ML15 Project Abstract
For the Period Ending June 30, 2019

PROJECT TITLE: Native Prairie Stewardship and Prairie Bank Easement Acquisition
PROJECT MANAGER: Judy Schulte
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FUNDING SOURCE: Environment and Natural Resources Trust Fund
LEGAL CITATION: ML15, Ch76, Sec2, Subd 9d

APPROPRIATION AMOUNT: $3,325,000
AMOUNT SPENT: $3,232,801
AMOUNT REMAINING: $92,199

Sound bite of Project Outcomes and Results
Permanently protected 1,107 acres of high-quality historically undisturbed native prairie, which house state and federally threatened species, state special concerns species, Species in Greatest Conservation Need and a wide variety of pollinators. Prairie enhancement (1,130 acres), outreach, monitoring and research activities were implemented across the state to improve prairie habitat.

Overall Project Outcome and Results

Through this appropriation, 1,107 acres of high quality dry hill, mesic and wet prairies, which house state and federally threatened species, state special concerns species, multiple Species in Greatest Conservation Need and a wide variety of pollinators, were permanently protected through 12 Native Prairie Bank conservation easements (see attached parcel list for more details). Protection efforts, through this appropriation and other Native Prairie Bank appropriations, preserve some of the best remaining native prairie in the state for current and future MN Citizens benefit. These remaining native prairies function at a significantly higher level and provide habitat to more species of insects, birds, reptiles and mammals than reconstructed/restored prairie. Additionally, 12 Baseline Property Reports and 22 monitoring events were completed through this appropriation. Stewardship funds for the 12 closed Native Prairie Bank easements were enrolled into the Conservation Easement Stewardship Account and 3 appraisals were conducted as an easement valuation best management practice.

A total of 221 acres of invasive species control and 909 acres of prescribed burns were completed to improve prairie quality throughout the prairie region of the state. Adaptive Management Monitoring was completed on 14 Native Prairie Banks and specific research was conducted to evaluate the impact of grazing on secretive marsh birds. Knowledge gained through this monitoring and research will help landowners, DNR land managers and partner agencies improve the management of native prairie and wetlands.

DNR Prairie Specialists participated in 7 outreach events, providing prairie protection, restoration and enhancement education. DNR Prairie Specialists also engaged 163 different priority prairie landowners to discuss protection and management options for their property. Ten Prairie Stewardship Plans were written by contractors, approved by DNR Prairie Specialist and provided to the landowners.

Project Results Use and Dissemination
Ten Prairie Stewardship Plans were written by contractors, approved by SNA Prairie Specialists and provided to landowners. These plans will help guide native prairie landowner's enhancement activities for well over a

decade. All outreach activities completed as part of this appropriation had the ENTRF logo present on any documentation or displays.

Attached is the *Waterbird Response to Conservation Grazing in Western Minnesota Tallgrass Prairies* summary of the research conducted through this appropriation to assess impacts of grazing on waterfowl and other wetland and grassland birds. The results of this study will be distributed to members of the conservation community in several ways. Agency and conservation organization staff hold a grazing webinar at the end of every other summer with DNR hosting and covering these results this year. Marissa, the grad student who took lead on this research had a poster at the recent MN Wildlife Society meetings and we will encourage her and/or her graduate advisor Dr Todd Arnold to present the final results at this year's meeting. Last, the information will be shared among Prairie Conservation Plan partners this fall. The information will be useful to DNR and USFWS staff as we continue to write new grazing plans and modify existing plans. As with any good research project, the results of this study point to additional questions that agency staff and researchers can address in the coming years.

Environment and Natural Resources Trust Fund (ENRTF)
M.L. 2015 Work Plan Final Report

Date of Report: August 12, 2019

Final Report

Date of Work Plan Approval: June 25, 2015

Project Completion Date: June 30, 2019

PROJECT TITLE: Native Prairie Stewardship and Prairie Bank Easement Acquisition

Project Manager: Judy Schulte

Organization: MN DNR – SNA Program

Mailing Address: 1241 East Bridge Street

City/State/Zip Code: Redwood Falls, MN 56283

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Location: Statewide

Total ENRTF Project Budget:		
	ENRTF Appropriation:	**$3,325,000**
	Amount Spent:	**$3,232,801**
	Balance:	**$92,199**

Legal Citation: ML15, Ch76, Sec2, Subd 9d

Appropriation Language:
$3,325,000 the first year is from the trust fund to the commissioner of natural resources to acquire native prairie bank easements on at least 675 acres, prepare baseline property assessments, restore and enhance at least 1,000 acres of native prairie sites, and provide technical assistance to landowners. Of this amount, up to $135,000 must be deposited in a conservation easement stewardship account. Deposits into the conservation easement stewardship account must be made upon closing on conservation easements or at a time otherwise approved in the work plan. A list of proposed easement acquisitions must be provided as part of the required work plan. This appropriation is available until June 30, 2018, by which time the project must be completed and final products delivered.

I. PROJECT TITLE: Native Prairie Stewardship and Prairie Bank Easement Acquisition

II. PROJECT STATEMENT: Of Minnesota's 235,000 acres of remaining native prairie, about 100,000 acres has no form of protection. At the same time, the Midwest experiencing the highest rate of grassland-to-cropland conversion seen since the 1920's. The MN Prairie Conservation Plan provides a road map for all partners to pursue the protection all remaining native prairie over the next 20 years – this project is one of those efforts. This project aims to work with landowners of native prairie identified by the MN Biological Survey (MBS) and provide them protection options and support their conservation efforts through a suite of tools offered by the DNR Scientific and Natural Area (SNA) Program. About 675 acres of native prairie will be permanently protected by the DNR's Native Prairie Bank (NPB) conservation easement program. The current landowner "waiting list" for NPB includes 75 projects for over 6000 acres. Native prairie restoration and enhancement activities will be implemented on about 1000 acres of NPBs threatened by invasive species and lack of natural disturbance regimes. This project will also conduct research on conservation grazing as a form of disturbance ecology for managing the structure and diversity of grassland habitats. This research will help land managers develop specific management practices applicable to Minnesota's grassland types.

III. OVERALL PROJECT STATUS UPDATES:

Amendment Request *(August 4, 2015)***:** Direct and Necessary costs were updated to exclude divisional cost. Of the additional $31,789 created by this change, $18,000 was moved to Activity 1 (Professional Services for acquisition) in order to conduct up to 3 appraisals as a best management practice to evaluate the performance of the formula used to derive NPB payment rates. Native Prairie Bank, along with other DNR conservation easements, went through a review of the easement valuation process this past spring. Through this process it was decided that best management practices should be implemented to insure valuation integrity. In order to implement these best management practices, NPB aims to conduct periodic appraisals to guide formula and valuation decisions. The remaining $13,789 was moved to Activity 4 (Prairie Stewardship Planning) to allow for the creation of 2 additional Prairie Stewardship Plans. Additionally, a request is made that reporting dates be adjusted to September 1 and March 1 of each year to better accommodate fiscal year closeout to insure the most up-to-date budget information is available during the reporting timeframe. **Amendment approved by LCCMR August 5, 2015**

Amendment Request (February 22, 2016): Three parcels have been added to the acquisition list-a 224 ac Polk County site, a 40-ac Big Stone County site, and a 120-ac Becker County site. All three sites are within Minnesota Prairie Conservation Plan Core Areas. **Amendment approved by LCCMR March 1, 2016**

Project Status as of February 22, 2016: SNA acquisition staff have approached and begun NPB easement negotiations with 3 different landowners – a 224 ac Polk County site, a 40-ac Big Stone County site, and a 120-ac Becker County site. SNA prairie specialists have begun writing 4 burn plans, installed 4 firebreaks, and continue to prepare for the 2016 spring burn season. Priority invasive species treatment sites have been identified and 5 projects have been initiated. SNA Prairie Specialists participated in 1 outreach event, providing prairie protection, restoration and enhancement education. SNA Prairie Specialists have also engaged 9 different priority prairie landowners to discuss protection and management options for their property.

Amendment Request (July 26, 2016): Two parcels have been added to the acquisition list-a 56 ac Nicollet County site and a 40-ac Cottonwood County site. Additionally, acres were adjusted from 224 to 218 for the Garfield 30-1 site located in Polk County as the survey has been completed and final acres determined. Please see Project List for more details. **Amendment approved by LCCMR July 29, 2016**

Project Status as of July 26, 2016:
SNA acquisition staff are actively working on 5 NPB easements with one set to close very soon. SNA acquisition staff are working with LCCMR staff on review of the easement terms for this project. Since no NPB easements

have officially closed, no stewardship funds have been enrolled into the Conservation Easement Stewardship Account. Three appraisals were conducted as an easement valuation best management practice. Invasive species control has taken place on 36.6 acres and prescribed burns have taken place on 20.3 acres. SNA Prairie Specialists participated in 1 outreach event, providing prairie protection, restoration and enhancement education. More outreach activities are planned and will be occurring soon. SNA Prairie Specialists have also engaged 10 different priority prairie landowners to discuss protection and management options for their property.

Amendment Request (November 22, 2016): Request to move $100,000 from Easement Acquisition to Professional Services. Recently a review of NPB payment rates was completed and the rates were adjusted, allowing for the acquisition of more acres tied to this appropriation than originally projected. Approximately 200 additional acres is anticipated at this time leading to the acquisition of more parcels and increasing the costs tied to professional services. Additionally, certain remote parcels have higher than anticipated survey costs due to the lack of historic data, tedious manual data collection, difficulty in locating section corners, and lack of county surveyor support (not all counties have an assigned county surveyor). Surveying of NPB easements is not required by statute, however accurate legal descriptions and well defined boundaries can significantly decrease compliance issues down the road and improve long-term enforcement.

Also updated Parcel List adding one additional parcel (please see parcel list for details) and updated phone number of Project Manager. **Amendment approved by LCCMR November 28, 2016**

Amendment Request (February 16, 2017):
Updated Parcel List adding two additional parcels (a 23 acre site in Grant County and a 36 acre site in Rice County). Please see parcel list for more details. **Amendment approved by LCCMR February 20, 2017.**

Project Status as of February 16, 2017:
Two NPB easements recently closed and SNA acquisition staff are actively working on 6 others. Two Baseline Property Reports and 2 monitoring events have been completed through this project. Stewardship funds for the 2 closed NPBs have not been enrolled into the Conservation Easement Stewardship Account to-date but will be very soon. Three appraisals were conducted as an easement valuation best management practice. Invasive species control has taken place on 238.6 acres and prescribed burns have taken place on 20.3 acres. SNA Prairie Specialists participated in 2 outreach events, providing prairie protection, restoration and enhancement education. More outreach activities are planned and will be occurring soon. SNA Prairie Specialists have also engaged 12 different priority prairie landowners to discuss protection and management options for their property.

Amendment Request (August 31, 2017): Staff recently reviewed the budget as we go into the final year of the appropriation and made adjustments as needed to close out projects. $1500 was moved out of printing and placed into travel and $13,437 was moved out of contracts and placed into salary, supplies and travel. A shortage of state qualified burn contractors, a rise in cost of qualified vendors and the complexity of the burns has led to higher than projected costs and more internal salary needs. Updated the Parcel List adding two additional parcels (a 46 acre project in Pope County and a 64 acre project in Wilkin County). Please see parcel list for more details. Request to move the 20 acres of reconstruction to woody removal and invasive species treatment. The ~4 acres of reconstruction needed will not be able to be completed with this appropriation on the easements being acquired because acquisitions were delayed due to the easement payment rate evaluation process and delays by landowners during the acquisition process. **Amendment Approved by LCCMR 9/11/2017**

Project Status as of August 31, 2017: Three NPB easements recently closed and SNA acquisition staff are actively working on 7 others. Three Baseline Property Reports and 16 monitoring events have been completed through this project. Stewardship funds for 2 closed NPBs have been enrolled into the Conservation Easement Stewardship Account. Three appraisals were conducted as an easement valuation best management practice.

An error was found in our reporting system that caused over reporting of invasive species control in the February status update, 106 acres of invasive species control has taken place to-date with more planned. Prescribed burns have taken place on 101 acres. SNA Prairie Specialists participated in 7 outreach events, providing prairie protection, restoration and enhancement education. More outreach activities are planned and will be occurring soon. SNA Prairie Specialists have also engaged 142 different priority prairie landowners to discuss protection and management options for their property.

Amendment Request (February 12, 2018): Request to extend appropriation until June 30, 2019 in order to complete NPB acquisitions that will option, but not close, by June 30, 2018. A review of NPB payment rates was completed in 2016 and the rates were adjusted (lowered), allowing for the acquisition of approximately 400 additional acres tied to this appropriation than originally projected (~1080 total acres). Additional acres led to additional parcels ultimately increasing the costs tied to professional services, personnel and travel for Activity 1. Therefore, this request includes moving $35,000 to professional services, $25,000 to personnel, and $4,000 to travel from easement acquisition within Activity 1. It also includes a request to move $45,000 from easement acquisition in Activity 1 to long-term easement stewardship in Activity 2. In addition to these requested changes, 4 new parcels have been added to the parcel list. **Amendment Approved by LCCMR 2/27/2018. Legislative approval during 2018 regular legislative session.**

Project Status as of February 12, 2018: Four NPB easements have closed and SNA acquisition staff are actively working on 8 others. Four Baseline Property Reports and 16 monitoring events have been completed through this project. Stewardship funds for 2 closed NPBs have been enrolled into the Conservation Easement Stewardship Account. Three appraisals were conducted as an easement valuation best management practice. To-date, 111 acres of invasive species control and 101 acres of prescribed burns have been completed with more currently being planned and executed. Adaptive Management Monitoring was completed on 10 NPBs during the 2017 growing season. SNA Prairie Specialists participated in 7 outreach events, providing prairie protection, restoration and enhancement education. SNA Prairie Specialists have also engaged 142 different priority prairie landowners to discuss protection and management options for their property. Ten Prairie Stewardship Plans have been contracted and are set to be completed by June 15, 2018.

Project Status as of September 1, 2018: Seven NPB easements have closed and SNA acquisition staff are actively working on 5 others. Seven Baseline Property Reports and 22 monitoring events have been completed through this project. Stewardship funds for 5 closed NPBs have been enrolled into the Conservation Easement Stewardship Account. Three appraisals were conducted as an easement valuation best management practice. To-date, 176 acres of invasive species control and 909 acres of prescribed burns have been completed. Adaptive Management Monitoring was completed on 10 NPBs during the 2017 growing season. SNA Prairie Specialists participated in 7 outreach events, providing prairie protection, restoration and enhancement education. SNA Prairie Specialists have also engaged 163 different priority prairie landowners to discuss protection and management options for their property. Ten Prairie Stewardship Plans have been written by contractors, approved by SNA Prairie Specialist and provided to the landowners.

Project Status as of February 20, 2019: Nine NPB easements have closed for a total of 858 acres with SNA acquisition staff actively working on 3 others. Nine Baseline Property Reports and 22 monitoring events have been completed through this project. Stewardship funds for 5 closed NPBs have been enrolled into the Conservation Easement Stewardship Account. Three appraisals were conducted as an easement valuation best management practice. To-date, 176 acres of invasive species control and 909 acres of prescribed burns have been completed. Adaptive Management Monitoring was completed on 10 NPBs during the 2017 growing season. SNA Prairie Specialists participated in 7 outreach events, providing prairie protection, restoration and enhancement education. SNA Prairie Specialists have also engaged 163 different priority prairie landowners to discuss protection and management options for their property. Ten Prairie Stewardship Plans have been written by contractors, approved by SNA Prairie Specialist and provided to the landowners.

Amendment Request (May 1, 2019): Request to move $25,000 from Easement Acquisition (Activity 1) to Professional Services (Activity 1) and $16,000 from Easement Acquisition (Activity 1) to Personnel (Activity 1) to aid in finishing up the last 3 NPB easements being acquired with this appropriation. On track to exceed acquisition acre accomplishments by ~403 acres, additional acres has led to additional acquisition services. Request to move $9,600 from Easement Acquisition (Activity 1), $430 from Supplies (Activity 3), $1,400 from Travel (Activity 3), $1,630 from Travel (Activity 1) and $2,040 from contracts (Activity 2) to Personnel (Activity 2). Also request to move $7,960 from contracts (Activity 2) to Travel (Activity 2). These shifts consolidate extra dollars throughout the budget to activity 2 to allow staff to finish up enhancement, monitoring and boundary signage activities. The extra contract dollars were initially contracted out for a winter/spring woody control project however the contractor was only able to complete part of the contract due to weather related issues therefore we are shifting the work to internal crews and other management activities. I also cleaned up the budget column A to better reflect the current work plan given this request and past approved amendment requests. **Amendment Approved by LCCMR 5/28/2019.**

Overall Project Outcomes and Results:

Through this appropriation, 1,107 acres of high quality dry hill, mesic and wet prairies, which house state and federally threatened species, state special concerns species, multiple Species in Greatest Conservation Need and a wide variety of pollinators, were permanently protected through 12 Native Prairie Bank conservation easements (see attached parcel list for more details). Protection efforts, through this appropriation and other Native Prairie Bank appropriations, preserve some of the best remaining native prairie in the state for current and future MN Citizens benefit. These remaining native prairies function at a significantly higher level and provide habitat to more species of insects, birds, reptiles and mammals than reconstructed/restored prairie. Additionally, 12 Baseline Property Reports and 22 monitoring events were completed through this appropriation. Stewardship funds for the 12 closed Native Prairie Bank easements were enrolled into the Conservation Easement Stewardship Account and 3 appraisals were conducted as an easement valuation best management practice.

A total of 221 acres of invasive species control and 909 acres of prescribed burns were completed to improve prairie quality throughout the prairie region of the state. Adaptive Management Monitoring was completed on 14 Native Prairie Banks and specific research was conducted to evaluate the impact of grazing on secretive marsh birds. Knowledge gained through this monitoring and research will help landowners, DNR land managers and partner agencies improve the management of native prairie and wetlands.

DNR Prairie Specialists participated in 7 outreach events, providing prairie protection, restoration and enhancement education. DNR Prairie Specialists also engaged 163 different priority prairie landowners to discuss protection and management options for their property. Ten Prairie Stewardship Plans were written by contractors, approved by DNR Prairie Specialist and provided to the landowners.

IV. PROJECT ACTIVITIES AND OUTCOMES:

ACTIVITY 1: NPB Acquisition of Prairie of Biodiversity Significance
Description: The SNA Program will protect and buffer high quality native prairie sites of by acquisition of NPB conservation easements on 675 acres. Payment rates are formula based, which is 65% of the marginal agricultural land rate as established by BWSR (M.S. 84.96). These rates are updated annually and reflect current land values within a given township. At least 3 appraisals will be conducted as a best management practice to evaluate formula performance. Conservation easement baseline reports will be completed on 9 NPBs, including all NPBs acquired with this funding. Additional baselines may be completed on previously acquired NPB acquisitions, with a focus on those acquired with ENRTF funds. Monitoring and easement stewardship-related work during this appropriation period will be completed on about 15 NPBs, with a focus on those acquired with ENRTF funds. Priority sites are identified by MBS and target rare and endangered plant and animal species, high

quality plant communities, and key habitats for Species of Greatest Conservation Need (SGCN). Any lands needing restoration will be completed using a combination of funds from Activity 3 below and/or state appropriations. It is anticipated that only 20 of the 675 acres acquired will need restoration.

Summary Budget Information for Activity 1: **ENRTF Budget: $2,560,761**
Amount Spent: $2,538,714
Balance: $22,048

Outcome	Completion Date
1. acquisition of NPB conservation easement - 675 acres of native prairie	6/30/18
2. conduct periodic appraisals as a valuation best management practice (~3 appraisals)	6/30/18
3. baseline property reports for acquired NPB easements	6/30/18
4. accelerated landowner outreach for NPB enrollment	6/30/18
5. monitoring and stewardship of NPB easements (15 NPBs)	6/30/18

Amendment Request *(August 4, 2015)***:** Direct and Necessary costs were updated to exclude divisional cost. This reduced the original budget for Activity 1 by $1,500. Of the additional $31,789 created by this change, $18,000 was moved back into Activity 1 (Professional Services for acquisition) in order to conduct up to 3 appraisals as a best management practice to evaluate the performance of the formula used to derive NPB payment rates. Native Prairie Bank, along with other DNR conservation easements, went through a review of the easement valuation process this past spring. Through this process it was decided that best management practices should be implemented to insure valuation integrity. In order to implement these best management practices, NPB aims to conduct periodic appraisals to guide formula and valuation decisions. **Amendment approved by LCCMR August 5, 2015**

Amendment Request (February 22, 2016): Three parcels have been added to the acquisition list-a 224 ac Polk County site, a 40-ac Big Stone County site, and a 120-ac Becker County site. All three sites are within Minnesota Prairie Conservation Plan Core Areas. **Amendment approved by LCCMR March 1, 2016**

Project Status as of February 22, 2016: SNA acquisition staff have approached and begun NPB easement negotiations with 3 different landowners – a 224 ac Polk County site, a 40-ac Big Stone County site, and a 120-ac Becker County site. These projects are considered to be in "stage 2" of the NPB easement enrollment process, meaning project maps and easement terms are being drafted and reviewed. We anticipated having options offered on these properties within the next 6-9 months. As the projects get closer to completed, baseline property reports for monitoring will be written. A list of ENRTF acquired NPB sites due for monitoring during the 2016 field has been compiled and field staff will work to visit these sites throughout the upcoming field season.

