Outdoor Heritage Fund Grant Application

The purpose of the North Dakota Outdoor Heritage Fund is to provide funding to state agencies, tribal governments, political subdivisions, and nonprofit organizations to:

Directive A. Provide access to private and public lands for sportsmen, including projects that create fish and wildlife habitat and provide access for sportsmen;

Directive B. Improve, maintain, and restore water quality, soil conditions, plant diversity, animal systems and to support other practices of stewardship to enhance farming and ranching;

Directive C. Develop, enhance, conserve, and restore wildlife and fish habitat on private and public lands; and

Directive D. Conserve natural areas for recreation through the establishment and development of parks and other recreation areas.

Exemptions

Outdoor Heritage Fund grants may not be used to finance the following:

A. Litigation;
B. Lobbying activities;
C. Any activity that would interfere, disrupt, or prevent activities associated with surface coal mining operations; sand, gravel, or scoria extraction activities; oil and gas operations; or other energy facility or infrastructure development;
D. The acquisition of land or to encumber any land for a term longer than twenty years; or
E. Projects outside this state or projects that are beyond the scope of defined activities that fulfill the purposes of Chapter 54-17.8 of the North Dakota Century Code.

Application Deadline

Applications for the first grant round cycle are due on **December 2, 2013 at 5:00 p.m. CST**. All information, including attachments, must be submitted by that date. See instructions below for submission information.

Instructions

It is our intent to have this form available on line. However, until that on-line form is available we are asking that you submit your application as a Word document. Please download this Word document (available on the Industrial Commission/Outdoor Heritage Fund Program website at http://www.nd.gov/ndic/outdoor-infopage.htm) to your computer and provide the information as requested. You are not limited to the spacing provided except in those instances where there is a limit on the number of words. After completing the application, save it and attach it to an e-mail and send it to outdoorheritage@nd.gov .Then submit the Word document as noted in the following paragraph.

Attachments in support of your application may be sent by mail to North Dakota Industrial Commission, ATTN: Outdoor Heritage Fund Program, State Capitol – Fourteenth Floor, 600 East Boulevard Ave. Dept. 405, Bismarck, ND 58505 or by e-mail to outdoorheritage@nd.gov . The application and all attachments must be received or postmarked by the application deadline. You will be sent a confirmation by e-mail of receipt of your application.

You may submit your application at any time prior to the application deadline. Early submission is appreciated and encouraged to allow adequate time to review your application and ensure that all required information has been included. Incomplete applications may not be considered for funding. **Any item noted with an * is required.**

Oral Presentation. Please note that you will be given an opportunity to make a ten-minute Oral Presentation at a meeting of the Outdoor Heritage Fund Advisory Board tentatively scheduled for the week of January 13, 2014. These presentations are strongly encouraged.

Open Record. Please note that your application and any attachments will be open records as defined by law and will be posted on the Industrial Commission/Outdoor Heritage Fund website.

Name of Organization *
North Dakota State University

Federal Tax ID# *
DUNS Number: 80-388-2299

Contact Person/Title *
Dr. Steven Travers, assistant professor

Address *
Biological Sciences, Dept. 2715
North Dakota State University
PO Box 6050
Fargo, ND

City *

Fargo

State *
North Dakota

Zip Code *
58108-6050

E-mail Address *

Steven.travers@ndsu.edu

Web Site Address (Optional)

Phone *
701-231-9435

Fax # (if available)
701-231-7149

List names of co-applicants if this is a joint proposal

MAJOR Directive: (select the Directive that best describes your grant request)*
Choose only one response

O **Directive A**. Provide access to private and public lands for sportsmen, including projects that create fish and wildlife habitat and provide access for sportsmen;

■ **Directive B**. Improve, maintain, and restore water quality, soil conditions, plant diversity, animal systems and to support other practices of stewardship to enhance farming and ranching;

O **Directive C**. Develop, enhance, conserve, and restore wildlife and fish habitat on private and public lands; and

O **Directive D**. Conserve natural areas for recreation through the establishment and development of parks and other recreation areas.

