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

Date: May 26, 2016

Program or Project Title: Knife River Habitat Rehabilitation - Phase III (HRE04)

Funds Requested: $5,200,000

Manager's Name: Kevin J. Bovee
Title: Secretary/Grant Manager
Organization: Lake Superior Steelhead Association
Address: P. O. Box 16034
City: Duluth, MN 55816
Office Number: 218-525-5960
Email: outriderduluth@msn.com
Website: www.steelheaders.org

County Locations: Lake, and St. Louis.

Regions in which work will take place:

- Northern Forest

Activity types:

- Enhance

Priority resources addressed by activity:

- Wetlands
- Forest
- Habitat

Abstract:

Poor historic forestry practices in the Knife River watershed have degraded trout habitat and resulted in a TMDL exceedance for turbidity. The LSSA proposes to locate, assess and rehabilitate identified stream impacted reaches within the watershed. The LSSA will use the new MPCA and Natural Channel Design evaluation criteria to rank and prioritize locations for rehabilitation. Our major focus will be stabilizing streambanks, installation of instream habitat and replanting riparian forest. Only stream sections located on public lands and private lands with DNR easements will be considered for this project. See the LSSA supplementary video for more detailed information.

Design and scope of work:

The Knife River watershed once held one of the largest populations of natural reproducing steelhead in the Great Lakes (Attachment 1). Since the late 1970's, the Knife River steelhead population has seen a dramatic decrease. One of the reasons for this decline is habitat loss.

The habitat loss is a long term result from historic logging. The pre-settlement forest composition within the Knife River watershed consisted primarily of old growth coniferous trees. Extensive clear-cut logging removed the old growth trees throughout the watershed, which were replaced by large stands of second growth aspen. This large-scale forest alteration removed the large trees that stabilized the stream banks and attracted unprecedented beaver populations to the watershed due to the new aspen food source. This combination has led to a rapidly deteriorating riparian zone that now includes slumping stream banks, dead trees and remnant beaver meadows. The slumping clay banks have also resulted in a TMDL exceedance for turbidity on the Knife River (Attachment 2). Recognizing the threat to the upper river, the DNR started performing limited stream studies. These studies have determined that habitat degradation in the watershed has resulted in poor rearing conditions for juvenile trout.

The goal of this grant is to rehabilitate stream banks, wetlands, fish habitat and riparian zone trees that have been impacted over the past 100 years. The LSSA proposes to use a combination of aerial data (LIDAR) and river surveys to locate and assess impacted stream areas within the Knife River watershed. A field reconnaissance and detailed stream survey using MPCA and Natural Channel Assessment methodology will determine the stream's condition. Impaired areas will be ranked and the most impacted reaches will be rehabilitated. Rehabilitation projects will be conducted by using design/build construction following Natural Channel Design criteria to achieve a stable stream reach. Our scope of work may include:

- Survey the stream using MPCA and Natural Channel Design methodology.
- Conduct baseline and periodic stream and biological data collection and monitoring on impact areas.
- Track adult fish movement within the watershed.
- Monitor water temperature and quality.
- Conduct fish shocking.
- Identify erosion areas.
- Measure streamflow.
- Complete permit applications
- Meet with regulators to receive project approvals.
- Conduct stakeholder meetings.
- Remove log jams and beaver blockages to restore connectivity.
- Restore stream flow.
- Create and restore wetlands and off-channel ponds.
- Perform design/build projects to stabilize streambanks, restore channels and installed woody debris using natural channel methodology.
- Remove impounded silt and sediments from the streambed.
- Planting of trees to restore the overhead canopy.
- Increase spawning and rearing habitat.

The LSSA has been awarded two previous Knife River LSOHC grants and this project will be a continuation of the first two phases. During the previous two grant phases the LSSA has demonstrated its ability to manage the grants and their financial responsibilities. Our project work is consistent with the Minnesota Constitution, statues and state laws and has been conducted in a transparent fashion using state of the art science.

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

- H2 Protect critical shoreland of streams and lakes
- 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
- National Fish Habitat Action Plan

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

The Lake Superior Steelhead Association's Knife River Habitat Rehabilitation project aligns with Chapters 3.3, 7, 8 and Addendum #1 in the DNR's 2016 Ten Year Lake Superior Management Plan (LSMP) revisions. The LSMP written goals lists aspects of our project in its brook, brown and rainbow trout sections and the stream habitat section. This plan also states LSOHC funds can be used to improve stream habitat using Natural Channel Design methods.

