Keeyask Generation Project

Aquatic Effects Monitoring Plan

Walleye Movement Monitoring Report

AEMP-2024-03

KEEYASK

Manitoba Environment and Climate Change Client File 5550.00
Manitoba Environment Act Licence No. 3107

2023 -2024

KEEYASK GENERATION PROJECT

AQUATIC EFFECTS MONITORING PLAN

REPORT #AEMP-2024-03

WALLEYE ACOUSTIC TRACKING IN THE NELSON RIVER BETWEEN CLARK LAKE AND THE LIMESTONE GENERATING STATION, OCTOBER 2022 TO OCTOBER 2023: YEAR 2 OPERATION

Prepared for

Manitoba Hydro

By

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June 2024

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This report should be cited as follows:

Funk, B. and C.L. Hrenchuk. 2024. Walleye acoustic tracking in the Nelson River between Clark Lake and the Limestone Generating Station, October 2022 to October 2023: Year 2 Operation Keeyask Generation Project Aquatic Effects Monitoring Plan Report #AEMP-2024-03. A report prepared for Manitoba Hydro by North/South Consultants Inc., June 2024. xvi + 241 pp.

SUMMARY

Background

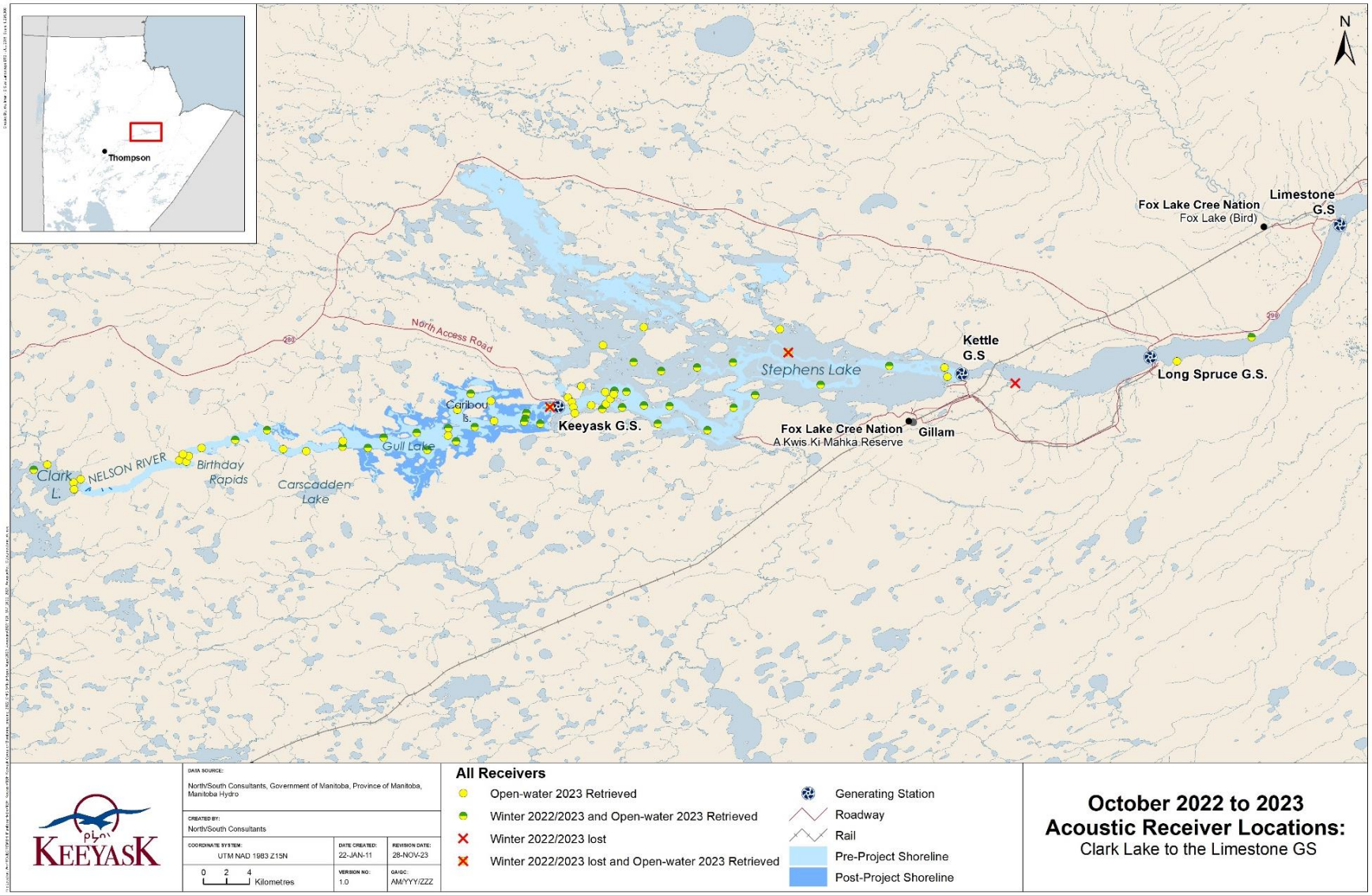
The Keeyask Hydropower Limited Partnership (KHLP) was required to prepare a plan to monitor the effects of construction and operation of the Keeyask Generating Station (GS) on the environment. Monitoring results provide information to assess the accuracy of predictions, information to determine the actual effects of construction and operation of the GS on the environment, and whether more needs to be done to reduce harmful effects.

Construction of the Keeyask GS began in mid-July 2014 and instream work was completed in 2020. The reservoir was impounded, and water levels were raised to full supply level between August 31 and September 5, 2020. Commissioning of the powerhouse turbines was initiated after impoundment. They were brought into service one at a time with the final of seven turbines completed on March 9, 2022.

Movements of pickerel (Walleye) in relation to Birthday Rapids and Gull Rapids were monitored prior to the start of the construction monitoring program in 2013, but because different methods were used to collect data under the Aquatic Effects Monitoring Plan (AEMP), the results are not directly comparable. While earlier studies did not record detailed fish movement patterns between Clark Lake and Stephens Lake, data indicated that most pickerel continued to live in the waterbody where they had been tagged and some moved over Birthday and Gull rapids. A small number of pickerel also moved downstream past the Kettle and Long Spruce generating stations.

This report presents results of pickerel movement monitoring from October 2022 to October 2023. It provides a summary of data collected since the monitoring program was initiated in June 2013. Tags were initially implanted into pickerel in 2013 and these tags expired in 2016. To continue the study, additional transmitters were applied to pickerel in 2014 (expired in 2017), 2016 (expired in 2021), 2018 (expire in 2023), 2019 (expire in 2023), 2021 (expire in 2025), and 2023 (expire in 2027). Monitoring these tags will continue through operation of the Keeyask GS.

Monitoring fish movements is an important component of the overall plan to monitor the impacts of construction and operation of the Keeyask GS on fish. Pickerel is one of the key species to monitor because it is: of commercial and domestic importance; abundant in the Keeyask area; and resilient enough to survive the acoustic tagging procedure.



Map showing the study area. The dots represent the locations of receivers in the river. The different colours represent receivers that were in the river at different times of the year.

Why is the study being done?

Monitoring during the time when the Keeyask GS is operational is being done to answer three questions:

Are there pickerel close to the Keeyask GS, particularly during spawning?

This question is important because pickerel used to spawn downstream of Gull Rapids where the Keeyask GS was built. If they no longer use this area now that the dam is finished, we will have to make sure they have other places where they can spawn.

How many pickerel are moving through and/or away from the Keeyask GS and how far are they going?

Movement studies tell us how many pickerel are moving down past the Keeyask GS, how far they travel up or downstream away from the site, whether they are leaving the Keeyask area completely, and when they are making these movements. The distance they travel is monitored as far upstream as the inlet to Clark Lake and downstream as far as the Limestone Reservoir.

If pickerel move downstream past the GS, they cannot move back, and they may also be injured or killed during passage. This could decrease the number of fish, especially those living upstream of the GS.

How many pickerel move upstream past Birthday and/or Long rapids?

Pickerel travelling upstream past these rapids tells us if they have left their original habitat in the Keeyask reservoir. Tracking these fish can tell us whether they return to the reservoir, move back and forth, or permanently leave the Keeyask area.

Did pickerel change where they live after the reservoir was flooded and GS construction was completed?

Flooding the reservoir changed the available habitat upstream from the GS. Constructing the GS also changed flow patterns in Stephens Lake. These changes may cause pickerel to move away or to use different areas of the river.

What was done?

Movements of pickerel were tracked using acoustic telemetry. This is a technique in which a tag is surgically implanted inside a fish. Each tag sends out a sound signal (called a “ping”) that is picked up by receivers that were placed along the Nelson River between Clark Lake and the Limestone GS (see study area map below). Movements are normally tracked in the Long Spruce forebay, downstream of the Kettle GS, however, low water levels in 2023 (see photos below) prevented this.

The boat launch downstream of the Kettle GS looking north at the launch (left) and east from the launch (right) showing low water levels observed during open-water 2023. This location was not accessible in 2023.

Each fish is given a battery powered transmitter that sends out a unique ping, and pings can be detected up to 1 kilometre (km) away from a receiver. By looking at detections recorded by different receivers, the movement of each fish can be tracked.

Eighty pickerel were originally tagged in 2013, 40 upstream and 40 downstream of Gull Rapids (now called the Keeyask GS) to establish movement pattern(s) before and throughout the Project. Since that time, 143 additional fish have been tagged upstream and 118 downstream to account for expired batteries and fish that moved out of the monitoring area. The additional tagging maintained a sample size of 40 fish up and downstream that could be tracked for the duration of the study.

Measuring a pickerel before surgery (left), conducting a surgery (middle), and releasing a pickerel after surgery (right).

What was found?

Pickerel tagged both upstream and downstream of the Keeyask GS have consistently showed the same movement patterns since monitoring began in 2013. Upstream of the GS, fish either stay in Gull Lake, move between Birthday Rapids and Gull Lake, move between Clark Lake and Gull Lake, or remain in the riverine area downstream of Birthday Rapids. Some fish also move downstream past the Keeyask GS. Pickerel tagged in Stephens Lake either stay in the portion of

the lake within 10 km from the Keeyask GS, or they move extensively within the lake. Most pickerel monitored in 2023 continued to display these same movement patterns.

Since tagging began in 2013, 40 fish have moved downstream past the Keeyask GS site. Thirteen of these movements likely happened because of tagging stress or mortality, while 27 movements occurred for other reasons. Most of the latter moved downstream in 2017 and 2019. The highest numbers of fish also moved downstream past the Kettle GS in the same years. In 2023, no pickerel moved downstream past the Keeyask GS, and one moved downstream past the Kettle and Long Spruce generating stations.

Before the start of construction in 2014, 14% of the tagged pickerel moved upstream into Clark Lake, most of which (71%) moved back downstream to Gull Lake within one to six months. During construction, 18% moved upstream, 50% of which moved back downstream to Gull Lake within one day to nine months. During the first open-water period after impoundment in 2021, 17 tagged pickerel moved upstream (31%), which represents a larger proportion of tagged fish than seen in past years. In 2022, five tagged pickerel (17%) moved upstream into Clark Lake during the open-water period, while eight (25%) moved upstream in 2023, but similar to all other years, most of these fish returned to Gull Lake before the end of the open-water period (56% in 2022 and 75% in 2023). Most fish that moved upstream to Clark Lake were detected here for a short period and returned downstream to Gull Lake.

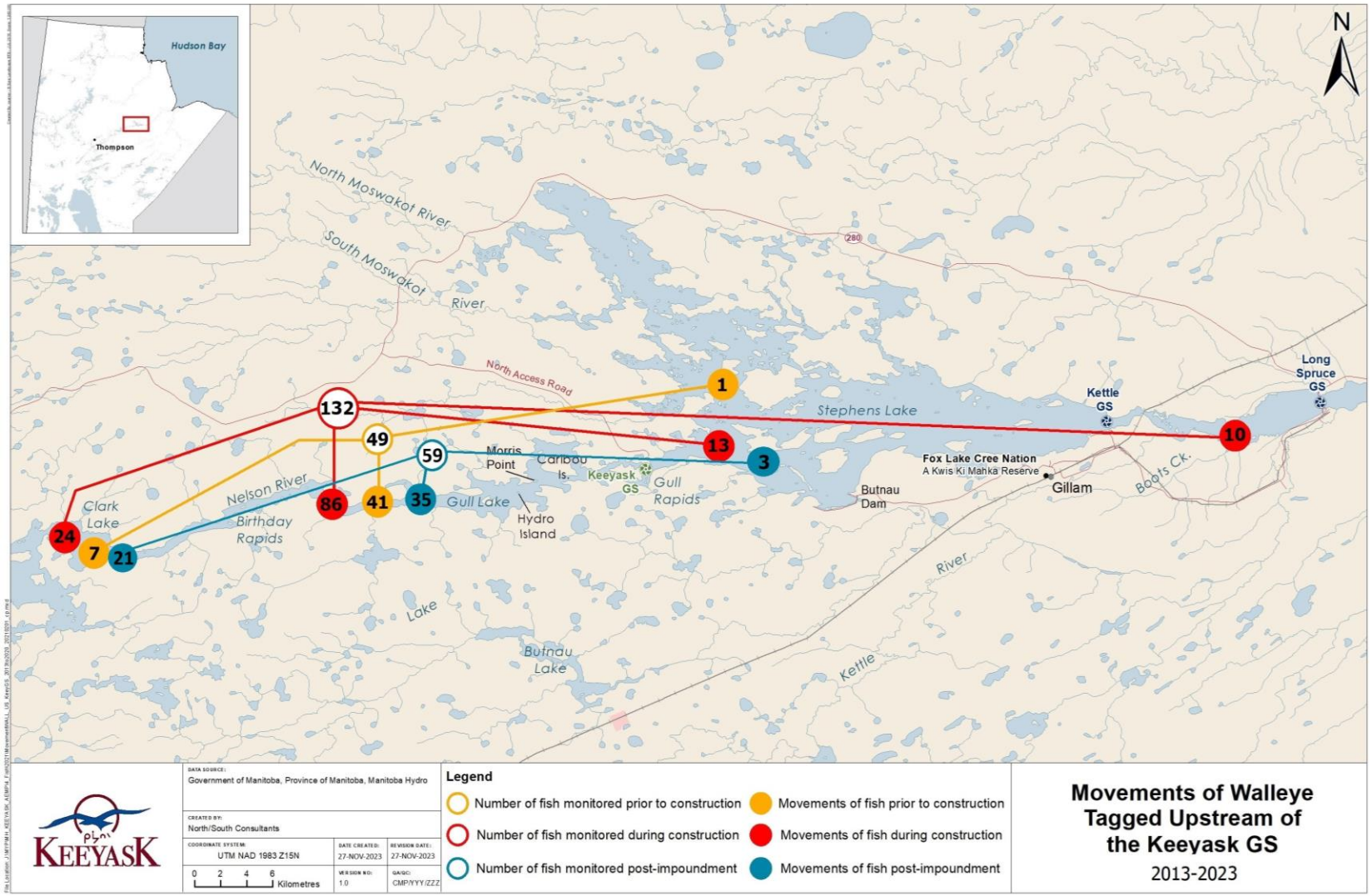
Pickerel in Stephens Lake have consistently used habitat directly downstream of the GS before and during construction. The Keeyask GS was completed on March 9, 2022, and its operation changed the flow patterns in Stephens Lake. Despite this, pickerel continue to be detected near the Keeyask GS (≤1.2 rkm) during the spawning period including 66% of detected fish in 2022 and 47% in 2023.

What does it mean?

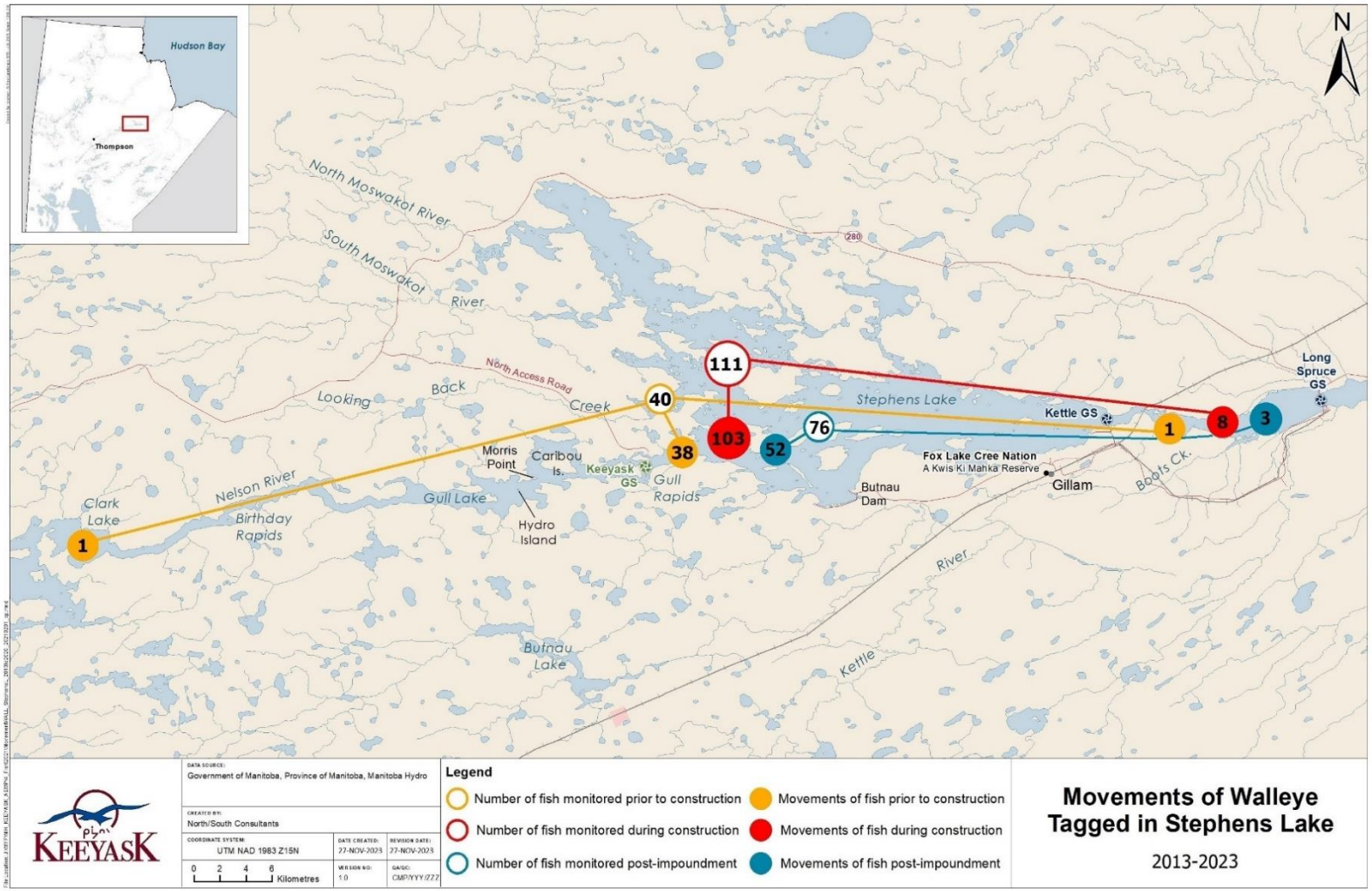
In all years since the study began in 2013, there has been no change in pickerel movements caused by the Keeyask GS. Pickerel use habitat immediately downstream of the Keeyask GS, including during the spawning period. After impounding the reservoir, most of the pickerel tagged upstream from the GS showed the same general movement patterns that were seen before impoundment. Although more fish were detected moving upstream out of the reservoir, most of those fish return within one year, and there was no indication that the number of pickerel moving downstream into Stephens Lake had increased more than what was seen in the past.

What will be done next?

Fish that were tagged in 2021 and 2023 (those containing tags that have battery-life remaining) will continue to be tracked in 2024. Ongoing tracking of fish through operation of the GS will indicate if the Project changed their general movements. Results will show what kinds of habitats these fish use, when and where they are spawning, where they are feeding, and whether they leave the Keeyask area.



Map showing how many pickerel tagged upstream of the Keeyask GS moved upstream out of Gull Lake, stayed in Gull Lake, and moved into Stephens Lake before construction (yellow), during construction (red) and after reservoir impoundment (blue). Movements of fish due to tagging stress or mortality were not included. Numbers of fish monitored (hollow circles) represent the number of fish tagged while the number of fish movements (solid circles) represent the number of fish detected.



Map showing how many pickerel tagged downstream of the Keeyask GS moved upstream through Gull Rapids, stayed in Stephens Lake, and moved downstream past the Kettle GS before construction (yellow), during construction (red) and after reservoir impoundment (blue). Movements due to tagging stress and mortality were not included. Numbers of fish monitored (hollow circles) represent the number of fish tagged while the number of fish movements (solid circles) represent the number of fish detected.

ACKNOWLEDGEMENTS

We would like to thank Manitoba Hydro for the opportunity and resources to conduct this study.

Grant Connell and Leslie Flett of Tataskweyak Cree Nation (TCN) are thanked for their local expertise and assistance in conducting the field work. We would also like to thank Douglas Kitchekeesik and Gordon Cook of TCN and Ray Mayham of Fox Lake Cree Nation for arranging logistic support and personnel needed to conduct the fieldwork.

The collection of biological samples described in this report was authorized by Economic Development, Investment, Trade, and Natural Resources, Fish and Wildlife Branch, under terms of the Scientific Collection Permit #57172605 (SCP 19-2023).

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1.0 INTRODUCTION

The Keeyask Generation Project (the Project) is a 695-megawatt (MW) hydroelectric generating station on the lower Nelson River in northern Manitoba. The GS is approximately 725 kilometres (km) northeast of Winnipeg, 35 km upstream of the existing Kettle Generating Station, 60 km east of the community of Split Lake, 180 km east-northeast of Thompson and 30 km west of Gillam. Construction of the GS began in July 2014 and the seven generating units were all in-service in March 2022.

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 aquatic 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: Aquatic Environment Supporting Volume* (AE SV). As part of the licensing process for the Project, an Aquatic Effects Monitoring Plan (AEMP) was developed detailing the monitoring activities of various components of the aquatic environment, including the focus of this report, Walleye (*Sander vitreus*) movement, for the construction and operation phases of the Project.

Pre-construction (baseline) movements of Walleye were monitored using radio telemetry from 2001 to 2005 (Barth *et al.* 2003; Murray *et al.* 2005; Murray and Barth 2007). Radio telemetry studies focused specifically on detecting the upstream and downstream movements of fish over rapids in the study area (Birthday Rapids and Gull Rapids). Pre-construction movement data revealed that the majority of Walleye did not move upstream or downstream over rapids into adjacent study reaches; rather, they remained within the reach where they had been tagged. The few fish that moved over one or more sets of rapids did so in the summer or fall, suggesting that these movements were not associated with spawning. A small number of Walleye also moved downstream past the Kettle and Long Spruce generating stations on the lower Nelson River. Additional information on long distance movements was obtained from mark-recapture studies. These results are not directly comparable to the movement data being collected under the AEMP.

In 2013, 80 Walleye were tagged with acoustic transmitters to assess the frequency of movement through Gull Rapids and to monitor the potential impact that construction of the Keeyask GS may have on movement (Hrenchuk and Barth 2014). Movements of these Walleye from the tagging date until 2016 are provided in Murray *et al.* (2015), Burnett *et al.* (2016), and Hrenchuk and Lacho (2017). As the transmitters applied in 2013 reached the end of their battery life in 2016, an additional 48 transmitters were applied to Walleye in 2016 to continue the movement study until 2021 (Hrenchuk and Lacho (2017; 2018; 2019; Hrenchuk 2020; 2021). An additional 60 tags were applied in 2021, and another 20 in 2023, to continue to track movements post-impoundment and during early operation; presented in Small and Hrenchuk (2022), Funk and Hrenchuk (2023), and the current report.

Impoundment of the Keeyask reservoir was completed on September 5, 2020, and monitoring in the Keeyask reservoir in 2021 represented the first year of monitoring with the reservoir at full

supply level. Monitoring in Stephens Lake, however, represented a transition between construction and operation as a considerable portion of the flow was still being passed through the spillway in spring and early summer 2021, when only a few units were in-service. All powerhouse units were commissioned by March 22, 2022. Therefore, monitoring in 2023 represents the second year of operation monitoring. Key questions identified in the AEMP relating to operation monitoring include:

- What is the frequency of downstream movement past the Keeyask GS and when are the movements occurring?
- Are Walleye utilizing habitat in the vicinity of construction activities (particularly during spawning)?
- What types of habitat are Walleye utilizing in the Keeyask reservoir (*i.e.,* are fish using the upper, middle, or lower end of the reservoir)?
- What proportion of the fish population moves from the Keeyask reservoir upstream past Birthday and/or Long rapids?

This report provides results of Walleye movement monitoring between October 2022 and October 2023, and summarizes what has been observed since the program began in 2013.

2.0 STUDY SETTING

The study area encompasses an approximately 110 km long reach of the Nelson River from Clark Lake to the upstream end of the Limestone Reservoir (Map 1). This section of river offers a diversity of physical habitat conditions, including a variety of substrate types, and variable water depths (range: 0–30 m) and velocities. Clark Lake is located immediately downstream of Split Lake, and approximately 42 km upstream of the Keeyask GS. Current is restricted to the main section of the lake, with off-current bays outside the main channel. The Assean River is the only major tributary to Clark Lake and flows into the north side. Downstream from the outlet of Clark Lake, the Nelson River narrows and water velocity increases for a 3 km stretch, known as Long Rapids. For the next 7 km, the river widens, and water velocity decreases. The area between Clark Lake and Birthday Rapids is referred to herein as the upper Keeyask reservoir.

Birthday Rapids is located approximately 10 km downstream of Clark Lake and 30 km upstream of the Keeyask GS and marks the upstream end of major water level changes because of impoundment by the Keeyask GS. The drop in elevation from the upstream to downstream side of Birthday Rapids was approximately 2 m prior to impoundment but is now nearly level, albeit a fast-flowing section of river. The 14 km reach of the Nelson River between Birthday Rapids and Gull Lake was characterized as a large and somewhat uniform channel with medium to high water velocities and a few large bays. This area is now within the Keeyask reservoir, though flooding was limited to mainly shoreline areas, and is referred to herein as the middle Keeyask reservoir.

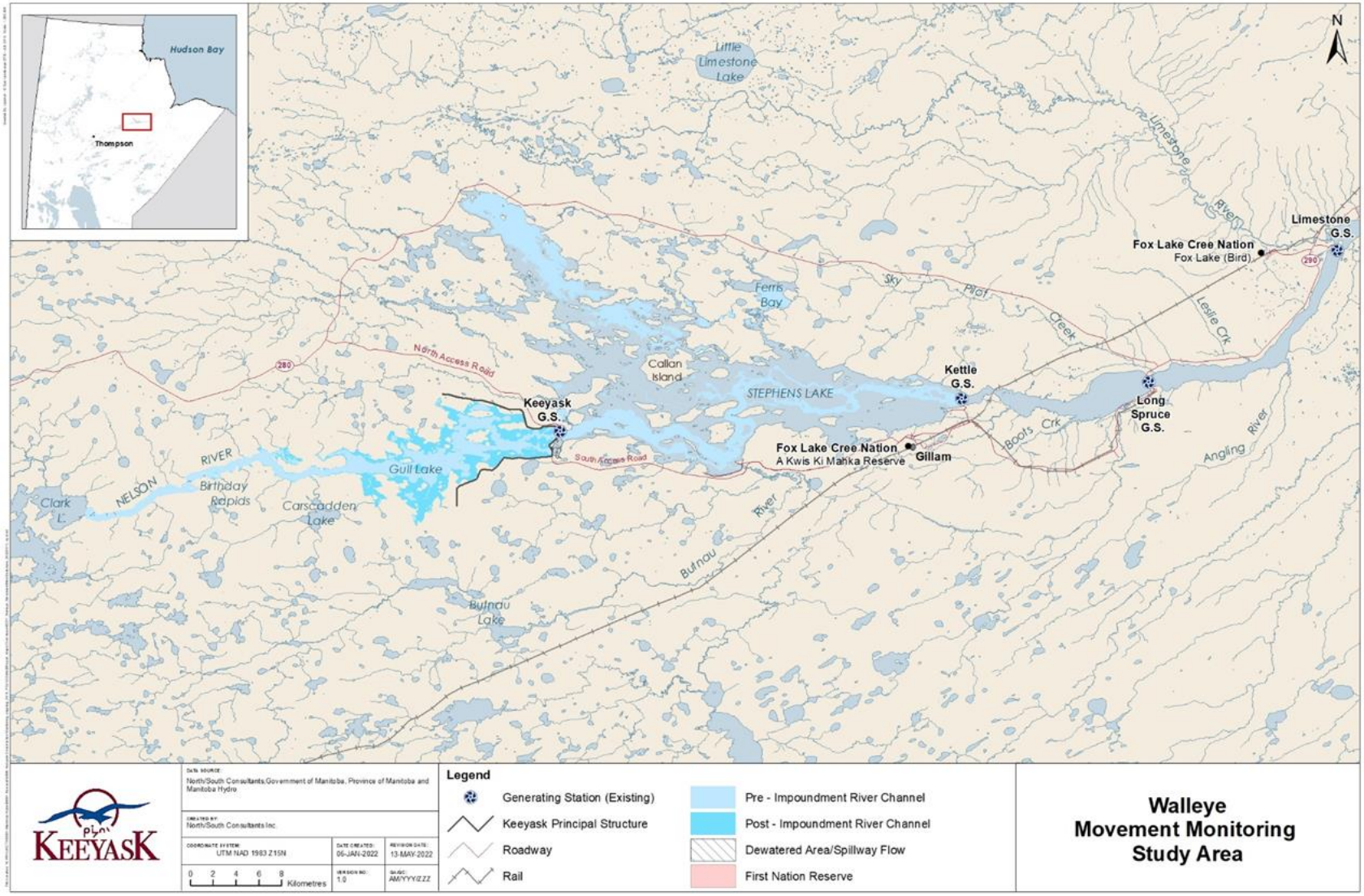
Prior to impoundment, Gull Lake was a widening of the Nelson River, with moderate to low water velocity beginning approximately 20 km upstream the Keeyask GS. Water levels on Gull Lake increased by several metres following impoundment and flooding along the shoreline and small tributaries entering this reach was extensive. Although this area is larger than prior to impoundment, the portion of the Keeyask reservoir is referred to herein as Gull Lake.

Just below the Keeyask GS, the Nelson River enters Stephens Lake. Stephens Lake was formed in 1971 by construction of the Kettle GS. Construction of the Keeyask GS has altered the flow distribution immediately downstream of the station.

Construction of the Kettle GS flooded Moose Nose Lake (north arm) and several other small lakes that previously drained into the Nelson River, as well as the old channels of the Nelson River that now lie within the southern portion of the lake. Major tributaries of Stephens Lake include the North and South Moswakot rivers that enter the north arm of the lake. Looking Back Creek is a second order stream that drains into the north arm of Stephens Lake. Kettle GS is located approximately 40 km downstream of the Keeyask GS.

The Long Spruce reservoir was formed in 1979 by the construction of the Long Spruce GS. It is a 16 km reach of the Nelson River extending from Long Spruce GS upstream to Kettle GS (Manitoba Hydro Public Affairs 1999). Kettle River and Boots Creek are the only major tributaries flowing into the Long Spruce reservoir, with both tributaries entering the reservoir on the south shore.

The Limestone reservoir was formed in 1990 by the construction of the Limestone GS. It is a 23 km reach of the Nelson River extending from Limestone GS upstream to Long Spruce GS. Four tributaries of the Nelson River enter the reservoir; Wilson Creek and Brooks Creek enter from the south, and Sky Pilot Creek and Leslie Creek enter from the north. Aquatic habitat within the reservoir ranges from a riverine environment in the upper reach, to more lacustrine conditions just upstream of the Limestone GS.



Map 1: Map of the lower Nelson River showing the site of the Keeyask Generating Station and the Walleye movement monitoring study setting.

3.0 METHODS

3.1 ACOUSTIC TELEMETRY

Acoustic telemetry involves tracking movements of fish surgically implanted with internal acoustic transmitters (tags). Each transmitter emits a unique signal, recognizable by stationary receivers. When tagged fish come into the detection range of a receiver (generally within 500 m to 1 km, depending on conditions), the transmitter code number, as well as the date and time, are stored in the receiver.

3.1.1 ACOUSTIC TRANSMITTER APPLICATION

Acoustic transmitters (VEMCO V13-1x) were first applied to Walleye in 2013 (40 upstream and 40 downstream of the Keeyask GS site) and 2014 (nine upstream and two downstream) (Murray *et al.* 2015). These transmitters expired during the 2016 open-water period. To continue Walleye movement monitoring with a similar sample size, 80 acoustic transmitters (VEMCO V13-1x[1]) were applied to Walleye between May 27 and June 7, 2016: 40 upstream, and 40 downstream of the Keeyask GS site (Table 1). Shortly after tagging *(i.e.*, within 22 days), eight fish moved downstream into Stephens Lake. To return the number of tagged fish upstream of the Keeyask GS to the original sample size, eight additional transmitters were applied on September 24, 2016 (Hrenchuk and Lacho 2017).

In October 2017, monitoring results indicated that several additional fish had either moved downstream out of Gull and Stephens lakes or had gone missing (see Sections 4.1.1 and 4.1.2). Therefore, to maintain a similar sample size of tagged fish, additional transmitters (VEMCO V13-1x) were applied to Walleye upstream of the Keeyask GS and in Stephens Lake in spring 2018. Seventeen fish were tagged upstream of the Keeyask GS between May 27 and June 5, and seven fish were tagged in Stephens Lake between June 6 and 9 (Table 1).

Additional transmitters were applied to Walleye in 2019 (VEMCO V13-1x) to maintain the sample size during GS operation, while obtaining one full year of tracking prior to GS commissioning. Twenty-seven fish were tagged upstream of the Keeyask GS between May 23 and June 7, and 29 were tagged in Stephens Lake between May 30 and June 3. An additional two fish were tagged in Stephens Lake on September 16 (31 total; Table 1). As these tags are nearing the end of their expected battery life, an additional 60 tags (VEMCO V13-1x) were applied to Walleye in May and June 2021; 30 upstream and 30 downstream of the Keeyask GS and another 20 tags (VEMCO

[1] Battery life for tags implanted in 2013 was estimated at 1,480 days; tags implanted in 2016 and 2018 had an estimated battery life of 1,735 days; tags implanted in 2019 had an estimated battery life of 1,492 days; and tags implanted in 2021 had an estimated battery life of 1,460 days.

V13-1x) were applied in May of 2023; 12 upstream and 8 downstream (Appendix 6). Release locations for the 20 Walleye tagged in 2023 are presented in Map 2.

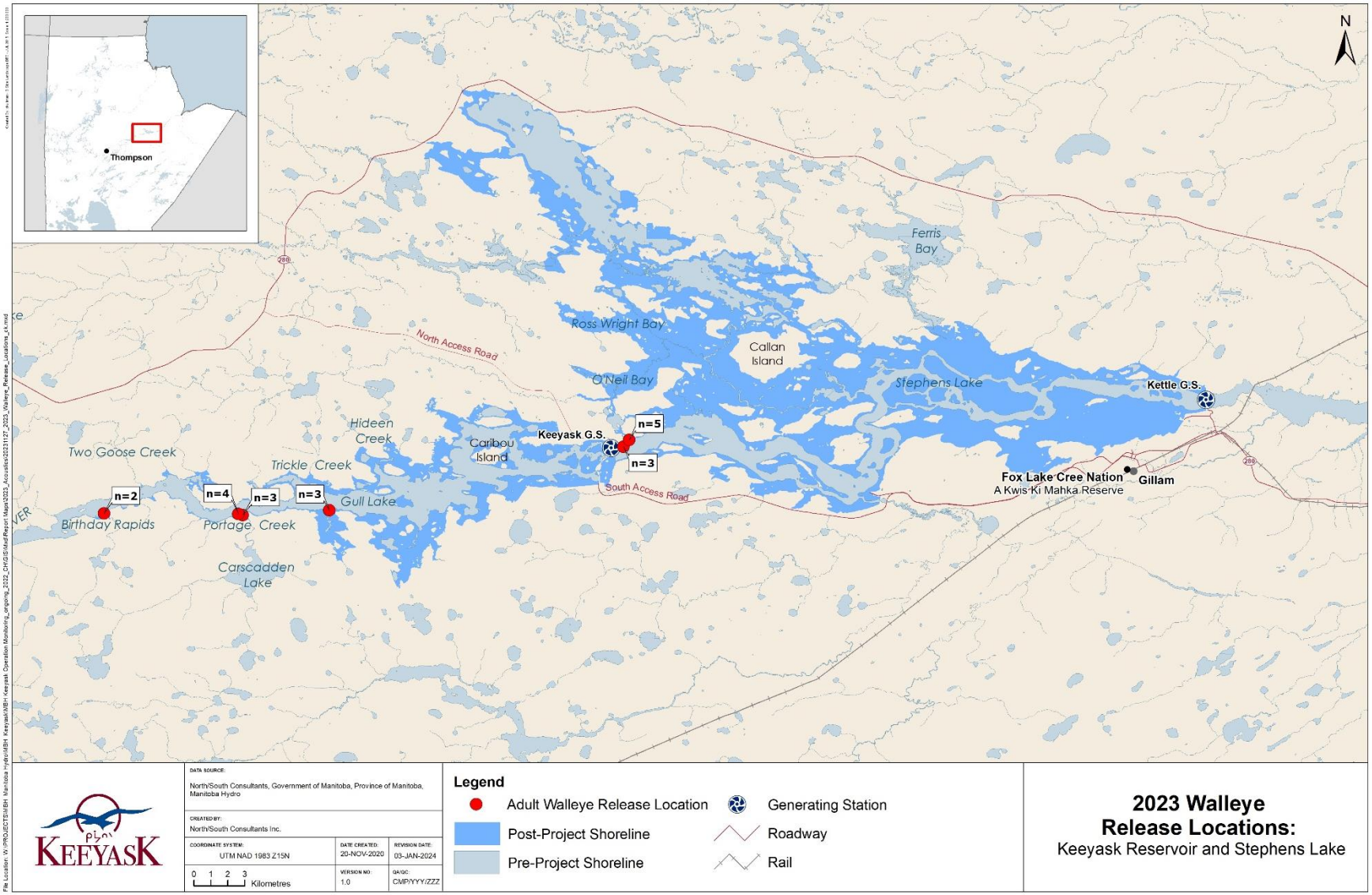
Table 1: Number of acoustic tags applied to Walleye in the Keeyask Study Area (upstream of the Keeyask GS site and in Stephens Lake) between June 2013 and October 2023.

Year	Upstream of Gull Rapids/Keeyask GS[1]	Stephens Lake	Total
2013*	40	40	80
2014*	9	2	11
2015*	0	0	0
2016*	48	40	88
2017*	0	0	0
2018*	17	7	24
2019	27	31	58
2020	0	0	0
2021	30	30	60
2022	0	0	0
2023	12	8	20

1. Referred to as the Keeyask GS after spillway commissioning in 2018.

*Tags no longer active during the current reporting period. Tags in 2018 expired prior to the open-water 2023 study period. Detailed information on movements (2013–2016) can be found in Hrenchuk and Barth (2014), Murray *et al*. (2015), Burnett *et al*. (2016), Hrenchuk and Lacho (2017; 2018; 2019), and Hrenchuk (2020).

Following capture, Walleye receiving tags were placed in a 66.4 L fish tub fitted with an aquarium aerator. All tagging was conducted on shore near the site of capture. Prior to transmitter implantation, Walleye were anaesthetized in a solution of clove oil and ethanol, adapted from Anderson *et al*. (1997). When the Walleye became immobile, they were placed in a surgery cradle ventral side up. Because the anesthetic renders a fish unable to ventilate on its own, fresh water was continuously poured over the gills. A small incision was made through the ventral body wall using a sterilized scalpel. An acoustic transmitter was inserted into the body cavity and the incision was closed with sutures. Walleye were placed in fresh water and monitored until they were able to maintain equilibrium and had regained their strength. They were released in off-current areas near the original capture site.



Map 2: Release locations for Walleye tagged with acoustic transmitters in the Keeyask reservoir in spring 2023.

3.1.2 ACOUSTIC RECEIVERS

Since 2013, stationary acoustic receivers (VEMCO model VR2W) have been used to continuously monitor tagged Walleye in the Nelson River between Clark Lake and the Long Spruce GS. In spring 2016, the receiver array was extended to the upper Limestone reservoir, with the placement of two receivers downstream of the Long Spruce GS. The intent of adding these receivers was to determine whether fish that had moved into the Long Spruce reservoir had continued to move downstream.

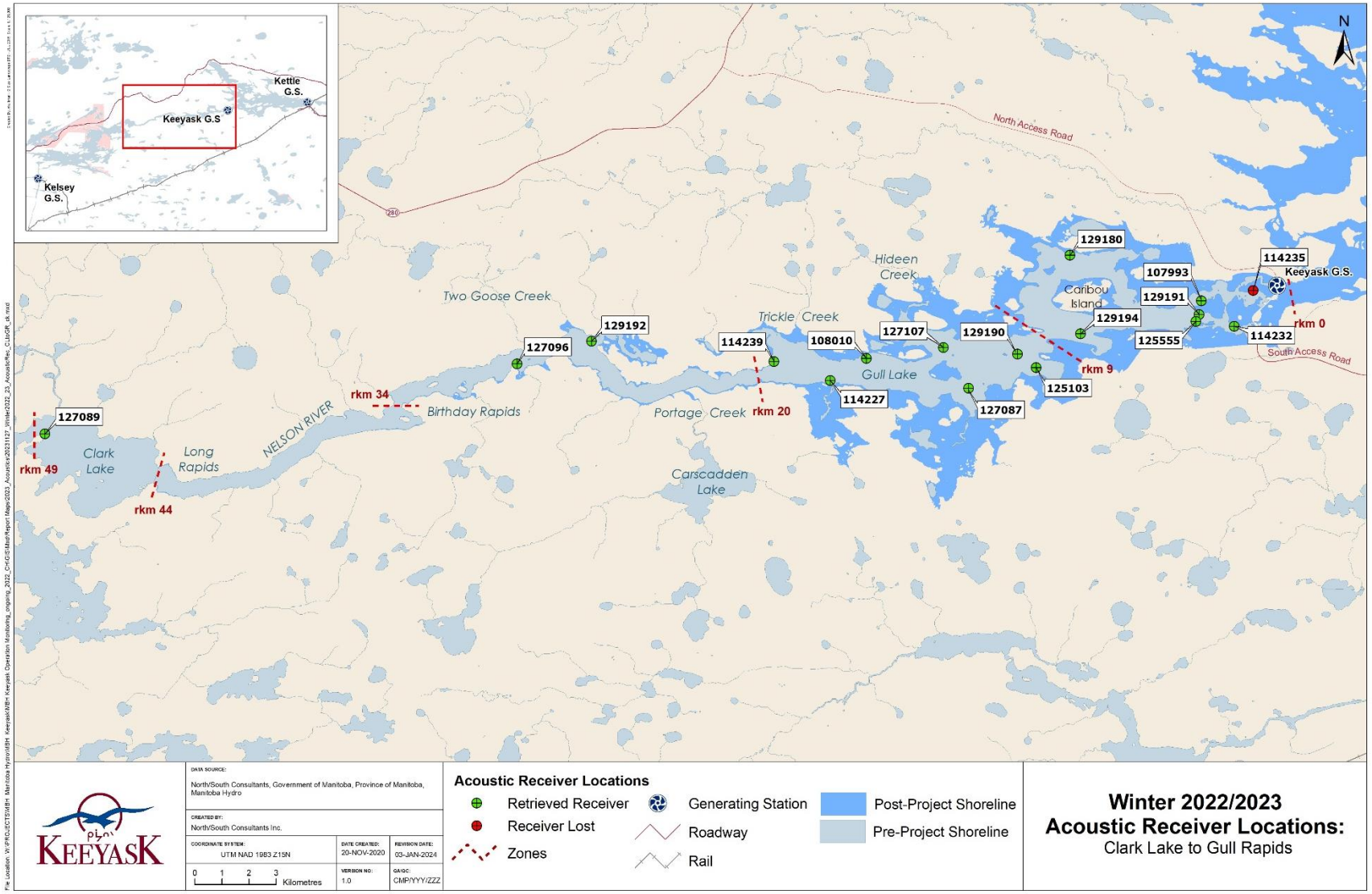
During the six-year construction phase of the Project (beginning in July 2014), receivers were deployed at the same sites as those established during the pre-construction phase (2011–2013). During the open-water period, receivers were deployed in calm water with a flat bottom free of large debris to maximize detection range and spaced along the main river channel throughout the study area to maximize spatial coverage. In Stephens Lake, receivers were placed at locations within pre-flood river channels, based on the observation that sturgeon tend to stay within river channels, even in flooded environments. At constrictions within the river channel, a series of receivers were deployed to create “gates” with the intent of recording all fish that passed by the river cross-section (described in Section 3.1.2.2).

The retrieval of receivers deployed during winter has proven challenging and several were lost in previous winters, likely moved by ice (Hrenchuk and Barth 2013). Because it appears that receivers will only remain safe from ice if deployed in calm areas at depths greater than 10 m, the number of possible receiver locations during winter is limited, especially in areas upstream of the Keeyask GS.

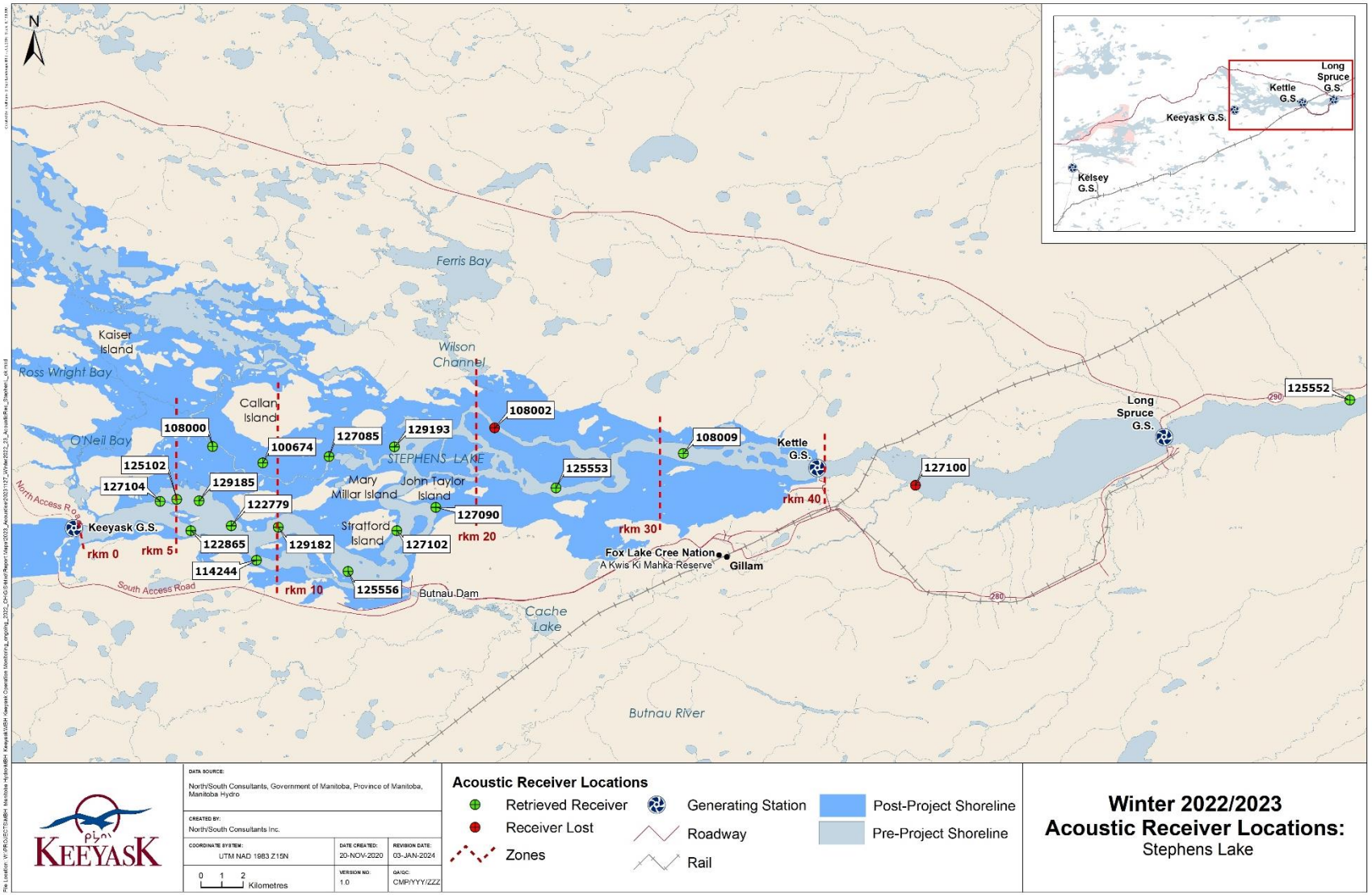
3.1.2.1 WINTER 2022/2023

The stationary acoustic receiver array for the winter 2022/2023 (October 11, 2022, to May 15, 2023) period consisted of 36 receivers. Seventeen were set upstream of the Keeyask GS, 17 in Stephens Lake, one downstream of the Kettle GS, and one downstream of the Long Spruce GS (Maps 3 and 4). The 2022/2023 winter array differed slightly from the array used in 2021/2022. Eight additional receivers were set within Gull Lake to increase over-winter coverage within the Keeyask reservoir at rkms -15.0 (#108010), -9.9 (#125103), -7.8 (#129194), -2.1 (#107993, #129191, and #125555), -0.8 (#114232), and -0.3 (#114235). Prior to flooding, these sites were too shallow and fast to be considered suitable locations to deploy receivers during winter.

One additional receiver was set downstream of the Long Spruce GS at the mouth of Leslie Creek (rkm 65.3; #125552).



Map 3: **Locations of stationary receivers set in the Nelson River from Clark Lake to the Keeyask GS between October 2022 and May 2023. River kilometer (rkm) distances are indicated with a dotted line. The former (pre-impoundment) river channel is shown in light blue.**



Map 4: **Locations of stationary receivers set in Stephens Lake from the Keeyask GS to Kettle GS between October 2022 and May 2023. River kilometer (rkm) distances are indicated with a dotted line. The former (pre-impoundment) river channel is shown in light blue.**

3.1.2.2 OPEN-WATER 2023

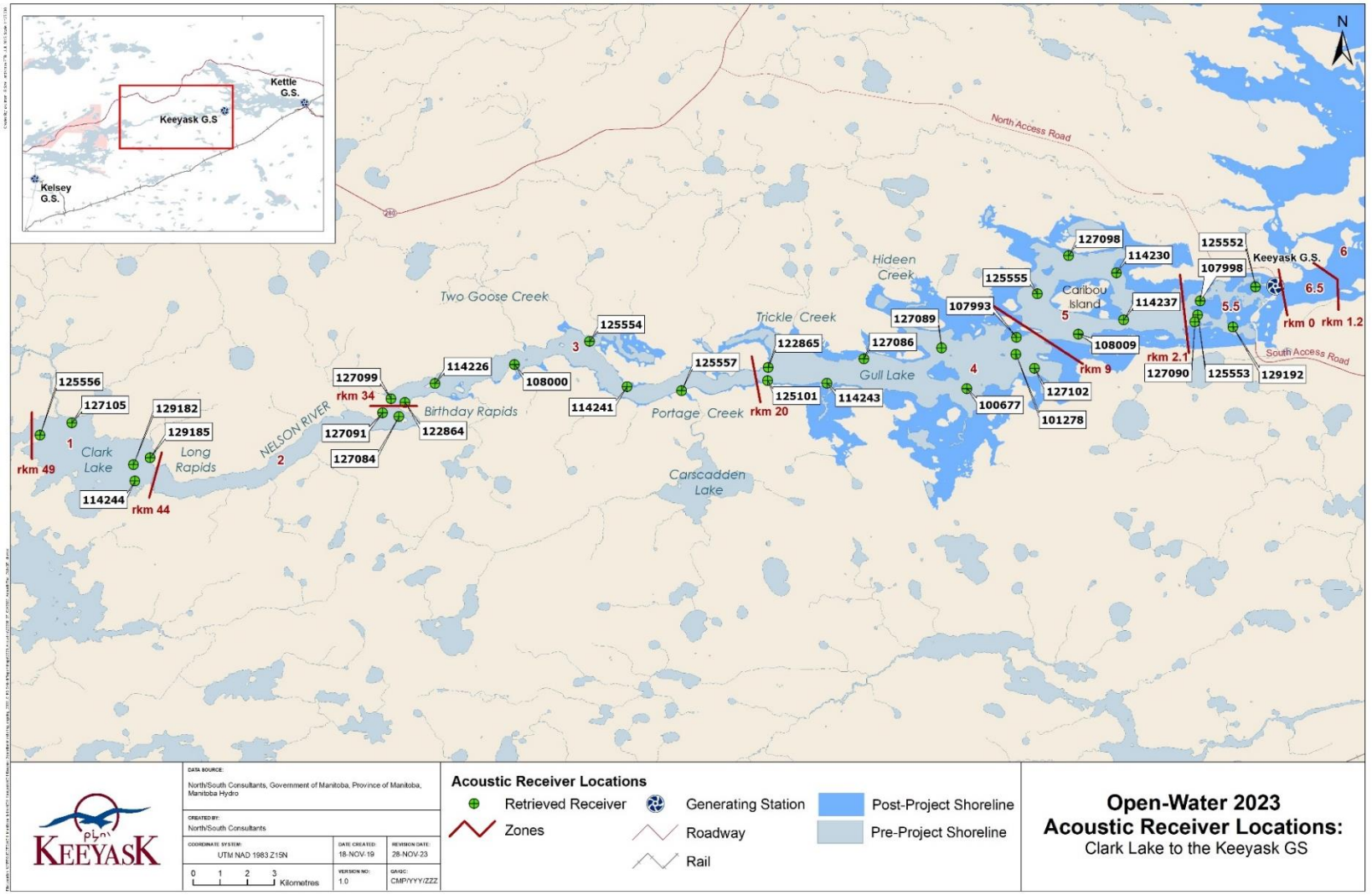
An array of 68 acoustic receivers was used during the beginning of the 2023 open-water period (defined as May 16 to October 2, 2023). Thirty-three were set upstream of the Keeyask GS, 33 in Stephens Lake, and two downstream of the Long Spruce GS (Maps 5, 6, and 7). The 2023 open-water array differed slightly from the array used in 2022. One receiver (#129182; rkm -44.5) was added to the "gate" (described below) at the outlet of Clark Lake (Map 5). Acoustic receivers could not be set in the Long Spruce reservoir during the 2023 open-water period due to low water levels that prevented boat access. The acoustic receiver set in this area during winter 2022/2023 (#129187; rkm 45.1) could not be retrieved.

Similar to previous years, receiver "gates" were established in several key areas selected by river morphology (channel restrictions) and habitat characteristics (areas with low velocity adjacent to the main flow of the river). Receiver "gates" consisted of two or more acoustic receivers set parallel to flow to provide complete (or nearly complete) signal coverage of a river cross-section. Areas between the "gates" were referred to as river zones. Receiver gates provide confidence that movements past key points are being detected, which allows for extrapolation of coarse-scale positions (*i.e.*, which zone) during periods when fish remain undetected. When analyzing data, fish detected within a zone that subsequently go undetected for a period of time without passing through a gate, are assumed to be within the zone in which they were last detected.

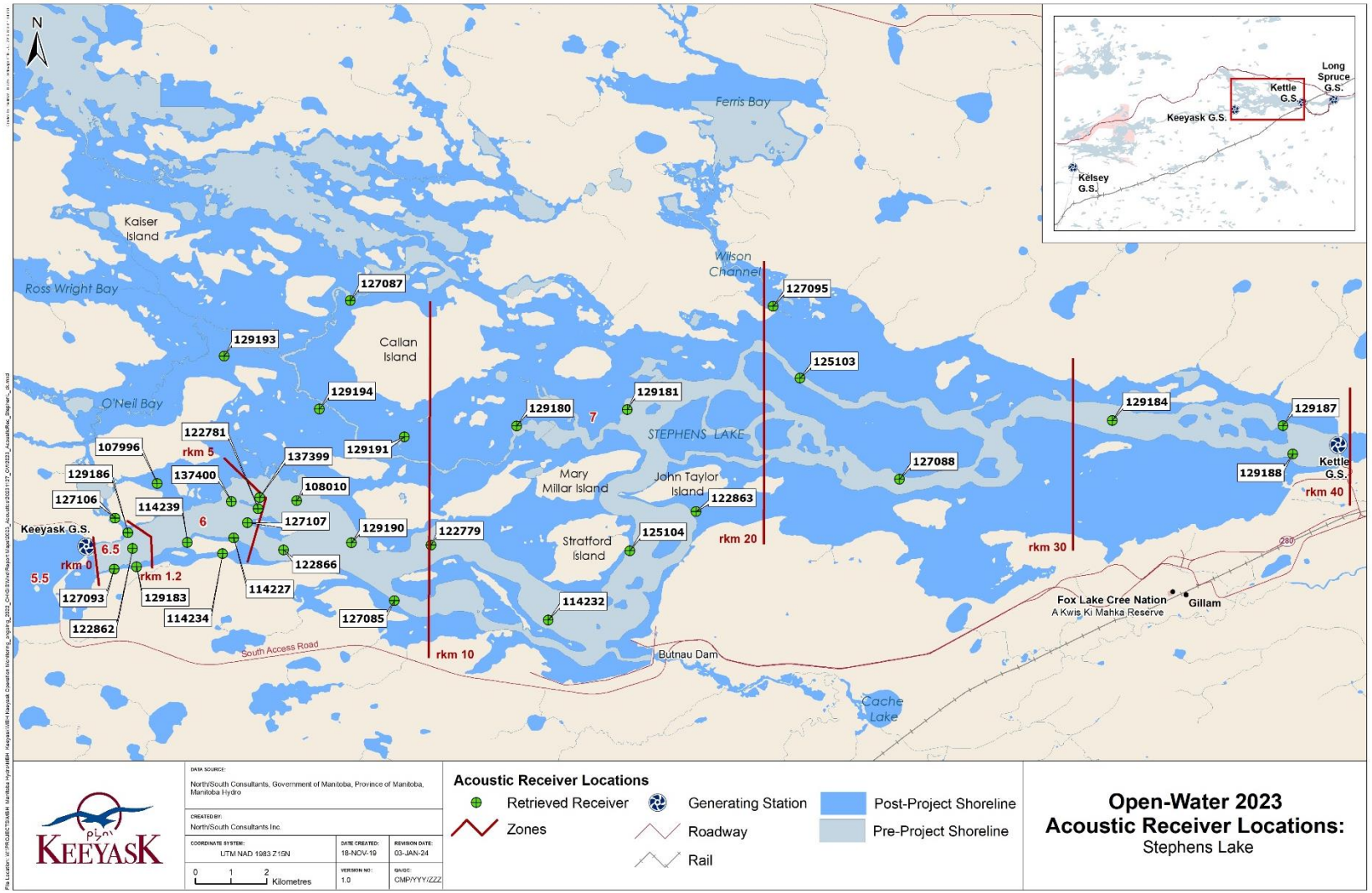
Five gates were established between Clark Lake and the Keeyask GS (44.0, 34.0, 20.0, 9.0, and 2.1 rkms upstream of the GS), dividing the river into six zones (Zones 1, 2, 3, 4, 5, and 5.5; Map 5). Three were established in Stephens Lake (1.2, 4.5, and 40.0 rkms downstream of the GS), dividing the lake into three zones (Zones 6.5, 6, and 7; Map 6). The location of the "gates" has remained consistent since 2013 except for the two gates closest to the station which were added in 2022 to track movements of fish close to and past the GS.

To describe fish movements for reporting purposes, the study area was divided into eleven different zones. The area upstream of the Keeyask GS was divided into six zones (Zones 1–5.5), while Stephens Lake was divided into three zones (Zones 6.5, 6, and 7). The Long Spruce reservoir is referred to as Zone 8 and the Limestone reservoir as Zone 9. Two additional zones were created in 2022 close to the Keeyask GS. Zone 5.5 is located within 2.1 rkm upstream of the GS, and Zone 6.5 is located within 1.2 rkm downstream of the GS.

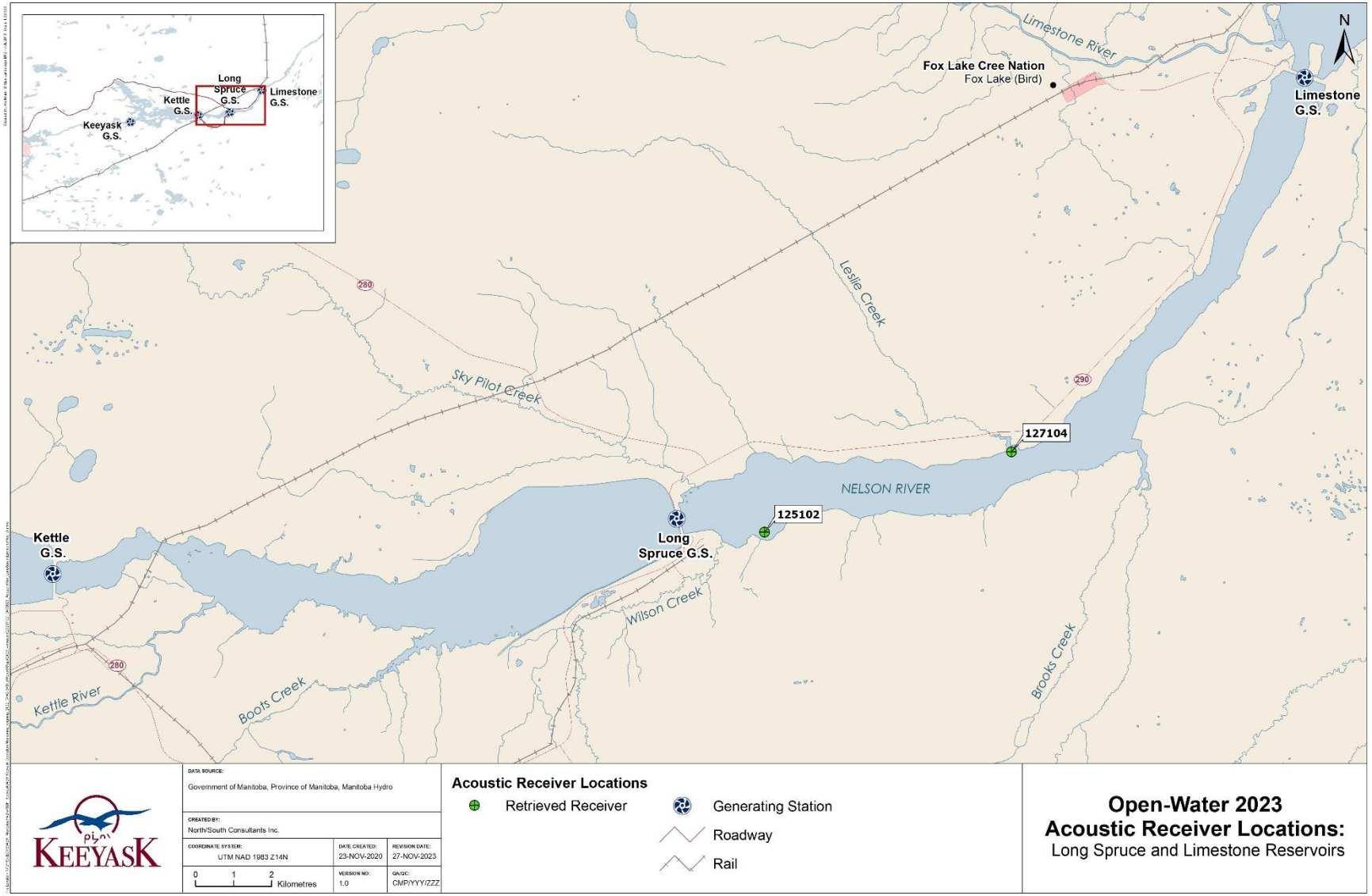
Water temperature within the Nelson River mainstem was recorded with a HOBO Water Temperature Pro data logger from October 10, 2022, to October 2, 2023. Walleye generally spawn in the spring when water temperature ranges from 4–9°C (Scott and Crossman 1998; Stewart and Watkinson 2004). In 2023, there were indications that the spawning period lasted beyond these temperatures. During spring spawning studies, Walleye were captured in spawning condition when the water temperature measured 13°C (Morrison and Hrenchuk 2024). Thus, data collected between 4 and 13°C was considered as the "spawning period".



Map 5: **Locations of stationary receivers set in the Nelson River from Clark Lake to the Keeyask GS between May and October 2023. The river is divided into six "zones" based on placement of receiver "gates." River kilometer (rkm) distances at zone divisions are indicated with a red line. The former (pre-impoundment) river channel is shown in light blue.**



Map 6: **Locations of stationary receivers set in Stephens Lake between May and October 2023. The river is divided into three "zones" based on placement of receiver "gates." River kilometer (rkm) distances are indicated with a red line. The pre-impoundment river channel is shown in light blue.**



Map 7: Locations of stationary receivers set between the Kettle and Limestone Generating Stations between May and October 2023.

3.1.3 DATA ANALYSIS

False detections can arise on acoustic telemetry receivers due to code collisions and/or environmental noise (Pincock 2012). To filter out false detections, a fish was required to be detected at least two times within a 30-minute interval at a given stationary receiver. Single detections were filtered and not used in most analyses; however, in instances when fish went undetected for lengthy periods, and/or rapid movements were suspected, raw data were also explored. In no instance did examination of raw data suggest that consideration of a single detection would result in a different behaviour or movement pattern compared with the result when single detections were removed.

Movements were analysed in terms of rkm distance, with the base of the Keeyask GS representing a distance of 0 rkm. The area located downstream of the Keeyask GS (*i.e.*, Stephens Lake and the Long Spruce reservoir) were given positive (+) distance values from the GS, while the area located upstream *(i.e.*, Gull and Clark lakes) were given negative (-) distance values (Figures 1 and 2). The average rkm distance from the GS was calculated over a 4-hour interval and plotted versus time for each fish. Total detection ranges were calculated by subtracting the farthest downstream detection location from the location of the farthest upstream detection. The proportion of time that all fish spent within each river zone during each 4-hour interval was plotted and presented as a percentage of the study period. For example, a fish that spent 44% of the time between May 1 and May 31 within Zone 4 means that the fish was detected within Zone 4 for 44% of the 186 4-hour intervals between May 1 and May 31.

Rapid downstream movements observed within two weeks of tagging were classified as caused by tagging stress or mortality. If the fish made a rapid downstream movement within two weeks of tagging followed by upstream and downstream movements, it was classified as tagging stress. If a fish made a rapid downstream movement within two weeks of tagging and was not detected again or did not display upstream movements, it was classified as a tagging mortality. If a fish was not detected for more than one year, it was classified as missing.

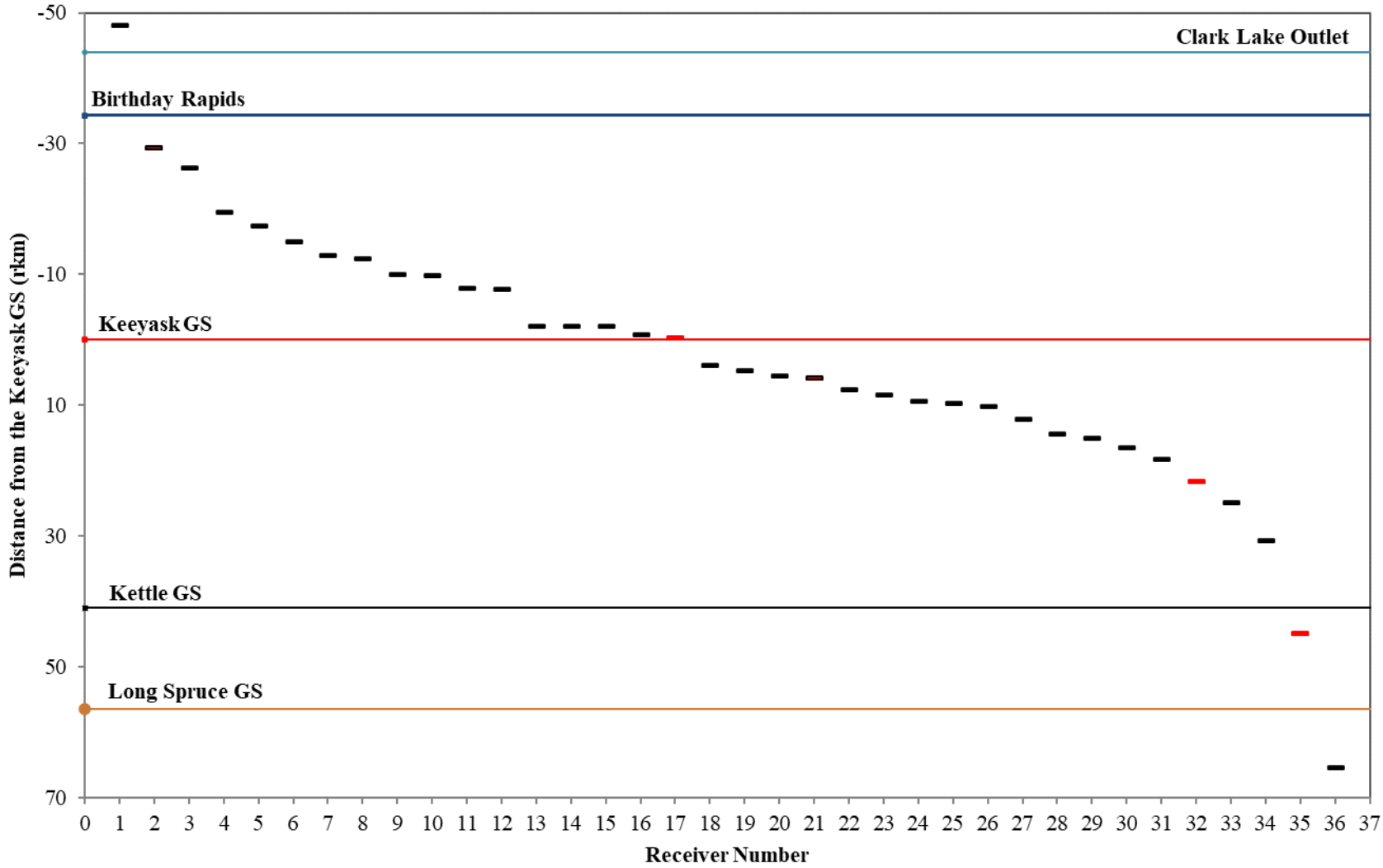


Figure 1: **Locations of stationary acoustic receivers (dashes) in relation to the base of the Keeyask GS (rkm 0) and other major landmarks (lines) in the Nelson River between Clark Lake and the Kettle GS between October 2022 and May 2023. Red dashes indicate receivers that could not be located at the end of the winter 2022/2023 period.**

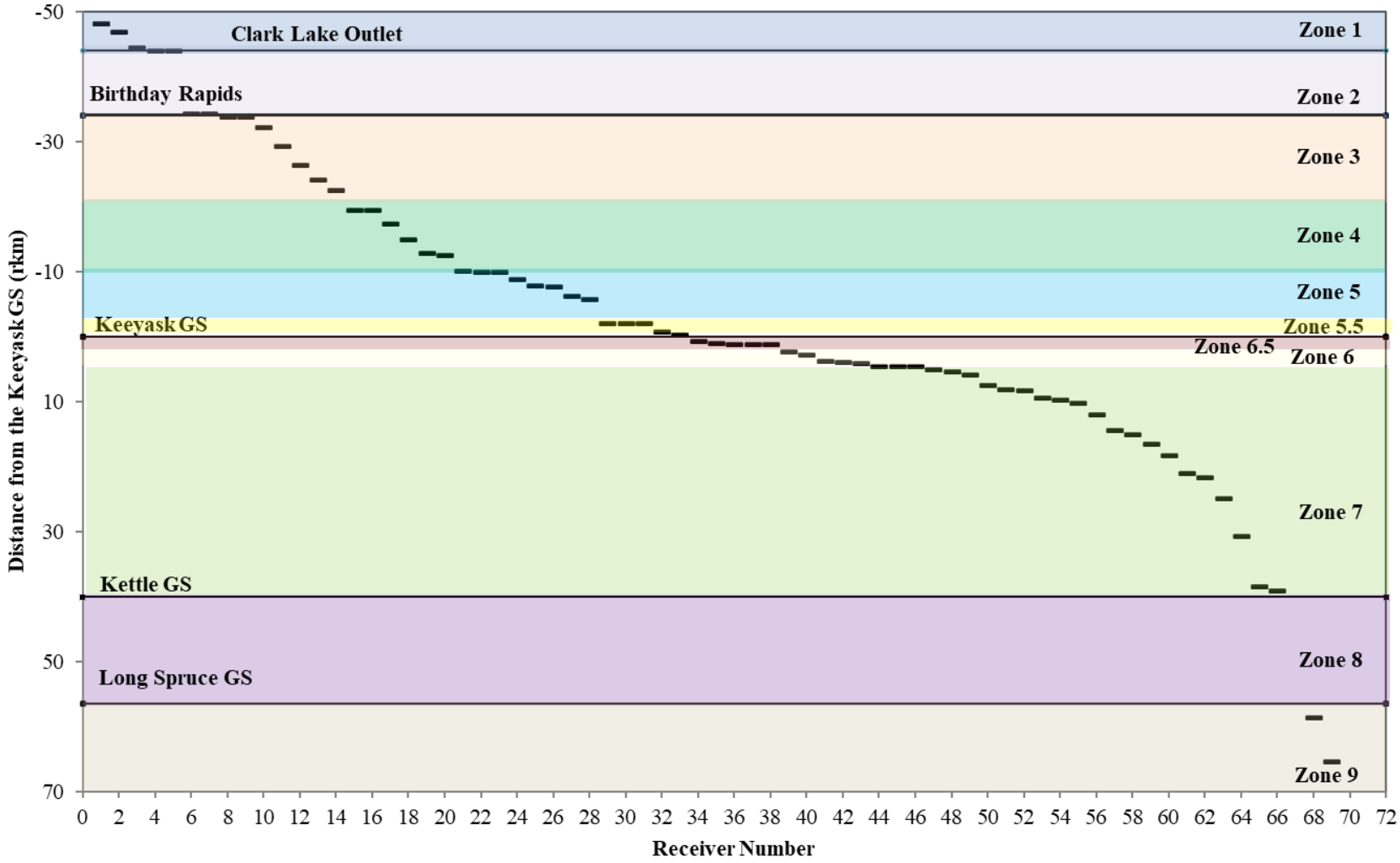


Figure 2: **Locations of stationary acoustic receivers (dashes) in relation to the base of the Keeyask GS (rkm 0) and other major landmarks (lines) in the Nelson River between Clark Lake (Zone 1) and the Limestone GS (Zone 9) between May and October 2023. River zones are indicated by different colours.**

4.0 RESULTS

Section 4.1 provides a summary of movements observed between tagging in spring 2019 and the end of the 2022 open-water period (October 10, 2022). Appendix A1 provides farthest upstream and downstream detection locations by river kilometer for each tagged fish (2019–2023) while appendices A2 to A5 provide movement summaries, by river kilometre, for each Walleye tagged between 2019 and 2021. Biological information associated with each tagged fish is provided in Appendix A6. Recapture data of fish with expired tags is provided in Appendix A7.

4.1 2019-2022 RESULTS SUMMARY

4.1.1 UPSTREAM OF THE KEEYASK GS

Forty Walleye were tagged upstream of Gull Rapids (now referred to as the Keeyask GS) in 2013, nine in 2014, and 48 in 2016. These tags are now expired. Tagging date, date of last detection, and subsequent recaptures for fish with expired tags are outlined in Appendix A7-1. A single fish (#6471) has been recaptured since its last detection date.

Seventeen fish were tagged between May 27 and June 5, 2018. Four of these tags were still active during winter 2022/2023 and are discussed herein. The remaining 13 tags are expired and are not discussed further. A total of 27 tags were applied between May 23 and June 7, 2019, and 30 more tags were applied between May 31 and June 14, 2021, bringing the total number of fish with active tags to 61 (Table 1).

Four fish were detected briefly in Gull Lake (between 0 and 18 days) after being tagged, and are considered missing due to tagging stress or mortality:

- #20155 was tagged on June 6, 2019, at the inlet of Gull Lake (rkm -19.5). It was last located farther downstream in Gull Lake (rkm -9.9) on June 14 (Appendix A2-8).
- #20164 was tagged on June 6, 2019, at the inlet of Gull Lake. It was last located farther downstream in Gull Lake (rkm -15.0) on the same day (Appendix A2-17).
- #20168 was tagged on June 7, 2019, at the inlet of Gull Lake. It was never detected and likely represents a tag malfunction.
- #20169 was tagged on June 7, 2019, at the inlet of Gull Lake. It was last located farther downstream in Gull Lake (rkm -12.9) on June 16 (Appendix A2-18).

An additional six fish are considered missing (*i.e.*, have not been detected for more than a year).

- #20153 was last detected on June 26, 2019, in Gull Lake at rkm -10.2 (Appendix A2-6).

- #20157 was last detected on September 19, 2020, in Gull Lake at rkm -12.9 (Appendix A2-10).
- #20170 was last detected on June 3, 2021, at rkm -46.9. This fish likely moved upstream through Clark Lake (Appendix A2-19).
- #20175 was last detected on October 5, 2019, in the riverine portion of the Nelson River between Birthday Rapids and Gull Lake (rkm -26.5) (Appendix A2-20).
- #20176 was last detected on October 6, 2019, at the inlet to Gull Lake (rkm -19.5) (Appendix A2-21).
- #20188 was last detected on August 15, 2021, at rkm -48.2. This fish likely moved upstream through Clark Lake (Appendix A2-26).

The ten fish described above were not included in data analyses and are not discussed in the remainder of the report.

Between open-water 2019 and winter 2022/2023, 13 tagged Walleye moved downstream from the Keeyask reservoir into Stephens Lake:

- #48264 was tagged on June 5, 2021, in the Keeyask reservoir, and it moved downstream past the Keeyask GS on July 19, 2022. It made multiple upstream and downstream movements within Stephens Lake, indicating it survived passage past the Keeyask GS (Appendix A4-8).
- Two moved into Stephens Lake and made multiple upstream and downstream movements indicating they survived passage. However, based on few detections, both fish are now considered missing.
    - #20182 was tagged on May 25, 2019, at the inlet of Gull Lake. It moved downstream past the Keeyask GS spillway on June 13, 2019. It was last detected in Stephens Lake on June 15, 2019 (Appendix A2-23).
    - #20186 was tagged on May 29, 2019, in upper Gull Lake. It moved throughout Gull Lake, as far upstream as the inlet and as far downstream as lower Gull Lake until August 10 when it moved downstream past the Keeyask GS spillway. It was last detected in Stephens Lake on August 12, 2019. (Appendix A2-24).
- Three moved downstream past the Keeyask GS into Stephens Lake, and then continued to move downstream into the Long Spruce Reservoir.
    - #20147 was tagged on June 5, 2019. It moved within upper Gull Lake until July 24, when it moved downstream past the Keeyask GS spillway. It continued to move downstream in Stephens Lake and was detected within the Long Spruce forebay on August 1, 2019 (Appendix A2-1).
    - #20187 was tagged on May 23, 2019, at the inlet of Gull Lake and moved downstream past the Keeyask GS spillway on June 19. It continued to move

downstream through Stephens Lake and was detected within the Long Spruce Reservoir on July 22, 2019 (Appendix A2-25).

- #48330 was tagged at the inlet of Gull Lake (rkm -17.4) on June 1, 2021. It moved as far upstream as rkm -19.5 before moving downstream through both the Keeyask GS and Kettle GS and was detected in the Long Spruce Reservoir on October 11, 2021 (Appendix A4-28).

- Three moved downstream past the Keeyask GS immediately after tagging and were detected briefly in Stephens Lake with no upstream movements. These fish are considered tagging mortalities, or their movements were induced by stress resulting from the tagging procedure and are not discussed in the remainder of the report.
  - #20158 was tagged on June 6, 2019, at the inlet of Gull Lake. It moved downstream past the Keeyask GS spillway on June 16 and was last detected on June 21, 2019 (Appendix A2-11).
  - #20160 was tagged on June 7, 2019, at the inlet of Gull Lake. It remained at this location until June 13 when it began to move downstream, moving past the Keeyask GS Spillway on June 17. It was located in upper Stephens Lake until the end of the study period (Appendix A2-13).
  - #48323 was tagged on June 6, 2021, in the middle Keeyask reservoir and moved downstream past the Keeyask GS on July 1, 2021. It was last detected on July 14, 2021 (Appendix A4-23).
- Four were last detected immediately upstream of the Kettle GS and likely moved downstream into the Long Spruce reservoir.
  - #20148 was tagged on June 5, 2019, in upper Gull Lake. It moved downstream past the Keeyask GS in winter 2019/2020 and continued to move downstream within Stephens Lake. It was last detected immediately upstream of the Kettle GS on July 5, 2020 (Appendix A2-2).
  - #20149 was tagged on June 5, 2019, in upper Gull Lake. It moved downstream past the Keeyask GS spillway on June 21, 2019, and continued to move downstream within Stephens Lake. It was last detected immediately upstream of the Kettle GS on July 2, 2019 (Appendix A2-3).
  - #20150 was tagged on June 5, 2019, in upper Gull Lake. It moved downstream within Gull Lake and was last detected at rkm -4.8 on June 21. It moved past the Keeyask GS Spillway on the same day and was last detected immediately upstream of the Kettle GS on July 2, 2019 (Appendix A2-4).
  - #20163 was tagged on June 6, 2019, at the inlet to Gull Lake. It was located here until June 22 when it moved upstream. It was located in the riverine area of the Nelson River between Birthday Rapids and Gull Lake until July 31 when it returned to Gull Lake. It moved downstream past the Keeyask GS spillway on August 9 and was last detected in lower Stephens Lake immediately upstream of the Kettle GS on August 16, 2019 (Appendix A2-16).

To summarize, 57 Walleye were tagged upstream of the Keeyask GS site in from 2019 to 2022, and four Walleye remained from the 2018 tagging year. Ten are considered missing and 13 moved downstream into Stephens Lake (Table 2). Therefore, 38 fish were available to be detected upstream of the Keeyask GS during winter 2022/2023.

The four remaining tags applied in 2018 expired prior to open-water 2023, and an additional 12 were applied in May 2023. Therefore, 46 fish were available to be detected upstream of the Keeyask GS in open-water 2023.

4.1.2 STEPHENS LAKE

Forty Walleye were tagged in Stephens Lake in 2013, two in 2014, and 40 in 2016. These tags are now expired. Tagging date, date of last detection, and subsequent recaptures for fish with expired tags are outlined in Appendix A7-2. No fish have been recaptured since their last detection date.

Seven fish were tagged between June 5 to June 9, 2018. Three of these tags were still active during winter 2022/2023 and are discussed herein. The remaining four tags are expired and are not discussed further. Thirty-one transmitters were applied between May and September 2019, and another 30 were applied between June 2 and June 6, 2021, bringing the total number of tagged fish to 64 (Table 1).

One fish (#48241) was tagged on June 3, 2021, in upper Stephens Lake. It moved downstream but has only been detected at rkm 24.9 since July 9, 2021, and has not made any upstream or downstream movements since that time. It is therefore assumed a mortality.

Fourteen tagged Walleye were detected for more than 14 days after tagging but have not been located for over two years and are considered missing:

- #20129 was last detected on September 30, 2019, in upper Stephens Lake at rkm 4.2 (Appendix A3-1).
- #20133 was last detected on October 2, 2019, in upper Stephens Lake at rkm 4.2 (Appendix A3-5).
- #20134 was last detected on July 6, 2019, in upper Stephens Lake at rkm 1.2 (Appendix A3-6).
- #20136 was last detected on July 24, 2019, in lower Stephens Lake at rkm 24.7 (Appendix A3-8).
- #20137 was last detected on April 4, 2020, in lower Stephens Lake at rkm 21.6 (Appendix A3-9).
- #20140 was last detected on August 25, 2020, in upper Stephens Lake at rkm 9.9 (Appendix A3-12)

- #20145 was last detected on July 6, 2019, in upper Stephens Lake at rkm 1.2 (Appendix A3-17).
- #20152 was last detected on July 19, 2019, in upper Stephens Lake at rkm 6.5 (Appendix A3-18).
- #20172 was last detected on July 4, 2020, in upper Stephens Lake at rkm 5.0. It only recorded two days of detections during the 2020 open-water study period (Appendix A3-22).
- #20177 was last detected on June 13, 2020, in upper Stephens Lake at rkm 5.2 (Appendix A3-26).
- #20178 was last detected on June 27, 2019, immediately downstream of the Keeyask GS spillway at rkm 0.6 (Appendix A3-27).
- #20180 was last detected on August 3, 2019, in lower Stephens Lake at rkm 24.7 (Appendix A3-29).
- #20183 was last detected on June 25, 2020, in upper Stephens Lake at rkm 8.4 (Appendix A3-30).
- #20184 was last detected on June 14, 2020, in lower Stephens Lake at rkm 13.9. This was the only day a detection was logged during the 2020 open-water study period (Appendix A3-31).

These 15 fish are not discussed in the remainder of this report.

Prior to winter 2022/2023, four Walleye moved downstream past the Kettle GS into the Long Spruce reservoir.

- #20141 was tagged on May 31, 2019, immediately downstream of the Keeyask GS. It moved between rkm 0.6 and 9.4 in upper Stephens Lake until June 14 when it moved rapidly downstream. It moved past the Kettle GS on June 15, 2019 (Appendix A3-13).
- #20142 was tagged on May 31, 2019, immediately downstream of the Keeyask GS and was detected moving between upper and lower Stephens Lake (rkm 5.2 to 18.8 until July 31, 2021. It was first detected downstream of the Long Spruce GS on August 16, 2020 (Appendix A3-14).
- #48236 was tagged on June 2, 2021, near the Keeyask GS. In 2022, it made multiple upstream and downstream movements near the GS before moving downstream past the Kettle GS on July 4, 2022, and was detected downstream of the Long Spruce GS on July 7, 2022 (Appendix A5-3).
- #48318 was tagged on June 2, 2021, near the Keeyask GS. It made multiple movements near the GS in 2022, before being detected downstream of the Kettle GS on September 4, 2022. Detections were only logged at rkm 44.9 until October 4, 2022 (Appendix A5-27).

One additional fish likely moved downstream past the Kettle GS; however, its movements could not be confirmed.

- #20167 was tagged on September 16, 2019, at rkm 5.5 in upper Stephens Lake. It moved downstream on September 20 and was last located immediately upstream of the Kettle GS (rkm 40.9) on September 27. Due to the short amount of time between tagging and this downstream movement (four days), it likely represents a movement caused by tagging stress or mortality (Appendix A3-20).

To summarize, 61 Walleye were tagged in Stephens Lake between 2019 and 2022, and three Walleye were available to be detected from the 2018 tagging year. Fifteen fish are considered missing and five moved downstream past the Kettle GS (four confirmed and one suspected; Table 2). One fish tagged in Gull Lake moved downstream into Stephens Lake in 2022 and was available for detection. Therefore, 45 fish were available to be detected in Stephens Lake during winter 2022/2023.

The three tags available from 2018 expired prior to open-water 2023, and an additional eight tags were applied in 2023. Therefore, 50 Walleye were available to be detected in Stephens Lake during the 2023 open-water period.

Table 2: Proportion of tagged Walleye that moved downstream past the Keeyask GS site and the Kettle GS each year since studies began in 2013.

Year	Keeyask GS[7] Site									Kettle GS[1]								
	Total Movements[2]			Tagging Stress/Mortality[3]			Adjusted Movements[4]			Total Movements[2]			Tagging Stress/mortality[3]			Adjusted Movements[4]		
	Total Fish	Total Move	%	# Fish Tagged	Total Move	%[5]	Total Fish	Total Move	%[6]	Total Fish	n	%	# Fish Tagged	n	%[5]	Total Fish	n	%[6]
2013	40	2	5	40	2	5	40	0	0	40	-	-	40	-	-	40	-	-
2014	42	1	2	9	0	0	42	1	2	40	1	3	2	-	-	40	1	3
2015	40	4	10	0	-	-	40	4	10	43	1	2	0	-	-	43	1	2
2016	79	11	14	48	5	10	79	6	8	88	4	5	40	3	8	88	1	1
2017	28	5	18	0	-	-	28	5	18	42	8	19	0	-	-	42	8	19
2018	34	5	15	17	4	24	34	1	3	42	8	19	7	5	71	42	3	7
2019	46	8	17	27	2	7	46	6	13	55	5	9	31	1	3	55	4	7
2020	31	1	3	0	-	-	31	1	3	45	1	2	0	-	-	45	1	2
2021	47	2	4	30	-	-	47	2	4	51	-	-	30	-	-	51	-	-
2022	41	1	2	0	-	-	41	1	2	47	2	4	0	-	-	47	2	4
2023	46	0	0	12	-	-	46	0	0	50	1	2	8	-	-	50	1	2

1. Includes all fish tagged in Stephens Lake as well as those that moved downstream from Gull Lake.
2. Includes all downstream movements, including those that occurred due to tagging stress and mortality and those that occurred independently.
3. Includes only Walleye that moved downstream within two weeks of tagging. These movements are likely caused by tagging stress or mortality.
4. Includes only Walleye that displayed downstream movements independently of tagging.
5. Proportion is calculated as a percentage of those tagged in the current year.
6. Proportion is calculated as a percentage of the total number of fish available for detection in the current year.
7. Referred to as Gull Rapids prior to 2018 when the Keeyask GS spillway was commissioned and the Keeyask GS after.

4.2 WINTER 2022/2023

Sixteen of 17 receivers deployed between Clark Lake and the Keeyask GS during the 2022/2023 winter period were retrieved. A single receiver (#114235) set immediately upstream of the Keeyask GS powerhouse could not be located (Map 3). Sixteen of 17 receivers deployed in Stephens Lake were also retrieved. A receiver set in lower Stephens Lake at rkm 21.7 (#108002) could not be located (Map 4). The single receiver set downstream of the Kettle GS (#127100) could not be retrieved due to low water levels that prevented boat access during the 2023 open-water period.

4.2.1 UPSTREAM OF THE KEEYASK GS

Nineteen of the 38 fish (50%) available to be detected were located a total of 186,728 times (range: 8–48,199 detections per individual) (Appendix A1-1). On average, fish were detected for 66 days of the 217-day winter period (30%) (range: 3–197 days). The farthest upstream detections occurred in the middle Keeyask reservoir at rkm -29.3 (by two fish; 11%). Four fish (21%) were detected as far downstream as rkm -7.8 (Figure 3; Appendix A1-1).

The majority of detections were logged by receivers located in the middle of Gull Lake between rkms -12.9 and -9.9 (n = 127,471; 68%; Figure 4). The average overall movement range was 4.9 rkm (range 0.0–11.9 rkm) (Figure 3; Table A1-1). Movements were as follows:

- The majority of fish (n = 15; 79%) remained in Gull Lake, moving no farther upstream than rkm -19.5.
- Two (11%) moved between Gull Lake and the middle Keeyask reservoir. These fish were detected as far upstream as rkm - 29.3 (just downstream of Birthday Rapids) and as far downstream as the upper portion of Gull Lake (rkm -15.0).
- Two (11%) remained in the middle Keeyask reservoir between rkm -29.3 and -26.4.

Individual movement graphs can be found in Appendix 2 and 4.

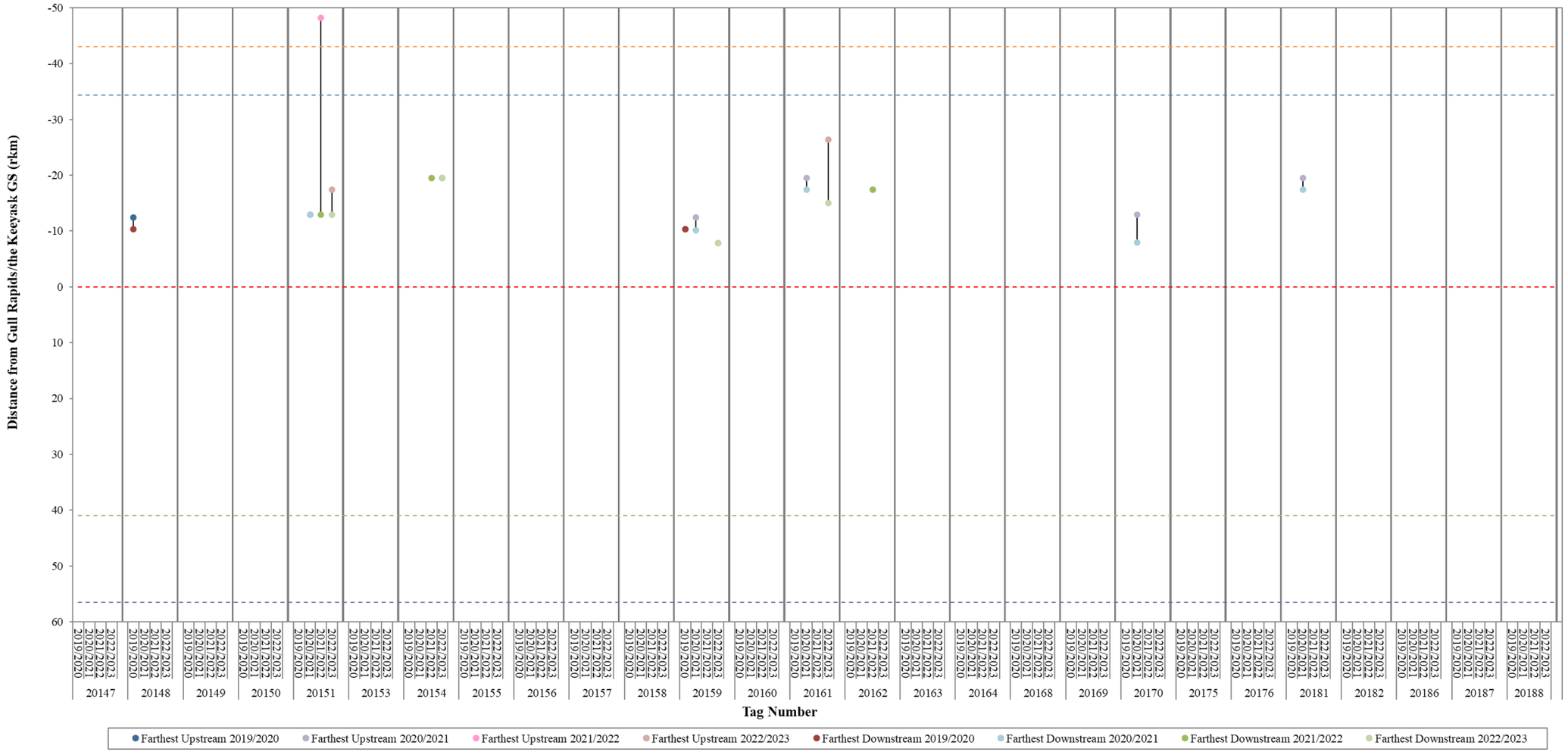


Figure 3: Detection ranges for individual Walleye tagged with acoustic transmitters upstream of the Keeyask GS during the winter period (2019–2023). Horizontal dotted lines indicate locations of landmarks (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

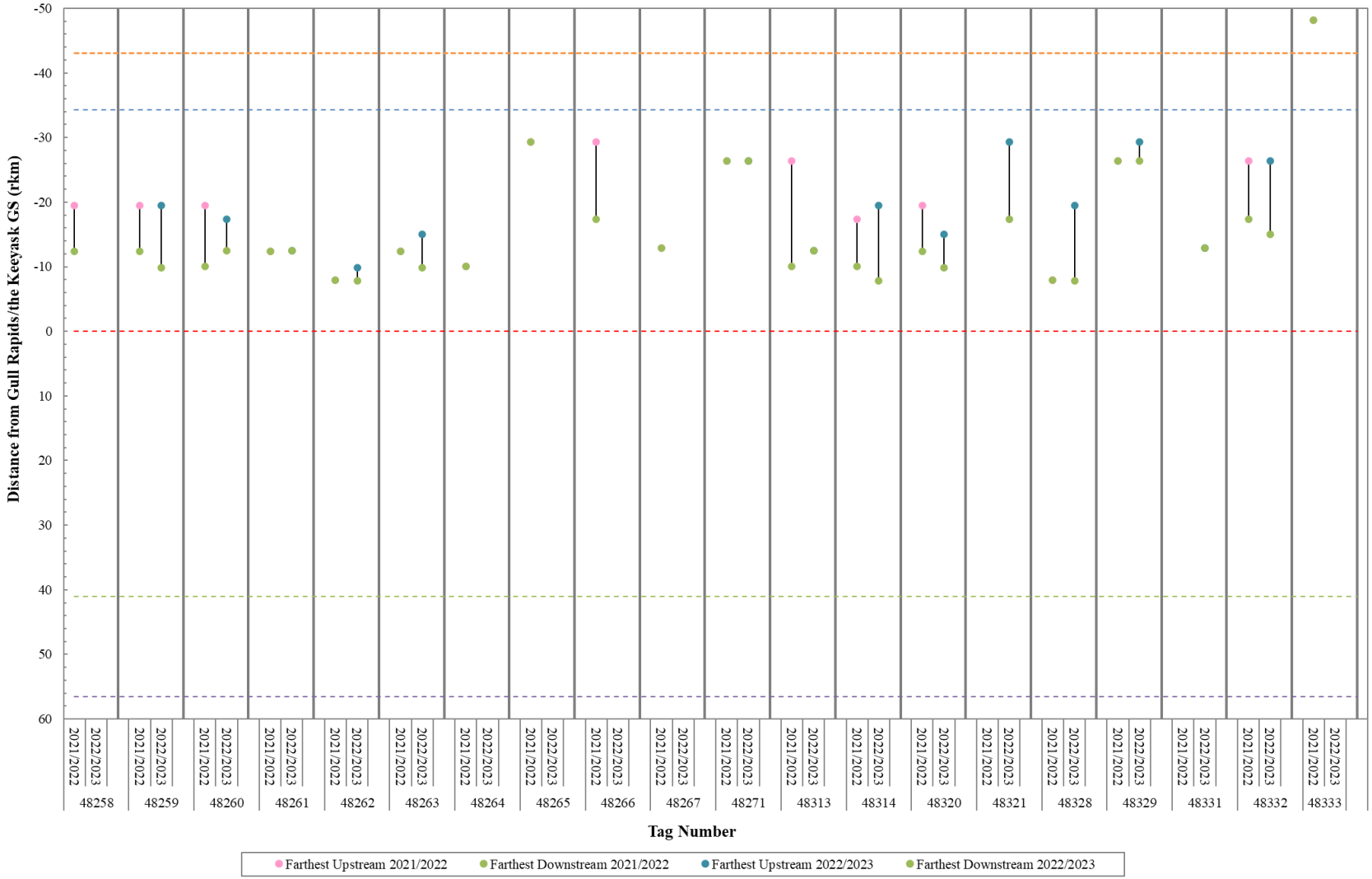


Figure 3: Detection ranges for individual Walleye tagged with acoustic transmitters upstream of the Keeyask GS during the winter period (2019-2023). Horizontal dotted lines indicate locations of landmarks (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS) (continued).

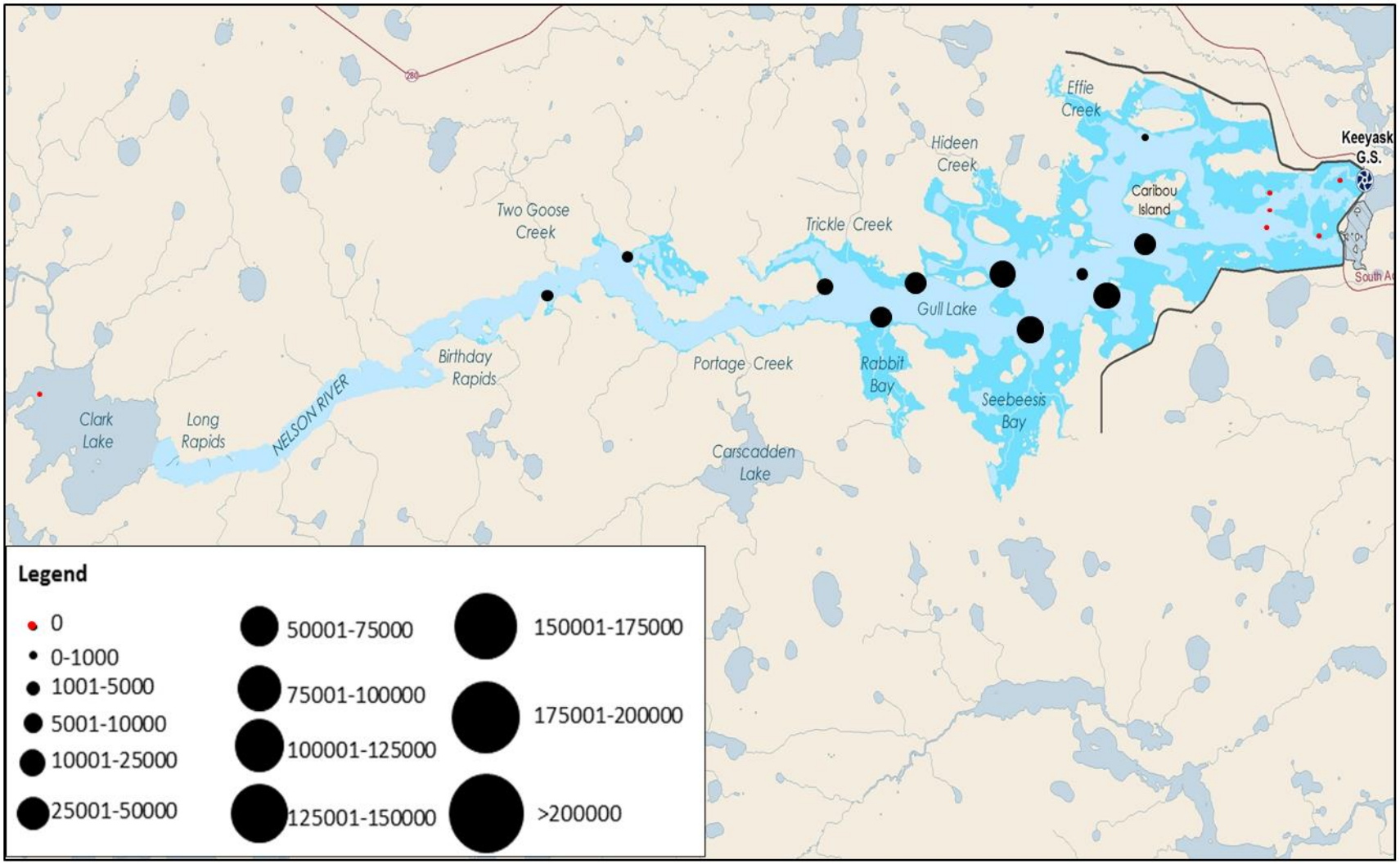


Figure 4: Relative number of detections of Walleye at each acoustic receiver set between Clark Lake and the Keeyask GS during winter 2022/2023 (October 11 to May 15, 2023). Number of detections indicated by size of bubble (defined in legend). Receivers with no detections indicated with red dot.

