Keeyask Generation Project

Terrestrial Effects Monitoring Plan

Colonial Waterbird Habitat Effects Monitoring Report

TEMP-2021-11

KEEYASK

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2020 -2021

KEEYASK GENERATION PROJECT

TERRESTRIAL EFFECTS MONITORING PLAN

REPORT #TEMP-2021-11

COLONIAL WATERBIRD

HABITAT EFFECTS MONITORING

Prepared for

Manitoba Hydro

By

Wildlife Resource Consulting Service MB Inc.

June 2021

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SUMMARY

Background

Construction of the Keeyask Generation Project (the Project) at Gull Rapids began in July 2014. 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 2020, the seventh summer of Project construction.

Why is the study being done?

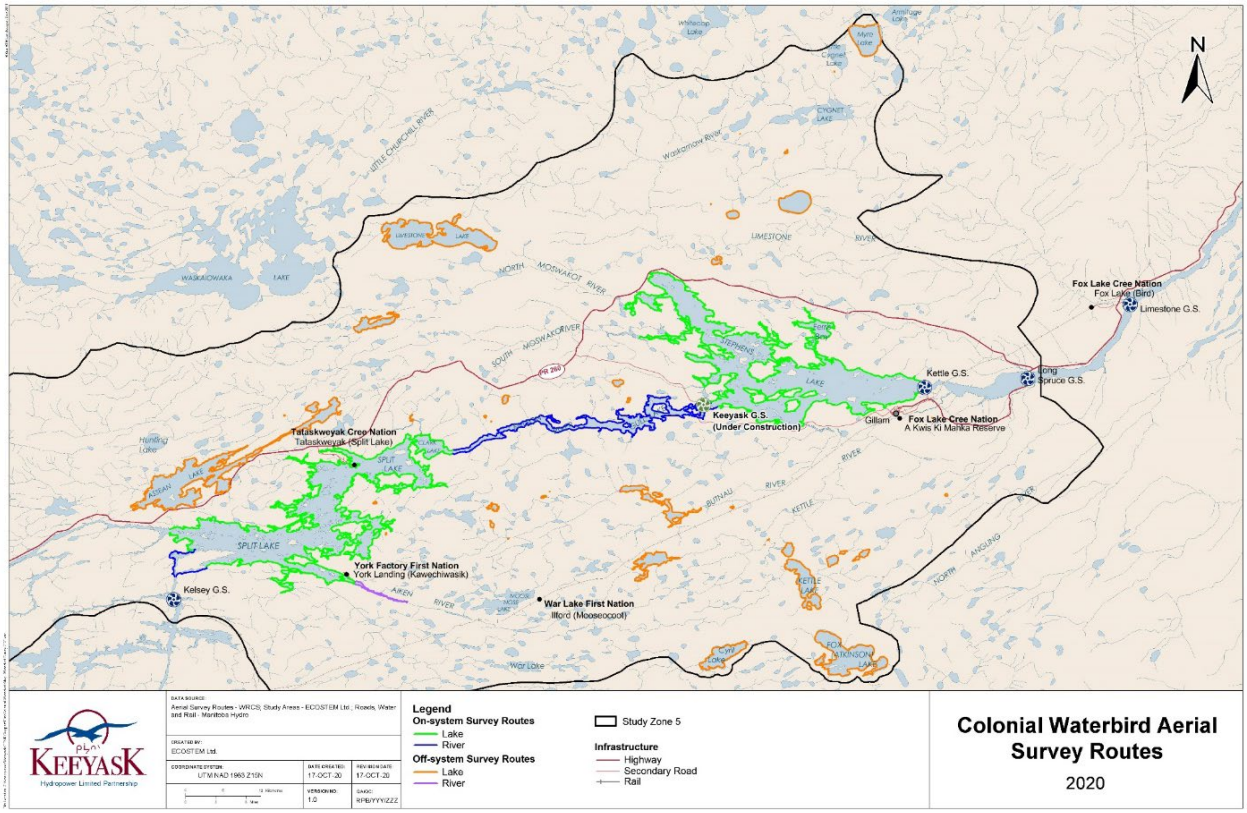
The Project has the potential to affect gull and tern populations through alteration and loss of habitat, as well as noise and light disturbance from construction activities. Monitoring is being done to evaluate Project effects on the number and location of ring-billed gulls and common terns and their breeding habitats. Other colonial waterbird populations (*e.g.*, American white pelican, Bonaparte's gull) are being monitored incidentally.

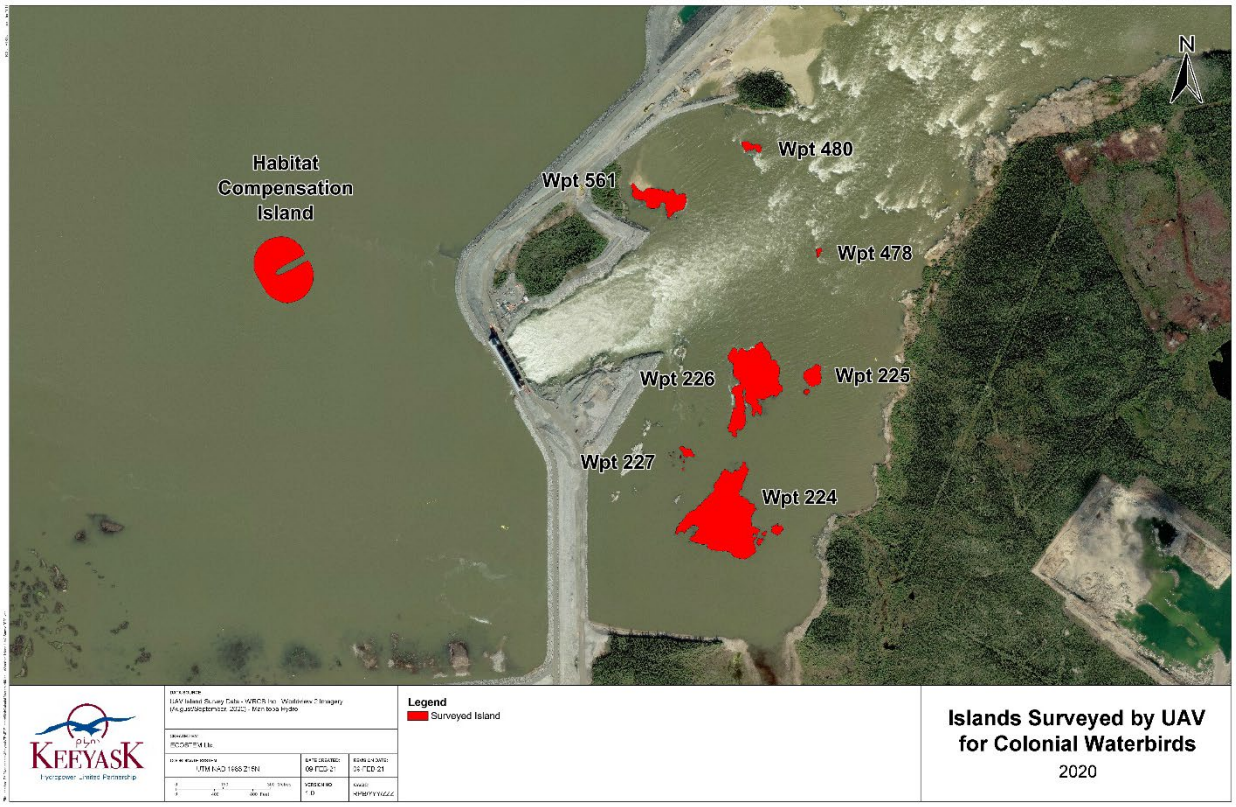
Colony of Ring-billed Gulls on an Island in Gull Rapids

What was done?

Helicopter surveys of the bird regional study area (Study Zone 5) and unmanned aerial vehicle (UAV or drone) surveys focused on the Gull Rapids area were conducted in summer 2020 to determine the numbers of gulls and terns present, where they are found, and what kinds of habitat they are using – both in areas expected to be affected by the Project and in areas away from the Project. 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 sixth year of colonial waterbird habitat effects monitoring during the construction period; surveys were also conducted from 2015 to 2019.

Before and during reservoir impoundment in late August and into September 2020, general wildlife surveys were conducted by helicopter, boat, and vehicle to confirm predicted effects on wildlife, including colonial waterbirds.





What was found?

High water levels within the Nelson River and Project construction activity affected some colonial nesting waterbirds in the Gull Rapids area in summer 2020. Due to the high water levels, available habitat was reduced in Gull Rapids and several, smaller islands were under water during the nesting season. The number of colonial waterbirds in the Gull Rapids area was reduced in comparison to previous years of Project construction monitoring and no successful nesting of any gull or tern species was observed.

Colonial waterbirds did not attempt to nest on the newly constructed habitat compensation island in 2020, but ring-billed gulls were observed loafing on the island in June. Following the impoundment of the reservoir (when water levels around the island are higher) the island should be more suitable for nesting birds in 2021.

The number of colonial waterbirds within the regional study area was similar to what has been seen during previous construction surveys, although some shifts in habitat use were observed due some islands being under water. The number of common terns and Bonaparte's gulls observed in the regional study area were the greatest numbers observed during any of the previous construction surveys. This may have been due to opportunistic feeding opportunities or other habitat conditions present in 2020.

Ring-billed Gulls Loafing on the Habitat Compensation Island in June 2020

What does it mean?

The results of the UAV and helicopter surveys suggest that high water levels in the Nelson River and Project construction activities did have an effect on colonial waterbird nesting sites in the Gull Rapids area in 2020. No successful nesting was observed in Gull Rapids in 2020 due to the high water levels and less habitat being available. Gulls appeared to adjust to the habitat limitations by finding nearby alternate habitat upstream of Gull Rapids and elsewhere in the study area.

What will be done next?

Aerial and UAV surveys will be conducted in the spring and summer of 2021 in the reservoir area, to continue monitoring the distribution and relative abundance of colonial waterbirds and their breeding habitats.

STUDY TEAM

We would like to thank Sherrie Mason and Rachel Boone of Manitoba Hydro for reviewing the report. Derek Longley of Prairie Helicopters is acknowledged for assistance in the field. We would also like to thank Dr. James Ehnes, ECOSTEM Ltd., for GIS supported study design and cartography and Unmanned Aerial Imaging Solutions Inc. (UAIS) for 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, M.N.R.M., Design, analysis, and reporting
- Mark Baschuk, M.Sc., Survey personnel, analysis, and reporting
- Kristian Bernjak, UAV photography
- Mike Connellan, UAV photography

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1.0 INTRODUCTION

Construction of the Keeyask Generation Project (the Project), a 695-megawatt hydroelectric generating station (GS) and associated facilities, began in July 2014. The Project is located at Gull Rapids on the lower Nelson River in northern Manitoba where Gull Lake flows into Stephens Lake, 35 km upstream of the existing Kettle GS.

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 *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 construction phase of the Project.

The Project has the potential to affect colonial waterbird populations through alteration and loss of habitat, as well as sensory disturbance. Three species of colonial waterbirds - ring-billed gull (*Larus delawarensis*), herring gull (*Larus argentatus*), and common tern (*Sterna hirundo*) - commonly breed on rocky islands and reefs in the Nelson River near the Project site. Previous colonial waterbird surveys, conducted in 2001-03, 2006, 2011, and 2013-19 have counted between 1,900-7,200 gulls and 10-200 common terns in the Gull Rapids area (KHLP 2012; Stantec 2014; Stantec 2015; WRCS 2016; WRCS 2017; WRCS 2018; WRCS 2019; WRCS 2020). Other colonial waterbird species that have been observed to breed in the region include herring gull, Bonaparte's gull (*Chroicocephalus philadelphia*), and Caspian tern (*Sterna caspia*). Colonial waterbirds that occur in the region but for which there is no evidence of breeding include American white pelican (*Pelecanus erythrorhynchos*), black tern (*Chlidonias niger*), and double-crested cormorant (*Phalacrocorax auritus*) (KHLP 2012).

Colonial waterbirds are generally gregarious birds that congregate into conspecific or multi-species groups of nesting birds at colony sites; the congregation of nesting birds is the colony (Kushlan 1986). Waterbird colonies range from a few birds to many thousands; however, two breeding pairs nesting at a site qualify as a colony (Kushlan *et al*. 2002). If nesting is not taking place, the group of birds is a congregation. At such sites, if birds are sleeping or resting the site is referred to as a communal roost site. Often confused with roosting, loafing includes activities involved in comfort behaviour (preening, stretching) and digestion; such sites are referred to as loafing sites (Campbell and Lack 1985).

At Gull Rapids, the loss of foraging and breeding habitat, and habitat avoidance due to Project sensory disturbances were anticipated on the local colonial waterbird population during construction. Colonial waterbirds receive regulatory protection under the *Manitoba Wildlife Act* (2015) and the federal *Migratory Birds Convention Act* (1994). To avoid disturbing breeding colonial waterbirds near Project construction activities, avian control measures to deter colonial

waterbirds were implemented in areas affected by construction near Gull Rapids. Permitted control measures in 2020 included pyrotechnics, kites, and egg and/or nest removal. All of these measures are permitted annually by Environment and Climate Change Canada under Damage and Danger permits. To monitor potential Project construction effects on colonial waterbirds in the Gull Rapids area, an Unmanned Aerial Vehicle (UAV or drone) was used to determine abundance, distribution, and habitat use of colonial waterbirds.

The primary goal of the colonial waterbird habitat effects monitoring is to evaluate how ring-billed gull and common tern breeding habitat distribution and abundance change due to the Project. Secondly, this study will evaluate how ring-billed gull and common tern habitat effectiveness changes due to Project sensory disturbance, by measuring changes in the distribution and abundance of ring-billed gulls and common terns in the vicinity of Project disturbances. This report contains the results of the sixth year (2020) of the Colonial Waterbird Habitat Effects study.

In 2020, colonial waterbird habitat near the Project experienced large changes due to the water-up phase, which included the transfer of water into work areas contained by temporary and permanent structures up to the prevailing upstream water levels. Water-up began on February 26, 2020 and finished by April 16, 2020. The water-up phase inundated some colonial waterbird habitat (island Wpt 83) immediately upstream of the Project powerhouse and spillway and made the constructed habitat compensation island more suitable for colonial waterbirds by surrounding it with water and isolating it from mainland areas (Map 1). Colonial waterbird habitat was also impacted during the breeding season by relatively high water levels in the Nelson River (Figure 1). Due to the relatively high water levels, habitat previously used by colonial waterbirds was inundated or not suitable for use in some areas.

Additionally, following the nesting season, reservoir impoundment occurred from August 31 to September 5, 2020, which further altered some colonial waterbird habitat upstream of the Project. During impoundment, a general wildlife survey was conducted in and around the reservoir to confirm predicted effects made in the EIS. General findings of this survey are included in this report.

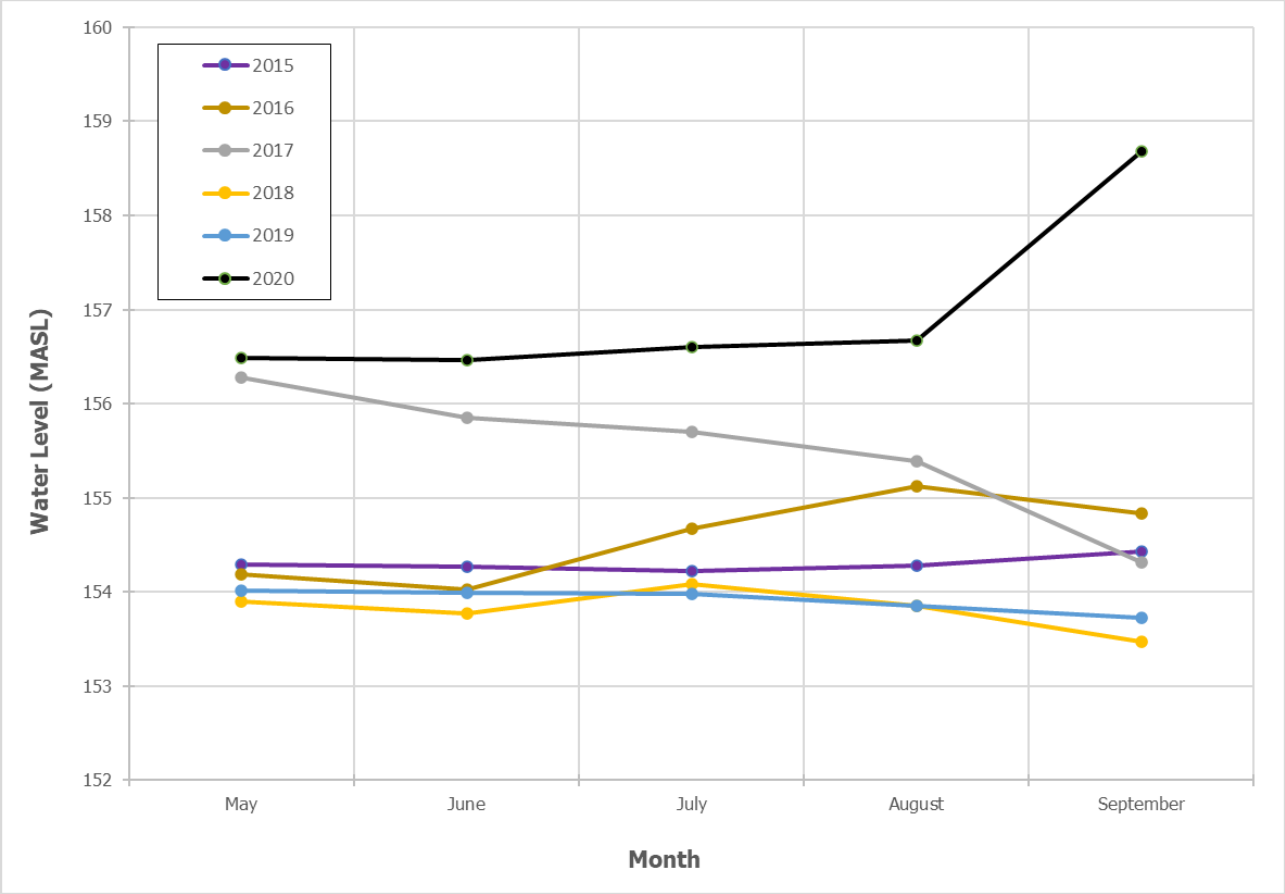


Figure 1: Water Level (MASL) in Gull Lake Area from 2015-2020 during the Gull and Tern Nesting Season

