Environment and Natural Resources Trust Fund

M.L. 2025 Approved Work Plan

General Information

ID Number: 2025-196

Staff Lead: Mike Campana

Date this document submitted to LCCMR: June 9, 2025

Project Title: Optimizing Non-Native Cattail Treatment Effectiveness in Prairie Wetlands

Project Budget: $942,000

Project Manager Information

Name: Megan Fitzpatrick

Organization: MN DNR - Fish and Wildlife Division

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Project Reporting

Date Work Plan Approved by LCCMR: June 24, 2025

Reporting Schedule: April 1 / October 1 of each year.

Project Completion: June 30, 2031

Final Report Due Date: August 14, 2031

Legal Information

Legal Citation: M.L. 2025, First Special Session, Chp. 1, Art. 2, Sec. 2, Subd. 06b

Appropriation Language: $942,000 the first year is from the trust fund to the commissioner of natural resources to compare the effectiveness of invasive cattail treatment methods and provide recommendations for managers to maximize benefits of conservation money for native wetland plants and wildlife. This appropriation is available until June 30, 2031, by which time the project must be completed and final products delivered.

Appropriation End Date: June 30, 2031

Narrative

Project Summary: We propose research to compare effectiveness of several invasive cattail treatment methods. Outcomes will include practical recommendations for managers to maximize benefits of conservation dollars for native plants and wildlife.

Describe the opportunity or problem your proposal seeks to address. Include any relevant background information.

Invasive cattail species (Typha angustifolia, T. x glauca) have dramatically proliferated in Minnesota since the mid-twentieth century. Unlike native cattail (T. latifolia), invasive cattail forms single-species stands, impacting native plant diversity and displacing wildlife food plants. In Minnesota's prairies, tens of thousands of seasonal wetlands (wet in spring, dry by late summer) that provide crucial shallow water wildlife habitat are degraded by invasive cattail. Dense stands eliminate open water patches necessary to ducks and marsh birds for spring foraging and breeding, and creates movement barriers for ducklings, amphibians, and other wildlife. Invasive cattail exacerbates other threats to prairie wetlands. Many of Minnesota's prairie wetlands have been drained, with remaining wetlands threatened by sedimentation, run-off, and other threats.

Minnesota's public land managers spend hundreds of thousands of dollars annually to combat invasive cattail. However, limited scientific information is available to guide management decisions. Potential treatments include herbicides and physical disturbances (like burning, grazing, mowing, disking, cutting, crushing, or scraping). Successful control is often short-lived, because cattail's rhizome system helps it recover from damage, and wind-dispersed seeds regenerate from the seed bank and surrounding private lands and roadsides. Consequently, wetland managers need information on initial success and long-term persistence of treatment options.

What is your proposed solution to the problem or opportunity discussed above? Introduce us to the work you are seeking funding to do. You will be asked to expand on this proposed solution in Activities & Milestones.

We propose research to compare the effectiveness of several cattail treatments for seasonal prairie wetlands. Importantly, we are incorporating unstudied treatments with potentially longer-lasting impacts, which could stretch conservation funds and reduce herbicide application frequency. Further, collaborating wetland managers guided selection of feasible treatments that can be implemented in the immediate future on thousands of impacted prairie wetlands.

We will compare these treatments using the scientifically rigorous before-after/control impact study design:

1. Glyphosate (herbicide) application: This treatment is common, relatively inexpensive, and included for comparison to other treatments.
2. Glyphosate followed by roller-chopping: This unstudied treatment entails a machine crushing cattail after glyphosate application to further damage plants. It is approximately 2x the cost of Treatment #1 per acre, but impacts may last longer, reducing frequency of retreatment.
3. Glyphosate followed by disking: This unstudied treatment involves a machine cutting into the soil after glyphosate application, damaging rhizomes and stratifying native plant seeds. It is about 3x the cost of Treatment #1, but impacts may last much longer.
4. Scraping: This machine treatment removes the soil's top layer, including cattail rhizomes. It is approximately 50x the cost of Treatment #1 but may last longest due to complete rhizome removal.

What are the specific project outcomes as they relate to the public purpose of protection, conservation, preservation, and enhancement of the state's natural resources?

