Main Request for Funding Form

Lessard-Sams Outdoor Heritage Council
Fiscal Year 2013

Program or Project Title: **Knife River Habitat Rehabilitation**

Funds Requested: $400,000.000

Manager's Name: Craig Wilson
Organization: Lake Superior Steelhead Association
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County Location: St. Louis and Lake

Ecological Planning Regions:

X Northern Forest ☐ Forest/Prairie Transition ☐ Southeast Forest

☐ Prairie ☐ Metro/Urban

Activity Type: *[check activities that will occur]*

☐ Protect - Fee ☐ Protect - Easement ☐ Protect - Other

x Restore ☐ Enhance

Priority Resources addressed by activity: *[check all resources affected]*

X Wetlands **X** Forests ☐ Prairie **X** Habitat

Project Abstract

Degradation to trout habitat in the upper Knife River Watershed has occurred from past forestry practices resulting in uncontrolled beaver colonization. The result is unfavorable rearing habitat for juvenile trout.

Project Narrative

Design and scope of work

Knife River Watershed

Situated on the St Louis/Lake County border in NE MN, the Knife River has over 181 miles of stream length within its watershed. The Knife River watershed consists of approximately 54,000 acres, of which 29,000 acres are owned by the State of Minnesota, St. Louis County and Lake County. Approximately 25,000 acres are privately owned and of this privately owned property 6,200 acres, or approximately 25%, are enrolled in stewardship plans. The Knife River has the best and most available steelhead spawning habitat on Minnesota's Northshore.

History of the Knife River

The Knife River once held one of the largest populations of natural reproducing steelhead in the Great Lakes and provided spawning habitat in its upper watershed to thousands of steelhead each spring. Since the late 1970's, the Knife River steelhead population has seen a dramatic decrease. Where thousands of steelhead once traveled upstream to spawn now only seven hundred make this same journey. One of the primary reasons for the decrease in the Knife River's steelhead population is the degradation to the upper Knife River watershed riparian habitat.

The Knife River lacks significant spring-fed flow and is kept cool in the summer by the shade of riparian trees along the streambank. Without cold water, juvenile trout migrate downstream in search of suitable cold water habitat or perish. According to a DNR fisheries study, the increased water temperature and lack of stream flow causes juvenile steelhead to prematurely migrate to Lake Superior. When these smolts migrate prematurely (before age 2) to Lake Superior they are significantly preyed upon. According to the DNR, 1 out of every 600 juvenile trout that migrate prematurely to Lake Superior return to spawn in the Knife River. In contrast, 1 out of every 10 two-year old smolts (non-early migrants) return from Lake Superior to spawn as adults. This is a primary limiting factor to the recovery of the steelhead population on the Knife River**.**

Habitat Degradation and its Results to the Upper Knife River Watershed

The historic forest composition within the Knife River watershed was old growth coniferous trees. Extensive clear-cut logging removed the old growth coniferous trees throughout the Knife River watershed, which were replaced by large stands of second growth aspen. This large-scale forest alteration attracted unprecedented beaver populations to the watershed because of the new food source. Once beavers colonized this area, dams were built blocking the stream flow and flooding the riparian tree cover. The flooded trees and shrubs along the riparian zone

quickly died resulting in open water ponds. The impoundment of shallow water and lack of tree cover associated with the beaver pond caused the water temperature to quickly warm and has led to an increase in evaporation. This increase in beaver activity has resulted in 30 plus years of habitat degradation to the upper Knife River watershed.

DNR Habitat Work and Studies Conducted in the Upper Knife River Watershed

Recognizing the threat to the upper river, the DNR started performing limited stream improvement projects involving the removal of beavers, breeching of beaver dams and limited improvement to fish passageways in the late 1990s. However, the DNR did not have the resources to restore the original fish passageways or the riparian habitat that originally existed prior to the beaver activity. Today hundreds of areas exists within this upper watershed that contain beaver meadows, dead trees, dam remnants, small woody debris, sediment impoundments and collapsed stream banks.

