



Keeyask Generation Project Aquatic Effects Monitoring Plan

Walleye Movement Monitoring Report AEMP-2017-04



KEEYASK GENERATION PROJECT

AQUATIC EFFECTS MONITORING PLAN

REPORT #AEMP-2017-04

WALLEYE MOVEMENT MONITORING IN THE NELSON RIVER BETWEEN CLARK LAKE AND THE LIMESTONE GENERATING STATION, OCTOBER 2015 TO OCTOBER 2016: YEAR 3 CONSTRUCTION

Prepared for

Manitoba Hydro

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SUMMARY

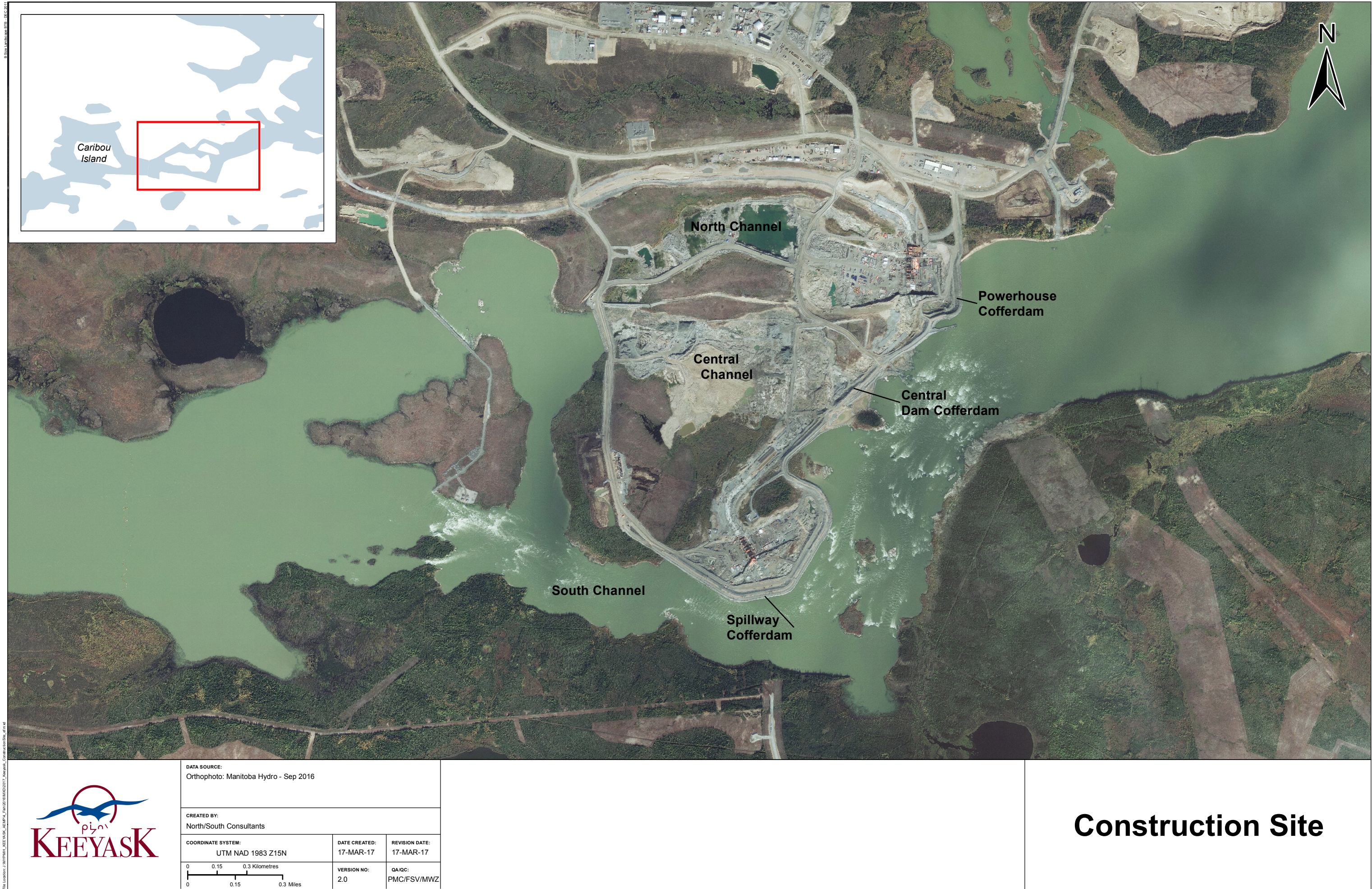
Background

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. Besides measuring the accuracy of the predictions made and actual effects of the GS on the environment, monitoring results will provide information on how construction and operation of the GS will affect the environment and if more needs to be done to reduce harmful effects.

Construction of the Keeyask GS began in mid-July 2014. During 2014 and 2015, cofferdams were constructed that blocked the north and central channels and a portion of the south channel of Gull Rapids (see map below). In 2016 there was little in-stream construction prior to the completion of field studies in fall: the central portion of the Central Dam Cofferdam was widened in April/May and work on the Tailrace Summer Level Cofferdam was started on August 4 and 5 and then stopped until October. With so little in-stream construction activity prior to completing field work in the fall, possible construction-related impacts to the aquatic environment during this period were limited to indirect effects (e.g., potential impacts to water quality from discharge at the cofferdam, runoff from disturbed terrestrial areas).

The movements of Walleye over Birthday Rapids and Gull Rapids were monitored prior to construction, but because different methods are being used for AEMP data collection, the results of the two programs can't be compared. While pre-construction studies did not record detailed fish movement patterns between Clark Lake and Stephens Lake, the data indicated that the majority of Walleye continued to live in the area where they had been tagged and did not swim across rapids into different parts of the river. When fish occasionally crossed either Birthday or Gull rapids, they did so in the summer or fall, which suggests that these movements were not a necessary part of spring egg-laying behavior. A small number of Walleye also moved downstream through the generating stations/spillways along the lower Nelson River.

This report presents results of Walleye movement monitoring from October 2015 to October 2016 and provides a summary of data collected since the monitoring program was initiated in June 2013. Tags applied to Walleye in 2016 will continue to provide movement information until 2020. 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. Walleye was identified as one of the key species to monitor because they are: of commercial and domestic importance, abundant in the Keeyask Area, known to pass through Gull Rapids in either direction and resilient enough to survive the acoustic tagging procedure.



Map of instream structures at the Keeyask generating station site, September 2016.

Why is the study being done?

Monitoring during construction is being done to answer two questions:

Are there Walleye close to the construction site, particularly during spawning?

If Walleye are in the river close to the construction area, they could be harmed by high amounts of mud in the water or they could be trapped inside an area that will be drained.

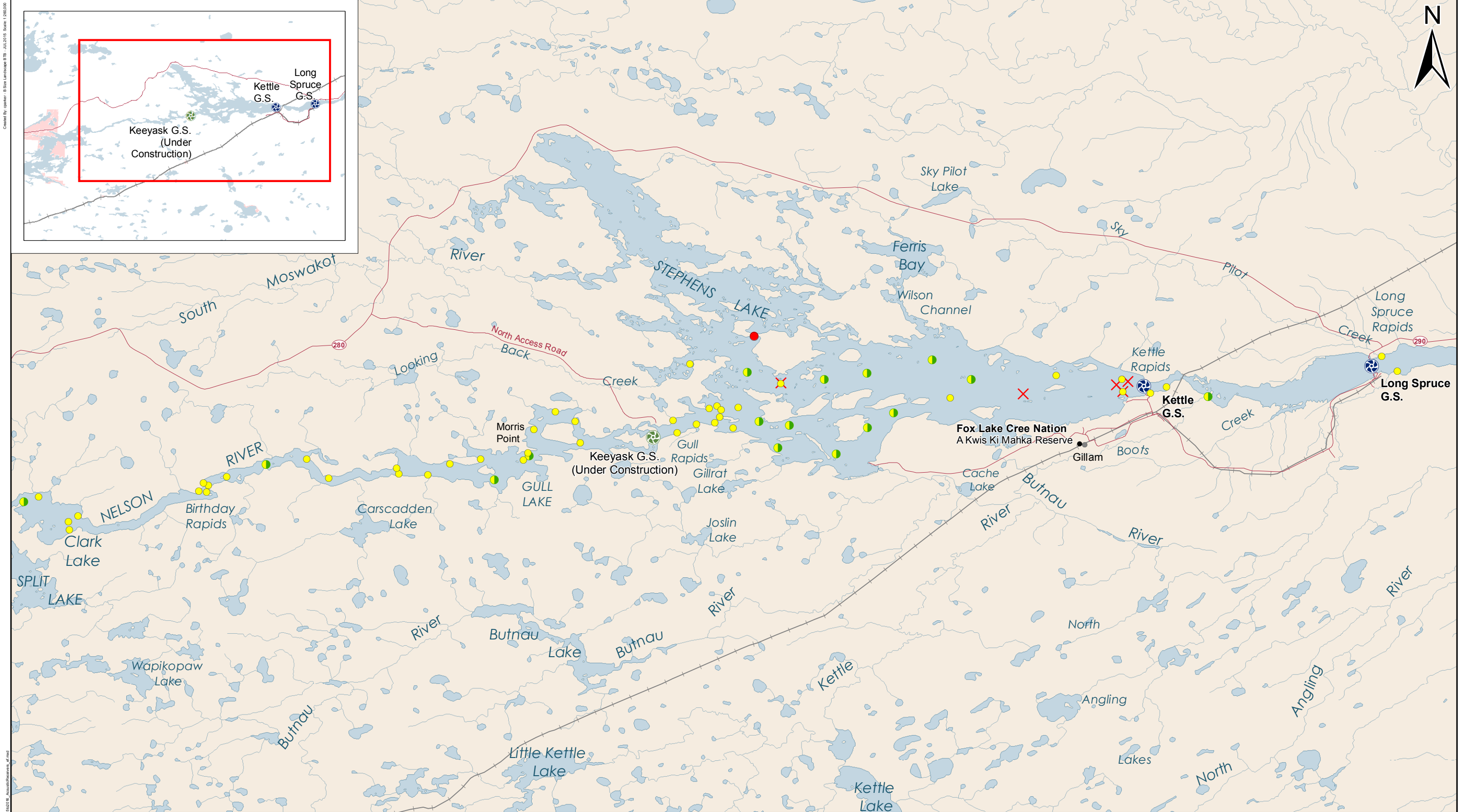
How many Walleye are moving through and/or away from Gull Rapids during construction and how far are they going?

Movement studies tell us how many Walleye are moving up or down through Gull Rapids, 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.

What was done?

The movements of Walleye 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 Long Spruce Generating Station (see study area map below). Each fish is given a transmitter that sends out a unique ping, and the pings can be detected up to 1 kilometre (km) away from a receiver. By looking at the pings recorded by different receivers, the movement of each fish can be tracked. The transmitters are powered by batteries with a three-year life-span.

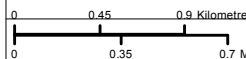
Eighty Walleye were tagged in 2013, 40 upstream and 40 downstream of Gull Rapids. Because these 80 transmitters were reaching the end of their lifespan, an additional 80 transmitters were applied to Walleye in June 2016: 40 upstream and 40 downstream of Gull Rapids. Eight of the fish tagged upstream moved downstream through Gull Rapids post-tagging, so an additional eight tags were applied upstream of Gull Rapids in fall 2016.



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Government of Manitoba, Province of Manitoba, Manitoba Hydro

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Legend

Acoustic Receivers

- Winter 2015/2016
- Open-water 2016
- Open-water 2016 lost
- ✗ Winter 2015/2016 lost
- Winter 2015/2016 and Open-water 2016

- ⊙ Generating Station (Existing)
- ⊙ Generating Station (Under Construction)
- Highway
- Rail
- First Nation Reserve

2016 Acoustic Receivers

Clark Lake to Limestone Reservoir

Map showing 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.

What was found?

How far, and where, Walleye moved depended on the individual fish and whether they lived upstream of Gull Rapids (in Gull Lake) or downstream of Gull Rapids (in Stephens Lake). Movements also depend on the water temperature/season.

Walleye tagged upstream of Gull Rapids in 2013 and 2014 tended to stay in open lake areas such as Gull Lake and Clark Lake instead of the more fast flowing environments of the Nelson River. Most Walleye either remained primarily in Gull Lake or moved between Gull Lake and Clark Lake, spending various amounts of time at both locations. Fish used the upstream portion of Gull Lake more than the lower portions near Gull Rapids. In terms of upstream movement, in 2014, one fish moved from Gull Lake, through Clark Lake and Split Lake, and was caught by a local angler in the Odei River, almost 100 km from its original release location. In terms of downstream movement, six of the fish tagged (two in 2014; three in 2015; and one in 2016) moved downstream through the rapids. In 2015, one of these moved downstream through Kettle GS and into the Long Spruce reservoir, although the route that it took past the station (through a turbine or over the spillway) could not be determined. It is known to have survived passage because it has continued to move in the Long Spruce reservoir.

Downstream of Gull Rapids, the majority of the fish tagged in 2013 and 2014 have remained in Stephens Lake, mainly within 10 km of the construction site. One moved upstream over Gull Rapids in late August through early September of 2013 and continued upstream through Gull Lake into Clark Lake. Another survived passage downstream through the Kettle GS but once again, it is unknown whether this fish moved downstream over the spillway or through a turbine. Walleye are frequently detected by the receivers immediately downstream of Gull Rapids and in the upper 5 km of Stephens Lake.

The Walleye tagged in 2016 were only monitored for a short period of time after tagging. Twelve of the 48 fish tagged upstream moved downstream through Gull Rapids, which is a much higher percentage than we have seen previously. It is possible that these movements were related to stress caused by tagging because sometimes fish show atypical movements within the first weeks after tagging. The rest of the newly-tagged fish in Gull Lake remained in the lake, exhibiting similar movement patterns to that observed for fish tagged in 2013. The newly-tagged fish in Stephens Lake displayed movement patterns similar to those tagged in 2013.

What does it mean?

Walleye are using habitat immediately downstream of the construction site at Gull Rapids. They do not seem to be disturbed by construction activity. Based on the tags applied in 2013 and 2014, the proportion of fish that move downstream past Gull Rapids is low (15% of tags over three years). The high rate of downstream movement seen in the newly-tagged fish within (25%) is likely not typical.

What will be done next?

Tags implanted in 2013 were expected to expire in 2016. The tags that were implanted in spring and fall 2016 will continue to provide information on Walleye movements.

ACKNOWLEDGEMENTS

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

Saul Mayham and Kelvin Kitchokeesik of Tataskweyak Cree Nation and John Henderson of Fox Lake Cree Nation are thanked for their assistance in conducting the field work.

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TABLE OF CONTENTS

1.0	INTRODUCTION.....	1
2.0	STUDY SETTING	3
2.1	2015/2016 CONSTRUCTION SUMMARY	4
3.0	METHODS.....	5
3.1	ACOUSTIC TELEMETRY	5
3.1.1	Acoustic Transmitter Application	5
3.1.2	Acoustic Receivers	6
3.1.2.1	Winter 2015/2016.....	6
3.1.2.2	Open-water 2016	7
3.1.3	Data Analysis	7
4.0	RESULTS.....	9
4.1	2013-2015 RESULTS SUMMARY	9
4.1.1	Upstream of Gull Rapids	9
4.1.2	Stephens Lake	10
4.2	WINTER 2015/2016.....	11
4.2.1	Upstream of Gull Rapids	11
4.2.2	Stephens Lake	11
4.2.3	Long Spruce Reservoir	12
4.3	OPEN-WATER 2016	12
4.3.1	Acoustic Receiver Retrieval	12
4.3.2	Upstream of Gull Rapids	12
4.3.2.1	Proportional Distribution	13
4.3.2.2	Movement Patterns	13
4.3.3	Stephens Lake	14
4.3.3.1	Proportional Distribution	15
4.3.3.2	Movement Patterns	15
4.3.4	Long Spruce Reservoir	16

4.3.5	Limestone Reservoir	16
4.4	2016 TAGGING.....	16
4.4.1	Acoustic Transmitter Application	16
4.4.2	Movements Upstream of Gull Rapids.....	17
4.4.2.1	Spring Tagging.....	17
4.4.2.2	Fall Tagging	18
4.4.2.3	Movements through Gull Rapids	19
4.4.3	Movements in Stephens Lake.....	21
4.4.3.1	Proportional Distribution	21
4.4.3.2	Movements	21
5.0	DISCUSSION	23
5.1	EVALUATION OF METHODOLOGY	23
5.2	MOVEMENT PATTERNS	24
5.3	KEY QUESTIONS	25
6.0	SUMMARY AND CONCLUSIONS.....	26
7.0	LITERATURE CITED.....	27

LIST OF TABLES

Table 1:	Number of acoustic tags applied to Walleye in the Keeyask Study Area (upstream of Gull Rapids and in Stephens Lake) between June 2013 and October 2016.	30
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LIST OF FIGURES

Figure 1:	Locations of stationary acoustic receivers (dashes) in relation to the base of Gull Rapids (rkm 0) and other major landmarks (lines) in the Nelson River between Clark Lake and the Limestone GS between October, 2015 and June, 2016.	32
Figure 2:	Locations of stationary acoustic receivers (dashes) in relation to the base of Gull Rapids (rkm 0) and other major landmarks (lines) in the Nelson River between Clark Lake and the Limestone GS between June and October, 2016.	33
Figure 3:	Detection ranges for individual Walleye tagged with acoustic transmitters upstream of Gull Rapids in 2013 during the winter period (2013-2016).	34
Figure 4:	Relative number of detections of Walleye at each acoustic receiver set between Clark Lake and Gull Rapids during winter 2015/2016 (October 12, 2015, to April 30, 2016).	36
Figure 5:	Detection ranges for individual Walleye tagged with acoustic transmitters in Stephens Lake in 2013 during the winter period (2013-2016).	37
Figure 6:	Relative number of detections of Walleye at each acoustic receiver set in Stephens Lake during winter 2015/2016 (October 12, 2015, to April 30, 2016).	39
Figure 7:	Detection ranges for individual Walleye tagged with acoustic transmitters upstream of Gull Rapids in 2013 during the open-water period (2011–2016).	40
Figure 8:	Relative number of detections of Walleye at each acoustic receiver set between Clark Lake and Gull Rapids during the 2016 open-water period (May 1 to October 19).	42
Figure 9:	Proportional distributions by zone for individual Walleye tagged with acoustic transmitters in 2013 during a portion of the 2016 open-water period (June 25 to October 19).	43
Figure 10:	Proportional distribution by zone for Walleye tagged with acoustic transmitters in the Keeyask GS Area in 2013 during a portion of the 2013 (August 25 to October 15), 2014 (June 4 to October 10), 2015 (June 4 to October 11), and 2016 (June 25 to October 19) open-water periods.	44
Figure 11:	Detection ranges for individual Walleye tagged with acoustic transmitters in Stephens Lake in 2013 during the open-water period (2011–2016).	45
Figure 12:	Relative number of detections of Walleye at each acoustic receiver set in Stephens Lake during the 2016 open-water period (May 1 to October 19).	47

Figure 13:	Detection ranges for individual Walleye tagged in 2016 with acoustic transmitters upstream of Gull Rapids during the 2016 open-water period.	48
Figure 14:	Relative number of detections of Walleye tagged in 2016 at each acoustic receiver set between Clark Lake and Gull Rapids during the 2016 open-water period (May 1 to October 19).....	50
Figure 15:	Proportional distribution by zone for Walleye tagged in 2016 during a portion of the 2016 open-water period (June 25 to October 19).	51
Figure 16:	Proportional distributions by zone for individual Walleye tagged upstream of Gull Rapids in 2016 during a portion of the 2016 open-water period (June 25 to October 19).	52
Figure 17:	Detection ranges for individual Walleye tagged in 2016 with acoustic transmitters in Stephens Lake during the 2016 open-water period.	53
Figure 18:	Relative number of detections of Walleye tagged in 2016 at each acoustic receiver set in Stephens Lake during the 2016 open-water period (May 1 to October 19).....	54
Figure 19:	Proportional distributions by zone for individual Walleye tagged in Stephens Lake in 2016 during a portion of the 2016 open-water period (June 25 to October 19) (continued).....	55

LIST OF MAPS

Map 1:	Map of the lower Nelson River showing the site of the Keeyask Generating Station and the Walleye movement monitoring study setting.	57
Map 2:	Map of instream structures at the Keeyask Generating Station site, September 2016.	58
Map 3:	Tagging locations of Walleye implanted with acoustic transmitters in 2016.	59
Map 4:	Locations of stationary receivers set in the Nelson River from Clark Lake to Gull Rapids between October 2015 and June 2016.	60
Map 5:	Locations of stationary receivers set in Stephens Lake from Gull Rapids to Kettle GS between October 2015 and June 2016.	61
Map 6:	Location of the stationary receiver set in the Long Spruce reservoir between October 2015 and June 2016.	62
Map 7:	Locations of stationary receivers set in the Nelson River from Clark Lake to Gull Rapids between June and October 2016.	63
Map 8:	Locations of stationary receivers set in Stephens Lake between June and October 2016.	64
Map 9:	Locations of stationary receivers set in the Long Spruce and Limestone reservoirs between June and October 2016.	65

LIST OF APPENDICES

Appendix 1:	Detection summaries for Walleye tagged and monitored in the Keeyask Study Area between 2013 and 2014	67
Appendix 2:	Location summary for individual acoustic tagged Walleye, Clark Lake to Gull Rapids, June 2013 to October 2016	81
Appendix 3:	Location summary for individual acoustic tagged Walleye in Stephens Lake, June 2013 to October 2015	134
Appendix 4:	Location summary for individual acoustic tagged Walleye upstream of Gull Rapids June 2016 to October 2016.....	179
Appendix 5:	Location summary for individual acoustic tagged Walleye in Stephens Lake June 2016 to October 2016.....	231
Appendix 6:	Biological and Tag information for Walleye tagged upstream and downstream of Gull Rapids	274

1.0 INTRODUCTION

The Keeyask Generation Project (the Project) is a 695-megawatt (MW) hydroelectric generating station at Gull Rapids on the lower Nelson River in northern Manitoba. The Project is approximately 725 kilometres (km) northeast of Winnipeg, 35 km upstream of the existing Kettle Generating Station, where Gull Lake flows into Stephens Lake, 60 km east of the community of Split Lake, 180 km east-northeast of Thompson and 30 km west of Gillam (Map 1). Construction of the Project began in July 2014.

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 monitoring activities of various components of the aquatic environment including the fish community. Monitoring of the fish community included studies targeting the movement of selected fish species such Walleye (*Sander vitreus*) which is the subject of this report.

Pre-construction (baseline) movements of Walleye were monitored from 2001 to 2005 (Barth *et al.* 2003; Murray *et al.* 2005; Murray and Barth 2007). Radio and acoustic 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; instead, they remained within the reach where they had been tagged. Those 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 a life history event such as spawning. A small number of Walleye also moved downstream through the generating stations/spillways along the lower Nelson River. Additional information on long distance movements was obtained from mark-recapture studies; for example, Walleye were found to move downstream into Stephens Lake after spawning in Gull Rapids. As pre-Project studies were not designed to record detailed movement patterns of in the Clarke Lake to Stephens Lake reach as a whole, their 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 construction of the Keeyask GS had on movements (Hrenchuk and Barth 2014a, b). Movements of these Walleye from the tagging date until October 2014 are provided in Murray *et al.* 2015; results from October 2014 to October 2015 are presented in Burnett *et al.* 2016. This report provides results of Walleye movement monitoring from October 2015 to October 2016 and summarizes what has been observed since the program began in 2013.

As the transmitters applied in 2013 are near to or have reached the end of their battery life, additional transmitters were applied to Walleye during 2016 to continue movement monitoring until 2019.

Walleye movements in the main flow of the Nelson River near the construction site may be affected by the installation of cofferdams that block upstream and downstream movements (Map 2), altered flow patterns, and disturbances such as blasting that may increase emigration from the construction area. The broad objective of Walleye movement monitoring is to better understand their movements and habitat use in the Keeyask Study Area during generating station construction, with particular focus on movements in the vicinity of Gull Rapids.

As presented in the AEMP, the key questions to be answered about Walleye movement monitoring during construction of the Keeyask GS are:

- What is the number (or proportion) of tagged Walleye that move past the construction site?
- Are Walleye utilizing habitat in the vicinity of construction activities (particularly during spawning)?

2.0 STUDY SETTING

The study area for the Walleye movement monitoring program encompasses an approximately 110 km long reach of the Nelson River from Clark Lake to the upstream end of the Limestone reservoir. 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. Water velocities were classified as low (0.2–0.5 metres per second [m/s]), moderate (0.5–1.5 m/s), or high (greater than 1.5 m/s), as described in the Keeyask AE SV.

Clark Lake is located immediately downstream of Split Lake, and approximately 42 km upstream of Gull Rapids (Map 1). 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.

Birthday Rapids is located approximately 10 km downstream of Clark Lake and 30 km upstream of Gull Rapids (Maps 1 and 3). The drop in elevation from the upstream to downstream side of Birthday Rapids is approximately 2 m. The 14 km reach of the Nelson River between Birthday Rapids and Gull Lake is characterized as a large somewhat uniform channel with medium to high water velocities. There are a few large bays with reduced water velocity and a number of small tributaries that drain into the Nelson River.

Gull Lake is a section of the Nelson River where the river widens, with moderate to low water velocity. Gull Lake is herein defined as the reach of the Nelson River beginning approximately 17 km upstream of Gull Rapids and 14 km downstream of Birthday Rapids, where the river widens to the north into a bay around a large point of land (Maps 1 and 3), and extending to the downstream end of Caribou Island, approximately 3 km upstream of Gull Rapids. Gull Lake has three distinct basins, the first extending from the upstream end of the lake downstream approximately 6 km to a large island; the second extending from the large island to Morris Point (a constriction in the river immediately upstream of Caribou Island); and the third extending from Morris Point to the downstream end of Caribou Island (Map 3).

Gull Rapids is located approximately 3 km downstream of Caribou Island on the Nelson River (Map 1). Two large islands and several small islands occur within the rapids, prior to the river narrowing. The rapids are approximately 2 km in length, and the river elevation drops approximately 11 m along its 2 km length. A summary of construction activities at Gull Rapids is provided in Section 2.1.

Just below Gull Rapids, the Nelson River enters Stephens Lake. Stephens Lake was formed in 1971 by construction of the Kettle GS. Between Gull Rapids and Stephens Lake there is an approximately 6 km long reach of the Nelson River that, although affected by water regulation at the Kettle GS, remains riverine habitat with moderate velocity. 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 (Map 4). 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 (Map 1). Kettle GS is located approximately 40 km downstream of Gull Rapids.

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 Long Spruce reservoir, with both tributaries entering the reservoir on the south shore (Map 1).

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.

2.1 CONSTRUCTION SUMMARY

Construction of the Keeyask GS began in mid-July 2014 with the construction of cofferdams in the north and central channels of Gull Rapids. These cofferdams resulted in the dewatering of the north and central channels and the diversion of all flow to the south channel. Construction of the spillway cofferdam, which extends into the south channel of Gull Rapids, was completed in 2015.

Work began to construct the Tailrace Summer Level Cofferdam on August 4 and 5, 2016 and then was suspended until October. Work also took place to widen the central portion of the Central Dam Cofferdam (Map 2) in late April and early May. With so little in-stream construction activity prior to completing field work in the fall, possible construction-related impacts to the aquatic environment during this period were limited to indirect effects (e.g., potential impacts to water quality from discharge at the cofferdam, runoff from disturbed terrestrial areas).

Split Lake outflows from late 2015 to the end of June 2016 were relatively high, generally ranging between 3500–4000 m³/s. The 75th percentile flow for Split Lake outflow is approximately 3,500 m³/s. Flow increased sharply in July 2016, reaching a peak of 4,700 m³/s in August, before declining. Water levels varied in conjunction with flow, however, some winter staging was apparent from December to May. During the winter of 2015/2016, water levels rose to approximately 155.5 m ASL. Water level on Gull Lake ranged from 154 – 155 m ASL for most of the open-water season.

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 range (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. Initially, the receiver array was designed to monitor adult Lake Sturgeon (Hrenchuk and Barth 2017), however the same array is also used to monitor juvenile Lake Sturgeon (Lacho and Hrenchuk 2017), Lake Whitefish (Burnett and Hrenchuk 2017), and Walleye.

3.1.1 ACOUSTIC TRANSMITTER APPLICATION

Acoustic transmitters (Vemco V13-1x, estimated 3 year battery life) were first applied to 80 Walleye in 2013: 40 upstream, and 40 downstream of Gull Rapids (Table 1). By fall 2013, it was suspected that 11 fish either shed their tags, suffered mortality, or had been captured by local resource users and the tags were not returned or reported captured. In order to return the number of tagged fish to the original sample size, additional transmitters were applied to Walleye upstream of Gull Rapids ($n = 9$) and in Stephens Lake ($n = 2$) in June 2014 (Murray *et al.* 2015).

Because of the approximate 3 year battery life of these transmitters, the tags applied to Walleye in 2013 will expire during 2016/2017. In order to replace these tags, 80 acoustic transmitters (Vemco V13-1, estimated 1,735 day battery life¹) were applied to Walleye between May 27 and June 7, 2016: 40 upstream, and 40 downstream of Gull Rapids (Table 1). At both locations, Walleye were captured using 75 yd (68.7 m) long gill net gangs. Gangs were composed of a mix of three panels of 3, 3¾, 4¼, or 5" (76, 95, 108, or 127 mm) twisted nylon mesh set for short (*i.e.*, less than 5 hr) durations. Individual gillnet panels measured 25 yds (22.9 m) long and 2.7 yds (2.5 m) deep. Following capture, Walleye were placed in a 76 L fish tub fitted with an aquarium aerator for transport. 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 anaesthetic renders a fish unable to

¹ Battery life for tags implanted in 2013 was 1480 days, however manufacturer suggested increase in transmission delay due to large number of tags in study area, thereby increasing the battery life to 1735 days. This will decrease the potential for code collisions and therefore is expected to increase the overall number of detections.

ventilate on its own, freshwater was continuously pumped over the gills. A small incision, approximately 2 cm in length, 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. Walleye were monitored in a recovery tank 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 3).

Immediately after tagging (*i.e.* within 22 days), eight fish tagged upstream of Gull Rapids in spring, 2016, moved downstream through Gull Rapids into Stephens Lake. In order to return the number of tagged fish upstream of Gull Rapids to the original sample size, eight additional transmitters were applied on September 24, 2016, using the same methods described above. Release locations are shown on Map 3.

3.1.2 ACOUSTIC RECEIVERS

Since 2013, stationary acoustic receivers (VEMCO model VR2 and VR2W, Shad Bay, Nova Scotia) were used to continuously monitor tagged Walleye 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 these receivers was to determine whether fish that had moved into the Long Spruce reservoir the preceding year had continued to move downstream.

After the start of construction in July 2014, receivers were deployed at the same sites as those established during the pre-construction phase (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. 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.

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

3.1.2.1 WINTER 2015/2016

The stationary acoustic receiver array for the winter 2015/2016 period (October 12, 2015 to April 30, 2016) consisted of 21 receivers. Four were set upstream of Gull Rapids, 16 throughout Stephens Lake, and one in the Long Spruce reservoir (Maps 4, 5, and 6).

Two receivers were added to the array in Stephens Lake in 2015/2016 to increase detection coverage: #114226 at rkm 9.9; and #114241 at rkm 26.0 (Map 5). Two receivers set at rkm 6.1

and 6.3 downstream of the Keeyask GS construction site were lost in 2014/2015 and were not replaced in 2015/2016.

3.1.2.2 OPEN-WATER 2016

An array of 60 receivers was used during the 2016 open-water period (defined as May 1 to October 19, 2016). Twenty six were set upstream of Gull Rapids, 29 in Stephens Lake, three in the Long Spruce reservoir, and two in the Limestone reservoir (Maps 7, 8, and 9).

The 2016 open-water array differed slightly from arrays used in previous years. Two receivers (#100656 and #125101) were set in locations that had not been used previously (Map 7). Receiver #100656 was set at rkm -46.9 near the Assean River to monitor potential upstream movements. Receiver #125101 was set at rkm -24.3 to allow for better detection coverage within the riverine area between Birthday Rapids and Gull Lake. Three additional receivers were set in Stephens Lake. Receiver #4495 (at rkm 7.0 in the north arm of Stephens Lake) and #129183 (at rkm 20 at the entrance to Ferris Bay) were set to monitor fish leaving the study area. Receiver #107993 was set at rkm 36.1 in lower Stephens Lake to provide better detection coverage in this area (Map 8). Two additional receivers were set immediately downstream of the Long Spruce GS (#100779 at rkm 57.6; and #114234 at rkm 58.6) in the Limestone reservoir to monitor potential movements through the GS (Map 9).

Receiver “gates” were deployed in several key areas: four between Clark Lake and Gull Rapids (44.0, 34.0, 19.0, and 10.0 rkms upstream of Gull Rapids), and two in Stephens Lake (4.5 and 40.0 rkms downstream of Gull Rapids) (Maps 7 and 8). Receiver “gates” consisted of two or more acoustic receivers set parallel to flow to provide 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 interpolation of coarse-scale positions (*i.e.* which zone) during periods which fish remain undetected. Should a fish be detected within a zone but then go undetected for a period of time, we can be confident that it is still located within that zone outside of receiver detection range, as it was not detected passing through a gate. The area upstream of Gull Rapids was divided into five zones (Map 7; Zones 1 to 5), while Stephens Lake was divided into two zones (Map 8; Zones 6 and 7). The Long Spruce reservoir is referred to as Zone 8 and the Limestone reservoir as Zone 9. The location of the “gates” has remained consistent since first set in 2012. On October 19, 2016, the majority of receivers were removed and a subset ($n = 21$) were redeployed to monitor movements during winter 2016/2017.

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 Gull Rapids representing a distance of 0 rkm. The area located downstream of Gull Rapids (*i.e.*, Stephens Lake and the Long Spruce reservoir) were given positive (+) distance values from Gull Rapids, 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 Gull Rapids was calculated over a 4-hour interval and plotted versus time for each fish. Total detection ranges were calculated by subtracting the furthest downstream detection location from the location of the furthest upstream detection. The proportion of time that all fish spent within each river zone was calculated and plotted.

4.0 RESULTS

Section 4.1 provides a summary of movements prior to winter 2015/2016 (since the study began in 2013). Figures 3 to 19 provide movement range, relative detection frequency, and proportional distribution of tagged fish both upstream and downstream of the construction site by season. Appendix A1 provides detection summaries, Appendices A2 and A3 provide movement summaries, by river kilometre, for each Walleye tagged in 2013, Appendices A4 and A5 provide movement summaries for each Walleye tagged in 2016. Biological information associated with each tagged fish is provided in Appendix A6.

To date, all the tagged Walleye that have moved downstream past generating stations on the Nelson River did so when the spillway was operational, so it is unknown whether these fish moved over the spillway or through one of the turbines.

4.1 2013–2015 RESULTS SUMMARY

4.1.1 UPSTREAM OF GULL RAPIDS

In 2013, 40 Walleye were tagged upstream of the Keeyask GS. As reported in Murray *et al.* (2015), based on a lack of relocation data, seven tags (#32864, #32865, #32866, #32867, #32870, #32871, and #32876) were considered missing prior to winter 2015/2016.

An additional seven fish have not been detected since open-water 2013 and are presumed missing:

- Four (#32846, #32856, #32875, and #32885) were last detected at the upstream end of Gull Lake (rkm -19.5 to -17.1) (Appendices A2-3, A2-8, A2-25, and A2-35).
- One (#32887) was last detected in the middle basin of Gull Lake (rkm -12.9) (Appendix A2-37).
- Two (#32853 and #32863) moved downstream through Gull Lake and were last detected in the lower basin (rkm -7.4 to -5.8). Although these fish were not initially considered as missing, they likely represent tagging mortalities (Appendices A2-7 and A2-13).

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

Prior to winter 2015/2016, five of the 40 Walleye tagged in 2013 moved downstream through Gull Rapids into Stephens Lake:

- #32833 was tagged in Gull Lake (rkm -17.9) on July 1, 2013. It moved downstream into Stephens Lake between June 10 and 16, 2015 and was detected in the Long Spruce

reservoir on 26 July, 2015. This fish survived passage through the GS, as it made multiple upstream and downstream movements with in the reservoir (Appendix A2-2).

- #32880 was tagged in Gull Lake (rkm -18.2) on July 1, 2013. It was first detected in Stephens Lake on June 14, 2014 (Appendix A2-30).
- #32882 was tagged in Gull Lake (rkm -10.6) on August 29, 2013, and moved downstream into Stephens Lake on August 12, 2014 (Appendix A2-32).
- #32884 was tagged in Gull Lake (rkm -17.1) on August 30, 2013. It was only located for two days post-tagging and was considered a tagging mortality. It was then detected in Stephens Lake on June 4, 2015 (Appendix A2-34) and has been included in the analysis moving forward.
- #32889 was tagged in Gull Lake (rkm -17.1) on August 30, 2013, and was last detected here on October 27, 2013. It was next detected in Stephens Lake on June 27, 2015 (Appendix A2-39).

A single fish moved upstream through Gull Rapids in 2013:

- #32843 was tagged in Stephens Lake (rkm 0.6) on June 27, 2013. It moved upstream into Gull Lake between August 28 and September 12, 2015 (Appendix A3-31).

Nine additional acoustic tags were applied to Walleye upstream of Gull Rapids between June 17 and 21, 2014.

Therefore, accounting for the 40 Walleye originally tagged, the fourteen missing tags (highlighted in Appendix 1), the nine additional tags added in 2014, the one fish that moved upstream from Stephens Lake, and the five fish that moved downstream into Stephens Lake, a total of 31 Walleye were available to be detected upstream of Gull Rapids during winter 2015/2016.

4.1.2 STEPHENS LAKE

Forty fish were initially tagged in Stephens Lake downstream of Gull Rapids in 2013, however, two (#32820 and #32842) displayed rapid downstream movements following tagging and were considered mortalities (Hrenchuk and Barth 2014) (Appendices A3-9 and A3-30, respectively). Another two fish (#32823 and #32835) have not been detected since open-water 2013 and are considered missing (Appendices A3-12 and A3-23).

Three tags (#32832, #32836, and #32837) were returned by a local resource user in 2015. The time and location of capture of the three fish is unknown.

A single fish moved downstream through the Kettle GS into the Long Spruce reservoir:

- #32811 was tagged in Stephens Lake (rkm 1.7) on June 26, 2013. It was detected in Stephens Lake until July 3, 2014, and in the Long Spruce reservoir on July 11, 2014 (Appendix A3-1).

Five fish have moved downstream from Gull Lake (as discussed in Section 4.1.1); however, one of these fish (#32833) moved downstream through the Kettle GS into the Long Spruce reservoir. An additional fish moved upstream through Gull Rapids into Gull Lake in 2013 (as discussed in section 4.1.1).

Two additional tags were applied to Walleye in Stephens Lake on 11 June, 2014 (Murray *et al.* 2015).

Therefore, accounting for the 40 originally tagged fish, the four missing, the two additional tags applied in 2014, the three harvested fish, the one fish that moved upstream into Gull Lake, the four fish that moved downstream from Gull Lake (subtracting the one that moved downstream into the Long Spruce reservoir in 2015), and the one fish that moved downstream into the Long Spruce reservoir in 2014, 37 fish were available to be detected downstream of Gull Rapids during winter 2015/2016.

4.2 WINTER 2015/2016

4.2.1 UPSTREAM OF GULL RAPIDS

All four receivers deployed upstream of Gull Rapids during winter were retrieved (Map 4). Fifteen of the 31 fish tagged in 2013 and 2014 were located, for a total of 37,834 detections (range: 2 – 10,104 detections per individual) (Appendix A1-1). Fish were detected between one and 50 days of the 202 day winter period. On average, fish were detected on 16 days, or for 8% of the study period (StDev = 19.8 days). A single fish (#6425) was located as far upstream as rkm -19.5, while six fish (#32847, #32858, #32879, #32881, #32886, and #6419) were located as far upstream as rkm -17.4 (Figure 3). The majority of detections (32,959; 87%) occurred at rkm -12.9 (Figure 4).

4.2.2 STEPHENS LAKE

Eleven of the 16 receivers deployed in Stephens Lake during winter were retrieved (Map 4). Three receivers located at rkms 10.5, 33.0, and 40.0 could not be retrieved due to the buildup of large woody debris that occurred during the winter months. The two receivers closest to Kettle GS (rkm 40.8) could not be retrieved (Map 5). Inspection with the sonar used to locate receivers after winter (Lowrance HDS) revealed that they were covered by sediment.

Thirteen of the 37 fish tagged in 2013 and 2014 were located, for a total of 35,090 detections (range: 7–11,038 detections per individual) (Appendix A1-2). Fish were detected on 1 to 156 days of the 202 day winter period (0–77% of the time). On average, fish were detected on 33 days, or for 16% of the study period (StDev = 45.3 days). Seven fish (54%) were located as far upstream as rkm 7.7, while two (15%) were located as far downstream as rkm 21.0 (Figure 5). The average overall movement range was 3.1 rkm (StDev = 5.0 rkm; range 0.0–13.3 rkm) (Figure 5; Appendix A1-2).

The majority of detections ($n = 19,097$) were logged at rkms 9.9 and 21.0. Seven fish (#6424, #32824, #32826, #32841, #32844, #32859, and #32882) were detected at rkm 7.9 in the upper reaches of Stephens Lake (Figure 6).

4.2.3 LONG SPRUCE RESERVOIR

The single receiver set in the Long Spruce reservoir was retrieved (Map 6). Neither of the Walleye (#32811 and #32833) last detected in this area were located during winter 2015/2016 (Appendices A3-1 and A2-2).

4.3 OPEN-WATER 2016

4.3.1 ACOUSTIC RECEIVER RETRIEVAL

Stationary acoustic receivers deployed upstream of Gull Rapids (26), in the Long Spruce reservoir (3), and in the Limestone reservoir (2) during the 2016 open-water period were successfully retrieved (Maps 7 and 9). One of the 29 receivers deployed in Stephens Lake (#4495; rkm 7.0) was caught on submerged trees approximately one month after it was deployed (Map 8). No data could be retrieved from this receiver.

4.3.2 UPSTREAM OF GULL RAPIDS

Nineteen of the 31 Walleye tagged in 2013 and 2014 were detected during the 2016 open-water season. Of the 12 fish that were not located (excluding those discussed in Section 4.1.1):

- Three (#32847, #6419, and #6426) were last detected during winter 2015/2016 (Appendices A2-4, A2-43, and A2-49).
 - All three were last detected in Gull Lake between rkm -17.1 and -12.9.
- Seven were last detected during open-water 2015.

- Two (#32851 and #32861) were last detected at the upstream end of Gull Lake (rkm -19.5) between June 25 and 30, 2015 (Appendices A2-5 and A2-11).
- #32857 was last detected downstream of Birthday Rapids (rkm -26.5) on September 11, 2015 (Appendix A2-9).
- Two (#32862 and 32868) were last detected moving upstream of Birthday Rapids (rkm -34.3) (Appendices A2-12 and A2-18).
- Two (#32873 and #32890) were last detected between September 1 and 14, 2015, in Clark Lake (rkm -48.2 to -44.3) (Appendices A2-23 and A2-40).
 - These fish likely moved upstream past the receiver array, or were captured by local resource users.
- Two have not been detected since open-water 2014:
 - #32874 was last detected lower Gull Lake (rkm -5.8) (Appendix A2-24).
 - #6420 moved upstream into Clark Lake and was last detected at rkm -48.2 (Appendix A2-44). This fish likely continued to move upstream past the array.

Walleye were detected between seven and 44,883 times for 1–144 days of the 172 day open-water season (0.6–83.7% of the time; Appendix A1-3). On average, fish were detected for 49 days (StDev = 42.9 days). Fish had a mean movement range of 13.9 rkm (StDev = 17.2 rkm; range: 0.0–74.3 rkm; Figure 7; Appendix A1-3). The majority of detections (n=67,702; 63%) were logged by the receivers set at the upstream end of Gull Lake (rkm -19.5 and -19.4) (Figure 8).

4.3.2.1 PROPORTIONAL DISTRIBUTION

As in previous years, individual Walleye used Zone 4 most often, spending a total of 61.0% of the study period in this area (StDev = 46.6%; range: 0–100%). Zone 3 was used for 19.9 % of the time (StDev: 36.4%; range: 0–100%). Zones 1, 2, and 5 were used less frequently: 8.5% (StDev = 20.8%; range: 0 – 64.8%), 0.1% (StDev = 0.6%; range: 0–2.4%), and 5.9% (StDev = 24.2%; range: 0–100%), respectively (Figures 9 and 10).

4.3.2.2 MOVEMENT PATTERNS

One Walleye (#6422) moved downstream through Gull Rapids (Appendix A2-46):

- This fish was detected between rkm -19.5 and -12.9 in both 2014 and 2015. It was detected near Birthday Rapids (rkm -29.4) at the end of May, 2016, and returned to Gull Lake in June. It was last detected in Gull Lake at rkm -5.8 on July 20. It was first detected in Stephens Lake at rkm 1.2 on July 21. It continued to move downstream and was last detected in Stephens Lake at rkm 18.6 on July 26. It passed through Kettle GS and was detected at rkms 43.5 and 44.9 on August 16. Based on the detection data, it remains unclear if this fish survived passage.

Three Walleye were detected in both Clark and Gull lakes:

- #32813 was detected in Clark Lake on May 7, 2016. It moved downstream to the base of Birthday Rapids (rkm -33.8) between June and July. It returned to Clark Lake and was last detected at the receiver near the mouth of the Assean River (rkm -46.9) on 5 August (Appendix A2-1).
- #32843 was detected in Clark Lake at rkm -48.2 on May 7 and July 12, 2016. It was then detected in the riverine area between Birthday Rapids and Gull Lake (rkm -26.5) on July 18. It was not detected again after this date (Appendix A3-31).
- #32869 was detected in the riverine area downstream of Birthday Rapids (rkm -26.5) at the beginning of the study period. It then moved into Gull Lake and was detected between rkms -19.4 and -14.8 until the end of July. It moved upstream to Clark Lake on August 10 and was last detected near the mouth of the Assean River (rkm -46.9) on August 11 (Appendix A2-19).

Three fish (#32879, #32881, #6417) were detected exclusively in Zone 3, the riverine area between Birthday Rapids and Gull Lake (Zone 3; rkm -34.0 to -19.6) (Appendices A2-29, A2-31, and A2-41). An additional fish (#32886) remained in this area during the majority of the study period but was also detected within Gull Lake for short periods of time (Appendix A2-36).

The remaining 11 fish were detected within Gull Lake for the majority of the study period:

- Four (#32852, #32883, #32888, and #6421) displayed upstream movements to Birthday Rapids (rkm -33.8 to -24.3) during the spring and returned to Gull Lake (Appendices A2-6, A2-33, A2-38, and A2-45).
- Seven were detected exclusively within Gull Lake:
 - One (#32878) was detected exclusively in the lower basin of Gull Lake (Zone 5; rkm -7.4) between May 25 and September 6 (Appendix A2-28).
 - Four (#32872, #6418, #6423, and #6425) were detected exclusively in Zone 4 (rkm -19.5 to -9.9) (Appendices A2-22, A2-42, A2-47, and A2-48).
 - Two (#32858 and #32877) moved throughout Gull Lake (Appendices A2-10 and A2-27).

4.3.3 STEPHENS LAKE

Seventeen of the 37 Walleye tagged in 2013 and 2014 available to be detected in Stephens Lake were located during the 2016 open-water period. One additional Walleye moved downstream from Gull Lake into Stephens Lake in 2016, but continued into the Long Spruce reservoir (discussed in Section 4.3.2.2).

Of the 20 fish not detected during the open-water season of 2016 (and not previously discussed in Section 4.2.2).

- Two (#32829 and #32859) were last detected during winter 2015/2016 in upper Stephens Lake (rkm 7.7 to 7.9) (Appendices A3-18 and A3-39).
 - Up until this point, both fish had been located regularly, suggesting that their tags may have expired.
- Nine (#32812, #32815, #32817, #32819, #32831, #32834, #32838, #32839, #32884, and #32889) were last detected during the 2015 open-water season (Appendices A3-2, A3-4, A3-6, A3-8, A3-10, A3-22, A3-26, A3-27, and A3-34).
- Two (#32830 and #32840) have not been detected since winter 2014/2015 (Appendices A3-19 and A3-28).
- Six (#32814, #32821, #32825, #32850, #32855, and #6427) have not been detected since open-water 2014 (Appendices A3-3, A3-10, A3-14, A3-36, A3-38, and A3-42).
 - A small commercial fishery existed on Stephens Lake during open-water 2014, and it is possible that these fish were captured.

Walleye were detected between 31 and 5,558 times for 1–72 days of the 172 day open-water season (0.6–41.9% of the time; Appendix A1-4). On average, fish were detected for 26 days (StDev = 19.9 days). Fish had a mean movement range of 8.9 rkm (StDev = 5.3 rkm; range: 0.0–17.4 rkm; Figure 11; Appendix A1-4). During the 2016 open-water period, the majority of detections ($n = 35,927$; 94%) were logged by receivers located within 10 rkm of Gull Rapids (Figure 12).

4.3.3.1 PROPORTIONAL DISTRIBUTION

As in 2015, individual Walleye used Zone 6 more frequently than Zone 7, spending 58.2% (StDev = 44.9%, range: 0–100%) and 41.8% (StDev = 41.8%, range: 0–100%) in each zone, respectively. A greater proportion of fish were detected close to Gull Rapids during the beginning of the study period than at the end (Figures 9 and 10).

- Zone 6 was used an average of 79% (StDev = 2.5%; range: 73–80%) of the time between June 25 and July 9, 2016.
- 62% (StDev = 3.9%; range: 53–67%) between July 10 and August 5.
- 53% (StDev = 1.6%; range: 47–53%) between August 6 and October 19.

4.3.3.2 MOVEMENT PATTERNS

Eleven fish remained in the upstream portion of Stephens Lake:

- Eight (#32816, #32818, #32822, #32824, #32826, #32828, #32844, and #6424), remained at or upstream of rkm 10.2 during the entire open-water season. These fish had movement ranges between 5.3 and 9.0 rkm (Appendices A3-5, A3-7, A3-11, A3-13, A3-15, A3-17, A3-32, and A3-41).

- Three (#32848, #32849, and #32880) were only detected at receivers in the upstream end of Stephens Lake, close to the construction site (between rkm 1.2 and 4.4) (Appendices A2-34, A2-35, and A2-30).

Six fish made more extensive movements throughout the lake:

- One (#32841) moved as far downstream as rkm 13.9 (Appendix A3-29).
- Five (#32827, #32845, #32854, #32860, and #32882) moved as far downstream as rkm 18.6 (Appendices A3-16, A3-33, A3-37, A3-40, and A2-32).

4.3.4 LONG SPRUCE RESERVOIR

Neither of the two walleye that had been previously detected in the Long Spruce reservoir (#32811 and #32833) was located during the open water season.

One Walleye (#6422) moved into the Long Spruce reservoir in August, 2016 (described in section 4.3.2.2).

4.3.5 LIMESTONE RESERVOIR

No Walleye were detected within the Limestone reservoir during the 2016 open-water period.

4.4 2016 TAGGING

4.4.1 ACOUSTIC TRANSMITTER APPLICATION

As previously discussed (section 3.1.1), 40 tags were applied to Walleye upstream of Gull Rapids between May 28 and June 7, 2016 (Appendix A6-3). These fish had a mean fork length of 477 mm (StDev = 77 mm; range: 350–660 mm) and a mean weight of 1,337 g (StDev = 464 g; range: 600–2,125 g). A single fish was released at Birthday Rapids (rkm -32.5), four on the north shore at the upstream end of Gull Lake (rkm -19.5), seven at Rabbit Creek (rkm -17.4), 27 on the north shore at rkm -14.8, and one at Hydro Island (rkm -10.3) (Map 3).

During the same time period (May 27–June 1, 2016), 40 tags were applied to Walleye in Stephens Lake (Appendix A6-4). These fish had a mean fork length of 461 mm (StDev = 49 mm; range: 322–534 mm) and a mean weight of 1,273 g (StDev = 500 g; range: 500–2,200 g). Thirty-three fish were released 1.2 rkm downstream of Gull Rapids, while seven were released on the south shore at rkm 2.7 (Map 3).

An additional eight tags were applied to fish captured upstream of Gull Rapids on September 24, 2016 (Appendix A6-3). These fish had a mean fork length of 447 mm (StDev = 52 mm; range: 362–508 mm) and a mean weight of 1,165 g (StDev = 500 g; range: 500–1,825 g). Three were released at Rabbit Creek (rkm -17.4), three on the north shore at rkm -17.2, and two on the north shore at rkm -12.5 (Map 3).

4.4.2 MOVEMENTS UPSTREAM OF GULL RAPIDS

4.4.2.1 SPRING TAGGING

All 40 fish tagged upstream of Gull Rapids between May and June, 2016, were detected between 118 and 40,350 times for 2–133 days (1–99% of the time) (Appendix A1-5). The average total movement range was 19.6 rkm (StDev = 19.3 rkm; range: 0.0 – 78.0 rkm) (Figure 13; Appendix A1-5). Four fish (10%) were located as far upstream as the inlet of Clark Lake (rkm -48.2), while four were located as far downstream in Gull Lake as rkm -5.8 (Figure 13; Appendix A1-5). Twelve fish (25%) moved downstream into Stephens Lake (Section 4.4.2.3). The majority of detections ($n = 260,440$; 77%) were logged within Gull Lake at receivers between rkm -19.5 and -14.8 (Figure 14).

4.4.2.1.1 PROPORTIONAL DISTRIBUTION

Walleye tagged in spring 2016 that remained upstream of Gull Rapids used Zone 4 (upper and middle basins of Gull Lake) most often, spending an average of 76.7% (StDev = 28.1%; range: 0 – 100%) of the study period in this area (Figures 15 and 16). The remaining four zones were used less frequently: Zone 1 (6.2%; StDev = 12.4; range: 0 – 48.0%); Zone 2 (1.0%; StDev = 3.5%; range: 0 – 17.4%); Zone 3 (10.2%; StDev = 18.7%; range: 0 – 70.3%); Zone 5 (5.8%; StDev = 17.2%; range: 0 – 71.2%) (Figures 15 and 16).

4.4.2.1.2 MOVEMENTS

Fifteen fish remained exclusively in Gull Lake:

- Two (#53768, and #53805) remained in upper Gull Lake, moving no further downstream than rkm -14.8 (Appendices A4-10 and A4-47).
- Thirteen (#53763, #53776, #53778, #53780, #53781, #53784, #53785, #53787, #53792, #53793, #53795, #53798, and #53800) moved throughout Gull Lake (Appendix 4).

Five fish moved into the riverine area between Birthday Rapids and Gull Lake:

- Two (#53772 and #53773) were located within Gull Lake for the majority of the study period, but made a single brief upstream movement (Appendices A4-14 and A4-15).
- One (#53806) made multiple upstream movements to the riverine area downstream of Birthday Rapids (rkms -33.8 to -26.5) (Appendix A4-48).

- Two (#53794 and #53796) remained in Zone 4 of Gull Lake until the middle of August (15–19), when they moved upstream to rkm -26.5 for the remainder of the study period (Appendices A4-36 and A4-38).

Five fish moved upstream into Clark Lake and remained there until the end of the open-water period:

- Four (#53777, #53783, #53797, and #53807) remained in the upper portion of Gull Lake for the majority of the study period but moved upstream to Clark Lake between August 16 and September 24 (Appendices A4-19, A4-25, A4-39, and A4-49).
 - All four fish were detected at the mouth of the Assean River (rkm -46.9), but remained within Clark Lake.
- One (#53789) was tagged immediately downstream of Birthday Rapids on May 30, 2016. It remained here until September 10, when it moved upstream. It was first located in Clark Lake on October 3 (Appendix A4-31).

Five fish (#53770, #53774, #53779, #53790, and #53802) were located for less than ten days of the study period (Appendices A4-12, A4-16, A4-21, A4-32, and A4-44). These fish may represent tagging mortalities or transmitter malfunctions. However, because the monitoring period in 2016 was short, they may be detected with continued monitoring.

The remaining ten fish moved downstream through Gull Rapids (described in section 4.4.2.3).

4.4.2.2 FALL TAGGING

All eight fish tagged upstream of Gull Rapids on September 24, 2016, were detected between 360 and 5,790 times, for 10–21 days (40–84% of the time) (Appendix A1-5). The average total movement range was 9.8 rkm (StDev = 9.7 rkm; range: 1.1–26.8 rkm) (Figure 13; Appendix A1-5). These Walleye were only detected in zones 4 and 5, using each an average of 97.9% (StDev = 4.4; range: 87.5%–100%) and 2.1% (StDev = 4.4; range: 0 – 100%), respectively (Figure 16).

Six fish remained exclusively in Gull Lake:

- Two (#53758 and #53765) largely remained within the lower portion of Zone 4 in Gull Lake (rkm -10.1 to -9.5) (Appendices A4-1 and A4-7).
- Two (#53766 and #53767) remained at rkm -12.9 for the majority of the study period (Appendices A4-8 and A4-9).
- Two (#53803 and #53804) moved between rkm -14.8 and -11.8 (Appendices A4-45 and A4-46).

The remaining two fish moved downstream through Gull Rapids (described in section 4.4.2.3).

4.4.2.3 MOVEMENTS THROUGH GULL RAPIDS

Twelve fish moved downstream through Gull Rapids into Stephens Lake during the 2016 open-water period. Fish moved downstream between 1 and 88 days after being tagged.

Six were detected in Stephens Lake making multiple upstream and downstream movements, and are presumed to be alive:

- #53759 was tagged on September 24, 2016, at rkm -17.5 (Appendix A4-2). It remained at rkm -12.9 until September 28, and was last detected in Gull Lake at rkm -5.8 on September 29.
 - It was detected in Stephens Lake on September 29 at rkm 1.2. It was detected in Stephens Lake until October 15, as far upstream as rkm 1.2 and as far downstream as rkm 9.4.
- #53760 was tagged on September 24, 2016, at rkm -17.5 (Appendix A4-3). It was detected between rkm -14.8 and -9.5 until October 3, when it was last detected in Gull Lake at rkm -5.8.
 - It was detected in Stephens Lake at rkm 2.7 on October 3. It moved between rkm 2.7 and 5.2 until October 5.
- #53775 was tagged on June 5, 2016, at rkm -14.8 (Appendix A4-17). It moved between rkm -10.1 and -9.5 until June 16. It was last detected in Gull Lake on June 17 at rkm -5.8.
 - It was detected in Stephens Lake on June 18 at rkm 1.2. It was detected in Stephens Lake until October 16, as far upstream as rkm 1.2 and as far downstream as rkm 18.6.
- #53788 was tagged on May 30, 2016, at rkm -14.8 (Appendix A4-30). It moved between rkm -19.5 and -14.8 until June 20, when it was last detected in Gull Lake at rkm -5.8.
 - It was detected in Stephens Lake at rkm 1.2 on June 21. It was detected moving between rkm 1.2 and 5.2 until July 9.
- #53799 was tagged on June 7, 2016, at rkm -14.8 (Appendix A4-41). It remained at rkm -12.9 until October 15, and was last detected in Gull Lake on this day at rkm -5.8.
 - It was detected in Stephens Lake at rkm 1.2 on June 16. It was detected in Stephens Lake between rkm 1.2 and 10.3 until October 16.
- #53801 was tagged on June 7, 2016, at rkm -14.8 (Appendix A4-43). It was detected in Gull Lake for a single day.
 - It was located in Stephens Lake at rkm 1.2 on June 7. It was detected in Stephens Lake only until June 14, but moved upstream and downstream between rkm 5.8 and 18.6 during this time, and is therefore presumed alive.

Four continued to move downstream into the Long Spruce reservoir, one of which moved into the Limestone reservoir.

- One (#53769) appears to have survived passage.
 - It was tagged on June 5, 2016, at rkm -14.8 (Appendix A4-11). It made regular movements between rkm -19.5 and -9.5 until August 8. It was last detected in Gull Lake at rkm -5.8 on August 16.
 - It was detected in Stephens Lake at rkm 1.2 on September 1. It moved between rkm 1.2 and 9.4 until September 8. It was last detected in Stephens Lake at rkm 36.1 on September 8.
 - It was subsequently detected in the Long Spruce reservoir on September 11 and was located until October 13.
- The remaining three fish may have been affected by tagging stress, and it is unknown if they survived GS passage:
 - #53771 was tagged on June 5, 2016, at rkm -14.8 (Appendix A4-13). It moved between rkm -19.4 and -5.8 until July 8. It was last detected in Gull Lake at rkm -5.8 on July 27.
 - It was first detected in Stephens Lake at rkm 1.2 on July 31. It moved between rkm 1.2 and 10.3 until August 6. It was last detected in Stephens Lake immediately upstream of the Kettle GS (rkm 40.9) on August 19.
 - It was detected for the first time in the Long Spruce reservoir on August 19, but made no upstream movements.
 - It was subsequently detected in the Limestone reservoir on August 21 at a single receiver.
 - #53782 was tagged on May 31, 2016, at rkm -19.5 (Appendix A4-24). It moved between rkm -19.5 and -17.4 until June 7 and was last detected in Gull Lake at rkm -5.8 on June 10.
 - It was detected in Stephens Lake at rkm 1.2 on June 17. It moved between rkm 1.2 and 2.7 until July 19. It was last detected in Stephens Lake at rkm 18.6 on July 28.
 - It was detected for a single day (August 8) by the receiver set at rkm 43.5 within the Long Spruce reservoir.
 - #53791 was tagged on May 29, 2016, at rkm -19.5 (Appendix A4-33). It moved downstream immediately after tagging, showing some upstream-downstream movement, and was last detected in Gull Lake at rkm -5.8 on June 5.
 - It was detected in Stephens Lake at rkm 1.2 on June 5. It moved between rkm 1.2 and 4.5 until June 17 after which it moved downstream and was last detected in Stephens Lake on June 26 at rkm 36.1.
 - It was next detected for a single day (June 27) within the Long Spruce reservoir but did not make any upstream movements.

Two fish were detected briefly in Stephens Lake with no upstream movements, and are presumed to be tagging mortalities:

- #53764 was tagged on June 5, 2016, at rkm -14.8 (Appendix A4-5). It was last detected in Gull Lake at rkm -5.8 on June 12.
 - It was detected in Stephens Lake at rkm 1.2 on June 12 and 13. It moved downstream to rkm 9.4 on June 14 and was not detected for the remainder of the study period.
- #53786 was tagged on May 30, 2016, at rkm -14.8 (Appendix A4-28). It moved downstream immediately after tagging and was last detected in Gull Lake at rkm -5.8 on June 2.
 - It was detected in Stephens Lake for a single day (June 2) and did not display any upstream movements.

4.4.3 MOVEMENTS IN STEPHENS LAKE

Thirty-nine of the 40 fish tagged in Stephens Lake between May and June, 2016, were detected between 118 and 380,602 times for 4–135 days (3–94% of the time) (Appendix A1-6). Mean movement range was 13.2 rkm (StDev = 4.8 rkm; range 1.5–19.8 rkm) (Figure 17; Appendix A1-6). Thirty six fish (92%) were detected as far upstream as rkm 1.2, while a single fish was detected as far downstream as rkm 21.0 (Figure 17; Appendix A1-6). One quarter of all detections ($n = 103,368$; 25.2%) were logged by a single receiver at rkm 18.6 (Figure 18). Overall, the majority of detections ($n = 273,381$; 66.5%) occurred within 5.2 rkm of the base of Gull Rapids (Figure 18). No fish moved upstream through Gull Rapids or downstream through the Kettle GS during the 2016 open-water period.

4.4.3.1 PROPORTIONAL DISTRIBUTION

Walleye used Zone 7 most frequently, spending an average of 70.0% (StDev = 32.9; range: 0 – 100%) of the study period in this area. Zone 6 was used an average of 30.0% (StDev = 32.9; range: 0 – 100%) of the time (Figures 15 and 19).

4.4.3.2 MOVEMENTS

Twelve fish remained in the upstream portion of Stephens Lake, only moving as far downstream as rkm 10.3:

- Four (#53724, #53739, #53740, and #53811) largely remained in the area immediately downstream of Gull Rapids (Zone 1), making brief downstream movements (Appendices A5-2, A5-16, A5-17, and A5-38).
- Eight (#53723, #53730, #53731, #53737, #53738, #53747, #53749, and #53750) moved between the two zones (Appendix 5).

Twenty fish moved further downstream into Stephens Lake:

- Five (#53726, #53733, #53748, #53755, and #53756) made regular upstream and downstream movements, moving as far downstream as rkm 16.8 (Appendices A5-4, A5-10, A5-25, A5-32, and A5-33).
- Eleven moved as far downstream as rkm 18.6.
 - Five (#53728, #53729, #53735, #53809, and #53810) were located at rkm -18.6 for the majority (23 – 121 days) of the study period (Appendices A5-5, A5-6, A5-12, A5-36, and A5-37).
 - Six (#53725, #53736, #53741, #53744, #53751, and #53808) made regular upstream and downstream movements (Appendices A5-3, A5-13, A5-18, A5-21, A5-28, and A5-35).
- Two (#53752 and #53812) were located upstream of rkm 4.4 until June 20 and July 15, respectively when both made single downstream movements as far as the mouth of Ferris Bay (rkm 20) (Appendices A5-29 and A5-39).
 - Neither fish was detected in Stephens Lake during the remainder of the open-water period.
- One (#53753) moved as far downstream as rkm 21.0, but was located at rkm -18.6 for the majority (70 days) of the study period (Appendix A5-30).

The remaining nine fish (#53727, #53732, #53734, #53742, #53743, #53745, #53746, #53754, and #53757) were located for less than ten days of the study period (Appendix 5). These fish may represent tagging mortalities or transmitter malfunctions. However, because these transmitters were monitored for a limited amount of time, they may be detected with continued monitoring.

5.0 DISCUSSION

Walleye movement monitoring was initiated in 2013 to describe movement just prior to and after the start of construction (mid-2014) and to monitor the effects of construction on fish movements and habitat use. Transmitters applied to Walleye in 2013 were 3-year transmitters and expired during the open-water period in 2016. Additional tags were applied both upstream and downstream of the construction site during the 2016 open-water period to allow for continued monitoring through the construction period. Forty-eight transmitters were applied to Walleye upstream of Gull Rapids, and an additional 40 were applied to Walleye in Stephens Lake. The discussion below highlights movement patterns observed since monitoring of Walleye movement began in 2013 and discusses the key questions (presented in the AEMP) with respect to potential impacts of construction on Walleye. Movements of original fish tagged in 2013 and those newly tagged in 2016 are considered separately in the discussion.

5.1 EVALUATION OF METHODOLOGY

Acoustic telemetry has proved to be an effective method for monitoring movements of Walleye in the Keeyask Study Area (Burnett *et al.* 2016; Murray *et al.* 2015; Hrenchuk and Barth 2014). However, as mentioned in previous reports, it is more difficult to interpret results of Walleye movement studies than those of adult and juvenile Lake Sturgeon. Walleye, unlike Lake Sturgeon, frequently utilize habitats outside the main river channel where receivers are deployed. As a result, the frequency of detection for Walleye is lower relative to Lake Sturgeon and results indicate that some tagged Walleye can be undetected for extended periods prior to “appearing” again within the array. Extended periods where fish are not detected can complicate data interpretation in some instances.

Data analyses in 2016 were further complicated by the fact that the acoustic transmitters were reaching the end of their three-year lifespan. It is likely that some of the transmitters were not functioning for the entirety of the current study period and may have expired prior to receiver deployment in early June. In 2016, fewer fish tagged in 2013 and 2014 were detected both upstream and downstream of Gull Rapids than in previous years. The proportion of fish detected upstream of Gull rapids has decreased from 98% in 2013, 81% in 2014, and 76% in 2015 to 61% in 2016. The proportion of fish detected in Stephens Lake has also decreased from 100% in 2013, 85% in 2014, and 68% in 2015 to 49% in 2016. This could be the result of natural mortality, local resource harvesting, fish leaving the study area, and/or tag malfunction or expiration.

The addition of the 88 new transmitters in 2016 will allow the study to carry on for the remainder of the construction period. All of the 48 Walleye tagged in 2016 in Gull Lake were detected, while 39 of the 40 Walleye tagged in Stephens Lake were detected. An unusual number of the

Walleye tagged in Gull Lake in 2016 moved downstream within the same year (12 of 48 tagged fish). Eight of these fish moved within two weeks of being tagged and movements are likely relate to tagging stress. Review of tagging procedures did not indicate any apparent cause for the higher than normal rate of downstream movement.

Although the frequency of detection is lower for Walleye relative to Lake Sturgeon, the acoustic receiver array is effective at describing long-distance movements within the study area during the open water period. Movement patterns have become evident, especially upstream of Gull Rapids where Walleye may remain in Gull Lake during the summer months and move upstream during spring or fall. Although movements within Gull and Stephens lakes may be less well represented, when fish move into the riverine sections of the study area or past the receiver gates, they are detected. Therefore, the study design is effective in monitoring long distance movements of fish, including movements past Gull Rapids. Fish are also readily detected when they move in the vicinity of Gull Rapids, which is a key objective during the construction period.

5.2 MOVEMENT PATTERNS

In 2016, Walleye tagged in 2013 and 2014 continued to display movement patterns similar to those observed since the start of the study. Walleye tagged in Gull Lake continued to display two general movement patterns, either remaining in Gull Lake (largely within the upper basin), or moving between Gull and Clark lakes. Walleye generally remain near to the upstream extent of the upper basin of Gull Lake (Zone 4), near the inlet of the lake. Walleye have consistently had the highest detection rates at this location since the study began in 2013 (Murray *et al.* 2015, Burnett *et al.* 2016). Apart from the fish that moved downstream following tagging, as discussed below, Walleye tagged in 2016 displayed similar movement patterns.

One of the 19 fish originally tagged in 2013/2014 in Gull Lake moved downstream through Gull Rapids and continued past the Kettle GS in 2016. As this fish did not display any upstream movements after Gull Lake, it may be mortality. In contrast, of the 48 Walleye tagged upstream of Gull Rapids in 2016, 12 (25%) moved downstream through Gull Rapids. Eight Walleye moved downstream within two weeks of tagging (*i.e.* between 1 and 13 days). Four of these fish continued to move downstream through the Kettle GS and one moved through the Long Spruce GS. The movements observed so soon after tagging are likely related to stress caused by the tagging process. The remaining fish tagged upstream of Gull Rapids moved downstream within 18 to 88 days of tagging. It is unknown whether Walleye tagged in 2016 upstream of Gull Rapids were affected by longer term adverse effects of tagging and further monitoring is required to determine whether this is the case.

In Stephens Lake, the majority of tagged Walleye remained exclusively within the upper 10.5 rkm during the open water period. This included both Walleye tagged in 2013/2014 and those tagged in 2016. No fish tagged in Stephens Lake in 2016 moved downstream past the Kettle GS or appeared to be affected by the tagging process.

No Walleye have moved upstream over Gull Rapids since construction began in mid-2014. Only one Walleye has moved upstream (in 2013) since the study began. It is plausible that upstream fish movement past the construction site is no longer possible because all of the river's flow has been diverted through the south channel, which is partially constricted as a result of constructing the spillway cofferdam. Discharge in the Nelson River has been above median levels since the start of construction, compounding the high water velocity in the south channel.

5.3 KEY QUESTIONS

In the discussion below, the key questions/objectives of Walleye movement monitoring during construction, as described in the AEMP, and presented in the introduction of this report, are addressed:

How many (or what proportion) of tagged Walleye move past the construction site?

Of the 41 Walleye initially tagged upstream of Gull Rapids in 2013 and 2014, six (15%) moved downstream through Gull Rapids during the three-year study period. The timing of three of these movements is unknown, as the fish were not detected for a year before being detected in Stephens Lake. The remaining three moved downstream in August 2014, June 2015, and between June and July 2016. Interestingly, the Walleye that moved through Gull Rapids in 2015 and 2016 also made subsequent moves through the Long Spruce GS.

In contrast, Walleye tagged in Gull Lake in 2016 showed a much higher rate of downstream movement over Gull Rapids, where 25% moved downstream in 2016. As discussed above, many of these movements are attributed to tagging stress.

Are Walleye using habitat in the vicinity of construction activities, particularly during spawning?

Monitoring since 2013 has shown that Walleye tagged upstream of Gull Rapids do not spend much time in the vicinity of the construction site. With the exception of the fish that moved through Gull Rapids in 2016, no Walleye were detected by the closest receiver to Gull Rapids (5.8 rkm upstream) and only one was detected at the second-closest receiver at 7.5 rkm upstream.

In contrast, Walleye in Stephens Lake regularly use habitat directly downstream of the construction site. In all study years, Walleye have been detected near Gull Rapids during the spring and have likely continued to spawn in this area during the construction period.

6.0 SUMMARY AND CONCLUSIONS

- There has been little change in the movement patterns of Walleye since the study began. Walleye tagged in Gull Lake continued to display two general movement patterns, either remaining in Gull Lake (largely within the upper basin), or moving between Gull and Clark lakes.
- In Stephens Lake, the majority of tagged Walleye remain exclusively within the upper 10.5 rkm during the open water period.
- The key questions, as described in the AEMP, for Walleye movement monitoring during construction of the Keeyask GS are as follows:

- *What is the number (or the proportion) of tagged Walleye that move past the construction site?*

Of the 41 fish tagged upstream of Gull Rapids in 2013 and 2014, six (15%) have moved downstream through Gull Rapids since the study began. Of the 48 Walleye tagged upstream of Gull Rapids in 2016, 12 (25%) moved downstream through Gull Rapids, however, many of these movements are believed to be related to tagging stress.

- *Are Walleye utilizing habitat in the vicinity of construction activities (particularly during spawning)?*

Monitoring since 2013 has shown that Walleye tagged upstream of Gull Rapids that remain in Gull Lake, do not spend much time in the vicinity of the construction site. In contrast, Walleye tagged in Stephens Lake, or those that have moved downstream from Gull Lake, regularly use habitat directly downstream of the construction site.

- This report marks the last monitoring period for Walleye tagged in 2013 and 2014. Subsequent reports will continue to monitor movements of Walleye tagged in 2016.

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TABLES

Table 1: Number of acoustic tags applied to Walleye in the Keeyask Study Area (upstream of Gull Rapids and in Stephens Lake) between June 2013 and October 2016.

Year	Upstream GR	Stephens Lake	Total
2013	40	40	80
2014	9	2	11
2015	0	0	0
2016	48	40	88

FIGURES

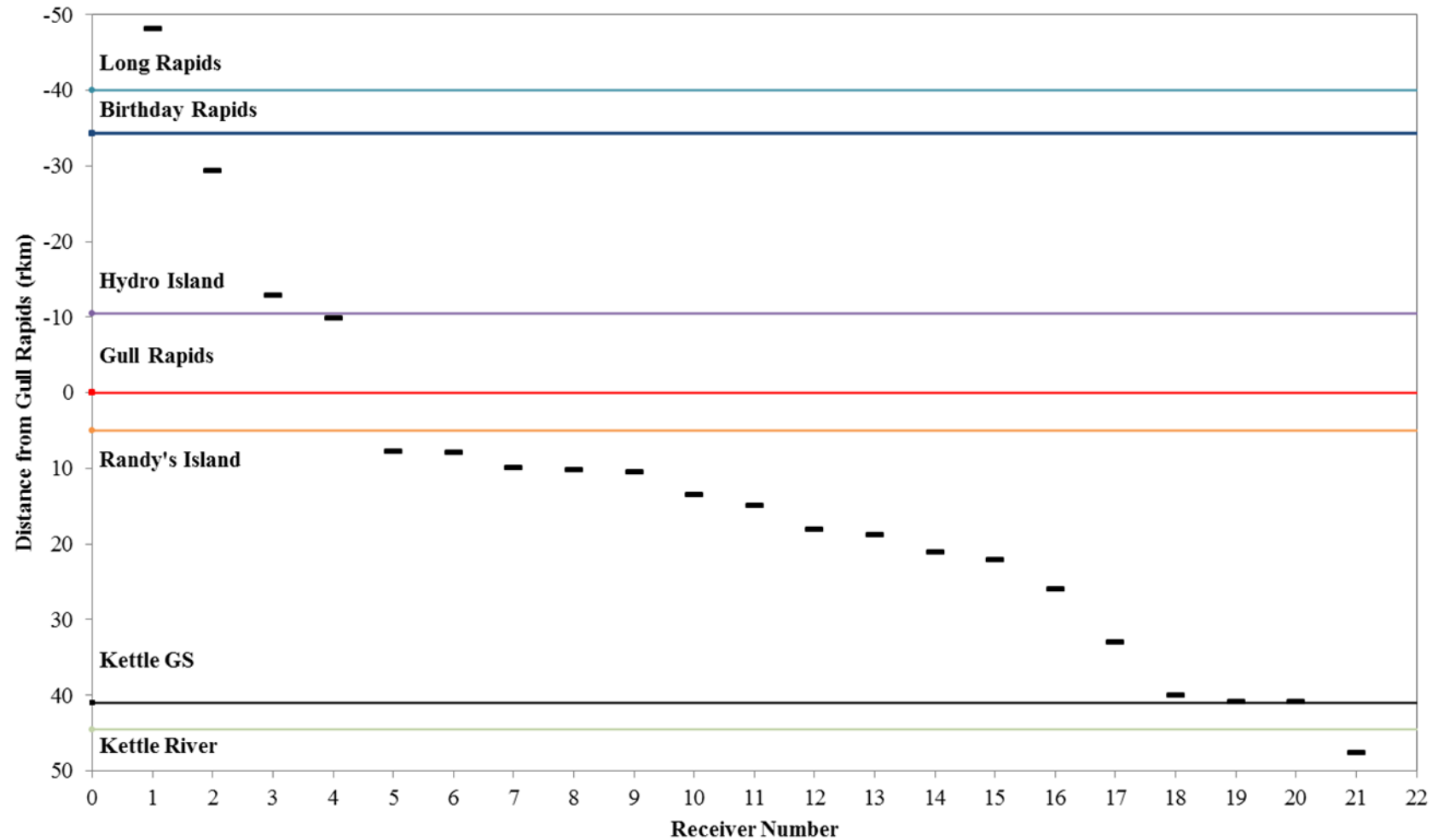


Figure 1: Locations of stationary acoustic receivers (dashes) in relation to the base of Gull Rapids (rkm 0) and other major landmarks (lines) in the Nelson River between Clark Lake and the Limestone GS between October, 2015 and June, 2016.

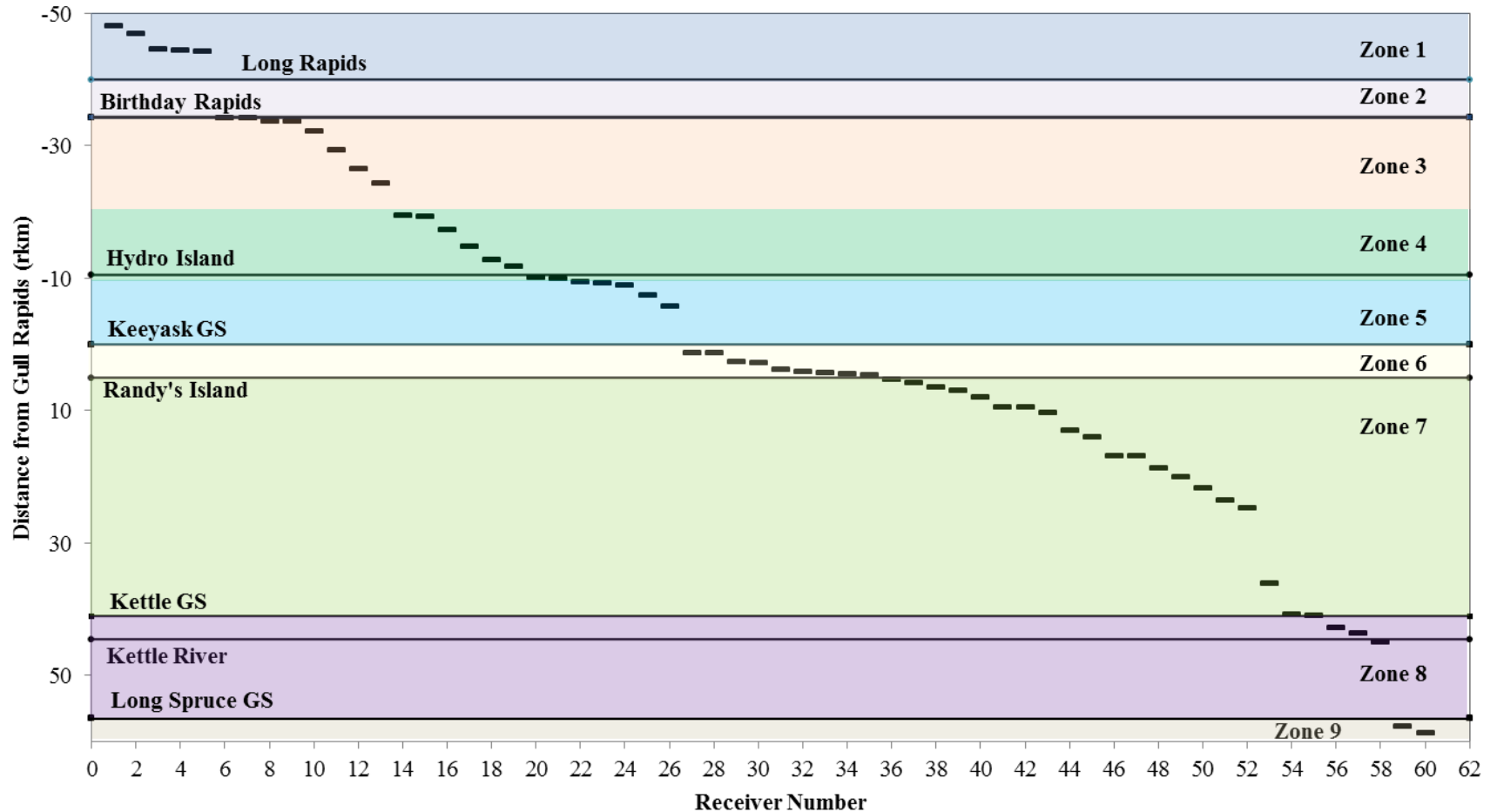


Figure 2: Locations of stationary acoustic receivers (dashes) in relation to the base of Gull Rapids (rkm 0) and other major landmarks (lines) in the Nelson River between Clark Lake and the Limestone GS between June and October, 2016. River zones upstream and downstream of Gull Rapids are indicated by shading.

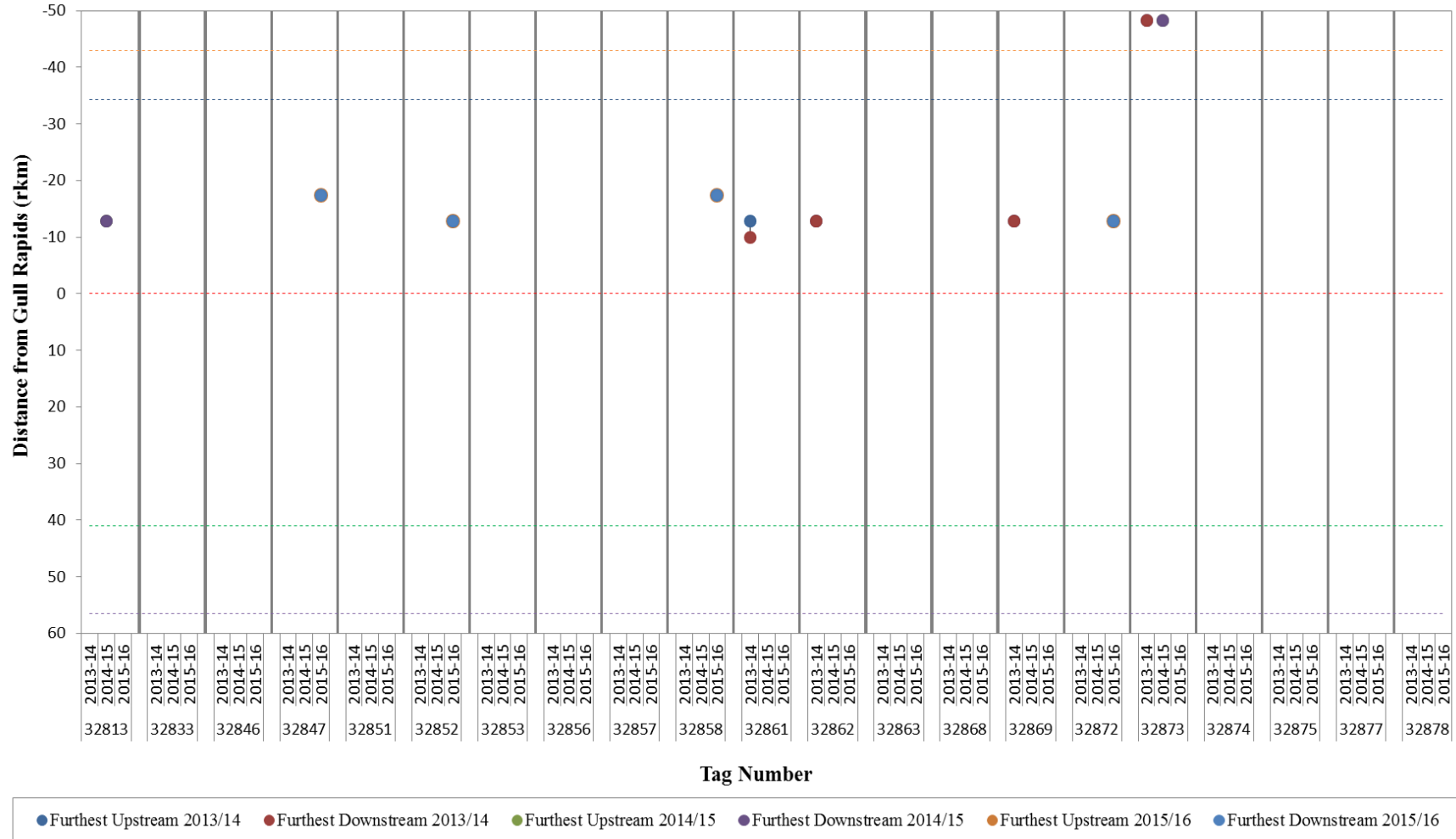


Figure 3: Detection ranges for individual Walleye tagged with acoustic transmitters upstream of Gull Rapids in 2013 during the winter period (2013–2016). Horizontal dotted lines indicate locations of landmarks (orange = Clark Lake outlet; blue = Birthday Rapids, red = Gull Rapids; green = Kettle GS).

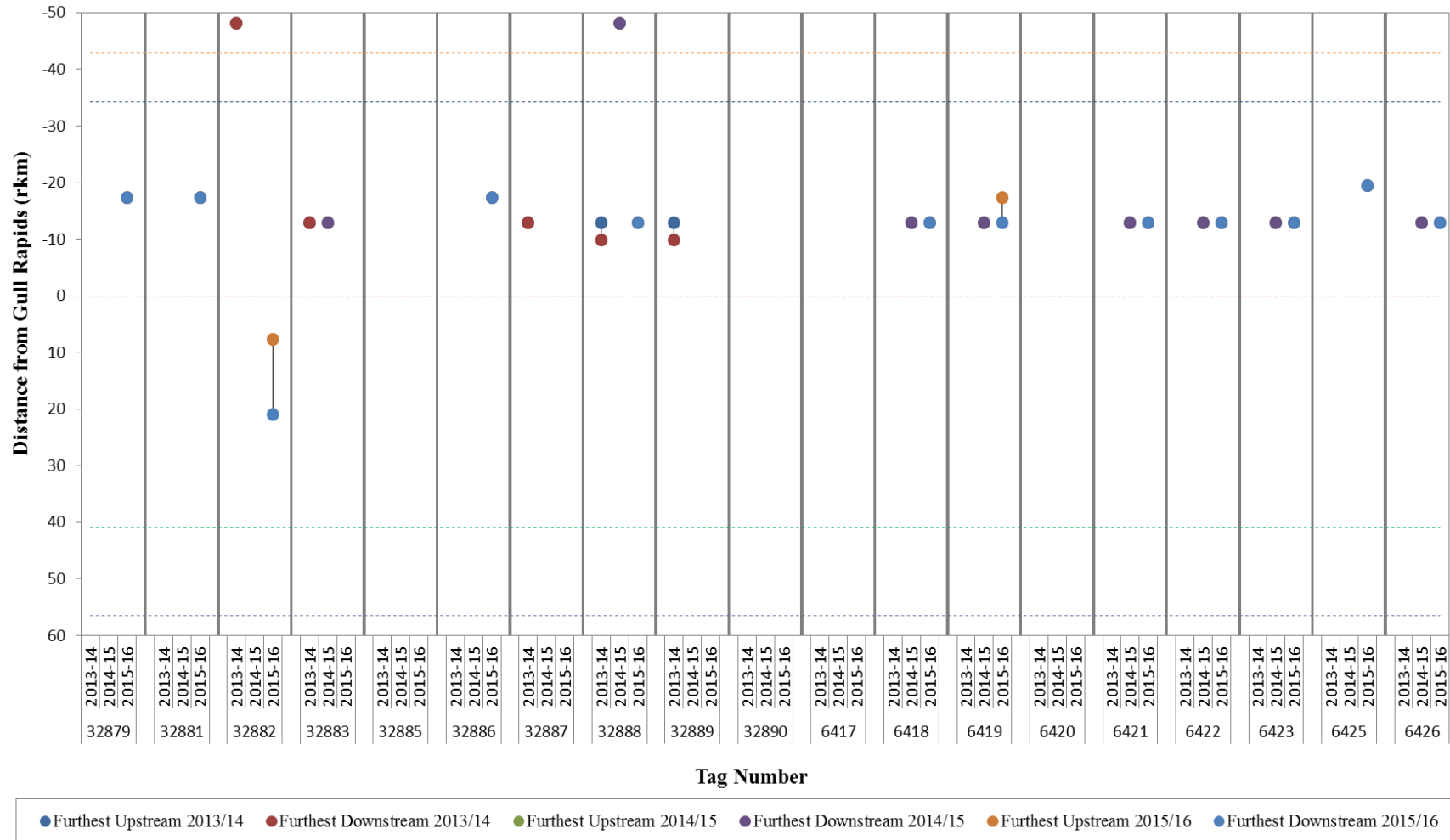


Figure 3: Detection ranges for individual Walleye tagged with acoustic transmitters upstream of Gull Rapids in 2013 during the winter period (2013–2016). Horizontal dotted lines indicate locations of landmarks (orange = Clark Lake outlet; blue = Birthday Rapids, red = Gull Rapids; green = Kettle GS) (continued).

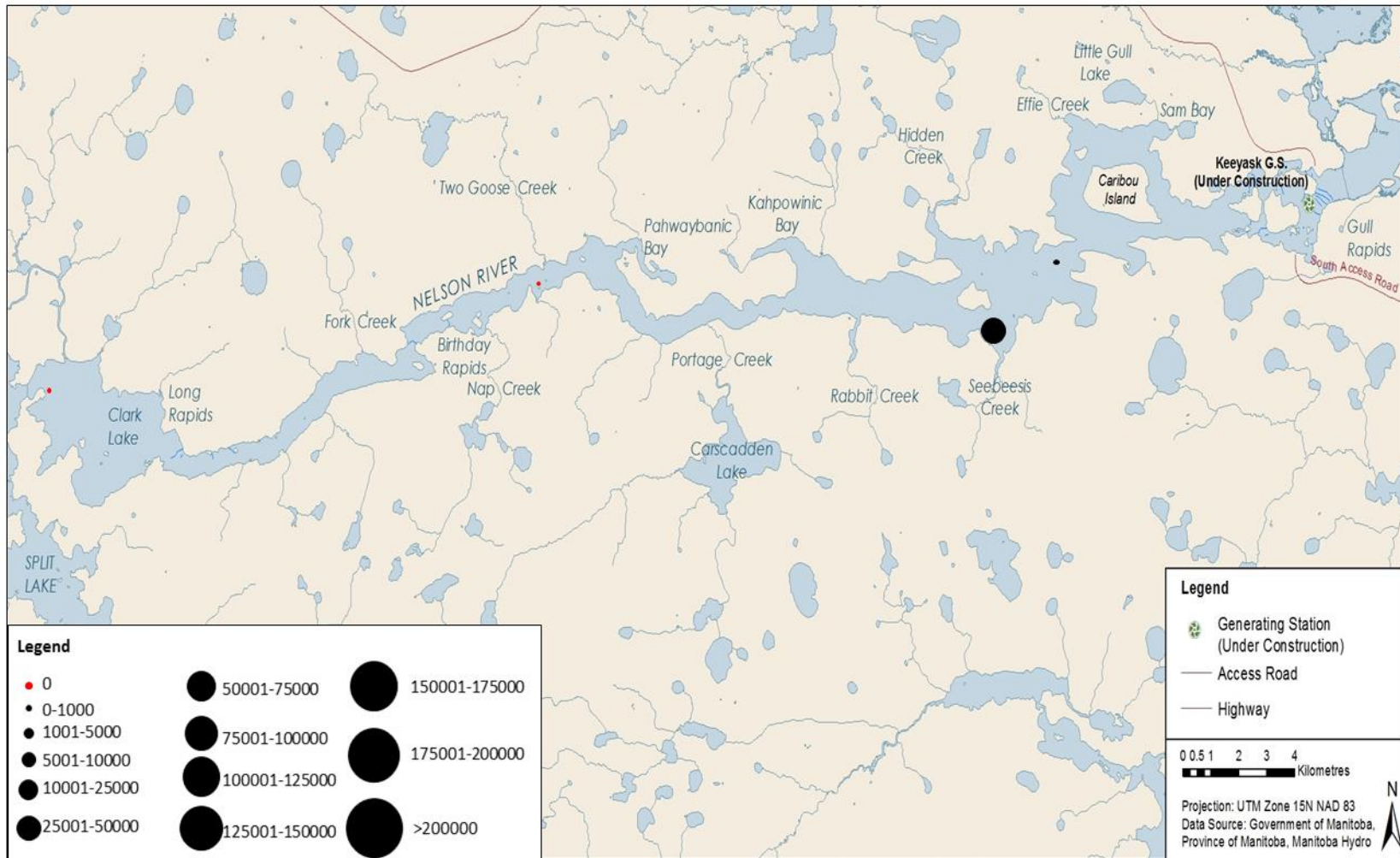


Figure 4: Relative number of detections of Walleye at each acoustic receiver set between Clark Lake and Gull Rapids during winter 2015/2016 (October 12, 2015, to April 30, 2016). Number of detections indicated by size of bubble (defined in legend). Receivers with no detections indicated with red dot.

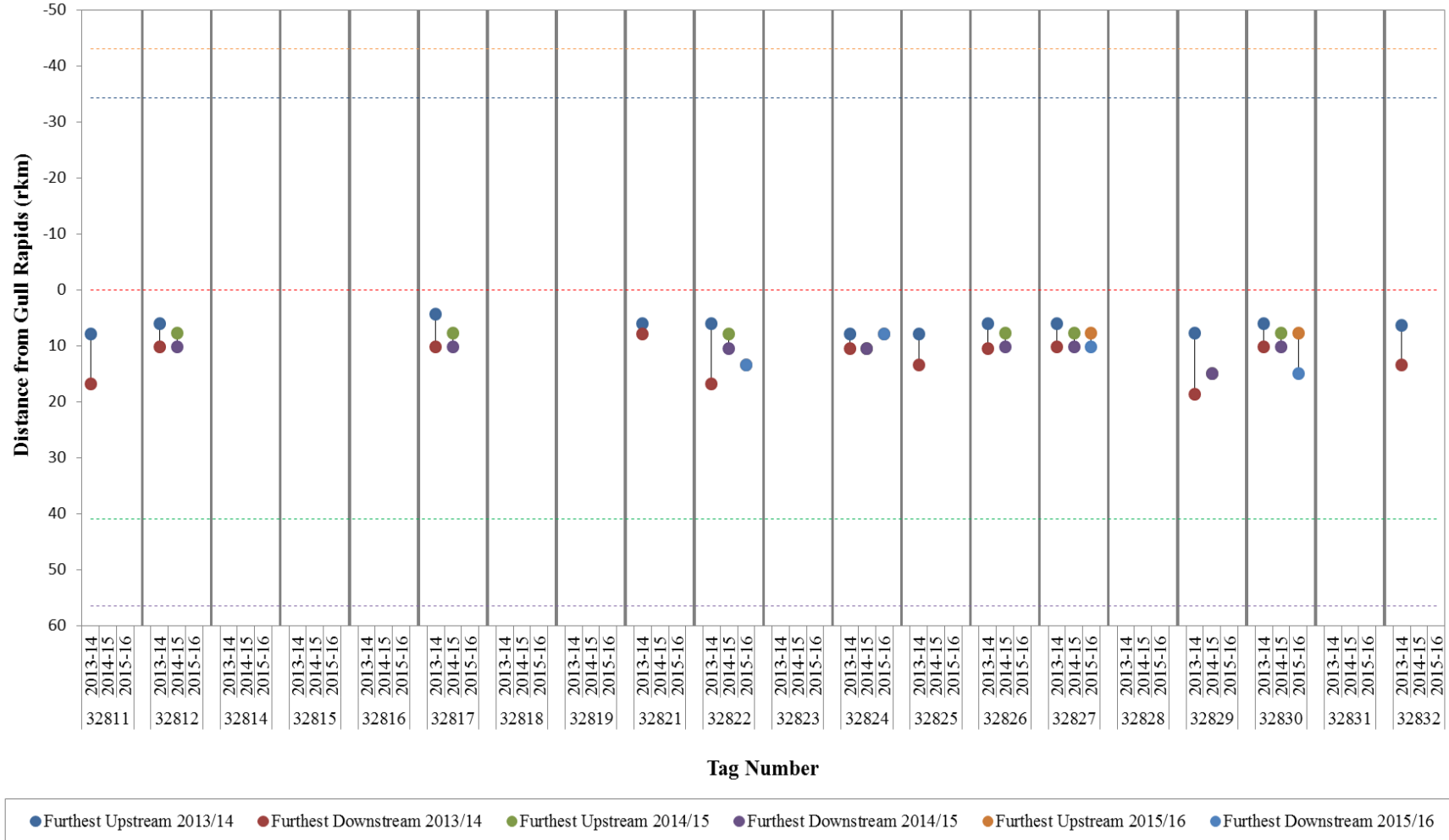


Figure 5: Detection ranges for individual Walleye tagged with acoustic transmitters in Stephens Lake in 2013 during the winter period (2013–2016). Horizontal dotted lines indicate locations of landmarks (orange = Clark Lake outlet; blue = Birthday Rapids, red = Gull Rapids; green = Kettle GS).

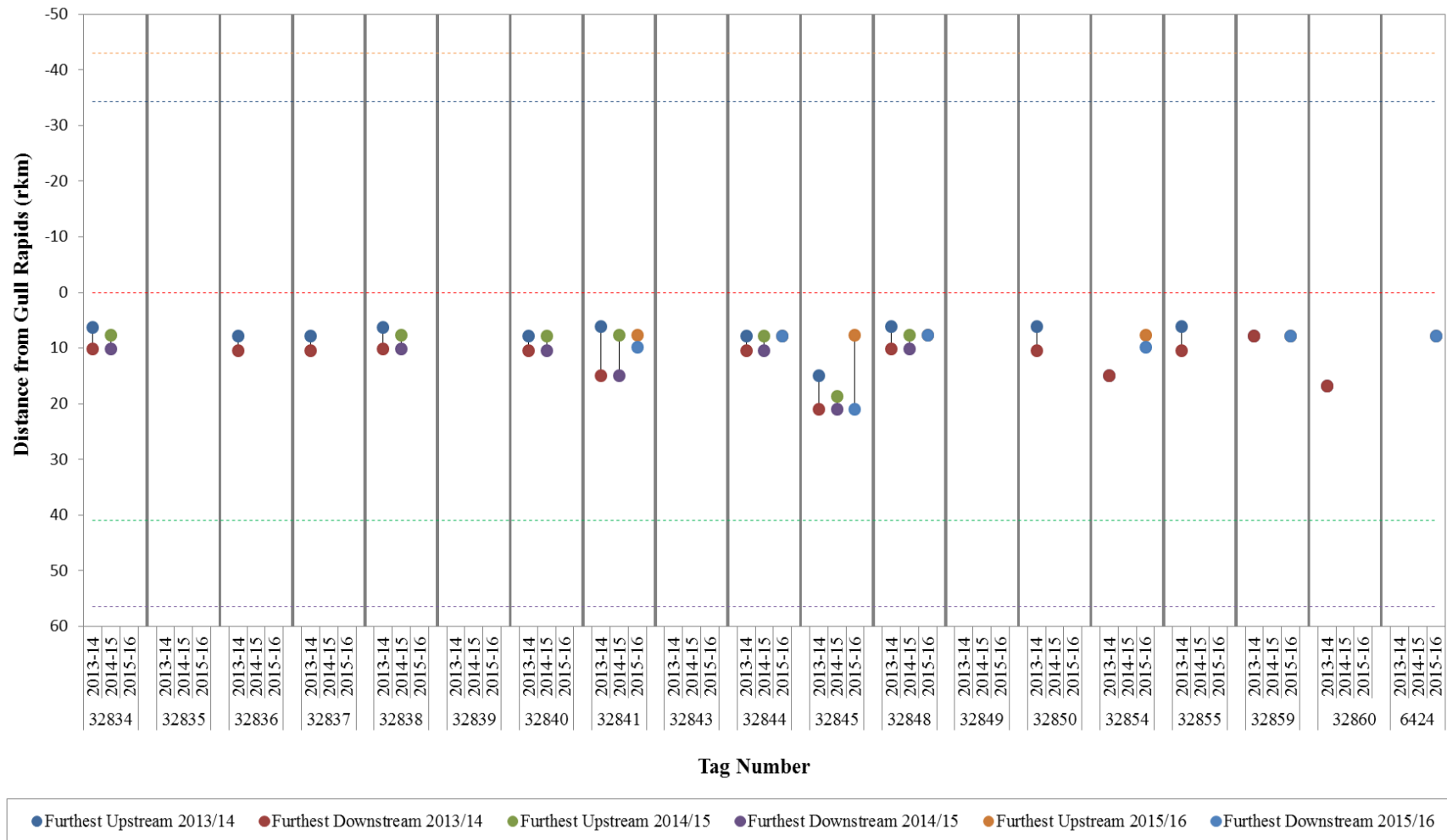


Figure 5: Detection ranges for individual Walleye tagged with acoustic transmitters in Stephens Lake in 2013 during the winter period (2013–2016). Horizontal dotted lines indicate locations of landmarks (orange = Clark Lake outlet; blue = Birthday Rapids, red = Gull Rapids; green = Kettle GS) (continued).

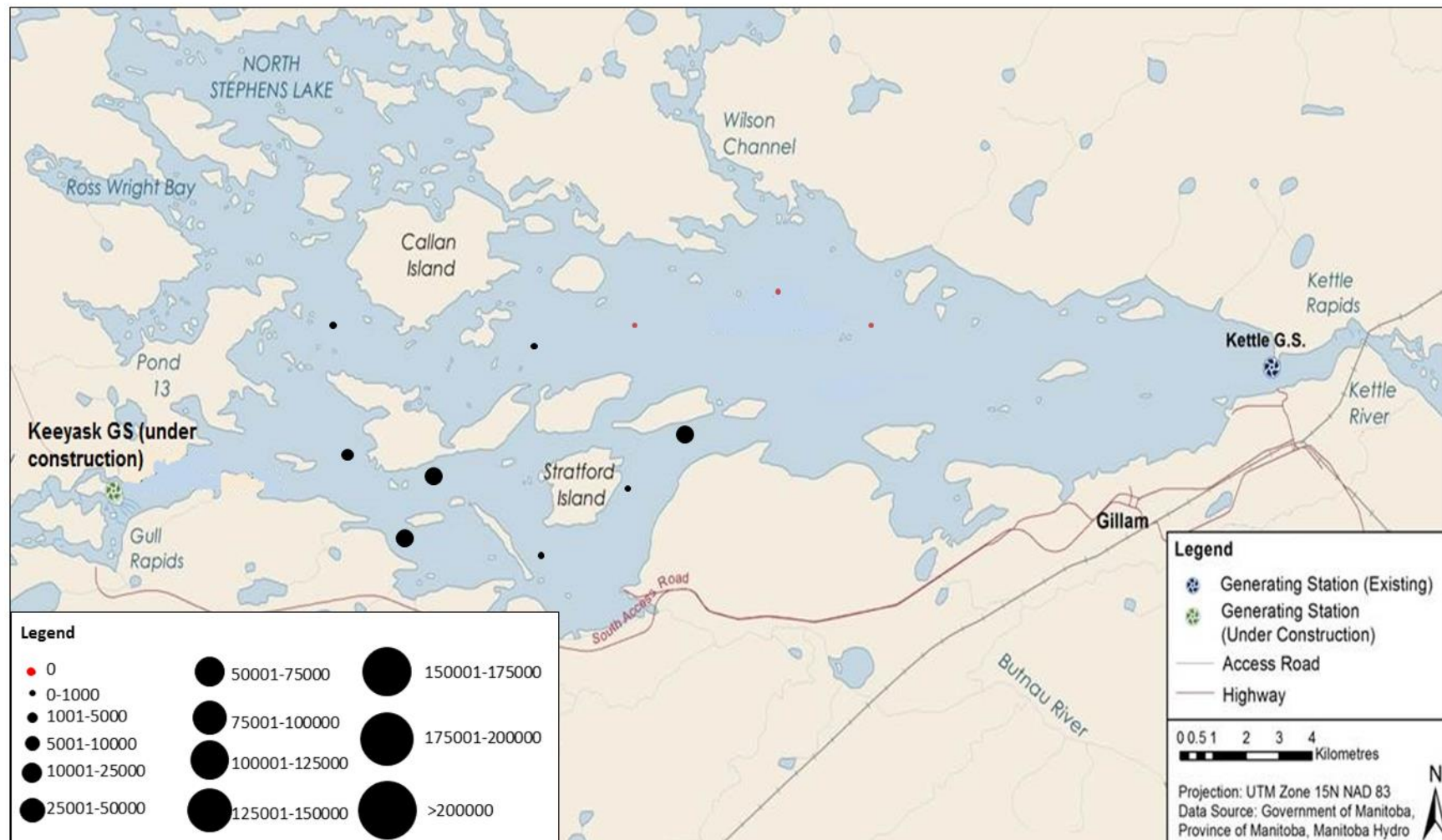


Figure 6: Relative number of detections of Walleye at each acoustic receiver set in Stephens Lake during winter 2015/2016 (October 12, 2015, to April 30, 2016). Number of detections indicated by size of bubble (defined in legend). Receivers with no detections indicated with red dot.



Figure 7: Detection ranges for individual Walleye tagged with acoustic transmitters upstream of Gull Rapids in 2013 during the open-water period (2011–2016). Horizontal dotted lines demarcate zones.

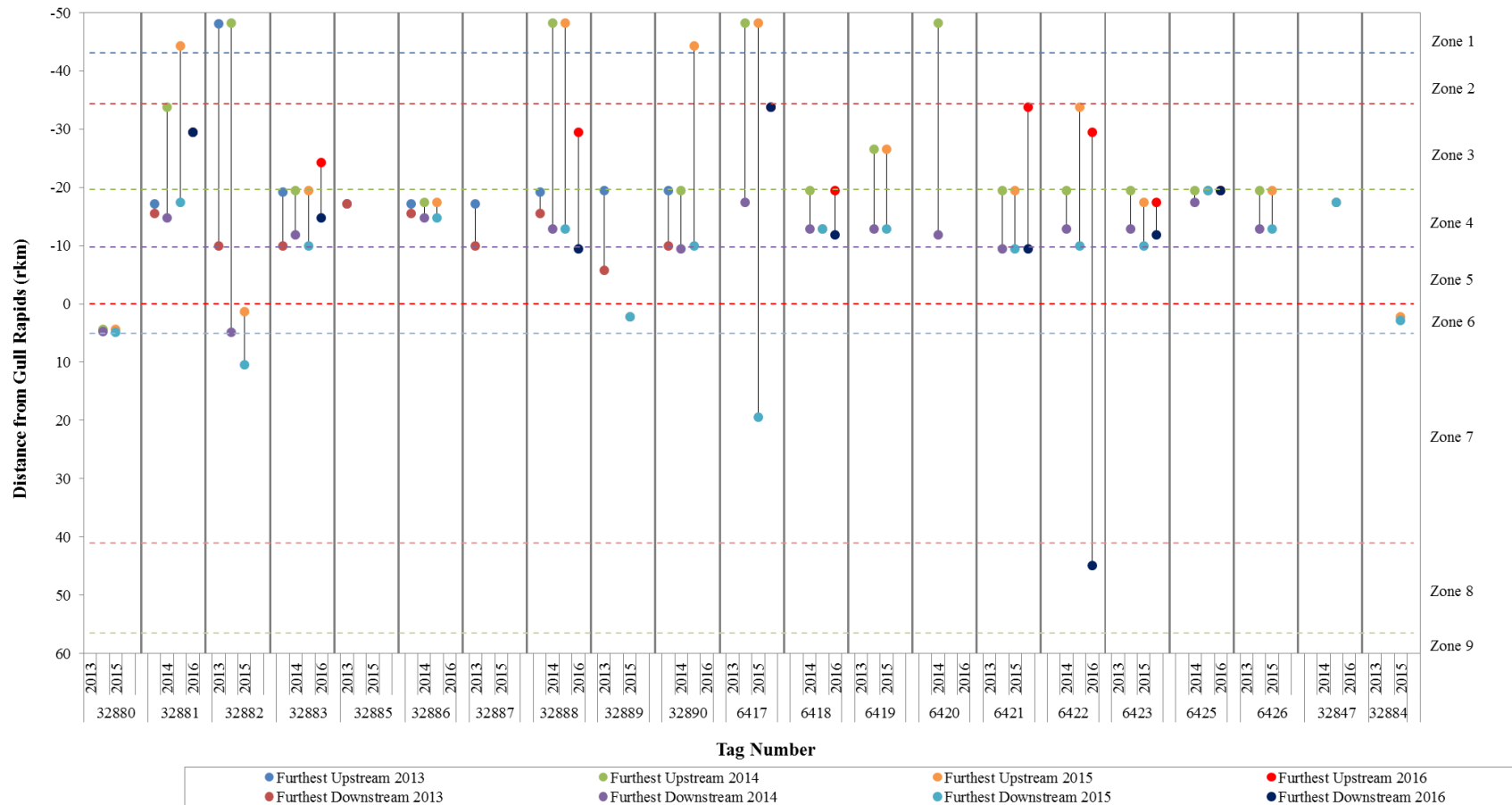


Figure 7: Detection ranges for individual Walleye tagged with acoustic transmitters upstream of Gull Rapids in 2013 during the open-water period (2011–2016). Horizontal dotted lines demarcate zones (continued).

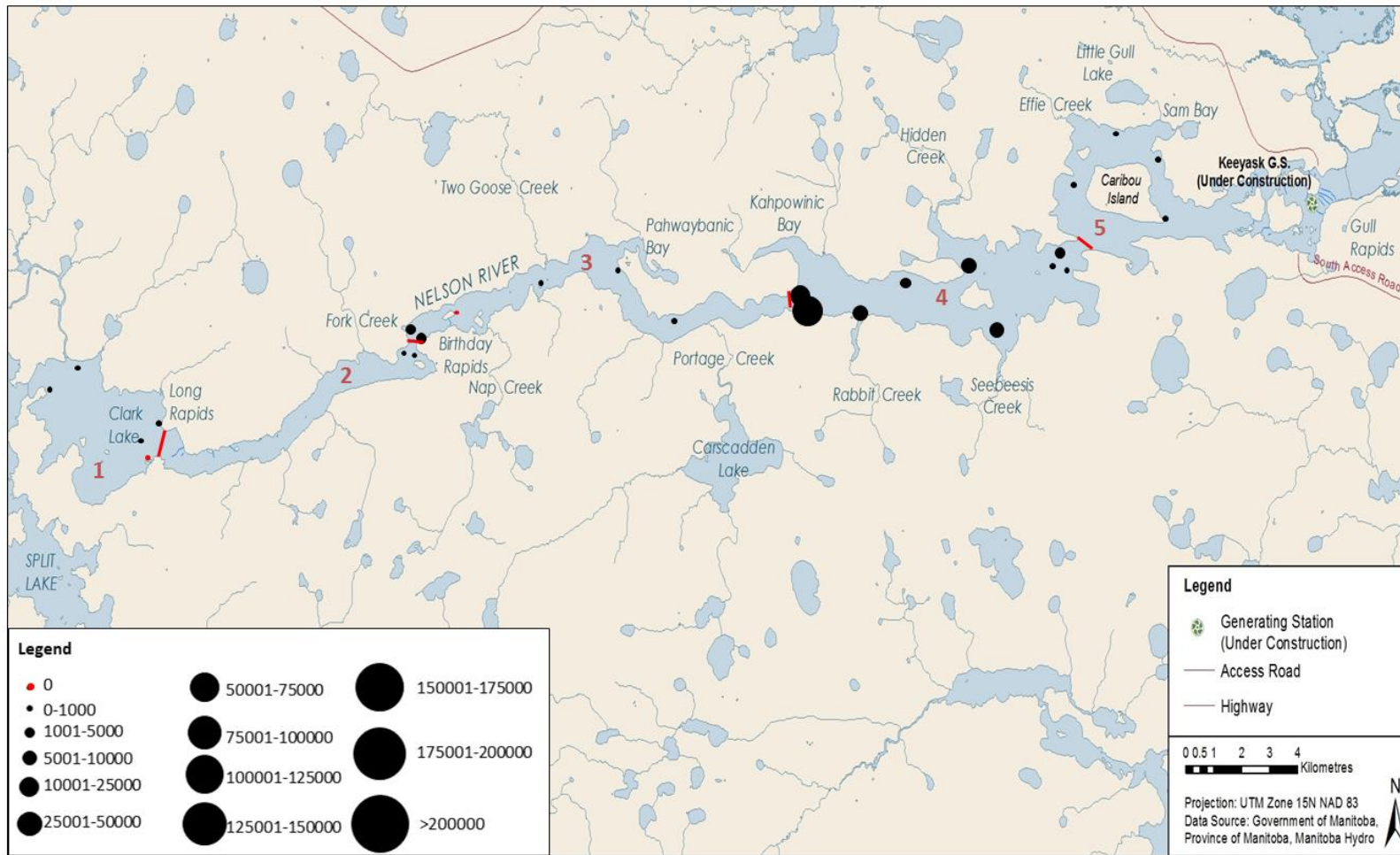


Figure 8: Relative number of detections of Walleye at each acoustic receiver set between Clark Lake and Gull Rapids during the 2016 open-water period (May 1 to October 19). Number of detections indicated by size of bubble (defined in legend). Receivers with no detections indicated with red dot.

