2019 Project Abstract
For the Period Ending June 30, 2023

PROJECT TITLE: Implementing Conservation Plans for Avian Species of Concern
PROJECT MANAGER: Alexandra Wardwell
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FUNDING SOURCE: Environment and Natural Resources Trust Fund
LEGAL CITATION: Legal Citation: M.L. 2019, First Special Session, Chp. 4, Art. 2, Sec. 2, Subd. 03k as extended by M.L. 2022, Chp. 94, Sec. 2, Subd. 19 (c.1) [to June 30, 2023]

APPROPRIATION AMOUNT: $124,000
AMOUNT SPENT: $121,721
AMOUNT REMAINING: $2,279

Sound bite of Project Outcomes and Results
Audubon established benchmark survey sites, to guide future conservation activities within Important Bird Areas, for three species of conservation concern: Black Tern, Common Tern and Yellow Rail. Audubon established these important benchmark survey locations for these species, while also working closely to build increase collaboration and communication with many partners.

Overall Project Outcome and Results
Common Tern and Black Tern are colonial waterbirds that have been declining for decades in Minnesota and in other portions of the Great Lake States due to many factors including habitat loss, interspecific species competition, predation, and human caused disturbances. In Minnesota, Common Tern are State Threatened species and Black Tern are a Species of Greatest Conservation Need. Yellow Rail are a secretive marsh bird that is a Special Concern Species in MN; much remains unknown about their life history. With this project, Audubon established benchmark survey sites to guide future restoration and enhancement activities within Important Bird Areas (IBAs). The project had numerous partnership-building successes, bringing natural resource professionals together from all over the state, the Great Lakes region, and Canada to discuss the conservation and monitoring of these three species. Audubon documented a new Common Tern nesting location for the first time in over a decade, conducted the most comprehensive Yellow Rail survey in over a decade with an estimated 78 individual Rail documented, and partnered with Natural Resources Resource Institute to conduct a thorough investigation of Black Tern benchmark survey locations in Minnesota IBAs. The data and information collected under this project has been entered into Minnesota's Natural Heritage Information System (NHIS), a database that provides information on Minnesota's rare plants, animals, native plant communities. The NHIS is continually updated as new information becomes available and is the most complete source of data on Minnesota's rare or otherwise significant species. This work benefits all Minnesotans as we work to conserve these species which have a critical habitat role and are part of Minnesota's rich natural heritage. Land managers and natural resource staff across state and federal agencies, tribal, and non-profit partners can use these benchmark survey locations to guide habitat to management benefit these species for better population outcomes.

Project Results Use and Dissemination

Survey results, data, and survey locations have been shared as conservation work for Black Tern, Common Tern, and Yellow Rail is ongoing. Due to the conservation status of these species, Audubon will continue to disseminate the significance of this work. Future collaboration with partners is planned to share findings, discuss collaborations, and next steps. Collaboration fosters conservation efforts that can be driven by data and provide insight on the distribution and future population trends in a changing climate. This will be instrumental in the development and execution of adaptive-management plans associated with monitoring outcomes. Audubon's webpage: Conservation of Focal Species.

Environment and Natural Resources Trust Fund (ENRTF)
M.L. 2019 ENRTF Work Plan (Main Document)

Date of Submission: August 15th, 2023

Final Report

Date of Work Plan Approval: June 5, 2019

Project Completion Date: June 30, 2023

PROJECT TITLE: Implementing Conservation Plans for Avian Species of Concern

Project Manager: Alexandra Wardwell

Organization: National Audubon Society

College/Department/Division: Audubon Minnesota

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Location: Statewide

Total Project Budget: $124,000

Amount Spent: $121,721

Balance: $2,279

Legal Citation: M.L. 2019, First Special Session, Chp. 4, Art. 2, Sec. 2, Subd. 03k as extended by M.L. 2022, Chp. 94, Sec. 2, Subd. 19 (c.1) [to June 30, 2023]

Appropriation Language: $124,000 the first year is from the trust fund to the commissioner of natural resources for an agreement with the National Audubon Society, Minnesota office, to establish benchmark survey sites for implementing and tracking outcomes of collaborative restoration and enhancement activities within Important Bird Areas for three bird species of conservation concern.

M.L. 2022 - Sec. 2. ENVIRONMENT AND NATURAL RESOURCES TRUST FUND; EXTENSIONS. [to June 30, 2023]

I. PROJECT STATEMENT:

We propose establishing benchmark survey sites to guide restoration and enhancement activities within Important Bird Areas for three species of conservation concern: The Common Tern, Black Tern and Yellow Rail. Over the past 10 years, Audubon MN has built a solid avian monitoring foundation with the completion of the Breeding Bird Atlas (MNBBA) in 2017 and the implementation of the statewide marshbird monitoring program in 2016. Using the protocol from the marshbird survey and the information gathered from the MNBBA, we propose establishing benchmark survey locations for these species of conservation need in order to better document and guide collaborative conservation efforts.

All three of these birds are focal species within Audubon's Blueprint for Bird Conservation and have individualized, action oriented conservation plans. The Yellow Rail was the least abundant focal species documented in the statewide marshbird monitoring effort. Benchmark sites focused on Yellow Rails are essential to understanding their decline. For Black Terns, the Great Lakes Marsh Monitoring Program reports a statistically significant declining trend (10.5% annual change) in the Great Lakes basin from 1995-2012; this is the largest decline of any marsh bird monitored by the program (Tozer 2013). Finally, Common Terns are a state threatened species with only 5 active colonies in Minnesota. Our intention is to support the coordinated implementation of the Blueprint for Bird Conservation Plans (Pfannmuller 2014) for each of these species.

There are 19 potential IBAs with occupancy records for the three focal species. We plan to designate up to 10 benchmark sites per focal species (some may overlap) within these priority IBAs. Once established, the benchmark sites will be added to the ongoing marshbird survey effort and surveyed by seasonal field technicians. Detailed habitat metrics will be recorded at each benchmark site to determine focal species occupancy as it relates to habitat composition and structure. Benchmark sites will also take into account current and planned management and serve as a resource to determine species response to such actions. Recommendations based on the comprehensive marshbird survey results and the data collected from the benchmark survey sites will be shared with statewide and regional working groups focused on wetland habitat improvements and species specific management (i.e. the MN Prairie Conservation Plan, the Joint Ventures Great Lakes Waterbird Working group and the Common Tern management working group).

II. OVERALL PROJECT STATUS UPDATES:

Amendment Request as of 6/3/2020

Due to COVID-19 impact on the 2020 field season we are adjusting field work and moving statistical analysis to an in-kind matching contribution. A new contract for University of Minnesota Duluth will cover the most critical 2020 field work – Black Tern and habitat surveys at benchmark sites. The outputs of the project will not change. We are requesting the following budget shifts:

- Eliminating $9,250 in contracted statistical analysis
- Reducing boat and flight contracts from $1,750 to $700
- Contracting University of Minnesota Duluth for $11,000
- Reducing travel budget $17,000 to $16,300

Amendment approved by LCCMR 6/4/2020

Amendment Request as of 05/01/2021

Audubon Minnesota requests the following amendments:

- Replacement of Nathaniel Miller with Alexandra Wardwell as Project Manager due to a change in his work duties.
- Official address change for Audubon Minnesota from St. Paul to Roseville, MN.
- Budget amendment:

- Reduce travel budget from $16,300 to $4,300 by transferring $12,000 from Travel to Professional/Technical/Service Contracts for yellow rail surveyor contract.
- Fewer travel funds are needed in part, because of more remote coordination and meetings over zoom due to the Covid-19 pandemic. Additionally, the use of sole source contracts vs Audubon staff for avian survey work also cut down on the amount of travel funds utilized.
- We would like to issue the yellow rail contract as a sole source contract and hire an experienced marshbird surveyor with extensive knowledge of yellow rail detection history, marshbird survey protocols, and ability to inventory and ground-truth prime yellow rail habitat.
- The amount decided for this sole source contract is based on the specialized skill set needed, the amount of travel, the number of hours required to conduct the surveys with the attention to detail and planning skills that are required. Based on a past contract for this project and our experience with other projects, $12,000 is a very reasonable amount given the intense nature of the surveys, the complexity of navigation required to survey secretive marshbirds at night, and the surveying amount which includes at least 20 survey routes totaling 120-160 individual survey points. This sole source contract amount is also similar to other avian survey contracts Audubon has contracted throughout the Great Lakes states for similar work in the past.
- Fieldwork for this project was originally designed to be completed by seasonal technicians; however, Audubon instituted a hiring freeze, which began in 2020 due to the Covid-19 pandemic. Because of this setback, Audubon sought an experienced surveyor who was efficient, could adapt to changing situations, and problem solve as required to complete this portion of the project.

Amendment Approved by LCCMR 5/12/2021

LCCMR updated the work plan to correspond with the appropriation end date of June 30, 2022 on June 6, 2021.

Amendment Request as of 01/27/2023

Audubon Minnesota requests the following amendments:
Add a budget line to contract with Tom Savre, experienced ornithologist, for assistance with common tern surveys and for boat transport for Audubon staff to the survey locations in order to follow up on our common tern findings from 2022 in the amount of $2,000. With another visit to the breeding colony on [redacted] on Pelican Lake and the most likely breeding locations on Baby Lake, in a hopefully lower water year than 2022, we hope to confirm the findings from 2022 and solidify that there is an existing and consistent breeding colony on Pelican Lake and whether or not terns are using Baby Lake for anything other than migration.

A budgetary amendment:
Reduce Boat Service Budget by $275 and incorporate into the Professional/Technical/Service Contracts line for a new budget total of $425.
Reduce the Supplies Budget by $600 and incorporate into the Professional/Technical/Service Contracts line for a new total of $100.
Reduce the Personnel Budget by $1,125 and incorporate into the Professional/Technical/Service Contracts line.
Reduce the Personnel Budget by $450 and incorporate into the Travel Expenses Budget.

Amendment approved by LCCMR 2/7/23

First Update May 1, 2020
The project team is currently working to cross-reference Important Bird Area (IBA) and Breeding Bird Atlas (MNBBA) data to identify benchmark sites. Audubon staff are working closely with staff from the Natural Resources Research Institute at the University of Minnesota, Duluth (NRRI), who maintain the MNBBA data. Because of considerations of COVID-19 this year's field season is at risk, however Audubon and NRRI are planning for potential summer surveys at Black Tern colonies identified in the MNBBA, but with gaps in full count and habitat data. If conducted, surveys will align with protocols from other Great Lakes' States in order to support regional population estimate and trend analyses. Work on Yellow Rail and Common Tern has not yet begun.

Second Update November 1, 2020
Despite delays caused by COVID 19 the project team was able to finalize a site list of potential survey sites for Black Terns and conduct surveys in 2020 to establish a baseline for Black Terns. A partnership established with the University of Minnesota, Duluth (NRRI) has been critical to this success. We have requested a one-year extension from LCCMR in order to conduct a full field season in 2021 with a focus on Common Tern and Yellow Rail and disseminate results.

Third Update May 1, 2021
Audubon conducted outreach to several individuals with extensive yellow rail survey experience. This resulted in yellow rail detection information sharing and the further fine-tuning of survey locations and desired site conditions. Audubon considered historical yellow rail detections in order to guide the placement of new baseline survey routes and survey points.

Audubon Minnesota plans to hire an experienced marshbird surveyor to conduct yellow rail surveys in our target Important Bird Areas within public lands including state and federal lands. Audubon has been coordinating with local and regional area wildlife managers, state forest managers, and U.S. Fish and Wildlife Service Refuge staff on special use permits where required.

Fourth Update November 1, 2021
Audubon Minnesota hired a marshbird expert to conduct yellow rail surveys in our targeted Important Bird Areas within state and federal lands. Audubon worked with local and regional area wildlife managers, state forest managers, and U.S. Fish and Wildlife Service Refuge staff to select survey locations and coordinate survey efforts. Area managers provided helpful suggestions on locations for survey sites as some had first-hand knowledge of where yellow rails were detected in the last decade. Additionally, area managers also provided critical information regarding on-the-ground site access information Audubon worked with state and federal employees to secure special use permits where required by each respective agency.
We established 20 benchmark survey routes to survey for yellow rails during the 2021 breeding season. Additionally, Audubon completed the groundwork for eight additional routes with 88 stations or survey points that were not surveyed in 2021. These additional routes would be utilized if an expansion of yellow rail survey routes becomes possible in the future.

Fifth Update May 1, 2022
Audubon Minnesota has conducted outreach to natural resource professionals who focus on colonial waterbird monitoring and survey efforts, in an effort to crowd-source knowledge around the five main common tern breeding areas in the state. Audubon has hosted numerous meetings that brought common tern experts together to share information. Topics for these meetings included everything from the impacts affecting breeding success on natural islands in Minnesota to artificial nesting options that could be utilized to improve common tern breeding success. Interspecies competition and high water are especially problematic for common terns nesting on natural islands in Minnesota lakes.

Additionally, Audubon formed a Yellow Rail Working Group, bringing together the yellow rail and marshbird experts in the state to collaborate and brainstorm possible next steps. We have had two meetings thus far, but plan to continue to have an annual or biannual discussions to move yellow rail conservation forward in the state of Minnesota. We are currently working to share relevant resources in an online repository, so that working group members have access to the recent survey data, journal articles, and protocols that each entity has used. One challenge we are faced with is finding a storage platform that is compatible with various agency and organization security restrictions.

Update as of June 30, 2022:

Project extended to June 30, 2023 by LCCMR 6/30/22 as a result of M.L. 2022, Chp.94, Sec. 2, Subd. 19, legislative extension criteria being met.

Sixth Update as of November 1, 2022:
In the summer of 2022, Audubon conducted breeding surveys for our last focal species, the Common Tern. We focused efforts on two lakes with previous common tern pair sightings in the last 10-15 years, which gave us more information about the habitat these birds are selecting for nesting, the challenges they face, and established a new benchmark monitoring location on Pelican Lake in Crow Wing County.

Audubon is planning several meetings to facilitate discussions with colonial waterbird (Black Tern and Common Tern) partners and marshbird partners (yellow rail and others) in Minnesota this fall and winter. Topics to discuss range from the risks and impact of avian influenza, high water levels, recent breeding success, continued monitoring, and situations where habitat enhancements or other conservation actions could be beneficial to impact populations.

Seventh Update as of May 1, 2023:
Audubon held two focal species partner meetings since the last update. Audubon hosted a Yellow Rail Partner Meeting the end of January 2023, attendees included staff from the MN DNR Biological Survey and Ecological and Water Resources, including the MN DNR State Wildlife Action Plan Coordinator, U.S. Fish and Wildlife Service Division of Migratory Birds, U.S. Fish and Wildlife Service Upper Mississippi River-Great Lakes Joint Ventures, and Voyageurs National Park.
The goal of the meeting was to deepen partnerships around Yellow Rail conservation and to align priorities for future collaborative work. We discussed 2022 Yellow Rail monitoring efforts, thoughts about the next steps for yellow rail conservation and monitoring in MN, priorities, research questions, and funding options or structure for future potential monitoring efforts. The creation of a forum for partner collaboration and coordination has been a major success of this project. After our January Yellow Rail Partner Meeting, partners rectified the Midwest Coordinated Marshbird Monitoring Group and a Great Lakes Marshbird Conservation Framework Kick-off Meeting was held, the first in over three years. Partners from eight states joined discussions about what a regional marshbird strategy could look like. Building from the interest from that meeting, a Great Lakes Marshbird Workshop was planned for May 2nd-3rd, 2023 in East Lansing, MI.

Audubon also held a Common Tern Partners Meeting to recap the 2022 breeding season on January 23rd, 2023. The meeting was attended by staff from U.S. Fish and Wildlife Mille Lacs National Wildlife Refuge, Mille Lacs Band of Ojibwe Natural Resource staff, and Leech Lake Band of Ojibwe Natural Resources staff, and MN DNR Biological Survey and Ecological and Water Resources. We reviewed the previous season and discussed future collaboration opportunities and 2023 planned survey efforts.

Audubon Minnesota also participated in the Great Lakes Black Tern Conservation Initiative Meeting on April 19th, 2023 to hear about partner's ongoing or upcoming Black Tern monitoring and research in the Great Lake States. These states have had numerous Motus towers erected in the past year, which will hopefully increase available information about the migratory stopover areas used by certain Black Tern and Common Terns. Motus Wildlife

Tracking System (Motus) is an international collaborative research network that uses coordinated automated radio telemetry to facilitate research and education on the ecology and conservation of migratory animals. More information on Motus can be found https://motus.org.

Final Report as of June 30, 2023 (to be submitted by August 15, 2023):

Audubon's aim was to establish benchmark survey sites, to guide future conservation activities within Important Bird Areas, for three species of conservation concern: Black Tern, Common Tern and Yellow Rail. We established these important benchmark survey locations for these species, while also working closely to build collaboration and have open discussion with many different partners including: MN DNR Biological Survey, MN DNR Ecological and Water Resources, including the MN DNR State Wildlife Action Plan Coordinator, MN DNR Wildlife, U.S. Fish and Wildlife Service Division of Migratory Birds, Mille Lacs National Wildlife Refuge, U.S. Fish and Wildlife Service Upper Mississippi River-Great Lakes Joint Ventures, Voyageurs National Park, University of Minnesota Duluth Natural Resources Research Institute (NRRI), Mille Lacs Band of Ojibwe Natural Resource staff, Leech Lake Band of Ojibwe Natural Resources staff, and Chippewa National Forest staff. The findings and partner relationships built will help guide collaborative conservation efforts going forward for these three priority bird species.

Audubon, in partnership with NRRI, completed a thorough investigation of Black Tern colonies within Important Bird Areas in Minnesota. As a part of this grant, Audubon completed the most complete survey of Yellow Rail in the state of Minnesota in over a decade with an estimated 78 individual rail documented. This information will be crucial for the continued monitoring and management for Yellow Rail. Lastly, Audubon looked at historical records from the Minnesota Breeding Bird Atlas to determine which historical occupancies to explore for new Common Tern nesting locations. Several lakes in the Brainerd area were surveyed and Pelican Lake in Crow Wing County was found to have a colony of 60 or more Common Tern.

Our initial plans for this grant were written in 2018, well before Covid-19 affected everyone's lives and plans in 2020 and beyond. Due to the complications from the Covid pandemic we had to pivot from our plans to utilize volunteers and newly hired Audubon staff to instead have existing Audubon staff work with researchers and experienced wildlife professionals the three focal species to document benchmark survey sites. We proposed documenting detailed habitat metrics at each benchmark site to determine the occupancy relationship as it relates to habitat composition and structure. However, based on staff and contractor time, expertise, budget, and Covid-19 restrictions, we had to rely on mapping for some of that information.

Audubon organized and held several partner meetings centering on our focal species. Common Tern Partners Meetings were held to recap the 2021 and 2022 breeding seasons. Partner meetings were attended by staff from U.S. Fish and Wildlife- Mille Lacs National Wildlife Refuge, Mille Lacs Band of Ojibwe Natural Resource staff, Leech Lake Band of Ojibwe Natural Resources staff, and MN DNR Biological Survey and Ecological and Water Resources staff. Yellow Rail partner meetings occurred in 2021, 2022, and early 2023. These meetings were attended by MN DNR Biological Survey and Ecological and Water Resources, including the MN DNR State Wildlife Action Plan Coordinator, U.S. Fish and Wildlife Service Division of Migratory Birds staff, U.S. Fish and Wildlife Service Upper Mississippi River-Great Lakes Joint Ventures staff, and Voyageurs National Park staff.

Overall Project Outcome and Results (from Abstract)

Common Tern and Black Tern are colonial waterbirds that have been declining for decades in Minnesota and in other portions of the Great Lake States due to many factors including habitat loss, interspecific species competition, predation, and human caused disturbances. In Minnesota, Common Tern are State Threatened species and Black Tern are a Species of Greatest Conservation Need. Yellow Rail are a secretive marshbird that much remains unknown about their life history and is a Special Concern Species in MN. With this project, Audubon established benchmark survey sites to guide future restoration and enhancement activities within Important Bird Areas (IBAs). The project had numerous partnership building successes, bringing natural resource professionals together from all over the state, Great Lakes region, and Canada to discuss the conservation and

monitoring of these three species. Audubon documented a new Common Tern nesting location for the first time in over a decade, conducted the most comprehensive Yellow Rail survey in over a decade with an estimated 78 individual Rail documented, and partnered with NRRI to conduct a thorough investigation of Black Tern benchmark survey locations in Minnesota IBAs. The data and information collected under this project has been entered into Minnesota's Natural Heritage Information System (NHIS), a database that provides information on Minnesota's rare plants, animals, native plant communities. The NHIS is continually updated as new information becomes available, and is the most complete source of data on Minnesota's rare or otherwise significant species. This work benefits all Minnesotan's as we work to conserve these species which have a critical habitat role and are part of Minnesota's rich natural heritage. Land managers and natural resource staff across state and federal agencies, tribal, and non-profit partners can use these benchmark survey locations to guide habitat to management benefit these species for better population outcomes.

III. PROJECT ACTIVITIES AND OUTCOMES:

ACTIVITY 1 Title: ***Implementation Area Site Selection***
Description: *Use the MN BBA and Important Bird Areas to establish focal benchmark marshbird survey locations. Site selection will be done via remote sensing using GIS and input from partnership collaboration. Then in-person site visits will determine the suitability of locations for the focal species.*

ACTIVITY 1 ENRTF BUDGET: $15,000
AMOUNT SPENT: $15,000
BALANCE: $0.00

Outcome	Completion Date
1. Conduct cross analysis of Breeding Bird Atlas data and IBA criterion	*Fall 2019*
2. Create GIS layer of benchmark sites to ground truth	*Winter 2019*
3. Ground truth and formalize benchmark site selection	*Spring 2020*

First Update as of May 1, 2020
Work towards outcome 1 is underway for Black Terns as Audubon has shared IBA data with NRRI who maintain MNBBA data. The ability to ground-truth benchmark sites is at risk this year because of COVID-19 and will likely need to be postponed until 2021. In late summer of 2020, we will have a better grasp on what can and cannot be completed in 2020.

Second Update as of November 1, 2020
The first two outcomes are complete for Black Terns and outcome three is halfway complete (ground-truthed in 2020 and now to be formalized with additional partners). A total of 14 Important Bird Areas were identified across the state as potential locations to establish long-term Black Tern monitoring locations.

Third Update as of May 1, 2021
The analysis of benchmark sites for yellow rail occurred in the winter of 2020 and spring of 2021. Ground-truthing of survey route locations began in April 2021 and will continue into early May. Final site selection is currently underway for the 2021 field season.

Fourth Update as of November 1, 2021
During the winter of 2021 and early spring of 2022 we will use GIS and information from state partners to establish benchmark sites for common terns. Ground-truthing efforts for the survey route locations will began in early spring 2022 in preparation for the 2022 common tern breeding season surveys.

Fifth Update as of May 1, 2022

Audubon researched existing breeding locations of common terns in the state and after discussion with partners, discovered that regular surveys occur to monitor the known breeding populations of common terns in the state. We talked with the Natural Resources Research Institute (NRRI) researchers, DNR non-game division biologists, U.S. Fish and Wildlife staff, Mille Lacs Band of Ojibwe Natural Resource staff, Leech Lake Band of Ojibwe Natural Resources staff who are all conducting monitoring at the four established common tern breeding locations. Historical records in the Minnesota Breeding Bird Atlas documented a population that is not being monitored, Audubon Minnesota plans to conduct surveys of this population in 2022. This survey work would be conducted by boat and on foot.

Additionally, we learned that Mille Lacs Band natural resources staff have had an artificial nesting platform out on both Mille Lacs Lake and on smaller Ogechie Lake at different times for Common Terns. We looked at plans and photos of other artificial nesting platforms and we plan to work together to enhance the platform for better outcomes. The platforms on Mille Lacs Lake have not been successful in the past, but it is clear that common terns in different states and areas prefer different kinds of artificial nesting conditions depending on the particular site conditions and it takes some trial and error. Some considerations we are researching are wave action, wave height, how sheltered the platform is, the vegetation height if present, presence of shelter for chicks, as well as the types of predators or threats present at the site (mink, owl, fox, raccoon, osprey, etc.). Additionally, competition for limited space with other bird species like ring-billed gulls, double-crested cormorants, and white pelicans along with higher water levels have decreased common tern nesting success on natural islands in Mille Lacs Lake and Leech Lake in the past.

The changes to the existing platform that Mille Lacs Band natural resources staff plan to include are:

- removing the overhead lines (meant to deter gulls)
- dropping the height of the side walls to 2-2.5 feet
- ensuring a layer of small pebbles of at least 2-3 inches deep covers the platform
- ensuring the placement of common tern decoys on the platform
- adding a common tern audio lure from a weather-proof speaker as an additional attractant

Our partners plan to update the group on the nesting platform project over the course of the breeding season. If the platform proves successful in attracting common terns to nest, there may be more interest in recreating similar projects on other surrounding lakes with common tern activity.

Update as of June 30, 2022:

Project extended to June 30, 2023 by LCCMR 6/30/22 as a result of M.L. 2022, Chp.94, Sec. 2, Subd. 19, legislative extension criteria being met.

Sixth Update as of November 1, 2022:

After reviewing historical breeding data from the Minnesota Breeding Bird Atlas and discussing monitoring efforts with our partners, we decided to focus survey efforts on lakes that had a high probability of breeding but little information recorded on the status or population numbers. We took into account which lakes in Minnesota had common tern pair sightings or evidence of breeding in the last 10-15 years. We found brief mentions of incidental findings of breeding common terns at Pelican Lake in Crow Wing County (2010) and Baby Lake in Cass County (2016). Audubon Minnesota decided to conduct initial monitoring on both lakes the end of June and early July.

Amazingly, we were able to document over 60 adult Common Tern resting and nesting on the [redacted] in Pelican Lake. [redacted] and has a significant ring-billed gull breeding population on the [redacted]. There were common tern nests with eggs present on the [redacted] which we observed during a flush survey to accurate census the breeding population.

While walking in the water [redacted] the nests were visible but the camouflage of the eggs among the rocks was impressive. After the flush survey, we observed the common tern colony return and return to the nests once we were a safe distance away. We propose this be an additional benchmark site for continued monitoring and possible future enhancement work. Because [redacted] is privately owned, working with the landowner would be critical to future nesting success in this location. The water levels for Pelican Lake were very high when we surveyed and the nests were in a precarious position with only feet of dry land on either side of the nests. We noted five additional common tern on or near [redacted] on Pelican Lake where they would alight on small willow shrubs on the [redacted]. In low water years, [redacted] could serve as additional nesting habitat but it was unclear if nesting attempts had occurred earlier in June and failed. Further surveys at this site would help us track consistency of breeding of this population. See images in Addendum B.

Water levels in Baby Lake in Cass County were high as well in 2022 and there were no sign of common tern at the most likely nesting spots on the lake's islands, rocky spits, or shorelines. An additional survey visit in 2023 could confirm the absence of common tern breeding on Baby Lake. See images in Addendum B.

Seventh Update as of May 1, 2023:
Audubon will complete a second survey of the Common Tern breeding location on Pelican Lake in Crow Wing County to finalize the site as a new benchmark site for Minnesota during the spring of 2023. Information on this breeding colony has been shared with Minnesota MN DNR Biological Survey and Ecological and Water Resources staff as they are a state-threatened species in Minnesota. Location information from Black Tern, Yellow Rail, and Common Tern surveys gathered as a result from this grant will be entered into the Natural Heritage Information System (NHIS) for Minnesota which is managed by the MN DNR and "provides information on Minnesota's rare plants, animals, native plant communities, and other rare features.
The NHIS is continually updated as new information becomes available, and is the most complete source of data on Minnesota's rare or otherwise significant species, native plant communities, and other natural features. Its purpose is to foster better understanding and conservation of these features." according to the Minnesota DNR. More information can be found at www.dnr.state.mn.us/nhnrp/nhis.html.

Final Report as of June 30, 2023 (to be submitted by August 15, 2023):

Audubon's relationship with partners was crucial to the success of the benchmark site selection for all three focal species. The project team worked to cross-reference Important Bird Area (IBA) and Breeding Bird Atlas (MNBBA) data to identify benchmark sites. Audubon staff worked closely with staff from the Natural Resources Research Institute at the University of Minnesota, Duluth (NRRI), who maintain the MNBBA data. With the Covid Pandemic affecting the first and then later, the second, seasons of field work, Audubon shifted away from volunteers helping with the marshbird survey site selection and surveys and instead we focused our efforts on the three focal species, Black Tern, Yellow Rail, and Common Tern. Despite the setbacks, Audubon and NRRI planned and conducted summer surveys at Black Tern colonies identified in the MNBBA, but with some gaps in full count and habitat data. The surveys aligned with survey protocols from other Great Lakes' States in order to support regional population estimate and trend analyses.

Audubon used remote sensing information, including aerial imagery, LiDAR, and vegetation classification, to key in on the IBAs with suitable habitat for focal species and fine tune survey locations for in-person site visits. Site suitability was assessed on site prior to survey efforts to ensure that habitat conditions met the requirements for each species. Species detection and data will be available to partnering organizations to improve survey techniques and further improve a data-driven approach to remote site selection. This data will also improve collective knowledge on current species distributions and how changing climate conditions may impact species future habitat selection.

ACTIVITY 2 Title: *Data Collection*

Description: *Conduct two seasons of data collection at benchmark (staff) and marshbird survey (volunteers) sites. Field staff will use point count and secretive marshbird survey protocols. A non-invasive, small, video capable drone will be used to gain visual access to inaccessible marsh habitats. Report on findings and develop management recommendations for ongoing restoration and enhancement work.*

ACTIVITY 2 ENRTF BUDGET: $109,000
AMOUNT SPENT: $106,721
BALANCE: $2,279

Outcome	Completion Date
1. Coordinate volunteers in continued marshbird survey effort statewide	*2020 -2021*
2. Hire field staff to collect two field seasons of benchmark species and habitat data	*2020-2021*
3. Field staff will use non-invasive, small, video capable drone to gain visual access to inaccessible marsh habitats.	*2020-2021*
3. Analyze and report on benchmark survey efforts, work to integrate recommendations into existing habitat management for these focal species	*2021*

First Update as of May 1, 2020
Field work with volunteers is not possible with COVID-19 and therefore we are focusing this effort on 2021. Prior to the outbreak project team members spent time conducting initial site visits of the potential benchmark sites.

Second Update as of November 1, 2020
Due to restrictions associated with Covid-19, no volunteers were recruited for this project in 2020. Surveys were conducted by NRRI. 10-min point-counts were used to document all observations of Black Terns present. Observations of Common Terns were also noted and vegetation surveys were conducted at each point.
A report from NRRI is currently in production. With a more complete survey effort in 2021 we are on track to incorporate long-term monitoring recommendations into existing habitat management plans for each species by the end of 2021.

Third Update as of May 1, 2021
Due to continued restrictions and safety concerns associated with Covid-19, no volunteers were recruited for this project in 2021. Instead, Audubon will hire an experienced marshbird surveyor to conduct night surveys for yellow rails in prioritized locations within the Important Bird Areas. Pending legislative approval of a one-year extension due to Covid-19, common tern benchmark surveys could occur this year or next field season with the help of partners.

Fourth Update as of November 1, 2021
Audubon set up and surveyed yellow rail benchmark routes over the course of the 2021 breeding season (specifics regarding survey locations and yellow rail detected in the Important Bird Areas in 2021 can be found on the attached addendum E). Analysis of species occupancy and the corresponding habitat data is ongoing. These results will be shared with state and federal partners to develop proper management recommendations for each survey location.

Fifth Update as of May 1, 2022
Audubon is working on entering yellow rail data from the 2021 field season into the Minnesota Natural Heritage Information System (NHIS) Database. These new yellow rail detections will be available to all agencies and non-profits that have current NHIS licenses, upon the next NHIS update.

Knowing where yellow rail are actively breeding will help inform where habitat management for yellow rail can be enhanced through vegetation management and water level management where possible. Audubon will be following up with area managers where yellow rail were detected and discussing management options.

Update as of June 30, 2022:

Project extended to June 30, 2023 by LCCMR 6/30/22 as a result of M.L. 2022, Chp.94, Sec. 2, Subd. 19, legislative extension criteria being met.

Sixth Update as of November 1, 2022:
Audubon Minnesota is planning to host a common tern Partner Meeting this fall, where partners can share updates about breeding successes or challenges from the 2022 breeding season. The discussion will center on the four main benchmark sites and any new sites, like Pelican Lake (Crow Wing County). We also hope to identify and discuss what the needs are at each benchmark site and how habitat protection or habitat enhancement could potentially improve breeding success in some cases.

One concern the common tern partners discussed in July was the 2022 avian influenza outbreak. It was estimated by Leech Lake Band of Ojibwe Natural Resources Management Wildlife staff that the mortality from avian influenza was at least 100-150 Caspian Tern, 100-150 gulls, 50 American White Pelican, 20-30 Double-crested Cormorant, and several Common Tern on Leech Lake. Luckily, there was no documented Common Tern mortality for the Lake Superior populations or the colonies on Lake of the Woods. The Minnesota DNR Ecological and Waters Resource Division staff did note that six deceased pelicans were found on one of the islands in Lake of the Woods and that nesting of all species seemed to be down including common tern.
High water may have played a role in common tern numbers being down but would not account for the other species population declines there as they typically nest on higher ground.

Audubon plans to host another Yellow Rail Working Group meeting with partners in late fall or early winter to discuss how yellow rail surveys may be conducted on a more regular basis at benchmark sites.
Additional discussions will take place with key partners on how the Statewide Marshbird Survey could be organized and surveyed by Audubon and partners or volunteers on a semi-regular basis.

Seventh Update as of May 1, 2023:
Audubon will be concluding the benchmark monitoring at the new Common Tern breeding location on Pelican Lake in Crow Wing County this June, 2023. Work will be ongoing to integrate new benchmark survey recommendations for all three species into existing habitat management for these focal species in Minnesota for the final report.

Final Report as of June 30, 2023 (to be submitted before August 15, 2023):

We had planned for the recruitment of volunteers for marshbird surveys, however, we faced a number of setbacks that prevented this effort. First, the required survey protocol for secretive marshbirds is unlike other citizen science projects due to demanding site conditions (dense vegetation and low light settings) that hinder movement and proved to be troublesome for even experienced surveyors. Furthermore, this recruitment effort was affected by the COVID-19 pandemic, which limited travel and prohibited group activities such as in-person training sessions. As a result, the combination of difficult survey conditions and the unprecedented situation of the pandemic, created barriers that could not be overcome during the timeline of this grant. We resorted to hiring professional surveyors and utilizing Audubon staff to conduct solo surveys in order to safely survey the bird populations and meet the planned deliverables.