Various DNR studies have determined this habitat degradation to the upper watershed has resulted in poor rearing conditions for juvenile trout in the summer months. These poor rearing conditions (increase in water temperature, increase in evaporation and decrease in stream flows) are the direct result of beaver activity/habitat degradation in the Knife River watershed.

The DNR has conducted an annual aerial survey of the upper Knife River watershed since the mid 1990's to locate beaver dams, which were funded by the LSSA for several years. As previously stated, each year the DNR has trapped beavers and performed limited beaver dam removal, but has not rehabilitated the resulting habitat damage caused to the streambed and adjacent riparian cover due to lack of funds. The damage that remains to the watershed is the loss of overhead tree canopy, siltation of the streambed, debris in the water, stream flow blockage and stream bank erosion.

Phase I Stream Restoration

The LSSA proposes to use the DNR's existing aerial data and beaver dam location maps to locate and assess the beaver impacted areas on the upper Knife River. The LSSA will discuss and rank the locations for rehabilitation. The area of focus will start with the primary spawning tributary in the Knife River watershed, which is the West Branch of the Main Knife River. A field reconnaissance will be conducted to determine the stream section's condition and to design the rehabilitation project. The preliminary data that will be collected may include:

- Review aerial photo and GIS maps of beaver impacted areas.
- Mark GPS location of habitat degradation.
- Determine proximity to access points.
- Measure the area of impacted stream.
- Survey the depth of sediment deposition.

- Determine length and thickness of remnant dam(s).
- Survey the stream elevations.
- Quantify the amount of large and small woody debris.
- Calculate the percent of shade covering various stream sections.
- Monitor water temperature.
- Document visual evidence of juvenile fish or adult spawning activity.
- Identify collapsed banks or erosion areas.
- Construct cross-section diagrams.

The design parameters will enable us to:

- Remove barriers that limit migration.
- Restore stream flow.
- Repair or stabilize eroded stream banks.
- Removal of small woody debris.
- Placement of large woody debris.
- Clear impounded siltation of the streambed.
- Planting of trees to restore the overhead canopy.

The project data and design parameters will be incorporated in a project permit and submitted for approval to the DNR and Army Corp. of Engineers. Once the permit(s) are approved, the LSSA will implement restoration on a portion of the beaver meadows identified for restoration.

Equipment Usage and Project Site Access

The goal of this project is to restore beaver impacted areas within the upper Knife River watershed. To accomplish this goal, mechanical equipment will be used in specified areas that have vehicle access. In areas with vehicle access to the watershed, heavy equipment will be mobilized to remove dams, stabilize stream banks, placement of large woody debris and plant mature trees. These areas will be given a high priority because rehabilitating these stream sections can provide an almost immediate benefit to the watershed.

However, the LSSA realizes that many areas we are proposing to restore have no vehicle river access. In these areas, the LSSA will not build temporary roads, import fill or mobilize heavy equipment, but be relegated to using hand equipment for improvement work. The LSSA does not want to cause more damage to the watershed than what we will be restoring. Thus much of our restoration efforts in remote areas will be limited and consist of a reduced scope of work.

Tree Planting

Tree planting will be a critical component of this restoration project. Tree planting will be focused on the riparian area of the stream or watershed. In remote areas of the watershed tree planting may be the only reasonable method of restoration employed due to lack of heavy equipment access. Plantings will vary between coniferous and deciduous trees and shrubs. The proposed species will consist of a various arrangement of bare root, potted and large root bundled trees. Some of the tree species that may be utilized include: white spruce, black spruce, tamarack, red pine, silver maple, red maple, willows and speckled alder. This new riparian zone will ultimately be a mix of fast growing shrubs and smaller tree species intermixed with slower growing larger trees. The planting of shrub species will provide an immediate canopy, while the tree plantings will provide long-term shade and large woody debris.

Phase II Knife River Watershed Black Ash Stand Replacement Planting

Black ash stands currently comprise a large percentage of the riparian forest community in various sections of the Knife River watershed, most notably in the headwaters where young trout rear. The State of Minnesota and the Minnesota DNR expect that all ash stands in the state to eventually experience high to total mortality due to an infestation of the emerald ash borer. This project aims to attempt to retain shade cover for the upper Knife River watershed by planting additional tree species within the riparian corridor to diversify the forest. Forest comprised primarily of black ash will be targeted for this component of the project.