This project also benefits the watershed's forest by replanting lost old growth tree species. The trees we propose planting are long lived tree species native to Minnesota that include white spruce, black spruce, tamarack, silver maple, red maple, river birch, yellow birch and swamp white oak. We are also looking into experimental "climate assisted migration" tree specie plantings to help alleviate possible changes in the riparian zone tree community in the watershed due to expected

Which LSOHC section priorities are addressed in this proposal:

Northern Forest:

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

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

The methods we will be using to rehabilitate the Knife River is called Natural Channel Design. Natural Channel Design compares unstable eroding stream reaches to stable functioning stream reaches (Attachment 2). The goal of a project is to bring an unstable stream reaches back to a stable state.

Natural Channel Design utilizes a three-step process. First, a stream reach is surveyed to collect data for comparison to several stable stream sections. Common criteria collected for evaluation is stream width to depth ratios, connection to the floodplain, eroding bank calculations, channel configuration, longitudinal profile, cross-section elevation, pebble count and vegetation. Second, plans and specifications are developed that depict how the existing stream channel will be altered and where it will be reconfigured to match the stable stream measurements. These plans will also depict where the placement of structures, location of stream bed excavation, the creation of a bench and floodplain and the realignment of the stream channel will occur. Three, is the construction project that rehabilitates the impacted stream area to restore the channel to meet the stable stream conditions. This construction uses heavy equipment to place massive natural materials such as large tree trunks, root wads and boulders to stabilize the bank.

This process repairs the geomorphic problems with the stream instead of applying habitat features without regard to the stream's configuration. This is why the rehabilitation project remains intact after a flood event. See the LSSA supplementary video provided for more detailed information.

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:

The LSSA has assessed the Knife River water temperature to determine which stream sections support trout production. Our temperature monitoring uses data loggers to record water temperature every hour over a four month summer time period. This assessment data has allowed the LSSA to conclude where the Knife River has suitable water temperature conditions to support trout survival. By overlaying this data on our watershed map, we have created what we call "trout zones".

After we mapped these "trout zones" in the Knife River, we realized that the upper watershed had the coolest water temperatures suitable for the growth of trout, the middle watershed had warmer water temperatures that were stressful for trout and the lower watershed had the hottest water that is lethal for trout. This data is being used in two ways. One, it tells us to avoid performing construction projects in the lower watershed because the summertime water temperatures are lethal for trout. So even if we created the best in-stream habitat features in the lower watershed, the water temperature would not allow for trout survival. Two, it gives us ideas where we should construct projects to get the best return on investment.

Another assessment tool that we use is a full biological survey. This survey evaluates the fish population through shocking, invertebrate community through kick nets and using the new MPCA habitat numerical assessment protocol. Using the full biological assessment tool allows us to track if our project has had an impact in the stream reach that we are currently working on and if there is a positive impact downstream. It is anticipated after completing several projects, our cool water corridor would extend downstream because the river channel will be narrower and deeper, consist of a canopied riparian zone and have water cooling undercut banks. So over time, once the cool water corridor is extended downstream, the "trout zone" should increase on the Knife River. If our hypothesis is correct, our temperature and biological monitoring will open new areas to perform stream habitat improvement downstream.

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 Knife River is a unique watershed on Minnesota's North Shore of Lake Superior. While the North Shore has over 60 tributaries that discharge to Lake Superior, only the Knife River does not have a barrier waterfalls that limits upstream migration of steelhead or coaster brook trout. This lack of a barrier falls means the Knife River has over 70 miles open anadromous Steelhead and coaster brook trout habitat.

The Knife River also has another unique feature, according to a DNR study by Charles Kruger, the Knife River has a genetically distinct strain of steelhead. Not only are these steelhead genetically distinct from other North Shore watersheds, but the Knife River steelhead are genetically distinct within its watershed. So this means that Main Knife River steelhead are genetically different than steelhead that are produced in its tributaries of Stanley Creek, McCarthy Creek, Main West Branch, Little West Branch, Captain Jacobson and Little Knife River.

This proposal addresses the uniqueness of the Knife River fishery by enhancing the trout habitat so the steelhead and coaster brook trout are allowed to spawn, rear and migrate back to Lake Superior to grow and mature. This fact is even more critical because the Knife River is no longer stocked with trout. Stocking was discontinued in the Knife River to protect the unique genetics of over 100 years of natural steelhead production. Essentially the Knife River is a natural wild fish hatchery that continues to genetically evolve.

