



Keeyask Generation Project Aquatic Effects Monitoring Plan

Adult Lake Sturgeon Movement Monitoring Report

AEMP-2022-01



KEEYASK GENERATION PROJECT

AQUATIC EFFECTS MONITORING PLAN

REPORT #AEMP-2022-01

ADULT LAKE STURGEON MOVEMENT MONITORING IN THE NELSON RIVER BETWEEN CLARK LAKE AND THE LIMESTONE GENERATING STATION, SEPTEMBER 2020 TO OCTOBER 2021: YEAR 8 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 and instream work was completed in 2020. The reservoir was impounded with water levels being raised to full supply level between August 31 and September 5, 2020. Commissioning of the powerhouse turbines was initiated after impoundment and five of seven units were in-service by fall 2021. During commissioning and as units came into service, substantial flows continued through the spillway until the summer of 2021 when more flow was going through the powerhouse than spillway. By mid-September the spillway was closed and barely used in the fall.

Lake Sturgeon were identified as one of the key species for monitoring. They were chosen because they are culturally important to Partner First Nations, local sturgeon populations have been previously impacted, and construction and operation of the GS will change or negatively impact important habitat. The plan to monitor the impacts of GS construction and operation on sturgeon includes several types of studies:

- Estimating the number of adults;
- Estimating the number and growth of juveniles (less than 800 millimetres [mm] in length);
- Identifying spawning locations and numbers of spawning fish; and
- Recording seasonal habitat use and long distance movements (*i.e.*, over GSs or rapids) through movement studies.

The movements of Lake Sturgeon over Birthday and Gull rapids were monitored prior to 2011, but because different methods were used from 2011 onward, the results of the two monitoring periods are not directly comparable. While pre-2011 studies did not record detailed fish movement patterns between Clark Lake and Stephens Lake, the data indicated that the majority of Lake Sturgeon continued to live in the area where they had been tagged and did not move 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 behaviour. No fish moved downstream over the Kettle GS.

This report provides the results of adult sturgeon movement monitoring conducted from September 2020 to October 2021. Monitoring was initiated in June 2011 and 2012 when 59 adult

Lake Sturgeon were tagged with acoustic transmitters with a 10-year battery life. Additional transmitters were applied to replace those that had gone missing or were captured including one in 2013, 11 in 2014, and one in 2018. An additional 51 adult Lake Sturgeon were tagged with acoustic transmitters in spring 2019 to continue monitoring through GS operation. Movements have been monitored for approximately three years before any changes to the river occurred (June 2011 to July 2014), approximately six years and two months of construction (July 2014 to September 2020), and just over one year after impoundment (September 5, 2020 to October 10, 2021). Upstream of the GS, the reservoir was flooded in 2020 so changes associated with GS operation may be seen. The Keeyask GS powerhouse is still under construction, so the full effects of operation haven't happened in Stephens Lake yet.



Adult Lake Sturgeon.

Why is the study being done?

Monitoring during the end of GS construction and during the first year after reservoir flooding is being done to answer five questions:

Is construction affecting the area that adult Lake Sturgeon occupy upstream and downstream of the construction site?

Monitoring sturgeon movement shows what areas of the river the sturgeon are using and where they are choosing to stay relative to the construction site.

Are there adult Lake Sturgeon close to the construction site?

If sturgeon 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 adult Lake Sturgeon are moving through and/or away from the generating station (formerly Gull Rapids) during construction and how far are they going?

Movement studies tell us how many sturgeon are moving up or down past the generating station, 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.

Are fish moving downstream through the GS and are these fish surviving passage?

Now that the reservoir is flooded, fish may react to changes in habitat by leaving the area. If they move downstream through the GS, they cannot move back, and may be injured or killed during passage. This could decrease the number of fish living upstream of the GS.

Did adult Lake Sturgeon change where they live after the reservoir was flooded?

Flooding of Gull Lake has caused changes to available habitat in the area. This may cause adult Lake Sturgeon to move away or to use different areas of the river.

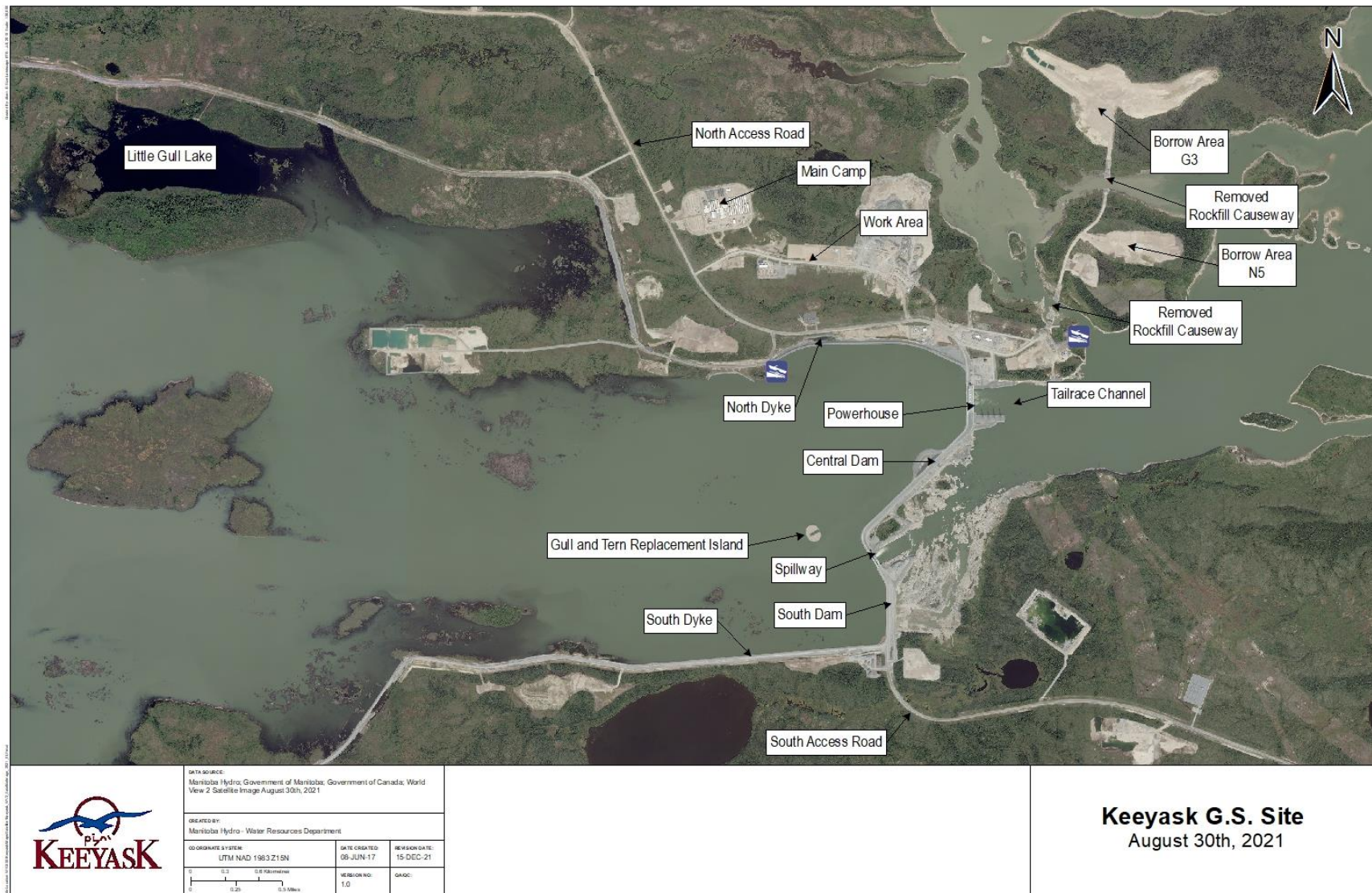
What was done?

The movements of adult sturgeon 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 placed along the Nelson River between Clark Lake and the Limestone GS (see study area map below). Each fish is given a transmitter that sends out a unique ping, which can be detected up to 1 kilometre (km) from a receiver. By looking at the detections that were recorded by different receivers, the movements of each fish can be tracked. The tags are powered by batteries with a 10-year lifespan.

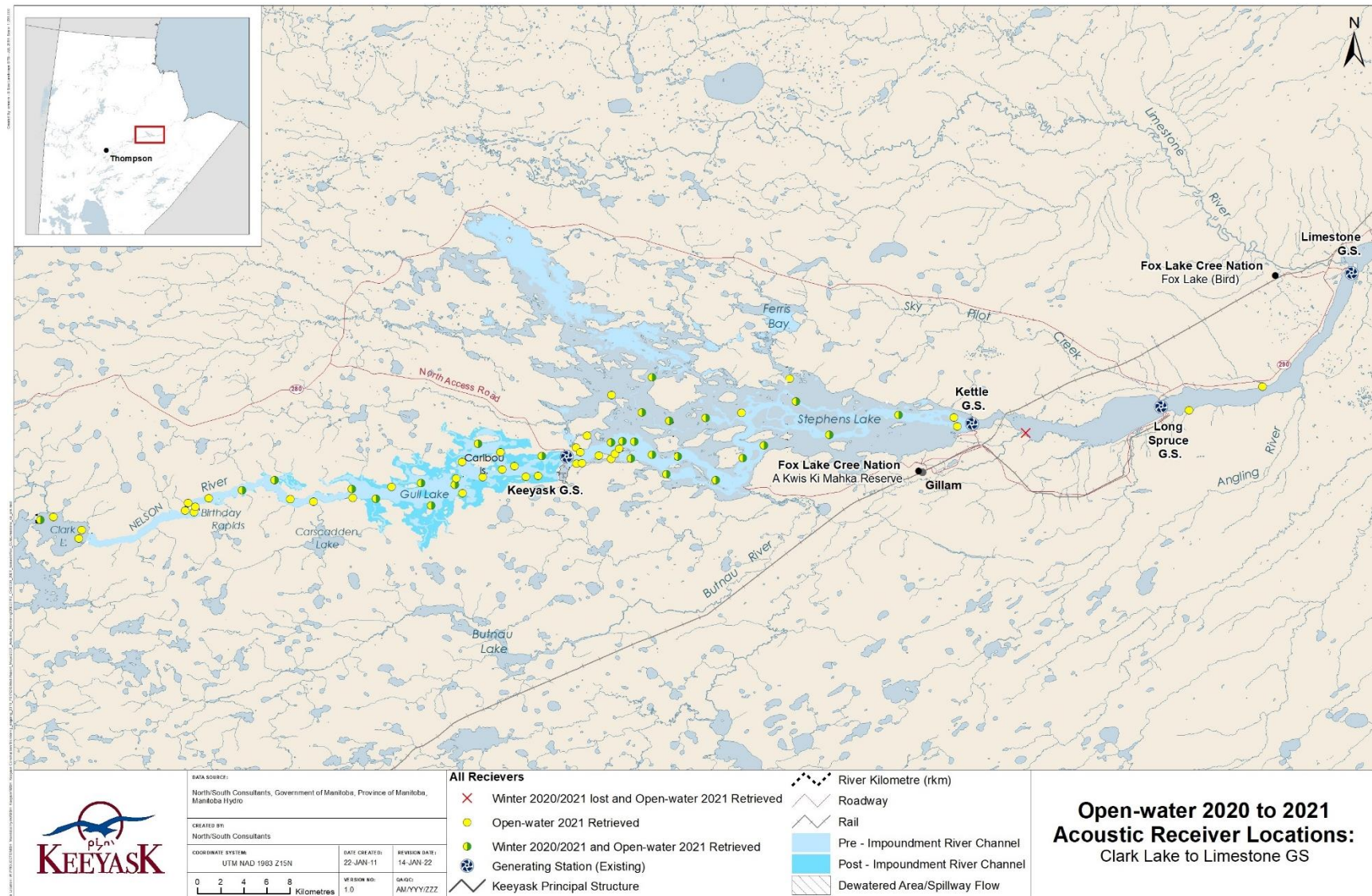


Adult Lake Sturgeon being held in a tank prior to surgery (left). Acoustic tag being implanted in an adult Lake Sturgeon (middle). Adult Lake Sturgeon released into the river after acoustic surgery (right).

Fifty-nine adult Lake Sturgeon were tagged in 2011 and 2012, 31 upstream and 28 downstream of Gull Rapids. The transmitters are powered by batteries with a 10-year lifespan. By the end of 2013, some fish were missing so 11 more tags were applied in 2014 (four upstream of Gull Rapids and seven in Stephens Lake) to return the number of tagged fish to the original sample size. One additional tag was applied in spring 2018 to a female sturgeon used for broodstock (eggs) in the stocking program. This tag was applied to track her survival after egg collection. Fifty-one new adult Lake Sturgeon were tagged in spring 2019, 26 upstream and 25 downstream of the Keeyask GS. These fish will be tracked both before and after reservoir impoundment.



Map illustrating instream structures at the Keeyask Generating Station site after reservoir flooding, August 2021.



Map showing the study area (pre-flooding shoreline). 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?

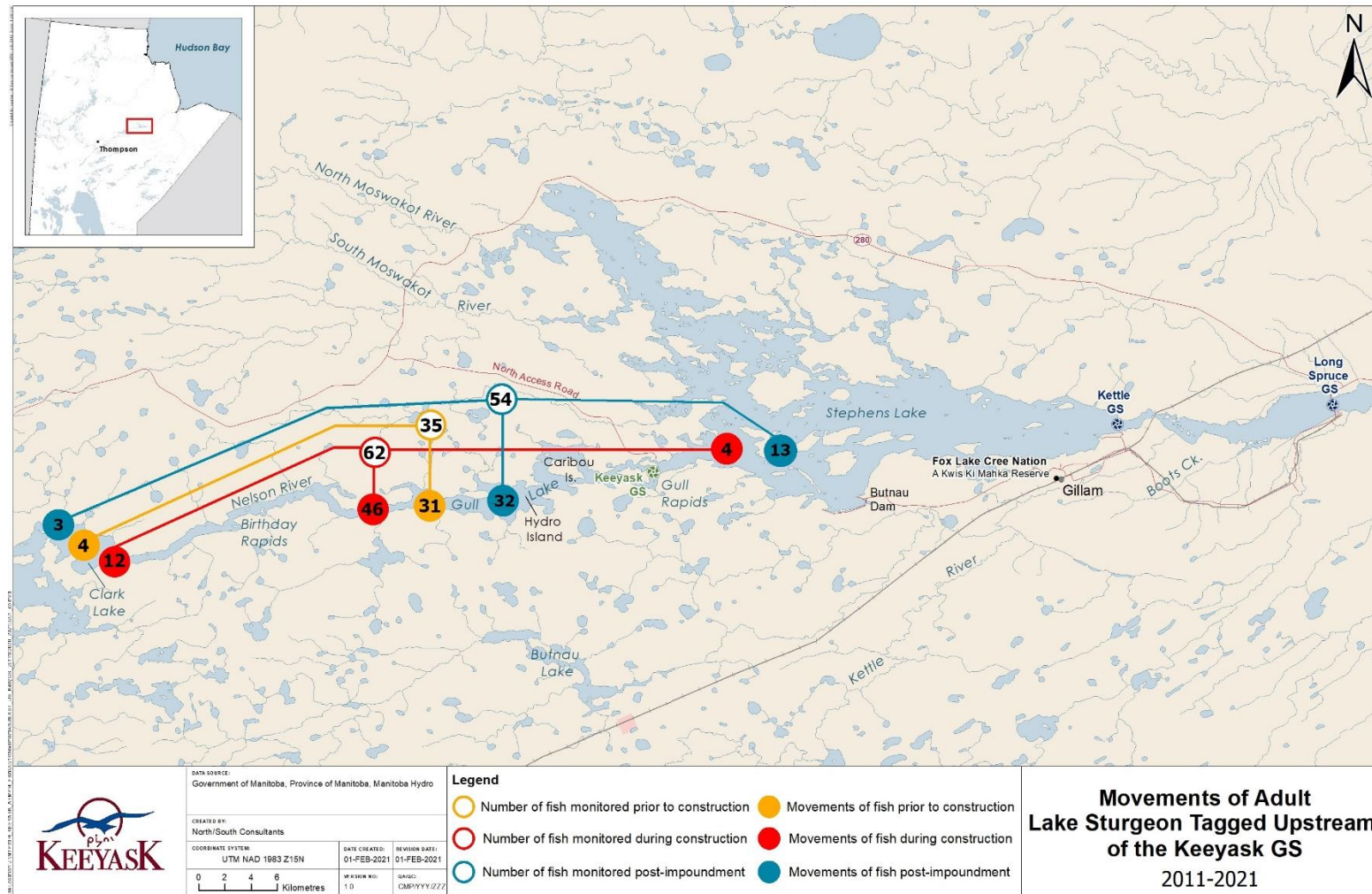
Lake Sturgeon are different from other fish in Manitoba because they do not begin to reproduce until they are at least 15 years old and they can live a very long time (more than 60 years and even up to 100 years). This means that where an individual sturgeon moves may change between years depending on how old it is, whether it is spawning, and what its individual habits are. Sturgeon spawn in spring in the fast-flowing water of large rapids and spend the rest of the open-water season feeding in areas of rivers or lakes. During the winter, they move to areas where they are protected from ice and fast water.

During this study, movements of the tagged fish were monitored year-round including the winter when the river is covered with ice. Monitoring movements in winter is challenging because the ice conditions can damage or move the receivers. For this reason, receivers are left in only a few locations over the winter, making it less likely that sturgeon will be detected. Because the reservoir was flooded in 2020, more suitable areas for receivers were available (deep areas with low flow) and additional receivers were set in winter 2020/2021.

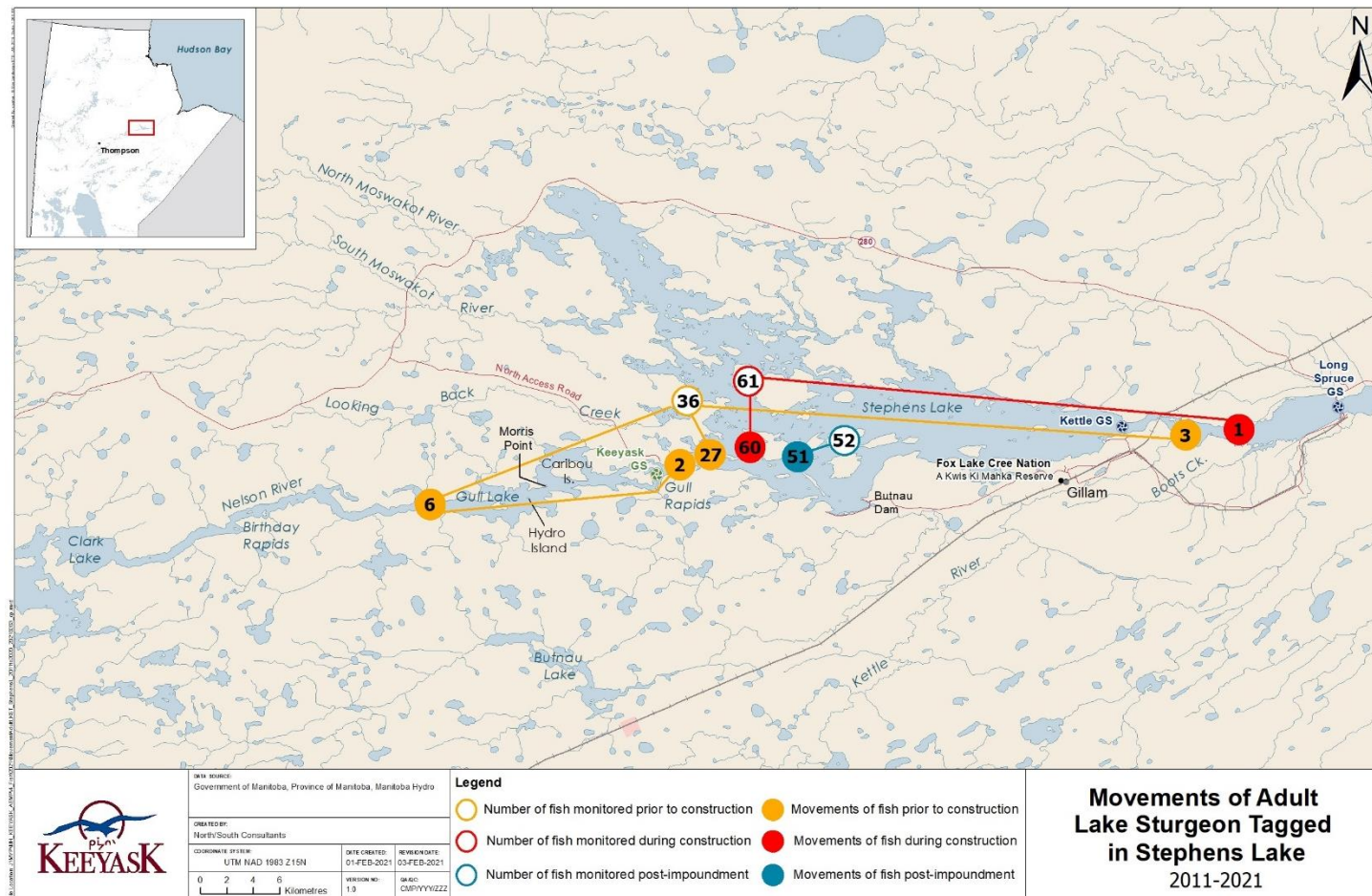
Before 2021, the sturgeon that were tagged upstream of the Keeyask GS were divided into three groups: those that usually live in Gull Lake (sometimes these fish leave for short periods of time then return); those that usually stay in the channel of the Nelson River between Birthday Rapids and Gull Lake; and those that usually stay in Clark Lake. In open-water 2021, most fish moved differently. Of the 44 fish that were available to be detected, only 15 fish (37%) showed the same movements as other years. Eleven fish (27%) moved more and moved farther upstream but stayed in the reservoir. Two fish (5%) moved upstream into Clark Lake and out of the study area. Thirteen fish (32%) moved downstream through the Keeyask GS.

The 13 fish that moved downstream through the GS shows an increase over previous years. Between 2011 and 2020, only six fish moved downstream. All movements through Gull Rapids/the Keeyask GS are shown in the maps below. Most of the fish moved downstream between June and July, and the rest moved downstream sometime between June and September. Based on the large size of adult Lake Sturgeon, it is likely that they all moved downstream through the spillway (they are too large to fit through the trash racks protecting the entry of the powerhouse). It is not clear why these fish moved downstream in the first open-water season after reservoir impoundment. All 13 fish were detected moving upstream and downstream in Stephens Lake, showing that they survived passage through the Keeyask GS.

Downstream of the GS, adult Lake Sturgeon continued to show the same movements as in previous years. Fish tagged in Stephens Lake tend to stay in the main river channel, specifically the part of Stephens Lake where the river channel was flooded when the Kettle GS was built. Fish tagged in Stephens Lake continue to be split into two groups: those that remain in upper Stephens Lake within about 13 km of the Keeyask GS; and those that periodically move downstream into lower Stephens Lake. Fish also continued to be detected immediately downstream of the Keeyask GS during the spring spawning period, suggesting that spawning has continued in this area during construction.



Map showing how many adult Lake Sturgeon moved upstream out of Gull Lake, stayed in Gull Lake, and moved into Stephens Lake before construction (yellow), during construction (red) and after reservoir impoundment (blue). Movements of fish due to tagging stress or mortality were not included. Numbers of fish monitored (hollow circles) represent the number of fish tagged while the number of fish movements (solid circles) represent the number of fish detected. The total number of fish includes all fish tagged during a period although all fish may not have been trackable through the entire period.



Map showing how many adult Lake Sturgeon moved upstream through Gull Rapids, stayed in Stephens Lake and moved downstream through the Kettle GS during before construction (yellow), during construction (red), and after reservoir impoundment (blue). Movements due to tagging stress and mortality were not included. Movements of fish due to tagging stress or mortality were not included. Numbers of fish monitored (hollow circles) represent the number of fish tagged while the number of fish movements (solid circles) represent the number of fish detected. Two fish moved upstream and then returned to Stephens Lake. The total number of fish includes all fish tagged during a period although all fish may not have been trackable through the entire period.

What does it mean?

Before the Keeyask GS reservoir was flooded, monitoring upstream of the GS showed that each sturgeon did not usually move great distances and that most preferred to live in similar locations year after year. The same patterns were seen immediately after impoundment in September 2020, during winter 2020/2021, and during the early part of open-water 2021. However, beginning in June 2021, differences in adult Lake Sturgeon movement patterns were observed, with most fish moving to different areas, some staying in the reservoir and some leaving. There was an increase in the number of Lake Sturgeon that moved downstream through the GS into Stephens Lake between June and September. These fish all survived passage through the Keeyask GS (likely the spillway) and stayed in Stephens Lake.

Movement monitoring from 2011–2021 indicates that construction of the Keeyask GS has not altered movement patterns of adult Lake Sturgeon in Stephens Lake. Many sturgeon continue to use habitat immediately downstream of the Keeyask GS, including during the spawning period.

What will be done next?

The tags that were implanted in 2011 have batteries that were estimated to last until 2021 and will likely not be detected after the 2021 monitoring year. The tags implanted in 2014 were supposed to last until 2024 but stopped transmitting early in 2021. The tags that were implanted in 2019 will last until 2029. Because of the large number of fish that moved downstream and expiring tags, only 14 active tags remain upstream of the Keeyask GS. Additional tags will be applied in 2022 to increase this number to 30. During the 2022 open water period there should be 38 active tags in Stephens Lake (including the fish that moved downstream in 2021). Following the movements of individual fish over such a long time will provide a better idea of what kinds of habitats these fish need to use over many years, and if fish continue to change their movements in the Keeyask reservoir. We will also be able to see if the large number of fish that moved downstream out of the reservoir in 2021 was a one-time event or if it continues to occur in the future.

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1.0 INTRODUCTION

The Keeyask Generation Project (the Project) is a 695-megawatt (MW) hydroelectric generating station at Gull (Keeyask) Rapids on the lower Nelson River in northern Manitoba. The Project is approximately 725 kilometers (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 the monitoring activities of various components of the aquatic environment, including the focus of this report, adult Lake Sturgeon movement, for the construction and operation phases of the Project.

One of the main objectives associated with radio and acoustic telemetry studies conducted prior to 2011 (*i.e.*, in support of the Keeyask Generation Project EIS) was detecting upstream and downstream movements of fish over rapids in the study area (Birthday Rapids and Gull Rapids). Pre-Project movement data revealed that the majority of Lake Sturgeon 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. Movement data collected from telemetry studies conducted prior to 2011 are not directly comparable to those described herein given that receiver coverage has improved considerably; the pre-Project acoustic receiver array was comprised of 20 receivers, while the array used after 2011 consists of as many as 60 receivers. Also, radio telemetry has not been used since 2004.

This report provides one year of results (September 2020 to October 2021) from the multi-year adult Lake Sturgeon movement monitoring program described in the AEMP. The report also discusses what has been learned since adult Lake Sturgeon movement monitoring began in 2011. In 2011 and 2012, 59 fish (measuring > 796 mm fork length) were tagged with acoustic transmitters with a 10-year battery lifespan. Thirty-one fish were captured and tagged upstream of Gull Rapids, and 29 fish were captured and tagged downstream of Gull Rapids. An additional fish was tagged in Stephens Lake in 2013 to replace a tag returned by a local resource user. By 2013, 11 tags were either missing or lost. To compensate for this loss, additional tags were implanted in 2014 to restore the sample size to 59 fish. Results from all studies dating back to 2011 are presented in Hrenchuk and McDougall (2012); Hrenchuk and Barth (2013); Hrenchuk *et al.* (2014); Hrenchuk and Barth (2015); Hrenchuk and Barth (2016); Hrenchuk and Barth (2017); Hrenchuk *et al.* (2018), Hrenchuk and Lacho (2019), Hrenchuk (2020), and Hrenchuk (2021). An

additional 51 adult Lake Sturgeon were tagged in 2019 to track changes before and up to nine years after reservoir impoundment.

Adult Lake Sturgeon movement monitoring during the construction phase was conducted between Clark Lake and the upper portion of the Limestone reservoir (Map 1) to determine if disturbances associated with construction alter habitat use and coarse-scale movement patterns upstream and downstream of the Project (Map 2). Results assisted in identifying:

- The use of key habitats (*i.e.*, spawning, rearing, and foraging) during construction;
- The potential vulnerability of sturgeon to activities at the construction site (*i.e.*, if sturgeon use the area in the immediate vicinity of the construction site they may be vulnerable to construction effects such as stranding during dewatering, releases of suspended sediment); and
- The potential for increased emigration or avoidance of the construction site due to disturbance (*i.e.*, blasting, suspended sediment inputs, *etc.*).

Impoundment of the Keeyask reservoir was completed on September 5, 2020 and sampling in the Keeyask reservoir in 2021 represented the first year that the reservoir was at full supply level. Monitoring in Stephens Lake, however, represented a transition between construction and operation as a considerable portion of the flow was still being passed through the spillway in spring and early summer when only a few units were in-service. Later in the summer and early fall as additional units became operational all the entire flow of the river was going through the powerhouse. Due to Keeyask reservoir impoundment, several key questions identified in the AEMP that have not been previously discussed are addressed.

- Will disturbances associated with construction alter coarse-scale movements upstream and/or downstream of the construction site?
- Are sturgeon using habitat in the immediate vicinity of the construction site?
- Will the frequency of long-distance movements (and subsequent downstream emigration/entrainment) by Lake Sturgeon increase during construction and operation of the Project?
- Are fish moving downstream past the GS and, if so, is there an indication that they have survived passage?
- Will there be a change in the proportional distribution of adult Lake Sturgeon following reservoir creation (*i.e.*, will there be a population level shift in distribution patterns following reservoir creation)?

This report provides results from September 2020 to October 2021, which is the sixth winter and seventh open-water period of monitoring conducted since construction of the Keeyask GS began in July 2014. This report includes data collected during the first winter and open-water period after impoundment of the Keeyask reservoir in September 2020.

2.0 STUDY SETTING

The study area encompasses an approximately 110 km long reach of the Nelson River from Clark Lake to the upstream end of the Limestone Reservoir (Map 1). This section of river offers a diversity of physical habitat conditions, including a variety of substrate types, and variable water depths (range 0–30 m) and velocities. Clark Lake is located immediately downstream of Split Lake, and approximately 42 km upstream of the Keeyask GS (formerly 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. The area between Clark Lake and the Keeyask GS is considered the Keeyask reservoir.

Birthday Rapids is located approximately 10 km downstream of Clark Lake and 30 km upstream of Gull Rapids/the Keeyask GS (Maps 1 and 2) and marks the upstream end of major water level changes as a result of impoundment by the Keeyask GS. The drop in elevation from the upstream to downstream side of Birthday Rapids was approximately 2 m prior to impoundment but is now a nearly level, albeit fast-flowing section of river. The 14 km reach of the Nelson River between Birthday Rapids and Gull Lake was characterized as a large and somewhat uniform channel with medium to high water velocities and a few large bays. This area is now within the Keeyask reservoir, though flooding was limited to mainly shoreline areas.

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

Just below the Keeyask GS, the Nelson River enters Stephens Lake (Maps 1 and 4). Stephens Lake was formed in 1971 by construction of the Kettle GS. Construction of the Keeyask GS has altered the flow distribution immediately downstream of the station.

Construction of the Kettle GS flooded Moose Nose Lake (north arm) and several other small lakes that previously drained into the Nelson River, as well as the old channels of the Nelson River that now lie within the southern portion of the lake (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 the Keeyask GS.

The Long Spruce reservoir was formed in 1979 by the construction of the Long Spruce GS. It is a 16 km reach of the Nelson River extending from Long Spruce GS upstream to Kettle GS (Manitoba Hydro Public Affairs 1999). Kettle River and Boots Creek are the only major tributaries flowing into Long Spruce reservoir, with both tributaries entering the reservoir on the south shore (Maps 1 and 7).

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 FLOWS, WATER LEVELS, AND KEEYASK OPERATIONS

From October 2020 to mid-June 2021 the calculated Split Lake outflow varied about the median flow of about 3,300 m³/s, ranging between about 3,000 m³/s and 3,900 m³/s. From mid-June to mid-August, the flows steadily decreased from about 3,700 m³/s to about 2,000 m³/s, which is approximately the 5th percentile low flow. Low flow conditions persisted from summer into winter, with flows dropping to a low of about 1,800 m³/s at the end of November 2021. These are the lowest flows that have occurred during Keeyask construction. It is not since 2005 that flows this low have occurred on the Nelson River.

Water levels on Gull Lake have been held steady between about 158.8-159 m since reservoir impoundment in September 2020. Upstream of Gull Lake at gauges below and above Birthday Rapids the levels were about 0.5 m and 2 m higher than on Gull Lake, a smaller difference than would have occurred prior to the project. Upstream levels increased about 3-4 m at these sites in winter due to ice effects as in previous years. Due to low flows in summer 2021 the water surface was relatively flat from Gull Lake to the gauge just upstream of Birthday Rapids, with a difference of only about 0.8-0.9 m between the two.

Keeyask is transitioning from a construction project to an operating station (Map 2). In 2021, the work at site has been focused on bringing units into service. By the end of April 2021, prior to the start of aquatic monitoring, Unit 1 and Unit 2 were in service. Throughout the open water period more units were being tested and brought into service one at a time. As units came into service, the distribution of flow between the spillway and powerhouse has gradually shifted, as summarized below. By the end of October 2021 five units were fully in service.

Discharges from the spillway and powerhouse are not measured but have been estimated based on performance design curves. For reference it is noted that the design discharge capacity of the powerhouse is 4,000 m³/s, giving each turbine unit a discharge capacity of approximately 570 m³/s.

Table below outlines Keeyask GS operation, including powerhouse and spillway flows, in 2021.

Dates	Powerhouse Units	Spillway Gate Operation	Powerhouse	Spillway	Keeyask Total
			Discharge (m ³ /s)		
End Apr. - end June 2021	Unit 2 online; Unit 3 testing	Gates 1, 2, 3, 5, 7 in use until mid-June. Gates 1, 3, 5, 7 primarily mid- to end-June.	Steady at about 1,100 varying down to 600 on a few intermittent days and up to 1,650 during two weeks of Unit 3 testing.	Generally, 2,200-2,800 except during Unit 3 testing it varied from about 1,400-2,400.	Generally, 3,400-3,900 except during Unit 3 testing it varied from 2,600-3,600.
End June – mid-Sept. 2021	Unit 3 online; Unit 5 testing	Generally, Gates 1, 3, 5, 7 until mid-July. Gates 3, 5, 7 until end of July. Various gates used in Aug. Gates 1 and 7 used in Sept. until closure of all gates on Sept. 11.	About 1,650, but reduced to 1,100 for two weeks with a unit shut down and varying up to 2,100 during two weeks of Unit 5 testing.	From end of June to mid-Aug. Nelson R inflow declined from about 3,600 to about 1,800-2,200 and has remained steady around 2,000-2,200 since then – corresponding spillway discharge gradually declined from about 2,400 to 0 by mid-Sept. when Unit 5 came into service although daily variations of +/- 200-400 or more in a few instances occurred during this time.	Total Keeyask discharge declined from about 3,600 to an average of about 2,000-2,200 corresponding to the decrease in Nelson R inflow, and daily variation of about +/- 200-400 depending on spillway and powerhouse operations.
Mid-Sept. – end Oct. 2021	Unit 5 online; Unit 4 testing; Unit 4 online Oct. 25	Various gates used very sporadically. First reopening on Sept. 28.	Average discharge about 2,000-2,200 with typical daily variation from 1,600-2,200 and a maximum variation between 1,000-2,800 depending on unit operations and Unit 4 testing.	No spillway flow except for a few intermittent days of up to 1,000.	Same as powerhouse.

3.0 METHODS

3.1 ACOUSTIC TELEMETRY

Acoustic telemetry involves tracking movements of fish surgically implanted with internal acoustic transmitters (tags). Each transmitter emits a unique signal, recognizable by stationary receivers. When tagged fish come into the detection range of a receiver (generally within 500 m to 1 km, depending on conditions), the transmitter code number, as well as the date and time, are stored in the receiver. Initially, the receiver array was designed to monitor adult Lake Sturgeon (the focus of this report); however, the same array is also used to monitor movements of juvenile Lake Sturgeon (Funk and Hrenchuk 2022), Walleye (Small and Hrenchuk 2022a), and Lake Whitefish (Small and Hrenchuk 2022b).

3.1.1 ACOUSTIC TRANSMITTER APPLICATION

Acoustic transmitters (VEMCO V16-4x, estimated 3,650-day battery life) were first applied to 59 fish in 2011 and 2012: 31 upstream and 28 downstream of Gull Rapids (Table 1). A single transmitter was reapplied to a fish in Stephens Lake in 2013 after being returned by a local resource user. At the beginning of the 2014 open-water period, it was suspected that 11 fish had either shed their tags, suffered mortality, or were captured by local resource users. In order to return the number of tagged fish to the original sample size, additional acoustic transmitters were applied to adult Lake Sturgeon upstream of Gull Rapids ($n = 4$) and in Stephens Lake ($n = 7$) in June 2014 (Hrenchuk and Barth 2015) (Table 1).

One additional fish was tagged with an acoustic transmitter (VEMCO V13-1x, estimated 1,735-day battery life) upstream of the Keeyask GS (rkm -26.0) on June 6, 2018 (Table 1). This fish was a female used as broodstock for the Project's stocking program (details can be found in Klassen *et al.* 2019). The acoustic transmitter was applied to monitor survival post egg collection.

Acoustic transmitters (VEMCO V16-4x, estimated 3,650-day battery life) were applied to an additional 51 fish in 2019: 26 upstream and 25 downstream of the Keeyask GS (Table 1). These transmitters will allow tracking of Lake Sturgeon through GS construction, and the first eight years of GS operation (to 2029).

3.1.2 ACOUSTIC RECEIVERS

Since 2011, stationary acoustic receivers (VEMCO model VR2W) have been used to continuously monitor tagged adult Lake Sturgeon in the Nelson River between Clark Lake and the Long Spruce GS. In spring 2016, the receiver array was extended to the upper Limestone reservoir, with the placement of two receivers downstream of the Long Spruce GS. The intent of adding these

receivers was to determine whether fish that had moved into the Long Spruce reservoir had continued to move downstream.

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

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

3.1.2.1 WINTER 2020/2021

The stationary acoustic receiver array for the winter 2020/2021 (September 24, 2020, to April 30, 2021) period consisted of 28 receivers. Although additional receivers were not set until May, the end of the winter period is defined as April 30 to provide consistency between years. Ten were set upstream of the Keeyask GS, 17 throughout Stephens Lake, and one in the Long Spruce forebay (Maps 3 and 4). Forebay impoundment in fall 2020 allowed for additional receivers to be set in the reservoir, due to the increase in deep off-current areas. An additional five receivers were set including one in the riverine portion of the reservoir between Birthday Rapids and Gull Lake (#114230; rkm -26.4), one at the inlet of Gull Lake (#122779; rkm -19.5), one at the mouth of the flooded backbay at Rabbit Creek (#114226; rkm -17.4), one north of Caribou Island (#129182; rkm -7.9), and one immediately upstream of the powerhouse (#127100; rkm -2.2). One additional receiver was set in Stephens Lake, closer to the GS (#125557; rkm 3.9).

3.1.2.2 OPEN-WATER 2021

An array of 64 acoustic receivers was used during the 2021 open-water period (defined as May 1 to October 10, 2021). Although additional receivers were not set until later in May, the start of the open-water period is defined as May 1 to provide consistency between years. Thirty-one were set both upstream of the Keeyask GS and in Stephens Lake (Maps 5 and 6). The 2021 open-water array differed slightly from the array used in 2020. Three additional receivers were set upstream of the GS: one in the reservoir upstream of Gull Lake (#114235; rkm -22.6), one south of Caribou Island (#114232; rkm -7.7), and one upstream of the Keeyask GS spillway (#129192; rkm -2.5) (Map 5).

Water levels downstream of the Keeyask GS in spring and summer 2021 were lower than in previous years, preventing access to the receiver set downstream of the Kettle GS. Several attempts were made to access the site throughout the open-water period. A boat was successfully launched downstream of the Kettle GS in October 2021, however, the single receiver set during winter 2020/2021 could not be retrieved. Two receivers were set downstream of the Long Spruce GS for the duration of the 2021 open-water period (Map 7).

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

Four gates were established between Clark Lake and the Keeyask GS (44.0, 34.0, 20.0, and 9.0 rkms upstream of the GS), and two were established in Stephens Lake (4.5 and 40.0 rkms downstream of the GS) (Maps 5 and 6). The location of the “gates” has remained consistent since 2013.

To describe fish movements for reporting purposes, the study area was divided into nine different zones. The area upstream of the Keeyask GS was divided into five zones (Map 5; Zones 1–5), while Stephens Lake was divided into two zones (Map 6; Zones 6 and 7). The Long Spruce reservoir is referred to as Zone 8 and the Limestone reservoir as Zone 9.

Water temperature within the Nelson River mainstem was recorded with a HOBO Water Temperature Pro data logger from September 24, 2020, to October 3, 2021. Lake Sturgeon generally spawn in the spring when water temperature ranges from 8–13°C (KHLP 2014). Thus, data collected during this temperature range was considered as “spawning period”.

By October 11, 2021, the majority of receivers were removed, and a subset ($n = 27$) were redeployed to monitor movements during winter 2021/2022.

3.1.3 DATA ANALYSIS

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

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

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

3.1.3.1 MAXIMUM LIKELIHOOD APPROACH

A maximum likelihood approach was used to compare pre- and post-construction movements, both between river zones and through Gull Rapids (now the Keeyask GS), Kettle GS, and Long Spruce GS. This method is broadly applicable and simple to apply.

A standard binomial coefficient was used to assess the probability of movement estimators.

$$f(y|N, p) = \binom{N}{n} p^y (1 - p)^{(N-y)}$$

Where:

$$\binom{N}{n} = \frac{N!}{n! (N - n)!}$$

A simple example is the chance of observing 5 heads in 20 coin tosses, if $p = 0.50$, would be:

$$f(5|20, 0.5) = \binom{20}{5} 0.5^5 (1 - 0.5)^{(20-5)} = 0.0148$$

For any observed set of results, the binomial coefficient is constant so we can ignore it when evaluating p . The values of p were evaluated using the maximum likelihood approach given the observed data for the following:

- Movement or no movement between zones;
- Upstream movement from zone to zone;

- Downstream movement from zone to zone; and
- Movement past barriers.

4.0 RESULTS

Section 4.1 provides a summary of movements observed for all fish tagged since inception of the study in June 2011 to the end of the 2021 open-water period (October 10, 2021). Numbers of fish tagged upstream of the Keeyask GS and in Stephens Lake, by year, are provided in Table 1. Tables 2 and 3 provide acoustic tag and biological information associated with each tagged fish. Table 4 summarizes the proportional distribution of tagged fish upstream and downstream of the construction site (2013–2021). Table 5 summarizes all movements through Gull Rapids or the Keeyask GS by fish tagged during the current (2011–2020) and previous (2001–2004) telemetry studies. Figure 3 provides water temperatures measured in the Nelson River mainstem from September 23, 2020, to October 3, 2021. Figures 4 to 8 illustrate detection locations and proportional distribution of tagged fish both upstream and downstream of the Keeyask GS by season. Appendix A1 provides farthest upstream and downstream detection locations by river kilometre for each tagged fish (2011–2020) while Appendices A2 to A4 provide movement summaries, by river kilometre, for each tagged sturgeon since the study began in June 2011. Appendices A6 and A7 illustrate movement ranges and detection distributions of fish tagged upstream and downstream of the GS during each open-water season since 2011.

4.1 2011–2021 RESULTS SUMMARY

4.1.1 UPSTREAM OF THE KEEYASK GS

Thirty-one fish were tagged upstream of Gull Rapids (now referred to as the Keeyask GS) in 2011 and 2012, and four additional transmitters were applied in June 2014 (Table 1). One additional female used as broodstock was tagged in 2018. An additional 26 tags were applied in spring 2019 to replace the tags originally applied in 2011/2012 that were estimated to expire in spring, 2021. Tagging date, biological information, and tag status is outlined in Table 2.

Twelve fish are considered missing (*i.e.*, have not been detected for more than a year) due to a lack of detections. Due to the time since tagging, it is likely that these tags have now expired.

- #16042 was tagged at the outlet of Clark Lake on June 5, 2011. It was detected regularly within Clark Lake until August 8, 2014 and has not been detected since (Appendix A2-4).
- #16045 has not been detected since August 18, 2011. It moved downstream immediately after being tagged in Gull Lake on June 10, 2011 and displayed few upstream movements (Appendix A2-5).
- #16057 was tagged in Gull Lake on June 16, 2011. It remained in this area until June 17, 2014, when it moved upstream through Birthday Rapids into Clark Lake and has not been detected since (Appendix A2-11).

- #16058 was tagged in Gull Lake on June 9, 2011. It was last detected in Clark Lake on October 6, 2019 (Appendix A2-12).
- #16061 was tagged in Gull Lake on June 21, 2011. It was last detected in the middle of Gull Lake at rkm -12.4 on November 4, 2019 (Appendix A2-15).
- #16063 was tagged in Gull Lake on June 11, 2011. It was last detected in Clark Lake on July 2, 2019 (Appendix A2-17).
- #16064 was tagged downstream of Birthday Rapids on June 12, 2011 (Appendix A2-18). It moved downstream into Gull Lake, where it was detected until June 21, 2012. It was next detected briefly in Gull Lake on two days in June and July 2016.
- #16070 was tagged in Gull Lake on June 16, 2011. It was last detected in the middle of Gull Lake at rkm -12.4 on December 13, 2019 (Appendix A2-24).
- #16072 was tagged in Gull Lake on June 21, 2011. It was last detected at the inlet of Gull Lake at rkm -19.5 on July 8, 2020 (Appendix A2-26).
- #16074 was tagged downstream of Birthday Rapids on June 13, 2011. It was last detected at the inlet of Gull Lake at rkm -19.5 on July 19, 2020 (Appendix A2-28).
- #16075 was tagged in Gull Lake on June 10, 2011. It was last detected in lower Gull Lake at rkm -4.8 on September 20, 2020 (Appendix A2-29).
- #16077 was tagged at the inlet of Gull Lake on June 10, 2011. It moved downstream immediately after tagging and was last detected in Gull Lake on June 21, 2011 (Appendix A2-31).

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

None of the four fish tagged in 2014 were detected during the winter 2021/2021 or open-water 2021 study periods. Although these transmitters were not estimated to expire until 2024, it is likely that the transmitters expired early. These include fish #32174, #32175, #32176, and #32177. These four fish are not discussed in the remainder of this report.

Tagging Date, date of last detection, and subsequent recaptures for fish with expired tags are outlined in Appendix A8-1. Three fish (#16061, #16067, and #16070) have been recaptured since their last detection date.

Prior to winter 2019/2020, six fish had moved upstream from Stephens Lake into Gull Lake, two of which returned to Stephens Lake during the 2014 open-water period:

- #16025 was tagged in Stephens Lake on June 16, 2012 and moved upstream through Gull Rapids on August 22, 2012. This fish subsequently moved back downstream into Stephens Lake, where it was first located on June 18, 2014. In August 2014, this fish moved downstream through the Kettle GS (Appendix A3-7).
 - This fish is now considered missing and is not discussed in the remainder of the report.

- #16029 was tagged in Stephens Lake on June 21, 2011 and moved upstream through Gull Rapids between July 29 and August 2, 2011. This fish has remained in Gull Lake since making this movement (Appendix A3-10).
- #16033 was tagged in Stephens Lake on June 18, 2011 and moved upstream through Gull Rapids on July 28, 2012. However, shortly after it was captured by a local resource user and the tag was returned and reapplied to another fish in Stephens Lake in 2013.
- #16037 was tagged in Stephens Lake on June 8, 2011 and moved upstream through Gull Rapids between September 3 and 6, 2013. It then moved downstream and was detected in Stephens Lake on July 1, 2014 (Appendix A3-17). Since 2014 this fish has remained in Stephens Lake.
- #16038 was tagged in Stephens Lake on June 12, 2011 and moved upstream through Gull Rapids on September 13, 2012. It continues to be detected in Gull Lake (Appendix A3-18).
- #16046 was tagged in Stephens Lake on June 11, 2011 and moved upstream through Gull Rapids between June 27 and July 4, 2012. This fish was detected in Gull Lake until 2013 but has not been located since (Appendix A3-23).
 - This fish is now considered missing and is not discussed in the remainder of the report.

Three fish have moved downstream through Gull Rapids into Stephens Lake:

- #16048 was tagged in Gull Lake on June 7, 2011. It moved upstream into Clark Lake in 2013, where it remained for over one year before moving downstream through Gull Rapids on June 28, 2015. It has remained in Stephens Lake since 2015 (Appendix A2-6).
- #16060 was tagged in Gull Lake on June 21, 2011. It was detected exclusively within the upper basin of Gull Lake between 2011 and 2016. It moved downstream through Gull Rapids and was detected in Stephens Lake on July 2, 2016. It has remained in Stephens Lake since 2016 (Appendix A2-14).
 - It was last detected in upper Stephens Lake at rkm 2.7 on August 3, 2020. It is now considered missing (tag is expired) and is not discussed in the remainder of the report.
- #16076 was tagged in Gull Lake on June 6, 2011. It moved downstream through Gull Rapids between June 6 and 9, 2017. It has remained in Stephens Lake since 2017 (Appendix A2-30).

One fish (#16067) was captured by a local resource user on June 16, 2020 and the tag was returned to NSC in September 2020. It was expired when returned.

In summary, 62 adult Lake Sturgeon were tagged upstream of the Keeyask GS between 2011 and 2019. Sixteen tags have expired, six moved upstream from Stephens Lake, three fish moved downstream into Stephens Lake, and one fish was harvested. Of the six that moved upstream into Gull Lake, two returned to Stephens Lake, one was harvested, and one is considered missing. Therefore, a total of 44 tagged sturgeon were available to be detected upstream of the Keeyask GS during winter 2020/2021.

4.1.2 STEPHENS LAKE

Twenty-eight fish were originally tagged in Stephens Lake in 2011 and 2012. Additional tags were applied in 2013 (n = 1) and 2014 (n = 7) (Table 1). An additional 25 tags were applied in spring 2019 to replace the tags originally applied in 2011 that will expire in spring, 2021. Tagging date, biological information, and tag status is outlined in Table 3.

Seven tags are considered missing due to a lack of detections. Due to the time since tagging, it is likely that these tags have expired.

- #16018 moved downstream immediately after being tagged on June 13, 2012. It was last detected on July 2, 2012, immediately upstream of Kettle GS (Appendix A3-1).
- #16024 moved downstream immediately after being tagged on June 13, 2012. It was last detected in Stephens Lake on June 25, 2012 (Appendix A3-6).
- #16032 was tagged on June 11, 2011. It was last detected in upper Stephens Lake at rkm 7.9 on January 21, 2019 (Appendix A3-13).
- #16043 was tagged on June 10, 2011. It was last detected on August 2, 2020 in upper Stephens Lake immediately downstream of the Keeyask GS spillway (Appendix A3-21).
- #16044 moved downstream immediately after being tagged on June 9, 2011. It subsequently moved back upstream and was last detected in upper Stephens Lake on September 17, 2012 (Appendix A3-22).
- #16047 moved downstream immediately after being tagged on June 26, 2011. It was last detected in Stephens Lake on June 28, 2011 (Appendix A3-24).
- #16049 was tagged on September 24, 2011. It was last detected in lower Stephens Lake at rkm 18.6 on June 25, 2020 (Appendix A3-25).

These seven fish are not discussed in the remainder of the report.

None of the seven fish tagged in 2014 were detected during the winter 2021/2021 or open-water 2021 study periods. Although these transmitters were not estimated to expire until 2024, it is likely that the transmitters expired early. These include fish #32167, #32168, #32169, #32170, #32171, #32172, and #32173. These seven fish are not discussed in the remainder of this report.

Tagging Date, date of last detection, and subsequent recaptures for fish with expired tags are outlined in Appendix A8-2. Two fish (#16043 and #32170) have been recaptured since their last detection date.

Four fish are known to have moved downstream out of Stephens Lake through the Kettle GS into the Long Spruce reservoir. All four fish are considered missing (*i.e.*, have not been detected for over a year) and are not discussed in the remainder of the report.

- #16021 was tagged in Stephens Lake on September 28, 2011 and moved downstream through the Kettle GS on September 16, 2012. As the Kettle GS spillway was open on this day, it is unknown whether the Lake Sturgeon moved through the spillway or passed through a turbine. It was last detected in the Long Spruce reservoir on September 18, 2012. It was subsequently detected in the Limestone reservoir between August 1 and September 5, 2016 (Appendix A3-4).
- #16025 was tagged in Stephens Lake on June 15, 2012. It moved upstream into Gull Lake in 2012 but returned to Stephens Lake in 2014 (Section 4.1.1). This fish subsequently moved downstream through Kettle GS between June and July, 2014. The Kettle GS spillway was open during June and July 2014, so it is not possible to determine if the fish moved through either the turbines or spillway. It was last detected in the Long Spruce reservoir on July 14, 2014 (Appendix A3-7).
- #16034 was tagged in Stephens Lake on June 18, 2011, and moved downstream through the Kettle GS between October 9, 2012, and June 10, 2013. This fish must have passed downstream through one of the Kettle GS turbines as the spillway was closed between October 2012 and June 2013. It was detected in the Long Spruce reservoir in open-water 2015. It passed through the Long Spruce GS between July 6 and 30, 2016, therefore, it is not possible to determine if the fish moved through either the turbines or spillway. It was last detected within the Limestone reservoir between July 30, 2016 and June 19, 2017 (Appendix A3-15).
- #16035 was tagged in Stephens Lake on September 2011 and was last detected in Stephens Lake on June 2, 2018, immediately upstream of the Kettle GS. It was subsequently detected in the Long Spruce reservoir from June 15 to August 8, 2018 (Appendix A3-16). Because of the timing of this downstream movement, it is not possible to determine if the fish moved through either the turbines or spillway.

Six fish have moved upstream out of Stephens Lake into Gull Lake (as discussed in Section 4.1.1); however, one of these fish (#16033) was captured by a local resource user and the tag was reapplied to a fish in Stephens Lake (#16033b). Two (#16025 and #16037) returned to Stephens Lake in 2014; however, #16025 moved downstream through the Kettle GS into the Long Spruce reservoir (discussed above). An additional two fish (#16048 and #16076) initially tagged in Gull Lake moved downstream through Gull Rapids into Stephens Lake and are still available to be detected (Section 4.1.1).

To summarize, 61 adult Lake Sturgeon were tagged in Stephens Lake between 2011 and 2019. Seven are considered missing, seven tags have expired, four moved downstream through the Kettle GS, four moved upstream into Gull Lake and did not return to Stephens Lake (including one fish that was harvested), and two moved downstream from Gull Lake. Therefore, 41 fish were available to be detected in Stephens Lake during winter 2020/2021.

4.2 WINTER 2020/2021

4.2.1 UPSTREAM OF THE KEEYASK GS

All ten receivers deployed between Clark Lake and the Keeyask GS during the 2020/2021 winter period were retrieved (Figure 1). Forty-one of the 44 adult Lake Sturgeon (93%) were located a total of 683,840 times (range: 100–58,458 detections per individual) (Appendix A1-1). Fish were detected on six to 218 days of the 219-day winter period (3–100% of the time) for an average of 126 days, or for 58% of the study period (standard deviation [StDev] = 61 days). The farthest upstream detections occurred at rkm -29.3 (by two fish; 5%), while the farthest downstream occurred at rkm -2.2 (by one fish; 2%) (Appendix A1-1). The average movement range was 3.9 rkm (range 0.0–21.4 rkm).

The majority of detections were logged by receivers located in the middle basin of Gull Lake at rkm -12.4 and -10.4 ($n = 511,859$; 75%; Figure 4). A large number of detections were also logged in the lower portion of the reservoir north of Caribou Island (rkm -7.9; $n = 123,065$; 18%). Movements were as follows:

- Thirty-seven fish (90% of all fish detected) remained within the Gull Lake portion of the reservoir, moving no farther upstream than rkm -19.5 and no farther downstream than rkm -2.2.
- Three (7%) remained within the riverine portion of the reservoir between Birthday Rapids and Gull Lake.
- One (2%) moved between both portions of the reservoir, and was detected as far upstream as rkm -29.3 (downstream of Birthday Rapids) and as far downstream as lower Gull Lake (rkm -7.9).

Individual movement graphs can be found in Appendix 2.

4.2.2 STEPHENS LAKE

All of the 17 receivers deployed in Stephens Lake during the 2020/2021 winter period were retrieved. All forty-one fish were located for a total of 1,238,019 detections (range: 98–69,934 detections per individual) (Appendix A1-2). On average, fish were detected for 156 days of the

219-day winter period (71%) (range: 2–219 days). The farthest upstream detections occurred at rkm 3.9 (by 31 fish; 76%), while the farthest downstream occurred at rkm 18.8 (by four fish; 10%). The average movement range was 6.5 rkm (range 0.0–14.9 rkm) (Appendix A1-2).

The majority of detections were logged by receivers located in the southern portion of Stephens Lake between rkm 3.3 and 13.4 ($n = 1,235,850$; 99.8%; Figure 5). Movements were as follows:

- Twenty-five fish (61% of all fish detected) were detected exclusively in the upstream portion of Stephens Lake, moving no farther downstream than rkm 10.2.
- Sixteen moved between the upstream and downstream portions of Stephens Lake.
 - Eight (20%) moved as far downstream as rkm 13.4.
 - Three (7%) moved as far downstream as rkm 16.1.
 - Five (12%) moved as far downstream as rkm 18.8.

Individual movement graphs can be found in Appendix 3.

4.3 OPEN-WATER 2021

All stationary acoustic receivers deployed upstream of the Keeyask GS ($n = 31$), in Stephens Lake ($n = 31$), and the Limestone reservoir ($n = 2$) during the 2021 open-water period were successfully retrieved (Maps 5 and 6).

Water temperature, as measured in the Nelson River mainstem, reached 8°C on June 2, 2021, and increased to 13°C by June 16 (Figure 3). Based on these water temperatures, the time between June 2 and 16 is referred to as the spawning period.

4.3.1 UPSTREAM OF THE KEEYASK GS

Forty-four adult Lake Sturgeon were available to be detected upstream of the Keeyask GS during the 2021 open-water period (Section 4.1.1). Forty-one (93%) were detected between 151 and 27,824 times for 4–150 days of the 162-day open-water period (2–93% of the time). The average total movement range was 30.4 rkm (StDev = 18.6 rkm; range: 2.1–73.1 rkm) (Appendix A1-3). The farthest upstream detections occurred at the inlet of Clark Lake at rkm -48.2 (by 11 fish; 27%). Thirteen fish moved downstream through the Keeyask GS, all of which were tagged in 2019 (discussed further in Section 4.3.1.2). Not including these fish, the farthest downstream detections occurred in lower Gull Lake at the receiver closest to the powerhouse at rkm -2.2 (by nine fish; 22%).

Of the three fish that were not detected:

- #16065 was tagged on June 12, 2011 immediately downstream of Birthday Rapids. It was last detected in Gull Lake at rkm -12.4 on January 18, 2021 (Appendix A2-19). Based on the time since tagging, it is likely that this tag has expired (Appendix 8).

- #16073 was tagged on June 12, 2011 in lower Gull Lake. It was last detected in Gull Lake at rkm -10.1 on October 3, 2020 (Appendix A2-27). Based on the time since tagging, it is likely that this tag has expired (Appendix 8).
- #7033 was tagged on June 5, 2019 in lower Gull Lake. It was last detected at the inlet to Clark Lake (rkm -48.2) on July 21, 2020 (Appendix A4-17). It is likely that this fish moved upstream out of the study area.

Four fish (#7022, #7065, #16061 [expired transmitter], and #16070 [expired transmitter]) were captured during adult Lake Sturgeon population monitoring conducted from May 28 and July 4, 2021. Capture details can be found in Loeppky et al. (2022).

Following reservoir impoundment in fall 2020, Lake Sturgeon continued to make distinct movements to spawning areas at Birthday Rapids and a small set of rapids at the inlet to Gull Lake during the spawning period in 2021. Sixteen fish (39%) made a distinct movement to a set of rapids during the spawning period (June 2 to 16, 2021).

- Twelve fish moved to Birthday Rapids.
 - #7022 was captured here during gillnetting studies (described in Loeppky et al. 2022) and was identified as a ripe spawning male.
- Four fish moved to the small set of rapids at the inlet to Gull Lake (rkm -19.5).

4.3.1.1 PROPORTIONAL DISTRIBUTION

Individual adult Lake Sturgeon that remained upstream of the Keeyask GS (not including the 13 fish that moved downstream through the GS) spent a larger proportion of the open-water period in 2021 in Clark Lake (Zone 1) and the area between Birthday Rapids and Gull Lake (Zone 3) than in previous years (Table 4; Figure 6). The proportion of time spent in each zone was as follows:

- Zone 1 for 19% of the time (StDev = 32%; range: 0–92%);
- Zone 2 for 0.7% of the time (StDev = 1%; range: 0–4%);
- Zone 3 for 14% of the time (StDev = 25%; range: 0–100%);
- Zone 4 for 37% of the time (StDev = 35%; range: 0–99%); and
- Zone 5 for 29% of the time (StDev = 37%; range: 0–99%).

4.3.1.2 MOVEMENT PATTERNS

During the 2021 open-water period, most detections were logged at the inlet (rkms -19.4 and -19.5; $n = 53,879$; 22%) and middle portion (rkms -12.5 and -10.1; $n = 54,308$; 22%) of Gull Lake (Figure 7). However, detections were logged at all receivers set upstream of the GS during the 2021 open-water period. In contrast to the habitual movement patterns shown in previous years,

individual Lake Sturgeon generally moved farther distances. In 2021, 26 of the 41 (63%) detected fish displayed different movements than in previous years, generally moving greater distances.

Fifteen fish continued to display the same general movement patterns observed in previous years:

- Six (#16036, #16038, #16039, #16051, #16055, and #16056) remained exclusively in Gull Lake, travelling as far upstream as the inlet to the lake (rkm -19.5) and as far downstream as the most northerly receiver (rkm -7.9).
- Three (#16029, #16062, and #54799) spent most of the open-water period in the upper portion of Gull Lake, but made an upstream movement into the lower riverine area (rkm -22.6) between Birthday Rapids and the Gull Lake inlet. Both fish displayed similar movements in previous years.
- Four spent the majority of the open-water period in Gull Lake, but briefly moved upstream to Birthday Rapids during the spawning period.
 - Three (#16059, #16066, and #16071) had not moved upstream to Birthday Rapids in previous years but displayed similar patterns during the remainder of the open-water period.
 - #16068 previously moved to Birthday Rapids in the spawning periods of 2013 and 2019.
- One (#16054) moved downstream from Clark Lake to Birthday Rapids during the spawning period. It has travelled regularly between these two areas since 2014.
- One (#16069) continued to remain in the riverine area between Birthday Rapids and Gull Lake.

Eleven moved more extensively than in previous years, throughout the Keeyask reservoir:

- Five (#7018, #7029, #7059, #7064, and #7067) moved between all five Zones upstream of the Keeyask GS, as far upstream as Clark Lake (rkm -48.2) and as far downstream as the area immediately upstream of the Keeyask GS spillway (rkm -2.2). All five moved briefly into Clark Lake but returned to the reservoir prior to the end of the open-water period.
 - Five moved briefly into Clark Lake but returned to the reservoir prior to the end of the open-water period.
- Six (#7019, #7023, #7032, #7056, #7065, and #16026) moved between the riverine area between Birthday Rapids and Gull Lake.

Two moved upstream out of the reservoir into Clark Lake. Based on the location of last detection, it is likely that both fish moved upstream past the receiver array:

- #7022 moved upstream into Clark Lake immediately following reservoir impoundment in 2020. It returned to the area downstream of Birthday Rapids during the spawning

period in 2021 before moving into Gull Lake. It returned to Clark Lake by the end of July.

- #7053 was detected within upper Gull Lake until June 15, 2021. It moved upstream and was last detected in Clark Lake on June 23, 2021.

Thirteen fish moved downstream through the Keeyask GS to Stephens Lake. All 13 fish displayed upstream and downstream movements within Stephens Lake, indicating they survived passage:

- Three (#7020, #7024, and #7034) moved upstream out of the reservoir into Clark Lake in June. All three fish returned downstream in July and were last detected immediately upstream of the Keeyask GS (rkm -2.5 and -2.2) between July 2 and 16.
 - All fish were next detected in Stephens Lake immediately downstream of the spillway (rkm 0.8) in July (#7034) or September (#7020 and #7024).
- Three (#7021, #7026, and #7066) made single upstream movements to Birthday Rapids during the spawning period, followed by a single downstream movement.
 - #7021 and #7066 moved from Birthday Rapids directly downstream and were last detected in the reservoir at the end of June.
 - #7021 was located downstream of the spillway (rkm 0.8) on June 23.
 - #7066 was not located in Stephens Lake (rkm 0.8) until September 13.
 - #7026 returned to Gull Lake after the spawning period. It remained here until August 5, when it was last detected immediately upstream of the spillway. It was detected downstream of the spillway on August 30.
- Three (#7028, #7030, and #7061) moved into the riverine portion of the reservoir between Birthday Rapids and Gull Lake during the spawning period. Each then moved downstream between June 17 and 23, when they were last detected upstream of the Keeyask GS.
 - #7028 was detected downstream of the spillway on September 16.
 - #7030 was detected downstream of the powerhouse (rkm 1.2) on July 18.
 - #7061 was detected farther downstream in Stephens Lake (rkm 2.7) on June 23.
- One (#7017) made extensive movements throughout the reservoir, moving between lower Gull Lake and Birthday Rapids several times between May 21 and August 10, 2021. It was last detected in lower Gull Lake on August 10. It was first detected downstream of the spillway on September 16.
- Three (#7027, #7025, and #7031) remained within Gull Lake and did not show extensive movements prior to moving downstream. Each were last detected in the lower portion of the reservoir in mid-June.
 - #7027 was detected downstream of the spillway on June 27.
 - #7030 was detected downstream of the spillway on September 12.

- #7061 was detected farther downstream in Stephens Lake (rkm 2.7) on June 14. Individual movement graphs can be found in Appendix 2.

4.3.2 STEPHENS LAKE

Forty-one adult Lake Sturgeon were available to be detected in Stephens Lake during the 2021 open-water period (Section 4.1.2). Thirty-nine fish (95%) were detected between 1,296 and 27,580 times over 15–135 days of the 162-day open-water period (9–83% of the time; Appendix A1-4). Mean movement range was 18.5 rkm (StDev = 6.9 rkm; range: 6.0–40.1 rkm) (Appendix A1-4). The farthest upstream detections occurred immediately downstream of the Keeyask GS spillway at rkm 0.8 (by 36 fish; 92%), while the farthest downstream detections occurred at the receiver slightly upstream from the Kettle GS at rkm 40.9 (by one fish; 3%).

Two fish last located during winter 2020/2021 were not detected in the open-water period. Based on the time since tagging, it is likely that both tags have expired.

- #16040 was tagged on June 9, 2011 in upper Stephens Lake. It was last detected in upper Stephens Lake at rkm 7.8 on April 26, 2021 (Appendix A3-19).
- #16048 was tagged on June 7, 2011 immediately downstream of Birthday Rapids. It moved downstream into Stephens Lake in 2015. It was last detected in upper Stephens Lake at rkm 5.4 on September 25, 2020 (Appendix A2-6)

One fish (#16043 [expired transmitter]) was captured during adult Lake Sturgeon population monitoring conducted from May 28 and July 4, 2021. Capture details can be found in Loeppky et al. (2022).

4.3.2.1 PROPORTIONAL DISTRIBUTION

In previous study years, fish have spent near equal proportions of time in both zones in Stephens Lake. In 2021, fish in Stephens Lake (not including the 13 that moved downstream from the Keeyask reservoir) continued to use both zones nearly equally. Fish spent 51% of the study period in Zone 6 closer to the GS (StDev = 25%; range: 5–97%), and 49% (StDev = 25%; range: 3–95%) of the time in Zone 7, farther from the GS (Table 4; Figure 6).

4.3.2.2 MOVEMENT PATTERNS

As observed in the last four years (2017–2020), most detections ($n = 467,596$; 94%) were logged by receivers located in the southern portion of Stephens Lake between rkms 0.8 and 13.4 during the 2021 open-water period (Figure 8).

All 39 fish used the area directly downstream of the Keeyask GS (rkms 0.8 to 3.9), but only eight fish (#16030, #16037, #16041, #16050, #16076, #7035, #7040, and #7060; 21%) remained within upper Stephens Lake (rkms 0.8 to 13.9) for the entire 2021 open-water period. The remaining 31 fish (79%) made regular upstream and downstream movements (closer and farther from the GS).

- Twenty moved as far downstream as rkm 18.8, remaining in the southern portion of Stephens Lake (rkms 0.8 to 18.8).
- Eight moved as far downstream as rkm 24.9.
 - Six (#16052, #7038, #7046, #7054, #7055, and #7057) were previously detected farther upstream in Stephens Lake, moving only as far downstream as rkms 9.4 to 18.8.
- Three travelled to the eastern boundary of Stephens Lake, upstream of the Kettle GS:
 - #16020 was detected at rkm 32.0 from June 8–10, 2021. This fish made similar movements in both 2018 and 2019.
 - #7043 moved between upper (rkm 0.8) and lower (rkm 24.9) Stephens Lake during the entire open-water period. It was briefly detected upstream of the Kettle GS (rkm 40.9) on September 20 but returned upstream for the remainder of the open-water period.
 - #7049 moved throughout Stephens Lake (rkm 0.8 to 24.9) for the entire open-water period and was detected briefly as far downstream as rkm 32.0.

During the spawning period (June 2 to 16, 2021), 28 fish (72%) were detected downstream of the Keeyask GS between rkms 0.8 to 1.3.

Individual movement graphs can be found in Appendix 3.

4.3.3 LONG SPRUCE AND LIMESTONE RESERVOIRS

Due to low water levels that prevented boat access downstream of the Kettle GS throughout the majority of the open-water period, no acoustic receivers were set in the Long Spruce reservoir. No adult Lake Sturgeon were detected within the Limestone reservoir in 2021.

4.4 ADULT LAKE STURGEON DISTRIBUTION

Proportional distributions of fish detected consistently during the open-water period since 2013 ($n = 97$) were compared, and the likelihood of fish movements between zones before construction, during construction, and after reservoir impoundment were calculated (Figures 9, 10, and 11). The overall likelihood of a movement (either upstream or downstream) between zones was 12% prior to construction, 14% during construction, and 18% after reservoir impoundment (Figure 9). The likelihood of a fish moving upstream from one zone to another was 43% prior to the onset of construction, 45% during construction, and 36% after impoundment (Figure 10). The likelihood of a fish moving downstream from one zone to another was 57% before construction, 55% during construction, and 64% after impoundment (Figure 11).

4.5 MOVEMENTS THROUGH BARRIERS

Prior to 2021, 12 movements through Gull Rapids/the Keeyask GS occurred since studies began in 2011: six upstream, and six downstream (Table 5; figures 13 and 14).

- Four (#16029, #16033, #16038, and #16046) tagged in Stephens Lake moved upstream and remained upstream in Gull Lake.
- Four (#16048, #16060, #16076, and #32174) tagged in Gull Lake moved downstream into Stephens Lake and remained in Stephens Lake.
- Two (#16025 and #16037) tagged in Stephens Lake moved upstream into Gull Lake and then returned to Stephens Lake.

Four downstream movements through Gull Rapids (#16060, #16048, #16076, and #32174) occurred following the start of Keeyask GS construction. Upstream movements through Gull Rapids have not been observed since 2013 and, since spillway commissioning in 2018, are no longer possible.

Additionally, four (#16021, #16025, #16034, and #16035) moved downstream through the Kettle GS. Two of these (#16021 and #16034) have since moved downstream through the Long Spruce GS.

Following impoundment of the Keeyask GS reservoir in fall 2020, 13 Lake Sturgeon moved downstream through the Keeyask GS into Stephens Lake, a large increase over all previous years (described in Section 4.3.1.2). All movements occurred between June and September 2021.

The likelihood of a fish moving through Gull Rapids (now the Keeyask GS), Kettle GS, or the Long Spruce GS was calculated for the pre-construction (2011–2014), during construction (2014–2020), and post-impoundment (2020–2021) study periods. Prior to construction, there was a 2% chance that a fish would move past the rapids or a generating station, compared to a 1% chance after the onset of construction. Post-impoundment, this increased to a 10% chance (Figure 12).

5.0 DISCUSSION

Adult Lake Sturgeon movement monitoring was initiated in 2011 to describe movements during the pre-construction (2011–2013), construction/commissioning (2014–2021), and operation (2022 onward) phases of the Keeyask Project. The intent of the study was to determine if habitat changes associated with construction and operation of the GS would alter habitat use and coarse-scale movement patterns. The discussion below highlights movement patterns that have been observed and discusses the key questions (presented in the AEMP) with respect to potential impacts of construction and impoundment on Lake Sturgeon and their movements.

5.1 EVALUATION OF METHODOLOGY

Acoustic telemetry continues to be an effective method for monitoring movements and habitat use patterns of adult Lake Sturgeon in the study area. During the 2021 open-water period, the majority of tagged fish remaining in the study area were located. Upstream of the Keeyask GS fish were detected for 34% of the 2021 open-water period (22–63% in previous years) and downstream in Stephens Lake fish were detected for 52% of the 2021 open-water period (34–77% in previous years). Impoundment of the reservoir did not appear to have a notable effect on the distribution of sturgeon in the main channel, such that there were still sturgeon detected by receivers. As a result of the frequency of detection in both Gull and Stephens lakes, a good understanding of coarse scale movement and habitat use patterns during the open-water period has been established.

Prior to reservoir impoundment in 2020, tracking during the winter period was limited by ice conditions which prevented use of a large receiver array, and only four receivers were set upstream of the Keeyask GS. However, forebay impoundment in fall 2020 increased suitable locations for receiver deployment, allowing for an additional six receivers to be set in the reservoir (i.e., due to the increase in deep off-current areas). During the 2020/2021 winter period, 93% of tagged Lake Sturgeon were detected for an average of 126 days (58% of the study period). This represents an increase from previous years when the average number of detection days were low (for example, 69% of fish tagged were detected for 30% of the winter 2019/2020 period). In Stephens Lake, receiver coverage has been more extensive since studies began in 2011 and, as a result, fish are detected more regularly (all 41 fish were detected for 71% of the 2020/2021 winter period).

5.2 KEY QUESTIONS

Impoundment of the Keeyask reservoir was completed on September 5, 2020 and sampling in the Keeyask reservoir in 2021 represented the first year that the reservoir was at full supply level. Monitoring in Stephens Lake, however, represented a transition between construction and operation as a considerable portion of the flow was still being passed through the spillway in spring and early summer when only a few units were in-service. Later in the summer and early

fall as additional units became operational all the entire flow of the river was going through the powerhouse. Due to Keeyask reservoir impoundment, several key questions identified in the AEMP that have not been previously discussed are addressed below.

Will disturbances associated with construction alter coarse-scale movements upstream and/or downstream of the construction site?

Instream construction activities related to the Keeyask GS concluded prior to open-water 2021. Adult Lake Sturgeon movement patterns changed little during the construction period. Upstream of Gull Rapids/the Keeyask GS, fish tended to display habitual movements, remaining in distinct portions of the study area: a) Clark Lake; b) the riverine portion of the Nelson River between Birthday Rapids and Gull Lake; and c) Gull Lake. Based on the maximum likelihood analysis comparing data before and during construction, the frequency of Lake Sturgeon movement between zones remained similar at 12% prior to and 14% during construction. Similarly, fish tagged in Stephens Lake displayed similar movement patterns during the course of construction. Lake Sturgeon tend to remain in the main river channel of Stephens Lake, specifically the part where the river channel was flooded when the Kettle GS was built. Some fish tend to remain in the upper portion of Stephens Lake, while others use both the upper and lower portions. As construction is now complete, this question is no longer relevant and will not be discussed going forward.

Are sturgeon using habitat in the immediate vicinity of the construction site?

As instream construction activities related to the Keeyask GS concluded prior to open-water 2021, this question is no longer relevant. Adult Lake Sturgeon continued to use the area upstream and downstream of the construction site throughout the construction period. Lake Sturgeon tagged upstream spent between 19 and 42% of each open-water period during construction in the river zone closest to the construction site. In Stephens Lake, Lake Sturgeon spent between 38 and 56% of the open water period in the zone closest to construction. Adult Lake Sturgeon tagged in Stephens Lake consistently spent more time closer to the Keeyask GS in spring, suggesting that spawning continued in this area during the construction phase of the Project. As construction is now complete, this question is no longer relevant and will not be discussed going forward.

Will the frequency of long-distance movements (and subsequent downstream emigration/entrainment) by Lake Sturgeon increase during construction and operation of the Project?

In all previous years since the study began (2011–2020), six fish have moved downstream through Gull Rapids: two before construction began in 2014, and four after (figures 13 and 14). Six fish have moved upstream through Gull Rapids, all prior to construction. The Keeyask GS spillway was commissioned in August 2018, after which upstream movement was no longer possible. The EIS predicted Lake Sturgeon may emigrate upstream or downstream away from the Keeyask reservoir in response to habitat disturbances associated with impoundment. The number of long-distance downstream movements through the Keeyask GS increased beginning in 2021. Thirteen fish moved downstream from the reservoir into Stephens Lake. Based on maximum likelihood estimates, the chance of an adult Lake Sturgeon moving out (upstream or

downstream) of the area upstream of the Keeyask GS or out of Stephens Lake was considerably lower prior to (1.5%) and during (1.0%) construction than in the year following impoundment (9.8%).

Based on the date of last detection in the reservoir and the first detections in Stephens Lake, the majority of confirmed downstream movements occurred in June and July ($n=6$). One fish moved downstream in August. The timing of entrainment for the remaining six fish is unclear, as there was a gap between the last upstream and first downstream detections. These fish were last detected in the reservoir in June but were not detected in Stephens Lake until September. Although 2021 was a low flow year, inflow from Split Lake and reservoir water levels remained relatively stable throughout June and July (Figure 15). Inflows decreased in August, however, the reservoir water level remained stable.

A similar increase in downstream movements was not observed from Floy-tag recaptures from the spring adult Lake Sturgeon population monitoring study (Loeppky and Hrenchuk 2022). However, gillnetting was conducted from May to the beginning of July, before the majority of movements occurred. A fish salvage conducted within a powerhouse draft tube in September 2021 resulted in the capture of 26 Lake Sturgeon, 13 of these were tagged, seven of which were originally tagged upstream of the GS (Schneider-Vieira and Hrenchuk 2021). One of these fish was confirmed to have moved downstream in 2021 based on the date of last capture.

It is possible that the emigration of Lake Sturgeon observed in 2021 was a singular event as fish adjusted to the new reservoir habitat. Continued monitoring will determine the long-term movement patterns.

In contrast, movements upstream out of the reservoir have not increased post-impoundment. Two fish (5%) moved upstream through Clark Lake in 2021. Before construction began, two of the tagged fish (7%) moved from Gull Lake through Clark Lake, while twelve fish (19%) moved during construction.

Are fish moving downstream past the GS and, if so, is there an indication that they have survived passage?

Thirteen adult Lake Sturgeon moved downstream past the GS in open-water 2021. All thirteen fish displayed upstream and downstream movements within Stephens Lake, indicating they survived passage. Given the size of the fish and trashracks upstream of the powerhouse, it is expected that they passed via the spillway and not the turbines. No fish continued to move downstream through the Kettle GS.

Will there be a change in the proportional distribution of adult Lake Sturgeon following reservoir creation (i.e., will there be a population level shift in distribution patterns following reservoir creation)?

During the first full open-water period after reservoir impoundment, Lake Sturgeon tagged upstream of the GS continued to spend the greatest amount of time in both basins of the Gull Lake portion of the reservoir. During the construction period (2014–2020), fish spent 44–66% of each open-water study period in Zone 4 and 19–42% of each open-water period in Zone 5 (the

upper and lower basins of Gull Lake). In 2021, the fish that remained upstream of the GS spent 37% of the time in Zone 4 and 29% of the time in Zone 5.

In Stephens Lake, Lake Sturgeon continued to spend nearly equal amounts of time in the two zones closer to and farther from the GS. During the construction period (2014–2020), Lake Sturgeon spent 38–56% of the time in Zone 6 (closer to the GS) and 45–62% of the time in Zone 7 (farther from the GS). In 2021, fish spent 51% of the time in Zone 6 and 49% of the time in Zone 7.

6.0 SUMMARY AND CONCLUSIONS

- Acoustic telemetry continues to be an effective method for monitoring adult Lake Sturgeon movement and habitat use. Movement monitoring is generally more effective during the open-water period relative to the winter period due to more locations where receivers can be effectively deployed. However, forebay impoundment in fall 2020 allowed for an additional six receivers to be set in the reservoir allowing for more detection coverage. Adult Lake Sturgeon were detected 58% of the 2020/2021 winter period and for 34% of the 2021 open-water period upstream of the GS 71% of the winter period and 52% of the open-water period in Stephens Lake.
- The key questions described in the AEMP for adult Lake Sturgeon movement monitoring during construction and post-impoundment periods were as follows:

- *Will disturbances associated with construction alter coarse-scale movements upstream and/or downstream of the construction site?*

Instream construction activities related to the Keeyask GS concluded prior to open-water 2021. Adult Lake Sturgeon movement patterns changed little during the construction period. As construction is now complete, this question is no longer relevant and will not be discussed going forward.

- *Are sturgeon using habitat in the immediate vicinity of the construction site?*

As instream construction activities related to the Keeyask GS concluded prior to open-water 2021, this question is no longer relevant. Adult Lake Sturgeon continued to use the area upstream and downstream of the construction site throughout the construction period. Adult Lake Sturgeon tagged in Stephens Lake consistently spent more time closer to the Keeyask GS in spring, suggesting that spawning continued in this area during the construction phase of the Project. As construction is now complete, this question is no longer relevant and will not be discussed going forward.

- *Will the frequency of long-distance movements (and subsequent downstream emigration/entrainment) by Lake Sturgeon increase during construction and operation of the Project?*

The number of long-distance downstream movements through the Keeyask GS increased in 2021. Prior to 2021, six adult Lake Sturgeon moved downstream through Gull Rapids/the Keeyask GS since studies began in 2011. Thirteen fish moved downstream through the Keeyask GS in 2021. The probability of an adult Lake Sturgeon moving out of the Keeyask reservoir or out of Stephens Lake was considerably lower prior to (1.5%) and during (1.0%) construction than post-impoundment (9.8%). The majority of confirmed downstream movements occurred in June and July (n=6). One fish moved downstream in August. The timing of entrainment for the remaining six fish is unclear, as there was a gap between the last upstream and first downstream

detection. These fish were last detected in the reservoir in June but were not detected in Stephens Lake until September.

In contrast, the number of movements upstream out of the reservoir have not increased post-impoundment. Two fish (5%) moved upstream through Clark Lake in 2021. Before construction began, two fish (7%) of tagged moved from Gull Lake through Clark Lake, while twelve fish (19%) moved during construction.

- *Are fish moving downstream past the GS and, if so, is there an indication that they have survived passage?*

Thirteen adult Lake Sturgeon moved downstream past the GS in open-water 2021. All thirteen fish continued to display upstream and downstream movements within Stephens Lake, indicating they survived passage. Based on the size of the fish, it is likely that all movements occurred through the spillway. No fish continued to move downstream through the Kettle GS.

- *Will there be a change in the proportional distribution of adult Lake Sturgeon following reservoir creation (i.e., will there be a population level shift in distribution patterns following reservoir creation)?*

During the first full open-water period after reservoir impoundment, Lake Sturgeon that remained upstream of the GS continued to spend the greatest amount of time in both basins of the Gull Lake portion of the reservoir. In Stephens Lake, Lake Sturgeon continued to spend nearly equal amounts of time in the two zones closer to and farther from the GS.

- Movements of Lake Sturgeon were monitored for the first full winter and open-water period after reservoir impoundment. An array of acoustic receivers was deployed at the end of the open-water period in 2021 to continue monitoring movements.
- Due to the large number of adult Lake Sturgeon that moved downstream through the Keeyask reservoir in 2021, it is recommended that additional transmitters be implanted into adult Lake Sturgeon in the Keeyask reservoir in spring 2022. The adult Lake Sturgeon population monitoring is scheduled to occur in the Upper Split Lake Area in spring 2022. It is recommended that population monitoring be repeated in the Keeyask reservoir and Stephens Lake in spring 2022 to identify if the number of movements was large enough to impact the overall population.

7.0 LITERATURE CITED

- Barth, C.C. and Mochnacz, N.J. 2004. Lake Sturgeon investigations in the Gull (Keeyask) Study Area, 2001. A report prepared for Manitoba Hydro by North/South Consultants Inc. xvi + 130 pp.
- Barth, C.C. 2005. Lake Sturgeon investigations in the Keeyask Study Area, 2002. A report prepared for Manitoba Hydro by North/South Consultants Inc. xii + 115 pp.
- Barth, C.C. and Murray, L. 2005. Lake Sturgeon investigations in the Keeyask Study Area, 2003. A report prepared for Manitoba Hydro by North/South Consultants Inc. xiv + 111 pp.
- Barth, C.C. and Ambrose, K.M. 2006. Lake Sturgeon investigations in the Keeyask Study Area, 2004. A report prepared for Manitoba Hydro by North/South Consultants Inc. x + 91 pp.
- Holm, J. and Hrenchuk, C.L. 2019. Adult Lake Sturgeon population monitoring in the future Keeyask reservoir and Stephens Lake, 2018. Keeyask Generation Project Aquatic Effects Monitoring Plan Report #AEMP-2019-05. A report prepared for Manitoba Hydro by North/South Consultants Inc., June 2019. xv + 100 pp.
- Hrenchuk, C.L. 2013. Adult Lake Sturgeon population monitoring in the Keeyask Study Area, 2012. Keeyask Generation Project Aquatic Effects Monitoring Plan Report #12-06. A report prepared for Manitoba Hydro by North/South Consultants Inc., June 2013. x + 62 pp.
- Hrenchuk, C.L. 2020. Juvenile Lake Sturgeon movement monitoring in the Nelson River between Clark Lake and the Limestone Generating Station, October 2018 to October 2019: Year 6 Construction. A Keeyask Generation Project Aquatic Effects Monitoring Plan report prepared for Manitoba Hydro by North/South Consultants Inc., Winnipeg, MB. 97 pp.
- Hrenchuk, C.L. 2021. Juvenile Lake Sturgeon movement monitoring in the Nelson River between Clark Lake and the Limestone Generating Station, October 2019 to September 2020: Year 7 Construction. A Keeyask Generation Project Aquatic Effects Monitoring Plan draft report prepared for Manitoba Hydro by North/South Consultants Inc., Winnipeg, MB. 104 pp.
- Hrenchuk, C.L. and Barth, C.C. 2013. Results of adult Lake Sturgeon movement monitoring in the Nelson River between Clark Lake and the Long Spruce Generating Station, October 2011 to October 2012. A report prepared for Manitoba Hydro by North/South Consultants Inc. viii + 137 pp.
- Hrenchuk, C.L. and Barth, C.C. 2014. Results of sub-adult Lake Sturgeon movement monitoring in the Nelson River between Clark Lake and the Long Spruce Generating Station, August to October, 2013. A report prepared for Manitoba Hydro by North/South Consultants Inc. ix+ 75 pp.

- Hrenchuk, C.L. and Barth, C.C. 2015. Adult Lake Sturgeon movement monitoring in the Nelson River between Clark Lake and the Long Spruce Generating Station, October 2013 to October 2014: Year 1 Construction. Keeyask Generation Project Aquatic Effects Monitoring Report #AEMP-2015-01. A report prepared for Manitoba Hydro by North/South Consultants Inc., June 2015. xvii + 142 pp.
- Hrenchuk, C.L. and Barth, C.C. 2016. Adult Lake Sturgeon movement monitoring in the Nelson River between Clark Lake and the Long Spruce Generating Station, October 2014 to October 2015: Year 2 Construction. Keeyask Generation Project Aquatic Effects Monitoring Report #AEMP-2016-04. A report prepared for Manitoba Hydro by North/South Consultants Inc., June 2016. xvi + 147 pp.
- Hrenchuk, C.L. and Barth, C.C. 2017. Adult Lake Sturgeon movement monitoring in the Nelson River between Clark Lake and the Limestone Generating Station, October 2015 to October 2016: Year 3 Construction. Keeyask Generation Project Aquatic Effects Monitoring Plan Report #AEMP-2017-01. A report prepared for Manitoba Hydro by North/South Consultants Inc., June 2017. xv + 148 pp.
- Hrenchuk, C.L. and Lacho, C.D. 2019. Walleye movement monitoring in the Nelson River between Clark Lake and the Limestone Generating Station, October 2017 to October 2018: Year 5 Construction. Keeyask Generation Project Aquatic Effects Monitoring Plan Report #AEMP-2019-04. A report prepared for Manitoba Hydro by North/South Consultants Inc., June 2019. xv + 199 pp.
- Hrenchuk, C.L. and McDougall, C.A. 2012. Adult Lake Sturgeon investigations in the Keeyask Study Area, 2011. A report prepared for Manitoba Hydro by North/South Consultants Inc. xii + 170 pp.
- Hrenchuk, C.L., Henderson, L.M. and Barth, C.C. 2014. Results of adult Lake Sturgeon movement monitoring in the Nelson River between Clark Lake and the Long Spruce Generating Station, October 2012 to October 2013. A report prepared for Manitoba Hydro by North/South Consultants Inc. xi + 132 pp.
- Hrenchuk, C.L., Lacho, C.D. and Barth, C.C. 2018. Adult Lake Sturgeon movement monitoring in the Nelson River between Clark Lake and the Limestone Generating Station, October 2016 to October 2017: Year 4 Construction. Keeyask Generation Project Aquatic Effects Monitoring Plan Report #AEMP-2018-03. A report prepared for Manitoba Hydro by North/South Consultants Inc., June 2018. xvi + 148 pp.
- Keeyask Hydropower Limited Partnership (KHLP). 2014. Keeyask Generation Project: Aquatic effects monitoring plan. A report prepared by Keeyask Hydropower Limited Partnership, Winnipeg, MB. 216 pp. + appendices.

- Klassen, C, Y. Michaluk, S., Kirchmann and L. Groening, 2019. Lake Sturgeon production and stocking summary for Birthday Rapids and Burntwood River populations, November 2017 to October 2018: Year 5 Construction. Keeyask Generation Project Fisheries Off-Setting and Mitigation Report #FOMP-2019-01. A report prepared by Manitoba Hydro, June 2019. xi + 65 pp.
- Lacho, C.D. and Hrenchuk, C.L. 2016. Juvenile Lake Sturgeon movement monitoring in the Nelson River between Clark Lake and the Long Spruce Generating Station, October 2014 to October 2015: Year 2 Construction. Keeyask Generation Project Aquatic Effects Monitoring Report #AEMP-2016-05. A report prepared for Manitoba Hydro by North/South Consultants Inc., June 2016. xiv + 96 pp.
- Lacho, C.D. and Hrenchuk, C.L. 2017. Juvenile Lake Sturgeon movement monitoring in the Nelson River between Clark Lake and the Long Spruce Generating Station, October 2015 to October 2016: Year 3 Construction. Keeyask Generation Project Aquatic Effects Monitoring Report #AEMP-2017-02. A report prepared for Manitoba Hydro by North/South Consultants Inc., June 2017. xvi + 100 pp.
- Lacho, C.D. and Hrenchuk, C.L. 2019a. Juvenile Lake Sturgeon movement in the Nelson River between Clark Lake and the Limestone Generating Station, October 2017 to October 2018: Year 5 Construction. Keeyask Generation Project Aquatic Effects Monitoring Plan Report #AEMP-2019-02. A report prepared for Manitoba Hydro by North/South Consultants Inc., June 2019. xvii + 101 pp.
- Lacho, C.D., Hrenchuk, C.L. and Barth, C.C. 2015. Juvenile Lake Sturgeon movement monitoring in the Nelson River between Clark Lake and the Long Spruce Generating Station, October 2013 to October 2014: Year 1 Construction. Keeyask Generation Project Aquatic Effects Monitoring Report #AEMP-2015-02. A report prepared for Manitoba Hydro by North/South Consultants Inc., June 2015. xvi + 92 pp.
- Lacho, C.D., Hrenchuk, C.L. and Barth, C.C. 2018. Juvenile Lake Sturgeon movement monitoring in the Nelson River between Clark Lake and the Limestone Generating Station, October 2016 to October 2017: Year 4 Construction. Keeyask Generation Project Aquatic Effects Monitoring Plan Report #AEMP-2018-04. A report prepared for Manitoba Hydro by North/South Consultants Inc., June 2018. xviii + 153 pp.
- Manitoba Hydro Public Affairs. December 1999. Long Spruce Generating Station. Brochure. 4 pp.
- Pincock, D.G. 2012. False detections: What they are and how to remove them from detection data. VEMCO, DOC-004691, Bedford, Nova Scotia. Available: [www.vemco.com/pdf/false detections.pdf](http://www.vemco.com/pdf/false%20detections.pdf). (April 2013).
- Schneider-Vieira, F. and C.L. Hrenchuk. 2021. Keeyask GS Powerhouse Unit 6 Fish Salvage Results – September 2021. A memorandum prepared for Carolyn Northover, October 4, 2021.

TABLES

Table 1: Number of acoustic transmitters applied, missing tags, immigrants and emigrants, and harvested adult Lake Sturgeon upstream of Gull Rapids and in Stephens Lake, indicating the number of fish remaining in the area at the end of each study period between June 2011 and October 2021.