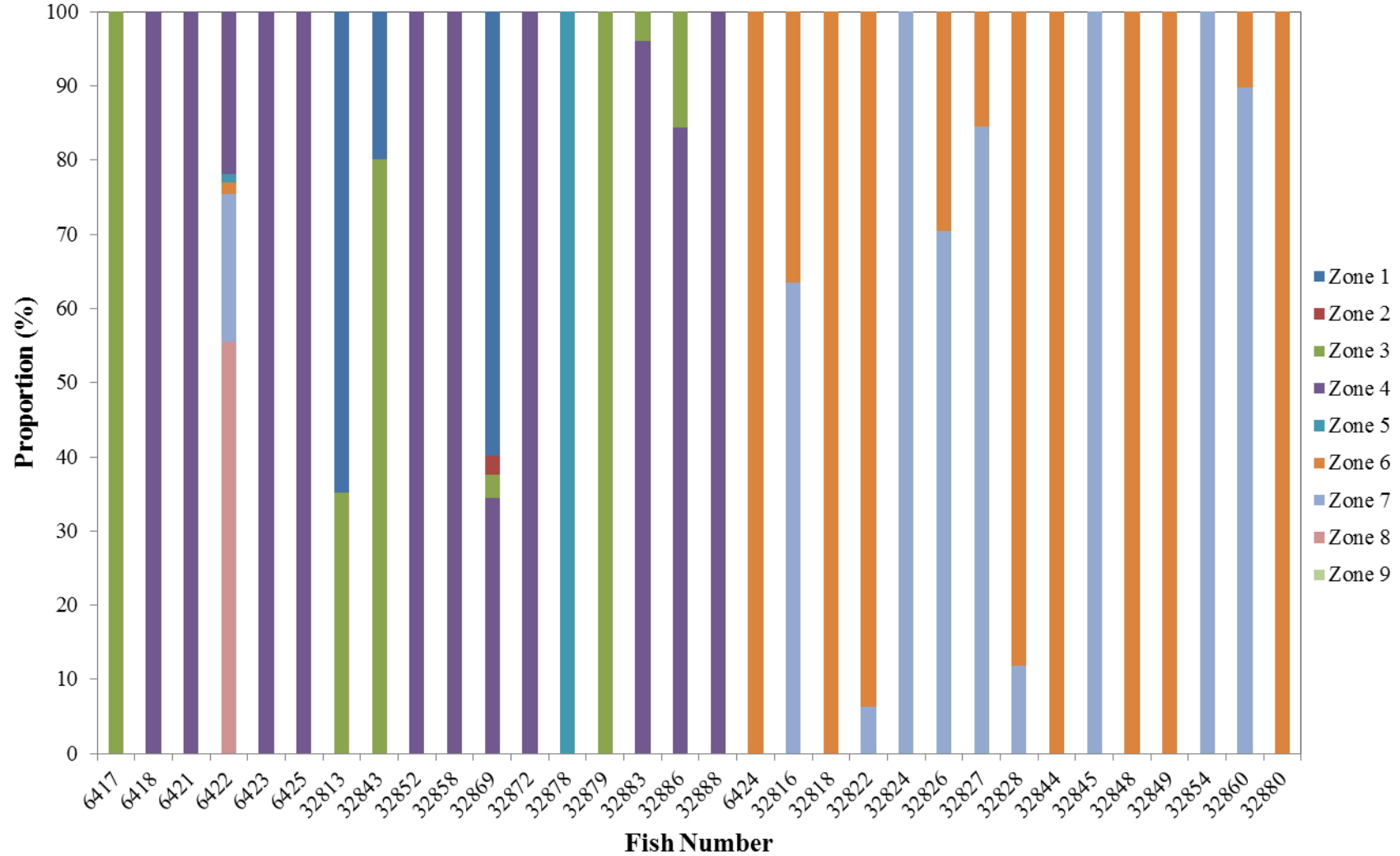


Figure 9: Proportional distributions by zone for individual Walleye tagged with acoustic transmitters in 2013 during a portion of the 2016 open-water period (June 25 to October 19).

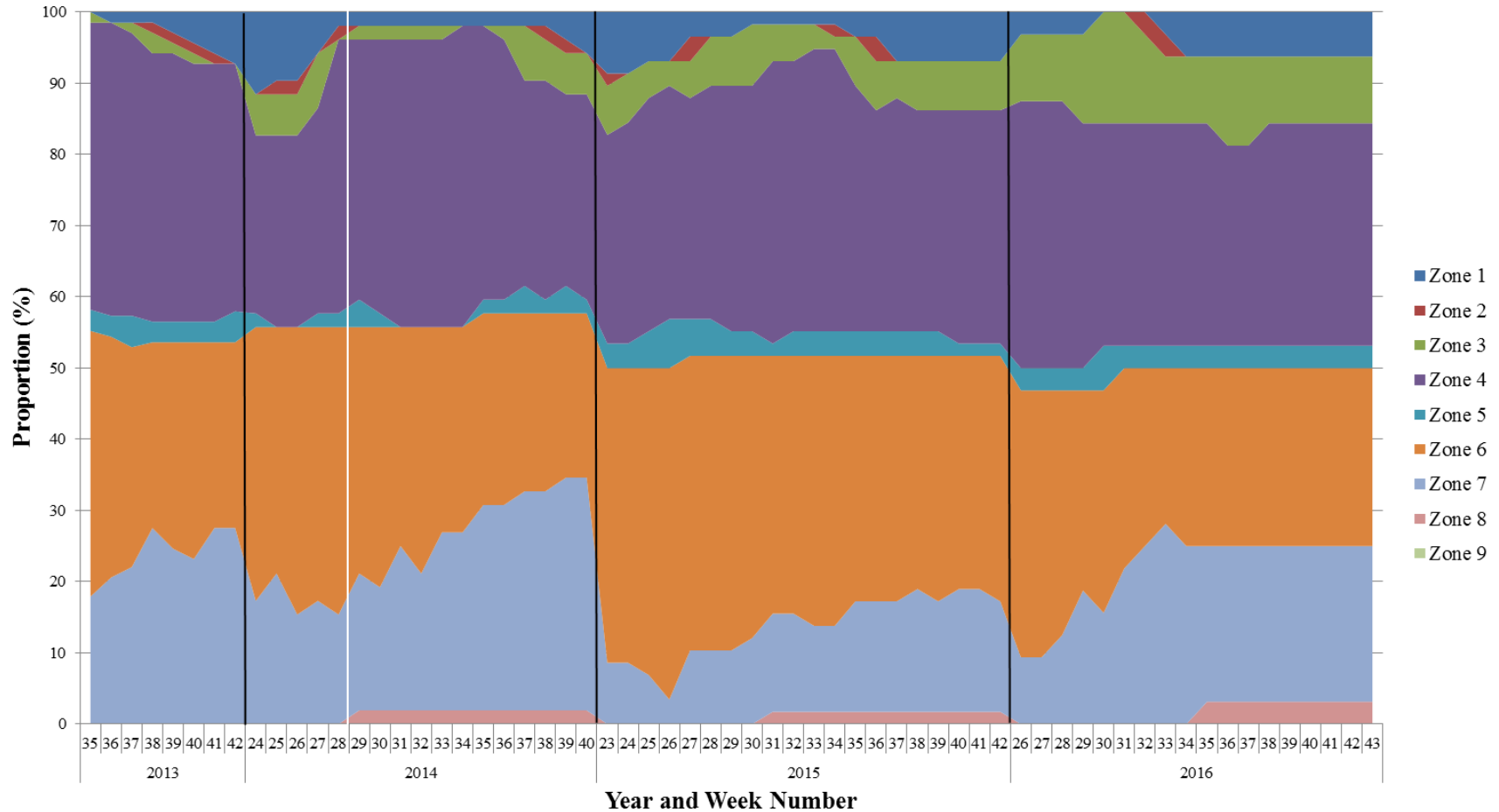


Figure 10: Proportional distribution by zone for Walleye tagged with acoustic transmitters in the Keeyask GS Area in 2013 during a portion of the 2013 (August 25 to October 15), 2014 (June 4 to October 10), 2015 (June 4 to October 11), and 2016 (June 25 to October 19) open-water periods. Black lines indicate study years. White line indicates start of Keeyask GS construction.

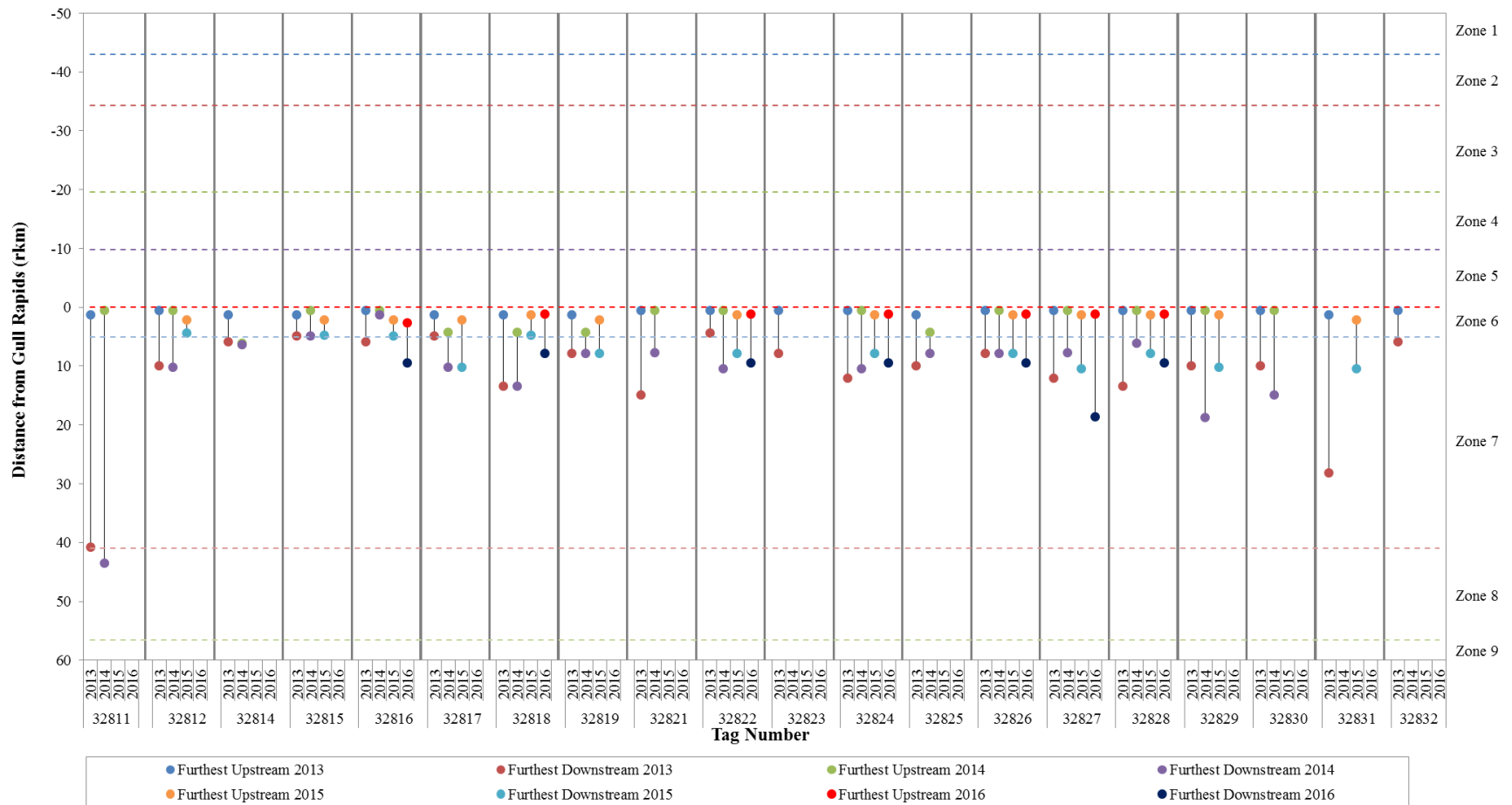


Figure 11: Detection ranges for individual Walleye tagged with acoustic transmitters in Stephens Lake in 2013 during the open-water period (2011–2016). Horizontal dotted demarcate zones.

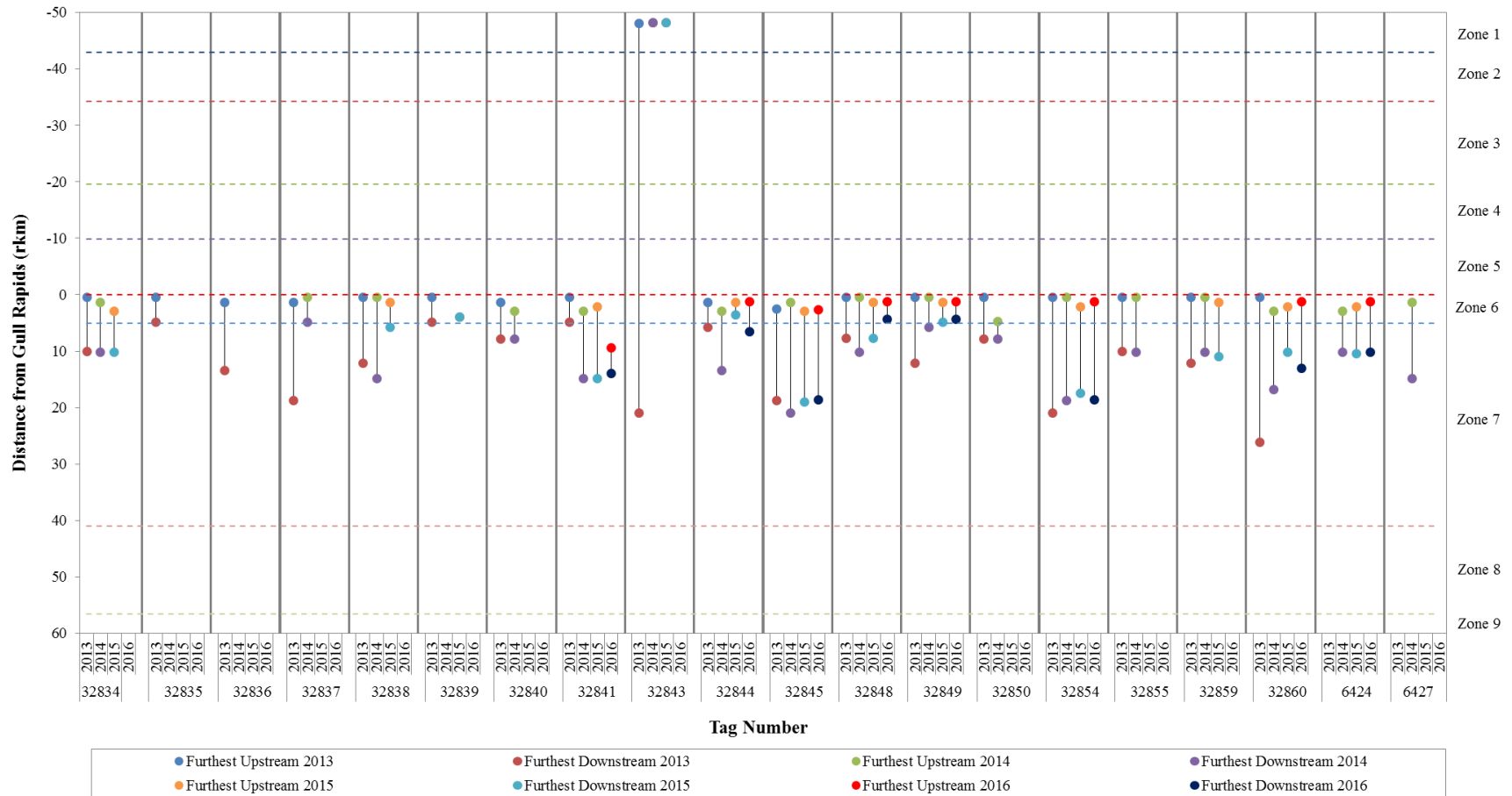


Figure 11: Detection ranges for individual Walleye tagged with acoustic transmitters in Stephens Lake in 2013 during the open-water period (2011–2016). Horizontal dotted lines demarcate zones.

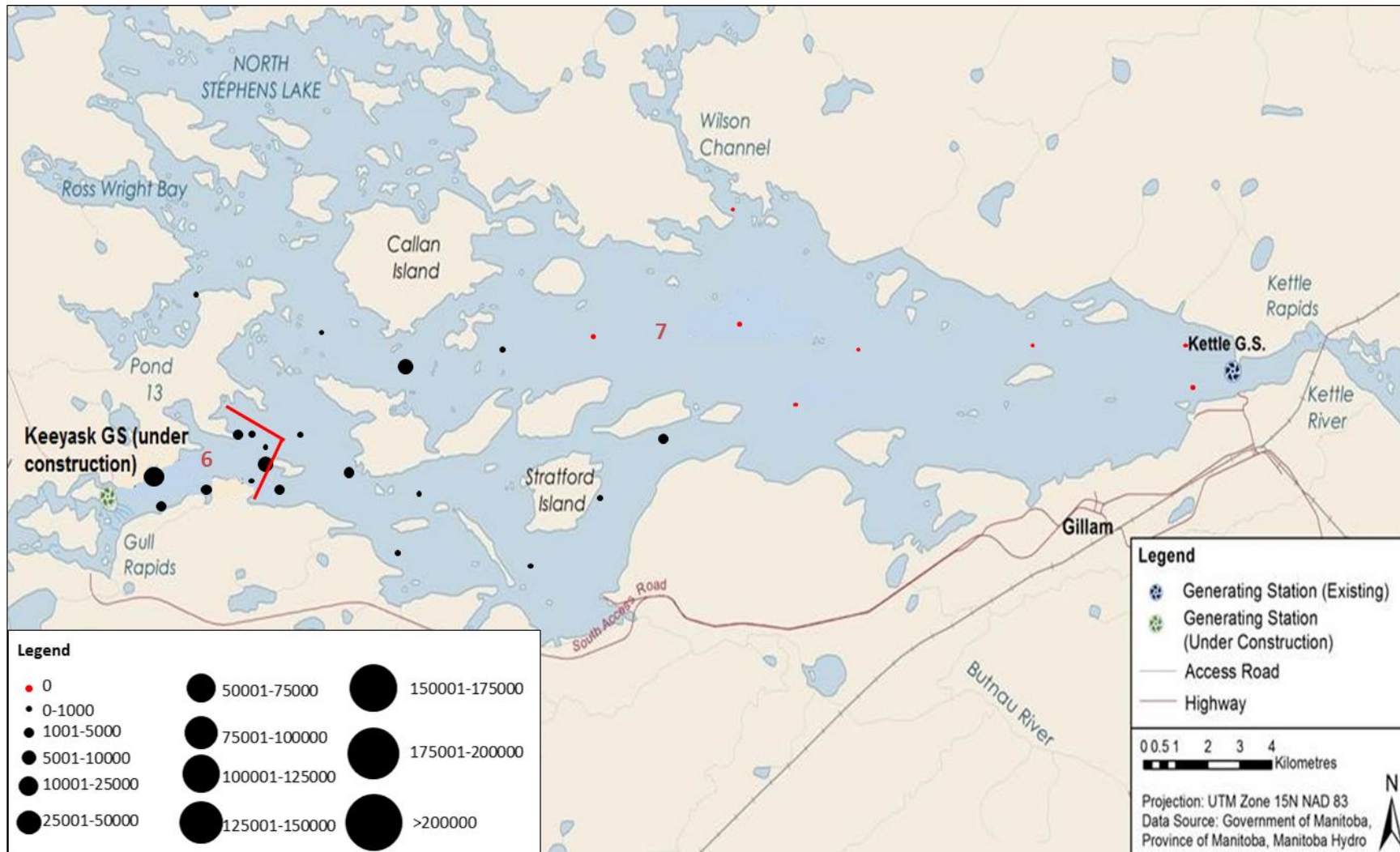


Figure 12: Relative number of detections of Walleye at each acoustic receiver set in Stephens Lake during the 2016 open-water period (May 1 to October 19). Number of detections indicated by size of bubble (defined in legend). Receivers with no detections indicated with red dot.

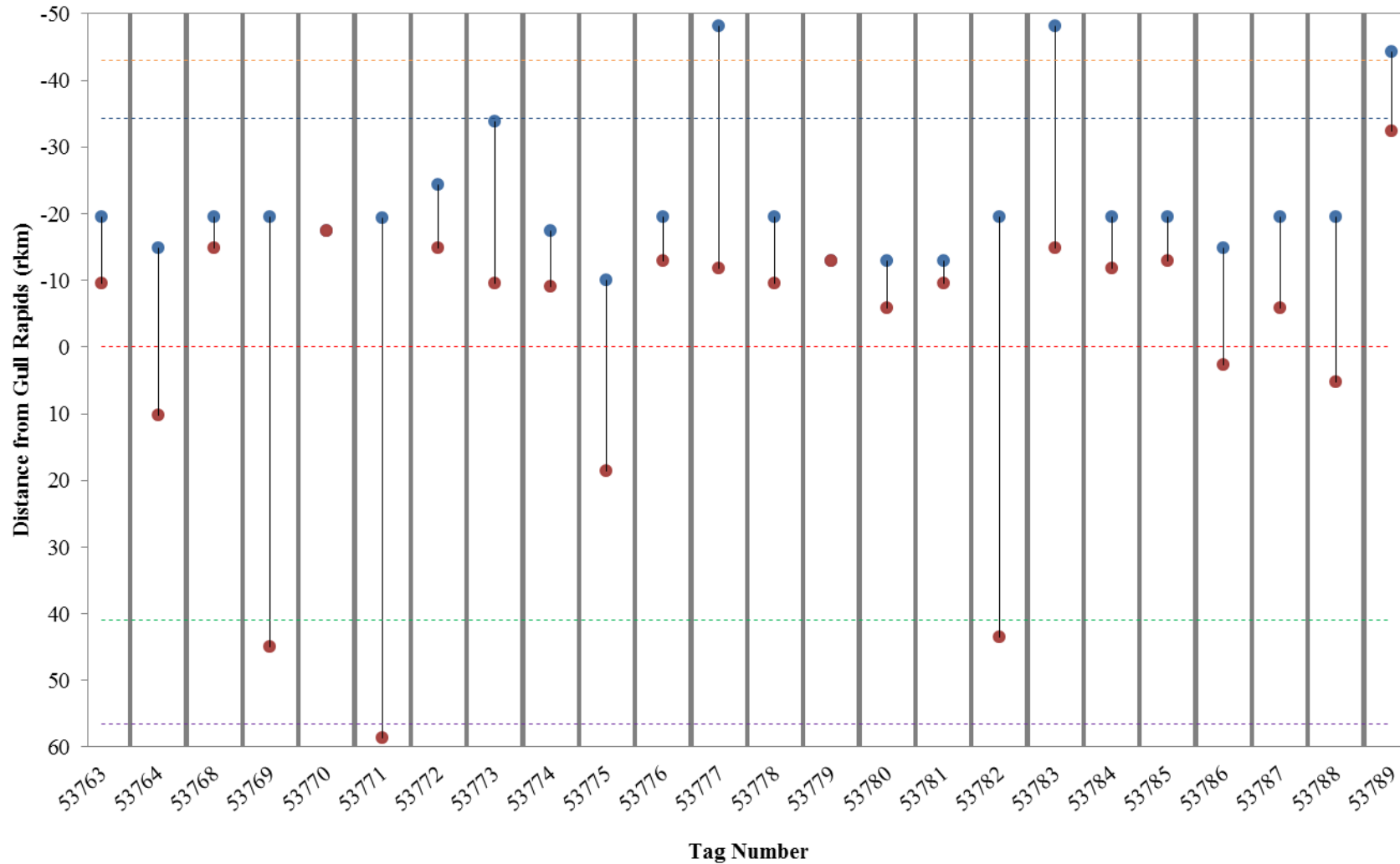


Figure 13: Detection ranges for individual Walleye tagged in 2016 with acoustic transmitters upstream of Gull Rapids during the 2016 open-water period. Horizontal dotted lines indicate locations of landmarks (orange = Clark Lake outlet; blue = Birthday Rapids, red = Gull Rapids; green = Kettle GS; purple = Long Spruce GS).

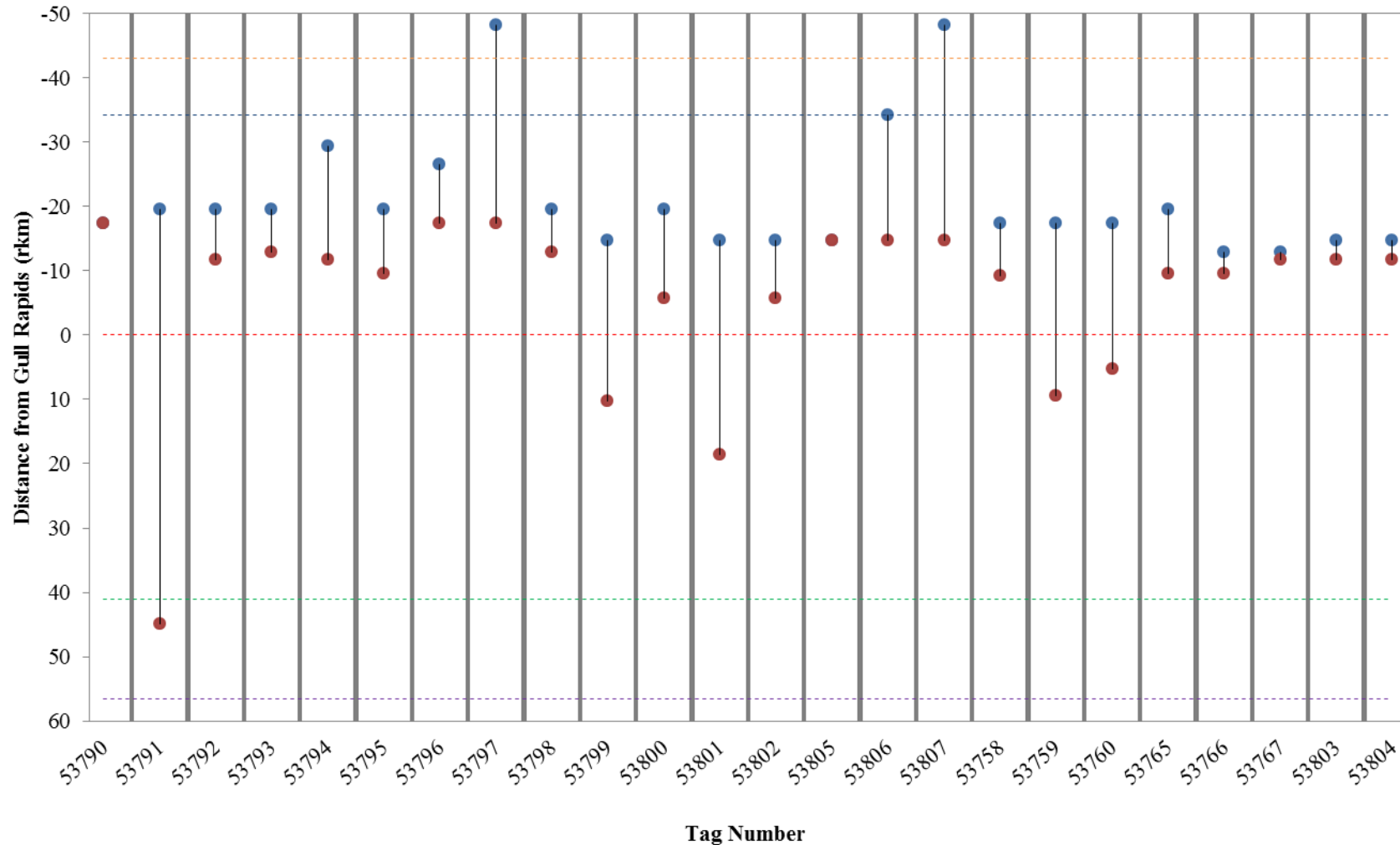


Figure 13: Detection ranges for Walleye tagged with acoustic transmitters in 2016 upstream of Gull Rapids during the 2016 open-water period. Horizontal dotted lines indicate locations of landmarks (orange = Clark Lake outlet; blue = Birthday Rapids, red = Gull Rapids; green = Kettle GS; purple = Long Spruce GS) (continued).

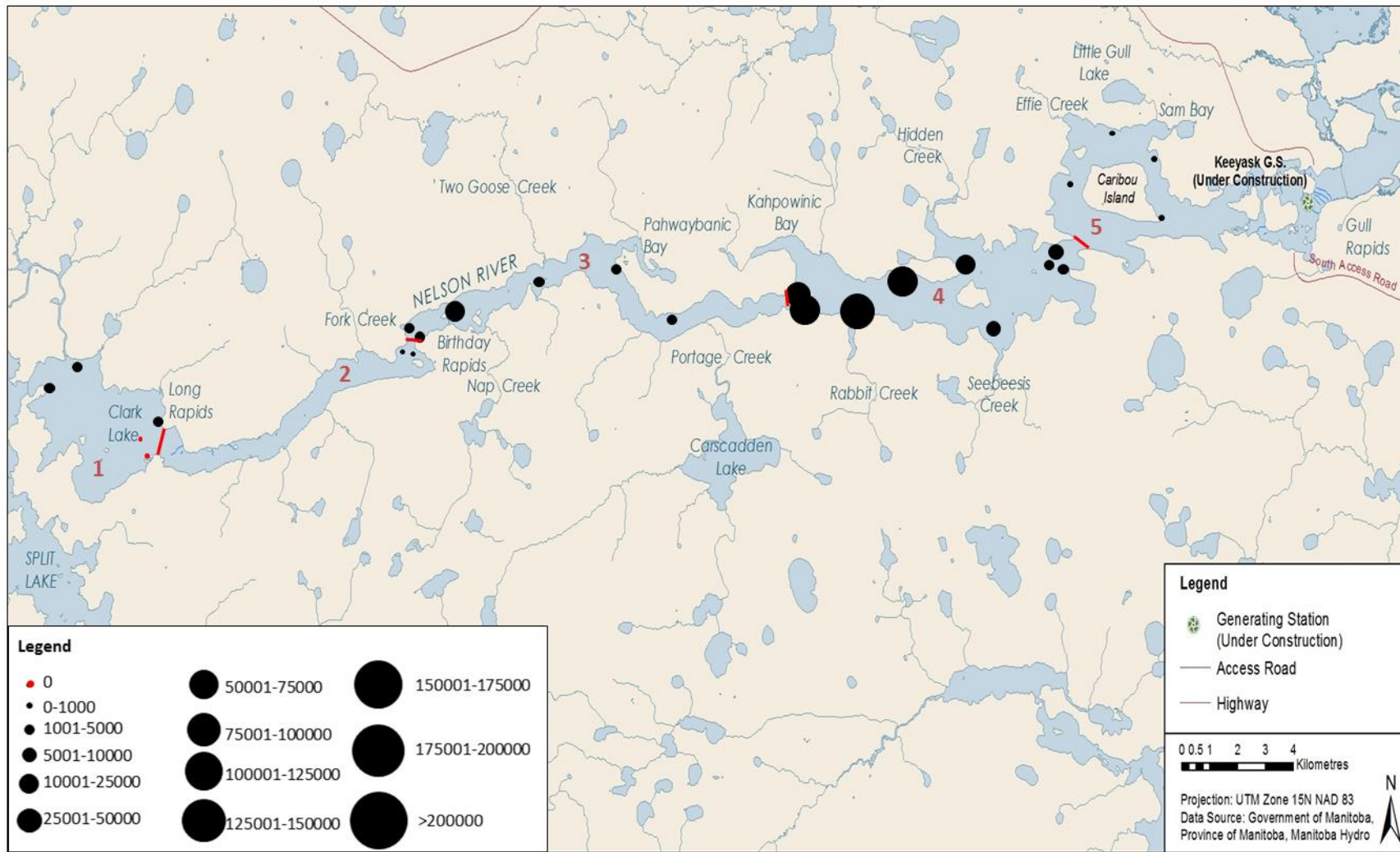


Figure 14: Relative number of detections of Walleye tagged in 2016 at each acoustic receiver set between Clark Lake and Gull Rapids during the 2016 open-water period (May 1 to October 19). Number of detections indicated by size of bubble (defined in legend). Receivers with no detections indicated with red dot.

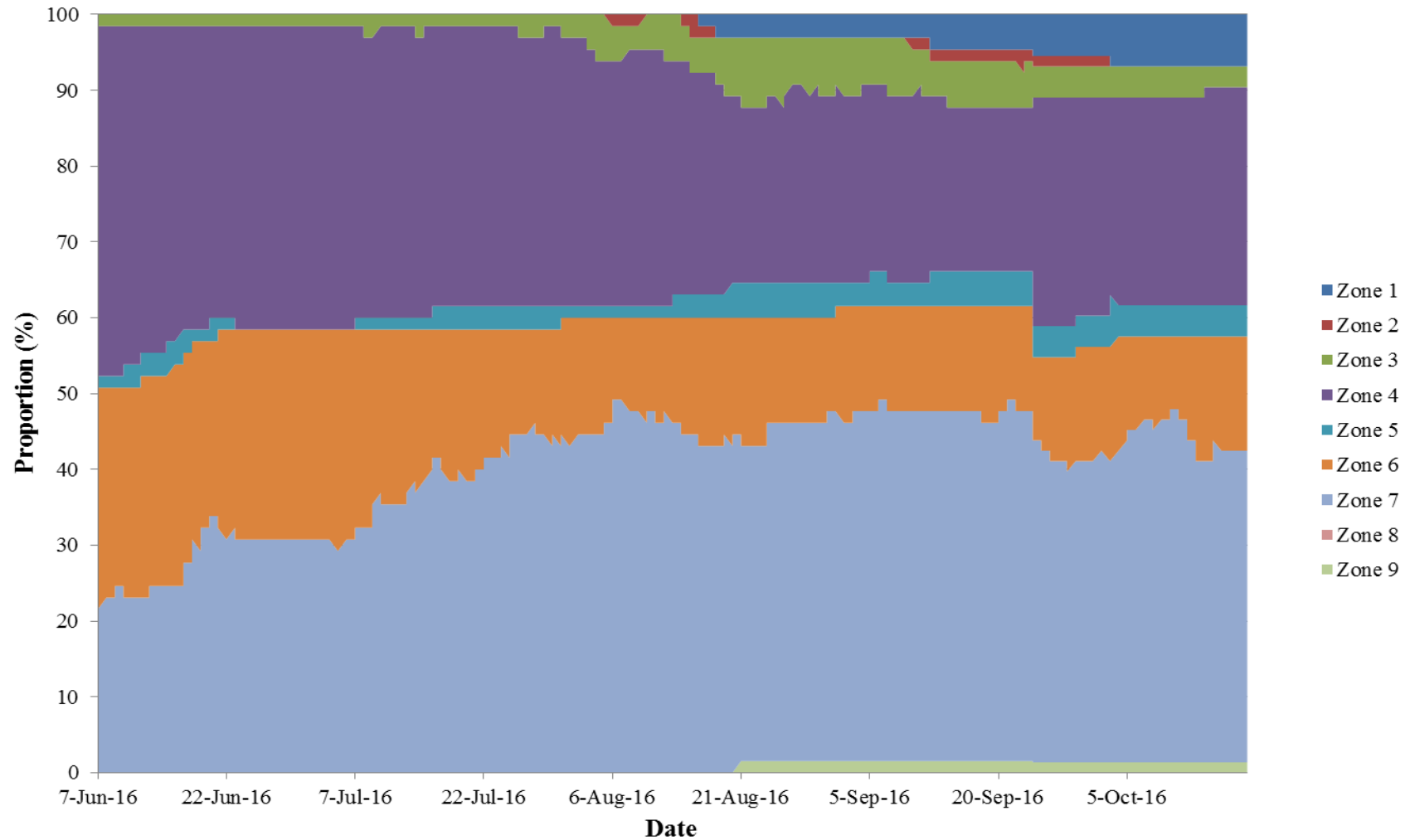


Figure 15: Proportional distribution by zone for Walleye tagged in 2016 during a portion of the 2016 open-water period (June 25 to October 19).

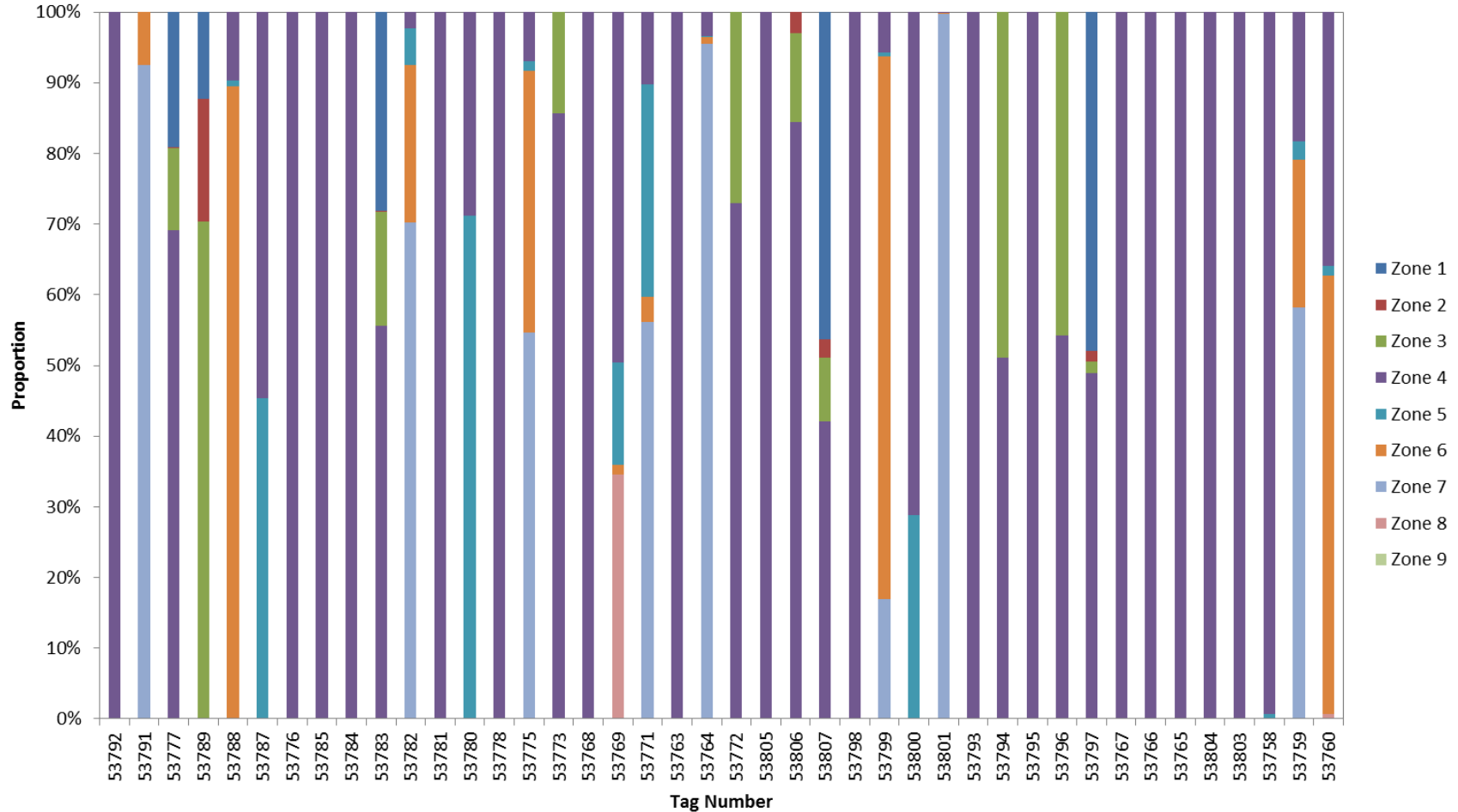


Figure 16: Proportional distributions by zone for individual Walleye tagged upstream of Gull Rapids in 2016 during a portion of the 2016 open-water period (June 25 to October 19).

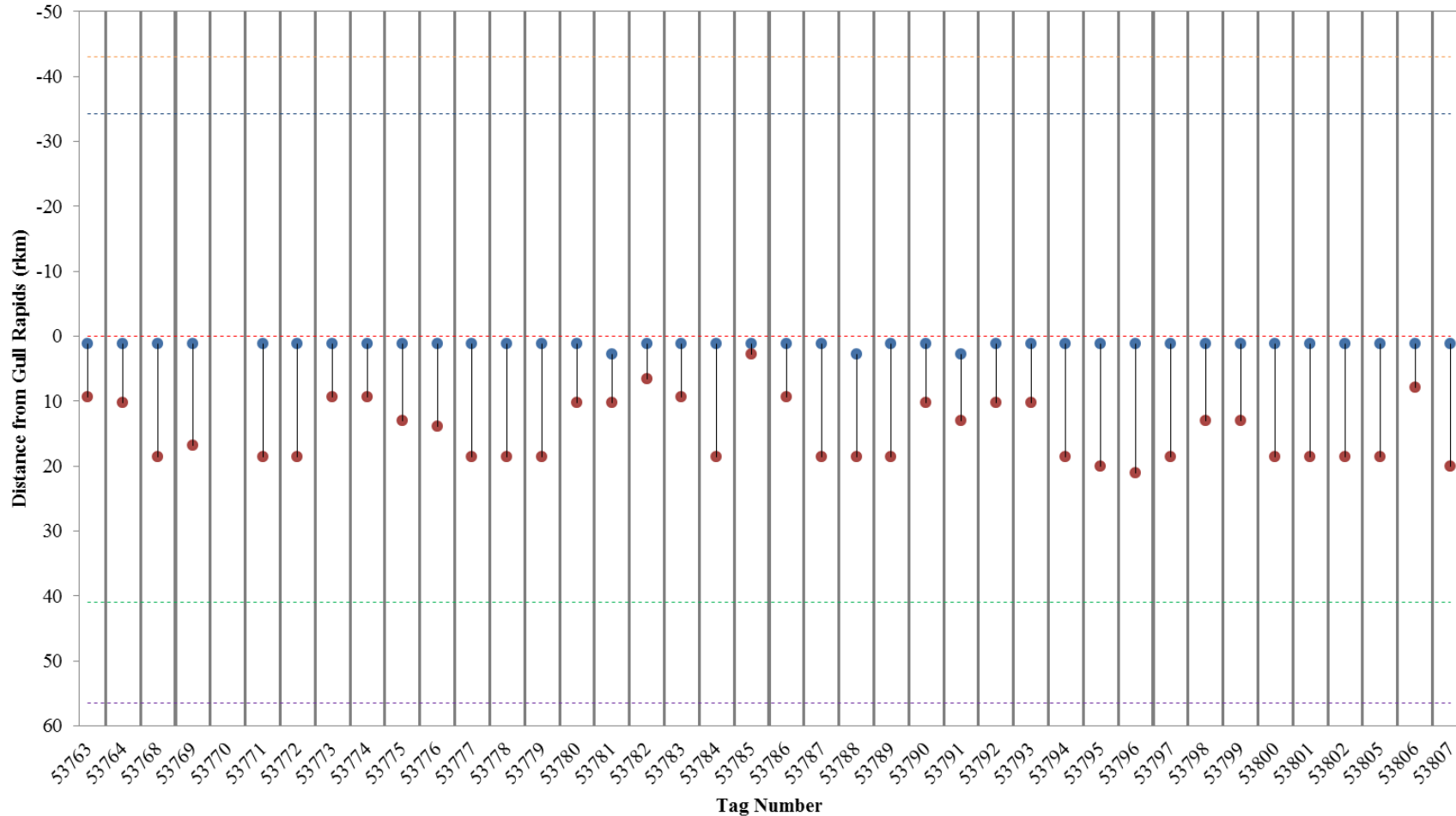


Figure 17: Detection ranges for individual Walleye tagged in 2016 with acoustic transmitters in Stephens Lake during the 2016 open-water period. Horizontal dotted lines indicate locations of landmarks (orange = Clark Lake outlet; blue = Birthday Rapids, red = Gull Rapids; green = Kettle GS; purple = Long Spruce GS).

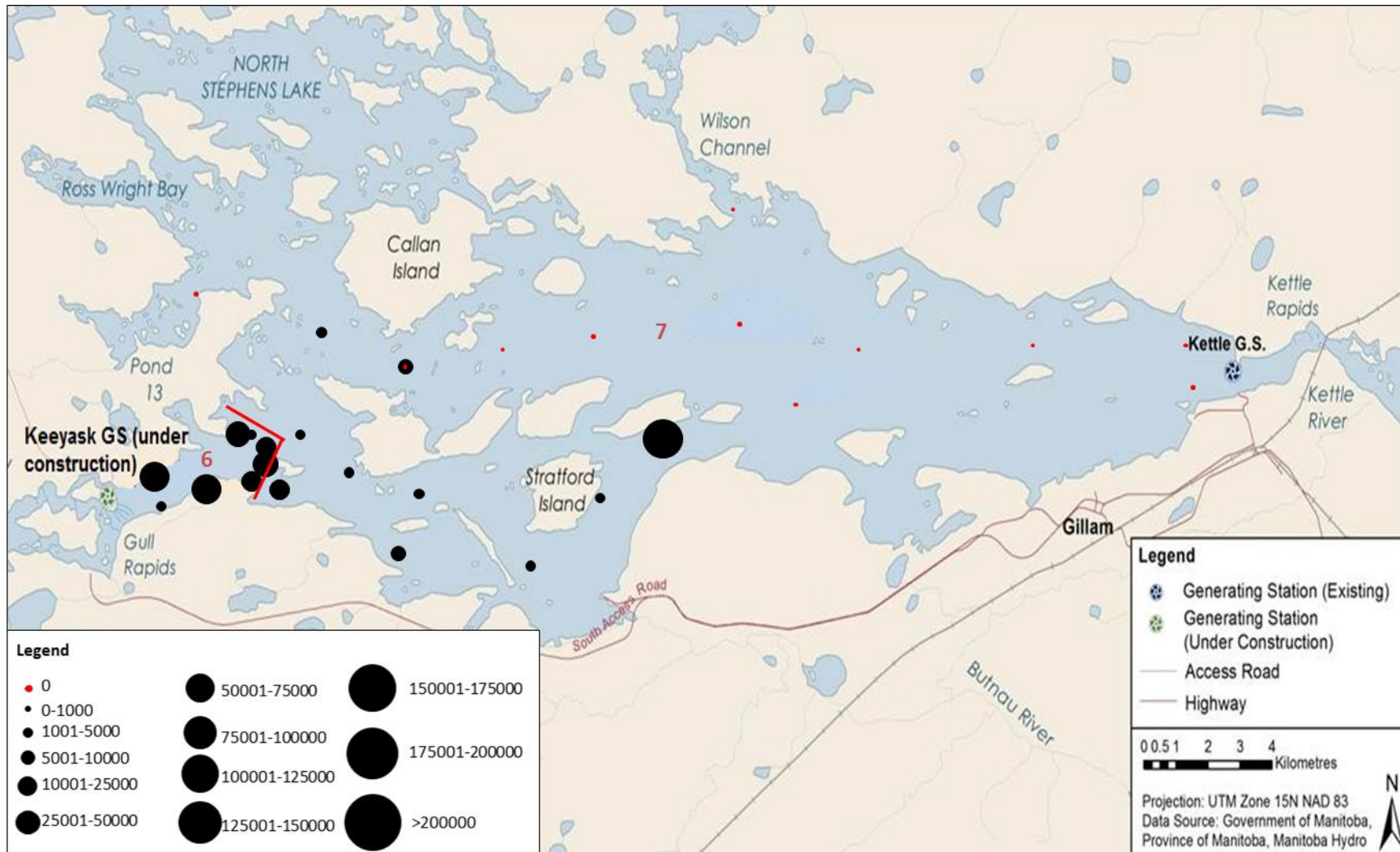


Figure 18: Relative number of detections of Walleye tagged in 2016 at each acoustic receiver set in Stephens Lake during the 2016 open-water period (May 1 to October 19). Number of detections indicated by size of bubble (defined in legend). Receivers with no detections indicated with red dot.

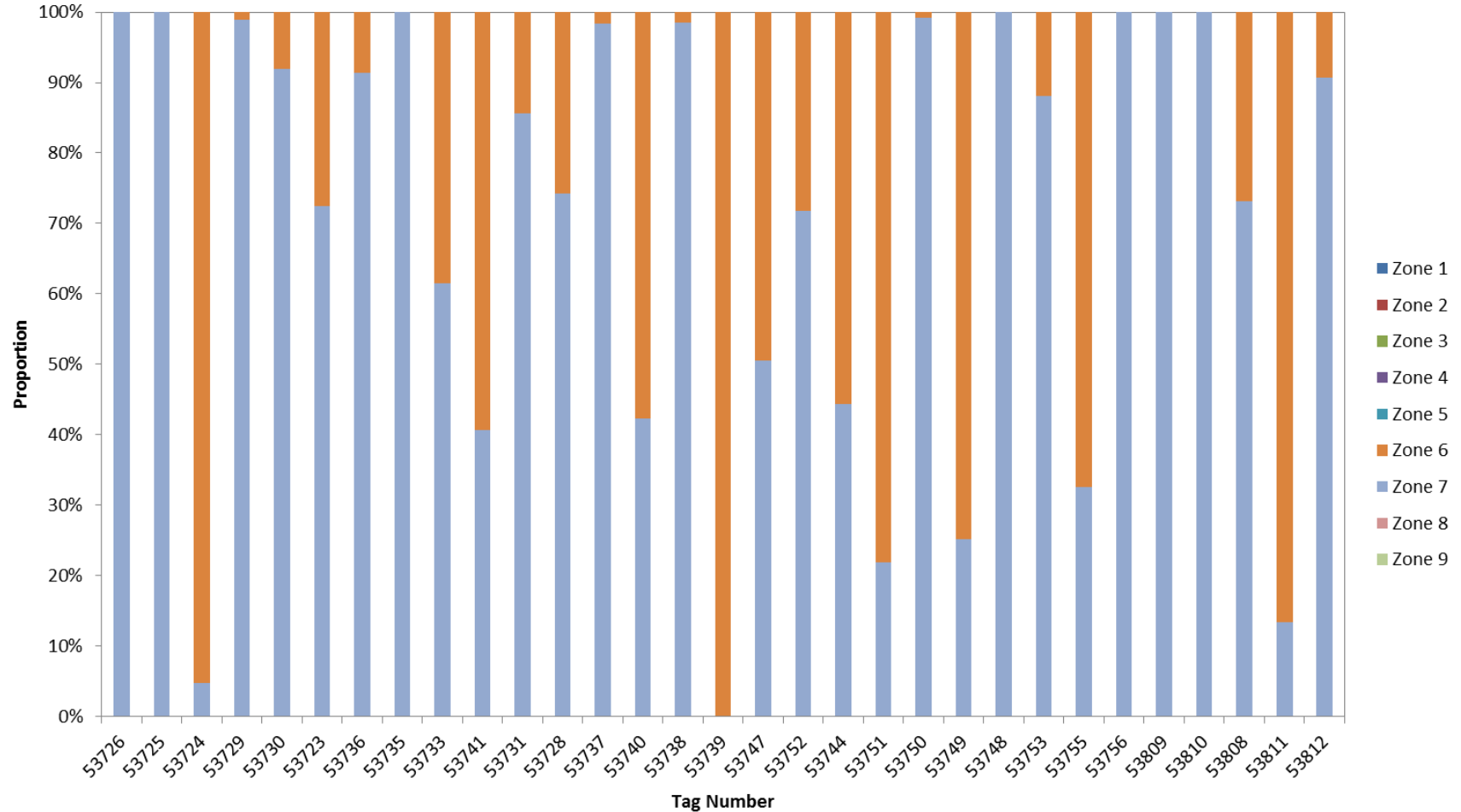
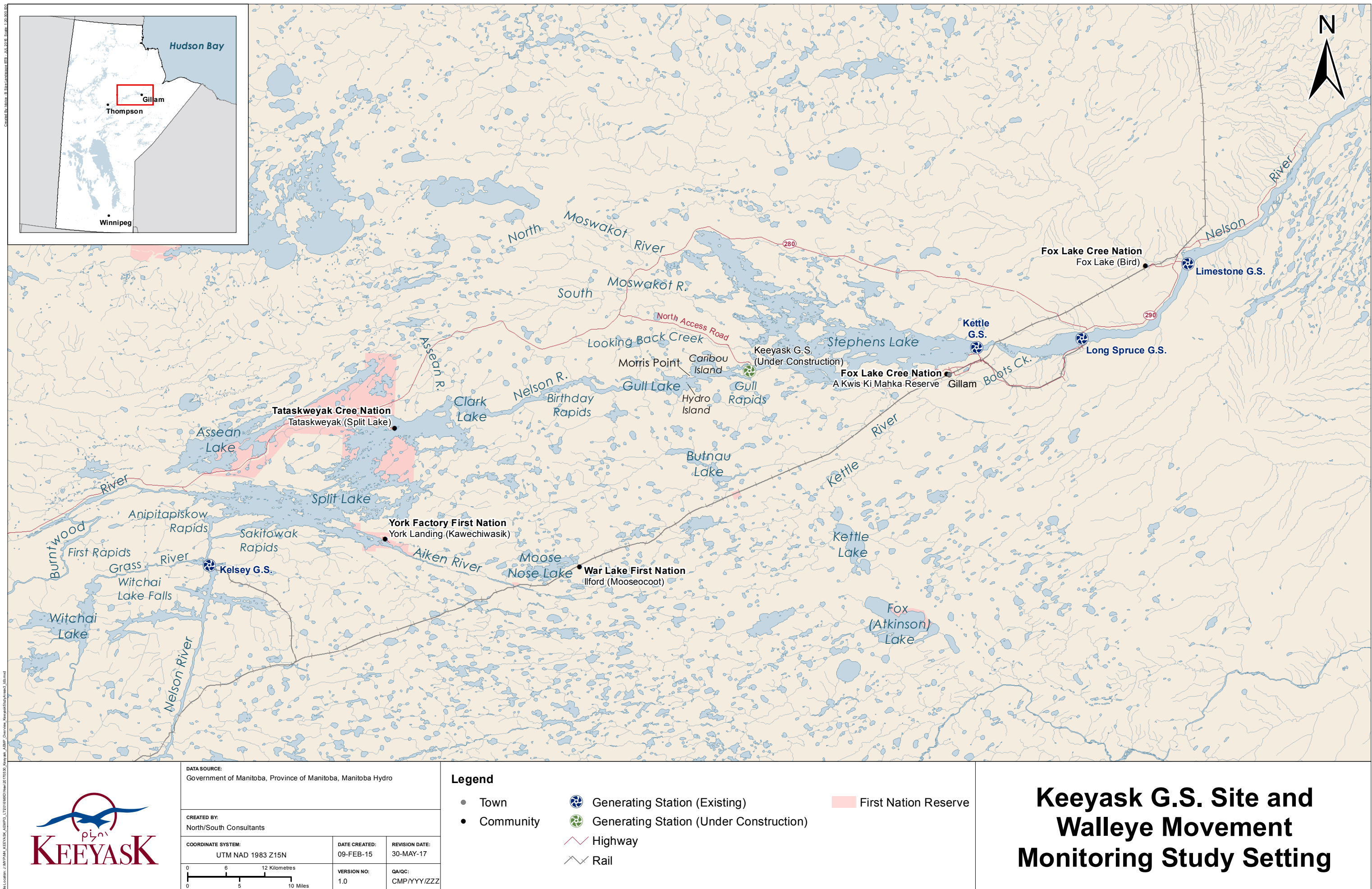
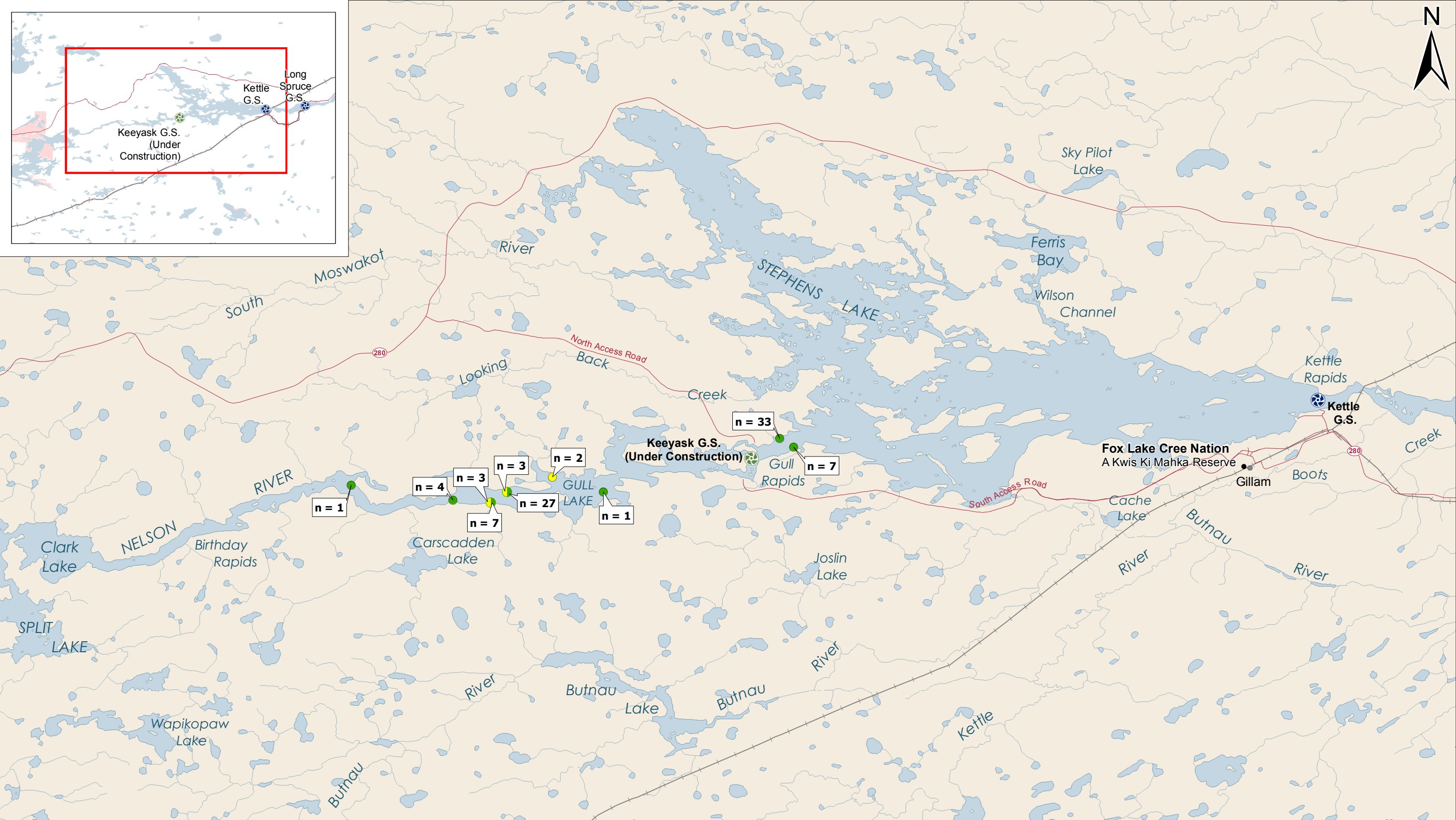


Figure 19: Proportional distributions by zone for individual Walleye tagged in Stephens Lake in 2016 during a portion of the 2016 open-water period (June 25 to October 19) (continued).

MAPS

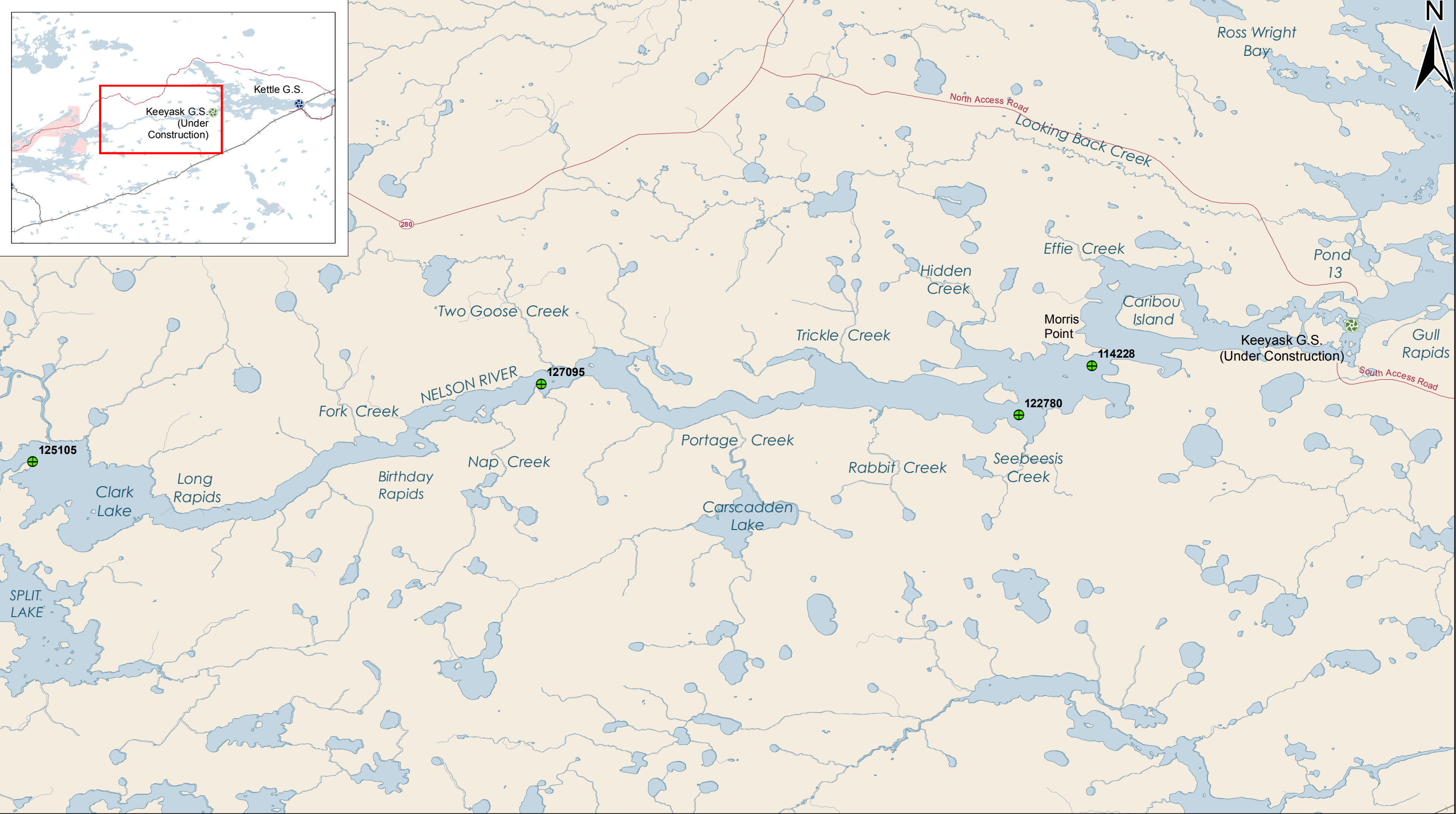


Created By: cpaier - B Size Landscape B111 - JUL 2015 Scale: 1:227,000
File Location: I:\MPS\WAL\KEEYASK_RELEASES\2016\Map301 TO 11 2016 WalleyeReleaseLocations CL to Kettle G.S. of.mxd



Map 3: Tagging locations of Walleye implanted with acoustic transmitters in 2016.

Created By: opaker - 8 Size Landscape BTH - JUL2015 Scale: 1:125,000
File Location: I:\MPS\WMA\KEEYASK\KEEYASK_Figure20\WMA\2015_05_15_Maps\Receiver_Clock_Lake_Gull_Rapids.dwg



DATA SOURCE: Government of Manitoba, Province of Manitoba, Manitoba Hydro		
CREATED BY: North/South Consultants		
COORDINATE SYSTEM: UTM NAD 1983 Z14N	DATE CREATED: 09-FEB-15	REVISION DATE: 01-NOV-16
0 0.45 0.9 Kilometres 0 0.35 0.7 Miles	VERSION NO: 1.0	QA/QC: CMP/YYY/ZZZ

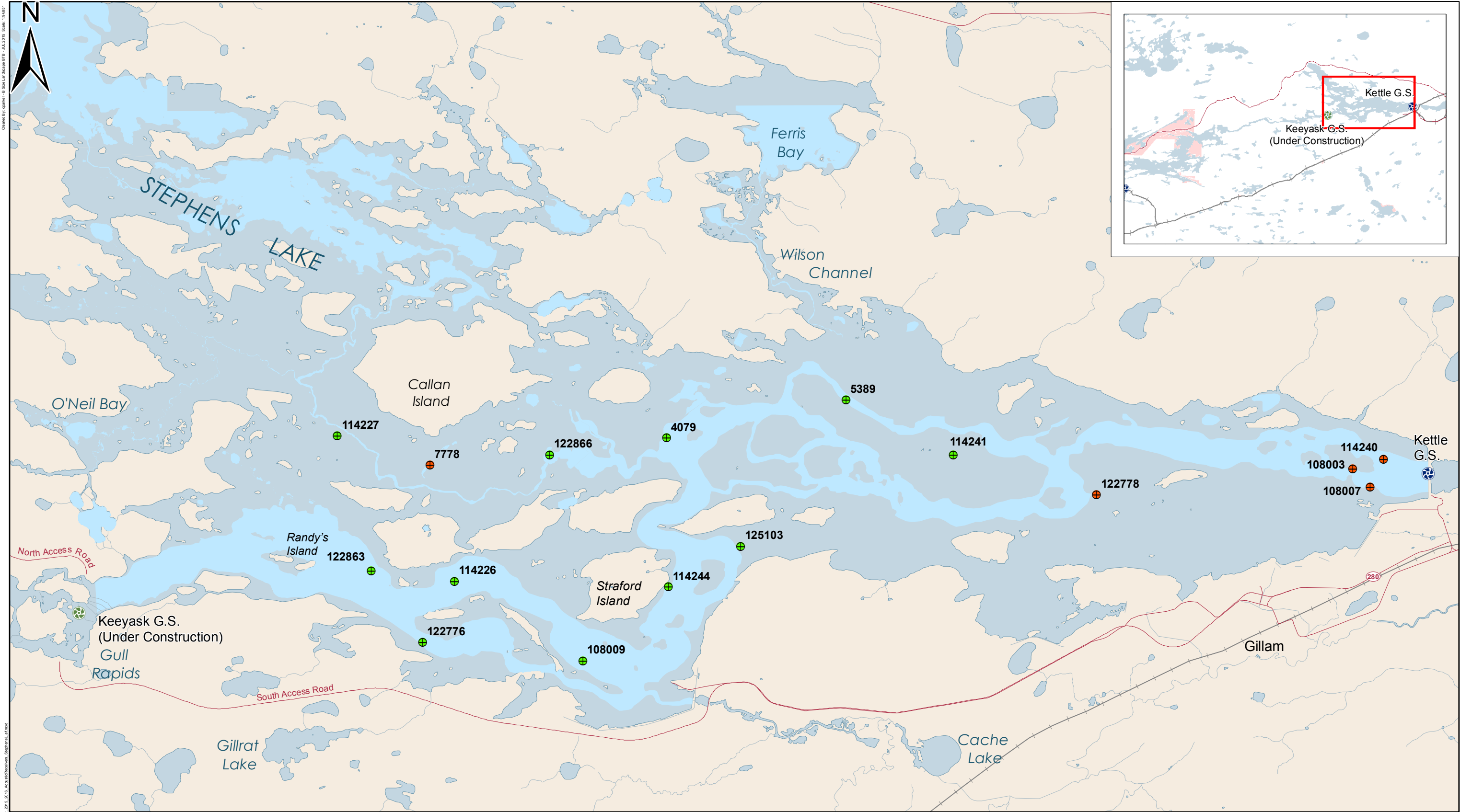
- Legend**
- Receiver Locations**
- Receiver Locations
 - Generating Station (Existing)
 - Generating Station (Under Construction)


- Highway
- Rail
- First Nation Reserve

Winter 2015/16
Acoustic Receiver Locations:
Clark Lake to Gull Rapids

Map 4: Locations of stationary receivers set in the Nelson River from Clark Lake to Gull Rapids between October 2015 and June 2016.

Created by: carver - B Size Landscape RTB - JUL 2015 Scale: 1:144,511





Map 5: Locations of stationary receivers set in Stephens Lake from Gull Rapids to Kettle GS between October 2015 and June 2016. The former (pre-impoundment) river channel is shown in light blue.

DATA SOURCE:
Government of Manitoba, Province of Manitoba, Manitoba Hydro

CREATED BY:
North/South Consultants

COORDINATE SYSTEM:
UTM NAD 1983 Z14N

DATE CREATED:
09-FEB-15

REVISION DATE:
08-JUN-17

VERSION NO:
1.0

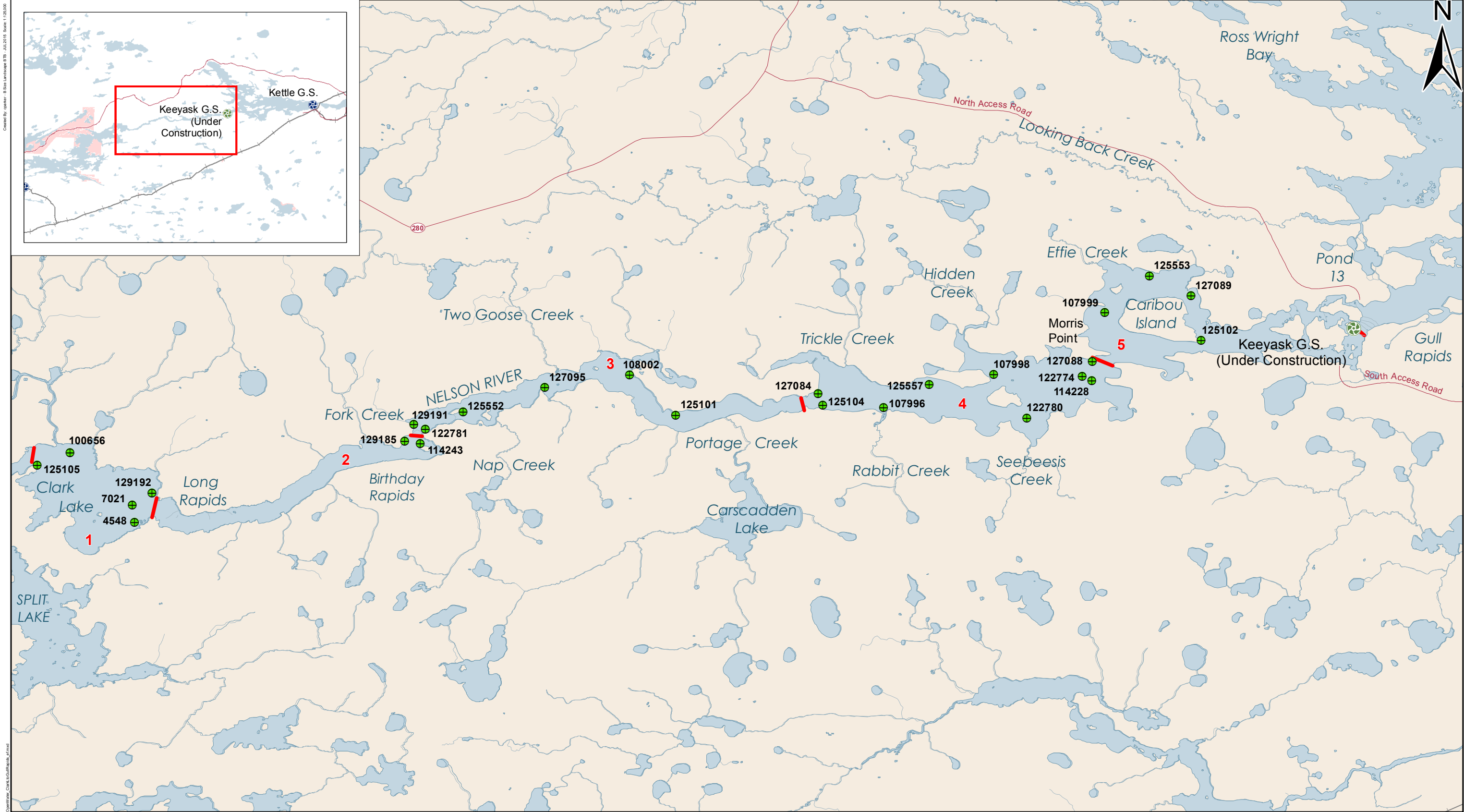
QA/QC:
CMP/YYY/ZZZ

Legend

Receiver Locations

- Retrieved
- Lost
- Generating Station (Existing)
- Generating Station (Under Construction)
- Highway
- Rail
- First Nation Reserve

Winter 2015/16
Acoustic Receiver Locations:
Stephens Lake

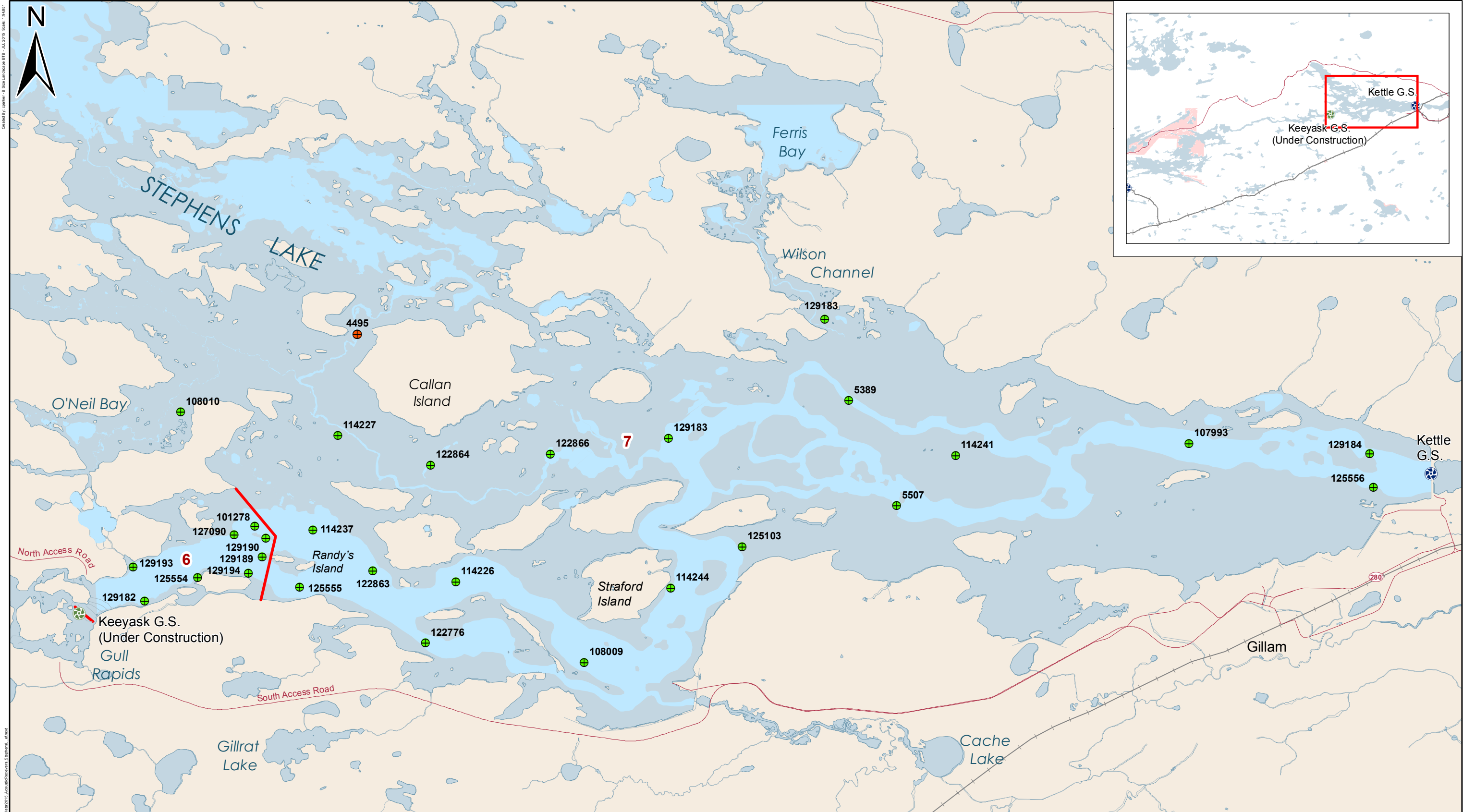


DATA SOURCE: Government of Manitoba, Province of Manitoba, Manitoba Hydro		
CREATED BY: North/South Consultants		
COORDINATE SYSTEM: UTM NAD 1983 Z 14N	DATE CREATED: 09-FEB-15	REVISION DATE: 28-OCT-16
0 0.45 0.9 Kilometres 0 0.35 0.7 Miles	VERSION NO: 1.0	QA/QC: CMP/YYY/ZZZ

- Legend**
- Receiver Locations
 - Generating Station (Existing)
 - Generating Station (Under Construction)
 - Highway
 - Rail
 - First Nation Reserve

**Open-water 2016
Acoustic Receiver Locations:
Clark Lake to Gull Rapids**

Map 7: Locations of stationary receivers set in the Nelson River from Clark Lake to Gull Rapids between June and October 2016. The river is divided into five "zones" based on placement of receiver "gates".



DATA SOURCE: Government of Manitoba, Province of Manitoba, Manitoba Hydro		
CREATED BY: North/South Consultants		
COORDINATE SYSTEM: UTM NAD 1983 Z14N	DATE CREATED: 09-FEB-15	REVISION DATE: 04-NOV-16
0 0.45 0.9 Kilometres 0 0.35 0.7 Miles	VERSION NO: 1.0	QA/QC: CMP/YYY/ZZZ

Legend		
Receiver Locations	Generating Station (Existing)	Zones
Retrieved	Generating Station (Under Construction)	Highway
Lost	Rail	First Nation Reserve

**Open-water 2016
Acoustic Receiver Locations:
Stephens Lake**

Map 8: Locations of stationary receivers set in Stephens Lake between June and October 2016. The river is divided into two "zones" based on placement of receiver "gates". The pre-impoundment river channel is shown in light blue.

APPENDICES

APPENDIX 1:

DETECTION SUMMARIES FOR WALLEYE TAGGED AND MONITORED IN THE KEEYASK STUDY AREA BETWEEN 2013 AND 2014

Table A1-1:	Detection summary for each of 49 Walleye tagged and monitored upstream of the Keeyask GS during winter 2013/2014 (October 16, 2013 to April 30, 2014), 2014/2015 (October 13, 2014 to April 30, 2015), and 2015/2016 (October 12, 2015 to April 30, 2016) periods.....	68
Table A1-2:	Detection summary for each of 42 Walleye tagged and monitored in Stephens Lake during winter 2013/2014 (October 16, 2013 to April 30, 2014), 2014/2015 (October 13, 2014 to April 30, 2015), and 2015/2016 (October 12, 2015 to April 30, 2016) periods.....	71
Table A1-3	Detection summary for each of 49 Walleye tagged and monitored upstream of Gull Rapids during open-water 2013 (May 1 to October 16), 2014 (May 1 to October 13), 2015 (May 1 to October 11), and 2016 (May 1 to October 19) periods.....	73
Table A1-4	Detection summary for each of 42 Walleye tagged and monitored in Stephens Lake during open-water 2013 (May 1 to October 16), 2014 (May 1 to October 13), 2015 (May 1 to October 11), and 2016 (May 1 to October 19) periods.....	75
Table A1-5:	Detection summary for each of 48 Walleye tagged upstream of Gull Rapids in June and September, 2016.	77
Table A1-6:	Detection summary for each of 40 Walleye tagged in Stephens Lake in June, 2016.....	79

Table A1-1: Detection summary for each of 49 Walleye tagged and monitored upstream of the Keeyask GS during winter 2013/2014 (October 16, 2013 to April 30, 2014), 2014/2015 (October 13, 2014 to April 30, 2015), and 2015/2016 (October 12, 2015 to April 30, 2016) periods. Tag id highlighted yellow = lost tags. Tag id highlighted purple = moved downstream through Gull Rapids.

Tag ID	2013/2014					2014/2015					2015/2016				
	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)
32813	0	-	-	-	-	7981	47	-12.9	-12.9	0.0	0	-	-	-	-
32833	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32846	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32847	0	-	-	-	-	0	-	-	-	-	1323	3	-17.4	-17.4	0.0
32851	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32852	0	-	-	-	-	0	-	-	-	-	2	1	-12.9	-12.9	0.0
32853	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32856	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32857	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32858	0	-	-	-	-	0	-	-	-	-	163	2	-17.4	-17.4	0.0
32861	20	3	-12.9	-9.9	3.0	0	-	-	-	-	0	-	-	-	-
32862	3	1	-12.9	-12.9	0.0	0	-	-	-	-	0	-	-	-	-
32863	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32864	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32865	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32866	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32867	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32868	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32869	48	4	-12.9	-12.9	0.0	0	-	-	-	-	0	-	-	-	-
32870	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32871	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32872	0	-	-	-	-	0	-	-	-	-	226	3	-12.9	-12.9	0.0
32873	52	2	-48.2	-48.2	0.0	64	1	-48.2	-48.2	0.0	0	-	-	-	-

Table A1-1: Detection summary for each of 49 Walleye tagged and monitored upstream of the Keeyask GS during winter 2013/2014 (October 16, 2013 to April 30, 2014), 2014/2015 (October 13, 2014 to April 30, 2015), and 2015/2016 (October 12, 2015 to April 30, 2016) periods. Tag id highlighted yellow = lost tags. Tag id highlighted purple = moved downstream through Gull Rapids (continued).

Tag ID	2013/2014					2014/2015					2015/2016				
	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)
32874	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32875	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32876	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32877	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32878	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32879	0	-	-	-	-	0	-	-	-	-	586	3	-17.4	-17.4	0.0
32880	0	-	-	-	-	0	-	-	-	-	5198	44	4.4	4.4	0.0
32881	0	-	-	-	-	0	-	-	-	-	471	3	-17.4	-17.4	0.0
32882	3047	49	-48.2	-48.2	0.0	0	-	-	-	-	205	14	7.7	21.0	13.3
32883	47	6	-12.9	-12.9	0.0	0	-	-	-	-	0	-	-	-	-
32884	0	-	-	-	-	50	4	-12.9	-12.9	0.0	0	-	-	-	-
32885	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32886	0	-	-	-	-	0	-	-	-	-	303	3	-17.4	-17.4	0.0
32887	68	3	-12.9	-12.9	0.0	0	-	-	-	-	0	-	-	-	-
32888	5796	56	-12.9	-9.9	3.0	1270	16	-48.2	-48.2	0.0	1173	34	-12.9	-9.9	3.0
32889	76	4	-12.9	-9.9	3.0	0	-	-	-	-	0	-	-	-	-
32890	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
6417	-	-	-	-	-	0	-	-	-	-	0	-	-	-	-
6418	-	-	-	-	-	15880	81	-12.9	-12.9	0.0	7500	42	-12.9	-12.9	0.0
6419	-	-	-	-	-	10362	124	-12.9	-12.9	0.0	526	9	-17.4	-12.9	4.5
6420	-	-	-	-	-	0	-	-	-	-	0	-	-	-	-
6421	-	-	-	-	-	8	1	-12.9	-12.9	0.0	5	1	-12.9	-12.9	0.0
6422	-	-	-	-	-	37506	137	-12.9	-12.9	0.0	10104	50	-12.9	-12.9	0.0

Table A1-1: Detection summary for each of 49 Walleye tagged and monitored upstream of the Keeyask GS during winter 2013/2014 (October 16, 2013 to April 30, 2014), 2014/2015 (October 13, 2014 to April 30, 2015), and 2015/2016 (October 12, 2015 to April 30, 2016) periods. Tag id highlighted yellow = lost tags. Tag id highlighted purple = moved downstream through Gull Rapids (continued).

Tag ID	2013/2014					2014/2015					2015/2016				
	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)
6423	-	-	-	-	-	4150	58	-12.9	-12.9	0.0	7043	37	-12.9	-12.9	0.0
6425	-	-	-	-	-	0	-	-	-	-	1516	3	-19.5	-19.5	0.0
6426	-	-	-	-	-	5971	27	-12.9	-12.9	0.0	6893	50	-12.9	-12.9	0.0

Table A1-2: Detection summary for each of 42 Walleye tagged and monitored in Stephens Lake during winter 2013/2014 (October 16, 2013 to April 30, 2014), 2014/2015 (October 13, 2014 to April 30, 2015), and 2015/2016 (October 12, 2015 to April 30, 2016) periods. Tag id highlighted yellow = lost tags. Tag id highlighted blue = moved upstream through Gull Rapids. Tag id highlighted red = moved downstream through Kettle GS. Tag highlighted green = harvested.

Tag ID	2013/2014					2014/2015					2015/2016				
	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)
32811	2223	34	7.9	16.8	8.9	0	-	-	-	-	0	-	-	-	-
32812	9630	86	6.1	10.2	4.1	5288	44	7.7	10.2	2.5	0	-	-	-	-
32814	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32815	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32816	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32817	4313	16	4.3	10.2	5.9	560	12	7.7	10.2	2.5	0	-	-	-	-
32818	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32819	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32820	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32821	17	2	6.1	7.9	1.8	0	-	-	-	-	0	-	-	-	-
32822	157	2	6.1	16.8	10.7	29	1	7.9	10.5	2.6	7	1	13.4	13.4	0.0
32823	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32824	6984	64	7.9	10.5	2.6	209	16	10.5	10.5	0.0	53	4	7.9	7.9	0.0
32825	196	6	7.9	13.4	5.5	0	-	-	-	-	0	-	-	-	-
32826	3219	19	6.1	10.5	4.4	465	7	7.7	10.2	2.5	0	-	-	-	-
32827	13769	86	6.1	10.2	4.1	7958	68	7.7	10.2	2.5	7083	84	7.7	10.2	2.5
32828	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32829	1239	32	7.7	18.7	11.0	105	9	14.9	14.9	0.0	831	13	7.7	14.9	7.2
32830	3029	25	6.1	10.2	4.1	1864	-	7.7	10.2	2.5	0	-	-	-	-
32831	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32832	1881	19	6.3	13.4	7.1	0	-	-	-	-	0	-	-	-	-

Table A1-2: Detection summary for each of 42 Walleye tagged and monitored in Stephens Lake during winter 2013/2014 (October 16, 2013 to April 30, 2014), 2014/2015 (October 13, 2014 to April 30, 2015), and 2015/2016 (October 12, 2015 to April 30, 2016) periods. Tag id highlighted yellow = lost tags. Tag id highlighted blue = moved upstream through Gull Rapids. Tag id highlighted red = moved downstream through Kettle GS. Tag highlighted green = harvested (continued).

Tag ID	2013/2014					2014/2015					2015/2016				
	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)
32834	3617	28	6.3	10.2	3.9	12042	74	7.7	10.2	2.5	0	-	-	-	-
32835	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32836	343	6	7.9	10.5	2.6	0	-	-	-	-	0	-	-	-	-
32837	1240	15	7.9	10.5	2.6	0	-	-	-	-	0	-	-	-	-
32838	6796	51	6.3	10.2	3.9	1234	38	7.7	10.2	2.5	0	-	-	-	-
32839	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32840	180	13	7.9	10.5	2.6	875	4	7.9	10.5	2.6	0	-	-	-	-
32841	5180	44	6.1	14.9	8.8	4389	36	7.7	14.9	7.2	2321	48	7.7	9.9	2.2
32842	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32843	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32844	4669	48	7.9	10.5	2.6	8877	65	7.9	10.5	2.6	13	1	7.9	7.9	0.0
32845	27452	142	14.9	21.0	6.1	10656	113	18.7	21.0	2.3	11038	156	7.7	21.0	13.3
32848	9944	64	6.1	10.2	4.1	5738	56	7.7	10.2	2.5	28	3	7.7	7.7	0.0
32849	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32850	1017	21	6.1	10.5	4.4	0	-	-	-	-	0	-	-	-	-
32854	17	3	14.9	14.9	0.0	0	-	-	-	-	7650	55	7.7	9.9	2.2
32855	13200	57	6.1	10.5	4.4	0	-	-	-	-	0	-	-	-	-
32859	187	7	7.9	7.9	0.0	0	-	-	-	-	18	2	7.9	7.9	0.0
32860	42	2	16.8	16.8	0.0	0	-	-	-	-	0	-	-	-	-
6424	-	-	-	-	-	0	-	-	-	-	645	10	7.9	7.9	0.0
6427	-	-	-	-	-	0	-	-	-	-	0	-	-	-	-

Table A1-3 Detection summary for each of 49 Walleye tagged and monitored upstream of Gull Rapids during open-water 2013 (May 1 to October 16), 2014 (May 1 to October 13), 2015 (May 1 to October 11), and 2016 (May 1 to October 19) periods. Tag id highlighted yellow = lost tags. Tag id highlighted purple = moved downstream through Gull Rapids.

Tag ID	2013					2014					2015					2016				
	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)
32813	4894	122	-19.4	-9.9	9.5	1130	35	-26.5	-9.9	16.6	4847	49	-48.2	-12.9	35.3	566	8	-48.2	-33.8	14.4
32833	23015	104	-19.5	-15.5	4.0	5458	87	-19.5	-7.4	12.1	2788	35	-17.4	43.5	60.9	0	-	-	-	-
32846	21867	89	-19.5	-15.5	4.0	0	0	-	-	-	0	-	-	-	-	0	-	-	-	-
32847	48687	99	-17.1	-17.1	0.0	56438	130	-17.4	-17.4	0.0	67288	134	-17.4	-17.4	0.0	0	-	-	-	-
32851	11797	91	-48.1	-19.2	28.9	6405	104	-44.5	-12.9	31.6	4341	31	-19.5	-19.4	0.1	0	-	-	-	-
32852	12797	90	-19.5	-9.9	9.6	5620	95	-33.8	-9.5	24.3	7786	59	-48.2	-11.8	36.4	483	16	-26.5	-12.9	13.6
32853	5475	61	-19.5	-7.4	12.1	0	0	-	-	-	0	-	-	-	-	0	-	-	-	-
32856	28306	85	-19.5	-19.2	0.3	0	0	-	-	-	0	-	-	-	-	0	-	-	-	-
32857	25904	87	-19.5	-15.5	4.0	11327	74	-19.5	-19.4	0.1	7116	68	-44.7	-19.4	25.3	0	-	-	-	-
32858	17890	103	-19.5	-9.9	9.6	7307	115	-19.5	-9.0	10.5	8375	113	-19.5	-9.3	10.2	2270	50	-19.5	-9.3	10.2
32861	14577	90	-19.5	-9.9	9.6	9424	118	-19.5	-14.8	4.7	1262	18	-19.5	-12.9	6.6	0	-	-	-	-
32862	4284	61	-19.5	-9.9	9.6	7216	84	-44.7	-7.4	37.3	1529	29	-34.3	-11.8	22.5	0	-	-	-	-
32863	1081	8	-17.1	-5.8	11.3	0	0	-	-	-	0	-	-	-	-	0	-	-	-	-
32864	0	-	-	-	-	0	0	-	-	-	0	-	-	-	-	0	-	-	-	-
32865	191	3	-17.1	4.9	22.0	0	0	-	-	-	0	-	-	-	-	0	-	-	-	-
32866	230	3	-17.1	10.0	27.1	0	0	-	-	-	0	-	-	-	-	0	-	-	-	-
32867	63	2	-15.5	-9.9	5.6	0	0	-	-	-	0	-	-	-	-	0	-	-	-	-
32868	3318	24	-48.1	-15.5	32.6	156	9	-48.2	-48.2	0.0	741	37	-44.3	-17.4	26.9	0	-	-	-	-
32869	1312	9	-17.1	-9.9	7.2	8500	103	-48.2	-12.9	35.3	0	-	-	-	-	939	46	-46.9	-14.8	32.1
32870	273	4	-17.1	-9.9	7.2	0	0	-	-	-	0	-	-	-	-	0	-	-	-	-
32871	78	1	-17.1	-5.8	11.3	0	0	-	-	-	0	-	-	-	-	0	-	-	-	-
32872	8740	46	-19.4	-12.3	7.1	26481	124	-19.5	-9.9	9.6	13898	116	-17.4	-9.9	7.5	7100	39	-14.8	-9.0	5.8
32873	3275	27	-48.1	-9.9	38.2	2570	70	-48.2	-12.9	35.3	1647	35	-48.2	-12.9	35.3	0	-	-	-	-
32874	1678	30	-19.2	-9.9	9.3	4414	77	-14.8	-5.8	9.0	0	-	-	-	-	0	-	-	-	-
32875	357	3	-17.1	-7.4	9.7	0	0	-	-	-	0	-	-	-	-	0	-	-	-	-
32876	150	2	-17.1	-5.8	11.3	0	0	-	-	-	0	-	-	-	-	0	-	-	-	-
32877	4876	35	-17.1	-9.9	7.2	3647	68	-44.5	-9.5	35.0	9619	93	-34.3	-9.5	24.8	197	4	-14.8	-9.0	5.8
32878	10313	42	-19.2	-15.5	3.7	6883	84	-33.8	-17.4	16.4	2039	26	-9.3	-5.8	3.5	38	5	-7.4	-7.4	0.0
32879	10523	42	-17.1	-17.1	0.0	27102	105	-32.3	-14.8	17.5	14994	104	-33.8	-17.4	16.4	4223	38	-33.8	-29.4	4.4
32880	223	2	-17.1	-5.8	11.3	158	8	4.4	4.8	0.4	0	-	-	-	-	5190	1	4.4	4.4	0.0
32881	12893	44	-17.1	-15.5	1.6	14741	96	-33.8	-14.8	19.0	14884	119	-44.3	-17.4	26.9	7	1	-29.4	-29.4	0.0
32882	3806	24	-48.1	-9.9	38.2	512	6	-48.2	4.9	53.1	0	-	-	-	-	31	3	4.1	21.0	16.9
32883	4491	40	-19.2	-9.9	9.3	18889	122	-19.5	-11.8	7.7	13035	131	-19.5	-9.9	9.6	2084	72	-24.3	-14.8	9.5
32884	79	3	-17.1	-9.9	7.2	0	0	-	-	-	292	18	2.2	2.9	0.7	0	-	-	-	-
32885	151	5	-17.1	-17.1	0.0	0	0	-	-	-	0	-	-	-	-	0	-	-	-	-
32886	11127	46	-17.1	-15.5	1.6	37512	127	-17.4	-14.8	2.6	13474	124	-17.4	-14.8	2.6	276	21	-24.3	-9.5	14.8

Table A1-3 Detection summary for each of 49 Walleye tagged and monitored upstream of Gull Rapids during open-water 2013 (May 1 to October 16), 2014 (May 1 to October 13), 2015 (May 1 to October 11), and 2016 (May 1 to October 19) periods. Tag id highlighted yellow = lost tags. Tag id highlighted purple = moved downstream through Gull Rapids (continued).

Tag ID	2013					2014					2015					2016				
	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)
32887	6256	28	-17.1	-9.9	7.2	0	0	-	-	-	0	-	-	-	-	0	-	-	-	-
32888	542	24	-19.2	-15.5	3.7	1896	45	-48.2	-12.9	35.3	10557	63	-48.2	-12.9	35.3	3900	56	-29.4	-9.5	19.9
32889	6145	42	-19.4	-5.8	13.6	0	0	-	-	-	18	4	2.2	2.2	0.0	0	-	-	-	-
32890	581	17	-19.4	-9.9	9.5	2794	57	-19.5	-9.5	10.0	1301	45	-44.3	-9.9	34.4	0	-	-	-	-
6417	-	-	-	-	-	9504	71	-48.2	-17.4	30.8	7788	72	-48.2	-19.4	28.8	1656	64	-33.8	-33.8	0.0
6418	-	-	-	-	-	20683	114	-19.5	-12.9	6.6	573	9	-12.9	-12.9	0.0	8727	114	-19.5	-11.8	7.7
6419	-	-	-	-	-	11490	82	-26.5	-12.9	13.6	10593	124	-26.5	-12.9	13.6	0	-	-	-	-
6420	-	-	-	-	-	8224	66	-48.2	-11.8	36.4	0	-	-	-	-	0	-	-	-	-
6421	-	-	-	-	-	15291	111	-19.5	-9.5	10.0	34330	121	-19.5	-9.5	10.0	44883	129	-33.8	-9.5	24.3
6422	-	-	-	-	-	20831	111	-19.5	-12.9	6.6	28087	125	-33.8	-9.9	23.9	8194	59	-29.4	44.9	74.3
6423	-	-	-	-	-	3044	62	-19.4	-12.9	6.5	6058	109	-17.4	-9.9	7.5	1659	70	-17.4	-11.8	5.6
6425	-	-	-	-	-	58854	110	-19.5	-17.4	2.1	71088	134	-19.5	-19.5	0.0	21068	144	-19.5	-19.4	0.1
6426	-	-	-	-	-	22404	109	-19.5	-12.9	6.6	28385	96	-19.5	-12.9	6.6	0	-	-	-	-

Table A1-4 Detection summary for each of 42 Walleye tagged and monitored in Stephens Lake during open-water 2013 (May 1 to October 16), 2014 (May 1 to October 13), 2015 (May 1 to October 11), and 2016 (May 1 to October 19) periods. Tag id highlighted yellow = lost tags. Tag id highlighted purple = moved downstream through Gull Rapids. Tag id highlighted yellow = lost tags. Tag id highlighted blue = moved upstream through Gull Rapids. Tag id highlighted red = moved downstream through Kettle GS. Tag highlighted green = harvested.

Tag ID	2013					2014					2015					2016				
	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)
32811	3101	15	1.3	40.8	39.5	4201	29	0.5	43.5	43.0	0	-	-	-	-	0	-	-	-	-
32812	23567	99	0.5	10.0	9.5	6015	79	0.5	10.2	9.7	348	8	2.2	4.4	2.2	0	-	-	-	-
32814	4291	29	1.3	5.8	4.5	2	1	6.1	6.3	0.2	0	-	-	-	-	0	-	-	-	-
32815	2024	11	1.3	4.9	3.6	33	2	0.5	4.9	4.4	29	5	2.2	4.7	2.5	0	-	-	-	-
32816	524	8	0.5	5.8	5.3	230	7	0.5	1.3	0.8	781	15	2.2	4.9	2.7	66	5	2.6	9.4	6.8
32817	9533	71	1.3	4.9	3.6	863	13	4.3	10.2	5.9	813	17	2.2	10.2	8.0	0	-	-	-	-
32818	2734	16	1.3	13.4	12.1	77	2	4.3	13.4	9.1	433	22	1.3	4.7	3.4	1153	42	1.2	7.9	6.7
32819	1597	20	1.3	7.9	6.6	29	3	4.3	7.9	3.6	203	7	2.2	7.9	5.7	0	-	-	-	-
32820	6300	62	0.5	14.9	14.4	1516	17	0.5	7.7	7.2	0	-	-	-	-	0	-	-	-	-
32821	526	7	1.3	26.2	24.9	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32822	3366	24	0.5	4.4	3.9	402	13	0.5	10.5	10.0	2226	34	1.3	7.9	6.6	4764	40	1.2	9.4	8.2
32823	1740	26	0.5	7.9	7.4	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32824	1851	38	0.5	12.1	11.6	3052	33	0.5	10.5	10.0	321	11	1.3	7.9	6.6	5389	48	1.2	9.4	8.2
32825	2477	29	1.3	10.0	8.7	91	4	4.3	7.9	3.6	0	-	-	-	-	0	-	-	-	-
32826	21084	66	0.5	7.9	7.4	3175	28	0.5	7.9	7.4	1609	36	1.3	7.9	6.6	1981	31	1.2	9.4	8.2
32827	11028	101	0.5	12.1	11.6	15945	112	0.5	7.7	7.2	5803	90	1.3	10.5	9.2	4575	48	1.2	18.6	17.4
32828	1676	14	0.5	13.4	12.9	1729	25	0.5	6.1	5.6	460	11	1.3	7.9	6.6	1088	22	1.2	9.4	8.2
32829	3237	35	0.5	10.0	9.5	8433	83	0.5	18.7	18.2	15166	123	1.3	10.2	8.9	0	-	-	-	-
32830	15475	83	0.5	10.0	9.5	22064	106	0.5	14.9	14.4	0	-	-	-	-	0	-	-	-	-
32831	8716	46	1.3	28.2	26.9	0	-	-	-	-	76	10	2.2	10.5	8.3	0	-	-	-	-
32832	11783	102	0.5	5.8	5.3	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32834	5591	44	0.5	10.0	9.5	4633	35	1.3	10.2	8.9	59	6	2.9	10.2	7.3	0	-	-	-	-
32835	7249	39	0.5	4.9	4.4	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32836	7946	59	1.3	13.4	12.1	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32837	6998	62	1.3	18.7	17.4	20	1	0.5	4.9	4.4	0	-	-	-	-	0	-	-	-	-
32838	24259	101	0.5	12.1	11.6	14365	97	0.5	14.9	14.4	3356	52	1.3	5.8	4.5	0	-	-	-	-
32839	9101	50	0.5	4.9	4.4	0	-	-	-	-	5	1	3.9	3.9	-	0	-	-	-	-
32840	1470	35	1.3	7.9	6.6	669	22	2.9	7.9	5.0	0	-	-	-	-	0	-	-	-	-
32841	7626	88	0.5	4.9	4.4	1284	17	2.9	14.9	12.0	17150	121	2.2	14.9	12.7	48	3	9.4	13.9	4.5
32842	100	4	1.3	28.2	26.9	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-
32843	2242	21	-48.1	21	69.1	28	5	-48.2	-48.2	0	0	-	-	-	-	187	3	-48.2	-26.5	21.7
32844	3359	28	1.3	5.8	4.5	631	8	2.9	13.4	10.5	304	16	1.3	3.6	2.3	307	9	1.2	6.5	5.3
32845	3441	21	2.5	18.7	16.2	4509	59	1.3	21.0	19.7	3323	34	2.9	19.0	16.1	1917	31	2.7	18.6	15.9
32848	4342	36	0.5	7.7	7.2	2297	30	0.5	10.2	9.7	7314	92	1.3	7.7	6.4	5558	72	1.2	4.4	3.2

Table A1-4 Detection summary for each of 42 Walleye tagged and monitored in Stephens Lake during open-water 2013 (May 1 to October 16), 2014 (May 1 to October 13), 2015 (May 1 to October 11), and 2016 (May 1 to October 19) periods. Tag id highlighted yellow = lost tags. Tag id highlighted purple = moved downstream through Gull Rapids. Tag id highlighted yellow = lost tags. Tag id highlighted blue = moved upstream through Gull Rapids. Tag id highlighted red = moved downstream through Kettle GS. Tag highlighted green = harvested (continued).

Tag ID	2013					2014					2015					2016				
	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)
32849	3753	22	0.5	12.1	11.6	15784	89	0.5	5.8	5.3	28553	100	1.3	4.9	3.6	1414	21	1.2	4.3	3.1
32850	33539	87	0.5	7.9	7.4	284	2	4.7	7.9	3.2	0	-	-	-	-	0	-	-	-	-
32854	11244	57	0.5	21.0	20.5	5003	47	0.5	18.7	18.2	938	11	2.2	17.4	15.2	1770	13	1.2	18.6	17.4
32855	4044	49	0.5	10.0	9.5	5724	33	0.5	10.2	9.7	0	-	-	-	-	0	-	-	-	-
32859	4456	31	0.5	12.1	11.6	5184	88	0.5	10.2	9.7	6045	95	1.3	11.0	9.7	0	-	-	-	-
32860	4879	37	0.5	26.2	25.7	180	12	2.9	16.8	13.9	168	12	2.2	10.2	8.0	1980	34	1.2	13.0	11.8
6424	-	-	-	-	-	4389	46	2.9	10.2	7.3	443	21	2.2	10.5	8.3	700	17	1.2	10.2	9.0
6427	-	-	-	-	-	2259	21	1.3	14.9	13.6	0	-	-	-	-	0	-	-	-	-

Table A1-5: Detection summary for each of 48 Walleye tagged upstream of Gull Rapids in June and September, 2016. Tag id highlighted purple = moved downstream through Gull Rapids. Tag id highlighted red = moved downstream through Kettle GS. Tag id highlighted orange = moved downstream through the Long Spruce GS.

Season	Tag ID	n	# Days	# Potential Detection Days	% Days Detected	U/S (rkm)	D/S (rkm)	Range (rkm)
Spring	53763	369	11	137	8	-19.5	-9.5	10
	53764	717	6	137	4	-14.8	10.3	25.1
	53768	5426	127	137	93	-19.5	-14.8	4.7
	53769	16254	94	137	69	-19.5	44.9	64.4
	53770	299	3	137	2	-17.4	-17.4	0
	53771	1919	26	137	19	-19.4	58.6	78
	53772	2950	19	137	14	-24.3	-14.8	9.5
	53773	7239	74	137	54	-33.8	-9.5	24.3
	53774	1403	7	137	5	-17.4	-9	8.4
	53775	9686	68	137	50	-10.1	18.6	28.7
	53776	10606	110	143	77	-19.5	-12.9	6.6
	53777	8877	99	144	69	-48.2	-11.8	36.4
	53778	6979	15	139	11	-19.5	-9.5	10
	53779	389	7	139	5	-12.9	-12.9	0
	53780	3585	28	139	20	-12.9	-5.8	7.1
	53781	344	10	140	7	-12.9	-9.5	3.4
	53782	11144	48	142	34	-19.5	43.5	63
	53783	18635	92	142	65	-48.2	-14.8	33.4
	53784	3309	85	143	59	-19.5	-11.8	7.7
	53785	30891	132	143	92	-19.5	-12.9	6.6
	53786	266	4	143	3	-14.8	2.7	17.5
	53787	6972	92	143	64	-19.5	-5.8	13.7
	53788	2521	24	143	17	-19.5	5.2	24.7
	53789	17373	84	143	59	-44.3	-32.3	12
	53790	1177	4	144	3	-17.4	-17.4	0
	53791	1265	17	144	12	-19.5	44.9	64.4
	53792	18568	130	145	90	-19.5	-11.8	7.7
	53793	40350	133	135	99	-19.5	-12.9	6.6
	53794	14606	97	135	72	-29.4	-11.8	17.6
	53795	7864	105	135	78	-19.5	-9.5	10

Table A1-5: Detection summary for each of 48 Walleye tagged upstream of Gull Rapids in June and September, 2016. Tag id highlighted purple = moved downstream through Gull Rapids. Tag id highlighted red = moved downstream through Kettle GS. Tag id highlighted orange = moved downstream through the Long Spruce GS (continued).

Season	Tag ID	n	# Days	# Potential Detection Days	% Days Detected	U/S (rkm)	D/S (rkm)	Range (rkm)
Spring	53796	4385	62	135	46	-26.5	-17.4	9.1
	53797	17953	86	135	64	-48.2	-17.4	30.8
	53798	11017	85	135	63	-19.5	-12.9	6.6
	53799	7477	59	135	44	-14.8	10.3	25.1
	53800	22181	94	135	70	-19.5	-5.8	13.7
	53801	1488	8	135	6	-14.8	18.6	33.4
	53802	118	2	135	1	-14.8	-5.8	9
	53805	17640	129	136	95	-14.8	-14.8	0
	53806	24853	125	136	92	-34.3	-14.8	19.5
	53807	7475	63	136	46	-48.2	-14.8	33.4
Fall	53758	409	10	25	40	-17.4	-9.3	8.1
	53759	2725	18	25	72	-17.4	9.4	26.8
	53760	360	10	25	40	-17.4	5.2	22.6
	53765	5790	20	25	80	-19.5	-9.5	10
	53766	1164	11	25	44	-12.9	-9.5	3.4
	53767	1490	16	25	64	-12.9	-11.8	1.1
	53803	1530	21	25	84	-14.8	-11.8	3
	53804	1829	17	25	68	-14.8	-11.8	3

Table A1-6: Detection summary for each of 40 Walleye tagged in Stephens Lake in June, 2016. Tag id highlighted yellow = missing tags.

Tag ID	n	# Days	# Potential Detection Days	% Days Detected	U/S (rkm)	D/S (rkm)	Range (rkm)
53723	6822	52	145	36	1.2	9.4	8.2
53724	16473	97	145	67	1.2	10.3	9.1
53725	1918	22	146	15	1.2	18.6	17.4
53726	1862	17	146	12	1.2	16.8	15.6
53727	0	0	145	0	-	-	-
53728	13006	102	145	70	1.2	18.6	17.4
53729	3470	41	145	28	1.2	18.6	17.4
53730	1907	15	145	10	1.2	9.4	8.2
53731	4702	19	145	13	1.2	9.4	8.2
53732	380	7	145	5	1.2	13	11.8
53733	2770	34	143	24	1.2	13.9	12.7
53734	2165	13	143	9	1.2	18.6	17.4
53735	71469	135	143	94	1.2	18.6	17.4
53736	5122	42	143	29	1.2	18.6	17.4
53737	2237	64	144	44	1.2	10.3	9.1
53738	7820	75	142	53	2.7	10.3	7.6
53739	9452	111	142	78	1.2	6.5	5.3
53740	12989	77	142	54	1.2	9.4	8.2
53741	4836	76	143	53	1.2	18.6	17.4
53742	1118	12	143	8	1.2	2.7	1.5
53743	466	9	142	6	1.2	9.4	8.2
53744	5132	56	142	39	1.2	18.6	17.4
53745	249	4	142	3	2.7	18.6	15.9
53746	310	4	142	3	1.2	18.6	17.4
53747	19408	65	142	46	1.2	10.3	9.1
53748	4332	57	142	40	2.7	13	10.3
53749	34767	132	142	93	1.2	10.3	9.1
53750	4459	52	142	37	1.2	10.3	9.1
53751	8287	56	142	39	1.2	18.6	17.4
53752	12710	51	142	36	1.2	20	18.8

Table A1-6: Detection summary for each of 40 Walleye tagged in Stephens Lake in June, 2016 (continued).