Our study will produce information (publications, reports, presentations) about the effectiveness and longevity of invasive cattail treatment impacts for wetland vegetation, waterfowl, and marsh birds in Minnesota's seasonal wetlands. Our research group includes USFWS and DNR managers who advised on selection of feasible treatments, such that this

work will produce practical information for land managers to balance frequency of needed retreatment versus cost per treatment, maximizing the impact of conservation dollars for enhancing wetland habitat across Minnesota's prairies and benefiting wetland wildlife viewers, waterfowl and rail hunters, and all Minnesotans who benefit from ecosystem services provided by healthy wetlands.

Project Location

What is the best scale for describing where your work will take place?

Region(s): NW, SW, Central,

What is the best scale to describe the area impacted by your work?

Region(s): SW, Central, NW,

When will the work impact occur?

During the Project and In the Future

Activities and Milestones

Activity 1: Comparing effectiveness and longevity of invasive cattail treatments for increasing native wetland vegetation

Activity Budget: $523,853

Activity Description:
Objective 1: Compare vegetative responses and their longevity among cattail treatments, including reduction in cattail abundance and type of cover that replaces cattail (open water, native vegetation, or cattail regrowth).
The DNR Wetlands Management Program and U.S. Fish and Wildlife Service will provide cattail treatments on seasonal prairie wetlands on public lands in western Minnesota using separate funding. LCCMR funding will support vegetation surveys before and after treatment, and in 10 untreated "control" wetlands, allowing us to report how treatment groups deviate from untreated wetlands and each other over time (before-after/control-impact experimental design). Large sample size to detect statistical trends is key to outcomes. We will study 50 wetlands: 10 per treatment group (above) and 10 control wetlands. We will survey vegetation in July-August before treatment (2025), treat in 2026, and re-survey for two years after treatment (2027 and 2028). We will survey wetlands in two ways: measuring cattail abundance, along with structure and coverage of other vegetation, in quadrats at sample points, and collecting high-resolution UAV ("uncrewed aerial vehicle"; drone) imagery to measure aerial coverage of cattail versus other plants and open water.

Activity Milestones:

Description	Approximate Completion Date
Conduct before-treatment surveys of vegetation on study wetlands (July-August 2025)	September 30, 2025
Conduct invasive cattail treatments on study wetlands and document treatment costs	October 31, 2026
Completion of annual after-treatment vegetation surveys on study wetlands (2 years)	September 30, 2029
Final results analysis, including cost-benefit analysis of each treatment	May 31, 2030
Start dissemination of final results: PhD dissertation, ≥1 oral presentation to managers, start writing publications	July 31, 2030

Activity 2: Comparing effectiveness and longevity of invasive cattail treatments for waterfowl and secretive marsh birds

Activity Budget: $418,147

Activity Description:
Objective 2: Assess which cattail treatments provide the greatest and longest-lasting benefits for waterfowl and marsh birds.
Seasonal wetlands provide critical habitat for breeding waterfowl and secretive marsh birds (bitterns, rails, grebes). We will survey birds in the 50 study wetlands in May-June, before treatment (2025; MNDNR-funded) and two years post-treatment (2027-2028). We will also survey as many wetlands as possible (~28) in 2029.
Accurately counting waterfowl in varying cattail conditions is challenging but necessary to understand when treatment benefits peak and decline. We will count waterfowl pairs using a UAV with thermal and red-green-blue cameras, allowing observers to see around obstructing vegetation. We successfully tested this method in DNR-funded pilot work.
Secretive marsh birds are understudied due to elusive behavior. We will deploy passive acoustic recording units (ARUs), a growing technology for wildlife surveys, to detect marsh bird occupancy in study wetlands via calls. Susan Ellis-Felege's lab has extensive experience with UAV and ARU-based surveys.
Activity 2 will show which treatments support the most waterfowl pairs and secretive marsh birds per wetland, in the context of Activity 1 vegetation trends. We will provide Minnesota and regional managers recommendations to maximize benefits of conservation dollars for wetland enhancement and wildlife.

