

Lessard-Sams Outdoor Heritage Council

Fiscal Year 2017 / ML 2016 Request for Funding



Date: June 15, 2015

Program or Project Title: Minnesota Trout Unlimited Coldwater Fish Habitat Enhancement, Phase 8

Funds Requested: \$3,000,000

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County Locations: Beltrami, Benton, Fillmore, Lake, Scott, St. Louis, Wabasha, and Winona.

Regions in which work will take place:

- Northern Forest
- Forest / Prairie Transition
- Southeast Forest
- Metro / Urban

Activity types:

- Enhance

Priority resources addressed by activity:

- Habitat

Abstract:

Minnesota Trout Unlimited volunteers and partners will enhance habitat for fish and wildlife in and along priority coldwater streams located on existing Aquatic Management Areas and existing public lands statewide, accelerating efforts to reduce the backlog of degraded public resources.

Design and scope of work:

Addressing degraded habitat on exiting public easements.

Minnesota's remaining coldwater streams are under increasing threats. While they are often the highest quality aquatic systems remaining in the state, and prized by both anglers and the general public because of this, many have badly degraded habitat. Given their relatively scarcity, being just six percent of total stream and river miles, this is a conservation issue of statewide importance that requires accelerated investment in projects which enhance or restore this habitat.

Minnesota Trout Unlimited ("MNTU") proposes to improve degraded habitat on numerous priority streams located on existing Aquatic Management Areas and public land around the state. Our members have demonstrated the capacity to complete these projects with Fiscal Year 2017 funding from the Outdoor Heritage Fund ("OHF"). MNTU respectfully proposes to partner with the Lessard-Sams Outdoor Heritage Council and the citizens of Minnesota to enhance habitat in and along the following public waters (in these counties):

1. Keene Creek (St. Louis)
2. Miller Creek (St. Louis)
3. Stewart River (Lake)
4. Clearwater River (Beltrami)
5. Little Rock Creek (Benton)

6. Eagle Creek (Scott)
7. West Indian Creek (Wabasha)
8. Wisel Creek (Fillmore)
9. Money Creek (Winona)
10. Numerous other streams (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. FY 2017 funded projects will use methods similar to those used on successful projects recently completed by MNTU chapters. MNTU will leverage our experience to optimize project design and implementation.

In consultation with professionals within the Minnesota Department of Natural Resources ("MNDNR"), MNTU will use 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.

Objectives: 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.

Methods: 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, the number of larger trout, and levels of successful natural reproduction. Additional benefits, typically extending many miles downstream from the project, include reduced erosion and sedimentation, cooler water temperatures, improved water quality, and increased connectivity of aquatic and riparian habitat corridors.

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 of the threats facing coldwater fisheries and watersheds, engage landowners and residents in conservation, foster partnerships, and increase public support for OHF projects.

Urgent conservation opportunities.

The targeted stream segments are currently providing limited habitat and clean water benefits, angling opportunities, or other enticements which increase outdoor recreation and encourage public appreciation and stewardship of aquatic ecosystems. By creating productive fisheries in visible and accessible areas, these projects will increase citizens' use of our coldwater ecosystems, tangibly re-connect Minnesotans to the land and water, foster understanding of threats to them, and motivate citizens to advocate for watershed and water quality improvements.

Stakeholder support.

We continue to receive strong support for these projects from landowners, rural communities (especially since most funding pays local contractors and suppliers for direct construction expenses), and local civic and sporting organizations. We will continue to gather local input and develop partnerships in the planning and implementation stages. Landowners typically become very enthusiastic partners,

working side-by-side with TU volunteers, donating materials, and helping secure additional conservation funding.

All outcomes in acres and stream miles will be achieved within the overall budget, although individual project budgets and budget numbers by category are estimates only. Construction efficiencies and leveraging other funds will likely permit us to lengthen and add habitat projects.