Amendment Request (July 26, 2016): Two parcels have been added to the acquisition list-a 56 ac Nicollet County site and a 40-ac Cottonwood County site. Additionally, acres were adjusted from 224 to 218 for the Garfield 30-1 site located in Polk County as the survey has been completed and final acres determined. Please see Project List for more details. **Amendment approved by LCCMR July 29, 2016**

Project Status as of July 26, 2016:
SNA acquisition staff have approached and begun NPB easement negotiations with 5 different landowners (218 ac Polk County site, 40-ac Big Stone County site, 120-ac Becker County site, 56 ac Nicollet County site and a 40 ac Cottonwood County Site). Garfield 30-1 (218 acres located in Polk County) will be closing soon. Odessa 19-1 (40 acres located in Big Stone County) has been optioned and survey units are working on a final legal description. The remaining 3 projects are considered to be in "stage 2" of the NPB easement enrollment process, meaning project maps and easement terms are being drafted and reviewed. We anticipate having options offered on these properties within the next 3-6 months. As the projects get closer to completed, baseline property reports for monitoring will be written. A list of ENRTF acquired NPB sites due for monitoring during the 2016 field

season was compiled this past winter and field staff have been diligently working to monitor these sites. Monitoring from the 2016 field season will be entered into our Easement Stewardship Database this winter.

Three appraisals were conducted through this appropriation on NPB easements. An additional 5 appraisals were conducted using the ML15 OHF Native Prairie Bank Acquisition appropriation. These appraisals, in addition to extensive additional research done with other non-LCCMR funding were completed as a best management practice to evaluate the performance of the formula used to derive NPB payment rates. As a result of this review, DNR decided to request an adjustment of the NPB formula from the historic approach of paying 65% of the RIM Crop Rate to 65% of the RIM Non-Crop Rate. This change was approved by the BWSR Board at their June 22, 2016 meeting. This revised formula still reflects MN Statute 84.96 (Native Prairie Bank) while decreasing the payment rate for a new NPB acquisition by an average of 33%. Best Management Practices, such as the appraisals and review completed, will continue to be conducted periodically to check the viability of the updated formula and determine if further changes or adjustments are needed.

Amendment Request (November 22, 2016): Request to move $100,000 from Easement Acquisition to Professional Services. Recently a review of NPB payment rates was completed and the rates were adjusted, allowing for the acquisition of more acres tied to this appropriation than originally projected. Approximately 200 additional acres is anticipated at this time leading to the acquisition of more parcels and increasing the costs tied to professional services. Additionally, certain remote parcels have higher than anticipated survey costs due to the lack of historic data, tedious manual data collection, difficulty in locating section corners, and lack of county surveyor support (not all counties have an assigned county surveyor). Surveying of NPB easements is not required by statute, however accurate legal descriptions and well defined boundaries can significantly decrease compliance issues down the road and improve long-term enforcement. Also updated Parcel List adding one additional parcel (please see parcel list for details). **Amendment approved by LCCMR November 28, 2016**

Amendment Request (February 16, 2017):
Updated Parcel List adding two additional parcels (a 23 acre site in Grant County and a 36 acre site in Rice County). Please see parcel list for more details. **Amendment approved by LCCMR February 20, 2017.**

Project Status as of February 16, 2017:
Two NPB easements recently closed (218 acre Polk County Site and a 40 acre Big Stone County site). SNA staff are actively working on 6 other NPB acquisitions (120-ac Becker County site, 34 ac Nicollet County site, a 40 ac Cottonwood County Site, a 260 acre Lac Qui Parle County site, a 23 acre Grant County site and a 36 acre Rice County site) with additional acquisitions sites being evaluated and negotiated. Two Baseline Property Reports and 2 monitoring events have been completed to-date through this project. A list of ENRTF acquired NPB sites due for monitoring during the 2017 field season was compiled in early February and field staff will aim to monitor these sites throughout the 2017 growing season.

Three appraisals were conducted through this appropriation on NPB easements. An additional 5 appraisals were conducted using the ML15 OHF Native Prairie Bank Acquisition appropriation. These appraisals, in addition to extensive additional research done with other non-LCCMR funding were completed as a best management practice to evaluate the performance of the formula used to derive NPB payment rates. As a result of this review, DNR decided to request an adjustment of the NPB formula from the historic approach of paying 65% of the RIM Crop Rate to 65% of the RIM Non-Crop Rate. This change was approved by the BWSR Board at their June 22, 2016 meeting. This revised formula still reflects MN Statute 84.96 (Native Prairie Bank) while decreasing the payment rate for a new NPB acquisition by an average of 33%. Best Management Practices, such as the appraisals and review completed, will continue to be conducted periodically to check the viability of the updated formula and determine if further changes or adjustments are needed.

Amendment Request (August 31, 2017): Updated Parcel List adding two additional parcels (a 46 acre project in Pope County and a 64 acre project in Wilkin County). Please see parcel list for more details. This amendment

also includes a request to move $14,258 from Activity 1 to Activity 2 to better balance budget needs for each activity. **Amendment Approved by LCCMR 9/11/2017**

Project Status as of September 1, 2017:
Three NPB easements recently closed (218 acre Polk County Site, a 40 acre Big Stone County site and a 41 acre Cottonwood County site). SNA staff are actively working on 7 other NPB acquisitions (120-ac Becker County site, 56 ac Nicollet County site, a 260 acre Lac Qui Parle County site, a 23 acre Grant County site, a 36 acre Rice County site, a 46 acre Pope County site and a 710 acre Wilkin county site of which approximately 64 acres will be paid for using this appropriation) with potential for additional acquisitions sites. Three Baseline Property Reports and 16 monitoring events have been completed to-date through this project.

Three appraisals were conducted through this appropriation on NPB easements. An additional 5 appraisals were conducted using the ML15 OHF Native Prairie Bank Acquisition appropriation. These appraisals, in addition to extensive additional research done with other non-LCCMR funding were completed as a best management practice to evaluate the performance of the formula used to derive NPB payment rates. As a result of this review, DNR decided to request an adjustment of the NPB formula from the historic approach of paying 65% of the RIM Crop Rate to 65% of the RIM Non-Crop Rate. This change was approved by the BWSR Board at their June 22, 2016 meeting. This revised formula still reflects MN Statute 84.96 (Native Prairie Bank) while decreasing the payment rate for a new NPB acquisition by an average of 33%. Best Management Practices, such as the appraisals and review completed, will continue to be conducted periodically to check the viability of the updated formula and determine if further changes or adjustments are needed.

Project Status as of February 12, 2018: Four NPB easements have closed (218 acre Polk County Site, a 40 acre Big Stone County site, a 41 acre Cottonwood County site and a 56 acre Nicollet County site). SNA staff are actively working on 8 other NPB acquisitions (a 260 acre Lac Qui Parle County site, a 23 acre Grant County site, a 36 acre Rice County site, a 46 acre Pope County site, a 153 acres Pipestone County site, a 34 acre Murray County site, a 44 acre Redwood County site and a 270 acre Marshall county site of which ~130 acres will be paid for using this appropriation). Four Baseline Property Reports and 16 monitoring events have been completed to-date through this project.
Three appraisals were conducted through this appropriation on NPB easements. An additional 5 appraisals were conducted using the ML15 OHF Native Prairie Bank Acquisition appropriation. These appraisals, in addition to extensive additional research done with other non-LCCMR funding were completed as a best management practice to evaluate the performance of the formula used to derive NPB payment rates. As a result of this review, DNR decided to request an adjustment of the NPB formula from the historic approach of paying 65% of the RIM Crop Rate to 65% of the RIM Non-Crop Rate. This change was approved by the BWSR Board at their June 22, 2016 meeting. This revised formula still reflects MN Statute 84.96 (Native Prairie Bank) while decreasing the payment rate for a new NPB acquisition by an average of 33%. Best Management Practices, such as the appraisals and review completed, will continue to be conducted periodically to check the viability of the updated formula and determine if further changes or adjustments are needed.

Project Status as of September 1, 2018: Seven NPB easements have closed for a total of 684 acres (218 acre Polk County Site, a 40 acre Big Stone County site, a 41 acre Cottonwood County site, a 56 acre Nicollet County site, a 257 acre Lac qui Parle County site, a 27 acre Rice County Site and a 45 acre Pop County site). SNA staff are actively working on 5 other NPB acquisitions (a 23 acre Grant County site, a 153 acres Pipestone County site, a 34 acre Murray County site, a 44 acre Redwood County site and a 270 acre Marshall county site of which ~130 acres will be paid for using this appropriation). Seven Baseline Property Reports and 22 monitoring events have been completed to-date through this project.
Three appraisals were conducted through this appropriation on NPB easements. An additional 5 appraisals were conducted using the ML15 OHF Native Prairie Bank Acquisition appropriation. These appraisals, in addition to extensive additional research done with other non-LCCMR funding were completed as a best management practice to evaluate the performance of the formula used to derive NPB payment rates. As a result of this

review, DNR decided to request an adjustment of the NPB formula from the historic approach of paying 65% of the RIM Crop Rate to 65% of the RIM Non-Crop Rate. This change was approved by the BWSR Board at their June 22, 2016 meeting. This revised formula still reflects MN Statute 84.96 (Native Prairie Bank) while decreasing the payment rate for a new NPB acquisition by an average of 33%. Best Management Practices, such as the appraisals and review completed, will continue to be conducted periodically to check the viability of the updated formula and determine if further changes or adjustments are needed.

Project Status as of February 20, 2019: Nine NPB easements have closed for a total of 858 acres (218 acre Polk County Site, a 40 acre Big Stone County site, a 41 acre Cottonwood County site, a 56 acre Nicollet County site, a 257 acre Lac qui Parle County site, a 27 acre Rice County Site, a 45 acre Pope County site, a 21 acre Grant County site and a 153 acre Pipestone County Site). SNA staff are actively working on 3 other NPB acquisitions (a 34 acre Murray County site, a 44 acre Redwood County site and a 270 acre Marshall county site of which ~130 acres will be paid for using this appropriation). Nine Baseline Property Reports and 22 monitoring events have been completed to-date through this project.
Three appraisals were conducted through this appropriation on NPB easements. An additional 5 appraisals were conducted using the ML15 OHF Native Prairie Bank Acquisition appropriation. These appraisals, in addition to extensive additional research done with other non-LCCMR funding were completed as a best management practice to evaluate the performance of the formula used to derive NPB payment rates. As a result of this review, DNR decided to request an adjustment of the NPB formula from the historic approach of paying 65% of the RIM Crop Rate to 65% of the RIM Non-Crop Rate. This change was approved by the BWSR Board at their June 22, 2016 meeting. This revised formula still reflects MN Statute 84.96 (Native Prairie Bank) while decreasing the payment rate for a new NPB acquisition by an average of 33%. Best Management Practices, such as the appraisals and review completed, will continue to be conducted periodically to check the viability of the updated formula and determine if further changes or adjustments are needed.

Final Report Summary: Twelve NPB easements have closed and initial acquisition reports submitted for a total of 1107 acres (218 acre Polk County Site, a 40 acre Big Stone County site, a 41 acre Cottonwood County site, a 56 acre Nicollet County site, a 257 acre Lac qui Parle County site, a 27 acre Rice County Site, a 45 acre Pope County site, a 21 acre Grant County site, a 156 acre Pipestone County Site, a 43 acre Murray County Site, a 45 acre Redwood County site and a 267 acre Marshall County site (of which 158 acres are prorated to this appropriation). Twelve Baseline Property Reports and 22 monitoring events have been completed to-date through this project.
Three appraisals were conducted through this appropriation on NPB easements. An additional 5 appraisals were conducted using the ML15 OHF Native Prairie Bank Acquisition appropriation. These appraisals, in addition to extensive additional research done with other non-LCCMR funding were completed as a best management practice to evaluate the performance of the formula used to derive NPB payment rates. As a result of this review, DNR decided to request an adjustment of the NPB formula from the historic approach of paying 65% of the RIM Crop Rate to 65% of the RIM Non-Crop Rate. This change was approved by the BWSR Board at their June 22, 2016 meeting. This revised formula still reflects MN Statute 84.96 (Native Prairie Bank) while decreasing the payment rate for a new NPB acquisition by an average of 33%. Best Management Practices, such as the appraisals and review completed, will continue to be conducted periodically to check the viability of the updated formula and determine if further changes or adjustments are needed.

ACTIVITY 2: Monitoring and Stewardship of Acquired Easements
Description: The policy of the DNR is to follow, as closely as possible, established industry practices in the stewardship of its conservation easement interests. DNR policy also directs each division or program to determine the amount of funding necessary to perform stewardship activities and seek funding from appropriate sources sufficient to meet its conservation easement stewardship obligations. The intent of this stewardship is to protect both the conservation values of the property protected by these easements and the investment of the state in those interests. Elements of this stewardship include regular compliance monitoring, effective record keeping and reporting, and resolution of any issues discovered during monitoring. The Native

Prairie Bank Program implements this policy by following the "Ecological and Water Resources Conservation Easement Stewardship Plan and Guidelines". This plan calls for annual landowner contacts as well as on-the-ground site evaluations every year for the first three years, then once every three years if no violations are found. Budgeted into this work plan is funding to be deposited into conservation easement account dedicated to the perpetual monitoring and enforcement of conservation easements. The dedicated stewardship and enforcement funds will provide the support needed for long-term, ongoing monitoring and enforcement activities of Native Prairie Bank easements acquired under this proposal. For Native Prairie Bank easements, the DNR has estimated that annual expenses for each project and the investment needed to generate annual income sufficient to cover these expenses in perpetuity ($15,000/easement). Funds for this activity will be deposited into a conservation easement stewardship account expected to be established in 2015. This account is further explained in Section VIII-B question #7 under "Conservation Easement Acquisition".

Summary Budget Information for Activity 2:	**ENRTF Budget:**	**$180,000**
	Amount Spent:	**$180,000**
	Balance:	**$0**

Outcome	**Completion Date**
1. monitoring and stewardship of ~9 acquired easements	6/30/18

Project Status as of February 22, 2016: To-date, no Native Prairie Bank easements have closed using funds allocated through this appropriation, therefore no stewardship funds have been used.

Project Status as of July 26, 2016: To-date, no Native Prairie Bank easements have closed using funds allocated through this appropriation, therefore no stewardship funds have been used. The Fiscal Year 2016 Conservation Easement Stewardship Account Plan has been submitted as part of this status update and DNR staff are currently working to create the Fiscal Year 2017 Account Plan.

Project Status as of February 16, 2017: Stewardship funds for the 2 closed NPBs will be enrolled into the Conservation Easement Stewardship Account prior to the end of fiscal year 2017. The Fiscal Year 2016 Conservation Easement Stewardship Account Plan was submitted as part of the Jul 26, 2016 status update and DNR staff are currently working to fine-tune the Fiscal Year 2017 Account Plan.

Project Status as of September 1, 2017: Stewardship funds for 2 closed NPBs was enrolled into the Conservation Easement Stewardship Account prior to the end of fiscal year 2017. The Fiscal Year 2016 Conservation Easement Stewardship Account Plan was submitted as part of the Jul 26, 2016 status update and the Fiscal Year 2017 Account Plan will be submitted by the October 31, 2017 deadline.

Project Status as of February 12, 2018: Stewardship funds for 2 closed NPBs were enrolled into the Conservation Easement Stewardship Account prior to the end of fiscal year 2017. NPBs that have closed by June 15, 2018 will be enrolled into the account prior to the end of fiscal year 2018. The Fiscal Year 2016 Conservation Easement Stewardship Account Plan was submitted as part of the Jul 26, 2016 status update and the Fiscal Year 2017 Account Plan was submitted on October 30, 2017.

Project Status as of September 1, 2018: Stewardship funds for 2 closed NPBs were enrolled into the Conservation Easement Stewardship Account prior to the end of fiscal year 2017 and another 3 sites were enrolled in 2018. NPBs that closed after June 15, 2018 will be enrolled into the account prior to the end of fiscal year 2019. The Fiscal Year 2016 Conservation Easement Stewardship Account Plan was submitted as part of the Jul 26, 2016 status update and the Fiscal Year 2017 Account Plan was submitted on October 30, 2017. The Fiscal Year 2018 Account Plan will be submitted prior to October 30, 2018.

Project Status as of February 20, 2019: Stewardship funds for 2 closed NPBs were enrolled into the Conservation Easement Stewardship Account prior to the end of fiscal year 2017 and another 3 sites were enrolled in 2018. NPBs that closed after June 15, 2018 will be enrolled into the account prior to the end of fiscal year 2019. The Fiscal Year 2016 Conservation Easement Stewardship Account Plan was submitted as part of the Jul 26, 2016 status update, the Fiscal Year 2017 Account Plan was submitted on October 30, 2017 and the Fiscal Year 2018 Account Plan was submitted on October 31, 2018.

Final Report Summary: Stewardship funds for the 12 closed Native Prairie Bank easements have been enrolled into the Conservation Easement Stewardship Account for a total of $180.000. The Fiscal Year 2016 Conservation Easement Stewardship Account Plan was submitted as part of the Jul 26, 2016 status update, the Fiscal Year 2017 Account Plan was submitted on October 30, 2017 and the Fiscal Year 2018 Account Plan was submitted on October 31, 2018. An Annual Easement Stewardship Plan and Financial Report will continue to be submitted annually by the 116P.20 required deadline (120 days after the close of the state fiscal year).

ACTIVITY 3: Native Prairie Restoration & Enhancement

Description: Restoration and enhancement activities would be completed on about 1000 acres. Management practices at 10 NPB sites would be measured to evaluate if objectives were met as part of adaptive management. Restoration and enhancement activities – including bringing sites acquired up to minimum standards – would be carried out through landowner agreements, DNR staff, Conservation Corps MN (CCM), Sentence to Service (STS), volunteers, and/or contractors. Activities include seed collection, planting, exotics control, woody encroachment removal, boundary signing, site cleanup, prescribed burns/mowing, and monitoring. All restorations will use seeds/plants of a local ecotype, collected from onsite or within the Seed Zone. This activity and its funding would include all work needed to bring up to the Department's minimum standards those NPB easements acquired through this funding.

Summary Budget Information for Activity 3:	**ENRTF Budget:**	**$322,771**
	Amount Spent:	**$302,665**
	Balance:	**$20,106**

Outcome	**Completion Date**
2. 150 acres of woody removal & exotics species treatment	6/30/18
3. 850 acres of prescribed burns	6/30/18
4. NPB easement boundary signs & development work to meet minimum standards on 9 NPB sites (including those acquired with this funding)	6/30/18
5. adaptive management monitoring on 5 NPB sites	6/30/18

Amendment Request *(August 4, 2015)***:** Direct and Necessary costs were updated to exclude divisional cost. These divisional costs were included in the original request for Activity 3. The reduction of $17,789 from Activity 3 is for the removal of these divisional costs. These funds were moved to Activity 1 and 4. **Amendment approved by LCCMR August 5, 2015**

Project Status as of February 22, 2016: SNA prairie specialists have begun writing 4 burn plans and installed 4 firebreaks for a total of 9,562 feet. These 4 burns are scheduled to be burned during the 2016 spring burn season. Priority invasive species treatment sites have been identified and 5 projects have been initiated. The invasive projects initiated so far are targeting Wild Carrot, Birdsfoot Trefoil, Crown Vetch and Buckthorn. Work plans are also being developed for 2016 woody encroachment and prairie reconstruction projects.

Project Status as of July 26, 2016: Cumulative accomplishments to date: 3-1. Prairie Restoration: No prairie restorations/reconstruction activities have taken place to-date. 3-2. Woody Removal & Invasive Species: Herbaceous invasive species treatment activities have taken place on 33.8 acres at 16 NPBs and woody invasive species activities were completed on 3.8 acres at 1 NPB. 3-3. Prescribed Burning: About 1.8 miles of firebreaks

were installed at 4 NPBs and prescribed burns were completed on 20.3 acres at 3 NPBs. 3-4. Development: No boundary signs have been installed to-date. 3-5. Adaptive Management Monitoring: No adaptive management monitoring has occurred.

Project Status as of February 16, 2017: Cumulative accomplishments to date: 3-1. Prairie Restoration: No prairie restorations/reconstruction activities have taken place to-date. 3-2. Woody Removal & Invasive Species: Herbaceous invasive species treatment activities have taken place on 32.8 acres at 13 NPBs and woody invasive species activities were completed on 205.8 acres at 7 NPB. 3-3. Prescribed Burning: In 2016, about 1.8 miles of firebreaks were installed at 4 NPBs and prescribed burns were completed on 20.3 acres at 3 NPBs. In preparation for the 2017 spring burn season, an additional 5 miles of fire breaks were installed this past fall at 8 NPBs. 3-4. Development: Boundary signs have been installed at 2 NPBs to-date. 3-5. Adaptive Management Monitoring: No adaptive management monitoring has occurred.

Amendment Request (August 31, 2017): Request to move the 20 acres of reconstruction to woody removal and invasive species treatment. The ~4 acres of reconstruction needed will not be able to be completed with this appropriation on the easements being acquired because the acquisitions were delayed due to the easement payment rate evaluation process and delays by landowners during the acquisition process. This amendment also includes a request to move $14,258 from Activity 1 and $4,242 from Activity 3 to Activity 2 to better balance budget needs for each activity. A shortage of state qualified burn contractors, a rise in cost of qualified vendors and the complexity of the burns has led to higher than projected costs and more internal salary needs. **Amendment Approved by LCCMR 9/11/2017**

Project Status as of September 1, 2017: Cumulative accomplishments to date: 3-1. Prairie Restoration: No prairie restorations/reconstruction activities have taken place to-date. 3-2. Woody Removal & Invasive Species: Herbaceous invasive species treatment activities have taken place on 39 acres at 18 NPBs and woody invasive species activities were completed on 67 acres at 7 NPB. 3-3. Prescribed Burning: To-date, 6.8 miles of firebreaks were installed at 11 NPBs and prescribed burns were completed on 101 acres at 8 NPBs. 3-4. Development: Boundary signs have been installed at 4 NPBs to-date. 3-5. Adaptive Management Monitoring: A contract is in place for adaptive management monitoring with working being completed throughout the summer.