2.0 METHODS

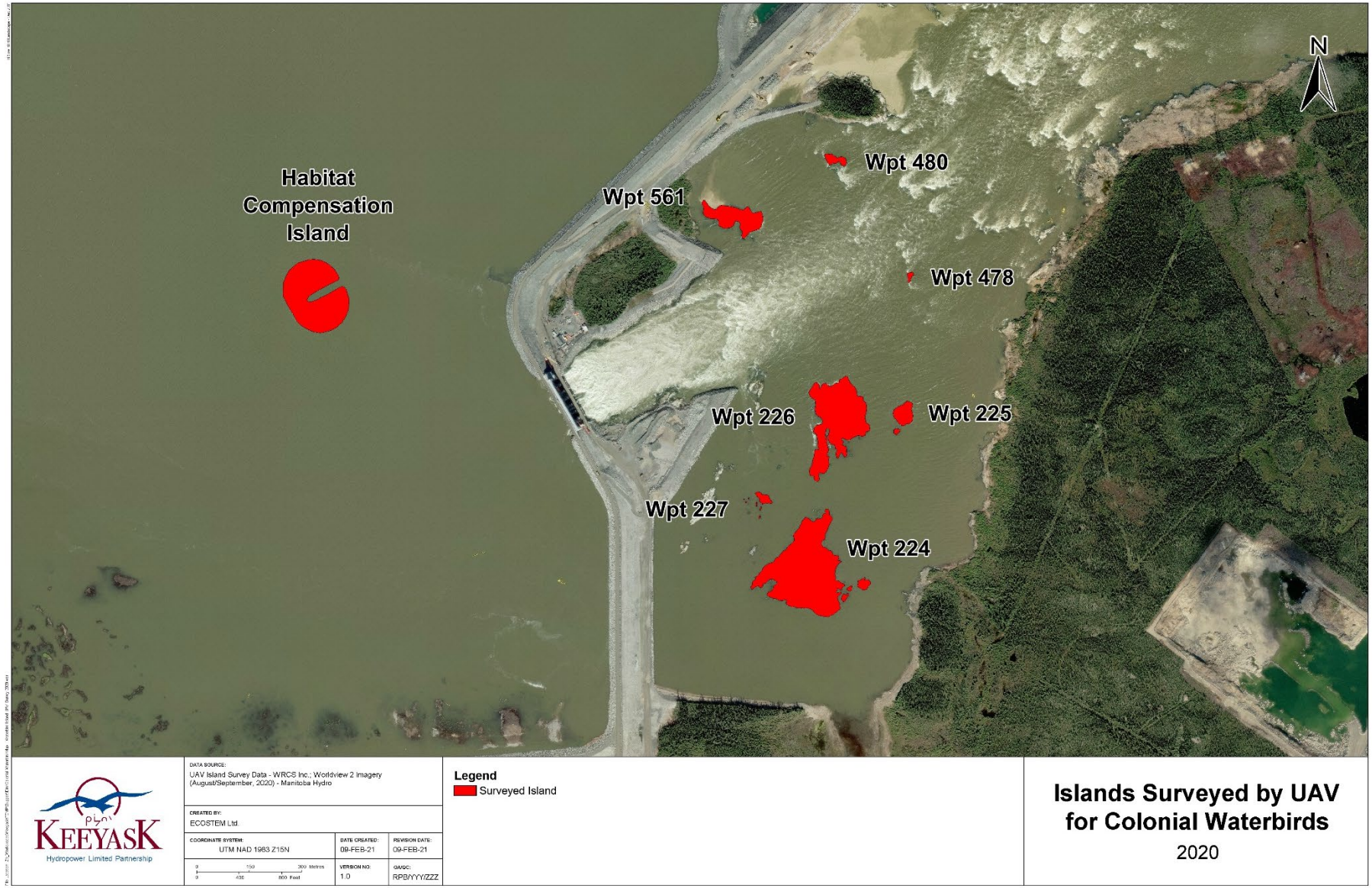
2.1 UNMANNED AERIAL VEHICLE SURVEYS

The distribution and abundance of colonial waterbirds at Gull Rapids was monitored using photographs taken from an Unmanned Aerial Vehicle (UAV or drone). Unmanned Aerial Imaging Solutions Inc. (UAIS) was contracted to conduct UAV flights and produce high-resolution images of colonial waterbird colonies and potential nesting areas in the Gull Rapids area.

UAIS deployed a DJI Mavic Pro quad-copter equipped with a 12 mega-pixel camera to survey islands in Gull Rapids and immediately upstream in the Nelson River. Using the software Drone Link, camera parameters, flight path, speed, and altitude were programmed into the UAV to guide it during each flight mission. Nine islands within the Gull Rapids area, known to support colonial waterbirds were photographed by the UAV platform in a grid pattern to produce overlapping photographs (Map 1). All flights were conducted at approximately 40 m above ground level (agl) to minimize disturbance to waterbird colonies.

UAV surveys were conducted during two periods in 2020: July 2-3 and July 28-29, to capture the nesting and brood rearing periods. This differed from previous years when the survey was conducted over three periods, including one in early June. During each of the two 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 Gull Rapids 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.



Map 1: Islands Surveyed by UAV in Gull Rapids in 2020

2.2 HELICOPTER SURVEY

Helicopter surveys were conducted to monitor the abundance, distribution, and habitat use of colonial waterbirds in portions of the bird regional study area (Study Zone 5) during the breeding season (Map 2). A random, stratified design was used to select waterbodies to be surveyed. Waterbodies were classified broadly as either on-system (influenced by existing or future hydroelectric operations) or off-system (unaffected by hydroelectric operations), grouped into two basic waterbody types (lake or river), and grouped into five different size classes (<1, 1-10, 11-100, 101-1,000, >1,000 ha). Small watercourses (*e.g.*, creeks) were excluded from the design and selection as gulls and terns do not typically use these features as nesting habitat.

The first survey occurred between June 23-24, 2020 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 21-23.

Daily flights 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.

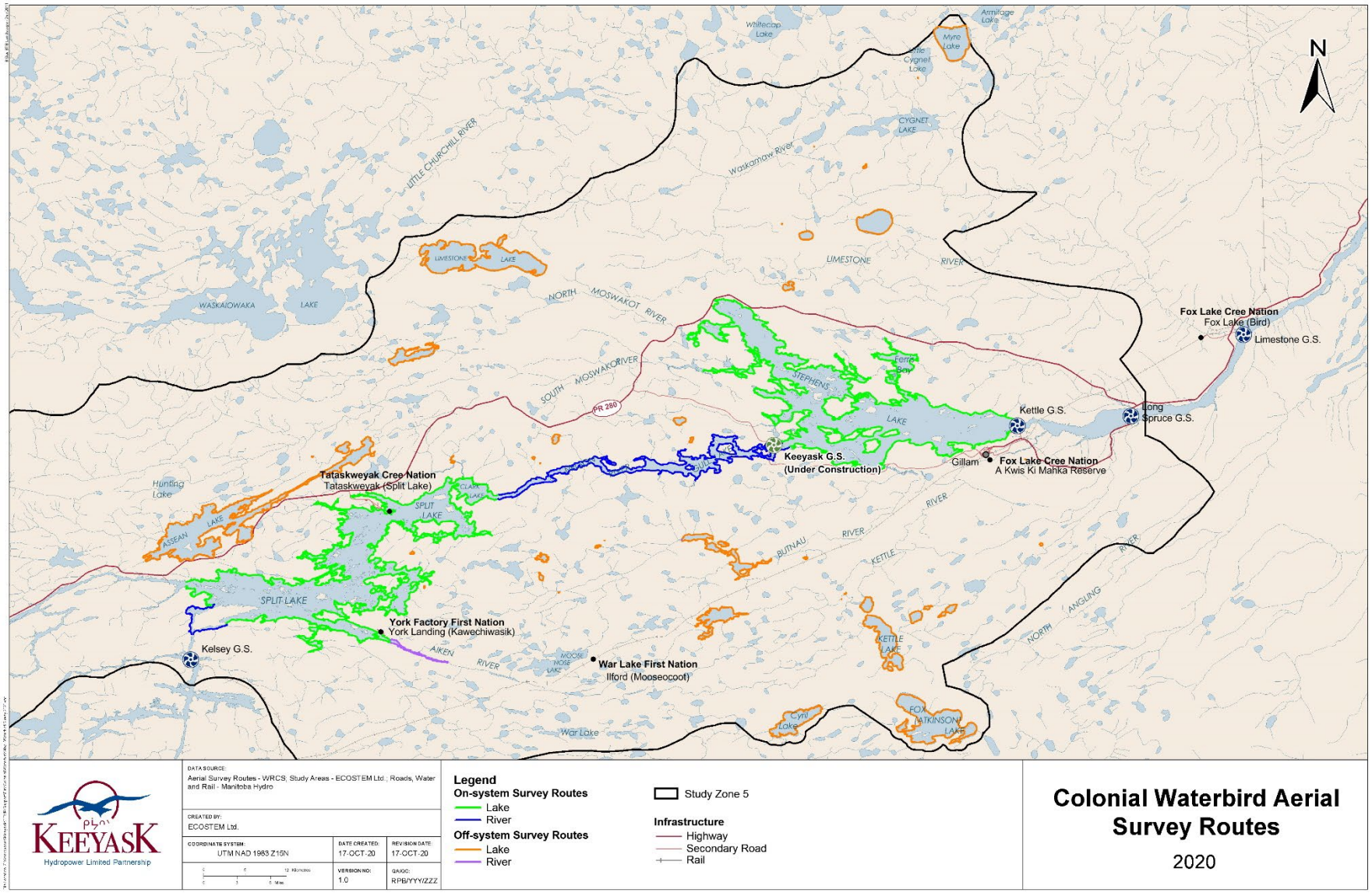
The aerial survey crew consisted of a single observer and the helicopter pilot. The observer was seated in the front left seat and was responsible for preliminary counts of colonial waterbirds and photographing congregations using a Canon Rebel T6i, 24.2-megapixel camera. The helicopter followed a shoreline 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 disturbing 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 analysed to permit mark-up of the photo 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.

Photo 1: Colony of Ring-billed Gulls on an Island in Gull Rapids on June 24, 2020



Map 2: Colonial Waterbird Helicopter Survey Routes and Waterbody Classification

2.3 RESERVOIR IMPOUNDMENT SURVEY

Prior to and during reservoir impoundment, general wildlife surveys were conducted in the reservoir area to confirm predicted effects on terrestrial wildlife. Surveys were conducted from a helicopter, by boat, and from vehicles from August 25 to September 4, 2020. Observations of wildlife, including colonial waterbirds, were recorded and georeferenced with a handheld GPS.

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 Gull Rapids area in 2020. Fewer ring-billed gulls were observed in June compared to the July survey (Table 1). The majority of ring-billed gulls were observed on one island, Wpt 226 (Map 3), which has supported the majority of gulls in previous years. The overall number of ring-billed gulls observed in the Gull Rapids area was much lower in comparison to previous years, with the exception of July 2017, which had lower numbers of ring-billed gulls observed due to high water levels (Figure 1).

No ring-billed gull nests or chicks were observed by UAV in the Gull Rapids area in 2020 (Table 1; Map 4). This was the first year of UAV monitoring where no ring-billed gull nests were observed on islands in this area, but the absence of chicks also occurred in 2017 (Appendix A). However, during the helicopter survey on June 24, 2020, two islands in Gull Rapids, Wpt 226 and Wpt 227, appeared to support ring-billed gull nests, with 218 nests and 188 nests, respectively. This is discussed further in section 4.0.

Low numbers of herring gulls were also observed in the Gull Rapids area in 2020 (Table 1) and most were observed on island Wpt 226 (Map 3). The greatest number of herring gulls observed in the Gull Rapids area was 26, which occurred during the July 28 survey (Table 1). Two herring gull nests were observed on two of the surveyed islands (Map 4), but no herring gull chicks were observed. This was the first year, other than 2015 when herring gull nests could not be determined from the UAV imagery, that so few herring gull nests were observed, but the absence of chicks also occurred in 2017 (Appendix A).

Several flocks of American white pelicans were observed in Gull Rapids in 2020. No signs of nesting were observed, and the greatest number (113) was observed during the July 28 survey (Table 1; Map 3).

No common terns were observed in the Gull Rapids area in 2020 (Table 1; Map 3).

Table 1: Maximum Number (Standard Deviation) of Colonial Waterbirds, Nests, and Chicks Observed by UAV in the Morning/Afternoon on Islands in the Gull Rapids Area in 2020 for Each Survey Period

Observation	03-July-20	28-July-20
Ring-billed Gull	134 (41)	2,744 (629)
Ring-billed Gull w. Nest	0 (0)	0 (0)
Ring-billed Gull Chick	0 (0)	0 (0)
Herring Gull	5 (4)	26 (16)
Herring Gull w. Nest	2 (1)	0 (0)
Herring Gull Chick	0 (0)	0 (0)
American White Pelican	24 (14)	113 (74)
Common Tern	0 (0)	0(0)

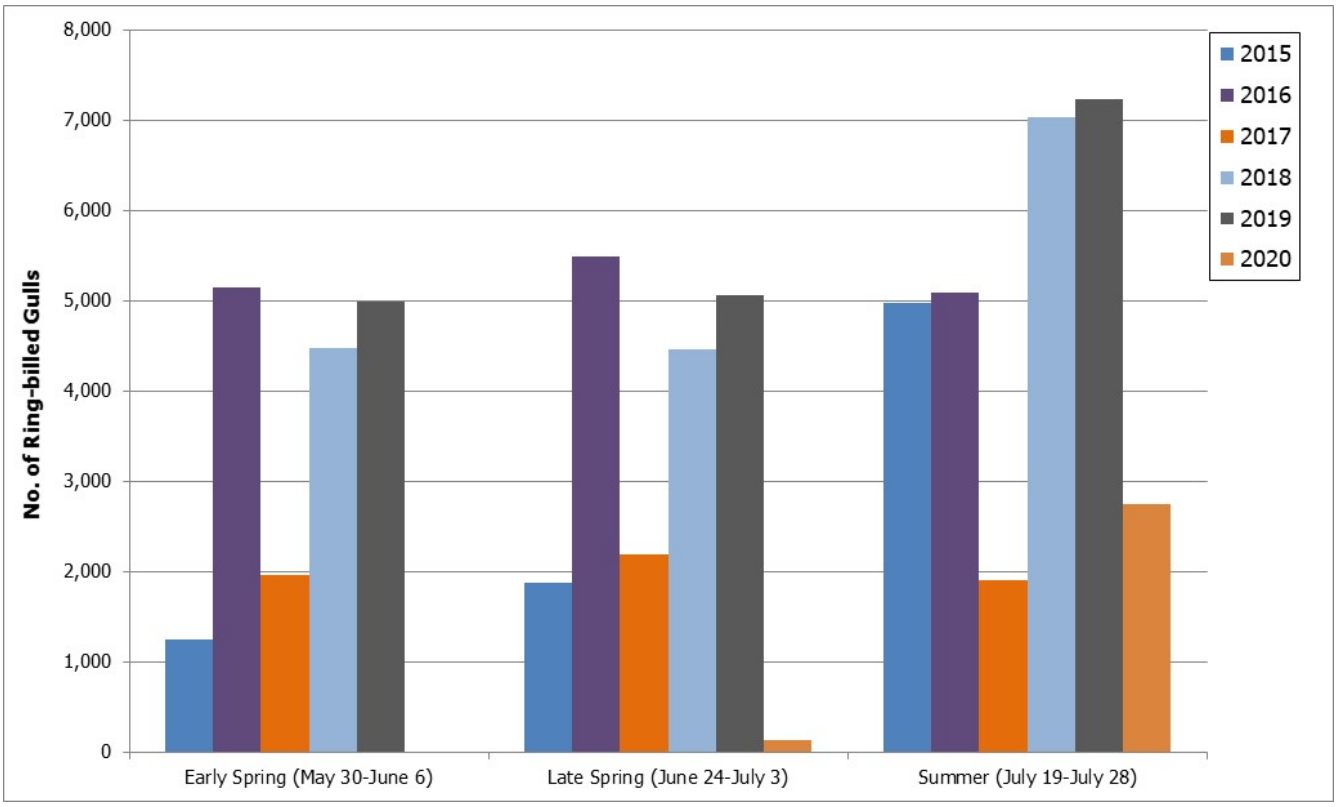
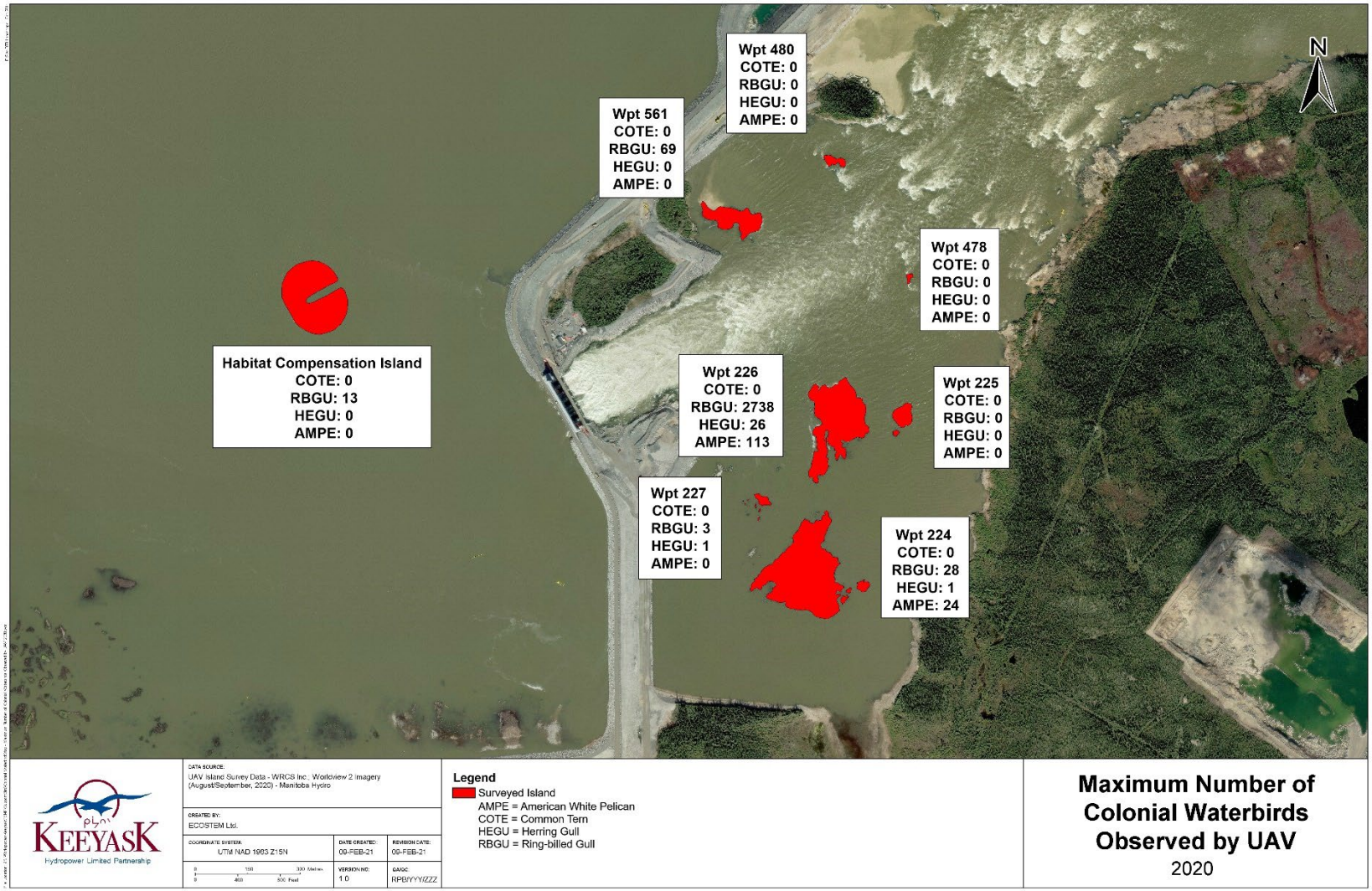
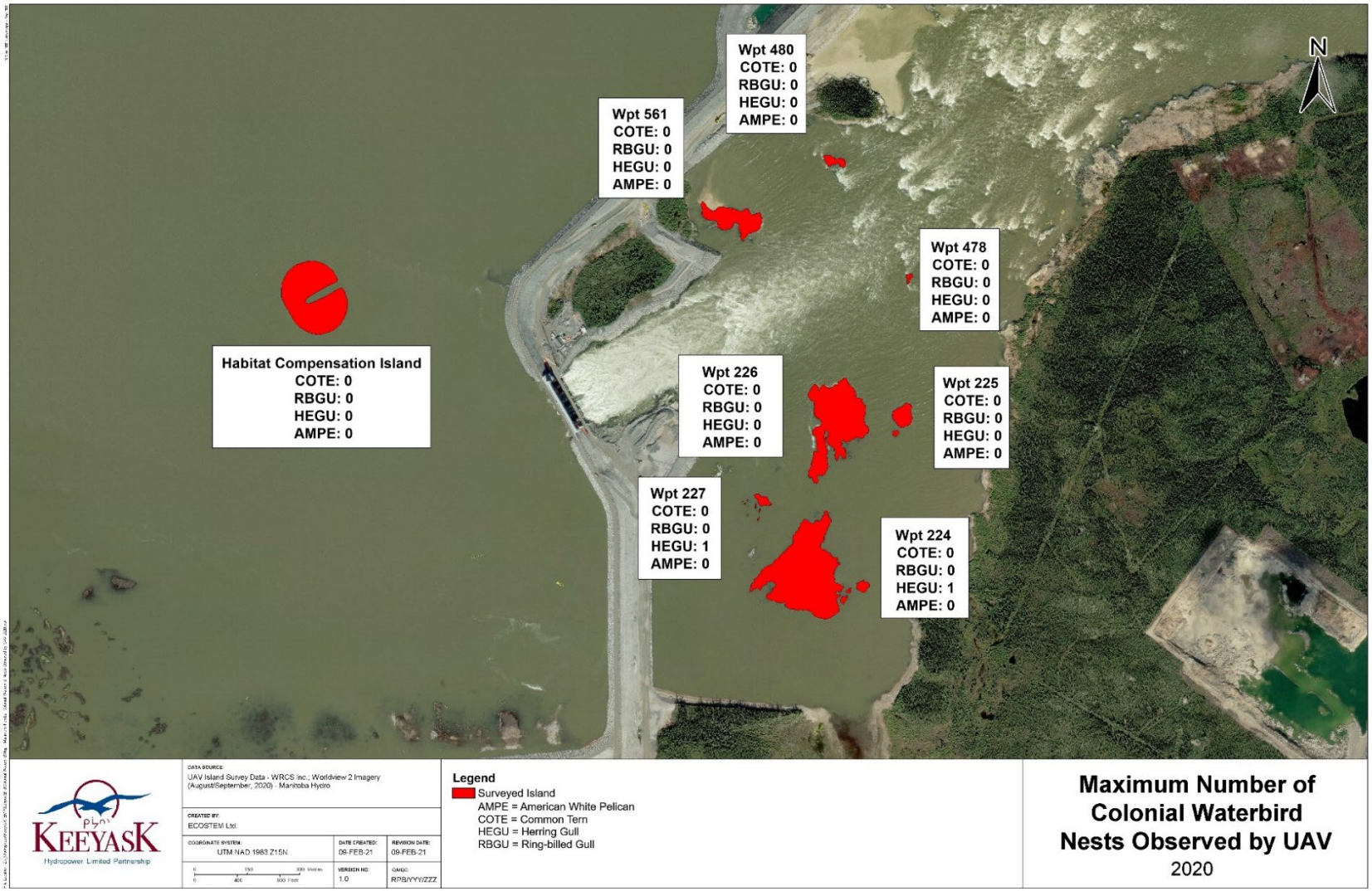