Additional Directive: (select the directives that also apply to the grant application purpose)*
Choose all that apply

■ **Directive A**. Provide access to private and public lands for sportsmen, including projects that create fish and wildlife habitat and provide access for sportsmen;

O **Directive B**. Improve, maintain, and restore water quality, soil conditions, plant diversity, animal systems and to support other practices of stewardship to enhance farming and ranching;

■ **Directive C**. Develop, enhance, conserve, and restore wildlife and fish habitat on private and public lands; and

O **Directive D**. Conserve natural areas for recreation through the establishment and development of parks and other recreation areas.

Type of organization: (select the category that describes your organization)*

■ State Agency

O Political Subdivision

O Tribal Entity

O Tax-exempt, nonprofit corporation, as described in United States Internal Revenue Code (26 U.S.C. § 501 (c)

Project Name*

Resistance to invasion by *Poa pratensis* in North Dakota prairies

Abstract/Executive Summary. An Executive Summary of the project stating its objectives, expected results, duration, total project costs and participants.* (no more than 500 words)

The grasslands of North Dakota provide valuable habitat for ducks, deer, pheasants, and grouse. Over the last century, North Dakota has become much warmer and growing seasons start much sooner, which creates an opening for noxious weed invasion in the spring. The old plant communities valued by outdoor enthusiasts are in danger of invasion from noxious weeds. In particular, Kentucky bluegrass (*Poa pratensis*) is creating the largest impact on plant communities in the grasslands. Kentucky bluegrass (KB) is the zebra mussel of the prairie. It has gone from not being recorded 150 years ago, being present 50 years ago, to the most common plant in the ND prairie today (many untilled sites from our sampling contain over 90% KB). The rapid increase from rarely reported in the early 1900s to prolific invasion is a cause for concern for many land managers trying to preserve plant biodiversity, valuable forage grasses, and habitat for North Dakota's wildlife. By linking the research being done at NDSU and natural resource organizations across the state the proposed research will assist with the creation and maintenance of grassland communities that provide suitable forage for wildlife while maintaining biodiversity.

Our objectives are to experimentally assess the ecological interactions that currently allow invasion by KB and assist in the development of tools for producing invasion resistant prairies that will benefit native wildlife and biodiversity. A key component of the fight against invasive species in North Dakota grasslands is the development of restoration ecology that uses seed mixes that are resistant to invasive species. North Dakota's annual temperature has increased more in the last 118 years than any other High Plains state (2.9 degrees Fahrenheit). Much of the decline of native species and the rapid increase in invasive species is correlated with this drastic change. Our hypothesis is KB will not be as competitive against plant species from a different ecoregion (e.g. more southern states). As a result of longer growing seasons in North Dakota (approximately 3 weeks), seed mixes with native seed from northern populations that are used to restore prairie in ND may work less favorably than southern seed mixes that are adapted to longer growing seasons. By selecting ecotypes of native grasses with the ability to warm up and grow faster in the spring there will be a narrower window of opportunity for the early spring invasion opportunity for noxious weeds. By planting seed mixes that are more resistant to invasion it will be possible for land managers to enhance habitat quality. The funds requested will support two years of fieldwork and lab experiments conducted primarily by members of the Travers laboratory at NDSU (Dr. Steven Travers, Lauren Dennhardt and undergraduate research assistants). The results of this project will improve current restoration efforts managed by organizations such as the USFWS, the ND Department of Game and Fish, local hunting chapters, and land owners who value the legendary prairies of North Dakota.

Amount of Grant request $ 88,925

Total Project Costs $ 125,853
(Note that in-kind and indirect costs can be used for matching funds)

Amount of Matching Funds $
In-Kind= $ 10,920
Indirect= $ 26,008
Please indicate if the matching funds will be in-kind, indirect or cash.

Source(s) of Matching Funds

North Dakota State University

Certifications *
■ I certify that this application has been made with the support of the governing body and chief executive of my organization.