Project Status as of February 12, 2018: Cumulative accomplishments to date: 3-2. Woody Removal & Invasive Species: Herbaceous invasive species treatment activities have taken place on 44 acres at 18 NPBs and woody invasive species activities were completed on 67 acres at 7 NPB. 3-3. Prescribed Burning: To-date, 16.5 miles of firebreaks were installed at 24 NPBs and prescribed burns were completed on 101 acres at 8 NPBs. 3-4. Development: Boundary signs have been installed at 5 NPBs to-date. 3-5. Adaptive Management Monitoring: Adaptive management monitoring was completed on 10 NPBs throughout the 2017 growing season.

Project Status as of September 1, 2018: Cumulative accomplishments to date: 3-2. Woody Removal & Invasive Species: Herbaceous invasive species treatment activities have taken place on 48 acres at 21 NPBs and woody invasive species activities were completed on 128 acres at 15 NPBs. 3-3. Prescribed Burning: To-date, 16.5 miles of firebreaks were installed at 24 NPBs and prescribed burns were completed on 909 acres at 17 NPBs. 3-4. Development: Boundary signs have been installed at 7 NPBs to-date. 3-5. Adaptive Management Monitoring: Adaptive management monitoring was completed on 10 NPBs throughout the 2017 growing season.

Project Status as of February 20, 2019: Cumulative accomplishments to date: 3-2. Woody Removal & Invasive Species: Herbaceous invasive species treatment activities have taken place on 48 acres at 21 NPBs and woody invasive species activities were completed on 128 acres at 15 NPBs. 3-3. Prescribed Burning: To-date, 16.5 miles of firebreaks were installed at 24 NPBs and prescribed burns were completed on 909 acres at 17 NPBs. 3-4. Development: Boundary signs have been installed at 9 NPBs to-date. 3-5. Adaptive Management Monitoring: Adaptive management monitoring was completed on 10 NPBs throughout the 2017 growing season.

Final Report Summary: Cumulative accomplishments to date: 3-2. Woody Removal & Invasive Species Herbaceous invasive species treatment activities have taken place on 49 acres at 21 NPBs and woody invasive species activities were completed on 172 acres at 16 NPBs. 3-3. Prescribed Burning: To-date, 16.5 miles of firebreaks were installed at 24 NPBs and prescribed burns were completed on 909 acres at 17 NPBs. 3-4. Development: Boundary signs have been installed at 12 NPBs to-date. 3-5. Adaptive Management Monitoring: Adaptive management monitoring was completed on 10 NPBs throughout the 2017 growing season and an additional 4 sites early in the 2019 growing season.

ACTIVITY 4: Native Prairie Landowner Assistance & Incentives
Description: Private landowners will increase their stewardship of native prairie through a suite of strategies. Six prairie management workshops/field days for private landowners and other practitioners will be held. DNR staff will meet with 40 landowners to provide technical consultation on how to best manage their prairie. At least 10 landowners will receive a comprehensive prairie stewardship plan including an evaluation their prairie's condition, identification of management needs, and recommendations for management action.

Summary Budget Information for Activity 4:	**ENRTF Budget:**	**$126,468**
	Amount Spent:	**$125,109**
	Balance:	**$1,359**

Outcome	**Completion Date**
1. 3 workshops/field days for prairie landowners & practitioners	6/30/18
2. consultations, guidance, mgmt. asst., etc. to 40 landowners	6/30/18
3. prairie stewardship plans provided to 10 prairie landowners	6/30/18

Amendment Request *(August 4, 2015)***:** Direct and Necessary costs were updated to exclude divisional costs (total reduction of $31,789), this took $12,500 out of the original budget for Activity 4 however, $13,789 of the divisional costs were placed back into Activity 4 (Prairie Stewardship Planning) to allow for the creation of 2 additional Prairie Stewardship Plans. **Amendment approved by LCCMR 8-5-2015**

Project Status as of February 22, 2016: SNA Prairie Specialists participated in 1 outreach event, providing prairie protection, restoration and enhancement education. SNA Prairie Specialists have also engaged 9 different priority prairie landowners to discuss protection and management options for their property. Ten prairie stewardship planning sites have been identified and a Prairie Stewardship Planning "Request for Proposals" is expected to be released through the state bid process in the next 9-months.

Project Status as of July 26, 2016: Cumulative accomplishments to date: 4-1 Workshops/Field Days: SNA Prairie Specialists participated in 1 outreach event, providing prairie protection, restoration and enhancement education. 4-2 Consultations: SNA Prairie Specialists have also engaged 10 different priority prairie landowners to discuss protection and management options for their property. 4-3 Prairie Stewardship Plans: 10 prairie stewardship planning sites have been identified and a Prairie Stewardship Planning "Request for Proposals" is expected to be released through the state bid process in the next 6-months.

Project Status as of February 16, 2017: Cumulative accomplishments to date: 4-1 Workshops/Field Days: SNA Prairie Specialists participated in 2 outreach event, providing prairie protection, restoration and enhancement education. 4-2 Consultations: SNA Prairie Specialists have also engaged 12 different priority prairie landowners to discuss protection and management options for their property. 4-3 Prairie Stewardship Plans: 10 prairie stewardship planning sites have been identified and a Prairie Stewardship Planning "Request for Proposals" was released in January. A March 1, 2017 target date has been set to award plans to selected contractors. Work through this contract will be completed by June 15, 2018.

Amendment Request (August 31, 2017): Request to move $1,693 from Activity 3 to Activity 2 to better balance budget needs for each activity. **Amendment Approved by LCCMR 9/11/2017**

Project Status as of September 1, 2017: Cumulative accomplishments to date: 4-1 Workshops/Field Days: SNA Prairie Specialists participated in 7 outreach event, providing prairie protection, restoration and enhancement education. 4-2 Consultations: SNA Prairie Specialists have also engaged 142 different priority prairie landowners to discuss protection and management options for their property. 4-3 Prairie Stewardship Plans: 10 prairie stewardship planning sites were identified and contracted out this past spring. Work through this contract will be completed by June 15, 2018.

Project Status as of February 12, 2018: Cumulative accomplishments to date: 4-1 Workshops/Field Days: SNA Prairie Specialists participated in 7 outreach events, providing prairie protection, restoration and enhancement education. 4-2 Consultations: SNA Prairie Specialists have also engaged 142 different priority prairie landowners to discuss protection and management options for their property. 4-3 Prairie Stewardship Plans: 10 prairie stewardship planning sites were identified and contracted out this past spring. Contractors will have submitted draft stewardship plans for DNR review by February 23, 2018 with final plans to be completed by June 15, 2018.

Project Status as of September 1, 2018: Cumulative accomplishments to date: 4-1 Workshops/Field Days: SNA Prairie Specialists participated in 7 outreach events, providing prairie protection, restoration and enhancement education. 4-2 Consultations: SNA Prairie Specialists have also engaged 163 different priority prairie landowners to discuss protection and management options for their property. 4-3 Prairie Stewardship Plans: 10 Prairie Stewardship Plans have been written by contractors, approved by SNA Prairie Specialist and provided to the landowners.

Project Status as of February 20, 2019: Cumulative accomplishments to date: 4-1 Workshops/Field Days: SNA Prairie Specialists participated in 7 outreach events, providing prairie protection, restoration and enhancement education. 4-2 Consultations: SNA Prairie Specialists have also engaged 163 different priority prairie landowners to discuss protection and management options for their property. 4-3 Prairie Stewardship Plans: 10 Prairie Stewardship Plans have been written by contractors, approved by SNA Prairie Specialist and provided to the landowners.

Final Report Summary: Cumulative accomplishments to date: 4-1 Workshops/Field Days: SNA Prairie Specialists participated in 7 outreach events, providing prairie protection, restoration and enhancement education. 4-2 Consultations: SNA Prairie Specialists have also engaged 163 different priority prairie landowners to discuss protection and management options for their property. 4-3 Prairie Stewardship Plans: 10 Prairie Stewardship Plans have been written by contractors, approved by SNA Prairie Specialist and provided to the landowners.

ACTIVITY 5: Conduct research on conservation grazing

Description:

Throughout the prairie pothole region, low nesting success is a key factor limiting populations of ground nesting birds. Ground nesting birds can have high rates of nesting success in moderately grazed pastures, and having more grass on the landscape can help elevate nesting success across all habitats, both grazed and ungrazed. This study will evaluate nesting on idle grasslands and pastures with different grazing intensities to identify grazing practices that are most compatible with nesting effort and success for ground nesting birds. The outcome will be Minnesota specific BMPs for conservation grazing to meet a range of conservation objectives. To implement this study, the MN DNR will partner with the University of Minnesota, Dept. of Fisheries, Wildlife, and Conservation Biology who will hire and manage a graduate student. This student will operate under the supervision of Dr. Todd Arnold, as well as the guidance of the DNR Farmland Research Group. Using funds from this appropriation, a sole source contract will be established with the University to fund the student and research activities.

Summary Budget Information for Activity 5: **ENRTF Budget:** **$ 135,000**

Amount Spent:	**$ 86,313**
Balance:	**$ 48,687**

Outcome	Completion Date
1. Hire grad. student, conduct research, analyze results	6/30/18
2. Develop and disseminate grazing BMP's	6/30/18

Project Status as of February 22 2016: Greg Hoch, DNR Prairie Habitat Team Supervisor, continues to work with Professor Todd Arnold at the University of Minnesota to coordinate the research project. No funding has been spent to-date.

Project Status as of July 26, 2016: Greg Hoch, DNR Prairie Habitat Team Supervisor, continues to work with Professor Todd Arnold at the University of Minnesota to coordinate the research project. No funding has been spent to-date.

Project Status as of February 16, 2017: Marissa Cent started as a master's student at the University of Minnesota in January 2017. She will be leading the research efforts to assess impacts of grazing on waterfowl and other wetland and grassland birds. She is currently working on developing survey protocols and Institutional Animal Care and Use Committee approval in preparation for upcoming field work, beginning in May 2017.

Project Status as of September 1, 2017: Marissa Cent started as a master's student at the University of Minnesota in January 2017. She has begun research efforts to assess impacts of grazing on waterfowl and other wetland and grassland birds. She has developed survey protocols, retained Institutional Animal Care and Use Committee approval and has been executing field work since May.
Surveys were conducted for birds and vegetation on native prairie study sites centered around the Morris Wetland Management District. Study sites had been grazed during one or more of the previous 3 years (treatment sites), or had not been grazed for at least 10 years (controls). All wetlands with visible surface water were surveyed two times for breeding waterfowl and other wetland birds, and later in the summer all wetlands were resurveyed for duck broods. Collected data on vegetation composition, inundation, and proportion of the wetland basin that was obscured by vegetation during each survey. A subsample of wetlands were resurveyed during evening hours following the secretive marsh bird protocol to obtain additional data on relative abundance of rails, grebes, coots, and bitterns as well as other wetland and grassland birds present within the count circle. At the conclusion of bird surveys, vegetation surveys were conducted to assess vegetation structure in relation to grazing.

Project Status as of February 12, 2018: Marissa Cent, a master's student at the University of Minnesota began research efforts in January of 2017 to assess impacts of grazing on waterfowl and other wetland and grassland birds. She developed survey protocols, retained Institutional Animal Care and Use Committee approval and executed field work throughout the 2017 growing season.
Surveys were conducted for birds and vegetation on native prairie study sites centered around the Morris Wetland Management District. Study sites had been grazed during one or more of the previous 3 years (treatment sites), or had not been grazed for at least 10 years (controls). All wetlands with visible surface water were surveyed two times for breeding waterfowl and other wetland birds, and later in the summer all wetlands were resurveyed for duck broods. Collected data on vegetation composition, inundation, and proportion of the wetland basin that was obscured by vegetation during each survey. A subsample of wetlands were resurveyed during evening hours following the secretive marsh bird protocol to obtain additional data on relative abundance of rails, grebes, coots, and bitterns as well as other wetland and grassland birds present within the count circle. At the conclusion of bird surveys, vegetation surveys were conducted to assess vegetation structure in relation to grazing.

Project Status as of September 1, 2018: Marissa Cent, a master's student at the University of Minnesota began research efforts in January of 2017 to assess impacts of grazing on waterfowl and other wetland and grassland birds. She developed survey protocols, retained Institutional Animal Care and Use Committee approval and executed field work throughout the 2017 and 2018 growing season. Six species of secretive marsh birds (American Bittern, Least Bittern, Pied-billed Grebe, Sora, Virginia Rail, and Yellow Rail) were targeted but all other wetland/grasslands species seen or heard during the surveys was noted as well.
Throughout the next few months, Marissa will compile and evaluate all the data to see the impacts of grazing on the abundance of secretive marsh birds. Grazing on wetlands that are dominated by dense stands of cattail or reed canary grass could open up habitat, positively impacting marsh bird production. However, on already open wetlands, cows could trample the emergent cover that marsh birds rely on for cover and nesting. As an indicator species of wetland health (Conway 2011), monitoring their productivity as it relates to different grazing regimes could reveal how the entire system is reacting to grazing.

Project Status as of February 20, 2019: Marissa Cent, a master's student at the University of Minnesota began research efforts in January of 2017 to assess impacts of grazing on waterfowl and other wetland and grassland birds. She developed survey protocols, retained Institutional Animal Care and Use Committee approval and executed field work throughout the 2017 and 2018 growing season. Six species of secretive marsh birds (American Bittern, Least Bittern, Pied-billed Grebe, Sora, Virginia Rail, and Yellow Rail) were targeted but all other wetland/grasslands species seen or heard during the surveys were noted as well.

Since completing field work, Marissa has been writing and analyzing her duck and marsh bird data. While she collected pair data on all ground-nesting waterfowl observed, only Blue-winged Teal and Mallards were sufficiently abundant for analysis. Blue-winged Teal pair abundance was unaffected by grazing, while Mallards showed a slight negative response to grazing frequency (Figure 1). Of the 5 marsh bird species observed, the Least Bittern and Sora were unaffected by grazing, while the American Bittern, Pied-billed Grebe, and Virginia Rail all showed positive responses to grazing frequency (Figure 2, 3, 4). If we consider that marsh birds are indicators of wetland health, their response to grazing in this study provides evidence that conservation grazing is not harmful to wetlands in the tallgrass prairies of western Minnesota.

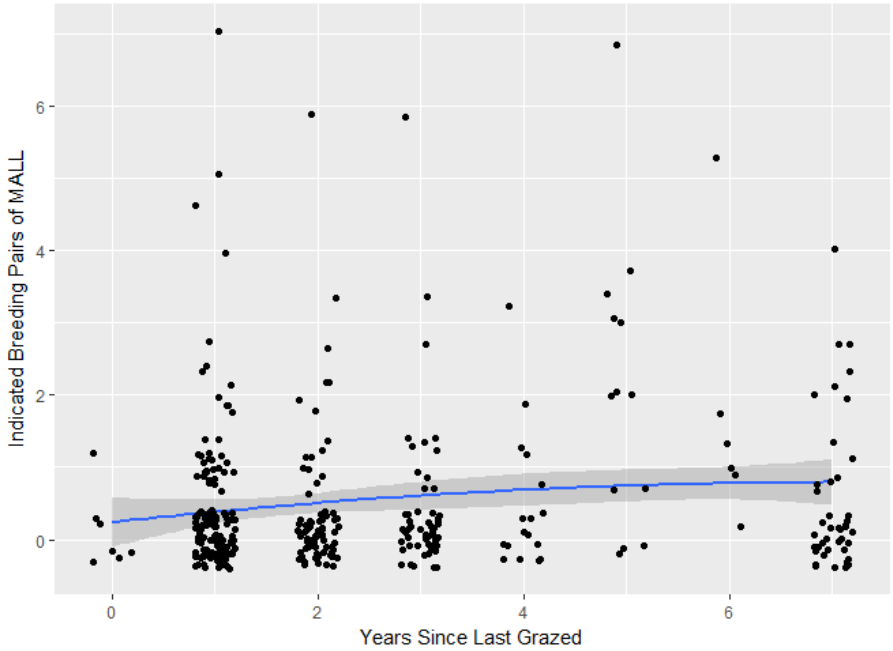


Figure 1. Mallard (MALL) Pair Response to Years Since Last Grazed. Incorporated a quadratic variable for Years Since Last Grazed, allowing for a non-linear correlation between grazing and pair abundance. Ninety-five percent confidence intervals included around the linear regression line.

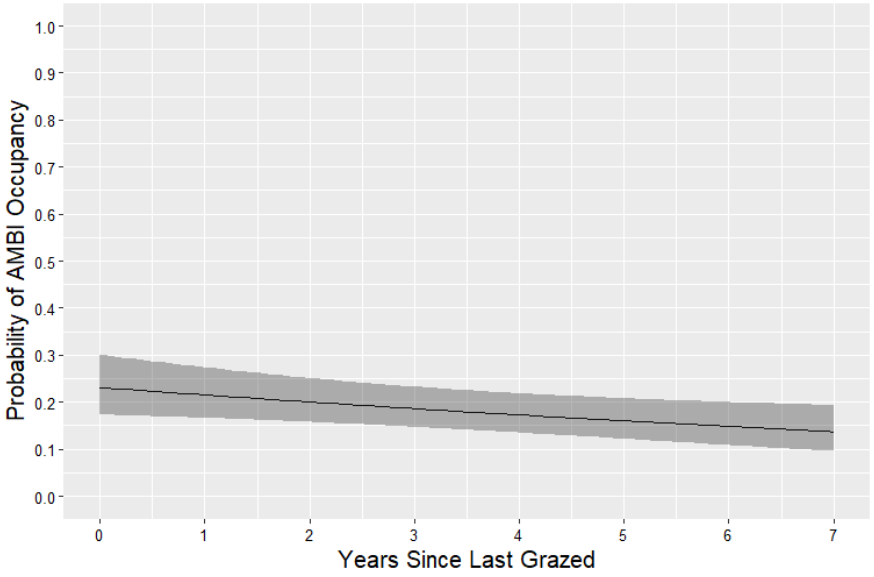


Figure 2. Predicted probability of American Bittern (AMBI) occupancy as it relates to time since last grazed. Ninety-five percent confidence intervals included around the linear regression line.

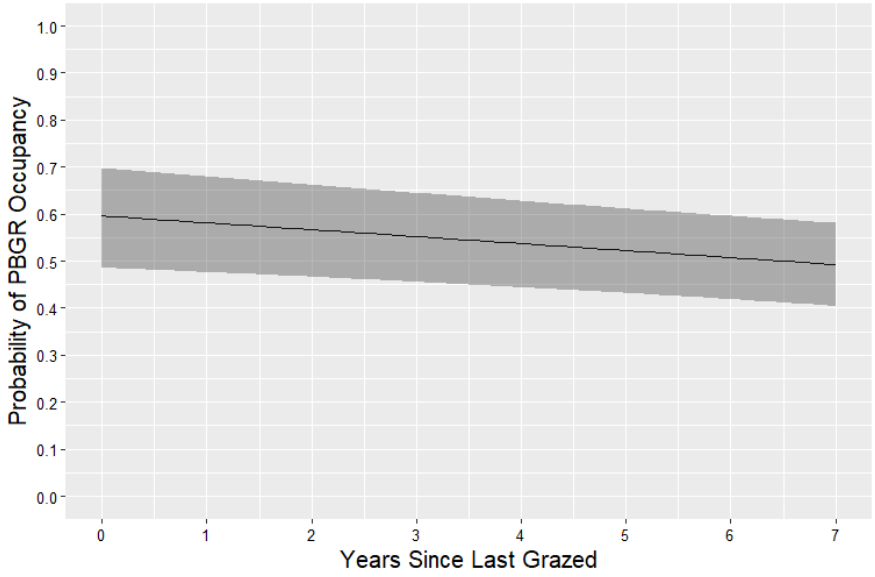


Figure 3. Predicted probability of Pied-billed Grebe (PBGR) occupancy as it relates to time since last grazed. Ninety-five percent confidence intervals included around the linear regression line.

Figure 4. Predicted probability of Virginia Rail (VIRA) occupancy as it relates to the number of times a site was grazed in the last three years. Ninety-five percent confidence intervals included around the linear regression line.

Final Report Summary: Marissa Cent, a master's student at the University of Minnesota began research efforts in January of 2017 to assess impacts of grazing on waterfowl and other wetland and grassland birds. She developed survey protocols, retained Institutional Animal Care and Use Committee approval and executed field work throughout the 2017 and 2018 growing season. Six species of secretive marsh birds (American Bittern, Least Bittern, Pied-billed Grebe, Sora, Virginia Rail, and Yellow Rail) were targeted but all other wetland/grasslands species seen or heard during the surveys were noted as well. Below is the Executive Summary of her findings and the complete report is appended to the Final Report for this appropriation.

Executive Summary of Finished Report: Conservation grazing is becoming a popular management tool in grassland systems that evolved with disturbance. While it has been found to be an effective tool for maintaining upland prairie cover, its impacts on wetlands and the species that rely upon wetlands is not well-studied. Our objective was to investigate the impacts of conservation grazing on two groups of waterbirds: secretive marsh birds and ground-nesting waterfowl. As an economically important group of birds, much of the public land in Minnesota is managed for the production of waterfowl. Meanwhile, secretive marsh birds are believed to be an indicator species, and their response to grazing could tell us how the whole system is responding to management. In 2017 and 2018, we conducted waterfowl pair and brood counts and call-response surveys for secretive marsh birds. We estimated abundance of Blue-winged teal and Mallard pairs in response to grazing frequency and years since a site was grazed using generalized linear models and estimated Blue-winged Teal brood abundance using generalized linear mixed effects models. Insufficient observations of Mallard broods prohibited analysis of brood abundance, but we combined all dabbler broods together to estimate overall brood abundance in relation to grazing. Using robust design occupancy models in Program MARK, we determined the relationship between grazing and marsh bird occupancy. Grazing explained variation in occupancy of American Bittern, Pied-billed Grebe, Sora, and Virginia Rail. American Bittern, Sora, and Virginia Rail responded positively to grazing. Pied-billed Grebe experienced a modest increase in local extinction one year after grazing but showed no response to increased grazing frequency. Grazing had no effect on Blue-winged Teal pair or brood abundance or dabbler brood abundance. Mallard abundance increased marginally in response to increased time since a site was grazed but showed no response to increased grazing frequency. Our study suggests that the use of frequent grazing at low intensities to manage upland cover should neutrally or positively impact occupancy of secretive marsh birds and abundance of ground-nesting waterfowl pairs and broods.

