



Keeyask Generation Project Terrestrial Effects Monitoring Plan

Colonial Waterbird Habitat Enhancement Monitoring Report

TEMP-2016-04



KEEYASK GENERATION PROJECT

TERRESTRIAL EFFECTS MONITORING PLAN

REPORT #TEMP-2016-04

COLONIAL WATERBIRD HABITAT ENHANCEMENT MONITORING REPORT

Prepared for

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By

Wildlife Resource Consulting Services MB Inc.

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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 including colonial waterbirds. 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 will affect colonial waterbirds, and whether or not more needs to be done to reduce harmful effects.

This report describes the results of colonial waterbird habitat enhancement monitoring conducted during the summer of 2015, the second summer of Project construction. Monitoring occurred at the constructed habitat replacement area/platforms for gulls and terns.

WHY IS THE STUDY BEING DONE?

Three species of colonial waterbirds (ring-billed gull, herring gull and common tern) breed near the Project site on the rocky reefs and islands in Gull Rapids. Because active construction for the Project is taking place on some of these islands and reefs, constructed gull nesting and tern nesting habitats have been developed nearby to provide colonial waterbirds with alternate nesting areas which are not affected by construction activity. This study was focused on whether the newly constructed habitats are successful at attracting nesting colonial waterbirds.

WHAT WAS DONE?

In early June, habitat replacement areas/platforms were established to provide alternate breeding habitat for colonial waterbirds. As described in the Terrestrial Mitigation Implementation Plan developed for the Project, part of William Smith Island was constructed into a new replacement nesting area for gulls, by clearing trees, providing a rocky substrate, and by placing eight large shipping containers (with rocks placed on top) to provide secure nesting habitat elevated from potential predators. Gull decoys and audio equipment that played sounds of breeding gulls were installed to attract breeding gulls to the area. Cameras were set up on the site to watch for birds, nests, chicks, and predators. In September, the decoys, audio equipment and cameras were removed.

For terns, two floating platforms were constructed. Suitability of the platforms for use by terns was enhanced by applying a layer of gravel on the platform. These platforms were towed and anchored in a bay of Gull Lake. Tern decoys and audio equipment that played sounds of breeding terns were installed to attract breeding terns to the platforms. Cameras were set up on the platforms to watch for birds, nests, chicks, and predators. In September, the floating platforms, decoys, audio equipment and cameras were removed from Gull Lake.



William Smith Island habitat enhancement area for gulls



Floating platforms for common terns

WHAT WAS FOUND?

Neither gulls or terns nested at the habitat replacement areas/platforms in 2015. The William Smith Island habitat enhancement area did not attract any gulls or other wildlife. Several terns used both of the new floating platforms for resting, but nesting was not observed.



Common tern on a floating platform

WHAT DOES IT MEAN?

The habitat replacement areas/platforms were probably not used for nesting because there are still many suitable natural islands in the south channel of Gull Rapids, outside of the construction areas, available for gulls and terns to use as nesting habitat. It may take some time for birds to accept the alternate nesting habitat. The use of the floating platforms by several terns for loafing suggests that the platforms are attractive and may be used by terns in future years for nesting.

WHAT WILL BE DONE NEXT?

The nesting habitat replacement areas/platforms will be available to waterbirds for the duration of the Project construction period. Improvements will be made to the nesting habitat replacement areas/platforms by removing larger rocks from the top of the shipping containers and reconfiguring tern decoys on the floating platforms. The floating platforms will be towed and re-anchored into Gull Lake in spring 2016 after ice breakup on the Nelson River. Gull and tern created habitat will be monitored to investigate use of these areas/platforms over time by colonial waterbirds and to ensure that they aren't being disturbed by predators.

STUDY TEAM

We would like to thank Sherrie Mason and Rachel Boone of Manitoba Hydro for reviewing the report. Caroline Walmsley and Megan Anger of Manitoba Hydro, Ben Hofer of Custom Helicopters, and Ron Bretecher of North/South Consultants Inc. are acknowledged for logistical assistance in the field. We would also like to thank Dr. James Ehnes, ECOSTEM Ltd., for GIS supported study design and cartography.