Activity Milestones:

Description	Approximate Completion Date
Conduct before-treatment surveys of waterfowl and marsh birds (Funded by MNDNR)	June 30, 2025
Conduct invasive cattail treatments on study wetlands	October 31, 2026
Completion of annual after-treatment waterfowl and marsh bird surveys on study wetlands (3 years post-treatment)	September 30, 2029
Final results analysis	May 31, 2030
Start dissemination of final results: PhD dissertation, ≥1 oral presentation to managers, start writing publications	July 31, 2030

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
John Maile	MN Department of Natural Resources (MN DNR)	-lead implementation of invasive cattail treatments on study wetlands on state Wildlife Management Areas -partner on project design and dissemination of findings, with particular expertise in wetland ecology, restoration/enhancement, and wetland wildlife	No
Ed Zlonis	MN Department of Natural Resources (MN DNR)	-partner on project design, implementation, data analysis, and dissemination, with particular expertise in waterfowl and wetlands	No
Sara Vacek	U.S. Fish and Wildlife Service (USFWS)	-co-lead implementation of invasive cattail treatments on study wetlands on federal Waterfowl Production Areas -coordinate with local USFWS staff regarding project needs and WPA access -partner on project design and dissemination of findings, with particular expertise in wetland ecology, restoration/enhancement, and wetland wildlife	No
Stacy Salvevold	U.S. Fish and Wildlife Service (USFWS)	-co-lead implementation of invasive cattail treatments on federal Waterfowl Production Areas -coordinate with local USFWS staff regarding project needs and WPA access -partner on project design and dissemination of findings, with particular expertise in wetland ecology, restoration/enhancement, and wetland wildlife	No
Dr. Susan Ellis-Felege	University of North Dakota	-advise PhD and MS student -lead UAV purchase and pilot (student) training -partner on project design, data collection, data analysis, and dissemination of findings , especially with regard to: UAV and ARU expertise, wetland vegetation and invasive cattails, and avian biology	Yes
Dr. Todd Arnold	University of Minnesota	-partner on project design, data analysis, and dissemination of findings, especially with regard to avian biology and detection probability in avian surveys	Yes
Dr. Dan Larkin	University of Minnesota	-partner on project design, data analysis, and dissemination of findings, especially with regard to wetland plant communities and invasive cattails	Yes

Dissemination

Describe your plans for dissemination, presentation, documentation, or sharing of data, results, samples, physical collections, and other products and how they will follow ENRTF Acknowledgement Requirements and Guidelines.
We will share our results and recommendations to optimize cattail treatment choices with wetland managers, scientists, and the public. We share results through at least three presentations. For example, we will seek to present in MN DNR Regional Wildlife meetings (small venues facilitating conversation with state land managers), at least one quarterly USFWS biological network meeting (field biologists and managers in the Prairie Pothole Region of Minnesota, Wisconsin, and Iowa), an MN DNR virtual “Wildlife Research Wednesday” event (for statewide DNR staff and the public), and at least one professional scientific conference, including the Minnesota Chapter of the Wildlife Society Annual Meeting. Our team will also produce a PhD dissertation, at least two publications in scientific journals, a public MN DNR Wildlife Research Summary Report, and a DNR “Research Information Brief” directed to managers. We will seek to become a MAISRC partnership project and, if successful, we will explore opportunities for collaboration with MAISRC around communications and outreach. Finally, this project will provide skill-development opportunities to numerous early-career biologists, including a graduate student and MN DNR research technicians.

The Acknowledgements section of all written products will contain at least the minimum ENRTF attribution language. In oral presentations, we will include at least the minimum verbal attribution language, and the optional attribution language when time allows. All posters and presentations with visual aids will contain at least the ENRTF logo, and the

written attribution language in the Acknowledgements section if space allows. We will educate the project graduate student and other project participants (e.g. technicians) about ENRTF and assist them in adhering to attribution requirements. We will ensure that any press releases or coverage from our organizations (MNDNR, USFWS, UND, UMN) include attribution language. In any third-party press coverage of the project, we will emphasize ENRTF and the importance of acknowledging its unique nature to interviewers.

Long-Term Implementation and Funding

Describe how the results will be implemented and how any ongoing effort will be funded. If not already addressed as part of the project, how will findings, results, and products developed be implemented after project completion? If additional work is needed, how will this work be funded?