According to GIS data provided by Paul Sandstrom of the Laurentian RC & D, nearly 10 miles of major Knife River tributary riparian forest stands are comprised primarily of ash. This component of the riparian rehabilitation project on the Knife River will target stands located on public land along the West Branch of the Knife River in St Louis County. The proposed plan will plant a wide variety of trees that will be selected for each location based on site conditions. Preemptive understory tree planting is proposed to utilize tree species including tamarack, silver maple, white spruce, white cedar, white pine, red pine, basswood, etc. Additional GIS and onsite survey work will be utilized to select specific ash stands and locations, as well as target additional locations within the watershed for future plantings.

Tree Planting

Tree planting in remote Knife River watershed headwaters will not be easy. As such, a variety of different planting techniques will be attempted during this project. These techniques include planting larger trees, using a variety of bare root, containerized trees and locally harvested trees, using matting to keep weed growth down, using both caging and tree tubes to inhibit browsing. The success of different techniques will be evaluated to aid in planting additional ash stands during future projects.

The LSSA anticipates using the Minnesota Conservation Corps. (MCC) labor for the majority of the tree planting. However, the LSSA and Trout Unlimited (TU) will also provide some donated labor for tree planting. All root bundled, large trees will be planted using heavy equipment. This service will be contracted.

Projects Benefits

The project's success will be measured by evaluating the short-term and long-term benefits. These objectives are:

Short-Term Benefits

- Allow for effective and efficient fish movement.
- High survival rate of planted trees.
- Stabilization of the stream bank.
- Decreased erosion.

Long-Term Benefits

- Reestablish a coniferous tree stream canopy corridor.
- Decrease in the summertime water temperature.
- Decrease beaver activity.
- Increase in summertime stream flows.
- Decrease in early smolt emigration.
- Increase in adult steelhead population.

Planning

This project has been designed and is consistent with the DNR's Lake Superior Management Plan and the DNR's Rainbow Trout Plan. Both of these DNR management plans place a high priority in habitat conservation and rehabilitation.

Relationship to Other Constitutional Funds

The Knife River water quality has been impaired to the point that this watershed was added to the 2006 Minnesota Pollution Control Agency (MPCA) Total Maximum Daily Load (TMDL) list of impaired waters for turbidity. Because of this TMDL exceedance, the South Saint Louis County Soil and Water Conservation District has received funding and is apply for more funding to stabilize streambanks and reduce sediment loading.

Relationship to Current Organizational Budget

The DNR does not have any funding for habitat work on the Knife River. Most of the tree planting, bank improvement, beaver dam removal and stream improvements have been paid for by the LSSA.

Sustainability and Maintenance

The long term viablity of this project will be maintained by the Knife River Stewardship Committee that was organized to monitor, implement and oversee the TMDL exceedance restoration. This group is finalizing the Knife River TMDL implemenation plan and part of the plan has designated future money to perform annual Knife River watershed aerial surveys, private landowner tree plantings, annual beaver removal and large scale stream bank stabilization. This group will have long term funding to monitor the work conducted within the Knife River watershed.

Outcomes

By restoring the upper Knife River watershed, the LSSA will reverse over 50 years of habitat degradation from logging the old growth coniferous trees from the riparian zone and will remove beaver impacts from the stream habitat. Not only will the survival of the juvenile steelhead and brook trout increase, but the natural ecosystem will be restored to its original condition of large primary growth trees. This return of old growth coniferous trees to the riparian zone will reduce beaver recolonization, maintain cool water temperatures and reduce evaporation during the summer months. These two factors are the primary reason juvenile fish migrate prematurely to Lake Superior. The DNR has concluded that the premature migration of juvenile steelhead to Lake Superior is a major limiting factor to the steelhead recovery program.

Activity Type Detail

Fee Acquisition Projects

Will local government approval be sought prior to acquisition?

