



Keeyask Generation Project  
Terrestrial Effects Monitoring Plan

Colonial Waterbird Habitat Effects Monitoring Report

TEMP-2024-08



# **KEYYASK GENERATION PROJECT**

## **TERRESTRIAL EFFECTS MONITORING PLAN**

REPORT #TEMP-2024-08

### **COLONIAL WATERBIRD**

### **HABITAT EFFECTS MONITORING**

### **YEAR 2 OPERATION**

**2023**

Prepared for  
Manitoba Hydro

By  
Wildlife Resource Consulting Service MB Inc.

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# SUMMARY

## Background

Construction of the Keeyask Generation Project (the Project) began in July 2014 and was fully operational in March 2022. The Keeyask Hydropower Limited Partnership (KHLP) was required to prepare a plan to monitor the effects of construction and operation of the generating station on the terrestrial environment. Monitoring results will help the KHLP, government regulators, members of local First Nation communities, and the general public understand how construction and operation of the generating station are affecting the environment, and whether or not more needs to be done to reduce harmful effects.

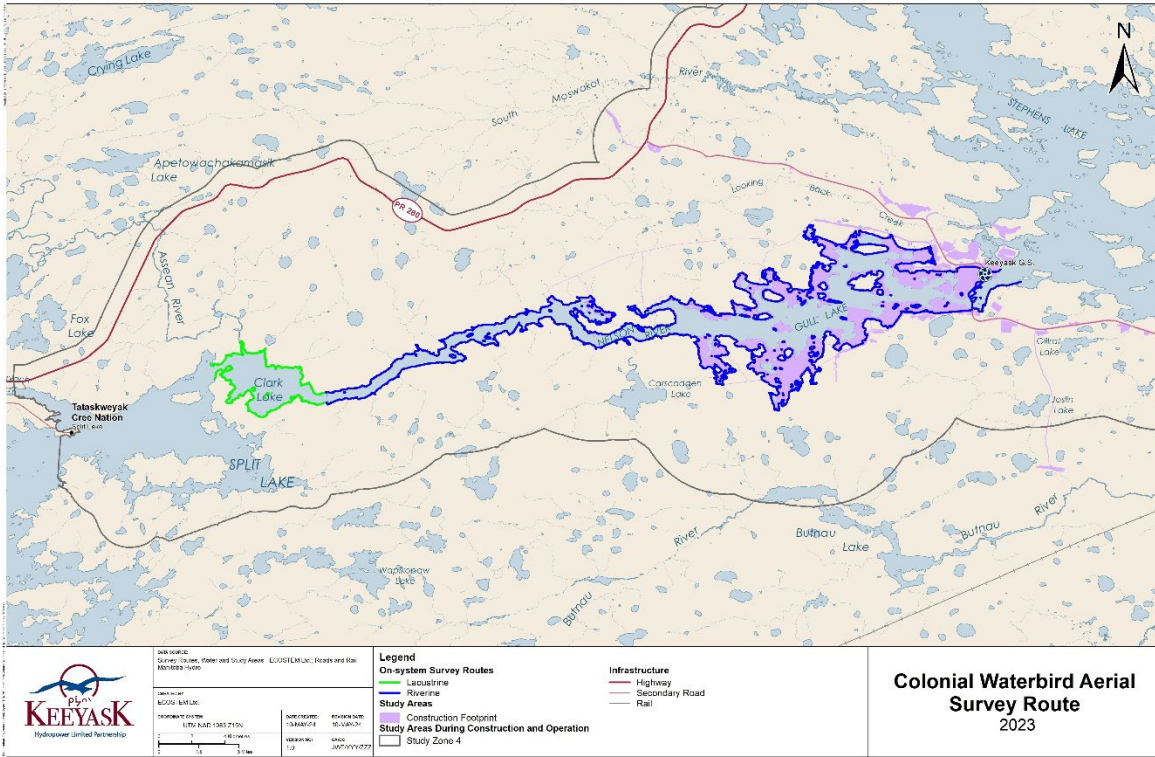
This report describes the results of colonial waterbird (gulls and terns) habitat effects monitoring conducted during the summer of 2023, the second year of Project operation. Previous surveys were conducted during Project construction from 2015 to 2022 using similar methods.

## Why is the study being done?

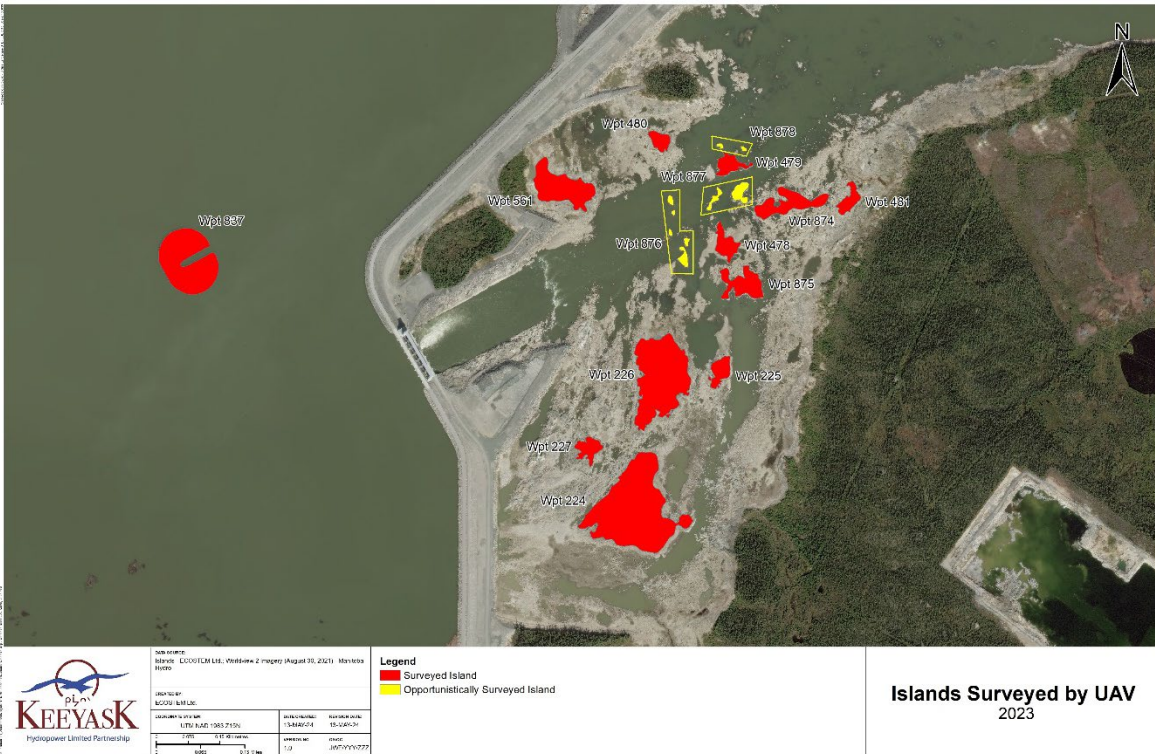
Reservoir creation and Project operation was predicted to reduce the quality and quantity of colonial waterbird habitat in the former Gull Rapids area and the reservoir. The alteration of the water regime was anticipated to make most of the traditional nesting islands and reefs in the former Gull Rapids area unsuitable for colonial waterbird breeding. In the reservoir, peatland disintegration and erosion were expected to increase water turbidity, possibly reducing the ability of colonial waterbirds to forage over the short term. Monitoring is being done to evaluate Project effects on the number and location of ring-billed gulls and common terns and their breeding habitats. Other colonial waterbird populations (e.g., American white pelican, Bonaparte's gull) are also being documented during this study.

## What was done?

Helicopter surveys of the reservoir and surrounding area (including the former Gull Rapids area and upstream to Clark Lake) and unmanned aerial vehicle (UAV or drone) surveys focused on the former Gull Rapids area were conducted in summer 2023 to determine the numbers of gulls and terns present, where they are found, and what kinds of habitat they are using. UAV surveys allowed the observation of gull and tern nests and chicks, from which productivity (number of chicks produced per nest) could be determined. This is the second year of colonial waterbird habitat effects monitoring during the operation period; surveys were also conducted from 2015 to 2022, during Project construction.



**Helicopter Survey Route for Colonial Waterbirds in 2023**



**Islands Surveyed by an Unmanned Aerial Vehicle (Drone) for Colonial Waterbirds in 2023**

## What was found?

In the second year of Project operation, habitat use by gulls and terns continued to favour the constructed Habitat Compensation Island upstream of the Project over the smaller islands in the former Gull Rapids area. Relatively low numbers of ring-billed gulls nested and congregated in the area, potentially due to low water levels at the start of the nesting season and/or increased numbers of bald eagles. The number of ring-billed gull chicks observed on the Habitat Compensation Island appeared to be low in comparison to the number of nests that were present and may have been a result of chicks hiding from view among the rocks, and/or the relatively high number of bald eagles present in the study area. Bald eagles appeared to have harassed ring-billed fledglings causing them to leave their natal islands. A number of ring-billed gull fledglings were also observed loafing on the road from the Generating Station to the Spillway and some were killed by vehicles.

The Habitat Compensation Island saw the highest number of nesting terns since it was built, likely due to decreased numbers of nesting ring-billed gulls. Other species including herring gull and American white pelican did not appear to be affected by Project operation and their numbers were consistent with previous observations.



**Colonial Waterbirds on the Habitat Compensation Island, June 2023**

**What does it mean?**

Project operation and water regime alteration appeared to reduce the quality and quantity of colonial waterbird habitat in the former Gull Rapids area, as anticipated. The Habitat Compensation Island successfully supported nesting common terns and ring-billed gulls. Increased bald eagle numbers in the former Gull Rapids area seems to be causing increased ring-billed gull predation and affecting ring-billed gull behaviour.

**What will be done next?**

The 2023 colonial waterbird survey was the second operation-phase survey for the Project. The next colonial waterbird survey is scheduled for 2024. Roadside monitoring for bird-vehicle collision mortalities will be conducted between the Generating Station and the Spillway.

# STUDY TEAM

We would like to thank Sherrie Mason and Rachel Boone of Manitoba Hydro for reviewing the report. We would also like to thank Dr. James Ehnes, ECOSTEM Ltd., for GIS supported study design, cartography, and the Unmanned Aerial Vehicle (UAV) operations and photography.

Biologists, technicians, and other personnel who designed, participated in, and drafted the study results included:

- Robert Berger, Wildlife Resource Consulting Services MB Inc. (WRCS) - Design, analysis, and reporting
- Mark Baschuk, WRCS - Survey personnel, analysis, and reporting
- Thomas Wood, WRCS - analysis and reporting
- Naomi Hutchinson, WRCS - Survey personnel
- Alex Snitowski, ECOSTEM Ltd. - UAV photography



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# 1.0 INTRODUCTION

The Keeyask Generation Project (the Project) is a 695-megawatt hydroelectric generating station (GS), located at the former Gull Rapids on the lower Nelson River in northern Manitoba where Gull Lake flows into Stephens Lake. Project construction began in July 2014 and the generating station was fully operational in March 2022.

The *Keeyask Generation Project: Response to EIS Guidelines* (EIS), completed in June 2012, provides a summary of predicted effects and planned mitigation for the Project. Technical supporting information for the terrestrial environment, including a description of the environmental setting, effects and mitigation, and a summary of proposed monitoring and follow-up programs is provided in the *Keeyask Generation Project Environmental Impact Statement: Terrestrial Environment Supporting Volume* (TESV). The *Keeyask Generation Project Terrestrial Effects Monitoring Plan* (TEMP) was developed as part of the licensing process for the Project. Monitoring activities for various components of the terrestrial environment were described, including the focus of this report, colonial waterbird habitat effects monitoring, for the operation phase of the Project.

Reservoir creation and Project operation was predicted to reduce the quality and quantity of habitat in the Gull Rapids area and within the reservoir for ring-billed gull (*Larus delawarensis*), herring gull (*Larus argentatus*), common tern (*Sterna hirundo*), and other species of colonial waterbirds (KHLP 2012). The alteration of the water regime was anticipated to make most of the islands and reefs in the Gull Rapids area unsuitable for colonial waterbird breeding, and it was unclear if it would result in the exposure of additional islands or reefs (KHLP 2012). Additionally, during the short term, peatland disintegration and mineral erosion processes in the reservoir were expected to increase water turbidity, potentially causing decreased foraging efficiency of colonial waterbirds. This potential effect may be offset by the foraging opportunities created in the tailrace area and are anticipated to decrease over time as sediment settles (KHLP 2012). To mitigate the loss of nesting habitat in the Gull Rapids area, a Habitat Compensation Island (HCI), just over 1 ha in size, was constructed upstream of the Project (Photo 1).

Previous habitat effects monitoring for colonial waterbirds, conducted during Project construction from 2015-2021, and during the first year of operation in 2022, indicated that colonial waterbird populations were primarily affected by water levels in the Nelson River and to a lesser degree by sensory disturbance from Project construction (WRCS 2016; WRCS 2017; WRCS 2018; WRCS 2019; WRCS 2020; WRCS 2021; WRCS 2022; WRCS 2023). The water levels in the Nelson River influenced the amount of available island habitat for colonial waterbirds, and as a result, their distribution in the area.

During construction-phase surveys (2015-2021), colonial waterbirds, including ring-billed gull, herring gull, and common tern, preferred to nest and congregate on the islands within Gull Rapids. Occasionally, high water levels caused nesting islands to become inundated, or alternatively, low water levels caused islands to become connected to the mainland, making them unsuitable for nesting. When this habitat was unsuitable, birds relocated to nearby islands that were directly

upstream (WRCS 2018; WRCS 2020). In 2021, this included the HCI, which supported common tern nests and congregating ring-billed gulls. In 2022, the first year of operation monitoring, there was a shift of gull and tern habitat use away from the islands in the former Gull Rapids area to the HCI. The HCI supported relatively large numbers of nesting common terns and ring-billed gulls, similar in number to what was observed in the region during Project construction. Ring-billed gulls were frequently observed nesting against the woody debris placed on the island in 2021.

Colonial waterbird habitat effects monitoring during Project operation used similar methods to monitoring conducted during the construction phase to evaluate how ring-billed gull, herring gull, and common tern breeding habitat distribution and abundance change due to Project operation. This report contains the results of the second year of the operation-phase Colonial Waterbird Habitat Effects study.



**Photo 1: Habitat Compensation Island, June 2023**

## 2.0 METHODS

### 2.1 UNMANNED AERIAL VEHICLE SURVEYS

The distribution and abundance of colonial waterbirds in the former Gull Rapids area was monitored using photographs taken from an Unmanned Aerial Vehicle (UAV or drone). ECOSTEM Ltd. was contracted to conduct UAV flights and produce high-resolution images of colonial waterbird colonies and potential nesting areas in the former Gull Rapids area. The survey used similar methods and survey locations as previous surveys conducted from 2017-2022.

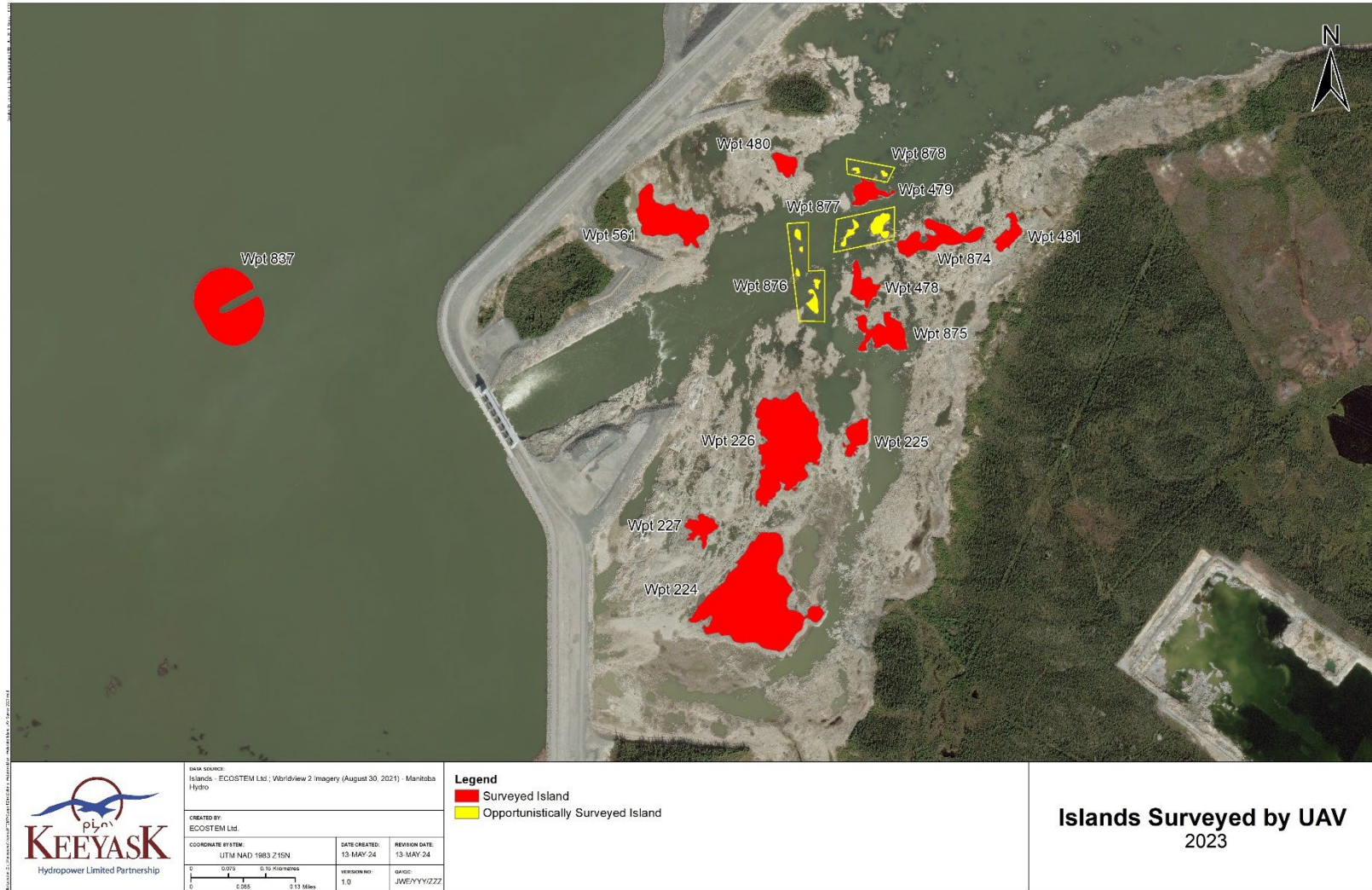
ECOSTEM Ltd. deployed an Autel EVO 2 Pro quadcopter, equipped with a 20-megapixel camera to survey islands in the former Gull Rapids area and the Habitat Compensation Island (HCI) immediately upstream of the Project. Nine islands within the former Gull Rapids area, known to support colonial waterbirds, and the constructed HCI were photographed by the UAV in a grid pattern to produce overlapping photographs (Map 1). All flights were conducted at approximately 25 m above ground level (agl) to minimize disturbance to waterbird colonies.

