Environment and Natural Resources Trust Fund
2019 Request for Proposals (RFP)

Project Title: **ENRTF ID: 039-AH**

Foundational Ecological Information for Tribal Fire Management

Category: H. Proposals seeking $200,000 or less in funding

Sub-Category: A. Foundational Natural Resource Data and Information

Total Project Budget: $ 182,860

Proposed Project Time Period for the Funding Requested: June 30, 2021 (2 yrs)

Summary:

The collection and development of tree-ring records for traditional Ojibwe lands to inform long-term adaptive management of 7.5 million acres of fire-dependent forests in Minnesota.

Name: Kurt Kipfmueller

Sponsoring Organization: U of MN

Title: Associate Professor

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Location

Region: Northeast

County Name: Carlton, St. Louis

City / Township:

Alternate Text for Visual:

Visual representation of historical and present conditions of red pine forests in Minnesota.

_____ Funding Priorities	_____ Multiple Benefits	_____ Outcomes	_____ Knowledge Base
_____ Extent of Impact	_____ Innovation	_____ Scientific/Tech Basis	_____ Urgency
_____ Capacity Readiness	_____ Leverage	_____ TOTAL	_____%
____ If under $200,000, waive presentation?			

PROJECT TITLE: Foundational Ecological Information for Tribal Fire Management

I. PROJECT STATEMENT

Long-lived, natural-origin red pine forests are slowly disappearing from the Minnesota landscape, largely due to a century of fire suppression across the state. Meanwhile, decades of forest research has clearly shown that red pine cannot regenerate naturally without the rejuvenating effect of periodic surface fires (see visual). Traditional knowledge from Ojibwe communities emphasizes that planned fires were historically used as an important management tool to increase berry production, maintain forest openings, and improve wildlife habitat. These multiple-benefit fires would have also maintained and regenerated red pine, a culturally important tree for the Lake Superior Ojibwe and the state tree of Minnesota. The use of planned fire as a forest management tool is slowly growing, but the reintroduction of fire to the landscape presents questions that require local ecological knowledge, cultural sensitivity, and the inclusion of groups directly responsible for fire management on the ground. The determination of when and where fire should be used must include a broad coalition of stakeholders guided by the best available information on historical fire processes.

We propose a **multi-century investigation of tree-ring-based fire history** that will **preserve a fading natural and cultural record** of forest fire in northeast Minnesota and **provide critical information for reintroducing fire** as a management tool to the landscape. With an emphasis on Fond du Lac tribal lands, project products will inform adaptive fire management across 7.5 million acres of fire-dependent conifer forest in northern Minnesota (40% of the NE MN landscape), all of which was land historically stewarded by the Minnesota Ojibwe since at least the mid 1700s. These fire-dependent forests, which are valued economically and ecologically, have been reduced in quality and abundance since European-American settlement. The remaining fire-dependent forests of Minnesota are increasingly vulnerable to drought, insects, and *catastrophic* fire as warming temperatures are predicted to lengthen the fire season and increase the duration and extent of native and non-native insect outbreaks. The reintroduction of planned fires to Minnesota's fire-dependent landscapes, particularly in pine forest types, may be one of the best ways to reduce ecosystem vulnerability to climate change, improve the natural regeneration of future timber resources, increase landscape biodiversity, create wildlife habitat, restore native vegetation communities, and reduce wildfire risk. Tree-ring-based fire histories provide site-specific ecological information desired by managers to make the most informed short- and long-term forest and fire management decisions at local to landscape scales.

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1: Locate and collect fire history sites on the Fond du Lac Reservation. With the aid of staff from Fond du Lac tribal forestry, we will survey, record, and sample 6-12 fire history sites within the Fond du Lac Reservation. We will reference management records, soil and landform maps, aerial imagery, and local knowledge to identify areas with high densities of remnant or living fire-scarred red pine trees, snags, and stumps on FDL lands. Where abundant fire scar records are found, fire-scarred wood will be collected for the development of fire histories.

Outcome	Completion Date
1. Network of fire history sites located, sampled, described.	*Summer 2020*

Activity 2: Participatory research and storytelling with Fond du Lac community members. A core group of Fond du Lac tribal community members will be invited on field trips to visit sample sites and share their knowledge of traditional uses of the sites and surrounding landscape.

Outcome	Completion Date
1. Information exchanges with at least five tribal elders documented and formally compiled as a research document with multi-media components.	*Summer 2020*

Activity 3: Prepare, date, and analyze wood samples.
We will prepare wood specimens for dendrochronological analysis at the Cloquet Forestry Center and in other University of Minnesota woodshop spaces. Once these tree-ring specimens are prepared for laboratory analysis, they will be crossdated, analyzed, and merged with newly developed tree-ring records for the Cloquet Forestry Center, located within the FDL Reservation.

