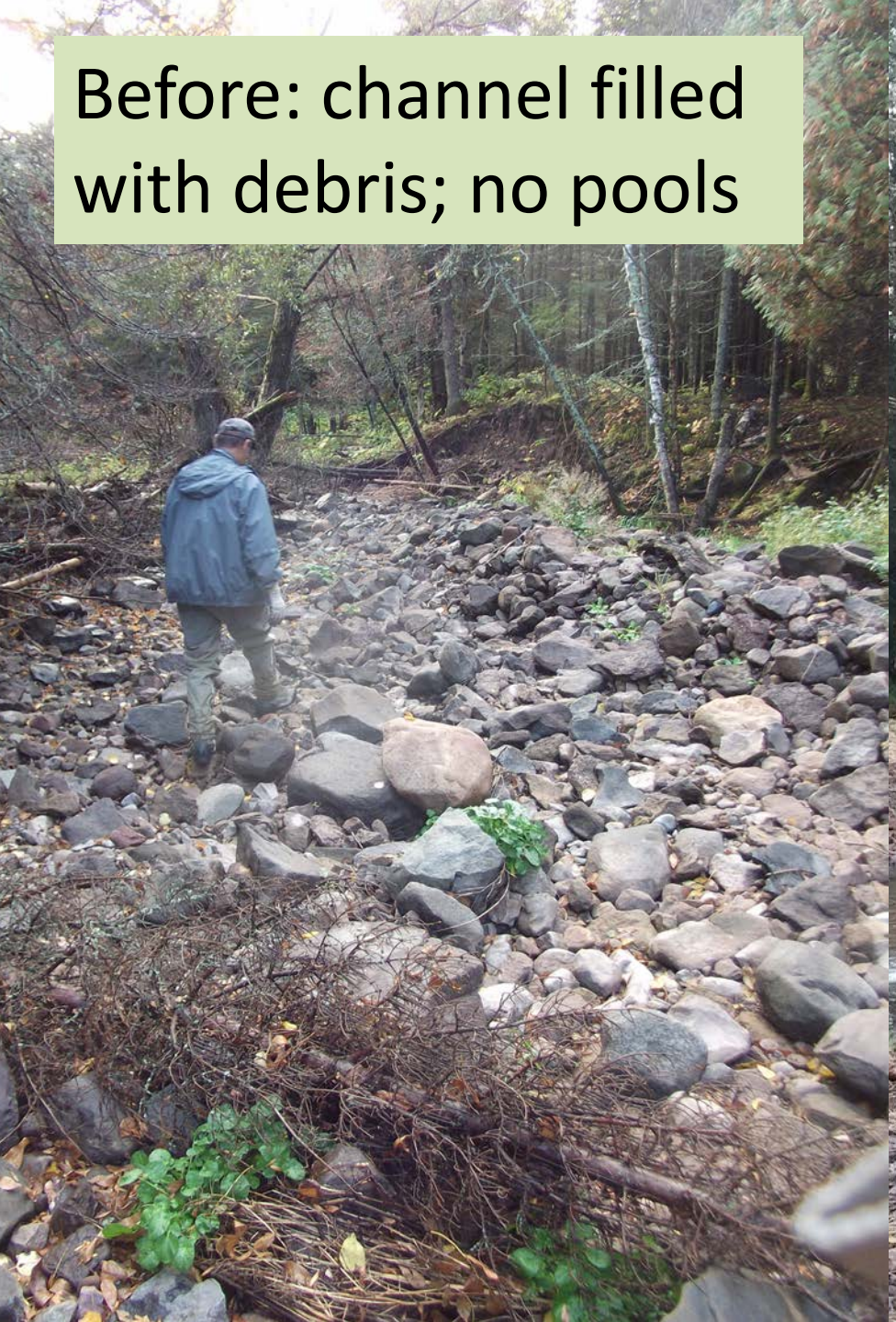


Data Generated From Parcel List

Southeast MN Before & After

Before: channel filled with debris; no pools

After: restored channel with deep pools



MINNESOTA TROUT UNLIMITED

Individual Project Descriptions - Minnesota Trout Unlimited - Fiscal Year 2018

This attachment briefly summarizes the priority habitat enhancement projects which Minnesota Trout Unlimited proposes to complete using FY 2018 funding from the Outdoor Heritage Fund. Additional priority habitats projects may be completed depending upon funds leveraged and construction efficiencies realized. All projects will enhance and/or restore degraded habitat on existing public property, on land permanently protected by a conservation and management easement under the aquatic management area system, or in public waters. No acquisitions are involved.