Season	Tag ID	n	# Days	# Potential Detection Days	% Days Detected	U/S (rkm)	D/S (rkm)	Range (rkm)
53753	23679	89	142	63	1	21	19.8	9.1
53754	1653	11	142	8	1	18.6	17.4	30.8
53755	12782	65	142	46	1	13	11.8	6.6
53756	2800	39	141	28	1	13	11.8	25.1
53757	714	5	141	4	1	18.6	17.4	13.7
53808	5683	43	141	30	1	18.6	17.4	33.4
53809	3821	62	141	44	1	18.6	17.4	9
53810	1340	43	141	30	1	18.6	17.4	0
53811	62445	123	141	87	1	7.9	6.7	19.5
53812	5047	27	141	19	1	20	18.8	33.4

APPENDIX 2:

LOCATION SUMMARY FOR INDIVIDUAL ACOUSTIC TAGGED WALLEYE, CLARK LAKE TO GULL RAPIDS, JUNE 2013 TO OCTOBER 2016

Figure A2-1:	Position of a Walleye tagged with an acoustic transmitter (code #32813) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	85
Figure A2-2:	Position of a Walleye tagged with an acoustic transmitter (code #32833) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	86
Figure A2-3:	Position of a Walleye tagged with an acoustic transmitter (code #32846) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	87
Figure A2-4:	Position of a Walleye tagged with an acoustic transmitter (code #32847) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	88
Figure A2-5:	Position of a Walleye tagged with an acoustic transmitter (code #32851) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	89
Figure A2-6:	Position of a Walleye tagged with an acoustic transmitter (code #32852) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	90
Figure A2-7:	Position of a Walleye tagged with an acoustic transmitter (code #32853) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	91
Figure A2-8:	Position of a Walleye tagged with an acoustic transmitter (code #32856) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	92
Figure A2-9:	Position of a Walleye tagged with an acoustic transmitter (code #32857) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	93
Figure A2-10:	Position of a Walleye tagged with an acoustic transmitter (code #32858) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	94

Figure A2-11: Position of a Walleye tagged with an acoustic transmitter (code #32861) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	95
Figure A2-12: Position of a Walleye tagged with an acoustic transmitter (code #32862) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	96
Figure A2-13: Position of a Walleye tagged with an acoustic transmitter (code #32863) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	97
Figure A2-14: Position of a Walleye tagged with an acoustic transmitter (code #32864) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	98
Figure A2-15: Position of a Walleye tagged with an acoustic transmitter (code #32865) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	99
Figure A2-16: Position of a Walleye tagged with an acoustic transmitter (code #32866) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	100
Figure A2-17: Position of a Walleye tagged with an acoustic transmitter (code #32867) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	101
Figure A2-18: Position of a Walleye tagged with an acoustic transmitter (code #32868) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	102
Figure A2-19: Position of a Walleye tagged with an acoustic transmitter (code #32869) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	103
Figure A2-20: Position of a Walleye tagged with an acoustic transmitter (code #32870) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	104
Figure A2-21: Position of a Walleye tagged with an acoustic transmitter (code #32871) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	105
Figure A2-22: Position of a Walleye tagged with an acoustic transmitter (code #32872) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	106
Figure A2-23: Position of a Walleye tagged with an acoustic transmitter (code #32873) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	107

Figure A2-24: Position of a Walleye tagged with an acoustic transmitter (code #32874) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	108
Figure A2-25: Position of a Walleye tagged with an acoustic transmitter (code #32875) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	109
Figure A2-26: Position of a Walleye tagged with an acoustic transmitter (code #32876) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	110
Figure A2-27: Position of a Walleye tagged with an acoustic transmitter (code #32877) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	111
Figure A2-28: Position of a Walleye tagged with an acoustic transmitter (code #32878) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	112
Figure A2-29: Position of a Walleye tagged with an acoustic transmitter (code #32879) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	113
Figure A2-30: Position of a Walleye tagged with an acoustic transmitter (code #32880) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	114
Figure A2-31: Position of a Walleye tagged with an acoustic transmitter (code #32881) in the Nelson River between Clark Lake and Gull Rapids relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	115
Figure A2-32: Position of a Walleye tagged with an acoustic transmitter (code #32882) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	116
Figure A2-33: Position of a Walleye tagged with an acoustic transmitter (code #32883) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	117
Figure A2-34: Position of a Walleye tagged with an acoustic transmitter (code #32884) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	118
Figure A2-35: Position of a Walleye tagged with an acoustic transmitter (code #32885) in the Nelson River between Clark Lake and Gull Rapids relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	119
Figure A2-36: Position of a Walleye tagged with an acoustic transmitter (code #32886) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	120

Figure A2-37: Position of a Walleye tagged with an acoustic transmitter (code #32887) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	121
Figure A2-38: Position of a Walleye tagged with an acoustic transmitter (code #32888) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	122
Figure A2-39: Position of a Walleye tagged with an acoustic transmitter (code #32889) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	123
Figure A2-40: Position of a Walleye tagged with an acoustic transmitter (code #32890) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	124
Figure A2-41: Position of a Walleye tagged with an acoustic transmitter (code #6417) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	125
Figure A2-42: Position of a Walleye tagged with an acoustic transmitter (code #6418) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	126
Figure A2-43: Position of a Walleye tagged with an acoustic transmitter (code #6419) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	127
Figure A2-44: Position of a Walleye tagged with an acoustic transmitter (code #6420) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	128
Figure A2-45: Position of a Walleye tagged with an acoustic transmitter (code #6421) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	129
Figure A2-46: Position of a Walleye tagged with an acoustic transmitter (code #6422) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	130
Figure A2-47: Position of a Walleye tagged with an acoustic transmitter (code #6423) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	131
Figure A2-48: Position of a Walleye tagged with an acoustic transmitter (code #6425) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	132
Figure A2-49: Position of a Walleye tagged with an acoustic transmitter (code #6426) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016.....	133

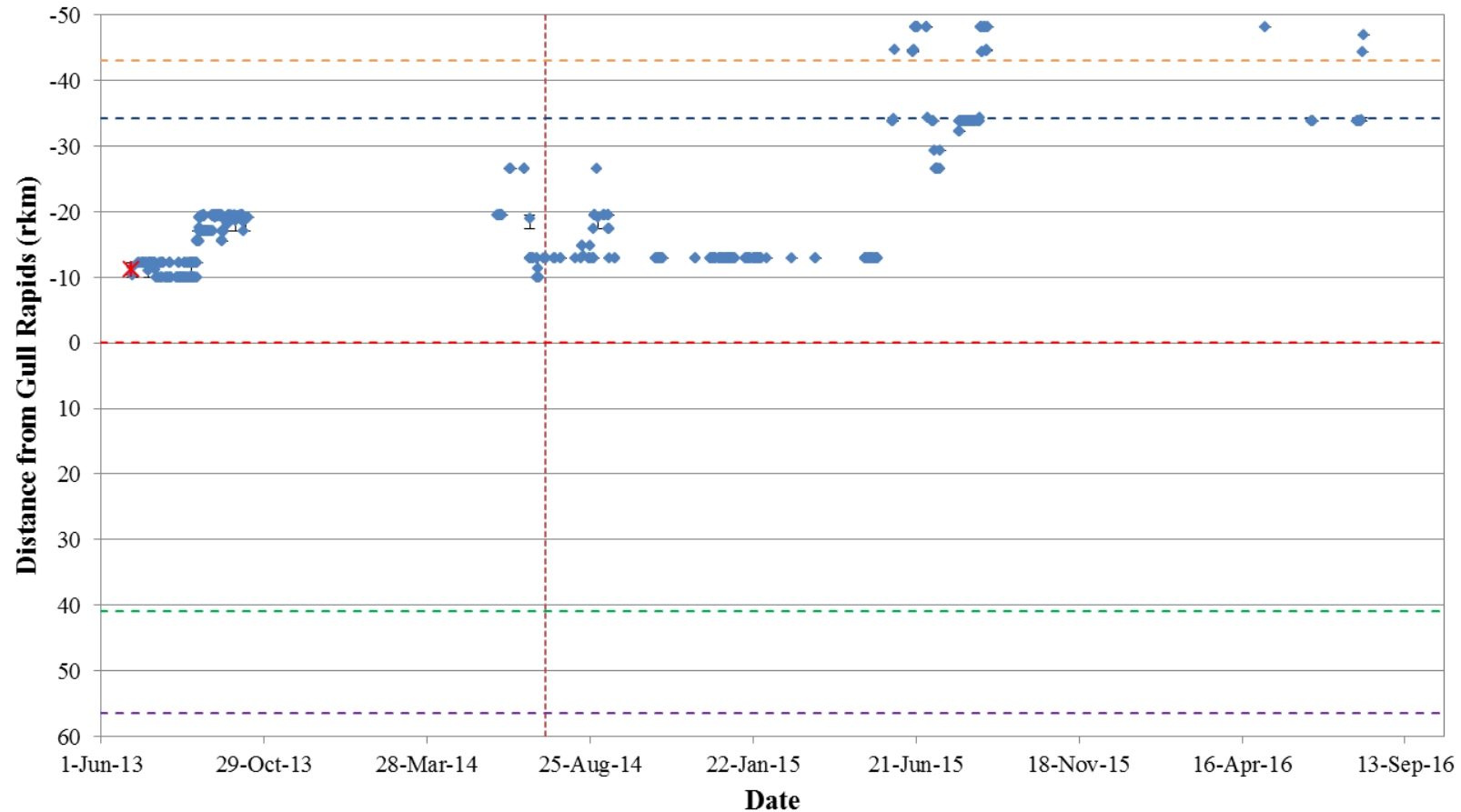


Figure A2-1: Position of a Walleye tagged with an acoustic transmitter (code #32813) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

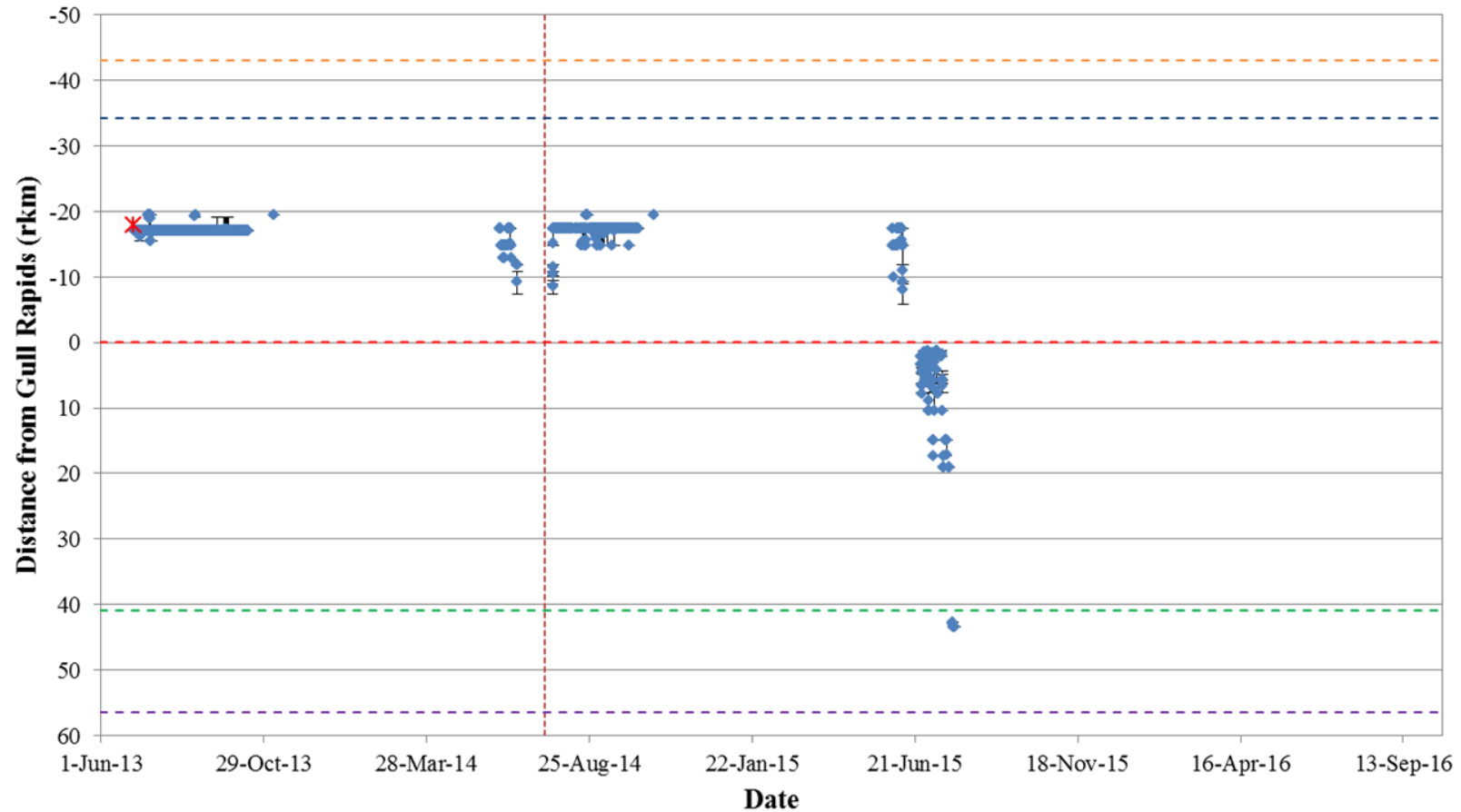


Figure A2-2: Position of a Walleye tagged with an acoustic transmitter (code #32833) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

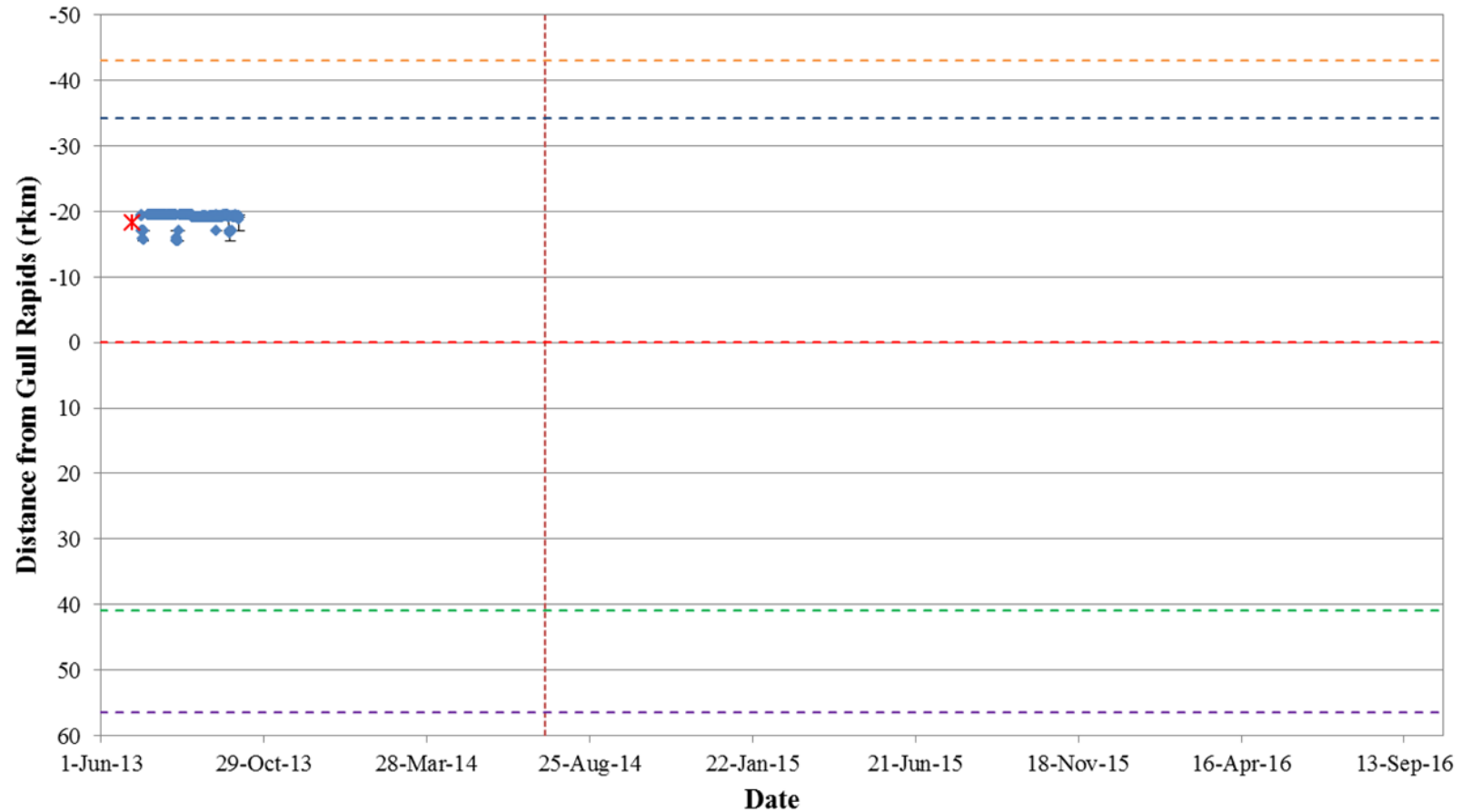


Figure A2-3: Position of a Walleye tagged with an acoustic transmitter (code #32846) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

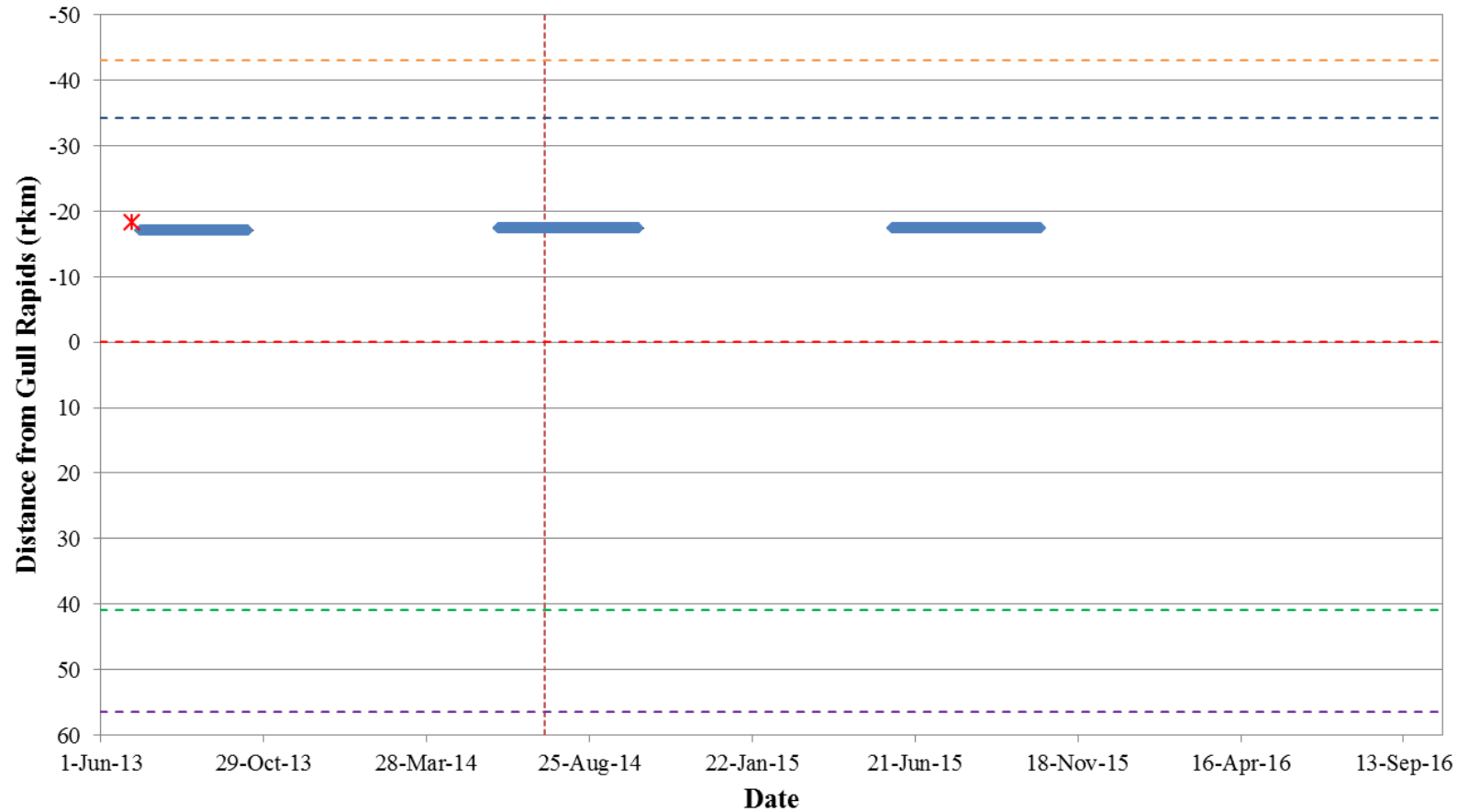


Figure A2-4: Position of a Walleye tagged with an acoustic transmitter (code #32847) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple). Note: this fish is considered dead.

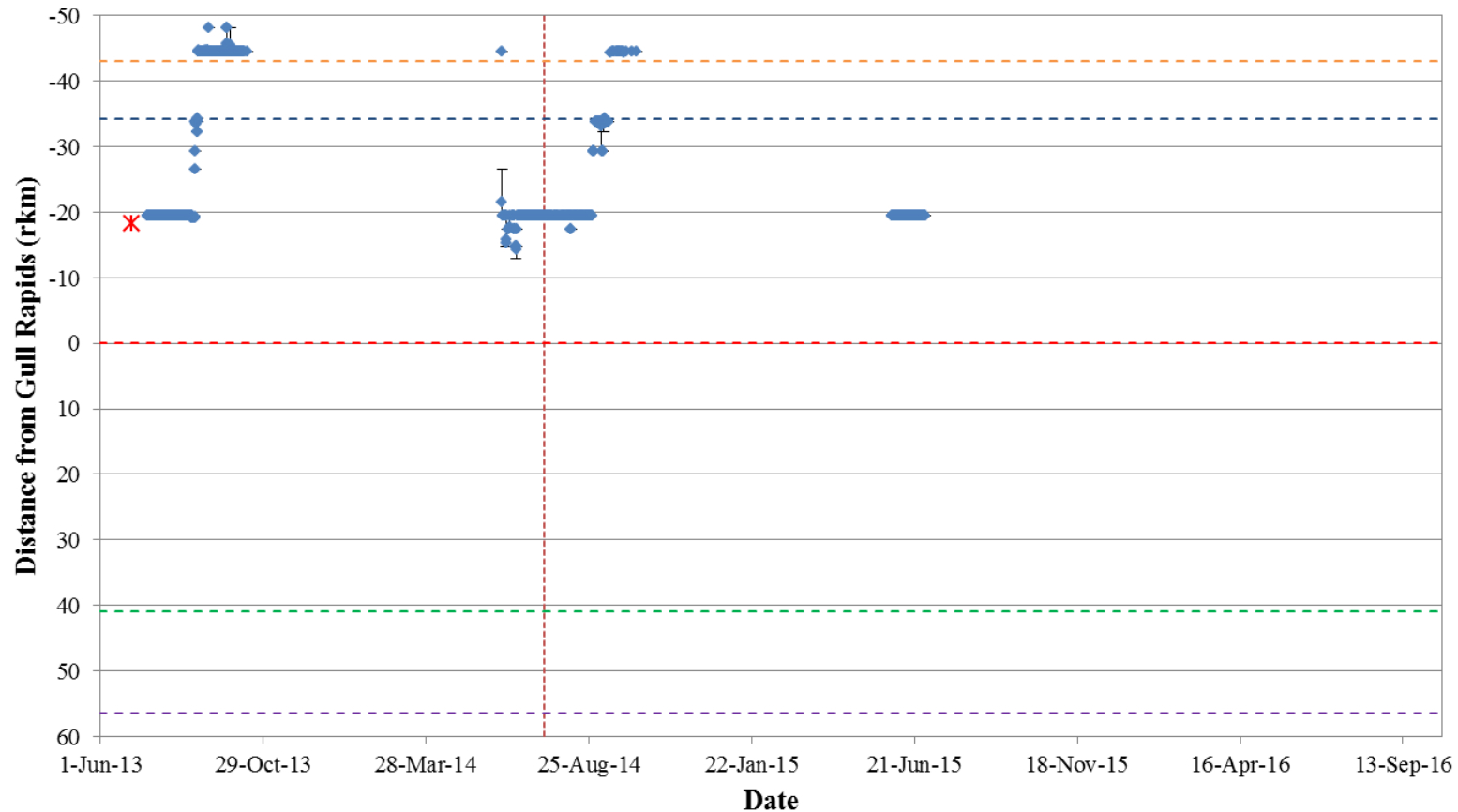


Figure A2-5: Position of a Walleye tagged with an acoustic transmitter (code #32851) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

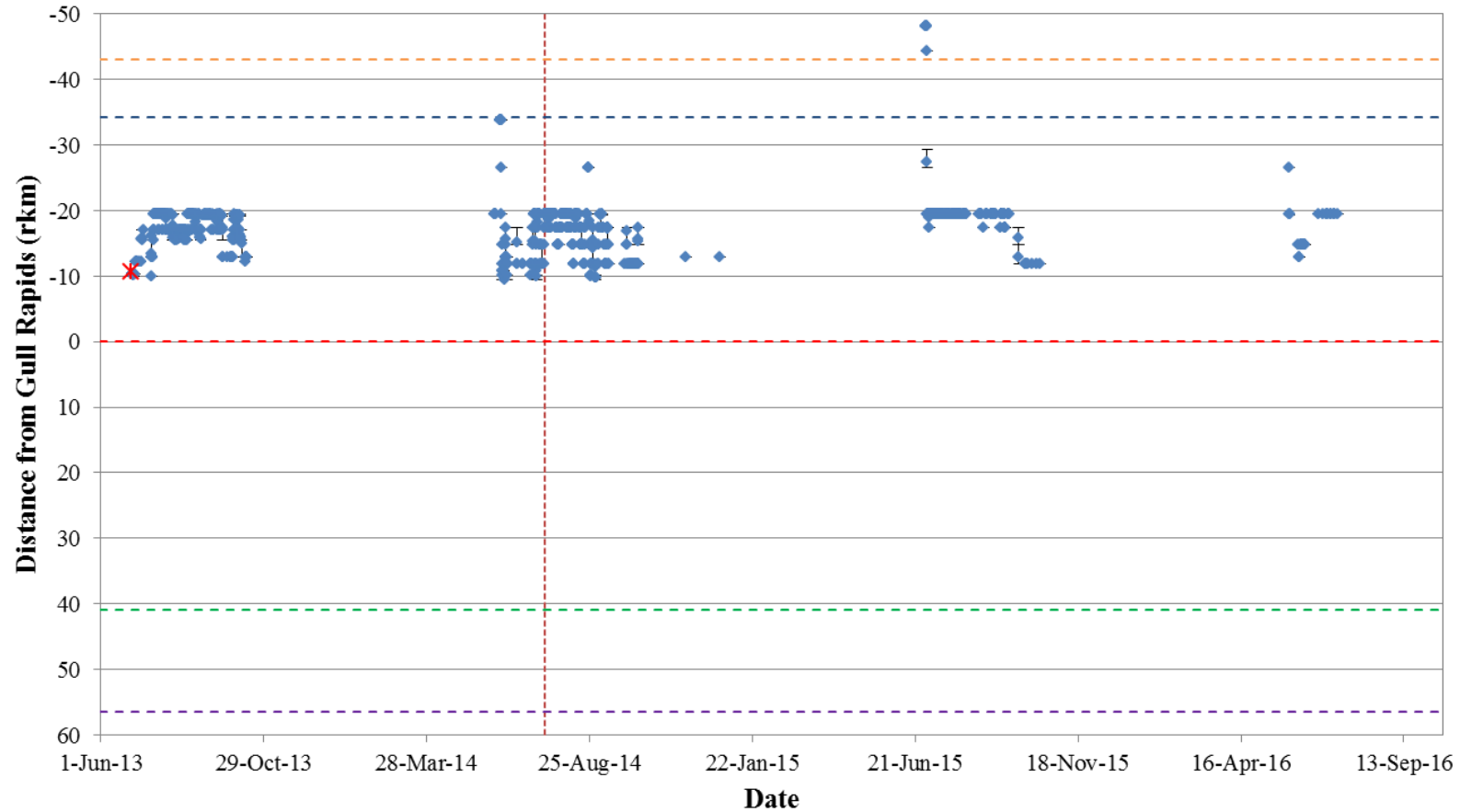


Figure A2-6: Position of a Walleye tagged with an acoustic transmitter (code #32852) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

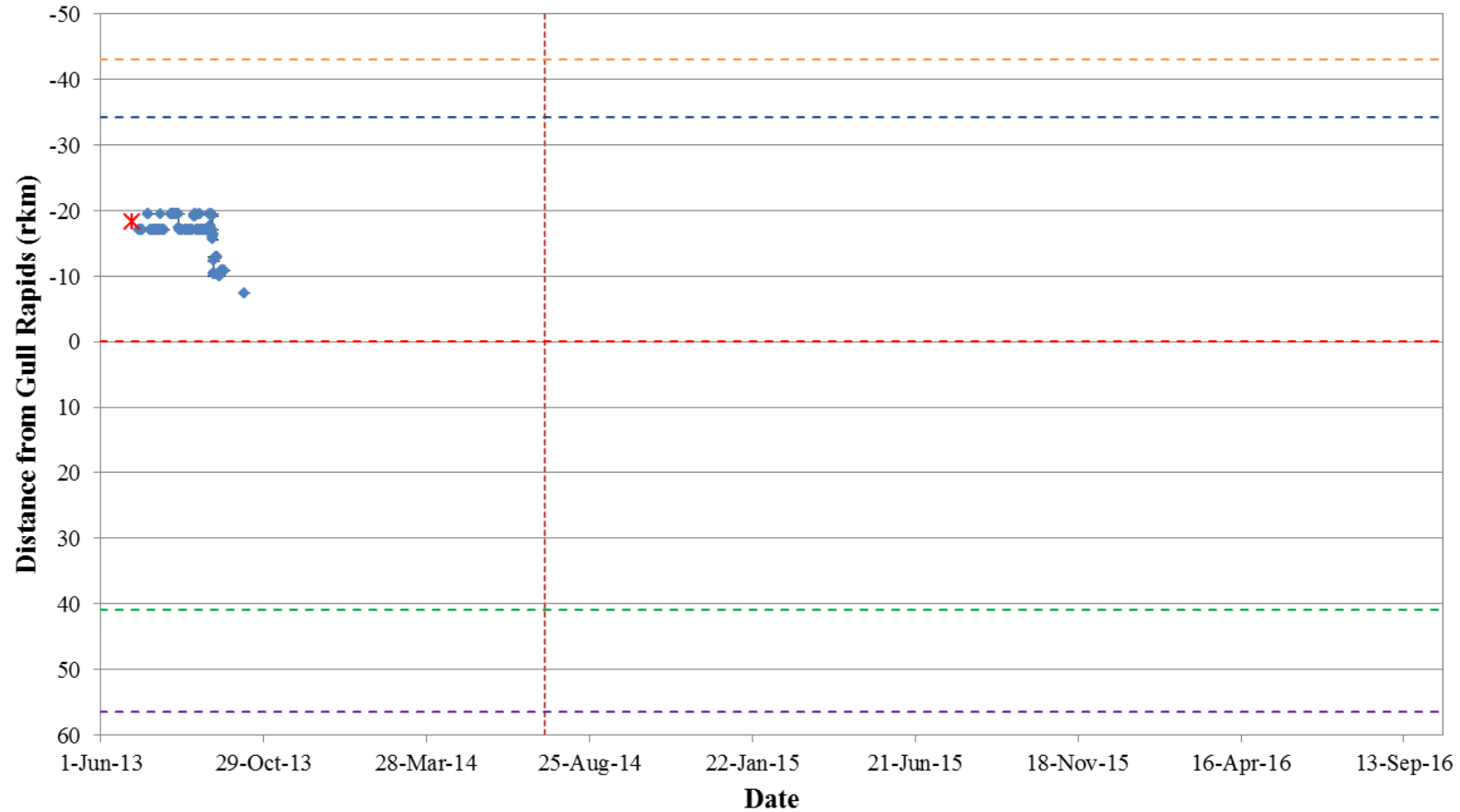


Figure A2-7: Position of a Walleye tagged with an acoustic transmitter (code #32853) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

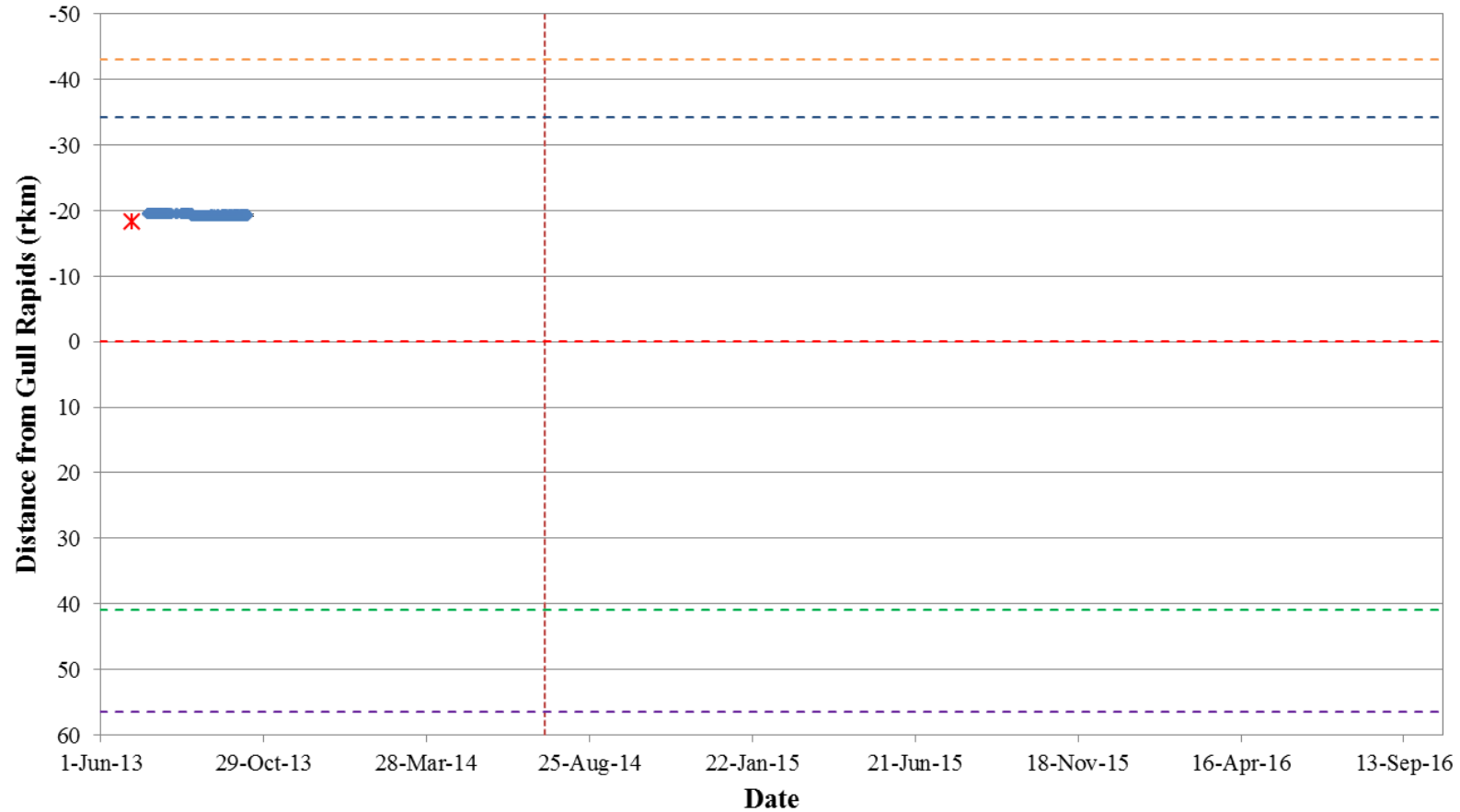


Figure A2-8: Position of a Walleye tagged with an acoustic transmitter (code #32856) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

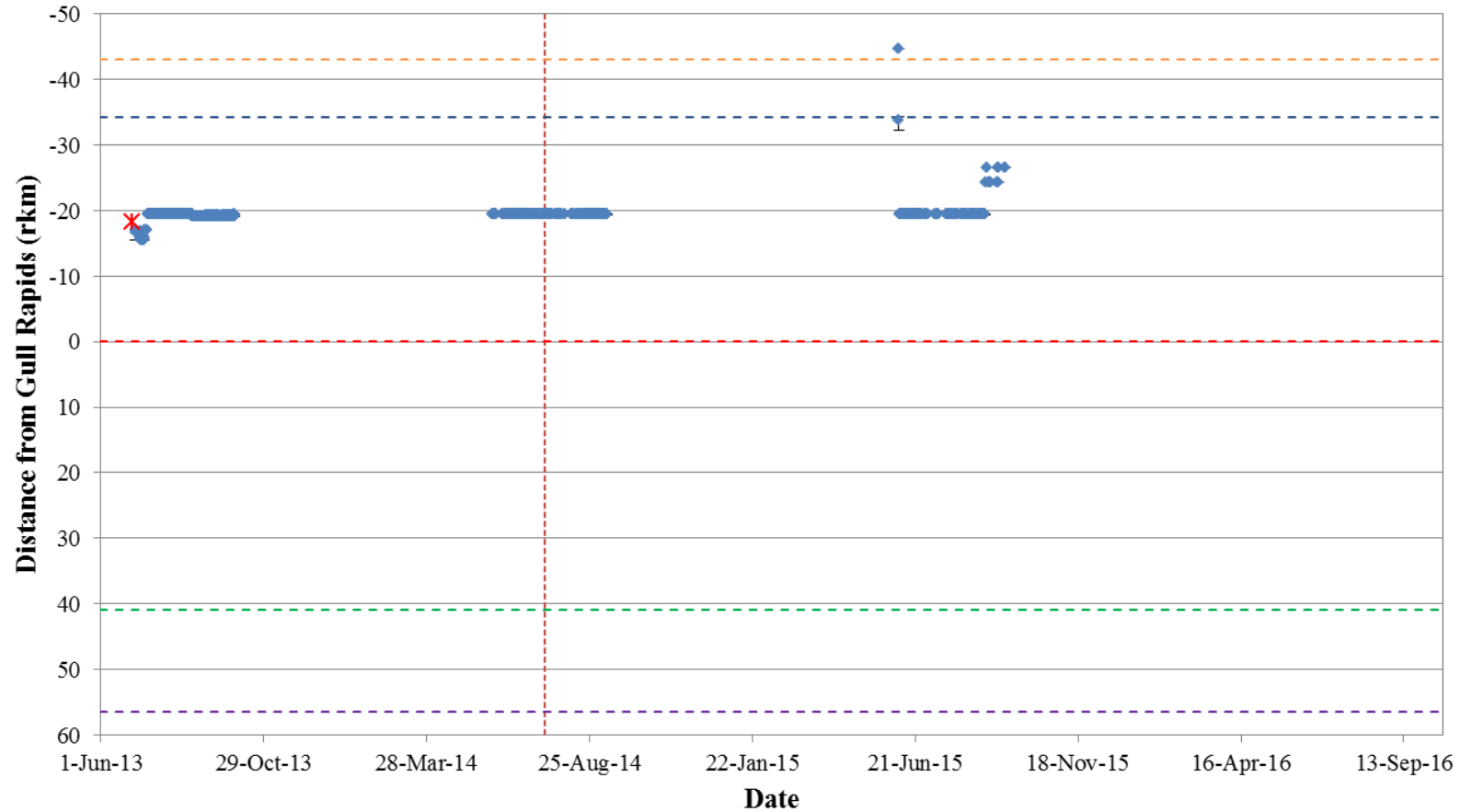


Figure A2-9: Position of a Walleye tagged with an acoustic transmitter (code #32857) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

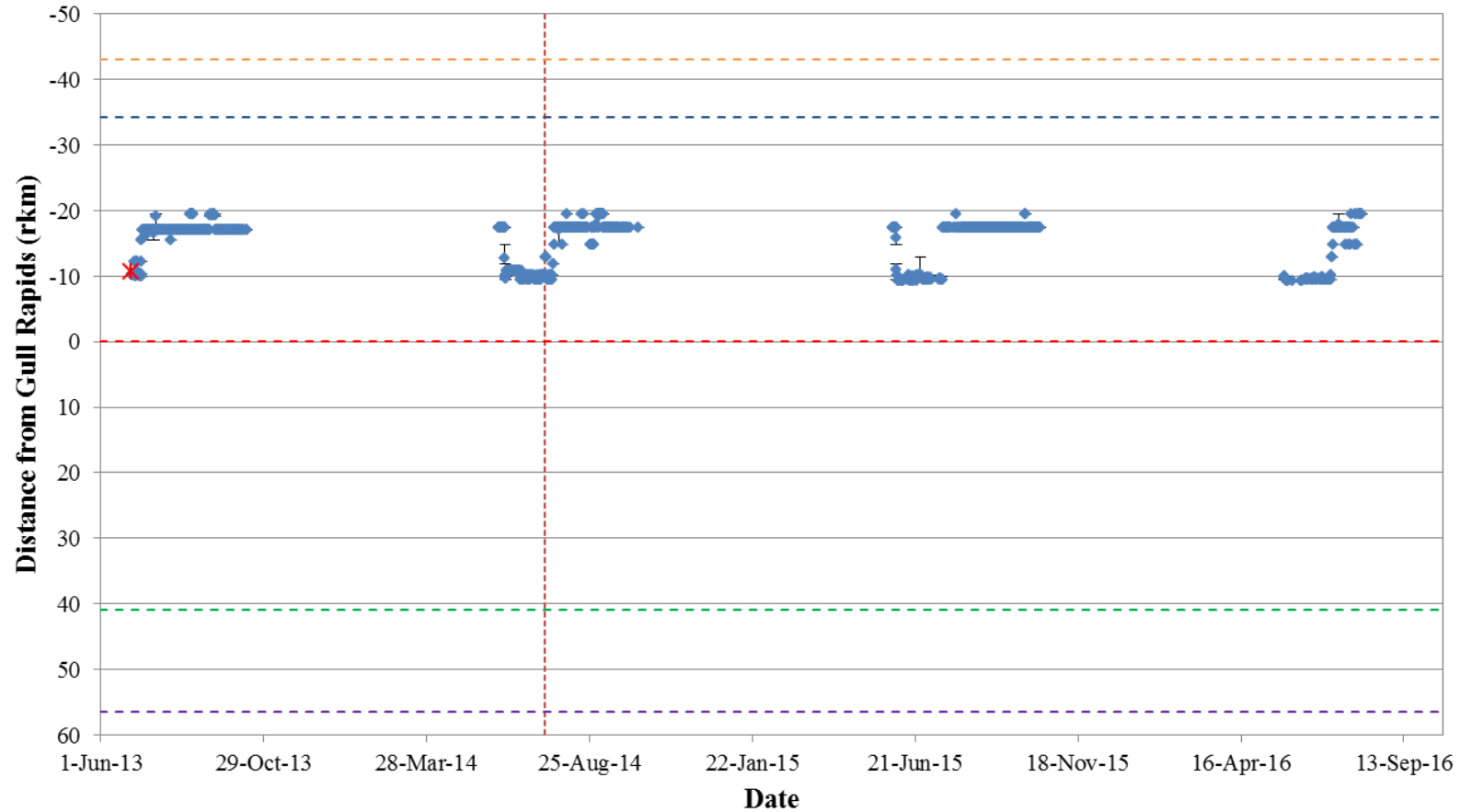


Figure A2-10: Position of a Walleye tagged with an acoustic transmitter (code #32858) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

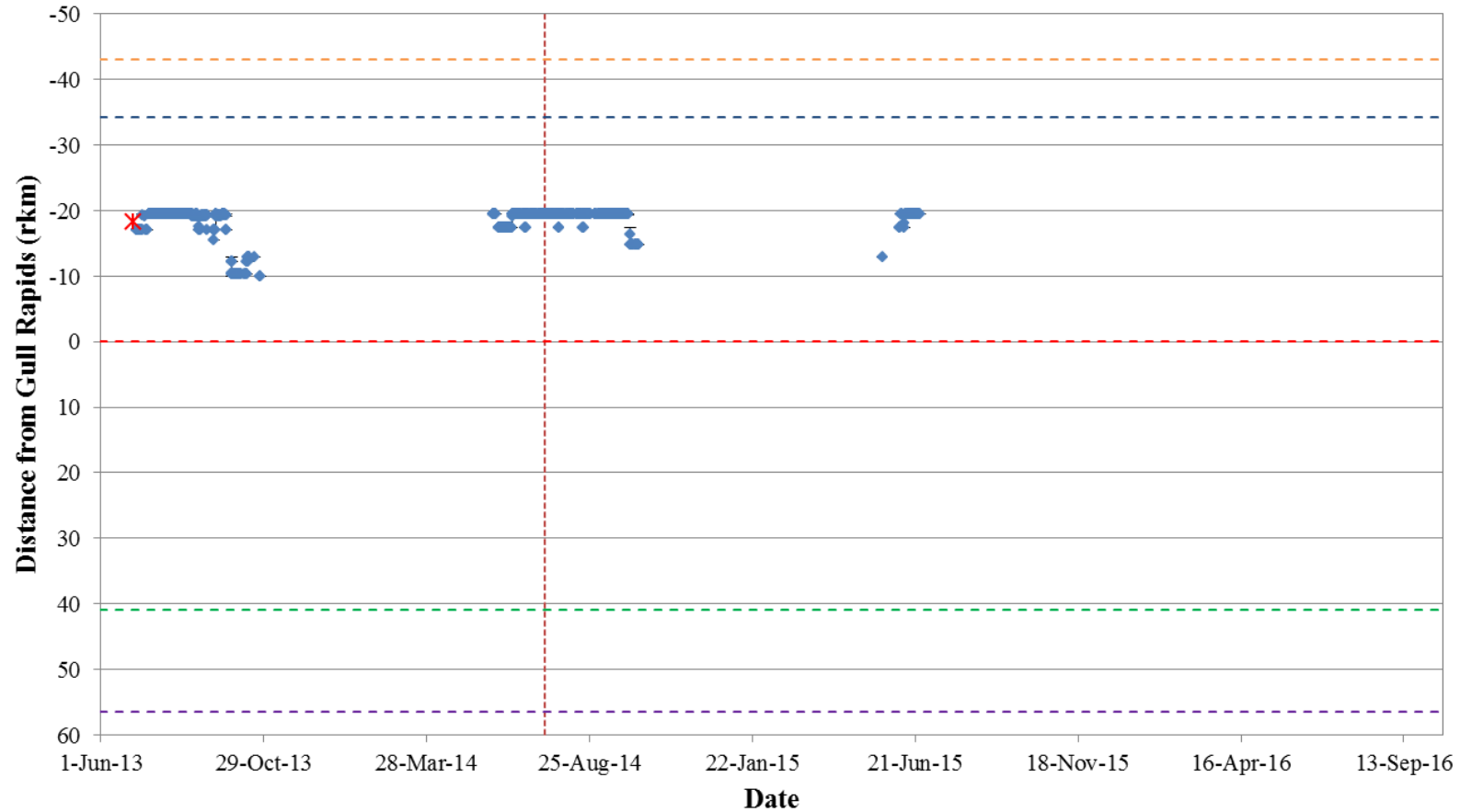


Figure A2-11: Position of a Walleye tagged with an acoustic transmitter (code #32861) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

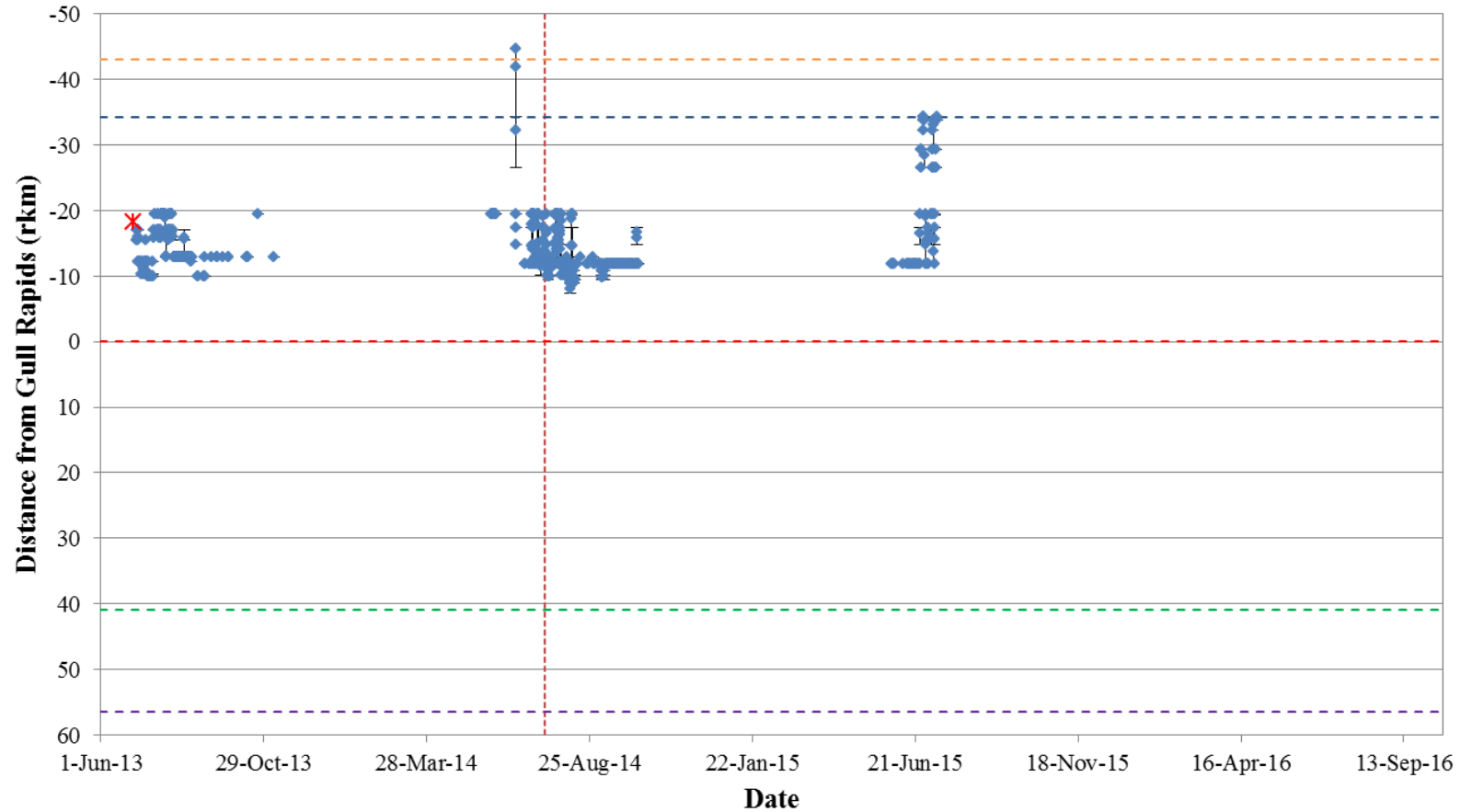


Figure A2-12: Position of a Walleye tagged with an acoustic transmitter (code #32862) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

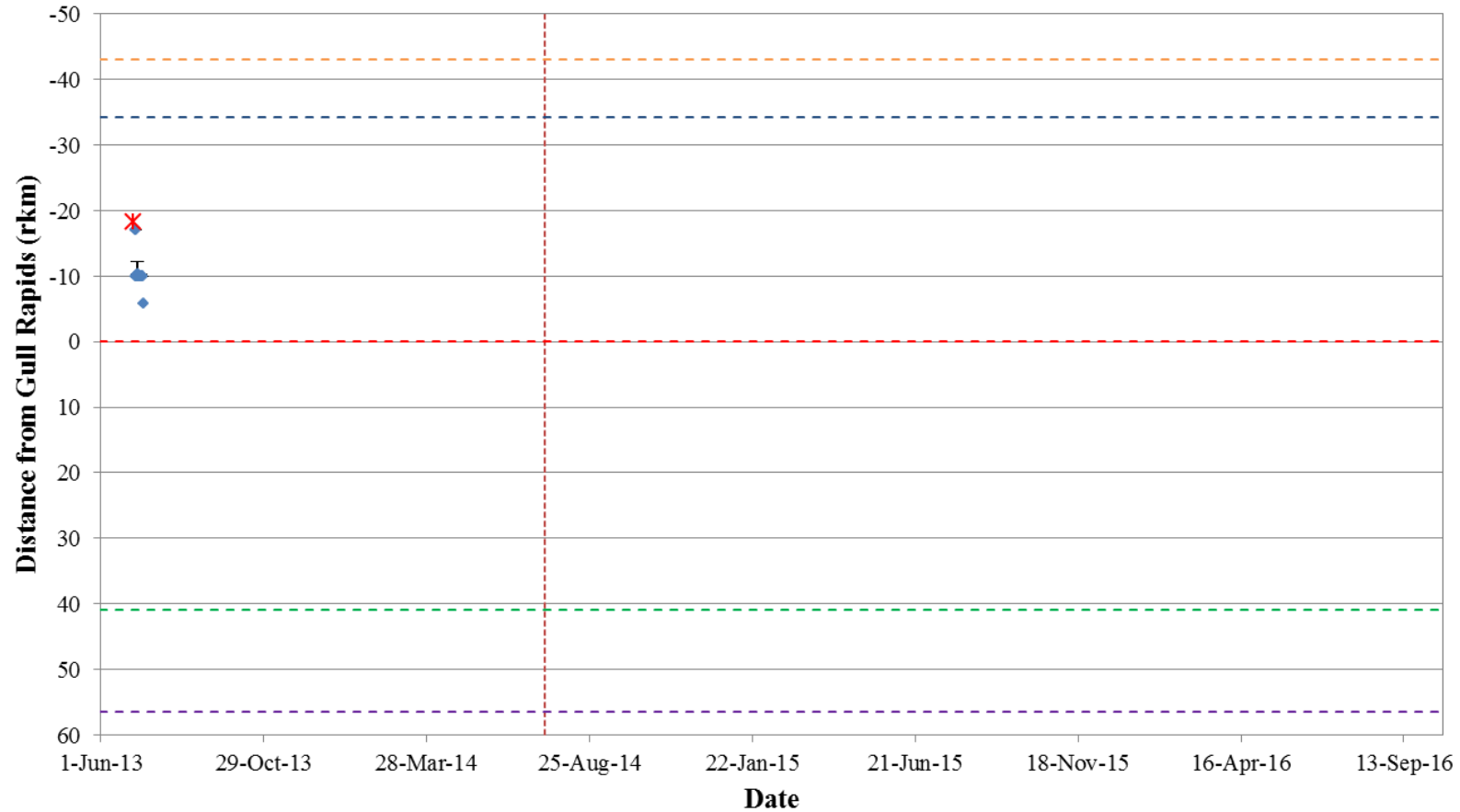


Figure A2-13: Position of a Walleye tagged with an acoustic transmitter (code #32863) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

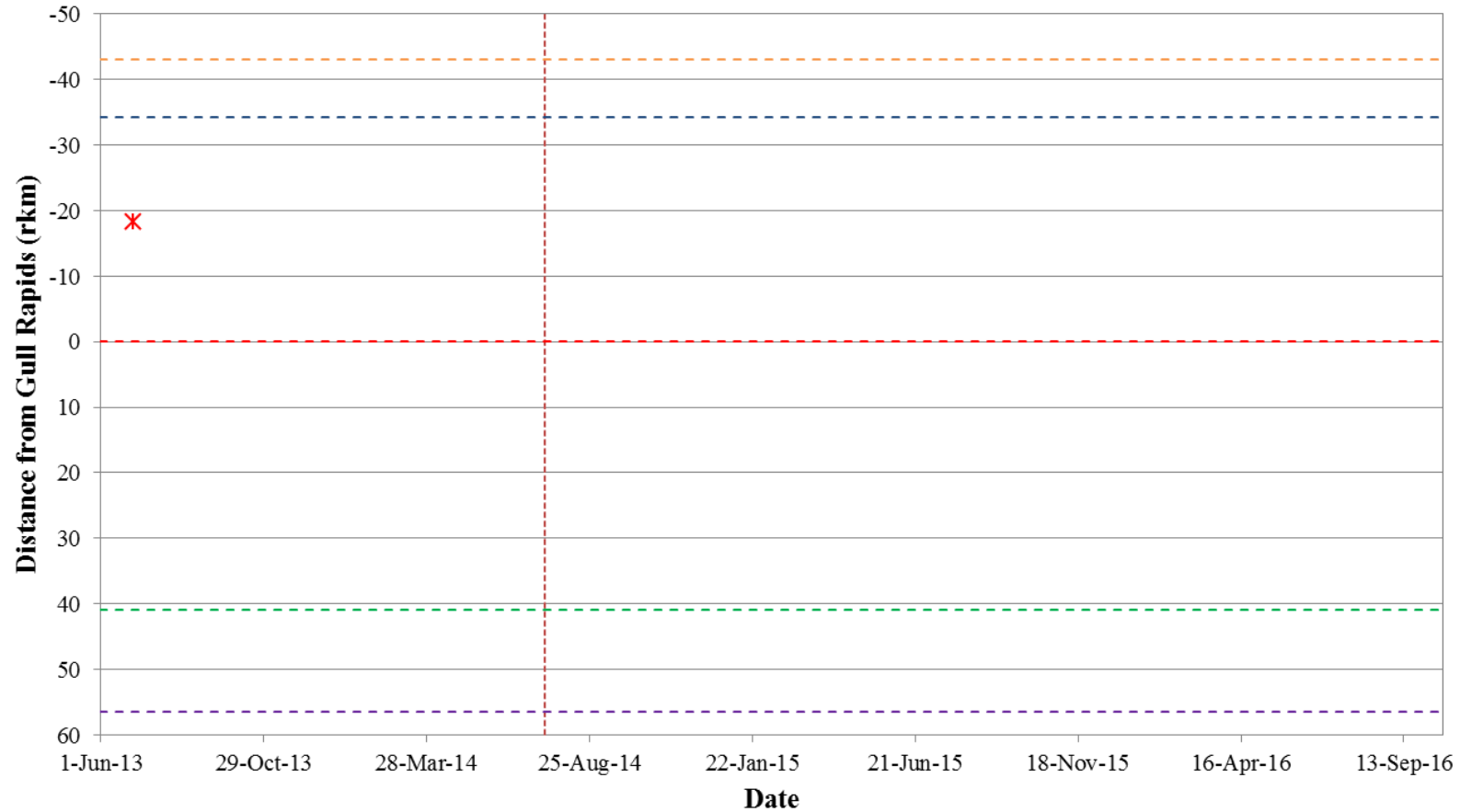


Figure A2-14: Position of a Walleye tagged with an acoustic transmitter (code #32864) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

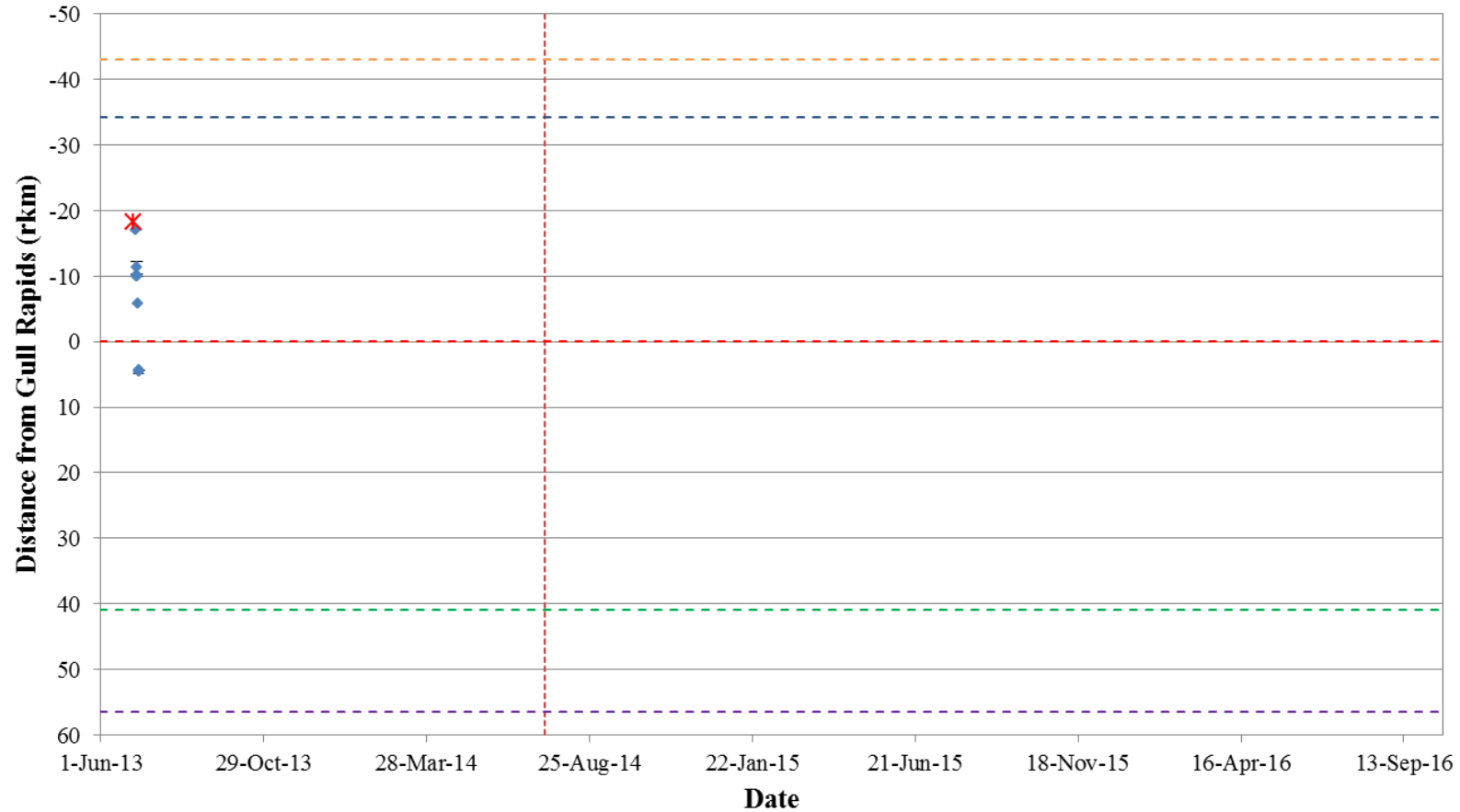


Figure A2-15: Position of a Walleye tagged with an acoustic transmitter (code #32865) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

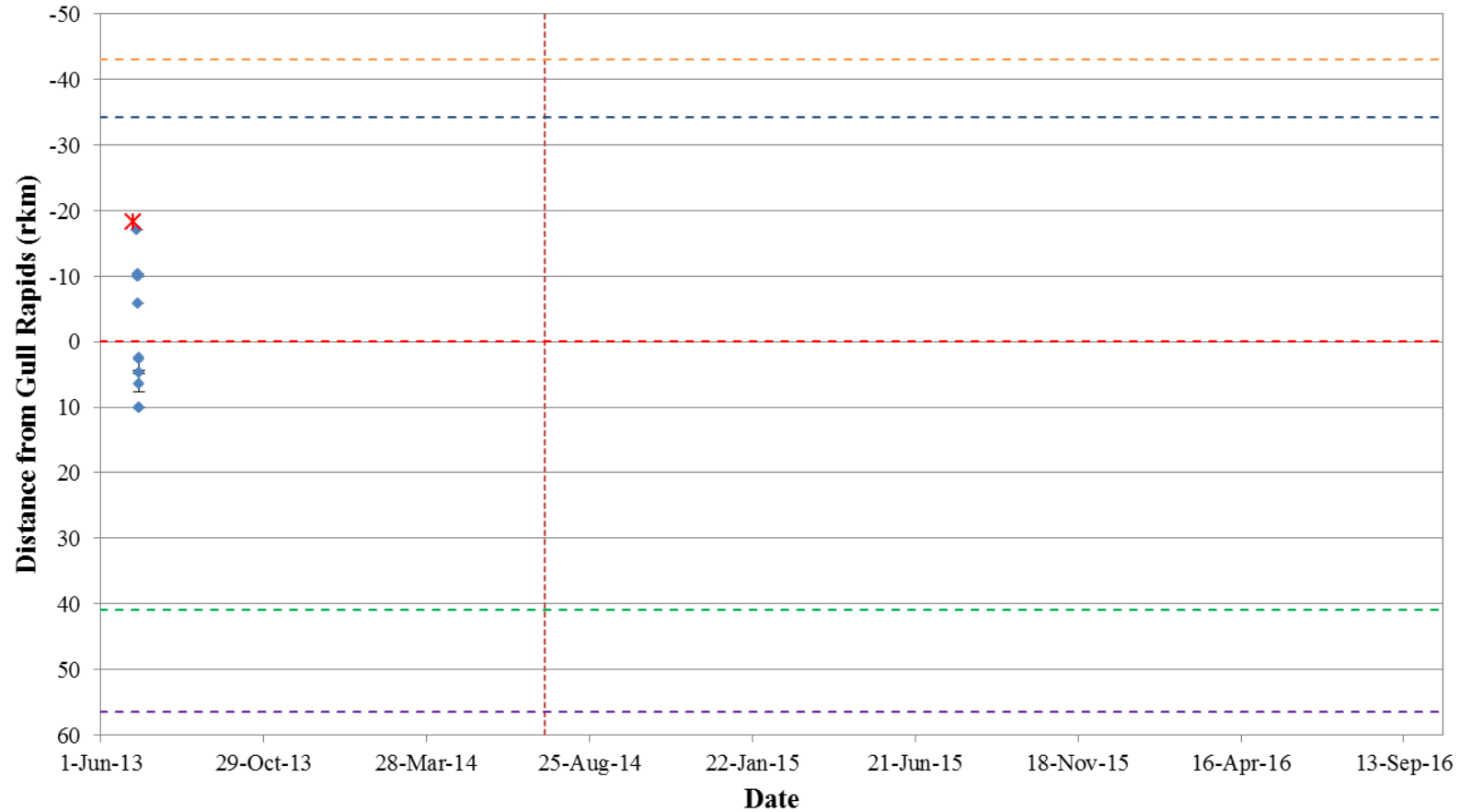


Figure A2-16: Position of a Walleye tagged with an acoustic transmitter (code #32866) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

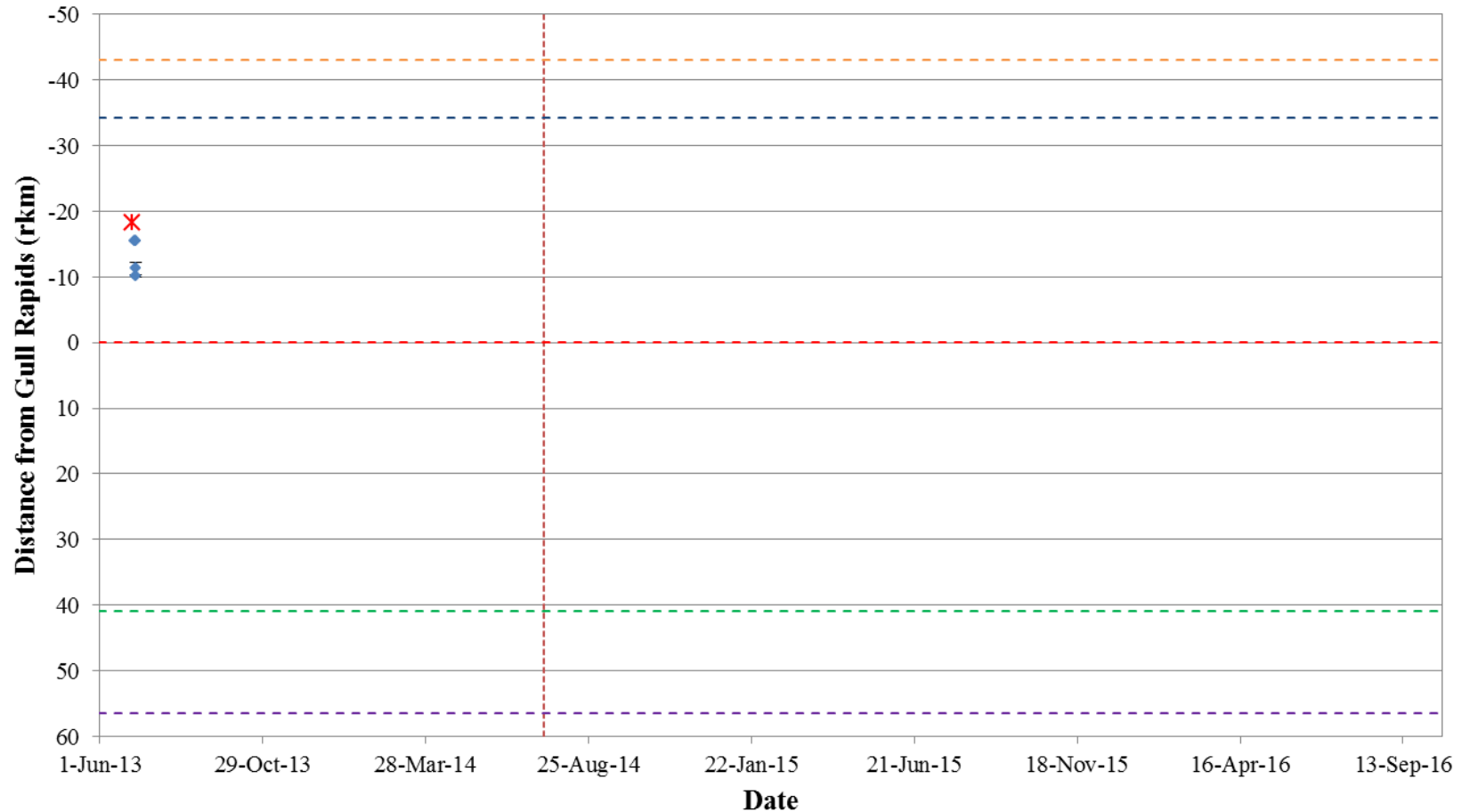


Figure A2-17: Position of a Walleye tagged with an acoustic transmitter (code #32867) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

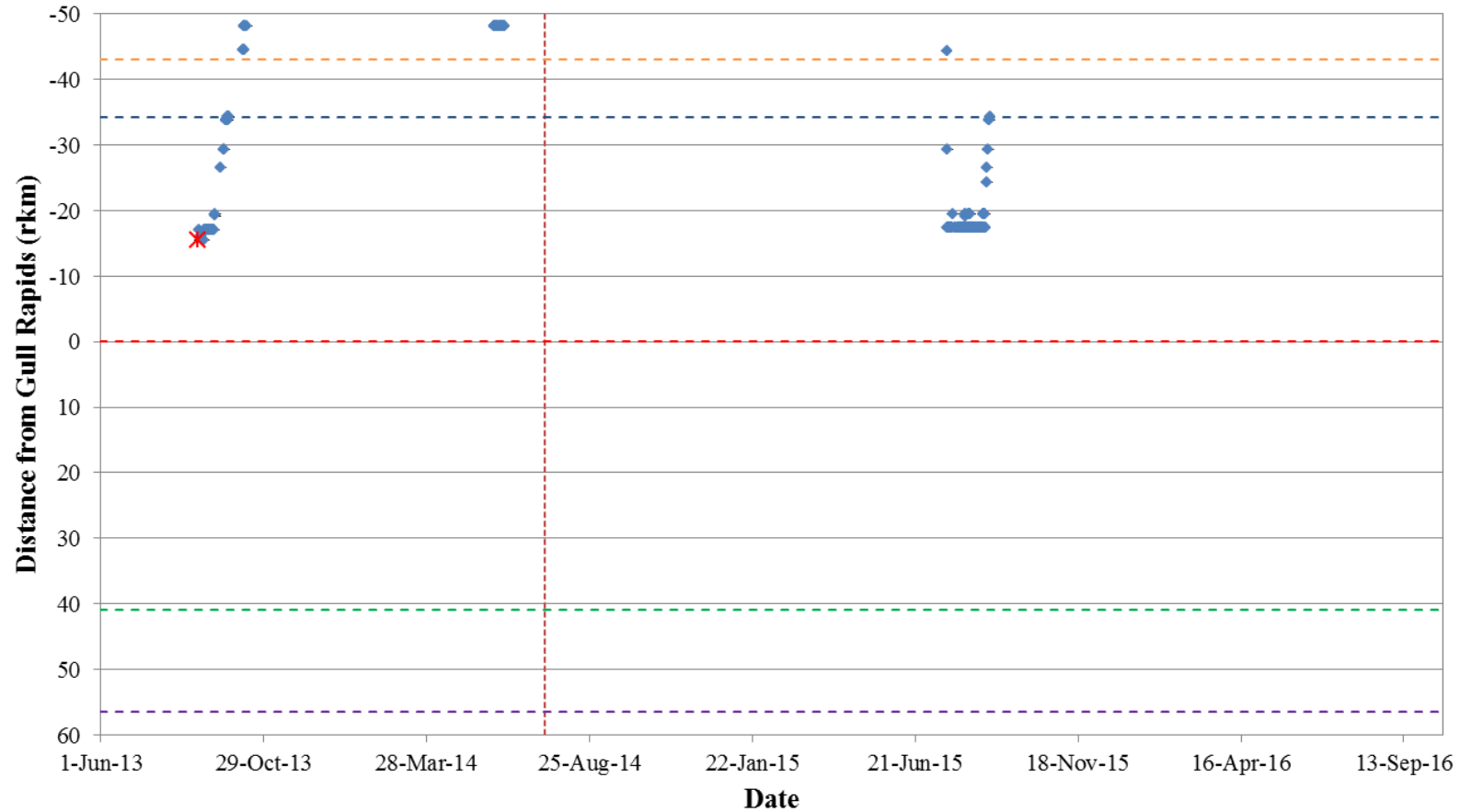


Figure A2-18: Position of a Walleye tagged with an acoustic transmitter (code #32868) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

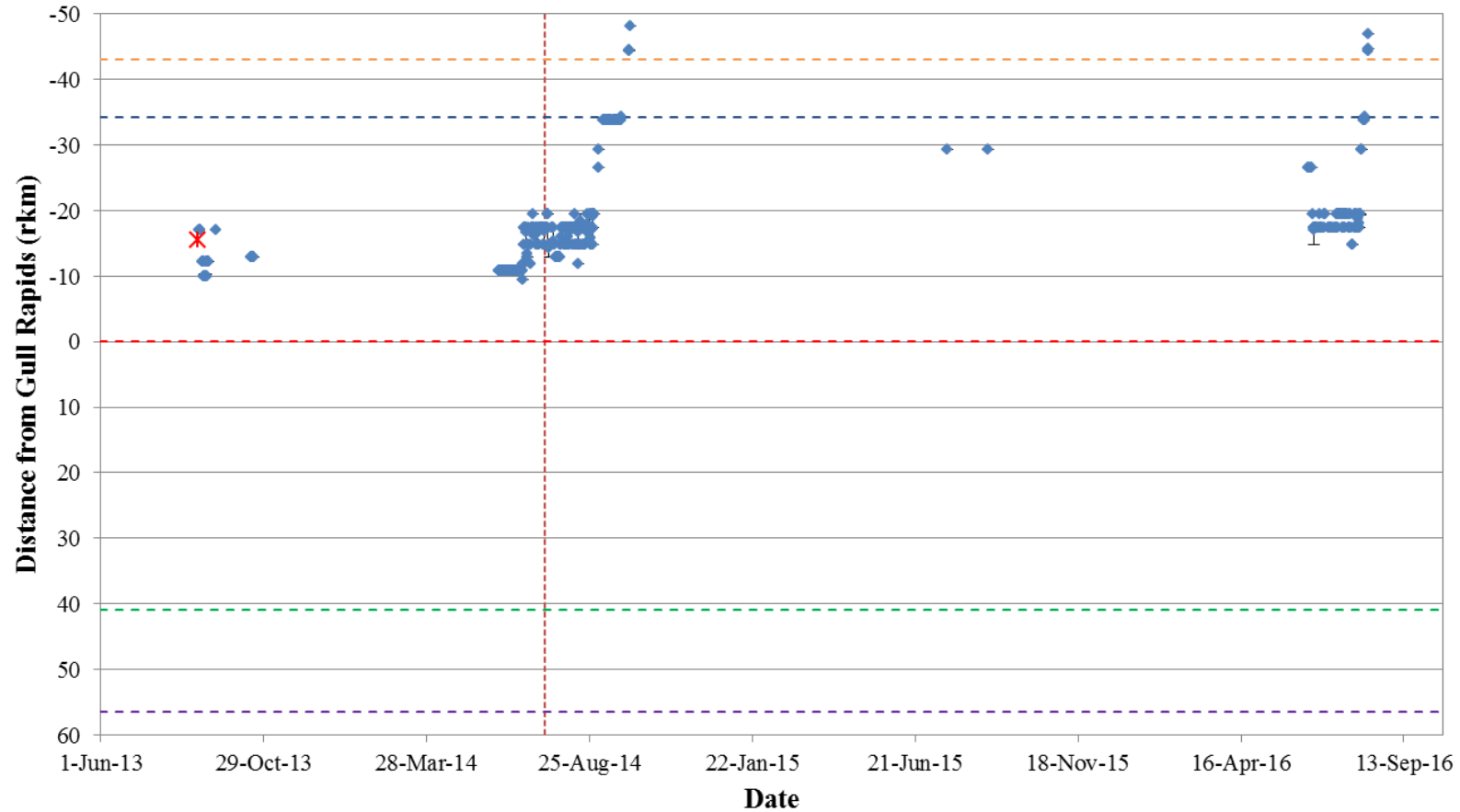


Figure A2-19: Position of a Walleye tagged with an acoustic transmitter (code #32869) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

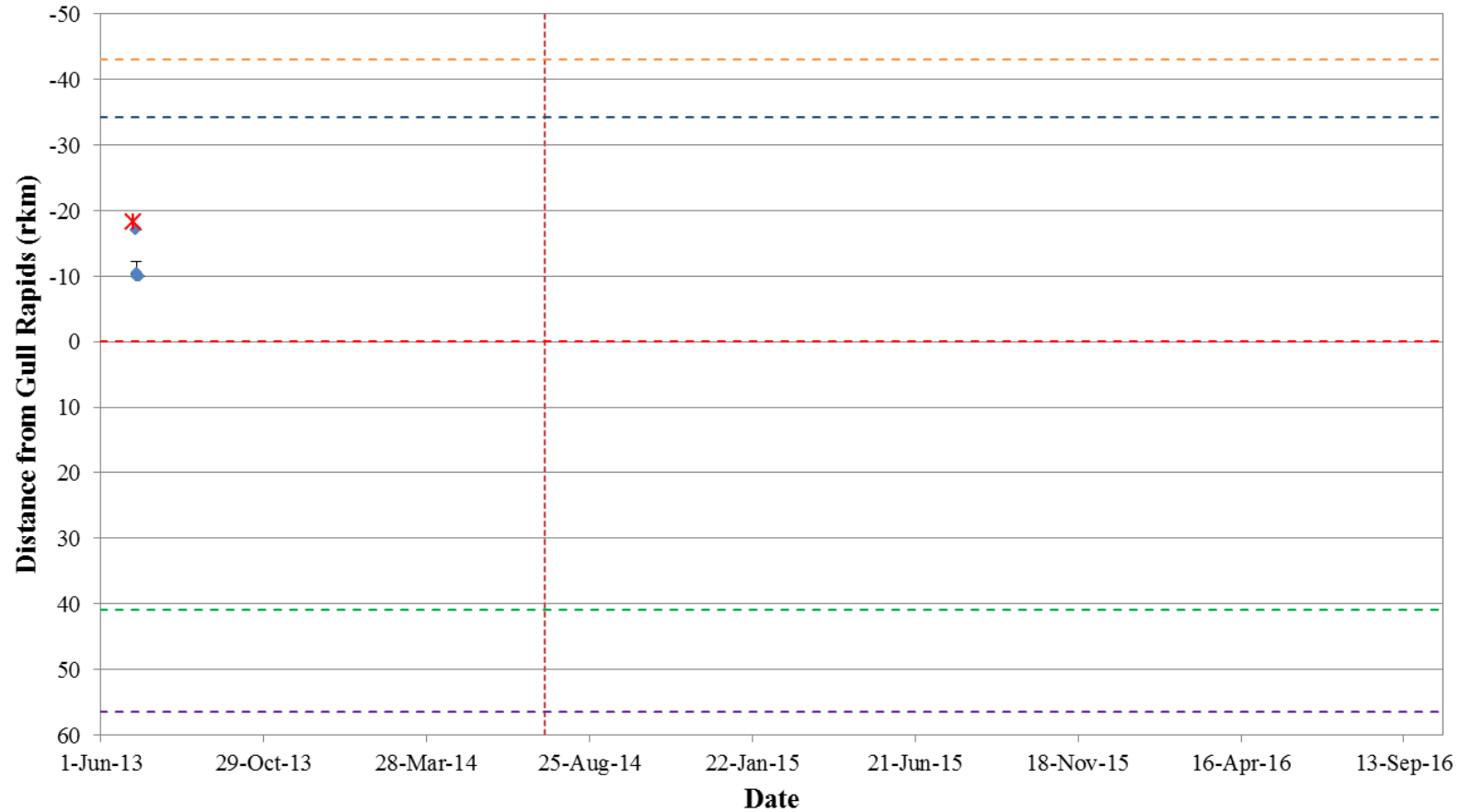


Figure A2-20: Position of a Walleye tagged with an acoustic transmitter (code #32870) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

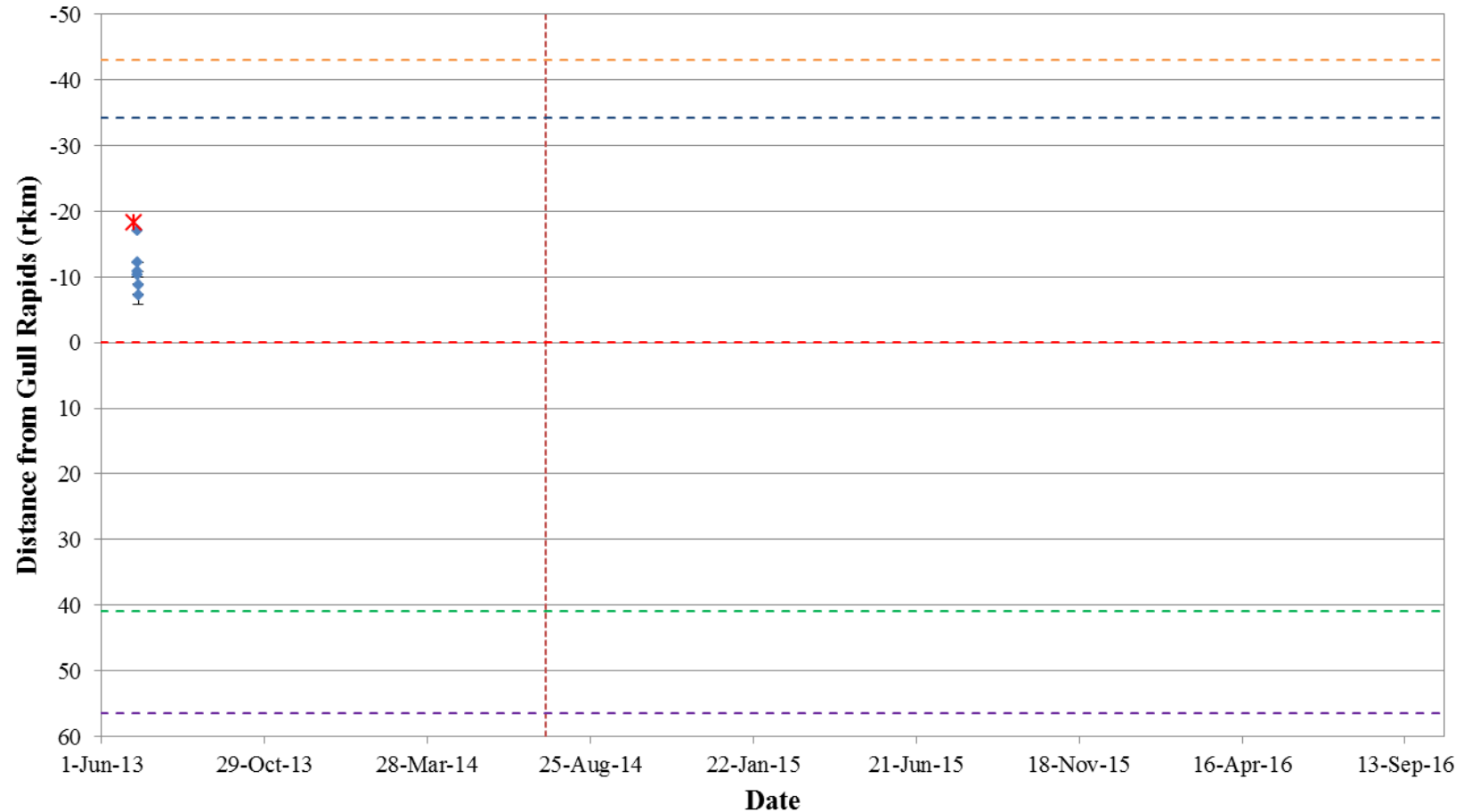


Figure A2-21: Position of a Walleye tagged with an acoustic transmitter (code #32871) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

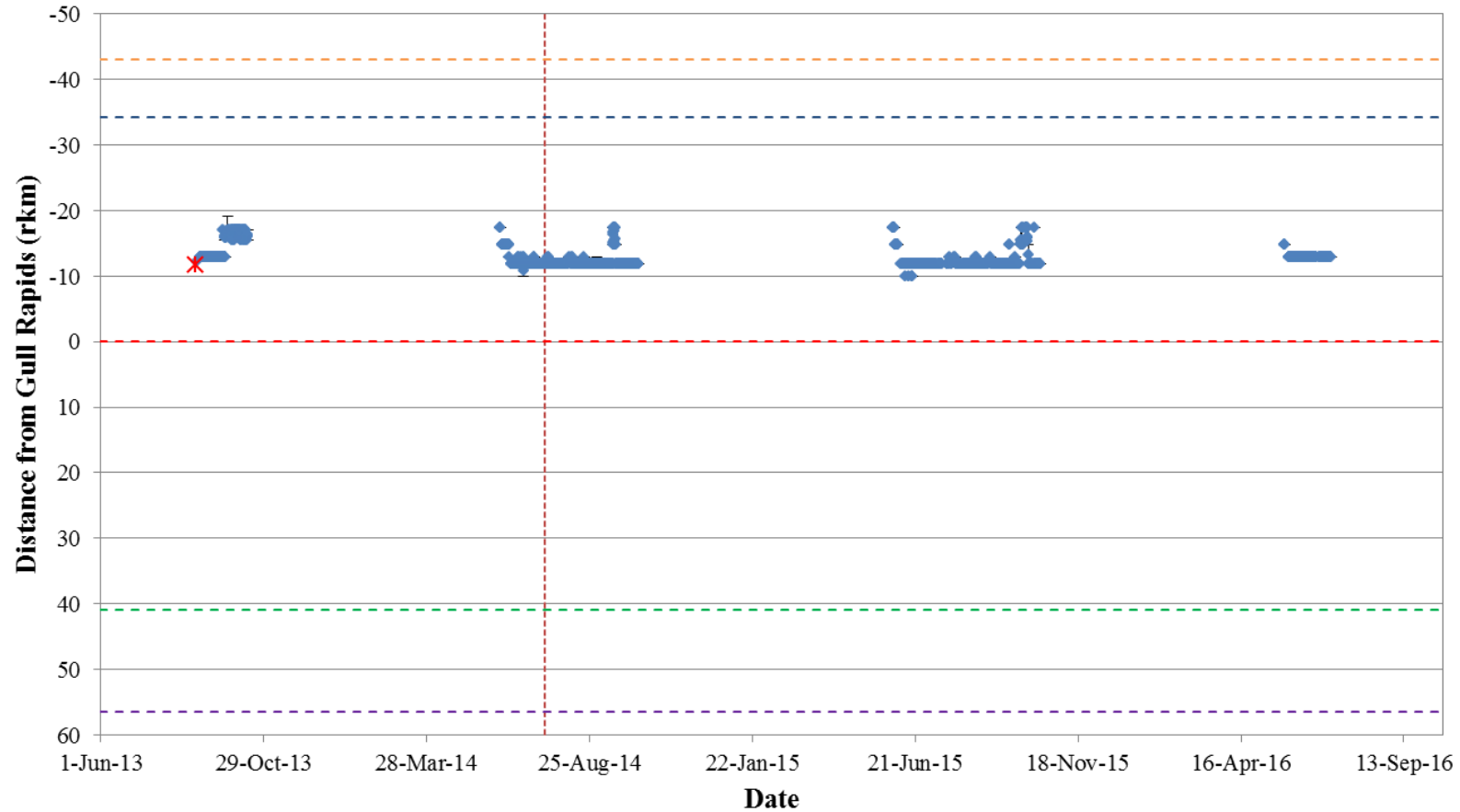


Figure A2-22: Position of a Walleye tagged with an acoustic transmitter (code #32872) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

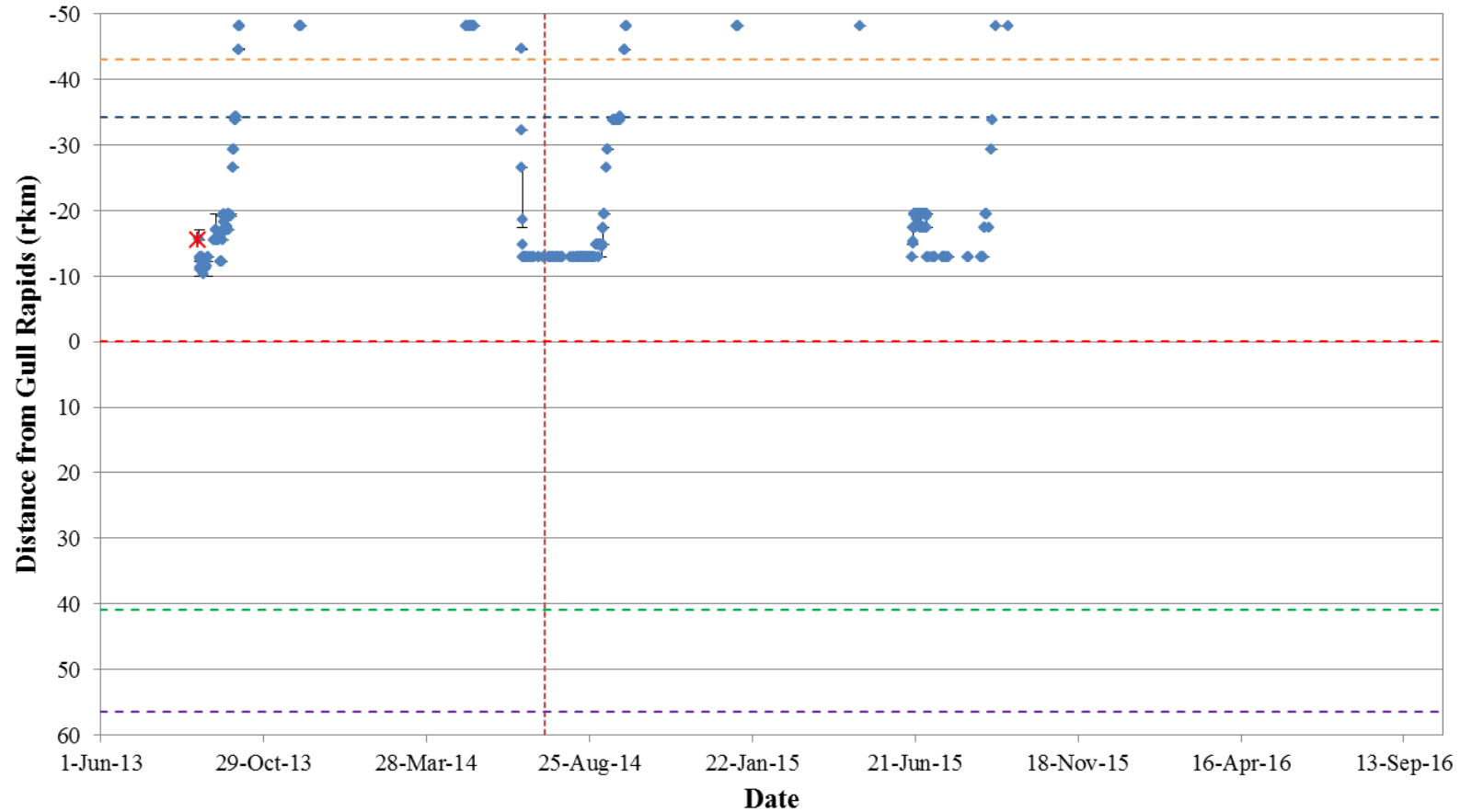


Figure A2-23: Position of a Walleye tagged with an acoustic transmitter (code #32873) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

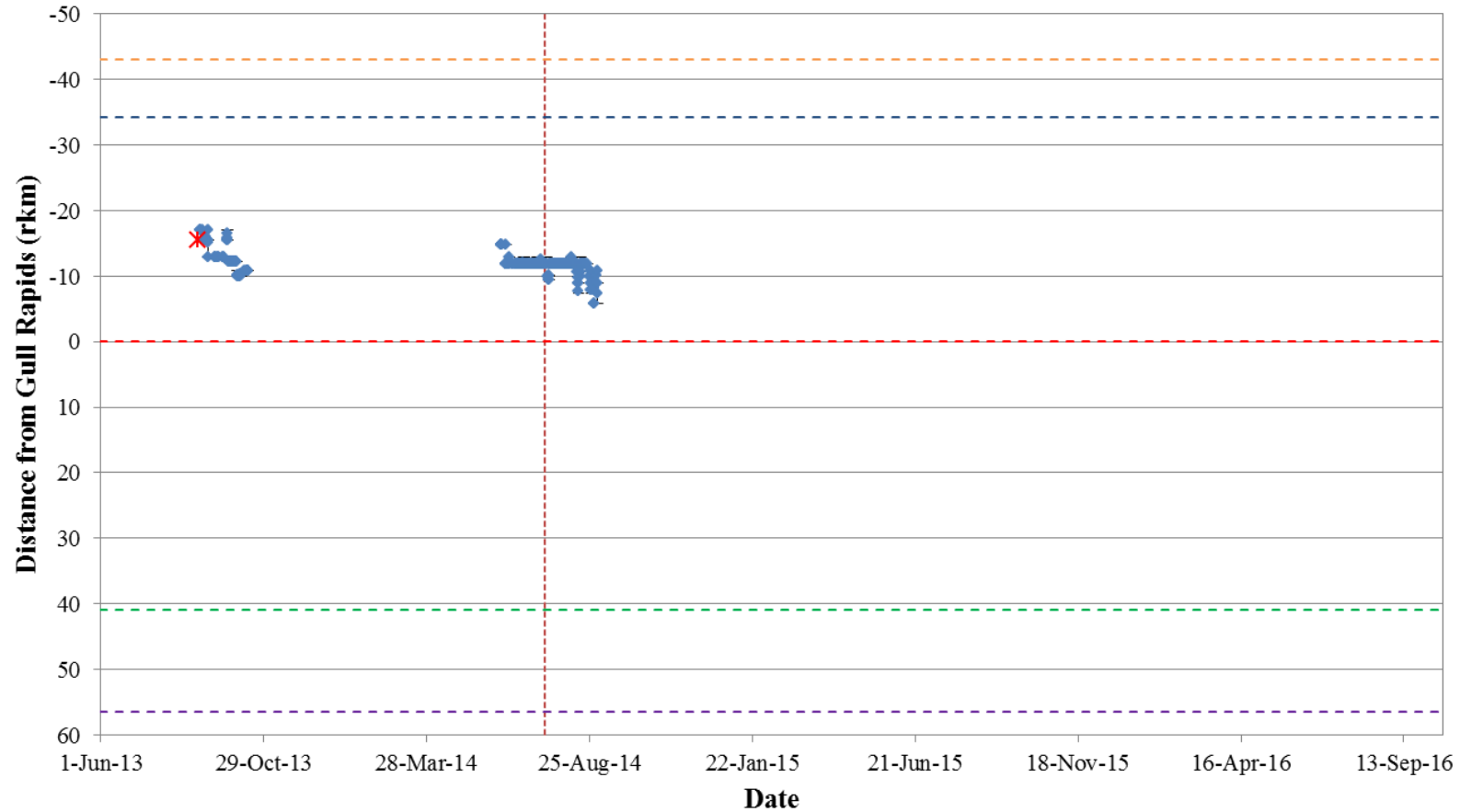


Figure A2-24: Position of a Walleye tagged with an acoustic transmitter (code #32874) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

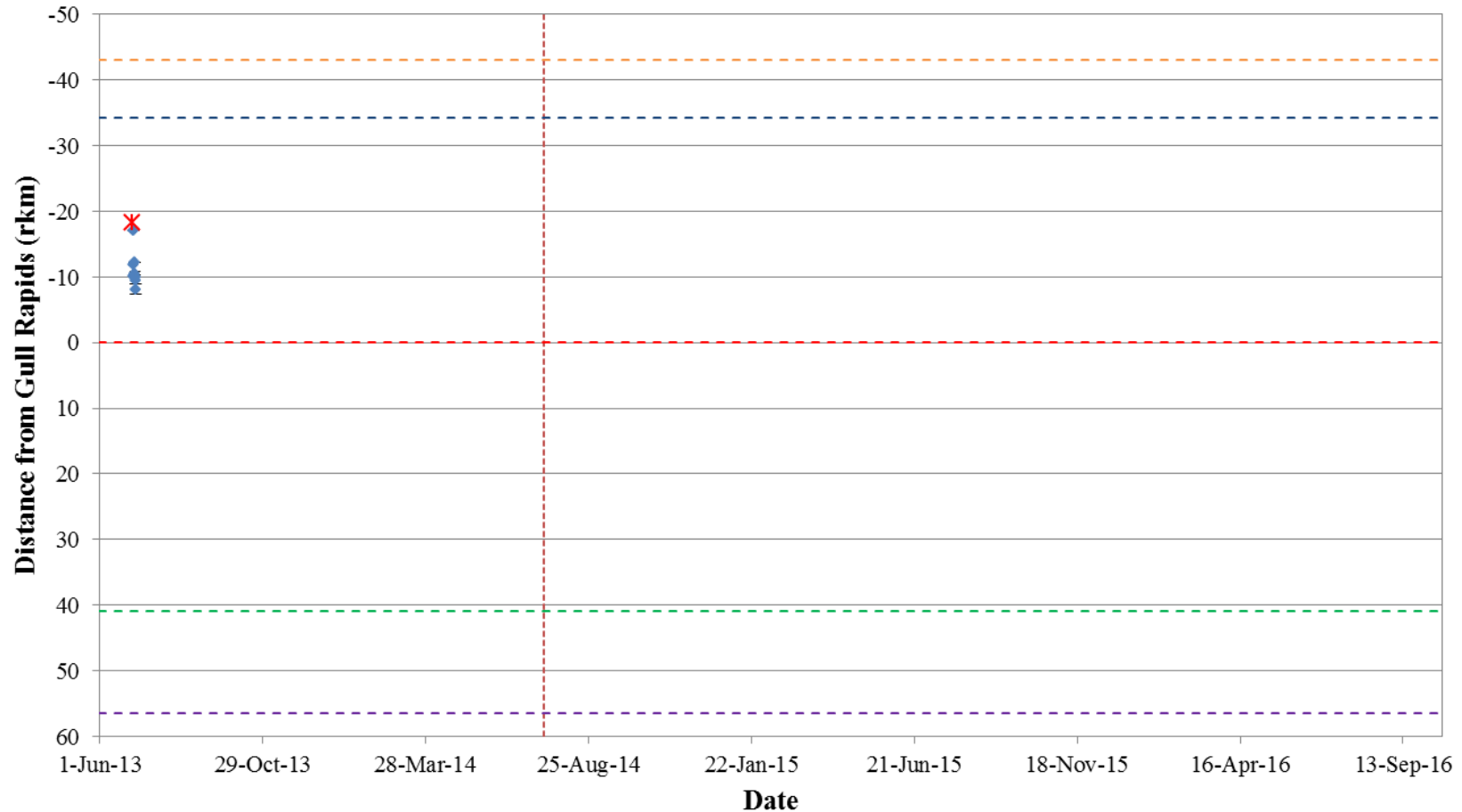


Figure A2-25: Position of a Walleye tagged with an acoustic transmitter (code #32875) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

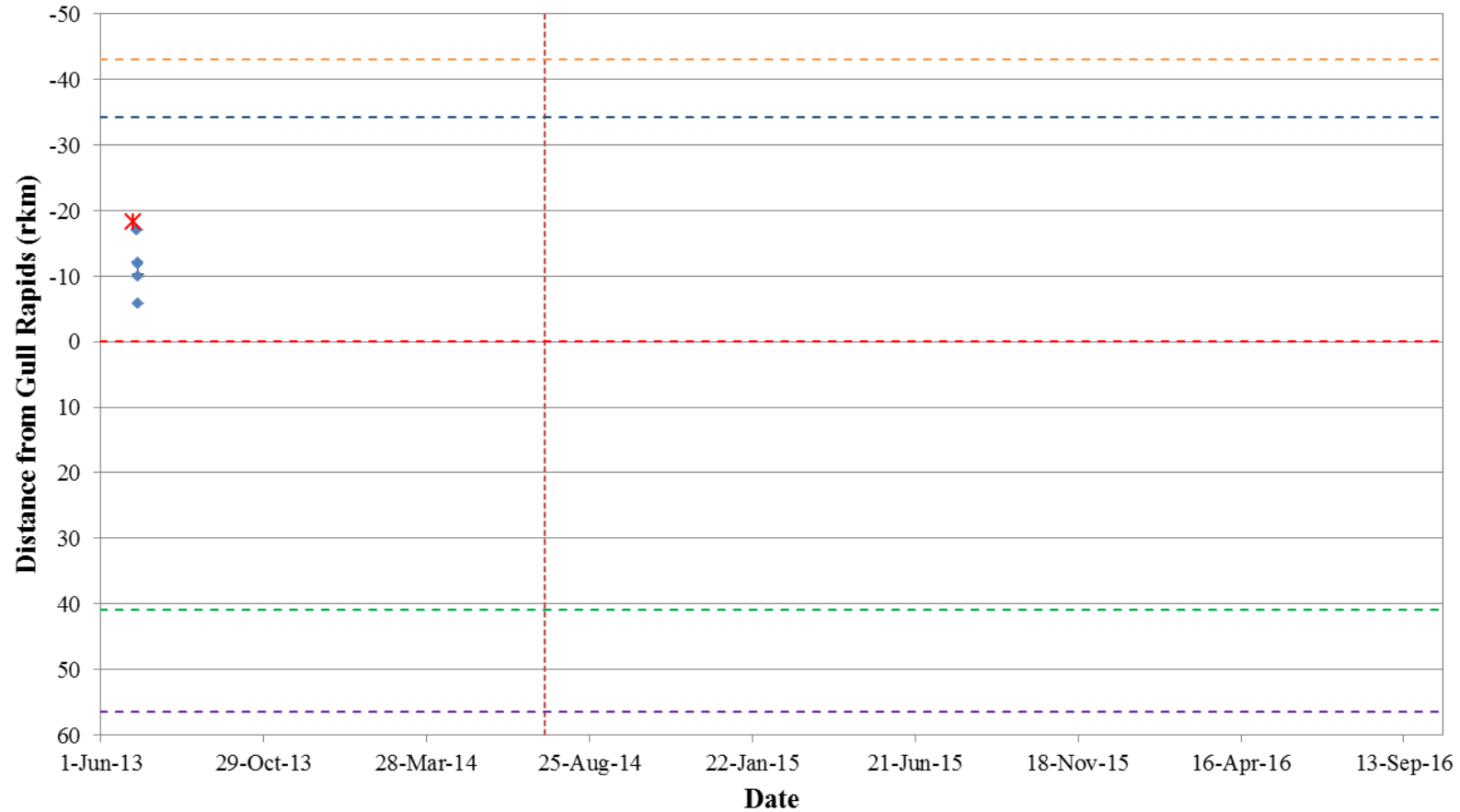


Figure A2-26: Position of a Walleye tagged with an acoustic transmitter (code #32876) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

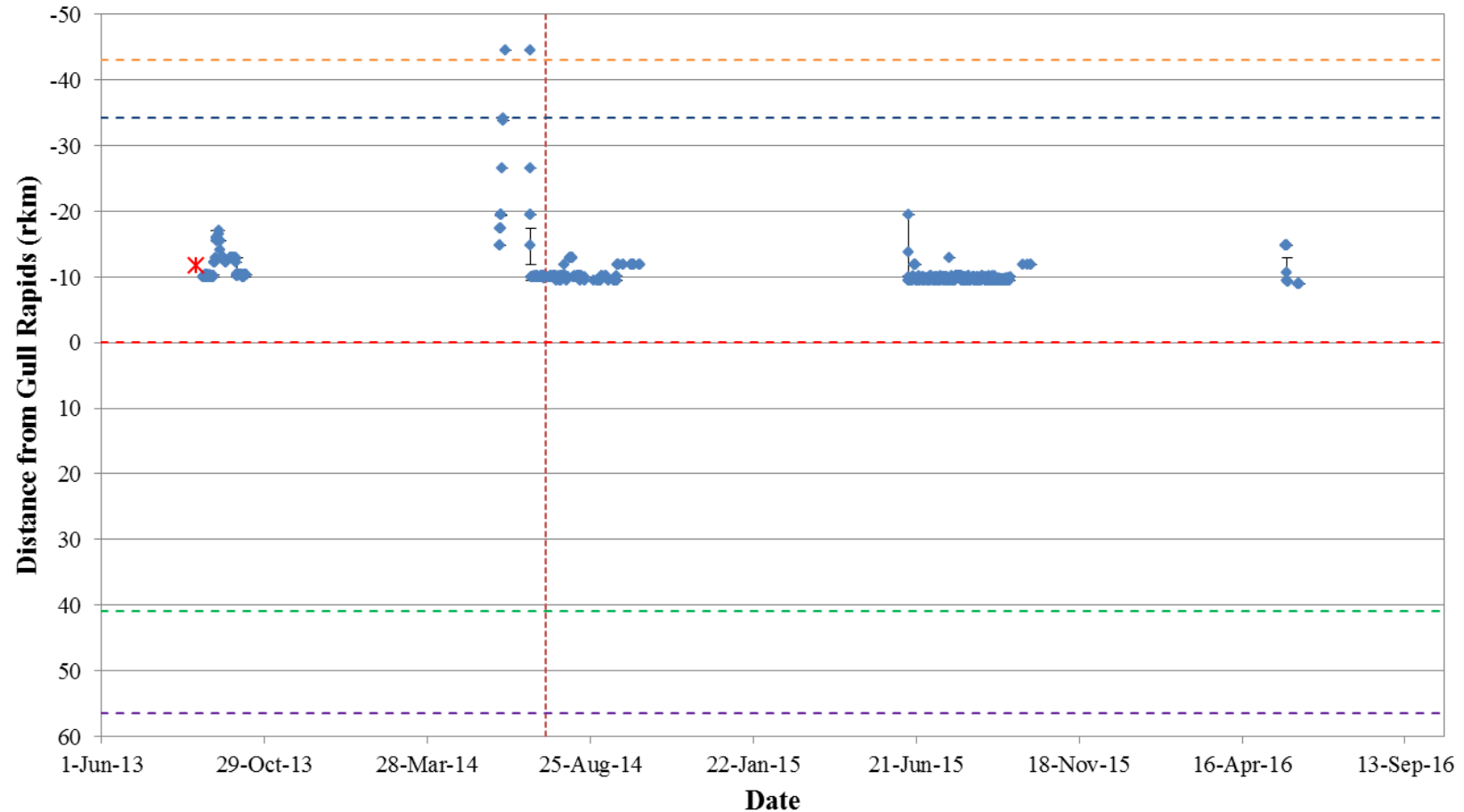


Figure A2-27: Position of a Walleye tagged with an acoustic transmitter (code #32877) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

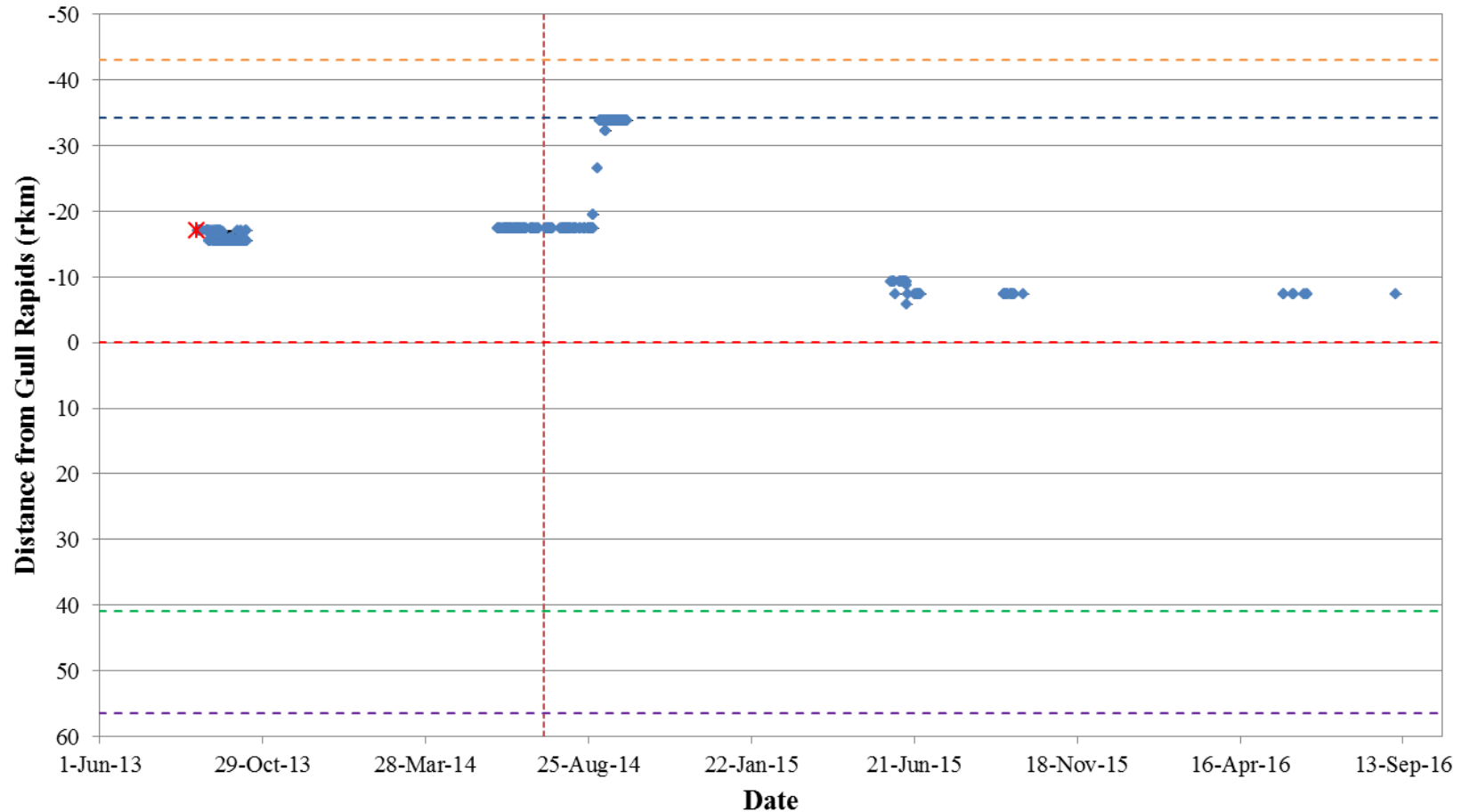
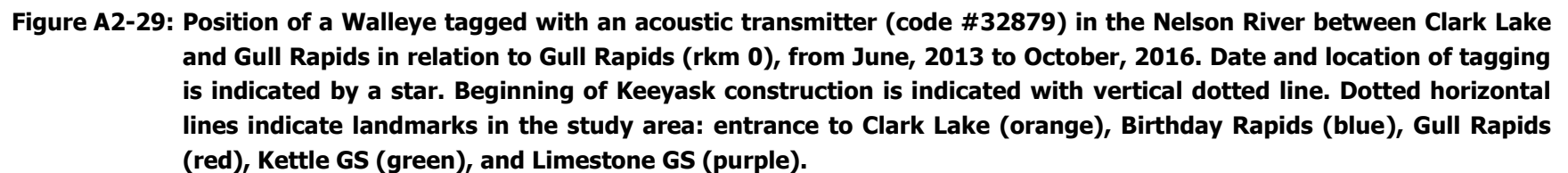


Figure A2-28: Position of a Walleye tagged with an acoustic transmitter (code #32878) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).



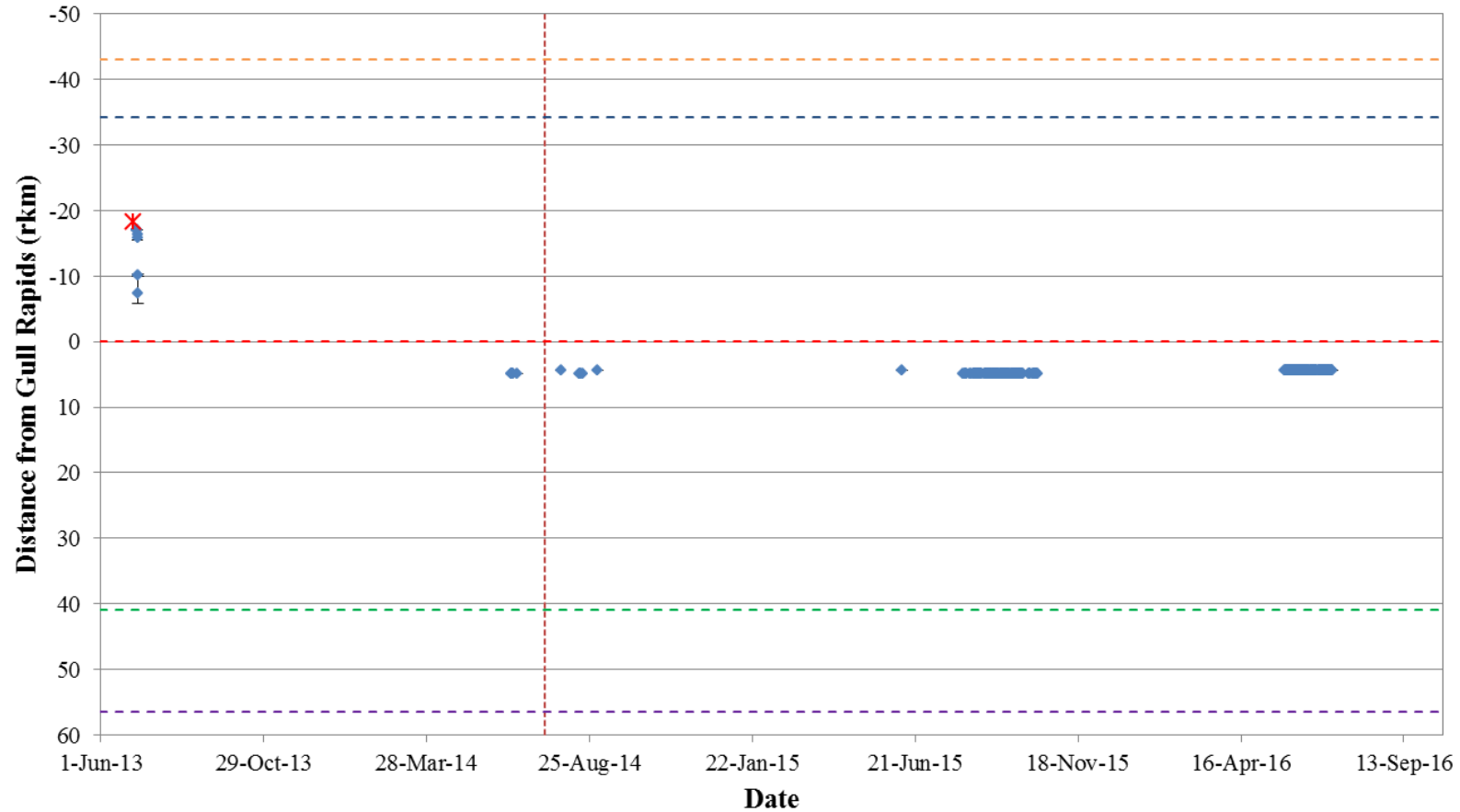
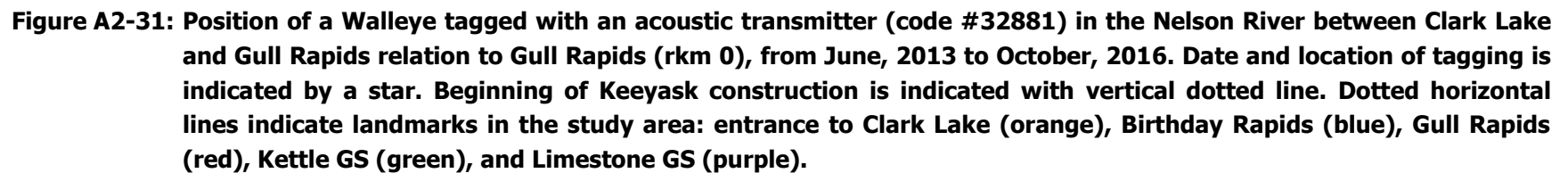


Figure A2-30: Position of a Walleye tagged with an acoustic transmitter (code #32880) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).