V. DISSEMINATION:

Description: Copies of Stewardship Plans are provided to local DNR managers and used by the landowner with other agencies and programs. Workshops and field days will be listed on the SNA website (http://www.dnr.state.mn.us/snas/index.html), and advertised locally via mailings and flyer postings. Results of the grazing study will be widely disseminated online, in press, and presented to a variety of stakeholders. The study will be submitted for professional, peer reviewed publication. In addition, the study's findings and management implications will be provided to land use decision makers, including public land managers, farmers, SWCD staff, and agricultural consultants.

Project Status as of February 22, 2016: Ten prairie stewardship planning sites have been identified and a Prairie Stewardship Planning "Request for Proposals" is expected to be released through the state bid process in the next 9-months. DNR managers and landowners will be involved in plan creation process and will be provided a copy of the plans once finished.

Project Status as of July 26, 2016: Ten prairie stewardship planning sites have been identified and a Prairie Stewardship Planning "Request for Proposals" is expected to be released through the state bid process in the next 6-months. DNR managers and landowners will be involved in plan creation process and will be provided a copy of the plans once finished. Outreach activities currently being planned as part of this appropriation will have the ENTRF logo present on any documentation or displays.

Project Status as of February 16, 2017: Ten prairie stewardship planning sites have been identified and a Prairie Stewardship Planning "Request for Proposals" was released in January. A March 1, 2017 target date has been set to award plans to selected contractors. Work through this contract will be completed by June 15, 2018. DNR managers and landowners will be involved in the plan creation process and will be provided a copy of the plans once finished. Outreach activities currently being planned as part of this appropriation will have the ENTRF logo present on any documentation or displays.

Project Status as of September 1, 2017: Ten prairie stewardship planning sites were identified and contracted out this past spring. Work through this contract will be completed by June 15, 2018. DNR managers and landowners will be involved in the plan creation process and will be provided a copy of the plans once finished. Outreach activities completed and currently being planned as part of this appropriation will have the ENTRF logo present on any documentation or displays.

Project Status as of February 12, 2018: Ten prairie stewardship planning sites were identified and contracted out during the spring of 2017. Work through this contract will be completed by June 15, 2018. DNR managers and landowners will be involved in the plan creation process and will be provided a copy of the plans once finished. Outreach activities completed and currently being planned as part of this appropriation will have the ENTRF logo present on any documentation or displays.

Project Status as of September 1, 2018: 10 Prairie Stewardship Plans have been written by contractors, approved by SNA Prairie Specialist and provided to the landowners. All outreach activities completed as part of this appropriation had the ENTRF logo present on any documentation or displays.

Project Status as of February 20, 2019: 10 Prairie Stewardship Plans have been written by contractors, approved by SNA Prairie Specialist and provided to the landowners. All outreach activities completed as part of this appropriation had the ENTRF logo present on any documentation or displays.

Final Report Summary: Ten Prairie Stewardship Plans were written by contractors, approved by SNA Prairie Specialists and provided to landowners. These plans will help guide native prairie landowner's enhancement activities for well over a decade. All outreach activities completed as part of this appropriation had the ENTRF logo present on any documentation or displays.

Attached is the *Waterbird Response to Conservation Grazing in Western Minnesota Tallgrass Prairies* summary of the research conducted through this appropriation to assess impacts of grazing on waterfowl and other wetland and grassland birds. The results of this study will be distributed to members of the conservation community in several ways. Agency and conservation organization staff hold a grazing webinar at the end of every other summer with DNR hosting and covering these results this year. Marissa, the grad student who took lead on this research had a poster at the recent MN Wildlife Society meetings and we will encourage her and/or her graduate advisor Dr Todd Arnold to present the final results at this year's meeting. Last, the information will be shared among Prairie Conservation Plan partners this fall. The information will be useful to DNR and USFWS staff as we continue to write new grazing plans and modify existing plans. As with any good research project, the results of this study point to additional questions that agency staff and researchers can address in the coming years.

VI. PROJECT BUDGET SUMMARY:
A. ENRTF Budget Overview:

Amendment Request *(August 4, 2015)***:** Direct and Necessary costs were updated to exclude divisional cost. Of the additional $31,789 created by this change, $6,815 was moved to personnel adjusting the specialists and technicians from 1.0 FTE to 1.1 FTE. An error was also caught in the Acquisition Coordinator/Prairie Biologist and Laborer categories, these numbers were adjusted to match more appropriately the original budget, no dollars were added to these categories. Of the remaining Direct and Necessary division dollars $6,974 was moved to Professional/Technical Contractors for Prairie Stewardship Plan development (as explained in Activity 4 amendment request -August 4, 2015) and $18,000 was moved to Professional Services for Acquisition in order to conduct at least 3 appraisals as an easement valuation best management practices (as explained in Activity 1 amendment request -August 4, 2015). **Amendment approved by LCCMR August 5, 2015**

Amendment Request (November 22, 2016): Request to move $100,000 from Easement Acquisition to Professional Services. Recently a review of NPB payment rates was completed and the rates were adjusted, allowing for the acquisition of more acres tied to this appropriation than originally projected. Approximately 200 additional acres is anticipated at this time leading to the acquisition of more parcels and increasing the costs tied to professional services. Additionally, certain remote parcels have higher than anticipated survey costs due to the lack of historic data, tedious manual data collection, difficulty in locating section corners, and lack of county surveyor support (not all counties have an assigned county surveyor). Surveying of NPB easements is not required by statute, however accurate legal descriptions and well defined boundaries can significantly decrease compliance issues down the road and improve long-term enforcement. **Amendment approved by LCCMR November 28, 2016**

Amendment Request (August 31, 2017): Staff recently reviewed the budget as we go into the final year of the appropriation and made adjustments as needed to close out projects. $1500 was moved out of printing and placed into travel and $13,437 was moved out of contracts and placed into salary, supplies and travel. This is due to a shortage of state qualified burn contractors, a rise in cost of qualified vendors and complex burns which has led to higher than projected costs and more internal salary needs. **Amendment Approved by LCCMR 9/11/2017**

Budget Category	$ Amount	Overview Explanation
Personnel:	$358,415 **Final Amount Spent:** $335,094	Acquisition Coordinator & Prairie Biologist (.1 FTE for 3-yrs) = $29,000 **Final Report:** Acquisition Coordinator & Prairie Biologist (.06 FTE for 4-yrs) = $21,845 Specialist and Technician (1.1 FTE spread across 4 people for 3-yrs) = $229,815

		Final Report: Specialist and Technician (1.02 FTE spread across 14 people for 4-yrs) = $293,260 Laborer and seasonal crews (.3 FTE spread across 2 people for 3-yrs) = $35,000 **Final Report:** Laborer and seasonal crews (.09 FTE spread across 3 people for 4-yrs) = $19,989
Professional/Technical/Service Contracts:	$276,537 **Final Amount Spent:** $223,055	Professional/technical Contractors: the state bid process will be sought for adaptive management monitoring and the development of Prairie Stewardship Plans ($34,974). **Final Report:** $51,539. Service contracts: will use CCM or the state bid process for completing woody encroachment removal & exotics control, prescribed burning/mowing projects, as well as site development ($130,000). **Final Report:** $85,203. A sole source contract will be established with the University of MN (Dept. of Fisheries, Wildlife, and Conservation Biology) for grazing research ($135,000). **Final Report:** $86,313.
Equipment/Tools/Supplies:	$11,225 **Final Amount Spent:** $10,123	Supplies, parts, tools, repair costs & supplies for restoration and enhancement, including safety items, hand tools, etc.; signs & posts; workshop & event supplies
Easement Acquisition:	$2,130,400 **Final Amount Spent:** $2,130,230	Landowner payments for an estimated 9 easements protecting 675 acres that will be held by the MN DNR. **Final Report: 1107 acres protected (12 easements).**
Monitoring and Easement Stewardship	$180,000 **Final Amount Spent:** $180,000	Funds will be deposited into conservation easement account dedicated to the perpetual monitoring and enforcement of conservation easements
Professional Services for Acquisition:	$278,000 **Final Amount Spent:** $268,712	Attorney General's Office and DNR Lands and Minerals costs associated with completing an acquisition; anticipate about 9 transactions; cost/transaction varies greatly between projects...$8000 - $12,000/acquisition. **Final Report:** 12 transactions, ~$20,000-22,000/acquisition.
Printing:	$0	Printing of materials for workshops and field days, and prairie stewardship plans
Travel Expenses in MN:	$56,574 **Final Amount Spent:** $51,738	Fleet charges for trucks, cars, & equipment, e.g. mowers, seeders; mileage, lodging & meals as per state contracts
Other: Direct and Necessary	$33,849 **Final**	DNR costs for the appropriation, see below

	Amount Spent: $33,849	
TOTAL ENRTF BUDGET:	**$3,325,000** **Final Amount Spent:** $3,232,801	

*Direct and Necessary expenses include both Department Support Services (Human Resources, IT Support, Safety, Financial Support, Communications Support, Planning Support, and Procurement Support) and Division Support Services. Department Support Services are described in the agency Service Level Agreement, and billed internally to divisions based on rates that have been developed for each area of service. These services are directly related to and necessary for the appropriation. Department leadership services (Commissioner's Office and Regional Directors) are not assessed. Division Support Services include costs associated with Division business offices and clerical support. Those elements of individual projects that put little or no demand on support services such as large single-source contracts, land acquisitions, and funds that are passed-thru to other entities are not assessed Direct and Necessary costs for those activities. For this work plan, landowner easement payments with an associated cost of $2,565,000 have not been assessed Direct and Necessary costs. In addition to itemized costs captured in our proposal budget, direct and necessary costs cover HR Support (~$5,967), Safety Support (~$1,476), Financial Support (~$7,857), Communication Support (~$4,564), IT Support (~$10,229), Planning Support (~$2,816), and Procurement Support (~$940) that are necessary to accomplishing funded programs/projects.

Explanation of Use of Classified Staff: Consistent with approved work plans for previous ENRTF appropriations for the SNA program, this funding will be used to pay project-associated costs for classified and unclassified staff paid almost exclusively with special project funds. These positions would not exist, but for special project funding received through the ENRTF and other funds. Each year these positions are assigned work based on the particular combination of soft funding available to address priority SNA Program activities.

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

Number of Full-time Equivalents (FTE) Directly Funded with this ENRTF Appropriation: A total of 1.4 FTE's spread across 7 different people for 3-years. **Final Report Update:** A total of 1.17 FTE's spread across 19 different people for 4-years.

Number of Full-time Equivalents (FTE) Estimated to Be Funded through Contracts with this ENRTF Appropriation: How many employees a future contractor will use, the hours they will work, or what salary they may pay their employees is not known. What is known is that $299,974 in contracts will be executed. **Final Report Update:** A total of $223,055 in contracts was executed.

B. Other Funds: NA

VII. PROJECT STRATEGY:

A. Project Partners: To accelerate efforts, the Native Prairie Bank Program is coordinating with Minnesota Prairie Plan partners and using the network of established Local Technical Teams (LTT's) to reach out to landowners and increase program enrollment. The LTT's are local staff from SWCD's, NRCS, DNR, USFWS, The Nature Conservancy and Pheasants Forever - to name a few. The LTT's have already begun cultivating

relationships with prairie landowners and eagerly await funding to deliver this program to willing landowners. Funds from this appropriation will not be used to fund these partner activities.
The MN DNR will partner with the University of Minnesota, Dept. of Fisheries, Wildlife, and Conservation Biology to hire and manage a graduate student. This student will conduct the research described in activity 5 under the supervision of Dr. Todd Arnold, as well as the guidance of the MN DNR Farmland Research Group. Using funds from this appropriation, a sole source contract will be established with the University to fund the student and research activities.

B. Project Impact and Long-term Strategy: The Native Prairie Bank Program targets MBS identified sites with high biodiversity native prairie and has set a program enrollment goal of 35,000 acres by 2025 (i.e. adding 25,000 acres in the next 10 years). It is anticipated that the remaining, available native prairie acres will be protected by other DNR programs, as well as partner organizations such as The Nature Conservancy and U.S. Fish & Wildlife Service.

C. Funding History:

Funding Source and Use of Funds	Funding Timeframe	$ Amount
ENRTF ML10, Ch362, Sec2, Sub4b & ML13, Ch52, Sec2, Subd17: SNA/NPB restoration, enhancement & acquisition (estimated prairie stewardship portion only)	July 2010-June 2014	$ 653,600
ENRTF ML10, Ch362, Sec2, Subd4f2k: MN Habitat Cons. Partnership – SNA/NPB restoration & enhancement (estimated prairie stewardship portion only)	July 2010-June 2012	$ 31,500
ENRTF ML11, First Special Session, Ch2, Art.3, Sec. 2, Subd4h: Native Prairie Stewardship and Native Prairie Bank Acquisition	July 2011-June 2014	$1,000,000
ENRTF ML13, Ch52, Sec. 2, Subd4c: Native Prairie Stewardship and Prairie Bank Acquisition	July 2013-June 2016	$750,000
OHF ML10, CH361, Art1, Sec2, Subd2a: Accelerated Prairie – SNA/NPB prairie acquisition, restoration & enhancement (estimated NPB portion only)	July 2010-June 2015	$ 650,000
OHF ML11, 1SS, Ch6, Art1, Sec2, Subd4b: Accelerated Prairie – SNA prairie restoration & enhancement (estimated NPB portion only)	July 2011-June 2016	$ 229,370
OHF ML11, 1SS, Ch6, Art1, Sec2, Subd4a: SNA & NPB acquisition (estimated NPB portion only)	July 2011-June 2016+	$ 347,870
OHF ML12, Ch262, Art1, Sec2, Subd4h: Accelerated Prairie – SNA prairie restoration & enhancement (estimated NPB portion only)	July 2012-June 2017	$ 184,629
OHF ML13, Ch137, Art1, Sec2, Subd4g: Accelerated Prairie – SNA prairie restoration & enhancement (estimated NPB portion only)	July 2013-June 2018	$ 96,110
OHF ML13, Ch137, Art1, Sec2, Subd4c: SNA & NPB acquisition (estimated NPB portion only)	July 2013-June 2018+	$ 753,500
OHF ML14, Ch256, Art1, Sec2, Subd4h: Accelerated Prairie – SNA prairie restoration & enhancement (estimated NPB portion only)	July 2014-June 2019	$ 285,650
OHF ML14, Ch256, Art1, Sec2, Subd2e: NPB acquisition	July 2014-June 2019+	$ 3,000,000

VIII. FEE TITLE ACQUISITION/CONSERVATION EASEMENT/RESTORATION REQUIREMENTS:

A. Parcel List: See attached Parcel List

B. Acquisition/Restoration Information:

Conservation Easement Acquisition

1. **Describe the selection process for identifying and including proposed parcels on the parcel list, including explanation of the criteria and decision-making process used to rank and prioritize parcels.**

Eligibility for Native Prairie Bank is established in both M.S. 84.96 and MN Rule 6136.09. To qualify, land must be covered by native prairie vegetation and have never been plowed. Eligible lands are prioritized based on factors including: size, quality and diversity of the native prairie habitat; occurrence of, or suitable habitat for rare species; location relative to other native prairie and/or public land; and potential for long-term habitat management and enhancement. MBS data is the foundation for many of these evaluation factors. The Native Prairie Bank program uses the "*Native Prairie Bank Evaluation Form*" evaluate and score individual projects.

2. **List all adopted state, regional, or local natural resource plans in which the lands included in the parcel list are identified. Include a link to the plan if one is available.**
   - *Minnesota Prairie Conservation Plan* – www.dnr.state.mn.us/prairieplan
   - *Minnesota's State Wildlife Action Plan* – www.dnr.state.mn.us/cwcs
   - *Minnesota DNR Strategic Conservation Agenda* **–** www.dnr.state.mn.us/conservationagenda
   - *MN Statewide Conservation Plan* - www.lccmr.leg.mn/documents/scpp/statewide_plan/scpp_2008-07-08_final_plan_overview.pdf

3. **For any conservation easement acquired, a restoration and management must be prepared. Summarize the components and expected outcomes of restoration and management plans for parcels acquired by your organization, how these plans are kept on file by your organization, and overall strategies for long-term plan implementation, including how long-term maintenance and management needs of the parcel will be financed into the future.**

   Each parcel acquired as a new NPB will have a Prairie Stewardship Plan. Prairie Stewardship Plans include, 1) a resource inventory and assessment of all the lands be native plant communities or restored to plant communities that would have been native to the site, 2) the landowner's goals as well as the NPB programs, and 3) prairie management alternatives/recommendations. The goals for the NPB's management are based upon soils, topography, geology, and other factors necessary to sustain the plant community. Each plan includes an implementation timetable which summarizes ongoing management needs and a statement on funding. Long-term management costs (e.g. invasive species treatments, prescribed fire, and monitoring/evaluation) will be covered by a combination funding sources, including, but not limited to, ENRTF, Outdoor Heritage Fund (OHF), federal grants, and other funds as appropriated. Each Prairie Stewardship Plan is kept in a DNR internal shared electronic filing system accessible to all SNA staff.

4. **For each parcel to be conveyed to a State of Minnesota entity (e.g., DNR) after purchase, provide a statement confirming that county board approval will be obtained.**

   NA

5. **If applicable (see M.S. 116P.17), provide a statement confirming that written approval from the DNR Commissioner will be obtained 10 business days prior to any final acquisition transaction. A copy of the written approval should be provided to LCCMR.**

   NA

6. **Provide a statement addressing how conservation easements will address specific water quality protection activities, such as keeping water on the landscape, reducing nutrient and contaminant loading, protecting groundwater, and not permitting artificial hydrological modifications.**

Native Prairie Bank easements address water quality protection by promoting or prohibiting the following activities:

- No artificial excavation, cultivation, drainage or filling
- No drawing of water from the easement as a source for irrigation, and no irrigation on the easement
- No dumping of garbage, junk or hazardous materials on the easement
- No application of pesticides unless authorized by the DNR
- All acres are to be covered with, and managed for, perennial native vegetation

7. **Describe the long-term monitoring and enforcement program for conservation easements acquired on parcels by your organization, including explanations of the process used for calculating conservation easement monitoring and enforcements costs, the process used for annual inspection and reporting on monitoring and enforcement activities, and the process used to ensure perpetual funding and implementation of monitoring and enforcement activities.**
   The policy of the DNR is to follow, as closely as possible, established industry practices in the stewardship of its conservation easement interests. The intent of this stewardship is to protect both the conservation values of the property protected by these easements and the investment of the state in those interests. Elements of this stewardship include the creation of baseline property reports, enforcement protocols, regular compliance monitoring, effective record keeping and reporting, and maintaining effective working relationships with the owners of these easement properties. The Native Prairie Bank Program implements this policy by following the "Ecological and Water Resources Conservation Easement Stewardship Plan and Guidelines". This plan calls for annual landowner contacts as well as on-the-ground site evaluations every year for the first three years, then once every three years if no violations are found. Budgeted into this work plan is funding to be deposited into conservation easement stewardship account dedicated to the perpetual monitoring and enforcement of conservation easements. The dedicated stewardship and enforcement funds will provide the support needed for long-term, ongoing monitoring and enforcement activities of Native Prairie Bank easements acquired under this proposal. For Native Prairie Bank easements, the DNR has estimated that annual expenses for each project and the investment needed to generate annual income sufficient to cover these expenses in perpetuity (~$15,000/easement). For each specific Native Prairie Bank easement, initial investment dollars are determined by using a DNR approved Conservation Easement Stewardship Calculator.
   Funds for this activity will be deposited into the conservation easement stewardship account expected to be established in 2015 and Minnesota Management & Budget protocols will be adhered to. After the closing of each Native Prairie Bank easement acquired with this appropriation, the calculated easement stewardship funds will be deposited into this account. Once funds are deposited and interest begins to accrue, this accrued interested will be applied towards actual expenses tied to annual landowner contact, regular compliance monitoring, record keeping and minor enforcement protocols.

Restoration

1. **Provide a statement confirming that all restoration activities completed with these funds will occur on land permanently protected by a conservation easement or public ownership.**
   All restoration activities done with this appropriation are on perpetual Native Prairie Bank lands administered by the SNA Program.

2. **Summarize the components and expected outcomes of restoration and management plans for the parcels to be restored by your organization, how these plans are kept on file by your organization, and overall strategies for long-term plan implementation.**
   Each restoration project will be based upon an ecological restoration and management plan and/or project plan with goals for reconstructing plant communities that are native to the site that are based upon soils, topography, geology, and other factors necessary to sustain the plant community. Each plan includes an implementation timetable which summarizes ongoing management needs. Each restoration and

management plan and project plan is kept in a DNR internal shared electronic filing system accessible to all SNA staff.