Audubon staff used remotely sensed information to select portions of Important Bird Areas with suitable habitat for the focal species to filter survey locations for in-person site visits. In our original proposal, we had planned to

use an unmanned aerial system (UAS) to aid in site selection but decided against this method as professional surveyors were hired for the majority of the survey effort. During the planning phase for this project, we conducted extensive research on the practicality of utilizing a UAS for site selection and identified some limitations. Sensors on board UAS platforms excel at overhead analysis, however important site conditions such as horizontal vegetation structure and community composition are difficult to ascertain. These conditions can be easily evaluated by trained and experienced surveyors which is the method we ultimately decided to use given the setbacks stated above.

Survey results for each species are as follows:

Black Tern Findings

Black Terns (*Chlidonias niger*) nest in wetlands and marsh habitats in the upper Midwest and great plains. Black Tern populations are experiencing statistically significant declines regionally, and in Minnesota and are listed as Species of Greatest Conservation Need (SGCN) by the Minnesota DNR. Audubon Minnesota contracted the Natural Resources Research Institute (NRRI) in Duluth, MN to identify benchmark survey locations and conduct breeding surveys of Black Terns in Important Bird Areas (IBAs) in Minnesota.

Potential survey sites were identified by creating a GIS layer of potential benchmark sites in IBAs where Black Tern were observed during the latest Minnesota Breeding Bird Atlas. This analysis produced 14 IBAs (Figure 1), within which 1-3 potential terrestrial survey locations were identified based on scouting by surveyors. Once the best survey location(s) was determined, the surveyor conducted a 10-min point-count from the shore or edge of the wetland to document all observations of Black Terns present.
Observations of Common Terns were also noted. Black Tern counts and vegetation surveys were conducted simultaneously at each point-count location between the dates of 11 – 24 June, 2020 (Table 1).

Surveys were conducted from sunrise to early afternoon (~15:00) during favorable weather conditions (i.e., only when there was no sustained rain or heavy fog and when the wind speed was < 18 mph (Beaufort scale wind of 4 or less)). All shoreline counts were conducted by a single observer. Upon arrival, the wetland was scanned from various locations along the shoreline using binoculars and a spotting scope. When terns were detected, the shoreline count began. For the purpose of these counts, a colony could consist of multiple sub-colonies 100-300 m apart. If groups of terns were > 800 m away, they were treated as a separate colony. If no terns were observed during scouting or if accessibility to a given IBA was difficult or not possible, that was noted.

Vegetation Surveys

At each specified tern monitoring point-count location, observers also conducted a vegetation survey, which was a modified version of the National Protocol Framework for the Inventory and Monitoring of Waterbirds and their Habitats, which was provided by Audubon Minnesota. Surveys consisted of a full-circle unlimited-distance visual assessment of habitat (dominant vegetation cover) and landscape features (e.g. interspersion) with the estimated location of the colony being the centroid. Observers should be able to visually assess >70% of the area surrounding the point-count. If <70% could be visually assessed from that location, additional vantage points were added, if possible.

Results and Discussion

A total of 20 survey locations were identified within 9 IBAs across the state and one survey location was identified on Higgins Lake, just outside of the Carlos Avery IBA. Trained surveyors conducted 10-minute unlimited radius point counts at each location in the summer of 2020. Black Terns were either not observed, or sites were inaccessible, at five of the IBAs visited (IBA ID: 7, 9, 23, 25, and 33).

Sites were surveyed once between the dates of June 11 – 24, 2020, although several IBAs were visited on multiple occasions to try to find either additional or new survey locations. A total of 299 adult Black Terns were observed during the course of these surveys. Of the 20 survey locations visited, NRRI recommended 15 survey points in 9 IBAs become part of the long-term monitoring plan for Black Terns in MN. Because surveys were restricted to land, estimating the location of nests was not feasible because most colonies were located too far away to visibly observe nests and/or vegetation height obscured views. Black Tern observations and vegetation surveys were recorded in the field using an iPad. Therefore, all data were entered digitally using an online data entry system.

Important Bird Area (IBA) Specific Survey Results

Agassiz National Wildlife Refuge (1)

A total of 106 Black Terns were observed from four survey points, which were established within the Agassiz NWR (Fig. 2). Survey point AG.1 was conducted at Parker Pool and has a nice observation deck which made for easy access to this location. This was the only survey location from which an official survey was conducted and where 37 Black Terns were observed. Survey point AG.2 was located at Farmes Pool where the largest number of black terns were observed in any of the IBAs surveyed (n = 55). However, this survey location was situated slightly outside of the Agassiz NWR IBA and therefore a formal survey was not conducted. If this is not an issue, we suggest this survey location be included in a long-term monitoring plan. Survey points AG.3 and AG.4 were located at Agassiz Pool, both of which were highly accessible and a smaller number of terns were observed, however, no formal surveys were conducted at either of these locations. Sites AG.3 and AG.4 could serve as backup survey points or additional survey points if desired.
Recommended: For the Agassiz NWR IBA, we recommend including survey points AG.1 and AG.2 (Parker Pool and Farmes Pool) in the long-term monitoring plan. These sites had the largest numbers of Black Terns observed and were easily accessible.

Camp Ripley-Pillsbury-Lake Alexander IBA (7)

We were unable to visit or conduct any formal surveys at the Camp Ripley-Pillsbury-Lake Alexander IBA due to an insufficient amount of time available to request access to the military reservation and travel restrictions associated with Covid-19. All roads were gated. Several lakes and ponds that appeared to have suitable habitat and were located in the IBA, but not part of the military lands, were visited, however, terns were not observed. Based on these restrictions, we cannot make a formal recommendation for or against including this IBA in long-term monitoring plan for Black Terns. We recommend this IBA be visited during the 2021 breeding season to determine whether it is appropriate to include in future monitoring efforts.

Carlos Avery (8) and Higgins Lake IBAs

A total of 17 Black Terns were observed at two survey points established within the Carlos Avery IBA and one survey point located near Higgins Lake, just outside the Carlos Avery IBA (Fig. 3). The lakes within the Carlos Avery IBA are heavily populated with residential homes and there also seems to be a lack of appropriate breeding habitat. However, the central portion of the IBA is the most promising location because it is part of a Wildlife Management Area (WMA) and has suitable marsh vegetation. Survey points CL.1 and CL.2 were both located near pools in the WMA, where surveys were conducted on the sides of dirt roads. Black Tern observations in this IBA were low, but could vary annually based on habitat availability. The survey point on Higgins Lake (HL.1) is very near Carlos Avery (Fig. 3).

This site is not very accessible by land, but it does seem promising, perhaps if access by boat was an option. ***Recommended:*** For the Carlos Avery IBA, although the number of Black Terns observed in 2020 was low, there is appropriate habitat available which could accommodate larger numbers of nesting terns. Therefore, we recommend survey points CA.1, CA.2, and HL.1 be included for long-term monitoring.

Chippewa Plains IBA (9)

A total of five lakes (Leech Lake, Walker Bay, White Oak Lake, Big Rice Lake, and Rice Lake) and a number of small ponds located in the Chippewa Plains IBA were scouted during the 2020 breeding season. However, there were no Black Terns observed at any of these locations and much of the shoreline was difficult to access due to private property. Aside from accessibility issues, there didn't appear to be suitable nesting habitat for Black Terns. Some of the smaller lakes that were scouted appeared to have suitable habitat but no terns were observed. Common Terns were observed on Leech Lake, where there is a known breeding colony, but they were very distant and difficult to count. Because there were no Black Tern observations within the Chippewa Plains IBA, we did not conduct any tern or vegetation surveys and cannot make a recommendation for or against including this IBA in Audubon's long-term monitoring plan. We recommend scouting locations within this IBA or attempting to access locations with appropriate habitat by boat.

Kittson-Roseau Aspen Parkland IBA (20)

A total of 27 Black Terns were observed from one survey point established within the Kittson-Roseau Aspen Parkland IBA (Fig. 4). This survey point (KR.1) was located at Twin Lakes, which has a nice observation deck, but requires a spotting scope for easy observation of terns. ***Recommended:*** We recommend KR.1 be included in the long-term monitoring plan due to the number of birds observed, ease of access, and proximity to IBAs 1 & 50.

Lac Qui Parle-Big Stone IBA (21)

A total of five Black Terns were observed at one survey location (LQP.1) within the Lac Qui Parle-Big Stone IBA (Fig. 5). Two survey locations were identified (LQP.1 and LQP.2). A small colony of five birds was located in a small wetland in a pasture between agricultural fields. Although expansive, the wetlands within this IBA did not appear to have a lot of appropriate marsh habitat for breeding Black Terns. There were no Black Terns observed from survey point LQP.2 and therefore a formal survey was not conducted. However, the habitat was appropriate and it could be considered as a backup or additional survey location. ***Recommended:*** We recommend LQP.1 be included in the long-term monitoring plan. Although a small number of terns were observed, it appeared to be one of the only accessible locations within this IBA with suitable nesting habitat for Black Terns.

Lake Maria State Park- Henry Larson County Forest IBA (23)

Sugar and Ida Lakes, located within the Lake Maria State Park- Henry Larson County Forest IBA, were scouted during the 2020 breeding season. Most of the lakes in this IBA were on private land and there appeared to be a lot of human activity and not a lot of appropriate nesting habitat for Black Terns. There were no Black Terns observed during the scouting of this IBA and therefore no tern or vegetation monitoring points established. Therefore, we cannot make a recommendation for a location to include in a long-term monitoring plan for this IBA.

Lake Osakis IBA (25)

Lake Osakis, located within the Lake Osakis IBA was scouted during the 2020 breeding season. The majority of the shoreline along this lake was residential so access was limited. From the public access points, there were no Black Terns observed. Although terns may have been present in other locations within the lake, it was difficult to assess from the public access points. It may be worth spending some additional time looking for access points on this lake or using a boat to scout the area. There were no Black Terns observed during the scouting of this IBA and therefore no tern or vegetation monitoring points established. Therefore, we cannot make a recommendation for a location to include in a long-term monitoring plan for this IBA.

Mille Lacs IBA (28)

A total of 23 Black Terns were observed at one survey location (ML.1) on Rice Lake in the Mille Lacs IBA (Fig. 6). The survey point was established on Hesitation WMA, a small WMA that provided public access to Rice Lake. It has a nice floating dock which allows for easy access and good visibility. There were also Common Terns observed on Mille Lacs Lake, where there is a known established colony. ***Recommended:*** We recommend survey point ML.1 be included in the long-term monitoring plan. There is good habitat available for nesting Black Terns and the survey location is relatively close to an established Audubon marshbird survey monitoring route (Fig. 6).

North Metro Mississippi River IBA (33)

Rice Lake, Mud Lake, and Goose Lake located in the Elm Creek Park Reserve within the North Metro Mississippi River IBA were scouted during the 2020 breeding season. Access points to this IBA were limited due to being heavily populated and because it lies within a state park. The park had a lot of human activity and did not appear to have appropriate nesting habitat for Black Terns. There were no Black Terns observed during the scouting of this IBA and therefore no tern or vegetation monitoring points established. Therefore, we cannot make a recommendation for a location to include in a long-term monitoring plan for this IBA.

Sherburne National Wildlife Refuge IBA (41)

A total of 24 Black Terns were observed from two survey locations (SH.1 and SH.2) on Pool 14 and Stickney Pool located around Prairie's Edge Wildlife Drive in the Sherburne NWR (Fig. 7). Sub colonies of Black Terns were observed within both of these survey locations. ***Recommended:*** We recommend including SH.1 and SH.2 in the long-term monitoring plan. Both of these sites have suitable habitat for nesting terns, observation decks, and safe places to stop and observe birds.

Swan Lake IBA (48)

A total of 20 Black Terns were observed at survey point SL.1 on Swan Lake in the Swan Lake IBA (Fig. 8). Survey locations were also established at two additional points on Middle Lake (SL.2 and SL.3), although no terns were observed and therefore formal surveys were not conducted. Access to Swan Lake was difficult, so we recommend using a public access point to get a boat on the water to do future surveys. There is likely a larger number of Black Terns present in the middle of the lake, which was not possible to see from the land-based survey locations. Also, the survey points established on Middle Lake had very tall cattail present, making visibility difficult. Those sites may also not have appropriate nesting habitat, but do have public access, and therefore could be used to better assess conditions using a boat.

Recommended: We recommend including SL.1 in the long-term monitoring plan as it offers the best vantage point for viewing birds within this IBA. However, we would also recommend accessing this location using a boat to potentially identify a more suitable or additional survey location(s) on the water.

Thief Lake IBA (50)

A total of 73 Black Terns were observed at two survey points (TL.1 and TL.2) in the Thief Lake IBA (Fig. 9). An additional survey location was also established in this IBA (TL.3) although there were only four birds observed here, visibility low, and most terns observed were likely birds previously counted at the other survey points. Therefore, no formal count was conducted at this survey location. This point could be used as a backup location with public access. Survey point TL.1 was conducted on an observation mound in the WMA. Birds were observed everywhere on the lake and a scope is necessary for observing birds at this site. Survey point TL.2 offers an additional vantage point, although visibility was not as good as TL.1 and some of the birds were likely counted at point TL.1. A vegetation survey was only conducted at TL.1 because TL.2 was considered a sub colony using the same habitat as that recorded in TL.1. ***Recommended:*** We recommend including TL.1 and TL.2 in the long-term monitoring plan as these sites offer the best vantage points and this IBA had the highest number of Black Tern observations after Agassiz NWR.

Whitewater Valleys IBA (57)

A total of four Black Terns were observed from one survey location (WWV.1) in the Whitewater Valleys IBA (Fig. 10). This survey point was located in a small wetland complex in a cow pasture. The amount of appropriate nesting habitat for Black Terns appears to be limited in this IBA, with the exception of the northern part of the Mississippi. We had hoped to scout Dorer Pools as a potential survey location but the road was closed. ***Recommended:*** We recommend including WWV.1 in the long-term monitoring plan as this is one of the only places in the IBA that appeared to have appropriate nesting habitat for Black Terns. However, we also recommend that Dorer Pools be scouted when the road becomes accessible.

Overall Black Tern Summary

The IBAs that were scouted in 2020 represented locations within IBAs where Black Tern had been observed during the 2009-2013 MNBBA project. It is possible that Black Terns are nesting in IBAs that were scouted but where terns were not detected, as well as in other IBAs in Minnesota that were not included in this 2020 scouting effort. The IBAs that were included were chosen based on the best available breeding season data within the state. Because sites were only visited once during the 2020 breeding season and because this effort was primarily aimed at identifying potential long-term monitoring locations, there is not sufficient information to provide a meaningful summary of population or vegetation trends or how they relate to bird abundance.

With a goal of establishing long-term monitoring locations within MN IBAs to guide restoration and enhance activities within designated IBAs for Black Terns, Common Terns, and Yellow Rails, it will be important to include monitoring locations where habitat appears appropriate but where terns were not observed, terns were observed in low numbers and some adequate habitat exists, and where both bird abundance and available habitat are extensive. This will help identify key habitat features associated with occupancy and to identify IBAs where restoration activities could be implemented to enhance nesting habitat. Over time, these monitoring sites can be used to determine colony persistence and document changes in colony size, which can assist in adapting best management practices for these species in Minnesota IBAs over time.

During the scouting and survey efforts, the highest number of Black Tern observations within the nine IBAs surveyed were located in three IBAs in the northwestern portion of the state (Thief Lake, Agassiz NWR, and the Kittson-Roseau Aspen Parkland IBAs). Throughout many of the IBAs visited, shoreline access was often the limiting factor and/or appropriate nesting habitat was lacking or not visible from the land-based survey locations. It may be useful to scout some of these IBAs by boat to determine Black Terns or Common Terns occupancy and potentially identify landowners who would be willing to allow access to their property if colonies are discovered. Establishing these long-term monitoring locations is a vital step in this very important effort by Audubon and other partners to provide data-driven restoration objectives aimed at maintaining and increasing populations of these vulnerable species in the state.

Yellow Rail Findings

Yellow Rail (*Coturnicops noveboracensis)* are secretive, and like many other marsh-dwelling birds, they are difficult to survey, in large part because of their inconspicuous nature, and also due to the difficulty of accessing their preferred sedge meadow habitats. Current avian surveys such as the Breeding Bird Survey and spring Waterfowl Surveys do not effectively monitor Yellow Rails. Ranked a species of High Concern by the North American Waterbird Conservation Plan and assigned a Continental Concern Score of 15/20 by Partners in Flight, Yellow Rail are officially classified as a Special Concern Species in Minnesota and designated a Species in Greatest Conservation Need (SGCN) by the Minnesota Department of Natural Resources.
Audubon's efforts to document Yellow Rail and establish benchmark survey sites is an important step for long-term Yellow Rail monitoring and conservation in the state.

In 2021, Audubon focused remote sensing efforts on Yellow Rail benchmark site selection within potential Important Bird Areas with significant desired habitat or historical populations. Yellow Rail are a secretive marshbird species that were not well detected during the Minnesota Statewide Marshbird Survey that Audubon conducted in 2016 and 2017. Audubon undertook Yellow Rail benchmark site selection and potential survey routes in 2020 and 2021 with the Yellow Rail surveys conducted in the summer of 2021. Audubon decided to alter C. Conway's 2011 Standardized North American Marsh Bird Monitoring Protocol, which is a call broadcast survey protocol, specifically to increase detection of Yellow Rail and to account for variations in bird behavior and the potential influence of site conditions.
One of the big changes made to the protocol was running the surveys in the evening, starting surveys well after sunset which is a divergence from the Conway marshbird protocol. Often, Yellow Rail wouldn't be heard calling until around 10 pm and would be more active even later into the evening. Audubon contracted with an experienced ornithologist and marshbird surveyor, Tom Savre, who undertook the fun, but challenging work of visiting the chosen benchmark IBAs, ground-truthing and scouting habitat, setting up survey points, and running predominantly night call playback surveys for Yellow Rail. This portion of the project required a significant amount of coordination with partners on the best habitat in 2021 to be surveyed. Audubon staff coordinated with land managers and Tom to get the best real-time information about the best habitat and conditions for Yellow Rail for the months that surveys were conducted. Audubon coordinated with state, federal, and nonprofit partners to complete and submit all the correct permits for the Yellow Rail surveys in IBAs that fell within public managed lands.

Audubon also coordinated several Yellow Rail and marshbird partner meetings which were attended by U.S. Fish and Wildlife Migratory Birds and Joint Ventures staff, MN DNR Ecological and Water Resources Division staff, state marshbird surveyors, Voyageurs National Park staff, and Chippewa National Forest staff. These meetings helped us fine-tune our surveys for this work and connected marshbird monitoring staff from all over the state that are involved with the conservation of Yellow Rails or their habitat, some for the first time. Recent marshbird survey results were shared among the group and helpful discourse on marshbird and Yellow Rail natural history, past survey experiences, and preferred habitat specifics ensued.

These discussions directly influenced the rejuvenation of the Midwest Marsh Bird Working Group which held a coordination meeting for the first time in several years this spring in Lansing Michigan.

The Yellow Rail surveys conducted in the summer of 2021 were overwhelmingly successful with an estimated 78 individual Yellow Rails documented. The survey effort turned into the most comprehensive Yellow Rail survey conducted in over a decade in the state of Minnesota. These data have been added to legacy Yellow Rail detections in Minnesota's Natural Heritage Information System (NHIS) with the Minnesota DNR which will increase the overall knowledge of Yellow Rail habitat preferences and distribution in Minnesota. See Table 2 for the full list of IBAs surveyed and Yellow Rail detections.

Common Tern Findings

Common Tern (*Sterna hirundo*) are colonial waterbirds that have been declining for decades in Minnesota and in other portions of the Great Lake States due to differing factors depending on location. According to the "*Status Assessment and Conservation Recommendations for the Common Tern (Sterna hirundo) in the Great Lakes" by Cuthbert et al.*, the major factors impacting Common Tern populations are common and widespread and include habitat loss and degradation, predators, human disturbances, and pesticide contaminants, In Minnesota, their greatest challenges stem from loss of habitat due to shoreline development and water level changes. Large lake levels can fluctuate from year to year making what was a suitable nesting location one year unusable the next if it is under water.
Additionally, there are serious issues with intraspecific competition between Common Tern and Ring-billed Gull, and in some locations, Double-crested Cormorant and White Pelican. Ring-billed Gulls have become especially problematic as their population in the Great Lake States region has increases substantially and they arrive on breeding grounds weeks before Common Terns. Common Tern prefers to nest on peninsulas or islands in large bodies of water as mainland sites are more at risk from terrestrial and aerial predators and human-based disturbances. The preferred nesting substrate can vary from boulders, to round stones on a natural shoreline, to sand and gravel beaches, and even dredge spoil piles as in the Interstate Island near Duluth. Nests consist of a small scrape or depression in the rocks or substrate and vegetation preferences can vary slightly from breeding colony to colony but in general they prefer sparse vegetation without any mid or overstory coverage. During the Minnesota Breeding Bird Atlas surveys, they were considered rare and are considered to be of Moderate Conservation Concern with Continental Concern Score of 11/20 by Partners in Flight. They are designated a species of Low Concern by the North American Waterbird Conservation Plan. However, in Minnesota, the Common Tern is officially classified as a Threatened Species and is designated a Species of Greatest Conservation Need (SGCN) by the Minnesota Department of Natural Resources. Audubon Minnesota has identified it as a Target Conservation Species.

Common Tern had the best existing benchmark survey locations already established of the three focal species. There are four main breeding colonies at present: Lake of the Woods, Lake Mille Lacs (Spirit and Hennepin Islands), Leech Lake, and the Duluth-Superior Harbor and St. Louis River Estuary. Audubon reached out to all partners who had or were already involved in monitoring Common Tern in the state in addition to partners in other great lake states (WI, IL, OH, NY) and Canada. We held numerous partner meetings to gather information and input on what monitoring needs existed at the four major breeding colonies. We determined that the four major breeding locations were being monitored by various partners depending on the location, so Audubon surveyed historic breeding sites and hosted partner meetings to bring all of the Common Tern partners together for information sharing and conservation planning.

In 2022, Audubon began surveys for Common Tern presence or absence and Common Tern nesting colonies. Surveys were conducted on all mainland shoreline and island shoreline on Pelican Lake in Crow Wing County and Baby Lake in Cass County. Both of these lakes had historical detections of Common Tern pairs and warranted confirmation of continued Common Tern occupancy.

In 2023, Audubon conducted follow up surveys for Common Tern presence or absence and Common Tern nesting colonies on four selected lakes in central Minnesota as follows: one lake with a known nesting colony of Common Tern as of 2022, Pelican Lake in Crow Wing County, Minnesota; one lake which has had Common Tern nesting in the past but has not been monitored in recent years, Baby Lake in Cass County, Minnesota; and two new lakes in the vicinity of Baby Lake; Webb and Ten Mile Lake. Webb Lake and Ten Mile Lake, both in Cass County, have similar shoreline and island characteristics to Baby Lake, and Pelican Lake focusing on features that could provide suitable Common Tern nesting habitat given the right conditions.

Pelican Lake, [redacted], Crow Wing County

All mainland shoreline and islands with Common Tern desired habitat conditions were surveyed by boat in June of 2022. [redacted], is also the [redacted] on [redacted] Audubon was thrilled when we got close to the [redacted] and immediately saw Common Tern fishing and flying with the addition of a few least tern and a Caspian Tern. Approximately 60 individuals or 30 pair of Common Tern were found to be nesting on [redacted], the first-time nesting had been documented here since 2010.

The Ring-billed gull is the dominant species nesting on the [redacted] Double-Crested Cormorants nesting there. Common Terns likely historically nested [redacted] but due to competition for available sites with gulls, are now relegated to the [redacted] constantly at risk from wave action due to the recent water levels and the windy conditions on Pelican Lake which can easily produce waves of several feet in height. The Common Tern nesting here seem to have a plentiful source of small fish [redacted] providing quick and close food for chicks allowing them to stay close to nests.

[redacted] was also surveyed by boat in June of 2023. Sadly, the survey results of this year's survey paint a very difficult year for the Common Tern on [redacted]. Upon approaching [redacted], we observed Common Tern flying and fishing but there were about half the number of terns in the air as last year, about 35 birds in total. This year there were 20 Ring-billed Gulls, 10 Caspian Tern, and one Least Tern also on the rocky point. There was sign of much more human and domesticated animal disturbance on the island in general including a metal statue, an old armchair, fire rings, and domesticated dog scat all along the point where Common Tern nest. None of this was present in 2022. There were roughly nine adult Common Tern carcasses littering the ground around the picnic table in addition to at least that many Ring-billed gull carcasses. It was unclear what caused the Common Tern and Ring-billed Gull deaths but possibilities include human caused, a wild predator, domesticated dog/s, or Avian Influenza and then scavengers moving the carcasses. There were only two active nests with three eggs found during the flush count survey in 2023. It is unclear if there were more nests previously that failed when adult birds died or because of disturbance events. No nest failure remains were noticed at the time of survey but there were adult bird bones along the shoreline. [redacted]. Audubon reached out to a manager to discuss signage options and hopes to work with the landholder to erect signage for education of the public to deter human and dog activity on both of [redacted] nesting points. These efforts may help to protect these declining state-threatened species.

Baby Lake, Cass County, Portion of Lake in Chippewa Plains IBA

All mainland shoreline and islands with Common Tern preferred habitat conditions were surveyed by boat. Water levels were quite high in both the summers of 2022 and 2023 which affects how much of rocky islands and peninsulas are exposed as potential nesting habitat for Common Tern. No Common Tern were observed during surveys in June of 2022 or June of 2023.

Ten Mile Lake, Cass County, Portion of Lake in Chippewa Plains IBA

All mainland shoreline and islands with Common Tern preferred habitat conditions were surveyed by boat in 2023. While there are potential sites for Common Tern nesting during lower water years, there were no Common Tern observed on Ten Mile Lake in June of 2023.

Webb Lake, Cass County, Near Chippewa Plains IBA

Similarly, to Baby Lake and Ten Mile Lake all mainland shoreline and islands with Common Tern preferred habitat conditions were surveyed by boat in 2023. While there are potential sites for Common Tern nesting during lower water years, there were no Common Tern observed on Webb Lake in June of 2023.

Lake of the Woods- State IBA

Lake of the Woods IBA is a State recognized IBA. As of the 1930s, Common Tern nested on Big Oak and Fourblock Islands within Lake of the Woods in addition to Pine and Curry's Island, a sand spit at the time that are now small islands during low water years. Currently, the MN DNR Ecological and Water Resources Nongame Wildlife Department monitors the current Common Tern Breeding Colonies [redacted] with the help of local contractors and boat operators as needed. Common Tern and Ring-billed Gulls are nesting alongside each other [redacted] and the Common Tern presence and nest success have varied depending on the year.

Lake Mille Lacs (Spirit and Hennepin Islands)- State IBA

Spirit and Hennepin Islands in Lake Mille Lacs comprise the smallest National Wildlife Refuge in the country, Mille Lacs National Wildlife Refuge. This National Wildlife Refuge was designated in 1915 showing how important 0.57 acres was to colonial water birds over 100 years ago. Hennepin Island also falls within the Mille Lacs Band of Ojibwe Reservation so the Tribe's Natural Resource Staff are a close partner of the U.S. Fish and Wildlife Service. On the ground monitoring of Common Tern at Lake Mille Lacs by the U.S. Fish and Wildlife has been hampered by dangerous conditions with shifting boulders on Hennepin Island. Common Tern have not had a known nesting attempt on Spirit Island since 1998. To have accurate Common Tern nesting counts, surveyors ideally need to be on the islands to differentiate the camouflaged tern eggs from rocks and other colonial bird eggs. Constant winter ice shift pushes and moves the island's large boulders making walking and climbing over the boulders treacherous. Currently, drones are not an option for U.S. Fish and Wildlife Service and National Wildlife Refuge lands due to the potential international security risk. The Refuge staff do monitor the islands from boats annually.

The Mille Lacs Band of Ojibwe Natural Resources staff have tried to entice Common Tern to nest on pontoon platforms on both Leech Lake and Lake Ogechie, a small, narrow and calm lake adjacent to Leech Lake.

The nesting platforms have several inches of gravel as nesting substrate and have warnings on them to detour human disturbance of the platforms. The Tribe has tried various modifications including netting and side walls to deter gulls from nesting on the platforms. Audubon organized two nesting platform discussions where nesting platform plans were shared and different designs and approaches used in Canada and other Great Lake States were discussed. Guest speaker Lee Harper of Riveredge Environmental Inc. in New York presented about aluminum box framed, raised nesting beds, with decking and gravel that were very successful for the St. Lawrence River Common Tern colony. Lee had also worked on artificial island creation for tern nesting and shared photos with the group. Additionally, Andrea Chreston, Project Manager of Toronto and Region Conservation (TRCA) at Tommy Thompson Park, presented on their artificial nesting platforms for Common Tern that were very successful. The floating platforms had angled metal sides and were positioned in small inland ponds within the park's peninsula which jutted out into Lake Ontario.
After hearing suggestions about Common Tern call lures successfully used on other platforms for Common Tern the Tribe decided to order a weatherproof speaker to play Common Tern recordings from their platform.

Chippewa Plains- Global IBA

Leech Lake is a recognized as a Global Important Bird Area and is critical habitat for a host of Species of Greatest Conservation Need (SGCN) bird species. Common Tern at Leech Lake are monitored annually by the Leech Lake Band of Ojibwa Natural Resources staff within the Fish, Wildlife and Plant Department. Islands historically used by Common Tern include Gull Island, Little Pelican Island, and Pelican Island.
Interspecific species competition with Ring-billed Gulls, lake water level changes, disturbance by humans, predators, have all been ongoing problems in addition to the recent threat that Avian Influenza poses for colonial nesting birds. The Leech Lake Ojibwa Natural Resources staff have worked hard to address challenges the terns have faced and have succeeded in maintaining a breeding population of 100–200 pairs since 2004 (Hamilton and Cuthbert 2016). Recently, some Common Terns and Ring-billed Gulls have been nesting on the largest island, Pelican Island.

Duluth-Superior Harbor- St. Louis River Estuary State IBA

The St. Louis River Estuary is recognized as a State Important Bird Area. This unique area witnesses much more human disturbance and impacts than some of the other benchmark survey locations. Because of the challenges Common Tern faced in this area, the Minnesota and Wisconsin Departments of Natural Resources acquired and undertook management of a dredge-spoil island created in the 1940s called Interstate Island. According to Minnesota's Breeding Bird Atlas the island is relatively inaccessible to the public and is intensively managed to reduce vegetation and Ring-billed Gull predation. According to NRRI, this site has consistently supported an average of approximately 190 breeding pairs since 1989 (Penning and Cuthbert 1993; A. Bracey and F. Strand, pers. Comm to MN Breeding Bird Atlas staff).

Overall Common Tern Summary

Throughout many of the IBAs and lakes visited, shoreline access and/or appropriate nesting habitat was lacking or not visible from the land-based survey locations. All of the four well-established Common Tern colonies in addition to the new colony located on Pelican Lake in Crow Wing County are only accessible by boat. It may be useful to scout additional IBAs or lakes with the right shoreline or islands by boat to determine Common Tern or Black Tern occupancy. If new colonies are discovered, outreach to shoreline landowners who would be willing to allow access to their property would be critical to ongoing monitoring success. Going forward, a potential tool for increasing or maintaining monitoring effort may be aerial imagery from drones, where sensible, as there could be less disturbance to nesting terns as compared to flush count surveys.

This work will help identify active colonies and key habitat features associated with occupancy and to identify Important Bird Areas (IBAs) where enhancement or restoration activities could be implemented to improve nesting habitat. Over time, these monitoring sites can be used to determine colony persistence and document changes in colony size and distribution, which can assist in adapting best management practices for these species in Minnesota IBAs over time.
Establishing these long-term monitoring locations is a vital step in this important effort by Audubon and all of the partners to provide data-driven restoration objectives aimed at maintaining and increasing populations of these vulnerable species in the Minnesota.

IV. DISSEMINATION: Over the course of the project, we will work closely with our partners in the Minnesota Department of Natural Resources, U.S. Fish and Wildlife Service, University of Minnesota- Duluth and others to keep them updated on project progress. Focal species will benefit from regular communication among working group partners (Joint Venture Great Lakes Waterbird group; Midwest Marsh Bird Working Group, Black Tern Initiative, and Common Tern Working Group). These partners will be instrumental in the development and execution of adaptive-management associated with monitoring. Audubon's communication team will work to place newsworthy stories on Audubon's websites, national magazine, and in the media. A dedicated webpage for the project will be created on mn.audubon.org. This page will depict the project overview and also updates and results.

The Minnesota Environment and Natural Resources Trust Fund (ENRTF) will be acknowledged through use of the trust fund logo or attribution language on project print and electronic media, publications, signage, and other communications per the ENRTF Acknowledgement Guidelines.

First Update as of May 1, 2020—waived by LCCMR

Second Update as of November 1, 2020—waived by LCCMR

Third Update as of May 1, 2021
In late winter, Audubon Minnesota reached out to Anna Sidie-Slettedahl regarding her past yellow rail detections. Anna graciously provided Audubon Minnesota with shapefiles of her former marshbird survey routes and those survey points that had yellow rail detections. This first-hand information and other detection sources such as the Breeding Bird Atlas data, Minnesota Ornithologists' Union postings, e-Bird, and Natural Heritage Information System data helped inform the route selection.
Audubon Minnesota set up a zoom meeting in early April 2021 to touch base and coordinate survey efforts with Steve Stucker, an Avian Ecologist with Minnesota DNR's Minnesota Biological Survey. Steve is a yellow rail expert and has very likely heard more yellow rails than anyone in the state. He provided valuable anecdotal knowledge regarding ideal water depth in sedge meadows and other site conditions and past MN DNR yellow rail survey effort history. Additional coordination with non-game wildlife research staff and endangered/threatened species research staff will occur. We have discussed the project with each DNR and U.S. Fish and Wildlife Service property manager while working with staff on Special Use Permits for the various property divisions. Some property managers have offered to meet with Audubon Minnesota staff and the yellow rail surveyor to provide site-specific particulars.
Many DNR staff shared their memorable experiences hearing or seeing yellow rails with us. Audubon will continue to network with partners about this project and will work to disseminate timely updates via our website and social media.

