

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

# **Restoration of Common Loon (*Gavia immer*) in Minnesota—2023 Annual Report**

Open-File Report 2024–1044



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By William S. Beatty, Kelly Amoth, Katelyn Bergstrom, Luke J. Fara, Brian R. Gray, Steven C. Houdek, Jayden Jech, Kevin P. Kenow, Robert Rabasco, Spencer Rettler, Michael Wellik, and Steven Yang

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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)
hectare (ha)	2.471	acre
hectare (ha)	0.003861	square mile (mi <sup>2</sup> )

## **Abbreviations**

ANP        artificial nest platform

MN DNR   Minnesota Department of Natural Resources



# Restoration of Common Loon (*Gavia immer*) in Minnesota—2023 Annual Report

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## Abstract

The *Deepwater Horizon* mobile drilling platform exploded on April 20, 2010. The resulting massive oil spill injured natural resources in the Gulf of Mexico, including wintering common loons (*Gavia immer*). We report on activities completed under the “Restoration of Common Loons in Minnesota” project in calendar year 2023, which was funded by the Open Ocean Trustee Implementation Group. In 2022, a subset of monitored breeding territories was identified as focal territories, which are sampling units for the study. The U.S. Geological Survey, in cooperation with the Minnesota Department of Natural Resources, monitored 98 common loon focal territories and an additional 43 nonfocal territories in 2023 across 56 study lakes in Minnesota. We collaborated with lake associations and private citizens to deploy 42 artificial nesting platforms within 44 focal treatment territories. The remaining 54 focal territories were controls. Territorial surveys were completed from May 8 to August 11, 2023, to evaluate occupancy, nest success, and chick survival. At least one nest attempt was observed in 31 of 44 treatment territories and a second nest attempt was observed after a failed initial attempt in 6 treatment territories. However, only one nest was on an artificial nesting platform in a treatment territory; the remaining nest locations were natural. At least one nest attempt was observed in 37 of 54 control territories, and a second nest attempt was observed after a failed initial attempt in 5 control territories. Chicks or other evidence of hatching were observed in 17 of 54 control territories and 17 of 44 treatment territories, with 1 of those successful treatment nests occurring on an artificial nesting platform. This report includes no formal analysis, but we plan to analyze data after collection of all field data in subsequent years.

## Introduction

The *Deepwater Horizon* mobile drilling unit exploded on April 20, 2010, resulting in release of approximately 5.0 million barrels of oil into the Gulf of Mexico (McNutt and others, 2012). In accordance with applicable Federal laws and regulations, a Natural Resources Damage Assessment was completed to evaluate natural resource damage from the oil spill (Deepwater Horizon Natural Resource Damage Assessment Trustees, 2016). The common loon (*Gavia immer*) was one of more than 100 bird species injured from the spill (Deepwater Horizon Natural Resource Damage Assessment Trustees, 2016). The estimated number of common loons injured from the spill was 561 to 910, which included direct mortalities and lost reproduction owing to mortality of breeding adults (Deepwater Horizon Natural Resource Damage Assessment Trustees, 2016). To restore common loons lost from the spill, the Deepwater Horizon Open Ocean Trustee Implementation Group funded the “Restoration of Common Loons in Minnesota” project. The project has three objectives (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.

In this report, we describe activities under the “Restoration of Common Loons in Minnesota” project for calendar year 2023. Specifically, we report progress on monitoring benchmarks defined in the Monitoring and Adaptive Management Plan (Open Ocean Trustee Implementation Group, 2019). Monitoring benchmarks are (1) baseline status of lakes; (2) length of linear shoreline acquired; (3) number of artificial nesting platforms (ANPs) deployed; (4) number of ANPs occupied; (5) number of lake associations recruited to participate in a loon friendly lake program; (6) number of intervention activities to promote environmentally friendly fishing gear; and (7) common loon presence/absence, territory occupancy, and nest productivity. Furthermore, summary statistics are provided, but no formal analysis is included because this is an ongoing project.

<sup>1</sup>U.S. Geological Survey.

<sup>2</sup>Minnesota Pollution Control Agency.

<sup>3</sup>Minnesota Department of Natural Resources.

## Methods

Breeding common loons were monitored on territories in north-central Minnesota in 2021 (Beatty and others, 2022) and 2022 (Beatty and others, 2023b). This study design closely resembled a before-after control-impact design, where pretreatment (that is, “before”) data were collected in 2021 and 2022. In 2022, 99 focal territories were identified from which inferences would be made (Beatty and others, 2023b). We identified 45 of 99 focal territories as treatment (that is, impact) units and categorized the remaining 54 territories as control units. Treatment was deployment of an ANP into respective focal territories. The abovementioned 99 territories are hereafter referred to as “focal territories” to distinguish them from other territories that were monitored.