Figure 2: Total Number of Ring-billed Gulls Observed at Gull Rapids by UAV During Early Spring, Late Spring, and Summer Surveys from 2015-2020. *Note that the early spring survey was not conducted in 2020.



Note: the maximum number of colonial waterbirds was selected from pooled data from all survey periods (July 3, July 28) and morning/afternoon periods.

Map 3: Maximum Number of Colonial Waterbirds Observed on Each Island by the UAV in Gull Rapids in 2020



Note: the maximum number of colonial waterbird nests was selected from pooled data from all survey periods (July 3, July 28) and morning/afternoon periods.

Map 4: Maximum Number of Colonial Waterbird Nests Observed on Each Island by the UAV in Gull Rapids in 2020

3.2 HELICOPTER SURVEY

Five species of colonial waterbirds were observed during the 2020 regional helicopter surveys (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 (Table 2). American white pelican, Bonaparte's gull, and herring gull were less abundant, which was consistent with the findings from previous construction surveys (Appendix B).

Table 2: 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

3.2.1 RING-BILLED GULL

Ring-billed gulls were the most common species of colonial waterbird observed in 2020. The total number of ring-billed gulls decreased slightly from June to July in the regional study area (Figure 2; Table 2). The decrease of ring-billed gulls from June to July differed from the previous findings of the surveys conducted from 2016-2019 but was consistent with the findings from 2015 (Figure 2; Appendix B).

In June 2020, ring-billed gulls were observed congregating at 41 sites and nesting at 2 sites in the regional study area (Map 5). In July 2020, ring-billed gulls were observed congregating at 59 sites and no nesting was observed (Map 8). Due to the relatively high water levels present in the Nelson River since early 2020, many of the islands in the Gull Rapids area were submerged or partially submerged, reducing the amount of habitat available for ring-billed gulls. As a result, one island (Wpt 560) supported the greatest number of ring-billed gulls in the study area in June, accounting for 32% of the total number of ring-billed gulls (Table 3). One island in Gull Rapids, Wpt 226, also supported a large number of gulls, with 28% of the total number in the study area in June and 31% in July (Table 3).

Ring-billed gull nests or probable nests were only observed on two islands within Gull Rapids, Wpt 226 and Wpt 227, in June 2020 (Map 5). No ring-billed gull nesting was observed in July 2020. Nesting on these islands is consistent with what has been observed during previous

surveys. No nesting was observed on the constructed habitat compensation island in 2020. Ring-billed gulls were observed loafing on the island during the June 2020 survey (Photo 2).

Of the 43 islands where ring-billed gulls were observed in June 2020, 29 (67%) had been used at least once in previous construction years (2015-2019) (Table 4). In July, of the 59 islands used, (58%) were used at least once in previous construction years (2015-2019) (Table 4). The number of islands at which ring-billed gulls were observed increased from 2015 to 2020.

Most ring-billed gull colonies and congregations were observed on large (>1,000 ha), on-system lakes and rivers on exposed bedrock islands (Table 4). This is consistent with what has been observed in previous surveys.

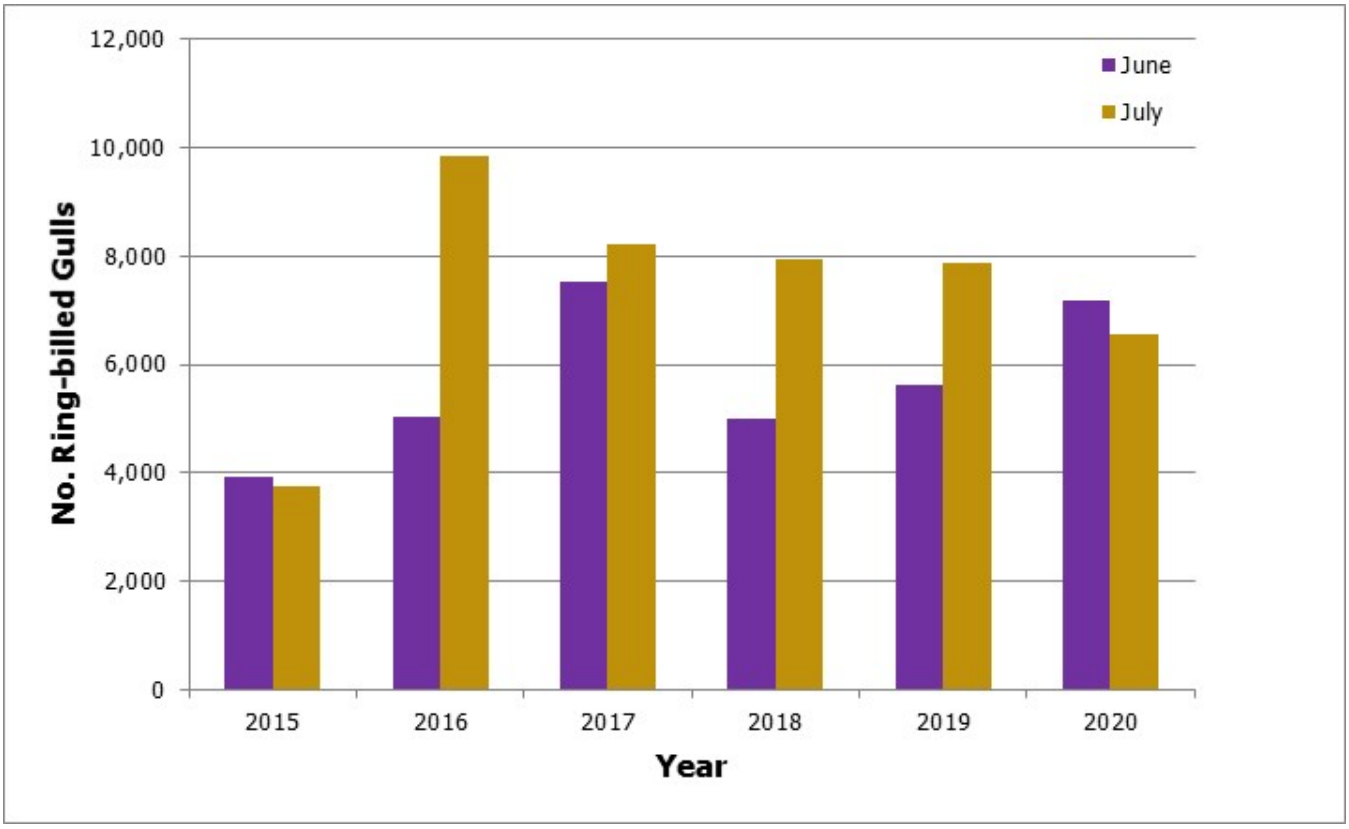
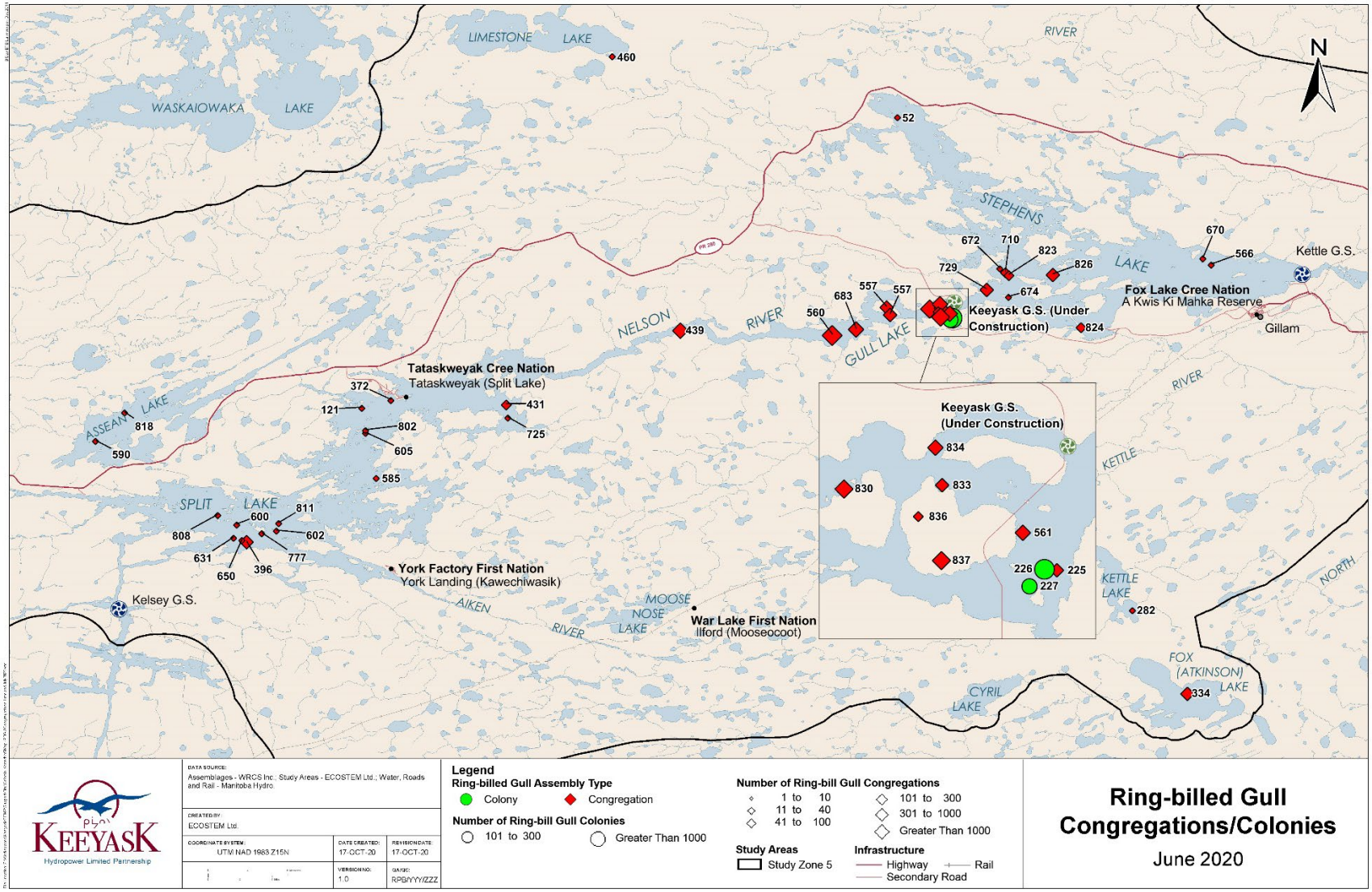
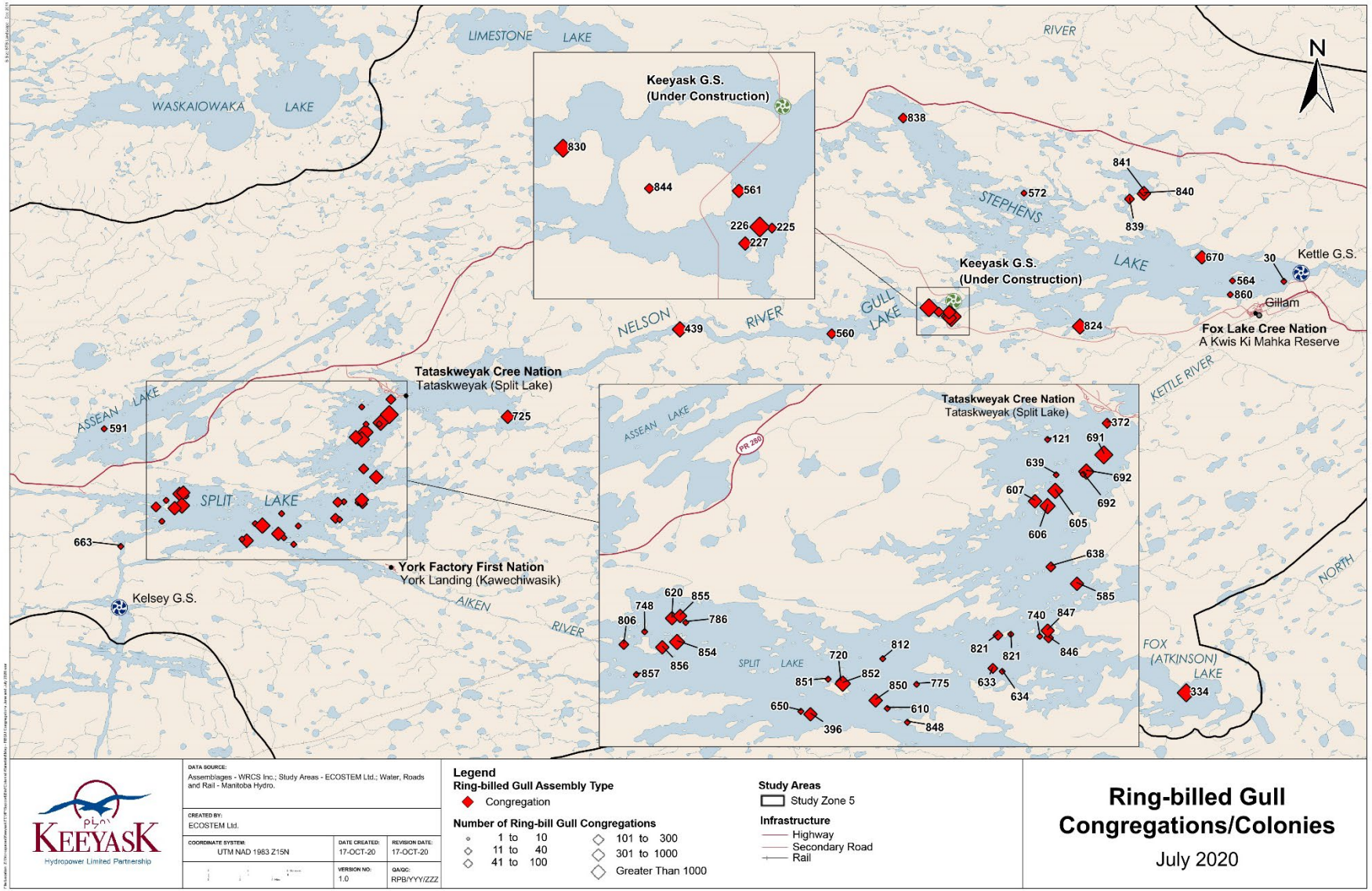


Figure 3: Number of Ring-billed Gulls Observed During Helicopter Surveys in June and July from 2015 to 2020



Map 5: Ring-billed Gull Colonies and Congregations Observed During Helicopter Surveys in June 2020



Map 6: Ring-billed Gull Colonies and Congregations Observed During Helicopter Surveys in July 2020

Table 3: Ring-billed Gull Congregations/Colonies Observed During the Helicopter Surveys in 2020

Waypoint	June				July			
	Adults (No Nest)	Occupied Nests	Total Adults	Total Chicks	Adults (No Nest)	Occupied Nests	Total Adults	Total Chicks
30	0	0	0	0	9	0	9	0
52	1	0	1	0	0	0	0	0
121	7	0	7	0	3	0	3	0
225	58	0	58	0	21	0	21	0
226	1,799	218	2,017	0	2,020	0	2,020	0
227	24	118	142	0	94	0	94	0
282	1	0	1	0	0	0	0	0
334	71	0	71	0	410	0	410	0
372	10	0	10	0	12	0	12	0
396	55	0	55	0	50	0	50	0
431	12	0	12	0	0	0	0	0
439	173	0	173	0	136	0	136	0
460	7	0	7	0	0	0	0	0
557	111	0	111	0	0	0	0	0
560	2,325	0	2,325	0	11	0	11	0
561	116	0	116	0	52	0	52	0
564	0	0	0	0	4	0	4	0
566	1	0	1	0	0	0	0	0
572	0	0	0	0	1	0	1	0
585	1	0	1	0	45	0	45	0
590	1	0	1	0	0	0	0	0
591	0	0	0	0	1	0	1	0
600	2	0	2	0	0	0	0	0
602	5	0	5	0	0	0	0	0
605	3	0	3	0	300	0	300	0
606	0	0	0	0	160	0	160	0