☐ Yes ☐ No, please explain **X** not applicable

If no, please explain here:

Is the land you plan to acquire free of any other permanent protection?

☐ Yes ☐ No, please explain **X** not applicable

If no, please explain here:

Easement Acquisition Projects

Will the eased land be open for public use?

☐ Yes ☐ No, please explain **X** not applicable

If no, please explain here:

Will the conservation easement be permanent?

☐ Yes ☐ No, please explain **X** not applicable

If no, please explain here:

Restoration and Enhancement Projects

Is the activity on permanently protected land and/or public waters?

X Yes ☐ No, please explain ☐ not applicable

If no, please explain here:

Does the activity take place on an Aquatic Management Area (AMA), Scientific and Natural Area (SNA), Wildlife Management Area (WMA), or State Forests?

X Yes, which ones ☐ No, please explain ☐ not applicable

If so, please indicate which ones: State and County Forest and designated Trout Stream

Past Outdoor Heritage Fund Appropriations Received for this program

ML 2009	ML 2010	ML 2011
N/A	N/A	N/A

Accomplishment Timeline

Activity	Milestone	Date
Site walk-through/Baseline Data Collection/Prepare Permit Application	Permit Approval	4/30/12
In-stream Fieldwork	Dam Removal/Bank Restoration	6/30/14
Site Preparation/Tree Planting	Riparian Zone Replanted	6/30/14

Attachments:

A. Budget
B. Proposed Output Tables 1-5
C. Parcel List

Attachment A. Budget Spreadsheet

Name of Proposal: Knife River Habitat Restoration
Date: 7/14/2011

Link HERE to definitions of the budget items below.

Total Amount of Request $ 1,500,000 *From page 1 on the funding form.*

Personnel

Position breakdown here	FTE	Over # of years	LSOHC Request	Anticipated Cash Leverage	Cash Leverage Source	Total
Manager of Programs	*0.5*	3	$ *20,000*			$ 20,000
Admin Asst						$ -
position 3						$ -
position 4						$ -
position 5						$ -
position 6						$ -
position 7						$ -
Total	0.5		$ 20,000	$ -	$ -	$ 20,000

Budget and Cash Leverage *(All your LSOHC Request Funds must be direct to and necessary for program outcomes.)*

Please describe how you intend to spend the requested funds.

Budget Item	LSOHC Request	Anticipated Cash Leverage	Cash Leverage Source	Total
Personnel - ***auto entered from above***	$ 20,000	$ -	$ -	$ 20,000
Contracts				$ -
Fee Acquisition w/ PILT ***(breakout in table 7)***				$ -
Fee Acquisition w/o PILT ***(breakout in table 7)***				$ -
Easement Acquisition				$ -
Easement Stewardship				$ -
Travel (in-state)	$ *5,000*			$ 5,000
Professional Services	$ *110,000*			$ 110,000
Direct Support Services	$ *175,000*			$ 175,000
DNR Land Acquisition Costs ($3,500 per acquisition)				$ -
Other				$ 90,000
Capital Equipment (*auto entered from below*)	$ -	$ -	*private source*	$ -
Other Equipment/Tools	$ *15,000*			$ 15,000
Supplies/Materials	$ *75,000*		*local fundraising*	$ 75,000
	$ 400,000	$ -	$ -	$ 400,000

Capital Equipment *(single items over $10,000 - auto entered into table above)*

Item Name	LSOHC Request	Leverage
Item 2 enter here		
Item 3 enter here		
Item 4 enter here		
Item 5 enter here		
Item 6 enter here		
Item 7 enter here		
Item 8 enter here		
Total	-	-

Attachment B. Output Tables

Name of Proposal:	Knife River habitat Restoration
Date:	7/14/2011

Table 1 and Table 3 column totals should be the same AND Table 2 and Table 4 column totals should be the same

If your project has lakes or shoreline miles instead of land acres, convert miles to acres for Tables 1 and 3 using the following conversion:
Lakeshore = 6 acres per lakeshore mile / Stream & River Shore = 12 acres per linear mile, if both sides