We identified an effective deployment date to characterize ANPs as either available or not available in 2023. ANPs deployed on or before this date would be categorized as effectively available to common loons as a nesting site and ANPs deployed after the date would be characterized as effectively not available to common loons as a nesting site. The effective deployment date was identified as May 19, 2023, because it was approximately 2 weeks after ice-out, which provided partners sufficient time to deploy ANPs. Consequently, ANPs were considered available to breeding common loons as a nesting platform if they were deployed on or before May 19, 2023. Observers documented presence/absence of ANPs during the first week of surveys (May 8, 2023) and communicated with partners about deployment of ANPs that were absent the first week. In addition, the earliest observed nesting attempt in 2022 was May 16, and a preliminary analysis indicated that 25 percent of nests were initiated by May 24, 2022. Thus, May 19 was an acceptable effective deployment date because it considered nesting common loon phenology and the logistics of ANP deployment.

We worked with private citizens and lake associations to effectively deploy 42 ANPs to 45 treatment territories. In one territory, the platform was placed after the effective deployment date and in an unsuitable location (Crow Wing, Island Lake – South). After several attempts to facilitate a relocation of the ANP failed, we reassigned this territory from the focal treatment category to the nonfocal category, reducing the number of focal treatment territories to 44 and the total number of focal territories to 98. Although 42 ANPs were effectively deployed to 44 treatment territories in 2023, the remaining 2 ANPs were deployed after the effective deployment date.

Common loon monitoring was completed for a third consecutive year, and 2023 represented the first year of treatment data (that is, the after in before-after control-impact). We surveyed 56 priority lakes across seven counties in north-central Minnesota (Beatty and others, 2024), including four lakes that were not surveyed in 2021 or 2022 (Big Sugar Bush Lake [not shown], Big Trout Lake [not shown], Wabedo Lake [not shown], and Woman Lake [not shown]) (fig. 1, table 1). Thus, 52 lakes contained at least one focal territory. In addition, we

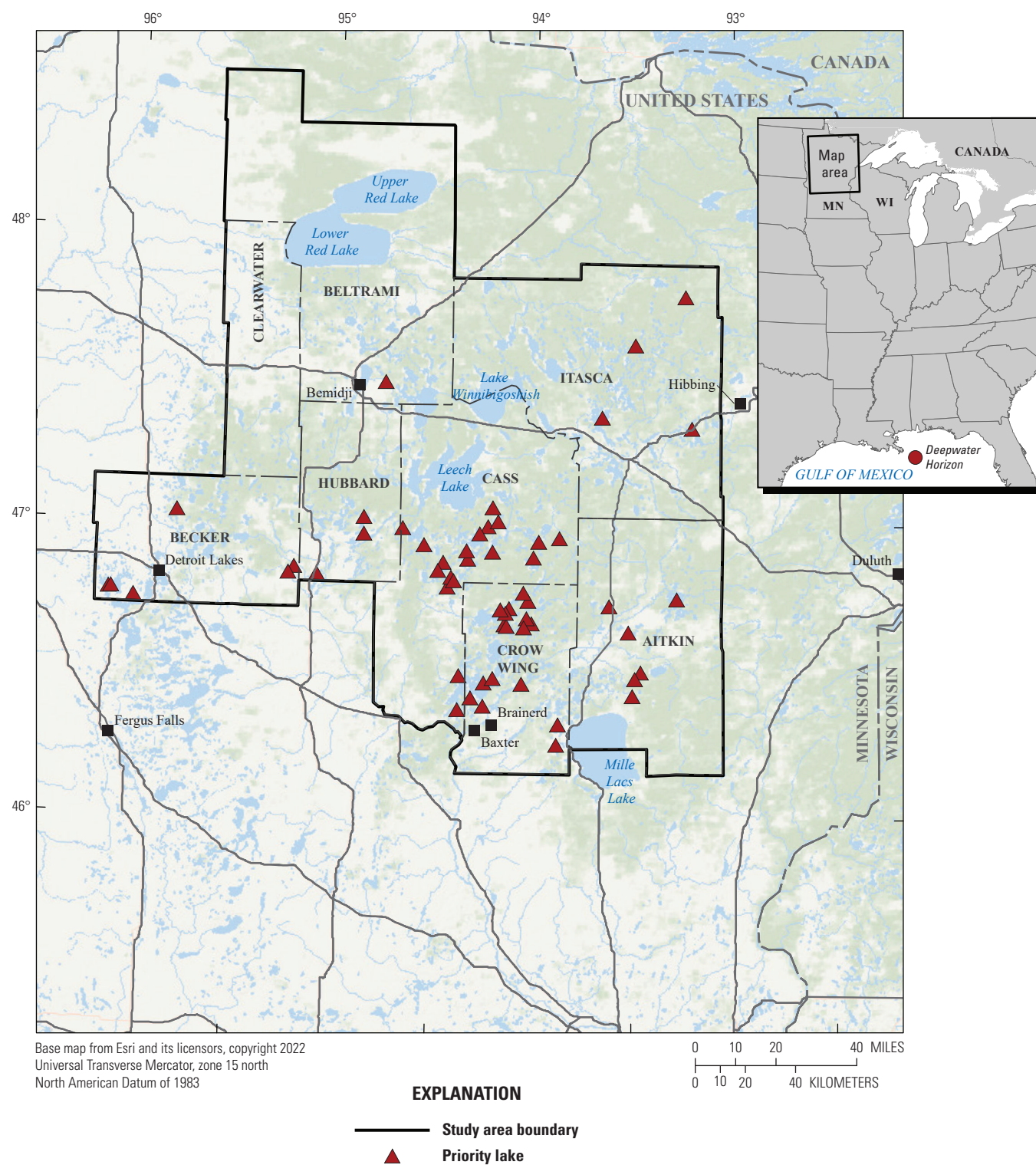
did not monitor three lakes in 2023 that were monitored in 2022 (Norway Lake [not shown], Spider Lake [not shown], and Buck Lake [not shown]) because territories on these lakes were identified as multilake territories and categorized as nonfocal territories. These multilake territories were removed from the study because of uncertainty associated with nesting location. In 2024, we anticipate we will not monitor Island Lake (Crow Wing County) as well because it has no remaining focal territories after moving the Crow Wing, Island Lake – South territory from focal to nonfocal status in 2023, as described earlier in the section.