■ I certify that if awarded grant funding none of the funding will be used for any of the exemptions noted on Page 1 of this application.

Narrative

Organization Information – Briefly summarize your organization's history, mission, current programs and activities. *
Include an overview of your organizational structure, including board, staff and volunteer involvement. (no more than 300 words)

North Dakota State University, established in 1890, is a student-focused, land-grant, research university, ranked by the Carnegie Commission on Higher Education among the top 108 public and private universities in the country. NDSU is in the elite category of "Research Universities/Very High Research Activity," with several programs ranked in the Top 100 by the National Science Foundation. NDSU is fully accredited as an institution by the Higher Learning Commission of the North Central Association of Colleges and Secondary Schools.

The mission of the Biological Sciences Department is to further the understanding of biology through teaching, research, and service. Faculty interests and expertise are in both plants and animals, ranging from cellular and molecular biology to population biology, as well as science education. We explore biological systems from molecular to ecological levels, considering both basic principles and applications of that knowledge. The department strives to develop literate, knowledgeable, and skilled graduates. Our graduates are expected to become concerned, informed, and contributing members of society.

Purpose of Grant – Describe the proposed project identifying how the project will meet the specific directive(s) of the Outdoor Heritage Fund Program *

In order to elucidate the ecological mechanisms of KB invasion and to experimentally test for resistance to invasion by native species, we will combine a series of laboratory experiments with field experiments.

Common garden experiment: We will assess the genetic basis of differences among ecotypes of native plant species collected along a latitudinal gradient by measuring phenological (natural history timing) and morphological characteristics in a common garden at NDSU. Seeds originating from multiple sites in North Dakota and along a transect from North Dakota to Kansas will be planted in replicate gardens at the agricultural field facilities (NDSU) and monitored for traits related to timing and competitive ability: timing of germination, seedling growth rate, days to first flower, root growth rate, plant area over time and biomass. We will test seeds from the dominant native species of the North Dakota prairies from each of the sites (*Panicum virgatum, Sporobolus hetrolepis, Pascopyrum smithii, Bouteloua gracilis,* and *Stipa virdula*). If rainfall and latitude gradients have led to the formation of ecotypes across a range of growth environments analysis of population level differences in characteristics will be significant despite similar growing conditions. These results will allow the identification and characterization of beneficial ecotypes for the changed environments in North Dakota.

Competition experiments: By growing plants from along precipitation and latitude gradients in environmental chambers we will tease apart the ecological dynamics of competition between KB and native plants from a variety of backgrounds. In the first series of experiments, native plants from different eco-regions will be grown in a paired design in pots with Kentucky bluegrass. The plants will be grown in an environmental chamber designed to mimic current growing seasons in North Dakota. We will monitor growth and fitness characteristics of multiple native species to assess resistance to invasion. In a second series of experiments, we will grow similar combinations of plants from different background in competitive conditions but we will modify the growth season variables (duration, temperature) to mimic projected environmental change for North Dakota. We will again measure competitive success of different ecotypes of native species. The results of these experiments will provide crucial insight into the vulnerability of native species to invasion and the role of ecotypic adaptation in resistance to invasion.

We will be directly addressing directive B of the Outdoor Heritage Fund. Our results will be directly incorporated into the development of restoration plans that will enhance the native biodiversity of North Dakota prairies, and improve habitat and forage for wildlife throughout the state. There are also important implications for preserving soil quality, another emphasis of directive B. KB alters soil characteristics making it harder for native plant species to re-establish by choking out the first few inches of soil. KB's root system does not goes as deep as many native species (a few inches versus up to 15 feet for many natives) which changes the underground ecosystem by removing a key component—plant root systems. Communities that resist invasion will ultimately result in better watersheds by preserving this underground community and the filtration qualities deep roots provide.