Outcome	Completion Date
1. Tree-ring samples dated and compiled	*Winter 2020*

Activity 4: Develop fire history report for the Fond du Lac Reservation.
Results from Activities 1-3 will be merged to create a fire history report for the Fond du Lac Reservation that merges local, traditional understandings of historical land use with tree-ring records that document fire occurrence.

Outcome	Completion Date
1. Report compiled	*Summer 2021*

III. PROJECT PARTNERS:
The project team includes Dr. Kurt Kipfmueller from University of Minnesota Department of Geography, Environment, & Society (Project Manager; receiving funding), Lane Johnson from Cloquet Forestry Center (field research manager; not funded), and Christian Nelson from Fond du Lac Tribal Forestry (field logistics; not funded). The project will also support one University of Minnesota graduate student (funded) to assist with all phases of the project. The project team will be working closely with individuals from Fond du Lac Resource Management including Jill Hoppe, FDL Tribal Historic Preservation Officer.

IV. LONG-TERM- IMPLEMENTATION AND FUNDING:
Fire history records collected as part of this project will be used by Fond du Lac Resource Management to further incorporate fire into management activities including the creation and maintenance of blueberry patches, silvicultural treatments to promote natural pine regeneration, and promote wildlife habitat for game species significant to the Fond du Lac Ojibwe. Site-specific records of fire, and associated wood specimens, will be used to promote conversations around traditional knowledge and management of FDL tribal lands, and enrich tribal connections to place through storytelling. Traditional knowledge shared will be incorporated into future demonstration silvicultural prescriptions for multiple resource benefits at the Cloquet Foresty Center.

V. TIME LINE REQUIREMENTS:
One full field season including the gathering of tree-ring samples and traditional knowledge beginning July 2019 ending October 2019, recommencing April 2020 and ending June 2020; one year of data analysis (November 2019 to October 2020; and 9 months for report preparation from November 2020 to June 2021. The full project will take two years to complete if implemented as a graduate student project.

2019 Detailed Project Budget

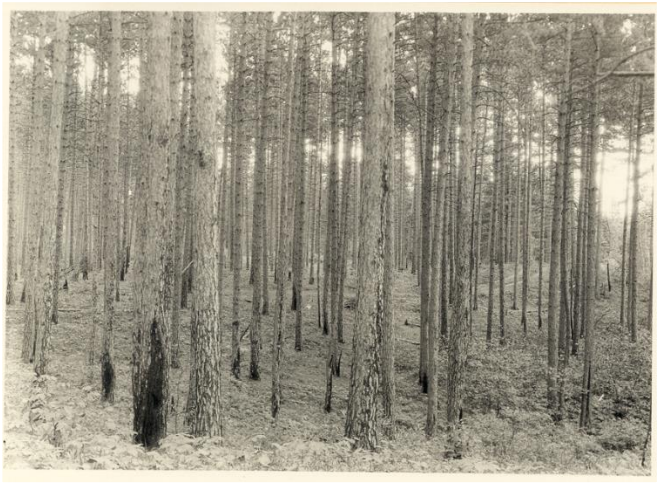
Project Title: Foundational Ecological Information to Guide Tribal Fire Management

IV. TOTAL ENRTF REQUEST BUDGET 2 years

BUDGET ITEM	AMOUNT
Personnel:	
Kurt Kipfmueller, Project PI, overseeing and participating in all aspects of the research, primary responsibility for data analysis (66.5% Salary, 33.5% benefits); 1.5 mos (8% FTE) for years 1 & 2.	$ 42,912
University of Minnesota Graduate Student Research Assistant, manages field data collection and data processing, assistance with data analysis and GIS mapping, assists with report development (51% Salary, 42% Tuition, 7.6% benefits), 50% FTE for years 1&2)	$ 96,040
1 Undergraduate Research Assistant, assist with data collection and processing of samples, preference will be given to an FDL tribal member attending the UofM (100% Salary, 0% benefits); 40% FTE for years 1 & 2	$ 24,000
Honorarium for Fond du Lac elders particpating in the project (5 elders, $200 honorarium each @ $25/hour and 16 hours each)	$ 2,000
Equipment/Tools/Supplies:	
GPS Receiver and hand-held tablet for recording and mapping locations of field samples	$ 1,400
Field and laboratory supplies (pallet wrap for samples, wood glue, sanding belts, replacement saw blades and chains, plywood for mounting samples, saw maintenance)	$ 2,500
Travel:	
University of Minnesota Fleet Vehicle Rental (1 mo. each in years 1 & 2) for travel to field sites	$ 2,028
Fleet Vehicle Mileage (2,000 miles year 1, 2,000 miles year 2 @ $0.37/mile) for travel to field sites	$ 1,480
Per Diem (2 people for 20 days in each of years 1 and 2 @ $51/day) while conducting fieldwork	$ 4,080
Lodging (32 people nights for each of years 1 & 2) while conducting field work. Overnight lodging at Cloquet Forestry Center, $30 per person per night.	$ 1,920
Additional Budget Items:	
Support to convene a culminating conference/workshop to share and discuss results with Fond du Lac Resource Management, Fond du Lac tribal members, and other community stakeholders.	$ 2,500
Archival Support (support to cover costs associated with permanent archival of specimens including packaging and inventory database support)	$ 2,000
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND $ REQUEST =	$ 182,860