3. **Describe how restoration efforts will utilize and follow the Board of Soil and Water Resources "Native Vegetation Establishment and Enhancement Guidelines" in order to ensure ecological integrity and pollinator enhancement.**
   The SNA Program follows or exceeds the recommendations found in the BWSR "Native Vegetation Establishment and Enhancement Guidelines". SNA restorations typically follow the current BWSR Guidelines, including Project Guidance, Plant Community Restoration, and Temporary Cover. The SNA Program follows the general direction of the BWSR Guidelines for "Recommended Steps for Obtaining Plant Materials", and has additional and more restrictive requirements for restoration material sources. Specifically, restoration and management of DNR lands are governed by DNR Operational Order #124 on "Plant Material Standards for Native Plant Community Restoration" and a pending Operational Order on "DNR Pollinator Habitat Program Guidelines" (which include BMPs).

4. **Describe how the long-term maintenance and management needs of the parcel being restored with these funds will be met and financed into the future.**
   Long-term management costs (e.g. invasive species treatments, prescribed fire, and monitoring/evaluation) will be covered by a combination funding sources, including, but not limited to, ENRTF, Outdoor Heritage Fund (OHF), federal grants, and other funds as appropriated.

5. **Describe how consideration will be given to contracting with Conservation Corps of Minnesota for any restoration activities.**
   DNR has a standing general contract with CCM under which the SNA Program often does project or activity specific agreements. For restoration projects, CCM has been and will continue to be used when appropriate for hand seed harvest. CCM also does some invasive species control on NPBs and will be considered on restoration projects for post-planting weed control.

6. **Provide a statement indicating that evaluations will be completed on parcels where activities were implemented both 1) initially after activity completion and 2) three years later as a follow-up. Evaluations should analyze improvements to the parcel and whether goals have been met, identify any problems with the implementation, and identify any findings that can be used to improve implementation of future restoration efforts at the site or elsewhere.**
   Restoration projects will be evaluated and a report submitted to the LCCMR to ascertain how well the native plants have been established and non-natives controlled. The evaluation reports include a summary of management plan outcomes, activities completed through the project, maps of the project area, a statement of ongoing management needs and funding, and a summary of the evaluation.

IX. VISUAL COMPONENT or MAP(S):

X. RESEARCH ADDENDUM: NA

XI. REPORTING REQUIREMENTS:

Periodic work plan status update reports will be submitted no later than March 1, 2016, September 1, 2016, March 1, 2017, September 1, 2017, March 1, 2018, September 1, 2018, and March 1, 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. 2015 Fonal Project Budget
Project Title: Native Prairie Stewardship and Prairie Bank Easement Acquisition
Legal Citation: ML15, Ch 76, Sec 2, Subd 9d
Project Manager: Judy Schulte
Organization: MNDNR - SNA
M.L. 2015 ENRTF Appropriation: $3,325,000
Project Length and Completion Date: 4 Years, June 30, 2019
Date of Report: August 12, 2019

ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET	Activity 1 Budget (5-1-2019)	Amount Spent	Activity 1 Balance	Activity 2 Budget (2-12-2018)	Amount Spent	Activity 2 Balance	Activity 3 Budget (5-1-2019)	Amount Spent	Activity 3 Balance	Activity 4 Budget (5-1-2019)	Amount Spent	Activity 4 Balance	Activity 5 Budget	Amount Spent	Activity 5 Balance	TOTAL BUDGET (5-1-2019)	TOTAL BALANCE
BUDGET ITEM													**Research on conservation grazing**				
Personnel (Wages and Benefits)																	
This funding will be used to pay project-associated costs for classified and unclassified staff paid almost exclusively with special project funds. These positions would not exist, but for special project funding received through the ENRTF and other funds	$135,549	$126,566	$8,983				$145,600	$132,001	$13,599	$77,266	$76,527	$739				$358,415	$23,321
Acquisition Coordinator & Prairie Biologist (.1 FTE for 3-yrs)																	
Specialist and Technician (1.3 FTE spread across 4 people for 3-yrs																	
Laborer and seasonal crews (.3 FTE spread across 2 people for 3-yrs)																	
Professional/Technical/Service Contracts							$105,000	$100,205	$4,795	$36,537	$36,537	$0	$135,000	$86,313	$48,687	$276,537	$53,482
Professional/Technical Contracts																	
Activity 3- Outcome 5: (~15,000) Adaptive Management Monitoring (~5 NPBs).																	
Activity 4-Outcome 3: (~$34,974) Prairie Stewardship Plans (10 plans). Contractors to be selected following state procurement & bidding process																	
Activity 5-Outcomes 1 & 2: ($135,000) Work Order Contract with the University of MN for Grazing Research Project (University Project Manager: Todd W. Arnold)																	
Service Contracts																	
Activity 3-Outcome 2: (~$62,500) Woody removal & exotic species treatment (130ac) Priority given to CCM; contractors to be selected following state procurement & bidding processes																	
Activity 3-Outcome 3: (~$27,500) Prescribed Burns (850 ac) Priority given to CCM; contractors to be selected following state procurement & bidding processes																	
Equipment/Tools/Supplies																	
Supplies, parts, tools, repair costs & supplies for restoration and enhancement, including safety items, handtools, etc; signs & posts; workshop & event supplies	$393	$98	$295				$9,862	$9,128	$734	$970	$896	$74				$11,225	$1,102
Easement Acquisition																	
Estimate securing about 12 easements for 1077 acres that will be held by the MN DNR - SNA Program	$2,130,400	$2,130,230	$170													$2,130,400	$170
Long term easement stewardship funding				$180,000	$180,000	$0										$180,000	$0
Professional Services for Acquisition																	
Attorney General's Office and DNR Lands and Minerals costs asscoiated with completing an acquisition; anticipate about 12 transactions; cost/transaction vary between projects...~$18,000/acquisition	$278,000	$268,712	$9,288													$278,000	$9,288
Printing																	
Printing of materials for workshops and field days, and prairie stewardship plans										$0	$0	$0				$0	$0
Travel expenses in Minnesota																	
Fleet charges for trucks, cars, & equipment, e.g. mowers, seeders; mileage, lodging & meals as per state contracts	$9,919	$6,608	$3,311				$42,460	$41,481	$979	$4,195	$3,649	$546				$56,574	$4,836
Other: Direct and Necessary Costs																	
DNR's direct and necessary costs pay for activities that are direct and related to and necessary for accomplishing appropriated programs/projects. This includes HR Support (~$5,967), Safety Support (~$1,476), Finacial Support (~$7,857), Communication Support (~$4,564), IT Support (~$10,229), Planning Support (~$2,816), and Procurement Support (~$940)	$6,500	$6,500	$0				$19,849	$19,849	$0	$7,500	$7,500	$0				$33,849	$0
COLUMN TOTAL	**$2,560,761**	**$2,538,714**	**$22,048**	**$180,000**	**$180,000**	**$0**	**$322,771**	**$302,665**	**$20,106**	**$126,468**	**$125,109**	**$1,359**	**$135,000**	**$86,313**	**$48,687**	**$3,325,000**	**$92,199**

Environment and Natural Resources Trust Fund

M.L. 2015 Parcel List-FINAL REPORT

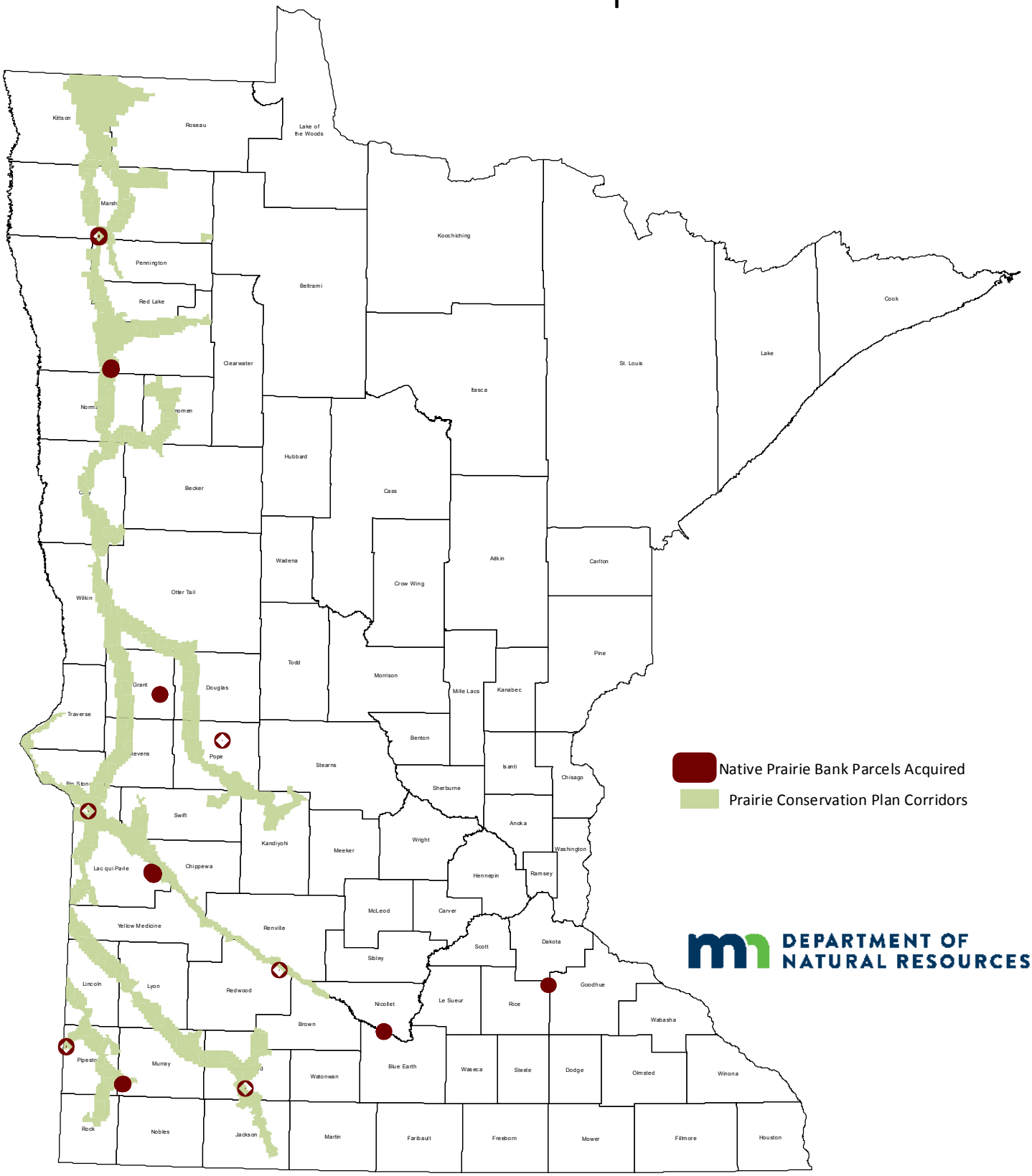
Project Title: Native Prairie Stewardship and Prairie Bank Easement Acquisition
Legal Citation: ML15, Ch76, Sec 2, Subd 9d
Project Manager: Judy Schulte
Organization: MN DNR - SNA
M.L. 2015 ENRTF Appropriation: $3,500,000
Project Length and Completion Date: 4 Years, June 30, 2019
Date of Report: August 12, 2019 (FINAL)

#	Acquisition or Restoration Parcel Name	Geographic Coordinates Format: [Deg.]° [Min.]' [Sec.]" [Hemis.] Latitude	Longitude	Estimated Cost	Estimated Annual PILT Liabilities	County	Site Significance	Activity Description	# of Acres	# of Shoreline Miles	Type of Landowner	Proposed Fee Title or Easement Holder (if applicable)	Status
1	Chanarambie Creek Prairies	43° 55' 12.9"	96° 1' 8.0"	$2818/ac	$ -	Murray, Pipestone	Dry gravel, mesic & wet prairies in biggest grassland complex with the highest quality prairie parcels in SW MN	Conservation Easement	60	NA	Private	DNR - SNA	These are general areas targeted. Specific parcels listed below.
2	Lac Qui Parle Prairies	43° 12' 10.4"	96° 10' 32.1"	$2850/ac	$ -	Big Stone	Next to existing DNR and TNC protected native prairies, part of a large macro site with many native prairie tracts; expands habitat for many rare butterfly and bird species	Conservation Easement	80	NA	Private	DNR - SNA	These are general areas targeted. Specific parcels listed below.
3	Glacial Lakes & Moraine Prairie	45° 25' 20.0"	95° 14' 34.5"	$1750/ac	$ -	Pope, Kandiyohi	Dry sand-gravel prairies of the Alexandria Moraine, provides habitat for the Threatened Dakota Skipper as well as the Poweshiek Skipperling and Regal Fritillary	Conservation Easement	80	NA	Private	DNR - SNA	These are general areas targeted. Specific parcels listed below.
4	Root River Prairies	43° 46' 14.6"	91° 39' 51.8"	$2025/ac	$ -	Houston, Fillmore, Winona	Southern Dry Bedrock Bluff (goat) prairies in a complex of bluff prairies and cold streams; habitat for timber rattlesnakes	Conservation Easement	20	NA	Private	DNR - SNA	These are general areas targeted. Specific parcels listed below.
5	Upper MN River Prairies	44° 40' 21.2"	95° 19' 2.0"	$2880/ac	$ -	Chippewa, Yellow Medicine, Renville, Redwood	MN River native prairie including oak savanna, wet prairie, rock outcrops; expands habitat for many rare plants, butterflys and birds	Conservation Easement	80	NA	Private	DNR - SNA	These are general areas targeted. Specific parcels listed below.
6	Yellow Medicine Coteau Prairie	44° 43' 42.7"	96° 25' 47.0"	$2990/ac	$ -	Yellow Medicine	Dry hill prairie, prairie meadow, wet prairie, rare species; part of a large, contiguous prairie macrosite, expands habitat for Western White Prairie Clover and Upland Sandpiper	Conservation Easement	80	NA	Private	DNR - SNA	These are general areas targeted. Specific parcels listed below.
7	Blue Mounds/Touch-The-Sky Prairie	43° 43' 16.2"	96° 12' 43.3	$3925/ac	$ -	Rock	Mesic to wet prairie with rock outcrops; provides habitat for many rare rock outcrop plants	Conservation Easement	40	NA	Private	DNR - SNA	These are general areas targeted. Specific parcels listed below.
8	Glacial Ridge Prairie	47° 41' 46.9"	96° 18' 43.9"	$1425/ac	$ -	Polk	Large complex of mesic to wet prairie; expands habitat for many rare butterfly and bird species, including the Dakota Skipper and Poweshiek Skipperling	Conservation Easement	160	NA	Private	DNR - SNA	These are general areas targeted. Specific parcels listed below.
9	Des Moines River Prairie	43° 50' 31.2"	95° 7' 7.6"	$4425/ac	$ -	Jackson	Part Des Moines River complex of native prairie including oak savanna; expands habitat for many rare plants, butterflys and birds	Conservation Easement	80	NA	Private	DNR - SNA	These are general areas targeted. Specific parcels listed below.
10	Kellogg-Weaver Dunes	44° 16' 10.6"	91° 56' 2.8"	$2100/ac	$ -	Winona	Rare habitats ranging from bare sand, to mature dunes with dry, mesic, or wet prairie. Area includes large population of Blanding turtles.	Conservation Easement	25	NA	Private	DNR - SNA	These are general areas targeted. Specific parcels listed below.
11	Frontenac Hay Creek	44° 30' 20.5"	92° 25' 6.1"	$2300/ac	$ -	Goodhue	Unique bedrock bluff prairie, as well as sand and gravel prairie communities; expands habitat for many rare plants, butterflys and birds	Conservation Easement	25	NA	Private	DNR - SNA	These are general areas targeted. Specific parcels listed below.
12	Rothsay Prairie	46° 29' 27.0"	96° 21' 23.4"	$1750/ac	$ -	Wilkin	Large complex of mesic to wet prairie; expands habitat for many rare butterfly and bird species	Conservation Easement	80	NA	Private	DNR - SNA	These are general areas targeted. Specific parcels listed below.
13	Garfield 30-1	47° 31' 24.9"	96° 19' 10.7"	$1000/ac	$ -	Polk	Large prairie within the MN Prairie Conservation Plan Agassiz Dunes Core Area. Not only does the site have a high quality plant community, an outstanding biodiversity significance rating, and several state T&E species it also is adjacent to Agassiz Dunes SNA.	Conservation Easement	218	NA	Private	DNR - SNA	Completed-LCCMR ID# 18-119-001, final acreage 217.7 acres
14	Odessa 19-1	45° 16' 55.2"	96° 20' 45.3"	$2500/acre	$ -	Big Stone	Dry Hill prairie with pockets of calcareous fens situtated within a larger remnant prairie complex. Within the MN Prairie Conservation Plan Big Stone Moraine Prairie Core Area.	Conservation Easement	40	NA	Private	DNR - SNA	Completed-LCCMR ID#18-011-001, final acreage 40.1 acres
15	White Earth 19-1	47° 6' 8.7"	95° 55' 4.8"	$1700/acre	$ -	Becker	Moderate sized prairie with a mix of dry and wet prairie plant communities. With the MN Prairie Conservation Plan Agassiz Beach Ridges Core Area.	Conservation Easement	0	NA	Private	DNR - SNA	Project moved to alternative funding due to acquisition delays.
16	Nicollet 33-1	44° 12' 33.3"	94° 12' 8.1"	$3800/acre	$ -	Nicollet	Southern Mesic and Wet Prairie located within the Minnesota River Valley immediately adjacent to Swan Lake WMA and multiple RIM easements.	Conservation Easement	56	NA	Private	DNR-SNA	Completed-LCCMR ID# 18-103-001, final acreage 56.4 acres
17	Great Bend 9-1	43° 54' 27.4"	95° 10' 6.6"	$3300/acre	$ -	Cottonwood	Mixture of Dry-Hill, Mesic and Wet Prairie with populations of Prairie Bush Clover and Small White Lady Slipper present. Located within the MN Prairie Conservation Plan Des Moines River Core Area.	Conservation Easement	41	NA	Private	DNR-SNA	Completed-LCCMR ID# 18-033-001, final acreage 41.4 acres
18	Lac Qui Parle 36-1	44° 21' 43.6"	95° 10' 10.8"	$3000/acre	$ -	Lac Qui Parle	Southern Mesic and Wet Saline Prairie located within the MN Prairie Conservation Plan Lac Qui Parle Core Area. Several rare bird and butterfly species noted on site.	Conservation Easement	257	NA	Private	DNR-SNA	Completed-LCCMR ID# 19-073-001, final acreage 257.3 acres
19	Elk Lake 19-1	45° 53' 15.9"	95° 51' 53.7"	$2000/acre	$ -	Grant	Southern Dry Hill Prairie north of Isaacson/Barrett WMA and northwest of several WPAs. Very suitable for cropland conversion if not protected long-term.	Conservation Easement	23	NA	Private	DNR-SNA	Completed-LCCMR ID# 19-051-001, final acreage 20.6 acres
20	Northfield 1-1	44° 26' 53.7"	93° 2' 50.4"	$3000/acre	$ -	Rice	High quality Southern Dry-Hill Prairie with Rock Outcrop inclusions. Parcel contains populations of prairie bush clover (Federally Threatened) and kittentails (State Threatened).	Conservation Easement	27	NA	Private	DNR-SNA	Completed-LCCMR ID# 19-131-001, final acreage 26.5 acres
21	Minnewaska 1-1	45° 39' 44.7"	95° 24' 13.1"	$2000/acre	$ -	Pope	Southern Dry Sand Gravel prairie surrounding and adjacent to the Glenwood Headquarters AMA. Located less than 1600 feet from Lake Minnewaska.	Conservation Easement	45	NA	Private	DNR-SNA	Completed-LCCMR ID# 19-121-001, final acreage 44.9 acres
22	Tanberg 33-1	46° 27' 53.6"	96° 21' 5.7"	$2000/acre	$ -	Wilkin	720 acre wet seepage prairie with Greater Prairie Chicken and other Species of Greatest Conservation Need observed onsite. Within the MN Prairie Plan Rothsay Prairie Core Area. Majority of parcel being acquired using OHF.	Conservation Easement	64	NA	Private	DNR-SNA	Parcel acquired with OHF
23	Troy 12-1	44° 5' 7.3"	96° 26' 5.0"	$3000/acre	$ -	Pipestone	Southern dry hill prairie with inclusion of a small seepage meadow/carr. Located within the MN Prairie Plan Hole-In-The-Mountain Core Area.	Conservation Easement	153	NA	Private	DNR-SNA	Completed-LCCMR ID# 19-117-001, final acreage 156.4 acres
24	Moulton 8-1	43° 54' 33.9"	96° 1' 33.6"	$3500/acre	$ -	Murray	Southern dry hill prairie with a small inclusion of wet prairie. Regal Fritillary, state special concerns species noted onsite with other rare butterfly species noted on adjacent prairie that extends into this parcel. Located within the MN Prairie Plan Chanarambie Creek Core Area.	Conservation Easement	34	NA	Private	DNR-SNA	Completed-LCCMR ID# 19-101-001, final acreage 43.3 acres
25	Viking 4-1	48° 11' 28.7"	96° 27' 10.7"	$1200/acre	$ -	Marshall	270 acre wet brush prairie and mesic prairie complex that includes a 7.5 acres of calcareous fen (~140 acres, including the fen, being acquired using Unimin mitigation funding). Two state threatened and one state watch list species noted onsite.	Conservation Easement	130	NA	Private	DNR-SNA	Completed-final acreage 267 acres, of which 158 acres is prorated to this appropriation. LCCMR ID# 19-089-001.
26	Sherman 17-1	44° 30' 31.7"	94° 56' 54.2"	$3000/acre	$ -	Redwood	Southern dry hill prairie that's grades into mesic prairie. Located with the MN Prairie Plan Upper Minnesota River Valley Core Area.	Conservation Easement	44	NA	Private	DNR-SNA	Completed-LCCMR ID# 19-127-001, final acreage 44.7 acres

NOTES: The above list represents locations with identified high quality prairies and interested landowners. This proposal will target these locations and enroll 675 acres; not all sites on the list will be enrolled.

