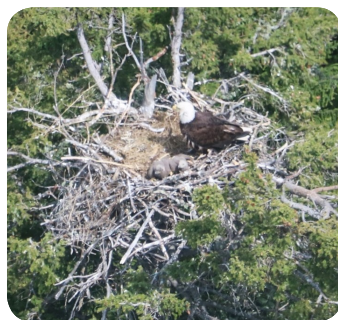




Keeyask Generation Project Terrestrial Effects Monitoring Plan

Bald Eagle Habitat Effects Monitoring Report

TEMP-2022-13



KEEYASK GENERATION PROJECT

TERRESTRIAL EFFECTS MONITORING PLAN

REPORT #TEMP-2022-13

BALD EAGLE HABITAT EFFECTS MONITORING 2021

Prepared for

Manitoba Hydro

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 bald eagles. 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 bald eagles, and whether more needs to be done to reduce potentially harmful effects.

During Project construction, bald eagle habitat upstream in the Nelson River between Split Lake and Gull Rapids experienced large changes. Vegetation clearing in the reservoir footprint occurred along the Nelson River during the winters of 2015/16 through 2017/2018 and reduced the amount of perching habitat available. Some bald eagle nests were present in the reservoir footprint, and the trees supporting these nests were left standing until artificial nest platforms could be constructed to provide alternative nesting sites. Five artificial nesting platforms were installed in February 2017 and were monitored for bald eagle use during this study.

The filling of the reservoir that occurred in fall 2020 also changed bald eagle habitat. The increased water levels resulted in a new shoreline and created more lake-like conditions in some areas.

This report describes the results of bald eagle habitat effects monitoring conducted during the summer of 2021, the eighth summer of Project construction, and compares results to previous surveys conducted in 2015, 2017 and 2019.



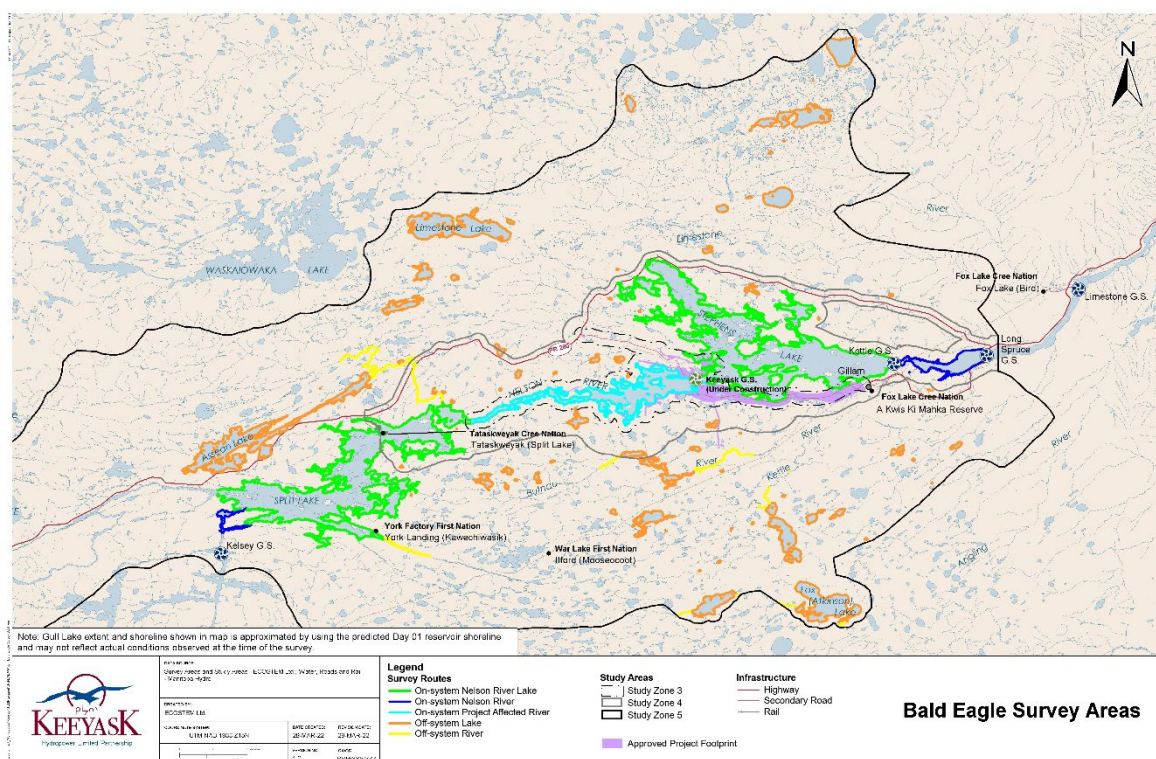
Bald Eagle Attending Nestlings in 2021

Why is the study being done?

The Project has the potential to affect bald eagle populations through alteration and loss of habitat, as well as noise and light disturbance from construction activities. Bald eagle habitat effects monitoring is being done to evaluate Project effects on the number and location of bald eagles and their breeding habitats.

What was done?

Helicopter-based aerial surveys took place in May, June, and July 2021 to determine the abundance, distribution, and habitat use of bald eagles in Project-affected areas and in reference areas within the broader Keeyask region. Bald eagle nests were also monitored for eggs and nestlings to monitor productivity. Previous construction-phase surveys in the same area were conducted in 2015, 2017, and 2019.



Shorelines Surveyed for Bald Eagles and Nests in 2021

What was found?

A total of 125 bald eagle nests were identified and monitored in 2021, along the surveyed shorelines in the region. Of the 125 nests identified, 62 were occupied by a breeding pair of bald eagles and 38 nests successfully produced 56 late-stage nestlings. Successful bald eagle nests produced 1.47 nestlings per nest.

The distribution and number of nests in the Project-affected hydraulic zone (all areas within 200 m of the actual Project footprint at the time of the survey), remained similar in 2021 to previous surveys conducted during Project construction and during the pre-construction period.

What does it mean?

Project construction did alter bald eagle habitat in the local study area, but it did not affect the number, distribution, or success of nests, or the number of chicks produced. The bald eagle population in the Project-affected hydraulic zone appears to be stable and sustainable, while the population in the overall study area is increasing.

What will be done next?

The 2021 bald eagle survey was the final construction-phase survey for the Project. As the Project moves into the operation phase, bald eagle habitat effects monitoring will continue during operation for the next 15 years. The next bald eagle survey is scheduled for 2022.

STUDY TEAM

We would like to thank Derek Longley of Prairie Helicopters, and Sherrie Mason and Rachel Boone of Manitoba Hydro for their assistance. We would also like to thank Dr. James Ehnes, of ECOSTEM Ltd. for GIS supported study design and cartography.

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

- Robert Berger, Wildlife Resource Consulting Services MB Ltd. (WRCS), Design, analysis, and reporting
- Mark Baschuk, WRCS, Survey personnel, analysis, and reporting
- Maryse Gagne, WRCS, Survey personnel

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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.

The *Keeyask Generation Project: Response to EIS Guidelines* (the 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, bald eagle (*Haliaeetus leucocephalus*) habitat effects monitoring, for the construction phase of the Project.

Project construction, including reservoir filling was anticipated to result in bald eagle habitat loss and loss of effective habitat, potentially resulting in changes to bald eagle distribution and/or reduced abundances (KHLP 2012). Vegetation clearing in the reservoir footprint occurred on the north side of the Nelson River during the winter of 2015/16 and on the south side of the Nelson River in the winters of 2016/2017 and 2017/18. The clearing resulted in the loss of nesting and potential perching habitat in the reservoir footprint. The trees supporting bald eagle nests in the reservoir footprint were left standing (Photo 1) until artificial nest platforms could be constructed to provide alternative nesting sites (Photo 2). Five artificial nesting platforms were installed in February 2017 and were monitored during construction-phase surveys to verify use and nesting success.

In 2020, bald eagle habitat within the Project's reservoir footprint experienced large changes due to the water-up phase and impoundment of the reservoir. Water-up included the transfer of water into work areas contained by temporary and permanent structures up to the prevailing upstream water levels and occurred from February 26 to April 16, 2020. Reservoir impoundment, which is the flooding of the full reservoir area, occurred from August 31 to September 5, 2020.

Reservoir creation was anticipated to result in the loss of some fast-flowing areas in the Nelson River and a potential redistribution of bald eagles from areas in the reservoir to the tailrace area (KHLP 2015b). Overall, The Project was predicted to increase bald eagle habitat by 380 ha (0.03% of habitat in Study Zone 5) following reservoir flooding and expansion, creating riparian habitat suitable for nesting and perching (KHLP 2015b).

The goal of this monitoring study was to evaluate how Project construction may have affected the abundance, distribution, and reproductive success of nesting bald eagles. Bald Eagle Habitat Effects monitoring was previously conducted in 2015, 2017, and 2019 (WRCS 2016; WRCS 2018;

WRCS 2020). This report provides the results of the fourth and final year of construction-phase monitoring for the Bald Eagle Habitat Effects study.