Waypoint	June				July			
	Adults (No Nest)	Occupied Nests	Total Adults	Total Chicks	Adults (No Nest)	Occupied Nests	Total Adults	Total Chicks
607	0	0	0	0	45	0	45	0
610	0	0	0	0	1	0	1	0
620	0	0	0	0	75	0	75	0
631	6	0	6	0	0	0	0	0
633	0	0	0	0	18	0	18	0
634	0	0	0	0	10	0	10	0
638	0	0	0	0	55	0	55	0
639	0	0	0	0	2	0	2	0
650	4	0	4	0	5	0	5	0
663	0	0	0	0	1	0	1	0
670	2	0	2	0	80	0	80	0
672	10	0	10	0	0	0	0	0
674	1	0	1	0	0	0	0	0
683	149	0	149	0	0	0	0	0
691	0	0	0	0	350	0	350	0
692	0	0	0	0	252	0	252	0
710	15	0	15	0	0	0	0	0
720	0	0	0	0	20	0	20	0
725	5	0	5	0	55	0	55	0
729	50	0	50	0	0	0	0	0
740	0	0	0	0	1	0	1	0
748	0	0	0	0	1	0	1	0
775	0	0	0	0	1	0	1	0
777	4	0	4	0	0	0	0	0
786	0	0	0	0	1	0	1	0
802	5	0	5	0	0	0	0	0
806	0	0	0	0	15	0	15	0

Waypoint	June				July			
	Adults (No Nest)	Occupied Nests	Total Adults	Total Chicks	Adults (No Nest)	Occupied Nests	Total Adults	Total Chicks
808	1	0	1	0	0	0	0	0
811	3	0	3	0	0	0	0	0
812	0	0	0	0	2	0	2	0
818	4	0	4	0	0	0	0	0
821	0	0	0	0	15	0	15	0
823	12	0	12	0	0	0	0	0
824	20	0	20	0	250	0	250	0
826	50	0	50	0	0	0	0	0
830	385	0	385	0	329	0	329	0
833	94	0	94	0	0	0	0	0
834	141	0	141	0	0	0	0	0
836	40	0	40	0	0	0	0	0
837	357	0	357	0	0	0	0	0
838	0	0	0	0	20	0	20	0
839	0	0	0	0	25	0	25	0
840	0	0	0	0	80	0	80	0
841	0	0	0	0	25	0	25	0
844	0	0	0	0	12	0	12	0
846	0	0	0	0	20	0	20	0
847	0	0	0	0	65	0	65	0
848	0	0	0	0	2	0	2	0
850	0	0	0	0	60	0	60	0
851	0	0	0	0	3	0	3	0
852	0	0	0	0	120	0	120	0
854	0	0	0	0	170	0	170	0
855	0	0	0	0	50	0	50	0
856	0	0	0	0	60	0	60	0

Waypoint	June				July			
	Adults (No Nest)	Occupied Nests	Total Adults	Total Chicks	Adults (No Nest)	Occupied Nests	Total Adults	Total Chicks
857	0	0	0	0	10	0	10	0
860	0	0	0	0	4	0	4	0
Total	6,141	336	6,477	0	5,639	0	5,639	0

Table 4: Waterbody Classification and Island Use by Ring-billed Gulls in June and July 2020

Island	Gathering	Month	System	Flow	Size Class	Island Habitat	Island Size Class (ha)	Years Used 2015-2020
226	Colony	June	On-system	River	>1,000	50% rock, 45% shrub/deadfall, 55% treed	1.0-1.9	1
227	Colony	June	On-system	River	>1,000	Exposed bedrock	<0.1	2
52	Congregation	June	On-system	Lake	>1,000	Boulders	<0.1	4
121	Congregation	June	On-system	Lake	>1,000	Exposed bedrock	0.1-0.9	5
225	Congregation	June	On-system	River	>1,000	Exposed bedrock	0.1-0.9	4
282	Congregation	June	Off-system	Lake	>1,000	95% boulders, 5% grass	0.1-0.9	3
334	Congregation	June	Off-system	Lake	>1,000	95% boulders, 5% grass	0.1-0.9	3
372	Congregation	June	On-system	Lake	>1,000	Exposed bedrock	0.1-0.9	4
396	Congregation	June	On-system	Lake	>1,000	Exposed bedrock	0.1-0.9	4
431	Congregation	June	On-system	Lake	>1,000	Exposed bedrock	0.1-0.9	3
439	Congregation	June	On-system	River	>1,000	50% bare rock, 50% grass	0.1-0.9	3
460	Congregation	June	Off-system	Lake	>1,000	Sandbar	0.1-0.9	3
557	Congregation	June	On-system	River	>1,000	Treed/burned	>4.0	2
557	Congregation	June	On-system	River	>1,000	Treed/burned	>4.0	1
560	Congregation	June	On-system	River	>1,000	Treed/cleared	>4.0	1
561	Congregation	June	On-system	River	>1,000	Exposed bedrock	1.0-1.9	1
566	Congregation	June	On-system	Lake	>1,000	Gravel	0.1-0.9	1
585	Congregation	June	On-system	Lake	>1,000	Exposed bedrock	<0.1	1
590	Congregation	June	Off-system	Lake	>1,000	Exposed bedrock	<0.1	1
600	Congregation	June	On-system	Lake	>1,000	Exposed bedrock	0.1-0.9	2
602	Congregation	June	On-system	Lake	>1,000	Exposed bedrock	0.1-0.9	3
605	Congregation	June	On-system	Lake	>1,000	Exposed bedrock	<0.1	2
631	Congregation	June	On-system	Lake	>1,000	Boulders	0.1-0.9	3
650	Congregation	June	On-system	Lake	>1,000	Exposed bedrock	0.1-0.9	3
670	Congregation	June	On-system	Lake	>1,000	70% tree/shrub, 30% sand/gravel	0.1-0.9	2

Island	Gathering	Month	System	Flow	Size Class	Island Habitat	Island Size Class (ha)	Years Used 2015-2020
672	Congregation	June	On-system	Lake	>1,000	Boulders	0.1-0.9	0
674	Congregation	June	On-system	Lake	>1,000	Boulders	0.1-0.9	2
683	Congregation	June	On-system	River	>1,000	Cleared island	0.1-0.9	2
710	Congregation	June	On-system	Lake	>1,000	Boulders	0.1-0.9	2
725	Congregation	June	On-system	Lake	>1,000	20% exposed bedrock, 80% treed	0.1-0.9	2
729	Congregation	June	On-system	Lake	>1,000	Exposed bedrock	<0.1	2
777	Congregation	June	On-system	Lake	>1,000	Exposed bedrock	<0.1	0
802	Congregation	June	On-system	Lake	>1,000	Exposed bedrock	<0.1	0
808	Congregation	June	On-system	Lake	>1,000	Exposed bedrock	<0.1	0
811	Congregation	June	On-system	Lake	>1,000	80% boulders, 20% treed	1.0-1.9	0
818	Congregation	June	Off-system	Lake	>1,000	90% treed, 10% bare rock	<0.1	0
823	Congregation	June	On-system	Lake	>1,000	Boulders	<0.1	0
824	Congregation	June	On-system	Lake	>1,000	Treed	<0.1	0
826	Congregation	June	On-system	Lake	>1,000	Treed	<0.1	0
830	Congregation	June	On-system	River	>1,000	Flooded peat	0.1-0.9	0
833	Congregation	June	On-system	River	>1,000	Gravel	<0.1	0
834	Congregation	June	On-system	River	>1,000	Flooded peat	<0.1	0
836	Congregation	June	On-system	River	>1,000	Flooded peat	<0.1	0
837	Congregation	June	On-system	River	>1,000	Nesting Island, gravel	<0.1	0
1	Dispersed	June	Off-system	Lake	>1,000	NA	NA	NA
7	Dispersed	June	Off-system	Lake	>1,000	NA	NA	NA
12	Dispersed	June	On-system	Lake	>1,000	NA	NA	NA
15	Dispersed	June	On-system	Lake	>1,000	NA	NA	NA
18	Dispersed	June	On-system	Lake	>1,000	NA	NA	NA
19	Dispersed	June	On-system	Lake	>1,000	NA	NA	NA
21	Dispersed	June	On-system	Lake	>1,000	NA	NA	NA
31	Dispersed	June	On-system	Lake	>1,000	NA	NA	NA

Island	Gathering	Month	System	Flow	Size Class	Island Habitat	Island Size Class (ha)	Years Used 2015-2020
32	Dispersed	June	On-system	River	>1,000	NA	NA	NA
33	Dispersed	June	On-system	River	>1,000	NA	NA	NA
34	Dispersed	June	On-system	River	>1,000	NA	NA	NA
38	Dispersed	June	On-system	River	>1,000	NA	NA	NA
39	Dispersed	June	On-system	River	>1,000	NA	NA	NA
40	Dispersed	June	On-system	River	>1,000	NA	NA	NA
41	Dispersed	June	On-system	River	>1,000	NA	NA	NA
42	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
50	Dispersed	June	On-system	River	>1,000	NA	NA	NA
53	Dispersed	June	On-system	River	>1,000	NA	NA	NA
59	Dispersed	June	On-system	River	>1,000	NA	NA	NA
60	Dispersed	June	On-system	River	>1,000	NA	NA	NA
61	Dispersed	June	On-system	River	>1,000	NA	NA	NA
67	Dispersed	June	On-system	River	>1,000	NA	NA	NA
75	Dispersed	June	On-system	River	>1,000	NA	NA	NA
86	Dispersed	June	On-system	River	>1,000	NA	NA	NA
89	Dispersed	June	Off-system	Lake	>1,000	NA	NA	NA
30	Congregation	July	On-system	Lake	>1,000	70% tree/shrub, 30% sand/gravel	1.0-1.9	5
121	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	0.1-0.9	5
225	Congregation	July	On-system	River	>1,000	Exposed bedrock	0.1-0.9	5
226	Congregation	July	On-system	River	>1,000	50% rock, 45% shrub/deadfall, 55% treed	1.0-1.9	3
227	Congregation	July	On-system	River	>1,000	Exposed bedrock	<0.1	2
334	Congregation	July	Off-system	Lake	>1,000	95% boulders, 5% grass	0.1-0.9	3
372	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	0.1-0.9	3
396	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	0.1-0.9	3

Island	Gathering	Month	System	Flow	Size Class	Island Habitat	Island Size Class (ha)	Years Used 2015-2020
439	Congregation	July	On-system	River	>1,000	50% bare rock, 50% grass	0.1-0.9	3
560	Congregation	July	On-system	River	>1,000	Treed/cleared	>4.0	1
561	Congregation	July	On-system	River	>1,000	Exposed bedrock	1.0-1.9	1
564	Congregation	July	On-system	Lake	>1,000	50% gravel, 50% treed	0.1-0.9	1
572	Congregation	July	On-system	Lake	>1,000	Boulders	<0.1	1
585	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	<0.1	1
591	Congregation	July	Off-system	Lake	>1,000	Exposed bedrock	0.1-0.9	2
605	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	<0.1	2
606	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	<0.1	0
607	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	<0.1	0
610	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	0.1-0.9	0
620	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	0.1-0.9	2
633	Congregation	July	On-system	Lake	>1,000	95% exposed bedrock, 5% tree/shrub	<0.1	2
634	Congregation	July	On-system	Lake	>1,000	95% exposed bedrock, 5% tree/shrub	<0.1	3
638	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	<0.1	2
638	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	<0.1	2
639	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	<0.1	2
650	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	0.1-0.9	3
663	Congregation	July	On-system	River	>1,000	Exposed bedrock	0.1-0.9	3
670	Congregation	July	On-system	Lake	>1,000	70% tree/shrub, 30% sand/gravel	0.1-0.9	2
691	Congregation	July	On-system	Lake	>1,000	80% tree/shrub, 20% sand/gravel	0.1-0.9	2
692	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	0.1-0.9	3
692	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	0.1-0.9	2
720	Congregation	July	On-system	Lake	>1,000	80% tree/shrub, 20% debris	0.1-0.9	0
725	Congregation	July	On-system	Lake	>1,000	20% exposed bedrock, 80% treed	0.1-0.9	2

Island	Gathering	Month	System	Flow	Size Class	Island Habitat	Island Size Class (ha)	Years Used 2015-2020
740	Congregation	July	On-system	Lake	>1,000	Boulders	<0.1	1
748	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	<0.1	1
775	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	<0.1	0
786	Congregation	July	On-system	Lake	>1,000	Boulders	<0.1	0
806	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	<0.1	0
812	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	<0.1	0
821	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	<0.1	1
821	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	<0.1	0
824	Congregation	July	On-system	Lake	>1,000	Treed	<0.1	0
830	Congregation	July	On-system	River	>1,000	Flooded peat	0.1-0.9	0
838	Congregation	July	On-system	Lake	>1,000	Treed	>4.0	1
839	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	0.1-0.9	0
840	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	0.1-0.9	0
841	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	0.1-0.9	0
844	Congregation	July	On-system	River	>1,000	Gravel	<0.1	0
846	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	<0.1	0
847	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	<0.1	0
848	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	<0.1	0
850	Congregation	July	On-system	Lake	>1,000	90% treed, 10% exposed bedrock	<0.1	0
851	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	<0.1	0
852	Congregation	July	On-system	Lake	>1,000	50% treed, 50% exposed bedrock	<0.1	0
854	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	<0.1	0
855	Congregation	July	On-system	Lake	>1,000	Treed	<0.1	0
856	Congregation	July	On-system	Lake	>1,000	Treed	<0.1	0
857	Congregation	July	On-system	Lake	>1,000	Treed	<0.1	0
860	Congregation	July	On-system	Lake	>1,000	50% treed, 50% gravel	3.0-3.9	1
2	Dispersed	July	Off-system	Lake	>1,000	NA	NA	NA

Island	Gathering	Month	System	Flow	Size Class	Island Habitat	Island Size Class (ha)	Years Used 2015-2020
8	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
9	Dispersed	July	Off-system	Lake	>1,000	NA	NA	NA
10	Dispersed	July	Off-system	Lake	>1,000	NA	NA	NA
14	Dispersed	July	On-system	River	>1,000	NA	NA	NA
15	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
17	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
19	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
23	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
27	Dispersed	July	On-system	Lake	>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
50	Dispersed	July	On-system	River	>1,000	NA	NA	NA
52	Dispersed	July	On-system	River	>1,000	NA	NA	NA
55	Dispersed	July	On-system	River	>1,000	NA	NA	NA
58	Dispersed	July	On-system	River	>1,000	NA	NA	NA
59	Dispersed	July	On-system	River	>1,000	NA	NA	NA
60	Dispersed	July	On-system	River	>1,000	NA	NA	NA
62	Dispersed	July	On-system	River	>1,000	NA	NA	NA
67	Dispersed	July	On-system	River	>1,000	NA	NA	NA
68	Dispersed	July	On-system	River	>1,000	NA	NA	NA
69	Dispersed	July	On-system	River	>1,000	NA	NA	NA
71	Dispersed	July	On-system	River	>1,000	NA	NA	NA
73	Dispersed	July	On-system	River	>1,000	NA	NA	NA
74	Dispersed	July	On-system	River	>1,000	NA	NA	NA
75	Dispersed	July	On-system	River	>1,000	NA	NA	NA
76	Dispersed	July	On-system	River	>1,000	NA	NA	NA
82	Dispersed	July	On-system	River	>1,000	NA	NA	NA
91	Dispersed	July	On-system	River	>1,000	NA	NA	NA

Island	Gathering	Month	System	Flow	Size Class	Island Habitat	Island Size Class (ha)	Years Used 2015-2020
92	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
95	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
96	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
98	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
99	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
100	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
101	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
102	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
104	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
105	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
106	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
107	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
108	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
109	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
114	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
115	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
116	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
117	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
118	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
119	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
120	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
122	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
124	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
128	Dispersed	July	Off-system	Lake	>1,000	NA	NA	NA
129	Dispersed	July	Off-system	Lake	>1,000	NA	NA	NA
138	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
139	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
140	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA

Island	Gathering	Month	System	Flow	Size Class	Island Habitat	Island Size Class (ha)	Years Used 2015-2020
142	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
144	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
147	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
149	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
150	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
153	Dispersed	July	On-system	River	>1,000	NA	NA	NA
155	Dispersed	July	On-system	River	>1,000	NA	NA	NA
156	Dispersed	July	On-system	River	>1,000	NA	NA	NA
158	Dispersed	July	On-system	River	>1,000	NA	NA	NA
160	Dispersed	July	Off-system	Lake	>1,000	NA	NA	NA

Photo 2: Ring-billed Gulls Loafing on the Habitat Compensation Island, June 24, 2020

3.2.2 COMMON TERN

Common terns were the second most abundant species of colonial waterbird observed in the regional study area in 2020 (Table 2). The total number of common terns counted more than doubled from June (620) to July (1,533) (Figure 4; Table 5). The increase of common terns from June to July has only been observed one other time in 2015, otherwise the numbers typically decrease from June to July (Figure 4). The number of common terns observed in June was within the ranges that have typically been observed in the study area during past surveys (Figure 4). In July 2020, the highest numbers of common terns were observed in comparison to any of the other study years (Figure 4).

In June 2020, common terns were observed congregating at 41 sites and nesting at one site (only a single individual nesting) (Table 5; Map 9). Of the four largest congregations, two were located on Stephens Lake (Wpt 670 and Wpt 829) and two were located on Split Lake (Wpt 164 and Wpt 805) (Map 7). The single nesting common tern was observed in Split Lake (Wpt 738) (Map 7). In July, 37 common tern congregations and no colonies were observed (Map 8).

In June 2020, 24 of 42 islands (57%) where common terns were observed were used at least once in previous construction years (2015-2019) (Table 6). In July 2020, 21 of 37 islands (57%) where common terns were observed were used at least once in previous construction years (2015-2019) (Table 6).

All common tern colonies and congregations were observed on islands. Most of the islands used consisted of boulders or exposed bedrock, were less than 1 ha in size, and were within large, on-system lakes or rivers (Table 6).

