

Prepared in cooperation with the Minnesota Department of Natural Resources and Minnesota Pollution Control Agency

Restoration of *Gavia immer* (Common Loon) in Minnesota—2022 Annual Report

Open-File Report 2023–1062

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Conversion Factors

International System of Units to U.S. customary units

Multiply	By	To obtain
Length		
kilometer (km)	0.6214	mile (mi)
Area		
hectare (ha)	2.471	acre
hectare (ha)	0.003861	square mile (mi ²)

Abbreviations

ANP	artificial nest platform
DWH	<i>Deepwater Horizon</i>
MN DNR	Minnesota Department of Natural Resources
MPCA	Minnesota Pollution Control Agency
NWLT	Northern Waters Land Trust
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

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By William S. Beatty,¹ Luke J. Fara,¹ Steven C. Houdek,¹ Robert Rabasco,² Spencer Rettler,² Elizabeth Rasmussen,² Kevin P. Kenow,¹ Brian R. Gray,¹ Steven Yang,³ and Kelly Amoth³

Abstract

The explosion of the *Deepwater Horizon* mobile drilling platform on April 20, 2010, caused a massive oil spill and injury to natural resources in the Gulf of Mexico. *Gavia immer* (common loon) were negatively affected from the spill. The Open Ocean Trustee Implementation Group funded the project “Restoration of Common Loons in Minnesota” to restore common loons lost to the spill. Here, we report on activities conducted for this project in an eight-county region in Minnesota in calendar year 2022. We identified a subset of territories that were monitored in 2021 as focal territories ($n=99$) from which multiyear study inferences can ultimately be made. We monitored nonfocal territories on all study lakes as well. We conducted surveys from May 9 to August 12, 2022. At least 1 nest attempt was observed in 68 of 99 focal territories, and a second nest attempt after a failed initial attempt was observed in 17 focal territories. Chicks or other evidence of hatching was observed in 33 of 99 territories. Data collected in 2021 and 2022 for this project are presented in a U.S. Geological Survey data release (<https://doi.org/10.5066/P9LA536E>). We present no formal data analysis in this report.

Introduction

The *Deepwater Horizon* (DWH; [fig. 1](#)) oil spill caused extensive injury to natural resources in the Gulf of Mexico in 2010 (Deepwater Horizon Natural Resource Damage Assessment Trustees, 2016), and *Gavia immer* (common loon) was one of the species substantially affected by the oil spill (Beatty and others, 2022). The DWH Open Ocean Trustee Implementation Group funded the project “Restoration of Common Loons in Minnesota” to restore common loons lost from the spill. The project has three objectives that are detailed below (Open Ocean Trustee Implementation Group, 2019):

1. Acquire and protect critical lakeshore nesting and foraging habitat.
2. Enhance common loon habitat and increase lake stewardship.
3. Reduce lead exposure through advocacy of nontoxic fishing tackle.

This report describes activities under the project “Restoration of Common Loons in Minnesota” for calendar year 2022. The Monitoring and Adaptive Management Plan (Open Ocean Trustee Implementation Group, 2019) identified benchmarks to evaluate project progress and completion. Thus, we report progress on monitoring benchmarks defined in the Monitoring and Adaptive Management Plan. Furthermore, we include no formal data analysis but report summary statistics based on data collected in 2021 and 2022 for this project (Beatty and others, 2023).

¹U.S. Geological Survey.