Photo 1: Tree Supporting a Bald Eagle Nest Retained During Vegetation Clearing in the Future Reservoir Area



Photo 2: Artificial Nesting Platform Installed near the Future Reservoir Shoreline in 2017

2.0 METHODS

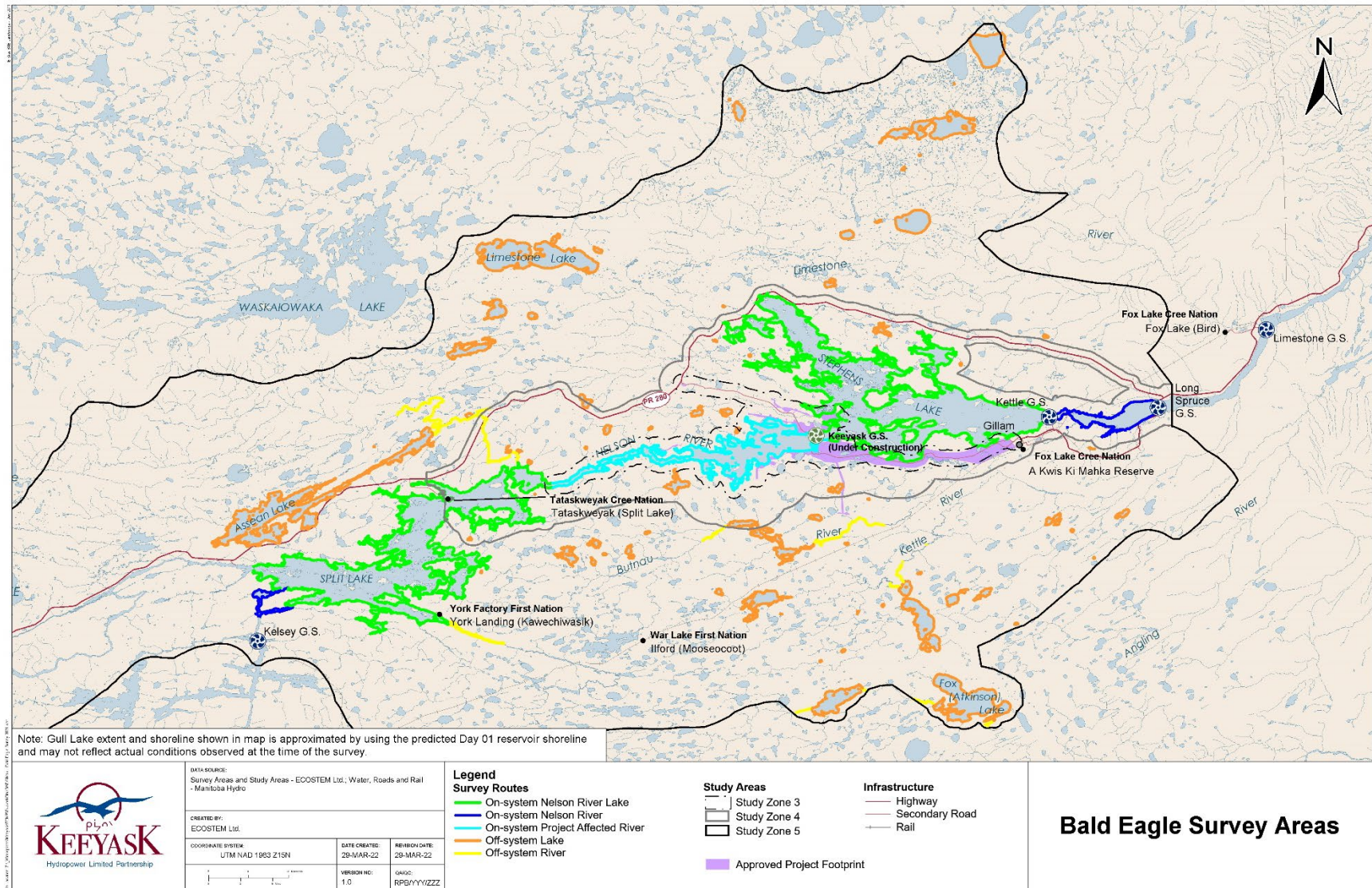
2.1 DATA COLLECTION

Helicopter-based aerial surveys were conducted to monitor the abundance, distribution, reproductive success, and habitat attributes of nesting locations of bald eagle in portions of Study Zone 5 during the 2021 breeding season (Map 1). Identical methods were used during the previous construction-phase surveys in 2015, 2017, and 2019 (WRCS 2016; WRCS 2018; WRCS 2020).

A random, stratified design was used to select waterbodies to be surveyed. Stratified random sampling is a method of sampling that involves the division of a population into smaller groups. These smaller groups (strata) were based on shared characteristics, including size and shoreline length. Waterbodies were classified broadly into either on-system (including Project-affected and Nelson River) or off-system hydraulic zones of influence, grouped into two basic categories (lake or river), and grouped into different size classes (0-10, >10-100, >100-1,000, >1,000-10,000, >10,000-100,000 ha). The Project-affected hydraulic zone includes all areas within 200 m of the actual Project footprint at the time of the survey (KHLP 2015b). The Nelson River zone included other reaches of the regulated Nelson River system from the Kelsey Generating Station (GS) downstream to the Limestone GS, but outside of the Project footprint. The off-system zone included randomly selected waterways and waterbodies off the Nelson River system that are unaffected by hydroelectric development. The total shoreline lengths and distribution of waterbodies are presented in Table 1 and Map 1.

Table 1: Shoreline Length (km) and Size Class (ha) of Waterbody Types Surveyed in 2021

Hydraulic Zone	Waterbody Type	Waterbody Size Class (ha)					Total Shoreline Length (km)
		>0-10	>10-100	>100-1000	>1,000-10,000	>10,000-100,000	
Project-affected	River	0	0	0	327	0	327
Nelson River	Lake	0	0	0	34	1,411	1,445
	River	0	0	29	69	0	98
Off-system	Lake	18	50	213	606	0	887
	River	8	85	124	0	0	218
Total		26	135	366	1,036	1,411	2,974



Map 1: Shorelines Surveyed for Bald Eagles and Nests in 2021

Aerial surveys followed protocols adapted from methods employed by the United States Fish and Wildlife Service (Jurek 1990; Jackman and Jenkins 2004) and the British Columbia Ministry of Environment (BCME 2013). 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 or nests. The survey was flown at approximately 100 km/h and at elevations greater than 100 m above ground level (agl) to minimize disturbance to nesting bald eagles and avoid collisions with flying birds.

The aerial survey crew consisted of two observers and the helicopter pilot. The helicopter flew 50-100 m from the shoreline, providing observers with a clear view of the trees along the shoreline. During the surveys, bird of prey observations and large stick nests were recorded along with their locations. Nests were named with a unique identification number ending with the year the nest was first observed (e.g., 14-2015, 105-2017). Tree species, nest height and tree heights were estimated using professional judgement and were verified using photography. All observations were georeferenced with a global positioning system (Garmin GPS 64). When a nest was observed, the helicopter slowed and circled the site once to georeference the nest and collect photographs with a Canon EOS Rebel T6i camera. Photography was conducted quickly to minimize disturbing birds and observers retreated if the eagles displayed agitated behaviour. Photographs were reviewed to confirm occupancy, and to verify nest contents.

Additionally, the five artificial nesting platforms installed in February 2017 were also surveyed during the bald eagle habitat effects monitoring survey in 2021 and previously in 2019.

The first survey occurred from May 26-29, 2021 and was conducted to locate initial nests and determine occupancy. A nest was considered occupied if at least one adult bald eagle was present at the nest. The second survey in mid-nesting season occurred from June 15-18, 2021 to determine the contents (e.g., perched adult, incubating adult, nestlings, empty) of nests located in May and to locate any additional nests that were not detected during the first survey. The third and final survey, occurred between July 17-18, 2021, and determined the number of nestlings near the fledgling stage of development (late-stage nestlings; Photo 3) and documented any nests that were not detected in the previous surveys.

Bald eagle nests located off the survey route while ferrying between refueling stops were recorded as incidental and excluded from the final productivity analysis. Other bird of prey species and large stick nests observed during the survey were recorded as incidental.



Photo 3: Late-stage Bald Eagle Nestling

2.2 DATA ANALYSIS

2.2.1 NEST ACTIVITY AND SUCCESS

Based on the results of the surveys, and using accepted standard methods (Jurek 1990; Jackman and Jenkins 2004), occupancy determinations were made for each monitored nest as follows:

- **Active:** Nests were defined as *Active* if there were two sexually mature bald eagles present on or near a nest, or there was at least one bald eagle in incubating posture on a nest (Steenhof and Newton 2007) during any of the three survey visits. Bald eagles are capable of breeding in their fifth year and are unmistakable with their completely white head and tail (McCollough 1989). Nests defined as *Active* were further categorized as:
 - **Active, Successful:** A nest with at least one late-stage nestling (dark plumage, no down; Photo 2) or as a fledged juvenile observed near the nest (Steenhof and Newton 2007).
 - **Active, Not Successful:** An *Active* nest with two sexually mature bald eagles and where no incubating adult or nestlings were observed.
 - **Active, Abandoned:** An *Active* nest containing an incubating adult, eggs or nestlings, where the adults ceased to attend the nest and did not successfully raise nestlings to the near fledging stage.

- **Active, Success Unknown:** An *Active* nest containing an incubating adult, eggs or nestlings, that was not sufficiently monitored to determine reproductive success (*i.e.*, *Active* nests observed in May or June and not observed in July).
- **Inactive:** Nests were defined as *Inactive* when only one or zero sexually mature bald eagles were observed near a sufficiently monitored nest (*i.e.*, nests observed in May and *Active* nests first observed in June).
- **Status Unknown:** Nests were defined as *Status Unknown* when an *Inactive* nest was not sufficiently monitored to determine reproductive success (*i.e.*, *Inactive* nests only observed in June or July).

Percentage of *Active* nests is calculated as:

$$\% \text{ Active nests} = \frac{\text{Total \# Active nests}}{\text{\# Active nests} + \text{\# Inactive nests}}$$

Percentage of *Successful* nests is calculated as:

$$\% \text{ Successful nests} = \frac{\text{Total \# Active, Successful nests}}{\text{\# Active nests}}$$

The percent of active, successful nests observed in the Project affected zone during Project construction was compared to the off-system and Nelson River hydraulic zones using a Wilcoxon signed-rank test ($\alpha=0.05$).