Fourth Update as of November 1, 2021
Audubon Minnesota worked closely with a number of organizations and agencies to identify suitable survey habitat on the properties that they manage, which enabled the success of the yellow rail surveys. This project is likely the most comprehensive yellow rail survey to be completed in a single season in the state of Minnesota. This data will be of great interest to the conservation community at large. Audubon is currently working through the field data that was collected over the past two breeding seasons.

Fifth Update as of May 1, 2022
Audubon Minnesota has been coordinating several working group meetings on colonial waterbirds, yellow rail survey efforts, as well as artificial nesting platform discussions for the common tern. Artificial nesting platforms for common terns have proven successful in other states and in a regional park in Toronto, Canada.

Audubon has hosted three working group meetings focused on common tern and two on yellow rail with many partners in the last four months. Participating partners included: the U.S. Fish and Wildlife Service (USFWS) Mille Lacs National Wildlife Refuge and Sherburne National Wildlife Refuge staff, Leech Lake Band of Ojibwe Natural Resource staff, Mille Lacs Band of Ojibwe Natural Resource staff, USFWS Joint Ventures and Migratory Bird staff members, a private consultant in New York State, Audubon Great Lakes ecological staff, project management staff at Tommy Thompson Park at Toronto and Region Conservation Authority (TRCA), and Minnesota DNR Ecological and Water Resources Division staff.
Audubon created a repository for relevant resources for common tern nesting platforms including PowerPoints, photos, and artificial nesting platform plans gathered from partners. We are actively working on a similar resource folder for yellow rail survey protocols, relevant journal articles, and data sharing. The partners in the yellow rail working group discussed several potential future funding opportunities and the coordinator of the Midwest Marsh Bird Working Group discussed an interest in meeting this year to coordinate marshbird work in the Great Lake states after hearing everyone discuss yellow rail surveys.

Update as of June 30, 2022:

Project extended to June 30, 2023 by LCCMR 6/30/22 as a result of M.L. 2022, Chp.94, Sec. 2, Subd. 19, legislative extension criteria being met.

Sixth Update as of November 1, 2022:
Audubon Minnesota is working on website content to summarize information about our efforts to develop the focal species benchmark survey locations and other relevant information we have gathered from this work. Once the colonial waterbird partners meet, we hope to share some news about the common tern-breeding season and the breeding colony on Pelican Lake via social media.

Seventh Update as of May 1, 2023:
Audubon is developing website content for this project and plans to have the websites operational by late spring or early summer of 2023. The National Audubon Society website template has been undergoing revisions delaying the production of new pages for state and regional offices.

Final Report as of June 30, 2023 (to be submitted on or before August 15, 2023):

Due to the sensitive nature of some of the species detections and known breeding locations, the distribution of exact survey locations must be thoughtfully approached. Exact survey and detection locations have been shared with LCCMR, the MN DNR NHIS, and site-specific partners. Due to their conservation status, we plan to widely distribute the significance of this work and the benefit to overall conservation of the three species. Furthermore, future collaboration with trusted partner organizations is planned to share detailed findings from the 2023 field season, to discuss future collaborations, and next steps.

This collaboration will foster conservation efforts that can be driven by data and can provide insight on the overall distribution within the state and future population trends in light of a changing climate and continued land use changes. Audubon has been in communication with all involved partners with regular check-ins and focal species-specific meetings, to increase communication and collaboration as we develop a more comprehensive marsh and waterbird monitoring plan. We feel that these efforts strike a balance of informing others on the broader trends of these three species while protecting the important breeding habitats of these Species of Greatest Conservation Need (SGCN). Audubon has a dedicated webpage for the project which can be found at https://mn.audubon.org/birds/priority-birds/conservation-focal-species and plans to make additional updates and improvements to the page in the late summer and fall of 2023.

Regular communication among focal species working group partners is critical to any kind of large-scale species conservation effort (Leech Lake Band of Ojibwe, Mille Lacs Band of Ojibwe natural resources staff, NRRI, Joint Venture Great Lakes Waterbird members, Black Tern Initiative, Common Tern Working Group, U.S. Fish and Wildlife Migratory Bird and Refuge staff, MN DNR staff from multiple divisions, Audubon Great Lakes). These partners will be instrumental in the development and execution of adaptive-management plans associated with monitoring outcomes.

Audubon will continue to work with partnering organizations and land managers in future years after the conclusion of this grant with the aim of continuing to improve habitat and outcomes for these focal species. More education on these important Minnesota birds and their role in ecosystems would raise awareness and inspire action locally to improve habitat on private lands and mitigate harm to these declining bird species.

V. ADDITIONAL BUDGET INFORMATION:

A. Personnel and Capital Expenditures

Explanation of Capital Expenditures Greater Than $5,000: N/A

Explanation of Use of Classified Staff: N/A

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

Enter Total Estimated Personnel Hours for entire duration of project: 3,182	Divide total personnel hours by 2,080 hours in 1 yr = TOTAL FTE: 1.53

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

Enter Total Estimated Contract Personnel Hours for entire duration of project: 80	Divide total contract hours by 2,080 hours in 1 yr = TOTAL FTE: .04

VI. PROJECT PARTNERS:

A. Partners outside of project manager's organization receiving ENRTF funding
N/A

B. Partners outside of project manager's organization NOT receiving ENRTF funding

Name	Title	Affiliation	Role
Stephanie Beilke	**Conservation Science Manager**	**Audubon**	**Great Lakes Black Tern working group coordination**
Rachael Pierce	**Migratory Bird Biologist**	**USFWS**	**Regional Marshbird monitoring coordination**
Anna Sidie-Slettedahl	**Assistant Coordinator**	**USFWS Upper MS River & Great Lakes Region JV**	**Yellow Rail expertise and collaboration**
TBD	**TBD**	**Multiple entities**	**Common Tern Working group**

VII. LONG-TERM- IMPLEMENTATION AND FUNDING:

This project focuses on implementing the management plans (MN Conservation Blueprint for Bird Conservation, 2014) for three benchmark species. We have built a solid foundation of monitoring information to guide this work and look to address specific habitat requirements of these species to advise ongoing restoration work. Audubon's role is to use the information gathered from these benchmark survey sites to provide recommendations to area managers working to conserve these focal species. There is potential for long term monitoring of avian use in these survey sites at 5 to 10 year intervals. If needed, we would seek additional funding from available state or federal resources for the follow-up monitoring activities.

VIII. REPORTING REQUIREMENTS:

- Project status update reports will be submitted May 1 and November 1 each year of the project
- A final report and associated products will be submitted between **June 30 and August 15, 2023.**

IX. SEE ADDITIONAL WORK PLAN COMPONENTS:

A. Budget Spreadsheet
B. Visual Component or Map
C. Parcel List Spreadsheet
D. Acquisition, Easements, and Restoration Requirements
E. Research Addendum

B. Visual Components

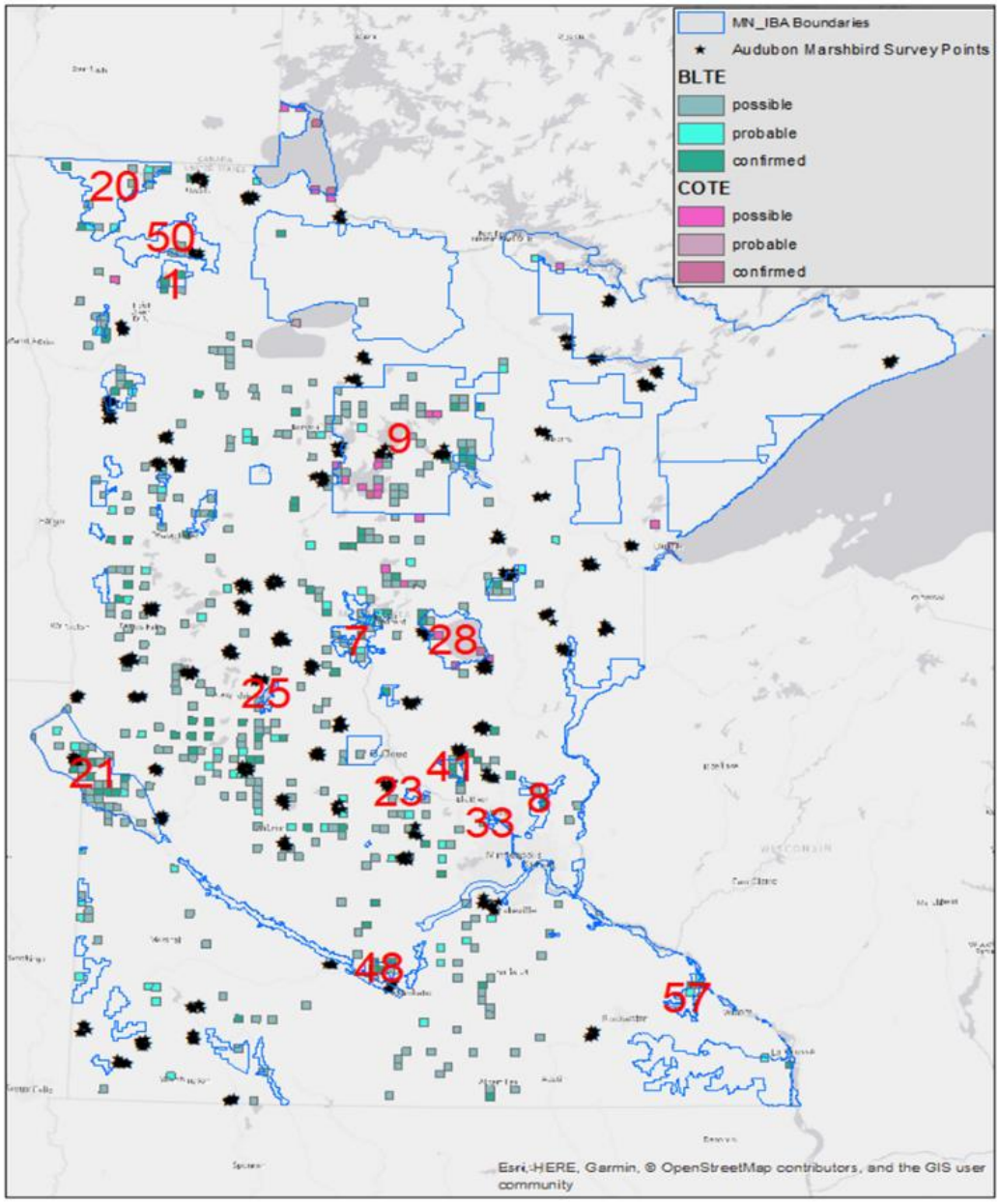


Figure 1. Location of Important Bird Areas (IBAs; MN_IBA_Boundaries) in Minnesota. Unique identification of IBAs selected to be scouted in 2020 are listed numerically (in red) and correspond to IBA ID in Table 1 (n = 14). Black Tern (BLTE) and Common Tern (COTE) observations (possible, probable, and confirmed nesting) are based on the Minnesota Breeding Bird Atlas (MNBBA) data. Locations of Audubon's Statewide Marshbird survey points are also included. NRRI.

Table 1. List of potential Important Bird Area (IBA) Black Tern monitoring locations for the 2020 field season. Unique IBA identification numbers (IBA ID) correspond with locations in Figure 1. The breeding status for each species; Black Tern (BLTE) and Common Tern (COTE) is based on Minnesota Breeding Bird Atlas (MNBBA) data. These breeding codes, listed in order of increasing importance are; possible, probable, and confirmed. No = species was not detected at this location during the MNBBA or Audubon Statewide Marshbird survey. We also state whether an Audubon Statewide Marshbird Survey route is located within the IBA. NRRI.

IBA ID	IBA Name	BLTE	COTE	Audubon Marshbird Survey
1	Agassiz NWR	Confirmed	No	No
7	Camp Ripley-Pillsbury-Lake Alexander	Confirmed	No	No
8	Carlos Avery	Confirmed	No	No
9	Chippewa Plains	Confirmed	Confirmed	Yes
20	Kittson-Roseau Aspen Parkland	Probable	No	No
21	Lac Qui Parle- Big Stone IBA	Probable	No	Yes
23	Lake Maria State Park- Henry Larson County Forest	Possible	No	No
25	Lake Osakis	Possible	No	No
28	Mille Lacs	Probable	Confirmed	No
33	North Metro Mississippi River	Probable	No	No
41	Sherburne NWR	Confirmed	No	No
48	Swan Lake	Confirmed	No	No
50	Thief Lake	Possible	No	Yes
57	Whitewater Valleys	Probable	No	No

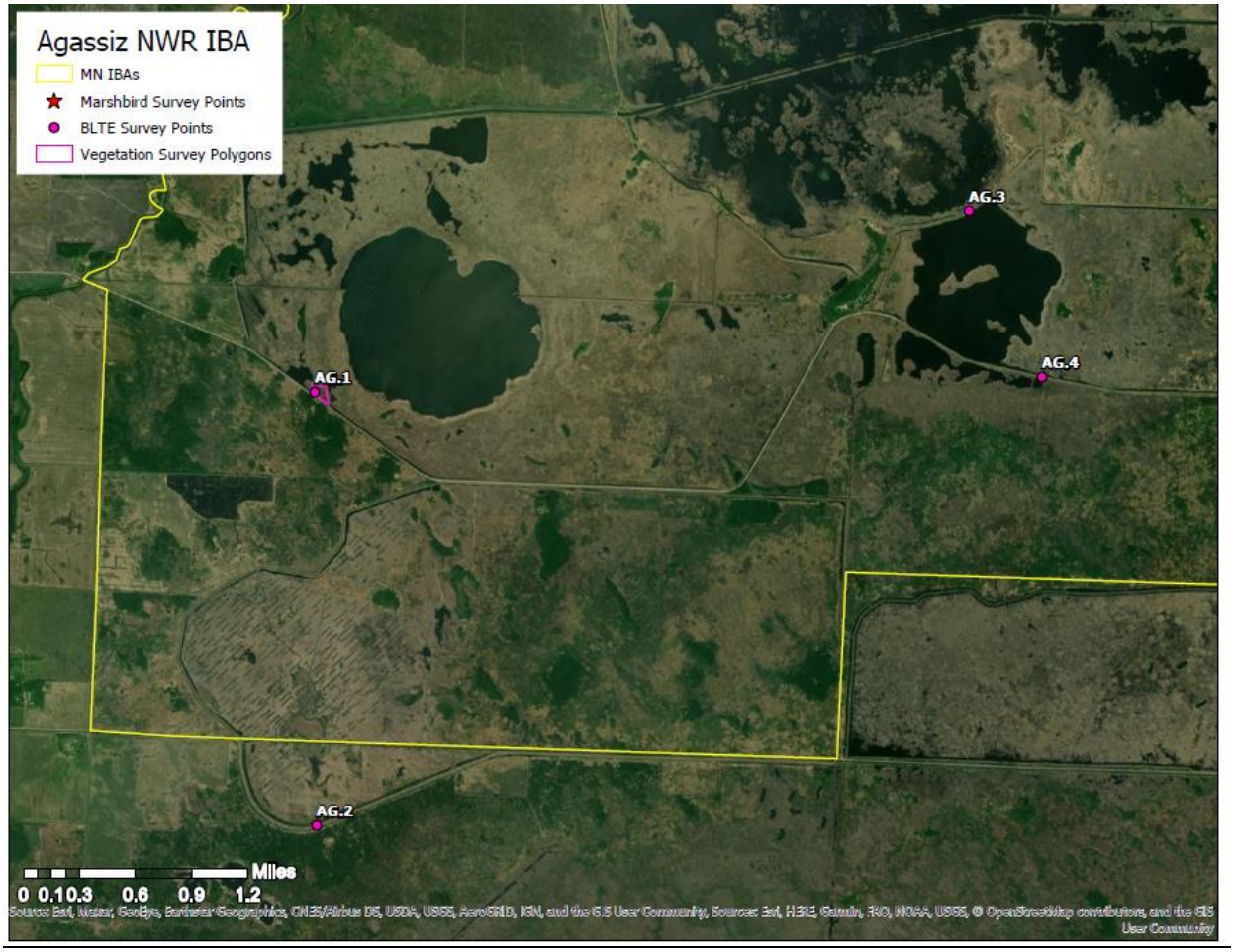


Figure 2. Potential Black Tern monitoring survey locations (*n* = 4; AG.1 – AG.4) established in the Agassiz NWR IBA in 2020. A formal survey was conducted at point AG.1, which includes the estimated range of visibility around the centroid of the vegetation survey.

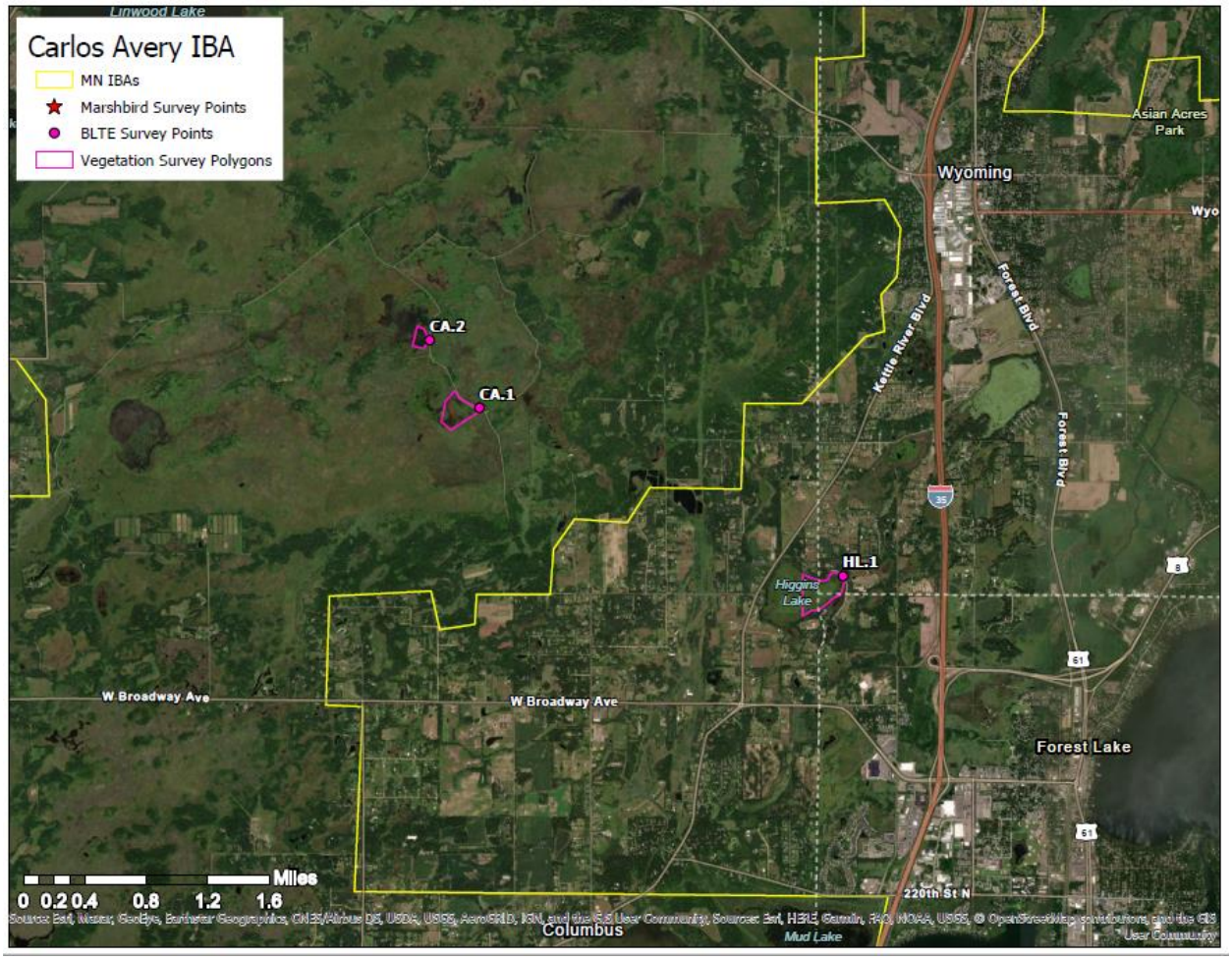


Figure 3. Potential Black Tern monitoring survey locations (*n* = 3; CA.1, CA.2, and HL.1) established in and just outside of the Carlos Avery IBA in 2020. A formal survey was conducted at each of the three points, which include the estimated range of visibility around the centroid of the vegetation survey.



Figure 4. Potential Black Tern monitoring survey location (*n* = 1; KR.1) established in the Kittson-Roseau Aspen Parklands IBA in 2020. A formal survey conducted at this point includes the estimated range of visibility around the centroid of the vegetation survey.

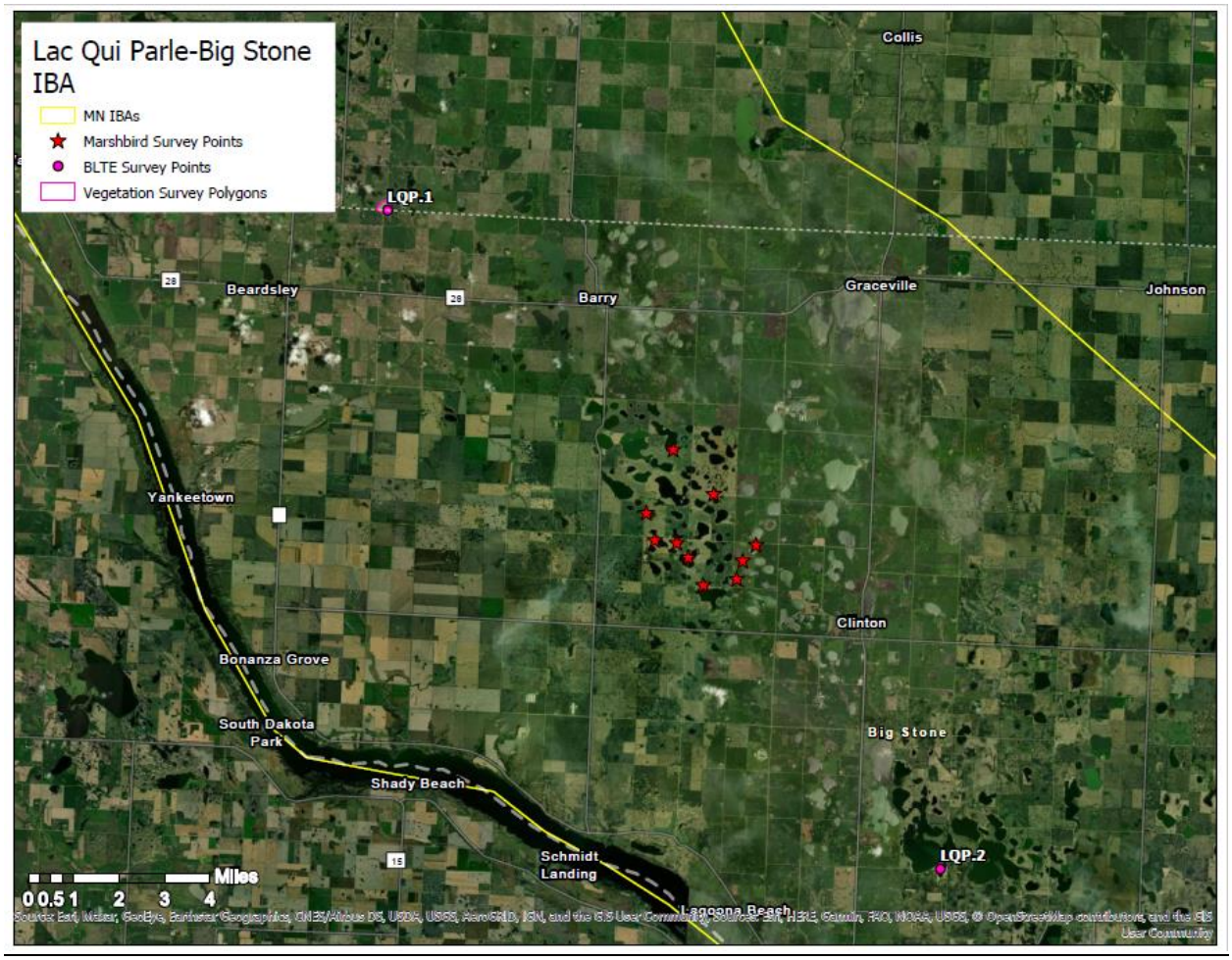


Figure 5. Potential Black Tern monitoring survey location (*n* = 1; LQP.1) established in the Lac Qui Parle-Big Stone IBA in 2020. A formal survey was conducted at this point, which includes the estimated range of visibility around the centroid of the vegetation survey. The location of Audubon's Statewide Marshbird Survey Points that occur within this IBA are also included.

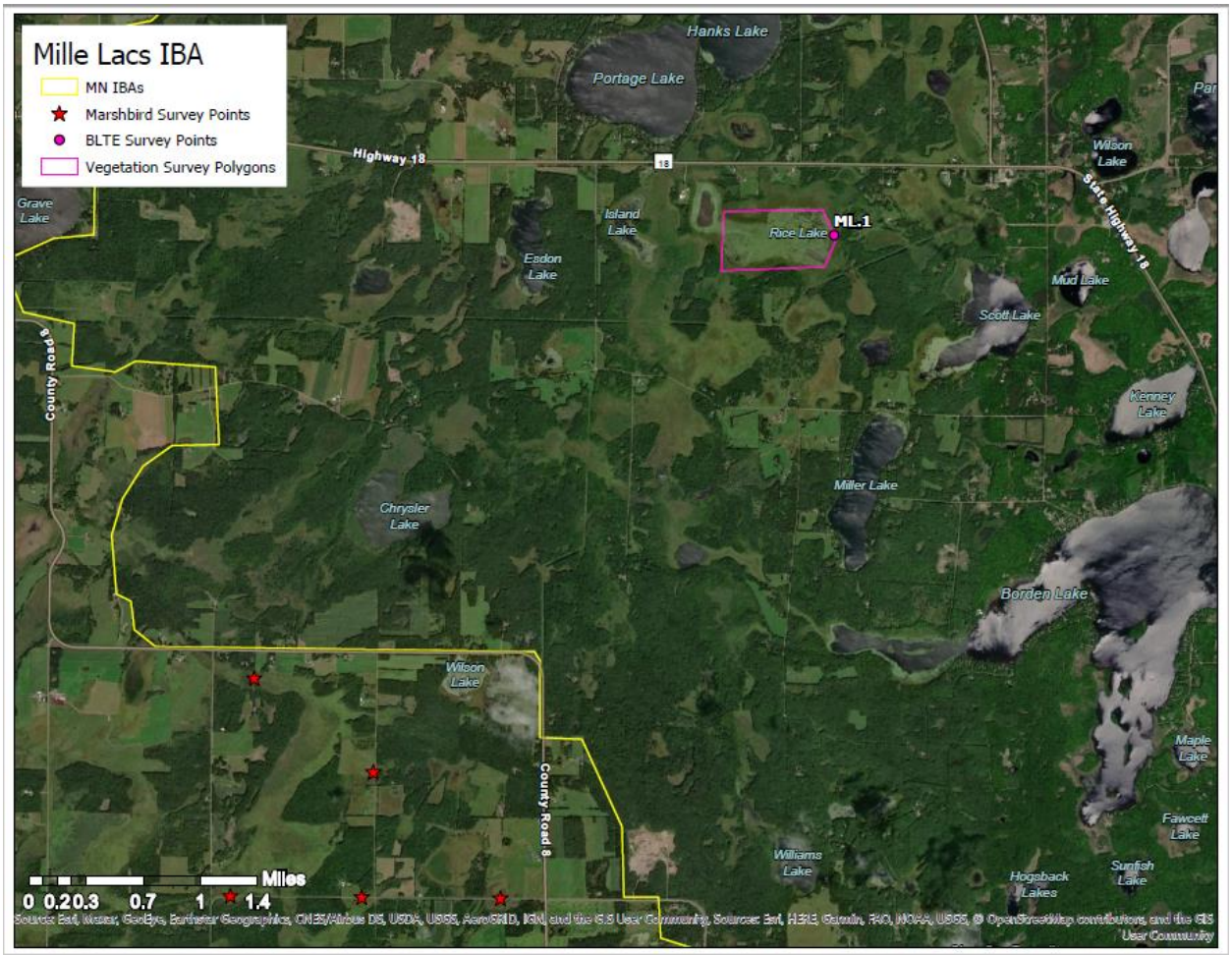


Figure 6. Potential Black Tern monitoring survey location (*n* = 1; ML.1) established in the Lac Qui Parle-Big Stone IBA in 2020. A formal survey was conducted at this point, which includes the estimated range of visibility around the centroid of the vegetation survey. The location of Audubon's Statewide Marshbird Survey Points that occur just outside the IBA are also included.

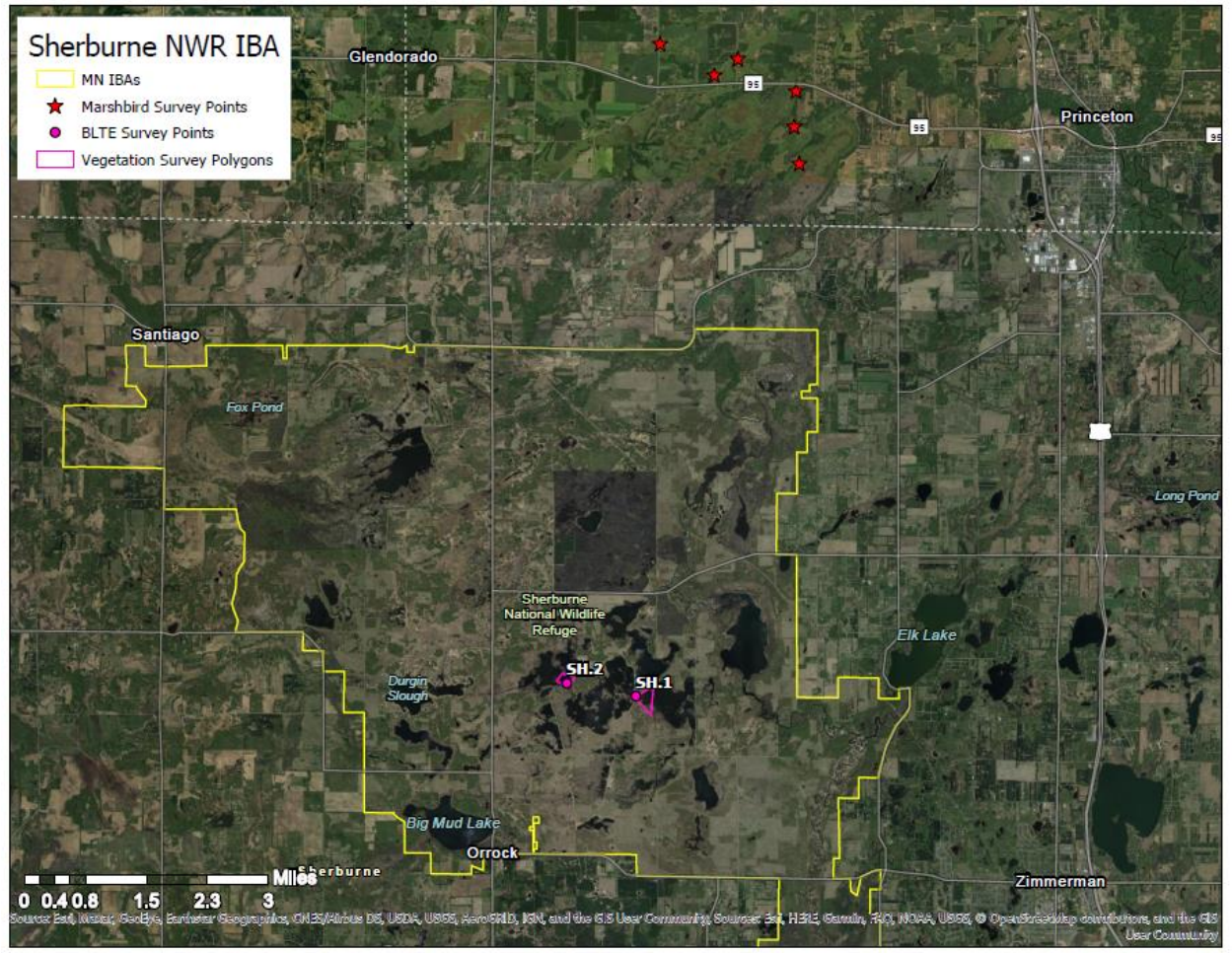


Figure 7. Potential Black Tern monitoring survey locations (*n* = 2; SH.1 and SH.2) established in the Sherburne NWR IBA in 2020. A formal survey was conducted at these points, which includes the estimated range of visibility around the centroid of the vegetation surveys. The location of Audubon's Statewide Marshbird Survey Points that occur just outside the IBA are also included.