Crops:

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

How does the request address MN habitats that have: historical value to fish and wildlife, wildlife species of greatest conservation need, MN County Biological Survey data, and/or rare, threatened and endangered species inventories:

The projects will restore degraded habitat in and along streams and rivers which historically supported naturally reproducing trout and steelhead populations enjoyed by generations of anglers. In the process, corridors of habitat will be reestablished for numerous other aquatic, terrestrial and avian wildlife species.

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

These degraded streams are no longer providing habitat, clean water benefits or recreational opportunities. In several cases critical spawning and nursery habitat was destroyed or blocked by flooding. If not restored soon the loss of many consecutive year classes could destroy the entire population of some key rivers or streams.

Describe the science based planning and evaluation model used:

MNTU reviews MNDNR watershed specific fisheries management plans and other conservation planning efforts, consults with MNDNR managers, and applies ranking criteria developed by the MNDNR. Projects must also have the potential to increase the carrying capacity (fish numbers), the streams have natural reproduction, and the public have access to them.

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
- Strategic Plan for Coldwater Resources Management in Southeastern Minnesota

Which LSOHC section priorities are addressed in this proposal:

Forest / Prairie Transition:

- Protect, enhance, and restore wild rice wetlands, shallow lakes, wetland/grassland complexes, aspen parklands, and shoreland that provide critical habitat for game and nongame wildlife

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

Metro / Urban:

- Enhance and restore coldwater fisheries systems

Southeast Forest:

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

Relationship to other funds:

- Not Listed

How does this proposal accelerate or supplement your current efforts in this area:

While our members and chapters have been planning, fundraising for and executing quality fish habitat restoration and enhancement projects around Minnesota for four decades, the availability of funds to hire heavy equipment operators and purchase materials remains the limiting factor in the amount of habitat work we can complete. Each discrete project is an additional “stand alone” project which supplements the amount of habitat work which MNTU chapters have traditionally been able to complete. Our partnership with the L-SOHC and taxpayers has dramatically increased the amount of degraded habitat we are restoring and enhancing for all Minnesotans. This funding will allow us to accelerate work on the backlog of degraded habitat found on existing public lands and easements.

Members play vital roles in planning, designing, overseeing, directing and providing manual labor on what are essentially construction projects, but we must hire excavation contractors and purchase rock, lumber and other materials put into the project sites. The knowledge, passion and commitment of our volunteers continue to increase, as does their successful acceleration of the pace of habitat improvement. To ensure we finish what we start, we continue developing a pool of qualified external contractors and consultants to assist with critical tasks.

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

Appropriation Year	Source	Amount
n/a	n/a - the proposed projects are all newstand alone projects	0

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 not uncommon following completion of a southeast Minnesota project, are gains which are sustainable 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
periodic-every 5 years	MNDNR, AMA, MNTU, other	inspection	consultation with MNDNR	assist MNDNR with maintenance or seeking other funding

Activity Details:

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 (AMA, County/Municipal, Public Waters, State Forests)**

Accomplishment Timeline:

Activity	Approximate Date Completed
Begin project planning, design and permitting work following a July 2016 appropriation.	Begin July 2016
Begin habitat enhancements during 2017 fieldwork season following completion of design work, permitting approvals, and contracting.	2017 fieldwork season
Complete riparian and in-stream habitat enhancements.	By October 2019
Cutting, burning, and/or spot spraying of vegetation to ensure native grasses and other appropriate vegetation becomes well established.	Through summers of 2019 & 2020
Tree plantings in riparian corridors, typically in May-June, following completion of in-stream work.	By July 2019

Federal Funding:

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

Outcomes:

Programs in the northern forest region:

- Improved aquatic habitat indicators *Through surveys of fish, macro invertebrates and/or stream substrates.*

Programs in forest-prairie transition region:

- Improved aquatic habitat vegetation *Through surveys of fish, macro invertebrates and/or stream substrates.*

Programs in metropolitan urbanizing region:

- Improved aquatic habitat indicators *Through surveys of fish, macro invertebrates and/or stream substrates.*

Programs in southeast forest region:

- Rivers, streams, and surrounding vegetation provide corridors of habitat *Through surveys of fish, macro invertebrates and/or stream substrates.*