Project results and associated recommendations for invasive cattail management methods in seasonal prairie wetlands will be communicated to agency wetland managers, scientists, and the public via ≥ 3 presentations following final analyses. The project manager and university professors will work with the graduate student following dissertation completion to format dissertation chapters for submission to scientific journals, preferably with an open access publication option. The MN DNR (Fitzpatrick), UND (Dr. Ellis-Felege), and UMN (Dr. Arnold, Dr. Larkin) will support analysis and writing. MN DNR will support oral presentations (Fitzpatrick's time, travel) at 1-2 conferences and regional manager meetings.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount
Personnel								
DNR Field Technicians for each season of wetland surveys		Assist with waterfowl and vegetation surveys during each of 3 field seasons (1 year pre-treatment, 1 year post-treatment, and 2 years post-treatment). 5 technicians in the pre-treatment year. 4 technicians (to be supplemented with additional field staff through University of North Dakota subaward) in each post-treatment year.			25%	1.53		$95,264
							Sub Total	**$95,264**
Contracts and Services								
University of North Dakota	Subaward	UND (Dr. Ellis-Felege) will provide and mentor a PhD and MS student and technicians (assistance with field work, data analysis, dissemination); provide and pilot a UAV, and provide expertise using ARUs. Personnel $412121; Supplies $24000; Travel $73600 (annual data collection at 50 wetlands, collaboration meetings, conference presentations); $16000 capital equipment.		X		6.6		$525,721
University of Minnesota	Subaward	Drs. Arnold and Larkin will assist with project design, data analysis, and writing, including avian detection probability modeling and plant survey methods and community metrics. UMN will follow the Commissioner's Plan for expense and tracking. Personnel $91389; Travel $5000 (to ~3 sites/year for technician training and field methods development)				0.4		$96,389
Minnesota Department of Agriculture	Service Contract	Minnesota Dept. of Agriculture will analyze annual water samples from our treatment wetlands for nitrogen and phosphorus, two nutrients that influence cattail growth and will help us understand treatment results. This work is a discrete service according to a published fee schedule.				0.03		$6,600
							Sub Total	**$628,710**

Equipment, Tools, and Supplies								
	Tools and Supplies	Miscellaneous supplies (technician waders, Rite in the Rain paper for datasheets, AA batteries for ARUs, supplies for nitrogen and phosphorous analysis, PVC piping to construct quadrats)	Annual supply needs for field surveys of vegetation, waterfowl, and marsh birds					$14,920
							Sub Total	**$14,920**
Capital Expenditures								
							Sub Total	**-**
Acquisitions and Stewardship								
							Sub Total	**-**
Travel In Minnesota								
	Miles/ Meals/ Lodging	For each of ~3 field seasons (3 seasons vegetation surveys and 2.55 seasons waterfowl and marsh bird surveys): Mileage to shuttle trucks to field season base location (DNR office nearest field sites; est. 180 miles) plus 13 weeks of mileage to field sites at 750 miles per crew per week, plus lodging (hotels or dorms) and meal reimbursement for staff in travel status intermittently during the 13 weeks.	Travel to conduct waterfowl, marsh bird, and vegetation surveys pre- and post-wetland treatments at ~50 wetlands in spring-summer of 2025, 2026, 2028, and 2029. Additionally, 1 week of travel to map treatment boundaries in Fall 2026.					$183,450
							Sub Total	**$183,450**
Travel Outside Minnesota								
							Sub Total	**-**
Printing and Publication								
							Sub Total	**-**
Other Expenses								

		Minnesota DNR Direct and Necessary Costs	DNR's direct and necessary costs pay for activities that are directly related to and necessary for accomplishing appropriated projects: People Support (~$3,684), Safety Support (~$517), Financial Support (~$2,841), Communication Support (~$1,528), IT Support (~$9,949), and Planning Support (~$1,137)					$19,656
							Sub Total	**$19,656**
							Grand Total	**$942,000**