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
- Nicholas LaPorte, M.N.R.M., Analysis and reporting
- Peter Hettinga, M.N.R.M., setup and installation
- Timothy Kroeker, B.Sc. P. Biol., setup and installation
- Gordon Macdonald, B.Sc., setup and installation
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TABLE OF CONTENTS

1.0	INTRODUCTION.....	1
2.0	METHODS.....	6
3.0	RESULTS.....	7
4.0	SUMMARY AND CONCLUSIONS.....	11
5.0	LITERATURE CITED.....	13
APPENDIX A: WILLIAM SMITH ISLAND ENHANCEMENT AREA		
	PHOTOGRAPHS	15
APPENDIX B: FLOATING PLATFORM PHOTOGRAPHS.....		21

LIST OF TABLES

Table 3-1:	Common Tern Events Captured by Cameras at Floating Platforms.	8
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LIST OF MAPS

Map 1-1:	Locations of Colonial Waterbird Habitat Replacement Areas/Platforms	3
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LIST OF PHOTOGRAPHS

Photo 1-1:	Gull Decoys and Audio Equipment Installation at the William Smith Island Gull Habitat Enhancement Area.....	4
Photo 1-2:	Gull Decoys at the William Smith Island Habitat Enhancement Area.....	4
Photo 1-3:	Tern Decoys and Audio Equipment Installation on the Floating Platforms.....	5
Photo 1-4:	Floating Platform with Common Tern Decoys and Audio Equipment.....	5
Photo 3-1:	Common Tern Sitting Tight on Floating Platform A	9
Photo 3-2:	Floating Platform A Damaged After a Storm	9
Photo 3-3:	Floating Platform B Damaged After a Storm	10

LIST OF APPENDICES

APPENDIX A: William Smith Island Enhancement Area Photographs	15
APPENDIX B: Floating Platform Photographs.....	21

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, 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 (TE SV). 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. The *Terrestrial Effects Monitoring Plan* (TEMP) was developed for the Project. Monitoring activities for various components of the terrestrial environment were described, including the focus of this report, colonial waterbird habitat enhancement monitoring, for the construction and operation phases of the Project.