UAV surveys were conducted during three periods in 2023: May 31 - June 1, June 23 - 24, and July 29, to capture the nesting and brood rearing periods. During each of the survey periods, islands were photographed during the morning (0600-1200 hours) and afternoon (1200-1700 hours). Photographs taken in the morning and afternoon for each survey period were examined to determine the number of colonial waterbirds, nests, hatch-year birds (chicks), and species present on each of the nesting islands in the survey area. A single observer examined the photographs to maintain a consistent interpretation and reduce subjectivity.

The maximum number of birds/nests/chicks observed from the morning or afternoon photographs was used to determine the potential suitability of islands for nesting colonial waterbirds. To describe the difference between morning and afternoon bird abundances, the standard deviations of bird/nests/chicks were calculated using the morning and afternoon data from the same period.

During the first survey period, ECOSTEM Ltd personnel noted waterbirds congregating on five previously unsurveyed islands, and manually flew the drone to photograph these islands. Grids were created for the islands and were used to photograph them in the subsequent survey periods. Birds counted on the new islands were excluded from total counts to allow results to be comparable to previous survey years.





**Map 1: Islands Surveyed by UAV in the Former Gull Rapids Area in 2023**

## 2.2 HELICOPTER SURVEY

Helicopter surveys were conducted to monitor the abundance, distribution, and habitat use of colonial waterbirds within and around the Project reservoir during the breeding season (Map 2). The survey methods used were identical to the methods used in previous surveys from 2016-2022. The survey area was consistent with the previous surveys in 2021 and 2022, and included the reservoir, the former Gull Rapids area immediately downstream of the Project, and upstream to Clark Lake.

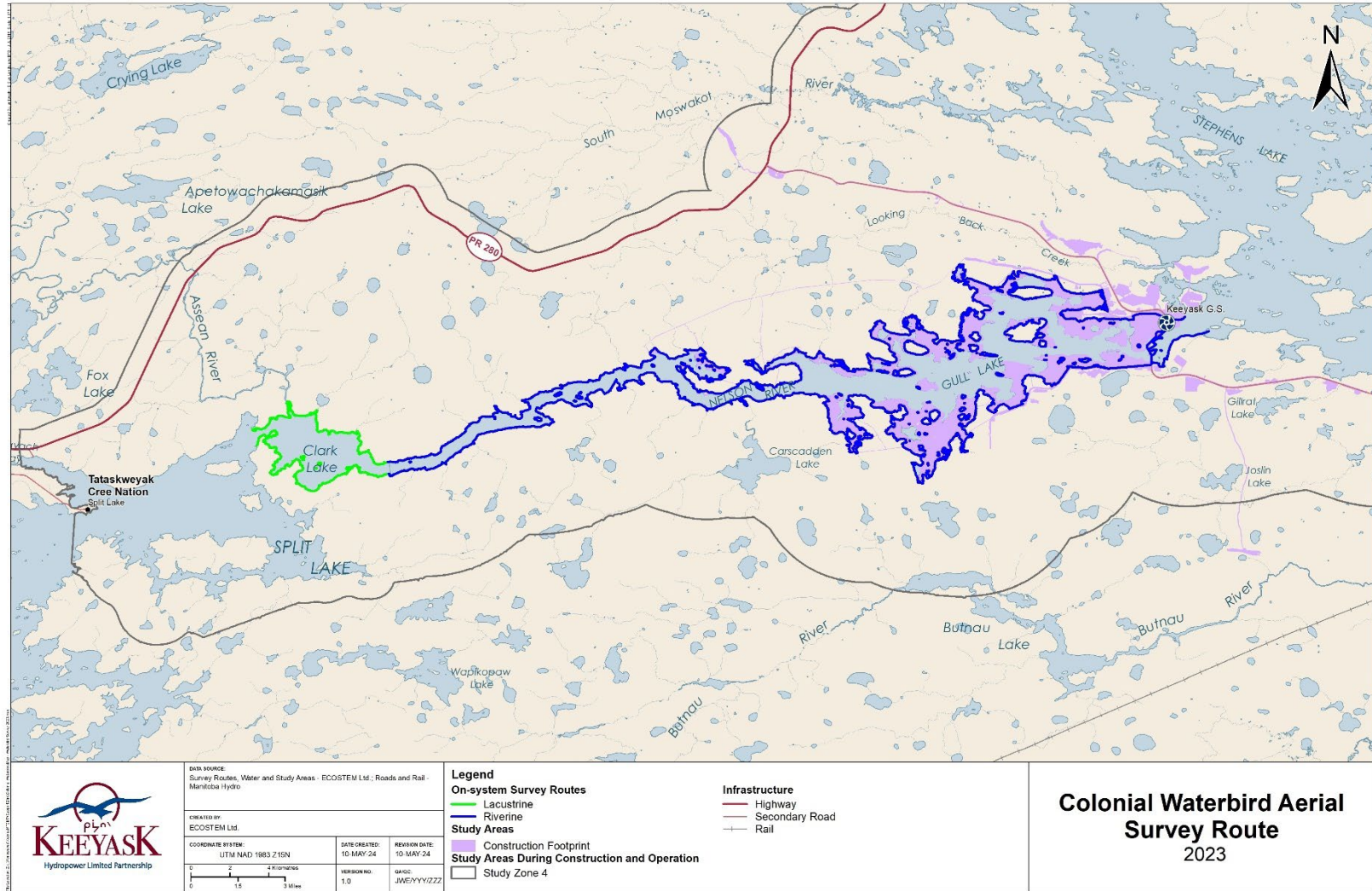
The first survey occurred on June 16, 2023 when gull and tern nests are typically initiated and most gulls and terns are incubating eggs, and the second survey occurred during the typical chick-rearing period on July 19, 2023.

The surveys were conducted when wind speeds were below 25 km/h and when rain or fog did not restrict observers' ability to count birds. The survey was flown at approximately 100 km/h, at elevations no less than 150 m agl, and at distances no closer than 300 m to minimize disturbance to waterbird colonies and avoid collisions with flying birds.

The aerial survey crew consisted of two observers and the helicopter pilot. The observers were seated in the front left and rear left seats and were responsible for preliminary counts of colonial waterbirds and photographing congregations using a Canon Rebel T6i, 24.2-megapixel camera. The helicopter followed a shoreline transect with open water on the left and terrestrial habitat on the right. When colonial waterbirds were spotted on rocky reefs in open water areas, the helicopter departed from the shoreline transect to investigate.

During the survey, numbers of waterbirds at all colony and congregation sites and all dispersed waterbirds were recorded along with their locations. Dispersed birds were single birds and flocks of waterbirds in flight. Congregated birds were groups of birds that showed no indication of nesting (*i.e.*, nests). A group of birds was considered a colony when there were at least two breeding pairs present and signs of nesting. When a congregation of waterbirds was observed the helicopter slowed and circled the site briefly for survey personnel to photograph and count individuals and nests. Preliminary abundance estimates were made by counting all nests and individuals. In-flight counts and photography were conducted quickly to minimize disturbance to birds. All observations were georeferenced with a Garmin GPS 64 global positioning system (GPS). Notes on the terrestrial habitat of congregation sites were recorded and island size (ha) was determined from remotely-sensed data. Island sizes were classified as <0.1 ha, 0.1-0.9 ha, 1.0-1.9 ha, 2.0-2.9, 3.0-3.9 ha, and  $\geq$ 4.0 ha.

Although individuals in small congregations of colonial waterbirds could be counted during the aerial survey, their numbers were determined with the in-flight photographs. Photographs were marked-up to facilitate the counting of adults sitting tight with no nest visible, birds flying, standing, or swimming, and occupied and unoccupied nests in the photographs. Evidence of nesting included presence of visible nests, adults sitting tight, or chicks. On a few occasions the in-flight photographs were of insufficient quality for birds to be counted, thus preliminary observer counts were included in lieu of photographic data in the final abundance estimates.



**Map 2: Colonial Waterbird Helicopter Survey Route and Waterbody Classification in 2023**



## 3.0 RESULTS

### 3.1 UNMANNED AERIAL VEHICLE SURVEY

As observed in previous years, ring-billed gulls were the most common species of colonial waterbird observed in the former Gull Rapids area in 2023 (Table 1; Figure 1). The number of ring-billed gulls observed in the former Gull Rapids area during the first survey period was the lowest compared to all previous survey years. During the second survey period in 2023, the number of ring-billed gulls observed was the second lowest seen compared to all previous surveys, with only 2020 being lower. The third survey period had the lowest number of ring-billed gulls observed compared to previous surveys, replacing 2022 as the lowest (Table 1; Figure 1).

Like 2022, in 2023 most ring-billed gulls were observed on the constructed HCI, upstream of the Project. The HCI supported 97-100% of congregating and 100% of nesting ring-billed gulls in the former Gull Rapids area in 2023 (Map 3; Map 4). The number of ring-billed gull nests (536) was the third lowest number of nests observed from previous survey years (2015-2022; see Appendix A). Evidence of predation of ring-billed gulls were present, with 6 pairs of gull wings detected on the HCI in the first survey (Photo 2). No wings of depredated gulls were noted in the UAV photos of the HCI in 2021 or 2022. Few ring-billed gulls were observed on the smaller islands in the former Gull Rapids area and none were observed nesting on them (Map 3; Map 4).

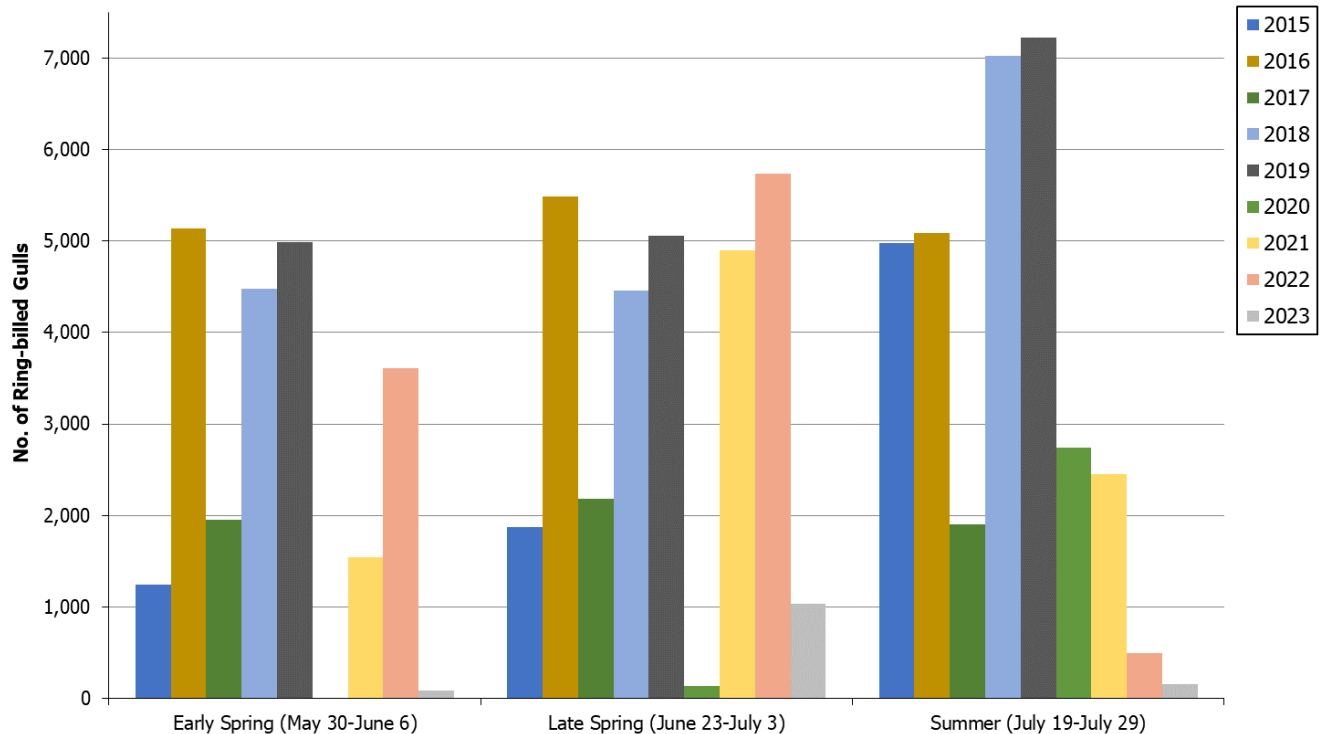
Up to 72 ring-billed gull chicks were observed in the former Gull Rapids area in July 2023, all found on the HCI (Table 1; Map 5). This was the second year that ring-billed gulls were observed to successfully raise young on the HCI. While on the lower end, the number of chicks observed in 2023 is within the range observed during previous surveys from 2015-2022 (Appendix A, Table 1).

Common terns were the second most abundant species of colonial waterbird observed in the former Gull Rapids area in 2023, which is consistent with previous years (Table 1; Figure 1). Common terns were only observed congregating and nesting on the HCI, which supported up to 255 nests, the highest number of nests in all survey years (Map 3; Map 4; Appendix A, Table 1). Up to eight tern chicks were observed on the HCI (Table 1). In all other survey years (2015-2022), tern chicks were only counted in UAV photos in 2021, where they were also observed on the HCI (Appendix A, Table 1).

The number of herring gulls, nests, and chicks observed in the former Gull Rapids area in 2023 were within the range observed during previous surveys from 2015-2021 (Table 1; Figure 1). Herring gulls were observed congregating on six islands and nesting on five islands in the former Gull Rapids area, including two nests on the HCI (Map 3; Map 4). Herring gull nests were primarily found on the smaller islands in the former Gull Rapids area, downstream of the Project (Map 4; Map 5). Only one herring gull chick was observed on one island, Wpt 226, during the 2023 survey (Appendix A, Table 2).

**Table 1: Maximum Number (Standard Deviation) of Colonial Waterbirds, Nests, and Chicks Observed by UAV in the Morning/Afternoon on Islands in the Former Gull Rapids Area in 2023 for Each Survey Period**

| Observation              | May 31-June 1 | June 23-24 | July 29  |
|--------------------------|---------------|------------|----------|
| American White Pelican   | 0 (0)         | 19 (13)    | 0 (0)    |
| Common Tern              | 0 (0)         | 108 (25)   | 73 (30)  |
| Common Tern w. Nest      | 0 (0)         | 255 (19)   | 0 (0)    |
| Common Tern Chick        | 0 (0)         | 0 (0)      | 8 (1)    |
| Herring Gull             | 23 (9)        | 62 (21)    | 3 (1)    |
| Herring Gull w. Nest     | 19 (1)        | 11 (4)     | 0 (0)    |
| Herring Gull Chick       | 0 (0)         | 0 (0)      | 1 (1)    |
| Ring-billed Gull         | 42 (27)       | 501 (279)  | 153 (89) |
| Ring-billed Gull w. Nest | 44 (1)        | 536 (93)   | 0 (0)    |
| Ring-billed Gull Chick   | 0 (0)         | 0 (0)      | 72 (15)  |



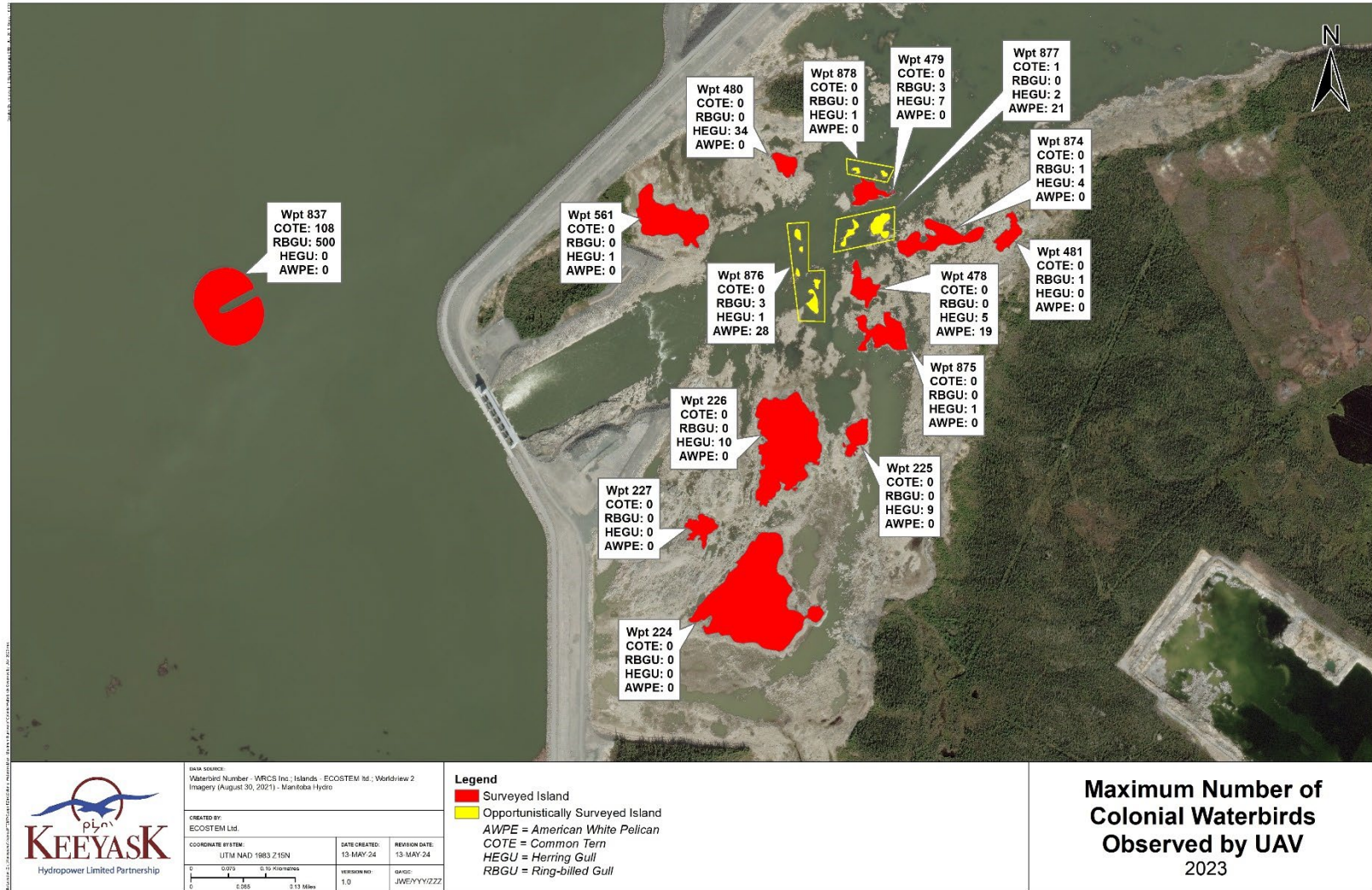
**Figure 1: Total Number of Ring-billed Gulls (With and Without Nests) Observed in the Former Gull Rapids Area by UAV During Early Spring, Late Spring, and Summer Surveys from 2015-2023. \*Note that the early spring survey was not conducted in 2020.**