Year	Upstream of Gull Rapids ¹						Stephens Lake						
	Tags Applied	Missing Tags	In ²	Out ³	Harvest	# Active Tags	Tags Applied	Missing Tags	In ⁴	Out (Gull Rapids) ⁵	Out (Kettle GS) ⁶	Harvest	# Active Tags
2011	30	-	1	-	-	31	19	-	-	1	-	-	18
2012	1	-	4	-	1	35	9	-	-	4	2	-	21
2013	0	-	1	-	-	36	1	-	-	1	-	-	21
2014	4	6	-	2	-	32	7	4	2	-	1	-	25
2015	0	6	-	1	-	31	0	4	1	-	-	-	26
2016	0	5	-	2	-	30	0	4	2	-	-	-	28
2017	0	5	-	1	-	29	0	4	1	-	-	-	29
2018	1	6	-	-	-	28	0	5	-	-	1	-	28
2019	26	6	-	-	-	54	25	5	-	-	-	-	52
2020	0	6	-	-	1	54	0	5	-	-	-	-	52
2021	0	16	-	13	-	15	0	14	13	-	-	-	56 ⁷

1. Referred to as the Keeyask GS after spillway commissioning in 2018.
2. Immigration from Stephens Lake.
3. Emigration to Stephens Lake.
4. Immigration from upstream of Gull Rapids.
5. Emigration to upstream of Gull Rapids.
6. Emigration to downstream of the Kettle GS.
7. An additional 18 tags are set to expire, so it is expected that 38 fish will be available to be detected in Stephens Lake in open-water 2022.

Table 2: Tagging and biological information associated with adult Lake Sturgeon implanted with acoustic transmitters upstream of the Keeyask GS between 2011 and 2021.

Tag ID	Date Tagged	Expiry Date	Status	Floy Tag	Fork Length (mm)	Total Length (mm)	Weight (g)
16026	19-Jun-12	17-Jun-22	Active	100450	955	1070	7711
16036	5-Jun-11	2-Jun-21	Active	74400	1313	1414	20185
16039	5-Jun-11	2-Jun-21	Active	48596	1425	1530	27216
16042	5-Jun-11	2-Jun-21	Expired	74399	956	1060	8165
16045	10-Jun-11	7-Jun-21	Expired	77516	1379	1533	21773
16048	7-Jun-11	4-Jun-21	Expired	94396	967	1103	9299
16051	10-Jun-11	7-Jun-21	Active	74394	1386	1510	24494
16054	6-Jun-11	3-Jun-21	Active	74398	816	915	5023
16055	6-Jun-11	3-Jun-21	Active	74396	872	974	6350
16056	10-Jun-11	7-Jun-21	Active	77515	1020	1120	9526
16057	16-Jun-11	13-Jun-21	Expired	77509	900	1024	7711
16058	9-Jun-11	6-Jun-21	Expired	82631	867	953	6124
16059	16-Jun-11	13-Jun-21	Active	64718	1260	1385	16783
16060	21-Jun-11	18-Jun-21	Expired	80188	1060	1170	10433
16061	21-Jun-11	18-Jun-21	Expired	77503	1305	1443	14515
16062	12-Jun-11	9-Jun-21	Active	77510	1176	1284	12247
16063	11-Jun-11	8-Jun-21	Expired	77514	1124	1229	10660
16064	12-Jun-11	9-Jun-21	Expired	80370	1066	1148	9072
16065	12-Jun-11	9-Jun-21	Expired	77511	958	1058	7484
16066	20-Jun-11	17-Jun-21	Active	77507	1310	1405	25855
16067	19-Jun-11	16-Jun-21	Captured	50826	1090	1210	11340
16068	19-Jun-11	16-Jun-21	Active	80368	1140	1254	11794
16069	17-Jun-11	14-Jun-21	Active	48909	1400	1570	32659
16070	16-Jun-11	13-Jun-21	Expired	77508	1072	1195	10886
16071	16-Jun-11	13-Jun-21	Active	76484	1026	1133	7711
16072	21-Jun-11	18-Jun-21	Expired	77506	850	967	6350
16073	12-Jun-11	9-Jun-21	Expired	77512	1169	1284	15422
16074	13-Jun-11	10-Jun-21	Expired	94030	915	1016	6804
16075	10-Jun-11	7-Jun-21	Expired	50888	1610	1700	43092
16076	16-Jun-11	13-Jun-21	Active	50808	1260	1375	19958
16077	10-Jun-11	7-Jun-21	Expired	80265	1143	1245	12247
32174	18-Jun-14	15-Jun-24	Expired	94117	1172	1296	17690
32175	18-Jun-14	15-Jun-24	Expired	105480	843	951	4082
32176	18-Jun-14	15-Jun-24	Expired	50853	1236	1370	22226
32177	18-Jun-14	15-Jun-24	Expired	105479	886	1001	5443
54799	6-Jun-23	7-Mar-23	Active	111765	1431	1475	21319

Table 2: Tagging and biological information associated with adult Lake Sturgeon implanted with acoustic transmitters upstream of the Keeyask GS between 2011 and 2021 (continued).

Tag ID	Date Tagged	Expiry Date	Status	Floy Tag	Fork Length (mm)	Total Length (mm)	Weight (g)
7017	6/8/2019	6/5/2029	Active	114771	949	1160	7257
7018	6/5/2019	6/2/2029	Active	114248	825	907	3629
7019	6/5/2019	6/2/2029	Active	76330	1172	1293	14061
7020	6/9/2019	6/6/2029	Active	105417	1000	1112	5443
7021	6/6/2019	6/3/2029	Active	91388	971	1080	7257
7022	6/7/2019	6/4/2029	Active	114774	1020	1142	7257
7023	6/8/2019	6/5/2029	Active	114770	955	1075	5897
7024	6/8/2019	6/5/2029	Active	103456	953	1070	6350
7025	6/7/2019	6/4/2029	Active	114773	902	1000	5443
7026	6/9/2019	6/6/2029	Active	114769	1070	1173	8165
7027	6/9/2019	6/6/2029	Active	50836	1280	1325	13154
7028	6/8/2019	6/5/2029	Active	79711	1285	1413	17236
7029	6/9/2019	6/6/2029	Active	114768	1135	1259	9525
7030	6/9/2019	6/6/2029	Active	64705	1065	1167	9072
7031	6/8/2019	6/5/2029	Active	114772	920	1040	6804
7032	6/9/2019	6/6/2029	Active	101388	890	1000	4990
7033	6/5/2019	6/2/2029	Active	114777	868	981	4990
7034	6/5/2019	6/2/2029	Active	77504	968	1090	6577
7053	5/25/2019	5/22/2029	Active	114648	866	994	4800
7056	5/25/2019	5/22/2029	Active	64726	1217	1346	-
7059	5/25/2019	5/22/2029	Active	86137	923	1042	6400
7061	6/5/2019	6/2/2029	Active	114776	930	1058	5897
7064	5/29/2019	5/26/2029	Active	114643	1016	1128	7938
7065	5/28/2019	5/25/2029	Active	107113	1034	1145	8165
7066	5/29/2019	5/26/2029	Active	91376	880	1010	5897
7067	5/29/2019	5/26/2029	Active	46424	1317	1445	-

Table 3: Tagging and biological information associated with adult Lake Sturgeon implanted with acoustic transmitters in Stephens Lake between 2011 and 2021.

Tag ID	Date Tagged	Expiry Date	Status	Floy Tag	Fork Length (mm)	Total Length (mm)	Weight (g)
16018	06/13/12	06/11/22	Expired	93923	1024	1145	8618
16019	06/13/12	06/11/22	Active	93922	850	951	6577
16020	06/08/12	06/06/22	Active	55557	992	1100	-
16021	09/28/11	09/25/21	Missing	91705	880	977	6804
16022	06/13/12	06/11/22	Active	81628	810	900	5443
16024	06/13/12	06/11/22	Expired	74416	960	1081	8391
16025	06/15/12	06/13/22	Missing	80374	1120	2350	10433
16027	06/13/12	06/11/22	Active	93921	894	991	6804
16028	06/13/12	06/11/22	Active	93924	884	976	5216
16029	06/21/11	06/18/21	Active	56202	1208	1316	16556
16030	06/12/11	06/09/21	Active	56152	1004	1103	7711
16031	06/13/12	06/11/22	Active	92925	906	1011	6804
16032	06/11/11	06/08/21	Expired	46892	1064	1159	11340
16033	06/18/11	06/15/21	Captured	74419	881	974	5443
16033b	09/16/13	09/14/23	Active	103230	755	842	-
16034	06/18/11	06/15/21	Missing	74418	796	904	4082
16035	09/26/11	09/23/21	Missing	69868	941	1040	8165
16037	06/08/11	06/05/21	Active	-9999	826	911	-
16038	06/12/11	06/09/21	Active	74415	1116	1239	11793
16040	06/09/11	06/06/21	Expired	74411	1006	1105	8391
16041	06/26/11	06/23/21	Active	74421	903	1001	7257
16043	06/10/11	06/07/21	Expired	88788	790	885	4536
16044	06/09/11	06/06/21	Expired	56208	1161	1296	14969
16046	06/11/11	06/08/21	Missing	74413	1085	1209	9979
16047	06/26/11	06/23/21	Expired	88789	920	1020	6577
16049	09/24/11	09/21/21	Expired	91174	1070	1182	10886
16050	06/13/11	06/10/21	Active	74415	922	1041	6577
16052	09/26/11	09/23/21	Active	69865	1190	1337	16329
16053	09/26/11	09/23/21	Active	69867	919	1021	8618
32167	06/11/14	06/08/24	Expired	-	910	1015	4990
32168	06/11/14	06/08/24	Expired	94234	884	980	4990
32169	06/13/14	06/10/24	Expired	-	810	908	4082
32170	06/11/14	06/08/24	Expired	46844	1095	2000	9525
32171	06/13/14	06/10/24	Expired	-	880	976	4536
32172	06/13/14	06/10/24	Expired	86136	904	1050	5897
32173	06/13/14	06/10/24	Expired	-	842	936	4082

Table 3: Tagging and biological information associated with adult Lake Sturgeon implanted with acoustic transmitters in Stephens Lake between 2011 and 2021 (continued).

Tag ID	Date Tagged	Expiry Date	Status	Floy Tag	Fork Length (mm)	Total Length (mm)	Weight (g)
7035	5/31/2019	5/28/2029	Active	115802	1086	1206	9072
7036	5/31/2019	5/28/2029	Active	100151	890	996	5897
7037	5/31/2019	5/28/2029	Active	114626	896	994	5670
7038	5/31/2019	5/28/2029	Active	114627	1032	1153	8618
7039	6/3/2019	5/31/2029	Active	46844	1115	1230	11340
7040	6/3/2019	5/31/2029	Active	114780	1050	1174	9072
7041	5/31/2019	5/28/2029	Active	56152	1090	1211	10886
7042	6/3/2019	5/31/2029	Active	114778	965	1074	6804
7043	9/15/2019	9/12/2029	Active	116091	1060	1182	-
7044	5/31/2019	5/28/2029	Active	88477	850	936	4536
7045	9/12/2019	9/9/2029	Active	116010	830	921	4850
7046	9/14/2019	9/11/2029	Active	91714	950	1100	-
7047	5/31/2019	5/28/2029	Active	100162	830	917	4536
7048	6/3/2019	5/31/2029	Active	69834	990	1114	9072
7049	6/3/2019	5/31/2029	Active	114781	931	1035	6350
7050	6/1/2019	5/29/2029	Active	114791	935	1043	6577
7051	6/3/2019	5/31/2029	Active	50808	1371	1510	19504
7052	6/3/2019	5/31/2029	Active	93921	980	1075	7938
7054	6/3/2019	5/31/2029	Active	110710	1003	1123	8618
7055	6/1/2019	5/29/2029	Active	114790	930	1040	5443
7057	6/3/2019	5/31/2029	Active	115843	893	1021	5443
7058	6/3/2019	5/31/2029	Active	115740	1135	1277	14515
7060	6/3/2019	5/31/2029	Active	112911	820	910	3402
7062	6/3/2019	5/31/2029	Active	110716	1065	1181	12020
7063	6/3/2019	5/31/2029	Active	101041	830	951	4536

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

Study Year	Upstream of Gull Rapids					Stephens Lake	
	1	2	3	4	5	6	7
2013	6.4	0.1	12.4	72.5	8.6	45.0	55.0
2014	9.0	0.1	10.8	52.3	27.7	38.2	61.8
2015	4.7	0.1	9.9	43.6	41.7	55.6	44.9
2016	7.3	0.1	12.1	56.5	24.1	41.8	59.2
2017	5.3	0.0	10.7	62.6	21.4	47.6	52.9
2018	7.4	0.1	14.8	48.5	29.2	47.4	53.3
2019	7.8	0.1	11.1	62.0	19.0	50.6	49.4
2020	2.0	0.1	9.9	66.2	21.8	44.2	55.8
2021	19.5	0.7	13.9	37.2	28.7	50.6	49.4

Table 5: Number of Lake Sturgeon tagged with acoustic and radio tags that moved upstream or downstream through Gull Rapids/the Keeyask GS during studies conducted in 2001–2004 and 2011–2021.

Life Stage	Year ¹	# Tagged Fish		# Fish Detected		Downstream Movements			Upstream Movements		
		U/S ²	D/S ³	U/S	D/S	#	% total	% detected	#	% total	% detected
Adult ⁴	2001	21	11	21	11	1	4.8	4.8	0	0.0	0.0
	2002	19	12	19	10	0	0.0	0.0	3	25.0	30.0
	2003	21	9	20	4	1	4.8	5.0	0	0.0	0.0
	2004	19	9	16	4	0	0.0	0.0	0	0.0	0.0
	2011	30	19	28	19	0	0.0	0.0	1	5.3	5.3
	2012	32	27	30	27	0	0.0	0.0	4	14.8	14.8
	2013	35	22	28	19	0	0.0	0.0	1	4.5	5.3
	2014	34	24	33	24	2	5.9	6.1	0	0.0	0.0
	2015	32	25	28	25	1	3.1	3.6	0	0.0	0.0
	2016	32	26	29	26	2	6.3	6.9	0	0.0	0.0
	2017	30	28	26	27	1	3.3	3.8	0	0.0	0.0
	2018	28	28	28	28	0	0.0	0.0	0	0.0	0.0
	2019	54	53	54	51	0	0.0	0.0	-	-	-
	2020	54	52	48	51	0	0.0	0.0	-	-	-
Juvenile ⁵	2021	44	41	41	39	13	29.5	31.7	-	-	-
	2013	20	20	18	20	0	0.0	0.0	0	0.0	0.0
	2014	20	20	20	19	0	0.0	0.0	0	0.0	0.0
	2015	20	20	19	19	0	0.0	0.0	0	0.0	0.0
	2016	20	20	19	19	0	0.0	0.0	0	0.0	0.0
	2017	20	18	18	13	0	0.0	0.0	0	0.0	0.0
	2018	20	19	20	14	0	0.0	0.0	0	0.0	0.0
	2019	20	14	17	13	1	5.0	5.9	-	-	-
	2020	19	13	17	12	0	0.0	0.0	-	-	-
	2021	19	13	19	12	3	15.7	15.7	-	-	-

1. Includes data from the current study (2011–2021), a study conducted between 2001 and 2004 (Barth and Mochnacz 2004; Barth 2005; Barth and Murray 2005; Barth and Ambrose 2006), and the juvenile Lake Sturgeon acoustic telemetry study initiated in Gull and Stephens Lake in 2013 (Hrenchuk and Barth 2014; Lacho *et al.* 2015, Lacho and Hrenchuk 2016; Lacho and Hrenchuk 2017; Lacho *et al.* 2018; Lacho and Hrenchuk 2019a; Hrenchuk 2020; Hrenchuk 2021; and Funk and Hrenchuk 2022).
2. Upstream of Gull Rapids (between Clark Lake and Gull Rapids) now referred to as the Keeyask GS.
3. Downstream of Gull Rapids (in Stephens Lake between Gull Rapids and the Kettle GS) now referred to as the Keeyask GS.
4. Refers to fish greater than 800 mm fork length.
5. Refers to fish less than 800 mm fork length.

FIGURES

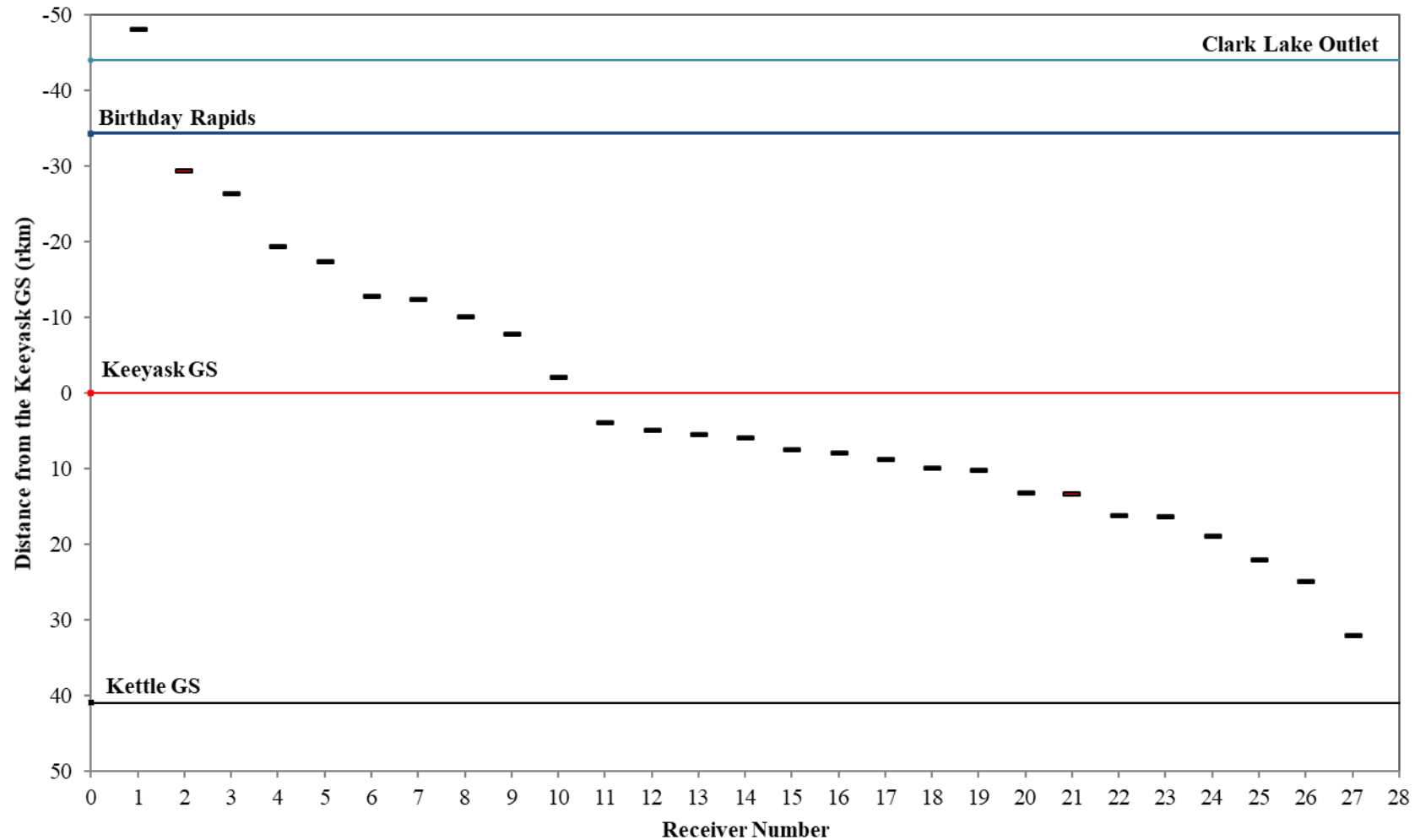


Figure 1: Locations of stationary acoustic receivers (dashes) in relation to the base of the Keeyask GS (rkm 0) and other major landmarks (lines) in the Nelson River between Clark Lake and the Kettle GS between September 2020 and May 2021. A red dash indicates a receiver that was lost.

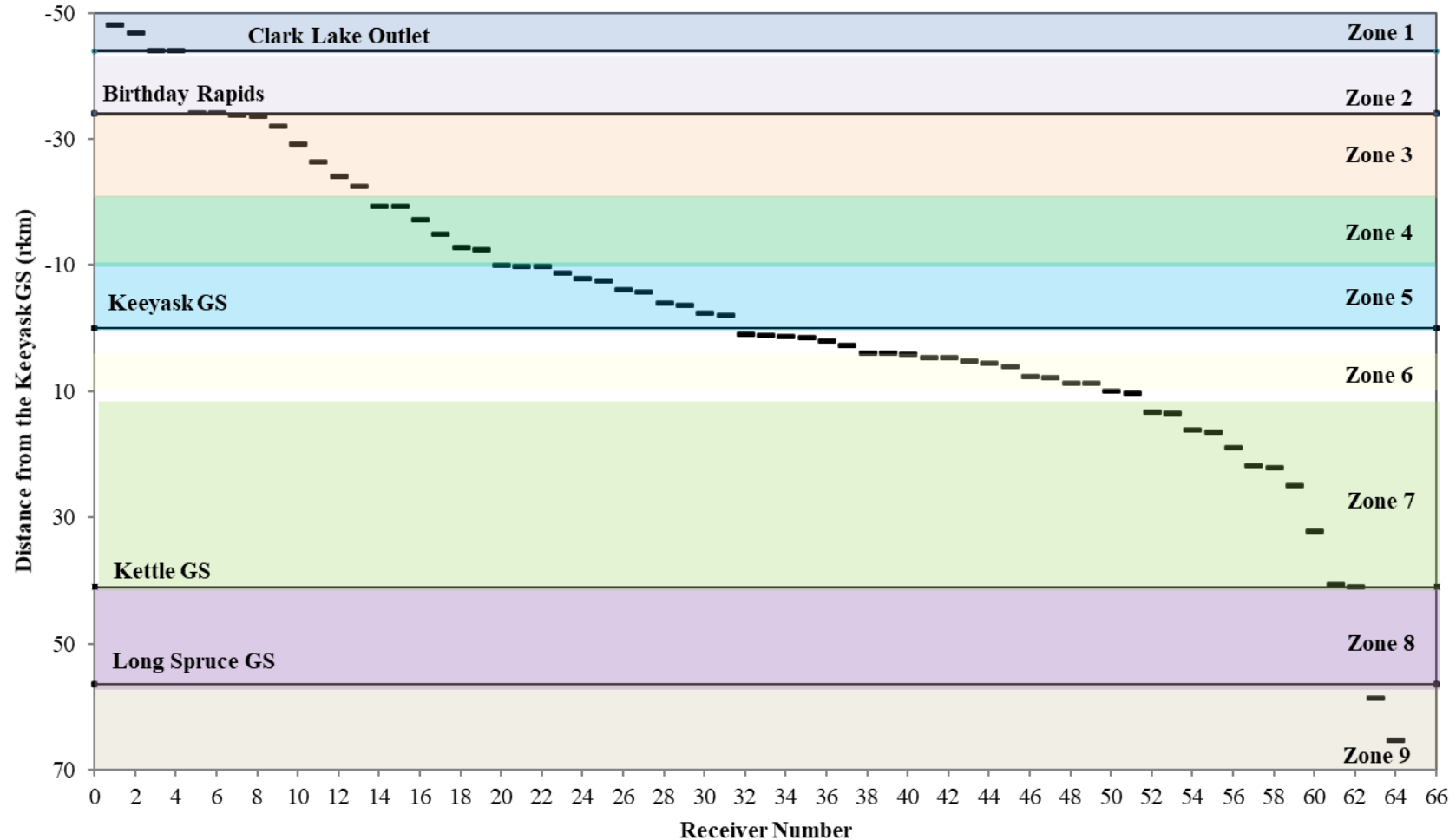


Figure 2: Locations of stationary acoustic receivers (dashes) in relation to the base of the Keeyask GS (rkm 0) and other major landmarks (lines) in the Nelson River between Clark Lake (Zone 1) and the Limestone GS (Zone 9) between June and October, 2021. River zones upstream and downstream of The Keeyask GS are indicated by shading.

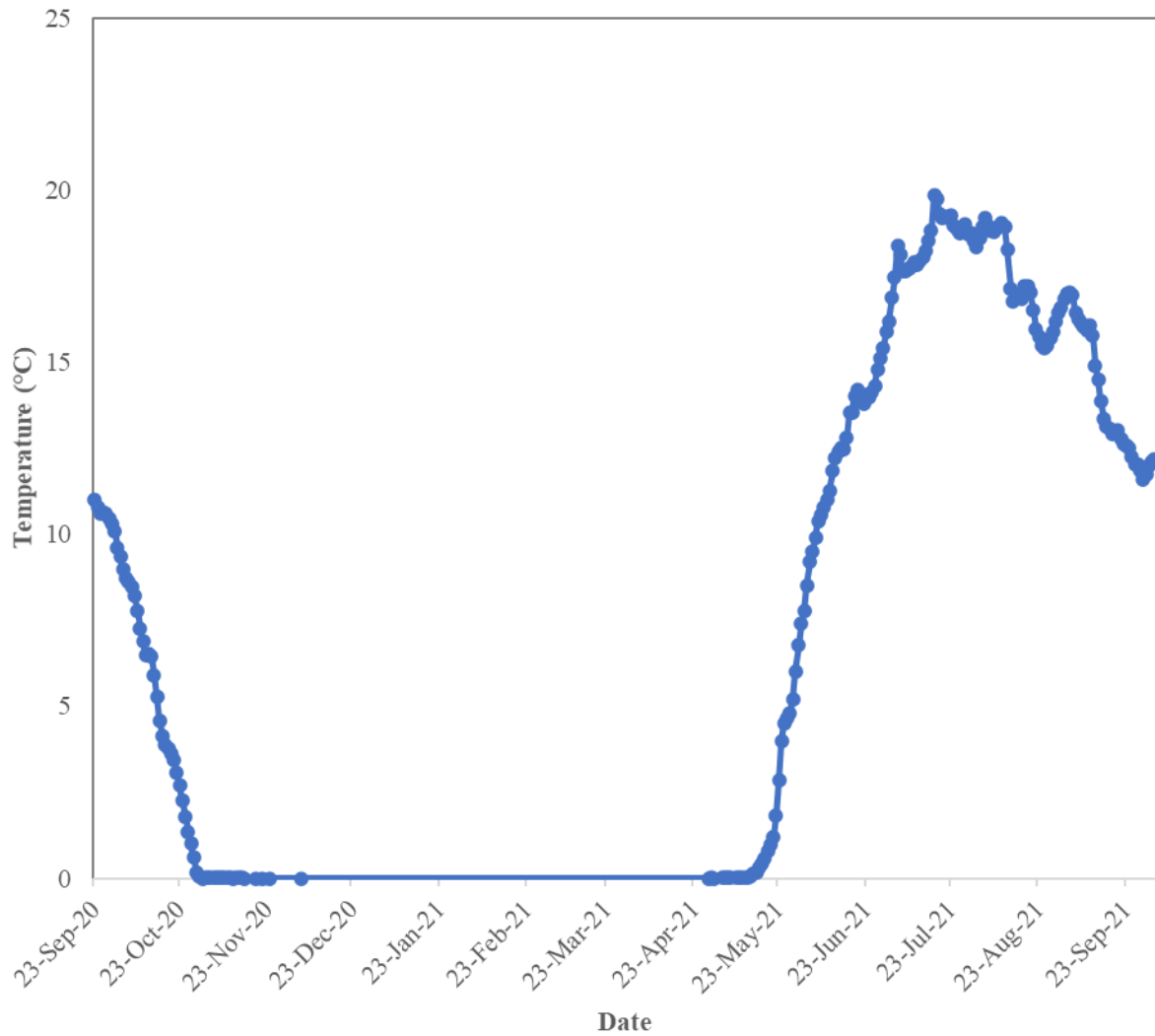


Figure 3: Water temperature in the Nelson River mainstem from September 23, 2020, to October 3, 2021.

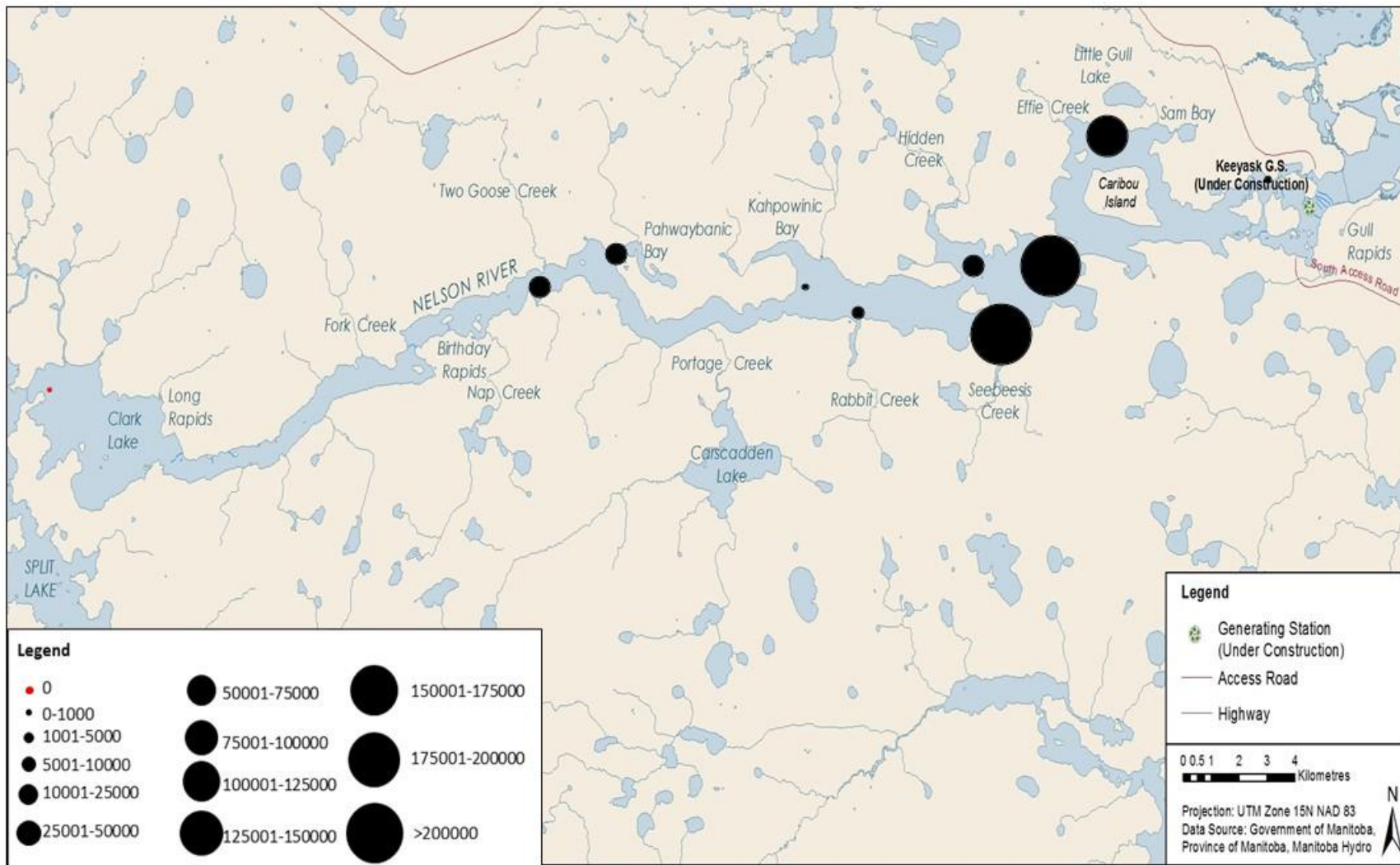


Figure 4: Relative number of detections at each acoustic receiver set between Clark Lake and the Keeyask GS during winter 2020/2021 (September 24, 2020 to April 30, 2021). Number of detections indicated by size of bubble (defined in legend). Receivers with no detections indicated with red dot.

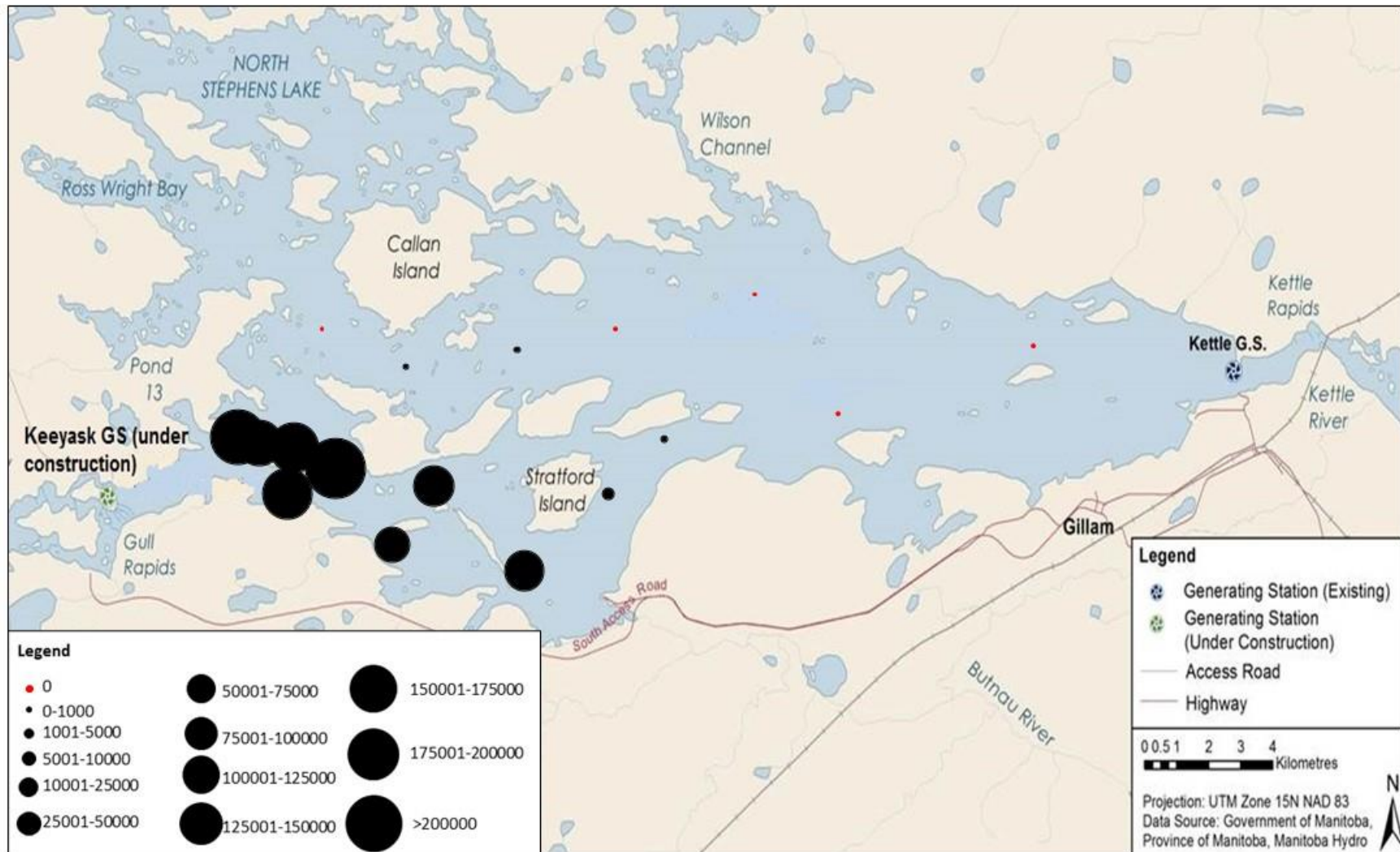


Figure 5: Relative number of detections at each acoustic receiver set in Stephens Lake during winter 2020/2021 (September 24, 2020 to April 30, 2021). Number of detections indicated by size of bubble (defined in legend). Receivers with no detections indicated with red dot.

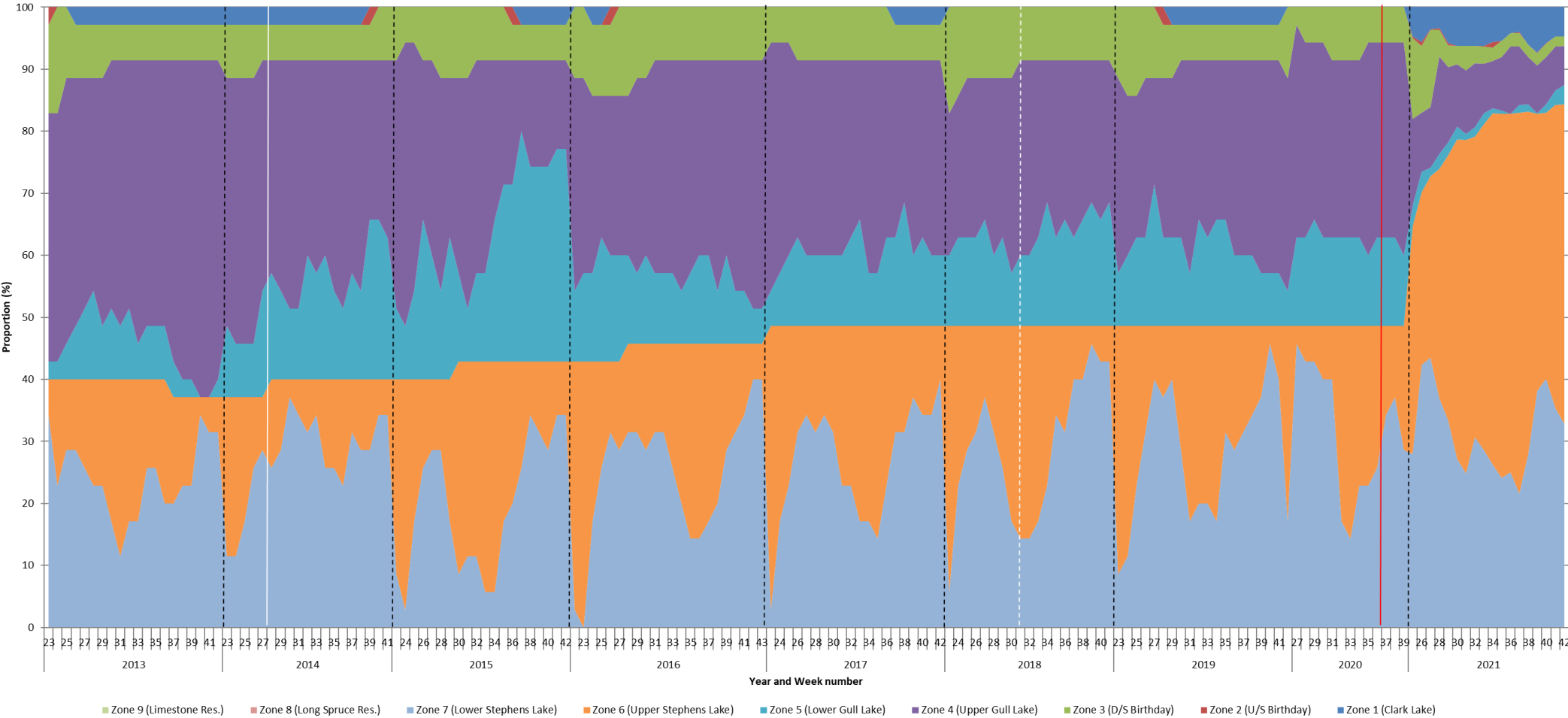


Figure 6: Proportional distribution by zone, for adult Lake Sturgeon tagged with acoustic transmitters in 2011 in the Keeyask GS Area during a portion of the 2013 (June 4 to October 15), 2014 (June 4 to October 3), 2015 (June 4 to October 11), 2016 (June 4 to October 19), 2017 (June 7 to October 16) 2018 (June 6 to October 10), 2019 (June 2 to October 7), 2020 (July 3 to September 23), and 2021 (May 1 to October 10) open-water periods. Black dashed lines indicate study years. Solid white line indicates start of Keeyask construction. Dashed white line indicates spillway commissioning. Solid red line indicates end of reservoir impoundment.

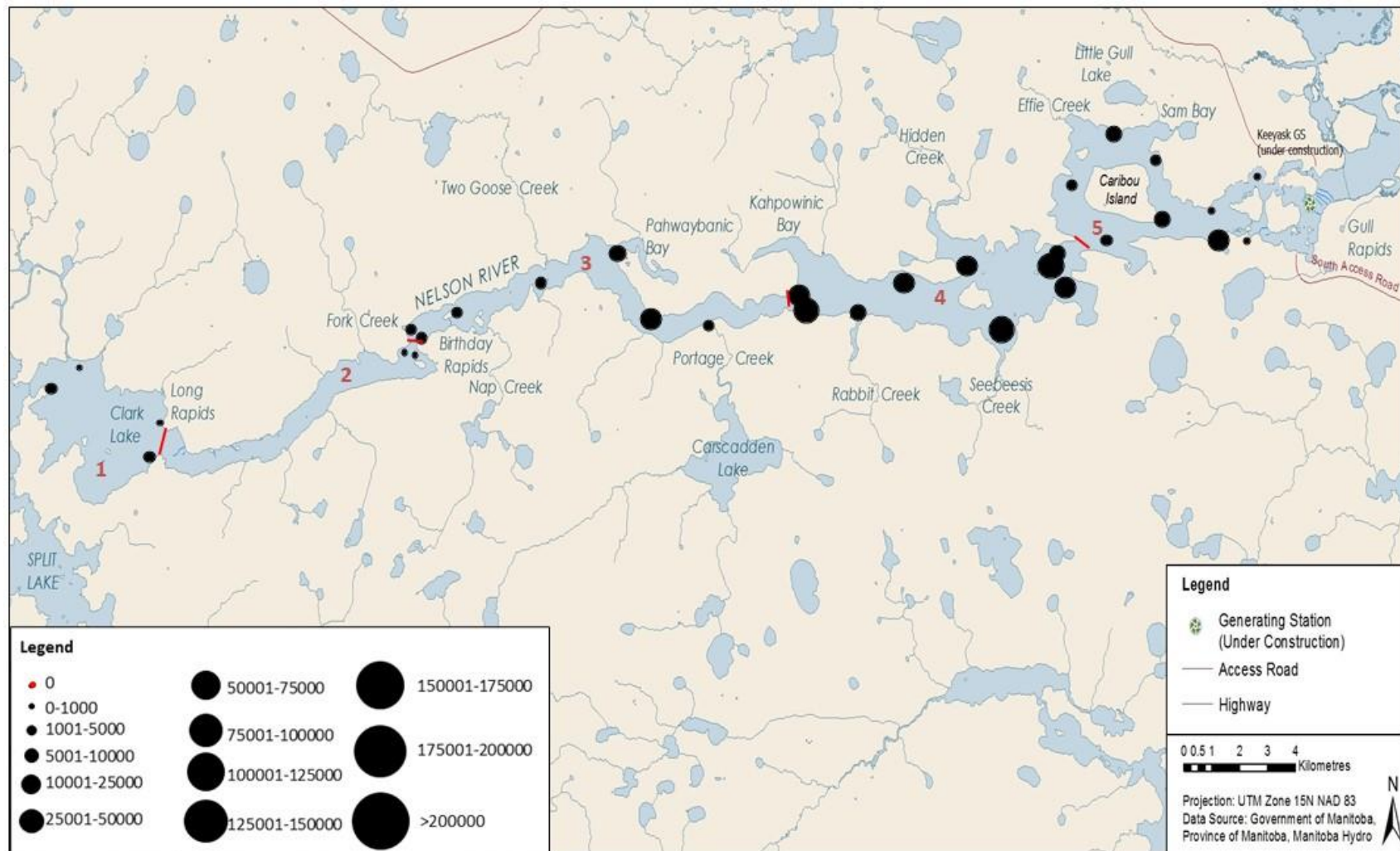


Figure 7: Relative number of detections at each acoustic receiver set in the Nelson River between Clark Lake and the Keyask GS during the 2021 open-water period (May 1 to October 10). Number of detections indicated by size of circle (defined in legend). Receivers with no detections indicated with red dot. The river is divided into five "zones" based on placement of receiver "gates."

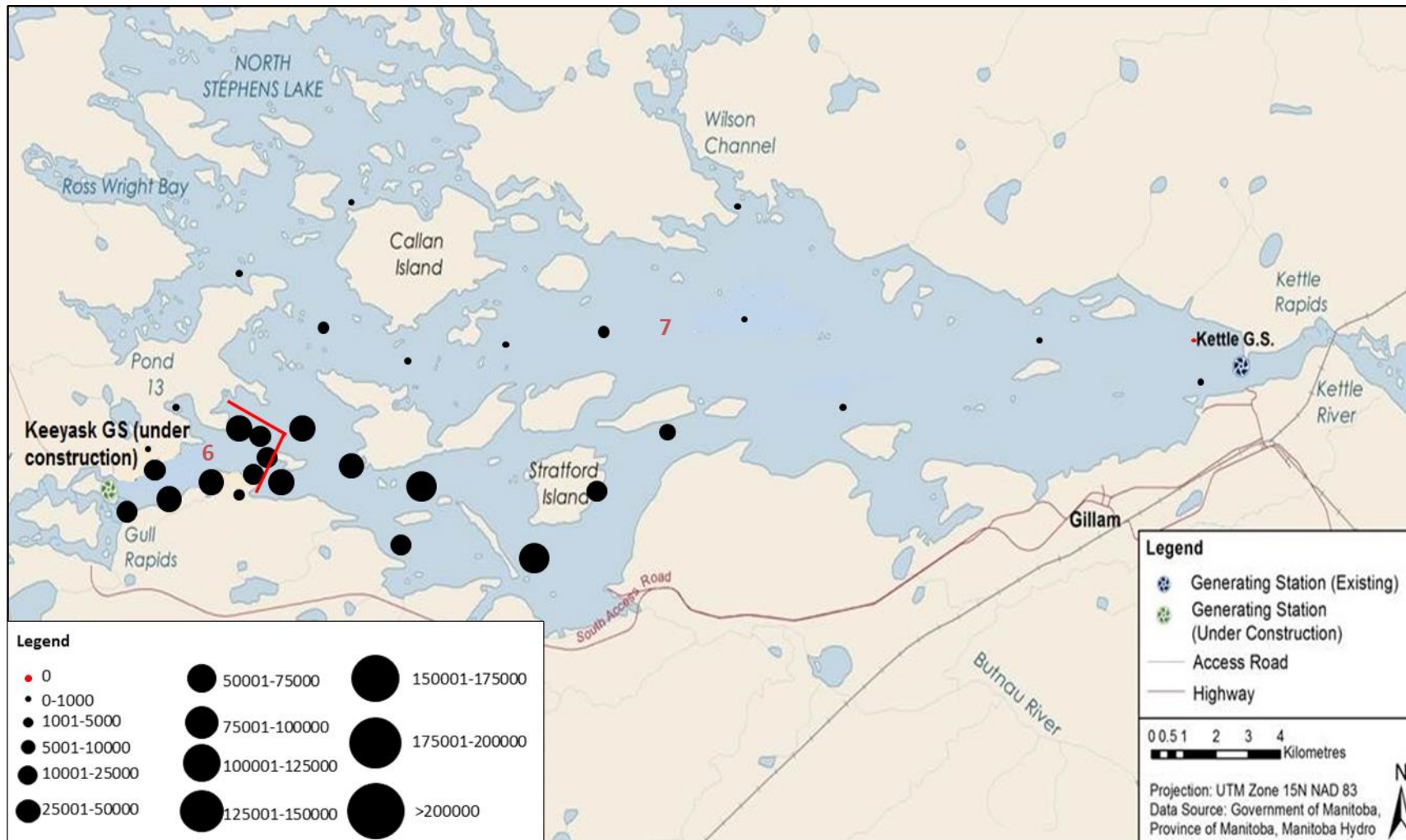


Figure 8: Relative number of detections at each acoustic receiver set in Stephens Lake during the 2021 open-water period (May 1 to October 10). Number of detections indicated by size of circle (defined in legend). Receivers with no detections indicated with red dot. The river is divided into two "zones" based on placement of receiver "gates."

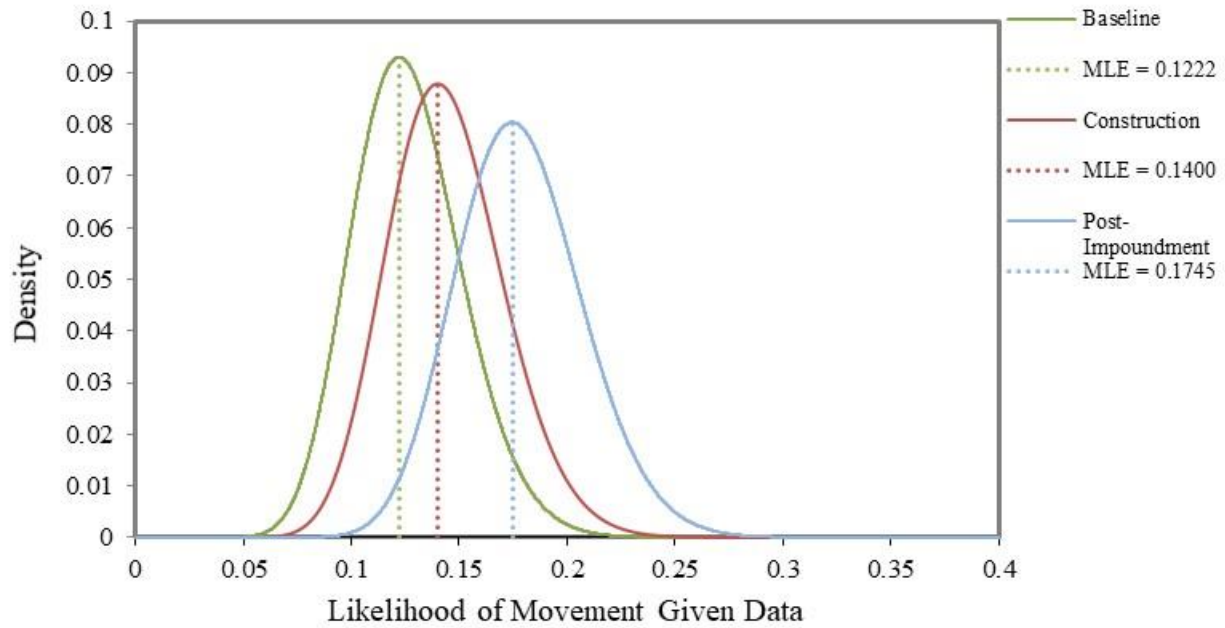


Figure 9: Likelihood of an adult Lake Sturgeon moving between river zones (either upstream or downstream) before construction, during construction, and after impoundment.

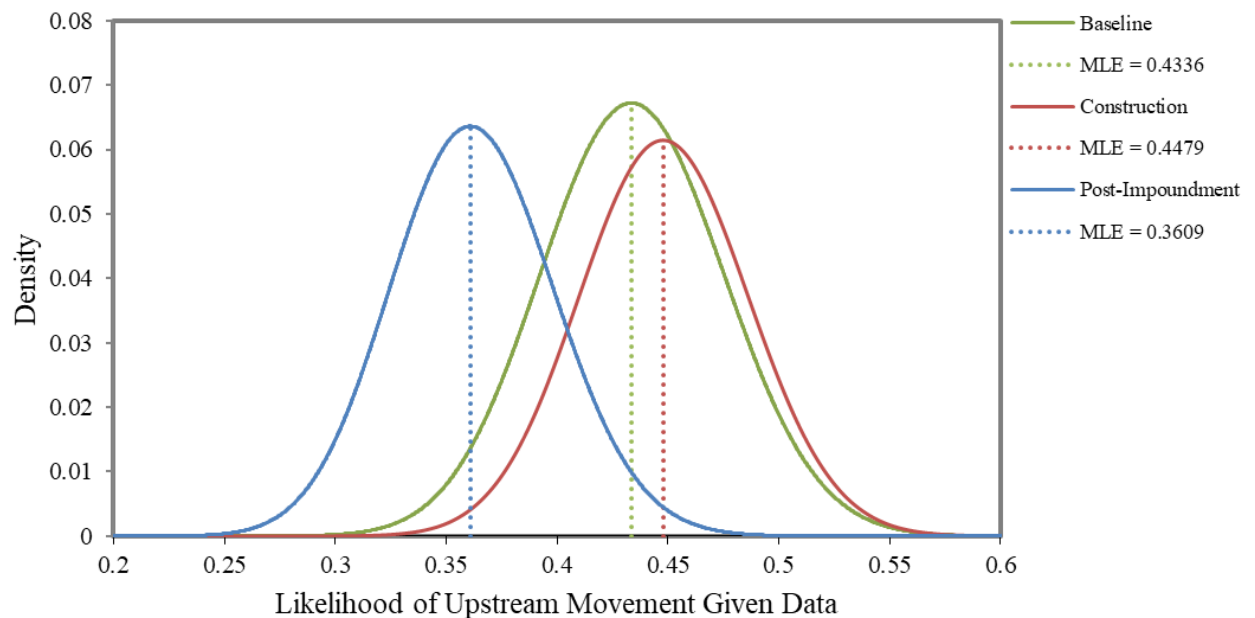


Figure 10: Likelihood that, if an adult Lake Sturgeon moves between river zones, the movement will be upstream before construction, during construction, and after impoundment.

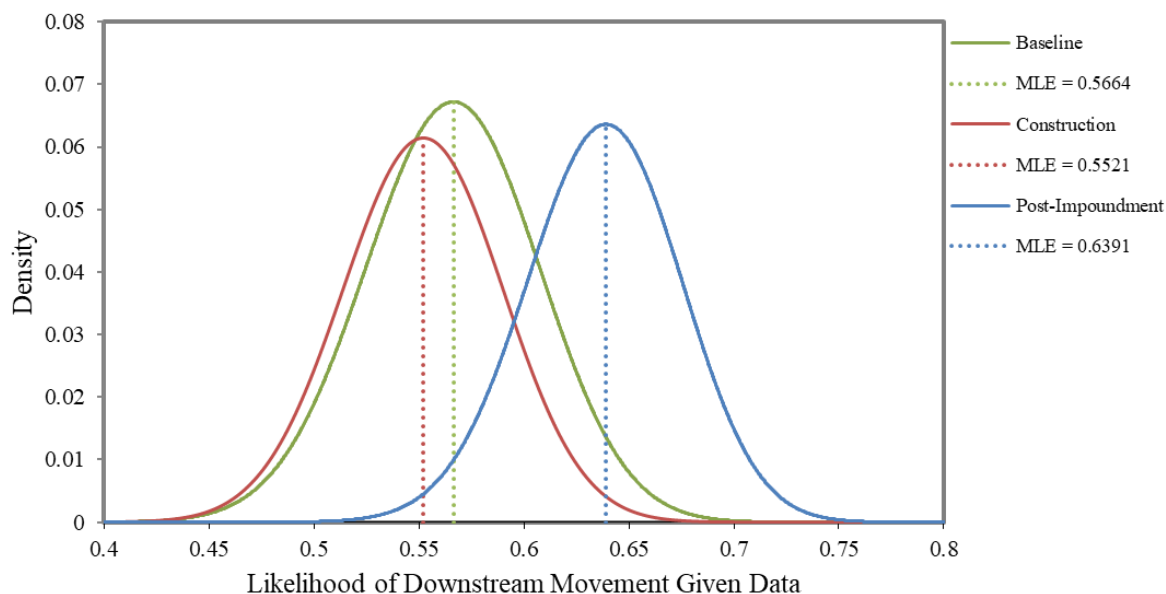


Figure 11: Likelihood that, if an adult Lake Sturgeon moves between river zones, the movement will be downstream before construction, during construction, and after impoundment.

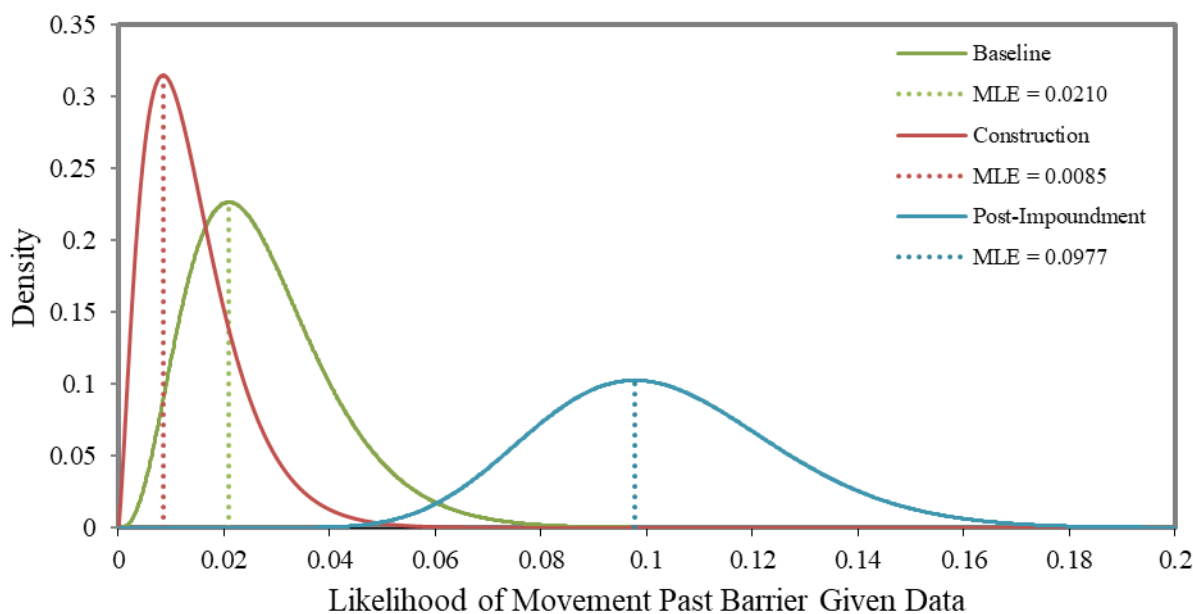


Figure 12: Likelihood of an adult Lake Sturgeon moving past a barrier (either Gull Rapids/the Keeyask GS, Kettle GS, or Long Spruce GS) before and after the onset of Keeyask construction. There were no movements past barriers after impoundment in September 2020.

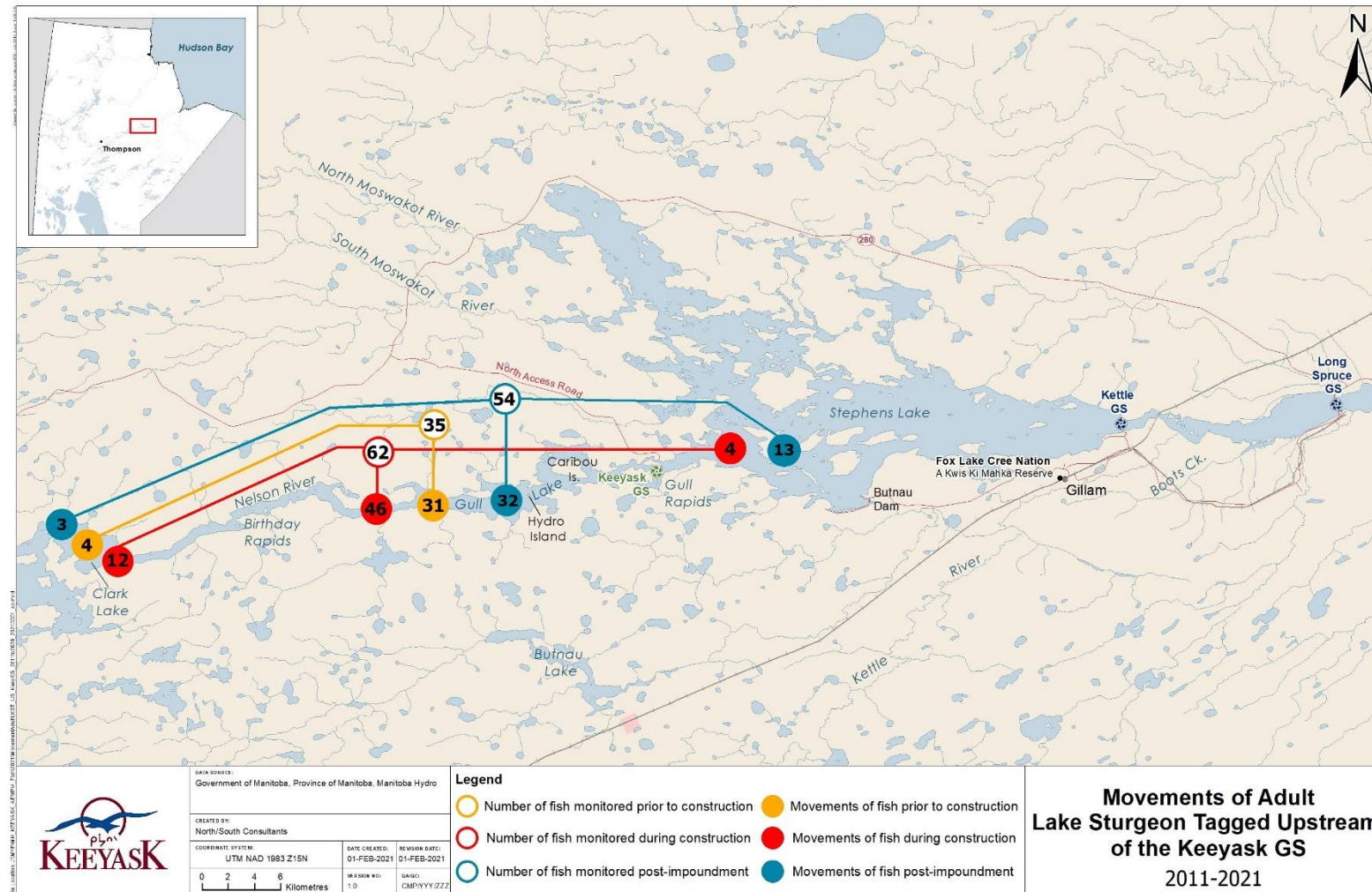


Figure 13: Map showing how many adult Lake Sturgeon moved upstream out of Gull Lake, stayed in Gull Lake, moved into Stephens Lake, and moved downstream through the Kettle GS before construction (yellow), during construction (red) and after reservoir impoundment (blue). Numbers of fish monitored (hollow circles) represent the number of fish tagged while the number of fish movements (solid circles) represent the number of fish detected.

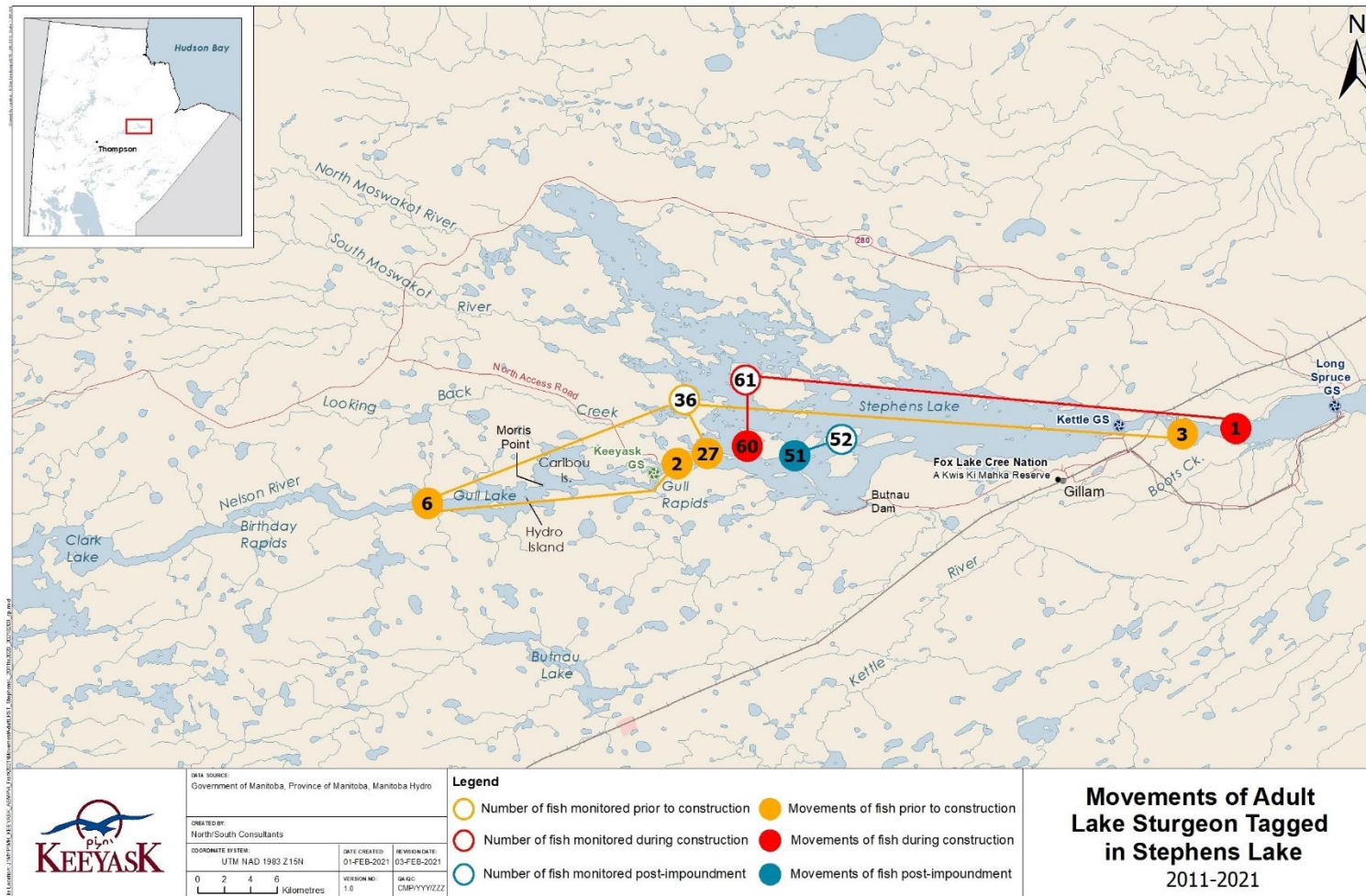


Figure 14: Map showing how many adult Lake Sturgeon stayed in Stephens Lake and moved downstream through the Kettle GS during before construction (yellow), during construction (red), and after reservoir impoundment (blue). Movements of fish due to tagging stress or mortality were not included. Numbers of fish monitored (hollow circles) represent the number of fish tagged while the number of fish movements (solid circles) represent the number of fish detected. Two fish moved upstream and then returned to Stephens Lake.

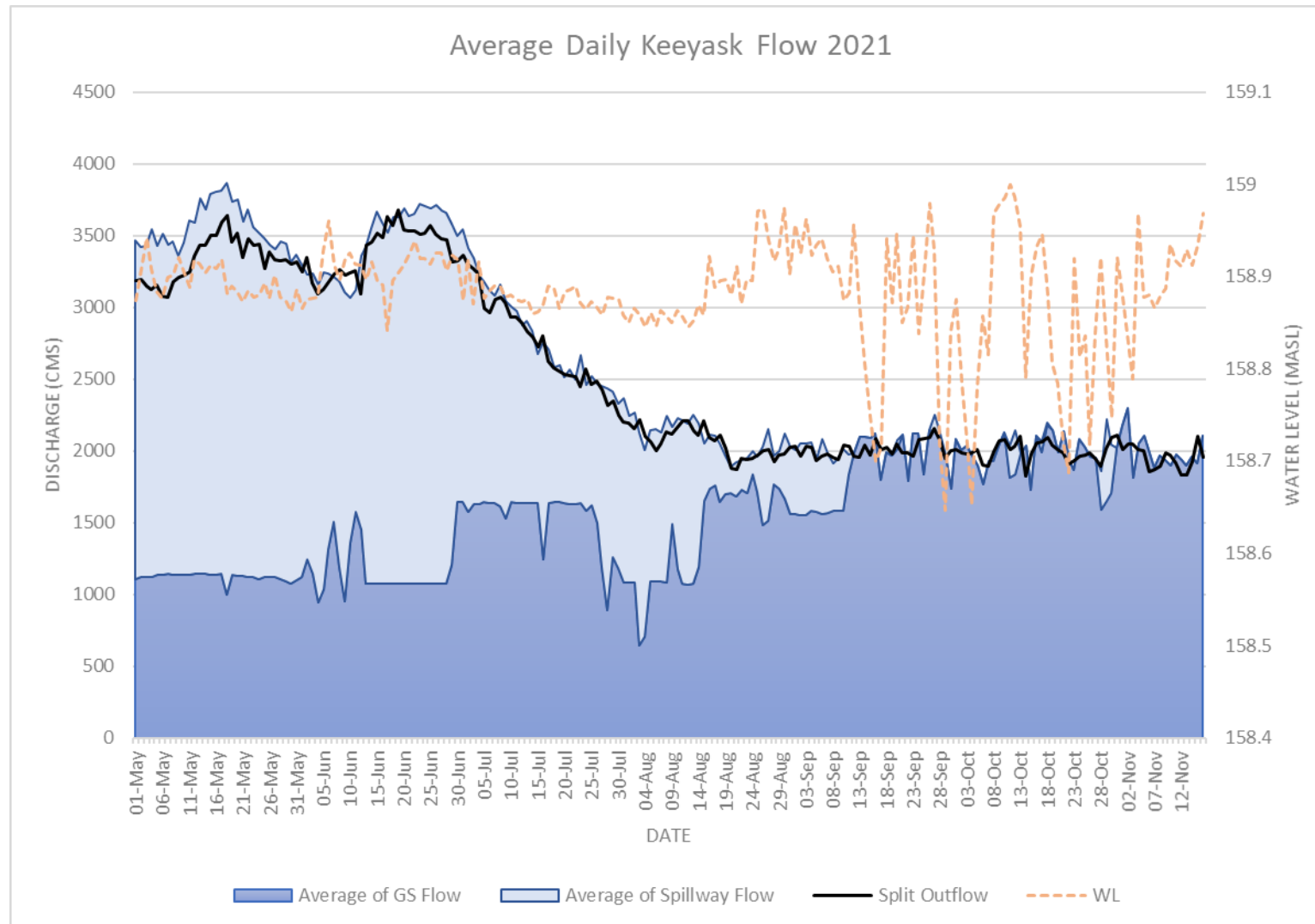
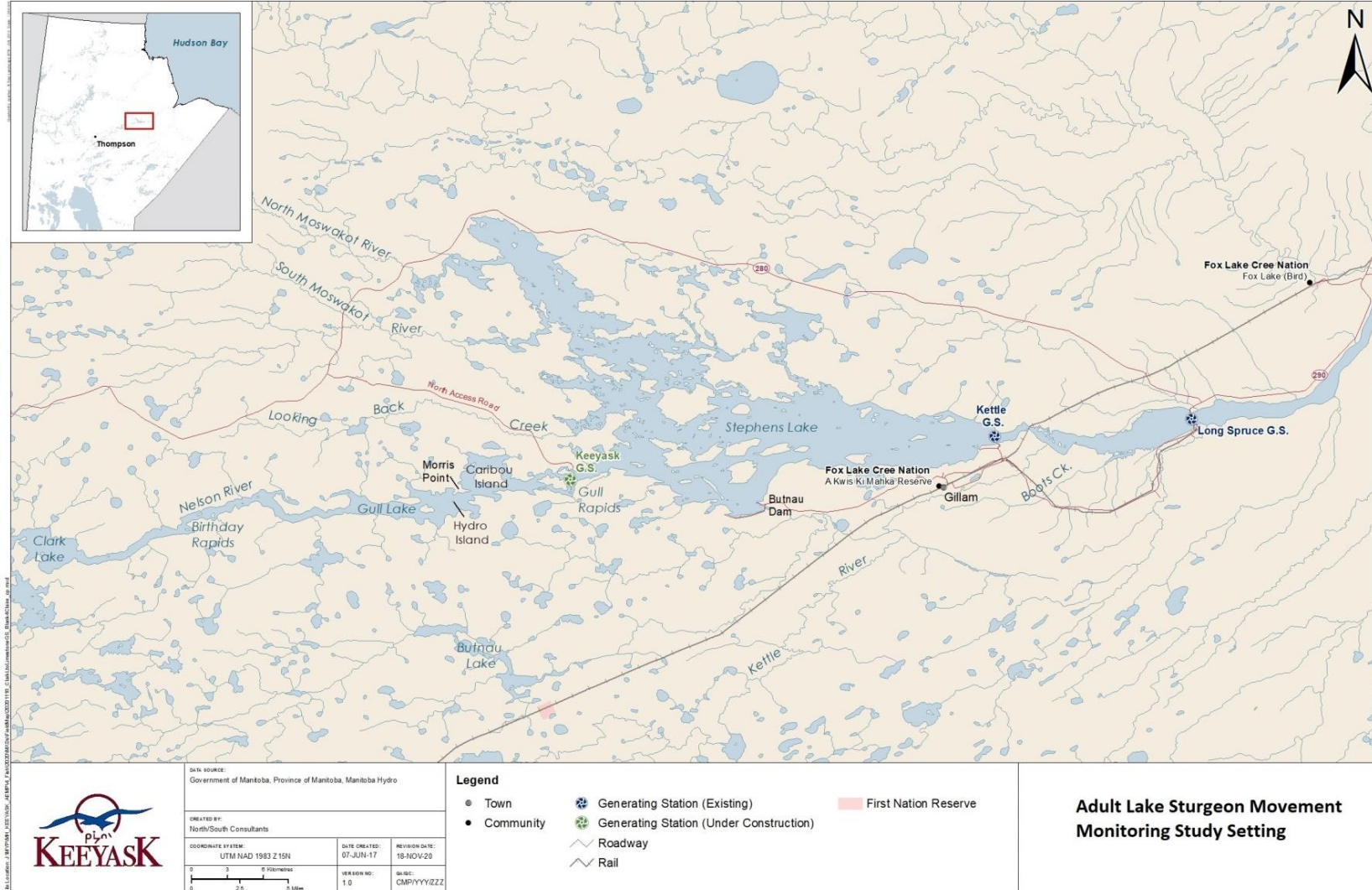
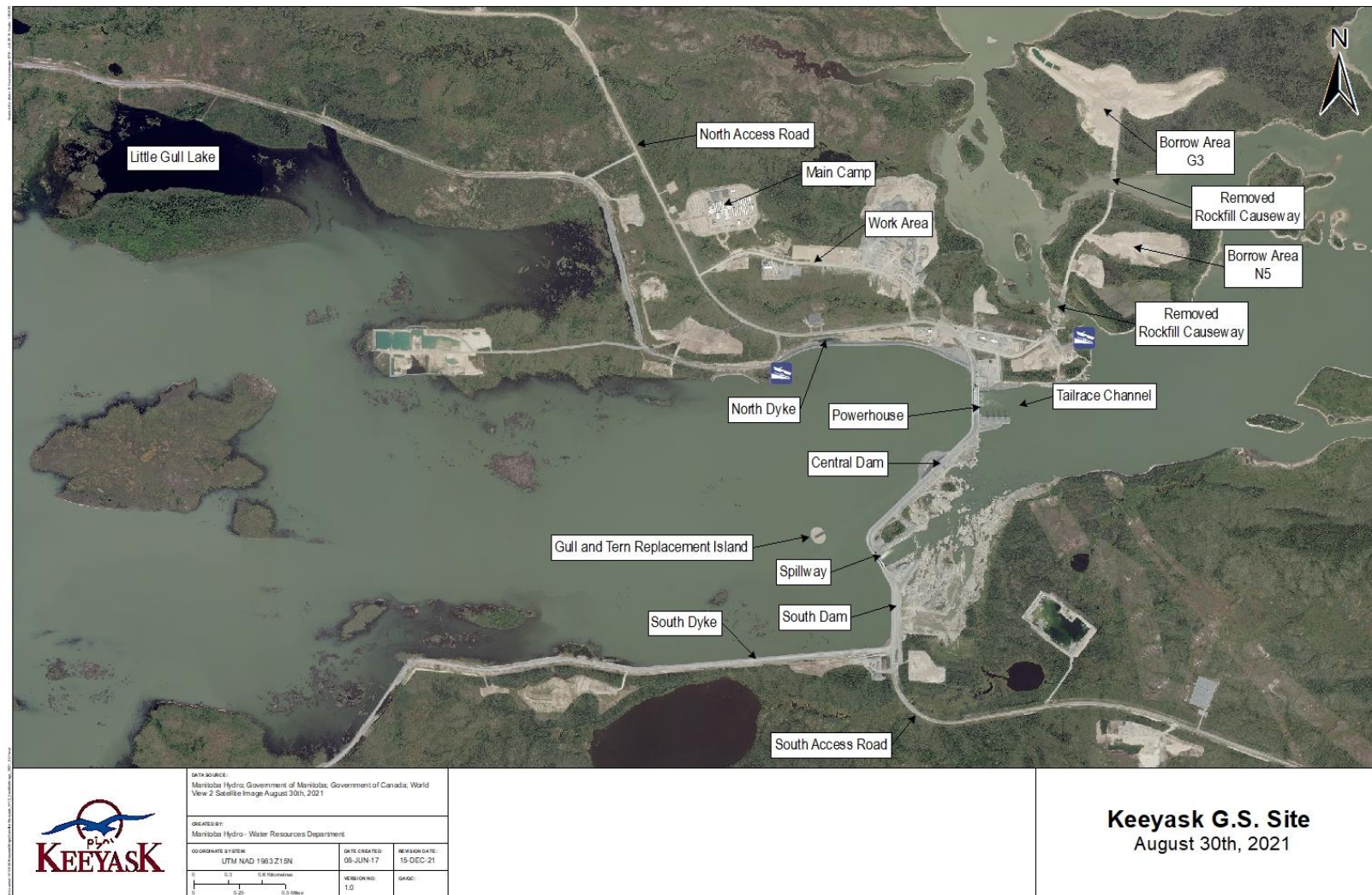


Figure 15: Flow summary for the Keeyask reservoir from May 1 to November 30, 2021 displaying average daily Split Lake outflow, GS powerhouse flow, spillway flow, and reservoir water level.

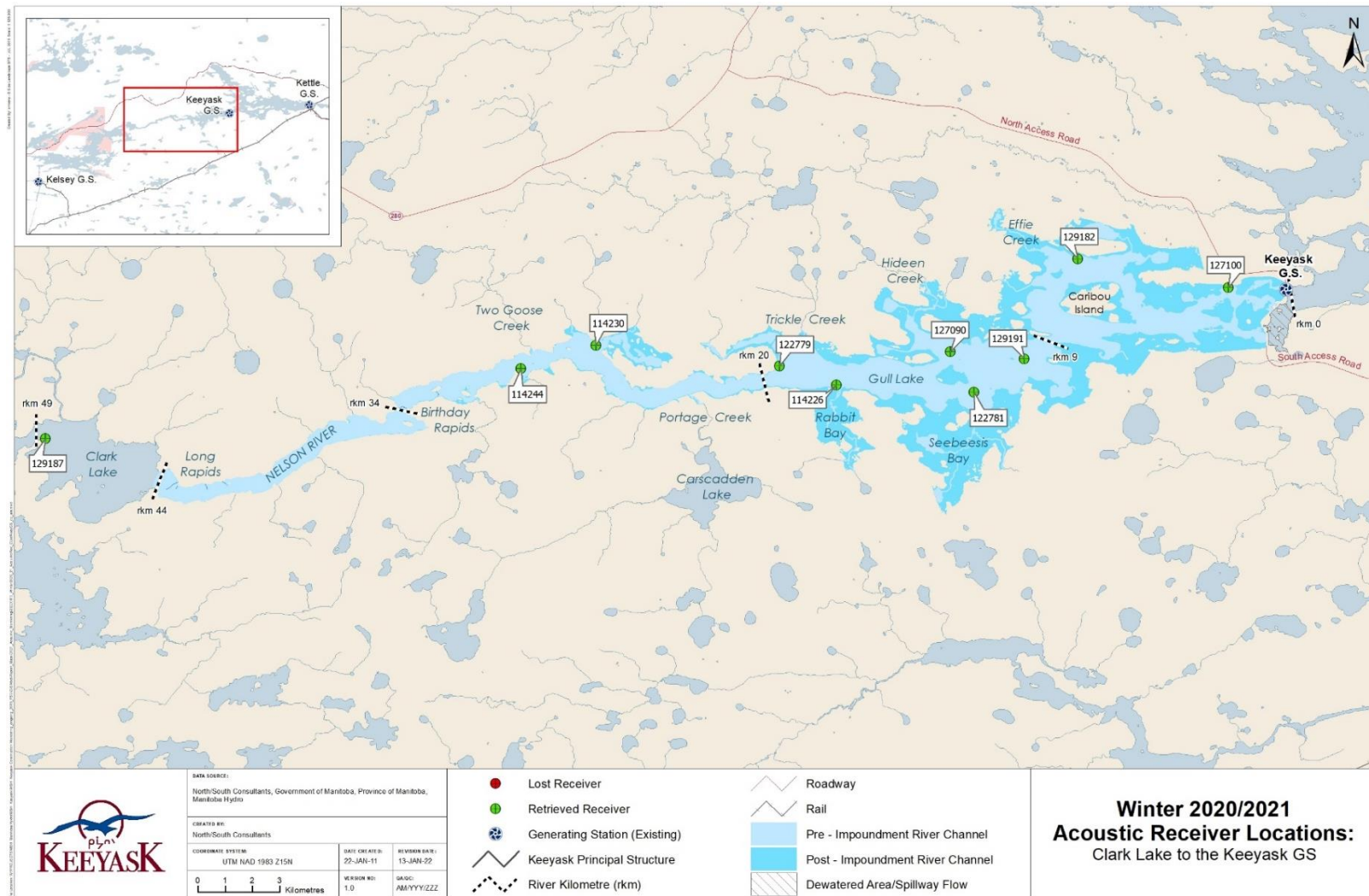
MAPS



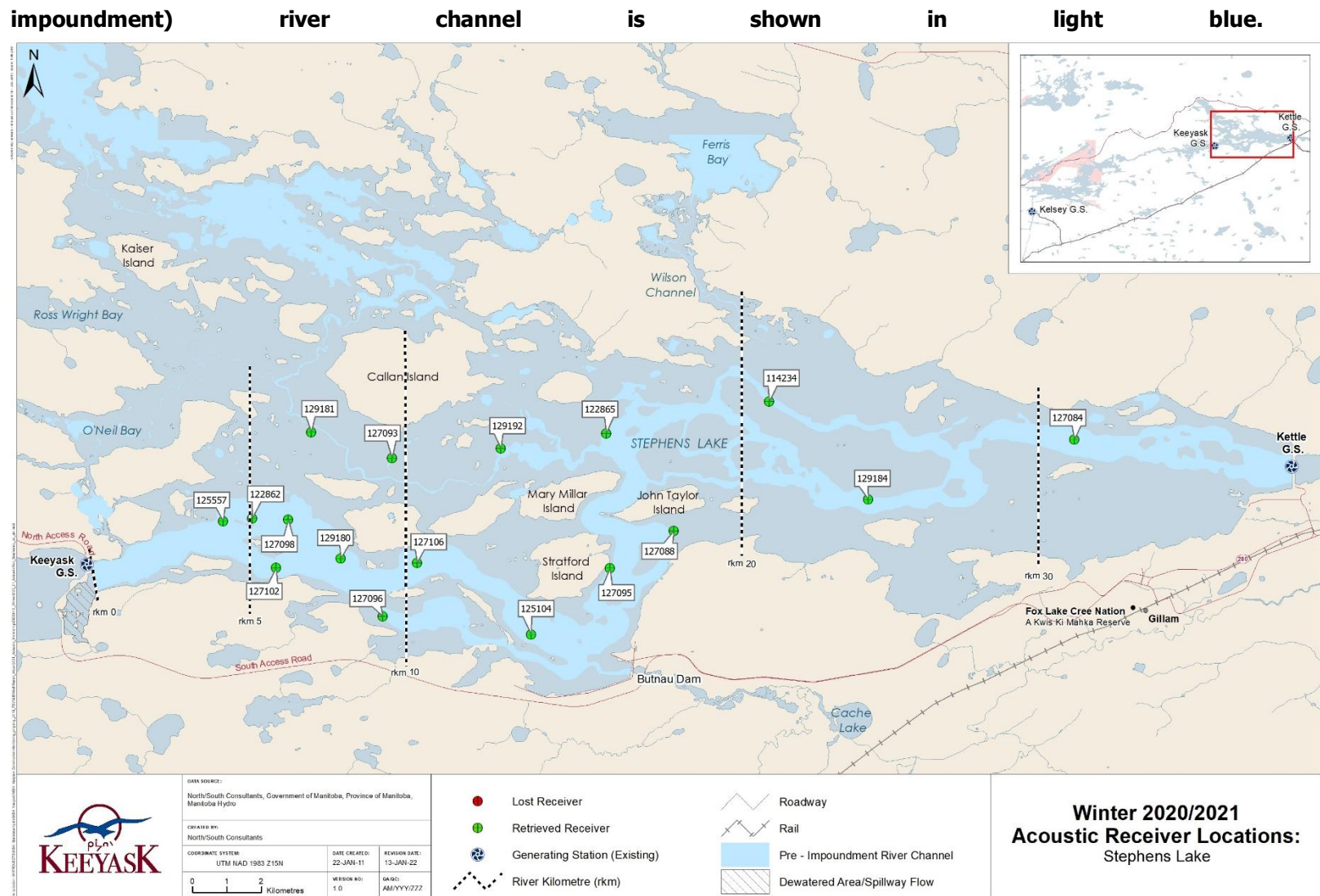
Map 1: Map of the Nelson River showing the site of the Keeyask Generating Station and the adult Lake Sturgeon movement monitoring study setting.



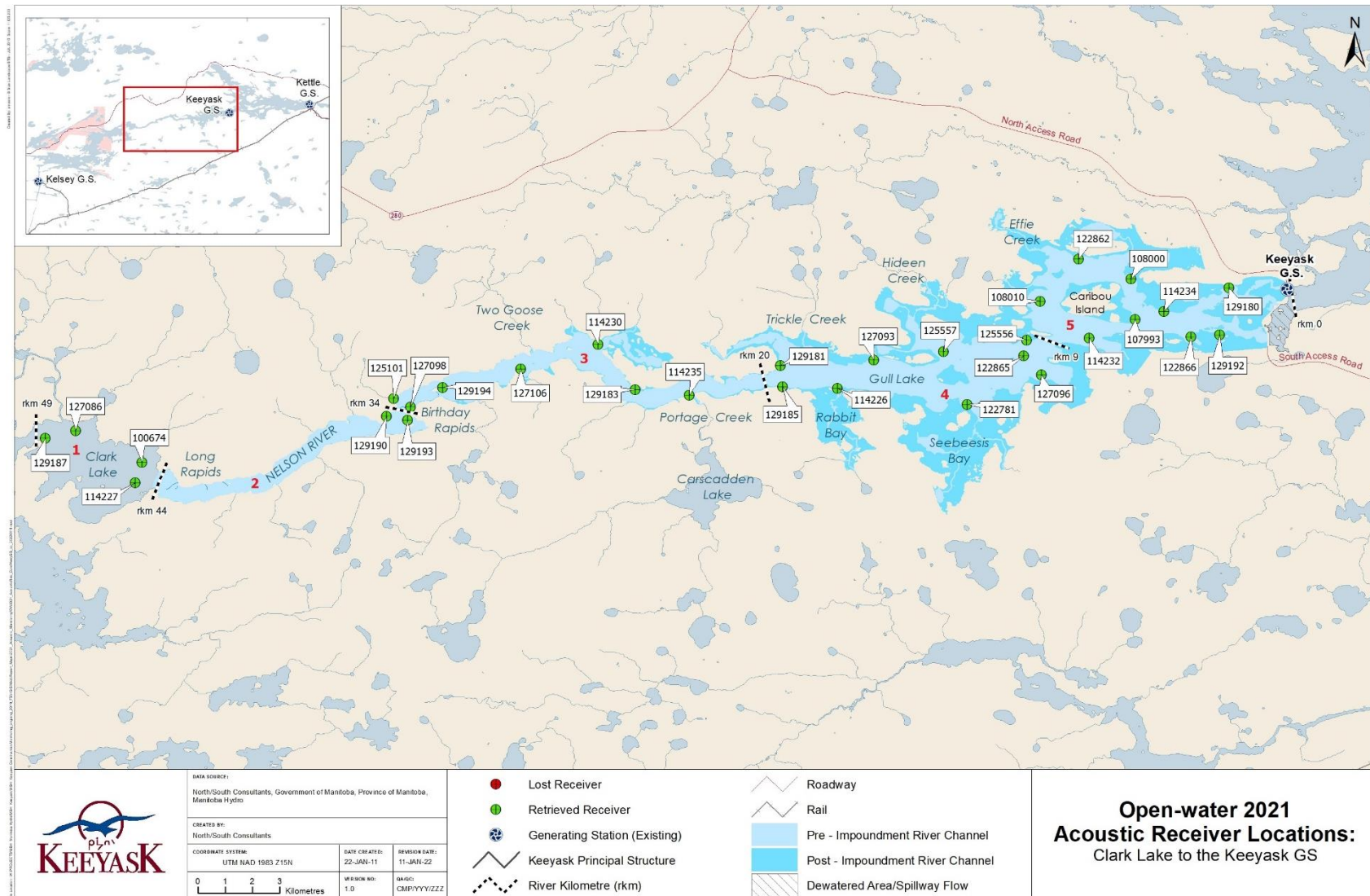
Map 2: Map illustrating instream structures at the Keeyask Generating Station site after reservoir flooding, August 2021.



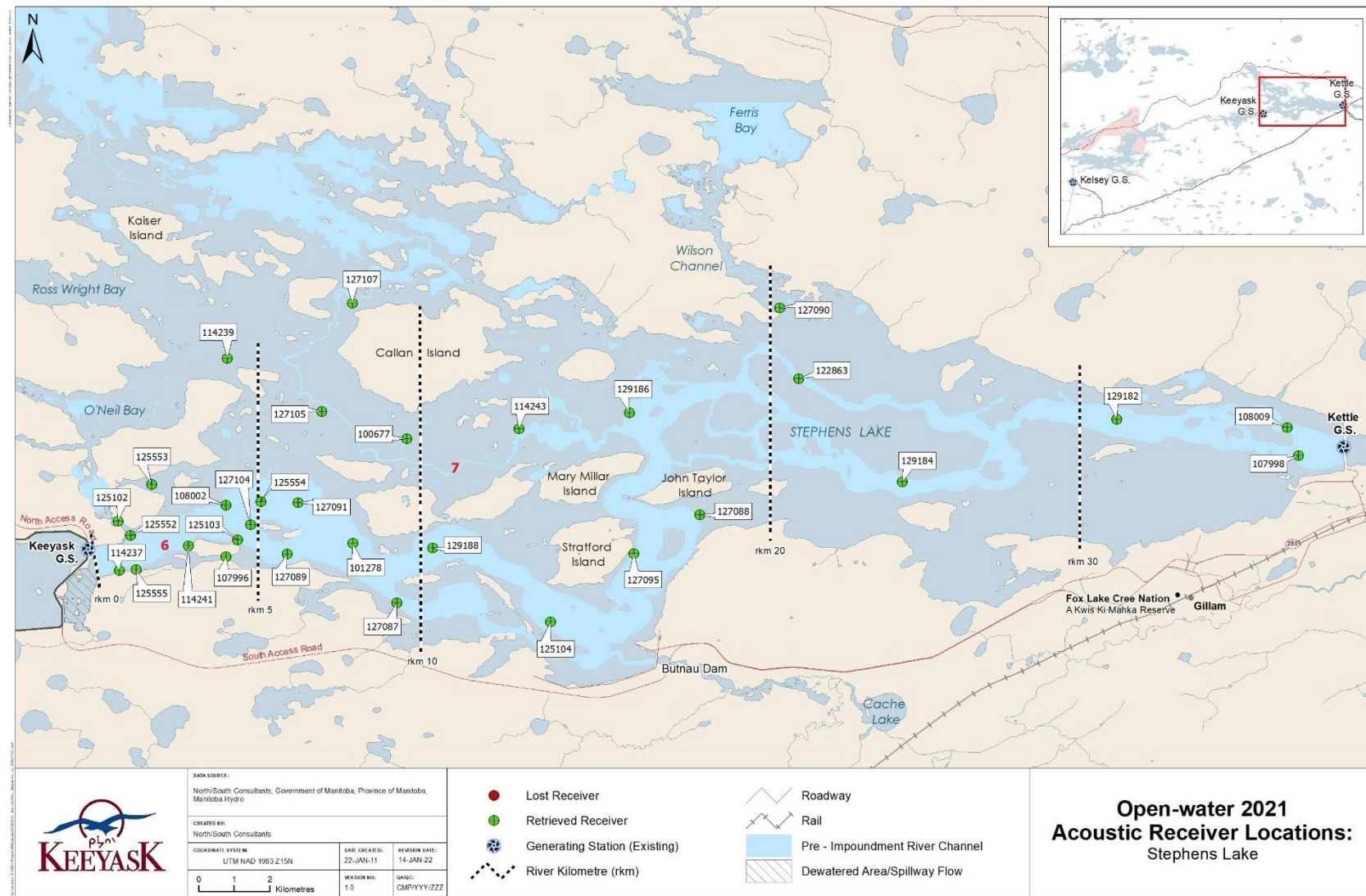
Map 3: Locations of stationary receivers set in the Nelson River from Clark Lake to the Keeyask GS between September 2020 and May 2021. River kilometer (rkm) distances are indicated with a dotted line. The former (pre-



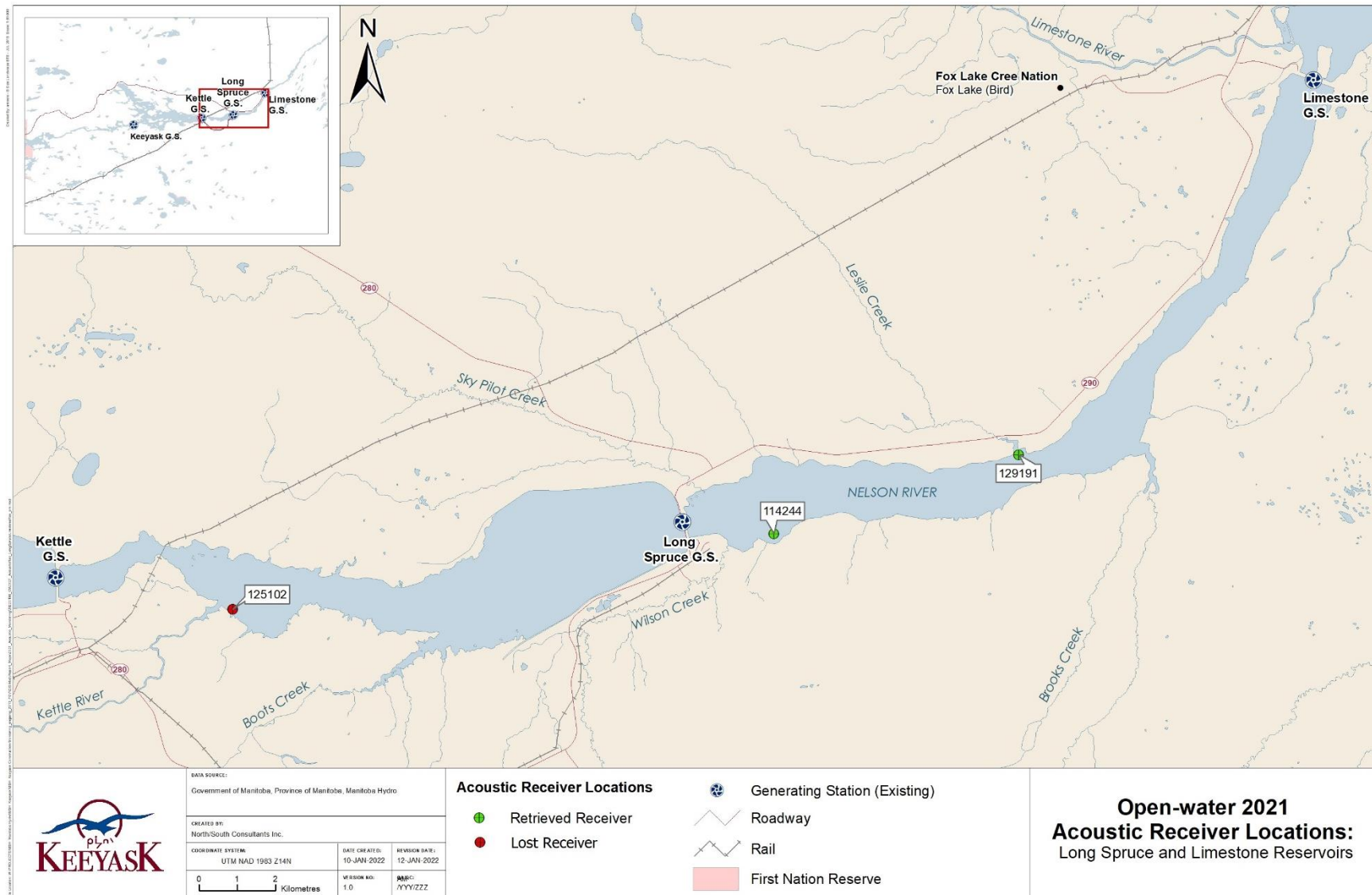
Map 4: Locations of stationary receivers set in Stephens Lake from the Keeyask GS to Kettle GS between September 2020 to May 2021. River kilometer (rkm) distances are indicated with a dotted line. The former (pre-impoundment) river channel is shown in light blue.