2.2.2 REPRODUCTIVE SUCCESS

Reproductive success was calculated as the number of nestlings per bald eagle breeding pair (*i.e.*, per *Active* nests) and the number of nestlings per successful bald eagle breeding pair. Nest assessed as *Active*, *Success Unknown* were not included in reproductive success calculations as the number of late stage nestlings in these nests was undetermined. The number of nestlings observed in nests in July was used as the numerator for both calculations.

$$\# \text{ Nestlings/Pair} = \frac{\text{Total \# late stage nestlings in Active nests}}{\text{\# Active nests}}$$

$$\# \text{ Nestlings/Successful pair} = \frac{\text{Total \# late stage nestlings in Active, Successful nests}}{\text{\# Active, Successful nests}}$$

Because the incubation period for bald eagle eggs is 35 days (Buehler 2000), nests observed to contain nestlings in the June or July survey were either *Active* in May but not detected by the

survey team or became active shortly after the May survey. Thus, *Active* nests first observed in June or July were included in occupancy determinations. *Inactive* nests observed for the first time in June or July were deemed *Status Unknown* because, without an observation earlier in the nesting season, there was no way to determine if the nest was used earlier in the season (*i.e.*, it was not known whether a nesting attempt had failed). Nests that did not contain nestlings in July but contained nestlings in June that were less than 10 weeks old, were assessed as *Abandoned*; it is confidently assumed that such nestlings did not survive to the point when they would fledge from the nest.

The number of late-stage nestlings per active nest observed and the number of late-stage nestlings per active, successful nest observed in the Project-affected hydraulic zone were compared to the values observed in the off-system and Nelson River hydraulic zones using a Wilcoxon signed-rank test ($\alpha=0.05$).

3.0 RESULTS

3.1.1 NEST ACTIVITY AND SUCCESS

A total of 125 bald eagle nests were found and monitored on the shorelines of surveyed waterbodies during the 2021 breeding season (Map 2). Of the monitored nests, 15 were in the Project-affected zone (Map 3), 64 were in the Nelson River zone, and 41 were observed in the Off-system zone (Appendix A).

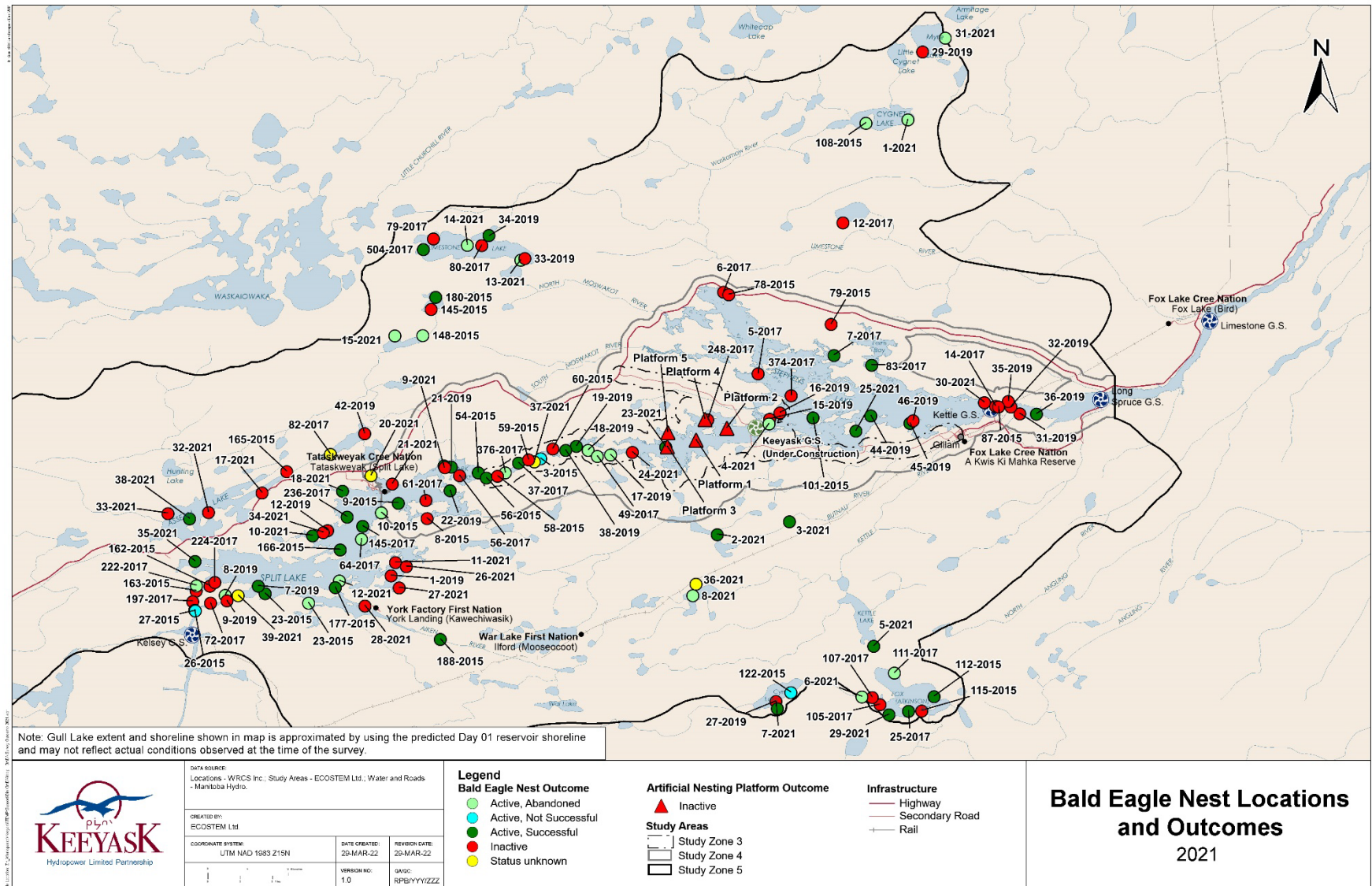
During the survey period from 2015-2021, a total of 183 bald eagle nests were observed and monitored in Study Zone 5 (Appendix B). The distribution of bald eagle nests remained relatively steady in the different hydraulic zones during the construction-phase surveys. There was no apparent shift in habitat use of bald eagles nesting in the Project-affected zone to other areas (Map 2; Map 3).

During the construction period the number of bald eagle nests observed increased each survey year (Table 2). Much of the increase was due to the accumulation of inactive nests. Inactive nests were monitored in subsequent survey years until they generally disintegrated due to lack of maintenance and weather action.

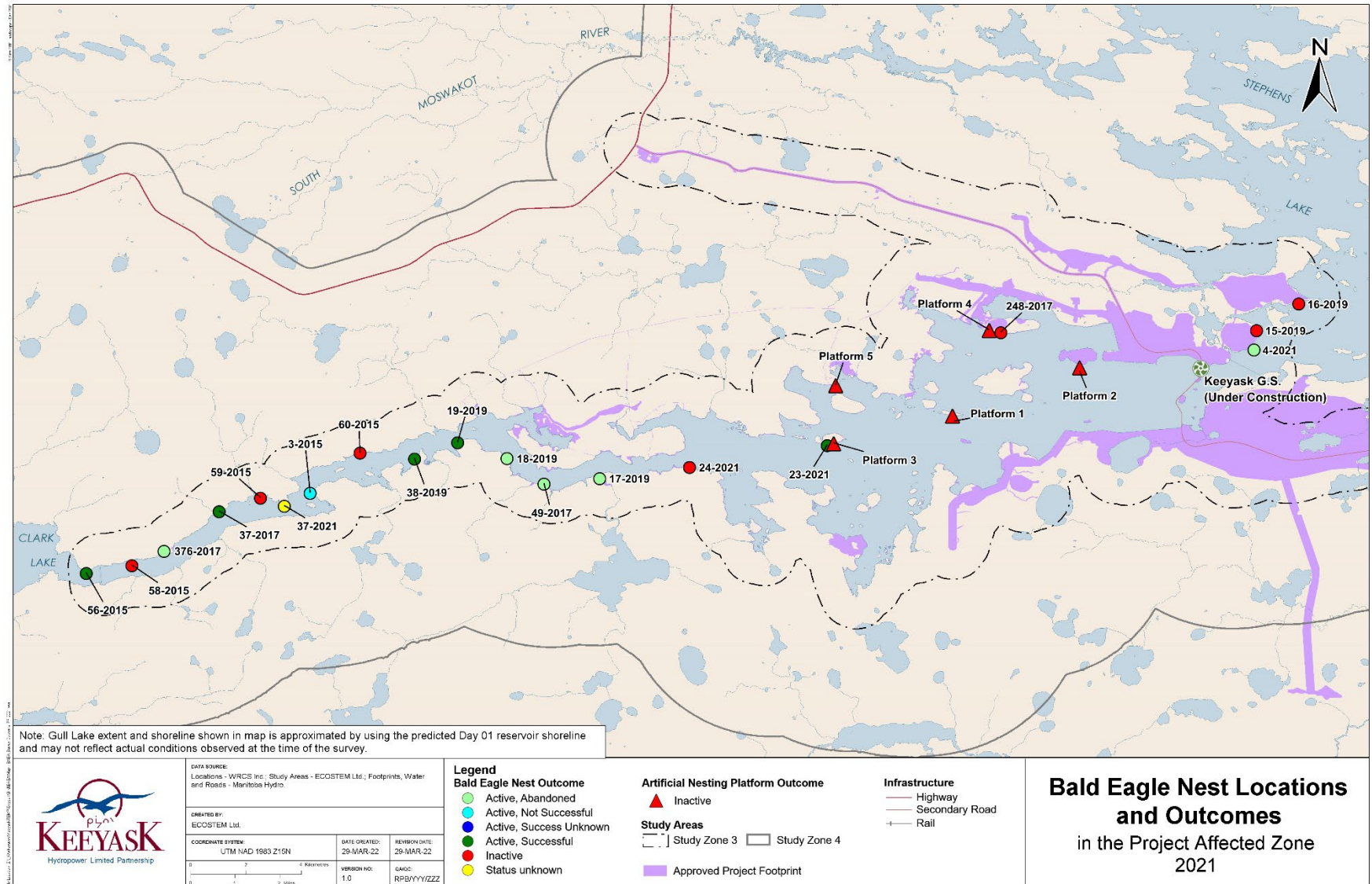
There was also an increase in the number of active nests within Study Zone 5 from the 2015 to 2019 surveys periods, which then declined slightly in 2021 (Table 3). The increase in active nests occurred mostly in the Nelson River hydraulic zone, with a small increase in the off-system hydraulic zone as well. Over the same period, the number of active nests in the Project-affected hydraulic zone remained stable (Table 3).