Each territory was surveyed by motorboat, kayak, canoe, or shoreline observation as described in Beatty and others (2022). We circumnavigated larger lakes and frequently stopped to scan for common loons. Information was collected on common loons and environmental variables that could affect loon or nest detection (refer to Beatty and others [2022] for a complete description), and all data from surveys were recorded in an ArcGIS Survey123 application. We visited loon territories every 3–15 days (mean=7.7 days) from May 8, 2023, to July 14, 2023, to collect information on territory occupancy, nesting, and chick survival (Beatty and others, 2022, 2023b). Each territory was surveyed twice from July 31, 2023, to August 11, 2023, to document chick presence to estimate survival.

## Results

We monitored 126 territories in 2021 (Beatty and others, 2022) and 132 territories in 2022 (Beatty and others, 2023a). In 2023, 141 total territories, including 54 focal control territories and 44 focal treatment territories, were monitored, and 12 new territories were identified. In addition, we monitored 22 nonfocal territories that had at least one nontreatment ANP in 2023 or a previous year, 16 nonfocal territories that were not identified in 2021, and 5 nonfocal territories that spanned multiple lakes (that is, multilake territories). In the field, observers often noted that some ANPs did not have sufficient nesting substrate.

In the sample of 98 focal territories, we observed at least one nest attempt in 31 of 44 treatment territories, and a second nest attempt after a failed initial attempt was observed in 6 treatment territories. However, only one nest was on an ANP in a treatment territory; the remaining nests were natural. We observed at least one nest attempt in 37 of 54 control territories, and a second nest attempt after a failed initial attempt was observed in 5 control territories. Chicks or other evidence of hatching was observed in 17 of 54 control territories and 17 of 44 treatment territories, with 1 of those successful treatment nests occurring on an ANP. In 2023, the first nest was documented on May 15, 2023, and 25 percent were initiated by May 22, 2023. Thus, the effective deployment date of May 19 was considered appropriate.



**Figure 1.** Priority lakes ( $n=56$ ) monitored for common territory occupancy, nesting, and chick survival in 2023 to evaluate the effects of artificial nesting platforms on reproductive success in north-central Minnesota.



## Benchmarks to Evaluate Project Progress

The Monitoring and Adaptative Management Plan (Open Ocean Trustee Implementation Group, 2019) provides parameters to assess progress and we report on all parameters in the following sections.