Map 5: Locations of stationary receivers set in the Nelson River from Clark Lake to the Keeyask GS between June and October 2021. The river is divided into five "zones" based on placement of receiver "gates." River kilometer (rkm) distances at zone divisions are indicated in red.



Map 6: Locations of stationary receivers set in Stephens Lake between June and October 2021. The river is divided into two "zones" based on placement of receiver "gates." The pre-impoundment river channel is shown in light blue. River kilometer (rkm) distances are indicated with a dotted red line.



Map 7: Locations of stationary receivers set between the Kettle and Limestone Generating Stations, June to October 2021.

APPENDICES

APPENDIX 1:

DETECTION SUMMARIES FOR LAKE STURGEON TAGGED AND MONITORED BETWEEN 2011 AND 2020

Table A1-1:	Detection summary for adult Lake Sturgeon tagged prior to 2019 and monitored upstream of Keeyask GS during the winter 2011/2012 (October 20, 2011 to April 30, 2012), 2012/2013 (October 16, 2012 to April 30, 2013), 2013/2014 (October 16, 2013 to April 30, 2014), 2014/2015 (October 13, 2014 to April 30, 2015), 2015/2016 (October 12, 2015 to April 30, 2016), 2016/2017 (October 20, 2015 to April 30, 2017), 2017/2018 (October 17, 2017 to April 30, 2018), 2018/2019 (October 11, 2018 to April 30, 2019), 2019/2020 (October 8, 2019 to April 30, 2020), and 2020/2021 (September 24, 2020 to April 30, 2021) periods.	66
Table A1-2:	Detection summary for adult Lake Sturgeon tagged prior to 2019 and monitored in Stephens Lake during the winter 2011/2012 (October 20, 2011 to April 30, 2012), 2012/2013 (October 16, 2012 to April 30, 2013), 2013/2014 (October 16, 2013 to April 30, 2014), 2014/2015 (October 13, 2014 to April 30, 2015), 2015/2016 (October 12, 2015 to April 30, 2016), 2016/2017 (October 20, 2015 to April 30, 2017), 2017/2018 (October 17, 2017 to April 30, 2018), 2018/2019 (October 11, 2018 to April 30, 2019), 2019/2020 (October 8, 2019 to April 30, 2020), and 2020/2021 (September 24, 2020 to April 30, 2021) periods.	67
Table A1-3:	Detection summary for adult Lake Sturgeon tagged in 2019 and monitored upstream of the Keeyask GS during the winter 2019/2020 (October 8, 2019 to April 30, 2020) and 2020/2021 (September 24, 2020 to April 30, 2021) periods.	68
Table A1-4:	Detection summary for adult Lake Sturgeon tagged in 2019 and monitored in Stephens Lake during the winter 2019/2020 (October 8, 2019 to April 30, 2020) and 2020/2021 (September 24, 2020 to April 30, 2021) periods.	69
Table A1-5:	Detection summary for adult Lake Sturgeon tagged prior to 2019 and monitored upstream of Keeyask GS during the open-water 2011 (June 1 to October 20), 2012 (May 1 to October 16), 2013 (May 1 to October 16), 2014 (May 1 to October 13), 2015 (May 1 to October 11), 2016 (May 1 to October 19), 2017 (May 1 to October 16), 2018 (May 1 to October 10), 2019 (May 1 to October 7), 2020 (May 1 to September 23), and 2021 (May 1 to October 10) periods.	70

Table A1-6:	Detection summary for adult Lake Sturgeon tagged prior to 2019 and monitored in Stephens Lake during the open-water 2011 (June 1 to October 20), 2012 (May 1 to October 16), 2013 (May 1 to October 16), 2014 (May 1 to October 13), 2015 (May 1 to October 11), 2016 (May 1 to October 19), 2017 (May 1 to October 16), 2018 (May 1 to October 10), 2019 (May 1 to October 7), 2020 (May 1 to September 23), , and 2021 (May 1 to October 10) periods.	71
Table A1-7:	Detection summary for adult Lake Sturgeon tagged in 2019 and monitored upstream of the Keeyask GS during the 2019 (June 1 to October 7), 2020 (May 1 to September 23), and 2021 (May 1 to October 10) open-water periods.	72
Table A1-8:	Detection summary for adult Lake Sturgeon tagged in 2019 and monitored in Stephens Lake during the 2019 (June 1 to October 7), 2020 (May 1 to September 23), and 2021 (May 1 to October 10) open-water periods.	73

Table A1-1: Detection summary for adult Lake Sturgeon tagged prior to 2019 and monitored upstream of Keeyask GS during the winter 2011/2012 (October 20, 2011 to April 30, 2012), 2012/2013 (October 16, 2012 to April 30, 2013), 2013/2014 (October 16, 2013 to April 30, 2014), 2014/2015 (October 13, 2014 to April 30, 2015), 2015/2016 (October 12, 2015 to April 30, 2016), 2016/2017 (October 20, 2015 to April 30, 2017), 2017/2018 (October 17, 2017 to April 30, 2018), 2018/2019 (October 11, 2018 to April 30, 2019), 2019/2020 (October 8, 2019 to April 30, 2020), and 2020/2021 (September 24, 2020 to April 30, 2021) periods. Tag ID highlighted yellow = lost tags. Tag ID highlighted purple = moved downstream through Gull Rapids/the Keeyask GS.

Tag ID	2011/2012			2012/2013			2013/2014			2014/2015			2015/2016			2016/2017			2017/2018			2018/2019			2019/2020			2020/2021				
	n	# Days	Range (rkm)	n	# Days	Range (rkm)	n	# Days	Range (rkm)	n	# Days	Range (rkm)	n	# Days	Range (rkm)	n	# Days	Range (rkm)	n	# Days	Range (rkm)	n	# Days	Range (rkm)	n	# Days	Range (rkm)	n	# Days	U/S (rkm)	D/S (rkm)	
16026	0	-	-	0	-	-	0	-	-	0	-	-	811	3	0.0	0	-	-	0	-	-	0	-	-	0	-	-	547	23.0	-26	-26.4	0.0
16036	2537	118	3.0	43	12	0.0	2326	52	0.0	362	16	0.0	4663	44	0.0	19532	105	0.0	716	32	2.1	1515	19	0.0	10791	34	2.1	46178	191	-17.4	-12.4	-5.0
16039	0	-	-	0	-	-	502	10	3.0	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	20	4	2.1	58458	197	-7.9	-7.9	0.0
16042	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	-	-	-	-	-
16045	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	-	-	-	-	-
16048	0	-	-	0	-	-	2932	66	0.0	0	-	-	11672	60	13.3	28566	172	8.7	43161	190	5.1	39113	195.0	5.1	36295	194.0	5.1	185	2.0	5.4	10.2	-4.8
16051	2475	51	0.0	7088	93	0.0	14618	92	3.0	0	-	-	13958	92	3.0	8873	101	0.0	18985	112	0.0	0	-	-	28439	134	0.0	10873	56	-17.4	-10.1	-7.3
16054	2772	40	5.1	4027	66	0.0	10807	83	3.0	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	-	-	-	-	-
16055	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	687	54	-10.1	-7.9	-2.2
16056	8711	176	0.0	1893	63	0.0	13493	87	0.0	0	-	-	12493	70	0.0	6661	102	0.0	16905	103	0.0	0	-	-	0	-	-	1233	37	-19.5	-10.1	-9.4
16057	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	-	-	-	-	-
16058	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	-	-	-	-	-
16059	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	2758	74	-10.1	-7.9	-2.2
16060	11406	138	0.0	4354	75	0.0	25171	137	0.0	0	-	-	12623	76	0.0	8361	82	2.7	281	5	4.2	14080	125.0	2.7	36248	168.0	2.7	-	-	-	-	-
16061	13225	94	4.3	1157	71	0.0	18018	115	0.0	140	11	0.0	16584	98	0.0	911	26	0.0	2403	34	2.1	0	-	-	273	11	0.0	-	-	-	-	-
16062	5943	148	0.0	2495	48	0.0	9079	120	0.0	0	-	-	12485	88	0.0	12753	107	0.0	17968	107	0.0	0	-	-	10441	72	0.0	12147	140	-12.9	-10.1	-2.8
16063	7905	134	5.1	3650	60	0.0	6098	84	0.0	739	10	0.0	17893	101	0.0	14630	106	0.0	12976	80	2.1	2127	21	0.0	0	-	-	-	-	-	-	-
16064	6717	139	0.0	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	-	-	-	-	-
16065	3485	129	0.0	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	7301	71	-12.9	-10.1	-2.8
16066	0	-	-	0	-	-	0	-	-	0	-	-	12928	84	0.0	0	-	-	0	-	-	0	-	-	0	-	-	25228	198	-19.5	-10.1	-9.4
16067	4542	149	3.0	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-					
16068	272	15	3.0	5623	73	0.0	22744	129	0.0	0	-	-	32671	142	0.0	17400	106	0.0	20418	116	0.0	0	-	-	123	10	2.1	6151	101	-12.9	-10.1	-2.8
16069	0	-	-	0	-	-	678	4	0.0	0	-	-	20	2	0.0	0	-	-	0	-	-	0	-	-	0	-	-	9563	68	-26.4	-26.4	0.0
16070	12833	184	0.0	2	1	0.0	33086	118	0.0	0	-	-	2	1	0.0	23	6	0.0	144	14	2.1	2024	53	0.0	1868	25	0.0	-	-	-	-	-
16071	7247	122	0.0	2351	38	0.0	11439	95	0.0	0	-	-	21854	118	0.0	7883	102	0.0	18505	100	0.0	0	-	-	1412	22	0.0	7440	98	-12.9	-10.1	-2.8
16072	11220	174	0.0	11687	96	0.0	27653	142	3.0	958	5	0.0	10157	74	0.0	17250	108	0.0	22681	115	0.0	0	-	-	6828	100	0.0	-	-	-	-	-
16073	2647	51	3.0	3284	66	0.0	1213	18	0.0	800	6	3.4	761	17	0.0	170	15	0.0	1629	83	0.0	4	2	0.0	7695	90	0.0	212	6	-12.4	-7.9	-4.5
16074	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	65	1	0.0	-	-	-	-	-
16075	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	-	-	-	-	-
16076	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	11940	102	0	51871	187	5.1	53681	200	5.1	18313	119	8.7	53632	204	3.9	10.2	-6.3
16077	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	-	-	-	-	-
32174	-	-	-	-	-	-	-	-	-	0	-	-	988	36	0.0	0	-	-	0	-	-	0	-	-	33639	165	5.1	-	-	-	-	-
32175	-	-	-	-	-	-	-	-	-	0	-	-	0	-	-	6228	75	0	7739	101	0.0	0	-	-	12569	96	0.0	-	-	-	-	-
32176	-	-	-	-	-	-	-	-	-	0	-	-	13046	87	0.0	13507	103	0.0	25715	118	0.0	0	-	-	0	-	-	-	-	-	-	-
32177	-	-	-	-	-	-	-	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	-	-	-	-	-
54799	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	40570	157	2.1	20699	129	-12.9	-10.1	-2.8

Table A1-2: Detection summary for adult Lake Sturgeon tagged prior to 2019 and monitored in Stephens Lake during the winter 2011/2012 (October 20, 2011 to April 30, 2012), 2012/2013 (October 16, 2012 to April 30, 2013), 2013/2014 (October 16, 2013 to April 30, 2014), 2014/2015 (October 13, 2014 to April 30, 2015), 2015/2016 (October 12, 2015 to April 30, 2016), 2016/2017 (October 20, 2015 to April 30, 2017), 2017/2018 (October 17, 2017 to April 30, 2018), 2018/2019 (October 11, 2018 to April 30, 2019), 2019/2020 (October 8, 2019 to April 30, 2020), and 2020/2021 (September 24, 2020 to April 30, 2021) periods. Tag ID highlighted green = moved upstream over Gull Rapids and harvested. Tag ID highlighted blue = moved upstream over Gull Rapids. Tag ID highlighted yellow = lost tags. Tag ID highlighted red = moved downstream through Kettle GS. Tag ID highlighted purple = moved downstream through Gull Rapids/the Keeyask GS. Tag ID highlighted orange = moved downstream through Long Spruce GS.

Tag ID	2011/2012			2012/2013			2013/2014			2014/2015			2015/2016			2016/2017			2017/2018			2018/2019			2019/2020			2020/2021				
	n	# Days	Range (rkm)	n	# Days	Range (rkm)	n	# Days	Range (rkm)	n	# Days	Range (rkm)	n	# Days	Range (rkm)	n	# Days	Range (rkm)	n	# Days	Range (rkm)	n	# Days	Range (rkm)	n	# Days	Range (rkm)	n	# Days	U/S (rkm)	D/S (rkm)	Range (rkm)
16018	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	-	-
16019	0	-	-	887	39	0.6	2959	33	8.8	8761	79	2.8	14035	107	13.3	34307	144	8.7	49386	193	8.7	46504	201	0.0	46896	196	30.9	4557	144	4.9	13.4	8.5
16020	0	-	-	3625	25	9.5	24335	102	8.8	6183	36	7.2	36598	188	7.2	40522	181	8.7	43215	188	8.7	42253	177	8.7	41964	199	8.7	24533	155	7.8	16.1	8.3
16021	16475	79	29.2	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	-	-
16022	0	-	-	1227	15	9.5	7508	83	4.1	10649	55	7.2	45870	197	7.2	21329	149	5.1	32696	193	5.1	51590	195	5.1	0	-	-	41855	203	3.9	18.8	14.9
16024	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	-	-
16025	0	-	-	1974	47	0.0	20670	114	0.0	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-								
16027	0	-	-	3398	70	4.3	2111	24	1.6	23369	120	2.8	50070	189	13.3	17718	175	4.2	32484	177	5.1	35350	188	5.1	26437	164	2.7	20881	138	3.9	13.4	9.5
16028	0	-	-	733	7	9.5	2123	8	14.9	21803	84	2.8	59177	199	2.5	5377	104	5.1	52456	184	5.1	79145	202	0.0	54606	167	5.1	22223	105	3.9	16.1	12.2
16029	1937	39	9.7	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	16781	85	0.0	0	-	-	0	-	-	100	8	-10.1	-10.1	0.0
16030	12583	70	3.9	13733	89	4.3	2887	63	8.8	8872	97	7.2	24440	160	7.2	29177	156	4.2	49491	192	5.1	461	5	5.1	13133	85	8.7	27757	99	3.9	10.2	6.3
16031	0	-	-	7414	26	3.8	45513	147	0.0	36654	117	0.0	58954	198	0.0	537	26	0.0	40104	140	6.5	14016	92	3.6	34404	129	8.3	54753	210	3.9	18.8	14.9
16032	48676	67	3.1	2284	23	2.4	3780	48	8.8	4759	53	2.5	36289	190	4.7	39506	164	6.0	2367	21	8.7	7144	51	8.7	0	-	-	0	-	-	-	-
16033	125	3	2.3	-	-	-	-	-	-	-	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-					
16033b	-	-	-	-	-	-	15689	104	7.3	3243	42	7.2	34665	149	7.2	17885	68	5.1	0	-	-	0	-	-	55567	204	4.2	66147	198	3.9	8.7	4.8
16034	39927	61	20.2	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-				0	-	-	-	-
16035	7225	84	3.1	22099	113	2.4	29174	179	12.6	14317	83	2.8	60418	202	7.2	26922	190	4.2	43778	194	5.1	0	-	-	0	-	-	0	-	-	-	-
16037	36948	77	3.9	991	18	4.3	24601	133	3.0	10762	61	2.8	4277	21	2.5	1551	17	8.7	0	-	-	16566	107	2.7	28170	190	5.1	18772	143	3.9	13.4	9.5
16038	14187	69	10.5	9	2	0.0	106	8	0.0	4	2	0.0	0	-	-	0	-	-	11575	61	0.0	26037	95	0.0	13692	71	2.1	54669	206	-12.4	-10.1	2.3
16040	18814	85	3.9	23113	104	2.4	4436	21	12.6	5033	26	2.5	29413	189	2.5	39264	189	4.2	38059	189	4.2	30871	110	5.1	31853	92	7.4	36971	195	3.9	10.2	6.3
16041	135	11	0.0	4328	25	3.8	16656	153	4.1	16912	74	2.5	30740	174	0.0	22473	119	6.0	48061	196	5.1	7027	121	3.6	31853	131	7.4	11557	190	10.2	18.8	8.6
16043	6989	49	17.1	10520	95	16.0	16074	114	10.8	36372	188	10.8	17192	188	13.3	10142	166	13.4	18030	176	6.5	11163	81	6.5	40793	137	11.6	0	-	-	-	-
16044	9036	57	21.0	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	-	-
16046	6972	85	3.1	248	25	0.0	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	-	-	-	-	-
16047	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	-	-
16049	20859	75	3.9	32364	157	4.3	24241	140	8.8	9993	101	2.8	18078	144	7.2	31523	176	8.7	16474	90	5.1	60739	199	5.1	52026	204	5.1	0	-	-	-	-
16050	345	3	0.0	18070	65	3.8	2920	50	10.8	8473	55	6.1	44567	169	4.7	23677	172	0.0	14296	93	6.5	37082	155	0.0	6670	84	3.6	12084	141	10.2	13.4	3.2
16052	143	4	9.6	6505	78	7.6	34688	173	0.0	18189	165	11.0	49267	186	13.3	13313	124	0.0	4096	69	3.6	7370	89	8.7	3738	43	11.6	44128	185	3.9	10.2	6.3
16053	2960	31	3.1	776	10	11.4	2209	20	14.9	7018	46	2.5	68422	200	2.5	26653	140	4.5	49211	184	5.1	26479	180	6.0	55416	199	2.4	12398	157	10.2	13.4	3.2
32167	-	-	-	-	-	-	-	-	-	293	14	0.0	37839	187	7.2	30174	143	6.0	38220	144	8.9	27516	128	8.7	7289	64	3.6	0	-	-	-	-
32168	-	-	-	-	-	-	-	-	-	19931	142	13.3	47809	189	2.5	24622	74	8.7	22658	121	4.2	63772	194	8.7	45399	200	5.1	0	-	-	-	-
32169	-	-	-	-	-	-	-	-	-	444	6	2.5	51598	201	7.2	4141	22	8.7	42584	165	8.7	0	-	-	9080	123	2.7	0	-	-	-	-
32170	-	-	-	-	-	-	-	-	-	3328	69	2.8	0	-	-	47	2	2.7	0	-	-	0	-	-	0	-	-	0	-	-	-	-
32171	-	-	-	-	-	-	-	-	-	3275	24	13.3	53443	182	7.2	30627	156	5.1	65428	196	5.1	27162	176	5.1	55520	204	5.1	0	-	-	-	-
32172	-	-	-	-	-	-	-	-	-	8293	37	11.0	1455	13	7.2	9761	68	2.7	17548	93	2.7	0	-	-	3681	44	2.7	0	-	-	-	-
32173	-	-	-	-	-	-	-	-	-	3843	49	2.5	45871	157	2.5	46475	145	4.2	4357	69	4.2	15813	75	4.2	50454	196	5.1	0	-	-	-	-

Table A1-3: Detection summary for adult Lake Sturgeon tagged in 2019 and monitored upstream of the Keeyask GS during the winter 2019/2020 (October 8, 2019 to April 30, 2020) and 2020/2021 (September 24, 2020 to April 30, 2021) periods.

Tag ID	2019/2020					2020/2021				
	n	# Days	U/S (rkm)	D/S (rkm)	Range (rkm)	n	# Days	U/S (rkm)	D/S (rkm)	Range (rkm)
7017	24444	174	-10.3	-10.3	0.0	21752	152	-12.9	-10.1	-2.8
7018	1121	19	-12.4	-10.3	2.1	18248	148	-19.5	-10.1	-9.4
7019	2600	35	-12.4	-10.3	2.1	19171	170	-12.9	-7.9	-5.0
7020	607	21	-12.4	-12.4	0.0	11929	122	-7.9	-7.9	0.0
7021	25206	79	-29.4	-29.4	0.0	22928	95	-29.3	-29.3	0.0
7022	456	2	-29.4	-29.4	0.0	-	-	-	-	-
7023	8685	70	-10.3	-10.3	0.0	26264	191	-12.9	-10.1	-2.8
7024	27181	168	-10.3	-10.3	0.0	19880	107	-29.3	-7.9	-21.4
7025	3	1	-12.4	-12.4	0.0	3586	68	-12.9	-12.4	-0.5
7026	2214	41	-12.4	-12.4	0.0	9317	174	-10.1	-10.1	0.0
7027	11820	105	-10.3	-10.3	0.0	22856	174	-12.9	-2.2	-10.7
7028	28985	177	-10.3	-10.3	0.0	25217	128	-12.4	-10.1	-2.3
7029	99	18	-10.3	-10.3	0.0	7059	121	-12.9	-10.1	-2.8
7030	8152	60	-10.3	-10.3	0.0	8291	122	-12.9	-7.9	-5.0
7031	27053	148	-10.3	-10.3	0.0	41670	199	-17.4	-10.1	-7.3
7032	8394	63	-10.3	-10.3	0.0	3671	110	-10.1	-10.1	0.0
7033	0	-	-	-	-	-	-	-	-	-
7034	0	-	-	-	-	44744	218	-19.5	-7.9	-11.6
7053	219	13	-12.4	-10.3	2.1	8571	123	-12.9	-10.1	-2.8
7056	688	27	-12.4	-12.4	0.0	13204	160	-12.9	-10.1	-2.8
7059	852	14	-12.4	-10.3	2.1	17168	210	-12.9	-10.1	-2.8
7061	0	-	-	-	-	213	22	-7.9	-7.9	0.0
7064	696	37	-12.4	-10.3	2.1	17306	166	-12.9	-10.1	-2.8
7065	67	11	-10.3	-10.3	0.0	22991	203	-12.4	-10.1	-2.3
7066	959	39	-12.4	-10.3	2.1	18176	170	-12.9	-10.1	-2.8
7067	19911	124	-10.3	-10.3	0.0	15384	139	-12.9	-7.9	-5.0

Table A1-4: Detection summary for adult Lake Sturgeon tagged in 2019 and monitored in Stephens Lake during the winter 2019/2020 (October 8, 2019 to April 30, 2020) and 2020/2021 (September 24, 2020 to April 30, 2021) periods.

Tag ID	2020/2021					2020/2021				
	n	# Days	U/S (rkm)	D/S (rkm)	Range (rkm)	n	# Days	U/S (rkm)	D/S (rkm)	Range (rkm)
7035	5505	54	5.2	5.8	0.6	12401	74	3.9	8.7	4.8
7036	15525	114	5.2	10.3	5.1	40691	209	3.9	10.2	6.3
7037	49403	202	5.2	10.3	5.1	41308	194	3.9	10.2	6.3
7038	28537	127	5.2	7.9	2.7	17429	114	3.9	10.2	6.3
7039	0	-	-	-	-	18757	79	3.9	7.8	3.9
7040	40531	190	5.2	13.9	8.7	49504	211	3.9	18.8	14.9
7041	14379	84	5.2	13.9	8.7	26800	102	3.9	10.2	6.3
7042	22913	131	13.9	16.8	2.9	40897	182	13.4	13.4	0.0
7043	34656	202	7.9	10.3	2.4	69934	219	3.9	10.2	6.3
7044	31446	178	5.2	9.4	4.2	51876	163	3.9	7.8	3.9
7045	24721	118	5.2	7.9	2.7	11341	135	3.9	7.8	3.9
7046	0	-	-	-	-	98	16	3.9	3.9	0.0
7047	24191	165	7.9	10.3	2.4	53403	204	3.9	10.2	6.3
7048	40541	160	5.2	13.9	8.7	46907	192	3.9	8.7	4.8
7049	33043	177	5.2	13.9	8.7	68196	213	10.2	16.1	5.9
7050	24998	152	5.2	18.6	13.4	4630	160	3.9	10.2	6.3
7051	18711	120	5.2	13.9	8.7	46586	205	3.9	10.2	6.3
7052	36882	196	5.2	36.1	30.9	4836	145	3.9	13.4	9.5
7054	26409	175	5.2	9.4	4.2	7666	168	10.2	13.4	3.2
7055	36130	192	5.2	10.3	5.1	43461	203	3.9	10.2	6.3
7057	36308	203	5.2	10.3	5.1	32930	199	3.9	10.2	6.3
7058	30636	159	7.9	18.6	10.7	28970	183	10.2	18.8	8.6
7060	30137	184	5.2	10.3	5.1	39966	211	3.9	8.7	4.8
7062	987	21	5.2	9.4	4.2	8213	50	3.9	8.7	4.8
7063	4	1	5.2	5.2	0.0	18786	90	3.9	8.7	4.8

Table A1-5: Detection summary for adult Lake Sturgeon tagged prior to 2019 and monitored upstream of Keeyask GS during the open-water 2011 (June 1 to October 20), 2012 (May 1 to October 16), 2013 (May 1 to October 16), 2014 (May 1 to October 13), 2015 (May 1 to October 11), 2016 (May 1 to October 19), 2017 (May 1 to October 16), 2018 (May 1 to October 10), 2019 (May 1 to October 7), 2020 (May 1 to September 23), and 2021 (May 1 to October 10) periods. Tag ID highlighted yellow = lost tags. Tag ID highlighted purple = moved downstream through Gull Rapids/the Keeyask GS. Tag ID highlighted green = moved downstream through the Kettle GS.

Tag ID	2011			2012			2013			2014			2015			2016			2017			2018			2019			2020			2021				
	n	# Days	Range (rkm)	n	# Days	Range (rkm)	n	# Days	Range (rkm)	n	# Days	Range (rkm)	n	# Days	Range (rkm)	n	# Days	Range (rkm)	n	# Days	Range (rkm)	n	# Days	Range (rkm)	n	# Days	Range (rkm)	n	# Days	U/S (rkm)	D/S (rkm)	Range (rkm)			
16026	-	-	-	23195	83	9.4	12588	83	0.0	13090	103	0.0	29896	103	7.3	28343	128	7.3	18137	119	14.6	29052	129	7.3	15615	107	4.7	5031	44	23.9	1303	17	-26.4	-2.2	24.2
16036	2152	32	8.6	6980	86	9.4	5328	82	8.1	12362	112	10.0	20379	132	9.6	16678	140	10.2	11145	102	12.1	9722	90	14.7	13154	121	13.7	10082	90	15.7	3478	29	-19.5	-10.1	9.4
16039	2260	42	13.3	5250	66	12.5	16487	107	11.3	12670	120	11.6	18372	119	10.5	15797	120	13.7	17882	110	13.7	23403	134	14.7	16641	116	14.7	16071	78	24.6	528	11	-19.5	-7.9	11.6
16042	1914	54	0.0	576	11	0.8	2626	30	3.4	6660	54	3.9	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	-	-
16045	786	13	7.0	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	-	-
16048	383	6	1.6	1773	37	0.8	10796	119	21.6	7527	93	21.7	20784	116	36.9	14738	108	22.3	15301	109	17.4	22386	128	23.5	27308	128	13.3	6739	83	18.2	0	-	-	-	-
16051	1935	76	8.7	5804	105	15.3	8015	115	13.4	10404	57	13.7	10706	126	26.5	8157	96	13.7	8451	85	11.6	15291	135	14.7	9992	112	19.9	60063	72	13.6	1091	18	-19.5	-10.1	9.4
16054	2697	49	12.0	4278	101	10.6	11062	105	9.5	7102	93	12.1	17220	90	38.7	9099	114	23.9	5602	33	21.7	14850	85	21.7	4142	30	20.4	0	-	-	265	4	-48.2	-34.3	13.9
16055	1140	9	3.4	1384	27	5.7	8271	89	4.9	7657	86	10.0	5005	104	5.5	12401	92	5.5	8824	108	13.7	9709	88	7.6	15077	127	5.1	2544	48	6.7	1286	11	-10.1	-7.9	2.2
16056	234	12	19.1	4665	87	10.6	12862	96	19.5	17163	115	10.0	18319	113	20.4	29142	135	23.6	16839	88	20.1	14370	110	29.0	8398	87	20.1	3647	50	16.5	888	17	-19.5	-17.4	2.1
16057	475	25	4.2	524	29	8.5	0	-	-	2	1	0.0	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	-	-
16058	549	16	9.3	1071	4	9.7	0	-	-	0	-	-	0	-	-	418	13	3.9	1169	38	3.9	544	18	3.7	2030	90	3.9	0	-	-	0	-	-	-	-
16059	599	5	3.4	1696	32	10.4	13935	78	11.3	10991	57	5.1	4708	85	13.7	7570	59	3.5	6223	64	4.3	2903	91	14.7	14404	121	5.4	8370	64	6.3	1486	18	-34.3	-3.8	30.5
16060	1759	43	7.1	4065	95	8.7	16366	124	7.1	13228	108	7.1	19911	115	7.4	8653	73	28.5	18575	115	11.8	12355	55	8.2	19060	132	13.3	2549	39	17.6	0	-	-	-	-
16061	711	37	2.4	4444	108	13.6	11503	114	5.5	7437	95	3.4	13771	111	13.7	15840	120	13.7	8642	79	13.7	11533	87	14.7	11202	107	8.1	0	-	-	0	-	-	-	-
16062	142	14	8.6	5624	86	12.4	16854	109	24.4	18336	129	7.9	19949	120	10.0	26029	145	10.0	18277	117	13.7	18684	137	24.6	15990	111	11.6	9066	76	7.5	1113	22	-22.6	-10.1	12.5
16063	2617	59	10.4	9474	105	5.7	21588	126	9.3	23121	127	7.9	24981	137	10.0	28915	163	10.0	24788	121	10.0	14228	115	14.7	4478	36	37.6	0	-	-	0	-	-	-	-
16064	1910	27	19.1	573	26	1.2	0	-	-	0	-	-	0	-	-	5	2	0.0	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	-	-
16065	931	36	4.5	6192	109	17.9	2581	38	5.1	3101	38	5.1	14349	104	28.0	7730	73	4.3	3061	62	13.7	4711	71	5.4	3448	90	14.7	3904	59	9.1	0	-	-	-	-
16066	772	39	1.8	4615	105	10.6	2322	36	8.1	8898	73	12.1	1884	20	7.9	6940	104	13.7	10910	94	6.1	10160	115	12.6	13197	127	8.1	5808	75	10.2	2351	29	-34.3	-12.4	21.9
16067	1640	34	1.6	2516	39	31.7	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	19167	114	38.3	2314	23	34.5	0	-	-	0	-	-	-	-
16068	1046	27	2.4	5882	105	10.6	10402	111	23.9	13158	121	10.0	16490	123	10.0	20273	135	13.7	13842	118	10.0	12545	121	16.6	3126	89	22.4	6469	90	9.6	658	15	-34.3	-17.4	16.9
16069	0	-	-	17495	85	4.5	13288	100	7.3	14172	66	2.9	8287	80	10.0	24559	122	5.1	18718	92	7.3	19345	102	2.9	12791	93	2.9	1420	44	3.0	151	9	-32.2	-26.4	5.8
16070	1080	40	8.6	14691	106	17.0	7943	89	9.6	9967	83	9.6	12593	101	10.0	4083	80	13.7	3202	80	10.0	4014	78	14.7	5686	83	14.7	0	-	-	0	-	-	-	-
16071	1403	43	8.6	9124	89	10.6	11285	130	9.3	17413	102	12.1	39272	131	13.7	37521	151	9.9	31215	124	13.7	21205	139	11.6	16737	122	14.7	3957	67	7.7	961	21	-34.3	-10.1	24.2
16072	2839	58	12.9	4031	91	10.6	16638	129	19.5	19306	112	7.9	15866	127	10.0	6608	129	10.0	16299	127	3.3	10676	115	22.4	8895	114	3.0	281	16	9.2	0	-	-	-	-
16073	1025	35	2.4	4432	102	12.4	6885	94	9.3	13884	127	10.0	4500	73	13.7	25145	151	13.7	10316	113	13.7	14231	124	14.7	9649	114	13.7	8206	71	11.2	0	-	-	-	-
16074	0	-	-	13006	67	4.7	11803	78	2.9	3105	23	7.3	655	13	15.9	2889	25	3.9	2957	24	3.7	3174	20	3.9	7540	77	3.9	98	5	28.7	0	-	-	-	-
16075	462	10	6.3	0	-	-	0	-	-	0	-	-	865	35	4.3	0	-	-	0	-	-	61208	134	0.0	61112	137	1.0	34499	81	0.0	0	-	-	-	-
16076	1040	35	6.3	2225	56	9.4	9270	81	11.3	9075	84	11.6	12474	79	11.6	27013	118	9.0	16851	94	24.0	21817	127	23.5	18015	128	18.0	11704	68	18.2	9923	38	2.7	8.7	6.0
16077	282	5	0.0	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	-	-
32174	-	-	-	-	-	-	-	-	-	9705	98	28.5	20042	118	42.4	15062	82	28.9	11336	60	12.7	1751	18	15.6	17944	90	18.0	8199	72	18.2	0	-	-	-	-
32175	-	-	-	-	-	-	-	-	-	9186	90	6.0	22601	114	5.3	48213	134	3.4	32547	133	5.3	11208	84	3.6	31761	117	3.6	15497	81	9.6	0	-	-	-	-
32176	-	-	-	-	-	-	-	-	-	22630	106	11.6	15054	109	26.5	23822	111	7.1	32410	125	7.0	23353	141	10.2	45707	134	14.7	23157	55	0.9	0	-	-	-	-
32177	-	-	-	-	-	-	-	-	-	20678	109	5.5	265	15	0.6	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	-	-
54799	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16229	111	21.7											

Table A1-6: Detection summary for adult Lake Sturgeon tagged prior to 2019 and monitored in Stephens Lake during the open-water 2011 (June 1 to October 20), 2012 (May 1 to October 16), 2013 (May 1 to October 16), 2014 (May 1 to October 13), 2015 (May 1 to October 11), 2016 (May 1 to October 19), 2017 (May 1 to October 16), 2018 (May 1 to October 10), 2019 (May 1 to October 7), 2020 (May 1 to September 23), , and 2021 (May 1 to October 10) periods. Tag ID highlighted green = moved upstream over Gull Rapids and harvested. Tag ID highlighted blue = moved upstream over Gull Rapids. Tag ID highlighted yellow = lost tags. Tag ID highlighted red = moved downstream through Kettle GS. Tag ID highlighted purple = moved downstream through Gull Rapids/the Keeyask GS. Tag ID highlighted orange = moved downstream through Long Spruce GS.

Tag ID	2011			2012			2013			2014			2015			2016			2017			2018			2019			2020			2021				
	n	# Days	Range (rkm)	n	# Days	Range (rkm)	n	# Days	Range (rkm)	n	# Days	Range (rkm)	n	# Days	Range (rkm)	n	# Days	Range (rkm)	n	# Days	Range (rkm)	n	# Days	Range (rkm)	n	# Days	Range (rkm)	n	# Days	U/S (rkm)	D/S (rkm)	Range (rkm)			
16018	0	-	-	341	5	34.5	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	-	-			
16019	0	-	-	9272	70	26.9	15039	116	18.2	13297	76	39.5	20832	129	27.0	17331	117	22.3	18192	117	17.4	19589	99	20.4	17756	128	24.1	9491	89	17.6	6741	73	0.8	24.9	24.1
16020	0	-	-	7450	101	11.9	13664	99	14.2	8592	111	19.7	25808	137	19.7	29291	155	17.4	19304	150	23.5	13674	104	34.9	8865	97	35.5	9754	105	17.4	4500	58	0.8	32	31.2
16021	2770	21	14.2	4530	30	5.0	0	-	-	0	-	-	0	-	-	1331	18	1.0	0	-	-	0	-	-	0	-	-	0	-	-	-	-	-		
16022	0	-	-	9845	100	16.0	7248	71	20.5	10957	101	20.5	18858	127	16.1	12608	124	22.3	13393	120	17.4	19908	126	17.4	17340	141	24.1	12292	96	17.6	16817	104	0.8	18.8	18.0
16024	0	-	-	398	9	4.0	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	-	-	-		
16025	0	-	-	2316	67	35.2	9668	119	10.2	1572	23	60.4	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	-	-	-		
16027	0	-	-	8249	87	16.0	15717	109	14.4	10960	72	9.7	14083	114	13.6	22348	148	9.0	22812	125	9.1	14092	119	17.4	16367	142	9.7	3342	42	17.6	8757	79	0.8	18.8	18.0
16028	0	-	-	9063	92	16.3	98	8	3.7	6174	58	17.4	16344	108	17.7	19657	109	12.7	29657	142	15.6	22350	126	17.4	16146	125	24.1	7884	76	15.6	11565	89	0.8	18.8	18.0
16029	3801	62	58.1	6087	102	19.9	4940	83	10.2	13325	102	16.0	8716	94	10.2	5821	101	20.1	12873	85	10.2	4030	80	10.2	3475	56	10.2	4059	37	6.3	688	13	-22.6	-10.1	12.5
16030	7733	86	15.5	6414	86	14.4	13494	86	25.5	16498	104	27.4	15935	94	17.7	10843	118	34.9	16302	127	34.9	18034	120	17.4	21071	113	18.0	7288	78	17.6	6630	34	0.8	7.8	7.0
16031	0	-	-	12814	104	16.3	10315	106	14.4	12775	99	13.6	17780	125	13.6	18745	141	15.6	14795	131	12.7	19537	128	17.4	10698	123	18.0	5722	71	30.8	13805	132	0.8	18.8	18.0
16032	5801	56	14.2	13833	120	16.0	17055	115	19.7	16765	118	18.2	11985	106	16.1	18322	116	17.5	29122	157	17.4	23612	107	15.6	0	-	-	0	-	-	0	-	-	-	-
16033	5144	44	14.2	3001	43	37.5	0	-	-	-	-	-	-	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	-	-
16033b	-	-	-	-	-	-	3505	30	12.4	13578	101	17.4	28621	127	16.1	21058	118	17.4	27766	127	12.7	20613	108	9.1	26564	129	9.7	10265	65	12.2	14716	91	0.8	16.3	15.5
16034	15378	75	11.2	15394	61	2.2	38582	117	0.8	25117	99	4.8	30925	119	0.8	10170	70	15.9	13	2	0.0	0	-	0.0	0	-	-	0	-	-	0	-	-	-	-
16035	1547	12	10.9	8767	91	14.4	19324	116	20.3	16298	121	19.7	23142	119	17.7	19523	133	23.5	27311	149	17.4	6244	35	39.6	0	-	-	0	-	-	0	-	-	-	-
16037	8375	50	7.4	13685	108	11.9	21481	125	44.3	13636	91	47.2	17230	113	16.1	13411	89	17.4	15203	109	17.4	19431	114	15.6	18611	126	17.4	9668	91	16.2	1296	15	3.9	10.2	6.3
16038	5777	45	11.2	3402	87	31.0	7973	124	9.3	3975	76	10.0	10827	75	12.1	15190	103	10.0	13109	131	10.2	12193	97	19.5	10310	99	13.7	7297	78	9.6	2236	24	-19.5	-12.4	7.1
16040	9602	70	12.5	8598	109	12.0	21959	128	18.0	4833	62	18.2	15041	122	19.7	15740	117	17.4	12642	92	17.4	16018	114	17.4	13386	90	18.0	6521	52	15.0	0	-	-	-	-
16041	15169	88	11.2	9437	81	40.7	8915	81	14.4	13556	111	14.4	15807	101	16.1	14398	113	13.7	20805	136	17.4	19091	126	17.4	12752	115	18.0	12102	106	14.9	8728	40	0.8	10.2	9.4
16043	20429	92	15.5	13049	98	11.9	12476	115	14.4	13303	118	15.8	20525	131	17.7	22234	122	13.7	18103	135	17.4	13235	102	17.4	23678	143	18.0	41	12	8.8	0	-	-	-	-
16044	1582	36	8.7	3932	53	11.9	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	-	-
16046	8350	72	24.7	199	68	23.5	360	10	7.2	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	-	-
16047	131	2	19.7	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	-	-
16049	1919	12	11.2	11705	102	26.9	24320	123	27.7	11319	83	27.4	20752	132	16.1	16056	127	22.3	22073	140	39.7	23304	115	39.7	21421	149	40.3	4135	31	13.4	0	-	-	-	-
16050	6519	57	15.5	7755	85	11.9	14411	88	14.2	7019	69	19.7	13783	98	13.6	17742	93	13.7	18778	72	12.7	12123	103	17.4	14718	124	13.3	6917	61	17.6	2871	29	1.2	10.2	9.0
16052	1920	17	11.2	4785	80	16.0	9791	65	20.5	8323	68	19.7	10937	96	17.4	13008	113	17.4	19047	127	17.4	14140	110	15.6	11608	122	16.2	6330	63	18.2	17427	110	0.8	24.9	24.1
16053	2740	18	12.5	13416	114	16.0	17049	126	18.2	13586	95	20.5	26058	130	16.1	29704	139	15.6	27363	150	12.7	29144	145	12.7	16622	138	13.3	11491	90	17.6	18142	114	0.8	16.1	15.3
32167	-	-	-	-	-	-	-	-	-	10421	91	20.5	33420	126	16.1	26260	130	22.3	27586	142	17.4	24579	138	17.4	12795	107	24.1	2460	49	14.3	0	-	-	-	-
32168	-	-	-	-	-	-	-	-	-	18169	100	20.5	34961	140	16.1	27764	134	22.3	35684	132	17.4	26784	129	17.4	28311	138	23.5	18990	85	17.6	0	-	-	-	-
32169	-	-	-	-	-	-	-	-	-	614	20	2.4	24873	131	15.2	26025	131	17.4	24410	124	17.4	16832	100	17.4	22173	118	18.0	5085	65	17.6	0	-	-	-	-
32170	-	-	-	-	-	-	-	-	-	5151	77	20.5	17310	127	16.1	13320	103	17.4	0	-	-	0	-	-	0	-	-	0	-	-	0	-	-	-	-
32171	-	-	-	-	-	-	-	-	-	36691	103	17.4	22567	111	16.1	27226	134	17.4	26214	120	12.7	34797	129	17.4	28597	138	9.7	10449	68	17.6	0	-	-	-	-
32172	-	-	-	-	-	-	-	-	-	19105	86	9.7	17221	108	9.7	19907	110	13.7	23914	93	8.2	18285	92	9.1	23516	110	13.3	8565	73	16.2	0	-	-	-	-
32173	-	-	-	-	-	-	-	-	-	24278	103	9.7	28920	117	9.7	26056	107	9.1	32014	127	9.1	36522	119	9.1	33008	128	9.7	11175	76						

Table A1-7: Detection summary for adult Lake Sturgeon tagged in 2019 and monitored upstream of the Keeyask GS during the 2019 (June 1 to October 7), 2020 (May 1 to September 23), and 2021 (May 1 to October 10) open-water periods. Tag ID highlighted purple = moved downstream through the Keeyask GS.

Tag ID	2019					2020					2021				
	n	# Days Detected	U/S (rkm)	D/S (rkm)	Range (rkm)	n	# Days Detected	U/S (rkm)	D/S (rkm)	Range (rkm)	n	# Days Detected	U/S (rkm)	D/S (rkm)	Range (rkm)
7017	10934	113	-46.9	-9.9	37.0	5650	72	-29.3	-9.9	19.4	9619	78	-33.9	1.3	35.2
7018	8505	88	-46.9	-9.9	37.0	6403	72	-17.4	-3.8	13.6	21136	137	-48.2	-2.2	46.0
7019	9944	102	-19.5	-7.4	12.1	6530	72	-19.5	-5.8	13.7	24954	150	-33.9	-2.2	31.7
7020	11960	94	-24.7	-4.8	19.9	3797	59	-15	-3.8	11.2	7291	53	-48.2	13.2	61.4
7021	7937	51	-33.8	-26.5	7.3	10778	71	-34.3	-26.4	7.9	9160	72	-33.9	32	65.9
7022	22714	105	-33.8	-24.7	9.1	7286	46	-48.2	-26.4	21.8	7566	40	-48.2	-7.7	40.5
7023	7212	82	-33.8	-9.9	23.9	3849	84	-17.4	-9.9	7.5	14268	150	-29.3	-2.5	26.8
7024	6599	80	-33.8	-9.9	23.9	5966	84	-33.8	-2.2	31.6	6973	52	-48.2	24.9	73.1
7025	17574	114	-46.9	-9.9	37.0	10765	90	-17.4	-9.9	7.5	6099	45	-17.4	5.4	22.8
7026	6780	46	-46.9	-9.9	37.0	3840	52	-29.4	-8.9	20.5	15026	97	-34.3	13.4	47.7
7027	10611	112	-19.5	-9.9	9.6	12281	69	-19.5	-6.2	13.3	13205	91	-24.2	18.8	43.0
7028	18216	108	-19.5	-9.9	9.6	10967	96	-17.4	-8.9	8.5	9251	55	-22.6	18.8	41.4
7029	7705	94	-19.5	-9.9	9.6	7584	67	-19.5	-9.9	9.6	11026	79	-48.2	-2.2	46.0
7030	6345	100	-19.5	-9.9	9.6	5911	72	-19.5	-8.9	10.6	10693	91	-19.5	24.9	44.4
7031	18594	117	-19.5	-4.8	14.7	9560	92	-19.5	-5.8	13.7	6325	49	-12.9	3.9	16.8
7032	9883	114	-19.5	-4.8	14.7	3024	55	-19.5	-9.9	9.6	4122	37	-24.2	-2.2	22.0
7033	18839	116	-12.5	-4.8	7.7	1428	16	-48.2	-4.8	43.4	0	-	-	-	-
7034	13573	98	-29.4	-4.8	24.6	10215	69	-17.4	-3.8	13.6	6008	66	-48.2	24.9	73.1
7053	8500	106	-19.5	-9.9	9.6	5183	70	-19.5	-9.9	9.6	2426	29	-48.2	-17.4	30.8
7056	4253	89	-19.5	-9.3	10.2	3597	71	-19.5	-8.9	10.6	7633	54	-34.3	-2.2	32.1
7059	9639	97	-19.5	-9.3	10.2	18696	102	-17.4	-9.9	7.5	27824	142	-48.2	-2.2	46.0
7061	12007	93	-29.4	-4.8	24.6	11986	71	-8.9	-2.2	6.7	1713	33	-24.2	7.5	31.7
7064	13665	104	-33.8	-9.9	23.9	5783	62	-29.4	-9.9	19.5	13837	106	-48.2	-2.2	46.0
7065	7891	107	-24.7	-9.9	14.8	6776	60	-19.5	-9.9	9.6	16700	145	-34.3	-3.8	30.5
7066	12321	108	-19.5	-9.3	10.2	8428	81	-29.4	-9.9	19.5	5690	47	-29.3	0.8	30.1
7067	8705	109	-19.5	-5.8	13.7	10238	78	-15	-6.2	8.8	9054	68	-48.2	-2.2	46.0

Table A1-8: Detection summary for adult Lake Sturgeon tagged in 2019 and monitored in Stephens Lake during the 2019 (June 1 to October 7), 2020 (May 1 to September 23), and 2021 (May 1 to October 10) open-water periods.

Tag ID	2019					2020					2021				
	n	# Days Detected	U/S (rkm)	D/S (rkm)	Range (rkm)	n	# Days Detected	U/S (rkm)	D/S (rkm)	Range (rkm)	n	# Days Detected	U/S (rkm)	D/S (rkm)	Range (rkm)
7035	19933	119	0.6	10.3	9.7	8021	77	1.2	13.4	12.2	14453	92	0.8	13.4	12.6
7036	19903	109	0.6	10.3	9.7	12401	102	2.7	9.4	6.7	16310	135	0.8	18.8	18.0
7037	21304	127	1.2	18.6	17.4	8027	68	0.6	18.8	18.2	15981	100	0.8	18.8	18.0
7038	12726	78	0.6	10.3	9.7	12491	75	0.6	13.0	12.4	6743	62	0.8	24.9	24.1
7039	10752	109	0.6	18.6	18.0	4523	69	0.6	18.8	18.2	11024	118	0.8	18.8	18.0
7040	5823	89	0.6	18.6	18.0	7485	78	0.6	18.8	18.2	10448	73	0.8	13.4	12.6
7041	20381	108	0.6	18.6	18.0	7261	77	1.2	18.8	17.6	12094	75	0.8	18.8	18.0
7042	18735	119	0.6	18.6	18.0	10964	98	0.6	16.8	16.2	13836	116	0.8	18.8	18.0
7043	3795	22	3.9	18.6	14.7	12258	100	1.2	18.8	17.6	15588	119	0.8	40.9	40.1
7044	10107	94	0.6	18.6	18.0	8483	73	1.2	24.7	23.5	12893	94	0.8	18.8	18.0
7045	5079	23	0.6	13.9	13.3	8293	87	0.6	18.6	18.0	5958	44	0.8	18.8	18.0
7046	4188	22	1.2	7.9	6.7	10581	86	0.6	9.4	8.8	6506	56	0.8	24.9	24.1
7047	11770	101	1.2	13.9	12.7	12139	92	1.2	13.4	12.2	11354	108	0.8	18.8	18.0
7048	19411	107	1.2	13.9	12.7	21325	110	0.6	13.4	12.8	13644	98	0.8	18.8	18.0
7049	17017	113	0.6	18.6	18.0	7696	100	2.7	24.9	22.2	11804	105	0.8	32.0	31.2
7050	20573	116	0.6	13	12.4	10323	80	0.6	16.1	15.5	11679	114	0.8	18.8	18.0
7051	13163	108	0.6	18.6	18.0	12468	75	0.6	18.8	18.2	19401	100	0.8	18.8	18.0
7052	16243	106	0.6	24.7	24.1	8029	92	1.2	18.8	17.6	7819	74	0.8	24.9	24.1
7054	30588	96	0.6	18.6	18.0	22518	109	1.2	18.8	17.6	18679	96	0.8	24.9	24.1
7055	18411	112	0.6	10.3	9.7	11888	97	1.2	18.8	17.6	15312	119	0.8	24.9	24.1
7057	27099	110	0.6	10.3	9.7	15469	92	1.2	18.8	17.6	8878	86	0.8	24.9	24.1
7058	13394	113	0.6	18.6	18.0	6453	101	0.6	18.8	18.2	6086	56	0.8	18.8	18.0
7060	16679	120	0.6	10.3	9.7	17039	85	0.6	10.3	9.7	27580	127	0.8	10.2	9.4
7062	27646	122	0.6	10.3	9.7	10919	90	1.2	8.7	7.5	8520	48	0.8	18.8	18.0
7063	27802	111	0.6	10.3	9.7	9448	85	0.6	13.4	12.8	10433	91	0.8	18.8	18.0

APPENDIX 2:

LOCATION SUMMARY FOR INDIVIDUAL ACOUSTIC TAGGED ADULT LAKE STURGEON, UPSTREAM OF THE KEEYASKGS, JUNE 2011 TO OCTOBER 2021

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- Figure A2-1: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16026) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021..... 77
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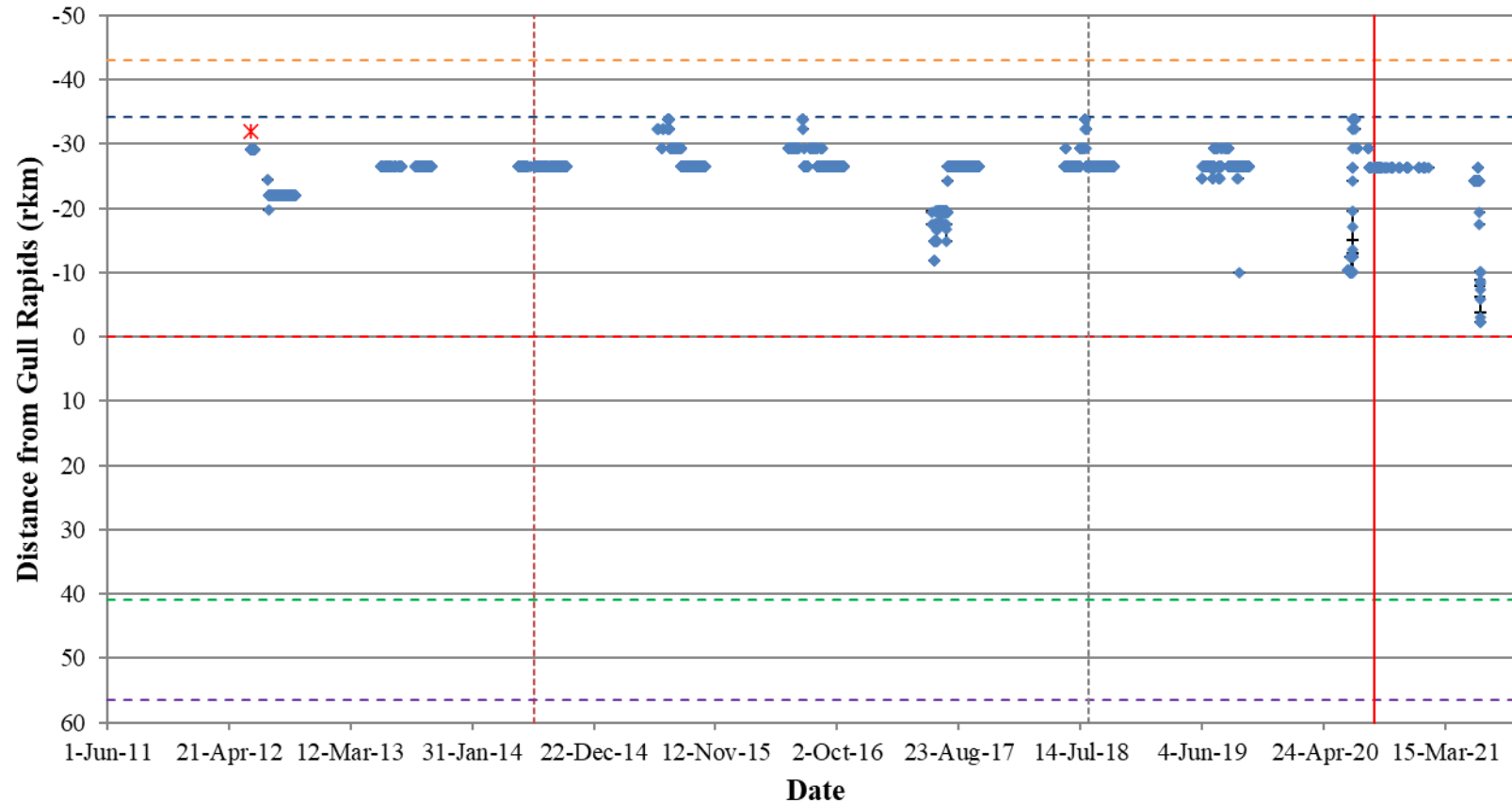


Figure A2-1: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16026) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

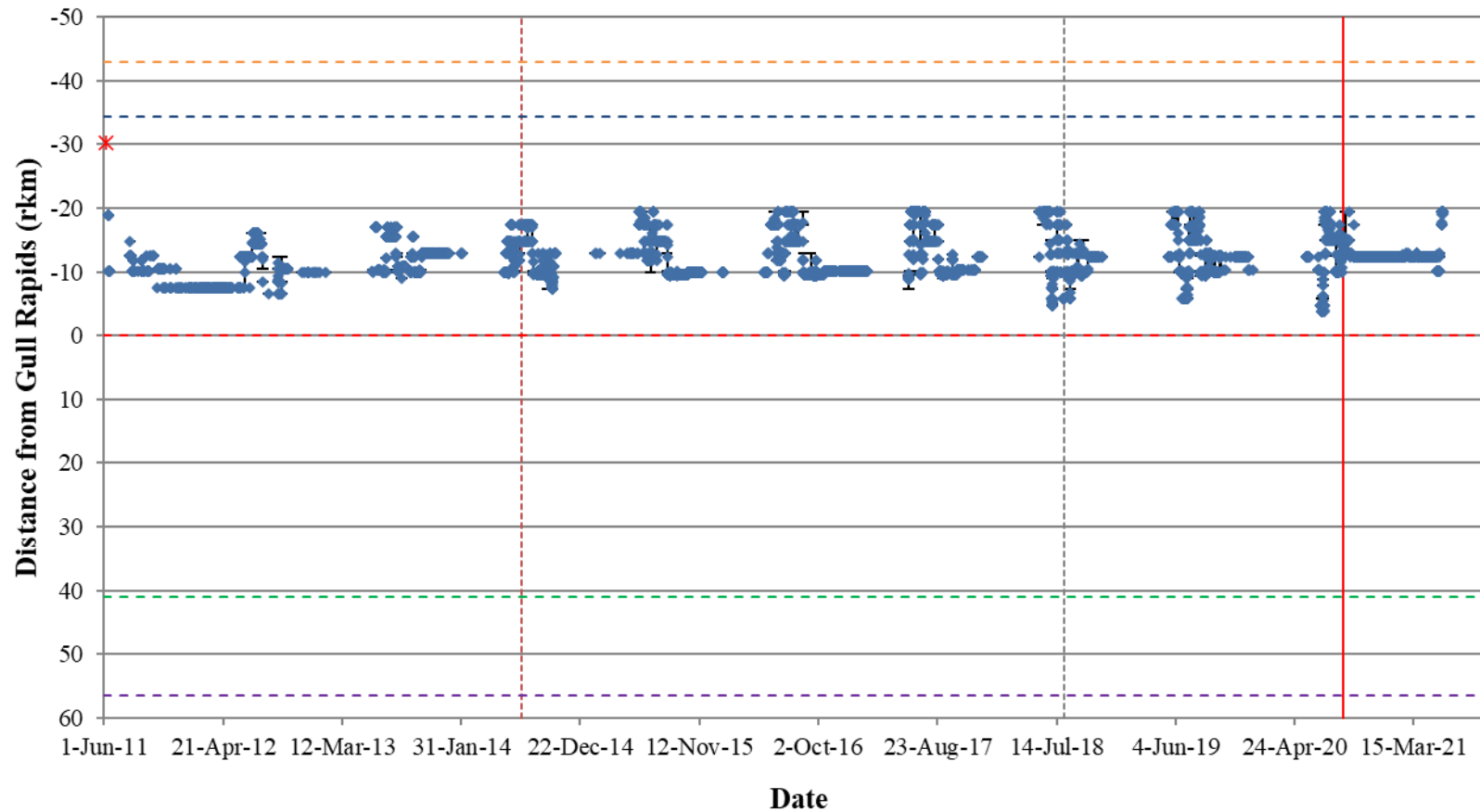


Figure A2-2: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16036) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

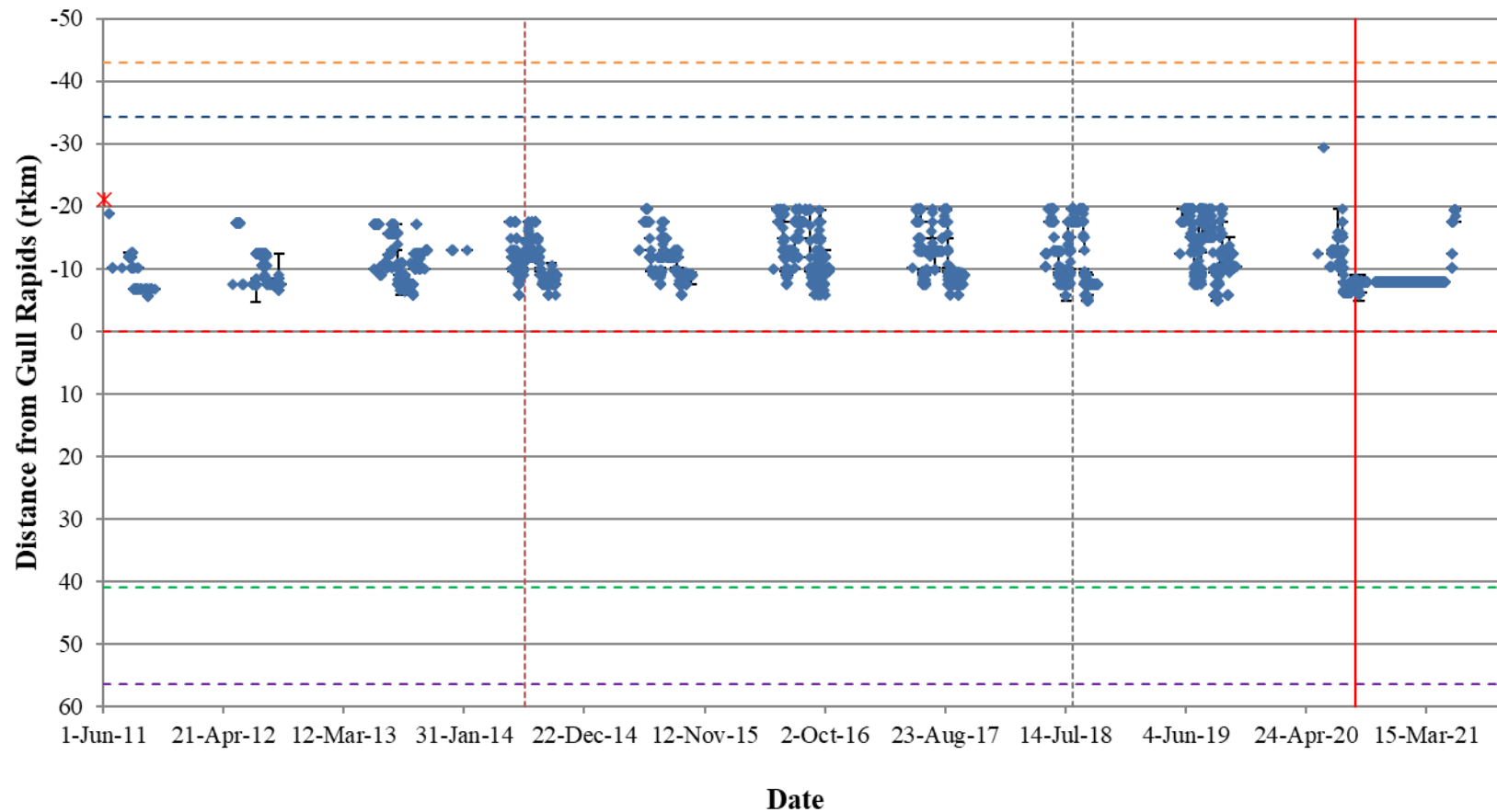


Figure A2-3: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16039) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

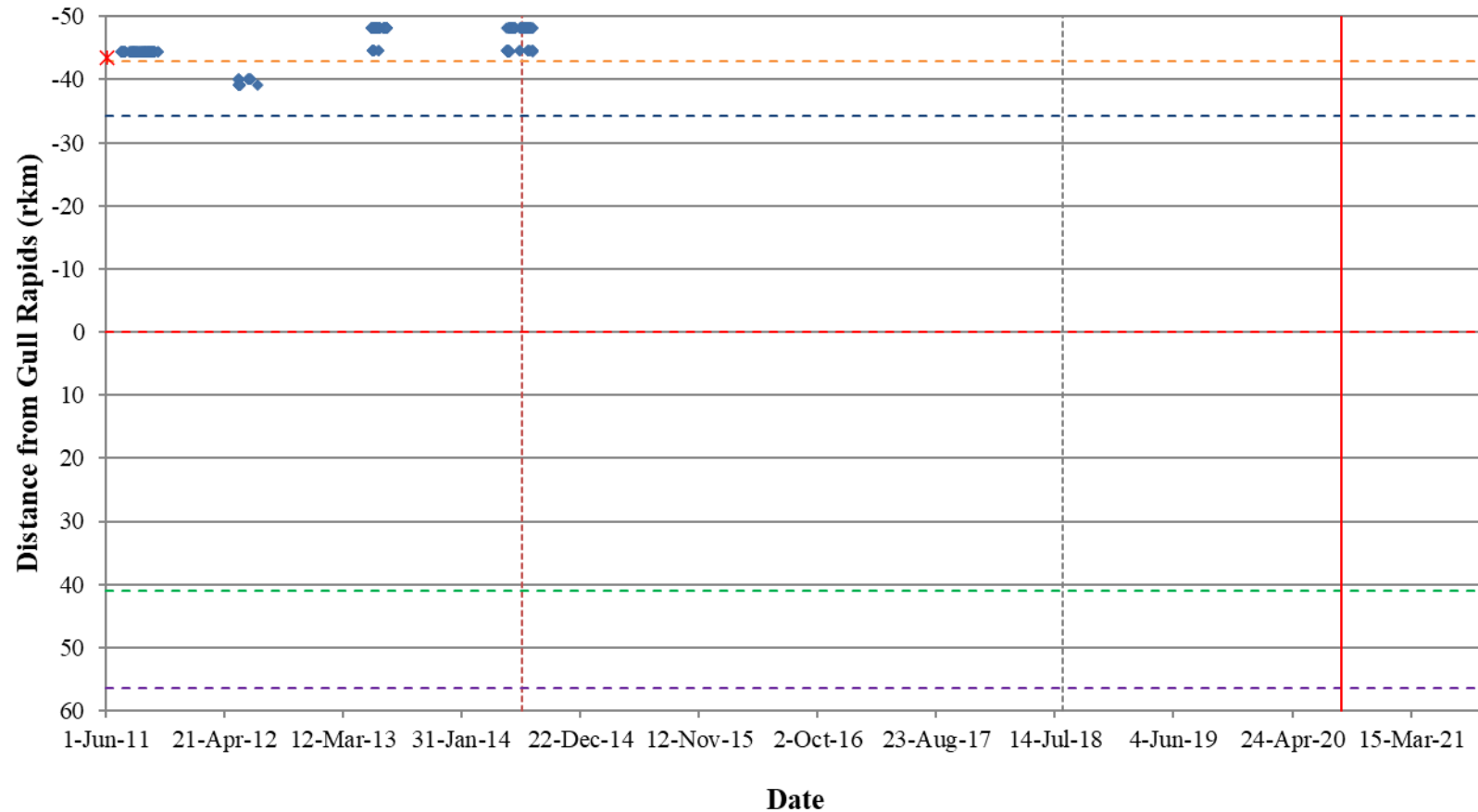


Figure A2-4: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16042) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

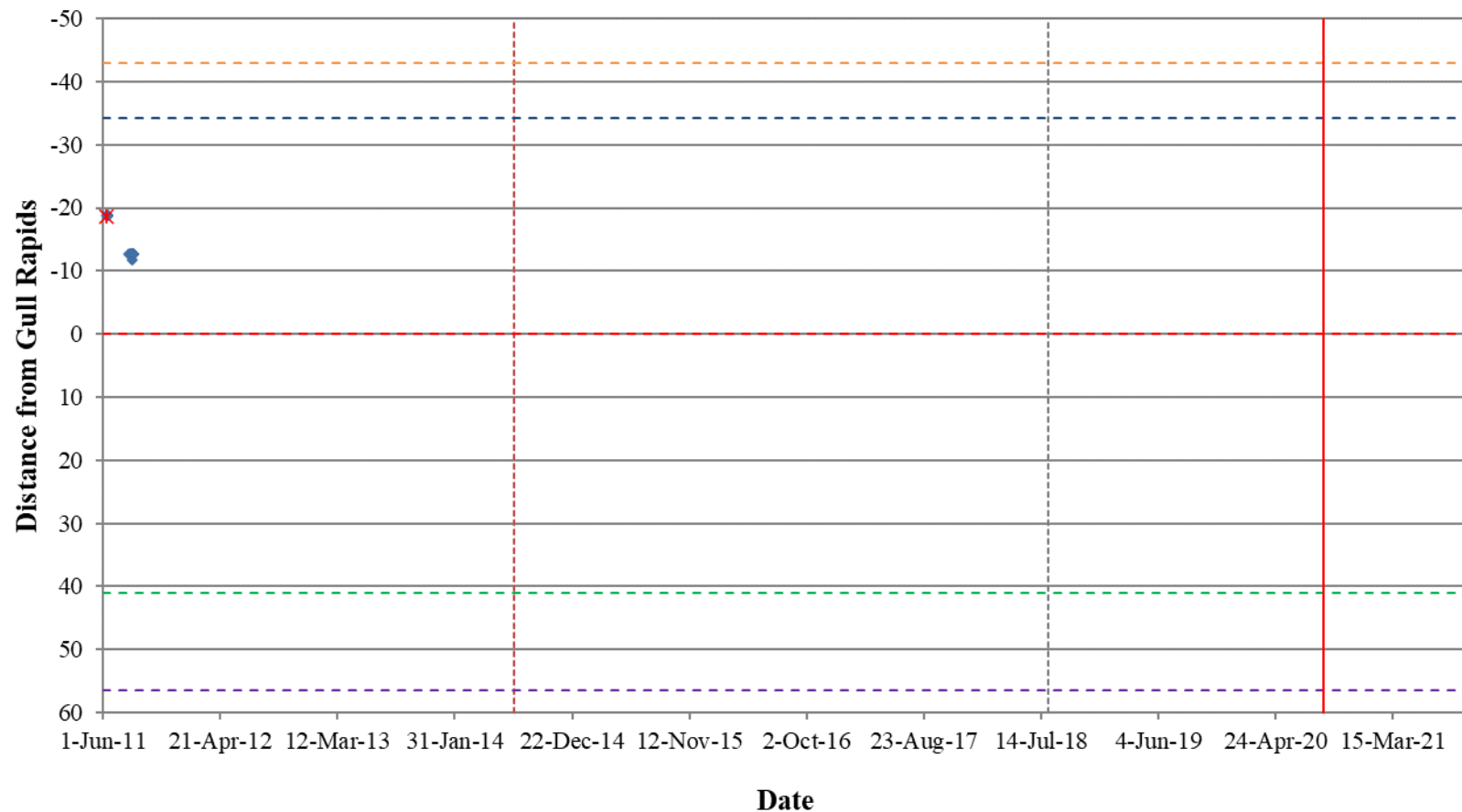


Figure A2-5: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16045) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

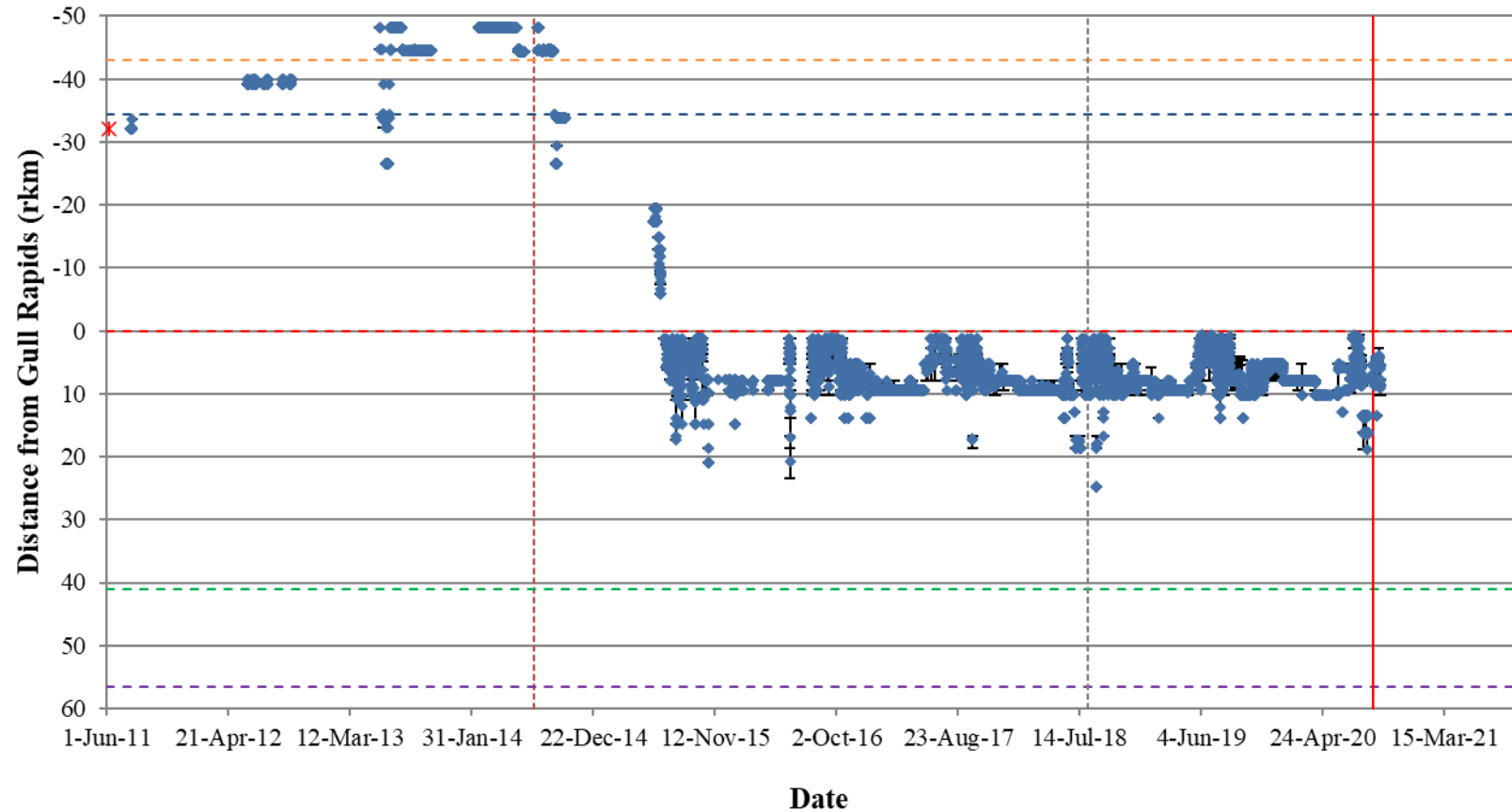


Figure A2-6: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16048) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

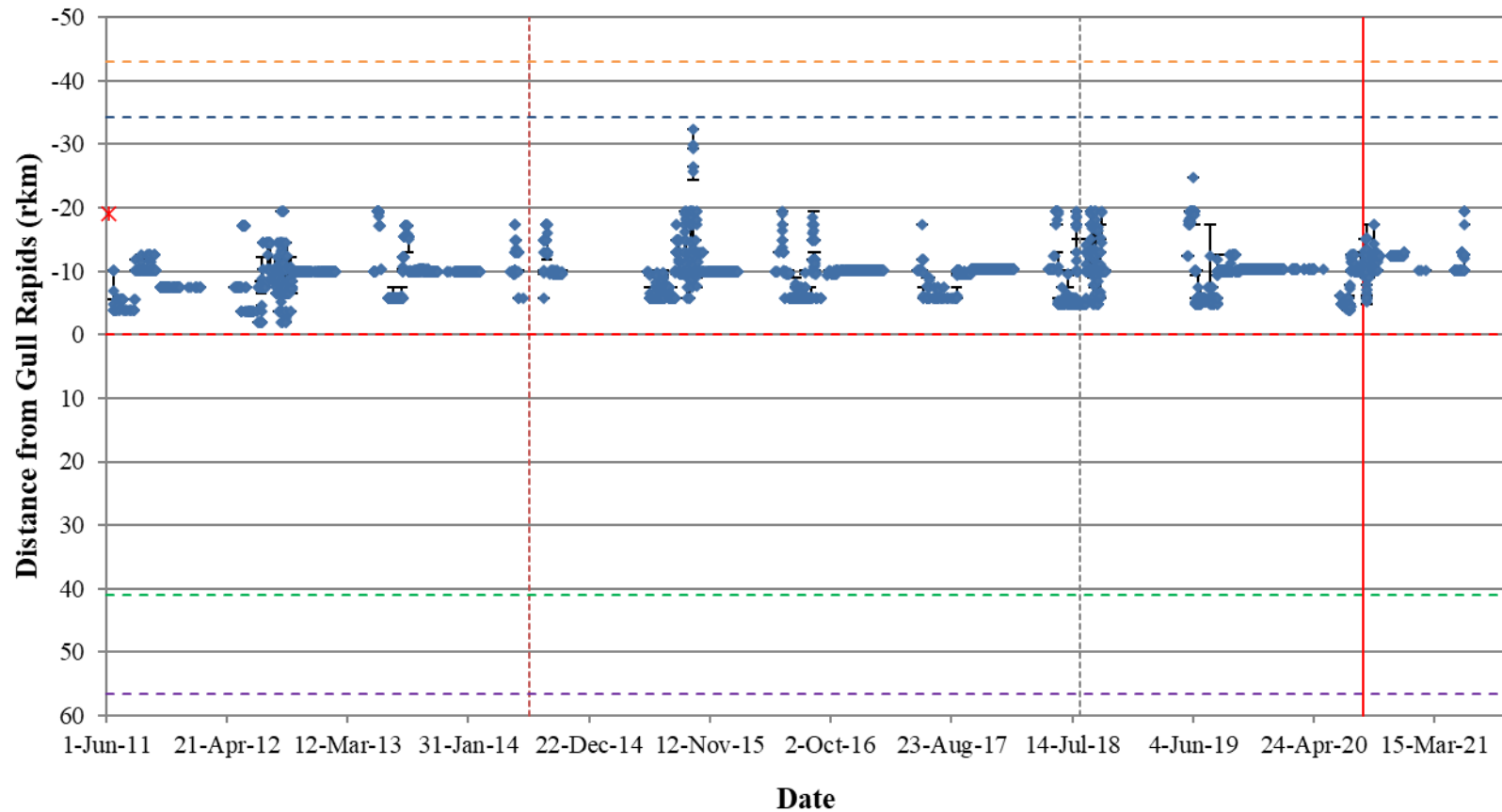


Figure A2-7: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16051) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

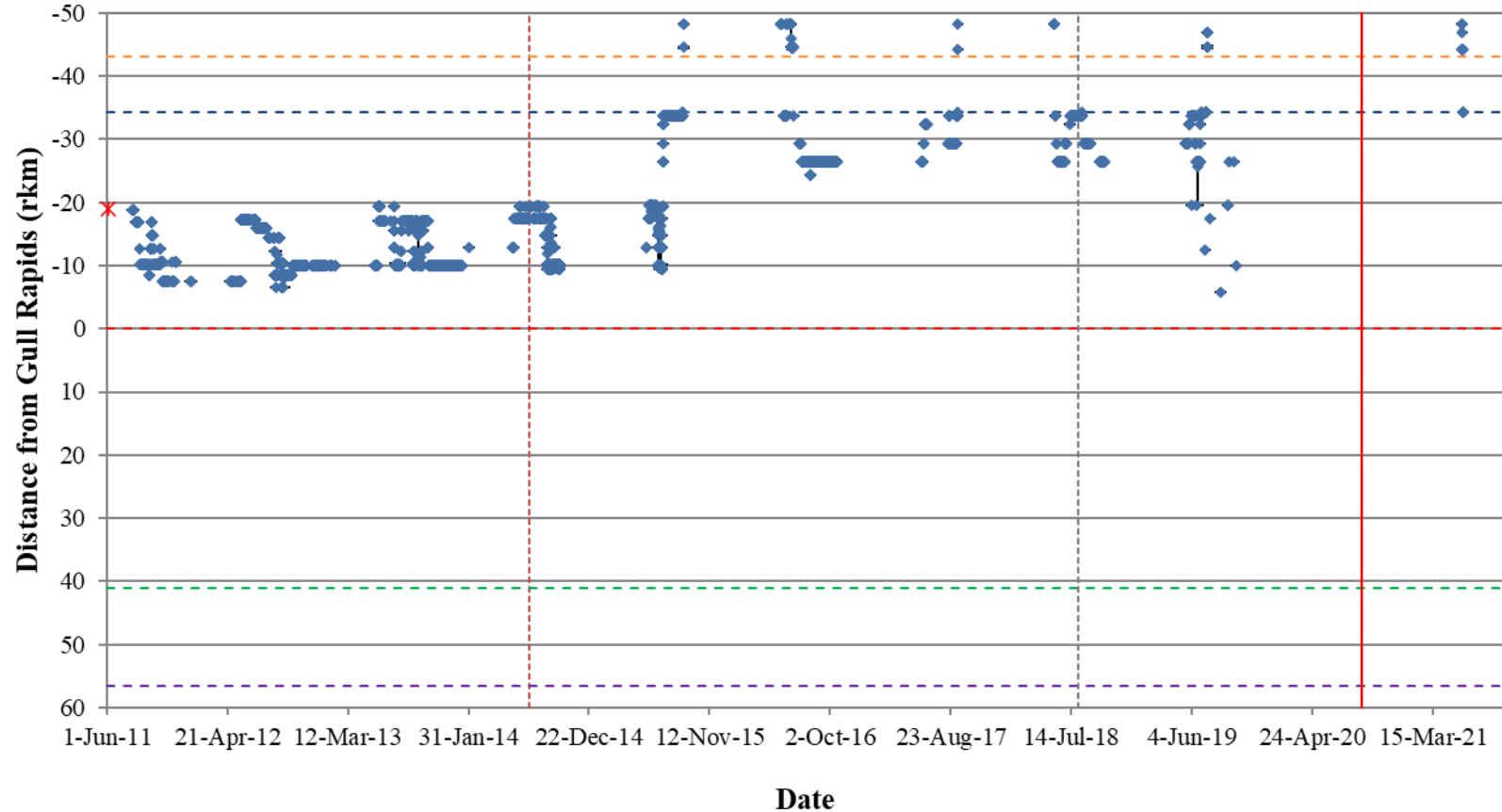


Figure A2-8: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16054) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

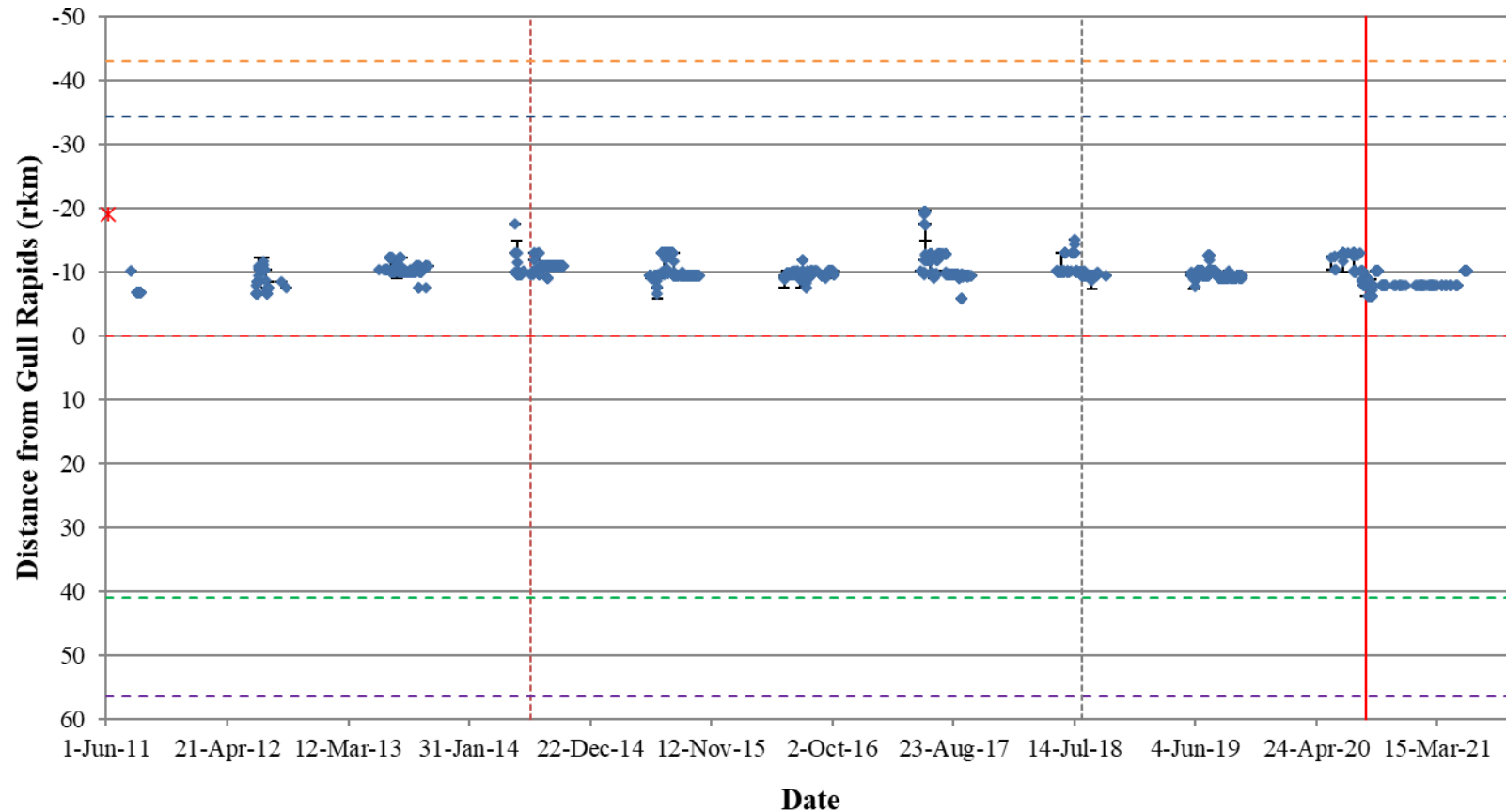


Figure A2-9: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16055) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

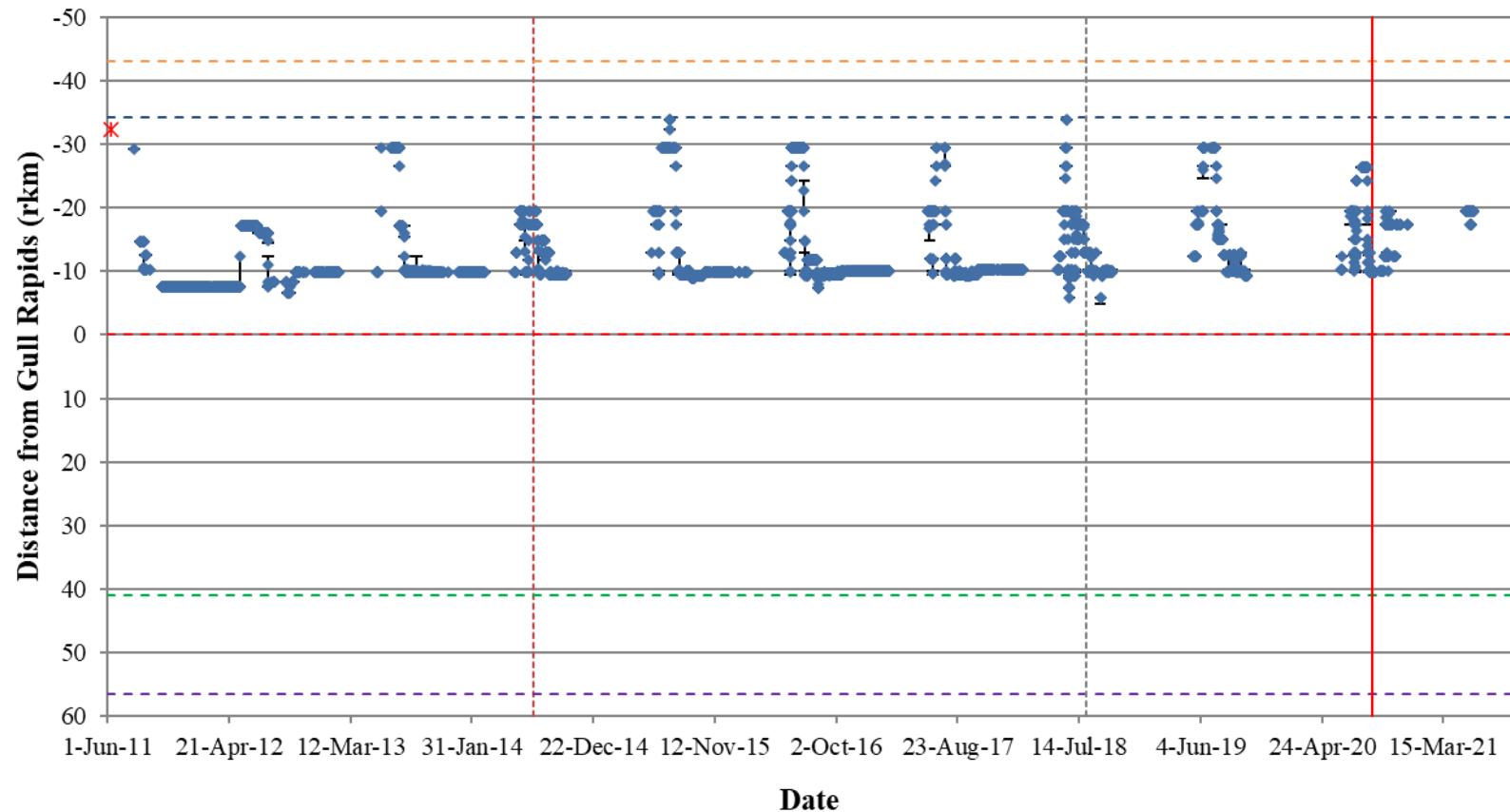


Figure A2-10: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16056) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

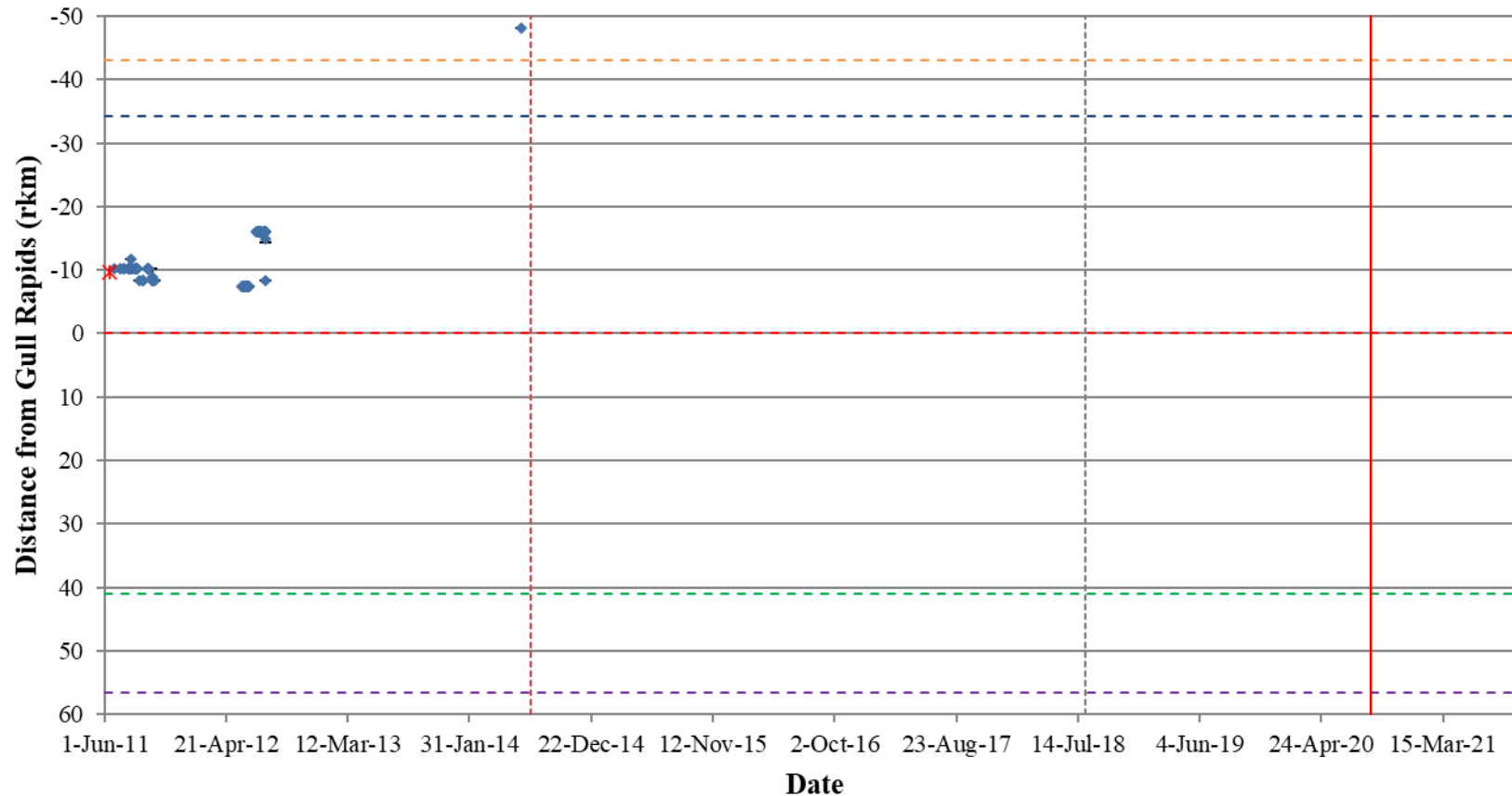


Figure A2-11: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16057) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