**Photo 2: Pair of gull wings photographed on the HCI on May 31, 2023**

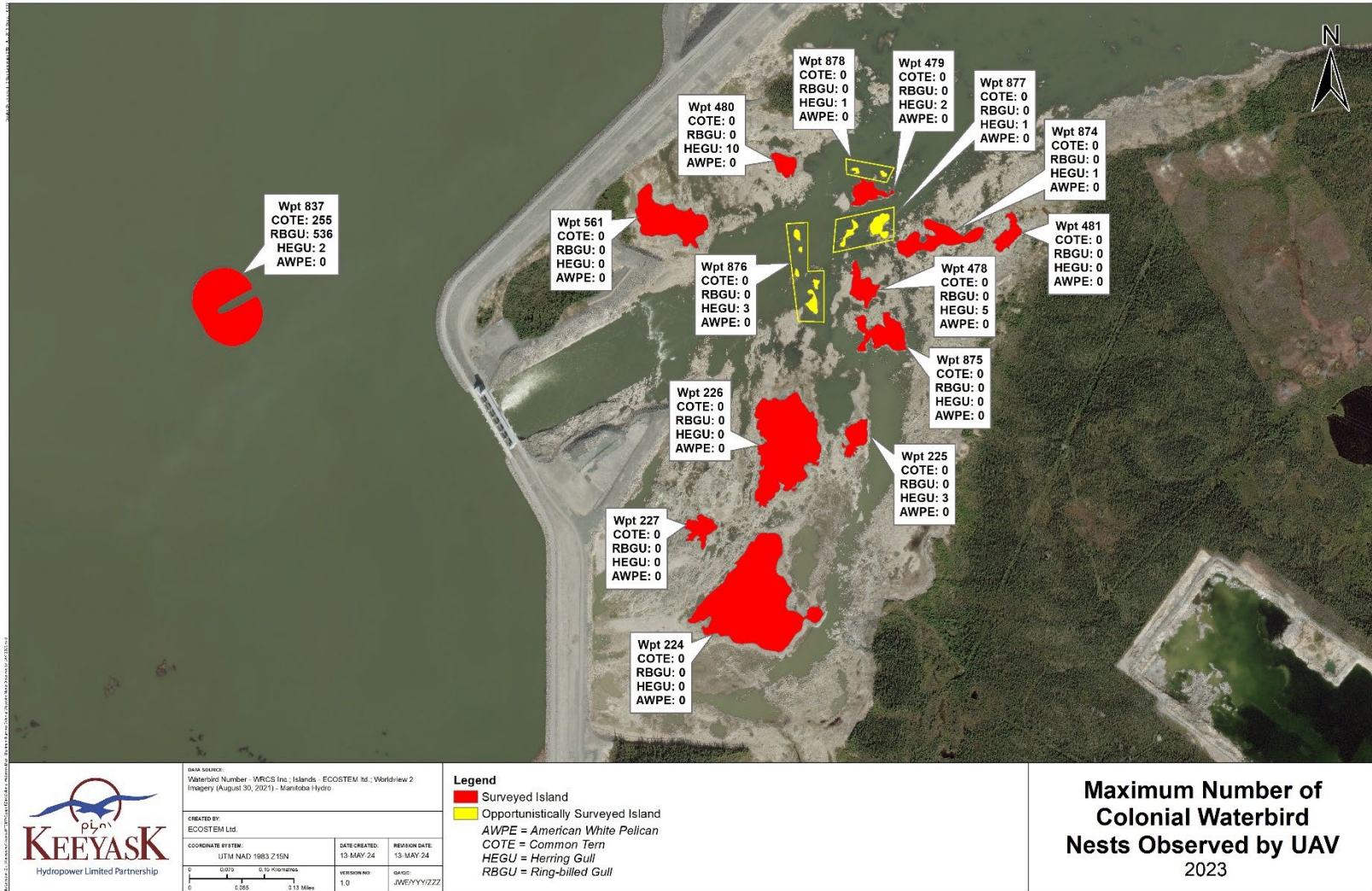
Several flocks of American white pelicans were observed in the former Gull Rapids area in 2023. No signs of nesting were observed, and the most pelicans were observed during the July survey, which was in the range observed during previous surveys from 2015–2022 (Table 1; Figure 1).

During the 2023 survey, five additional islands in the previous Gull Rapids area were opportunistically photographed (Map 3; Map 4). During the May 31–June 1 survey, a small number of herring gulls congregated and nested on some of these islands. During the June 23–24 survey, some of these additional islands were either partially or totally submerged. Three islands, Wpt 867, Wpt 877, and Wpt 878, had at least one herring gull nest during the first survey period and were completely submerged during the second survey period. No chicks were observed on any of the additional islands on the July 29 survey, but congregations of American white pelicans were present on the additional islands and ranged from 16 to 28 individuals (Appendix A, Table 2).



Note: the maximum number of colonial waterbirds was selected from pooled data from all survey periods (June 4-5, June 21-23, July 28) and morning/afternoon periods.

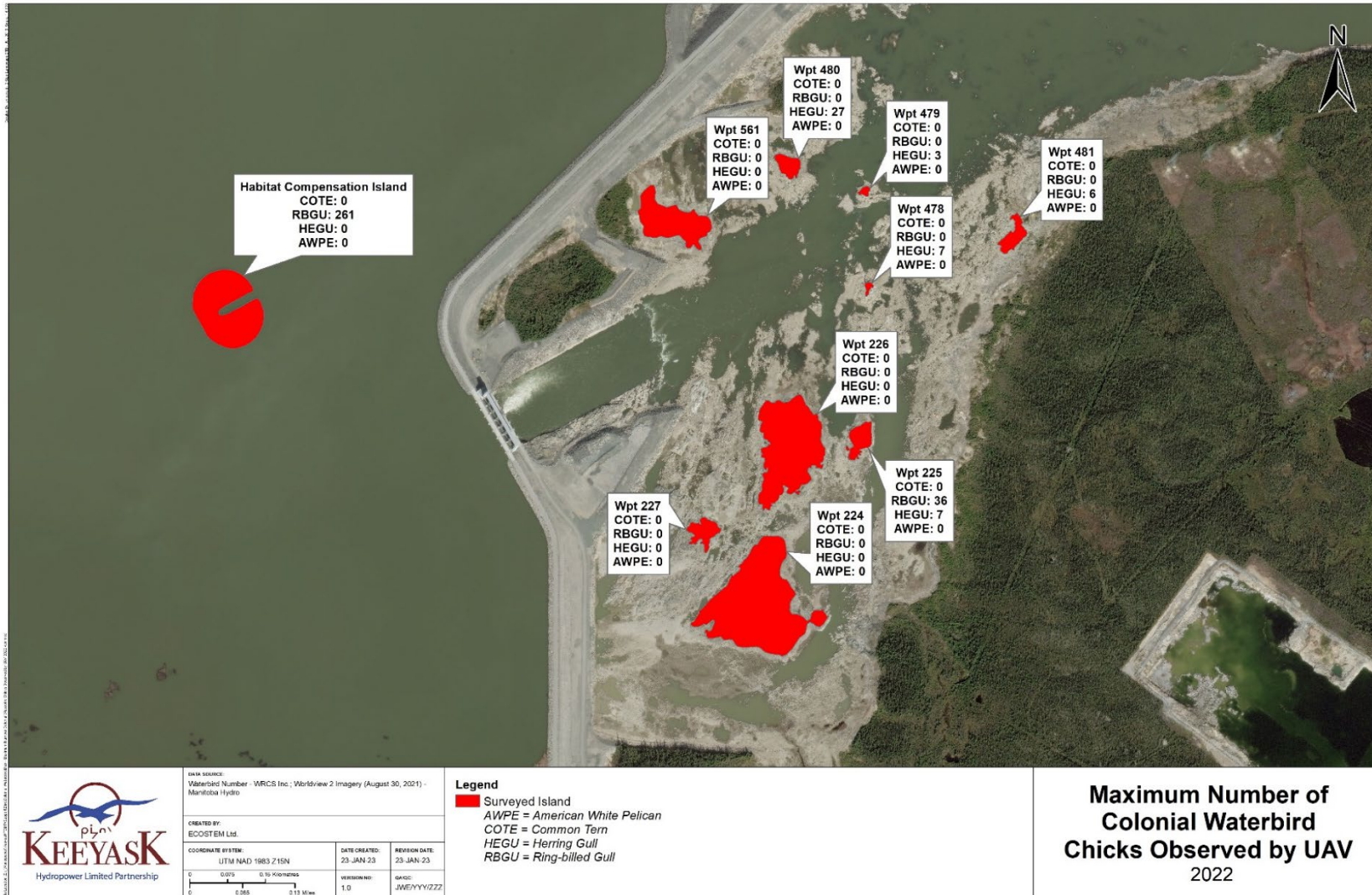
**Map 3: Maximum Number of Colonial Waterbirds Observed on Each Island by UAV in the Former Gull Rapids Area in 2023**



Note: the maximum number of colonial waterbird nests was selected from pooled data from all survey periods (June 4-5, June 21-23, July 28) and morning/afternoon periods.

**Map 4: Maximum Number of Colonial Waterbird Nests Observed on Each Island by UAV in the Former Gull Rapids Area in 2023**





Note: the maximum number of colonial waterbird nests was selected from pooled data from all survey periods (June 4-5, June 21-23, July 28) and morning/afternoon periods.

**Map 5: Maximum Number of Colonial Waterbird Chicks Observed on Each Island by UAV in the Former Gull Rapids Area in 2023**

## 3.2 HELICOPTER SURVEY

Four species of colonial waterbirds were observed during the 2023 helicopter surveys of the reservoir and surrounding area (Table 2). During both helicopter surveys, in June and July, ring-billed gulls were the most abundant colonial waterbird, with common terns being the second most abundant, which is consistent with previous surveys conducted from 2015-2022 (Table 2). American white pelican and herring gull were less abundant, which was consistent with the findings from previous construction monitoring surveys. No Bonaparte's gulls were observed in 2023.

**Table 2: Colonial Waterbird Abundance Observed During Helicopter Surveys in 2023**

| Observation            | June 16    |              |            |              | July 19   |              |            |              |
|------------------------|------------|--------------|------------|--------------|-----------|--------------|------------|--------------|
|                        | Colony     | Congregation | Dispersed  | Total        | Colony    | Congregation | Dispersed  | Total        |
| Ring-billed Gull       | 174        | 2,619        | 228        | 3,021        | 0         | 1,855        | 63         | 1,918        |
| Ring-billed Gull Chick | 0          | 0            | 0          | 0            | 0         | 439          | 0          | 439          |
| Common Tern            | 72         | 358          | 51         | 481          | 19        | 42           | 93         | 154          |
| Herring Gull           | 11         | 107          | 4          | 122          | 0         | 18           | 0          | 18           |
| American White Pelican | 0          | 34           | 12         | 46           | 0         | 52           | 9          | 61           |
| <b>Total</b>           | <b>257</b> | <b>3,183</b> | <b>230</b> | <b>3,670</b> | <b>19</b> | <b>2,406</b> | <b>165</b> | <b>2,590</b> |

### 3.2.1 RING-BILLED GULL

Ring-billed gulls were the most common species of colonial waterbird observed in the reservoir and surrounding area in 2023. The total number of ring-billed gulls decreased from June to July, which differed from the previous findings of the surveys conducted from 2015-2019 but was consistent with the findings from 2020-2022 (Figure 2; Table 3; Appendix B). The number of ring-billed gulls observed in the reservoir and surrounding area were some of the lowest observed in June, and the lowest observed in July (Figure 2).

In June 2023, ring-billed gulls were observed congregating at 12 sites in and around the reservoir, and nesting was observed on the HCI (Map 6). The HCI supported 27% and 30% of the total adult ring-billed gulls observed in June and July, respectively, which was lower than observed during previous surveys (Table 3). In July 2023, ring-billed gulls were observed congregating at eight sites and no nesting was observed (Table 3; Map 7).

Ring-billed gull chicks were observed in the former Gull Rapids area on two islands, the HCI, and on island Wpt 873 (Table 3; Map 7). The chicks observed on island Wpt 873 likely moved to this area and did not hatch there as the island consisted of small areas of peat that were low in the water. An additional group of 201 ring-billed gull chicks was observed near island Wpt 863 on July 19, 2023 (Photo 3). These chicks were likely hatched on island Wpt 863 and appeared to be forced off the island due to bald eagle activity. Up to 31 mature and immature bald eagles were observed on a small, treed island approximately 250 metres to the north of island Wpt 863 (Photo 4).

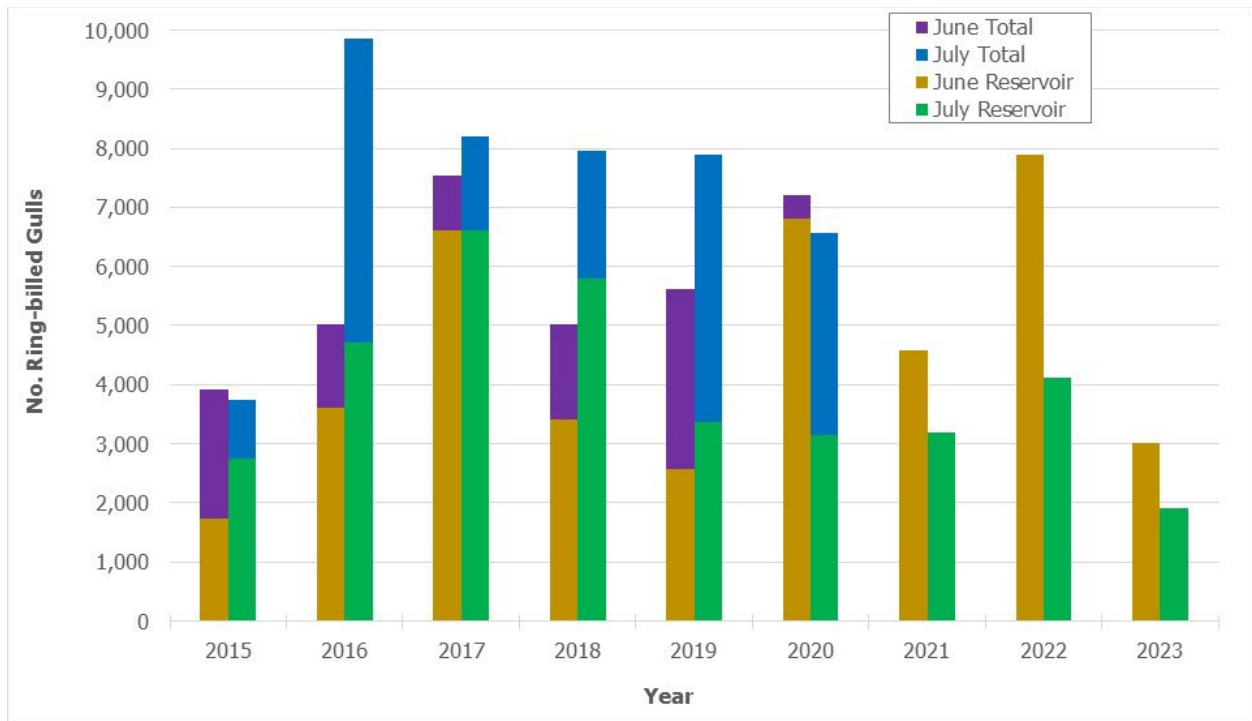
Of the 12 islands where ring-billed gulls were observed in June 2023, 11 (92%) had been used at least once in previous survey years (2015-2022; Table 4). In July, of the eight islands used, seven (88%) were used at least once in previous survey years (2015-2022; Table 4).