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
Contracts and Services - University of North Dakota	Subaward	UND (Dr. Ellis-Felege) will provide and mentor a PhD and MS student and technicians (assistance with field work, data analysis, dissemination); provide and pilot a UAV, and provide expertise using ARUs. Personnel $412121; Supplies $24000; Travel $73600 (annual data collection at 50 wetlands, collaboration meetings, conference presentations); $16000 capital equipment.	As stated in our original work plan, we are requesting this sub award to an out-of-state university due to Dr. Susan Ellis-Felege's expertise in using UAVs (uncrewed aerial vehicles, or "drones") to survey waterfowl. Use of UAVs to survey waterfowl is key to project outcomes due to the need to accurately count waterfowl in wetlands with varying cattail conditions. (Cattail is tall and visually obstructs traditional ground-based counts in the flat prairie landscape.) We could not find any scientists/professors in Minnesota with expertise in using UAVs to survey birds. Given the need to search out of state, we are partnering with UND due to Dr. Ellis-Felege's demonstrated expertise with UAVs to survey waterfowl (prior publications and positive references), and UND's location on the Minnesota border. Minimal out-of-state travel costs will be incurred in travel to field sites. (Distance from UND campus to Minnesota border is less than 5 miles.) Travel costs break down as follows: (1) travel in Minnesota related to field work in Minnesota $65,063, (2) travel outside of Minnesota related to field work in Minnesota $2,074, (3) Travel in Minnesota related to conferences in Minnesota ($3,939), (4) Travel outside of Minnesota related to conferences in Minnesota ($24), (5) Travel outside of Minnesota for conferences in other states ($2,500). All conference attendance is to participate in formal presentation of project findings. Travel component #5 is for one person (Dr. Ellis-Felege or one of the two project graduate students) to formally present project findings at one out-of-state conference. The conference will be The Wildlife Society Annual Conference. The Wildlife Society's Annual Conference is one of the largest gatherings of wildlife professionals and supporters in North America, and it has pertinent professional working groups such as the Wetlands Working Group and the Invasive Species Working Group. Presenting at this conference will allow us to share results (effectiveness and costs of various treatments for invasive cattail) with managers across the multi-state/international Prairie Pothole Region, and in other regions where invasive cattail degrades wildlife habitat. It will also allow us to gather feedback from a wide array of professionals and scientists, which will help us refine our analyses, conclusions, and management recommendations. We also here include two pieces of information about Eligible Expenses: First, the UND subaward include a $16,000 capital expense for a UAV system (drone with battery, cameras, and controller). This equipment will continue to be used for the same program through its useful life. The manufacturer of the model UND plans to purchase estimates a lifespan of 1000 hours/platform in ideal conditions. We estimate that flight time necessary to complete waterfowl surveys and wetland orthomosaics over the 5-year

			project will meet or exceed these hours. Further, this is over a 5-year period flying in areas that will impose additional environmental stressors to the equipment (stressful rather than ideal conditions, e.g., wind, bugs, moisture, extreme temperature, etc...) at which point the value of the platform will be substantially reduced and likely not viable for additional project work at the completion of the study. Second, personnel costs include $52,894 to cover graduate student tuition (PhD and MS). Per LCCMR instructions, we have removed indirect costs requested by UND from the subaward. With the removal of indirect costs, the university is no longer able to provide full tuition waivers for graduate students (formerly in the "Non ENRTF" funds budget). However, the university will provide a 50% tuition waiver for the MS student to ensure that tuition costs do not rise above the indirect costs originally proposed. These students' graduate research will compose a substantial amount of project work, including data collection, UAV piloting, data analysis, and dissemination. Again, we note that we are partnering with an out-of-state university because we could not find any scientists/professors in Minnesota with expertise in using UAVs to survey birds. Additionally, we selected a university on the Minnesota border, allowing us to train young-career scientists local to western Minnesota and grow the local region's natural resource workforce.