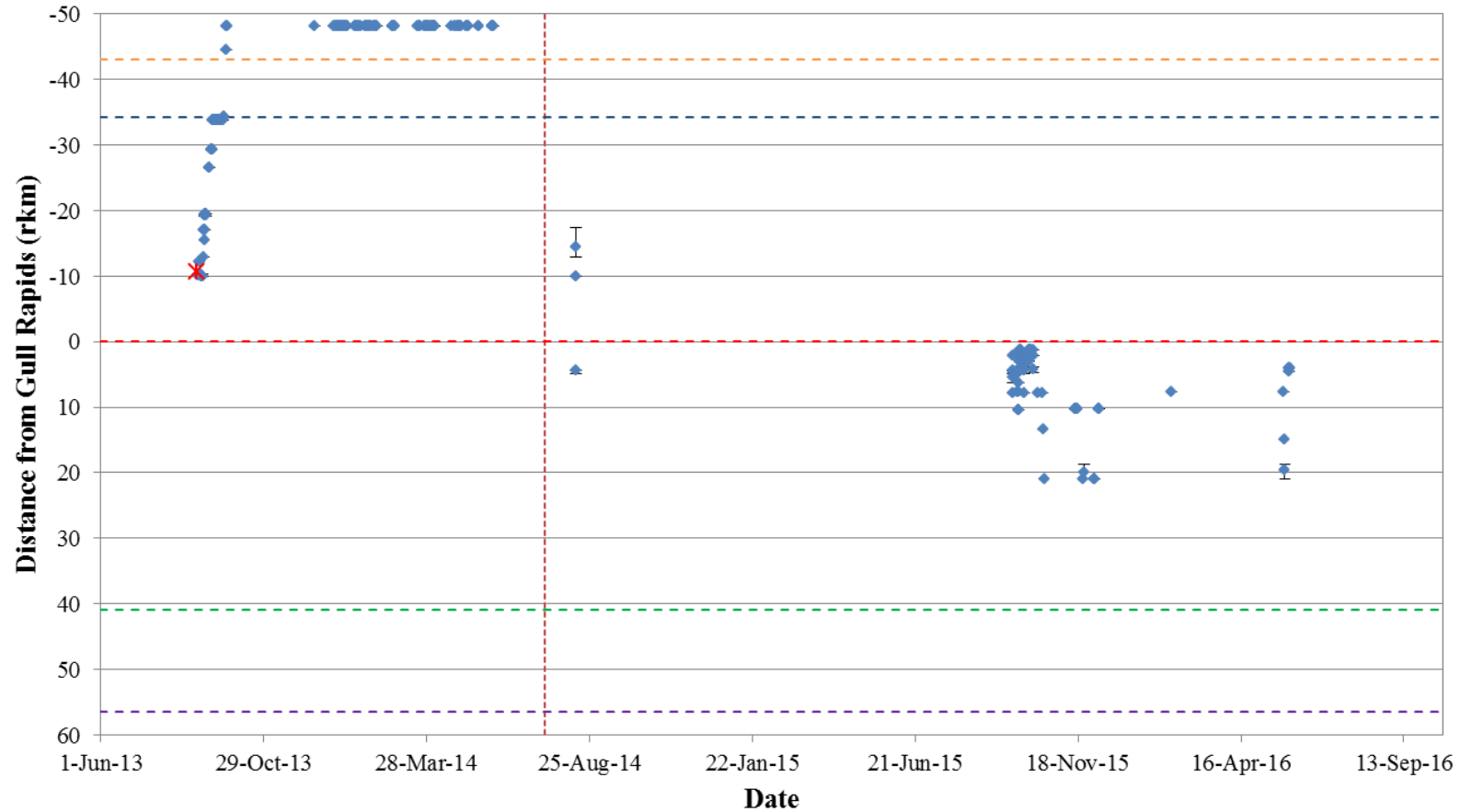


Figure A2-32: Position of a Walleye tagged with an acoustic transmitter (code #32882) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

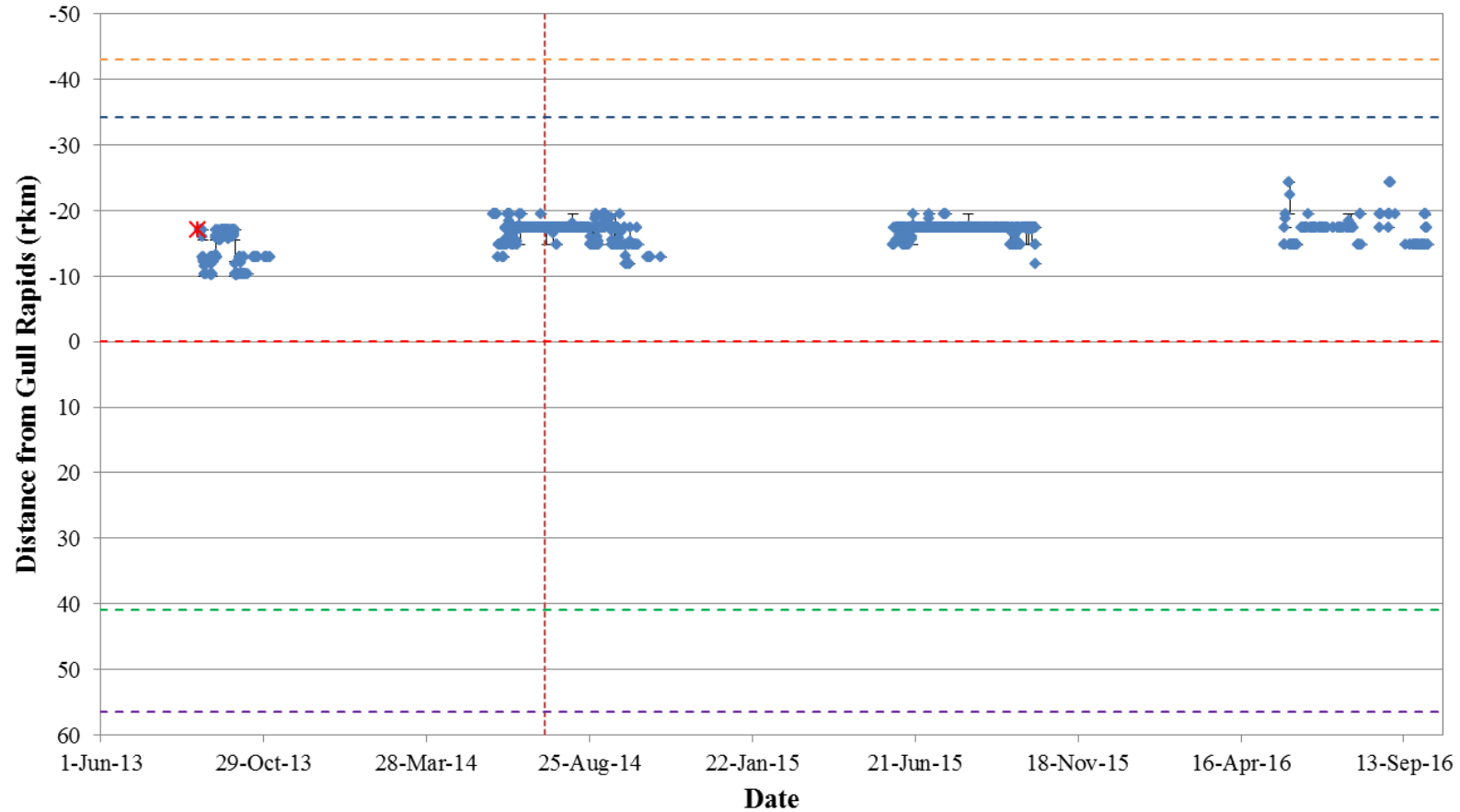


Figure A2-33: Position of a Walleye tagged with an acoustic transmitter (code #32883) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

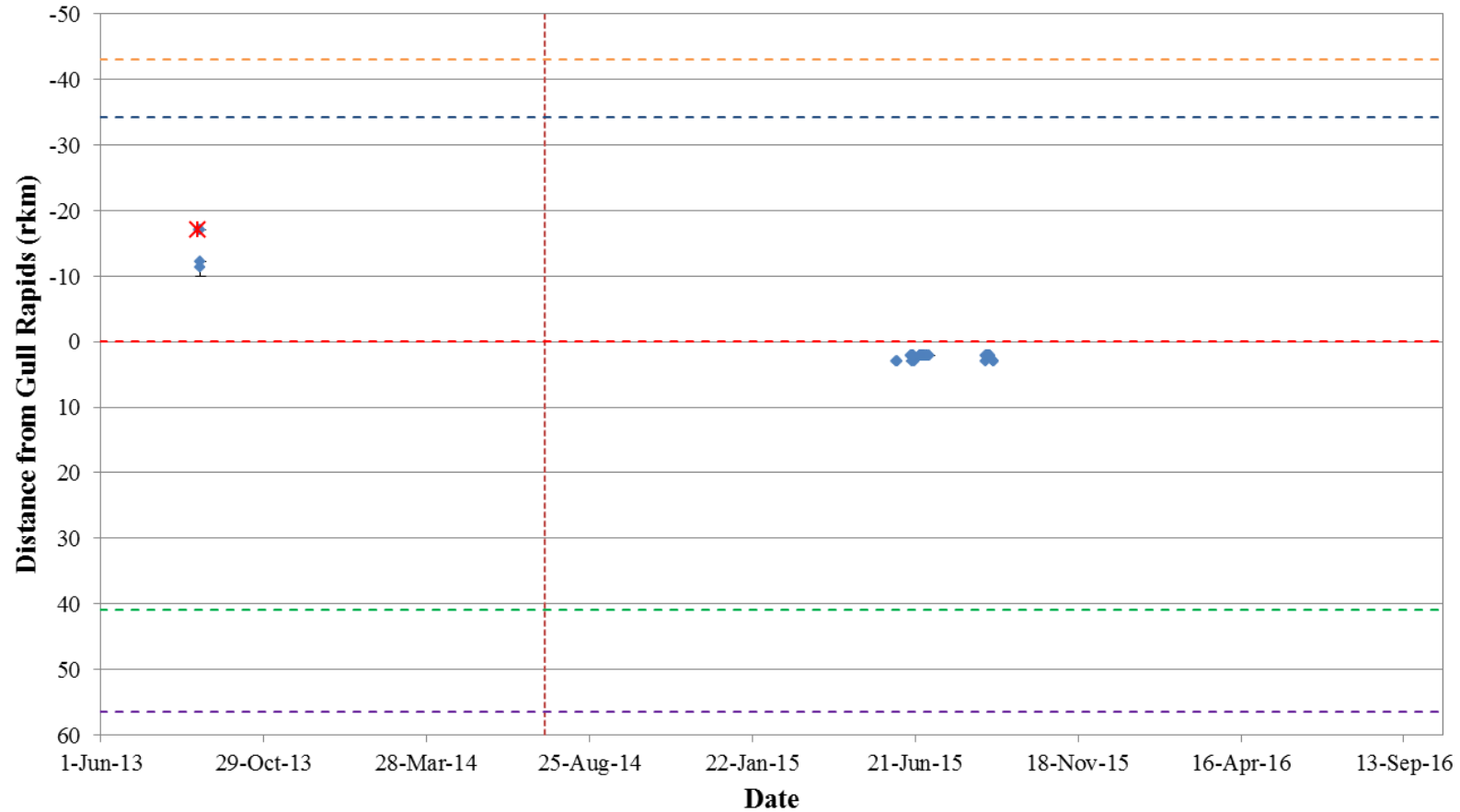


Figure A2-34: Position of a Walleye tagged with an acoustic transmitter (code #32884) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

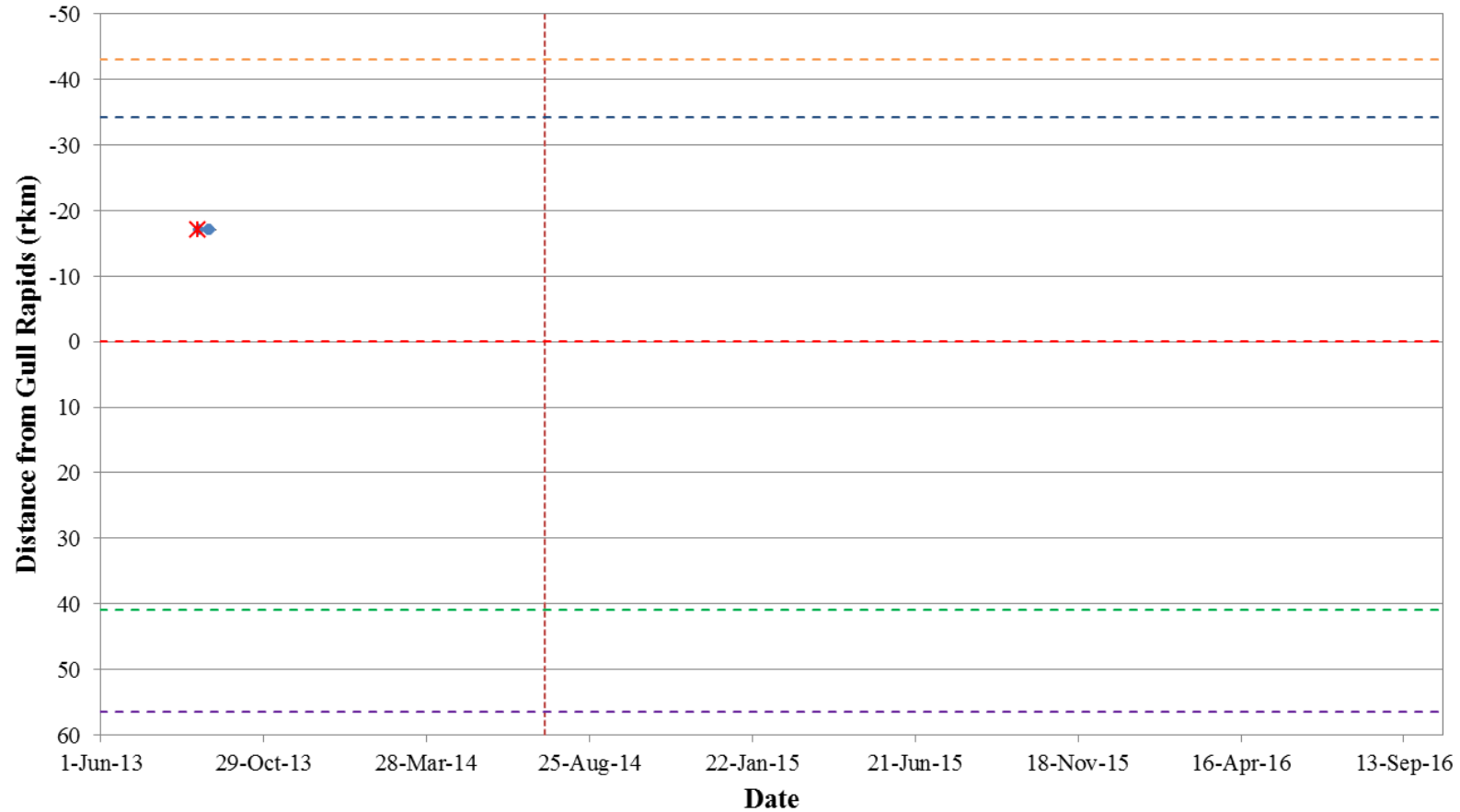


Figure A2-35: Position of a Walleye tagged with an acoustic transmitter (code #32885) in the Nelson River between Clark Lake and Gull Rapids relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

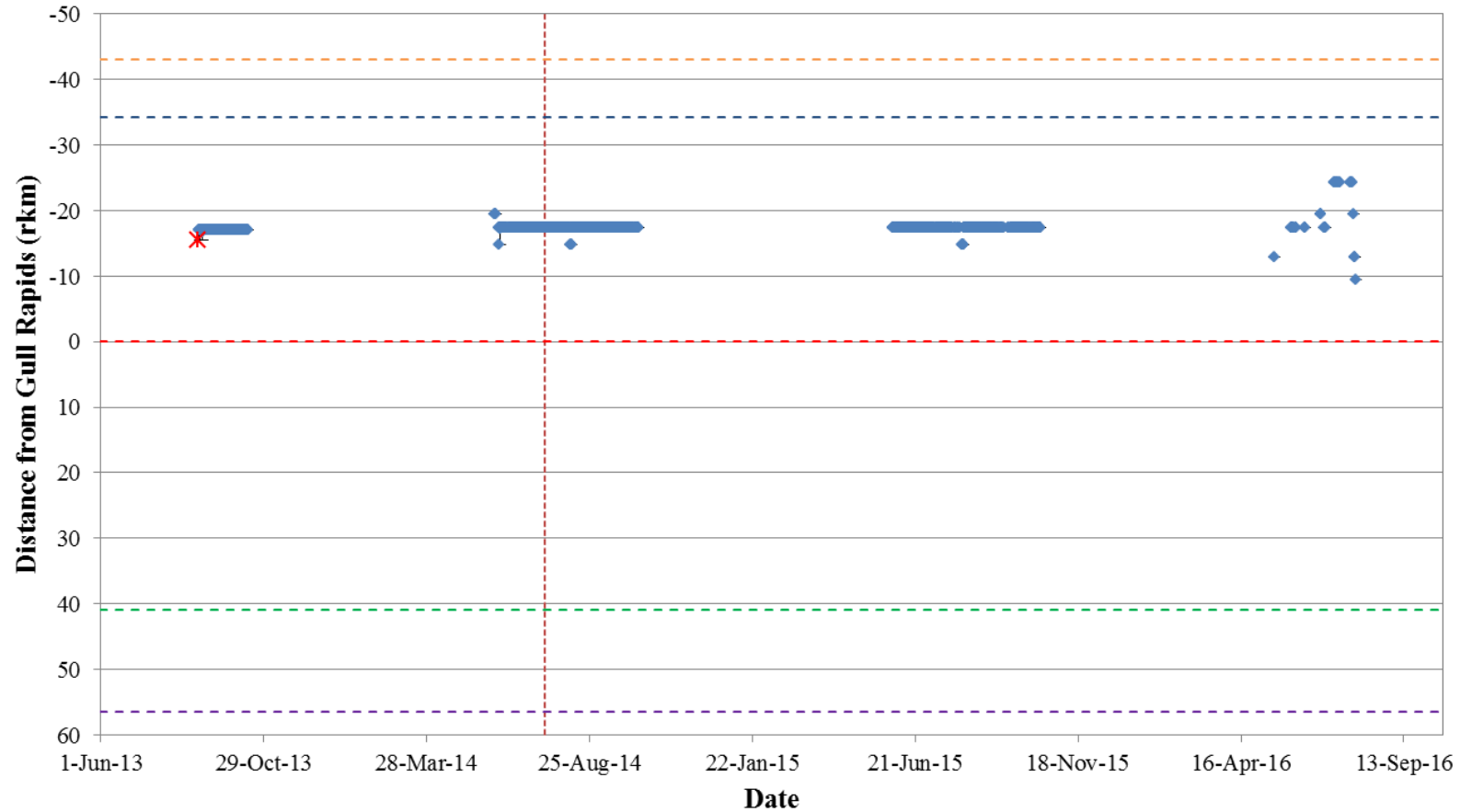


Figure A2-36: Position of a Walleye tagged with an acoustic transmitter (code #32886) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

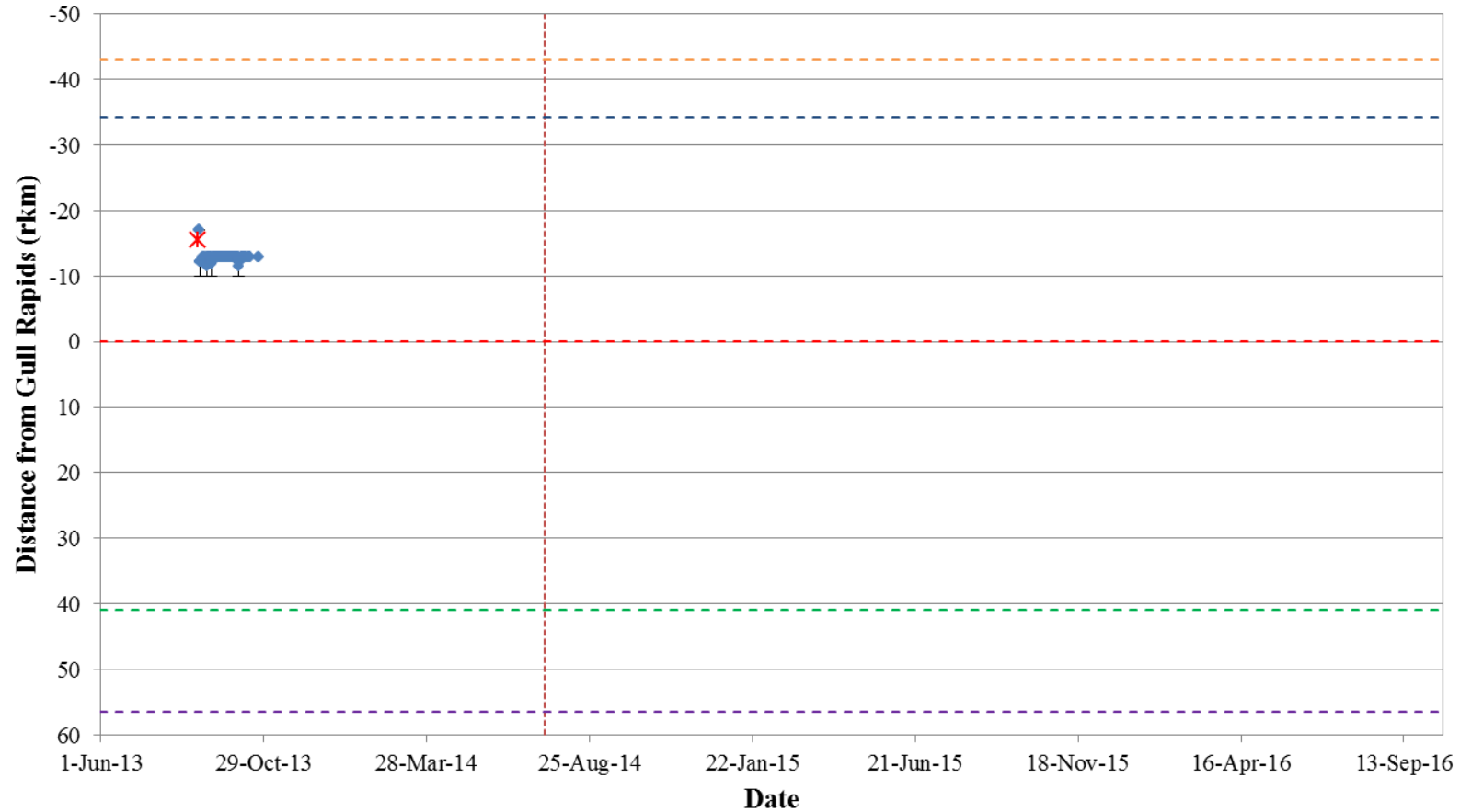


Figure A2-37: Position of a Walleye tagged with an acoustic transmitter (code #32887) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

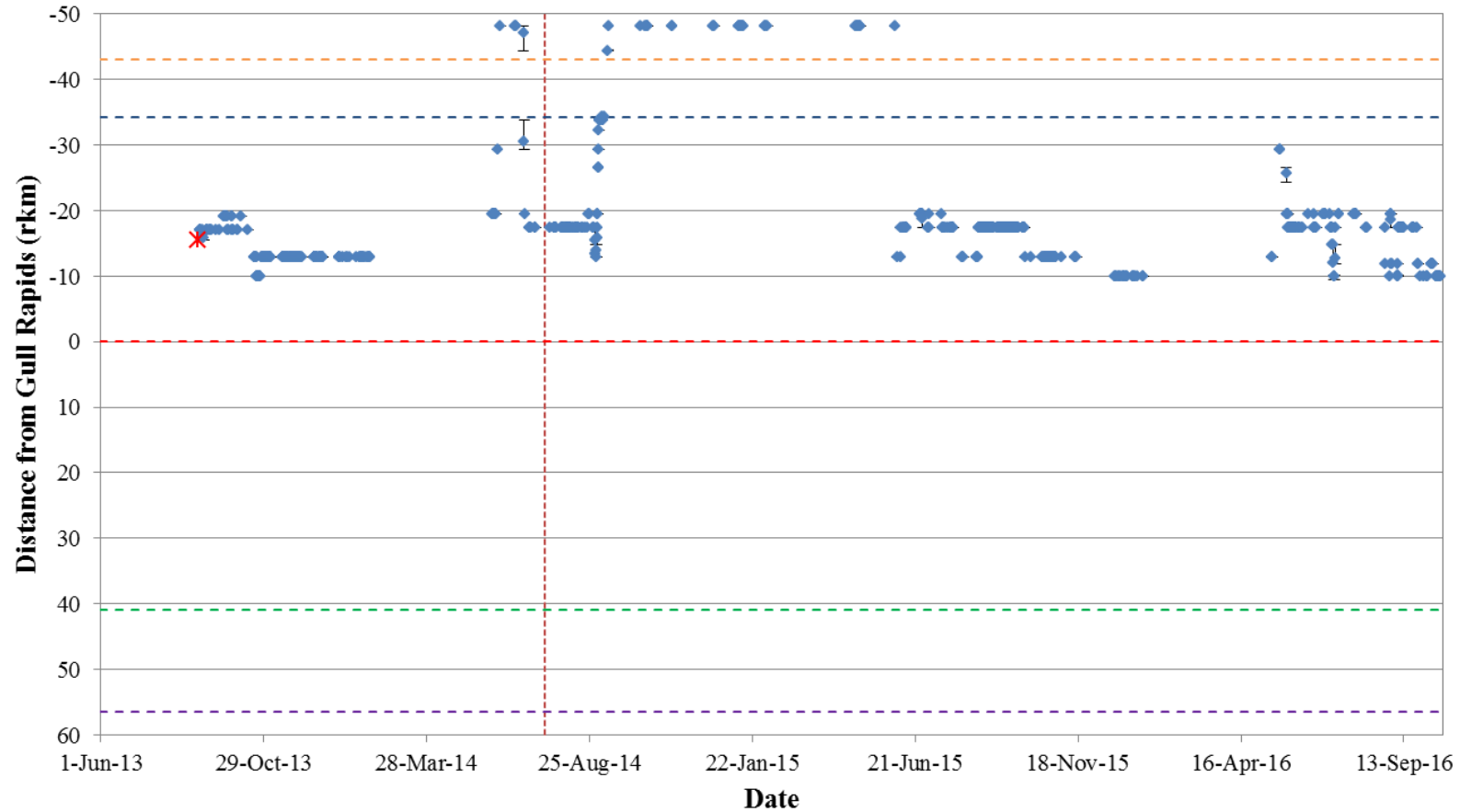


Figure A2-38: Position of a Walleye tagged with an acoustic transmitter (code #32888) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

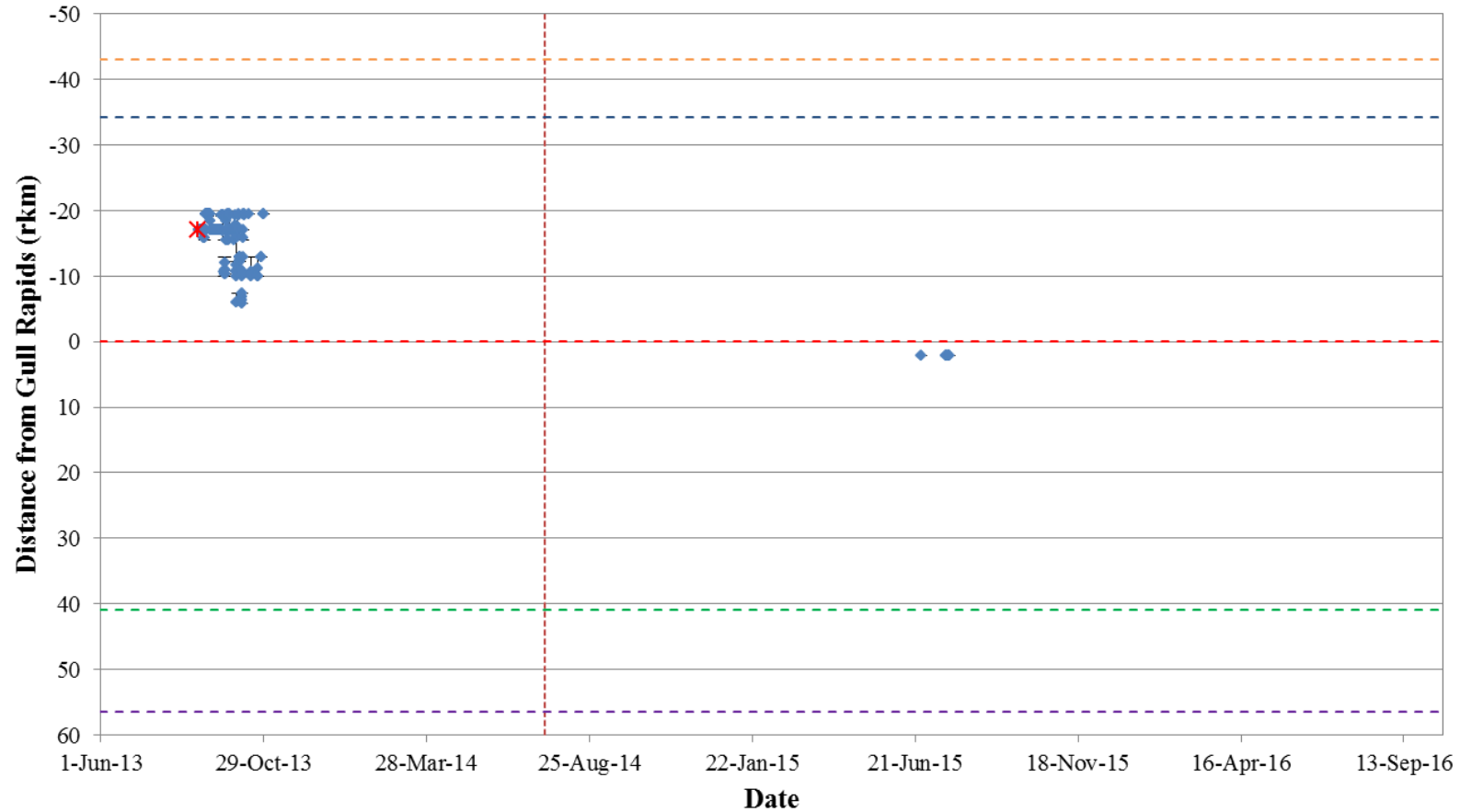


Figure A2-39: Position of a Walleye tagged with an acoustic transmitter (code #32889) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

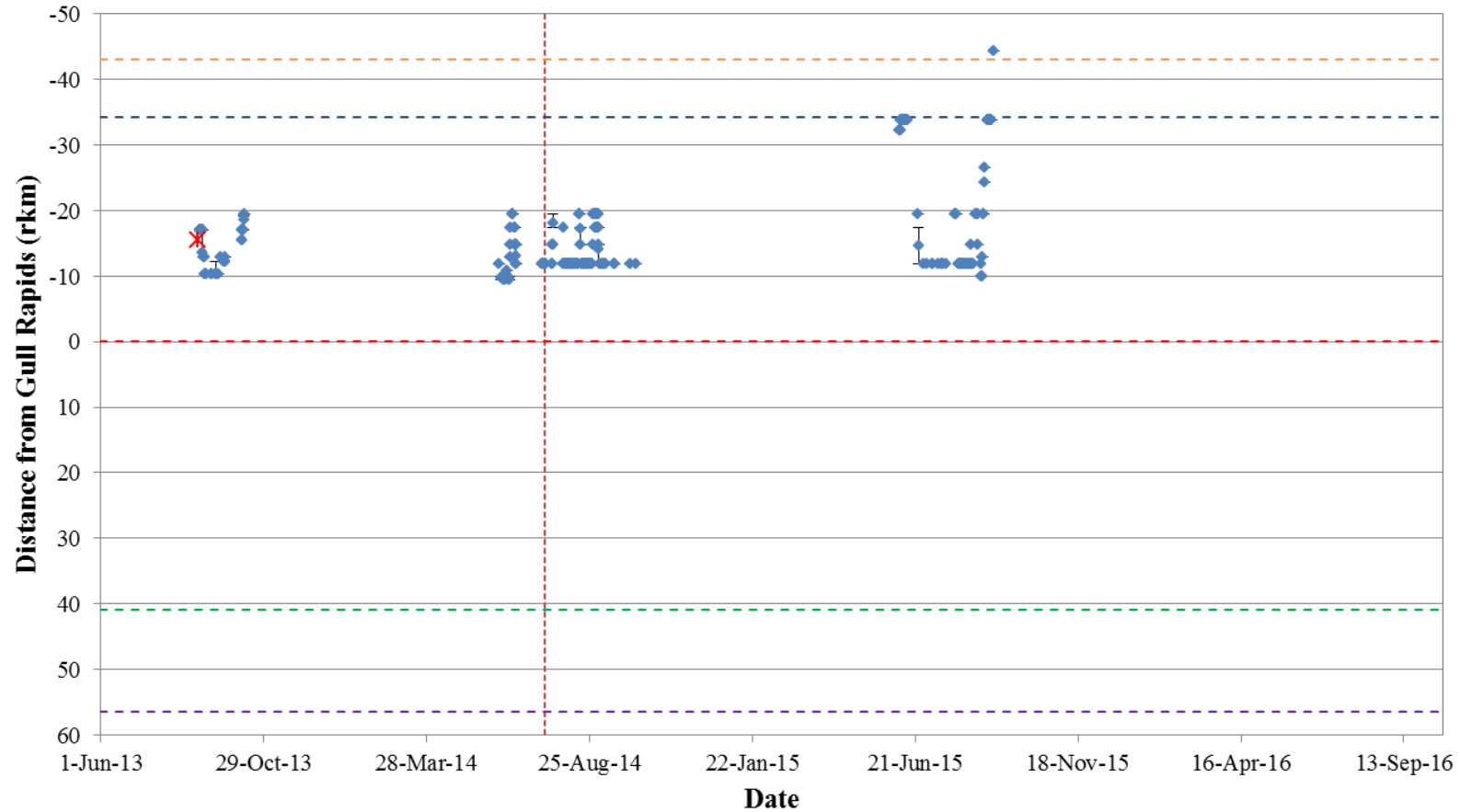


Figure A2-40: Position of a Walleye tagged with an acoustic transmitter (code #32890) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

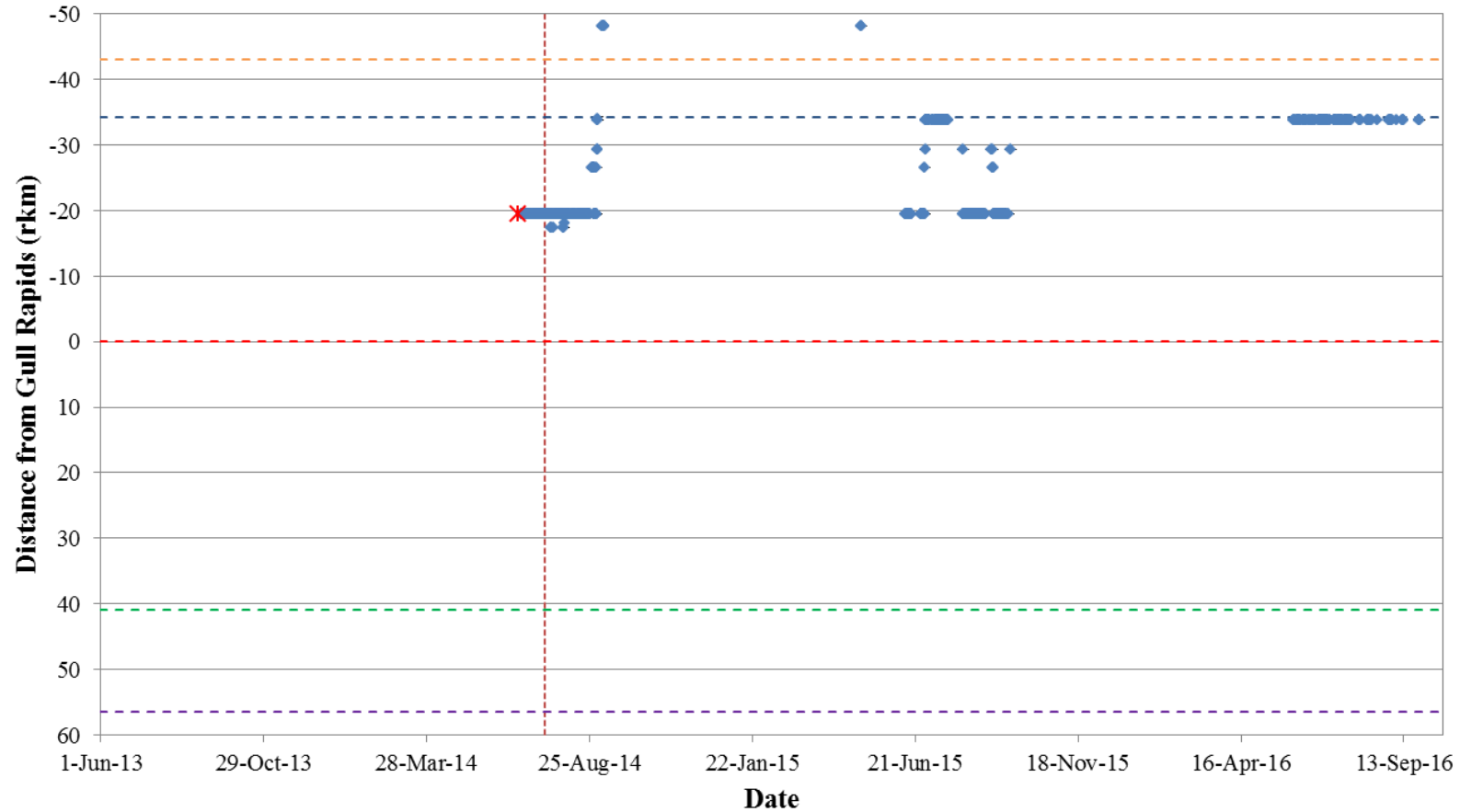


Figure A2-41: Position of a Walleye tagged with an acoustic transmitter (code #6417) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

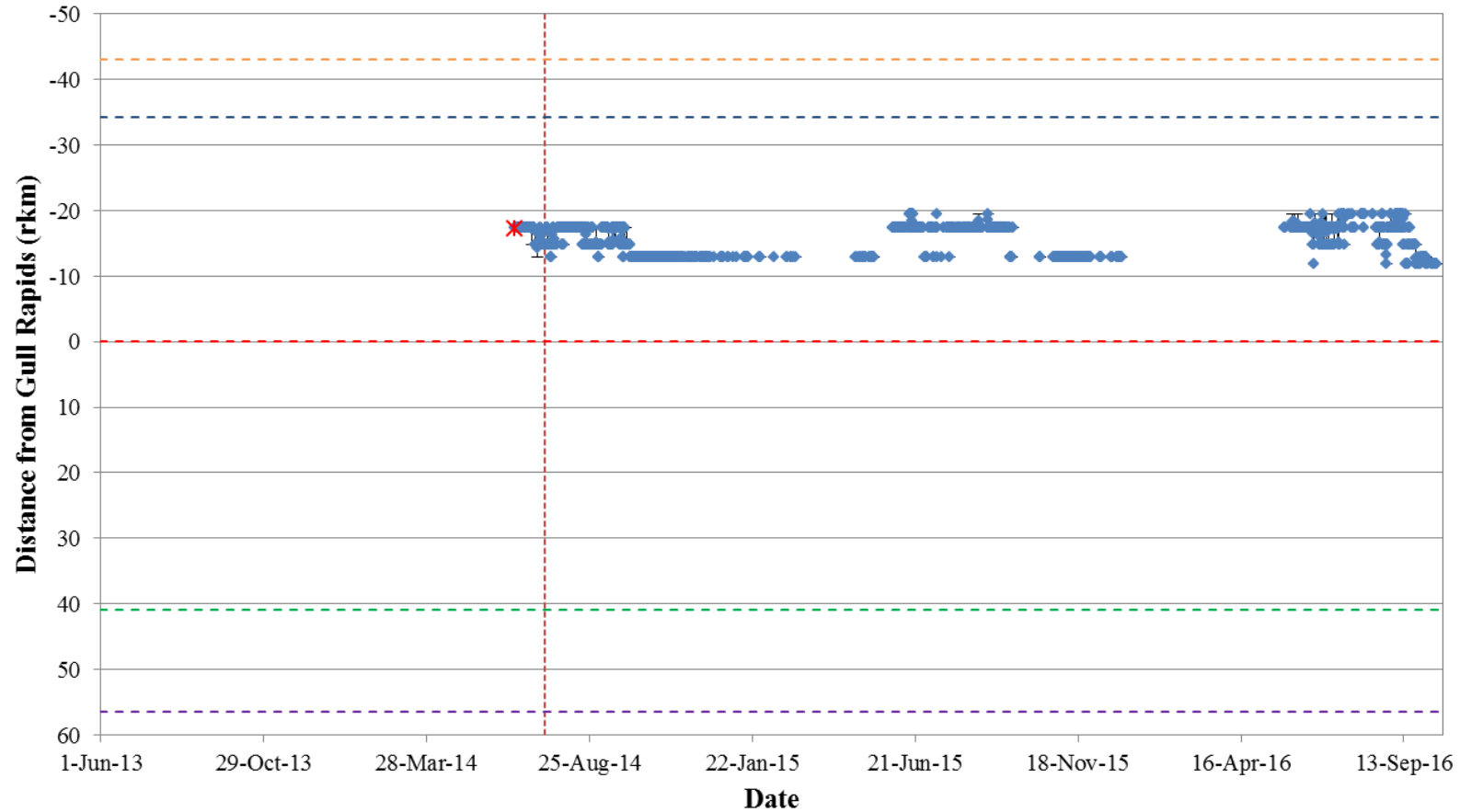


Figure A2-42: Position of a Walleye tagged with an acoustic transmitter (code #6418) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

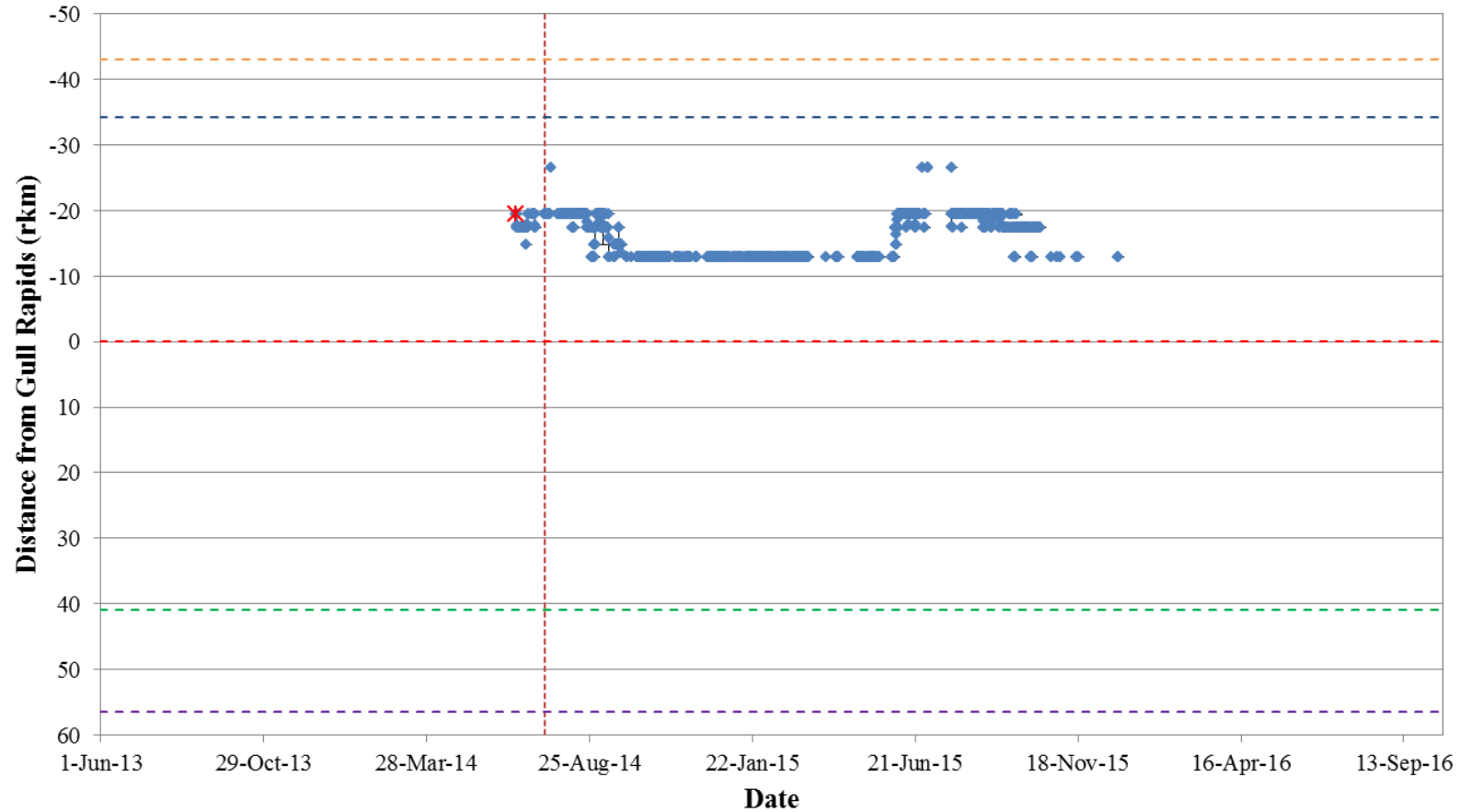


Figure A2-43: Position of a Walleye tagged with an acoustic transmitter (code #6419) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

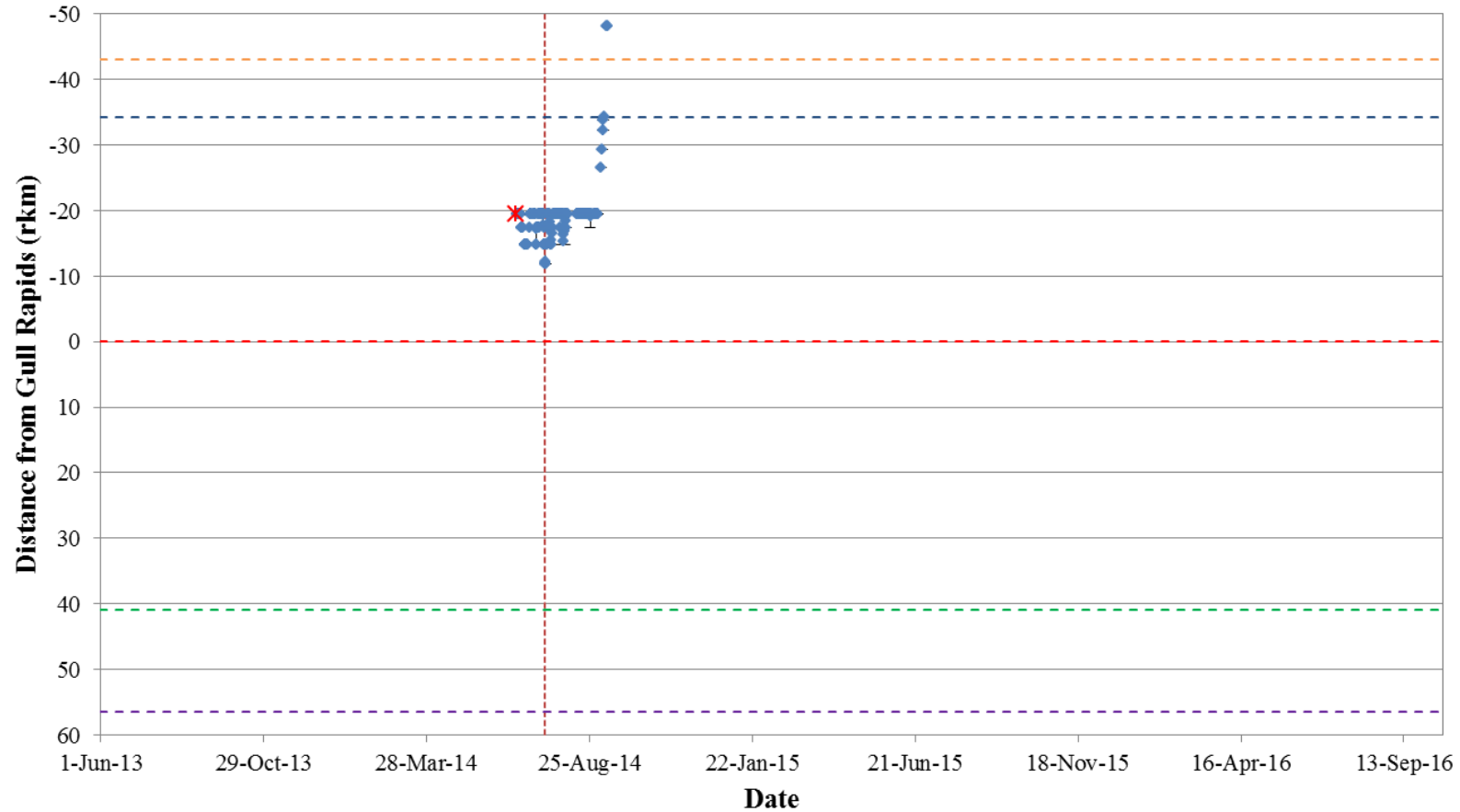


Figure A2-44: Position of a Walleye tagged with an acoustic transmitter (code #6420) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

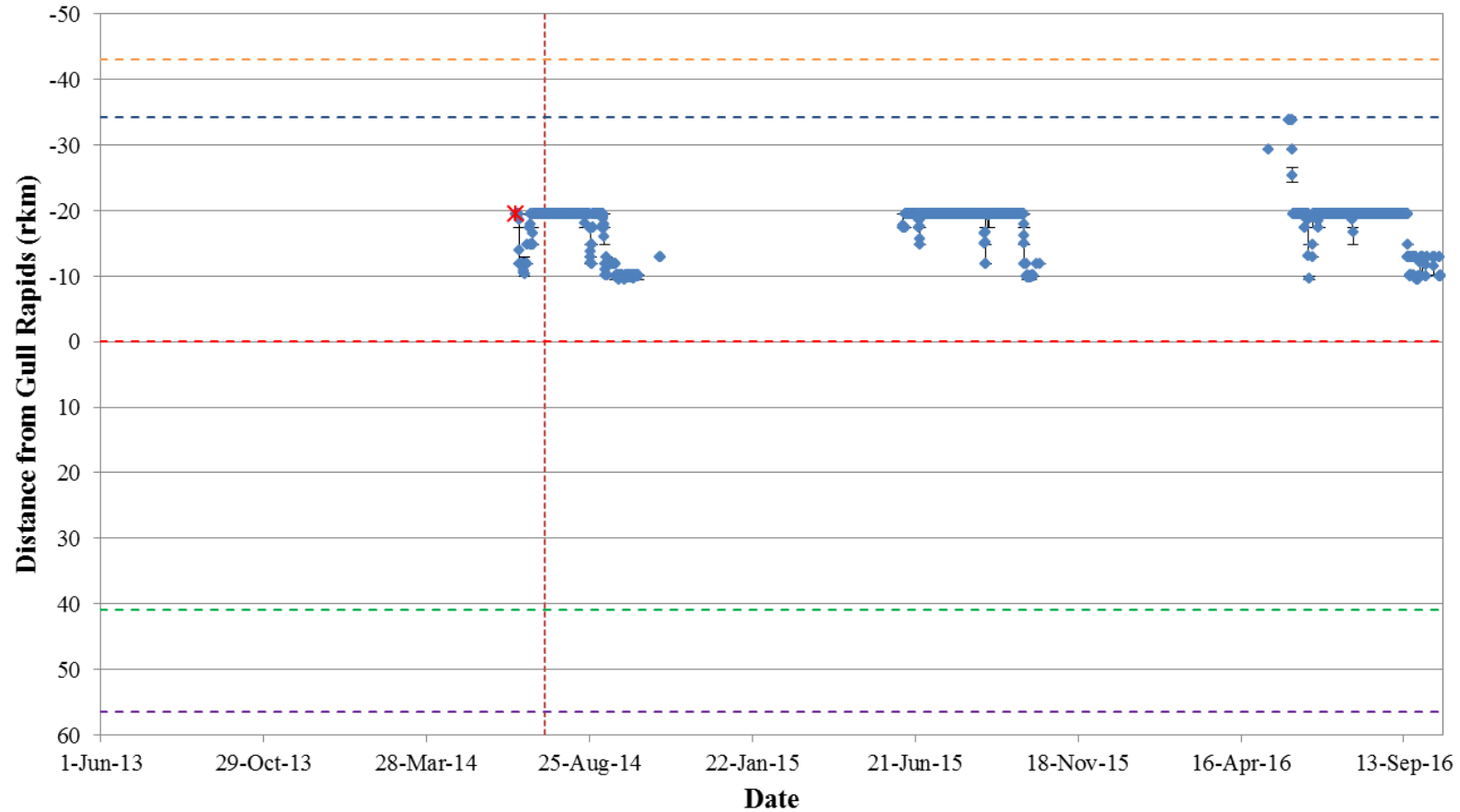


Figure A2-45: Position of a Walleye tagged with an acoustic transmitter (code #6421) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

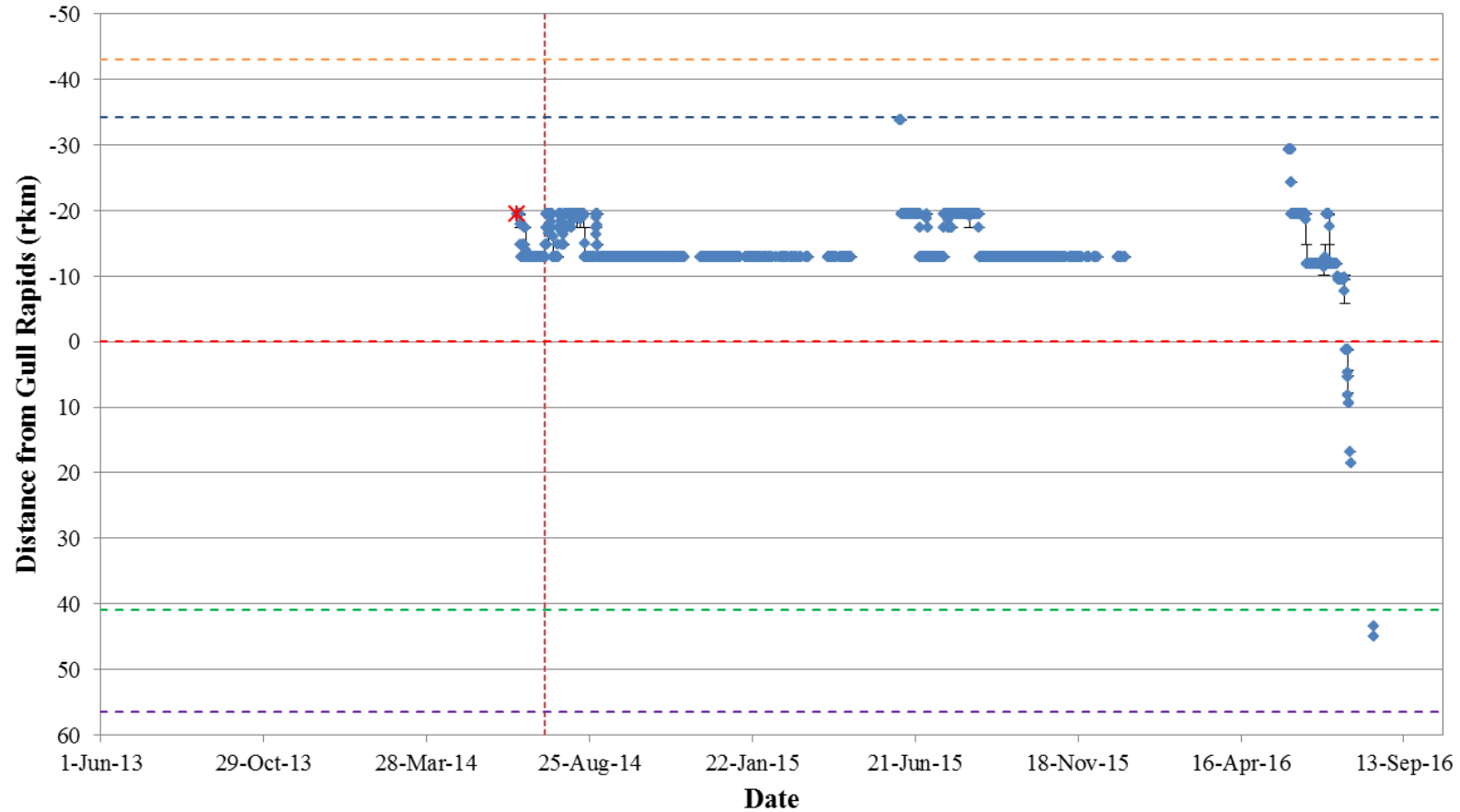


Figure A2-46: Position of a Walleye tagged with an acoustic transmitter (code #6422) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

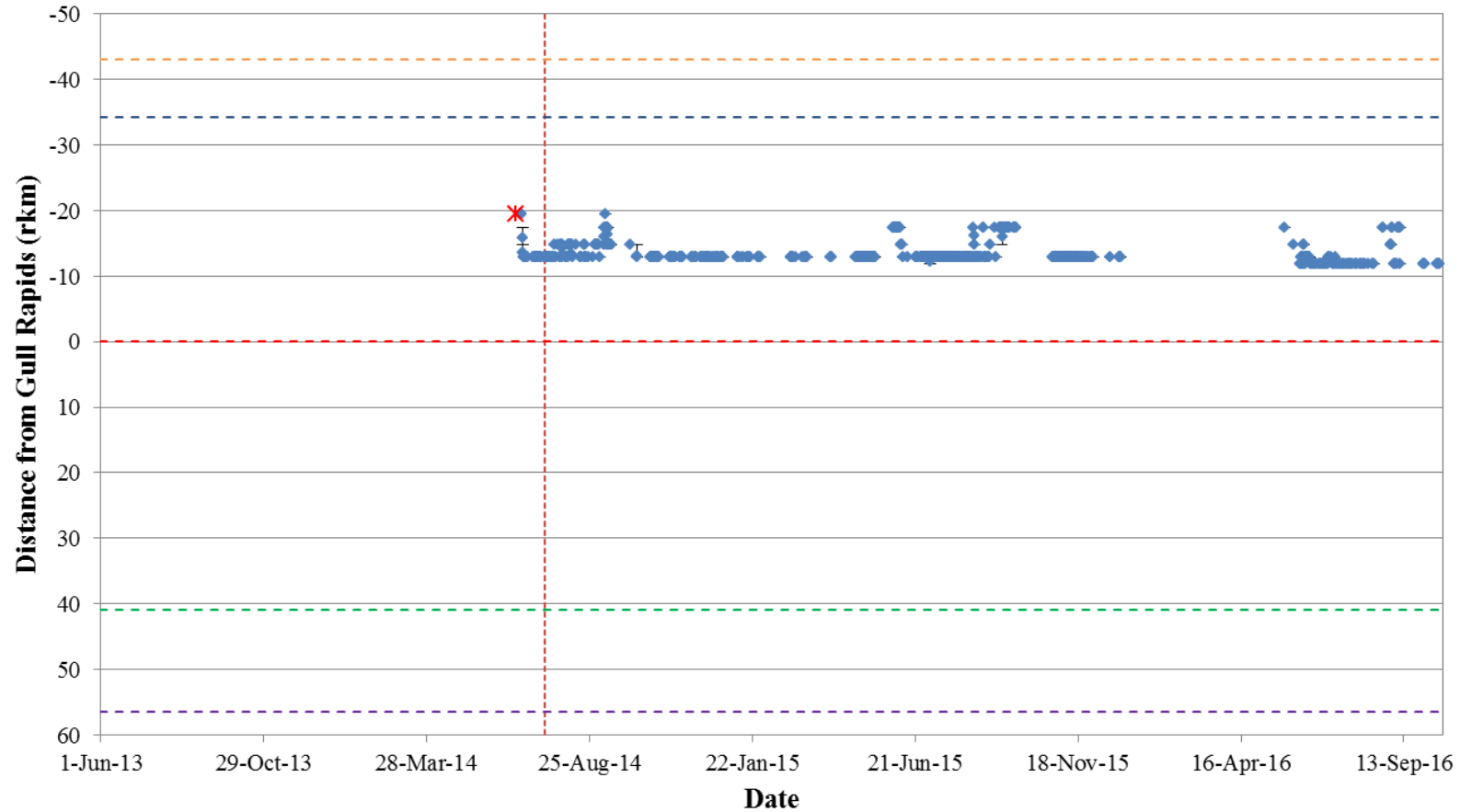


Figure A2-47: Position of a Walleye tagged with an acoustic transmitter (code #6423) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

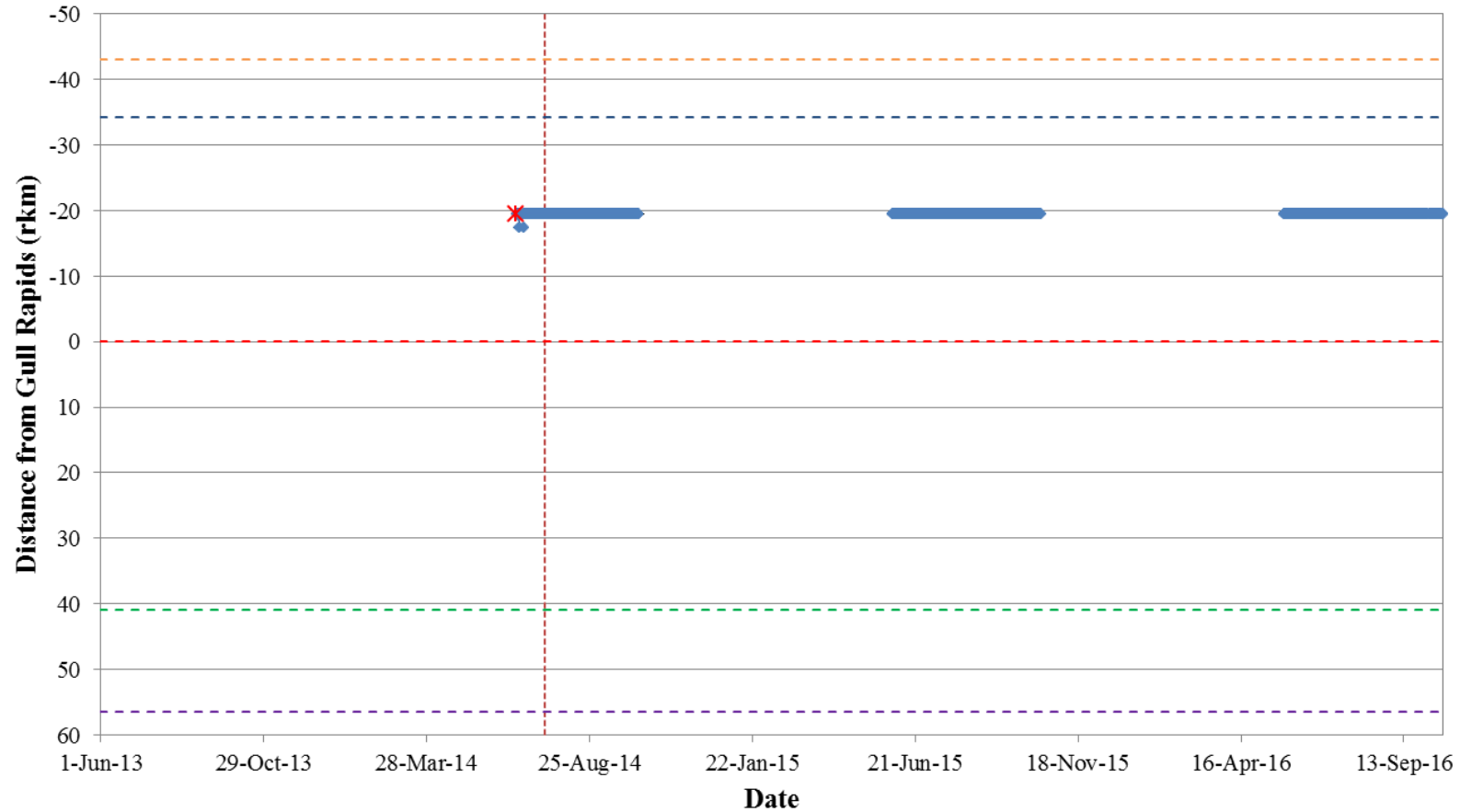


Figure A2-48: Position of a Walleye tagged with an acoustic transmitter (code #6425) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

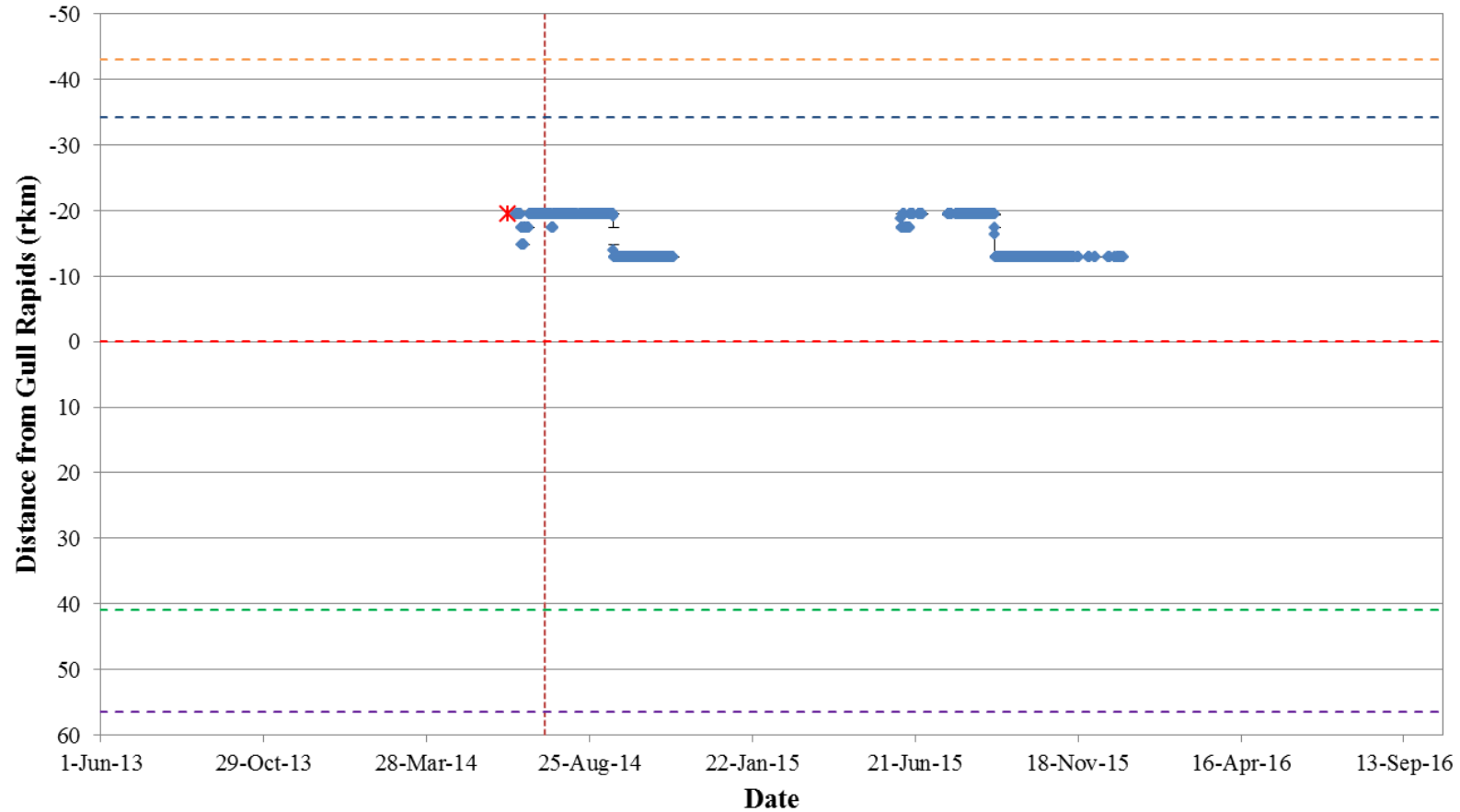


Figure A2-49: Position of a Walleye tagged with an acoustic transmitter (code #6426) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

APPENDIX 3:

LOCATION SUMMARY FOR INDIVIDUAL ACOUSTIC TAGGED WALLEYE IN STEPHENS LAKE, JUNE 2013 TO OCTOBER 2015

Figure A3-1: Position of a Walleye tagged with an acoustic transmitter (code #32811) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.	137
Figure A3-2: Position of a Walleye tagged with an acoustic transmitter (code #32812) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.	138
Figure A3-3: Position of a Walleye tagged with an acoustic transmitter (code #32814) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.	139
Figure A3-4: Position of a Walleye tagged with an acoustic transmitter (code #32815) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.	140
Figure A3-5: Position of a Walleye tagged with an acoustic transmitter (code #32816) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.	141
Figure A3-6: Position of a Walleye tagged with an acoustic transmitter (code #32817) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.	142
Figure A3-7: Position of a Walleye tagged with an acoustic transmitter (code #32818) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.	143
Figure A3-8: Position of a Walleye tagged with an acoustic transmitter (code #32819) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.	144
Figure A3-9: Position of a Walleye tagged with an acoustic transmitter (code #32820) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.	145
Figure A3-10: Position of a Walleye tagged with an acoustic transmitter (code #32821) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.	146
Figure A3-11: Position of a Walleye tagged with an acoustic transmitter (code #32822) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.	147
Figure A3-12: Position of a Walleye tagged with an acoustic transmitter (code #32823) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.	148
Figure A3-13: Position of a Walleye tagged with an acoustic transmitter (code #32824) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.	149
Figure A3-14: Position of a Walleye tagged with an acoustic transmitter (code #32825) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.	150
Figure A3-15: Position of a Walleye tagged with an acoustic transmitter (code #32826) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.	151

Figure A3-16: Position of a Walleye tagged with an acoustic transmitter (code #32827) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.....	152
Figure A3-17: Position of a Walleye tagged with an acoustic transmitter (code #32828) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.....	153
Figure A3-18: Position of a Walleye tagged with an acoustic transmitter (code #32829) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.....	154
Figure A3-19: Position of a Walleye tagged with an acoustic transmitter (code #32830) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.....	155
Figure A3-20: Position of a Walleye tagged with an acoustic transmitter (code #32831) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.....	156
Figure A3-21: Position of a Walleye tagged with an acoustic transmitter (code #32832) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.....	157
Figure A3-22: Position of a Walleye tagged with an acoustic transmitter (code #32834) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.....	158
Figure A3-23: Position of a Walleye tagged with an acoustic transmitter (code #32835) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.....	159
Figure A3-24: Position of a Walleye tagged with an acoustic transmitter (code #32836) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.....	160
Figure A3-25: Position of a Walleye tagged with an acoustic transmitter (code #32837) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.....	161
Figure A3-26: Position of a Walleye tagged with an acoustic transmitter (code #32838) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.....	162
Figure A3-27: Position of a Walleye tagged with an acoustic transmitter (code #32839) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.....	163
Figure A3-28: Position of a Walleye tagged with an acoustic transmitter (code #32840) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.....	164
Figure A3-29: Position of a Walleye tagged with an acoustic transmitter (code #32841) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.....	165
Figure A3-30: Position of a Walleye tagged with an acoustic transmitter (code #32842) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.....	166
Figure A3-31: Position of a Walleye tagged with an acoustic transmitter (code #32843) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.....	167
Figure A3-32: Position of a Walleye tagged with an acoustic transmitter (code #32844) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.....	168
Figure A3-33: Position of a Walleye tagged with an acoustic transmitter (code #32845) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.....	169
Figure A3-34: Position of a Walleye tagged with an acoustic transmitter (code #32848) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.....	170

Figure A3-35: Position of a Walleye tagged with an acoustic transmitter (code #32849) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.....	171
Figure A3-36: Position of a Walleye tagged with an acoustic transmitter (code #32850) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.....	172
Figure A3-37: Position of a Walleye tagged with an acoustic transmitter (code #32854) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.....	173
Figure A3-38: Position of a Walleye tagged with an acoustic transmitter (code #32855) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.....	174
Figure A3-39: Position of a Walleye tagged with an acoustic transmitter (code #32859) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.....	175
Figure A3-40: Position of a Walleye tagged with an acoustic transmitter (code #32860) in Stephens Lake (rkm >0), from June, 2013 to October, 2016.....	176
Figure A3-41: Position of a Walleye tagged with an acoustic transmitter (code #6424) in Stephens Lake (rkm >0), from June, 2014 to October, 2016.....	177
Figure A3-42: Position of a Walleye tagged with an acoustic transmitter (code #6427) in Stephens Lake (rkm >0), from June, 2014 to October, 2016.....	178

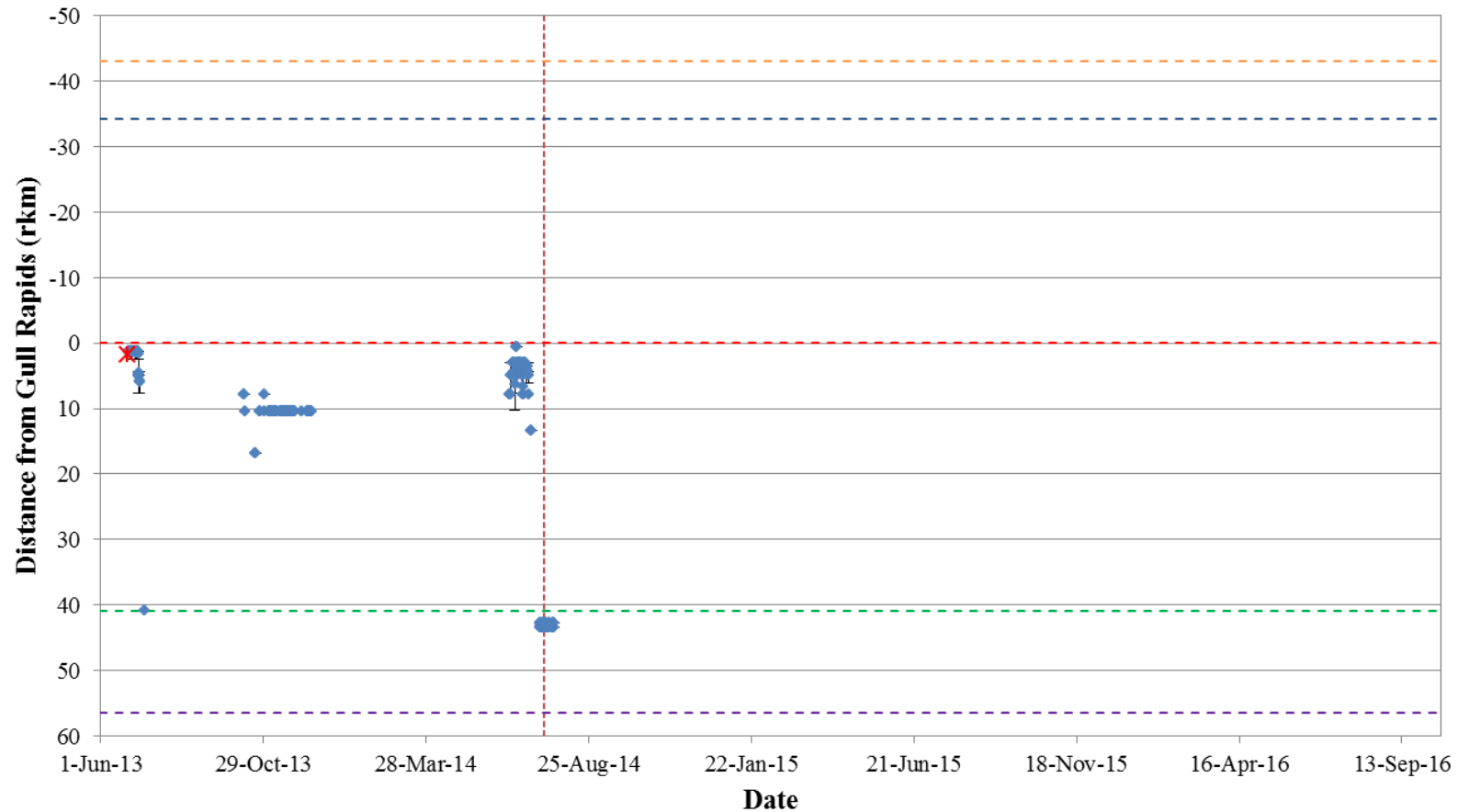


Figure A3-1: Position of a Walleye tagged with an acoustic transmitter (code #32811) in Stephens Lake (rkm > 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

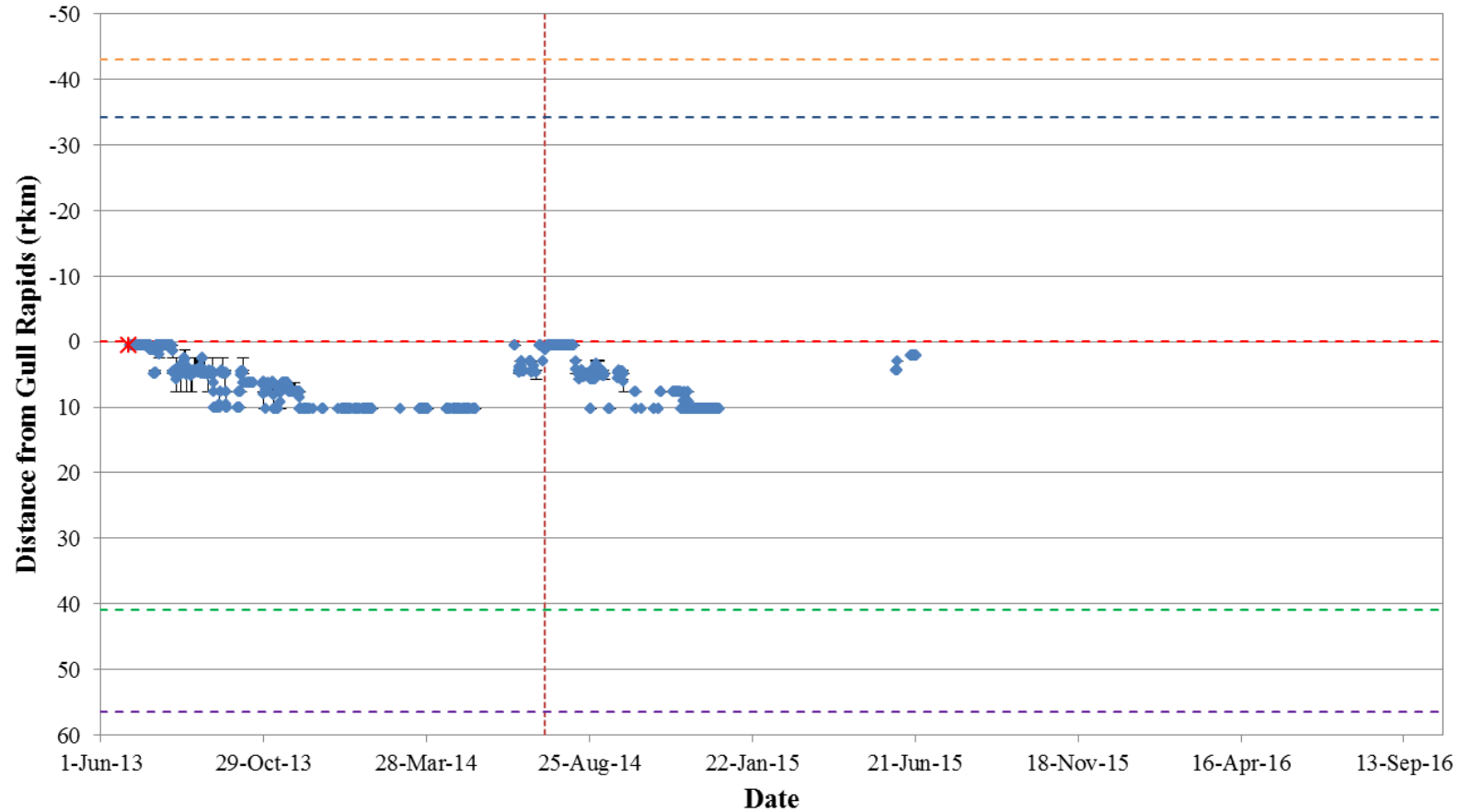


Figure A3-2: Position of a Walleye tagged with an acoustic transmitter (code #32812) in Stephens Lake (rkm > 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

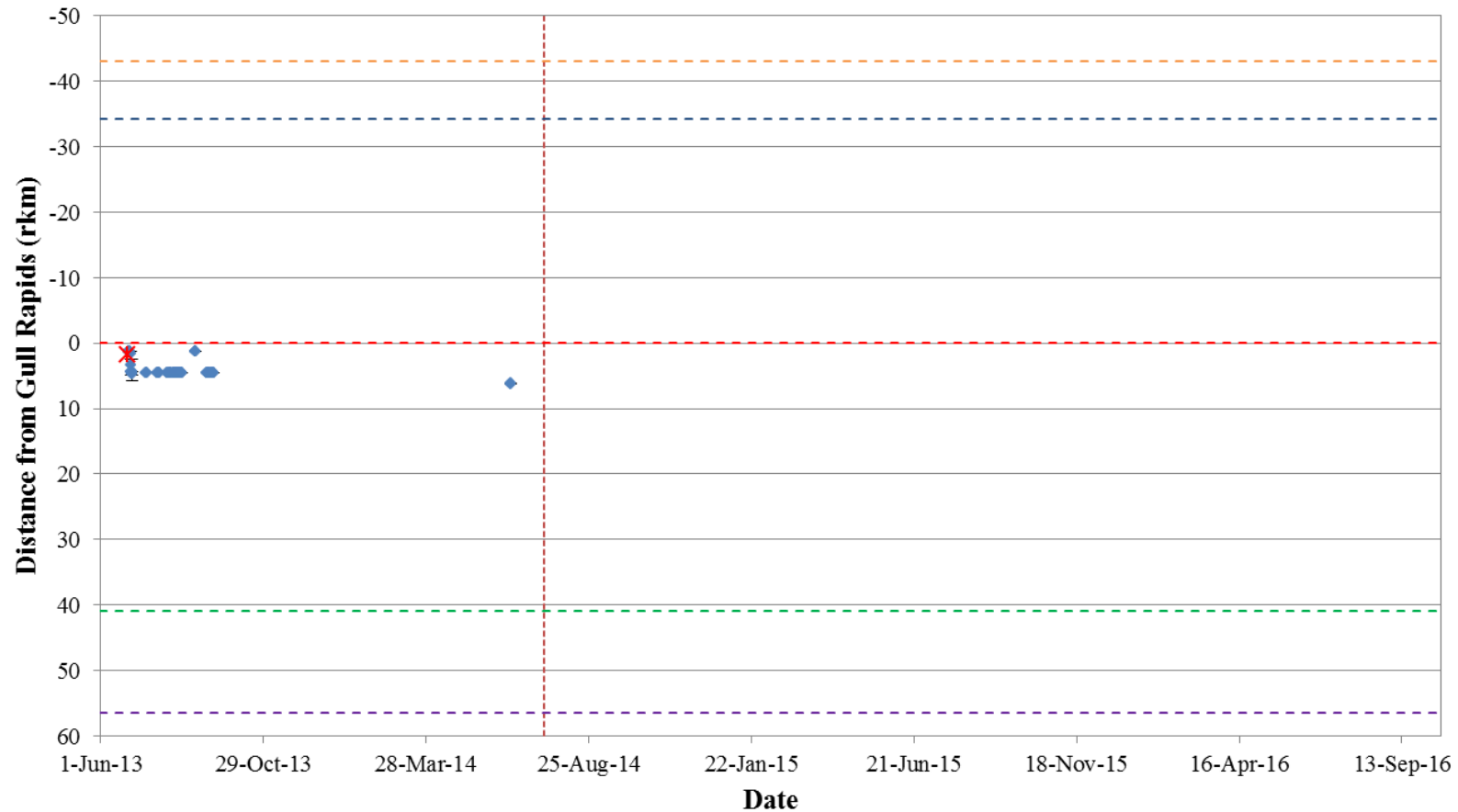


Figure A3-3: Position of a Walleye tagged with an acoustic transmitter (code #32814) in Stephens Lake (rkm > 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

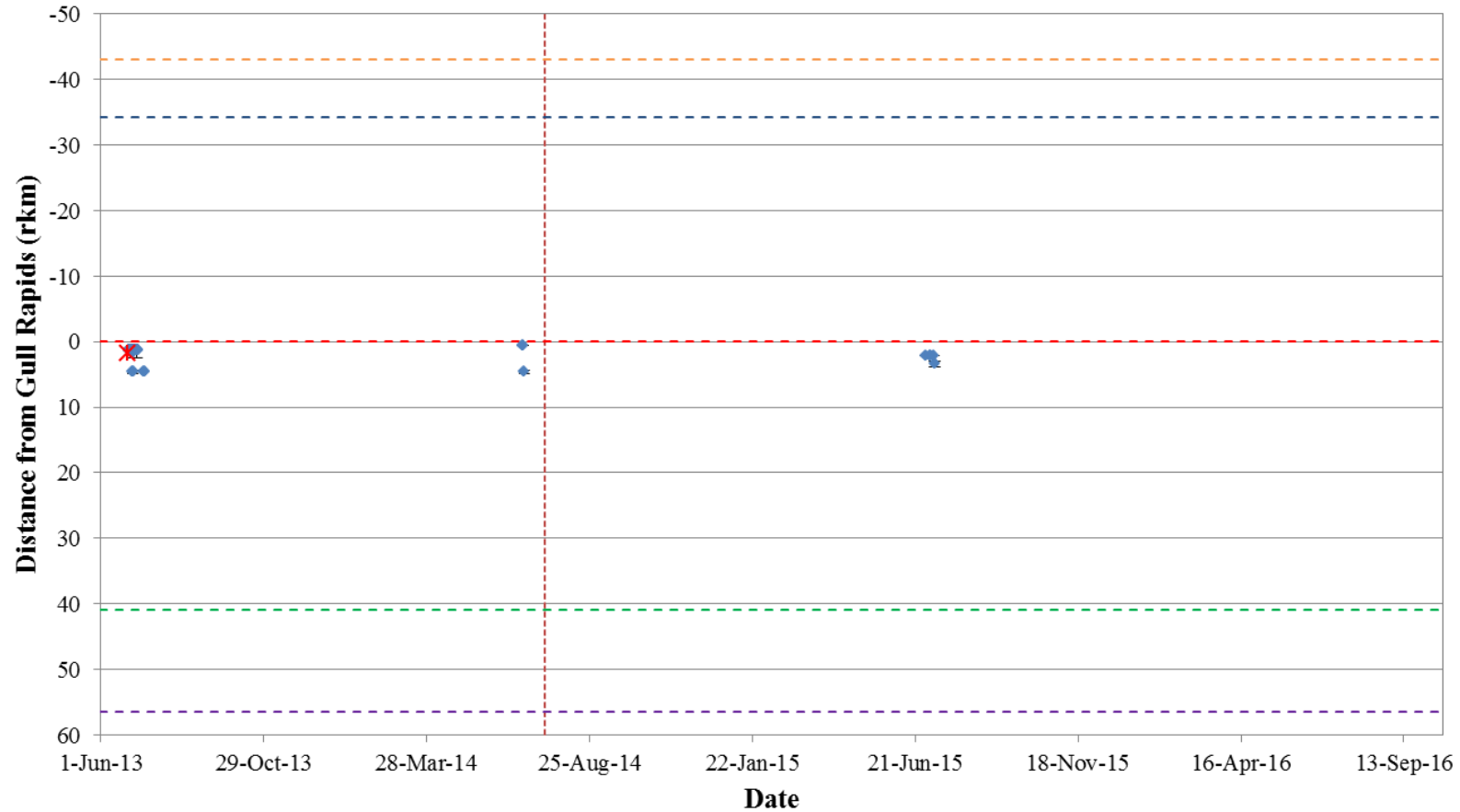


Figure A3-4: Position of a Walleye tagged with an acoustic transmitter (code #32815) in Stephens Lake (rkm > 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

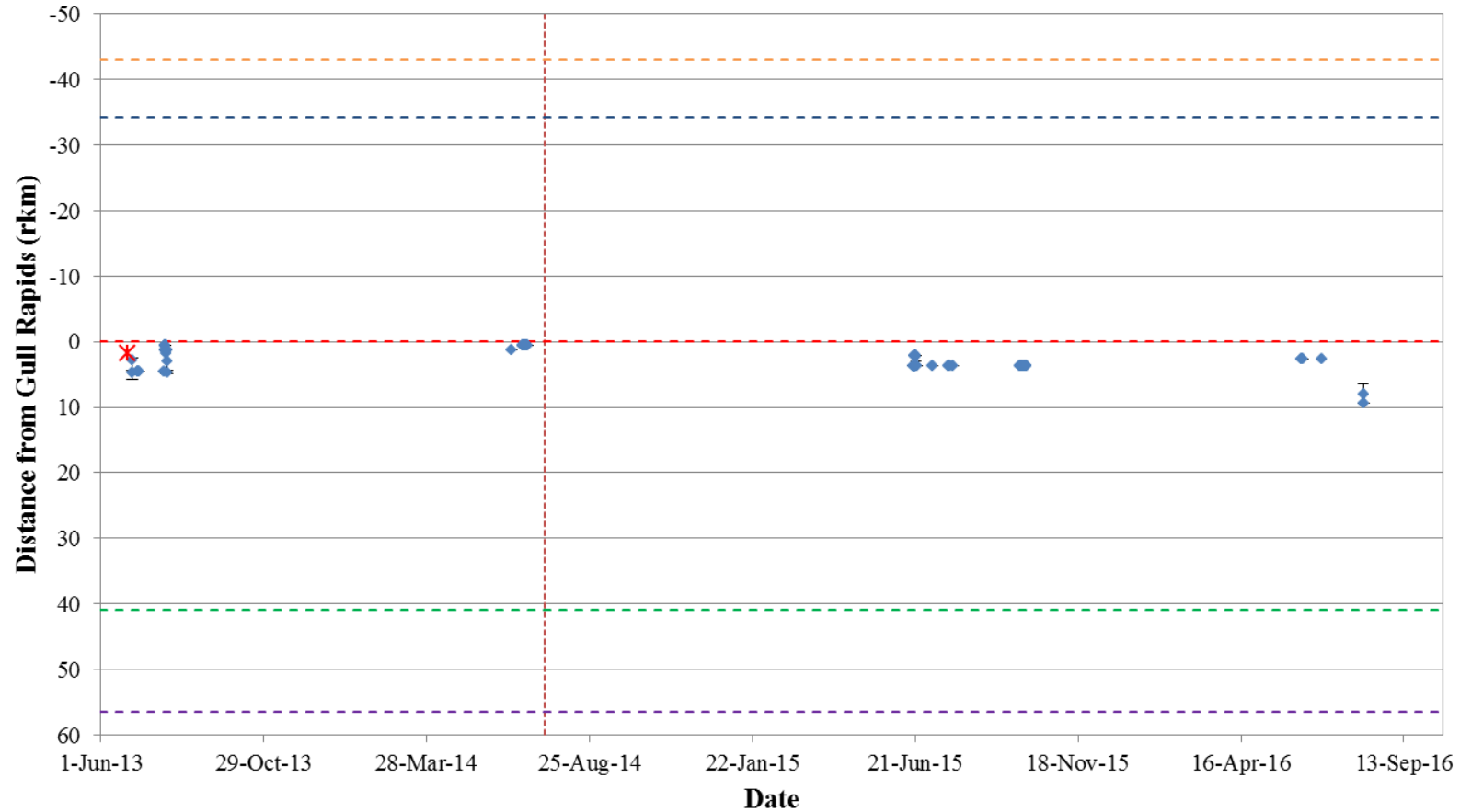


Figure A3-5: Position of a Walleye tagged with an acoustic transmitter (code #32816) in Stephens Lake (rkm > 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

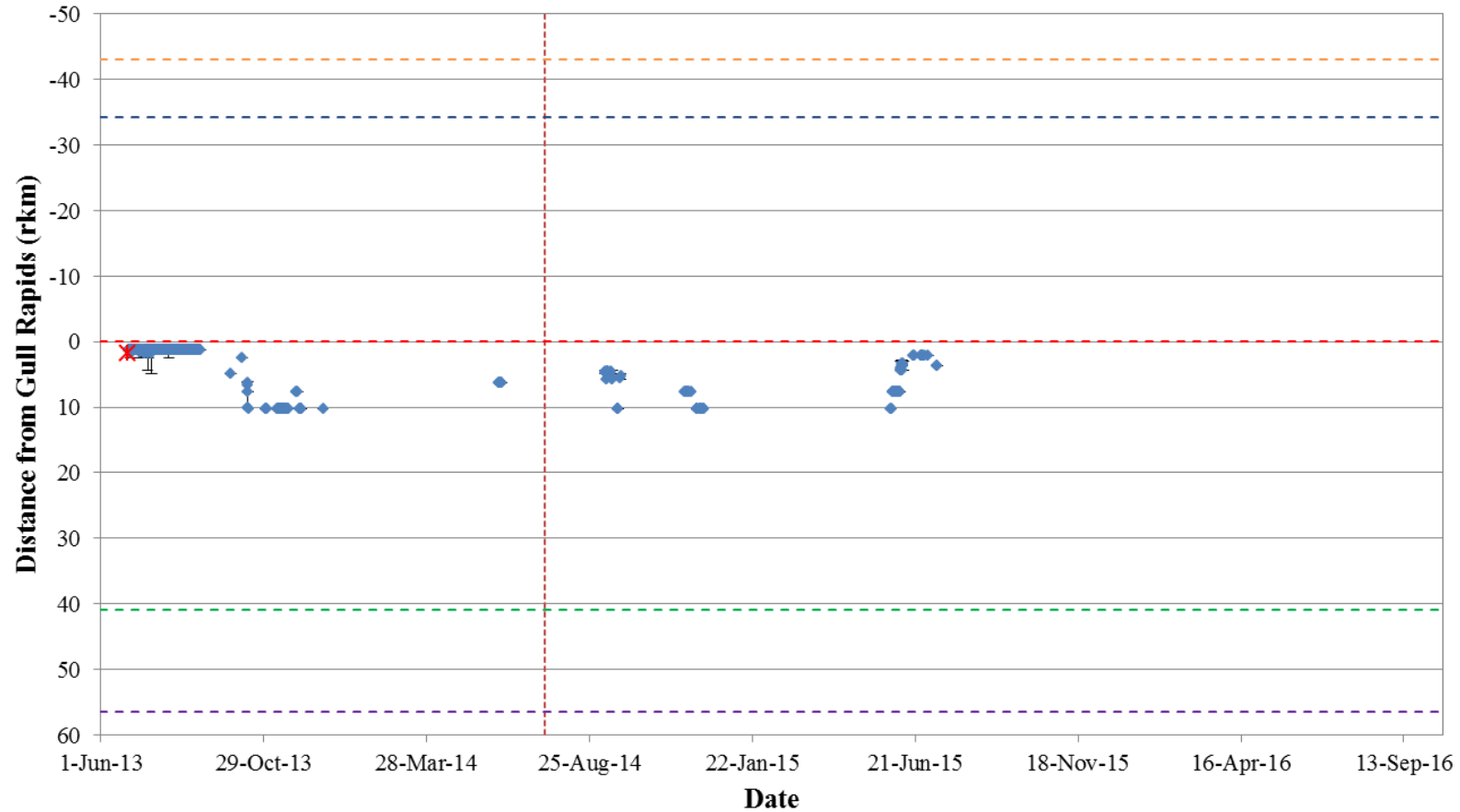


Figure A3-6: Position of a Walleye tagged with an acoustic transmitter (code #32817) in Stephens Lake (rkm > 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

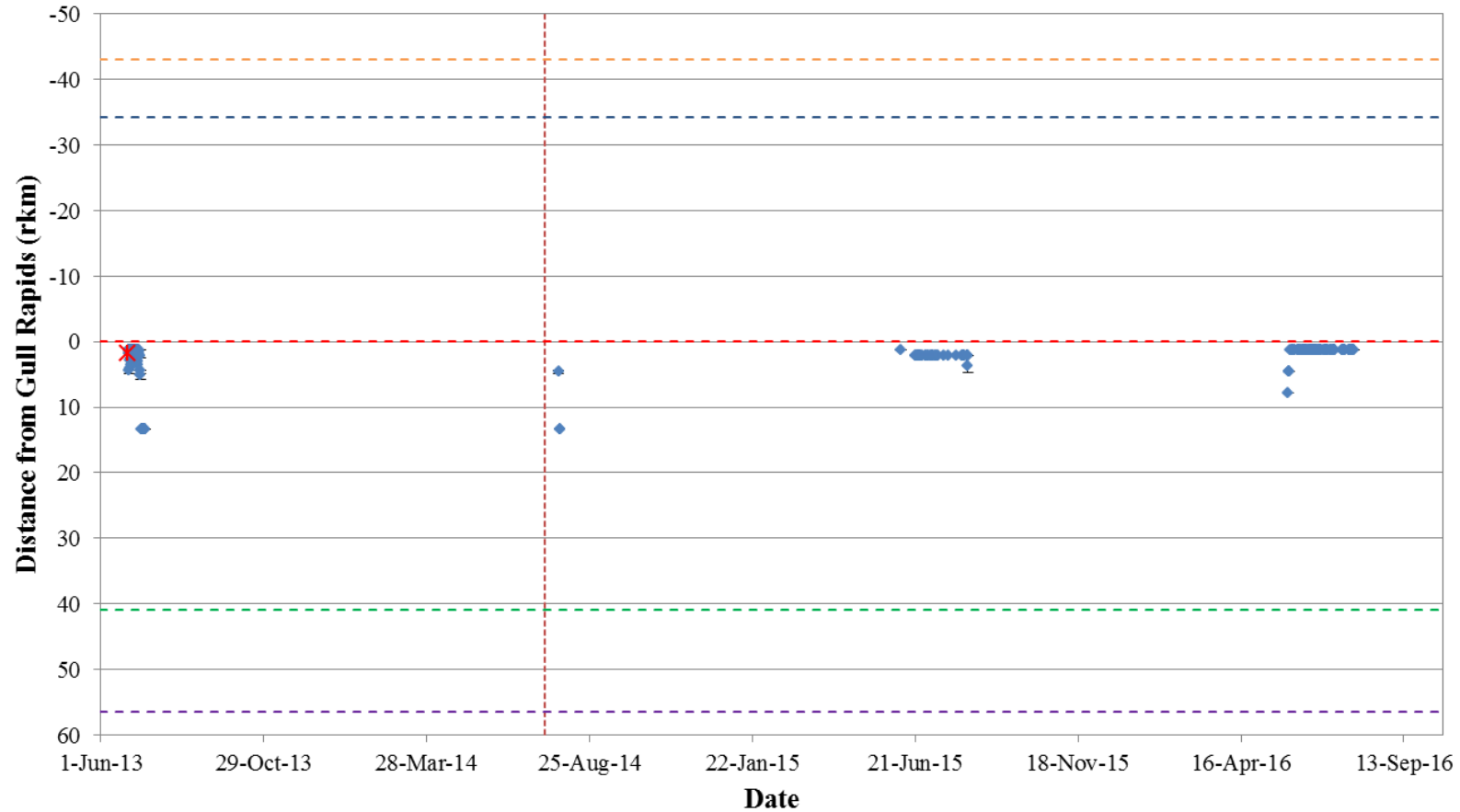


Figure A3-7: Position of a Walleye tagged with an acoustic transmitter (code #32818) in Stephens Lake (rkm > 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

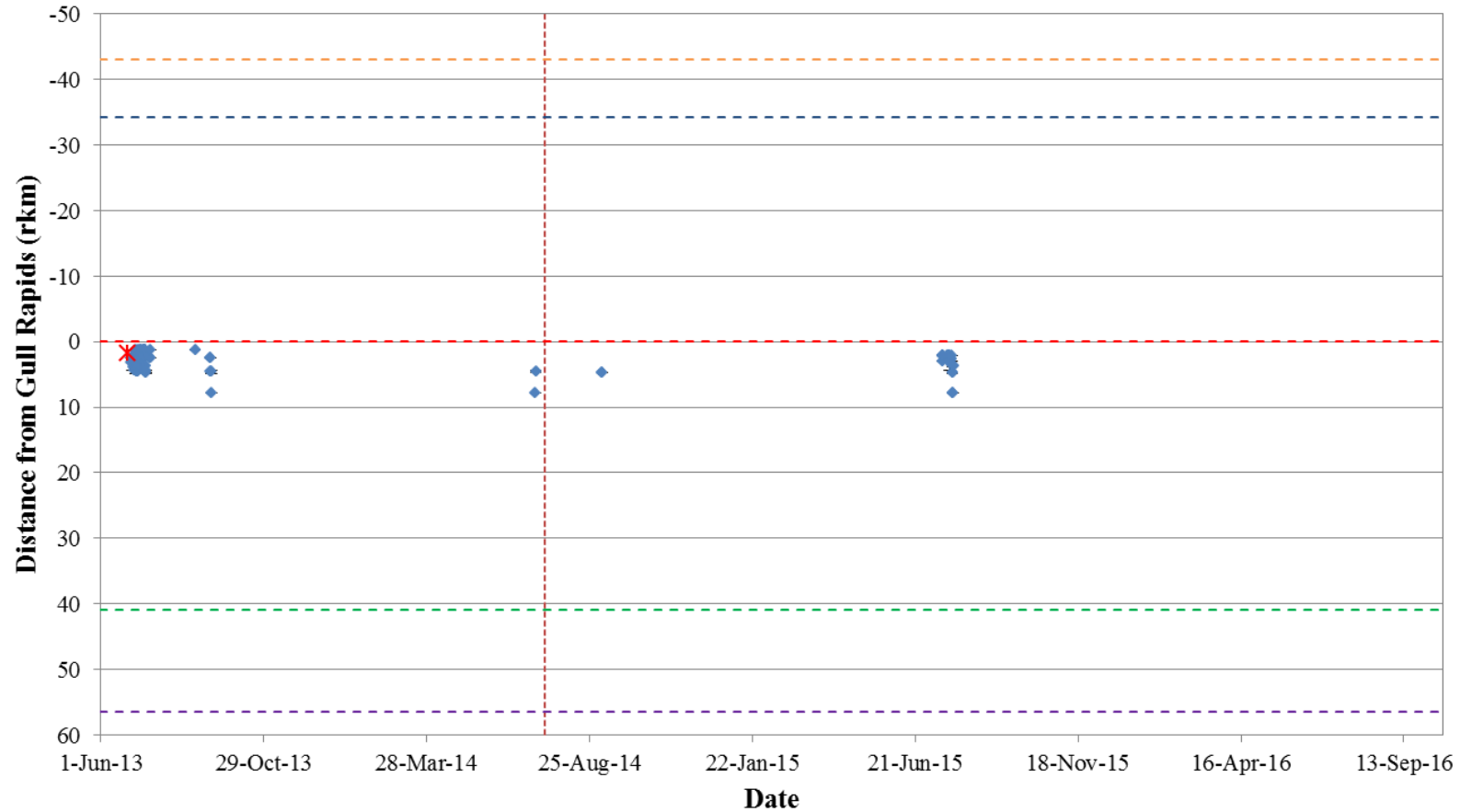


Figure A3-8: Position of a Walleye tagged with an acoustic transmitter (code #32819) in Stephens Lake (rkm > 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

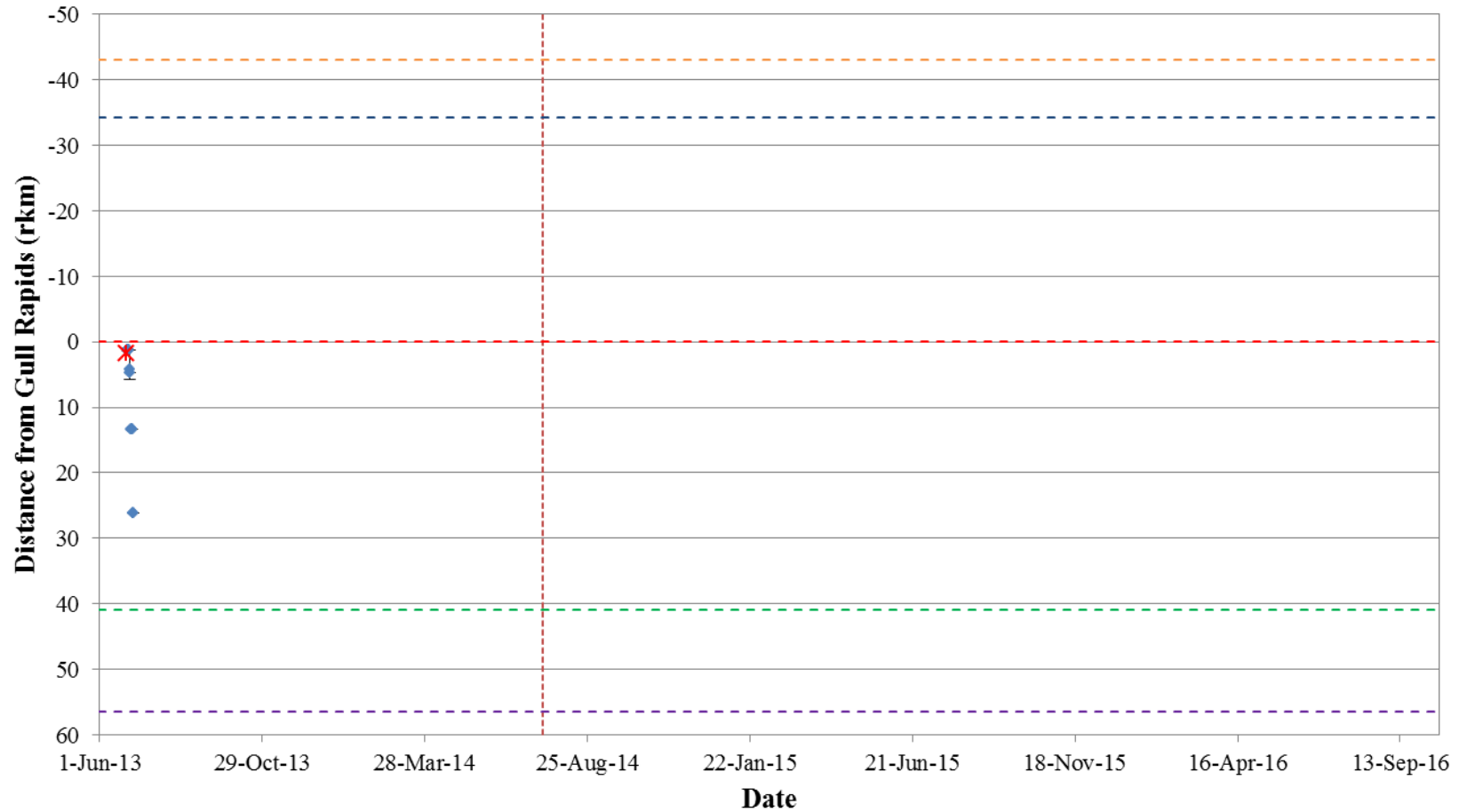


Figure A3-9: Position of a Walleye tagged with an acoustic transmitter (code #32820) in Stephens Lake (rkm >0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

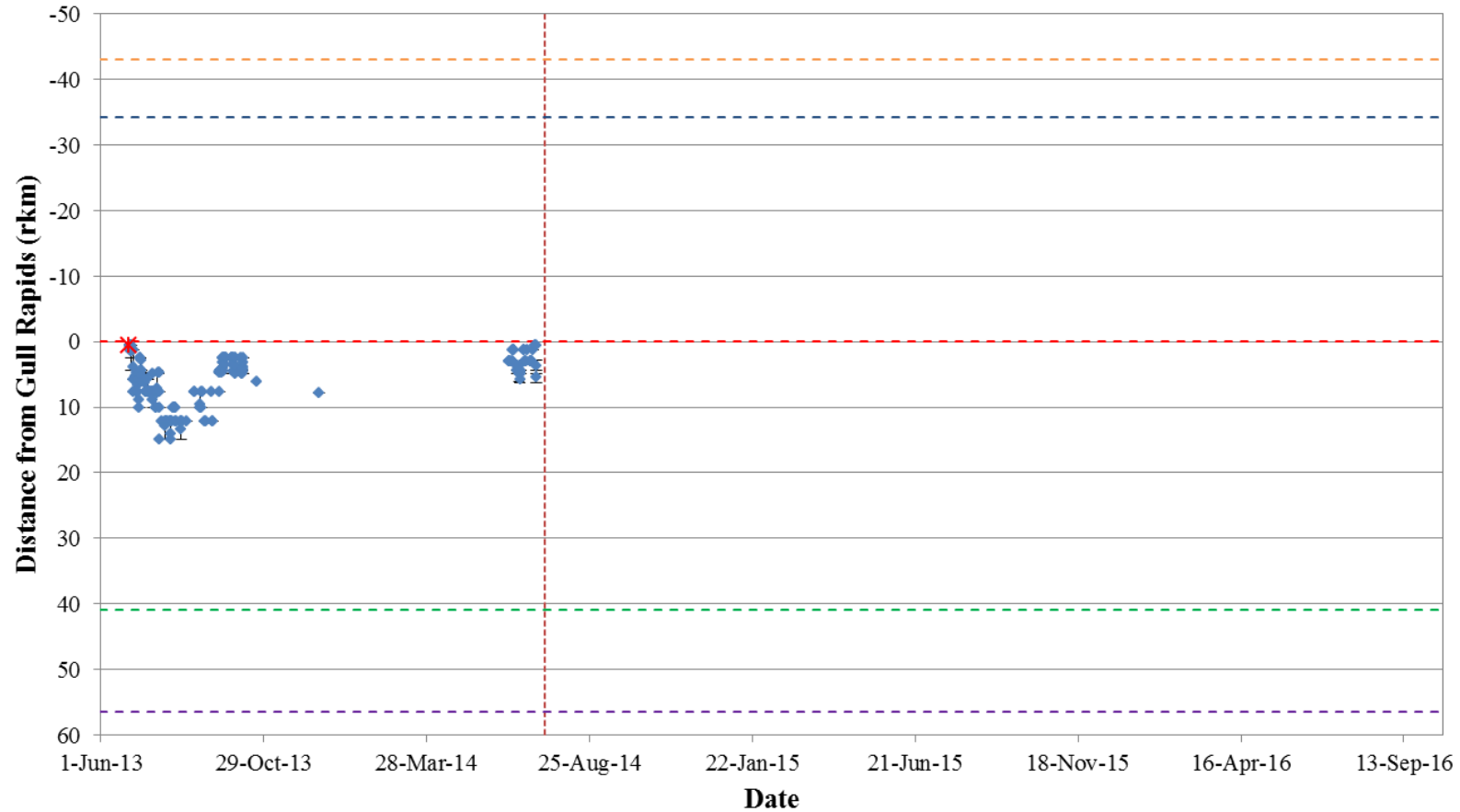


Figure A3-10: Position of a Walleye tagged with an acoustic transmitter (code #32821) in Stephens Lake (rkm > 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

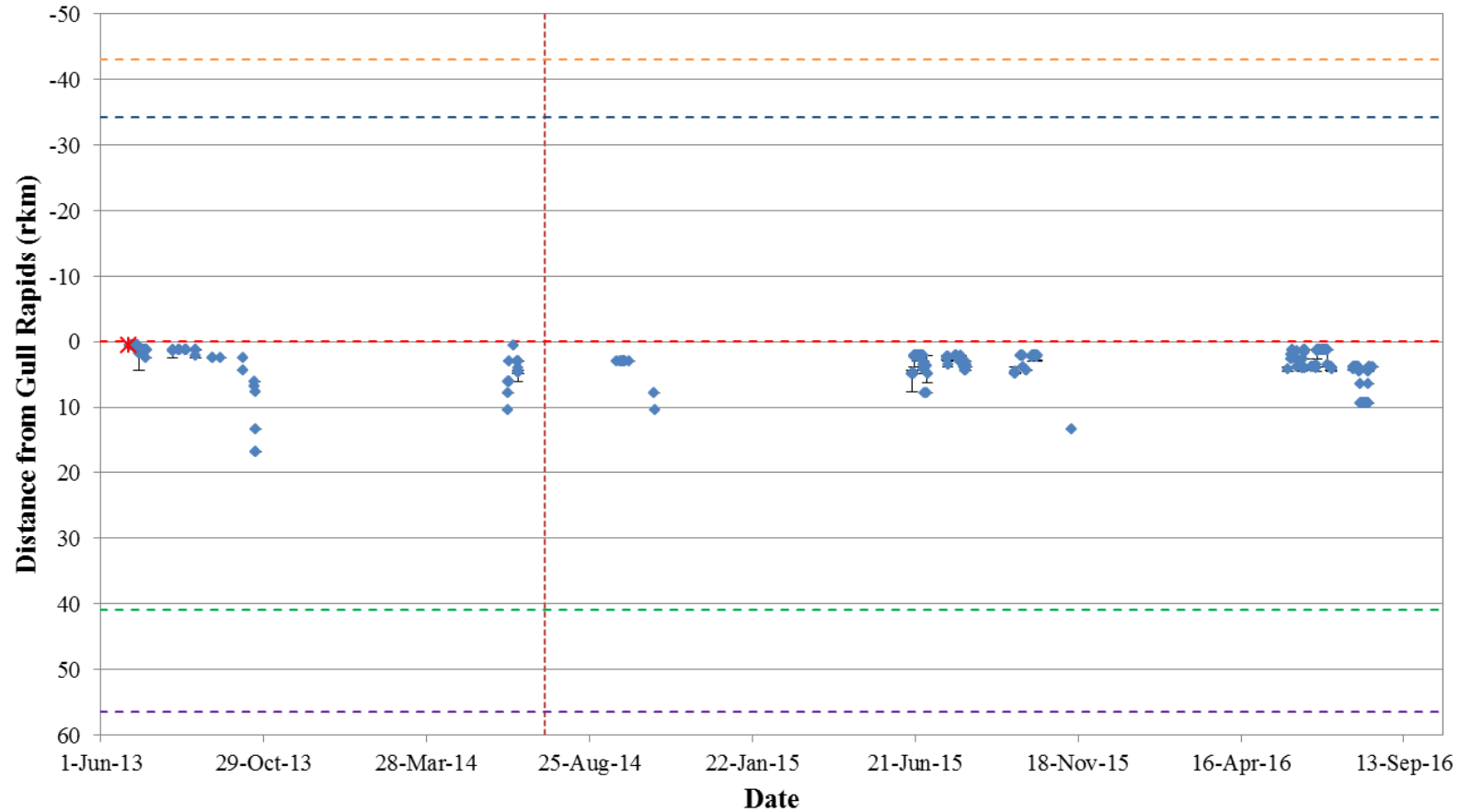


Figure A3-11: Position of a Walleye tagged with an acoustic transmitter (code #32822) in Stephens Lake (rkm > 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

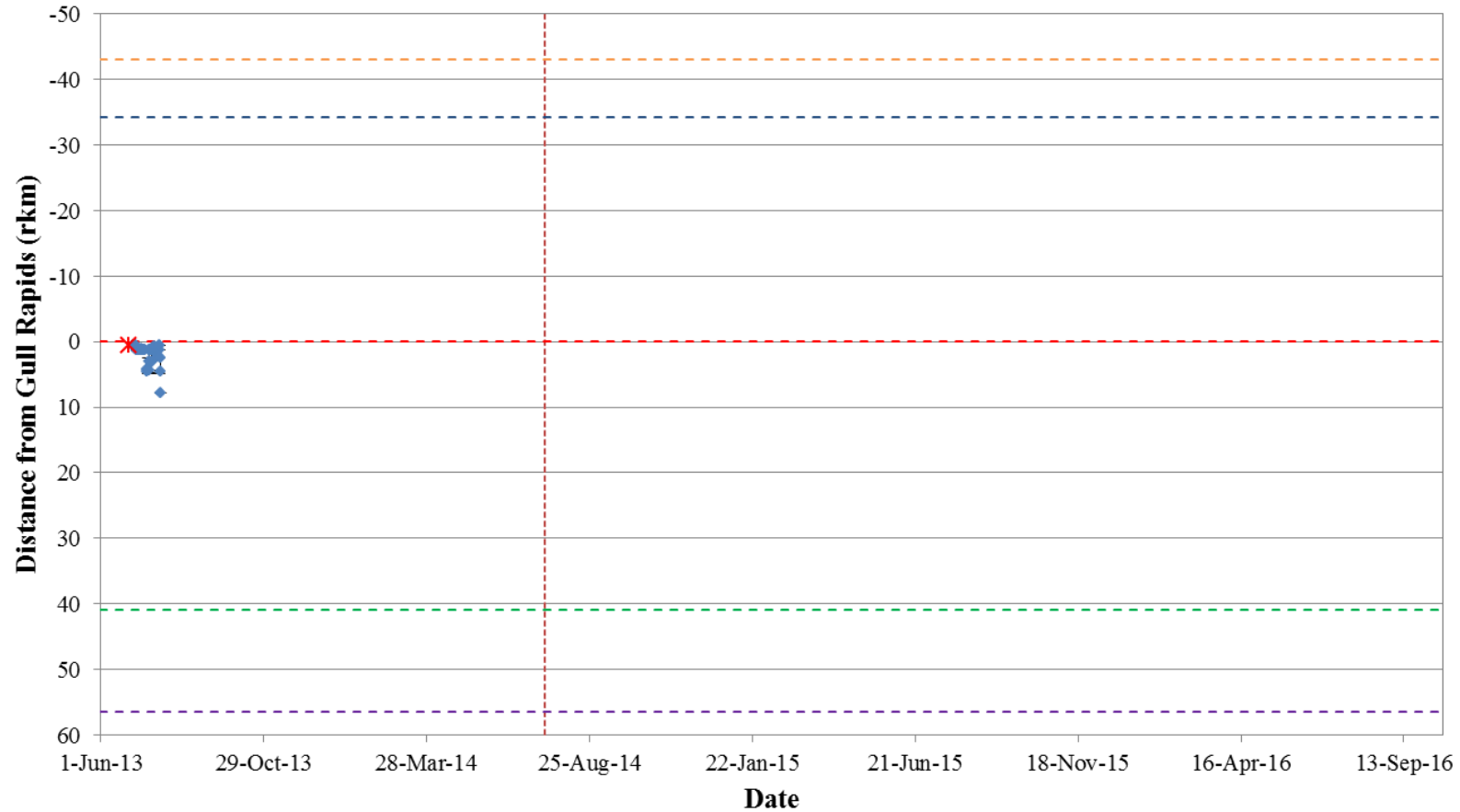


Figure A3-12: Position of a Walleye tagged with an acoustic transmitter (code #32823) in Stephens Lake (rkm > 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

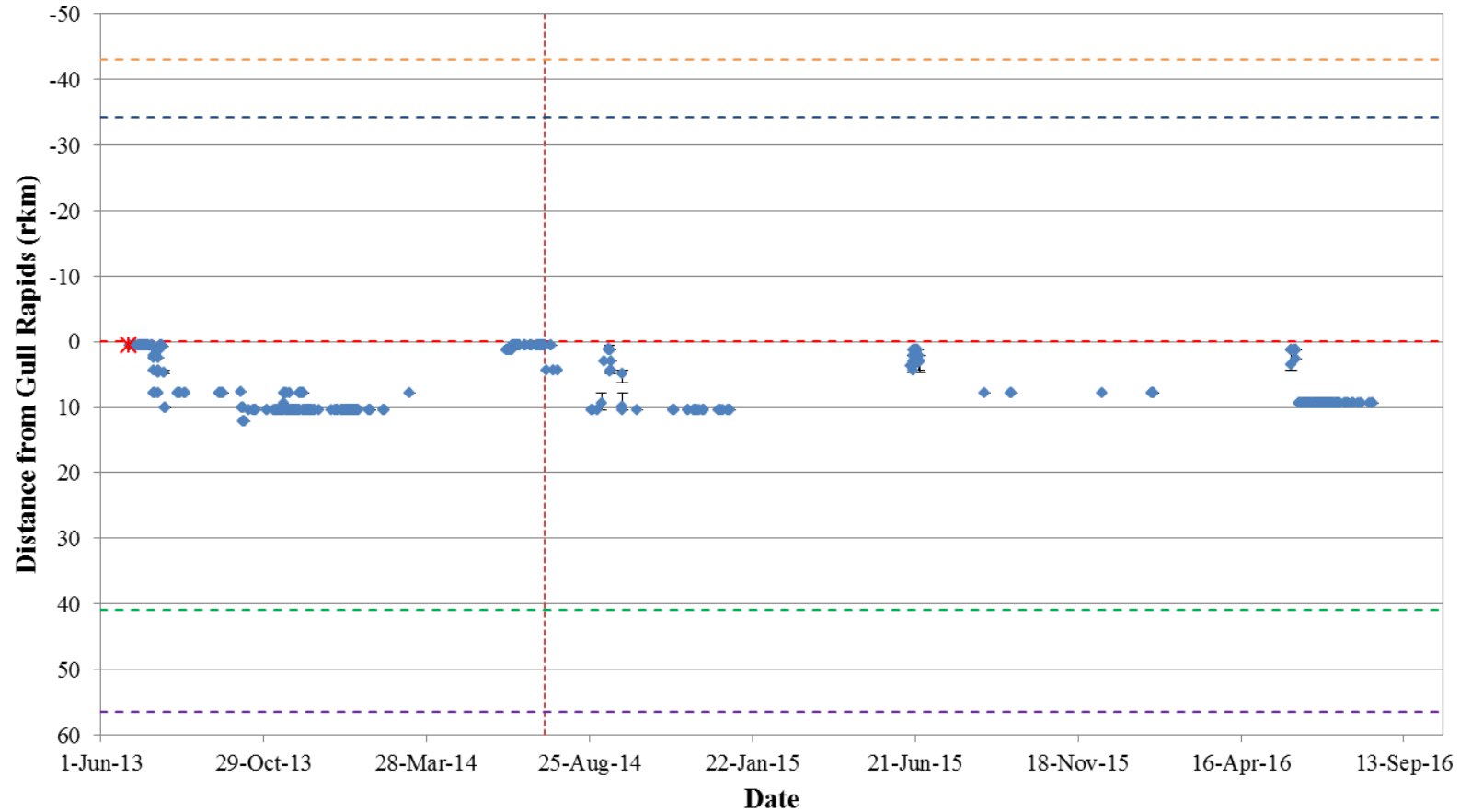


Figure A3-13: Position of a Walleye tagged with an acoustic transmitter (code #32824) in Stephens Lake (rkm > 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