Budget Spreadsheet

Total Amount of Request: \$3,000,000

Budget and Cash Leverage

Budget Name	LSOHC Request	Anticipated Leverage	Leverage Source	Total
Personnel	\$100,000	\$0		\$100,000
Contracts	\$1,350,000	\$300,000	SWCD, NRCS, USFWS	\$1,650,000
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	\$5,000	\$0		\$5,000
Professional Services	\$515,000	\$0		\$515,000
Direct Support Services	\$0	\$0		\$0
DNR Land Acquisition Costs	\$0	\$0		\$0
Capital Equipment	\$0	\$0		\$0
Other Equipment/Tools	\$10,000	\$0		\$10,000
Supplies/Materials	\$1,020,000	\$300,000	SWCD, NRCS, USFWS	\$1,320,000
DNR IDP	\$0	\$0		\$0
Total	\$3,000,000	\$600,000	-	\$3,600,000

Personnel

Position	FTE	Over # of years	LSOHC Request	Anticipated Leverage	Leverage Source	Total
Program manager	0.40	2.00	\$60,000	\$0		\$60,000
Watershed Coordinator	0.10	2.00	\$10,000	\$0		\$10,000
Program assistant	0.25	2.00	\$30,000	\$0		\$30,000
Total	0.75	6.00	\$100,000	\$0	-	\$100,000

Amount of Request: \$3,000,000

Amount of Leverage: \$600,000

Leverage as a percent of the Request: 20.00%

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	153	153
Total	0	0	0	153	153

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	\$3,000,000	\$3,000,000
Total	\$0	\$0	\$0	\$3,000,000	\$3,000,000

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	2	5	98	0	48	153
Total	2	5	98	0	48	153

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	\$65,000	\$70,000	\$1,488,000	\$0	\$1,377,000	\$3,000,000
Total	\$65,000	\$70,000	\$1,488,000	\$0	\$1,377,000	\$3,000,000

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	\$19,608

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	\$32,500	\$14,000	\$15,184	\$0	\$28,688

Target Lake/Stream/River Feet or Miles

13

Parcel List

Section 1 - Restore / Enhance Parcel List

Beltrami

Name	TRDS	Acres	Est Cost	Existing Protection?
Clearwater River	14835231	4	\$0	Yes

Benton

Name	TRDS	Acres	Est Cost	Existing Protection?
Little Rock Creek	03831210	4	\$0	Yes

Fillmore

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

Lake

Name	TRDS	Acres	Est Cost	Existing Protection?
Stewart River	05310219	29	\$0	Yes

Scott

Name	TRDS	Acres	Est Cost	Existing Protection?
Eagle Creek	11521218	2	\$0	Yes

St. Louis

Name	TRDS	Acres	Est Cost	Existing Protection?
Keene Creek	05015236	4	\$0	Yes
Miller Creek	05014218	9	\$0	Yes

Wabasha

Name	TRDS	Acres	Est Cost	Existing Protection?
West Indian Creek	10911216	72	\$0	Yes

Winona

Name	TRDS	Acres	Est Cost	Existing Protection?
Money Creek	10507209	11	\$0	Yes

Section 2 - Protect Parcel List

No parcels with an activity type protect.