Non ENRTF Funds

Category	Specific Source	Use	Status	$ Amount
State				
In-Kind	Game and Fish Fund: MS 97A.055	DNR Staff Time (Megan Fitzpatrick: 70% FTE over 5 years = 3.5 FTEs and NR Spec Ed Zlonis to assist with project planning, field work, analysis, and dissemination at 0.1 FTE for 5 years = 0.5 FTEs)	Secured	$458,224
In-Kind	Game and Fish Funds. More specific information (with specific legal citation) will follow MN DNR budget meeting in May 2024.	MN DNR will provide 2 laptops for project activities (5 years) and trucks for field work (4 trucks per year of surveys, 38 truck-months over the duration of the project)	Secured	$24,880
In-Kind	TBD closer to proposed 2026 treatments. Numerous funding sources are available, including some state and some federal. We are listing state for now, but this may need adjustment later.	Estimated cost for cattail treatments on 20 wetlands on Wildlife Management Areas for the MN DNR Wetlands Management Program (WMP) with average size 2.5 acres. The WMP conducts wetland enhancements in the prairie region every year at a rate of >>20 wetlands per year. We will collect data before and after their treatments on 20 wetlands that fall within the parameters of our study design in 2026. We have designed our study to focus on a type of wetland that WMP commonly treats, ensuring that we will have more than enough potential study wetlands available from WMP's normal enhancement work. We are listing the status as pending only because specific funding sources for specific wetlands are not determined this far in advance of treatments.	Pending	$228,438
In-Kind	OHF: ML 2021, First Sp. Session, Ch. 1, Art. 1, Sec. 2, subd. 4(f)	MN DNR Wetlands Management Program staff time to plan and manage cattail treatments. The Wetlands Management Program enhances prairie wetlands as part of their regular work. We will collect data on ~20 study wetlands on Wildlife Management Areas that fall within our study parameters. We have designed our study such that the type of wetland WMP commonly treats falls within our study parameters, ensuring that OHF funds will not be used for research.	Secured	$20,000
In-Kind	FAW Heritage Enhancement Funds: MN Laws of 23 Chapter 60 Article 1 Section 3 Subd 6(a)	MN DNR funding for technician salary/fringe, supplies and tools, and travel to support before-treatment marsh bird and waterfowl surveys in April-June 2025	Secured	$146,087
			State Sub Total	**$877,629**
Non-State				
In-Kind	TBD closer to proposed 2026 treatments. Numerous funding sources are available, including some state and some federal. We are listing non-state for now, but this may need adjustment later.	Estimated cost for cattail treatments on 20 wetlands on federal Waterfowl Production Areas for the USFWS, with average wetland size 2.5 acres. The USFWS conducts wetland enhancements in the prairie region every year at a rate of >>20 wetlands per year. We will collect data before and after their treatments on 20 wetlands that fall within the parameters of our study design in 2026. We have designed our study to focus on a type of wetland that USFWS commonly treats,	Pending	$228,438

		ensuring that we will have more than enough potential study wetlands available from USFWS's normal enhancement work. We are listing the status as pending only because specific funding sources for specific wetlands are not determined this far in advance of treatments.		
In-Kind	University of North Dakota (state funds, but from North Dakota, not Minnesota)	50% tuition waiver for MS student that is supported on the project. The MS student will conduct a substantial amount of work for the project, including developing best practices and validation methods for ARUs, data collection, UAV piloting, data analysis, and dissemination of results.	Secured	$7,984
In-Kind	University of North Dakota (state funds, but from North Dakota rather than Minnesota)	5% of Dr. Susan Ellis-Felege's 9-month salary with fringe, for 5 years. Dr. Ellis-Felege will advise a PhD student and provide extensive expertise in UAV (drone) surveys of waterfowl, avian biology, wetland vegetation, and ARUs (acoustic recording units) for surveying birds	Pending	$35,230
In-Kind	U.S. Fish and Wildlife Service (Morris and Fergus Falls Wetland Management Districts)	USFWS biologist time to plan and manage cattail treatments and provide consultation and coordination with PhD student, Universities and MN DNR. USFWS partners with Ducks Unlimited to enhance prairie wetlands as part of their regular work. We will collect data on ~20 study wetlands on Waterfowl Production Areas that fall within our study parameters. 2.5% of 2 biologists' time for 5 years	Secured	$25,000
In-Kind	University of North Dakota (state funds, but from North Dakota rather than Minnesota)	Indirect costs (41% rate on $439,827 eligible costs). This is larger than the indirect cost in our draft workplan because UND was initially proposing a reduced 20% indirect cost rate equal to that used with the North Dakota Game and Fish Department. We mistakenly forgot to include the 21% waiver in the draft workplan budget.	Secured	$180,329
Cash	Ducks Unlimited	Donation from Ducks Unlimited to University of North Dakota to purchase a UAV system and accessories to support the first year of data collection and subsequently act as back-up equipment for this project. Having a second UAV eliminates a “single point of failure” component from the project.	Secured	$33,443
			Non State Sub Total	**$510,424**
			Funds Total	**$1,388,053**

Total Project Cost: $2,330,053

This amount accurately reflects total project cost?