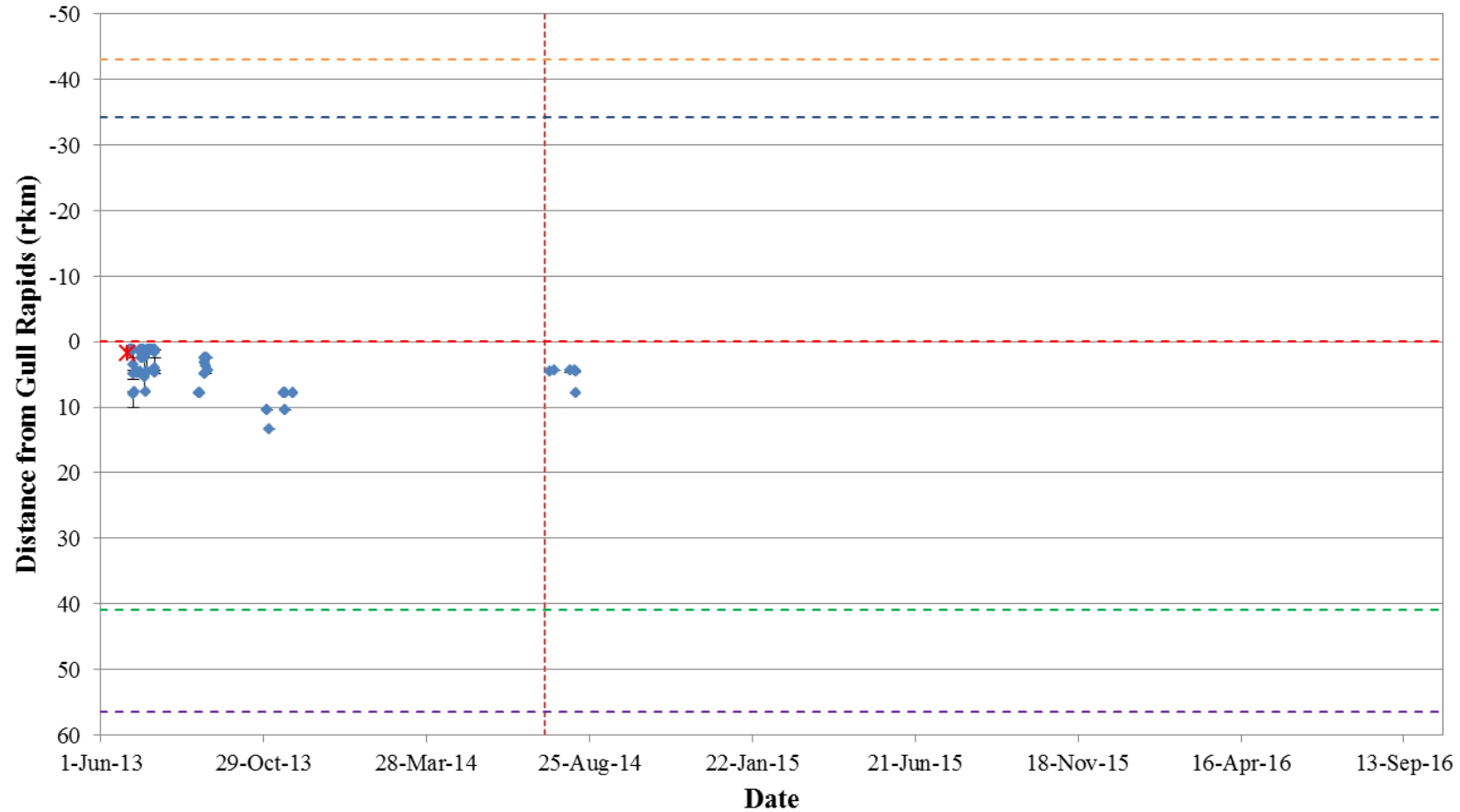


Figure A3-14: Position of a Walleye tagged with an acoustic transmitter (code #32825) in Stephens Lake (rkm > 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

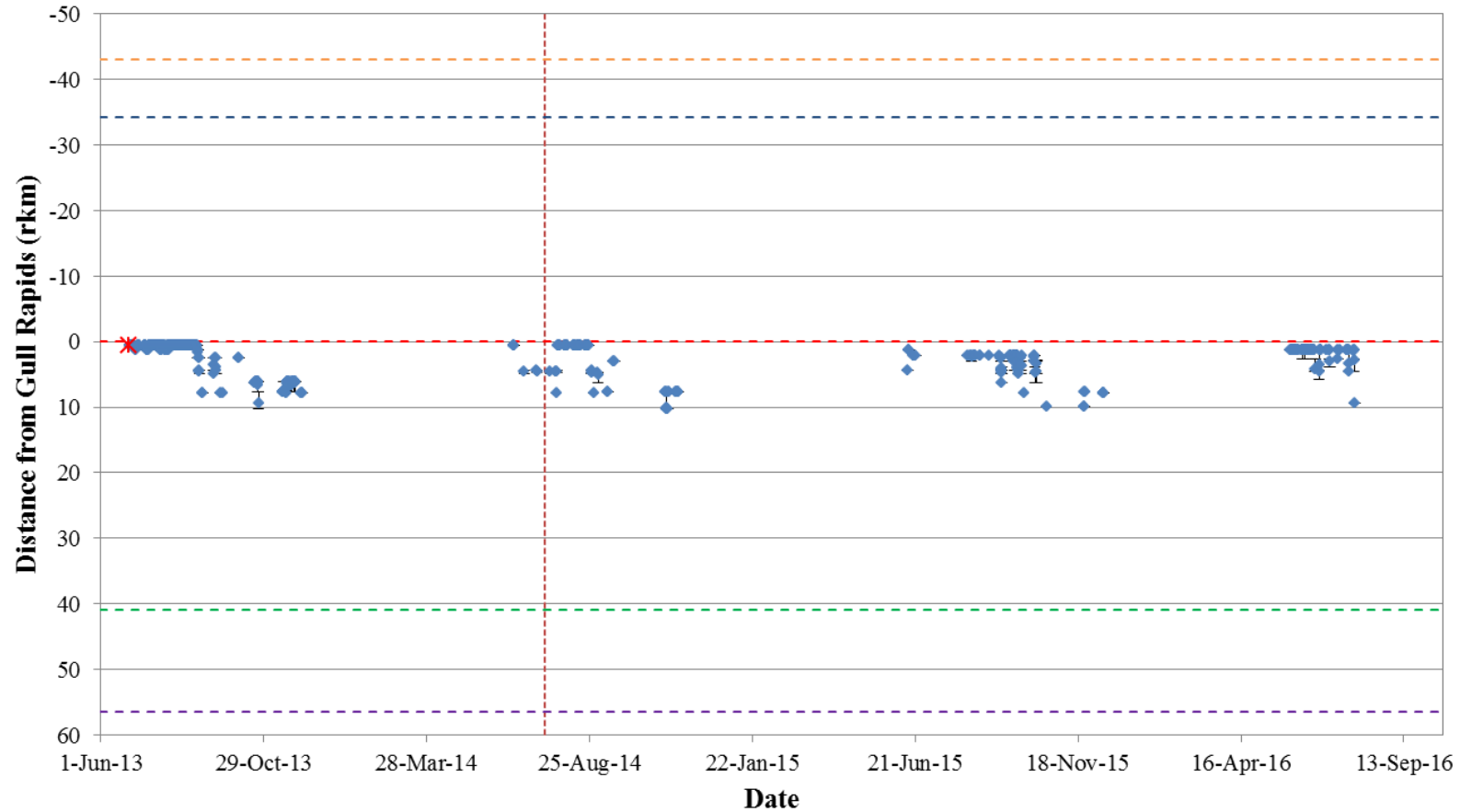


Figure A3-15: Position of a Walleye tagged with an acoustic transmitter (code #32826) in Stephens Lake (rkm > 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

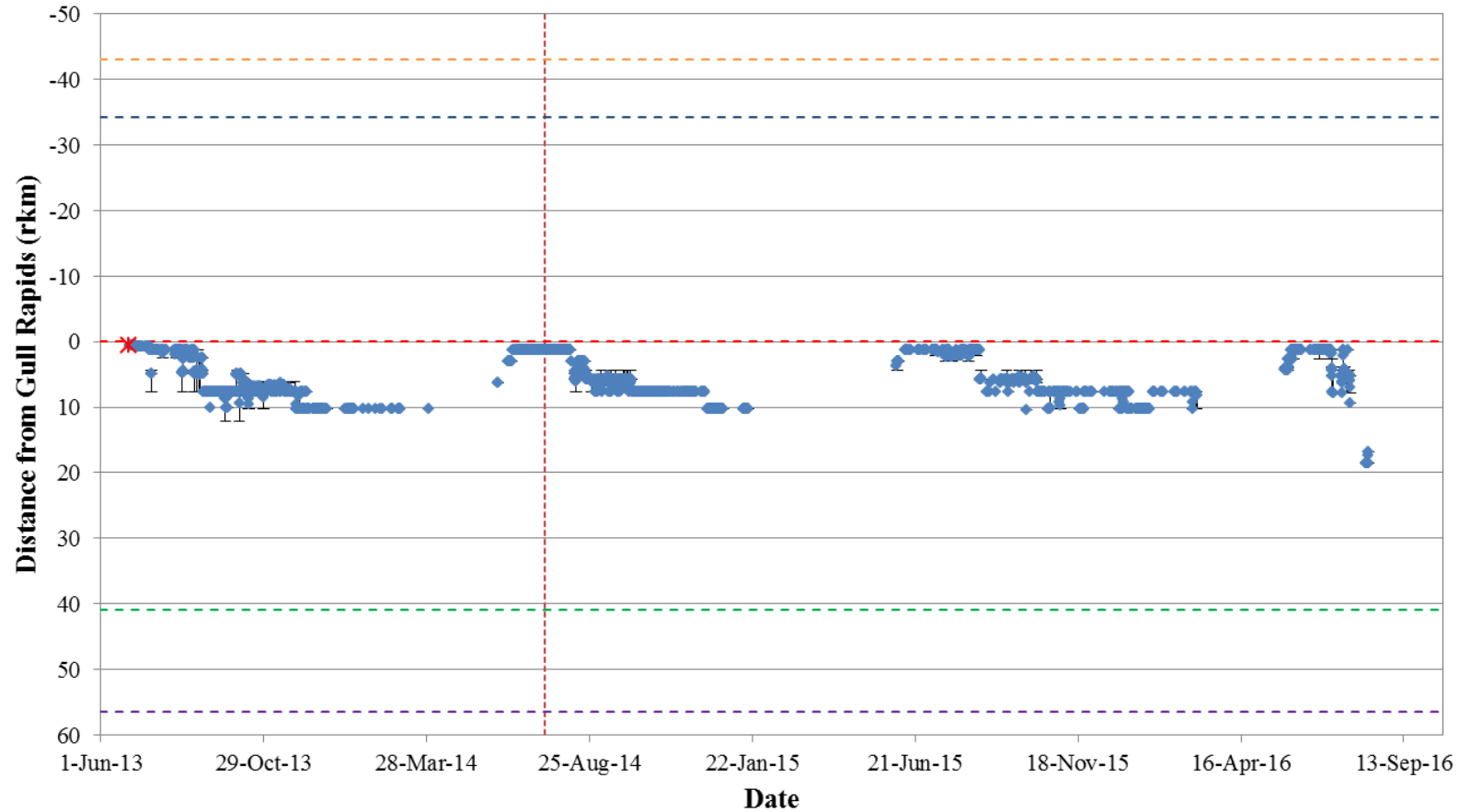


Figure A3-16: Position of a Walleye tagged with an acoustic transmitter (code #32827) in Stephens Lake (rkm > 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

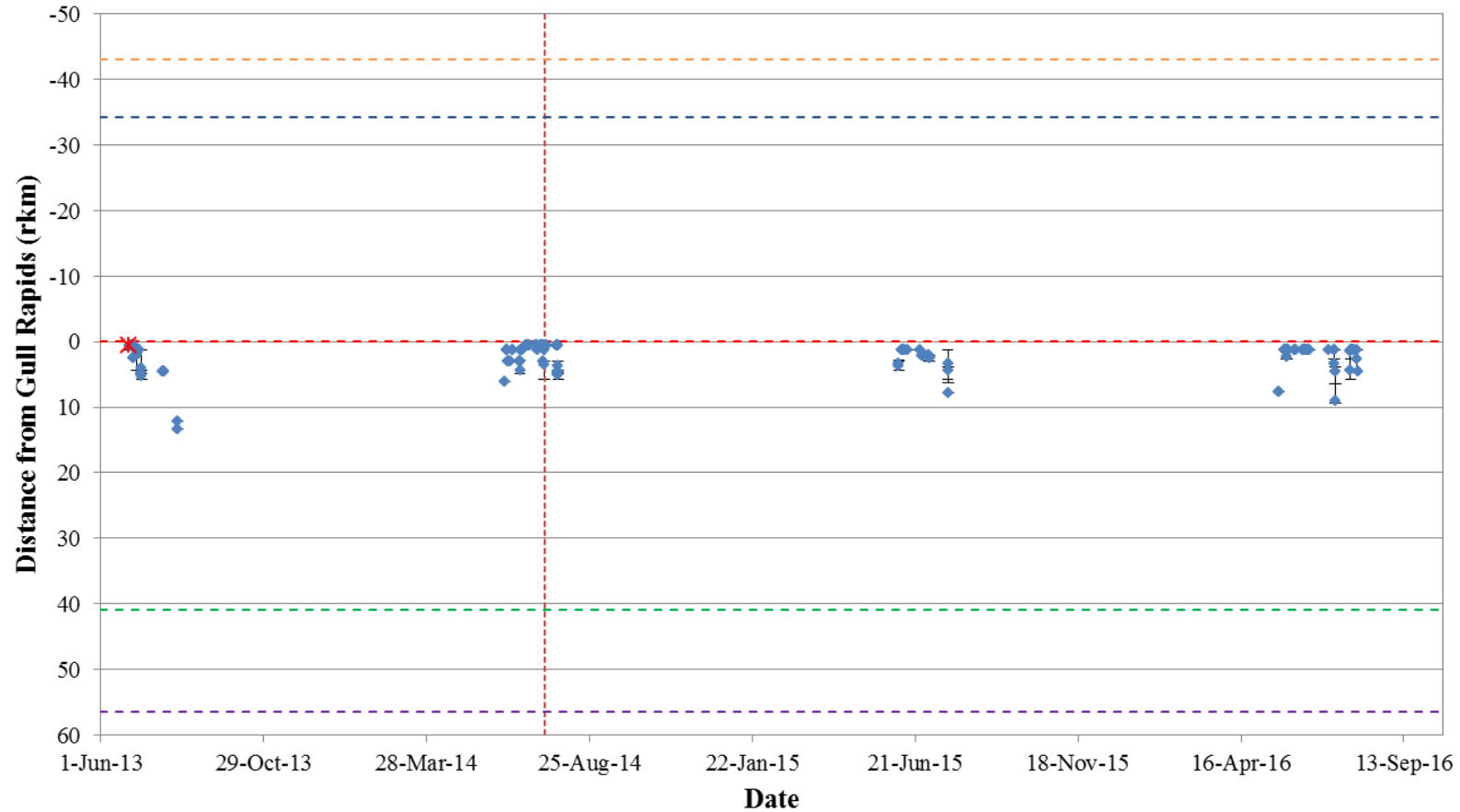


Figure A3-17: Position of a Walleye tagged with an acoustic transmitter (code #32828) in Stephens Lake (rkm > 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

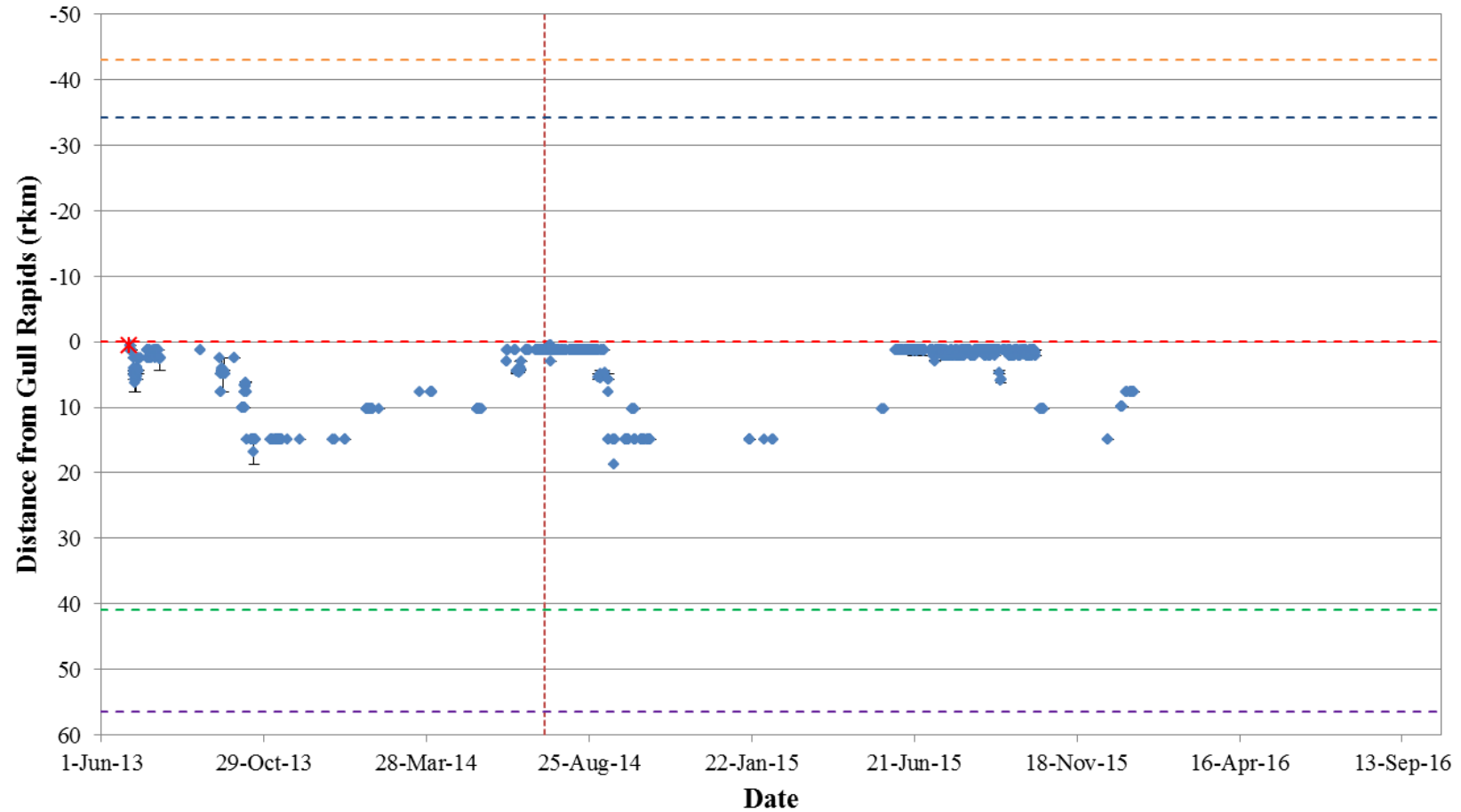


Figure A3-18: Position of a Walleye tagged with an acoustic transmitter (code #32829) in Stephens Lake (rkm > 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

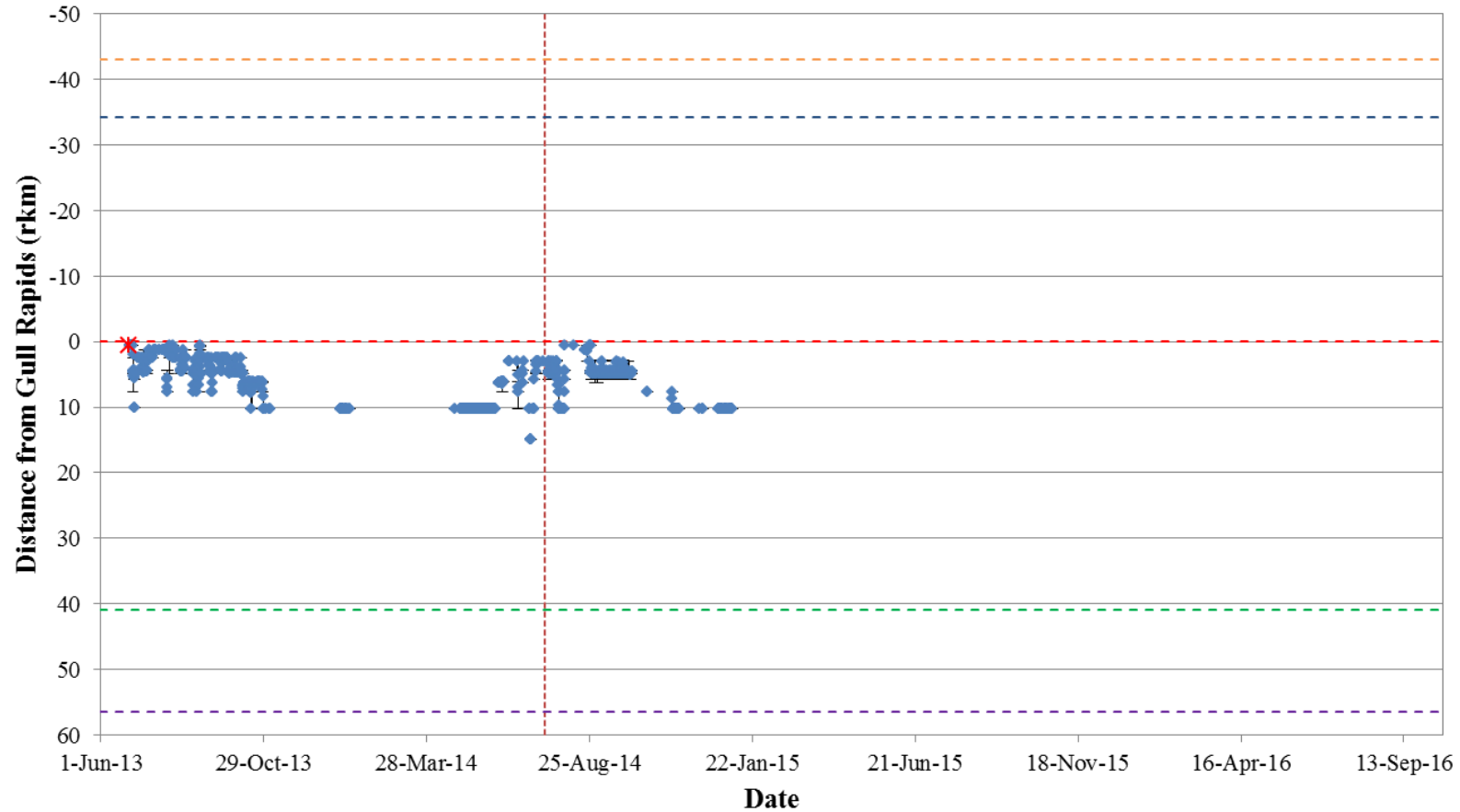


Figure A3-19: Position of a Walleye tagged with an acoustic transmitter (code #32830) in Stephens Lake (rkm > 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

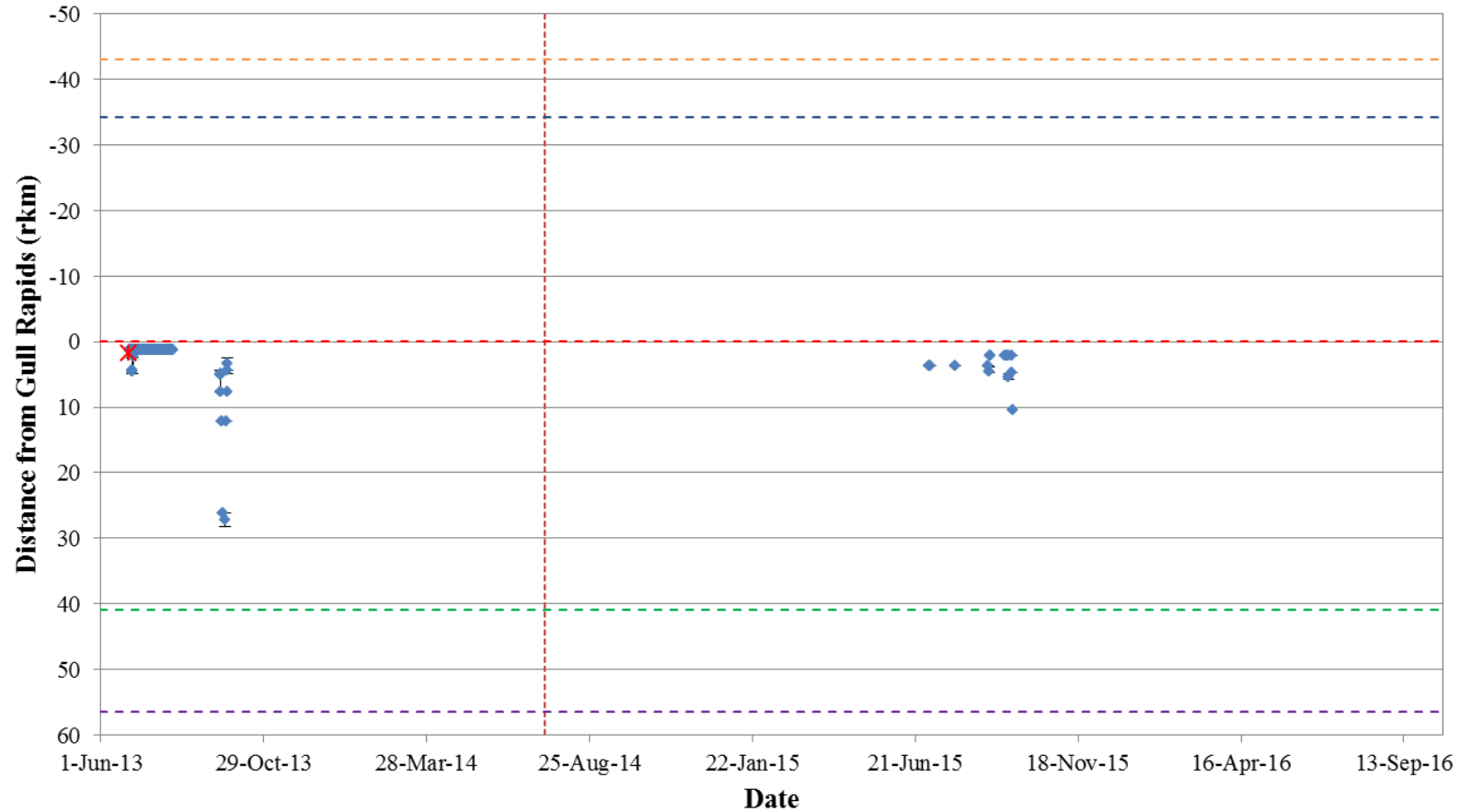


Figure A3-20: Position of a Walleye tagged with an acoustic transmitter (code #32831) in Stephens Lake (rkm > 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

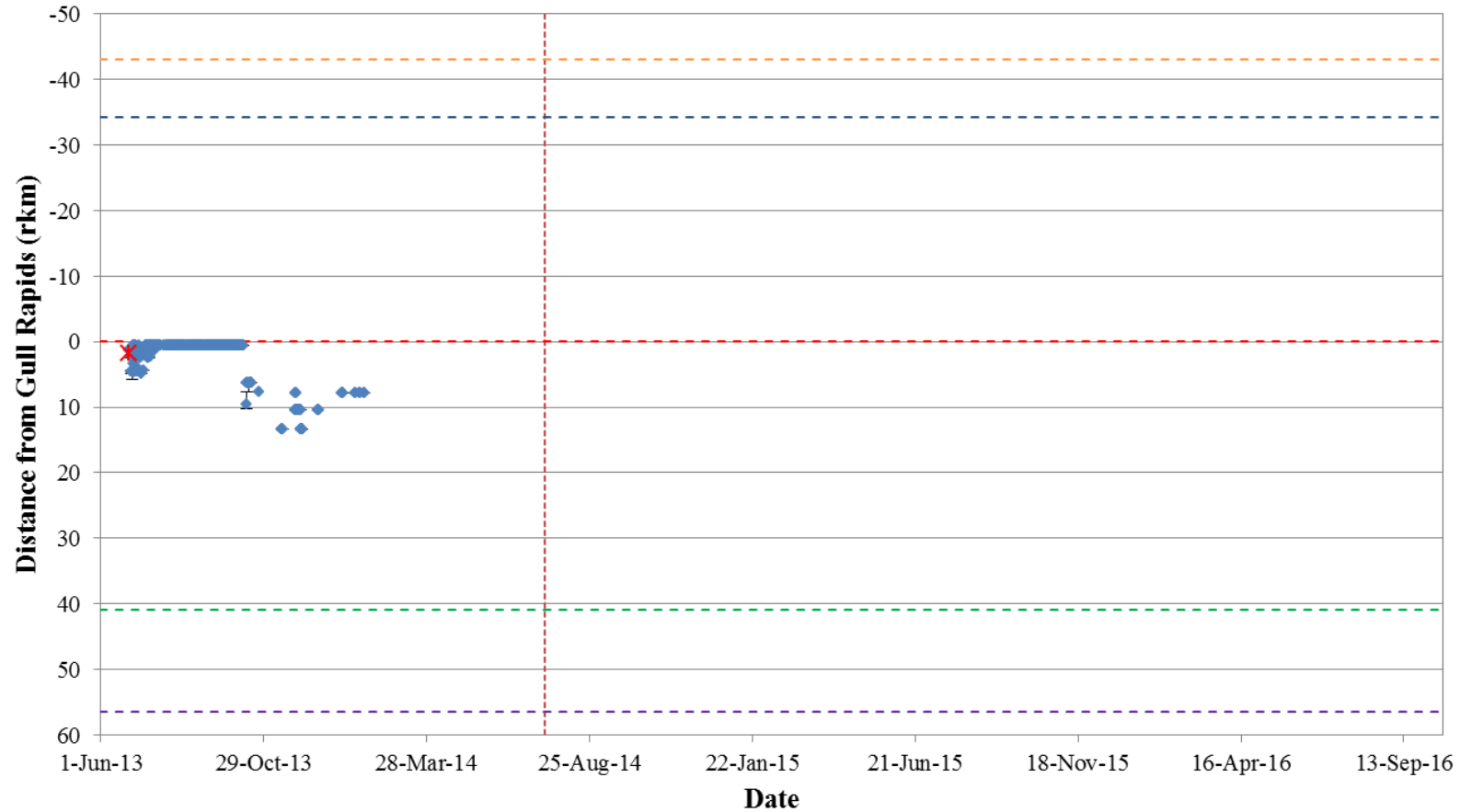


Figure A3-21: Position of a Walleye tagged with an acoustic transmitter (code #32832) in Stephens Lake (rkm > 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

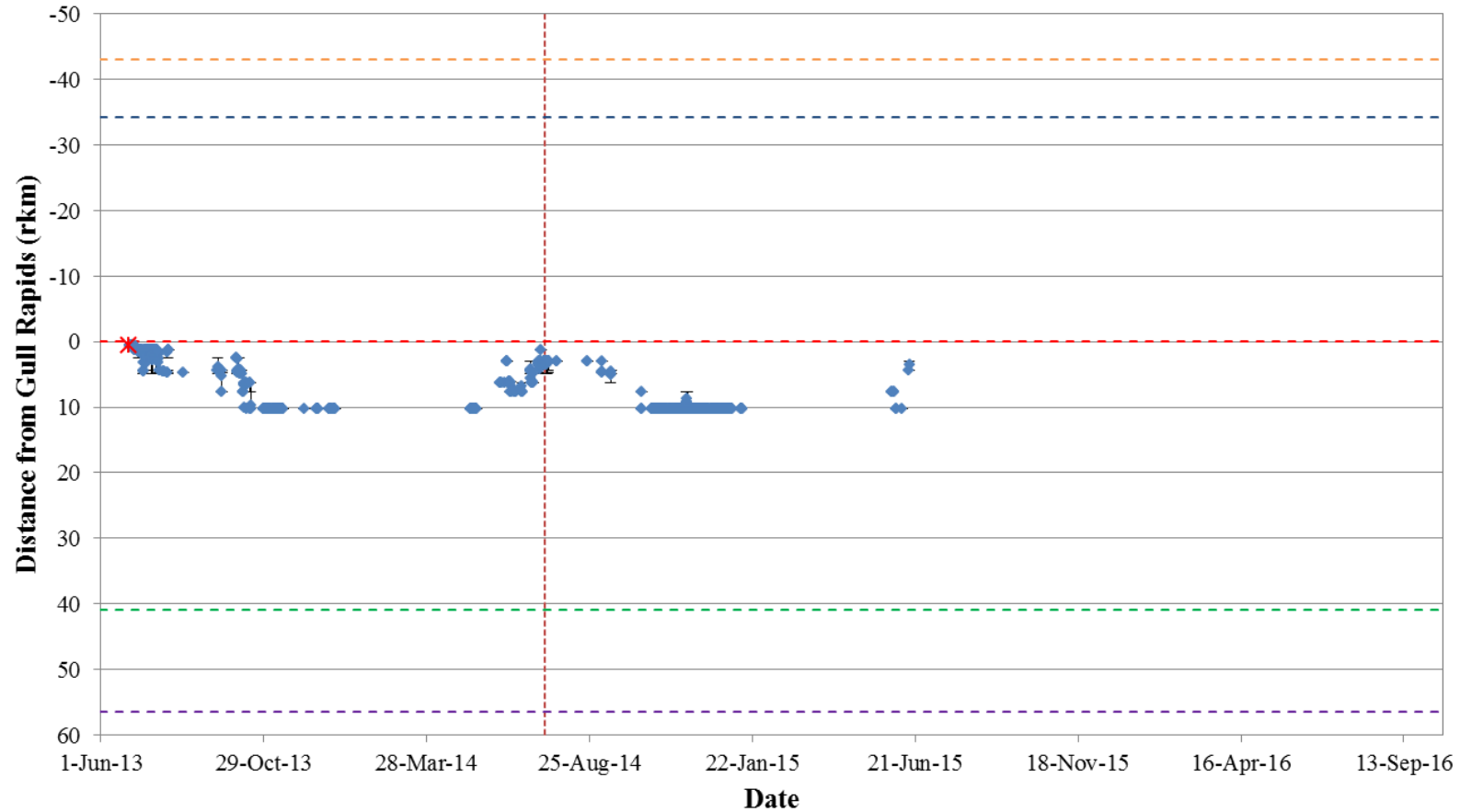


Figure A3-22: Position of a Walleye tagged with an acoustic transmitter (code #32834) in Stephens Lake (rkm > 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

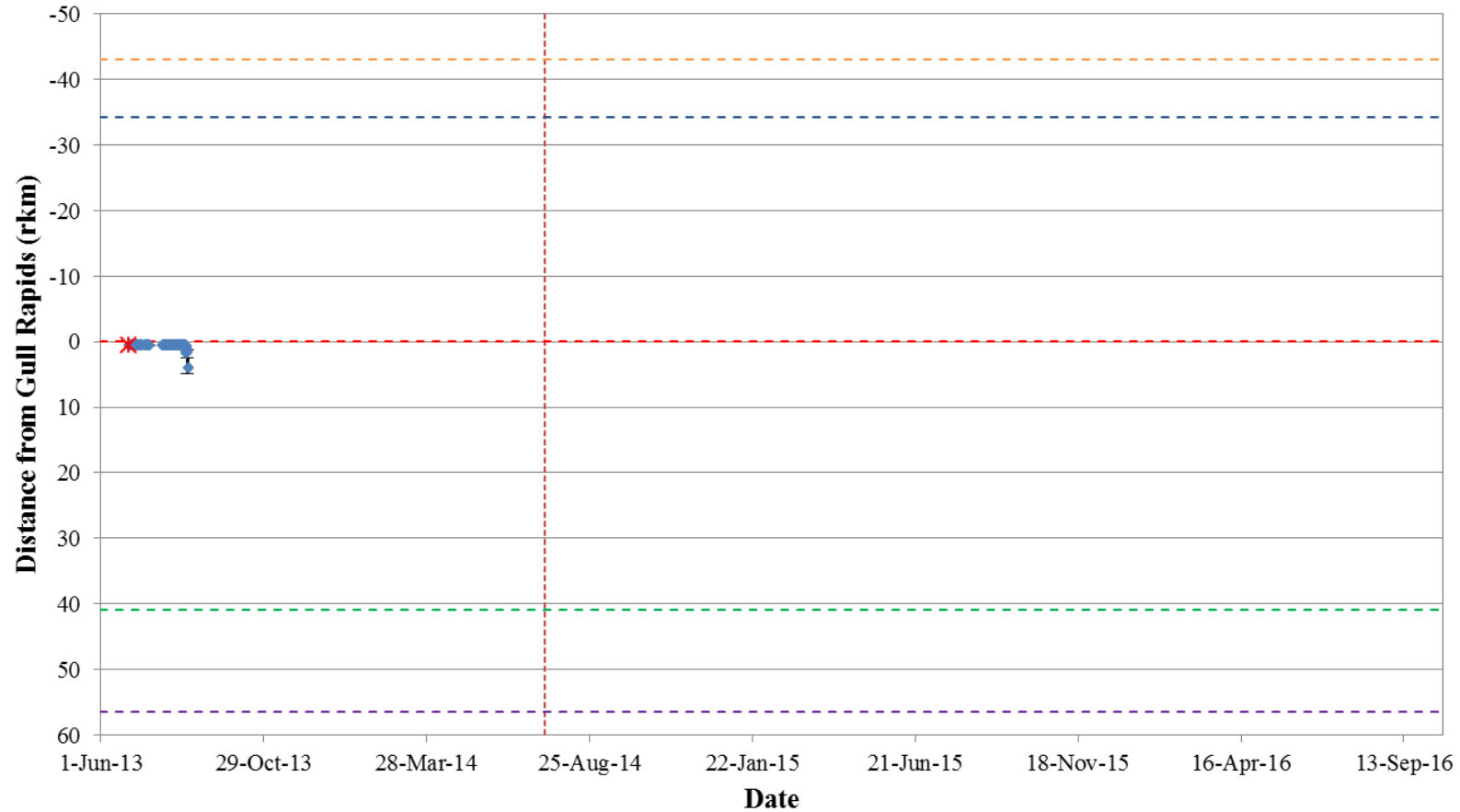


Figure A3-23: Position of a Walleye tagged with an acoustic transmitter (code #32835) in Stephens Lake (rkm >0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

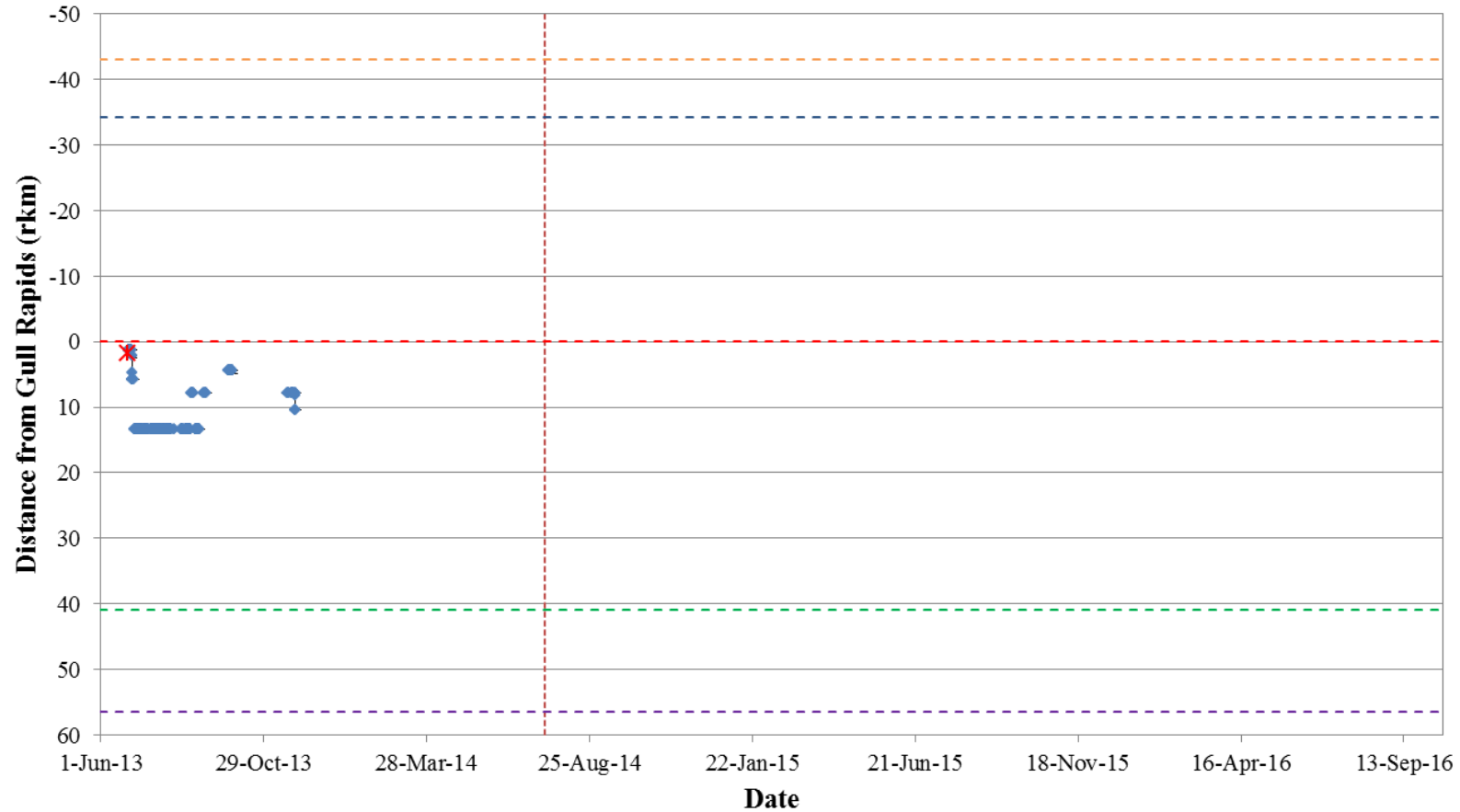


Figure A3-24: Position of a Walleye tagged with an acoustic transmitter (code #32836) in Stephens Lake (rkm > 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

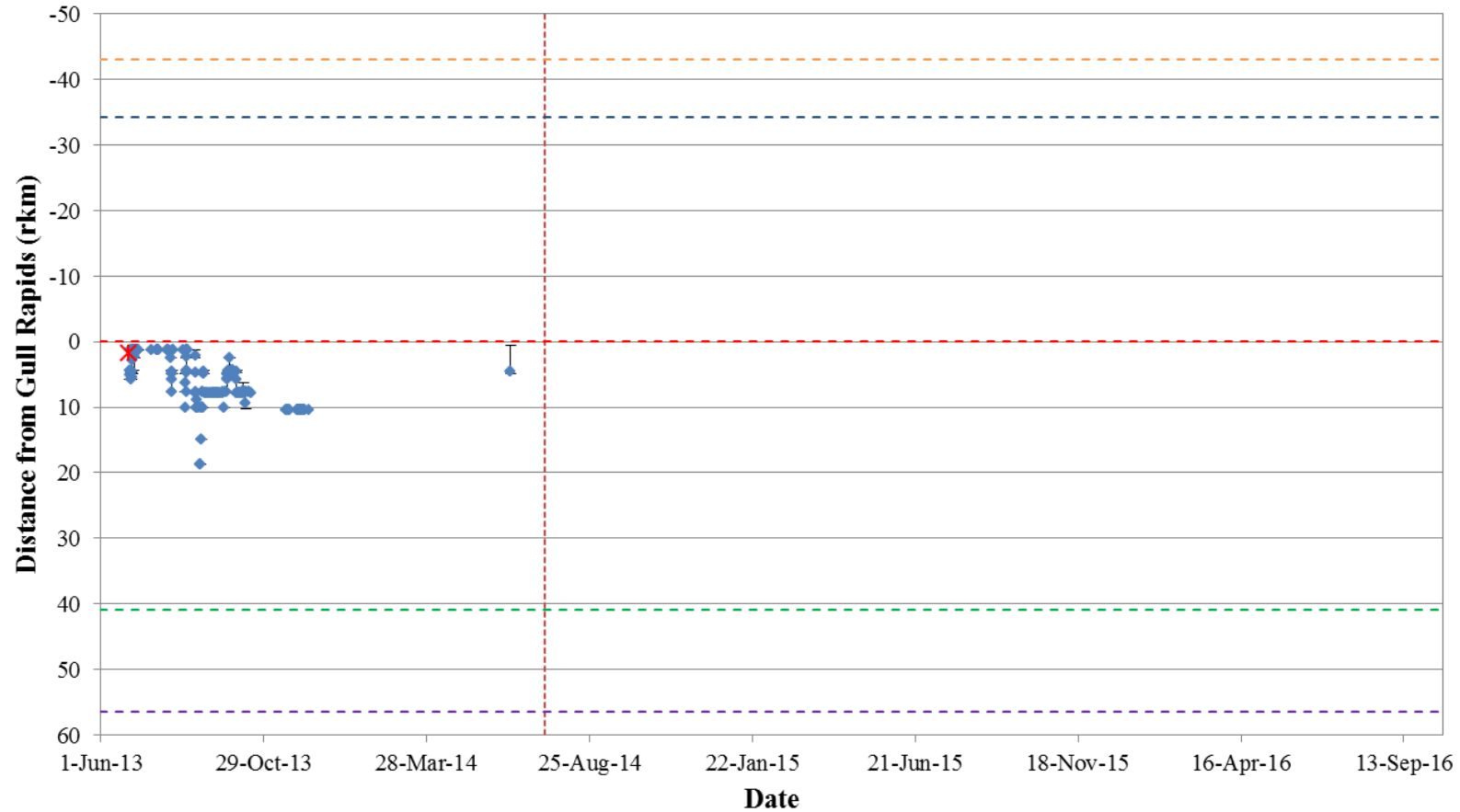


Figure A3-25: Position of a Walleye tagged with an acoustic transmitter (code #32837) in Stephens Lake (rkm > 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

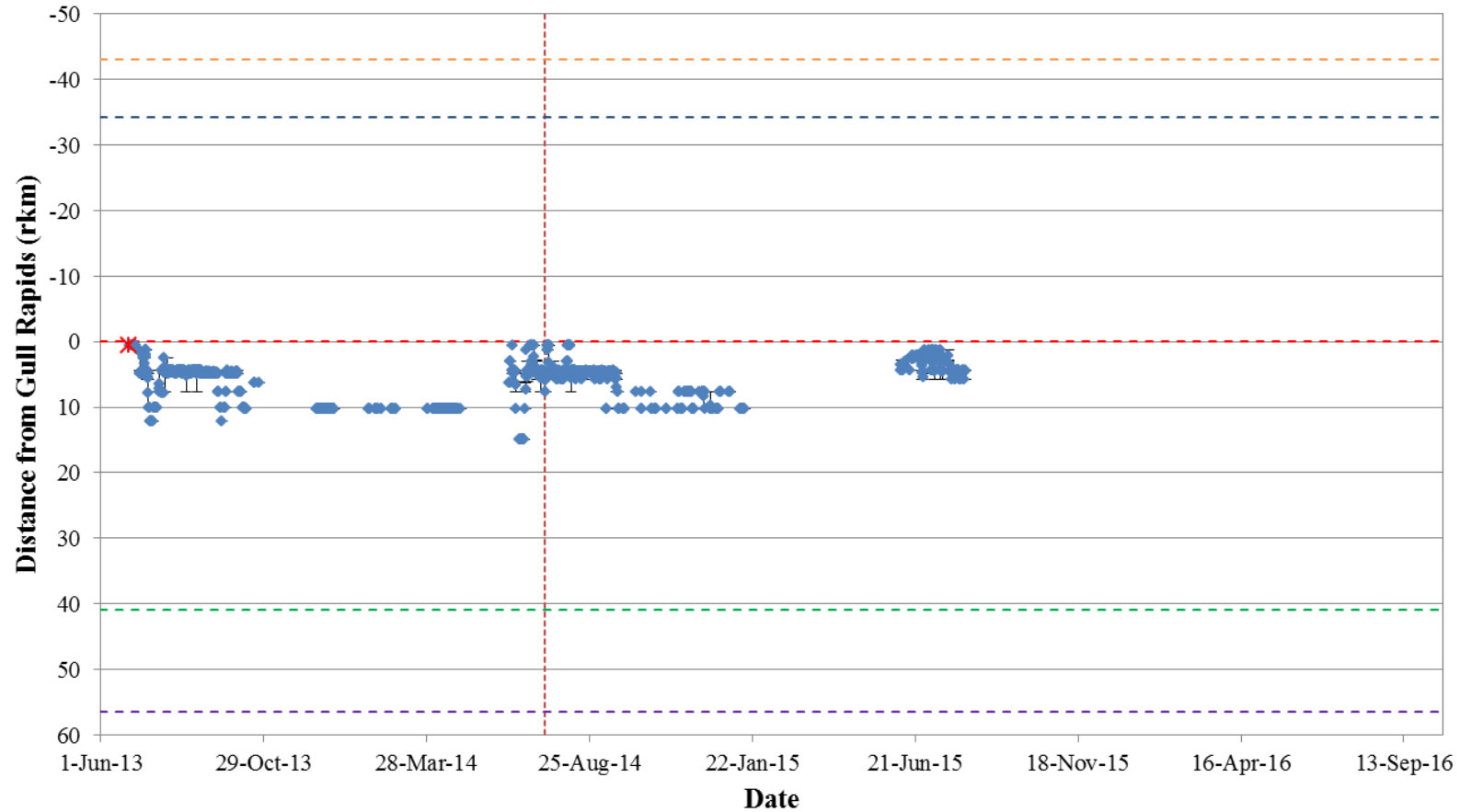


Figure A3-26: Position of a Walleye tagged with an acoustic transmitter (code #32838) in Stephens Lake (rkm > 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

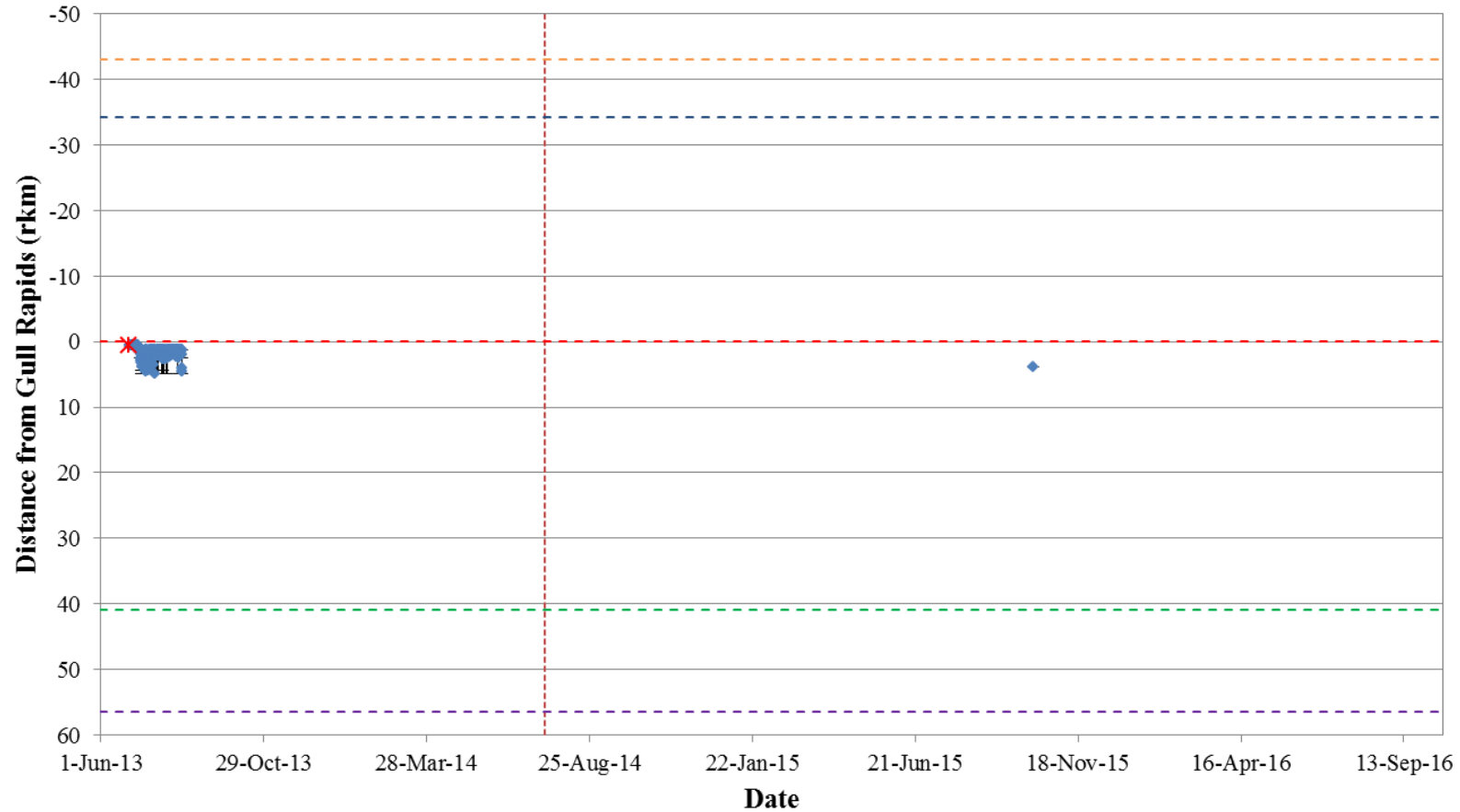


Figure A3-27: Position of a Walleye tagged with an acoustic transmitter (code #32839) in Stephens Lake (rkm >0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

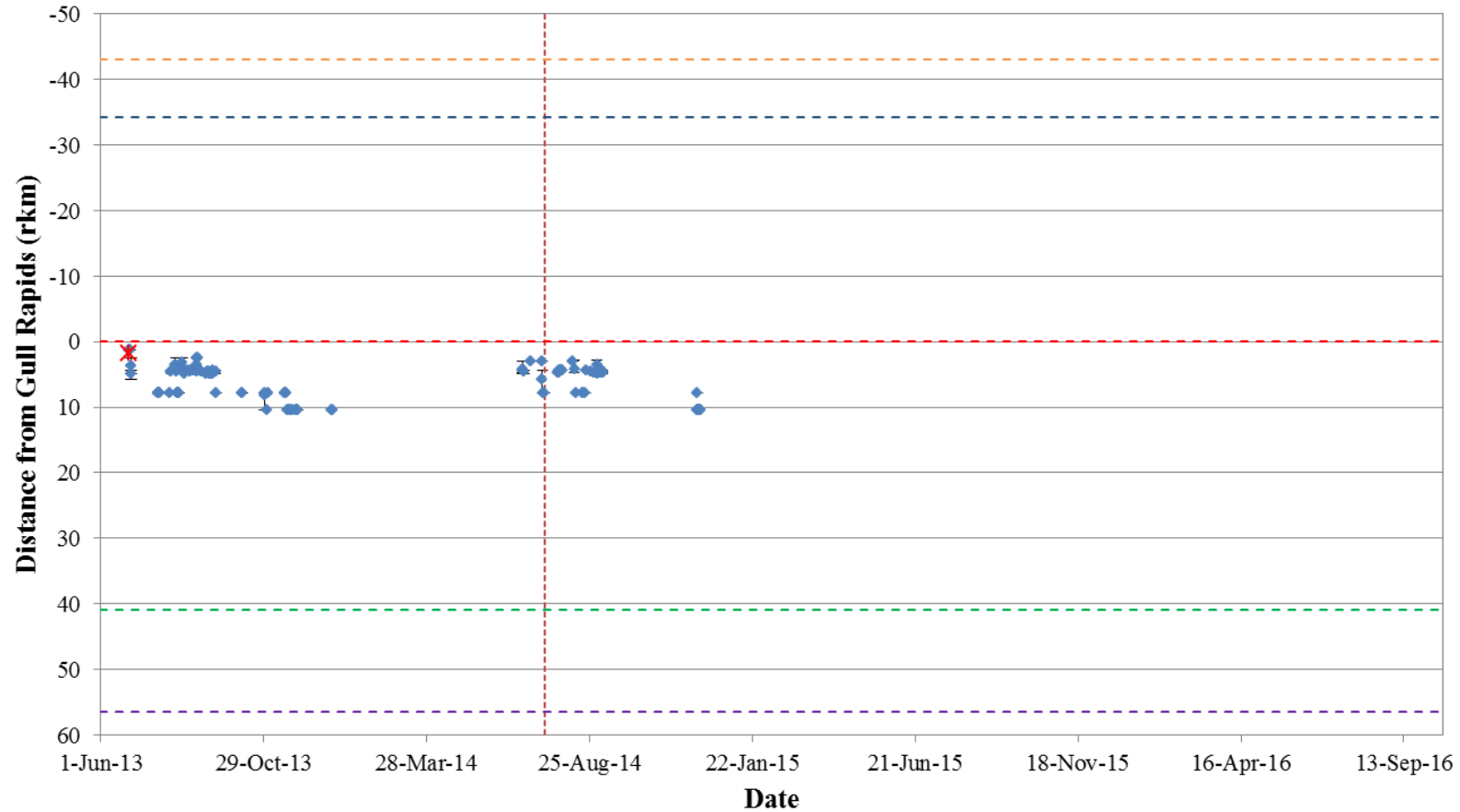


Figure A3-28: Position of a Walleye tagged with an acoustic transmitter (code #32840) in Stephens Lake (rkm > 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

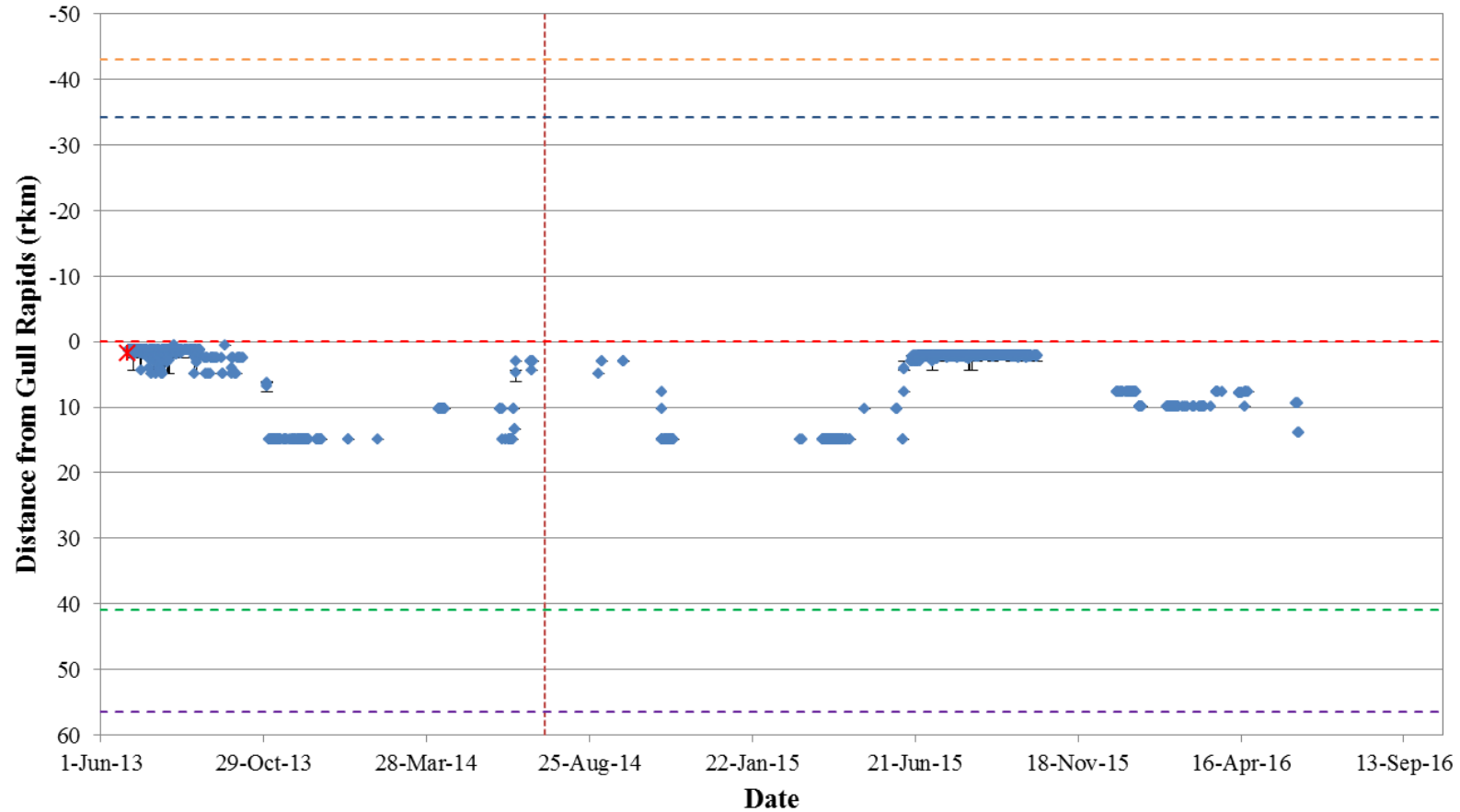


Figure A3-29: Position of a Walleye tagged with an acoustic transmitter (code #32841) in Stephens Lake (rkm > 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

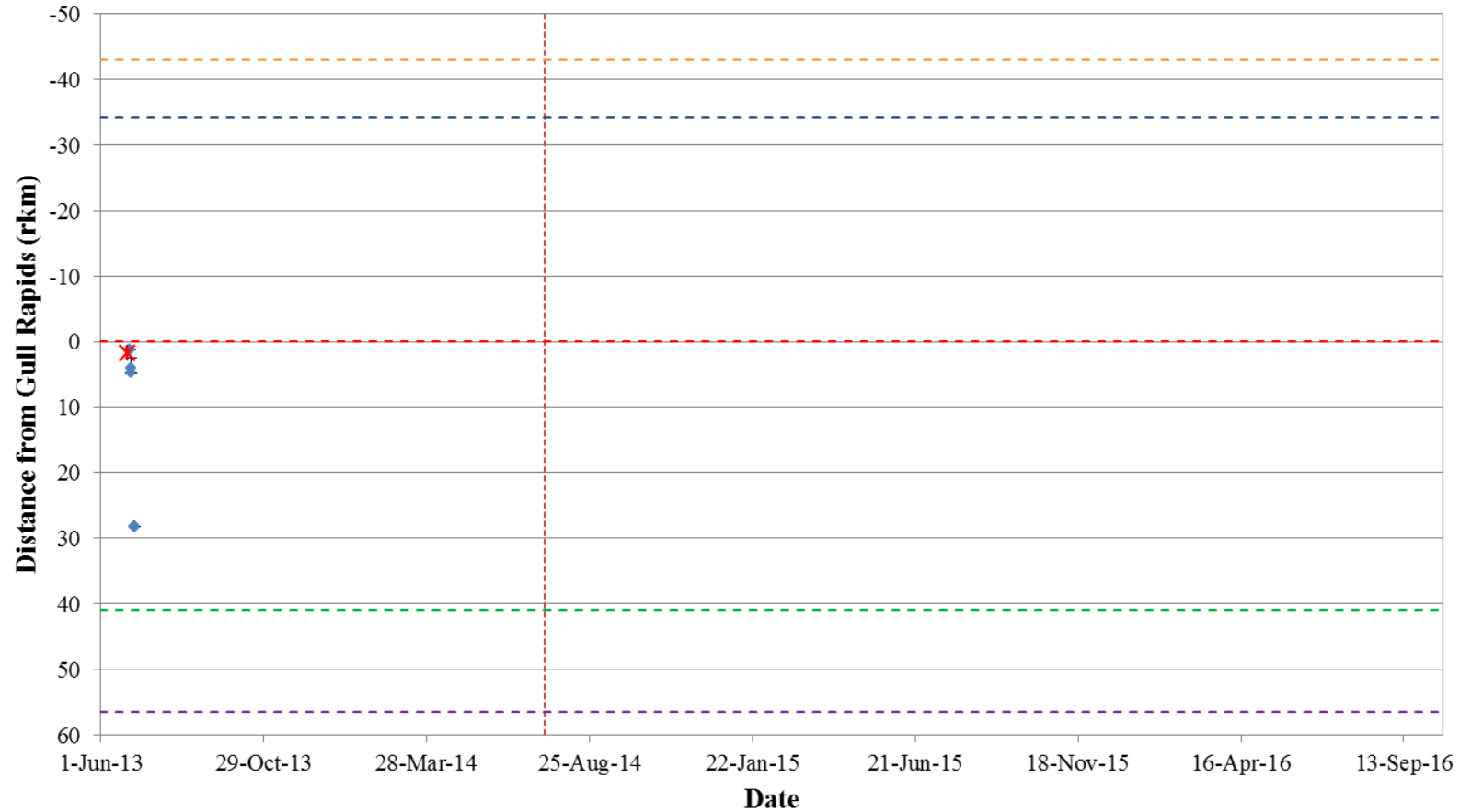


Figure A3-30: Position of a Walleye tagged with an acoustic transmitter (code #32842) in Stephens Lake (rkm >0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

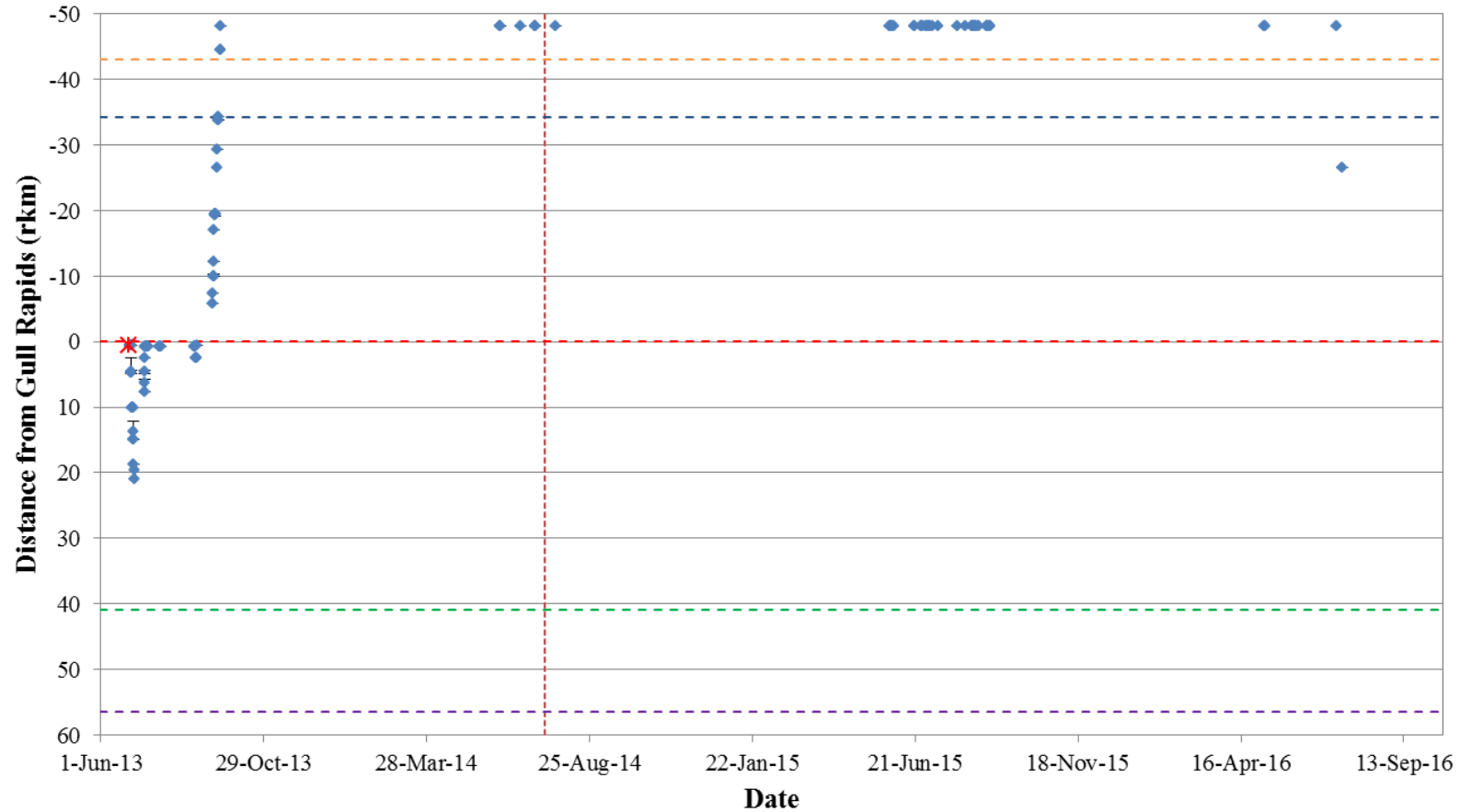


Figure A3-31: Position of a Walleye tagged with an acoustic transmitter (code #32843) in Stephens Lake (rkm > 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

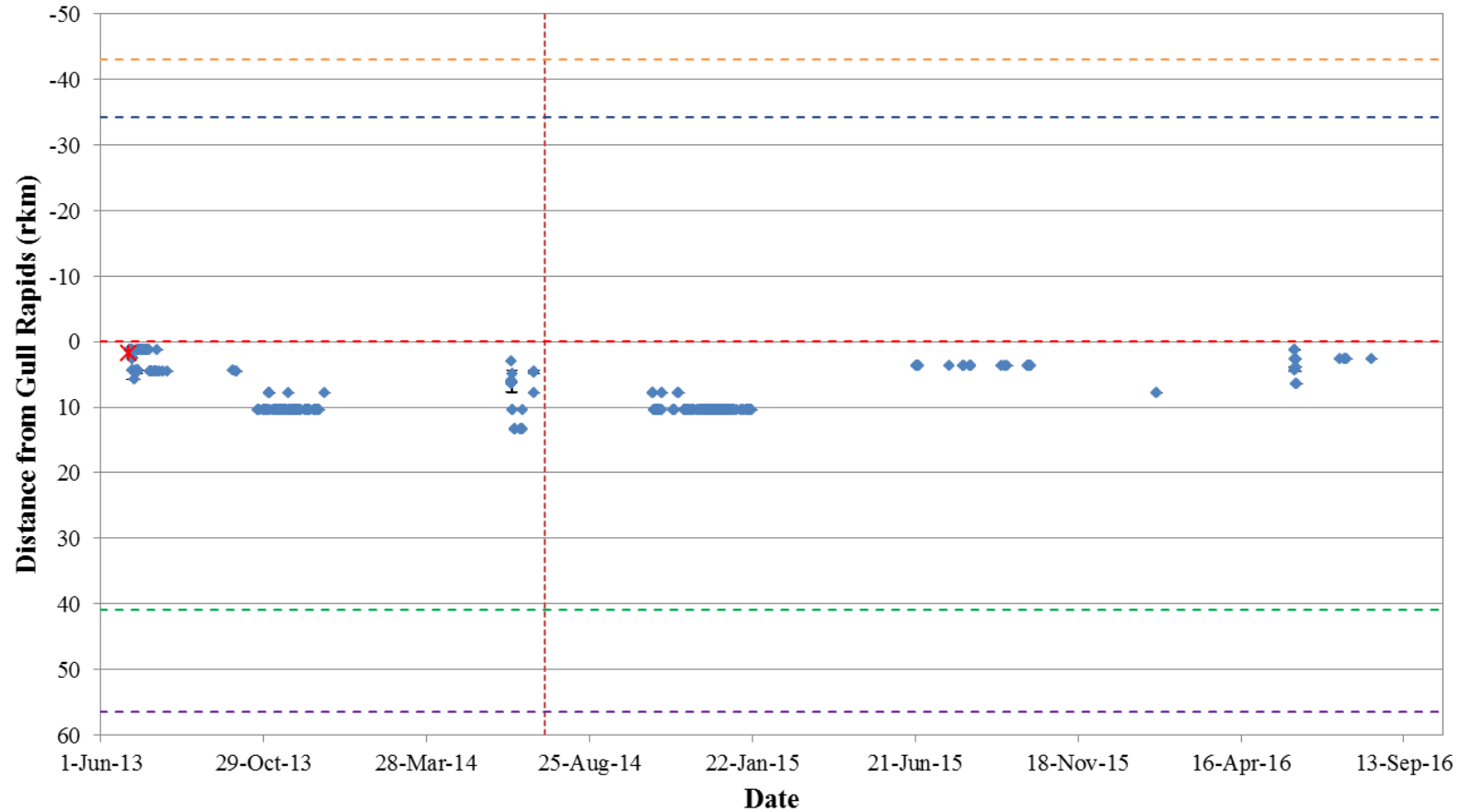


Figure A3-32: Position of a Walleye tagged with an acoustic transmitter (code #32844) in Stephens Lake (rkm > 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

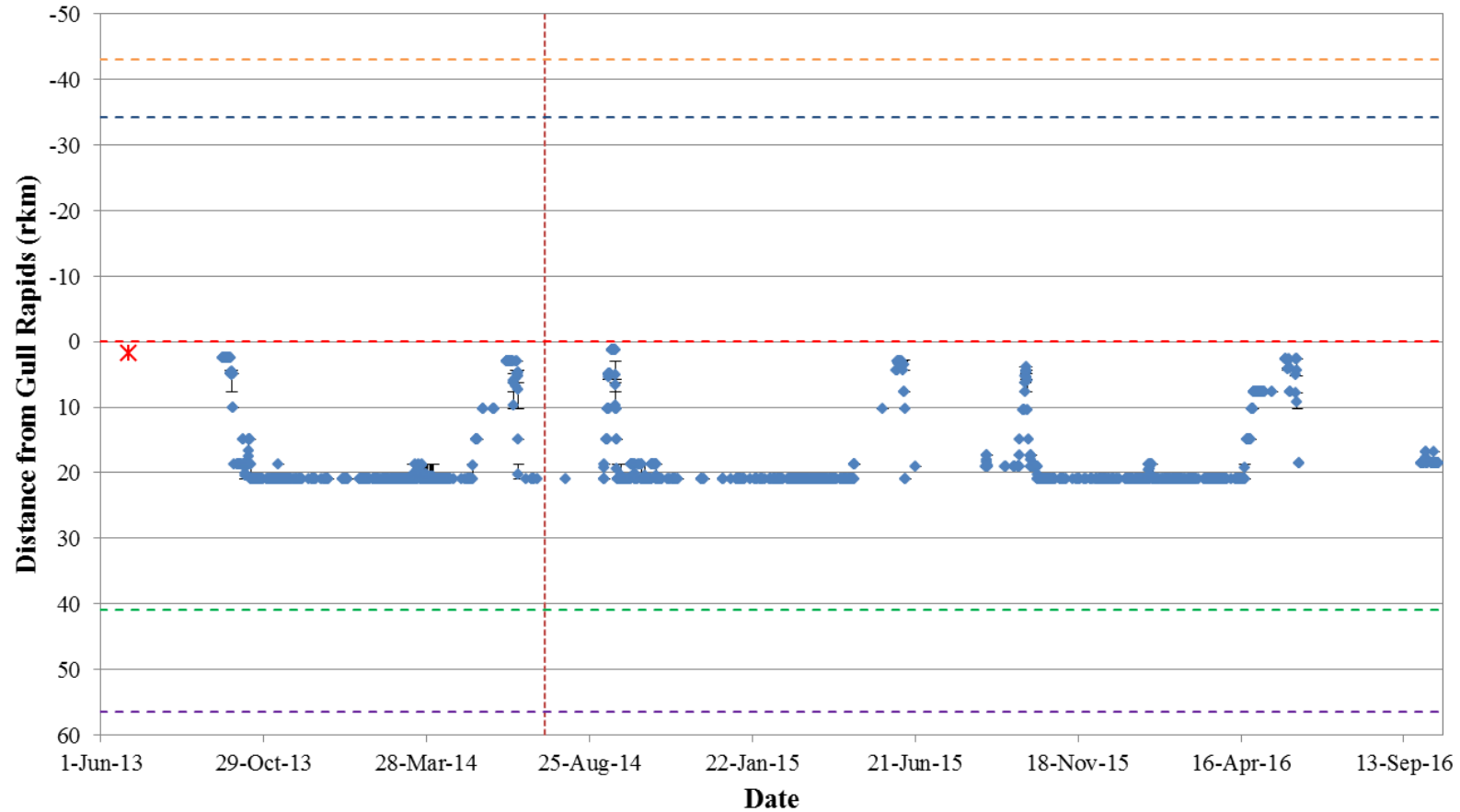


Figure A3-33: Position of a Walleye tagged with an acoustic transmitter (code #32845) in Stephens Lake (rkm > 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

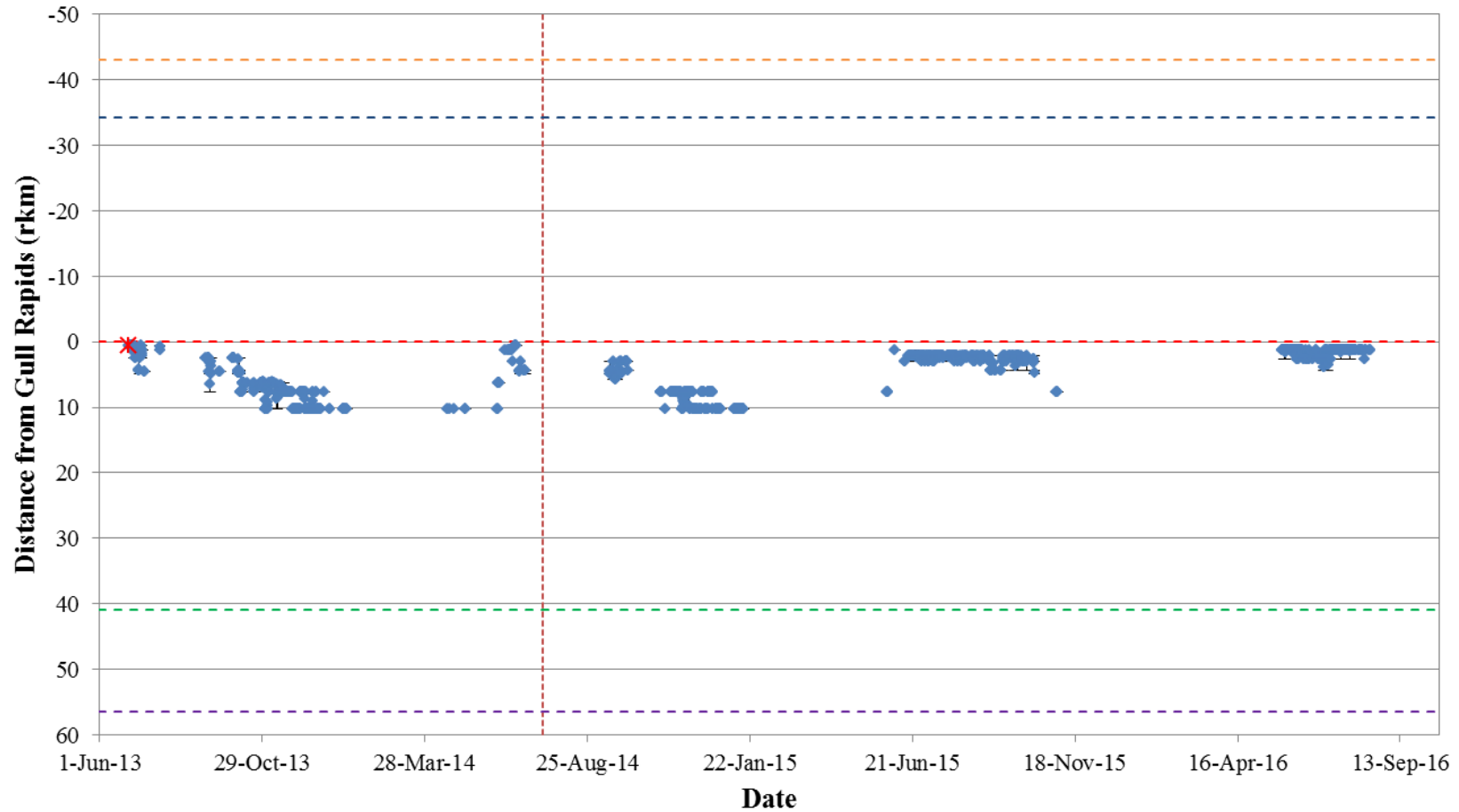


Figure A3-34: Position of a Walleye tagged with an acoustic transmitter (code #32848) in Stephens Lake (rkm > 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

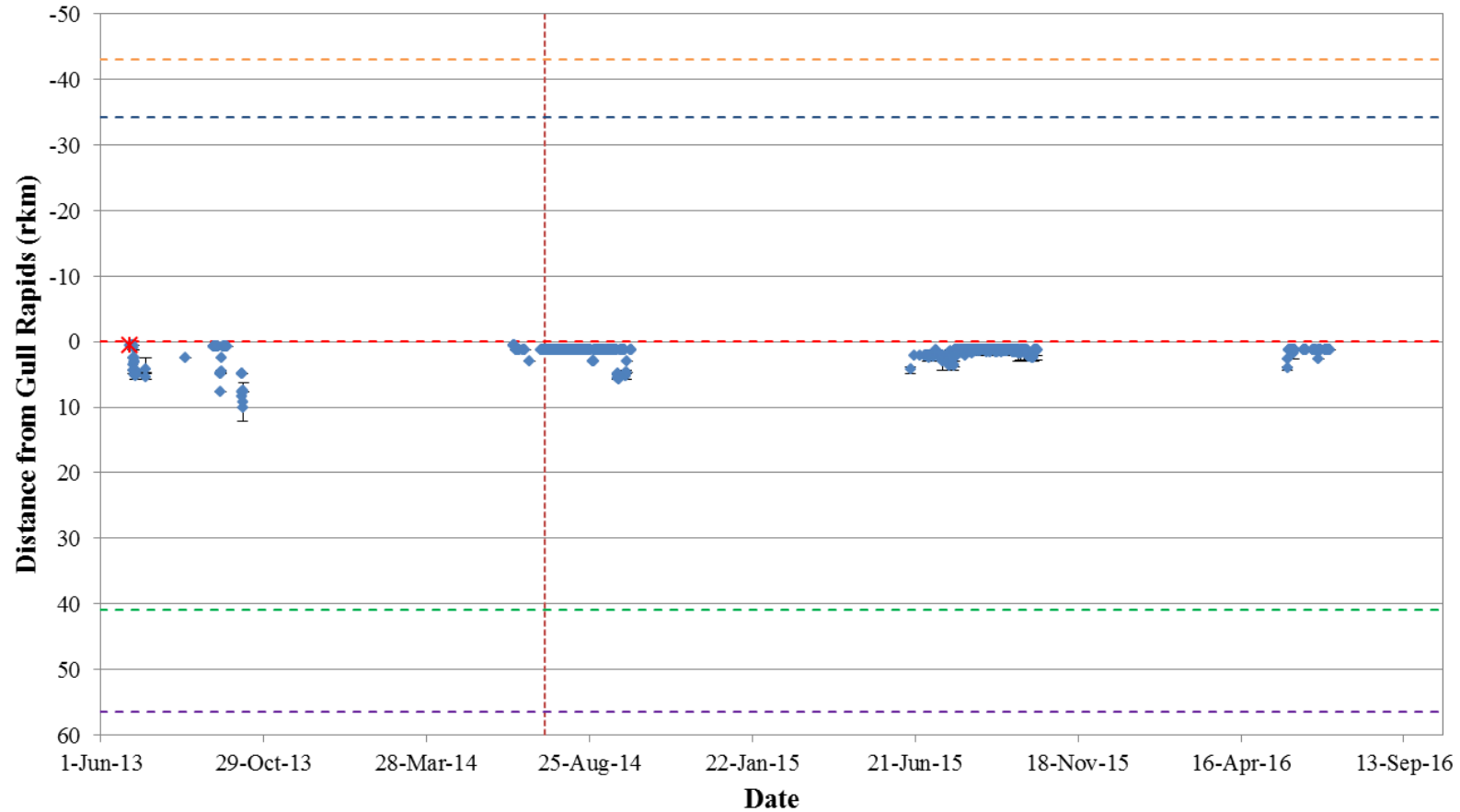


Figure A3-35: Position of a Walleye tagged with an acoustic transmitter (code #32849) in Stephens Lake (rkm > 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

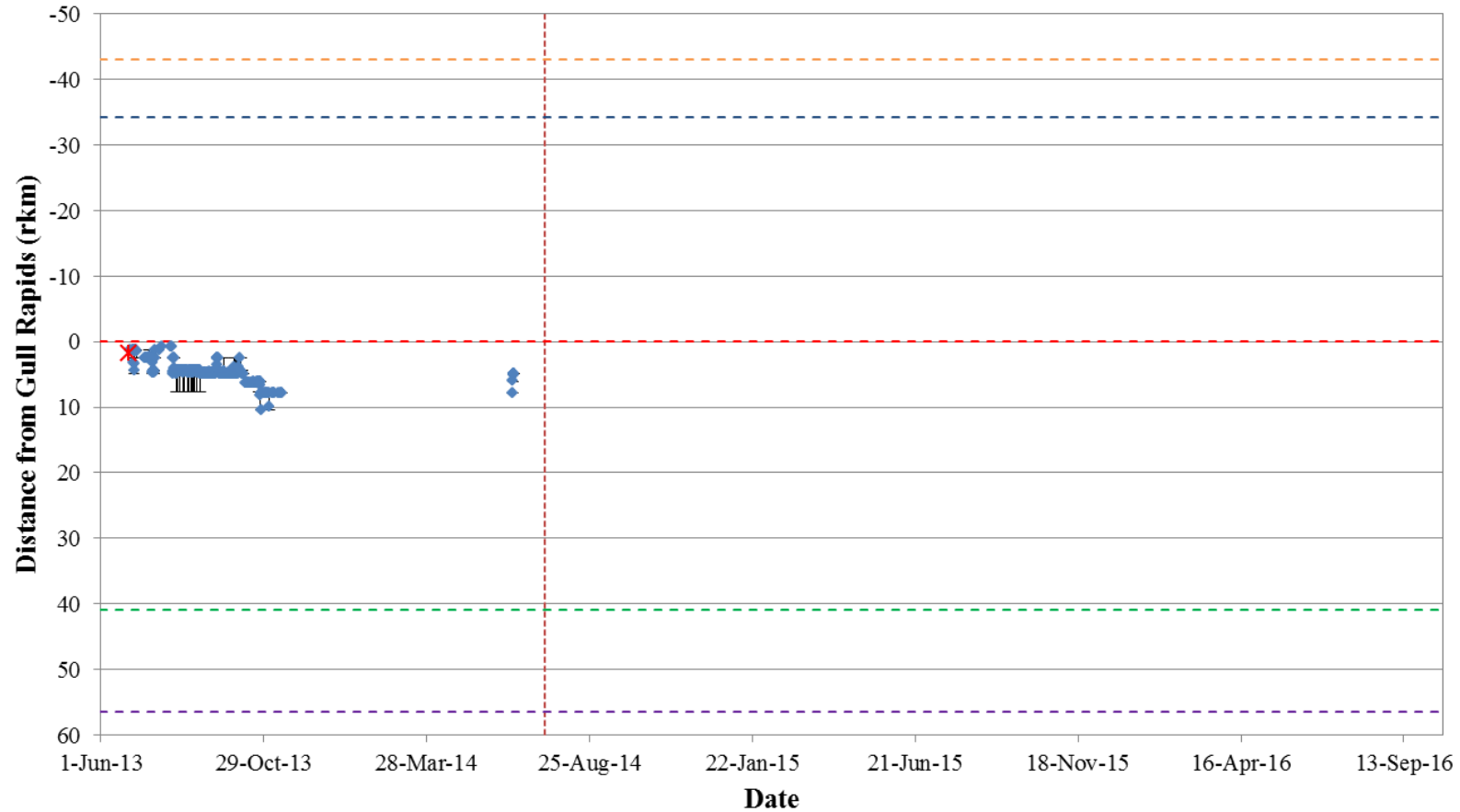


Figure A3-36: Position of a Walleye tagged with an acoustic transmitter (code #32850) in Stephens Lake (rkm > 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

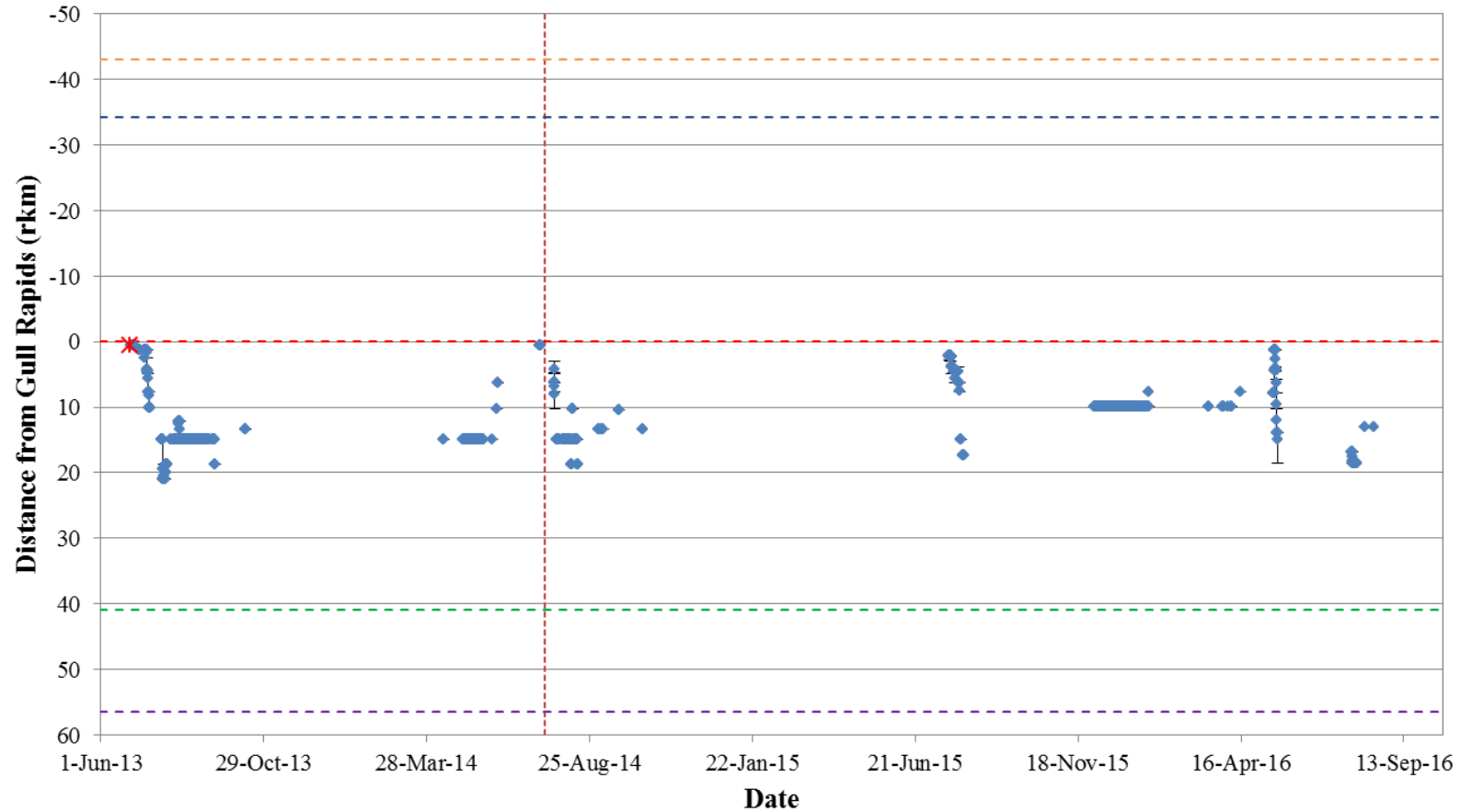


Figure A3-37: Position of a Walleye tagged with an acoustic transmitter (code #32854) in Stephens Lake (rkm > 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

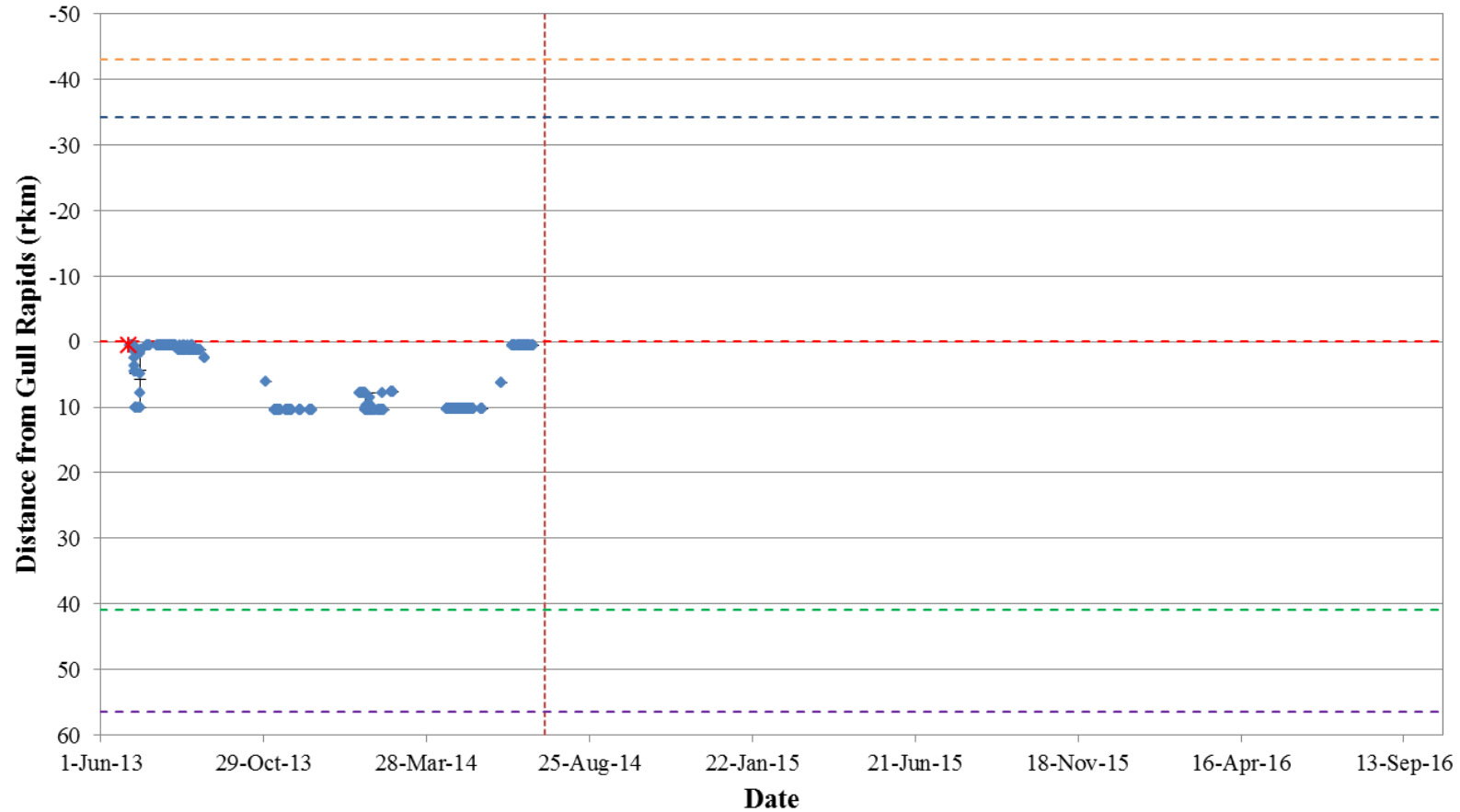


Figure A3-38: Position of a Walleye tagged with an acoustic transmitter (code #32855) in Stephens Lake (rkm > 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

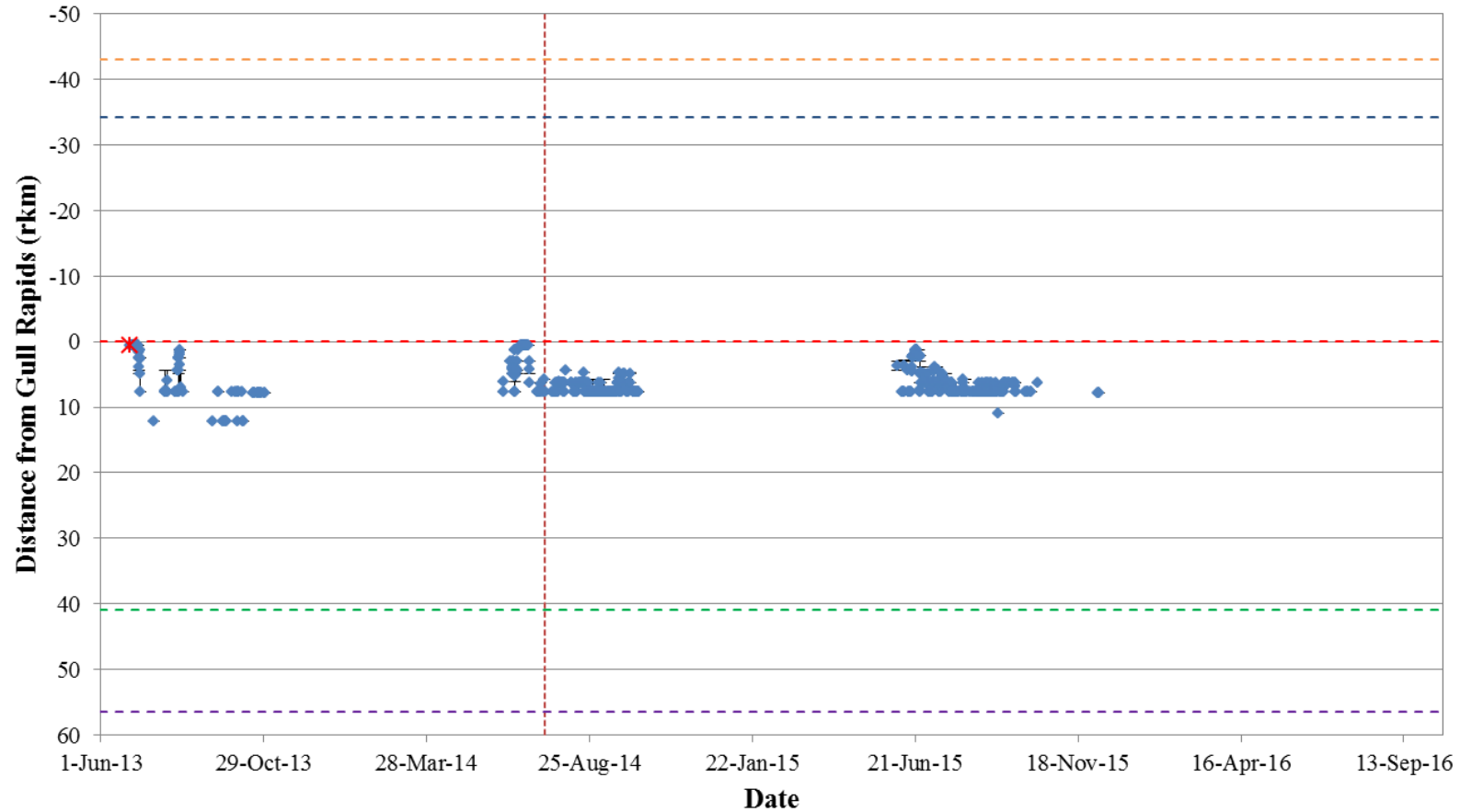


Figure A3-39: Position of a Walleye tagged with an acoustic transmitter (code #32859) in Stephens Lake (rkm > 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

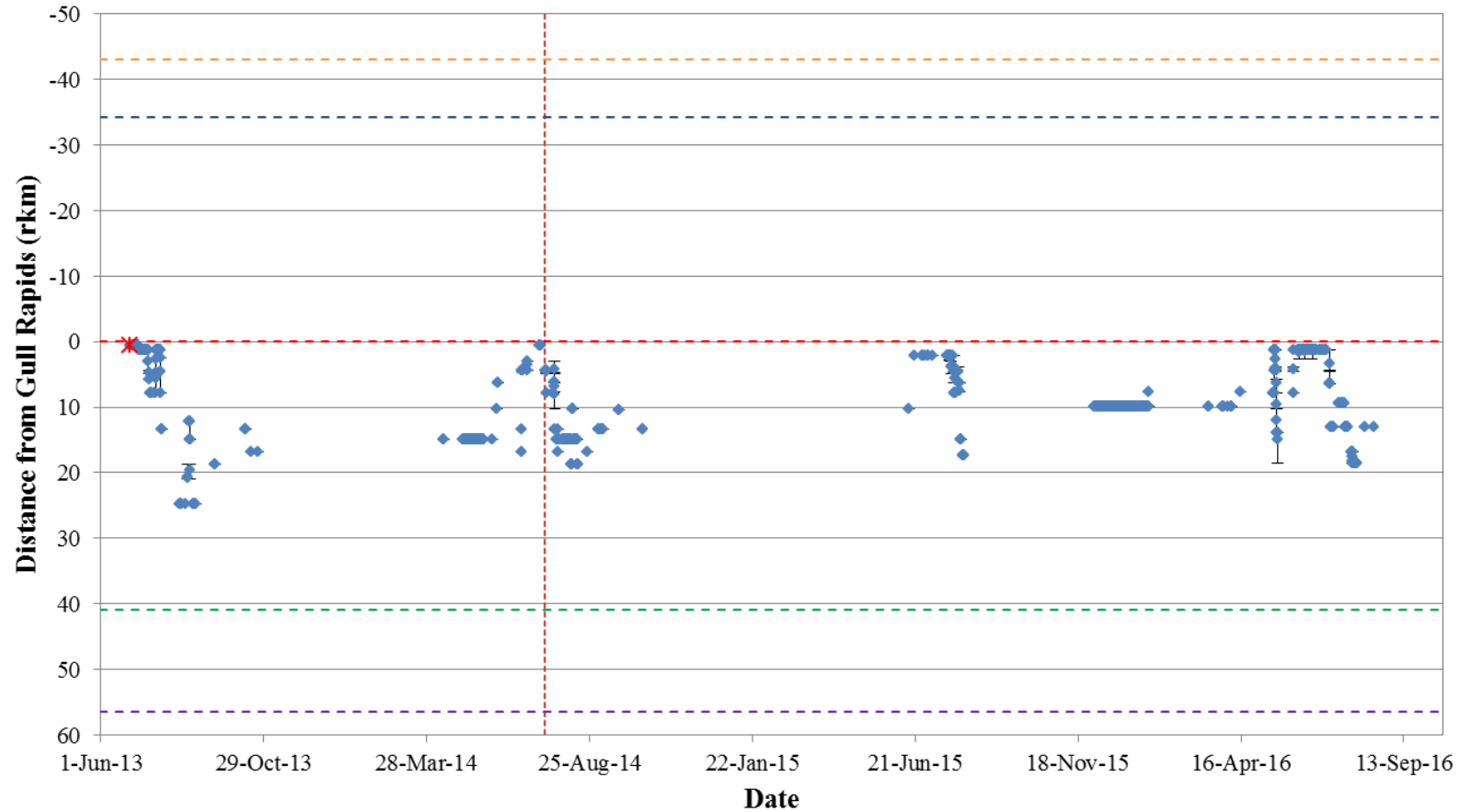


Figure A3-40: Position of a Walleye tagged with an acoustic transmitter (code #32860) in Stephens Lake (rkm > 0), from June, 2013 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

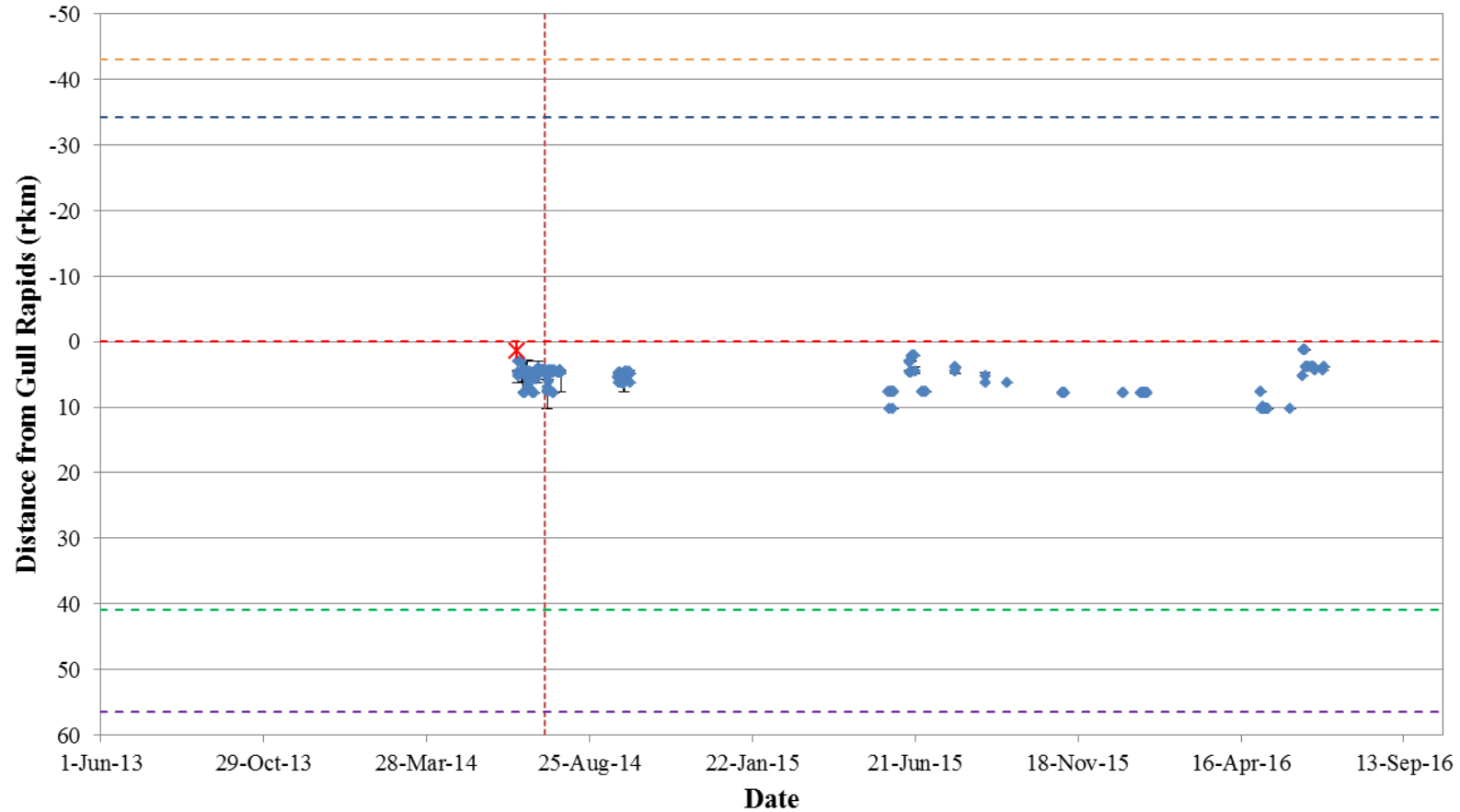


Figure A3-41: Position of a Walleye tagged with an acoustic transmitter (code #6424) in Stephens Lake (rkm > 0), from June, 2014 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

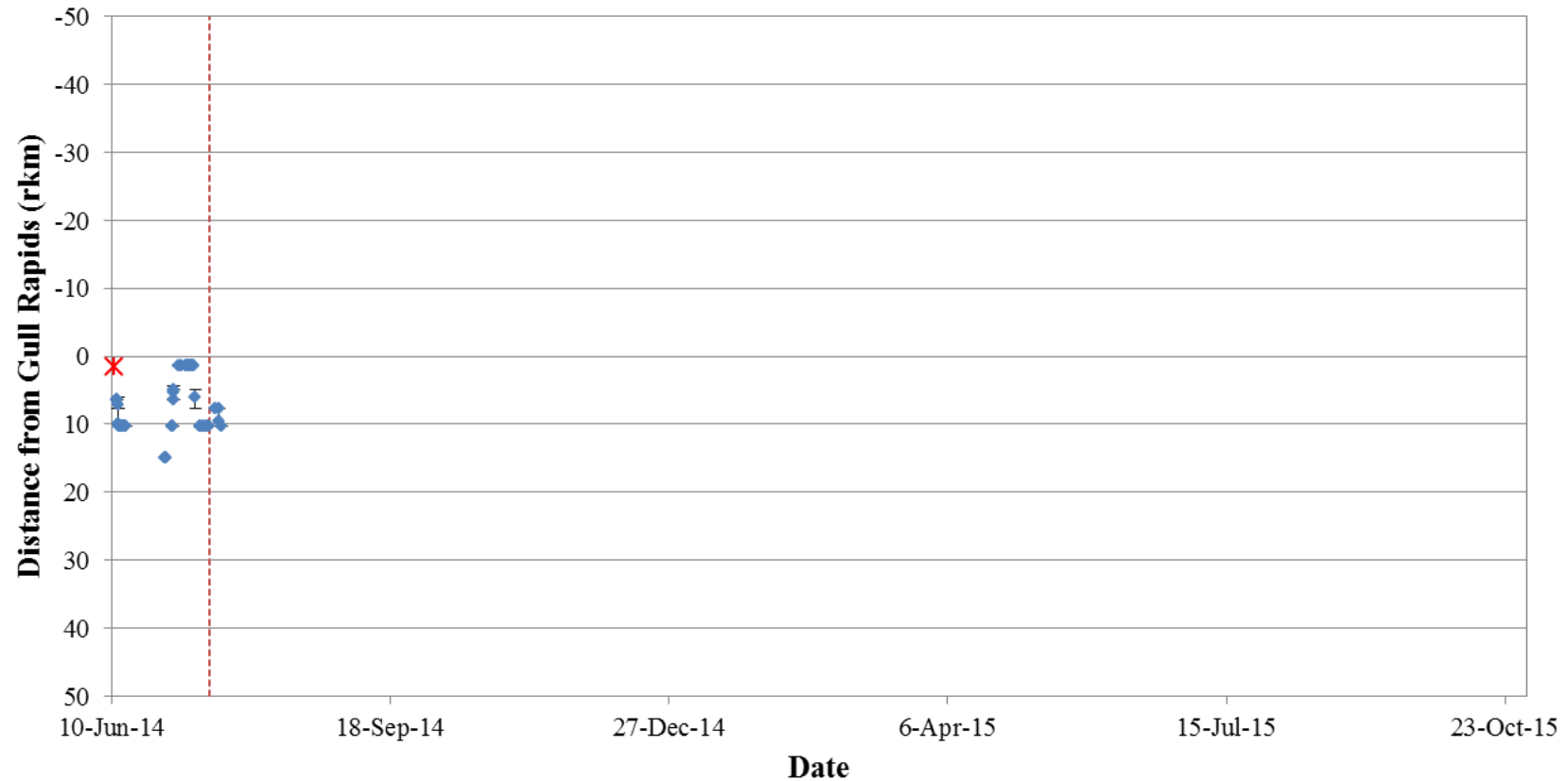


Figure A3-42: Position of a Walleye tagged with an acoustic transmitter (code #6427) Stephens Lake (rkm >0), from June, 2014 to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

APPENDIX 4:

LOCATION SUMMARY FOR INDIVIDUAL ACOUSTIC TAGGED WALLEYE UPSTREAM OF GULL RAPIDS JUNE 2016 TO OCTOBER 2016

Figure A4-1:	Position of a Walleye tagged with an acoustic transmitter (code #53758) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from September to October, 2016.....	183
Figure A4-2:	Position of a Walleye tagged with an acoustic transmitter (code #53759) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from September to October, 2016.....	184
Figure A4-3:	Position of a Walleye tagged with an acoustic transmitter (code #53760) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from September to October, 2016.....	185
Figure A4-4:	Position of a Walleye tagged with an acoustic transmitter (code #53763) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	186
Figure A4-5:	Position of a Walleye tagged with an acoustic transmitter (code #53764) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	187
Figure A4-7:	Position of a Walleye tagged with an acoustic transmitter (code #53765) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from September to October, 2016.....	188
Figure A4-8:	Position of a Walleye tagged with an acoustic transmitter (code #53766) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from September to October, 2016.....	189
Figure A4-9:	Position of a Walleye tagged with an acoustic transmitter (code #53767) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from September to October, 2016.....	190
Figure A4-10:	Position of a Walleye tagged with an acoustic transmitter (code #53768) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	191
Figure A4-11:	Position of a Walleye tagged with an acoustic transmitter (code #53769) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	192

Figure A4-12: Position of a Walleye tagged with an acoustic transmitter (code #53770) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	193
Figure A4-13: Position of a Walleye tagged with an acoustic transmitter (code #53771) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	194
Figure A4-14: Position of a Walleye tagged with an acoustic transmitter (code #53772) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	195
Figure A4-15: Position of a Walleye tagged with an acoustic transmitter (code #53773) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	196
Figure A4-16: Position of a Walleye tagged with an acoustic transmitter (code #53774) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	197
Figure A4-17: Position of a Walleye tagged with an acoustic transmitter (code #53775) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	198
Figure A4-18: Position of a Walleye tagged with an acoustic transmitter (code #53776) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	199
Figure A4-19: Position of a Walleye tagged with an acoustic transmitter (code #53777) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	200
Figure A4-20: Position of a Walleye tagged with an acoustic transmitter (code #53778) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	201
Figure A4-21: Position of a Walleye tagged with an acoustic transmitter (code #53779) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	202
Figure A4-22: Position of a Walleye tagged with an acoustic transmitter (code #53780) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	203
Figure A4-23: Position of a Walleye tagged with an acoustic transmitter (code #53781) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	204
Figure A4-24: Position of a Walleye tagged with an acoustic transmitter (code #53782) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	205

Figure A4-25: Position of a Walleye tagged with an acoustic transmitter (code #53783) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	206
Figure A4-26: Position of a Walleye tagged with an acoustic transmitter (code #53784) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	207
Figure A4-27: Position of a Walleye tagged with an acoustic transmitter (code #53785) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	208
Figure A4-28: Position of a Walleye tagged with an acoustic transmitter (code #53786) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	209
Figure A4-29: Position of a Walleye tagged with an acoustic transmitter (code #53787) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	210
Figure A4-30: Position of a Walleye tagged with an acoustic transmitter (code #53788) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	211
Figure A4-31: Position of a Walleye tagged with an acoustic transmitter (code #53789) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	212
Figure A4-32: Position of a Walleye tagged with an acoustic transmitter (code #53790) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	213
Figure A4-33: Position of a Walleye tagged with an acoustic transmitter (code #53791) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	214
Figure A4-34: Position of a Walleye tagged with an acoustic transmitter (code #53792) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	215
Figure A4-35: Position of a Walleye tagged with an acoustic transmitter (code #53793) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	216
Figure A4-36: Position of a Walleye tagged with an acoustic transmitter (code #53794) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	217
Figure A4-37: Position of a Walleye tagged with an acoustic transmitter (code #53795) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	218

Figure A4-38: Position of a Walleye tagged with an acoustic transmitter (code #53796) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	219
Figure A4-39: Position of a Walleye tagged with an acoustic transmitter (code #53797) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	220
Figure A4-40: Position of a Walleye tagged with an acoustic transmitter (code #53798) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	221
Figure A4-41: Position of a Walleye tagged with an acoustic transmitter (code #53799) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	222
Figure A4-42: Position of a Walleye tagged with an acoustic transmitter (code #53800) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	223
Figure A4-43: Position of a Walleye tagged with an acoustic transmitter (code #53801) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	224
Figure A4-44: Position of a Walleye tagged with an acoustic transmitter (code #53802) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	225
Figure A4-45: Position of a Walleye tagged with an acoustic transmitter (code #53803) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	226
Figure A4-46: Position of a Walleye tagged with an acoustic transmitter (code #53804) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	227
Figure A4-47: Position of a Walleye tagged with an acoustic transmitter (code #53805) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	228
Figure A4-48: Position of a Walleye tagged with an acoustic transmitter (code #53806) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	229
Figure A4-49: Position of a Walleye tagged with an acoustic transmitter (code #53807) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016.	230

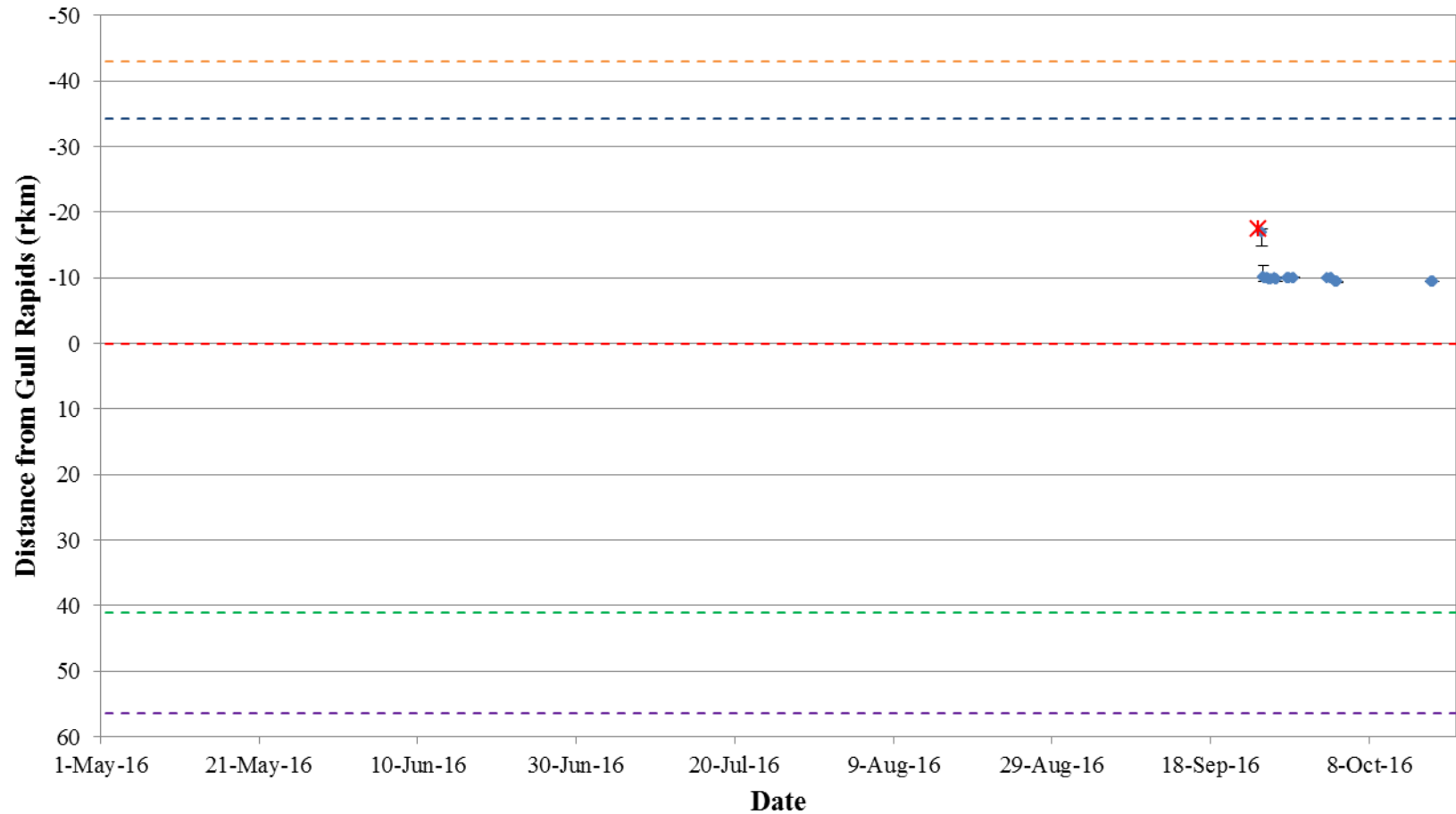


Figure A4-1: Position of a Walleye tagged with an acoustic transmitter (code #53758) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from September to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