4.2.2 STEPHENS LAKE

Nineteen of 45 fish (42%) were located a total of 136,448 times (range: 11–40,218 detections per individual) (Appendix A1-2). On average, fish were detected for 52 days of the 217-day winter period (24%) (range: 1–199 days). Six fish (32%) were detected at the farthest upstream receiver at rkm 3.8, while one (5%) was detected at the farthest downstream receiver at rkm 30.7.

The majority of detections were logged by receivers located in the southern portion of the reservoir upstream of rkm 8.3 (n = 85,219; 62%; Figure 5). A large number of detections were also logged farther downstream in the northern portion of Stephens Lake at rkm 15.0 (n = 30,147; 22%). The average movement range was 4.1 rkm (range 0.0–13.6 rkm) (Figure 6; Table A1-2). Movements were as follows:

- The majority of fish (n = 11; 58%) remained in the upstream portion of Stephens Lake, moving no farther downstream than rkm 10.2.
- Four (21%) moved throughout Stephens Lake using both areas closer to and farther from the GS.
- Four (21%) remained in lower Stephens Lake, moving only as far upstream as rkm 12.0 and as far downstream as rkm 30.7.

Individual movement graphs can be found in Appendix 3 and 5.

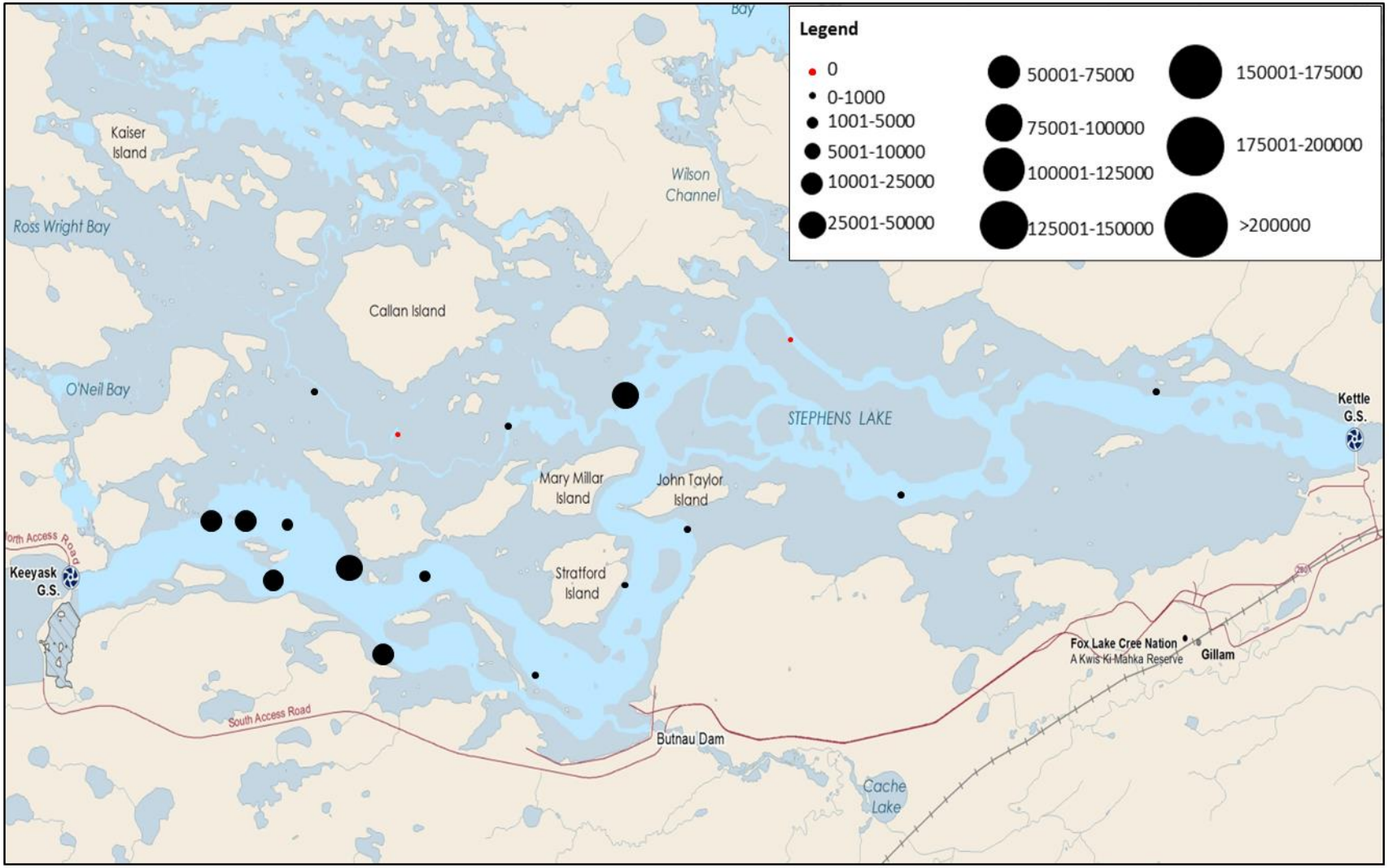


Figure 5: Relative number of detections of Walleye at each acoustic receiver set in Stephens Lake during winter 2022/2023 (October 11, 2022, to May 15, 2023). Number of detections indicated by size of bubble (defined in legend). Receivers with no detections indicated with red dot.

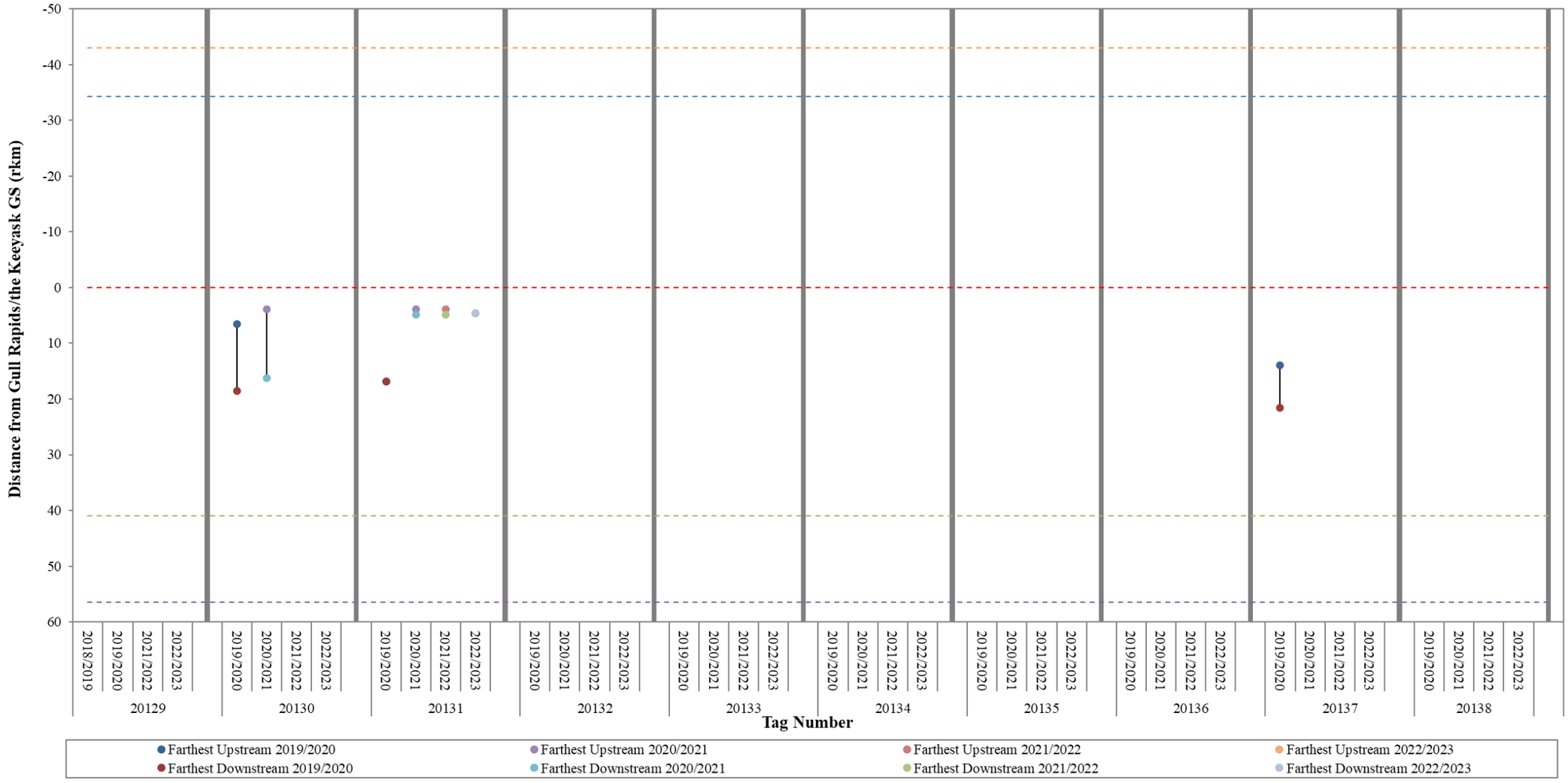


Figure 6: Detection ranges for individual Walleye tagged with acoustic transmitters in Stephens Lake during the winter period (2019–2023). Horizontal dotted lines indicate locations of landmarks (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

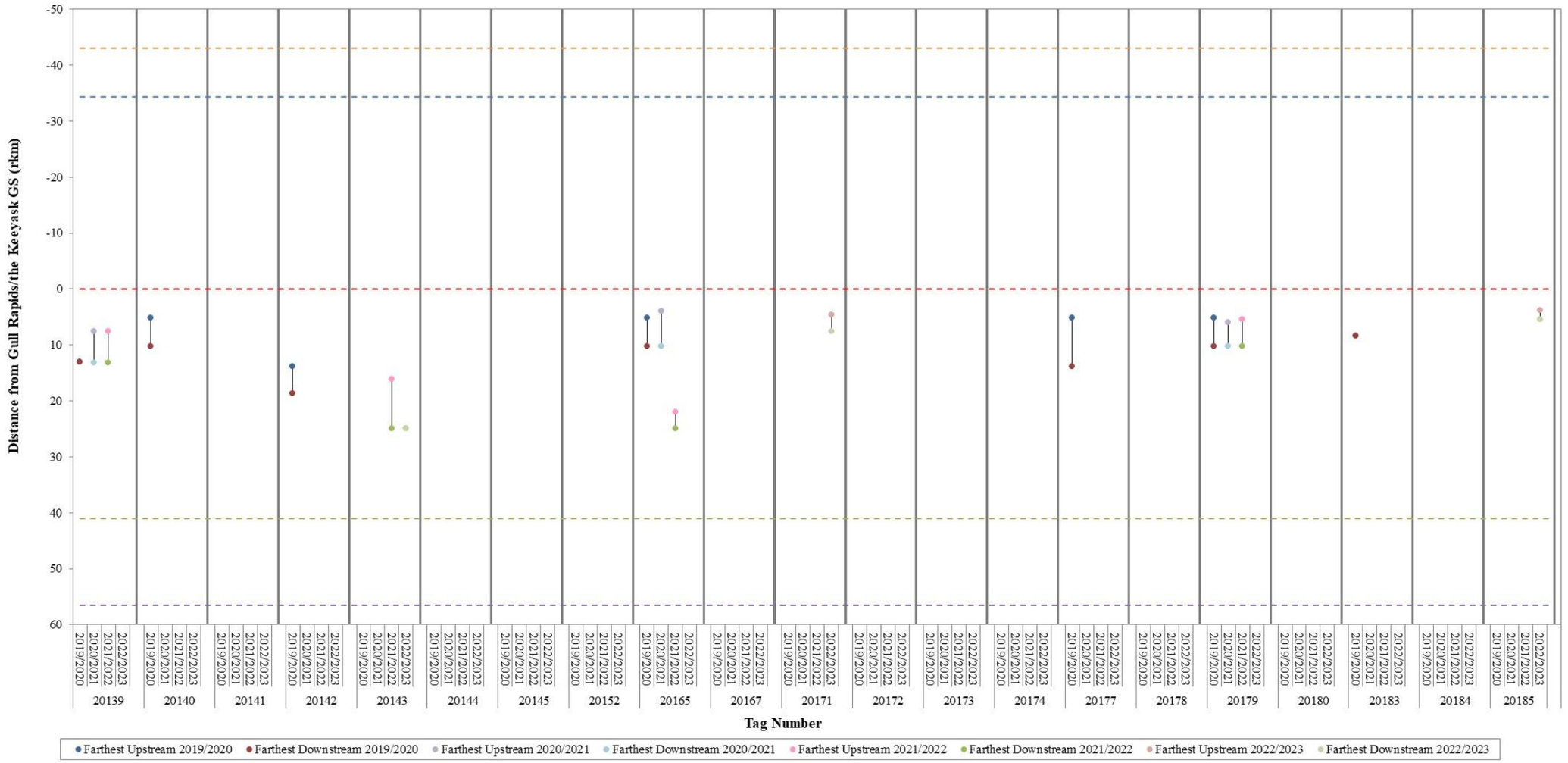


Figure 6: Detection ranges for individual Walleye tagged with acoustic transmitters in Stephens Lake during the winter period (2019–2023). Horizontal dotted lines indicate locations of landmarks (orange = Clark Lake outlet; blue = Birthday Rapids; red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS) (continued).

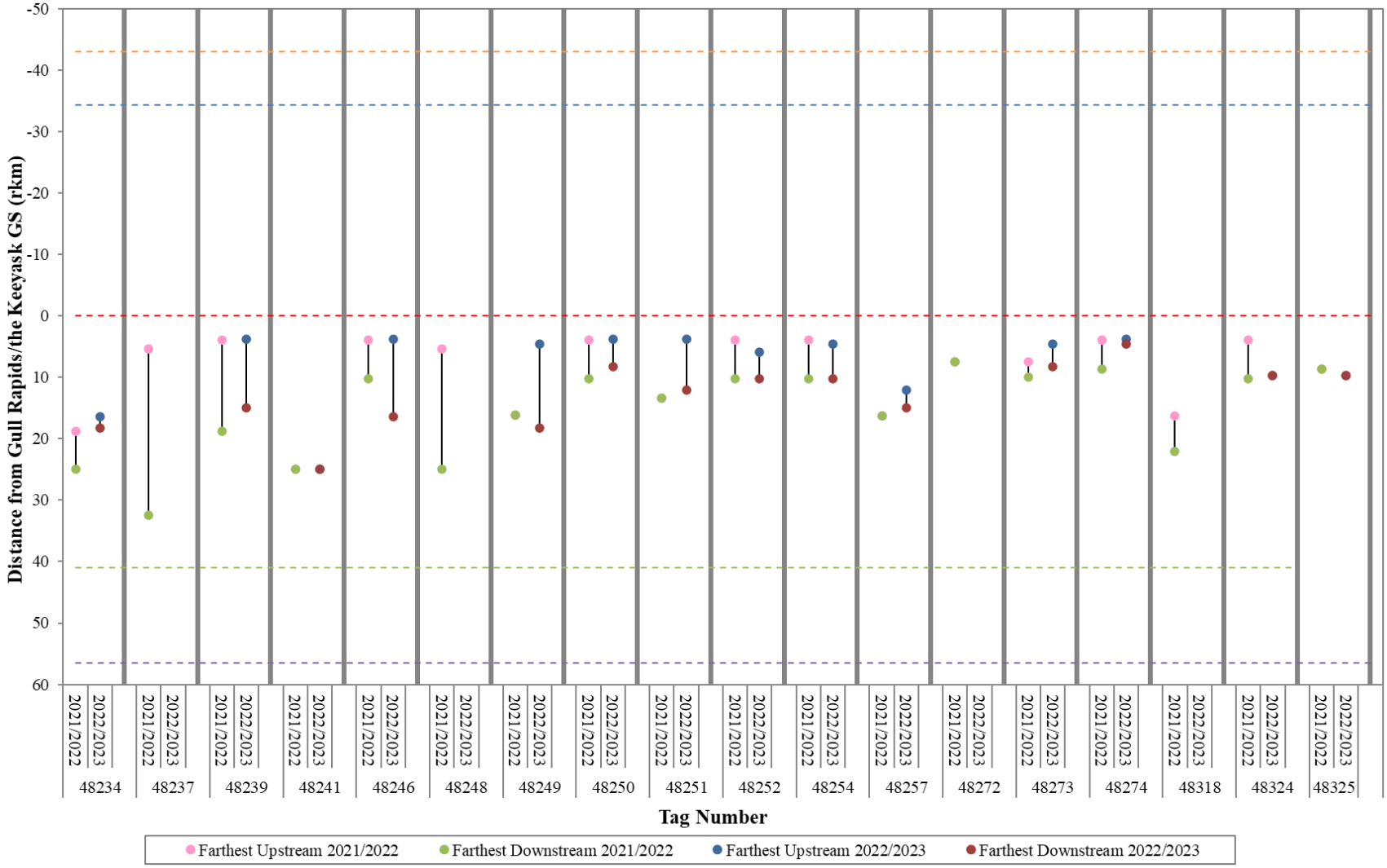


Figure 6: Detection ranges for individual Walleye tagged with acoustic transmitters in Stephens Lake during the winter period (2019–2023). Horizontal dotted lines indicate locations of landmarks (orange = Clark Lake outlet; blue = Birthday Rapids; red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS) (continued).

4.3 OPEN-WATER 2023

All stationary acoustic receivers deployed upstream of the Keeyask GS (n = 33), in Stephens Lake (n = 33), and downstream of the Long Spruce GS (n = 2) during the 2023 open-water period were successfully retrieved (Maps 5, 6, and 7).

Water temperature, as measured in the Nelson River mainstem, reached 4˚C on May 18, 2023, and increased to 13˚C by June 4, 2023 (Figure 7). Therefore, the time between May 18 and June 4 is considered the spawning period.

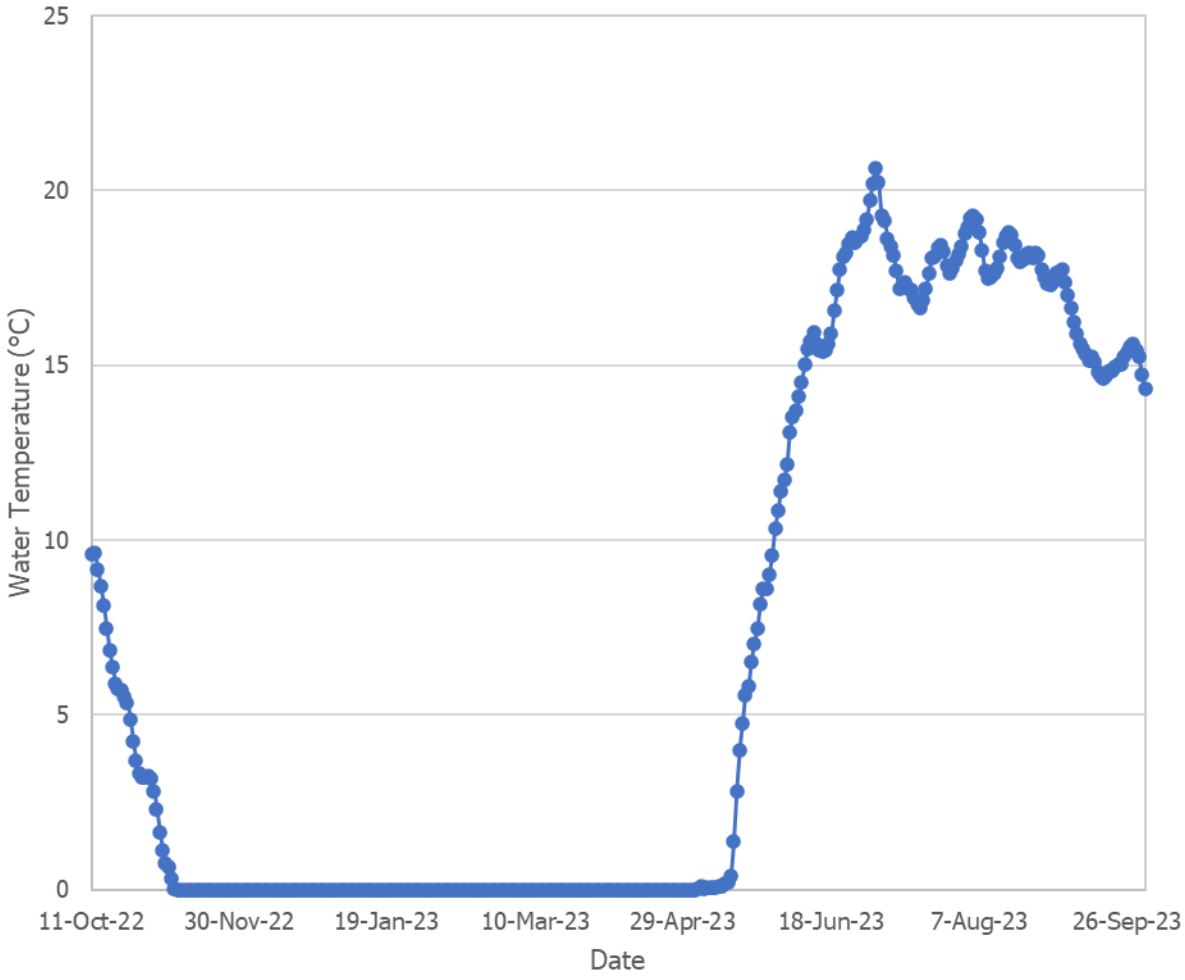


Figure 7: Water temperature in the Nelson River mainstem from October 11, 2022, to October 2, 2023.

4.3.1 UPSTREAM OF THE KEEYASK GS

Forty-six Walleye were available to be detected upstream of the Keeyask GS during the 2023 open-water period (Section 4.1.1). Thirty-two (70%) were detected between 177–30,353 times for 7–129 days of the 140-day open-water period (5–92% of the time; Appendix A1-3). The average total movement range was 17.7 rkm (StDev = 14.1 rkm; range: 0.0–42.4 rkm) (Figure 8; Appendix A1-3). The farthest upstream detections occurred at the inlet to Clark Lake at rkm -48.2 (by ten fish; 31%). Four fish (13%) were detected as far downstream as rkm -5.8 (Figures 8 and 9; Table A1-3). No fish moved downstream past the Keeyask GS (Table 2).

Of the 14 fish that were not detected during open-water 2023:

- Eight were last detected during the 2021 open-water period.
- Six were detected through the 2022 open-water period.
    - Three (#48258, #48268, and #48319) were detected for less than three days and likely remain largely in areas outside of the receiver array.

Individual movement graphs can be found in Appendix 2 and 4.

4.3.1.1 PROPORTIONAL DISTRIBUTION

Walleye tagged in 2021 and 2023 spent a greater amount of time in the middle Keeyask reservoir (Zone 3) than those tagged in 2019. This is likely a reflection of tagging location as most fish tagged in 2021 and 2023 were captured and tagged in Zone 3. Because of this, proportional distributions were calculated separately for these two groups.

Walleye tagged in 2019 spent most of the time (78% of the 2023 open-water period) in upper Gull Lake (Zone 4), rarely moving upstream into the middle Keeyask reservoir (2%; Zone 3; Table 3; Figure 10). The remainder of the open-water period was spent in lower Gull Lake (20%; Zone 5). None of these fish moved upstream into Clark Lake.

Walleye tagged in 2021 and 2023 spent a greater amount of time in the middle Keeyask reservoir (Zone 3) than those tagged in 2019 and moved upstream into Clark Lake (Zone 1; Table 3). Each zone was used as follows:

- Zone 1 for 6% of the time (StDev = 12%; range = 0–43%)
- Zone 2 for 8% of the time (StDev = 20%; range = 0–81%)
- Zone 3 for 39% of the time (StDev = 45%; range = 0–100%)
- Zone 4 for 35% of the time (StDev = 43%; range = 0–100%)
- Zone 5 for 12% of the time (StDev = 28%; range = 0–96%)

No fish tagged in any year spent time in the area immediately upstream of the Keeyask GS (Zone 5.5; Figure 9)

Table 3: Proportion of time spent in each river zone by Walleye tagged upstream of the Keeyask GS site during a portion of the 2013 (June 4 to October 15), 2014 (June 4 to October 3), 2015 (June 4 to October 11), 2016 (June 4 to October 19), 2017 (June 7 to October 16), 2018 (June 6 to October 10), 2019 (June 2 to October 7), 2020 (July 3 to September 23), 2021 (June 13 to October 10), 2022 (May 16 to October 10), and 2023 (May 16 to October 2) open-water periods.

Tagging Year	Study Year	Upstream of Gull Rapids					
		Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 5.5
2013	2013	4.0	1.3	2.0	84.0	8.7	-
	2014	6.9	1.2	4.8	82.7	4.3	-
	2015	10.4	4.2	6.5	71.8	7.1	-
	2016	8.5	0.1	19.9	61.0	5.9	-
2016/2018	2016	3.7	0.6	6.1	78.6	8.7	-
	2017	5.9	1.8	12.3	63.7	16.3	-
	2018	9.6	0.9	9.2	56.5	23.8	-
	2019	18.7	1.3	6.9	53.4	19.8	-
	2020	0.0	0.1	1.1	43.3	55.6	-
2018-2019	2019	5.3	0.5	5.7	75.2	13.4	-
	2020	1.5	0.2	9.2	60.3	28.8	-
	2021	8.6	2.5	8.8	55.1	25.0	-
	2022	0.4	0.0	0.6	61.3	37.7	0.0
2019	2023	0.0	0.0	1.6	78.4	20.0	0.0
2021	2021	8.5	1.9	35.5	40.3	13.8	-
	2022	1.7	3.7	32.3	48.4	13.9	0.0
2021-2023	2023	5.9	7.7	39.2	35.0	12.2	0.0

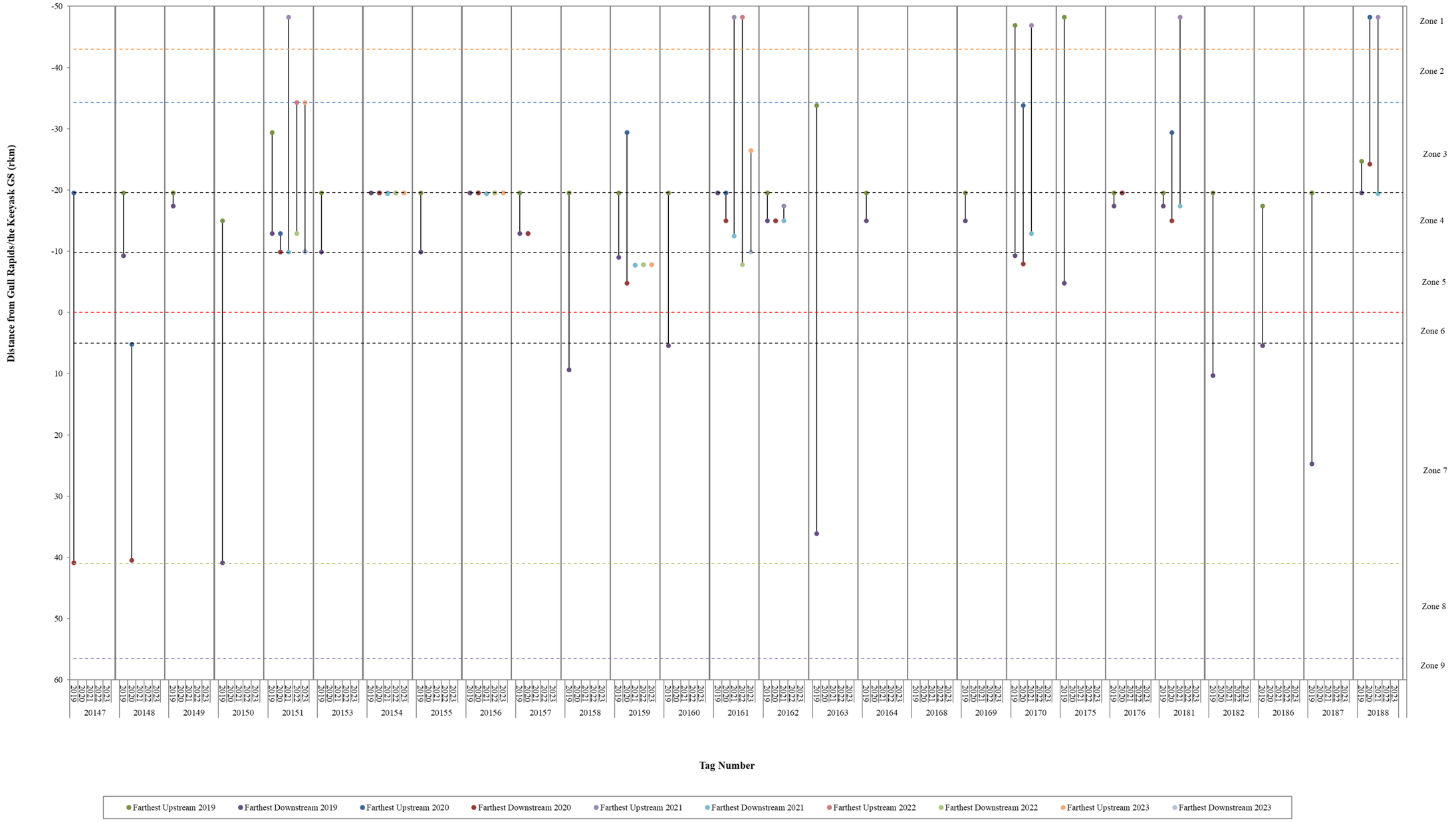


Figure 8: Detection ranges for individual Walleye tagged with acoustic transmitters in 2019-2023 upstream of the Keeyask GS during the open-water period (2019–2023). Horizontal dotted lines demarcate zones (orange = Clark Lake outlet; blue = Birthday Rapids; red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

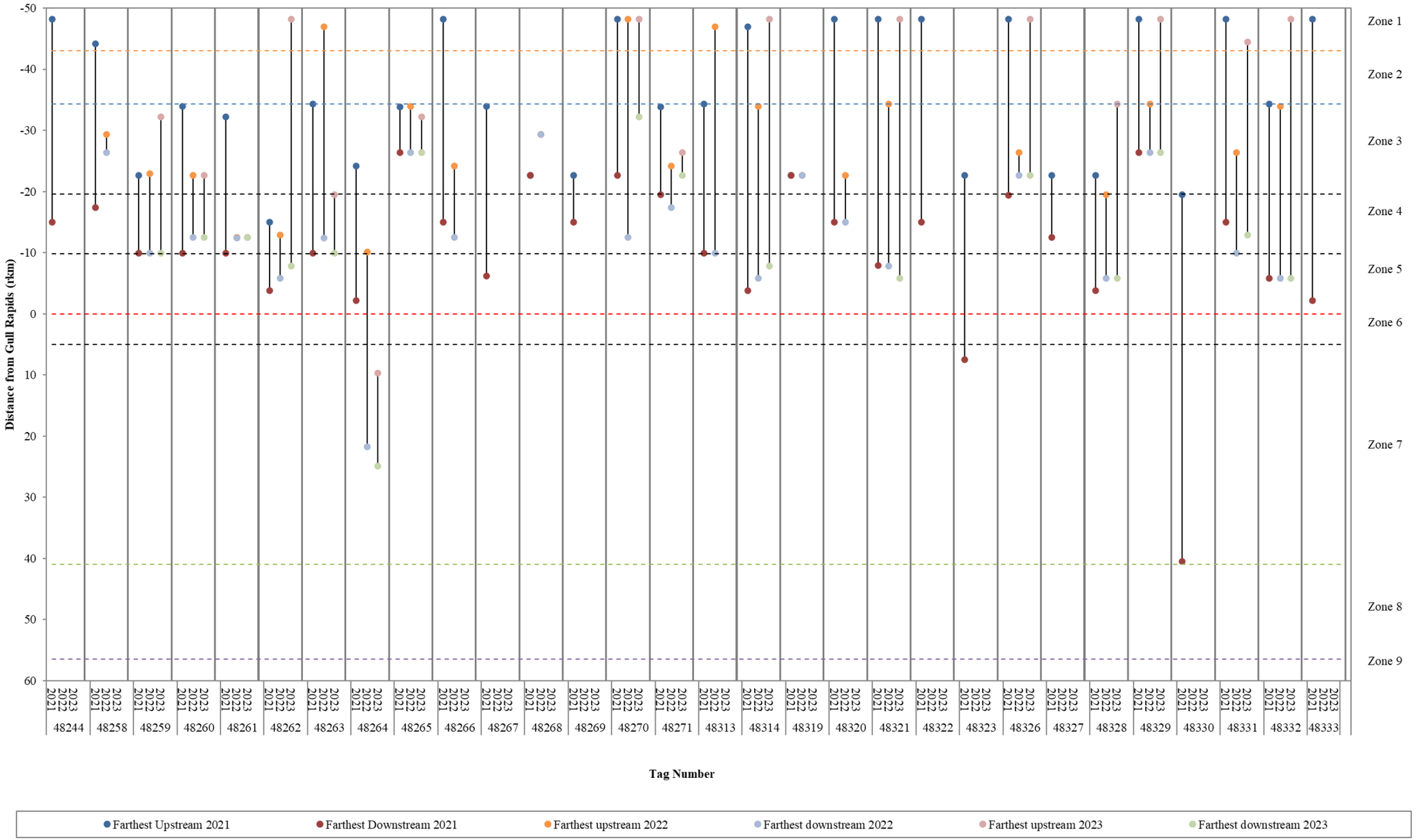


Figure 8: Detection ranges for individual Walleye tagged with acoustic transmitters in 2019-2023 upstream of the Keeyask GS during the open-water period (2019-2023). Horizontal dotted lines demarcate zones (orange = Clark Lake outlet; blue = Birthday Rapids; red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS) (continued).

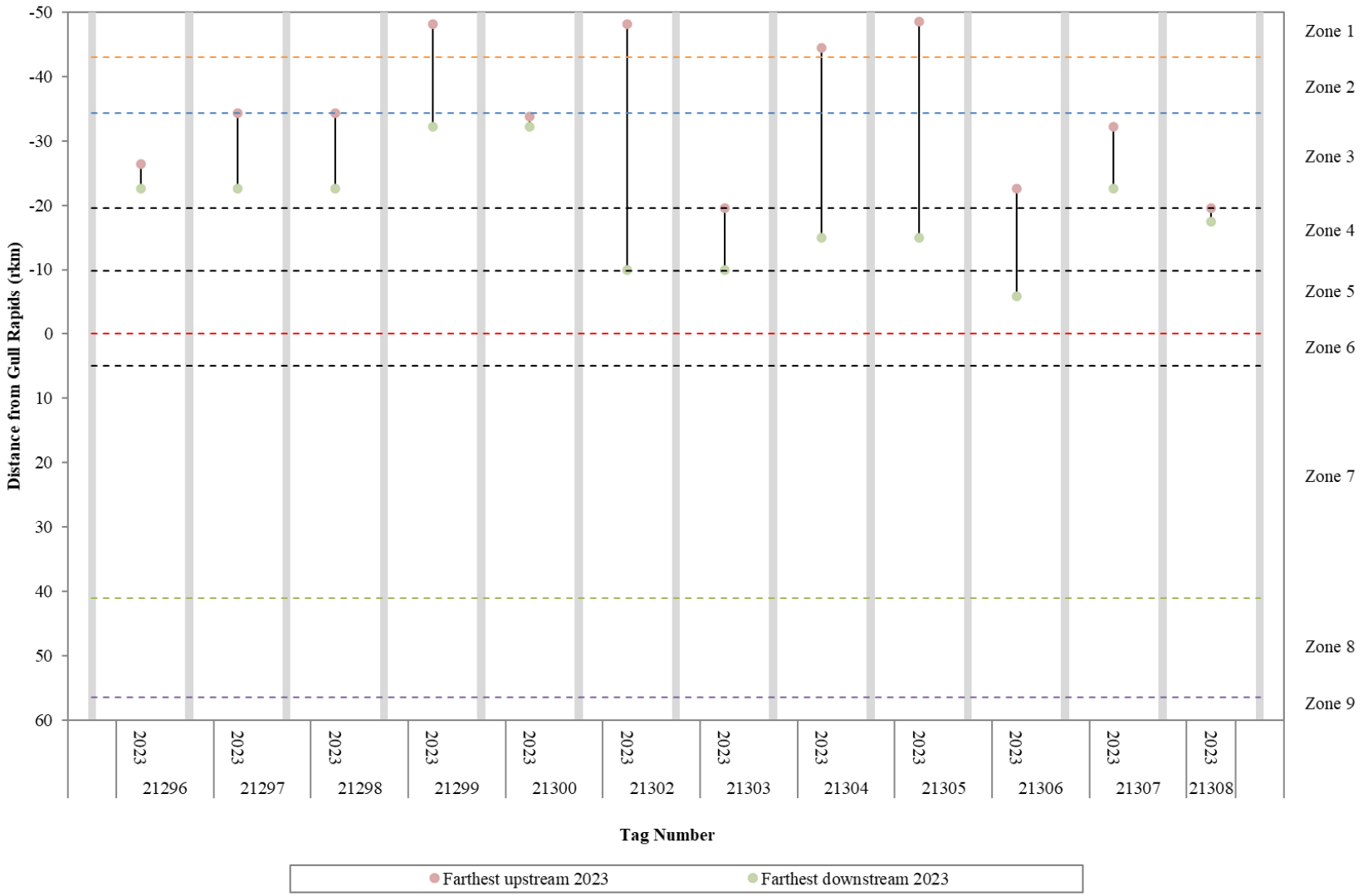


Figure 8: Detection ranges for individual Walleye tagged with acoustic transmitters in 2019-2023 upstream of the Keeyask GS during the open-water period (2019-2023). Horizontal dotted lines demarcate zones (orange = Clark Lake outlet; blue = Birthday Rapids; red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS) (continued).

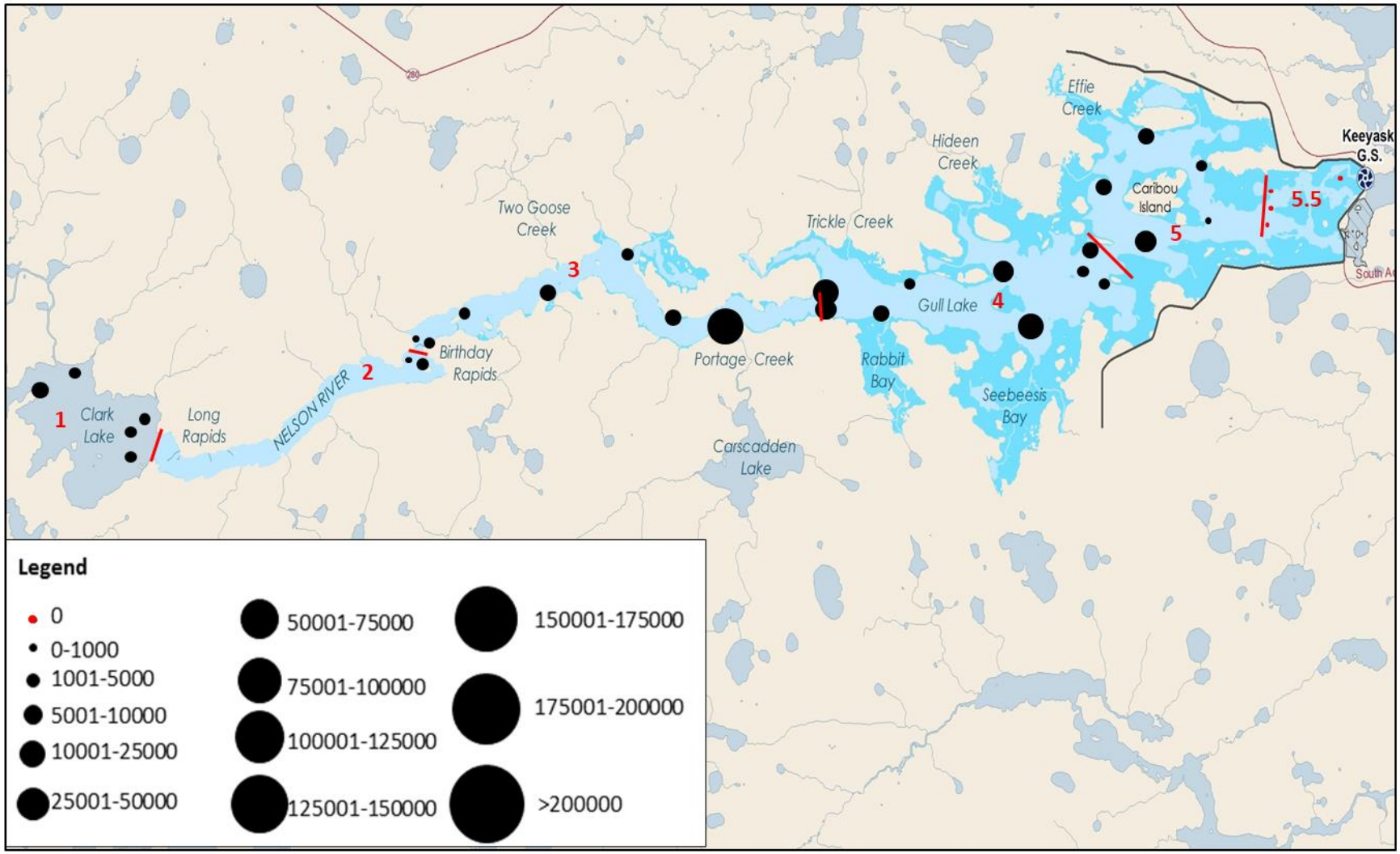


Figure 9: Relative number of detections at each acoustic receiver set in the Nelson River between Clark Lake and the Keeyask GS during the 2023 open-water period (May 16 to October 2). Number of detections indicated by size of circle (defined in legend). Receivers with no detections indicated with red dot. The river is divided into six "zones" based on placement of receiver "gates."

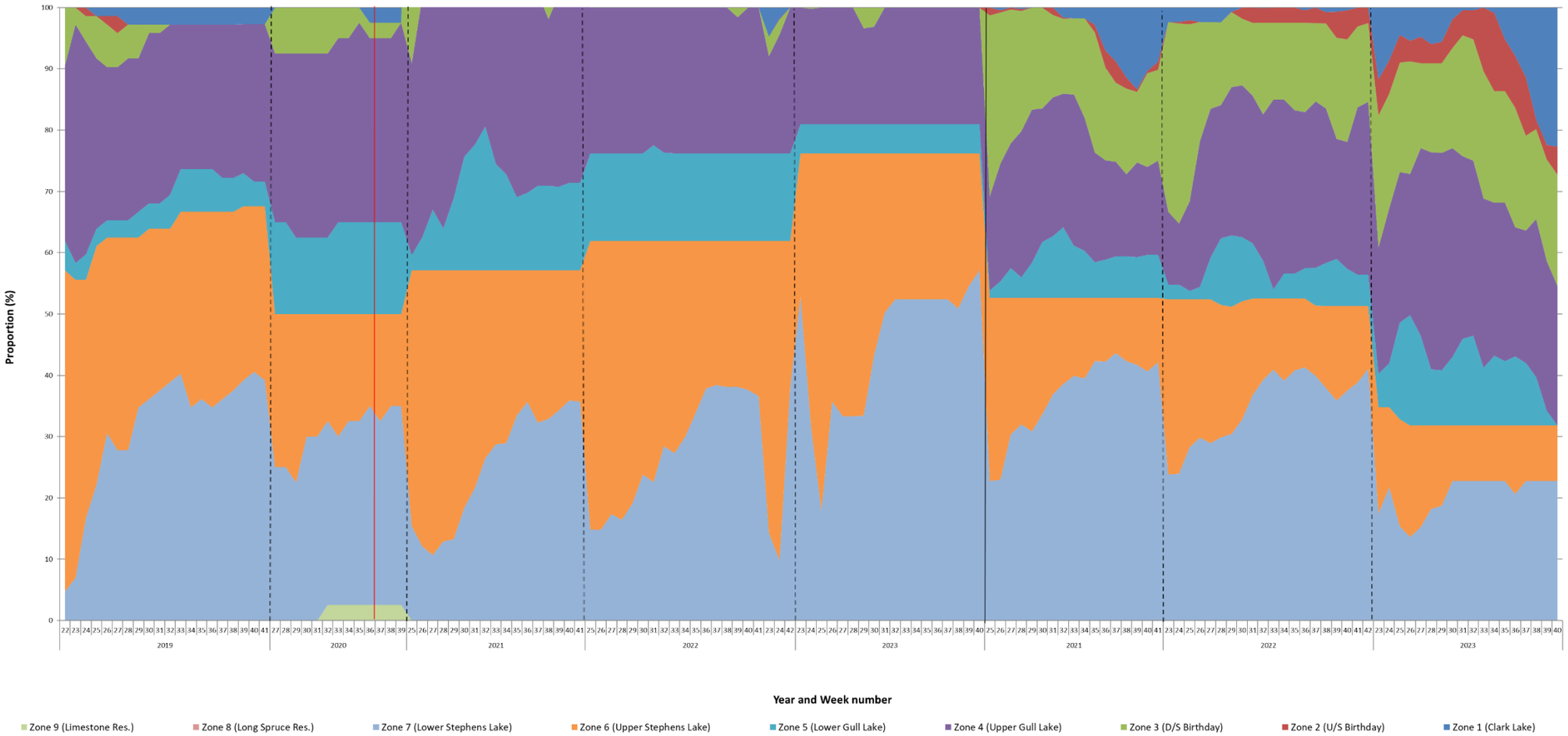


Figure 10: Proportional distribution by zone, for Walleye tagged with acoustic transmitters in 2019, 2021, and 2023 in the Keeyask GS Area during a portion of the 2019 (June 2 to October 7), 2020 (July 3 to September 23), 2021 (May 1 to October 10), 2022 (May 16 to October 10), and 2023 (May 16 to October 2) open-water periods. Black dashed lines indicate study years. Solid red line indicated beginning of the operation period. Zones 5.5 and 6.5 were created in 2022 but were combined with zones 6 and 5 to remain consistent with previous monitoring years.

4.3.1.2 MOVEMENT PATTERNS

During the 2023 open-water period, the majority of detections were logged just upstream of the inlet to Gull Lake at Portage Creek (rkm -22.6; n = 79,768; 28%), at the inlet to Gull Lake (rkm -19.5; n = 44,487; 16%), and in the middle of Gull Lake (rkm -12.5; n = 36,594; 13%) (Figure 9).

Twenty Walleye remained in the Keeyask reservoir:

- Eight (#20154, #20156, #20159, #20161, #21303, #21308, #48261, and #48263) were detected only within Gull Lake.
- Seven (#21296, #21297, #21298, #21300, #21307, #48265, and #48271) were detected only within the middle Keeyask reservoir.
- Five moved (#20151, #21306, #48259, #48260, and #48328) moved between Gull Lake and the middle Keeyask reservoir.

Twelve Walleye moved upstream into Clark Lake.

- Three (#48314, #48329, and #48331) returned to the Keeyask reservoir by the end of the study period.
- Nine (#21299, #21302, #21304, #21305, #48262, #48270, #48321, #48326, and #48332) moved upstream into Clark Lake and were last detected here by the end of the study period.

Movement patterns from the onset of the study are shown in Figure 11.

4.3.1.3 SPAWNING MOVEMENTS

During the spawning period (May 18 to June 4), the majority of the 19,137 detections were logged at the inlet to Gull Lake (rkm -19.5; n = 7,846; 41%) and in the middle Keeyask reservoir at the entrance to Portage Creek (rkm -22.6; n = 4,327; 23%) (Figure 12).

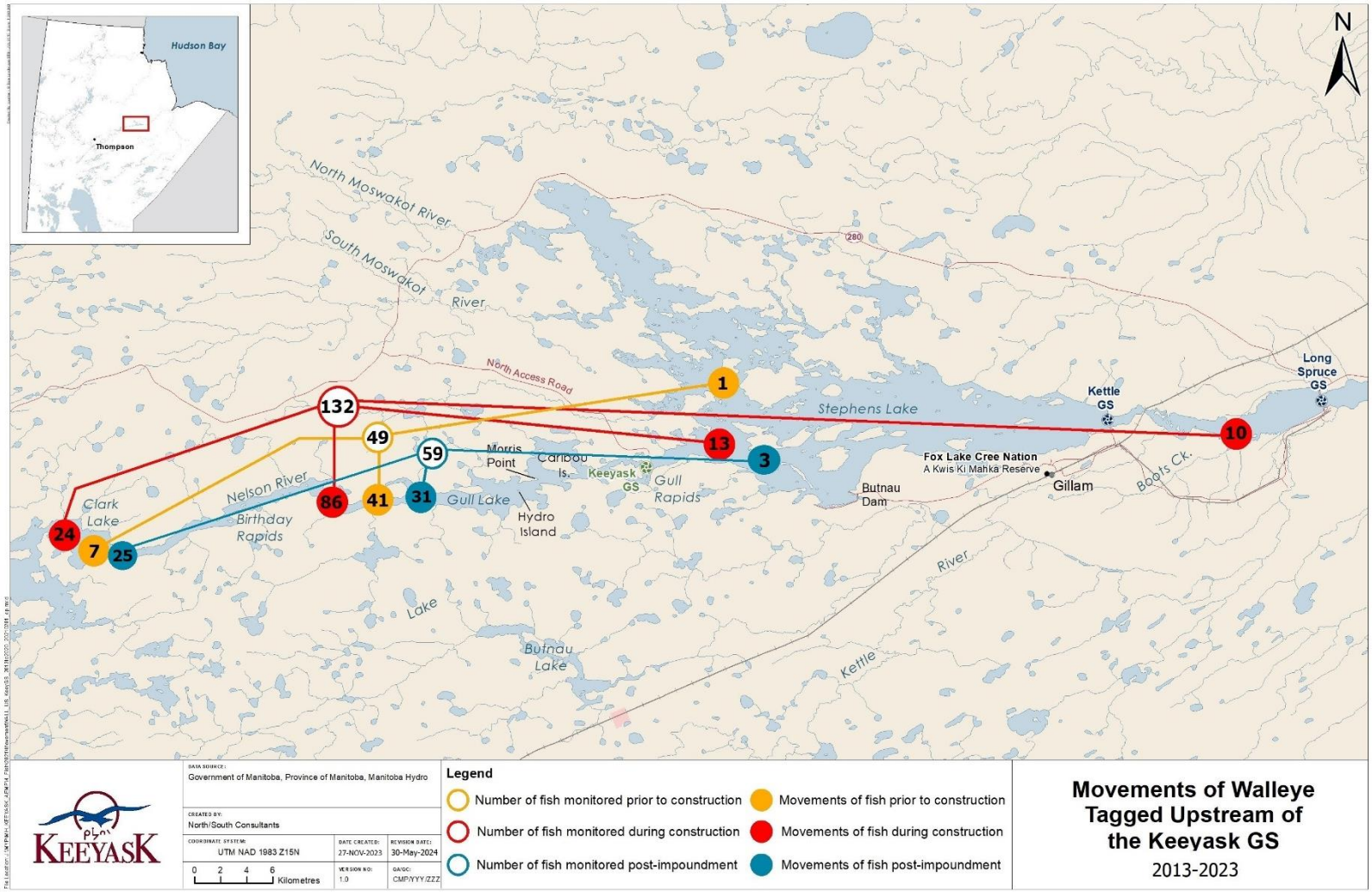


Figure 11: Map showing the number of Walleye that moved upstream out of Gull Lake, stayed in Gull Lake, and moved into Stephens Lake before construction (yellow), during construction (red) and after reservoir impoundment (blue). Movements of fish due to tagging stress or mortality were not included. Numbers of fish monitored (hollow circles) represent the number of fish tagged while the number of fish movements (solid circles) represent the number of fish detected.

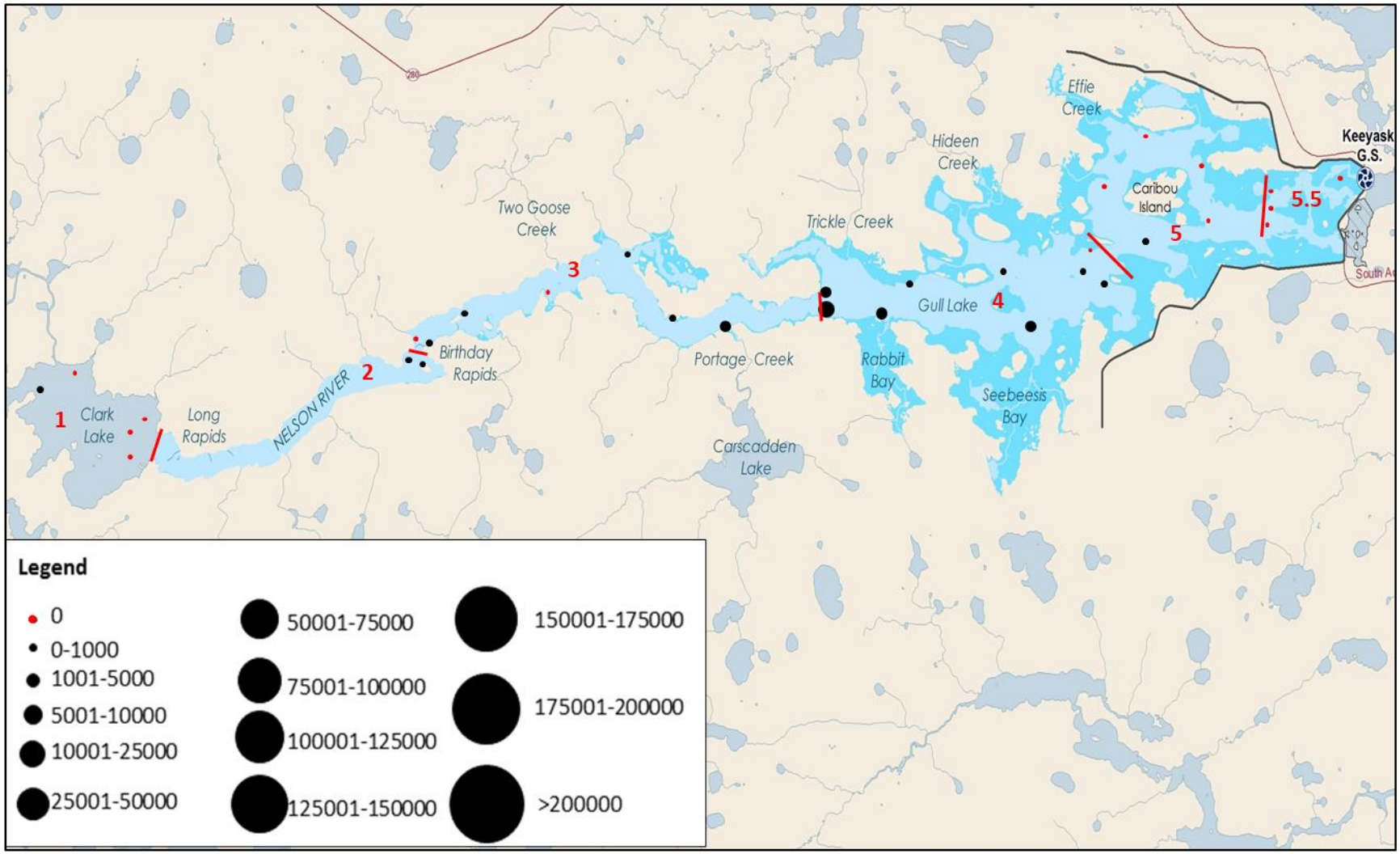


Figure 12: Relative number of detections at each acoustic receiver set in the Nelson River between Clark Lake and the Keeyask GS during the 2023 spawning period (May 18 to June 4). Number of detections indicated by size of circle (defined in legend). Receivers with no detections indicated with red dot. The river is divided into six "zones" based on placement of receiver "gates."

4.3.2 STEPHENS LAKE

Fifty Walleye were available to be detected in Stephens Lake during the 2023 open-water period (Section 4.1.2). Thirty-six (72%) were detected between 83 and 36,725 times for 4–126 days of the 140-day open-water period (3–90% of the time; Table A1-4). The average total movement range was 11.9 rkm (StDev = 12.6 rkm; range: 0.0–64.6 rkm) (Figure 13). The farthest upstream detections occurred near the Keeyask GS spillway at rkm 0.7 (by 16 fish; 44%). One fish moved downstream past the Kettle and Long Spruce GSs (described further in Section 4.3.3.2). Not including this fish, the farthest downstream detection occurred immediately upstream of the Kettle GS (rkm 39.0; by one fish; 3%); however, this fish did not move downstream through the GS and returned to upper Stephens Lake (Figure 14).

Fourteen fish were not detected during open-water 2023. Nine were last detected during open-water 2021, one in winter 2021/2022, and four were regularly detected during the open-water 2022 period.

Individual movement graphs can be found in Appendix 3 and 5.

4.3.2.1 PROPORTIONAL DISTRIBUTION

As in previous years, Walleye spent a similar amount of time in upper Stephens Lake (Zones 6 and 6.5) and lower Stephens Lake (Zone 7; Table 4; Figure 10). Each zone was used as follows:

- Zone 6.5 for 26% of the time (StDev = 38%; range = 0–100%)
- Zone 6 for 19% of the time (StDev = 32%; range = 0–100%)
- Zone 7 for 55% of the time (StDev = 45%; range = 0–100%)

Table 4: Proportion of time spent in each river zone by Walleye tagged in Stephens Lake during a portion of the 2013 (June 4 to October 15), 2014 (June 4 to October 3), 2015 (June 4 to October 11), 2016 (June 4 to October 19), 2017 (June 7 to October 16), 2018 (June 6 to October 10), 2019 (June 2 to October 7), 2020 (July 3 to September 23), 2021 (June 13 to October 10), 2022 (May 16 to October 10) and 2023 (May 16 to October 2) open-water periods.

Tagging Year	Study Year	Stephens Lake		
		Zone 6.5	Zone 6	Zone 7
2013	2013	-	66.0	34.0
	2014	-	59.0	41.0
	2015	-	76.5	23.5
	2016	-	58.2	41.8
2016/2018	2016	-	30.0	70.0
	2017	-	33.8	66.2
	2018	-	35.5	64.5
	2019	-	56.1	43.9
	2020	-	24.8	75.2
2019	2019	-	50.0	50.0
	2020	-	45.7	50.3
2016-2019	2019	-	51.7	48.3
	2020	-	41.5	55.3
	2021	-	55.9	44.1
2021	2021	-	30.4	69.6
2018-2021	2022	25.0	16.0	59.0
2019-2023	2023	26.1	19.1	54.8

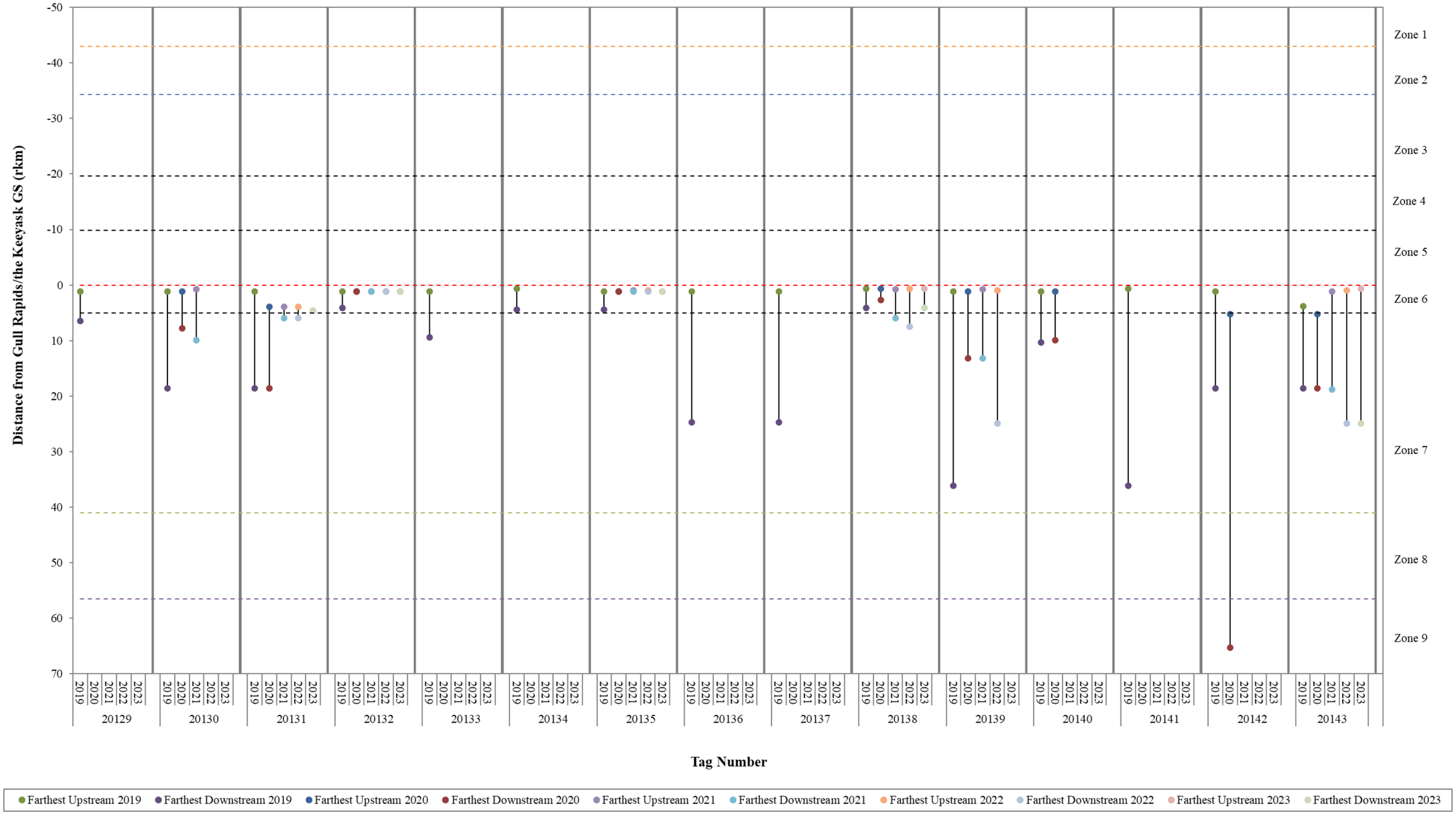


Figure 13: Detection ranges for individual Walleye tagged with acoustic transmitters in 2019-2023 in Stephens Lake during the open-water period (2019–2023). Horizontal dotted lines demarcate zones (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

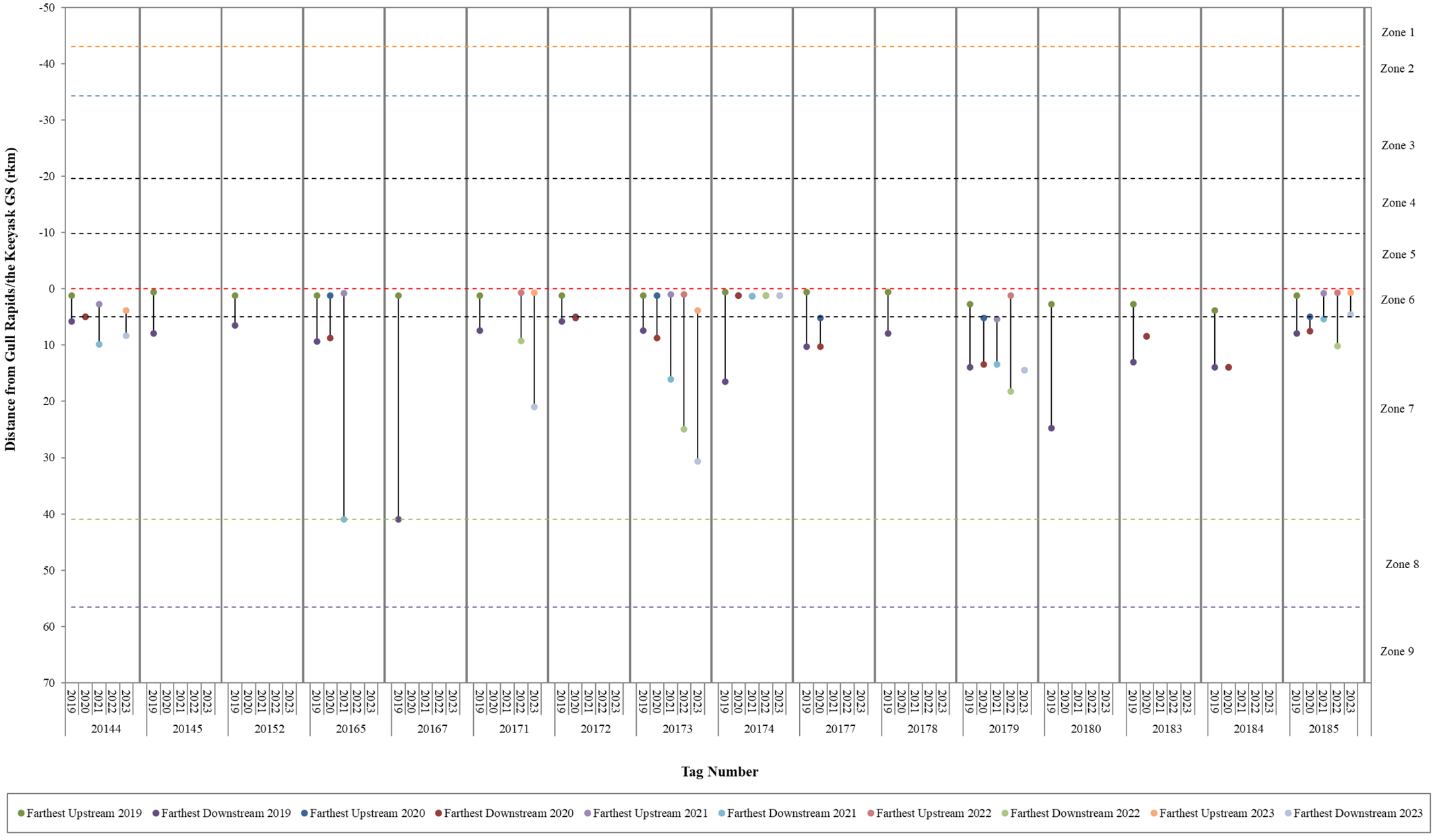


Figure 13: Detection ranges for individual Walleye tagged with acoustic transmitters in 2019-2023 in Stephens Lake during the open-water period (2019–2023). Horizontal dotted lines demarcate zones (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS). (continued).

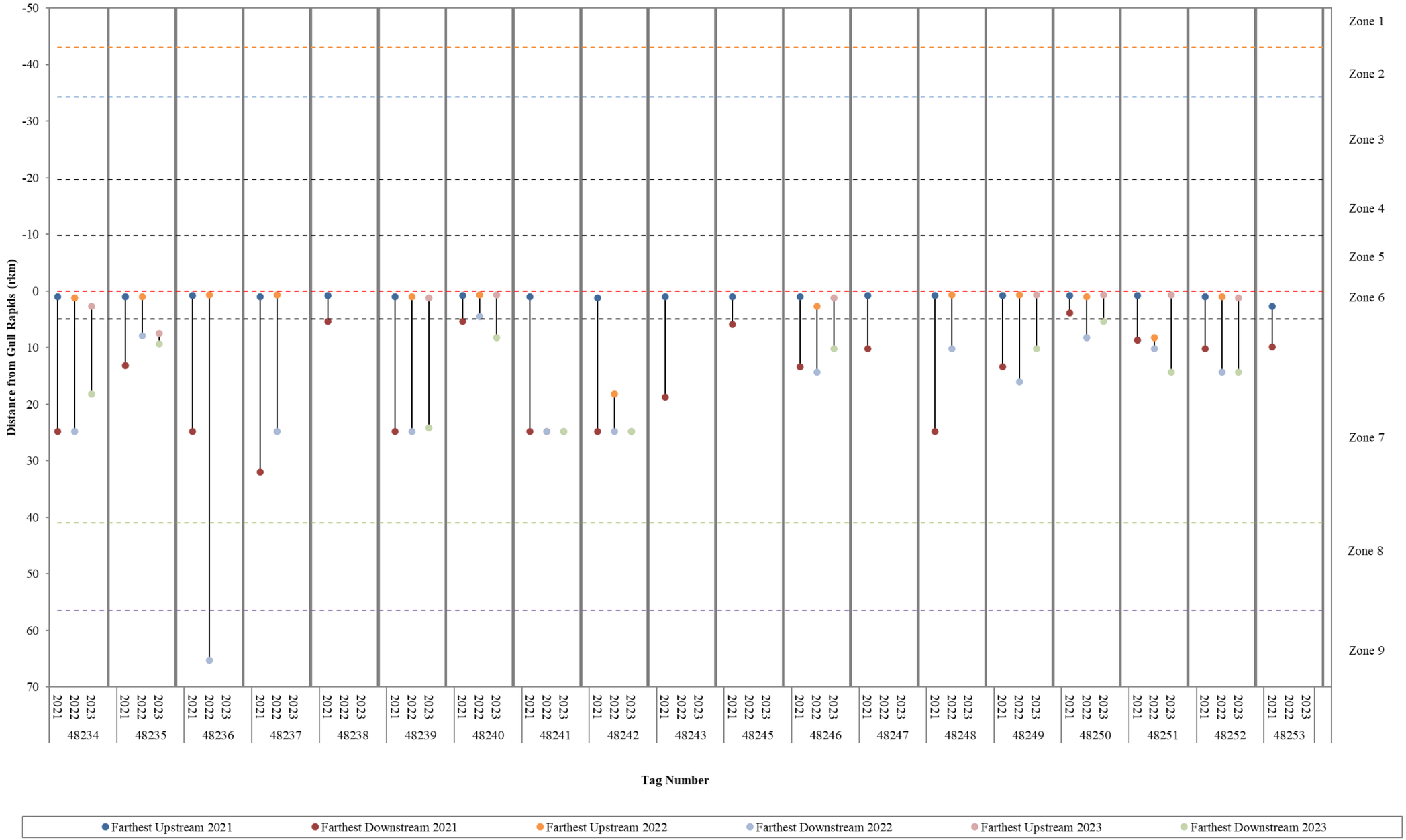


Figure 13: Detection ranges for individual Walleye tagged with acoustic transmitters in 2019-2023 in Stephens Lake during the open-water period (2019–2023). Horizontal dotted lines demarcate zones (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS). (continued).

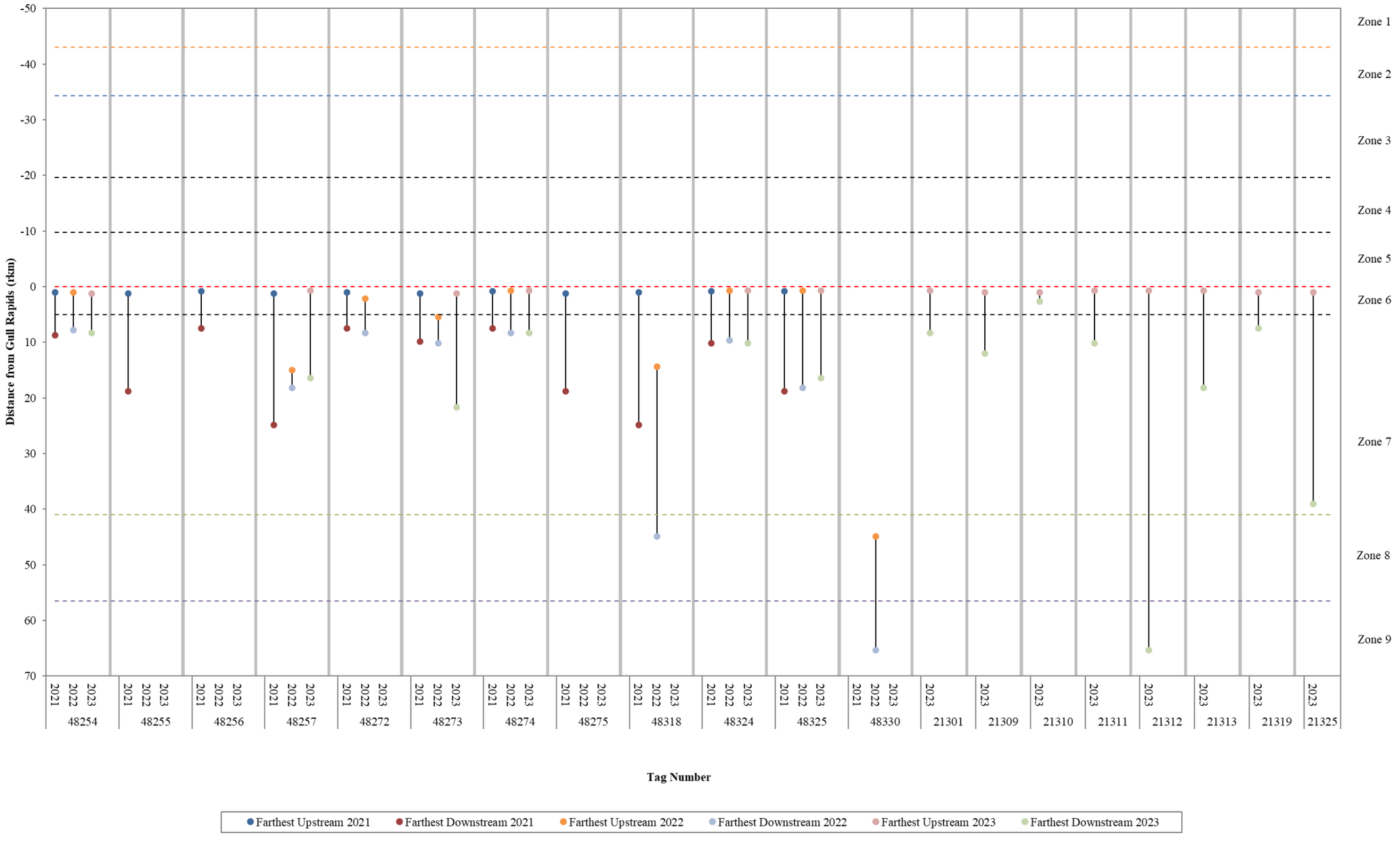


Figure 13: Detection ranges for individual Walleye tagged with acoustic transmitters in 2019-2023 in Stephens Lake during the open-water period (2019–2023). Horizontal dotted lines demarcate zones (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS). (continued).

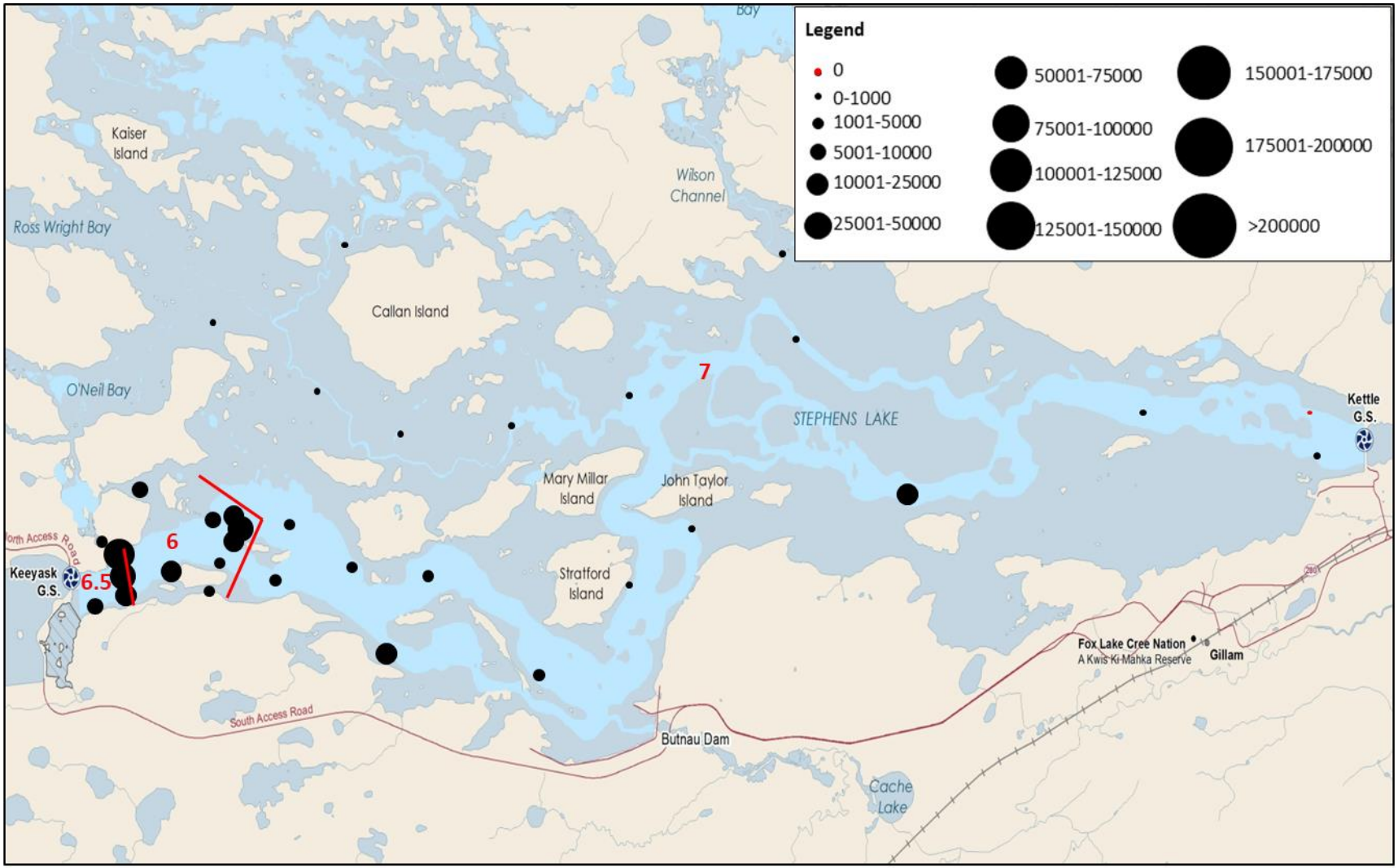


Figure 14: Relative number of detections at each acoustic receiver set in Stephens Lake during the 2023 open-water period (May 16 to October 2). Number of detections indicated by size of circle (defined in legend). Receivers with no detections indicated with red dot. The river is divided into three "zones" based on placement of receiver "gates."

4.3.2.2 MOVEMENT PATTERNS

During the 2023 open-water period, most detections were logged within 4.6 rkm of the GS (n = 203,158; 83%) with 46% (n = 112,678) logged between rkm 0.7 and 1.2 (Figure 13). As seen in previous years, the majority of detections were logged in the southern portion of Stephens Lake.

General movement patterns were similar to previous years:

- Seventeen fish remained in upper Stephens Lake, travelling as far downstream as rkm 10.2.
- Sixteen moved between upper and lower Stephens Lake, moving as far upstream as rkm 0.7 and as far downstream as rkm 39.0.
- Two (#20179 and #48242) remained in lower Stephens Lake between rkms 14.4 and 24.9.
- One (#21312) moved downstream through both the Kettle and Long Spruce GSs. It was last detected in Stephens Lake on June 16, 2023, at rkm 30.7, and moved downstream through both GSs on June 20, 2023. This fish did not display any upstream movements and it is unclear if it survived passage.

All movements out of Stephens Lake since 2013 are outlined in Figure 15.

4.3.2.3 SPAWNING MOVEMENTS

During the spawning period (May 18 to June 4), 17 fish (47% of all detected) were detected downstream of the Keeyask GS between rkms 0.7 and 1.2. A total of 8,244 detections (47%) were logged at rkm 1.2 (by 21 fish; Figure 16). The majority of these were logged at the receiver on the north shore closest to the powerhouse (#129186; n = 5,754; 33%) by 19 fish. An additional 412 (2%) detections were logged at the receiver closest to the spillway (rkm 0.7; #127093) by five fish.

Of the 17 fish that were detected:

- Seven (#20171, #48239, #48246, #48249, #48251, #48257, and #48273) made distinct upstream movements to the GS. These movements were likely related to spawning.
- Seven (#20138, #20185, #48240, #48250, #48274, #48324, and #48325) made movements to the GS during the spawning period as well as during the open-water period.
- Three (#20132, #20135, and #20174) were detected at rkm 1.2 for the entire duration of the study period.

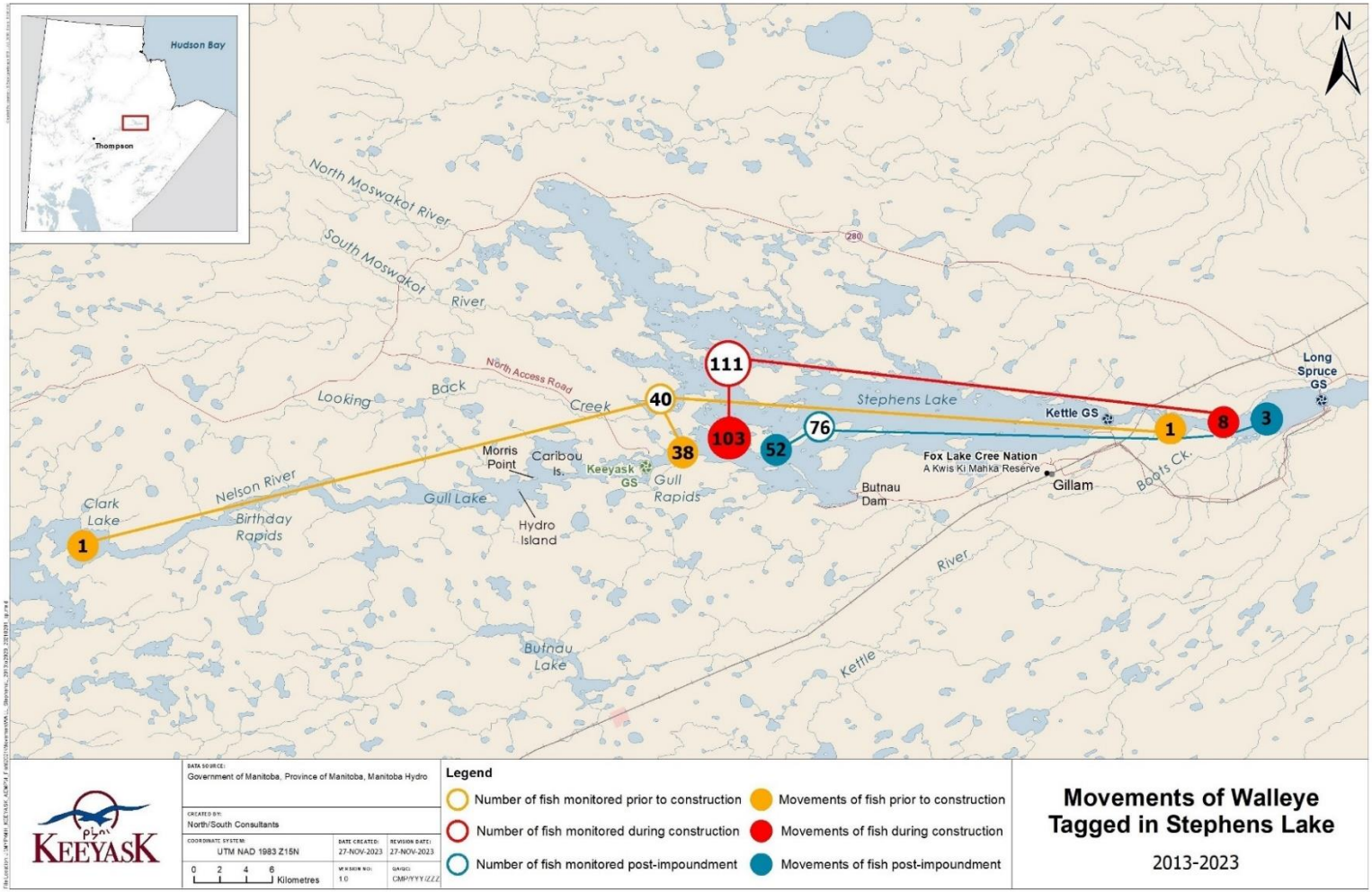


Figure 15: Map showing the number of Walleye that moved upstream through Gull Rapids, stayed in Stephens Lake, and moved downstream past the Kettle GS before construction (yellow), during construction (red) and after reservoir impoundment (blue). Movements due to tagging stress and mortality were not included. Numbers of fish monitored (hollow circles) represent the number of fish tagged while the number of fish movements (solid circles) represent the number of fish detected.

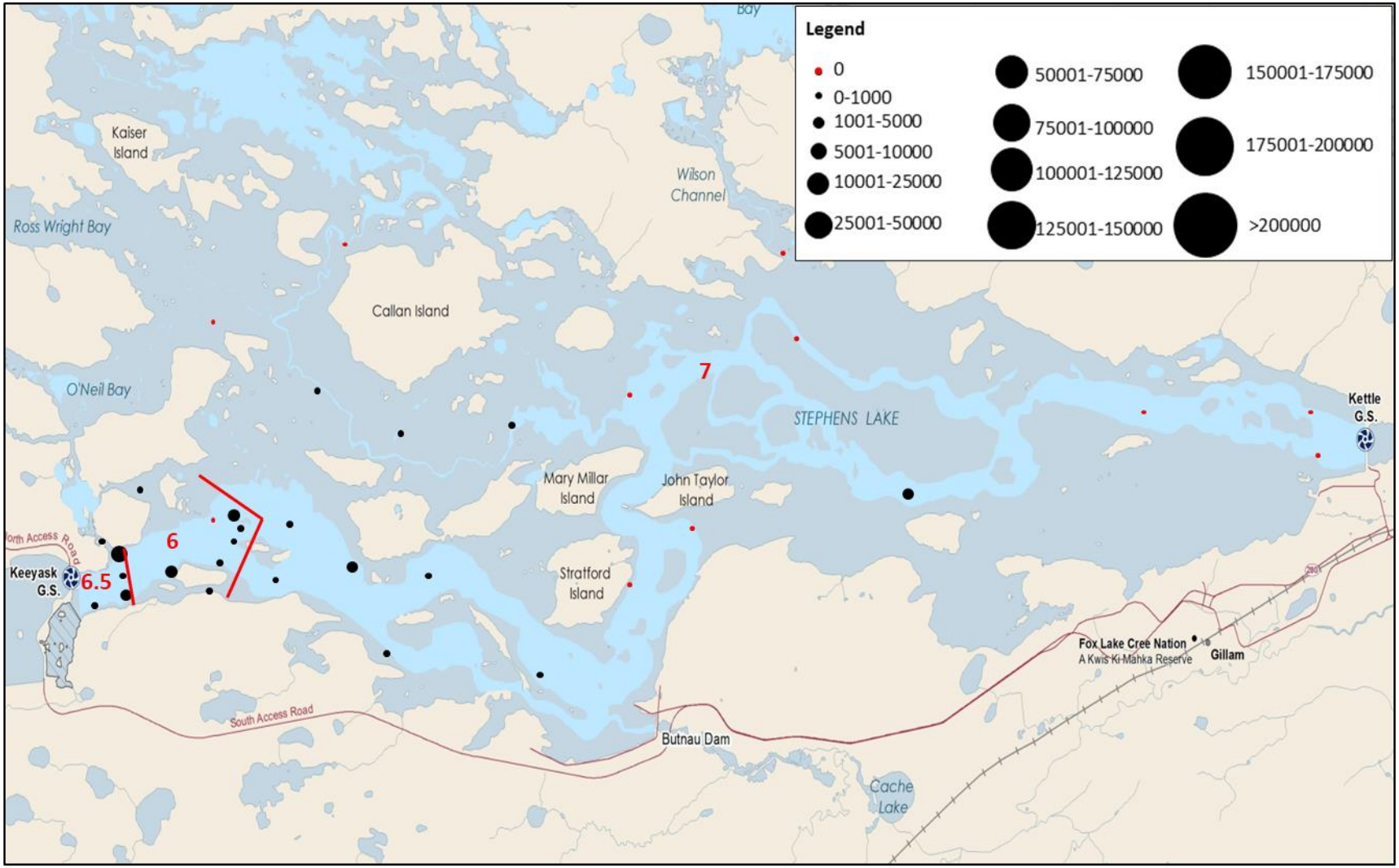


Figure 16: Relative number of detections at each acoustic receiver set in Stephens Lake during the 2023 open-water spawning period (May 18 to June 4). Number of detections indicated by size of circle (defined in legend). Receivers with no detections indicated with red dot. The river is divided into six "zones" based on placement of receiver "gates."

5.0 DISCUSSION

Walleye movement monitoring was initiated in 2013 to describe movements during the pre-construction (2013), construction/commissioning (2014–2021), and operation (2022-present) phases of the Keeyask Project. Monitoring is being conducted to determine if habitat changes associated with construction and operation of the GS have altered habitat use and coarse-scale movement patterns. The discussion below is focussed on the key questions (presented in the AEMP) with respect to potential impacts of impoundment and operation of the Keeyask GS on Walleye and their movements.

Acoustic transmitters have been applied to Walleye upstream and downstream of the Keeyask GS (formerly Gull Rapids) in seven different years since the study began (2013, 2014, 2016, 2018, 2019, 2021, and 2023). Regular tagging is required to maintain a sample size of 80 fish and provide overlap to record movements associated with different phases of the Project. Transmitters applied in earlier years have since expired (2013–2018), although any recapture information about these fish is still reported. Movements of Walleye tagged in 2019, 2021, and 2023 are discussed herein and compared with movement patterns observed from those tagged in 2013–2018.

5.1 EVALUATION OF METHODOLOGY

Acoustic telemetry continues to be an effective method for monitoring movements and habitat use patterns of Walleye in the study area. During the 2023 open-water period, the majority of tagged fish remaining in the study area were located. In 2023, 70% of fish were detected upstream of the Keeyask GS (compared to 47–100% in previous years) and 72% were detected in Stephens Lake (compared to 50–98% in previous years). The data collected provides a good understanding of coarse-scale Walleye movements. This has been facilitated by the extensive array of stationary acoustic receivers spread over a ~100 km length of the Nelson River between Clark Lake and the Limestone GS, and the inclusion of receiver gates which provide confidence that movements of Walleye past key points are being detected.

5.2 MOVEMENT PATTERNS

Although different Walleye have been tagged and monitored over time, similar coarse-scale movement patterns have been observed both upstream and downstream of the Keeyask GS site since the study began in 2013. Each year, fish tagged upstream of the Keeyask GS have been split into four groups: those that remained in Gull Lake; those that moved between Birthday Rapids and Gull Lake; those that moved between Clark Lake and Gull Lake; and those that remain in the riverine area downstream of Birthday Rapids. These movement patterns have not changed following reservoir impoundment in September 2020. Walleye in 2023 continued to inhabit Gull

Lake and the riverine portion of the reservoir, spending little time near the GS. No fish moved farther downstream than rkm -5.8 in either 2022 or 2023. Walleye tagged in 2019 showed similar movement patterns as previous years, remaining almost exclusively (98% of the open-water period) in the Gull Lake portion of the reservoir. Walleye tagged in the Keeyask reservoir in 2021–2023 spent similar amounts of time within Gull Lake (47%) and the middle Keeyask reservoir (39%), but also moved upstream into Clark Lake, spending 14% of the study period upstream of Birthday Rapids.

Before the start of construction in 2014, 14% of the tagged Walleye moved upstream into Clark Lake, most of which (71%) moved back downstream to Gull Lake within one to six months. During construction, 18% of tagged Walleye moved upstream, 50% of which moved back downstream to Gull Lake within one day to nine months. During the first open-water period after impoundment in 2021, 17 tagged Walleye moved upstream (31%), which represents a larger proportion of tagged fish than seen in past years. In 2022, five tagged Walleye (17%) moved upstream into Clark Lake during the open-water period, while twelve (38%) moved upstream in 2023. In previous years, the majority of these fish returned to Gull Lake before the end of the open-water period, however, only three fish that moved upstream (25%) in 2023 had returned to the Keeyask reservoir by October 2023.

Walleye tagged in Stephens Lake have been consistently split into two groups: those that remain exclusively within the upper portion of the lake (*i.e.*, within 10.2 rkm of the Keeyask GS), and those that move extensively within the lake. Independent of tagging year, Walleye continued to be detected in the areas closer to and farther from the station in similar proportions, spending 25–77% of the open-water period closer to the GS prior to operation (*i.e.*, 2013–2021), and 41–46% of time in the area during operation (2022 and 2023).

5.3 KEY QUESTIONS

Key questions identified in the AEMP relevant to the operation period are addressed below.

What is the frequency of downstream movement past the Keeyask GS, and when are the movements occurring?

It was predicted in the EIS that Walleye would leave the Keeyask reservoir due to changes in water level and velocities following impoundment. Since tagging began in 2013, 40 fish have moved downstream past the Keeyask GS site. Thirteen of these movements likely occurred due to tagging stress or mortality, while 27 movements occurred independent of tagging. By year, the highest proportion of tagged Walleye moved downstream past the Keeyask GS construction site (independent of tagging stress) in 2017 (18%) and the Keeyask GS spillway in 2019 (13%). In all other years, the proportion of tagged Walleye that moved downstream past the Keeyask GS has ranged from 0% (in 2013) to 10% (in 2015). No Walleye moved past the Keeyask GS during either the 2022/2023 winter or 2023 open-water study periods. Overall, there does not appear to be a clear increasing or decreasing trend in the proportion of Walleye that move downstream past the Keeyask GS.

Are Walleye using habitat in the vicinity of the Keeyask GS, particularly during spawning?

Monitoring since 2013 has shown that Walleye tagged upstream of the Keeyask GS do not spend much time in the vicinity of the Keeyask GS site. Since studies began, Walleye have rarely been detected at the receiver set closest to the Keeyask GS site (rkm -5.8 from 2013–2017, -4.8 from 2018–2019, -2.2 in 2020–2021, and -0.3 in 2022–2023). In 2023, no fish moved farther downstream than rkm -5.8.

In contrast, Walleye in Stephens Lake regularly used habitat directly downstream of the construction site and continue to use this area after GS completion. The Keeyask GS was completed on March 9, 2022, when all powerhouse units were commissioned, causing flow alterations downstream in Stephens Lake. Walleye have been detected near the Keeyask GS site (≤1.2 rkm) during spring in all study years and have likely continued to spawn in this area. Seventeen fish (47% of all detected) were detected within 1.2 km of the Keeyask GS during the 2023 spawning period (May 18–June 4), with the majority of fish detected at the receiver located closest to the Keeyask GS powerhouse. Eighty Walleye were captured in spawning condition downstream of the GS in spring 2023, with capture sites located within 0.6 km of the powerhouse and 1.4 km of the spillway (Morrison and Hrenchuk 2024). Together, these suggest that Walleye have continued to spawn downstream of the Keeyask GS during operation.

What types of habitat are Walleye utilizing in the Keeyask reservoir (i.e., are fish using the upper, middle, or lower end of the reservoir)?

Walleye have continued to spend the majority of the open-water period in the upper basin of Gull Lake (Zone 4) since the study began in 2013. This has not changed following reservoir impoundment. However, as observed in the past two years, the proportion of time spent in Gull Lake differed based on tagging year. For the open-water 2023 period, Walleye tagged in 2019 spent nearly the entire open-water period in Gull Lake, with 78% of time spent in upper Gull Lake (Zone 4) and 20% in lower Gull Lake (Zone 5). Walleye tagged in 2021–2023 were detected in Gull Lake for 47% of the study period, but also spent 39% of the time in the middle Keeyask reservoir (Zone 3). This most likely reflects tagging location, as the majority of fish tagged in 2021 and 2023 were captured and tagged in the middle Keeyask reservoir.

What proportion of the fish population moves from the Keeyask reservoir upstream past Birthday and/or Long rapids?

Before the start of construction in 2014, seven of 49 tagged Walleye (14%) moved upstream into Clark Lake. During the construction period, 24 of 132 tagged Walleye (18%) moved upstream. During the first open-water period post-impoundment (2021), 17 tagged Walleye (36%; five tagged in 2018/2019 and 12 tagged in 2021) moved upstream. Only five fish (17%) moved upstream into Clark Lake in 2022, while twelve (38%) in 2023. In all years previous, most fish (50–75%) detected in Clark Lake returned downstream prior to the end of the open-water period. In 2023, only three fish (25%) had returned to the Keeyask reservoir by October.

6.0 SUMMARY AND CONCLUSIONS

- Acoustic transmitters were applied to Walleye upstream and downstream of the Keeyask GS construction site in 2013, 2014, 2016, 2018, 2019, 2021, and 2023. The transmitters applied in 2013, 2014, 2016, and 2018 have expired. Sixty new transmitters were applied in spring 2021 (30 upstream and 30 downstream of the Keeyask GS) and will last until open-water 2025. An additional 20 transmitters (12 upstream and 8 downstream) were applied in spring 2023 which will last until open-water 2027.
- Walleye tagged upstream of the Keeyask GS have consistently displayed four general movement patterns since monitoring began in 2013. These fish either: remain in Gull Lake, move between Birthday Rapids and Gull Lake, move between Clark Lake and Gull Lake, or remain in the riverine area downstream of Birthday Rapids. These patterns have not changed following reservoir impoundment in September 2020.
- Walleye tagged in Stephens Lake have been consistently split into two groups: those that remain exclusively within the upper portion (within 10.2 rkm of the Keeyask GS) of the lake; and those that move extensively throughout the lake. These patterns have not changed following completion of the Keeyask GS in March 2022.
- The key questions, as described in the AEMP, for Walleye movement monitoring during construction and impoundment of the Keeyask GS are as follows:
    - *What is the frequency of downstream movement past the Keeyask GS, and when are the movements occurring?*

        Since tagging began in 2013, 40 fish have moved downstream past the Keeyask GS site. Thirteen of these movements likely occurred due to tagging stress or mortality, while 27 movements occurred independently of tagging. By year, the highest proportion of tagged Walleye moved downstream past the Keeyask GS site (independent of tagging stress) in 2017 (18%) and the Keeyask GS spillway in 2019 (13%). In all other years, the rate of downstream movement has ranged from 0% (in 2013) to 10% (in 2015). No fish moved downstream past the Keeyask GS in 2023. Overall, there does not appear to be a clear increasing or decreasing trend in the proportion of Walleye that move downstream past the Keeyask GS.
    - *Are Walleye utilizing habitat in the vicinity of the Keeyask GS (particularly during spawning)?*

        Monitoring since 2013 has shown that Walleye tagged upstream do not spend much time in the vicinity of the Keeyask GS site. Since studies began, Walleye have rarely been detected at the receiver set closest to the Keeyask GS site (rkm -5.8 from 2013–2017, -4.8 from 2018–2019, -2.2 in 2020–2021, and -0.3 in 2022). In 2023, no fish were detected farther downstream than rkm -5.8.

In contrast, Walleye in Stephens Lake regularly used habitat directly downstream of the construction site and continue to use this area after GS completion. Walleye have been detected near the Keeyask GS site (≤ rkm 1.2) during the spring in all study years and have likely continued to spawn in this area during the construction and initial operation periods. Seventeen Walleye (47% of all detected) were detected within 1.2 rkm of the GS during the 2023 spawning period (May 18–June 4).

- *What types of habitat are Walleye utilizing in the Keeyask reservoir (i.e., are fish using the upper, middle, or lower end of the reservoir)?*

  Walleye have continued to spend the majority of the open-water period in the upper basin of Gull Lake (Zone 4) since the study began in 2013. As observed in the past two years, the proportion of time spent in Gull Lake differed based on tagging year. Walleye tagged in 2019 spent nearly the entire 2023 open-water period in Gull Lake, with 78% of time spent in upper Gull Lake (Zone 4) and 20% in lower Gull Lake (Zone 5). Walleye tagged in 2021–2023 were detected in Gull Lake for 47% of the study period, but also spent 39% of the time in the middle Keeyask reservoir (Zone 3). This most likely reflects tagging location, as most fish tagged in 2021 and 2023 were captured and tagged in Zone 3.