Methods. Methods used vary by region and project site. MNTU consults with professional in the MNDNR and uses the best available stream restoration and coldwater aquatic science to select specific habitat improvement methods for each stream that reflect the distinct characteristics of the watershed and ecological region, address the specific limiting factors (e.g. spawning substrate, adult cover, invertebrate production, etc.), and account for the land use practices. Habitat enhancement methods typically include: (1) sloping stream banks back to both remove streamside sediments that have previously been transported from uplands areas and better reconnect the stream to its floodplain, (2) removing shallow rooted woody vegetation (invasive box elder, buckthorn, etc.) to enable removal of accumulated sediments, reduce competition with desirable plant and grass species, and allow beneficial energy inputs (sunlight) to reach the streams, (3) stabilizing eroding stream banks, (4) installing overhead bank and other in-stream cover for trout, (5) utilizing soil erosion prevention measures, (6) seeding exposed banks and taking steps to firmly establish vegetation (including using native prairie grasses where appropriate and feasible), (7) improving angling accessibility, (8) fencing riparian corridors where appropriate to facilitate managed grazing and prevent damage from over-grazing, (9) restoring large cover logs to the channels of Northern forested streams to increase deep pool habitat, and (10) planting long lived trees along Northern forested streams to shade and cool the water, and provide a source of future cover logs.

These actions directly enhance physical habitat, and typically increase overall trout abundance (biomass), the number of larger trout, and levels of successful natural reproduction. Additional benefits include reduced erosion and sedimentation, cooler water temperatures, improved water quality, and increased connectivity of aquatic and riparian habitat corridors.

Northern Forest Section

1. Sucker Brook (Clearwater)

Sucker Brook is a native brook trout stream which joins the Mississippi River just two miles downstream of the Headwaters of the Mississippi in Itasca State Park. The stream is very accessible to the half million park visitors and the project will ensure quality brook trout habitat and fishing adjacent to this iconic park. Virtually the entire stream and its cold springs are protected by permanent easements and public land,

including a portion in a Scientific & Natural Area. However, its current protected status alone will not undo the historic damage to the stream channel, nor repair its degraded habitat. This project will enhance and/or restore the degraded habitat and help the stream and its trout population reach their potential.

Native brook trout require clean gravel and cobble for spawning, rearing and food production. Portions of Sucker Brook have become overly wide and thus unable to naturally transport the excess sand entering the stream in a few places. Natural reproduction and overall productivity (including trout abundance) have suffered. We will work closely with the DNR to design and implement a project which will narrow the channel, return woody habitat and maintain exposed gravel vital for food production and spawning success. Native trout fisheries are scarce resource in this part of state, and restoring productivity to one on the doorstep of Minnesota's first state park is very fitting.

2. Keene Creek (St. Louis)

Keene Creek is one of Duluth's top brook trout fisheries, despite decades of impacts to this "urban" trout stream. Duluth area streams were hammered by unprecedented flooding in June 2012, decimating brook trout habitat and leaving most streams with very unstable channels. Keene Creek did not escape damage. This project will restore a second segment of the stream channel, increase the amount of deep pool habitat and trout cover, connect good habitat and bolster the size and long term sustainability of this native brook trout fishery.

Keene Creek begins in Hermantown and flows south through a forested park and enters Duluth above Skyline Drive. It then tumbles down the hillside in a series of pools and runs before it enters the St Louis River near Grassy Point. This surprisingly productive stream is a short bicycle ride from thousands of homes and is popular with children and adults alike. It is arguably the most productive, fishable trout stream on the western half of Duluth and supports itself through good natural reproduction. By building upon the restoration in the adjacent reach (being done with Fy2017 funding), this project will substantially increase the resilience and productivity of the fishery in both segments, and make it especially attractive for use by youth and families. The MNDNR Duluth Area Fisheries Office identified this creek as a top priority for habitat improvement.