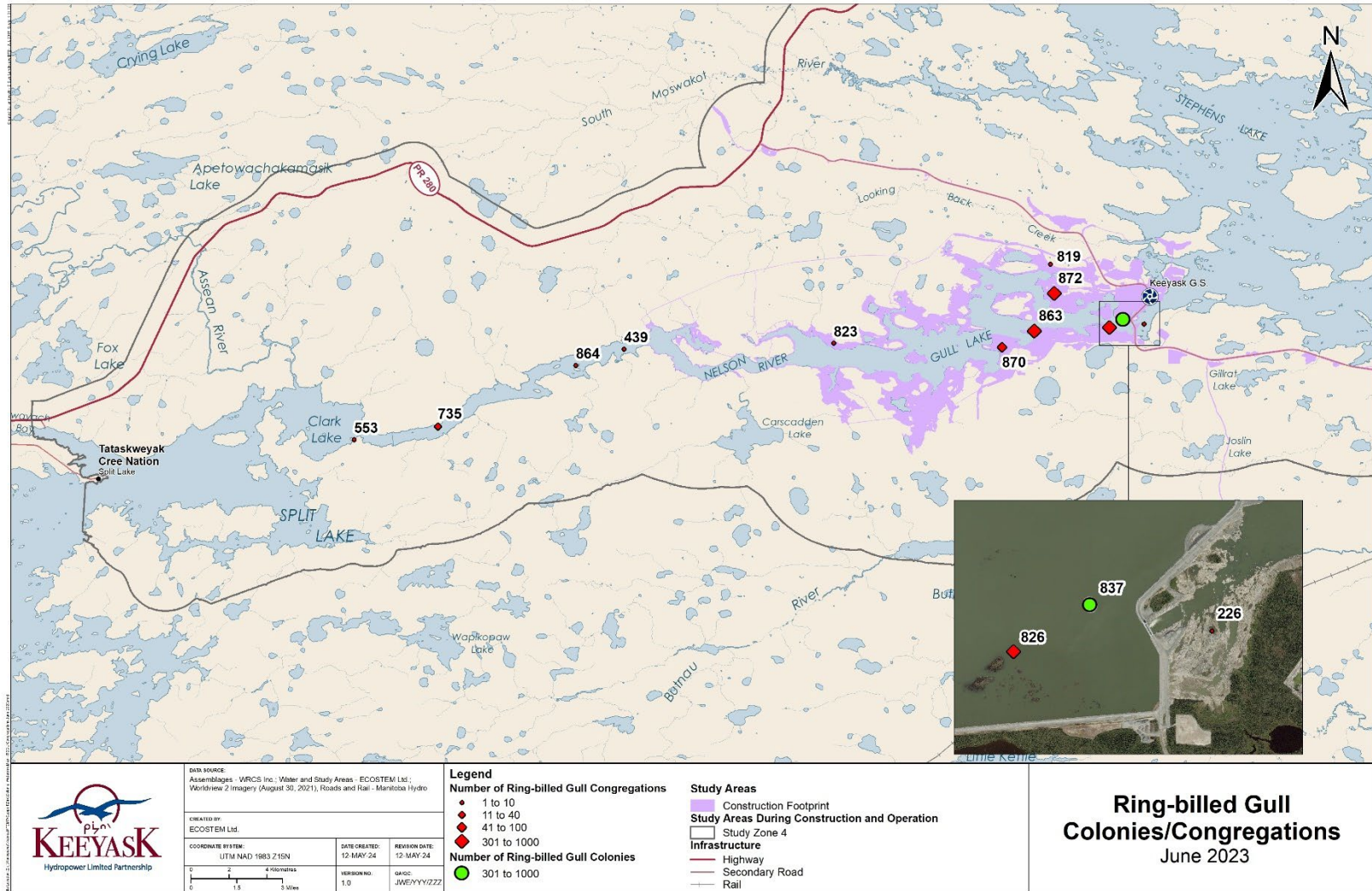
**Photo 3: Raft of ring-billed gull chicks flushed from island Wpt 863, potentially by bald eagle activity**



**Photo 4:** Small, treed island to the north of island Wpt 863 (background) that supported up to 30 bald eagles

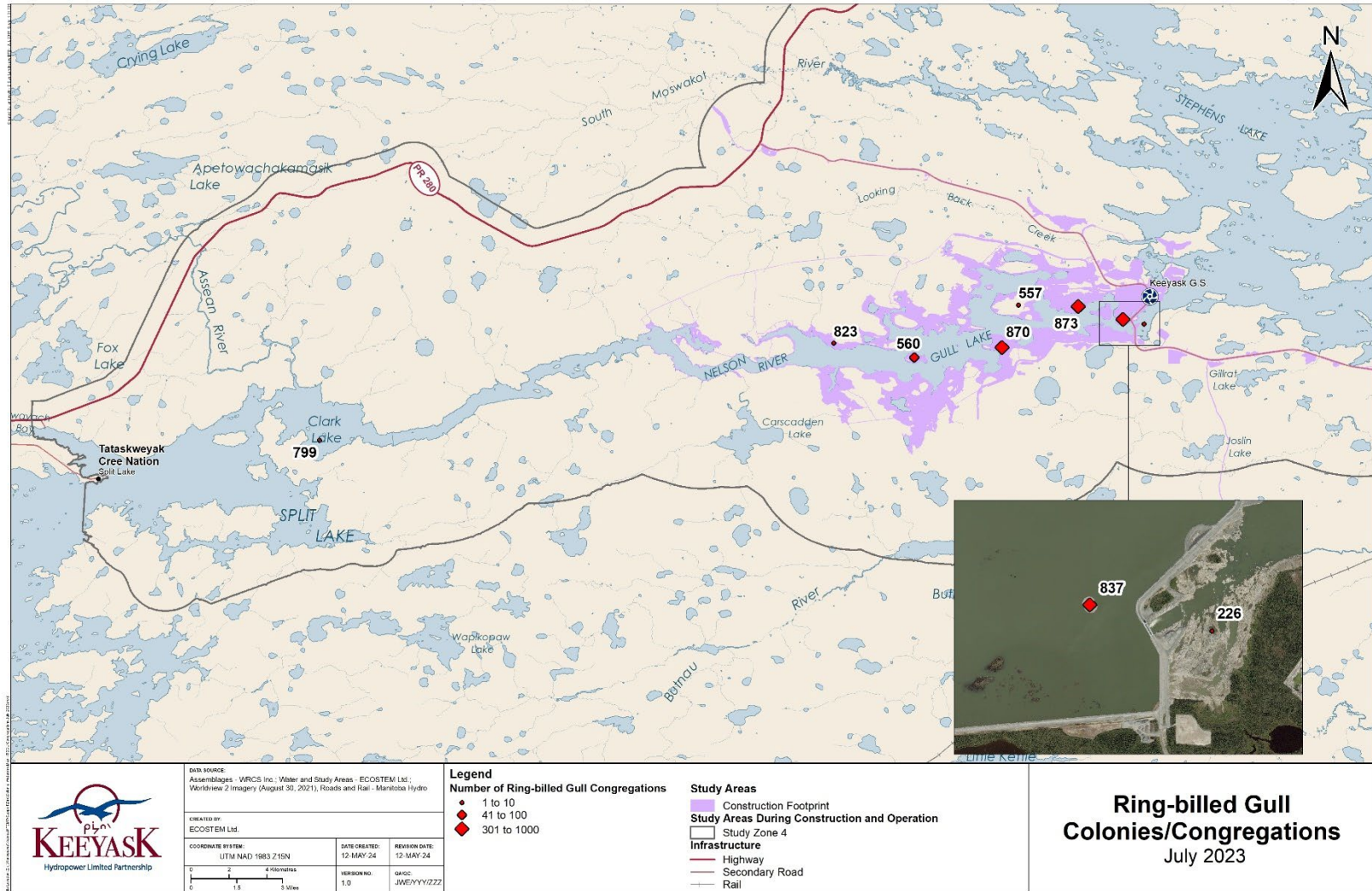


**Figure 2: Number of Ring-billed Gulls Observed in the Reservoir (including the Former Gull Rapids Area and Clark Lake) and Total Study Area (Study Zone 5) During Helicopter Surveys in June and July from 2015 to 2023. \*Note: Only the reservoir, former Gull Rapids area, and Clark Lake were surveyed from 2021-2023.**



**Map 6: Ring-billed Gull Colonies and Congregations Observed in and around the Reservoir During Helicopter Surveys in June 2023**





**Map 7: Ring-billed Gull Colonies and Congregations Observed in and around the Reservoir During Helicopter Surveys in July 2023**

**Table 3: Ring-billed Gull Congregations/Colonies Observed During the Helicopter Surveys in 2023**

| Waypoint | June             |                |              |              | July             |                |              |              |
|----------|------------------|----------------|--------------|--------------|------------------|----------------|--------------|--------------|
|          | Adults (No Nest) | Occupied Nests | Total Adults | Total Chicks | Adults (No Nest) | Occupied Nests | Total Adults | Total Chicks |
| 226      | 6                | 0              | 6            | 0            | 3                | 0              | 3            | 0            |
| 439      | 1                | 0              | 1            | 0            | 0                | 0              | 0            | 0            |
| 553      | 2                | 0              | 2            | 0            | 0                | 0              | 0            | 0            |
| 557      | 0                | 0              | 0            | 0            | 2                | 0              | 2            | 0            |
| 560      | 0                | 0              | 0            | 0            | 55               | 0              | 55           | 0            |
| 735      | 15               | 0              | 15           | 0            | 0                | 0              | 0            | 0            |
| 799      | 0                | 0              | 0            | 0            | 4                | 0              | 4            | 0            |
| 819      | 1                | 0              | 1            | 0            | 0                | 0              | 0            | 0            |
| 823      | 10               | 0              | 10           | 0            | 1                | 0              | 1            | 0            |
| *837     | 585              | 174            | 759          | 0            | 562              | 0              | 562          | 11           |
| 826      | 419              | 0              | 419          | 0            | 0                | 0              | 0            | 0            |
| 863      | 900              | 0              | 900          | 0            | 0                | 0              | 0            | 0            |
| 864      | 10               | 0              | 10           | 0            | 0                | 0              | 0            | 0            |
| 870      | 99               | 0              | 99           | 0            | 541              | 0              | 541          | 59           |
| 872      | 571              | 0              | 571          | 0            | 0                | 0              | 0            | 0            |
| 873      | 0                | 0              | 0            | 0            | 687              | 0              | 687          | 168          |
| Total    | 2,619            | 174            | 2,793        | 0            | 1,855            | 0              | 1,855        | 238          |

\* Habitat Compensation Island

**Table 4: Waterbody Classification and Island Use by Ring-billed Gulls in June and July 2023**

| Island | Gathering    | Month | System    | Flow  | Waterbody Size Class (m <sup>2</sup> ) | Island Habitat                      | Island Size Class (ha) | Years Used 2015-2023 |
|--------|--------------|-------|-----------|-------|--|-------------------------------------|------------------------|----------------------|
| 837    | Colony       | June  | On-system | River | >1,000                                 | Habitat Compensation Island, gravel | 1.0-1.9                | 4                    |
| 226    | Congregation | June  | On-system | River | >1,000                                 | 50% rock, 50% shrub/deadfall        | 1.0-1.9                | 9                    |
| 439    | Congregation | June  | On-system | River | >1,000                                 | 50% bare rock, 50% grass            | 0.1-0.9                | 5                    |
| 553    | Congregation | June  | On-system | Lake  | >1,000                                 | Boulders                            | <0.1                   | 5                    |
| 735    | Congregation | June  | On-system | River | >1,000                                 | Boulders                            | <0.1                   | 4                    |
| 819    | Congregation | June  | On-system | River | >1,000                                 | Floating peat                       | <0.1                   | 2                    |
| 823    | Congregation | June  | On-system | River | >1,000                                 | Floating peat                       | <0.1                   | 3                    |
| 826    | Congregation | June  | On-system | River | >1,000                                 | Floating peat                       | <0.1                   | 3                    |
| 863    | Congregation | June  | On-system | River | >1,000                                 | Floating peat                       | <0.1                   | 3                    |
| 864    | Congregation | June  | On-system | River | >1,000                                 | 50% shrub, 50% grass                | 0.1-0.9                | 3                    |
| 870    | Congregation | June  | On-system | River | >1,000                                 | Floating peat                       | <0.1                   | 3                    |
| 872    | Congregation | June  | On-system | River | >1,000                                 | Floating peat                       | <0.1                   | 1                    |
| 1      | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 2      | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 4      | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 6      | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 7      | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 8      | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 9      | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 10     | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 11     | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 12     | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 13     | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 18     | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 19     | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 20     | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 21     | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 23     | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 24     | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 26     | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 27     | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 28     | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 29     | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 30     | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 32     | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |

| Island | Gathering    | Month | System    | Flow  | Waterbody Size Class (m <sup>2</sup> ) | Island Habitat                      | Island Size Class (ha) | Years Used 2015-2023 |
|--------|--------------|-------|-----------|-------|--|-------------------------------------|------------------------|----------------------|
| 33     | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 34     | Dispersed    | June  | On-system | Lake  | >1,000                                 | NA                                  | NA                     | NA                   |
| 35     | Dispersed    | June  | On-system | Lake  | >1,000                                 | NA                                  | NA                     | NA                   |
| 36     | Dispersed    | June  | On-system | Lake  | >1,000                                 | NA                                  | NA                     | NA                   |
| 37     | Dispersed    | June  | On-system | Lake  | >1,000                                 | NA                                  | NA                     | NA                   |
| 38     | Dispersed    | June  | On-system | Lake  | >1,000                                 | NA                                  | NA                     | NA                   |
| 40     | Dispersed    | June  | On-system | Lake  | >1,000                                 | NA                                  | NA                     | NA                   |
| 42     | Dispersed    | June  | On-system | Lake  | >1,000                                 | NA                                  | NA                     | NA                   |
| 44     | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 45     | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 48     | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 49     | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 50     | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 52     | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 53     | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 54     | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 55     | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 56     | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 57     | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 58     | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 226    | Congregation | July  | On-system | River | >1,000                                 | 50% rock, 50% shrub/deadfall        | 1.0-1.9                | 9                    |
| 557    | Congregation | July  | On-system | River | >1,000                                 | Treed/burned                        | >4.0                   | 4                    |
| 560    | Congregation | July  | On-system | River | >1,000                                 | Treed/cleared                       | >4.0                   | 6                    |
| 799    | Congregation | July  | On-system | Lake  | >1,000                                 | Gravel                              | 1.0-1.9                | 3                    |
| 823    | Congregation | July  | On-system | River | >1,000                                 | Floating peat                       | <0.1                   | 3                    |
| 837    | Congregation | July  | On-system | River | >1,000                                 | Habitat Compensation Island, gravel | 1.0-1.9                | 4                    |
| 870    | Congregation | July  | On-system | River | >1,000                                 | Floating peat                       | <0.1                   | 3                    |
| 873    | Congregation | July  | On-system | River | >1,000                                 | Floating peat                       | 1.0-1.9                | 1                    |
| 2      | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 5      | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 6      | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 10     | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 12     | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 15     | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 16     | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 17     | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 22     | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 24     | Dispersed    | July  | On-system | Lake  | >1,000                                 | NA                                  | NA                     | NA                   |

| Island | Gathering | Month | System    | Flow  | Waterbody Size Class (m <sup>2</sup> ) | Island Habitat | Island Size Class (ha) | Years Used 2015-2023 |
|--------|-----------|-------|-----------|-------|--|----------------|------------------------|----------------------|
| 25     | Dispersed | July  | On-system | Lake  | >1,000                                 | NA             | NA                     | NA                   |
| 26     | Dispersed | July  | On-system | Lake  | >1,000                                 | NA             | NA                     | NA                   |
| 31     | Dispersed | July  | On-system | River | >1,000                                 | NA             | NA                     | NA                   |
| 32     | Dispersed | July  | On-system | River | >1,000                                 | NA             | NA                     | NA                   |
| 33     | Dispersed | July  | On-system | River | >1,000                                 | NA             | NA                     | NA                   |
| 34     | Dispersed | July  | On-system | River | >1,000                                 | NA             | NA                     | NA                   |
| 41     | Dispersed | July  | On-system | River | >1,000                                 | NA             | NA                     | NA                   |
| 44     | Dispersed | July  | On-system | River | >1,000                                 | NA             | NA                     | NA                   |
| 47     | Dispersed | July  | On-system | River | >1,000                                 | NA             | NA                     | NA                   |
| 50     | Dispersed | July  | On-system | River | >1,000                                 | NA             | NA                     | NA                   |
| 53     | Dispersed | July  | On-system | River | >1,000                                 | NA             | NA                     | NA                   |
| 55     | Dispersed | July  | On-system | River | >1,000                                 | NA             | NA                     | NA                   |

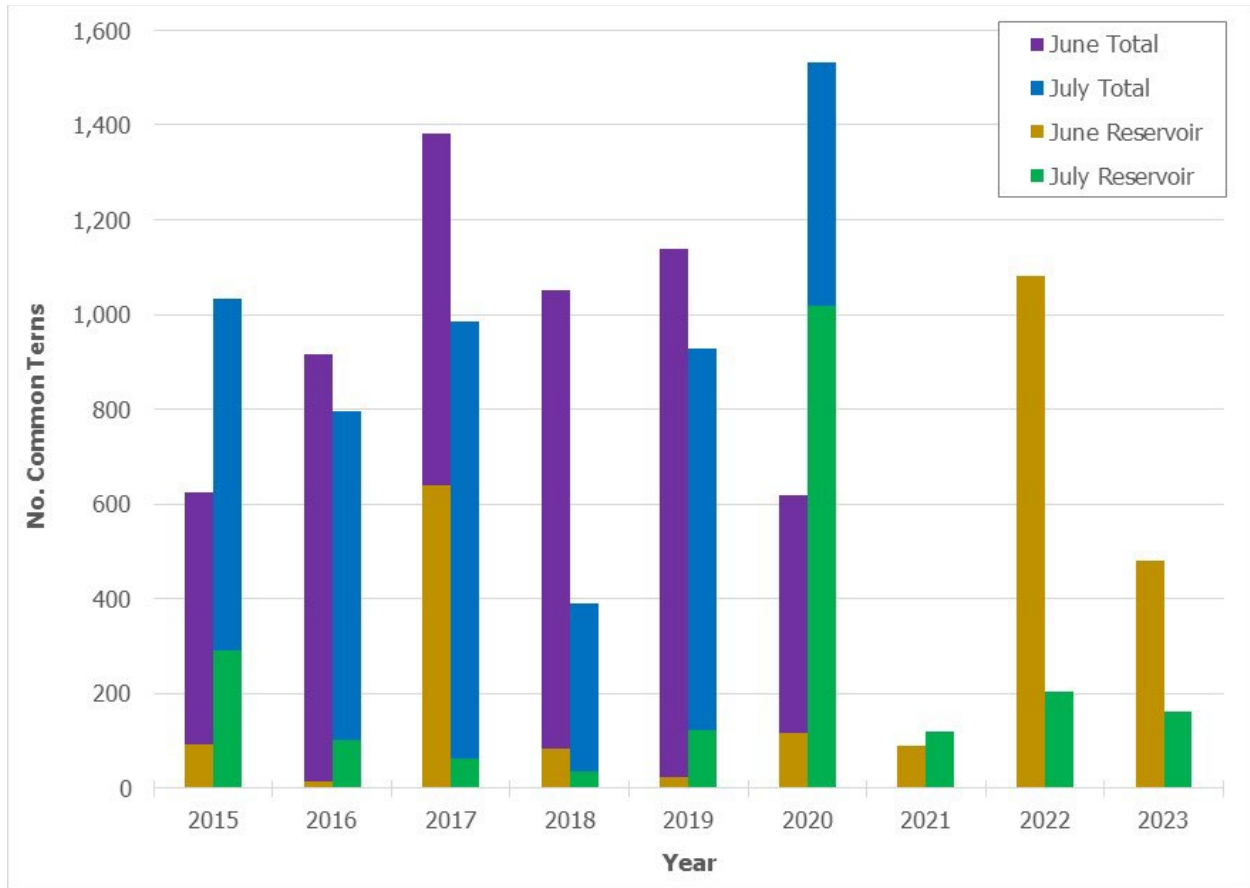
### 3.2.2 COMMON TERN

Common terns were the second most abundant species of colonial waterbird observed in and around the reservoir in 2023 (Table 2).