- *What proportion of the fish population move from the Keeyask reservoir upstream past Birthday and/or Long rapids?*

  Before the start of construction in 2014, seven of 49 tagged Walleye (14%) moved upstream into Clark Lake. During the construction period, 24 of 132 tagged Walleye (18%) moved upstream. During the first open-water period post-impoundment, 17 tagged Walleye (36%) moved upstream. Only five Walleye (17%) moved upstream into Clark Lake in 2022, while twelve (38%) moved upstream into Clark Lake in 2023. In all previous years, most fish (50–75%) detected in Clark Lake returned downstream prior to the end of the open-water period. In 2023, only three fish (25%) had returned to the Keeyask reservoir by October.

- It was predicted in the EIS that Walleye may leave the Keeyask reservoir due to changes in water level and velocities following impoundment. Overall, there does not appear to be a clear increasing or decreasing trend in the proportion of Walleye that move downstream past the Keeyask GS. Since tagging began in 2013, 27 fish have moved downstream past the Keeyask GS site independent of tagging stress or mortality. By year, the highest proportion of tagged Walleye that moved downstream past the Keeyask GS site was in 2017 (18%) and 2019 (13%). In all other years, the rate of downstream movement has ranged from 0% (in 2013) to 10% (in 2015). No fish moved downstream past the Keeyask GS in 2023. The number of movements upstream out of the Keeyask reservoir increased in 2021 but returned closer to pre-impoundment rates in 2022 and 2023. Prior to impoundment, 24 of 132 tagged Walleye (18%) moved upstream into Clark Lake while 17 tagged Walleye (31%) moved upstream in 2021. Only five fish (17%) moved upstream

into Clark Lake in 2022, and eight (25%) in 2023. In all sampling years, most fish (50–75%) that moved upstream to Clark Lake were detected here for only a short period and then returned downstream.

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APPENDICES

APPENDIX 1: DETECTION SUMMARIES FOR WALLEYE TAGGED AND MONITORED IN THE KEEYASK STUDY AREA BETWEEN 2018 AND 2023

Table A1-1: Detection summary for Walleye monitored upstream of the Keeyask GS during the winter 2018/2019 (October 11, 2018 to April 30, 2019), 2019/2020 (October 8, 2019 to April 30, 2020), 2020/2021 (September 24, 2020 to April 30, 2021), 2021/2022 (October 11, 2021 to May 15, 2022), and 2022/2023 (October 11, 2022 to May 15, 2023) periods. Tag ID highlighted yellow = lost tag. Tag ID highlighted purple = moved downstream past the Keeyask GS. Tag ID highlighted green = moved downstream through Kettle GS. Tag ID highlighted orange = suspected to have moved downstream through Kettle GS. Tag ID highlighted red = moved downstream through Long Spruce GS.

Tag ID	Date tagged	2018/2019					2019/2020					2020/2021					2021/2022					2022/2023				
		n	# Days	Farthest U/S (rkm)	Farthest D/S (rkm)	Range (rkm)	n	# Days	Farthest U/S (rkm)	Farthest D/S (rkm)	Range (rkm)	n	# Days	Farthest U/S (rkm)	Farthest D/S (rkm)	Range (rkm)	n	# Days	Farthest U/S (rkm)	Farthest D/S (rkm)	Range (rkm)	n	# Days	Farthest U/S (rkm)	Farthest D/S (rkm)	Range (rkm)
25744	5-Jun-18	-	-	-	-	-	-	-	-	-	-	26	4	-7.9	-7.9	0.0	-	-	-	-	-	8	3	-7.9	-7.9	0.0
25746	5-Jun-18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10543	119	-12.9	-12.9	0.0	-	-	-	-	-
25749	28-May-18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25751	5-Jun-18	37	8	-12.4	-12.4	0	-	-	-	-	-	49906	189	-12.9	-12.9	0.0	13	1	-19.5	-12.4	7.1	-	-	-	-	-
20147	05-Jun-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20148	05-Jun-19	-	-	-	-	-	2209	46	-12.4	-10.3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20149	06-Jun-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-		-	-	-	-	-
20150	05-Jun-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-		-	-	-	-	-
20151	05-Jun-19	-	-	-	-	-	-	-	-	-	-	4269	37	-12.9	-12.9	0.0	14550	139	-48.2	-12.9	35.3	12004	129	-17.4	-12.9	4.5
20153	06-Jun-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20154	06-Jun-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	56693	137	-19.5	-19.5	0.0	4294	27	-19.5	-19.5	0.0
20155	06-Jun-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20156	06-Jun-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20157	06-Jun-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20158	06-Jun-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20159	07-Jun-19	-	-	-	-	-	3466	83	-10.3	-10.3	0.0	3148	53	-12.4	-10.1	2.3	-	-	-	-	-	9367	150	-7.8	-7.8	0.0
20160	07-Jun-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20161	07-Jun-19	-	-	-	-	-	-	-	-	-	-	3954	35	-19.5	-17.4	2.1	-	-	-	-	-	10714	48	-26.4	-15	11.4
20162	06-Jun-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1136	21	-17.4	-17.4	0.0	-	-	-	-	-
20163	06-Jun-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20164	06-Jun-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20168	07-Jun-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20169	07-Jun-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20170	06-Jun-19	-	-	-	-	-	-	-	-	-	-	469	5	-12.9	-7.9	5.0	-	-	-	-	-	-	-	-	-	-
20175	29-May-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20176	29-May-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20181	29-May-19	-	-	-	-	-	-	-	-	-	-	6356	49	-19.5	-17.4	2.1	-	-	-	-	-	-	-	-	-	-
20182	25-May-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20186	29-May-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20187	23-May-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20188	23-May-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48244	03-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48258	05-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7316	78	-19.5	-12.4	7.1	-	-	-	-	-
48259	05-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10116	102	-19.5	-12.4	7.1	6074	29	-19.5	-9.9	9.6
48260	05-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20600	87	-19.5	-10.1	9.4	3743	34	-17.4	-12.5	4.9
48261	07-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24168	202	-12.4	-12.4	0.0	41410	197	-12.5	-12.5	0.0

Table A1-1: Detection summary for Walleye monitored upstream of the Keeyask GS during the winter 2018/2019 (October 11, 2018 to April 30, 2019), 2019/2020 (October 8, 2019 to April 30, 2020), 2020/2021 (September 24, 2020 to April 30, 2021), 2021/2022 (October 11, 2021 to May 15, 2022), and 2022/2023 (October 11, 2022 to May 15, 2023) periods. Tag ID highlighted yellow = lost tag. Tag ID highlighted purple = moved downstream past the Keeyask GS. Tag ID highlighted green = moved downstream through Kettle GS. Tag ID highlighted orange = suspected to have moved downstream through Kettle GS. Tag ID highlighted red = moved downstream through Long Spruce GS (continued).

Tag ID	Date tagged	2018/2019					2019/2020					2020/2021					2021/2022					2022/2023				
		n	# Days	Farthest U/S (rkm)	Farthest D/S (rkm)	Range (rkm)	n	# Days	Farthest U/S (rkm)	Farthest D/S (rkm)	Range (rkm)	n	# Days	Farthest U/S (rkm)	Farthest D/S (rkm)	Range (rkm)	n	# Days	Farthest U/S (rkm)	Farthest D/S (rkm)	Range (rkm)	n	# Days	Farthest U/S (rkm)	Farthest D/S (rkm)	Range (rkm)
48262	10-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	3	-7.9	-7.9	0.0	917	71	-9.9	-7.8	2.1
48263	14-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16750	144	-12.4	-12.4	0.0	7948	147	-15	-9.9	5.1
48264	05-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	1	-10.1	-10.1	0.0	-	-	-	-	-
48265	05-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10899	68	-29.3	-29.3	0.0	-	-	-	-	-
48266	05-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6901	85	-29.3	-17.4	11.9	-	-	-	-	-
48267	05-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	359	7	-12.9	-12.9	0.0	-	-	-	-	-
48268	05-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48269	05-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48270	05-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48271	05-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3139	46	-26.4	-26.4	0.0	866	17	-26.4	-26.4	0.0
48313	31-May-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1396	53	-26.4	-10.1	16.3	193	7	-12.5	-12.5	0.0
48314	31-May-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16558	152	-17.4	-10.1	7.3	48199	13	-19.5	-7.8	11.7
48319	31-May-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48320	31-May-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10662	72	-19.5	-12.4	7.1	20706	64	-15	-9.9	5.1
48321	31-May-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2591	13	-29.3	-17.4	11.9
48322	31-May-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48323	31-May-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48326	31-May-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48327	01-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48328	31-May-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14883	128	-7.9	-7.9	0.0	3178	54	-19.5	-7.8	11.7
48329	01-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1635	19	-26.4	-26.4	0.0	346	5	-29.3	-26.4	2.9
48330	01-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48331	01-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2490	44	-12.9	-12.9	0.0
48332	01-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12989	53	-26.4	-17.4	9.0	11680	43	-26.4	-15.0	11.4
48333	31-May-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	136	2	-48.2	-48.2	0.0	-	-	-	-	-

Table A1-2: Detection summary for Walleye monitored in Stephens Lake during the winter 2016/2017 (October 20, 2015 to April 30, 2017), 2017/2018 (October 17, 2017 to April 30, 2018), 2018/2019 (October 11, 2018 to April 30, 2019), 2019/2020 (October 8, 2019 to April 30, 2020), 2020/2021 (September 24, 2020 to April 30 2021), 2021/2022 (October 11, 2021 to May 15, 2022), and 2022/2023 (October 11, 2022 to May 15, 2023) periods. Tag ID highlighted yellow = lost tag. Tag ID highlighted green = moved downstream through Kettle GS. Tag ID highlighted orange = suspected to have moved downstream through Kettle GS. Tag ID highlighted red = moved downstream through Long Spruce GS. Tag highlighted blue = assumed mortality.

Tag ID	Date tagged	2018/2019					2019/2020					2020/2021					2021/2022					2022/2023				
		n	# Days	Farthest U/S (rkm)	Farthest D/S (rkm)	Range (rkm)	n	# Days	Farthest U/S (rkm)	Farthest D/S (rkm)	Range (rkm)	n	# Days	Farthest U/S (rkm)	Farthest D/S (rkm)	Range (rkm)	n	# Days	Farthest U/S (rkm)	Farthest D/S (rkm)	Range (rkm)	n	# Days	Farthest U/S (rkm)	Farthest D/S (rkm)	Range (rkm)
25735	6-Jun-18	-	-	-	-	-	600	13	13	36.1	23.1	391	15	32	32	0.0	-	-	-	-	-	98	4	30.7	30.7	0.0
25737	6-Jun-18	-	-	-	-	-	0	-	-	-	-	26	3	3.9	4.9	1.0	13	4	3.9	3.9	0.0	1923	27	3.8	7.5	3.7
25741	6-Jun-18	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20129	03-Jun-19	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20130	01-Jun-19	-	-	-	-	-	1057	5	6.5	16.8	10.3	1946	16	3.9	16.3	12.4	-	-	-	-	-	-	-	-	-	-
20131	31-May-19	-	-	-	-	-	66	5	16.8	16.8	0.0	77327	206	3.9	4.9	1.0	36553	189	3.9	4.9	1.0	8085	116	4.6	4.6	0.0
20132	01-Jun-19	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20133	31-May-19	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20134	31-May-19	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20135	01-Jun-19	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	_	_	_	-	-
20136	01-Jun-19	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20137	31-May-19	-	-	-	-	-	8548	48	13.9	21.6	7.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20138	31-May-19	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20139	31-May-19	-	-	-	-	-	20139	4	13	13	0.0	126	6	7.5	13.2	5.7	6582	67	7.5	13.2	5.7	-	-	-	-	-
20140	31-May-19	-	-	-	-	-	20140	14	5.2	10.3	5.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20141	31-May-19	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20142	31-May-19	-	-	-	-	-	7989	75	13.9	18.6	4.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20143	01-Jun-19	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	136	3	16.1	24.9	8.8	11	1	24.9	24.9	0.0
20144	01-Jun-19	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20145	01-Jun-19	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20152	31-May-19	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20165	16-Sep-19	-	-	-	-	-	39683	174	5.2	10.3	5.1	52505	200	3.9	10.2	6.3	28	1	22	24.9	2.9	-	-	-	-	-
20167	16-Sep-19	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20171	27-May-19	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	226	3	4.6	7.5	2.9
20172	30-May-19	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20173	30-May-19	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20174	30-May-19	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20177	30-May-19	-	-	-	-	-	10513	89	5.2	13.9	8.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20178	30-May-19	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20179	30-May-19	-	-	-	-	-	45009	183	5.2	10.3	5.1	56962	5	5.9	10.2	4.3	52110	196	5.4	10.2	4.8	-	-	-	-	-
20180	30-May-19	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20183	30-May-19	-	-	-	-	-	177	6	8.4	8.4	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20184	30-May-19	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20185	30-May-19	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12	2	3.8	5.4	1.6

Table A1-2: Detection summary for Walleye monitored in Stephens Lake during the winter 2016/2017 (October 20, 2015 to April 30, 2017), 2017/2018 (October 17, 2017 to April 30, 2018), 2018/2019 (October 11, 2018 to April 30, 2019), 2019/2020 (October 8, 2019 to April 30, 2020), 2020/2021 (September 24, 2020 to April 30 2021), 2021/2022 (October 11, 2021 to May 15, 2022), and 2022/2023 (October 11, 2022 to May 15, 2023) periods. Tag ID highlighted yellow = lost tag. Tag ID highlighted green = moved downstream through Kettle GS. Tag ID highlighted orange = suspected to have moved downstream through Kettle GS. Tag ID highlighted red = moved downstream through Long Spruce GS. Tag highlighted blue = assumed mortality (continued).

Tag ID	Date tagged	2018/2019					2019/2020					2020/2021					2021/2022					2022/2023				
		n	# Days	Farthest U/S (rkm)	Farthest D/S (rkm)	Range (rkm)	n	# Days	Farthest U/S (rkm)	Farthest D/S (rkm)	Range (rkm)	n	# Days	Farthest U/S (rkm)	Farthest D/S (rkm)	Range (rkm)	n	# Days	Farthest U/S (rkm)	Farthest D/S (rkm)	Range (rkm)	n	# Days	Farthest U/S (rkm)	Farthest D/S (rkm)	Range (rkm)
48234	02-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21720	71	18.8	24.9	6.1	328	3	16.4	18.2	1.8
48235	02-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48236	02-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48237	02-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20791	108	5.4	32.5	27.1	-	-	-	-	-
48238	02-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48239	02-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8935	82	3.9	18.8	14.9	11385	33	3.8	15.0	11.2
48240	02-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						-	-	-	-	-
48242	02-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48243	02-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48245	04-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48246	06-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10543	119	3.9	10.2	6.3	25135	130	3.8	16.4	12.6
48247	05-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48248	06-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14942	95	5.4	24.9	19.5	-	-	-	-	-
48249	06-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	1	16.1	16.1	0.0	13150	154	4.6	18.2	13.6
48250	06-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14911	78	3.9	10.2	6.3	3629	61	3.8	8.3	4.5
48251	02-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13	1	13.4	13.4	0.0	8659	94	3.8	12.0	8.2
48252	06-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	28241	149	3.9	10.2	6.3	40218	199	5.9	10.2	4.3
48253	06-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48254	06-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8042	38	3.9	10.2	6.3	1523	31	4.6	10.2	5.6
48255	06-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48256	06-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48257	06-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	278	10	16.3	16.3	0.0	20345	96	12	15.0	3.0
48272	02-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	42	8	7.5	7.5	0.0	-	-	-	-	-
48273	02-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18117	59	7.5	9.9	2.4	206	7	4.6	8.3	3.7
48274	02-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5801	50	3.9	8.7	4.8	1363	13	3.8	4.6	0.8
48275	02-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48318	02-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1003	36	16.3	22.0	5.7	-	-	-	-	-
48324	02-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2377	45	3.9	10.2	6.3	36	3	9.7	9.7	0.0
48325	02-Jun-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	329	11	8.7	8.7	0.0	116	10	9.7	9.7	0.0

Table A1-3: Detection summary for Walleye and monitored upstream of the Keeyask GS during the open-water 2018 (May 1 to October 10), 2019 (May 1 to October 7), 2020 (May 1 to September 23), 2021 (May 1 to October 10), 2022 (May 16 to October 10), and 2023 (May 16 to October 2) periods. Tag ID highlighted yellow = lost tag. Tag ID highlighted purple = moved downstream past the Keeyask GS. Tag ID highlighted green = moved downstream through Kettle GS. Tag ID highlighted orange = suspected to have moved downstream through Kettle GS. Tag ID highlighted red = moved downstream through Long Spruce GS.

Tag ID	Date tagged	2019					2020					2021					2022					2023				
		n	# Days	U/S (rkm)	D/S (rkm)	Range (rkm)	n	# Days	U/S (rkm)	D/S (rkm)	Range (rkm)	n	# Days	U/S (rkm)	D/S (rkm)	Range (rkm)	n	# Days	U/S (rkm)	D/S (rkm)	Range (rkm)	n	# Days	U/S (rkm)	D/S (rkm)	Range (rkm)
20147	05-Jun-19	11721	46	-19.5	40.9	60.4	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
20148	05-Jun-19	25306	116	-19.5	-9.3	10.2	998	8	5.2	40.5	35.3	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
20149	06-Jun-19	7	1	-19.5	-17.4	2.1	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
20150	05-Jun-19	1783	8	-15.0	40.9	55.9	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
20151	05-Jun-19	7125	97	-29.4	-12.9	16.5	7166	72	-12.9	-9.9	3.0	6885	89	-48.2	-9.9	38.3	2708	48	-34.3	-12.9	21.4	734	13	-34.3	-9.9	24.4
20153	06-Jun-19	1607	9	-19.5	-9.9	9.6	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
20154	06-Jun-19	66867	115	-19.5	-19.5	0.0	31732	78	-19.5	-19.5	0.0	107836	144	-19.5	-19.4	0.1	21568	85	-19.5	-19.5	0.0	4127	20	-19.5	-19.5	0.0
20155	06-Jun-19	621	5	-19.5	-9.9	9.6	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
20156	06-Jun-19	62130	121	-19.5	-19.5	0.0	22726	56	-19.5	-19.5	0.0	951	27	-19.4	-19.4	0.0	74316	130	-19.5	-19.5	0.0	25790	49	-19.5	-19.5	0.0
20157	06-Jun-19	1174	9	-19.5	-12.9	6.6	131	12	-12.9	-12.9	0.0	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
20158	06-Jun-19	1697	6	-19.5	9.4	28.9	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
20159	07-Jun-19	10988	82	-19.5	-9.0	10.5	6662	71	-29.4	-4.8	24.6	126	9	-7.7	-7.7	0.0	154	28	-7.8	-7.8	0.0	177	21	-7.8	-7.8	0.0
20160	07-Jun-19	9846	10	-19.5	5.4	24.9	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
20161	07-Jun-19	4014	81	-19.5	-19.5	0.0	1817	37	-19.5	-15.0	4.5	8590	88	-48.2	-12.5	35.7	6319	67	-48.2	-7.8	40.4	1895	25	-26.4	-9.9	16.5
20162	06-Jun-19	537	13	-19.5	-15.0	4.5	76	8	-15.0	-15.0	0.0	5694	75	-17.4	-15.0	2.4	0	-	-	-	-	0	-	-	-	-
20163	06-Jun-19	6084	53	-33.8	36.1	69.9	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
20164	06-Jun-19	106	1	-19.5	-15.0	4.5	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
20168	07-Jun-19	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
20169	07-Jun-19	27	4	-19.5	-15.0	4.5	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
20170	06-Jun-19	6259	89	-46.9	-9.3	37.6	2464	42	-33.8	-7.9	25.9	384	7	-46.9	-12.9	34.0	0	-	-	-	-	0	-	-	-	-
20175	29-May-19	6127	65	-48.2	-4.8	43.4	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
20176	29-May-19	42406	118	-19.5	-17.4	2.1	1390	17	-19.5	-19.5	0.0	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
20181	29-May-19	6572	93	-19.5	-17.4	2.1	1604	24	-29.4	-15.0	14.4	18752	52	-48.2	-17.4	30.8	0	-	-	-	-	0	-	-	-	-
20182	25-May-19	10080	22	-19.5	10.3	29.8	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
20186	29-May-19	10480	74	-17.4	5.4	22.8	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
20187	23-May-19	4991	35	-19.5	24.7	44.2	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
20188	23-May-19	31081	102	-24.7	-19.5	5.2	2715	27	-48.2	-24.2	24.0	3561	36	-48.2	-19.4	28.8	0	-	-	-	-	0	-	-	-	-
48244	03-Jun-21	-	-	-	-	-	-	-	-	-	-	4065	55	-48.2	-15	33.2	0	-	-	-	-	0	-	-	-	-
48258	05-Jun-21	-	-	-	-	-	-	-	-	-	-	7034	72	-44.2	-17.4	26.8	60	1	-29.3	-26.4	2.9	0	-	-	-	-
48259	05-Jun-21	-	-	-	-	-	-	-	-	-	-	11740	103	-22.6	-9.9	12.7	20728	124	-22.6	-9.9	12.7	16540	113	-32.2	-9.9	22.3
48260	05-Jun-21	-	-	-	-	-	-	-	-	-	-	1771	12	-33.9	-9.9	24.0	1025	22	-22.6	-12.5	10.1	400	7	-22.6	-12.5	10.1
48261	07-Jun-21	-	-	-	-	-	-	-	-	-	-	14837	109	-32.2	-9.9	22.3	5327	117	-12.5	-12.4	0.1	26123	117	-12.5	-12.5	0
48262	10-Jun-21	-	-	-	-	-	-	-	-	-	-	6686	71	-15	-3.8	11.2	1844	51	-12.9	-5.8	7.1	8775	89	-48.2	-7.8	40.4
48263	14-Jun-21	-	-	-	-	-	-	-	-	-	-	7971	78	-34.3	-9.9	24.4	6876	58	-46.9	-12.4	34.5	4793	74	-19.5	-9.9	9.6
48264	05-Jun-21	-	-	-	-	-	-	-	-	-	-	31981	122	-24.2	-2.2	22	14965	62	-10.1	21.7	31.8	469	9	9.7	24.9	15.2
48265	05-Jun-21	-	-	-	-	-	-	-	-	-	-	10385	70	-33.8	-26.4	7.4	6505	29	-33.9	-26.4	7.5	877	12	-32.2	-26.4	5.8
48266	05-Jun-21	-	-	-	-	-	-	-	-	-	-	19958	101	-48.2	-15	33.2	7011	39	-24.2	-12.5	11.7	0	-	-	-	-

Table A1-3: Detection summary for Walleye and monitored upstream of the Keeyask GS during the open-water 2018 (May 1 to October 10), 2019 (May 1 to October 7), 2020 (May 1 to September 23), 2021 (May 1 to October 10), 2022 (May 16 to October 10), and 2023 (May 16 to October 2) periods. Tag ID highlighted yellow = lost tag. Tag ID highlighted purple = moved downstream past the Keeyask GS. Tag ID highlighted green = moved downstream through Kettle GS. Tag ID highlighted orange = suspected to have moved downstream through Kettle GS. Tag ID highlighted red = moved downstream through Long Spruce GS (continued).

Tag ID	Date tagged	2019					2020					2021					2022					2023				
		n	# Days	U/S (rkm)	D/S (rkm)	Range (rkm)	n	# Days	U/S (rkm)	D/S (rkm)	Range (rkm)	n	# Days	U/S (rkm)	D/S (rkm)	Range (rkm)	n	# Days	U/S (rkm)	D/S (rkm)	Range (rkm)	n	# Days	U/S (rkm)	D/S (rkm)	Range (rkm)
48267	05-Jun-21	-	-	-	-	-	-	-	-	-	-	8532	81	-33.9	-6.2	27.7	0	-	-	-	-	0	-	-	-	-
48268	05-Jun-21	-	-	-	-	-	-	-	-	-	-	9172	22	-22.6	-22.6	0.0	28	1	-29.3	-29.3	0.0	0	-	-	-	-
48269	05-Jun-21	-	-	-	-	-	-	-	-	-	-	23174	99	-22.6	-15	7.6	0	-	-	-	-	0	-	-	-	-
48270	05-Jun-21	-	-	-	-	-	-	-	-	-	-	4093	38	-48.2	-22.6	25.6	5882	97	-48.2	-12.5	35.7	8665	69	-48.2	-32.2	16
48271	05-Jun-21	-	-	-	-	-	-	-	-	-	-	16646	104	-33.8	-19.5	14.3	6315	46	-24.2	-17.4	6.8	7896	72	-26.4	-22.6	3.8
48313	31-May-21	-	-	-	-	-	-	-	-	-	-	6469	69	-34.3	-9.9	24.4	2753	22	-46.9	-9.9	37.0	0	-	-	-	-
48314	31-May-21	-	-	-	-	-	-	-	-	-	-	21586	117	-46.9	-3.8	43.1	16846	25	-33.9	-5.8	28.1	19069	129	-48.2	-7.8	40.4
48319	31-May-21	-	-	-	-	-	-	-	-	-	-	1777	13	-22.6	-22.6	0.0	8	3	-22.6	-22.6	0.0	0	-	-	-	-
48320	31-May-21	-	-	-	-	-	-	-	-	-	-	13062	113	-48.2	-15	33.2	10477	91	-22.6	-15.0	7.6	0	-	-	-	-
48321	31-May-21	-	-	-	-	-	-	-	-	-	-	4198	49	-48.2	-7.9	40.3	3368	60	-34.3	-7.8	26.5	9256	91	-48.2	-5.8	42.4
48322	31-May-21	-	-	-	-	-	-	-	-	-	-	7284	55	-48.2	-15	33.2	0	-	-	-	-	0	-	-	-	-
48323	31-May-21	-	-	-	-	-	-	-	-	-	-	4033	32	-22.6	7.5	30.1	0	-	-	-	-		-	-	-	-
48326	31-May-21	-	-	-	-	-	-	-	-	-	-	20171	121	-48.2	-19.4	28.8	15348	63	-26.4	-22.6	3.8	19514	104	-48.2	-22.6	25.6
48327	01-Jun-21	-	-	-	-	-	-	-	-	-	-	4121	17	-22.6	-12.5	10.1	0	-	-	-	-	0	-	-	-	-
48328	31-May-21	-	-	-	-	-	-	-	-	-	-	28131	124	-22.6	-3.8	18.8	25110	127	-19.5	-5.8	13.7	24442	123	-34.3	-5.8	28.5
48329	01-Jun-21	-	-	-	-	-	-	-	-	-	-	2232	34	-48.2	-26.4	21.8	9421	62	-34.3	-26.4	7.9	3606	31	-48.2	-26.4	21.8
48330	01-Jun-21	-	-	-	-	-	-	-	-	-	-	2502	23	-19.5	40.5	60.0	543	19	44.9	65.3	20.4	0	-	-	-	-
48331	01-Jun-21	-	-	-	-	-	-	-	-	-	-	10686	89	-48.2	-15	33.2	9135	96	-26.4	-9.9	16.5	10931	76	-44.5	-12.9	31.6
48332	01-Jun-21	-	-	-	-	-	-	-	-	-	-	12924	103	-34.3	-5.8	28.5	8536	87	-33.9	-5.8	28.1	2806	35	-48.2	-5.8	42.4
48333	31-May-21	-	-	-	-	-	-	-	-	-	-	7130	67	-48.2	-2.2	46.0	0	-	-	-	-	0	-	-	-	-
21296	28-May-23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2741	24	-26.4	-22.6	3.8
21297	30-May-23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	30353	110	-34.3	-22.6	11.7
21298	30-May-23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6504	53	-34.3	-22.6	11.7
21299	30-May-23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1708	37	-48.2	-32.2	16
21300	30-May-23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	389	15	-33.8	-32.2	1.6
21302	28-May-23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10379	66	-48.2	-9.9	38.3
21303	28-May-23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4524	49	-19.5	-9.9	9.6
21304	30-May-23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8925	30	-44.5	-15	29.5
21305	30-May-23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10582	92	-48.2	-15	33.2
21306	28-May-23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1444	10	-22.6	-5.8	16.8
21307	28-May-23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4279	21	-32.2	-22.6	9.6
21308	28-May-23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2457	18	-19.5	-17.4	2.1

Table A1-4: Detection summary for Walleye monitored in Stephens Lake during the open-water 2016 (May 1 to October 19), 2017 (May 1 to October 16), 2018 (May 1 to October 10), 2019 (May 1 to October 7), 2020 (May 1 to September 23), 2021 (May 1 to October 10), 2022 (May 16 to October 10), and 2023 (May 16 to October 2) periods. Tag ID highlighted yellow = lost tag. Tag ID highlighted green = moved downstream through Kettle GS. Tag ID highlighted orange = suspected to have moved downstream through Kettle GS. Tag ID highlighted red = moved downstream through Long Spruce GS.

Tag ID	Date tagged	2019					2020					2021					2022					2023				
		n	# Days	U/S (rkm)	D/S (rkm)	Range (rkm)	n	# Days	U/S (rkm)	D/S (rkm)	Range (rkm)	n	# Days	U/S (rkm)	D/S (rkm)	Range (rkm)	n	# Days	U/S (rkm)	D/S (rkm)	Range (rkm)	n	# Days	U/S (rkm)	D/S (rkm)	Range (rkm)
20129	03-Jun-19	2257	23	1.2	6.5	5.3	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	-	-	-	-
20130	01-Jun-19	3708	25	1.2	18.6	17.4	1753	15	1.2	7.8	6.6	4460	29	0.8	9.9	9.1	0	-	-	-	-	0	-	-	-	-
20131	31-May-19	11481	79	1.2	18.6	17.4	4020	63	3.9	18.6	14.7	12054	114	3.9	5.9	2.0	29195	107	3.9	5.9	2.0	23183	48	4.6	4.6	0.0
20132	01-Jun-19	20473	103	1.2	4.1	2.9	23801	82	1.2	1.2	0.0	20	7	1.2	1.2	0.0	18344	120	1.2	1.2	0.0	9883	45	1.2	1.2	0.0
20133	31-May-19	6795	44	1.2	9.4	8.2	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	-	-	-	-
20134	31-May-19	771	11	0.6	4.4	3.8	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	-	-	-	-
20135	01-Jun-19	55200	124	1.2	4.4	3.2	36772	82	1.2	1.2	0.0	67306	130	1.0	1.2	0.2	67999	124	1.0	1.2	0.2	23880	45	1.2	1.2	0.0
20136	01-Jun-19	673	18	1.2	24.7	23.5	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	-	-	-	-
20137	31-May-19	2094	29	1.2	24.7	23.5	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	-	-	-	-
20138	31-May-19	22235	95	0.6	4.1	3.5	20138	37	0.6	2.7	2.1	5014	53	0.8	5.9	5.1	15821	102	0.7	7.5	6.8	3064	17	0.7	4.1	3.4
20139	31-May-19	2457	39	1.2	36.1	34.9	20139	22	1.2	13.2	12.0	1755	28	0.8	13.2	12.4	720	11	1.0	24.9	23.9	0	-	-	-	-
20140	31-May-19	1190	50	1.2	10.3	9.1	20140	37	1.2	9.9	8.7	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
20141	31-May-19	2202	15	0.6	36.1	35.5	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
20142	31-May-19	9295	91	1.2	18.6	17.4	20142	30	5.2	65.3	60.1	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
20143	01-Jun-19	181	6	3.8	18.6	14.8	20143	7	5.2	18.6	13.4	4327	38	1.2	18.8	17.6	3350	33	1.0	24.9	23.9	1417	15	0.7	24.9	24.2
20144	01-Jun-19	5023	31	1.2	5.8	4.6	20144	3	5.0	5.0	0.0	554	9	2.7	9.9	7.2	0	-	-	-	-	282	6	3.9	8.3	4.4
20145	01-Jun-19	883	20	0.6	7.9	7.3	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
20152	31-May-19	11491	41	1.2	6.5	5.3	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
20165	16-Sep-19	5391	11	1.2	9.4	8.2	23771	89	1.2	8.7	7.5	22233	89	0.8	40.9	40.1	0	-	-	-	-	0	-	-	-	-
20167	16-Sep-19	1661	9	1.2	40.9	39.7	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
20171	27-May-19	1870	14	1.2	7.4	6.2	0	-	-	-	-	0	-	-	-	-	1172	8	0.7	9.3	8.6	679	12	0.7	21.0	20.3
20172	30-May-19	5131	43	1.2	5.8	4.6	11	2	5.0	5.2	0.2	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
20173	30-May-19	2377	45	1.2	7.4	6.2	2394	27	1.2	8.7	7.5	8824	57	1.0	16.1	15.1	17348	86	1.0	24.9	23.9	1433	9	3.8	30.7	26.9
20174	30-May-19	20228	60	1.0	16.5	15.5	36791	82	1.2	1.2	0.0	32278	115	1.3	1.3	0.0	45444	124	1.2	1.2	0.0	8316	43	1.2	1.2	0
20177	30-May-19	11339	100	0.6	10.3	9.7	670	19	5.2	10.3	5.1	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
20178	30-May-19	4293	26	0.6	7.9	7.3	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
20179	30-May-19	2746	35	2.7	13.9	11.2	394	25	5.2	13.4	8.2	7947	44	5.4	13.4	8.0	4434	25	1.2	18.2	17.0	192	4	14.4	14.4	0
20180	30-May-19	1874	37	2.7	24.7	22.0	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
20183	30-May-19	1338	12	2.7	13.0	10.3	11	3	8.4	8.4	0.0	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
20184	30-May-19	2823	16	3.8	13.9	10.1	3	2	13.9	13.9	0.0	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
20185	30-May-19	5527	63	1.2	7.9	6.7	177	8	5.0	7.5	2.5	1469	31	0.8	5.4	4.6	13895	115	0.7	10.2	9.5	1140	24	0.7	4.6	3.9
48234	02-Jun-21	-	-	-	-	-	-	-	-	-	-	1964	15	1	24.9	23.9	4422	33	1.2	24.9	23.7	2233	12	2.7	18.2	15.5
48235	02-Jun-21	-	-	-	-	-	0	-	-	-	-	736	19	1	13.2	12.2	2318	49	1	8	7.0	296	8	7.5	9.3	1.8
48236	02-Jun-21	-	-	-	-	-	0	-	-	-	-	2214	35	0.8	24.9	24.1	1354	18	0.7	65.3	64.6	0	-	-	-	-

Table A1-4: Detection summary for Walleye monitored in Stephens Lake during the open-water 2016 (May 1 to October 19), 2017 (May 1 to October 16), 2018 (May 1 to October 10), 2019 (May 1 to October 7), 2020 (May 1 to September 23), 2021 (May 1 to October 10), 2022 (May 16 to October 10), and 2023 (May 16 to October 2) periods. Tag ID highlighted yellow = lost tag. Tag ID highlighted green = moved downstream through Kettle GS. Tag ID highlighted orange = suspected to have moved downstream through Kettle GS. Tag ID highlighted red = moved downstream through Long Spruce GS.

Tag ID	Date tagged	2019					2020					2021					2022					2023				
		n	# Days	U/S (rkm)	D/S (rkm)	Range (rkm)	n	# Days	U/S (rkm)	D/S (rkm)	Range (rkm)	n	# Days	U/S (rkm)	D/S (rkm)	Range (rkm)	n	# Days	U/S (rkm)	D/S (rkm)	Range (rkm)	n	# Days	U/S (rkm)	D/S (rkm)	Range (rkm)
48237	02-Jun-21	-	-	-	-	-	0	-	-	-	-	3101	29	1	32	31.0	1604	22	0.7	24.9	24.2	0	-	-	-	-
48238	02-Jun-21	-	-	-	-	-	0	-	-	-	-	6601	33	0.8	5.4	4.6	0	-	-	-	-	0	-	-	-	-
48239	02-Jun-21	-	-	-	-	-	0	-	-	-	-	2048	25	1	24.9	23.9	1384	23	1	24.9	23.9	1246	19	1.2	24.9	23.7
48240	02-Jun-21	-	-	-	-	-	0	-	-	-	-	3124	45	0.8	5.4	4.6	7819	81	0.7	4.5	3.8	8977	74	0.7	8.3	7.6
48242	02-Jun-21	-	-	-	-	-	0	-	-	-	-	3141	29	1.2	24.9	23.7	415	7	18.2	24.9	6.7	83	5	24.9	24.9	0.0
48243	02-Jun-21	-	-	-	-	-	0	-	-	-	-	1389	10	1	18.8	17.8	0	-	-	-	-	0	-	-	-	-
48245	04-Jun-21	-	-	-	-	-	0	-	-	-	-	358	9	1	5.9	4.9	0	-	-	-	-	0	-	-	-	-
48246	06-Jun-21	-	-	-	-	-	0	-	-	-	-	18039	76	1	13.4	12.4	31425	94	2.7	14.4	11.7	27004	80	1.2	10.2	9
48247	05-Jun-21	-	-	-	-	-	0	-	-	-	-	3726	27	0.8	10.2	9.4	0	-	-	-	-	0	-	-	-	-
48248	06-Jun-21	-	-	-	-	-	0	-	-	-	-	3452	19	0.8	24.9	24.1	5531	34	0.7	10.2	9.5	0	-	-	-	-
48249	06-Jun-21	-	-	-	-	-	0	-	-	-	-	7771	52	0.8	13.4	12.6	5325	58	0.7	16.1	15.4	1177	10	0.7	10.2	9.5
48250	06-Jun-21	-	-	-	-	-	0	-	-	-	-	16010	116	0.8	3.9	3.1	9912	113	1	8.3	7.3	13686	111	0.7	5.4	4.7
48251	02-Jun-21	-	-	-	-	-	0	-	-	-	-	855	9	0.8	8.7	7.9	191	3	8.3	10.2	1.9	2677	19	0.7	14.4	13.7
48252	06-Jun-21	-	-	-	-	-	0	-	-	-	-	11239	92	1	10.2	9.2	15865	109	1	14.4	13.4	17504	115	1.2	14.4	13.2
48253	06-Jun-21	-	-	-	-	-	0	-	-	-	-	451	4	2.7	9.9	7.2	0	-	-	-	-	0	-	-	-	-
48254	06-Jun-21	-	-	-	-	-	0	-	-	-	-	2482	46	1	8.7	7.7	1643	38	1	7.8	6.8	602	23	1.2	8.3	7.1
48255	06-Jun-21	-	-	-	-	-	0	-	-	-	-	2216	11	1.2	18.8	17.6	0	-	-	-	-	0	-	-	-	-
48256	06-Jun-21	-	-	-	-	-	0	-	-	-	-	19665	105	0.8	7.5	6.7	0	-	-	-	-	0	-	-	-	-
48257	06-Jun-21	-	-	-	-	-	0	-	-	-	-	3894	43	1.2	24.9	23.7	215	7	15	18.2	3.2	3767	21	0.7	16.4	15.7
48272	02-Jun-21	-	-	-	-	-	0	-	-	-	-	2204	43	1	7.5	6.5	631	30	2.2	8.3	6.1	0	-	-	-	-
48273	02-Jun-21	-	-	-	-	-	0	-	-	-	-	3757	60	1.2	9.9	8.7	2685	27	5.4	10.2	4.8	1850	41	1.2	21.7	20.5
48274	02-Jun-21	-	-	-	-	-	0	-	-	-	-	3823	60	0.8	7.5	6.7	7772	92	0.7	8.3	7.6	36725	126	0.7	8.3	7.6
48275	02-Jun-21	-	-	-	-	-	0	-	-	-	-	8714	31	1.2	18.8	17.6	0	-	-	-	-	0	-	-	-	-
48318	02-Jun-21	-	-	-	-	-	0	-	-	-	-	9581	77	1	24.9	23.9	3783	118	14.4	44.9	30.5	0	-	-	-	-
48324	02-Jun-21	-	-	-	-	-	0	-	-	-	-	15250	91	0.8	10.2	9.4	7556	71	0.7	9.7	9.0	13921	78	0.7	10.2	9.5
48325	02-Jun-21	-	-	-	-	-	0	-	-	-	-	6355	48	0.8	18.8	18.0	7181	63	0.7	18.2	17.5	4774	40	0.7	16.4	15.7
21301	29-May-23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1578	10	0.7	8.3	7.6
21309	29-May-23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1860	9	1	12	11.0
21310	29-May-23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5406	14	1	2.7	1.7
21311	29-May-23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2347	12	0.7	10.2	9.5
21312	29-May-23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1771	16	0.7	65.3	64.6
21313	29-May-23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3371	23	0.7	18.2	17.5
21319	29-May-23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2140	11	1	7.5	6.5
21325	29-May-23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1430	19	1	39	38

APPENDIX 2:
LOCATION SUMMARY FOR INDIVIDUAL ACOUSTIC TAGGED WALLEYE UPSTREAM OF THE KEEYASK GS IN 2018/2019: MAY 2018 TO OCTOBER 2023

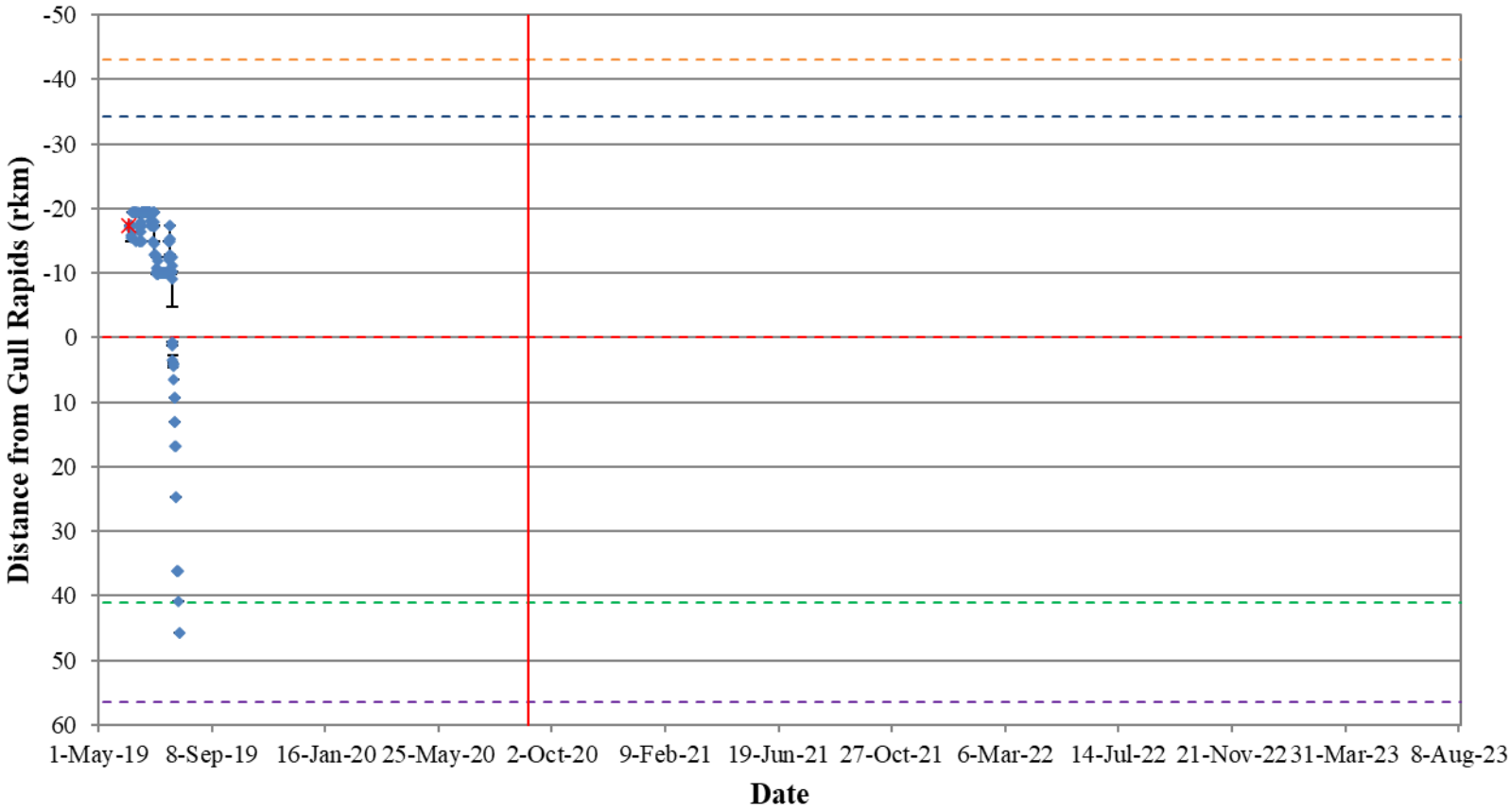

Figure A2-1: Position of a Walleye tagged with an acoustic transmitter (code #20147) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

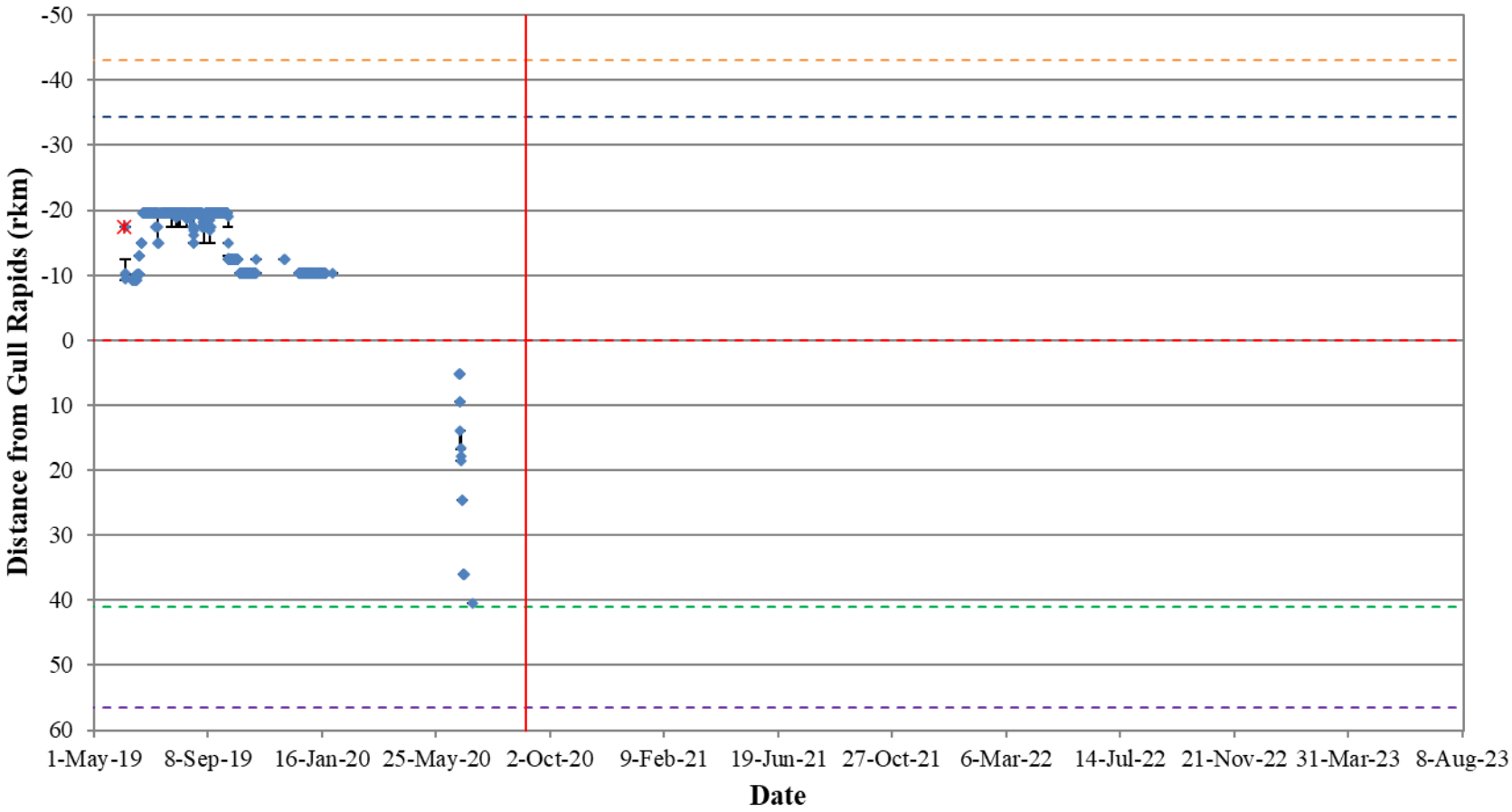

Figure A2-2: Position of a Walleye tagged with an acoustic transmitter (code #20148) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

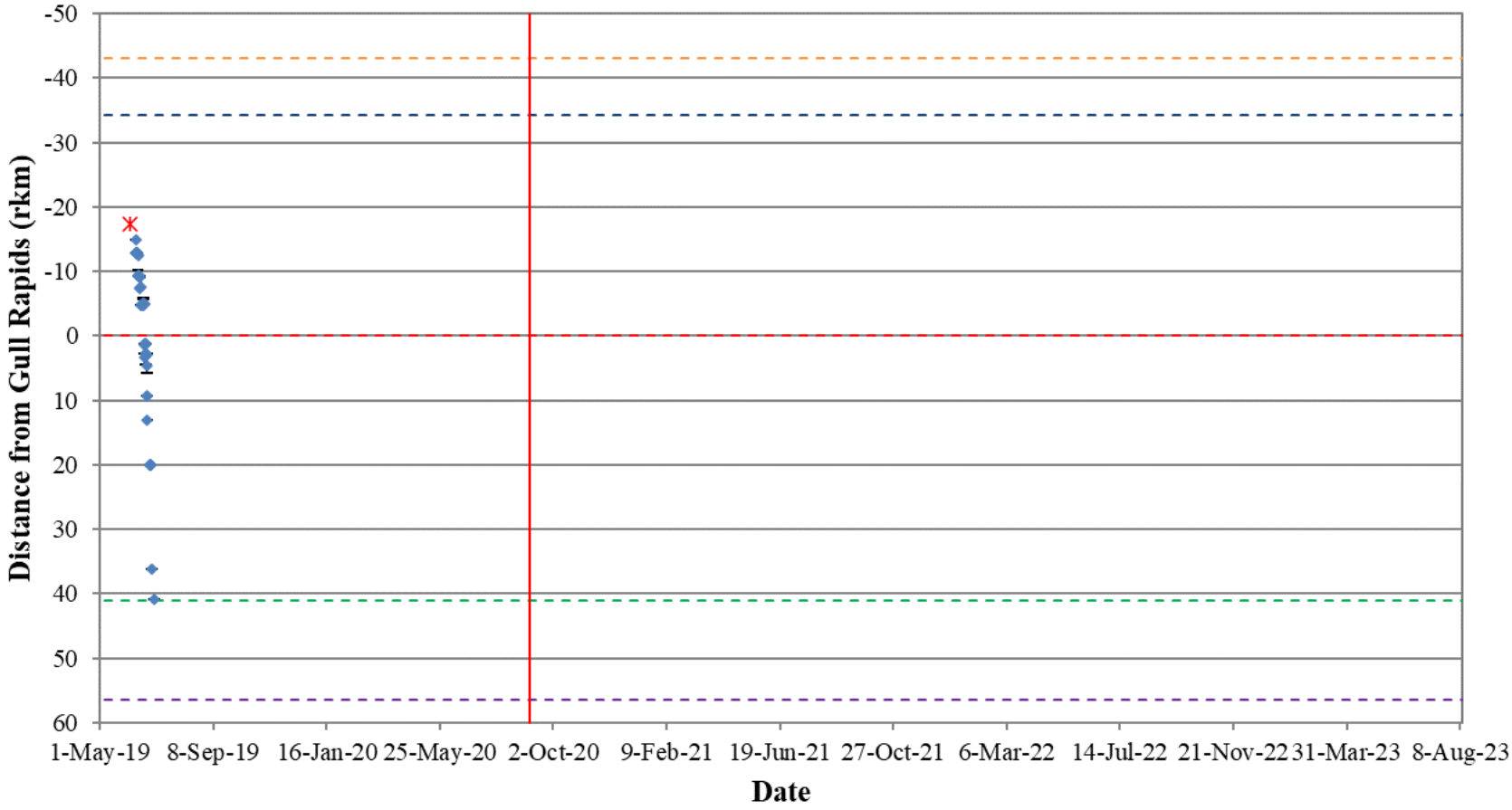

Figure A2-3: Position of a Walleye tagged with an acoustic transmitter (code #20149) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

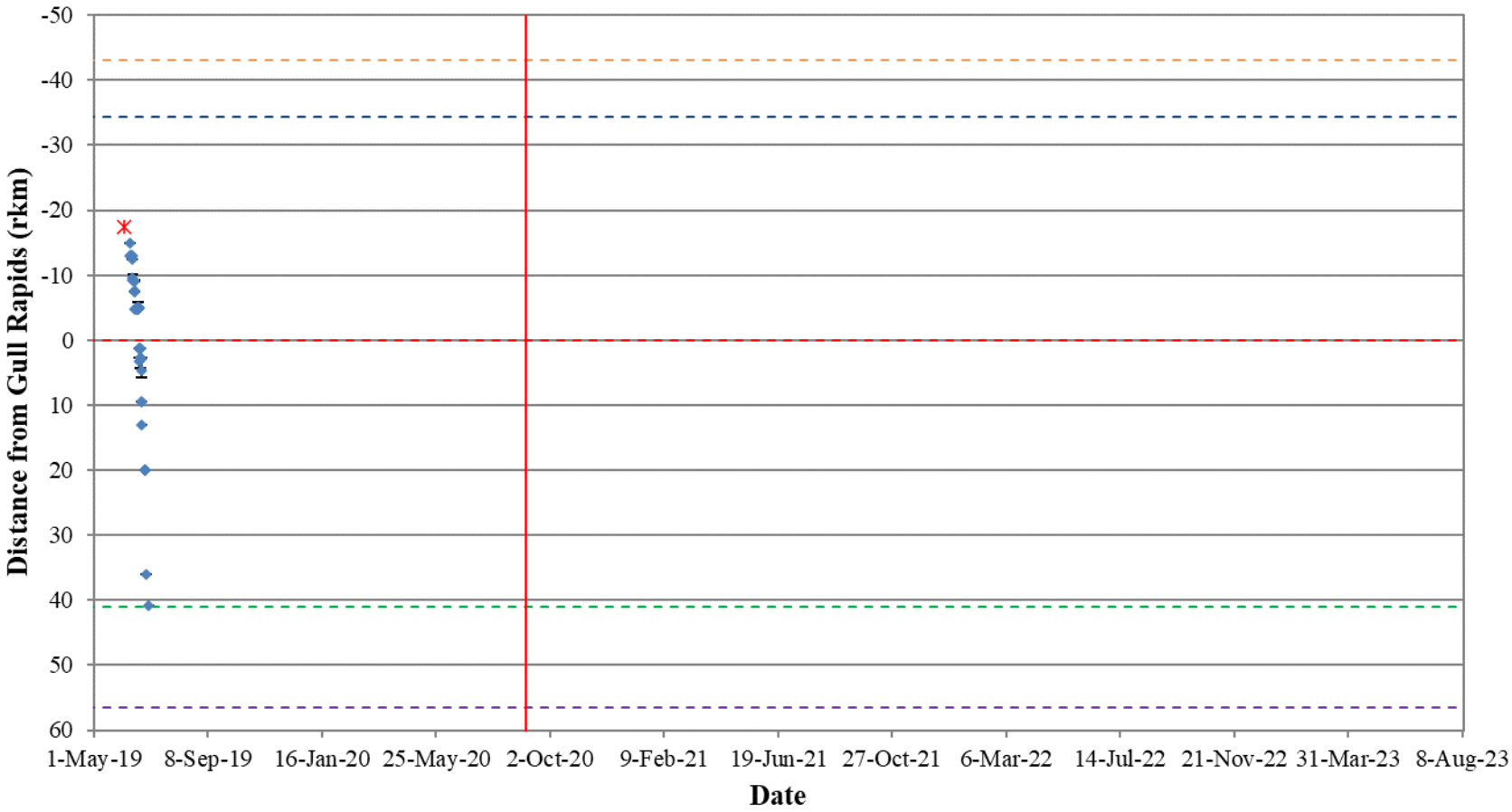

Figure A2-4: Position of a Walleye tagged with an acoustic transmitter (code #20150) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

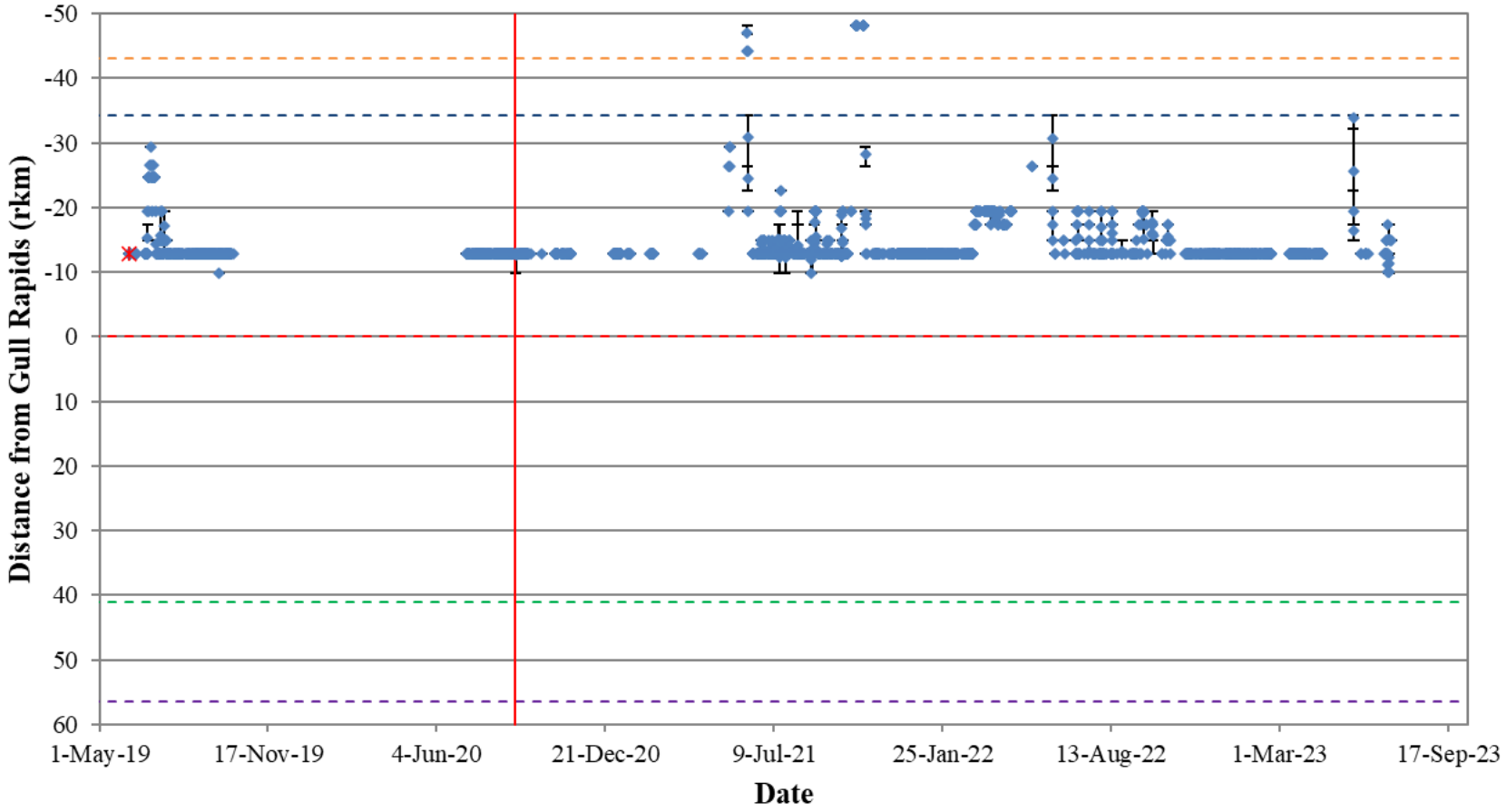

Figure A2-5: Position of a Walleye tagged with an acoustic transmitter (code #20151) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

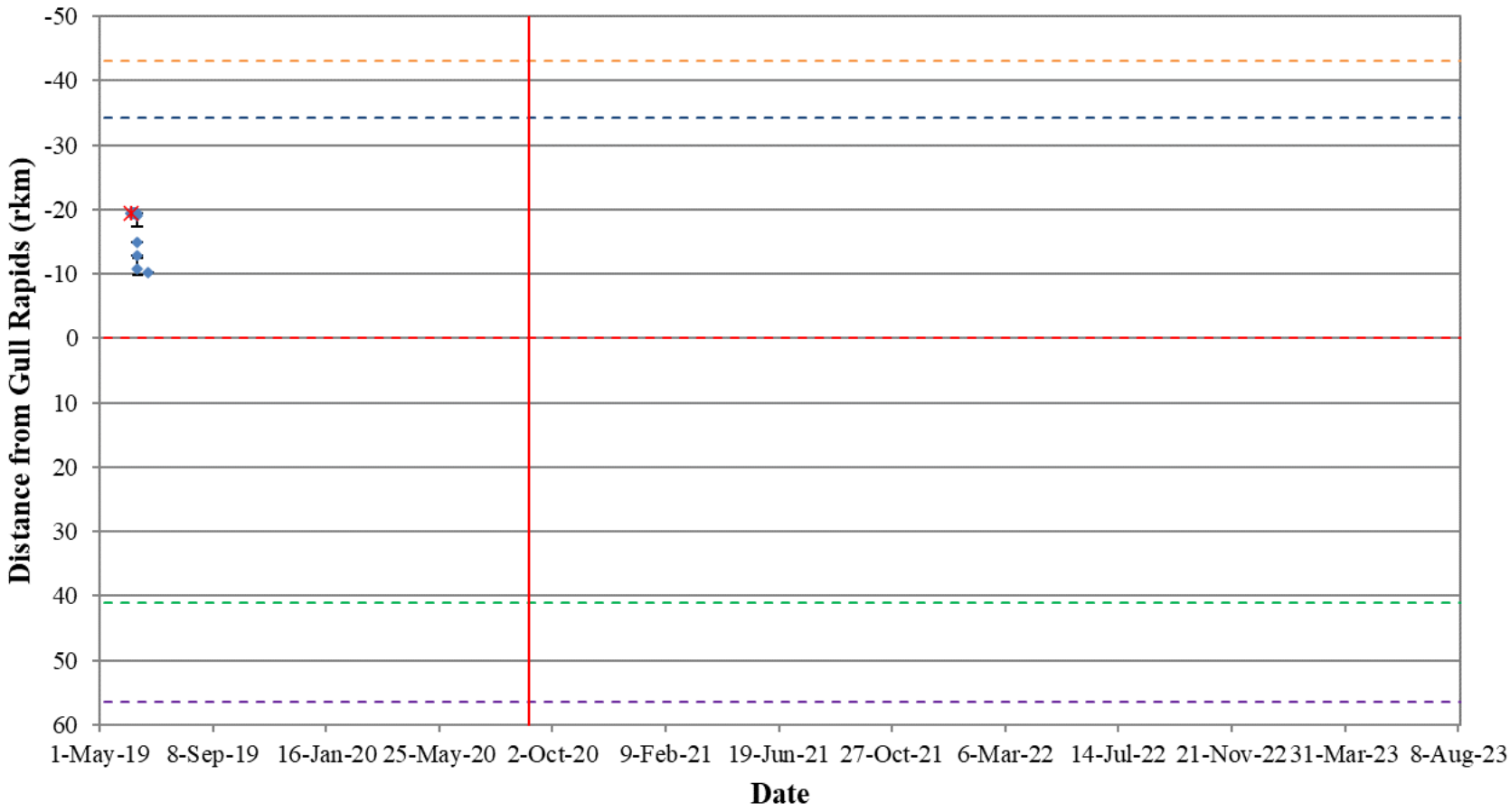

Figure A2-6: Position of a Walleye tagged with an acoustic transmitter (code #20153) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

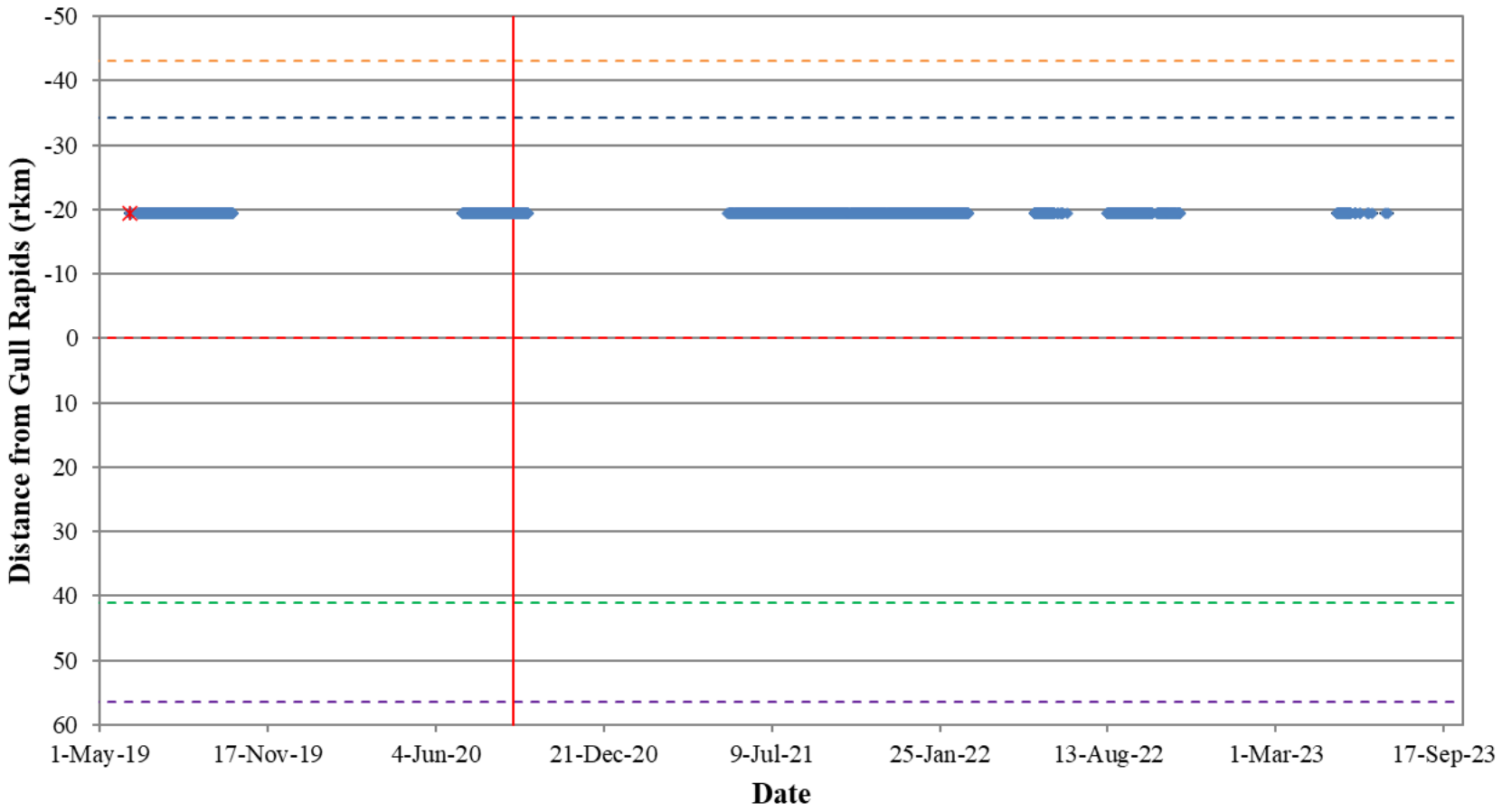

Figure A2-7: Position of a Walleye tagged with an acoustic transmitter (code #20154) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce (purple).

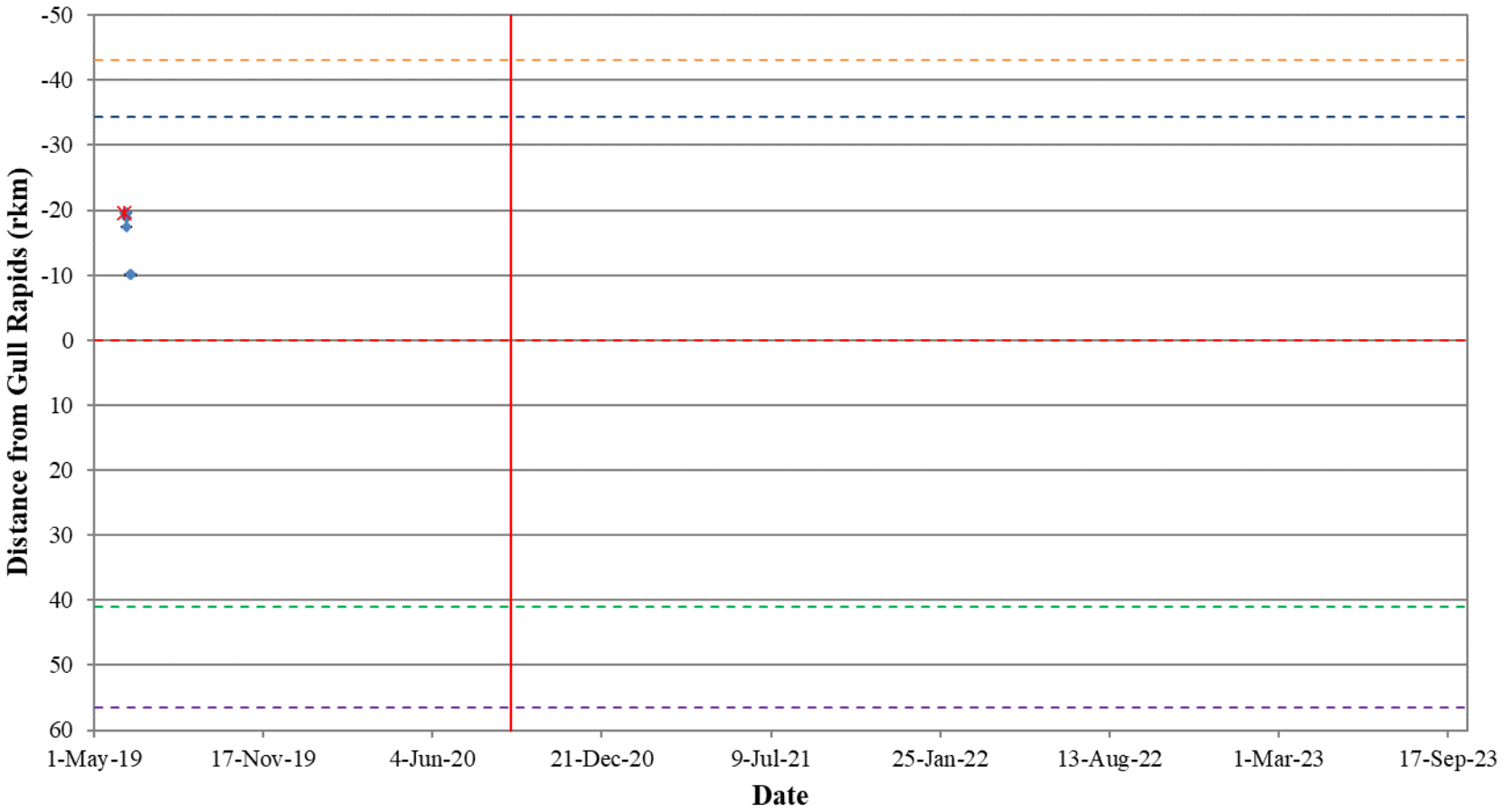

Figure A2-8: Position of a Walleye tagged with an acoustic transmitter (code #20155) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

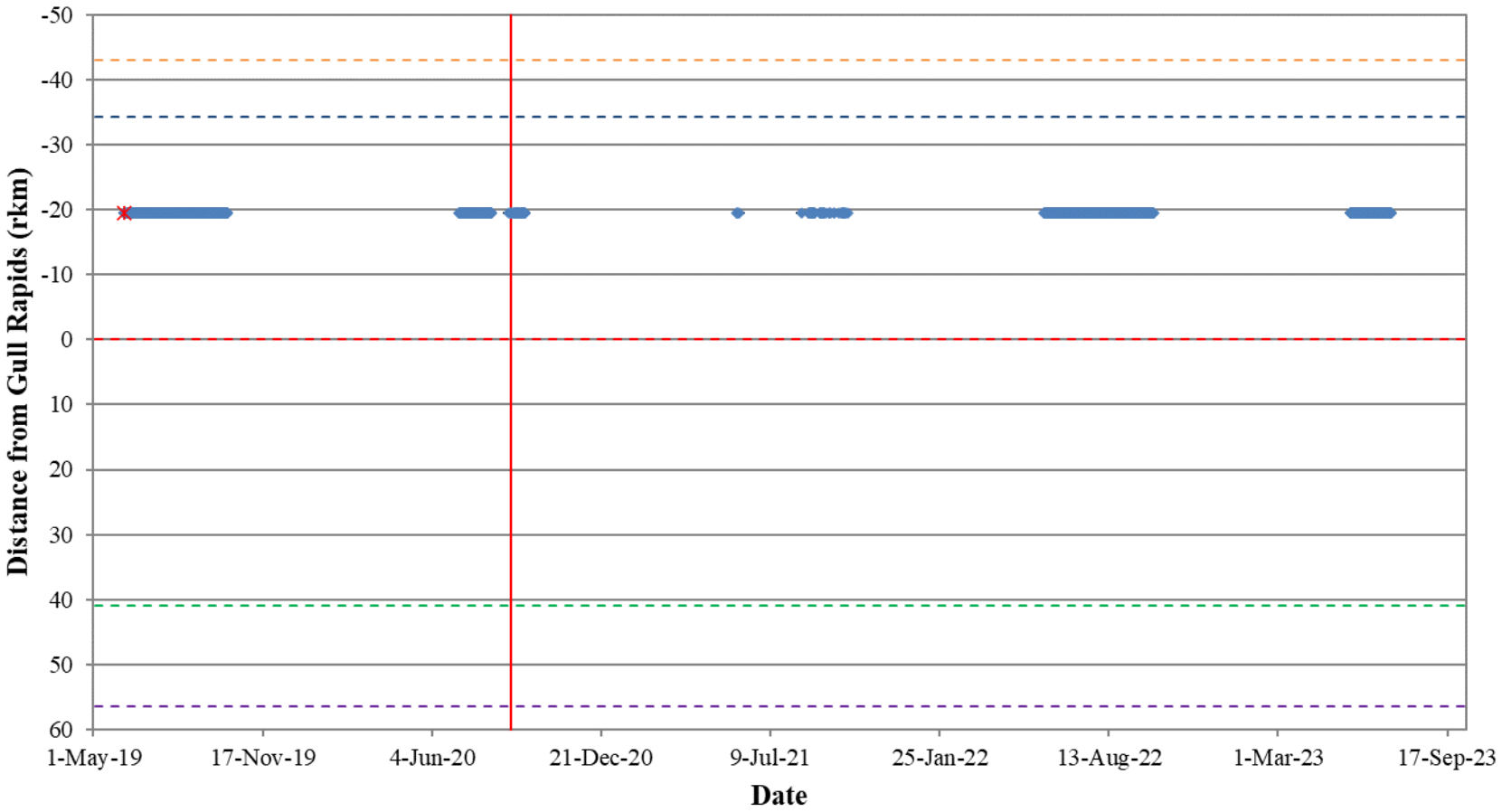

Figure A2-9: Position of a Walleye tagged with an acoustic transmitter (code #20156) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

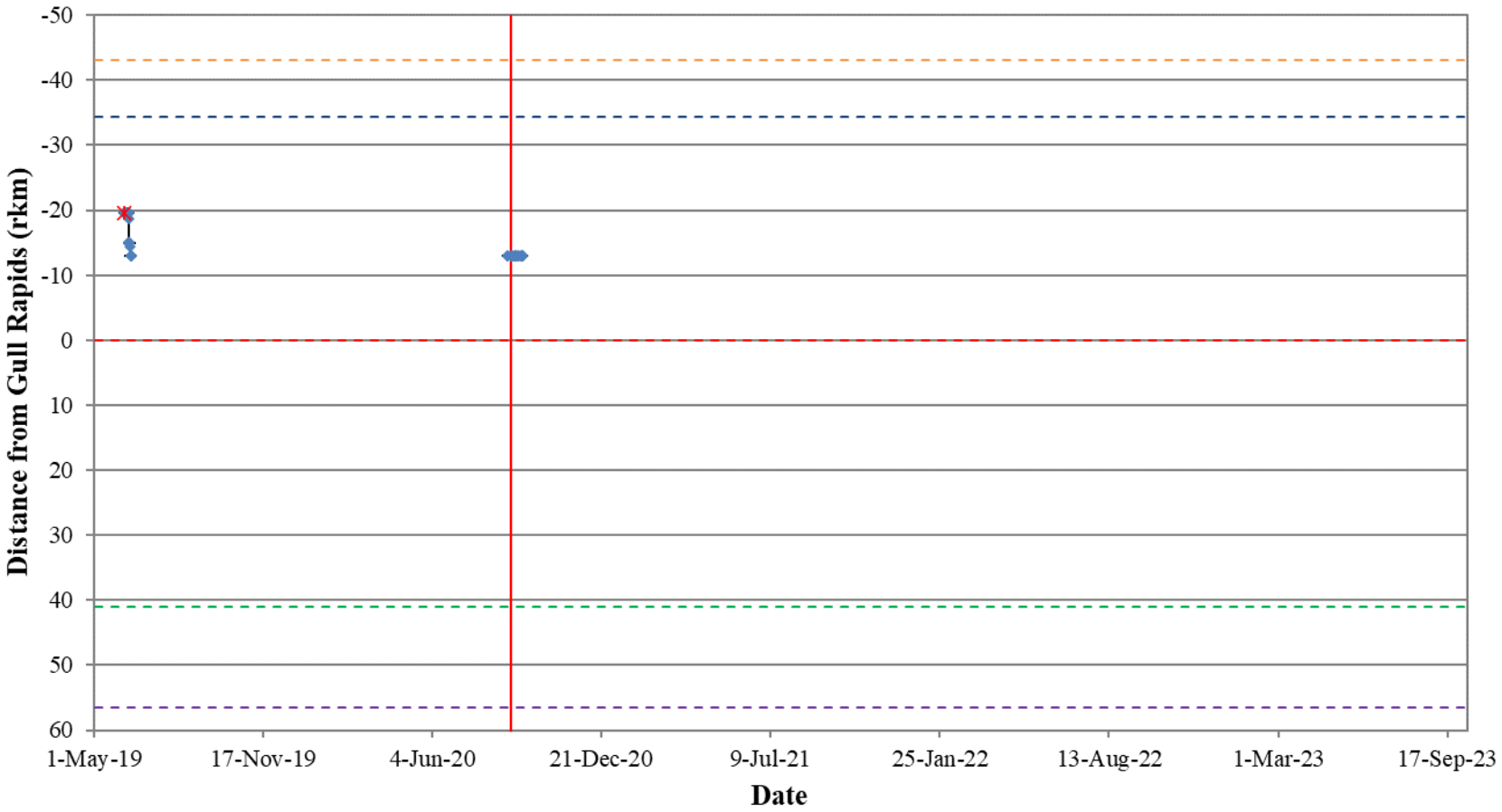

Figure A2-10: Position of a Walleye tagged with an acoustic transmitter (code #20157) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

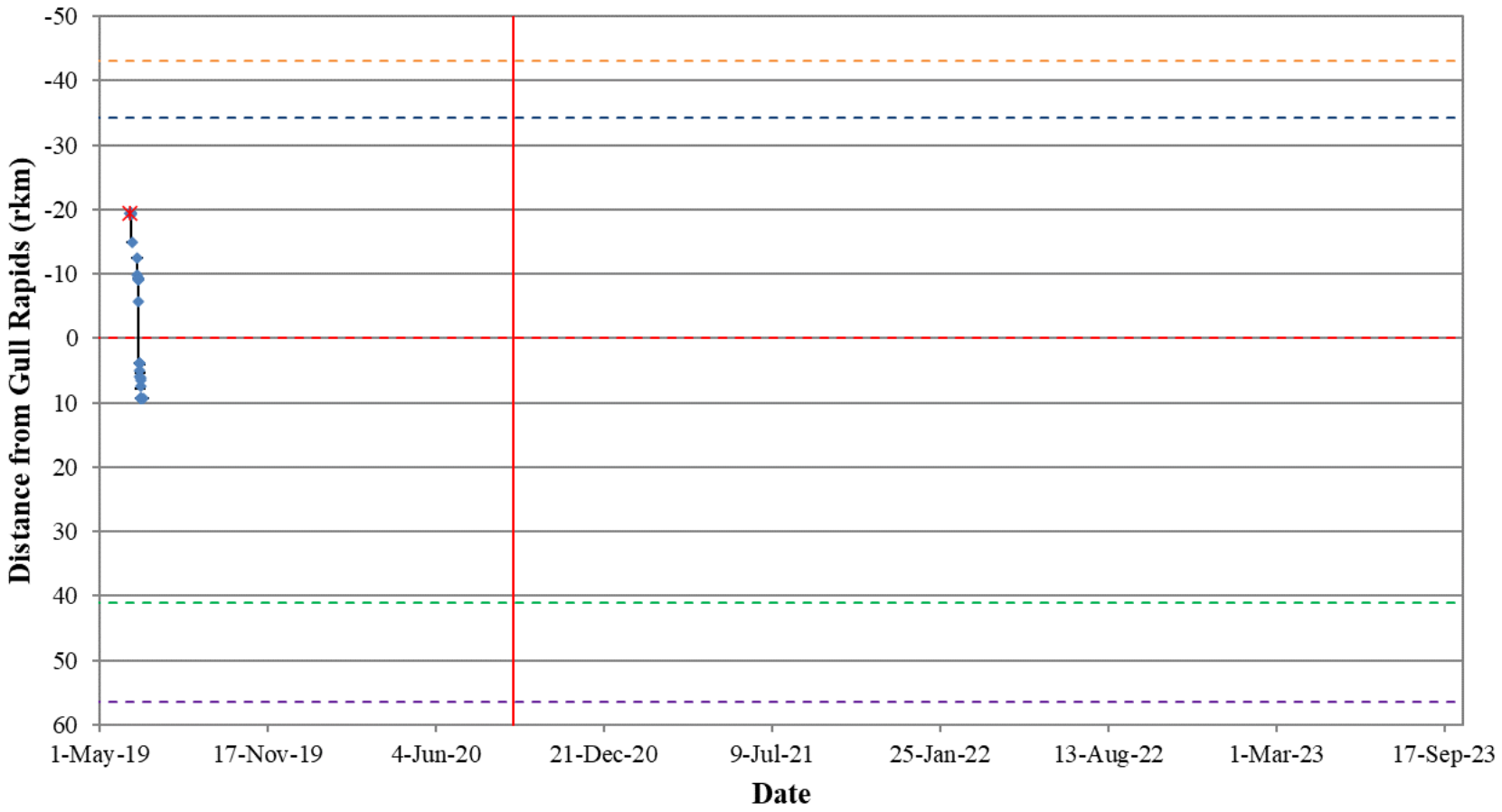

Figure A2-11: Position of a Walleye tagged with an acoustic transmitter (code #20158) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

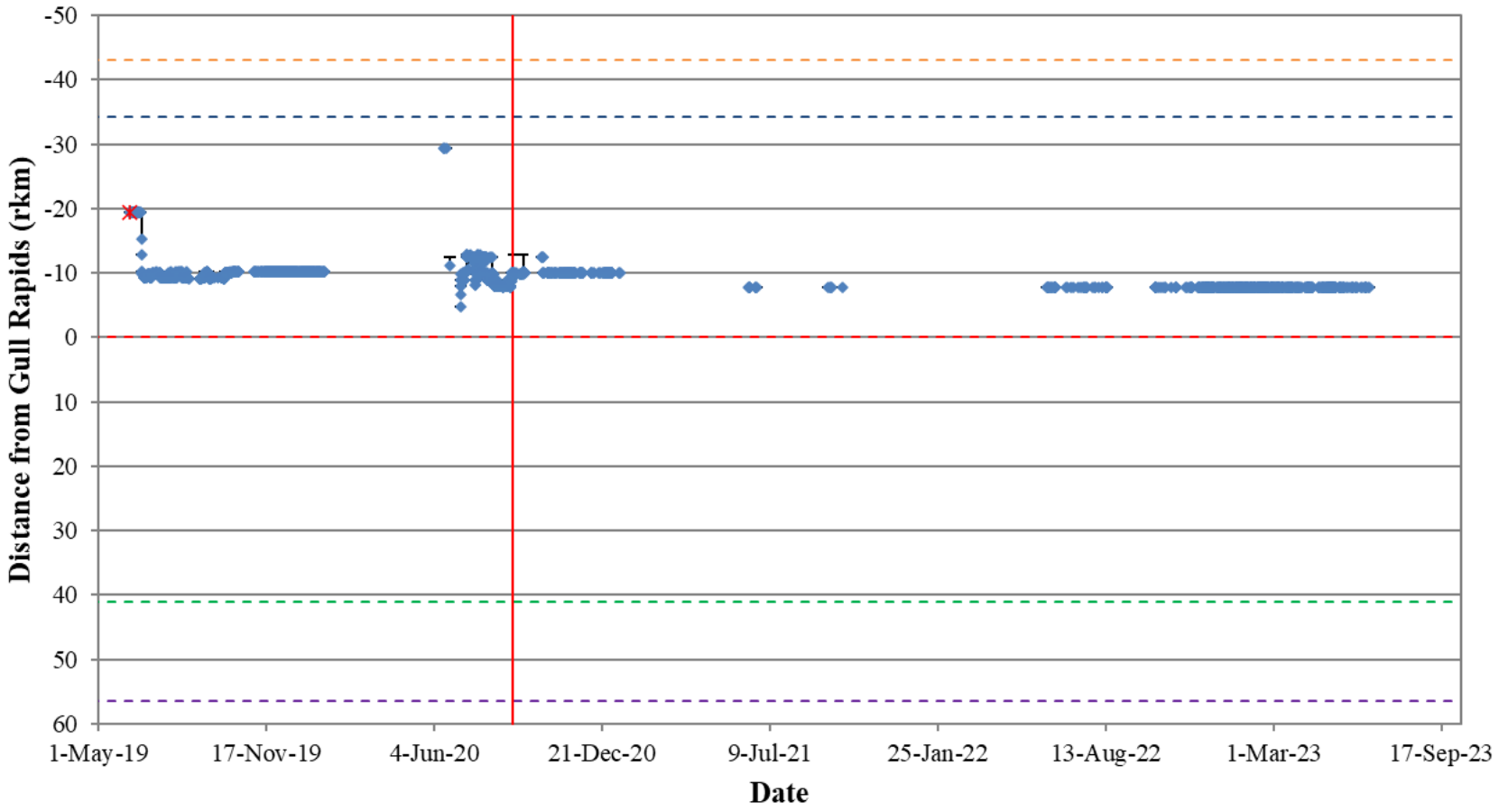

Figure A2-12: Position of a Walleye tagged with an acoustic transmitter (code #20159) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

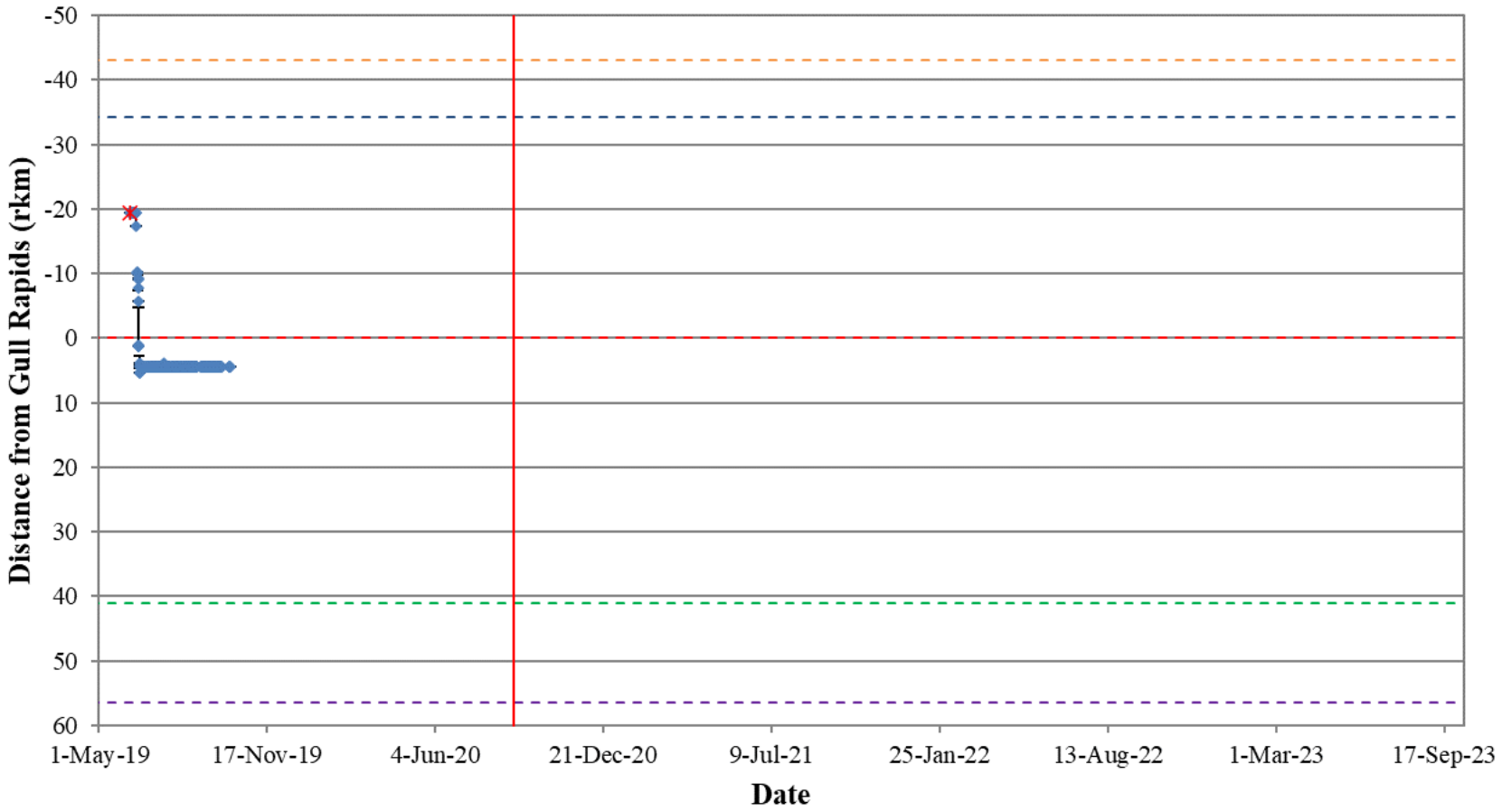

Figure A2-13: Position of a Walleye tagged with an acoustic transmitter (code #20160) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

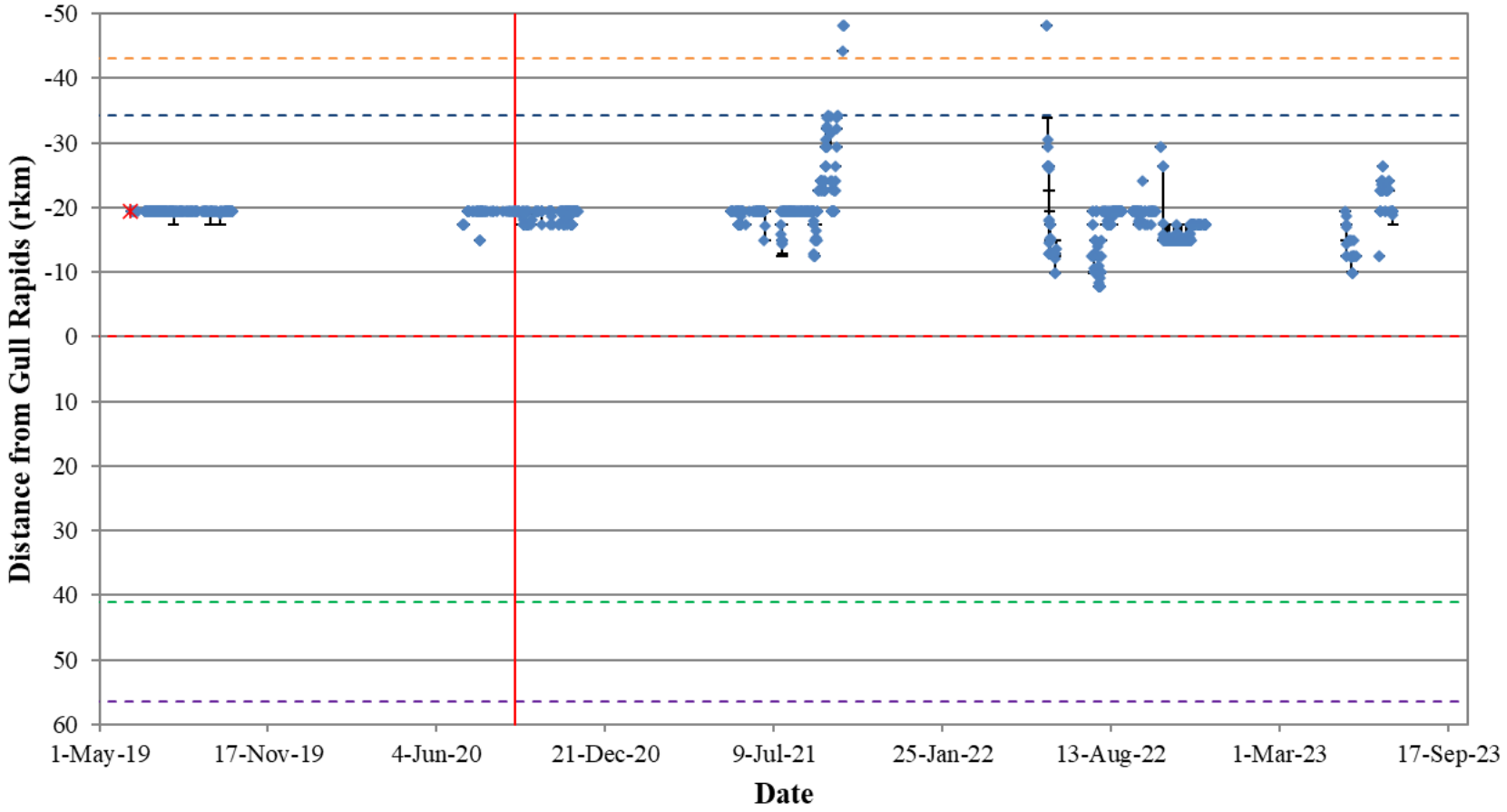

Figure A2-14: Position of a Walleye tagged with an acoustic transmitter (code #20161) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

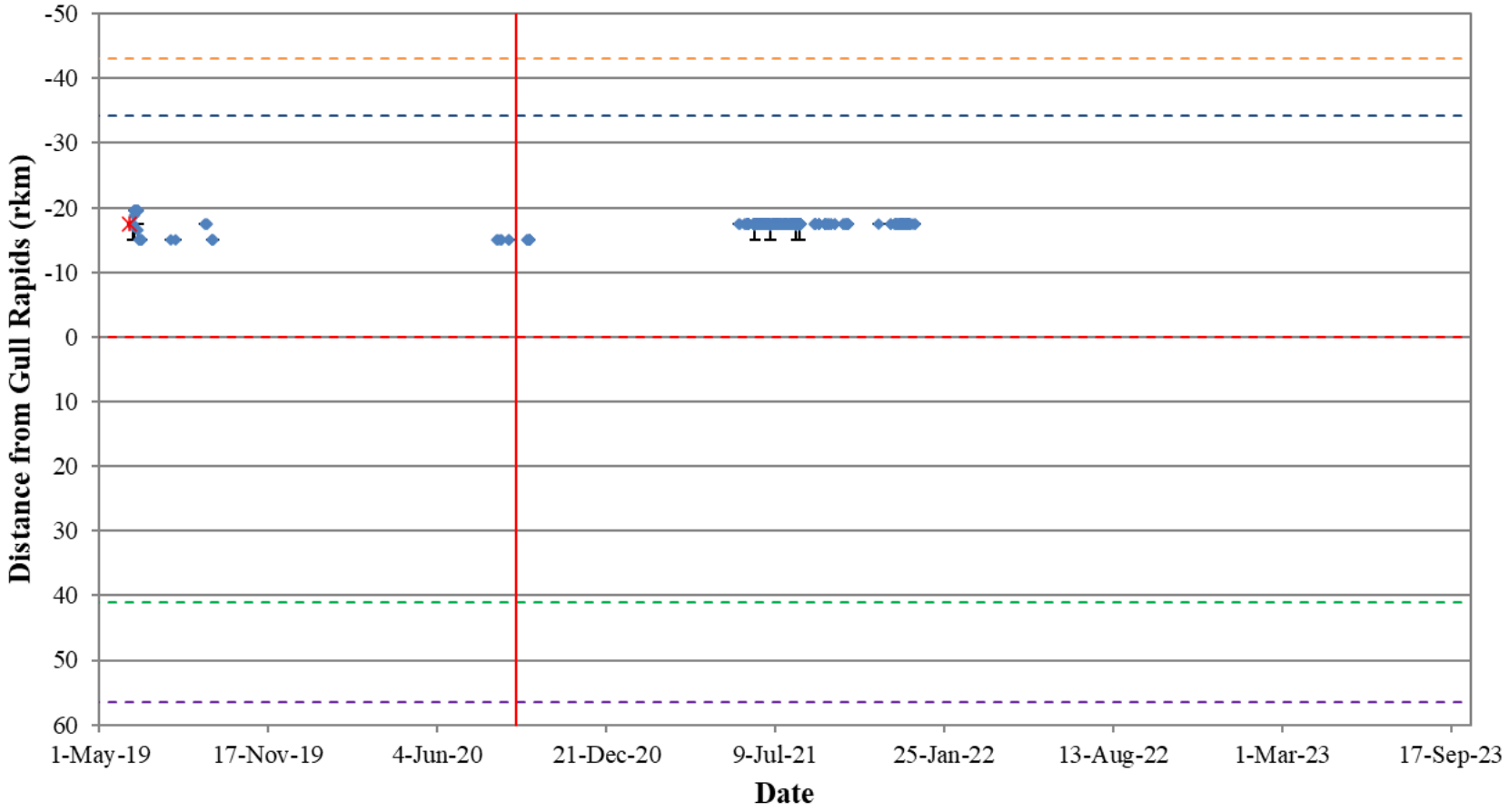

Figure A2-15: Position of a Walleye tagged with an acoustic transmitter (code #20162) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

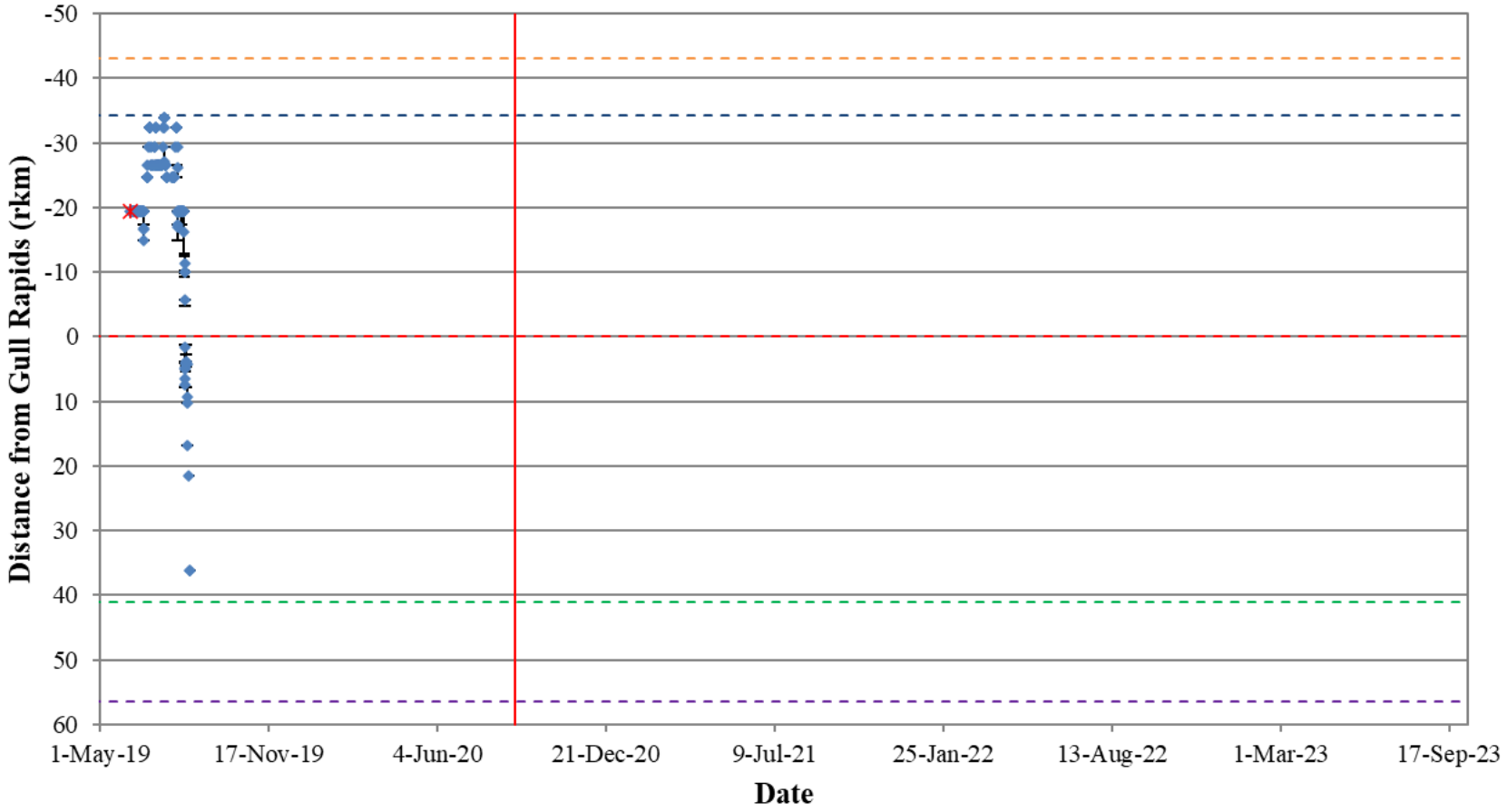

Figure A2-16: Position of a Walleye tagged with an acoustic transmitter (code #20163) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 10, 2022. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