Early logging removed large cover logs and boulders from the stream channel, and several logging cycles have maintained a young forest ecosystem which is incapable of naturally replacing this missing habitat anytime soon. Prior to the historically severe 2012 flooding, the relative absence of deep pool habitat stood out as a factor limiting the productivity and long term sustainability of this fishery. The 2012 floods destabilized and tore apart the stream channel in many places, and did nothing to increase the quantity of deep pool habitat and stable woody cover.

In addition to stabilizing the channel, the project will directly increase the amount of deep pool habitat and overhead cover using large logs and boulders, using approaches similar to those employed on MNTU's Sucker River project. The project will use significant volunteer labor provided by the Gitche Gumee Chapter of TU (Duluth), MNTU, local angling and conservation groups, and Duluth area residents.

This wooded park is frequented by children on bicycles eager to catch the colorful wild brook trout found here. The restored habitat will create better spawning habitat and adult cover and create a more productive, resilient fishery for thousands to easily access and get hooked on fishing.

3. Miller Creek (St. Louis)

Miller Creek is a native brook trout stream which runs through Hermantown and Duluth, Minnesota. This storied brook trout fishery is where countless young anglers cut their teeth on trout angling, including several well-known outdoor writers. In recent decades has been impacted by development and the community has focused much effort at lowering water temperatures to improve trout survival and reproduction. Monitoring has verified that water temperatures in the project reach, located in the upper portion of the watershed, are suitable for sustaining naturally reproducing brook trout. However, this section of the river was straightened in the past and the resulting lack of habitat is limiting trout abundance. This project will restore habitat and nearly double the stream length by restoring a natural meandering pattern along 4,000 feet of stream.

We will use natural channel design methodology to restore this channelized reach to a hydrologically stable channel that provides good trout habitat and is re-connected to its floodplain. Restoring the connection to the floodplain will also reduce erosion by slowing down stream velocities during high flows and increasing critical cool water baseflow. The riparian area will be planted with native trees and shrubs, hopefully with significant volunteer involvement by the community.

This highly visible project is a short hike or bike ride for thousands of kids and families.

This project will be done in partnership with the St. Louis County SWCD, and should leverage approximately $400,000 to $700,000 dollars in non-OHF funding. Partners are likely to include the cities of Hermantown and Duluth, the MN Pollution Control Agency, the MNDNR, the MN Dept. of Transportation, St. Louis County, and other entities that have taken steps to restore this urban trout fishery over the past several decades.

4. Stewart River (Lake)

This project builds upon a watershed scale restoration effort and recent OHF funded habitat work. The Stewart River, located outside Two Harbors, MN, is known for its

productive and popular wild steelhead fishery, as well as its brook trout fishing. MNTU has been spearheading a collaborate planning process with the MNDNR, other conservation and sporting groups, and other agencies to identify the top tier of North Shore watersheds on which to focus future protection, restoration and enhancement actions. Consensus was reached on the top tier watersheds in the Lake Superior basin, and the Stewart River watershed ranks at the head of this select group. This project will restore another high priority segment identified by a thorough watershed assessment.

This FY 2018 project will build upon enhancement and restoration work by MNTU and several partners which was recently completed or is underway. MNTU's FY 2013 appropriation from the OHF funded two projects on the Stewart River improving habitat for juvenile steelhead and other salmonids and restoring riparian canopy to lower water temperatures. MNTU leveraged this OHF funding to secure federal Great Lakes Restoration funding. A portion of the federal funding is being used to for a watershed coordinator from the community who is engaging landowners and area residents in a comprehensive, watershed scale effort to improve water quality, hydrology and aquatic habitat. FY 2016 and 2017 funding is being used for a collaborative project with the Lake County Land Department restoring degraded forest habitat, and two stream projects done in partnership with the MNDNR and Lake County SWCD. The FY 2018 project proposed will keep momentum going in the watershed by restoring another high priority section of river.