The results of our proposed project address directive C as well by promoting improved land management for both public and private lands. Private land managed through the conservation reserve

program will benefit from improved seed mixes developed directly from this research as will homeowners with an interest in prairie restoration. Our results will lead to the development of restoration plans that are lower cost relative to current plans. The cost of maintaining a resilient ecosystem is lower than one that can easily be invaded.

Management of Project – Provide a description of how the you will manage and oversee the project to ensure it is carried out on schedule and in a manner that best ensures its objectives will be met.*

Dr. Steven Travers will oversee the project through both years. He will assist in the development of experiments, hiring of assistants and data collection as well as communicate and interact with land managers and state and federal agencies. Dr. Travers will be responsible for weekly meetings with the graduate assistant and technicians to monitor the progress of the project and facilitate communication and monitoring of the results. Laboratory, greenhouse and office space assigned to Dr. Travers at NDSU will be available to the project and those working on the project. These facilities include a "field lab" with sink, oven and microscope facilities as well as two computers and a printer. There is also a "wet lab" with balances, centrifuges, pH meter, a refrigerator and freezer as well as glassware for laboratory work and standard chemical stores. Two benches in the greenhouse facility in Steven's Hall will be available for plant materials.

Lauren Dennhardt is a graduate student who has been working on her PhD on KB invasion for the last two and a half years. She will be responsible for field collections, managing and training undergraduates in the greenhouse who collect data on plants, oversee the development and execution of the growth chamber experiments, analyze the data and communicate the results. She will organize field trips and monitor data collection and experimental maintenance on a daily basis. During the three summer months she will devote 100% of her time to the project. During the remaining nine months she is paid for a teaching assistantship at 50% time. She will devote 50% of her time to the project during those 9 months.

Evaluation – Describe your plan to document progress and results. *

The competition experiments will be initiated in year one of the project and maintained throughout year two. The common garden experiment will be conducted in the growing season of year two. Weekly lab meetings will be held for the undergraduate research assistants working on the project and the graduate research assistant (Lauren Dennhardt) to report to Dr. Travers on the progress of the experiments that week. Undergraduate assistants will report directly to Ms. Dennhardt as the experiments progress. Bi-annual reports synthesizing data collection, results of analyses and preliminary conclusions will be prepared by Dr. Travers and made available to the funding agency and state and federal agencies interested in the outcomes. Upon the completion of each of the experiments and the common garden experiments, the results, conclusions and implications will be synthesized into manuscripts to be submitted for publishing in peer-reviewed scientific journals.

Financial Information

ATTACHMENT: **Project Budget – Using the standard project budget format that is available on the website at http://www.nd.gov/ndic/outdoor-infopage.htm , please include a detailed total project budget that specifically outlines all the funds you are requesting.***

The project budget should identify all matching funds, funding sources and indicate whether the matching funds are in the form of cash or in-kind services. As noted on the standard project budget format, certain values have been identified for in-kind services. Please utilize these values in identifying your matching funds. **NOTE: No indirect costs will be funded.**

■ I certify that a project budget will be sent to the Commission*

Sustainability – Indicate how the project will be funded or sustained in future years. *

This project is a continuation of earlier work funded by the USFWS and represents an area of interest to state and federal agencies. The USFWS already monitors many of the prairies in the regions by hiring biological technicians that collect plant biodiversity and invasion data. Wildlife biologists are currently compiling management techniques that work in the Great Plains because invasive grasses are such a threat. The research/project proposed in this grant is geared toward a necessary link between the research being conducted at North Dakota State University and land managers throughout the state. Invasive grasses have incurred an increasingly dire situation in the prairies, which management alone cannot solve. Creating a new tool (more resilient ecotypes) allows land managers to build habitat more efficiently. Our lab has a close relationship with the USFWS already (we present research to them annually), so implementation of recommendations will be easy to pass off to managers working on invasive grasses throughout the state.

Partial Funding – Indicate how the project will be affected if less funding is available than that requested.