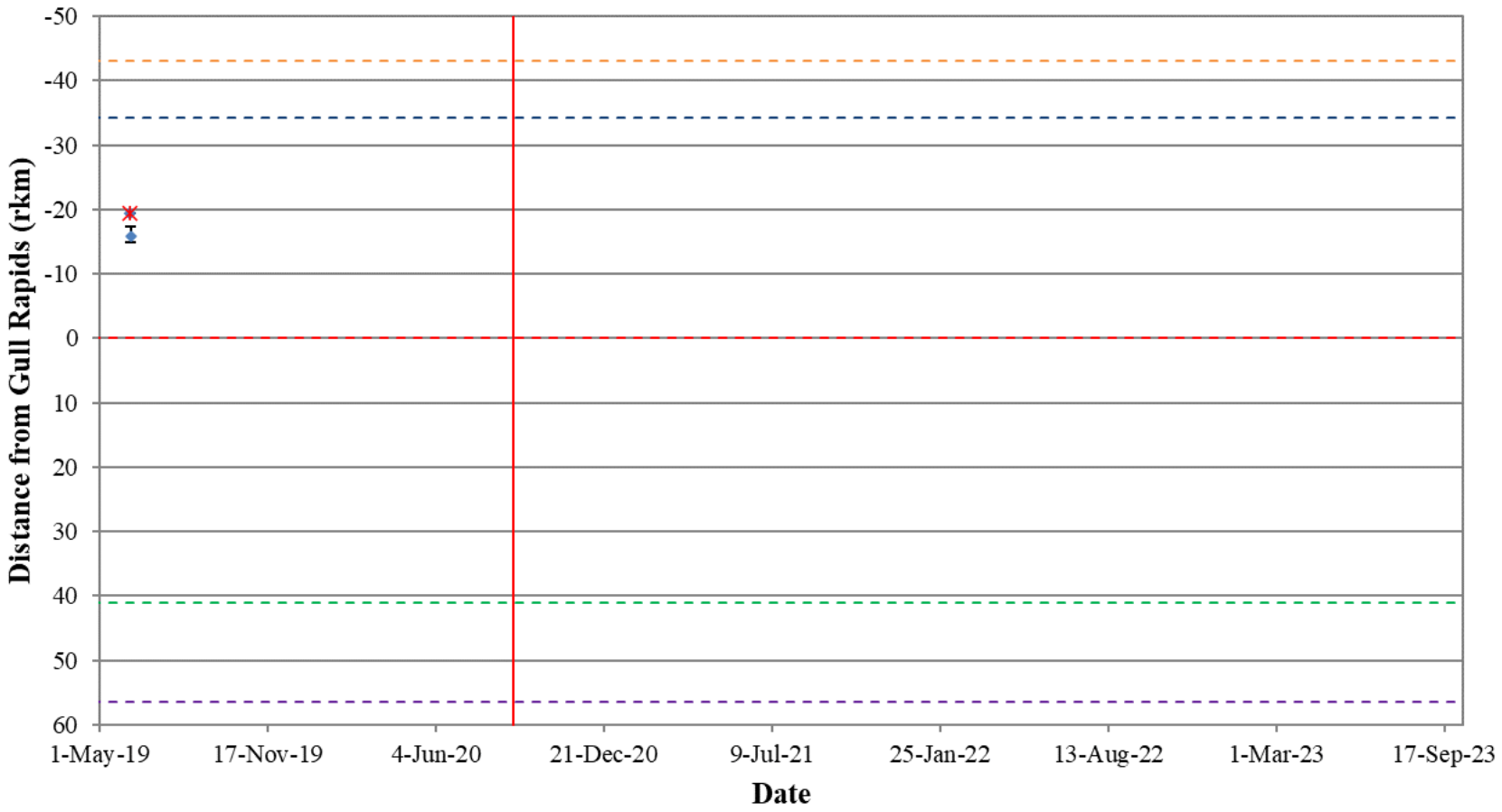

Figure A2-17: Position of a Walleye tagged with an acoustic transmitter (code #20164) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

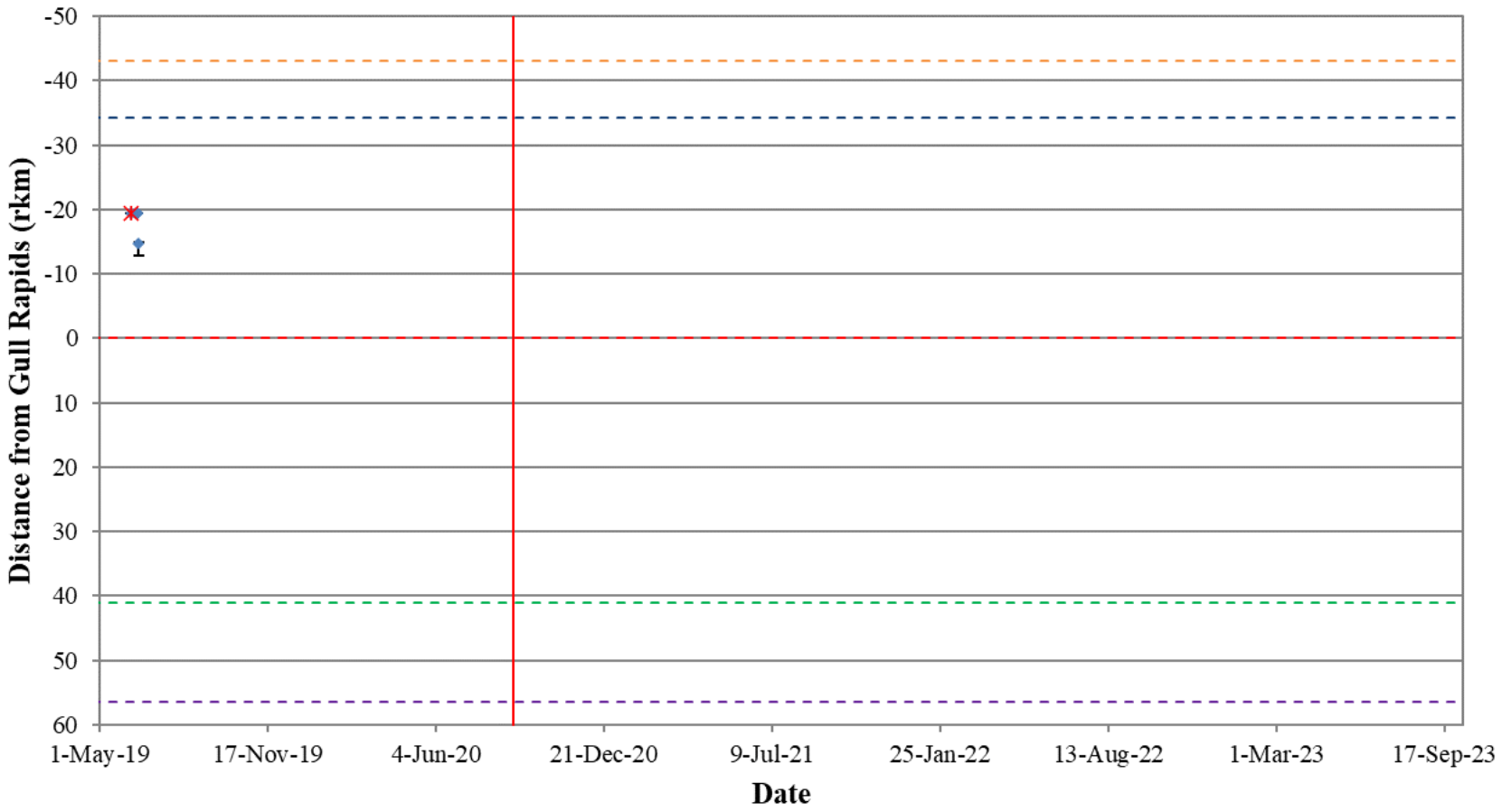

Figure A2-18: Position of a Walleye tagged with an acoustic transmitter (code #20169) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

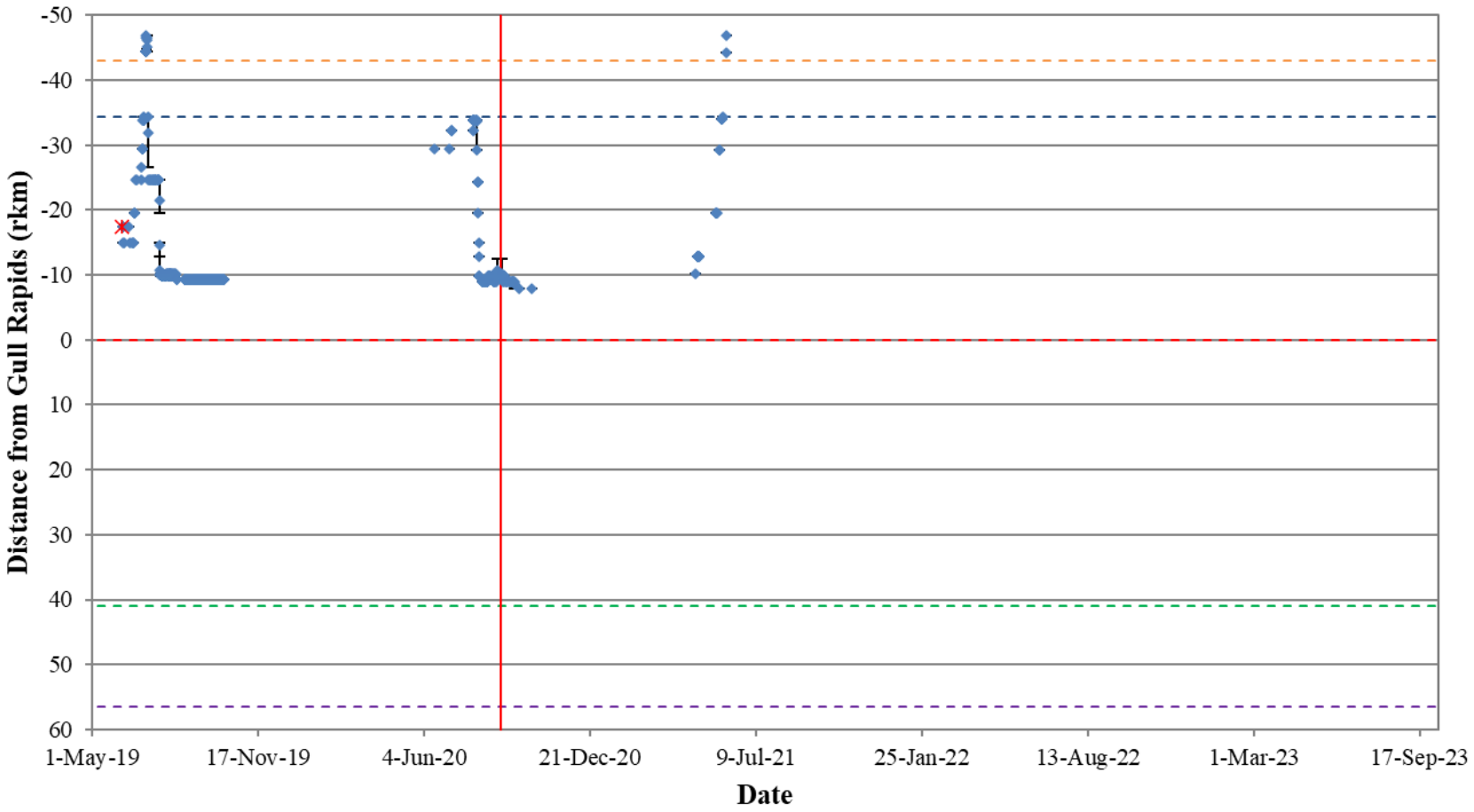

Figure A2-19: Position of a Walleye tagged with an acoustic transmitter (code #20170) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1 to October 10, 2022. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

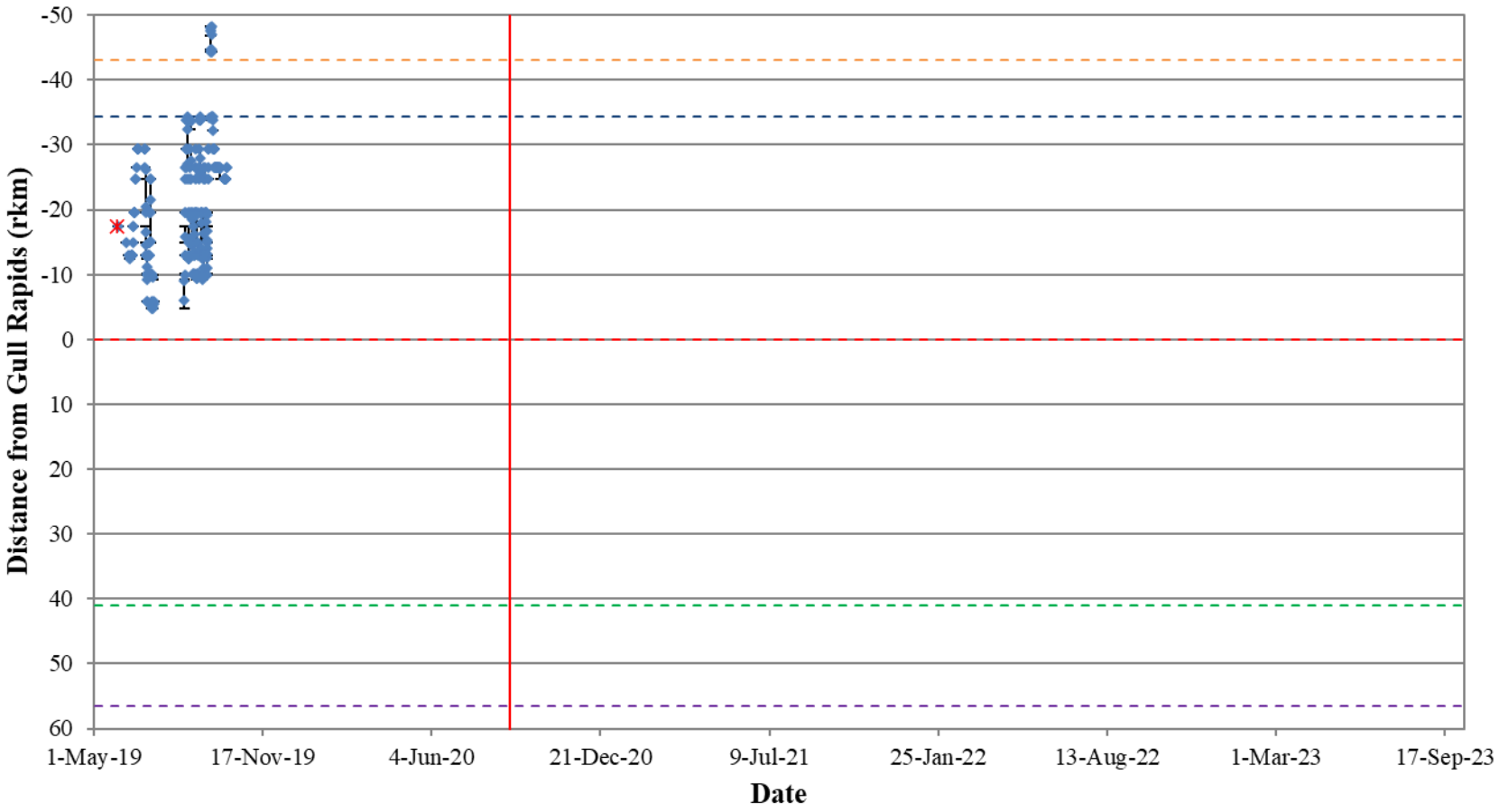

Figure A2-20: Position of a Walleye tagged with an acoustic transmitter (code #20175) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

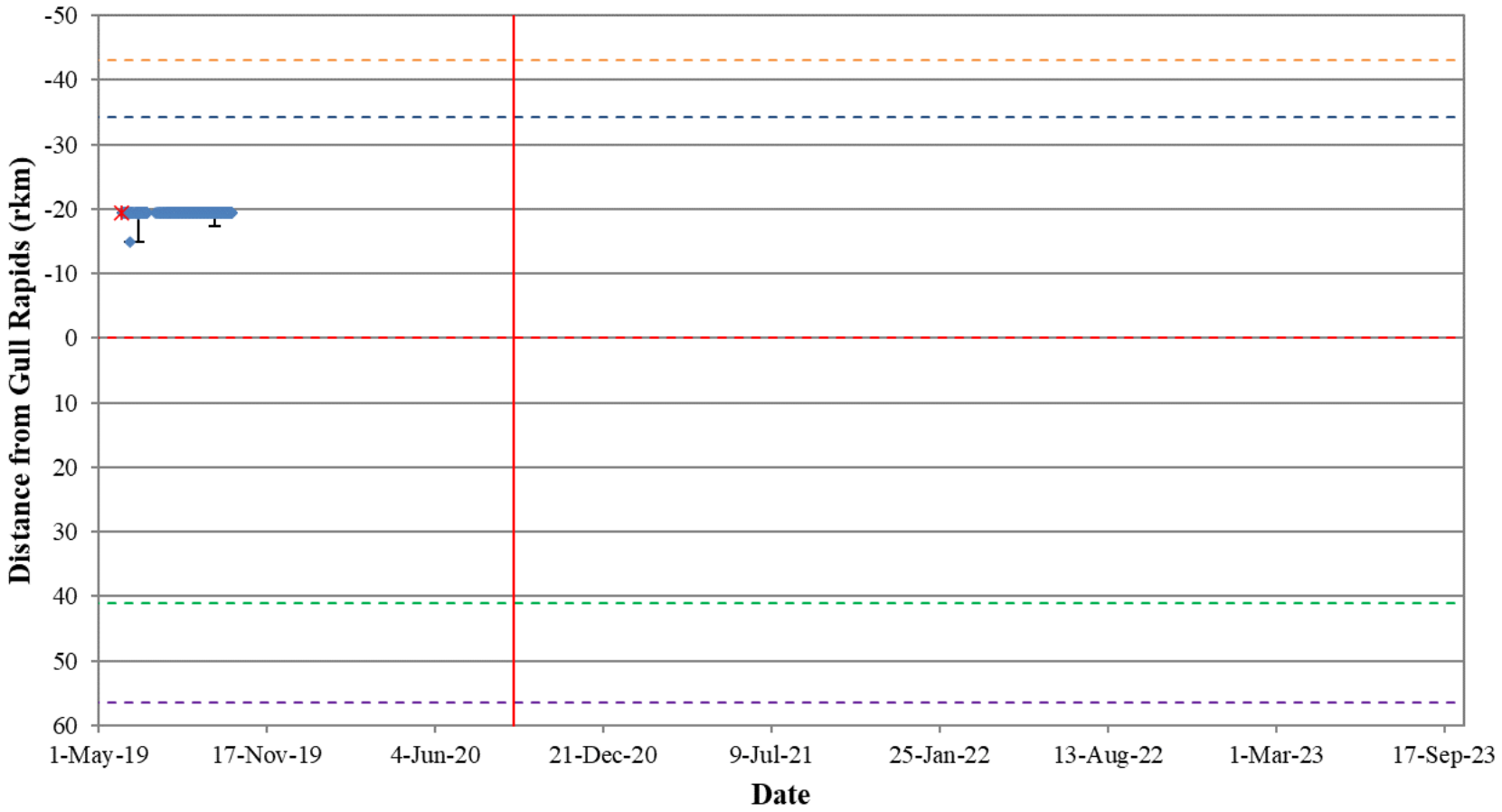

Figure A2-21: Position of a Walleye tagged with an acoustic transmitter (code #20176) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1 to October 10, 2022. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

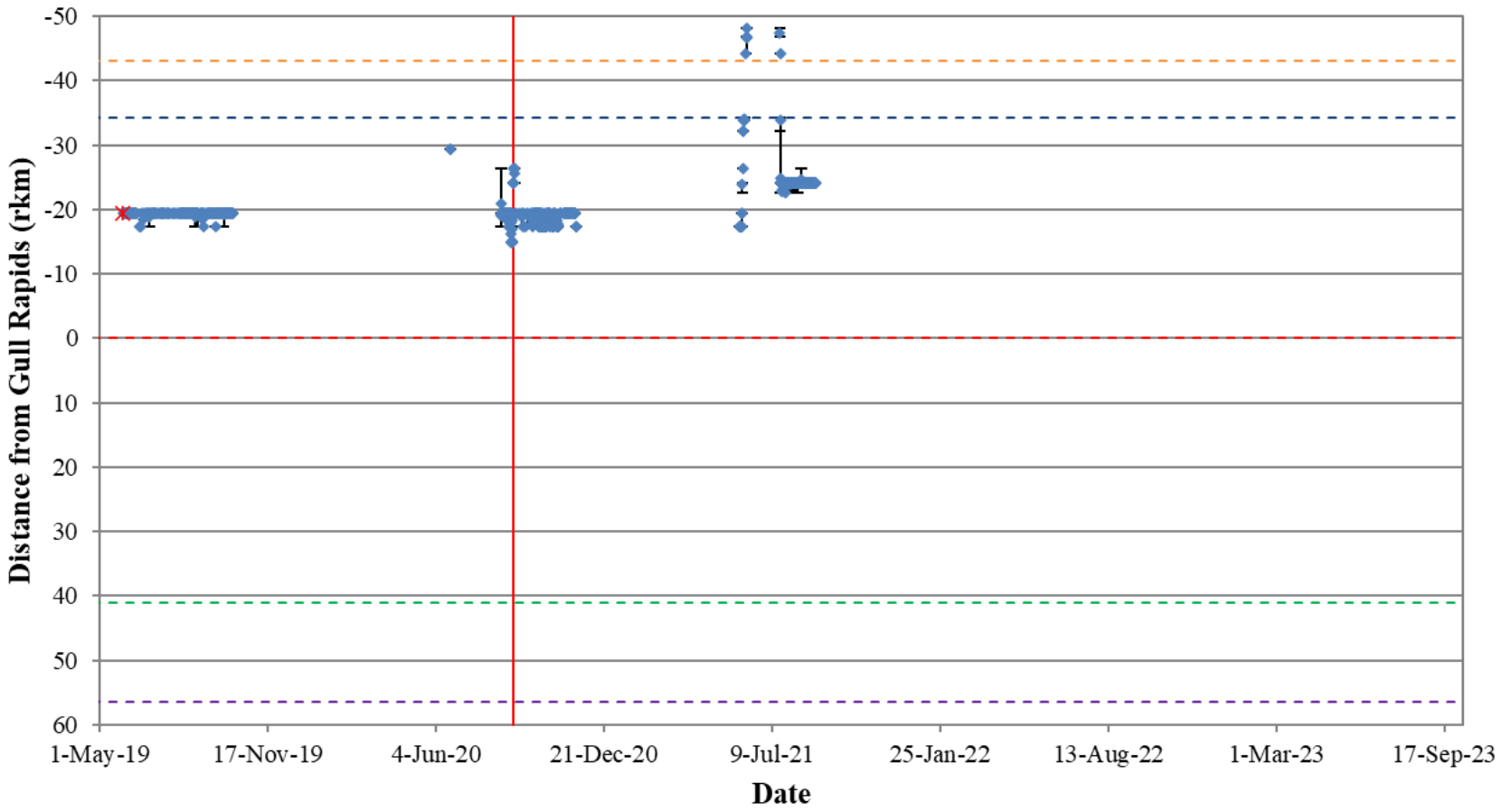

Figure A2-22: Position of a Walleye tagged with an acoustic transmitter (code #20181) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

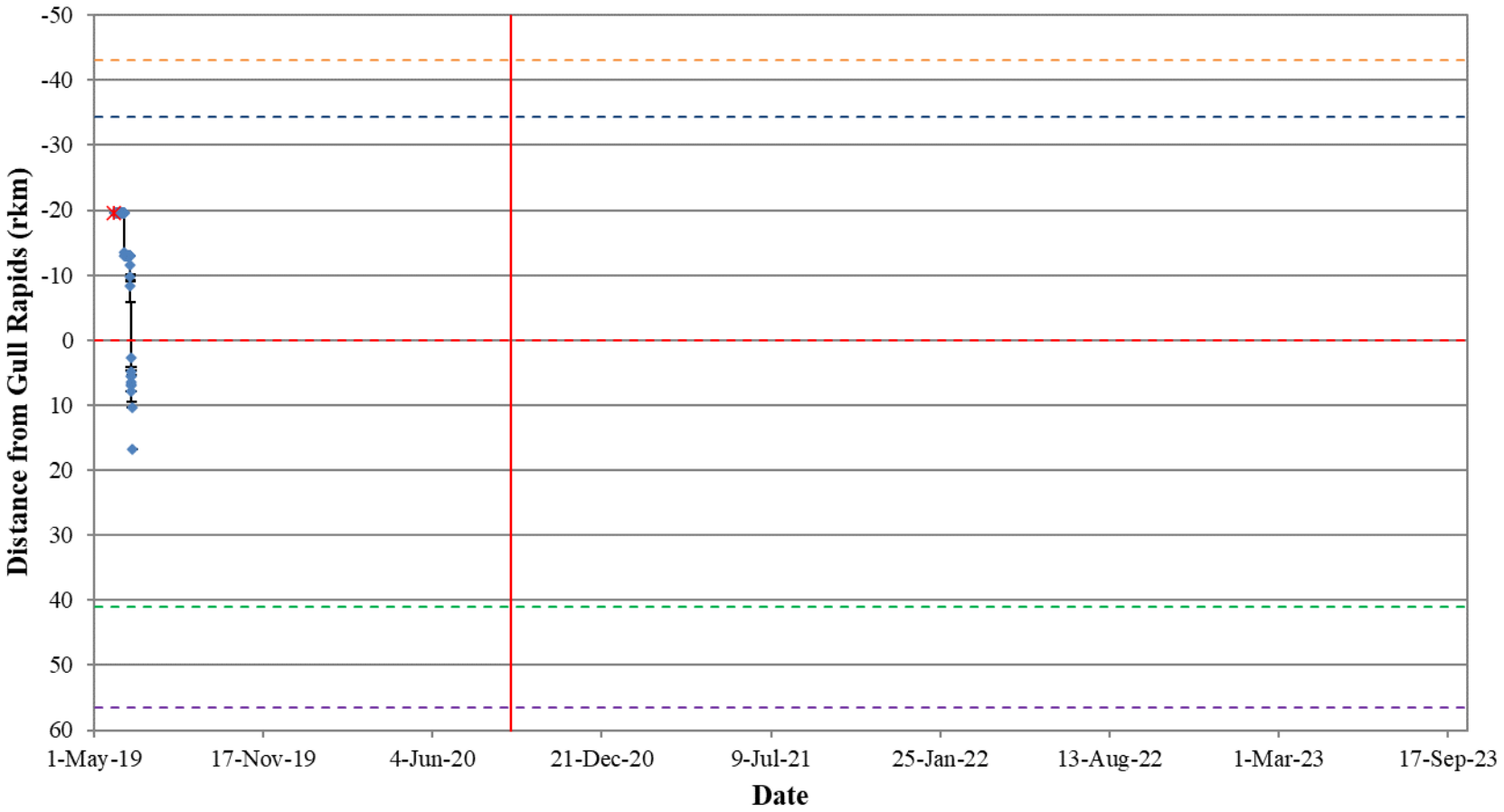

Figure A2-23: Position of a Walleye tagged with an acoustic transmitter (code #20182) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

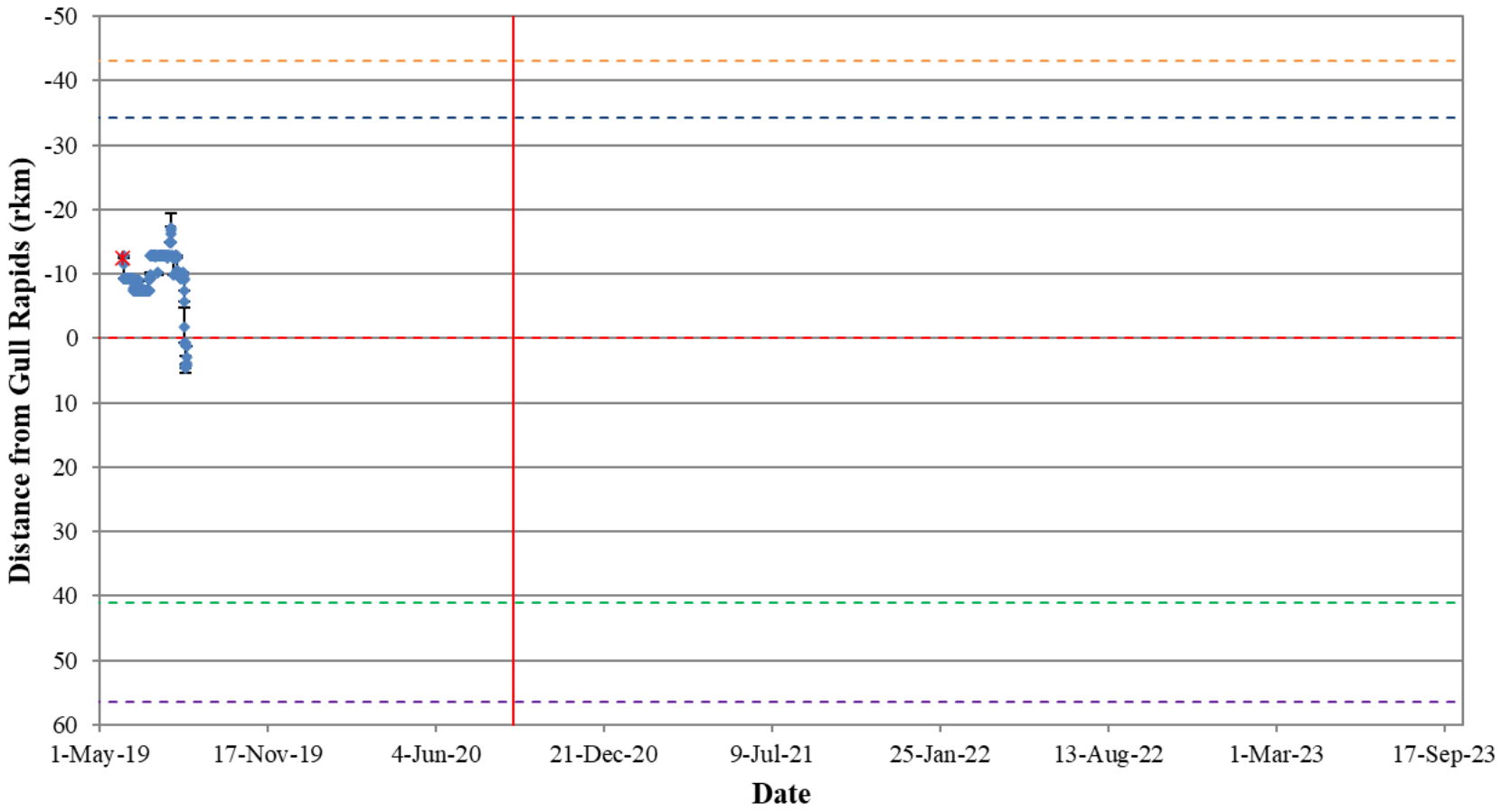

Figure A2-24: Position of a Walleye tagged with an acoustic transmitter (code #20186) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

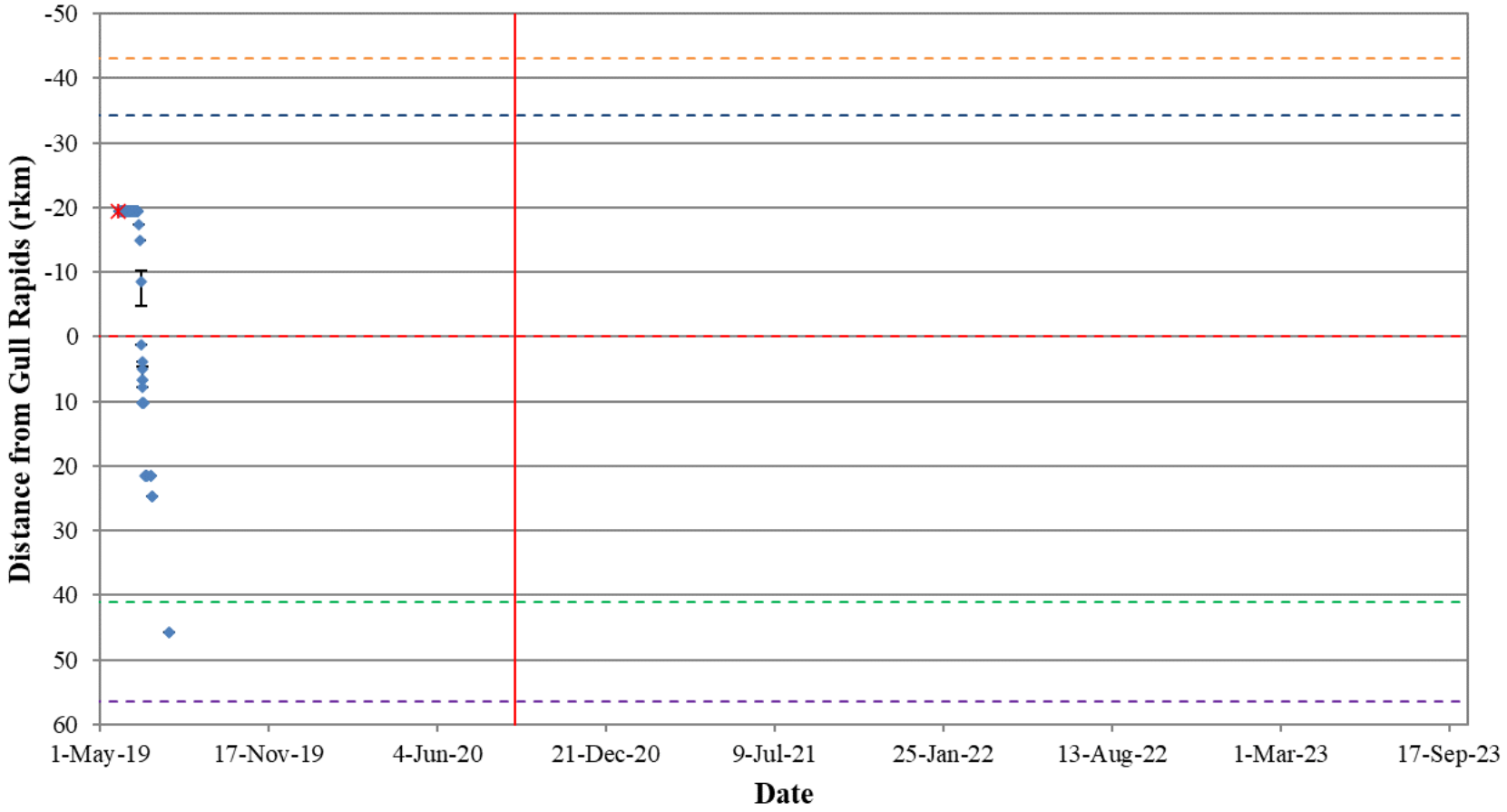

Figure A2-25: Position of a Walleye tagged with an acoustic transmitter (code #20187) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

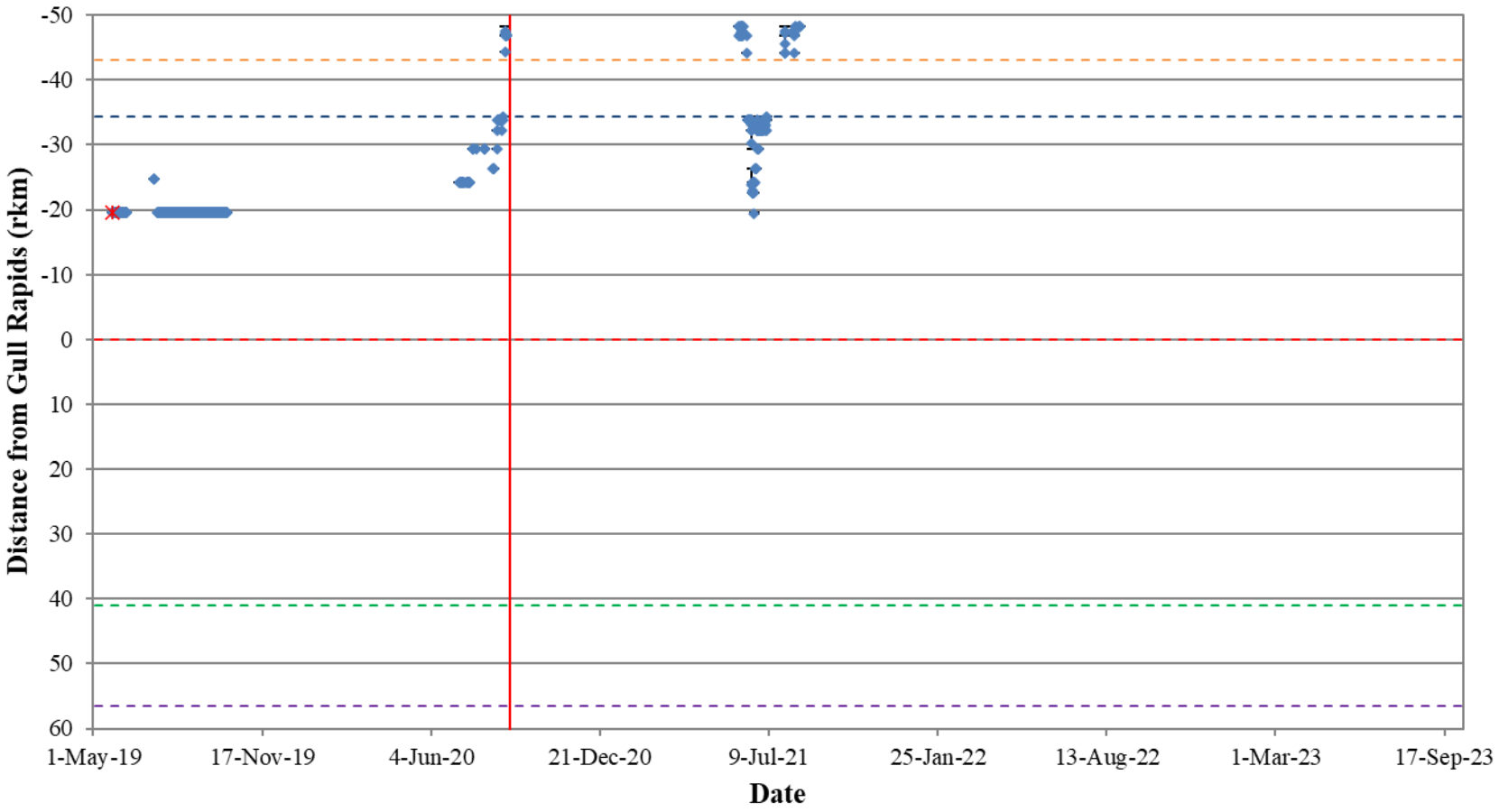

Figure A2-26: Position of a Walleye tagged with an acoustic transmitter (code #20188) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

APPENDIX 3: LOCATION SUMMARY FOR INDIVIDUAL ACOUSTIC TAGGED WALLEYE IN STEPHENS LAKE IN 2018/2019: MAY 2018 TO OCTOBER 2023

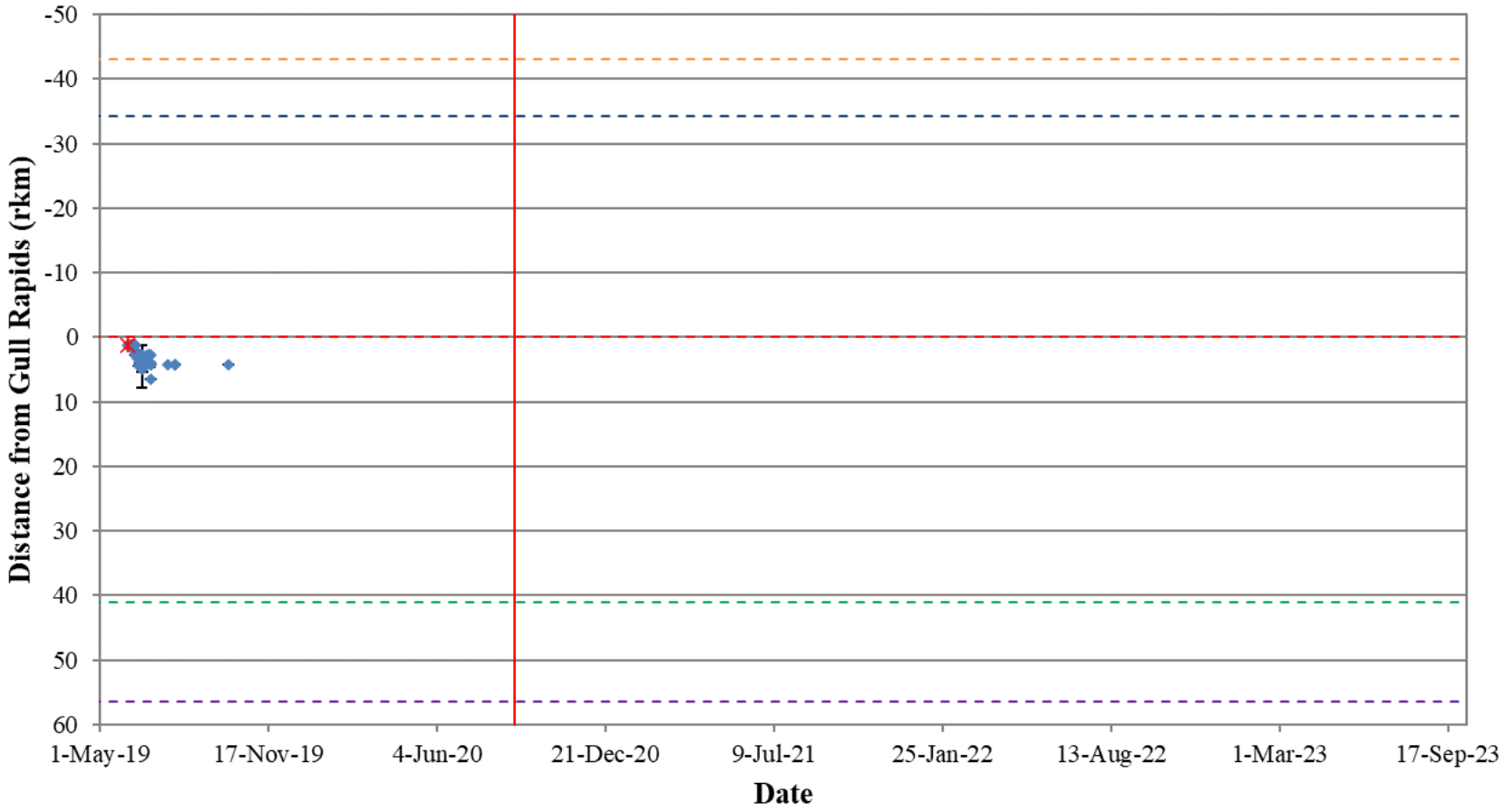

Figure A3-1: Position of a Walleye tagged with an acoustic transmitter (code #20129) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

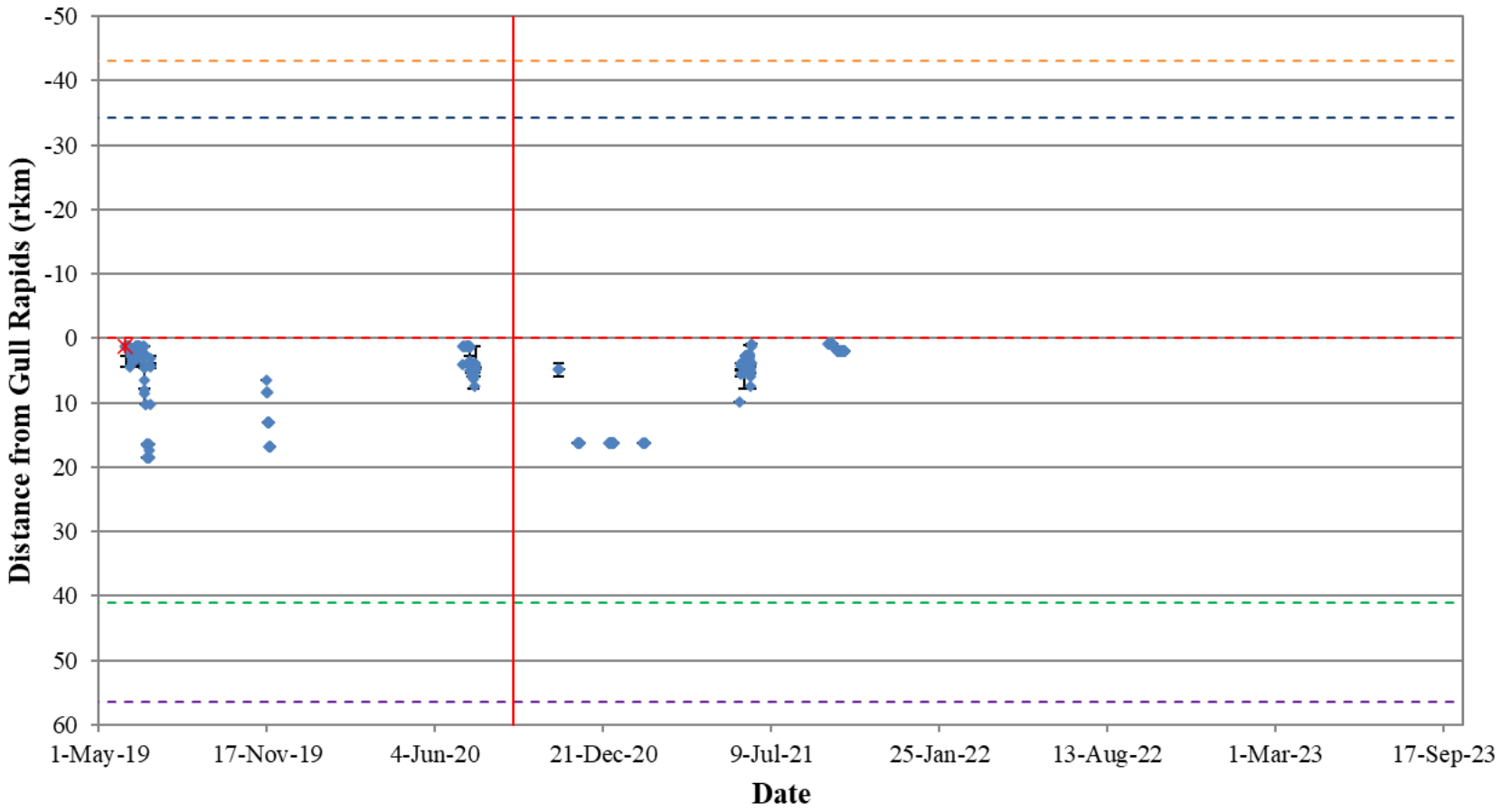

Figure A3-2: Position of a Walleye tagged with an acoustic transmitter (code #20130) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

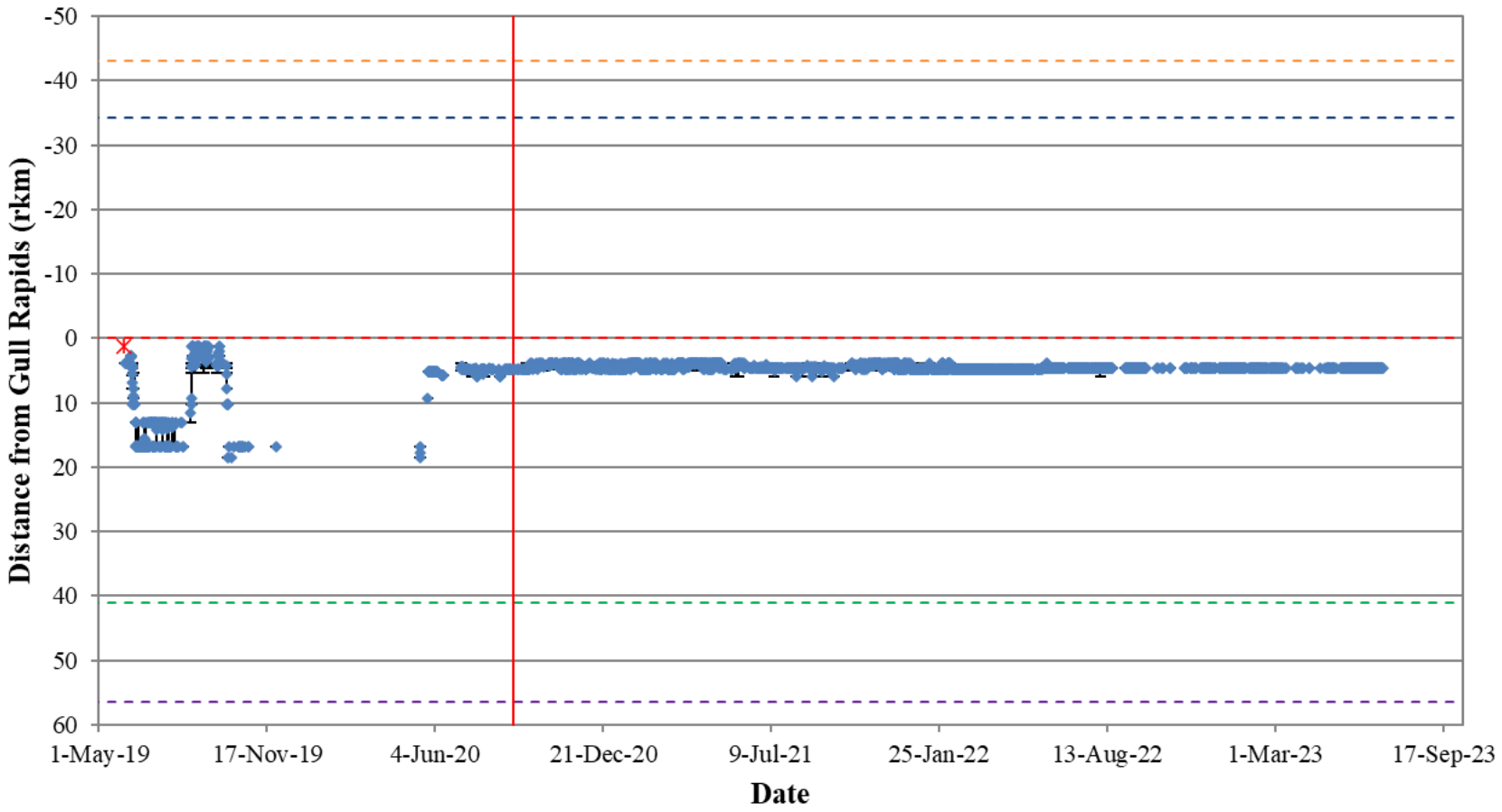

Figure A3-3: Position of a Walleye tagged with an acoustic transmitter (code #20131) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

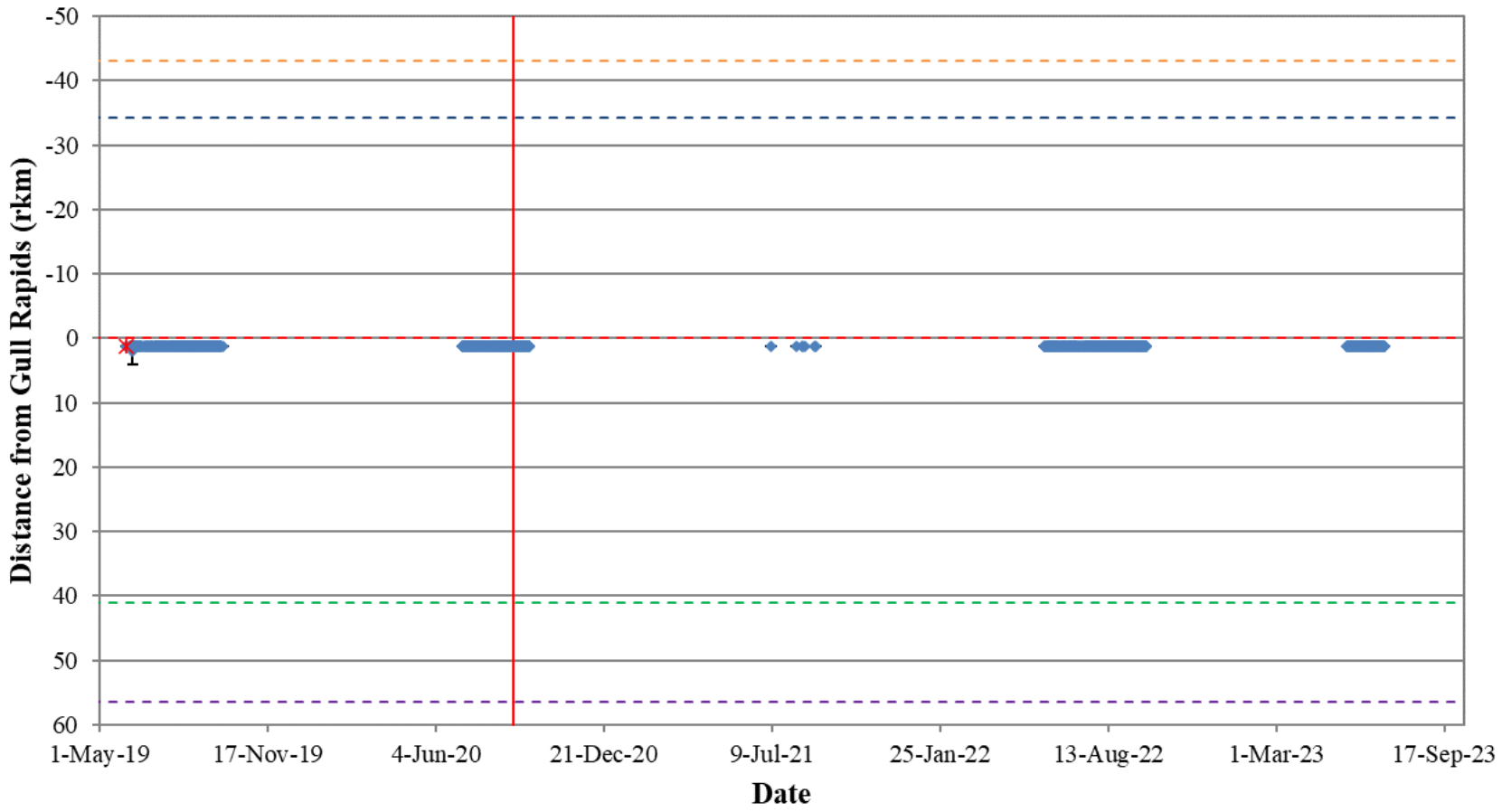

Figure A3-4: Position of a Walleye tagged with an acoustic transmitter (code #20132) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

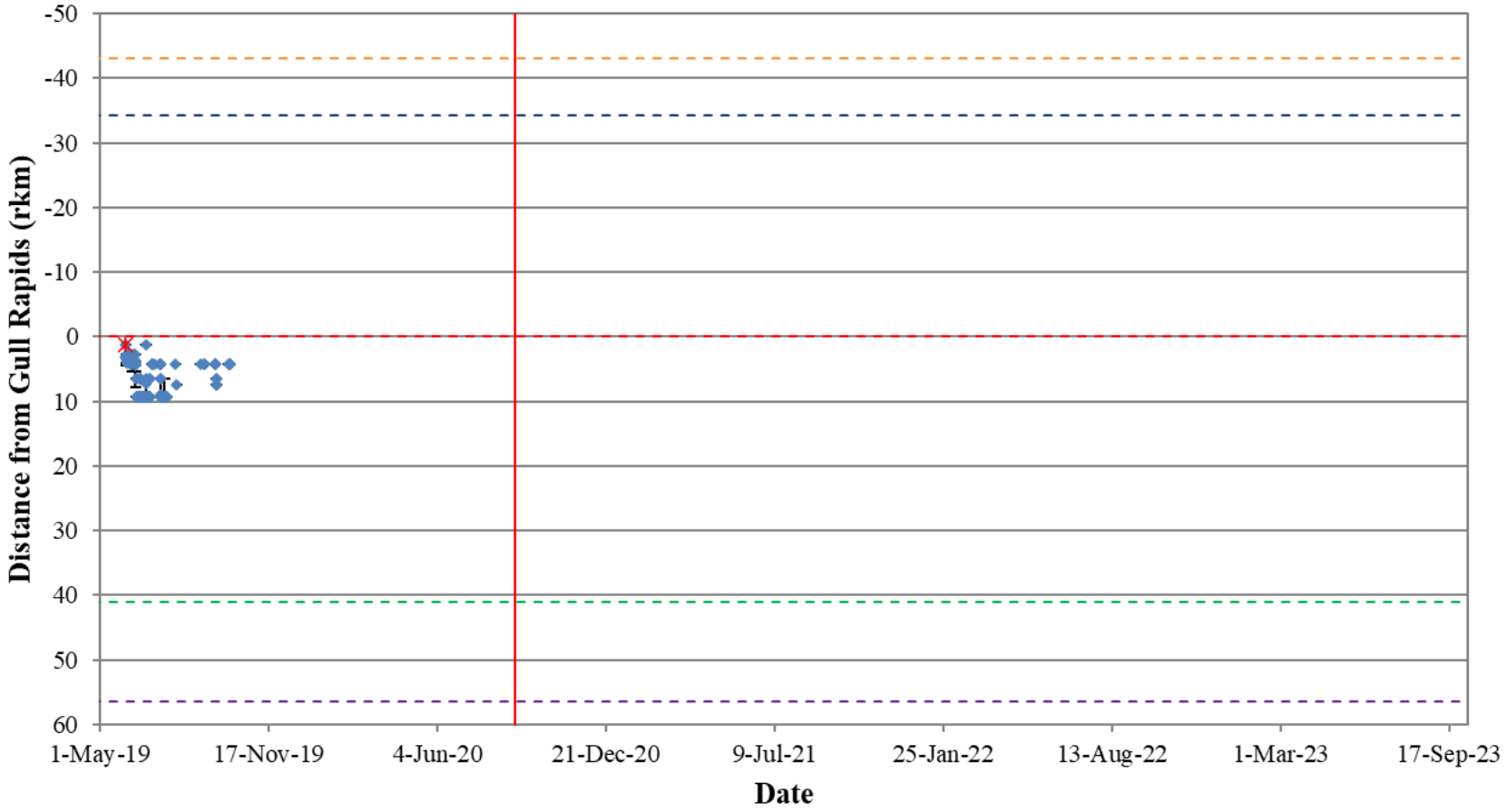

Figure A3-5: Position of a Walleye tagged with an acoustic transmitter (code #20133) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

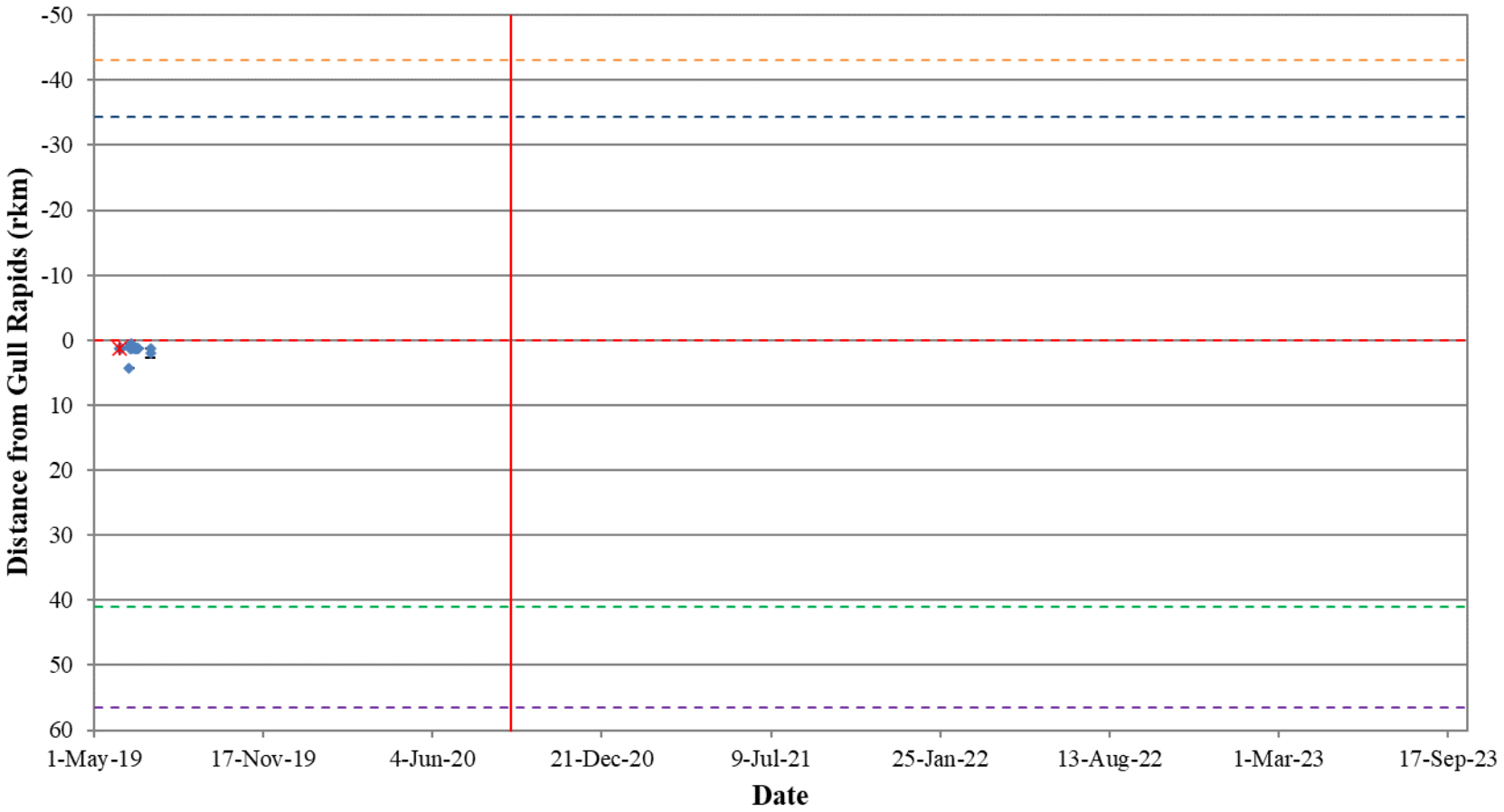

Figure A3-6: Position of a Walleye tagged with an acoustic transmitter (code #20134) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

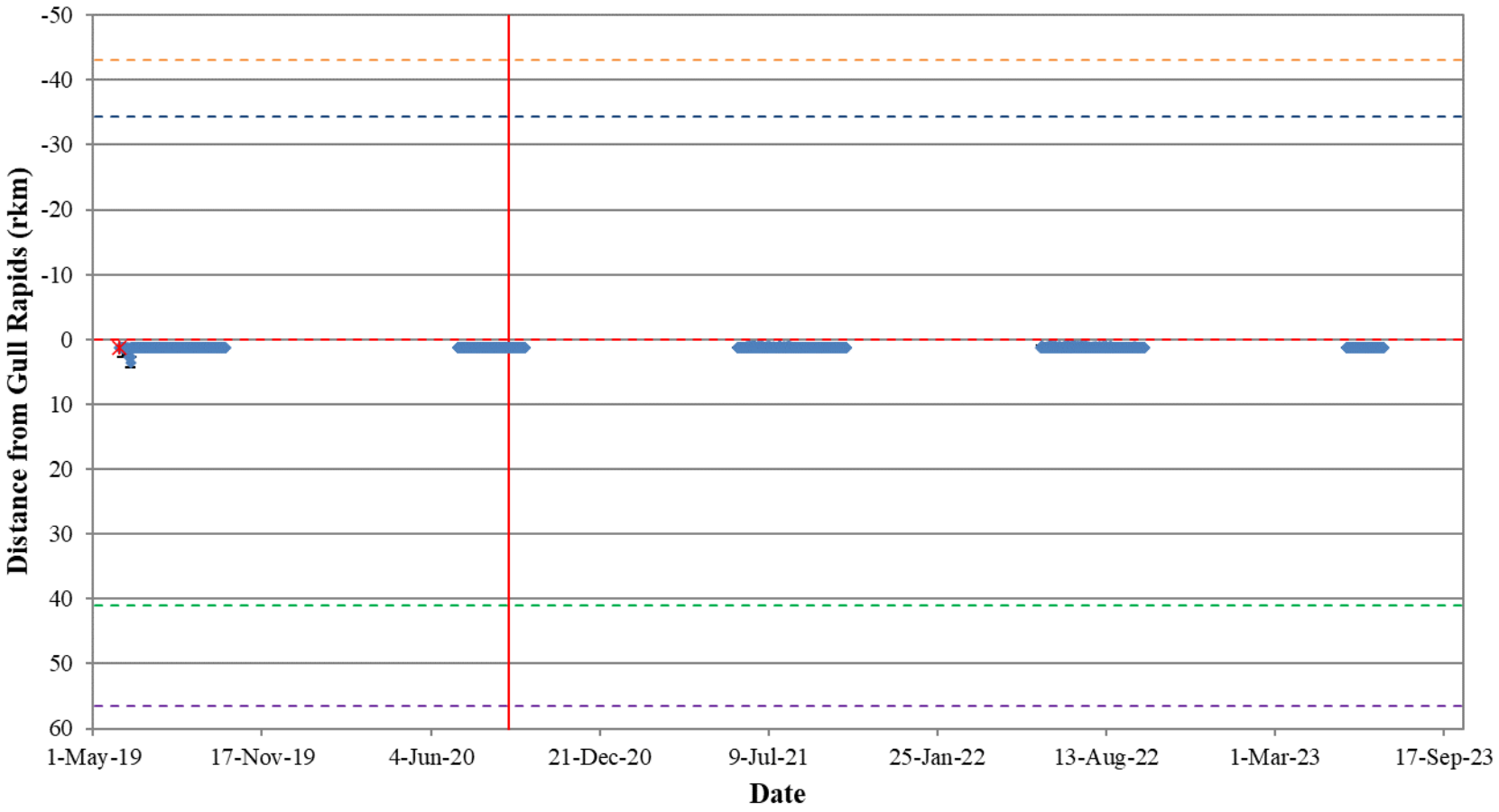

Figure A3-7: Position of a Walleye tagged with an acoustic transmitter (code #20135) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

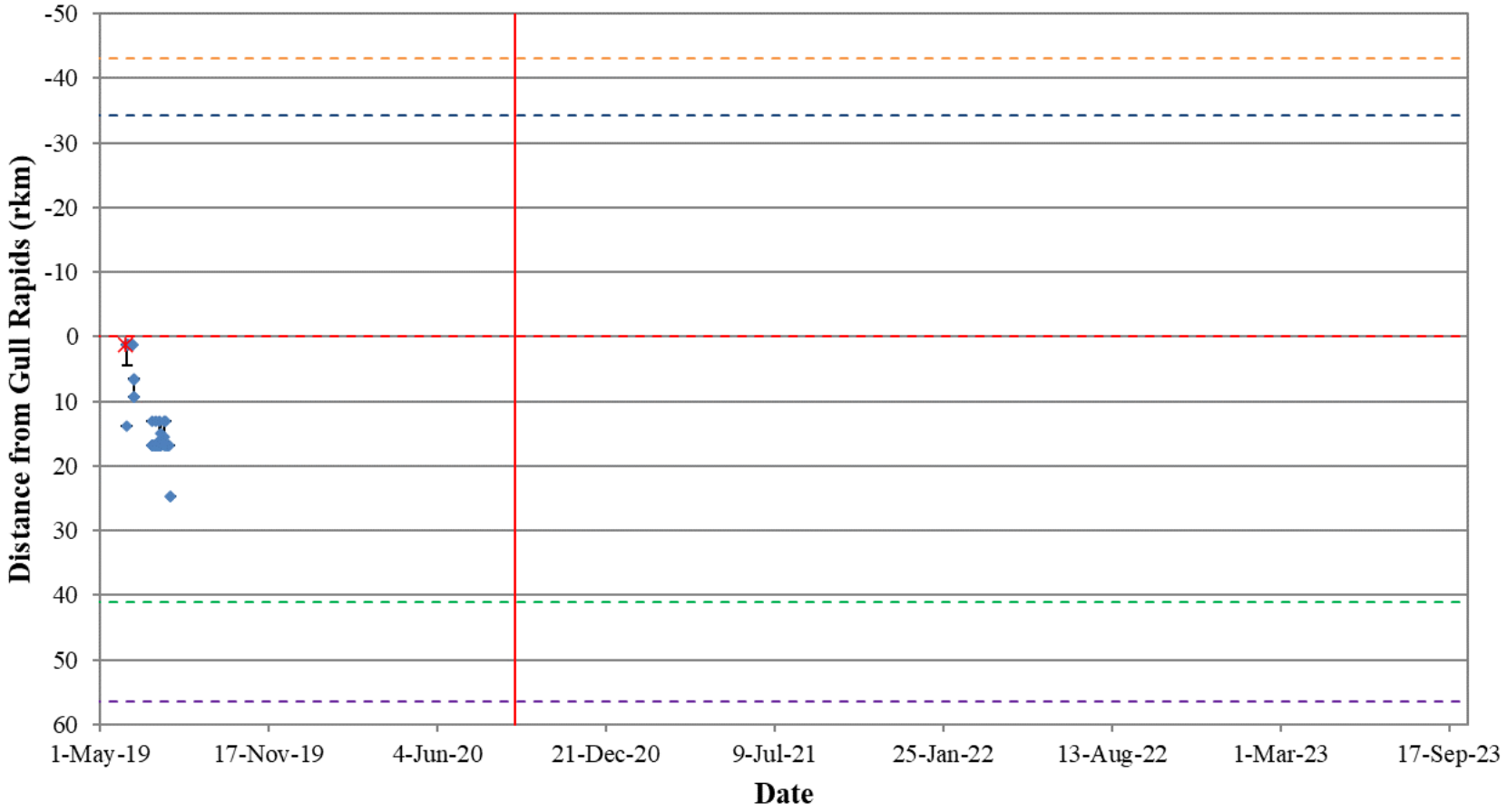

Figure A3-8: Position of a Walleye tagged with an acoustic transmitter (code #20136) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

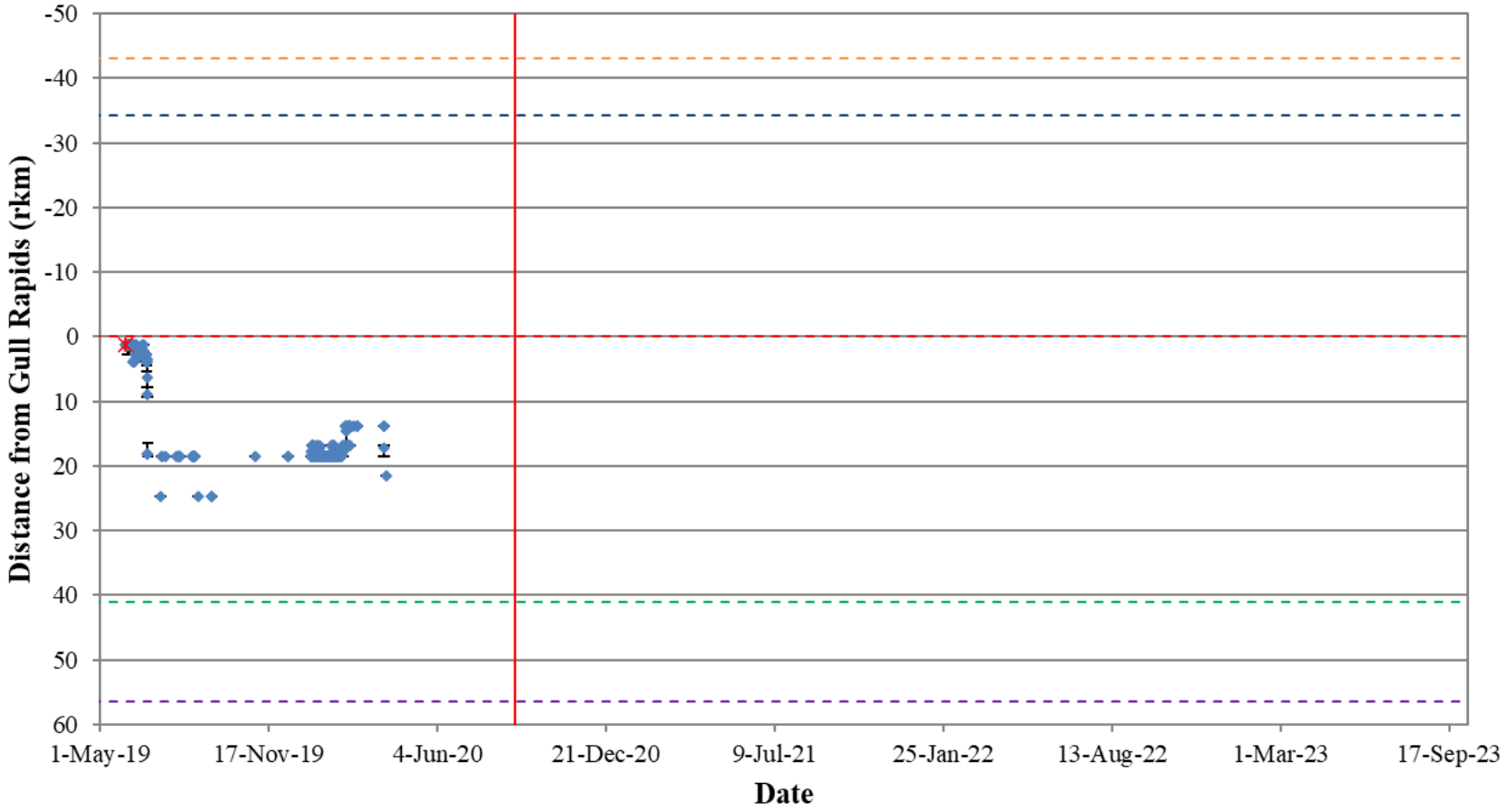

Figure A3-9: Position of a Walleye tagged with an acoustic transmitter (code #20137) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

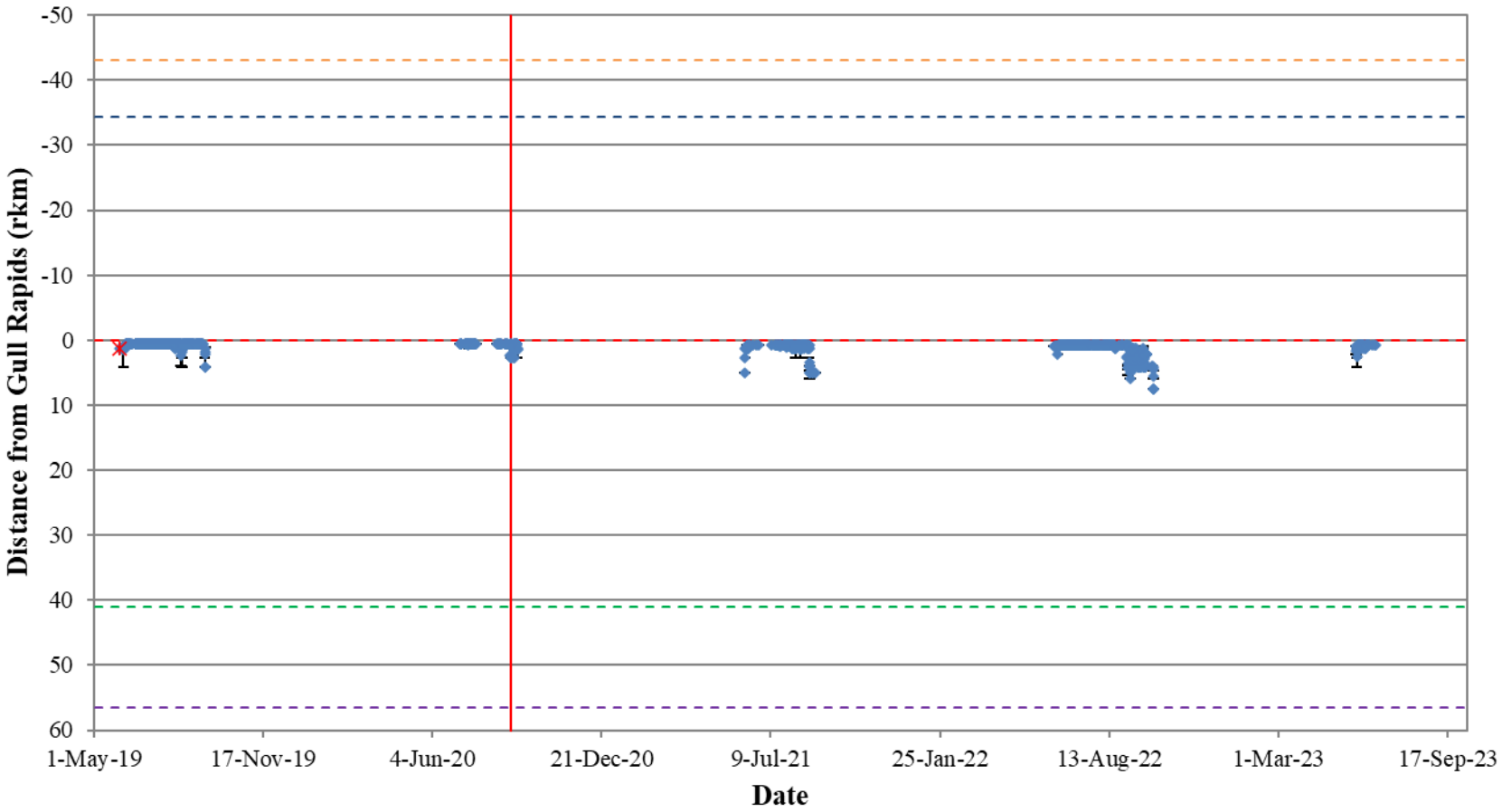

Figure A3-10: Position of a Walleye tagged with an acoustic transmitter (code #20138) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

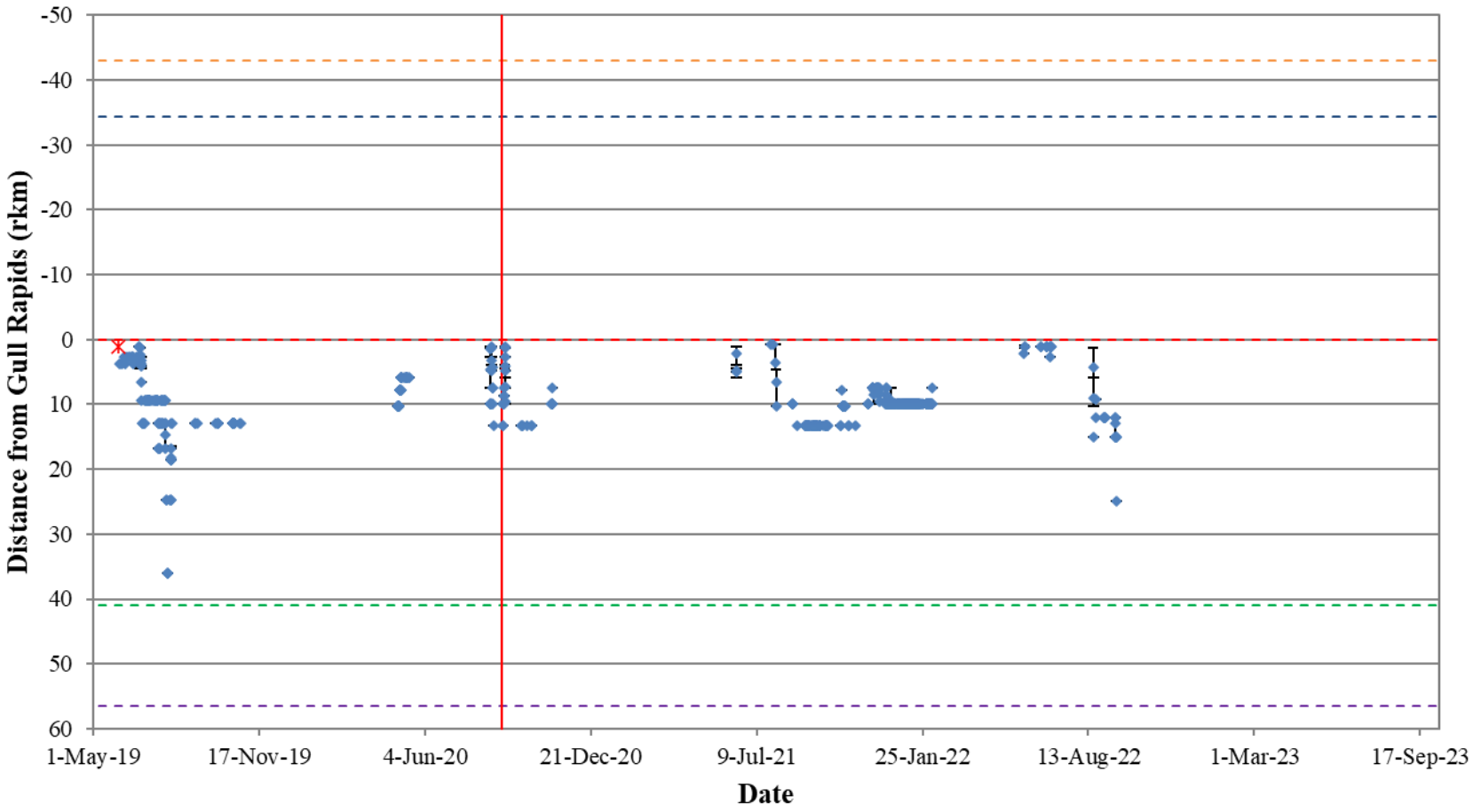

Figure A3-11: Position of a Walleye tagged with an acoustic transmitter (code #20139) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

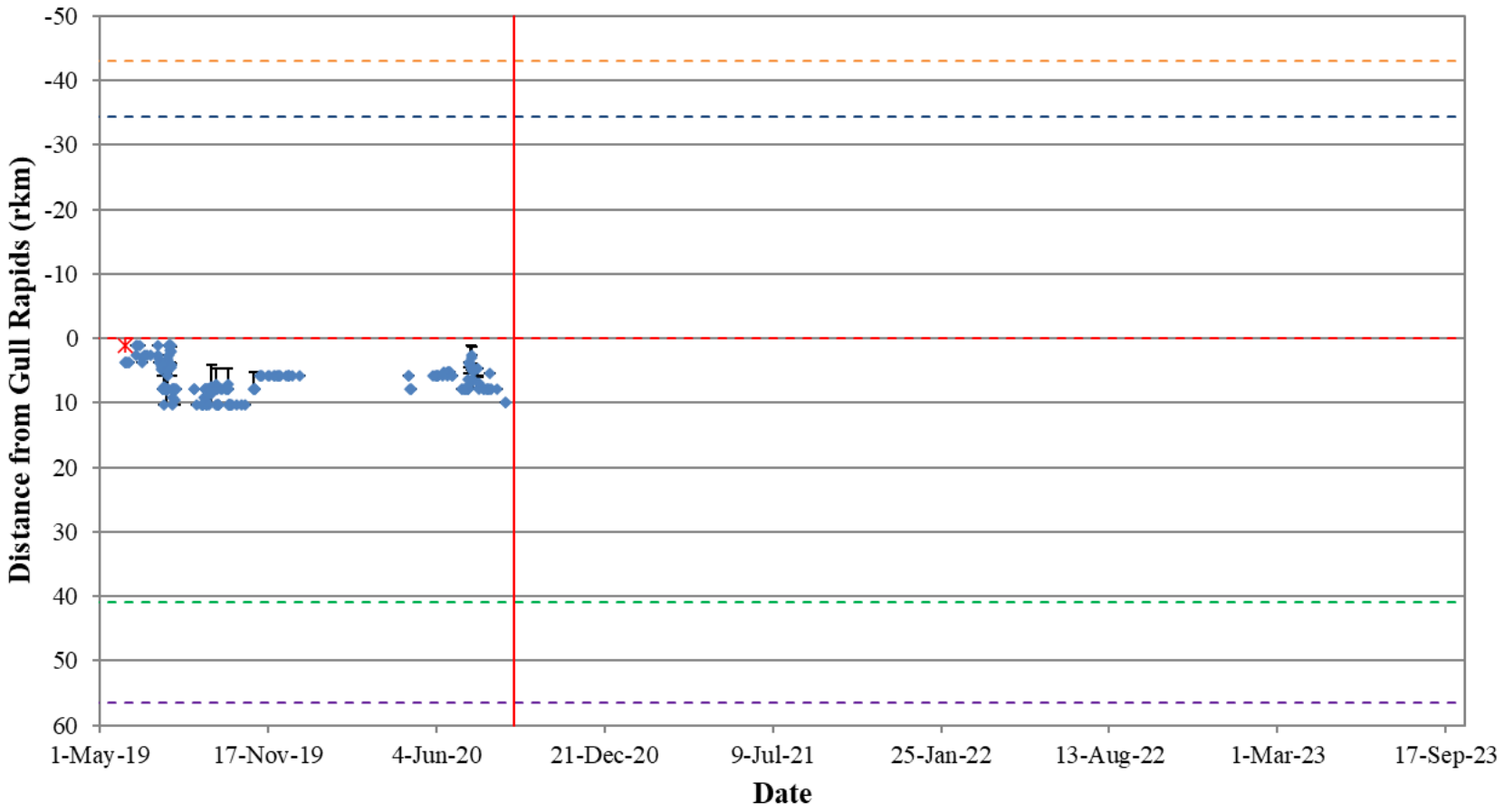

Figure A3-12: Position of a Walleye tagged with an acoustic transmitter (code #20140) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

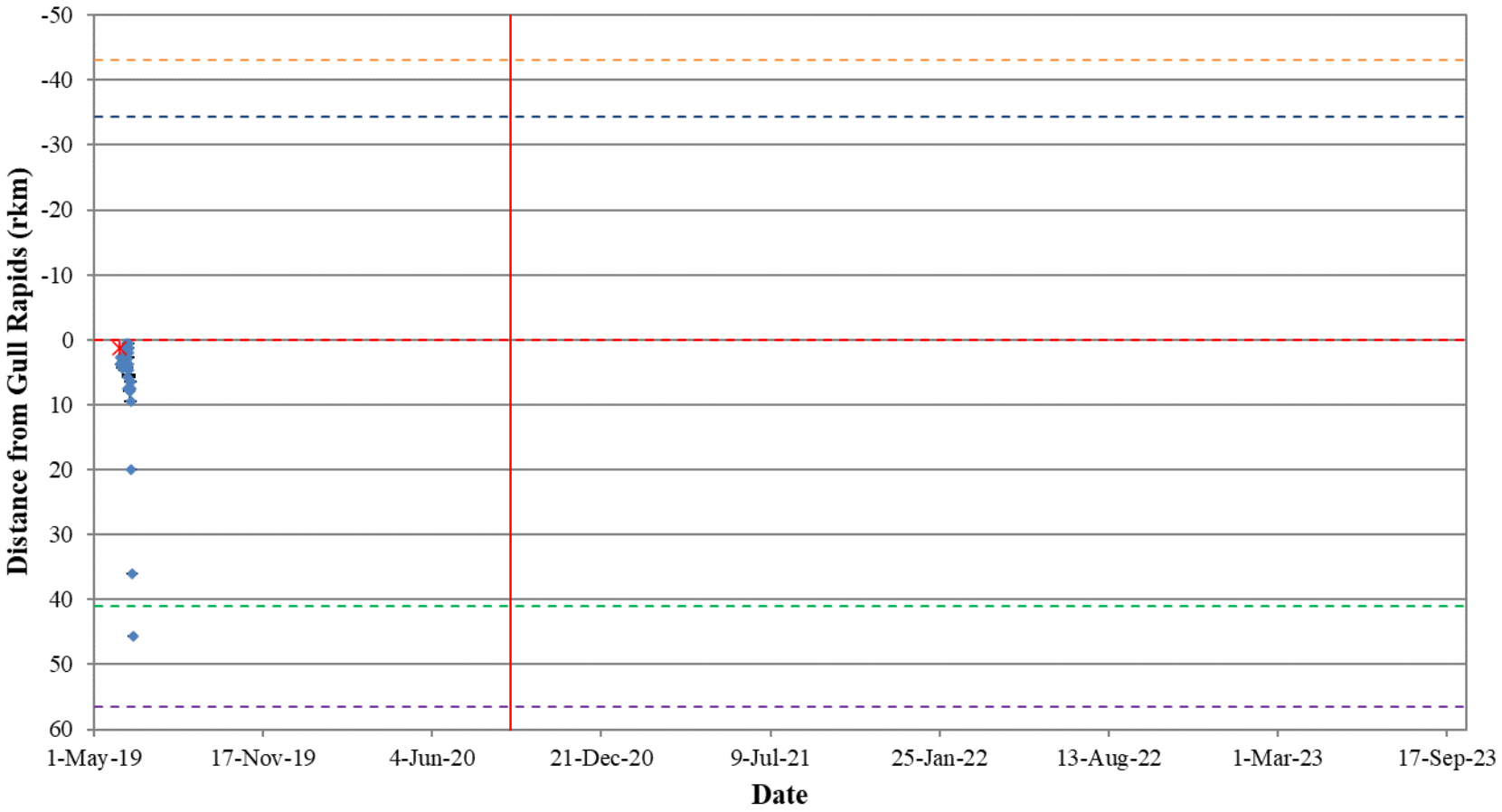

Figure A3-13: Position of a Walleye tagged with an acoustic transmitter (code #20141) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

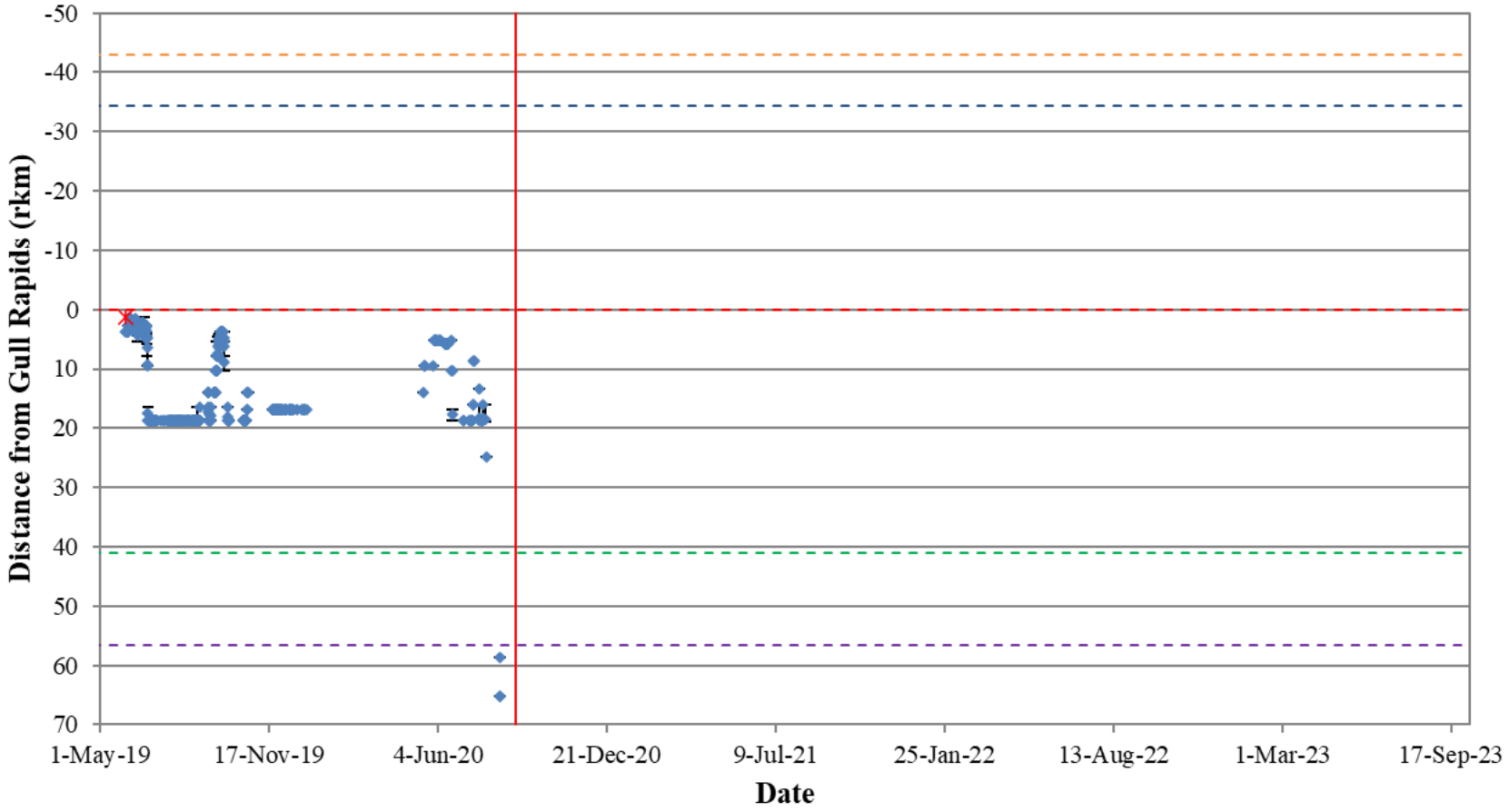

Figure A3-14: Position of a Walleye tagged with an acoustic transmitter (code #20142) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

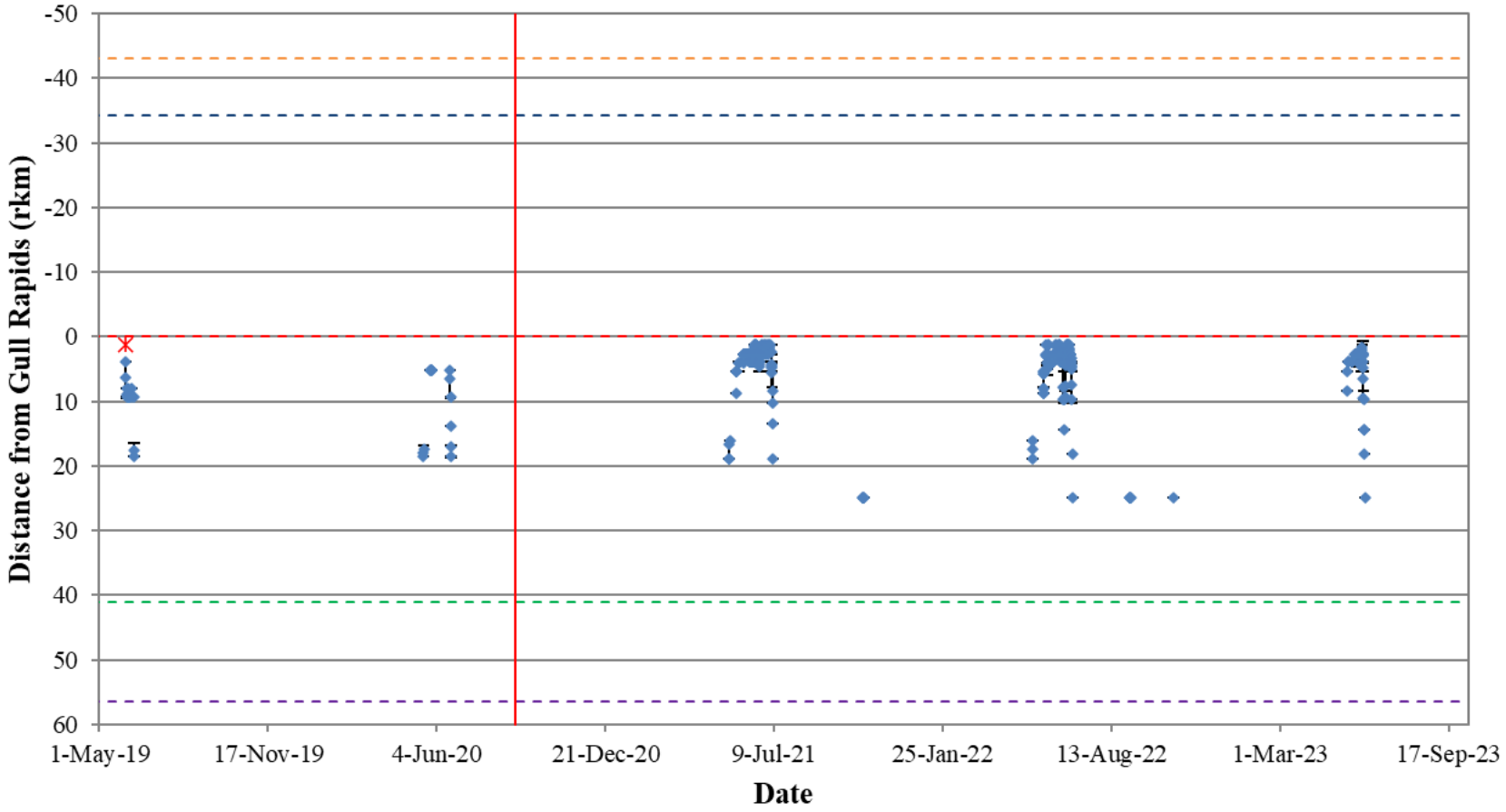

Figure A3-15: Position of a Walleye tagged with an acoustic transmitter (code #20143) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

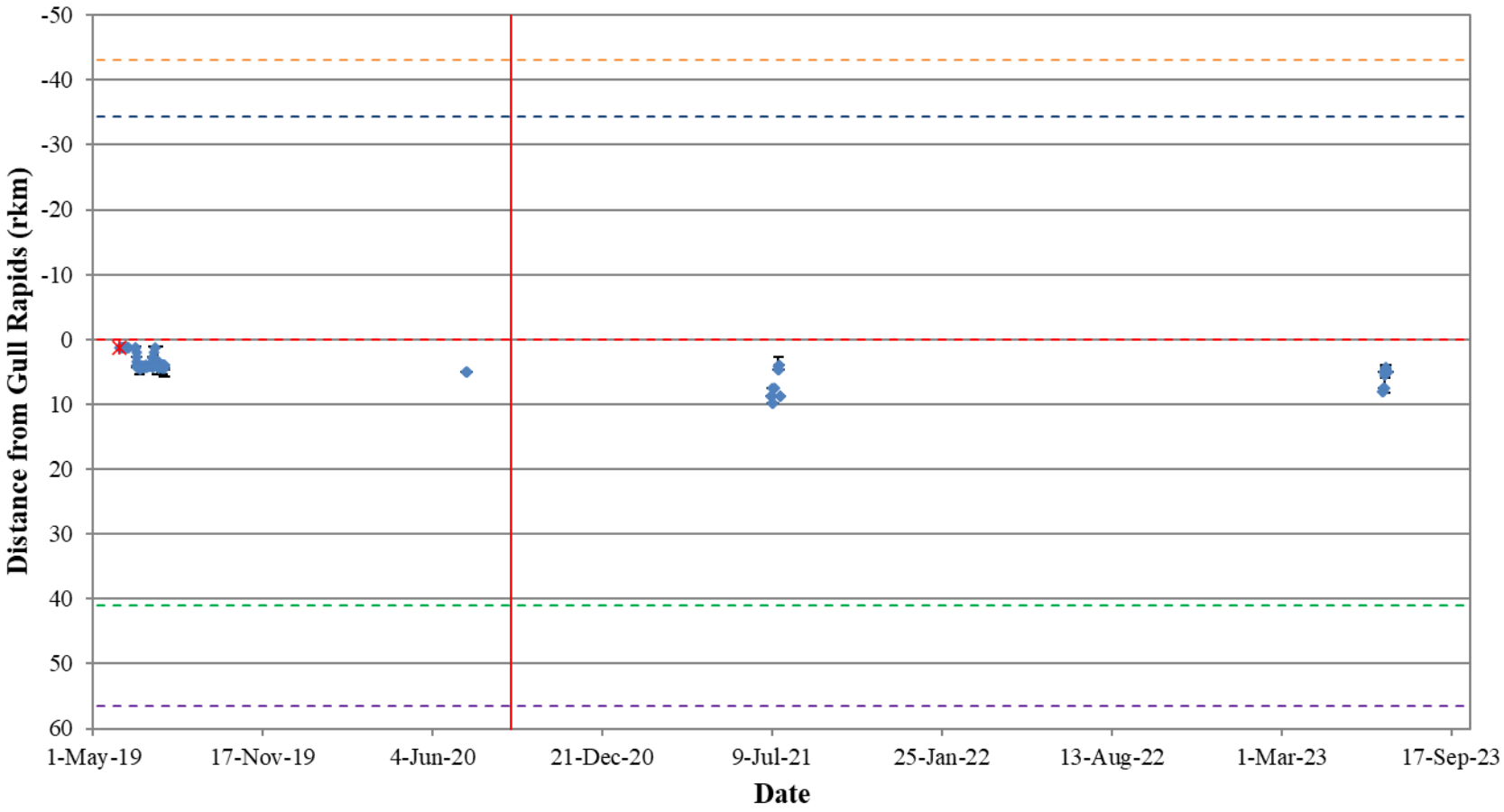

Figure A3-16: Position of a Walleye tagged with an acoustic transmitter (code #20144) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