Section 2a - Protect Parcel with Bldgs

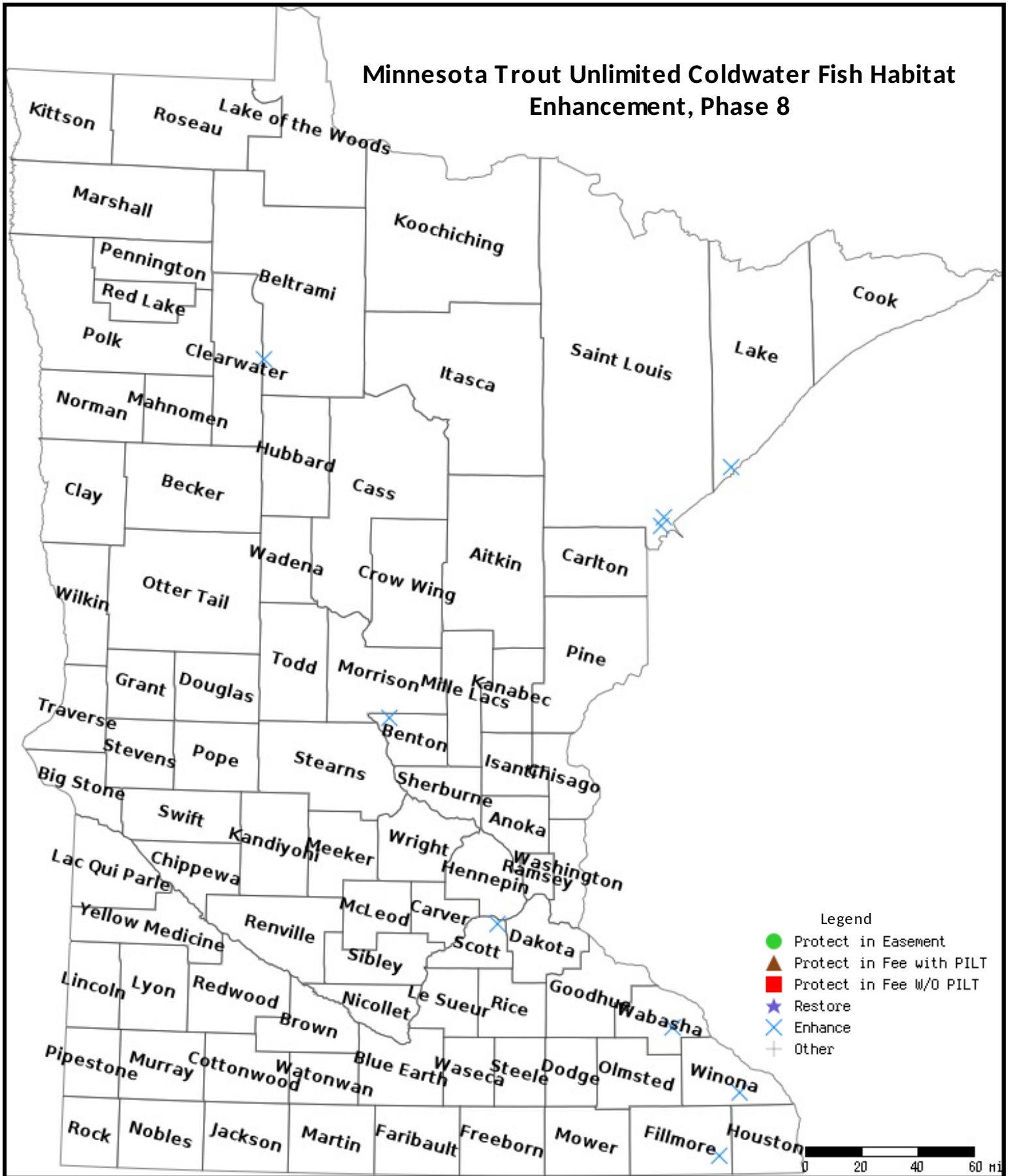
No parcels with an activity type protect and has buildings.

Section 3 - Other Parcel Activity

No parcels with an other activity type.

Parcel Map

Minnesota Trout Unlimited Coldwater Fish Habitat Enhancement, Phase 8



Data Generated From Parcel List

Individual Project Descriptions - Minnesota Trout Unlimited - Fiscal Year 2017

This attachment briefly summarizes the priority habitat enhancement projects which Minnesota Trout Unlimited proposes to complete using FY 2017 funding from the Outdoor Heritage Fund. Additional priority habitats projects may be completed depending upon funds leveraged and construction efficiencies realized. Actions to be performed, opportunities seized and partnerships being fostered are outlined. 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.