The project site was torn apart by the historically severe flood of June 2012. The channel is now very unstable and stability must be restored along with in-stream cover habitat. The project is essential in order to restore a stable, properly functioning stream channel, with restored fish habitat, and reduced erosion and sedimentation. This reach of river now contains eroding banks, down cut channel and debris piles, and an overly wide channel in places. Pool habitat has been destroyed. The channel will be restored to a stable dimension, pattern, and profile, and pools will be created. Eroding banks will be stabilized using toe wood and woody cover, and further erosion and sediment inputs from the site reduced. A properly functioning, stable channel with depth and woody cover will provide habitat for steelhead, trout and other aquatic organisms, increase water quality and withstand high flows.

5. Fiddle Creek (Cook)

Fiddle Creek is a small, but very accessible, wild brook trout stream which flows into upper reaches of the Brule River west of the Gunflint Trail. A number of campsites are located nearby, and the gravel road which parallels the stream is well maintained, since it provides access to several entry points into the BWCAW. In-stream habitat will be enhanced here using manual labor.

Historic logging impacted nearly every trout stream in Cook County, typically including the removal of in-stream cover and widening of stream channels. Over the past 50 years degraded habitat was enhanced in numerous of these streams Cook County streams via habitat improvement projects designed to benefit wild brook trout populations. Many of these habitat improvements were very effective and these streams became popular fishing destinations for local and "down state" anglers alike. However, little maintenance has been done in the past 20 years and many in-stream habitat structures are in poor condition and no longer functioning well. Better understandings of how in-stream structures function in this geologic setting have led to modified designs and methods over the past two or more decades, and old work sites can in many cases be enhanced or modified to provide much greater resource benefits.

The MNDNR recently completed a comprehensive evaluation and catalogue of needed maintenance work on Cook County trout streams and rivers. MNTU is working in partnership with the DNR's Grand Marais Area Fisheries Office to begin enhancement and maintenance work on projects identified as high priorities in that catalogue. We are targeting two of these priority stream segments – on Fiddle Creek and Timber Creek – for enhancement with Fy2018 funding.

Since access with heavy equipment is difficult in this rocky terrain along Fiddle Creek, in-stream habitat for adult brook trout will be enhanced using manual labor. The MNDNR will contribute significant amounts of effort in design, permitting and supervision of the construction crew. Conservation Corps Minnesota, MNTU volunteers, and/or interns will provide needed labor. The majority of OHF funding is for labor, and a smaller amount for materials, tools and supplies.

6. Timber Creek (Cook)

Timber Creek is another wild brook trout located just north of Grand Marais, Minnesota. Timber Creek crosses the paved Gunflint Trial three times before flowing into a larger trout river, Brule River, just upstream of Northern Light Lake. The colder flows of this smaller stream make it an important summer refuge and spawning area for brook trout from the larger river. The project will enhance in-stream cover habitat for adult brook trout and connect vital habitat utilized by the larger trout population, not just those individuals which will reside year round in the improved reach. By improving connectivity, the long term productivity and sustainability of the larger trout population will be bolstered.

In addition to suffering the typical impacts of the historic logging, including the removal of in-stream cover, this stream has also been impacted by road and culvert construction. Past habitat enhancements have helped offset many of these impacts,

but many in-stream habitat structures are in poor condition and no longer functioning properly.

Working closely with DNR Fisheries personnel, MNTU and other volunteers will use hand labor to revitalize and replace failing wood and rock habitat structures, with conservation corps members and/or interns providing back up labor if needed. Using improved understanding of how such structures function in the geologic and geomorphologic setting at this site, new structures may be placed so as to provide the deep water cover that larger adult brook trout need. Rock may be used direct both high and low stream flows appropriately. We will also assess whether additional measures are needed to counter impacts from road and culvert construction. We anticipate engaging many local residents and volunteers from sporting, conservation, and outdoor education groups in summer fieldwork. MNDNR will contribute significant amounts of effort in design, permitting and construction supervision.