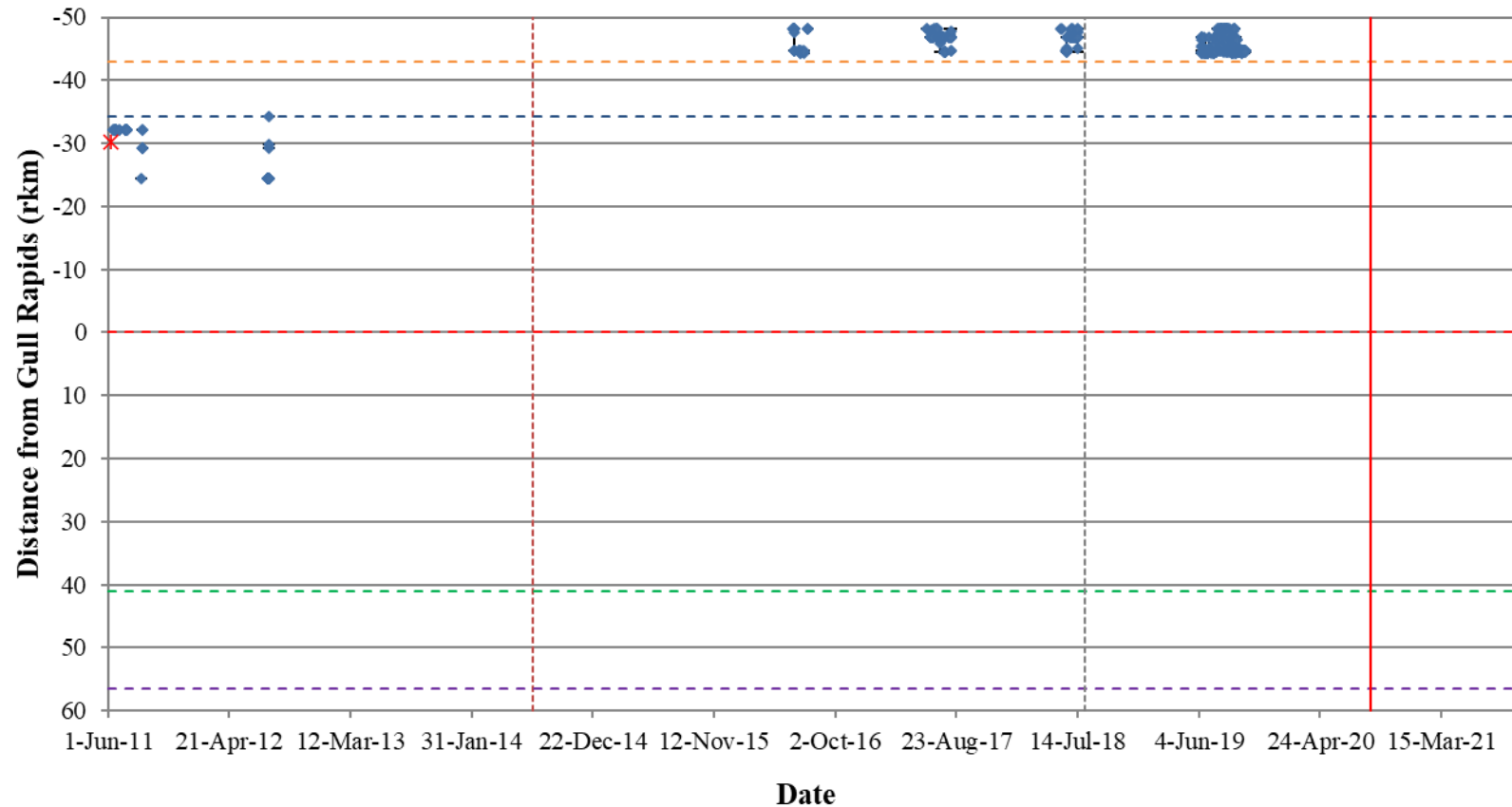


Figure A2-12: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16058) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

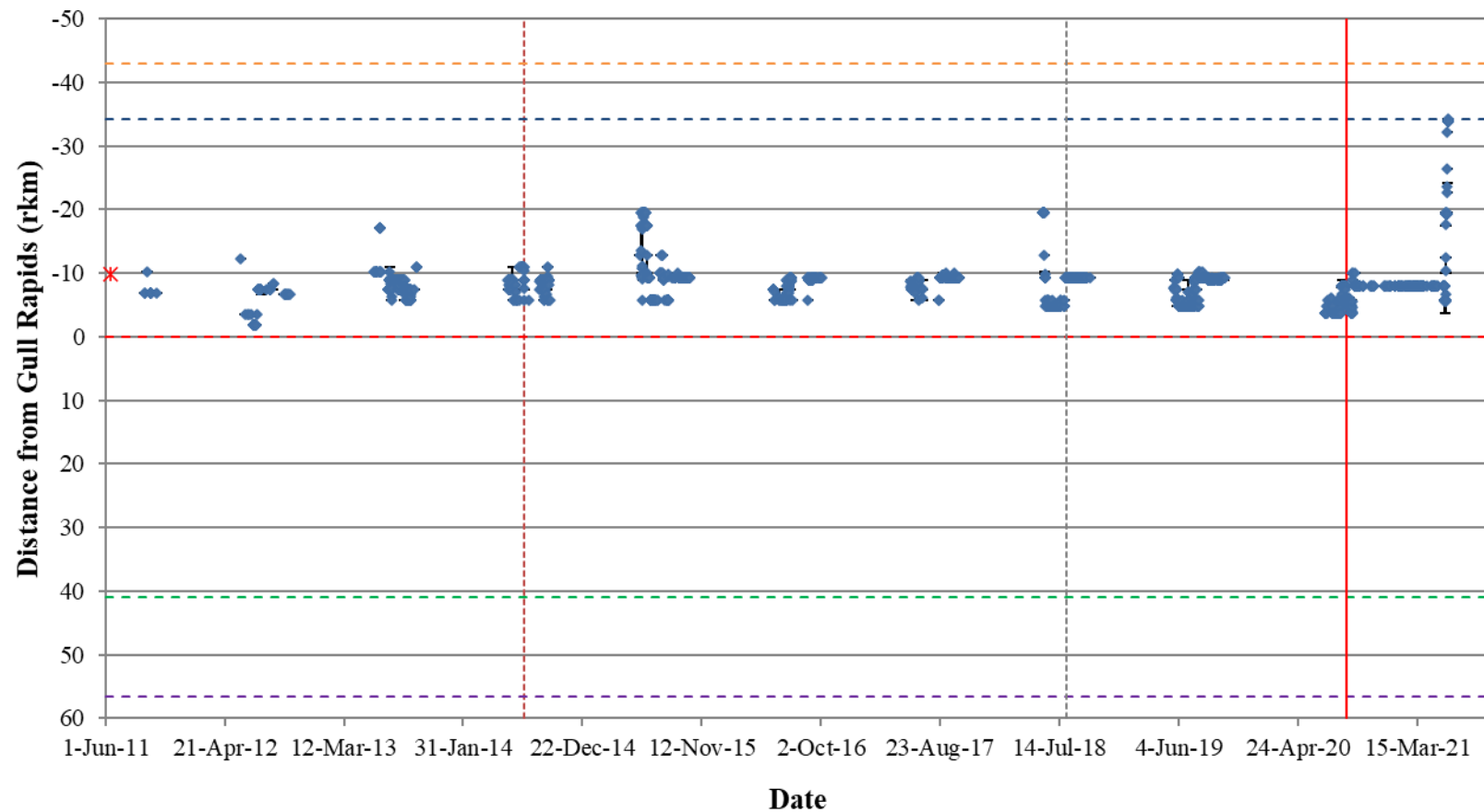


Figure A2-13: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16059) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

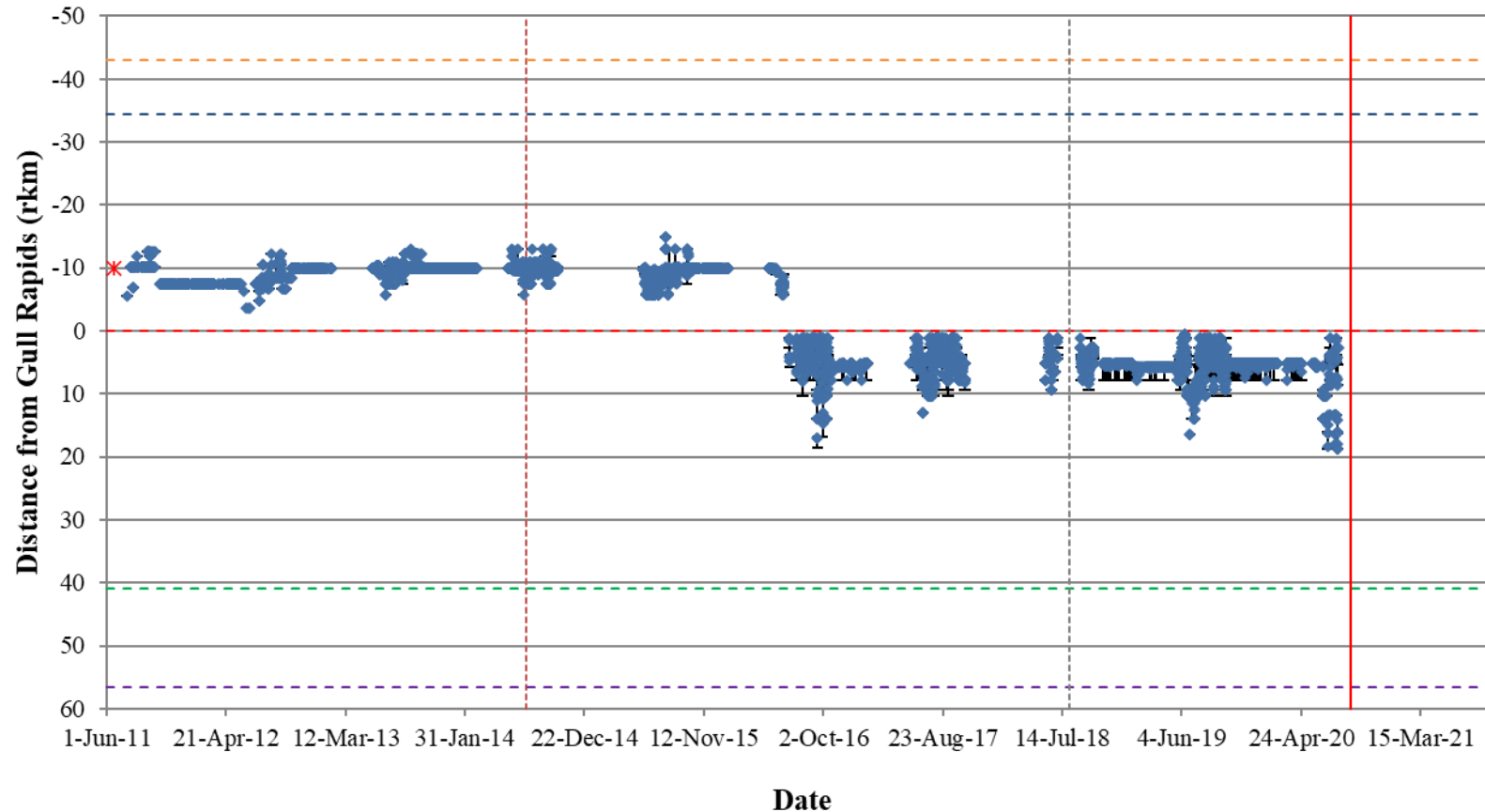


Figure A2-14: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16060) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

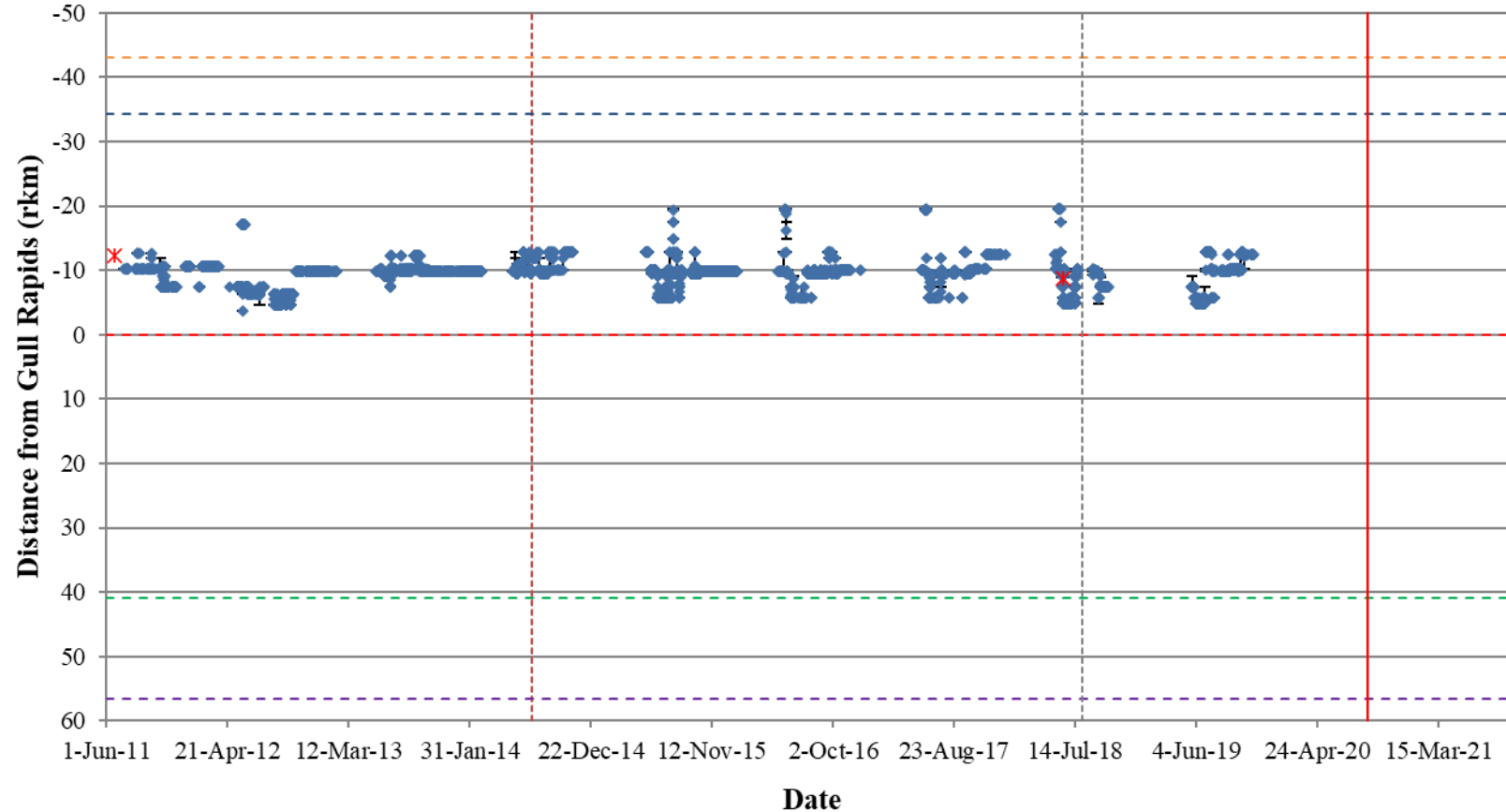


Figure A2-15: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16061) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging and recaptures are indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

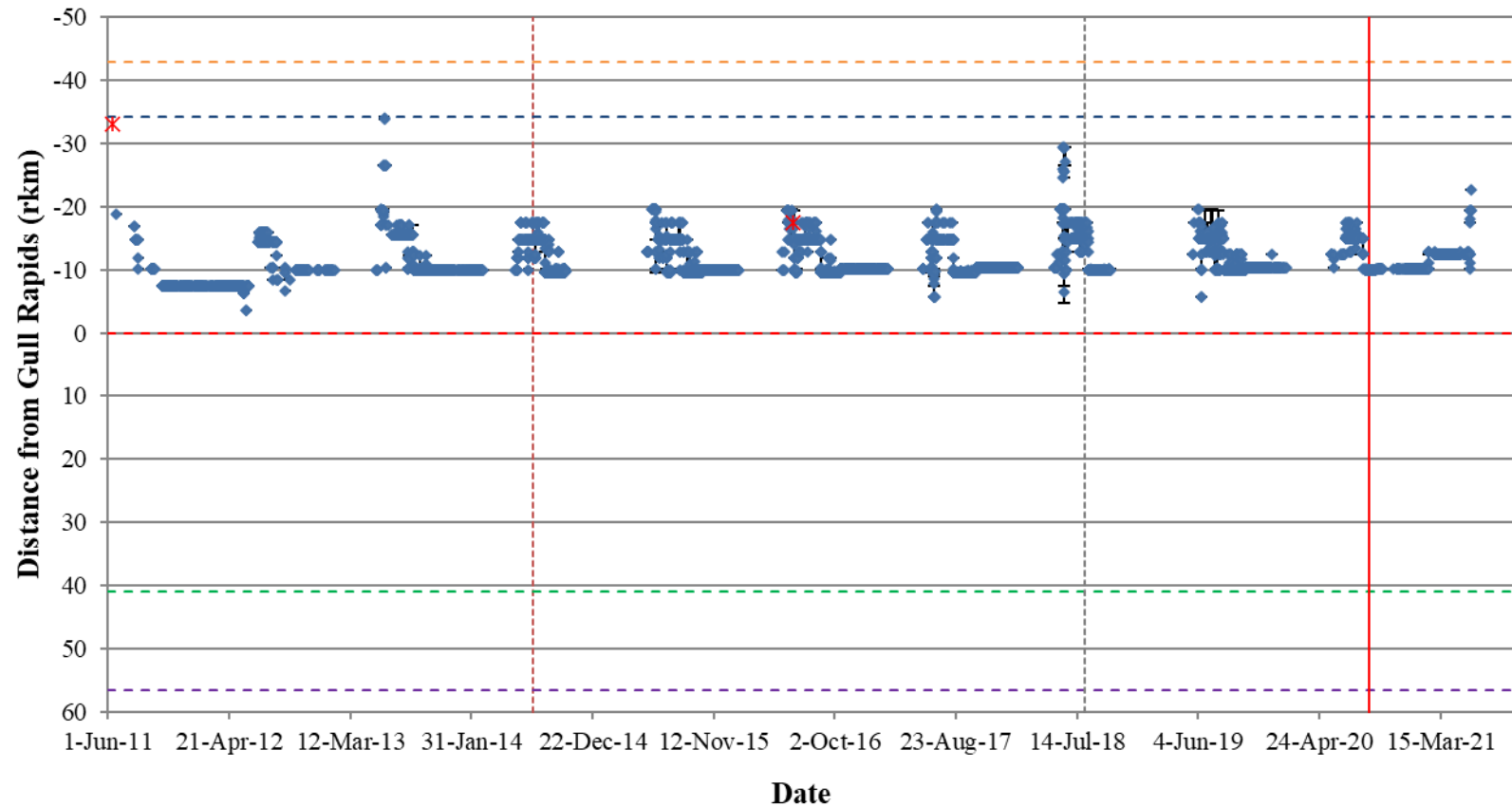


Figure A2-16: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16062) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging and recaptures are indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

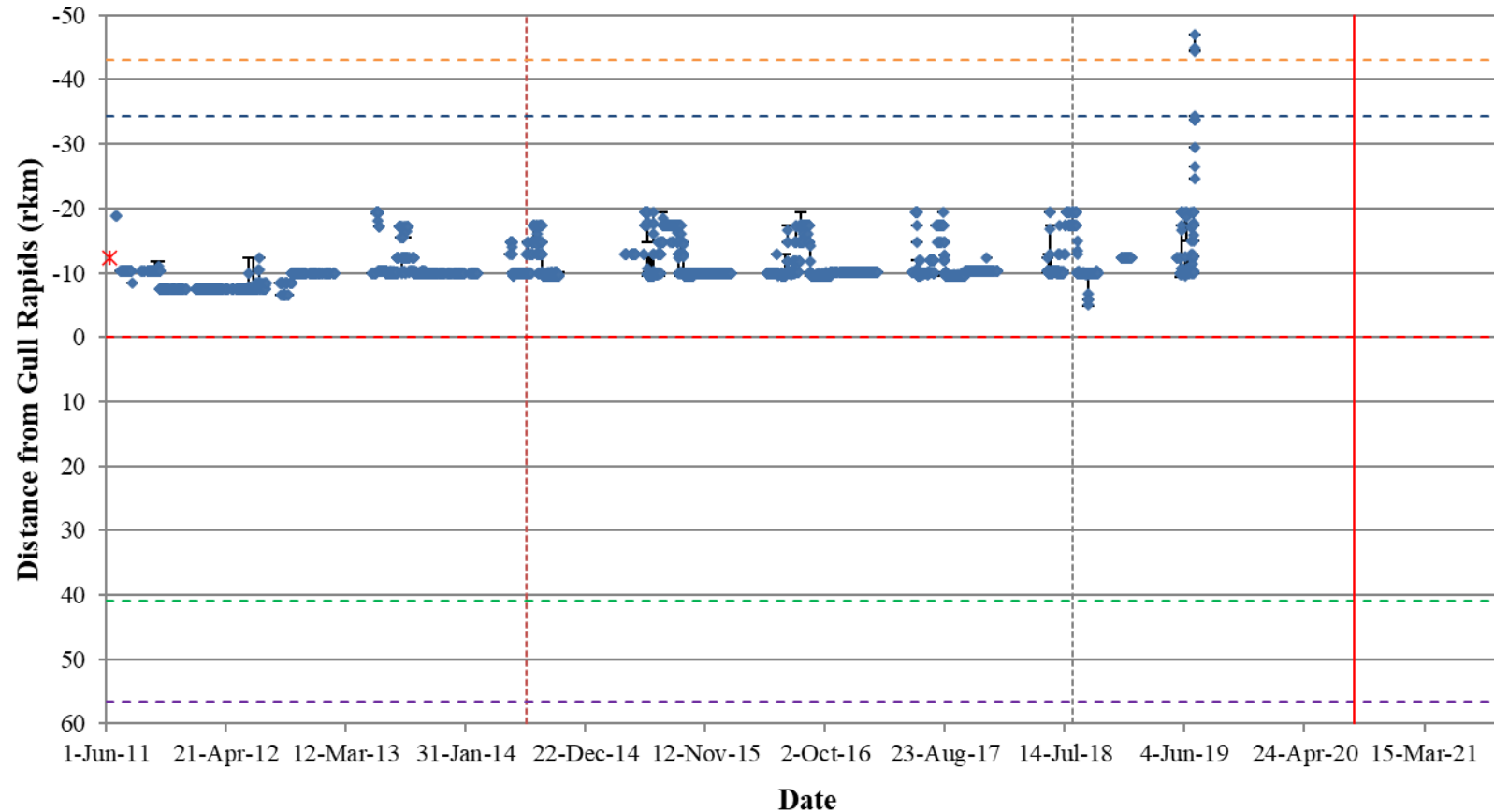


Figure A2-17: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16063) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

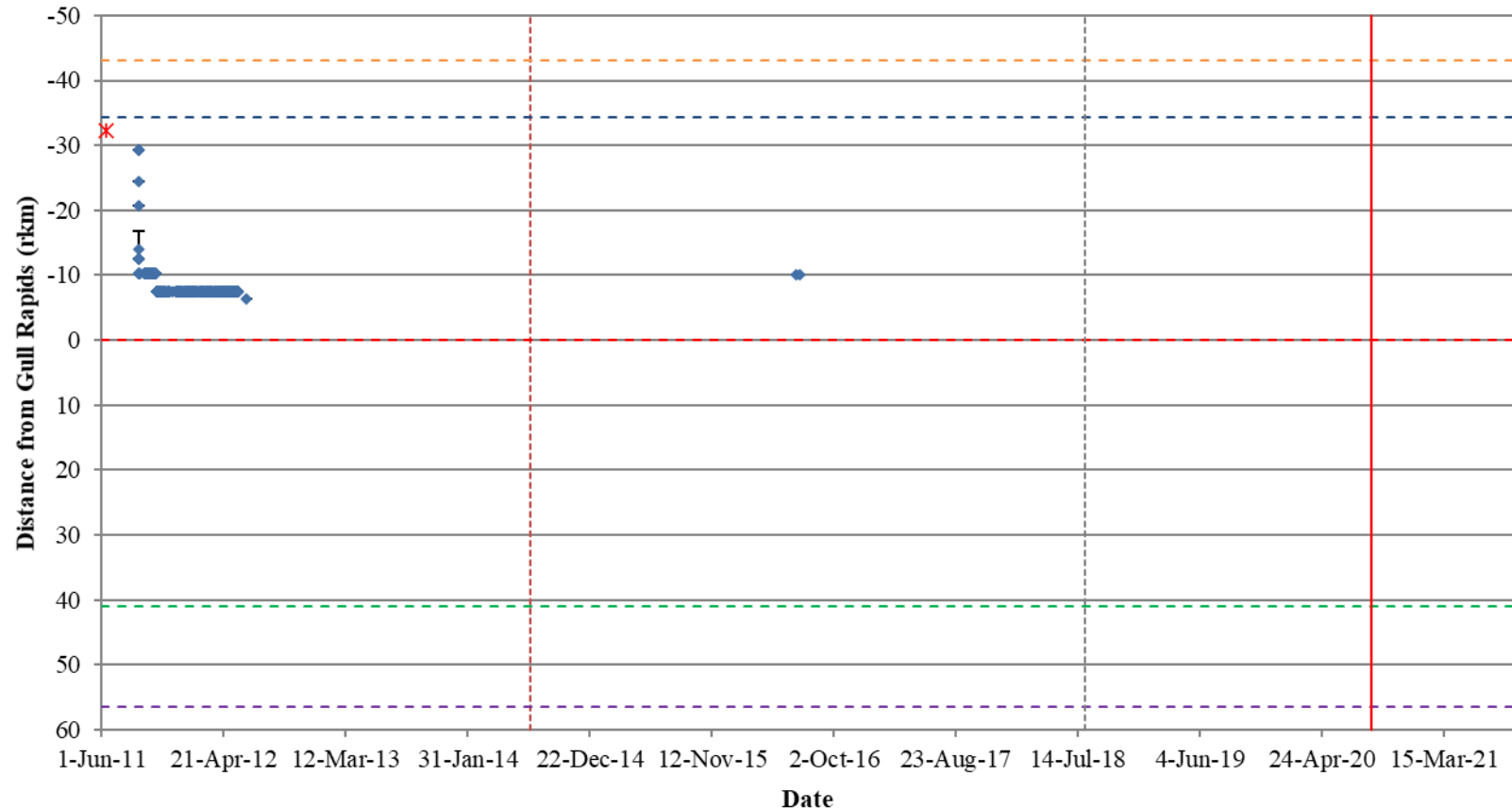


Figure A2-18: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16064) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

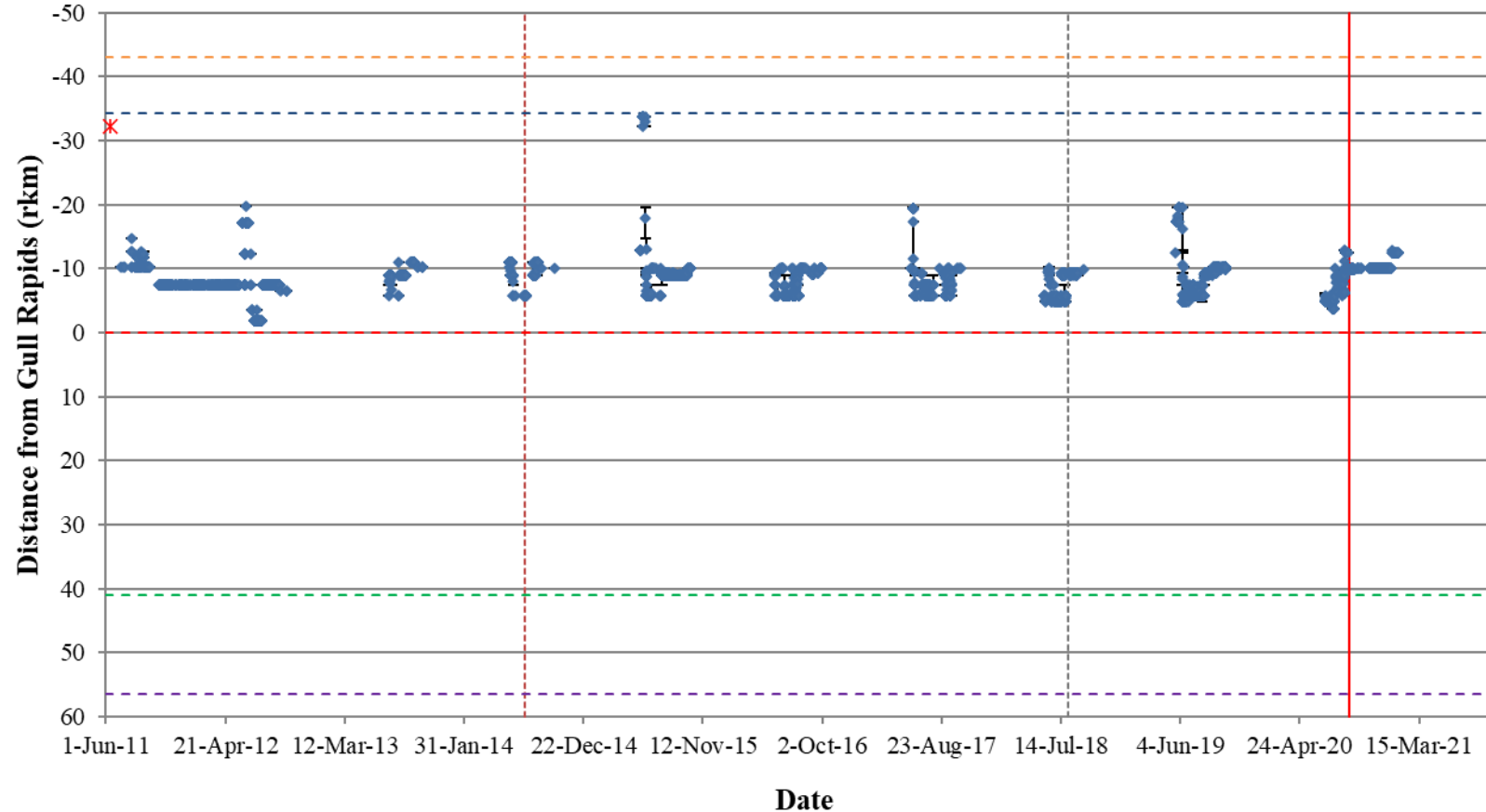


Figure A2-19: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16065) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 21, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

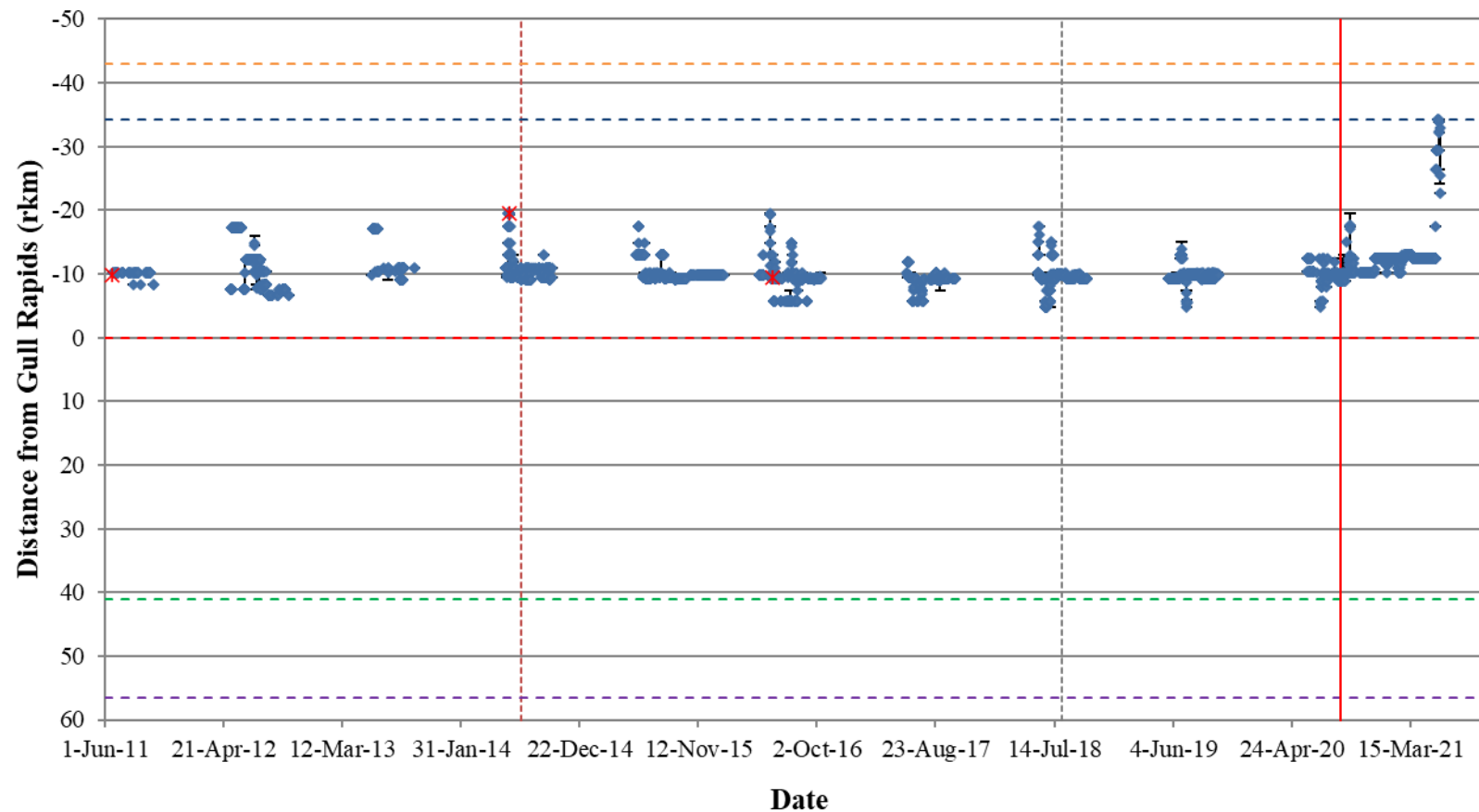


Figure A2-20: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16066) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging and recaptures are indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

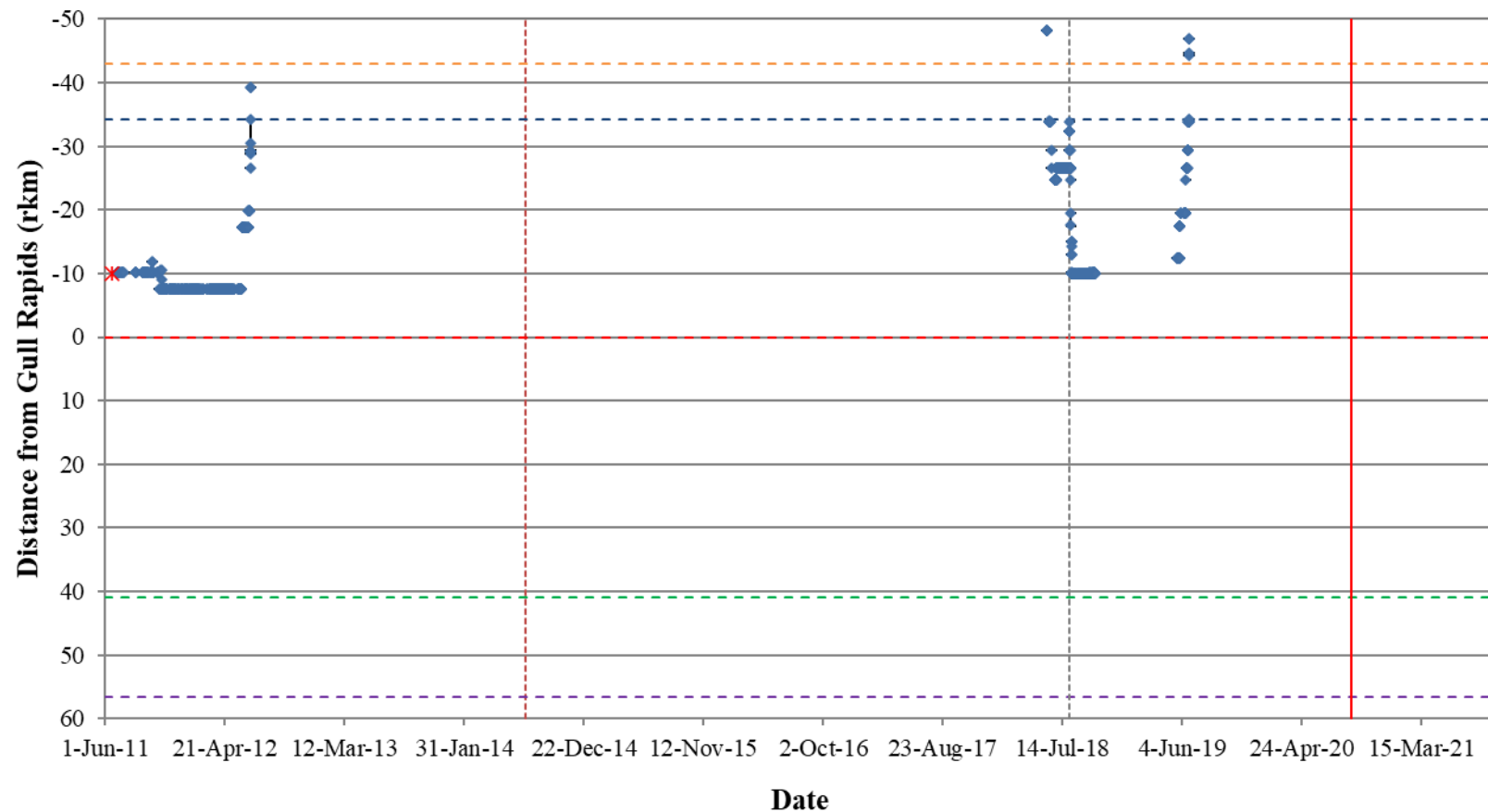


Figure A2-21: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16067) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

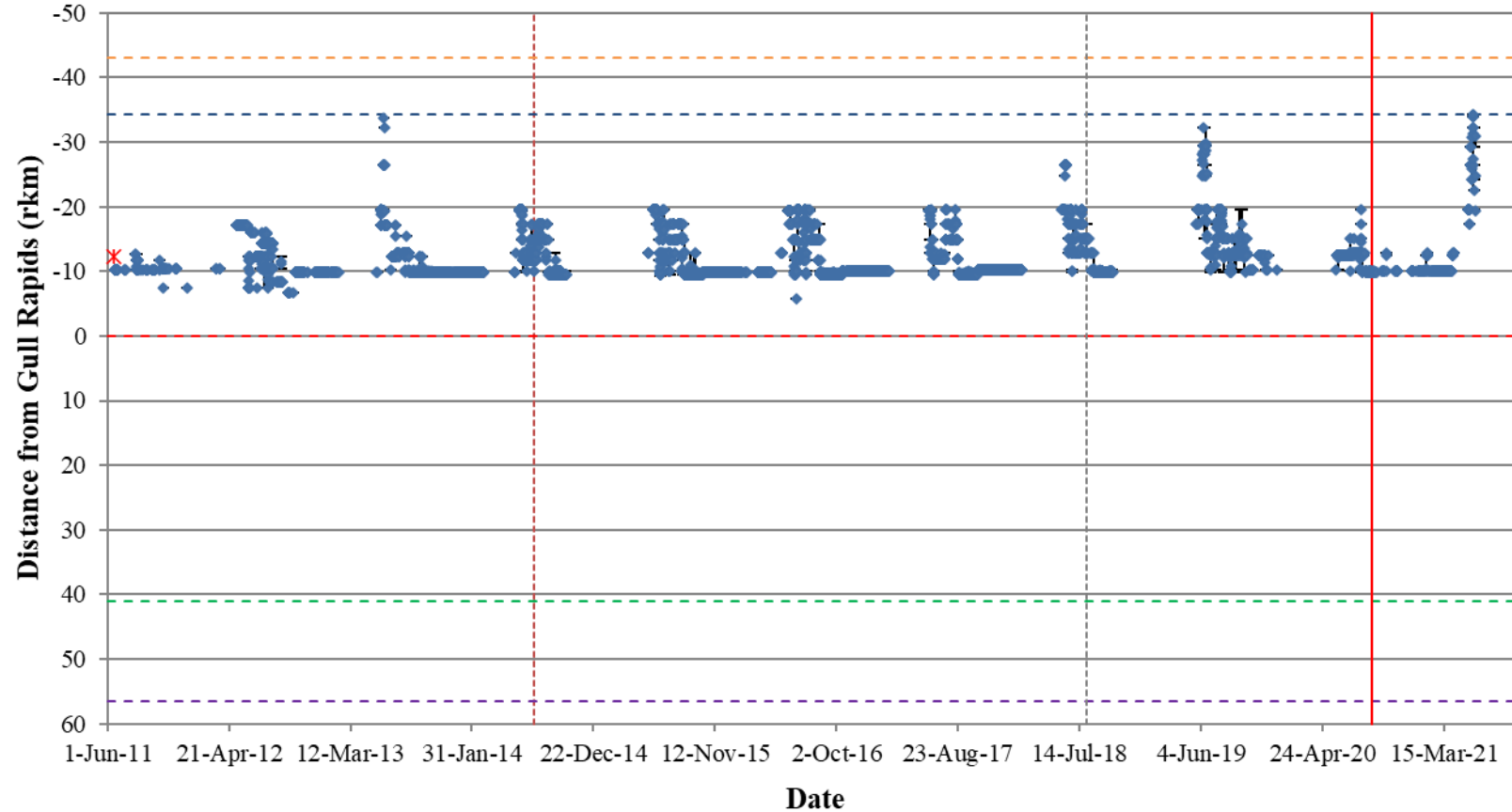


Figure A2-22: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16068) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

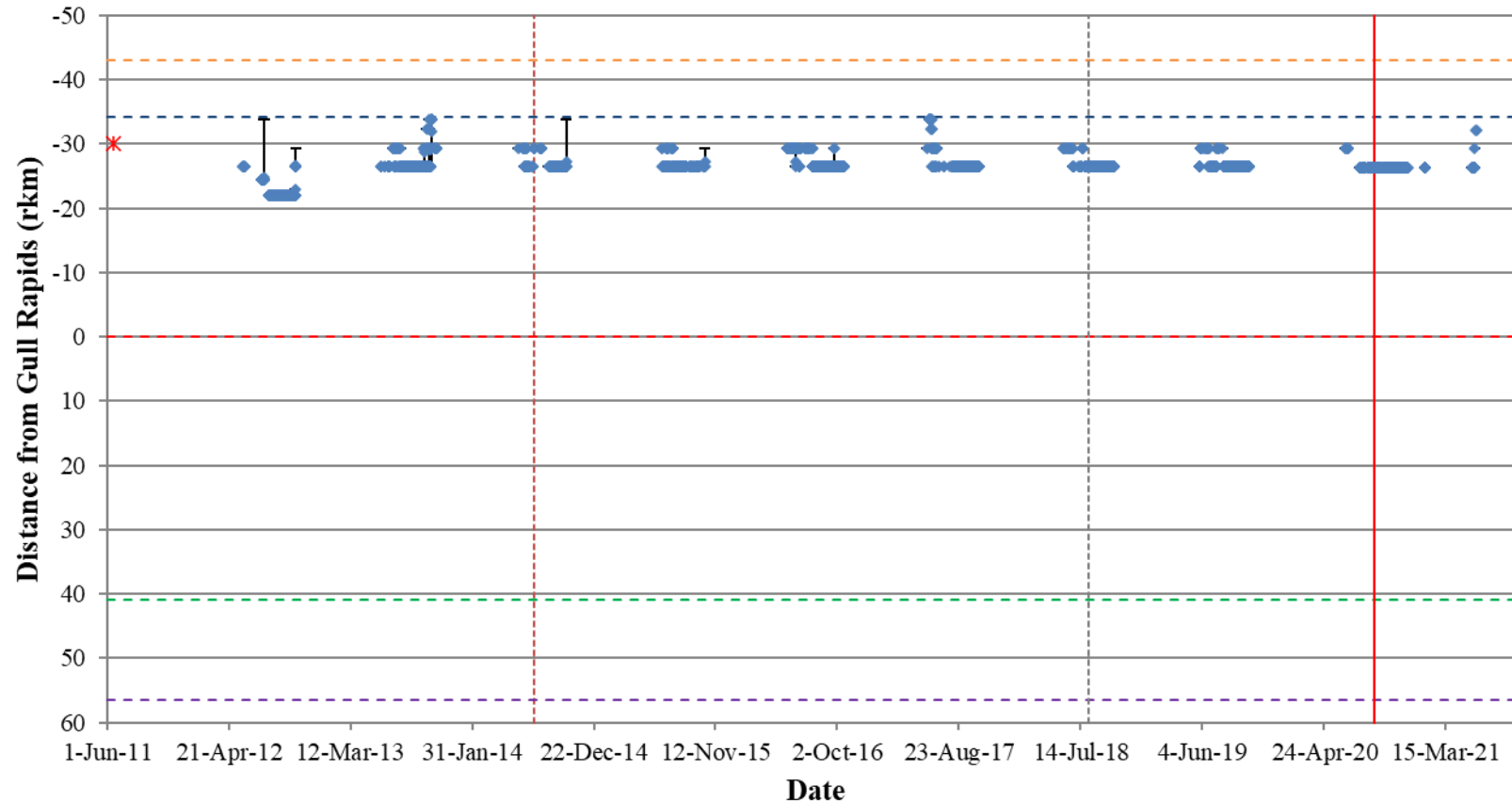


Figure A2-23: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16069) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

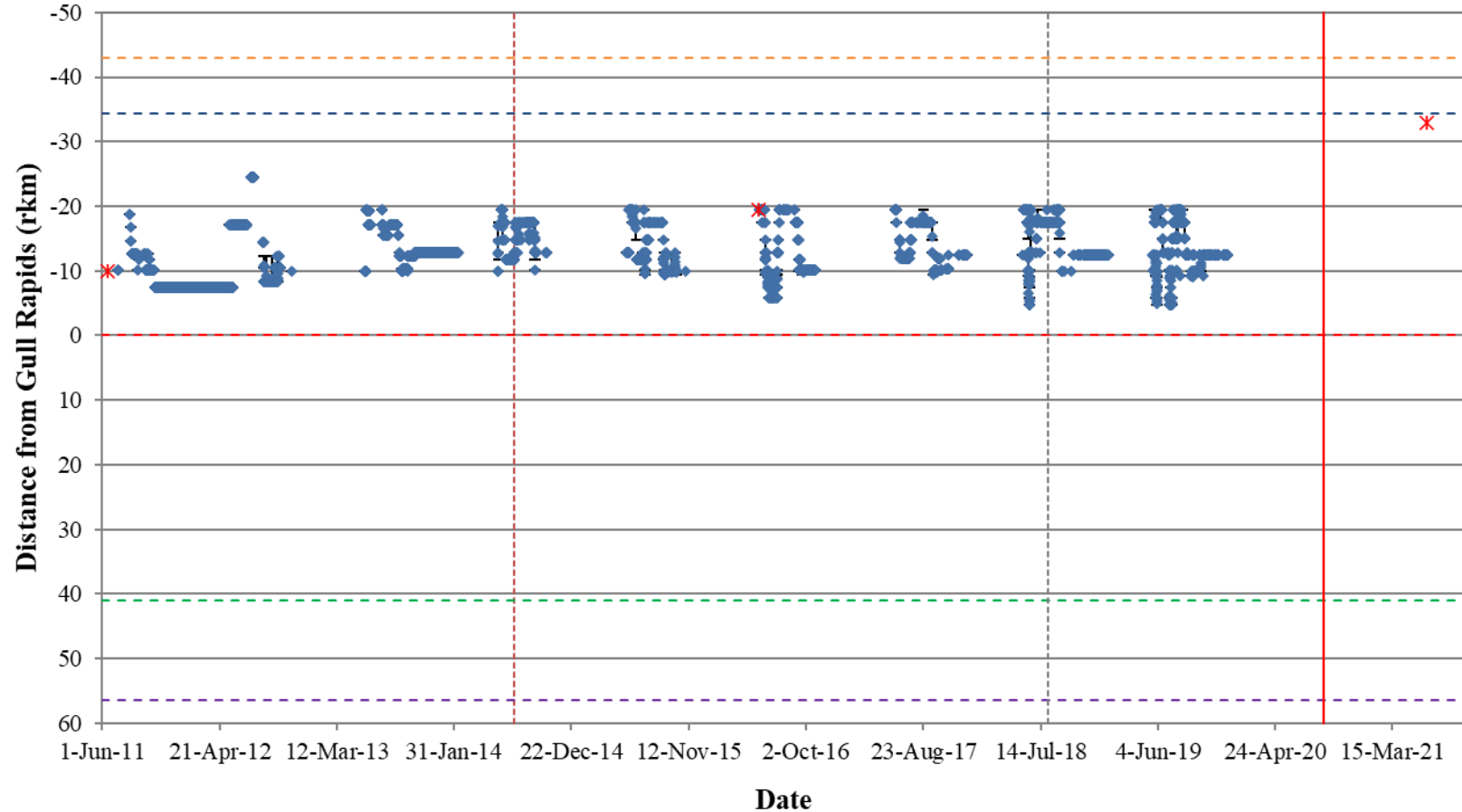


Figure A2-24: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16070) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging and recaptures are indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

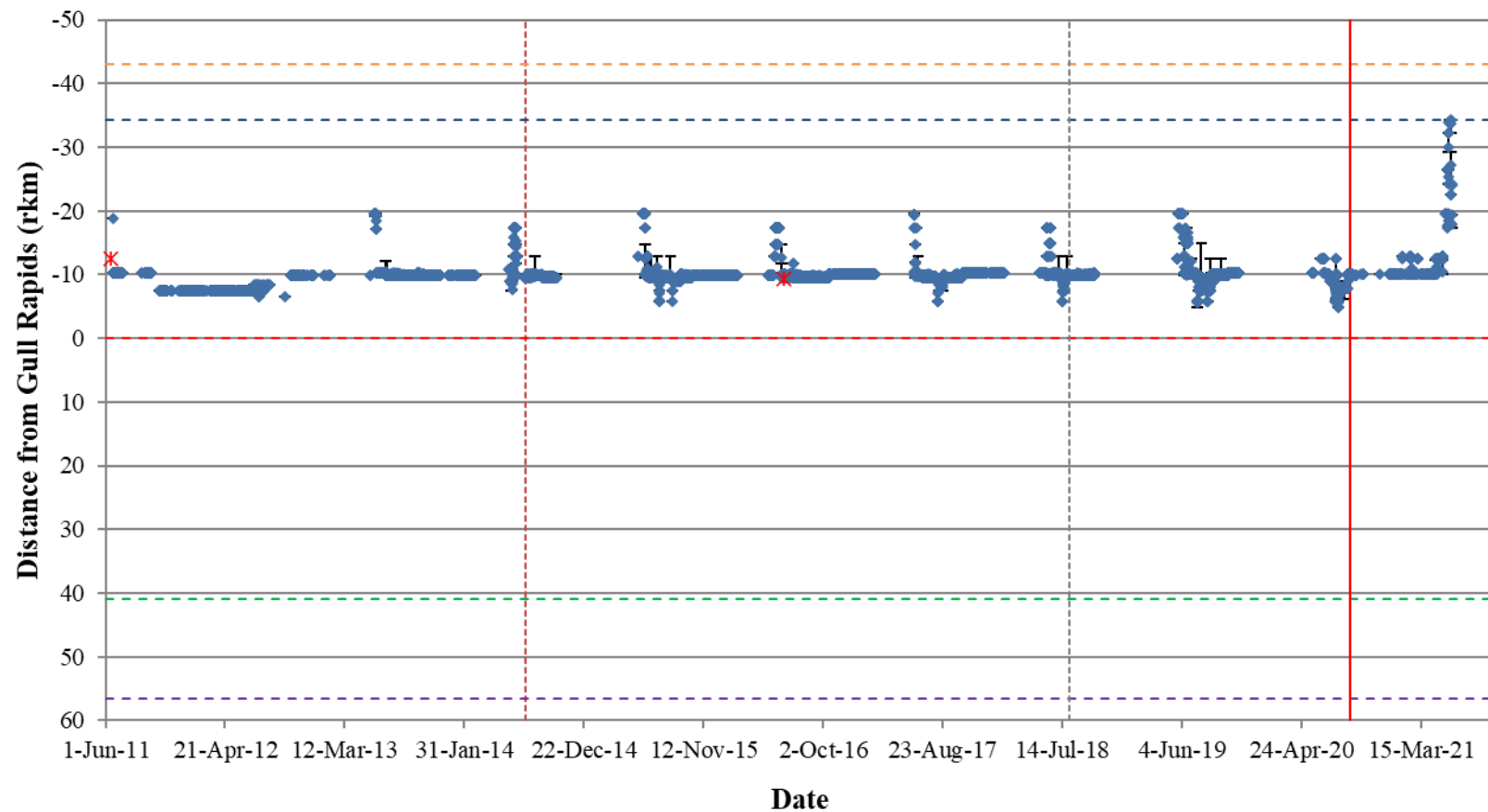


Figure A2-25: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16071) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging and recaptures are indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

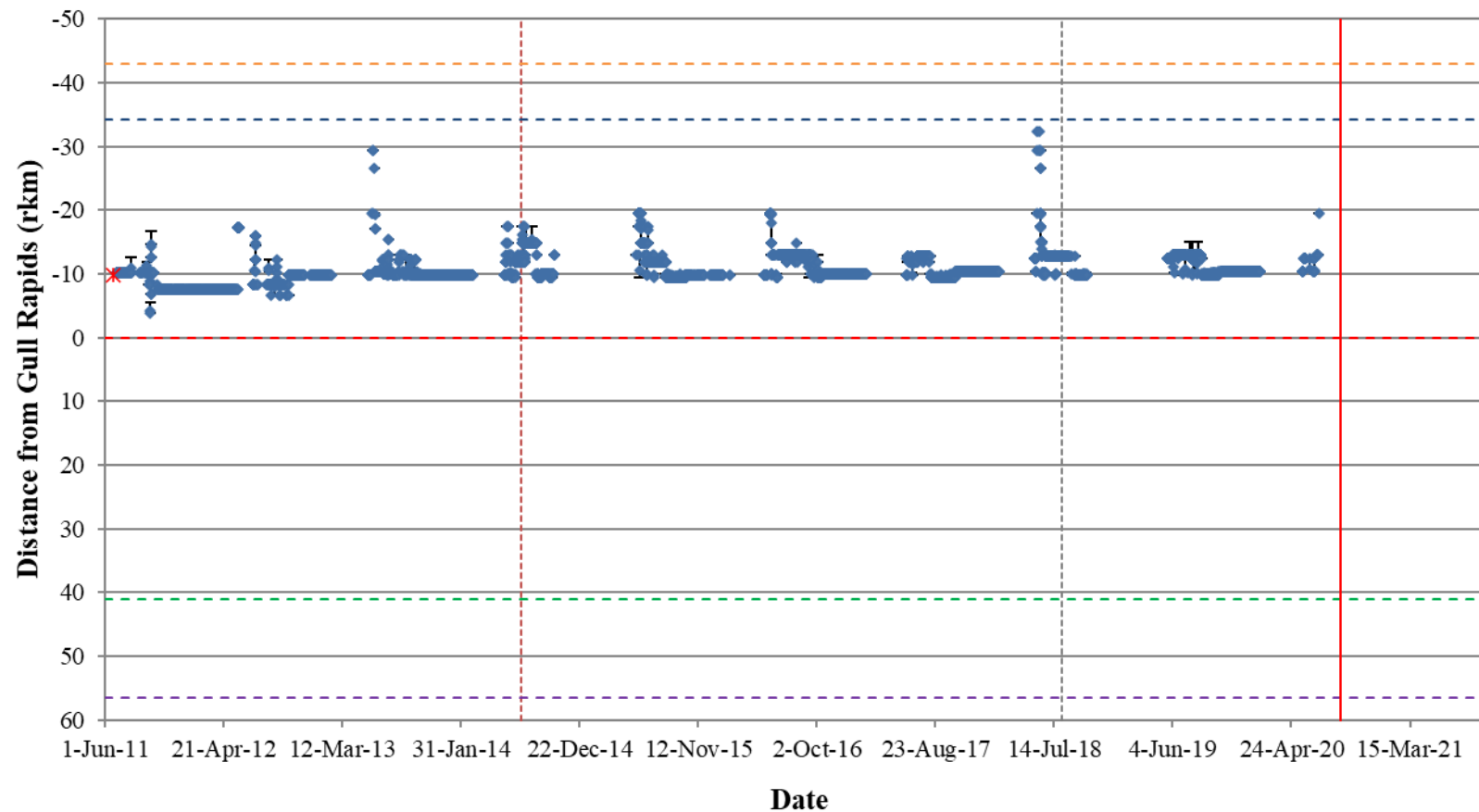


Figure A2-26: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16072) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

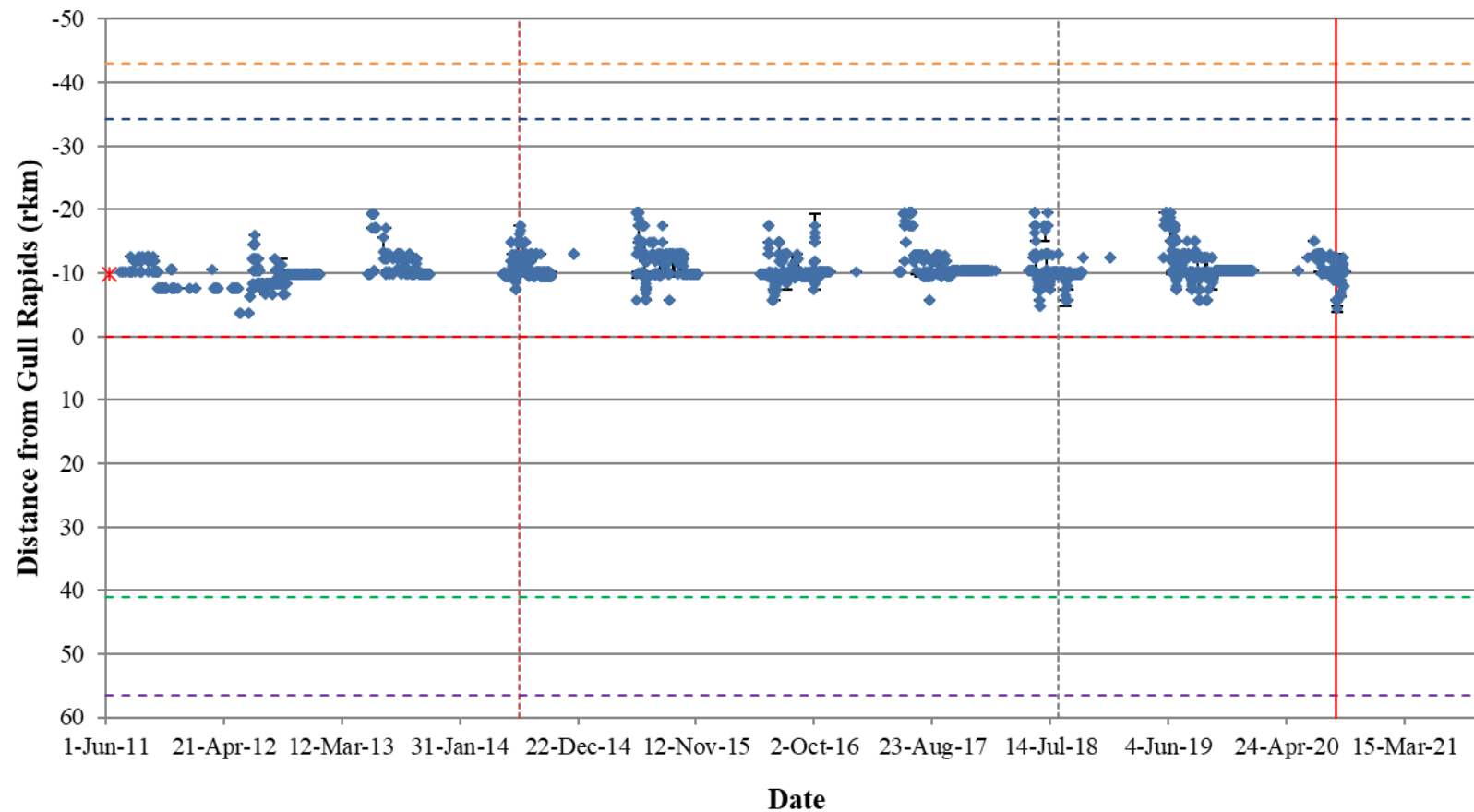


Figure A2-27: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16073) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

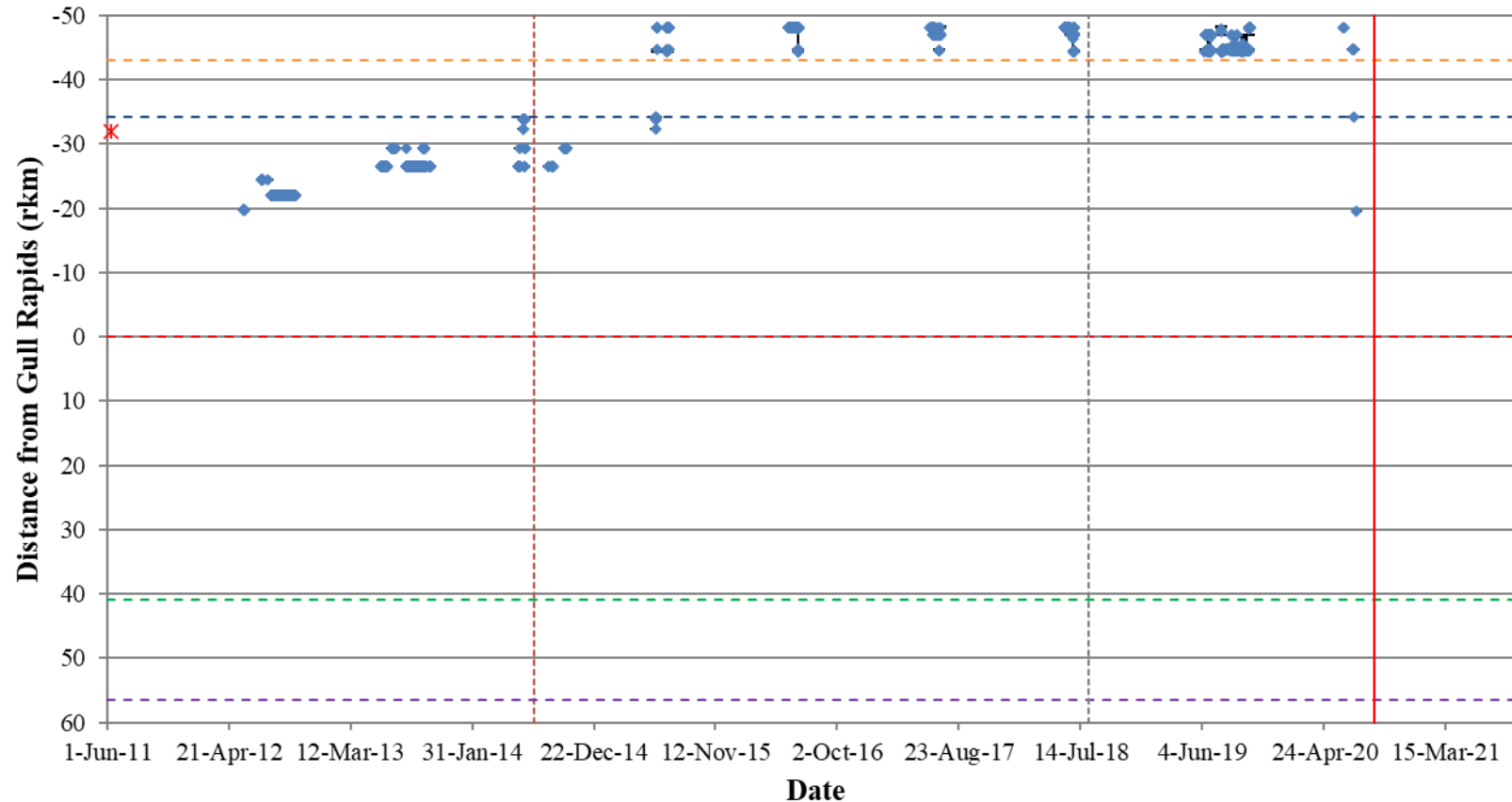


Figure A2-28: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16074) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

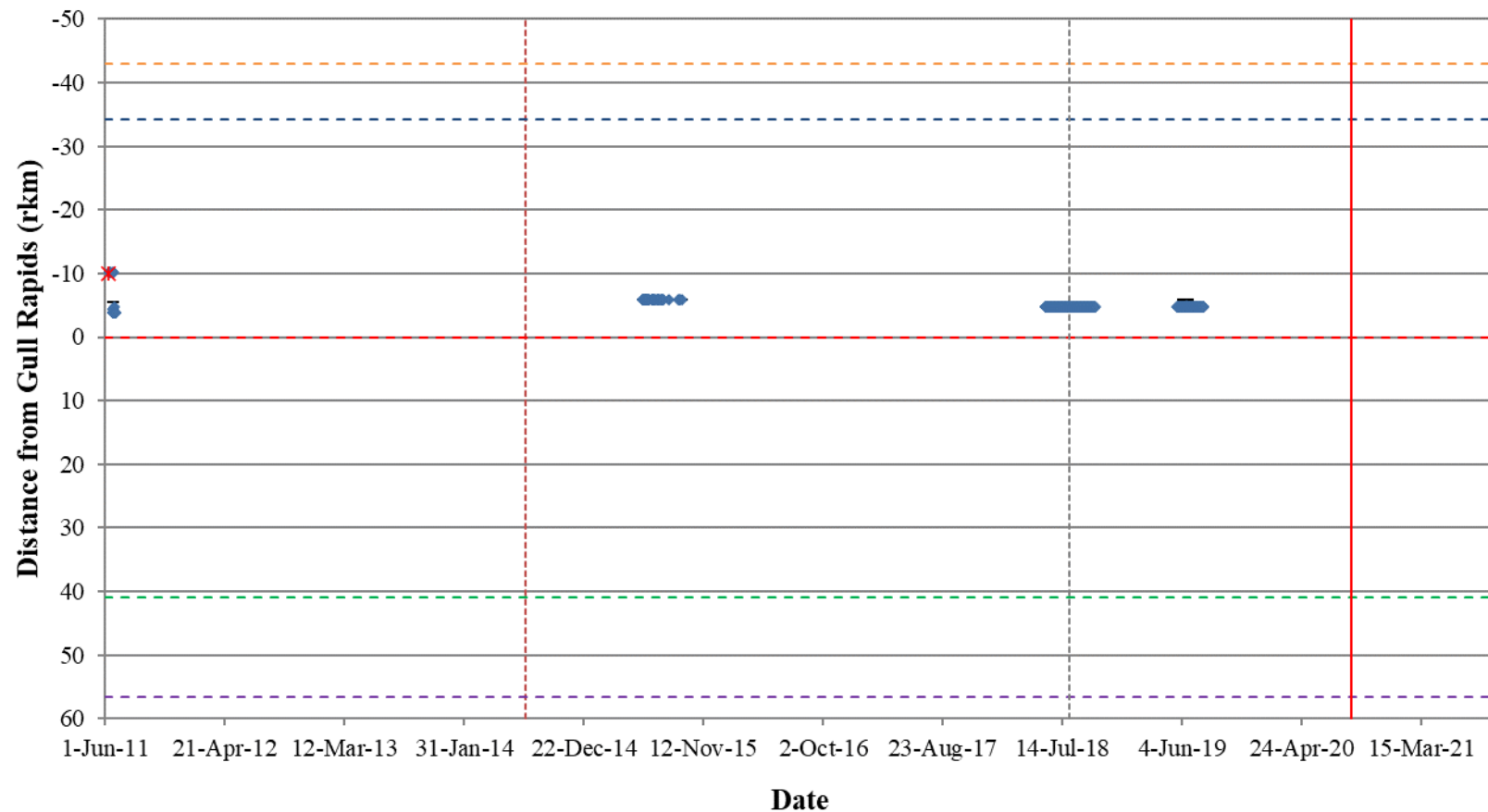


Figure A2-29: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16075) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

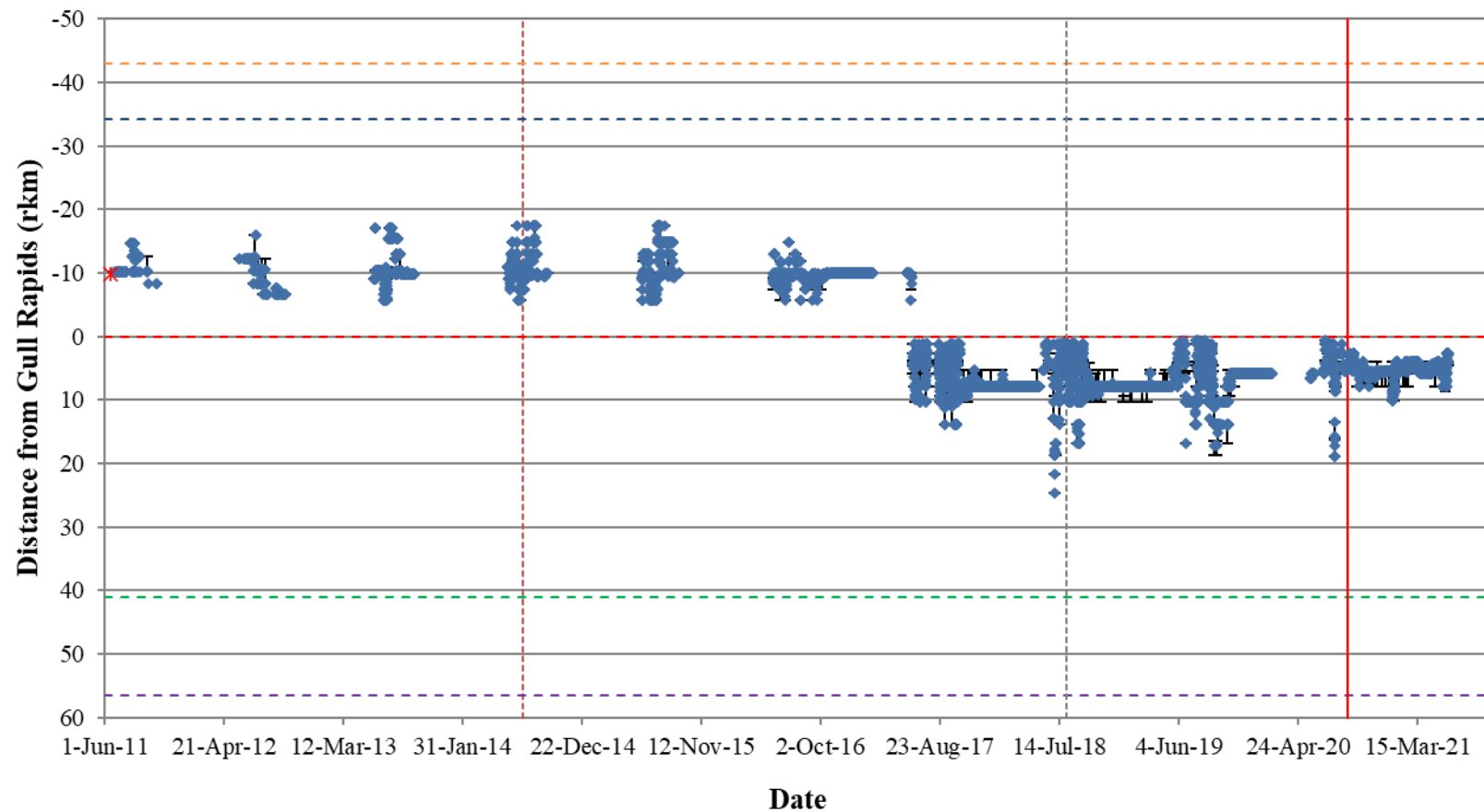


Figure A2-30: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16076) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

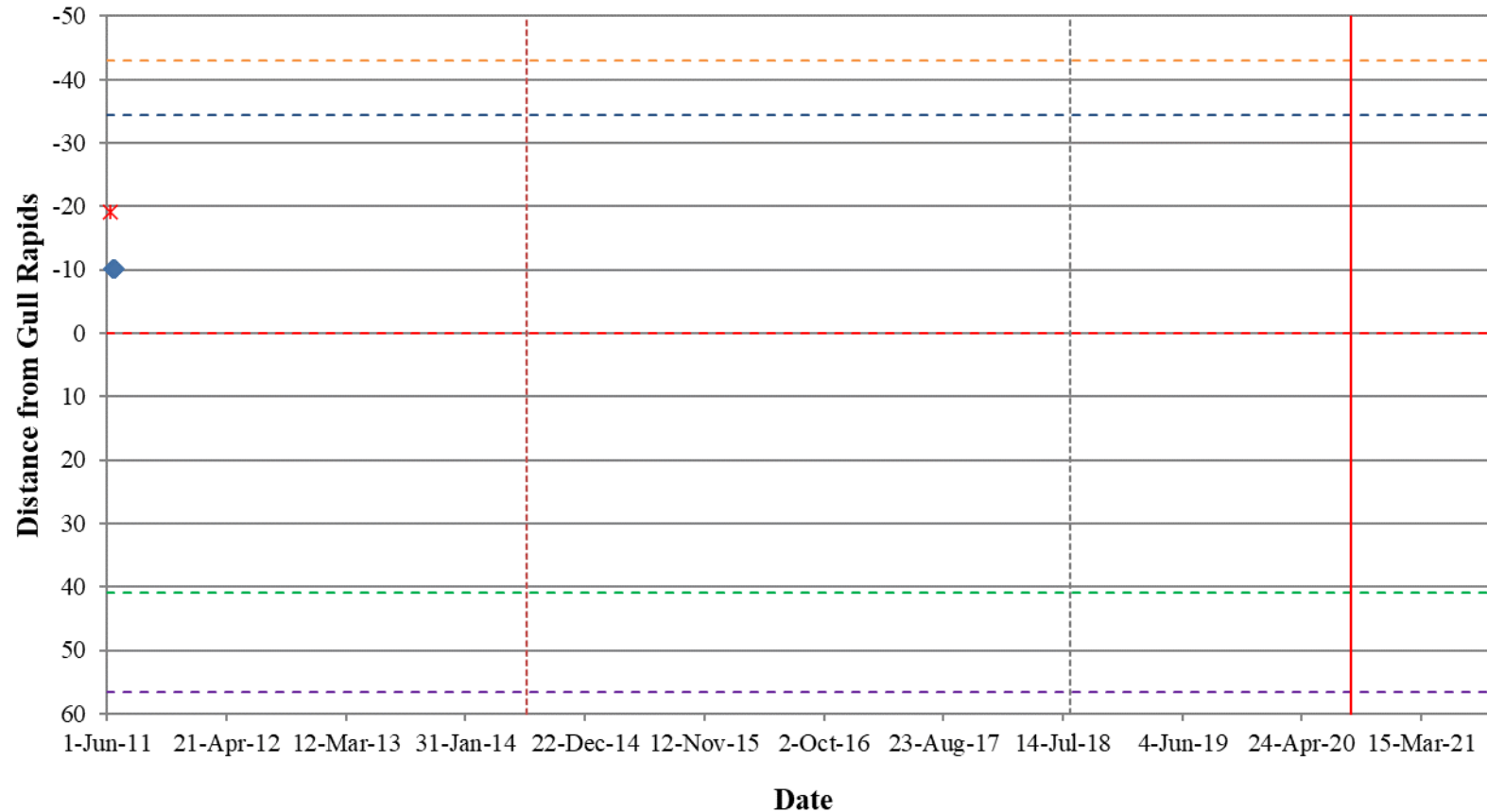


Figure A2-31: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16077) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

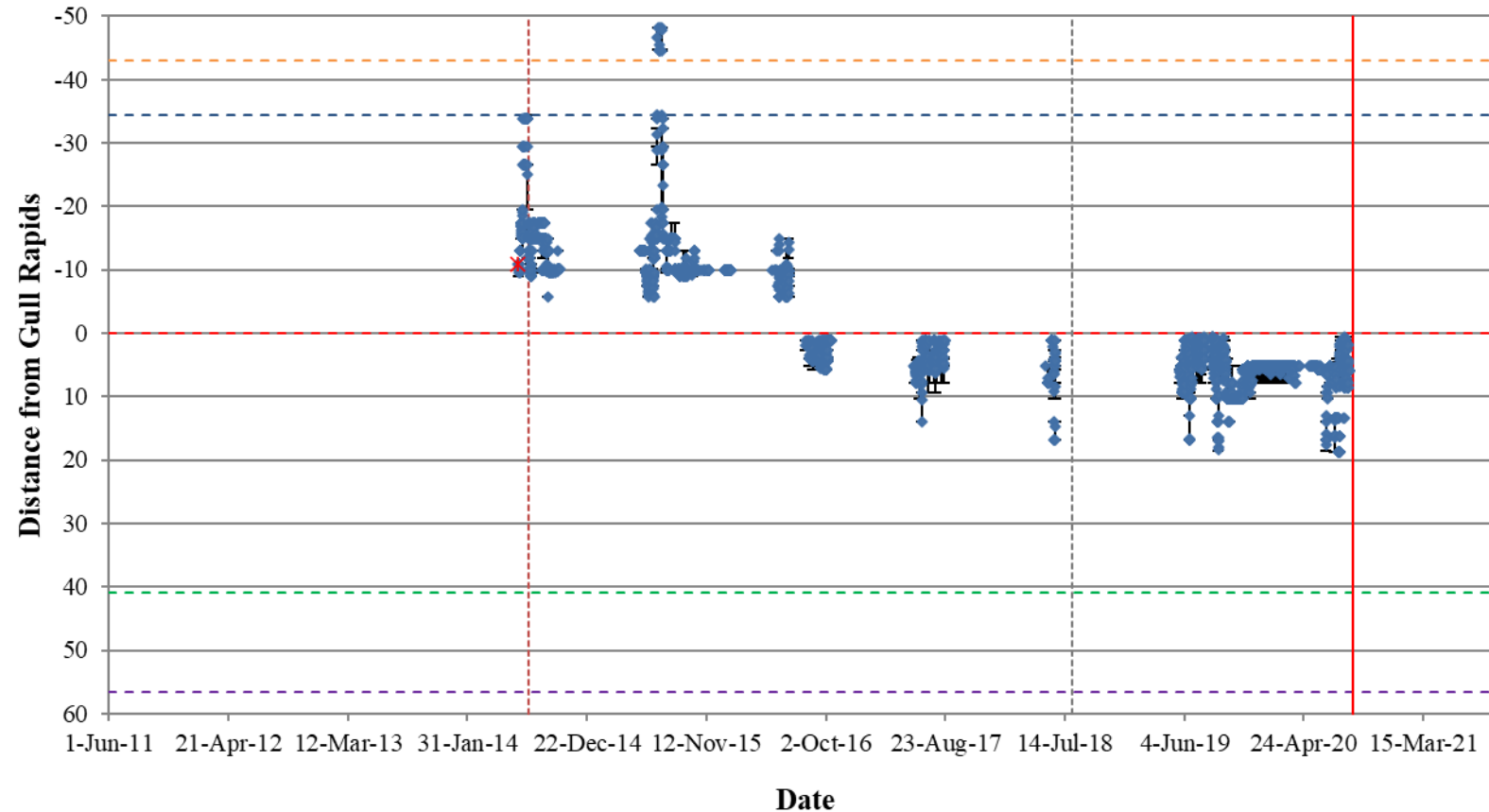


Figure A2-32: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #32174) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

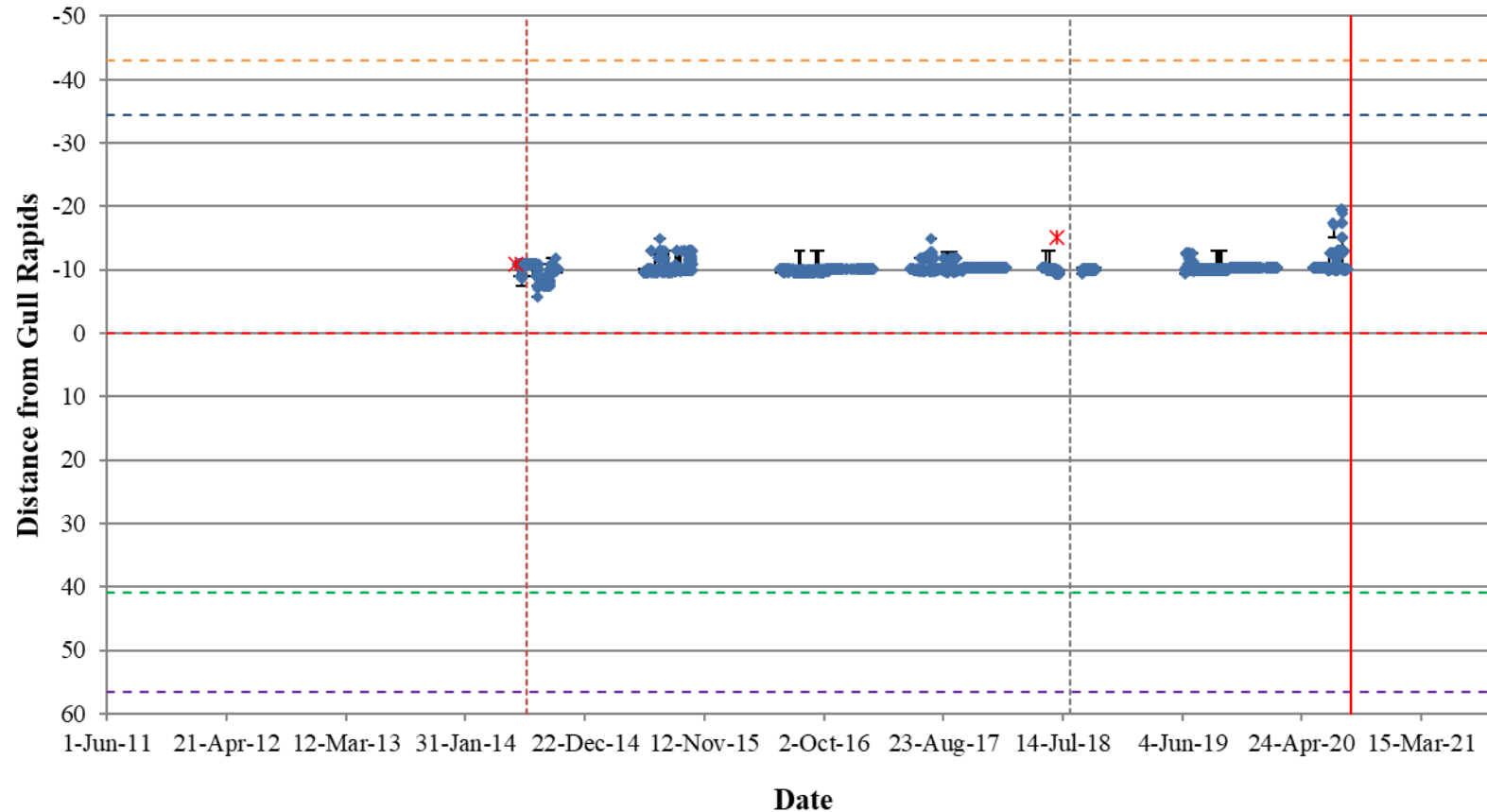


Figure A2-33: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #32175) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging and recaptures are indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

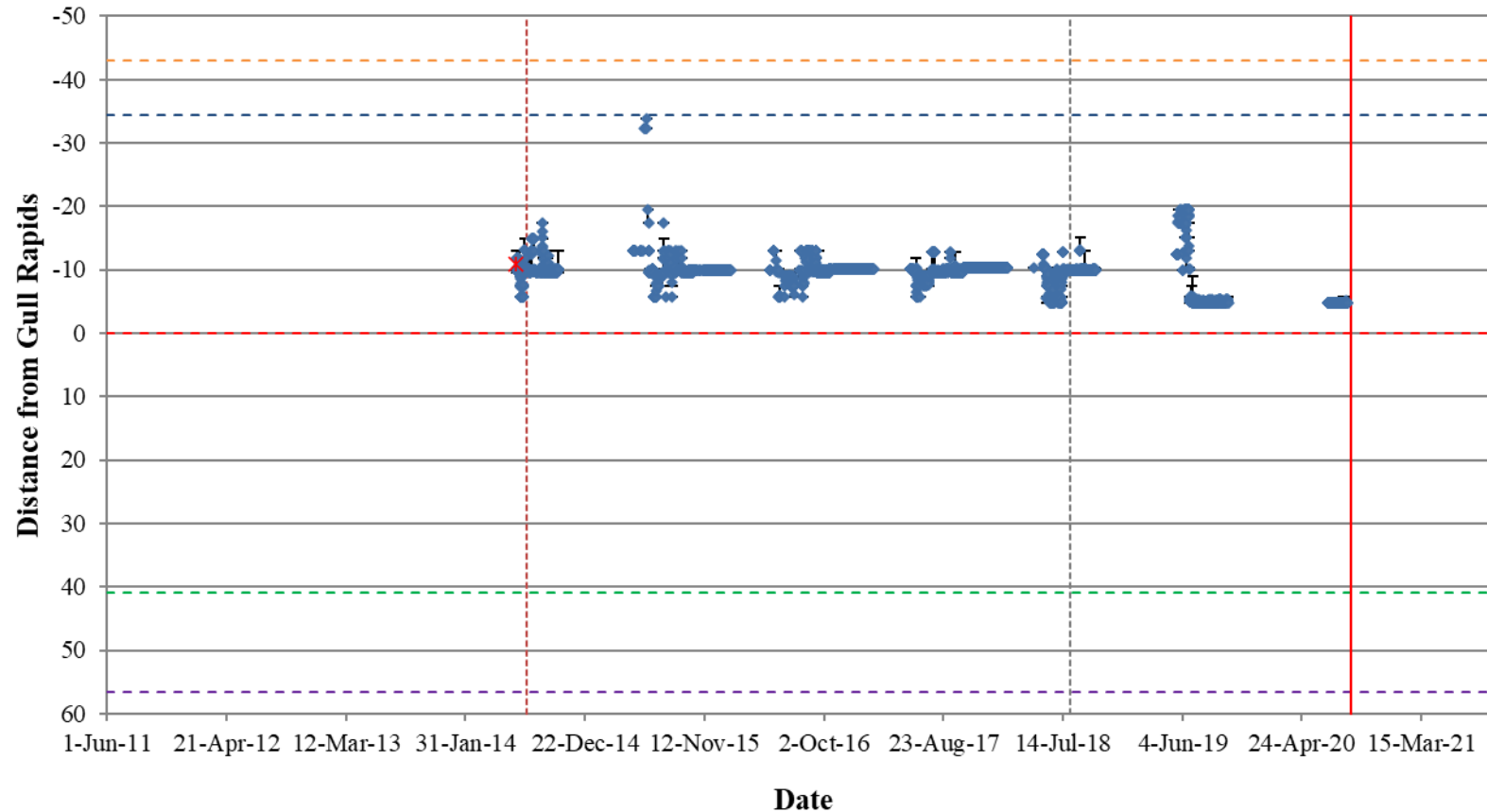


Figure A2-34: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #32176) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

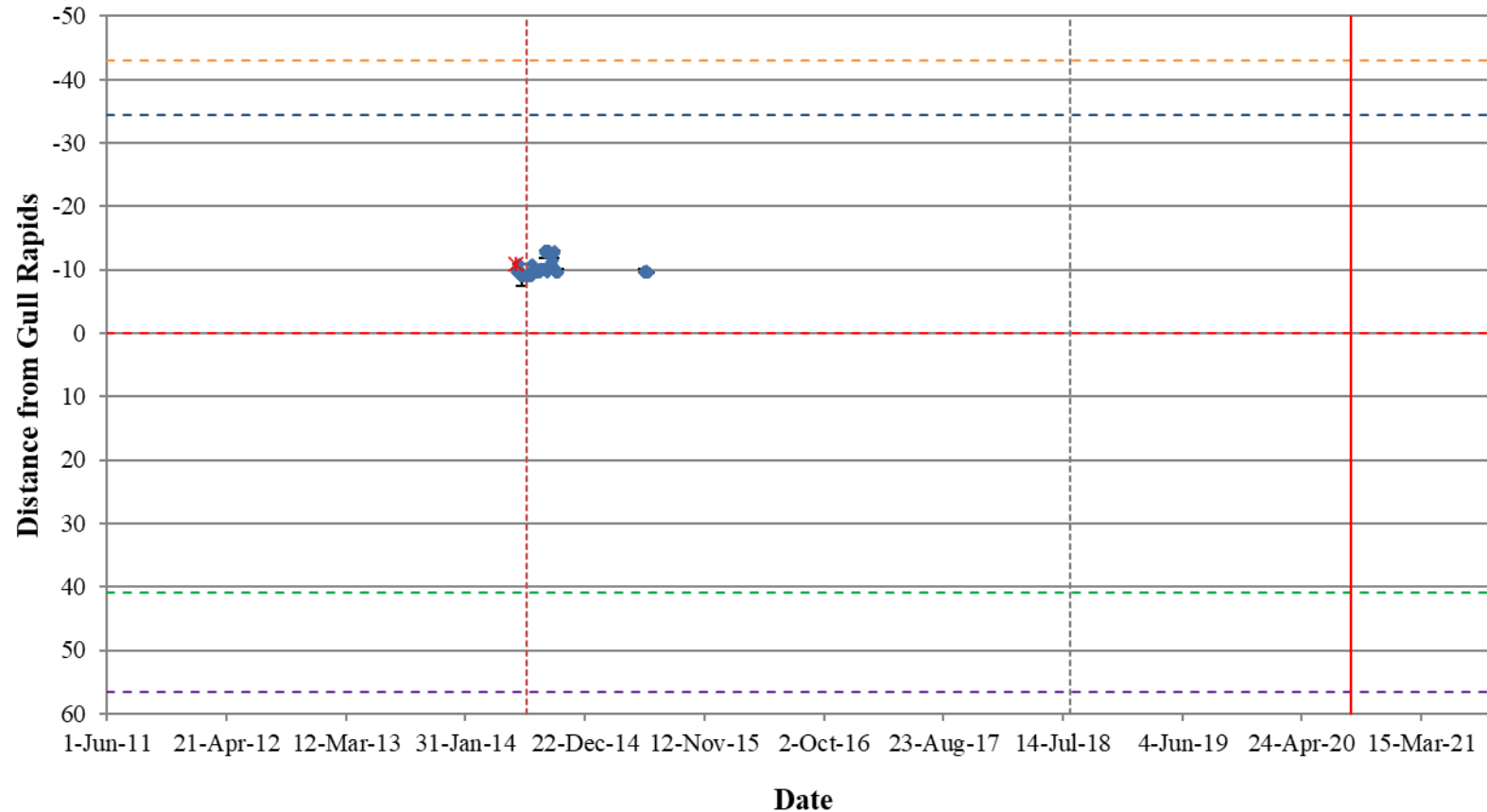


Figure A2-35: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #32177) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

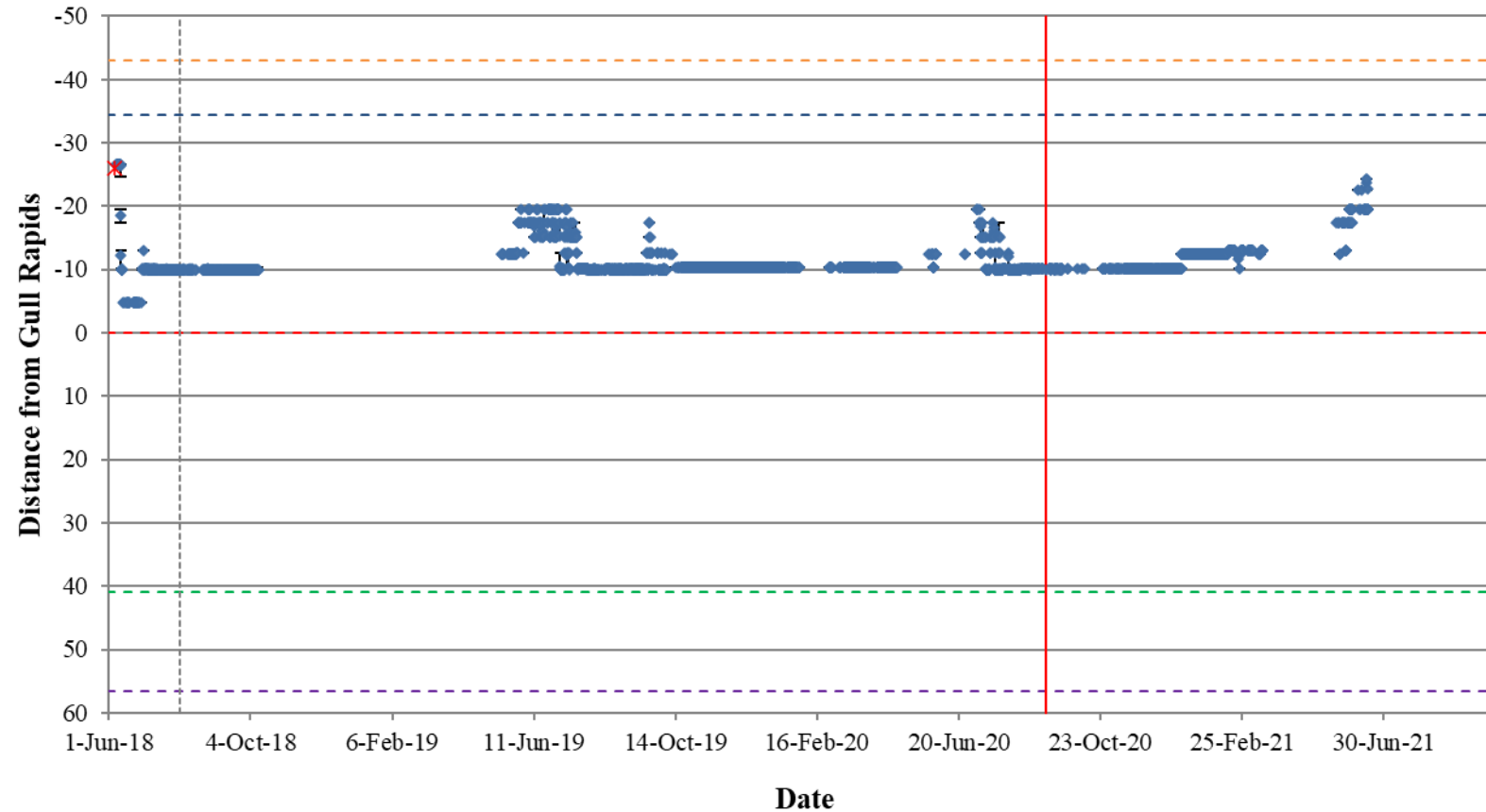


Figure A2-36: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #54799) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from June 1, 2018 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