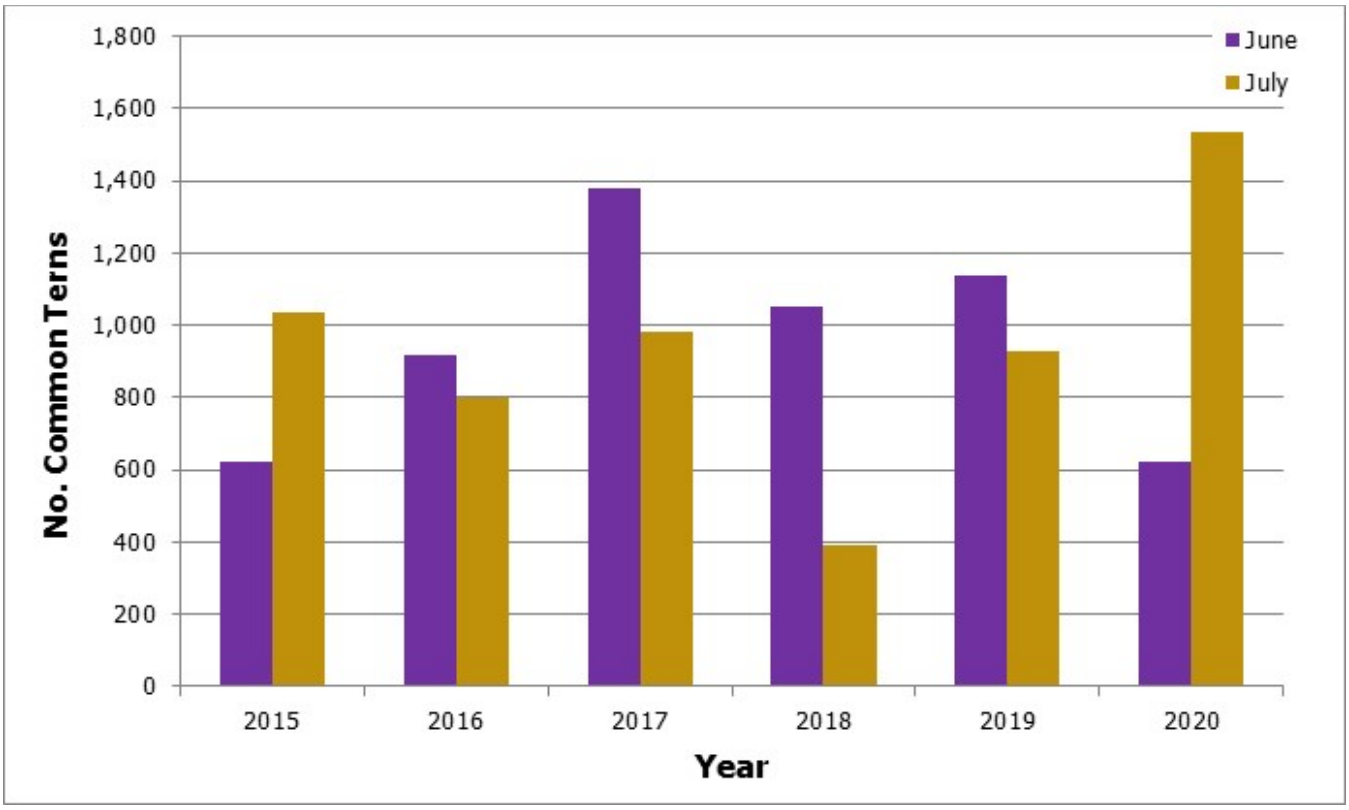
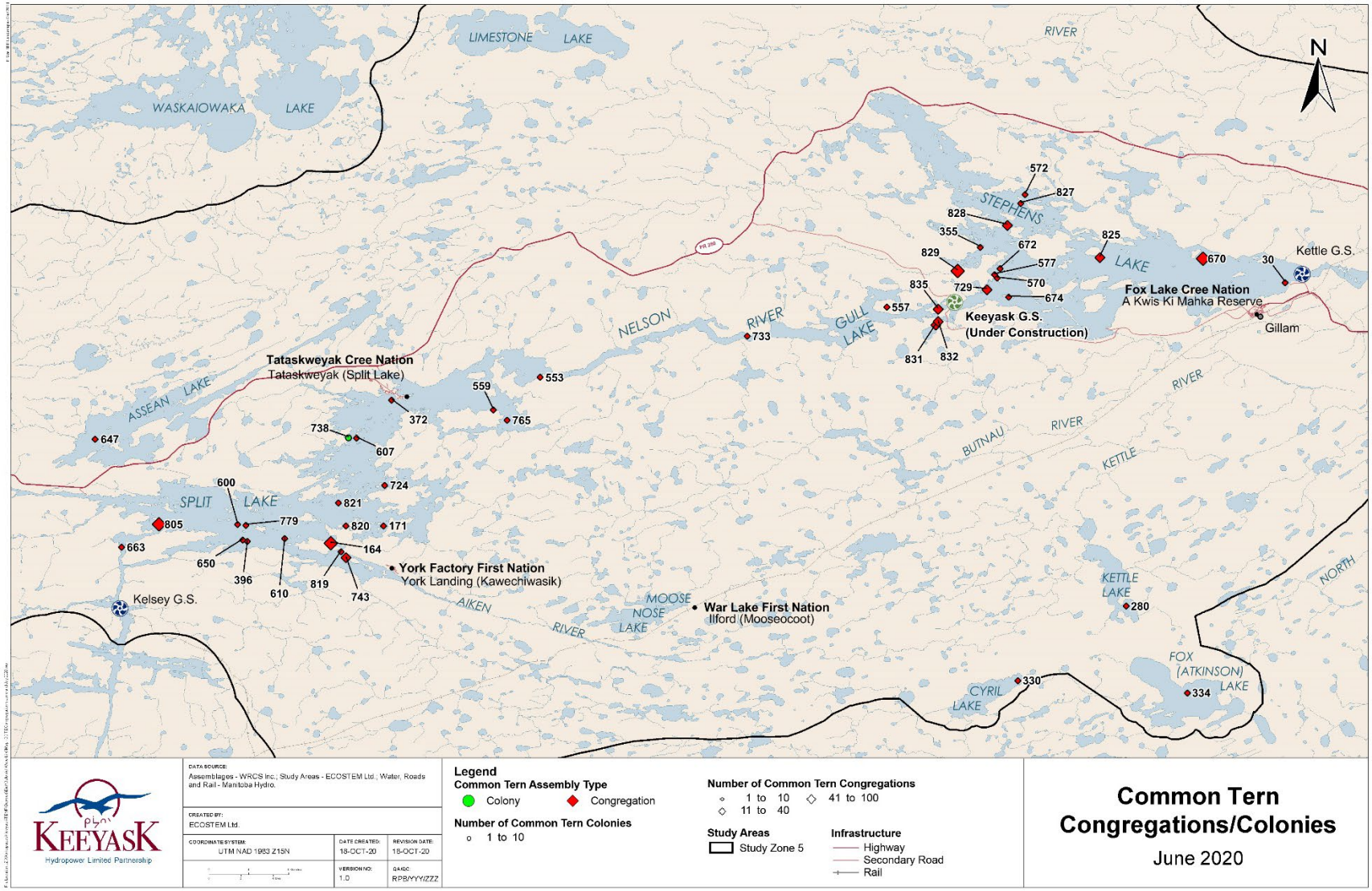
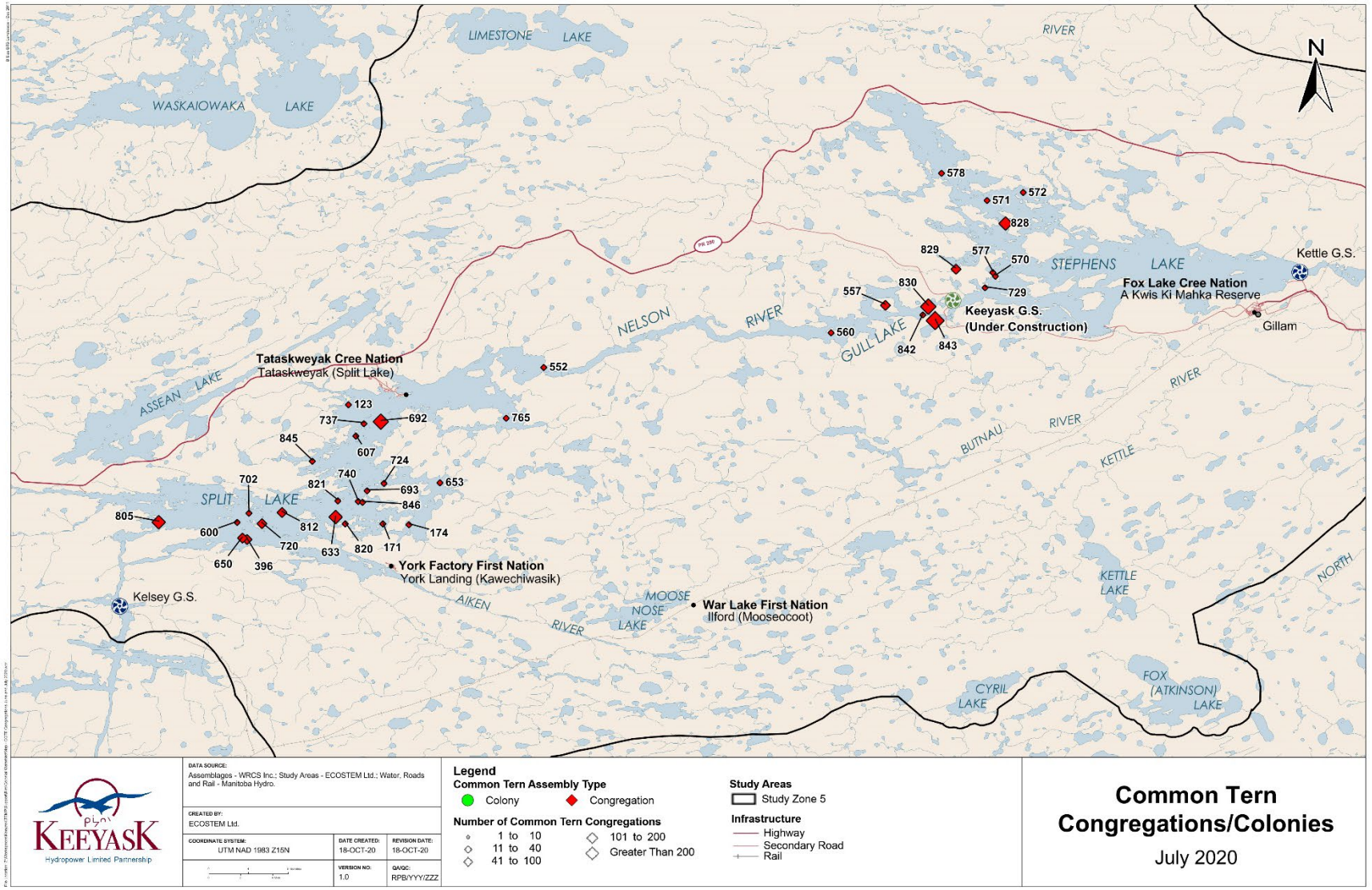


Figure 4: Number of Common Terns Observed During Helicopter Surveys in June and July from 2015 to 2020



Map 7: Common Tern Colonies and Congregations Observed During Helicopter Surveys in June 2020



Map 8: Common Tern Colonies and Congregations Observed During Helicopter Surveys in July 2020

Table 5: Common Tern Congregations/Colonies Observed During the Helicopter Surveys in 2020

Waypoint	June				July			
	Adults (No Nest)	Occupied Nests	Total Adults	Total Chicks	Adults (No Nest)	Occupied Nests	Total Adults	Total Chicks
30	1	0	1	0	0	0	0	0
123	0	0	0	0	1	0	1	0
164	65	0	65	0	0	0	0	0
171	2	0	2	0	1	0	1	0
174	0	0	0	0	1	0	1	0
280	2	0	2	0	0	0	0	0
330	5	0	5	0	0	0	0	0
334	5	0	5	0	0	0	0	0
355	2	0	2	0	0	0	0	0
372	2	0	2	0	0	0	0	0
396	1	0	1	0	15	0	15	0
552	0	0	0	0	1	0	1	0
553	3	0	3	0	0	0	0	0
557	1	0	1	0	35	0	35	0
559	2	0	2	0	0	0	0	0
560	0	0	0	0	2	0	2	0
570	8	0	8	0	2	0	2	0
571	0	0	0	0	2	0	2	0
572	2	0	2	0	2	0	2	0
577	2	0	2	0	2	0	2	0
578	0	0	0	0	2	0	2	0
600	10	0	10	0	2	0	2	0
607	4	0	4	0	6	0	6	0
610	1	0	1	0	0	0	0	0
633	0	0	0	0	60	0	60	0
647	1	0	1	0	0	0	0	0

Waypoint	June				July			
	Adults (No Nest)	Occupied Nests	Total Adults	Total Chicks	Adults (No Nest)	Occupied Nests	Total Adults	Total Chicks
650	2	0	2	0	20	0	20	0
653	0	0	0	0	5	0	5	0
663	1	0	1	0	0	0	0	0
670	55	0	55	0	0	0	0	0
672	4	0	4	0	0	0	0	0
674	4	0	4	0	0	0	0	0
692	0	0	0	0	120	0	120	0
693	0	0	0	0	1	0	1	0
702	0	0	0	0	2	0	2	0
720	0	0	0	0	30	0	30	0
724	1	0	1	0	5	0	5	0
729	20	0	20	0	2	0	2	0
733	3	0	3	0	0	0	0	0
737	0	0	0	0	1	0	1	0
738	0	1	1	0	0	0	0	0
740	0	0	0	0	1	0	1	0
743	40	0	40	0	0	0	0	0
765	8	0	8	0	2	0	2	0
779	3	0	3	0	0	0	0	0
805	60	0	60	0	85	0	85	0
812	0	0	0	0	20	0	20	0
819	2	0	2	0	0	0	0	0
820	2	0	2	0	1	0	1	0
821	1	0	1	0	2	0	2	0
825	35	0	35	0	0	0	0	0
827	1	0	1	0	0	0	0	0
828	40	0	40	0	70	0	70	0
829	65	0	65	0	13	0	13	0

Waypoint	June				July			
	Adults (No Nest)	Occupied Nests	Total Adults	Total Chicks	Adults (No Nest)	Occupied Nests	Total Adults	Total Chicks
830	0	0	0	0	142	0	142	0
831	25	0	25	0	0	0	0	0
832	30	0	30	0	0	0	0	0
835	30	0	30	0	0	0	0	0
842	0	0	0	0	6	0	6	0
843	0	0	0	0	603	0	603	0
845	0	0	0	0	2	0	2	0
846	0	0	0	0	3	0	3	0
Total	551	1	552	0	1,270	0	1,270	0

Table 6: Waterbody Classification and Island Use by Common Terns in 2020

Waypoint	Gathering	Month	System	Flow	Size Class	Island Habitat	Island Size Class (ha)	Years Used 2015-2020
738	Colony (single nest)	June	On-system	Lake	>1,000	Exposed bedrock	<0.1	1
30	Congregation	June	On-system	Lake	>1,000	70% tree/shrub, 30% sand/gravel	1.0-1.9	5
164	Congregation	June	On-system	Lake	>1,000	90% exposed bedrock, 10% grass	<0.1	4
171	Congregation	June	On-system	Lake	>1,000	Exposed bedrock	<0.1	1
280	Congregation	June	Off-system	Lake	>1,000	Boulders	<0.1	3
330	Congregation	June	Off-system	Lake	>1,000	Boulders	<0.1	4
334	Congregation	June	Off-system	Lake	>1,000	95% boulders, 5% grass	0.1-0.9	3
355	Congregation	June	On-system	Lake	>1,000	90% boulders, 10% driftwood	<0.1	4
372	Congregation	June	On-system	Lake	>1,000	Exposed bedrock	0.1-0.9	4
396	Congregation	June	On-system	Lake	>1,000	Exposed bedrock	0.1-0.9	3
553	Congregation	June	On-system	Lake	>1,000	Boulders	<0.1	1
557	Congregation	June	On-system	River	>1,000	Treed/burned	>4.0	1
559	Congregation	June	On-system	Lake	>1,000	50% boulders, 50% gravel	0.1-0.9	1
570	Congregation	June	On-system	Lake	>1,000	Boulders	<0.1	1
572	Congregation	June	On-system	Lake	>1,000	Boulders	<0.1	1
577	Congregation	June	On-system	Lake	>1,000	Boulders	<0.1	1
600	Congregation	June	On-system	Lake	>1,000	Exposed bedrock	0.1-0.9	2
607	Congregation	June	On-system	Lake	>1,000	Exposed bedrock	<0.1	0
610	Congregation	June	On-system	Lake	>1,000	Exposed bedrock	0.1-0.9	0
647	Congregation	June	Off-system	Lake	>1,000	Exposed bedrock	<0.1	0
650	Congregation	June	On-system	Lake	>1,000	Exposed bedrock	0.1-0.9	3
663	Congregation	June	On-system	River	>1,000	Exposed bedrock	0.1-0.9	3
670	Congregation	June	On-system	Lake	>1,000	70% tree/shrub, 30% sand/gravel	0.1-0.9	2
672	Congregation	June	On-system	Lake	>1,000	Boulders	0.1-0.9	0

Waypoint	Gathering	Month	System	Flow	Size Class	Island Habitat	Island Size Class (ha)	Years Used 2015-2020
674	Congregation	June	On-system	Lake	>1,000	Boulders	0.1-0.9	2
724	Congregation	June	On-system	Lake	>1,000	70% tree/shrub, 30% sand/gravel	1.0-1.9	0
729	Congregation	June	On-system	Lake	>1,000	Exposed bedrock	<0.1	2
733	Congregation	June	On-system	River	>1,000	Boulders	<0.1	1
743	Congregation	June	On-system	Lake	>1,000	Boulders	<0.1	1
765	Congregation	June	On-system	Lake	>1,000	Boulders	<0.1	0
779	Congregation	June	On-system	Lake	>1,000	Exposed bedrock	<0.1	0
805	Congregation	June	On-system	Lake	>1,000	Boulders	1.0-1.9	0
819	Congregation	June	On-system	Lake	>1,000	Exposed bedrock	<0.1	0
820	Congregation	June	On-system	Lake	>1,000	Exposed bedrock	<0.1	0
821	Congregation	June	On-system	Lake	>1,000	Exposed bedrock	<0.1	0
825	Congregation	June	On-system	Lake	>1,000	80% treed, 20% sand	1.0-1.9	0
827	Congregation	June	On-system	Lake	>1,000	Exposed bedrock	<0.1	0
828	Congregation	June	On-system	Lake	>1,000	Grass	<0.1	0
829	Congregation	June	On-system	Lake	>1,000	Sandbar	<0.1	0
831	Congregation	June	On-system	River	>1,000	Flooded peat	<0.1	0
832	Congregation	June	On-system	River	>1,000	Flooded peat	<0.1	0
835	Congregation	June	On-system	River	>1,000	Flooded peat	<0.1	0
2	Dispersed	June	Off-system	Lake	>1,000	NA	NA	NA
2	Dispersed	June	Off-system	Lake	>1,000	NA	NA	NA
3	Dispersed	June	Off-system	Lake	>1,000	NA	NA	NA
4	Dispersed	June	Off-system	Lake	>1,000	NA	NA	NA
5	Dispersed	June	Off-system	Lake	>1,000	NA	NA	NA
6	Dispersed	June	Off-system	Lake	>1,000	NA	NA	NA
10	Dispersed	June	Off-system	Lake	>1,000	NA	NA	NA
11	Dispersed	June	On-system	Lake	>1,000	NA	NA	NA
17	Dispersed	June	On-system	Lake	>1,000	NA	NA	NA
20	Dispersed	June	On-system	Lake	>1,000	NA	NA	NA