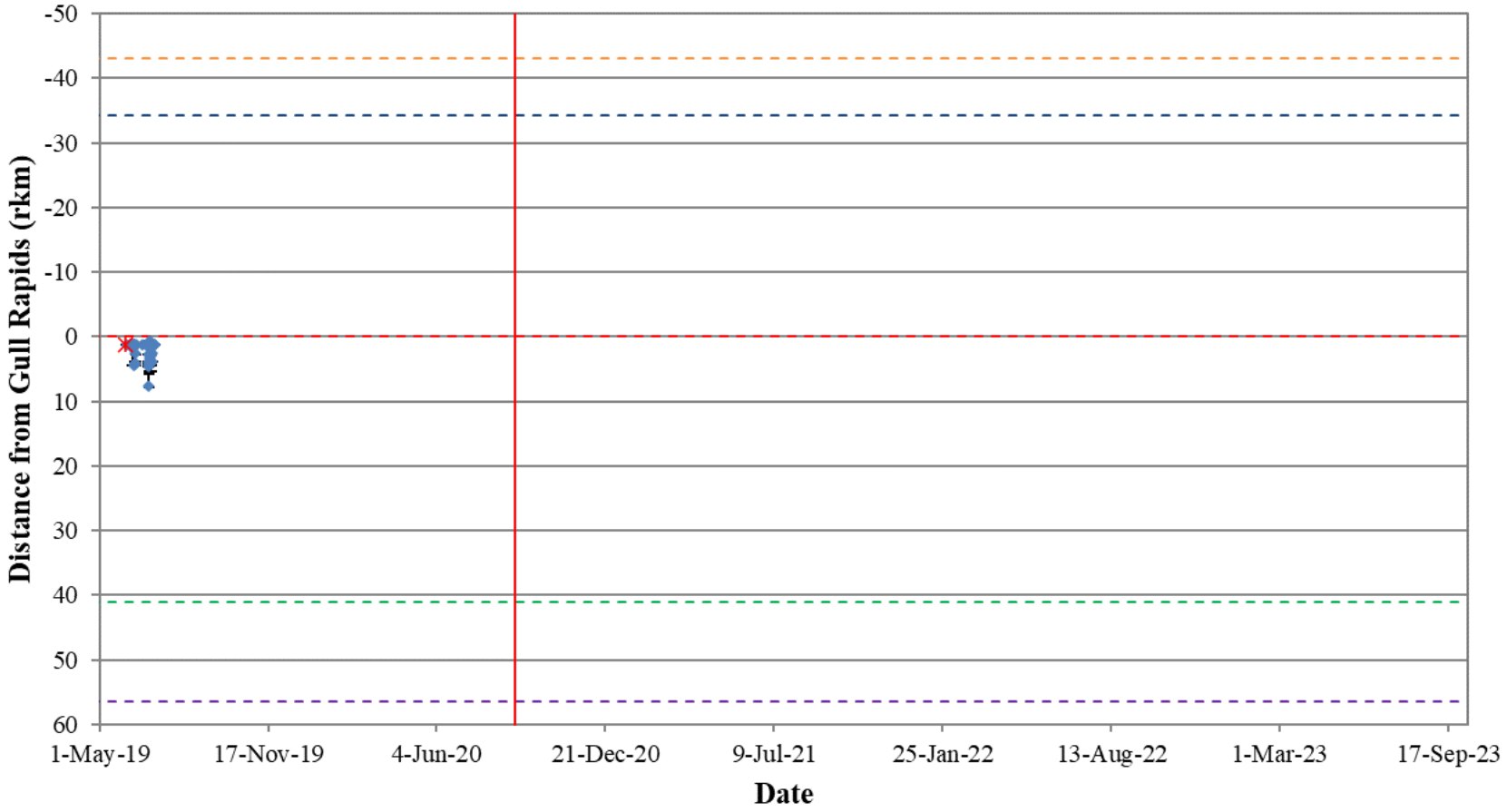

Figure A3-17: Position of a Walleye tagged with an acoustic transmitter (code #20145) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

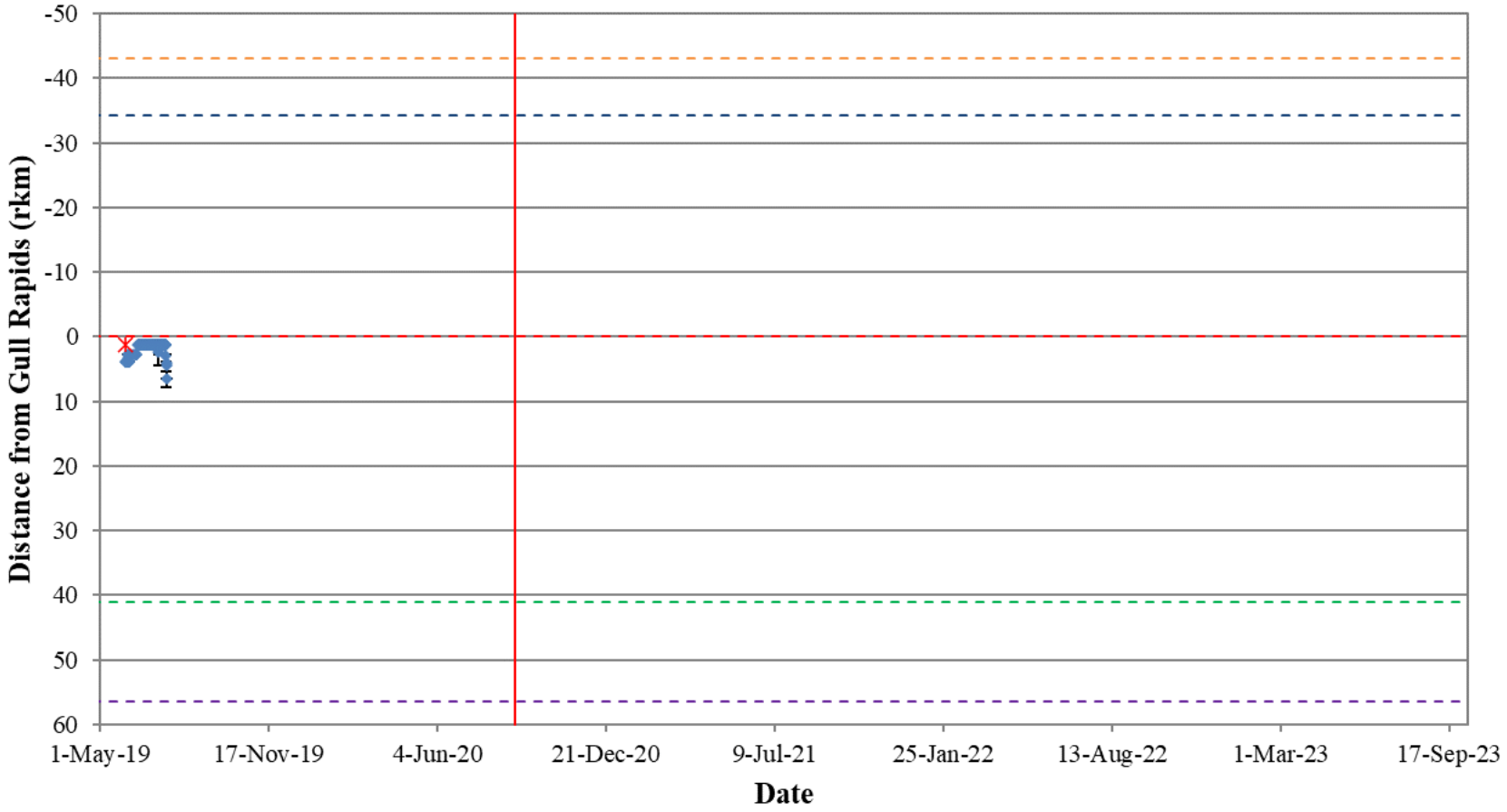

Figure A3-18: Position of a Walleye tagged with an acoustic transmitter (code #20152) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

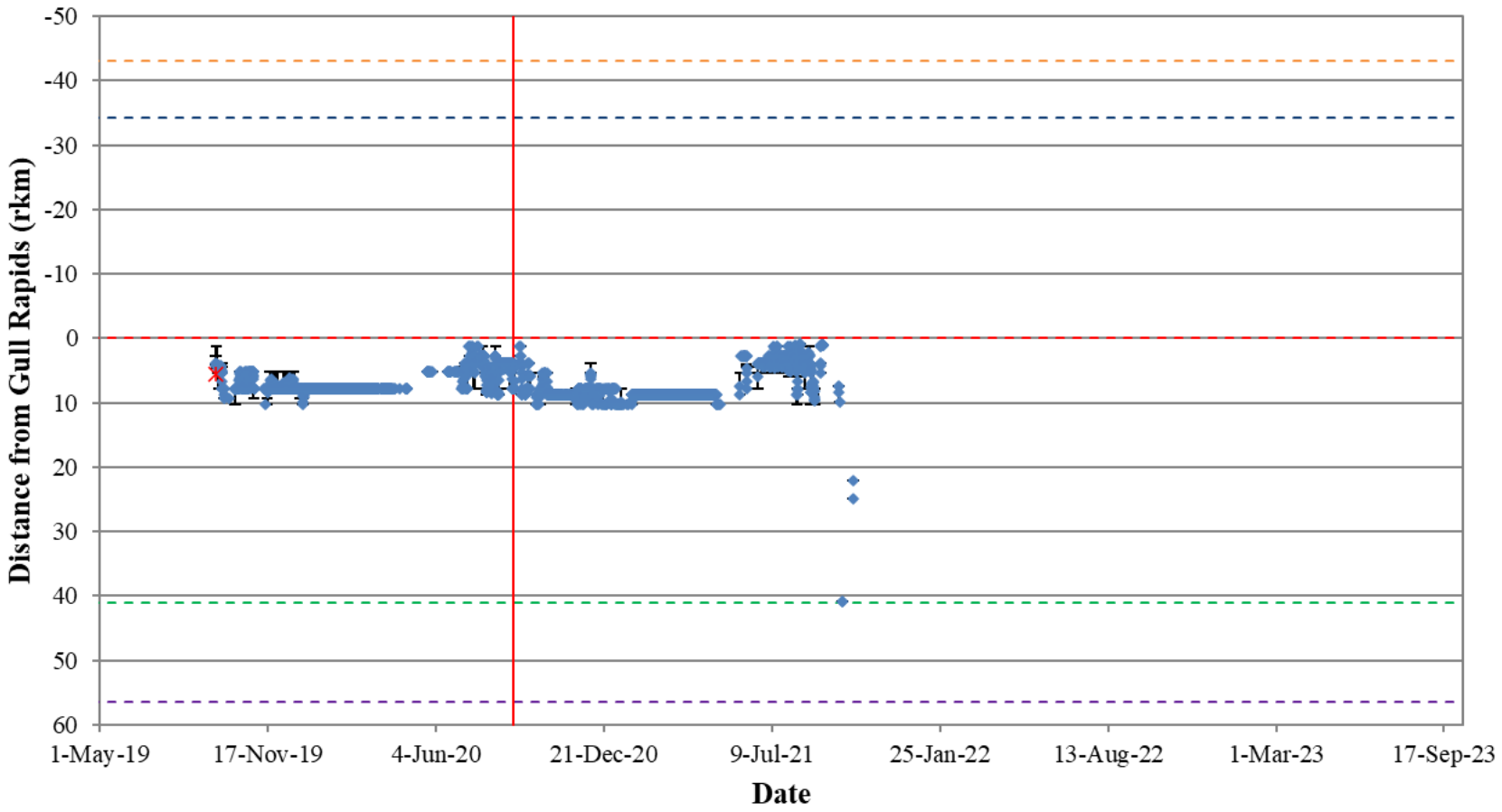

Figure A3-19: Position of a Walleye tagged with an acoustic transmitter (code #20165) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

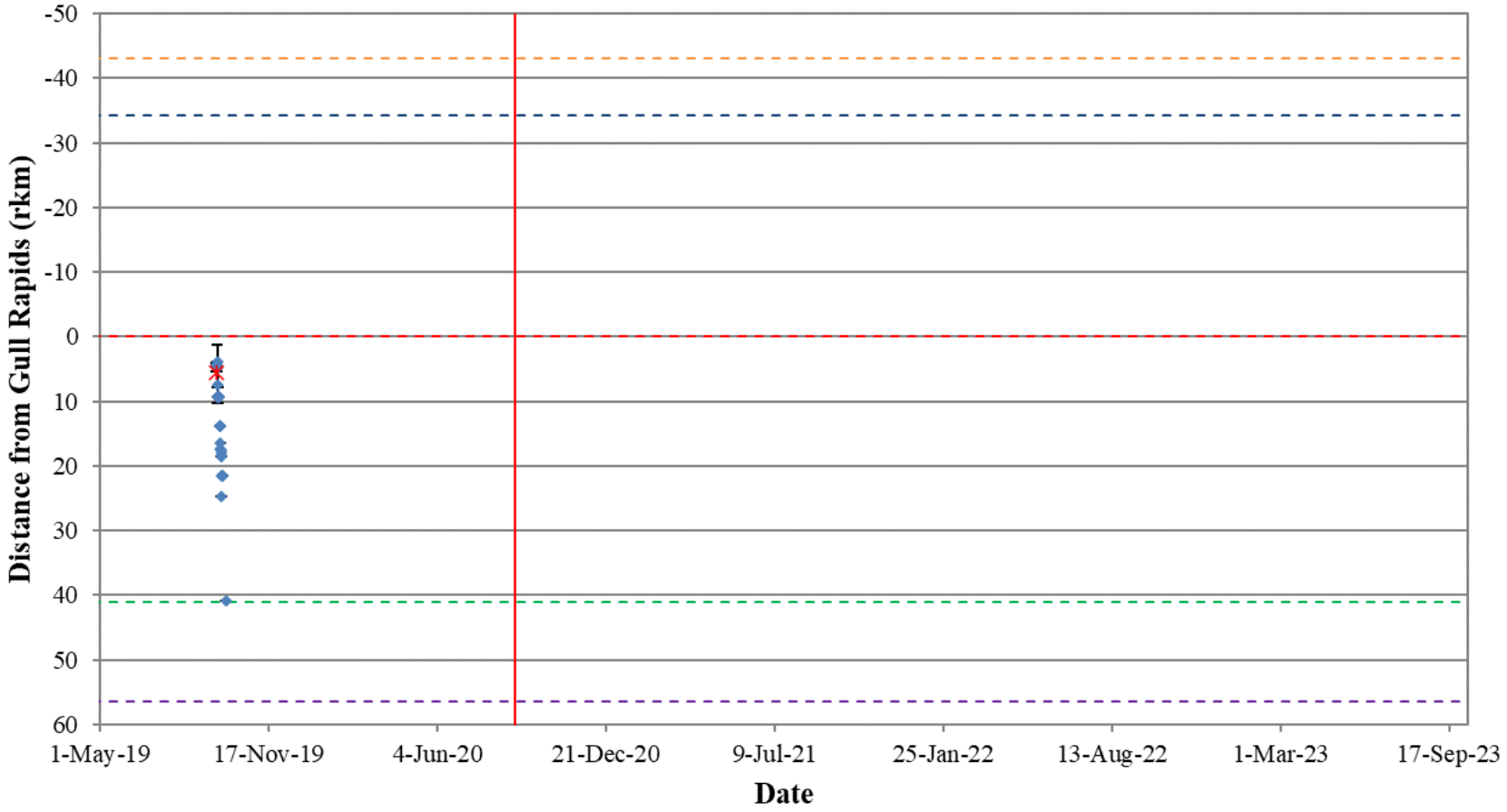

Figure A3-20: Position of a Walleye tagged with an acoustic transmitter (code #20167) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

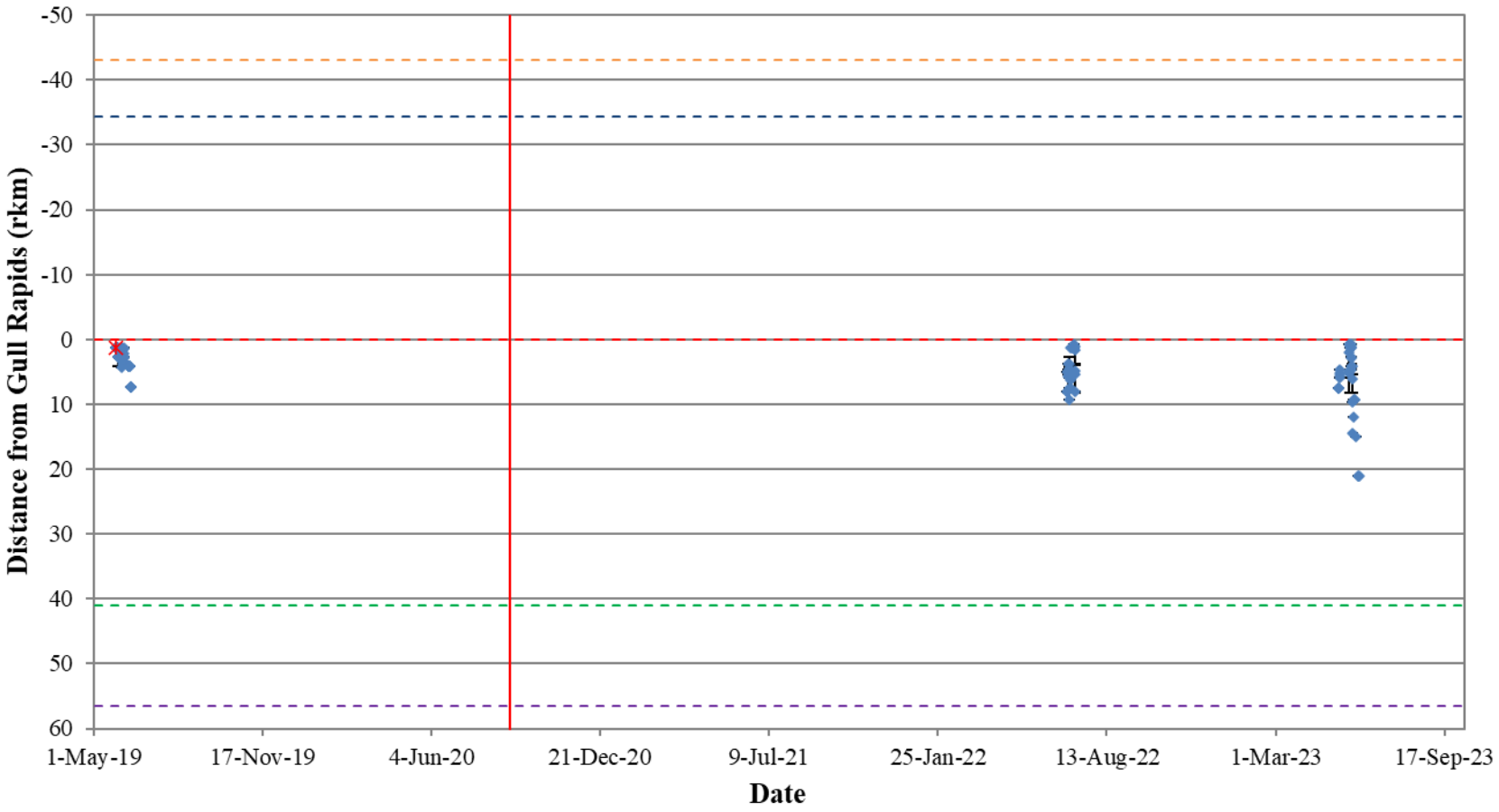

Figure A3-21: Position of a Walleye tagged with an acoustic transmitter (code #20171) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

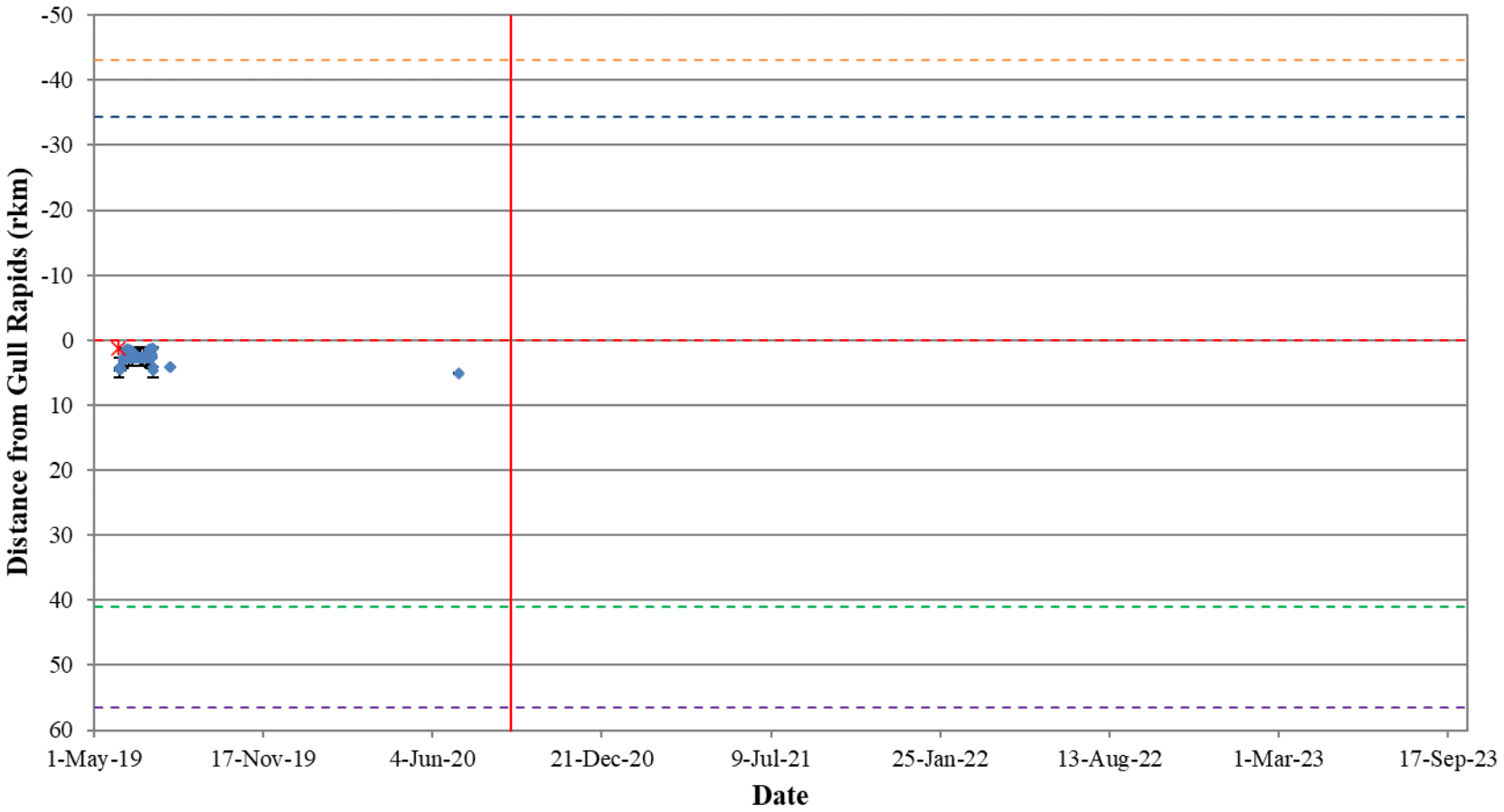

Figure A3-22: Position of a Walleye tagged with an acoustic transmitter (code #20172) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

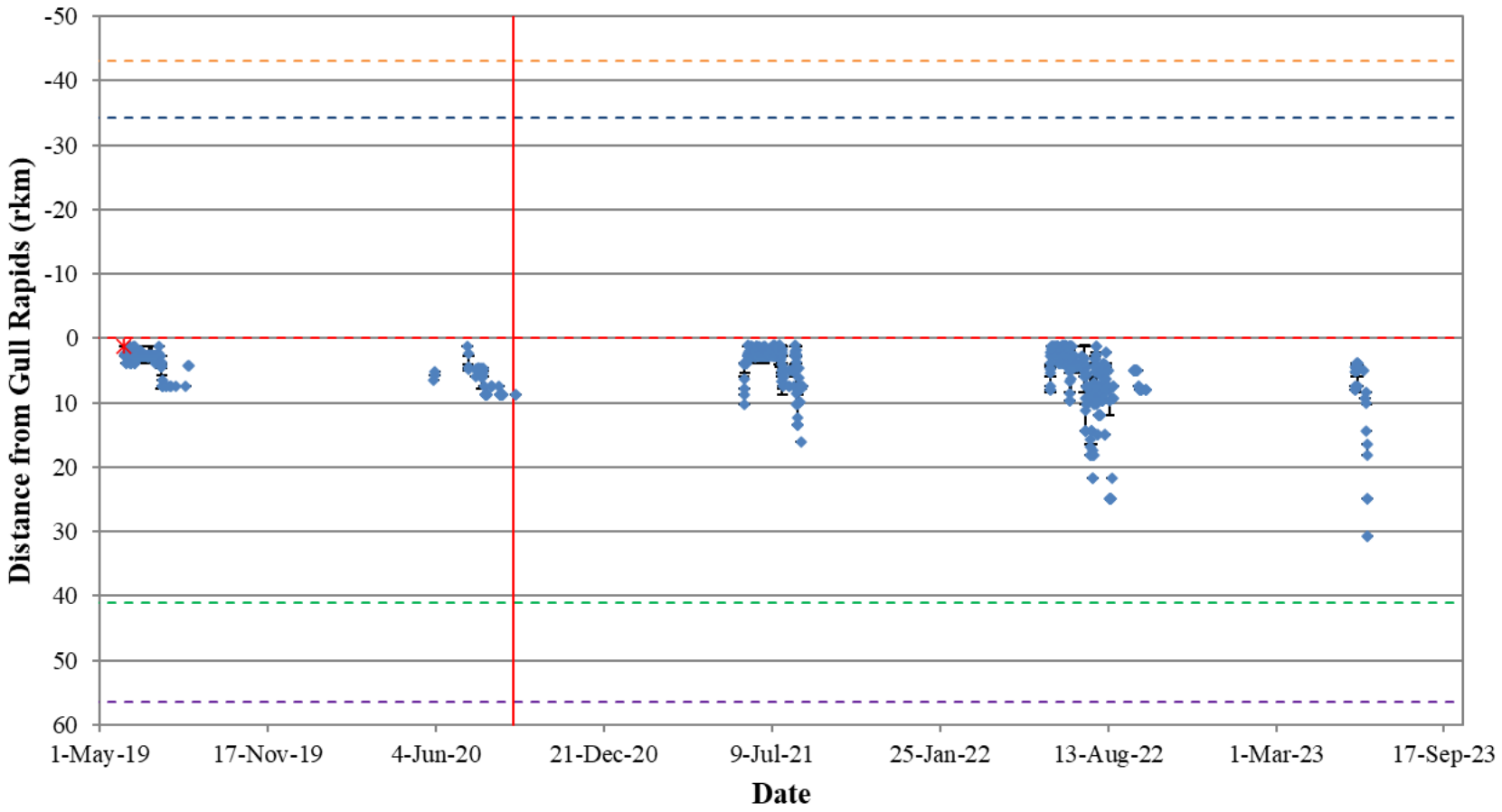

Figure A3-23: Position of a Walleye tagged with an acoustic transmitter (code #20173) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

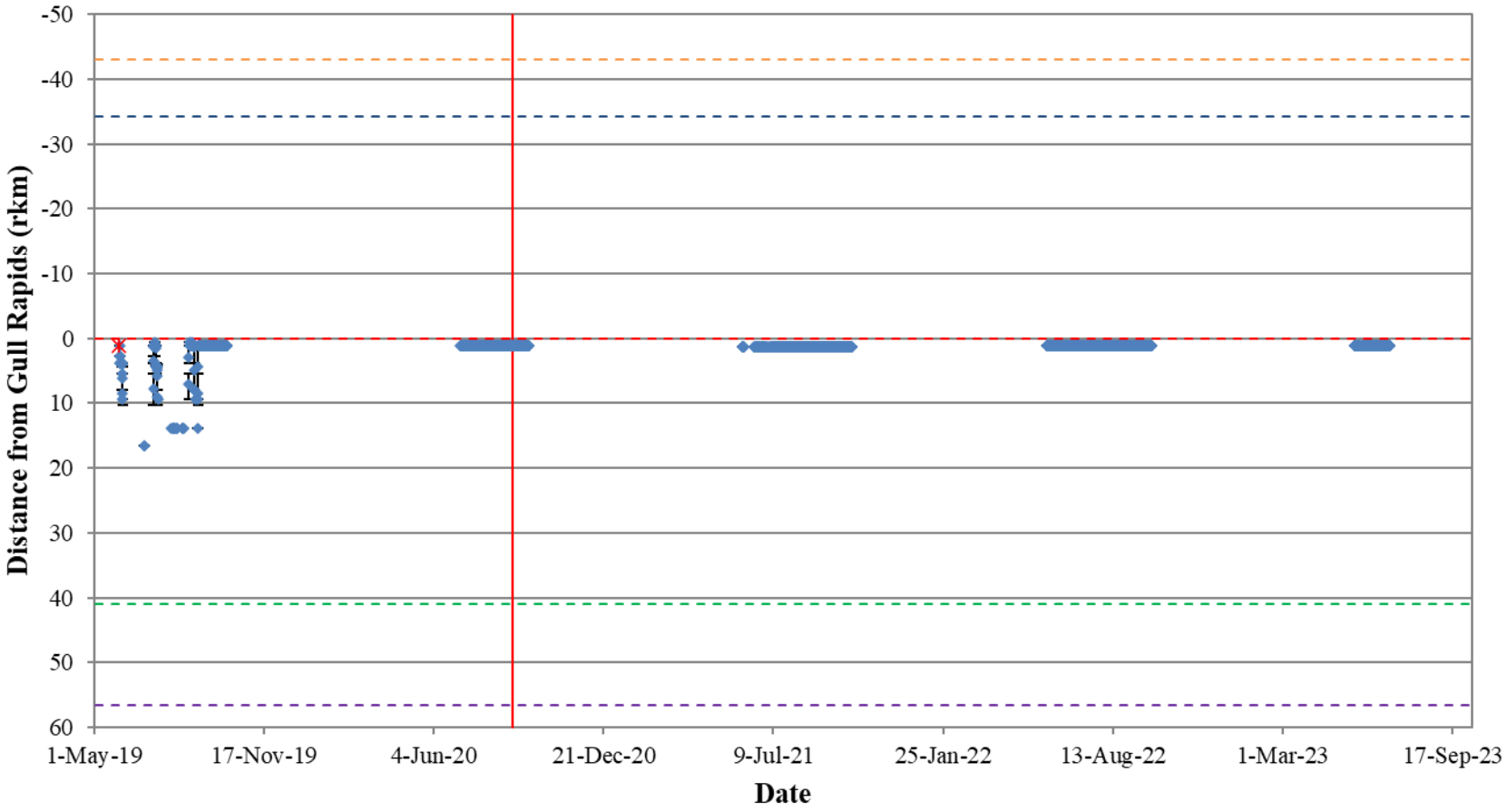

Figure A3-24: Position of a Walleye tagged with an acoustic transmitter (code #20174) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

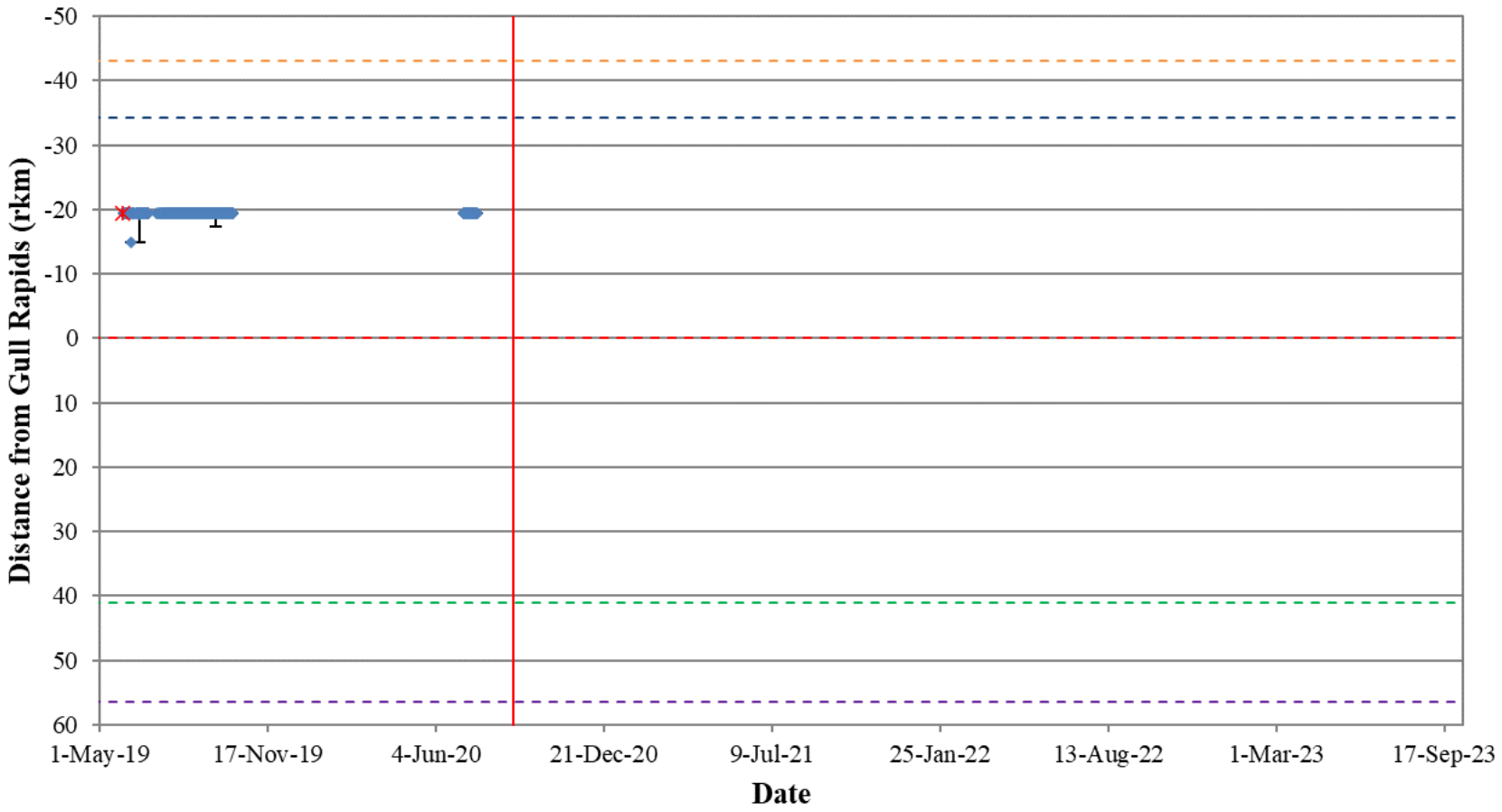

Figure A3-25: Position of a Walleye tagged with an acoustic transmitter (code #20176) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

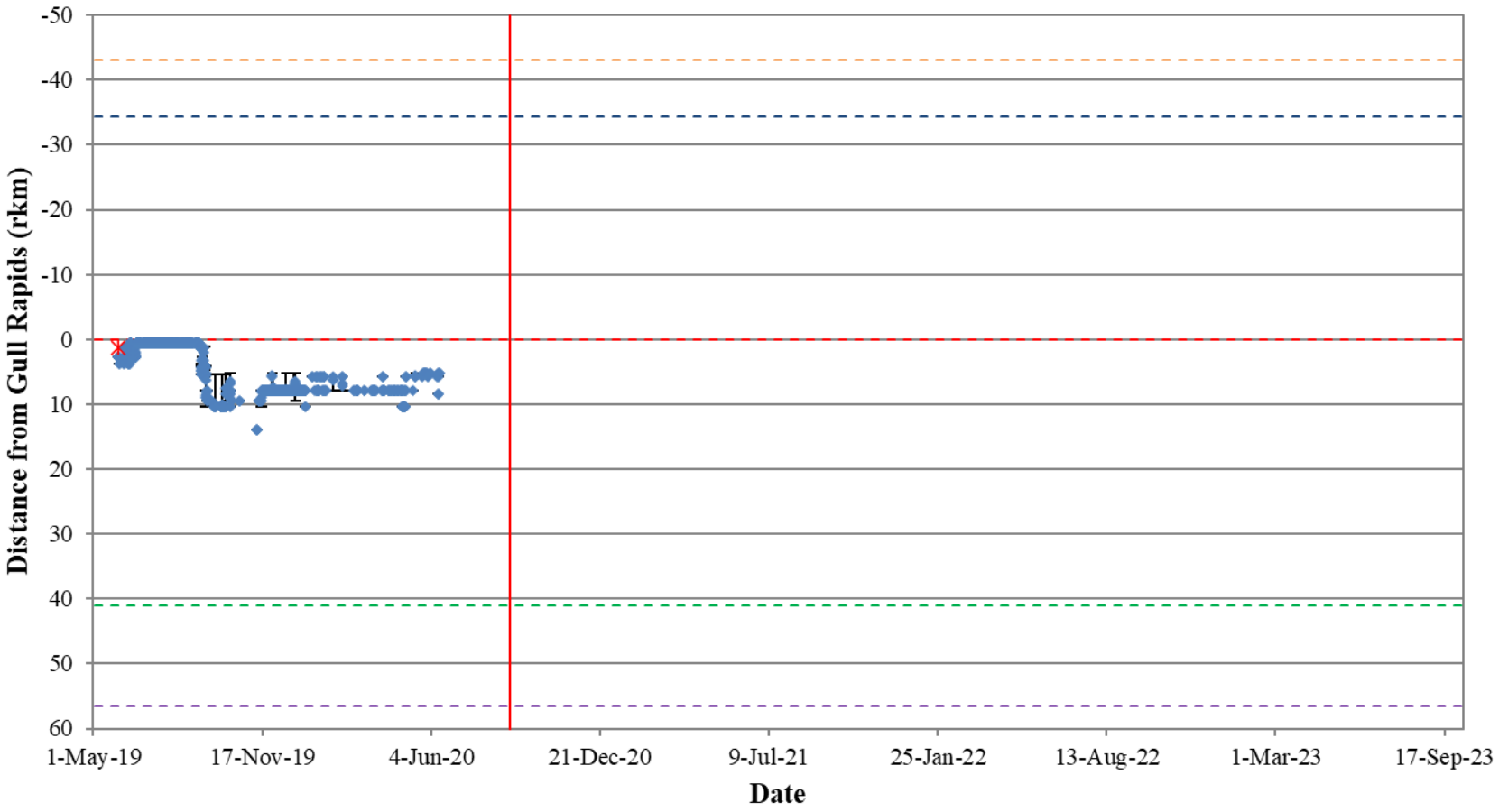

Figure A3-26: Position of a Walleye tagged with an acoustic transmitter (code #20177) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

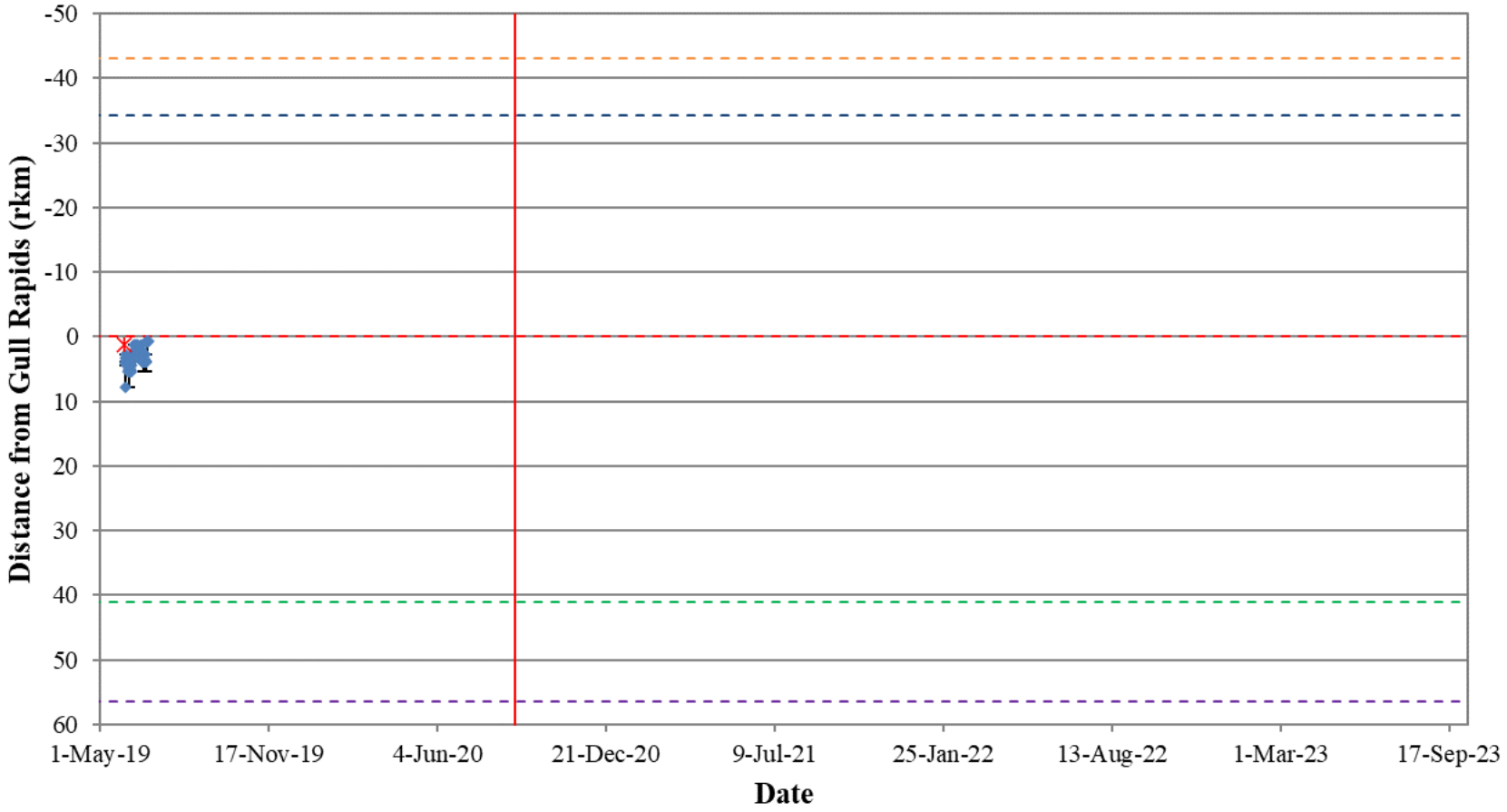

Figure A3-27: Position of a Walleye tagged with an acoustic transmitter (code #20178) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

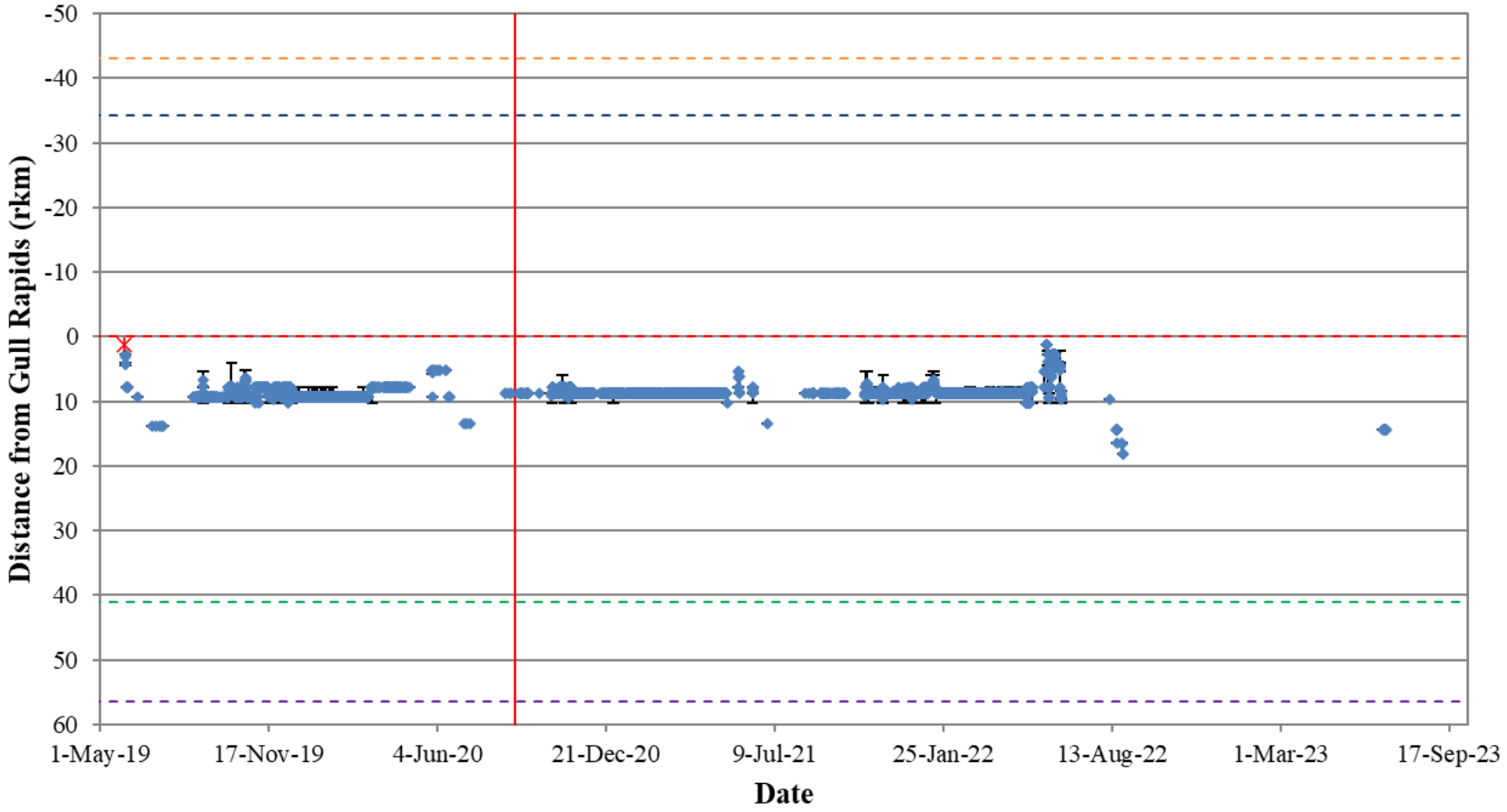

Figure A3-28: Position of a Walleye tagged with an acoustic transmitter (code #20179) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

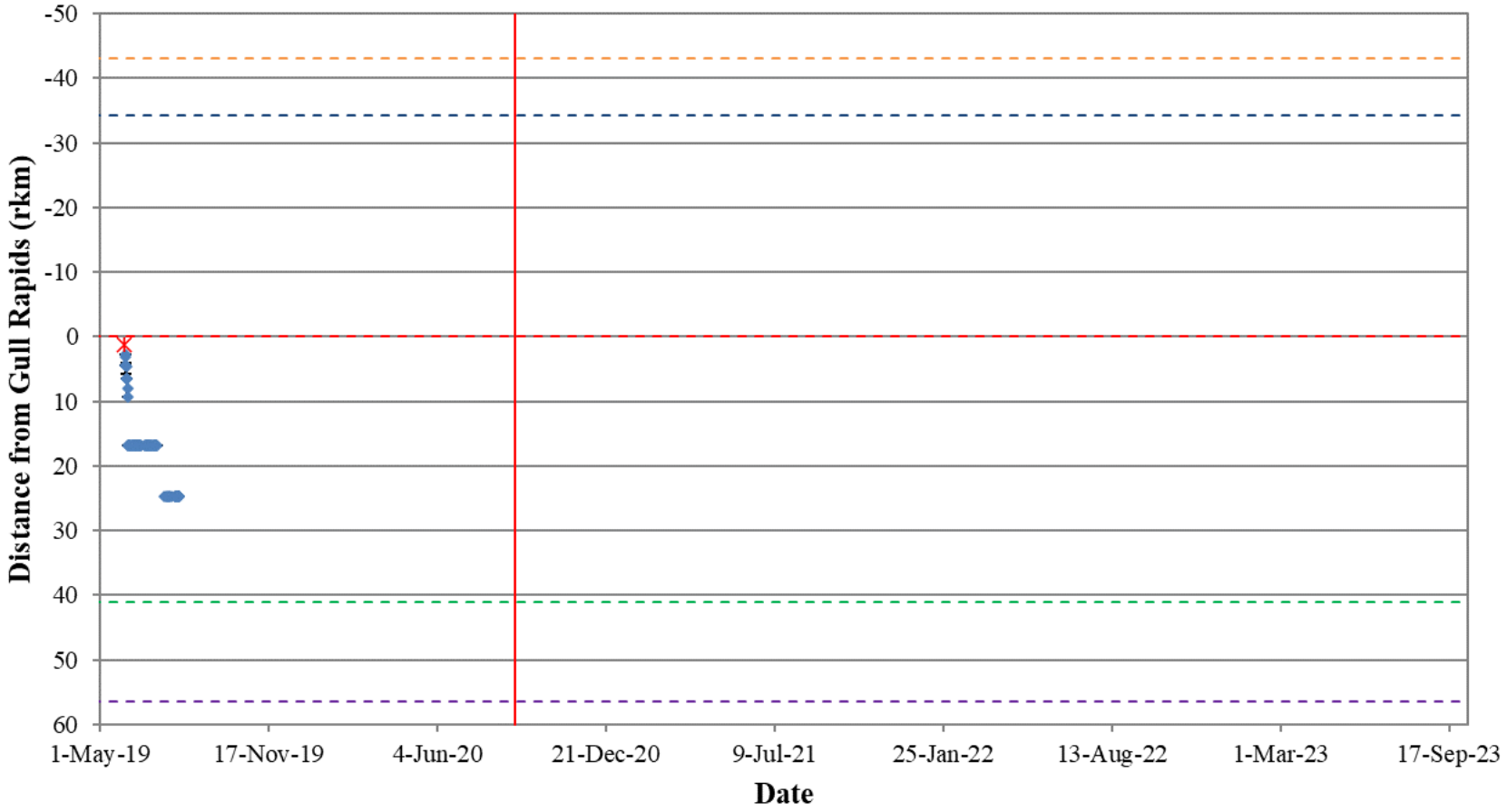

Figure A3-29: Position of a Walleye tagged with an acoustic transmitter (code #20180) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

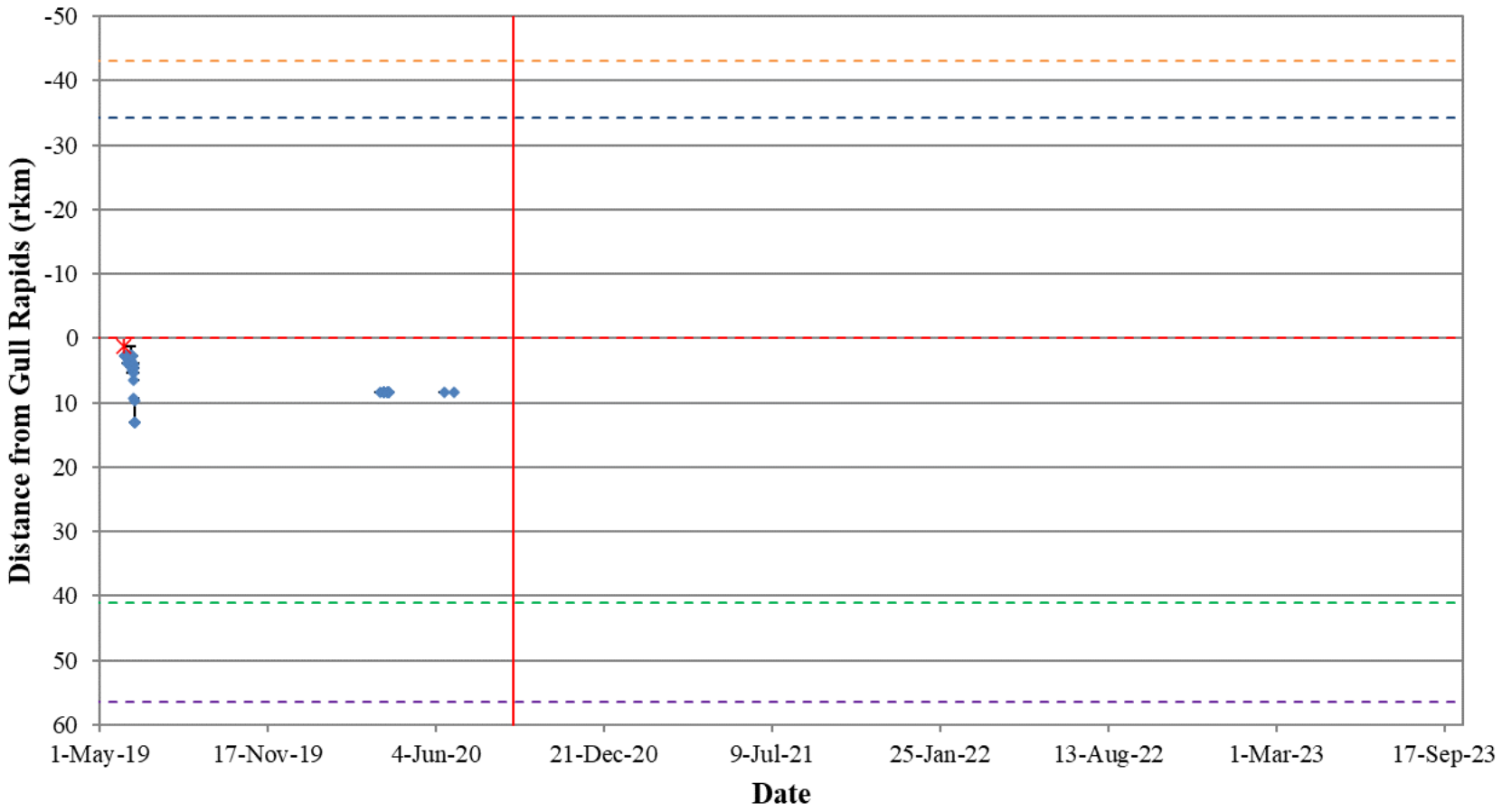

Figure A3-30: Position of a Walleye tagged with an acoustic transmitter (code #20183) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

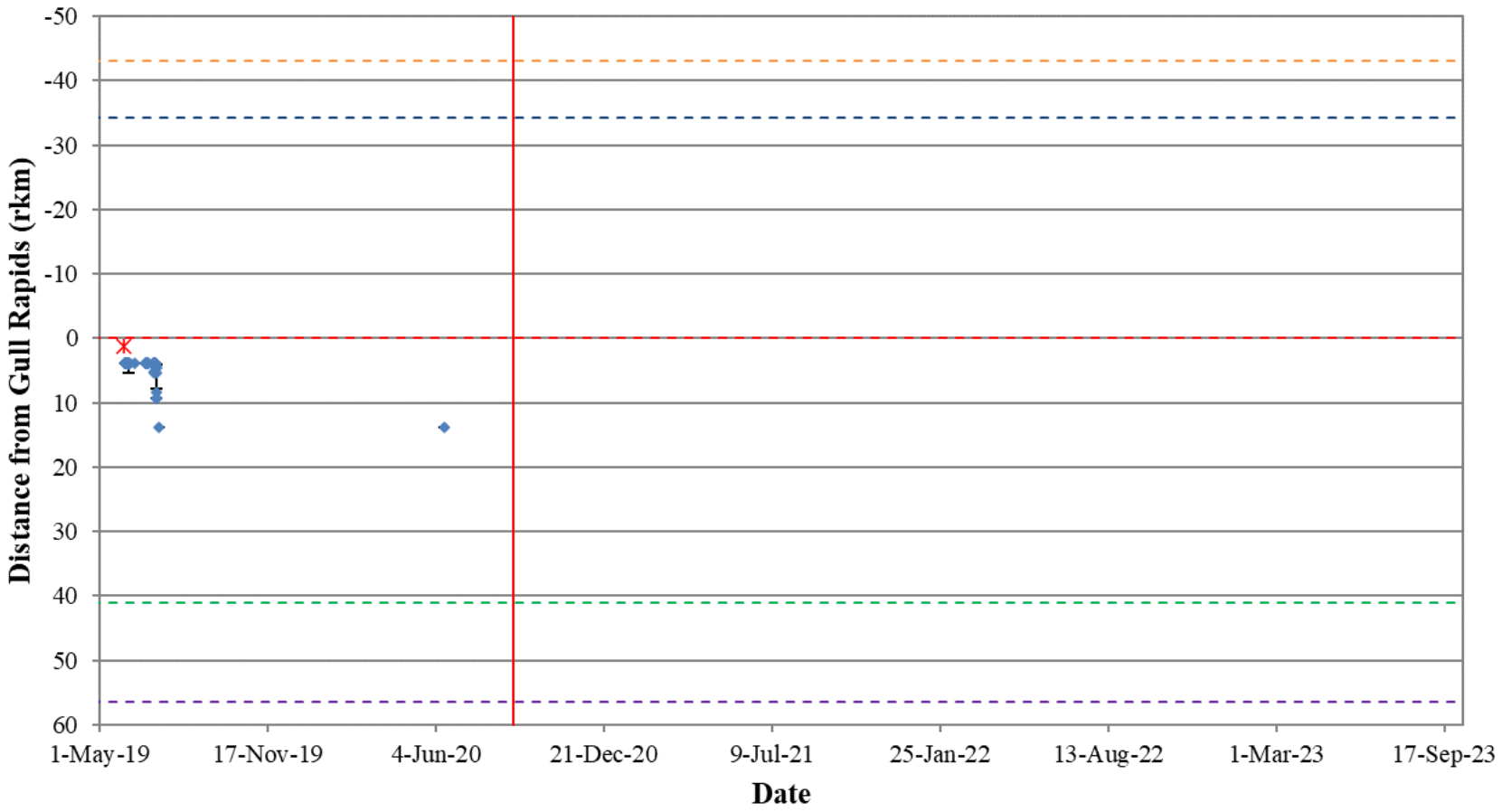

Figure A3-31: Position of a Walleye tagged with an acoustic transmitter (code #20184) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

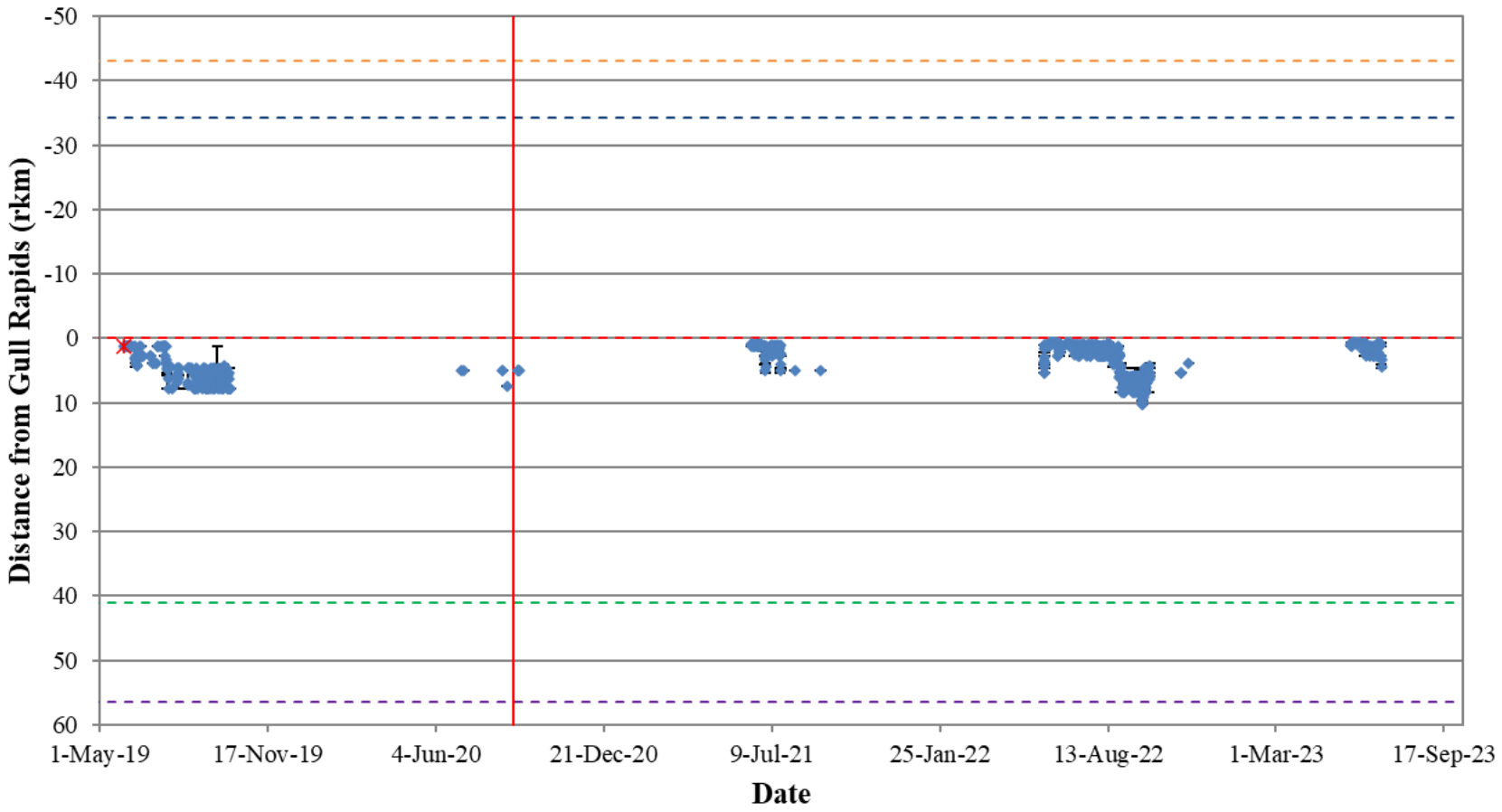

Figure A3-32: Position of a Walleye tagged with an acoustic transmitter (code #20185) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2019 to October 2, 2023. Date and location of tagging is indicated by a star. The end of reservoir impoundment is indicated with a solid vertical red line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

APPENDIX 4:
LOCATION SUMMARY FOR INDIVIDUAL ACOUSTIC TAGGED WALLEYE UPSTREAM OF THE KEEYASK GS IN 2021/2023: MAY 2021 TO OCTOBER 2023

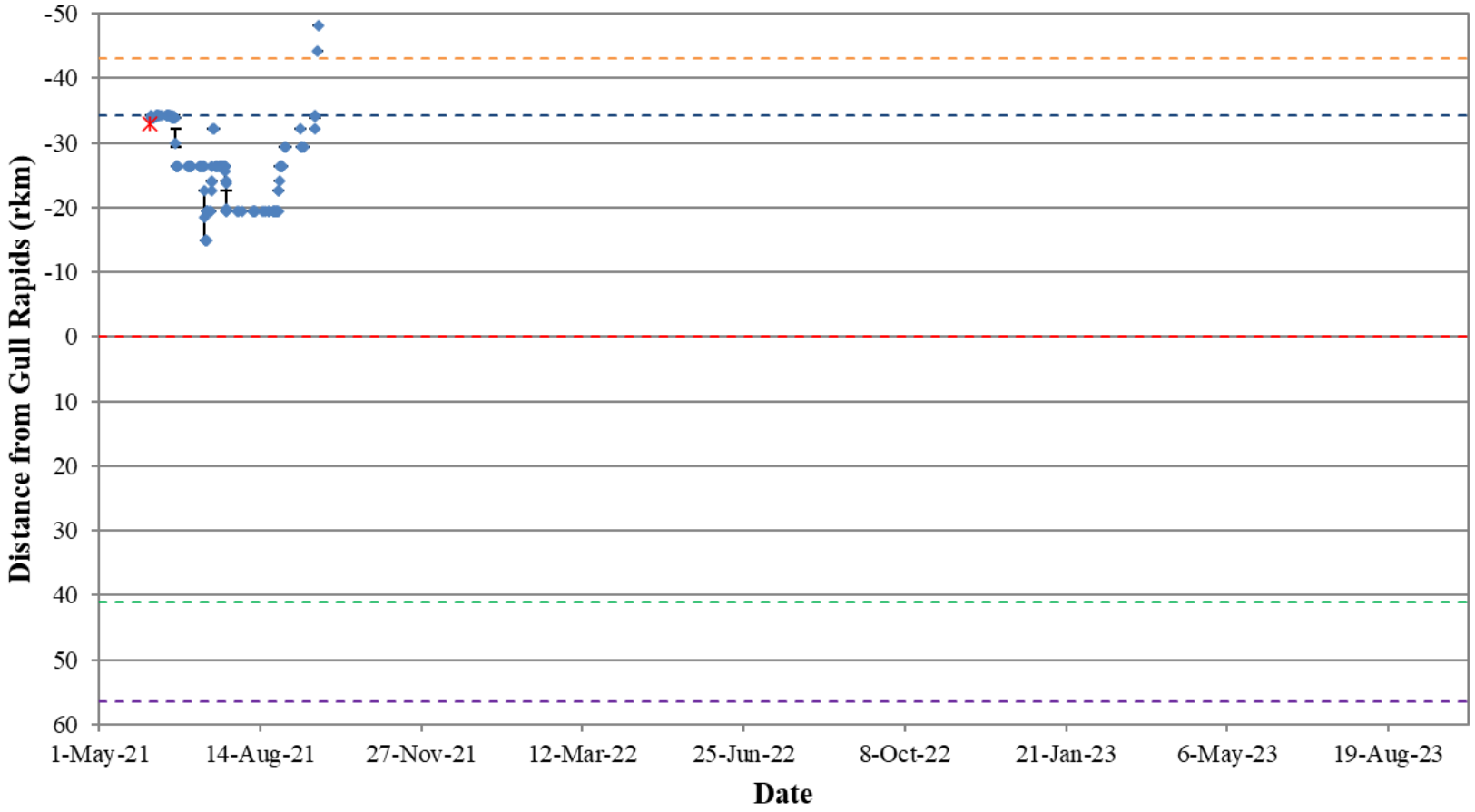

Figure A4-1: Position of a Walleye tagged with an acoustic transmitter (code #48244) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

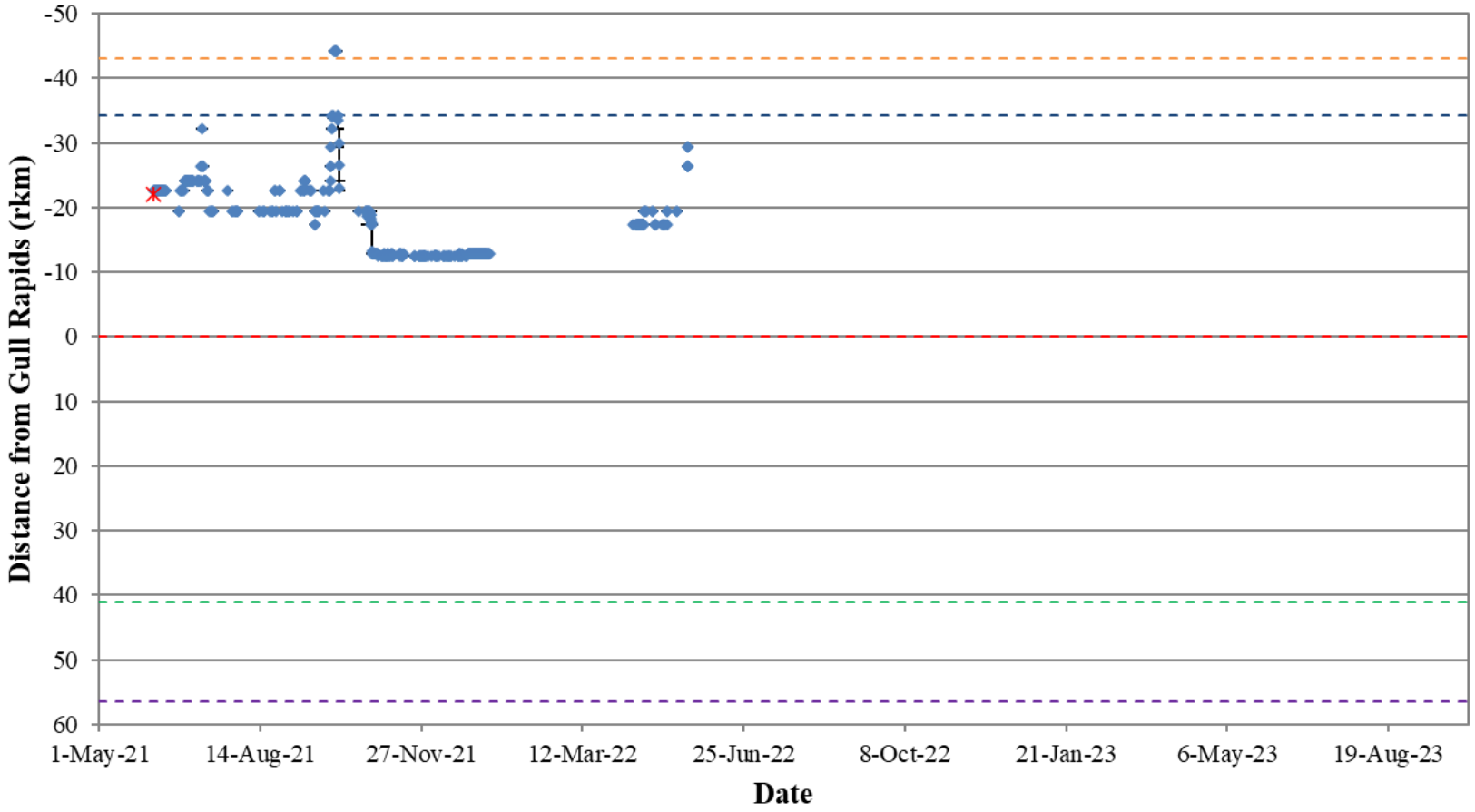

Figure A4-2: Position of a Walleye tagged with an acoustic transmitter (code #48258) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

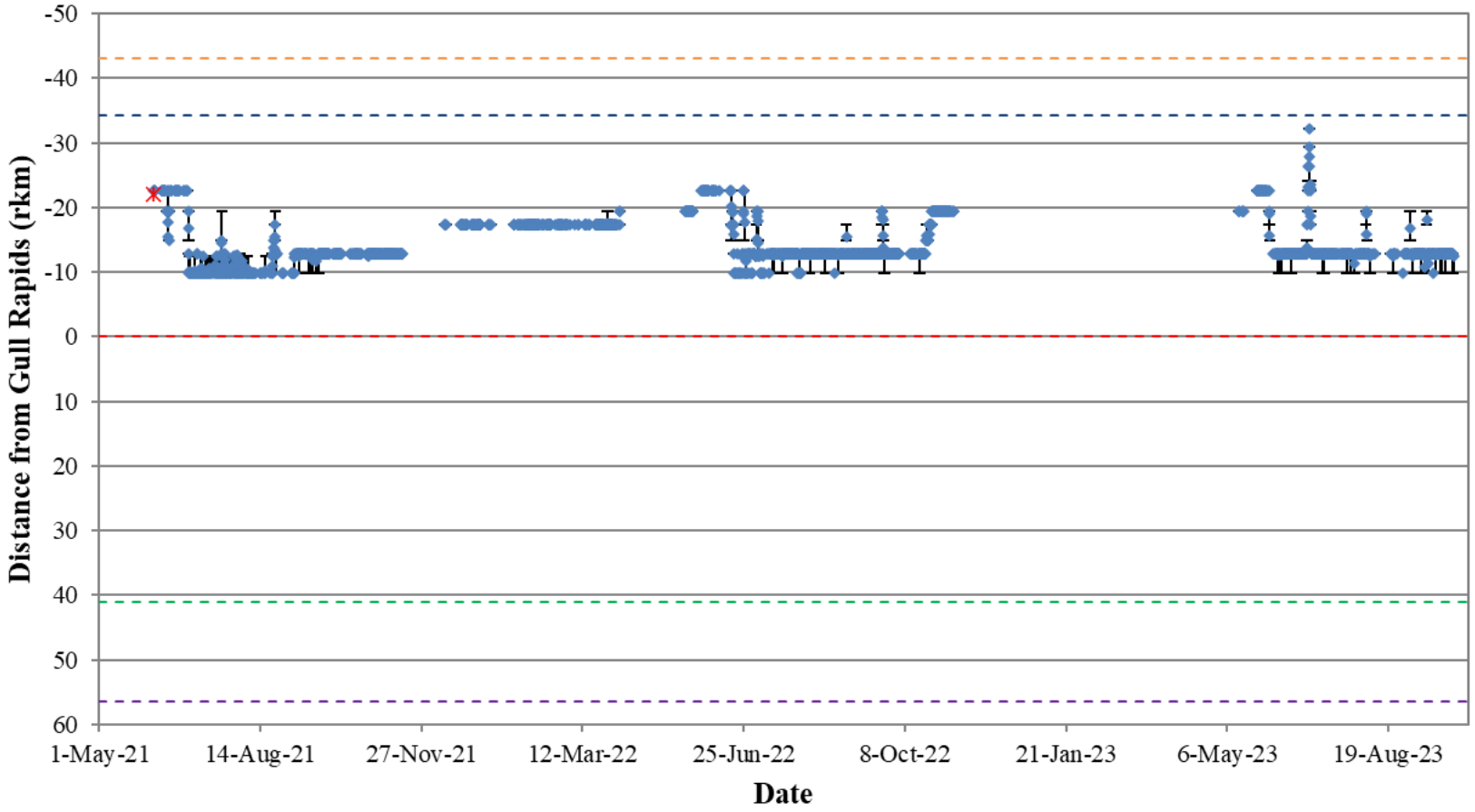

Figure A4-3: Position of a Walleye tagged with an acoustic transmitter (code #48259) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

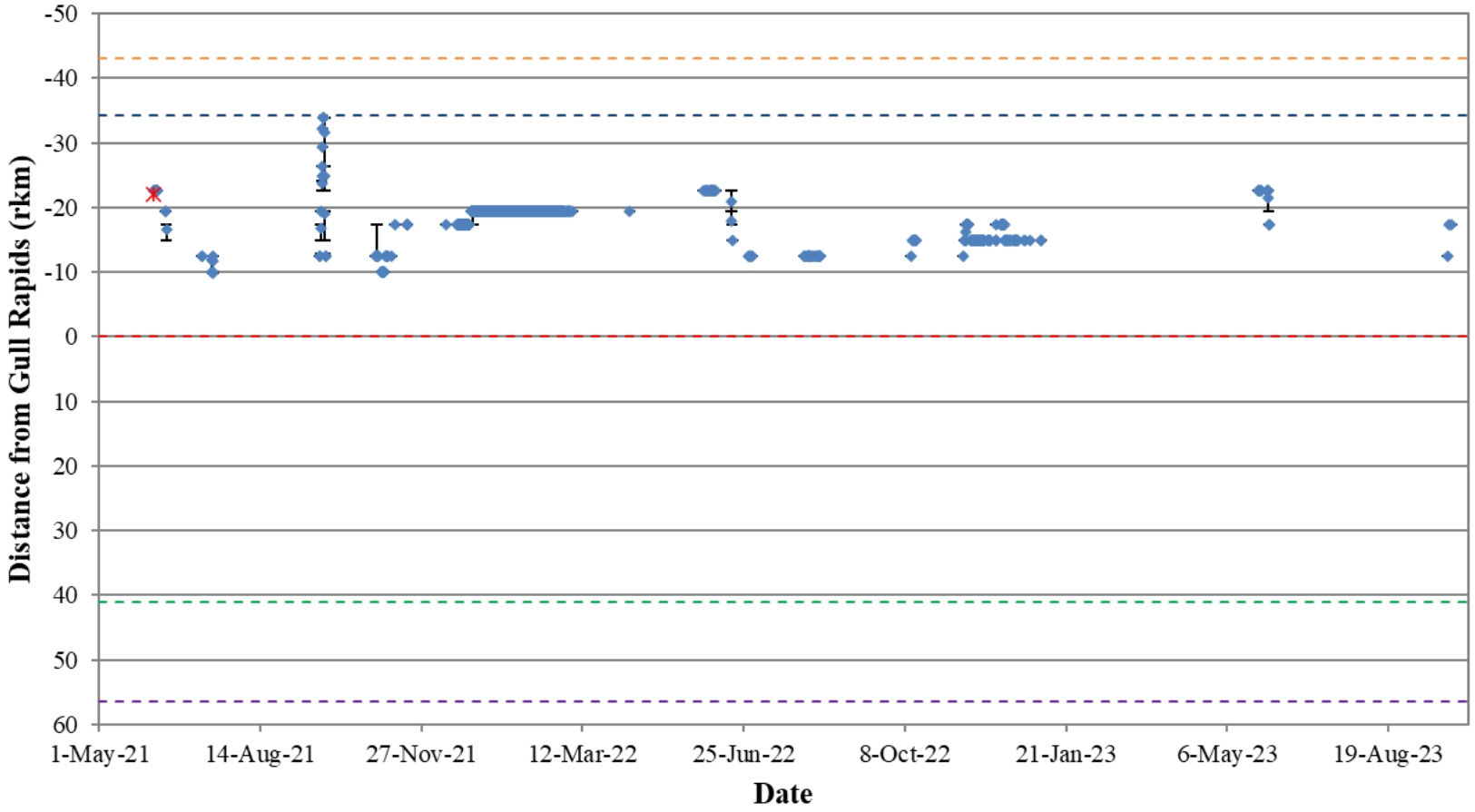

Figure A4-4: Position of a Walleye tagged with an acoustic transmitter (code #48260) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

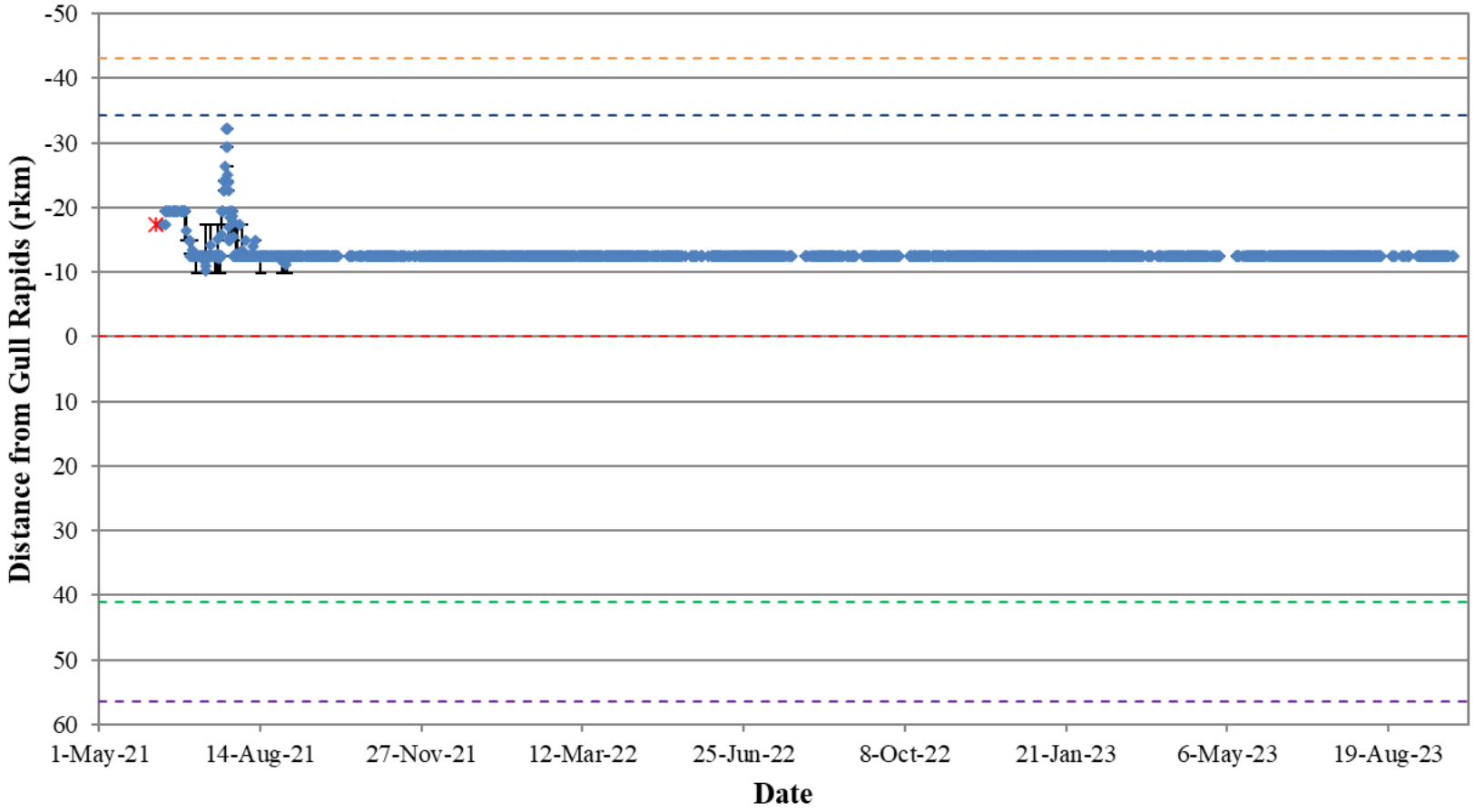

Figure A4-5: Position of a Walleye tagged with an acoustic transmitter (code #48261) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

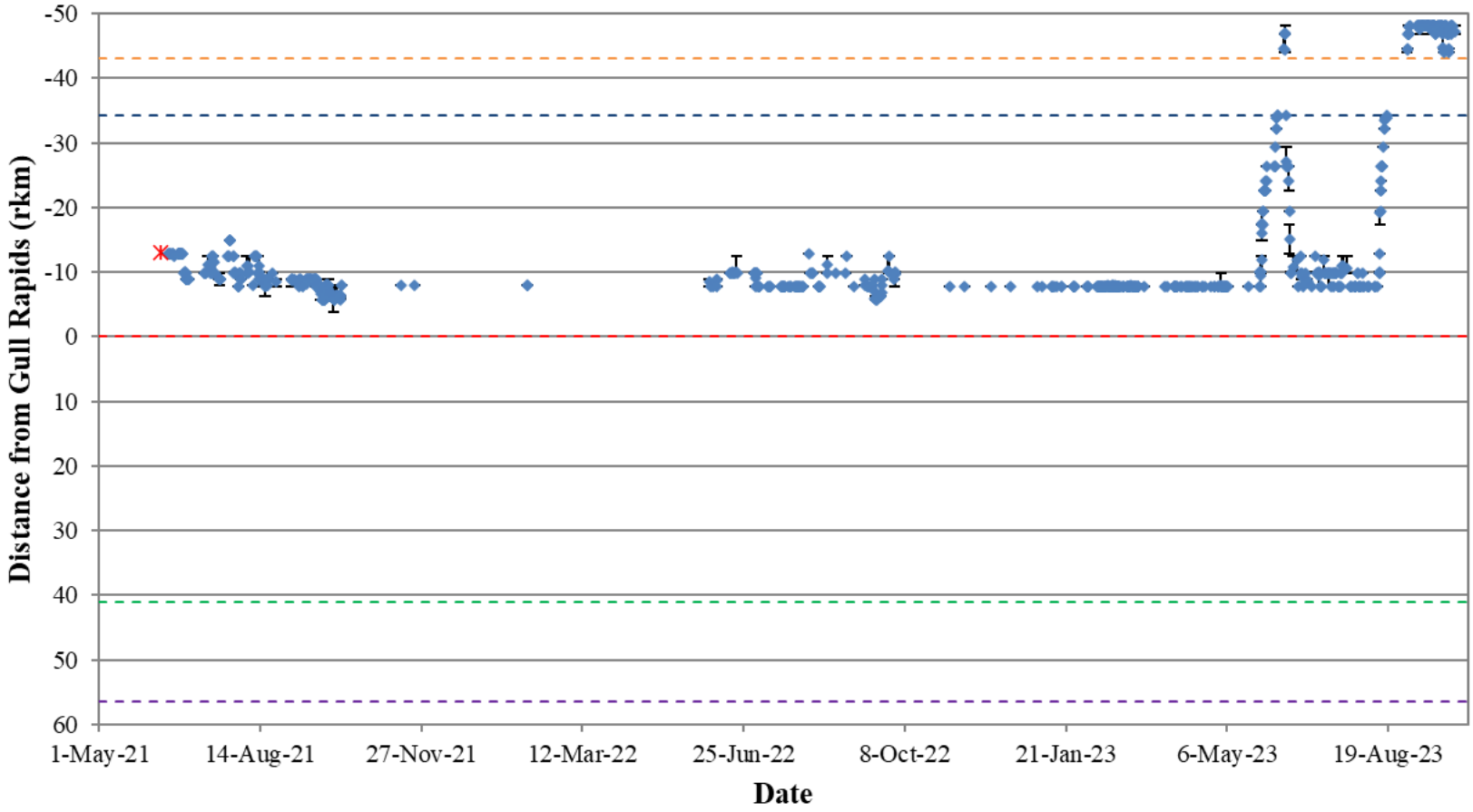

Figure A4-6: Position of a Walleye tagged with an acoustic transmitter (code #48262) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

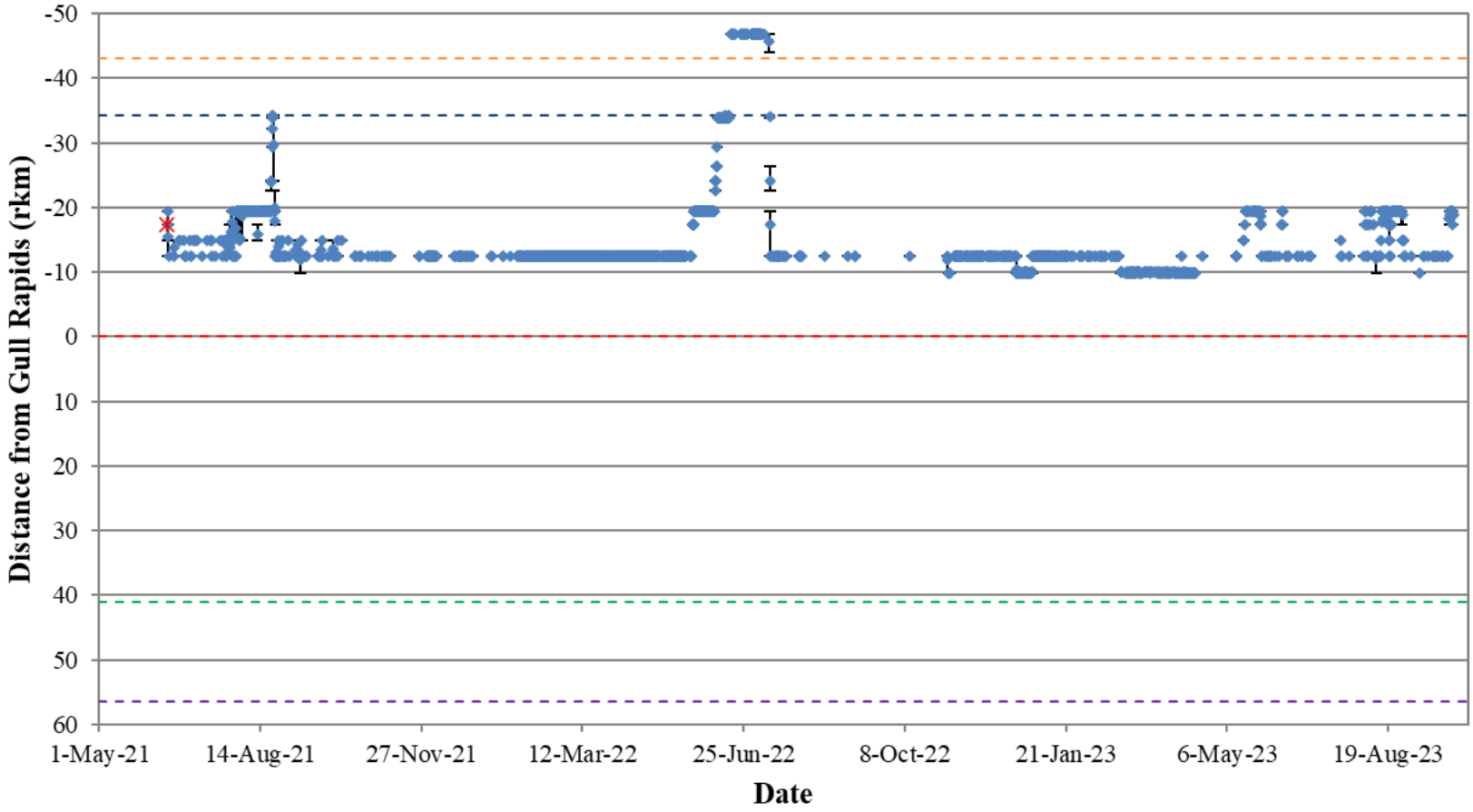

Figure A4-7: Position of a Walleye tagged with an acoustic transmitter (code #48263) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

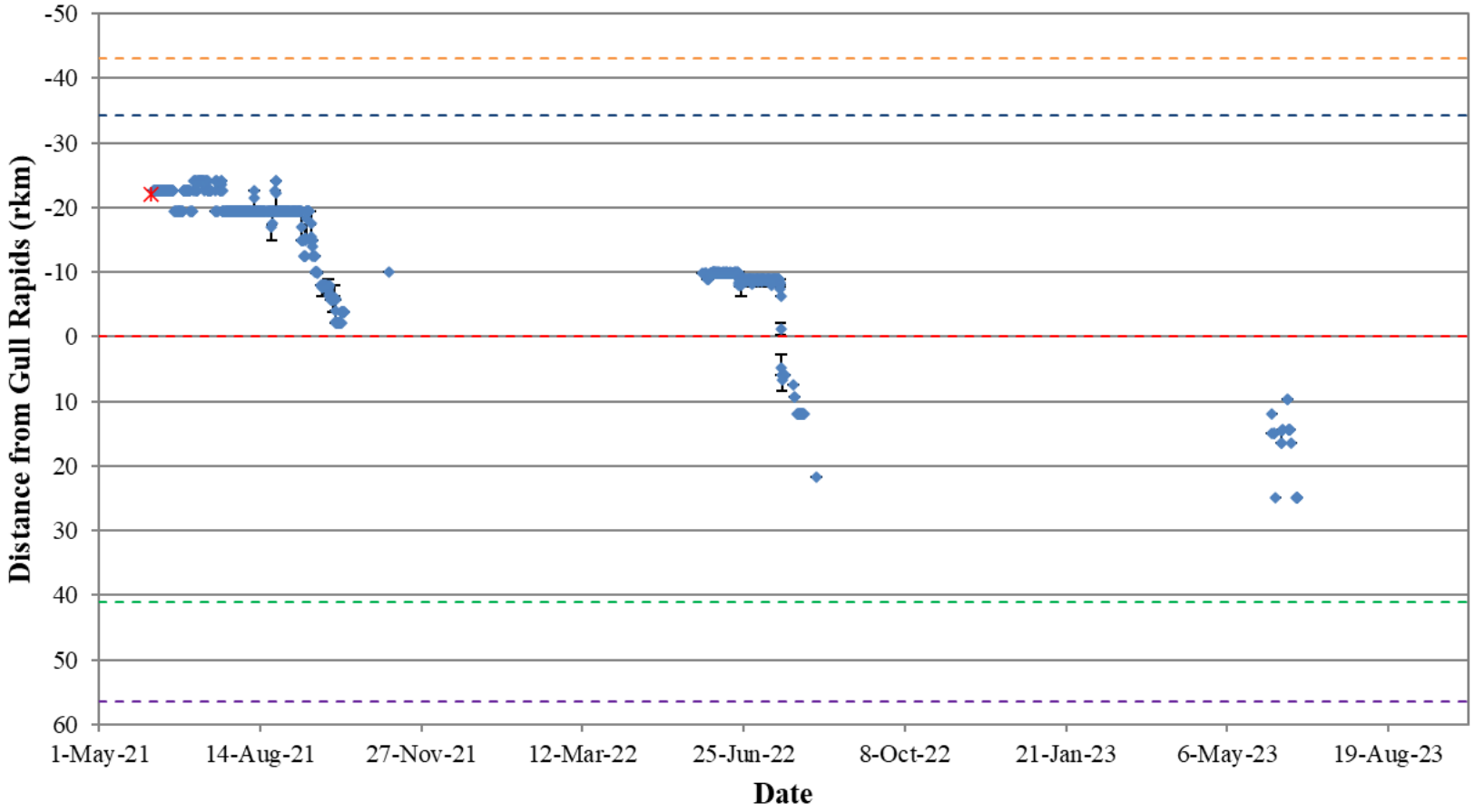

Figure A4-8: Position of a Walleye tagged with an acoustic transmitter (code #48264) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

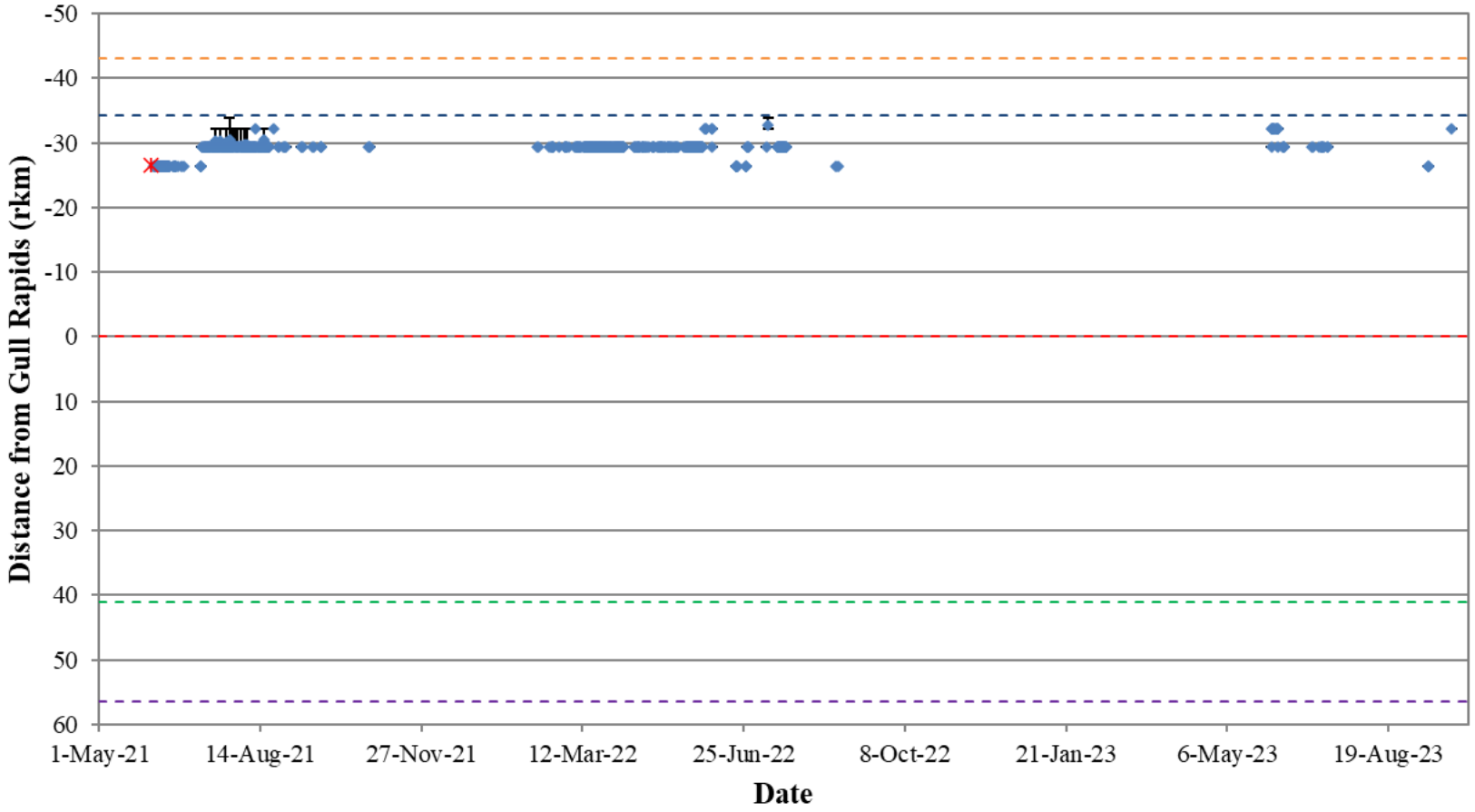

Figure A4-9: Position of a Walleye tagged with an acoustic transmitter (code #48265) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

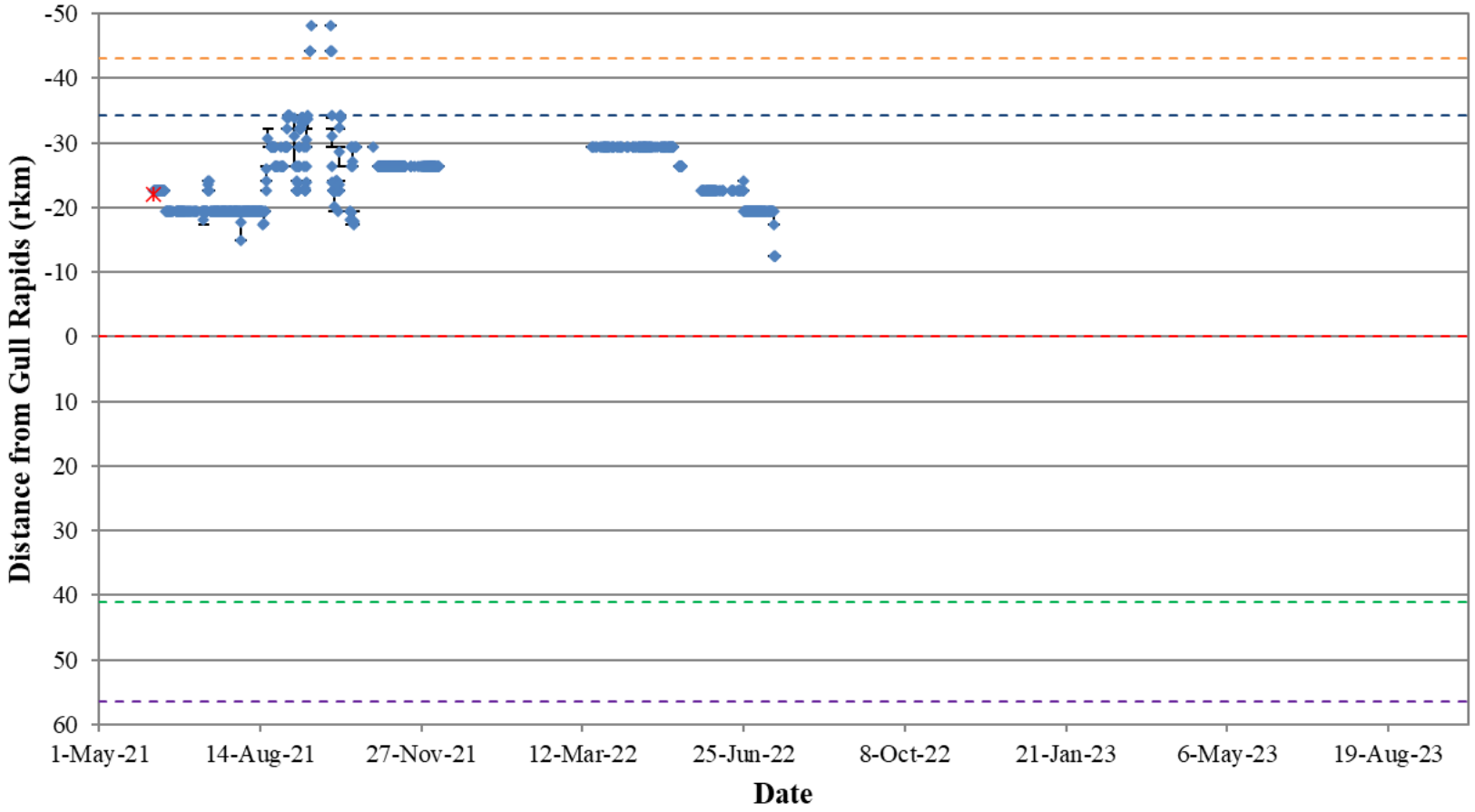

Figure A4-10: Position of a Walleye tagged with an acoustic transmitter (code #48266) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