### Parameter 1—Baseline Status of Lakes

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

### Parameter 2—Length of Linear Shoreline Acquired

Minnesota Department of Natural Resources (MN DNR), U.S. Fish and Wildlife Service, and U.S. Geological Survey staff reviewed several individual parcels for ranking and consideration of lakeshore habitat acquisition. The U.S. Fish and Wildlife Service provided approval prior to MN DNR internal processing. Five parcels were discussed internally with MN DNR staff from the Division of Ecological and Water Resources, Division of Fisheries and Wildlife, Division of Lands and Minerals, and MN DNR Acquisition Program. The five parcels under consideration for acquisition as of the end of calendar year 2023 contained a total of 2.8 kilometers of shoreline. However, no parcels have completed the acquisition process, and the length of linear shoreline acquired for this project is uncertain because all parcels are currently (2023) in the MN DNR acquisition process. Thus, the final value for this parameter may be (substantially) less or more than the amount of shoreline currently under consideration.

### Parameter 3—Number of Deployed Artificial Nest Platforms

We identified 45 focal territories as treatment territories in winter 2023. May 19 was identified as an effective ANP deployment date, whereby ANPs deployed on or before this day were considered available to nesting loons and ANPs deployed after this date were considered not available to nesting loons. We worked with private citizens and lake associations to deploy 42 ANPs to those 45 treatment territories by May 19, 2023. An additional ANP (Blueberry Lake) was deployed the week of May 22 and another was deployed June 23 (Thunder Lake – South Island). Although these ANPs were deployed, they were not considered available to nesting loons. In another territory, the ANP was placed in an unsuitable location sometime during the week of May 22 (Crow Wing Island Lake – South). This territory was reassigned from the focal treatment category to the nonfocal category after several failed attempts to relocate the ANP. Thus, we deployed 42

**Table 1.** Lakes in a seven-county region in north-central Minnesota that were surveyed to collect information on common loon (*Gavia immer*) territory occupancy, nest success, and chick survival in 2023.

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

**Table 1.** Lakes in a seven-county region in north-central Minnesota that were surveyed to collect information on common loon (*Gavia immer*) territory occupancy, nest success, and chick survival in 2023.—Continued

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

of 44 (95 percent) of ANPs by May 19, 2023. The ANPs that were deployed late were not considered available to renesting breeding pairs because the sampling unit for this parameter is the ANP rather than nesting attempt.

#### Parameter 4—Number of Occupied Artificial Nest Platforms

Of 42 effectively deployed ANPs, 1 was observed as occupied, which resulted in a successful nest. A higher rate of occupancy is anticipated in 2024 because breeding loon pairs will be familiar with the presence of ANPs and nesting substrate will be placed appropriately (Piper and others, 2002).

#### Parameter 5—Number and Locations of Recruited Lake Associations

MN DNR staff sent inquiries to approximately 68 lake associations about participating in the Loon Friendly Lake Registry program. The Loon Friendly Lake Registry program provides support to lake associations to develop lake management plans and encourages lake associations to appoint

a liaison to support loon friendly activities on the lake. In addition, participants in the Loon Friendly Lake Registry are provided plans to enhance loon productivity and encourage monitoring of loon activity as part of an ongoing MN DNR community science project, the Volunteer Loon Watcher Survey. The MN DNR recruited 21 lake associations in calendar year 2023 to join the Loon Friendly Lake Registry program. A total of 17 lake associations were recruited in the following focal counties: Aitkin (1), Cass (6), Hubbard (2), Crow Wing (4), Beltrami (2), Becker (1), and Itasca (1). Additionally, 4 lake associations were recruited outside the focal counties including St. Louis (1), Morrison (1), Pine (1), and Lake (1). MN DNR staff participated in approximately 22 community events or presentations focused on loon conservation and project related topics.

#### 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 111 in-person education programs in 2023. Education and outreach programs ranged from presentations to students (kindergarten through high school), ice fishing programs, visiting summer fishing day camps, tabling at community events, and tabling at a sports show. The program also included working with lake associations in the summer, and the participants collected and recycled more than 300 pounds of lead fishing tackle from anglers. In addition to these activities, the program included an exhibit about loons built around the world’s largest floating loon from Virginia, Minnesota. The exhibit was featured 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 these outreach programs is the distribution of sample packs of lead-free fishing tackle to the public. In 2023, the program distributed more than 10,000 sample packs of lead-free fishing tackle across Minnesota.

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

We monitored 98 focal territories on 56 lakes in 2023 and observed at least 1 loon on 1 sampling occasion in 95 territories. An occupied territory was defined as a sampling unit that had a pair of loons present on at least three sampling occasions between May 8, 2023, and July 14, 2023, or an observation of a subsequent stage in the reproductive process (for example, nesting, chicks). We observed 40 of 44 treatment territories and 50 of 54 control territories as occupied in 2023.

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