Waypoint	Gathering	Month	System	Flow	Size Class	Island Habitat	Island Size Class (ha)	Years Used 2015-2020
24	Dispersed	June	On-system	Lake	>1,000	NA	NA	NA
27	Dispersed	June	On-system	Lake	>1,000	NA	NA	NA
28	Dispersed	June	On-system	Lake	>1,000	NA	NA	NA
36	Dispersed	June	On-system	River	>1,000	NA	NA	NA
37	Dispersed	June	On-system	River	>1,000	NA	NA	NA
43	Dispersed	June	On-system	River	>1,000	NA	NA	NA
45	Dispersed	June	On-system	River	>1,000	NA	NA	NA
46	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
54	Dispersed	June	On-system	River	>1,000	NA	NA	NA
59	Dispersed	June	On-system	River	>1,000	NA	NA	NA
61	Dispersed	June	On-system	River	>1,000	NA	NA	NA
73	Dispersed	June	On-system	River	>1,000	NA	NA	NA
74	Dispersed	June	On-system	River	>1,000	NA	NA	NA
77	Dispersed	June	On-system	River	>1,000	NA	NA	NA
79	Dispersed	June	On-system	River	>1,000	NA	NA	NA
85	Dispersed	June	On-system	River	>1,000	NA	NA	NA
87	Dispersed	June	On-system	River	>1,000	NA	NA	NA
88	Dispersed	June	Off-system	Lake	>1,000	NA	NA	NA
123	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	<0.1	4
171	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	<0.1	5
174	Congregation	July	On-system	Lake	>1,000	Boulders	<0.1	5
396	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	0.1-0.9	3
552	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	<0.1	1
557	Congregation	July	On-system	River	>1,000	Treed/burned	>4.0	1
560	Congregation	July	On-system	River	>1,000	Treed/cleared	>4.0	1
570	Congregation	July	On-system	Lake	>1,000	Boulders	<0.1	1
571	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	0.1-0.9	1

Waypoint	Gathering	Month	System	Flow	Size Class	Island Habitat	Island Size Class (ha)	Years Used 2015-2020
572	Congregation	July	On-system	Lake	>1,000	Boulders	<0.1	1
577	Congregation	July	On-system	Lake	>1,000	Boulders	<0.1	1
578	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	<0.1	1
600	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	0.1-0.9	2
607	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	<0.1	0
633	Congregation	July	On-system	Lake	>1,000	95% exposed bedrock, 5% tree/shrub	<0.1	2
650	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	0.1-0.9	3
653	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	0.1-0.9	2
692	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	0.1-0.9	2
693	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	0.1-0.9	0
702	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	0.1-0.9	2
720	Congregation	July	On-system	Lake	>1,000	80% tree/shrub, 20% debris	0.1-0.9	0
724	Congregation	July	On-system	Lake	>1,000	70% tree/shrub, 30% sand/gravel	1.0-1.9	0
729	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	<0.1	2
737	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	<0.1	1
740	Congregation	July	On-system	Lake	>1,000	Boulders	<0.1	1
765	Congregation	July	On-system	Lake	>1,000	Boulders	<0.1	0
805	Congregation	July	On-system	Lake	>1,000	Boulders	1.0-1.9	0
812	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	<0.1	0
820	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	<0.1	0
821	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	<0.1	0
828	Congregation	July	On-system	Lake	>1,000	Grass	<0.1	0
829	Congregation	July	On-system	Lake	>1,000	Sandbar	<0.1	0
830	Congregation	July	On-system	River	>1,000	Flooded peat	0.1-0.9	0
842	Congregation	July	On-system	River	>1,000	Flooded peat	1.0-1.9	0
843	Congregation	July	On-system	River	>1,000	Flooded peat	0.1-0.9	0
845	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	<0.1	0

Waypoint	Gathering	Month	System	Flow	Size Class	Island Habitat	Island Size Class (ha)	Years Used 2015-2020
846	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	<0.1	0
6	Dispersed	July	Off-system	Lake	>1,000	NA	NA	NA
7	Dispersed	July	Off-system	Lake	>1,000	NA	NA	NA
11	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
12	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
13	Dispersed	July	On-system	River	>1,000	NA	NA	NA
16	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
18	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
21	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
22	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
26	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
30	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
31	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
37	Dispersed	July	On-system	River	>1,000	NA	NA	NA
40	Dispersed	July	On-system	River	>1,000	NA	NA	NA
41	Dispersed	July	On-system	River	>1,000	NA	NA	NA
45	Dispersed	July	On-system	River	>1,000	NA	NA	NA
47	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
50	Dispersed	July	On-system	River	>1,000	NA	NA	NA
51	Dispersed	July	On-system	River	>1,000	NA	NA	NA
53	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
57	Dispersed	July	On-system	River	>1,000	NA	NA	NA
58	Dispersed	July	On-system	River	>1,000	NA	NA	NA
59	Dispersed	July	On-system	River	>1,000	NA	NA	NA
60	Dispersed	July	On-system	River	>1,000	NA	NA	NA

Waypoint	Gathering	Month	System	Flow	Size Class	Island Habitat	Island Size Class (ha)	Years Used 2015-2020
61	Dispersed	July	On-system	River	>1,000	NA	NA	NA
62	Dispersed	July	On-system	River	>1,000	NA	NA	NA
63	Dispersed	July	On-system	River	>1,000	NA	NA	NA
64	Dispersed	July	On-system	River	>1,000	NA	NA	NA
65	Dispersed	July	On-system	River	>1,000	NA	NA	NA
66	Dispersed	July	On-system	River	>1,000	NA	NA	NA
70	Dispersed	July	On-system	River	>1,000	NA	NA	NA
72	Dispersed	July	On-system	River	>1,000	NA	NA	NA
77	Dispersed	July	On-system	River	>1,000	NA	NA	NA
78	Dispersed	July	On-system	River	>1,000	NA	NA	NA
88	Dispersed	July	Off-system	Lake	>1,000	NA	NA	NA
89	Dispersed	July	Off-system	Lake	>1,000	NA	NA	NA
93	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
94	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
97	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
133	Dispersed	July	Off-system	Lake	>1,000	NA	NA	NA
146	Dispersed	July	On-system	Lake	>1,000	NA	NA	NA
157	Dispersed	July	On-system	River	>1,000	NA	NA	NA
159	Dispersed	July	Off-system	Lake	>1,000	NA	NA	NA

3.2.3 HERRING GULL

Relatively low numbers of herring gulls were observed in the regional study area in 2020 compared to ring-billed gulls (Table 2). The total number of herring gulls observed in June and July was consistent with the numbers that have been observed during other survey years (Figure 5). The number of herring gulls observed decreased from June to July, which was consistent with previous construction surveys (Figure 5).

Herring gull nests were observed at 11 sites in the regional study area (Table 7). Four nests were observed on island Wpt 225, six nests were observed on islands in Split Lake, and the remaining nests were located on Stephens Lake and Fox Lake (Map 11).

In June 2020, 15 of 19 islands (79%) where herring gulls were observed were used at least once in previous construction years (2015-2019) (Table 8). In July 2020, 14 of 16 islands (88%) where herring gulls were observed were used at least once in previous construction years (2015-2019) (Table 8).

All herring gull nests observed were located on islands. Most islands used consisted of exposed bedrock or boulders, were less than 1 ha in size, and were within large, on-system lakes or rivers (Table 8).

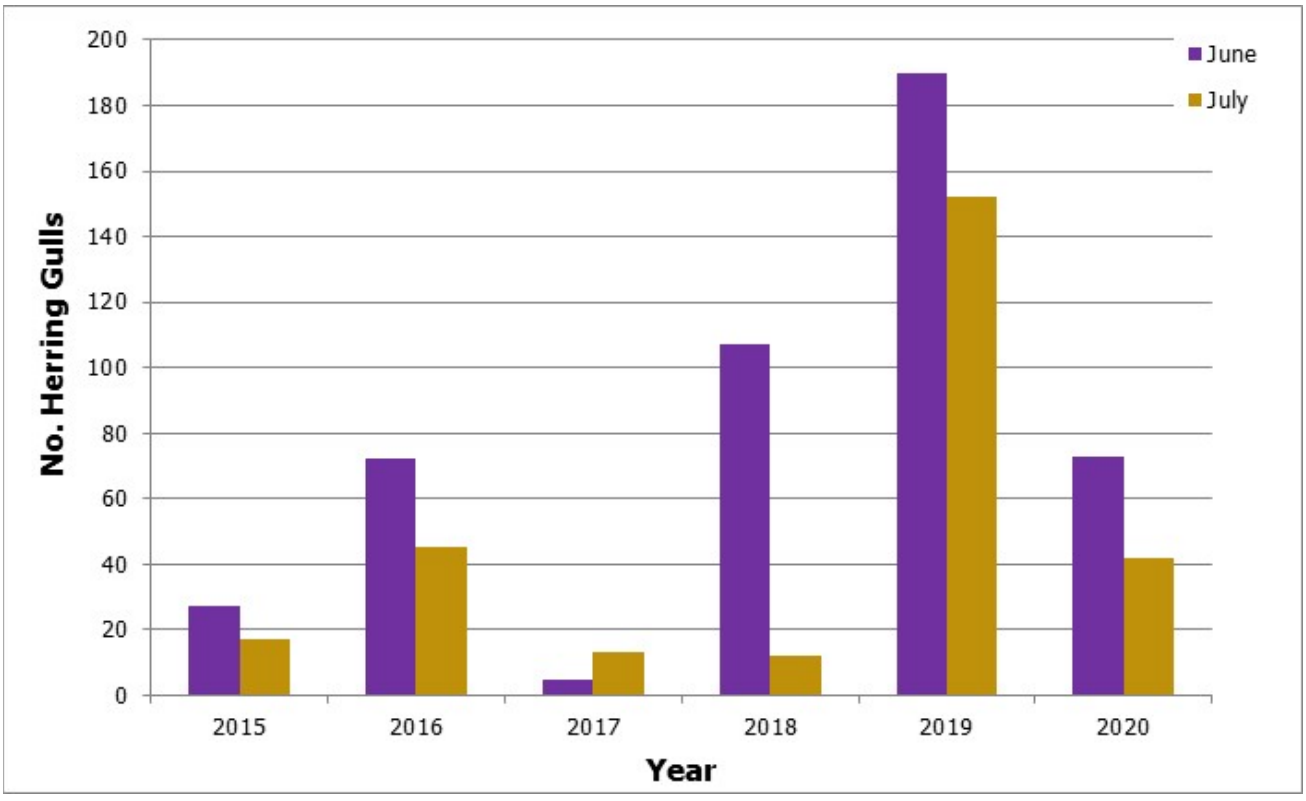
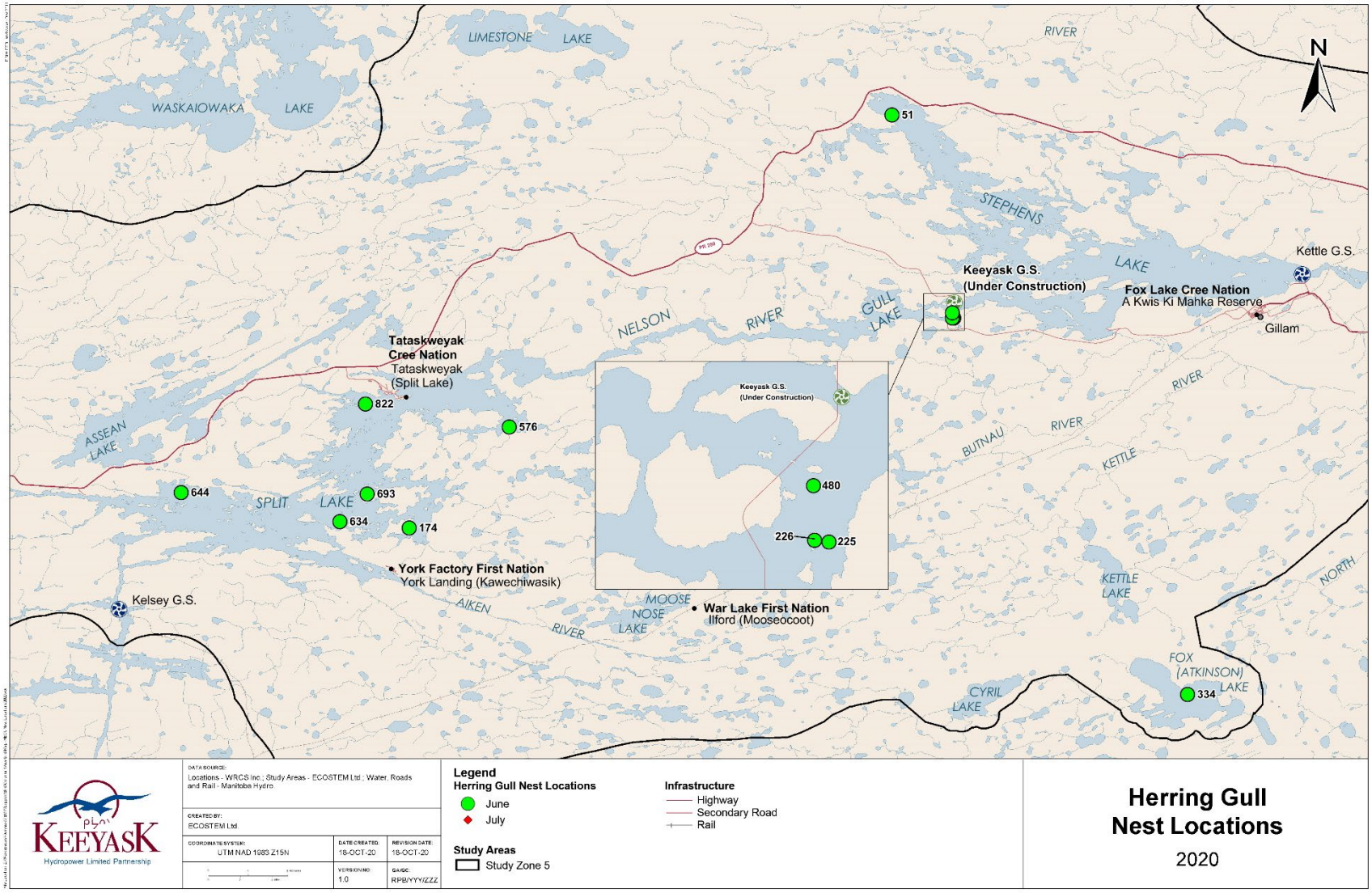


Figure 5: Number of Herring Gulls Observed During Helicopter Surveys in June and July from 2015 to 2020



Map 9: Herring Gull Nests Observed During Helicopter Surveys in 2020* Note: no active herring gull nests were observed in July.

Table 7: Herring Gulls and Nest Sites Observed During the Helicopter Surveys in 2020

Waypoint	June				July			
	Adults (No Nest)	Occupied Nests	Total Adults	Total Chicks	Adults (No Nest)	Occupied Nests	Total Adults	Total Chicks
51	0	1	1	0	1	0	1	0
52	0	0	0	0	1	0	1	0
171	0	0	0	0	2	0	2	0
174	1	1	2	0	0	0	0	0
225	19	4	23	0	5	0	5	0
226	3	1	4	0	0	0	0	0
227	0	0	0	0	4	0	4	0
280	0	0	0	0	1	0	1	0
330	0	0	0	0	3	0	3	0
334	1	1	2	0	0	0	0	0
480	5	1	6	0	2	0	2	0
555	1	0	1	0	0	0	0	0
572	2	0	2	0	0	0	0	0
576	3	1	4	0	7	0	7	0
578	0	0	0	0	1	0	1	0
598	1	0	1	0	0	0	0	0
602	0	0	0	0	3	0	3	0
629	1	0	1	0	0	0	0	0
631	0	0	0	0	7	0	7	0
634	9	1	10	0	0	0	0	0
644	1	1	2	0	0	0	0	0
653	1	0	1	0	0	0	0	0
693	0	1	1	0	0	0	0	0
695	2	0	2	0	0	0	0	0
700	0	0	0	0	1	0	1	0
722	2	0	2	0	0	0	0	0

Waypoint	June				July			
	Adults (No Nest)	Occupied Nests	Total Adults	Total Chicks	Adults (No Nest)	Occupied Nests	Total Adults	Total Chicks
802	0	0	0	0	1	0	1	0
807	2	0	2	0	0	0	0	0
822	0	1	1	0	0	0	0	0
838	0	0	0	0	2	0	2	0
849	0	0	0	0	1	0	1	0
Total	54	14	68	0	42	0	42	0

Table 8: Waterbody Classification and Island Use by Herring Gulls in 2020

Waypoint	Gathering	Month	System	Flow	Size Class	Island Habitat	Island Size Class (ha)	Years Used 2015-2020
51	Nest	June	On-system	Lake	>1,000	Boulders	<0.1	4
174	Nest	June	On-system	Lake	>1,000	Boulders	<0.1	5
225	Nest	June	On-system	River	>1,000	Exposed bedrock	0.1-0.9	4
226	Nest	June	On-system	River	>1,000	50% rock, 45% shrub/deadfall, 55% treed	1.0-1.9	1
334	Nest	June	Off-system	Lake	>1,000	95% boulders, 5% grass	0.1-0.9	3
480	Nest	June	On-system	River	>1,000	Exposed bedrock	0.1-0.9	3
576	Nest	June	On-system	Lake	>1,000	Exposed bedrock	<0.1	1
634	Nest	June	On-system	Lake	>1,000	95% exposed bedrock, 5% tree/shrub	<0.1	3
644	Nest	June	On-system	Lake	>1,000	Exposed bedrock	0.1-0.9	3
693	Nest	June	On-system	Lake	>1,000	Exposed bedrock	0.1-0.9	0
822	Nest	June	On-system	Lake	>1,000	Exposed bedrock	<0.1	0
555	Congregation	June	On-system	Lake	>1,000	80% tree/shrub, 20% sand/gravel	0.1-0.9	1
572	Congregation	June	On-system	Lake	>1,000	Boulders	<0.1	1
598	Congregation	June	Off-system	Lake	>1,000	Exposed bedrock	<0.1	2
629	Congregation	June	On-system	Lake	>1,000	Exposed bedrock	<0.1	2
653	Congregation	June	On-system	Lake	>1,000	Exposed bedrock	0.1-0.9	2
695	Congregation	June	On-system	Lake	>1,000	80% tree/shrub, 20% sand/gravel	0.1-0.9	0
722	Congregation	June	On-system	Lake	>1,000	Exposed bedrock	0.1-0.9	2
807	Congregation	June	On-system	Lake	>1,000	Exposed bedrock	<0.1	0
9	Dispersed	June	Off-system	Lake	>1,000	NA	NA	NA
16	Dispersed	June	On-system	Lake	>1,000	NA	NA	NA
29	Dispersed	June	On-system	Lake	>1,000	NA	NA	NA
82	Dispersed	June	On-system	River	>1,000	NA	NA	NA
51	Congregation	July	On-system	Lake	>1,000	Boulders	<0.1	4

Waypoint	Gathering	Month	System	Flow	Size Class	Island Habitat	Island Size Class (ha)	Years Used 2015-2020
52	Congregation	July	On-system	Lake	>1,000	Boulders	<0.1	1
171	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	<0.1	3
225	Congregation	July	On-system	River	>1,000	Exposed bedrock	0.1-0.9	5
227	Congregation	July	On-system	River	>1,000	Exposed bedrock	<0.1	3
280	Congregation	July	Off-system	Lake	>1,000	Boulders	<0.1	3
330	Congregation	July	Off-system	Lake	>1,000	Boulders	<0.1	1
480	Congregation	July	On-system	River	>1,000	Exposed bedrock	0.1-0.9	3
576	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	<0.1	1
578	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	<0.1	1
602	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	0.1-0.9	3
631	Congregation	July	On-system	Lake	>1,000	Boulders	0.1-0.9	3
700	Congregation	July	On-system	River	>1,000	Exposed bedrock	0.1-0.9	2
802	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	<0.1	0
838	Congregation	July	On-system	Lake	>1,000	Treed	>4.0	1
849	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	<0.1	0

3.2.4 BONAPARTE'S GULL

In June the number of Bonaparte's gulls observed was within the range that had been observed in previous construction surveys (Table 2; Figure 6) and nesting was observed at one site (Wpt 859) on Fox Lake (Map 10). In July the number of Bonaparte's gulls observed was the highest number observed from all the construction survey years (Table 2; Figure 6) and numerous, large groups were observed throughout the study area (Table 9; Map 11). Several large groups of dispersed birds were observed on Fox Lake, and other large groups were observed on Myre Lake, Limestone Lake, and Assean Lake (Map 11). Of the seven sites Bonaparte's gulls were observed congregating or nesting, four (57%) had been used in previous construction years (2015-2019) (Table 10).