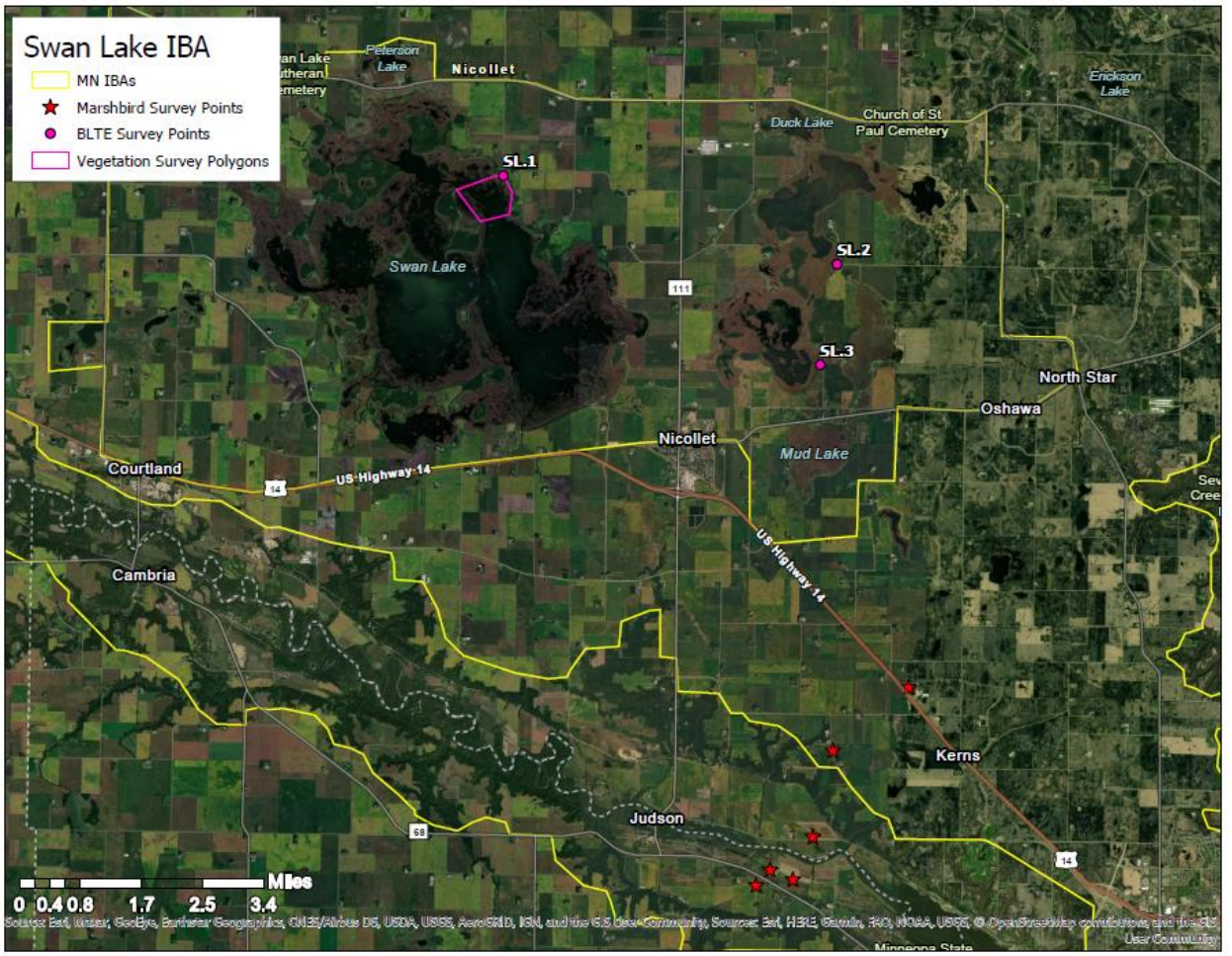


Figure 8. Potential Black Tern monitoring survey locations (*n* = 3; SL.1, SL.2, and SL.3) established in the Swan Lake IBA in 2020. A formal survey was conducted at point SL.1, which includes the estimated range of visibility around the centroid of the vegetation survey. The location of Audubon's Statewide Marshbird Survey Points that occur just outside the IBA are also included.

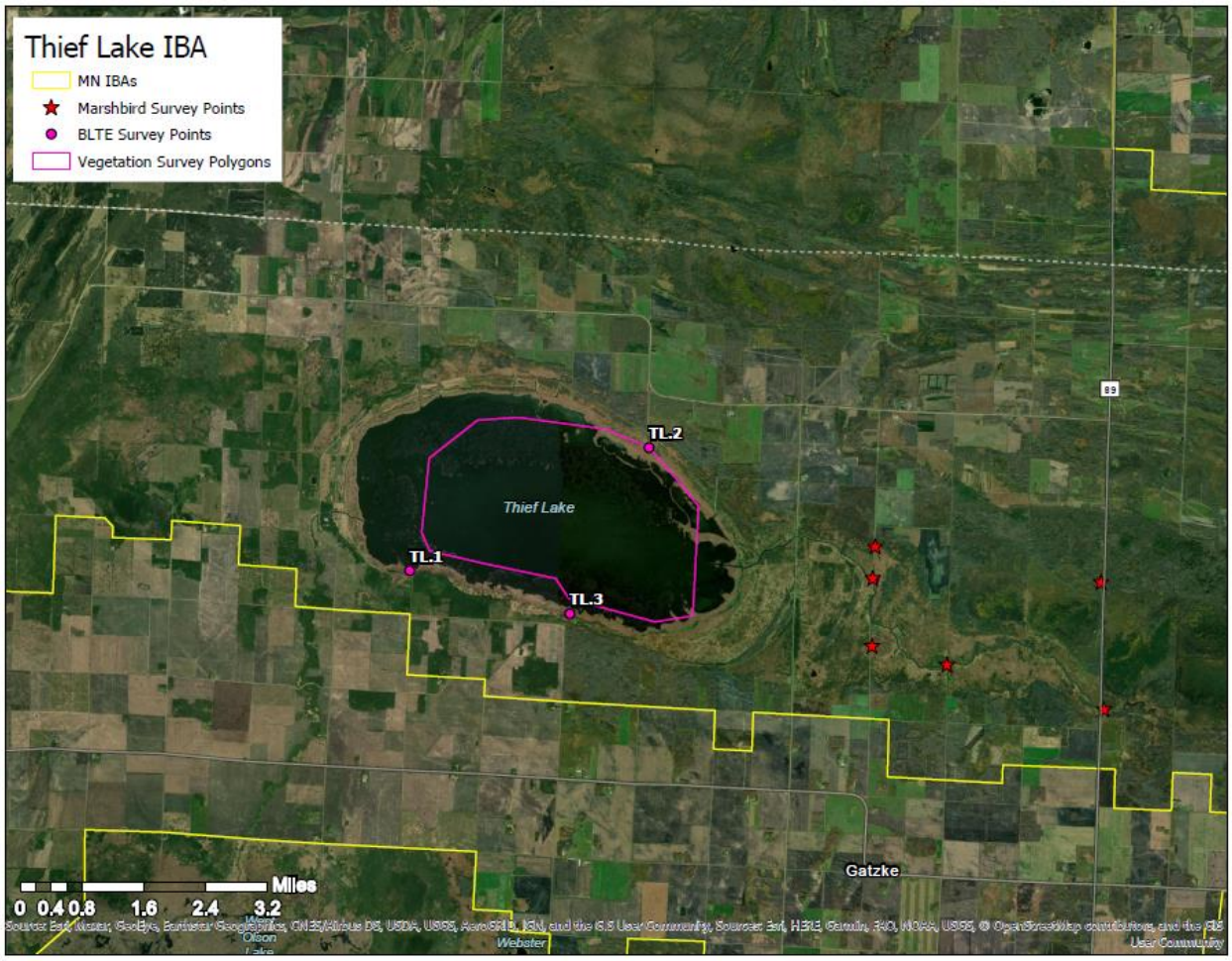


Figure 9. Potential Black Tern monitoring survey locations (*n* = 3; TL.1, TL.2, and TL.3) established in the Thief Lake IBA in 2020. A formal survey was conducted at points TL.1 and TL.2, which include the estimated range of visibility around the centroid of the vegetation surveys. At this IBA visibility was nearly the entire lake. The location of Audubon's Statewide Marshbird Survey Points that occur within the IBA are also included.

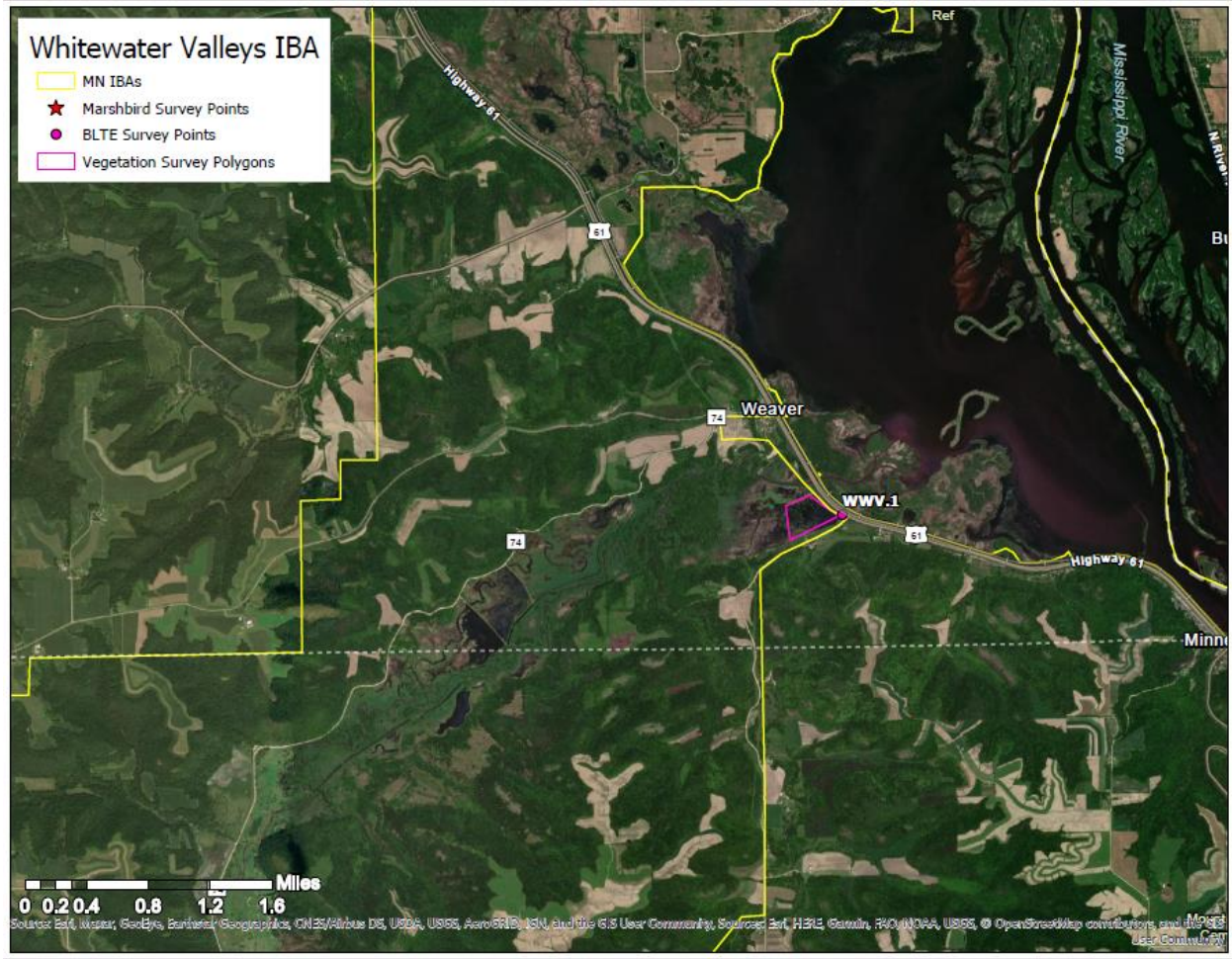


Figure 10. Potential Black Tern monitoring survey location (*n* = 1; WWV.1) established in the Whitewater Valleys IBA in 2020. A formal survey was conducted at this point, which includes the estimated range of visibility around the centroid of the vegetation survey. The location of Audubon's Statewide Marshbird Survey Points that occur just outside the IBA are also included.



Figure 11. Approaching [redacted] on Pelican Lake. [redacted]. Alex Wardwell.



Figure 12. The boat anchored during the flush count survey on [redacted], Pelican Lake. Alex Wardwell.

[redacted]



Figure 14. [redacted]



Figure 15. [redacted]. Common Tern can be seen flying above. Alex Wardwell.



Figure 16. [redacted] where Common Tern are nesting. Common Tern are visible flying above the peninsula. Alex Wardwell.



Figure 17. A potential nesting site for Common Tern during low water years on Baby Lake in Cass County. The summer of 2022 brought high water levels and there were no signs of nesting Common Tern on Baby Lake.



Figure 18. Common Tern survey photo. [redacted] June 26th, 2022.



Figure 19. [redacted] June 26th, 2022.



Figure 20. Common Tern nests with eggs. [redacted], Pelican Lake, June 26th, 2022.



Figure 21. Common Tern nests with eggs. [redacted], Pelican Lake, June 26th, 2022. Wave action and spray causing the nesting area to become wet.



Figure 22. Common Tern nests with eggs. [redacted], Pelican Lake, June 26th, 2022.



Figure 23. Common Tern nests with eggs. [redacted], Pelican Lake, June 26th, 2022.



Figure 24. Common Tern nest with eggs on a higher portion of the rocky spit. [redacted], Pelican Lake, June 26th, 2022



Figure 25. Common Tern nests with eggs. [redacted], Pelican Lake, June 26th, 2022



Figure 26. Common Tern nest with eggs tucked into stinging nettle, Virginia creeper, Canada thistle, and possibly common burdock on [redacted], Pelican Lake, June 26th, 2022.



Figure 27. Human disturbance near the nesting Common Tern [redacted], Pelican Lake. Common Tern and Ring-billed Gull remains are scattered around this area, notice the white feathers. Apologies for the raindrops on the camera lens!



Figure 28. Common Tern remains on [redacted], Pelican Lake June 23rd, 2023. Tom Savre.



Figure 29. Ring-billed Gull remains on [redacted], Pelican Lake, June 23rd, 2023. Tom Savre.



Figure 30. Common Tern nest with three eggs on Pelican Lake's [redacted]. June 23rd, 2023. Tom Savre.



Figure 31. Common Tern nest with three eggs. Only one of two active nests found on [redacted] Pelican Lake. June 23rd, 2023. Tom Savre.



Figure 32. Common Tern nest with three eggs. Second active nest found on [redacted] on Pelican Lake. June 23rd, 2023. Tom Savre.



Figure 33. Common Tern surveys on Baby Lake, Cass County. June 22nd, 2023. Tom Savre.



Figure 34. Common Tern surveys on Baby Lake, Cass County. June 22nd, 2023. Tom Savre.

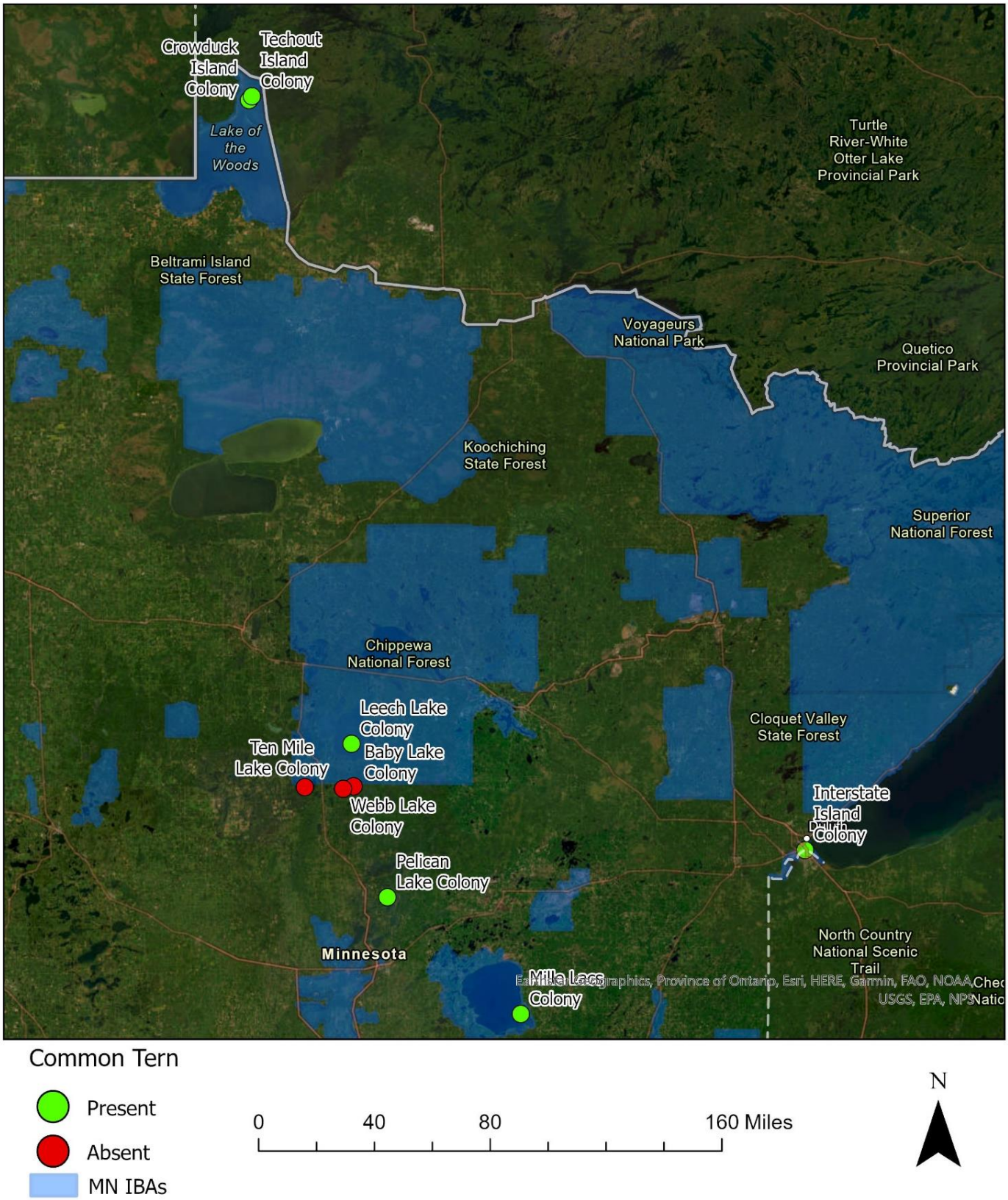


Figure 35. Map of Common Tern survey locations. Green points represent active colonies at present and the red points represent survey locations where Common Tern were absent.

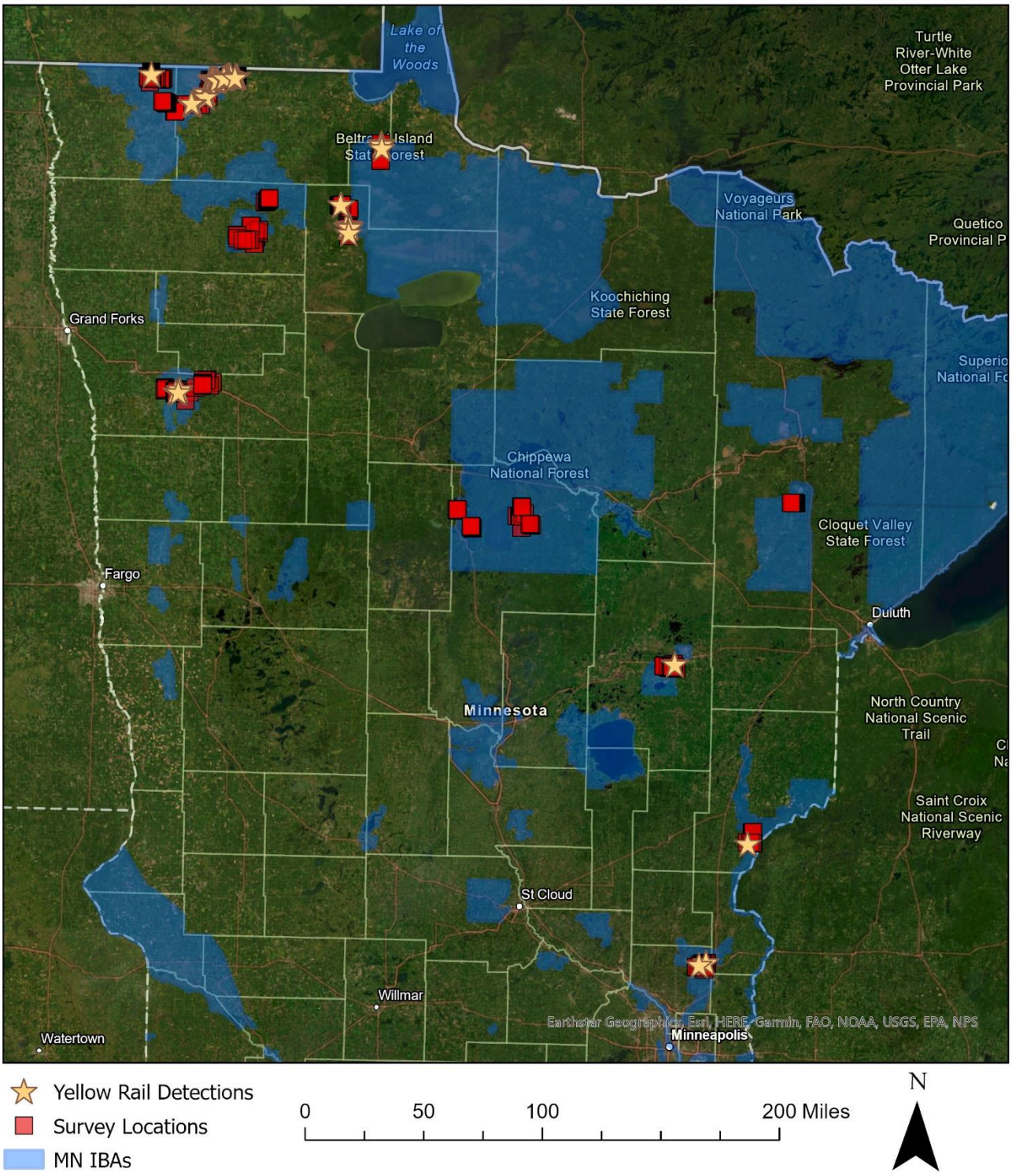


Figure 36. Map of Yellow Rail survey route locations (red squares) and Yellow Rail detections (yellow stars) with IBAs highlighted in blue.

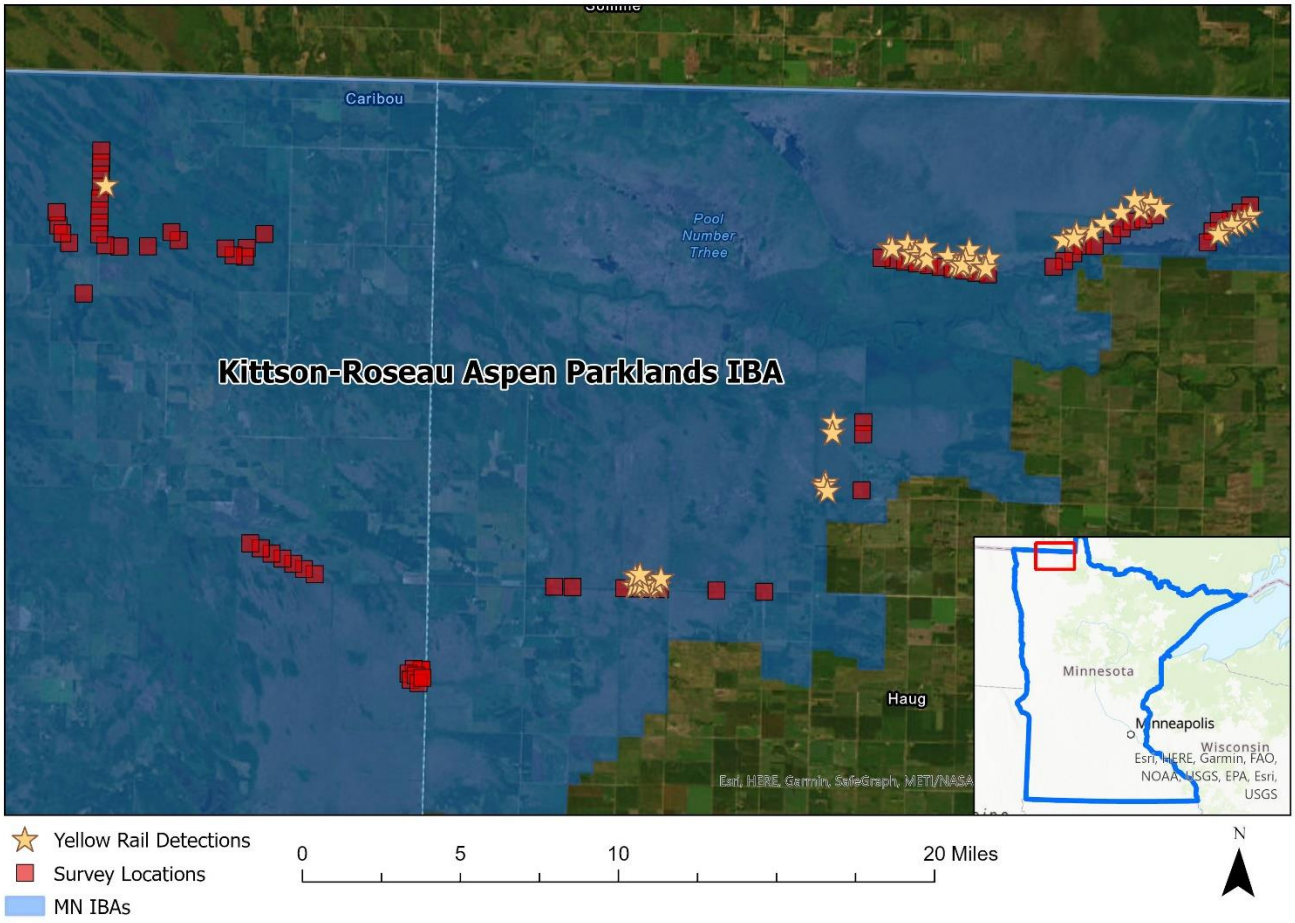


Figure 37. Map showing a focused inset on several Yellow Rail survey locations (red squares) and detections (yellow stars) within the unique and lovely Kittson-Roseau Aspen Parklands IBA.

Table 2. Yellow Rail survey locations conducted in IBAs and estimated Yellow Rail Detections. *Route established but not surveyed in 2021. [1]Minimum estimate of number of individual YERA detected during 2021 surveys - does not count multiple detections of the same bird (the second, third, or more detections of any individuals that were determined with little doubt to be same bird heard from multiple locations) but was the most conservative with regard to questionable possible multiple detections. [2]Observors best estimate of total number of YERA detected during 2021 surveys - does not count multiple detections that were determined to be the same bird heard from multiple locations - includes a few individuals that seemed like to be unique detections. [3]Maximum number of individual YERA detected during 2021 surveys. This number is the most liberal estimate with regard to questionable multiple detections. This number still does not include multiple detections that were determined to be clearly the same bird heard from multiple locations using compass bearings.

Audubon Important Bird Areas Covered by Routes		Management Units Containing Survey Routes	Established 2021		Surveyed 2021		YERA		
			Route	Points	Route	Points	Min[1]	EST[2]	Max[3]
1	Agassiz NWR	Agassiz NWR (3 Routes)	AGAS-1	10	AGAS-1	10	0	0	0
			AGAS-2	8	AGAS-2	8	0	0	0
			AGAS-3	8	AGAS-3	3	0	0	0
4	Big Bog	Beltrami Island SF (2 Routes)	BELT-1	15	BELT-1	10	5	5	6
			BELT-2	7	BELT-2	7	3	3	4
		Red Lake WMA (2 Routes)	REDL-1	11	REDL-1	10	8	9	9
			REDL-2	6	*	-	-	-	-
8	Carlos Avery	Carlos Avery WMA (1 Route)	CARL-1	13	CARL-1	9	2	2	2
9	Chippewa Plains	Battleground SF (1 Route)	BATT-1	12	BATT-1	9	0	0	0
		Welsh Lake SF (1 Route)	WELS-1	5	WELS-1	4	0	0	0
		Chippewa Nat. Forest (1 Route)	CHIP-1	7	*	-	-	-	-
13	Glacial Ridge	Glacial Ridge NWR (2 Routes)	GLAC-1	9	GLAC-1	9	3	3	3
			GLAC-2	9	*	-	-	-	-
		Typmpanuchus WMA (1 Route)	TYMP-1	6	*	-	-	-	-
		Mentor Prairie WMA (1 Route)	MENT-1	6	*	-	-	-	-
19	Kettle River Banning State Park	Chengwatana SF (1 Route)	CHEN-1	9	CHEN-1	6	1	1	1
20	Kittson-Roseau Aspen Parkland	Roseau River WMA (4 Routes)	ROSE-1	6	ROSE-1	6	7	7	8
			ROSE-2	11	ROSE-2	11	12	12	13
			ROSE-3	10	ROSE-3	10	16	18	20
			ROSE-4	11	ROSE-4	9	15	15	16
		Caribou WMA (2 Routes)	CARI-1	12	CARI-1	8	1	1	1
			CARI-2	11	*	-	-	-	-
		Beaches Lake WMA (2 Routes)	BEAC-1	7	*	-	-	-	-
			BEAC-2	7	*	-	-	-	-
27	McGregor Marsh	McGregor Marsh SNA (1 Route)	MCGR-1	12	MCGR-1	11	2	2	2
		Kimberly Marsh WMA (1 Route)	KIMB-1	4	KIMB-1	4	0	0	0
40	Sax-Zim Bog	Cloquet Valley SF (1 Route)	CLOQ-1	7	CLOQ-1	7	0	0	0
50	Thief Lake	Thief Lake WMA (1 Route)	THIE-1	7	THIE-1	7	0	0	0
		Totals	**28**	**246**	**20**	**158**	**75**	**78**	**85**



Figure 38. Sedge meadow habitat at Carlos Avery WMA (Carlos Avery IBA) during survey site scouting, May 2021.



Figure 39. Yellow Rail survey location**.** Sedge-dominated wetland at Carlos Avery WMA (Carlos Avery IBA), May 2021.



Figure 40. Yellow Rail survey location. Sedge-dominated wetland in Caribou WMA (Kittson-Roseau Aspen Parklands IBA) Mid-June 2021.



Figure 41. Yellow Rail survey location. Roseau River WMA (Kittson-Roseau Aspen Parklands IBA). Reed canary grass in the foreground, native *Phragmites* common reed grass, and a sedge wetland in the far background. Mid-June 2021.



Figure 42. Yellow Rail survey location. Roseau River WMA (Kittson-Roseau Aspen Parklands IBA). Mid-June 2021.



Figure 43. Yellow Rail survey location. Roseau River WMA (Kittson-Roseau Aspen Parklands IBA) mid-June 2021.

Appendix E.

NRRI Standard Operating Procedures for data entry (Black Tern monitoring and vegetation surveys)

Tern Monitoring Protocol

Data were entered using an online data entry system (123 Survey; https://survey123.arcgis.com/). The following information was entered at each point-count location:

- *Monitor Name:* First and Last name of observer
- *Email:* Observers email address
- *Phone:* Observers phone number
- *Location Name:* Unique identification name or number associated with the point-count location within each IBA
- *Sub colony name (in applicable)*: Name each sub colony if several are present (could be based on their location within the wetland complex, i.e. North Sub colony, East Sub colony)
-
- *Survey Period:* Survey Period 1 (June 1 -30) or Survey Period 2 (July 1 – 31)
- *Date:* Date survey was conducted
- *Site Visit #:* For this survey it will always be 1 since we will only be conducting one survey
- *Location (map)*: Enter GPS coordinates for point-count locations. If more than one sub colony is present, enter a separate data entry form for each sub-colony
- *Weather*: Record the following weather variables at each point-count location
    - *Wind:* Categorize wind speed based on the Beaufort scale: 0=smoke rises vertically; 1=wind direction shown by smoke drift; 2=wind felt on face; leaves rustle; 3=leaves & small twigs in constant motion and light flag extended; 4=raises dust and loose paper -- small branches are moved; 5=small trees with leaves sway -- crested wavelets on inland waters
    - *Cloud Cover:* 0-10%, 10-50%, 50-90%, 90-100%
    - *Precipitation:* No precipitation, Fog, Drizzle, Rain, Snow, Snow/Sleet
- *Count Start Time:* Enter time count began
- *Count End Time*: Enter time count ended
- *Colony Active?* Yes or No
- *Number of adult terns present*:
- *If nesting documented:* Record the GPS coordinates for 1-4 nests identified after the shore survey. Use estimates if you are able to detect nests but not able to access the site for flush counts.
    - *For each nest, identify nesting stage:* Incubation or Nestling

Vegetation Monitoring Protocol

Data were entered using an online data entry system (123 Survey; https://survey123.arcgis.com/). The following information was entered at each vegetation location:

- *Monitor name:* First and last name
- *IBA name:* Unique name of the IBA being surveyed
- *Site ID:* Unique name of wetland point-count location
- *Date:* Date wetland was surveyed in mmddyyyy format
- *Vegetation Survey Location:* Identify location of observation points on map, record GPS coordinates for each (Veg_Lat & Veg_Lon) and outline estimated range of visibility (in meters)
- *sub colony name (in applicable)*: Name each sub colony if several are present (could be based on their location within the wetland complex, i.e. North Sub colony, East Sub colony)

Visual estimates of the following were conducted using the Loges et al. (2017) protocol:

- *Visibility*: (>70% based on delineation map)
- *Start Temperature*: Temperature in ^{o}F when survey was started
- *Wind:* (Beaufort scale)
- *WD* = Water Depth using 6 class types (*Dry, Saturated/Mud, 0-5cm, 5-15cm, 15-25cm, >25cm*. Water Depth: % of unit in each category (must sum to 100%)
- *HC* = Habitat Cover of five types (open water, bare ground/mudflat, emergent, scrub-shrub, or forest). Percent Habitat Cover: % of location in each category (sum to 100%)
- *Interspersion*: using three class configurations (**Class L**: large and connected patches of water/bare ground features; **Class S**: small, disconnected patches of water/bare ground; **Class M**: discernible regions of both classes L and S)
- *VH* = Vegetation height using seven categories (<2.5cm, 2.5 – 15cm, 15 – 30cm, 30 – 60cm, 60cm – 3m, 3 – 6m, >6m). Vegetation Height (%) of location in each category (Sum to 100%)
- *Percent vegetation cover for dominant plant species*: (1 to 5 species) by name (Plant species name) and Percentage/dispersion.
- *Disturbance Severity*: (1-4)
- *Comments*: Any additional information about the survey location at the time of survey.