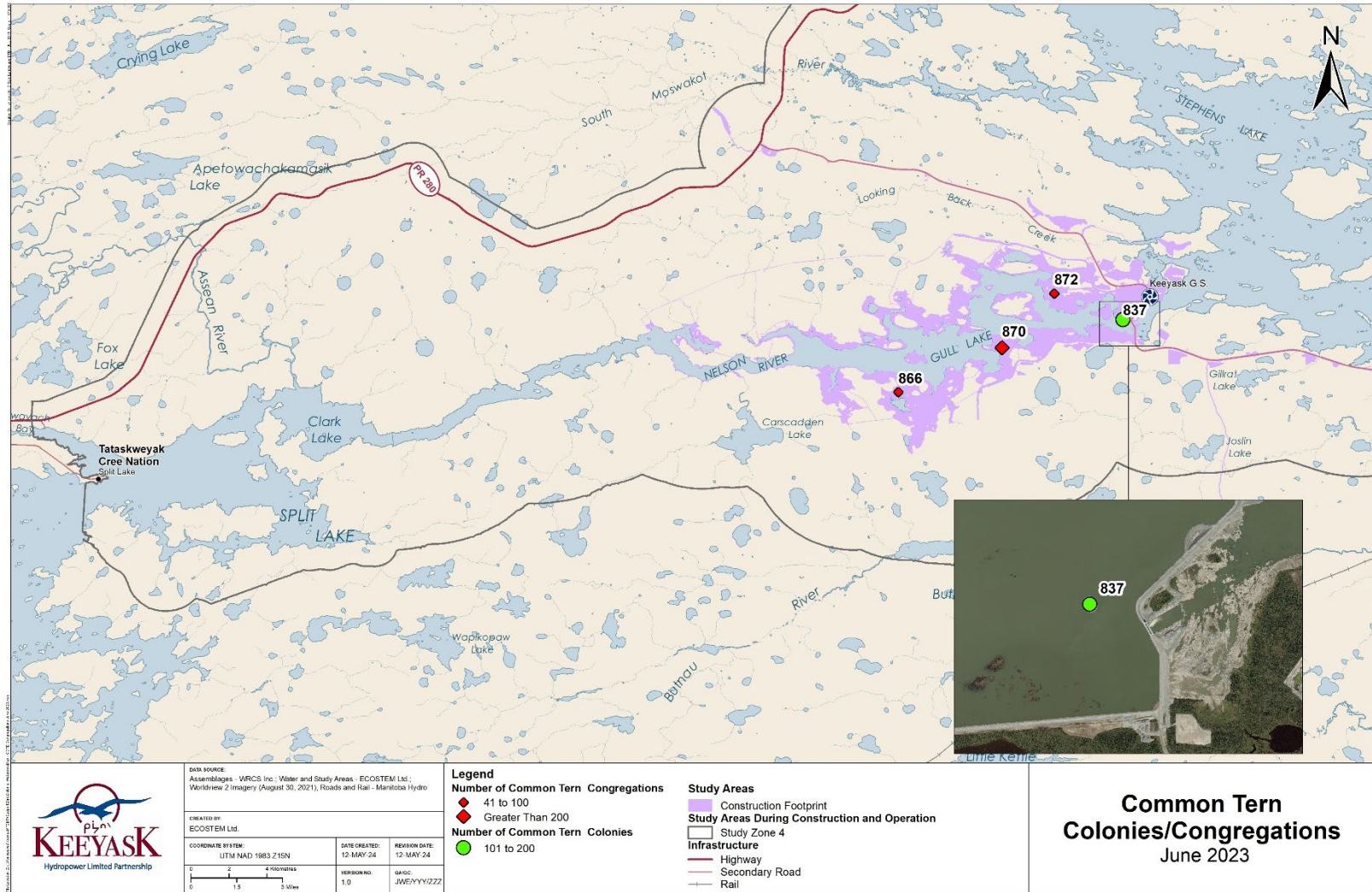
The number of common terns observed in June 2023 was the third highest number observed during any of the surveys conducted from 2015-2022 (Figure 3). In July 2023, the number of common terns decreased substantially, which is consistent with other survey years, and was within the ranges observed during previous surveys (Figure 3).

In June 2023, common terns were observed congregating at four sites and nesting on only one site, the HCI, where 72 nests were observed (Table 5; Map 8). This was the third year that common terns nested on the HCI, which also occurred in 2021 and 2022.

In July 2023, common terns were observed congregating at three sites and nesting was again observed on the HCI (Table 5; Map 9). No common tern chicks were observed on the HCI in 2023, which also occurred in 2022, and may have been a result of fireweed (*Epilobium angustifolium*) growth near the nesting area, providing cover for the chicks and making them less visible (Photo 3; Section 3.2.1).

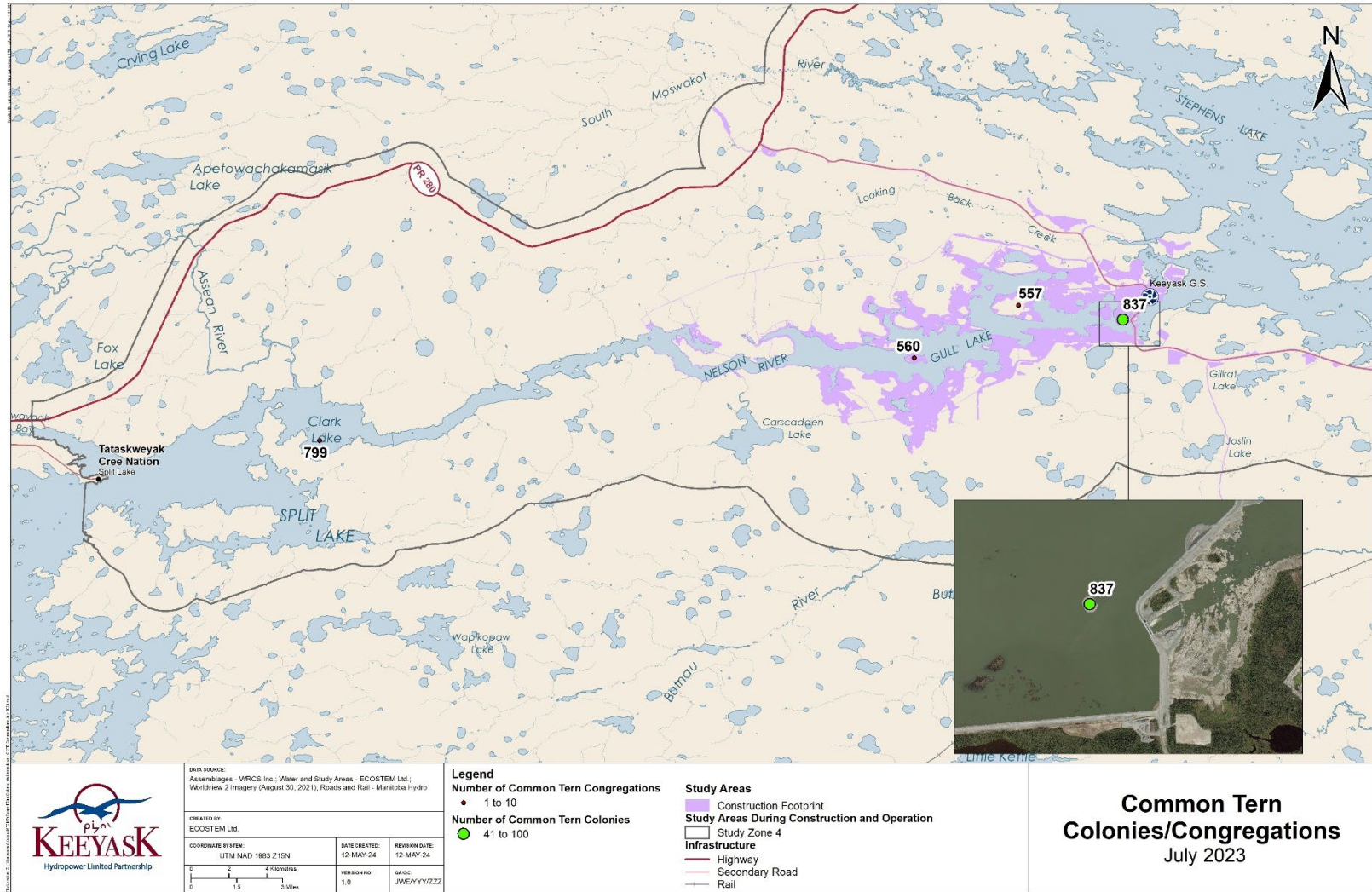


**Figure 3: Number of Common Terns Observed in the Reservoir (including the Former Gull Rapids Area and Clark Lake) and Total Study Area (Study Zone 5) During Helicopter Surveys in June and July from 2015 to 2023. \*Note: Only the reservoir, former Gull Rapids area, and Clark Lake were surveyed from 2021-2023.**



**Map 8: Common Tern Colonies and Congregations Observed in and around the Reservoir During Helicopter Surveys in June 2023**





**Map 9: Common Tern Colonies and Congregations Observed in and around the Reservoir During Helicopter Surveys in July 2023**

**Table 5: Common Tern Congregations/Colonies Observed in and around the Reservoir During the Helicopter Surveys in 2023**

| Waypoint | June             |                |              |              | July             |                |              |              |
|----------|------------------|----------------|--------------|--------------|------------------|----------------|--------------|--------------|
|          | Adults (No Nest) | Occupied Nests | Total Adults | Total Chicks | Adults (No Nest) | Occupied Nests | Total Adults | Total Chicks |
| 557      | 0                | 0              | 0            | 0            | 4                | 0              | 4            | 0            |
| 560      | 0                | 0              | 0            | 0            | 2                | 0              | 2            | 0            |
| 799      | 0                | 0              | 0            | 0            | 3                | 0              | 3            | 0            |
| *837     | 41               | 72             | 113          | 0            | 33               | 19             | 52           | 0            |
| 866      | 60               | 0              | 60           | 0            | 0                | 0              | 0            | 0            |
| 870      | 212              | 0              | 212          | 0            | 0                | 0              | 0            | 0            |
| 872      | 45               | 0              | 45           | 0            | 0                | 0              | 0            | 0            |
| Total    | 358              | 72             | 430          | 0            | 42               | 19             | 61           | 0            |

\* Habitat Compensation Island

**Table 6: Waterbody Classification and Island Use by Common Terns in June and July 2023**

| Island | Gathering    | Month | System    | Flow  | Waterbody Size Class (m <sup>2</sup> ) | Island Habitat                      | Island Size Class (ha) | Years Used 2015-2023 |
|--------|--------------|-------|-----------|-------|--|-------------------------------------|------------------------|----------------------|
| 837    | Colony       | June  | On-system | River | >1,000                                 | Habitat Compensation Island, gravel | 1.0-1.9                | 4                    |
| 866    | Congregation | June  | On-system | River | >1,000                                 | Floating peat                       | <0.1                   | 3                    |
| 870    | Congregation | June  | On-system | River | >1,000                                 | Floating peat                       | <0.1                   | 3                    |
| 872    | Congregation | June  | On-system | River | >1,000                                 | Floating peat                       | <0.1                   | 1                    |
| 2      | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 5      | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 9      | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 14     | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 15     | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 16     | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 32     | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 37     | Dispersed    | June  | On-system | Lake  | >1,000                                 | NA                                  | NA                     | NA                   |
| 39     | Dispersed    | June  | On-system | Lake  | >1,000                                 | NA                                  | NA                     | NA                   |
| 41     | Dispersed    | June  | On-system | Lake  | >1,000                                 | NA                                  | NA                     | NA                   |
| 43     | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 44     | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 47     | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 51     | Dispersed    | June  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |

| Island | Gathering    | Month | System    | Flow  | Waterbody Size Class (m <sup>2</sup> ) | Island Habitat                      | Island Size Class (ha) | Years Used 2015-2023 |
|--------|--------------|-------|-----------|-------|--|-------------------------------------|------------------------|----------------------|
| 837    | Colony       | July  | On-system | River | >1,000                                 | Habitat Compensation Island, gravel | 1.0-1.9                | 4                    |
| 557    | Congregation | July  | On-system | River | >1,000                                 | Treed/burned                        | >4.0                   | 4                    |
| 560    | Congregation | July  | On-system | River | >1,000                                 | Treed/cleared                       | >4.0                   | 6                    |
| 799    | Congregation | July  | On-system | Lake  | >1,000                                 | Gravel                              | 1.0-1.9                | 3                    |
| 1      | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 3      | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 5      | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 7      | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 8      | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 9      | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 11     | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 13     | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 14     | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 18     | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 19     | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 20     | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 21     | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 23     | Dispersed    | July  | On-system | Lake  | >1,000                                 | NA                                  | NA                     | NA                   |
| 24     | Dispersed    | July  | On-system | Lake  | >1,000                                 | NA                                  | NA                     | NA                   |
| 27     | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 28     | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 29     | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 35     | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 36     | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 37     | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 38     | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 39     | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 40     | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 42     | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 43     | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 45     | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 46     | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 48     | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 49     | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 51     | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 52     | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 54     | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |
| 55     | Dispersed    | July  | On-system | River | >1,000                                 | NA                                  | NA                     | NA                   |

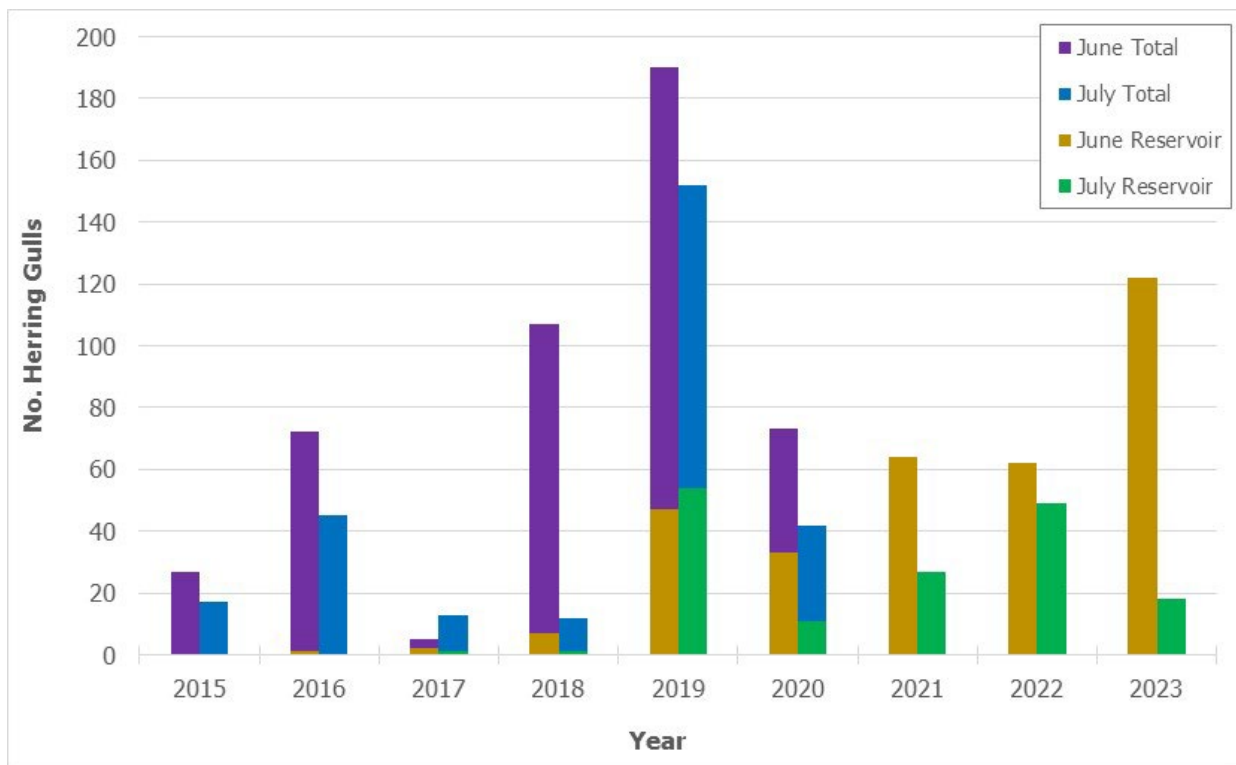


### 3.2.3 HERRING GULL

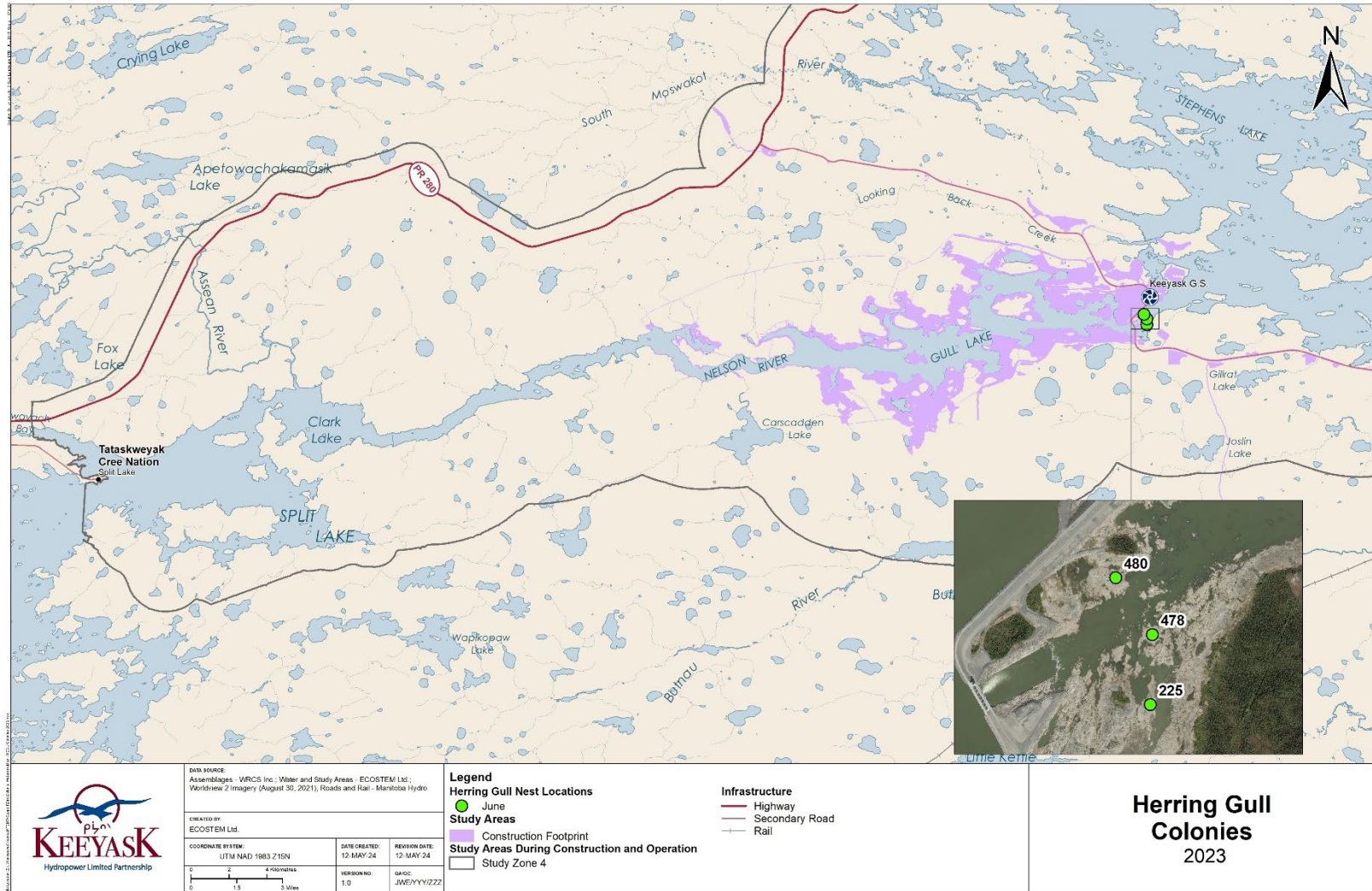
The number of herring gulls observed in June 2023 was the greatest number observed in the reservoir and surrounding area during any of the previous surveys from 2015-2022 (Figure 4). The number observed during July decreased, as has been observed during previous surveys, and was within the range observed previously (Figure 4).