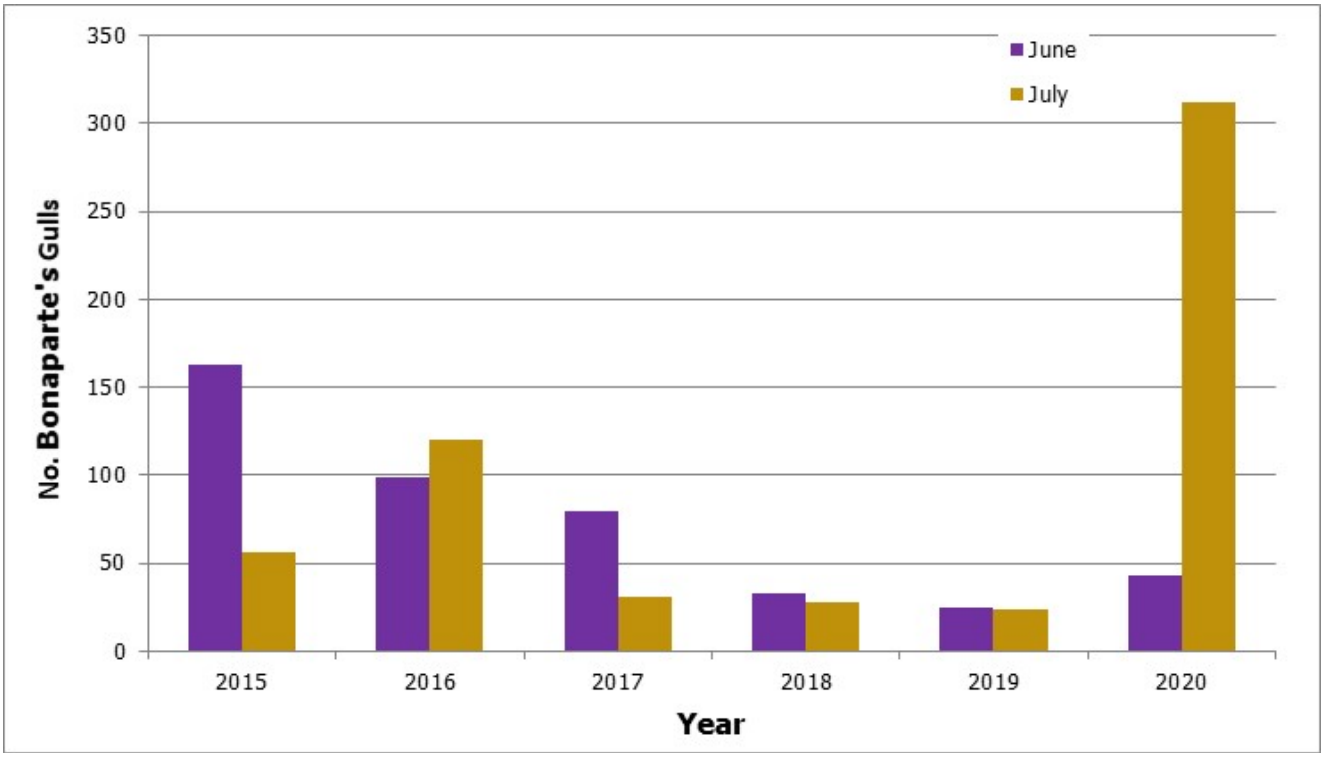
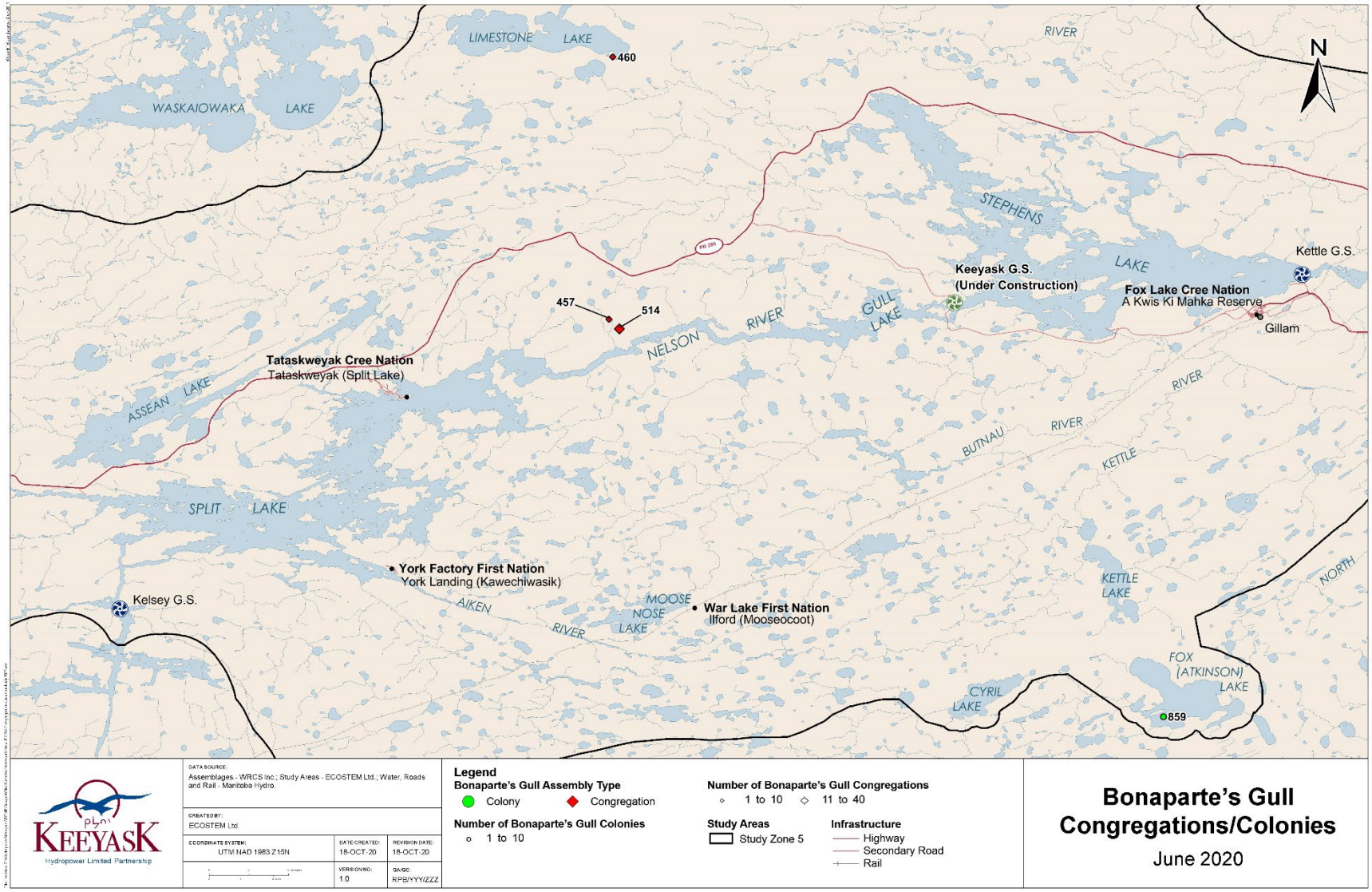
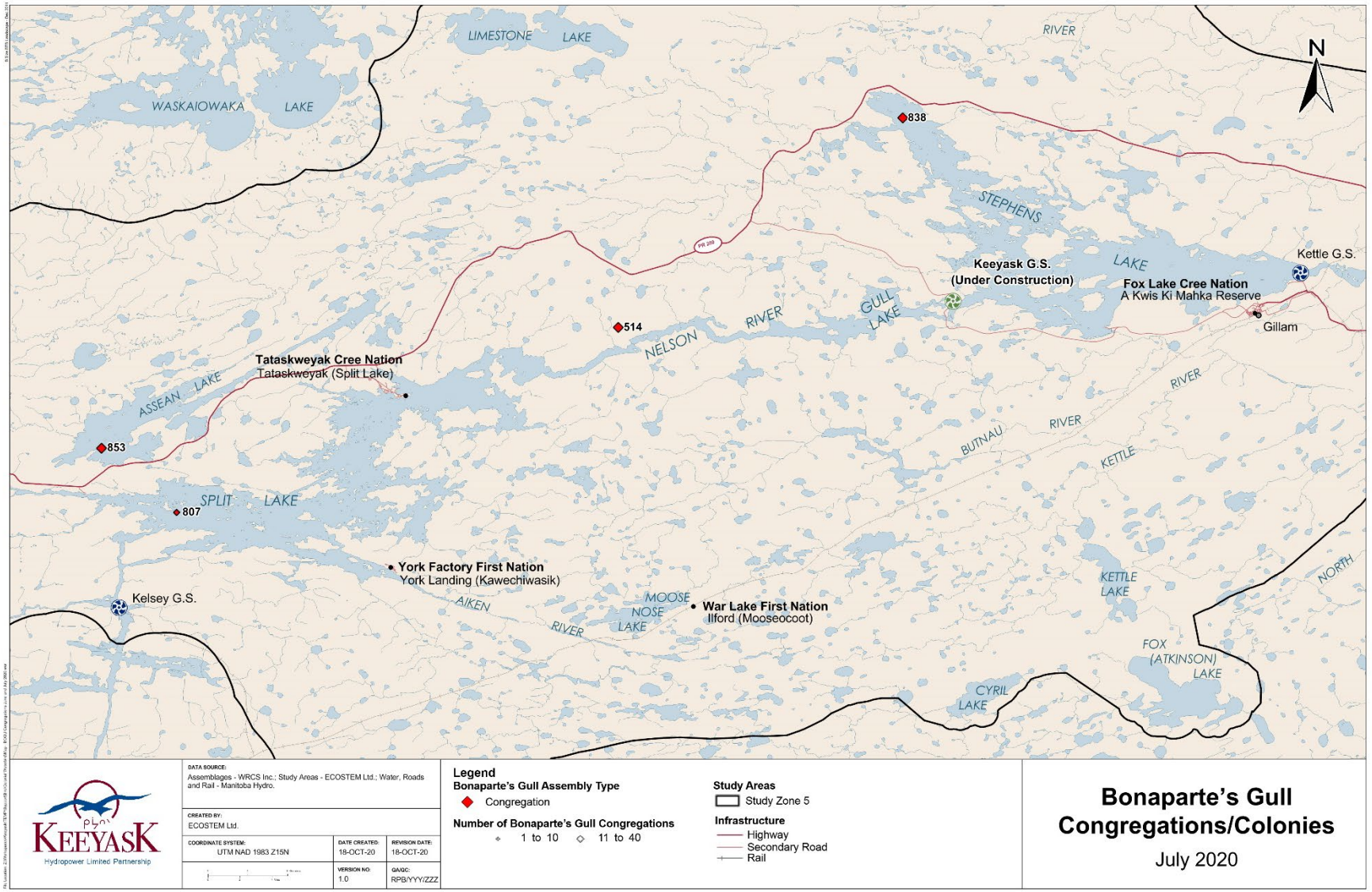


Figure 6: Number of Bonaparte's Gulls Observed During Helicopter Surveys in June and July from 2015 to 2020



Map 10: Bonaparte's Gull Congregations and Nest Sites Observed During Helicopter Surveys in June 2020



Map 11: Bonaparte's Gull Congregations and Nest Sites Observed During Helicopter Surveys in July 2020

Table 9: Bonaparte's Gull Congregations and Nest Sites Observed during the Helicopter Surveys in 2020

Waypoint	June				July			
	Adults (No Nest)	Occupied Nests	Total Adults	Total Chicks	Adults (No Nest)	Occupied Nests	Total Adults	Total Chicks
457	10	0	10	0	0	0	0	0
460	3	0	3	0	0	0	0	0
514	23	0	23	0	17	0	17	0
807	0	0	0	0	1	0	1	0
838	0	0	0	0	32	0	32	0
853	0	0	0	0	25	0	25	0
859	6	1	7	0	0	0	0	0
Total	42	1	43	0	75	0	75	0

Table 10: Waterbody Classification and Island Use by Bonaparte's Gulls in 2020

Waypoint	Gathering	Month	System	Flow	Size Class	Island Habitat	Island Size Class (ha)	Years Used 2015-2020
859	Colony (single nest)	June	Off-system	Lake	>1,000	NA	NA	NA
457	Congregation	June	Off-system	Lake	10-100	Burned black spruce forest	NA	3
460	Congregation	June	Off-system	Lake	>1,000	Sandbar	0.1-0.9	1
514	Congregation	June	Off-system	Lake	<1	Burned black spruce forest	NA	1
514	Congregation	July	Off-system	Lake	<1	Burned black spruce forest	NA	1
807	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	<0.1	0
838	Congregation	July	On-system	Lake	>1,000	Treed	>4.0	0
853	Congregation	July	Off-system	Lake	>1,000	Treed	1.0-1.9	0
1	Dispersed	July	Off-system	Lake	>1,000	NA	NA	NA
3	Dispersed	July	Off-system	Lake	>1,000	NA	NA	NA
4	Dispersed	July	Off-system	Lake	>1,000	NA	NA	NA
130	Dispersed	July	Off-system	Lake	>1,000	NA	NA	NA
132	Dispersed	July	Off-system	Lake	10-100	NA	NA	NA
135	Dispersed	July	Off-system	Lake	>1,000	NA	NA	NA
136	Dispersed	July	Off-system	Lake	>1,000	NA	NA	NA
137	Dispersed	July	Off-system	Lake	10-100	NA	NA	NA
161	Dispersed	July	Off-system	Lake	>1,000	NA	NA	NA
162	Dispersed	July	Off-system	Lake	>1,000	NA	NA	NA
163	Dispersed	July	Off-system	Lake	>1,000	NA	NA	NA

3.2.5 AMERICAN WHITE PELICAN

The number of American white pelicans observed in the regional study area in June 2020 was slightly higher than what has been observed during previous construction surveys (Figure 7). In July 2020, the number of pelicans increased, and was within the range that has been observed during previous surveys (Figure 7).

American white pelicans were concentrated in areas of fast flowing water, including near the Kelsey GS tailrace, on the Nelson River, and at Gull Rapids near the Keeyask GS (Map 12; Table 11). No American white pelicans were observed nesting in the study area in 2020. These findings are consistent with the observations made during previous construction surveys.

In June 2020, five of six islands (83%) where American white pelicans were observed were used at least once in previous years (2015-2019) (Table 12). In July 2020, eight of nine islands (89%) where American white pelicans were observed were used at least once in previous construction years (2015-2019) (Table 12).

Islands used by American white pelicans were typically exposed bedrock, 0.1-0.9 ha in size, and located on on-system lakes or rivers (Table 12).