ML15
Environment and Natural Resources Trust Fund
Final Report

Native Prairie Bank Acquisitions



Final Report:

WATERBIRD RESPONSE TO CONSERVATION GRAZING IN WESTERN MINNESOTA TALLGRASS PRAIRIES

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and

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EXECUTIVE SUMMARY

Conservation grazing is becoming a popular management tool in grassland systems that evolved with disturbance. While it has been found to be an effective tool for maintaining upland prairie cover, its impacts on wetlands and the species that rely upon wetlands is not well-studied. Our objective was to investigate the impacts of conservation grazing on two groups of waterbirds: secretive marsh birds and ground-nesting waterfowl. As an economically important group of birds, much of the public land in Minnesota is managed for the production of waterfowl. Meanwhile, secretive marsh birds are believed to be an indicator species, and their response to grazing could tell us how the whole system is responding to management. In 2017 and 2018, we conducted waterfowl pair and brood counts and call-response surveys for secretive marsh birds. We estimated abundance of Blue-winged teal and Mallard pairs in response to grazing frequency and years since a site was grazed using generalized linear models and estimated Blue-winged Teal brood abundance using generalized linear mixed effects models. Insufficient observations of Mallard broods prohibited analysis of brood abundance, but we combined all dabbler broods together to estimate overall brood abundance in relation to grazing. Using robust design occupancy models in Program MARK, we determined the relationship between grazing and marsh bird occupancy. Grazing explained variation in occupancy of American Bittern, Pied-billed Grebe, Sora, and Virginia Rail. American Bittern, Sora, and Virginia Rail responded positively to grazing. Pied-billed Grebe experienced a modest increase in local extinction one year after grazing but showed no response to increased grazing frequency. Grazing had no effect on Blue-winged Teal pair or brood abundance or dabbler brood abundance. Mallard abundance increased marginally in response to increased time since a site was grazed but showed no response to increased grazing frequency. Our study suggests that the use of frequent grazing at

low intensities to manage upland cover should neutrally or positively impact occupancy of secretive marsh birds and abundance of ground-nesting waterfowl pairs and broods.

INTRODUCTION

Until fairly recently, a widely-held belief was that grazing by livestock provided few benefits to grassland systems (Schieltz and Rubenstein 2016). This viewpoint likely stemmed from the harmful effects caused by unsustainable grazing practices during recent centuries (Briske et al. 2011). Year-round grazing at a high intensity led to a homogenous, overgrazed landscape that inhibited native plant species growth and species diversity (Briske et al. 2011, Richmond et al. 2012, Morris and Reich 2013, Minnesota Prairie Plan Working Group 2018). Overgrazing also negatively impacts wetlands, resulting in increased erosion and sedimentation, eutrophication, and the removal of emergent vegetation (Kantrud 1986, Harrison et al. 2017). However, in the tallgrass prairie of Minnesota, native prairie plants evolved in an ecosystem with high levels of ungulate grazing pressure (Sampson and Knopf 1994, Grace 1998, Heisler et al. 2003), and sustainable grazing practices can promote structural diversity of upland and wetland vegetation to benefit a greater diversity of wildlife species (Kantrud 1986, Morris and Reich 2013).

North American prairies evolved with and were maintained by frequent disturbances that influenced the architecture of the land, including fire and grazing (Collins 1990, Fuhlendorf and Engle 2004). Regular wildfires ensured that fire-intolerant species, notably trees and shrubs, were unable to establish themselves on the prairie (Anderson 1990, Grace 1998). Fires burned unevenly, creating a mosaic of successional stages on the landscape that supported greater species diversity (Collins 1990, Fuhlendorf and Engle 2004). Recently burned patches were preferred by grazing ungulates, enhancing their populations and further disturbing and shaping vegetation communities (Collins and Gibson 1990, Minnesota Prairie Plan Working Group 2018).

Additionally, both fire and grazing played an important role in controlling excessive accumulation of dead plant litter, which decreases primary productivity (Collins 1990).

While we now recognize the critical role that frequent disturbance plays in grassland ecosystems, humans spent the last 200 years removing most disturbance from our prairie. We have eradicated our native grazing ungulates, most notably bison (*Bos bison*), and actively suppressed wildfires as they pose a significant threat to the livelihood and survival of those living and working on the land (Collins 1990, Kantrud 1986). In the absence of disturbance, trees, shrubs, and non-native and invasive species have infiltrated prairie systems, out-competing native prairie species and altering the ecosystem (Sampson and Knopf 1994, Grace 1998, Bakker 2003, Heisler et al. 2003, Minnesota Prairie Plan Working Group 2018). An estimated 99.6% of Minnesota's native tallgrass prairie has been lost since European settlement (Sampson and Knopf 1994, Minnesota Prairie Plan Working Group 2018) as a direct result of widespread cultivation and urban development (Samson and Knopf 1994, Thompson et al. 2016), and unfortunately, what prairie remains is often highly degraded due to the suppression of natural disturbances (Sampson and Knopf 1994, Grace 1998, Bakker 2003, Heisler et al. 2003). The fate of Minnesota's prairies extends to the wetlands embedded within them. In the last 200 years, 91.9% of wetlands in Minnesota's Prairie Parkland Region have disappeared, primarily due to agricultural drainage (Minnesota Prairie Plan Working Group 2018). Meanwhile, the Minnesota Pollution Control Agency has reported that, of the wetlands remaining, 50% are rated to be in poor condition (Genet 2015). This loss in quality is due in large part to the proliferation of invasive emergent vegetation species (Genet 2015, Minnesota Prairie Plan Working Group 2018), which have been able to establish themselves in the absence of regular disturbances (Minnesota Prairie Plan Working Group 2018). Today, undisturbed, shallow wetlands quickly

become choked with invasive hydrophytes, particularly hybrid cattails (*Typha X glauca* Godr. and *T. angustifolia*) and reed canary grass (*Phalaris arundinacea*) (Kantrud 1986, Genet 2015, Minnesota Prairie Plan Working Group 2018). Hybrid cattail form monocultures that dominate entire wetlands, leaving little to no open water and negatively impacting plant species and structural diversity (Kantrud 1986).

Because wildfires still pose a significant economic threat, they continue to be actively suppressed. And with our native grazers gone, remnant prairies would go undisturbed without human intervention. Today, in the absence of natural disturbances, land managers must recreate these phenomena as best they can if they hope to preserve what remains of Minnesota's native prairie. Notable objectives of mimicking disturbance include suppression of woody and non-native species, encouragement of native plant species growth, reduction of litter buildup, and promotion of a structurally diverse plant community (Collins 1990, Devries and Armstrong 2011). Whereas prescribed burning is widely-regarded as an effective disturbance tool on the prairie (Collins and Gibson 1990), it is expensive, logistically complicated, and difficult to perform at the intensity and frequency that are needed (Thompson et al. 2016). Because woody vegetation can benefit from infrequent burning (Grace 1998, Heisler et al. 2003), it is important that land managers consider other disturbance tools if they are unable to perform burns as frequently as needed.

One practical alternative to burning is conservation grazing (Minnesota Prairie Plan Working Group 2018). Widespread grazing by bison (*Bos bison*) and other ungulate species once acted as a secondary natural disturbance regime in the Great Plains (Grace 1998, Heisler et al. 2003), and conservation grazing using domestic livestock attempts to mimic this regime (Fuhlendorf and Engle 2004). Past studies have established that grazing can positively impact

upland cover, controlling dead litter buildup, promoting native species growth, and creating structural diversity of prairie plant communities (Ryan et al. 2006, Morris and Reich 2013). However, the impacts of conservation grazing on wetlands and wetland-dependent wildlife is less well-known (U.S. Fish and Wildlife Service 2017). Intensive levels of grazing are recognized as being harmful to wetland health (Kantrud 1986, Harrison et al. 2017), but conservation grazing is performed at more sustainable levels (Minnesota Prairie Plan Working Group 2018). If conservation grazing is going to be used by land managers in the tallgrass prairies on the Midwest, it is important that we consider how grazing in this ecosystem is impacting prairie wetlands and the species that rely upon them for habitat.

Secretive marsh birds are rarely seen and infrequently vocalize (Conway and Gibbs 2005, Conway 2011). Though one of the least studied avian groups in North America, many populations are believed to be in decline (Conway 2011). They include rails, bitterns, and grebes, and although they are not taxonomically related, they all rely on similar wetland habitat that involves a juxtaposition of dense emergent vegetation and open water (Lor and Malecki 2006). Emergent vegetation that becomes too thick can be a hinderance to water birds, impeding their ability to move and forage (Ma et al. 2010, Johnson 1984). Additionally, monocultures of hybrid cattail create a structurally homogenous vegetation community that is unattractive to many waterbird species (Kantrud 1986, Minnesota Prairie Plan Working Group 2018). Monitoring the productivity of secretive marsh birds as it relates to wetland management practices could reveal how the entire system is reacting to manipulations (Conway 2011).

Ground-nesting waterfowl are in the unique position of relying on both upland and wetland habitat during the breeding season. Upland vegetation is important for providing cover for nests (Reynolds et al. 2001, Stephens et al. 2005n), whereas emergent wetland vegetation

provides cover to flightless broods (Raven et al. 2007). Nevertheless, too much emergent cover may reduce the attractiveness of prairie wetlands to some dabbling duck broods (Walker et al. 2013). Because waterfowl are economically important game species for the region, how ground-nesting ducks respond to grazing will likely be important to land managers considering conservation grazing as a disturbance tool. Although studies have assessed the impact of grazing on waterfowl, results have been inconsistent (Duebbert et al. 1986, Warren et al. 2008, Harrison et al. 2017). Furthermore, the majority have focused on the impacts of high-intensity grazing. These studies typically compared grazed to ungrazed sites without considering other factors (i.e. time of year, intensity, frequency) (Briske et al. 2011, Schieltz and Rubenstein 2016). The few studies that have investigated waterfowl breeding success across a range of intensities have found benefits at low to medium levels of grazing, but harm at high levels (Warren et al. 2008, Harrison et al. 2017). But we are unaware of any studies that have investigated how the frequency of grazing affects waterfowl productivity. How often a site should be disturbed might be as important as how intensely it should be disturbed (Devries and Armstrong 2011).

Our objective was to evaluate waterbird response to conservation grazing in the tallgrass prairie of western Minnesota. Collectively, the U.S. Fish and Wildlife Service (USFWS), Minnesota Department of Natural Resources (DNR), and non-profit conservation organizations such as The Nature Conservancy (TNC) manage thousands of acres of remnant native prairie throughout western Minnesota (Johnson 1997). With so much land to be managed and regularly disturbed, conservation grazing is a potentially valuable tool for managers who are unable to burn as often as needed or who are unable to burn at all. With so few of the state's original wetlands still present on the land, and even fewer of good quality, it is important to understand

how conservation grazing practices are impacting a vulnerable group of birds that rely on wetlands and emergent vegetation during a critical time in their life cycle.

METHODS

Study Area

We surveyed wetlands on Waterfowl Production Areas (WPAs) in the Morris Wetland Management District (WMD) in western Minnesota. Historically, this was a productive tallgrass prairie system that provided important habitat for migrating birds (both as breeding habitat and migration stop-overs). Since European settlement, however, the land has seen widespread conversion to row-crop agriculture and a significant loss of prairie and wetland habitat (U.S. Fish and Wildlife Service 2012). Within Morris WMD, just 10% of the district's historical wetlands remain and an estimated 1% of its native prairie (U.S. Fish and Wildlife Service 2012, U.S. Fish and Wildlife Service 2017). Despite the prairie and wetland loss, this region's remnant prairie still provides important habitat to prairie species.

These public lands are managed primarily for the production and conservation of migrating waterfowl by the United States Fish and Wildlife Service (USFWS) (U.S. Fish and Wildlife Service 2017). The Morris WMD is in Minnesota's Prairie Parkland Region and lies within the eastern-most extent of the Prairie Pothole Region (PPR). The district is characterized by a landscape transitioning from relatively flat tallgrass prairie in the west to rolling hardwood forests in the east (U.S. Fish and Wildlife Service 2017). (U.S. Fish and Wildlife Service 2017). These distinct topographies impact the characteristics of the wetlands on the land. Wetlands in the western counties are smaller and shallower with more emergent vegetation, while wetlands in the eastern counties are larger and deeper with more open water.

To meet their objective of maximizing waterfowl production, the Morris WMD largely focuses on upland habitat enhancement. They actively burn, graze, and hay their lands to promote growth of native prairie plants and combat woody and nonnative species encroachment (U.S. Fish and Wildlife Service 2017). The district has an extensive grazing program and collaborates with cattle producers to provide pastures in exchange for a grazing fee. Their grazing objectives include reducing accumulation of biomass, engineering a more heterogeneous landscape, and promoting the growth of native grasses through reduced competition from invasives. To achieve these objectives, they focus efforts on short-duration, late spring grazing. Grazing contracts typically stipulate 30-day grazing periods between May 1 and July 31 at a stocking rate of 1 cow-calf pair per acre (U.S. Fish and Wildlife Service 2017).

Site Selection

We selected sites with a variety of grazing histories to investigate waterbird response to grazing. Larger WPAs were often divided into smaller management units with variable management histories. In these instances, we often had more than 1 site on a WPA. Using management histories of the district's WPAs, we grouped sites by the number of years since they were last grazed: 0 (currently being grazed), 1, 2, 3, 4, 5, 6, 7+ years. We considered sites that had no form of disturbance (grazing, burning, or haying) in over 6 years undisturbed. Due to the limited number of sites with grazing as the only form of recent disturbance management, selecting sites randomly was not an option. Because the district actively manages with fire as well as grazing, it was impossible to select a large enough sample of grazed WPAs that did not have a recent burn history. As a result, we incorporated some sites that had been burned as well as grazed in the last 6 years. Some 2017 sites were dropped in 2018 if they were burned or mowed between field seasons, while some previously unsurveyed sites were added in 2018.

Secretive Marsh Birds

Field Methods: Depending on the size of the site, we randomly selected ≥1 wetland per site that would be assigned a marsh bird survey point. To minimize the chance of counting the same bird at multiple survey points, we spaced points ≥400 meters apart (Conway 2011). On larger sites that allowed for more than 1 wetland to be surveyed, we randomly selected a second wetland to survey. Following the protocol of Conway (2011), we placed survey points along the edges of selected wetlands where emergent vegetation was present. We grouped marsh bird points into survey routes based on proximity to each other and maintained those routes and the order in which wetlands were surveyed across each field season (Conway 2011). Because some 2017 sites were dropped and others added in 2018, not all survey routes remained the same in 2017 and 2018.

We adapted the Standardized North American Marsh Bird Monitoring Protocol (Conway 2011) to survey 6 species of secretive marsh birds: American Bittern (*Botaurus lentiginosus*), Least Bittern (*Ixobrychus exilis*), Pied-billed Grebe (*Podilymbus podiceps*), Sora (*Porzana carolina*), Virginia Rail (*Rallus limicola*), and Yellow Rail (*Coturnicops noveboracensis*). Unlike the standardized protocol, which specifies 3 visits during the marsh bird breeding season, we surveyed marsh bird routes twice, choosing to prioritize a larger sample size over additional visits. We surveyed each route once in the morning (30 minutes prior to sunrise to 0930 hours) and once in the evening (1800 hours to 30 minutes after sunset) (Bolenbaugh et al. 2011) using different observers for each visit.

At the beginning of each survey, we documented time and estimated wetland inundation and percent emergent vegetation covering the wetland using both aerial images of the wetland and various vantage points around the wetland. When wind impeded our ability to detect calls

(wind ≥ 24 km/h; 15 mph), we halted surveys. Additionally, we paused or halted surveys in the event of continuous precipitation. If a survey route could not be completed, we started the survey route over on the next available day (Conway 2011).

Surveys were 11 minutes long, consisting of a 5-minute passive survey followed by 6 minutes of broadcasting common breeding and territorial calls of our 6 target species to elicit responses from secretive marsh birds. Each of these latter minutes consisted of 30 seconds of broadcasting various calls of 1 species followed by 30 seconds of silence. Upon hearing one of the focal species, the surveyor recorded the species, type of call, minute detected, whether the bird was seen and/or heard, and estimated location to help determine if a bird heard later in the survey was a new bird.

Statistical methods: We assessed the impact of grazing and other variables on occurrence of secretive marsh birds with robust design occupancy models (McKenzie et al. 2003) in Program MARK (White and Burnham 1999) using a limited, *a priori* set of candidate models (Ahlering et al. 2018). Robust design occupancy allowed us to incorporate multiple visits (i.e., 2 visits per year, for 1 or 2 years) without assuming an individual site maintained the same occupancy status throughout all 4 surveys. Because our primary focus was on occupancy, we parameterized the model by estimating occupancy during all 4 survey periods (ψ_t) and estimating local extinction (ε_t) between survey periods (McKenzie et al. 2003). We expected detection probabilities (p) of each species to differ in their response to playback and occupancy to differ in response to grazing, and so we modeled each species separately.

We first modeled vocalization probability for each species using an intercept-only model for ψ. We built vocalization probability models that considered how broadcasted calls impacted the probability of a species calling. We reasoned that the probability of calling could be

influenced by survey minute, survey period, and survey year. Starting with survey minute, we held visit and year constant and reasoned that there were 4 likely vocalization behaviors in response to broadcasted calls. All four assumed a constant detection probability throughout the initial 5-minute passive survey. First, we considered that the broadcasted calls did not influence the probability of calling; therefore, the model had a constant detection probability throughout the 11-minute survey. Second, we considered that only conspecific calls influenced vocalization probability, thus all heterospecific calling minutes and silent minutes were held constant while the conspecific minute had a separate (presumably greater) detection probability. The third and fourth models considered that both conspecific and heterospecific calls influenced vocalization probability. The third model included 1 vocalization probability for all heterospecific calling minutes and 1 for the conspecific calling minute, while the fourth model allowed for variation in vocalization probability among all 6 calling minutes. Using second-order Akaike's Information Criterion (AIC_c), we determined the best performing model that explained each species' response to broadcasted calls. We then constructed models to investigate whether vocalization probability was influenced by survey period or survey year. As a final step, we incorporated a suite of 5 variables that have been documented to impact detection probability, including observer, noise level, AM vs. PM, time since sunrise/sunset, and survey day.

After identifying an AIC_c -best detection model for each species, we then fit companion occupancy models. Because the primary objective of our project was to investigate the impact that grazing might have on occupancy of secretive marsh birds, our analysis was designed to assess whether the inclusion of grazing variables altered predictions about site-level occupancy. Accordingly, we built a base occupancy model that included influential site- and landscape-level characteristics that past studies have shown to be correlated with marsh bird occupancy. The site-

level characteristics we included were 1) area of the surveyed wetland, 2) percent of emergent vegetation covering the wetland, 3) wetland permanence class (Shaw and Fredine 1956), and 4) the number of years since a site was burned. The landscape-level variable we included was total wetland area within a 200-meter buffer. To calculate this last variable, we created 200-meter buffers around the central points of surveyed wetlands and overlaid all wetland types intersecting the buffers. We then calculated the total area in hectares of the intersecting wetlands within each buffer.

To assess whether the addition of a grazing variable to the base model improved model performance, we fit 4 grazing models for each species with occupancy as the response variable. While we selected survey sites based on the number of years since a site was grazed (years since grazed), we created an additional grazing variable to illustrate grazing frequency: the number of times a site had been grazed in the last 3 years. Because these 2 grazing variables were highly correlated, we considered their effects in separate models. We fit 1 model with grazing frequency, 1 model with a linear variable for years since grazed, and to account for potential non-linear responses, we added a quadratic term for years since grazed to a third model. To determine if grazing caused a site that was occupied in year 1 to become unoccupied, we fit a fourth model that included a binary covariate on the extinction parameter ($\varepsilon_{2\text{-}3}$) to determine if sites that were grazed the previous year were more likely to become unoccupied. We compared the 4 grazing models to the base model described above using AIC_c.

Ground-nesting Waterfowl

Field methods: We conducted four rounds of waterfowl surveys in 2017 and 2018. During the first two rounds, our sampling methods were influenced by concurrent surveys of secretive marsh birds, which are performed in the mornings and evenings. Given that past studies have endorsed both morning and evening waterfowl surveys (Pagano and Arnold 2009*a*), we conducted visual surveys for waterfowl pairs in the morning (visible light – 1030) and evening (1700 – dark). Pair surveys were conducted from May 12 – June 3 in 2017 and May 15 – May 29 in 2018. We missed the optimum window for pair counts of early-nesting waterfowl (i.e. Mallard, Northern Pintail) in 2017; however, a much colder than average April and a late iceout (Waterfowl Population Status 2018) may have pushed back that window for early-nesters in 2018. We conducted three rounds of brood surveys between June and the end of July. Because we were no longer surveying for marsh birds during the third and fourth visits, all surveys were conducted during the morning. During the third visit, we conducted same-day replicate surveys to obtain an estimate of detection probability. We completed replicate visits at least one and no more than four hours after the first visit.

To survey for pairs and broods at each site, we conducted visual surveys of every wetland with visible open water. We rotated observers between visits to minimize impacts of observer variation. At the beginning of each survey, we documented time, temperature, cloud cover, and wind. We also estimated wetland inundation and percent emergent vegetation covering the wetland (Walker et al. 2013, Carlson et al. 2018) using both aerial images of the wetland and various vantage points around the wetland. When waterfowl were observed, we recorded species and social category: lone pair, lone male, lone female, grouped pairs, group of ≤5 males, group of >5 males, grouped females, group of 2 males and 1 female, other mixed sex groups, and broods

(Dzubin 1969). When broods were observed, we counted the number of ducklings and estimated their age (Gollop and Marshall 1954).