Yes

Attachments

Required Attachments

Visual Component

File: c71397cc-ef8.pdf

Alternate Text for Visual Component

This infographic is titled "Optimizing Invasive Cattail Treatment Effectiveness in Prairie Pothole Wetlands". It asks, "What's the most efficient way to get from this...", over two images of cattail-filled prairie wetlands, "...to this?" (over two pictures of prairie wetlands with a mix of diverse native vegetation and open water)....

Supplemental Attachments

Capital Project Questionnaire, Budget Supplements, Support Letter, Photos, Media, Other

Title	File
2025-196 Research Addendum revised_Final	0de1a048-72a.pdf

Difference between Proposal and Work Plan

Describe changes from Proposal to Work Plan Stage

We are proposing a revised Work Plan for two reasons. First, we received a reduced amount of funding from LCCMR compared to our requested amount. Second, MN DNR has not allotted our project some of the in-kind support for which we had applied at the time of LCCMR proposal submission. To account for these changes, we will delay our first year of data collection to 2026 and modify our vegetation survey methods. With this revised plan, we will still obtain valuable comparative information about the effectiveness and longevity of cattail treatments to help managers maximize the impact of conservation dollars for enhancing wetland habitat. We describe the changes in more detail below.

First, due to unexpected budget constraints at the agency level, MN DNR will not contribute funds to initiate the project in fiscal year 2025. Due to the seasonal phenology of ducks and marsh birds, these surveys must be conducted in spring (i.e., prior to July 1). Consequently, we propose to delay the start of field data collection 2025 to 2026, the first spring season in which LCCMR funds will be available. Correspondingly, we will conduct cattail treatments on our study wetlands in 2027 (rather than 2026), and then conduct two years of post-treatment surveys instead of three. Two years of post-treatment data will provide important information to inform manager decisions, as we expect to see divergence in treatment outcomes within two years based on preliminary observations by managers in our collaboration group.

Though two years of post-treatment data will provide valuable information and could compose a full project, we expect that further informative changes will occur in the third year post-treatment. Consequently, we will continue seeking funding to extend data collection to a third year post-treatment. For example, Ducks Unlimited is now fundraising for this project, and we will approach the Prairie Pothole Joint Venture at their next annual RFP.

Next, we requested MN DNR in-kind support to partially fund vegetation data collection in fiscal years 2026-2030. Because MN DNR has not yet awarded funds for the project, we are uncertain of the level at which we will receive in-kind support for data collection in future fiscal years. Consequently, to be conservative, we are providing a redesigned vegetation survey plan that does not rely on MN DNR funding. The new survey plan also accounts for the reduced LCCMR funding compared to our requested amount. Specifically, we originally proposed to gather vegetation data through three complementary methods: (1) collecting UAV imagery to measure aerial coverage of cattail versus other plants and open water, (2) measuring cattail abundance in quadrats at sample points, and (3) collecting plant species-

level coverage data using timed meander surveys. Rather than conducting a separate timed meander survey, we will collect measures of vegetation structure and coverage (broad taxonomic levels) in addition to cattail abundance at sample points (quadrats). With advice from the managers in our group, this plan retains the highest-priority information for manager decision-making, including cattail abundance, open water coverage, and habitat structure.

MNDNR continues to support provision of in-kind funding for laptops and trucks ($24,880) and MNDNR permanent staff time (Fitzpatrick and Zlonis; $458,224; value increased from proposal due to correction of a mathematical error).

Describing Changes from Draft Work Plan to Revised Work Plan, Feb. 2025:

We have two positive updates to our proposed Work Plan arising from two new sources of support. First, MN DNR was able to allot some additional in-kind support to our project for the 2025 (current) fiscal year (FY2025; through June 30, 2025). These funds have allowed us to adjust our work schedule in order to extend data collection to a third year post-treatment for invasive cattails, as detailed below.

Our Draft Work Plan proposed collecting data for two years following wetland treatments for invasive cattail. As discussed, two years of post-treatment data will provide valuable information and could compose a full project, but we expect that further informative changes will occur in the third year post-treatment. Consequently, we have continued to seek funding to extend data collection to a third year post-treatment.