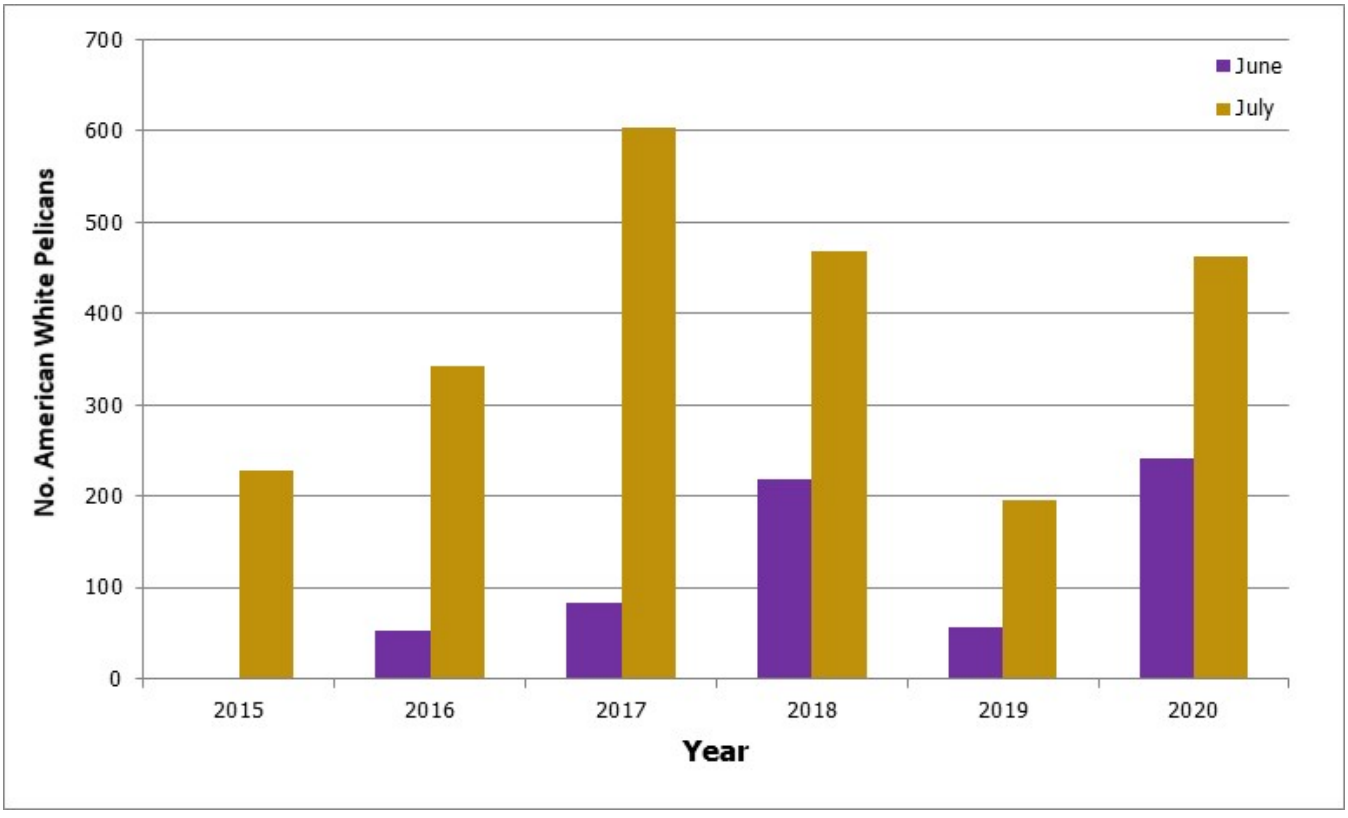
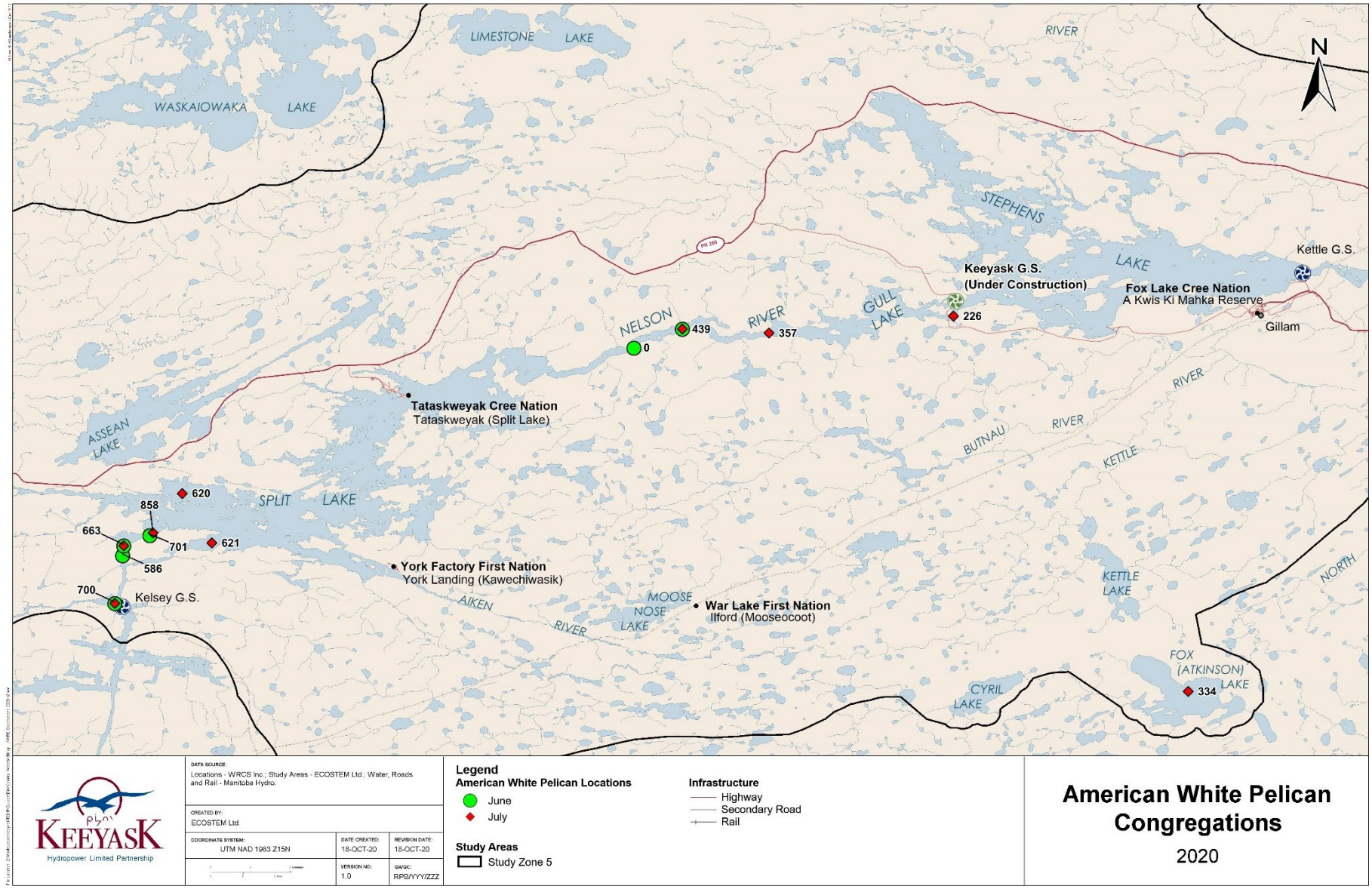


Figure 7: Number of American White Pelicans Observed During Helicopter Surveys in June and July from 2015 to 2020



Map 12: American White Pelican Observations Made During the Helicopter Surveys in 2020

Table 11: American White Pelican Observations Made During the Helicopter Surveys in 2020

Waypoint	June				July			
	Adults (No Nest)	Occupied Nests	Total Adults	Total Chicks	Adults (No Nest)	Occupied Nests	Total Adults	Total Chicks
0	52	0	52	0	0	0	0	0
226	0	0	0	0	35	0	35	0
334	0	0	0	0	9	0	9	0
357	0	0	0	0	5	0	5	0
439	51	0	51	0	107	0	107	0
586	1	0	1	0	0	0	0	0
620	0	0	0	0	2	0	2	0
621	0	0	0	0	2	0	2	0
663	2	0	2	0	16	0	16	0
700	70	0	70	0	184	0	184	0
701	20	0	20	0	0	0	0	0
858	0	0	0	0	6	0	6	0
Total	196	0	196	0	366	0	366	0

Table 12: Waterbody Classification and Island Use by American White Pelicans in 2020

Waypoint	Gathering	Month	System	Flow	Size Class	Island Habitat	Island Size Class (ha)	Years Used 2015-2020
35	Congregation	June	On-system	River	>1,000	Shoreline	NA	0
439	Congregation	June	On-system	River	>1,000	50% bare rock, 50% grass	0.1-0.9	4
586	Congregation	June	On-system	River	>1,000	40% exposed bedrock, 60% shrub	0.1-0.9	1
663	Congregation	June	On-system	River	>1,000	Exposed bedrock	0.1-0.9	3
700	Congregation	June	On-system	River	>1,000	Exposed bedrock	0.1-0.9	2
701	Congregation	June	On-system	River	>1,000	Boulders	0.1-0.9	2
13	Dispersed	June	On-system	River	>1,000	NA	NA	NA
14	Dispersed	June	On-system	River	>1,000	NA	NA	NA
36	Dispersed	June	On-system	River	>1,000	NA	NA	NA
39	Dispersed	June	On-system	River	>1,000	NA	NA	NA
40	Dispersed	June	On-system	River	>1,000	NA	NA	NA
47	Dispersed	June	On-system	River	>1,000	NA	NA	NA
71	Dispersed	June	On-system	River	>1,000	NA	NA	NA
226	Congregation	July	On-system	River	>1,000	50% rock, 45% shrub/deadfall, 55% treed	1.0-1.9	2
334	Congregation	July	Off-system	Lake	>1,000	95% boulders, 5% grass	0.1-0.9	3
357	Congregation	July	On-system	River	>1,000	Exposed bedrock	<0.1	1
439	Congregation	July	On-system	River	>1,000	50% bare rock, 50% grass	0.1-0.9	3
620	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	0.1-0.9	2
621	Congregation	July	On-system	Lake	>1,000	Exposed bedrock	0.1-0.9	2
663	Congregation	July	On-system	River	>1,000	Exposed bedrock	0.1-0.9	3
700	Congregation	July	On-system	River	>1,000	Exposed bedrock	0.1-0.9	2
858	Congregation	July	On-system	River	>1,000	Exposed bedrock	<0.1	0
79	Dispersed	July	On-system	River	>1,000	NA	NA	NA
80	Dispersed	July	On-system	River	>1,000	NA	NA	NA
81	Dispersed	July	On-system	River	>1,000	NA	NA	NA
82	Dispersed	July	On-system	River	>1,000	NA	NA	NA

Waypoint	Gathering	Month	System	Flow	Size Class	Island Habitat	Island Size Class (ha)	Years Used 2015-2020
83	Dispersed	July	On-system	River	>1,000	NA	NA	NA
84	Dispersed	July	On-system	River	>1,000	NA	NA	NA
85	Dispersed	July	On-system	River	>1,000	NA	NA	NA
86	Dispersed	July	On-system	River	>1,000	NA	NA	NA
87	Dispersed	July	On-system	River	>1,000	NA	NA	NA
88	Dispersed	July	Off-system	Lake	>1,000	NA	NA	NA
89	Dispersed	July	Off-system	Lake	>1,000	NA	NA	NA
90	Dispersed	July	On-system	River	>1,000	NA	NA	NA
152	Dispersed	July	On-system	River	>1,000	NA	NA	NA
154	Dispersed	July	On-system	River	>1,000	NA	NA	NA
158	Dispersed	July	On-system	River	>1,000	NA	NA	NA

3.3 RESERVOIR IMPOUNDMENT SURVEY

On August 26, 2020, during a pre-impoundment helicopter survey, 19 ring-billed gulls (no chicks or juveniles) and 14 American white pelicans were observed at Gull Rapids. During reservoir impoundment, common terns, including adults and juveniles, were observed occasionally, feeding in the Nelson River (Photo 3). A few ring-billed gulls were observed feeding in the Nelson River and occasionally, loafing on rafts of woody debris floating in bays and along shorelines.

No colonial waterbirds were observed on the habitat compensation island during the reservoir impoundment survey.

The survey confirmed the predicted effects of reservoir impoundment on colonial waterbirds.

Photo 3: Common Tern Observed during the Reservoir Impoundment Survey in 2020

4.0 DISCUSSION

The number of breeding ring-billed gulls observed at Gull Rapids in 2020 was much lower than the numbers observed during previous construction surveys conducted from 2015-2019, and during the pre-construction period between 2001-2013 (KHLP 2012; Stantec 2014; WRCS 2016; WRCS 2017; WRCS 2018; WRCS 2019; WRCS 2020; Appendix A). The reason for the low use by ring-billed gulls appears to be the high water levels present in the Nelson River since early 2020, which persisted during the time of the surveys, and reduced the amount of habitat available. High water levels in the Nelson River also occurred in 2017 and reduced the number of colonial waterbirds using the Gull Rapids area (Appendix A). In 2020, some of the smaller islands, including Wpt 83, Wpt 480, and Wpt 478, were completely under water and the larger islands that typically support large numbers of birds, including Wpt 226 and Wpt 227 were reduced in size. In addition to the high water levels in the Nelson River, the change/reduction of water flow around some of the islands as a result of Project development, the loss of one island during water-up in early 2020, and potential sensory disturbance from ongoing construction activities may have influenced ring-billed gull use of the area. However, human disturbance in the Gull Rapids area is limited to audible disturbance, which is often ineffective at dissuading gulls and typically results in habituation (Nisbet 2000; Cook *et al.* 2008; Soldatini *et al.* 2008).

Ring-billed gull nesting both in Gull Rapids and throughout the regional study area appeared to be greatly reduced in 2020, likely as a result of the high water levels in the Nelson River and other waterbodies. Ring-billed gulls were only observed nesting on two islands in Gull Rapids, Wpt 226 and Wpt 227, and no ring-billed gull chicks were observed on any island in 2020.

During the helicopter survey in late June, relatively low numbers of ring-billed gulls, in comparison to previous construction years, were observed nesting on two islands, Wpt 226 and Wpt 227 (118 and 218 nests, respectively). However, during the UAV survey in early July, no nests were observed and only 58 ring-billed gulls were observed on Wpt 226 and three observed on Wpt 227. The substantial difference between these two surveys may have been a result of timing. During the early July UAV survey ring-billed gulls were only observed in low numbers in both the morning and afternoon periods. The reason for this is unknown and could be related to construction disturbance, change in abundance or access to food, the presence of predators, or other factors. The nesting gulls observed in late June did not appear to nest successfully as no chicks were observed during later surveys.

Due to the reduced amount of habitat available in the Gull Rapids area from the high water levels, ring-billed gulls appeared to shift their loafing areas to various islands upstream of the Project. Numerous congregations of ring-billed gulls were observed on islands and flooded peatland areas within the Nelson River. This shift in habitat use has been observed during previous construction surveys, particularly in 2017 when there were also high water levels in the Nelson River (WRCS 2018).

Ring-billed gulls were observed loafing on the habitat compensation island in June, but no nesting was observed. With impoundment of the reservoir in early September 2020, it is anticipated that the island will become more suitable for gulls during the 2021 breeding season.

No common terns were observed at Gull Rapids in 2020, but large numbers were observed directly upstream, particularly on the flooded peat islands along the shoreline. Similar to ring-billed gulls, the reduction of habitat caused by the high water levels in the Nelson River likely caused this shift in habitat use, which has been observed in previously during construction (WRCS 2018). In July, the number of common terns was the highest observed during any of the previous surveys. Several large groups were observed directly upstream of Gull Rapids on floating peatlands, which may have created suitable foraging habitat for the birds.

The numbers of herring gulls and American white pelicans observed in the regional study area were within ranges observed during previous surveys, suggesting there were no large changes in local populations or effects due to Project construction. However, the number of American white pelicans observed at Gull Rapids was the highest number observed in the area during any of the previous surveys (Appendix A). This may have been due to American white pelicans shifting their habitat use due to the high water levels in the Nelson River and due to their population and range expansion in North America (King and Anderson 2005).

The number of Bonaparte's gulls observed in the regional study area in July 2020 was the highest observed during any of the previous surveys. Two large groups were observed along the shores of Fox Lake, where they have not previously been observed during monitoring surveys. The apparent increase in the number of Bonaparte's gulls may have been due to opportunistic feeding conditions created by emerging insects such as midges or other species of flying insects, which make up a large proportion of Bonaparte's gull diets (Cornell 2019). However, there are no data to support this hypothesis. Changes in the local populations of Bonaparte's gulls is not likely related to Project construction as this species is typically observed using off-system habitat that is unaffected by Project construction.

Overall, some habitat use by colonial waterbirds in the regional study area shifted due to the high water levels in the area and numerous islands being under water. This did not appear to affect the overall number of colonial waterbirds in the study area, as observations of all species were within or above the range of numbers observed during previous surveys. Predicted effects from the EIS were confirmed in the fall during reservoir impoundment, but by this time most birds had migrated out of the area.

Helicopter surveys and UAV surveys will continue in 2021, but will be limited to the reservoir area. Data collected by these surveys will provide further insight into the potential effects of the Project on colonial waterbird nesting, productivity, and population trends at Gull Rapids and within the reservoir.

5.0 SUMMARY AND CONCLUSIONS

High water levels present within the Nelson River and Project construction activity appeared to affect some colonial nesting waterbirds in the Gull Rapids area in 2020. Due to the high water levels, habitat availability was reduced in the Gull Rapids area and several, smaller islands were under water during the nesting season. The number of colonial waterbirds in the Gull Rapids area was reduced in comparison to previous years and no successful nesting of any gull or tern species was observed.

Colonial waterbirds did not attempt to nest on the habitat compensation island in 2020. Ring-billed gulls were observed loafing on the island in June and following the impoundment of the reservoir the island should be more suitable for nesting birds in 2021.

The number of colonial waterbirds within the regional study area was consistent with previous surveys, although some shifts in habitat use were observed due to the high water levels and some islands being under water. The number of common terns and Bonaparte's gulls observed in the study area were the greatest numbers observed during any of the previous surveys. This may have been due to opportunistic foraging opportunities or other habitat conditions present in 2020.

Aerial and UAV surveys will be conducted in the spring and summer of 2021 in the reservoir area to continue monitoring the distribution and relative abundance of colonial waterbirds and their breeding habitats.

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Appendix A: UAV Survey Results 2015-2020

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

Species	03-Jul-2020	28-Jul-2020	03-Jun-2019	24-Jun-2019	24-Jul-2019	6-Jun-2018	29-Jun-2018	20-Jul-2018	30-May-2017	28-Jun-2017	19-Jul-2017	03-Jun-2016	27-Jun-2016	20-Jul-2016	04-Jun-2015	25-Jun-2015	27-Jul-2015
Ring-billed Gull	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	0	1	474	0	36	1,009	0	0	0	0	52	1,774	0	10	42
Ring-billed Gull w. Nest	0	0	3,364	3,820	0	2,909	3,171	0	71	852	0	851	759	0	38	81	0
Common Tern	0	0	0	0	0	3	60	49	10	2	1	47	138	25	61	60	3
Common Tern w. Nest	0	0	0	0	0	0	105	0	0	21	0	0	10	0	0	0	0
Herring Gull	5	16	8	31	47	25	33	64	5	27	7	8	10	11	0	0	0
Herring Gull Chick	0	0	0	19	20	0	24	24	0	0	0	0	4	1	0	0	0
Herring Gull w. Nest	2	0	41	27	0	34	8	0	4	10	1	19	8	0	0	0	0
American Pelican	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 2020.

Island	Observation	July 3 2020		July 28 2020	
		Morning	Evening	Morning	Evening
Wpt 224	American White Pelican	0	0	0	0
	Herring Gull	0	0	0	0
	Herring Gull w. Nest	0	0	0	0
	Herring Gull Chick	0	0	0	0
	Ring-billed Gull	0	0	0	0
	Ring-billed Gull w. Nest	0	0	0	0
	Ring-billed Gull Chick	0	0	0	0
Wpt 225	American White Pelican	24	4	0	0
	Herring Gull	0	0	0	0
	Herring Gull w. Nest	1	0	0	0
	Herring Gull Chick	0	0	0	0
	Ring-billed Gull	23	10	28	0
	Ring-billed Gull w. Nest	0	0	0	0
	Ring-billed Gull Chick	0	0	0	0
Wpt 226	American White Pelican	0	0	9	113
	Herring Gull	5	0	3	26
	Herring Gull w. Nest	0	0	0	0
	Herring Gull Chick	0	0	0	0
	Ring-billed Gull	28	58	1,788	2,738
	Ring-billed Gull w. Nest	0	0	0	0
	Ring-billed Gull Chick	0	0	0	0
Wpt 227	American White Pelican	0	0	0	0
	Herring Gull	0	0	0	0
	Herring Gull w. Nest	1	0	0	0
	Herring Gull Chick	0	0	0	0
	Ring-billed Gull	1	3	0	0
	Ring-billed Gull w. Nest	0	0	0	0
	Ring-billed Gull Chick	0	0	0	0
Wpt 561	American White Pelican	0	0	0	0
	Herring Gull	0	0	0	0
	Herring Gull w. Nest	0	0	0	0
	Herring Gull Chick	0	0	0	0
	Ring-billed Gull	69	5	38	6
	Ring-billed Gull w. Nest	0	0	0	0
	Ring-billed Gull Chick	0	0	0	0

Island	Observation	July 3 2020		July 28 2020	
		Morning	Evening	Morning	Evening
Habitat Compensation Island	American White Pelican	0	0	0	0
	Herring Gull	0	0	0	0
	Herring Gull w. Nest	0	0	0	0
	Herring Gull Chick	0	0	0	0
	Ring-billed Gull	13	0	0	0
	Ring-billed Gull w. Nest	0	0	0	0
	Ring-billed Gull Chick	0	0	0	0

Appendix B: Colonial Waterbird Abundance Observed during Helicopter Surveys 2015-2019

Table 1: 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 2: 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

Table 3: Colonial Waterbird Abundance Observed During Helicopter Surveys in 2017

Species	June			July		
	Congregated Birds	Dispersed Birds	Total	Congregated 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

Table 4: 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

Table 5: 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