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

The upper Knife River watershed is a cool water stream that is very conducive to trout production. However in the summer the water temperatures in the lower sections of the Knife River heat up to lethal conditions, and its lower named tributaries, the Little Knife River and Stanley Creek, can go dry during abnormally hot or dry summers.

The lower Knife River and its downstream tributaries are currently not conducive to trout production due to these warm summertime water temperatures and this region has a survival rate of essentially zero. Our previous LSOHC habitat grant projects have performed limited evaluation into the potential of this area and to potentially extend the cool water "trout zone" downstream into this lower river region. If we could extend the cool water zone downstream to this region, the creation of trout habitat would be tremendous and far exceed anything we could do in the upper watershed.

The lower region does have some positive factors in its favor. These stream factors include good stream flow, more water volume, and deeper pool depths than the upper or middle trout zones. In theory, trout production could go from its current state of essentially zero fish to several hundred fish per river mile if this habitat could be converted from a warm water region to cool flow. This increase in stream habitat would also greatly exceed the DNR's long term goal of 7,500 (2 year old) fish stated in the 2016 LAMP revisions.

Outcomes:

Programs in the northern forest region:

- Improved aquatic habitat indicators • *Increase in cool water temperatures.*
  - *Increase in trout and invertebrate habitat.*
  - *Improved stream stability.*
  - *Reduction of erosion.*
  - *Delisting the Knife River as a TMDL impaired river for turbidity.*
  - *Narrower and deeper stream channels.*
  - *Increase in spawning areas.*
  - *Increase rearing habitat.*
  - *Increase in trout production.*
  - *Increase in 2 year old trout retention.*
  - *Increase in riparian tree canopy.*
  - *Decrease in reed canary beaver meadows.*

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

A critical component of this project is to insure beaver do not re-impact areas that have been rehabilitated. To insure that these project areas are maintained after the project is complete, annual helicopter flights are conducted to insure beavers do not re-colonize the project areas. These beaver flights are conducted in late autumn by the DNR as they have been previously for over 15 years. If dams or beaver activity is noted in the annual flight, the DNR will contract with Federal trappers to remove the beavers and notch their dams. The estimated cost of the flight, beaver removal and dam notching throughout the entire Knife River watershed is approximately $15,000. If the DNR loses funding for this project, the TMDL implementation plan has budgeted $35,000 annually for this task. Included in this budget is beaver flights, trapping, dam notching and supplemental tree planting.

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

Year	Source of Funds	Step 1	Step 2	Step 3
July 1, 2017-2018	DNR	Beaver Flight	Beaver Trapping	N/A
July1, 2017-2018	LSSA	Beaver Stream Walk	Beaver Trapping	Tree Planting
July 1, 2018-2019	DNR	Beaver Flight	Beaver Trapping	N/A
July 1, 2018-2019	LSSA	Beaver Stream Walk	Beaver Trapping	Tree Planting
July 1, 2019-2020	DNR	Beaver Flight	Beaver Trapping	N/A
July 1, 2019-2020	LSSA	Beaver Stream Walk	Beaver Trapping	Tree Planting
July 1, 2020-2021	DNR	Beaver Flight	Beaver Trapping	N/A
July 1, 2020-2021	LSSA	Beaver StreamWalk	Beaver Trapping	Tree Planting

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

The LSSA has spent money on two previous LSOHC grant phases to get to the stage where major construction on several streambanks simultaneously can occur. We have worked closely with the DNR and developed a protocol to quickly assess, design and permit the necessary construction work. The LSSA now has the ability and personnel in place to perform two large constructions project each season. By delaying construction, the eroding streambanks will get worse and additional sediments will discharge to the stream further impacting water quality and costing more money to rehabilitate.

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

The LSSA has used our charitable gaming funds to supplement work on the first two phases of this LSOHC grant. The amount of charitable gaming money we have spent is approximately $45,000. These funds went to design work on the second falls, beaver dam removal and beaver trapping. The LSSA has also had a large club volunteer effort. The LSSA estimates that we have spent approximately $20,000 for equipment use, trees and tree material purchases, volunteer labor and lunches to volunteers for the tree planting related to this grant. This in-house contribution total is approximately $65,000 since 2012.

