



Environment and Natural Resources Trust Fund (ENRTF) M.L. 2016 Work Plan

Date of Report: May 29, 2016

Date of Next Status Update Report:

Date of Work Plan Approval:

Project Completion Date: 30 June 2019

Does this submission include an amendment request? ___

PROJECT TITLE: Restoration of Elk to Northeastern Minnesota

Project Manager: James D Forester

Organization: University of Minnesota

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Location: Carlton, Pine, and St. Louis Counties

Total ENRTF Project Budget:

ENRTF Appropriation: \$300,000

Amount Spent: \$0

Balance: \$300,000

Legal Citation: M.L. 2016, Chp. 186, Sec. 2, Subd. 03I

Appropriation Language:

\$300,000 the second year is from the trust fund to the Board of Regents of the University of Minnesota in cooperation with the Fond du Lac Band and Rocky Mountain Elk Foundation to determine the habitat suitability and levels of public support for restoring elk to northeastern Minnesota. This appropriation is available until June 30, 2019, by which time the project must be completed and final products delivered.

I. PROJECT TITLE: Restoration of Elk to Northeastern Minnesota

II. PROJECT STATEMENT:

Elk historically occupied most of Minnesota prior to the early 1900's. Although two small populations were re-established in northwest MN, they are currently managed at low levels to reduce human-wildlife conflict. Forested areas of the state, however, could avoid some of these conflicts and see significant ecological and economic benefits from returning elk to the landscape. Re-establishing this keystone herbivore will help restore the state's traditional wildlife heritage, diversify the large mammal community, increase tourism from wildlife viewers, and eventually provide additional hunting opportunities. Finally, a landscape actively managed for elk will benefit other species adapted to young forests and brushlands. Evidence from other eastern states indicates elk restoration can be successful, but success is dependent on active forest management and public support for elk by local communities.

This research will determine areas of suitable habitat and levels of public support for restoring elk to Northeastern Minnesota. Research will be conducted in an area already identified as having local public interest and abundant public forest land (i.e., southern St Louis, Carlton, and northern Pine counties; Figure 1). The research team will build upon existing eastern elk restoration research to address two research goals:

- 1) Identify the amount of public support for a restored elk population by surveying citizens in and around the prospective restoration sites.
- 2) Determine where suitable habitat exists and how many elk it could sustain. Combine the public support and habitat suitability maps to identify areas likely to support a restored elk population.

Despite potential economic and ecological benefits, care must be taken to determine if suitable habitat exists for elk and if the public will support having elk on the landscape. Our initial interaction with county governments and conservation groups indicates there is great interest in exploring elk restoration; however, we will conduct a quantitative survey of public attitudes to determine levels of tolerance for elk across the study area. To identify locations of suitable habitat, we will compile existing data on land use and land cover and collect field data on forage availability. We will use these data in conjunction with a synthesis of existing elk research in the Midwest to map how habitat suitability varies across the study area. Finally, we will combine the public support and habitat suitability maps to identify areas most likely to support a successful restoration. This study will provide critical information to wildlife managers and local governments allowing them to make an informed decision regarding habitat suitability and public support for the next steps in elk restoration.

III. OVERALL PROJECT STATUS UPDATES:

Project Status as of 2 December 2016:

Project Status as of 30 June 2017:

Project Status as of 31 January 2018:

Project Status as of 30 June 2018:

Project Status as of 31 January 2019:

Overall Project Outcomes and Results:

IV. PROJECT ACTIVITIES AND OUTCOMES:

ACTIVITY 1: Assessing public attitudes towards elk restoration.

Description: Understanding the public’s attitudes and acceptance of elk and their potential impacts are key components of assessing the viability of elk restoration. Long-term management of elk will require an adaptive impact approach in which management objectives and strategies are guided by the preferences of the impacted public. To address this need, we propose conducting surveys and workshops with local citizens.

Three important groups include: private landowners in the potential restoration zone, hunters and the larger conservation community, and the general public residing in or near the potential restoration zone. The completed target sample size for each study group will provide error estimates within 4%. We will contact potential respondents in each target population using current best practices for multi-modal survey contact designs and probability-based sampling approaches. Probability-based samples are essential to allowing generalization of results back to the populations of interest. Initial contacts will be made using address-based sampling designs and mailed paper surveys. Subsequent contacts will be made via e-mail when possible with provision of a web-based response.