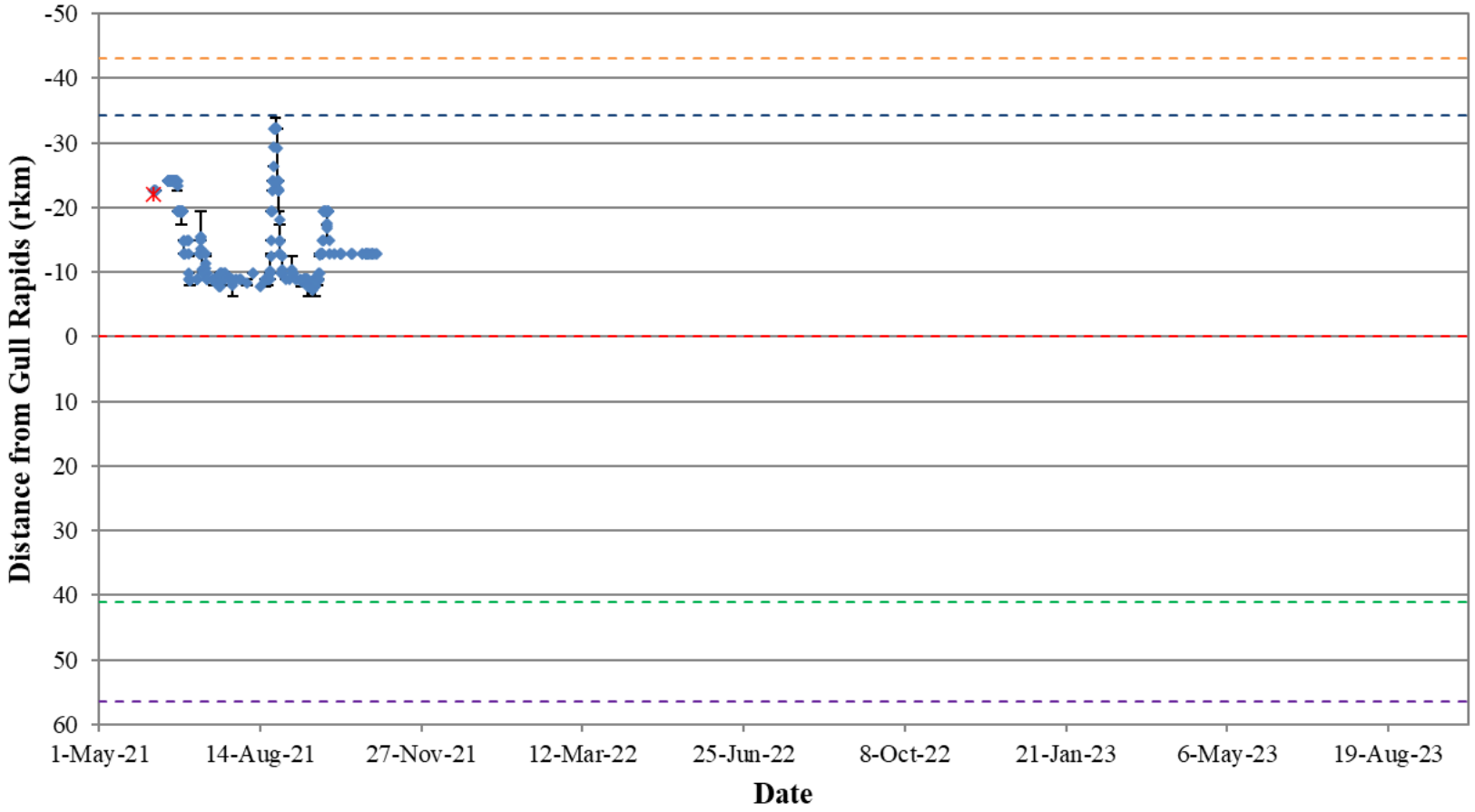

Figure A4-11: Position of a Walleye tagged with an acoustic transmitter (code #48267) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

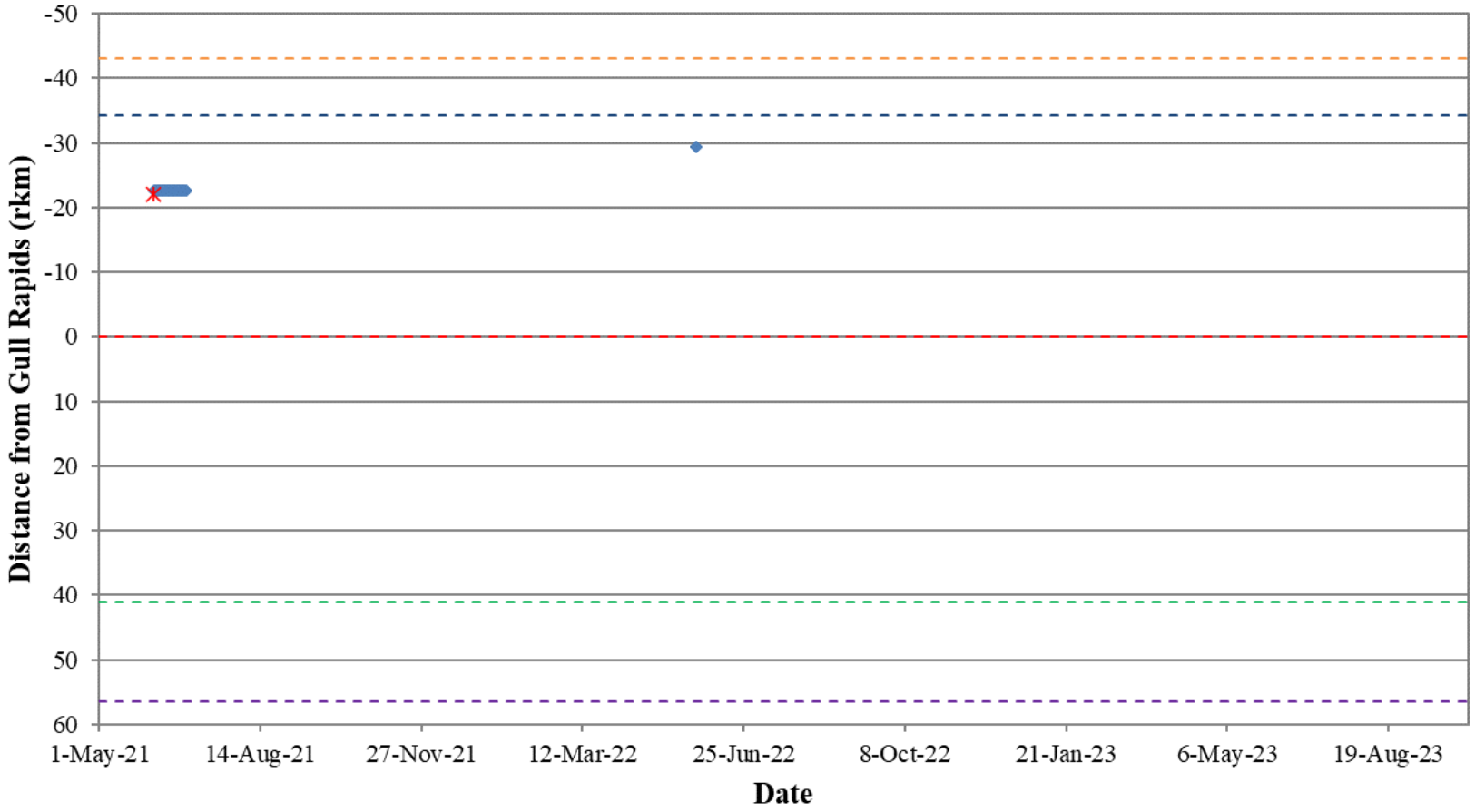

Figure A4-12: Position of a Walleye tagged with an acoustic transmitter (code #48268) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

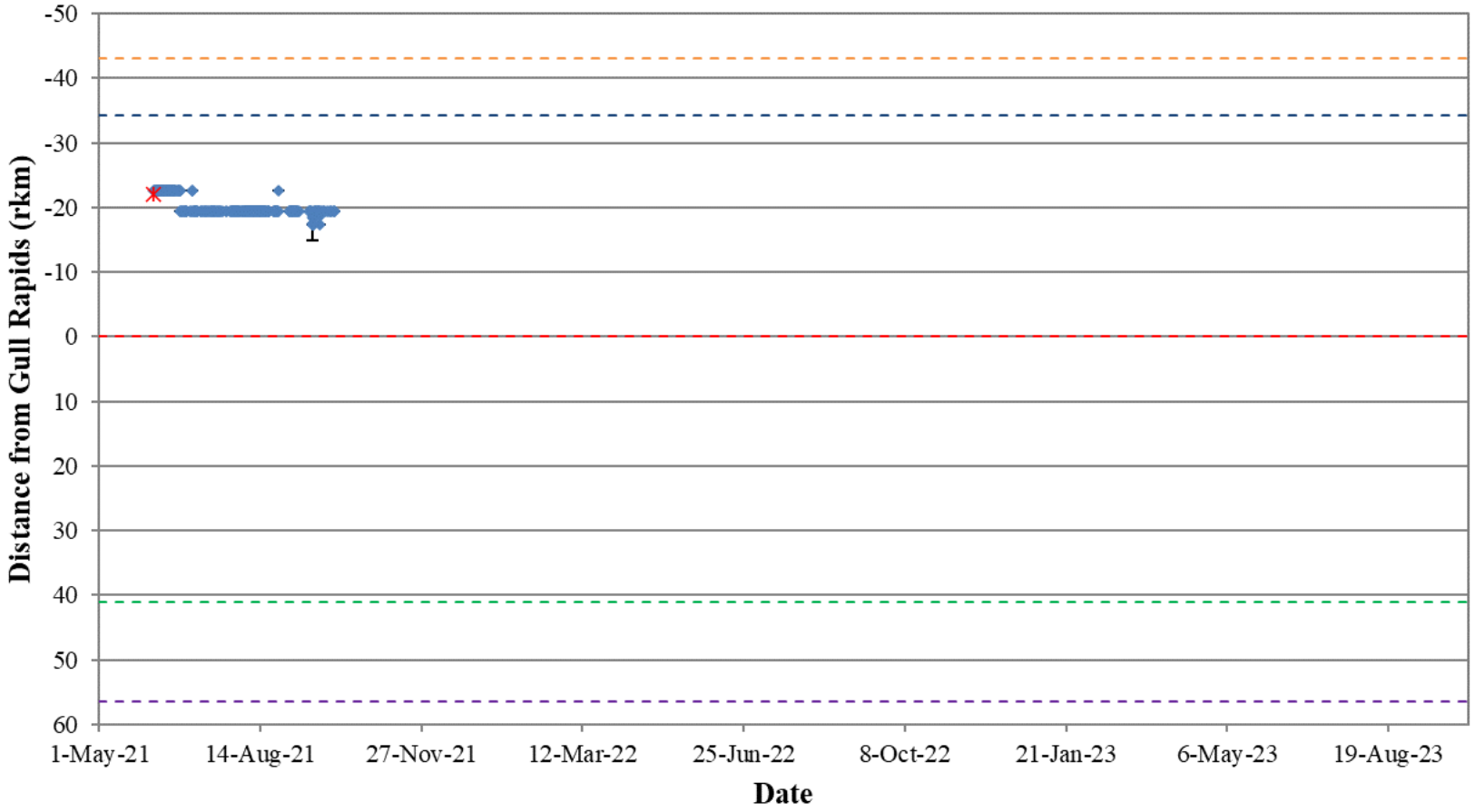

Figure A4-13: Position of a Walleye tagged with an acoustic transmitter (code #48269) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

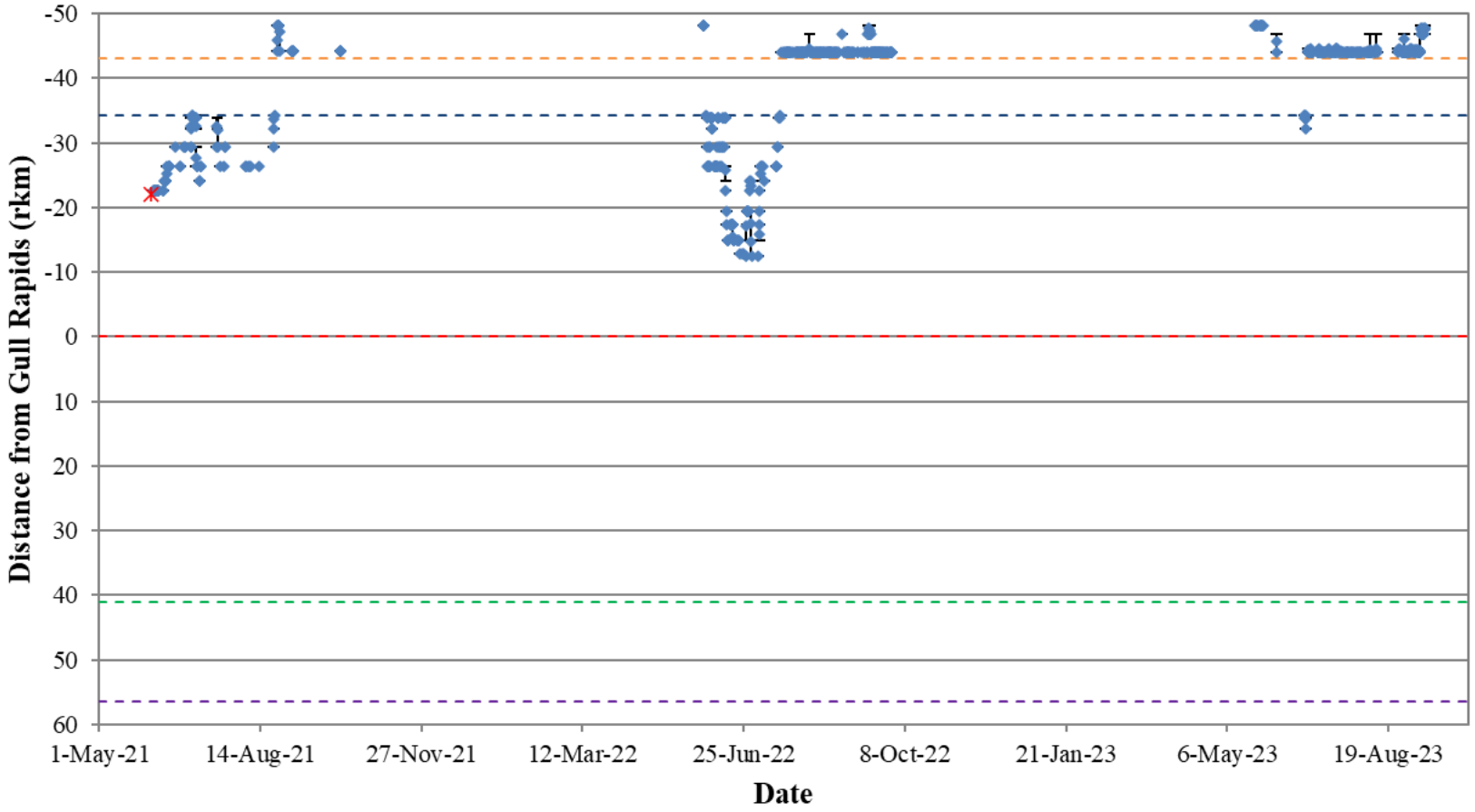

Figure A4-14: Position of a Walleye tagged with an acoustic transmitter (code #48270) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

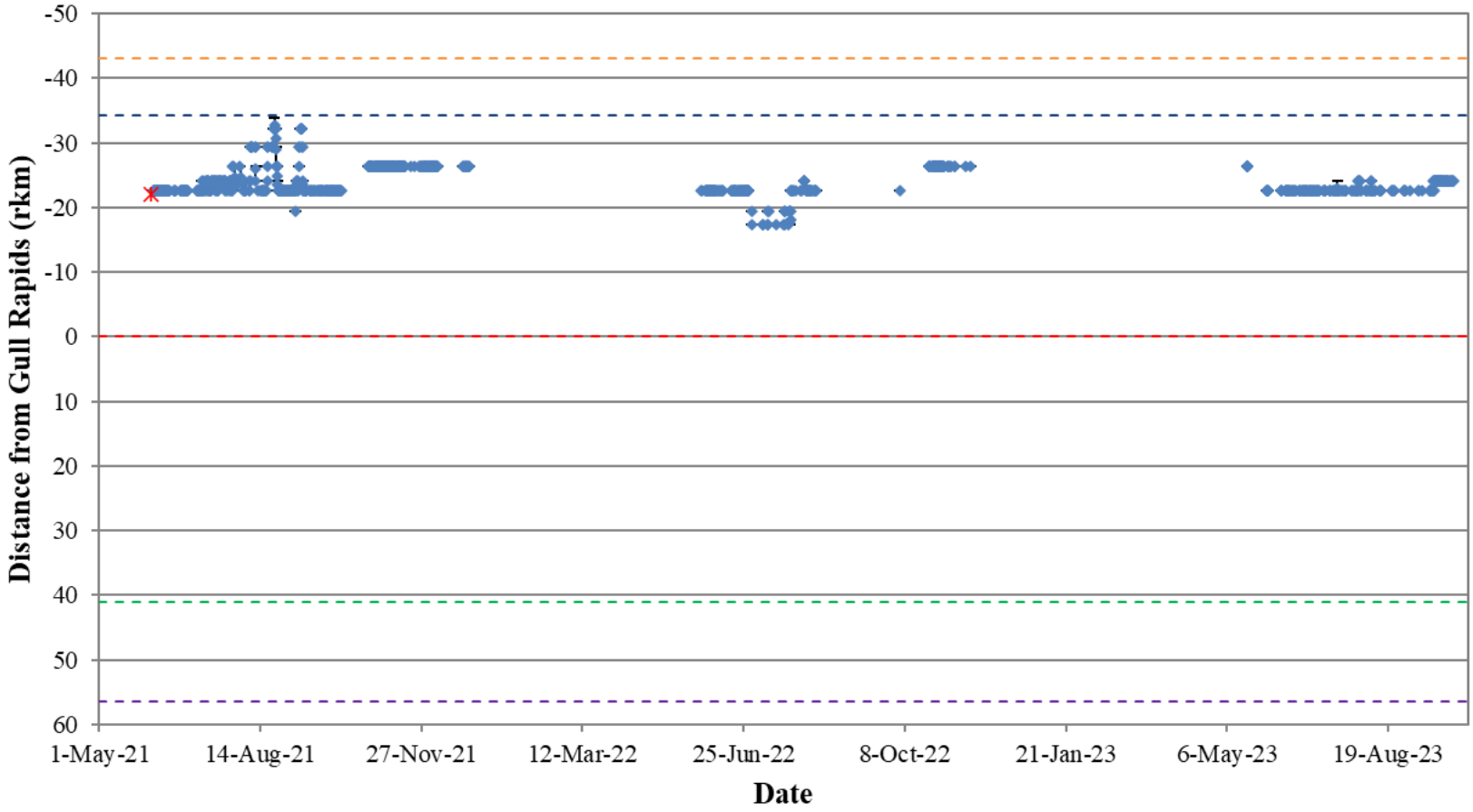

Figure A4-15: Position of a Walleye tagged with an acoustic transmitter (code #48271) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

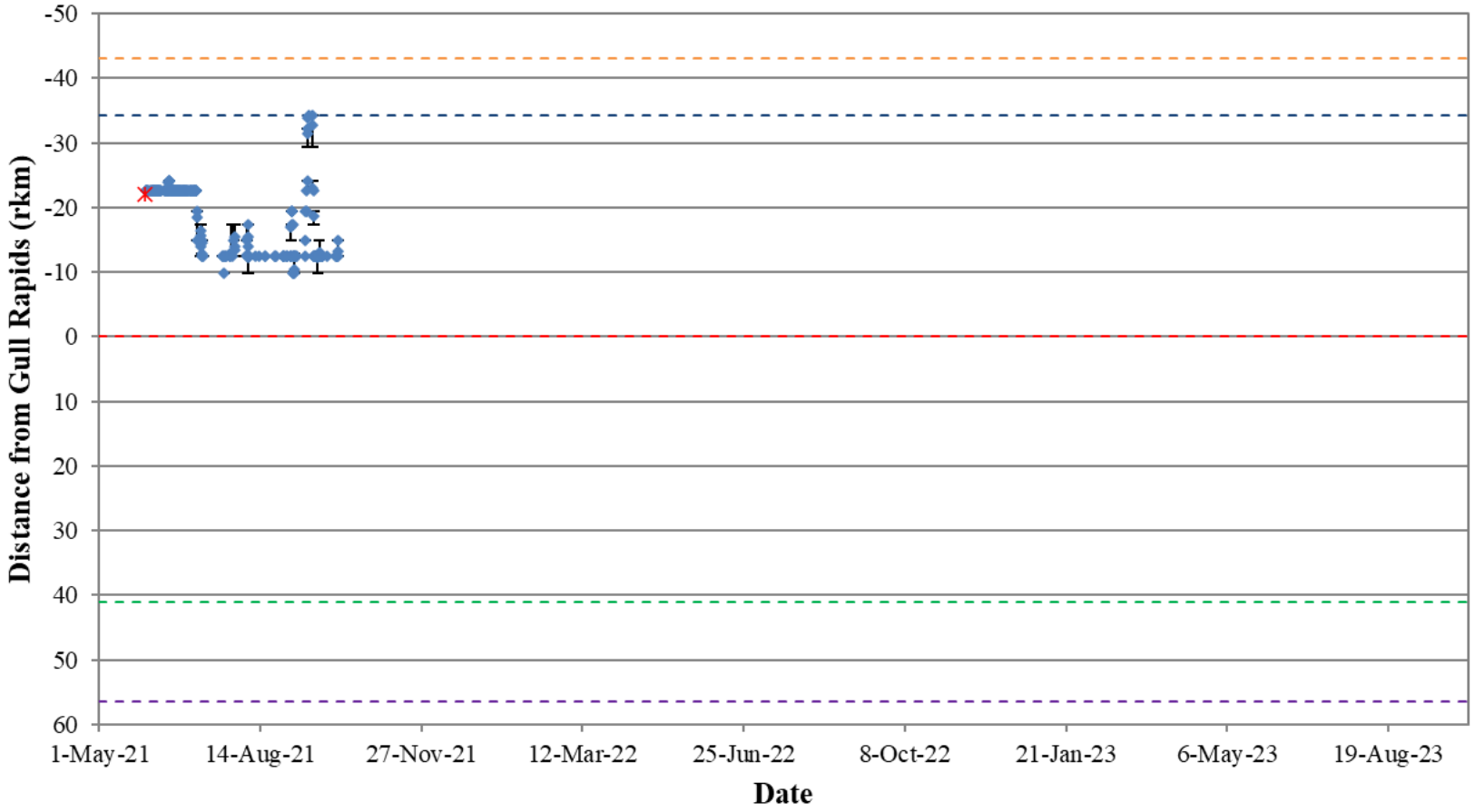

Figure A4-16: Position of a Walleye tagged with an acoustic transmitter (code #48276) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

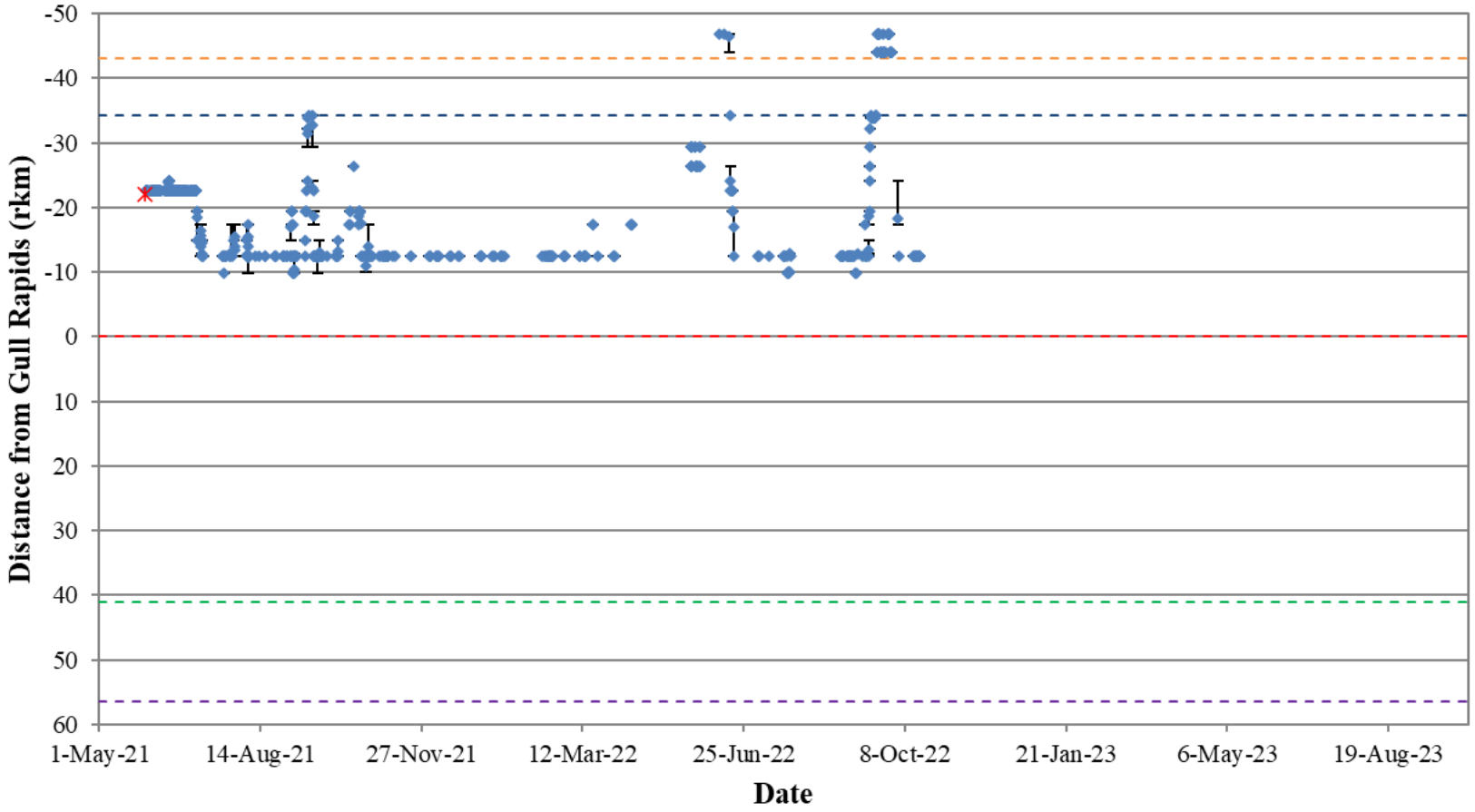

Figure A4-17: Position of a Walleye tagged with an acoustic transmitter (code #48313) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

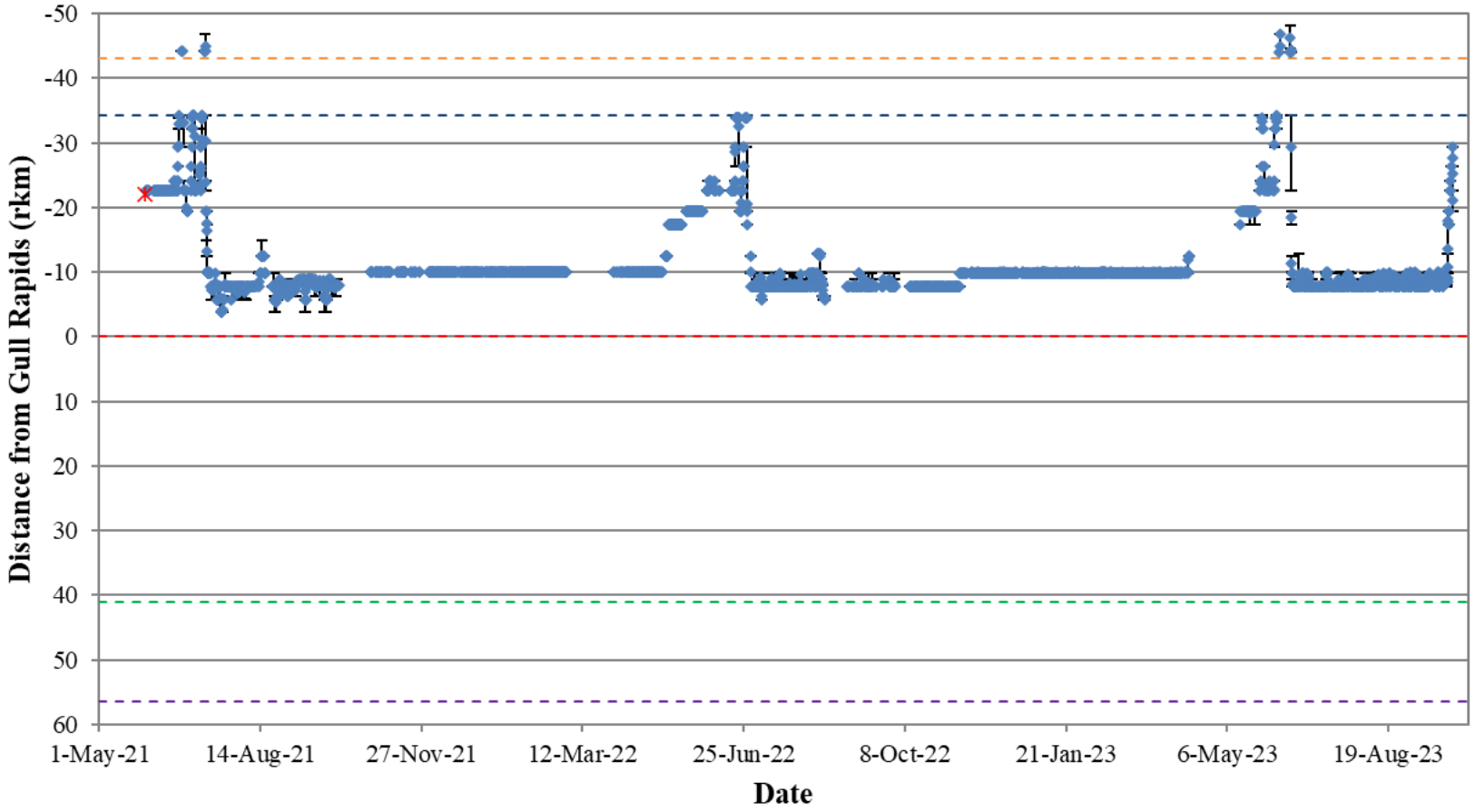

Figure A4-18: Position of a Walleye tagged with an acoustic transmitter (code #48314) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

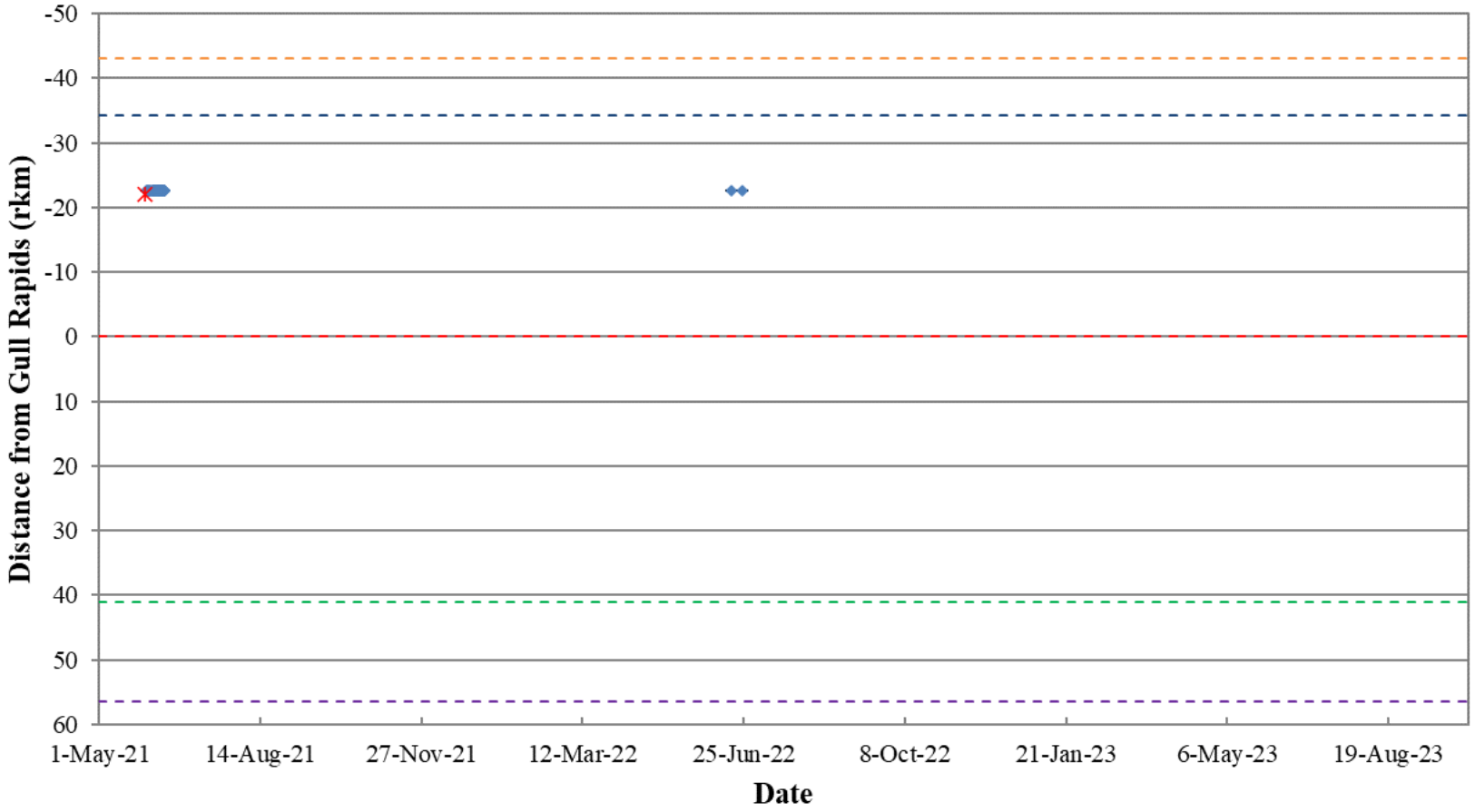

Figure A4-19: Position of a Walleye tagged with an acoustic transmitter (code #48319) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

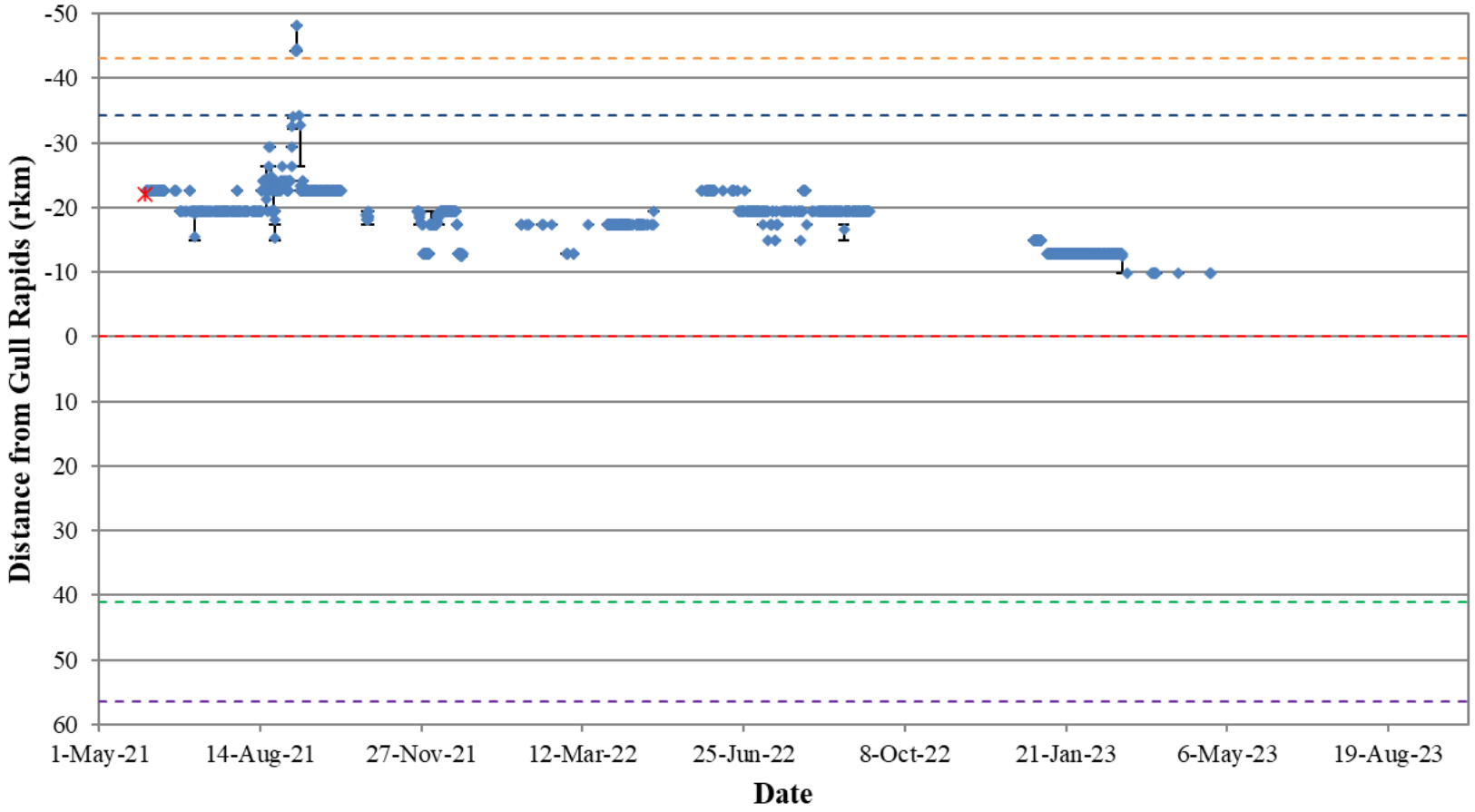

Figure A4-20: Position of a Walleye tagged with an acoustic transmitter (code #48320) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

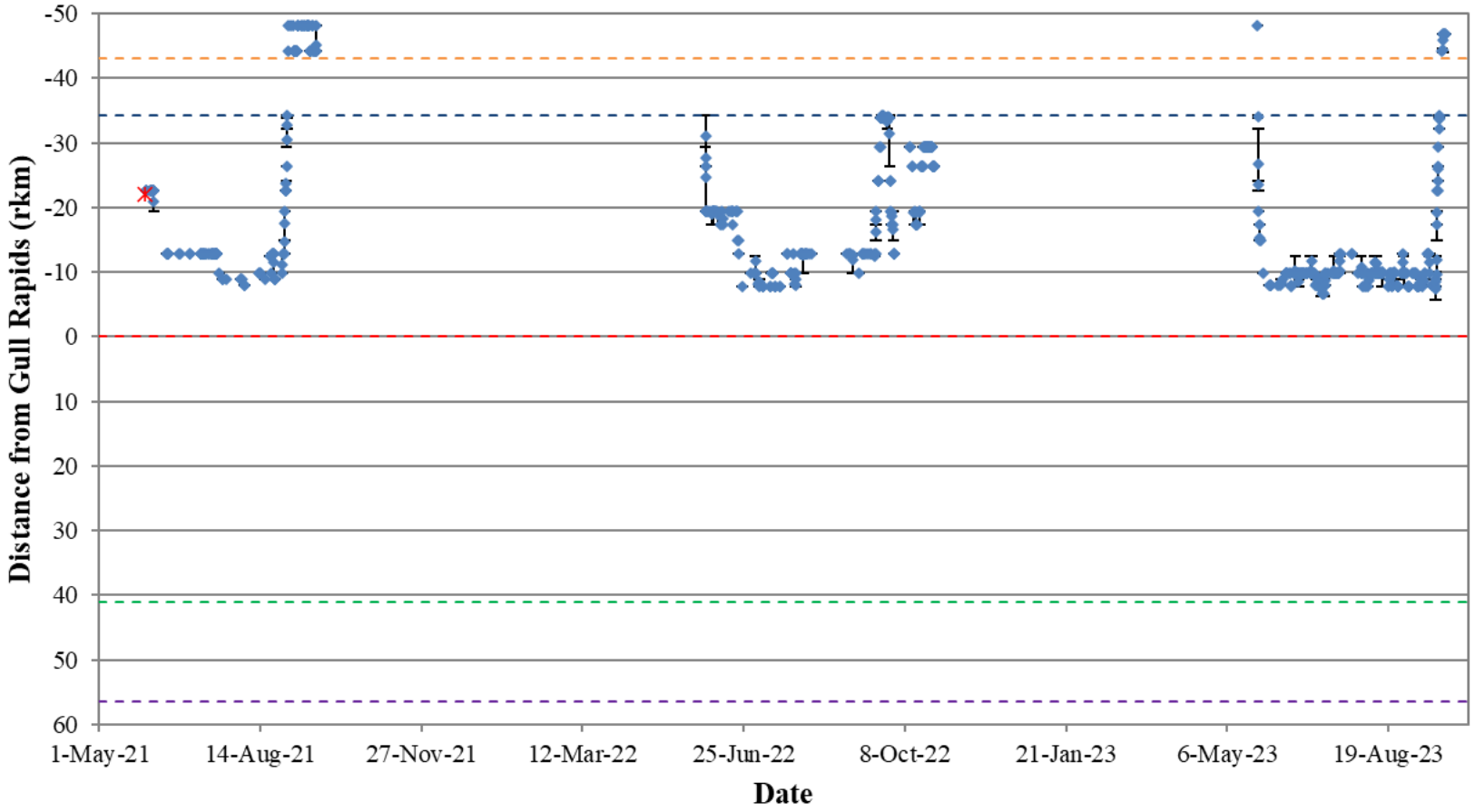

Figure A4-21: Position of a Walleye tagged with an acoustic transmitter (code #48321) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

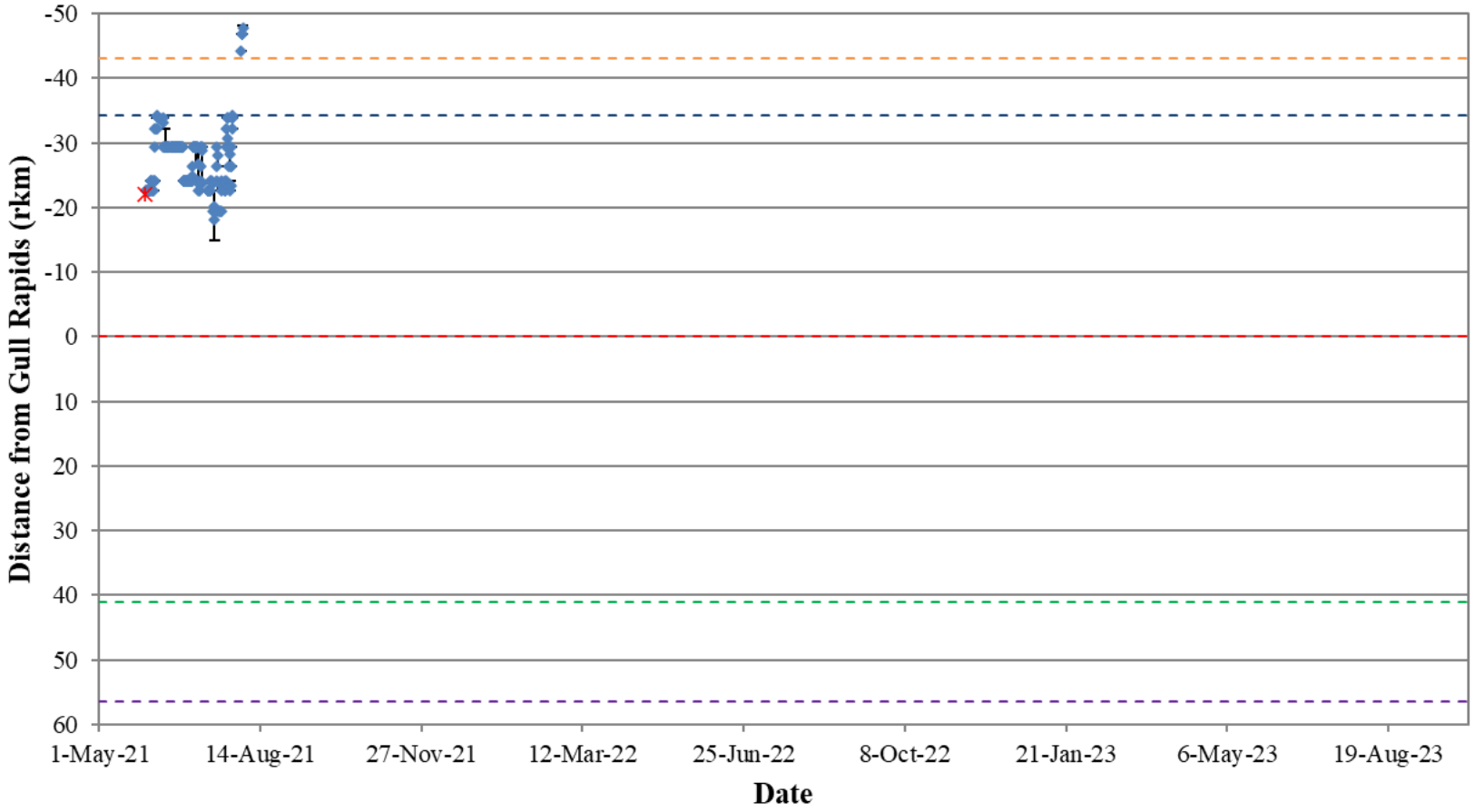

Figure A4-22: Position of a Walleye tagged with an acoustic transmitter (code #48322) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

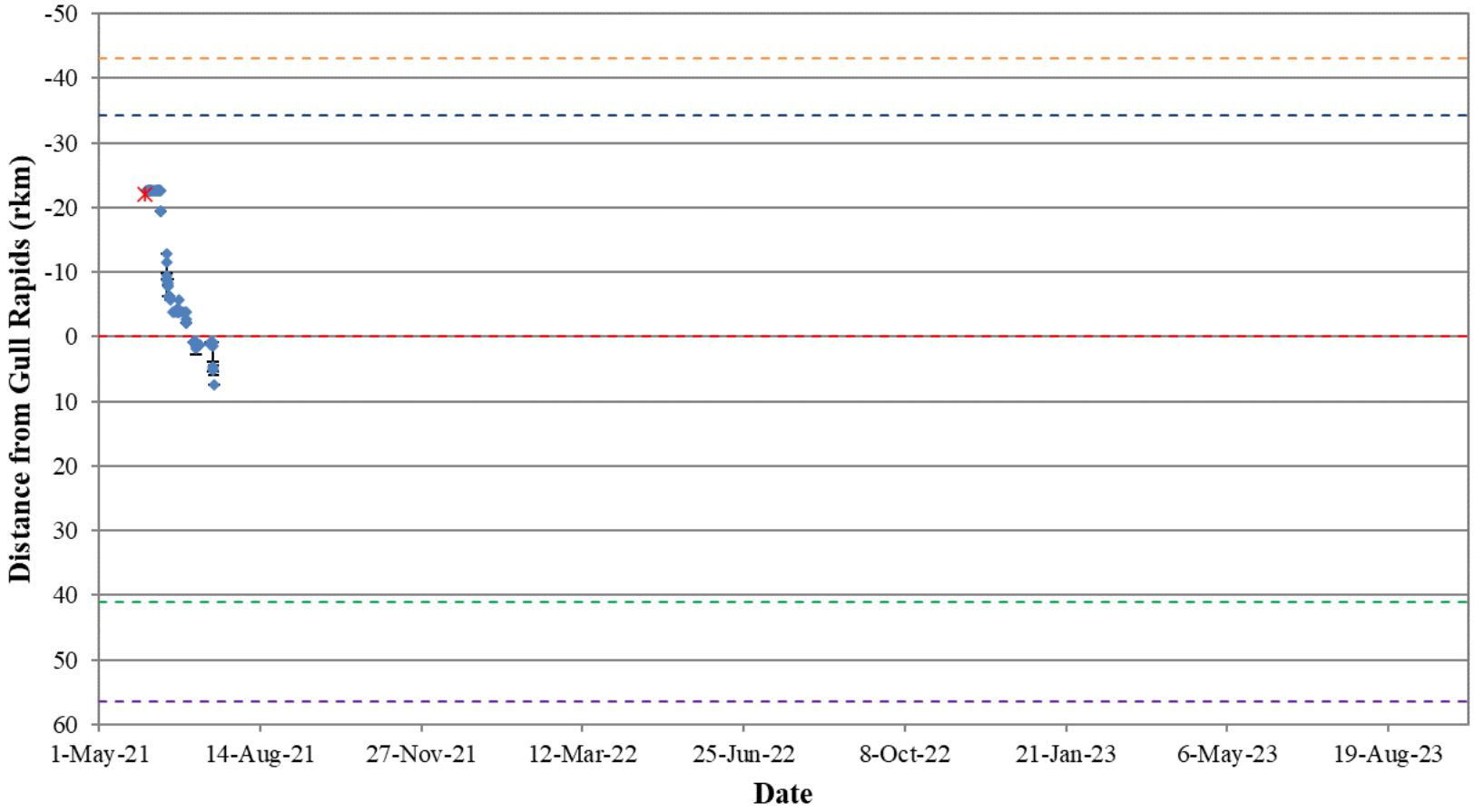

Figure A4-23: Position of a Walleye tagged with an acoustic transmitter (code #48323) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

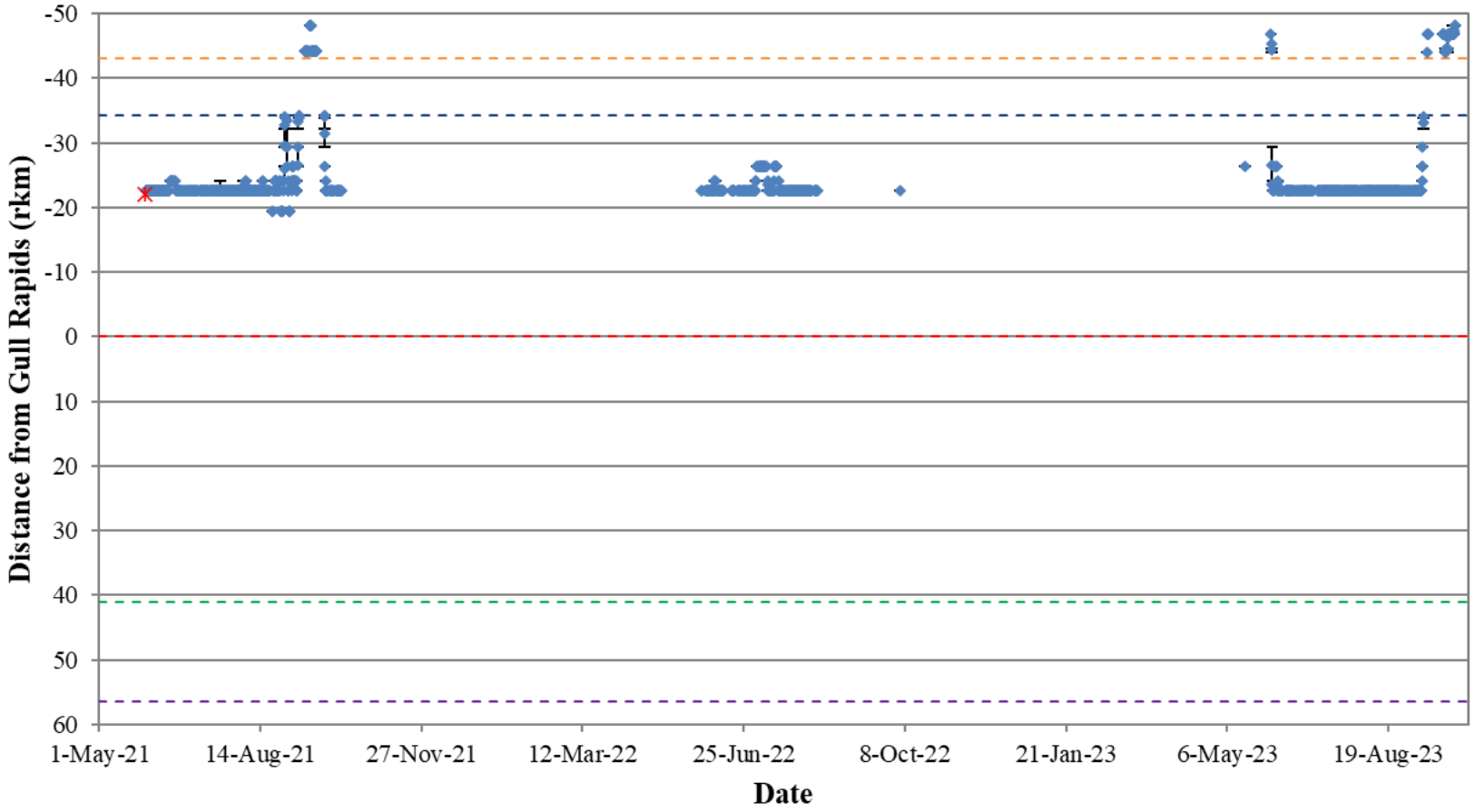

Figure A4-24: Position of a Walleye tagged with an acoustic transmitter (code #48326) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

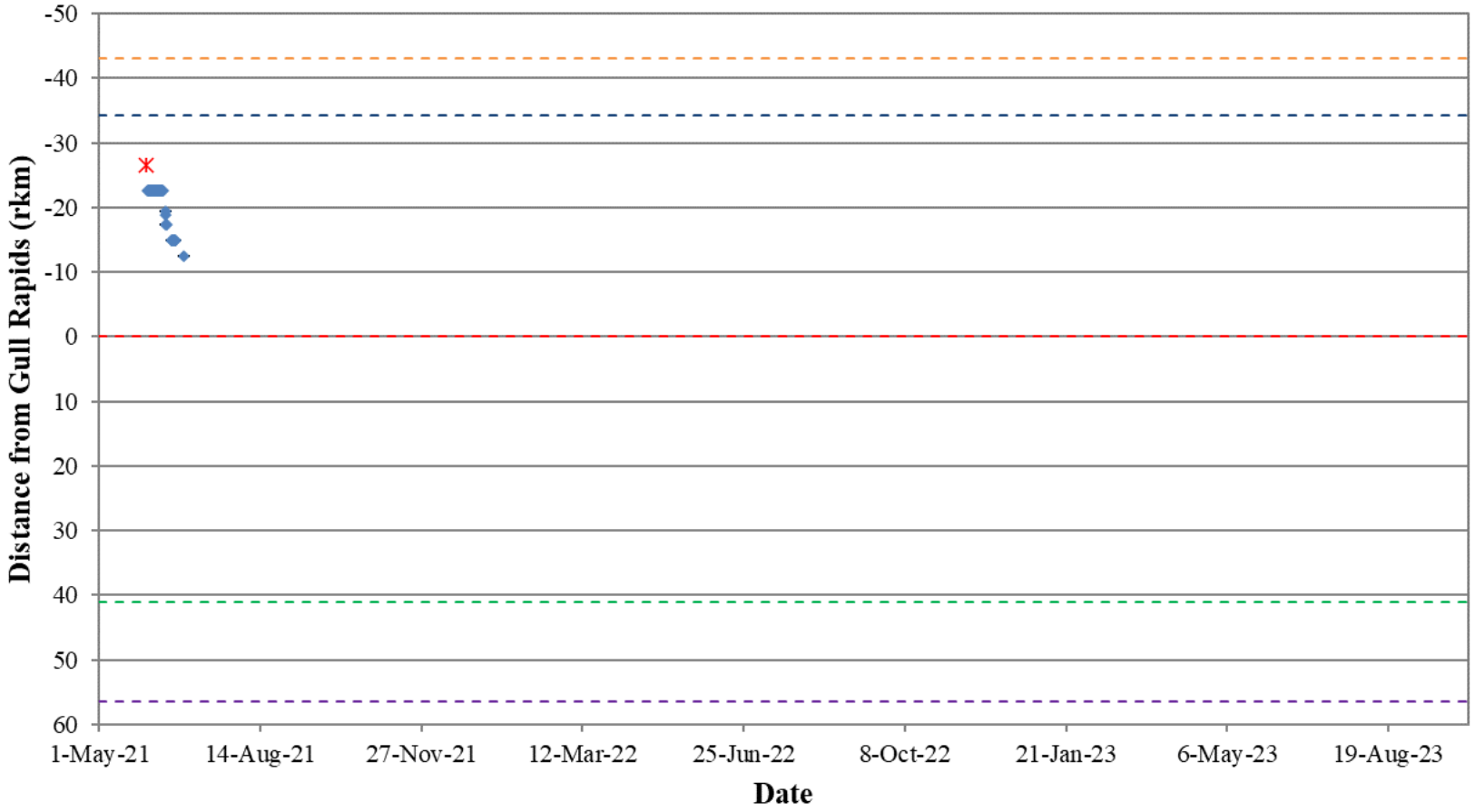

Figure A4-25: Position of a Walleye tagged with an acoustic transmitter (code #48327) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

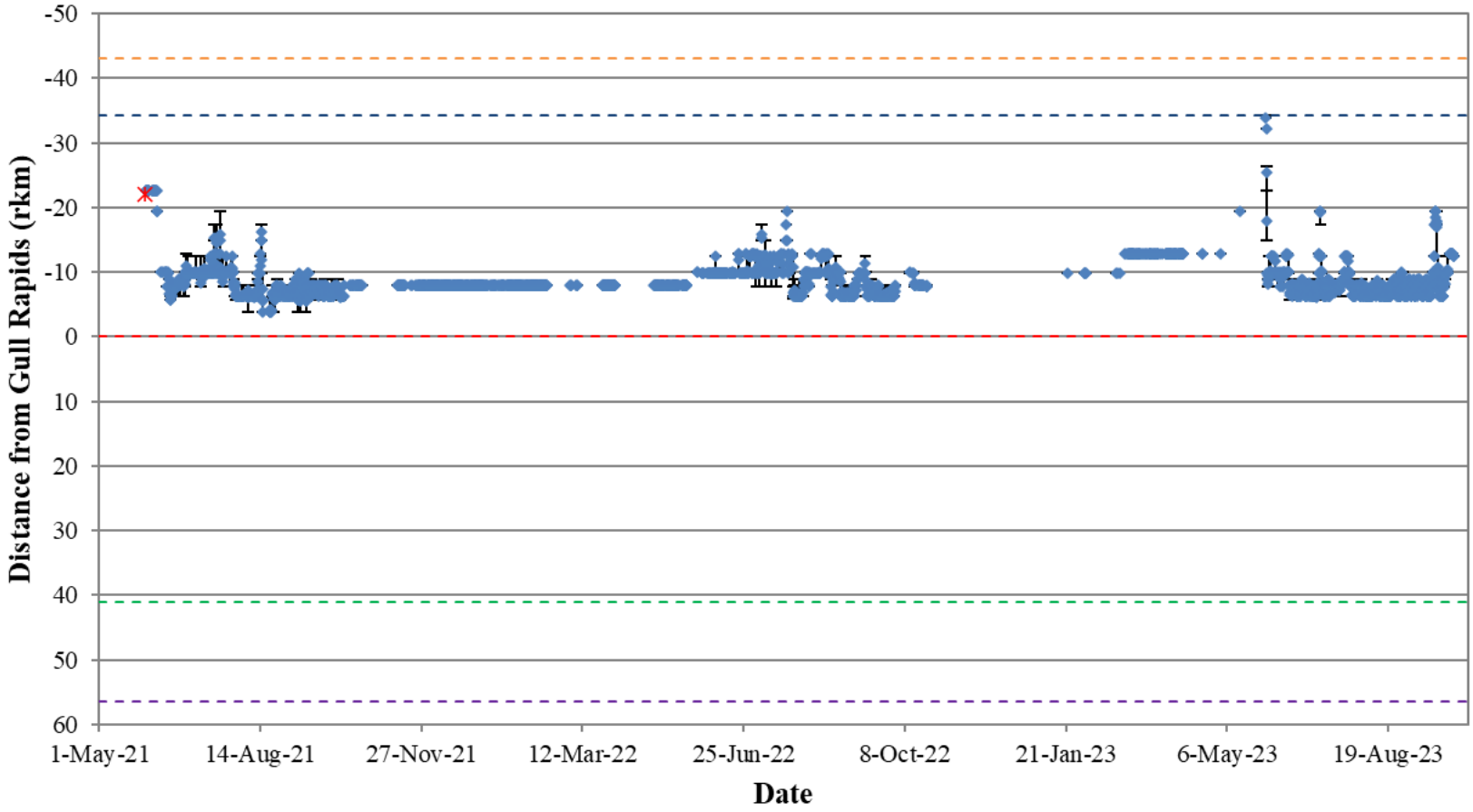

Figure A4-26: Position of a Walleye tagged with an acoustic transmitter (code #48328) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

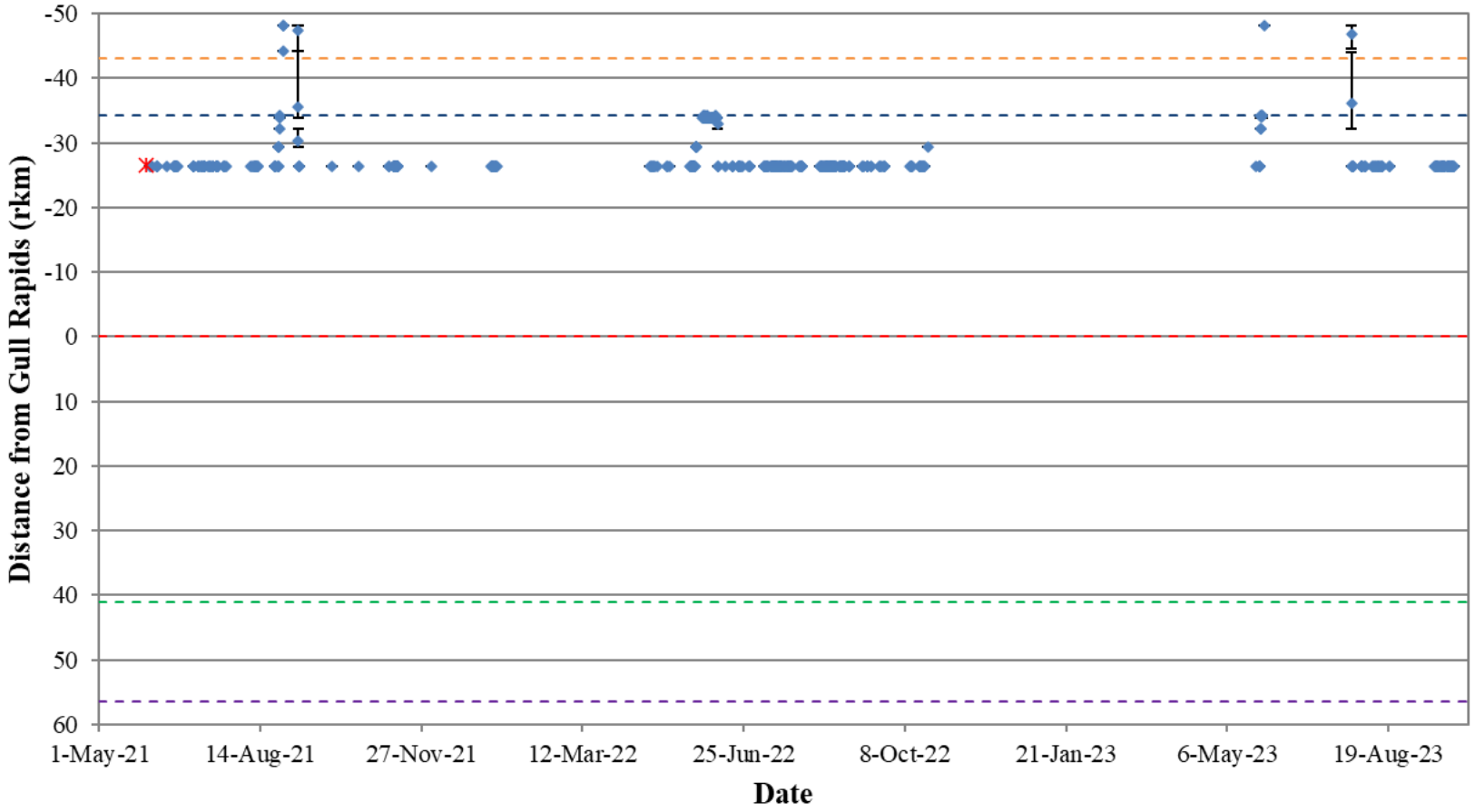

Figure A4-27: Position of a Walleye tagged with an acoustic transmitter (code #48329) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

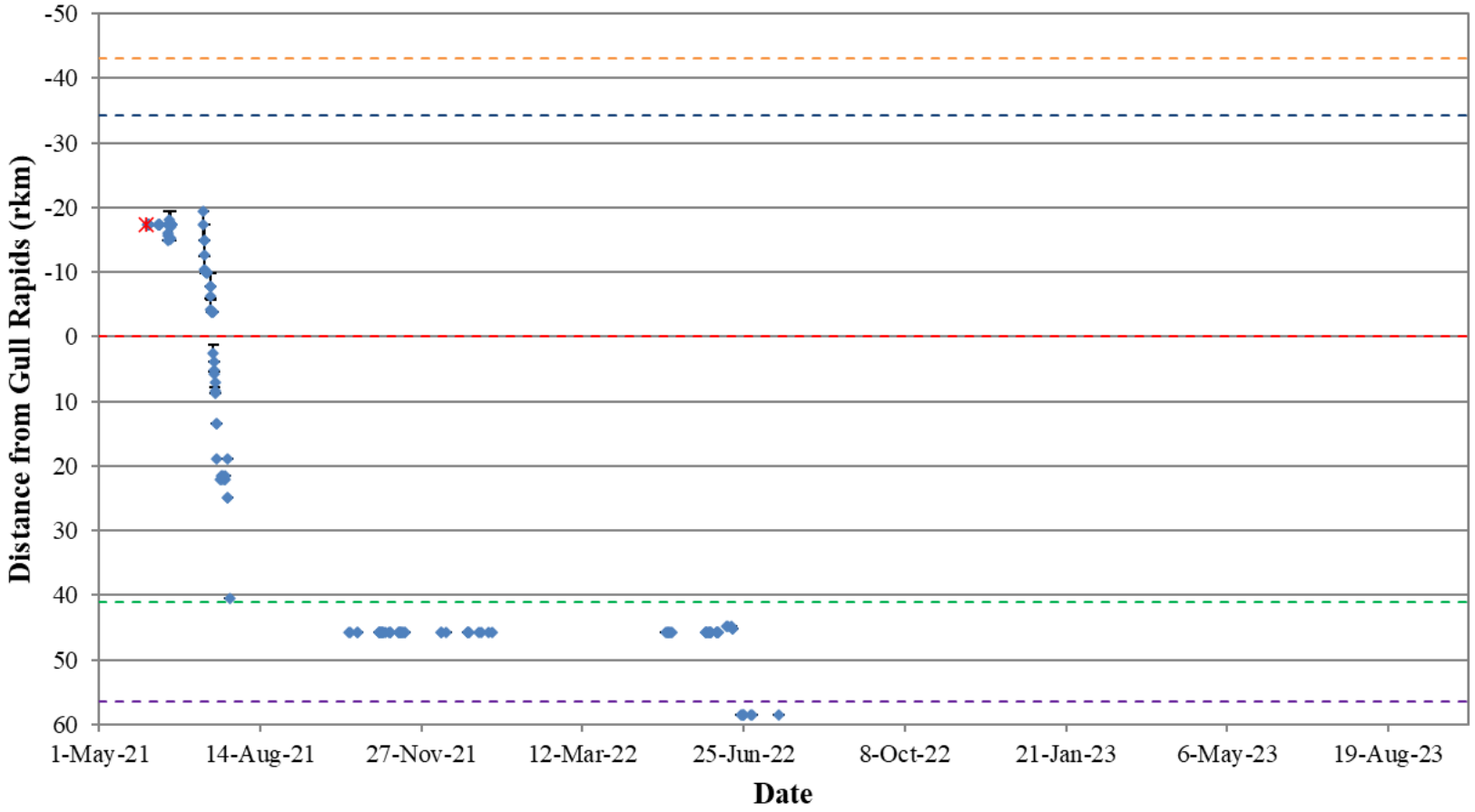

Figure A4-28: Position of a Walleye tagged with an acoustic transmitter (code #48330) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

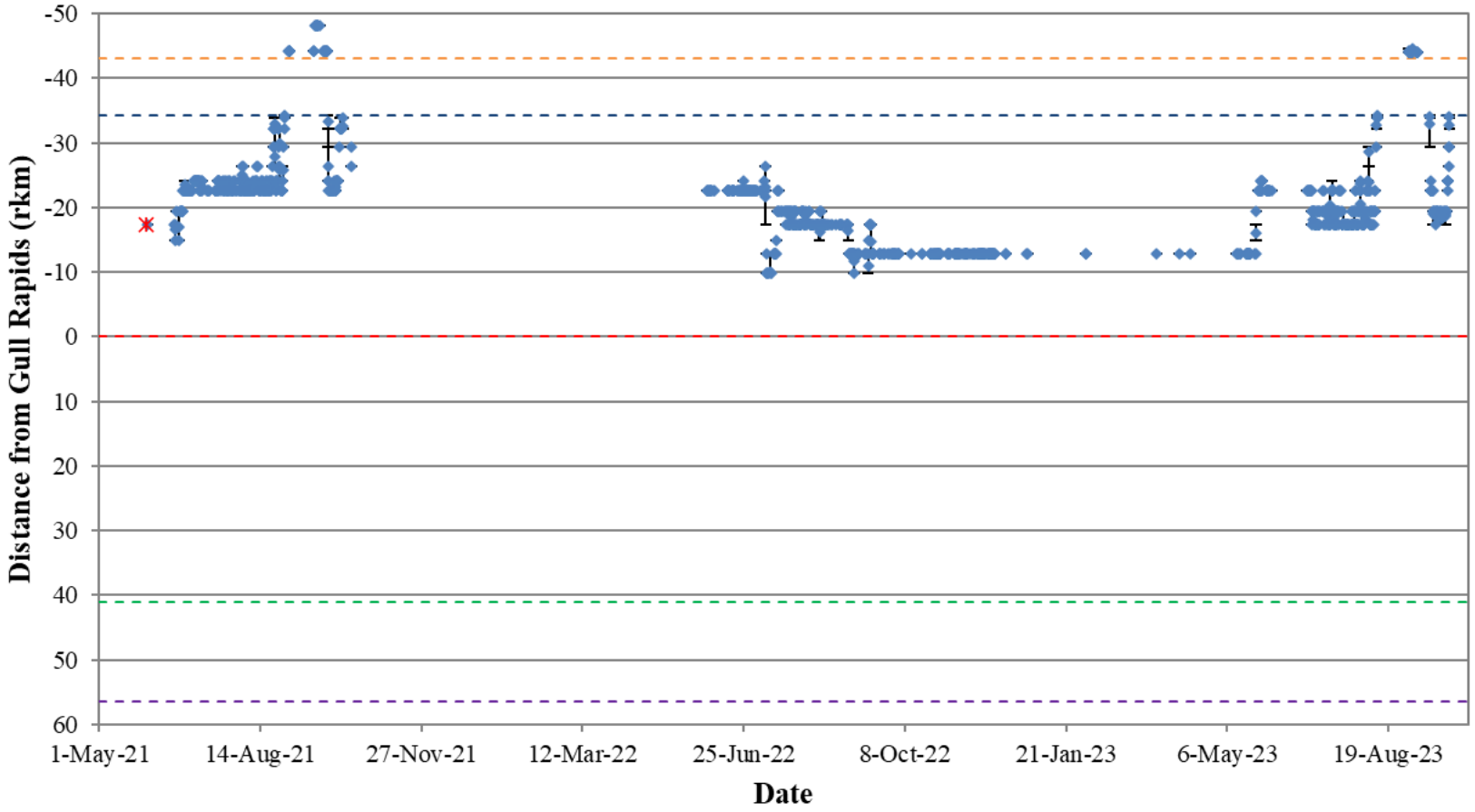

Figure A4-29: Position of a Walleye tagged with an acoustic transmitter (code #48331) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

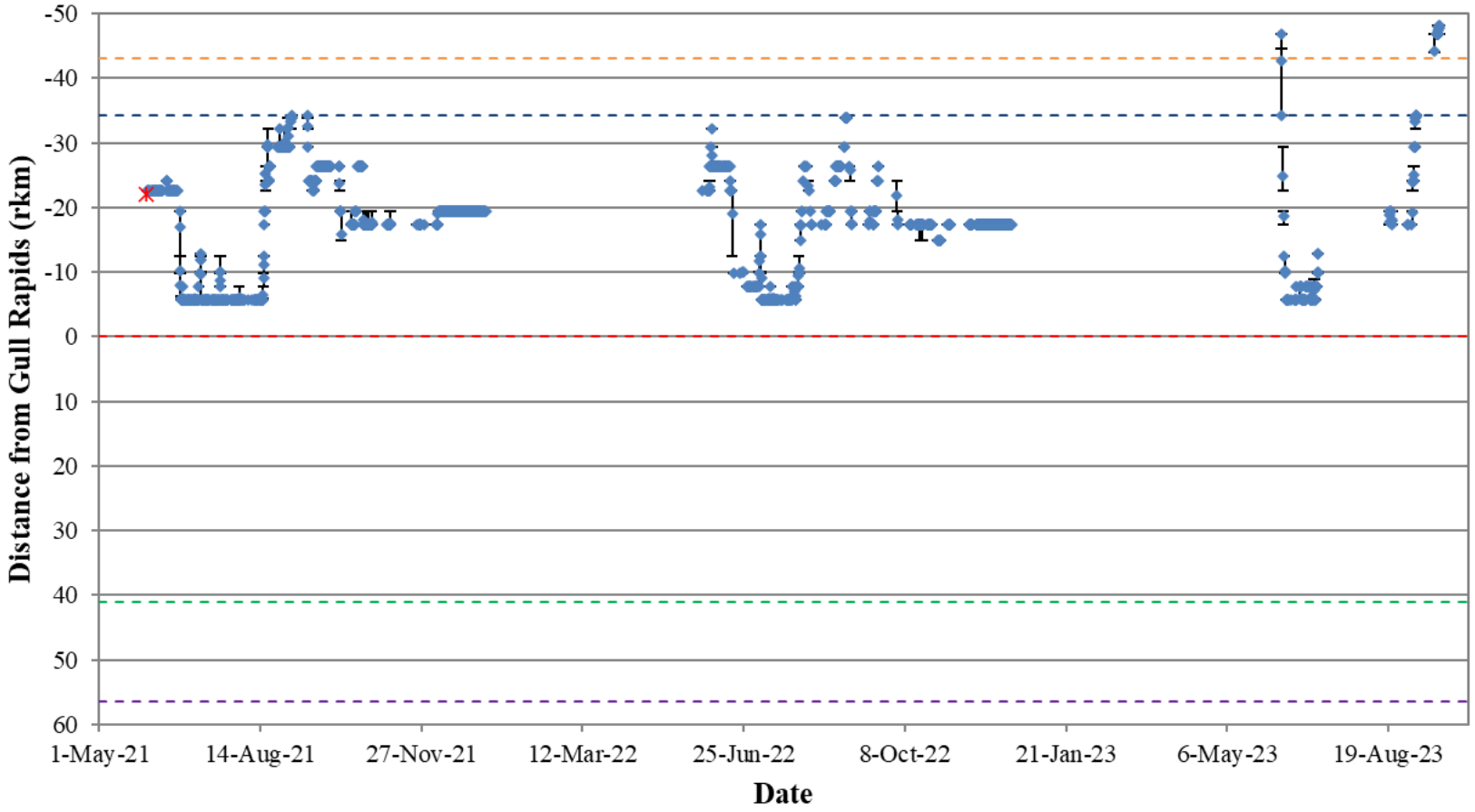
-50
-40
-30
-20
-10
0
10
20
30
40
50
60
Distance from Gull Rapids (rkm)
1-May-21
14-Aug-21
27-Nov-21
12-Mar-22
25-Jun-22
8-Oct-22
21-Jan-23
6-May-23
19-Aug-23
Date

Figure A4-30: Position of a Walleye tagged with an acoustic transmitter (code #48332) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

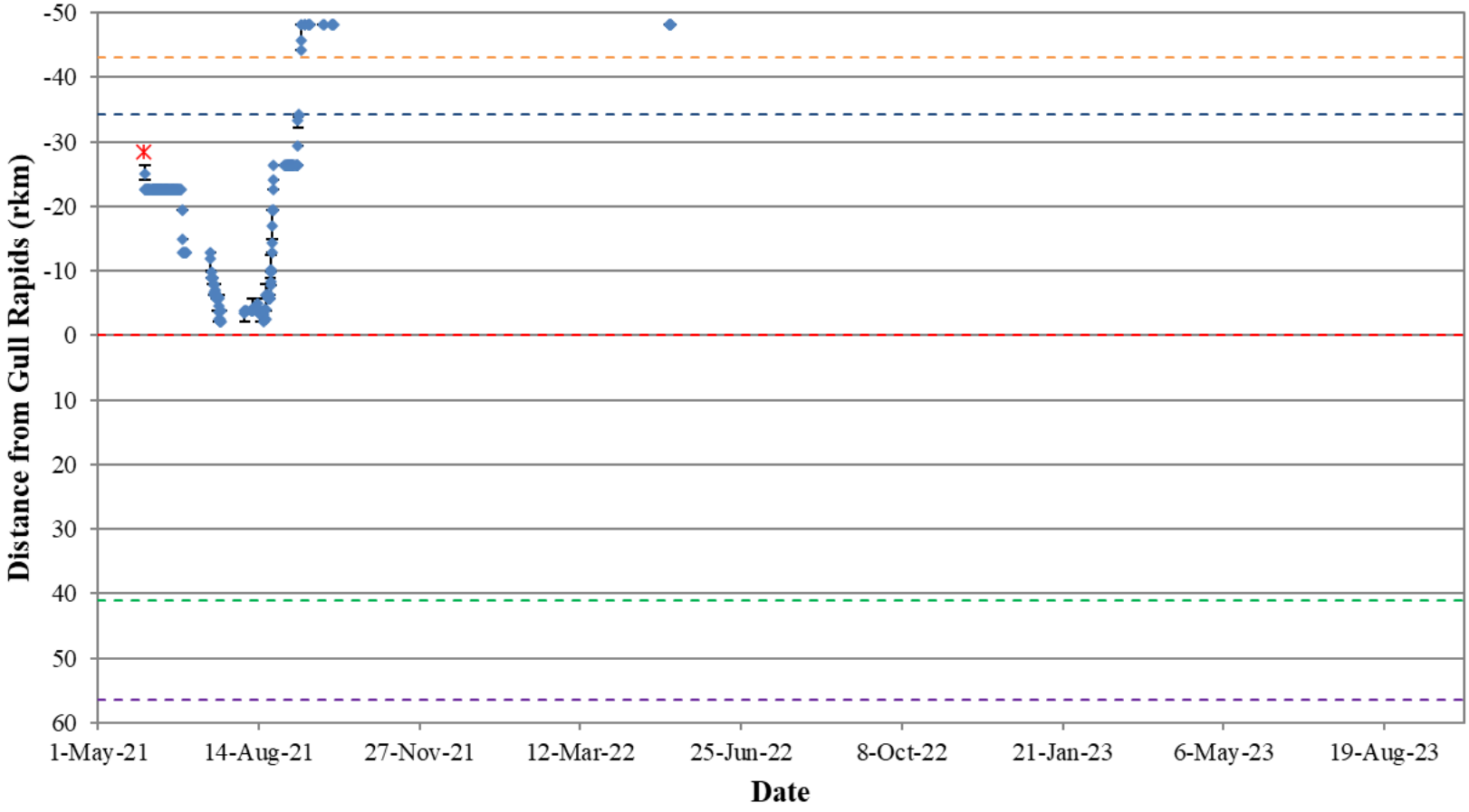

Figure A4-31: Position of a Walleye tagged with an acoustic transmitter (code #48333) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

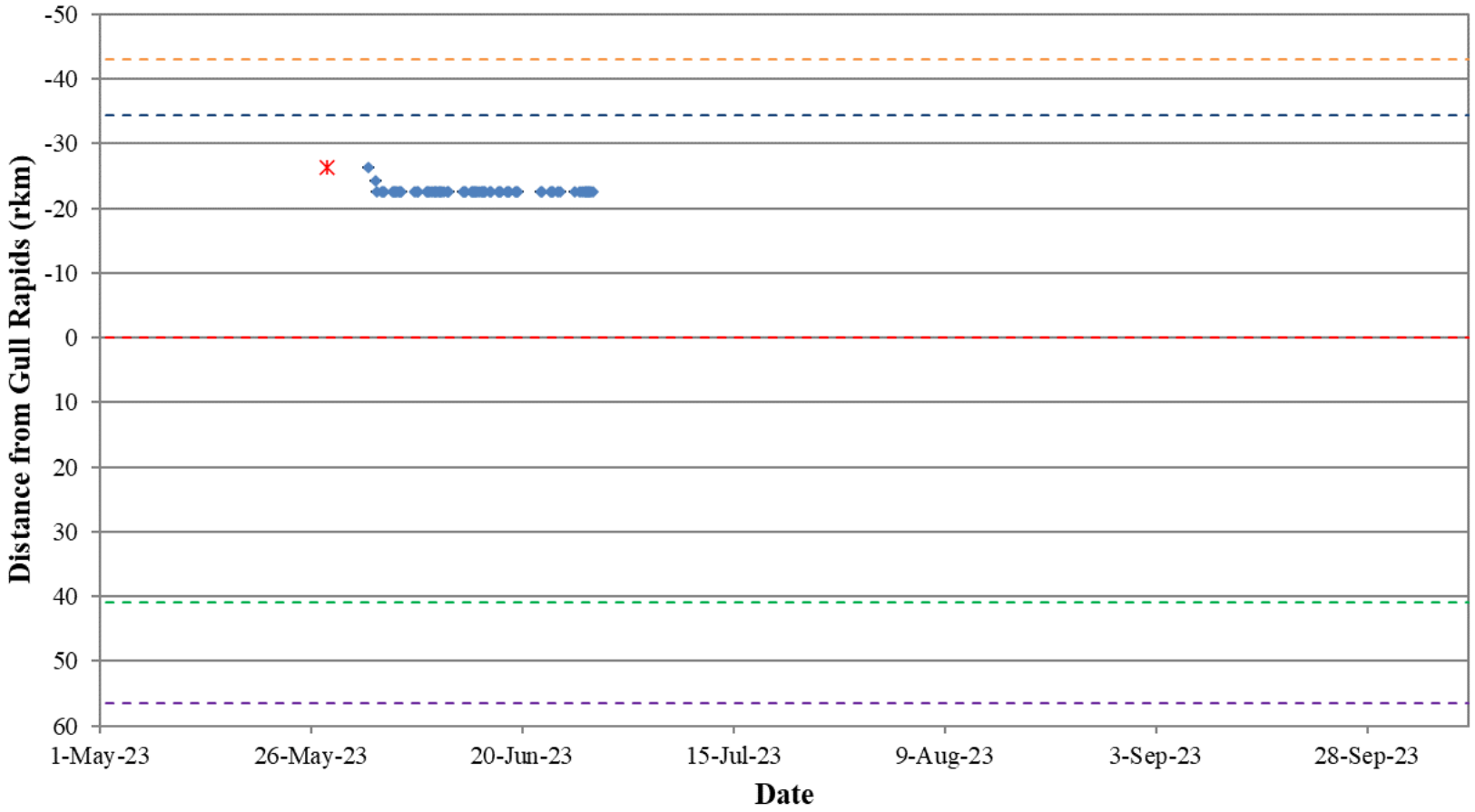

Figure A4-32: Position of a Walleye tagged with an acoustic transmitter (code #21296) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2023 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

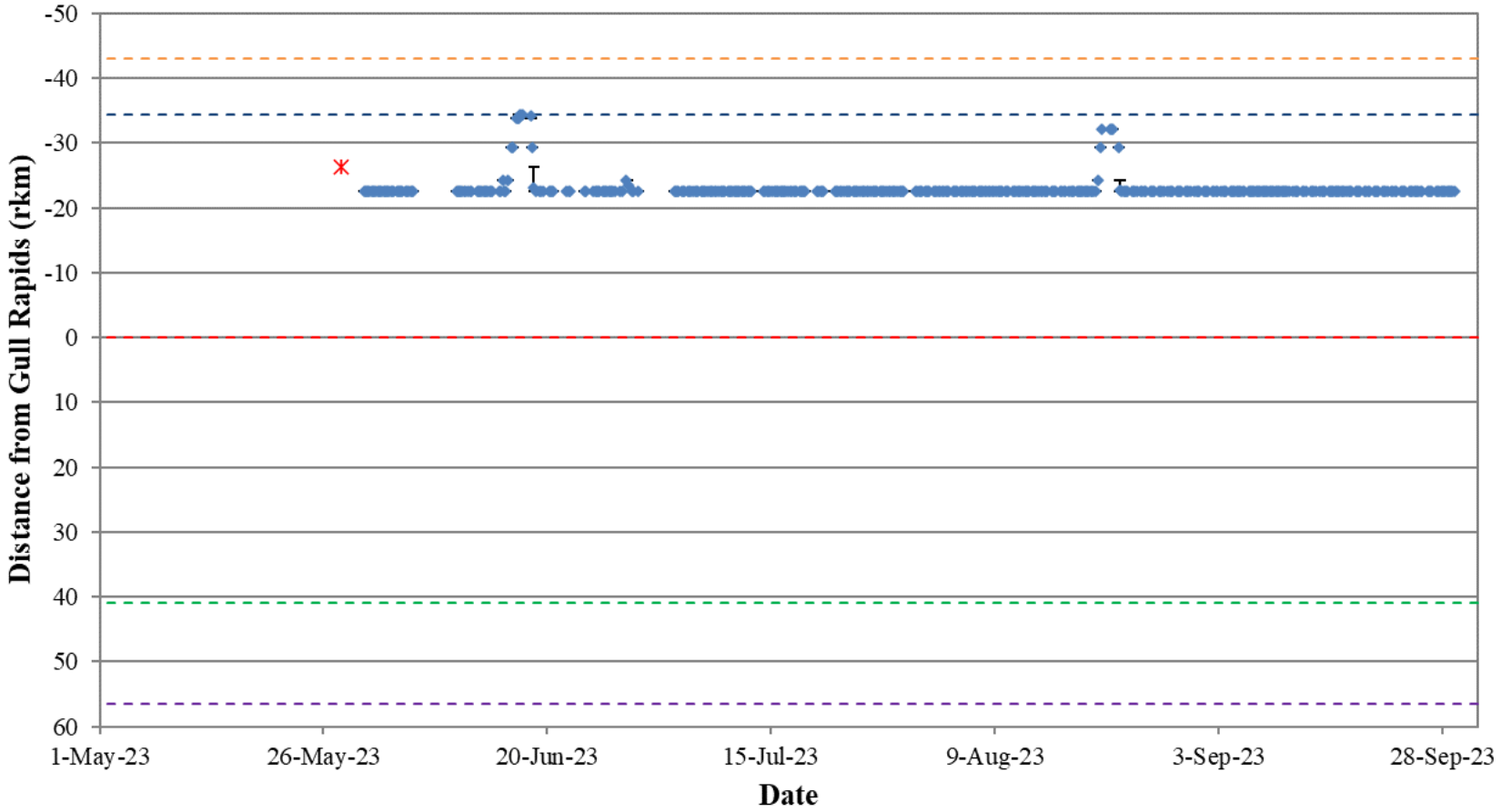

Figure A4-33: Position of a Walleye tagged with an acoustic transmitter (code #21297) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2023 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

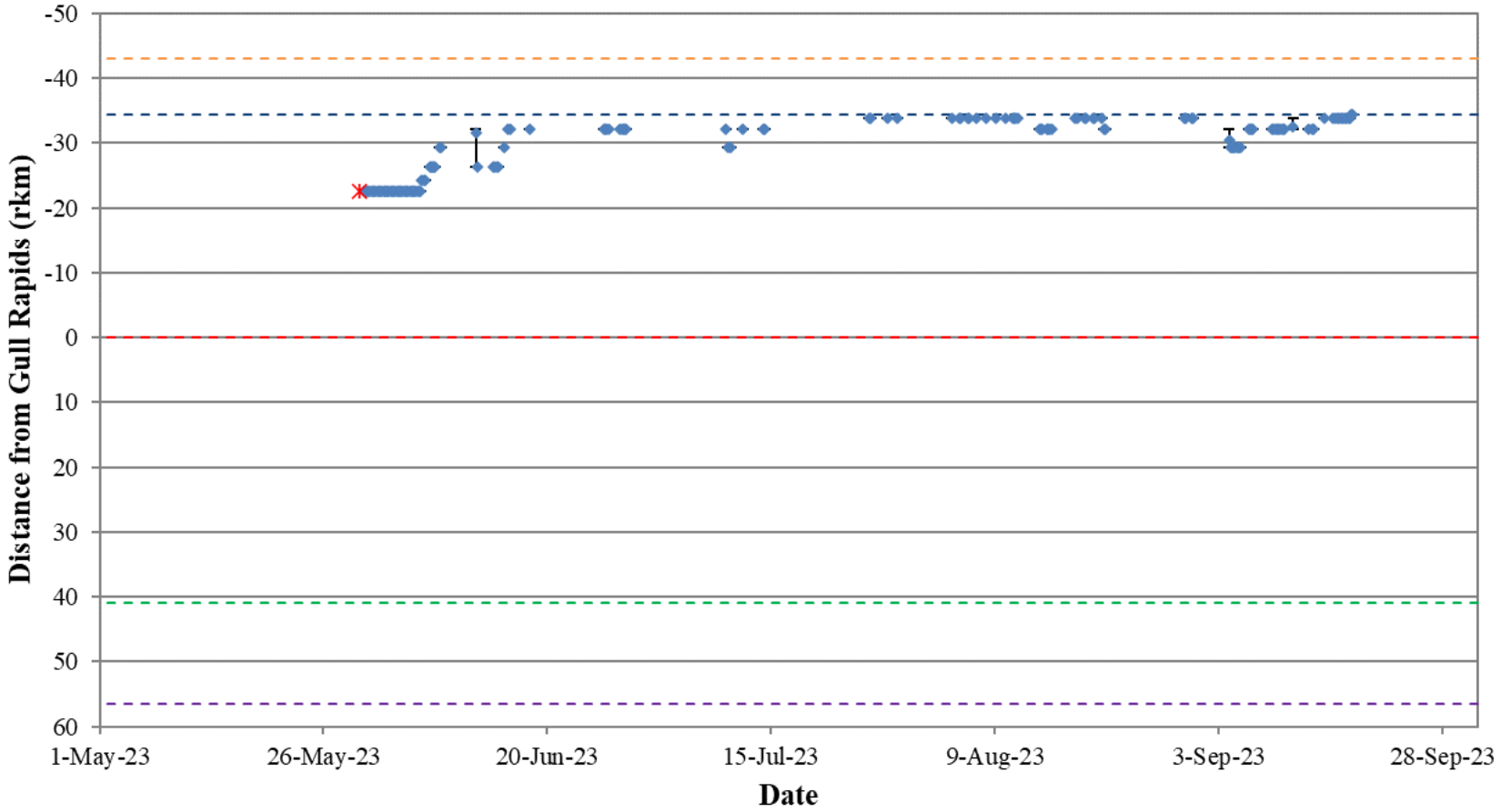

Figure A4-34: Position of a Walleye tagged with an acoustic transmitter (code #21298) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2023 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

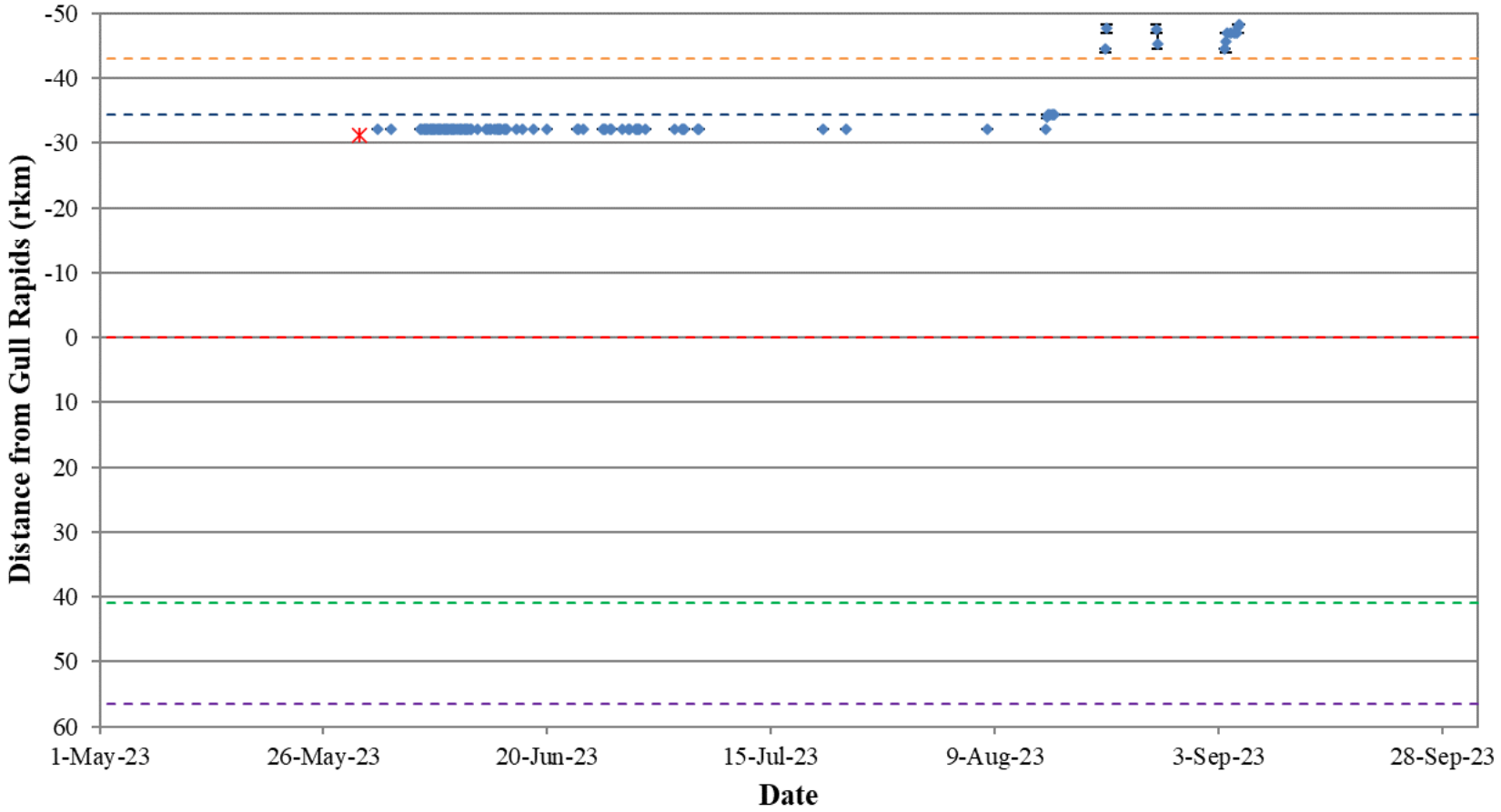

Figure A4-35: Position of a Walleye tagged with an acoustic transmitter (code #21299) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2023 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

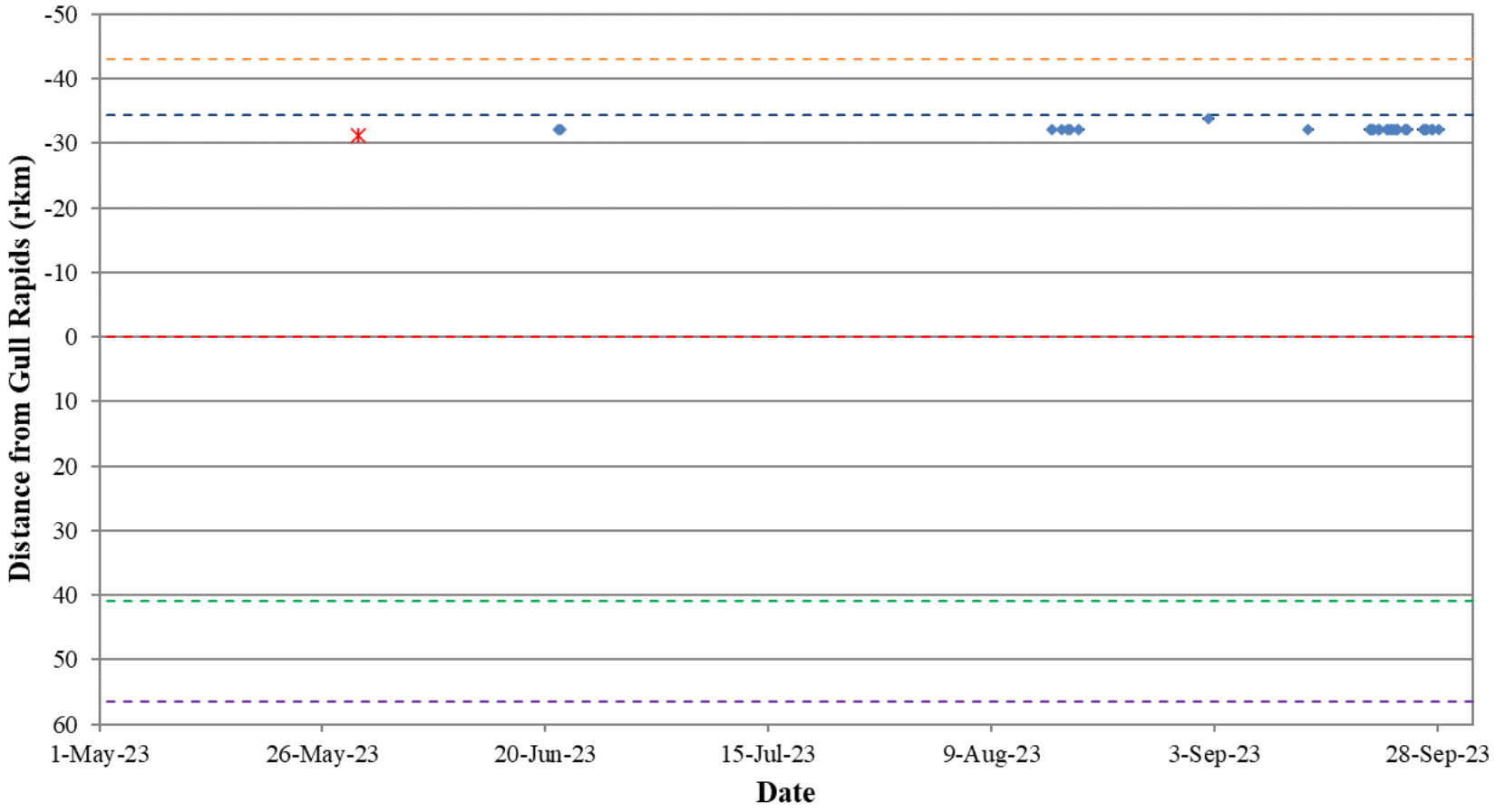

Figure A4-36: Position of a Walleye tagged with an acoustic transmitter (code #21300) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2023 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

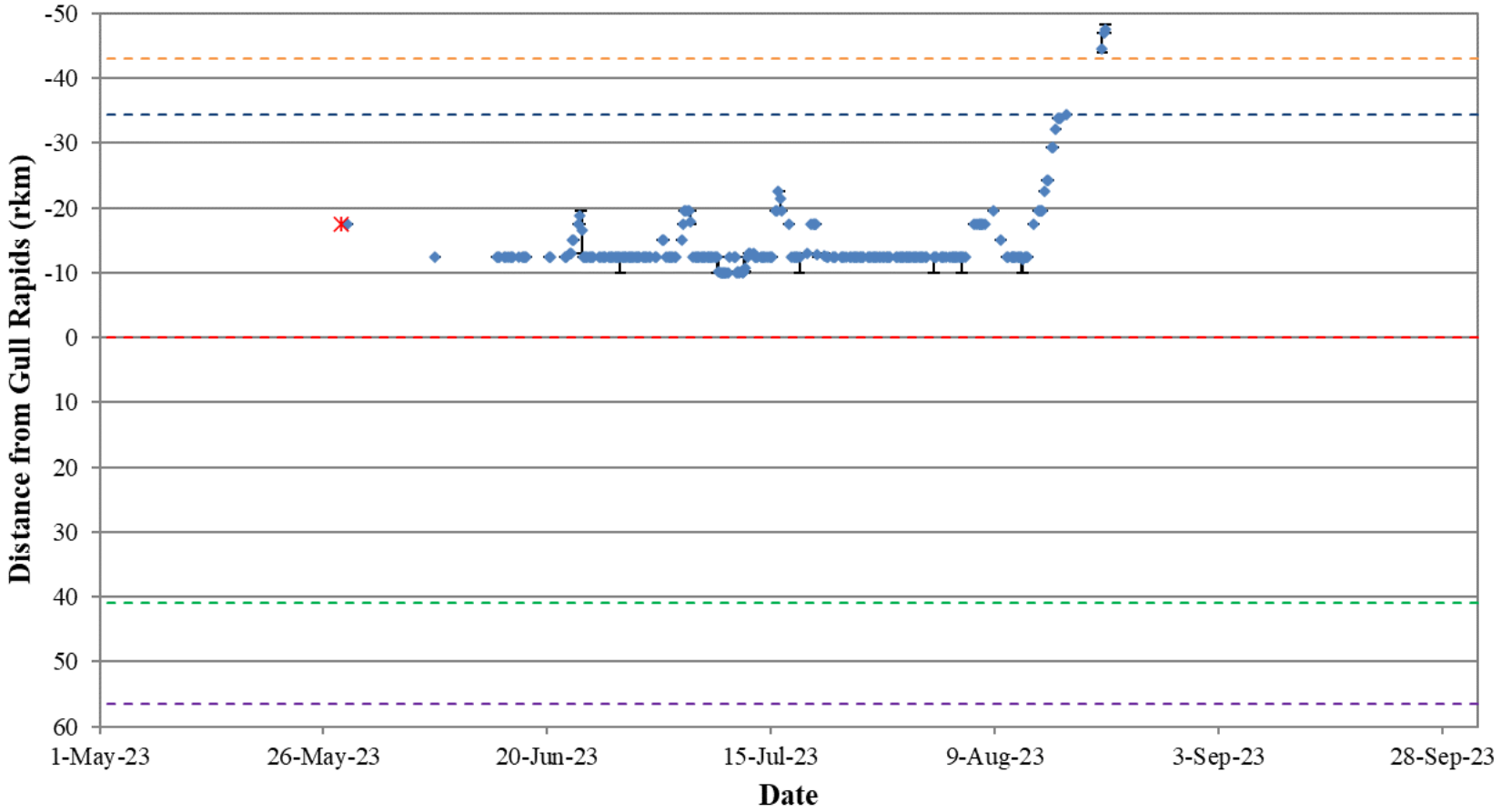

Figure A4-37: Position of a Walleye tagged with an acoustic transmitter (code #21302) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2023 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