Southeast Forest Section (Driftless area)

The five projects in southeast Minnesota described below share a legacy of degraded habitat due to agricultural practices of the past century. The following example is typical of how and why MNTU improves habitat along trout streams in this ecological region:

Decades of erosion have led to wider, shallower and warmer streams, and left a legacy of excessive streamside sediments which continually re-erode and cover in-stream habitat, food production areas and spawning habitat. In many cases shallow rooted invasive trees have taken over the riparian corridors, out competing native vegetation which better secures soils, and reducing energy inputs to the stream. Projects remove invasive trees and grade steep, eroding banks with machinery to remove sediments. Importantly, this reconnects the stream to its floodplain.

Eroding banks are sloped back to a more gradual 3 to 1 slope and the toe anchored to curb erosion. Banks are then seeded with deep rooted grasses to secure soils within the entire corridor and keep them from eroding in high water. The sloped banks allow floodwaters to quickly spread out into the floodplain and slow down, reducing the destructive impact of a flood. Since the projects are designed for long-term ecological and hydraulic stability, flood waters typically just flatten grasses temporarily and do not damage the in-stream structures and undercut banks.

Overhead cover habitat is created both by increasing the stream's depth through via narrowing the channel or installing rock weir plunge pools, and by placing cover structures in select stream banks. These trees and wooden structures help recreate the undercut banks which had existed before settlement and land use practices altered the more stable flows which had gradually created and maintained them. The streams flow faster, deeper and cooler, and provide vital overhead cover.

The MNDNR is a key partner in work on all projects. Other partners typically include farmer-landowners, the NRCS and local Soil and Water Conservation Districts.

7. West Indian Creek (Wabasha)

West Indian Creek is increasingly drawing anglers in large part due to the rave reviews of the previously completed OHF funded project which MNTU completed downstream from the Fy2018 project site. Not only will the many of the benefits of this new project (improved water quality, reduced sedimentation, improved natural reproduction, increased macroinvertebrates, etc.) flow down to the completed project, but it will provide a third mile of quality habitat and fishing to spread out the fishing pressure.

This Fy2018 project site is the second half of a two mile long stream reach. The upper mile will be enhanced or restored with Fy2017 funding. The upstream end of the project site has several pools with little depth, some high eroding banks, and long overly wide, shallow reaches with low gradient which are filling with silt. Habitat conditions worsen moving downstream and the lower portion shows very significant declines in habitat quality and bank stability. Streambanks at the lower end are up to 20' high and unstable, and are a major cause of soil loss and sedimentation extended for miles downstream. Invasive, shallow rooted box elders are found throughout the reach. There are too few deep pools and too many overly wide reaches of shallow water. The deposition of eroded sediment here has caused the widening channel to become braided, which causes warming water temperatures. Prior to recent degradation the reach held wild brook trout, as well as the current wild brown trout population.

There are some old habitat improvement structures on this easement which have held up well, despite the degradation of surrounding habitat. The project will incorporate and improve the function of these existing features, while narrowing the channel in places, removing braids, repairing and sloping eroding banks, and completing removal of invasive trees to allow deeper rooted grasses to become established. The project will help create a robust trout fishery sustained by natural reproduction.

8. Wisel Creek (Fillmore)

Wisel Creek is an important fishery which enters into a high quality section of the Root River near Choice, MN. MNTU recently completed work on a tributary of Wisel Creek and both the MNDNR and TU have improved habitat on portions of Wisel Creek in the past. Reduced Fy2017 funding meant that only the design work has been funded. We are now seeking construction funding for this 7,000' long project. Habitat improvements on this large reach of river will build upon the benefits of the earlier work and make the overall trout population in the watershed more resilient.

The habitat enhancement methods described in the agricultural area example above will be used. Trout habitat, trout populations, and trout angling will increase. Water quality benefits due to the reconnected floodplain and stabilized streambanks will be substantial. The Hiawatha Chapter of TU will contribute substantial labor on the project and coordinate work with the landowner and MNDNR Lanesboro Area Fisheries Office.