APPENDIX 3:

LOCATION SUMMARY FOR INDIVIDUAL ACOUSTIC TAGGED ADULT LAKE STURGEON, STEPHENS LAKE, JUNE 2011 TO OCTOBER 2021

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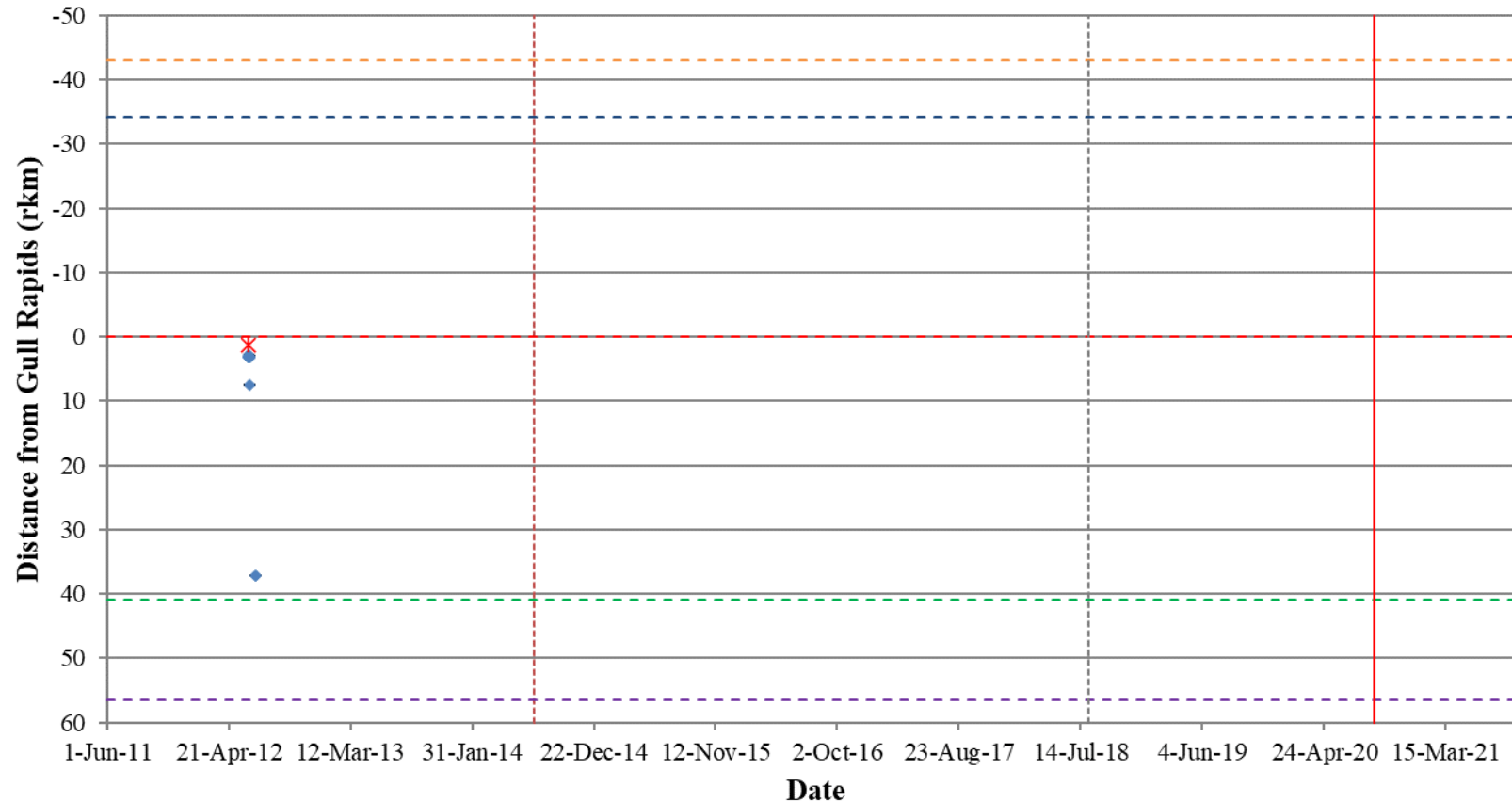


Figure A3-1: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16018) in Stephens Lake in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

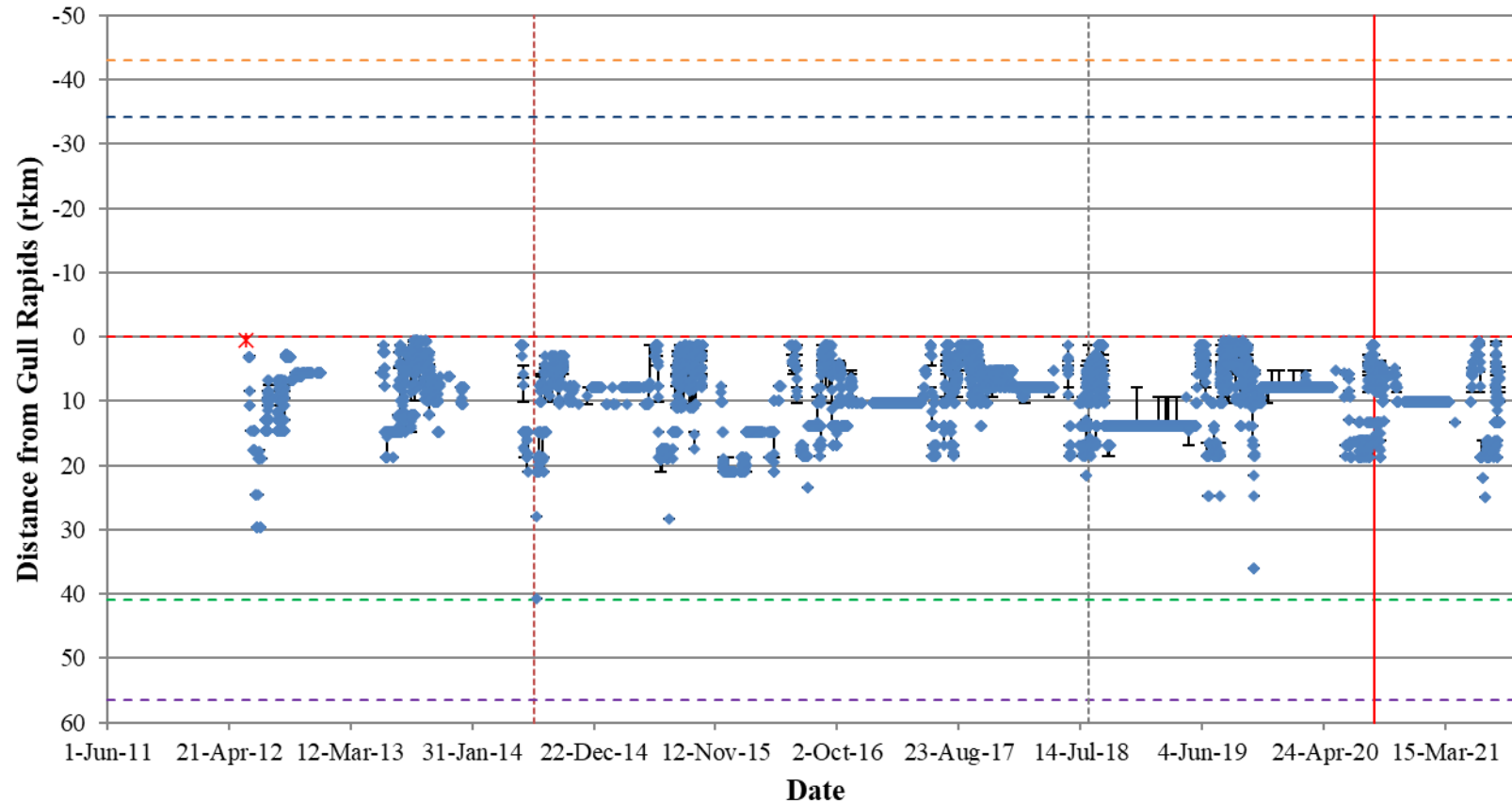


Figure A3-2: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16019) in Stephens Lake in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

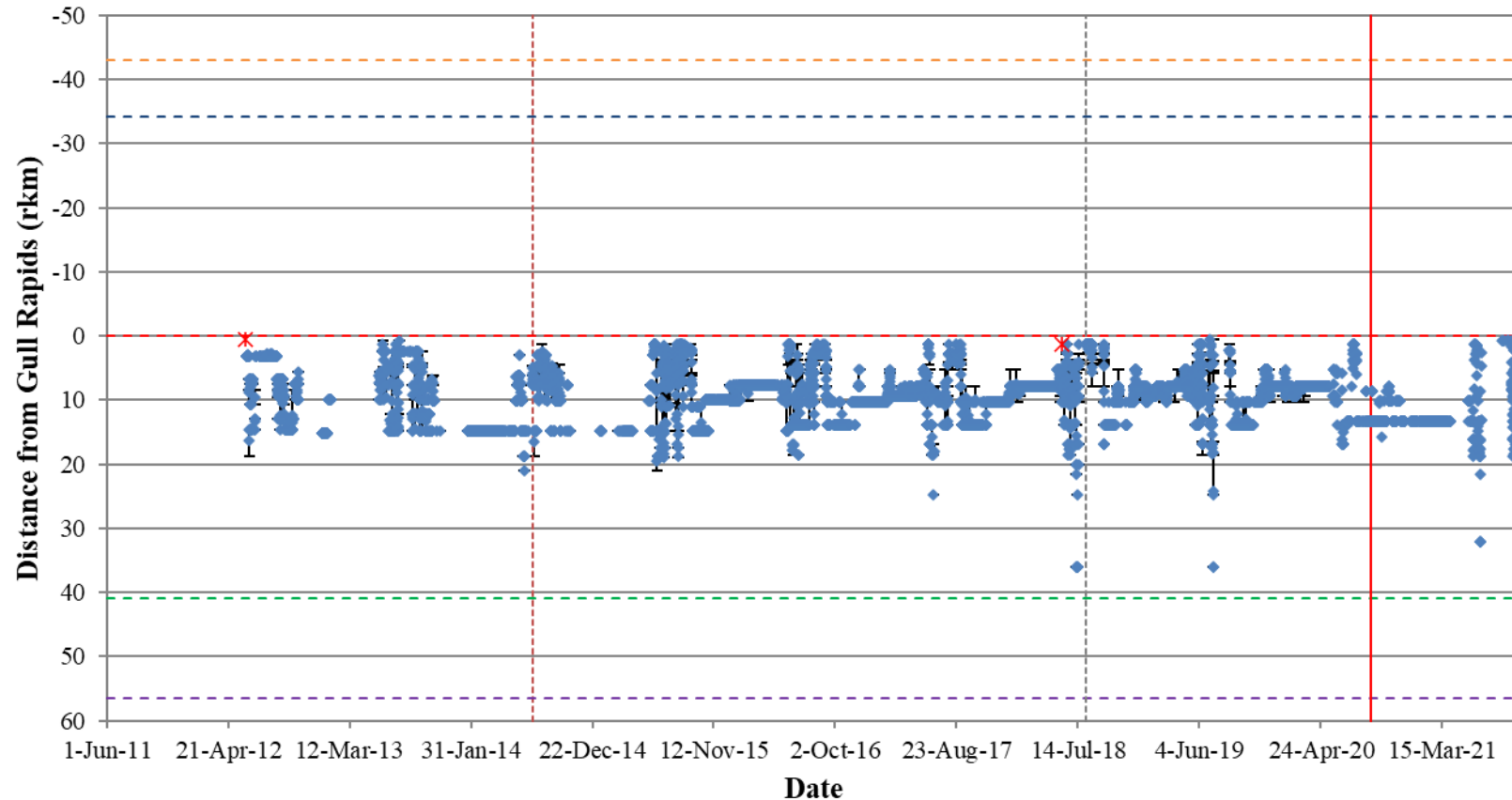


Figure A3-3: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16020) in Stephens Lake in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging and recaptures are indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

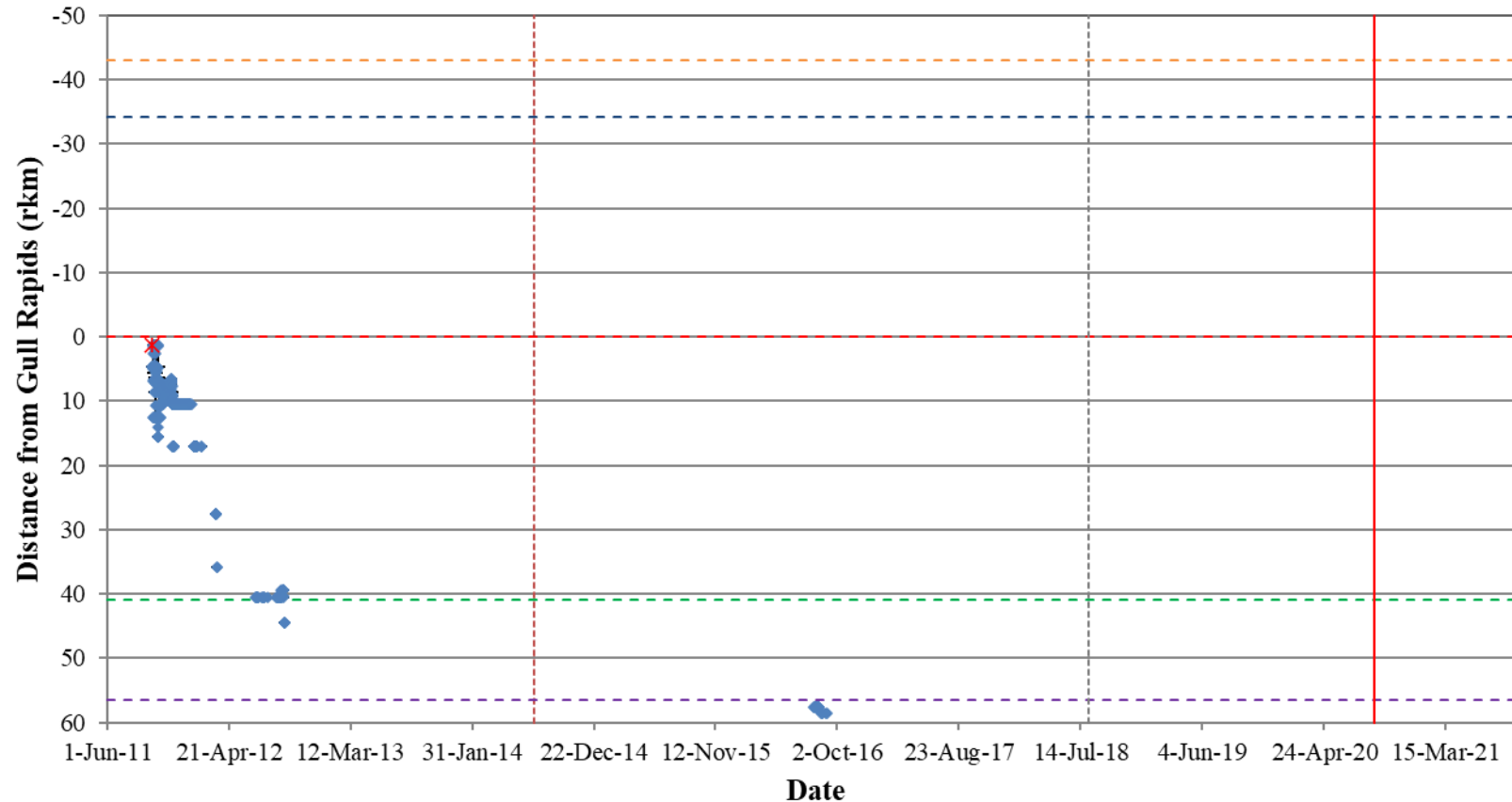


Figure A3-4: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16021) in Stephens Lake in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

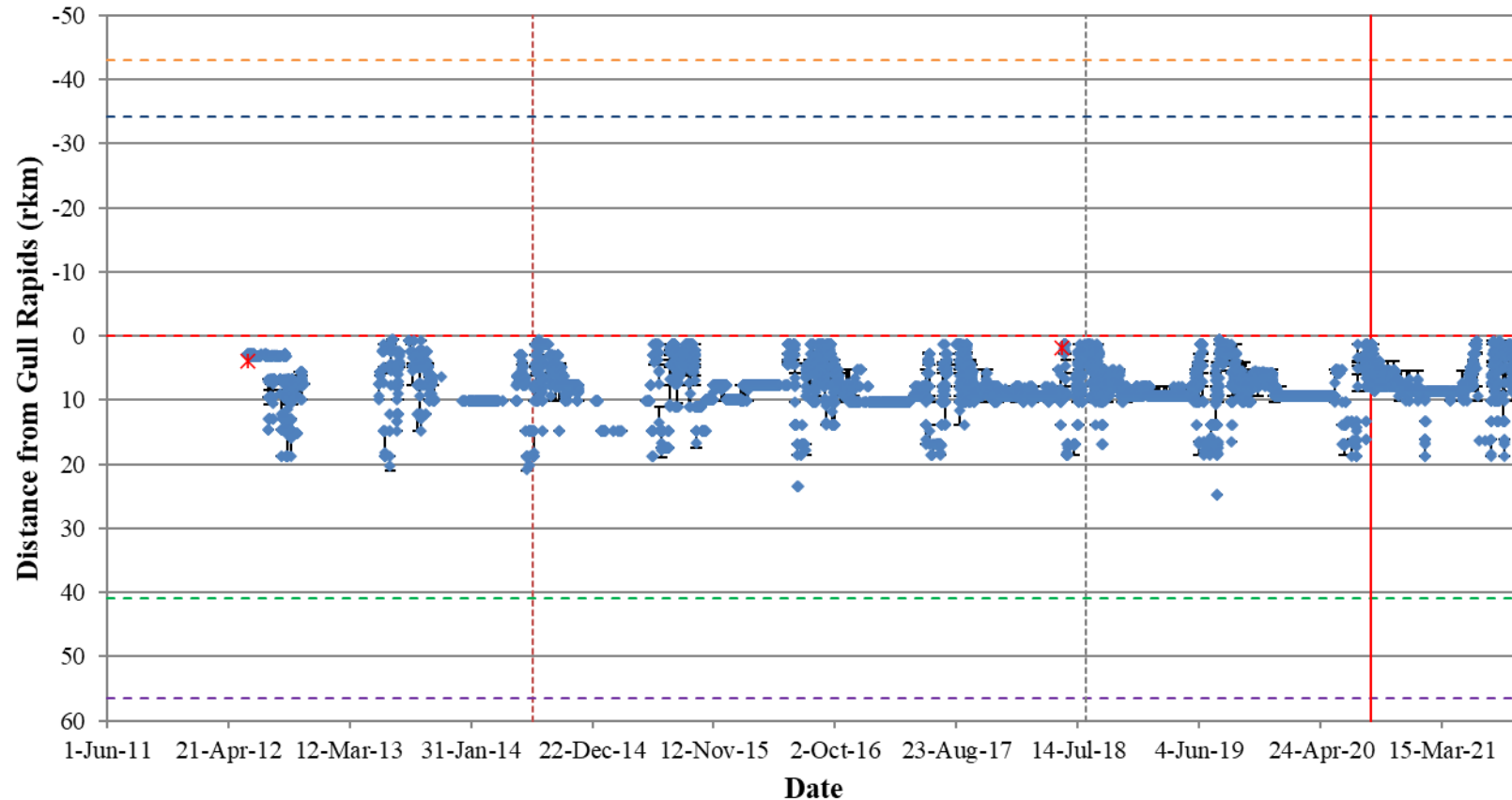


Figure A3-5: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16022) in Stephens Lake in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging and recaptures are indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

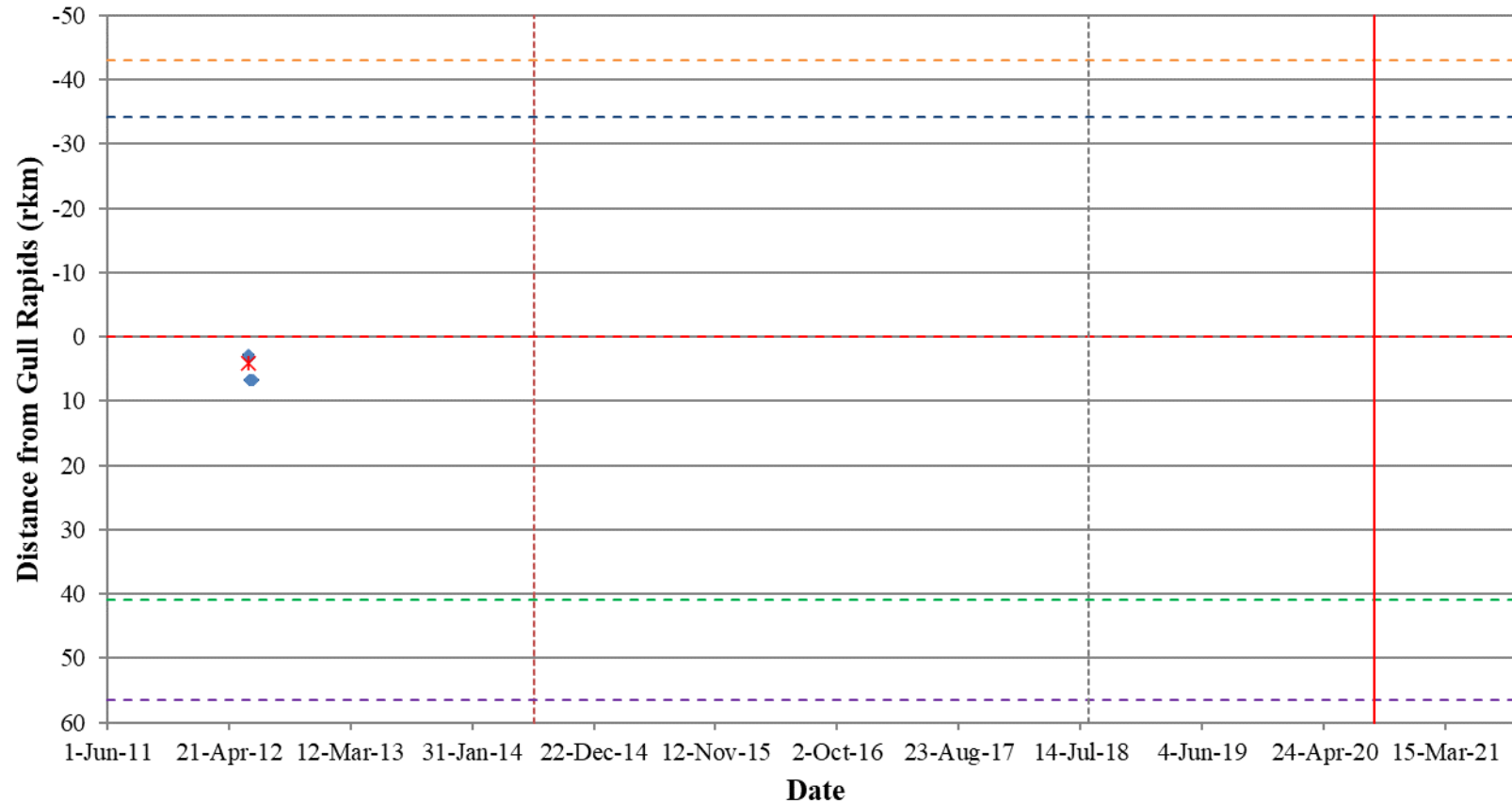


Figure A 3-6: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16024) in Stephens Lake in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

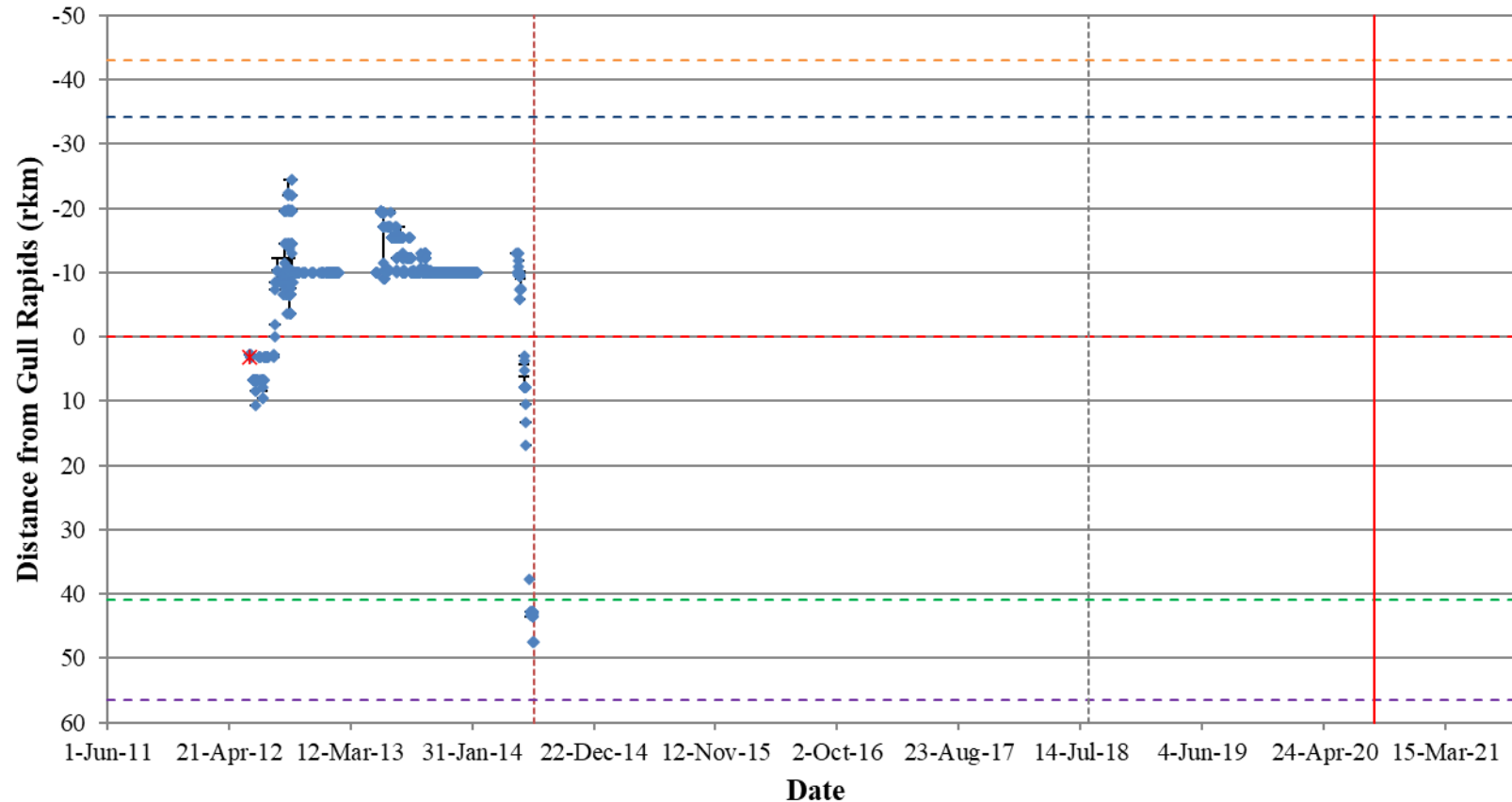


Figure A3-7: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16025) in Stephens Lake in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 21, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

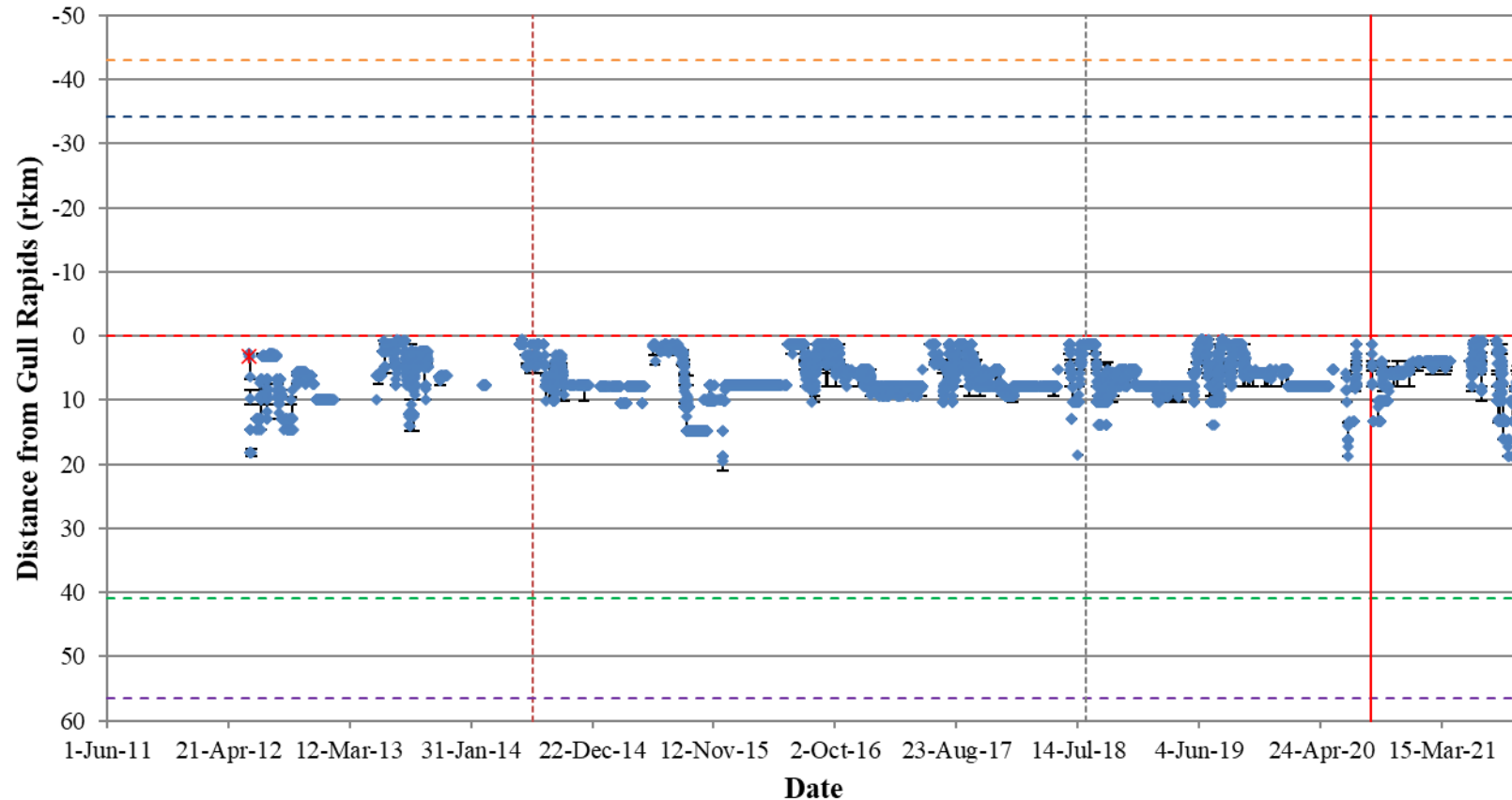


Figure A3-8: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16027) in Stephens Lake in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

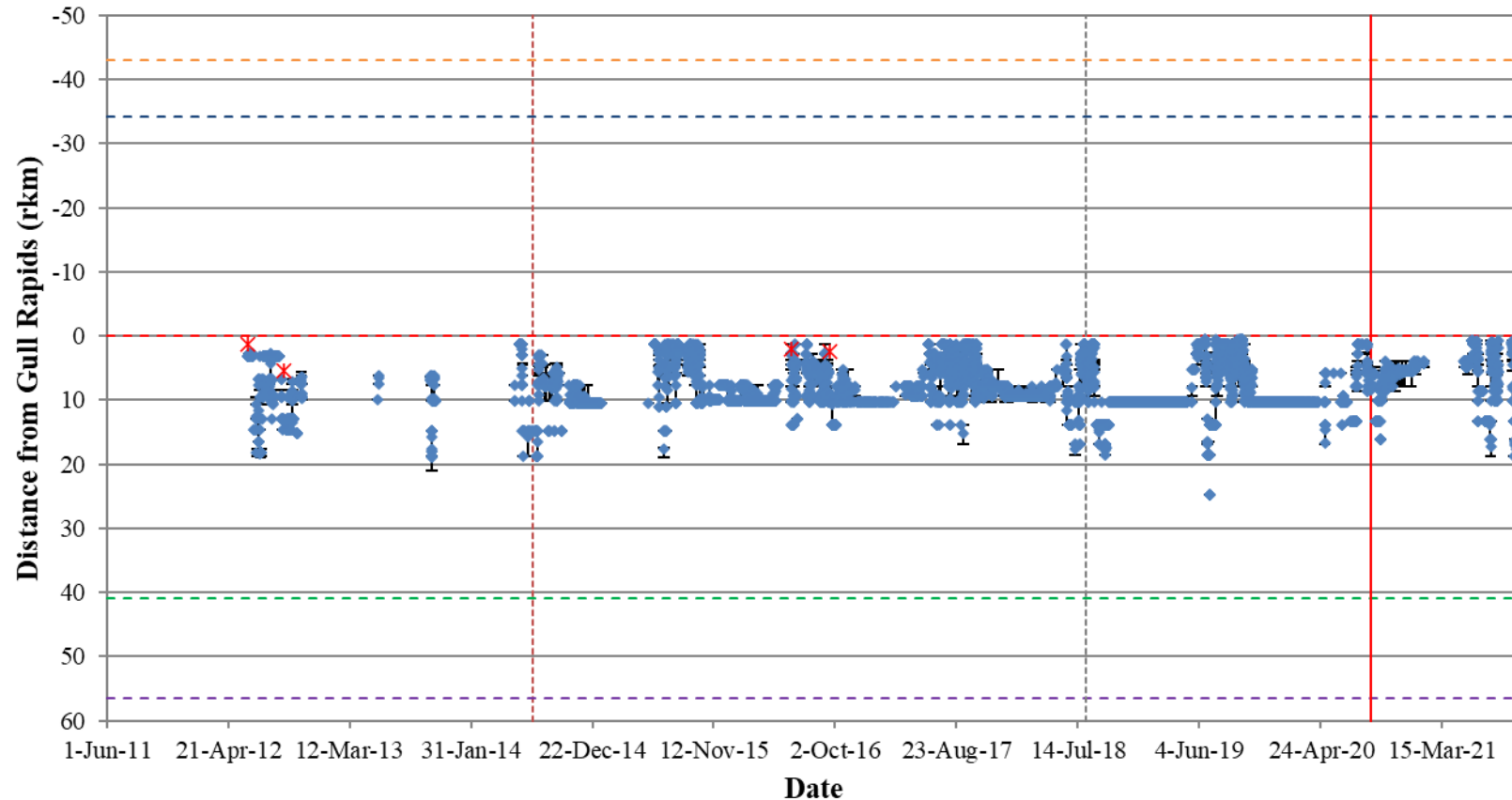


Figure A3-9: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16028) in Stephens Lake in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging and recaptures are indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

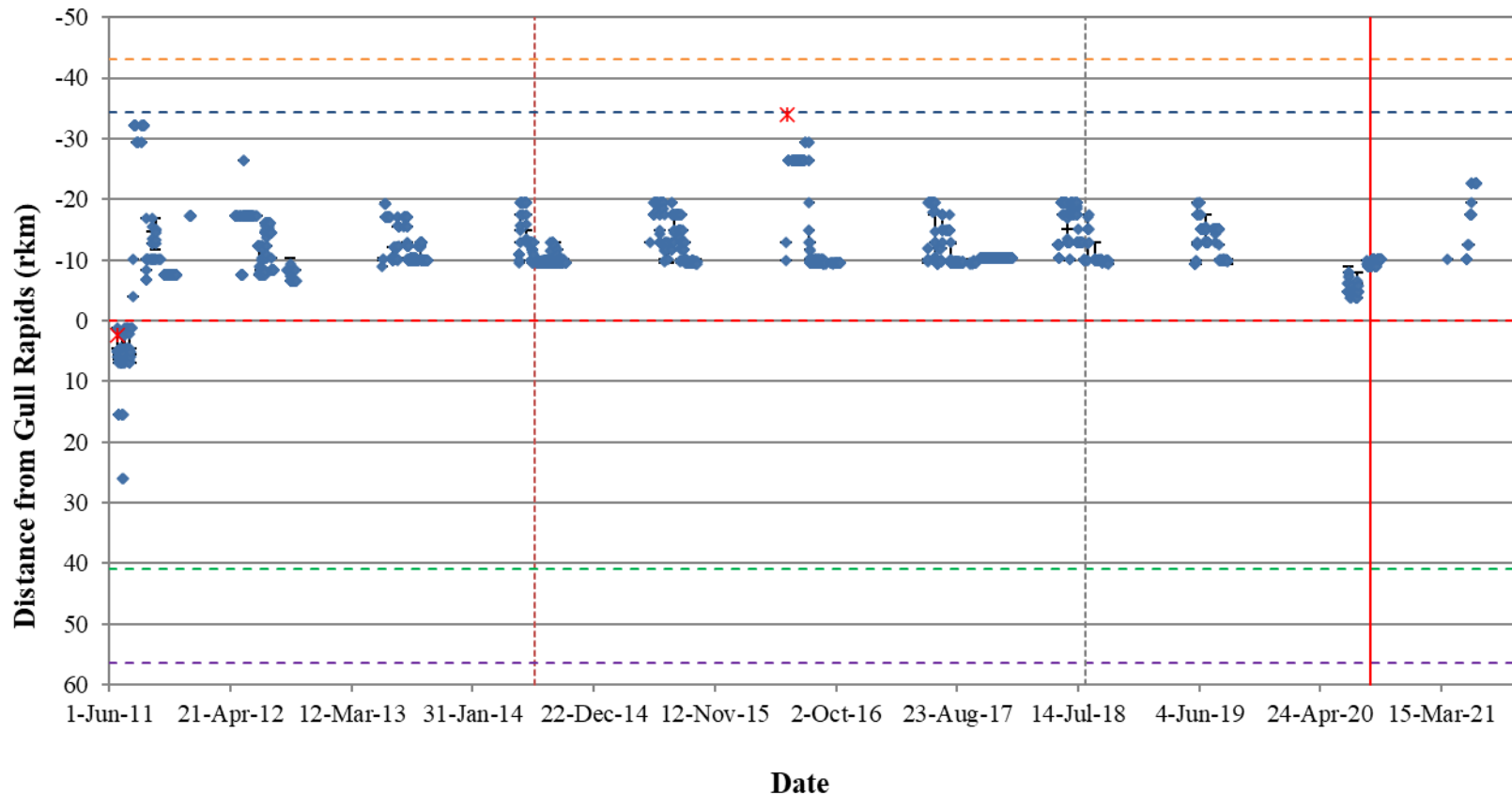


Figure A3-10: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16029) in Stephens Lake in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging and recaptures are indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

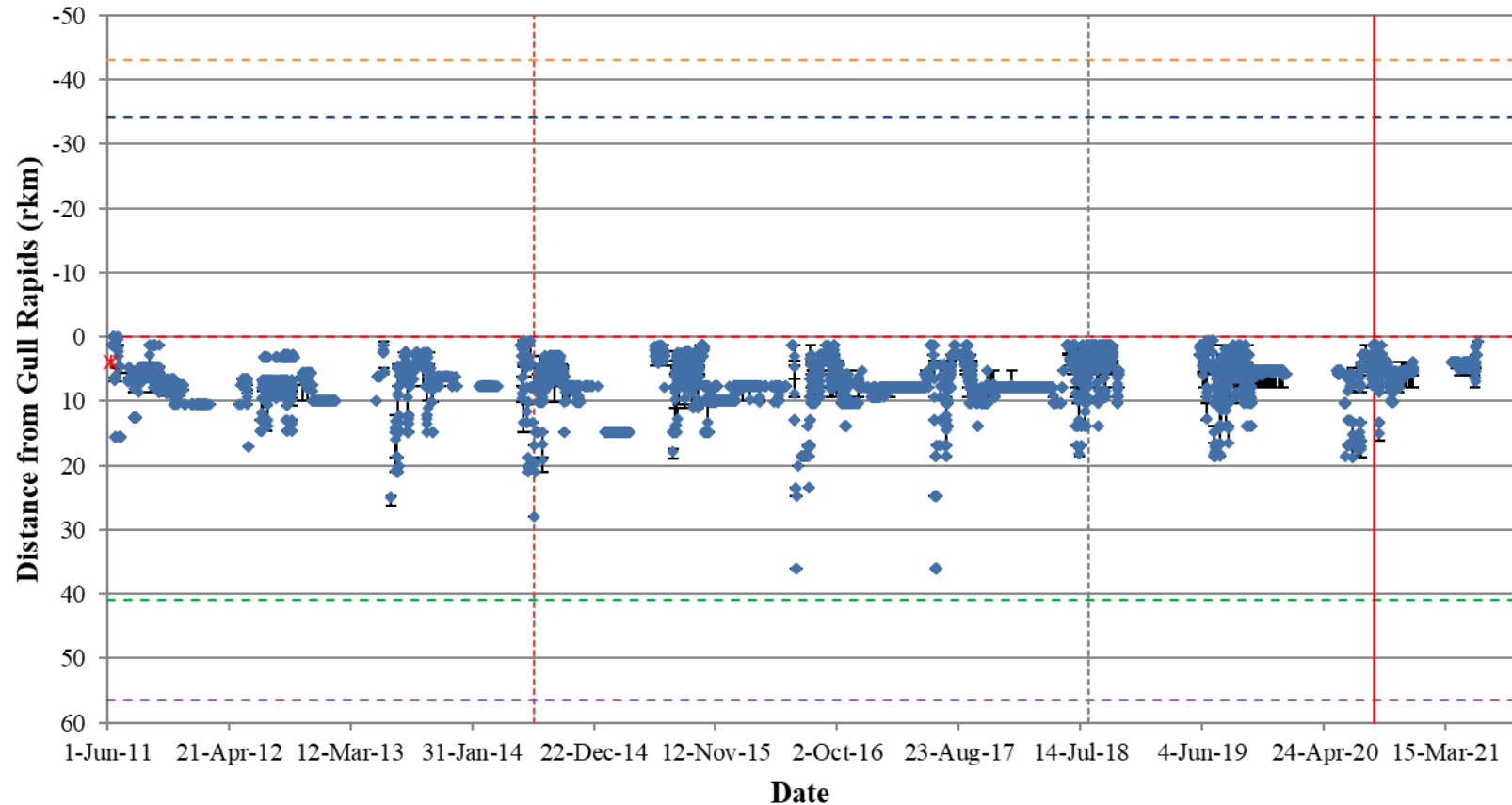


Figure A3-11: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16030) in Stephens Lake in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).



Figure A3-12: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16031) in Stephens Lake in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

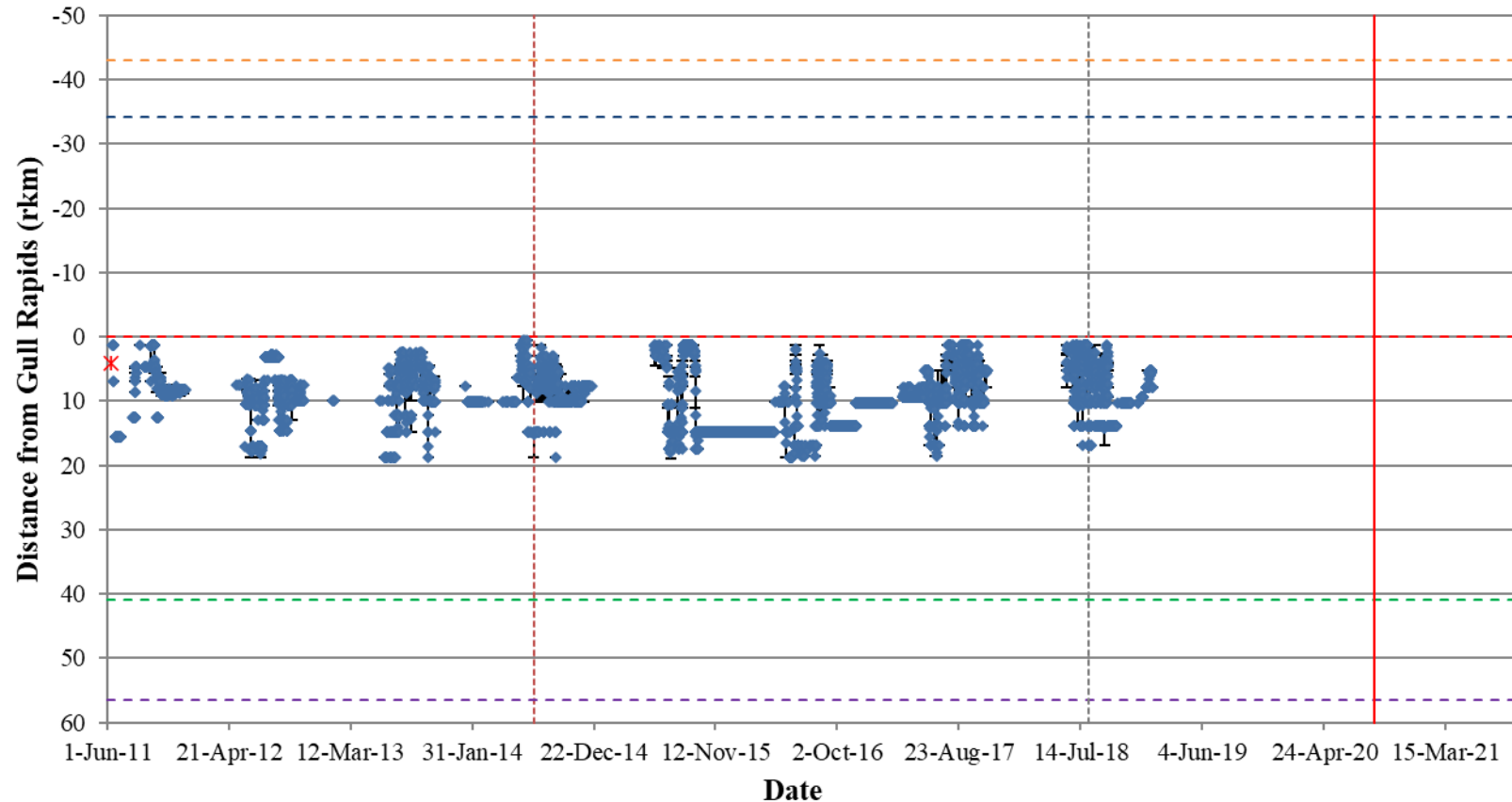


Figure A3-13: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16032) in Stephens Lake in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

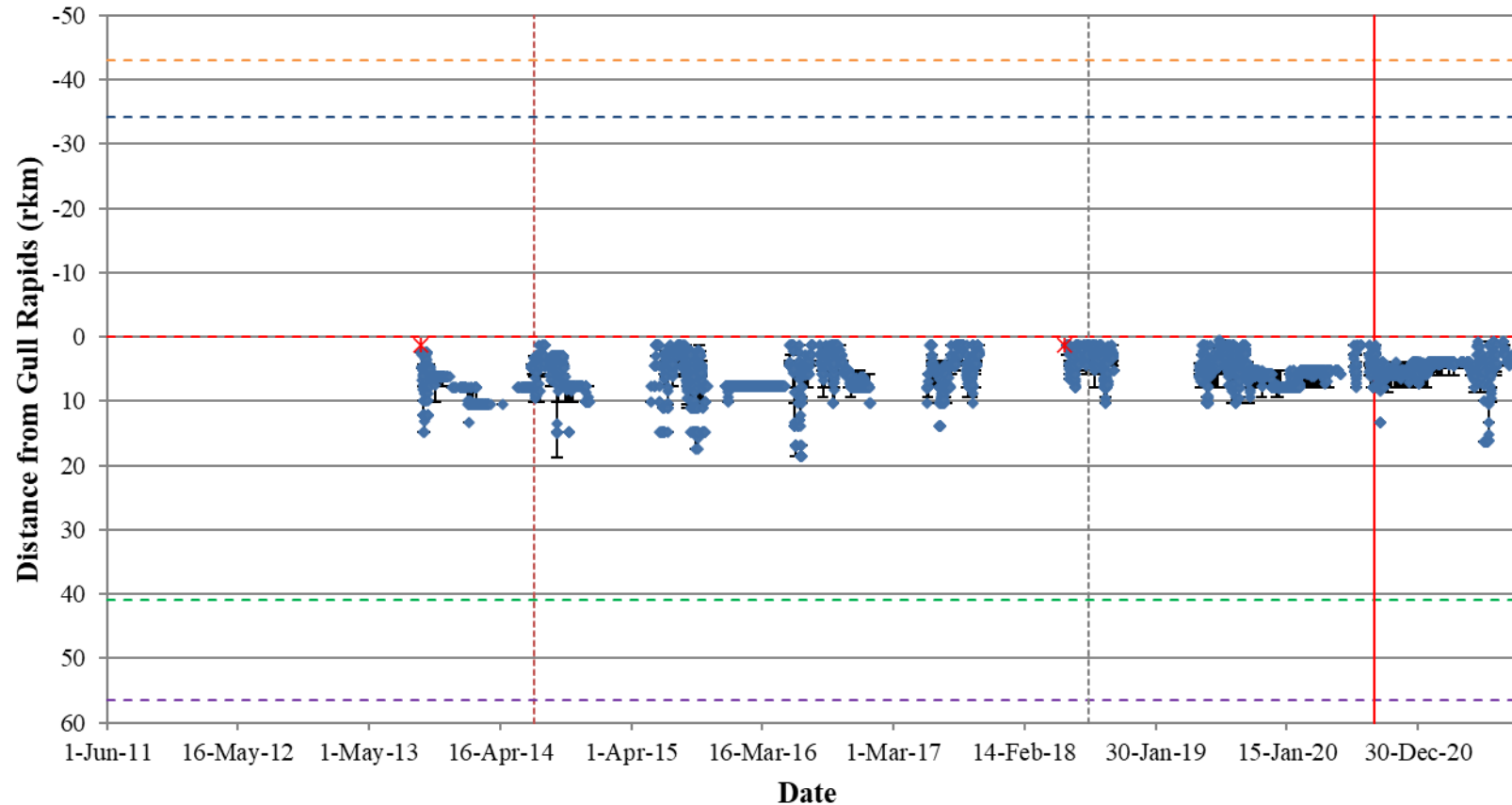


Figure A3-14: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16033b) in Stephens Lake in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging and recapture is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

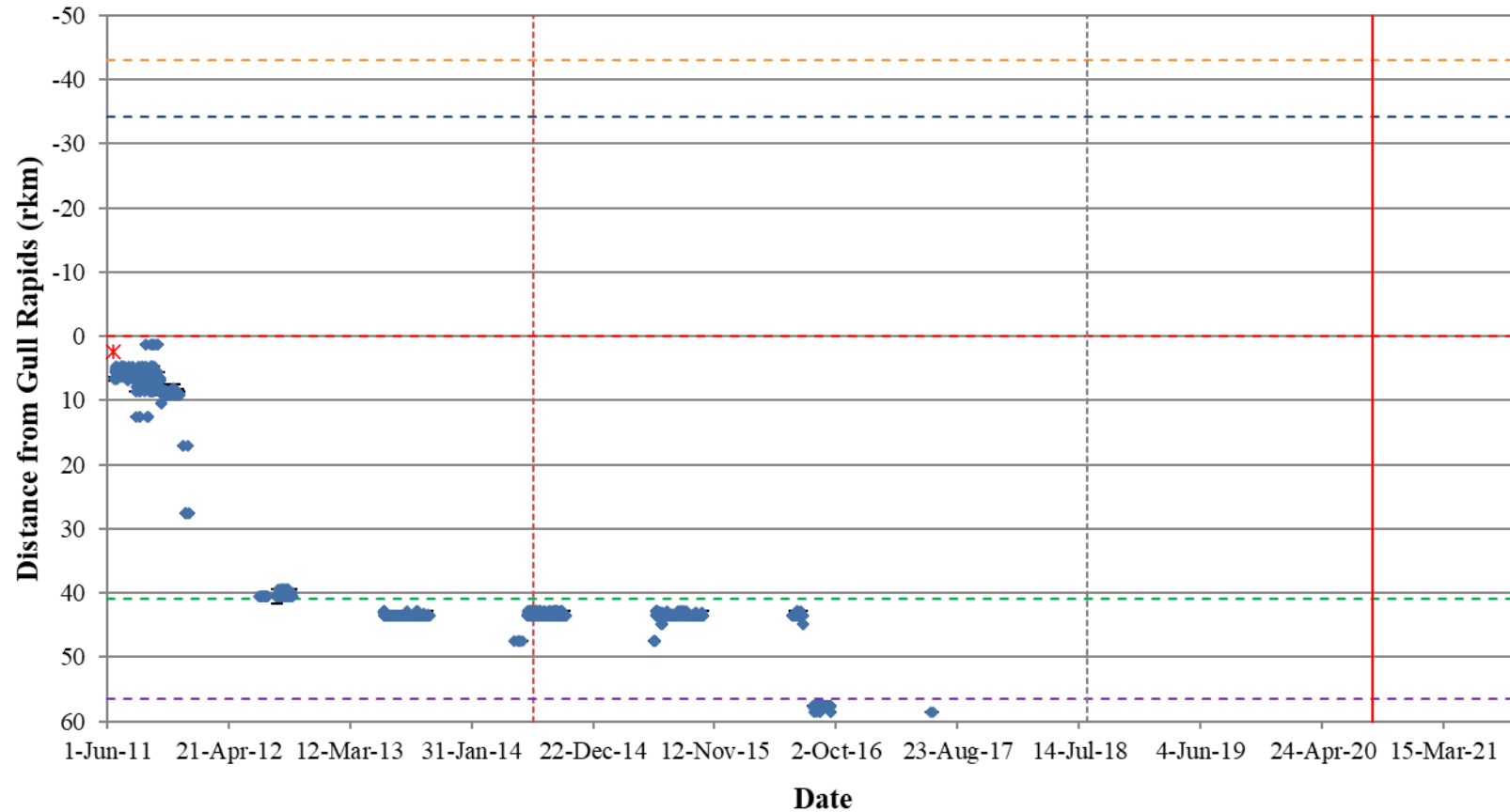


Figure A3-15: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16034) in Stephens Lake in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

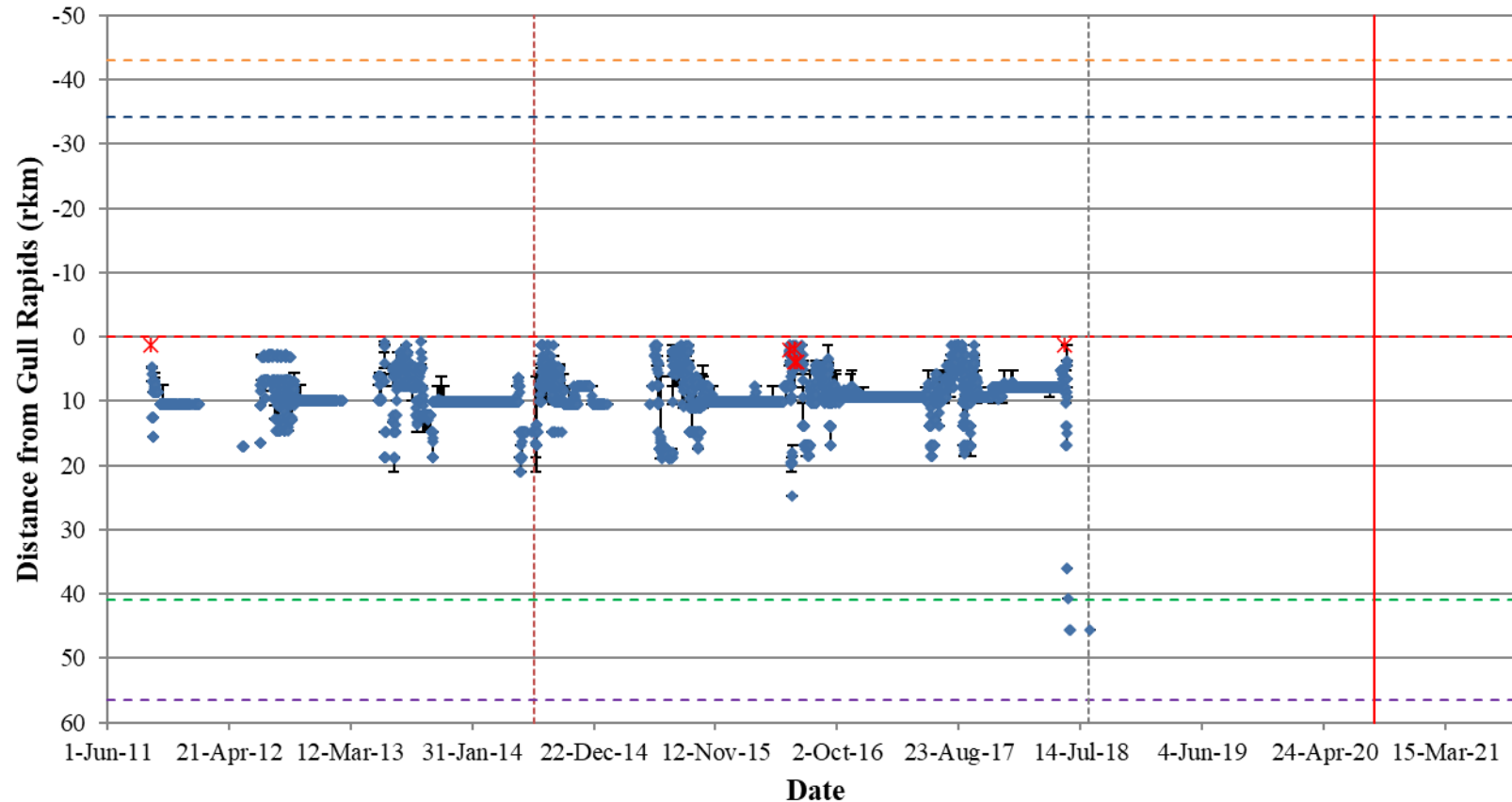


Figure A3-16: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16035) in Stephens Lake in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging and recaptures are indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

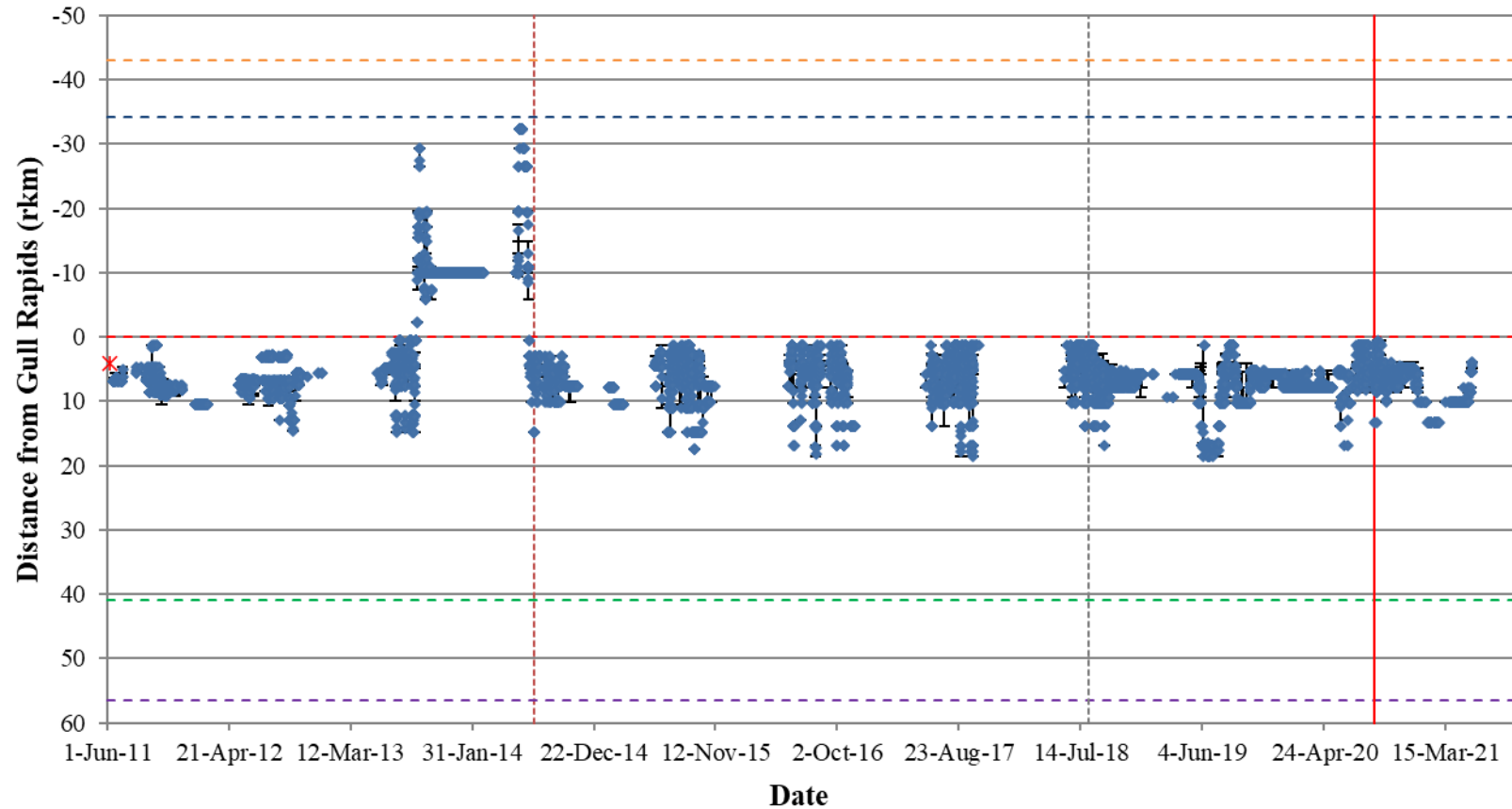


Figure A3-17: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16037) in Stephens Lake in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

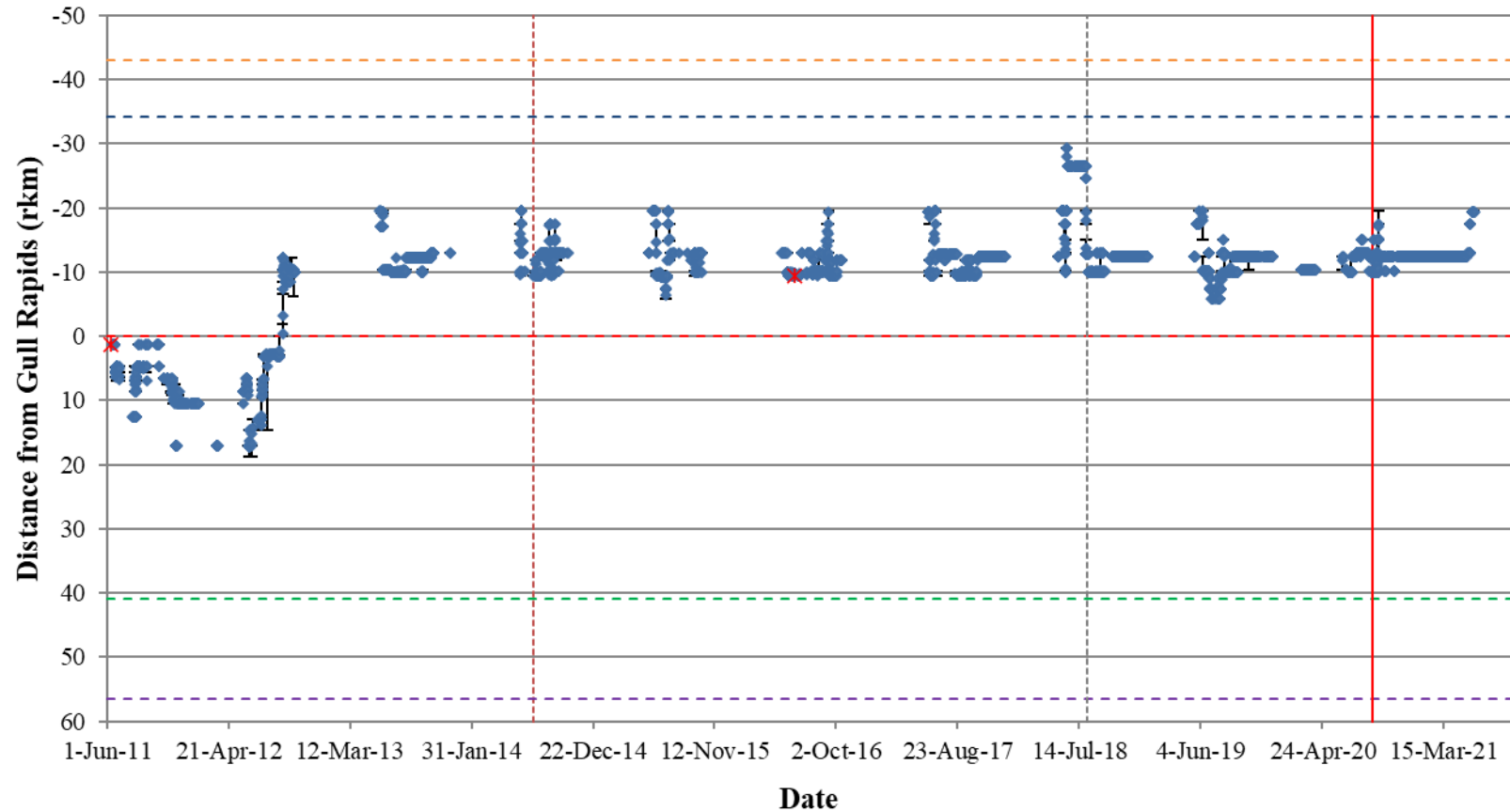


Figure A3-18: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16038) in Stephens Lake in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging and recaptures are indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

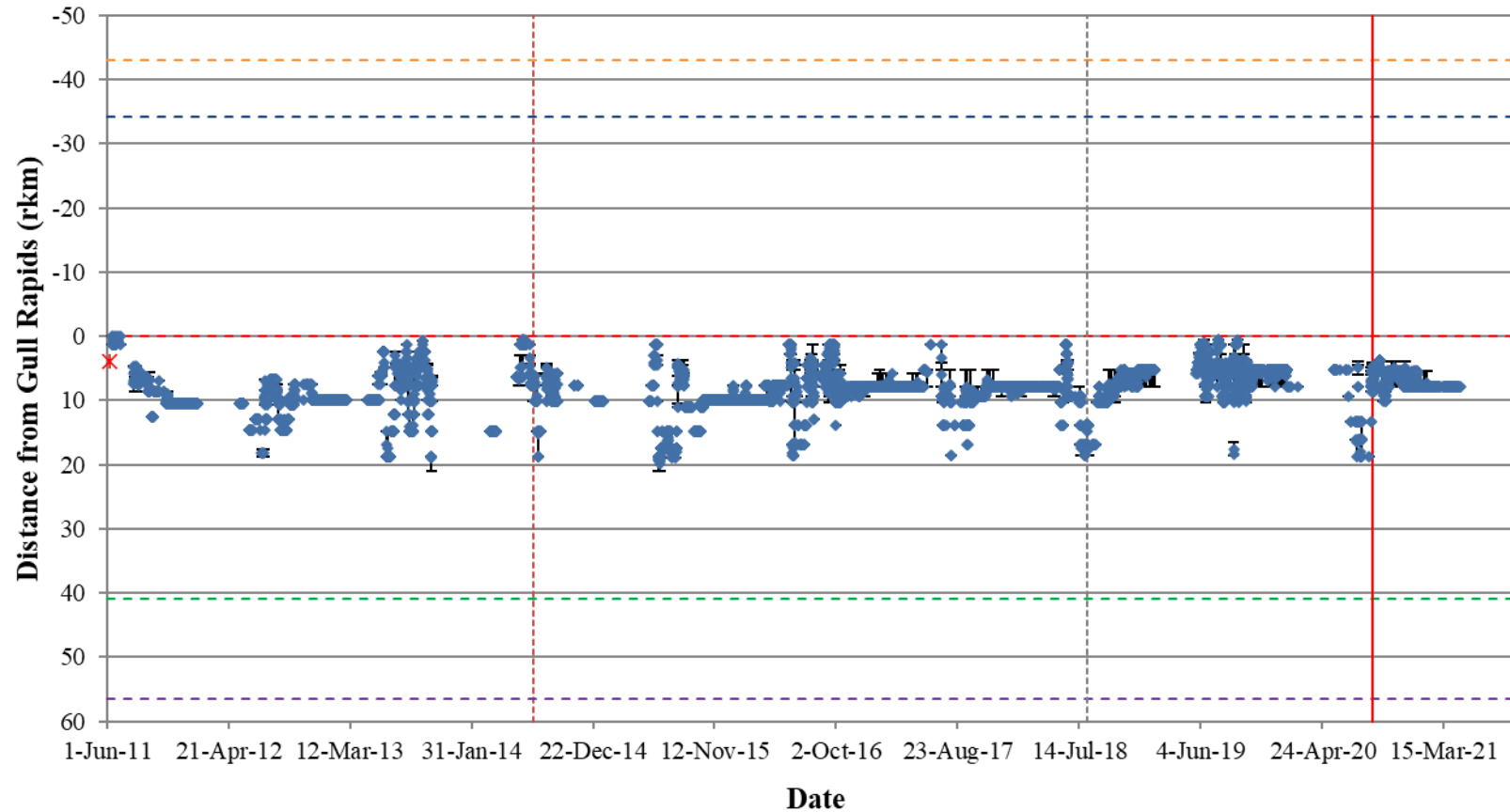


Figure A3-19: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16040) in Stephens Lake in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

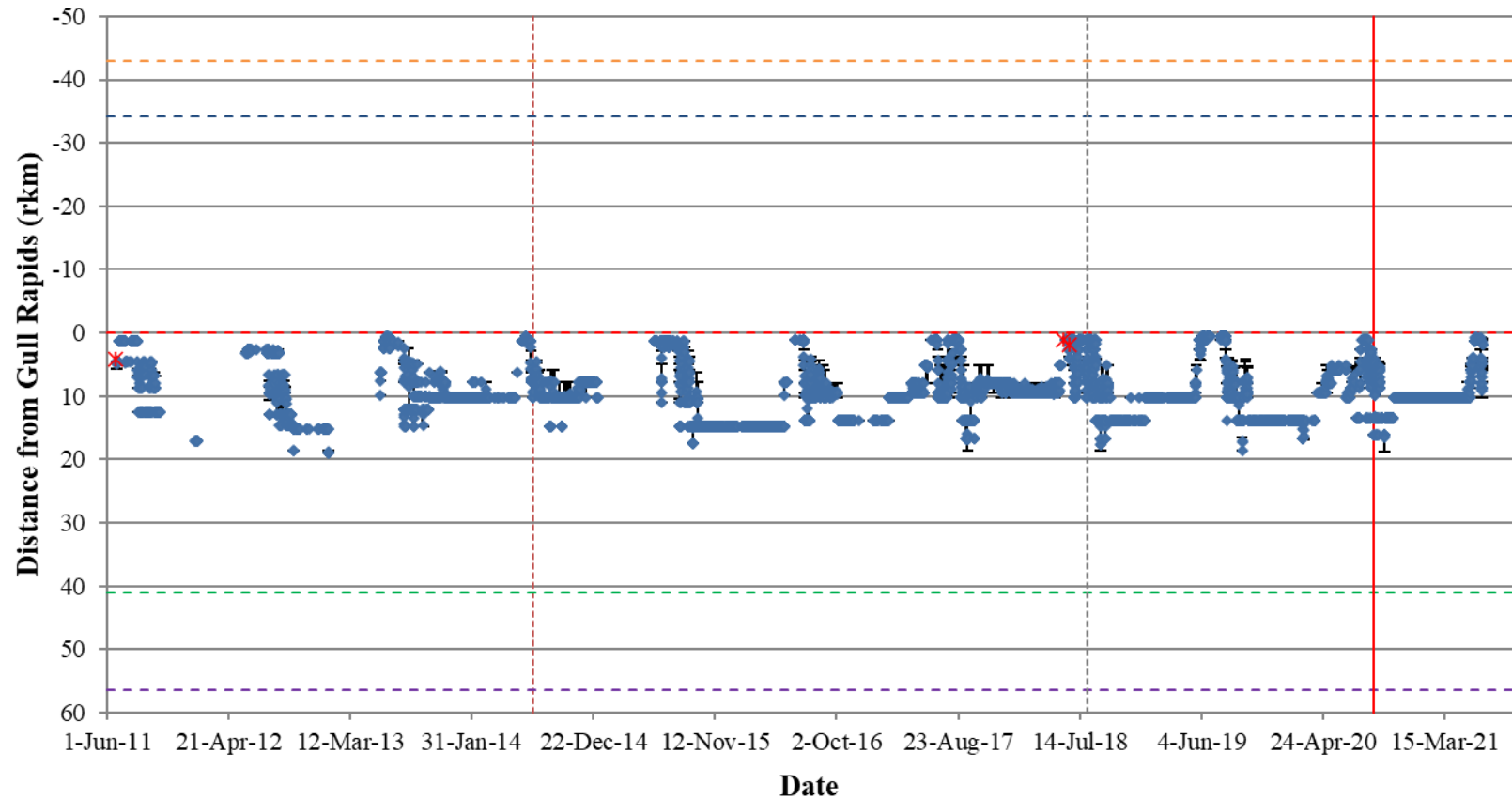


Figure A3-20: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16041) in Stephens Lake in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging and recaptures are indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

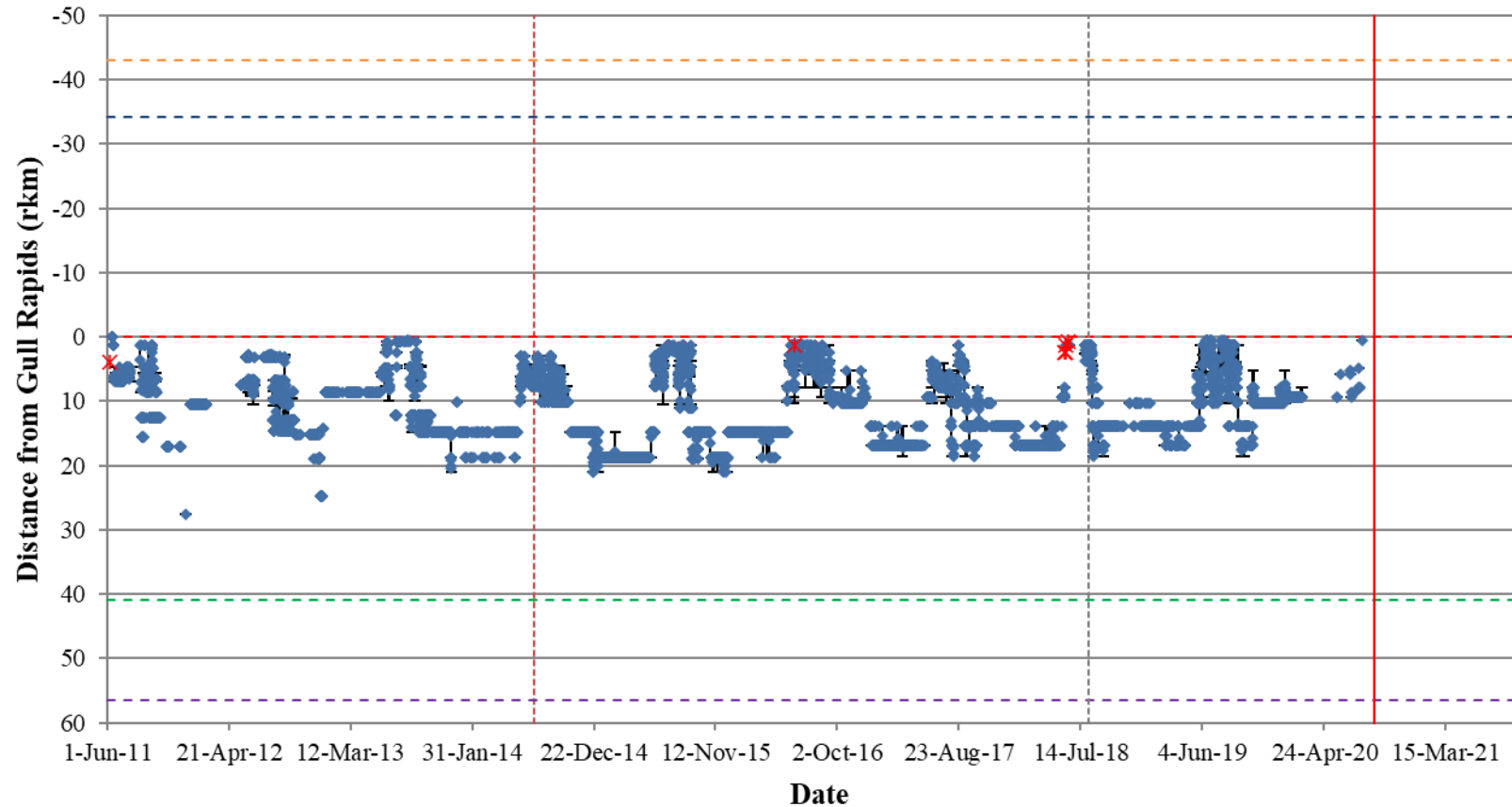


Figure A3-21: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16043) in Stephens Lake in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging and recaptures are indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

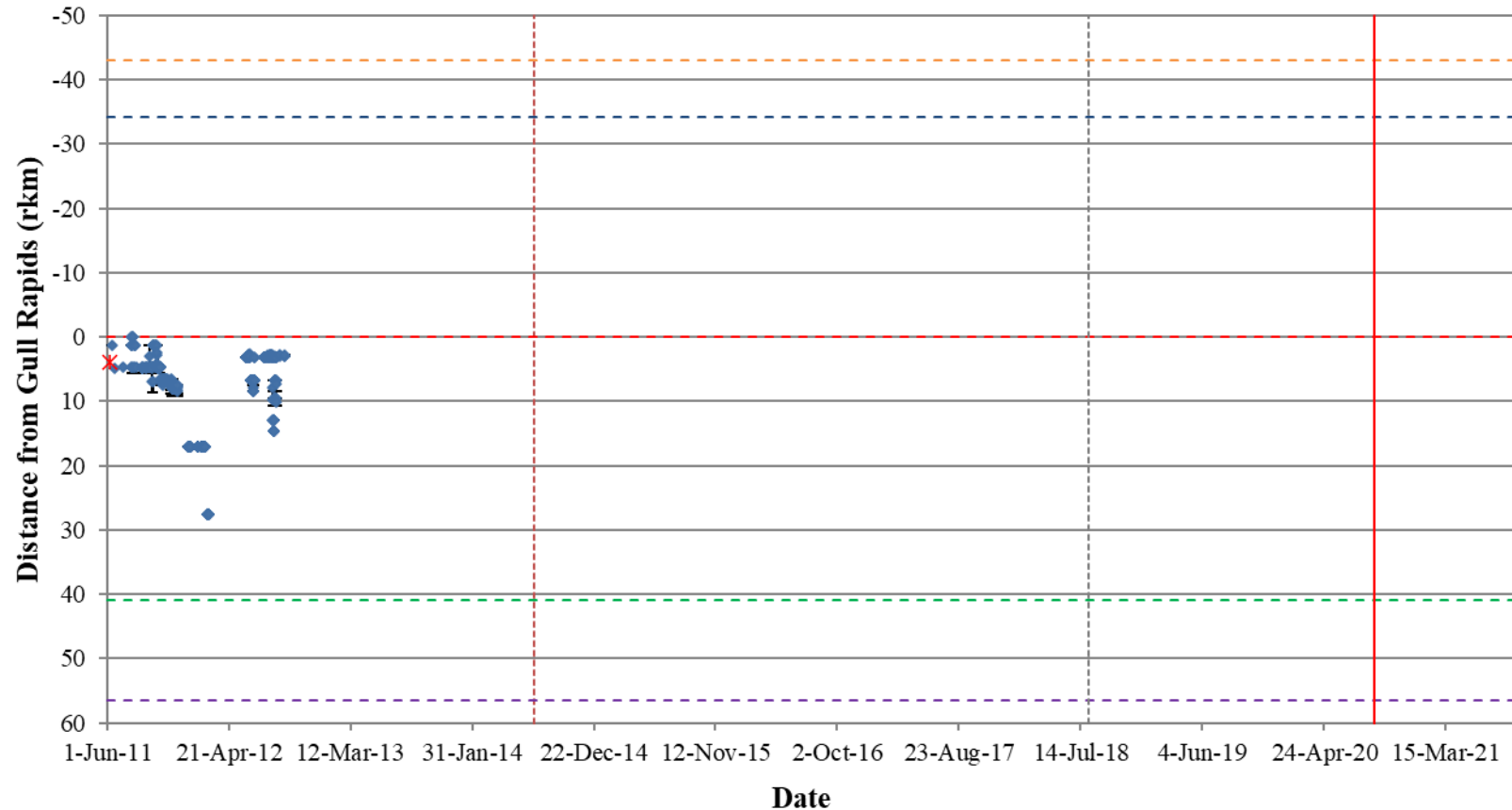


Figure A3-22: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16044) in Stephens Lake in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

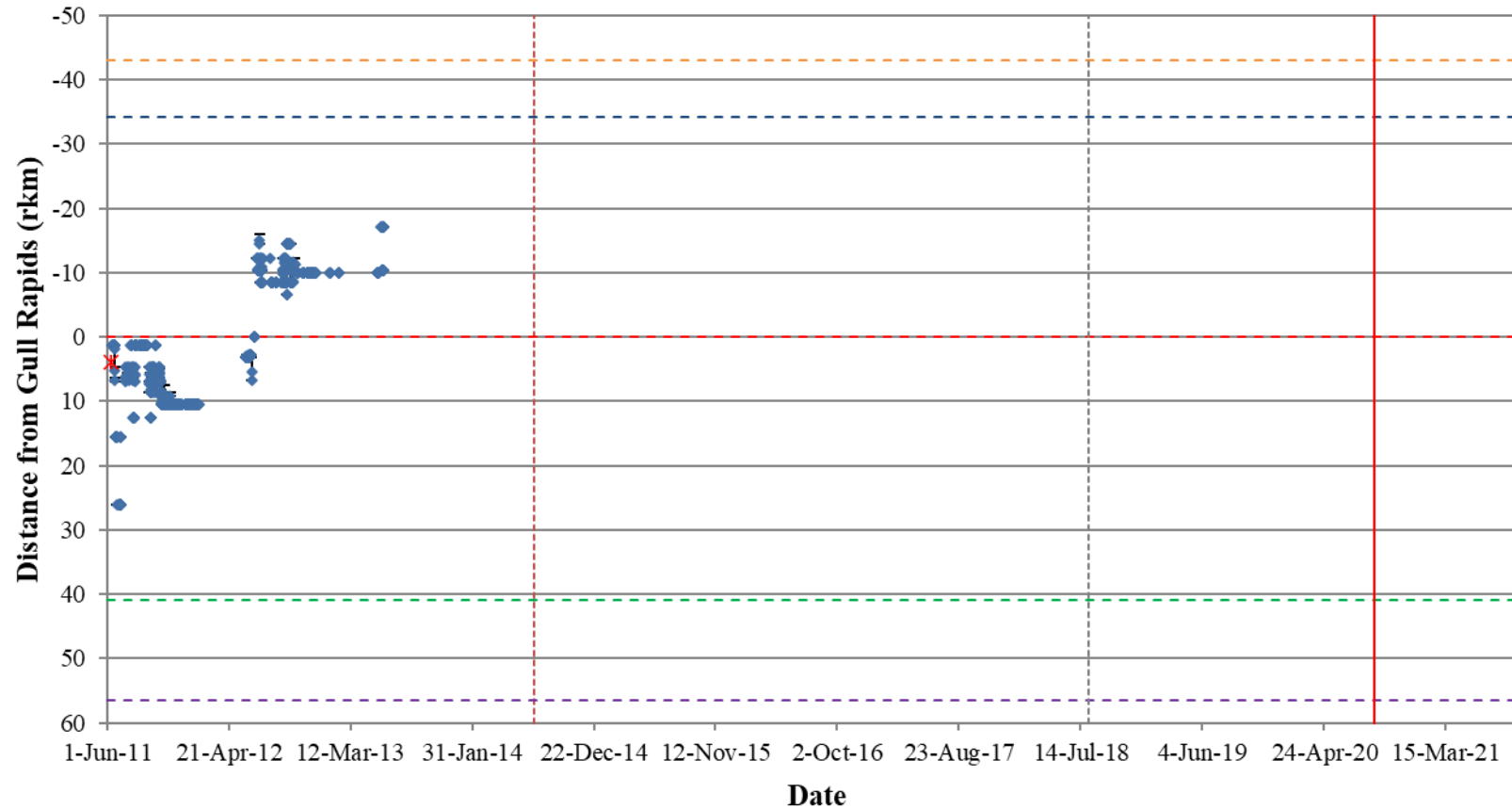


Figure A3-23: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16046) in Stephens Lake in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

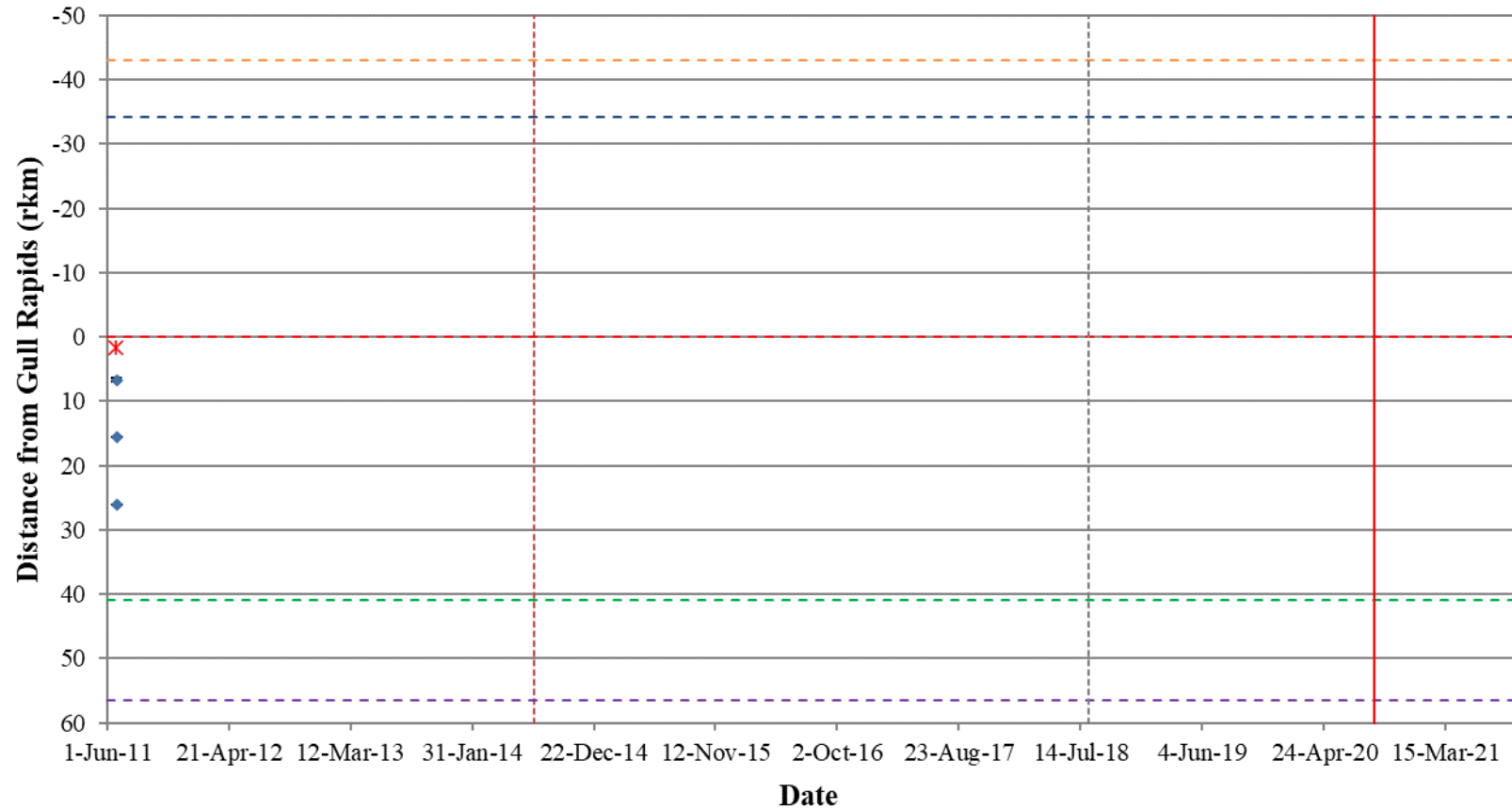


Figure A3-24: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16047) in Stephens Lake in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

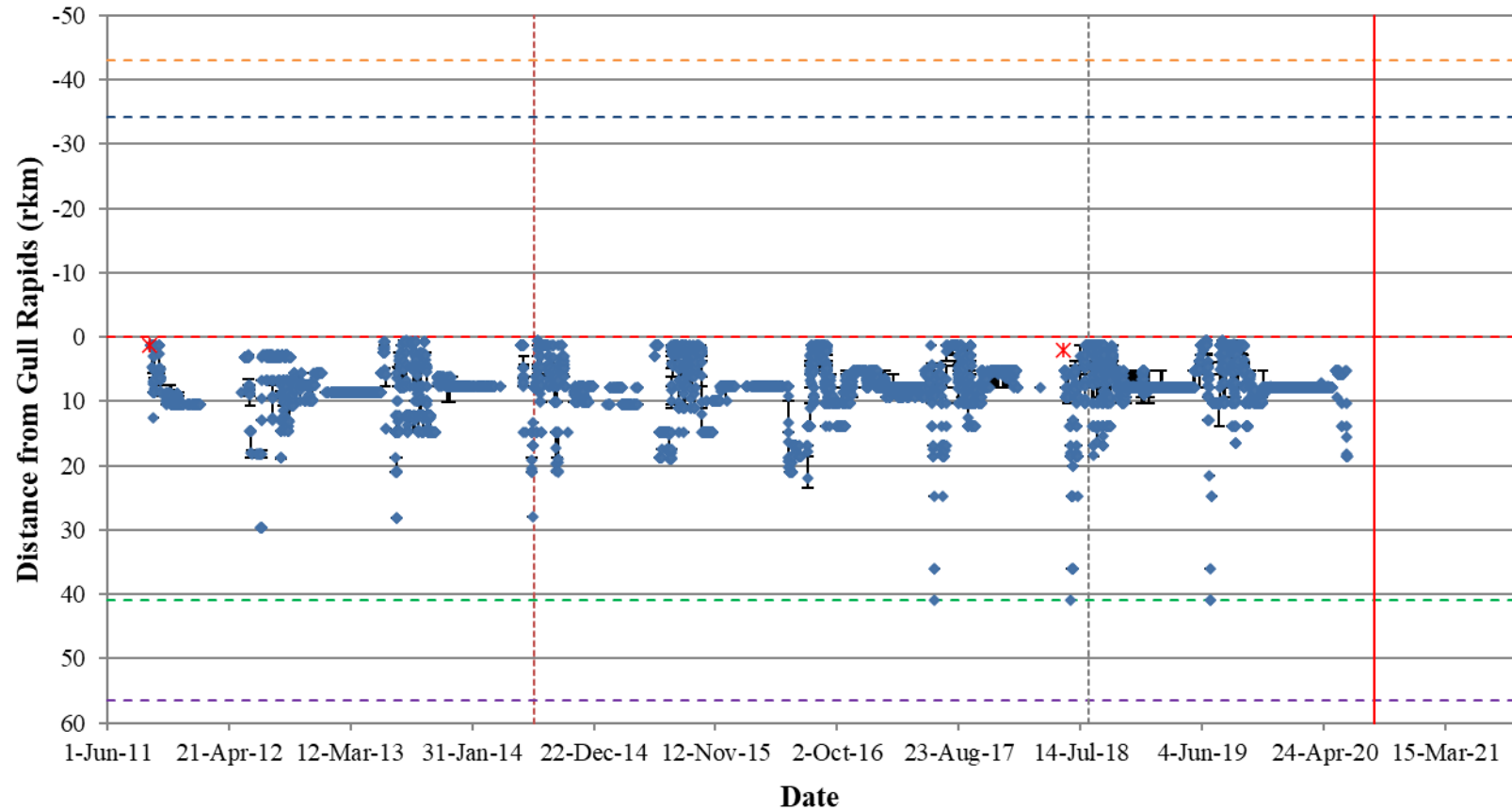


Figure A3-25: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16049) in Stephens Lake in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging and recaptures are indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