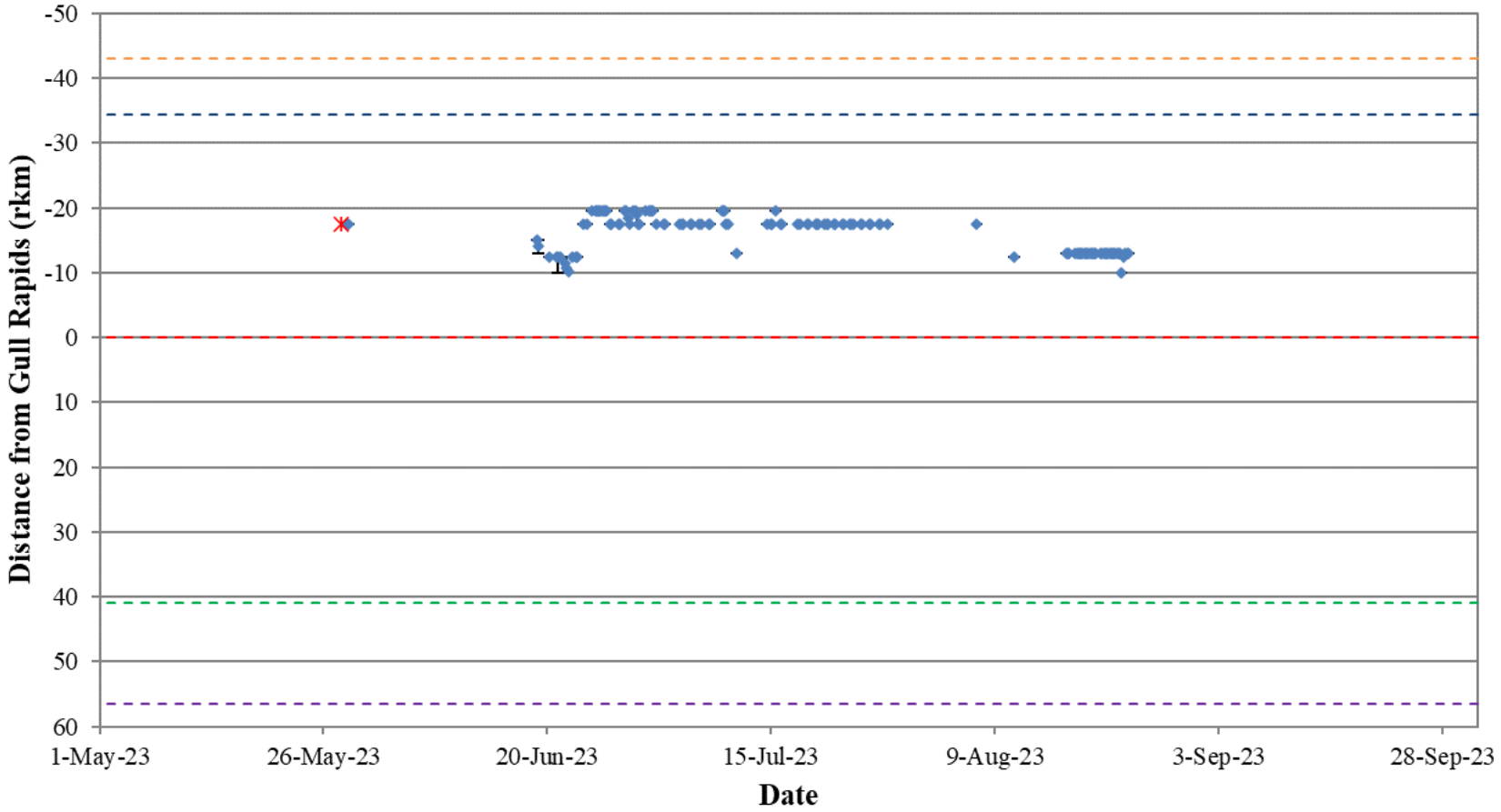

Figure A4-38: Position of a Walleye tagged with an acoustic transmitter (code #21303) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2023 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

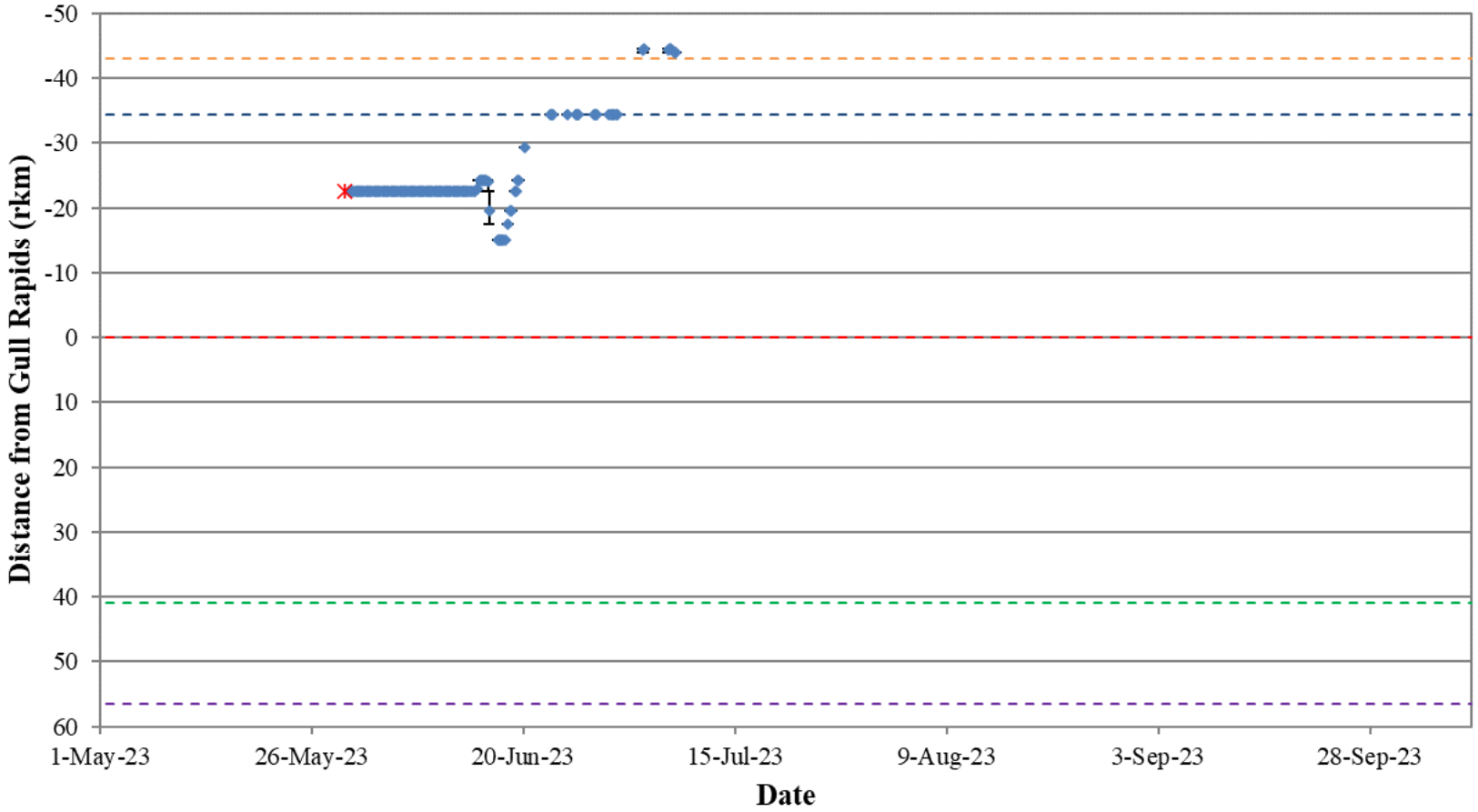

Figure A4-39: Position of a Walleye tagged with an acoustic transmitter (code #21304) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2023 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

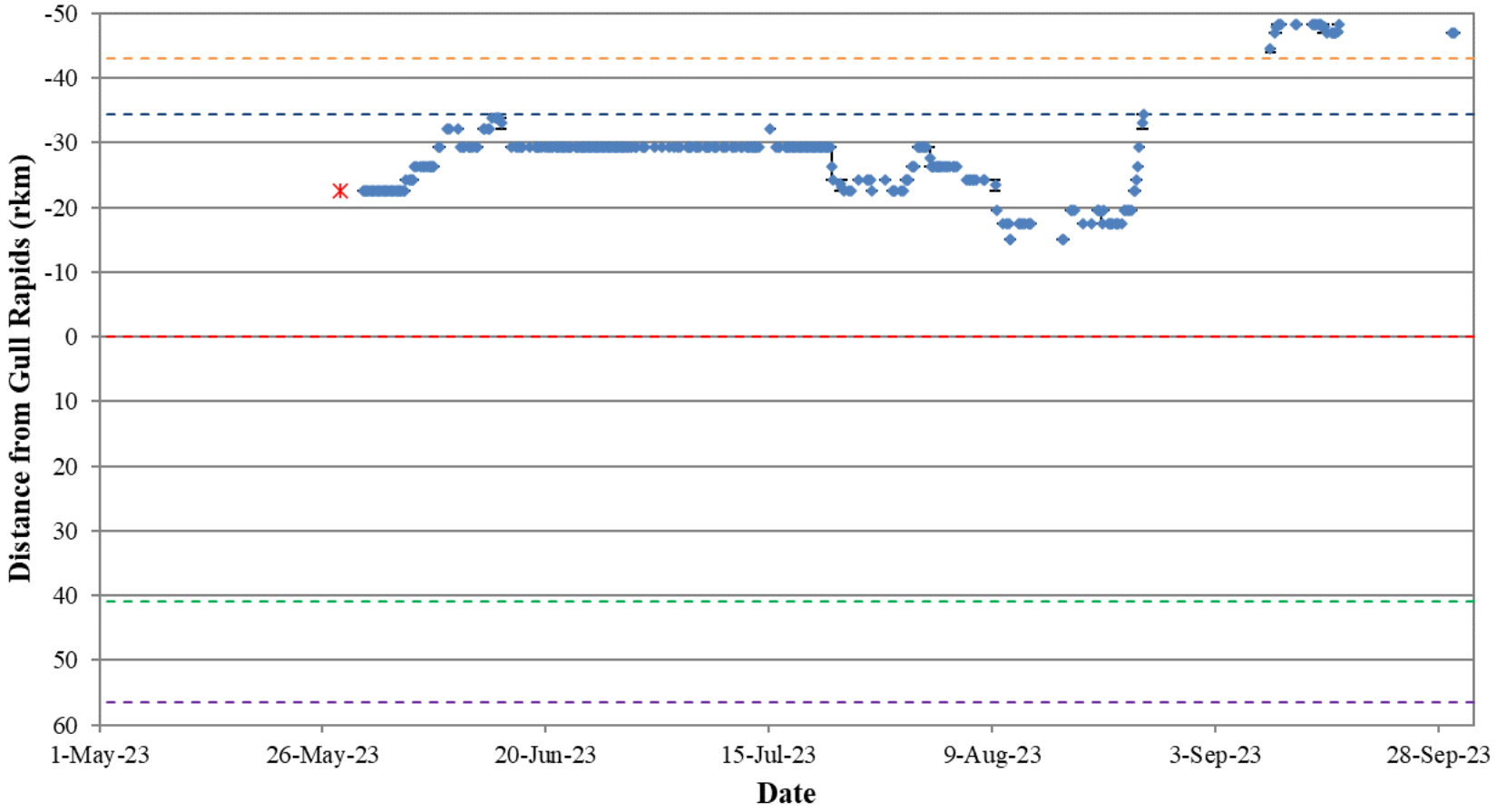

Figure A4-40: Position of a Walleye tagged with an acoustic transmitter (code #21305) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2023 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

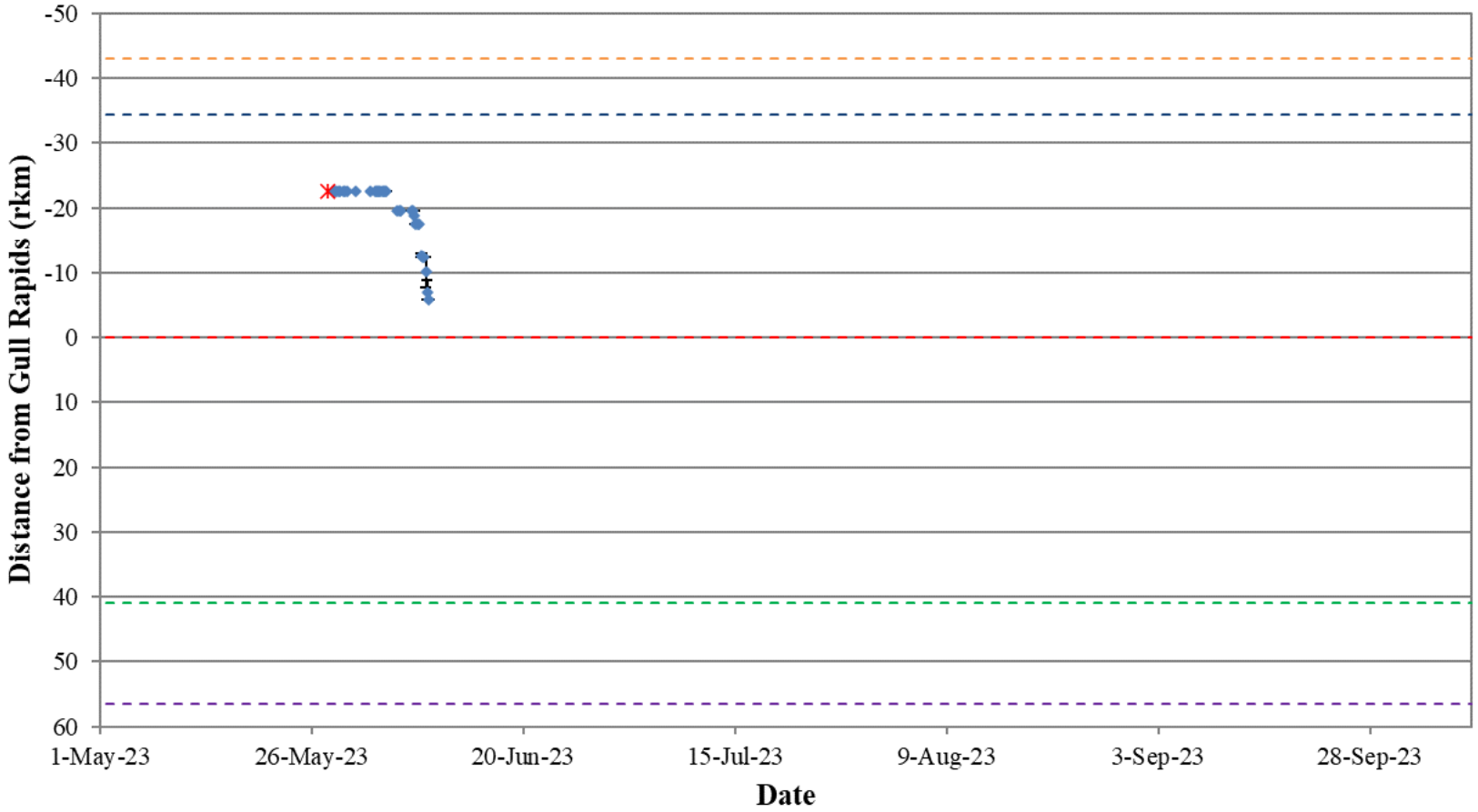

Figure A4-41: Position of a Walleye tagged with an acoustic transmitter (code #21306) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2023 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

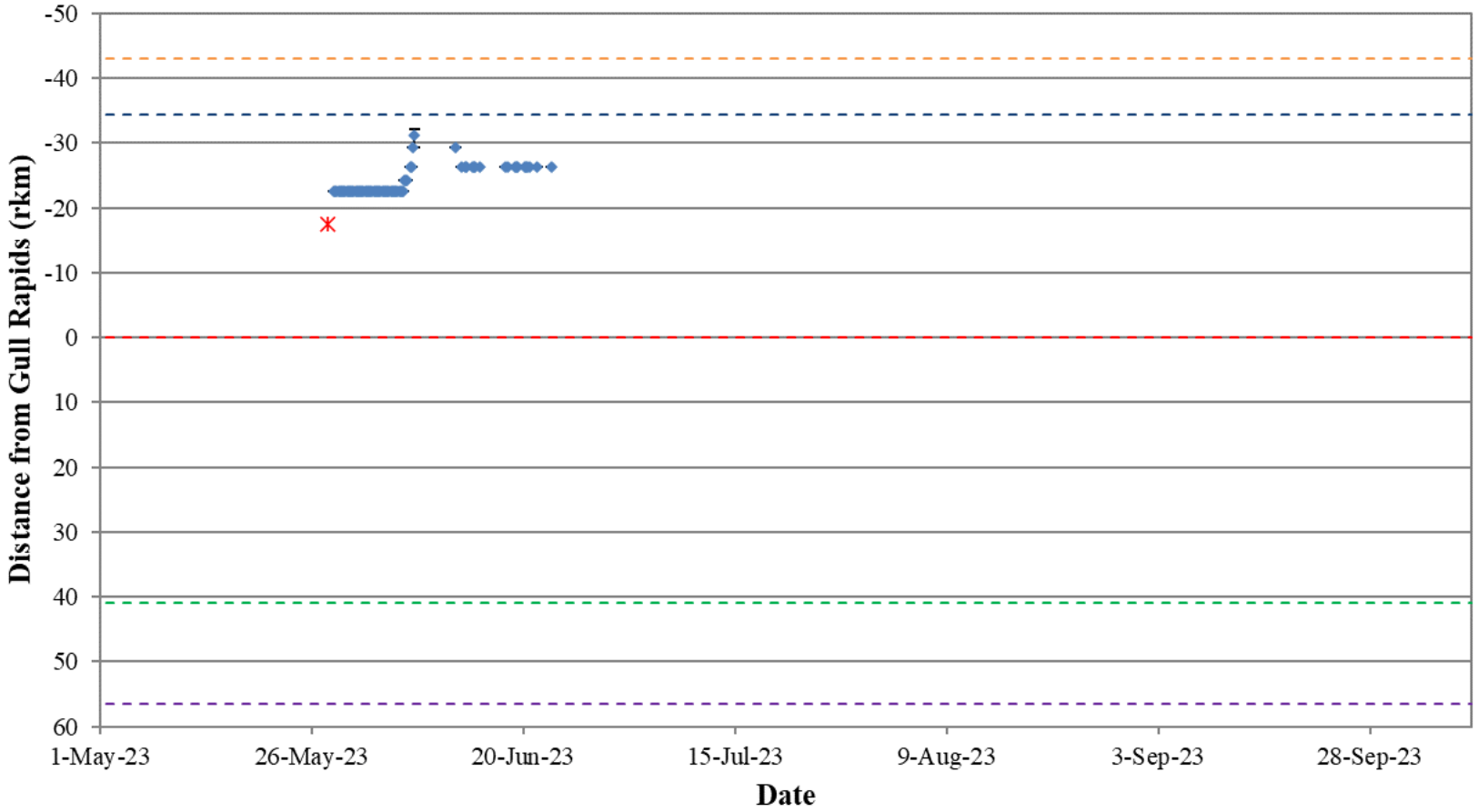

Figure A4-42: Position of a Walleye tagged with an acoustic transmitter (code #21307) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2023 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

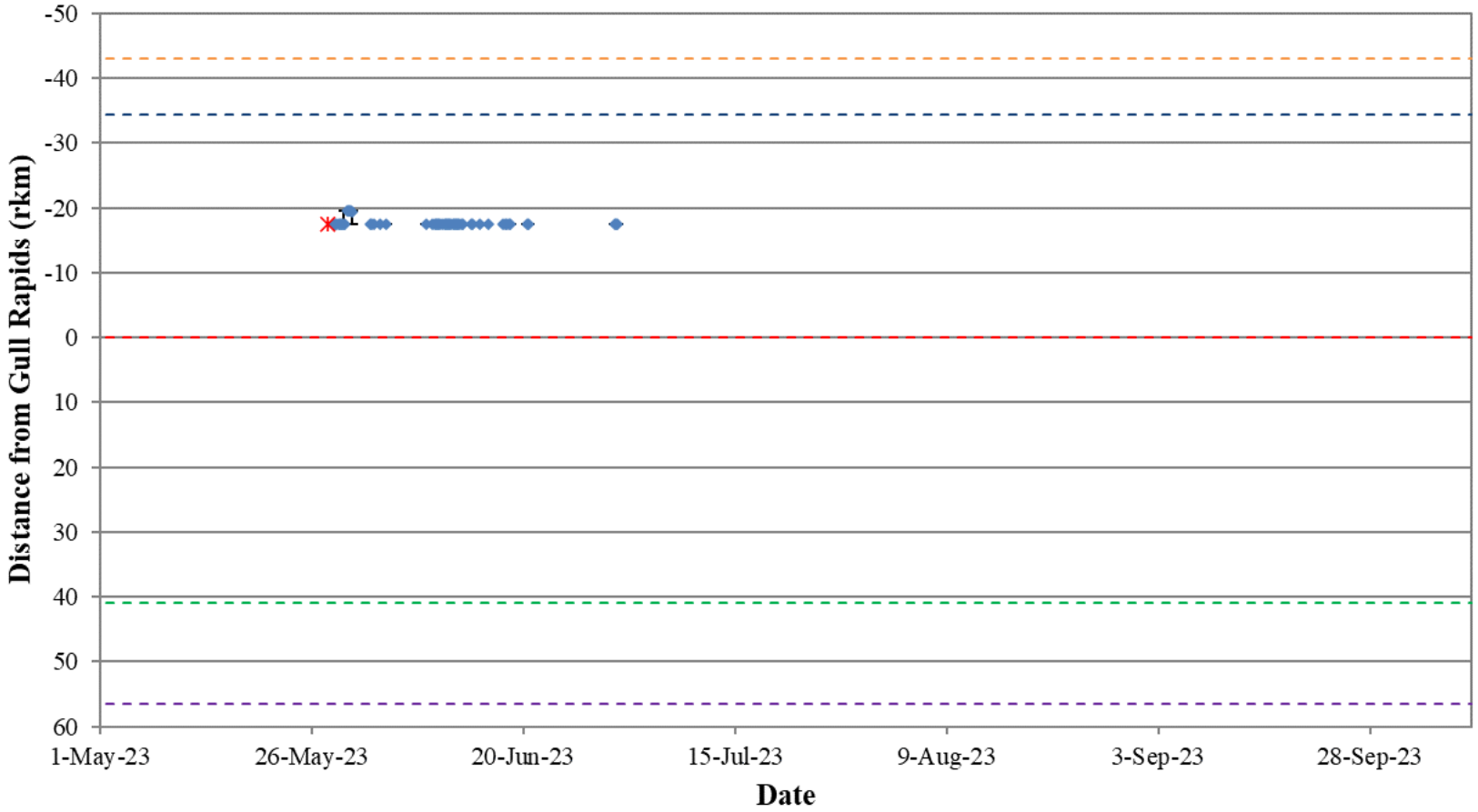

Figure A4-43: Position of a Walleye tagged with an acoustic transmitter (code #21308) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0) from May 1, 2023 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

APPENDIX 5: LOCATION SUMMARY FOR INDIVIDUAL ACOUSTIC TAGGED WALLEYE IN STEPHENS LAKE IN 2021/2023: MAY 2021 TO OCTOBER 2023

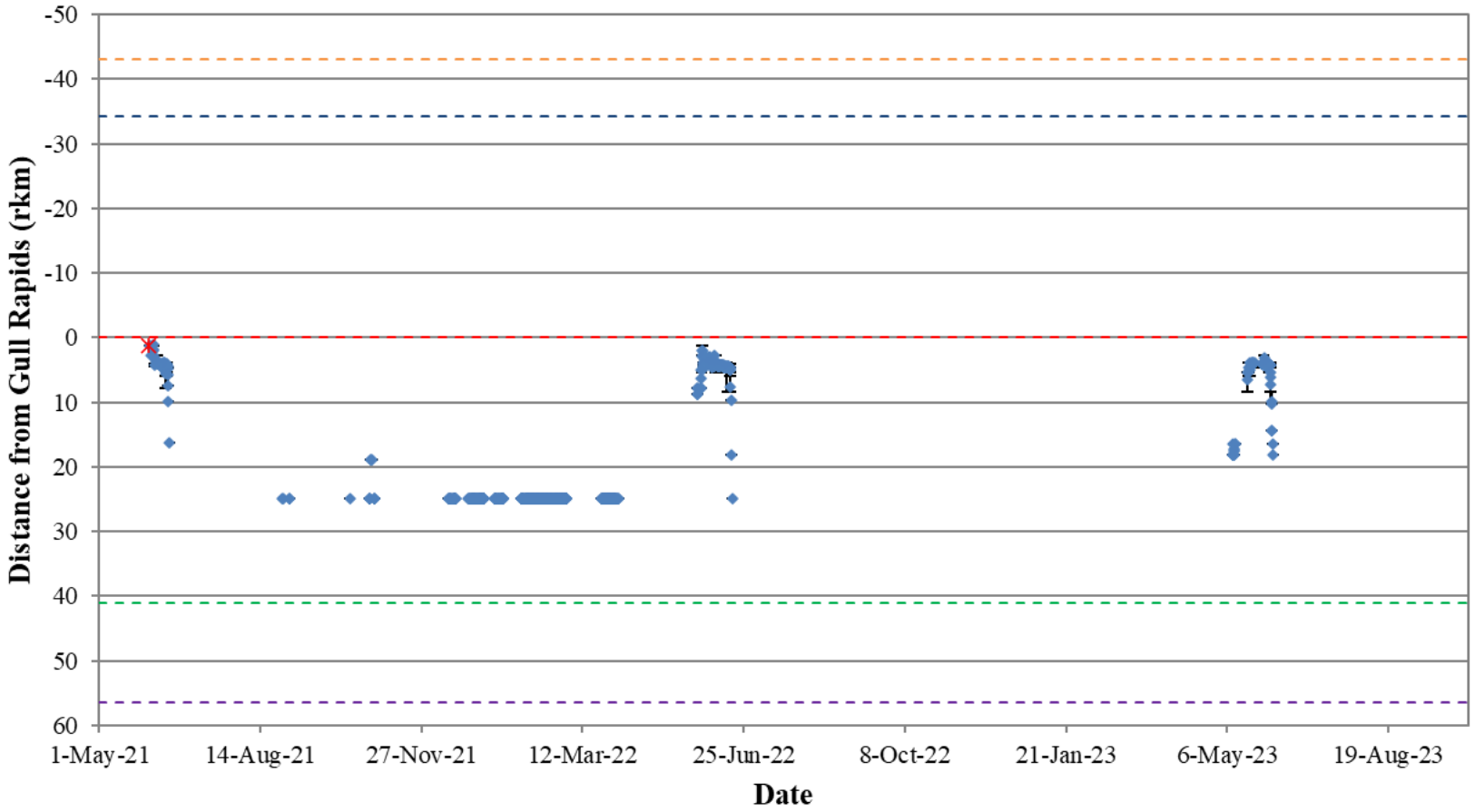

Figure A5-1: Position of a Walleye tagged with an acoustic transmitter (code #48234) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

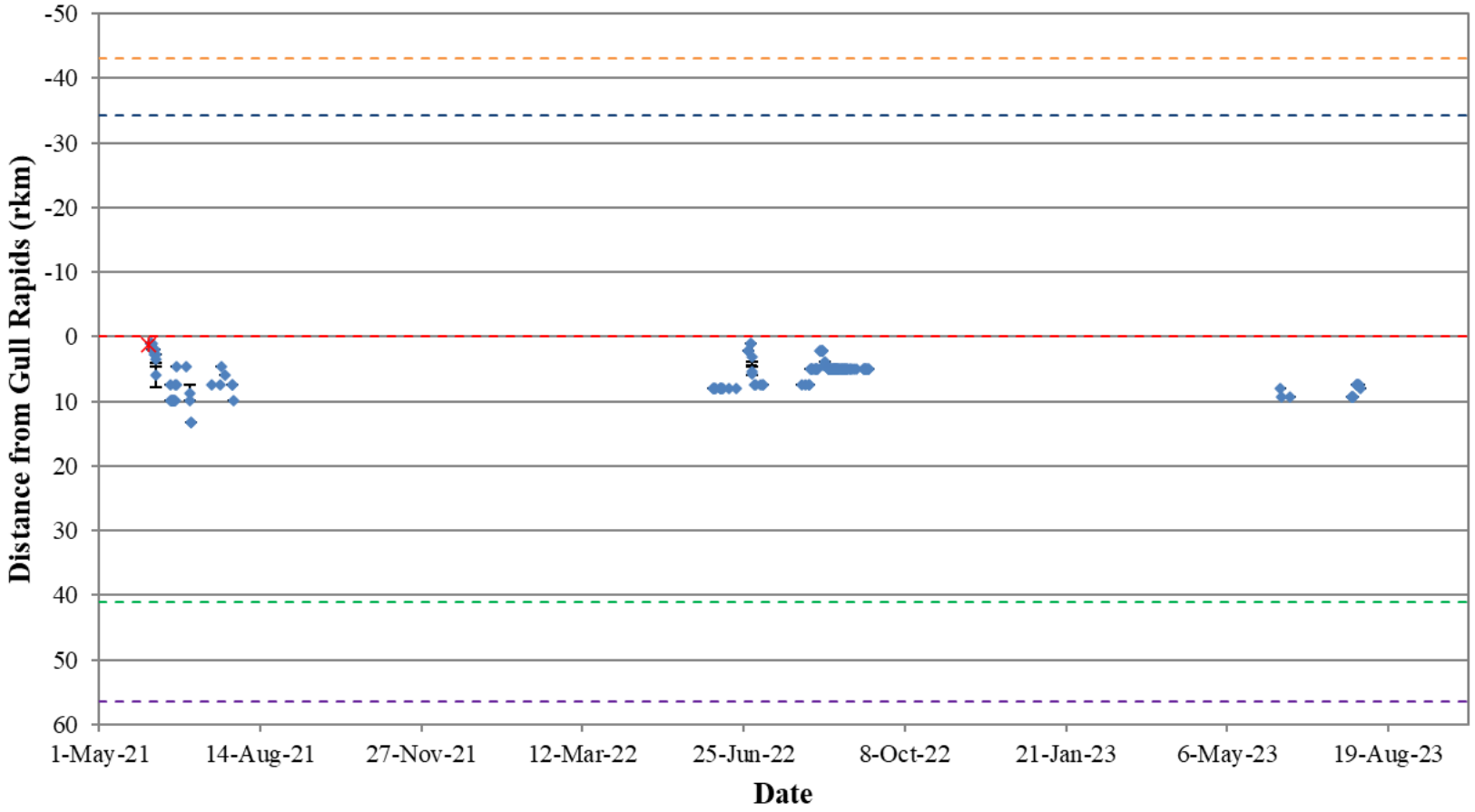

Figure A5-2: Position of a Walleye tagged with an acoustic transmitter (code #48235) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

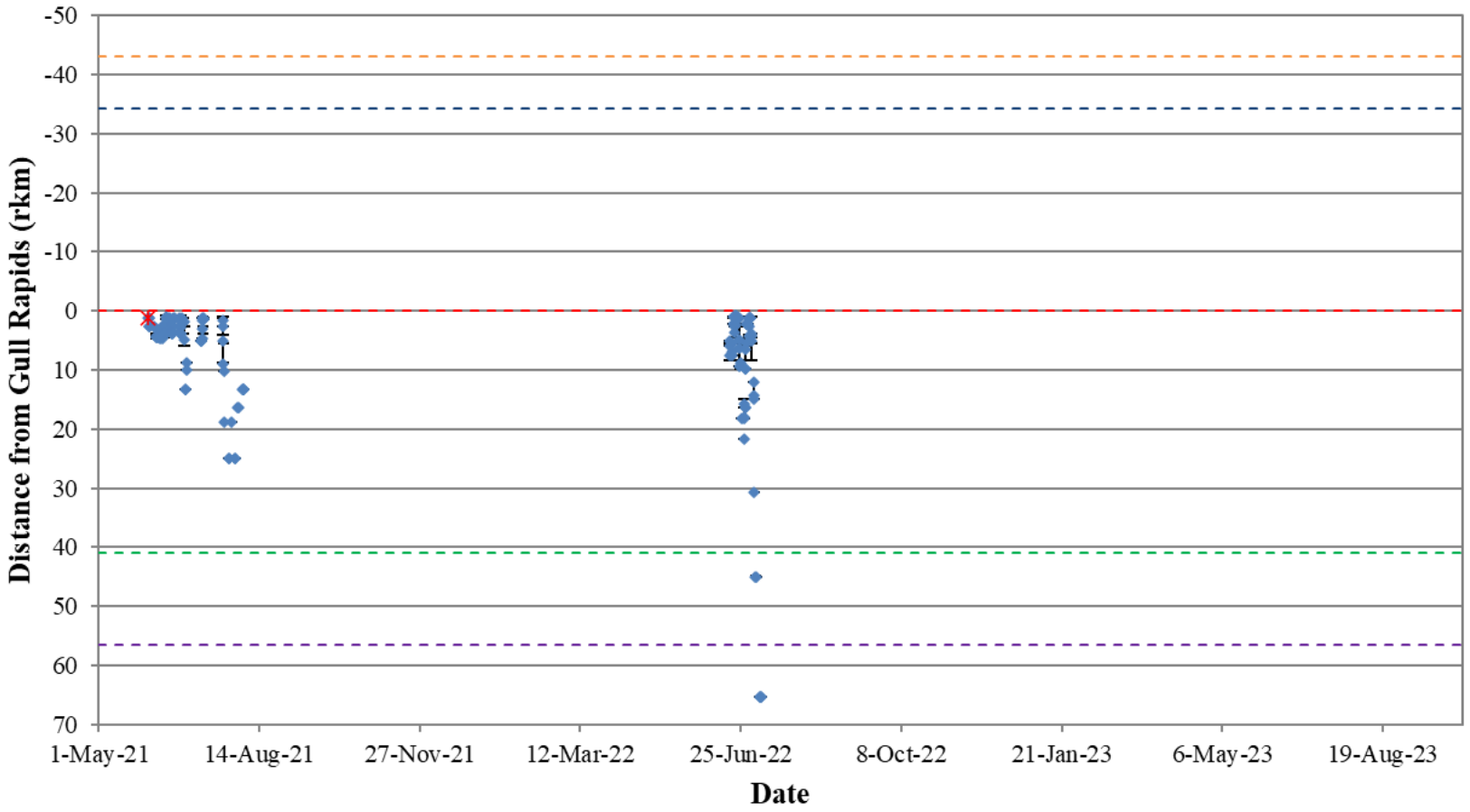

Figure A5-3: Position of a Walleye tagged with an acoustic transmitter (code #48236) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

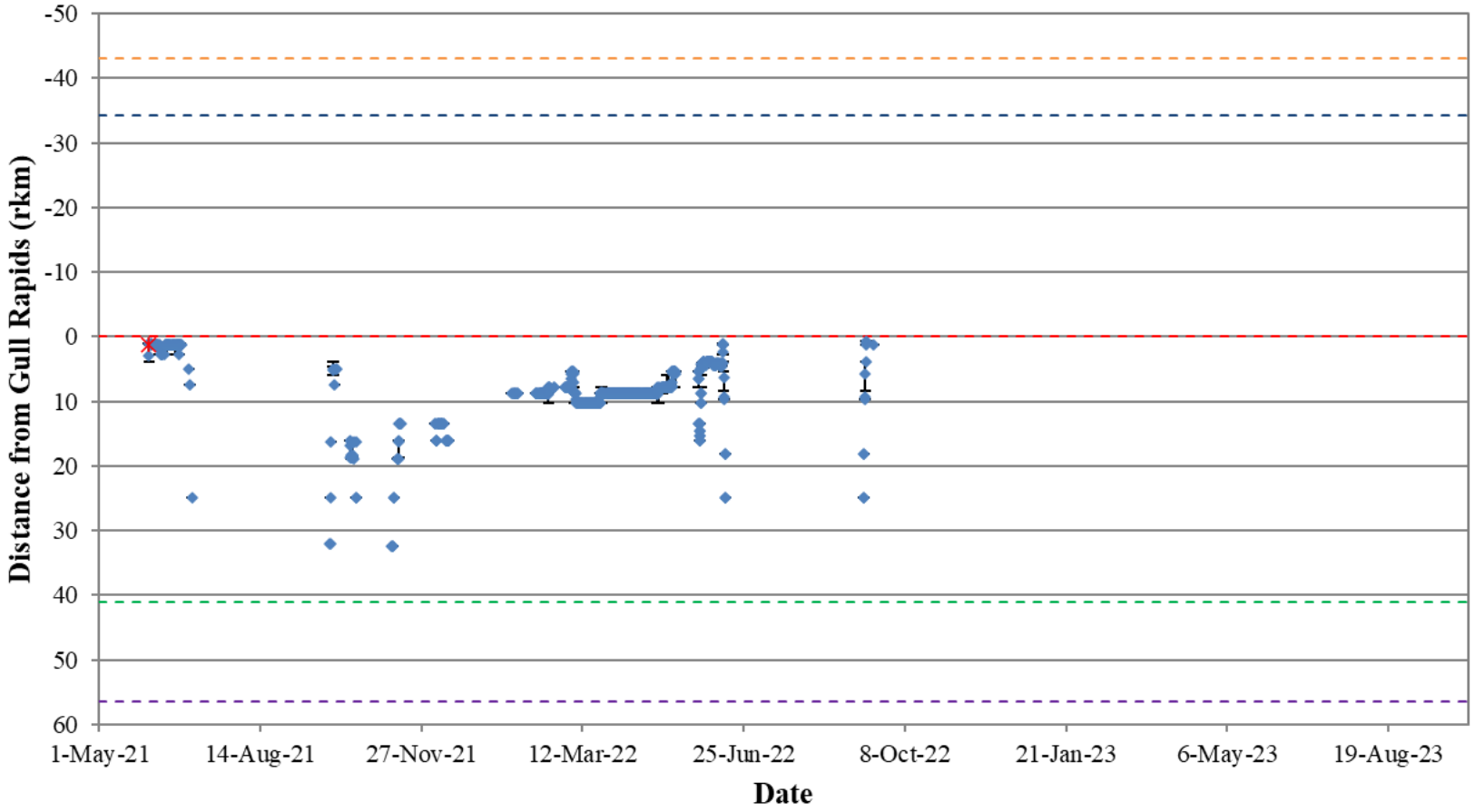

Figure A5-4: Position of a Walleye tagged with an acoustic transmitter (code #48237) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

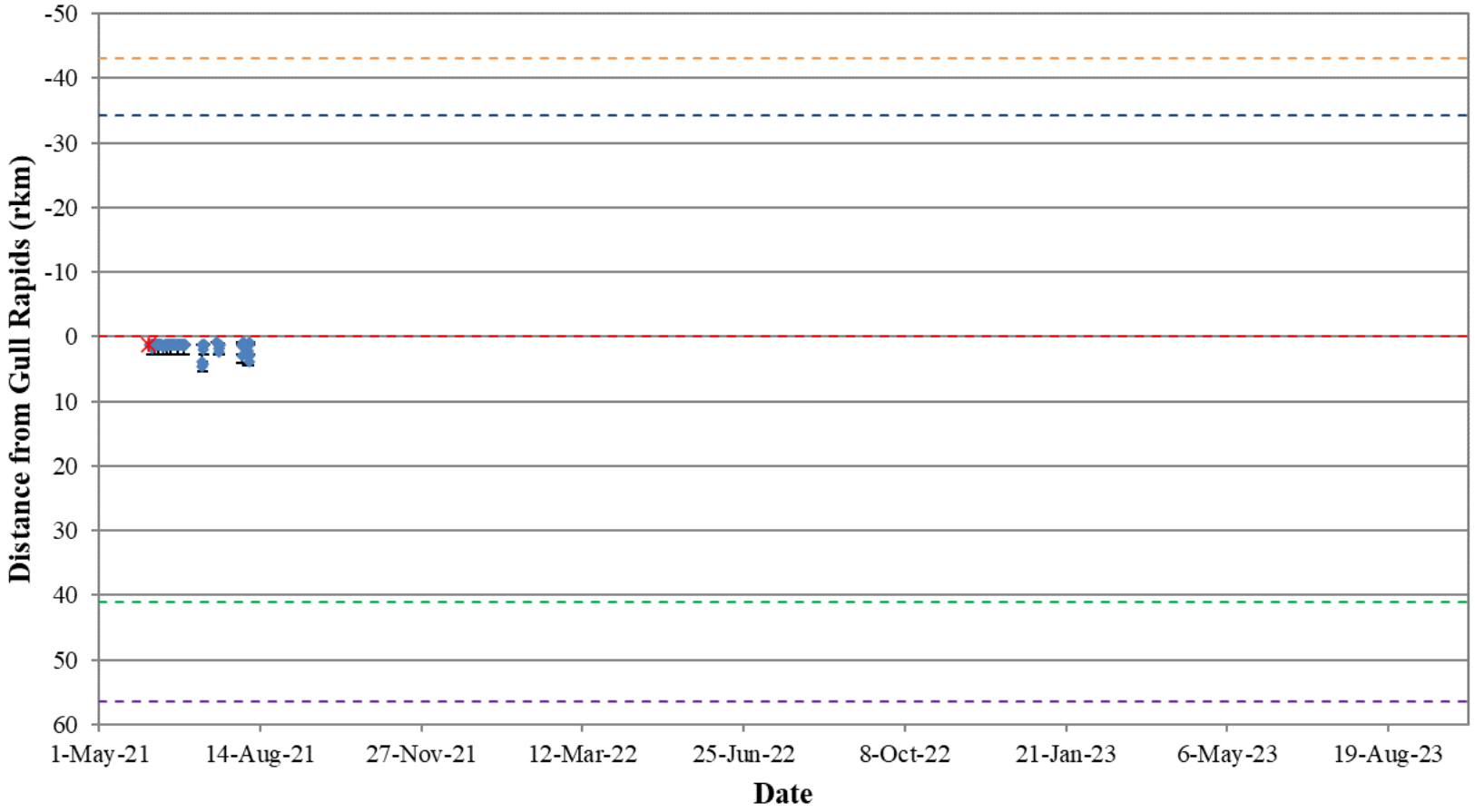

Figure A5-5: Position of a Walleye tagged with an acoustic transmitter (code #48238) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

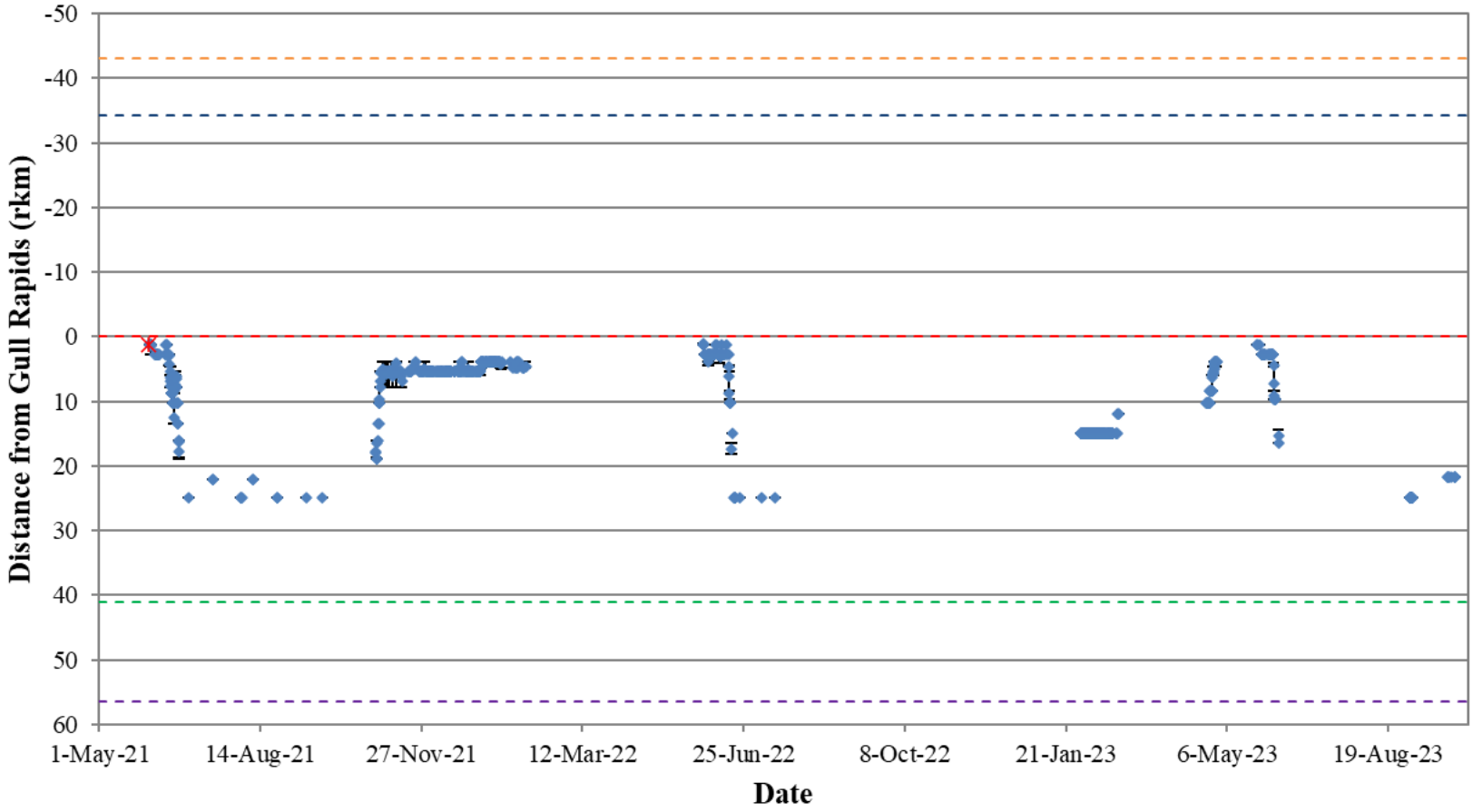

Figure A5-6: Position of a Walleye tagged with an acoustic transmitter (code #48239) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

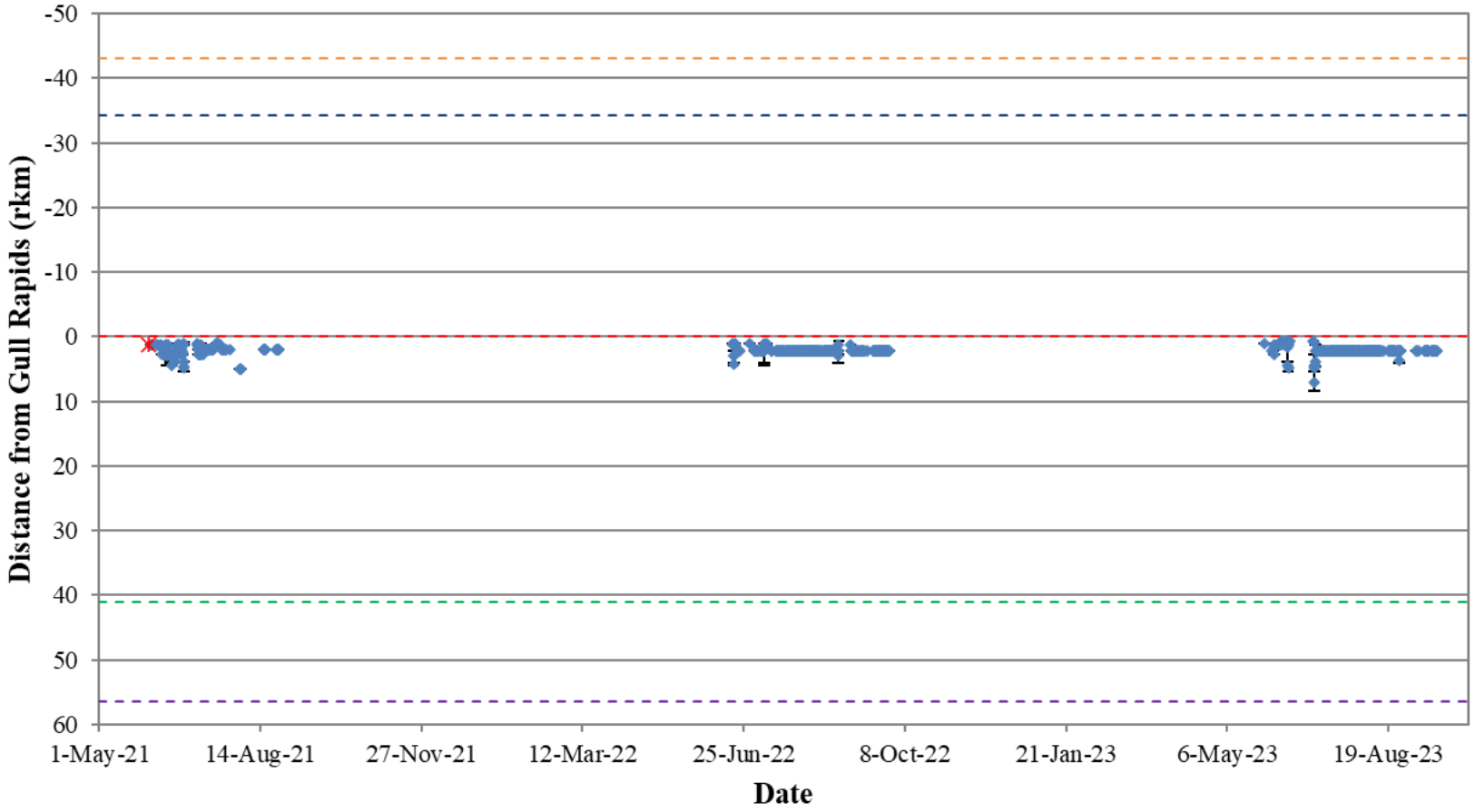

Figure A5-7: Position of a Walleye tagged with an acoustic transmitter (code #48240) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

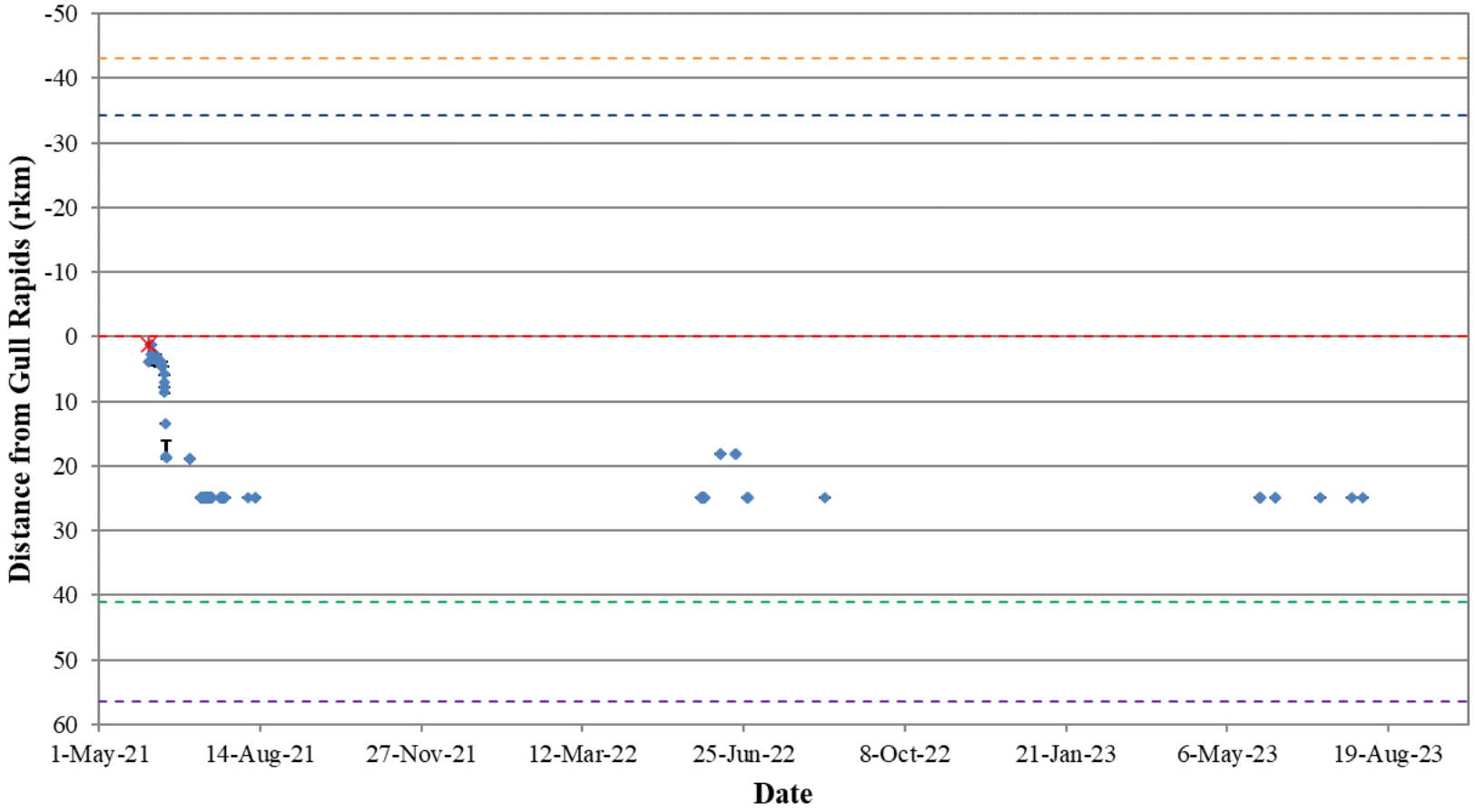

Figure A5-8: Position of a Walleye tagged with an acoustic transmitter (code #48242) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

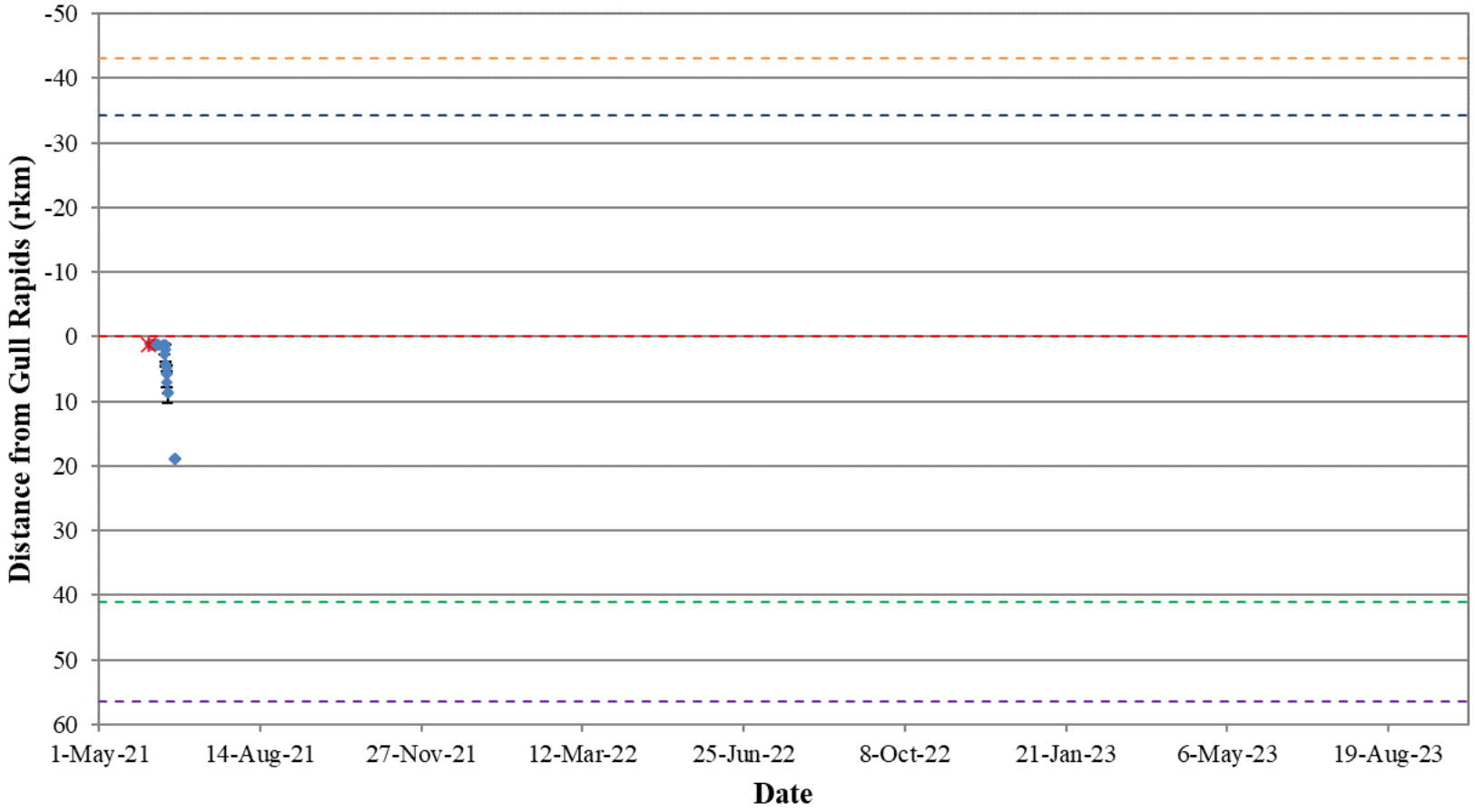

Figure A5-9: Position of a Walleye tagged with an acoustic transmitter (code #48243) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

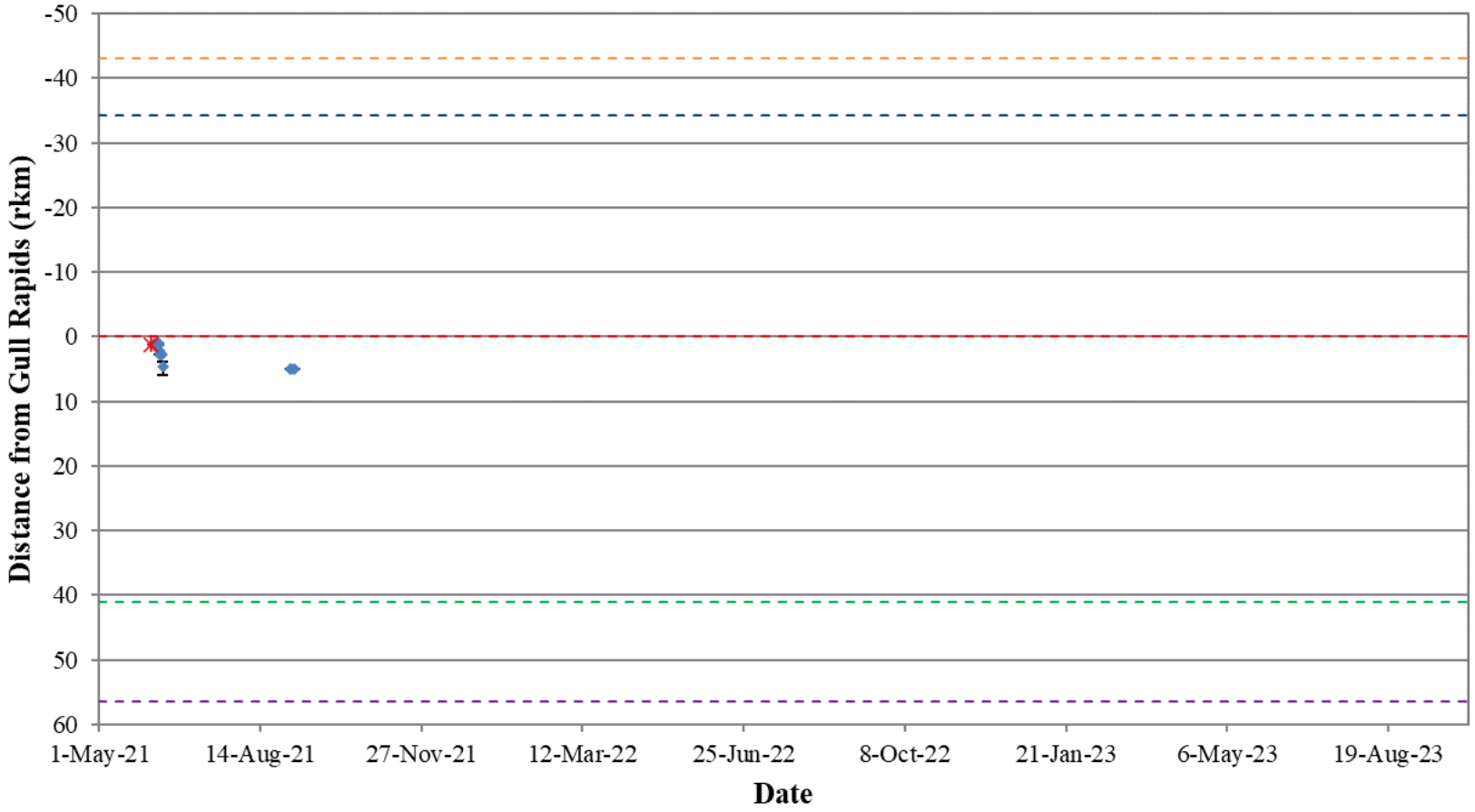

Figure A5-10: Position of a Walleye tagged with an acoustic transmitter (code #48245) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

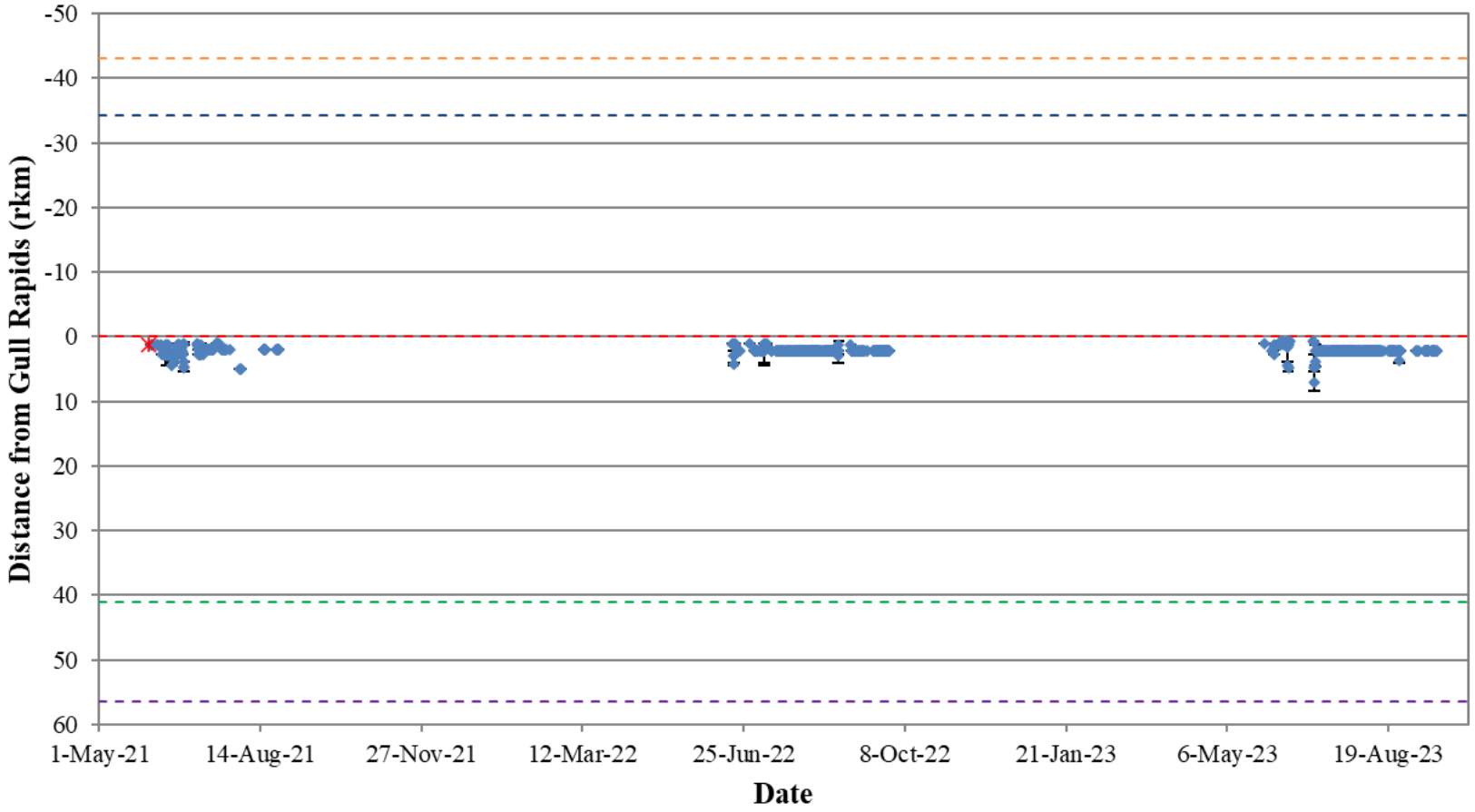

Figure A5-11: Position of a Walleye tagged with an acoustic transmitter (code #48246) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

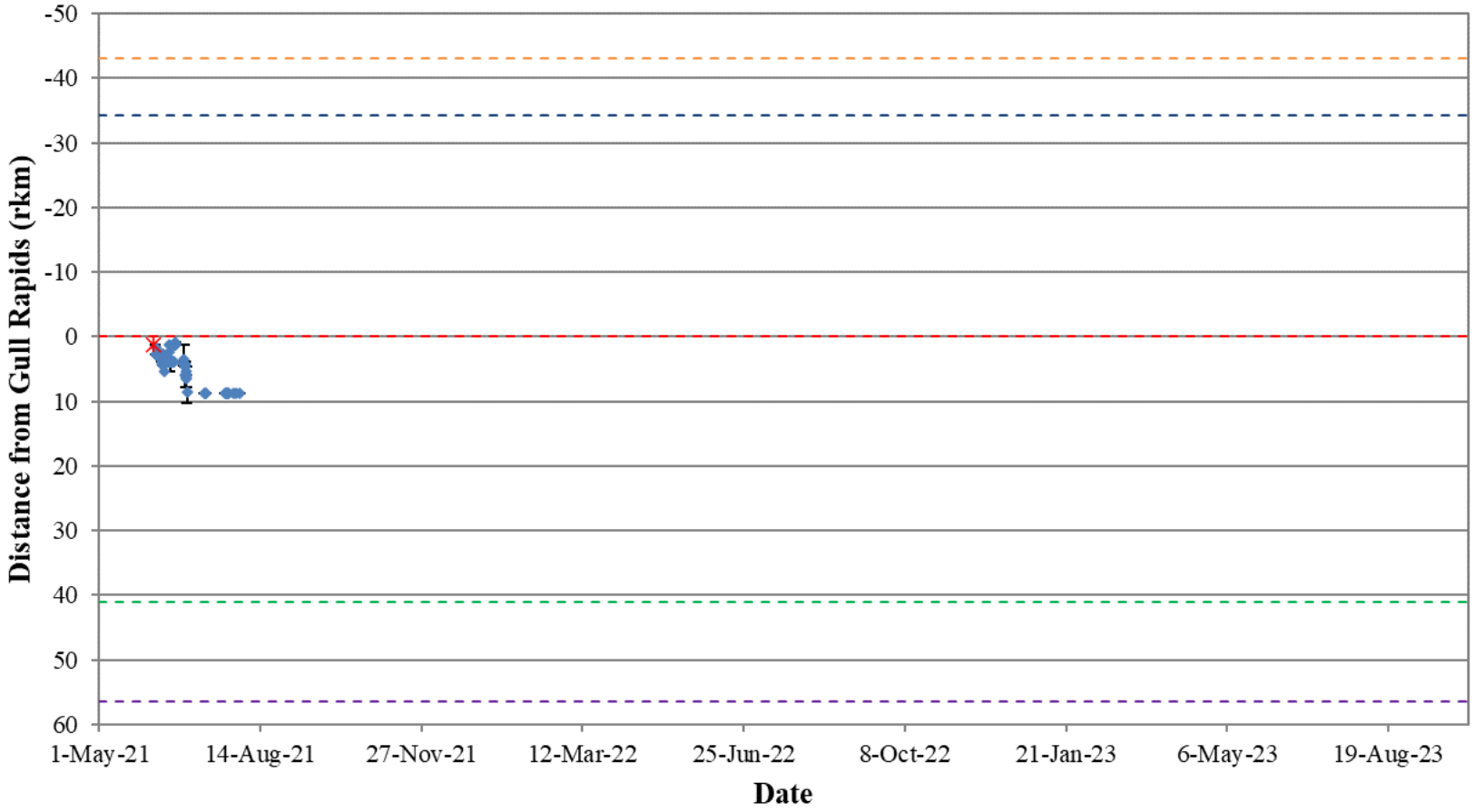

Figure A5-12: Position of a Walleye tagged with an acoustic transmitter (code #48247) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

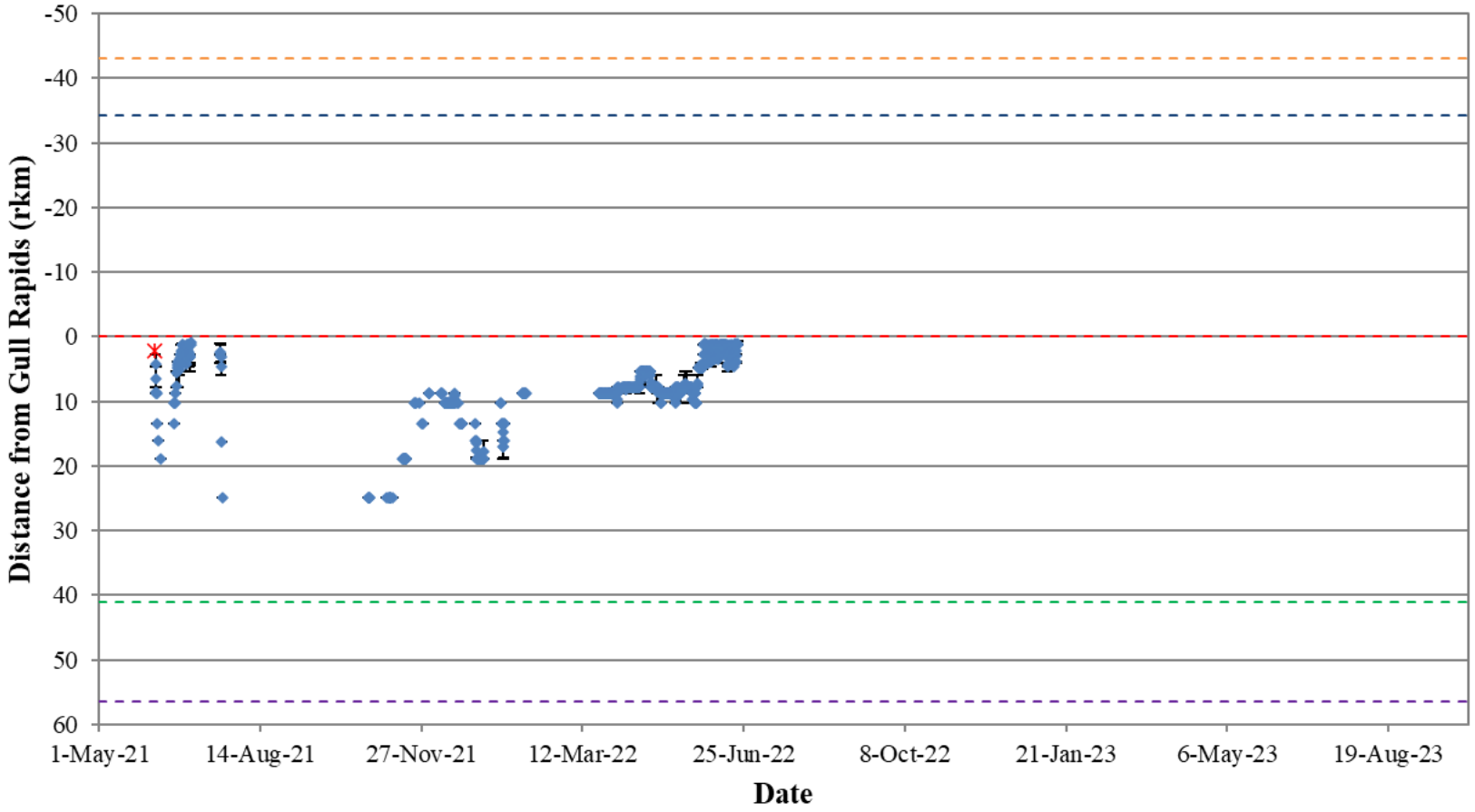

Figure A5-13: Position of a Walleye tagged with an acoustic transmitter (code #48248) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

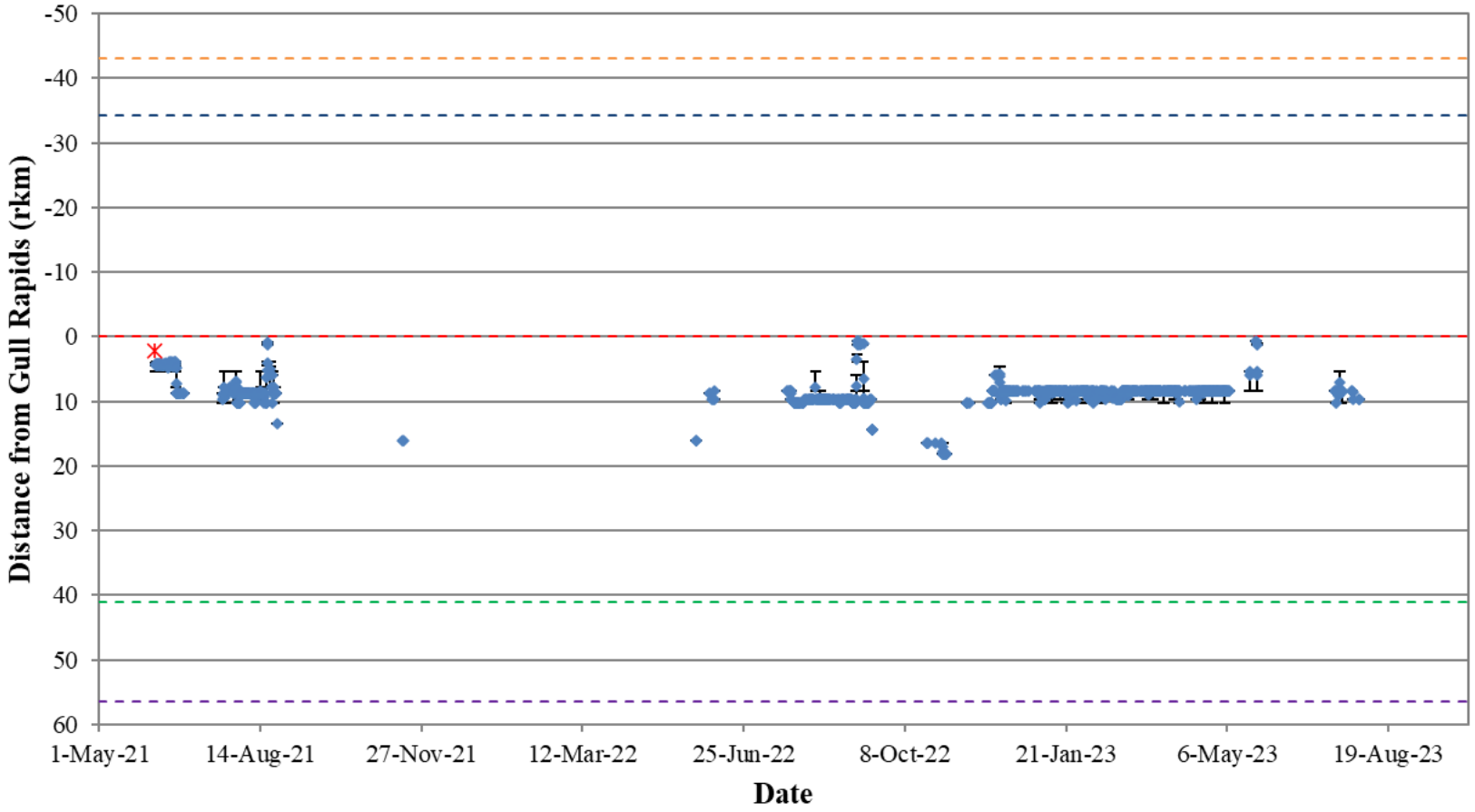

Figure A5-14: Position of a Walleye tagged with an acoustic transmitter (code #48249) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

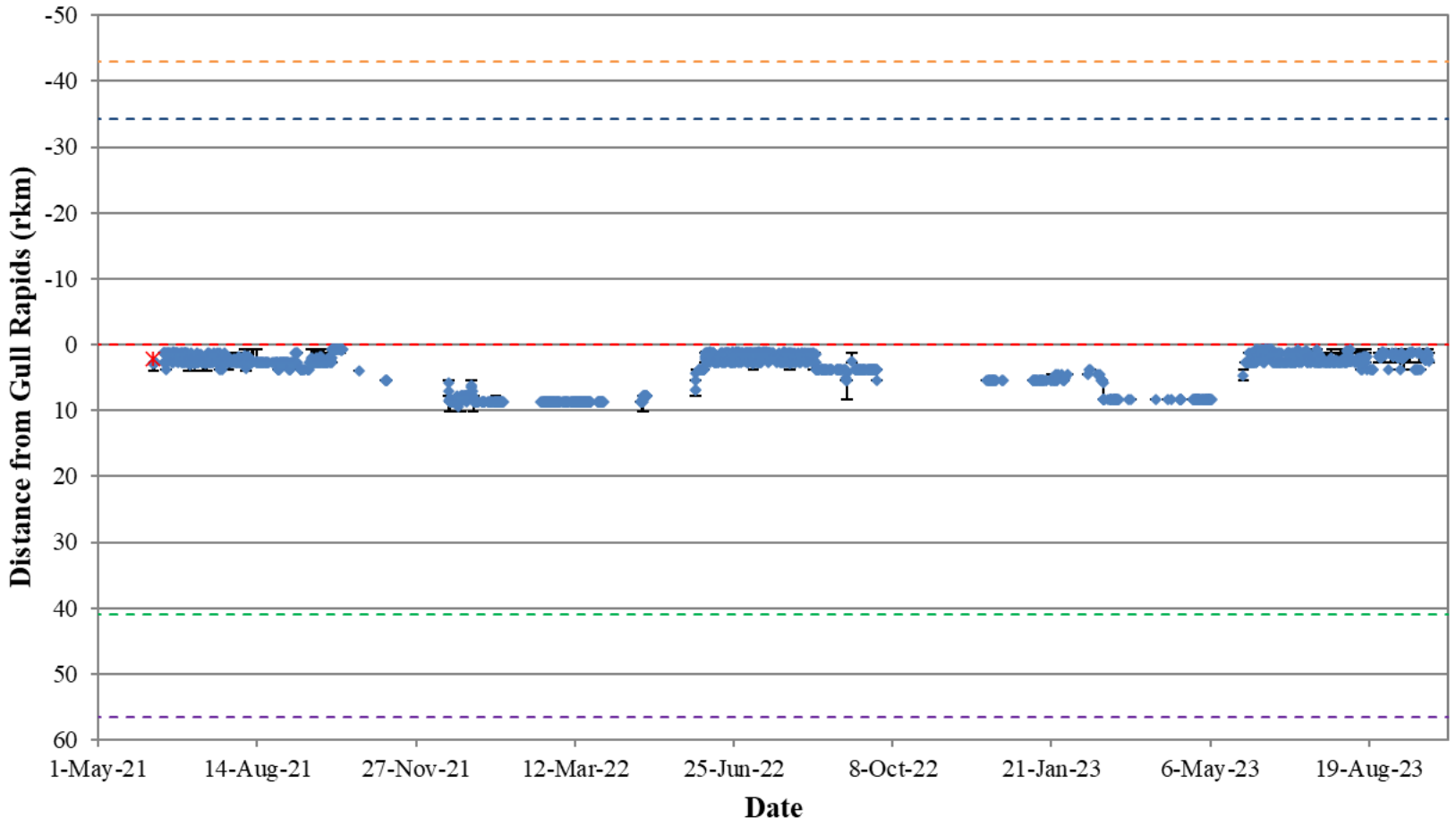

Figure A5-15: Position of a Walleye tagged with an acoustic transmitter (code #48250) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

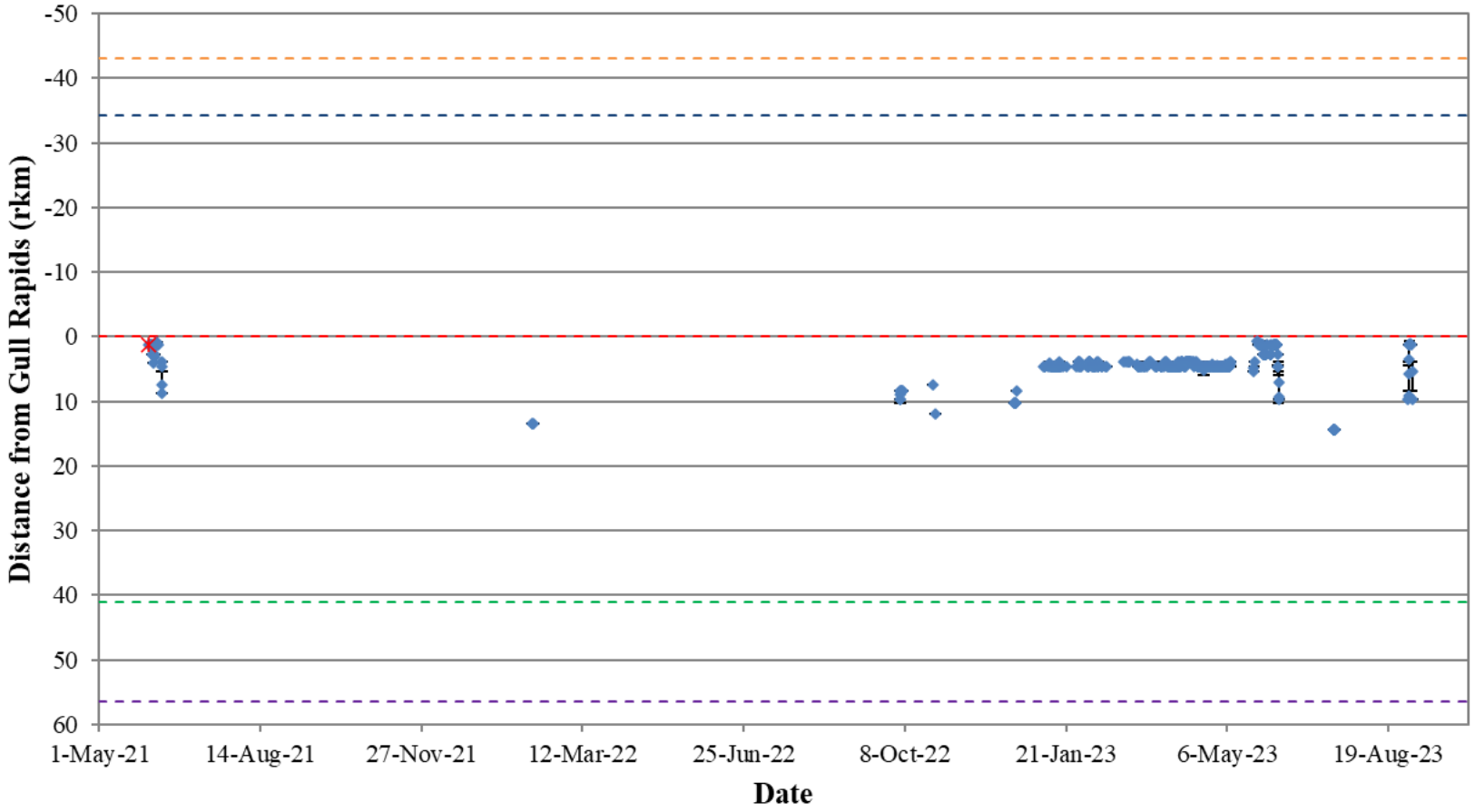

Figure A5-16: Position of a Walleye tagged with an acoustic transmitter (code #48251) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

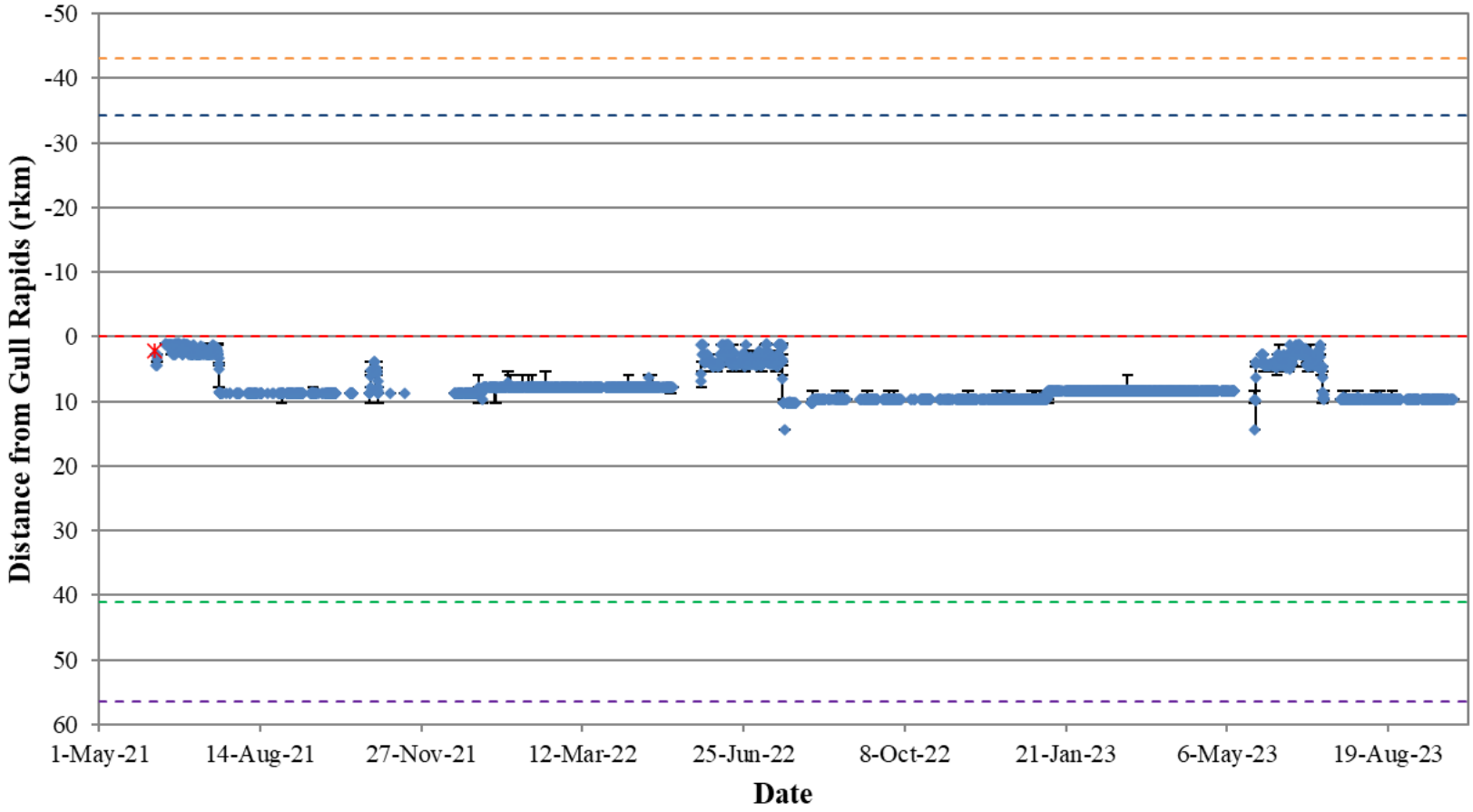

Figure A5-17: Position of a Walleye tagged with an acoustic transmitter (code #48252) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

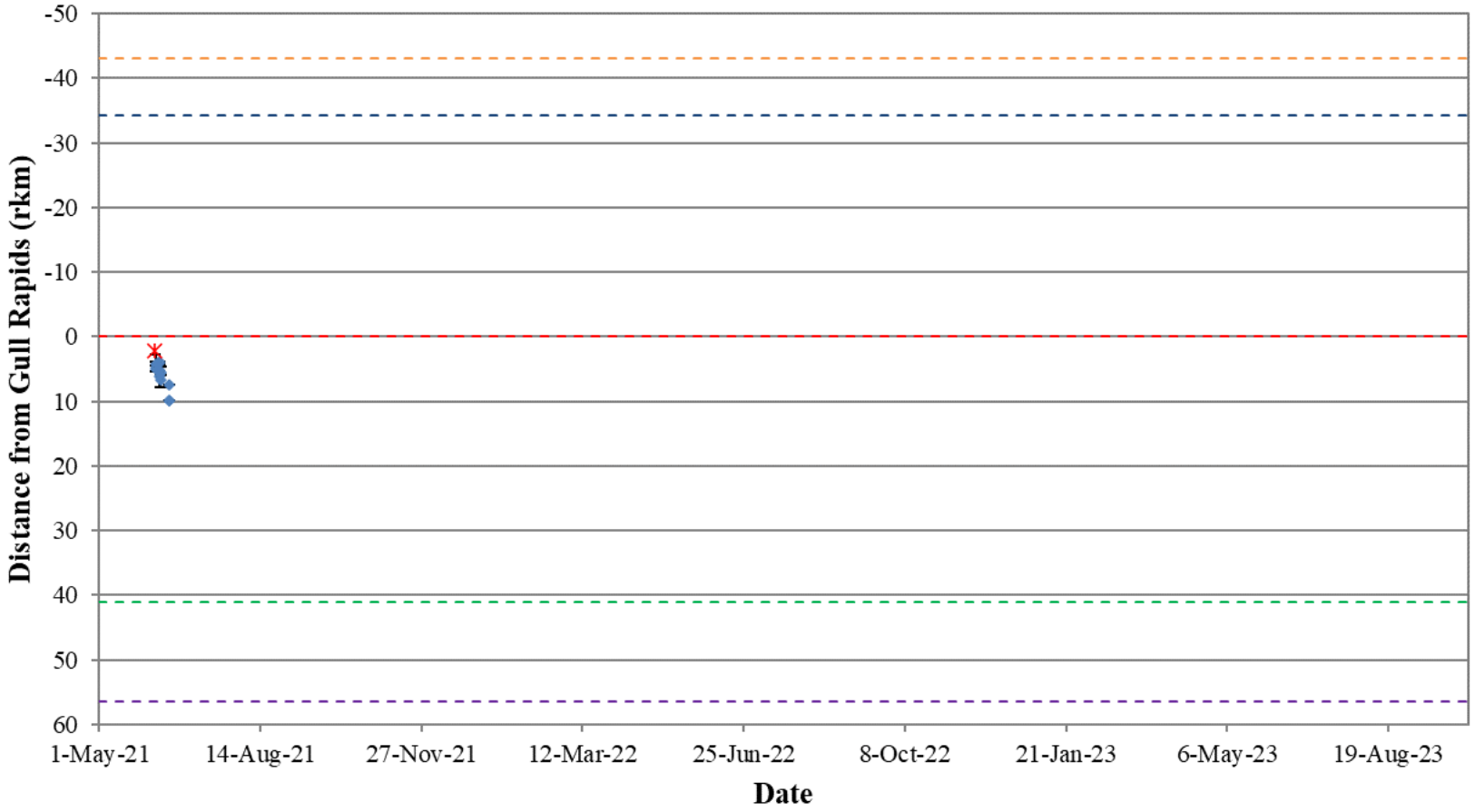

Figure A5-18: Position of a Walleye tagged with an acoustic transmitter (code #48253) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

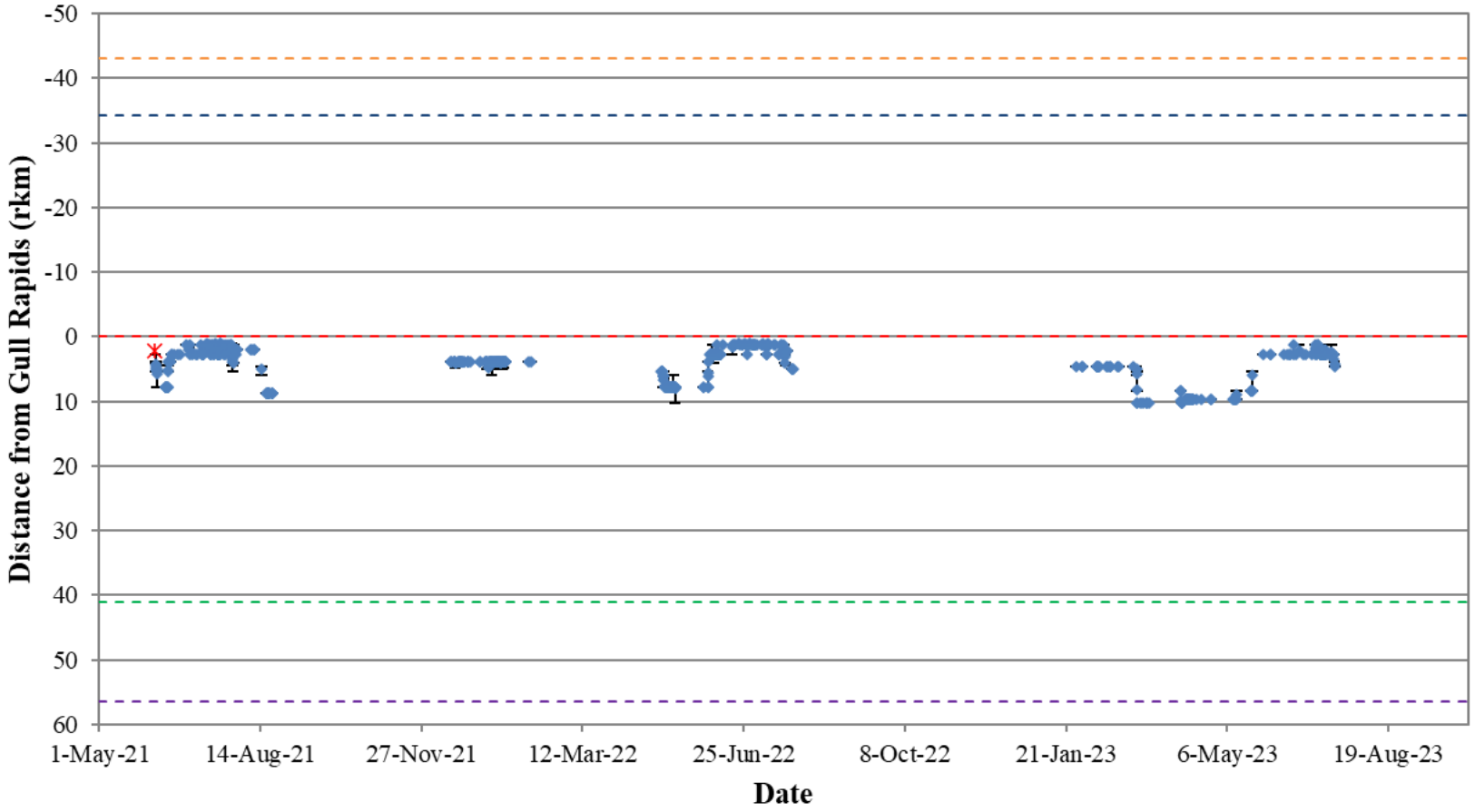

Figure A5-19: Position of a Walleye tagged with an acoustic transmitter (code #48254) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

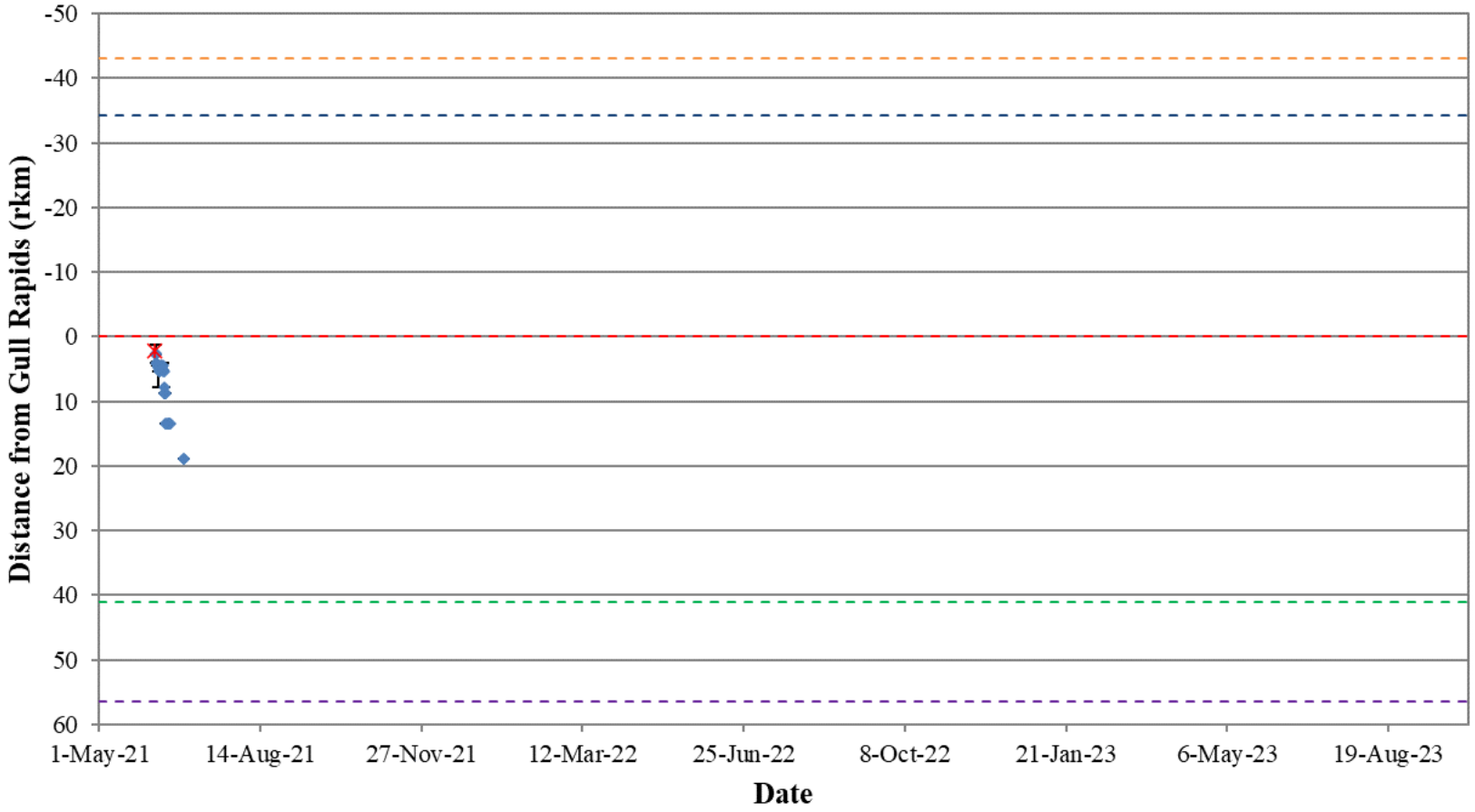

Figure A5-20: Position of a Walleye tagged with an acoustic transmitter (code #48255) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