To ensure observers were able to competently survey an entire wetland, we excluded wetlands greater than 5 ha. On vegetated wetlands and larger wetlands, surveyors used multiple vantage points to adequately survey an entire wetland, spending at least 5 minutes per wetland to maximize detection probability (Pagano and Arnold 2009a). We did not return to wetlands that were dry or completely occluded by vegetation. We halted surveys when wind exceeded 50 km/hour, precipitation persisted, or fog impeded our ability to see. If a site could not be completed due to inclement weather, we started it over on the next available day.

Statistical methods: To evaluate waterfowl pair and brood response to grazing, we used a limited, *a priori* set of candidate models (Ahlering et al. 2018). Because the objective of our project was to investigate the impact that grazing may have on abundance of ducks, our analysis was designed to assess whether the inclusion of grazing variables altered predictions about site-level abundance. Accordingly, we built base models for pair and brood abundance that included influential site- and landscape-level characteristics that past studies have shown to be correlated with dabbling duck abundance. The site-level variables were longitude, wetland inundation, percent of emergent vegetation covering the wetland, area of surveyed wetland, wetland permanence (Shaw and Fredine 1956), and the number of years since the site was last burned. The landscape-level variables included were 1) the proportion of land cover classified as wetland habitat within a buffer (2000-m for pairs and 500-m for broods) of the surveyed wetland (National Wetlands Inventory 2018) and 2) the proportion of land cover classified as agricultural within those buffers (National Agricultural Statistics Service 2017). We also included observer and time of day because previous studies have shown that they can impact detection probability

(Pagano and Arnold 2009). Lastly, we included survey day and year as additional variables in our base model. Using z-transformation, we re-scaled our quantitative variables prior to analysis.

To assess whether the addition of a grazing variable to the base model improved model performance, we fit three grazing models for each set of analyses. We fit 1 model with grazing frequency, 1 model with a linear variable for years since grazed, and to account for potential non-linear responses, we added a quadratic term for years since grazed to a third model. We compared the 3 grazing models to the base model described above using AIC. If a grazing model had a lower AIC value than its corresponding base model, we concluded that grazing had a demonstrable effect on waterfowl abundance.

We modeled pair abundance using generalized linear models with a negative binomial distribution and indicated breeding pairs of a particular species as our response variable. We used the social categories explained earlier to calculate indicated breeding pairs: lone pairs + grouped pairs + max(lone males or lone females) + 2M:1F + max(grouped males ≤5 and grouped females). Our base model for each species included the same set of independent variables described above, which was compared to the three grazing models to determine if grazing was having a noticeable impact on pair abundance. To determine the effect of grazing on brood abundance, we fit generalized linear mixed effects models (glmer in lme4 package in R) with a Poisson distribution and number of broods of a species as our response variable.

Emergent Wetland Vegetation

To explore the potential impacts of grazing on emergent wetland vegetation, we fit linear models with percent emergent vegetation as the response variable and grazing as an indicator variable. We considered our 2 grazing variables (years since grazed and grazing frequency) in separate models, as we did for our marsh bird analysis. The first 2 models we fit investigated the

response by emergent wetland vegetation to our grazing variables. Recognizing that there was likely a relationship between percent emergent wetland vegetation and wetland permanence, we fit a third model with wetland class as a predictor variable. We combined wetland classes 1 and 2, as there were insufficient numbers of each to analyze on their own. Lastly, we fit models with an additive and an interactive effect between class and our two grazing variables. With each of our grazing variables, we fit 1 model with grazing and wetland class as predictor variables and 1 model with an interaction between the two. We compared the AIC values of the 7 models to determine the top model and if grazing had any effect on percent emergent wetland vegetation.

RESULTS

Fifty sites were surveyed across 37 WPAs in 2017 and 53 sites across 41 WPAs in 2018. Between 2017 and 2018, we surveyed 85 sites that had a recent grazing history and 18 sites that had not been disturbed in 7+ years (Table 1). Thirty-two sites had been burned in the previous 6 years.

Table 1. Grazing histories of sites surveyed for secretive marsh birds and waterfowl in 2017 and 2018 in western Minnesota.

Years Since Last Grazed	No. of 2017 Sites	No. of 2018 Sites	Total
0	2	1	3
1	14	14	28
2	13	7	20
3	4	11	15
4	7	4	11
5	1	4	5
6	2	1	3
7+	7	11	18
Total	50	53	103

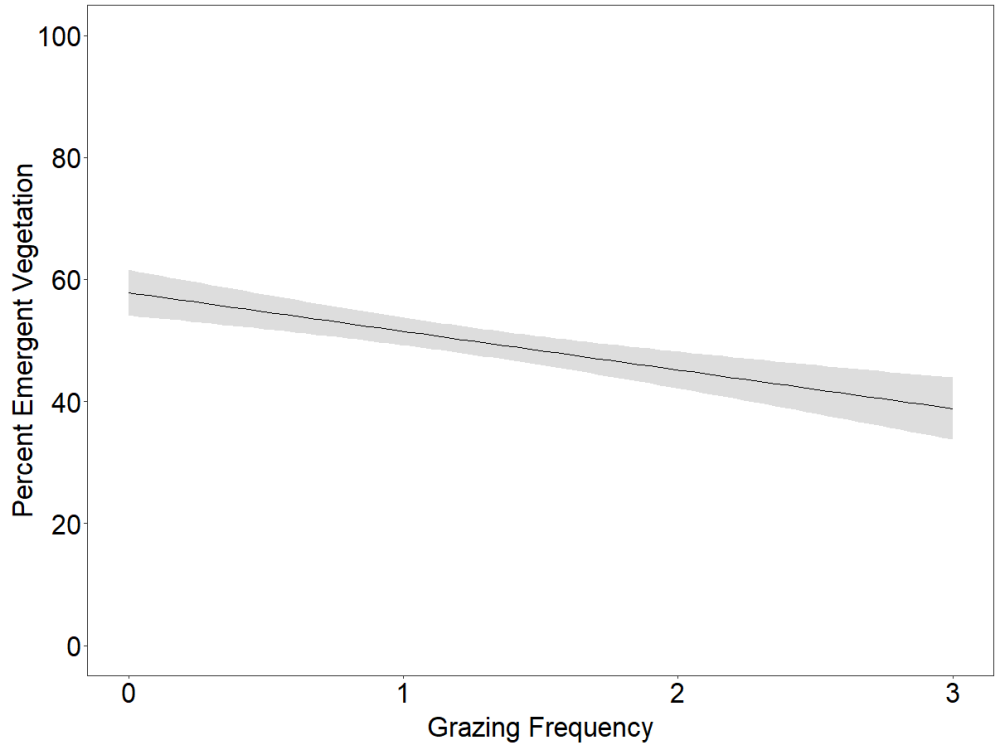
Emergent Wetland Vegetation

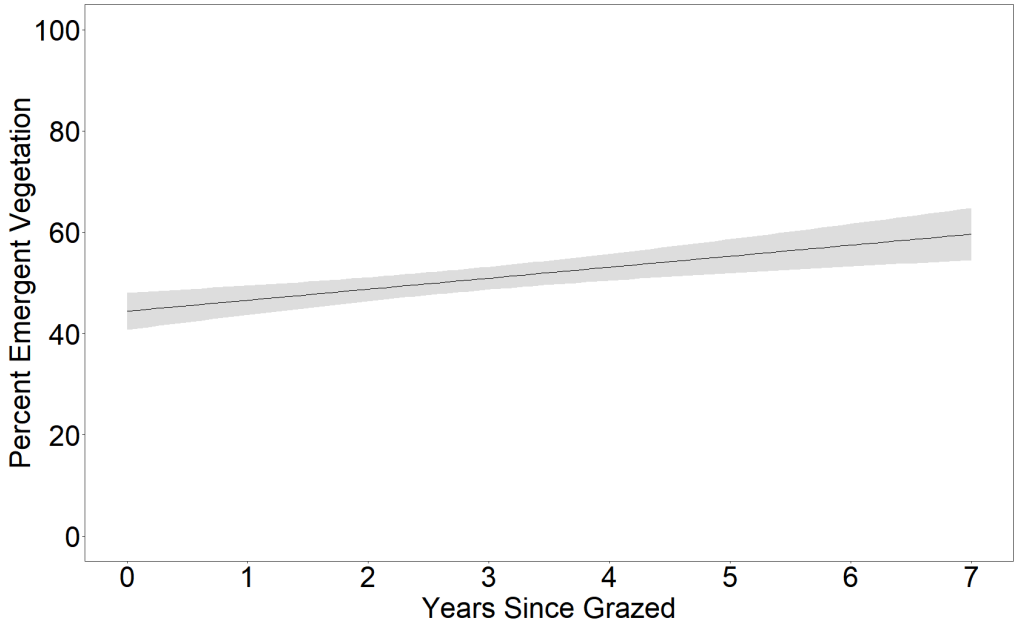
The top model predicting percent emergent vegetation included additive effects of wetland class and grazing frequency (Table 2). Percent emergent wetland vegetation was negatively associated with increasing grazing frequency (Figure 1). The model with wetland class and years since grazed was also competitive (ΔAIC = 2.12), indicating that recentness of grazing was also an important predictor of percent emergent vegetation, with percent vegetation showing a positive relationship to years since grazed. There is some evidence that grazing effects vary among wetland classes, but while it is a competitive model, the grazing effect was not strong enough to overcome the 4-parameter penalty to AIC.

Table 2. Model results for percent emergent vegetation analysis including number of parameters (K) and ΔAIC.

Model	**K**	**ΔAIC**
Grazing frequency + Wetland class	6	0
Years since grazed + Wetland class	6	2.124
Grazing frequency * Wetland class	10	3.176
Years since grazed * Wetland class	10	3.562
Wetland class	5	16.744
Grazing frequency	2	128.034
Years since grazed	2	132.606

Figure 1. Relationship between percent emergent vegetation and grazing. Top figure presents response of emergent cover to grazing frequency (the number of times a site was grazed in the last 3 years), whereas bottom figure shows response to time since grazed. The shaded area represents an 85% confidence interval.





Secretive Marsh Birds

We surveyed 86 wetlands at 50 sites across 37 WPAs in 2017 and 89 wetlands at 53 sites across 41 WPAs in 2018. We completed 350 marsh bird surveys between the 2 field seasons. We detected 579 individuals of our target species with Soras detected on 76 sites, Pied-billed Grebes on 57, Virginia Rails on 45, American Bitterns on 25, Least Bitterns on 11, and Yellow Rail on 0. We were able to model detection probability and occupancy of Sora, Pied-billed Grebe, Virginia Rail, and American Bittern, but there were insufficient detections of Least Bittern and Yellow Rail to perform analysis.

Vocalization Probability: The 4 species of marsh birds responded differently to broadcasted calls (Table 3). Detection probability of American Bittern varied between survey periods and years, but not among survey minutes, with a constant probability of calling during each survey minute. The top vocalization probability model for Pied-billed Grebe allowed for variation within survey minute, survey period, and survey year. Within surveys, Pied-billed Grebe detection was greatest following their own broadcast call and consistently low during both the initial passive listening period and all other species' calls. The top vocalization probability model for Sora included variation within survey minutes, with 7 modeled vocalization probabilities within a survey: detection remained consistently low during the passive listening period and varied across the 6 minutes of broadcasted calls and was greatest following their own calls. The top model for Virginia Rail included variation within survey minute and survey period, with 7 vocalization probabilities within a survey, showing a similar response to broadcasted calls as Soras.

Table 3. Vocalization probability models for the four species of secretive marsh birds analyzed. Each model parameter represents a different vocalization probability and varied by minute, visit, and/or year.

Species	**Equation**
American Bittern	$\beta_0 + \beta_{visit} + \beta_{year}$
Pied-billed Grebe	$\beta_0 + \beta_{min\ 1\text{-}9,11*visit*year} + \beta_{min\ 10*visit*year}$
Sora	$\beta_0 + \beta_{min1\text{-}5} + \beta_{min6} + \beta_{min7} + \beta_{min8} + \beta_{min9} + \beta_{min10} + \beta_{min11}$
Virginia Rail	$\beta_0 + \beta_{min1\text{-}5} + \beta_{min6} + \beta_{min7} + \beta_{min8} + \beta_{min9} + \beta_{min10} + \beta_{min11}$

Occupancy: Grazing helped explain variation of occupancy in all 4 species of marsh birds (Table 4). Both years since grazed and grazing frequency improved model performance for American Bittern, though AIC indicates that years since grazed was a better predictor of occupancy. Sites were less likely to be occupied by American Bittern the longer they went without grazing (Figure 2), and more frequently grazed sites were more likely to be occupied (Figure 3). Virginia Rail responded positively to increased grazing frequency, and Sora responded negatively to increasing years since grazed. The grazing variable on the extinction parameter ($\varepsilon_{2\text{-}3}$) was only present in the top model for Pied-billed Grebe (Figure 4). We could not include the parameter in the Virginia Rail model as it was inestimable, likely a result of a lack of data. Sites that had been grazed the previous year were more likely to experience local extinction by Pied-billed Grebe between 2017 and 2018.

Table 4. Model results for occupancy of four species of secretive marsh birds including number of parameters (K) and ΔAIC_c.

Species	**Model**	**K**	**ΔAIC_c**
American Bittern	Base model + Years since grazed	23	0.0
	Base model + Years since grazed^2	24	0.5037
	Base model + Grazing frequency	23	3.2852
	Base model	22	4.693
	Base model + Grazed last year	23	6.9523
Pied-billed Grebe	Base model + Grazed last year	27	0.0
	Base model	26	0.4624
	Base model + Years since grazed^2	28	1.9581
	Base model + Years since grazed	27	2.7736
	Base model + Grazing frequency	27	2.7751
Sora	Base model + Years since grazed	26	0.0
	Base model	25	2.1655
	Base model + Years since grazed^2	27	2.3423
	Base model + Grazing frequency	26	3.2717
	Base model + Grazed last year	26	4.409
Virginia Rail	Base model + Grazing frequency	33	0.0
	Base model	32	2.4258
	Base model + Years since grazed^2	34	3.6400
	Base model + Years since grazed	33	3.9607

Figure 2. Marsh bird occupancy versus time since grazed, using the best supported linear (AMBI, SORA) or quadratic model (PBGR, VIRA). Lines represent mean predicted occupancy, whereas dots represent predicted values for each survey site, given other unique combinations of covariates.

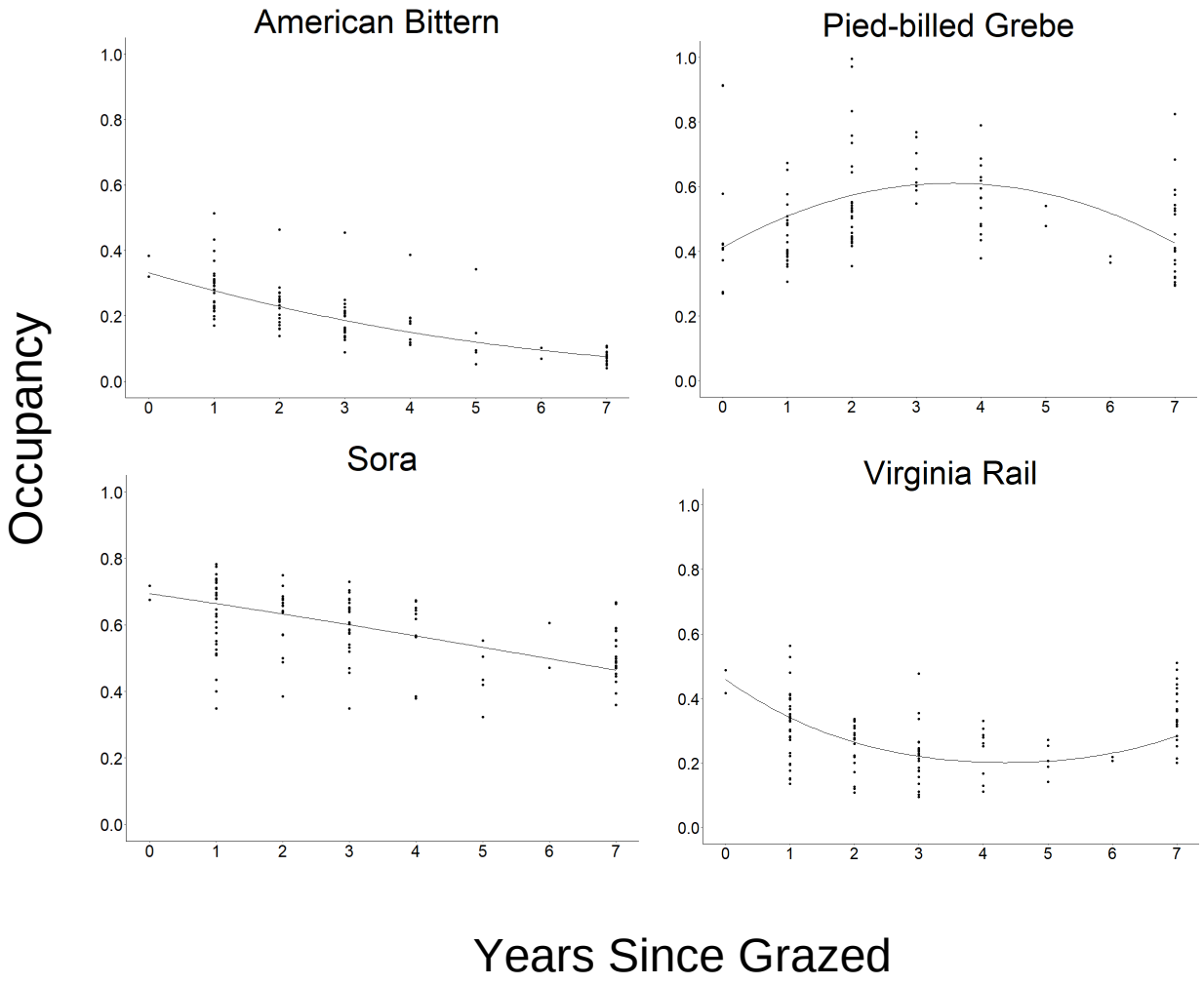


Figure 3. Marsh bird occupancy response to grazing frequency (number of times grazed in the last three years). Lines represent mean predicted occupancy, whereas dots represent predicted values for each survey site, given other unique combinations of covariates.

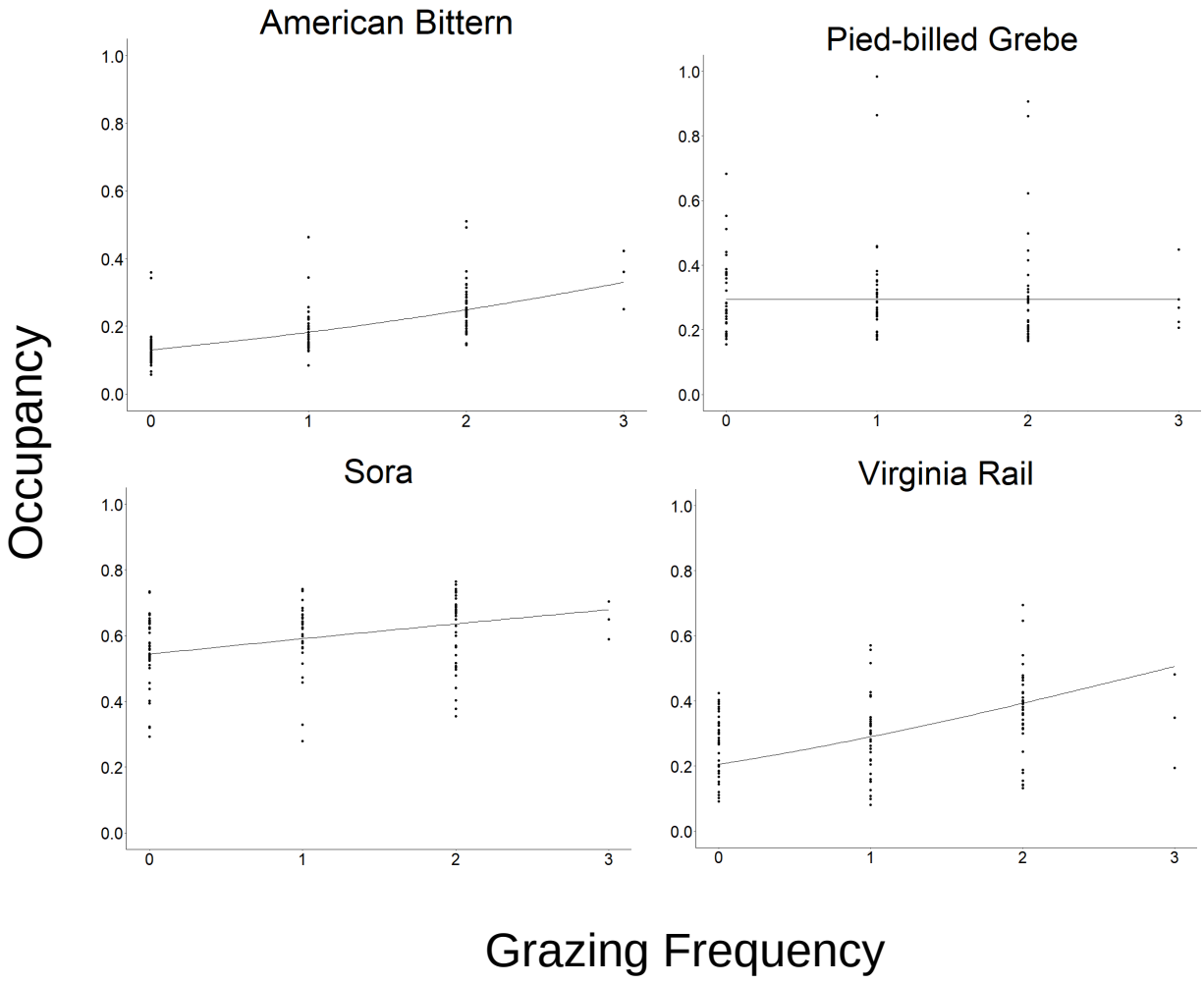
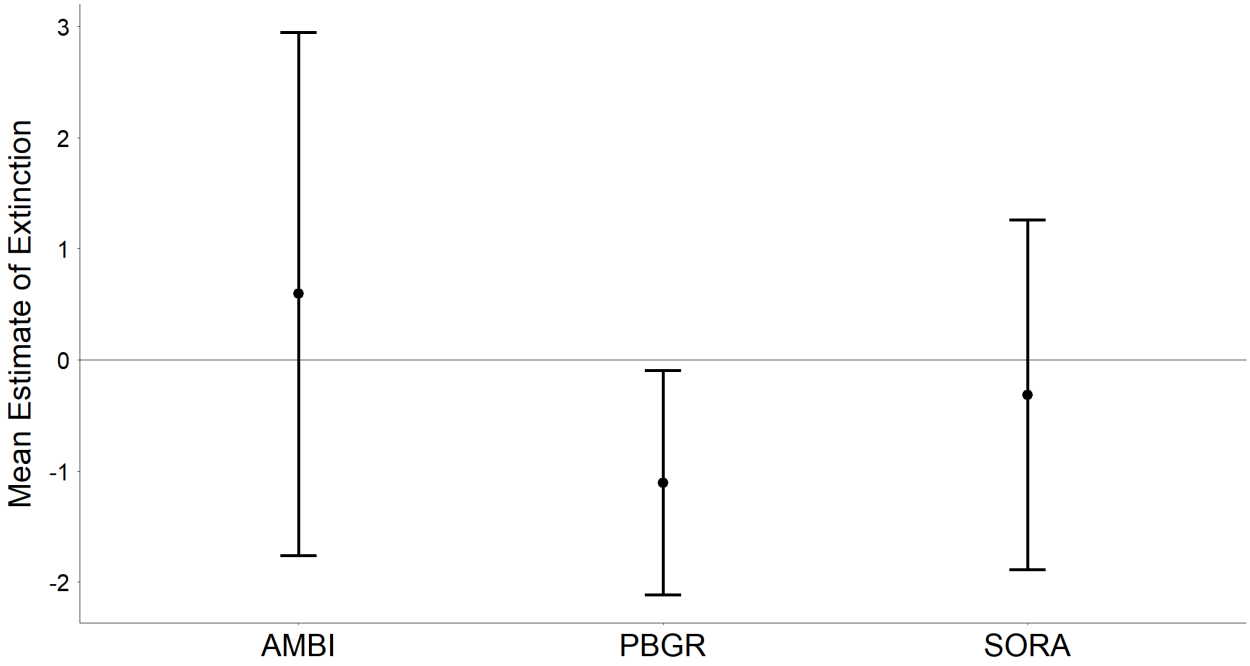


Figure 4. Effect of grazing in the previous year on between-year local extinction probability. Negative estimates indicate a reduction in extinction probability when sites were grazed last year. VIRA not included, because parameter was inestimable.