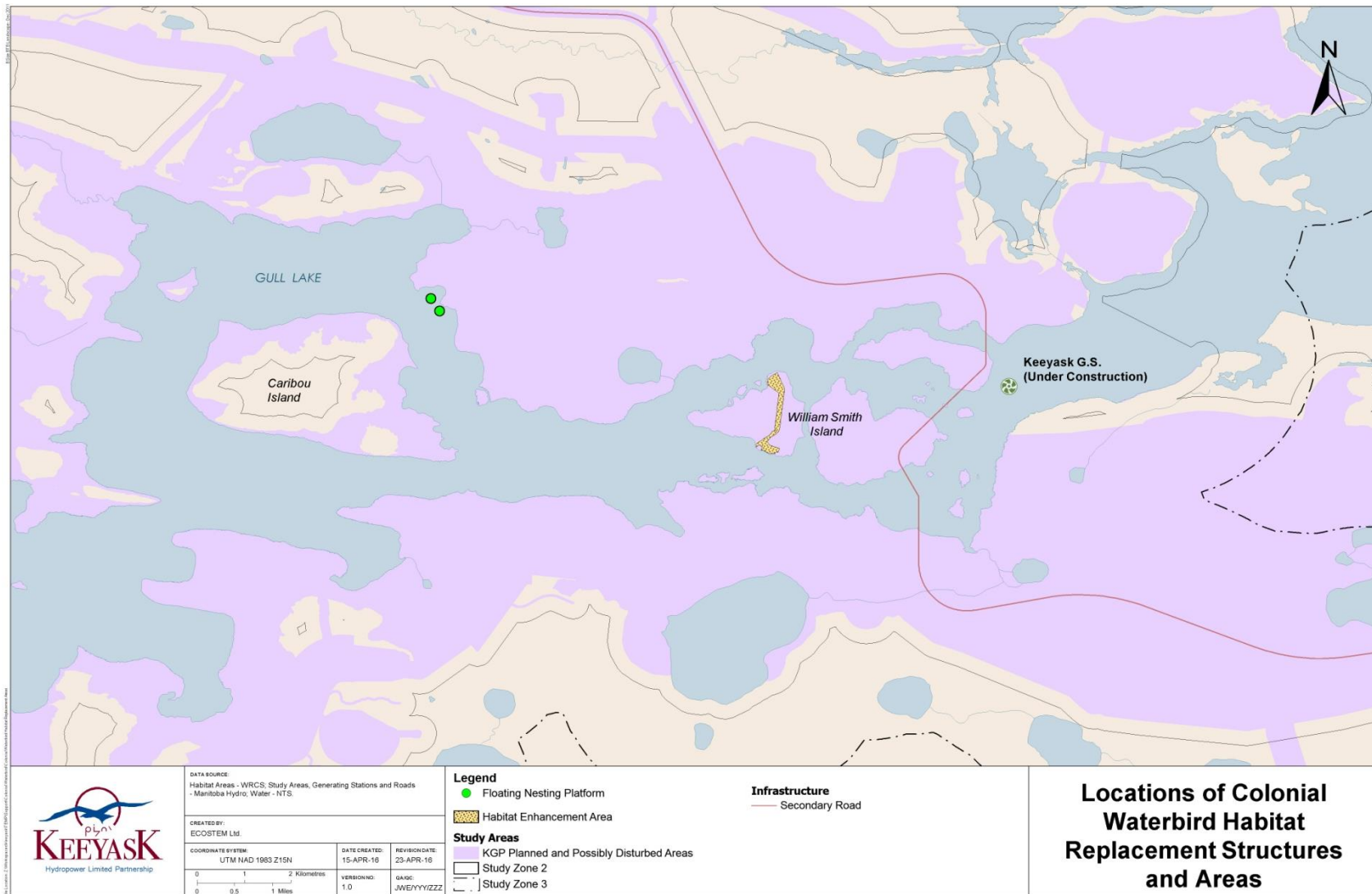
The Project has the potential to effect colonial waterbird populations through alteration and loss of habitat, as well as sensory disturbance. Three species of colonial waterbird; ring-billed gull, herring gull, and common tern commonly breed on rocky islands and reefs in the Nelson River near the Project site. Breeding season surveys conducted in 2001, 2002, 2003, 2006, and 2011 indicate that upwards of 1,500 pairs of ring-billed gulls (*Larus delawarensis*) and 100 pairs of common terns (*Sterna hirundo*; hereafter referred to as terns) colonise islands in Gull Rapids (KHLP 2012). Studies in 2013 (Stantec 2014) reported approximately 3,000 pairs of gulls and 50 pairs of terns, while studies in 2014 estimated 6,200 (± 1000) gulls and 23 terns in Gull Rapids (Stantec 2015). Islands in the Nelson River between Gull Rapids and Birthday Rapids have supported upwards of 1,500 pairs of gulls and 100 pairs of terns (KHLP 2012). Other colonial waterbird species that have been observed to breed in the region include herring gull (*Larus argentatus*), 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). Conversely, regardless of how many birds are congregated, if nesting is not taking place, the group of birds is not a colony but a congregation or a potential colony. 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; these sites are referred to as loafing sites (Campbell and Lack 1985).

To offset loss of colonial waterbird nesting habitat at Gull Rapids, habitat replacement areas/platforms (e.g., created nesting habitat and floating platforms) were implemented and monitored to determine their effectiveness (KHLP 2015). For gulls, the southern shore of William Smith Island (Map 1-1) was cleared of vegetation and graded with rocky substrate to emulate a natural nesting island (Photo 1-1). At this site large shipping containers were placed in the graded area and rocky substrate was placed on top to provide nesting habitat elevated from potential terrestrial predators. On April 30, 2015, concrete and wooden gull decoys and audio equipment broadcasting breeding gull vocalizations, were installed on top of the containers and at ground-level (Photo 1-2) to enhance the social attractiveness of the site to gulls.