We will use county property records to identify and randomly select landowners for inclusion in the study and augment county contact information with available e-mail addresses to allow for direct electronic contact of respondents with e-mail addresses. We will use Address Based Sampling (ABS) utilizing the US Postal Service’s Computerized Delivery Sequence File (or 9-1-1 response) addresses to randomly select individual households for participation in the study. This ABS approach provides 100% coverage of owner-occupied and rental residential addresses and will be augmented with e-mail contact information so that follow-up contacts can be electronic and data collection web-based. We will use the Minnesota Department of Natural Resource’s Electronic License System data to randomly select hunters and other conservationists for participation in the study. Up to 30% of individuals in the ELS provide an e-mail contact, and we will append additional e-mail addresses using commercially available services so that an e-mail contact and web-based survey option can be provided to those respondents who prefer electronic contact. This probability-based sampling and multi-modal administration strategy will help to minimize sampling, non-coverage and response biases.

The primary objectives of the surveys will be to understand citizens’: 1) attitudes toward elk and elk restoration; 2) acceptance and tolerance of potential elk impacts; 3) preference for management objectives concerning elk restoration including elk population size and geographical distribution; and 4) preferences for management strategies to address potential conflicts with elk. Our approach for gathering social survey data will be guided by numerous studies assessing the social aspects of wildlife restoration. Based on our findings, we will develop a spatially explicit map of expected tolerance levels for a restored elk population.

We will also conduct a minimum of 6 local workshops and webinars after the social survey data have been collected and analyzed so we can better understand the public perceptions of the social survey data and ecological research from Activity 2 and facilitate discussion among the attendees about the research findings. The primary objectives of the workshops are to disseminate research findings and facilitate dialogue concerning the implications of the findings. We will also develop a website and use traditional and social media outlets to distribute information about the project to the public.

Summary Budget Information for Activity 1:

ENRTF Budget: \$ 138,804
Amount Spent: \$ 0
Balance: \$ 138,804

| Outcome | Completion Date |
|---|-----------------|
| 1. Design, implement and analyze data for 3 survey groups (based on up to 12,182 mailed surveys; this is the most effective method for a statistically valid survey). | December 2017 |

| | |
|--|-----------|
| 2. Complete social acceptance map for the study area. | May 2018 |
| 3. Complete 6 public workshops / webinars (25-50 attendees expected at each). | May 2019 |
| 4. Develop website and use traditional and social media outlets to distribute information and receive comments about the social and ecological survey results. | June 2019 |

Activity Status as of 2 December 2016:

Activity Status as of 30 June 2017:

Activity Status as of 31 January 2018:

Activity Status as of 30 June 2018:

Activity Status as of 31 January 2019:

Final Report Summary:

ACTIVITY 2: Ecological aspects of elk restoration

Description:

Whether a restored elk population will thrive at a given site will depend on a variety of factors. Here, we will focus our efforts on determining: 1) human land-use patterns; 2) the distribution of current land-cover types (including forest age structures and the specific agricultural uses); 3) expected future changes to land cover; 4) the diversity and abundance of forage within each cover type; and 5) locations of captive cervid operations. We will consider risk of agricultural damage and other potential human conflicts as well as expected elk movement patterns and population growth. Finally, we will use the existing 2013-2014 MN land-cover dataset to identify prospective sites; field surveys of forage availability will be conducted in all of these areas to estimate the distribution of food resources (both quality and amount) within each land-cover type. We will combine these data with existing information on elk habitat use to develop a habitat suitability map and estimate the carrying capacity of potential relocation sites. This map will be integrated with the final product of Activity 1 to produce an elk suitability map for the region.

Compilation of existing spatial data: In Year 1, we will collect existing data about recent land use (e.g., locations of agriculture, timber harvest, and captive cervid operations) and land cover from state and county agencies. Future use of public lands will be considered by discussing forest management plans with agency representatives; when possible (i.e., where spatially explicit plans of timber harvest are available) we will include expected land-cover change into our projections of suitability. Land cover will be validated in Years 2 and 3 by visiting 250 sites across the study area.