We will use the new FY2025 funding from MN DNR to purchase start-up supplies and equipment (including ARUs) and conduct before-treatment waterfowl and marsh bird surveys on our study wetlands in April-June 2025. With the ability to start data collection in FY2025, we can shift our project schedule one year earlier, such that wetland treatments are conducted in 2026. We still propose to use ENRTF funds to support vegetation surveys prior to treatment (July-August 2025), and to support waterfowl, marsh bird, and vegetation surveys for the first two years following treatment (now 2027 and 2028). With the funds loosened by the new MN DNR contribution, we will survey as many study wetlands as possible in Year 3 post-treatment (2029), starting with spring waterfowl and marsh bird surveys. We estimate that remaining funds will allow us to survey 55% (approximately 28) of our study wetlands for waterfowl and marsh birds in spring 2029. A smaller sample size of sites in Year 3 post-treatment may make comprehensive statistical analyses including Year 3 challenging, but the surveys will provide valuable information suggesting patterns, without impacting our ability to conduct robust analysis of Year 1 and 2. Additionally, we will continue seeking funding to extend data collection to all sites in Year 3.

Second, Ducks Unlimited made a donation to Dr. Ellis-Felege's lab at the University of North Dakota for purchase of a second UAV system to support the first year of data collection (2025) and subsequently act as back-up equipment for this project. Having a second UAV eliminates a "single point of failure" component from the project. That is, if the UAV malfunctions or otherwise incurs damage, it will likely require several weeks for repair. Given the limited seasonal period during which data is available to measure each year, several weeks would reduce our sample size to an extent that it would greatly impact our ability to draw conclusions. Given the importance of each field season to the project to track annual differences among treatments, having a second UAV greatly reduces potential for losing critical data.

Finally, with regard to project personnel and labor within the UND subaward, we have replaced some technicians in the early years of the project with a master's student whose thesis will focus on marsh bird surveys. We identified this training opportunity and potential for benefit to the project while conducting preliminary work with the ARUs purchased with the new MN DNR funds. The MS student will develop ARU protocols, including sound analysis validation steps, in addition to collecting the early-project baseline inventory of data for understanding impacts of cattail-choked wetlands on marsh birds. Inclusion of an MS project also gives us the opportunity to train another early-career researcher in natural resources with a focus on Minnesota wildlife.

Thank you for considering these revisions to our Work Plan.

Additional Acknowledgements and Conditions:

The following are acknowledgements and conditions beyond those already included in the above workplan:

Do you understand and acknowledge the ENRTF repayment requirements if the use of capital equipment changes?

N/A

Do you understand that travel expenses are only approved if they follow the "Commissioner's Plan" promulgated by the Commissioner of Management of Budget or, for University of Minnesota projects, the University of Minnesota plan?

Yes, I understand the Commissioner's Plan applies.

Does your project have potential for royalties, copyrights, patents, sale of products and assets, or revenue generation?

No

Do you understand and acknowledge IP and revenue-return and sharing requirements in 116P.10?

N/A

Do you wish to request reinvestment of any revenues into your project instead of returning revenue to the ENRTF?

N/A

Does your project include original, hypothesis-driven research?

Yes

Does the organization have a fiscal agent for this project?

No

Does your project include the pre-design, design, construction, or renovation of a building, trail, campground, or other fixed capital asset costing $10,000 or more or large-scale stream or wetland restoration?

No

Do you propose using an appropriation from the Environment and Natural Resources Trust Fund to conduct a project that provides children's services (as defined in Minnesota Statutes section 299C.61 Subd.7 as "the provision of care, treatment, education, training, instruction, or recreation to children")?

No

Provide the name(s) and organization(s) of additional individuals assisting in the completion of this project:

Megan Fitzpatrick submitted the proposal through the LCCMR online system. Additional contributors to the text and budget preparation were: Sara Vacek, Stacy Salvevold, John Maile, Todd Arnold, Susan Ellis-Felege, Daniel Larkin, and Ed Zlonis. Please refer to Project Collaborators for their affiliations. Additionally, DNR Fish and Wildlife Division Director Dave Olfelt reviewed and approved the proposal for submission.

Do you understand that a named service contract does not constitute a funder-designated subrecipient or approval of a sole-source contract? In other words, a service contract entity is only approved if it has been selected according to the contracting rules identified in state law and policy for organizations that receive ENRTF funds through direct appropriations, or in the DNR's reimbursement manual for non-state organizations. These rules may include competitive bidding and prevailing wage requirements

Yes, I understand