Two floating platforms were deployed for terns approximately five km upstream of Gull Rapids on June 16 and 17, 2015 (Map 1-1). This was after most gulls should have initiated their nests, so as to minimize competition from gulls for the floating platforms. These two platforms provide a total of approximately 50 m² of replacement habitat designed to accommodate 50 tern pairs per platform. Each floating platform was topped with gravel to emulate a natural nesting island and equipped with a ramp to allow access to the platform from the water (Photo 1-3). Wooden tern decoys, and audio equipment broadcasting breeding tern vocalizations (Photo 1-4) were installed to increase the social attractiveness of the floating platforms to terns.



Map 1-1: Locations of Colonial Waterbird Habitat Replacement Areas/Platforms



Photo 1-1: Gull Decoys and Audio Equipment Installation at the William Smith Island Gull Habitat Enhancement Area



Photo 1-2: Gull Decoys at the William Smith Island Habitat Enhancement Area



Photo 1-3: Tern Decoys and Audio Equipment Installation on the Floating Platforms



Photo 1-4: Floating Platform with Common Tern Decoys and Audio Equipment

2.0 METHODS

To evaluate the effectiveness of the colonial waterbird replacement habitat areas/platforms, Reconyx cameras, also known as camera traps or trail cameras, were installed and programmed to capture images at predetermined times of the day. At the William Smith Island gull habitat enhancement area, three Reconyx HC850 HyperFire Pro cameras positioned on top of the shipping containers captured images at 8 a.m., 12 p.m., 4 p.m., and 8 p.m. from April 30 to August 8, 2015. These three cameras are also equipped with a 3G cellular modem that transmitted images to Winnipeg. An additional two Reconyx HC600 cameras were positioned at ground level to capture hourly images between 4 a.m. and 8 p.m. One of these cameras operated from May 10 to June 9, while the other operated from May 14 to August 9, 2015.

Both floating platforms A and B were equipped with a Reconyx PC850 HyperFire Pro camera that captured images at 8 a.m., 12 p.m., 4 p.m., and 8 p.m. from June 17 to September 30, 2015. Floating platform A is north of platform B (Map 1-1). These two cameras are also equipped with a 3G cellular modem that transmitted images to Winnipeg.

Images from the colonial waterbird replacement habitat areas/platforms were reviewed each day they were received to determine the presence/absence of colonial waterbirds and their behaviours, or other wildlife, at the floating platforms. All photographs were thoroughly evaluated after the field season.

In addition to Reconyx cameras, the constructed gull nesting habitat was photographed by an Unmanned Aerial Vehicle (UAV) employed in a different study, and opportunistically investigated from helicopters during wide ranging aerial surveys that flew over the sites. UAV photography was conducted on June 4, and June 25, 2015. Helicopter flyovers occurred on June 12, July 26, and July 31, 2015. UAV deployment and helicopter survey methods are detailed in Report # TEMP-2016-03 (WRCS 2016).

3.0 RESULTS

Neither the William Smith Island habitat enhancement area for gulls, nor the floating platforms for terns were used for nesting by nesting colonial waterbirds in 2015. The cameras at both sites performed successfully and continued capturing images throughout the 2015 monitoring period.

The William Smith Island habitat enhancement area did not successfully attract gulls or other wildlife to the site in 2015. At this site, a total of 2,741 images were captured over 101 days of operation. Colonial waterbirds were not captured nesting in any of the photographs, and no nest development was observed. Only three photographs contained images of wildlife. One photograph captured a single gull flying over the Nelson River at 5 a.m. on June 2 (Appendix A; Photo A-1), another captured two gulls flying over the road leading to the habitat enhancement area at noon on June 14 (Appendix A; Photo A-2), and a third photograph captured two unknown birds (possibly gull species) in flight over the road at 4 p.m. on July 15 (Appendix A; Photo A-3). Incidentally, cameras at the William Smith Island habitat enhancement area captured trucks at the threshold of this access-restricted site (Appendix A; Photos A-4 and A-5).