Forage availability: We will identify 120 sites distributed among the primary land-cover types within the study area. During the summer of Year 2 (June-August) we will visit each site to estimate plant species abundance and biomass for all functional groups (herbaceous plants, grasses, and low woody vegetation). For a subset of the sites we will collect and dry plant biomass to refine biomass allometric equations for the study area. The forage diversity and abundance estimates will be extrapolated across the study area, and these maps crossvalidated and then ground-truthed by visiting 50 sites in the summer of Year 3.

Restoration Suitability: We will synthesize current and previous research on elk from Wisconsin, Ontario, Michigan, and western Minnesota to develop Habitat Suitability estimates for the study area. These data will consist of resource selection patterns and population growth rates through time. Based on our data that quantify the distribution of resources and previous research on elk physiology and behavior, we will develop

approximate carrying capacities for a variety of potential release sites within the study area. We will combine the Ecological and Social maps to identify areas where restoration efforts are more likely to succeed. Our final feasibility report will summarize the strengths and weaknesses for different release sites with the goal to provide managers with the information they need to decide if an elk restoration is feasible, and if so where it will have the greatest likelihood of success in the study area.

Summary Budget Information for Activity 2

ENRTF Budget: \$ 161,196
Amount Spent: \$ 0
Balance: \$ 161,196

| Outcome | Completion Date |
|--|------------------------|
| <i>1. Identify primary elk study areas using existing data.</i> | <i>May 2017</i> |
| <i>2. Complete forage surveys (visit 120 sites distributed among primary land-cover types to estimate quality and abundance of common elk forage species).</i> | <i>September 2017</i> |
| <i>3. Ground truth land-cover and forage availability maps (visit 250 sites to confirm cover types).</i> | <i>August 2018</i> |
| <i>4. Complete ecological carrying capacity map and population estimation.</i> | <i>December 2018</i> |
| <i>5. Complete final suitability map and feasibility report.</i> | <i>June 2019</i> |

Activity Status as of 2 December 2016:

Activity Status as of 30 June 2017:

Activity Status as of 31 January 2018:

Activity Status as of 30 June 2018:

Activity Status as of 31 January 2019:

Final Report Summary:

V. DISSEMINATION:

Description: The workshops in Activity 1 will provide a direct outlet to share our findings with the public. A fact sheet that summarizes our findings will be distributed to LCCMR members and land managers at the state and federal level; this will also be made available on the UMN Department of Fisheries, Wildlife, and Conservation Biology website. Results will be presented at state and national wildlife and ecology conferences (e.g., both state and national conferences of The Wildlife Society, the Society for Conservation Biology). Any publications resulting from this project will be made available through the FWCB website or Open Access journal websites.

We also expect that there will be a large amount of informal dissemination because we will be working closely with researchers and managers from the Department of Natural Resources, county governments, and the Fond du Lac Band of Lake Superior Chippewa. These researchers will take the results of our study into consideration as they make management decisions and will work with us to ensure that our data products reach a broad audience within their agencies.

Status as of 2 December 2016:

Status as of 31 May 2017:

Status as of 31 January 2018:

Status as of 31 May 2018:

Status as of 31 January 2019:

Final Report Summary:

VI. PROJECT BUDGET SUMMARY:

A. ENRTF Budget Overview:

| Budget Category | \$ Amount | Overview Explanation |
|---|------------------|---|
| Personnel: | \$ 278,151 | 1 project manager at 8%FTE for 3y; 1 postdoc at 100% FTE for 2y; 1 PhD student at 50% FTE for 2 y; 1 lab technician at 8% FTE for 3 y; 2 undergraduate research assistants at 15%FTE for 1y; 4 undergraduate research assistants at 17% FTE for 2y. |
| Professional/Technical/Service Contracts: | \$3,654 | Mailing services for survey |
| Travel Expenses in MN: | \$13,008 | Travel to study area by project management staff and technicians 3 months/yr for 2 years; partial room and board for field crew. |
| Other: | \$0 | |
| TOTAL ENRTF BUDGET: | \$300,000 | |

Explanation of Use of Classified Staff: NA

Explanation of Capital Expenditures Greater Than \$5,000: NA

Number of Full-time Equivalents (FTE) Directly Funded with this ENRTF Appropriation: 4.9