The percent of active, successful nests remained relatively steady in all hydraulic zones during the construction period, except for a spike in the Project-affected hydraulic zone in 2017 (Table 3; Map 4). The percent of active, successful nests in the Project-affected hydraulic zone was lower in comparison to the other hydraulic zones, but not significantly different from those observed in the Nelson River or in the off-system hydraulic zones during the construction period ($p = 0.25$ and $p = 0.38$, respectively).

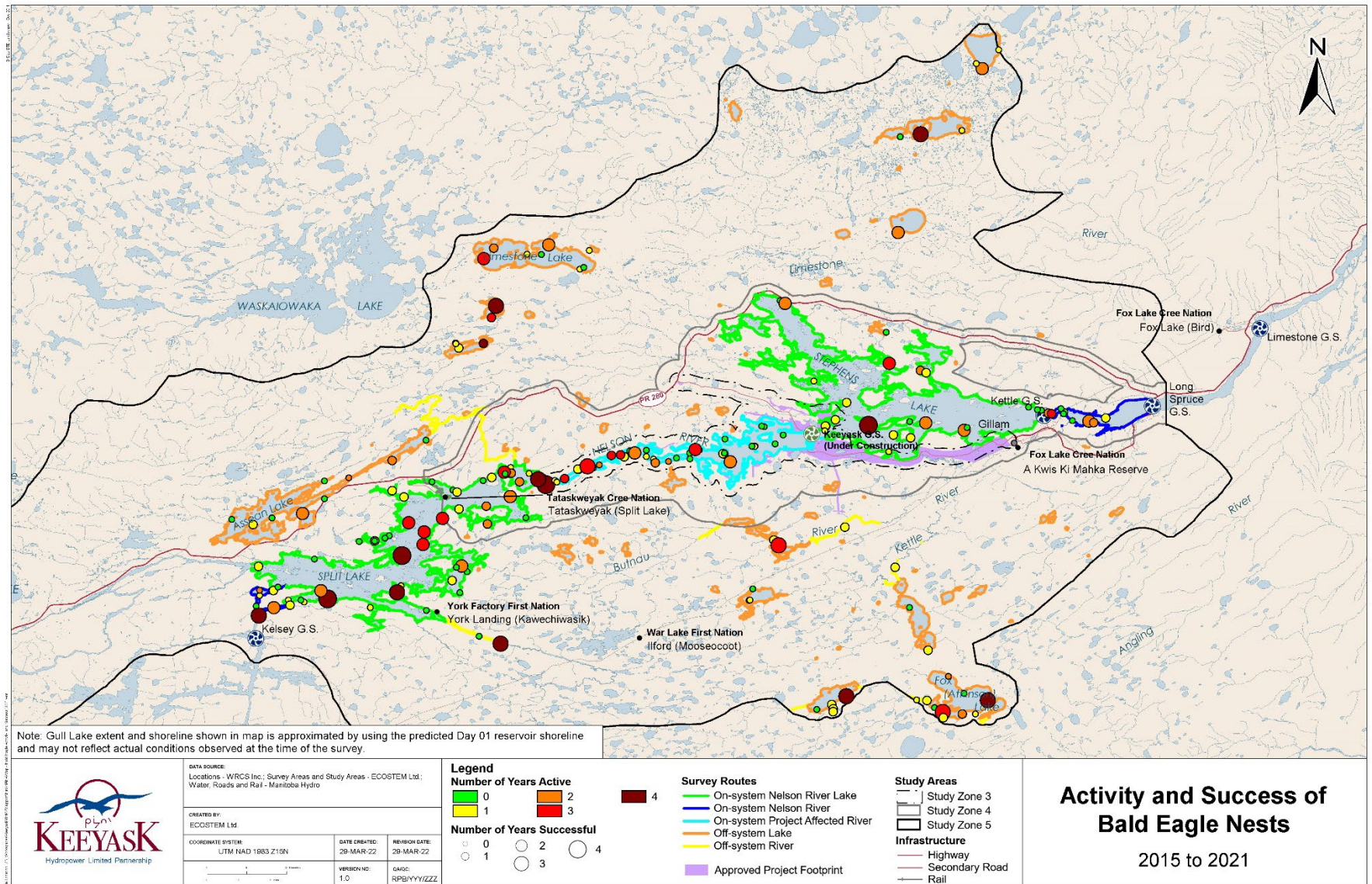
During the construction period the Project-affected zone contained the lowest number of nests in comparison to the other hydraulic zones, but the density of nests (nests/100 km of shoreline) were some of the greatest observed in the Study Area (Table 4). The density of bald eagle nests in the Project-affected zone remained steady during from 2015-2019 and decreased in 2021. The actual number of nests remained similar in 2021 to previous years, but the filling of the reservoir increased the amount of shoreline, lowering the nest density.



Map 2: Bald Eagle Nest Locations and Outcomes on Surveyed Waterbodies in 2021



Map 3: Bald Eagle Nest Locations and Outcomes in the Project-Affected Hydraulic Zone in 2021



Map 4: Number of Years Bald Eagle Nests were Active and Successful from 2015-2021

Table 2: Number and Outcomes of Bald Eagle Nests in Study Zone 5 During the Construction Period from 2015-2021

Nest Outcome	Number of Bald Eagle Nests			
	2015	2017	2019	2021
Active, Successful	25	36	44	38
Active, Not Successful	4	3	4	3
Active, Nest Abandoned	13	14	14	21
Active, Success Unknown	0	2	0	0
Inactive	18	38	43	58
Status Unknown	4	4	1	5
Total	64	97	106	125

Table 3: Productivity of Bald Eagle Nests During the 2015, 2017, 2019 and 2021 Breeding Seasons

	2015				2017				2019				2021			
	Project-affected	Nelson River	Off-system	Study Zone 5 (All areas)	Project-affected	Nelson River	Off-system	Study Zone 5 (All areas)	Project-affected	Nelson River	Off-system	Study Zone 5 (All areas)	Project-affected	Nelson River	Off-system	Study Zone 5 (All areas)
# Nests surveyed	16	26	22	64	23	43	31	97	18	59	29	106	15	64	41	125
# Active nests	10	16	16	42	9	28	18	55*	9	34	19	62	9	30	23	62
# Active, Successful nests	3	12	10	25	7	17	12	36	4	27	13	44	4	22	12	38
% Active, Successful nests	30	75	63	60	78	61	67	67	44	79	68	71	44	73	52	61
# Late-stage nestlings	6	20	16	42	11	26	15	52	7	46	22	75	5	33	18	56
# Late-stage nestlings/ Active nests	0.60	1.25	1.00	1.00	1.22	0.93	0.83	0.96	0.78	1.35	1.16	1.21	0.56	1.1	0.78	0.9
# Late-stage nestlings/ Active, Successful nests	2.00	1.67	1.60	1.68	1.57	1.53	1.25	1.44	1.75	1.70	1.69	1.70	1.25	1.5	1.5	1.47

Table 4: Active Bald Eagle Nest Density (nests/100 km of shoreline) Within Study Zone 5 During the Construction Period from 2015-2021

Hydraulic Zone	Waterbody Type	Nest Density (Nests/100 km)			
		2021	2019	2017	2015
Project-affected	River	2.75	3.67	3.67	4.08
Nelson River	Lake	1.87	2.21	1.45	0.90
	River	3.06	3.06	7.14	3.06
Off-system	Lake	2.25	1.80	1.92	1.69
	River	1.38	0.92	0.46	0.46
Total		2.08	2.14	1.90	1.45

3.1.2 REPRODUCTIVE SUCCESS

The number of late-stage nestlings per active nest remained relatively steady in all hydraulic zones during the construction period, except for a spike in the Projected-affected hydraulic zone in 2017 (Table 3). The number of late-stage nestlings per active nest was lower in comparison to the other hydraulic zones, but not significantly different from those observed in the Nelson River or in the off-system hydraulic zones during the construction period ($p = 0.25$ and $p = 0.63$, respectively).

The number of late-stage nestlings per active, successful nest was relatively steady in all hydraulic zones during the construction period (Table 3). The Projected-affected zone supported a slightly higher number of late-stage nestlings per active, successful nests in 2015, 2017, and 2019, but decreased in 2021 (Table 3). The number of nestlings observed in the Project-affected zone was not significantly different from the number in the Nelson River or Off-system hydraulic zones during the construction period ($p = 0.63$ and $p = 0.38$, respectively).

The artificial nesting platforms were not used successfully by bald eagles during the survey period, but two platforms appeared to have unused bald eagle nests present in 2021 (Table 5; Photo 4; Photo 5). Common ravens also nested in two of the platforms and in 2021 another contained sticks that were likely brought there by a bald eagle or common raven (Table 5).

Table 5: Artificial Nesting Platform Contents during Construction Surveys from 2015-2021. Note: Data from 2015 are absent as the artificial nesting platforms were installed in 2017

Nest	2017	2019	2021
Platform 1	Empty	Active common raven nest	Potential unused bald eagle nest
Platform 2	Empty	Empty	Empty
Platform 3	Empty	Some sticks on platform	Potential unused bald eagle nest
Platform 4	Some sticks on platform	Some sticks on platform	Active common raven nest
Platform 5	Empty	Empty	Some sticks on platform



Photo 4: Potential Unused Bald Eagle Nest in Platform 3 in 2021



Photo 5: Potential Unused Bald Eagle Nest in Platform 1 in 2021

4.0 DISCUSSION

Project construction was not anticipated to cause the displacement of bald eagles, but some loss of perching and nesting habitat was expected (KHLP 2012). These predictions are supported by the observations made during the construction-phase surveys in 2015, 2017, 2019, and 2021.