The floating platforms did not successfully attract nesting birds in 2015. However, 31 events of loafing terns were captured by cameras on the floating platforms. At this site, a total of 848 photographs were captured over 213 days between June 16 and September 30, 2015. Between June 28 and September 1, the camera at platform A captured 28 images of terns loafing, while the camera at platform B captured three images of terns loafing (Table 3-1). All photographs captured images of single birds except for one photograph containing two terns loafing on the ramp on July 3 (Appendix B; Photo B-1). Terns were present during morning, noon and late afternoon hours. The only evidence of terns potentially using a floating platform as a nesting site was contained in one image captured at 4 p.m. on July 3 at platform A. This photograph contains a tern sitting tight on the gravel as though it was initiating a nest (Photo 3-1); no birds, nest, or eggs were visible in subsequent photographs. Examples of photographs of terns on the floating platforms are available in Appendix B.

High winds in late September challenged the structural integrity of the floating platforms. When northwesterly winds surpassed 50 km/h on September 22 and 27, waves caused both platforms to buckle, resulting in the gravel layer shifting to one side of the platforms (Photos 3-2 and 3-3).

Table 3-1: Common Tern Events Captured by Cameras at Floating Platforms.

Date	Time	Platform A or B	Number of birds	Behaviour
28-Jun-15	8 a.m.	A	1	Loafing on platform edge
29-Jun-15	8 p.m.	B	1	Loafing on platform edge
03-Jul-15	12 p.m.	A	2	Loafing on ramp
04-Jul-15	12 p.m.	A	1	Sitting tight on gravel
13-Jul-15	12 p.m.	A	1	Loafing on ramp
13-Jul-15	4 p.m.	A	1	Loafing on ramp
14-Jul-15	12 p.m.	A	1	Loafing on ramp
22-Jul-15	4 p.m.	B	1	Loafing on platform edge
23-Jul-15	12 p.m.	A	1	Loafing on gravel
25-Jul-15	12 p.m.	A	1	Loafing on ramp
25-Jul-15	4 p.m.	A	1	Loafing on ramp
05-Aug-15	12 p.m.	A	1	Loafing on platform edge
06-Aug-15	12 p.m.	A	1	Loafing on ramp
06-Aug-15	4 p.m.	A	1	Loafing on platform edge
12-Aug-15	12 p.m.	A	1	Loafing on ramp
14-Aug-15	8 a.m.	A	1	Loafing on platform edge
17-Aug-15	8 a.m.	B	1	Loafing on platform edge
21-Aug-15	12 p.m.	A	1	Loafing on platform edge
22-Aug-15	8 a.m.	A	1	Loafing on platform edge
24-Aug-15	8 a.m.	A	1	Loafing on platform edge
24-Aug-15	4 p.m.	A	1	Loafing on platform edge
25-Aug-15	8 a.m.	A	1	Loafing on ramp
26-Aug-15	8 a.m.	A	1	Loafing on gravel
27-Aug-15	12 p.m.	A	1	Loafing on platform edge
28-Aug-15	12 p.m.	A	1	Loafing on platform edge
29-Aug-15	12 p.m.	A	1	Loafing on platform edge
30-Aug-15	4 p.m.	A	1	Loafing on platform edge
31-Aug-15	12 p.m.	A	1	Loafing on platform edge
31-Aug-15	4 p.m.	A	1	Loafing on platform edge
01-Sep-15	8 a.m.	A	1	Loafing on platform edge
01-Sep-15	12 p.m.	A	1	Loafing on platform edge
Total			32	