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Attachment A: FINAL REPORT
Environment and Natural Resources Trust Fund
M.L. 2019 Budget Spreadsheet- Final
Legal Citation: M.L. 2019, First Special Session, Chp. 4, Art. 2, Sec. 2, Subd. 03k
Project Manager: Alexandra Wardwell
Project Title: Implementing Conservation Plans for Avian Species of Concern
Organization: Audubon Minnesota
Project Budget: $124,000
Project Length and Completion Date: 4 years; July 1, 2023
Today's Date: August 15th, 2023

ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET	Budget	Amount Spent	Balance
BUDGET ITEM			
Personnel (Wages and Benefits)	$ 93,725	$ 91,923	$ 1,802
Project Manager: $52,000 (75% salary, 25% benefits); 32% FTE each year for 3 years			$ -
Administrative support: $7,500, (75% salary, 25% benefits); 6% FTE each year for 3 years			$ -
2 Temporary Field Surveyors: $35,800, (93% Salary and 7% benefits); 19%FTE- 10 weeks, each person, for each year, for 2 years			$ -
Professional/Technical/Service Contracts			$ -
Yellow Rail Surveyor Contract - Sole source contract to marshbird expert Tom Savre to complete the yellow rail surveys for the season due to the hiring freeze in effect during the seasonal hiring period. We request a sole source contract without bid due the level of expertise that is required and the absence of other parties in Minnesota that are specialized with yellow rails. The sole source contract amount is a resonable amount based on past avian survey contracts with this project and throughout the Great Lakes.	$ 12,000	$ 12,000	$ -
Boat (2 boat trips) and/or air (1 flight) service for remote access to benchmark locations	$ 425	$ 425	$ -
University of Minnesota Duluth - sole source a contract to the University of MN Duluth to undertake Black Tern monitoring this season. Without bid, because there are no other entities in the State who have the Black Tern field expertise. We've compared the proposal to similar work we've done in the Midwest and it's reasonably costed.	$ 11,000	$ 11,000	$ -
Common Tern Survey Assistance and Boat Use-Tom Savre to assist with Common Tern Surveys and lake transport on Pelican, Baby, or surrounding Lakes in June of 2023.	$ 2,000	$ 2,000	$ -
Equipment/Tools/Supplies			$ -
Surveyor supplies such as: chest waders (2 pr $150/pair), safety vests, flagging, battaries, printing data sheets, field packs	$ 100	$ 25	$ 75
Capital Expenditures Over $5,000			$ -
		$ -	$ -
Fee Title Acquisition			$ -
		$ -	$ -
Easement Acquisition			$ -
		$ -	$ -
Professional Services for Acquisition			$ -
		$ -	$ -
Printing			$ -
		$ -	$ -
Travel expenses in Minnesota			$ -
Staff and surveyor travel/ lodging for duration of survey (following DNR commissioner plan)	$ 4,750	$ 4,348	$ 402
Other			$ -
		$ -	$ -
COLUMN TOTAL	$ 124,000	$ 121,721	$ 2,279

OTHER FUNDS CONTRIBUTED TO THE PROJECT	Status (secured or pending)	Budget	Spent	Balance
Non-State: Audubon indirect costs	secured	$ 17,400	$ 17,400	$ -
State:			$ -	$ -
In kind:			$ -	$ -

PAST AND CURRENT ENRTF APPROPRIATIONS	Amount legally obligated but not yet spent	Budget	Spent	Balance
Current appropriation: Maximize Value of Water Impoundments to Wildlife. Legal Citation: M.L. 2017, Chp. 96, Sec. 2, Subd. 06f	$ -		$ 195,000	$ -
Past appropriations: Create a Statewide Waterbird Monitoring Program. Legal Citiation: M.L. 2015, Chp. 76, Sec. 2, Subd. 03f	$ -		$ 146,000	$ -

Environment and Natural Resources Trust Fund (ENRTF)
M.L. 2019 ENRTF Work Plan (Main Document)

Date of Submission: August 15th, 2023

Final Report

Date of Work Plan Approval: June 5, 2019

Project Completion Date: June 30, 2023

PROJECT TITLE: Implementing Conservation Plans for Avian Species of Concern

Project Manager: Alexandra Wardwell

Organization: National Audubon Society

College/Department/Division: Audubon Minnesota

Mailing Address: Highway 36 West, Suite 400
City/State/Zip Code: Roseville, MN 55113
Telephone Number: 651-739-9332

Email Address: alexandra.wardwell@audubon.org

Web Address: mn.audubon.org

Location: Statewide

Total Project Budget: $124,000

Amount Spent: $121,721

Balance: $2,279

Legal Citation: M.L. 2019, First Special Session, Chp. 4, Art. 2, Sec. 2, Subd. 03k as extended by M.L. 2022, Chp. 94, Sec. 2, Subd. 19 (c.1) [to June 30, 2023]

Appropriation Language: $124,000 the first year is from the trust fund to the commissioner of natural resources for an agreement with the National Audubon Society, Minnesota office, to establish benchmark survey sites for implementing and tracking outcomes of collaborative restoration and enhancement activities within Important Bird Areas for three bird species of conservation concern.

M.L. 2022 - Sec. 2. ENVIRONMENT AND NATURAL RESOURCES TRUST FUND; EXTENSIONS. [to June 30, 2023]

I. PROJECT STATEMENT:

We propose establishing benchmark survey sites to guide restoration and enhancement activities within Important Bird Areas for three species of conservation concern: The Common Tern, Black Tern and Yellow Rail. Over the past 10 years, Audubon MN has built a solid avian monitoring foundation with the completion of the Breeding Bird Atlas (MNBBA) in 2017 and the implementation of the statewide marshbird monitoring program in 2016. Using the protocol from the marshbird survey and the information gathered from the MNBBA, we propose establishing benchmark survey locations for these species of conservation need in order to better document and guide collaborative conservation efforts.

All three of these birds are focal species within Audubon's Blueprint for Bird Conservation and have individualized, action oriented conservation plans. The Yellow Rail was the least abundant focal species documented in the statewide marshbird monitoring effort. Benchmark sites focused on Yellow Rails are essential to understanding their decline. For Black Terns, the Great Lakes Marsh Monitoring Program reports a statistically significant declining trend (10.5% annual change) in the Great Lakes basin from 1995-2012; this is the largest decline of any marsh bird monitored by the program (Tozer 2013). Finally, Common Terns are a state threatened species with only 5 active colonies in Minnesota. Our intention is to support the coordinated implementation of the Blueprint for Bird Conservation Plans (Pfannmuller 2014) for each of these species.

There are 19 potential IBAs with occupancy records for the three focal species. We plan to designate up to 10 benchmark sites per focal species (some may overlap) within these priority IBAs. Once established, the benchmark sites will be added to the ongoing marshbird survey effort and surveyed by seasonal field technicians. Detailed habitat metrics will be recorded at each benchmark site to determine focal species occupancy as it relates to habitat composition and structure. Benchmark sites will also take into account current and planned management and serve as a resource to determine species response to such actions. Recommendations based on the comprehensive marshbird survey results and the data collected from the benchmark survey sites will be shared with statewide and regional working groups focused on wetland habitat improvements and species specific management (i.e. the MN Prairie Conservation Plan, the Joint Ventures Great Lakes Waterbird Working group and the Common Tern management working group).

II. OVERALL PROJECT STATUS UPDATES:

Amendment Request as of 6/3/2020

Due to COVID-19 impact on the 2020 field season we are adjusting field work and moving statistical analysis to an in-kind matching contribution. A new contract for University of Minnesota Duluth will cover the most critical 2020 field work – Black Tern and habitat surveys at benchmark sites. The outputs of the project will not change. We are requesting the following budget shifts:

- Eliminating $9,250 in contracted statistical analysis
- Reducing boat and flight contracts from $1,750 to $700
- Contracting University of Minnesota Duluth for $11,000
- Reducing travel budget $17,000 to $16,300

Amendment approved by LCCMR 6/4/2020

Amendment Request as of 05/01/2021

Audubon Minnesota requests the following amendments:

- Replacement of Nathaniel Miller with Alexandra Wardwell as Project Manager due to a change in his work duties.
- Official address change for Audubon Minnesota from St. Paul to Roseville, MN.
- Budget amendment:

- Reduce travel budget from $16,300 to $4,300 by transferring $12,000 from Travel to Professional/Technical/Service Contracts for yellow rail surveyor contract.
- Fewer travel funds are needed in part, because of more remote coordination and meetings over zoom due to the Covid-19 pandemic. Additionally, the use of sole source contracts vs Audubon staff for avian survey work also cut down on the amount of travel funds utilized.
- We would like to issue the yellow rail contract as a sole source contract and hire an experienced marshbird surveyor with extensive knowledge of yellow rail detection history, marshbird survey protocols, and ability to inventory and ground-truth prime yellow rail habitat.
- The amount decided for this sole source contract is based on the specialized skill set needed, the amount of travel, the number of hours required to conduct the surveys with the attention to detail and planning skills that are required. Based on a past contract for this project and our experience with other projects, $12,000 is a very reasonable amount given the intense nature of the surveys, the complexity of navigation required to survey secretive marshbirds at night, and the surveying amount which includes at least 20 survey routes totaling 120-160 individual survey points. This sole source contract amount is also similar to other avian survey contracts Audubon has contracted throughout the Great Lakes states for similar work in the past.
- Fieldwork for this project was originally designed to be completed by seasonal technicians; however, Audubon instituted a hiring freeze, which began in 2020 due to the Covid-19 pandemic. Because of this setback, Audubon sought an experienced surveyor who was efficient, could adapt to changing situations, and problem solve as required to complete this portion of the project.

Amendment Approved by LCCMR 5/12/2021

LCCMR updated the work plan to correspond with the appropriation end date of June 30, 2022 on June 6, 2021.

Amendment Request as of 01/27/2023

Audubon Minnesota requests the following amendments:
Add a budget line to contract with Tom Savre, experienced ornithologist, for assistance with common tern surveys and for boat transport for Audubon staff to the survey locations in order to follow up on our common tern findings from 2022 in the amount of $2,000. With another visit to the breeding colony on [redacted] on Pelican Lake and the most likely breeding locations on Baby Lake, in a hopefully lower water year than 2022, we hope to confirm the findings from 2022 and solidify that there is an existing and consistent breeding colony on Pelican Lake and whether or not terns are using Baby Lake for anything other than migration.

A budgetary amendment:
Reduce Boat Service Budget by $275 and incorporate into the Professional/Technical/Service Contracts line for a new budget total of $425.
Reduce the Supplies Budget by $600 and incorporate into the Professional/Technical/Service Contracts line for a new total of $100.
Reduce the Personnel Budget by $1,125 and incorporate into the Professional/Technical/Service Contracts line.
Reduce the Personnel Budget by $450 and incorporate into the Travel Expenses Budget.

Amendment approved by LCCMR 2/7/23

First Update May 1, 2020
The project team is currently working to cross-reference Important Bird Area (IBA) and Breeding Bird Atlas (MNBBA) data to identify benchmark sites. Audubon staff are working closely with staff from the Natural Resources Research Institute at the University of Minnesota, Duluth (NRRI), who maintain the MNBBA data. Because of considerations of COVID-19 this year's field season is at risk, however Audubon and NRRI are planning for potential summer surveys at Black Tern colonies identified in the MNBBA, but with gaps in full count and habitat data. If conducted, surveys will align with protocols from other Great Lakes' States in order to support regional population estimate and trend analyses. Work on Yellow Rail and Common Tern has not yet begun.

Second Update November 1, 2020
Despite delays caused by COVID 19 the project team was able to finalize a site list of potential survey sites for Black Terns and conduct surveys in 2020 to establish a baseline for Black Terns. A partnership established with the University of Minnesota, Duluth (NRRI) has been critical to this success. We have requested a one-year extension from LCCMR in order to conduct a full field season in 2021 with a focus on Common Tern and Yellow Rail and disseminate results.

Third Update May 1, 2021
Audubon conducted outreach to several individuals with extensive yellow rail survey experience. This resulted in yellow rail detection information sharing and the further fine-tuning of survey locations and desired site conditions. Audubon considered historical yellow rail detections in order to guide the placement of new baseline survey routes and survey points.

Audubon Minnesota plans to hire an experienced marshbird surveyor to conduct yellow rail surveys in our target Important Bird Areas within public lands including state and federal lands. Audubon has been coordinating with local and regional area wildlife managers, state forest managers, and U.S. Fish and Wildlife Service Refuge staff on special use permits where required.

Fourth Update November 1, 2021
Audubon Minnesota hired a marshbird expert to conduct yellow rail surveys in our targeted Important Bird Areas within state and federal lands. Audubon worked with local and regional area wildlife managers, state forest managers, and U.S. Fish and Wildlife Service Refuge staff to select survey locations and coordinate survey efforts. Area managers provided helpful suggestions on locations for survey sites as some had first-hand knowledge of where yellow rails were detected in the last decade. Additionally, area managers also provided critical information regarding on-the-ground site access information Audubon worked with state and federal employees to secure special use permits where required by each respective agency.
We established 20 benchmark survey routes to survey for yellow rails during the 2021 breeding season. Additionally, Audubon completed the groundwork for eight additional routes with 88 stations or survey points that were not surveyed in 2021. These additional routes would be utilized if an expansion of yellow rail survey routes becomes possible in the future.

Fifth Update May 1, 2022
Audubon Minnesota has conducted outreach to natural resource professionals who focus on colonial waterbird monitoring and survey efforts, in an effort to crowd-source knowledge around the five main common tern breeding areas in the state. Audubon has hosted numerous meetings that brought common tern experts together to share information. Topics for these meetings included everything from the impacts affecting breeding success on natural islands in Minnesota to artificial nesting options that could be utilized to improve common tern breeding success. Interspecies competition and high water are especially problematic for common terns nesting on natural islands in Minnesota lakes.

Additionally, Audubon formed a Yellow Rail Working Group, bringing together the yellow rail and marshbird experts in the state to collaborate and brainstorm possible next steps. We have had two meetings thus far, but plan to continue to have an annual or biannual discussions to move yellow rail conservation forward in the state of Minnesota. We are currently working to share relevant resources in an online repository, so that working group members have access to the recent survey data, journal articles, and protocols that each entity has used. One challenge we are faced with is finding a storage platform that is compatible with various agency and organization security restrictions.

Update as of June 30, 2022:

Project extended to June 30, 2023 by LCCMR 6/30/22 as a result of M.L. 2022, Chp.94, Sec. 2, Subd. 19, legislative extension criteria being met.

Sixth Update as of November 1, 2022:
In the summer of 2022, Audubon conducted breeding surveys for our last focal species, the Common Tern. We focused efforts on two lakes with previous common tern pair sightings in the last 10-15 years, which gave us more information about the habitat these birds are selecting for nesting, the challenges they face, and established a new benchmark monitoring location on Pelican Lake in Crow Wing County.

Audubon is planning several meetings to facilitate discussions with colonial waterbird (Black Tern and Common Tern) partners and marshbird partners (yellow rail and others) in Minnesota this fall and winter. Topics to discuss range from the risks and impact of avian influenza, high water levels, recent breeding success, continued monitoring, and situations where habitat enhancements or other conservation actions could be beneficial to impact populations.

Seventh Update as of May 1, 2023:
Audubon held two focal species partner meetings since the last update. Audubon hosted a Yellow Rail Partner Meeting the end of January 2023, attendees included staff from the MN DNR Biological Survey and Ecological and Water Resources, including the MN DNR State Wildlife Action Plan Coordinator, U.S. Fish and Wildlife Service Division of Migratory Birds, U.S. Fish and Wildlife Service Upper Mississippi River-Great Lakes Joint Ventures, and Voyageurs National Park.
The goal of the meeting was to deepen partnerships around Yellow Rail conservation and to align priorities for future collaborative work. We discussed 2022 Yellow Rail monitoring efforts, thoughts about the next steps for yellow rail conservation and monitoring in MN, priorities, research questions, and funding options or structure for future potential monitoring efforts. The creation of a forum for partner collaboration and coordination has been a major success of this project. After our January Yellow Rail Partner Meeting, partners rectified the Midwest Coordinated Marshbird Monitoring Group and a Great Lakes Marshbird Conservation Framework Kick-off Meeting was held, the first in over three years. Partners from eight states joined discussions about what a regional marshbird strategy could look like. Building from the interest from that meeting, a Great Lakes Marshbird Workshop was planned for May 2nd-3rd, 2023 in East Lansing, MI.

Audubon also held a Common Tern Partners Meeting to recap the 2022 breeding season on January 23rd, 2023. The meeting was attended by staff from U.S. Fish and Wildlife Mille Lacs National Wildlife Refuge, Mille Lacs Band of Ojibwe Natural Resource staff, and Leech Lake Band of Ojibwe Natural Resources staff, and MN DNR Biological Survey and Ecological and Water Resources. We reviewed the previous season and discussed future collaboration opportunities and 2023 planned survey efforts.

Audubon Minnesota also participated in the Great Lakes Black Tern Conservation Initiative Meeting on April 19th, 2023 to hear about partner's ongoing or upcoming Black Tern monitoring and research in the Great Lake States. These states have had numerous Motus towers erected in the past year, which will hopefully increase available information about the migratory stopover areas used by certain Black Tern and Common Terns. Motus Wildlife

Tracking System (Motus) is an international collaborative research network that uses coordinated automated radio telemetry to facilitate research and education on the ecology and conservation of migratory animals. More information on Motus can be found https://motus.org.

Final Report as of June 30, 2023 (to be submitted by August 15, 2023):

Audubon's aim was to establish benchmark survey sites, to guide future conservation activities within Important Bird Areas, for three species of conservation concern: Black Tern, Common Tern and Yellow Rail. We established these important benchmark survey locations for these species, while also working closely to build collaboration and have open discussion with many different partners including: MN DNR Biological Survey, MN DNR Ecological and Water Resources, including the MN DNR State Wildlife Action Plan Coordinator, MN DNR Wildlife, U.S. Fish and Wildlife Service Division of Migratory Birds, Mille Lacs National Wildlife Refuge, U.S. Fish and Wildlife Service Upper Mississippi River-Great Lakes Joint Ventures, Voyageurs National Park, University of Minnesota Duluth Natural Resources Research Institute (NRRI), Mille Lacs Band of Ojibwe Natural Resource staff, Leech Lake Band of Ojibwe Natural Resources staff, and Chippewa National Forest staff. The findings and partner relationships built will help guide collaborative conservation efforts going forward for these three priority bird species.

Audubon, in partnership with NRRI, completed a thorough investigation of Black Tern colonies within Important Bird Areas in Minnesota. As a part of this grant, Audubon completed the most complete survey of Yellow Rail in the state of Minnesota in over a decade with an estimated 78 individual rail documented. This information will be crucial for the continued monitoring and management for Yellow Rail. Lastly, Audubon looked at historical records from the Minnesota Breeding Bird Atlas to determine which historical occupancies to explore for new Common Tern nesting locations. Several lakes in the Brainerd area were surveyed and Pelican Lake in Crow Wing County was found to have a colony of 60 or more Common Tern.

Our initial plans for this grant were written in 2018, well before Covid-19 affected everyone's lives and plans in 2020 and beyond. Due to the complications from the Covid pandemic we had to pivot from our plans to utilize volunteers and newly hired Audubon staff to instead have existing Audubon staff work with researchers and experienced wildlife professionals the three focal species to document benchmark survey sites. We proposed documenting detailed habitat metrics at each benchmark site to determine the occupancy relationship as it relates to habitat composition and structure. However, based on staff and contractor time, expertise, budget, and Covid-19 restrictions, we had to rely on mapping for some of that information.

Audubon organized and held several partner meetings centering on our focal species. Common Tern Partners Meetings were held to recap the 2021 and 2022 breeding seasons. Partner meetings were attended by staff from U.S. Fish and Wildlife- Mille Lacs National Wildlife Refuge, Mille Lacs Band of Ojibwe Natural Resource staff, Leech Lake Band of Ojibwe Natural Resources staff, and MN DNR Biological Survey and Ecological and Water Resources staff. Yellow Rail partner meetings occurred in 2021, 2022, and early 2023. These meetings were attended by MN DNR Biological Survey and Ecological and Water Resources, including the MN DNR State Wildlife Action Plan Coordinator, U.S. Fish and Wildlife Service Division of Migratory Birds staff, U.S. Fish and Wildlife Service Upper Mississippi River-Great Lakes Joint Ventures staff, and Voyageurs National Park staff.

Overall Project Outcome and Results (from Abstract)

Common Tern and Black Tern are colonial waterbirds that have been declining for decades in Minnesota and in other portions of the Great Lake States due to many factors including habitat loss, interspecific species competition, predation, and human caused disturbances. In Minnesota, Common Tern are State Threatened species and Black Tern are a Species of Greatest Conservation Need. Yellow Rail are a secretive marshbird that much remains unknown about their life history and is a Special Concern Species in MN. With this project, Audubon established benchmark survey sites to guide future restoration and enhancement activities within Important Bird Areas (IBAs). The project had numerous partnership building successes, bringing natural resource professionals together from all over the state, Great Lakes region, and Canada to discuss the conservation and

monitoring of these three species. Audubon documented a new Common Tern nesting location for the first time in over a decade, conducted the most comprehensive Yellow Rail survey in over a decade with an estimated 78 individual Rail documented, and partnered with NRRI to conduct a thorough investigation of Black Tern benchmark survey locations in Minnesota IBAs. The data and information collected under this project has been entered into Minnesota's Natural Heritage Information System (NHIS), a database that provides information on Minnesota's rare plants, animals, native plant communities. The NHIS is continually updated as new information becomes available, and is the most complete source of data on Minnesota's rare or otherwise significant species. This work benefits all Minnesotan's as we work to conserve these species which have a critical habitat role and are part of Minnesota's rich natural heritage. Land managers and natural resource staff across state and federal agencies, tribal, and non-profit partners can use these benchmark survey locations to guide habitat to management benefit these species for better population outcomes.

III. PROJECT ACTIVITIES AND OUTCOMES:

ACTIVITY 1 Title: ***Implementation Area Site Selection***
Description: *Use the MN BBA and Important Bird Areas to establish focal benchmark marshbird survey locations. Site selection will be done via remote sensing using GIS and input from partnership collaboration. Then in-person site visits will determine the suitability of locations for the focal species.*

ACTIVITY 1 ENRTF BUDGET: $15,000
AMOUNT SPENT: $15,000
BALANCE: $0.00

Outcome	Completion Date
1. Conduct cross analysis of Breeding Bird Atlas data and IBA criterion	*Fall 2019*
2. Create GIS layer of benchmark sites to ground truth	*Winter 2019*
3. Ground truth and formalize benchmark site selection	*Spring 2020*

First Update as of May 1, 2020
Work towards outcome 1 is underway for Black Terns as Audubon has shared IBA data with NRRI who maintain MNBBA data. The ability to ground-truth benchmark sites is at risk this year because of COVID-19 and will likely need to be postponed until 2021. In late summer of 2020, we will have a better grasp on what can and cannot be completed in 2020.

Second Update as of November 1, 2020
The first two outcomes are complete for Black Terns and outcome three is halfway complete (ground-truthed in 2020 and now to be formalized with additional partners). A total of 14 Important Bird Areas were identified across the state as potential locations to establish long-term Black Tern monitoring locations.

Third Update as of May 1, 2021
The analysis of benchmark sites for yellow rail occurred in the winter of 2020 and spring of 2021. Ground-truthing of survey route locations began in April 2021 and will continue into early May. Final site selection is currently underway for the 2021 field season.

Fourth Update as of November 1, 2021
During the winter of 2021 and early spring of 2022 we will use GIS and information from state partners to establish benchmark sites for common terns. Ground-truthing efforts for the survey route locations will began in early spring 2022 in preparation for the 2022 common tern breeding season surveys.

Fifth Update as of May 1, 2022

Audubon researched existing breeding locations of common terns in the state and after discussion with partners, discovered that regular surveys occur to monitor the known breeding populations of common terns in the state. We talked with the Natural Resources Research Institute (NRRI) researchers, DNR non-game division biologists, U.S. Fish and Wildlife staff, Mille Lacs Band of Ojibwe Natural Resource staff, Leech Lake Band of Ojibwe Natural Resources staff who are all conducting monitoring at the four established common tern breeding locations. Historical records in the Minnesota Breeding Bird Atlas documented a population that is not being monitored, Audubon Minnesota plans to conduct surveys of this population in 2022. This survey work would be conducted by boat and on foot.

Additionally, we learned that Mille Lacs Band natural resources staff have had an artificial nesting platform out on both Mille Lacs Lake and on smaller Ogechie Lake at different times for Common Terns. We looked at plans and photos of other artificial nesting platforms and we plan to work together to enhance the platform for better outcomes. The platforms on Mille Lacs Lake have not been successful in the past, but it is clear that common terns in different states and areas prefer different kinds of artificial nesting conditions depending on the particular site conditions and it takes some trial and error. Some considerations we are researching are wave action, wave height, how sheltered the platform is, the vegetation height if present, presence of shelter for chicks, as well as the types of predators or threats present at the site (mink, owl, fox, raccoon, osprey, etc.). Additionally, competition for limited space with other bird species like ring-billed gulls, double-crested cormorants, and white pelicans along with higher water levels have decreased common tern nesting success on natural islands in Mille Lacs Lake and Leech Lake in the past.

The changes to the existing platform that Mille Lacs Band natural resources staff plan to include are:

- removing the overhead lines (meant to deter gulls)
- dropping the height of the side walls to 2-2.5 feet
- ensuring a layer of small pebbles of at least 2-3 inches deep covers the platform
- ensuring the placement of common tern decoys on the platform
- adding a common tern audio lure from a weather-proof speaker as an additional attractant

Our partners plan to update the group on the nesting platform project over the course of the breeding season. If the platform proves successful in attracting common terns to nest, there may be more interest in recreating similar projects on other surrounding lakes with common tern activity.

Update as of June 30, 2022:

Project extended to June 30, 2023 by LCCMR 6/30/22 as a result of M.L. 2022, Chp.94, Sec. 2, Subd. 19, legislative extension criteria being met.

Sixth Update as of November 1, 2022:

After reviewing historical breeding data from the Minnesota Breeding Bird Atlas and discussing monitoring efforts with our partners, we decided to focus survey efforts on lakes that had a high probability of breeding but little information recorded on the status or population numbers. We took into account which lakes in Minnesota had common tern pair sightings or evidence of breeding in the last 10-15 years. We found brief mentions of incidental findings of breeding common terns at Pelican Lake in Crow Wing County (2010) and Baby Lake in Cass County (2016). Audubon Minnesota decided to conduct initial monitoring on both lakes the end of June and early July.

Amazingly, we were able to document over 60 adult Common Tern resting and nesting on the [redacted] in Pelican Lake. [redacted] and has a significant ring-billed gull breeding population on the [redacted]. There were common tern nests with eggs present on the [redacted] which we observed during a flush survey to accurate census the breeding population.

While walking in the water [redacted] the nests were visible but the camouflage of the eggs among the rocks was impressive. After the flush survey, we observed the common tern colony return and return to the nests once we were a safe distance away. We propose this be an additional benchmark site for continued monitoring and possible future enhancement work. Because [redacted] is privately owned, working with the landowner would be critical to future nesting success in this location. The water levels for Pelican Lake were very high when we surveyed and the nests were in a precarious position with only feet of dry land on either side of the nests. We noted five additional common tern on or near [redacted] on Pelican Lake where they would alight on small willow shrubs on the [redacted]. In low water years, [redacted] could serve as additional nesting habitat but it was unclear if nesting attempts had occurred earlier in June and failed. Further surveys at this site would help us track consistency of breeding of this population. See images in Addendum B.

Water levels in Baby Lake in Cass County were high as well in 2022 and there were no sign of common tern at the most likely nesting spots on the lake's islands, rocky spits, or shorelines. An additional survey visit in 2023 could confirm the absence of common tern breeding on Baby Lake. See images in Addendum B.

Seventh Update as of May 1, 2023:
Audubon will complete a second survey of the Common Tern breeding location on Pelican Lake in Crow Wing County to finalize the site as a new benchmark site for Minnesota during the spring of 2023. Information on this breeding colony has been shared with Minnesota MN DNR Biological Survey and Ecological and Water Resources staff as they are a state-threatened species in Minnesota. Location information from Black Tern, Yellow Rail, and Common Tern surveys gathered as a result from this grant will be entered into the Natural Heritage Information System (NHIS) for Minnesota which is managed by the MN DNR and "provides information on Minnesota's rare plants, animals, native plant communities, and other rare features.
The NHIS is continually updated as new information becomes available, and is the most complete source of data on Minnesota's rare or otherwise significant species, native plant communities, and other natural features. Its purpose is to foster better understanding and conservation of these features." according to the Minnesota DNR. More information can be found at www.dnr.state.mn.us/nhnrp/nhis.html.

Final Report as of June 30, 2023 (to be submitted by August 15, 2023):

Audubon's relationship with partners was crucial to the success of the benchmark site selection for all three focal species. The project team worked to cross-reference Important Bird Area (IBA) and Breeding Bird Atlas (MNBBA) data to identify benchmark sites. Audubon staff worked closely with staff from the Natural Resources Research Institute at the University of Minnesota, Duluth (NRRI), who maintain the MNBBA data. With the Covid Pandemic affecting the first and then later, the second, seasons of field work, Audubon shifted away from volunteers helping with the marshbird survey site selection and surveys and instead we focused our efforts on the three focal species, Black Tern, Yellow Rail, and Common Tern. Despite the setbacks, Audubon and NRRI planned and conducted summer surveys at Black Tern colonies identified in the MNBBA, but with some gaps in full count and habitat data. The surveys aligned with survey protocols from other Great Lakes' States in order to support regional population estimate and trend analyses.

Audubon used remote sensing information, including aerial imagery, LiDAR, and vegetation classification, to key in on the IBAs with suitable habitat for focal species and fine tune survey locations for in-person site visits. Site suitability was assessed on site prior to survey efforts to ensure that habitat conditions met the requirements for each species. Species detection and data will be available to partnering organizations to improve survey techniques and further improve a data-driven approach to remote site selection. This data will also improve collective knowledge on current species distributions and how changing climate conditions may impact species future habitat selection.

ACTIVITY 2 Title: *Data Collection*

Description: *Conduct two seasons of data collection at benchmark (staff) and marshbird survey (volunteers) sites. Field staff will use point count and secretive marshbird survey protocols. A non-invasive, small, video capable drone will be used to gain visual access to inaccessible marsh habitats. Report on findings and develop management recommendations for ongoing restoration and enhancement work.*

ACTIVITY 2 ENRTF BUDGET: $109,000
AMOUNT SPENT: $106,721
BALANCE: $2,279

Outcome	Completion Date
1. Coordinate volunteers in continued marshbird survey effort statewide	*2020 -2021*
2. Hire field staff to collect two field seasons of benchmark species and habitat data	*2020-2021*
3. Field staff will use non-invasive, small, video capable drone to gain visual access to inaccessible marsh habitats.	*2020-2021*
3. Analyze and report on benchmark survey efforts, work to integrate recommendations into existing habitat management for these focal species	*2021*

First Update as of May 1, 2020
Field work with volunteers is not possible with COVID-19 and therefore we are focusing this effort on 2021. Prior to the outbreak project team members spent time conducting initial site visits of the potential benchmark sites.

Second Update as of November 1, 2020
Due to restrictions associated with Covid-19, no volunteers were recruited for this project in 2020. Surveys were conducted by NRRI. 10-min point-counts were used to document all observations of Black Terns present. Observations of Common Terns were also noted and vegetation surveys were conducted at each point.
A report from NRRI is currently in production. With a more complete survey effort in 2021 we are on track to incorporate long-term monitoring recommendations into existing habitat management plans for each species by the end of 2021.

Third Update as of May 1, 2021
Due to continued restrictions and safety concerns associated with Covid-19, no volunteers were recruited for this project in 2021. Instead, Audubon will hire an experienced marshbird surveyor to conduct night surveys for yellow rails in prioritized locations within the Important Bird Areas. Pending legislative approval of a one-year extension due to Covid-19, common tern benchmark surveys could occur this year or next field season with the help of partners.

Fourth Update as of November 1, 2021
Audubon set up and surveyed yellow rail benchmark routes over the course of the 2021 breeding season (specifics regarding survey locations and yellow rail detected in the Important Bird Areas in 2021 can be found on the attached addendum E). Analysis of species occupancy and the corresponding habitat data is ongoing. These results will be shared with state and federal partners to develop proper management recommendations for each survey location.

Fifth Update as of May 1, 2022
Audubon is working on entering yellow rail data from the 2021 field season into the Minnesota Natural Heritage Information System (NHIS) Database. These new yellow rail detections will be available to all agencies and non-profits that have current NHIS licenses, upon the next NHIS update.

Knowing where yellow rail are actively breeding will help inform where habitat management for yellow rail can be enhanced through vegetation management and water level management where possible. Audubon will be following up with area managers where yellow rail were detected and discussing management options.

Update as of June 30, 2022:

Project extended to June 30, 2023 by LCCMR 6/30/22 as a result of M.L. 2022, Chp.94, Sec. 2, Subd. 19, legislative extension criteria being met.

Sixth Update as of November 1, 2022:
Audubon Minnesota is planning to host a common tern Partner Meeting this fall, where partners can share updates about breeding successes or challenges from the 2022 breeding season. The discussion will center on the four main benchmark sites and any new sites, like Pelican Lake (Crow Wing County). We also hope to identify and discuss what the needs are at each benchmark site and how habitat protection or habitat enhancement could potentially improve breeding success in some cases.

One concern the common tern partners discussed in July was the 2022 avian influenza outbreak. It was estimated by Leech Lake Band of Ojibwe Natural Resources Management Wildlife staff that the mortality from avian influenza was at least 100-150 Caspian Tern, 100-150 gulls, 50 American White Pelican, 20-30 Double-crested Cormorant, and several Common Tern on Leech Lake. Luckily, there was no documented Common Tern mortality for the Lake Superior populations or the colonies on Lake of the Woods. The Minnesota DNR Ecological and Waters Resource Division staff did note that six deceased pelicans were found on one of the islands in Lake of the Woods and that nesting of all species seemed to be down including common tern.
High water may have played a role in common tern numbers being down but would not account for the other species population declines there as they typically nest on higher ground.

Audubon plans to host another Yellow Rail Working Group meeting with partners in late fall or early winter to discuss how yellow rail surveys may be conducted on a more regular basis at benchmark sites.
Additional discussions will take place with key partners on how the Statewide Marshbird Survey could be organized and surveyed by Audubon and partners or volunteers on a semi-regular basis.

Seventh Update as of May 1, 2023:
Audubon will be concluding the benchmark monitoring at the new Common Tern breeding location on Pelican Lake in Crow Wing County this June, 2023. Work will be ongoing to integrate new benchmark survey recommendations for all three species into existing habitat management for these focal species in Minnesota for the final report.