In June 2023, herring gulls were observed nesting on three islands within the former Gull Rapids area (Map 6). All of the islands used by herring gulls in June were in the former Gull Rapids area and had been used at least once in previous survey years (2015-2022) (Map 10; Table 8).

In July 2023, herring gulls were observed congregating on five islands, four of which were in the former Gull Rapids area. No nesting birds or chicks were observed in July (Table 7).



**Figure 4: Number of Herring Gulls Observed in the Reservoir (including the Former Gull Rapids Area and Clark Lake) and Total Study Area (Study Zone 5) During Helicopter Surveys in June and July from 2015 to 2023. \*Note: Only the reservoir, former Gull Rapids area, and Clark Lake were surveyed from 2021-2023.**



**Map 10: Herring Gull Colonies Observed During Helicopter Surveys in 2023**

**Table 7: Herring Gulls and Colonies Observed in and around the Reservoir During the Helicopter Surveys in 2023**

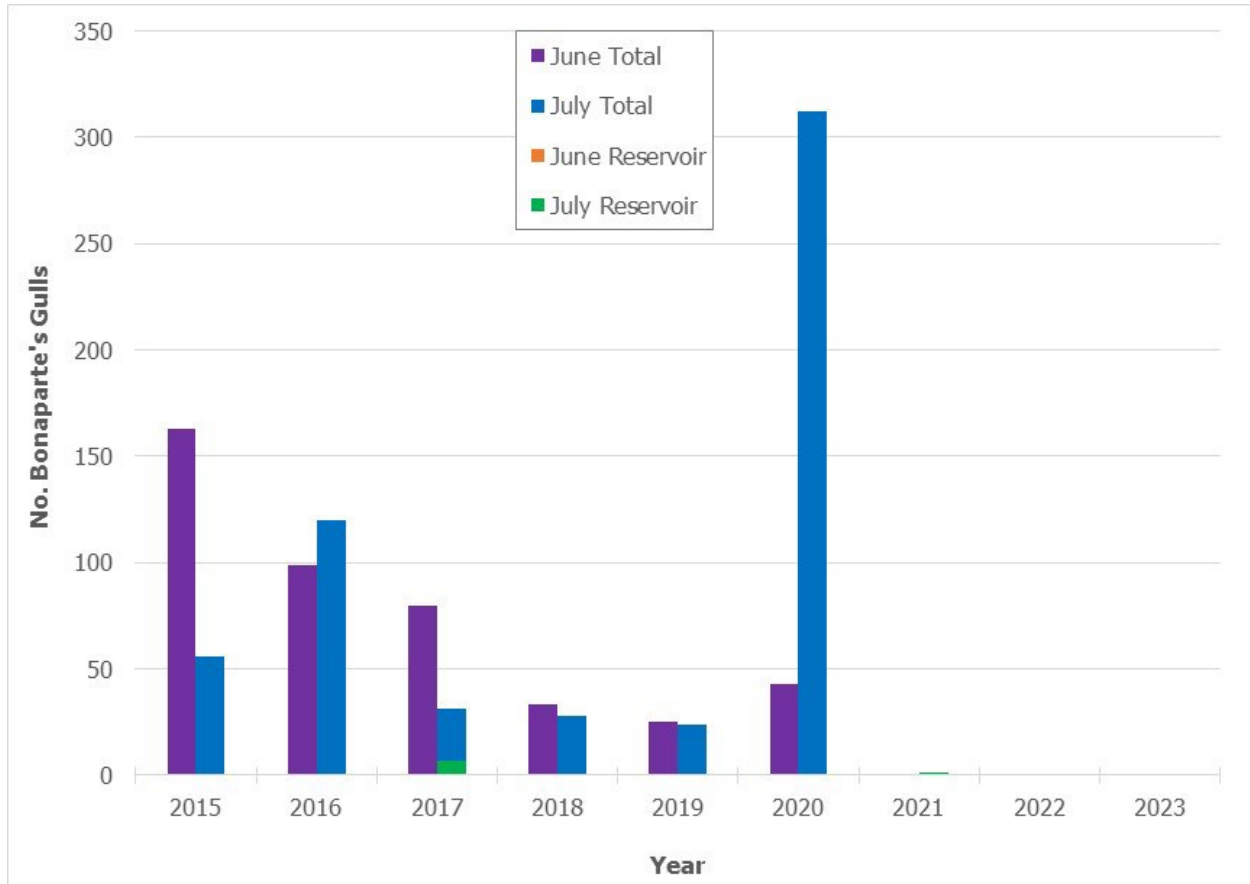
| Waypoint | June             |                |              |              | July             |                |              |              |
|----------|------------------|----------------|--------------|--------------|------------------|----------------|--------------|--------------|
|          | Adults (No Nest) | Occupied Nests | Total Adults | Total Chicks | Adults (No Nest) | Occupied Nests | Total Adults | Total Chicks |
| 225      | 7                | 3              | 10           | 0            | 9                | 0              | 9            | 0            |
| 439      | 0                | 0              | 0            | 0            | 1                | 0              | 1            | 0            |
| 478      | 4                | 4              | 8            | 0            | 1                | 0              | 1            | 0            |
| 479      | 1                | 0              | 1            | 0            | 3                | 0              | 3            | 0            |
| 480      | 28               | 4              | 32           | 0            | 4                | 0              | 4            | 0            |
| 560      | 2                | 0              | 2            | 0            | 0                | 0              | 0            | 0            |
| 561      | 2                | 0              | 2            | 0            | 0                | 0              | 0            | 0            |
| 826      | 63               | 0              | 63           | 0            | 0                | 0              | 0            | 0            |
| Total    | 107              | 11             | 118          | 0            | 18               | 0              | 18           | 0            |

**Table 8: Waterbody Classification and Island Use by Herring Gulls in 2023**

| Island | Gathering    | Month | System    | Flow  | Waterbody Size Class (m <sup>2</sup> ) | Island Habitat           | Island Size Class (ha) | Years Used 2015-2023 |
|--------|--------------|-------|-----------|-------|--|--------------------------|------------------------|----------------------|
| 225    | Colony       | June  | On-system | River | >1,000                                 | Exposed bedrock          | 0.1-0.9                | 9                    |
| 478    | Colony       | June  | On-system | River | >1,000                                 | Exposed bedrock          | <0.1                   | 9                    |
| 480    | Colony       | June  | On-system | River | >1,000                                 | Exposed bedrock          | 0.1-0.9                | 8                    |
| 479    | Congregation | June  | On-system | River | >1,000                                 | Exposed bedrock          | <0.1                   | 9                    |
| 560    | Congregation | June  | On-system | River | >1,000                                 | Treed/cleared            | >4.0                   | 6                    |
| 561    | Congregation | June  | On-system | River | >1,000                                 | Exposed bedrock          | 1.0-1.9                | 6                    |
| 826    | Congregation | June  | On-system | River | >1,000                                 | Floating peat            | <0.1                   | 3                    |
| 17     | Dispersed    | June  | On-system | River | >1,000                                 | NA                       | NA                     | NA                   |
| 55     | Dispersed    | June  | On-system | River | >1,000                                 | NA                       | NA                     | NA                   |
| 225    | Congregation | July  | On-system | River | >1,000                                 | Exposed bedrock          | 0.1-0.9                | 9                    |
| 439    | Congregation | July  | On-system | River | >1,000                                 | 50% bare rock, 50% grass | 0.1-0.9                | 5                    |
| 478    | Congregation | July  | On-system | River | >1,000                                 | Exposed bedrock          | <0.1                   | 9                    |
| 479    | Congregation | July  | On-system | River | >1,000                                 | Exposed bedrock          | <0.1                   | 9                    |
| 480    | Congregation | July  | On-system | River | >1,000                                 | Exposed bedrock          | 0.1-0.9                | 8                    |

### 3.2.4 BONAPARTE’S GULL

No Bonaparte’s gulls were observed in the reservoir or surrounding area in 2023. This is consistent with previous construction surveys (2015-2022) as Bonaparte’s gulls are typically observed in off-system areas (Figure 5).



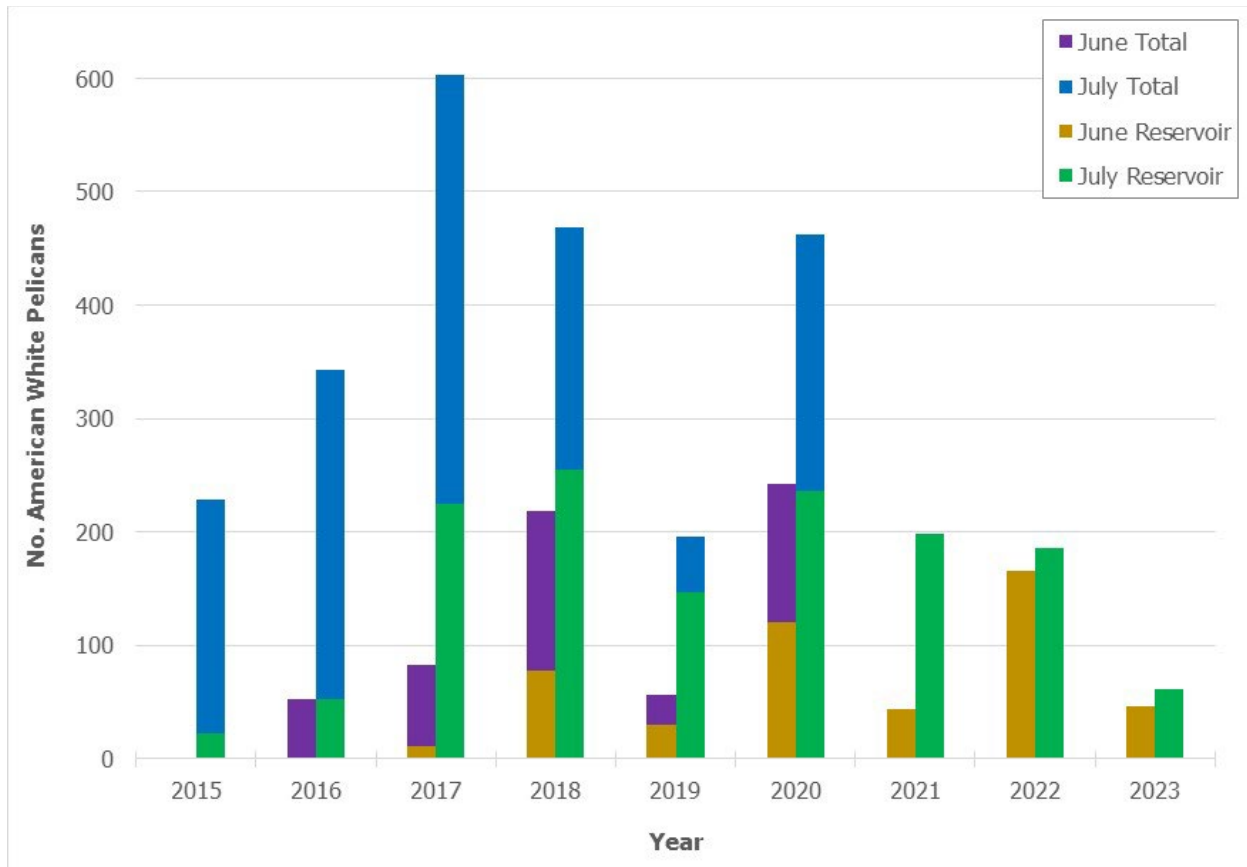
**Figure 5: Number of Bonaparte’s Gulls Observed in the Reservoir (including the Former Gull Rapids Area and Clark Lake) and Total Study Area (Study Zone 5) During Helicopter Surveys in June and July from 2015 to 2023. \*Note: Only the reservoir, former Gull Rapids area, and Clark Lake were surveyed from 2021-2023.**

### 3.2.5 AMERICAN WHITE PELICAN

The number of American white pelicans observed in June 2023 was the third lowest number that has been observed compared to all previous surveys from 2015-2022, and in contrast to June 2022, when the highest numbers were recorded (Figure 6). In July 2023, the number of pelicans increased slightly, and was the third lowest number that has been observed (Figure 6).

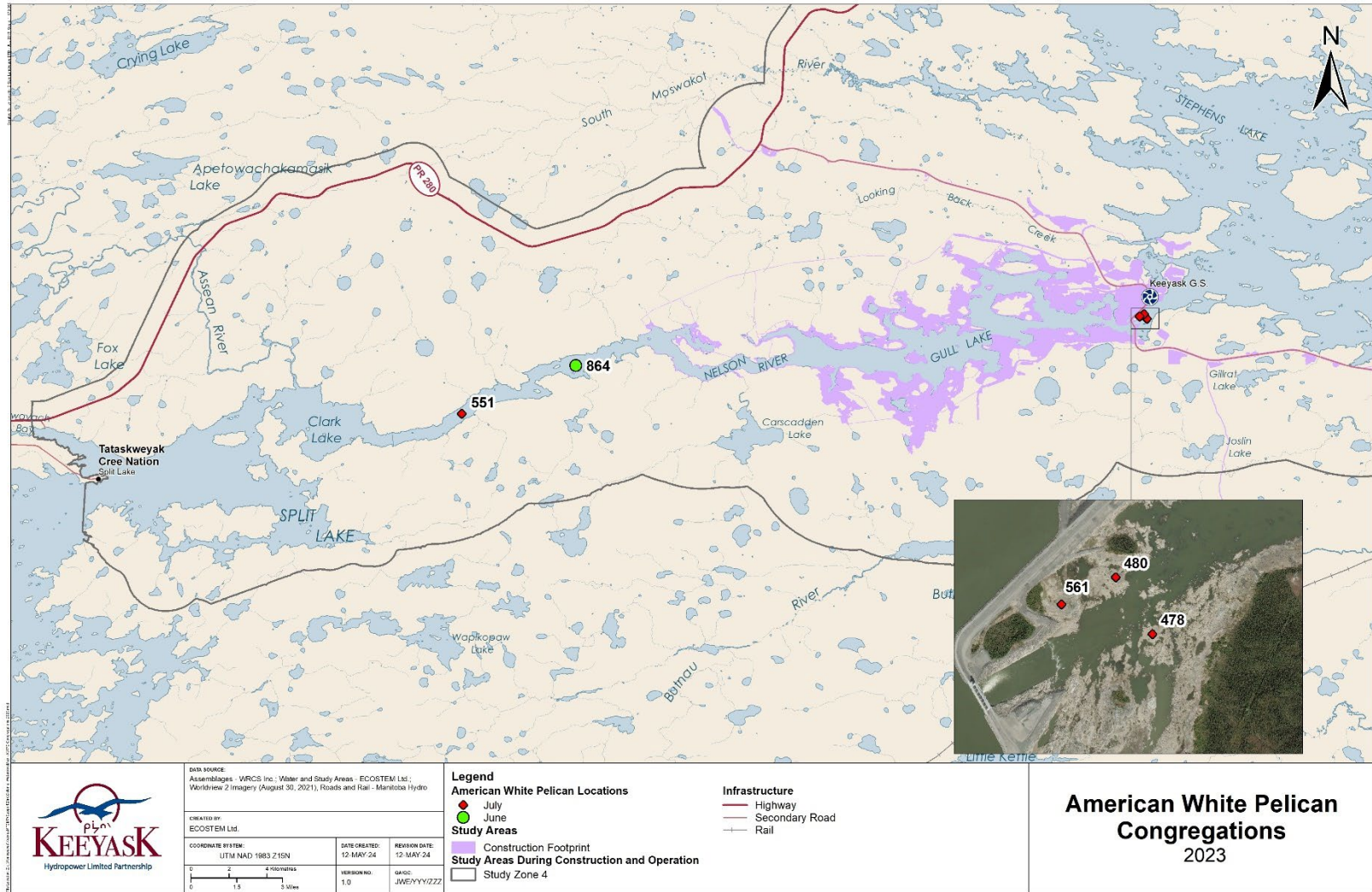
Only a single congregation of American white pelicans was observed in June 2023, with the majority of bird dispersed in the area (Table 9). In July 2023, four congregations of American white pelicans were observed, with the largest congregation consisting of 30 birds (Table 9). No American white pelicans were observed on the HCI in 2023.

All of the islands used by American white pelicans in June and July 2023 had been used at least once in previous survey years (2015-2022) (Table 10).