Photo 3-1: Common Tern Sitting Tight on Floating Platform A



Photo 3-2: Floating Platform A Damaged After a Storm

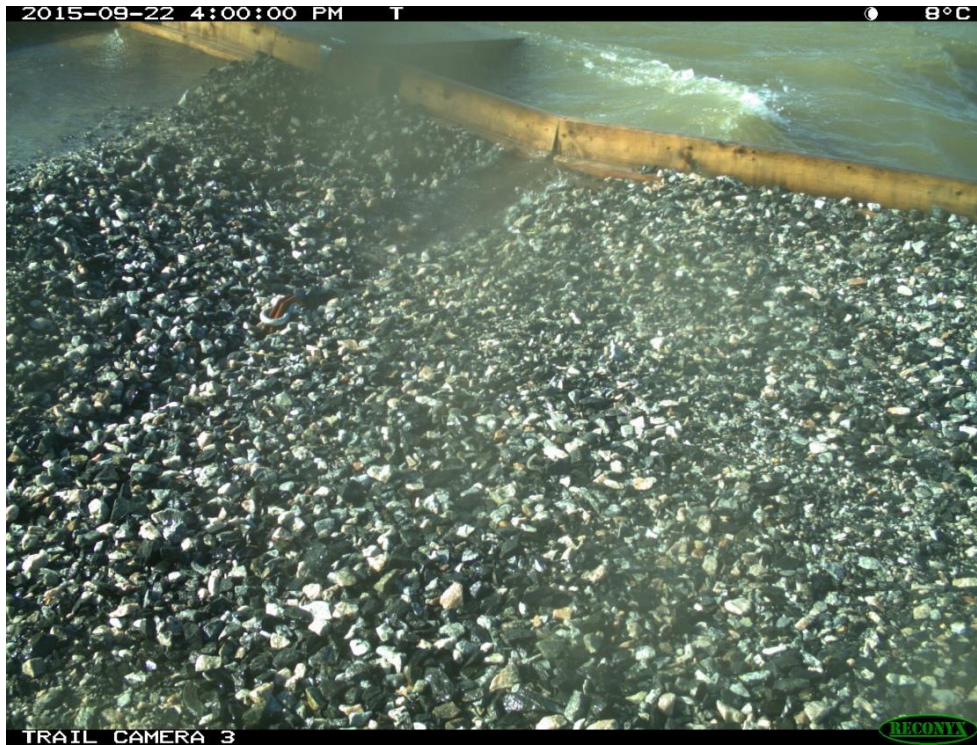


Photo 3-3: Floating Platform B Damaged After a Storm

4.0 SUMMARY AND CONCLUSIONS

During this first year of having the replacement habitat areas/platforms prepared and available for nesting birds, neither the William Smith Island gull habitat enhancement area nor the floating platforms were successful in attracting nesting colonial waterbirds. Even though it was predicted that it may take one or two breeding seasons for birds to accept the replacement habitat area/platforms (KHLP 2015), several factors may have contributed to these areas/platforms not being colonised in 2015.

The primary reason the colonial waterbird replacement habitat areas/platforms were not used by gulls is most likely the continued availability and distribution of natural nesting habitat at Gull Rapids and other areas in the region (see Colonial Waterbird Habitat Effects Monitoring Report; WRCS 2016). Although colonial waterbirds were successfully deterred from nesting in active construction areas in the Gull Rapids area (see Environmental Protection Plan Monitoring Report; Manitoba Hydro 2016), several islands and reefs exist within the southern channel outside of the active construction area, and were colonised by ring-billed gulls. Islands and reefs in the southern channel of Gull Rapids contained colonies in previous years (KHLP 2012, Stantec 2014, Stantec 2015). It is not surprising then that the same islands and reefs, and other neighbouring islands, would be colonised as colony site fidelity is strong in ring-billed gulls (Southern and Southern 1982). Attempted nesting and use of islands for loafing should have occurred regardless of sensory disturbances from adjacent construction activities. Gulls in particular are tolerant of human disturbances as they have adapted to using urban landscapes.

The large rocks on top of the shipping containers in the gull habitat replacement area may have contributed to the unattractiveness of the site to potentially nesting gulls. The attractiveness of the gull habitat replacement area can be further improved by removing large rocks from the top of the shipping containers and adding a layer of gravel. This will also increase the total area available to nesting gulls and should remove barriers to chicks that could have difficulty moving around the top of the shipping containers before they are capable of flight. Additionally, changing the appearance of the shipping containers from rusty red to neutral colours (e.g., beige, ivory, gray) may also improve their attractiveness to gulls.