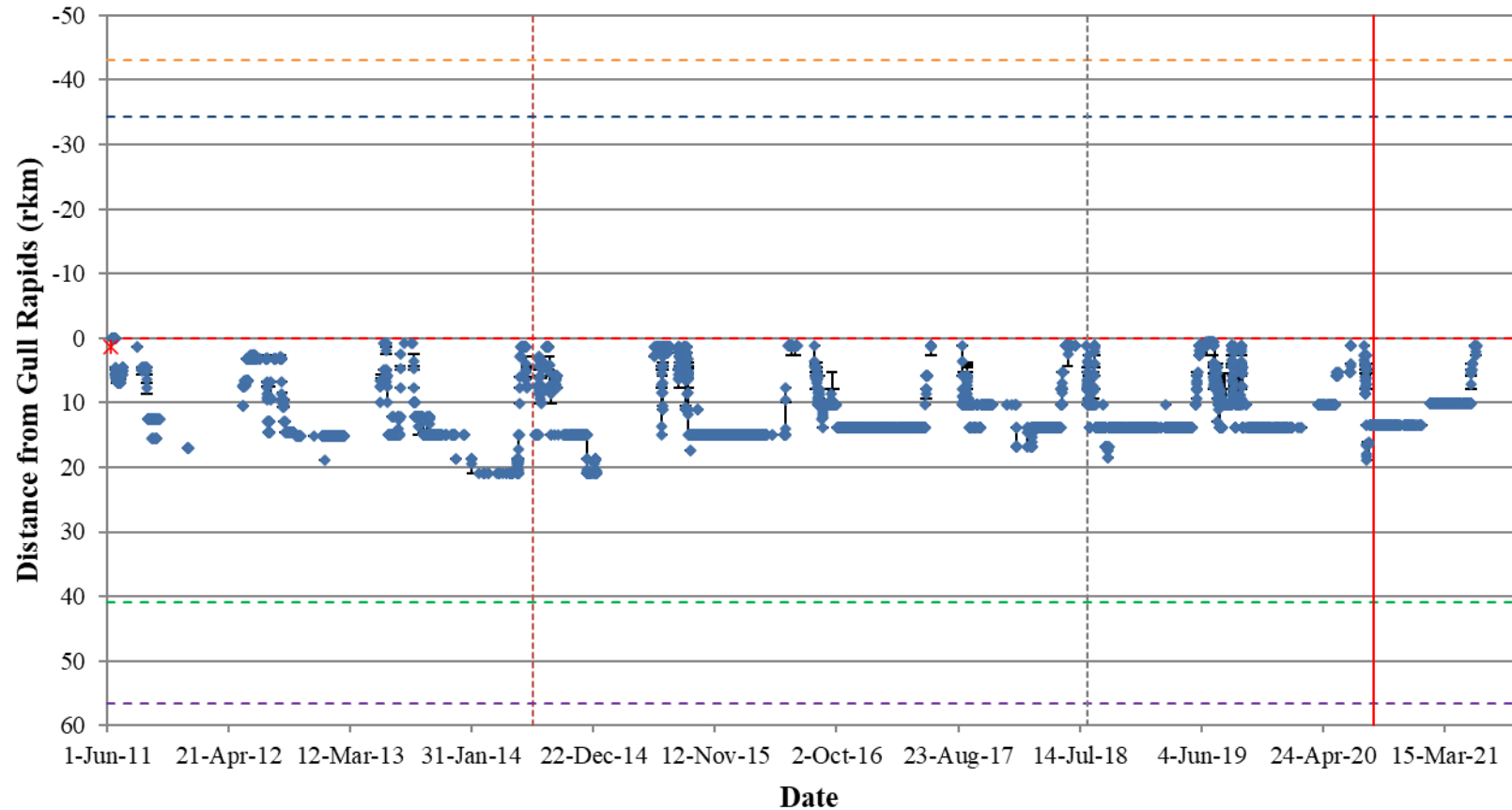


Figure A3-26: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16050) in Stephens Lake in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

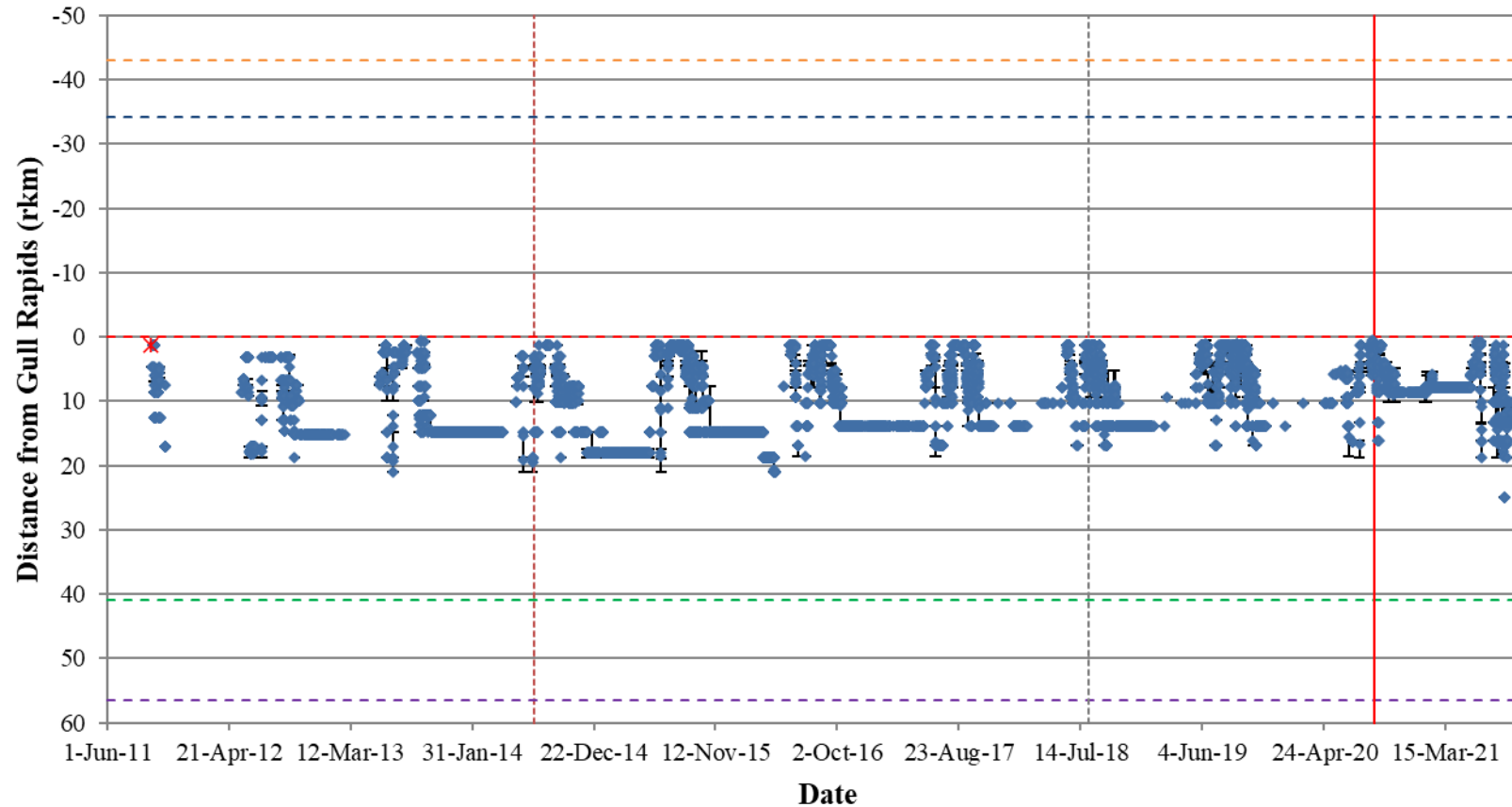


Figure A3-27: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16052) in Stephens Lake in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

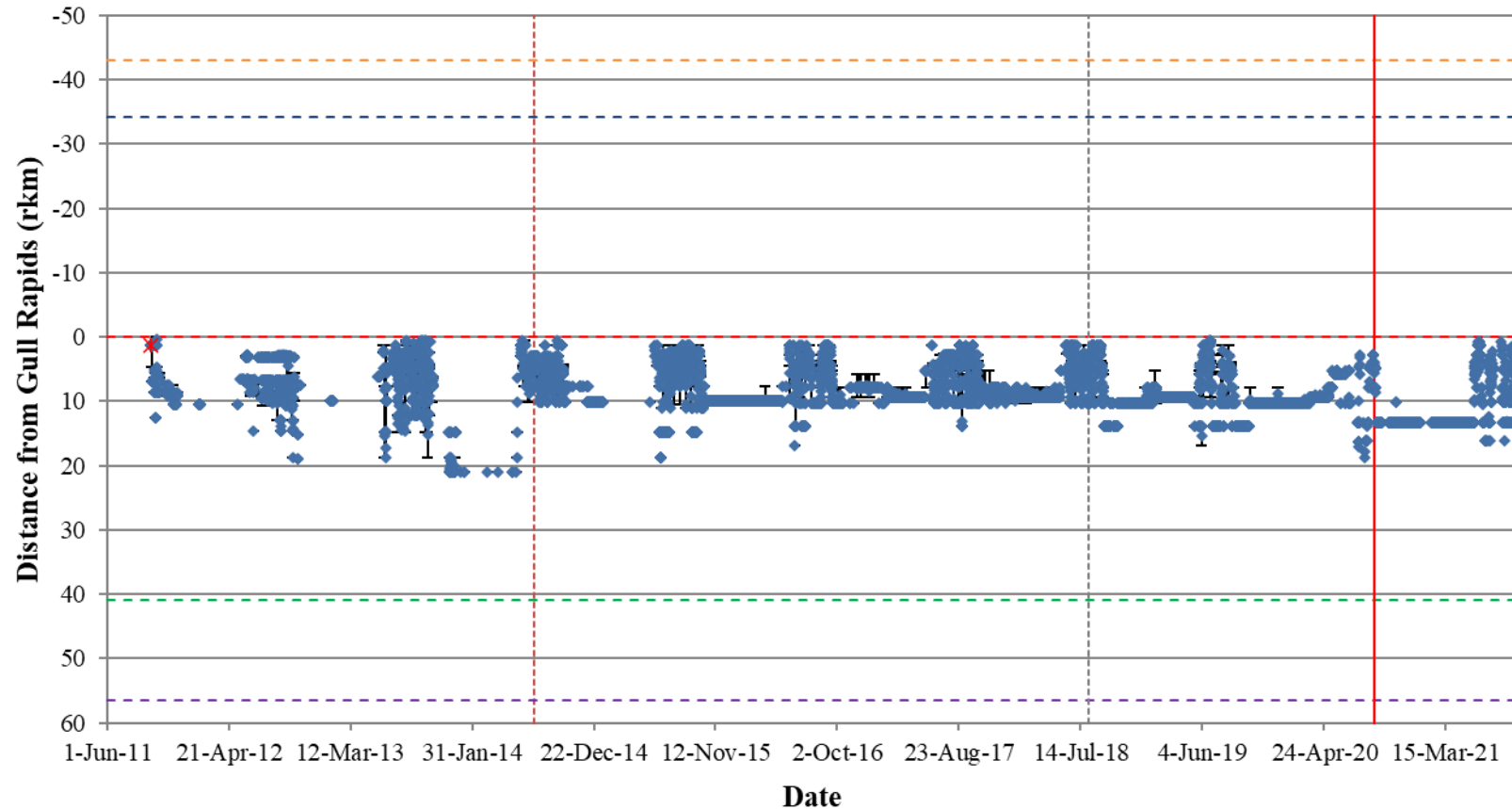


Figure A3-28: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #16053) in Stephens Lake in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

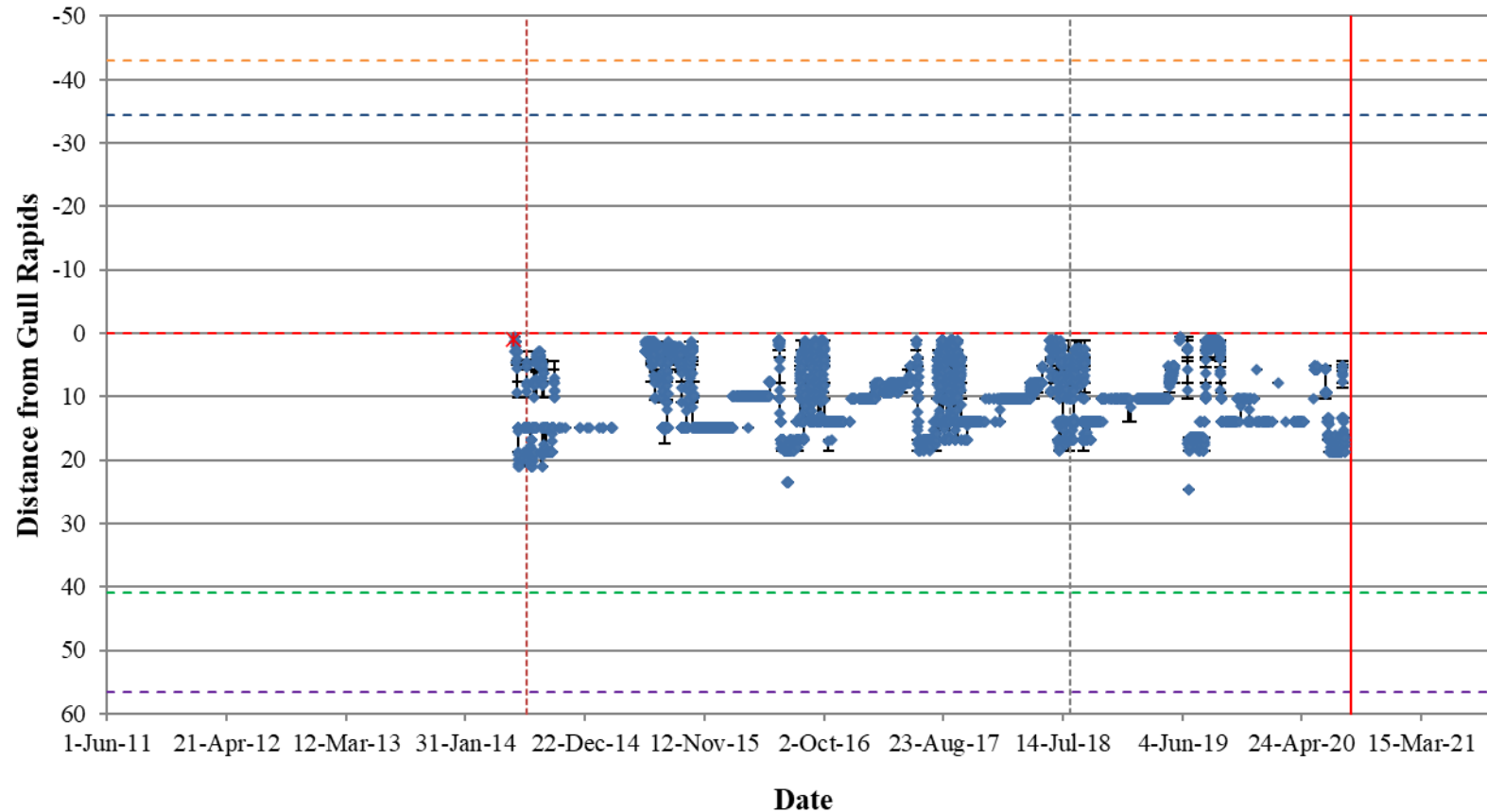


Figure A3-29: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #32167) in Stephens Lake in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

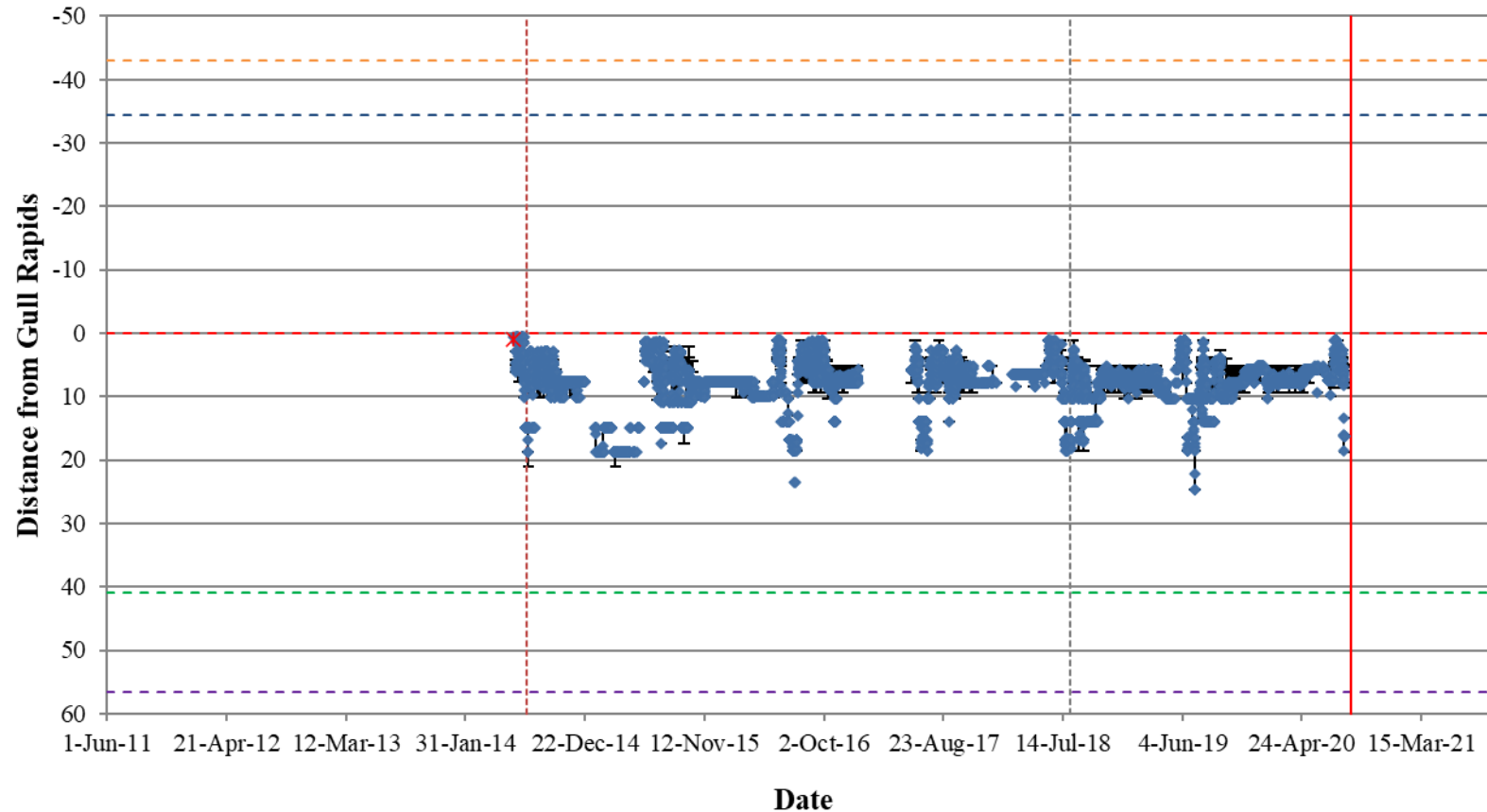


Figure A3-30: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #32168) in Stephens Lake in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

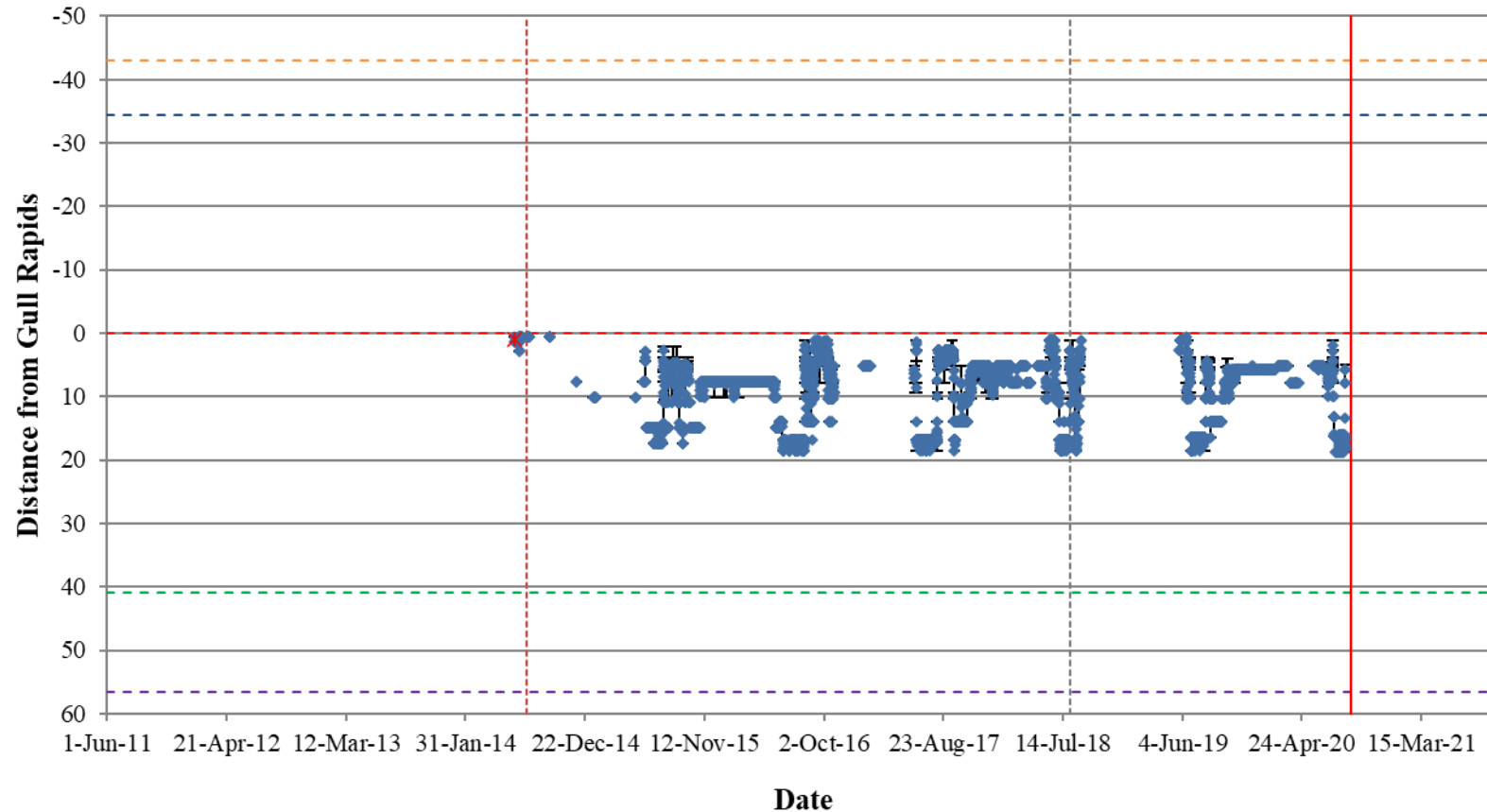


Figure A3-31: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #32169) in Stephens Lake in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

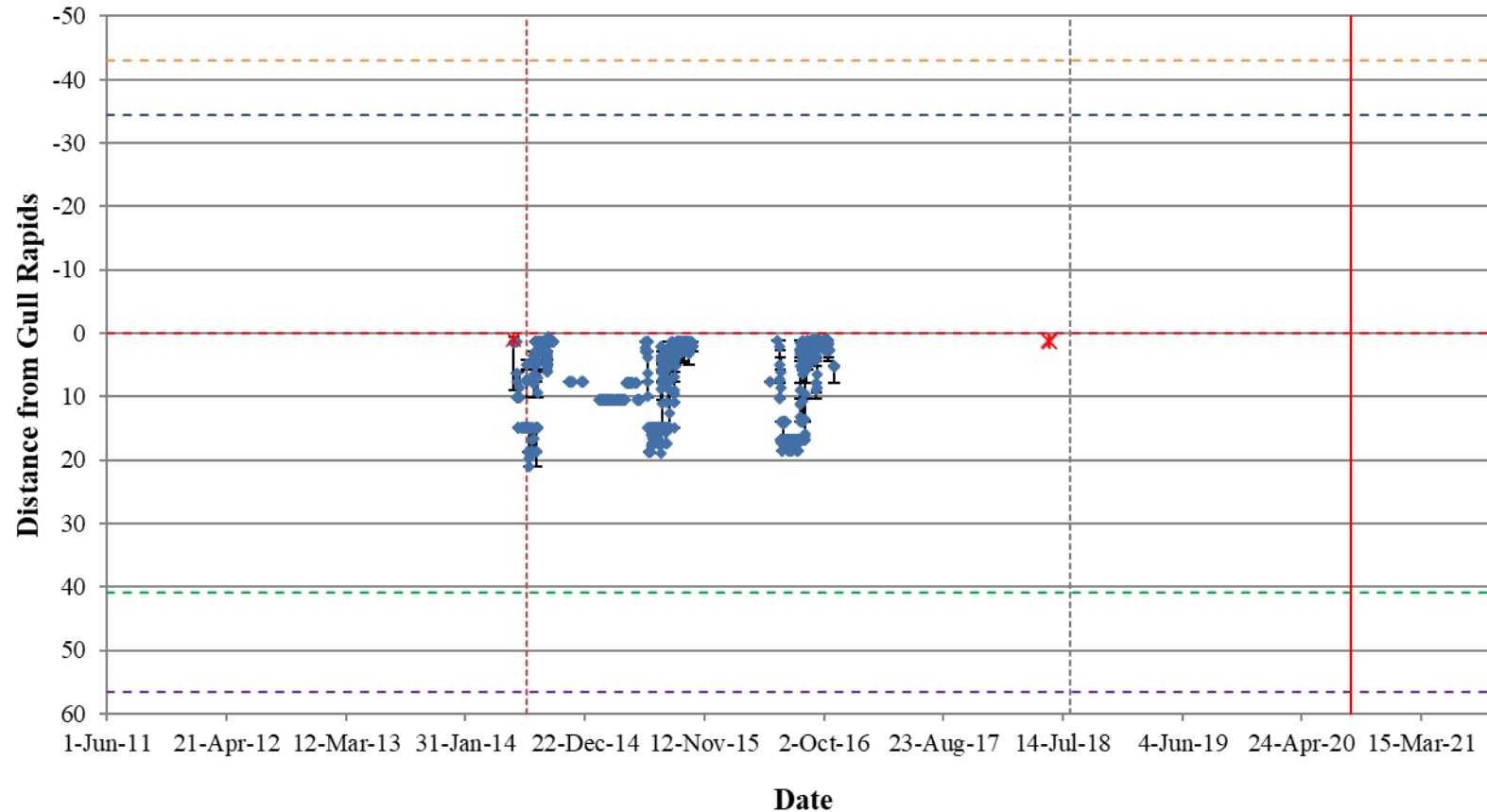


Figure A3-32: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #32170) in Stephens Lake in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging and recaptures are indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

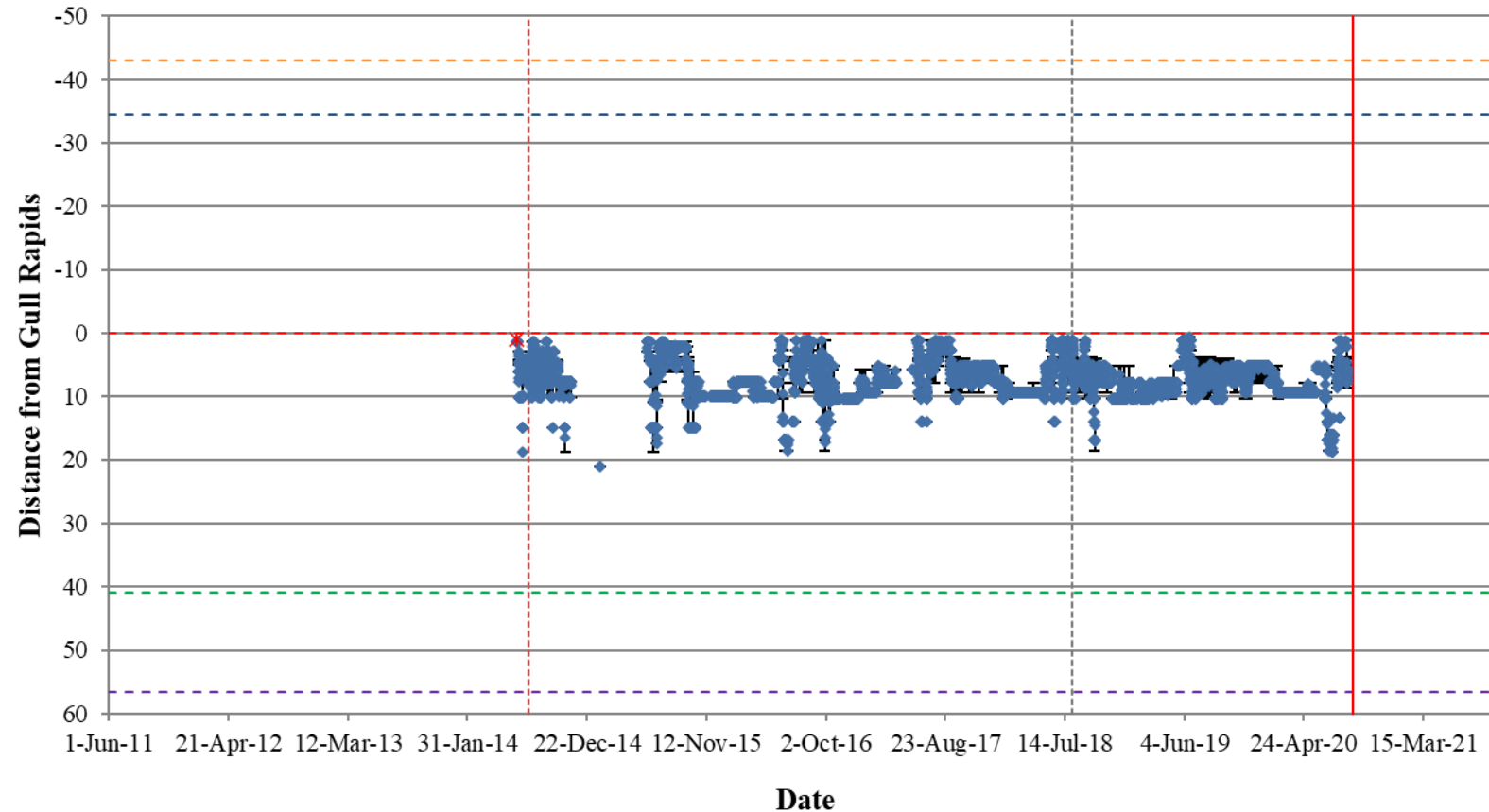


Figure A3-33: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #32171) in Stephens Lake in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

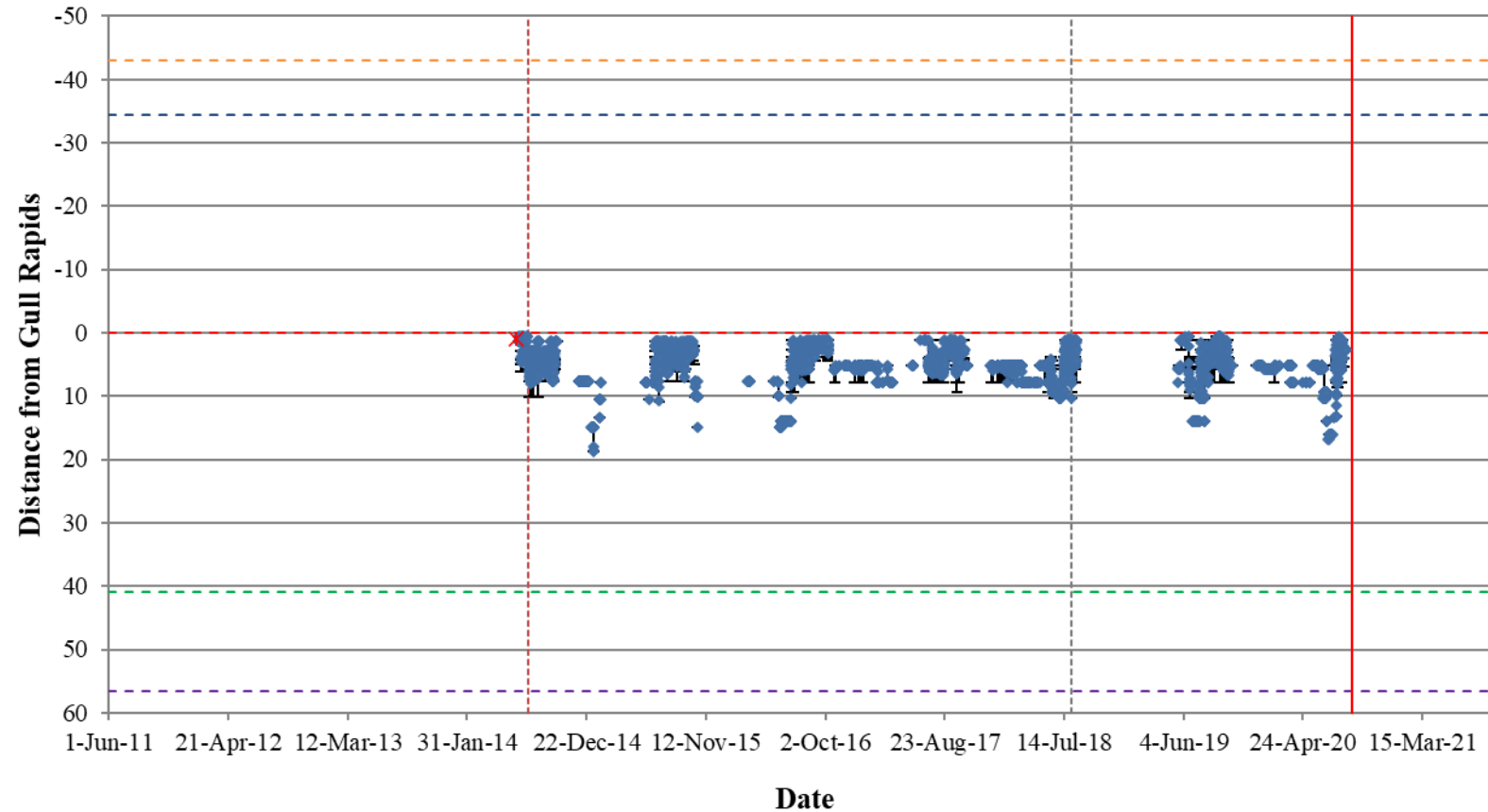


Figure A3-34: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #32172) in Stephens Lake in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).



Figure A3-35: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #32173) in Stephens Lake in relation to the Keeyask GS (rkm 0), from June 1, 2011 to October 10, 2021. Date and location of tagging is indicated by a star. Beginning of Keeyask construction is indicated with a vertical dotted red line, beginning of spillway commissioning is indicated with a vertical dotted grey line, and end of reservoir impoundment is indicated with a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids, red = the Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

APPENDIX 4:

LOCATION SUMMARY FOR INDIVIDUAL ACOUSTIC TAGGED ADULT LAKE STURGEON, UPSTREAM OF THE KEEYASK GS, MAY TO OCTOBER 2021

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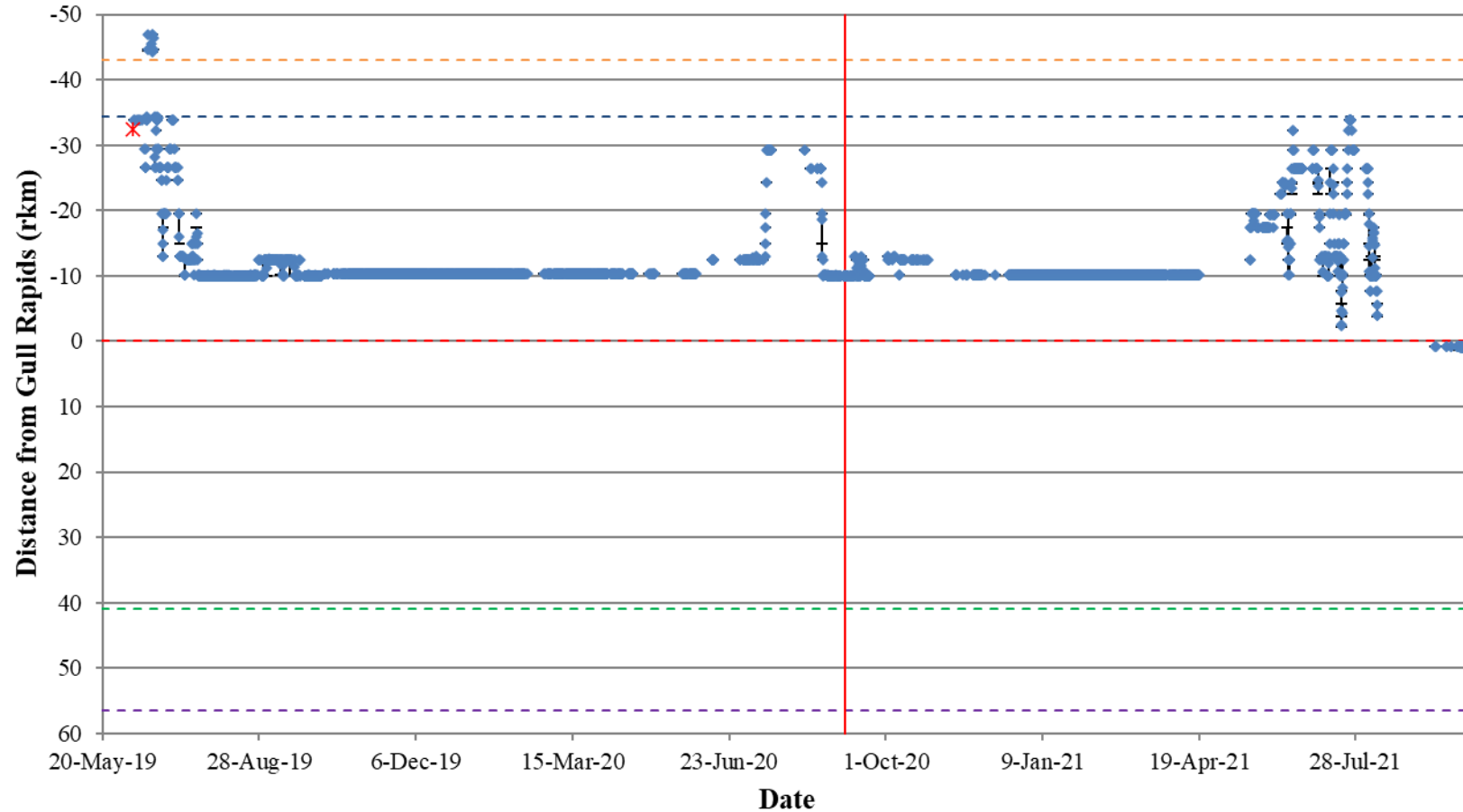


Figure A4-1: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7017) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

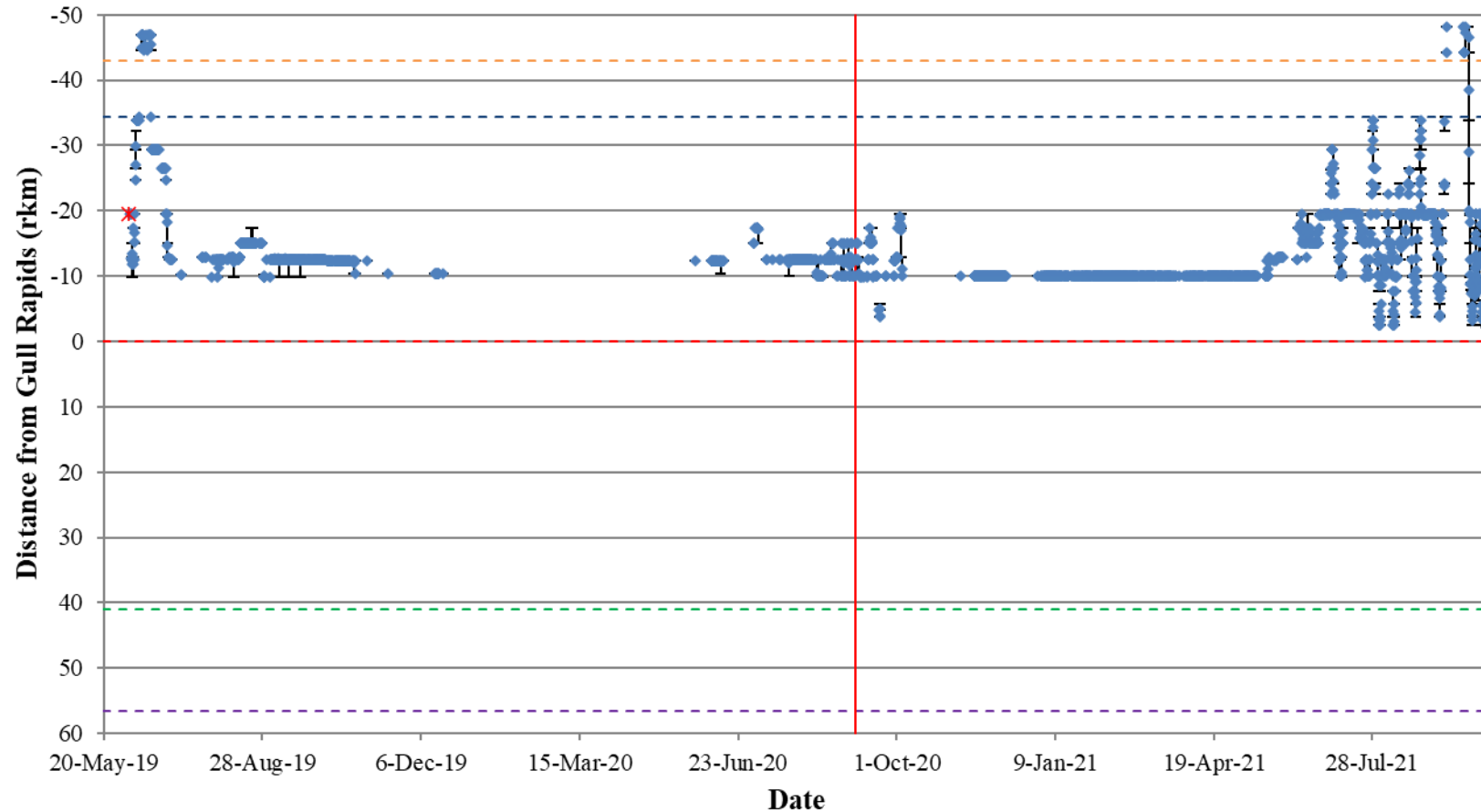


Figure A4-2: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7018) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

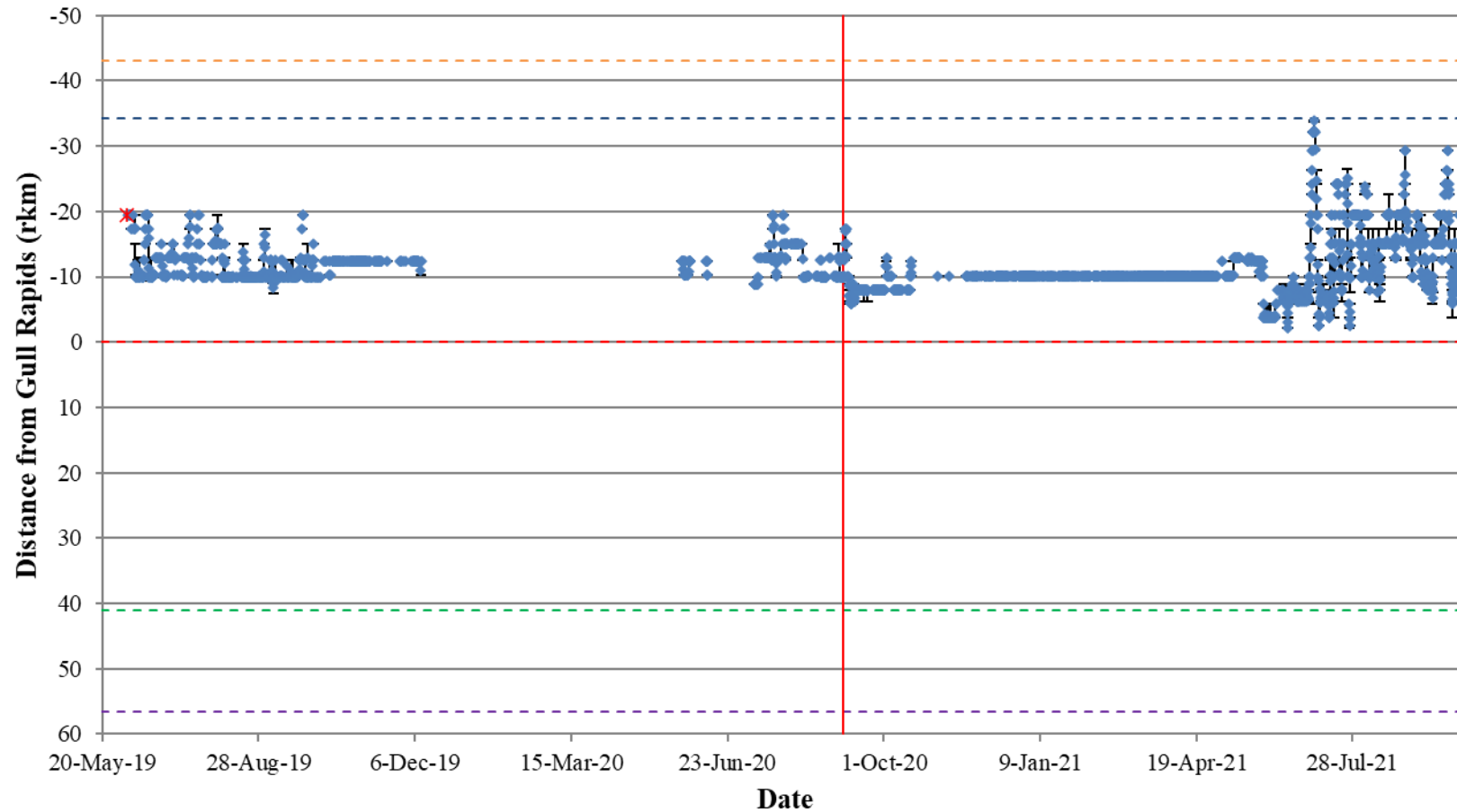


Figure A4-3: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7019) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

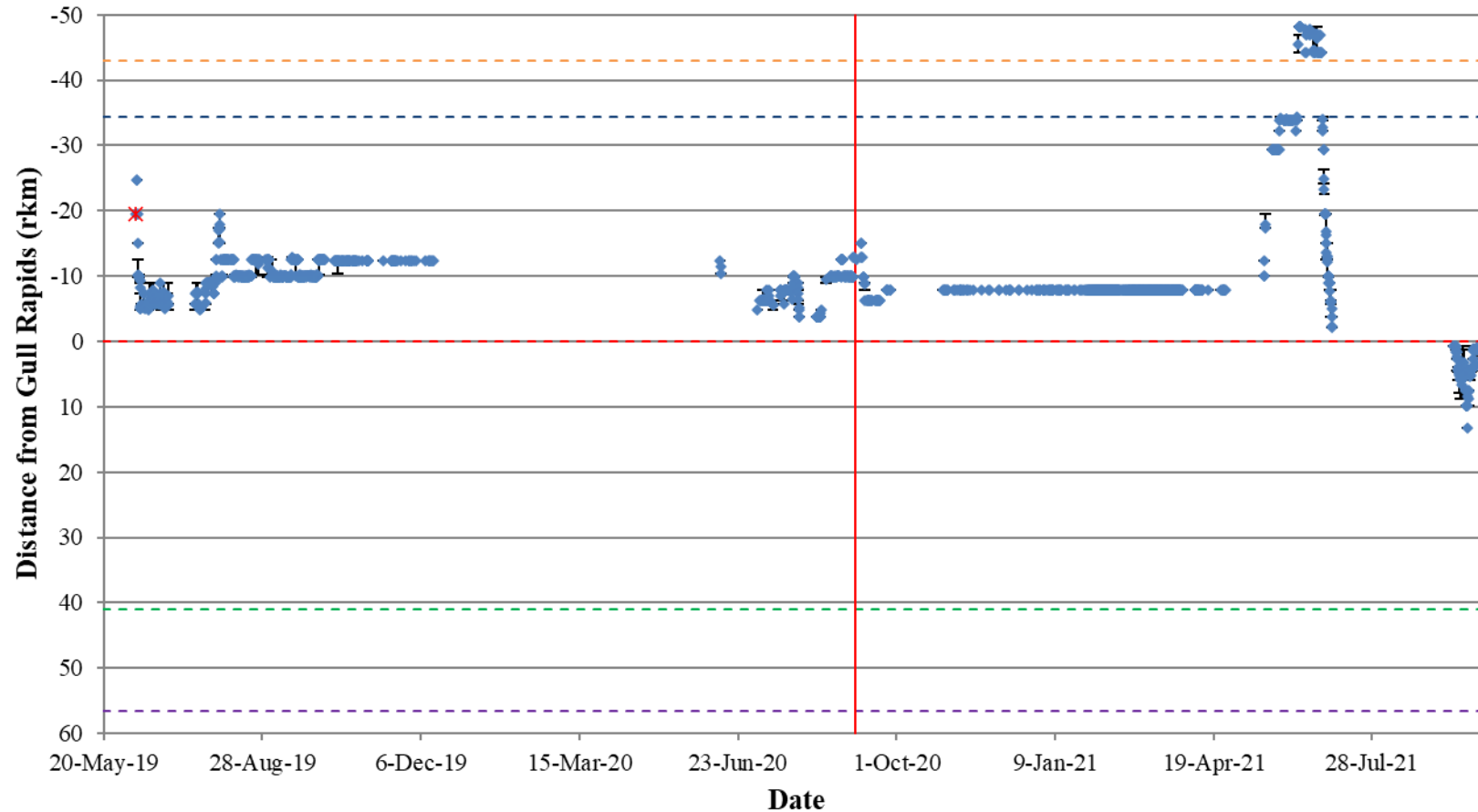


Figure A4-4: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7020) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

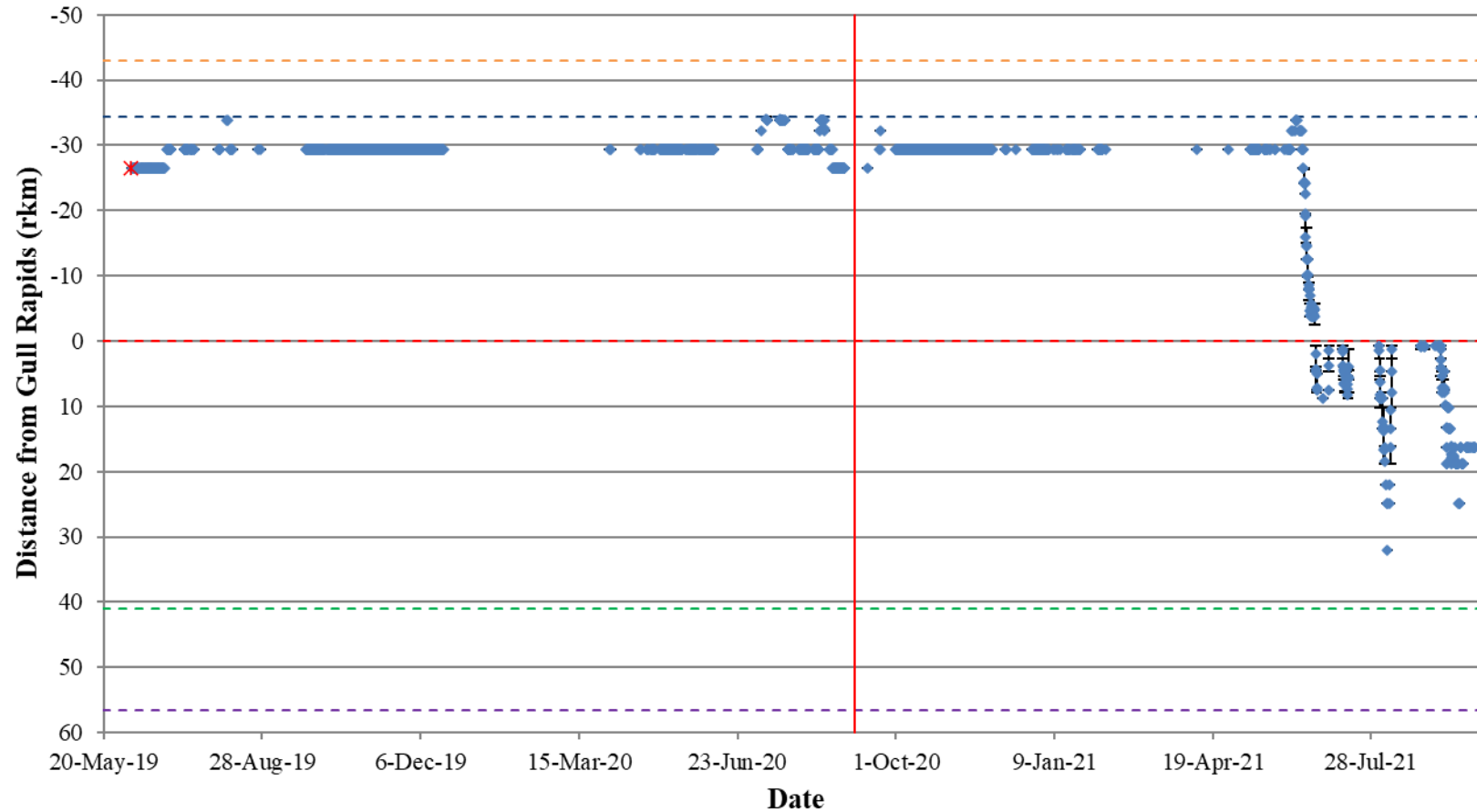


Figure A4-5: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7021) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

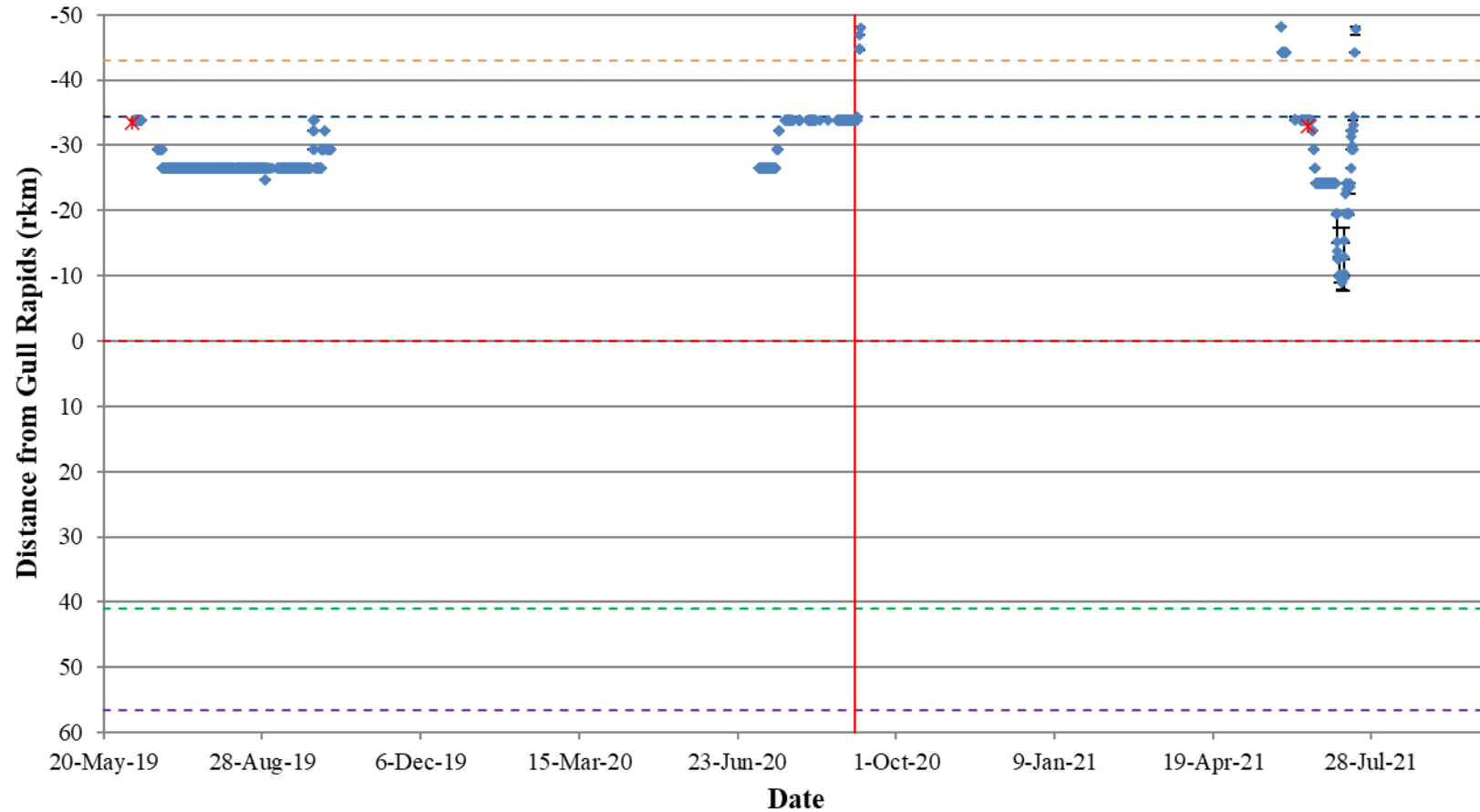


Figure A4-6: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7022) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

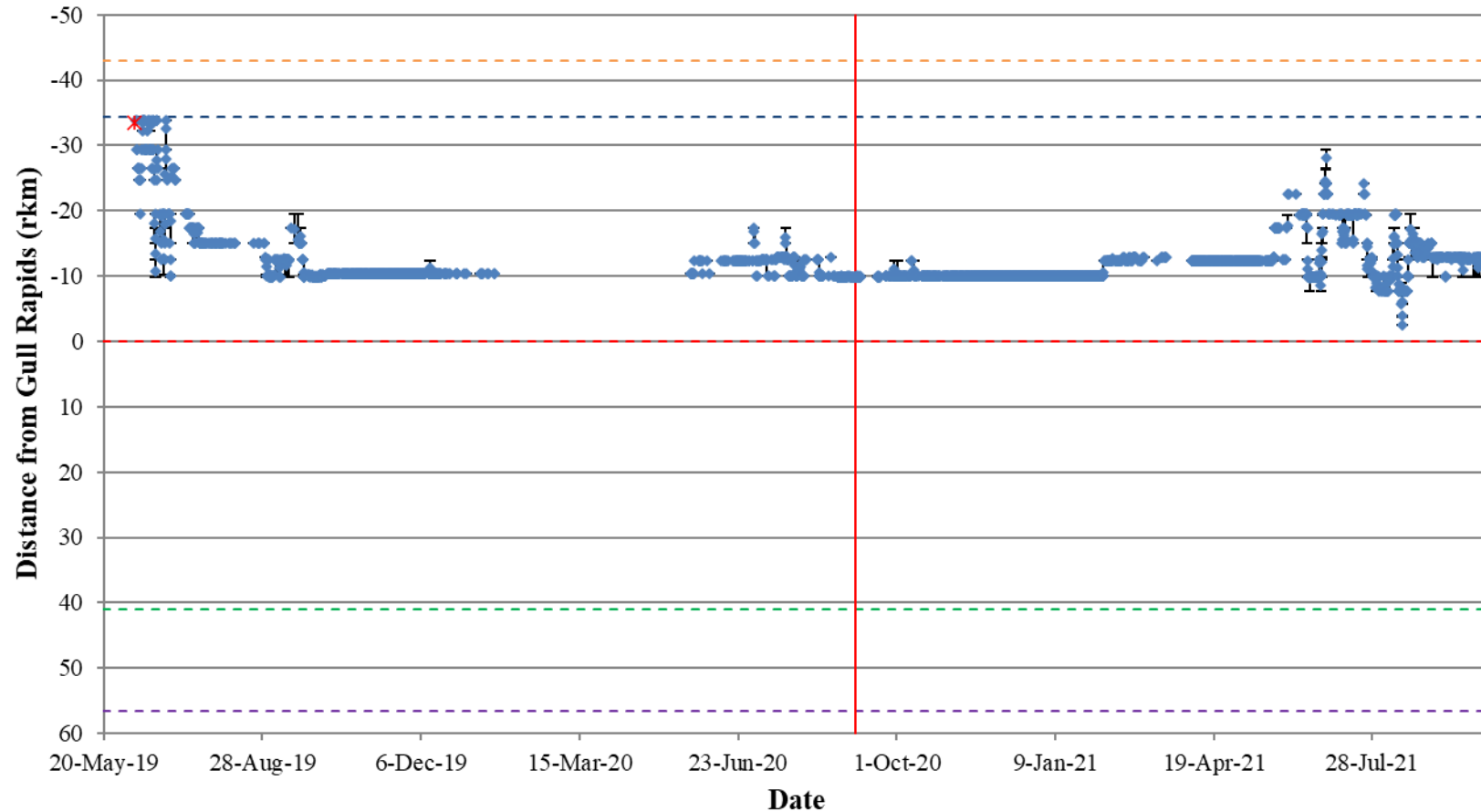


Figure A4-7: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7023) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

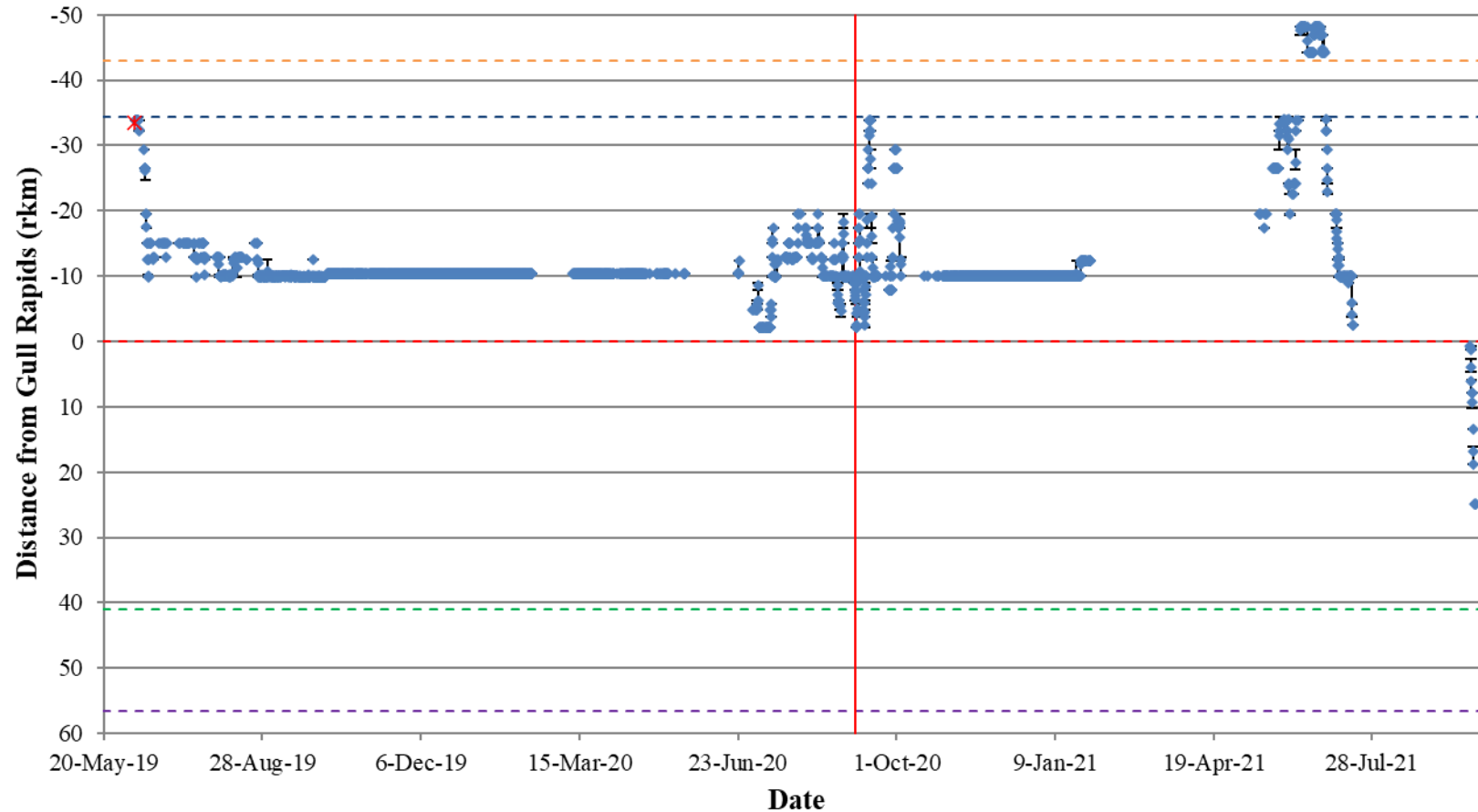


Figure A4-8: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7024) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

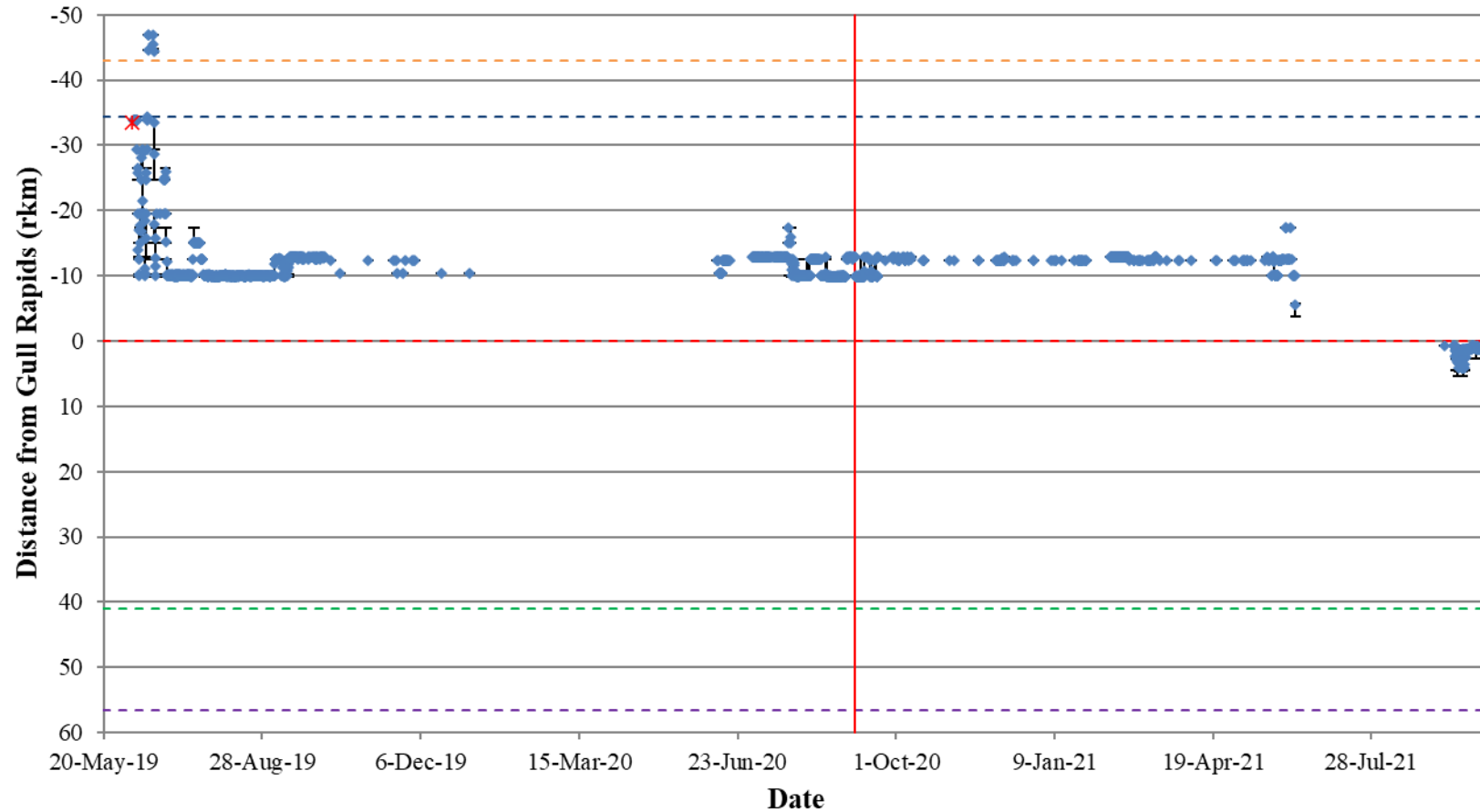


Figure A4-9: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7025) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

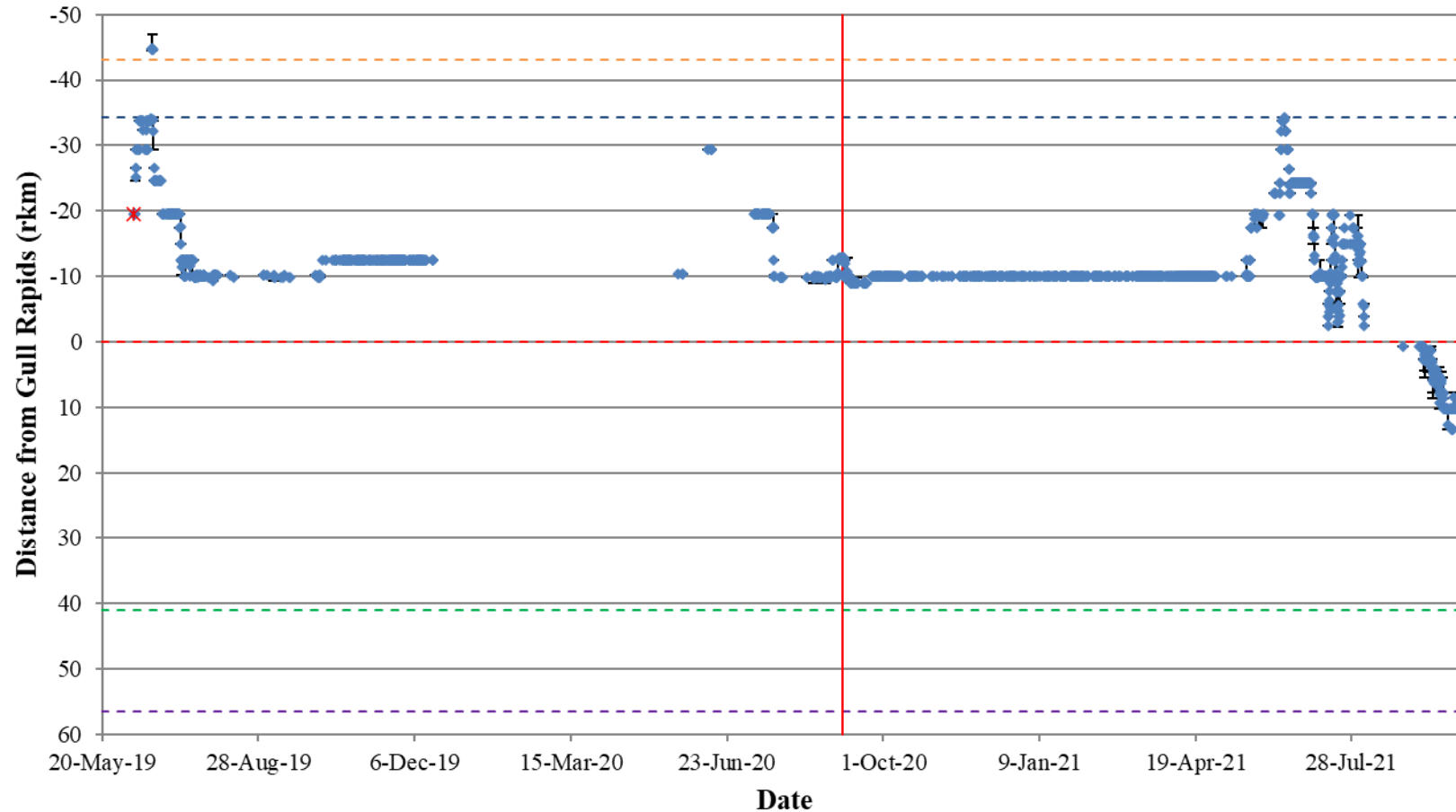


Figure A4-10: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7026) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

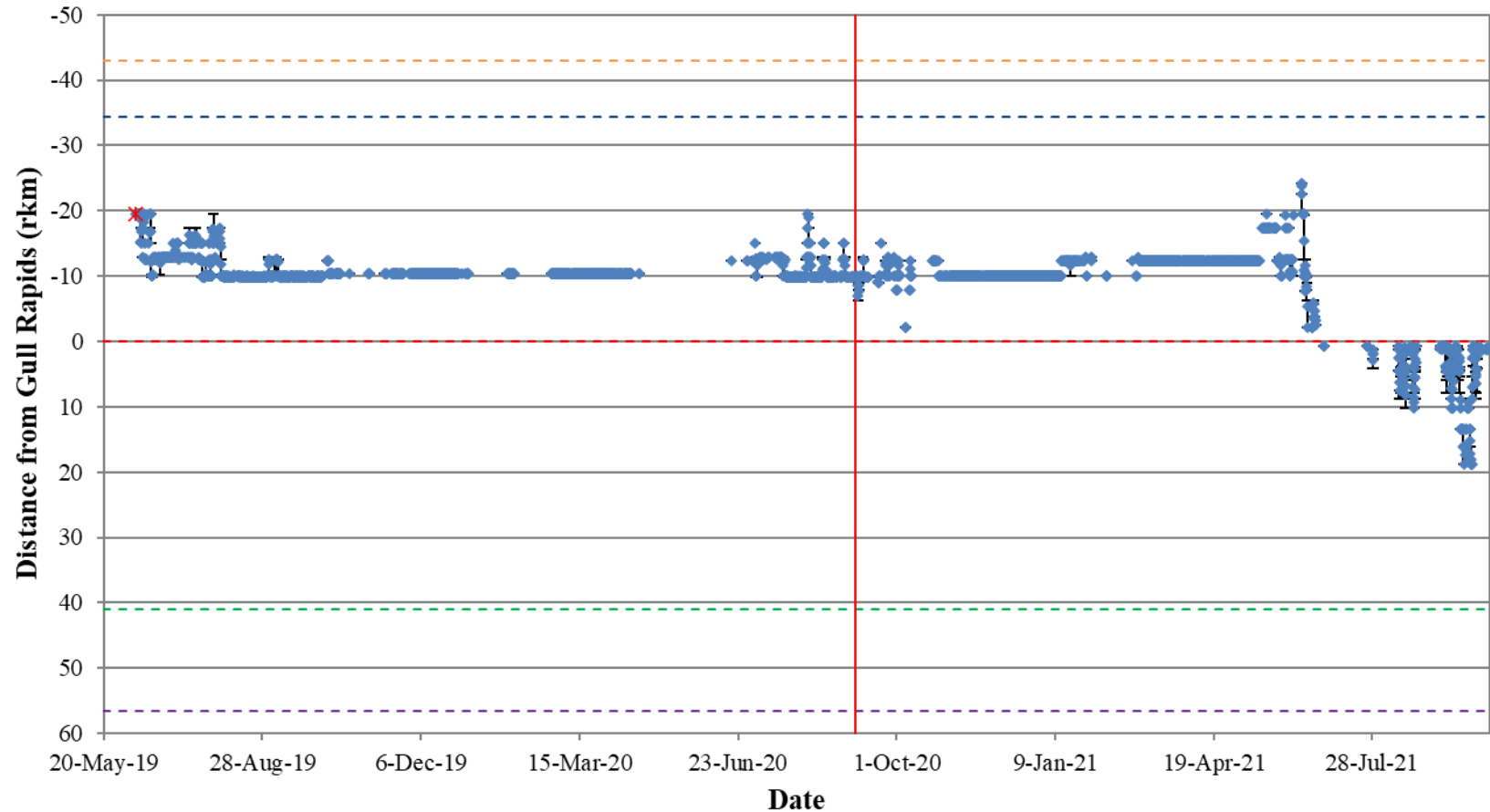


Figure A4-11: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7027) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

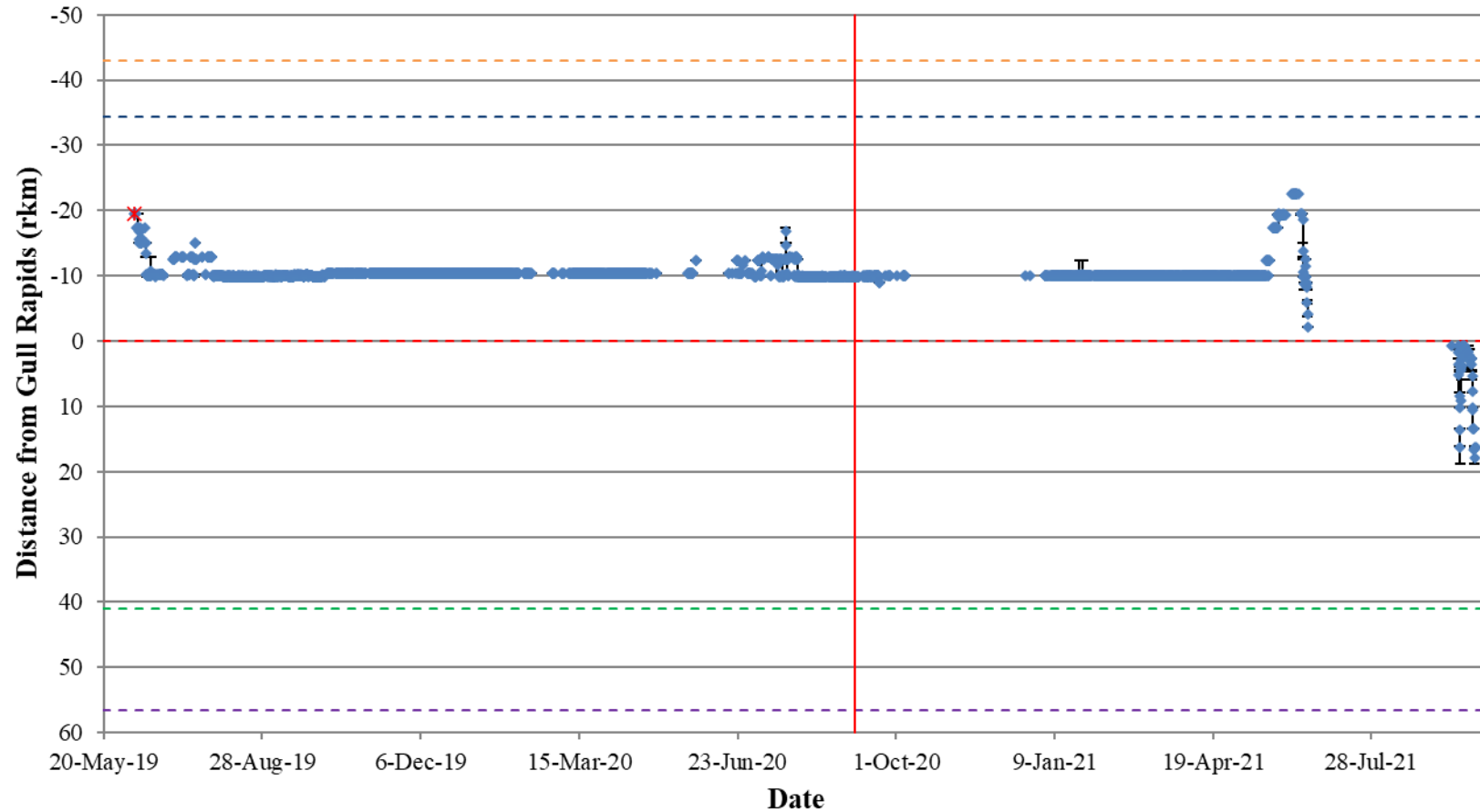


Figure A4-12: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7028) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

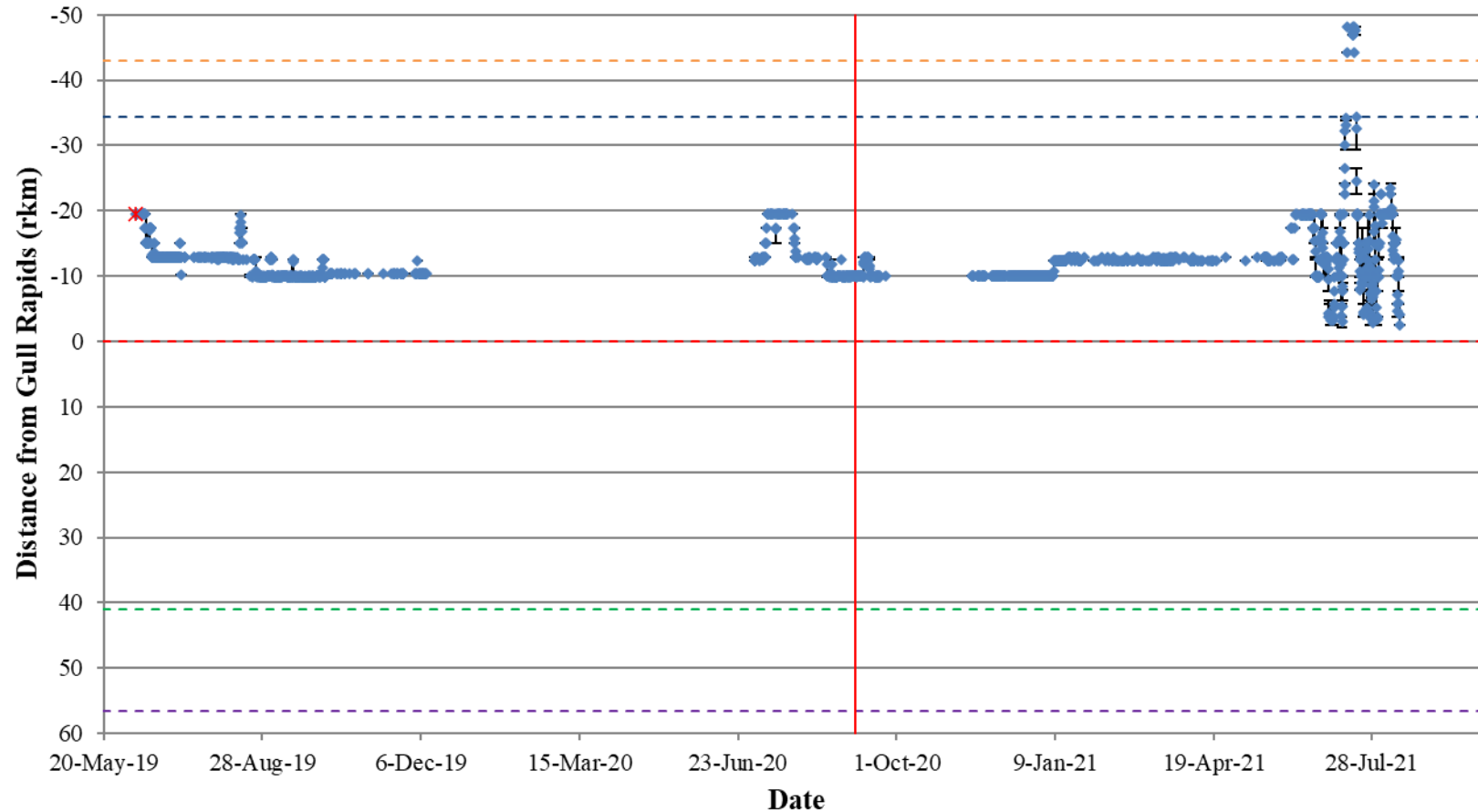


Figure A4-13: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7029) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

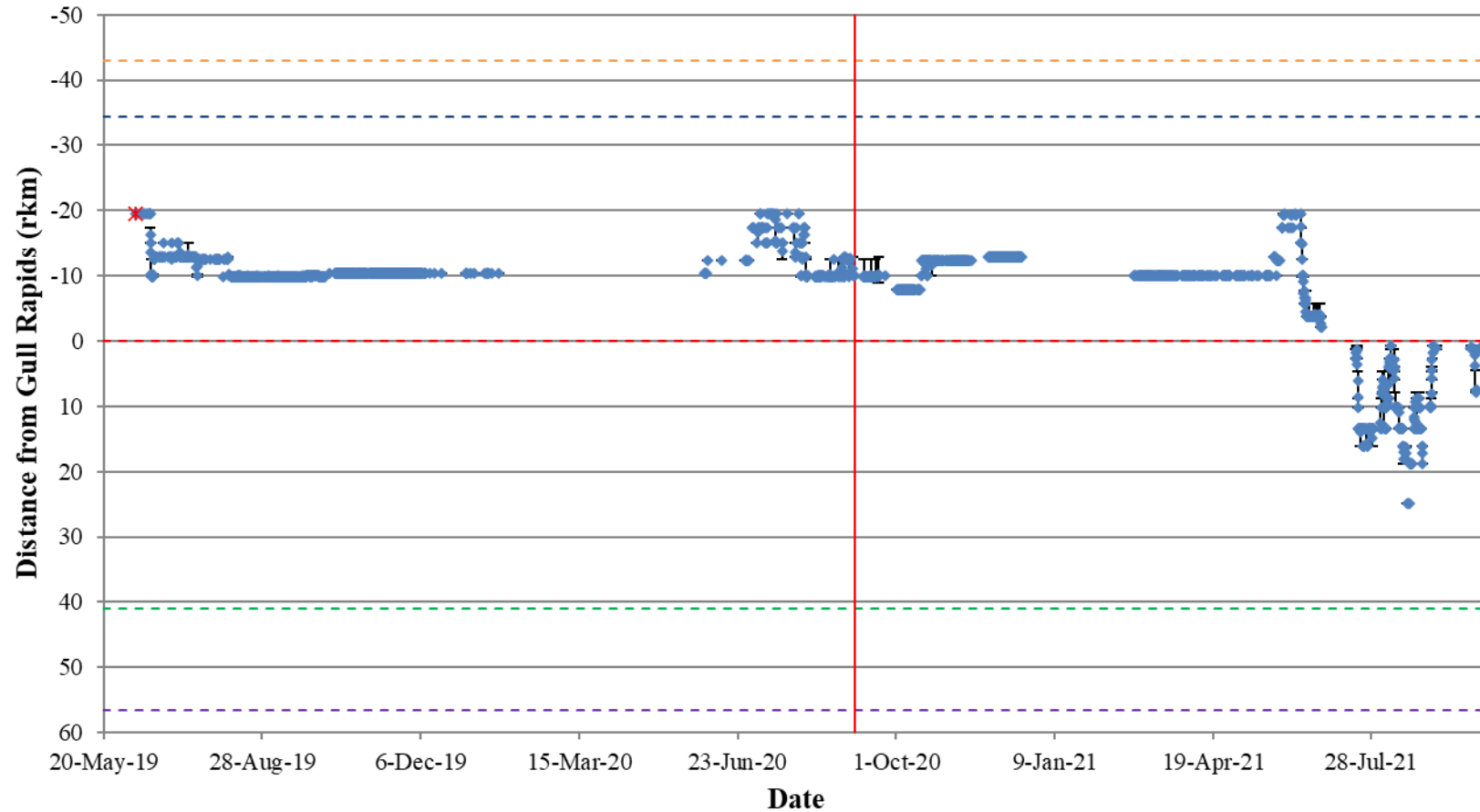


Figure A4-14: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7030) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

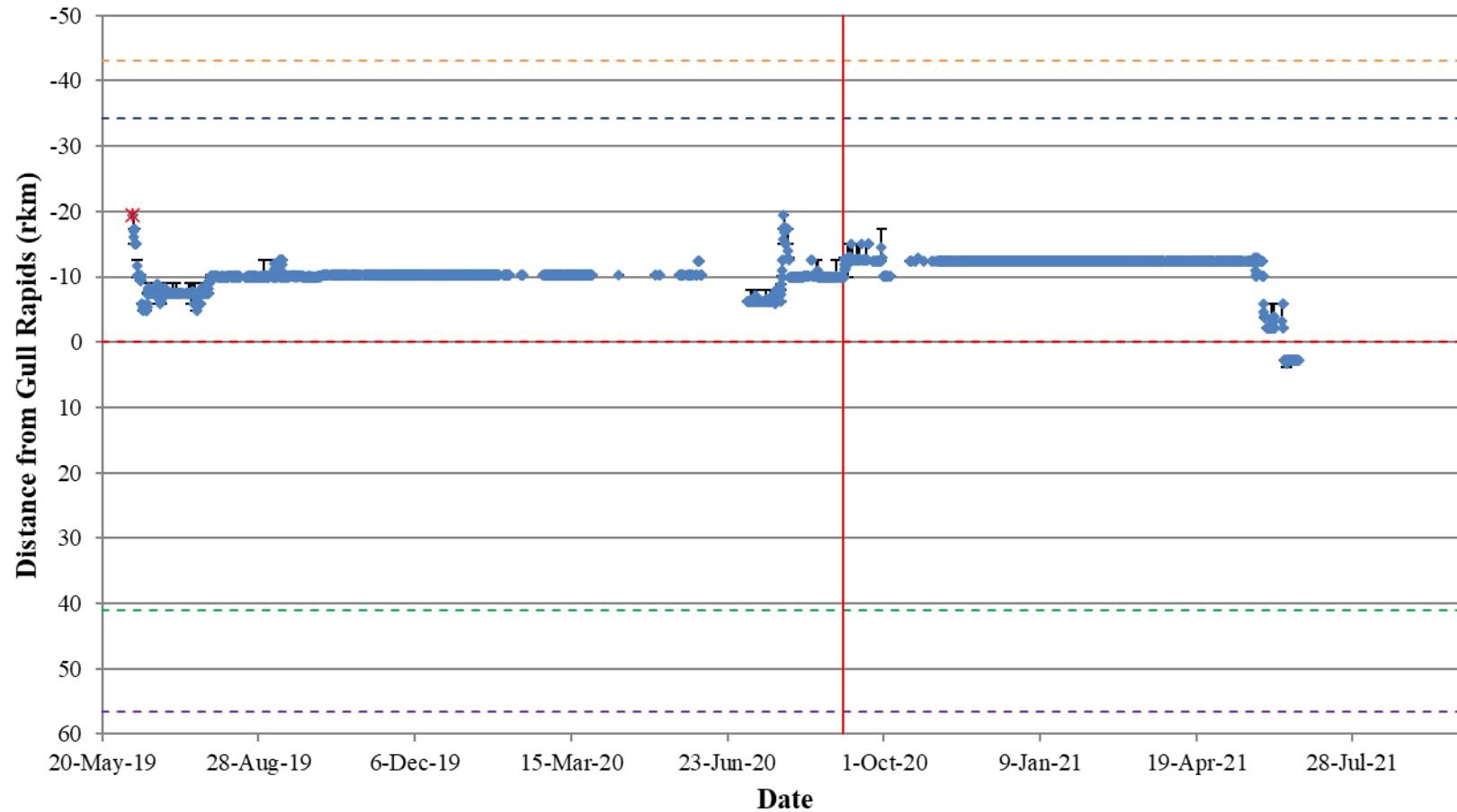


Figure A4-15: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7031) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

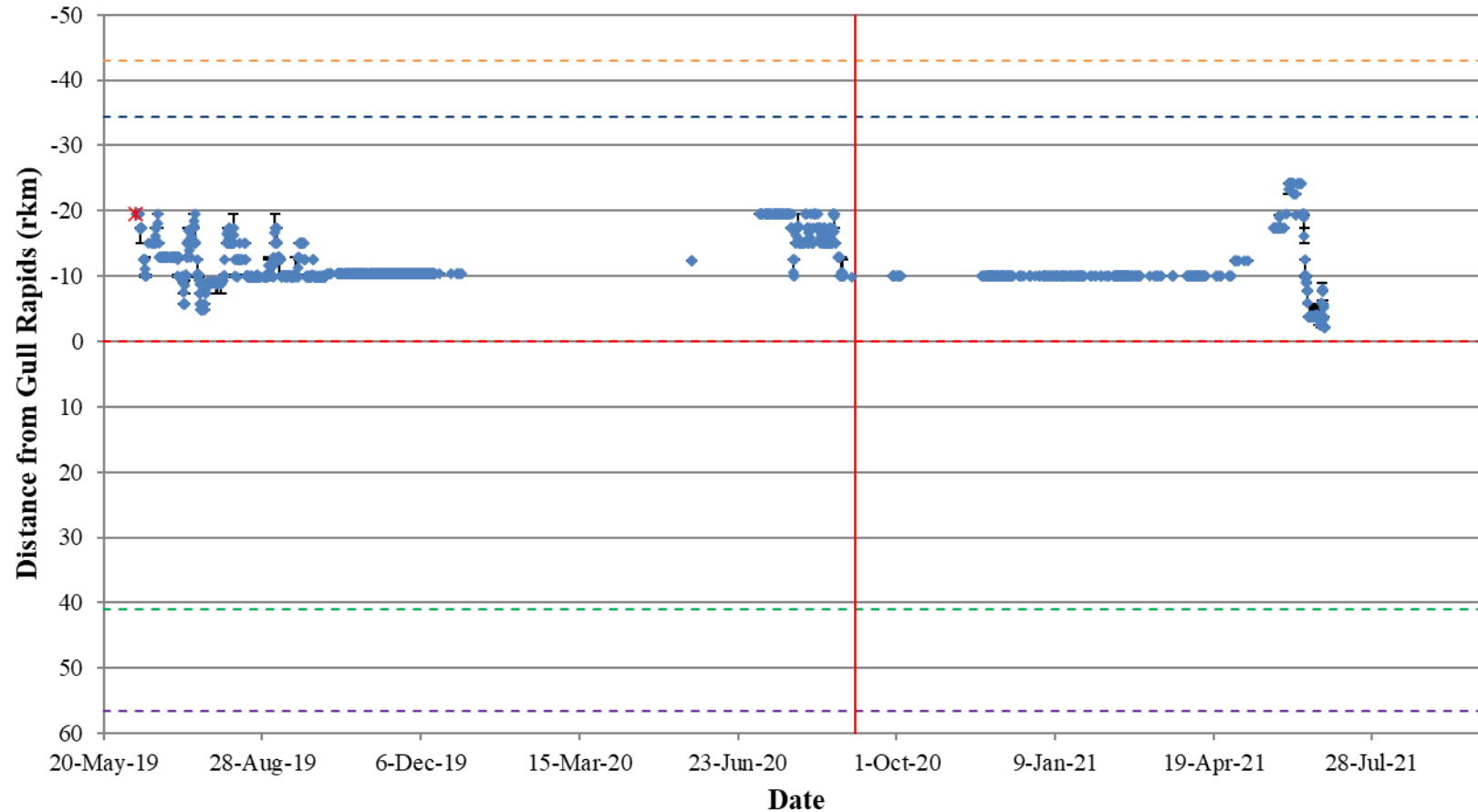


Figure A4-16: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7032) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