Northern Forest Section

1. 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. The project will restore the stream channel, which was destabilized by the 2012 flood, increase the amount of deep pool habitat and trout cover, 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, as well as adults. It is arguably the most productive, fishable trout stream on the western half of Duluth and supports itself through good natural reproduction. The MNDNR Duluth Area Fisheries Office identified this creek as a priority stream for trout habitat improvement efforts.

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 site is in a wooded park 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 resilient fishery for thousands to easily access.

The project will use significant volunteer labor provided by the Gitche Gumee Chapter of TU (Duluth), MNTU, local angling and conservation groups, and Duluth residents.

2. 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 will be a highly visible and accessible location on public land just 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.

3. Stewart River (Lake)

The Stewart River, located outside Two Harbors, MN, is known for its productive and popular wild steelhead fishery. 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. Following a lengthy process, consensus was reached on the top tier watersheds in The lake Superior basin. The Stewart River watershed ranks at the head of this select group. The FY 2017 project will restore 2,000' of a section of river which historically produced the bulk of the wild steelhead smolts which return as adults to provide this impressive wild steelhead fishery.

This FY 2017 project will build upon enhancement and restoration work by MNTU and several partners which is currently underway or planned for this watershed. 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 also successfully leveraged this state 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. We are optimistic that the Legislature will pass your Fy 2016 recommendations during the upcoming special session and fund both (1) the collaboration with the Lake County Land Department to restore degraded forest habitat, which will benefit forest hydrology and the river, and (2) restoration of another 3,000' reach of the Stewart River in partnership with the MNDNR and Lake County SWCD. The FY 2017 project proposed will keep momentum going in the watershed by restoring another key segment of vital spawning and nursery habitat.

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.

4. Clearwater River (Beltrami)

The Clearwater River is a highly utilized trout stream in Beltrami County, MN, an area of the state with few remaining trout waters. The project is located within a 7 mile stretch of contiguous, publicly accessible trout water. A handicap-accessible boardwalk and fishing platforms were constructed on nearby public land in 2004, which was one of the first such projects constructed in the state of Minnesota. Public use of the resource is significant due to its proximity to the population center of Bemidji, MN and the rather

limited coldwater resources and stream trout fishing opportunities in northwest Minnesota.

While much of the river corridor remains healthy, negative impacts from human activities are evident in some reaches of the Clearwater River. The project is located on the site of an old logging splash dam, and has been used as a cattle pasture since the 1950s. The site contains some of the most degraded habitat in this stream. Indeed, the MNDNR recently completed an assessment of the entire river and identified this site as the top priority for habitat restoration.

The pastured site is heavily grazed with no cattle exclusion from the Clearwater River and is a significant source of nutrient runoff and sedimentation. The stream banks have been denuded and trampled down due to overgrazing. The stream channel is braided and overly wide, and no longer conveys the river's sediment load. The overly wide and shallow channel contributes to warming of the river, provides little trout cover (depth) and its substrates, essential for food production and spawning, are buried.

The initial phase of work here will involve installation of exclusion fencing to keep cattle out of the riparian corridor while still allowing cattle to access water at a controlled crossing (a riffle which will provide good aquatic food production). This will enhance the riparian corridor habitat by allowing vegetation to become reestablished, provide channel stability, shading, future inputs of woody cover, and to intercept runoff from the pasture.

In addition, several bank erosion "hot spots" will be addressed using toe wood, which both stabilizes banks and provides overhead cover and woody habitat. Further work in the upper reach will restore proper channel dimensions using natural channel design methods. Work will include using toe wood to stabilize banks, providing fish habitat improvements and promoting scouring of the stream channel through the placement of rock and/or log vanes.

Forest / Prairie Transition Section

5. Little Rock Creek (Benton)

Little Rock Creek is one of a handful of trout streams remaining in the St. Cloud area. The MNDNR's assessment of the stream determined that the stream suffers from a high sand bedload, reduced base flow and overly wide stream channel which result in the accumulation of sand deposits throughout much of the stream channel. In addition, there are several badly eroding streambanks that are contributing large amounts of sand and sediment to the stream channel. These locations also lack cover habitat.