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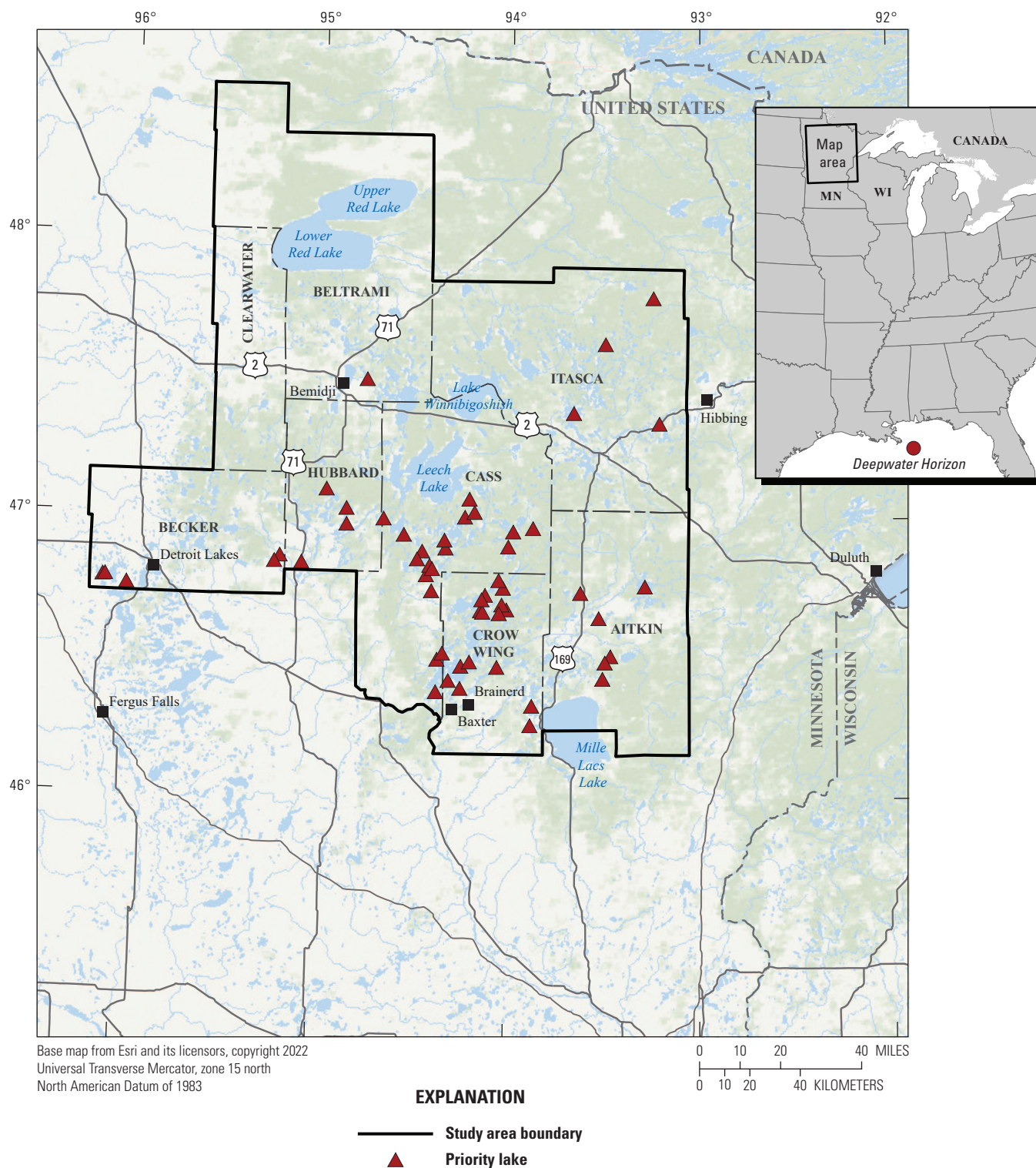


Figure 1. Priority lakes ($n=55$) monitored for *Gavia immer* (common loon) territory occupancy, nesting success, and chick survival in 2022 to evaluate the effect of artificial nest platforms on common loon reproductive success in an eight-county region in north-central Minnesota.

Methods

In 2022, we conducted common loon monitoring for a second consecutive year to collect additional pretreatment data before artificial nest platform (ANP) deployment in 2023. We surveyed priority lakes from May 9 to August 12, 2022 (fig. 1; table 1). We provided a detailed description of the methods used to identify priority lakes in Beatty and others (2022). Briefly, we identified an eight-county study area to focus project activities (Beatty and others, 2022). We identified priority lakes from Minnesota Loon Watcher citizen science data (K. Larson, Minnesota Department of Natural Resources, written commun., 2020) to focus activities on lakes with low common loon reproductive rates. All priority lakes had less than or equal to (\leq) 0.85 chicks hatched per pair or \leq 0.7 fledged chicks per pair in August based on Minnesota Loon Watcher data (Beatty and others, 2022). Although we anticipated surveys would begin on May 2, 2022, many survey lakes had ice present the first week of May. Consequently, we surveyed all territories the week of May 9, 2022.

We provided a detailed description of the methods used to monitor loon territories in Beatty and others (2022). Briefly, we surveyed each lake by motorboat, kayak, canoe, or shoreline observation. We circumnavigated larger lakes with a motorboat and frequently stopped to scan for common loons with binoculars or the naked eye. We thoroughly searched small inlets, bays, coves, and areas around islands for common loons. We also collected information on environmental variables that could affect detection. We recorded all data from surveys in an ArcGIS Survey123 application. We visited loon territories every 3–18 days (mean=8.6 days, median=7 days) from May 9 to July 15 to document territory occupancy, monitor nests, and document chicks. We visited one territory (Daisy Lake) two days in a row because the first visit was conducted at dusk. We conducted chick survival surveys from August 1 to August 12, 2022; we visited each territory twice during this period.