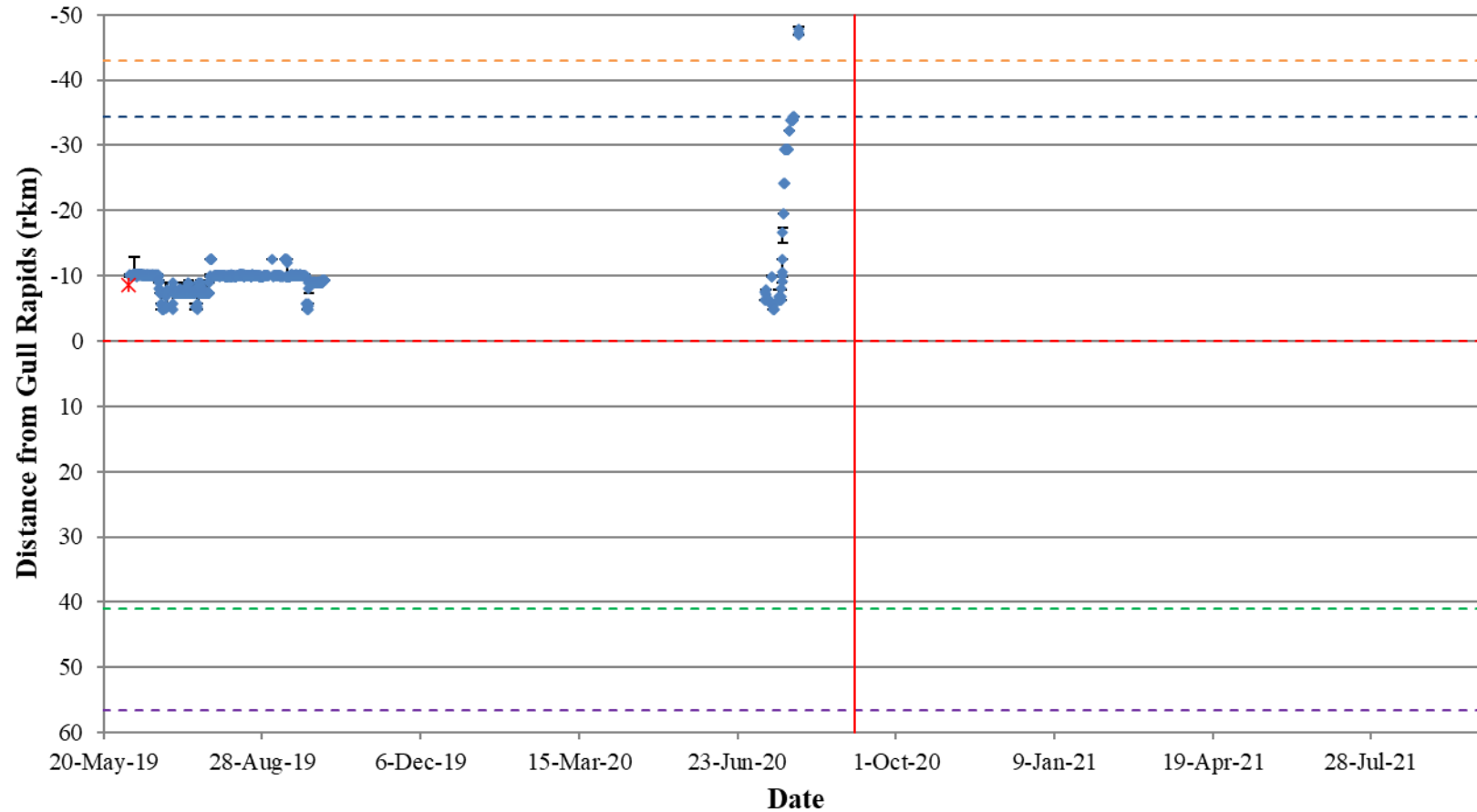


Figure A4-17: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7033) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

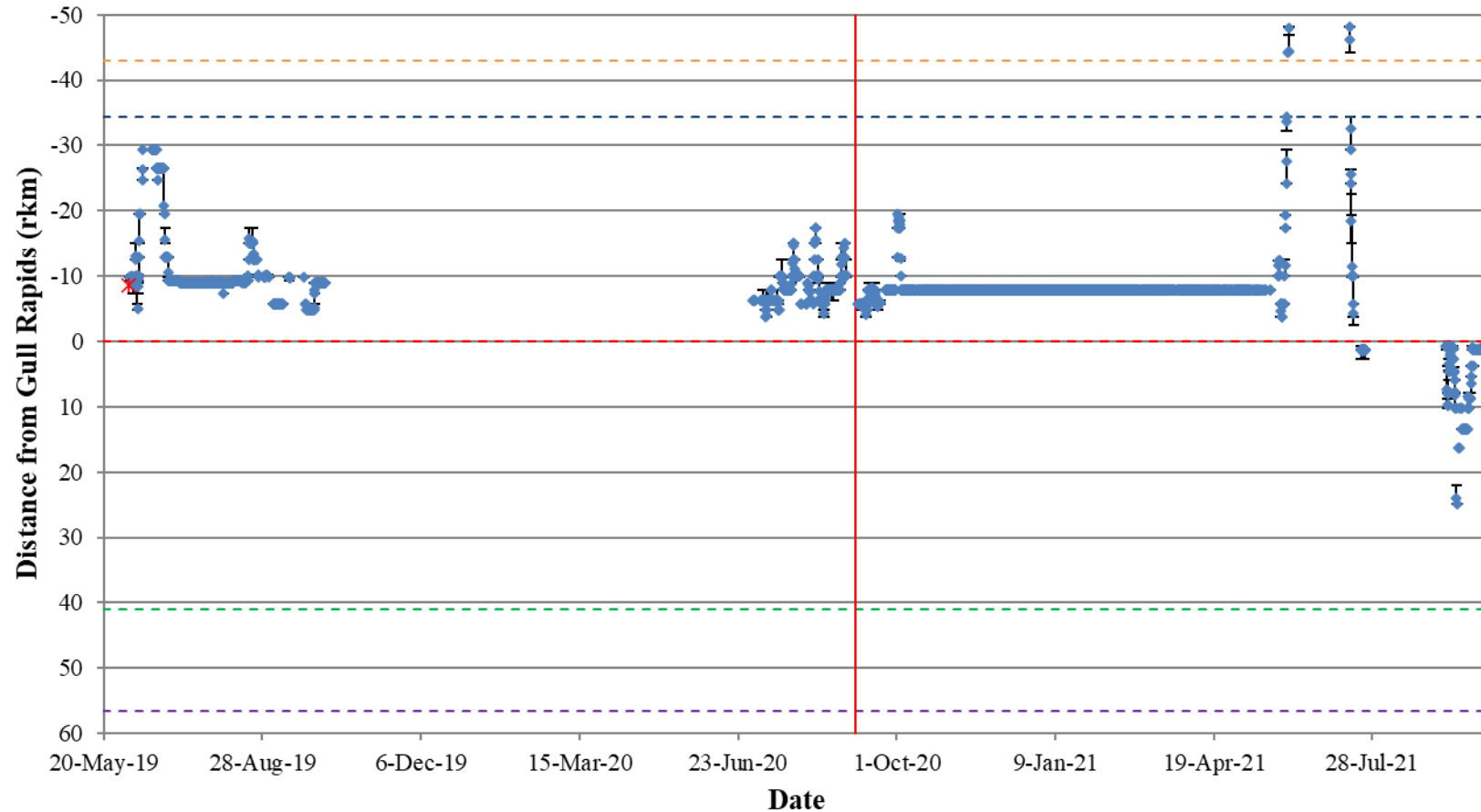


Figure A4-18: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7034) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

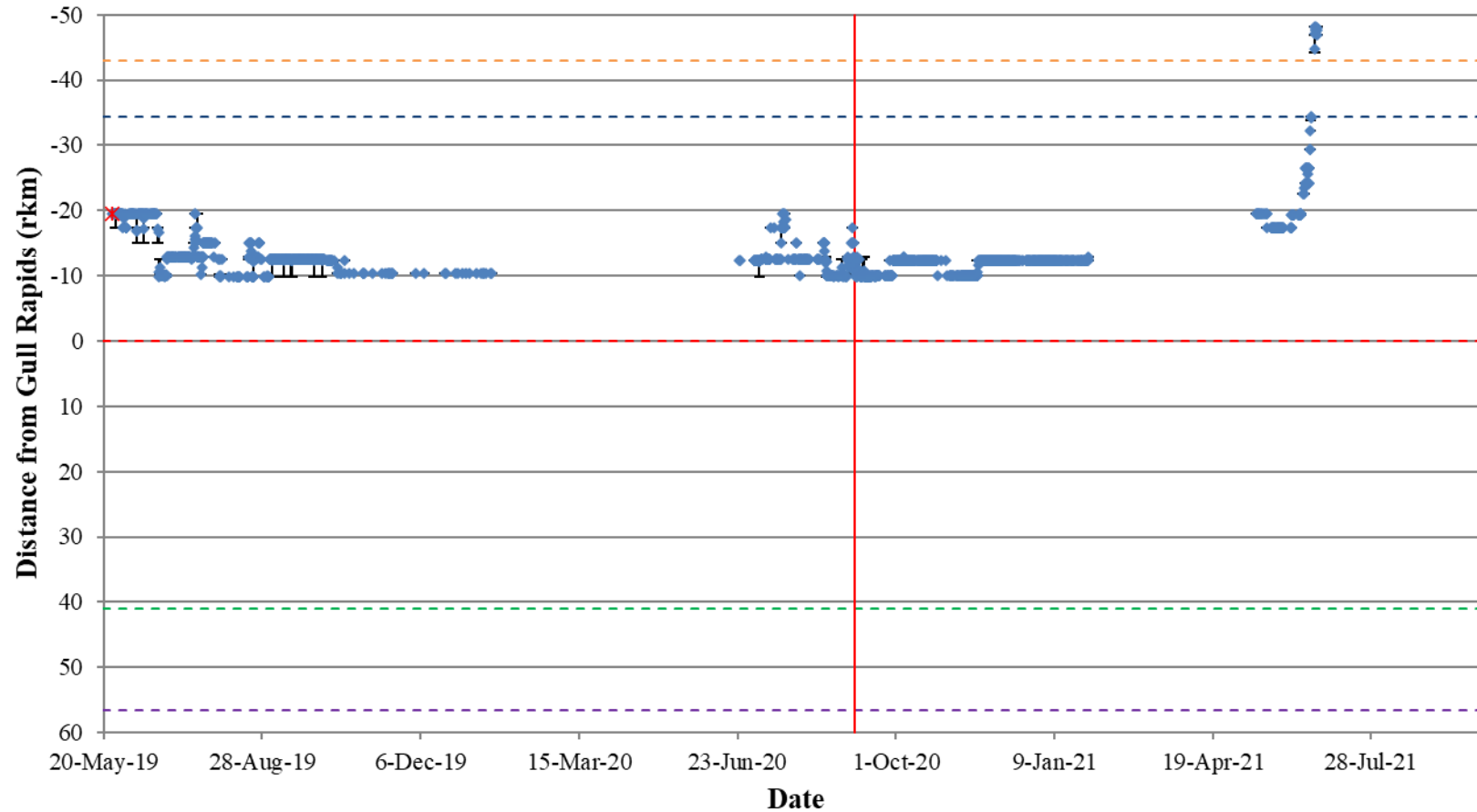


Figure A4-19: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7053) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

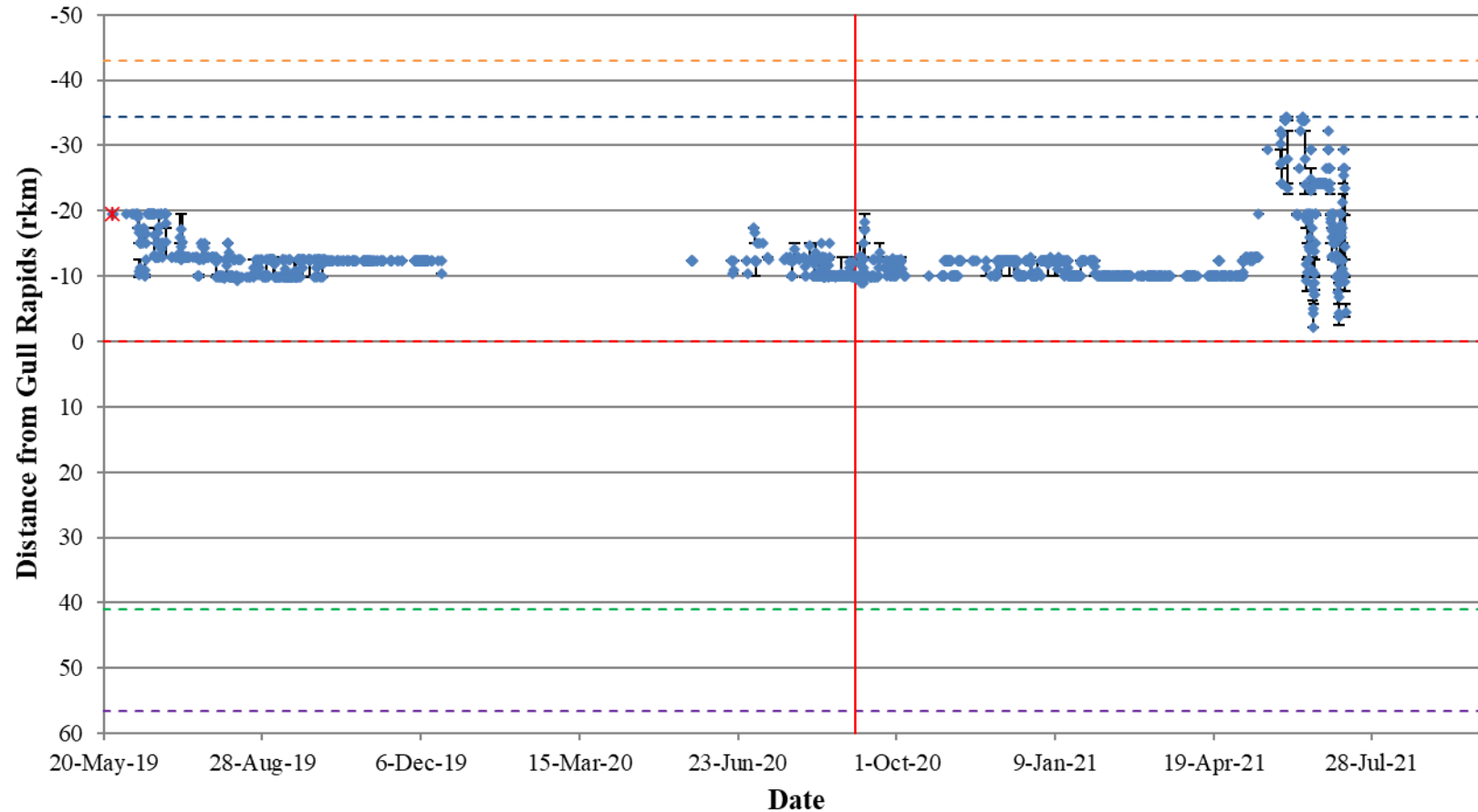


Figure A4-20: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7056) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

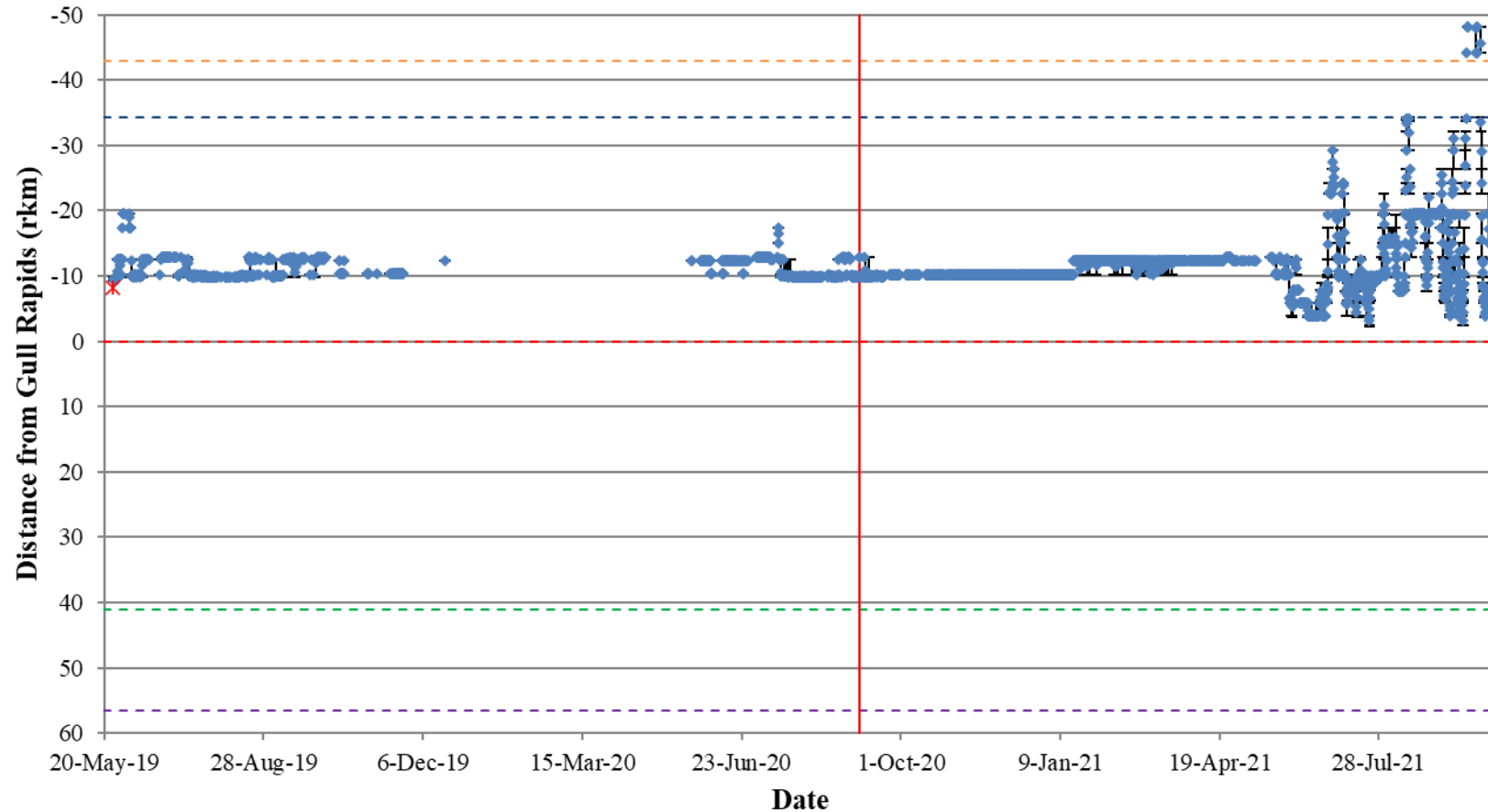


Figure A4-21: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7059) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

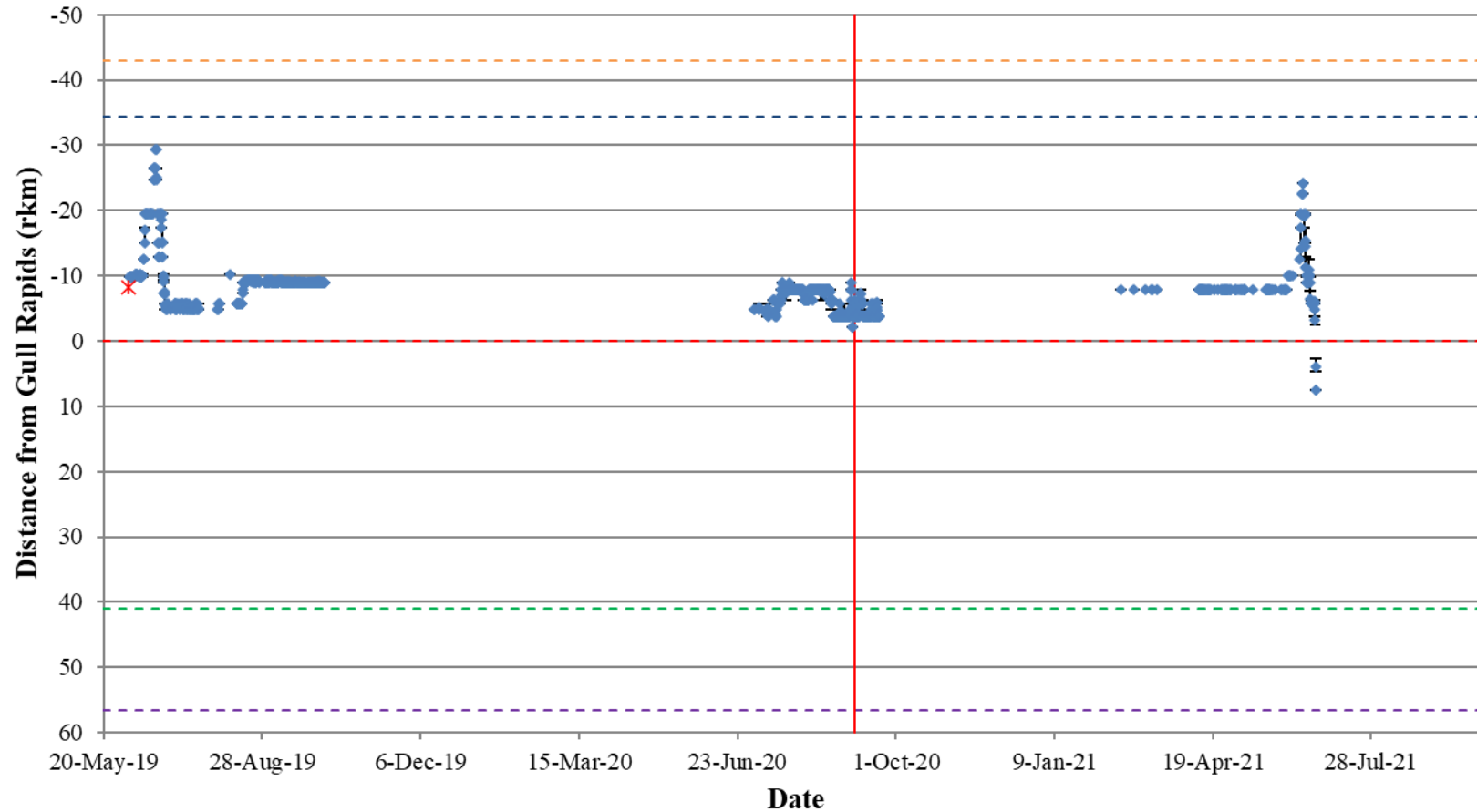


Figure A4-22: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7061) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

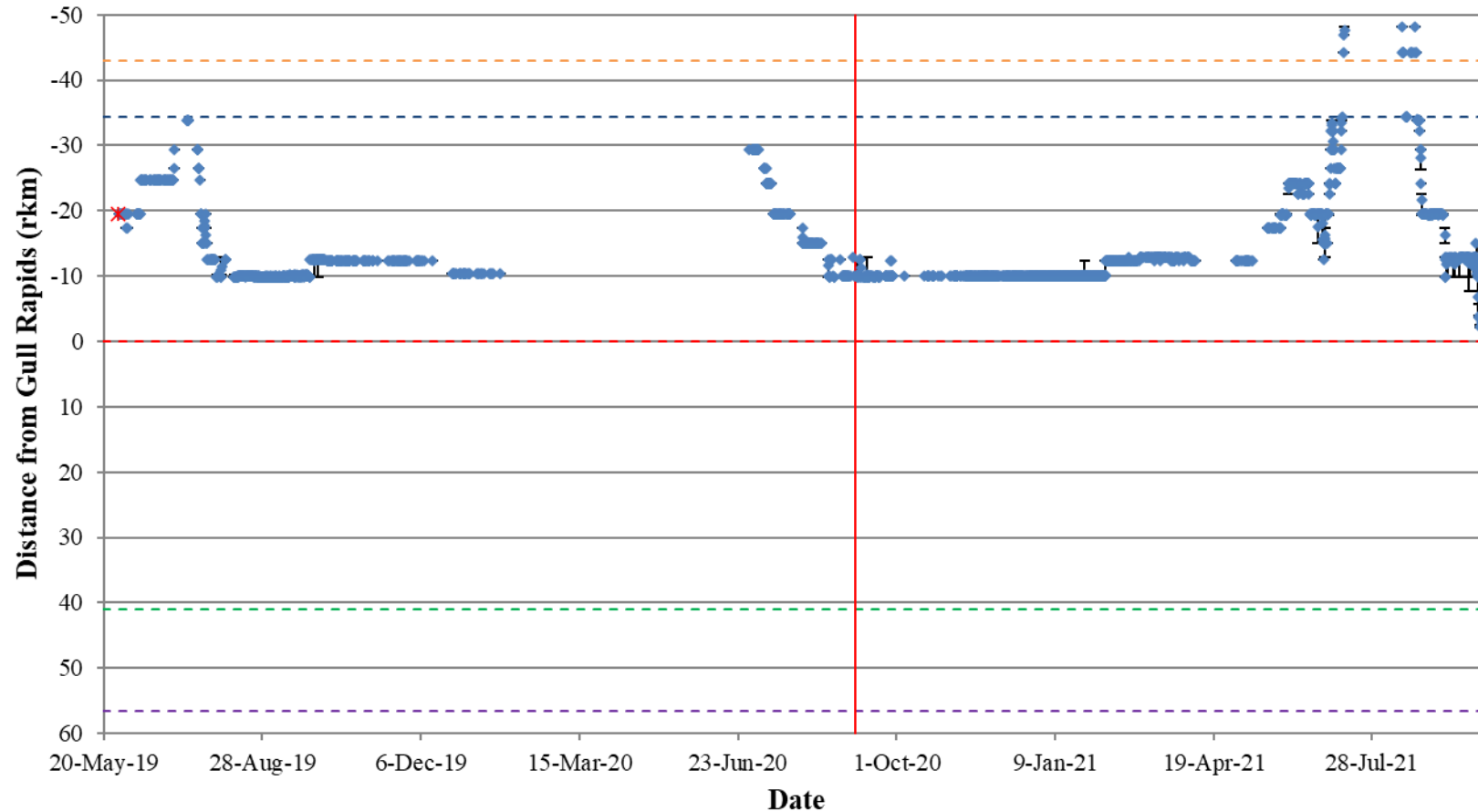


Figure A4-23: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7064) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

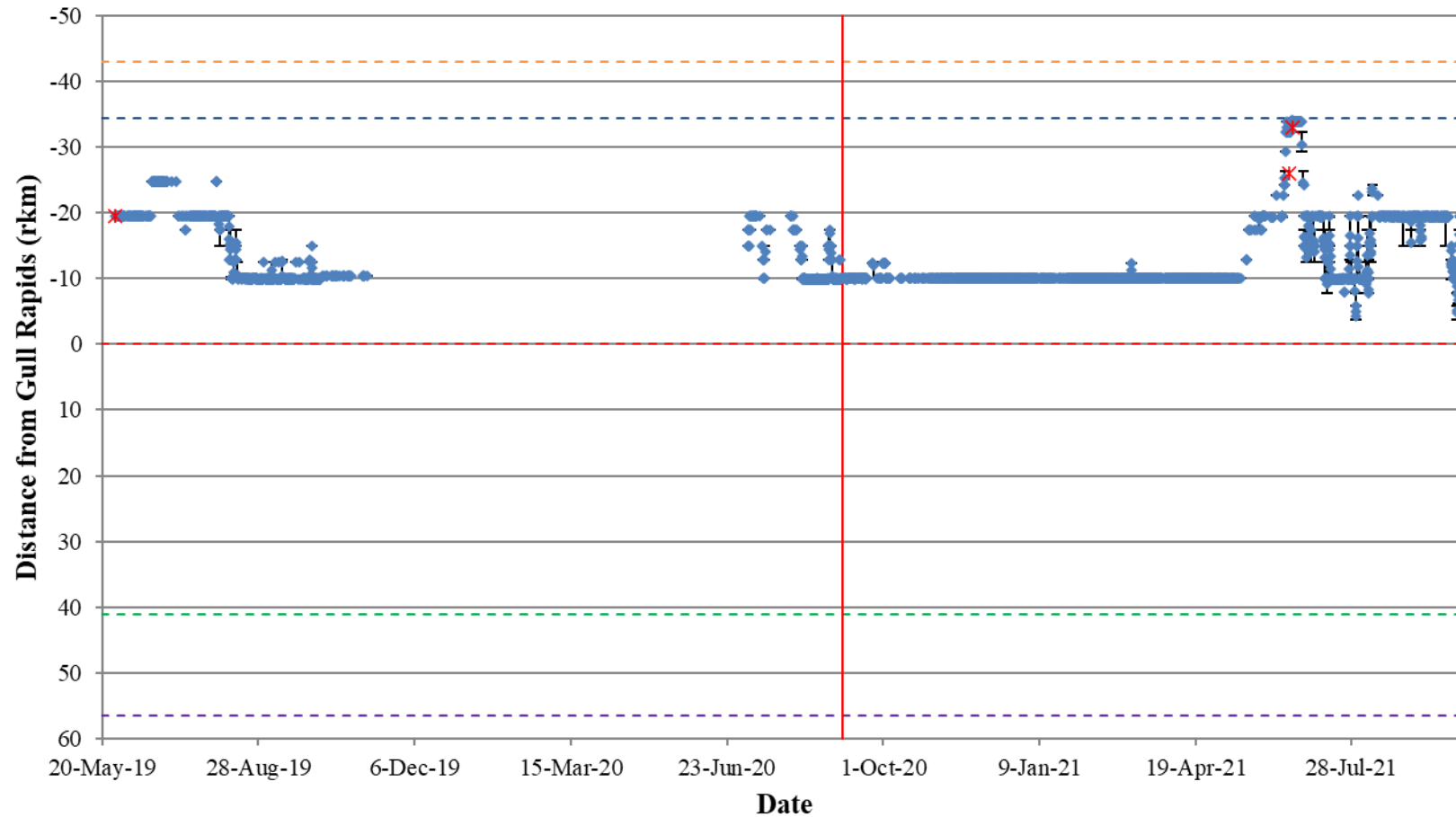


Figure A4-24: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7065) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

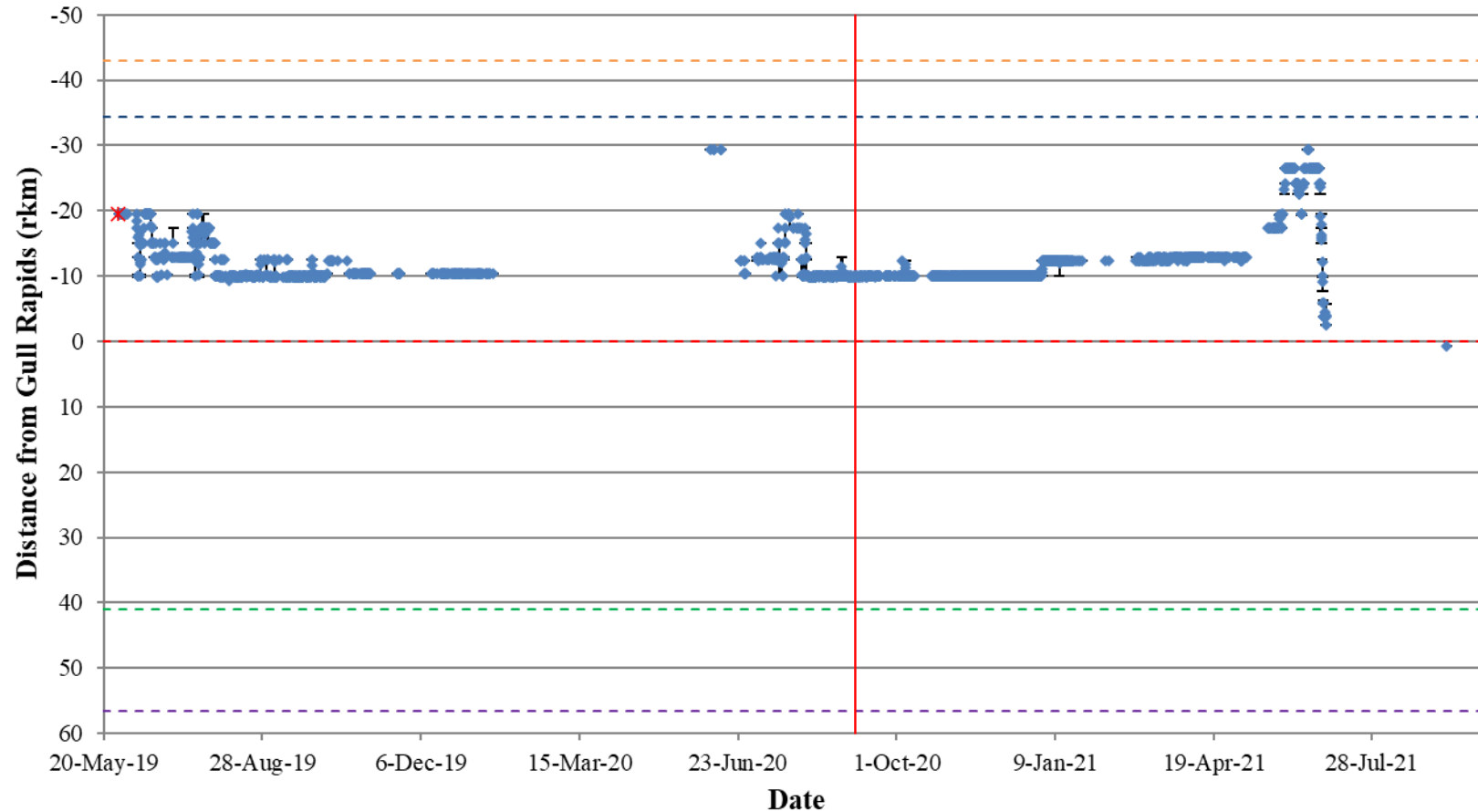


Figure A4-25: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7066) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

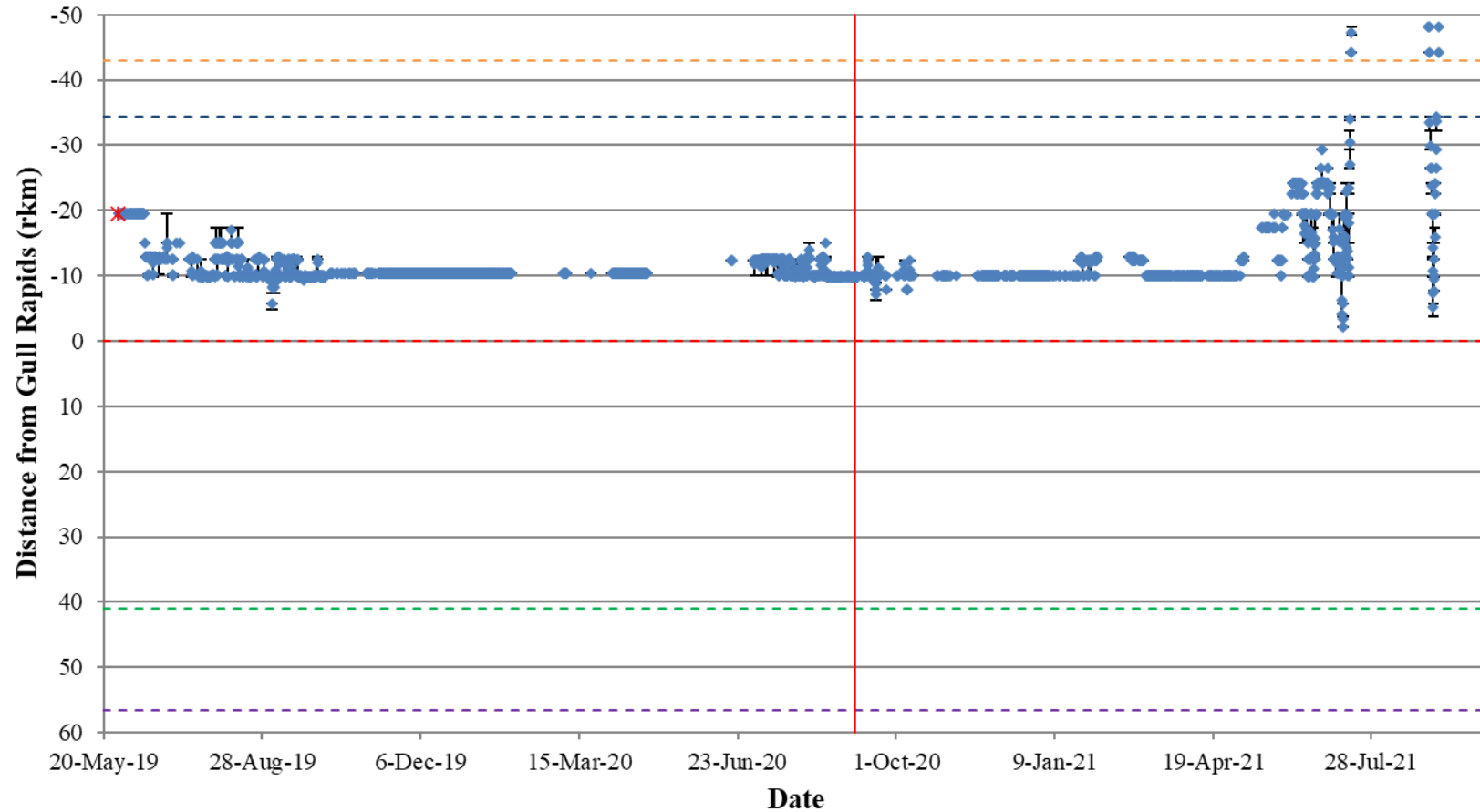


Figure A4-26: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7067) in the Nelson River between Clark Lake and the Keeyask GS in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

APPENDIX 5:

LOCATION SUMMARY FOR INDIVIDUAL ACOUSTIC TAGGED ADULT LAKE STURGEON, STEPHENS LAKE, MAY TO OCTOBER 2021

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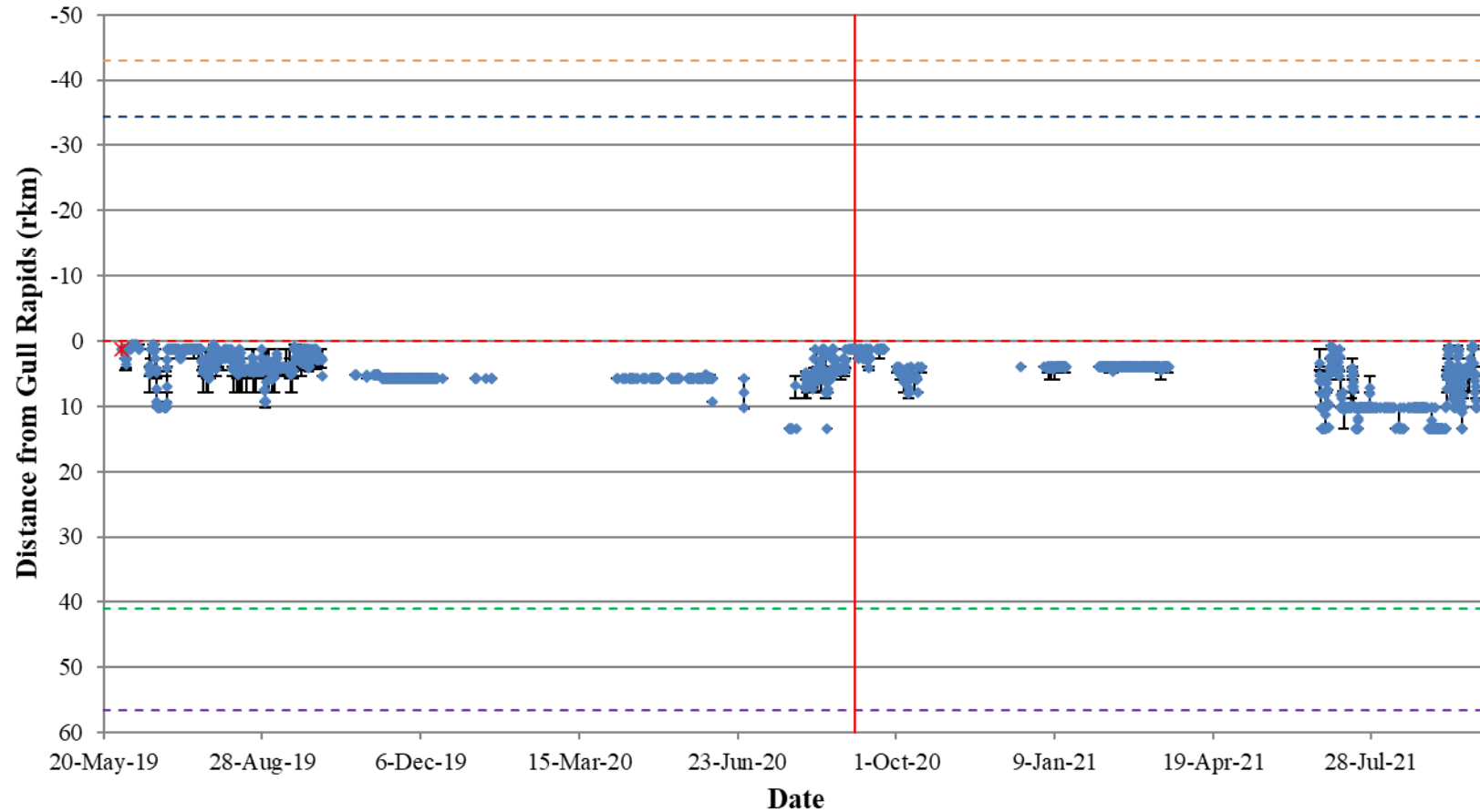


Figure A5-1: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7035) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

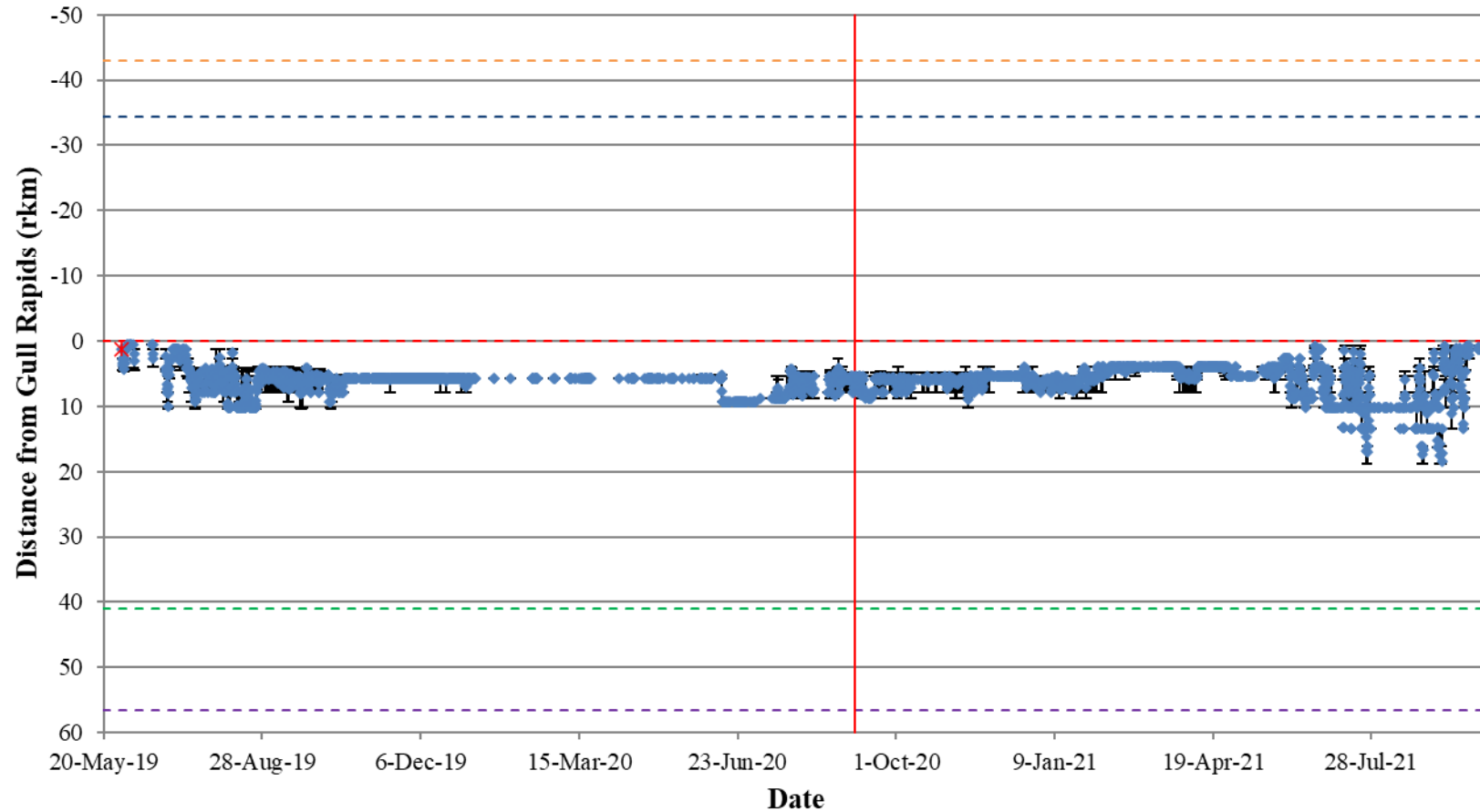


Figure A5-2: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7036) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

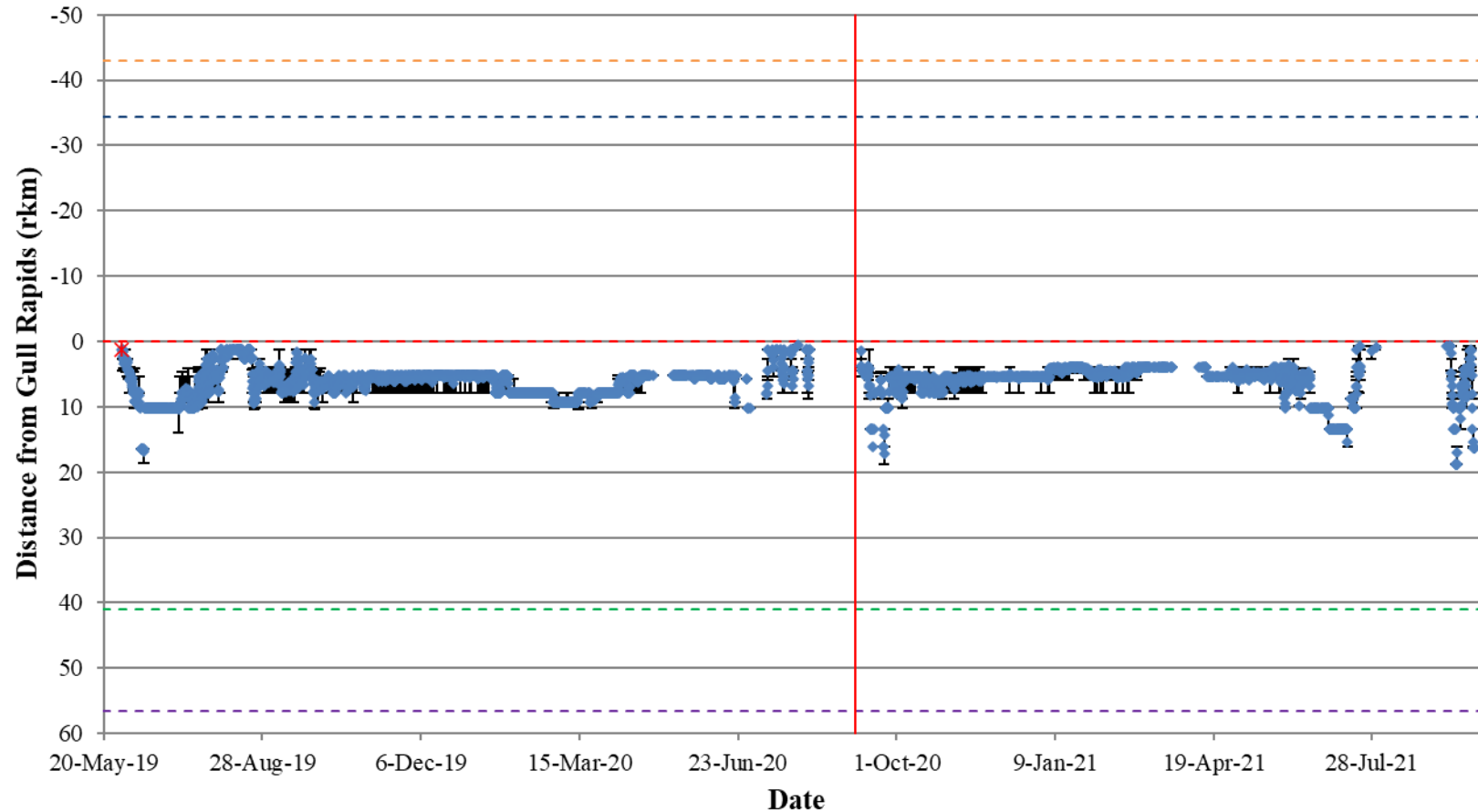


Figure A5-3: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7037) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

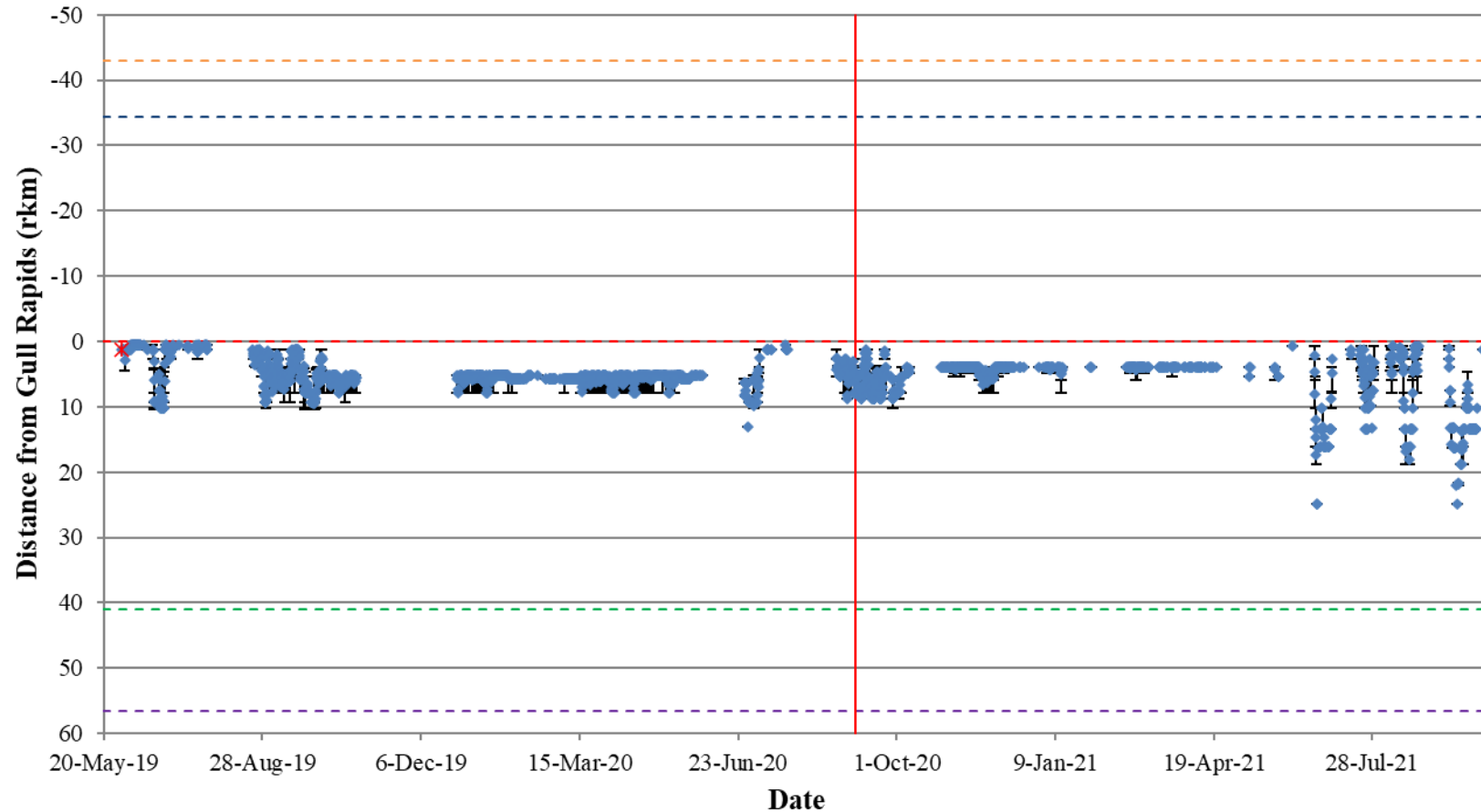


Figure A5-4: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7038) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

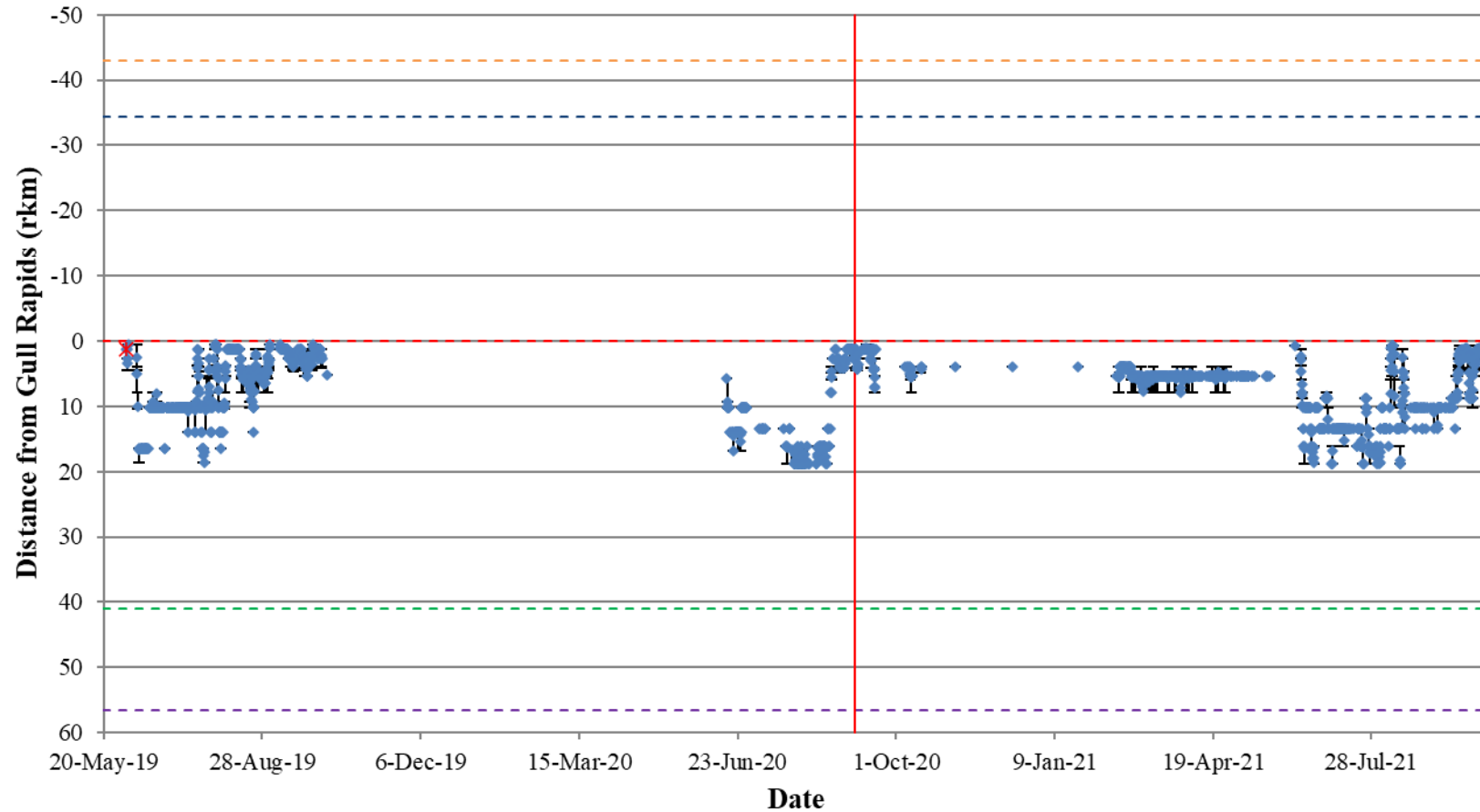


Figure A5-5: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7039) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

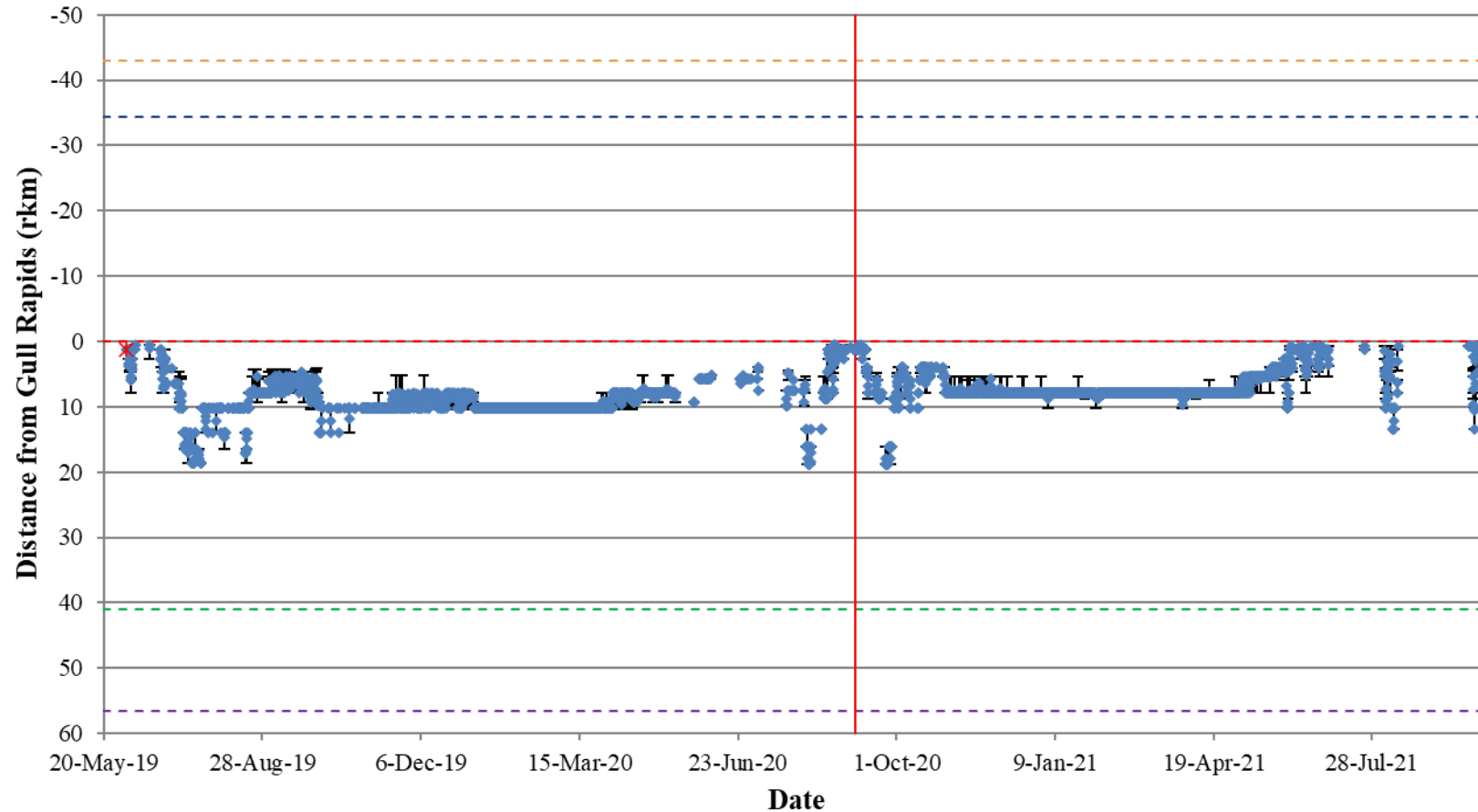


Figure A5-6: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7040) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

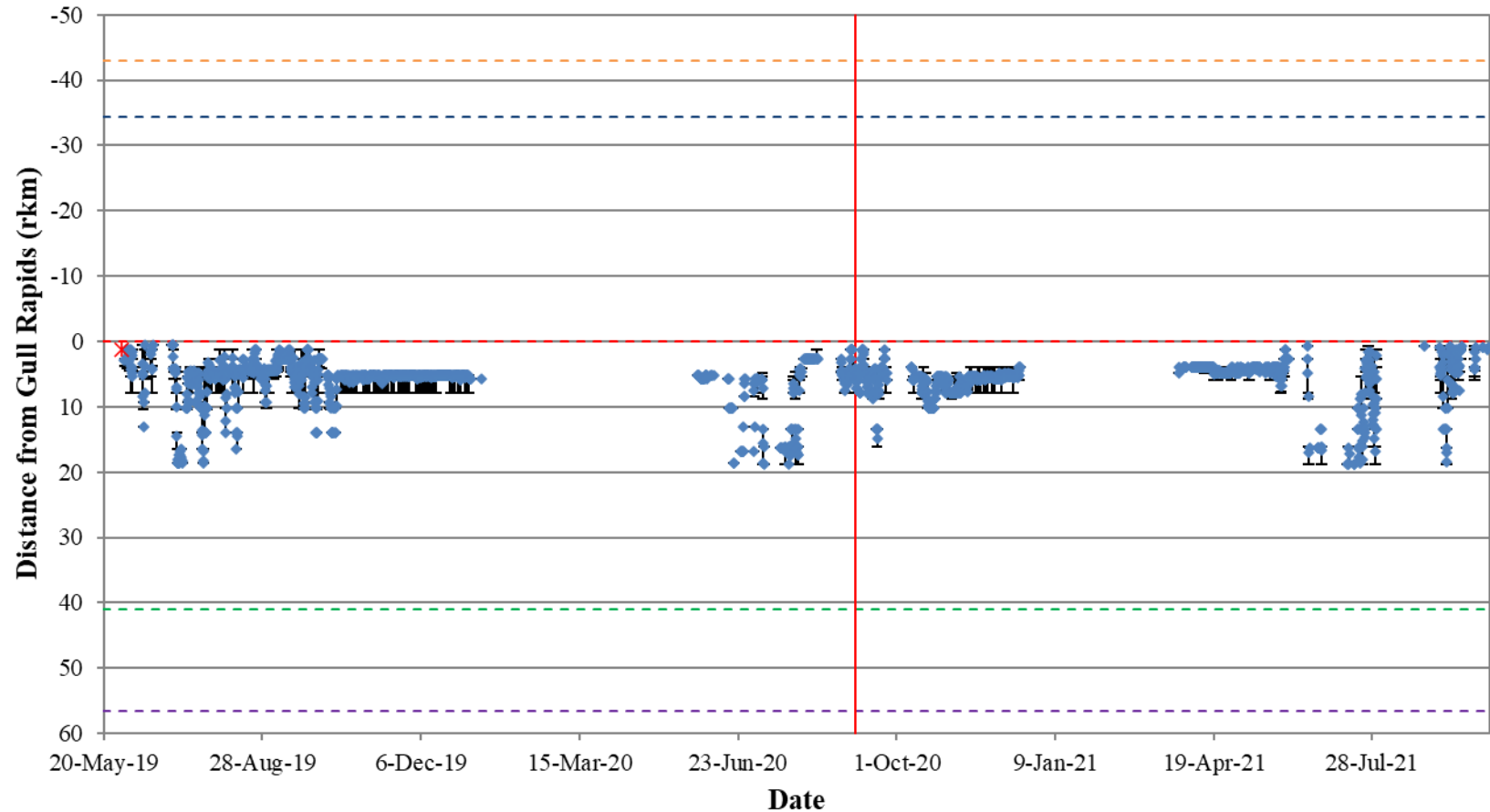


Figure A5-7: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7041) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

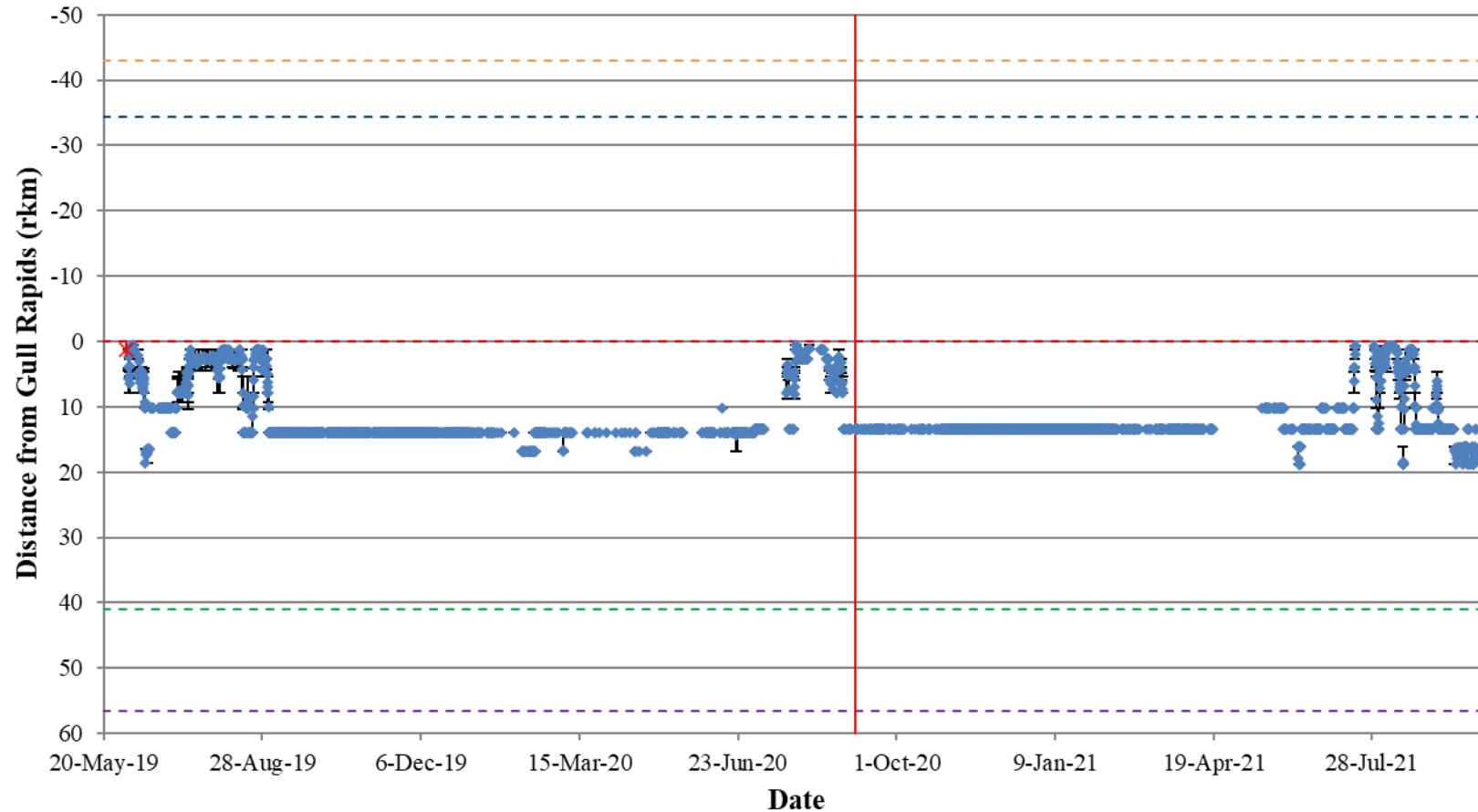


Figure A5-8: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7042) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

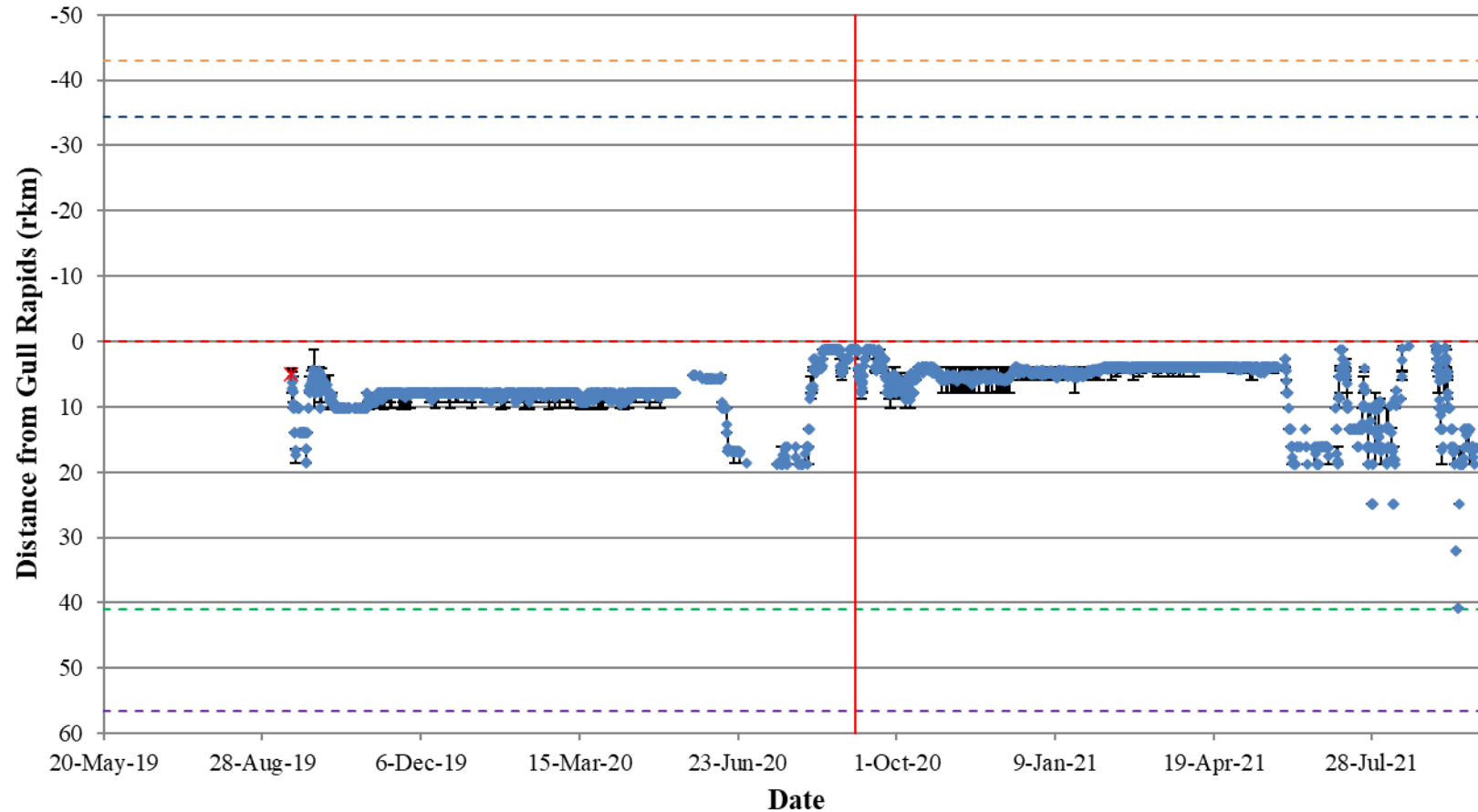


Figure A5-9: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7043) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

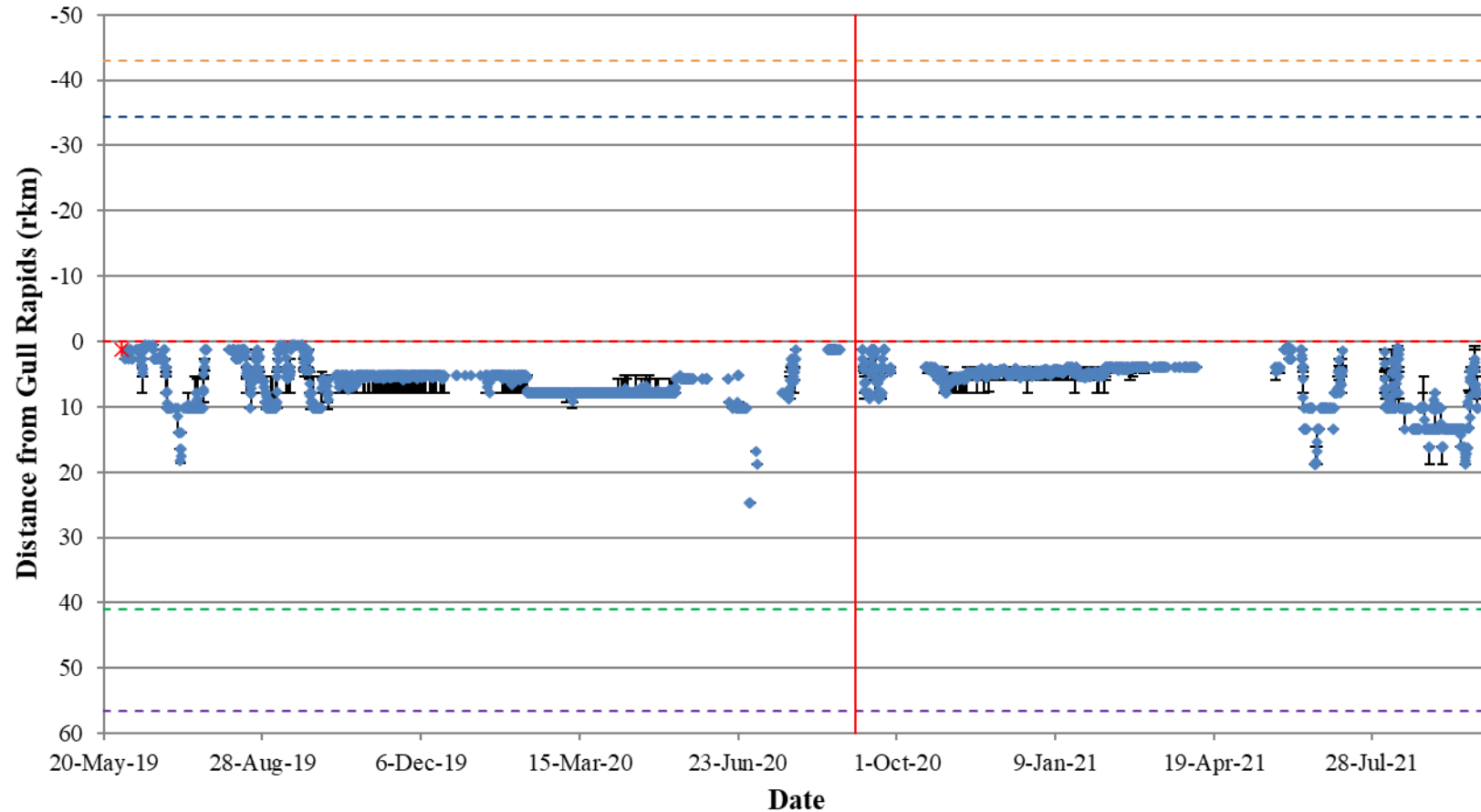


Figure A5-10: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7044) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

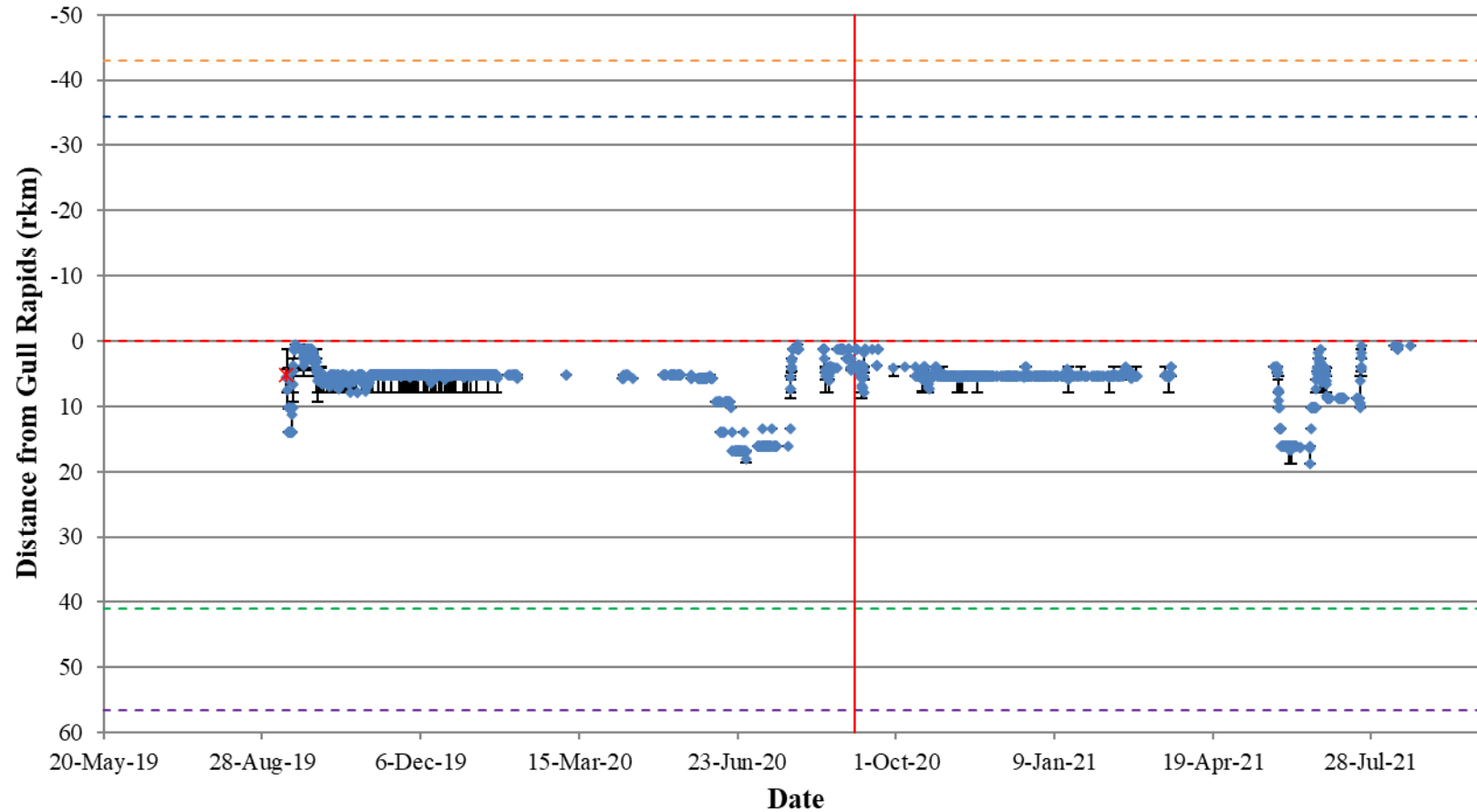


Figure A5-11: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7045) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

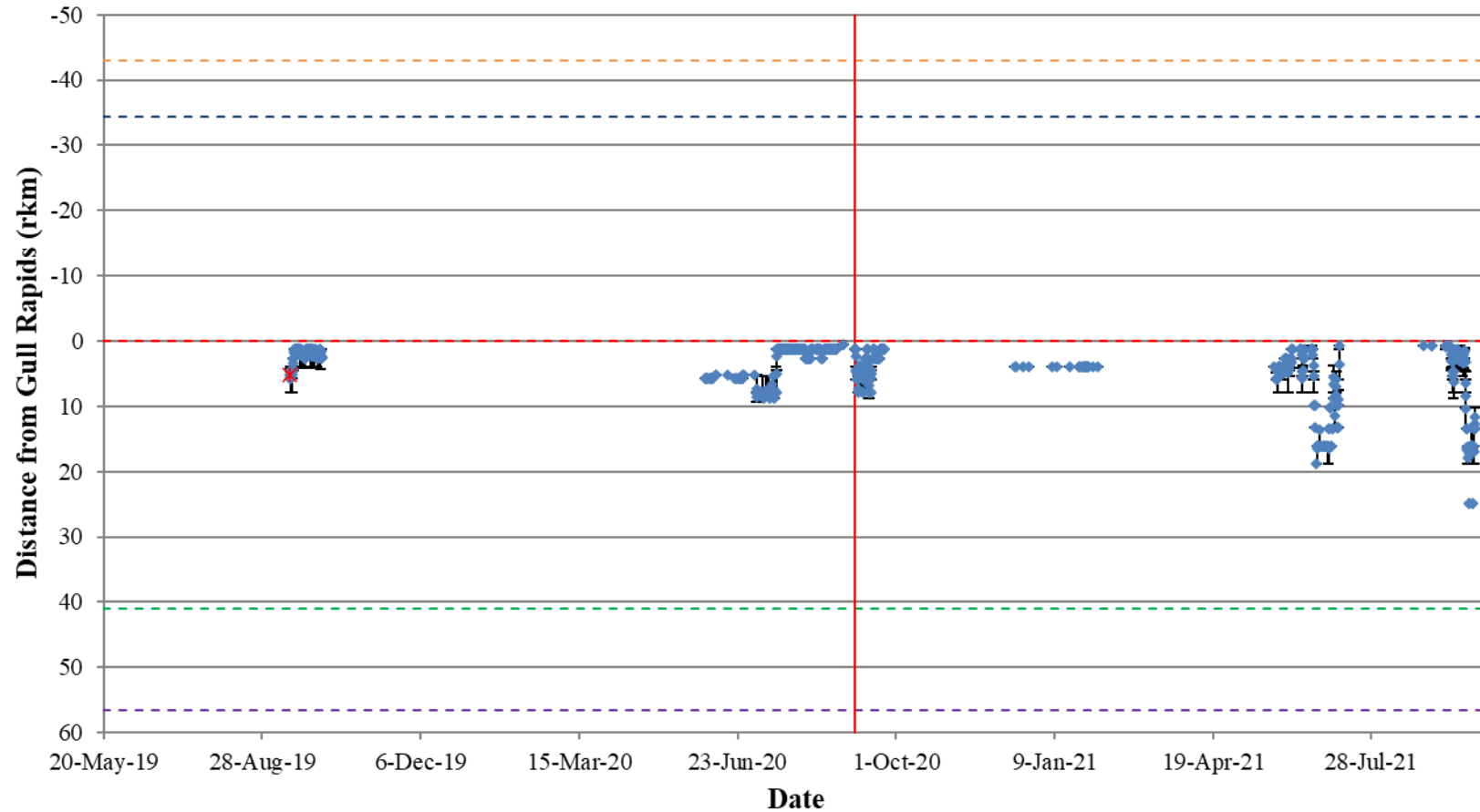


Figure A5-12: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7046) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

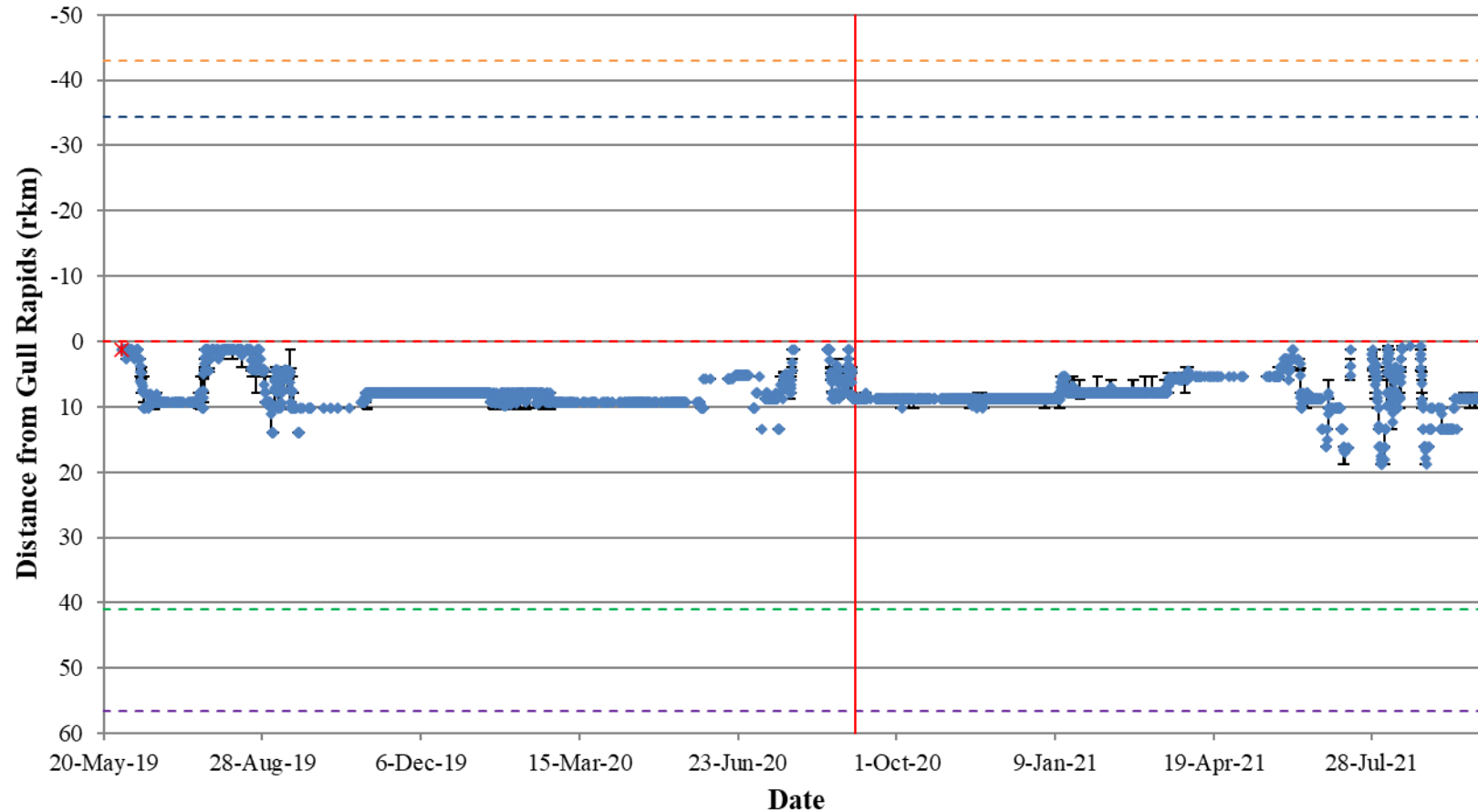


Figure A5-13: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7047) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

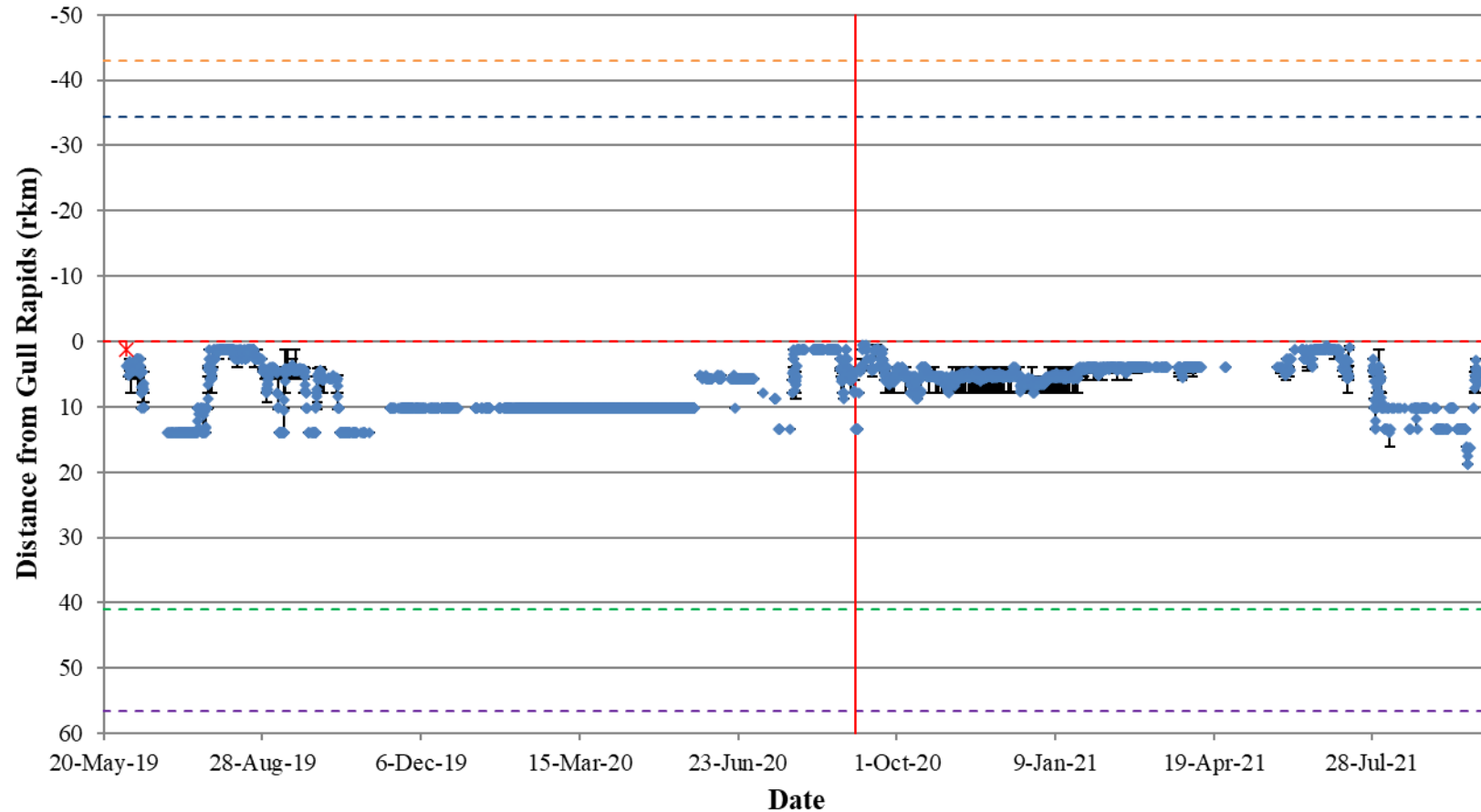


Figure A5-14: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7048) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

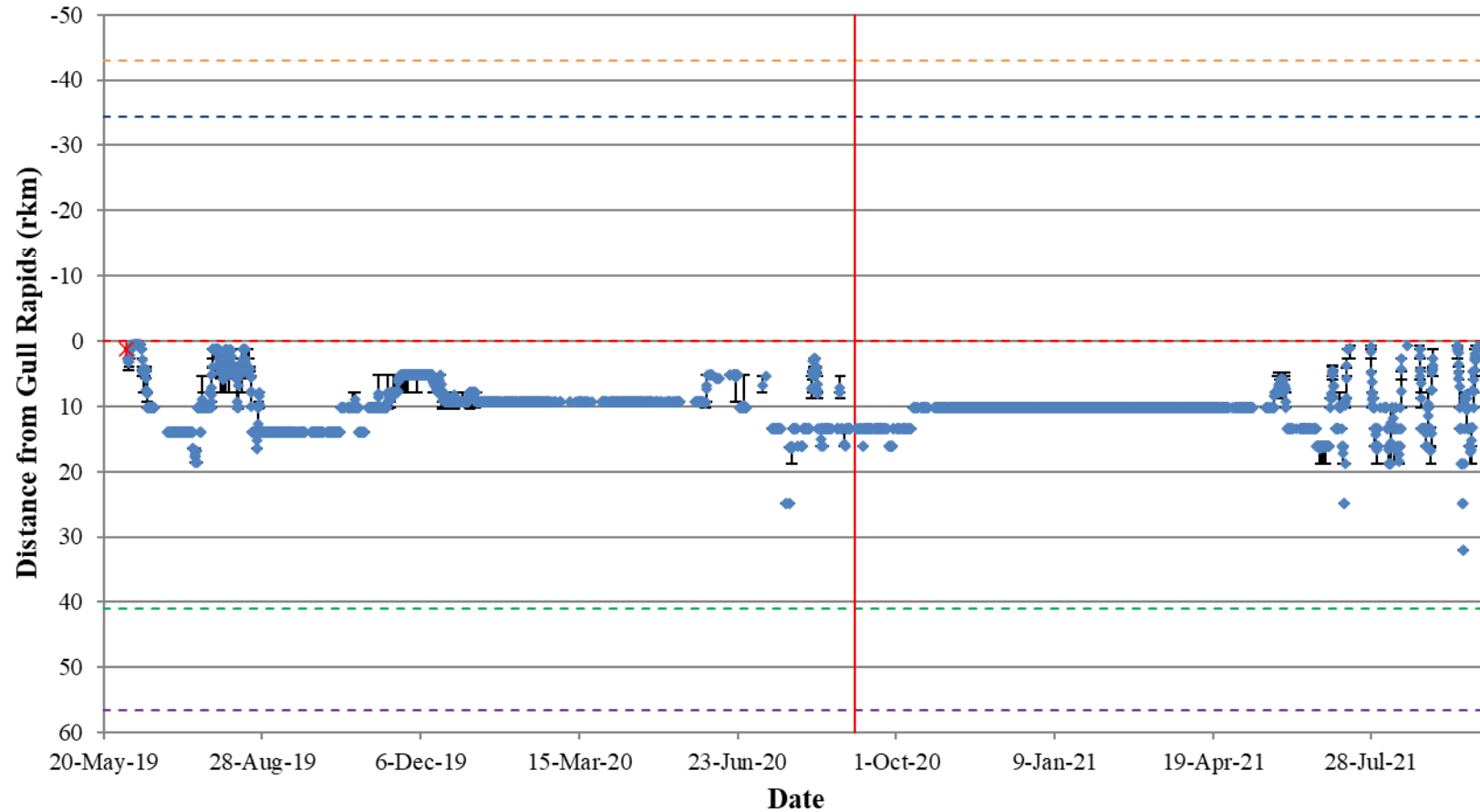


Figure A5-15: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7049) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