V. OTHER FUNDS

SOURCE OF FUNDS	AMOUNT	Status
Other Non-State $ To Be Applied To Project During Project Period:	N/A	N/A
Other State $ To Be Applied To Project During Project Period:	N/A	N/A
In-kind Services To Be Applied To Project During Project Period:	N/A	N/A
Past and Current ENRTF Appropriation:	N/A	N/A
Other Funding History:	N/A	N/A



1. Fire-maintained stand of natural-origin red pine, 108 years old, photo taken ca. 1924, Cloquet, MN

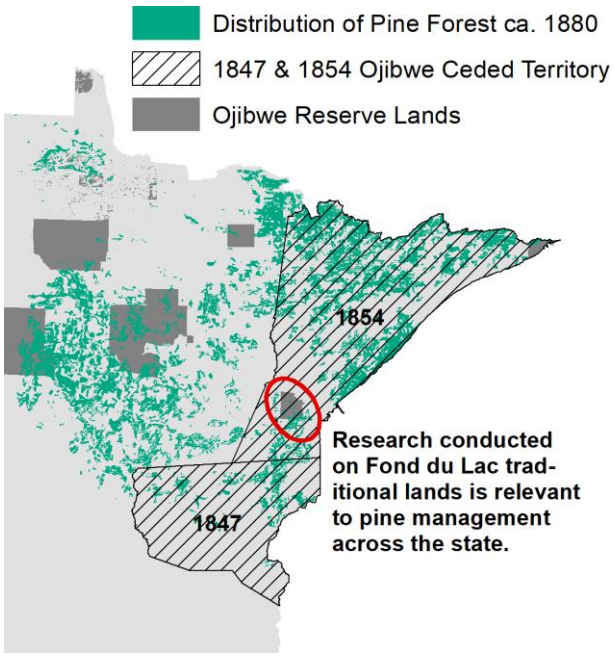
2. Planted red pine stand with fire exclusion since establishment ca. 1930, photo taken 2018, Cloquet, MN

3. Controlled blueberry burn in coastal red pine forest, Stockton Island, Apostle Islands National Lakeshore, WI

1. Red pine forests were historically maintained by frequent surface fires that often created long-lived stands resistant to catastrophic crown fire with open understories, vigorous ground cover, and quality habitat for wildlife.

2. A century of fire suppression (fire absence) has created dense red pine stands and understories that are vulnerable to drought, disease, and wildfire across the forest lands of northern Minnesota.

3. Site-specific fire history reconstructions guide best practices for reintroduction of fire to pine lands to improve forest health, wildlife habitat, and recreational values while reducing the risk of catastrophic wildfire.



Prescribed fires benefit fire-loving trees, flora, and fauna

Project Manager Qualifications and Organization Description

Dr. Kurt Kipfmueller is Associate Professor of Geography, Environment, & Society at the University of Minnesota–Twin Cities. Dr. Kipfmueller has extensive experience reconstructing fires using tree rings in a variety of forested landscapes. His most recent research efforts involve the reconstruction of fires in red pine forests of the Boundary Waters Canoe Area Wilderness, Voyageurs National Park, Apostle Islands National Lakeshore, and along the Brule River (WI). He received his Ph.D. from the University of Arizona in 2003. His research has appeared in *Ecological Applications*, *Quaternary Research*, *Canadian Journal of Forest Research*, *Forest Ecology and Management*, and *Geophysical Research Letters*. He is founding and senior member of the Center for Dendrochronology at the University of Minnesota. He is also a member of the Academy of Distinguished Teachers at the University of Minnesota and has provided exceptional research partnerships with undergraduates in his laboratory group.