**Figure 6: Number of American White Pelicans Observed in the Reservoir (including the Former Gull Rapids Area and Clark Lake) and Total Study Area (Study Zone 5) During Helicopter Surveys in June and July from 2015 to 2023. \*Note: Only the reservoir, former Gull Rapids area, and Clark Lake were surveyed from 2021-2023.**





**Map 11: American White Pelican Observations Made During the Helicopter Surveys in 2023**

**Table 9: American White Pelican Observations Made During the Helicopter Surveys in 2023**

| Waypoint | June             |                |              |              | July             |                |              |              |
|----------|------------------|----------------|--------------|--------------|------------------|----------------|--------------|--------------|
|          | Adults (No Nest) | Occupied Nests | Total Adults | Total Chicks | Adults (No Nest) | Occupied Nests | Total Adults | Total Chicks |
| 478      | 0                | 0              | 0            | 0            | 7                | 0              | 7            | 0            |
| 480      | 0                | 0              | 0            | 0            | 9                | 0              | 9            | 0            |
| 551      | 0                | 0              | 0            | 0            | 6                | 0              | 6            | 0            |
| 561      | 0                | 0              | 0            | 0            | 30               | 0              | 30           | 0            |
| 864      | 10               | 0              | 10           | 0            | 0                | 0              | 0            | 0            |

**Table 10: Waterbody Classification and Island Use by American White Pelicans in 2023**

| Island | Gathering    | Month | System    | Flow  | Waterbody Size Class (m <sup>2</sup> ) | Island Habitat       | Island Size Class (ha) | Years Used 2015-2023 |
|--------|--------------|-------|-----------|-------|--|----------------------|------------------------|----------------------|
| 864    | Congregation | June  | On-system | River | >1,000                                 | 50% shrub, 50% grass | 0.1-0.9                | 3                    |
| 22     | Dispersed    | June  | On-system | River | >1,000                                 | NA                   | NA                     | NA                   |
| 23     | Dispersed    | June  | On-system | River | >1,000                                 | NA                   | NA                     | NA                   |
| 25     | Dispersed    | June  | On-system | River | >1,000                                 | NA                   | NA                     | NA                   |
| 46     | Dispersed    | June  | On-system | River | >1,000                                 | NA                   | NA                     | NA                   |
| 478    | Congregation | July  | On-system | River | >1,000                                 | Exposed bedrock      | <0.1                   | 9                    |
| 480    | Congregation | July  | On-system | River | >1,000                                 | Exposed bedrock      | 0.1-0.9                | 8                    |
| 551    | Congregation | July  | On-system | River | >1,000                                 | Exposed bedrock      | <0.1                   | 4                    |
| 561    | Congregation | July  | On-system | River | >1,000                                 | Exposed bedrock      | 1.0-1.9                | 6                    |
| 28     | Dispersed    | July  | On-system | River | >1,000                                 | NA                   | NA                     | NA                   |
| 30     | Dispersed    | July  | On-system | River | >1,000                                 | NA                   | NA                     | NA                   |
| 31     | Dispersed    | July  | On-system | River | >1,000                                 | NA                   | NA                     | NA                   |

## 4.0 DISCUSSION

Reservoir creation and Project operation was predicted to reduce the quality and quantity of colonial waterbird habitat in the reservoir and former Gull Rapids area (KHLP 2012). Additionally, erosion along the newly created reservoir shoreline may reduce foraging efficiency of gulls and terns due to increased water turbidity (KHLP 2012). These potential effects were to be offset and mitigated by increased foraging opportunities provided by the tailrace area and the habitat provided by the constructed HCI.

At the beginning of the 2023 nesting season, the spillway was closed resulting in relatively low water levels in the former Gull Rapids area. The low water levels caused islands to become connected to the mainland, resulting in poor nesting habitat and forcing birds to use alternate habitat located upstream of the Project. By the second UAV survey, the spillway was open and water levels in the former Gull Rapids area had increased, submerging portions of islands that were previously dry. Some herring gull nests were inundated.

Ring-billed gull numbers were generally low in the Project reservoir and former Gull Rapids area in 2023. The low water levels in the former Gull Rapids area at the start of the nesting period may have encouraged ring-billed gulls to use alternative habitat further upstream. The number of ring-billed gull chicks observed on the HCI appeared to be low in comparison to the number of nests that were present. The same was observed in 2022 and may have been a result of the chicks using rocks for cover, making them difficult to detect. Predation pressure from bald eagles might also have influenced ring-billed gull habitat selection, with higher numbers of bald eagles being noted in the area both in 2022 and 2023. Bald eagles can directly reduce the reproductive success of ring-billed gulls by preying on adults, eggs, or chicks, or indirectly by increasing the amount of time and energy spent by adults being vigilant for predators resulting in less energy for foraging or caring for eggs or young (Parrish et al. 2001; White et al. 2006). The presence of wings of presumably depredated ring-billed gulls on the HCI, where none were observed in previous years, supports that predation pressure was higher in 2023. It is possible that with fewer gulls in the area, the remaining gulls mob predators less, or less effectively, which lead to greater predator success and presence. Smaller colonies of waterbirds have been reported to mob predators less than larger ones (Minias *et al.* 2020).

Bald eagles appeared to influence the distribution of ring-billed gull chicks in the reservoir in 2023. A large group of bald eagles near island Wpt 863 appeared to have flushed ring-billed gull chicks from the island and into the open water. It is possible that bald eagles may have forced ring-billed gull chicks from the HCI onto the nearby GS road, where numerous chicks were incidentally observed on the road between the Generating Station and the Spillway in July. As these birds were not agile flyers at this time, several mortalities, caused by vehicle collisions, were observed on the road. Additionally, several immature bald eagles were observed in the same area, and were likely preying on these gulls, or possibly scavenging on the carcasses, which also made them more susceptible for vehicle-caused mortality. Site-specific monitoring between the Generating Station and the Spillway is recommended to determine whether future bird-vehicle collision mortality persists at this location and becomes problematic.

The numbers of common terns nesting in 2023 was the highest of all surveyed years, and congregating tern numbers were the third highest. All observed common tern nests were on the HCI. The low numbers of ring-billed gulls nesting and congregating on the HCI may have resulted in less competition for desirable nest locations for terns. Common terns are smaller than ring-billed gulls, and displacement by ring-billed gulls has been linked to declines in tern colonies in the Great Lakes area (Courtney and Blokpoel 1983). High numbers of congregating common terns were observed in the survey area, mainly due to the use of floating peat islands by this species. Although the number of common terns loafing in the reservoir is still high relative to previous survey years, the decline of tern congregation from 2022 to 2023 could be related to reduced loafing habitat as the peat islands disintegrate over time.

Herring gulls in the former Gull Rapids area do not appear to be affected by continued Project operation. In all the surveys conducted to date, the greatest number of nesting herring gulls was observed in the former Gull Rapids area in 2023. While large numbers of gulls were observed in June, few chicks were observed in the area in July, with herring gull numbers dropping. A decrease in herring gull numbers from June to July was observed in most survey years. Overall, herring gull numbers have remained consistent throughout survey years from 2015-2023.

The number of American white pelicans in the study area in 2023 was the third lowest observed for the former Gull Rapids area. While low, the number was still within the range of numbers observed during surveys in previous years, suggesting that the local population remains stable. No nesting was observed for American white pelicans.

No Bonaparte's gulls were observed within the reservoir or surrounding area in 2023. This number is consistent with 2022, where no Bonaparte's gulls were observed, and 2021, where a single Bonaparte's gull was observed. Bonaparte's gulls typically use off-system lakes and were not affected by Project operation.

Helicopter and UAV surveys will continue during Project operation. Data collected by these surveys will provide further insight into the potential long-term effects of the Project on colonial waterbird nesting, productivity, and population trends in the Regional Study Area. The next survey for colonial waterbird habitat effects monitoring is scheduled for spring 2024.

## 5.0 SUMMARY AND CONCLUSIONS

In the second year of Project operation, habitat use by gulls and terns continued to favour the HCI upstream of the Project over the downstream former Gull Rapids area. Of the three years that gulls and terns have nested on the HCI, 2023 had the highest number of nesting common terns. High numbers of congregating common terns were observed during the helicopter survey in the Project reservoir, mainly due to the use of floating peat islands by this species.

In 2023 ring-billed gull numbers were the lowest seen among all survey years. Low water levels during the beginning of the nesting period and/or increased bald eagle numbers may have led to decreased ring-billed gull numbers in former the Gull Rapids area. Bald eagles appear to continue to be attracted to the area, depredating gulls, and driving chicks off islands. Roadside monitoring for bird-vehicle collision mortalities will be conducted between the Generating Station and the Spillway to determine whether future bird-vehicle collision mortality persists at this location and becomes problematic. The numbers of other species, including herring gull and American white pelican, were consistent with previous observations. A small number of herring gull nests were inundated when the spillway was opened.

The 2023 colonial waterbird survey was the second operation-phase survey for the Project. The next colonial waterbird survey is scheduled for 2024.

## 6.0 LITERATURE CITED

- Courtney, P.A. and Blokpoel, H., 1983. Distribution and numbers of Common Terns on the lower Great Lakes during 1900-1980: a review. *Colonial Waterbirds*, 1983: 107-120.
- KHLP (Keeyask Hydropower Limited Partnership). 2012. Keeyask Generation Station Project environmental impact statement – response to EIS guidelines. Prepared by Keeyask Hydropower Limited Partnership, Winnipeg, Manitoba. June 2012. 1208 pp.
- Minias, P., Gach, K., Włodarczyk, R., Bartos, M., Drzewińska-Chańko, J., Rembowski, M., Jakubas, D. and Janiszewski, T., 2020. Colony size as a predictor of breeding behaviour in a common waterbird. *PLOS One*, 15(11).
- Parrish, J.K., Marvier, M., R.T. Paine. 2001. Direct and indirect effects: interactions between bald eagles and common murre. *Ecological Applications* 11(6): 1858-1869.
- White, A.F., Heath, J.P., and B. Gisborne. 2006. Seasonal timing of bald eagle attendance and influence on activity budgets of glaucous-winged gull in Barkley Sound, British Columbia. *Waterbirds* 29(4): 49-500.
- WRCS (Wildlife Resource Consulting Services MB Inc.). 2016. Colonial Waterbird Habitat Effects Monitoring. Terrestrial Effects Monitoring Plan Report #TEMP-2016-03. A report prepared for Manitoba Hydro by Wildlife Resource Consulting Services MB Inc., June 2016.
- WRCS (Wildlife Resource Consulting Services MB Inc.). 2017. Colonial Waterbird Habitat Effects Monitoring. Terrestrial Effects Monitoring Plan Report #TEMP-2017-06. A report prepared for Manitoba Hydro by Wildlife Resource Consulting Services MB Inc., June 2017.
- WRCS (Wildlife Resource Consulting Services MB Inc.). 2018. Keeyask Generation Project Terrestrial Effects Monitoring Plan Report #TEMP-2018-09: Colonial Waterbird Habitat Enhancement Monitoring 2017. A report prepared for Manitoba Hydro by Wildlife Resource Consulting Services MB Inc., June 2018.
- WRCS (Wildlife Resource Consulting Services MB Inc.). 2019. Keeyask Generation Project Terrestrial Effects Monitoring Plan Report #TEMP-2019-08. Colonial Waterbird Habitat Effects Monitoring. A report prepared for Manitoba Hydro by Wildlife Resource Consulting Services MB Inc., June 2019.
- WRCS (Wildlife Resource Consulting Services MB Inc.). 2020. Keeyask Generation Project Terrestrial Effects Monitoring Plan Report #TEMP-2020-14. Colonial Waterbird Habitat Effects Monitoring. A report prepared for Manitoba Hydro by Wildlife Resource Consulting Services MB Inc., June 2020.
- WRCS (Wildlife Resource Consulting Services MB Inc.). 2021. Keeyask Generation Project Terrestrial Effects Monitoring Plan Report #TEMP-2021-10. Colonial Waterbird Habitat Effects Monitoring. A report prepared for Manitoba Hydro by Wildlife Resource Consulting Services MB Inc., June 2021.

WRCS (Wildlife Resource Consulting Services MB Inc.). 2022. Keeyask Generation Project Terrestrial Effects Monitoring Plan Report #TEMP-2022-15. Colonial Waterbird Habitat Effects Monitoring. A report prepared for Manitoba Hydro by Wildlife Resource Consulting Services MB Inc., June 2022.

WRCS (Wildlife Resource Consulting Services MB Inc.). 2023. Keeyask Generation Project Terrestrial Effects Monitoring Plan Report #TEMP-2023-12. Colonial Waterbird Habitat Effects Monitoring Year 1 Operation, 2022. A report prepared for Manitoba Hydro by Wildlife Resource Consulting Services MB Inc., June 2023.

## **APPENDIX A: UAV SURVEY RESULTS 2015-2023**



**Table 1: Colonial Waterbirds Enumerated from Images of Islands in Gull Rapids taken by a UAV from 2015-2023. \*Note the early spring survey was not conducted in 2020.**

| Species                  | 31-<br>May-<br>23 | 23-<br>Jun-<br>23 | 29-<br>Jul-<br>23 | 04-<br>Jun-<br>22 | 21-<br>Jun-<br>22 | 28-<br>Jul-<br>22 | 03-<br>Jun-<br>21 | 30-<br>Jun-<br>21 | 21-<br>Jul-<br>21 | 03-<br>Jul-<br>20 | 28-<br>Jul-<br>20 | 03-<br>Jun-<br>19 | 24-<br>Jun-<br>19 | 24-<br>Jul-<br>19 | 6-<br>Jun-<br>18 | 29-<br>Jun-<br>18 | 20-<br>Jul-<br>18 | 30-<br>May-<br>17 | 28-<br>Jun-<br>17 | 19-<br>Jul-<br>17 | 03-<br>Jun-<br>16 | 27-<br>Jun-<br>16 | 20-<br>Jul-<br>16 | 04-<br>Jun-<br>15 | 25-<br>Jun-<br>15 | 27-<br>Jul-<br>15 |
|--------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Ring-billed Gull         | 43                | 501               | 153               | 2,602             | 3,080             | 491               | 1,541             | 4,902             | 2,447             | 134               | 2,744             | 1,628             | 1,240             | 7,227             | 1,565            | 1,288             | 7,030             | 1,884             | 1,334             | 1,900             | 4,291             | 4,730             | 5,092             | 1,210             | 1,792             | 4,978             |
| Ring-billed Gull Chick   | 0                 | 0                 | 72                | 0                 | 0                 | 296               | 0                 | 0                 | 42                | 0                 | 0                 | 0                 | 1                 | 474               | 0                | 36                | 1,009             | 0                 | 0                 | 0                 | 0                 | 52                | 1,774             | 0                 | 10                | 42                |
| Ring-billed Gull w. Nest | 44                | 536               | 0                 | 1,009             | 2,656             | 0                 | 282               | 1,566             | 11                | 0                 | 0                 | 3,364             | 3,820             | 0                 | 2,909            | 3,171             | 0                 | 71                | 852               | 0                 | 851               | 759               | 0                 | 38                | 81                | 0                 |
| Common Tern              | 0                 | 108               | 73                | 28                | 41                | 160               | 3                 | 57                | 109               | 0                 | 0                 | 0                 | 0                 | 0                 | 3                | 60                | 49                | 10                | 2                 | 1                 | 47                | 138               | 25                | 61                | 60                | 3                 |
| Common Tern Chick        | 0                 | 0                 | 8                 | 0                 | 0                 | 0                 | 0                 | 0                 | 11                | 0                 | 0                 | 0                 | 0                 | 0                 | 0                | 0                 | 0                 | 0                 | 0                 | 0                 | 0                 | 0                 | 0                 | 0                 | 0                 | 0                 |
| Common Tern w. Nest      | 0                 | 255               | 0                 | 1                 | 67                | 0                 | 0                 | 96                | 171               | 0                 | 0                 | 0                 | 0                 | 0                 | 0                | 105               | 0                 | 0                 | 21                | 0                 | 0                 | 10                | 0                 | 0                 | 0                 | 0                 |
| Herring Gull             | 23                | 62                | 3                 | 19                | 45                | 69                | 17                | 15                | 29                | 5                 | 16                | 8                 | 31                | 47                | 25               | 33                | 64                | 5                 | 27                | 7                 | 8                 | 10                | 11                | 0                 | 0                 | 0                 |
| Herring Gull Chick       | 0                 | 0                 | 1                 | 0                 | 45                | 33                | 0                 | 8                 | 8                 | 0                 | 0                 | 0                 | 19                | 20                | 0                | 24                | 24                | 0                 | 0                 | 0                 | 0                 | 4                 | 1                 | 0                 | 0                 | 0                 |
| Herring Gull w. Nest     | 19                | 11                | 0                 | 47                | 23                | 1                 | 16                | 11                | 0                 | 2                 | 0                 | 41                | 27                | 0                 | 34               | 8                 | 0                 | 4                 | 10                | 1                 | 19                | 8                 | 0                 | 0                 | 0                 | 0                 |
| American White Pelican   | 0                 | 19                | 0                 | 0                 | 10                | 30                | 0                 | 20                | 44                | 24                | 113               | 1                 | 0                 | 69                | 0                | 23                | 52                | 0                 | 5                 | 36                | 0                 | 0                 | 0                 | 0                 | 0                 | 0                 |