9. Rush Creek (Winona)

This project builds upon concerted efforts to protect and improve water quality and coldwater fisheries in the Rush Creek - Pine Creek subwatershed of the Root River. MNTU has restored three miles of contiguous habitat on Pine Creek, the major tributary to Rush Creek. The MNDNR is wrapping up work on the 2 to 3 mile long section of Rush Creek located immediately upstream of this FY2018 project site. The site is immediately downstream of the bridge which provides the best access in this entire valley.

The Rush Creek and Pine Creek subwatershed extends from the Interstate 90 corridor south to the Root River at Rushford. The combined Rush-Pine subwatershed contains more than 58 miles of designated trout water over 35 miles of perpetual easements. Pine Creek and its two tributaries, Hemingway and Coolridge, are considered some of the finest trout waters in the state, and harbor native brook trout genetics in a large, robust population. The watersheds receive special Farm bill funding through the Mississippi River Basin Healthy Watersheds Initiative (MRBI), which has enabled the NRCS and numerous partners to focus efforts here, helping landowners implement conservation practices that avoid, control, and trap nutrient runoff; improve wildlife habitat; and maintain agricultural productivity. By funding this project the Council can realize its vision of combining in-stream enhancement work with streamside/riparian work to the top of the watershed in order to slow runoff and keep aquatic habitat clean and productive, with prolific fish, game and wildlife populations.

The project site is severely degraded segment of stream containing highly eroding stream banks. Habitat will be enhanced using methods described above. The Hiawatha and Win-Cres Chapters of TU will contribute substantial labor on the project and coordinate work with the landowner and MNDNR Lanesboro Area Fisheries Office.

10. Long Creek (Wabasha)

Long Creek is a tributary to the Zumbro River located east of Zumbro Falls, MN. Most of this 7,800 foot long corridor is choked by shallow rooted, invasive trees which are severely limiting macroinvertebrate production and trout abundance. In-stream conditions and riparian wildlife will benefit from removal of this detrimental canopy and a return of riparian grasses and beneficial sunlight. This enhancement project may be all the habitat work needed here, or could be the springboard for additional in-stream work on this stream.

11. South Branch of Whitewater River (Winona)

The project reach was destabilized and habitat badly damage as the result of August 2007 floods. In 2015 its trout population was nearly wiped out by a major fish kill. We will enhance habitat on 8,000 feet of this popular section. By providing good habitat and increased carrying capacity, the project will accelerate the recovery of the wild trout population. This is a highly visible, well used section of river. This is an opportunity both to do good habitat work and to demonstrate to anglers that their tax dollars are helping where they desperately want to see it used. This stream segment has been heavily silted and cluttered with downed trees and other woody debris. The proposed work will remove undesirable trees and brush, re-slope the banks, re-contour and stabilize the stream channel, and improve its connection to its natural flood plain. The work will improve trout holding and hiding cover in the project area.

Statewide

12. Numerous streams statewide (prioritized maintenance list)

Many trout stream corridors are being choked by shallow rooted, invasive trees which are severely limiting macroinvertebrate (food) production and trout abundance in the streams. In-stream conditions and riparian wildlife will often benefit from removal of this detrimental canopy and allow a return to more deeply rooted riparian grasses and beneficial sunlight, which triggers the food production cycle. Many streams with good groundwater input need only this vegetation management to improve habitat and allow the streams to naturally narrow and deepen.

A prioritized list of stream corridors needing vegetative treatment is being prepared by the DNR with input from Minnesota Trout Unlimited. Sites will be selected which do not need other, more extensive measures such as major bank sloping. Treatment methods will vary based upon site conditions and may include logging, brushing, controlled burns, and herbicide applications. Efforts to restore healthier riparian forests in northern parts of the state are often hampered by unnaturally high beaver densities tied to second or third growth forest conditions. To prevent inundation of planted areas, as well as to prevent excessive warming of the water, some targeted beaver management may also be undertaken.

Notes: The terms "restore" and "enhance" are used interchangeably throughout the grant proposal and the individual project descriptions since the dividing line is not clear and definitions (or interpretations) not well settled. All projects proposed her will enhance habitat, and several will also restore it. These are construction projects and estimates of the relative mix of contract versus materials are estimates only.