The bald eagle population in the study area during Project construction remained stable and sustainable. Generally, for a bald eagle population to be sustainable, more than 50% of nests are required to be successful and 0.7 young must be fledged per breeding pair annually (Sprunt *et al.* 1973; Elliott *et al.* 1998). Within the study area from 2015-2021, bald eagle nest success ranged from 60-71% and produced 0.9-1.21 late-stage nestlings per active nest, suggesting the population is stable or slightly increasing. These numbers are comparable to or greater than those observed in other long-term studies conducted in other areas. In one long-term study in Saskatchewan from 1968-1991, Gerard *et al.* (1992) found that bald eagle nest success ranged from 42-88% and averaged one fledged young per successful nest. Another long-term study conducted in an undisturbed national park in Alaska from 1993-2015 found that nest success ranged from 51-60% and bald eagles produced 0.76 to 0.89 chicks per nest (Wilson *et al.* 2018).

Sensory disturbance did not appear to affect nesting bald eagles near the Project. The distribution of nests within the Project-affected zone did not appear to shift as a result of sensory disturbance during construction. Within the Project-affected zone, a similar number of active nests were observed from 2015-2021 (9-10), which was similar to the number of active nests observed during the pre-construction period in 2011 (8) and 2014 (8) (Stantec 2013; Stantec 2014).

Vegetation clearing in the reservoir footprint did remove some bald eagle nesting and perching habitat. The effects of habitat removal were partially mitigated by delaying the removal of trees that supported bald eagle nests in the footprint until the fall/winter of 2019. The construction of five artificial nesting structures in the footprint also mitigated for the loss of nesting habitat. The use of the artificial nesting structures was limited during Project construction, but in 2021 two platforms contained unused nests and others showed signs of nesting activity (*i.e.*, sticks present inside) or nesting common ravens. It should be noted that many of the artificial nesting platforms were located inland from the shoreline prior to reservoir creation. This likely limited their attractiveness to bald eagles until 2021, which was the first breeding season for bald eagles after reservoir filling. Additionally, it can take many years for bald eagles to use artificial nesting platforms (Hunter *et al.* 1997; Bortolotti *et al.* 1988) and natural sites are typically preferred over artificial ones (Hunter *et al.* 1997). Based on the observations in 2021 it is likely that the artificial nesting platforms will support bald eagles in the future.

Reservoir filling that occurred in fall 2020 did not appear to impact nesting bald eagles in 2021. The number of nests in the Project-affected zone remained stable in 2021 suggesting the area around the newly formed reservoir provided sufficient nesting habitat for bald eagles. The percent of active, successful nests and the number of late-stage nestlings produced in the Project-affected zone did not significantly differ from the other hydraulic zones, suggesting Project construction did not affect nest success or reproduction during the survey years. However, it was noted that

the number of nestlings per active, successful nest in the Project-affected zone was slightly lower than the nests in other hydraulic zones in 2021, in comparison to other survey years when nests in this zone have produced the greatest numbers of late-stage nestlings. It is unknown if this is a result of reservoir creation, which may have reduced foraging opportunities for bald eagles and resulted in lower chick survival or natural variation. As 2021 was the first breeding year for bald eagles after reservoir creation, it may be possible that effects, such as decreased reproduction, could be delayed or occur gradually over time. Continued monitoring during Project operation will allow for the verification of predicted effects.

5.0 SUMMARY AND CONCLUSIONS

Project construction resulted in changes to bald eagle habitat in the reservoir. Some of the habitat changes, including nest loss, were mitigated by the construction of artificial nesting platforms in nearby areas.

Project construction did not appear to affect bald eagle nest numbers or productivity in the study area and the overall population appears to be sustainable and slightly increasing. The number of active nests within the Project-affected zone has remained consistent with the pre-construction surveys conducted in 2011 and 2014, as well as the construction-phase surveys conducted from 2015-2021.

There were no significant differences in the percent of active, successful nests or the number of late-stage nestlings produced in the Project-affected zone compared to other zones in the study area. This suggests that sufficient nesting habitat and foraging opportunities exist within the study area for bald eagles to successfully nest and raise young.

The 2021 bald eagle survey was the final construction-phase survey for the Project. As the Project moves into the operation phase, bald eagle habitat effects monitoring will continue during operation for the next 15 years. The next bald eagle survey is scheduled for 2022.

6.0 LITERATURE CITED

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APPENDIX A: Bald Eagle Nest-Tree Types, Nest Heights, and Location

Nest	Hydraulic Zone	Location	UTM	Nest Tree Type	Tree Height (m)	Nest Height (m)
1-2019	Nelson River	Split Lake	14 V 682158 6224858	Poplar	10	10
1-2021	Off-system	Cygnat Lake	15 V 386537 6293363	Aspen	5	3
2-2017	Nelson River	Nelson River	15 V 365925 6248579	NA	NA	NA
2-2021	Off-system	Butnau lake	15 V 358053 6231361	Aspen	4	4
3-2015	Project-affected	Nelson River, Birthday Rapids	15 V 331640 6242724	Poplar	17	15
3-2021	Off-system	Butnau Lake	15 V 368828 6233280	Aspen	5	4
4-2021	Nelson River	Stephens Lake	15 V 365786 6247903	Spruce	15	15
5-2017	Nelson River	Stephens Lake, West shore	15 V 364136 6255411	Spruce	12	11
5-2021	Off-system	Kettle Lake	15 V 381433 6214677	Aspen	10	9
6-2017	Nelson River	Stephens Lake, North shore	15 V 358991 6267595	Poplar	25	22
6-2021	Off-system	Fox Lake	15 U 379692 6207136	Aspen	15	14
7-2017	Nelson River	Stephens Lake, North shore	15 V 375496 6258125	Spruce	12	12
7-2019	Nelson River	Split Lake	14 V 662493 6221592	Spruce	12	12
7-2021	Off-system	Cyril Lake	15 U 367032 6205369	Spruce	12	12
8-2015	Nelson River	Split Lake	15 V 314661 6233773	Poplar	8	8
8-2019	Nelson River	Split Lake	14 V 657695 6219760	Poplar	12	12
8-2021	Off-system	Little Kettle Lake	15 V 354418 6222249	Birch	5	4
9-2015	Nelson River	Split Lake	14 V 682284 6235714	Poplar	12	12
9-2019	Nelson River	Split Lake	14 V 658045 6218971	Spruce	10	10
9-2021	Nelson River	Split Lake	15 V 317365 6241398	Spruce	15	15
10-2015	Nelson River	Split Lake	14 V 679877 6234113	Dead Spruce	22	20
10-2019	Nelson River	Split Lake	14 V 661114 6226270	Spruce	10	10
10-2021	Nelson River	Split Lake	14 V 669963 6229782	Aspen	10	8
11-2017	Off-system	Cygnat Lake	15 V 377203 6292419	NA	NA	NA
11-2019	Nelson River	Split Lake	14 V 669963 6229782	Spruce	10	10
11-2021	Nelson River	Split Lake	14 V 682644 6226890	Spruce	10	10
12-2017	Off-system	Little Limestone Lake	15 V 376851 6277952	Jack Pine	15	14
12-2019	Nelson River	Split Lake	14 V 672103 6230752	Spruce	12	12
12-2021	Nelson River	Split Lake	14 V 674529 6223403	Spruce	12	11
13-2021	Off-system	Limestone Lake	15 V 328689 6272381	Aspen	12	10
14-2017	Nelson River	Nelson River, Kettle GS	15 V 399644 6250541	Jack Pine	24	22
14-2021	Off-system	Limestone Lake	15 V 320678 6274608	Spruce	10	10
15-2019	Nelson River	Stephens Lake, West Shore	15 V 365884 6248604	Spruce	10	10
15-2021	Off-system	Crying Lake	14 V 679602 6260608	Spruce	10	10