Number of Full-time Equivalents (FTE) Estimated to Be Funded through Contracts with this ENRTF Appropriation: 0

B. Other Funds:

| Source of Funds | \$ Amount Proposed | \$ Amount Spent | Use of Other Funds |
|---------------------------------|---------------------------|------------------------|--|
| Non-state | | | |
| Fond du Lac Band | \$15,000 | \$0 | internal funding to support survey materials Survey materials (envelopes, paper, printing costs, etc: 12182 surveys \$1.25 each) |
| Fond du Lac Band | \$26,400 | \$0 | Pending - external funding to support field effort (room and board for field crew, equipment, postage) |
| Rocky Mountain Elk Foundation | \$15,000 | \$0 | funding to support survey incentive (\$3 / completed survey) |
| United States Geological Survey | \$32,000 | \$0 | Salary for Fulton (10% match over two years) |

| | | | |
|---|------------------|----------------|---|
| Fond du Lac Band | \$27,799 | \$0 | Salary for Schrage (10% match) |
| Fond du Lac Band | \$8,736 | \$0 | Salary for Howes (3% match) |
| Fond du Lac Band | \$10,500 | \$0 | Travel for Schrage and FDL employees for elk research |
| State | | | |
| UMN research funds from Forester | \$3,158 | \$3,158 | |
| UMN foregone Indirect Cost Recovery funding | \$137,023 | \$0 | 52% of direct costs, excluding graduate fringe |
| TOTAL OTHER FUNDS: | \$277,896 | \$3,158 | |

VII. PROJECT STRATEGY:

A. Project Partners:

A research team will be led by scientists from the University of Minnesota Department of Fisheries, Wildlife, and Conservation Biology (Dr. James Forester) and MN Cooperative Fish & Wildlife Research Unit (Dr. David Fulton) and the Fond du Lac Resource Management Division (Mike Schrage and Tom Howes). Forester will oversee the ecological portion of the project while Fulton will take the lead on the public attitude and acceptance survey. We will support a PhD level graduate student and a postdoctoral research associate on this project (advised by Forester and Fulton) and will receive support from the Fond du Lac Band and the Rocky Mountain Elk Foundation. Carlton, St. Louis, and Pine Counties, and the Minnesota Department of Natural Resources are not receiving funding, but are supporting this application and will provide data on forest management and land use. Other local and statewide conservation organizations have written letters of support for conducting this initial feasibility study.

B. Project Impact and Long-term Strategy:

If this study demonstrates there is sufficient public support and suitable habitat, then the next steps in the process for restoring elk to Northeastern Minnesota can be taken. Further, we will develop a research framework that could be applied to other areas of the state where citizens are interested in exploring the feasibility of elk restoration. The proposed work builds on moose research by the MNDNR in NW Minnesota to examine how this species is responding to a variety of landscapes. This study will directly address questions of management concern and will also advance managers’ understanding of (1) the strength of public support for an elk restoration in NE Minnesota; (2) where a reintroduced elk population would be most likely to thrive based on the landscape-scale distribution of forage and land cover; and (3) where areas of social support and high-quality elk habitat overlap. Our ongoing collaborations with state, tribal, and federal agencies will ensure that the research results are broadly disseminated and that they will be used to help determine if elk restoration in this area is feasible in the future.

C. Funding History:

| Funding Source and Use of Funds | Funding Timeframe | \$ Amount |
|--|--------------------------|------------------|
| Mike Schrage and Tom Howes from the Fond du Lac Band have given 20 presentations to local county governments and the public on this topic to build initial support for this plan. In addition, Mike has attended 2 Eastern Elk Workshops and traveled to Michigan and Wisconsin to better understand the issues and logistics with restoring elk populations. Funding has come from internal Fond du Lac Band funding sources to cover time and travel expenses. | 2014-2015 | \$14,632 |
| | | \$ |
| | | \$ |