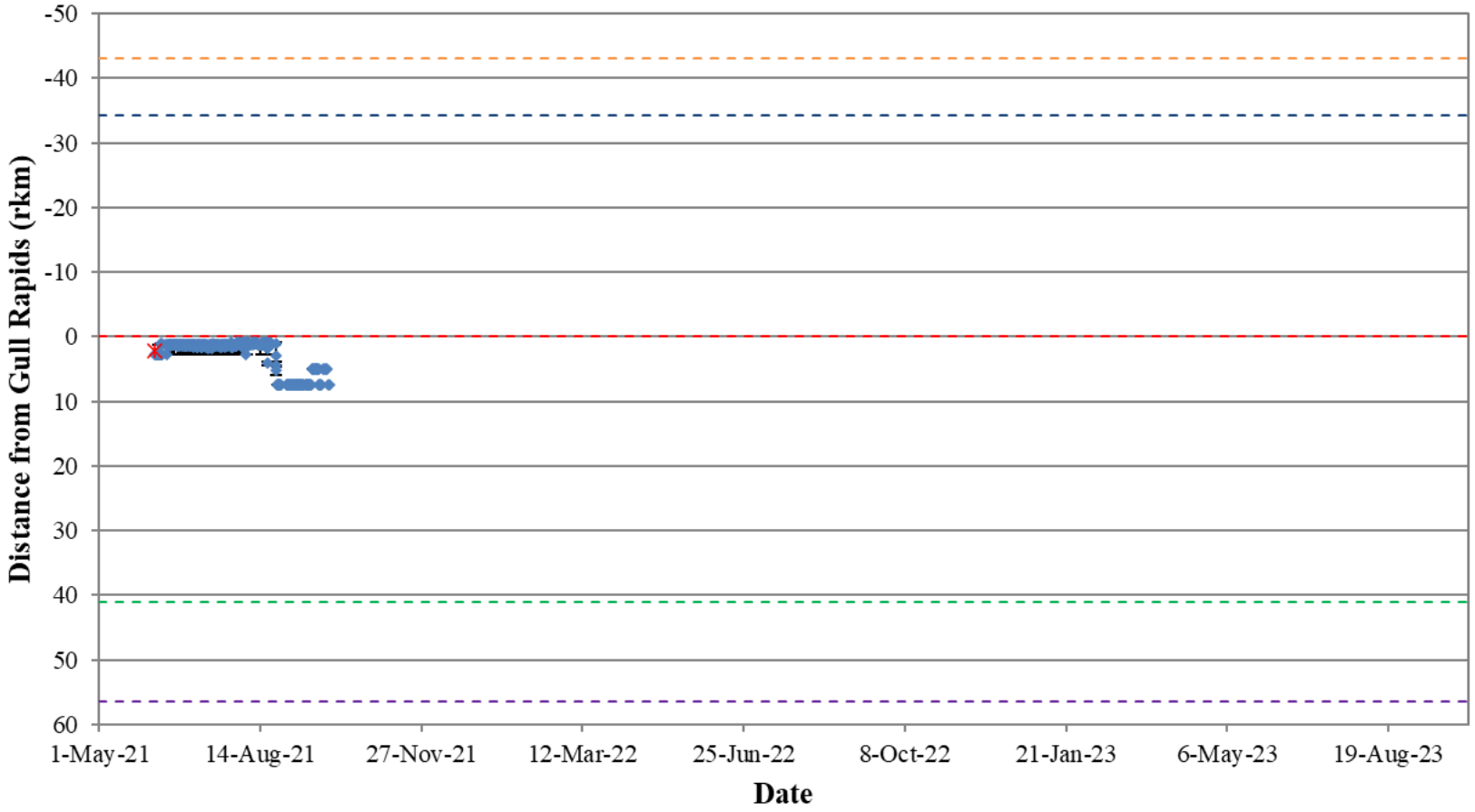

Figure A5-21: Position of a Walleye tagged with an acoustic transmitter (code #48256) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

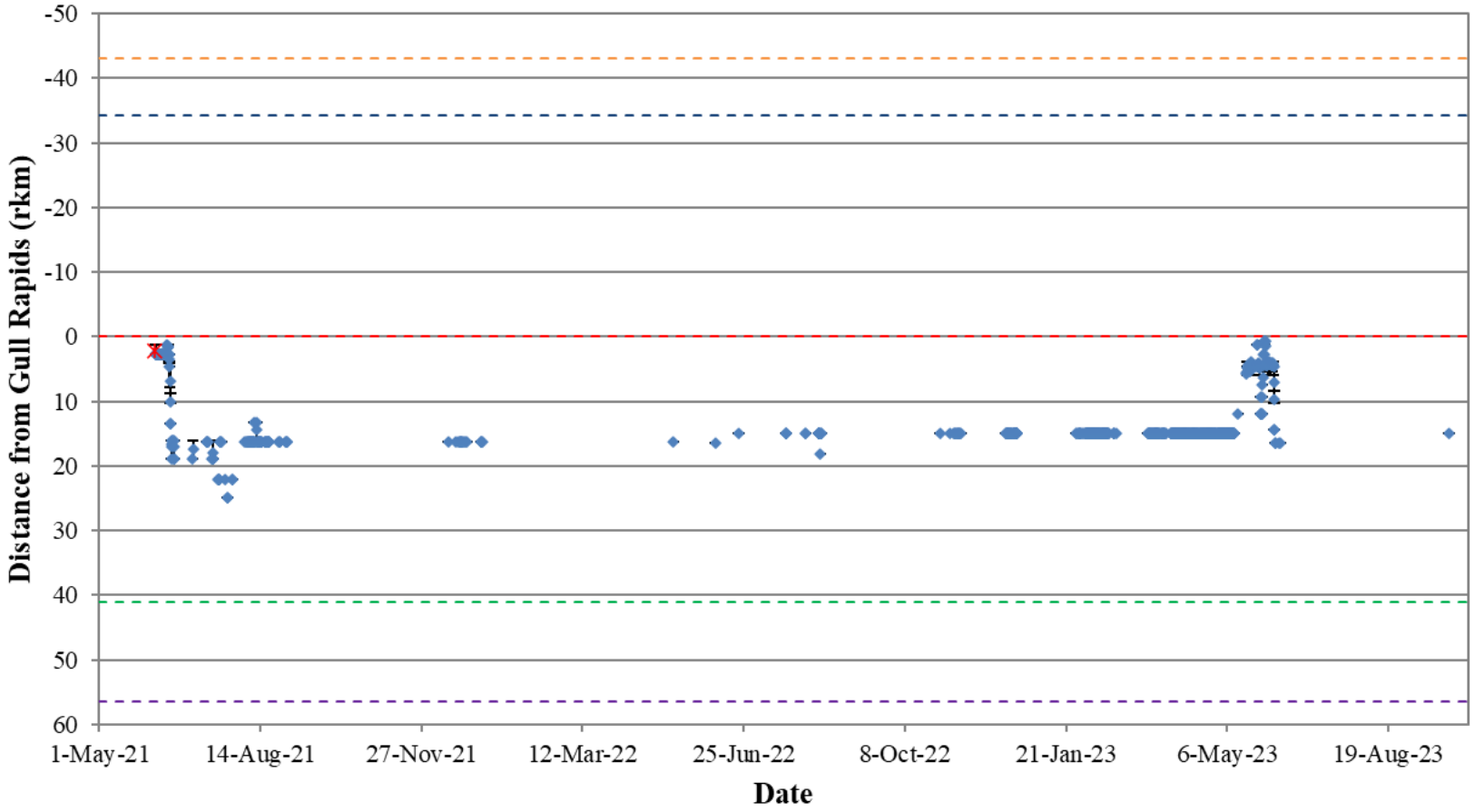

Figure A5-22: Position of a Walleye tagged with an acoustic transmitter (code #48257) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

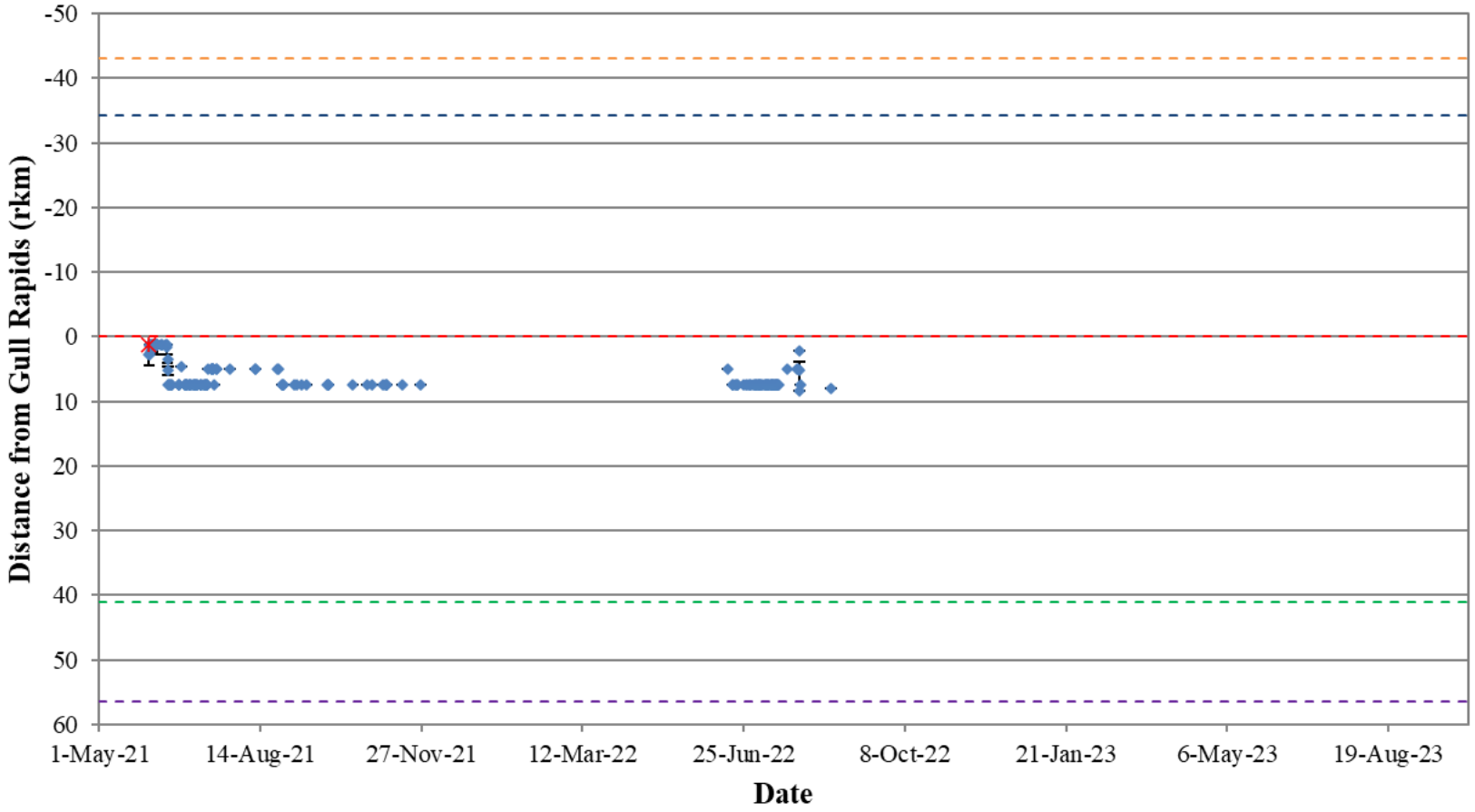

Figure A5-23: Position of a Walleye tagged with an acoustic transmitter (code #48272) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

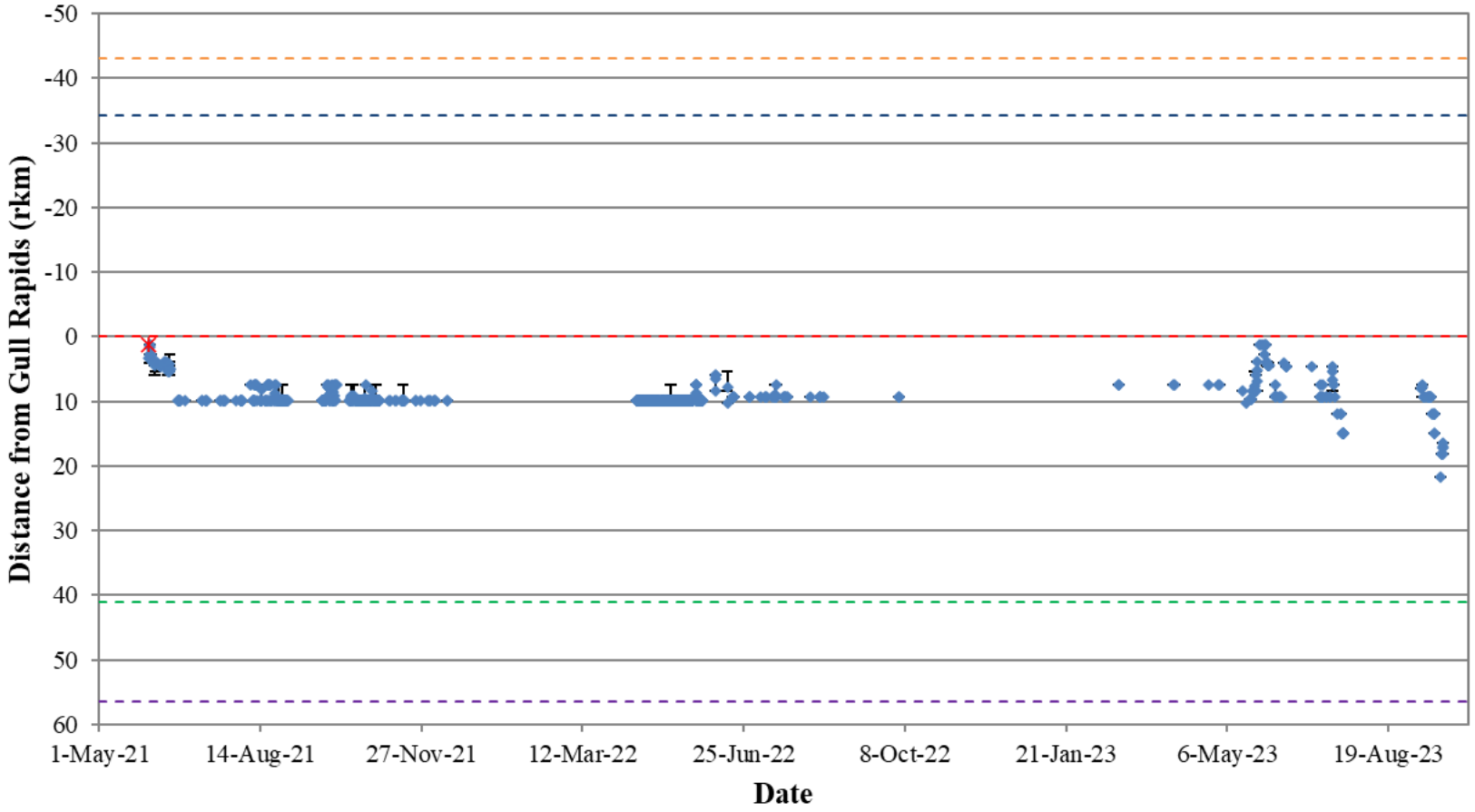

Figure A5-24: Position of a Walleye tagged with an acoustic transmitter (code #48273) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

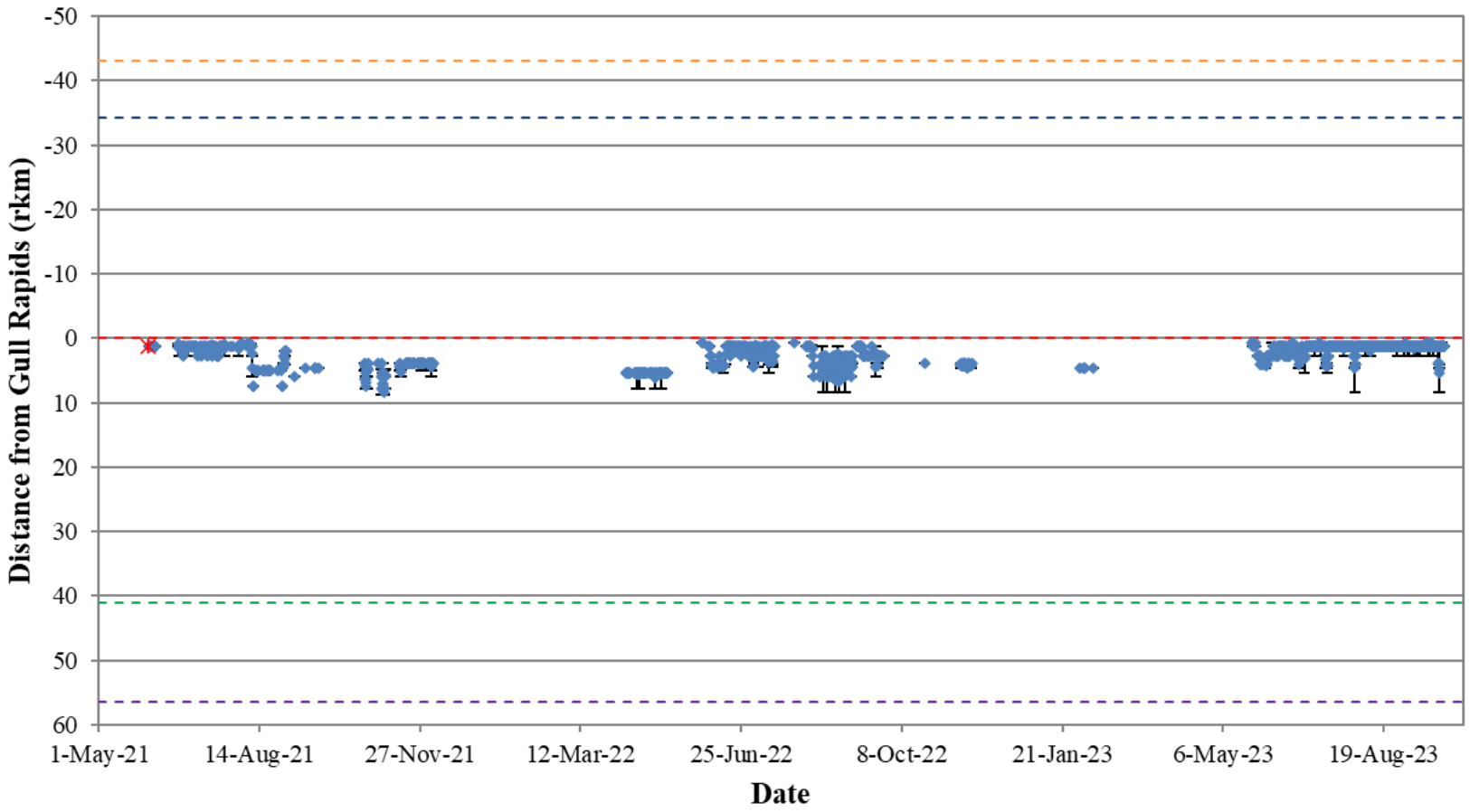

Figure A5-25: Position of a Walleye tagged with an acoustic transmitter (code #48274) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

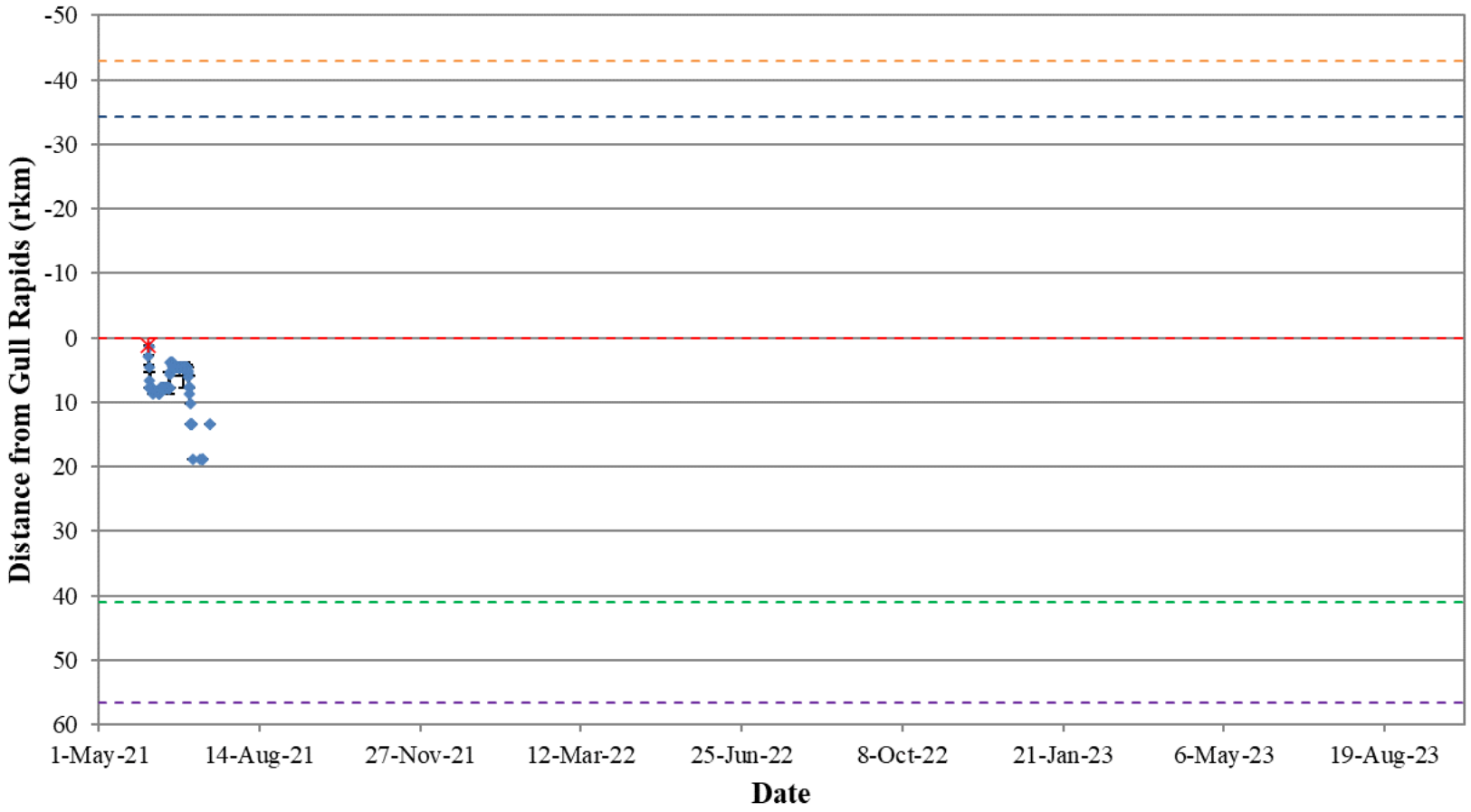

Figure A5-26: Position of a Walleye tagged with an acoustic transmitter (code #48275) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

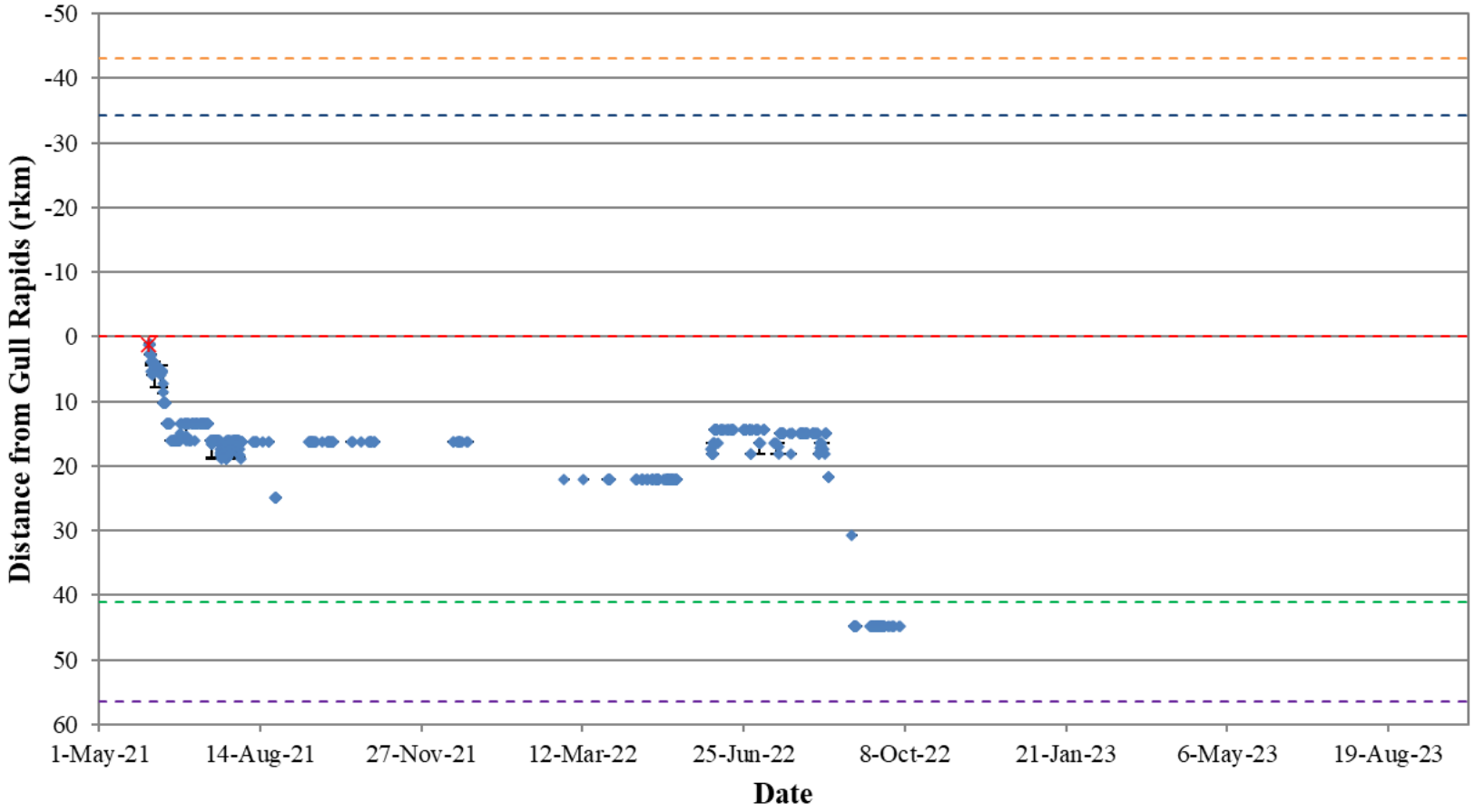

Figure A5-27: Position of a Walleye tagged with an acoustic transmitter (code #48318) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

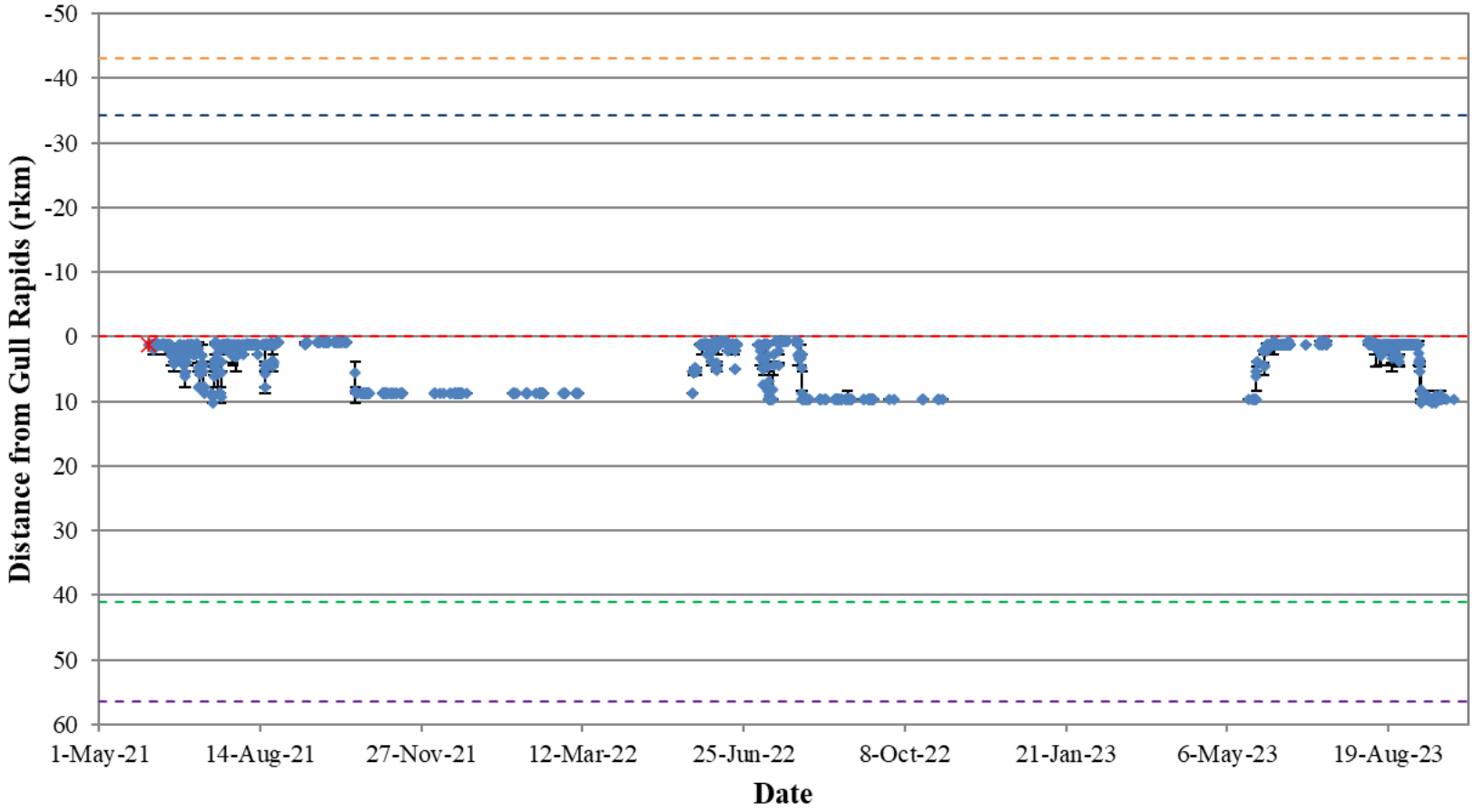

Figure A5-28: Position of a Walleye tagged with an acoustic transmitter (code #48324) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

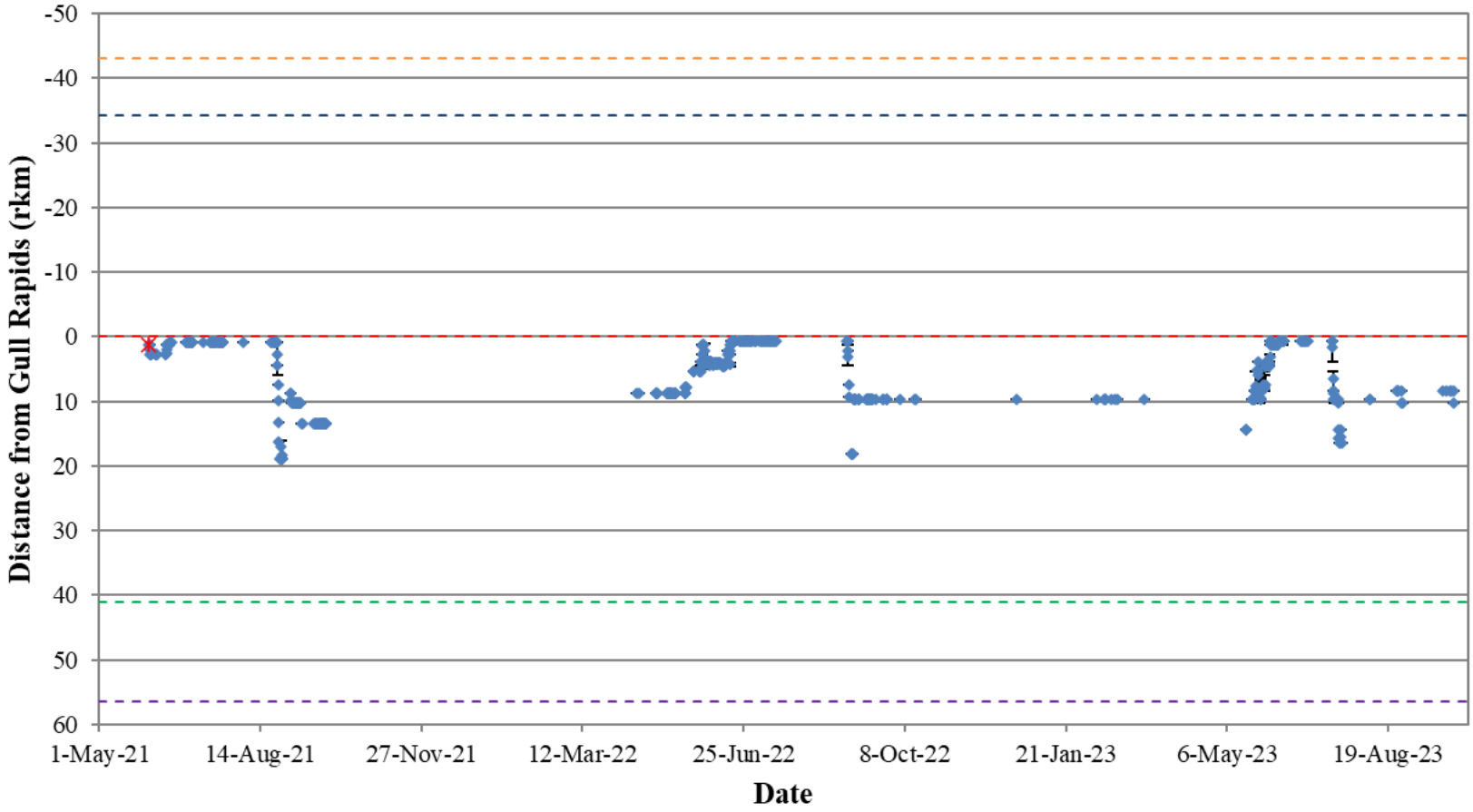

Figure A5-29: Position of a Walleye tagged with an acoustic transmitter (code #48325) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2021 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

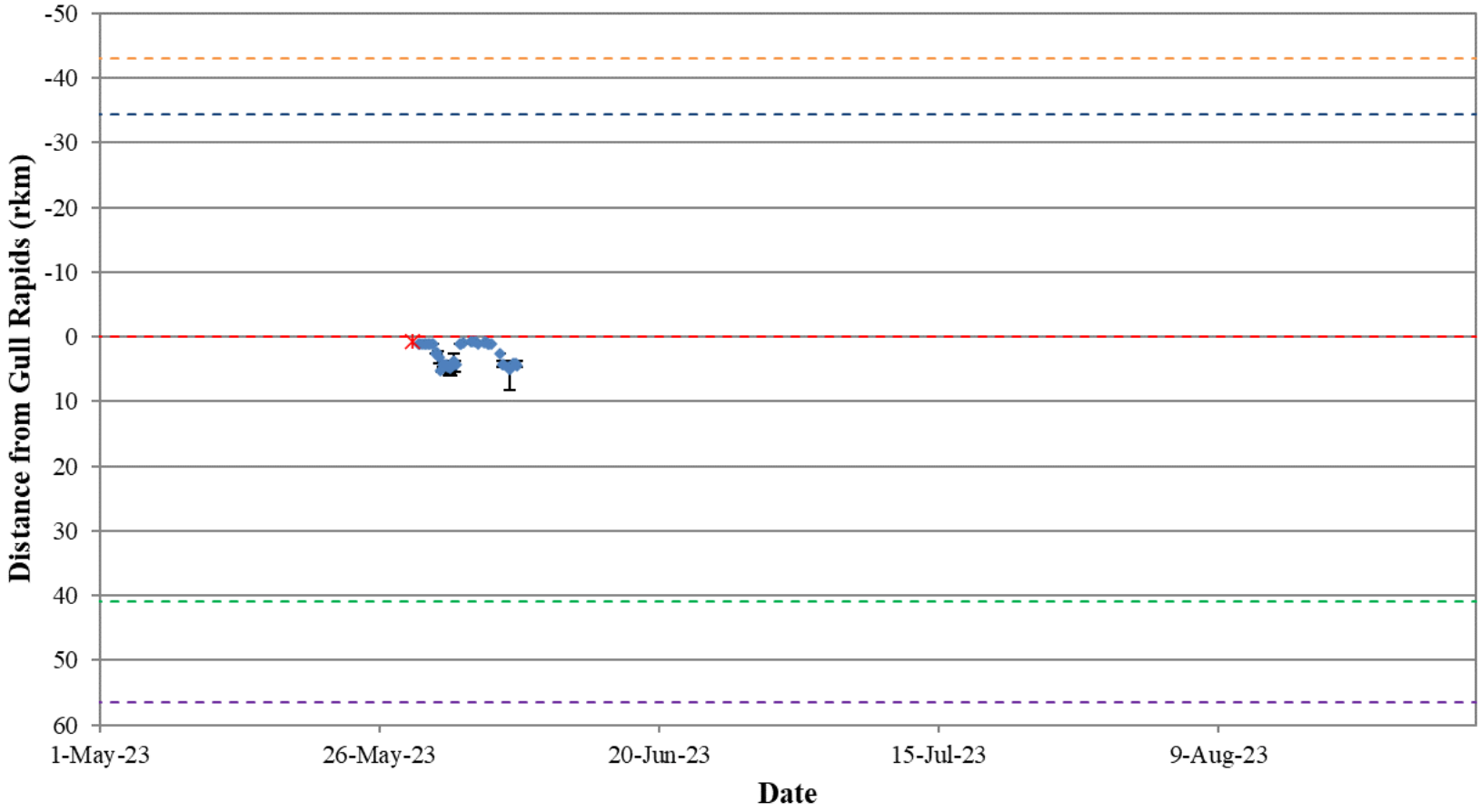

Figure A5-30: Position of a Walleye tagged with an acoustic transmitter (code #21301) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2023 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

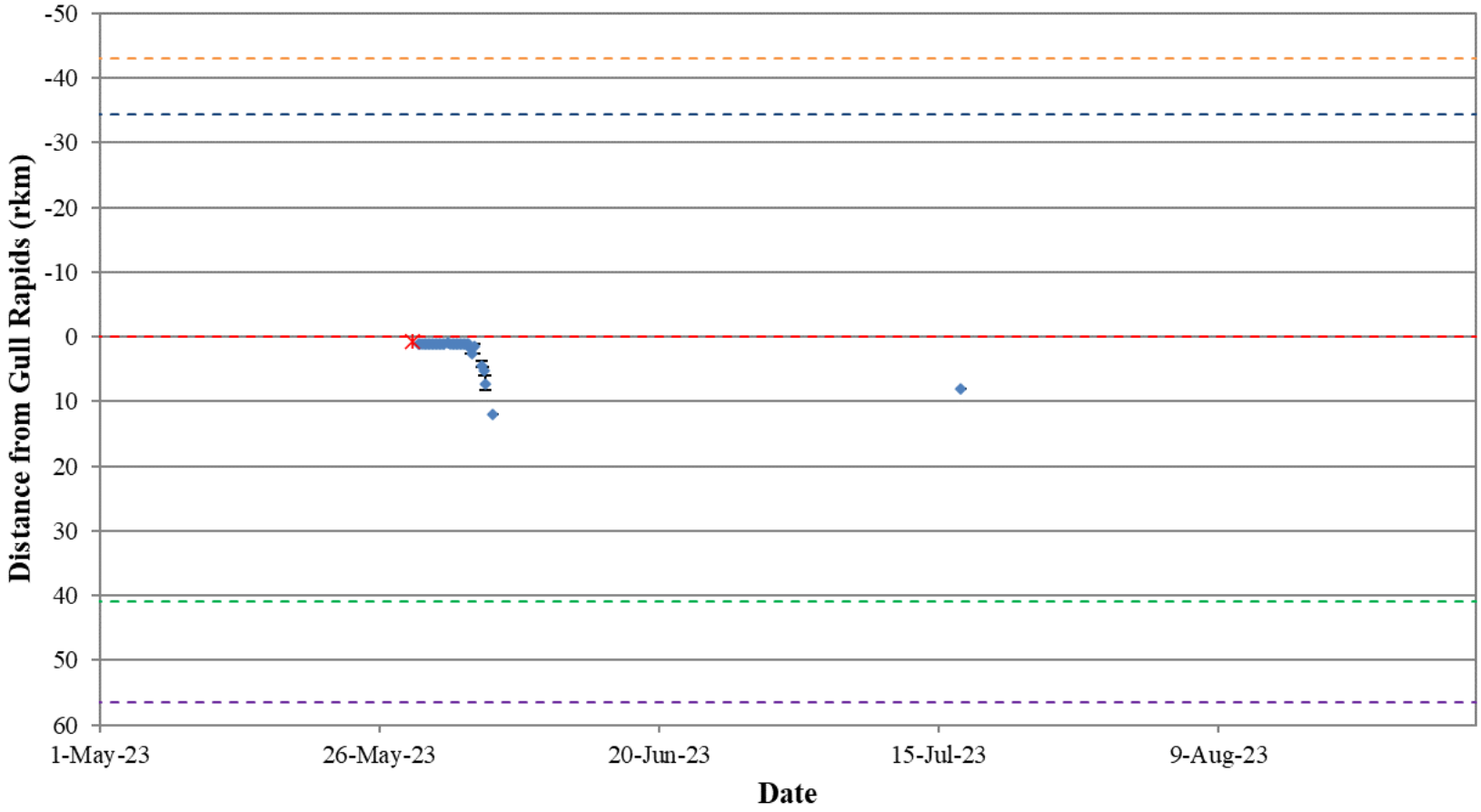

Figure A5-31: Position of a Walleye tagged with an acoustic transmitter (code #21309) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2023 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

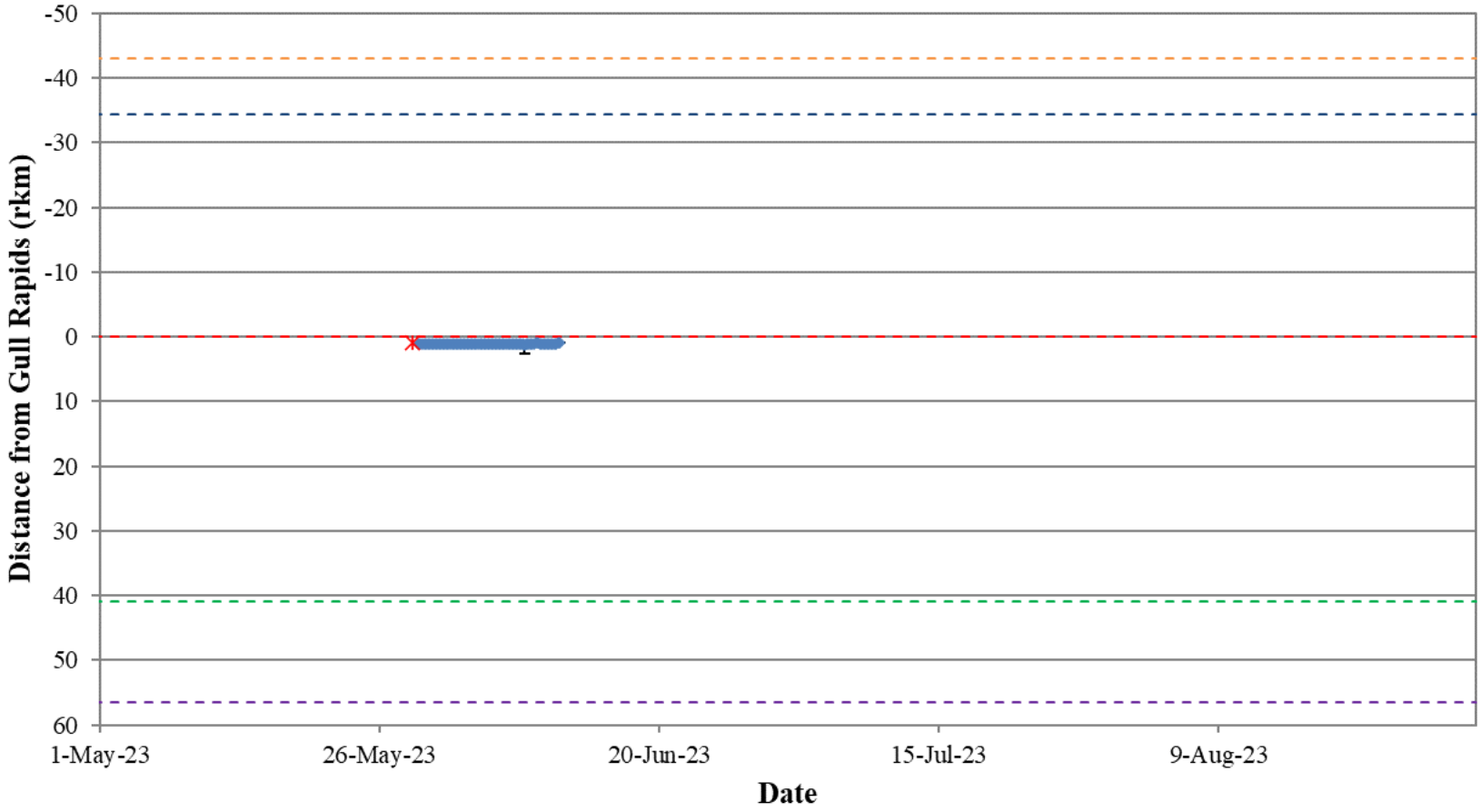

Figure A5-32: Position of a Walleye tagged with an acoustic transmitter (code #21310) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2023 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

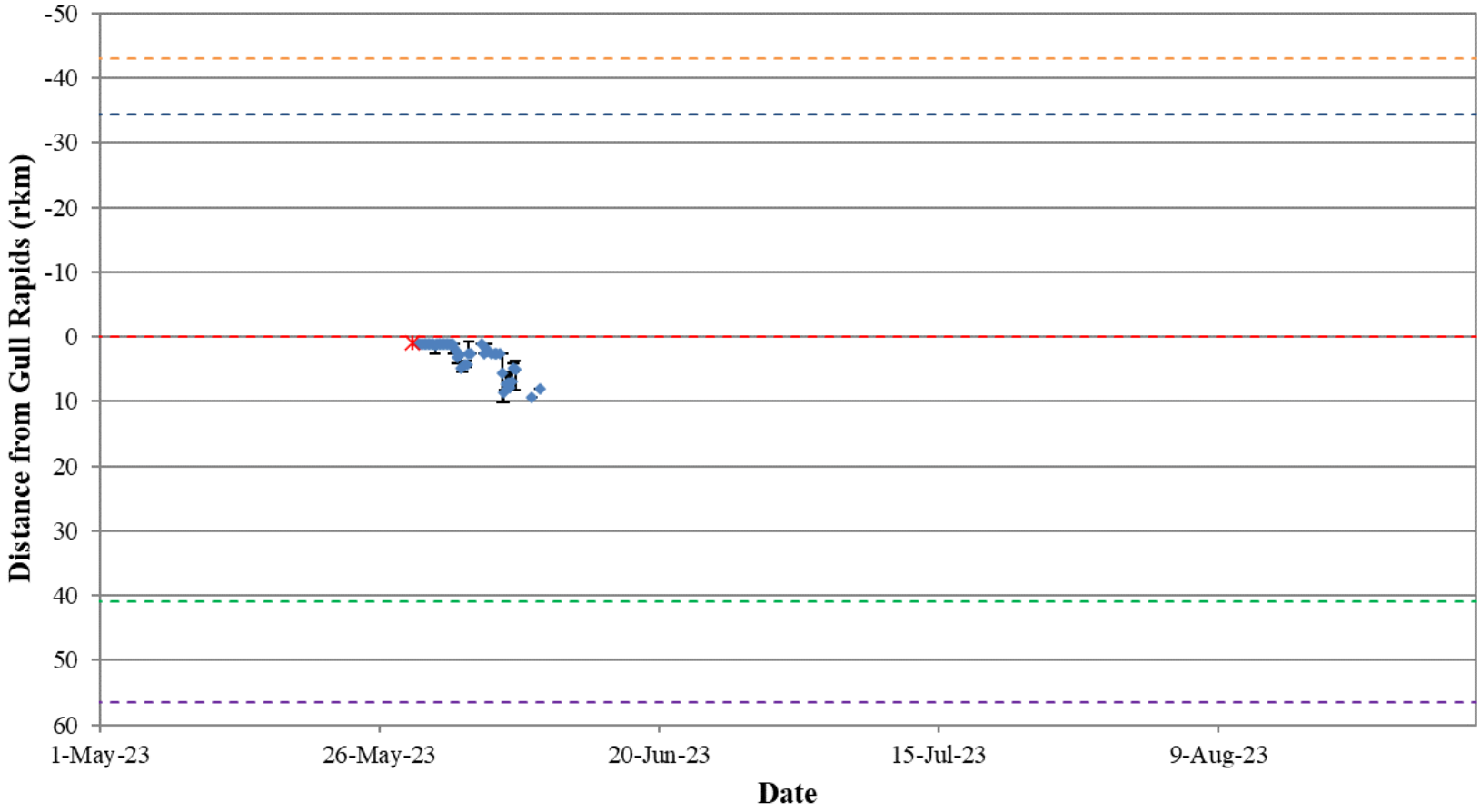

Figure A5-33: Position of a Walleye tagged with an acoustic transmitter (code #21311) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2023 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

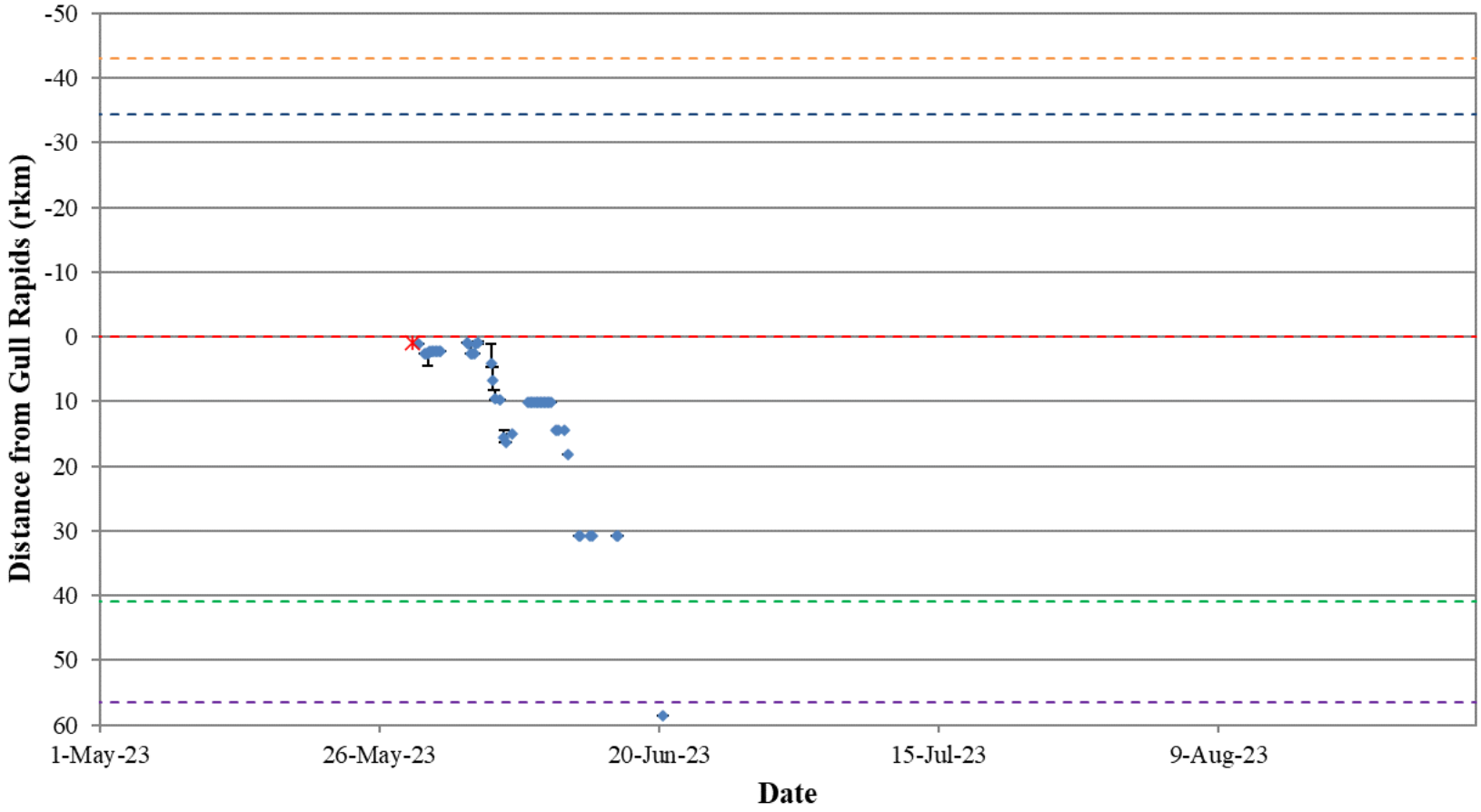

Figure A5-34: Position of a Walleye tagged with an acoustic transmitter (code #21312) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2023 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

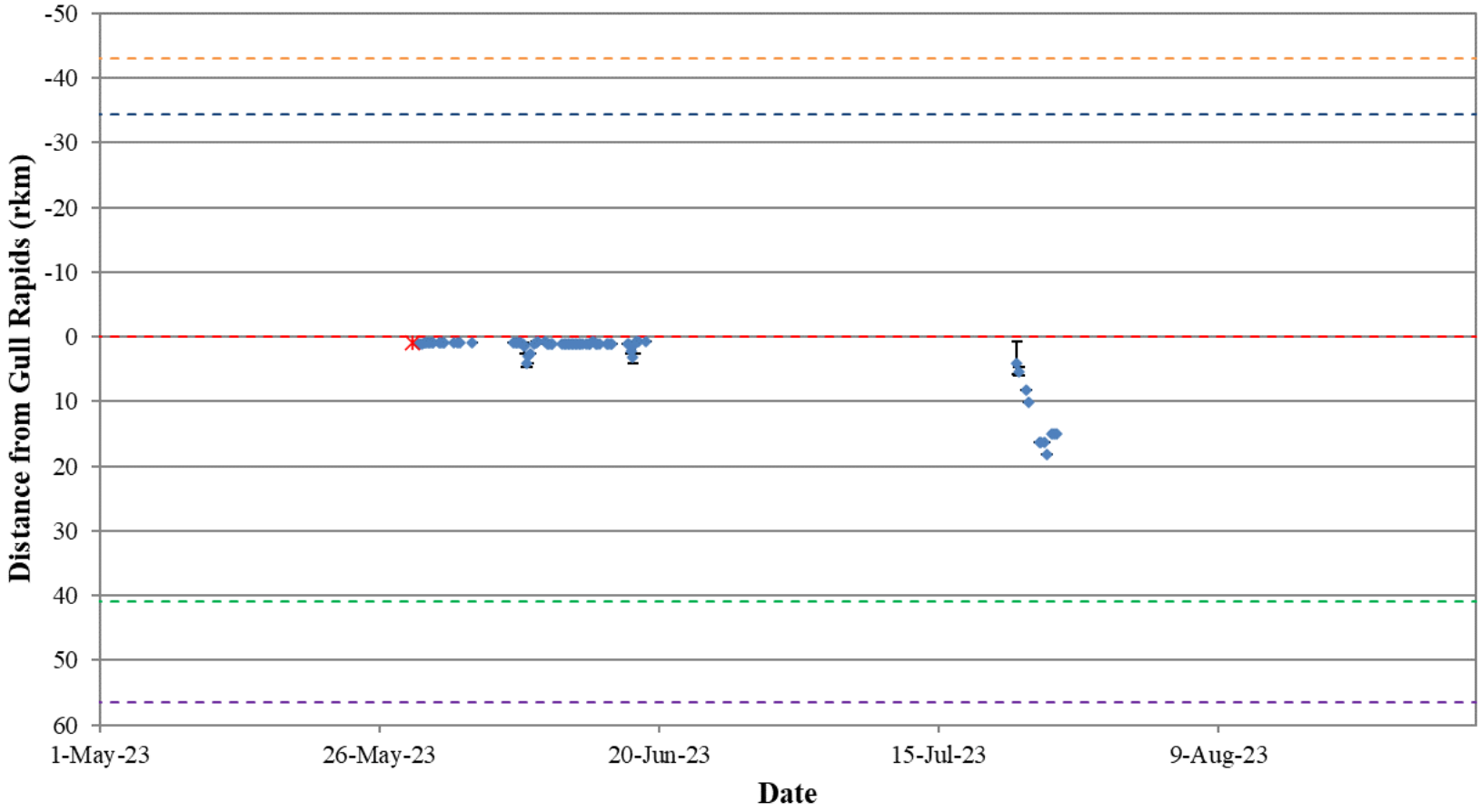

Figure A5-35: Position of a Walleye tagged with an acoustic transmitter (code #21313) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2023 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

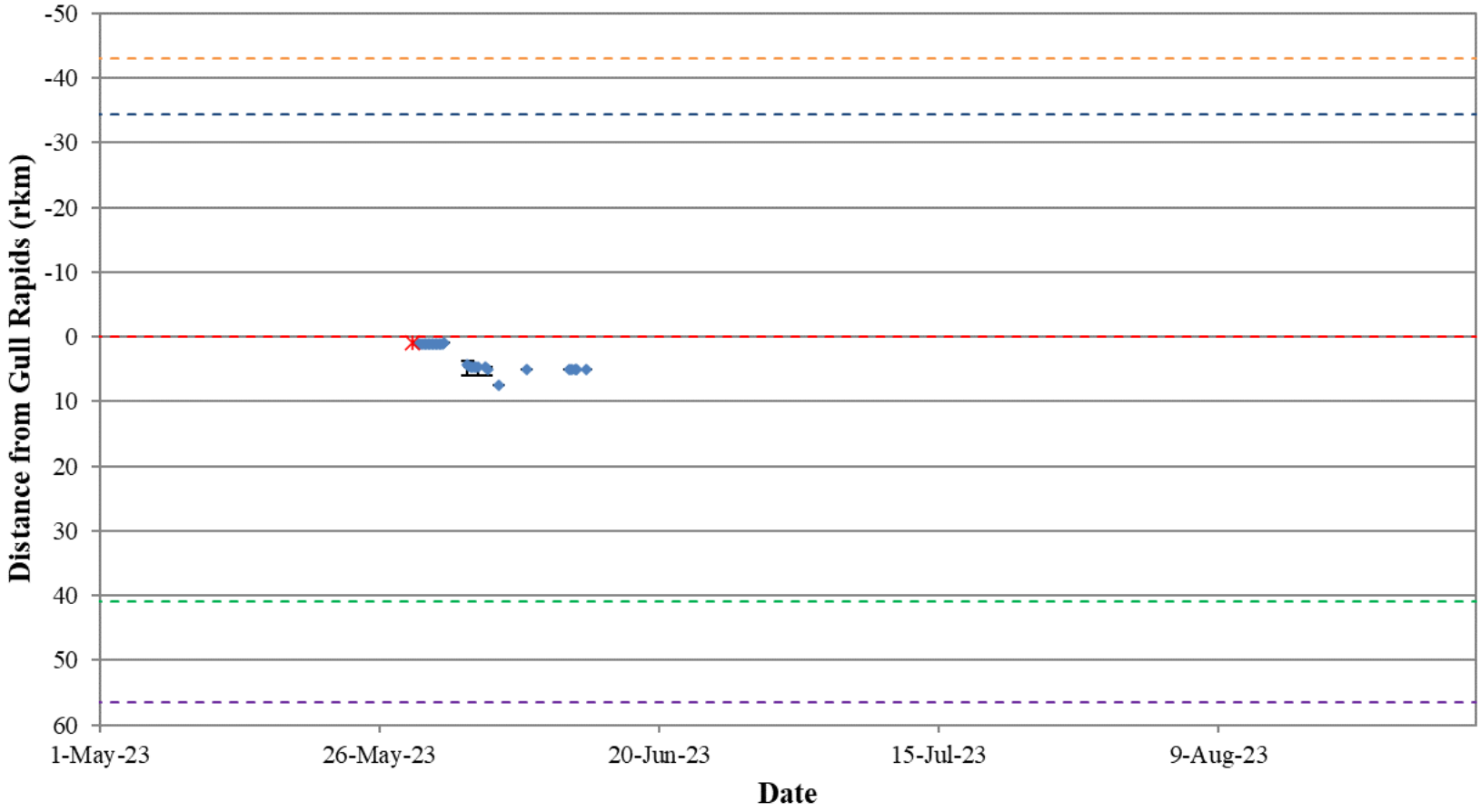

Figure A5-36: Position of a Walleye tagged with an acoustic transmitter (code #21319) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2023 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

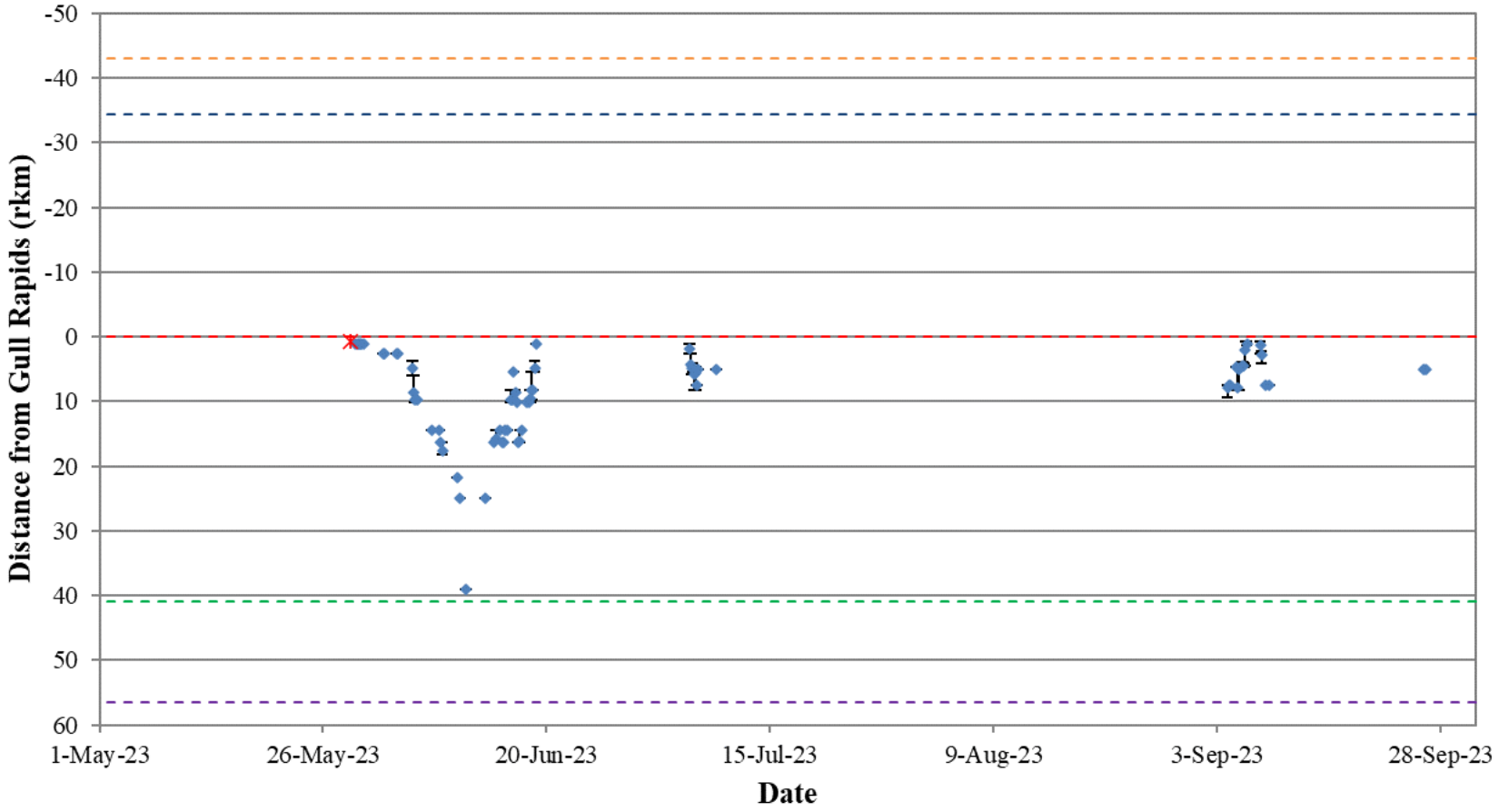

Figure A5-37: Position of a Walleye tagged with an acoustic transmitter (code #21325) in the Nelson River in Stephens Lake in relation to the Keeyask GS (rkm 0) from May 1, 2023 to October 2, 2023. Date and location of tagging is indicated by a star. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Keeyask GS (red), Kettle GS (green), and Long Spruce GS (purple).

APPENDIX 6:
BIOLOGICAL AND TAG INFORMATION FOR WALLEYE TAGGED UPSTREAM AND DOWNSTREAM OF THE KEEYASK GS 2018-2023

Table A6-1: Tag and biological information for each Walleye acoustically tagged upstream of the Keeyask GS between 2018 and 2023.

Acoustic Tag #	Floy Tag #	Tagging Date	Tag Life (days)	Expiry Date	Fork Length (mm)	Weight (g)
25739	109719	5-Jun-18	1735	6-Mar-23	410	800
25740	109718	5-Jun-18	1735	6-Mar-23	388	550
25742	109712	5-Jun-18	1735	6-Mar-23	320	400
25743	109713	5-Jun-18	1735	6-Mar-23	442	925
25744	109715	5-Jun-18	1735	6-Mar-23	525	1575
25745	109716	5-Jun-18	1735	6-Mar-23	438	850
25746	109717	5-Jun-18	1735	6-Mar-23	504	1750
25747	109704	28-May-18	1735	26-Feb-23	374	575
25748	109706	28-May-18	1735	26-Feb-23	398	525
25749	109705	28-May-18	1735	26-Feb-23	393	550
25750	109710	1-Jun-18	1735	2-Mar-23	403	725
25751	109711	5-Jun-18	1735	6-Mar-23	343	450
25752	109701	27-May-18	1735	25-Feb-23	404	700
25753	109702	27-May-18	1735	25-Feb-23	356	425
25754	109703	27-May-18	1735	25-Feb-23	367	550
25755	109708	1-Jun-18	1735	2-Mar-23	396	775
25756	109709	1-Jun-18	1735	2-Mar-23	452	1050
20147	114247	5-Jun-19	1492	6-Jul-23	523	1769
20148	114246	5-Jun-19	1492	6-Jul-23	383	590
20149	114245	6-Jun-19	1492	7-Jul-23	335	450
20150	114249	5-Jun-19	1492	6-Jul-23	500	1300
20151	114250	5-Jun-19	1492	6-Jul-23	485	1400
20153	114239	6-Jun-19	1492	7-Jul-23	498	1450
20154	114240	6-Jun-19	1492	7-Jul-23	415	800
20155	114241	6-Jun-19	1492	7-Jul-23	417	800
20156	114242	6-Jun-19	1492	7-Jul-23	299	300
20157	114243	6-Jun-19	1492	7-Jul-23	447	1000
20158	114244	6-Jun-19	1492	7-Jul-23	288	300
20159	114231	7-Jun-19	1492	8-Jul-23	500	1500
20160	114232	7-Jun-19	1492	8-Jul-23	415	800
20161	114226	7-Jun-19	1492	8-Jul-23	446	950
20162	114236	6-Jun-19	1492	7-Jul-23	300	300
20163	114237	6-Jun-19	1492	7-Jul-23	363	600
20164	114238	6-Jun-19	1492	7-Jul-23	343	500
20168	114775	7-Jun-19	1492	8-Jul-23	429	850
20169	114233	7-Jun-19	1492	8-Jul-23	391	550
20170	114235	6-Jun-19	1492	7-Jul-23	365	400
20171	114647	27-May-19	1492	27-Jun-23	386	600
20175	114642	29-May-19	1492	29-Jun-23	374	580
20176	114645	29-May-19	1492	29-Jun-23	419	900
20181	114644	29-May-19	1492	29-Jun-23	345	500
20182	-	25-May-19	1492	25-Jun-23	311	350
20186	114641	29-May-19	1492	29-Jun-23	350	450

Table A6-1: Tag and biological information for each Walleye acoustically tagged upstream of the Keeyask GS between 2018 and 2023 (continued)

Acoustic Tag #	Floy Tag #	Tagging Date	Tag Life (days)	Expiry Date	Fork Length (mm)	Weight (g)
20187	114649	23-May-19	1492	23-Jun-23	320	-
20188	114650	23-May-19	1492	23-Jun-23	380	-
48244	121601	03-Jun-21	1460	02-Jun-25	385	720
48258	121628	05-Jun-21	1460	04-Jun-25	438	920
48259	121627	05-Jun-21	1460	04-Jun-25	431	1000
48260	121626	05-Jun-21	1460	04-Jun-25	474	1220
48261	121520	07-Jun-21	1460	06-Jun-25	422	1050
48262	121513	10-Jun-21	1460	09-Jun-25	320	475
48263	121536	14-Jun-21	1460	13-Jun-25	392	710
48264	121614	05-Jun-21	1460	04-Jun-25	516	1870
48265	121619	05-Jun-21	1460	04-Jun-25	460	1270
48266	121624	05-Jun-21	1460	04-Jun-25	538	1700
48267	121625	05-Jun-21	1460	04-Jun-25	488	1440
48268	121623	05-Jun-21	1460	04-Jun-25	452	1160
48269	121622	05-Jun-21	1460	04-Jun-25	475	1280
48270	121612	05-Jun-21	1460	04-Jun-25	505	1700
48271	121613	05-Jun-21	1460	04-Jun-25	497	1500
48313	116422	31-May-21	1460	30-May-25	541	2100
48314	116425	31-May-21	1460	30-May-25	435	1000
48319	116419	31-May-21	1460	30-May-25	363	580
48320	116420	31-May-21	1460	30-May-25	386	740
48321	116423	31-May-21	1460	30-May-25	474	1350
48322	116424	31-May-21	1460	30-May-25	393	640
48323	116418	31-May-21	1460	30-May-25	327	490
48326	116417	31-May-21	1460	30-May-25	319	500
48327	122261	01-Jun-21	1460	31-May-25	350	500
48328	116421	31-May-21	1460	30-May-25	440	1250
48329	122266	01-Jun-21	1460	31-May-25	420	850
48330	122255	01-Jun-21	1460	31-May-25	360	570
48331	122254	01-Jun-21	1460	31-May-25	355	520
48332	122270	01-Jun-21	1460	31-May-25	398	770
48333	116416	31-May-21	1460	30-May-25	349	500
21301	125375	29-May-23	1460	28-May-27	429	900
21309	125378	29-May-23	1460	28-May-27	430	850
21310	125370	29-May-23	1460	28-May-27	388	700
21311	125372	29-May-23	1460	28-May-27	385	600
21312	125369	29-May-23	1460	28-May-27	410	700
21313	125373	29-May-23	1460	28-May-27	408	750
21319	125371	29-May-23	1460	28-May-27	444	1050
21325	125379	29-May-23	1460	28-May-27	450	950

Table A6-2: Tag and biological information for each Walleye acoustically tagged in Stephens Lake between 2018 and 2023.

Acoustic Tag #	Floy Tag #	Tagging Date	Tag Life (days)	Expiry Date	Fork Length (mm)	Weight (g)
25732	90279	9-Jun-18	1735	10-Mar-23	415	525
25734	90277	7-Jun-18	1735	8-Mar-23	395	600
25735	109725	6-Jun-18	1735	7-Mar-23	468	1250
25736	90276	7-Jun-18	1735	8-Mar-23	482	1400
25737	109722	6-Jun-18	1735	7-Mar-23	390	650
25738	109721	6-Jun-18	1735	7-Mar-23	569	1725
25741	109720	6-Jun-18	1735	7-Mar-23	409	625
20129	114779	3-Jun-19	1492	4-Jul-23	363	500
20130	114785	1-Jun-19	1493	3-Jul-23	340	450
20131	114646	31-May-19	1494	3-Jul-23	530	1500
20132	114786	1-Jun-19	1495	5-Jul-23	320	400
20133	114796	31-May-19	1496	5-Jul-23	477	1200
20134	114795	31-May-19	1497	6-Jul-23	500	1450
20135	114783	1-Jun-19	1498	8-Jul-23	330	400
20136	114787	1-Jun-19	1499	9-Jul-23	472	1100
20137	114797	31-May-19	1500	9-Jul-23	482	1450
20138	114794	31-May-19	1501	10-Jul-23	451	1350
20139	114800	31-May-19	1502	11-Jul-23	439	900
20140	114799	31-May-19	1503	12-Jul-23	367	600
20141	114639	31-May-19	1504	13-Jul-23	433	850
20142	114798	31-May-19	1505	14-Jul-23	471	1300
20143	114792	1-Jun-19	1506	16-Jul-23	415	900
20144	114784	1-Jun-19	1507	17-Jul-23	367	550
20145	114782	1-Jun-19	1508	18-Jul-23	426	850
20152	114636	31-May-19	1509	18-Jul-23	479	1150
20165	117592	16-Sep-19	1510	4-Nov-23	465	1200
20167	117590	16-Sep-19	1511	5-Nov-23	420	800
20171	114647	27-May-19	1492	27-Jun-23	386	600
20172	114632	30-May-19	1512	20-Jul-23	470	1200
20173	114633	30-May-19	1513	21-Jul-23	470	1350
20174	114634	30-May-19	1514	22-Jul-23	502	1350
20177	114630	30-May-19	1515	23-Jul-23	460	1300
20178	114631	30-May-19	1516	24-Jul-23	499	1600
20179	114637	30-May-19	1517	25-Jul-23	453	1000
20180	114638	30-May-19	1518	26-Jul-23	520	1500
20183	114635	30-May-19	1519	27-Jul-23	455	850
20184	114628	30-May-19	1520	28-Jul-23	392	700
20185	114629	30-May-19	1521	29-Jul-23	390	650
48234	116450	2-Jun-21	1460	1-Jun-25	761	2550
48235	116449	2-Jun-21	1460	1-Jun-25	454	1070
48236	116448	2-Jun-21	1460	1-Jun-25	462	1320
48237	116447	2-Jun-21	1460	1-Jun-25	402	720
48238	116446	2-Jun-21	1460	1-Jun-25	348	490

Table A6-2: Tag and biological information for each Walleye acoustically tagged in Stephens Lake between 2018 and 2022 (continued).

Acoustic Tag #	Floy Tag #	Tagging Date	Tag Life (days)	Expiry Date	Fork Length (mm)	Weight (g)
48239	116445	02-Jun-21	1460	01-Jun-25	337	400
48240	116444	02-Jun-21	1460	01-Jun-25	428	1000
48241	116443	02-Jun-21	1460	01-Jun-25	370	600
48242	117975	02-Jun-21	1460	01-Jun-25	422	950
48243	117974	02-Jun-21	1460	01-Jun-25	397	840
48245	117971	04-Jun-21	1460	03-Jun-25	440	825
48246	122126	06-Jun-21	1460	05-Jun-25	422	750
48247	117970	05-Jun-21	1460	04-Jun-25	412	650
48248	122127	06-Jun-21	1460	05-Jun-25	340	450
48249	122046	06-Jun-21	1460	05-Jun-25	350	450
48250	122047	06-Jun-21	1460	05-Jun-25	481	1250
48251	116433	02-Jun-21	1460	01-Jun-25	365	600
48252	122147	06-Jun-21	1460	05-Jun-25	484	1350
48253	122150	06-Jun-21	1460	05-Jun-25	391	675
48254	122149	06-Jun-21	1460	05-Jun-25	430	1000
48255	122148	06-Jun-21	1460	05-Jun-25	460	950
48256	122045	06-Jun-21	1460	05-Jun-25	472	1100
48257	122128	06-Jun-21	1460	05-Jun-25	485	1300
48272	116435	02-Jun-21	1460	01-Jun-25	345	550
48273	116437	02-Jun-21	1460	01-Jun-25	380	580
48274	116434	02-Jun-21	1460	01-Jun-25	362	600
48275	116436	02-Jun-21	1460	01-Jun-25	433	810
48318	116431	02-Jun-21	1460	01-Jun-25	415	875
48324	116429	02-Jun-21	1460	01-Jun-25	353	500
48325	116432	02-Jun-21	1460	01-Jun-25	350	600
21296	125400	28-May-23	1460	27-May-27	479	1450
21297	125777	30-May-23	1460	29-May-27	364	750
21298	125780	30-May-23	1460	29-May-27	475	1300
21299	125772	30-May-23	1460	29-May-27	349	750
21300	125773	30-May-23	1460	29-May-27	340	600
21302	125383	28-May-23	1460	27-May-27	486	1450
21303	125382	28-May-23	1460	27-May-27	335	600
21304	125781	30-May-23	1460	29-May-27	330	500
21305	125779	30-May-23	1460	29-May-27	435	950
21306	91760	28-May-23	1460	27-May-27	473	1300
21307	125390	28-May-23	1460	27-May-27	510	1500
21308	125385	28-May-23	1460	27-May-27	480	1000

APPENDIX 7: TAGGING AND RECAPTURE INFORMATION ASSOCIATED WITH WALLEYE IMPLANTED WITH ACOUSTIC TRANSMITTERS THAT HAVE EXPIRED BETWEEN 2013 AND 2022

Table A7-1: Tagging, tag expiry, and subsequent recapture information for Walleye tagged with acoustic transmitters in the Keeyask reservoir following tag expiry.

Acoustic Tag	Floy Tag	Tagging Date	Estimated Tag Expiry Date	Date of Last Detection	Location of Last Detection	Recapture Date	Recapture Location	Recapture Program
32813	100239	29/06/2013	13-Aug-16	5-Aug-16	Clark Lake	-	-	-
32852	100247	29/06/2013	13-Aug-16	14-Jul-16	Gull Lake	-	-	-
32858	100246	29/06/2013	13-Aug-16	5-Aug-16	Gull Lake	-	-	-
32856	100240	30/06/2013	13-Aug-16	14-Oct-13	Gull Lake	-	-	-
32853	100241	30/06/2013	15-Aug-16	11-Oct-13	Gull Lake	-	-	-
32851	100244	30/06/2013	15-Aug-16	30-Jun-15	Gull Lake	-	-	-
32846	100242	30/06/2013	15-Aug-16	6-Oct-13	Gull Lake	-	-	-
32847	100243	30/06/2013	15-Aug-16	14-Oct-15	Gull Lake	-	-	-
32857	87839	30/06/2013	14-Aug-16	11-Sep-15	Nelson River between Birthday Rapids and Gull Lake	-	-	-
32833	87840	01/07/2013	15-Aug-16	27-Jul-15	Long Spruce reservoir	-	-	-
32861	87842	01/07/2013	15-Aug-16	25-Jun-15	Gull Lake	-	-	-
32862	-	01/07/2013	15-Aug-16	11-Jul-15	Gull Lake	-	-	-
32865	87845	01/07/2013	15-Aug-16	6-Jul-13	Stephens Lake	-	-	-
32863	87846	01/07/2013	15-Aug-16	10-Jul-13	Gull Lake	-	-	-
32880	87847	01/07/2013	15-Aug-16	9-Jul-16	Stephens Lake	-	-	-
32866	87848	01/07/2013	15-Aug-16	6-Jul-13	Stephens Lake	-	-	-
32876	87849	01/07/2013	15-Aug-16	5-Jul-13	Gull Lake	-	-	-
32875	87850	01/07/2013	15-Aug-16	4-Jul-13	Gull Lake	-	-	-
32870	87841	01/07/2013	15-Aug-16	6-Jul-13	Gull Lake	-	-	-
32871	75875	01/07/2013	15-Aug-16	5-Jul-13	Gull Lake	-	-	-
32867	87843	01/07/2013	15-Aug-16	4-Jul-13	Gull Lake	-	-	-
32877	103106	27/08/2013	11-Oct-16	8-Jun-16	Gull Lake	-	-	-
32872	105107	27/08/2013	11-Oct-16	7-Jul-16	Gull Lake	-	-	-
32882	103267	29/08/2013	13-Oct-16	30-May-16	Stephens Lake	-	-	-
32883	103266	30/08/2013	14-Oct-16	5-Oct-16	Gull Lake	-	-	-
32884	103264	30/08/2013	14-Oct-16	1-Sep-15	Stephens Lake	-	-	-

Table A7-1: Tagging, tag expiry, and subsequent recapture information for Walleye tagged with acoustic transmitters in the Keeyask reservoir following tag expiry (continued).

Acoustic Tag	Floy Tag	Tagging Date	Estimated Tag Expiry Date	Date of Last Detection	Location of Last Detection	Recapture Date	Recapture Location	Recapture Program
32879	103263	30/08/2013	14-Oct-16	12-Sep-16	Birthday Rapids	-	-	-
32878	103262	30/08/2013	14-Oct-16	6-Sep-16	Gull Lake	-	-	-
32889	103260	30/08/2013	14-Oct-16	22-Jul-15	Stephens Lake	-	-	-
32885	103259	30/08/2013	14-Oct-16	10-Sep-13	Gull Lake	-	-	-
32886	103257	30/08/2013	14-Oct-16	31-Jul-16	Gull Lake	-	-	-
32890	103256	30/08/2013	14-Oct-16	1-Sep-15	Clark Lake	-	-	-
32888	103255	30/08/2013	14-Oct-16	16-Oct-16	Gull Lake	-	-	-
32873	103254	30/08/2013	14-Oct-16	14-Sep-15	Clark Lake	-	-	-
32868	103253	30/08/2013	14-Oct-16	28-Aug-15	Birthday Rapids	-	-	-
32874	103252	30/08/2013	14-Oct-16	1-Sep-14	Gull Lake	-	-	-
32881	-	30/08/2013	14-Oct-16	9-May-16	Nelson River between Birthday Rapids and Gull Lake	-	-	-
32887	103227	30/08/2013	14-Oct-16	24-Oct-13	Gull Lake	-	-	-
32869	103226	30/08/2013	14-Oct-16	11-Aug-16	Clark Lake	-	-	-
6417	101395	21/06/2014	5-Aug-17	30-Jun-17	Nelson River between Birthday Rapids and Gull Lake	15-Sep-14	Odei River	Local fisher
6418	105476	17/06/2014	1-Aug-17	6-Aug-17	Gull Lake	-	-	-
6419	105498	18/06/2014	2-Aug-17	18-Jan-17	Gull Lake	-	-	-
6420	-	18/06/2014	2-Aug-17	10-Sep-14	Clark Lake	-	-	-
6421	105496	18/06/2014	2-Aug-17	18-Jan-17	Gull Lake	-	-	-
6422	105490	19/06/2014	3-Aug-17	16-Aug-16	Long Spruce reservoir	-	-	-
6423	105499	18/06/2014	2-Aug-17	5-Aug-17	Gull Lake	-	-	-
6425	105489	18/06/2014	3-Aug-17	19-Oct-16	Gull Lake	-	-	-
6426	105497	11/06/2014	2-Aug-17	29-Dec-15	Gull Lake	-	-	-
53792	-	28/05/2016	13-Jul-19	27-Sep-18	Gull Lake	-	-	-
53791	107242	29/05/2016	14-Jul-19	27-Jun-16	Long Spruce reservoir	-	-	-
53777	107241	29/05/2016	14-Jul-19	2-Sep-17	Downstream of Long Spruce GS	-	-	-

Table A7-1: Tagging, tag expiry, and subsequent recapture information for Walleye tagged with acoustic transmitters in the Keeyask reservoir following tag expiry (continued).

Acoustic Tag	Floy Tag	Tagging Date	Estimated Tag Expiry Date	Date of Last Detection	Location of Last Detection	Recapture Date	Recapture Location	Recapture Program
53790	107240	29/05/2016	14-Jul-19	21-Nov-20	Gull Lake			
53789	107235	30/05/2016	15-Jul-19	8-Sep-18	Clark Lake	-	-	-
53788	107201	30/05/2016	15-Jul-19	9-Jul-16	Downstream of the Keeyask GS	-	-	-
53787	107202	30/05/2016	15-Jul-19	17-Sep-16	Gull Lake	-	-	-
53786	107203	30/05/2016	15-Jul-19	2-Jun-16	Downstream of the Keeyask GS	-	-	-
53776	107205	30/05/2016	15-Jul-19	22-Aug-17	Gull Lake	-	-	-
53785	107207	30/05/2016	15-Jul-19	17-Jul-17	Gull Lake	-	-	-
53784	107208	30/05/2016	15-Jul-19	12-Jan-19	Gull Lake	-	-	-
53783	110331	31/05/2016	16-Jul-19	30-Mar-18	Clark Lake	-	-	-
53782	110332	31/05/2016	16-Jul-19	8-Aug-16	Long Spruce reservoir	-	-	-
53781	110333	02/06/2016	18-Jul-19	4-Jul-18	Gull Lake	-	-	-
53780	110334	03/06/2016	19-Jul-19	16-Jul-16	Gull Lake	-	-	-
53779	110335	03/06/2016	19-Jul-19	13-Jun-16	Gull Lake	-	-	-
53778	100336	03/06/2016	19-Jul-19	17-Jun-16	Gull Lake	-	-	-
53775	110337	05/06/2016	21-Jul-19	24-Jul-19	Stephens Lake	-	-	-
53774	110338	05/06/2016	21-Jul-19	6-Nov-20	Gull Lake	-	-	-
53773	110339	05/06/2016	21-Jul-19	22-Jul-17	Long Spruce reservoir	-	-	-
53768	110340	05/06/2016	21-Jul-19	11-Nov-17	Gull Lake	-	-	-
53769	110341	05/06/2016	21-Jul-19	26-Jun-17	Long Spruce reservoir	-	-	-
53770	107150	05/06/2016	21-Jul-19	11-Jun-16	Gull Lake	-	-	-
53771	107149	05/06/2016	21-Jul-19	21-Aug-16	Long Spruce reservoir	-	-	-
53763	107147	05/06/2016	21-Jul-19	19-Jun-16	Gull Lake	-	-	-
53764	107146	05/06/2016	21-Jul-19	14-Jun-16	Stephens Lake	-	-	-
53772	107145	05/06/2016	21-Jul-19	19-Jun-17	Gull Lake	-	-	-
53805	107225	06/06/2016	22-Jul-19	8-Oct-18	Gull Lake	-	-	-
53806	107142	06/06/2016	22-Jul-19	19-Oct-16	Gull Lake	-	-	-

Table A7-1: Tagging, tag expiry, and subsequent recapture information for Walleye tagged with acoustic transmitters in the Keeyask reservoir following tag expiry (continued).

Acoustic Tag	Floy Tag	Tagging Date	Estimated Tag Expiry Date	Date of Last Detection	Location of Last Detection	Recapture Date	Recapture Location	Recapture Program
53807	107126	06/06/2016	22-Jul-19	19-Aug-16	Clark Lake			
53798	110525	07/06/2016	23-Jul-19	29-May-17	Gull Lake	-	-	-
53799	110524	07/06/2016	23-Jul-19	25-Jun-17	Long Spruce reservoir	-	-	-
53800	110523	07/06/2016	23-Jul-19	20-Sep-20	Gull Lake	-	-	-
53801	110522	07/06/2016	23-Jul-19	14-Jun-16	Stephens Lake	-	-	-
53802	110521	07/06/2016	23-Jul-19	8-Jun-16	Gull Lake	-	-	-
53793	110520	07/06/2016	23-Jul-19	29-Jun-19	Stephens Lake	-	-	-
53794	110519	07/06/2016	23-Jul-19	22-Jun-18	Clark Lake	-	-	-
53795	110518	07/06/2016	23-Jul-19	12-Oct-17	Gull Lake	-	-	-
53796	110517	07/06/2016	23-Jul-19	24-Jul-20	Gull Lake	-	-	-
53797	110516	07/06/2016	23-Jul-19	6-Aug-19	Gull Lake	-	-	-
53767	111527	24/09/2016	9-Nov-19	8-Jan-17	Gull Lake	-	-	-
53766	111528	24/09/2016	9-Nov-19	12-Oct-16	Gull Lake	-	-	-
53765	111530	24/09/2016	9-Nov-19	23-Jul-17	Gull Lake	-	-	-
53804	111531	24/09/2016	9-Nov-19	6-Jun-17	Gull Lake	-	-	-
53803	111532	24/09/2016	9-Nov-19	21-Jan-17	Gull Lake	-	-	-
53758	111533	24/09/2016	9-Nov-19	11-Aug-17	Downstream of the Keeyask GS	-	-	-
53759	111535	24/09/2016	9-Nov-19	14-Jun-18	Stephens Lake	-	-	-
53760	111536	24/09/2016	9-Nov-19	25-Sep-17	Stephens Lake	-	-	-
25752	109701	27/05/2018	25-Feb-23	24-Jun-18	Long Spruce reservoir	-	-	-
25753	109702	27/05/2018	25-Feb-23	12-Aug-18	Long Spruce reservoir	-	-	-
25754	109703	27/05/2018	25-Feb-23	19-Jun-22	Nelson River between Birthday Rapids and Gull Lake	-	-	-
25747	109704	28/05/2018	26-Feb-23	23-Aug-20	Gull Lake	-	-	-
25749	109705	28/05/2018	26-Feb-23	1-Oct-22	Gull Lake	-	-	-
25748	109706	28/05/2018	26-Feb-23	19-Jun-18	Long Spruce reservoir	-	-	-
25755	109708	01/06/2018	2-Feb-23	6-Aug-18	Long Spruce reservoir	-	-	-

Table A7-1: Tagging, tag expiry, and subsequent recapture information for Walleye tagged with acoustic transmitters in the Keeyask reservoir following tag expiry (continued).

Acoustic Tag	Floy Tag	Tagging Date	Estimated Tag Expiry Date	Date of Last Detection	Location of Last Detection	Recapture Date	Recapture Location	Recapture Program
25756	109709	01/06/2018	2-Mar-23	3-Jul-19	Clark Lake			
25750	109710	01/06/2018	2-Mar-23	9-Aug-19	Clark Lake	-	-	-
25751	109711	05/06/2018	6-Mar-23	22-Aug-22	Gull Lake	-	-	-
25742	109712	05/06/2018	6-Mar-23	6-Jun-19	Gull Lake	-	-	-
25743	109713	05/06/2018	6-Mar-23	12-Jun-18	Gull Lake	-	-	-
25744	109715	05/06/2018	6-Mar-23	23-Oct-22	Gull Lake	-	-	-
25745	109716	05/06/2018	6-Mar-23	6-Jun-18	Gull Lake	-	-	-
25746	109717	05/06/2018	6-Mar-23	23-Dec-21	Gull Lake	-	-	-
25740	109718	05/06/2018	6-Mar-23	31-Jul-18	Long Spruce reservoir	-	-	-
25739	109719	05/06/2018	6-Mar-23	20-Nov-18	Stephens Lake	-	-	-

Table A7-2: Tagging, tag expiry, and subsequent recapture information for Walleye tagged with acoustic transmitters in Stephens Lake following tag expiry.

Acoustic Tag	Floy Tag	Tagging Date	Original Tagging Location	Estimated Tag Expiry Date	Date of Last Detection	Location of Last Detection	Recapture Date	Recapture Location	Recapture Program
32820	91226	26/06/2013	Stephens Lake	10-Aug-16	2-Jul-13	Stephens Lake	-	-	-
32815	91227	26/06/2013	Stephens Lake	10-Aug-16	9-Jul-15	Stephens Lake	-	-	-
32819	91228	26/06/2013	Stephens Lake	10-Aug-16	26-Jul-15	Stephens Lake	-	-	-
32814	91229	26/06/2013	Stephens Lake	10-Aug-16	14-Jun-14	Stephens Lake	-	-	-
32818	91230	26/06/2013	Stephens Lake	10-Aug-16	28-Jul-16	Downstream of the Keeyask GS	-	-	-
32817	91232	26/06/2013	Stephens Lake	10-Aug-16	11-Jul-15	Stephens Lake	-	-	-
32816	91234	26/06/2013	Stephens Lake	10-Aug-16	7-Aug-16	Stephens Lake	-	-	-
32811	91233	26/06/2013	Stephens Lake	10-Aug-16	24-Jul-14	Long Spruce reservoir	-	-	-
32841	91235	26/06/2013	Stephens Lake	10-Aug-16	8-Jun-16	Stephens Lake	-	-	-
32836	91236	26/06/2013	Stephens Lake	10-Aug-16	27-Nov-13	Stephens Lake	-	-	-
32825	91237	27/06/2013	Stephens Lake	11-Aug-16	12-Aug-14	Stephens Lake	-	-	-
32842	91238	27/06/2013	Stephens Lake	11-Aug-16	2-Jul-13	Stephens Lake	-	-	-
32837	91239	27/06/2013	Stephens Lake	11-Aug-16	13-Jun-14	Stephens Lake	-	-	-
32831	91240	27/06/2013	Stephens Lake	11-Aug-16	18-Sep-15	Stephens Lake	-	-	-
32844	91241	27/06/2013	Stephens Lake	11-Aug-16	14-Aug-16	Stephens Lake	-	-	-
32845	91242	27/06/2013	Stephens Lake	5-Nov-16	14-Oct-16	Stephens Lake	-	-	-
32840	91243	27/06/2013	Stephens Lake	11-Aug-16	5-Dec-14	Stephens Lake	-	-	-
32832	91244	27/06/2013	Stephens Lake	11-Aug-16	29-Jan-14	Stephens Lake	-	-	-
32850	91245	27/06/2013	Stephens Lake	11-Aug-16	16-Jun-14	Stephens Lake	-	-	-
32826	91246	27/06/2013	Stephens Lake	11-Aug-16	29-Jul-16	Stephens Lake	-	-	-
32839	91247	27/06/2013	Stephens Lake	11-Aug-16	7-Oct-15	Stephens Lake	-	-	-
32830	91248	27/06/2013	Stephens Lake	11-Aug-16	3-Jan-15	Stephens Lake	-	-	-
32824	91249	27/06/2013	Stephens Lake	11-Aug-16	15-Aug-16	Stephens Lake	-	-	-
32829	91250	27/06/2013	Stephens Lake	11-Aug-16	9-Jan-16	Stephens Lake	-	-	-
32835	100225	27/06/2013	Stephens Lake	11-Aug-16	20-Aug-13	Stephens Lake	-	-	-
32834	100226	27/06/2013	Stephens Lake	11-Aug-16	15-Jun-15	Stephens Lake	-	-	-

Table A7-2: Tagging, tag expiry, and subsequent recapture information for Walleye tagged with acoustic transmitters in Stephens Lake following tag expiry (continued).

Acoustic Tag	Floy Tag	Tagging Date	Original Tagging Location	Estimated Tag Expiry Date	Date of Last Detection	Location of Last Detection	Recapture Date	Recapture Location	Recapture Program
32828	100227	27/06/2013	Stephens Lake	11-Aug-16	1-Aug-16	Stephens Lake			
32827	100228	27/06/2013	Stephens Lake	11-Aug-16	11-Aug-16	Stephens Lake	-	-	-
32822	100229	27/06/2013	Stephens Lake	11-Aug-16	15-Aug-16	Stephens Lake	-	-	-
32843	100230	27/06/2013	Stephens Lake	11-Aug-16	18-Jul-16	Gull Lake	-	-	-
32821	100250	27/06/2013	Stephens Lake	11-Aug-16	7-Jul-14	Stephens Lake	-	-	-
32838	100232	27/06/2013	Stephens Lake	11-Aug-16	6-Aug-15	Stephens Lake	-	-	-
32823	100233	28/06/2013	Stephens Lake	12-Aug-16	26-Jul-13	Stephens Lake	-	-	-
32812	91231	28/06/2013	Stephens Lake	12-Aug-16	22-Jun-15	Stephens Lake	-	-	-
32855	100234	28/06/2013	Stephens Lake	12-Aug-16	4-Jul-14	Downstream of the Keeyask GS	-	-	-
32849	100249	28/06/2013	Stephens Lake	12-Aug-16	6-Jul-16	Downstream of the Keeyask GS	-	-	-
32854	100235	28/06/2013	Stephens Lake	12-Aug-16	16-Aug-16	Stephens Lake	-	-	-
32860	100236	28/06/2013	Stephens Lake	12-Aug-16	16-Aug-16	Stephens Lake	-	-	-
32859	100237	28/06/2013	Stephens Lake	12-Aug-16	7-Dec-15	Stephens Lake	-	-	-
32848	100238	28/06/2013	Stephens Lake	12-Aug-16	16-Aug-16	Downstream of the Keeyask GS	-	-	-
6424		19/06/2014	Stephens Lake	26-Jul-17		Stephens Lake	-	-	-
6427		11/06/2014	Stephens Lake	26-Jul-17		Stephens Lake	-	-	-
53726	110544	27/05/2016	Stephens Lake	12-Jul-19	19-Jun-16	Stephens Lake	-	-	-
53725	110532	27/05/2016	Stephens Lake	12-Jul-19	25-Sep-18	Stephens Lake	-	-	-
53724	110538	28/05/2016	Stephens Lake	13-Jul-19	6-Jun-19	Downstream of the Keeyask GS	-	-	-
53729	110350	28/05/2016	Stephens Lake	13-Jul-19	31-May-19	Stephens Lake	-	-	-
53730	110349	28/05/2016	Stephens Lake	13-Jul-19	1-Nov-17	Stephens Lake	-	-	-
53723	110348	28/05/2016	Stephens Lake	13-Jul-19	21-Jun-18	Stephens Lake	-	-	-
53736	110345	30/05/2016	Stephens Lake	15-Jul-19	14-Jun-20	Stephens Lake	-	-	-
53735	110344	30/05/2016	Stephens Lake	15-Jul-19	5-Mar-21	Stephens Lake	-	-	-
53734	110343	30/05/2016	Stephens Lake	15-Jul-19	27-Jul-18	Stephens Lake	-	-	-
53733	110326	30/05/2016	Stephens Lake	15-Jul-19	6-Aug-16	Stephens Lake	-	-	-

Table A7-2: Tagging, tag expiry, and subsequent recapture information for Walleye tagged with acoustic transmitters in Stephens Lake following tag expiry (continued).

Acoustic Tag	Floy Tag	Tagging Date	Original Tagging Location	Estimated Tag Expiry Date	Date of Last Detection	Location of Last Detection	Recapture Date	Recapture Location	Recapture Program
53742	110327	30/05/2016	Stephens Lake	15-Jul-19	11-Jun-16	Stephens Lake			
53741	110330	30/05/2016	Stephens Lake	15-Jul-19	8-Sep-20	Stephens Lake	-	-	-
53732	110536	01/06/2016	Stephens Lake	13-Jul-19	14-Jun-16	Stephens Lake	-	-	-
53731	110534	01/06/2016	Stephens Lake	13-Jul-19	9-Jun-18	Stephens Lake	-	-	-
53727	110537	01/06/2016	Stephens Lake	13-Jul-19			-	-	-
53728	110347	01/06/2016	Stephens Lake	13-Jul-19	18-Sep-17	Downstream of the Long Spruce GS	-	-	-
53737	110346	01/06/2016	Stephens Lake	14-Jul-19	16-Jul-17	Long Spruce reservoir	-	-	-
53740	110543	01/06/2016	Stephens Lake	16-Jul-19	20-Feb-19	Stephens Lake	-	-	-
53738	110542	01/06/2016	Stephens Lake	16-Jul-19	28-Jul-17	Upstream of the Kettle GS	-	-	-
53739	110540	01/06/2016	Stephens Lake	16-Jul-19	14-Oct-16	Stephens Lake	-	-	-
53746	110541	01/06/2016	Stephens Lake	16-Jul-19	9-Aug-17	Downstream of the Long Spruce GS	-	-	-
53745	110417	01/06/2016	Stephens Lake	16-Jul-19	20-Jan-18	Stephens Lake	-	-	-
53747	110418	01/06/2016	Stephens Lake	16-Jul-19	7-Sep-17	Long Spruce reservoir	-	-	-
53752	110419	01/06/2016	Stephens Lake	16-Jul-19	3-Jul-18	Stephens Lake	-	-	-
53744	110421	01/06/2016	Stephens Lake	16-Jul-19	11-Jul-19	Stephens Lake	-	-	-
53743	110422	01/06/2016	Stephens Lake	16-Jul-19	13-Jun-16	Stephens Lake	-	-	-
53751	110423	01/06/2016	Stephens Lake	16-Jul-19	8-Aug-17	Downstream of the Long Spruce GS	-	-	-
53750	110424	01/06/2016	Stephens Lake	16-Jul-19	29-Jan-18	Stephens Lake	-	-	-
53749	110425	01/06/2016	Stephens Lake	16-Jul-19	29-Jul-17	Stephens Lake	-	-	-
53748	110951	01/06/2016	Stephens Lake	16-Jul-19	7-Jun-18	Stephens Lake	-	-	-
53753	110952	01/06/2016	Stephens Lake	16-Jul-19	8-Aug-17	Upstream of Kettle GS	-	-	-
53754	110953	01/06/2016	Stephens Lake	16-Jul-19	28-Jun-16	Stephens Lake	-	-	-
53755	110954	01/06/2016	Stephens Lake	16-Jul-19	20-Jun-19	Stephens Lake	-	-	-
53756	110957	02/06/2016	Stephens Lake	17-Jul-19	23-Sep-17	Stephens Lake	-	-	-
53757	110958	02/06/2016	Stephens Lake	17-Jul-19	15-Jul-20	Stephens Lake	28-Aug-20	Long Spruce reservoir	Local fisher
53809	110961	02/06/2016	Stephens Lake	17-Jul-19	8-Sep-18	Stephens Lake	-	-	-

Table A7-2: Tagging, tag expiry, and subsequent recapture information for Walleye tagged with acoustic transmitters in Stephens Lake following tag expiry (continued).

Acoustic Tag	Floy Tag	Tagging Date	Original Tagging Location	Estimated Tag Expiry Date	Date of Last Detection	Location of Last Detection	Recapture Date	Recapture Location	Recapture Program
53810	110962	02/06/2016	Stephens Lake	17-Jul-19	8-Sep-19	Stephens Lake			
53808	110963	02/06/2016	Stephens Lake	17-Jul-19	23-Jun-18	Stephens Lake	-	-	-
53811	110964	02/06/2016	Stephens Lake	17-Jul-19	18-Feb-18	Stephens Lake	-	-	-
53812	110959	02/06/2016	Stephens Lake	17-Jul-19	5-Aug-16	Stephens Lake	-	-	-
25741	109720	06/06/2018	Stephens Lake	7-Mar-23	28-Aug-21	Downstream of the Keeyask GS	-	-	-
25738	109721	06/06/2018	Stephens Lake	7-Mar-23	23-Jul-18	Long Spruce reservoir	-	-	-
25737	109722	06/06/2018	Stephens Lake	7-Mar-23	13-Mar-23	Stephens Lake	-	-	-
25735	109725	06/06/2018	Stephens Lake	7-Mar-23	23-Oct-22	Upstream of the Kettle GS	-	-	-
25736	90276	07/06/2018	Stephens Lake	8-Mar-23	26-Jun-18	Stephens Lake	-	-	-
25734	90277	07/06/2018	Stephens Lake	8-Mar-23	13-Jun-18	Stephens Lake	-	-	-
25732	90279	09/06/2018	Stephens Lake	10-Mar-23	14-Jul-18	Long Spruce reservoir	-	-	-