Much of the funding will go toward purchasing a growth chamber for Steven's Hall at the NDSU campus to conduct controlled climactic research on phenology. The biological sciences department at NDSU contains multiple labs who work on phenology research and its effects on invertebrates, mammals, birds, and plants throughout the state. The loss of funding will mean we will either be able to buy a less appropriate growth chamber (will not be able to mimic CO_2 changes in the atmosphere) or research will be slowed by joining a long waiting list to rent growth chamber space at the greenhouses on campus. Ultimately, this will result in fewer replicates and poorer statistical strength of the research. Poorer statistical strength will hurt chances of getting published and making better recommendations to land managers. Although, if the ideal is not met we will still be able to produce good data, just less of it overall. With less money we will still be able to run the experiment with either fewer replicates or altered methodology. In this proposal we have outlined the ideal for this project.

Scoring of Grants

All applications will be scored by the Outdoor Heritage Fund Advisory Board after your ten-minute oral presentation. The ranking sheet(s) that will be used by the Board is available on the website at http://www.nd.gov/ndic/outdoor-infopage.htm .

Awarding of Grants

All decisions on requests will be reported to applicants no later than 30 days after Industrial Commission consideration. Applicants whose proposals have been approved will receive a contract outlining the terms and conditions of the grant. Please note the appropriate sample contract for your organization on the website at http://www.nd.gov/ndic/outdoor-infopage.htm that set forth the general provisions that will be included in any contract issued by the North Dakota Industrial Commission. Please indicate if you can meet all the provisions of the sample contract. If there are provisions in that contract that your organization is unable to meet, please indicate below what those provisions would be. *

Should this project be selected for funding and a contract is issued to NDSU, we request the sample language in article 11 and 20 be deleted and the following replacement language be inserted in articles 11 and 20 of the sample contract for a state entity.

11. Ownership of Work Product, Equipment and Materials
Title to all inventions and discoveries made solely by Contractor inventors resulting from the Agreement shall reside in Contractor; title to all inventions and discoveries made solely by Commission inventors resulting from the Agreement shall reside in Commission; title to all inventions and discoveries made jointly by Contractor and Commission inventors resulting from the Agreement shall reside jointly in Contractor and Commission. Inventorship shall be determined in accordance with U.S. Patent Law.

20. Compliance with Public Records Law
Contractor understands that, except for disclosures prohibited in this Agreement, the Commission must disclose to the public upon request any records it receives from the Contractor. Contractor further understands that any records that are obtained or generated by the Contractor under this Agreement, except for records that are confidential under this Agreement, may, under certain circumstances, be open to the public upon request under the North Dakota open records law. Contractor agrees to contact the Commission immediately upon receiving a request for information under the open records law and to comply with the Commission's instructions on how to respond to the request.

Responsibility of Recipient

The recipient of any grant from the Industrial Commission must use the funds awarded for the specific purpose described in the grant application and in accordance with the contract. The recipient cannot use any of the funds for the purposes stated under Exemptions on the first page of this application.

If you have any questions about the application or have trouble submitting the application, please contact Karlene Fine at 701-328-3722 or kfine@nd.gov

Budget Standard Form

Please use the table below to provide a detailed total project budget that specifically outlines all the funds you are requesting and if there are any matching funds being utilized to fund this project. Please note if the matching funds are in the form of cash, indirect costs or in-kind services. The budget should identify all other committed funding sources and the amount of funding from each source. Match can come from any source (i.e. private sources, State and Federal funding, Tribal funding, etc.) Note match funding is not required but an application will be scored higher if match funding is provided. (See Scoring Form.)

Please feel free to add columns and rows as needed. Please include narrative to fully explain the proposed budget.

Note that NO INDIRECT COSTS will be funded from the Outdoor Heritage Fund.