Final Report as of June 30, 2023 (to be submitted before August 15, 2023):

We had planned for the recruitment of volunteers for marshbird surveys, however, we faced a number of setbacks that prevented this effort. First, the required survey protocol for secretive marshbirds is unlike other citizen science projects due to demanding site conditions (dense vegetation and low light settings) that hinder movement and proved to be troublesome for even experienced surveyors. Furthermore, this recruitment effort was affected by the COVID-19 pandemic, which limited travel and prohibited group activities such as in-person training sessions. As a result, the combination of difficult survey conditions and the unprecedented situation of the pandemic, created barriers that could not be overcome during the timeline of this grant. We resorted to hiring professional surveyors and utilizing Audubon staff to conduct solo surveys in order to safely survey the bird populations and meet the planned deliverables.

Audubon staff used remotely sensed information to select portions of Important Bird Areas with suitable habitat for the focal species to filter survey locations for in-person site visits. In our original proposal, we had planned to

use an unmanned aerial system (UAS) to aid in site selection but decided against this method as professional surveyors were hired for the majority of the survey effort. During the planning phase for this project, we conducted extensive research on the practicality of utilizing a UAS for site selection and identified some limitations. Sensors on board UAS platforms excel at overhead analysis, however important site conditions such as horizontal vegetation structure and community composition are difficult to ascertain. These conditions can be easily evaluated by trained and experienced surveyors which is the method we ultimately decided to use given the setbacks stated above.

Survey results for each species are as follows:

Black Tern Findings

Black Terns (*Chlidonias niger*) nest in wetlands and marsh habitats in the upper Midwest and great plains. Black Tern populations are experiencing statistically significant declines regionally, and in Minnesota and are listed as Species of Greatest Conservation Need (SGCN) by the Minnesota DNR. Audubon Minnesota contracted the Natural Resources Research Institute (NRRI) in Duluth, MN to identify benchmark survey locations and conduct breeding surveys of Black Terns in Important Bird Areas (IBAs) in Minnesota.

Potential survey sites were identified by creating a GIS layer of potential benchmark sites in IBAs where Black Tern were observed during the latest Minnesota Breeding Bird Atlas. This analysis produced 14 IBAs (Figure 1), within which 1-3 potential terrestrial survey locations were identified based on scouting by surveyors. Once the best survey location(s) was determined, the surveyor conducted a 10-min point-count from the shore or edge of the wetland to document all observations of Black Terns present.
Observations of Common Terns were also noted. Black Tern counts and vegetation surveys were conducted simultaneously at each point-count location between the dates of 11 – 24 June, 2020 (Table 1).

Surveys were conducted from sunrise to early afternoon (~15:00) during favorable weather conditions (i.e., only when there was no sustained rain or heavy fog and when the wind speed was < 18 mph (Beaufort scale wind of 4 or less)). All shoreline counts were conducted by a single observer. Upon arrival, the wetland was scanned from various locations along the shoreline using binoculars and a spotting scope. When terns were detected, the shoreline count began. For the purpose of these counts, a colony could consist of multiple sub-colonies 100-300 m apart. If groups of terns were > 800 m away, they were treated as a separate colony. If no terns were observed during scouting or if accessibility to a given IBA was difficult or not possible, that was noted.

Vegetation Surveys

At each specified tern monitoring point-count location, observers also conducted a vegetation survey, which was a modified version of the National Protocol Framework for the Inventory and Monitoring of Waterbirds and their Habitats, which was provided by Audubon Minnesota. Surveys consisted of a full-circle unlimited-distance visual assessment of habitat (dominant vegetation cover) and landscape features (e.g. interspersion) with the estimated location of the colony being the centroid. Observers should be able to visually assess >70% of the area surrounding the point-count. If <70% could be visually assessed from that location, additional vantage points were added, if possible.

Results and Discussion

A total of 20 survey locations were identified within 9 IBAs across the state and one survey location was identified on Higgins Lake, just outside of the Carlos Avery IBA. Trained surveyors conducted 10-minute unlimited radius point counts at each location in the summer of 2020. Black Terns were either not observed, or sites were inaccessible, at five of the IBAs visited (IBA ID: 7, 9, 23, 25, and 33).

Sites were surveyed once between the dates of June 11 – 24, 2020, although several IBAs were visited on multiple occasions to try to find either additional or new survey locations. A total of 299 adult Black Terns were observed during the course of these surveys. Of the 20 survey locations visited, NRRI recommended 15 survey points in 9 IBAs become part of the long-term monitoring plan for Black Terns in MN. Because surveys were restricted to land, estimating the location of nests was not feasible because most colonies were located too far away to visibly observe nests and/or vegetation height obscured views. Black Tern observations and vegetation surveys were recorded in the field using an iPad. Therefore, all data were entered digitally using an online data entry system.

Important Bird Area (IBA) Specific Survey Results

Agassiz National Wildlife Refuge (1)

A total of 106 Black Terns were observed from four survey points, which were established within the Agassiz NWR (Fig. 2). Survey point AG.1 was conducted at Parker Pool and has a nice observation deck which made for easy access to this location. This was the only survey location from which an official survey was conducted and where 37 Black Terns were observed. Survey point AG.2 was located at Farmes Pool where the largest number of black terns were observed in any of the IBAs surveyed (n = 55). However, this survey location was situated slightly outside of the Agassiz NWR IBA and therefore a formal survey was not conducted. If this is not an issue, we suggest this survey location be included in a long-term monitoring plan. Survey points AG.3 and AG.4 were located at Agassiz Pool, both of which were highly accessible and a smaller number of terns were observed, however, no formal surveys were conducted at either of these locations. Sites AG.3 and AG.4 could serve as backup survey points or additional survey points if desired.
Recommended: For the Agassiz NWR IBA, we recommend including survey points AG.1 and AG.2 (Parker Pool and Farmes Pool) in the long-term monitoring plan. These sites had the largest numbers of Black Terns observed and were easily accessible.

Camp Ripley-Pillsbury-Lake Alexander IBA (7)

We were unable to visit or conduct any formal surveys at the Camp Ripley-Pillsbury-Lake Alexander IBA due to an insufficient amount of time available to request access to the military reservation and travel restrictions associated with Covid-19. All roads were gated. Several lakes and ponds that appeared to have suitable habitat and were located in the IBA, but not part of the military lands, were visited, however, terns were not observed. Based on these restrictions, we cannot make a formal recommendation for or against including this IBA in long-term monitoring plan for Black Terns. We recommend this IBA be visited during the 2021 breeding season to determine whether it is appropriate to include in future monitoring efforts.

Carlos Avery (8) and Higgins Lake IBAs

A total of 17 Black Terns were observed at two survey points established within the Carlos Avery IBA and one survey point located near Higgins Lake, just outside the Carlos Avery IBA (Fig. 3). The lakes within the Carlos Avery IBA are heavily populated with residential homes and there also seems to be a lack of appropriate breeding habitat. However, the central portion of the IBA is the most promising location because it is part of a Wildlife Management Area (WMA) and has suitable marsh vegetation. Survey points CL.1 and CL.2 were both located near pools in the WMA, where surveys were conducted on the sides of dirt roads. Black Tern observations in this IBA were low, but could vary annually based on habitat availability. The survey point on Higgins Lake (HL.1) is very near Carlos Avery (Fig. 3).

This site is not very accessible by land, but it does seem promising, perhaps if access by boat was an option. ***Recommended:*** For the Carlos Avery IBA, although the number of Black Terns observed in 2020 was low, there is appropriate habitat available which could accommodate larger numbers of nesting terns. Therefore, we recommend survey points CA.1, CA.2, and HL.1 be included for long-term monitoring.

Chippewa Plains IBA (9)

A total of five lakes (Leech Lake, Walker Bay, White Oak Lake, Big Rice Lake, and Rice Lake) and a number of small ponds located in the Chippewa Plains IBA were scouted during the 2020 breeding season. However, there were no Black Terns observed at any of these locations and much of the shoreline was difficult to access due to private property. Aside from accessibility issues, there didn't appear to be suitable nesting habitat for Black Terns. Some of the smaller lakes that were scouted appeared to have suitable habitat but no terns were observed. Common Terns were observed on Leech Lake, where there is a known breeding colony, but they were very distant and difficult to count. Because there were no Black Tern observations within the Chippewa Plains IBA, we did not conduct any tern or vegetation surveys and cannot make a recommendation for or against including this IBA in Audubon's long-term monitoring plan. We recommend scouting locations within this IBA or attempting to access locations with appropriate habitat by boat.

Kittson-Roseau Aspen Parkland IBA (20)

A total of 27 Black Terns were observed from one survey point established within the Kittson-Roseau Aspen Parkland IBA (Fig. 4). This survey point (KR.1) was located at Twin Lakes, which has a nice observation deck, but requires a spotting scope for easy observation of terns. ***Recommended:*** We recommend KR.1 be included in the long-term monitoring plan due to the number of birds observed, ease of access, and proximity to IBAs 1 & 50.

Lac Qui Parle-Big Stone IBA (21)

A total of five Black Terns were observed at one survey location (LQP.1) within the Lac Qui Parle-Big Stone IBA (Fig. 5). Two survey locations were identified (LQP.1 and LQP.2). A small colony of five birds was located in a small wetland in a pasture between agricultural fields. Although expansive, the wetlands within this IBA did not appear to have a lot of appropriate marsh habitat for breeding Black Terns. There were no Black Terns observed from survey point LQP.2 and therefore a formal survey was not conducted. However, the habitat was appropriate and it could be considered as a backup or additional survey location. ***Recommended:*** We recommend LQP.1 be included in the long-term monitoring plan. Although a small number of terns were observed, it appeared to be one of the only accessible locations within this IBA with suitable nesting habitat for Black Terns.

Lake Maria State Park- Henry Larson County Forest IBA (23)

Sugar and Ida Lakes, located within the Lake Maria State Park- Henry Larson County Forest IBA, were scouted during the 2020 breeding season. Most of the lakes in this IBA were on private land and there appeared to be a lot of human activity and not a lot of appropriate nesting habitat for Black Terns. There were no Black Terns observed during the scouting of this IBA and therefore no tern or vegetation monitoring points established. Therefore, we cannot make a recommendation for a location to include in a long-term monitoring plan for this IBA.

Lake Osakis IBA (25)

Lake Osakis, located within the Lake Osakis IBA was scouted during the 2020 breeding season. The majority of the shoreline along this lake was residential so access was limited. From the public access points, there were no Black Terns observed. Although terns may have been present in other locations within the lake, it was difficult to assess from the public access points. It may be worth spending some additional time looking for access points on this lake or using a boat to scout the area. There were no Black Terns observed during the scouting of this IBA and therefore no tern or vegetation monitoring points established. Therefore, we cannot make a recommendation for a location to include in a long-term monitoring plan for this IBA.

Mille Lacs IBA (28)

A total of 23 Black Terns were observed at one survey location (ML.1) on Rice Lake in the Mille Lacs IBA (Fig. 6). The survey point was established on Hesitation WMA, a small WMA that provided public access to Rice Lake. It has a nice floating dock which allows for easy access and good visibility. There were also Common Terns observed on Mille Lacs Lake, where there is a known established colony. ***Recommended:*** We recommend survey point ML.1 be included in the long-term monitoring plan. There is good habitat available for nesting Black Terns and the survey location is relatively close to an established Audubon marshbird survey monitoring route (Fig. 6).

North Metro Mississippi River IBA (33)

Rice Lake, Mud Lake, and Goose Lake located in the Elm Creek Park Reserve within the North Metro Mississippi River IBA were scouted during the 2020 breeding season. Access points to this IBA were limited due to being heavily populated and because it lies within a state park. The park had a lot of human activity and did not appear to have appropriate nesting habitat for Black Terns. There were no Black Terns observed during the scouting of this IBA and therefore no tern or vegetation monitoring points established. Therefore, we cannot make a recommendation for a location to include in a long-term monitoring plan for this IBA.

Sherburne National Wildlife Refuge IBA (41)

A total of 24 Black Terns were observed from two survey locations (SH.1 and SH.2) on Pool 14 and Stickney Pool located around Prairie's Edge Wildlife Drive in the Sherburne NWR (Fig. 7). Sub colonies of Black Terns were observed within both of these survey locations. ***Recommended:*** We recommend including SH.1 and SH.2 in the long-term monitoring plan. Both of these sites have suitable habitat for nesting terns, observation decks, and safe places to stop and observe birds.

Swan Lake IBA (48)

A total of 20 Black Terns were observed at survey point SL.1 on Swan Lake in the Swan Lake IBA (Fig. 8). Survey locations were also established at two additional points on Middle Lake (SL.2 and SL.3), although no terns were observed and therefore formal surveys were not conducted. Access to Swan Lake was difficult, so we recommend using a public access point to get a boat on the water to do future surveys. There is likely a larger number of Black Terns present in the middle of the lake, which was not possible to see from the land-based survey locations. Also, the survey points established on Middle Lake had very tall cattail present, making visibility difficult. Those sites may also not have appropriate nesting habitat, but do have public access, and therefore could be used to better assess conditions using a boat.

Recommended: We recommend including SL.1 in the long-term monitoring plan as it offers the best vantage point for viewing birds within this IBA. However, we would also recommend accessing this location using a boat to potentially identify a more suitable or additional survey location(s) on the water.

Thief Lake IBA (50)

A total of 73 Black Terns were observed at two survey points (TL.1 and TL.2) in the Thief Lake IBA (Fig. 9). An additional survey location was also established in this IBA (TL.3) although there were only four birds observed here, visibility low, and most terns observed were likely birds previously counted at the other survey points. Therefore, no formal count was conducted at this survey location. This point could be used as a backup location with public access. Survey point TL.1 was conducted on an observation mound in the WMA. Birds were observed everywhere on the lake and a scope is necessary for observing birds at this site. Survey point TL.2 offers an additional vantage point, although visibility was not as good as TL.1 and some of the birds were likely counted at point TL.1. A vegetation survey was only conducted at TL.1 because TL.2 was considered a sub colony using the same habitat as that recorded in TL.1. ***Recommended:*** We recommend including TL.1 and TL.2 in the long-term monitoring plan as these sites offer the best vantage points and this IBA had the highest number of Black Tern observations after Agassiz NWR.

Whitewater Valleys IBA (57)

A total of four Black Terns were observed from one survey location (WWV.1) in the Whitewater Valleys IBA (Fig. 10). This survey point was located in a small wetland complex in a cow pasture. The amount of appropriate nesting habitat for Black Terns appears to be limited in this IBA, with the exception of the northern part of the Mississippi. We had hoped to scout Dorer Pools as a potential survey location but the road was closed. ***Recommended:*** We recommend including WWV.1 in the long-term monitoring plan as this is one of the only places in the IBA that appeared to have appropriate nesting habitat for Black Terns. However, we also recommend that Dorer Pools be scouted when the road becomes accessible.

Overall Black Tern Summary

The IBAs that were scouted in 2020 represented locations within IBAs where Black Tern had been observed during the 2009-2013 MNBBA project. It is possible that Black Terns are nesting in IBAs that were scouted but where terns were not detected, as well as in other IBAs in Minnesota that were not included in this 2020 scouting effort. The IBAs that were included were chosen based on the best available breeding season data within the state. Because sites were only visited once during the 2020 breeding season and because this effort was primarily aimed at identifying potential long-term monitoring locations, there is not sufficient information to provide a meaningful summary of population or vegetation trends or how they relate to bird abundance.

With a goal of establishing long-term monitoring locations within MN IBAs to guide restoration and enhance activities within designated IBAs for Black Terns, Common Terns, and Yellow Rails, it will be important to include monitoring locations where habitat appears appropriate but where terns were not observed, terns were observed in low numbers and some adequate habitat exists, and where both bird abundance and available habitat are extensive. This will help identify key habitat features associated with occupancy and to identify IBAs where restoration activities could be implemented to enhance nesting habitat. Over time, these monitoring sites can be used to determine colony persistence and document changes in colony size, which can assist in adapting best management practices for these species in Minnesota IBAs over time.

During the scouting and survey efforts, the highest number of Black Tern observations within the nine IBAs surveyed were located in three IBAs in the northwestern portion of the state (Thief Lake, Agassiz NWR, and the Kittson-Roseau Aspen Parkland IBAs). Throughout many of the IBAs visited, shoreline access was often the limiting factor and/or appropriate nesting habitat was lacking or not visible from the land-based survey locations. It may be useful to scout some of these IBAs by boat to determine Black Terns or Common Terns occupancy and potentially identify landowners who would be willing to allow access to their property if colonies are discovered. Establishing these long-term monitoring locations is a vital step in this very important effort by Audubon and other partners to provide data-driven restoration objectives aimed at maintaining and increasing populations of these vulnerable species in the state.

Yellow Rail Findings

Yellow Rail (*Coturnicops noveboracensis)* are secretive, and like many other marsh-dwelling birds, they are difficult to survey, in large part because of their inconspicuous nature, and also due to the difficulty of accessing their preferred sedge meadow habitats. Current avian surveys such as the Breeding Bird Survey and spring Waterfowl Surveys do not effectively monitor Yellow Rails. Ranked a species of High Concern by the North American Waterbird Conservation Plan and assigned a Continental Concern Score of 15/20 by Partners in Flight, Yellow Rail are officially classified as a Special Concern Species in Minnesota and designated a Species in Greatest Conservation Need (SGCN) by the Minnesota Department of Natural Resources.
Audubon's efforts to document Yellow Rail and establish benchmark survey sites is an important step for long-term Yellow Rail monitoring and conservation in the state.

In 2021, Audubon focused remote sensing efforts on Yellow Rail benchmark site selection within potential Important Bird Areas with significant desired habitat or historical populations. Yellow Rail are a secretive marshbird species that were not well detected during the Minnesota Statewide Marshbird Survey that Audubon conducted in 2016 and 2017. Audubon undertook Yellow Rail benchmark site selection and potential survey routes in 2020 and 2021 with the Yellow Rail surveys conducted in the summer of 2021. Audubon decided to alter C. Conway's 2011 Standardized North American Marsh Bird Monitoring Protocol, which is a call broadcast survey protocol, specifically to increase detection of Yellow Rail and to account for variations in bird behavior and the potential influence of site conditions.
One of the big changes made to the protocol was running the surveys in the evening, starting surveys well after sunset which is a divergence from the Conway marshbird protocol. Often, Yellow Rail wouldn't be heard calling until around 10 pm and would be more active even later into the evening. Audubon contracted with an experienced ornithologist and marshbird surveyor, Tom Savre, who undertook the fun, but challenging work of visiting the chosen benchmark IBAs, ground-truthing and scouting habitat, setting up survey points, and running predominantly night call playback surveys for Yellow Rail. This portion of the project required a significant amount of coordination with partners on the best habitat in 2021 to be surveyed. Audubon staff coordinated with land managers and Tom to get the best real-time information about the best habitat and conditions for Yellow Rail for the months that surveys were conducted. Audubon coordinated with state, federal, and nonprofit partners to complete and submit all the correct permits for the Yellow Rail surveys in IBAs that fell within public managed lands.

Audubon also coordinated several Yellow Rail and marshbird partner meetings which were attended by U.S. Fish and Wildlife Migratory Birds and Joint Ventures staff, MN DNR Ecological and Water Resources Division staff, state marshbird surveyors, Voyageurs National Park staff, and Chippewa National Forest staff. These meetings helped us fine-tune our surveys for this work and connected marshbird monitoring staff from all over the state that are involved with the conservation of Yellow Rails or their habitat, some for the first time. Recent marshbird survey results were shared among the group and helpful discourse on marshbird and Yellow Rail natural history, past survey experiences, and preferred habitat specifics ensued.

These discussions directly influenced the rejuvenation of the Midwest Marsh Bird Working Group which held a coordination meeting for the first time in several years this spring in Lansing Michigan.

The Yellow Rail surveys conducted in the summer of 2021 were overwhelmingly successful with an estimated 78 individual Yellow Rails documented. The survey effort turned into the most comprehensive Yellow Rail survey conducted in over a decade in the state of Minnesota. These data have been added to legacy Yellow Rail detections in Minnesota's Natural Heritage Information System (NHIS) with the Minnesota DNR which will increase the overall knowledge of Yellow Rail habitat preferences and distribution in Minnesota. See Table 2 for the full list of IBAs surveyed and Yellow Rail detections.

Common Tern Findings

Common Tern (*Sterna hirundo*) are colonial waterbirds that have been declining for decades in Minnesota and in other portions of the Great Lake States due to differing factors depending on location. According to the "*Status Assessment and Conservation Recommendations for the Common Tern (Sterna hirundo) in the Great Lakes" by Cuthbert et al.*, the major factors impacting Common Tern populations are common and widespread and include habitat loss and degradation, predators, human disturbances, and pesticide contaminants, In Minnesota, their greatest challenges stem from loss of habitat due to shoreline development and water level changes. Large lake levels can fluctuate from year to year making what was a suitable nesting location one year unusable the next if it is under water.
Additionally, there are serious issues with intraspecific competition between Common Tern and Ring-billed Gull, and in some locations, Double-crested Cormorant and White Pelican. Ring-billed Gulls have become especially problematic as their population in the Great Lake States region has increases substantially and they arrive on breeding grounds weeks before Common Terns. Common Tern prefers to nest on peninsulas or islands in large bodies of water as mainland sites are more at risk from terrestrial and aerial predators and human-based disturbances. The preferred nesting substrate can vary from boulders, to round stones on a natural shoreline, to sand and gravel beaches, and even dredge spoil piles as in the Interstate Island near Duluth. Nests consist of a small scrape or depression in the rocks or substrate and vegetation preferences can vary slightly from breeding colony to colony but in general they prefer sparse vegetation without any mid or overstory coverage. During the Minnesota Breeding Bird Atlas surveys, they were considered rare and are considered to be of Moderate Conservation Concern with Continental Concern Score of 11/20 by Partners in Flight. They are designated a species of Low Concern by the North American Waterbird Conservation Plan. However, in Minnesota, the Common Tern is officially classified as a Threatened Species and is designated a Species of Greatest Conservation Need (SGCN) by the Minnesota Department of Natural Resources. Audubon Minnesota has identified it as a Target Conservation Species.

Common Tern had the best existing benchmark survey locations already established of the three focal species. There are four main breeding colonies at present: Lake of the Woods, Lake Mille Lacs (Spirit and Hennepin Islands), Leech Lake, and the Duluth-Superior Harbor and St. Louis River Estuary. Audubon reached out to all partners who had or were already involved in monitoring Common Tern in the state in addition to partners in other great lake states (WI, IL, OH, NY) and Canada. We held numerous partner meetings to gather information and input on what monitoring needs existed at the four major breeding colonies. We determined that the four major breeding locations were being monitored by various partners depending on the location, so Audubon surveyed historic breeding sites and hosted partner meetings to bring all of the Common Tern partners together for information sharing and conservation planning.

In 2022, Audubon began surveys for Common Tern presence or absence and Common Tern nesting colonies. Surveys were conducted on all mainland shoreline and island shoreline on Pelican Lake in Crow Wing County and Baby Lake in Cass County. Both of these lakes had historical detections of Common Tern pairs and warranted confirmation of continued Common Tern occupancy.

In 2023, Audubon conducted follow up surveys for Common Tern presence or absence and Common Tern nesting colonies on four selected lakes in central Minnesota as follows: one lake with a known nesting colony of Common Tern as of 2022, Pelican Lake in Crow Wing County, Minnesota; one lake which has had Common Tern nesting in the past but has not been monitored in recent years, Baby Lake in Cass County, Minnesota; and two new lakes in the vicinity of Baby Lake; Webb and Ten Mile Lake. Webb Lake and Ten Mile Lake, both in Cass County, have similar shoreline and island characteristics to Baby Lake, and Pelican Lake focusing on features that could provide suitable Common Tern nesting habitat given the right conditions.

Pelican Lake, [redacted], Crow Wing County

All mainland shoreline and islands with Common Tern desired habitat conditions were surveyed by boat in June of 2022. [redacted], is also the [redacted] on [redacted] Audubon was thrilled when we got close to the [redacted] and immediately saw Common Tern fishing and flying with the addition of a few least tern and a Caspian Tern. Approximately 60 individuals or 30 pair of Common Tern were found to be nesting on [redacted], the first-time nesting had been documented here since 2010.

The Ring-billed gull is the dominant species nesting on the [redacted] Double-Crested Cormorants nesting there. Common Terns likely historically nested [redacted] but due to competition for available sites with gulls, are now relegated to the [redacted] constantly at risk from wave action due to the recent water levels and the windy conditions on Pelican Lake which can easily produce waves of several feet in height. The Common Tern nesting here seem to have a plentiful source of small fish [redacted] providing quick and close food for chicks allowing them to stay close to nests.

[redacted] was also surveyed by boat in June of 2023. Sadly, the survey results of this year's survey paint a very difficult year for the Common Tern on [redacted]. Upon approaching [redacted], we observed Common Tern flying and fishing but there were about half the number of terns in the air as last year, about 35 birds in total. This year there were 20 Ring-billed Gulls, 10 Caspian Tern, and one Least Tern also on the rocky point. There was sign of much more human and domesticated animal disturbance on the island in general including a metal statue, an old armchair, fire rings, and domesticated dog scat all along the point where Common Tern nest. None of this was present in 2022. There were roughly nine adult Common Tern carcasses littering the ground around the picnic table in addition to at least that many Ring-billed gull carcasses. It was unclear what caused the Common Tern and Ring-billed Gull deaths but possibilities include human caused, a wild predator, domesticated dog/s, or Avian Influenza and then scavengers moving the carcasses. There were only two active nests with three eggs found during the flush count survey in 2023. It is unclear if there were more nests previously that failed when adult birds died or because of disturbance events. No nest failure remains were noticed at the time of survey but there were adult bird bones along the shoreline. [redacted]. Audubon reached out to a manager to discuss signage options and hopes to work with the landholder to erect signage for education of the public to deter human and dog activity on both of [redacted] nesting points. These efforts may help to protect these declining state-threatened species.

Baby Lake, Cass County, Portion of Lake in Chippewa Plains IBA

All mainland shoreline and islands with Common Tern preferred habitat conditions were surveyed by boat. Water levels were quite high in both the summers of 2022 and 2023 which affects how much of rocky islands and peninsulas are exposed as potential nesting habitat for Common Tern. No Common Tern were observed during surveys in June of 2022 or June of 2023.

Ten Mile Lake, Cass County, Portion of Lake in Chippewa Plains IBA

All mainland shoreline and islands with Common Tern preferred habitat conditions were surveyed by boat in 2023. While there are potential sites for Common Tern nesting during lower water years, there were no Common Tern observed on Ten Mile Lake in June of 2023.

Webb Lake, Cass County, Near Chippewa Plains IBA

Similarly, to Baby Lake and Ten Mile Lake all mainland shoreline and islands with Common Tern preferred habitat conditions were surveyed by boat in 2023. While there are potential sites for Common Tern nesting during lower water years, there were no Common Tern observed on Webb Lake in June of 2023.

Lake of the Woods- State IBA

Lake of the Woods IBA is a State recognized IBA. As of the 1930s, Common Tern nested on Big Oak and Fourblock Islands within Lake of the Woods in addition to Pine and Curry's Island, a sand spit at the time that are now small islands during low water years. Currently, the MN DNR Ecological and Water Resources Nongame Wildlife Department monitors the current Common Tern Breeding Colonies [redacted] with the help of local contractors and boat operators as needed. Common Tern and Ring-billed Gulls are nesting alongside each other [redacted] and the Common Tern presence and nest success have varied depending on the year.

Lake Mille Lacs (Spirit and Hennepin Islands)- State IBA

Spirit and Hennepin Islands in Lake Mille Lacs comprise the smallest National Wildlife Refuge in the country, Mille Lacs National Wildlife Refuge. This National Wildlife Refuge was designated in 1915 showing how important 0.57 acres was to colonial water birds over 100 years ago. Hennepin Island also falls within the Mille Lacs Band of Ojibwe Reservation so the Tribe's Natural Resource Staff are a close partner of the U.S. Fish and Wildlife Service. On the ground monitoring of Common Tern at Lake Mille Lacs by the U.S. Fish and Wildlife has been hampered by dangerous conditions with shifting boulders on Hennepin Island. Common Tern have not had a known nesting attempt on Spirit Island since 1998. To have accurate Common Tern nesting counts, surveyors ideally need to be on the islands to differentiate the camouflaged tern eggs from rocks and other colonial bird eggs. Constant winter ice shift pushes and moves the island's large boulders making walking and climbing over the boulders treacherous. Currently, drones are not an option for U.S. Fish and Wildlife Service and National Wildlife Refuge lands due to the potential international security risk. The Refuge staff do monitor the islands from boats annually.

The Mille Lacs Band of Ojibwe Natural Resources staff have tried to entice Common Tern to nest on pontoon platforms on both Leech Lake and Lake Ogechie, a small, narrow and calm lake adjacent to Leech Lake.

The nesting platforms have several inches of gravel as nesting substrate and have warnings on them to detour human disturbance of the platforms. The Tribe has tried various modifications including netting and side walls to deter gulls from nesting on the platforms. Audubon organized two nesting platform discussions where nesting platform plans were shared and different designs and approaches used in Canada and other Great Lake States were discussed. Guest speaker Lee Harper of Riveredge Environmental Inc. in New York presented about aluminum box framed, raised nesting beds, with decking and gravel that were very successful for the St. Lawrence River Common Tern colony. Lee had also worked on artificial island creation for tern nesting and shared photos with the group. Additionally, Andrea Chreston, Project Manager of Toronto and Region Conservation (TRCA) at Tommy Thompson Park, presented on their artificial nesting platforms for Common Tern that were very successful. The floating platforms had angled metal sides and were positioned in small inland ponds within the park's peninsula which jutted out into Lake Ontario.
After hearing suggestions about Common Tern call lures successfully used on other platforms for Common Tern the Tribe decided to order a weatherproof speaker to play Common Tern recordings from their platform.

Chippewa Plains- Global IBA

Leech Lake is a recognized as a Global Important Bird Area and is critical habitat for a host of Species of Greatest Conservation Need (SGCN) bird species. Common Tern at Leech Lake are monitored annually by the Leech Lake Band of Ojibwa Natural Resources staff within the Fish, Wildlife and Plant Department. Islands historically used by Common Tern include Gull Island, Little Pelican Island, and Pelican Island.
Interspecific species competition with Ring-billed Gulls, lake water level changes, disturbance by humans, predators, have all been ongoing problems in addition to the recent threat that Avian Influenza poses for colonial nesting birds. The Leech Lake Ojibwa Natural Resources staff have worked hard to address challenges the terns have faced and have succeeded in maintaining a breeding population of 100–200 pairs since 2004 (Hamilton and Cuthbert 2016). Recently, some Common Terns and Ring-billed Gulls have been nesting on the largest island, Pelican Island.

Duluth-Superior Harbor- St. Louis River Estuary State IBA

The St. Louis River Estuary is recognized as a State Important Bird Area. This unique area witnesses much more human disturbance and impacts than some of the other benchmark survey locations. Because of the challenges Common Tern faced in this area, the Minnesota and Wisconsin Departments of Natural Resources acquired and undertook management of a dredge-spoil island created in the 1940s called Interstate Island. According to Minnesota's Breeding Bird Atlas the island is relatively inaccessible to the public and is intensively managed to reduce vegetation and Ring-billed Gull predation. According to NRRI, this site has consistently supported an average of approximately 190 breeding pairs since 1989 (Penning and Cuthbert 1993; A. Bracey and F. Strand, pers. Comm to MN Breeding Bird Atlas staff).

Overall Common Tern Summary

Throughout many of the IBAs and lakes visited, shoreline access and/or appropriate nesting habitat was lacking or not visible from the land-based survey locations. All of the four well-established Common Tern colonies in addition to the new colony located on Pelican Lake in Crow Wing County are only accessible by boat. It may be useful to scout additional IBAs or lakes with the right shoreline or islands by boat to determine Common Tern or Black Tern occupancy. If new colonies are discovered, outreach to shoreline landowners who would be willing to allow access to their property would be critical to ongoing monitoring success. Going forward, a potential tool for increasing or maintaining monitoring effort may be aerial imagery from drones, where sensible, as there could be less disturbance to nesting terns as compared to flush count surveys.

This work will help identify active colonies and key habitat features associated with occupancy and to identify Important Bird Areas (IBAs) where enhancement or restoration activities could be implemented to improve nesting habitat. Over time, these monitoring sites can be used to determine colony persistence and document changes in colony size and distribution, which can assist in adapting best management practices for these species in Minnesota IBAs over time.
Establishing these long-term monitoring locations is a vital step in this important effort by Audubon and all of the partners to provide data-driven restoration objectives aimed at maintaining and increasing populations of these vulnerable species in the Minnesota.

IV. DISSEMINATION: Over the course of the project, we will work closely with our partners in the Minnesota Department of Natural Resources, U.S. Fish and Wildlife Service, University of Minnesota- Duluth and others to keep them updated on project progress. Focal species will benefit from regular communication among working group partners (Joint Venture Great Lakes Waterbird group; Midwest Marsh Bird Working Group, Black Tern Initiative, and Common Tern Working Group). These partners will be instrumental in the development and execution of adaptive-management associated with monitoring. Audubon's communication team will work to place newsworthy stories on Audubon's websites, national magazine, and in the media. A dedicated webpage for the project will be created on mn.audubon.org. This page will depict the project overview and also updates and results.

The Minnesota Environment and Natural Resources Trust Fund (ENRTF) will be acknowledged through use of the trust fund logo or attribution language on project print and electronic media, publications, signage, and other communications per the ENRTF Acknowledgement Guidelines.