The project will stabilize the worst bank erosion sites using woody material, which will also provide cover and encourage the scouring of deeper holes for large trout to survive and thrive. The bank stabilization work using "toe wood" methods will be designed with MNDNR. MNTU will hire local contractors to provide excavation services and materials. Approximately 300 linear feet of badly eroding bank will be enhanced in this manner.

In addition, despite some earlier enhancement work done in portions of the project reach, the stream channel needs to be narrowed further in order for the stream to flush the sand from the channel and expose the gravel and cobble substrate necessary for trout spawning, food production and young of year trout habitat. Wide shallow conditions may also contribute to increased water temperatures.

The Mid Minnesota Chapter of Trout Unlimited will work with MNDNR to create and place additional brush mats and brush bundles in the stream channel to further narrow the stream channel throughout the reach.. As much as 2,000 feet of stream (of 6,800' easement stretch) may be addressed in this manner. Brush placements are intended to reduce erosion, narrow and deepen the stream channel over time, and lower water temperatures to benefit brook and brown trout and other fish and macro-invertebrates.

Metro Urbanizing Section

6. Eagle Creek (Scott)

Eagle Creek is a rare urban trout stream in eastern Scott County. Habitat enhancement will help boost the trout population so anglers in the south metro can stop for a few hours of fishing close to home. Eagle Creek originates as two branches before draining to the Minnesota River as a single main stem. The west (main) branch begins in Shakopee and the east branch begins in Savage. The single main stem then flows through Savage and the Minnesota Valley National Wildlife Refuge to the Minnesota River. The stream has a small self-sustaining population of wild brown trout and has not been stocked since 1978. The primary factors limiting brown trout abundance in Eagle Creek are the limited areas of spawning habitat and deeper water.

This project would build upon the state's substantial investment in the 1990s, when it acquired fee title to most of the riparian corridor to protect this unique resource and the historic Boiling Springs. The project area shows lingering effects of stream degradation due to channel down-cutting. The stream channel is wide, shallow and dominated with sandy substrate. Deep water and other fish cover habitats are limiting. Much of the stream has been isolated from the historical watershed and lower stream flow is maintained by springs. Reduced flows have increased aggradation of sediments in this portion of the channel keeping it wide and shallow. Due to the width and shallowness of this reach, stream warming can occur during sunny days.

This project will improve approximately 1,000 feet of stream habitat in the East Branch. Coir logs, brush bundles, and toe wood revetments will be placed to narrow the channel where the stream is over-wide while increasing depth and cover for fish. Cross veins and riffles will be placed to direct stream flow and increase spawning areas and other habitats beneficial to trout. We will minimize disturbance to existing vegetation and soils, and much of the work will be constructed without use of heavy equipment. This will minimize disturbance to wildlife and allow optimum re-establishment of native vegetation.

The Twin Cities Chapter of trout Unlimited will work in close partnership with the MNDNR.

Southeast Forest Section (Driftless area)

The three 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 coldwater 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 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 and in these subwatersheds. 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 site we now propose to enhance with Fy2017 funding. 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 another mile of quality habitat and fishing to spread out the fishing pressure on busy weekends.

The upper 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 relatively 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 this stretch reach its potential and again provide 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 is presently working on a tributary of Wisel Creek and both the MNDNR and MNTU have improved habitat in portions of Wisel Creek in the past. Habitat improvements 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. Money Creek (Winona)

Money Creek is located just a few miles south of Interstate 90 near Witoka, MN and is well positioned to be a good introduction to anglers being drawn to the area by the growing reputation of southeast Minnesota's Driftless area trout streams. No other stream offers such short access from the Interstate, yet you would never guess it when fishing this small secluded valley. Money Creek faces the typical degradation described in the agricultural area example, and the habitat enhancement methods described 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 Win Cres Chapter of TU will contribute substantial labor on the project and coordinate work with the landowner and MNDNR Lanesboro Area Fisheries Office.

Statewide

10. Habitat enhancement through management of riparian vegetation

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 beaver management may also be undertaken.