Table 1. Lakes in an eight-county region in north-central Minnesota that were surveyed to collect baseline information on common loon territory occupancy, nest success, and chick survival.

[Data are from Beatty and others (2023). Clearwater County did not have any lakes that met criteria for inclusion in this study (Beatty and others, 2022) and thus is not included in this table]

County	Lake
Aitkin	Big Sandy
Aitkin	Clear
Aitkin	Dam
Aitkin	Gun
Aitkin	Long
Aitkin	Waukenabo
Becker	Blueberry
Becker	Knutson
Becker	Maud
Becker	Nelson
Becker	Unnamed
Beltrami	Stump
Cass	Birch
Cass	Boxell
Cass	Dade
Cass	Five Point
Cass	Hattie
Cass	Horse
Cass	Horseshoe
Cass	Howard
Cass	Island
Cass	Little Thunder
Cass	Long
Cass	Lost
Cass	Margaret
Cass	Mud
Cass	Norway
Cass	Spider
Cass	Thunder
Cass	Town Line
Cass	Widow
Crow Wing	Barbour
Crow Wing	Butterfield
Crow Wing	Cross Lake Reservoir
Crow Wing	Dolney
Crow Wing	Goodrich
Crow Wing	Hartley
Crow Wing	Island
Crow Wing	Little Ox

Table 1. Lakes in an eight-county region in north-central Minnesota that were surveyed to collect baseline information on common loon territory occupancy, nest success, and chick survival.—Continued

[Data are from Beatty and others (2023). Clearwater County did not have any lakes that met criteria for inclusion in this study (Beatty and others, 2022) and thus is not included in this table]

County	Lake
Crow Wing	Little Rabbit
Crow Wing	Mitchell
Crow Wing	Mollie
Crow Wing	Moody
Crow Wing	Mud
Crow Wing	Pleasant
Crow Wing	Scott
Crow Wing	Velvet
Hubbard	Buck
Hubbard	Crooked
Hubbard	Daisy
Hubbard	Lord
Itasca	Alice
Itasca	Deer
Itasca	Ox Hide
Itasca	Thistledew

Results

In 2021, we monitored 126 territories on 55 lakes (fig. 1; table 1) throughout the study area, 16 of which contained an ANP, otherwise known as our intended future treatment, in 2021 (Beatty and others, 2022). Thus, Beatty and others (2022) reported monitoring 110 territories in 2021 that did not include an ANP because the goal of common loon monitoring in 2021 and 2022 was to collect pretreatment data from territories without ANPs. We conducted further revisions to our sample of focal territories in early 2022 before the 2022 field season commenced. We identified eight territories as multi-lake territories and re-categorized these as nonfocal territories because of uncertainty associated with the nesting location. Consequently, we identified 126–16–8=102 territories as focal territories for the study before field surveys commenced in 2022, and randomly assigned 45 of these territories to the treatment category with the remaining 57 territories assigned to the control category. Treatment territories represented sampling units that are planned to receive an ANP in 2023, whereas control territories would not receive an ANP for the duration of the study.

We observed a new ANP in three focal territories in 2022, and we re-categorized these territories to nonfocal territories (Crooked Lake, West Crooked East Bay territory; Crooked

Lake, West Crooked West Bay territory; Thunder Lake, East Bay Island territory). We did not identify the responsible party for the new ANPs, but ANPs are typically deployed by landowners who have property on lakes. We identified six new territories in 2022, which were territories that were not detected in 2021. We identified new territories on Deer Lake (3), Crooked Lake (1), Goodrich Lake (1), and Stump Lake (1). We categorized these six new territories as nonfocal territories. Thus, we monitored 126+6=132 total territories in 2022, and we had a sample of 132–16–8–3–6=99 focal territories in 2022. We continued to monitor nonfocal territories to document loon dynamics on study lakes to better inform states of focal territories on the same lake.

In our sample of 99 focal territories, we observed an initial nest attempt in 68 territories and a second nest attempt in 17 territories. All second nest attempts were the result of a failed initial nest attempt. As in 2021, we considered a successful nest attempt as a territory where at least one chick was observed, or where other evidence of a successful nest was observed at the nest site (Beatty and others, 2022). In 2022, we observed a successful nest attempt in 33 of 99 focal territories.