**Table 2: Colonial Waterbirds Enumerated from Images of Islands in Gull Rapids taken by a UAV in 2023.**

| Island  | Observation              | May 31-June 1 2023 |         | June 23-24 2023 |         | July 29 2023 |         |
|---------|--------------------------|--------------------|---------|-----------------|---------|--------------|---------|
|         |                          | Evening            | Morning | Evening         | Morning | Evening      | Morning |
| Wpt 224 | American White Pelican   | 0                  | 0       | 0               | 0       | 0            | 0       |
|         | Common Tern              | 0                  | 0       | 0               | 0       | 0            | 0       |
|         | Common Tern w. Nest      | 0                  | 0       | 0               | 0       | 0            | 0       |
|         | Common Tern Chick        | 0                  | 0       | 0               | 0       | 0            | 0       |
|         | Herring Gull             | 0                  | 0       | 0               | 0       | 0            | 0       |
|         | Herring Gull w. Nest     | 0                  | 0       | 0               | 0       | 0            | 0       |
|         | Herring Gull Chick       | 0                  | 0       | 0               | 0       | 0            | 0       |
|         | Ring-billed Gull         | 0                  | 0       | 0               | 0       | 0            | 0       |
|         | Ring-billed Gull w. Nest | 0                  | 0       | 0               | 0       | 0            | 0       |
|         | Ring-billed Gull Chick   | 0                  | 0       | 0               | 0       | 0            | 0       |
| Wpt 225 | American White Pelican   | 0                  | 0       | 0               | 0       | 0            | 0       |
|         | Common Tern              | 0                  | 0       | 0               | 0       | 0            | 0       |
|         | Common Tern w. Nest      | 0                  | 0       | 0               | 0       | 0            | 0       |
|         | Common Tern Chick        | 0                  | 0       | 0               | 0       | 0            | 0       |
|         | Herring Gull             | 6                  | 3       | 9               | 3       | 0            | 1       |
|         | Herring Gull w. Nest     | 0                  | 2       | 3               | 0       | 0            | 0       |
|         | Herring Gull Chick       | 0                  | 0       | 0               | 0       | 0            | 0       |
|         | Ring-billed Gull         | 0                  | 0       | 0               | 0       | 0            | 0       |
|         | Ring-billed Gull w. Nest | 0                  | 0       | 0               | 0       | 0            | 0       |
|         | Ring-billed Gull Chick   | 0                  | 0       | 0               | 0       | 0            | 0       |
| Wpt 226 | American White Pelican   | 0                  | 0       | 0               | 0       | 0            | 0       |
|         | Common Tern              | 0                  | 0       | 0               | 0       | 0            | 0       |
|         | Common Tern w. Nest      | 0                  | 0       | 0               | 0       | 0            | 0       |
|         | Common Tern Chick        | 0                  | 0       | 0               | 0       | 0            | 0       |
|         | Herring Gull             | 3                  | 0       | 10              | 3       | 0            | 0       |
|         | Herring Gull w. Nest     | 0                  | 0       | 0               | 0       | 0            | 0       |
|         | Herring Gull Chick       | 0                  | 0       | 0               | 0       | 1            | 0       |
|         | Ring-billed Gull         | 0                  | 0       | 0               | 0       | 0            | 0       |
|         | Ring-billed Gull w. Nest | 0                  | 0       | 0               | 0       | 0            | 0       |
|         | Ring-billed Gull Chick   | 0                  | 0       | 0               | 0       | 0            | 0       |
| Wpt 227 | American White Pelican   | 0                  | 0       | 0               | 0       | 0            | 0       |
|         | Common Tern              | 0                  | 0       | 0               | 0       | 0            | 0       |
|         | Common Tern w. Nest      | 0                  | 0       | 0               | 0       | 0            | 0       |
|         | Common Tern Chick        | 0                  | 0       | 0               | 0       | 0            | 0       |
|         | Herring Gull             | 0                  | 0       | 0               | 0       | 0            | 0       |
|         | Herring Gull w. Nest     | 0                  | 0       | 0               | 0       | 0            | 0       |
|         | Herring Gull Chick       | 0                  | 0       | 0               | 0       | 0            | 0       |
|         | Ring-billed Gull         | 0                  | 0       | 0               | 0       | 0            | 0       |

| Island              | Observation              | May 31-June 1 2023 |         | June 23-24 2023 |         | July 29 2023 |         |
|---------------------|--------------------------|--------------------|---------|-----------------|---------|--------------|---------|
|                     |                          | Evening            | Morning | Evening         | Morning | Evening      | Morning |
| Wpt 478             | Ring-billed Gull w. Nest | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | Ring-billed Gull Chick   | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | American White Pelican   | 0                  | 0       | 0               | 10      | 0            | 0       |
|                     | Common Tern              | 0                  | 0       | 19              | 0       | 0            | 0       |
|                     | Common Tern w. Nest      | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | Common Tern Chick        | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | Herring Gull             | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | Herring Gull w. Nest     | 3                  | 5       | 2               | 5       | 1            | 0       |
|                     | Herring Gull Chick       | 3                  | 5       | 1               | 1       | 0            | 0       |
|                     | Ring-billed Gull         | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | Ring-billed Gull w. Nest | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | Ring-billed Gull Chick   | 0                  | 0       | 0               | 0       | 0            | 0       |
| Wpt 479             | American White Pelican   | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | Common Tern              | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | Common Tern w. Nest      | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | Common Tern Chick        | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | Herring Gull             | 3                  | 1       | 7               | 4       | 1            | 2       |
|                     | Herring Gull w. Nest     | 2                  | 1       | 1               | 1       | 0            | 0       |
|                     | Herring Gull Chick       | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | Ring-billed Gull         | 0                  | 0       | 0               | 0       | 0            | 3       |
|                     | Ring-billed Gull w. Nest | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | Ring-billed Gull Chick   | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | American White Pelican   | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | Common Tern              | 0                  | 0       | 0               | 0       | 0            | 0       |
| Common Tern w. Nest | 0                        | 0                  | 0       | 0               | 0       | 0            |         |
| Common Tern Chick   | 0                        | 0                  | 0       | 0               | 0       | 0            |         |
| Wpt 480             | Herring Gull             | 7                  | 1       | 34              | 17      | 0            | 0       |
|                     | Herring Gull w. Nest     | 10                 | 9       | 6               | 4       | 0            | 0       |
|                     | Herring Gull Chick       | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | Ring-billed Gull         | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | Ring-billed Gull w. Nest | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | Ring-billed Gull Chick   | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | American White Pelican   | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | Common Tern              | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | Common Tern w. Nest      | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | Common Tern Chick        | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | Herring Gull             | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | Herring Gull Chick       | 0                  | 0       | 0               | 0       | 0            | 0       |
| Wpt 481             | Herring Gull w. Nest     | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | Ring-billed Gull         | 0                  | 0       | 1               | 0       | 0            | 0       |

| Island   | Observation              | May 31-June 1 2023 |         | June 23-24 2023 |         | July 29 2023 |         |
|--|--------------------------|--------------------|---------|-----------------|---------|--------------|---------|
|  |                          | Evening            | Morning | Evening         | Morning | Evening      | Morning |
| Wpt 561  | Ring-billed Gull w. Nest | 0                  | 0       | 0               | 0       | 0            | 0       |
|  | Ring-billed Gull Chick   | 0                  | 0       | 0               | 0       | 0            | 0       |
|  | American White Pelican   | 0                  | 0       | 0               | 0       | 0            | 0       |
|  | Common Tern              | 0                  | 0       | 0               | 0       | 0            | 0       |
|  | Common Tern w. Nest      | 0                  | 0       | 0               | 0       | 0            | 0       |
|  | Common Tern Chick        | 0                  | 0       | 0               | 0       | 0            | 0       |
|  | Herring Gull             | 1                  | 0       | 0               | 0       | 0            | 0       |
|  | Herring Gull Chick       | 0                  | 0       | 0               | 0       | 0            | 0       |
|  | Herring Gull w. Nest     | 0                  | 0       | 0               | 0       | 0            | 0       |
|  | Ring-billed Gull         | 0                  | 0       | 0               | 0       | 0            | 0       |
|  | Ring-billed Gull w. Nest | 0                  | 0       | 0               | 0       | 0            | 0       |
|  | Ring-billed Gull Chick   | 0                  | 0       | 0               | 0       | 0            | 0       |
| Wpt 837<br>(Habitat<br>Compensation<br>Island) | American White Pelican   | 0                  | 0       | 0               | 0       | 0            | 0       |
|  | Common Tern              | 0                  | 0       | 72              | 108     | 73           | 31      |
|  | Common Tern w. Nest      | 0                  | 0       | 200             | 255     | 0            | 0       |
|  | Common Tern Chick        | 0                  | 0       | 0               | 0       | 7            | 8       |
|  | Herring Gull             | 0                  | 0       | 0               | 0       | 0            | 0       |
|  | Herring Gull w. Nest     | 2                  | 2       | 0               | 0       | 0            | 0       |
|  | Herring Gull Chick       | 0                  | 0       | 0               | 0       | 0            | 0       |
|  | Ring-billed Gull         | 43                 | 5       | 500             | 106     | 153          | 27      |
|  | Ring-billed Gull w. Nest | 44                 | 42      | 536             | 405     | 0            | 0       |
|  | Ring-billed Gull Chick   | 0                  | 0       | 0               | 0       | 72           | 51      |
| Wpt 874  | American White Pelican   | 0                  | 0       | 0               | 0       | 0            | 0       |
|  | Common Tern              | 0                  | 0       | 0               | 0       | 0            | 0       |
|  | Common Tern w. Nest      | 0                  | 0       | 0               | 0       | 0            | 0       |
|  | Common Tern Chick        | 0                  | 0       | 0               | 0       | 0            | 0       |
|  | Herring Gull             | 4                  | 0       | 4               | 4       | 0            | 0       |
|  | Herring Gull w. Nest     | 1                  | 0       | 1               | 1       | 0            | 0       |
|  | Herring Gull Chick       | 0                  | 0       | 0               | 0       | 0            | 0       |
|  | Ring-billed Gull         | 0                  | 0       | 0               | 0       | 1            | 1       |
|  | Ring-billed Gull w. Nest | 0                  | 0       | 0               | 0       | 0            | 0       |
|  | Ring-billed Gull Chick   | 0                  | 0       | 0               | 0       | 0            | 0       |
| Wpt 875  | American White Pelican   | 0                  | 0       | 0               | 0       | 0            | 0       |
|  | Common Tern              | 0                  | 0       | 0               | 0       | 0            | 0       |
|  | Common Tern w. Nest      | 0                  | 0       | 0               | 0       | 0            | 0       |
|  | Common Tern Chick        | 0                  | 0       | 0               | 0       | 0            | 0       |
|  | Herring Gull             | 0                  | 0       | 0               | 0       | 0            | 1       |
|  | Herring Gull w. Nest     | 0                  | 0       | 0               | 0       | 0            | 0       |
|  | Herring Gull Chick       | 0                  | 0       | 0               | 0       | 0            | 0       |
| Ring-billed Gull                               | 0                        | 0                  | 0       | 0               | 0       | 0            |         |

| Island              | Observation              | May 31-June 1 2023 |         | June 23-24 2023 |         | July 29 2023 |         |
|---------------------|--------------------------|--------------------|---------|-----------------|---------|--------------|---------|
|                     |                          | Evening            | Morning | Evening         | Morning | Evening      | Morning |
| Wpt 876             | Ring-billed Gull w. Nest | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | Ring-billed Gull Chick   | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | American White Pelican   | 0                  | 0       | 0               | 0       | 28           | 16      |
|                     | Common Tern              | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | Common Tern w. Nest      | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | Common Tern Chick        | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | Herring Gull             | 0                  | 1       | 0               | 0       | 0            | 0       |
|                     | Herring Gull w. Nest     | 3                  | 3       | 0               | 0       | 0            | 0       |
|                     | Herring Gull Chick       | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | Ring-billed Gull         | 0                  | 0       | 3               | 0       | 3            | 2       |
|                     | Ring-billed Gull w. Nest | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | Ring-billed Gull Chick   | 0                  | 0       | 0               | 0       | 0            | 0       |
| Wpt 877             | American White Pelican   | 0                  | 0       | 0               | 0       | 12           | 21      |
|                     | Common Tern              | 0                  | 0       | 0               | 0       | 1            | 0       |
|                     | Common Tern w. Nest      | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | Common Tern Chick        | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | Herring Gull             | 2                  | 1       | 0               | 0       | 0            | 0       |
|                     | Herring Gull w. Nest     | 1                  | 1       | 0               | 0       | 0            | 0       |
|                     | Herring Gull Chick       | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | Ring-billed Gull         | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | Ring-billed Gull w. Nest | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | Ring-billed Gull Chick   | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | American White Pelican   | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | Common Tern              | 0                  | 0       | 0               | 0       | 0            | 0       |
| Common Tern w. Nest | 0                        | 0                  | 0       | 0               | 0       | 0            |         |
| Common Tern Chick   | 0                        | 0                  | 0       | 0               | 0       | 0            |         |
| Wpt 879             | Herring Gull             | 1                  | 1       | 0               | 0       | 0            | 0       |
|                     | Herring Gull w. Nest     | 1                  | 1       | 0               | 0       | 0            | 0       |
|                     | Herring Gull Chick       | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | Ring-billed Gull         | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | Ring-billed Gull w. Nest | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | Ring-billed Gull Chick   | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | Ring-billed Gull w. Nest | 0                  | 0       | 0               | 0       | 0            | 0       |
|                     | Ring-billed Gull Chick   | 0                  | 0       | 0               | 0       | 0            | 0       |

## **Appendix B: Colonial Waterbird Abundance Observed during Helicopter Surveys 2015- 2022**

**Table 1: Colonial Waterbird Abundance Observed During Helicopter Surveys in 2022**

| Species                | June              |                 |       | July              |                 |       |
|------------------------|-------------------|-----------------|-------|-------------------|-----------------|-------|
|                        | Congregated Birds | Dispersed Birds | Total | Congregated Birds | Dispersed Birds | Total |
| Ring-billed Gull       | 7,708             | 191             | 7,899 | 3,496             | 614             | 4,110 |
| Ring-billed Gull Chick | 0                 | 0               | 0     | 43                | 0               | 43    |
| Common Tern            | 968               | 112             | 1,080 | 1,270             | 263             | 1,533 |
| Herring Gull           | 62                | 0               | 62    | 42                | 0               | 42    |
| Herring Gull Chick     | 0                 | 0               | 0     | 8                 | 0               | 8     |
| American White Pelican | 159               | 7               | 166   | 366               | 96              | 462   |
| Total                  | 8,897             | 310             | 9,207 | 7,392             | 1,525           | 8,917 |

**Table 2: Colonial Waterbird Abundance Observed During Helicopter Surveys in 2021**

| Observation            | June 19           |                 |       | July 18           |                 |       |
|------------------------|-------------------|-----------------|-------|-------------------|-----------------|-------|
|                        | Congregated Birds | Dispersed Birds | Total | Congregated Birds | Dispersed Birds | Total |
| Ring-billed Gull       | 4,305             | 265             | 4,570 | 2,882             | 300             | 3,182 |
| Ring-billed Gull Chick | 0                 | 0               | 0     | 70                | 0               | 70    |
| Common Tern            | 78                | 13              | 91    | 780               | 140             | 920   |
| Herring Gull           | 31                | 0               | 64    | 26                | 1               | 27    |
| Herring Gull Chick     | 0                 | 0               | 0     | 2                 | 0               | 2     |
| American White Pelican | 22                | 21              | 43    | 195               | 3               | 198   |
| Bonaparte's Gull       | 0                 | 0               | 0     | 0                 | 1               | 1     |
| Total                  | 4,469             | 299             | 4,768 | 3,955             | 445             | 4,400 |

**Table 3: Colonial Waterbird Abundance Observed During Helicopter Surveys in 2020**

| Species                | June              |                 |       | July              |                 |       |
|------------------------|-------------------|-----------------|-------|-------------------|-----------------|-------|
|                        | Congregated Birds | Dispersed Birds | Total | Congregated Birds | Dispersed Birds | Total |
| Ring-billed Gull       | 6,477             | 720             | 7,197 | 5,639             | 929             | 6,568 |
| Common Tern            | 552               | 68              | 620   | 1,270             | 263             | 1,533 |
| American White Pelican | 196               | 46              | 242   | 366               | 96              | 462   |
| Bonaparte's Gull       | 43                | 0               | 43    | 75                | 237             | 312   |
| Herring Gull           | 68                | 5               | 73    | 42                | 0               | 42    |
| Total                  | 7,336             | 839             | 8,175 | 7,392             | 1,525           | 8,917 |

**Table 4: Colonial Waterbird Abundance Observed During Helicopter Surveys in 2019**

| Species                | June              |                 |       | July              |                 |       |
|------------------------|-------------------|-----------------|-------|-------------------|-----------------|-------|
|                        | Congregated Birds | Dispersed Birds | Total | Congregated Birds | Dispersed Birds | Total |
| Ring-billed Gull       | 5,513             | 103             | 5,616 | 7,685             | 199             | 7,884 |
| Common Tern            | 1,072             | 67              | 1,139 | 920               | 8               | 928   |
| Herring Gull           | 184               | 6               | 190   | 152               | 0               | 152   |
| Bonaparte's Gull       | 16                | 9               | 25    | 18                | 6               | 24    |
| American White Pelican | 41                | 15              | 56    | 146               | 50              | 196   |
| Total                  | 6,826             | 200             | 7,026 | 8,921             | 263             | 9,184 |

**Table 5: Colonial Waterbird Abundance Observed During Helicopter Surveys in 2018**

| Species                | June              |                 |       | July              |                 |       |
|------------------------|-------------------|-----------------|-------|-------------------|-----------------|-------|
|                        | Congregated Birds | Dispersed Birds | Total | Congregated Birds | Dispersed Birds | Total |
| Ring-billed Gull       | 4,597             | 417             | 5,014 | 7,943             | 3               | 7,946 |
| Common Tern            | 1,006             | 46              | 1,052 | 391               | 0               | 391   |
| Herring Gull           | 107               | 0               | 107   | 12                | 0               | 12    |
| Bonaparte's Gull       | 12                | 21              | 33    | 16                | 12              | 28    |
| American White Pelican | 194               | 24              | 218   | 425               | 44              | 469   |
| Total                  | 5,916             | 508             | 6,424 | 8,787             | 59              | 8,846 |

**Table 6: Colonial Waterbird Abundance Observed During Helicopter Surveys in 2017**

| Species                | June              |                 |       | July               |                 |       |
|------------------------|-------------------|-----------------|-------|--------------------|-----------------|-------|
|                        | Congregated Birds | Dispersed Birds | Total | Congregate d Birds | Dispersed Birds | Total |
| Ring-billed Gull       | 5,835             | 1,708           | 7,543 | 7,780              | 422             | 8,202 |
| Common Tern            | 1,377             | 4               | 1,381 | 979                | 5               | 984   |
| Bonaparte's Gull       | 50                | 30              | 80    | 0                  | 31              | 31    |
| Herring Gull           | 5                 | 0               | 5     | 13                 | 0               | 13    |
| American White Pelican | 37                | 46              | 83    | 393                | 210             | 603   |
| Total                  | 7,304             | 1,788           | 9,092 | 9,165              | 668             | 9,833 |



**Table 7: Colonial Waterbird Abundance Observed During Helicopter Surveys in 2016**

| Species                | June              |                 |       | July              |                 |        |
|------------------------|-------------------|-----------------|-------|-------------------|-----------------|--------|
|                        | Congregated Birds | Dispersed Birds | Total | Congregated Birds | Dispersed Birds | Total  |
| Ring-billed Gull       | 5,217             | 359             | 5,576 | 12,087            | 1,229           | 13,316 |
| Common Tern            | 861               | 54              | 915   | 579               | 218             | 797    |
| Bonaparte's Gull       | 55                | 44              | 99    | 58                | 62              | 120    |
| Herring Gull           | 67                | 5               | 72    | 42                | 3               | 45     |
| American White Pelican | 0                 | 52              | 52    | 0                 | 343             | 343    |
| Black Tern             | 0                 | 0               | 0     | 0                 | 8               | 8      |
| Total                  | 6,200             | 514             | 6,714 | 12,766            | 1,863           | 14,629 |

**Table 8: Colonial Waterbird Abundance Observed During Helicopter Surveys in 2015**

| Species                | June              |                 |       | July              |                 |       |
|------------------------|-------------------|-----------------|-------|-------------------|-----------------|-------|
|                        | Congregated Birds | Dispersed Birds | Total | Congregated Birds | Dispersed Birds | Total |
| Ring-billed Gull       | 3,026             | 894             | 3,925 | 3,439             | 302             | 3,741 |
| Common Tern            | 451               | 173             | 624   | 572               | 461             | 1,033 |
| Bonaparte's Gull       | 26                | 137             | 163   | 0                 | 56              | 56    |
| Herring Gull           | 23                | 4               | 27    | 9                 | 8               | 17    |
| American White Pelican | 0                 | 1               | 1     | 228               | 0               | 228   |
| Total                  | 3,526             | 1,209           | 4,740 | 4,248             | 827             | 5,075 |