Finally, the LSSA has applied for two SOGL grants and as of yet we have not been approved. The LSSA anticipates applying for a SOGL grant again in the spring of 2017 and an Enbridge Habitat grant in 2017.

Relationship to other funds:

- Clean Water Fund
- 2012 Flood Relief

Describe the relationship of the funds:

The Legacy Clean Water Fund and 2012 Flood Relief money has been used by the local Soil and Water Conservation Districts for the Knife River watershed's private stream sections. This money was used to stabilize slumping clay banks as part of the TMDL implementation plan. This money was awarded to the South St. Louis Soil and Water Conservation District and Lake County Soil and Water Conservation District.
The LSSA and SWCD are working cooperatively on separate sections of river to insure the entire watershed is addressed and improved. The LSSA is primarily working on the upper river habitat on public lands and private lands with easements, while the SWCD is working on the lower river sections and concentrating on private lands.

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

Not Listed

Activity Details

Requirements:

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

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

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

Do you anticipate federal funds as a match for this program - **Yes**

Are the funds confirmed - **No**

What is the approximate date you anticipate receiving confirmation of the federal funds - **June, 2017**

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
Stream Temperature Monitoring	June 2021
Stream Assessment and Stream Reach Surveying	June 2021
Biological Baseline Assessment	June 2021
Rehabilitation Project Design and Permitting	June 2021
Design/Build Construction Activities to Rehabilitate Stream Impacts	June 2021
Tree Planting	June 2021

Budget Spreadsheet

Total Amount of Request: $5,200,000

Budget and Cash Leverage

Budget Name	LSOHC Request	Anticipated Leverage	Leverage Source	Total
Personnel	$520,000	$0		$520,000
Contracts	$3,846,000	$0		$3,846,000
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	$1,000	$0		$1,000
Professional Services	$9,000	$0		$9,000
Direct Support Services	$0	$0		$0
DNR Land Acquisition Costs	$0	$0		$0
Capital Equipment	$0	$0		$0
Other Equipment/Tools	$50,000	$0		$50,000
Supplies/Materials	$774,000	$0		$774,000
DNR IDP	$0	$0		$0
Total	$5,200,000	$0	-	$5,200,000

Personnel

Position	FTE	Over # of years	LSOHC Request	Anticipated Leverage	Leverage Source	Total
Grant Manager, Asst. Grant Manager	1.25	6.00	$520,000	$0		$520,000
Total	1.25	6.00	$520,000	$0	-	$520,000

Amount of Request:	$5,200,000
Amount of Leverage:	$0
Leverage as a percent of the Request:	0.00%
DSS + Personnel:	$520,000
As a % of the total request:	10.00%
Easement Stewardship:	$0
As a % of the Easement Acquisition:	-%

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

N/A

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:

N/A

Describe and explain leverage source and confirmation of funds:

Only confirmed funding source is LSSA annual charitable gaming donation. Applying for two other federal grants in 2017.

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:

We could scale the project back to rehabilitate less lineal feet of stream.

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	2,400	2,400
Total	0	0	0	2,400	2,400

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	$5,200,000	$5,200,000
Total	$0	$0	$0	$5,200,000	$5,200,000

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	0	0	2,400	2,400
Total	0	0	0	0	2,400	2,400

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	$0	$0	$5,200,000	$5,200,000
Total	$0	$0	$0	$0	$5,200,000	$5,200,000

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	$2,167

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	$0	$0	$2,167

Target Lake/Stream/River Feet or Miles

70

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:

Final parcel identification will be supplied with the Accomplishment Plan

Section 1 - Restore / Enhance Parcel List

Lake

Name	TRDS	Acres	EstCost	Existing Protection?
Knife River and Tributaries	05311232	0	$0	Yes
Knife River and Tributaries	05211204	0	$0	Yes
Knife River and Tributaries	05211205	0	$0	Yes
Knife River and Tributaries	05311205	0	$0	Yes
Knife River and Tributaries	05311207	0	$0	Yes
Knife River and Tributaries	05311208	0	$0	Yes
Knife River and Tributaries	05311217	0	$0	Yes
Knife River and Tributaries	05311218	0	$0	Yes
Knife River and Tributaries	05311220	0	$0	Yes
Knife River and Tributaries	05311229	0	$0	Yes
Knife River and Tributaries	05311232	0	$0	Yes
Knife River and Tributaries	05311233	0	$5,200,000	Yes

St. Louis

Name	TRDS	Acres	EstCost	Existing Protection?
Main West Knife River and Tributaries	05312203	0	$0	Yes
Main West Knife River and Tributaries	05312210	0	$0	Yes
Main West Knife River and Tributaries	05312215	0	$0	Yes
Main West Knife River and Tributaries	05312222	0	$0	Yes

Section 2 - Protect Parcel List

No parcels with an activity type protect.