Benchmarks to Evaluate Project Progress

The Monitoring and Adaptative Management Plan (Open Ocean Trustee Implementation Group, 2019) provides parameters for project progress, and we report on all parameters in the plan below. Data collected for this study in 2021 and 2022 are presented in Beatty and others (2023).

Parameter 1, Baseline Status of Lakes

We detailed the completion of parameter 1 in the 2021 annual report (Beatty and others, 2022).

Parameter 2, Length of Linear Shoreline Acquired

The Minnesota Department of Natural Resources (MN DNR) contracted Northern Waters Land Trust (NWLTL) to identify potential parcels for consideration for acquisition. Contract costs were covered by State funds. NWLTL compiled information on lakeshore owners in the focus area, screened for potential habitat at a broad spatial scale, distributed information on agency interest in acquiring loon habitat, assessed landowner interest in selling, and summarized interactions with landowners. NWLTL findings were provided to MN DNR, and eight landowners expressed interest in either fee title acquisition or conservation easements on shoreline parcels that are considered loon nesting habitat. NWLTL concluded outreach to evaluate landowner interest in acquisition on October 7, 2022. In addition, three landowners expressed

interest in fee title acquisition or conservation easements through MN DNR Fisheries, and one landowner directly contacted MN DNR to express interest in the program.

Joint meetings among MN DNR, U.S. Fish and Wildlife Service (USFWS), and U.S. Geological Survey (USGS) staffs were held to discuss and rank the value of individual parcels to the project and to secure approval from USFWS for individual parcels to enter the internal MN DNR acquisition process. Five parcels were then discussed internally with MN DNR Fisheries and Wildlife staff and MN DNR Acquisition Program staff.

Parameter 3, Number of ANPs Deployed

We monitored 132 territories on 55 lakes (fig. 1) throughout the study area in 2022, including 99 focal territories, 8 multilake territories, 19 territories with an ANP, and 6 new territories. We randomly assigned 45 of 99 focal territories to the ANP treatment category. As of the end of calendar year 2022, MN DNR had commitments from 26 partners to construct and deploy 39 ANPs in spring 2023 on these treatment territories. MN DNR plans to continue working with potential partners to generate support for the remaining six ANPs. Thus, we deployed 0 of 45 (0 percent) of anticipated ANPs in 2022.

Parameter 4, Number of ANPs Occupied

We did not deploy ANPs in 2022. We plan to deploy ANPs spring 2023 in collaboration with lake associations and loon stewards. We have no values to report for the number of ANPs occupied.

Parameter 5, Number and Locations of Lake Associations Recruited

MN DNR recruited 72 lake associations in calendar year 2022 in the following counties: Aitkin (6), Becker (5), Beltrami (2), Cass (21), Clearwater (2), Crow Wing (11), Hubbard (24), and Itasca (3) (fig. 1). Lake associations were recruited to develop lake management plans that contain conservation actions for common loons.

Parameter 6, Number of Intervention Activities to Promote Use of Environmentally Friendly Fishing Gear

The Minnesota Pollution Control Agency's "Get the Lead Out" program conducted 65 in-person education programs and 21 virtual programs in 2022. Education and outreach programs from the program ranged from presentations to K–12 students (both virtually and in person), ice fishing programs, visiting summer fishing day camps, tabling at community events, tabling at a sports show, and giving virtual

presentations for lake association members and the public. In addition to all these activities, the program coordinated an exhibit about loons built around the World's Largest Floating Loon from Virginia, Minn. The exhibit was included in the Eco-Experience building at the Minnesota State Fair and was seen by more than 200,000 people during the 12 days of the fair. Another component of all these outreach programs is giving sample packs of lead-free fishing tackle to the public. The program distributed an estimated 20,000 sample packs of lead-free tackle during 2022 to people across the State.

Parameter 7, Presence/Absence, Territory Occupancy and Nest Productivity

We monitored 99 focal territories on 55 lakes (fig. 1) in 2022. All territories had at least one loon present on at least one sampling occasion. We defined an occupied territory as a sampling unit that had a pair of loons present on at least three sampling occasions between May 9, 2022, and July 15, 2022, or an observation of a subsequent stage in the reproductive process. Two examples of these subsequent stages in the reproductive process include nesting and hatched chicks. We observed 95 of 99 territories as occupied in 2022 (Beatty and others, 2023).

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