IX. VISUAL COMPONENT or MAP(S):

Feasibility of restoring elk to Northeastern Minnesota

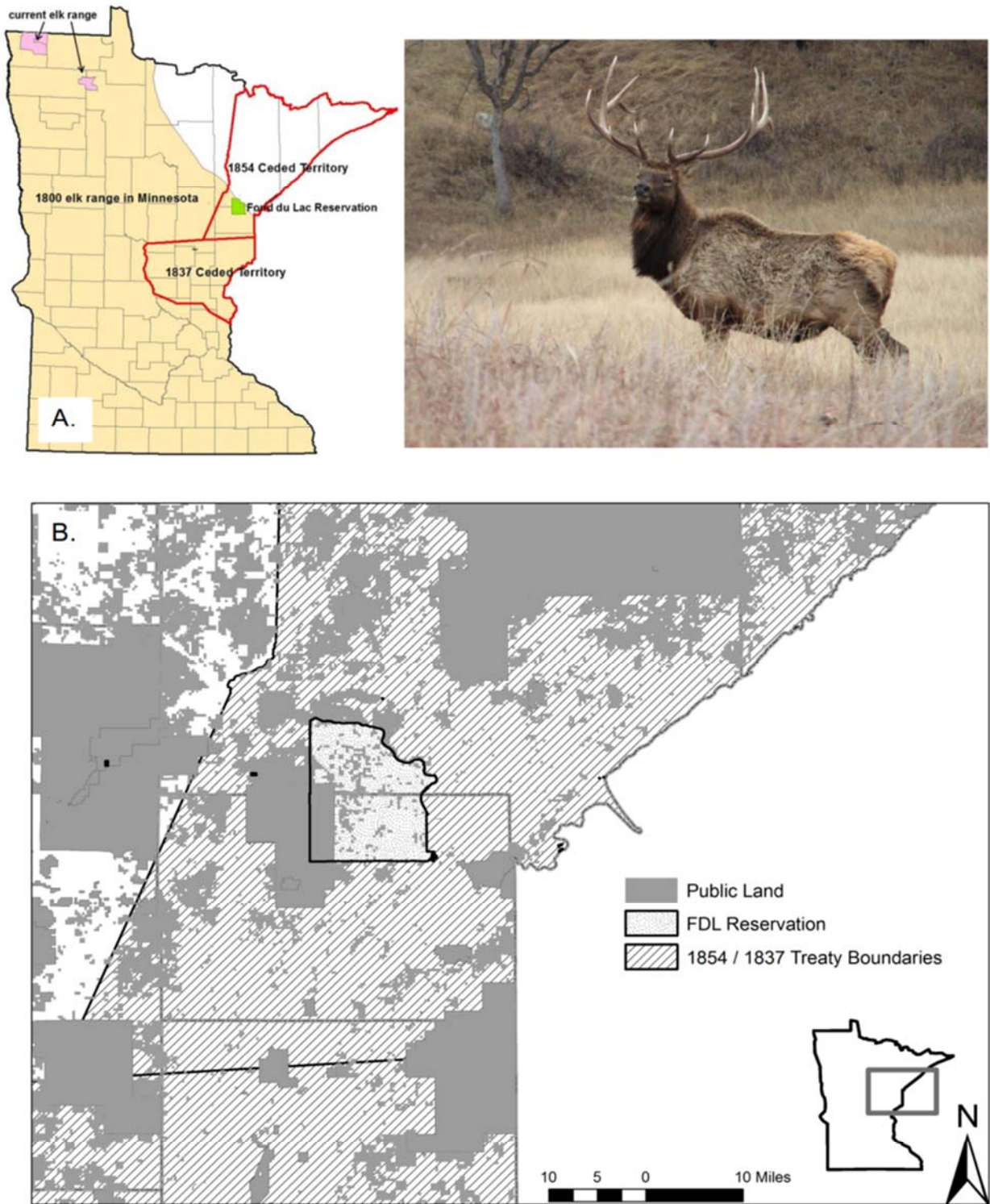


Figure 1: A. Historic and current range of elk in Minnesota. **B.** The proposed study area in Northeastern MN. A combination of public opinion surveys and workshops along with GIS mapping, air photos, and field surveys of habitat characteristics will identify areas with sufficient public support and suitable habitat for restoring an elk population.

X. RESEARCH ADDENDUM: NA

XI. REPORTING REQUIREMENTS:

Periodic work plan status update reports will be submitted no later than 2 December 2016, 31 May 2017, 31 January 2018, 31 May 2018, and 31 January 2019. A final report and associated products will be submitted between June 30 and August 15, 2019.