	OHF Request	Applicant's Match Share (Cash)	Applicant's Match Share (In-Kind)	Applicant's Match Share (Indirect)	Other Project Sponsor's Share
Full-time faculty	$10,111	$	$10,920	$	$
Research Asst.	$37,080	$	$	$	$
Undergraduate Asst.	$4,944	$	$	$	$
Travel	$2,660	$	$	$	$
Material & Supplies	$3,000	$	$	$	$
Equipment	$31,130	$	$	$	$
Unrecovered F & A	$	$	$	$26,008	$
Total Project Costs	$88,925	$	$10,920	$26,008	$

In-kind services used to match the request for Outdoor Heritage Fund dollars shall be valued as follows:

- Labor costs — $15.00 an hour
- Land costs — Average rent costs for the county as shown in the most recent publication of the USDA, National Agricultural Statistics Services, North Dakota Field Office
- Equipment — Any equipment purchased must be listed separately with documentation showing actual cost.
- Equipment usage — Actual documentation
- Seed & Seedlings — Actual documentation
- Transportation — Mileage at federal rate
- Supplies & materials — Actual documentation

More categories will be added as we better understand the types of applications that will be submitted. We will use as our basis for these standards other State and Federal programs that have established rates. For example the North Dakota Nonpoint Source Pollution Management Program has established rates. If your project includes work that has an established rate under another State Program please use those rates and note your source.

Approved by OHF Advisory Board: October 17, 2013
Approved by Industrial Commission: October 22, 2013

Travers_Dennhardt Budget Justification

Salary

Graduate Research Assistant: The assistant will commit 100% of time to the project during the summer months (May, June and July) and 50% time to the project during the remaining nine months. Research salary will amount to $2400 per month. At the projected percentages extended over two years the salary expenses will be (2400*3 mo.*100% = 7200) + (2400*9 mo*50% = 10,800) = 18,000 per year (plus 3% fringe = 540) = 18,540* 2 years or **$37,080**. Faculty: The principal investigator will contribute 6% of in-kind effort to the project and will be compensated by University salary (nine-month contract). Dr. Travers monthly salary is $7778. At a rate of 6%, the in kind contribution equals (7778*9 mo.*6% = 4200) + (30% fringe = 1260) = 5460 per year*2 years or **$10,920**. In addition, one month of summer salary plus 30% fringe is requested from the sponsor (7,778 + 2,333) or **$10,111**.

Undergraduate assistant: We request funds for a research assistant that will be paid $10/hour for 20 hours a week over 3 summer months, plus 3% fringe (10*20*4*3 = 2400) + (3% fringe = 72) = 2,472 per year*2 years or **$4,944**.

Travel

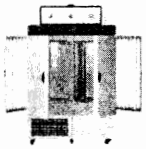
We propose to travel to multiple sites across North Dakota to sample seeds and plant material for the experiments described in the narrative. At minimum, we will require one trip per site per year. We will rent a fleet vehicle from the car pool at NDSU.

Gas/Rental Car	1 way		RT	
Bluestem		17		34
Grand Forks		94		188
Pingree		119		238
Lostwood/Souris		480		960
NWR		329		658
Eker Soil Site		32		64
Tewaukon NWR		96		192
Total mileage	1167		2334	
Cost per mile		$0.57/mile		$1,330.38

Equipment and Supplies

We are requesting funds for an environmental chamber to be housed in the Department of Biological Sciences. The chamber is the most efficient way for us to conduct growth experiments on plants under controlled temperatures, photoperiods and humidity. In addition, to conduct the growth experiments proposed in this study we will require expendable greenhouse supplies including soil, pots and fertilizer necessary to grow plants.

Growth Chamber:
http://www.coleparmer.com/Product/1000_liter_Plant_Growth_Chamber_With_Humidity_Control_230VAC/UX-39353-20?referred_id=778&pcrid=13001626719&gclid=CPSgjKuQhbsCFSho7AodTUUAgA



UX-39353-20
1000-liter Plant Growth Chamber With Humidity Control, 230VAC
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1000-liter Plant Growth Chamber With Humidity Control, 230VAC

UX-39353-20

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These programmable growth chambers provide precise temperature control to maximize your plant growth. The 10-step program allows you to set temperature, humidity, and illumination profile which can be repeated up to 999 times. Dual sensors monitor water level and a quick-