Ground-nesting waterfowl

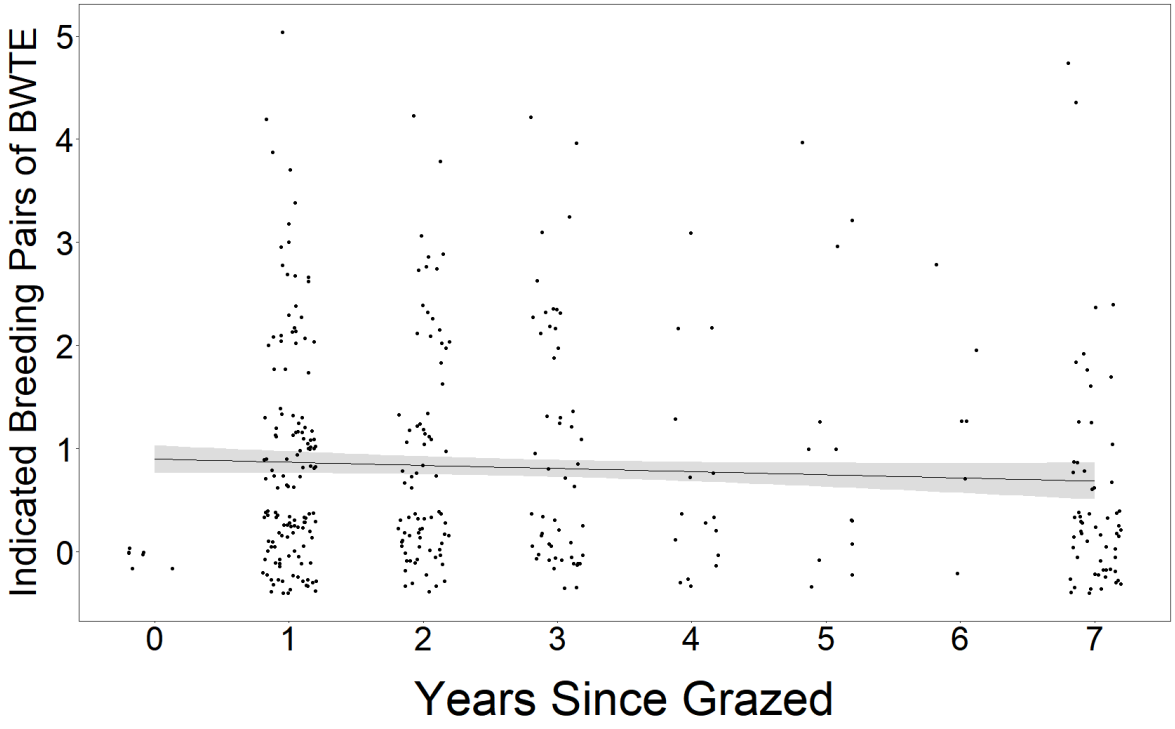
We detected 916 Blue-winged Teal, 705 Mallard, 60 Gadwall, 55 Northern Shovelers, and 17 Green-winged Teal indicated breeding pairs and 70 Blue-winged Teal, 30 Mallard, 4 Gadwall, and 13 unknown broods. We were able to model pair abundance of Blue-winged Teal and Mallard, but there were insufficient detections of other species to perform analysis. Grazing helped explain variation in abundance for Mallard pairs with years since grazed included in the top model (Table 5). Mallard pair abundance increased as years since grazed increased (Figure 5). Grazing did not improve model performance for Blue-winged Teal pairs, and the top model was the base model. Grazing frequency had no effect on pair abundance of either species (Figure 6). We only had sufficient data to analyze Blue-winged Teal broods; however, we combined all dabbler broods observed (Blue-winged Teal, Gadwall, Mallard, and unknown dabblers) and fit

our brood models to the whole group. Grazing did not help explain variation in brood abundance for Blue-winged Teal or our combined group of all dabblers (Table 5).

Table 5. Model results for abundance of two species of indicated breeding pairs including number of parameters (K) and ΔAIC.

Species	**Model**	**df**	**ΔAIC**
Blue-winged Teal pairs	Base model	15	0.0
	Base model + Years since grazed	16	1.3721
	Base model + Grazing frequency	17	1.9913
	Base model + Years since grazed^2	16	3.3356
Mallard pairs	Base model + Years since grazed	15	0.0
	Base model + Years since grazed^2	16	0.2965
	Base model	14	1.8512
	Base model + Grazing frequency	15	2.7131
All dabbler broods	Base model	12	0.0
	Base model + Years since grazed	13	1.3129
	Base model + Grazing frequency	13	1.9968
	Base model + Years since grazed^2	14	3.2943
Blue-winged Teal broods	Base model	12	0.0
	Base model + Years since grazed	13	1.5837
	Base model + Grazing frequency	13	1.7986
	Base model + Years since grazed^2	14	3.3581

Figure 5. Blue-winged Teal and Mallard pair response to years since grazed, using the best-supported linear model. Lines represent mean predicted abundance, whereas dots represent predicted values for each survey site, given other unique combinations of covariates.



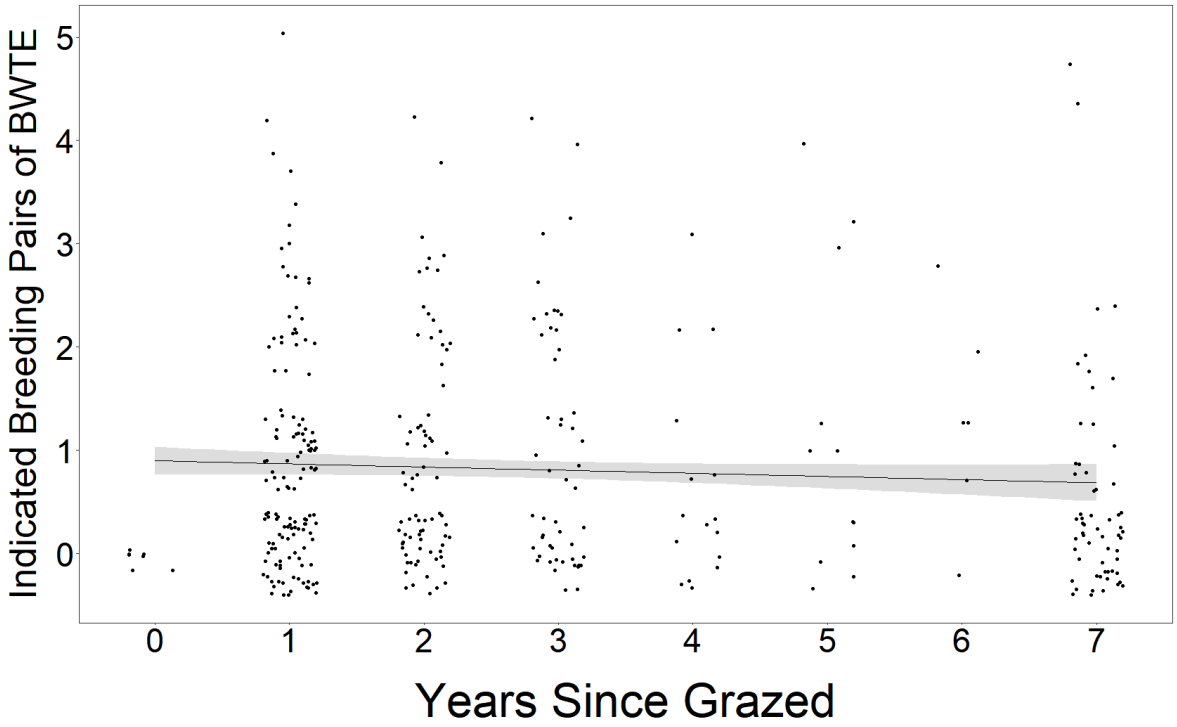
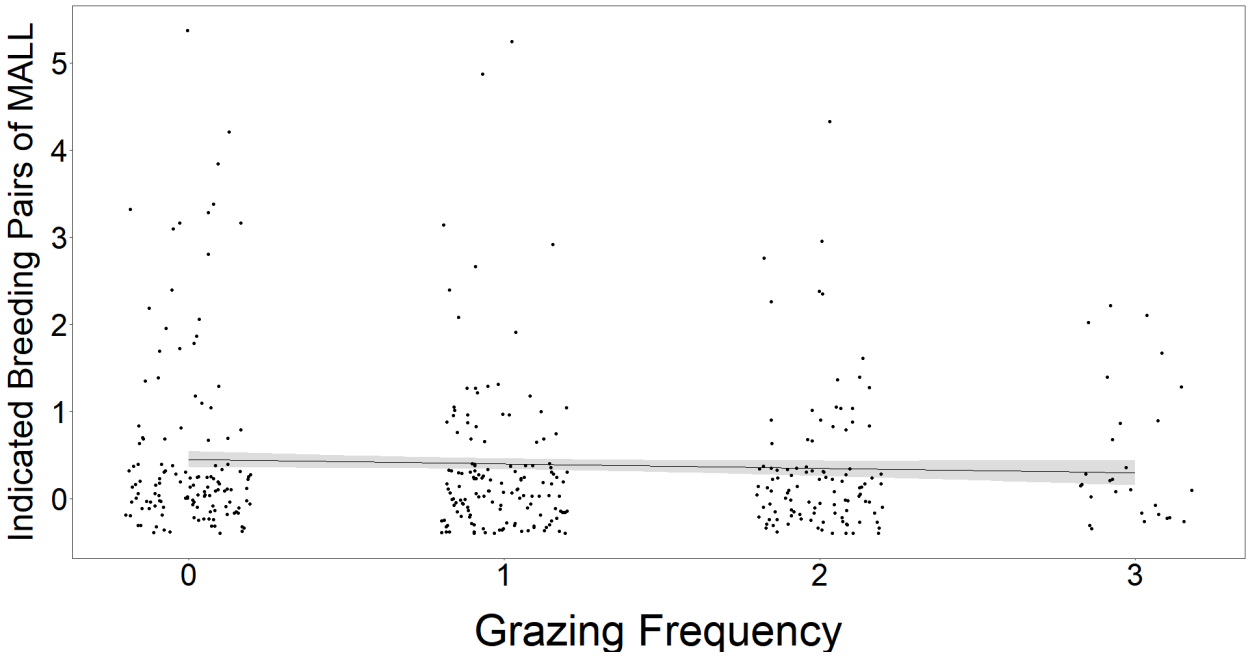
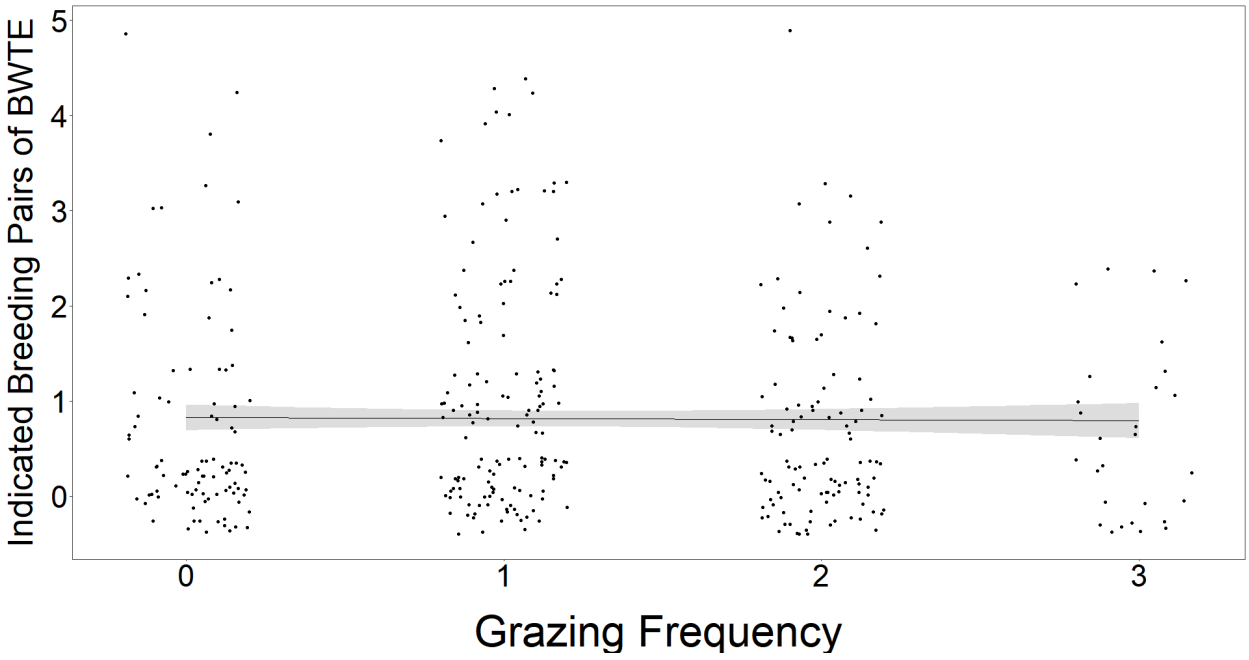


Figure 6. Blue-winged Teal and Mallard pair response to grazing frequency (number of times grazed in the last three years). Lines represent mean predicted abundance, whereas dots represent predicted values for each survey site, given other unique combinations of covariates.





DISCUSSION

Conservation grazing decreased the percentage of emergent vegetation in study wetlands. In addition, the longer a site had gone undisturbed by grazing, the more vegetated wetlands became. While this change is statistically significant, our results show that conservation grazing at this low intensity is unlikely to drastically alter the percent of emergent vegetation covering a wetland. A modest reduction can be expected in response to trampling and grazing on emergent vegetation, exposing open water and increasing interspersion of water and vegetation. Additional research into the impact of grazing frequency on water quality would give us more information on how wetlands respond to conservation grazing.

A modest decrease of emergent vegetation is likely appropriate for most secretive marsh bird species, who prefer wetlands dominated by vegetation (Gibbs et al. 1991, Lor and Malecki 2006). Both years since grazed and grazing frequency improved model performance beyond the base model for American Bitterns, though years since grazed was a slightly more important occupancy predictor. While very little is known about the ecology of this secretive marsh bird, we do know that they prefer shallower wetlands with significant habitat interspersion (Lowther et al. 2009). Grazing that opened up heavily choked wetlands and increased interspersion would understandably be beneficial for these birds. While we do not have evidence to support that Soras were significantly affected by increased grazing frequency, they did show decreased probability of occupancy the longer a site went undisturbed by grazing. Given that the results of our emergent vegetation model showed that grazing only modestly reduced wetland vegetation even when performed multiple years in a row, it is unlikely that 2 or 3 consecutive years of light grazing reduces wetland vegetation cover to such a degree that wetlands would become unattractive to Soras. Meanwhile, idle wetlands become increasingly choked by dense vegetation

and may become less attractive to Soras. While our 2 grazing variables are highly correlated, only grazing frequency was an important predictor of Virginia Rail occupancy. This could be a result of their preference for earlier-successional wetlands that do not have an accumulation of residual standing biomass (Conway 1995). Grazing multiple years within a short span likely increases the impact of trampling and grazing on emergent vegetation, more effectively controlling accumulation of biomass and maintaining a wetland that does not impede movement of Virginia Rails.

Pied-billed Grebes have remarkably different habitat preferences than the other 3 species of marsh birds analyzed in this paper. They prefer densely vegetated wetlands interspersed with a considerable amount of open water (Weller and Spatcher 1965, Bolenbaugh et al. 2011). As diving marsh birds, Pied-billed Grebes forage for fish and invertebrates and escape danger by diving and thus prefer deeper wetlands (Muller and Storer 1999, Baschuk et al. 2012). Given that these deeper wetlands are less at risk of being dominated by invasive emergent vegetation, it is unsurprising that grazing frequency or years since grazed did not influence occupancy of Pied-billed Grebe. Since we did see a modest impact of grazing on percent emergent vegetation, it is possible that grazing at higher intensities could trample perimeter vegetation that grebes rely upon for cover. However, our results indicate that, at a low intensity, increased grazing frequency and years since grazed did not impact Pied-billed Grebe occupancy. We did report a reduction in local extinction at sites that were grazed the previous year. While we cannot explain why we saw this effect, ΔAIC for the base model was only 0.4624, indicating that the grazing effect was minor. Given that years since grazed was not an important occupancy predictor, perhaps the negative grazing effect was short-lived.

Grazing did not impact abundance of Blue-winged Teal pairs, suggesting that at this low intensity of grazing, cattle were not altering vegetation to a degree that wetlands become more or less attractive to teal breeding pairs. And while Mallard pair abundance increased the longer a site went undisturbed, increased grazing frequency had no observable effect. When we looked at Blue-winged Teal individually or all dabbler species combined, we saw no evidence that grazing frequency or years since grazed influenced brood abundance. Our study suggests that grazing at least once every three years at a low intensity does not negatively affect pair or brood abundance of dabbling ducks.

While our results indicate that increased grazing frequency at a low intensity is not harmful to marsh bird occupancy or ground-nesting duck pair and brood abundance, a few caveats are in order. Drier grassland ecosystems recover from grazing more slowly and so our results should be applied cautiously in more arid habitats such as mixed or short-grass prairies. Additionally, our study only analyzed effects of late-spring, low intensity grazing, and we cannot assume similar results on the tallgrass prairie when different grazing prescriptions are applied. This suggests that our results apply primarily to conservation land managers. For livestock producers, these low stocking rates are likely impractical. Additional research is needed to investigate how grazing frequency and years since grazed influences waterbirds at higher stocking rates. Past studies have found that mesic grasslands that evolved with heavy grazing pressures can sustainably support moderate levels of grazing (Fuhlendorf and Engle 2001), so it is possible that Minnesota's tallgrass prairie could support higher stocking rates without negatively influencing waterbird populations; however, this requires additional research.

Management Implications

Management of restored and native prairies frequently focuses on upland management (U.S. Fish and Wildlife Service 2017). But in grassland systems like the Prairie Pothole Region, wetland habitat is vital to the survival of many species, and upland management could have unintended impacts. More land managers are using conservation grazing as an alternative or supplement for burning to enhance upland prairie habitat for wildlife. While much is still unknown about how grazing at lower intensities is impacting wetlands, our study suggests that secretive marsh birds and ground-nesting waterfowl are not negatively impacted by increased grazing frequency. If land managers in the tallgrass prairie are unable to burn as regularly as needed, then our results suggest that the use of frequent grazing at low intensities to manage upland cover should neutrally or positively impact occupancy of secretive marsh birds and abundance of ground-nesting waterfowl pairs and broods. Additionally, the longer land managers go without a disturbance on the land, the more dominated wetlands become by vegetation, negatively impacting some species of marsh birds. If land managers are considering secretive marsh birds in their management plans, we do not recommend idling pastures for 6+ years.

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