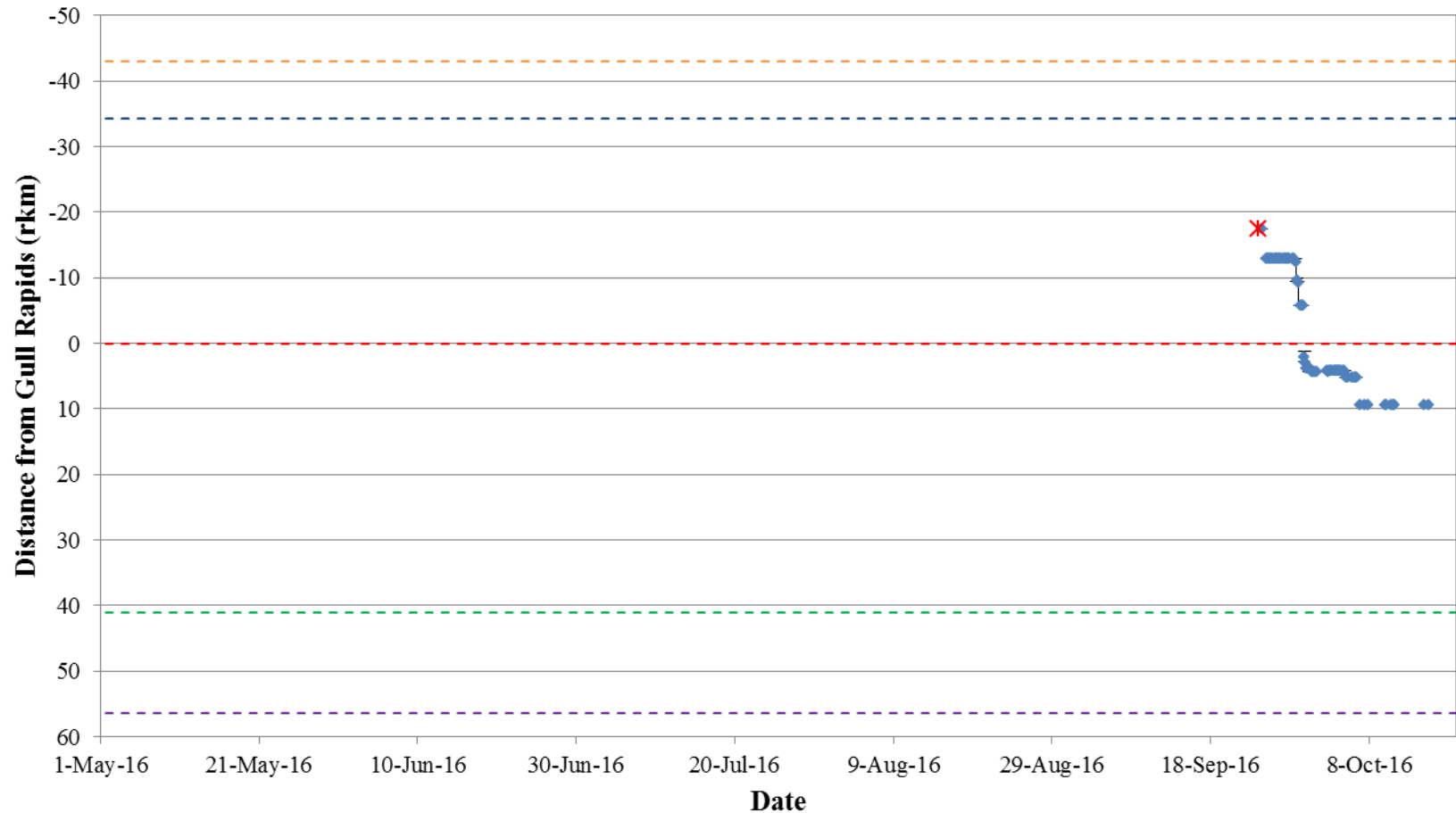


Figure A4-2: Position of a Walleye tagged with an acoustic transmitter (code #53759) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from September to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

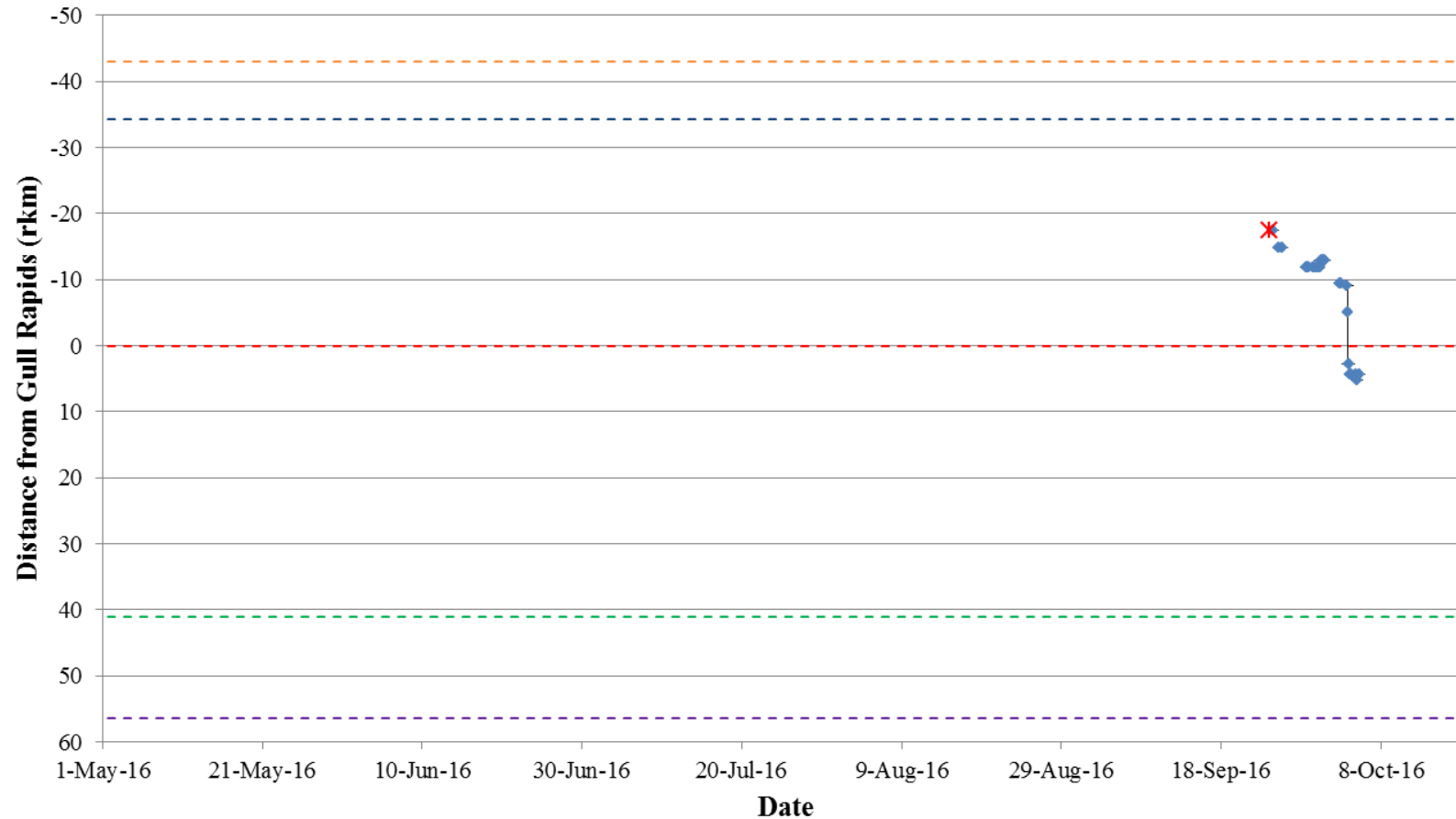


Figure A4-3: Position of a Walleye tagged with an acoustic transmitter (code #53760) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from September to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

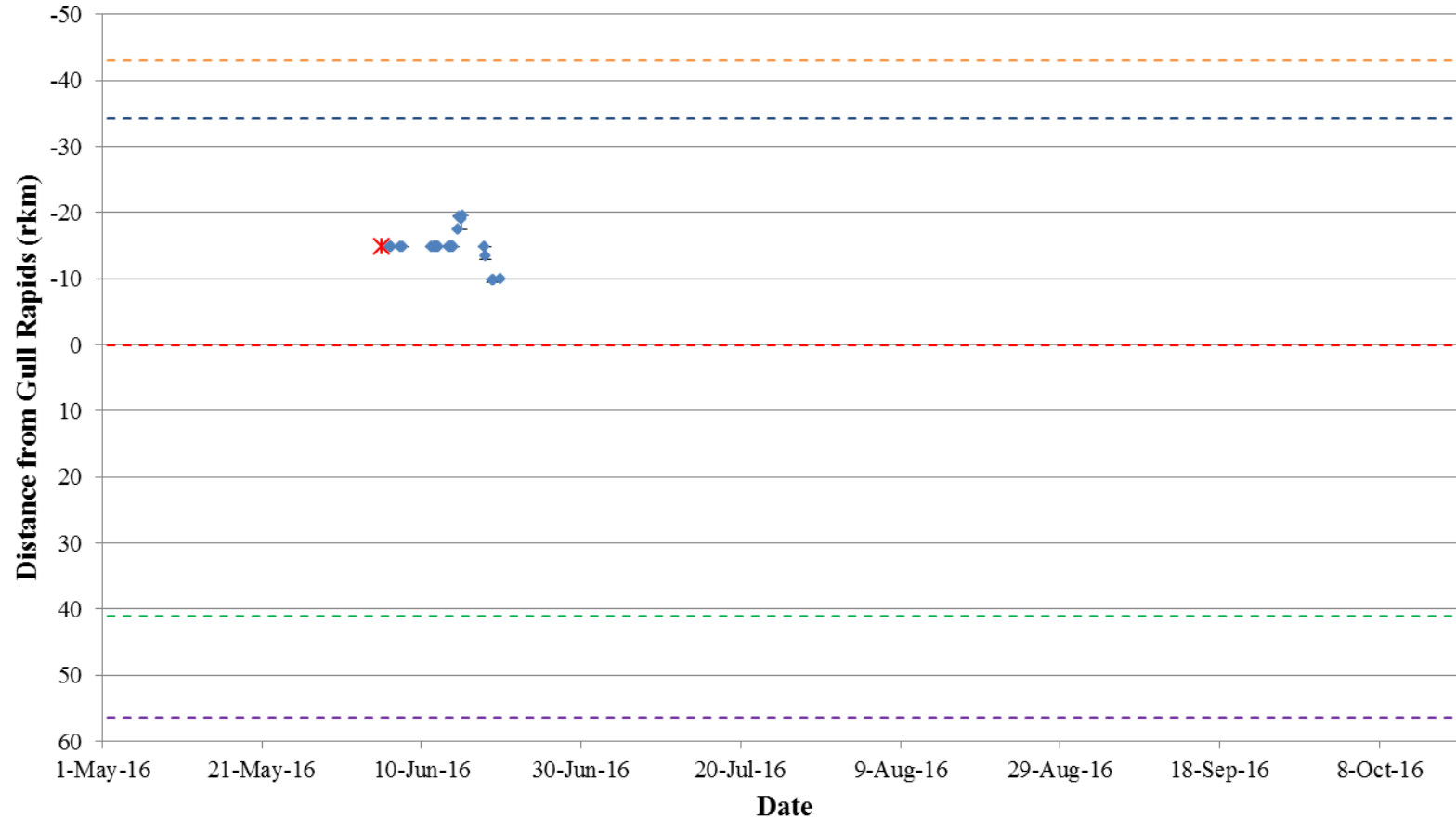


Figure A4-4: Position of a Walleye tagged with an acoustic transmitter (code #53763) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

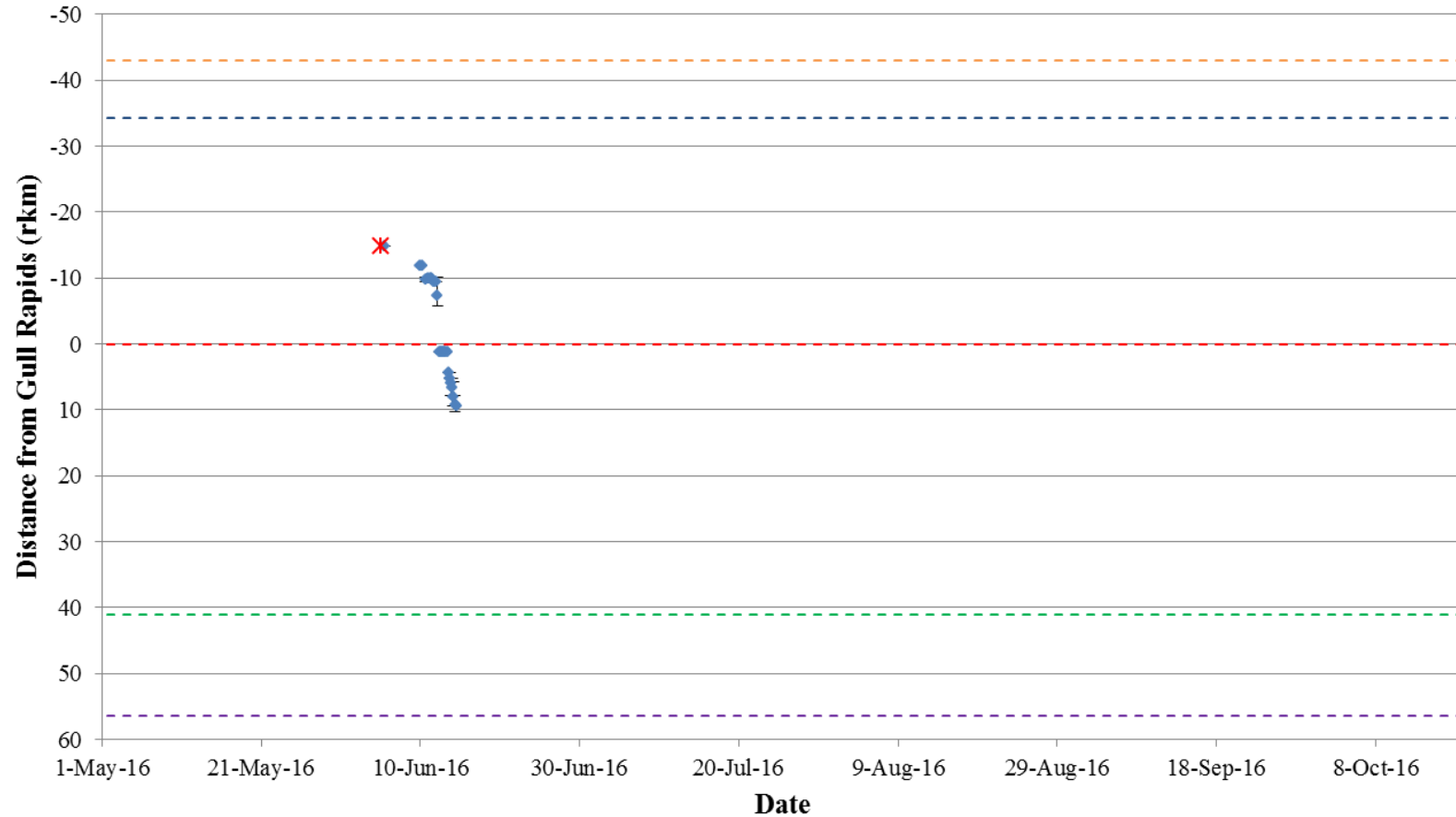


Figure A4-5: Position of a Walleye tagged with an acoustic transmitter (code #53764) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

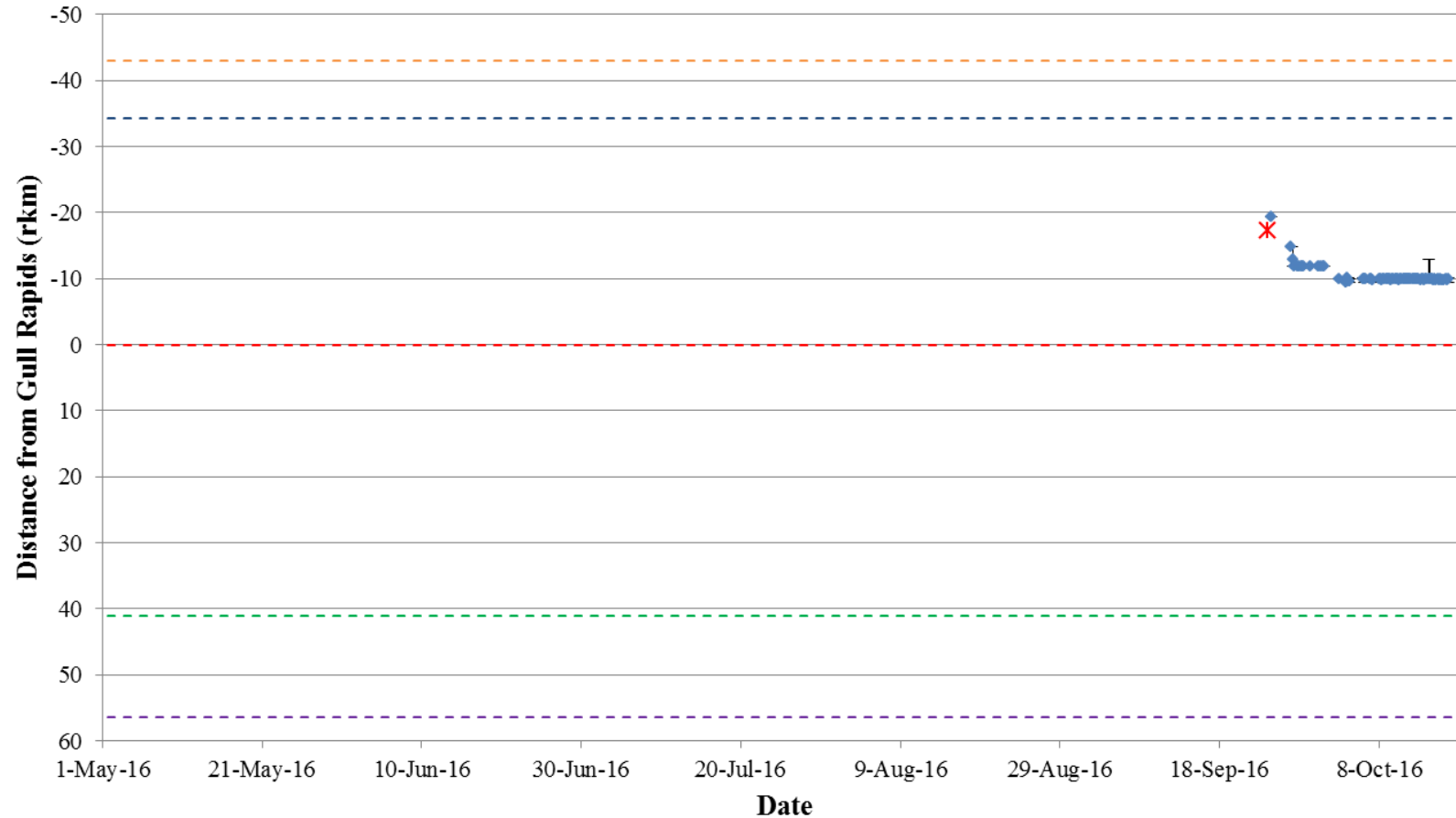


Figure A4-7: Position of a Walleye tagged with an acoustic transmitter (code #53765) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from September to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

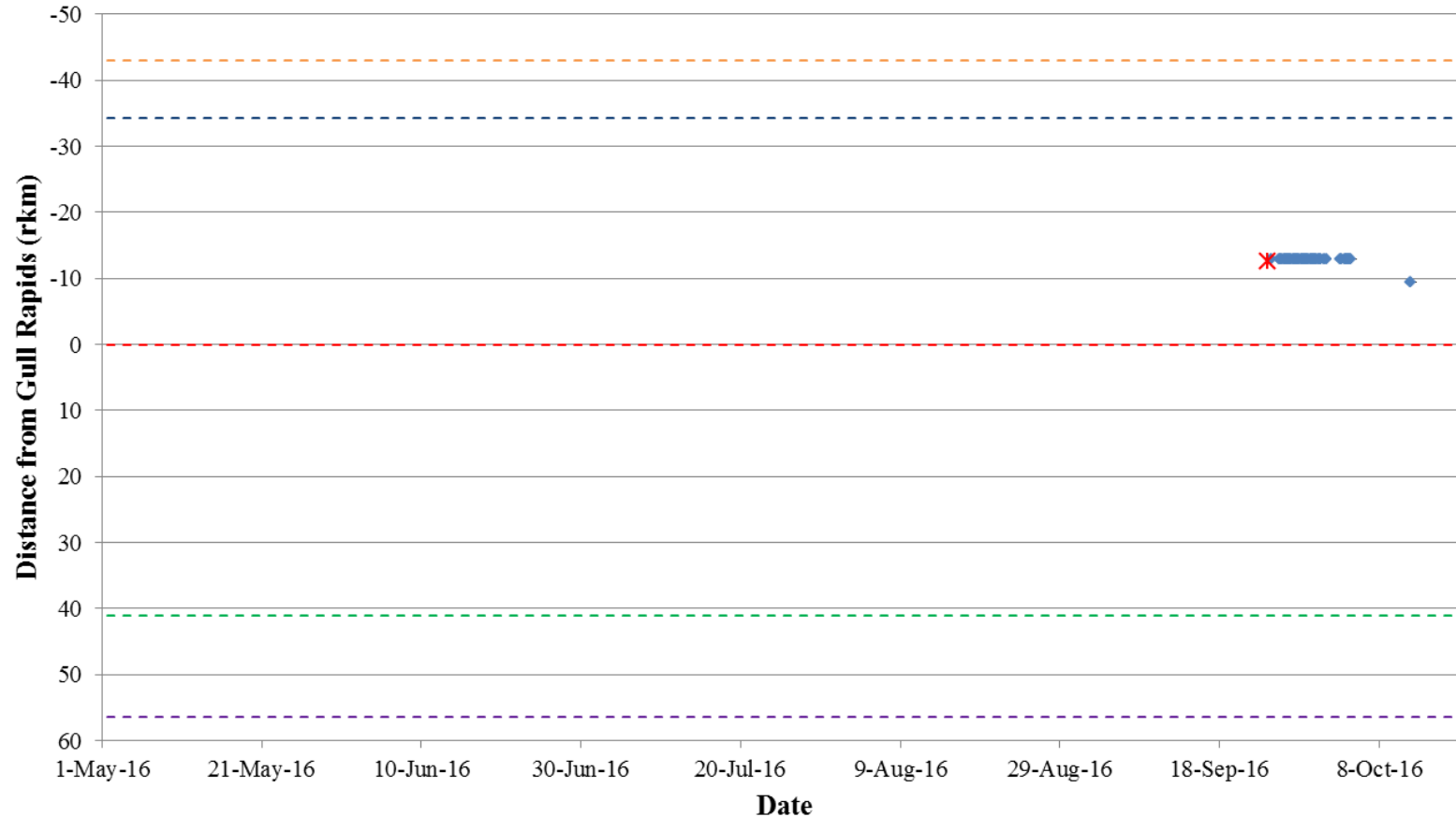


Figure A4-8: Position of a Walleye tagged with an acoustic transmitter (code #53766) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from September to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

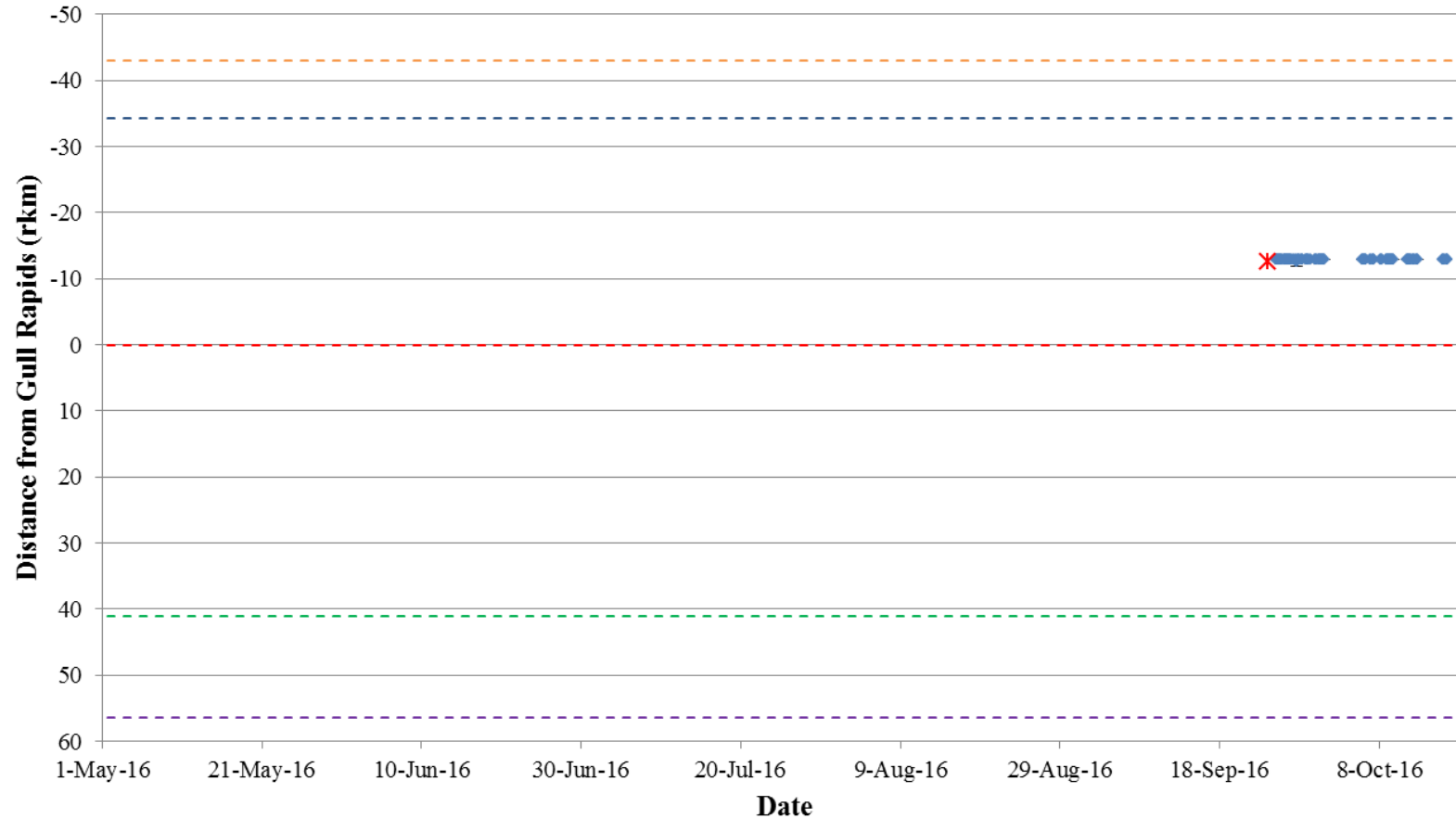


Figure A4-9: Position of a Walleye tagged with an acoustic transmitter (code #53767) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from September to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

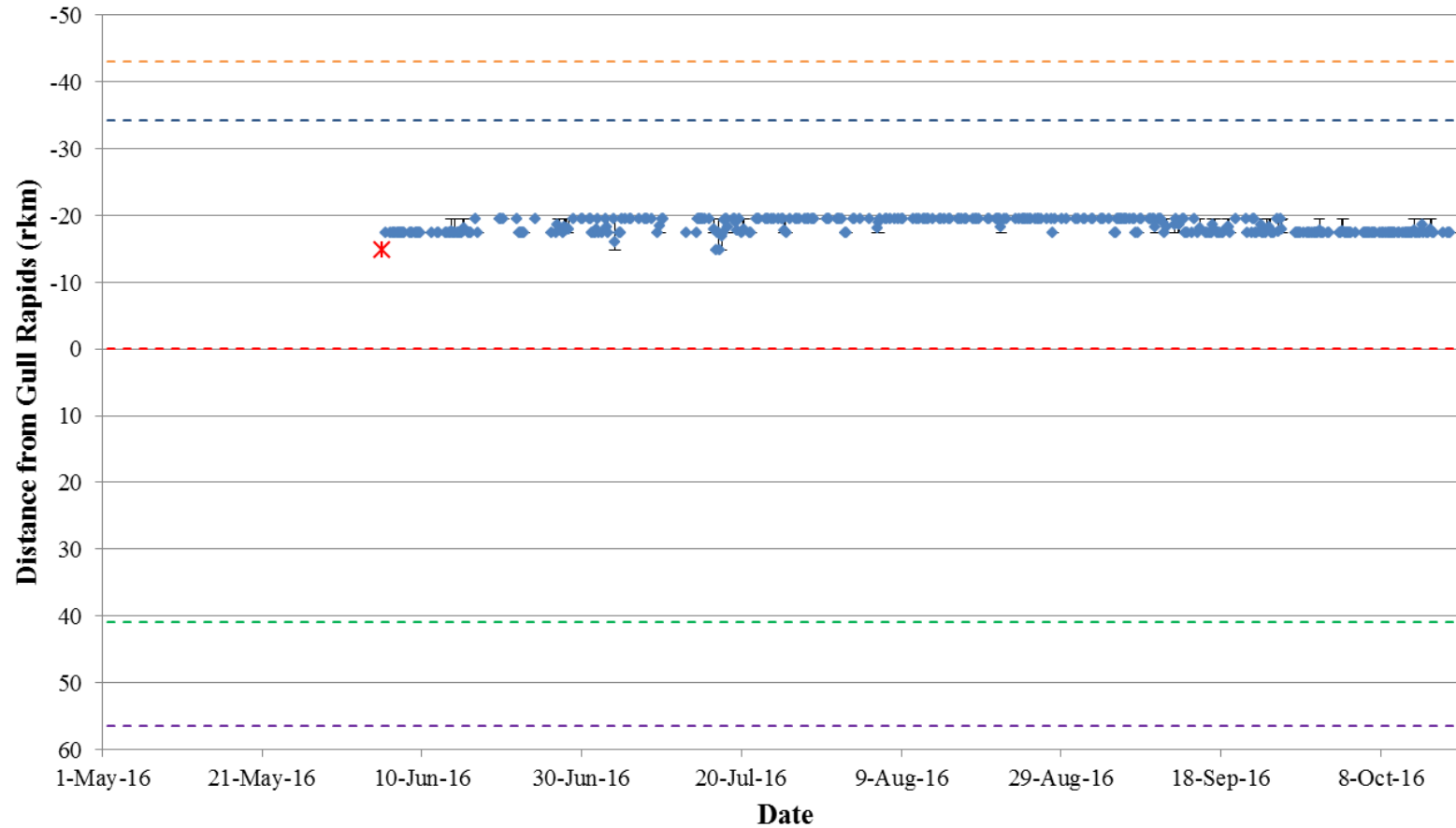


Figure A4-10: Position of a Walleye tagged with an acoustic transmitter (code #53768) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

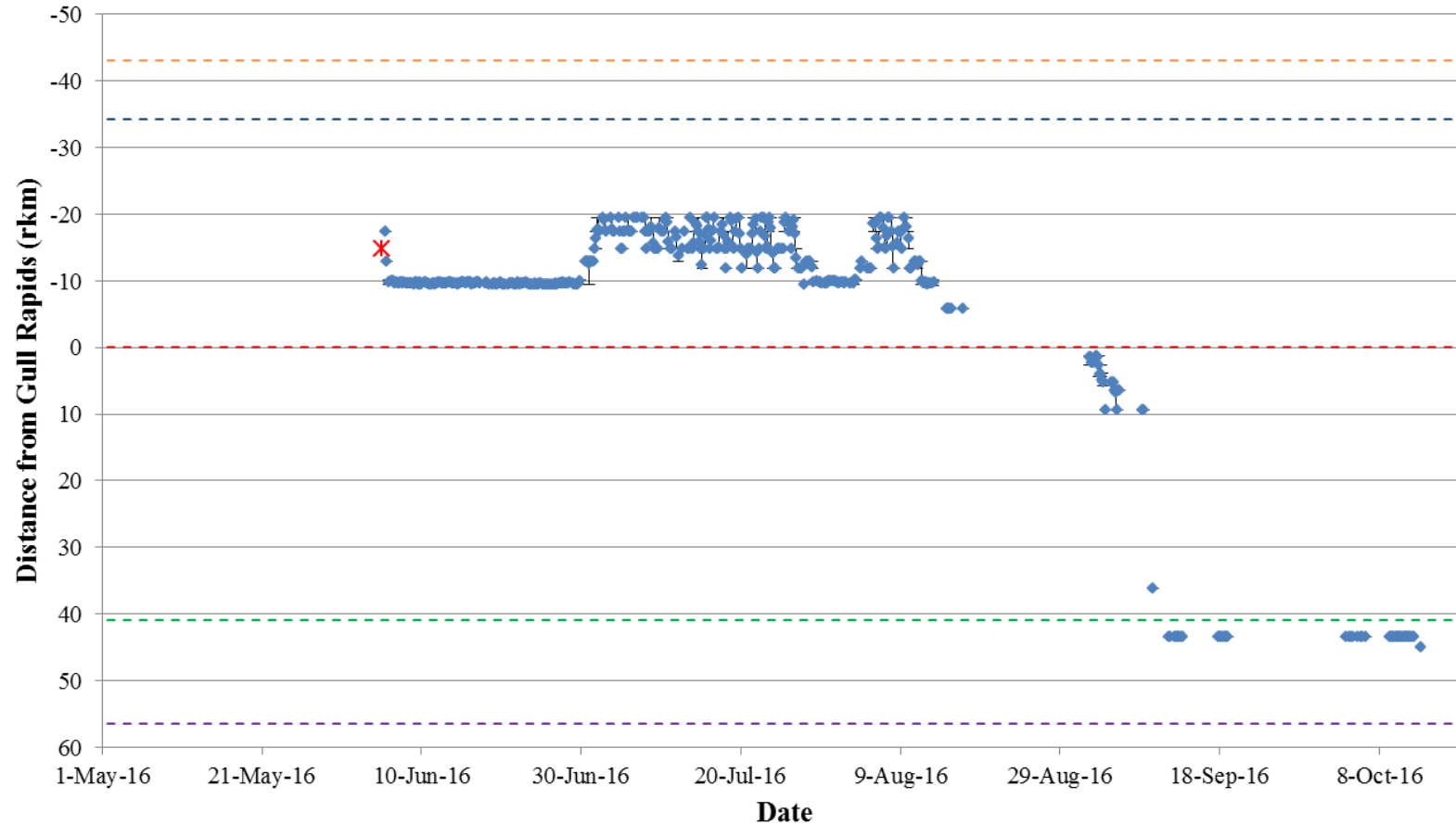


Figure A4-11: Position of a Walleye tagged with an acoustic transmitter (code #53769) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

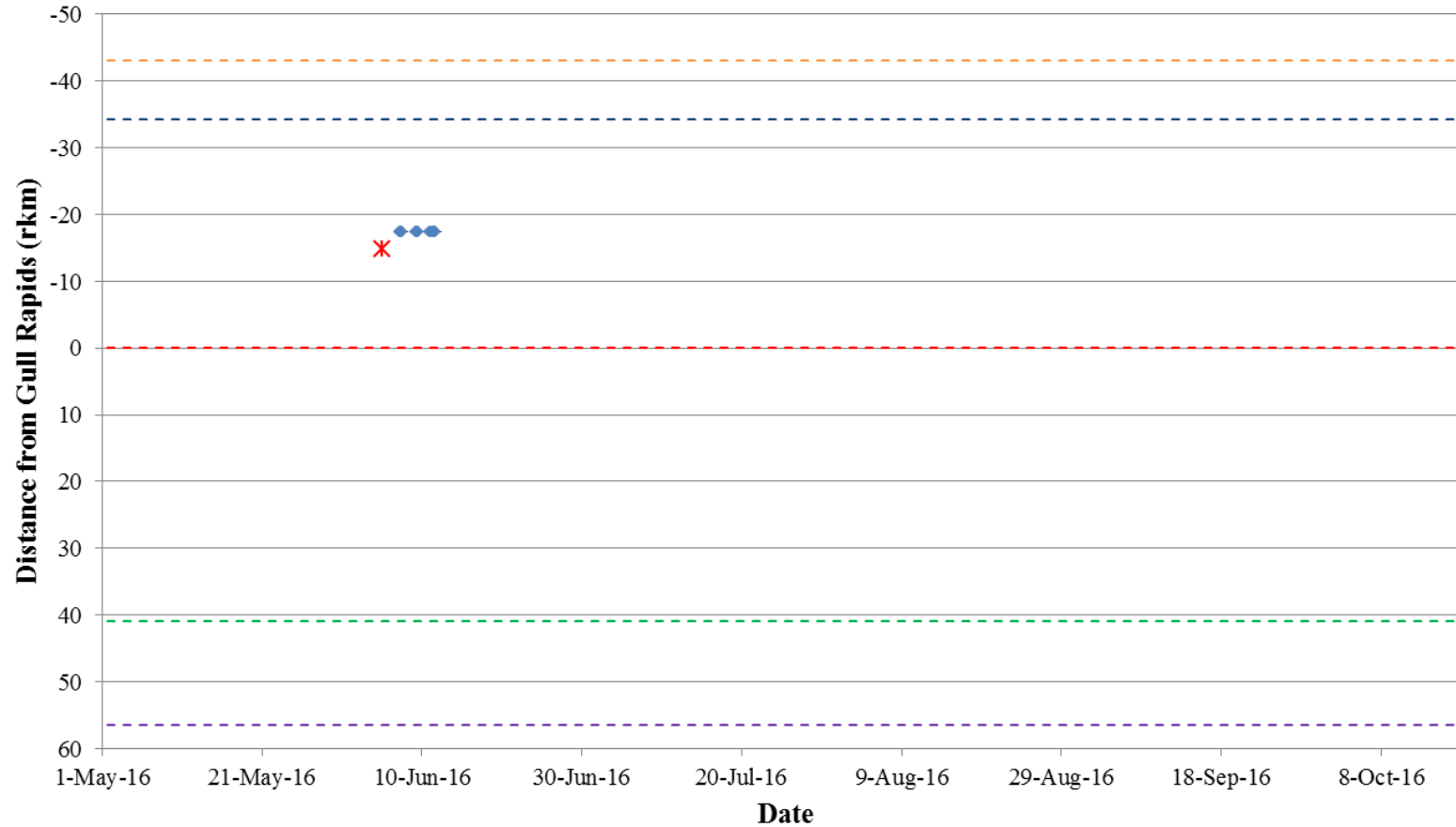


Figure A4-12: Position of a Walleye tagged with an acoustic transmitter (code #53770) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

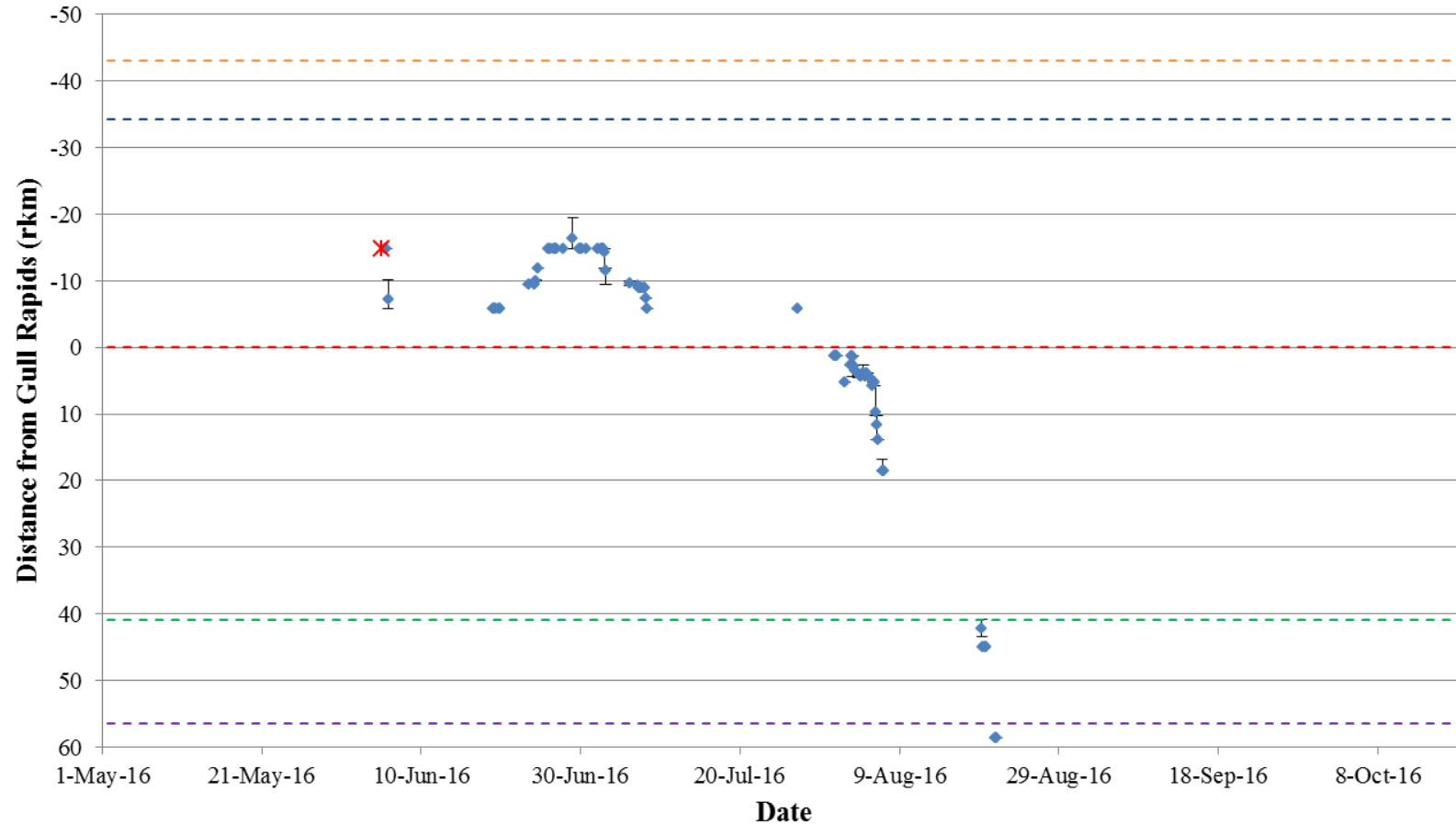


Figure A4-13: Position of a Walleye tagged with an acoustic transmitter (code #53771) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

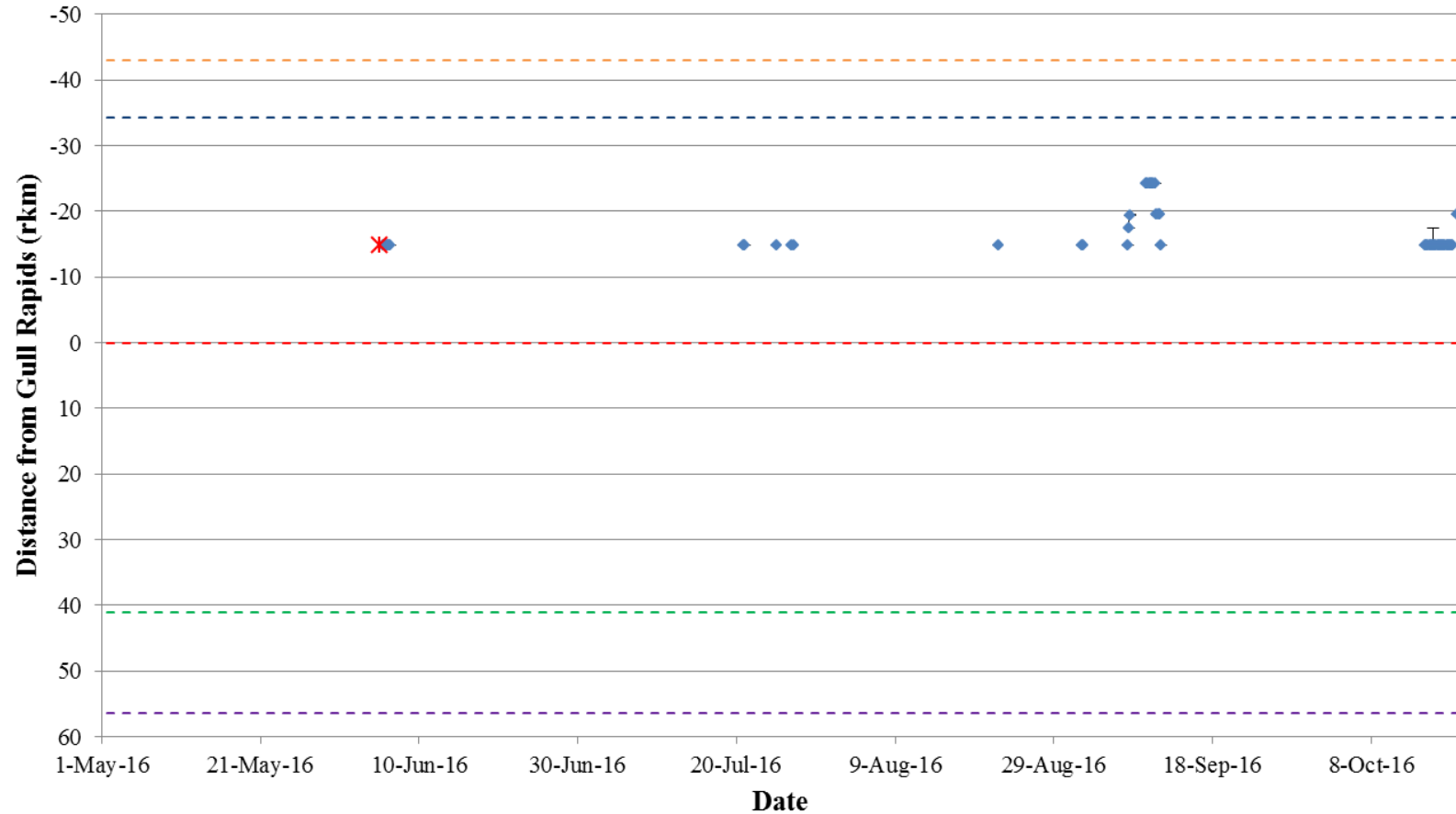


Figure A4-14: Position of a Walleye tagged with an acoustic transmitter (code #53772) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

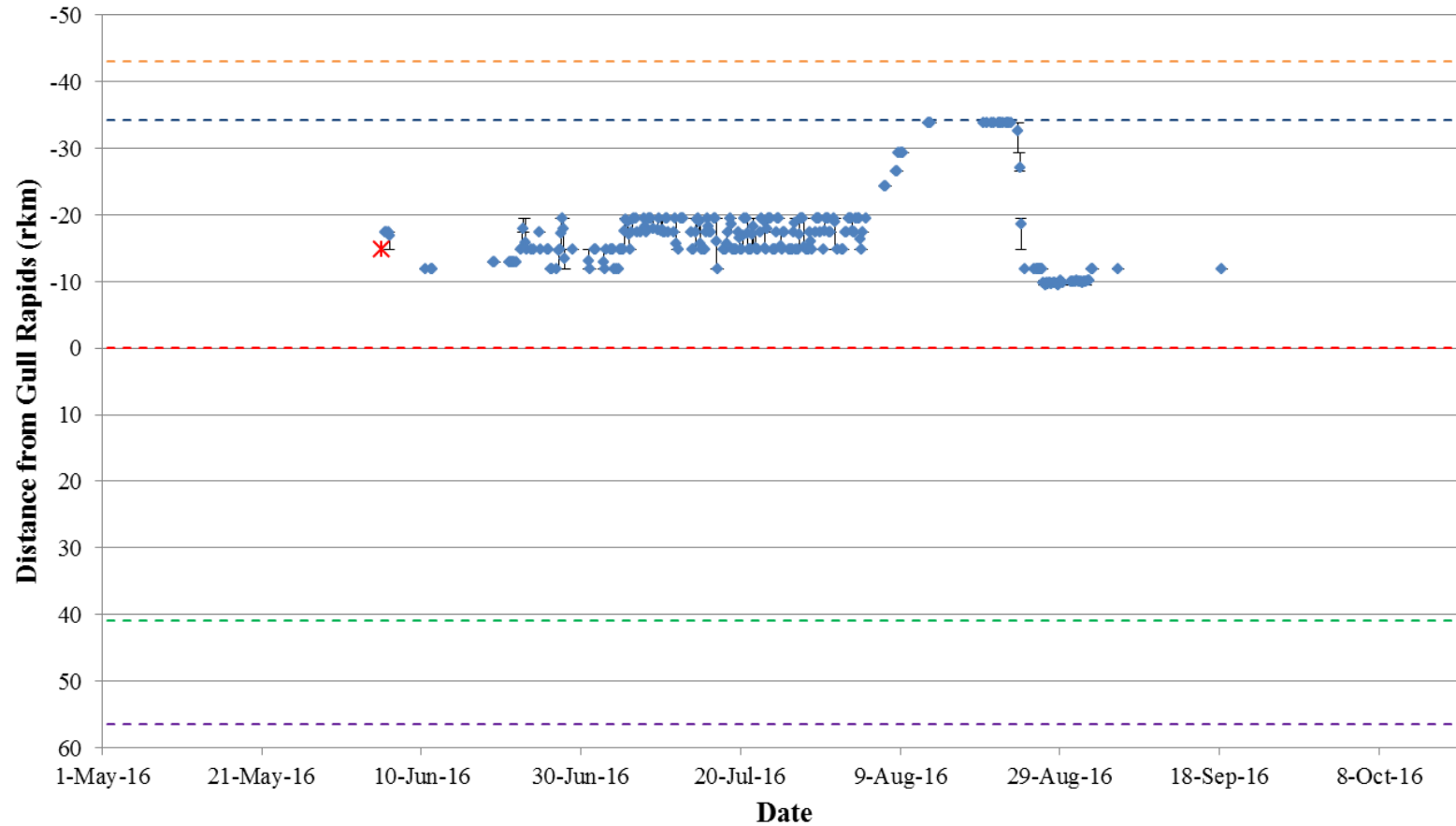


Figure A4-15: Position of a Walleye tagged with an acoustic transmitter (code #53773) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

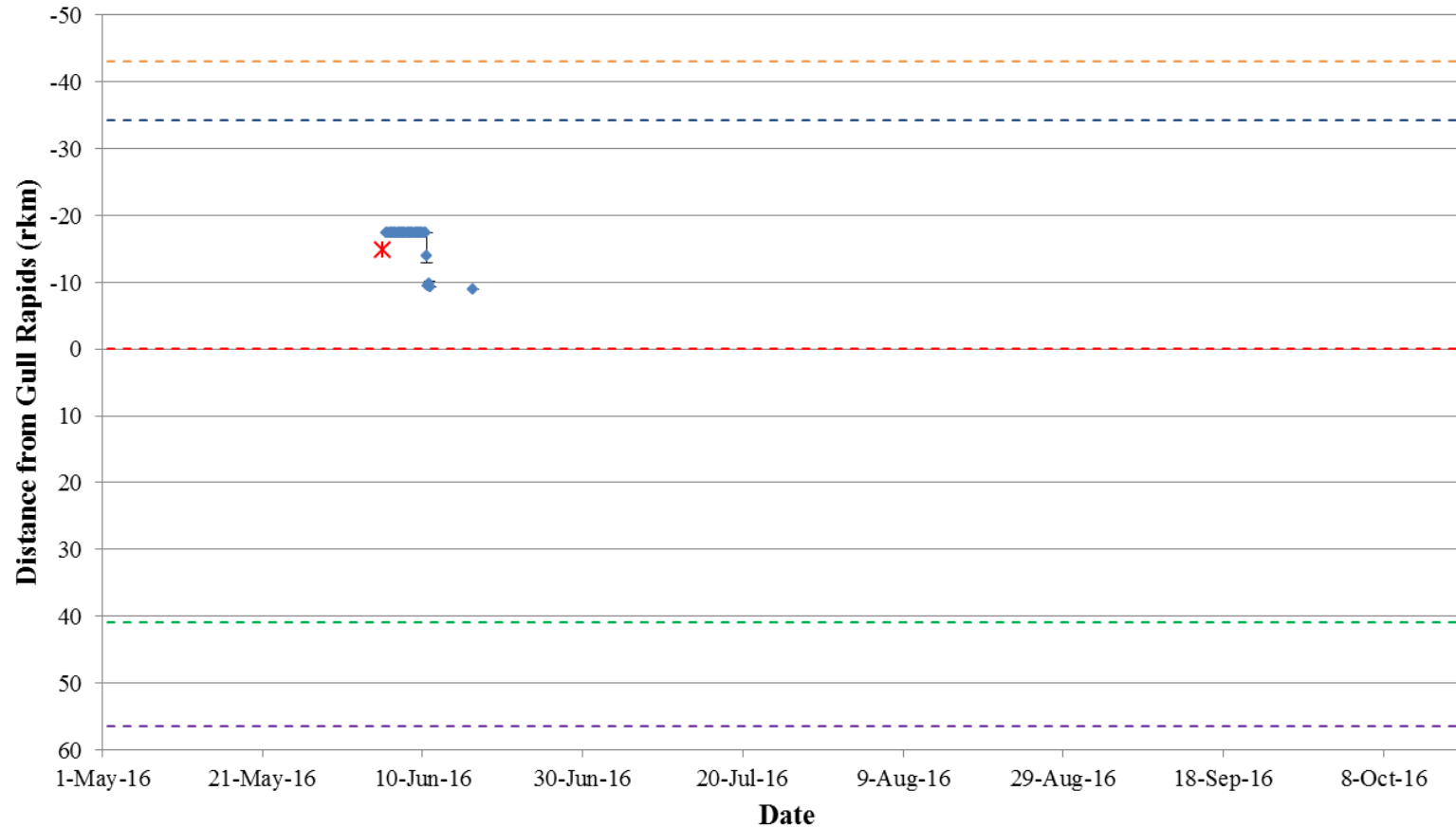


Figure A4-16: Position of a Walleye tagged with an acoustic transmitter (code #53774) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

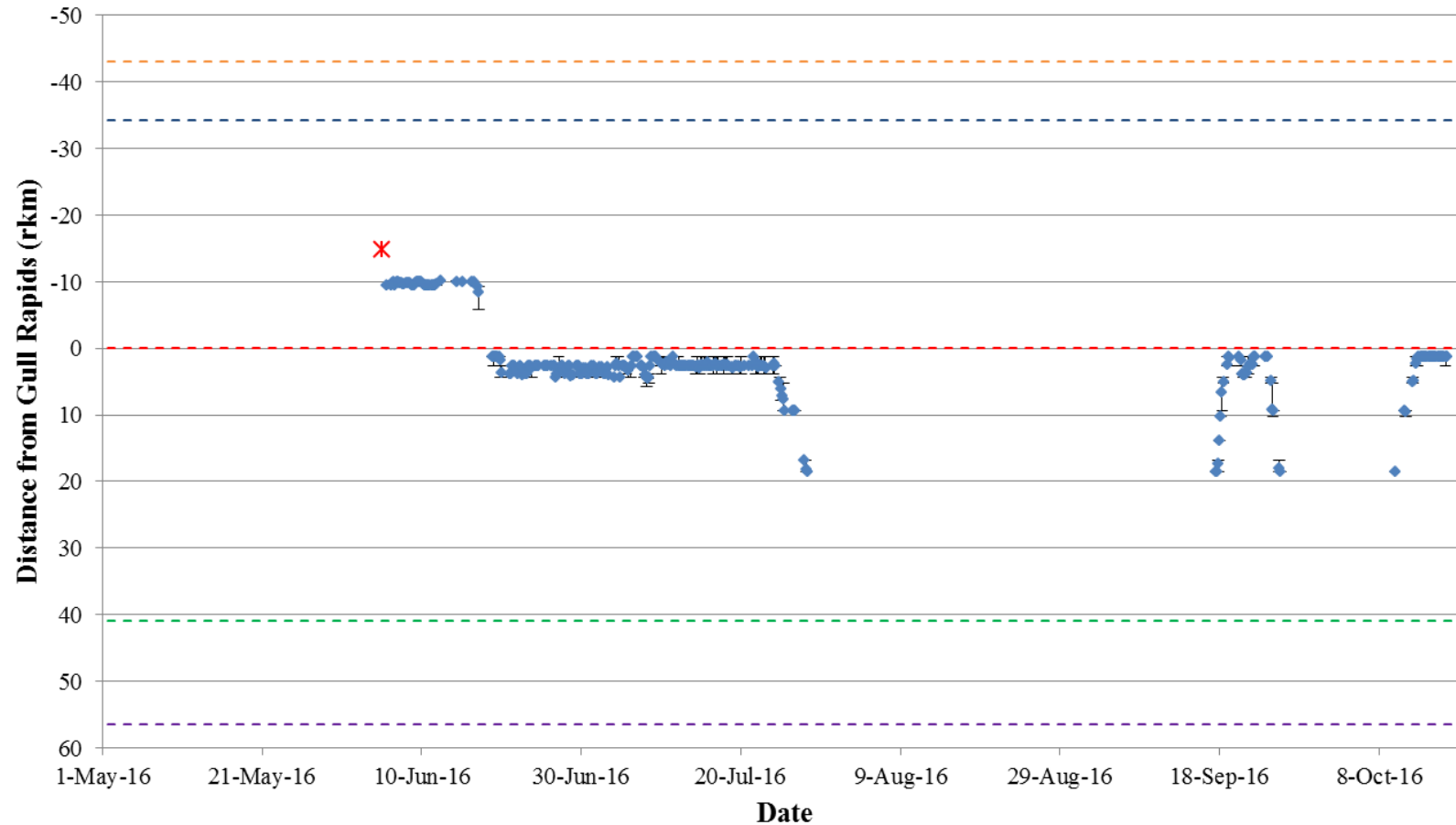


Figure A4-17: Position of a Walleye tagged with an acoustic transmitter (code #53775) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

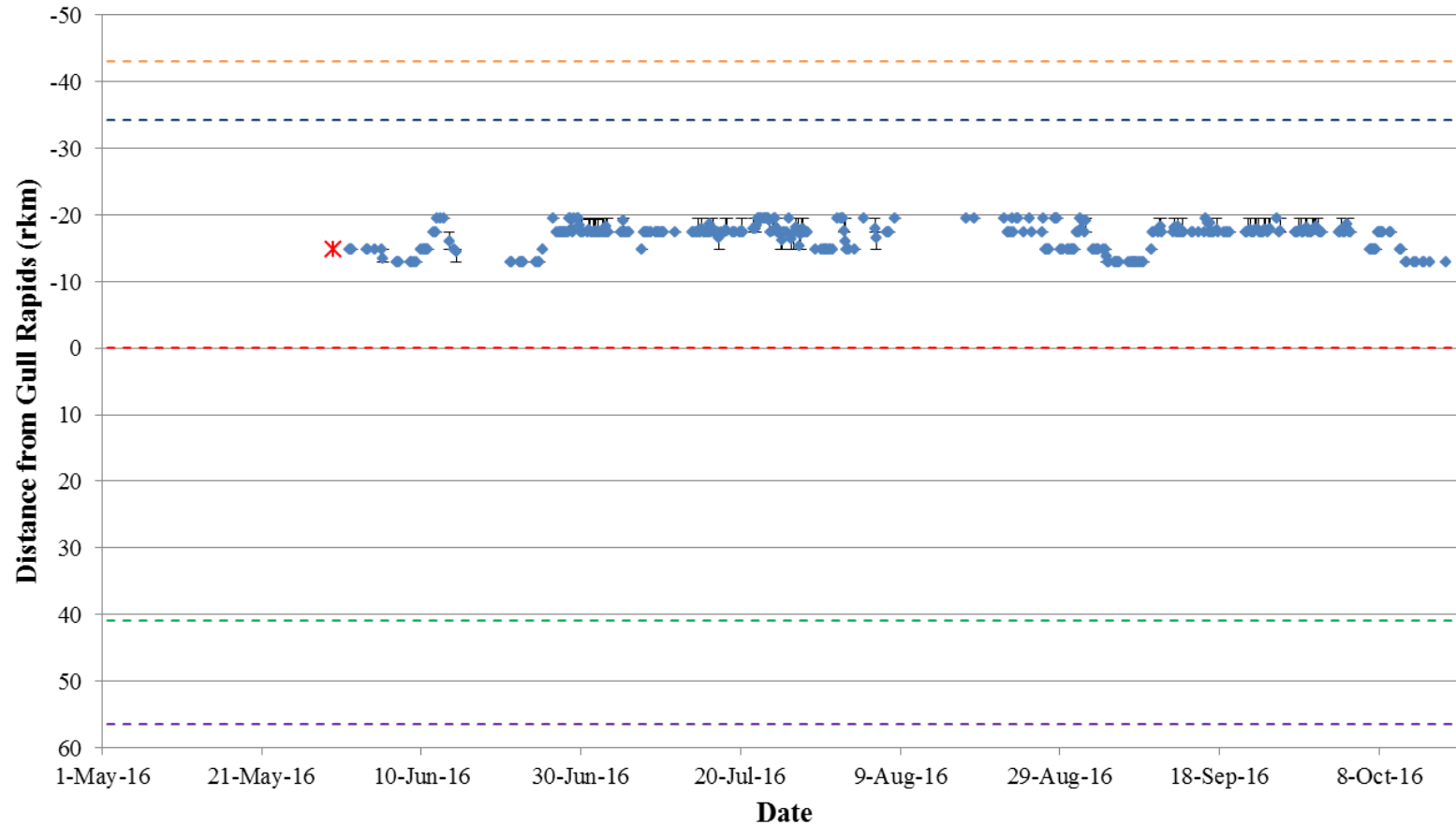


Figure A4-18: Position of a Walleye tagged with an acoustic transmitter (code #53776) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

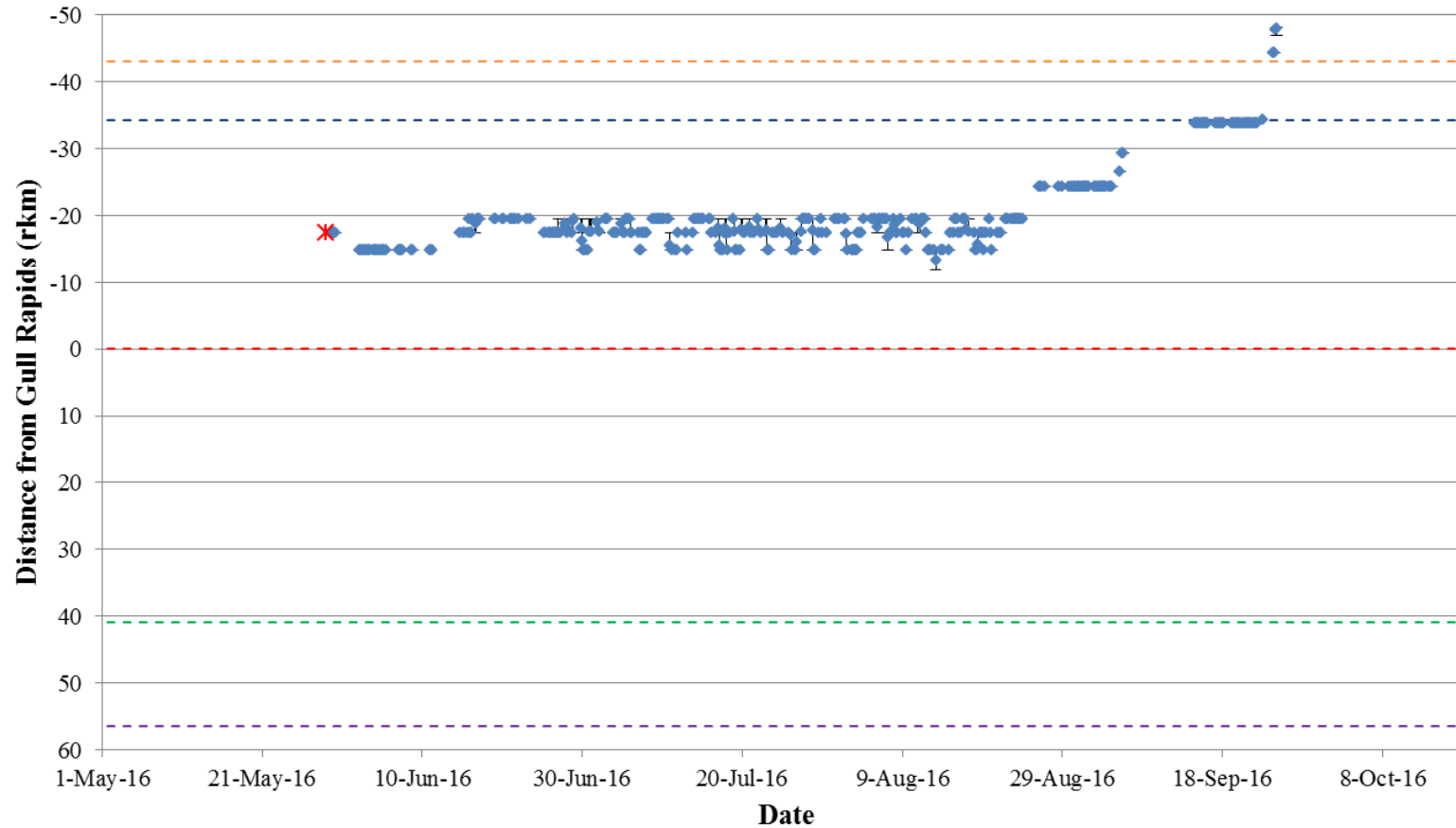


Figure A4-19: Position of a Walleye tagged with an acoustic transmitter (code #53777) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

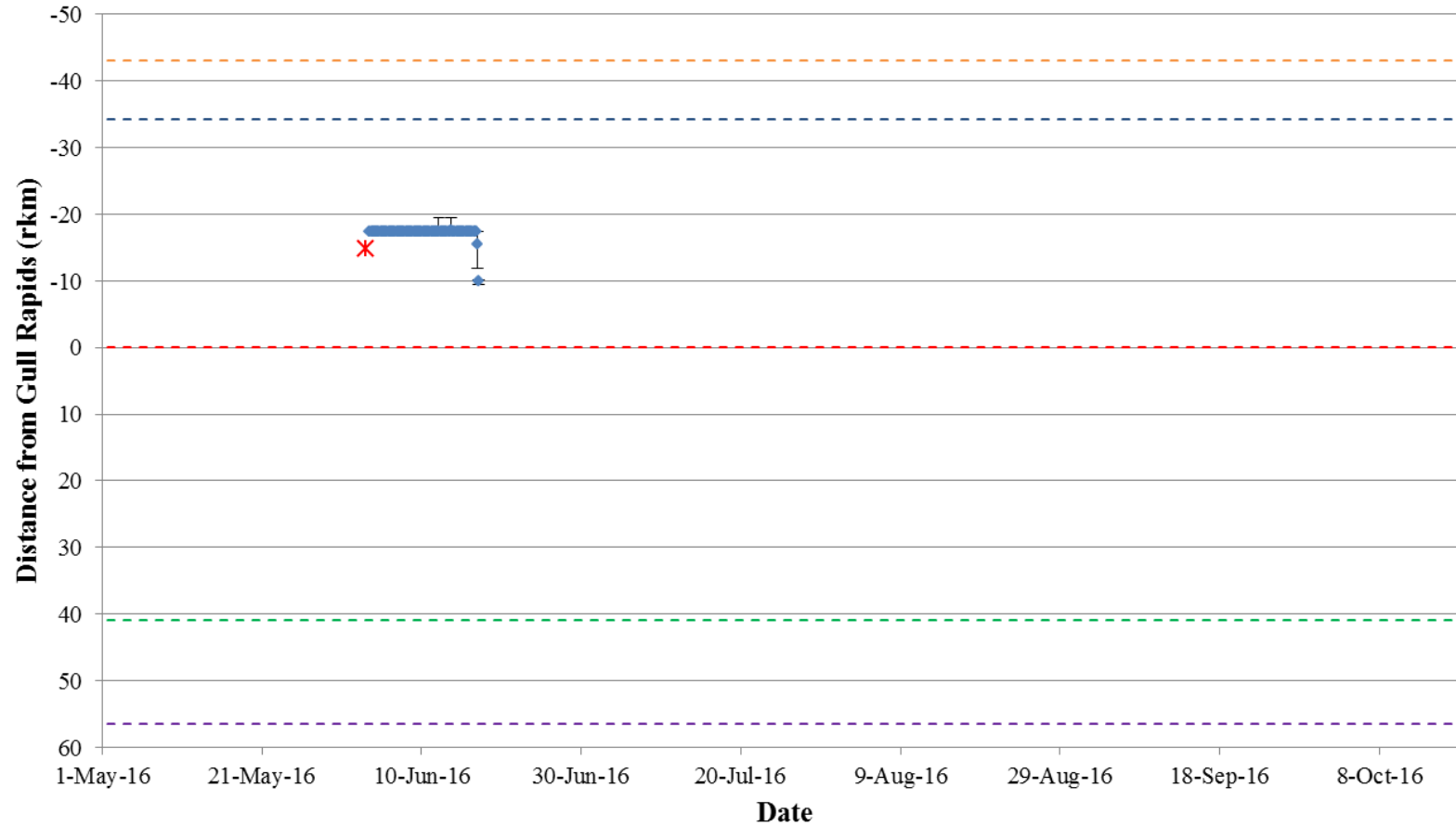


Figure A4-20: Position of a Walleye tagged with an acoustic transmitter (code #53778) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

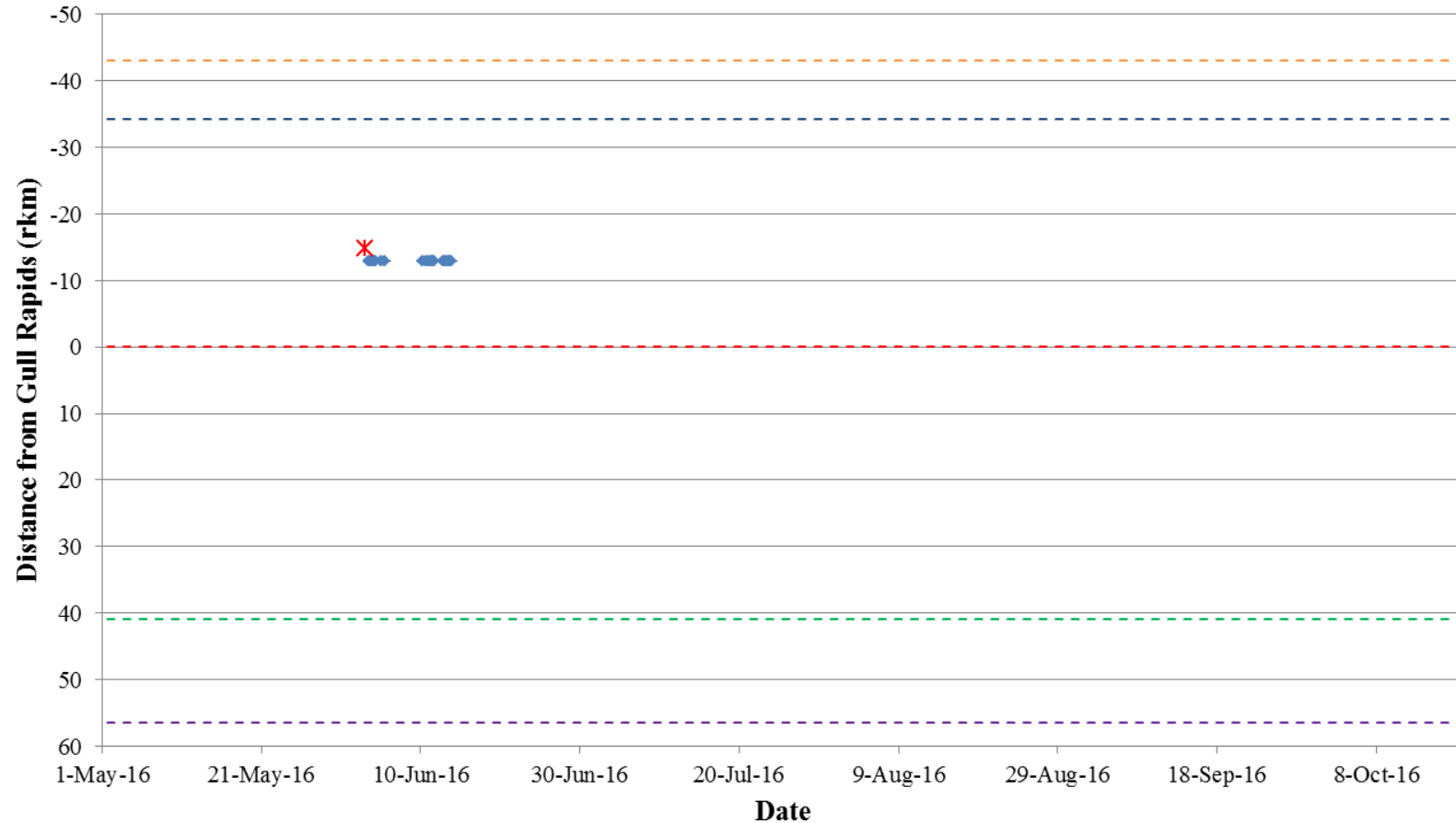


Figure A4-21: Position of a Walleye tagged with an acoustic transmitter (code #53779) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

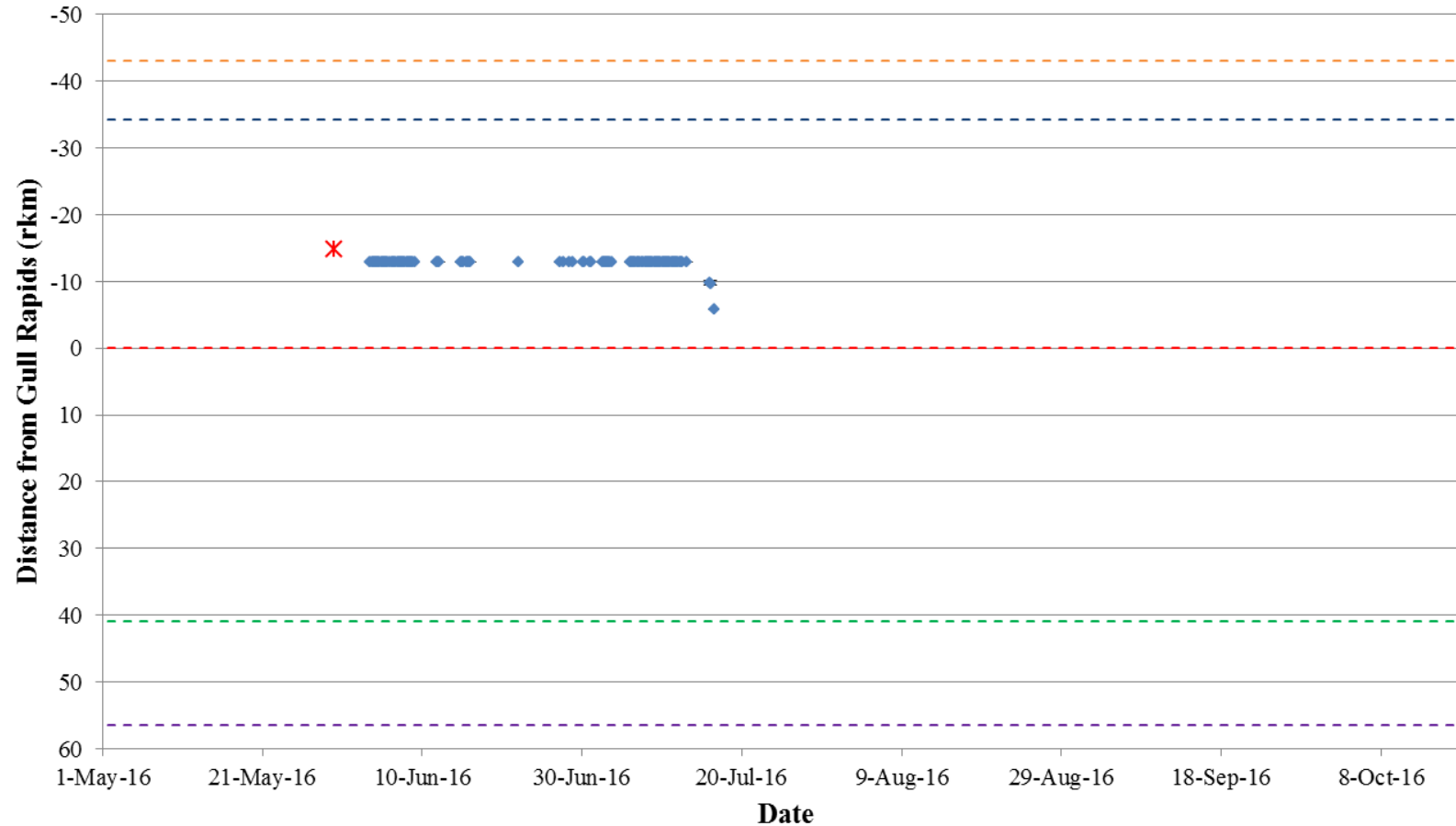


Figure A4-22: Position of a Walleye tagged with an acoustic transmitter (code #53780) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

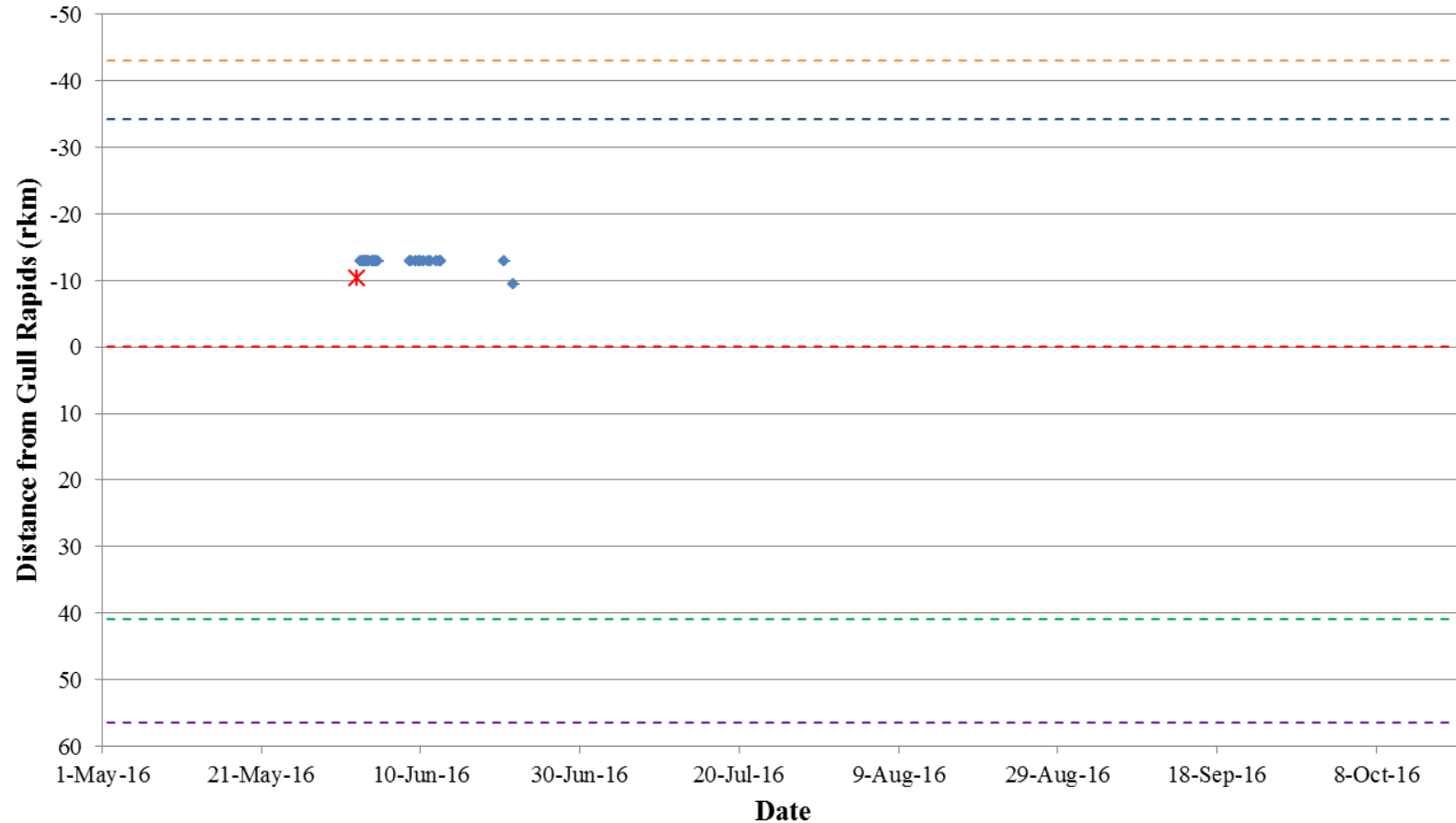


Figure A4-23: Position of a Walleye tagged with an acoustic transmitter (code #53781) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

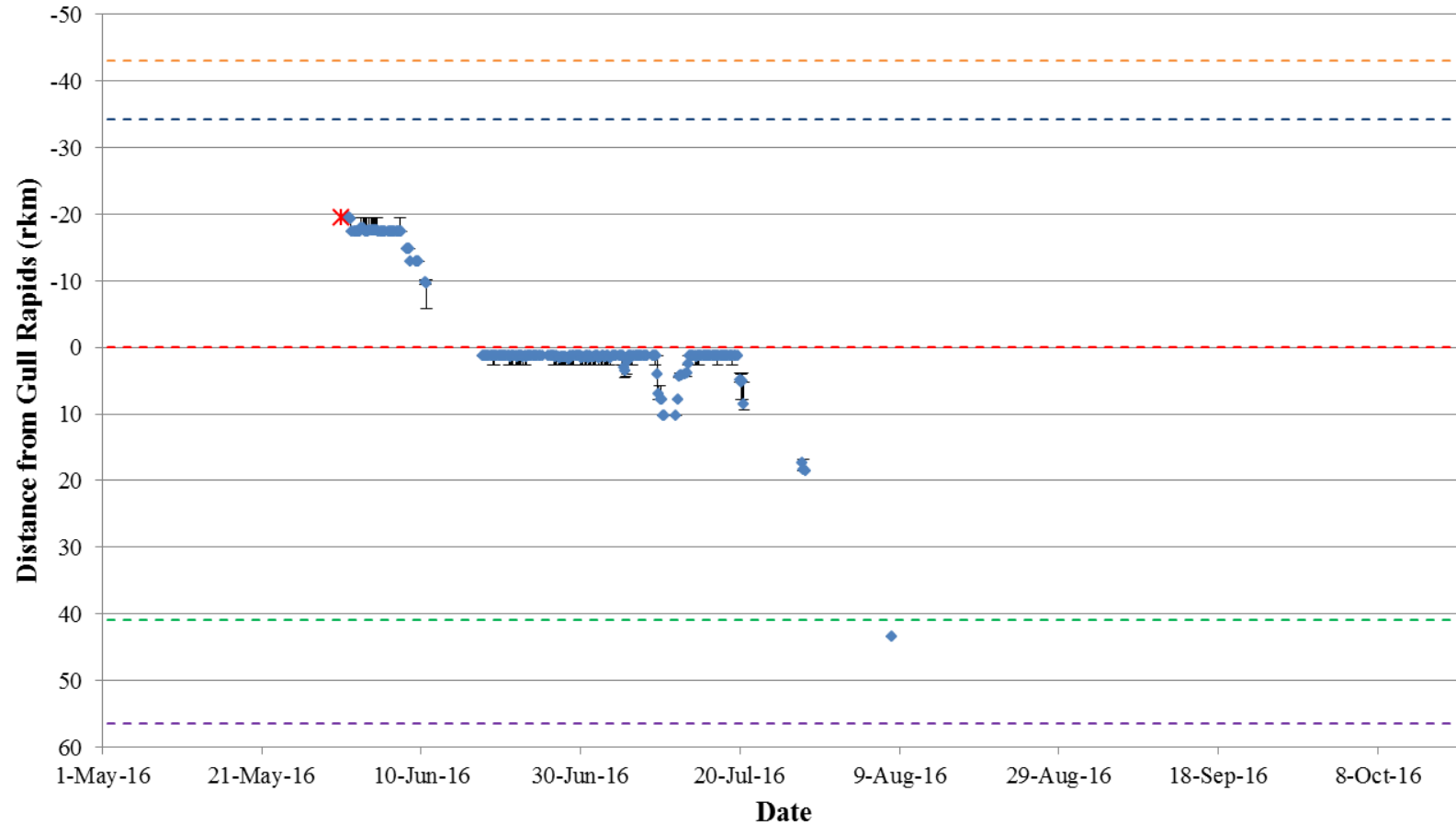


Figure A4-24: Position of a Walleye tagged with an acoustic transmitter (code #53782) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

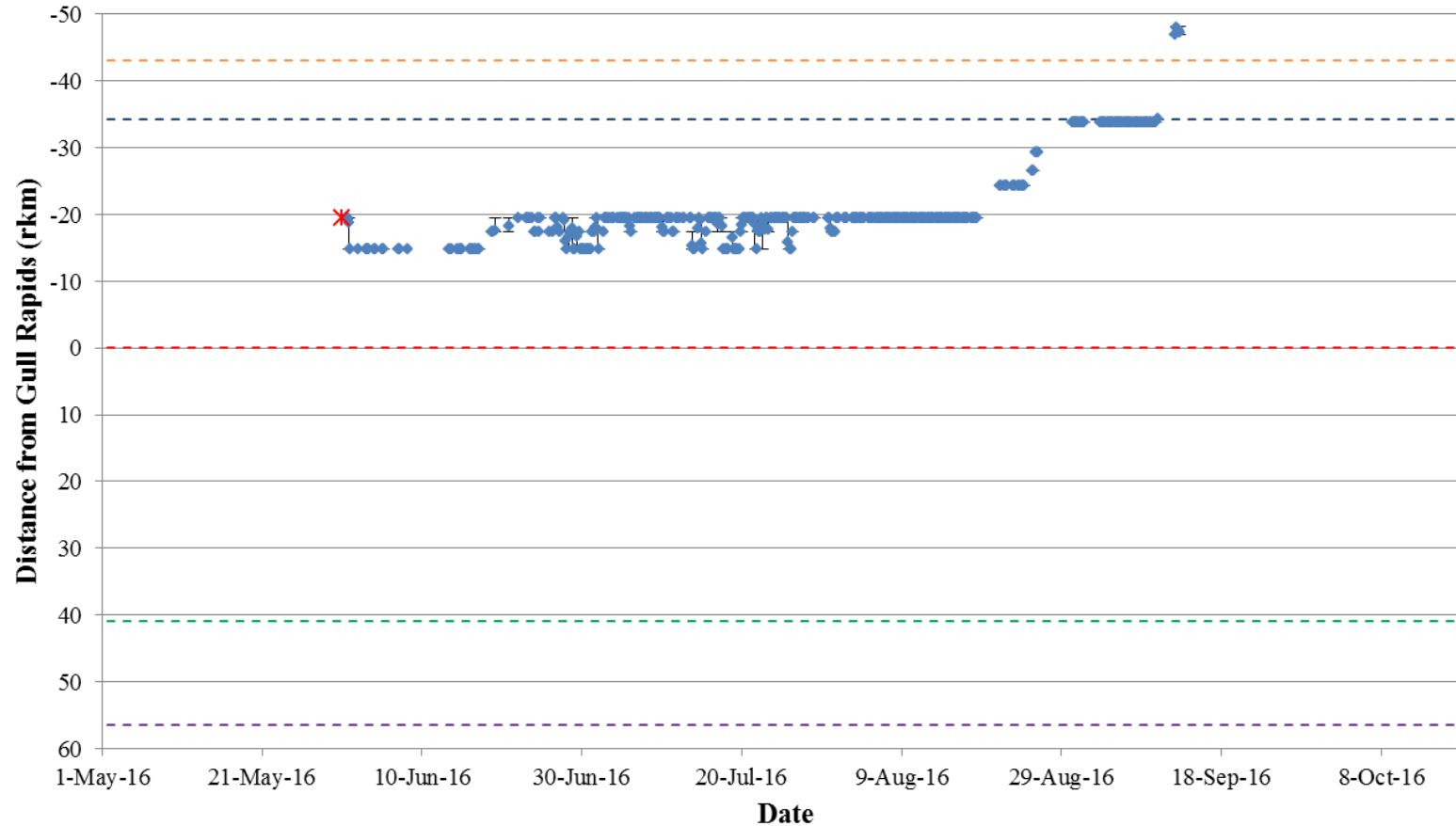


Figure A4-25: Position of a Walleye tagged with an acoustic transmitter (code #53783) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

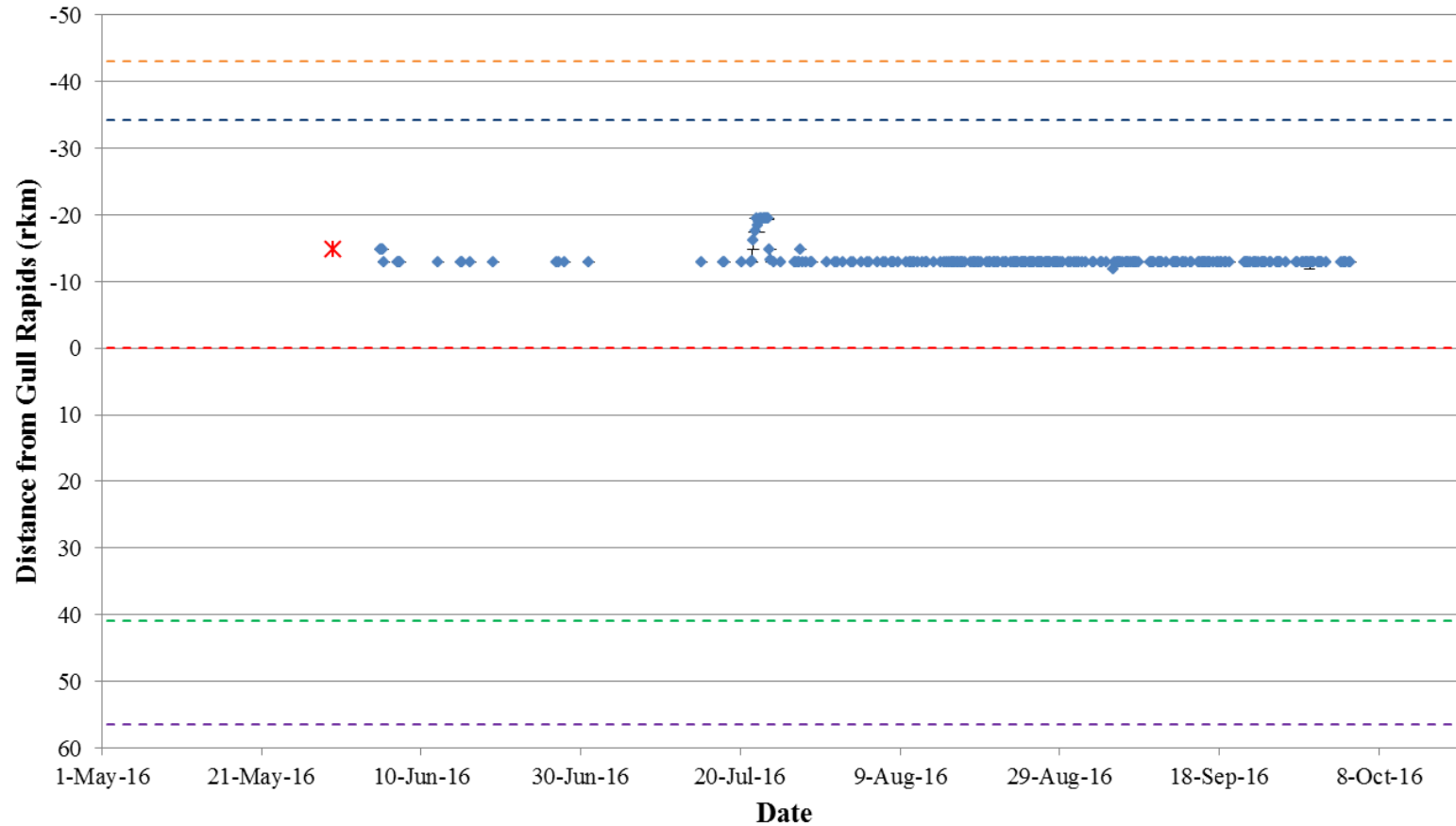


Figure A4-26: Position of a Walleye tagged with an acoustic transmitter (code #53784) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

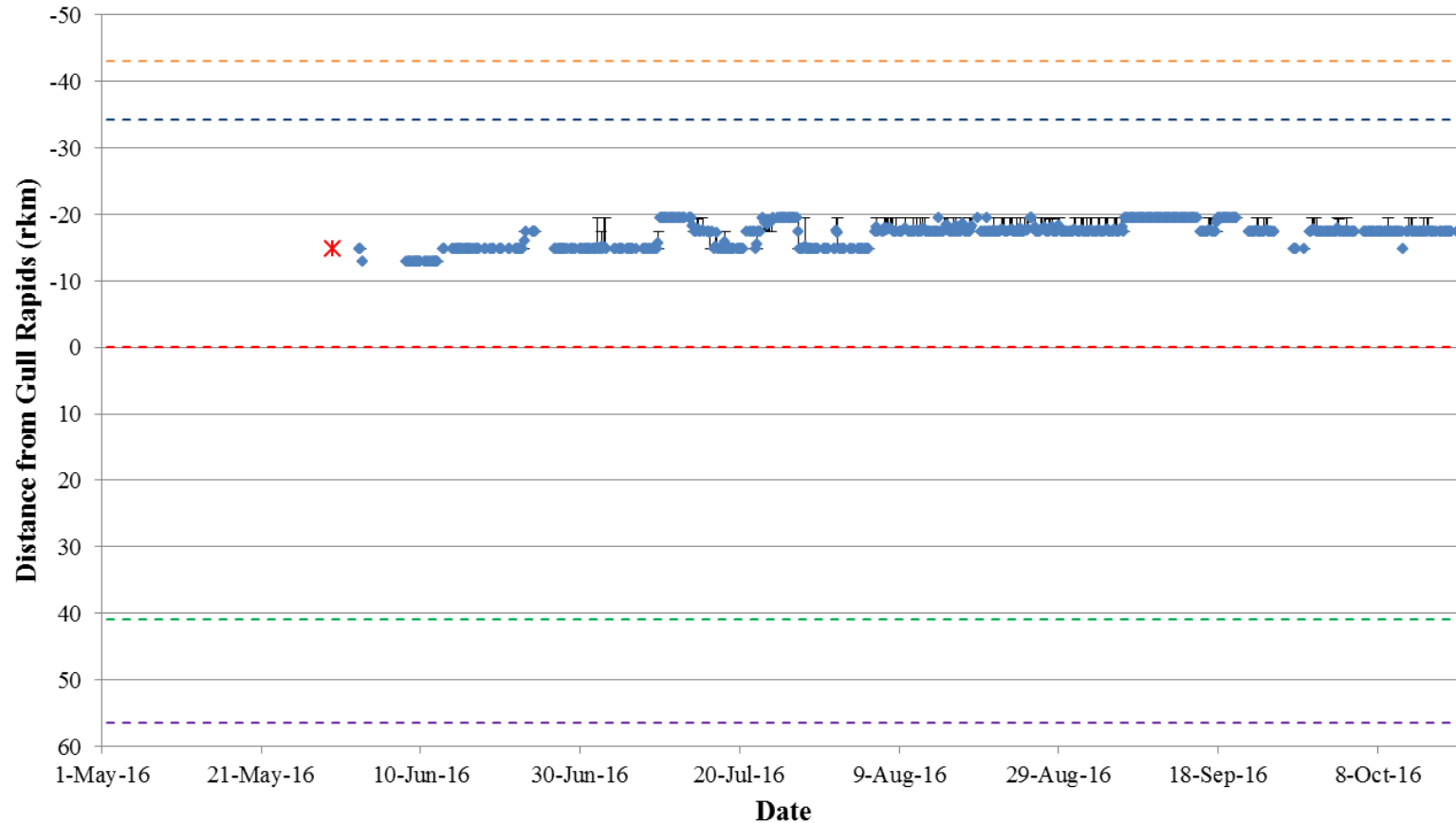


Figure A4-27: Position of a Walleye tagged with an acoustic transmitter (code #53785) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

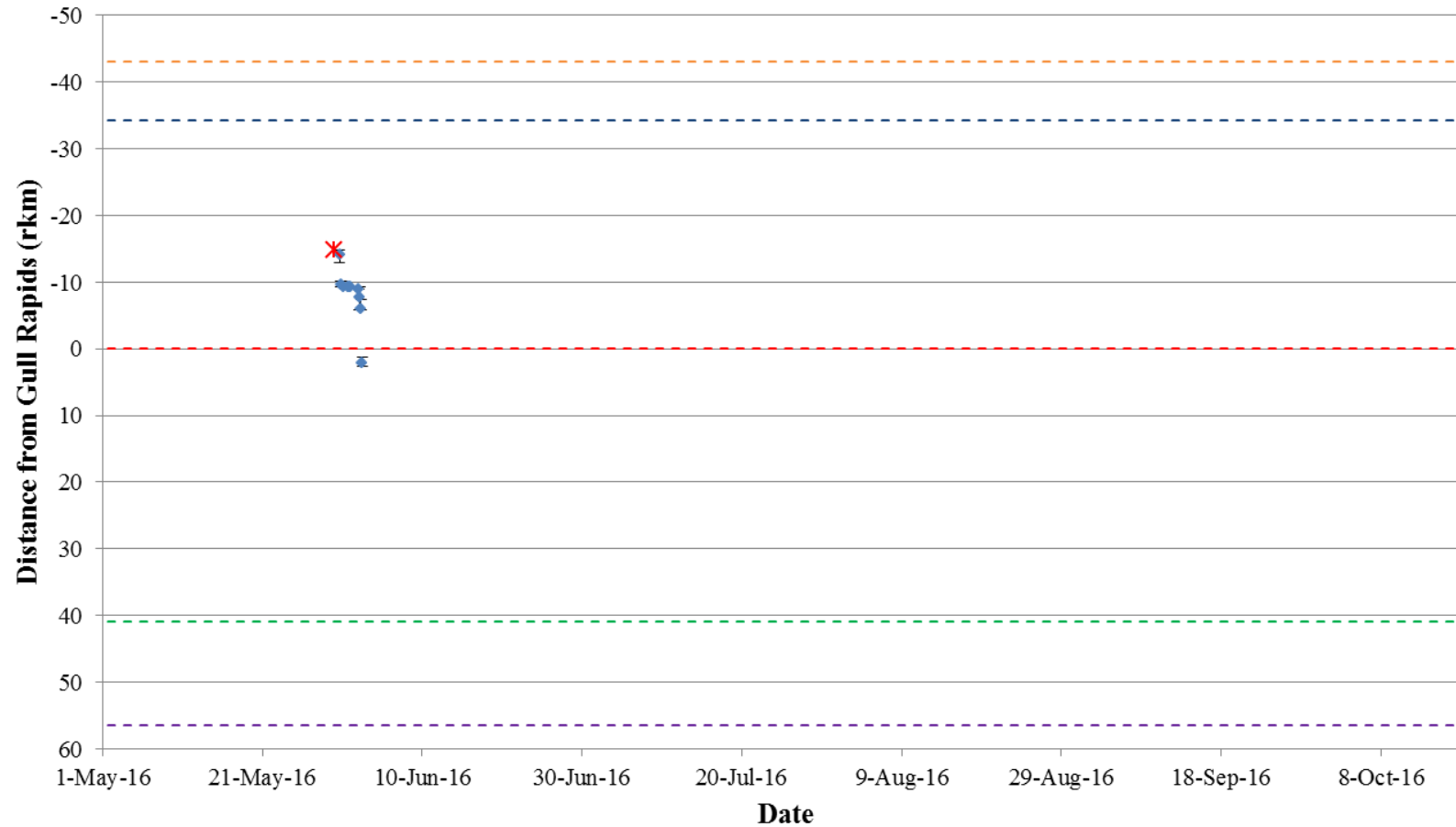


Figure A4-28: Position of a Walleye tagged with an acoustic transmitter (code #53786) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

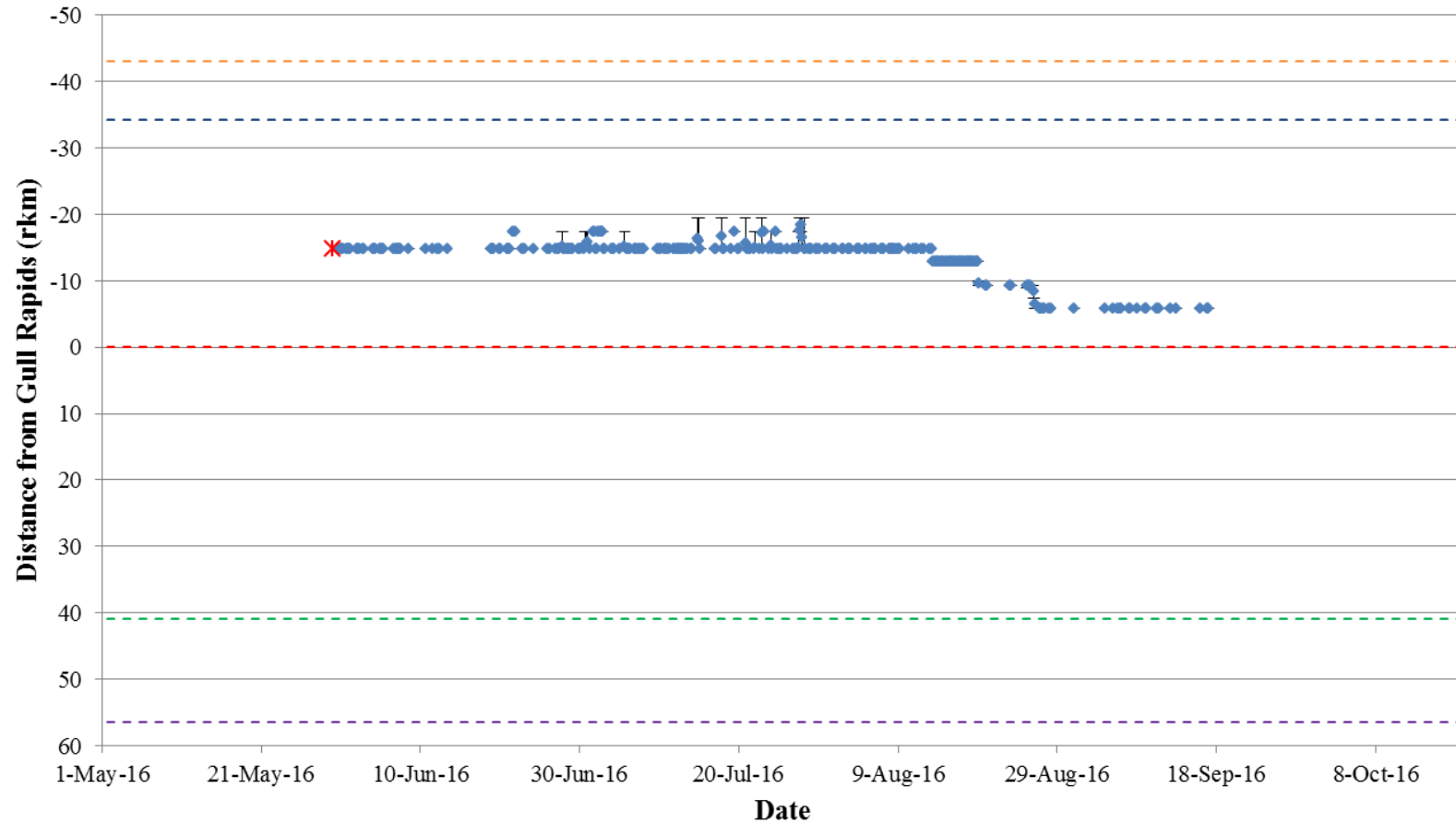


Figure A4-29: Position of a Walleye tagged with an acoustic transmitter (code #53787) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

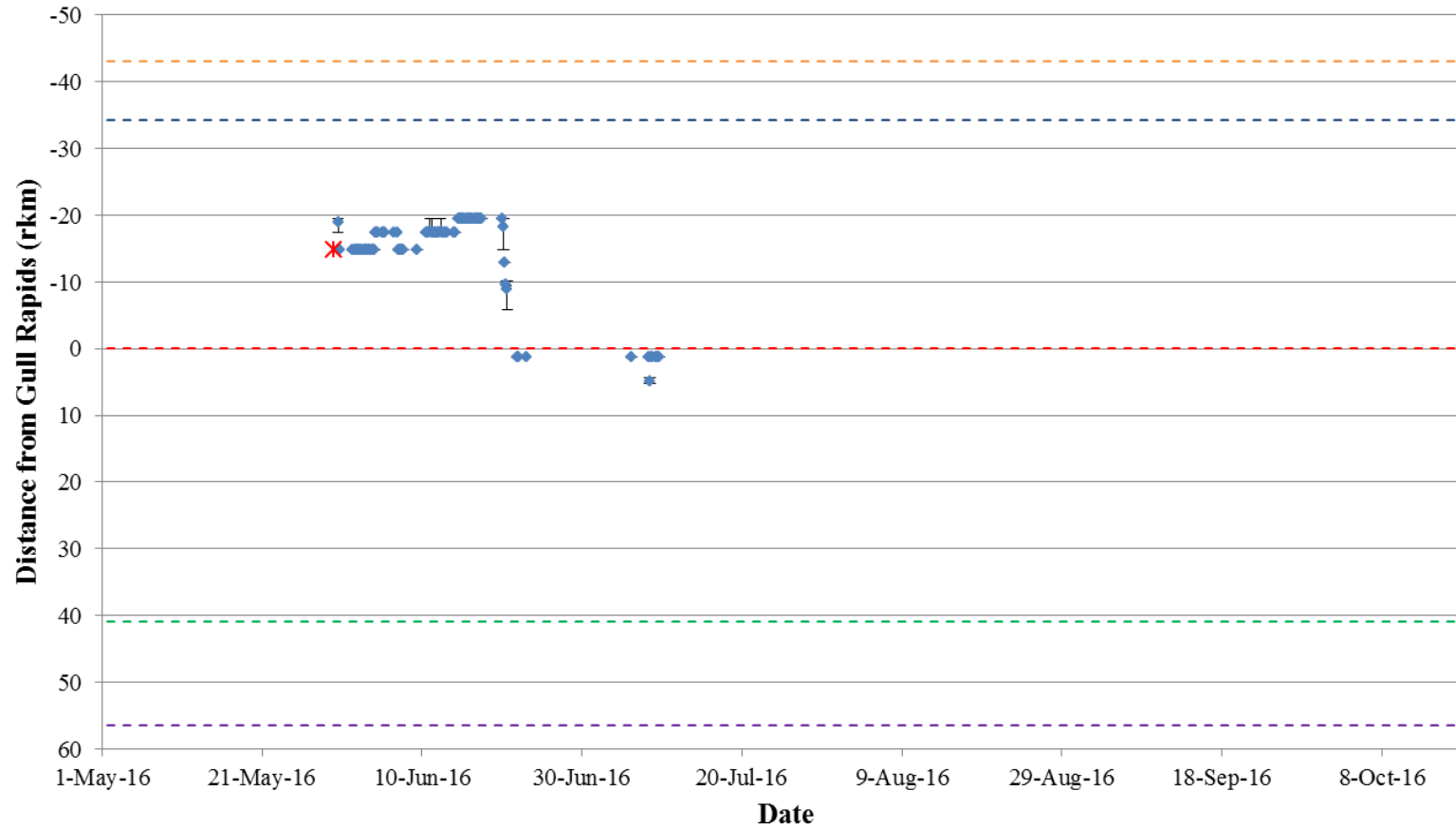


Figure A4-30: Position of a Walleye tagged with an acoustic transmitter (code #53788) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

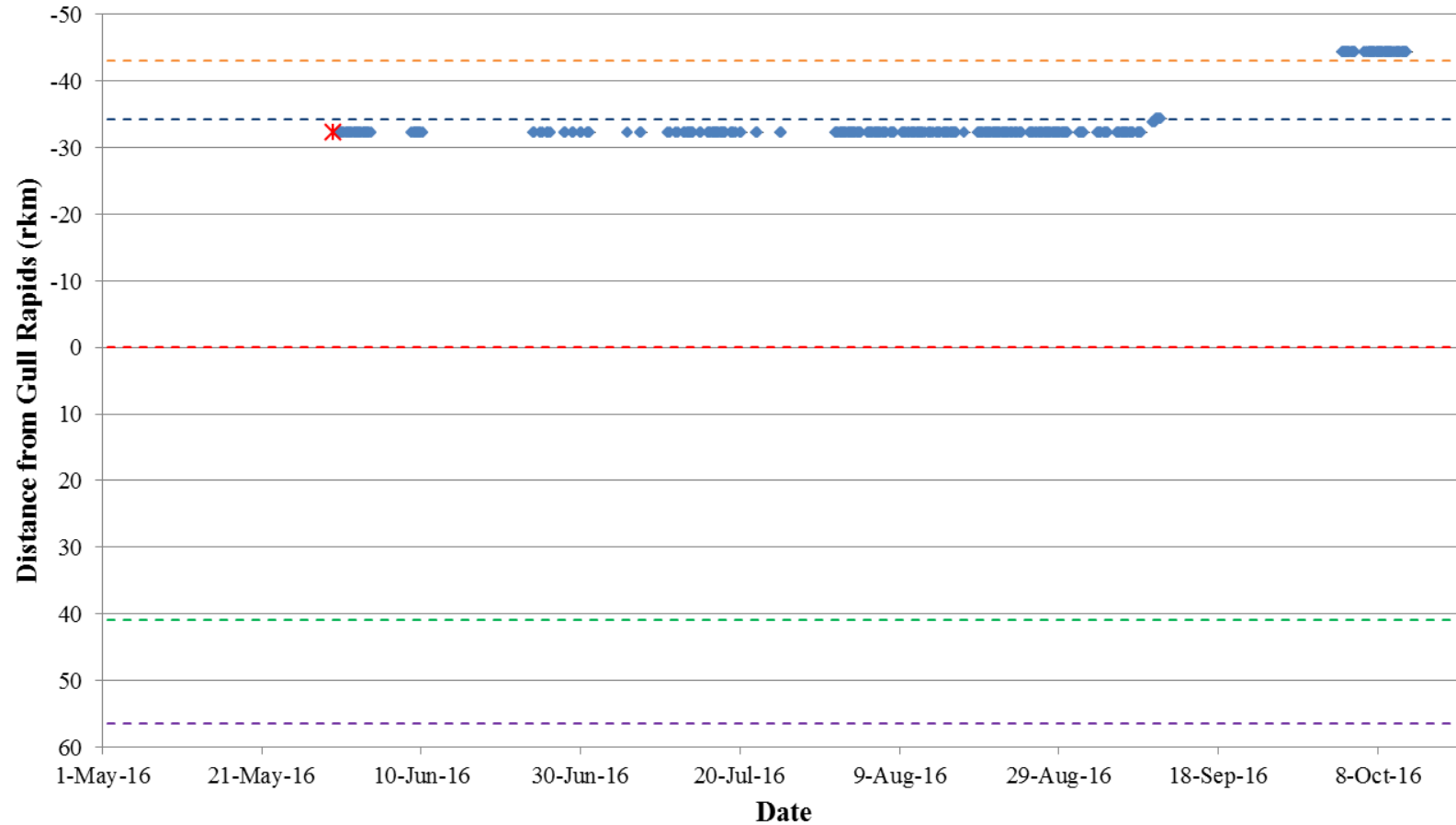


Figure A4-31: Position of a Walleye tagged with an acoustic transmitter (code #53789) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

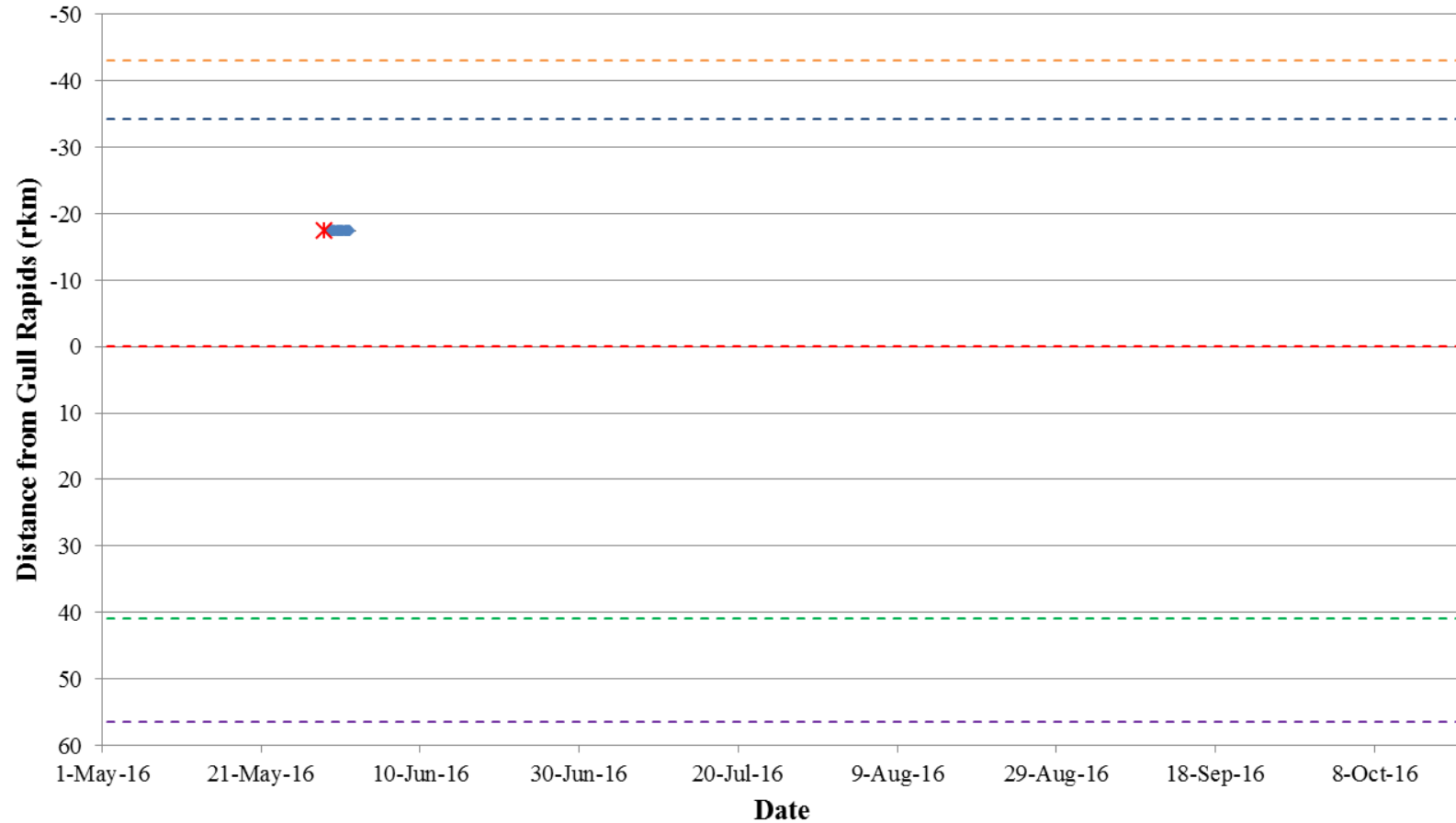


Figure A4-32: Position of a Walleye tagged with an acoustic transmitter (code #53790) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