Nest	Hydraulic Zone	Location	UTM	Nest Tree Type	Tree Height (m)	Nest Height (m)
16-2019	Nelson River	Stephens Lake, West Shore	15 V 367409 6249564	Dead spruce	8	8
16-2021	Nelson River	Split Lake	14 V 670216 6219695	Aspen	15	14
17-2019	Project-affected	Nelson River	15 V 342113 6243255	Poplar	10	10
17-2021	Off-system	Assean Lake	14 V 661852 6235512	Aspen	12	10
18-2019	Project-affected	Nelson River	15 V 338766 6243978	Poplar	12	12
18-2021	Nelson River	Split Lake	14 V 673807 6236797	Aspen	10	8
19-2019	Project-affected	Nelson River	15 V 336976 6244549	Poplar	10	10
20-2019	Nelson River	Clark Lake	15 V 317912 6241304	Spruce	10	10
20-2021	Nelson River	Split Lake	14 V 677862 6239486	Aspen	8	7
21-2019	Nelson River	Clark Lake	15 V 318292 6241456	Spruce	12	12
21-2021	Nelson River	Split Lake	14 V 681138 6238502	Aspen	10	8
22-2019	Nelson River	Split Lake	15 V 318126 6237931	Spruce	8	8
23-2015	Nelson River	Split Lake	14 V 663636 6220536	Spruce	20	20
23-2019	Nelson River	Split Lake	15 V 320504 6234713	Poplar	10	10
23-2021	Project-affected	Nelson River	15 V 350353 6244445	Spruce	5	5
24-2021	Project-affected	Nelson River	15 V 345367 6243656	Aspen	12	10
25-2017	Off-system	Atkinson lake	15 U 386618 6204993	Dead Poplar	10	10
25-2019	Project-affected	Nelson River	15 V 338743 6244928	Spruce	10	10
25-2021	Nelson River	Stephens Lake	15 V 378792 6246835	Aspen	15	13
26-2015	Nelson River	Split Lake	14 V 653365 6217146	Spruce	15	15
26-2021	Nelson River	Split Lake	14 V 684323 6226407	Spruce	15	15
27-2015	Nelson River	Split Lake	14 V 653439 6217073	Spruce	15	15
27-2019	Off-system	Cyril Lake	15 U 366808 6206441	Birch	8	8
27-2021	Nelson River	Split Lake	14 V 683518 6223144	Spruce	15	15
28-2021	Nelson River	Split Lake	14 V 678663 6219996	Spruce	15	15
29-2019	Off-system	Myre Lake	15 V 388732 6303481	Tamarack	8	8
29-2021	Off-system	Fox Lake	15 U 383721 6204439	Spruce	8	7
30-2019	Nelson River	Stephens Lake, North Shore	15 V 396635 6251473	Spruce	10	10
30-2021	Nelson River	Nelson River	15 V 397970 6251077	Spruce	12	12
31-2019	Nelson River	Nelson River	15 V 403274 6249424	Spruce	12	12
31-2021	Off-system	Myre Lake	15 V 392121 6305555	Aspen	15	13
32-2019	Nelson River	Nelson River	15 V 401947 6250462	Spruce	10	10
32-2021	Off-system	Assean Lake	14 V 654151 6231901	Spruce	15	15
33-2019	Off-system	Limestone Lake	15 V 329283 6272613	Spruce	12	12
33-2021	Off-system	Assean Lake	14 V 648143 6231187	Aspen	10	8
34-2017	Nelson River	Split Lake	14 V 681769 6238256	Spruce	21	21
34-2019	Off-system	Limestone Lake	15 V 323941 6276081	Spruce	10	10
34-2021	Nelson River	Split Lake	14 V 671506 6230369	Aspen	12	10

Nest	Hydraulic Zone	Location	UTM	Nest Tree Type	Tree Height (m)	Nest Height (m)
35-2017	Nelson River	Split Lake	15 V 317211 6241629	Spruce	15	15
35-2019	Nelson River	Nelson River	15 V 401555 6251251	Spruce	15	15
35-2021	Nelson River	Split Lake	14 V 652767 6224436	Spruce	10	10
36-2019	Nelson River	Nelson River	15 V 405775 6249358	Poplar	15	15
36-2021	Off-system	Little Kettle Lake	15 V 354857 6223967	Hydro Tower	15	13
37-2017	Project-affected	Nelson River, Upstream of Birthday Rapids	15 V 328353 6242063	Poplar	15	15
37-2019	Nelson River	Stephens Lake	15 V 378665 6249295	Spruce	10	10
37-2021	Project-affected	Nelson River	15 V 330704 6242254	Aspen	12	10
38-2019	Project-affected	Nelson River	15 V 335418 6243959	Poplar	10	10
38-2021	Off-system	Assean Lake	14 V 651407 6230689	Aspen	12	11
39-2015	Nelson River	Nelson River - Split Reach	14 V 667630 6229507	Spruce	NA	9
39-2019	Nelson River	Clark Lake	15 V 319619 6240109	Spruce	12	12
39-2021	Nelson River	Split Lake	14 V 659617 6219909	Spruce	8	8
40-2017	Project-affected	Nelson River, Between Birthday Rapids and Gull Rapids	15 V 345303 6244529	Poplar	18	17
40-2019	Off-system	Aiken River	15 V 313434 6216803	Transmission Tower	20	20
42-2019	Off-system	Assean Lake	14 V 676381 6245669	Poplar	10	10
43-2019	Nelson River	Stephens Lake	15 V 376188 6247244	Spruce	10	10
44-2019	Nelson River	Stephens Lake	15 V 381018 6249126	Poplar	15	15
45-2019	Nelson River	Stephens Lake	15 V 386873 6247984	Dead Spruce	8	8
46-2019	Nelson River	Stephens Lake	15 V 387334 6248399	Poplar	15	15
47-2017	Project-affected	Nelson River, Between Birthday Rapids and Gull Rapids	15 V 351444 6243204	Poplar	15	14
49-2017	Project-affected	Nelson River, Between Birthday Rapids and Gull Rapids	15 V 340108 6243053	Poplar	14	9
51-2015	Nelson River	Nelson River - Split Reach	14 V 685522 6240305	White Birch	NA	13
52-2015	Nelson River	Nelson River - Clark Reach	15 V 318195 6242330	Dead spruce	NA	15
53-2015	Nelson River	Nelson River - Clark Reach	15 V 320986 6241438	Aspen	NA	12
54-2015	Nelson River	Clark Lake	15 V 322348 6240594	Dead Poplar	12	12

Nest	Hydraulic Zone	Location	UTM	Nest Tree Type	Tree Height (m)	Nest Height (m)
56-2015	Nelson River	Nelson River, Upstream of Birthday Rapids	15 V 323548 6239832	Dead Poplar	8	10
56-2017	Nelson River	Clark Lake	15 V 319532 6240180	Dead Spruce	17	12
57-2015	Project-affected	Nelson River - Keeyask Reach	15 V 324876 6240384	Aspen	NA	13
58-2015	Project-affected	Nelson River, Upstream of Birthday Rapids	15 V 325196 6240113	Spruce	18	18
59-2015	Project-affected	Nelson River, Upstream of Birthday Rapids	15 V 329843 6242553	Poplar	18	16
60-2015	Project-affected	Nelson River, Between Birthday Rapids and Gull Rapids	15 V 333445 6244175	Poplar	15	8
61-2015	Project-affected	Nelson River, Between Birthday Rapids and Gull Rapids	15 V 334823 6244238	Poplar	15	15
61-2017	Nelson River	Split Lake	15 V 314486 6236485	Poplar	24	17
62-2015	Project-affected	Nelson River - Keeyask Reach	15 V 336306 6244924	Dead spruce	NA	11
64-2015	Project-affected	Nelson River - Keeyask Reach	15 V 339842 6243587	Spruce	NA	11
64-2017	Nelson River	Split Lake	14 V 677277 6229913	Spruce	15	15
66-2015	Project-affected	Nelson River, Between Birthday Rapids and Gull Rapids	15 V 346126 6245094	Poplar	15	15
67-2015	Project-affected	Nelson River - Keeyask Reach	15 V 346802 6244984	Dead Aspen	NA	16
68-2015	Project-affected	Nelson River - Keeyask Reach	15 V 350494 6244389	Aspen	NA	10
69-2015	Project-affected	Nelson River - Keeyask Reach	15 V 355163 6245525	Fallen Dead Spruce	NA	3
72-2017	Nelson River	Split Lake	14 V 655600 6218443	Poplar	20	17
78-2015	Nelson River	Stephens Lake, North shore	15 V 359753 6267215	Spruce	25	25
79-2015	Off-system	Small Unnamed Lake 5 km North of Stephens Lake	15 V 375091 6262798	Spruce	15	15
79-2017	Off-system	Limestone Lake	14 V 684074 6275540	Spruce	19	15
80-2017	Off-system	Limestone Lake	15 V 322842 6274576	Poplar	16	12
82-2015	Nelson River	Stephens Lake, Ferris Bay	15 V 380257 6257025	Spruce	12	12

Nest	Hydraulic Zone	Location	UTM	Nest Tree Type	Tree Height (m)	Nest Height (m)
82-2017	Off-system	Assean Lake	14 V 671532 6242142	Poplar	15	10
83-2017	Nelson River	Stephens Lake	15 V 381119 6256687	NA	NA	NA
86-2015	Nelson River	Nelson River - Stephens Reach	15 V 398576 6251004	Spruce	NA	8
87-2015	Nelson River	Nelson River, Kettle GS	15 V 400115 6250447	Spruce	24	24
88-2015	Nelson River	Nelson River - Long Spruce Reach	15 V 402169 6250771	Spruce	NA	16
92-2015	Nelson River	Nelson River, Downstream of Kettle GS	15 V 406511 6249127	Spruce	20	17
97-2015	Nelson River	Nelson River	15 V 375454 6244746	Spruce	NA	18
101-2015	Nelson River	Stephens Lake	15 V 372381 6248802	Dead Jack pine	19	19
102-2015	Project-affected	Nelson River	15 V 358251 6245905	Spruce	NA	10
105-2017	Off-system	Atkinson lake	15 U 382376 6205969	Spruce	8	8
107-2015	Off-system	Myre Lake	15 V 389577 6302739	Spruce	NA	17
107-2017	Off-system	Cyril River	15 U 381232 6207044	Spruce	14	14
108-2015	Off-system	Cygnat Lake	15 V 380284 6292841	Birch	10	10
111-2017	Off-system	Fox Lake	15 V 384522 6210702	NA	NA	NA
112-2015	Off-system	Atkinson lake	15 U 390456 6207144	Poplar	25	20
113-2017	Off-system	Kettle River	15 V 376411 6227216	Poplar	12	10
115-2015	Off-system	Atkinson lake	15 U 388614 6205029	Poplar	25	20
117-2015	Off-system	Atkinson lake	15 U 383656 6205375	Spruce	20	20
121-2015	Off-system	Fox Lake	15 V 386854 6208149	Spruce	NA	10
122-2015	Off-system	Cyril Lake	15 U 369055 6207763	Poplar	5	5
123-2015	Off-system	Cyril Lake	15 U 367021 6205781	Spruce	NA	11
134-2015	Off-system	Kettle Lake	15 V 378605 6221132	Aspen	NA	10
141-2015	Off-system	Butnau lake	15 V 358778 6230620	Spruce	15	13
142-2015	Off-system	Small Unnamed Lake 1 km North of Limestone Lake	15 V 330109 6275194	Poplar	18	18
145-2015	Off-system	Small Unnamed Lake 1 km North of Limestone Lake	14 V 684630 6265004	Poplar	25	19
145-2017	Nelson River	Split Lake	14 V 677291 6231852	Jack Pine	10	17
146-2015	Off-system	Crying Lake	14 V 679546 6260750	Spruce	NA	16
147-2015	Off-system	Crying Lake	14 V 680094 6260013	Spruce	12	18
148-2015	Off-system	Crying Lake	14 V 683758 6261010	Birch	15	8
156-2015	Off-system	Assean Lake	14 V 658680 6233013	Spruce	NA	9