First Update as of May 1, 2020—waived by LCCMR

Second Update as of November 1, 2020—waived by LCCMR

Third Update as of May 1, 2021
In late winter, Audubon Minnesota reached out to Anna Sidie-Slettedahl regarding her past yellow rail detections. Anna graciously provided Audubon Minnesota with shapefiles of her former marshbird survey routes and those survey points that had yellow rail detections. This first-hand information and other detection sources such as the Breeding Bird Atlas data, Minnesota Ornithologists' Union postings, e-Bird, and Natural Heritage Information System data helped inform the route selection.
Audubon Minnesota set up a zoom meeting in early April 2021 to touch base and coordinate survey efforts with Steve Stucker, an Avian Ecologist with Minnesota DNR's Minnesota Biological Survey. Steve is a yellow rail expert and has very likely heard more yellow rails than anyone in the state. He provided valuable anecdotal knowledge regarding ideal water depth in sedge meadows and other site conditions and past MN DNR yellow rail survey effort history. Additional coordination with non-game wildlife research staff and endangered/threatened species research staff will occur. We have discussed the project with each DNR and U.S. Fish and Wildlife Service property manager while working with staff on Special Use Permits for the various property divisions. Some property managers have offered to meet with Audubon Minnesota staff and the yellow rail surveyor to provide site-specific particulars.
Many DNR staff shared their memorable experiences hearing or seeing yellow rails with us. Audubon will continue to network with partners about this project and will work to disseminate timely updates via our website and social media.

Fourth Update as of November 1, 2021
Audubon Minnesota worked closely with a number of organizations and agencies to identify suitable survey habitat on the properties that they manage, which enabled the success of the yellow rail surveys. This project is likely the most comprehensive yellow rail survey to be completed in a single season in the state of Minnesota. This data will be of great interest to the conservation community at large. Audubon is currently working through the field data that was collected over the past two breeding seasons.

Fifth Update as of May 1, 2022
Audubon Minnesota has been coordinating several working group meetings on colonial waterbirds, yellow rail survey efforts, as well as artificial nesting platform discussions for the common tern. Artificial nesting platforms for common terns have proven successful in other states and in a regional park in Toronto, Canada.

Audubon has hosted three working group meetings focused on common tern and two on yellow rail with many partners in the last four months. Participating partners included: the U.S. Fish and Wildlife Service (USFWS) Mille Lacs National Wildlife Refuge and Sherburne National Wildlife Refuge staff, Leech Lake Band of Ojibwe Natural Resource staff, Mille Lacs Band of Ojibwe Natural Resource staff, USFWS Joint Ventures and Migratory Bird staff members, a private consultant in New York State, Audubon Great Lakes ecological staff, project management staff at Tommy Thompson Park at Toronto and Region Conservation Authority (TRCA), and Minnesota DNR Ecological and Water Resources Division staff.
Audubon created a repository for relevant resources for common tern nesting platforms including PowerPoints, photos, and artificial nesting platform plans gathered from partners. We are actively working on a similar resource folder for yellow rail survey protocols, relevant journal articles, and data sharing. The partners in the yellow rail working group discussed several potential future funding opportunities and the coordinator of the Midwest Marsh Bird Working Group discussed an interest in meeting this year to coordinate marshbird work in the Great Lake states after hearing everyone discuss yellow rail surveys.

Update as of June 30, 2022:

Project extended to June 30, 2023 by LCCMR 6/30/22 as a result of M.L. 2022, Chp.94, Sec. 2, Subd. 19, legislative extension criteria being met.

Sixth Update as of November 1, 2022:
Audubon Minnesota is working on website content to summarize information about our efforts to develop the focal species benchmark survey locations and other relevant information we have gathered from this work. Once the colonial waterbird partners meet, we hope to share some news about the common tern-breeding season and the breeding colony on Pelican Lake via social media.

Seventh Update as of May 1, 2023:
Audubon is developing website content for this project and plans to have the websites operational by late spring or early summer of 2023. The National Audubon Society website template has been undergoing revisions delaying the production of new pages for state and regional offices.

Final Report as of June 30, 2023 (to be submitted on or before August 15, 2023):

Due to the sensitive nature of some of the species detections and known breeding locations, the distribution of exact survey locations must be thoughtfully approached. Exact survey and detection locations have been shared with LCCMR, the MN DNR NHIS, and site-specific partners. Due to their conservation status, we plan to widely distribute the significance of this work and the benefit to overall conservation of the three species. Furthermore, future collaboration with trusted partner organizations is planned to share detailed findings from the 2023 field season, to discuss future collaborations, and next steps.

This collaboration will foster conservation efforts that can be driven by data and can provide insight on the overall distribution within the state and future population trends in light of a changing climate and continued land use changes. Audubon has been in communication with all involved partners with regular check-ins and focal species-specific meetings, to increase communication and collaboration as we develop a more comprehensive marsh and waterbird monitoring plan. We feel that these efforts strike a balance of informing others on the broader trends of these three species while protecting the important breeding habitats of these Species of Greatest Conservation Need (SGCN). Audubon has a dedicated webpage for the project which can be found at https://mn.audubon.org/birds/priority-birds/conservation-focal-species and plans to make additional updates and improvements to the page in the late summer and fall of 2023.

Regular communication among focal species working group partners is critical to any kind of large-scale species conservation effort (Leech Lake Band of Ojibwe, Mille Lacs Band of Ojibwe natural resources staff, NRRI, Joint Venture Great Lakes Waterbird members, Black Tern Initiative, Common Tern Working Group, U.S. Fish and Wildlife Migratory Bird and Refuge staff, MN DNR staff from multiple divisions, Audubon Great Lakes). These partners will be instrumental in the development and execution of adaptive-management plans associated with monitoring outcomes.

Audubon will continue to work with partnering organizations and land managers in future years after the conclusion of this grant with the aim of continuing to improve habitat and outcomes for these focal species. More education on these important Minnesota birds and their role in ecosystems would raise awareness and inspire action locally to improve habitat on private lands and mitigate harm to these declining bird species.

V. ADDITIONAL BUDGET INFORMATION:

A. Personnel and Capital Expenditures

Explanation of Capital Expenditures Greater Than $5,000: N/A

Explanation of Use of Classified Staff: N/A

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

Enter Total Estimated Personnel Hours for entire duration of project: 3,182	Divide total personnel hours by 2,080 hours in 1 yr = TOTAL FTE: 1.53

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

Enter Total Estimated Contract Personnel Hours for entire duration of project: 80	Divide total contract hours by 2,080 hours in 1 yr = TOTAL FTE: .04

VI. PROJECT PARTNERS:

A. Partners outside of project manager's organization receiving ENRTF funding
N/A

B. Partners outside of project manager's organization NOT receiving ENRTF funding

Name	Title	Affiliation	Role
Stephanie Beilke	**Conservation Science Manager**	**Audubon**	**Great Lakes Black Tern working group coordination**
Rachael Pierce	**Migratory Bird Biologist**	**USFWS**	**Regional Marshbird monitoring coordination**
Anna Sidie-Slettedahl	**Assistant Coordinator**	**USFWS Upper MS River & Great Lakes Region JV**	**Yellow Rail expertise and collaboration**
TBD	**TBD**	**Multiple entities**	**Common Tern Working group**

VII. LONG-TERM- IMPLEMENTATION AND FUNDING:

This project focuses on implementing the management plans (MN Conservation Blueprint for Bird Conservation, 2014) for three benchmark species. We have built a solid foundation of monitoring information to guide this work and look to address specific habitat requirements of these species to advise ongoing restoration work. Audubon's role is to use the information gathered from these benchmark survey sites to provide recommendations to area managers working to conserve these focal species. There is potential for long term monitoring of avian use in these survey sites at 5 to 10 year intervals. If needed, we would seek additional funding from available state or federal resources for the follow-up monitoring activities.

VIII. REPORTING REQUIREMENTS:

- Project status update reports will be submitted May 1 and November 1 each year of the project
- A final report and associated products will be submitted between **June 30 and August 15, 2023.**

IX. SEE ADDITIONAL WORK PLAN COMPONENTS:

A. Budget Spreadsheet
B. Visual Component or Map
C. Parcel List Spreadsheet
D. Acquisition, Easements, and Restoration Requirements
E. Research Addendum

B. Visual Components

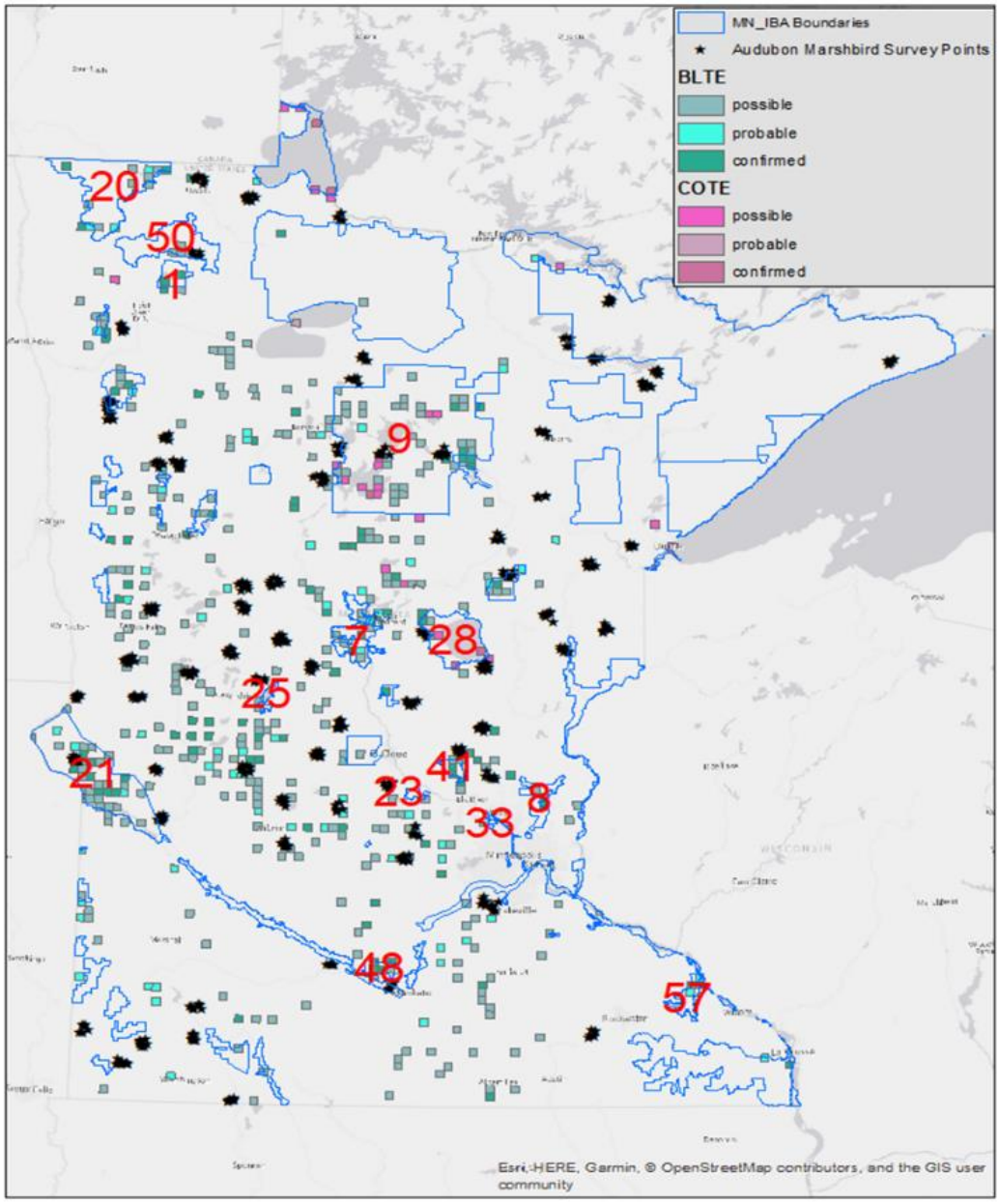


Figure 1. Location of Important Bird Areas (IBAs; MN_IBA_Boundaries) in Minnesota. Unique identification of IBAs selected to be scouted in 2020 are listed numerically (in red) and correspond to IBA ID in Table 1 (n = 14). Black Tern (BLTE) and Common Tern (COTE) observations (possible, probable, and confirmed nesting) are based on the Minnesota Breeding Bird Atlas (MNBBA) data. Locations of Audubon's Statewide Marshbird survey points are also included. NRRI.

Table 1. List of potential Important Bird Area (IBA) Black Tern monitoring locations for the 2020 field season. Unique IBA identification numbers (IBA ID) correspond with locations in Figure 1. The breeding status for each species; Black Tern (BLTE) and Common Tern (COTE) is based on Minnesota Breeding Bird Atlas (MNBBA) data. These breeding codes, listed in order of increasing importance are; possible, probable, and confirmed. No = species was not detected at this location during the MNBBA or Audubon Statewide Marshbird survey. We also state whether an Audubon Statewide Marshbird Survey route is located within the IBA. NRRI.

IBA ID	IBA Name	BLTE	COTE	Audubon Marshbird Survey
1	Agassiz NWR	Confirmed	No	No
7	Camp Ripley-Pillsbury-Lake Alexander	Confirmed	No	No
8	Carlos Avery	Confirmed	No	No
9	Chippewa Plains	Confirmed	Confirmed	Yes
20	Kittson-Roseau Aspen Parkland	Probable	No	No
21	Lac Qui Parle- Big Stone IBA	Probable	No	Yes
23	Lake Maria State Park- Henry Larson County Forest	Possible	No	No
25	Lake Osakis	Possible	No	No
28	Mille Lacs	Probable	Confirmed	No
33	North Metro Mississippi River	Probable	No	No
41	Sherburne NWR	Confirmed	No	No
48	Swan Lake	Confirmed	No	No
50	Thief Lake	Possible	No	Yes
57	Whitewater Valleys	Probable	No	No

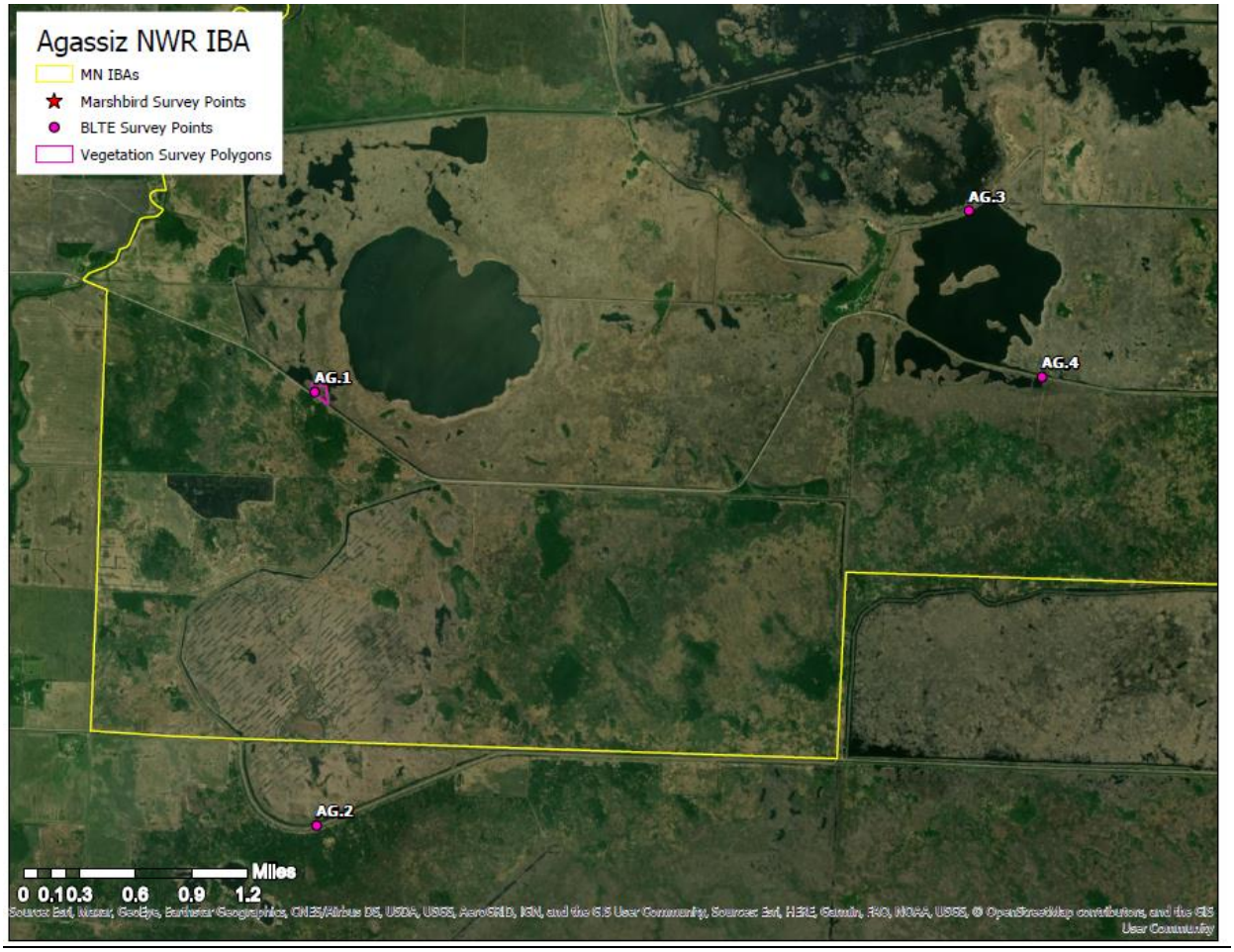


Figure 2. Potential Black Tern monitoring survey locations (*n* = 4; AG.1 – AG.4) established in the Agassiz NWR IBA in 2020. A formal survey was conducted at point AG.1, which includes the estimated range of visibility around the centroid of the vegetation survey.

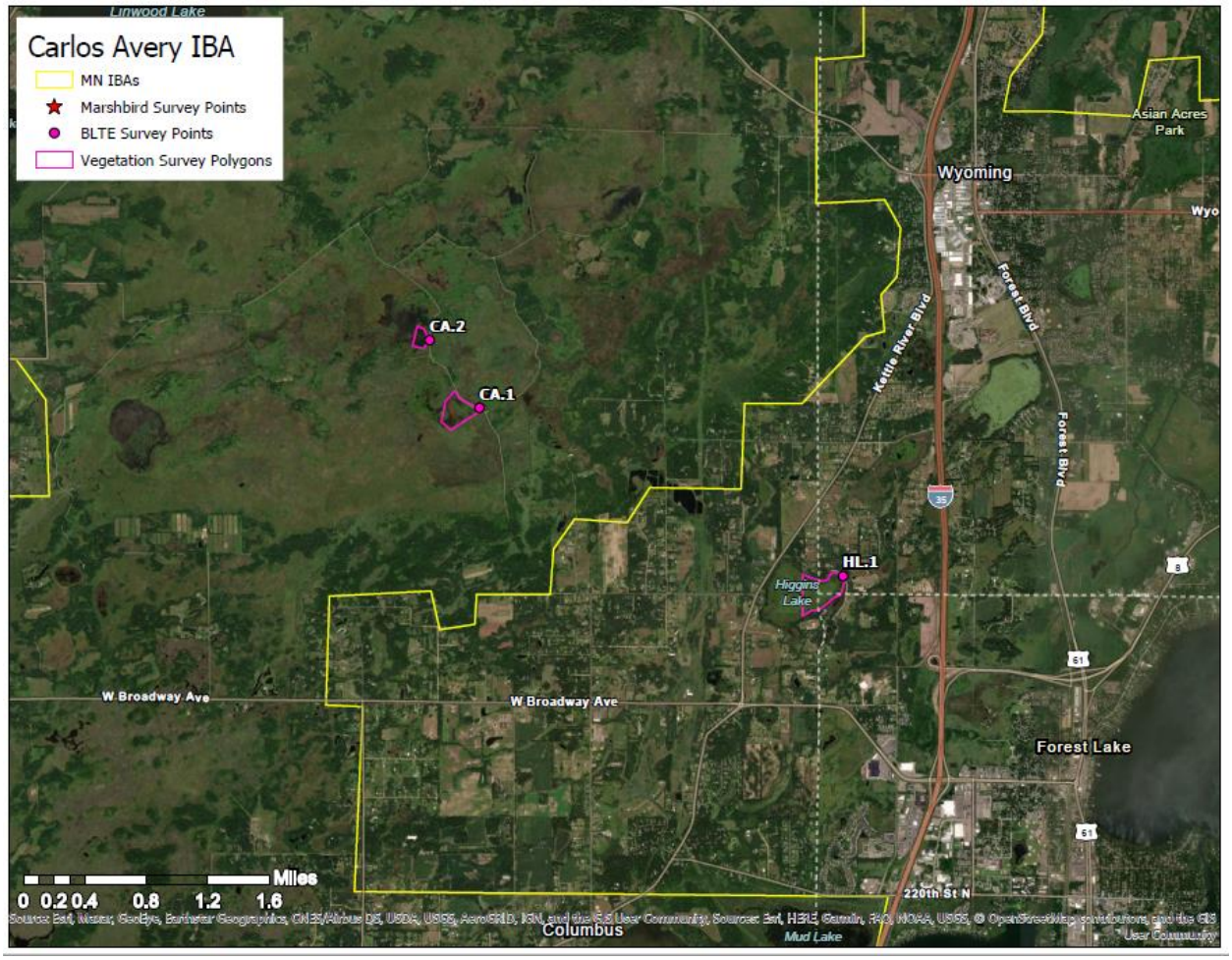


Figure 3. Potential Black Tern monitoring survey locations (*n* = 3; CA.1, CA.2, and HL.1) established in and just outside of the Carlos Avery IBA in 2020. A formal survey was conducted at each of the three points, which include the estimated range of visibility around the centroid of the vegetation survey.



Figure 4. Potential Black Tern monitoring survey location (*n* = 1; KR.1) established in the Kittson-Roseau Aspen Parklands IBA in 2020. A formal survey conducted at this point includes the estimated range of visibility around the centroid of the vegetation survey.

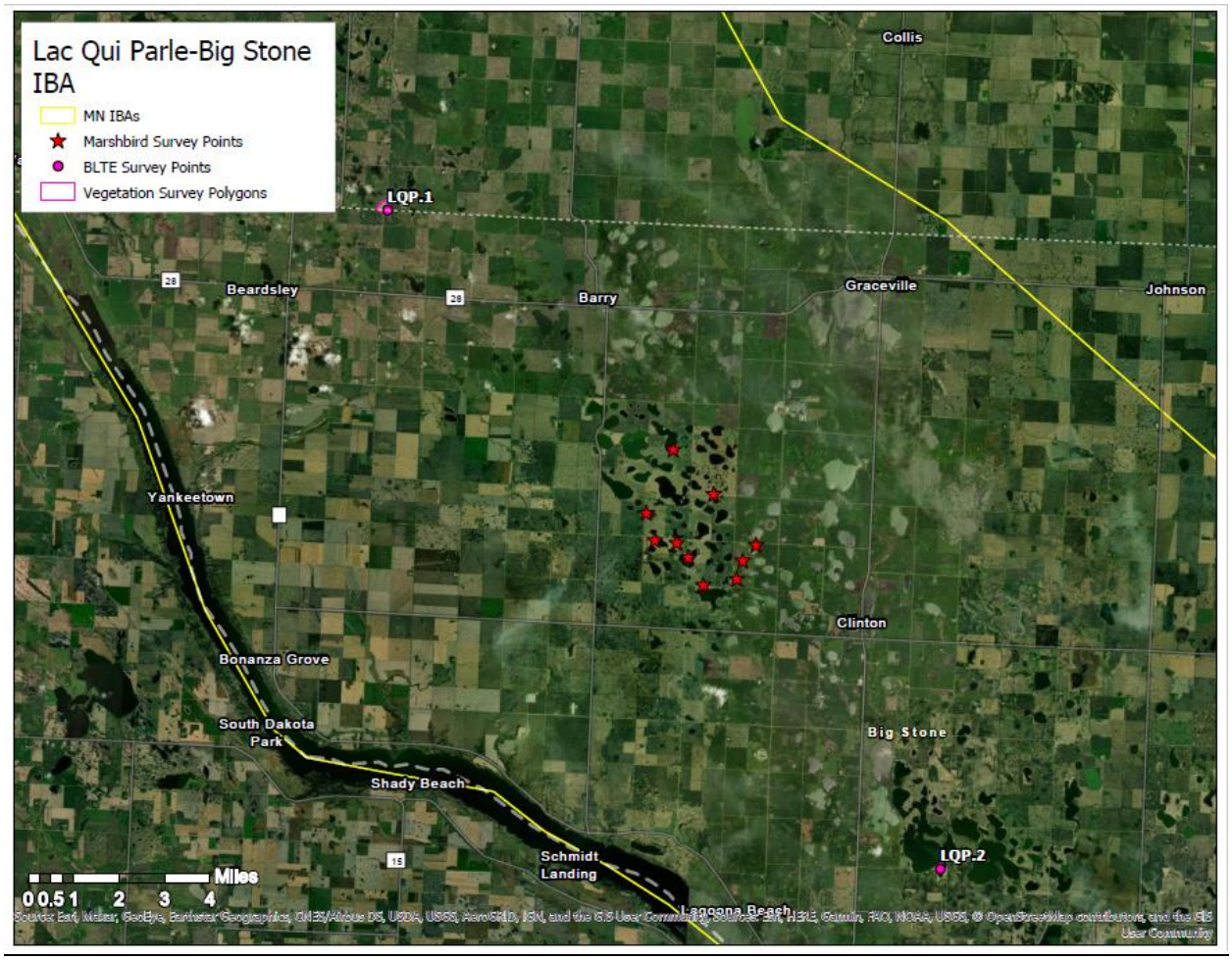


Figure 5. Potential Black Tern monitoring survey location (*n* = 1; LQP.1) established in the Lac Qui Parle-Big Stone IBA in 2020. A formal survey was conducted at this point, which includes the estimated range of visibility around the centroid of the vegetation survey. The location of Audubon's Statewide Marshbird Survey Points that occur within this IBA are also included.

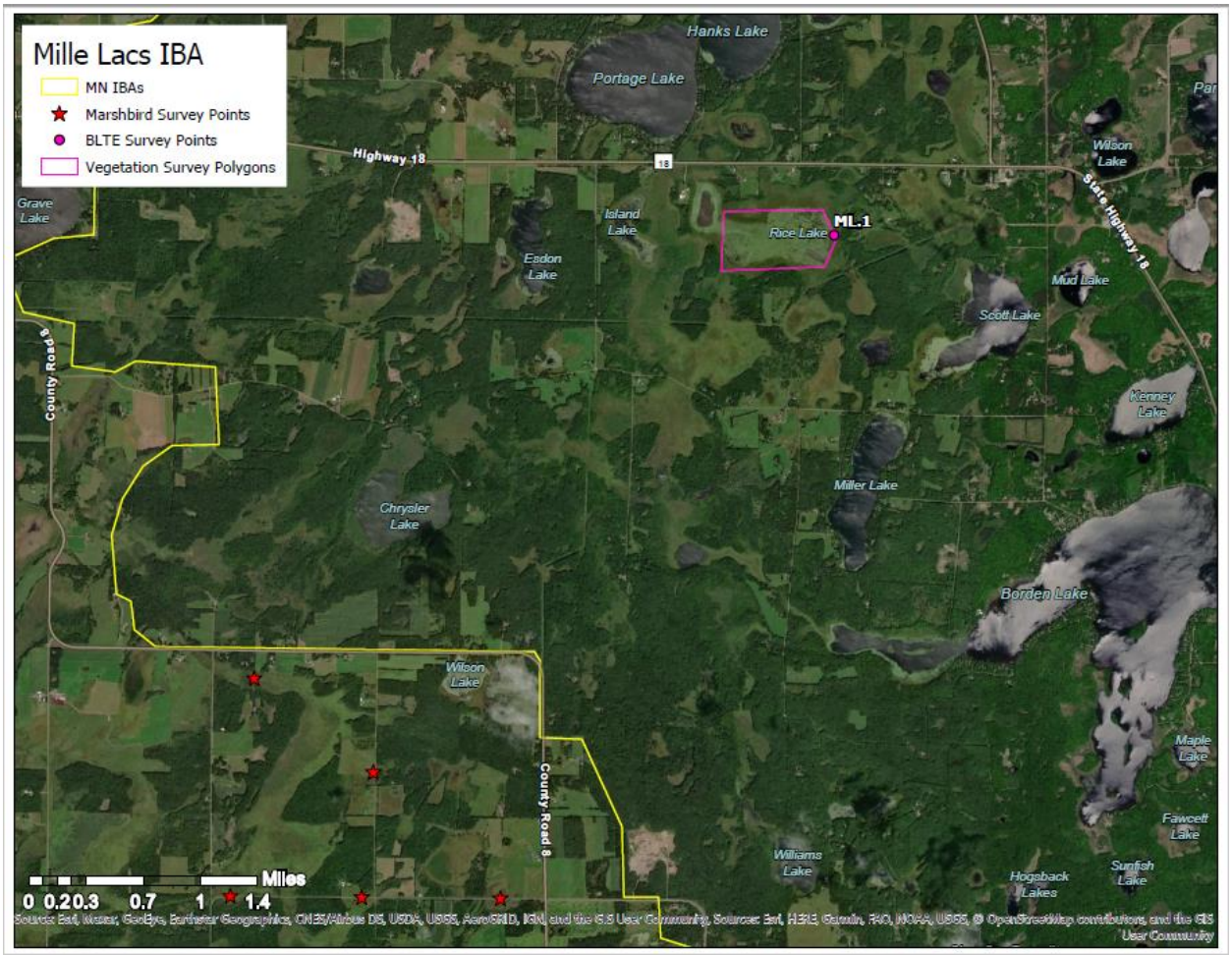


Figure 6. Potential Black Tern monitoring survey location (*n* = 1; ML.1) established in the Lac Qui Parle-Big Stone IBA in 2020. A formal survey was conducted at this point, which includes the estimated range of visibility around the centroid of the vegetation survey. The location of Audubon's Statewide Marshbird Survey Points that occur just outside the IBA are also included.

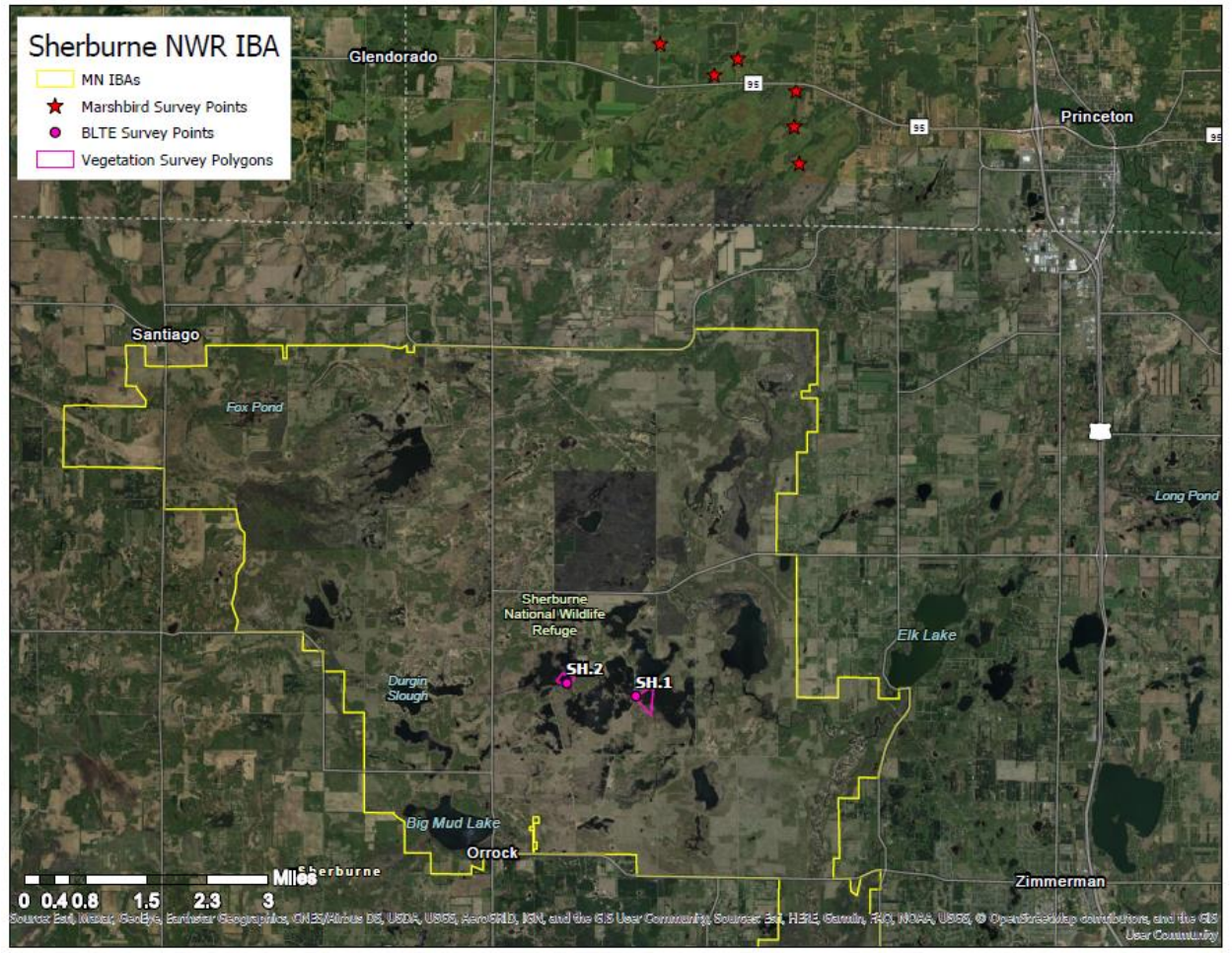


Figure 7. Potential Black Tern monitoring survey locations (*n* = 2; SH.1 and SH.2) established in the Sherburne NWR IBA in 2020. A formal survey was conducted at these points, which includes the estimated range of visibility around the centroid of the vegetation surveys. The location of Audubon's Statewide Marshbird Survey Points that occur just outside the IBA are also included.