**Environment and Natural Resources Trust Fund
M.L. 2016 Project Budget**

Project Title: Restoration of Elk to Northeastern Minnesota

Legal Citation: M.L. 2016, Chp. 186, Sec. 2, Subd. 03I

Project Manager: James D Forester

Organization: University of Minnesota

M.L. 2016 ENRTF Appropriation: \$300,000

Project Length and Completion Date: 3 Years, June 30, 2019

Date of Report: May 29, 2016



| ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET | Activity 1 Budget | Amount Spent | Activity 1 Balance | Activity 2 Budget | Amount Spent | Activity 2 Balance | TOTAL BUDGET | TOTAL BALANCE |
|--|--|--------------|--|-------------------|--------------|--------------------|--------------|---------------|
| BUDGET ITEM | Assessing public attitudes towards elk restoration. | | Ecological aspects of elk restoration | | | | | |
| Personnel (Wages and Benefits) | \$134,150 | \$0 | \$134,150 | \$144,001 | \$0 | \$144,001 | \$278,151 | \$278,151 |
| Faculty (Forester) - 8%FTE = 1mo summer salary per year over 3yr (\$25,519) plus 33.8% fringe (\$8,625): will manage project, and take lead on supervise the collection and analysis of elk habitat data (total = \$34,144). | | | | | | | | |
| Postdoctoral scholar \$22/hr 100% FTE for two years (annually: \$45,760 salary, \$9,793 fringe; total = \$111,106): Will lead field and GIS data collection and analysis efforts, and create final combined suitability map. | | | | | | | | |
| PhD student \$21/hr 50% FTE for two years (annually: \$21,723 salary, \$18,848 fringe and tuition, total = \$79,941): Will lead stakeholder engagement survey efforts. | | | | | | | | |
| <i>Undergraduate lab assistants – 3-4 students, working a total of 624h over 1 yr, \$15/h: will complete survey mailing and aid graduate students with data entry of survey results (total 30% FTE for 1 yr = \$9,360)</i> | | | | | | | | |
| <i>Undergraduate field and lab assistants – 3-4 students, 40h/wk, 10 wks over 2 yr, \$15/h: will aid graduate student and postdoc with data collection and entry. (total 70% FTE /yr for 2 years = \$43,600)</i> | | | | | | | | |
| | | | | | | | | |
| Professional/Technical/Service Contracts | \$3,654 | \$0 | \$3,654 | | | | \$3,654 | \$3,654 |
| <i>Mailing services for surveys (UMN mailing service)</i> | | | | | | | | |
| Equipment/Tools/Supplies | \$1,000 | \$0 | \$1,000 | \$4,187 | \$0 | \$4,187 | \$5,187 | \$5,187 |
| field equipment (cloth sample bags 300 x \$1.50) | | | | | | | | |
| Tablets for data entry (1 x \$250) | | | | | | | | |
| Handheld GPS units (1 x \$530) | | | | | | | | |

| | | | | | | | | |
|--|------------------|------------|------------------|------------------|------------|------------------|------------------|------------------|
| Compasses (standard sighting compasses 2 x \$45) | | | | | | | | |
| Drying oven (for drying vegetation biomass samples) | | | | | | | | |
| Survey postage (Outgoing surveys 12182 x \$0.48, Business reply questionnaires 1560 x \$0.65) Fond du Lac will cover \$5862 of postage. | | | | | | | | |
| Travel expenses in Minnesota | | | | \$13,008 | \$0 | \$13,008 | \$13,008 | \$13,008 |
| Travel to study area by project management staff and technicians 3 months/yr for 2 years (1 fleet truck @\$818/month, \$0.37/mi, 9000 miles/ yr) | | | | | | | | |
| <i>Room and board for field crew (2 yr of summer field sessions, 3 months/yr, 6 crew members at a time, rent @ \$1,500/mo, board @\$1,240/mo) -- Fond du Lac Band will cover \$15,000 of these costs</i> | | | | | | | | |
| | | | | | | | | |
| COLUMN TOTAL | \$138,804 | \$0 | \$138,804 | \$161,196 | \$0 | \$161,196 | \$300,000 | \$300,000 |