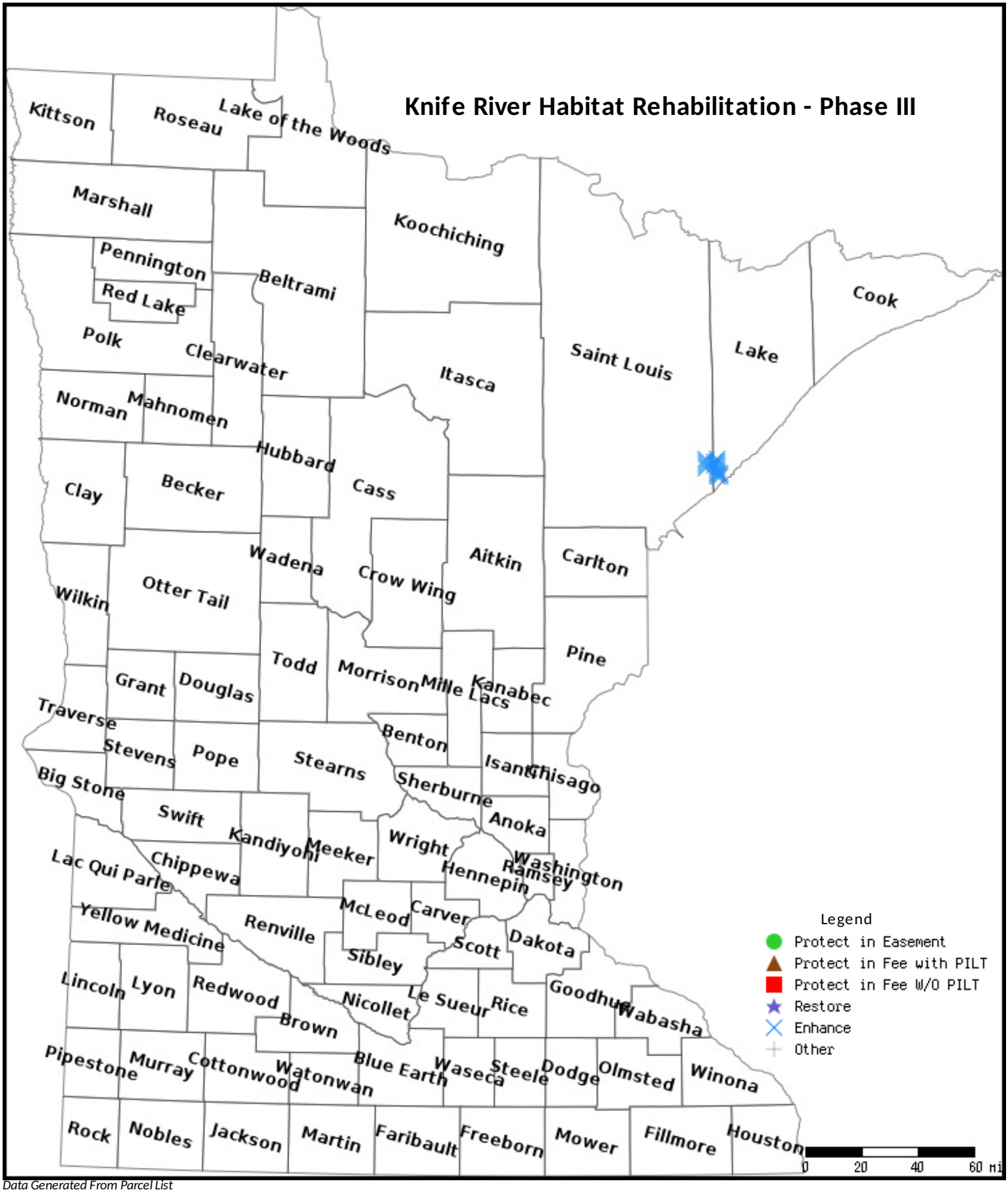
Section 2a - Protect Parcel with Bldgs

No parcels with an activity type protect and has buildings.