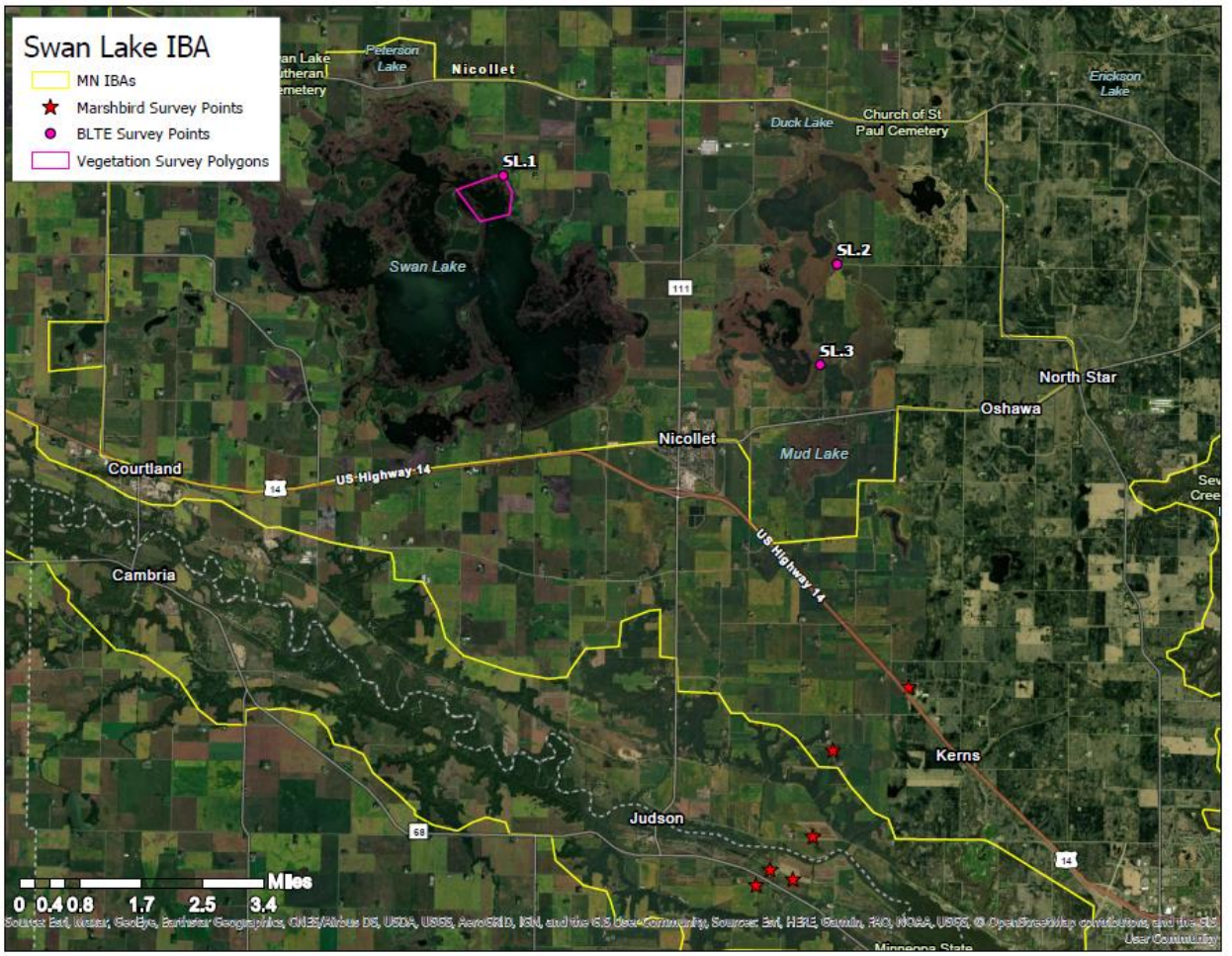


Figure 8. Potential Black Tern monitoring survey locations (*n* = 3; SL.1, SL.2, and SL.3) established in the Swan Lake IBA in 2020. A formal survey was conducted at point SL.1, which includes the estimated range of visibility around the centroid of the vegetation survey. The location of Audubon's Statewide Marshbird Survey Points that occur just outside the IBA are also included.

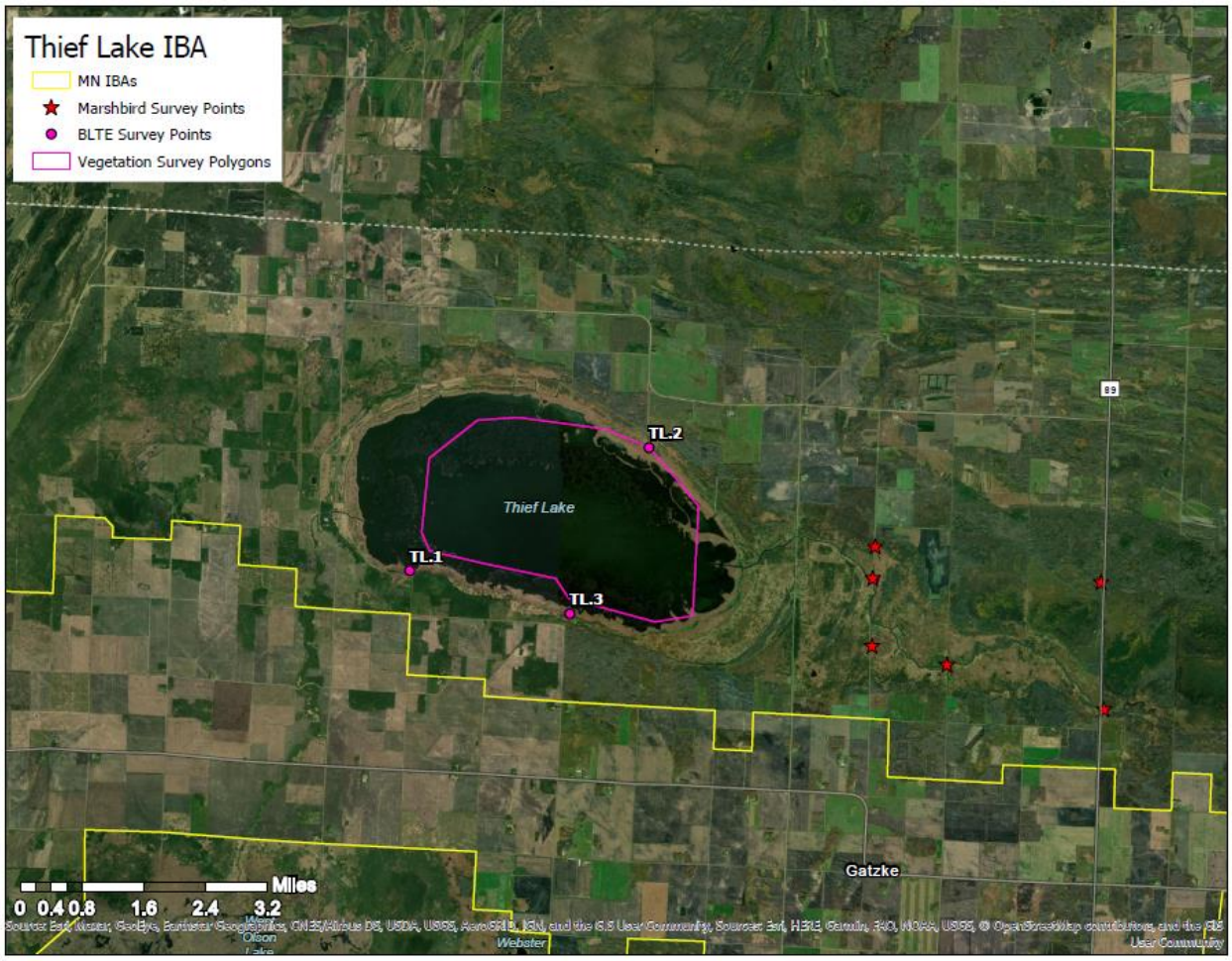


Figure 9. Potential Black Tern monitoring survey locations (*n* = 3; TL.1, TL.2, and TL.3) established in the Thief Lake IBA in 2020. A formal survey was conducted at points TL.1 and TL.2, which include the estimated range of visibility around the centroid of the vegetation surveys. At this IBA visibility was nearly the entire lake. The location of Audubon's Statewide Marshbird Survey Points that occur within the IBA are also included.

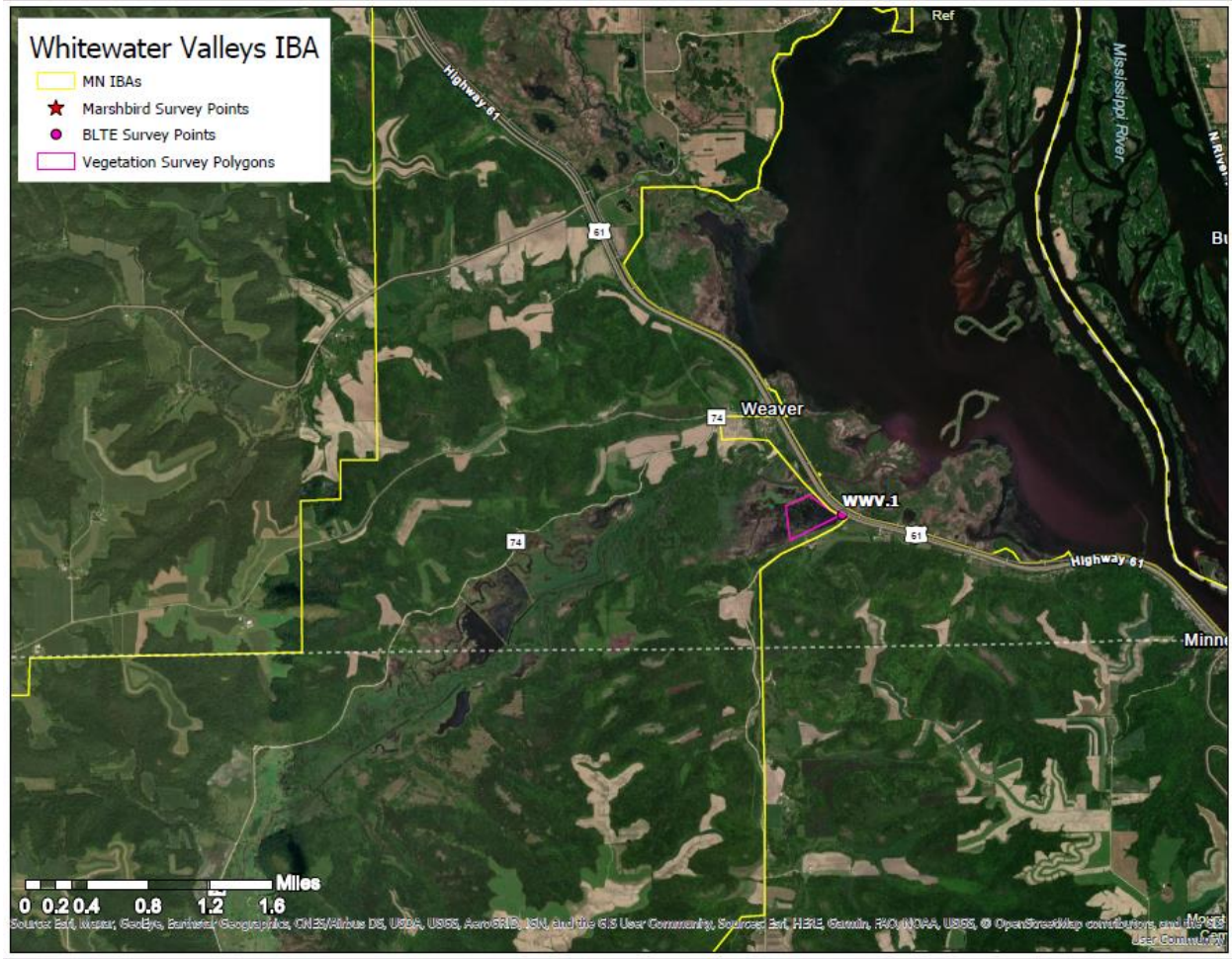


Figure 10. Potential Black Tern monitoring survey location (*n* = 1; WWV.1) established in the Whitewater Valleys IBA in 2020. A formal survey was conducted at this point, which includes the estimated range of visibility around the centroid of the vegetation survey. The location of Audubon's Statewide Marshbird Survey Points that occur just outside the IBA are also included.



Figure 11. Approaching [redacted] on Pelican Lake. [redacted]. Alex Wardwell.



Figure 12. The boat anchored during the flush count survey on [redacted], Pelican Lake. Alex Wardwell.

[redacted]



Figure 14. [redacted]



Figure 15. [redacted]. Common Tern can be seen flying above. Alex Wardwell.



Figure 16. [redacted] where Common Tern are nesting. Common Tern are visible flying above the peninsula. Alex Wardwell.



Figure 17. A potential nesting site for Common Tern during low water years on Baby Lake in Cass County. The summer of 2022 brought high water levels and there were no signs of nesting Common Tern on Baby Lake.



Figure 18. Common Tern survey photo. [redacted] June 26th, 2022.



Figure 19. [redacted] June 26th, 2022.



Figure 20. Common Tern nests with eggs. [redacted], Pelican Lake, June 26th, 2022.



Figure 21. Common Tern nests with eggs. [redacted], Pelican Lake, June 26th, 2022. Wave action and spray causing the nesting area to become wet.



Figure 22. Common Tern nests with eggs. [redacted], Pelican Lake, June 26th, 2022.



Figure 23. Common Tern nests with eggs. [redacted], Pelican Lake, June 26th, 2022.



Figure 24. Common Tern nest with eggs on a higher portion of the rocky spit. [redacted], Pelican Lake, June 26th, 2022



Figure 25. Common Tern nests with eggs. [redacted], Pelican Lake, June 26th, 2022



Figure 26. Common Tern nest with eggs tucked into stinging nettle, Virginia creeper, Canada thistle, and possibly common burdock on [redacted], Pelican Lake, June 26th, 2022.



Figure 27. Human disturbance near the nesting Common Tern [redacted], Pelican Lake. Common Tern and Ring-billed Gull remains are scattered around this area, notice the white feathers. Apologies for the raindrops on the camera lens!



Figure 28. Common Tern remains on [redacted], Pelican Lake June 23rd, 2023. Tom Savre.



Figure 29. Ring-billed Gull remains on [redacted], Pelican Lake, June 23rd, 2023. Tom Savre.



Figure 30. Common Tern nest with three eggs on Pelican Lake's [redacted]. June 23rd, 2023. Tom Savre.



Figure 31. Common Tern nest with three eggs. Only one of two active nests found on [redacted] Pelican Lake. June 23rd, 2023. Tom Savre.



Figure 32. Common Tern nest with three eggs. Second active nest found on [redacted] on Pelican Lake. June 23rd, 2023. Tom Savre.



Figure 33. Common Tern surveys on Baby Lake, Cass County. June 22nd, 2023. Tom Savre.



Figure 34. Common Tern surveys on Baby Lake, Cass County. June 22nd, 2023. Tom Savre.

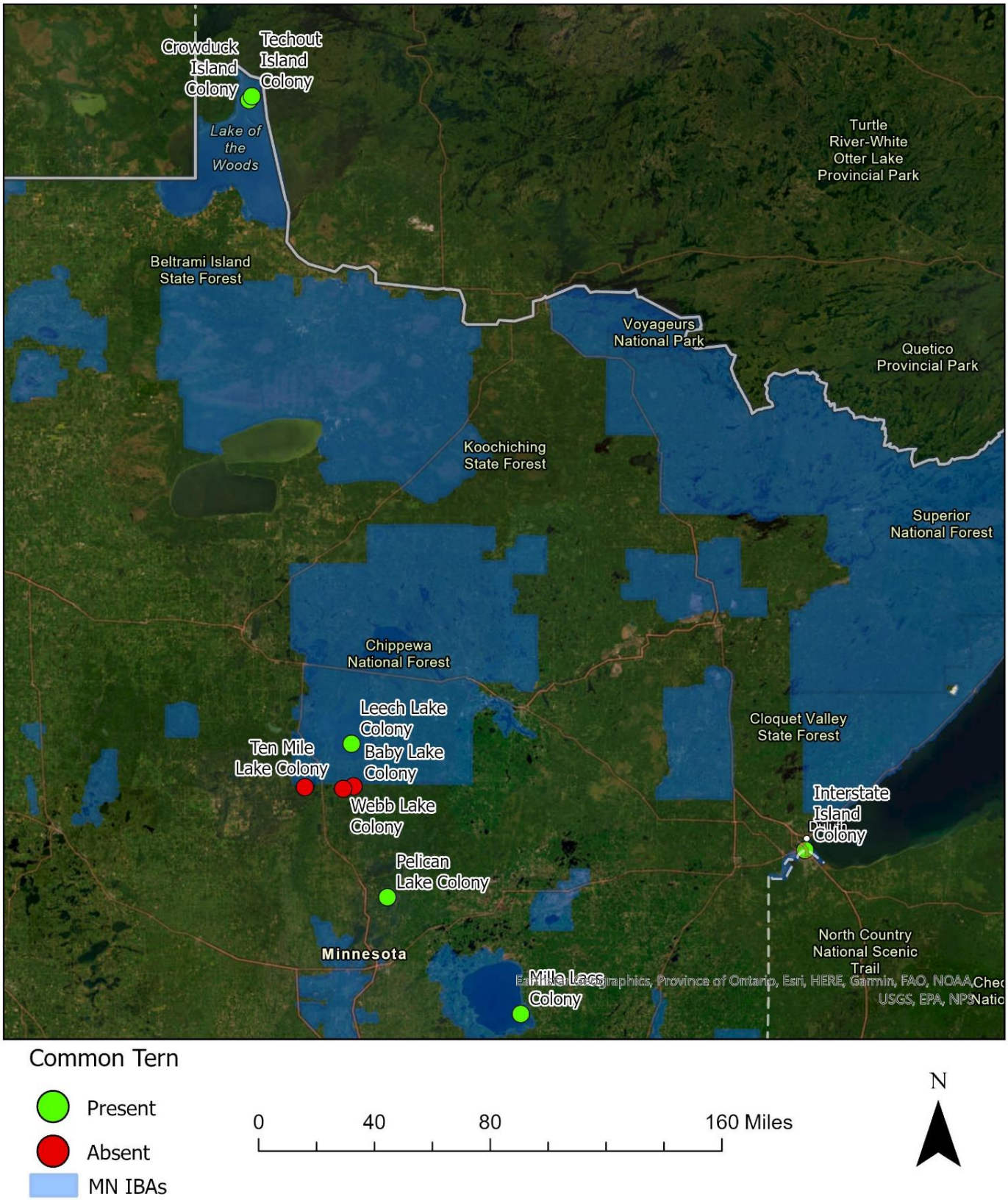


Figure 35. Map of Common Tern survey locations. Green points represent active colonies at present and the red points represent survey locations where Common Tern were absent.

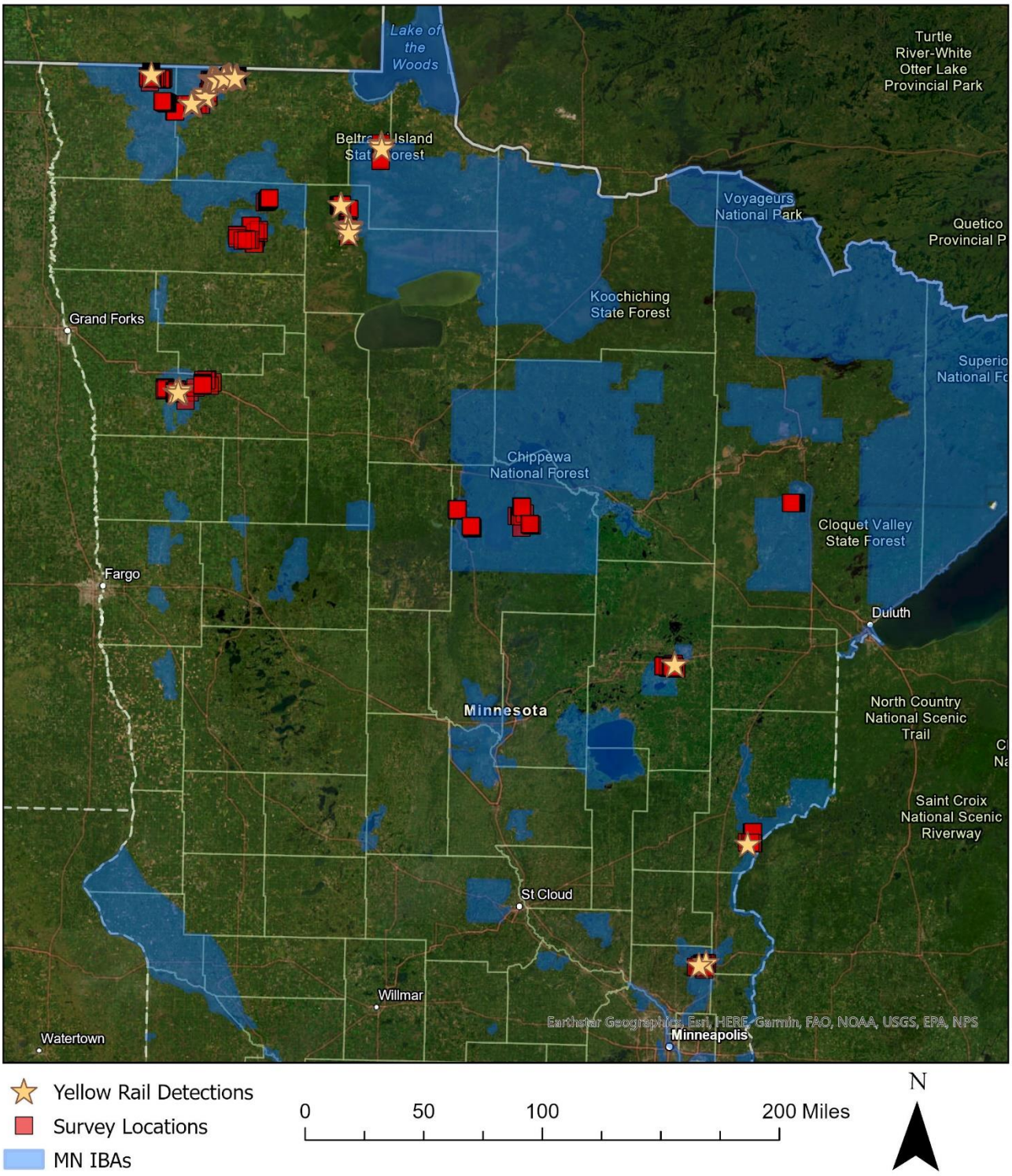


Figure 36. Map of Yellow Rail survey route locations (red squares) and Yellow Rail detections (yellow stars) with IBAs highlighted in blue.

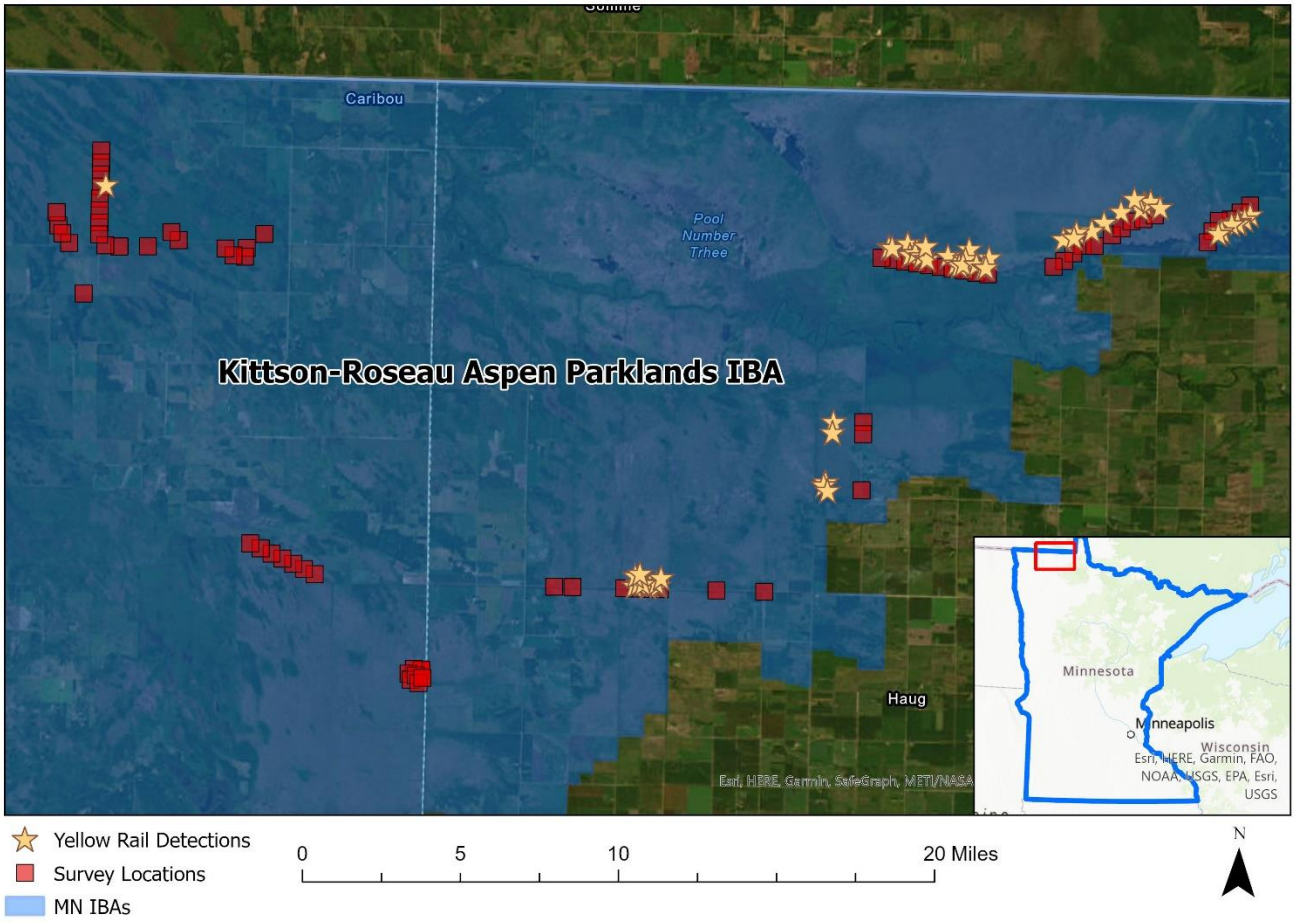


Figure 37. Map showing a focused inset on several Yellow Rail survey locations (red squares) and detections (yellow stars) within the unique and lovely Kittson-Roseau Aspen Parklands IBA.

Table 2. Yellow Rail survey locations conducted in IBAs and estimated Yellow Rail Detections. *Route established but not surveyed in 2021. [1]Minimum estimate of number of individual YERA detected during 2021 surveys - does not count multiple detections of the same bird (the second, third, or more detections of any individuals that were determined with little doubt to be same bird heard from multiple locations) but was the most conservative with regard to questionable possible multiple detections. [2]Observors best estimate of total number of YERA detected during 2021 surveys - does not count multiple detections that were determined to be the same bird heard from multiple locations - includes a few individuals that seemed like to be unique detections. [3]Maximum number of individual YERA detected during 2021 surveys. This number is the most liberal estimate with regard to questionable multiple detections. This number still does not include multiple detections that were determined to be clearly the same bird heard from multiple locations using compass bearings.

Audubon Important Bird Areas Covered by Routes		Management Units Containing Survey Routes	Established 2021		Surveyed 2021		YERA		
			Route	Points	Route	Points	Min[1]	EST[2]	Max[3]
1	Agassiz NWR	Agassiz NWR (3 Routes)	AGAS-1	10	AGAS-1	10	0	0	0
			AGAS-2	8	AGAS-2	8	0	0	0
			AGAS-3	8	AGAS-3	3	0	0	0
4	Big Bog	Beltrami Island SF (2 Routes)	BELT-1	15	BELT-1	10	5	5	6
			BELT-2	7	BELT-2	7	3	3	4
		Red Lake WMA (2 Routes)	REDL-1	11	REDL-1	10	8	9	9
			REDL-2	6	*	-	-	-	-
8	Carlos Avery	Carlos Avery WMA (1 Route)	CARL-1	13	CARL-1	9	2	2	2
9	Chippewa Plains	Battleground SF (1 Route)	BATT-1	12	BATT-1	9	0	0	0
		Welsh Lake SF (1 Route)	WELS-1	5	WELS-1	4	0	0	0
		Chippewa Nat. Forest (1 Route)	CHIP-1	7	*	-	-	-	-
13	Glacial Ridge	Glacial Ridge NWR (2 Routes)	GLAC-1	9	GLAC-1	9	3	3	3
			GLAC-2	9	*	-	-	-	-
		Typmpanuchus WMA (1 Route)	TYMP-1	6	*	-	-	-	-
		Mentor Prairie WMA (1 Route)	MENT-1	6	*	-	-	-	-
19	Kettle River Banning State Park	Chengwatana SF (1 Route)	CHEN-1	9	CHEN-1	6	1	1	1
20	Kittson-Roseau Aspen Parkland	Roseau River WMA (4 Routes)	ROSE-1	6	ROSE-1	6	7	7	8
			ROSE-2	11	ROSE-2	11	12	12	13
			ROSE-3	10	ROSE-3	10	16	18	20
			ROSE-4	11	ROSE-4	9	15	15	16
		Caribou WMA (2 Routes)	CARI-1	12	CARI-1	8	1	1	1
			CARI-2	11	*	-	-	-	-
		Beaches Lake WMA (2 Routes)	BEAC-1	7	*	-	-	-	-
			BEAC-2	7	*	-	-	-	-
27	McGregor Marsh	McGregor Marsh SNA (1 Route)	MCGR-1	12	MCGR-1	11	2	2	2
		Kimberly Marsh WMA (1 Route)	KIMB-1	4	KIMB-1	4	0	0	0
40	Sax-Zim Bog	Cloquet Valley SF (1 Route)	CLOQ-1	7	CLOQ-1	7	0	0	0
50	Thief Lake	Thief Lake WMA (1 Route)	THIE-1	7	THIE-1	7	0	0	0
		Totals	**28**	**246**	**20**	**158**	**75**	**78**	**85**



Figure 38. Sedge meadow habitat at Carlos Avery WMA (Carlos Avery IBA) during survey site scouting, May 2021.



Figure 39. Yellow Rail survey location**.** Sedge-dominated wetland at Carlos Avery WMA (Carlos Avery IBA), May 2021.



Figure 40. Yellow Rail survey location. Sedge-dominated wetland in Caribou WMA (Kittson-Roseau Aspen Parklands IBA) Mid-June 2021.



Figure 41. Yellow Rail survey location. Roseau River WMA (Kittson-Roseau Aspen Parklands IBA). Reed canary grass in the foreground, native *Phragmites* common reed grass, and a sedge wetland in the far background. Mid-June 2021.



Figure 42. Yellow Rail survey location. Roseau River WMA (Kittson-Roseau Aspen Parklands IBA). Mid-June 2021.



Figure 43. Yellow Rail survey location. Roseau River WMA (Kittson-Roseau Aspen Parklands IBA) mid-June 2021.

Appendix E.

NRRI Standard Operating Procedures for data entry (Black Tern monitoring and vegetation surveys)

Tern Monitoring Protocol

Data were entered using an online data entry system (123 Survey; https://survey123.arcgis.com/). The following information was entered at each point-count location:

- *Monitor Name:* First and Last name of observer
- *Email:* Observers email address
- *Phone:* Observers phone number
- *Location Name:* Unique identification name or number associated with the point-count location within each IBA
- *Sub colony name (in applicable)*: Name each sub colony if several are present (could be based on their location within the wetland complex, i.e. North Sub colony, East Sub colony)
-
- *Survey Period:* Survey Period 1 (June 1 -30) or Survey Period 2 (July 1 – 31)
- *Date:* Date survey was conducted
- *Site Visit #:* For this survey it will always be 1 since we will only be conducting one survey
- *Location (map)*: Enter GPS coordinates for point-count locations. If more than one sub colony is present, enter a separate data entry form for each sub-colony
- *Weather*: Record the following weather variables at each point-count location
    - *Wind:* Categorize wind speed based on the Beaufort scale: 0=smoke rises vertically; 1=wind direction shown by smoke drift; 2=wind felt on face; leaves rustle; 3=leaves & small twigs in constant motion and light flag extended; 4=raises dust and loose paper -- small branches are moved; 5=small trees with leaves sway -- crested wavelets on inland waters
    - *Cloud Cover:* 0-10%, 10-50%, 50-90%, 90-100%
    - *Precipitation:* No precipitation, Fog, Drizzle, Rain, Snow, Snow/Sleet
- *Count Start Time:* Enter time count began
- *Count End Time*: Enter time count ended
- *Colony Active?* Yes or No
- *Number of adult terns present*:
- *If nesting documented:* Record the GPS coordinates for 1-4 nests identified after the shore survey. Use estimates if you are able to detect nests but not able to access the site for flush counts.
    - *For each nest, identify nesting stage:* Incubation or Nestling

Vegetation Monitoring Protocol

Data were entered using an online data entry system (123 Survey; https://survey123.arcgis.com/). The following information was entered at each vegetation location:

- *Monitor name:* First and last name
- *IBA name:* Unique name of the IBA being surveyed
- *Site ID:* Unique name of wetland point-count location
- *Date:* Date wetland was surveyed in mmddyyyy format
- *Vegetation Survey Location:* Identify location of observation points on map, record GPS coordinates for each (Veg_Lat & Veg_Lon) and outline estimated range of visibility (in meters)
- *sub colony name (in applicable)*: Name each sub colony if several are present (could be based on their location within the wetland complex, i.e. North Sub colony, East Sub colony)

Visual estimates of the following were conducted using the Loges et al. (2017) protocol:

- *Visibility*: (>70% based on delineation map)
- *Start Temperature*: Temperature in ^{o}F when survey was started
- *Wind:* (Beaufort scale)
- *WD* = Water Depth using 6 class types (*Dry, Saturated/Mud, 0-5cm, 5-15cm, 15-25cm, >25cm*. Water Depth: % of unit in each category (must sum to 100%)
- *HC* = Habitat Cover of five types (open water, bare ground/mudflat, emergent, scrub-shrub, or forest). Percent Habitat Cover: % of location in each category (sum to 100%)
- *Interspersion*: using three class configurations (**Class L**: large and connected patches of water/bare ground features; **Class S**: small, disconnected patches of water/bare ground; **Class M**: discernible regions of both classes L and S)
- *VH* = Vegetation height using seven categories (<2.5cm, 2.5 – 15cm, 15 – 30cm, 30 – 60cm, 60cm – 3m, 3 – 6m, >6m). Vegetation Height (%) of location in each category (Sum to 100%)
- *Percent vegetation cover for dominant plant species*: (1 to 5 species) by name (Plant species name) and Percentage/dispersion.
- *Disturbance Severity*: (1-4)
- *Comments*: Any additional information about the survey location at the time of survey.

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