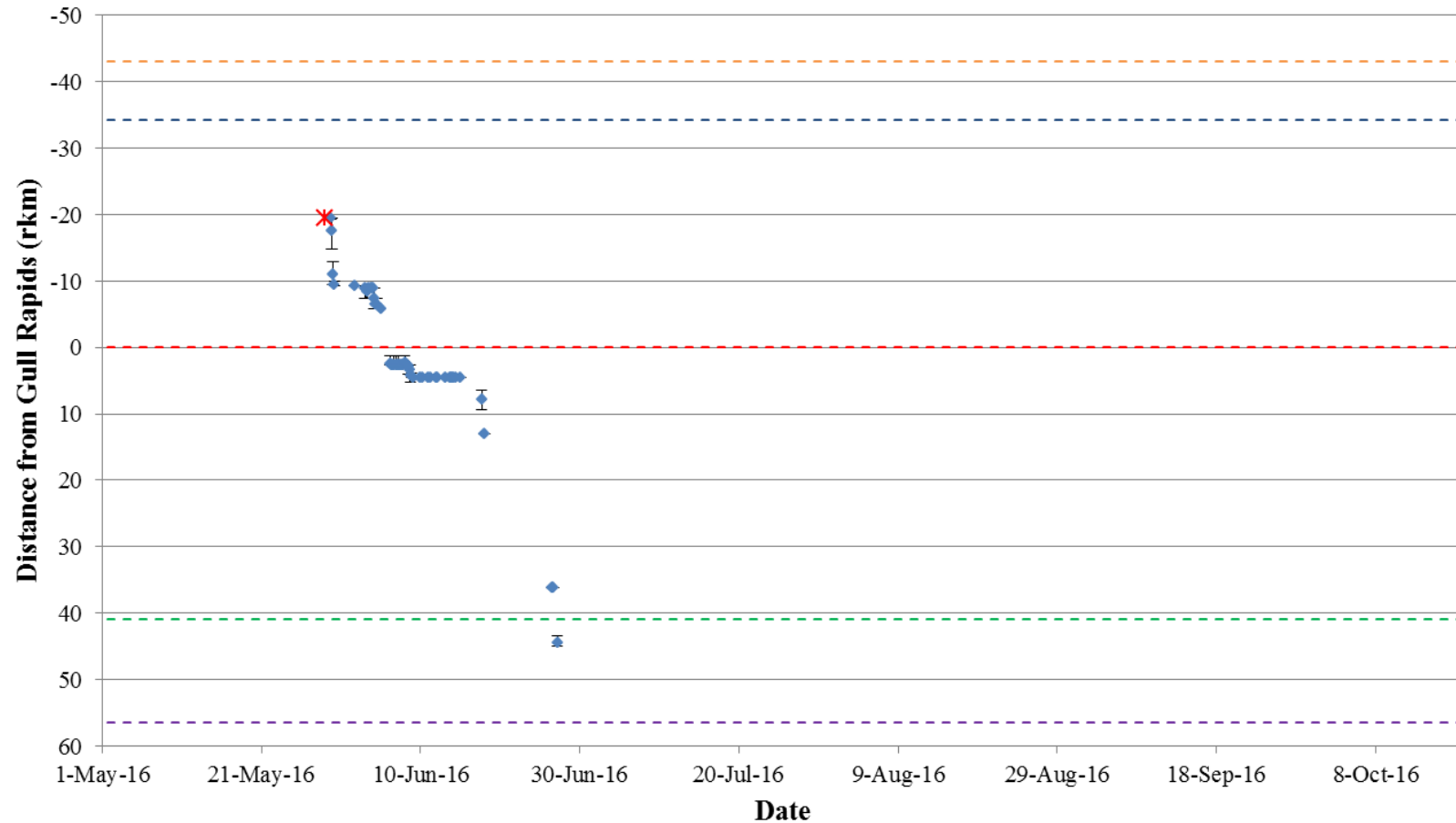


Figure A4-33: Position of a Walleye tagged with an acoustic transmitter (code #53791) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

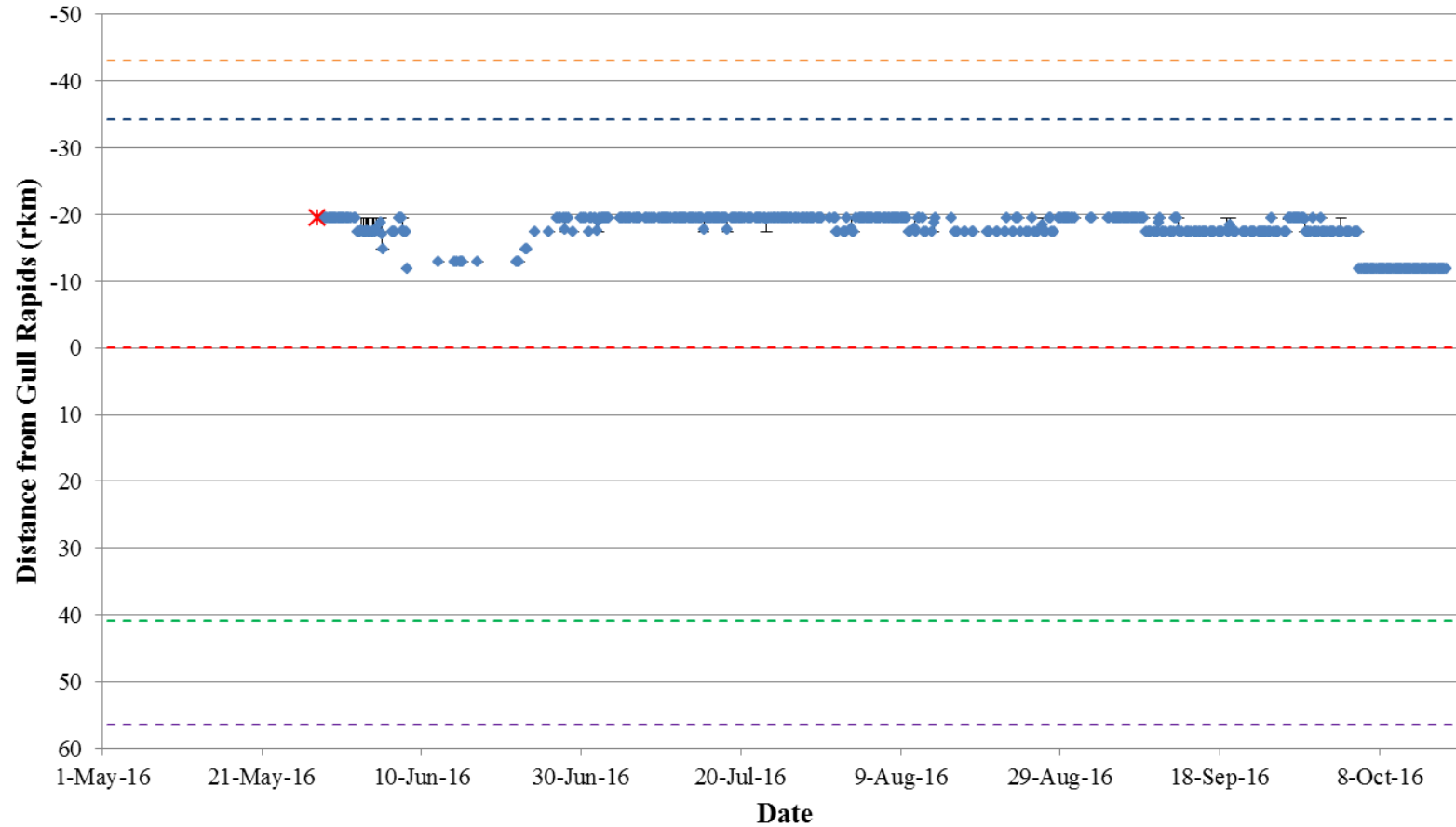


Figure A4-34: Position of a Walleye tagged with an acoustic transmitter (code #53792) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

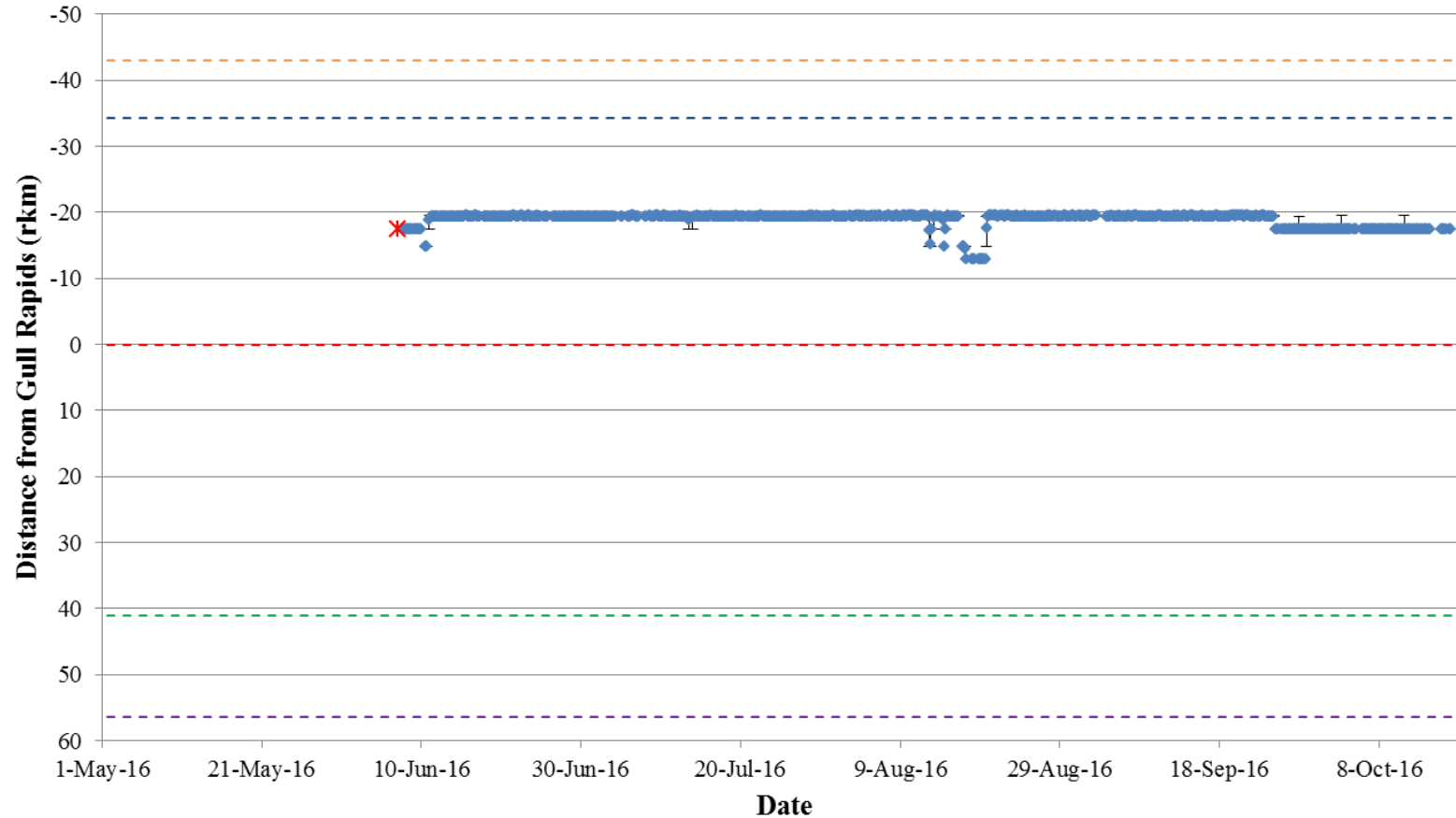


Figure A4-35: Position of a Walleye tagged with an acoustic transmitter (code #53793) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

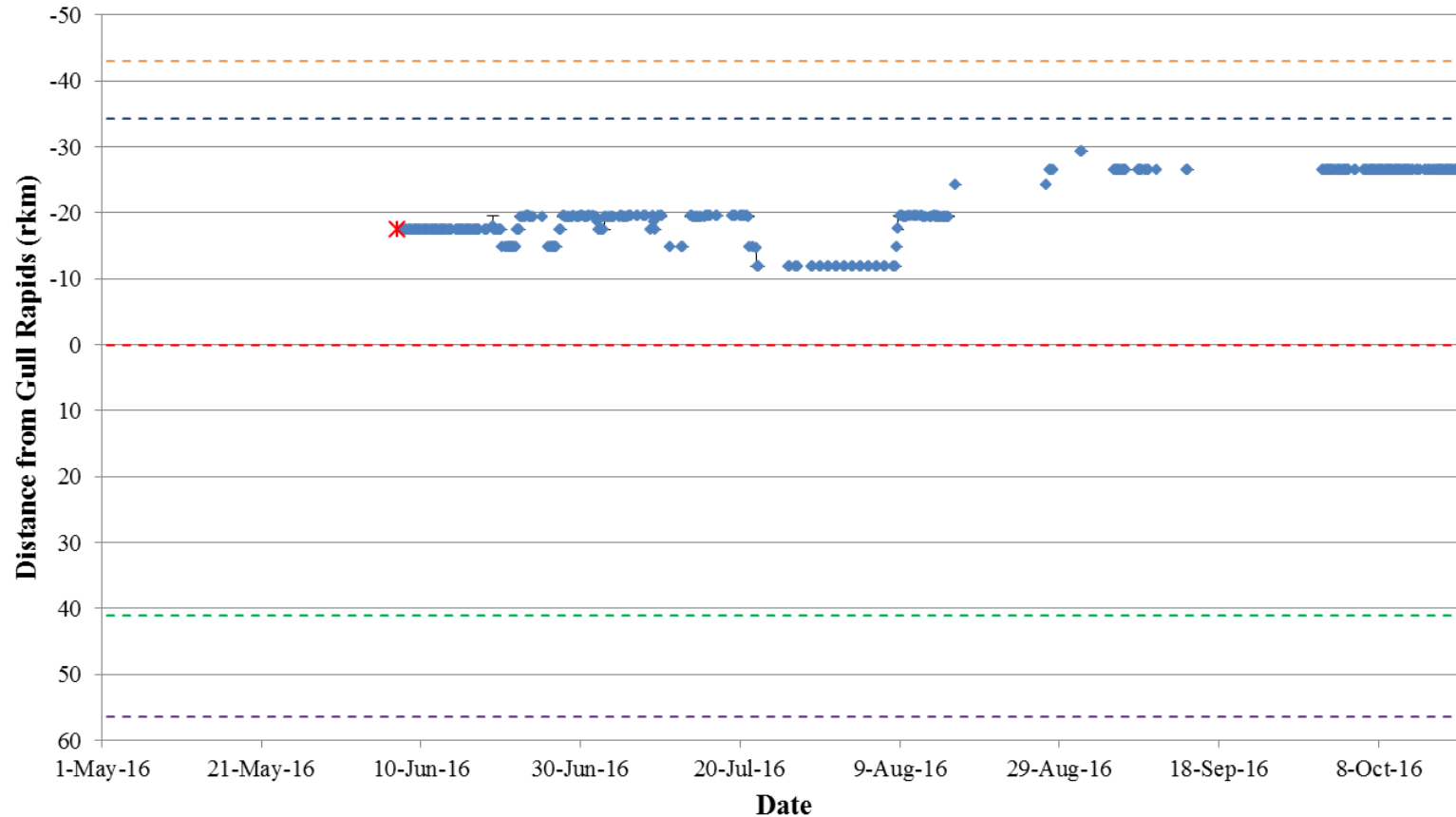


Figure A4-36: Position of a Walleye tagged with an acoustic transmitter (code #53794) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

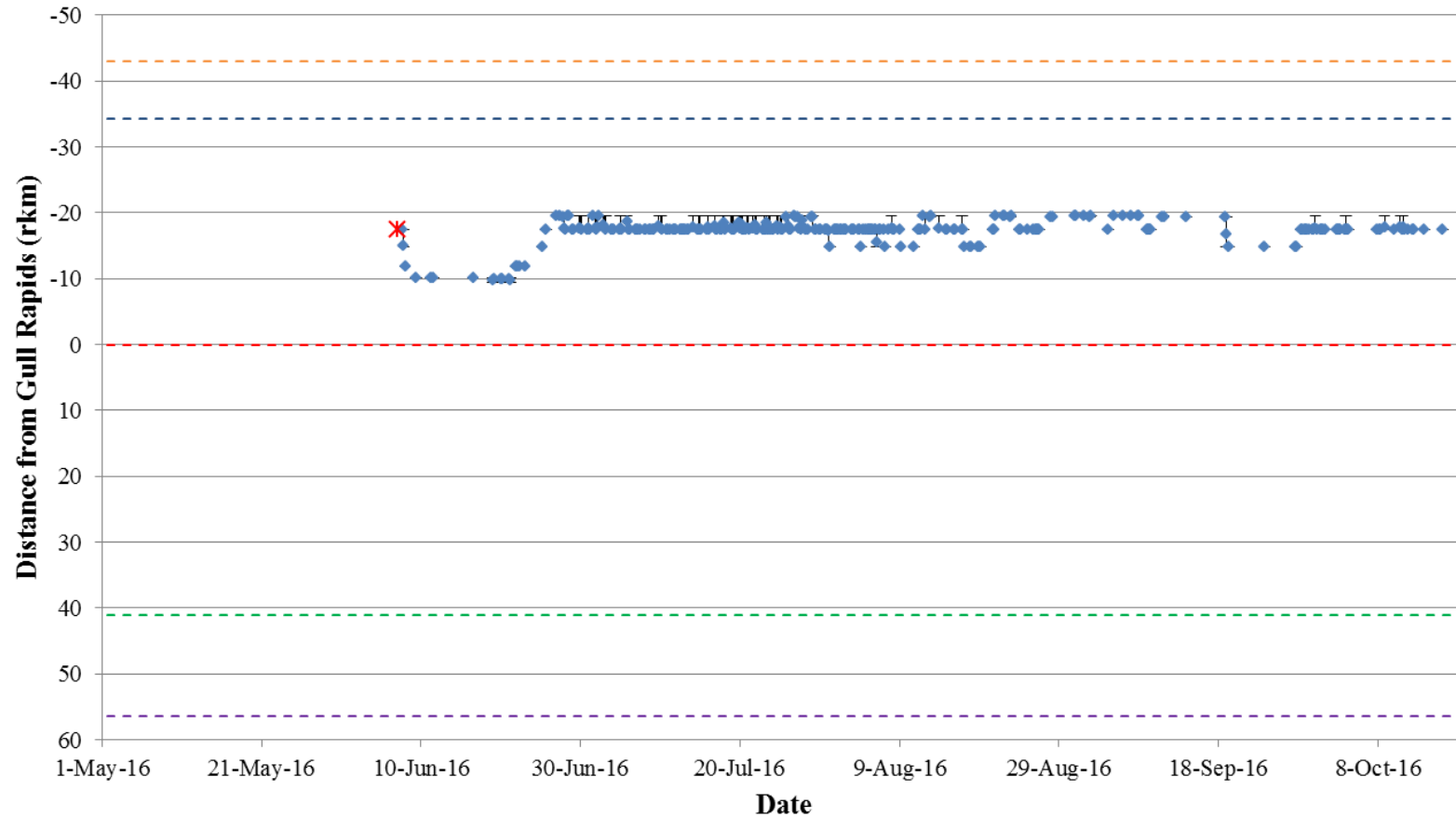


Figure A4-37: Position of a Walleye tagged with an acoustic transmitter (code #53795) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

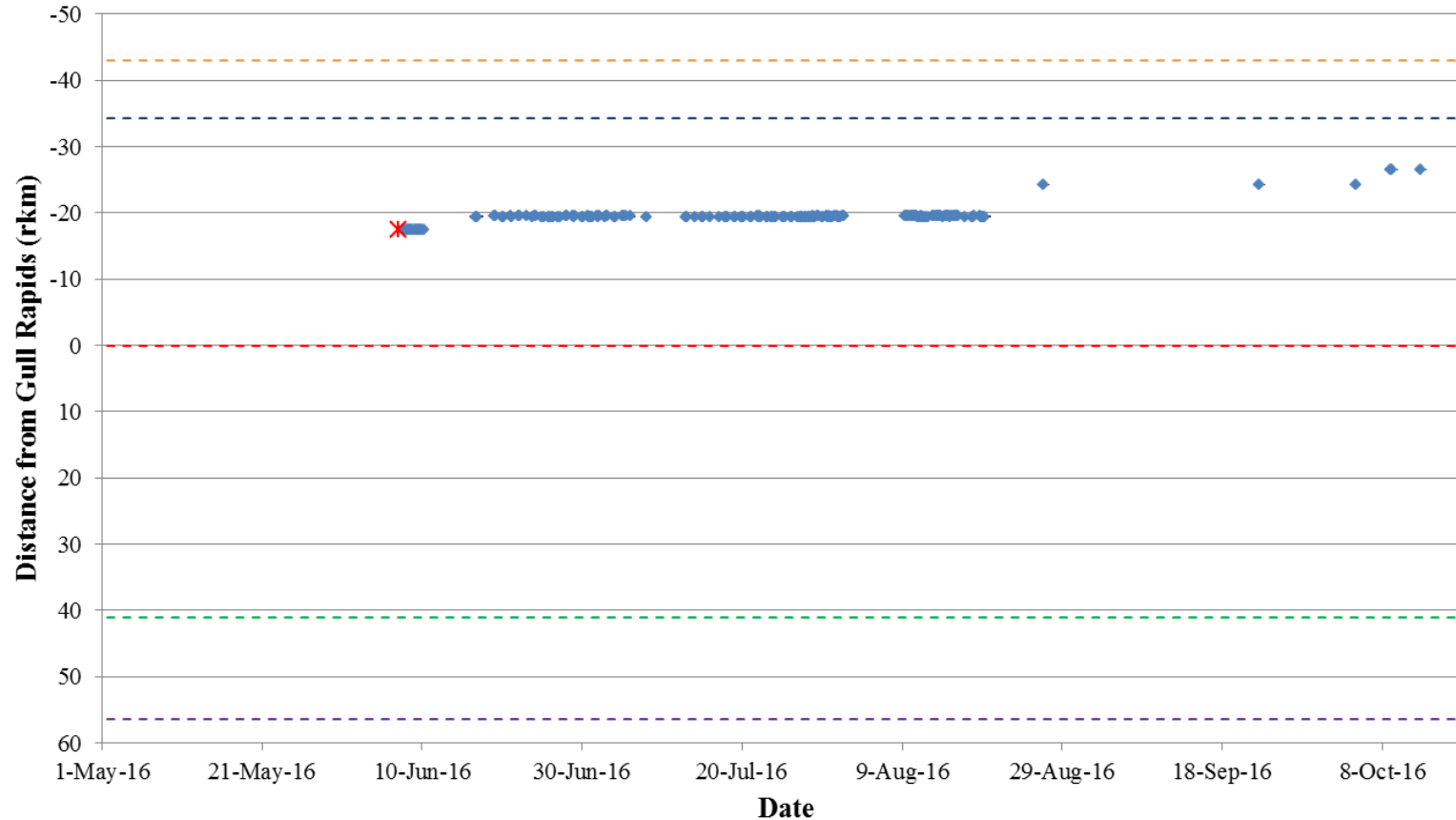


Figure A4-38: Position of a Walleye tagged with an acoustic transmitter (code #53796) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

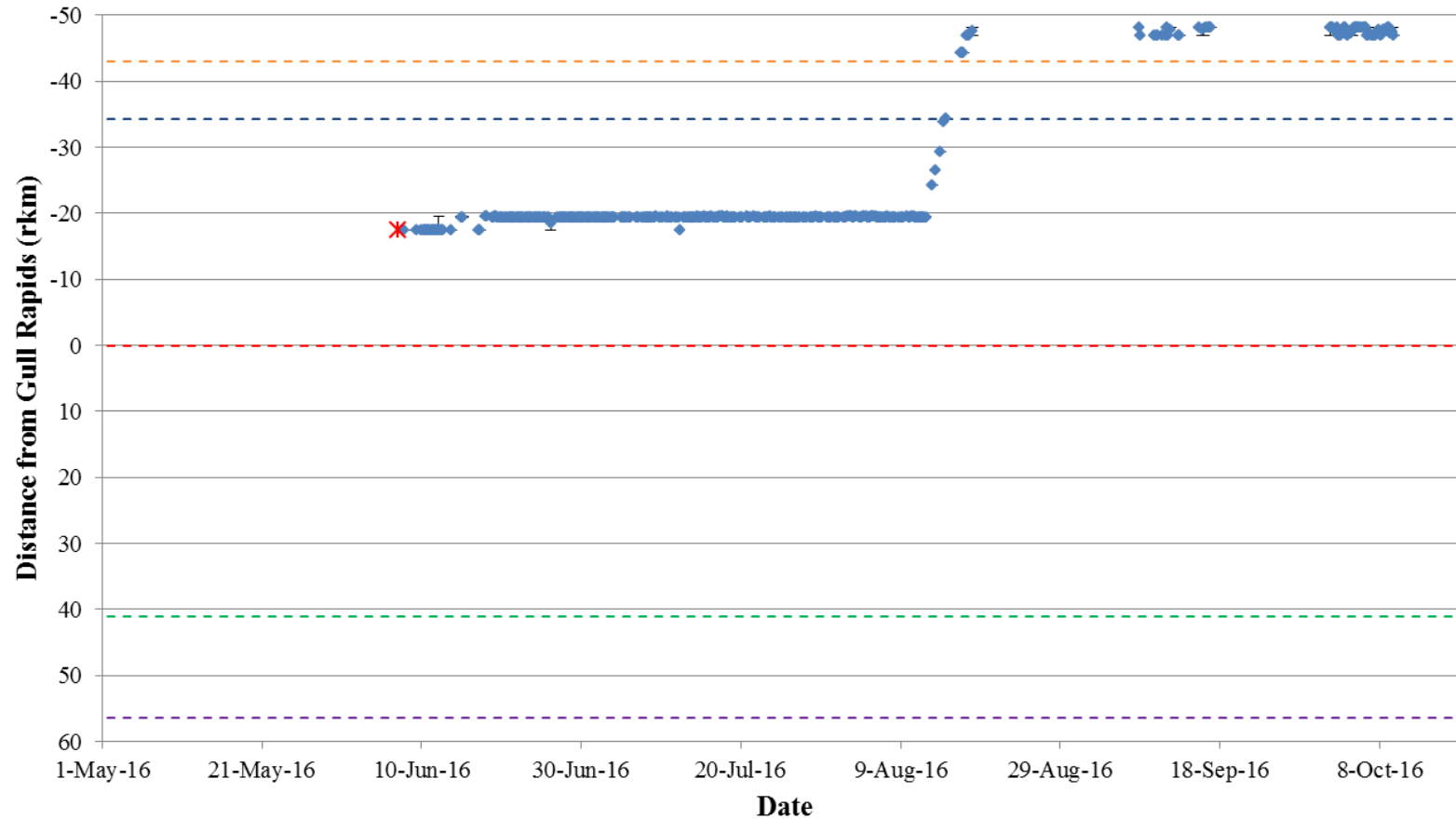


Figure A4-39: Position of a Walleye tagged with an acoustic transmitter (code #53797) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

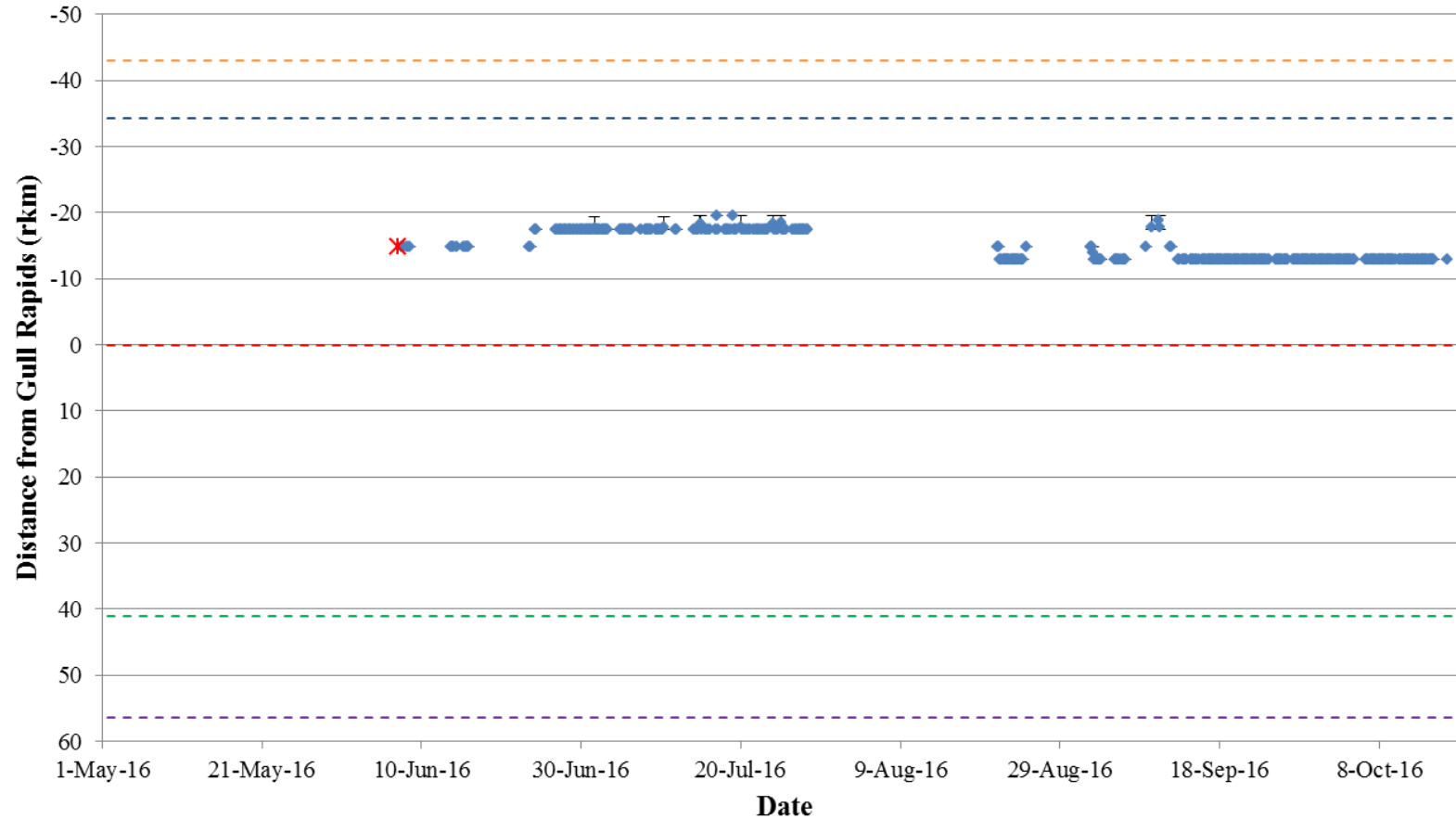


Figure A4-40: Position of a Walleye tagged with an acoustic transmitter (code #53798) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

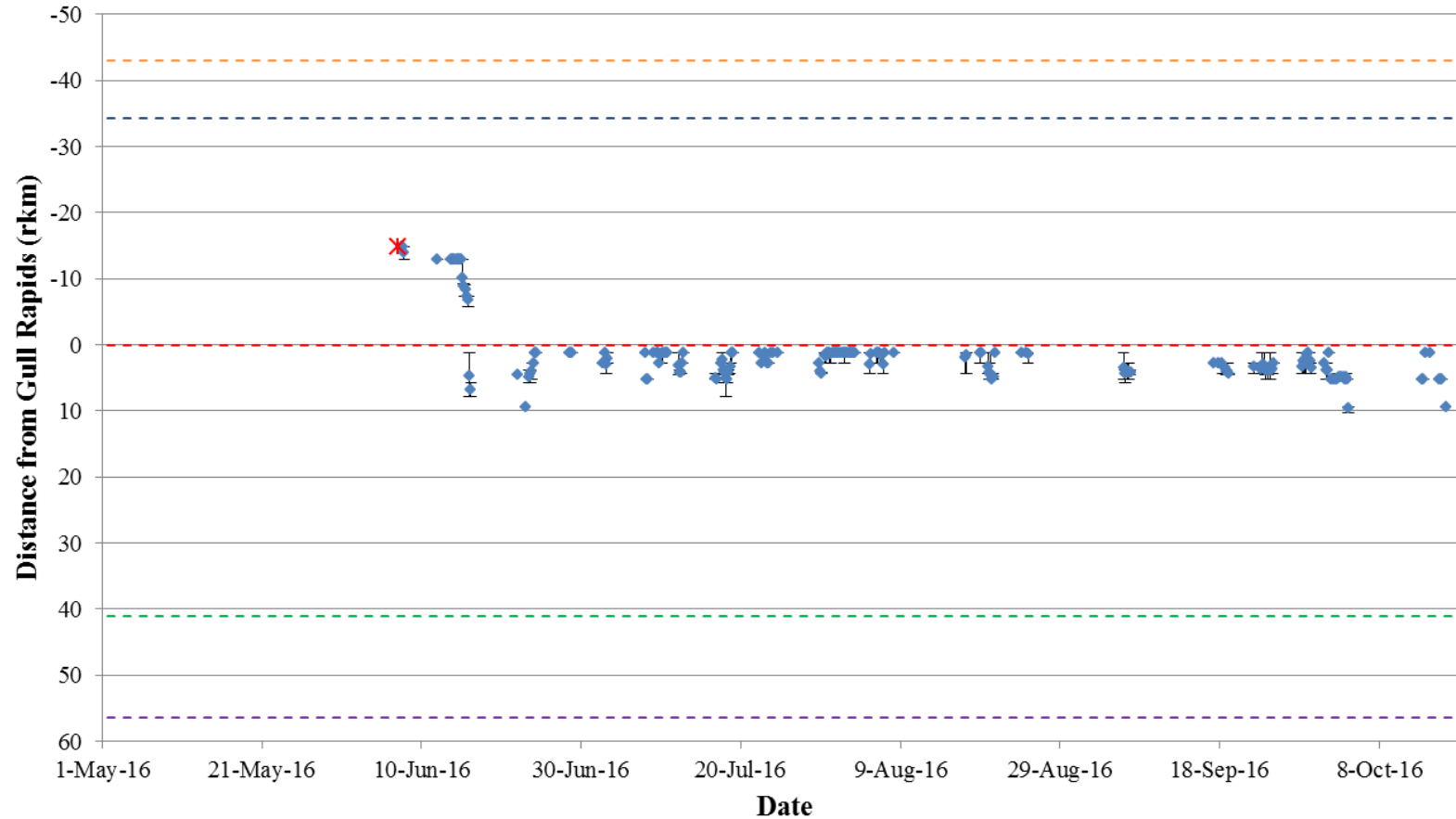


Figure A4-41: Position of a Walleye tagged with an acoustic transmitter (code #53799) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

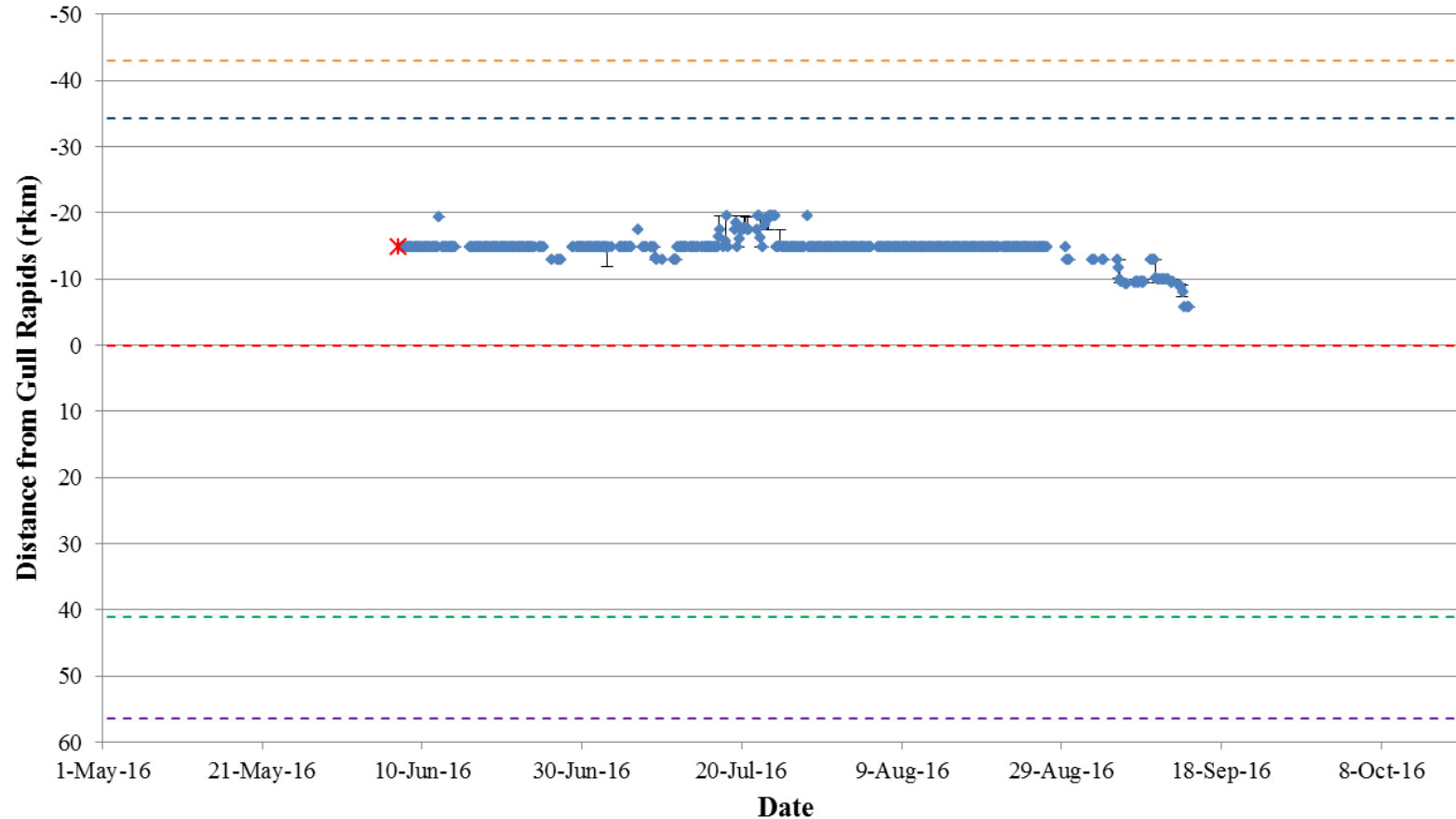


Figure A4-42: Position of a Walleye tagged with an acoustic transmitter (code #53800) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

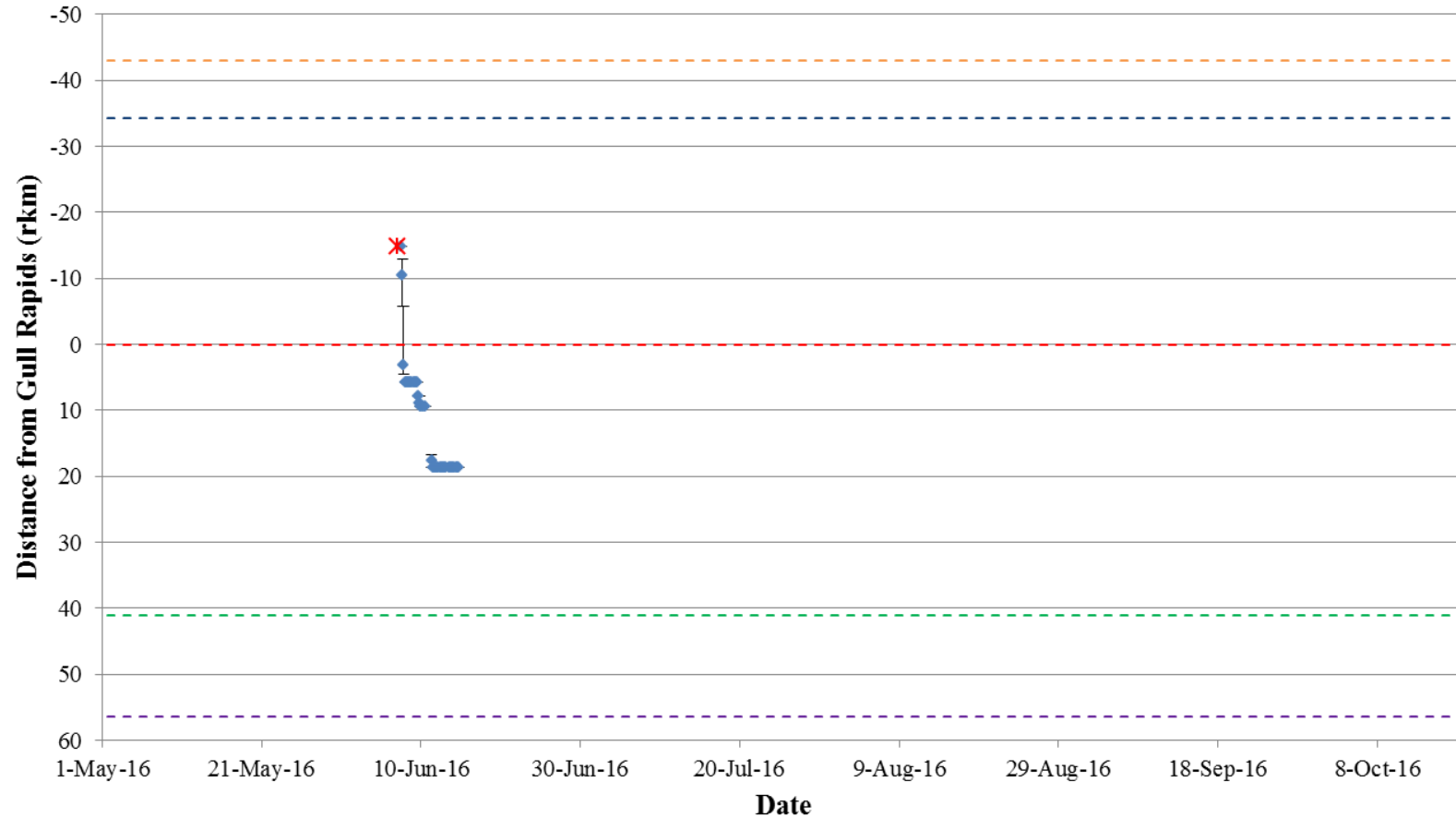


Figure A4-43: Position of a Walleye tagged with an acoustic transmitter (code #53801) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

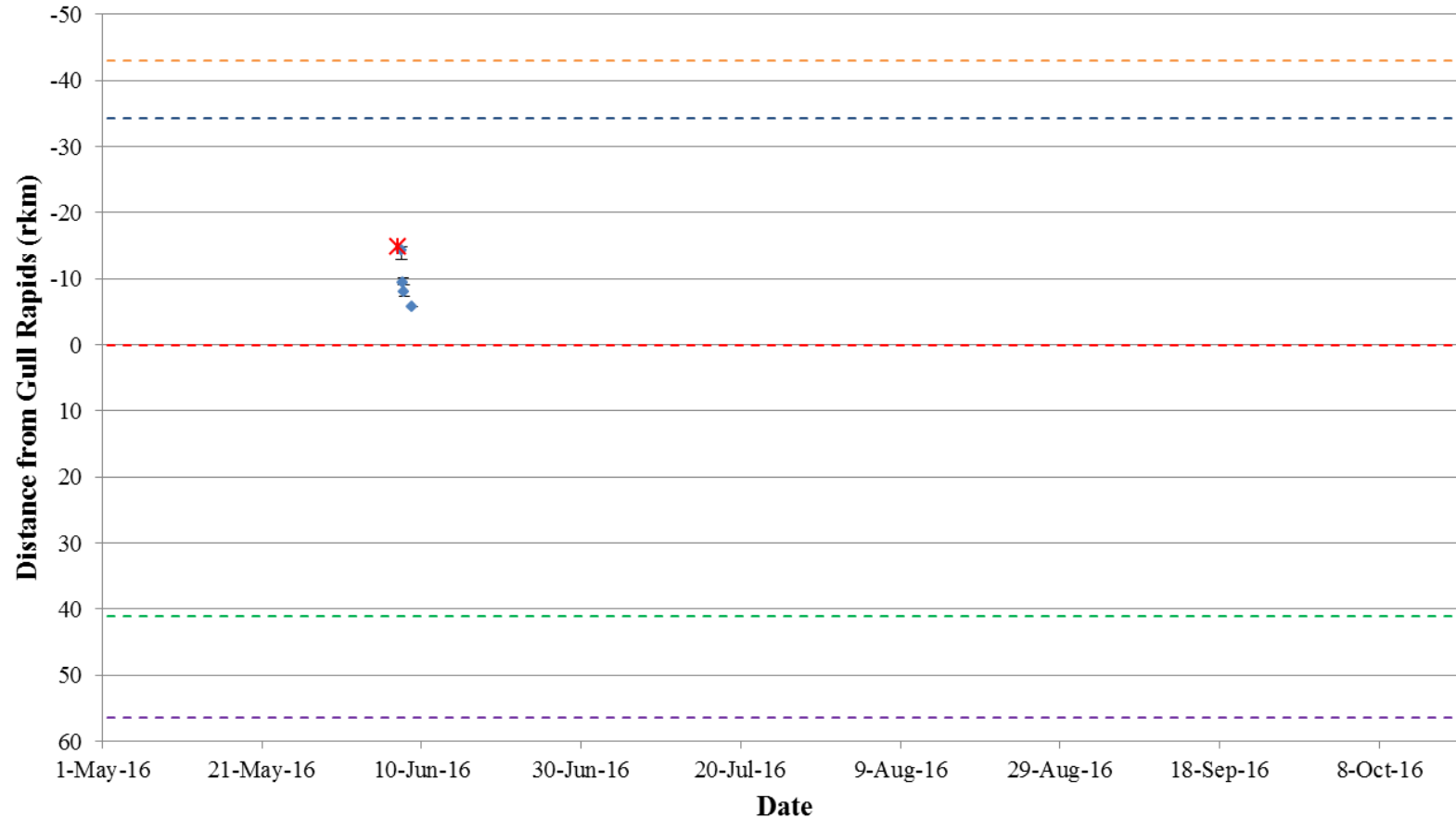


Figure A4-44: Position of a Walleye tagged with an acoustic transmitter (code #53802) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

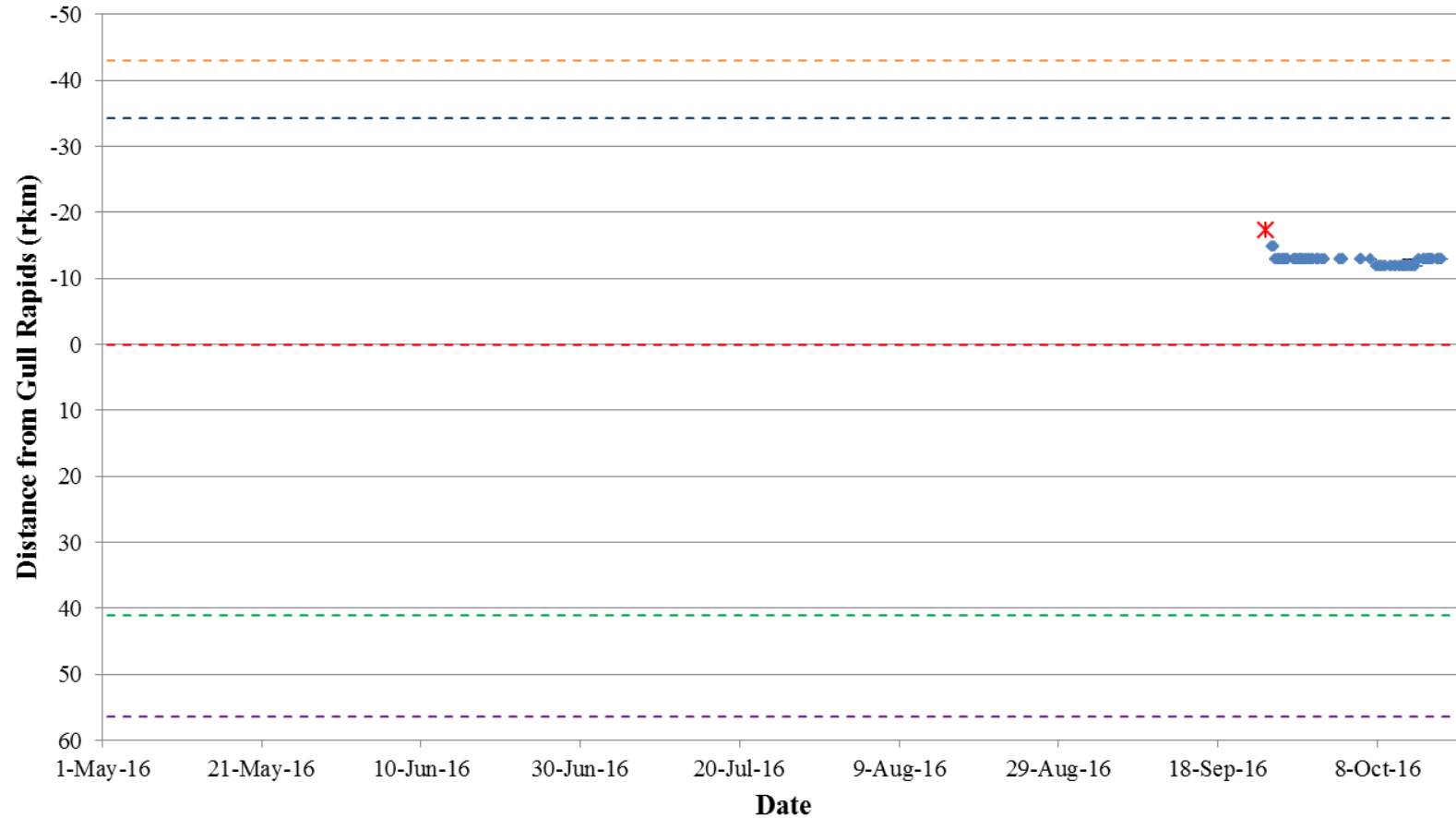


Figure A4-45: Position of a Walleye tagged with an acoustic transmitter (code #53803) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

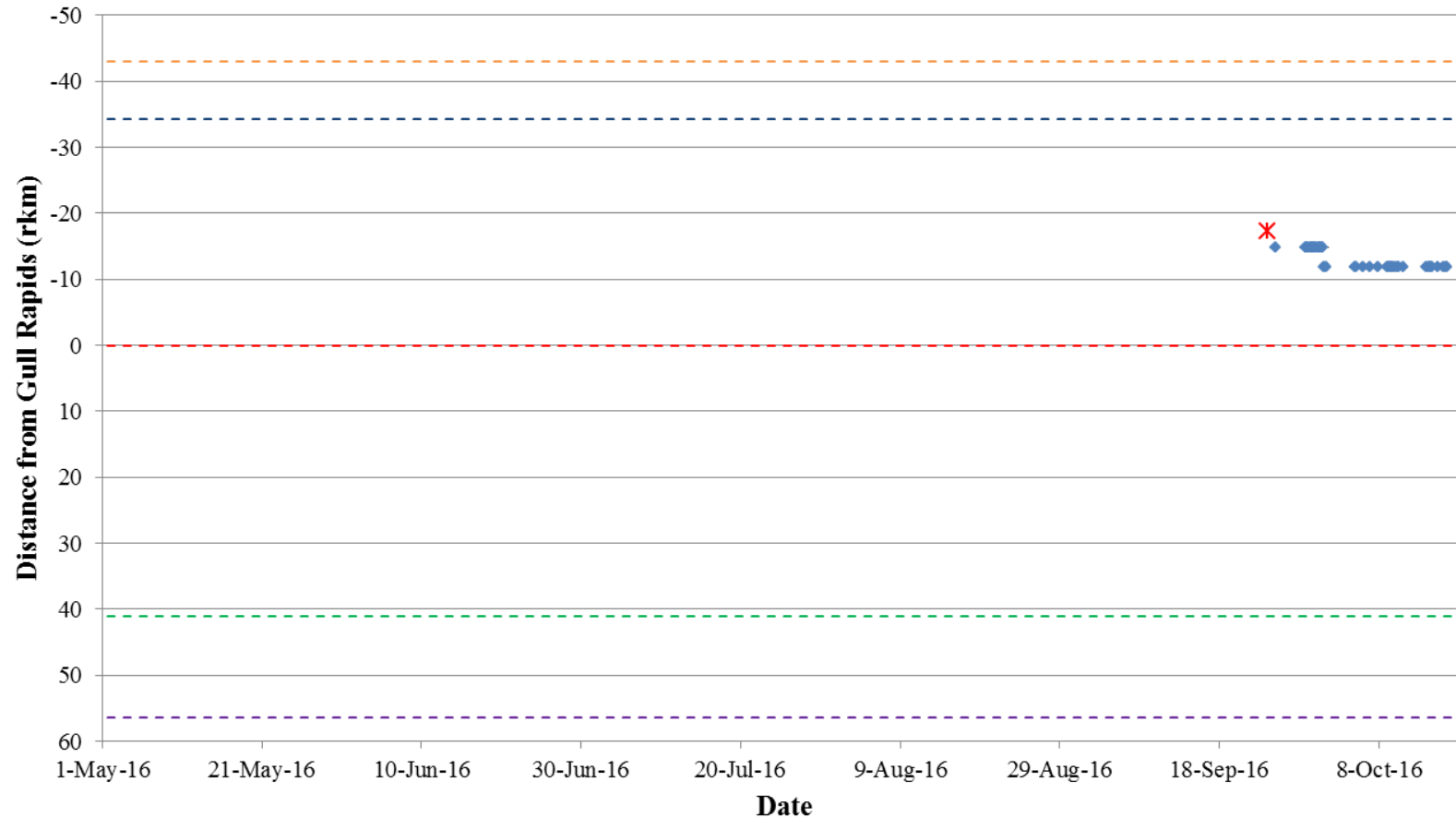


Figure A4-46: Position of a Walleye tagged with an acoustic transmitter (code #53804) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

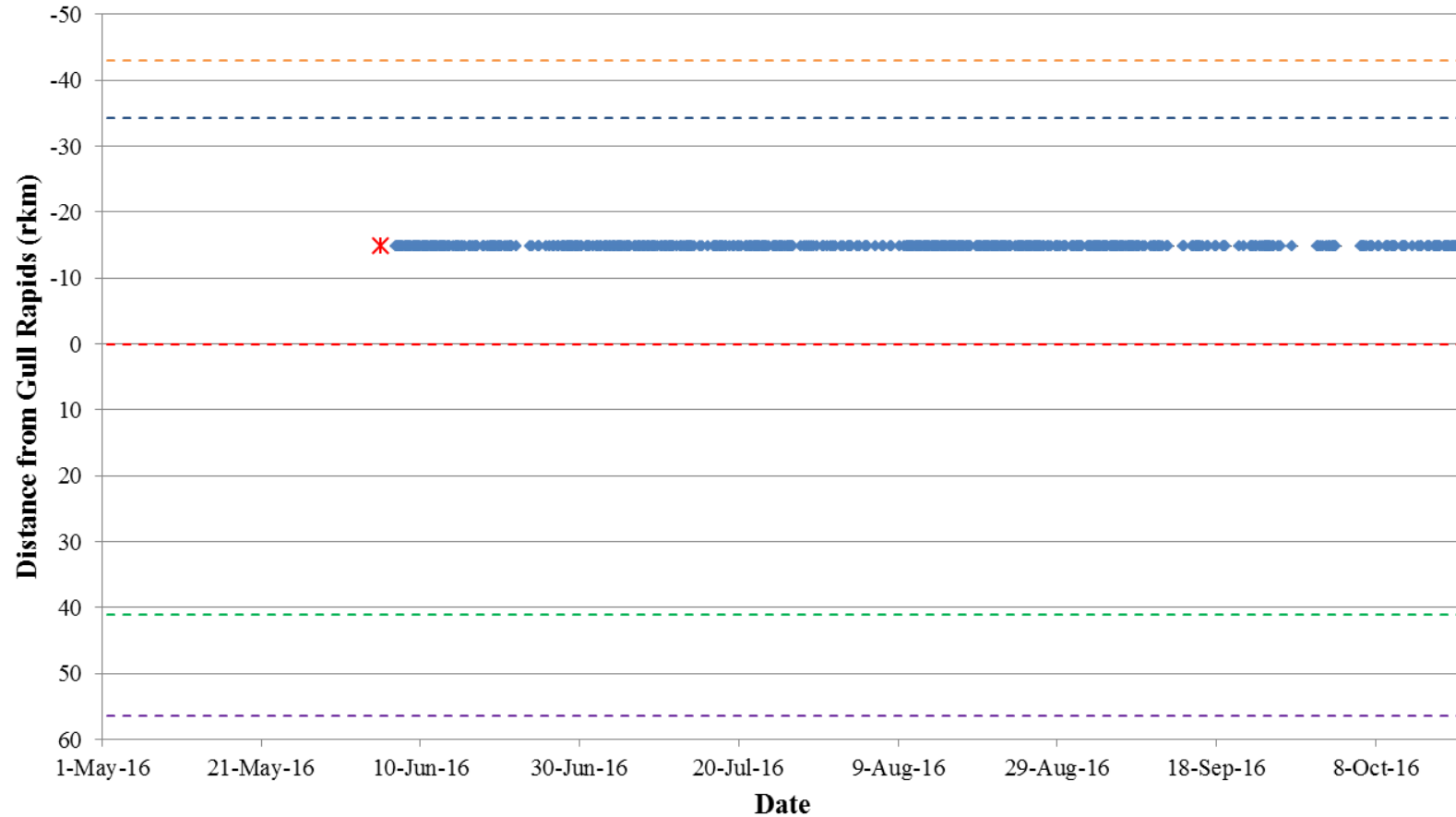


Figure A4-47: Position of a Walleye tagged with an acoustic transmitter (code #53805) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

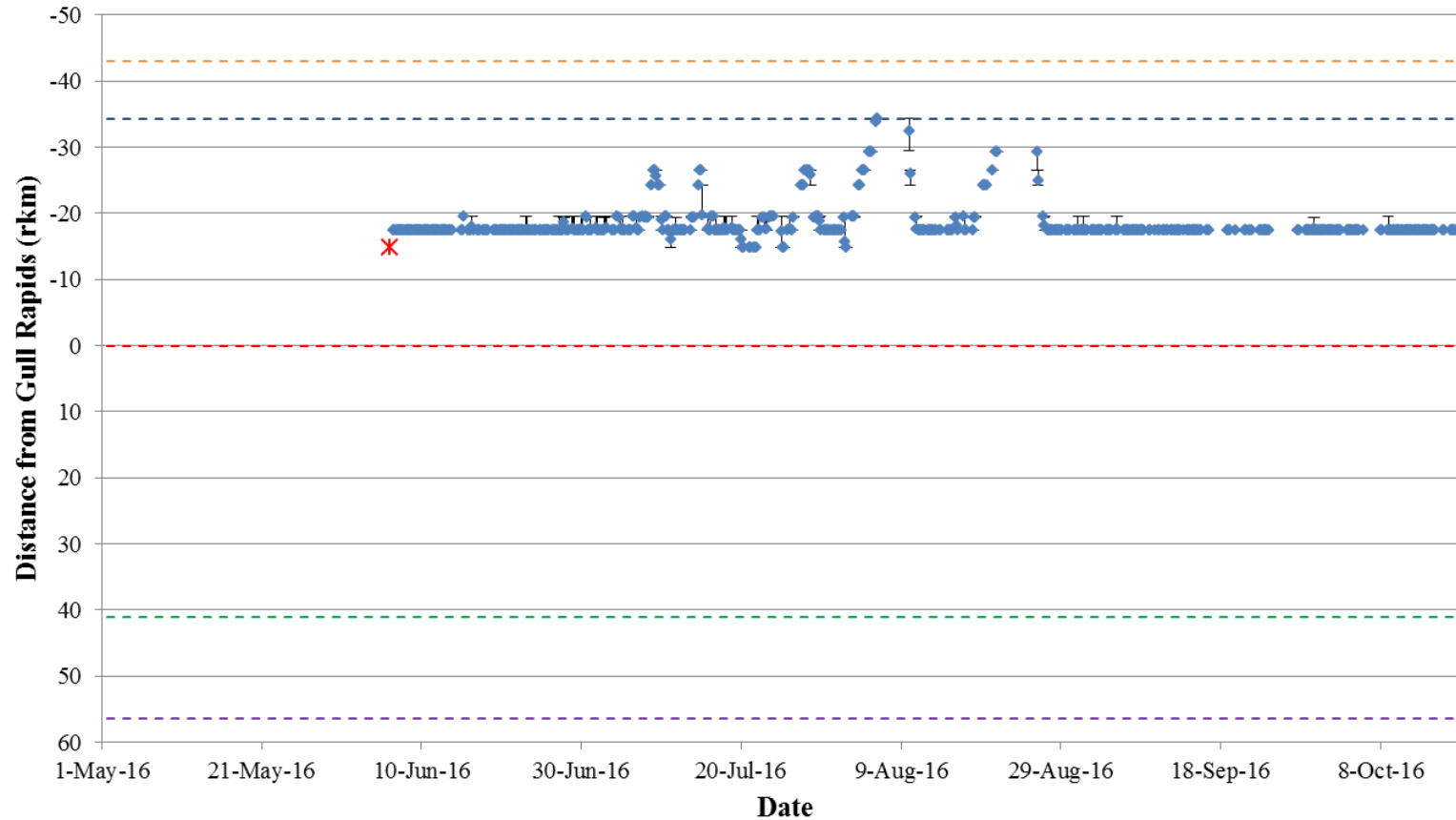


Figure A4-48: Position of a Walleye tagged with an acoustic transmitter (code #53806) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

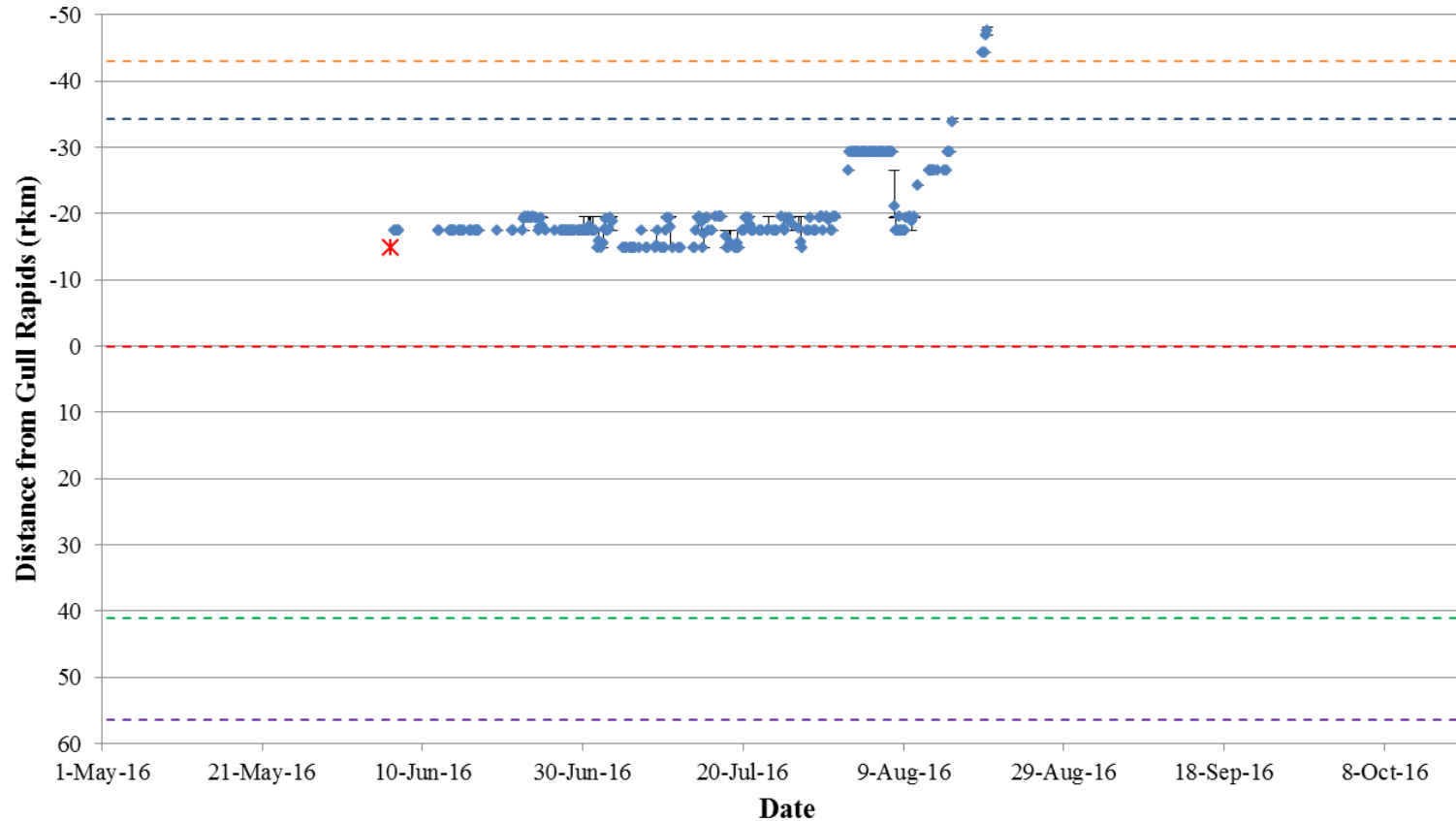


Figure A4-49: Position of a Walleye tagged with an acoustic transmitter (code #53807) in the Nelson River between Clark Lake and Gull Rapids in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

APPENDIX 5:

LOCATION SUMMARY FOR INDIVIDUAL ACOUSTIC TAGGED WALLEYE IN STEPHENS LAKE JUNE 2016 TO OCTOBER 2016

Figure A5-1: Position of a Walleye tagged with an acoustic transmitter (code #53723) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016.	235
Figure A5-2: Position of a Walleye tagged with an acoustic transmitter (code #53724) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016.	236
Figure A5-3: Position of a Walleye tagged with an acoustic transmitter (code #53725) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016.	237
Figure A5-4: Position of a Walleye tagged with an acoustic transmitter (code #53726) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016.	238
Figure A5-5: Position of a Walleye tagged with an acoustic transmitter (code #53728) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016.	239
Figure A5-6: Position of a Walleye tagged with an acoustic transmitter (code #53729) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016.	240
Figure A5-7: Position of a Walleye tagged with an acoustic transmitter (code #53730) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016.	241
Figure A5-8: Position of a Walleye tagged with an acoustic transmitter (code #53731) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016.	242
Figure A5-9: Position of a Walleye tagged with an acoustic transmitter (code #53732) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016.	243
Figure A5-10: Position of a Walleye tagged with an acoustic transmitter (code #53733) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016.	244

Figure A5-11: Position of a Walleye tagged with an acoustic transmitter (code #53734) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016.	245
Figure A5-12: Position of a Walleye tagged with an acoustic transmitter (code #53735) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016.	246
Figure A5-13: Position of a Walleye tagged with an acoustic transmitter (code #53736) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016.	247
Figure A5-14: Position of a Walleye tagged with an acoustic transmitter (code #53737) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016.	248
Figure A5-15: Position of a Walleye tagged with an acoustic transmitter (code #53738) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016.	249
Figure A5-16: Position of a Walleye tagged with an acoustic transmitter (code #53739) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016.	250
Figure A5-17: Position of a Walleye tagged with an acoustic transmitter (code #53740) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016.	251
Figure A5-18: Position of a Walleye tagged with an acoustic transmitter (code #53741) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016.	252
Figure A5-19: Position of a Walleye tagged with an acoustic transmitter (code #53742) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016.	253
Figure A5-20: Position of a Walleye tagged with an acoustic transmitter (code #53743) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016.	254
Figure A5-21: Position of a Walleye tagged with an acoustic transmitter (code #53744) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016.	255
Figure A5-22: Position of a Walleye tagged with an acoustic transmitter (code #53745) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016.	256
Figure A5-23: Position of a Walleye tagged with an acoustic transmitter (code #53746) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016.	257

Figure A5-24: Position of a Walleye tagged with an acoustic transmitter (code #53747) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016.	258
Figure A5-25: Position of a Walleye tagged with an acoustic transmitter (code #53748) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016.	259
Figure A5-26: Position of a Walleye tagged with an acoustic transmitter (code #53749) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016.	260
Figure A5-27: Position of a Walleye tagged with an acoustic transmitter (code #53750) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016.	261
Figure A5-28: Position of a Walleye tagged with an acoustic transmitter (code #53751) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016.	262
Figure A5-29: Position of a Walleye tagged with an acoustic transmitter (code #53752) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016.	263
Figure A5-30: Position of a Walleye tagged with an acoustic transmitter (code #53753) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016.	264
Figure A5-31: Position of a Walleye tagged with an acoustic transmitter (code #53754) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016.	265
Figure A5-32: Position of a Walleye tagged with an acoustic transmitter (code #53755) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016.	266
Figure A5-33: Position of a Walleye tagged with an acoustic transmitter (code #53756) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016.	267
Figure A5-34: Position of a Walleye tagged with an acoustic transmitter (code #53757) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016.	268
Figure A5-35: Position of a Walleye tagged with an acoustic transmitter (code #53808) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016.	269
Figure A5-36: Position of a Walleye tagged with an acoustic transmitter (code #53809) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016.	270

Figure A5-37: Position of a Walleye tagged with an acoustic transmitter (code #53810) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016.	271
Figure A5-38: Position of a Walleye tagged with an acoustic transmitter (code #53811) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016.	272
Figure A5-39: Position of a Walleye tagged with an acoustic transmitter (code #53812) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016.	273

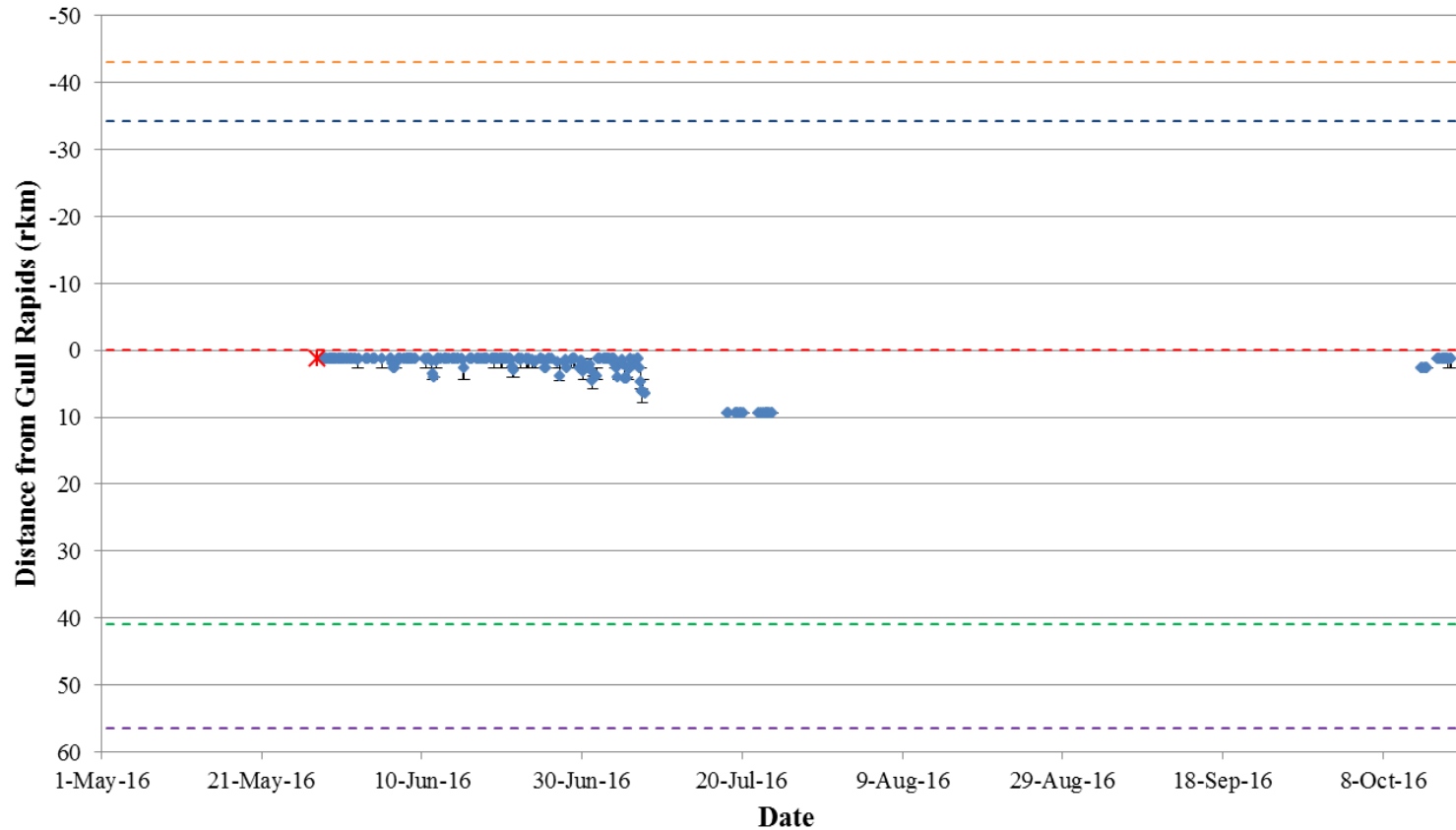


Figure A5-1: Position of a Walleye tagged with an acoustic transmitter (code #53723) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

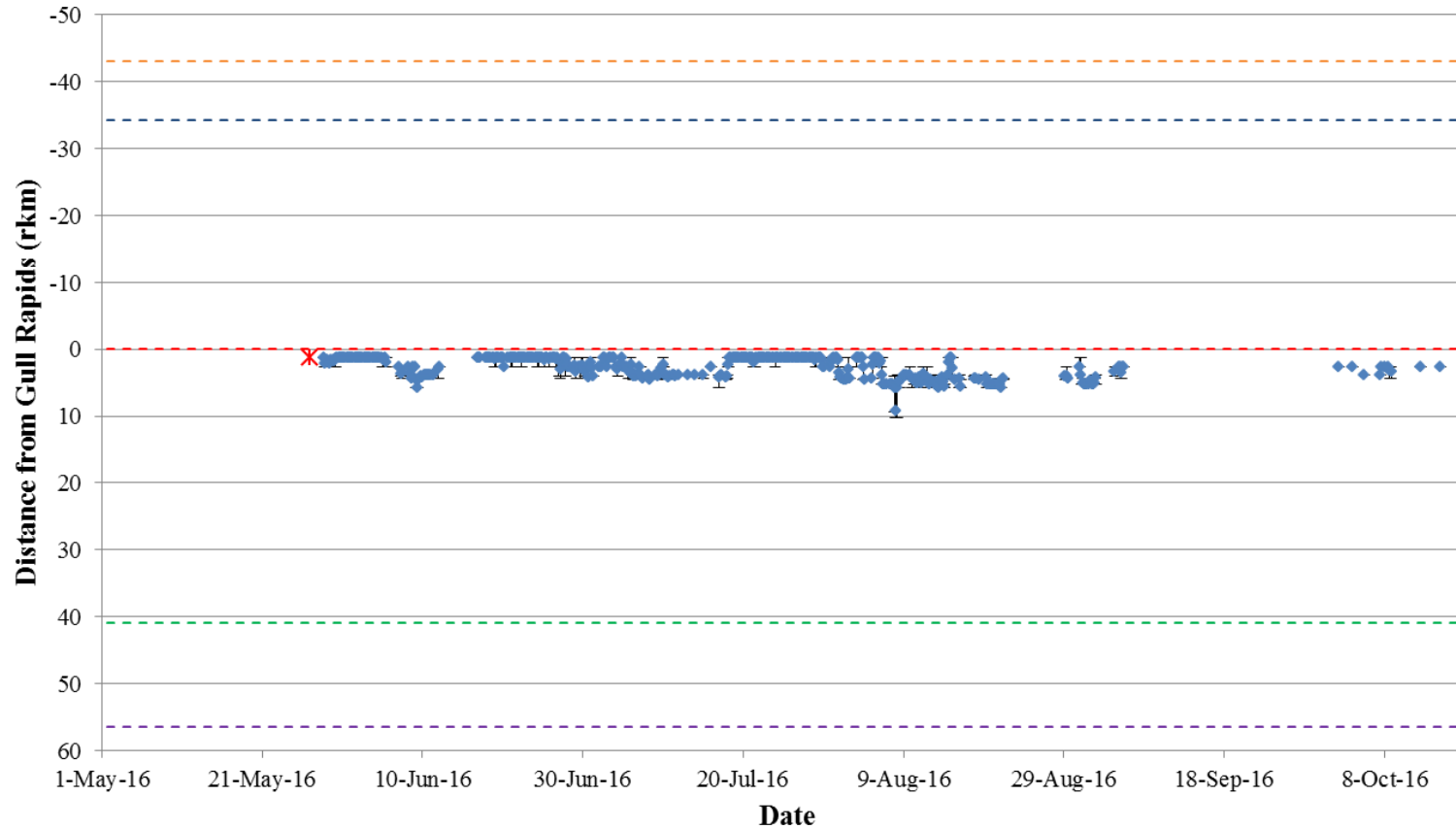


Figure A5-2: Position of a Walleye tagged with an acoustic transmitter (code #53724) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

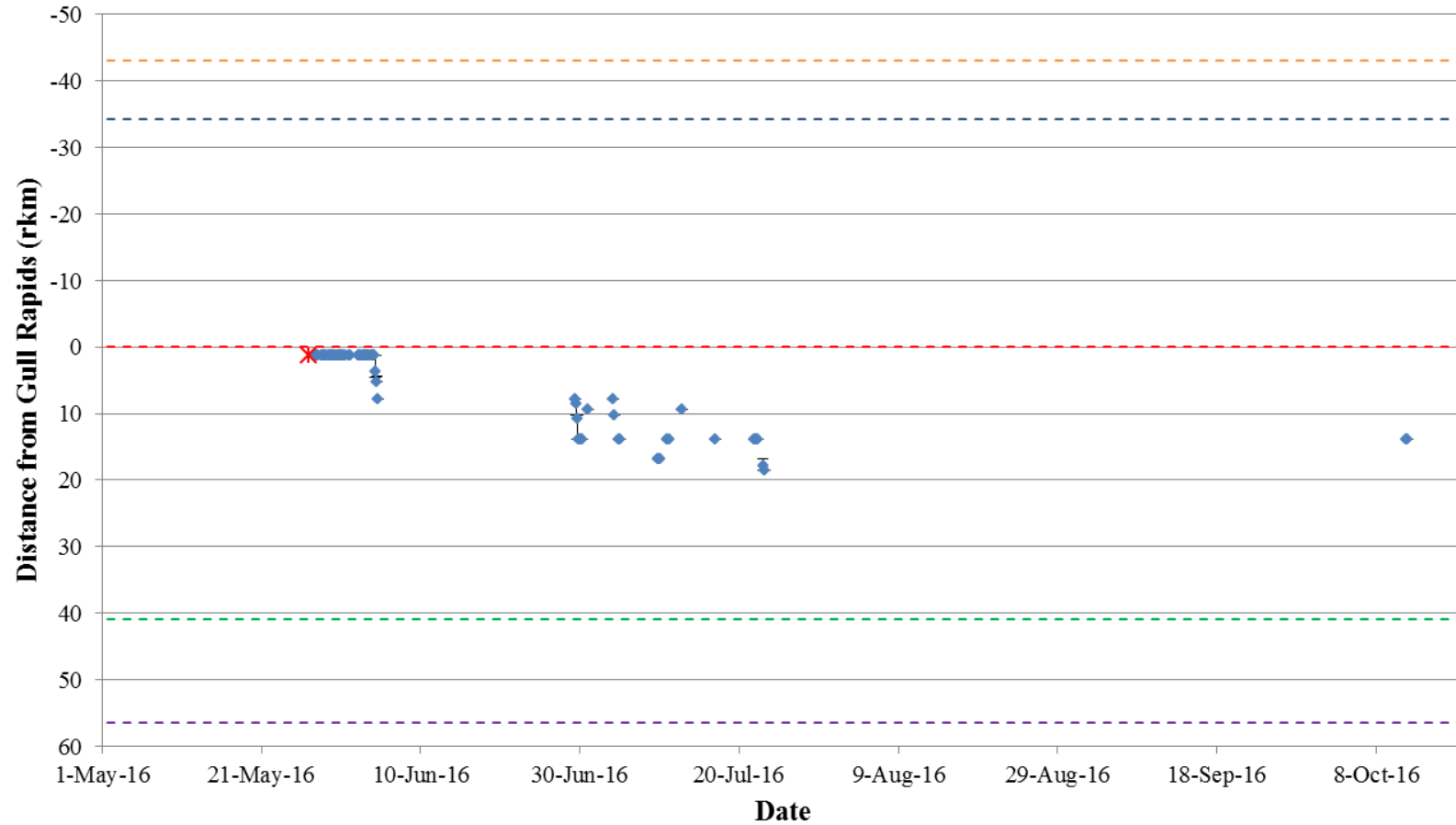


Figure A5-3: Position of a Walleye tagged with an acoustic transmitter (code #53725) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

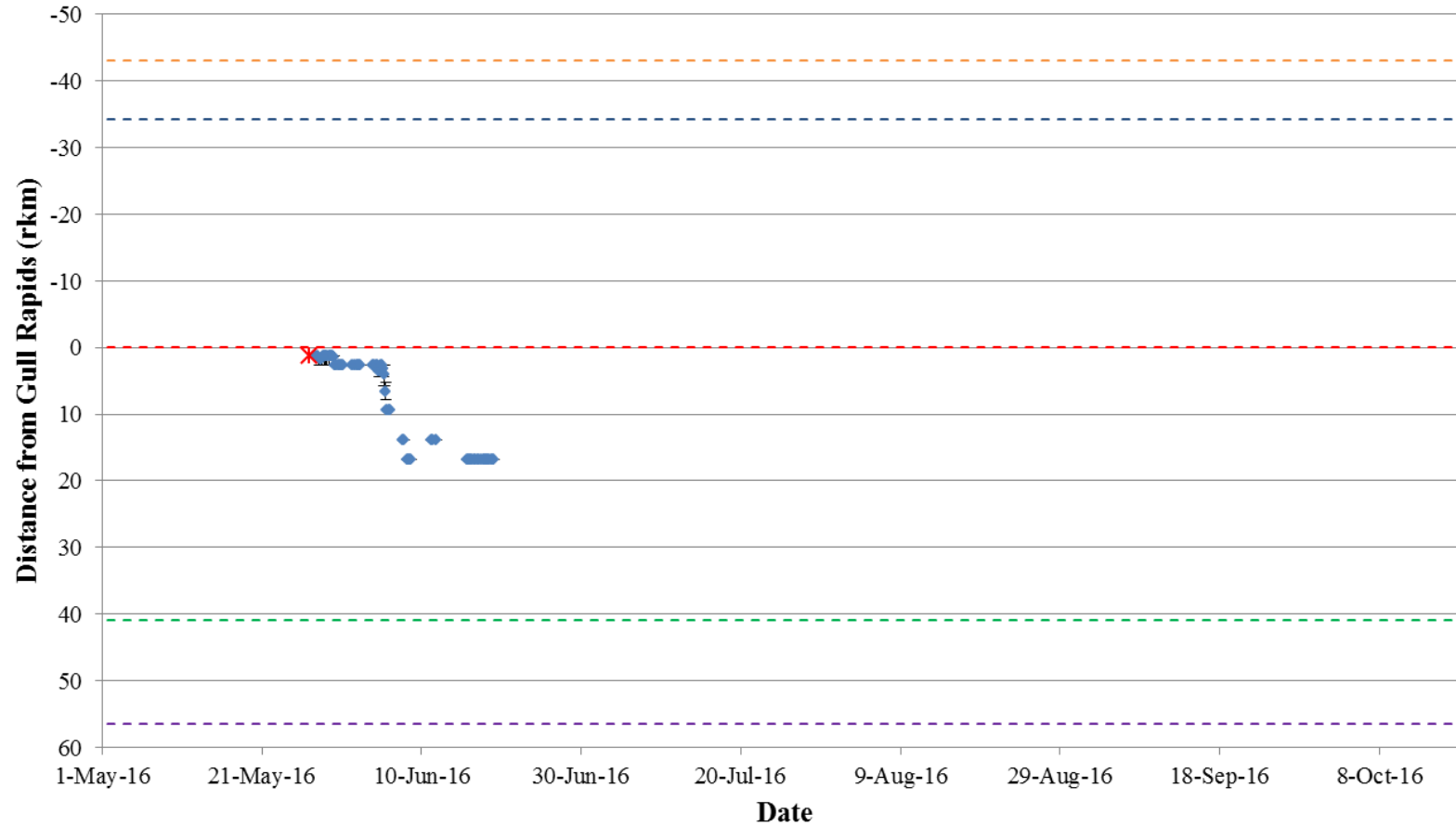


Figure A5-4: Position of a Walleye tagged with an acoustic transmitter (code #53726) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

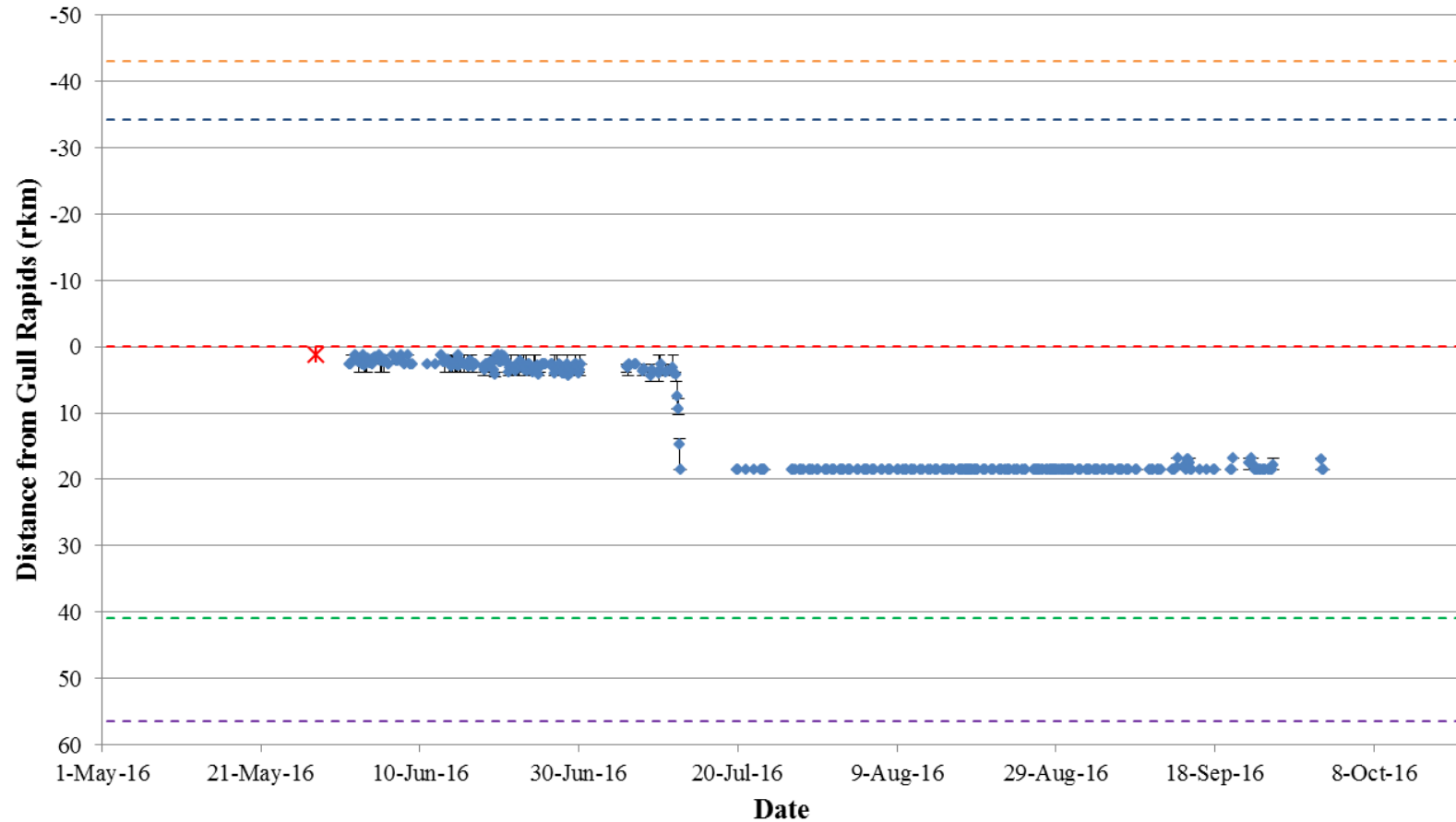


Figure A5-5: Position of a Walleye tagged with an acoustic transmitter (code #53728) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

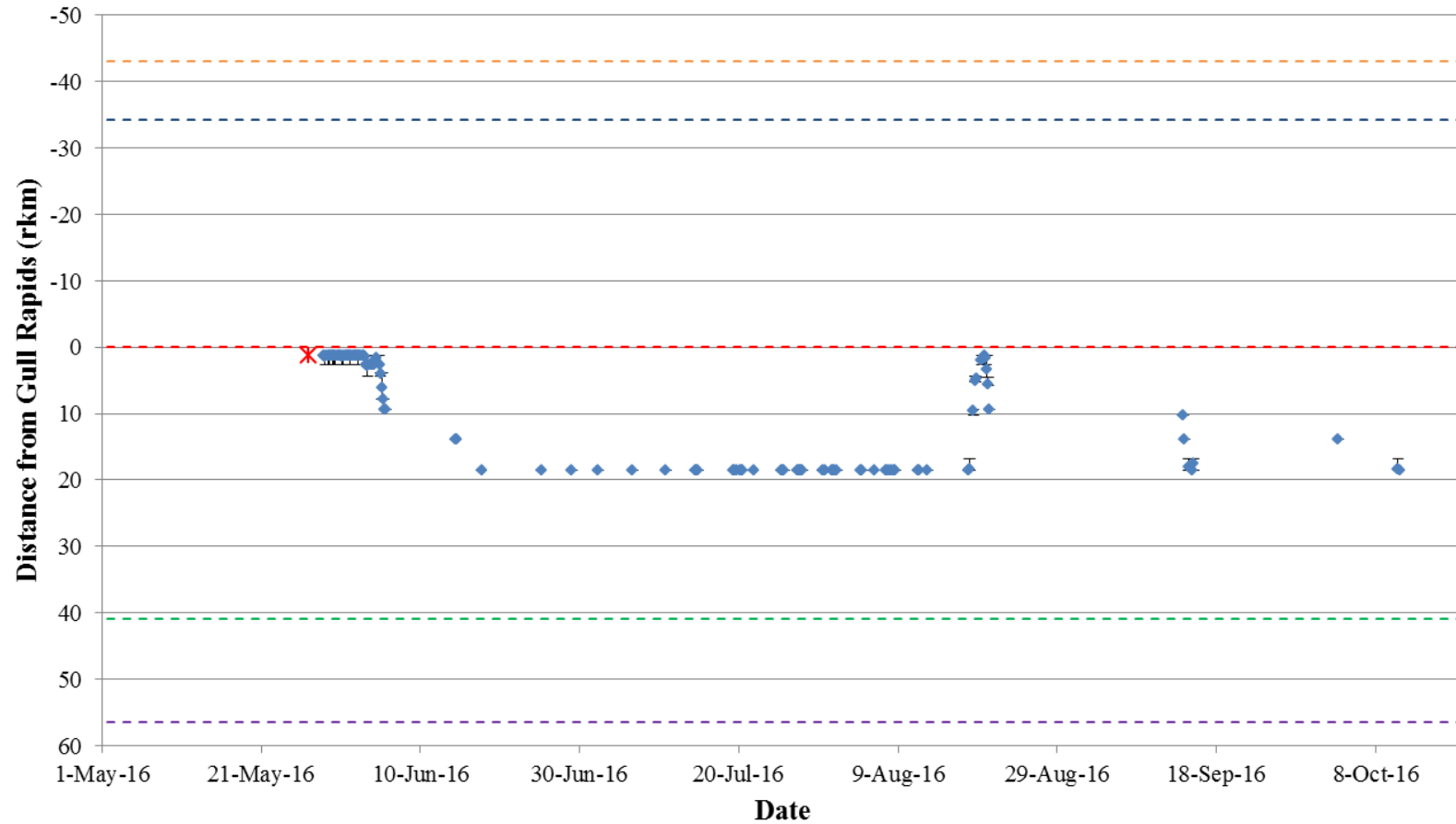


Figure A5-6: Position of a Walleye tagged with an acoustic transmitter (code #53729) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

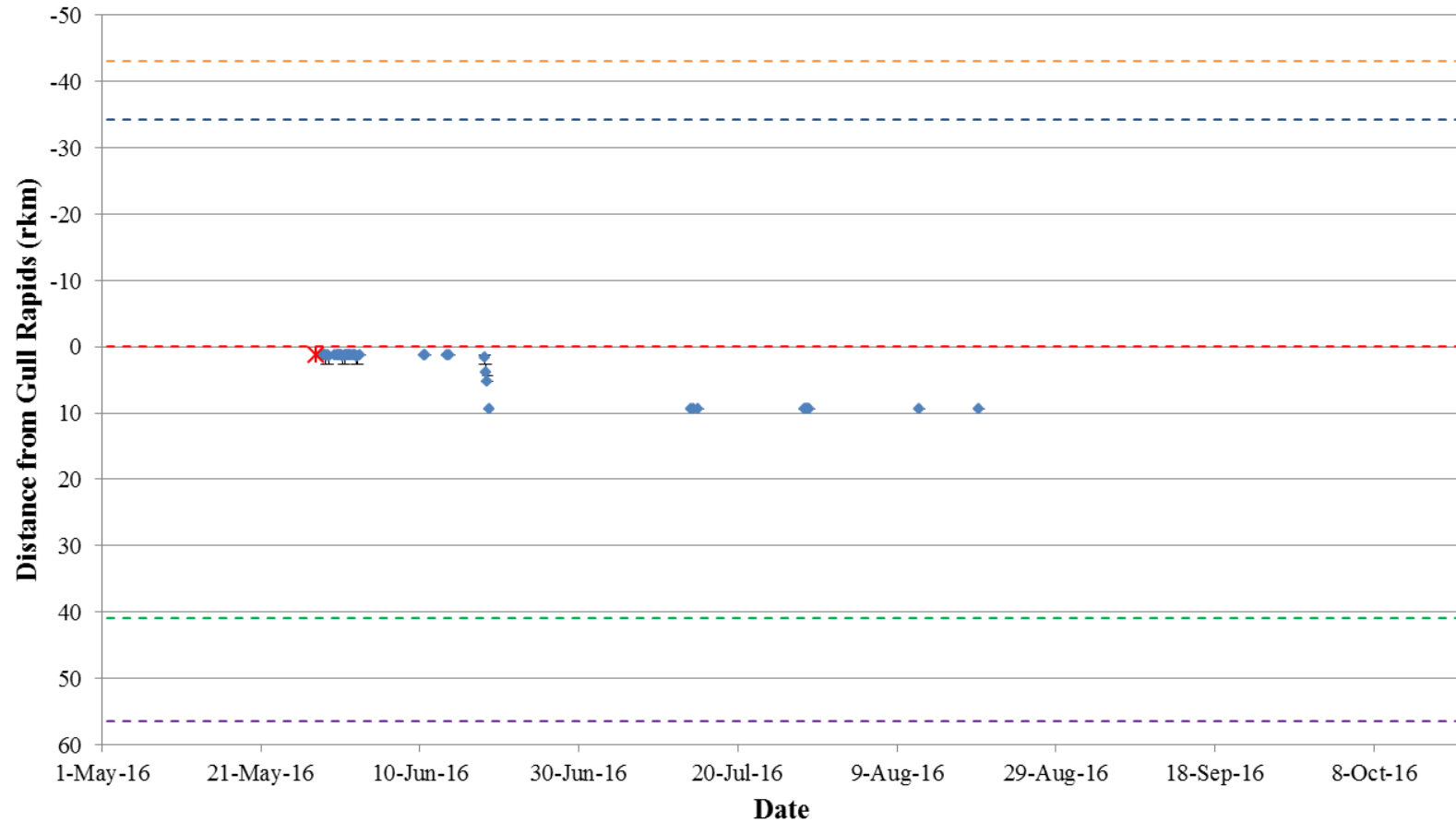


Figure A5-7: Position of a Walleye tagged with an acoustic transmitter (code #53730) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

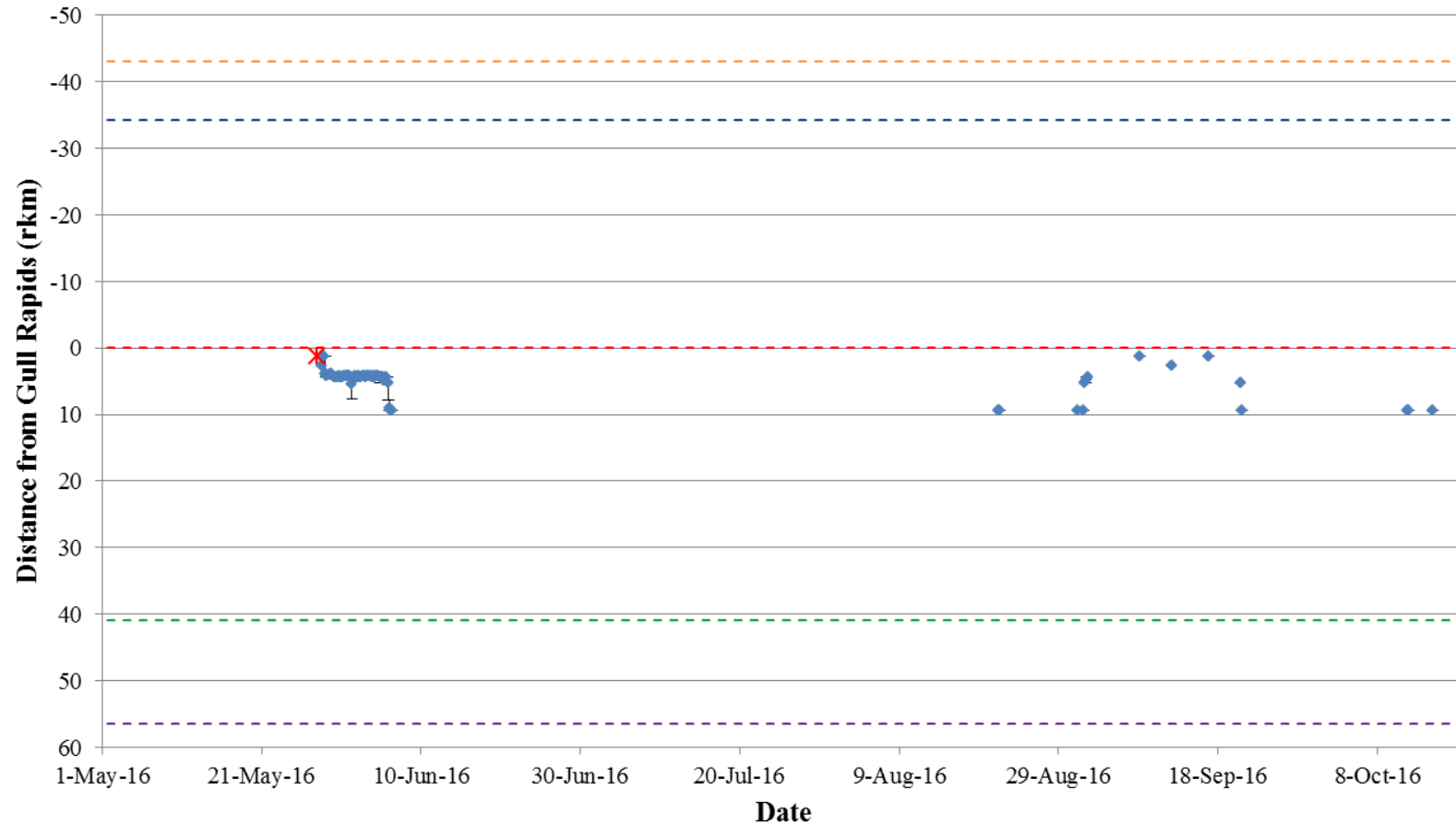


Figure A5-8: Position of a Walleye tagged with an acoustic transmitter (code #53731) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

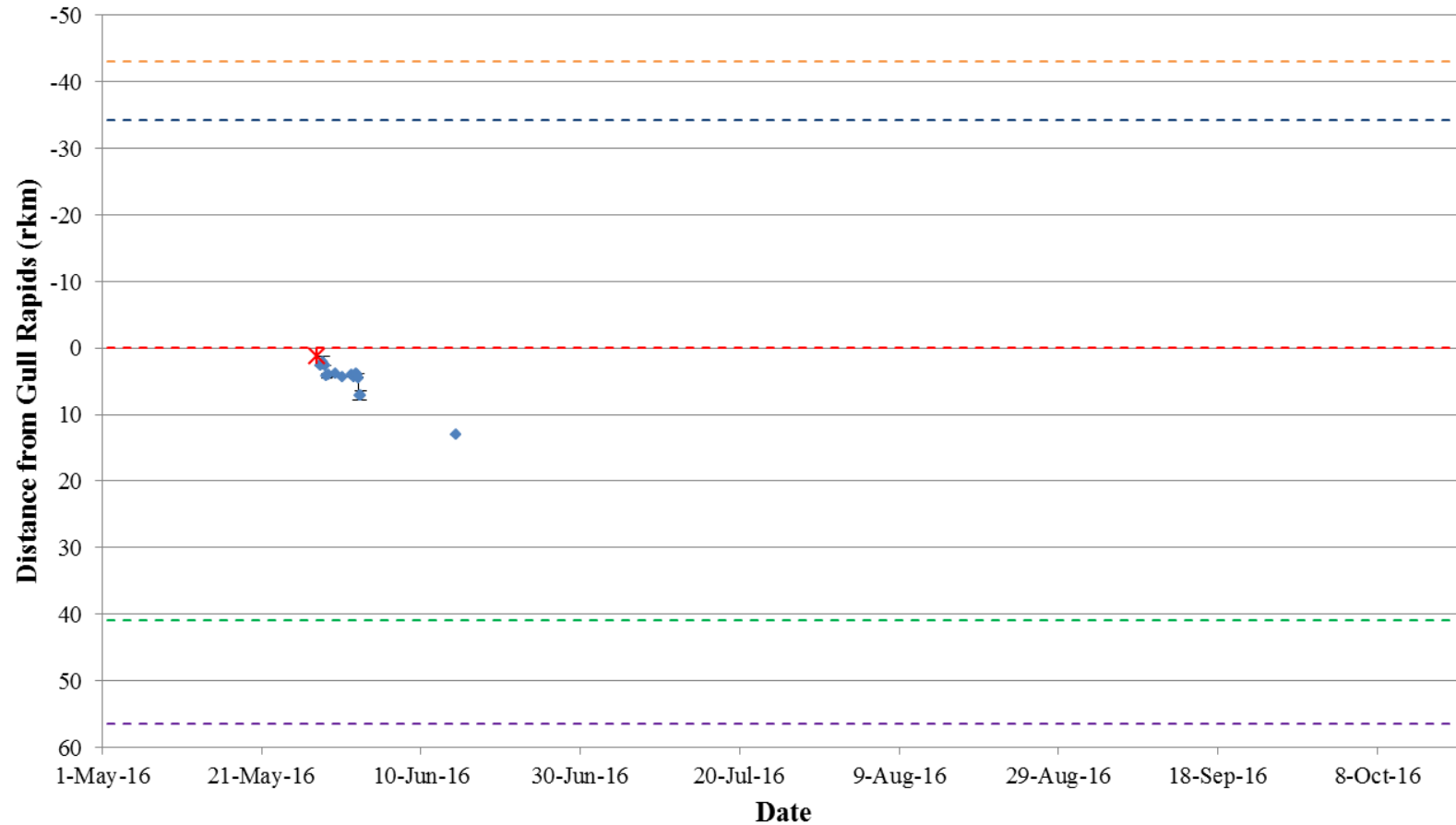


Figure A5-9: Position of a Walleye tagged with an acoustic transmitter (code #53732) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

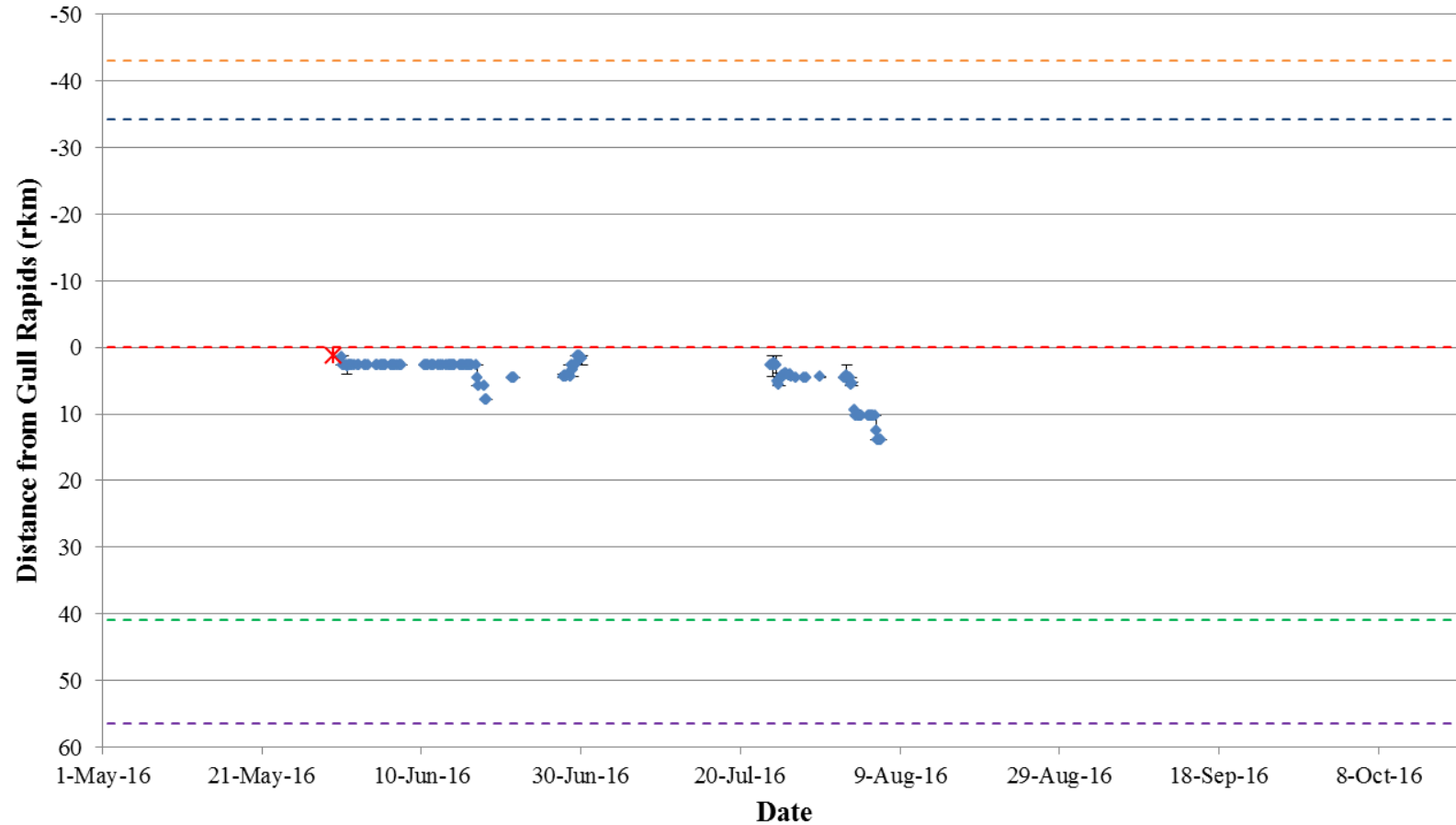


Figure A5-10: Position of a Walleye tagged with an acoustic transmitter (code #53733) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

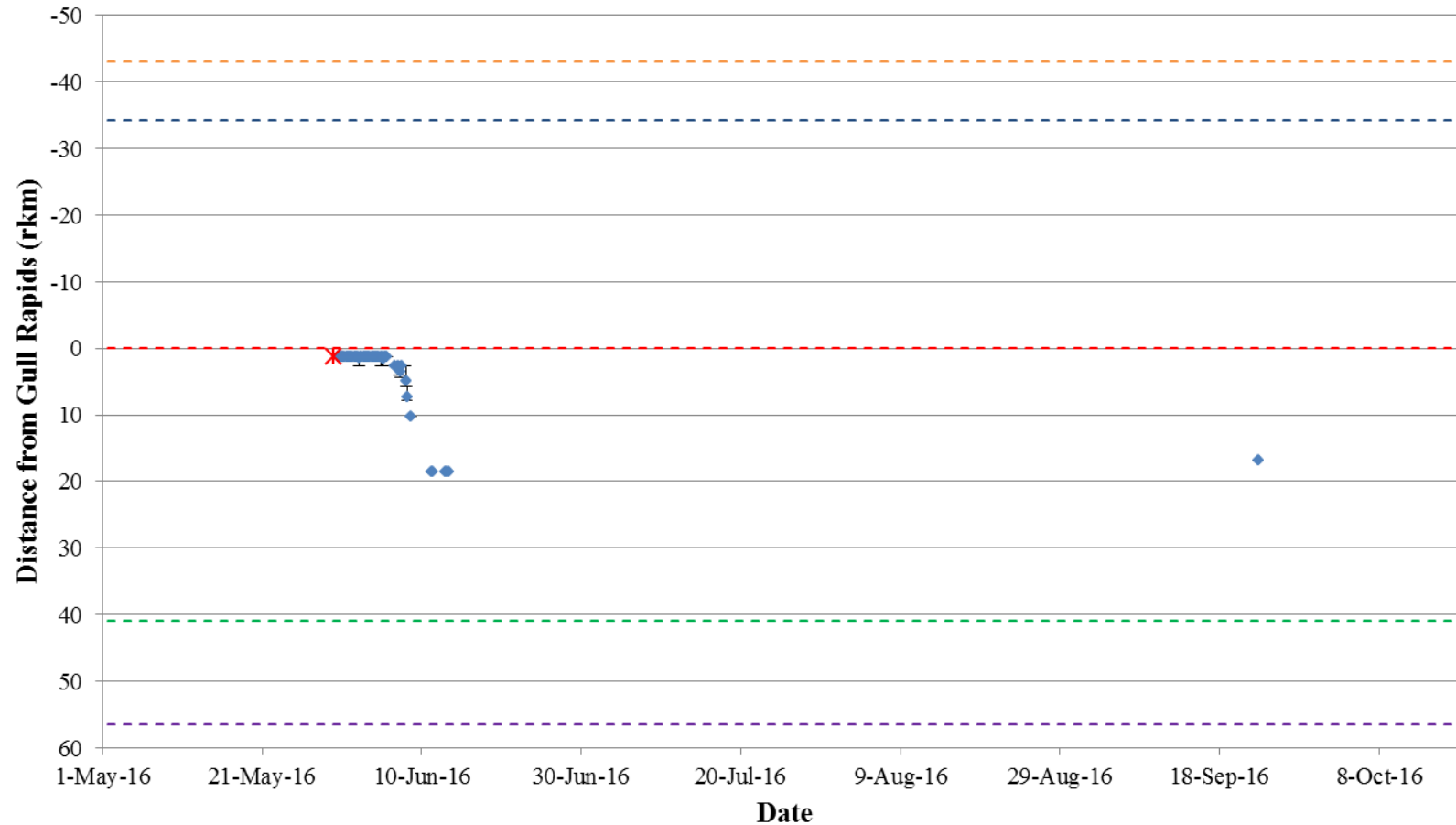


Figure A5-11: Position of a Walleye tagged with an acoustic transmitter (code #53734) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

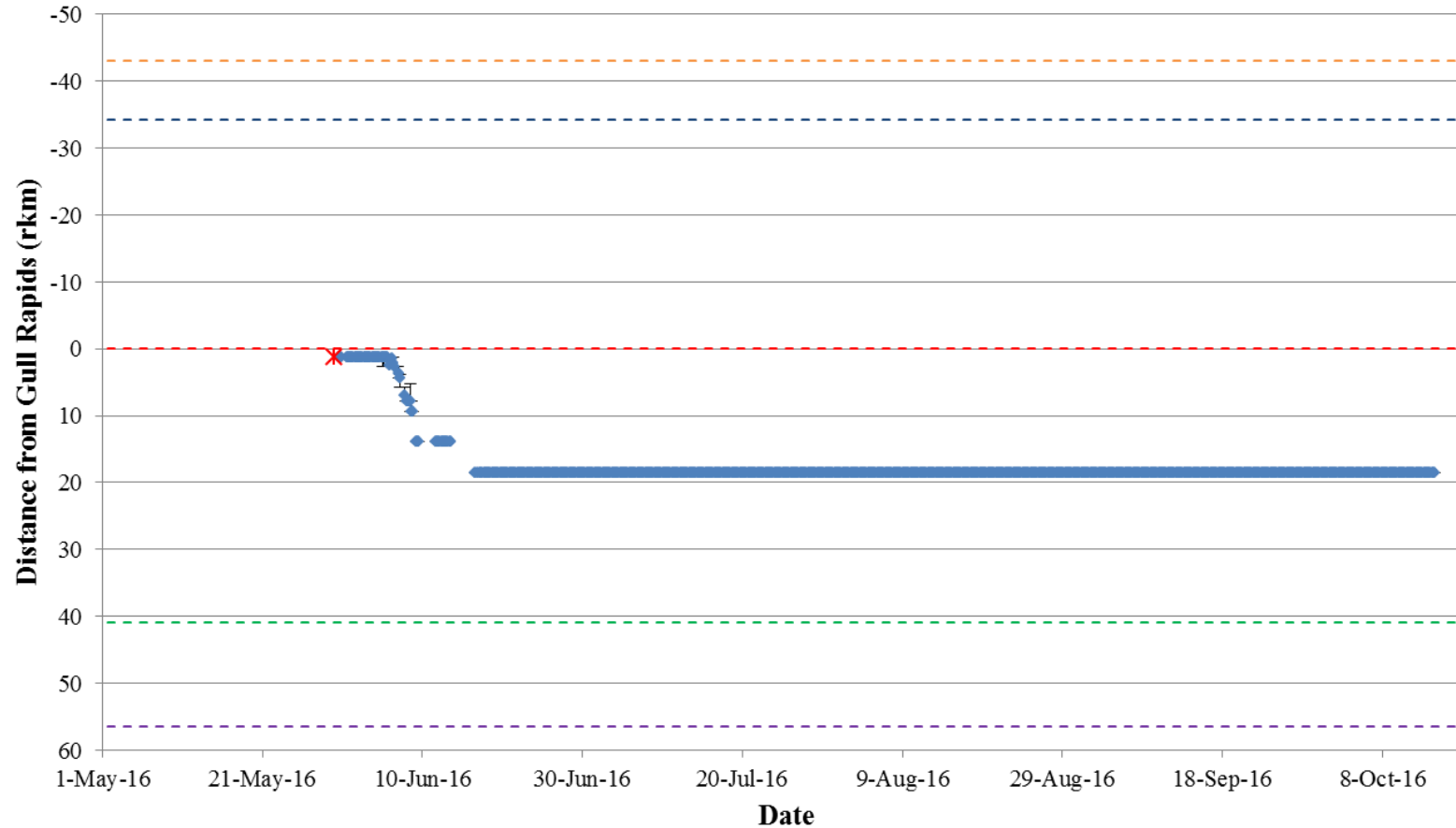


Figure A5-12: Position of a Walleye tagged with an acoustic transmitter (code #53735) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