Section 3 - Other Parcel Activity

No parcels with an other activity type.

Parcel Map



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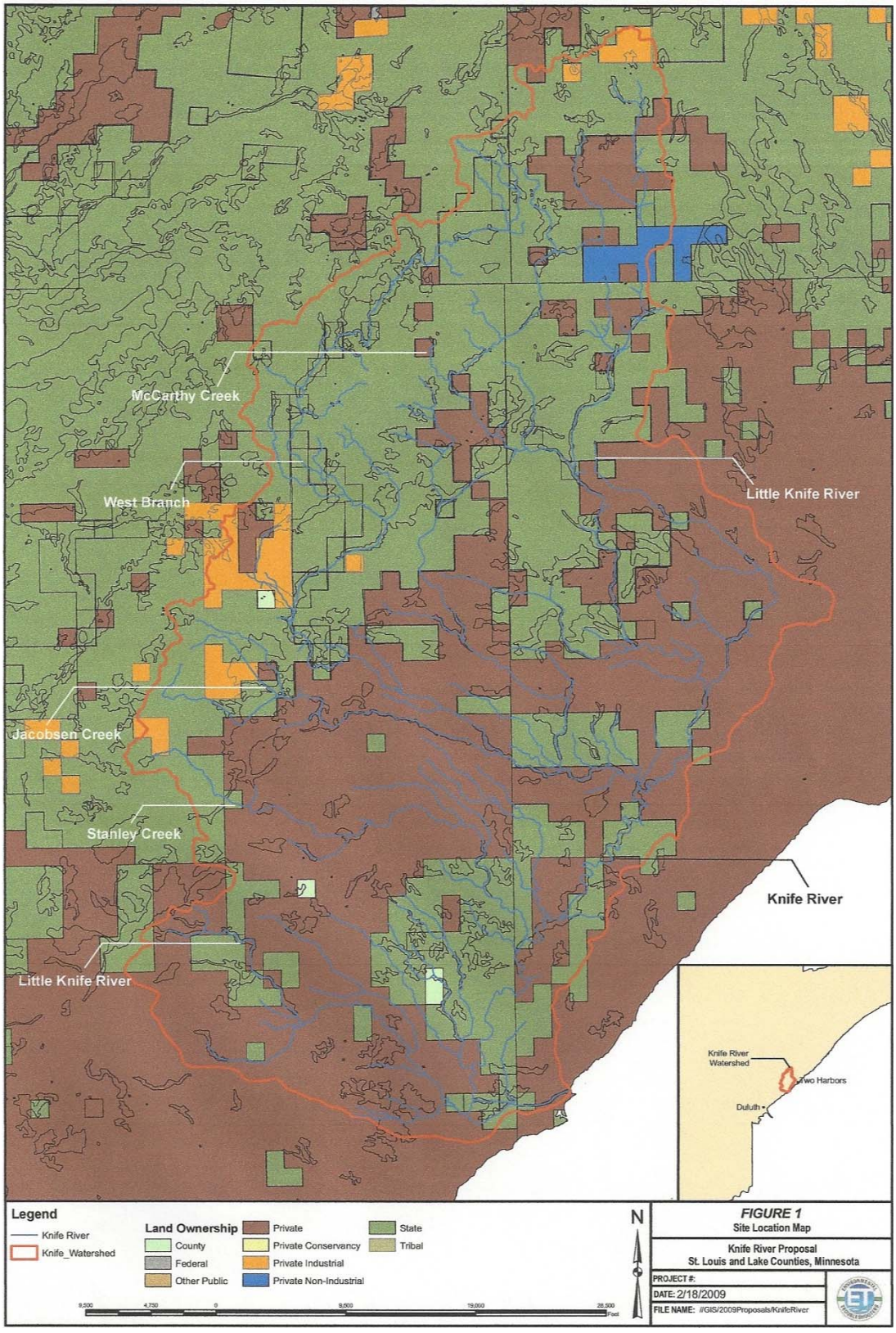

FIGURE 1
Site Location Map

Knife River Proposal
St. Louis and Lake Counties, Minnesota

PROJECT #:
DATE: 2/18/2009
FILE NAME: //GIS/2009Proposals/KnifeRiver

Unstable slumping bank

Stable stream bank