Nest	Hydraulic Zone	Location	UTM	Nest Tree Type	Tree Height (m)	Nest Height (m)
162-2015	Nelson River	Split Lake	14 V 655325 6220967	Spruce	16	15
163-2015	Nelson River	Split Lake	14 V 653324 6220054	Jack pine	20	15
165-2015	Off-system	Assean Lake	14 V 665241 6238987	Dead Poplar	23	20
166-2015	Nelson River	Split Lake	14 V 674251 6228054	Spruce	15	15
176-2015	Nelson River	Nelson River - Split Reach	14 V 683395 6227161	Spruce	NA	15
177-2015	Nelson River	Split Lake	14 V 674005 6222385	Spruce	18	18
178-2015	Project-affected	Nelson River - Keeyask Reach	15 V 328527 6242066	Aspen	NA	11
179-2015	Off-system	Assean Lake	14 V 661620 6238195	Spruce	NA	17
180-2015	Off-system	Small Unnamed Lake 1 km north of Limestone Lake	15 V 315987 6266847	Spruce	21	17
182-2015	Off-system	Little Kettle Lake	15 V 354312 6222230	Birch	4	8
184-2015	Project-affected	Nelson River - Keeyask Reach	15 V 343306 6243780	Aspen	NA	12
185-2015	Project-affected	Nelson River - Keeyask Reach	15 V 336216 6244834	Dead spruce	NA	9
187-2015	Nelson River	Nelson River - Split Reach	14 V 660110 6219633	Aspen	NA	13
188-2015	Off-system	Aiken River	15 V 316663 6215706	Dead Spruce	15	15
197-2017	Nelson River	Nelson River, Downstream of Kelsey GS	14 V 652944 6218419	Jack Pine	11	9
222-2017	Nelson River	Nelson River, Downstream of Kelsey GS	14 V 653283 6220828	Jack Pine	10	15
224-2017	Nelson River	Split Lake	14 V 655977 6221555	Spruce	12	14
236-2017	Nelson River	Split Lake	14 V 674846 6233002	Poplar	15	12
243-2017	Nelson River	Split Lake	15 V 315327 6240803	Spruce	12	12
246-2017	Project-affected	Nelson River, Between Birthday Rapids and Gull Rapids	15 V 354727 6245558	Dead spruce	12	8
248-2017	Project-affected	Gull Lake	15 V 356627 6248525	Poplar	12	6
268-2017	Nelson River	Nelson River	15 V 408327 6249812	NA	NA	NA
288-2017	Nelson River	Nelson River	15 V 408327 6249812	NA	NA	NA
339-2017	Off-system	Cyril Lake	15 U 364556 6205708	NA	NA	NA
374-2017	Nelson River	Stephens Lake	15 V 369091 6252145	Spruce	10	8
376-2017	Project-affected	Nelson River	15 V 326359 6240629	Poplar	12	10
471-2017	Nelson River	Split Lake	14 V 671930 6237600	NA	NA	NA
504-2017	Off-system	Limestone Lake	14 V 682700 6273844	Spruce	10	8

Nest	Hydraulic Zone	Location	UTM	Nest Tree Type	Tree Height (m)	Nest Height (m)
526-2017	Project-affected	Nelson River	15 V 355220 6245543	Fallen Spruce	0	0

APPENDIX B: Nest Contents and Outcomes of Bald Eagle Nests

Table 1: Bald Eagle Nest Outcomes and Number of Years Nests were Active and Successful from 2015 to 2021. Note: data may not be available for all survey years at locations where nests have collapsed.

Nest	Hydraulic Zone	2015	2017	2019	2021	No. Years Active	No. Years Successful
56-2015	Nelson River	Active, Successful	Active, Successful	Active, Successful	Active, Successful	4	4
23-2015	Nelson River	Active, Successful	Active, Successful	Active, Successful	Active, Successful	4	4
166-2015	Nelson River	Active, Successful	Active, Successful	Active, Successful	Active, Successful	4	4
101-2015	Nelson River	Active, Successful	Active, Successful	Active, Successful	Active, Successful	4	4
54-2015	Nelson River	Active, Successful	Active, Abandoned	Active, Successful	Active, Successful	4	3
27-2015	Nelson River	Active, Successful	Active, Successful	Active, Successful	Active, Not Successful	4	3
188-2015	Off-system	Active, Successful	Active, Successful	Active, Not Successful	Active, Successful	4	3
180-2015	Off-system	Active, Nest Abandoned	Active, Successful	Active, Successful	Active, Successful	4	3
177-2015	Nelson River	Active, Successful	Active, Successful	Active, Not Successful	Active, Successful	4	3
122-2015	Off-system	Active, Successful	Active, Successful	Active, Successful	Active, Not Successful	4	3
112-2015	Off-system	Active, Nest Abandoned	Active, Successful	Active, Successful	Active, Successful	4	3
108-2015	Off-system	Active, Successful	Active, Successful	Active, Successful	Active, Abandoned	4	3
148-2015	Off-system	Active, Successful	Active, Abandoned	Active, Abandoned	Active, Abandoned	4	1
59-2015	Project-affected	Active, Successful	Active, Successful	Active, Successful	Inactive	3	3
141-2015	Off-system	Active, Successful	Active, Successful	Active, Successful	-	3	3
117-2015	Off-system	Active, Successful	Active, Successful	Active, Successful	-	3	3
7-2017	Nelson River	-	Active, Abandoned	Active, Successful	Active, Successful	3	2
66-2015	Project-affected	Active, Nest Abandoned	Active, Successful	Active, Successful	-	3	2
64-2017	Nelson River	-	Active, Successful	Active, Successful	Active, Abandoned	3	2
504-2017	Off-system	-	Active, Success Unknown	Active, Successful	Active, Successful	3	2
35-2017	Nelson River	-	Active, Successful	Active, Abandoned	Active, Successful	3	2
236-2017	Nelson River	-	Active, Successful	Active, Abandoned	Active, Successful	3	2
145-2017	Nelson River	-	Active, Success Unknown	Active, Successful	Active, Successful	3	2
10-2015	Nelson River	Inactive	Active, Successful	Active, Successful	Active, Abandoned	3	2

Nest	Hydraulic Zone	2015	2017	2019	2021	No. Years Active	No. Years Successful
87-2015	Nelson River	Active, Not Successful	Active, Abandoned	Active, Successful	Inactive	3	1
61-2015	Project-affected	Active, Nest Abandoned	Active, Successful	Active, Abandoned	-	3	1
60-2015	Project-affected	Active, Successful	Active, Not Successful	Active, Abandoned	Inactive	3	1
376-2017	Project-affected	-	Active, Successful	Active, Abandoned	Active, Abandoned	3	1
145-2015	Off-system	Active, Not Successful	Active, Successful	Active, Abandoned	Inactive	3	1
78-2015	Nelson River	Active, Successful	Inactive	Active, Successful	Inactive	2	2
72-2017	Nelson River	-	Active, Successful	Active, Successful	Inactive	2	2
7-2019	Nelson River	-	-	Active, Successful	Active, Successful	2	2
47-2017	Project-affected	-	Active, Successful	Active, Successful	-	2	2
45-2019	Nelson River	-	-	Active, Successful	Active, Successful	2	2
44-2019	Nelson River	-	-	Active, Successful	Active, Successful	2	2
36-2019	Nelson River	-	-	Active, Successful	Active, Successful	2	2
34-2019	Off-system	-	-	Active, Successful	Active, Successful	2	2
22-2019	Nelson River	-	-	Active, Successful	Active, Successful	2	2
19-2019	Project-affected	-	-	Active, Successful	Active, Successful	2	2
176-2015	Nelson River	Active, Successful	Active, Successful	-	-	2	2
156-2015	Off-system	Active, Successful	Active, Successful	-	-	2	2
12-2017	Off-system	-	Active, Successful	Active, Successful	Inactive	2	2
107-2015	Off-system	Active, Successful	Active, Successful	-	-	2	2
92-2015	Nelson River	Active, Successful	Active, Abandoned	Inactive	-	2	1
82-2017	Off-system	-	Active, Abandoned	Active, Successful	Status Unknown	2	1
82-2015	Nelson River	Active, Successful	Active, Not Successful	Inactive	-	2	1
8-2015	Nelson River	Active, Successful	Active, Not Successful	Inactive	Inactive	2	1
79-2017	Off-system	-	Active, Successful	Active, Abandoned	Inactive	2	1
61-2017	Nelson River	-	Active, Successful	Active, Abandoned	Inactive	2	1
56-2017	Nelson River	-	Active, Abandoned	Active, Successful	Inactive	2	1
49-2017	Project-affected	-	Active, Successful	Inactive	Active, Abandoned	2	1
25-2017	Off-system	-	Active, Abandoned	Inactive	Active, Successful	2	1
21-2019	Nelson River	-	-	Active, Not Successful	Active, Successful	2	1