Table 1. Acres by Resource Type

Describe the scope of the project in acres (use conversion above if needed)

	Wetlands	Prairies	Forest	Habitats	Total
Restore			*99*	*99*	198
Protect Fee					0
Protect Easement					0
Protect Other					0
Enhance					0
Total	0	0	99	99	

Total Acres (sum of Total column)	198	*These two cells should be the same figure.*
Total Acres (sum of Total row)	198	

Table 2. Total Requested Funding by Resource Type

	Wetlands	Prairies	Forest	Habitats	Total
Restore			*$ 200,000*	*$ 200,000*	$ 400,000
Protect Fee					$ -
Protect Easement					$ -
Protect Other					$ -
Enhance					$ -
Total	$ -	$ -	$ 200,000	$ 200,000	

Total Dollars (sum of Total column)	$ 400,000	*These two cells should be the same figure.*
Total Dollars (sum of Total row)	$ 400,000	

Check to make sure this amount is the same as the Funding Request Amount on page 1 of Main Funding Form.

Table 3. Acres within each Ecological Section

	Metro/Urban	Forest/Prairie	SE Forest	Prairie	Northern Forest	Total
Restore					*198*	198
Protect Fee						0
Protect Easement						0
Protect Other						0
Enhance						0
Total	0	0	0	0	198	

Total Acres (sum of Total column)	198	*These three cells should be the same figure.*
Total Acres (sum of Total row)	198	
Total Acres from Table 1.	198	

Attachment B. Output Tables

Table 4. Total Requested Funding within each Ecological Section

	Metro/Urban	Forest/Prairie	SE Forest	Prairie	Northern Forest	Total
Restore						$ -
Protect Fee						$ -
Protect Easement						$ -
Protect Other						$ -
Enhance					*$ 400,000*	$ 400,000
Total	$ -	$ -	$ -	$ -	$ 400,000	

Total Dollars (sum of Total column) $ 400,000
Total Dollars (sum of Total row) $ 400,000
These two cells should be the same figure.
Check to make sure these amounts are the same
as the Funding Request Amount on page 1 of Main Funding Form.

Table 5. Target Lake/Stream/River Miles

16.5 # miles of Lakes / Streams / Rivers Shoreline

Table 6. Acquisition by PILT Status *(enter information in acres)*

	Wetlands	Prairies	Forests	Habitats	Total
Acquired in Fee with State PILT Liability					0
Acquired in Fee w/o State PILT Liability					0
Permanent Easement *NO State PILT Liability*					0
	0	0	0	0	

Table 7. Estimated Value of Land Acquisition by PILT Status *(enter information in dollars)*

	Wetlands	Prairies	Forests	Habitats	Total	*FYI: should match total in budget table that is auto entered below*
Acquired in Fee with State PILT Liability					$ -	$ -
Acquired in Fee w/o State PILT Liability					$ -	$ -
Permanent Easement *NO State PILT Liability*					$ -	$ -
	$ -	$ -	$ -	$ -		

Attachment C. Parcel List

Name of Proposal:
7/14/2011
Knife River Habitat Restoration

Parcel Name	County	Township (25-258)	Range (01-51)	Direction most parcels are 2 with the exception of some areas of Cook County which is 1	Section (01 thru 36)	TRDS	# of acres	Budgetary Estimate (includes administrative, restoration or other related costs and do not include matching money contributed or earned by the transaction)	Description	Activity PF=Protect Fee PE=Protect Easement PO=Protect Other R=Restore E=Enhance	If Easement, what is the easement cost as a % of the fee acquisition?	Any existing protection? (yes/no)	Open to hunting and fishing? (yes/no)
West Branch of the Knife River	*St. Louis*	*53 N*	*12 W*		*portions of* 2,3,9,10,12 19,20,22,23 24,26,27,29 30 and 34		*198*	*$400,000*	*Streambed and stream bank* acreage	*R and E*	*n/a*	*Yes*	*Yes*

Information provided will be used to map project locations. Incomplete or inaccurate information will result in that parcel or program not being mapped.