The potential presence of terrestrial predators and visits by humans at the gull habitat enhancement area may have contributed to breeding gulls not being attracted to the site. Humans may be attracted to the site out of curiosity. By installing signs that indicate 24/7 video surveillance, curious humans may be further discouraged from approaching the area. Although no predators were photographed at the site, it is possible that a predator event occurred between timed photographs. Installing motion and infrared sensing cameras will assist in monitoring predators that may visit the site. Predators may be attracted to the habitat enhancement area by the sight of gull decoys, the sound of the gull vocalizations playback, or potentially the scent of nesting waterbirds in future years.

Even though the floating platforms were not accepted by terns as suitable nesting habitat, they did successfully attract a few terns. The floating platforms were probably not colonised during

this first operational year due to the continued availability of natural nesting habitat at Gull Rapids and on upstream islands.

The floating platforms were planned to be deployed after the local ring-billed gull population began nesting and before the arrival of common terns to the breeding grounds (KHLP 2014a). However, logistical constraints prevented deployment of the platforms until June 16 and 17, 2015. In 2016, earlier deployment of the platforms will be attempted, but will be dependent on constraints such as ice conditions. Also, the tern decoys were configured such that they were clustered in a single corner of the platforms. This may not be an attractive distribution to terns investigating the platforms as potential nesting areas. In future years, the decoys will be dispersed across the surface of the platforms to improve their attractiveness.

The effects of late September storms on the floating platforms demonstrated that nests and eggs on the platforms may be at risk from water inundation and shifting nesting substrate when winds are high. Ridges or baffles mounted on the main platform surface should restrict the gravel substrate from substantially shifting when the platform is being rocked by waves. Several storms of similar strength occurred earlier in the breeding season that did not alter the habitat structure of the platforms. This may also suggest that part of the structure may have failed, causing it to rock more than usual, thus resulting in the excessive shifting of nesting substrate. The attractiveness of the floating platforms to terns could be further improved by tying floating driftwood to the platform to provide additional loafing areas next to the raft, and by scattering driftwood, large cinderblocks and chick shelters on top of the platform surface (Jarvie and Blokpoel 1996, Environment Canada 2013).

Recommendations to improve colonial waterbird habitat enhancement area/platforms include:

- Remove large rocks from on top of the shipping containers and replace with gravel;
- Paint the shipping containers in neutral colours;
- Monitor the presence of predators and humans through motion and infrared triggered cameras;
- Further discourage access to the site by erecting signage indicating 24/7 video surveillance;
- Deploy the floating platforms earlier in June;
- Prevent shifting nesting substrate on the floating platforms by adding ridges; and
- Increase the attractiveness of the floating platforms by scattering driftwood, large cinderblocks and chick shelters on top of the floating platform surface.

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APPENDIX A: William Smith Island Enhancement Area Photographs



Photo A-1. One gull captured flying over Gull Rapids on June 2, 2015 at the William Smith Island Habitat Enhancement Area



Photo A-2. Two gulls captured flying over the William Smith Island Habitat Enhancement Area on June 14, 2015



Photo A-3. Two unknown birds captured flying over the William Smith Island Habitat Enhancement Area on July 15, 2015



Photo A-4: Unidentified Truck parked at William Smith Island Habitat Enhancement Area at 8 p.m. on May 25, 2015



Photo A-5: Unidentified Truck parked at William Smith Island Habitat Enhancement Area at 12 p.m. on May 30, 2015

APPENDIX B: Floating Platform Photographs



Photo B-1. Two Terns loafing on the Ramp of Platform A on July 3, 2015



Photo B-2. Tern Loafing on the Edge of Platform A on June 28, 2015



Photo B-3. Tern Loafing on the Ramp of Platform B on June 29, 2015



Photo B-4. Tern Loafing on the Ramp of Platform B on July 22, 2015



Photo B-5. Tern Loafing on the Ramp of Platform B on August 17, 2015



Photo B-63. Tern Preening on the Gravel Surface of Platform A on August 26, 2015



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