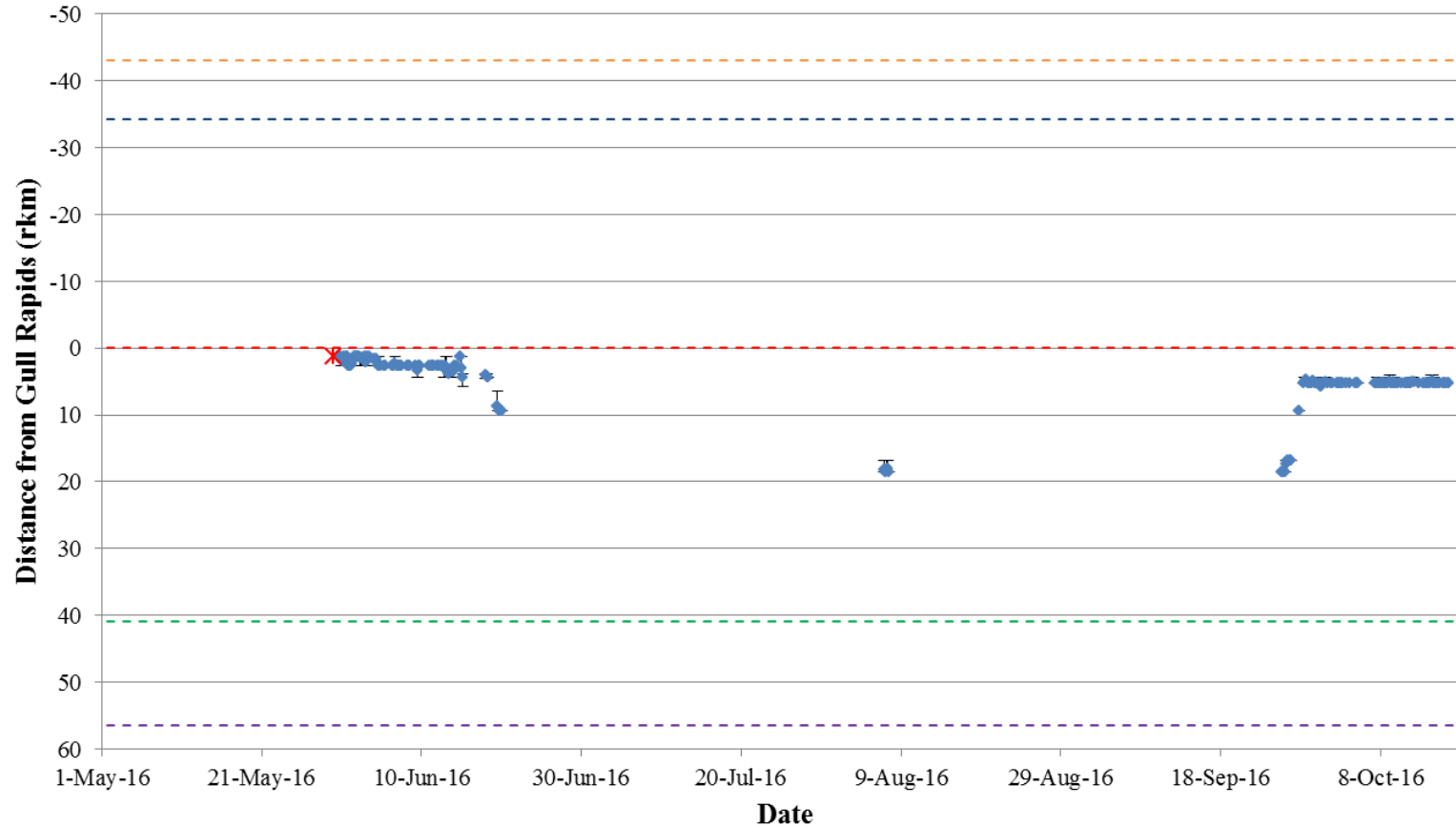


Figure A5-13: Position of a Walleye tagged with an acoustic transmitter (code #53736) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

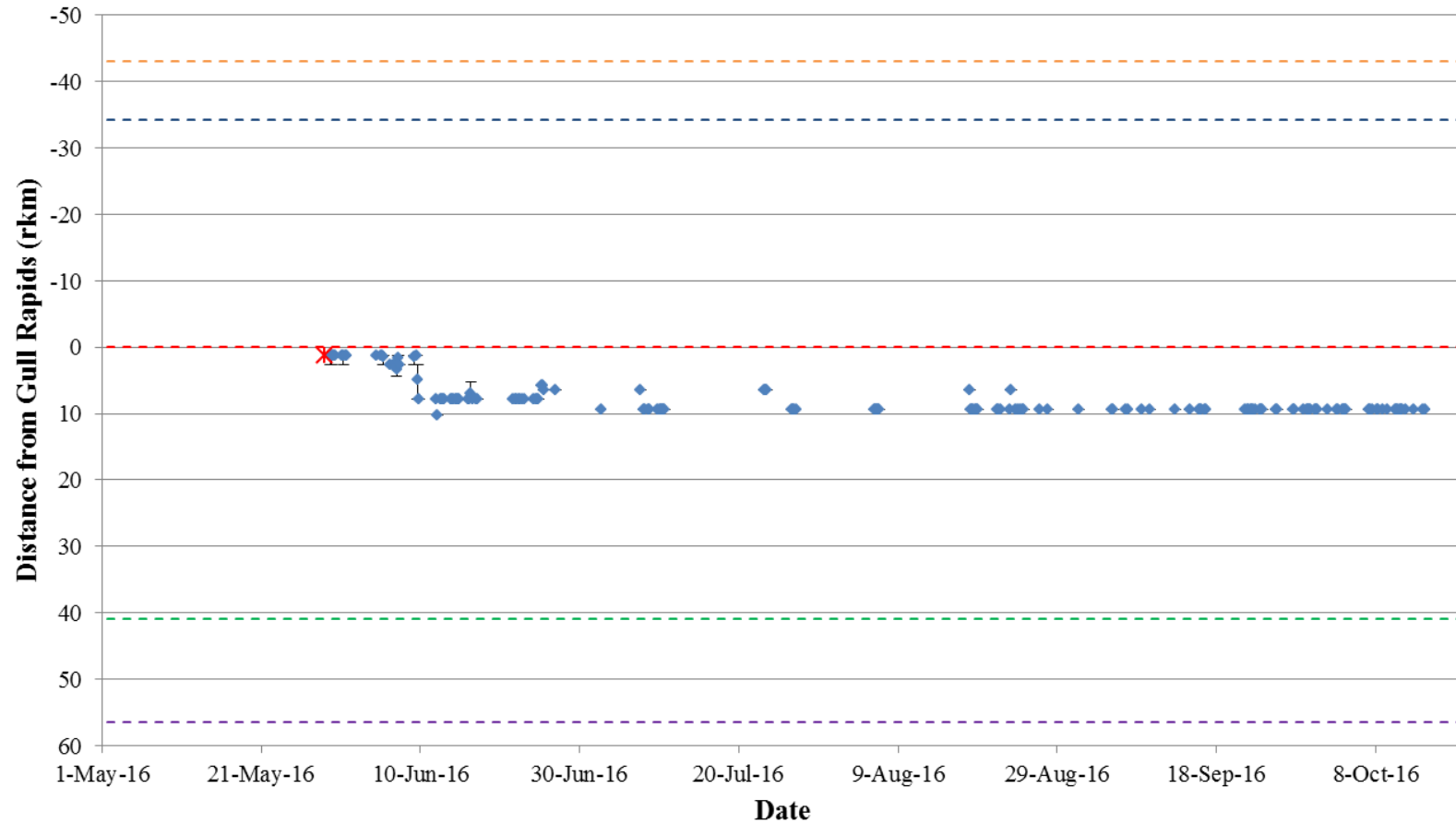


Figure A5-14: Position of a Walleye tagged with an acoustic transmitter (code #53737) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

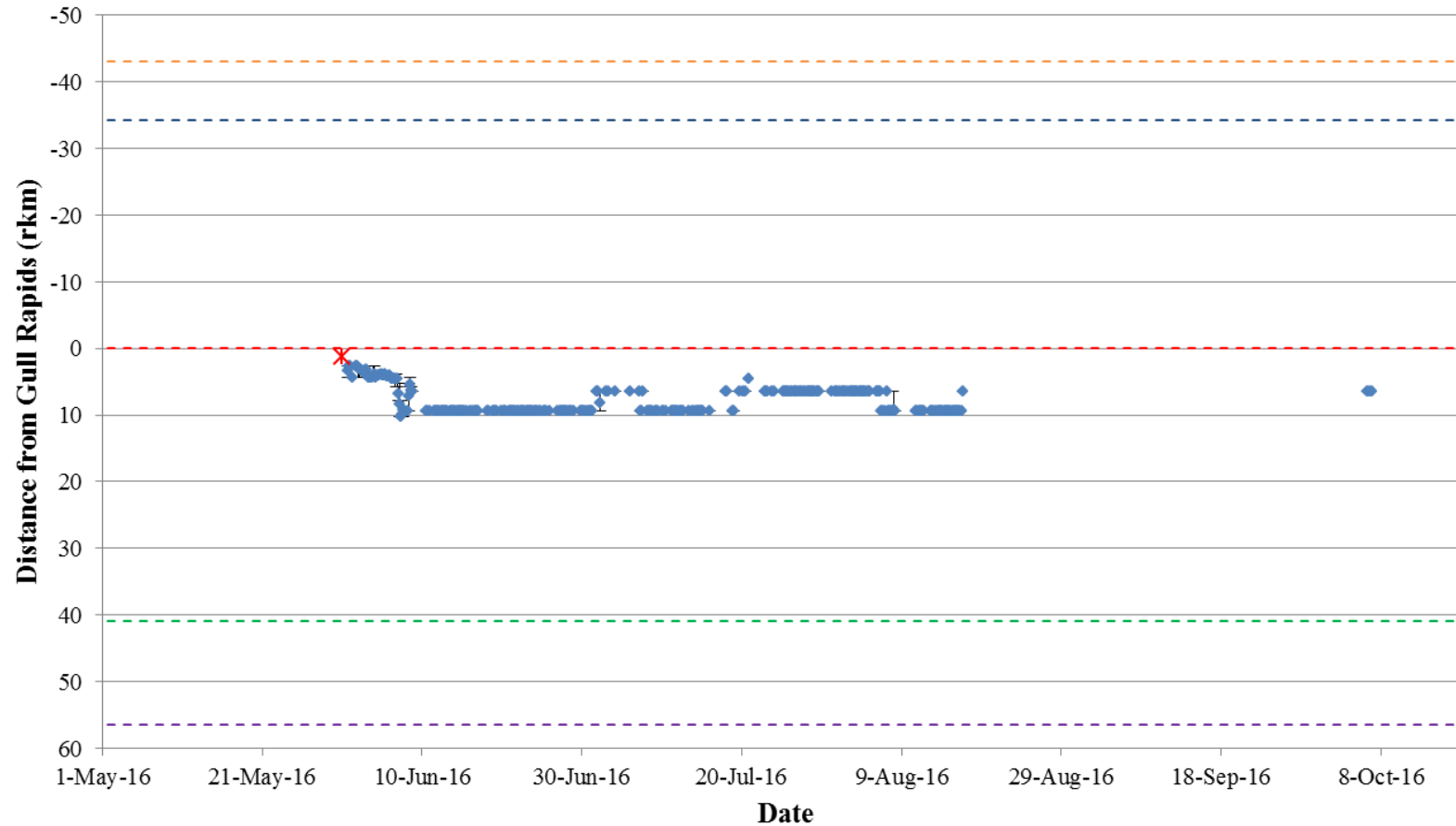


Figure A5-15: Position of a Walleye tagged with an acoustic transmitter (code #53738) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

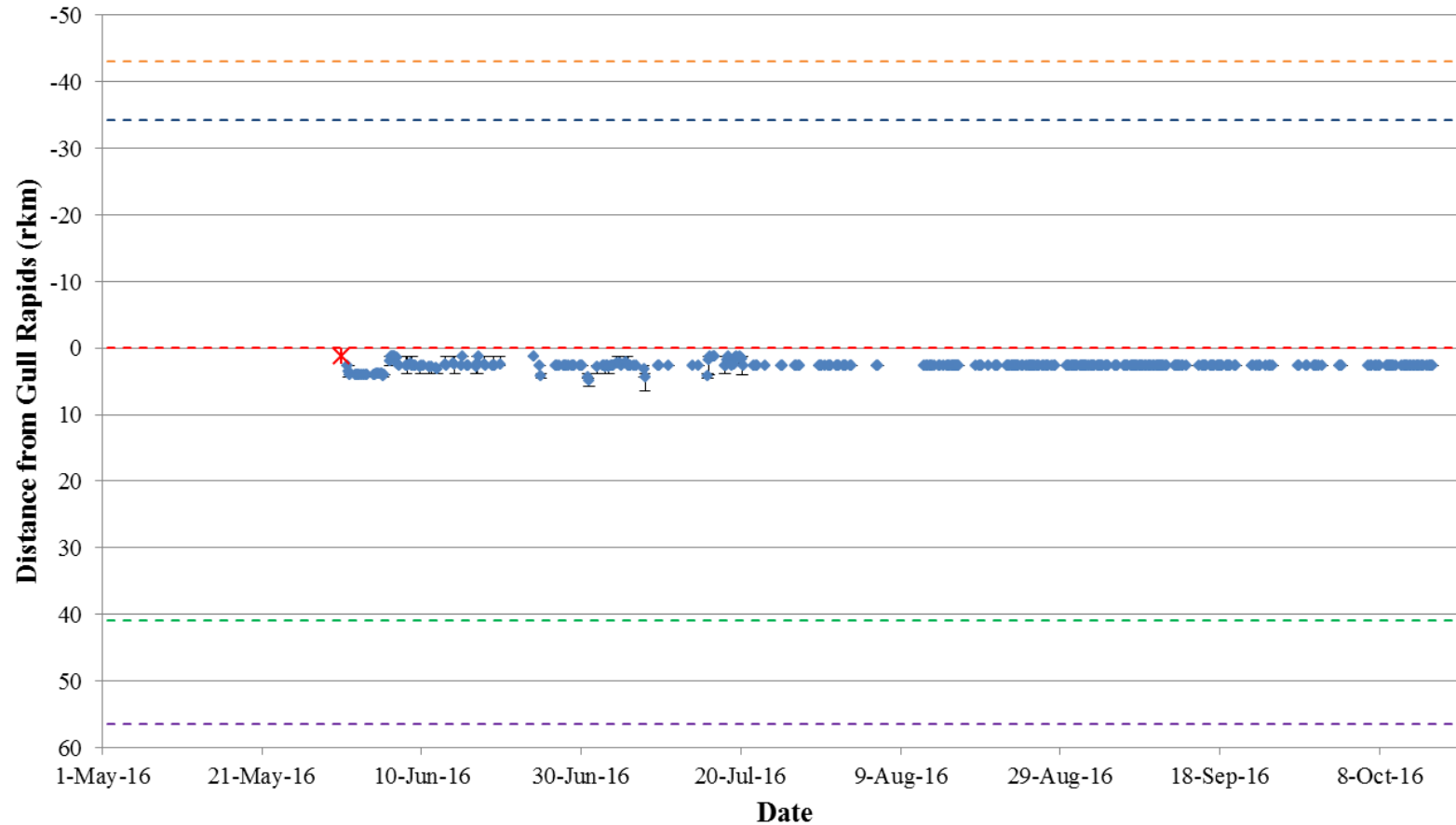


Figure A5-16: Position of a Walleye tagged with an acoustic transmitter (code #53739) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

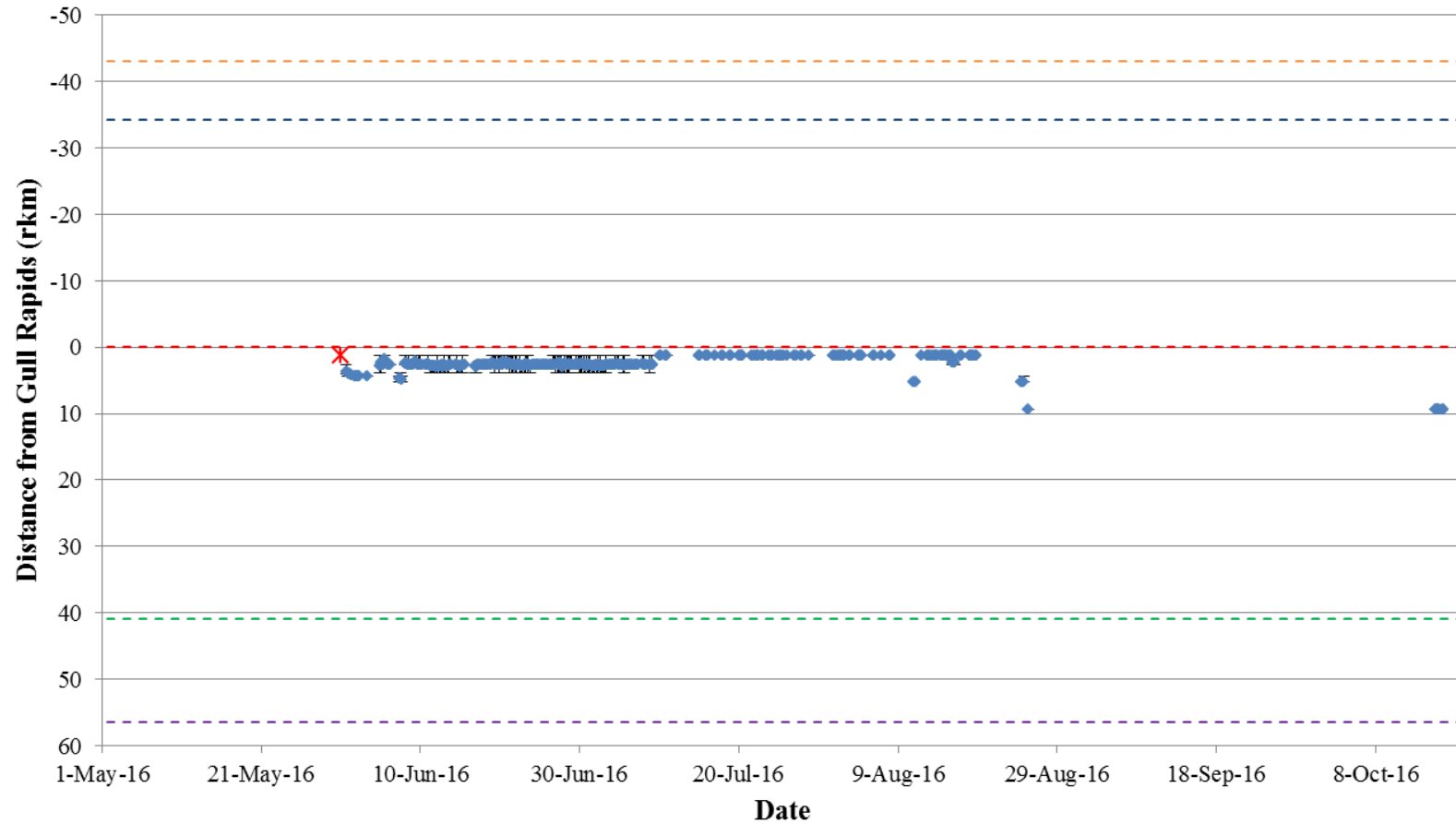


Figure A5-17: Position of a Walleye tagged with an acoustic transmitter (code #53740) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

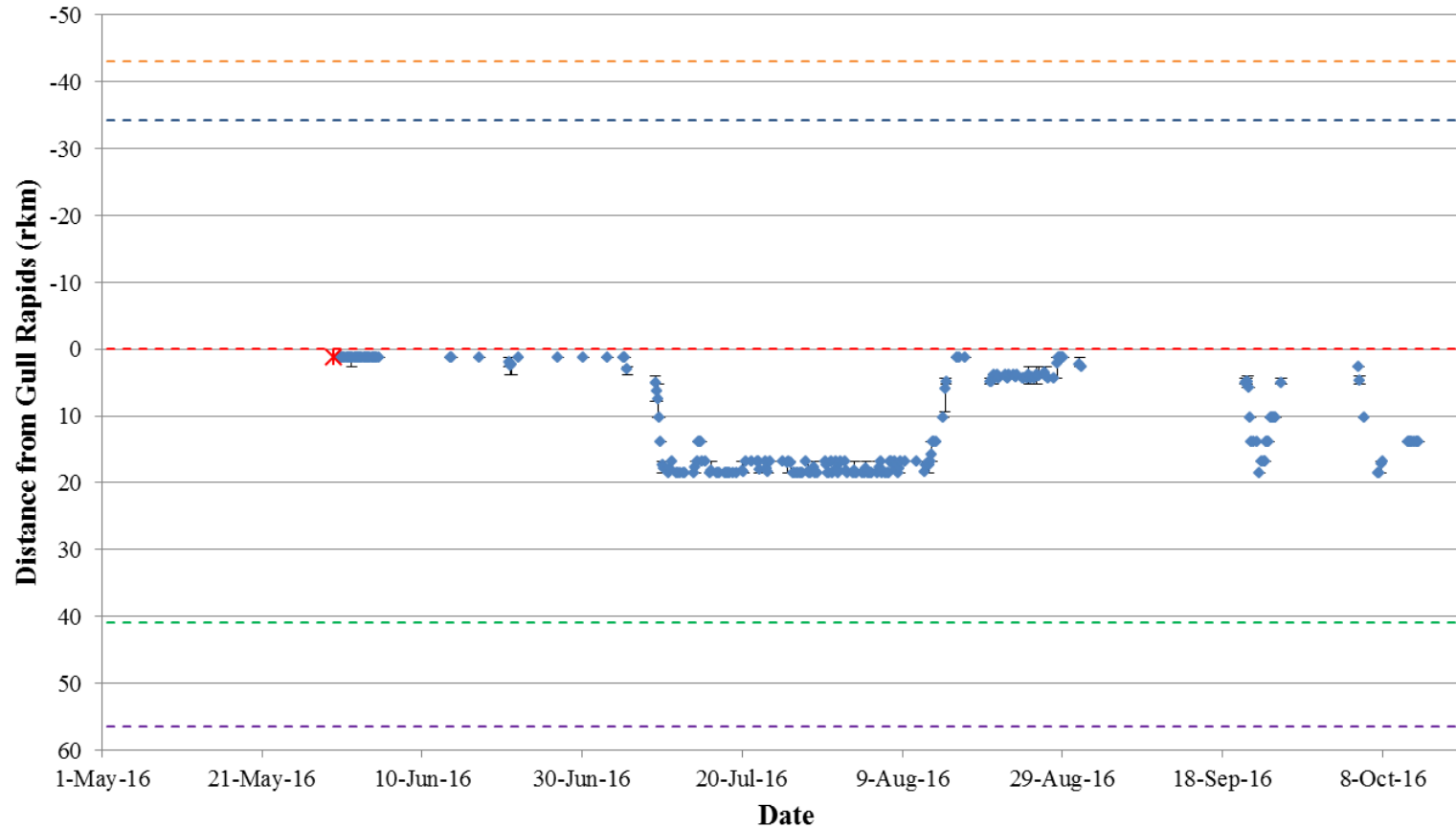


Figure A5-18: Position of a Walleye tagged with an acoustic transmitter (code #53741) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

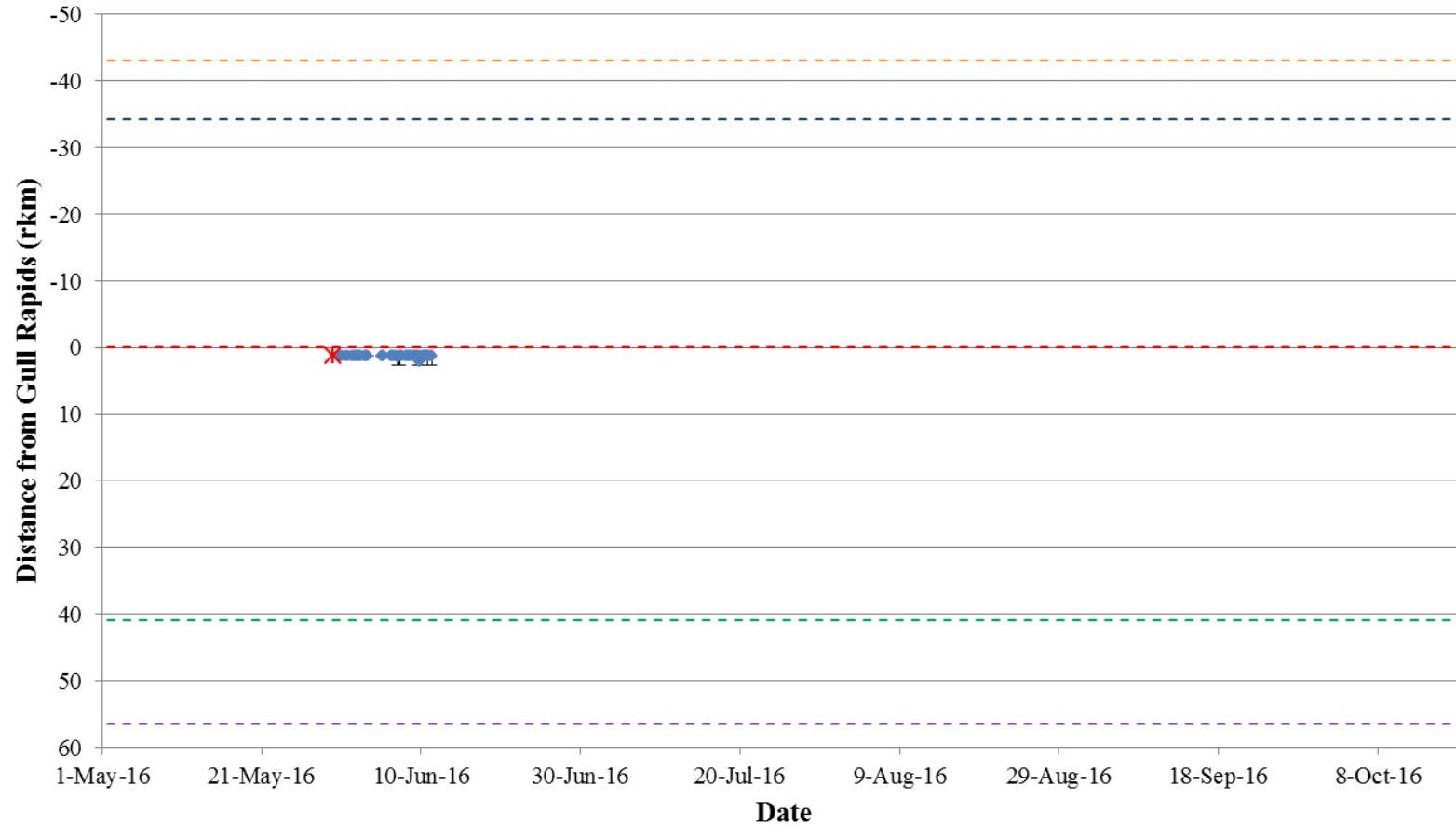


Figure A5-19: Position of a Walleye tagged with an acoustic transmitter (code #53742) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

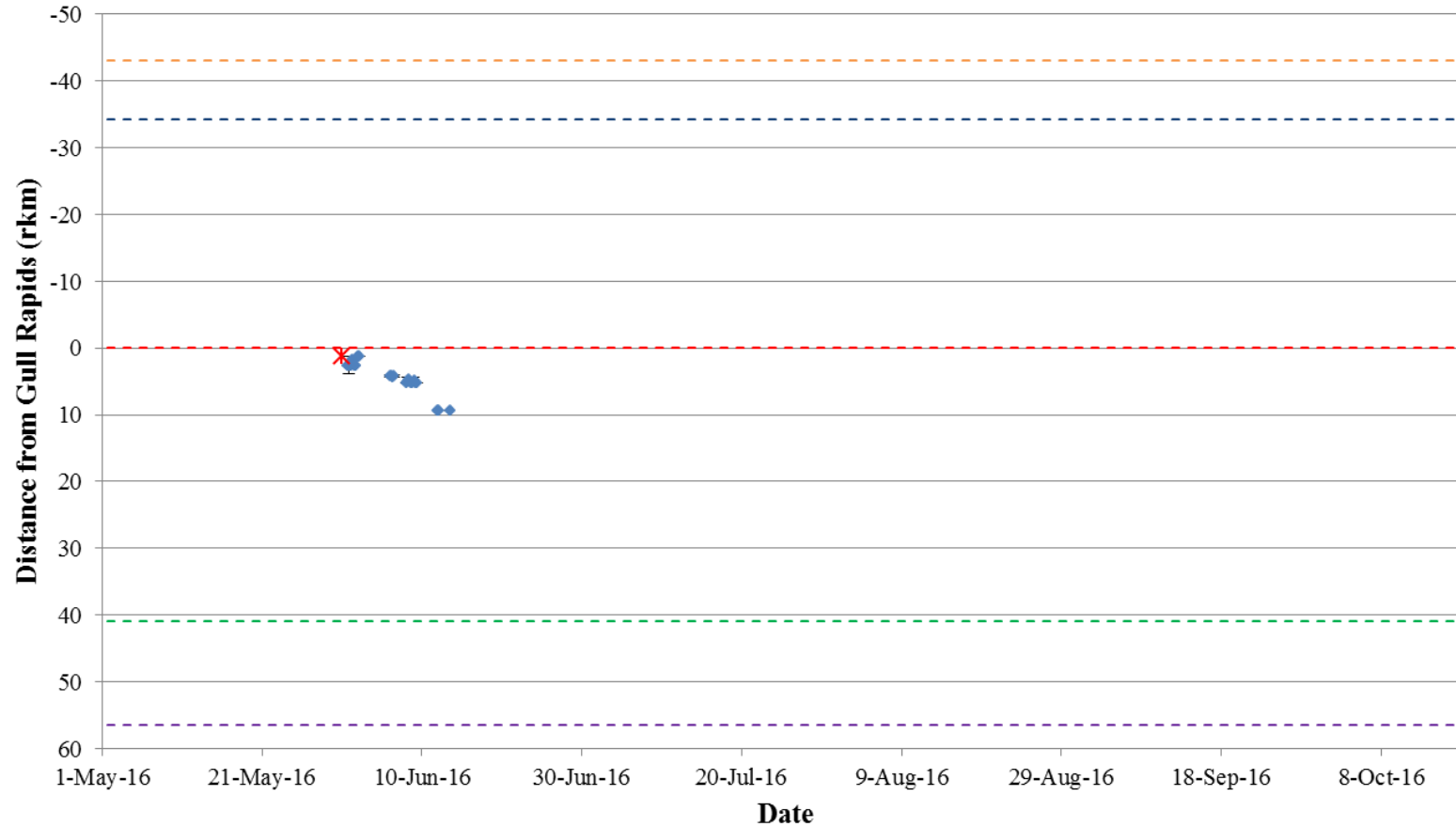


Figure A5-20: Position of a Walleye tagged with an acoustic transmitter (code #53743) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

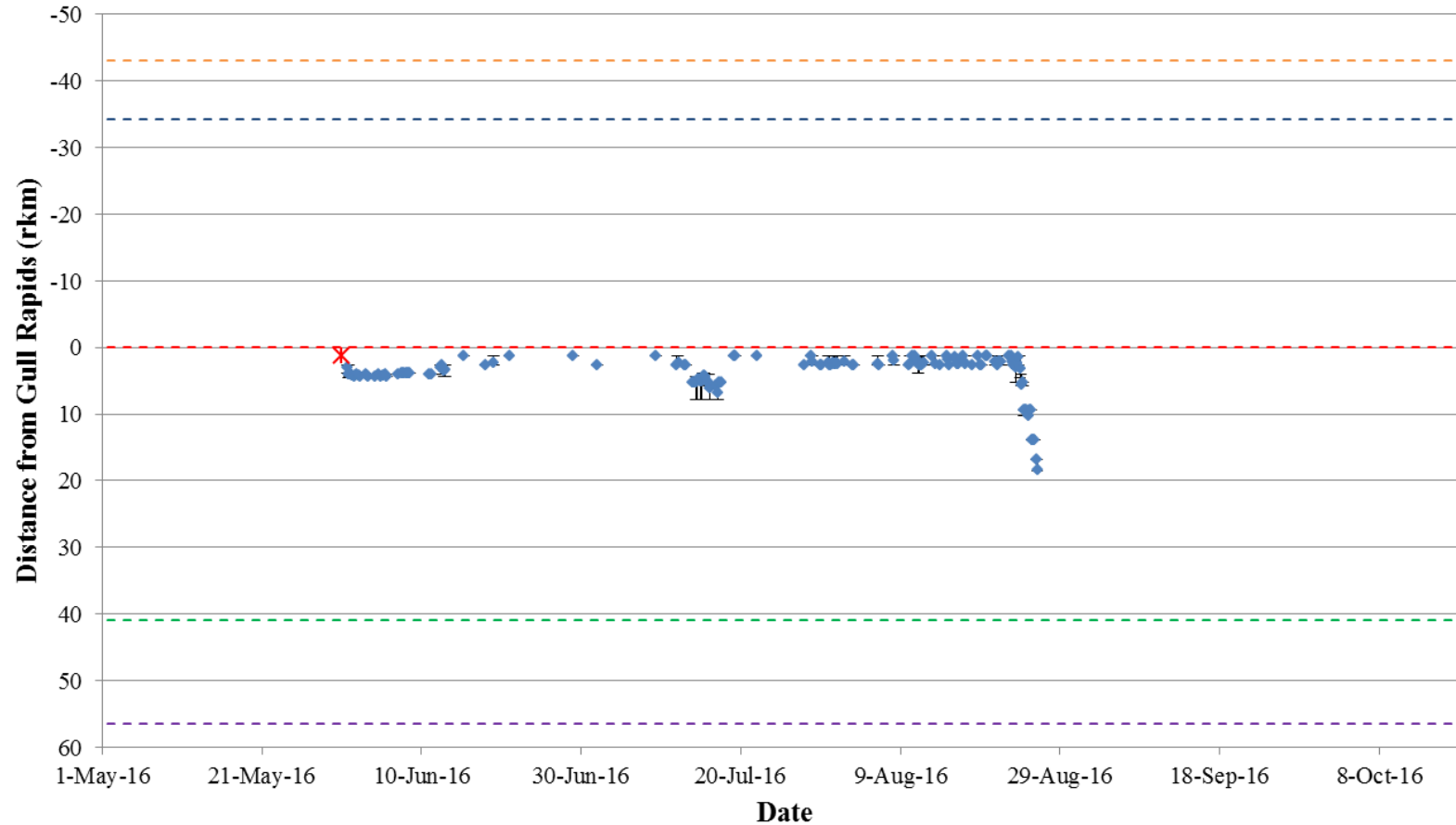


Figure A5-21: Position of a Walleye tagged with an acoustic transmitter (code #53744) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

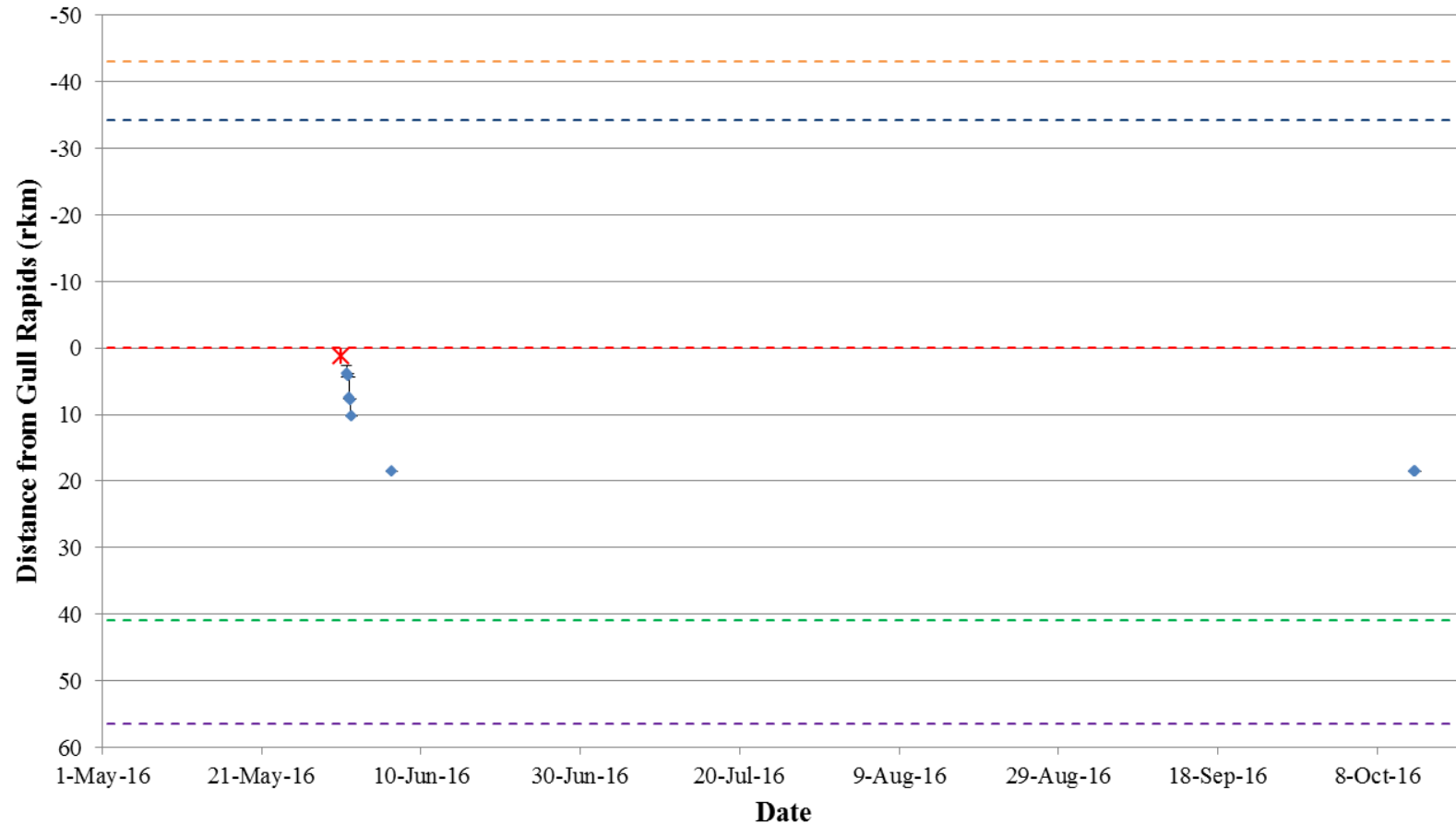


Figure A5-22: Position of a Walleye tagged with an acoustic transmitter (code #53745) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

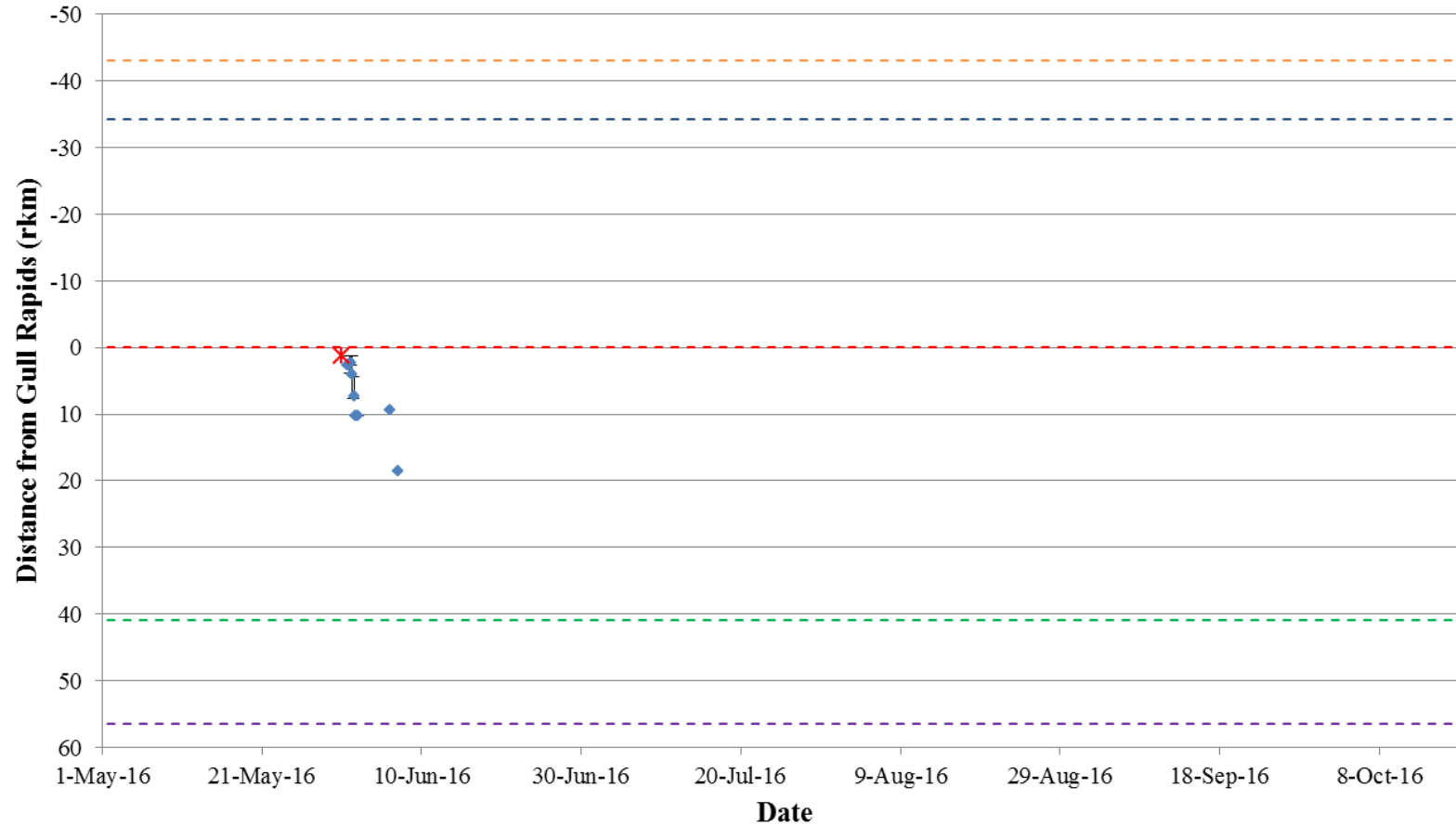


Figure A5-23: Position of a Walleye tagged with an acoustic transmitter (code #53746) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

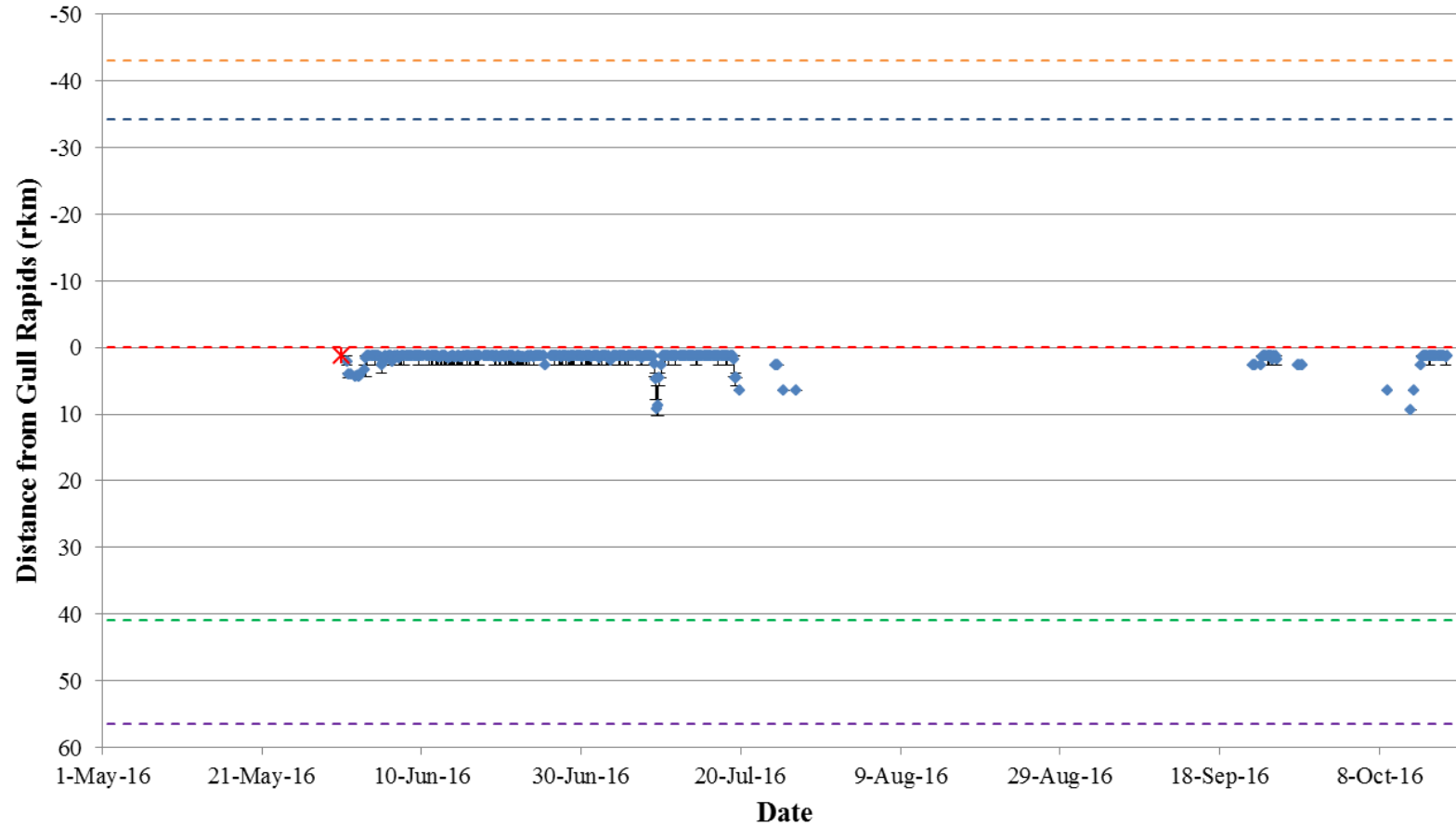


Figure A5-24: Position of a Walleye tagged with an acoustic transmitter (code #53747) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

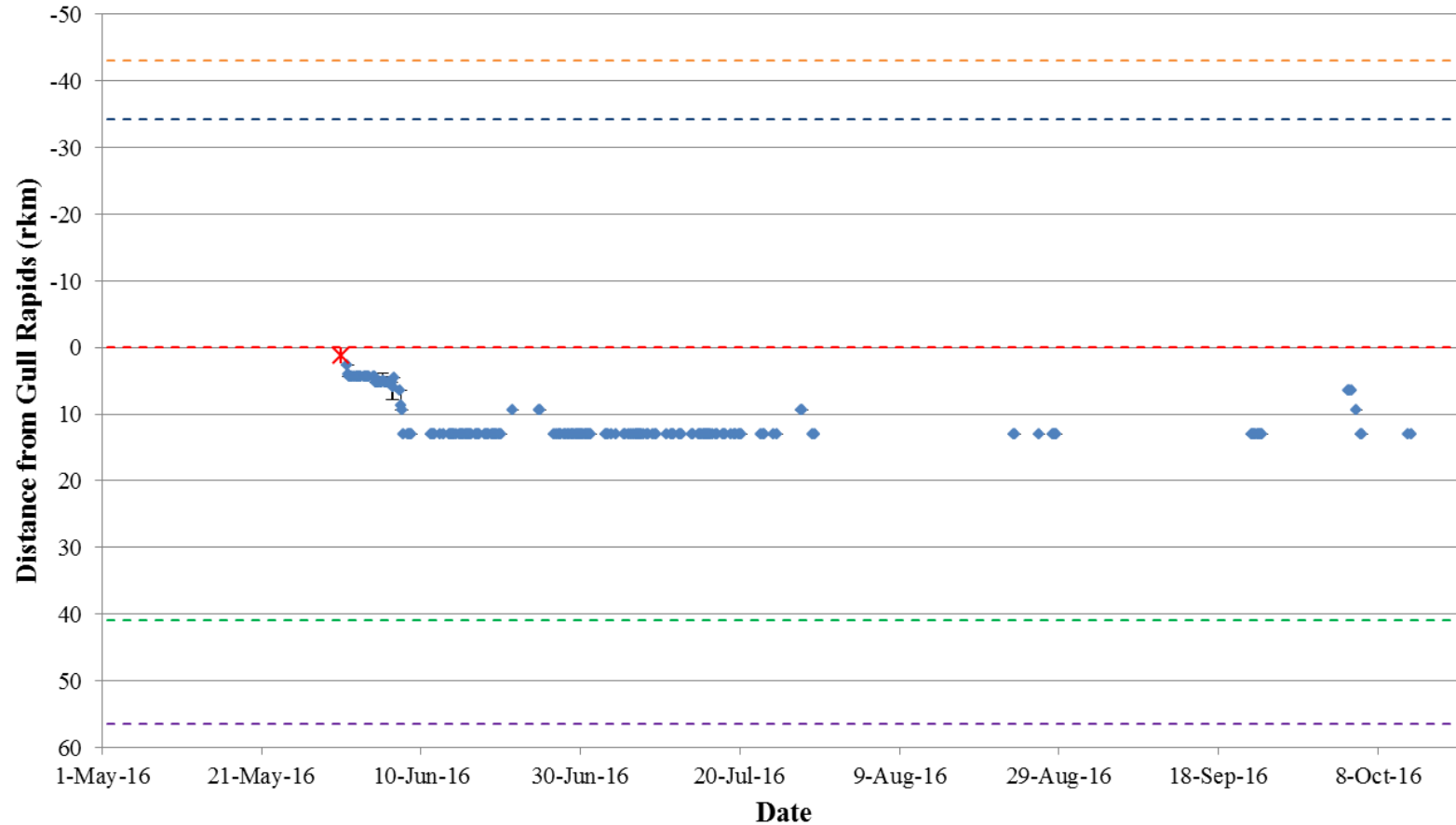


Figure A5-25: Position of a Walleye tagged with an acoustic transmitter (code #53748) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

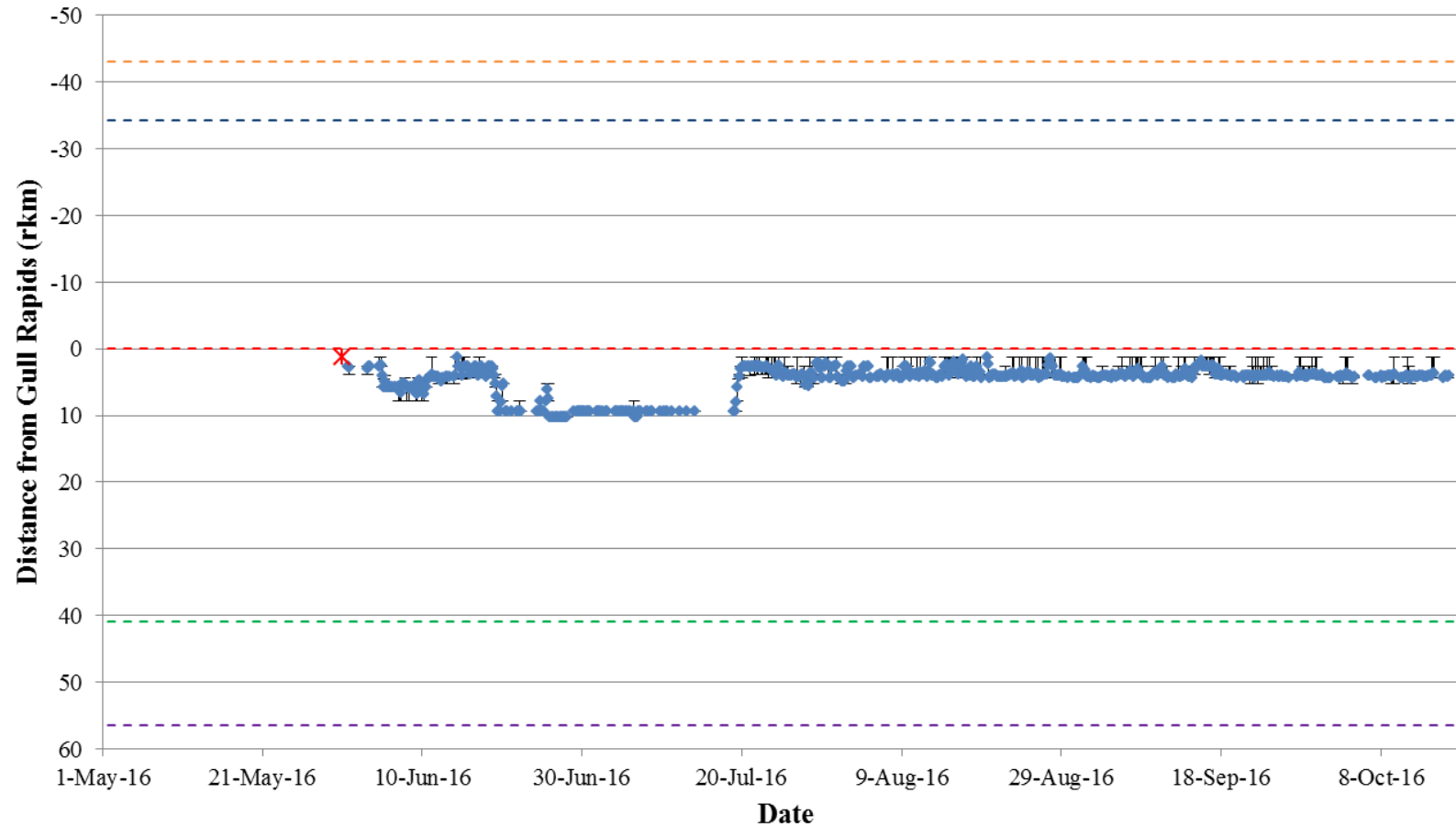


Figure A5-26: Position of a Walleye tagged with an acoustic transmitter (code #53749) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

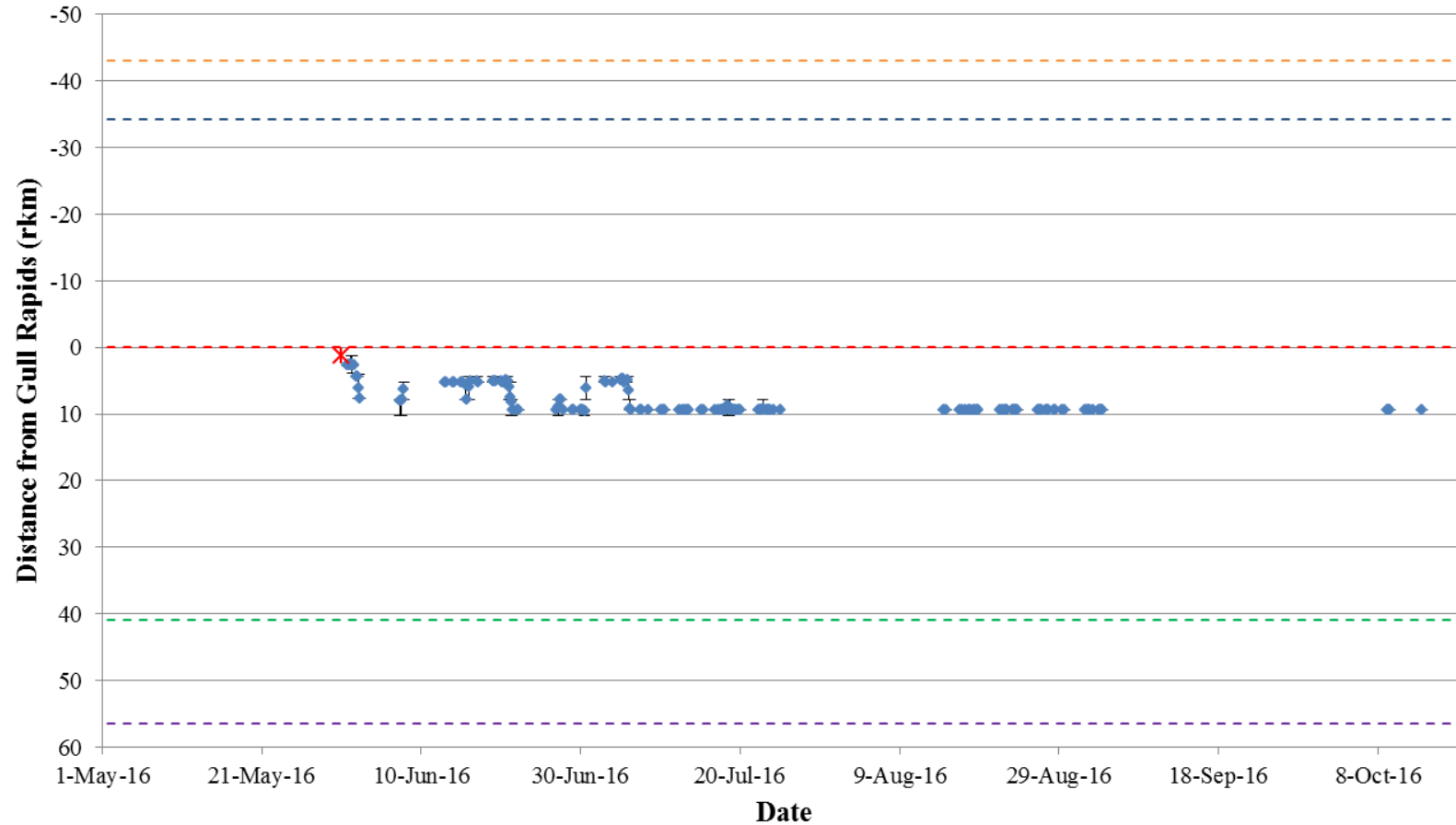


Figure A5-27: Position of a Walleye tagged with an acoustic transmitter (code #53750) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

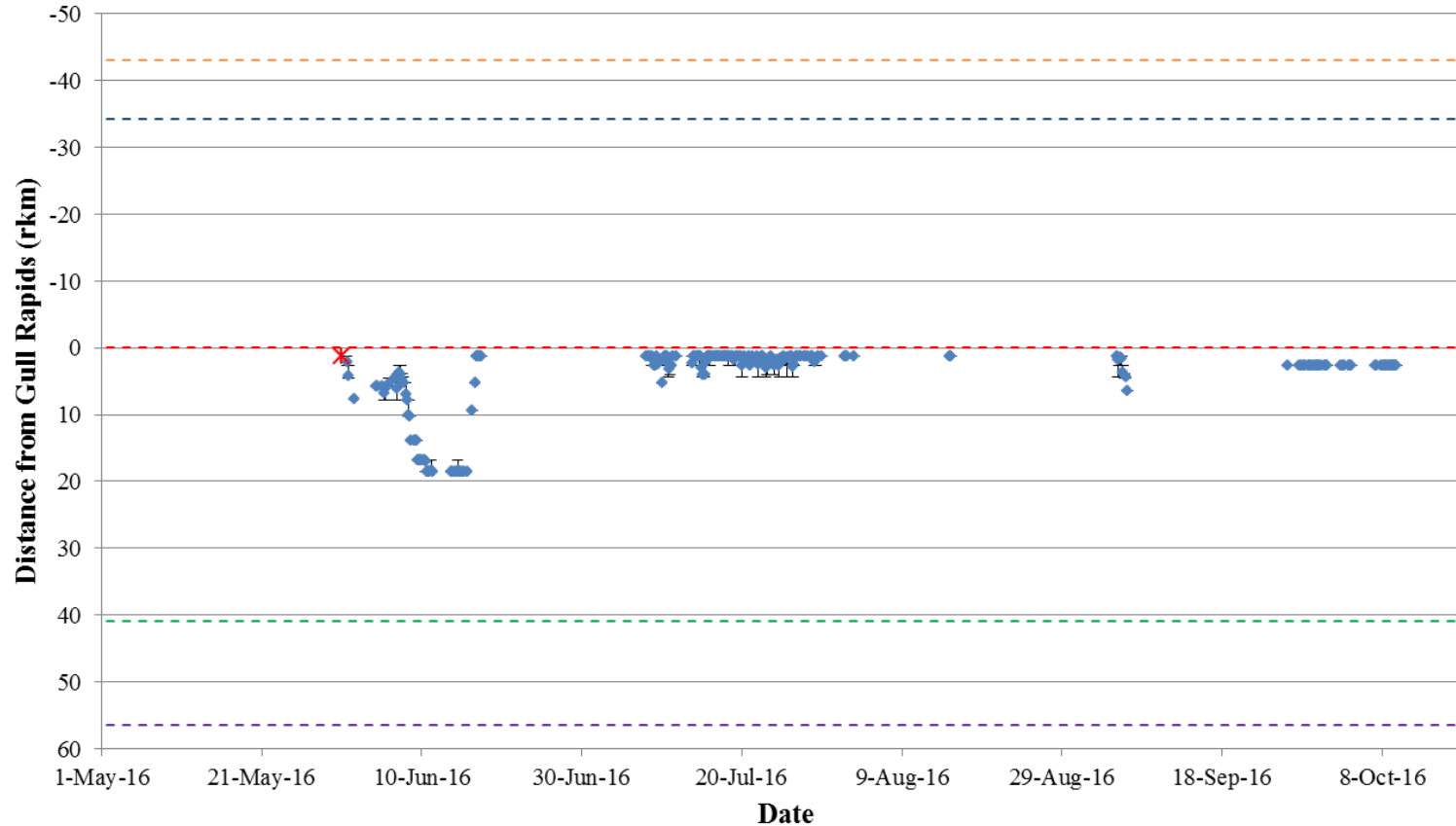


Figure A5-28: Position of a Walleye tagged with an acoustic transmitter (code #53751) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

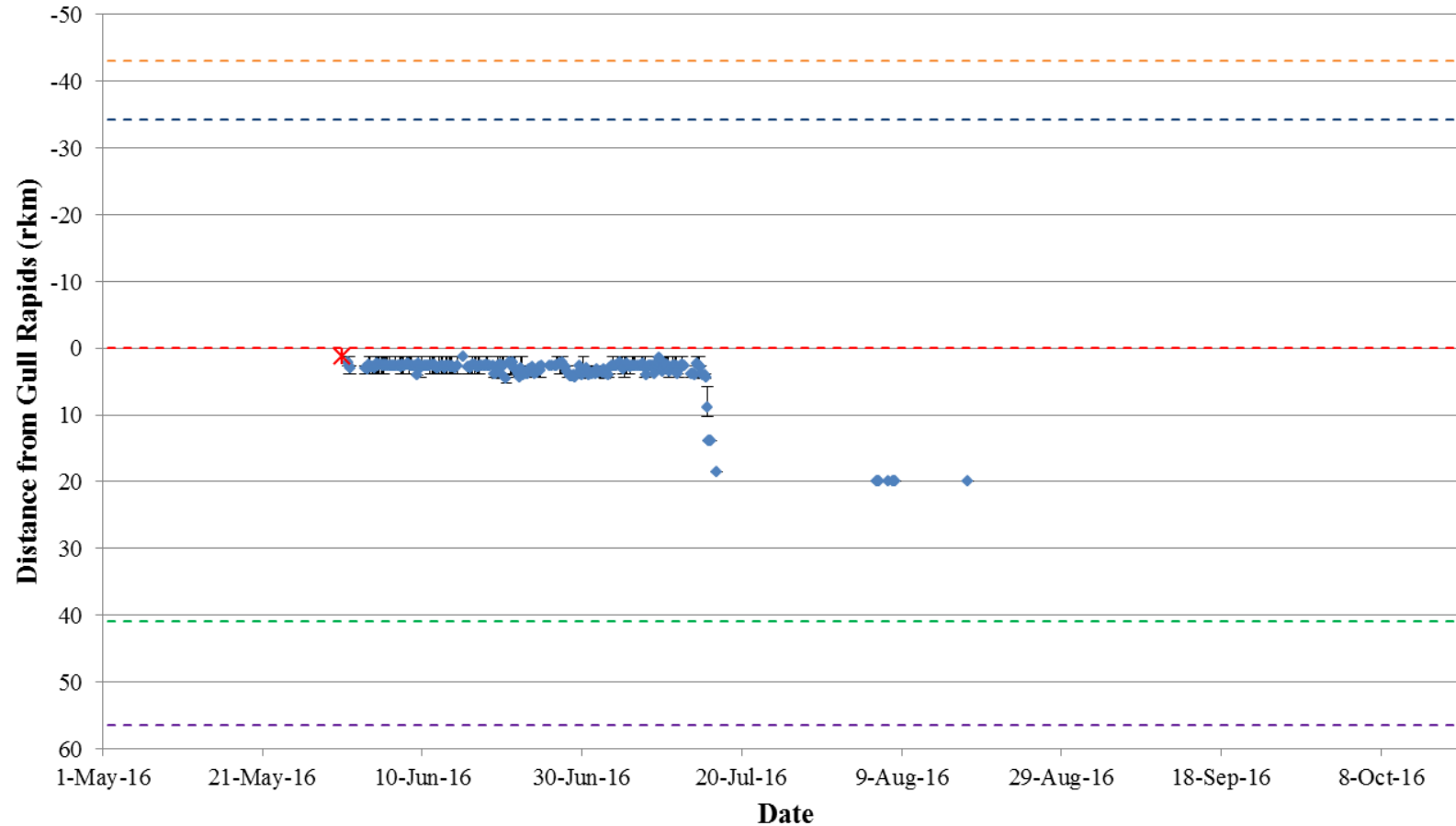


Figure A5-29: Position of a Walleye tagged with an acoustic transmitter (code #53752) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

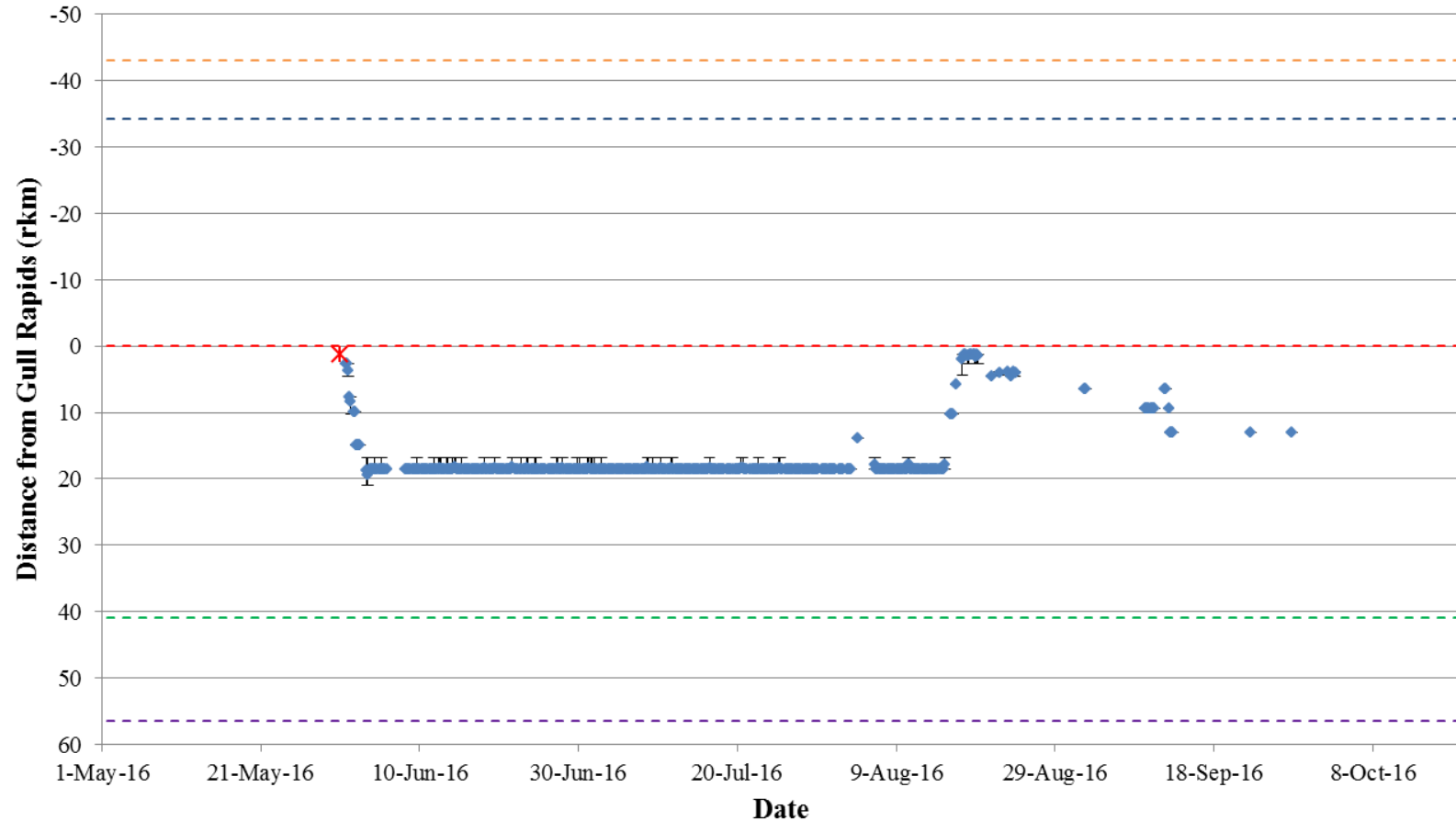


Figure A5-30: Position of a Walleye tagged with an acoustic transmitter (code #53753) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

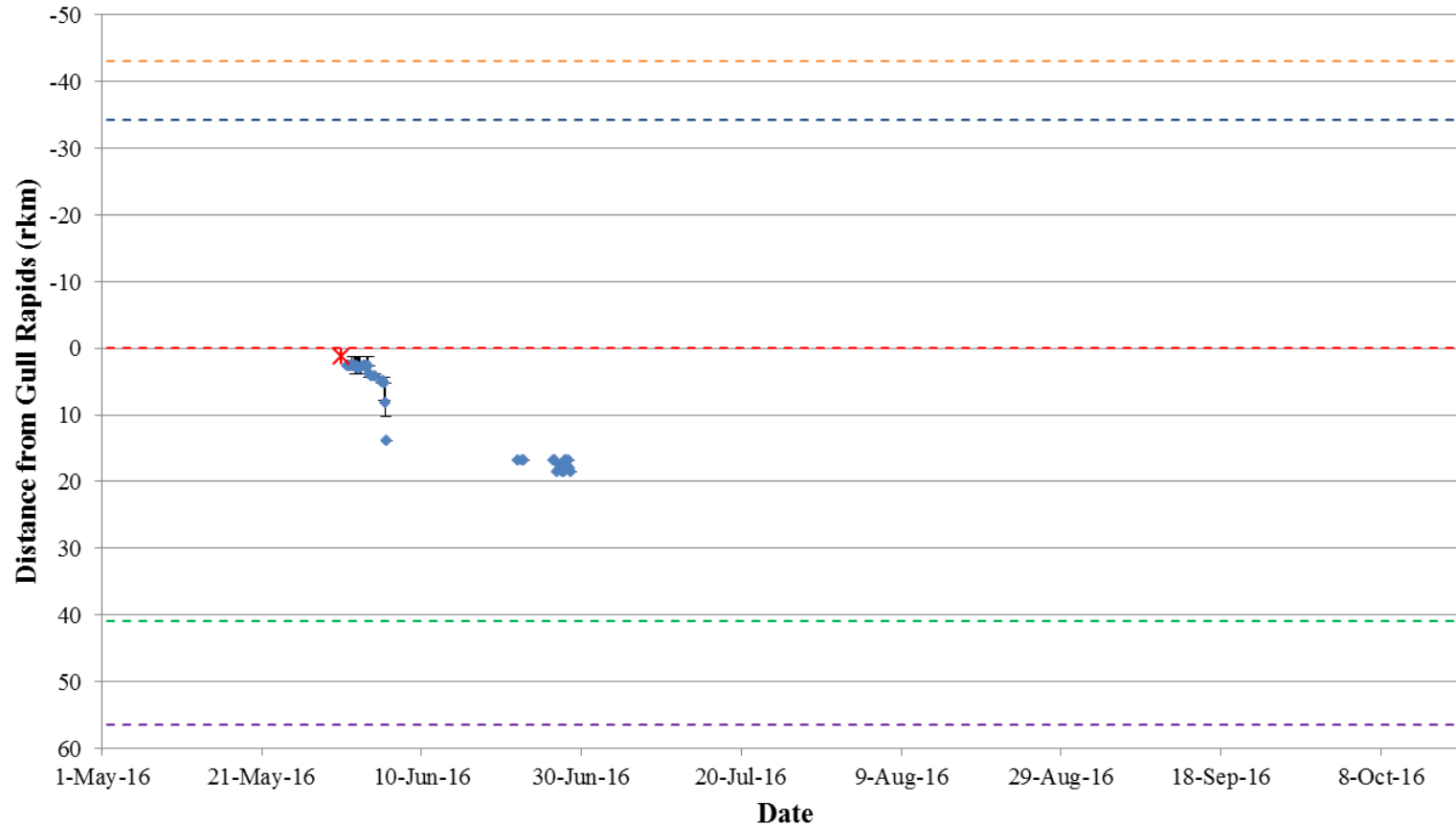


Figure A5-31: Position of a Walleye tagged with an acoustic transmitter (code #53754) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

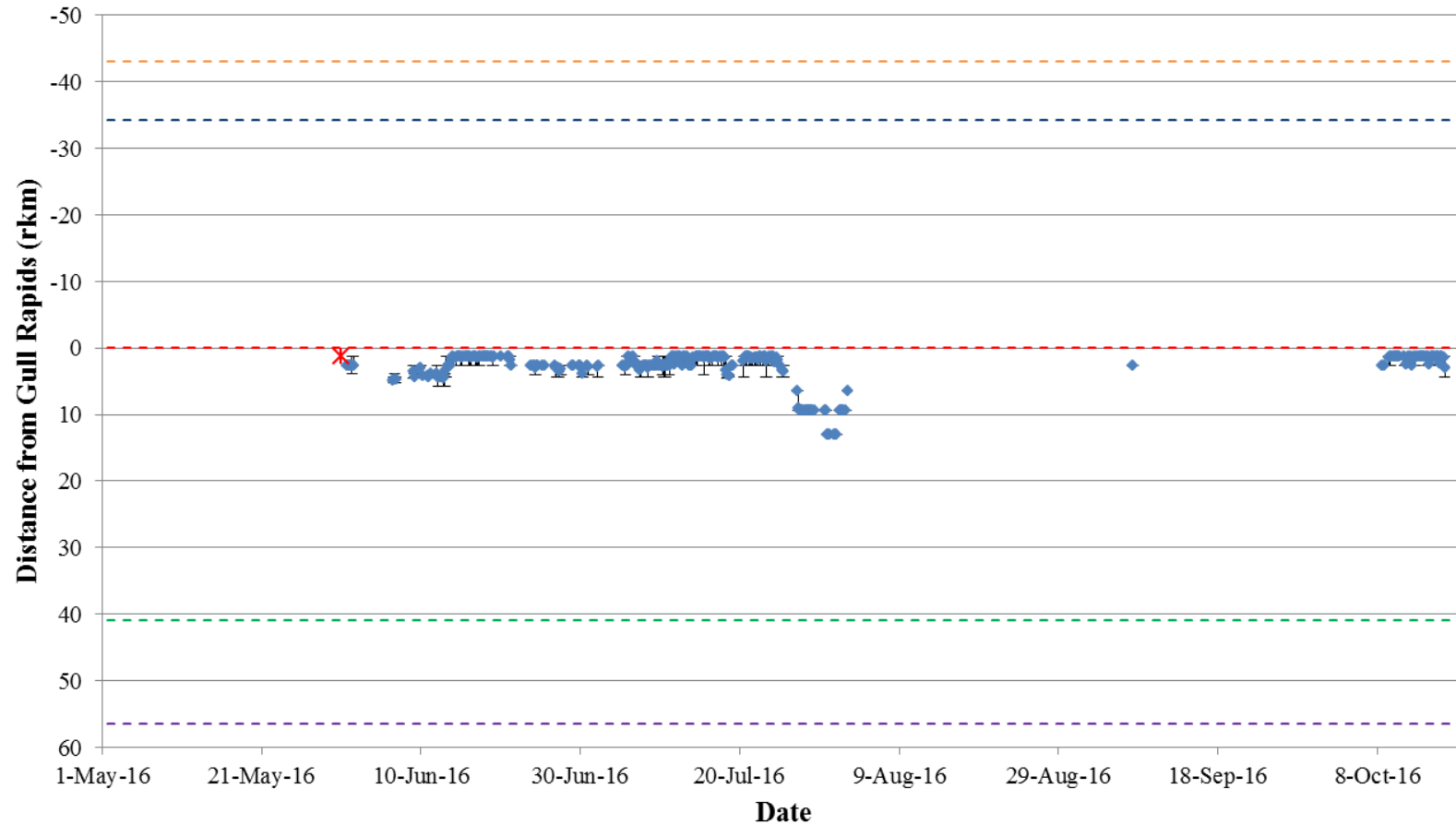


Figure A5-32: Position of a Walleye tagged with an acoustic transmitter (code #53755) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

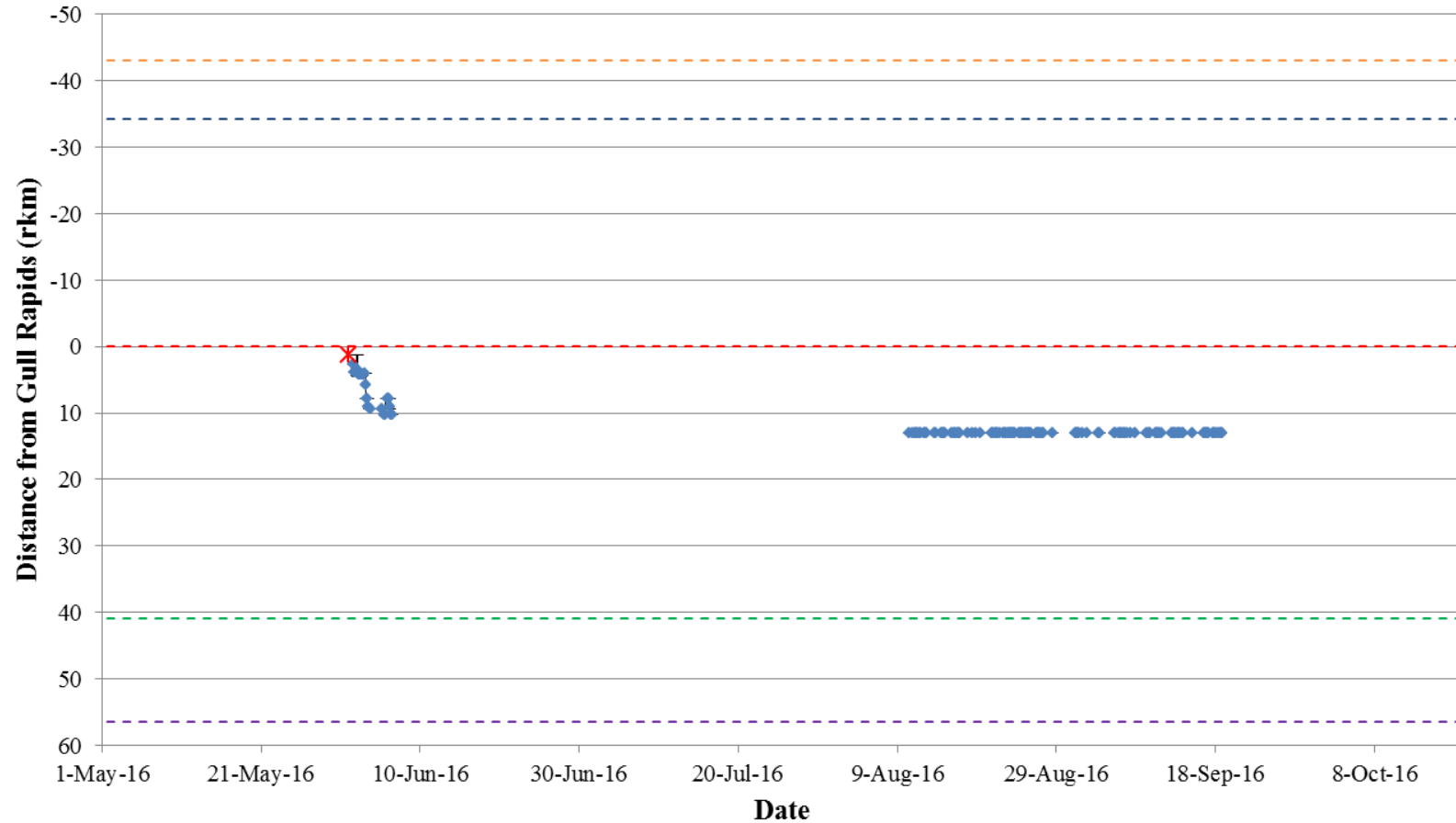


Figure A5-33: Position of a Walleye tagged with an acoustic transmitter (code #53756) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

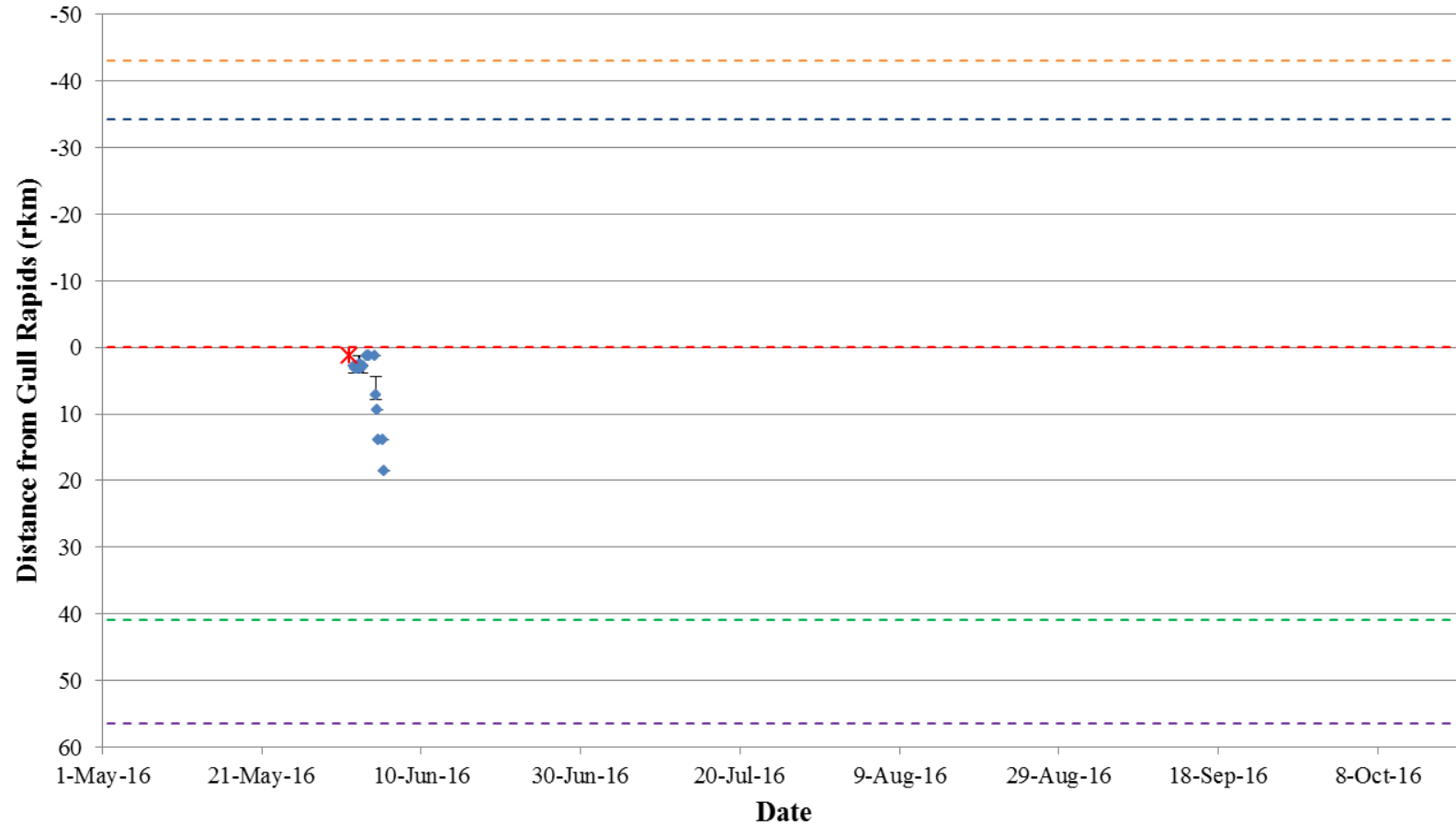


Figure A5-34: Position of a Walleye tagged with an acoustic transmitter (code #53757) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

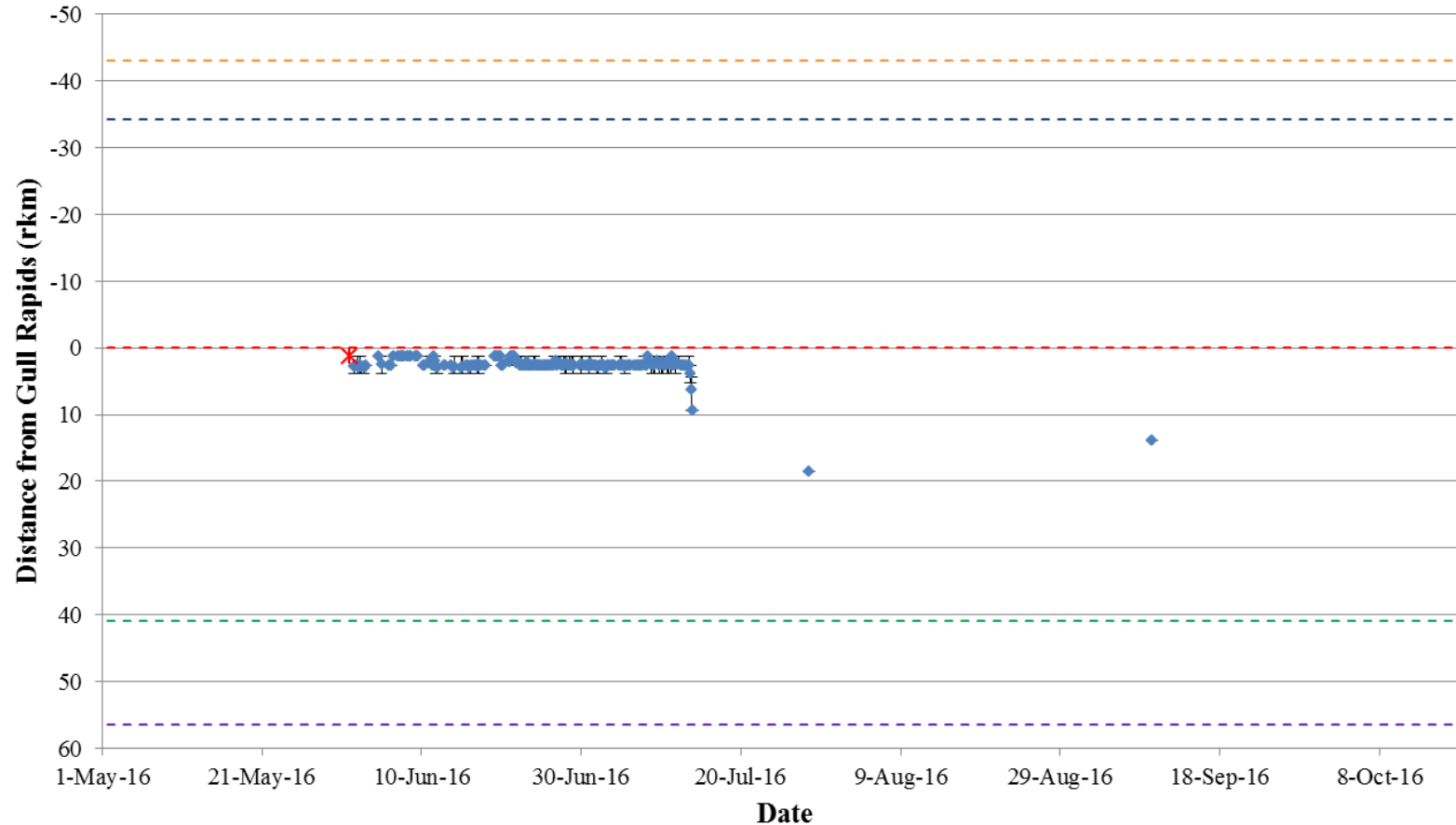


Figure A5-35: Position of a Walleye tagged with an acoustic transmitter (code #53808) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

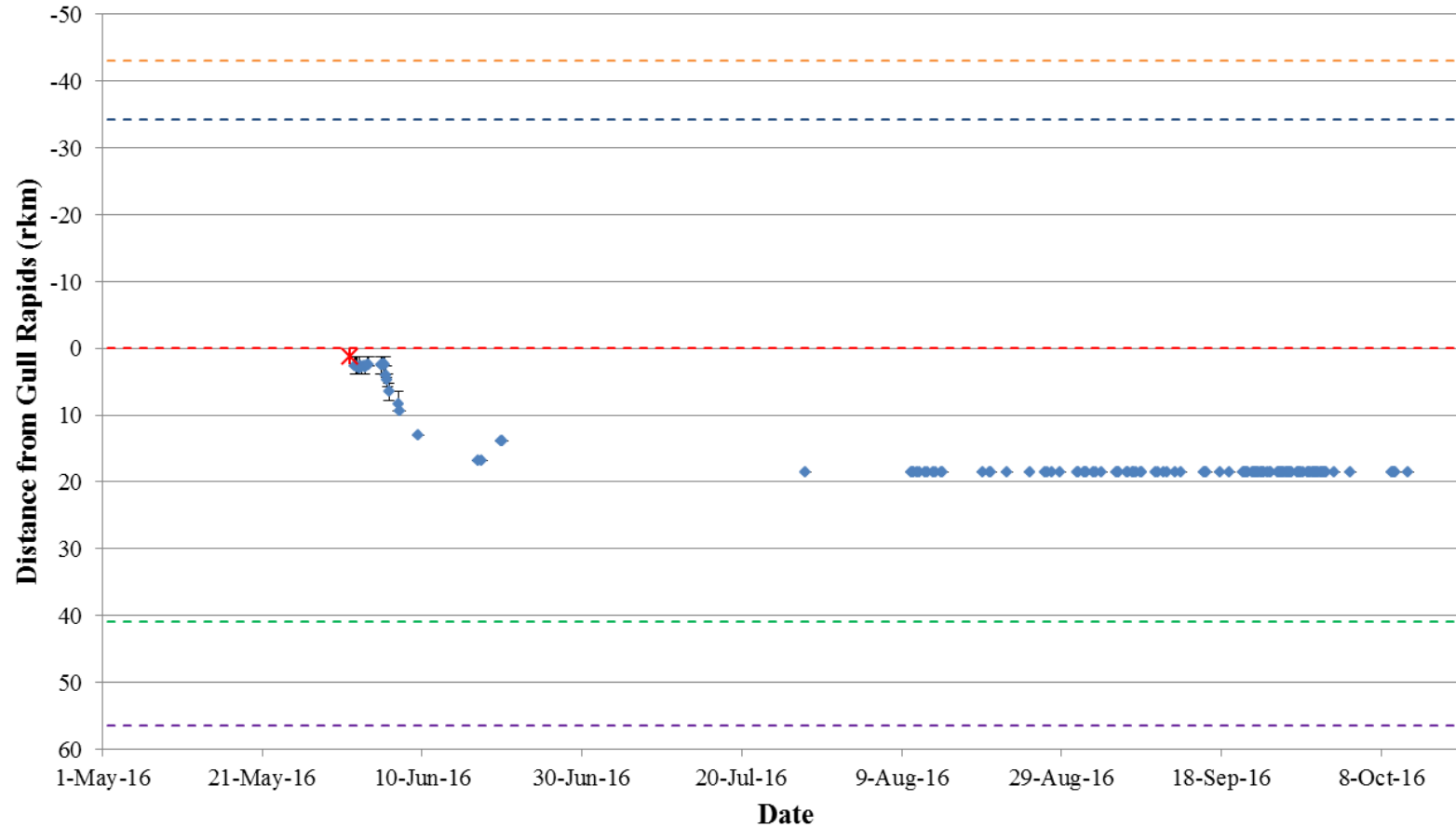


Figure A5-36: Position of a Walleye tagged with an acoustic transmitter (code #53809) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

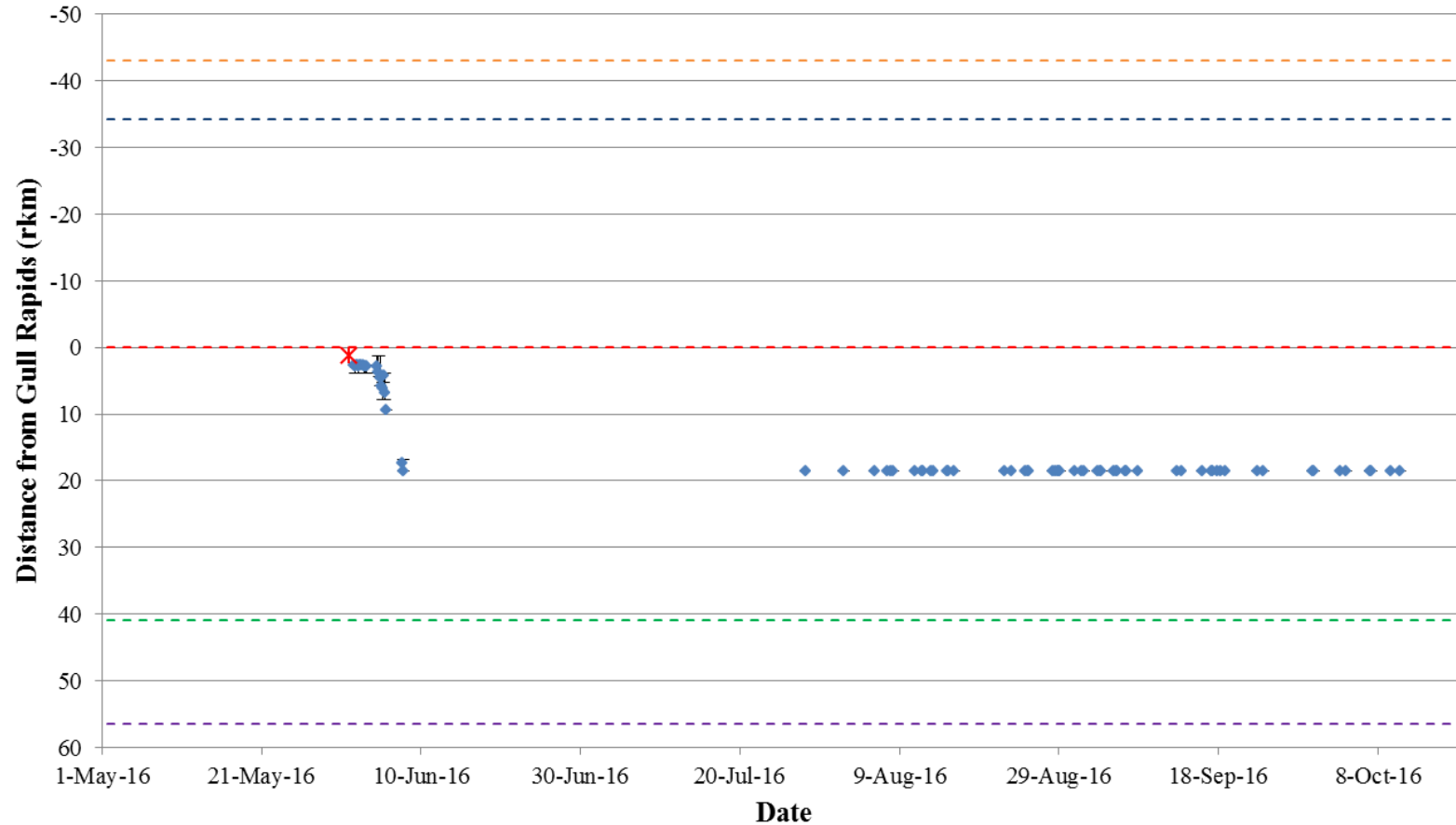


Figure A5-37: Position of a Walleye tagged with an acoustic transmitter (code #53810) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

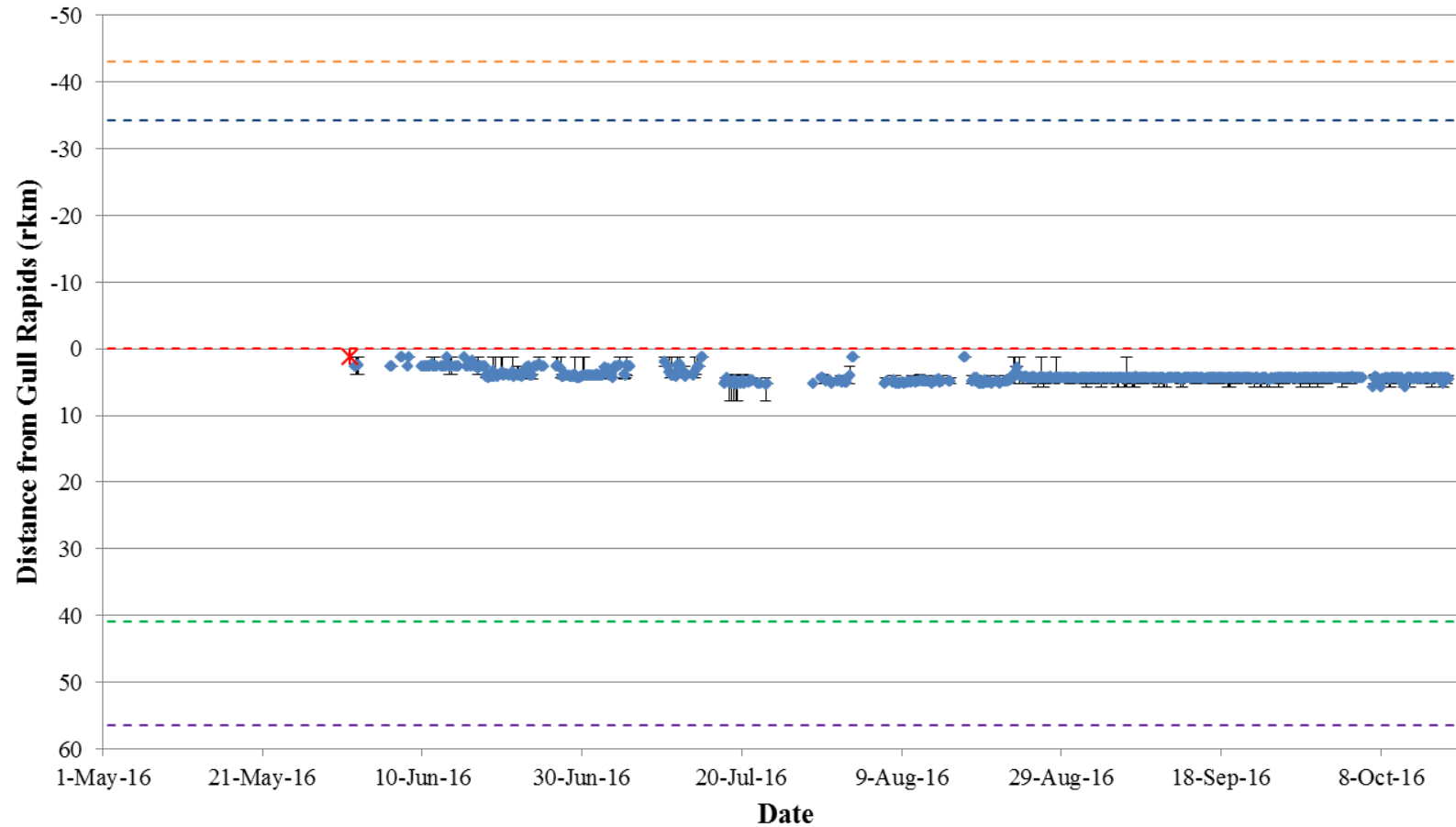


Figure A5-38: Position of a Walleye tagged with an acoustic transmitter (code #53811) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

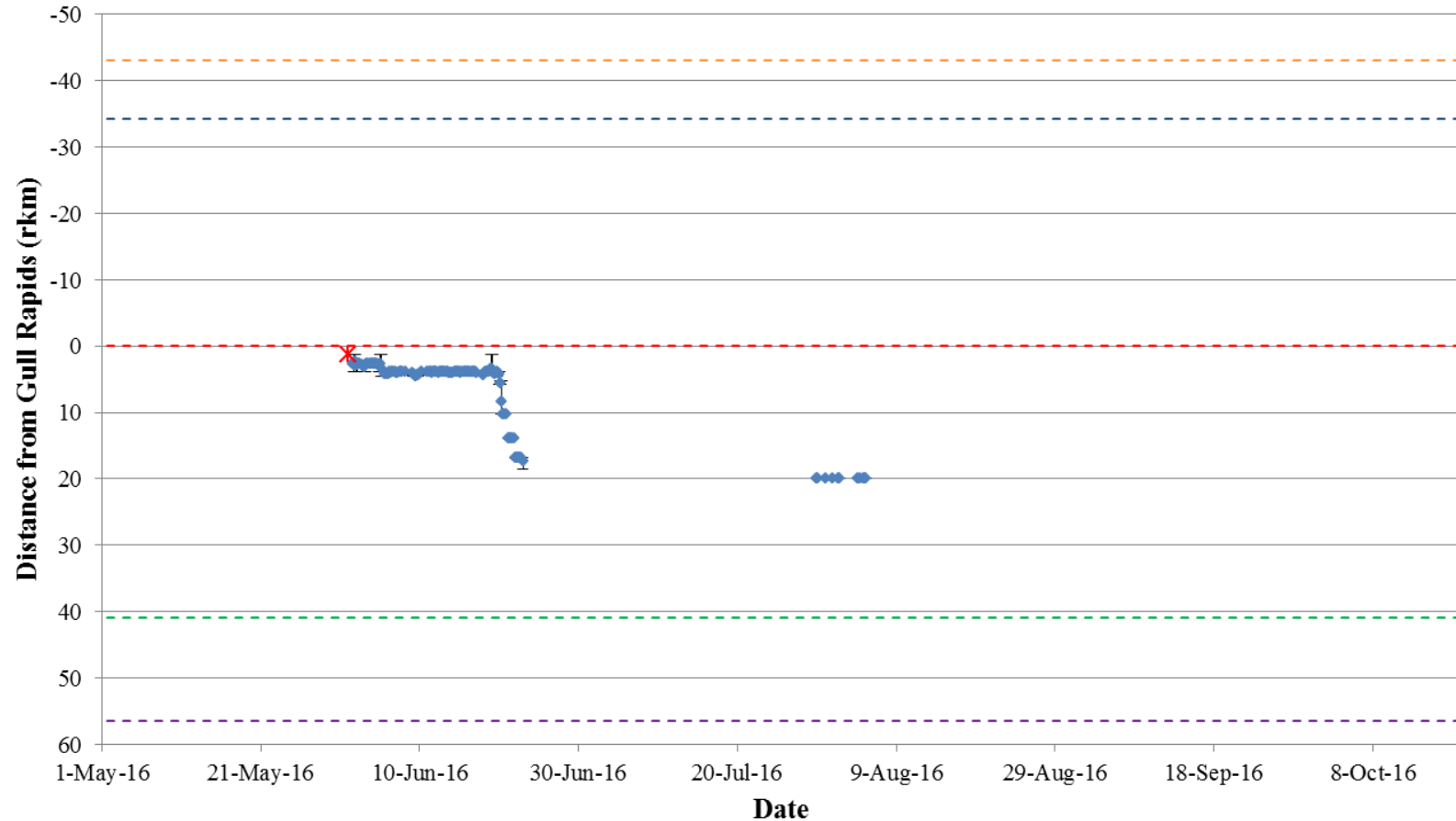


Figure A5-39: Position of a Walleye tagged with an acoustic transmitter (code #53812) in the Nelson River in Stephens Lake in relation to Gull Rapids (rkm 0), from June to October, 2016. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with vertical dotted line. Dotted horizontal lines indicate landmarks in the study area: entrance to Clark Lake (orange), Birthday Rapids (blue), Gull Rapids (red), Kettle GS (green), and Limestone GS (purple).

APPENDIX 6:

BIOLOGICAL AND TAG INFORMATION FOR WALLEYE TAGGED UPSTREAM AND DOWNSTREAM OF GULL RAPIDS

Table A6-1:	Tag and biological information for each Walleye acoustically tagged upstream of Gull Rapids in 2013 and 2014.	275
Table A6-2:	Tag and biological information for each Walleye acoustically tagged downstream of Gull Rapids in 2013 and 2014.	277
Table A6-3:	Tag and biological information for each Walleye acoustically tagged upstream of Gull Rapids in 2016.	279
Table A6-4:	Tag and biological information for each Walleye acoustically tagged upstream of Gull Rapids in 2016.	281

Table A6-1: Tag and biological information for each Walleye acoustically tagged upstream of Gull Rapids in 2013 and 2014.

Tag ID	Date tagged	Tag Life (days)	Expiry date	Fork Length (mm)	Weight (g)
32813	29-Jun-13	1141	13-Aug-16	410	750
32833	1-Jul-13	1141	15-Aug-16	532	2000
32846	30-Jun-13	1141	14-Aug-16	510	1600
32847	30-Jun-13	1141	14-Aug-16	412	900
32851	30-Jun-13	1141	14-Aug-16	530	1975
32852	29-Jun-13	1141	13-Aug-16	526	1675
32853	30-Jun-13	1141	14-Aug-16	375	575
32856	29-Jun-13	1141	13-Aug-16	580	2675
32857	30-Jun-13	1141	14-Aug-16	560	2225
32858	29-Jun-13	1141	13-Aug-16	495	1550
32861	1-Jul-13	1141	15-Aug-16	530	1975
32862	1-Jul-13	1141	15-Aug-16	500	1850
32863	1-Jul-13	1141	15-Aug-16	460	1200
32868	30-Aug-13	1141	14-Oct-16	396	850
32869	30-Aug-13	1141	14-Oct-16	365	600
32872	27-Aug-13	1141	11-Oct-16	566	2300
32873	30-Aug-13	1141	14-Oct-16	385	750
32874	30-Aug-13	1141	14-Oct-16	443	1000
32875	1-Jul-13	1141	15-Aug-16	412	1000
32877	27-Aug-13	1141	11-Oct-16	476	1310
32878	30-Aug-13	1141	14-Oct-16	446	1150
32879	30-Aug-13	1141	14-Oct-16	437	1070
32880	1-Jul-13	1141	15-Aug-16	600	2700
32881	30-Aug-13	1141	14-Oct-16	405	900
32882	29-Aug-13	1141	13-Oct-16	450	1000
32883	30-Aug-13	1141	14-Oct-16	535	2200
32885	30-Aug-13	1141	14-Oct-16	395	825
32886	30-Aug-13	1141	14-Oct-16	578	2425
32887	30-Aug-13	1141	14-Oct-16	451	1125
32888	30-Aug-13	1141	14-Oct-16	444	1300
32889	30-Aug-13	1141	14-Oct-16	418	940
32890	30-Aug-13	1141	14-Oct-16	390	850
6417	21-Jun-14	1141	5-Aug-17	559	2250
6418	17-Jun-14	1141	1-Aug-17	529	1950

Table A6-1: Tag and biological information for each Walleye acoustically tagged upstream of Gull Rapids in 2013 and 2014 (continued).

Tag ID	Date tagged	Tag Life (days)	Expiry date	Fork Length (mm)	Weight (g)
6419	18-Jun-14	1141	2-Aug-17	490	1550
6420	18-Jun-14	1141	2-Aug-17	467	1250
6421	18-Jun-14	1141	2-Aug-17	514	1800
6422	19-Jun-14	1141	3-Aug-17	514	1750
6423	18-Jun-14	1141	2-Aug-17	503	1800
6425	19-Jun-14	1141	3-Aug-17	364	560
6426	18-Jun-14	1141	2-Aug-17	541	1950

Table A6-2: Tag and biological information for each Walleye acoustically tagged downstream of Gull Rapids in 2013 and 2014.

Tag ID	Date tagged	Tag Life (days)	Expiry date	Fork Length (mm)	Weight (g)
32811	26-Jun-13	1141	10-Aug-16	524	1750
32812	28-Jun-13	1141	12-Aug-16	464	1250
32814	26-Jun-13	1141	10-Aug-16	470	1350
32815	26-Jun-13	1141	10-Aug-16	610	2525
32816	26-Jun-13	1141	10-Aug-16	533	1675
32817	26-Jun-13	1141	10-Aug-16	444	1150
32818	26-Jun-13	1141	10-Aug-16	591	2800
32819	26-Jun-13	1141	10-Aug-16	492	1500
32821	27-Jun-13	1141	11-Aug-16	474	1250
32822	27-Jun-13	1141	11-Aug-16	530	1750
32823	28-Jun-13	1141	12-Aug-16	438	975
32824	27-Jun-13	1141	11-Aug-16	510	1800
32825	27-Jun-13	1141	11-Aug-16	600	2800
32826	27-Jun-13	1141	11-Aug-16	480	1600
32827	27-Jun-13	1141	11-Aug-16	515	2000
32828	27-Jun-13	1141	11-Aug-16	406	900
32829	27-Jun-13	1141	11-Aug-16	395	700
32830	27-Jun-13	1141	11-Aug-16	432	950
32831	27-Jun-13	1141	11-Aug-16	441	1150
32832	27-Jun-13	1141	11-Aug-16	476	1450
32834	27-Jun-13	1141	11-Aug-16	525	1900
32835	27-Jun-13	1141	11-Aug-16	554	2000
32836	26-Jun-13	1141	10-Aug-16	463	1350
32837	27-Jun-13	1141	11-Aug-16	451	1250
32838	27-Jun-13	1141	11-Aug-16	445	1100
32839	27-Jun-13	1141	11-Aug-16	477	1350
32840	27-Jun-13	1141	11-Aug-16	480	1700
32841	26-Jun-13	1141	10-Aug-16	530	1700
32843	27-Jun-13	1141	11-Aug-16	390	800
32844	27-Jun-13	1141	11-Aug-16	492	1400
32845	21-Sep-13	1141	5-Nov-16	474	1400
32848	28-Jun-13	1141	12-Aug-16	500	1500
32849	28-Jun-13	1141	12-Aug-16	472	1525
32850	27-Jun-13	1141	11-Aug-16	460	1225

Table A6-2: Tag and biological information for each Walleye acoustically tagged downstream of Gull Rapids in 2013 and 2014 (continued).

Tag ID	Date tagged	Tag Life (days)	Expiry date	Fork Length (mm)	Weight (g)
32854	28-Jun-13	1141	12-Aug-16	475	1425
32855	28-Jun-13	1141	12-Aug-16	496	1400
32859	28-Jun-13	1141	12-Aug-16	516	1600
32860	28-Jun-13	1141	12-Aug-16	450	1175
6424	11-Jun-14	1141	26-Jul-17	443	1015
6427	11-Jun-14	1141	26-Jul-17	455	1100

Table A6-3: Tag and biological information for each Walleye acoustically tagged upstream of Gull Rapids in 2016.

Tag ID	Date tagged	Tag Life (days)	Expiry date	Fork Length (mm)	Weight (g)
53763	05-Jun-16	1141	21-Jul-19	510	-
53764	05-Jun-16	1141	21-Jul-19	560	-
53768	05-Jun-16	1141	21-Jul-19	520	-
53769	05-Jun-16	1141	21-Jul-19	393	-
53770	05-Jun-16	1141	21-Jul-19	350	-
53771	05-Jun-16	1141	21-Jul-19	353	-
53772	05-Jun-16	1141	21-Jul-19	400	-
53773	05-Jun-16	1141	21-Jul-19	405	-
53774	05-Jun-16	1141	21-Jul-19	522	-
53775	05-Jun-16	1141	21-Jul-19	514	-
53776	30-May-16	1141	15-Jul-19	535	-
53777	29-May-16	1141	14-Jul-19	404	1050
53778	03-Jun-16	1141	19-Jul-19	523	-
53779	03-Jun-16	1141	19-Jul-19	400	-
53780	03-Jun-16	1141	19-Jul-19	660	-
53781	02-Jun-16	1141	18-Jul-19	525	-
53782	31-May-16	1141	16-Jul-19	509	1550
53783	31-May-16	1141	16-Jul-19	388	850
53784	30-May-16	1141	15-Jul-19	510	-
53785	30-May-16	1141	15-Jul-19	526	-
53786	30-May-16	1141	15-Jul-19	400	-
53787	30-May-16	1141	15-Jul-19	360	-
53788	30-May-16	1141	15-Jul-19	603	-
53789	30-May-16	1141	15-Jul-19	577	-
53790	29-May-16	1141	14-Jul-19	533	2000
53791	29-May-16	1141	14-Jul-19	400	725
53792	28-May-16	1141	13-Jul-19	559	-
53793	07-Jun-16	1141	23-Jul-19	560	2125
53794	07-Jun-16	1141	23-Jul-19	440	1200
53795	07-Jun-16	1141	23-Jul-19	410	900
53796	07-Jun-16	1141	23-Jul-19	441	1150
53797	07-Jun-16	1141	23-Jul-19	520	1700
53798	07-Jun-16	1141	23-Jul-19	495	1500

Table A6-3: Tag and biological information for each Walleye acoustically tagged upstream of Gull Rapids in 2016 (continued).

Tag ID	Date tagged	Tag Life (days)	Expiry date	Fork Length (mm)	Weight (g)
53799	07-Jun-16	1141	23-Jul-19	511	1650
53800	07-Jun-16	1141	23-Jul-19	530	1750
53801	07-Jun-16	1141	23-Jul-19	360	600
53802	07-Jun-16	1141	23-Jul-19	468	1300
53805	06-Jun-16	1141	22-Jul-19	532	-
53806	06-Jun-16	1141	22-Jul-19	405	-
53807	06-Jun-16	1141	22-Jul-19	451	-
53758	24-Sep-16	1141	09-Nov-19	423	750
53759	24-Sep-16	1141	09-Nov-19	362	500
53760	24-Sep-16	1141	09-Nov-19	512	1825
53765	24-Sep-16	1141	09-Nov-19	491	1300
53766	24-Sep-16	1141	09-Nov-19	484	1250
53767	24-Sep-16	1141	09-Nov-19	508	1450
53803	24-Sep-16	1141	09-Nov-19	484	1550
53804	24-Sep-16	1141	09-Nov-19	410	700

Table A6-4: Tag and biological information for each Walleye acoustically tagged upstream of Gull Rapids in 2016.

Tag ID	Date tagged	Tag Life (days)	Expiry date	Fork Length (mm)	Weight (g)
53723	28-May-16	1141	13-Jul-19	510	1500
53724	28-May-16	1141	13-Jul-19	433	1050
53725	27-May-16	1141	12-Jul-19	480	1200
53726	27-May-16	1141	12-Jul-19	412	800
53727	28-May-16	1141	13-Jul-19	486	-
53728	28-May-16	1141	13-Jul-19	507	1650
53729	28-May-16	1141	13-Jul-19	375	560
53730	28-May-16	1141	13-Jul-19	491	1700
53731	28-May-16	1141	13-Jul-19	442	950
53732	28-May-16	1141	13-Jul-19	530	1825
53733	30-May-16	1141	15-Jul-19	322	500
53734	30-May-16	1141	15-Jul-19	460	1325
53735	30-May-16	1141	15-Jul-19	374	600
53736	30-May-16	1141	15-Jul-19	398	900
53737	29-May-16	1141	14-Jul-19	508	1625
53738	31-May-16	1141	16-Jul-19	522	1875
53739	31-May-16	1141	16-Jul-19	480	1300
53740	31-May-16	1141	16-Jul-19	482	1400
53741	30-May-16	1141	15-Jul-19	404	975
53742	30-May-16	1141	15-Jul-19	452	1250
53743	31-May-16	1141	16-Jul-19	469	1450
53744	31-May-16	1141	16-Jul-19	405	750
53745	31-May-16	1141	16-Jul-19	453	1200
53746	31-May-16	1141	16-Jul-19	467	1380
53747	31-May-16	1141	16-Jul-19	520	1600
53748	31-May-16	1141	16-Jul-19	442	975
53749	31-May-16	1141	16-Jul-19	411	750
53750	31-May-16	1141	16-Jul-19	531	1800
53751	31-May-16	1141	16-Jul-19	422	825
53752	31-May-16	1141	16-Jul-19	468	1400
53753	31-May-16	1141	16-Jul-19	488	1325
53754	31-May-16	1141	16-Jul-19	475	1375
53755	31-May-16	1141	16-Jul-19	506	1475

Table A6-4: Tag and biological information for each Walleye acoustically tagged upstream of Gull Rapids in 2016 (continued).

Tag ID	Date tagged	Tag Life (days)	Expiry date	Fork Length (mm)	Weight (g)
53756	01-Jun-16	1141	17-Jun-19	495	1800
53757	01-Jun-16	1141	17-Jul-19	530	1750
53808	01-Jun-16	1141	17-Jul-19	360	600
53809	01-Jun-16	1141	17-Jul-19	468	1300
53810	01-Jun-16	1141	17-Jul-19	532	-
53811	01-Jun-16	1141	17-Jul-19	405	-
53812	01-Jun-16	1141	17-Jul-19	451	-