Nest	Hydraulic Zone	2015	2017	2019	2021	No. Years Active	No. Years Successful
178-2015	Project-affected	Active, Nest Abandoned	Active, Successful	-	-	2	1
14-2017	Nelson River	-	Active, Abandoned	Active, Successful	Inactive	2	1
3-2015	Project-affected	Active, Nest Abandoned	Inactive	Inactive	Active, Not Successful	2	0
222-2017	Nelson River	-	Inactive	Active, Abandoned	Active, Abandoned	2	0
17-2019	Project-affected	-	-	Active, Not Successful	Active, Abandoned	2	0
165-2015	Off-system	Active, Nest Abandoned	Active, Abandoned	Inactive	Inactive	2	0
111-2017	Off-system	-	Active, Abandoned	Status Unknown	Active, Abandoned	2	0
9-2019	Nelson River	-	-	Active, Successful	Inactive	1	1
9-2015	Nelson River	Inactive	Inactive	Inactive	Active, Successful	1	1
83-2019	Nelson River	-	-	Inactive	Active, Successful	1	1
7-2021	Off-system	-	-	-	Active, Successful	1	1
68-2015	Project-affected	Active, Successful	-	-	-	1	1
5-2021	Off-system	-	-	-	Active, Successful	1	1
471-2017	Nelson River	-	Active, Successful	-	-	1	1
43-2019	Nelson River	-	-	Active, Successful	-	1	1
38-2021	Off-system	-	-	-	Active, Successful	1	1
38-2019	Project-affected	-	-	Inactive	Active, Successful	1	1
374-2017	Nelson River	-	Status unknown	Active, Successful	Inactive	1	1
37-2017	Project-affected	-	Inactive	Inactive	Active, Successful	1	1
35-2021	Nelson River	-	-	-	Active, Successful	1	1
34-2017	Nelson River	-	Active, Successful	Inactive	-	1	1
3-2021	Off-system	-	-	-	Active, Successful	1	1
29-2021	Off-system	-	-	-	Active, Successful	1	1
288-2017	Nelson River	-	Active, Successful	-	-	1	1
27-2019	Off-system	-	-	Active, Successful	Inactive	1	1
25-2021	Nelson River	-	-	-	Active, Successful	1	1
243-2017	Nelson River	-	Active, Successful	Inactive	-	1	1
23-2021	Project-affected	-	-	-	Active, Successful	1	1
2-2021	Off-system	-	-	-	Active, Successful	1	1

Nest	Hydraulic Zone	2015	2017	2019	2021	No. Years Active	No. Years Successful
2-2017	Nelson River	-	Active, Successful	-	-	1	1
18-2021	Nelson River	-	-	-	Active, Successful	1	1
162-2015	Nelson River	Inactive	Inactive	Active, Successful	Inactive	1	1
16-2019	Nelson River	-	-	Active, Successful	Inactive	1	1
15-2019	Nelson River	-	-	Active, Successful	Inactive	1	1
147-2015	Off-system	Active, Successful	Inactive	Inactive	-	1	1
123-2015	Off-system	Active, Successful	Inactive	-	-	1	1
1-2019	Nelson River	-	-	Active, Successful	Inactive	1	1
113-2017	Off-system	-	Inactive	Active, Successful	-	1	1
107-2017	Off-system	-	Inactive	Active, Successful	Inactive	1	1
10-2021	Nelson River	-	-	-	Active, Successful	1	1
97-2015	Nelson River	Active, Nest Abandoned	-	-	-	1	0
8-2021	Off-system	-	-	-	Active, Abandoned	1	0
8-2019	Nelson River	-	-	Inactive	Active, Abandoned	1	0
69-2015	Project-affected	Active, Nest Abandoned	-	-	-	1	0
64-2015	Project-affected	Active, Nest Abandoned	-	-	-	1	0
6-2021	Off-system	-	-	-	Active, Abandoned	1	0
58-2015	Project-affected	Inactive	Inactive	Active, Abandoned	Inactive	1	0
57-2015	Project-affected	Active, Not Successful	-	-	-	1	0
53-2015	Nelson River	Active, Nest Abandoned	-	-	-	1	0
526-2017	Project-affected	-	Active, Not Successful	-	-	1	0
52-2015	Nelson River	Active, Nest Abandoned	-	-	-	1	0
5-2017	Nelson River	-	Inactive	Active, Abandoned	Inactive	1	0
4-2021	Nelson River	-	-	-	Active, Abandoned	1	0
31-2021	Off-system	-	-	-	Active, Abandoned	1	0
29-2019	Off-system	-	-	Active, Abandoned	Inactive	1	0
187-2015	Nelson River	Status Unknown	Active, Abandoned	-	-	1	0
182-2015	Off-system	Active, Nest Abandoned	Inactive	Inactive	-	1	0
18-2019	Project-affected	-	-	Inactive	Active, Abandoned	1	0

Nest	Hydraulic Zone	2015	2017	2019	2021	No. Years Active	No. Years Successful
163-2015	Nelson River	Inactive	Active, Abandoned	Inactive	Inactive	1	0
16-2021	Nelson River	-	-	-	Active, Abandoned	1	0
15-2021	Off-system	-	-	-	Active, Abandoned	1	0
142-2015	Off-system	Active, Not Successful	Inactive	Inactive	-	1	0
14-2021	Off-system	-	-	-	Active, Abandoned	1	0
13-2021	Off-system	-	-	-	Active, Abandoned	1	0
12-2021	Nelson River	-	-	-	Active, Abandoned	1	0
1-2021	Off-system	-	-	-	Active, Abandoned	1	0
115-2015	Off-system	Inactive	Inactive	Active, Abandoned	Inactive	1	0
Platform 5	Project-affected	-	Inactive	Inactive	Inactive	0	0
Platform 4	Project-affected	-	Inactive	Inactive	Inactive	0	0
Platform 3	Project-affected	-	Inactive	Inactive	Inactive	0	0
Platform 2	Project-affected	-	Inactive	Inactive	Inactive	0	0
Platform 1	Project-affected	-	Inactive	Inactive	Inactive	0	0
9-2021	Nelson River	-	-	-	Inactive	0	0
88-2015	Nelson River	Inactive	Inactive	-	-	0	0
86-2015	Nelson River	Inactive	Inactive	-	-	0	0
80-2017	Off-system	-	Inactive	Inactive	Inactive	0	0
79-2015	Off-system	Inactive	Inactive	Status Unknown	Inactive	0	0
67-2015	Project-affected	Inactive	Inactive	-	-	0	0
62-2015	Project-affected	Inactive	Inactive	-	-	0	0
6-2017	Nelson River	-	Inactive	Inactive	Inactive	0	0
51-2015	Nelson River	Inactive	Inactive	-	-	0	0
46-2019	Nelson River	-	-	Status Unknown	Inactive	0	0
42-2019	Off-system	-	-	Inactive	Inactive	0	0
40-2019	Off-system	-	-	Inactive	-	0	0
40-2017	Project-affected	-	Inactive	Inactive	-	0	0
39-2021	Nelson River	-	-	-	Status Unknown	0	0
39-2019	Nelson River	-	-	Inactive	-	0	0

Nest	Hydraulic Zone	2015	2017	2019	2021	No. Years Active	No. Years Successful
39-2015	Nelson River	Inactive	Status unknown	Status Unknown	-	0	0
37-2021	Project-affected	-	-	-	Status Unknown	0	0
37-2019	Nelson River	-	-	Inactive	-	0	0
36-2021	Off-system	-	-	-	Status Unknown	0	0
35-2019	Nelson River	-	-	Inactive	Inactive	0	0
34-2021	Nelson River	-	-	-	Inactive	0	0
339-2017	Off-system	-	Status unknown	-	-	0	0
33-2021	Off-system	-	-	-	Inactive	0	0
33-2019	Off-system	-	-	Inactive	Inactive	0	0
32-2021	Off-system	-	-	-	Inactive	0	0
32-2019	Nelson River	-	-	Inactive	Inactive	0	0
31-2019	Nelson River	-	-	Inactive	Inactive	0	0
30-2021	Nelson River	-	-	-	Inactive	0	0
30-2019	Nelson River	-	-	Inactive	-	0	0
28-2021	Nelson River	-	-	-	Inactive	0	0
27-2021	Nelson River	-	-	-	Inactive	0	0
268-2017	Nelson River	-	Status unknown	-	-	0	0
26-2021	Nelson River	-	-	-	Inactive	0	0
26-2015	Nelson River	Inactive	Inactive	Inactive	Inactive	0	0
25-2019	Project-affected	-	-	Inactive	-	0	0
248-2017	Project-affected	-	Inactive	Inactive	Inactive	0	0
246-2017	Project-affected	-	Inactive	Inactive	-	0	0
24-2021	Project-affected	-	-	-	Inactive	0	0
23-2019	Nelson River	-	-	Inactive	-	0	0
224-2017	Nelson River	-	Inactive	Inactive	Inactive	0	0
21-2021	Nelson River	-	-	-	Inactive	0	0
20-2021	Nelson River	-	-	-	Status Unknown	0	0
20-2019	Nelson River	-	-	Inactive	-	0	0
197-2017	Nelson River	-	Inactive	Inactive	Inactive	0	0

Nest	Hydraulic Zone	2015	2017	2019	2021	No. Years Active	No. Years Successful
185-2015	Project-affected	Status Unknown	Inactive	-	-	0	0
184-2015	Project-affected	Status Unknown	-	-	-	0	0
179-2015	Off-system	Status Unknown	-	-	-	0	0
17-2021	Off-system	-	-	-	Inactive	0	0
146-2015	Off-system	Inactive	Inactive	-	-	0	0
134-2015	Off-system	Inactive	-	-	-	0	0
12-2019	Nelson River	-	-	Inactive	Inactive	0	0
121-2015	Off-system	Inactive	-	-	-	0	0
11-2021	Nelson River	-	-	-	Inactive	0	0
11-2019	Nelson River	-	-	Inactive	-	0	0
11-2017	Off-system	-	Inactive	-	-	0	0
105-2017	Off-system	-	Inactive	Inactive	Inactive	0	0
102-2015	Project-affected	Inactive	-	-	-	0	0
10-2019	Nelson River	-	-	Inactive	-	0	0