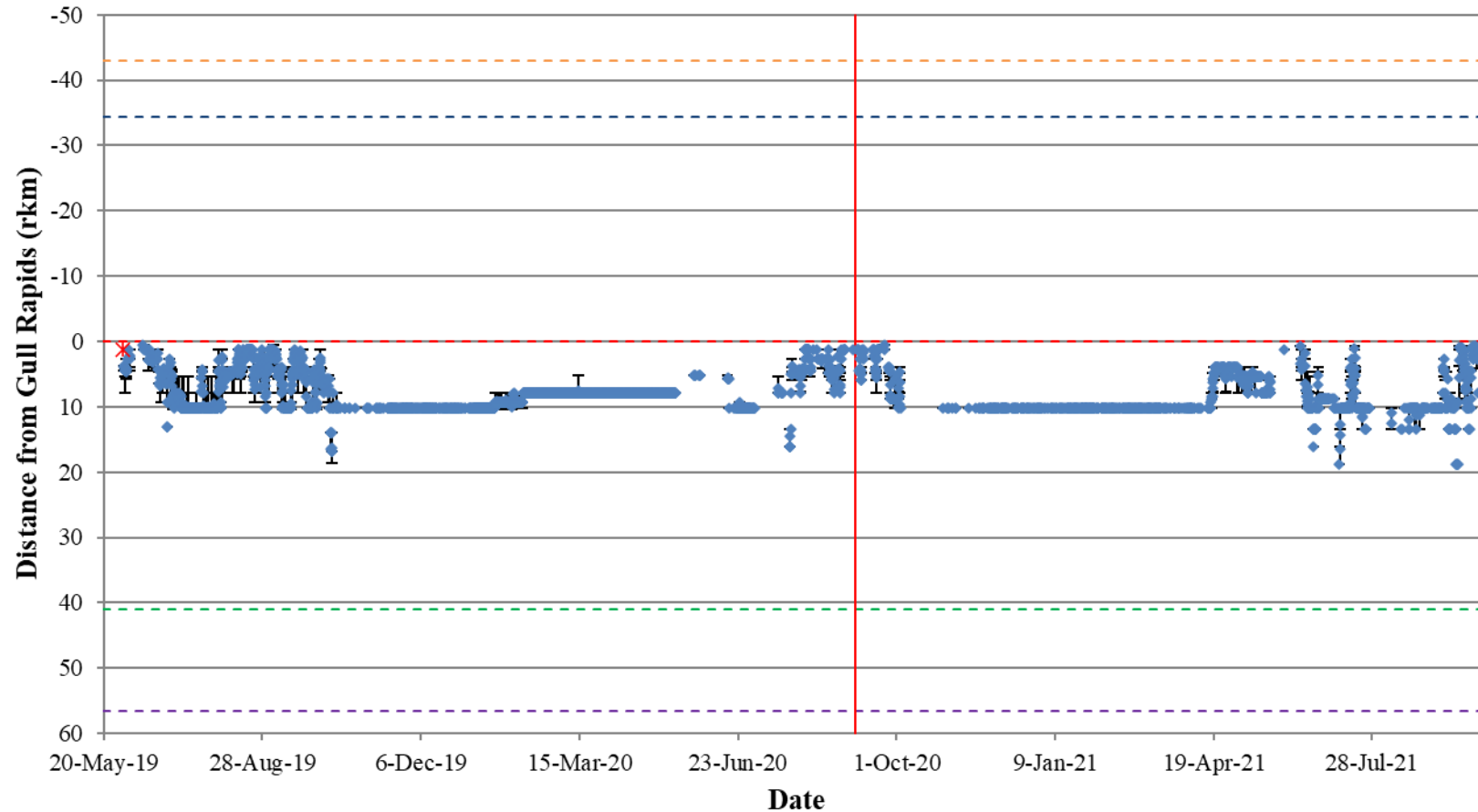


Figure A5-16: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7050) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

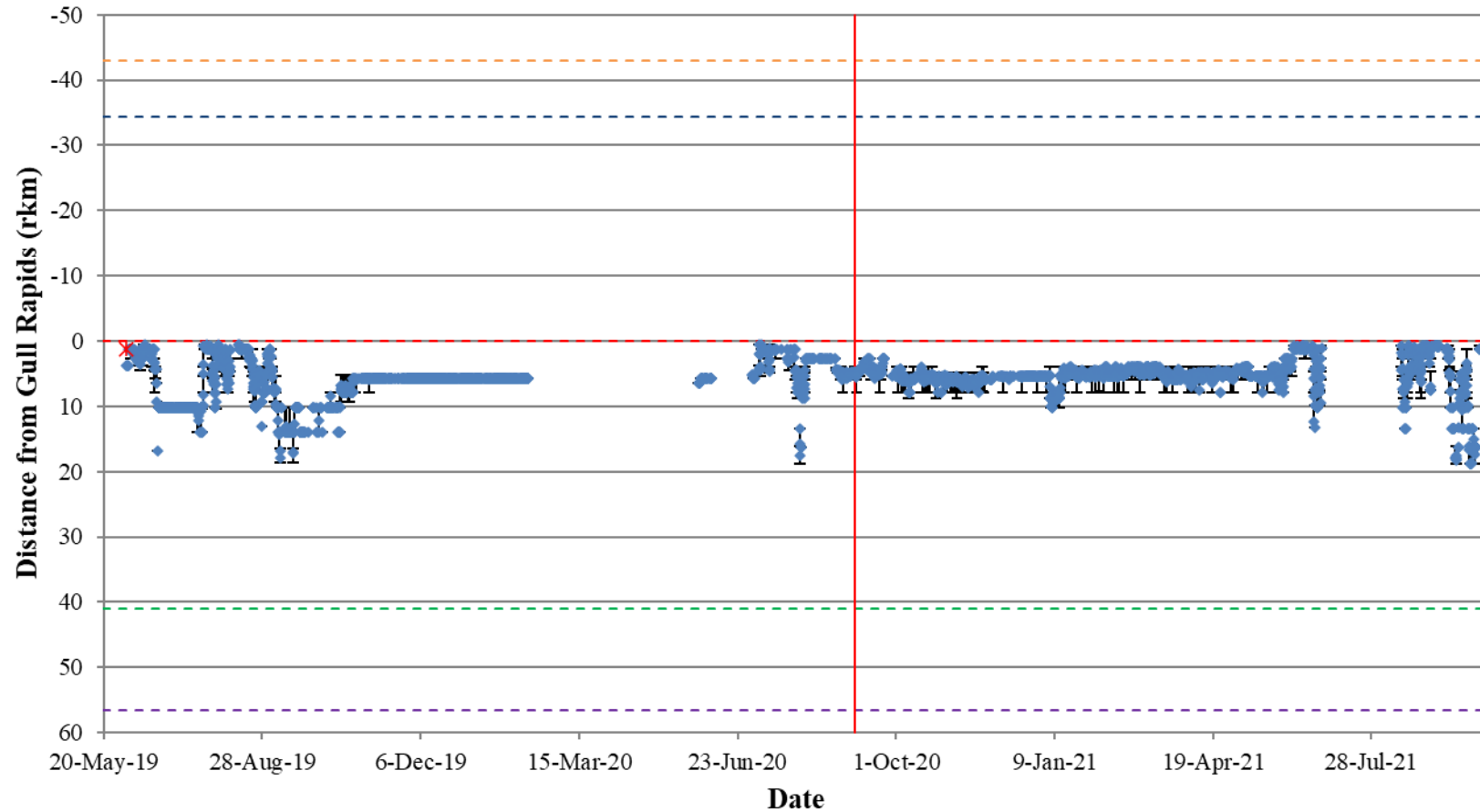


Figure A5-17: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7051) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

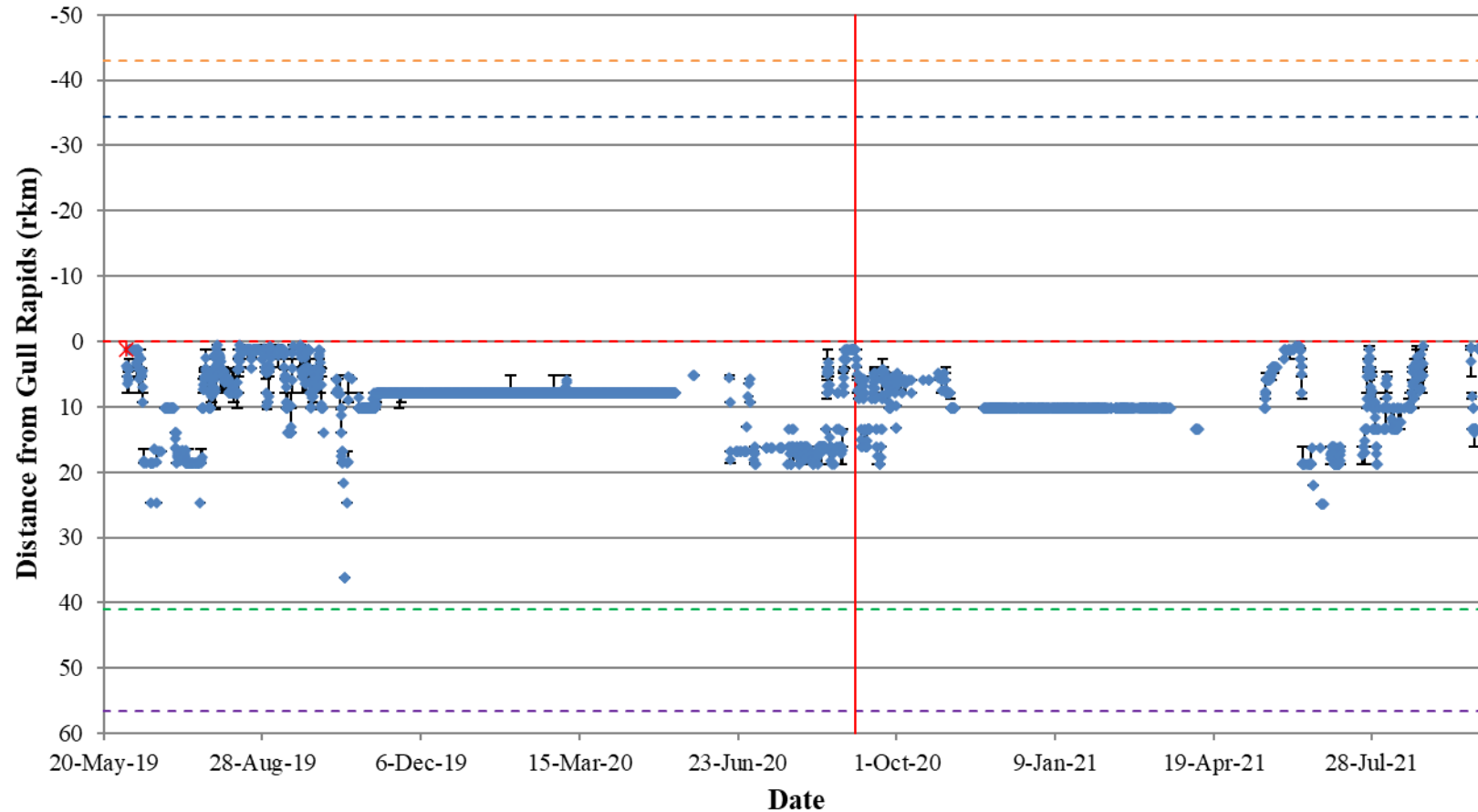


Figure A5-18: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7052) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

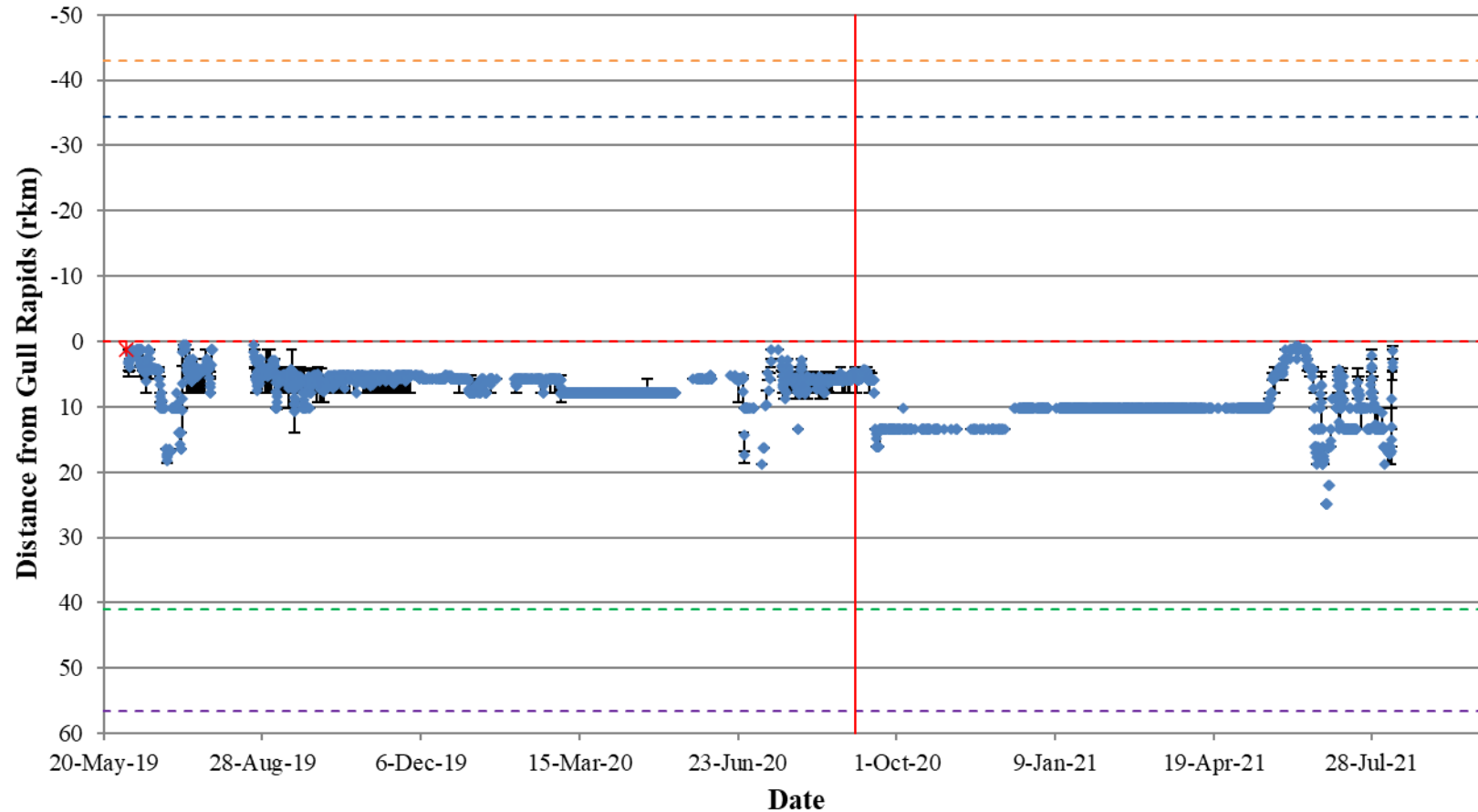


Figure A5-19: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7054) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

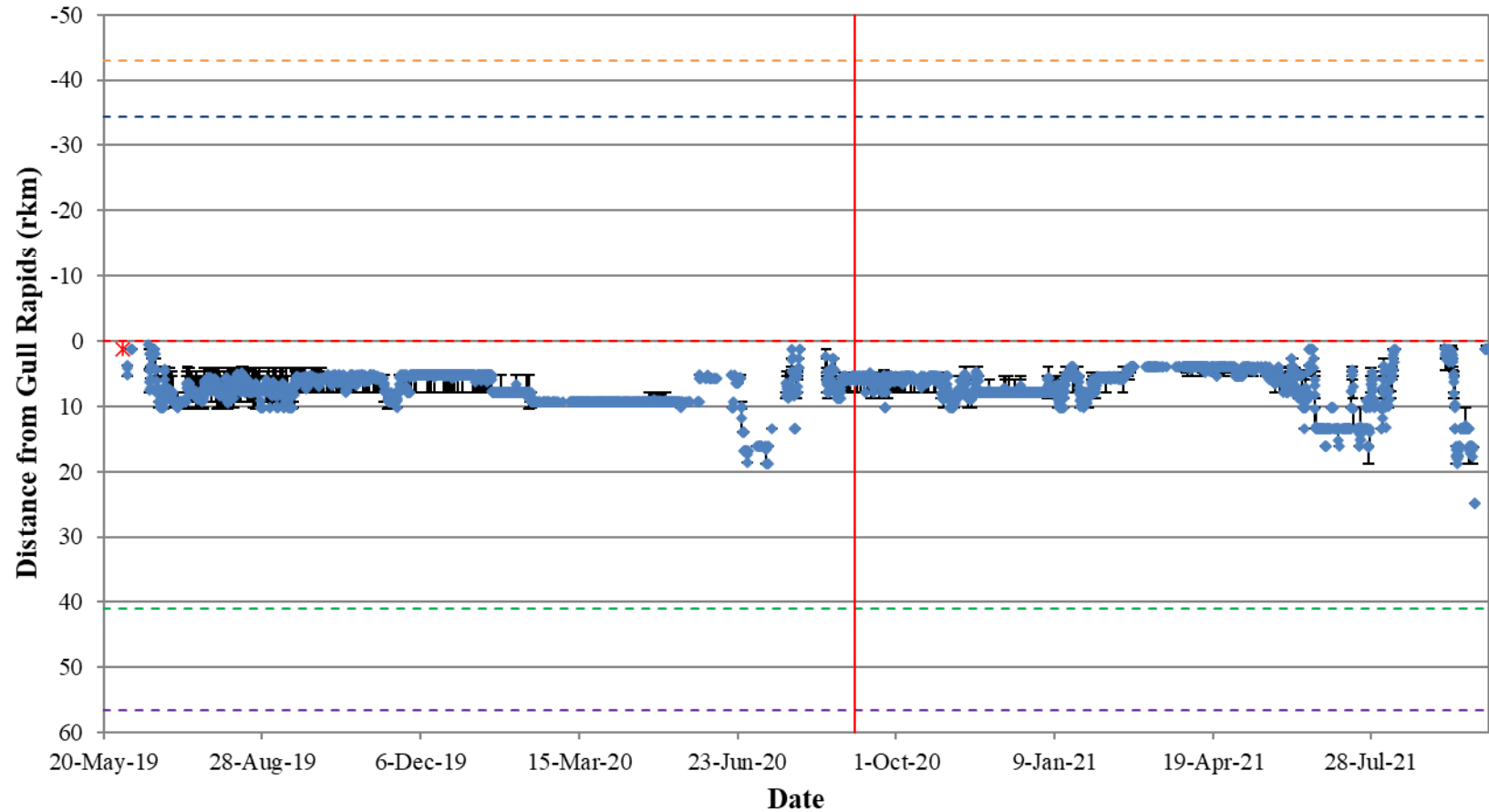


Figure A5-20: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7055) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

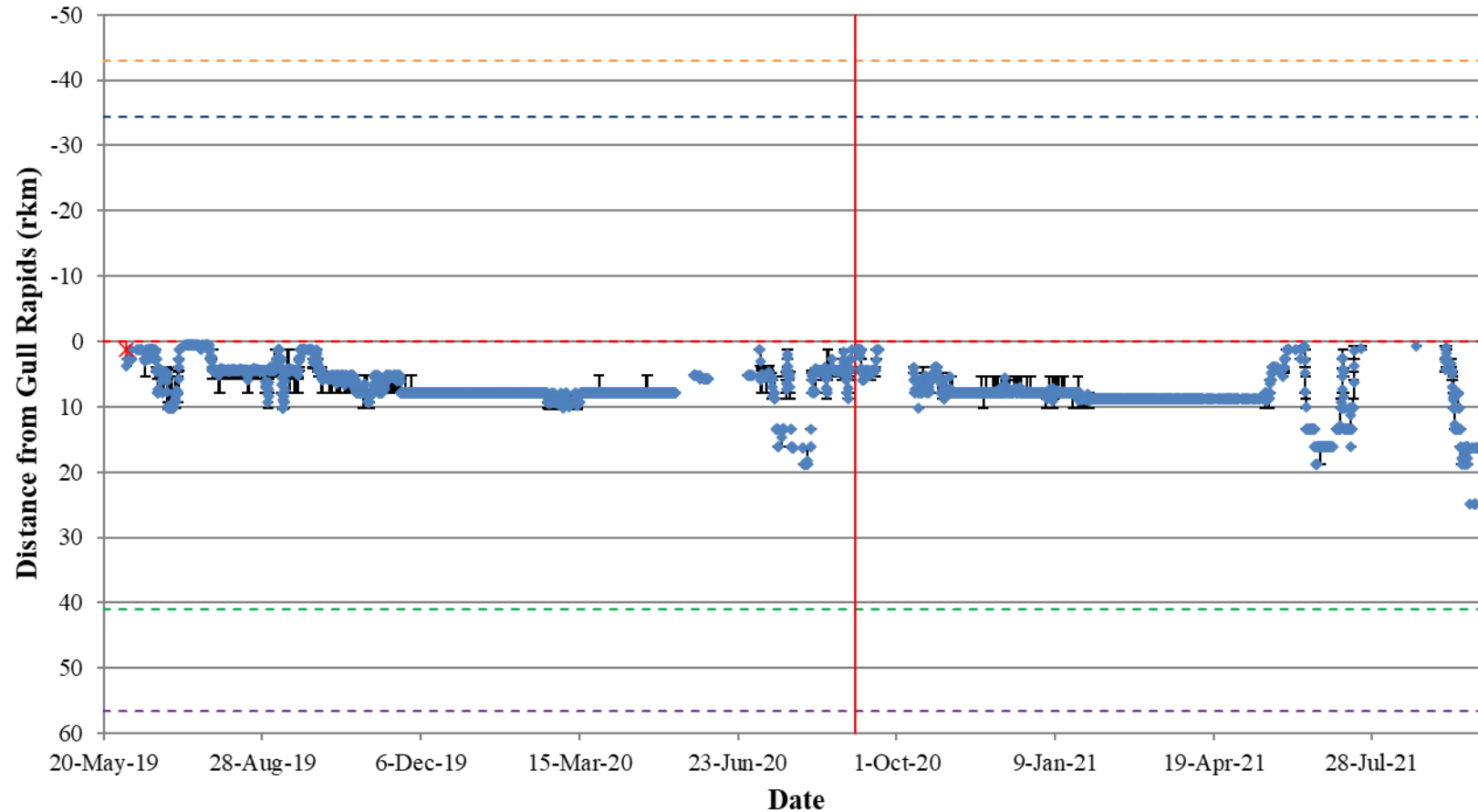


Figure A5-21: Position of a Lake Sturgeon tagged with an acoustic transmitter (code #7057) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Date and location of tagging is indicated by a star. Completion of reservoir impoundment is indicated by a vertical solid red line. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

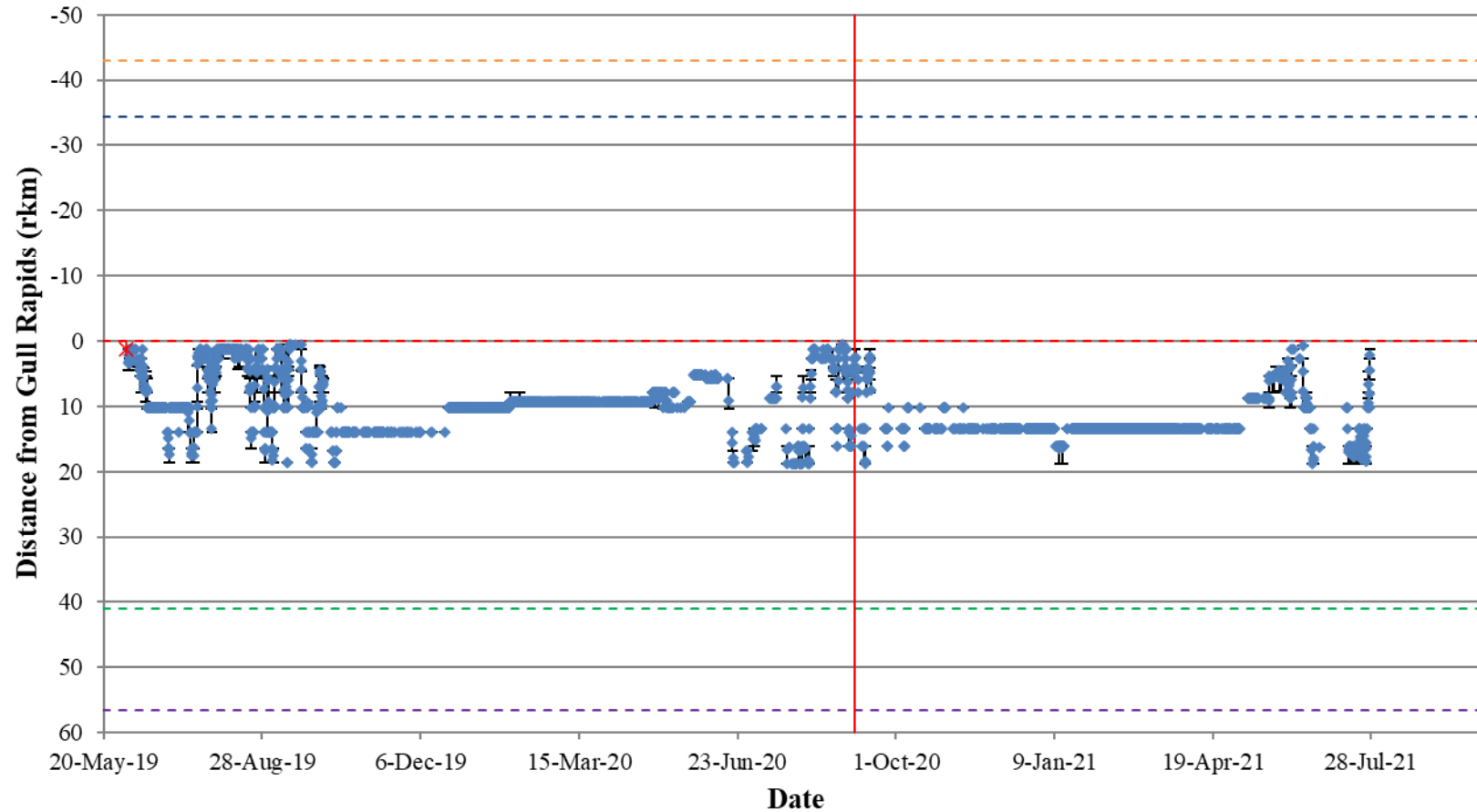


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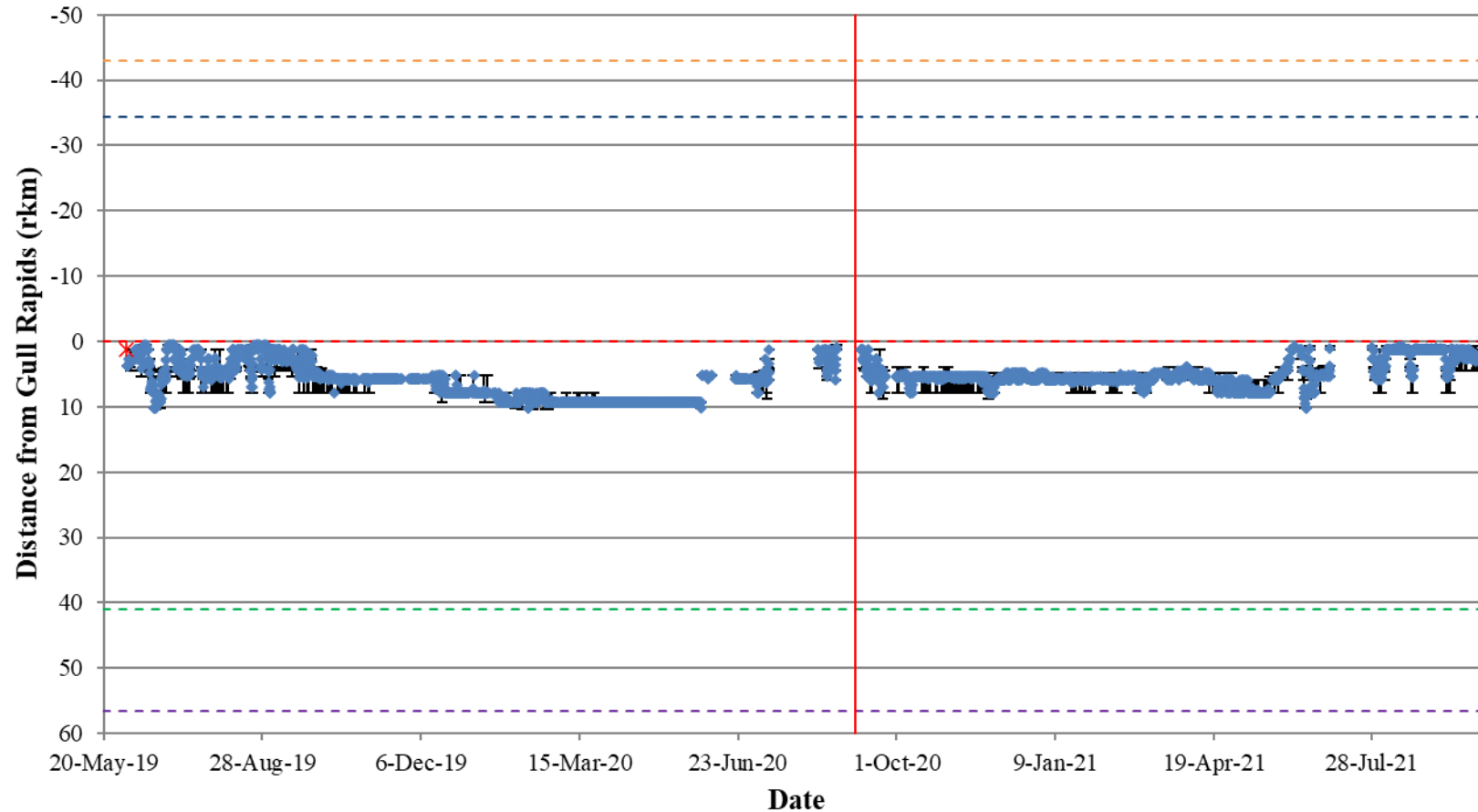


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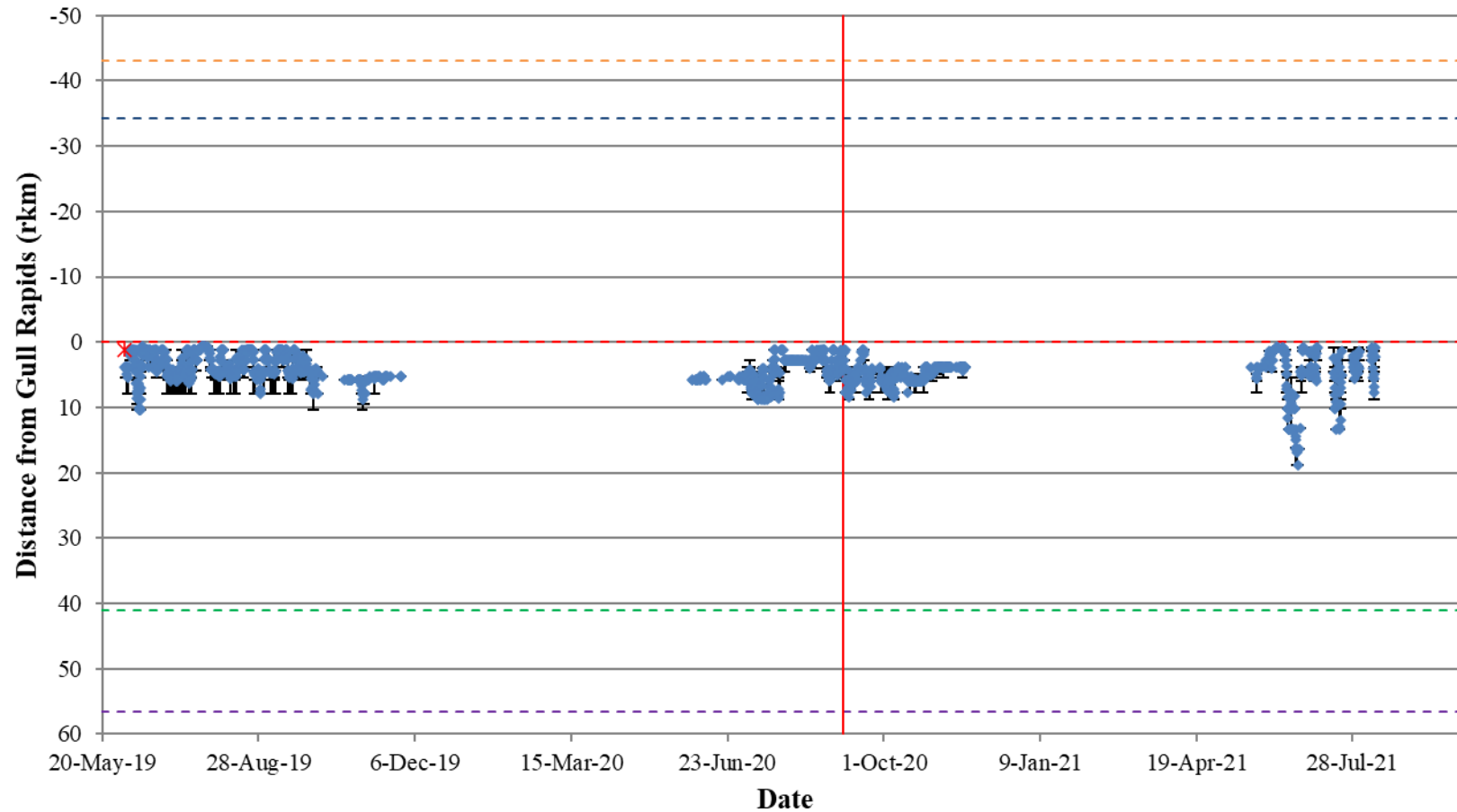


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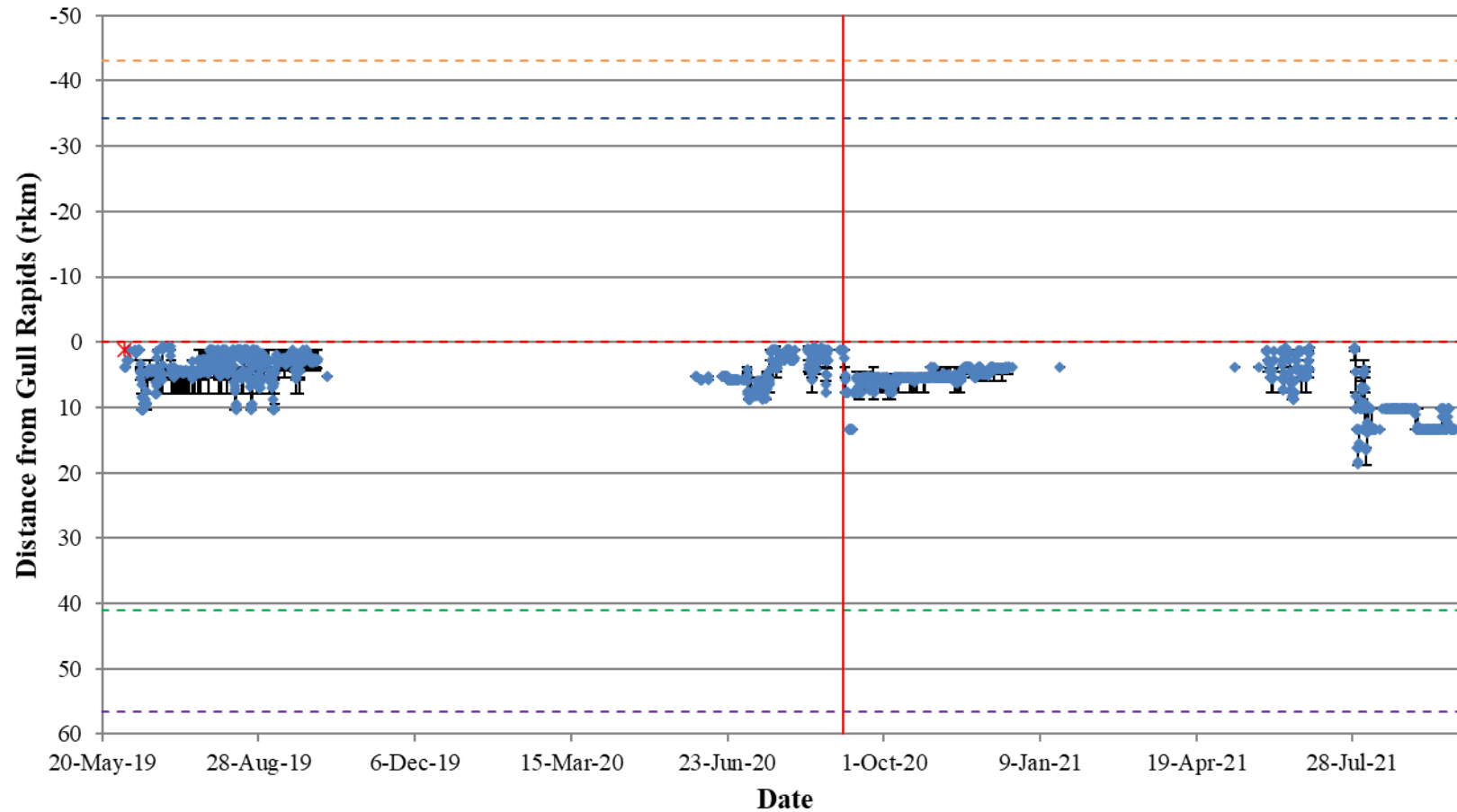


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APPENDIX 6:

DETECTION RANGES FOR LAKE STURGEON TAGGED AND MONITORED BETWEEN 2011 AND 2021 UPSTREAM OF THE KEEYASK GS

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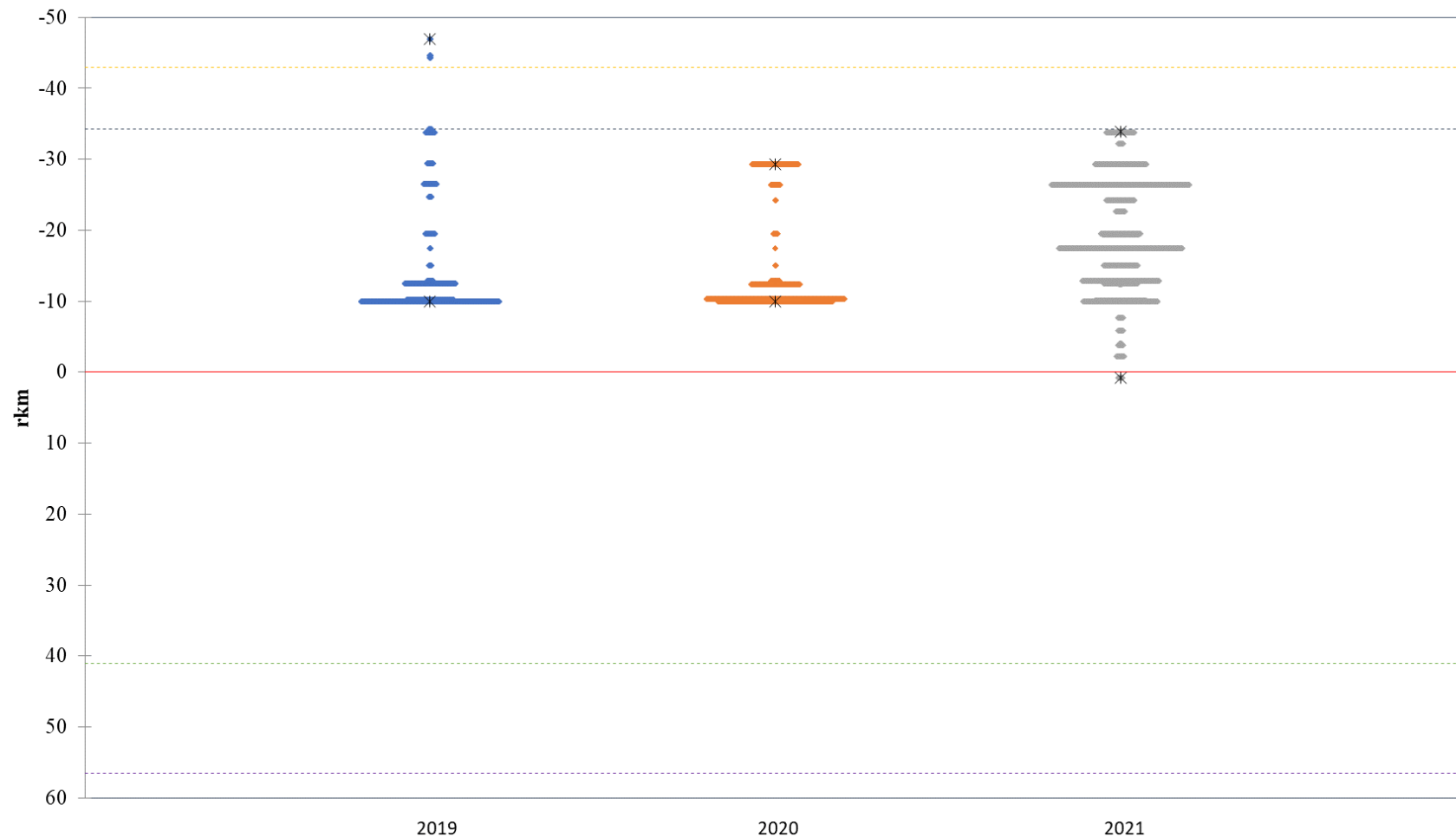


Figure A6-1: Detection ranges and distribution and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7017) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

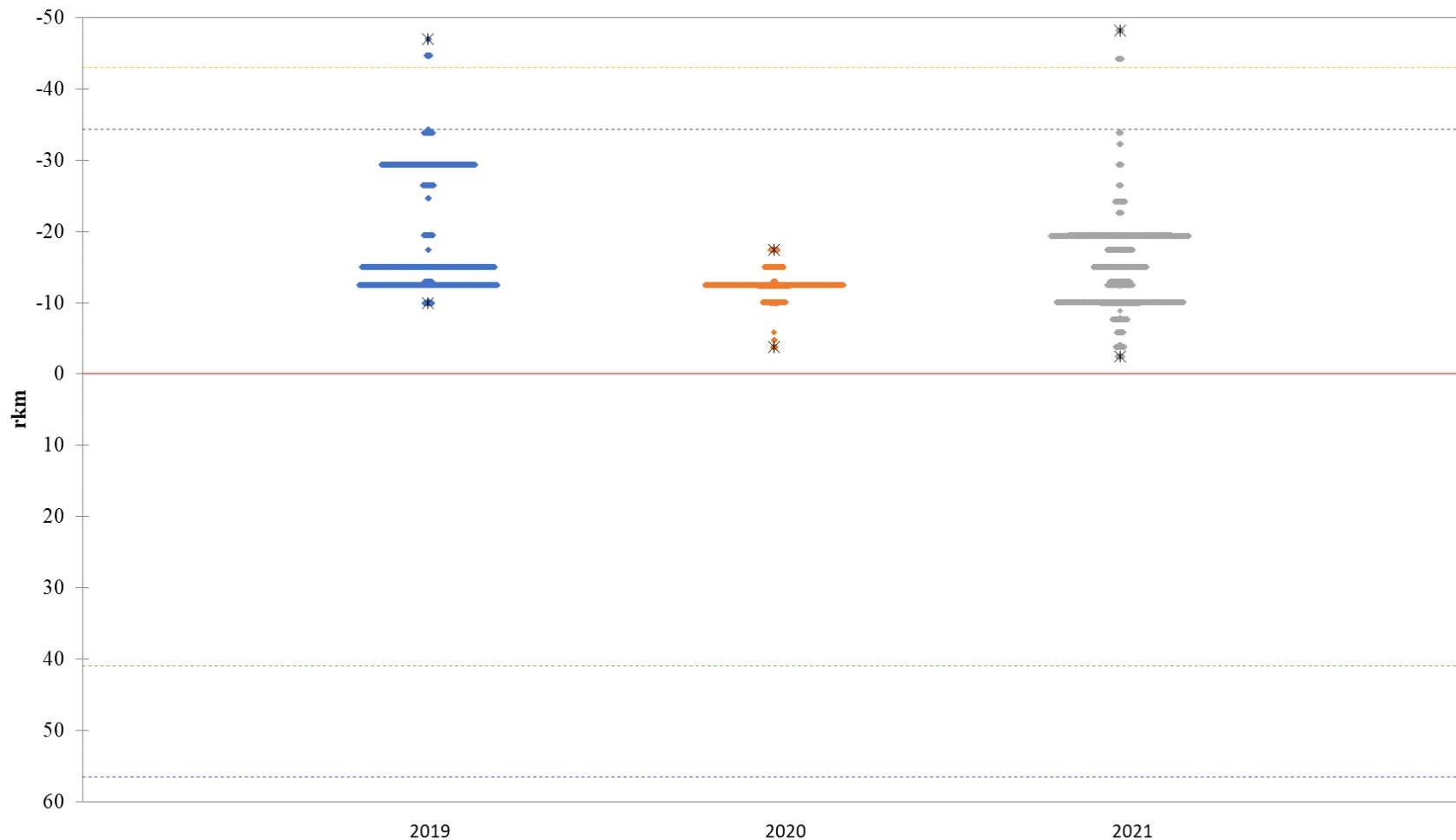


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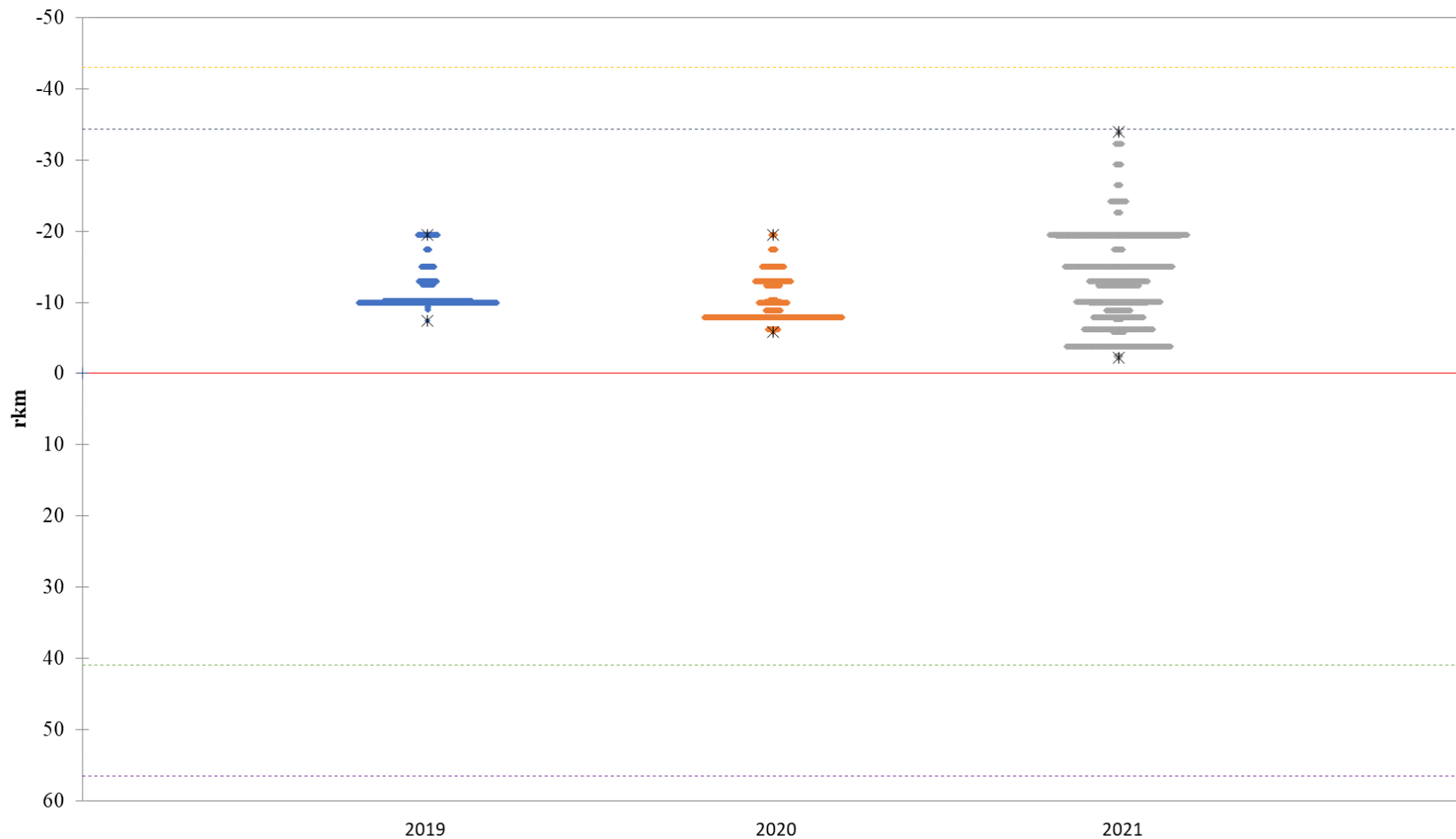


Figure A6-3: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7019) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

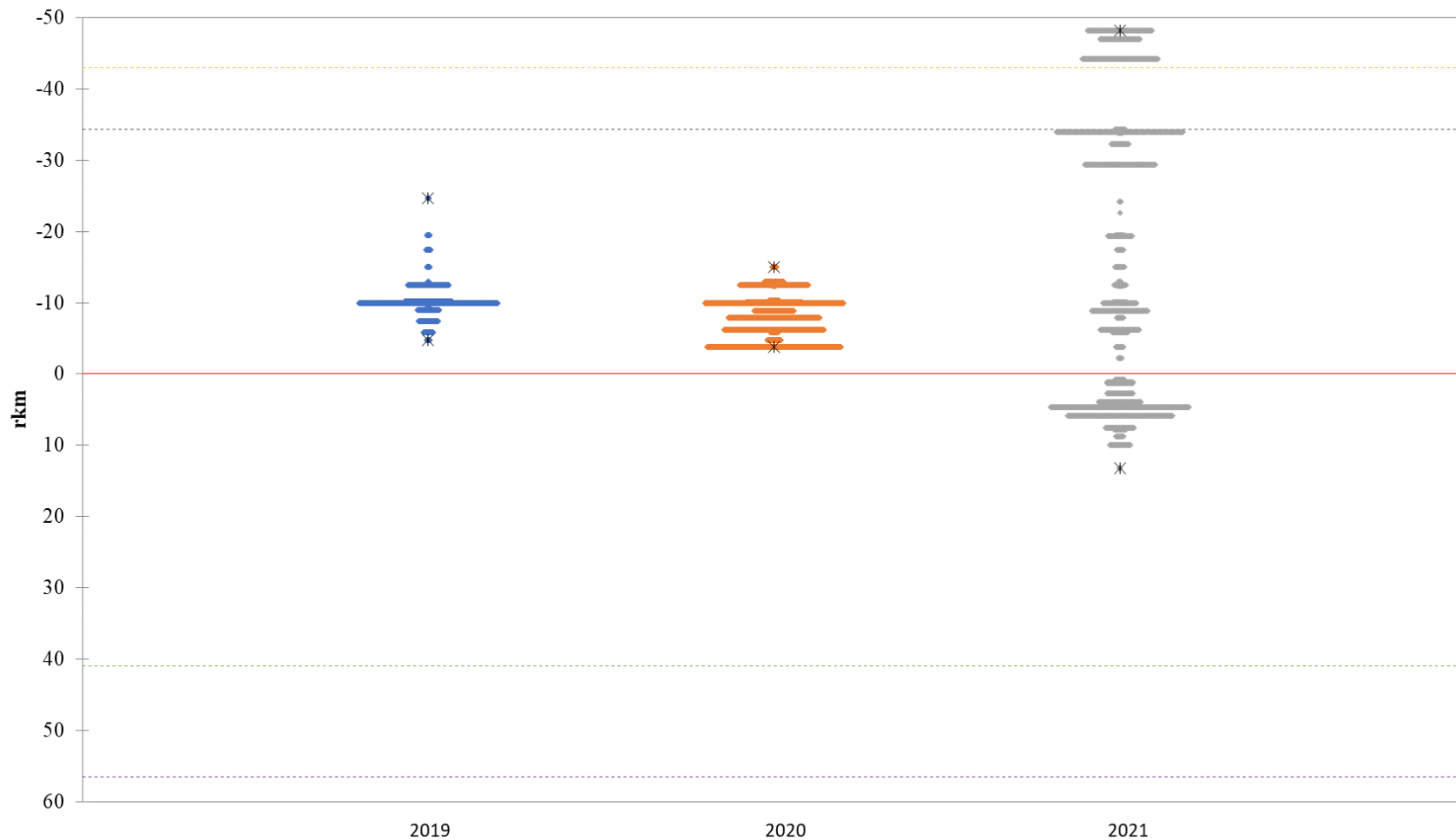


Figure A6-4: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7020) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

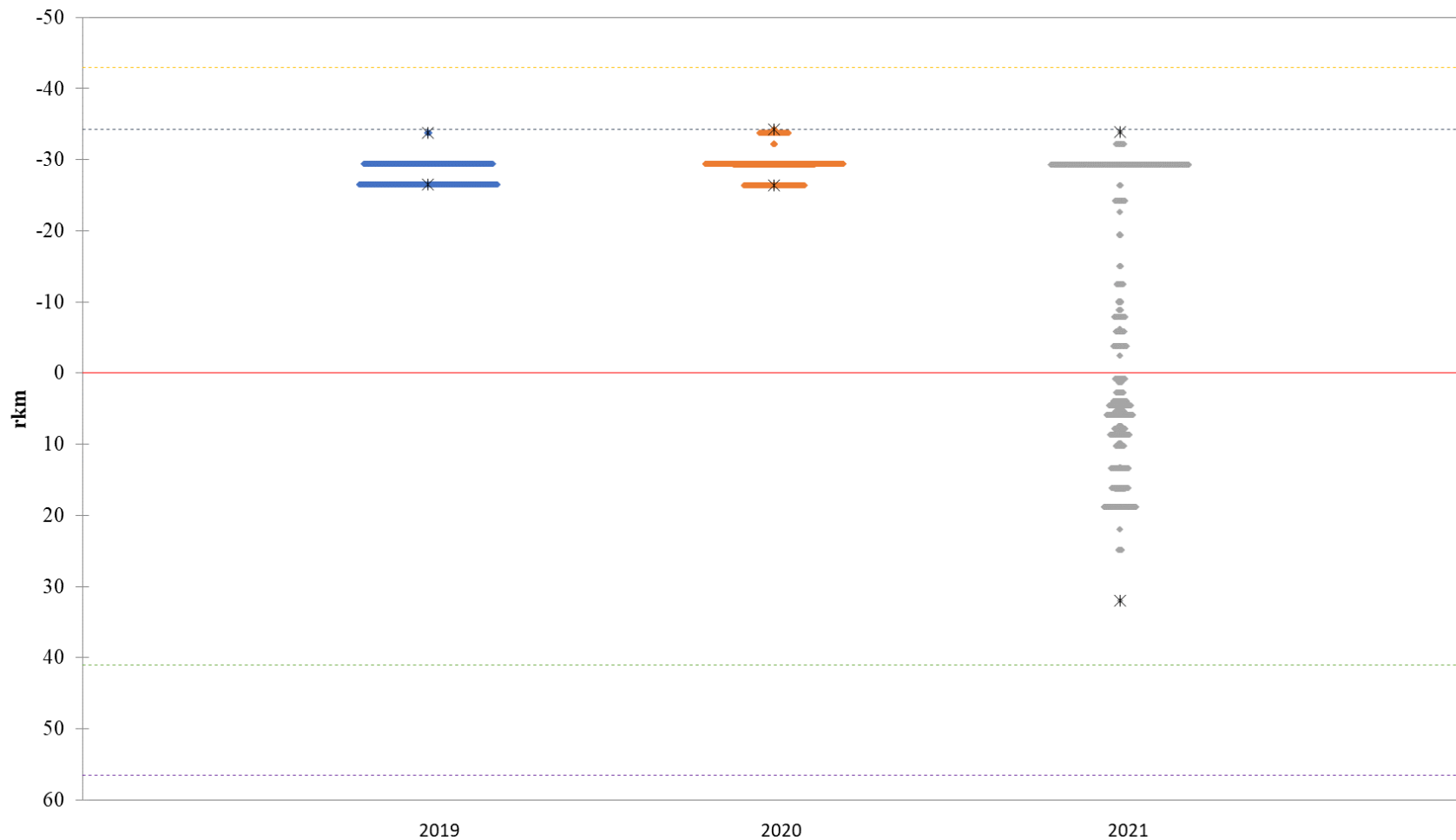


Figure A6-5: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7021) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

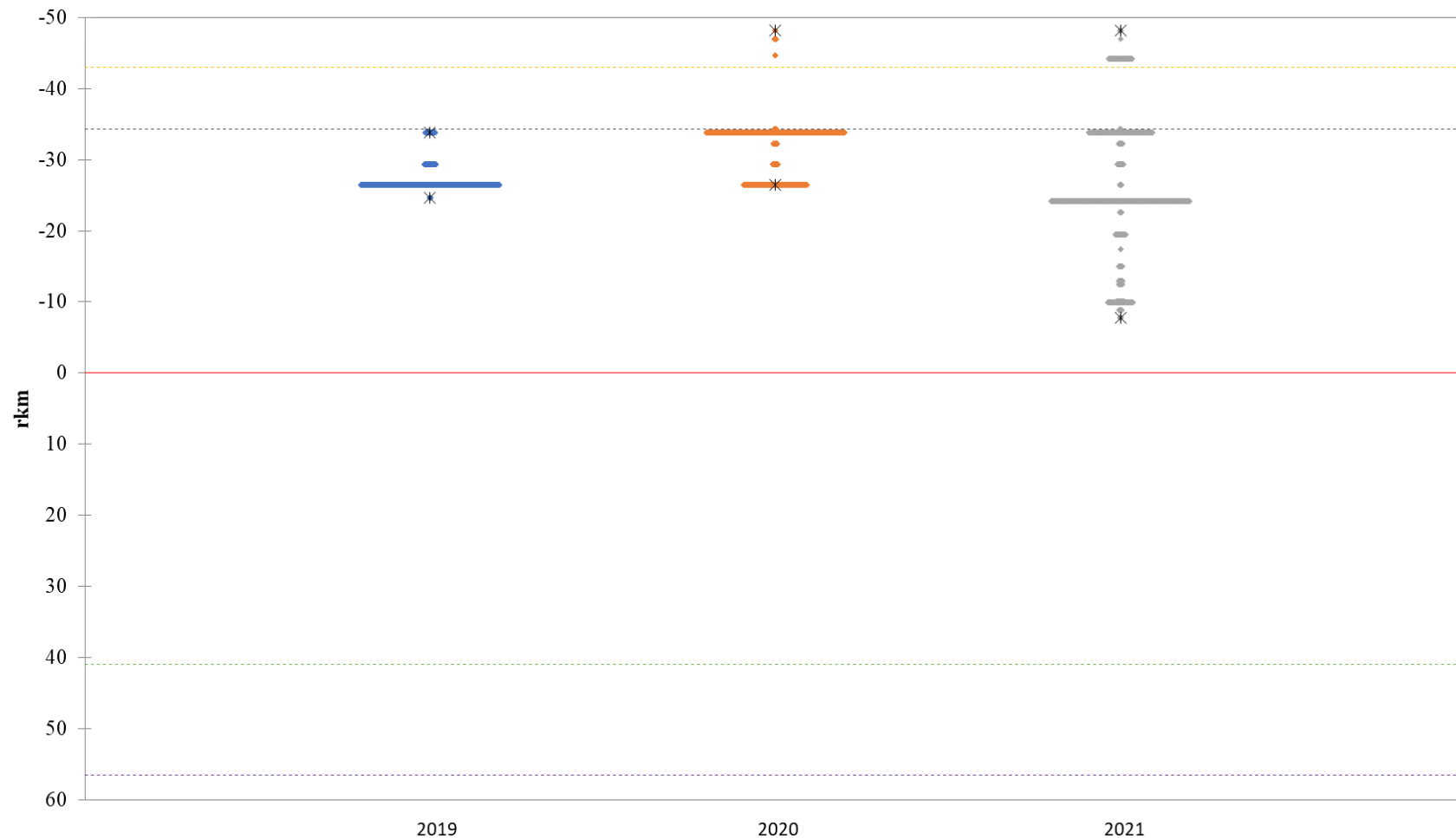


Figure A6-6: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7022) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

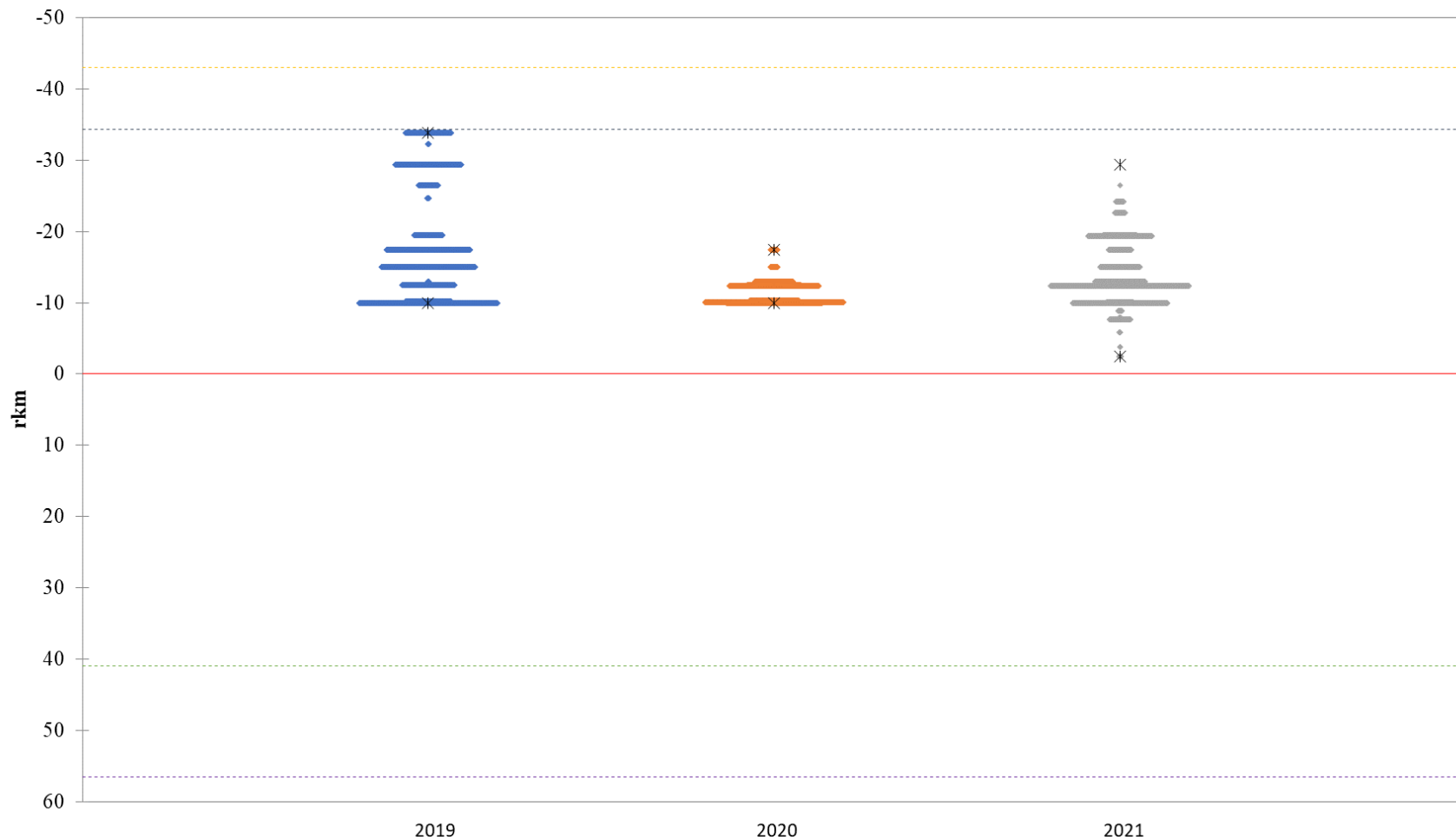


Figure A6-7: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7023) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

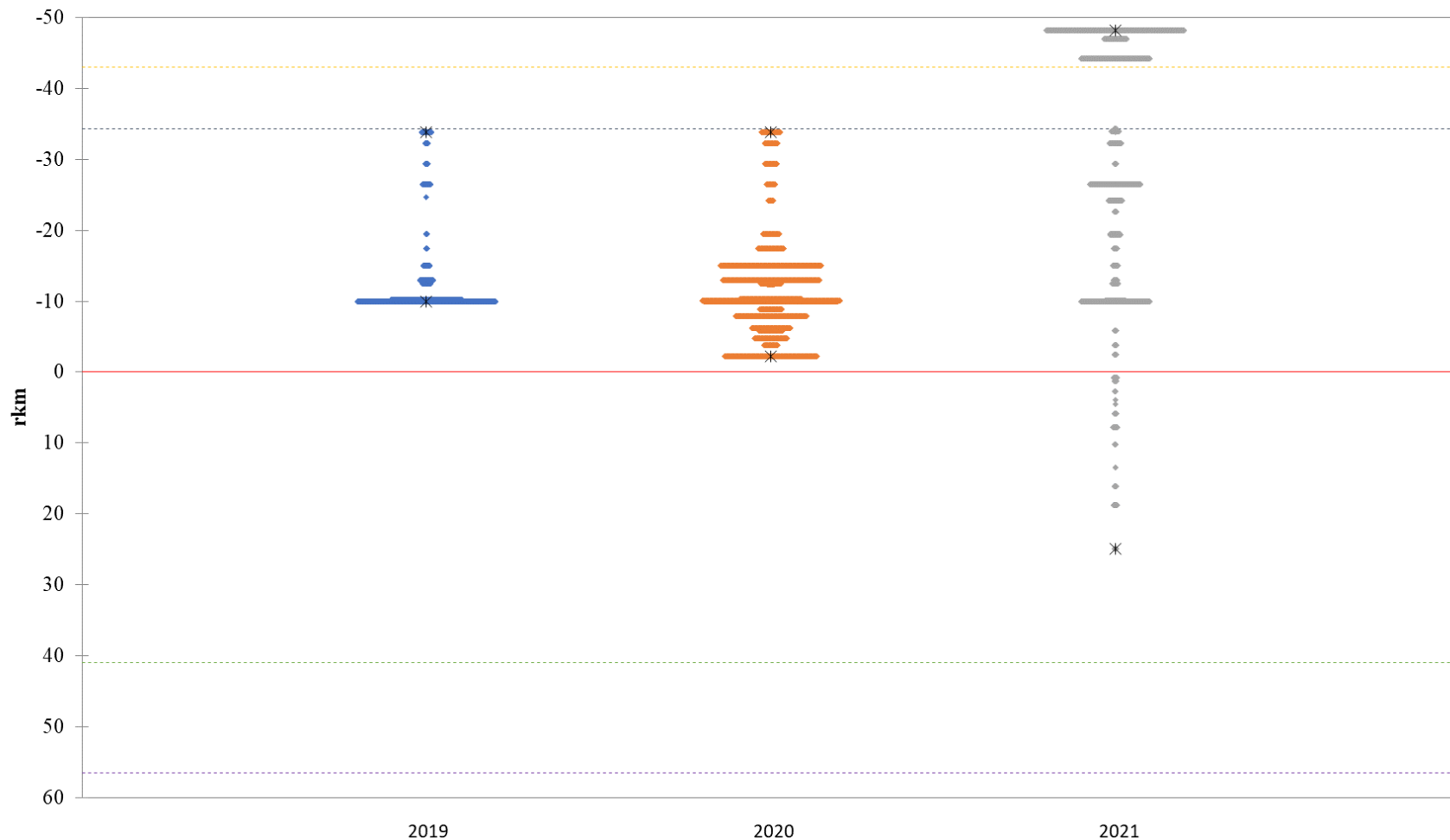


Figure A6-8: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7024) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

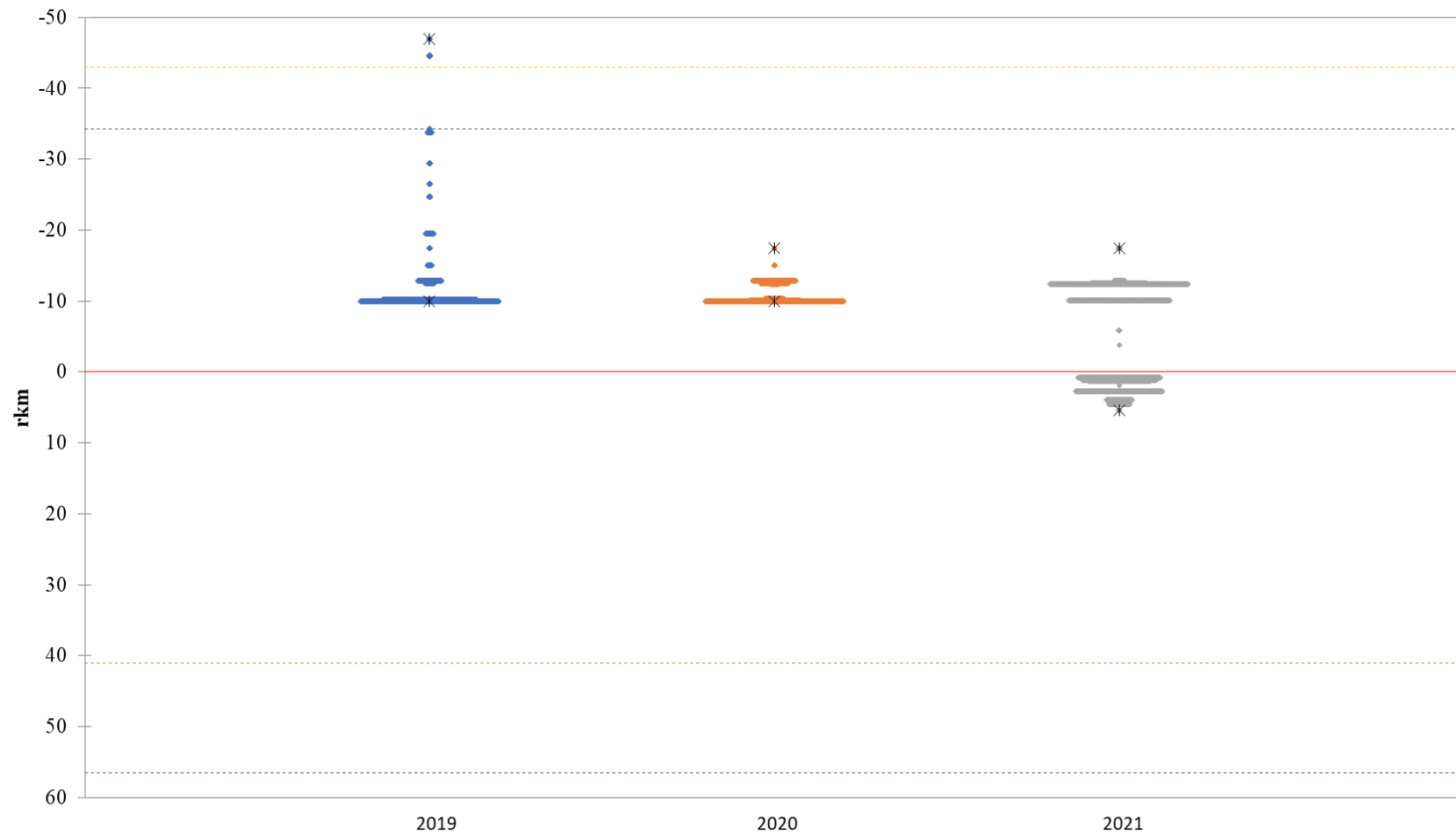


Figure A6-9: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7025) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

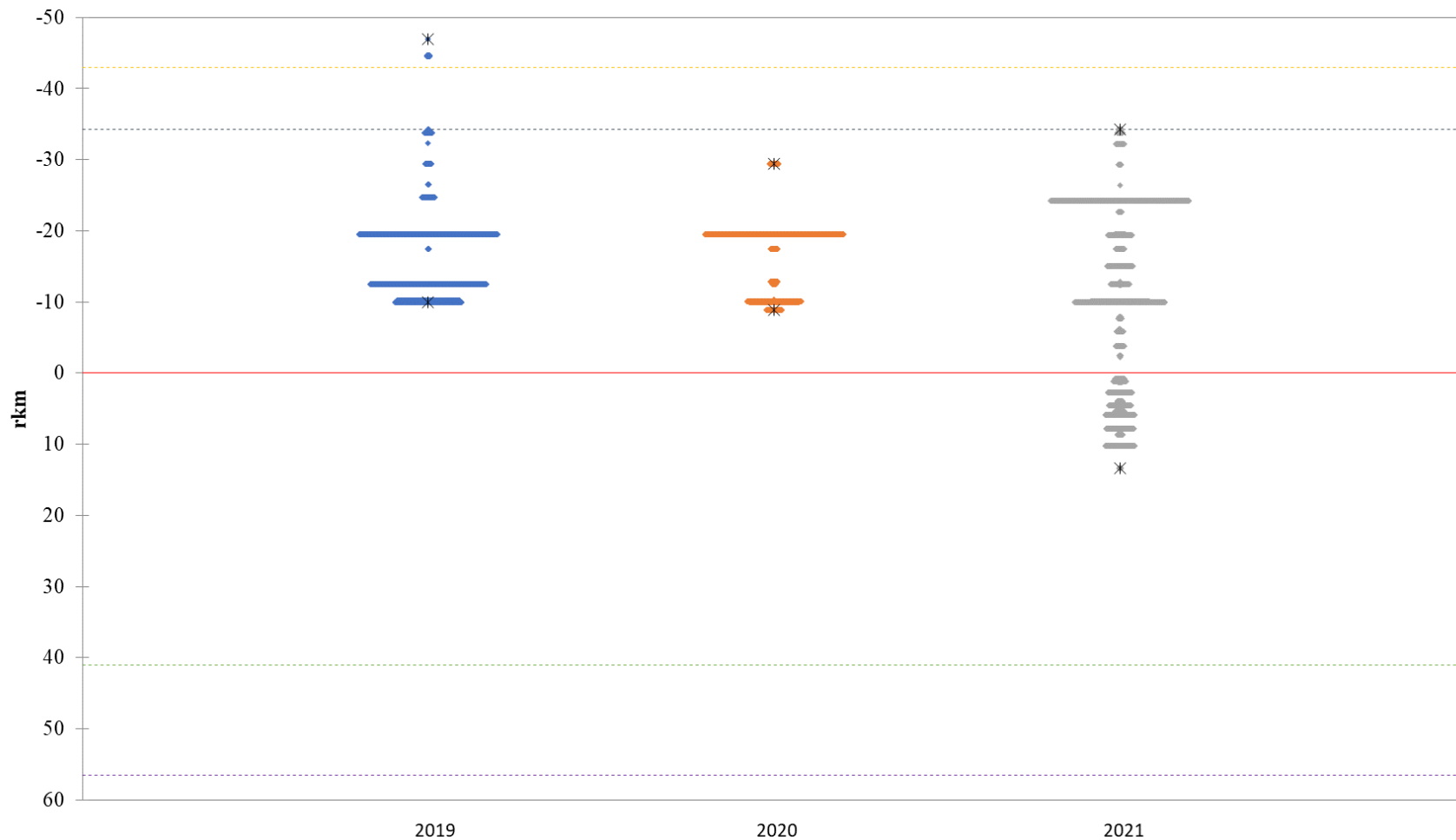


Figure A6-10: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7026) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

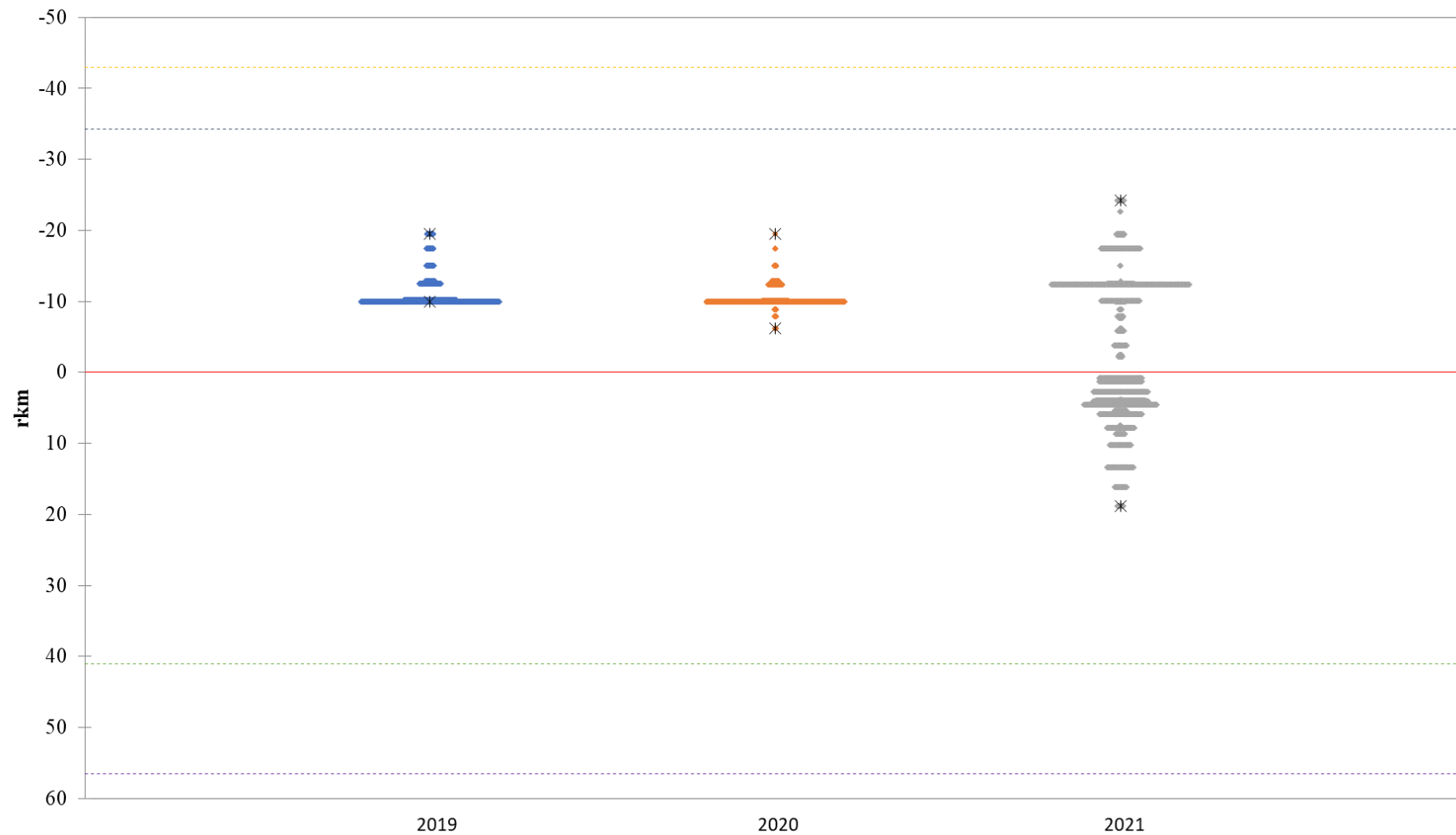


Figure A6-11: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7027) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

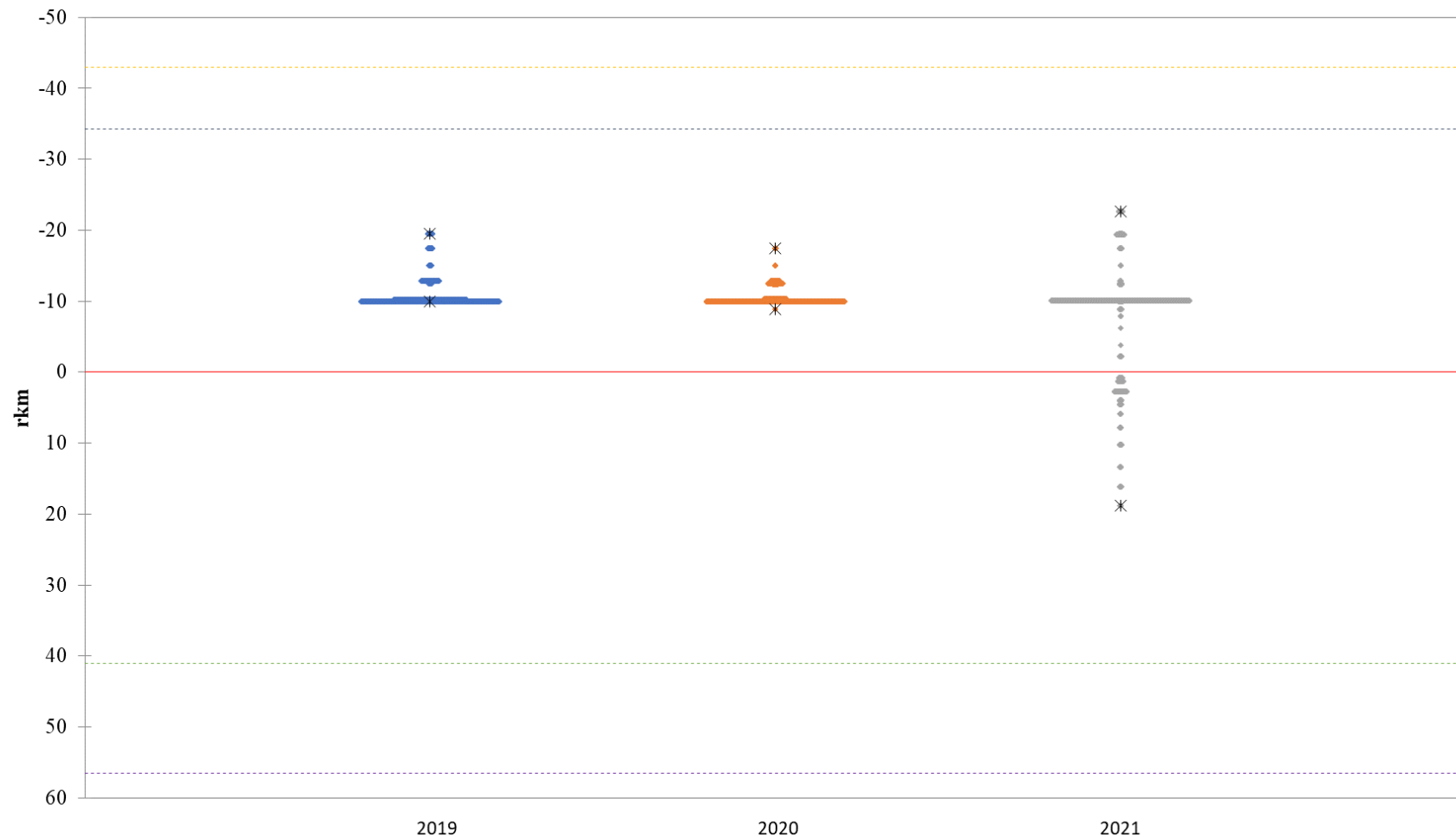


Figure A6-12: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7028) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

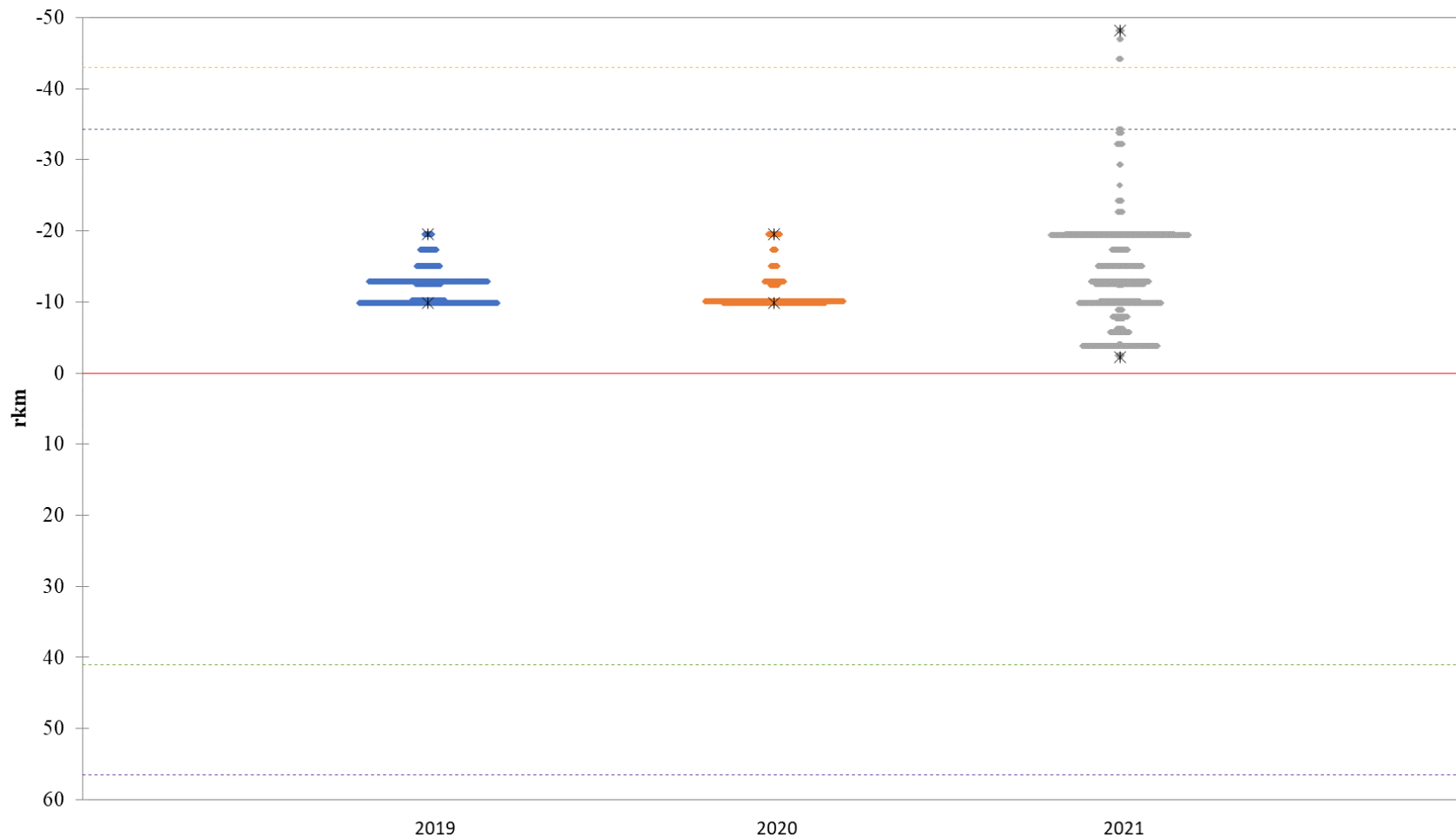


Figure A6-13: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7029) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

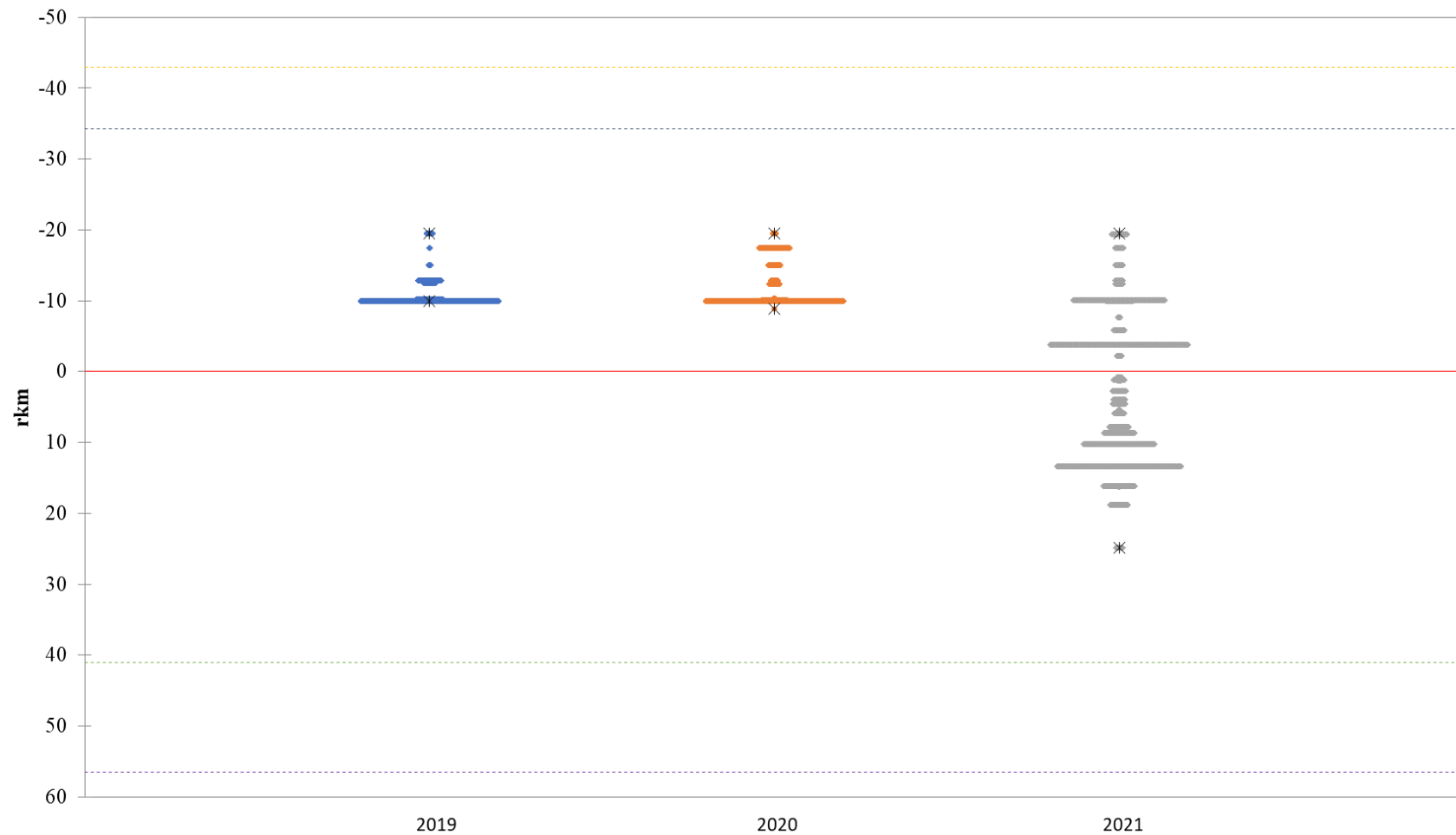


Figure A6-14: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7030) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

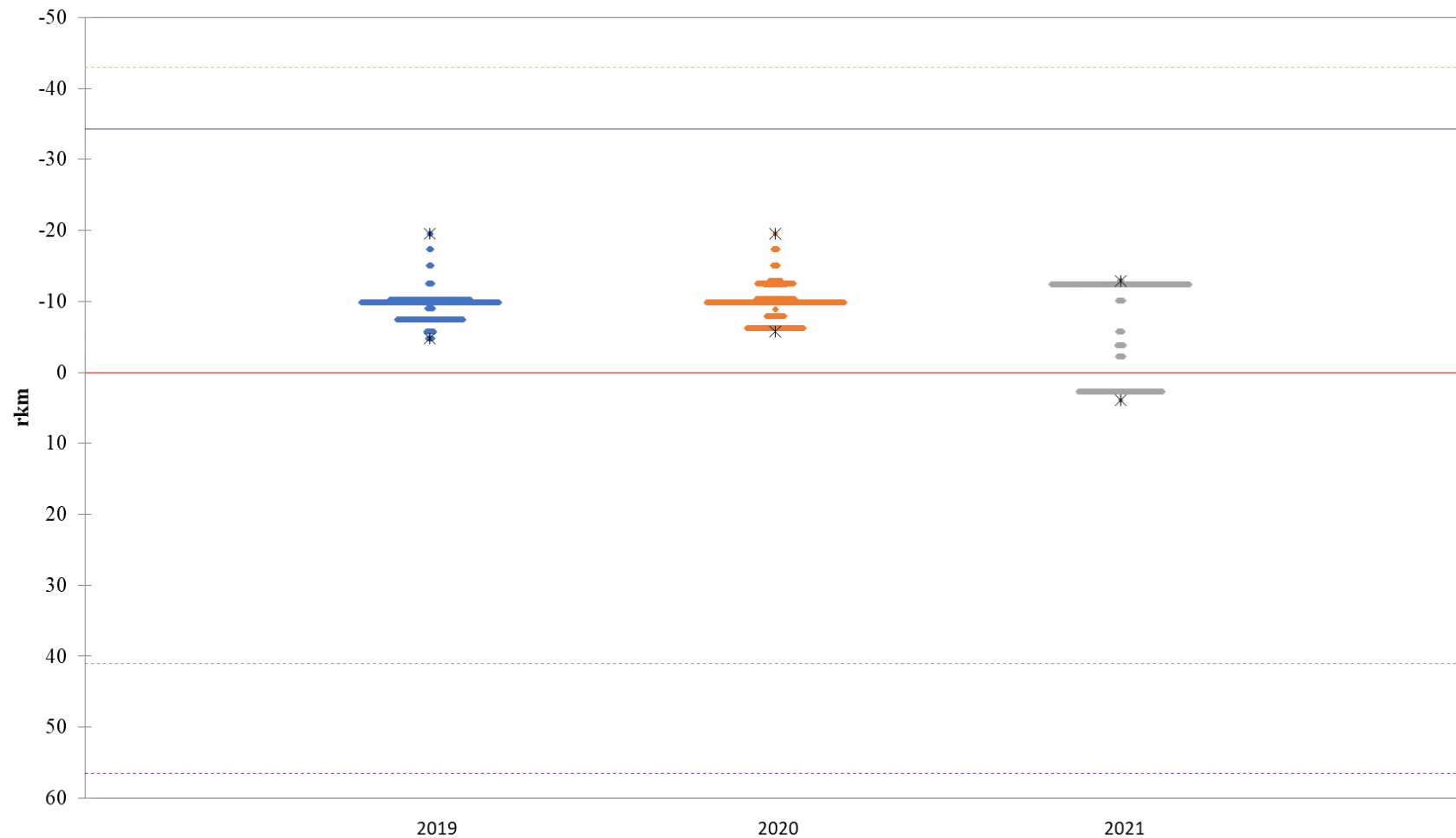


Figure A6-15: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7031) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

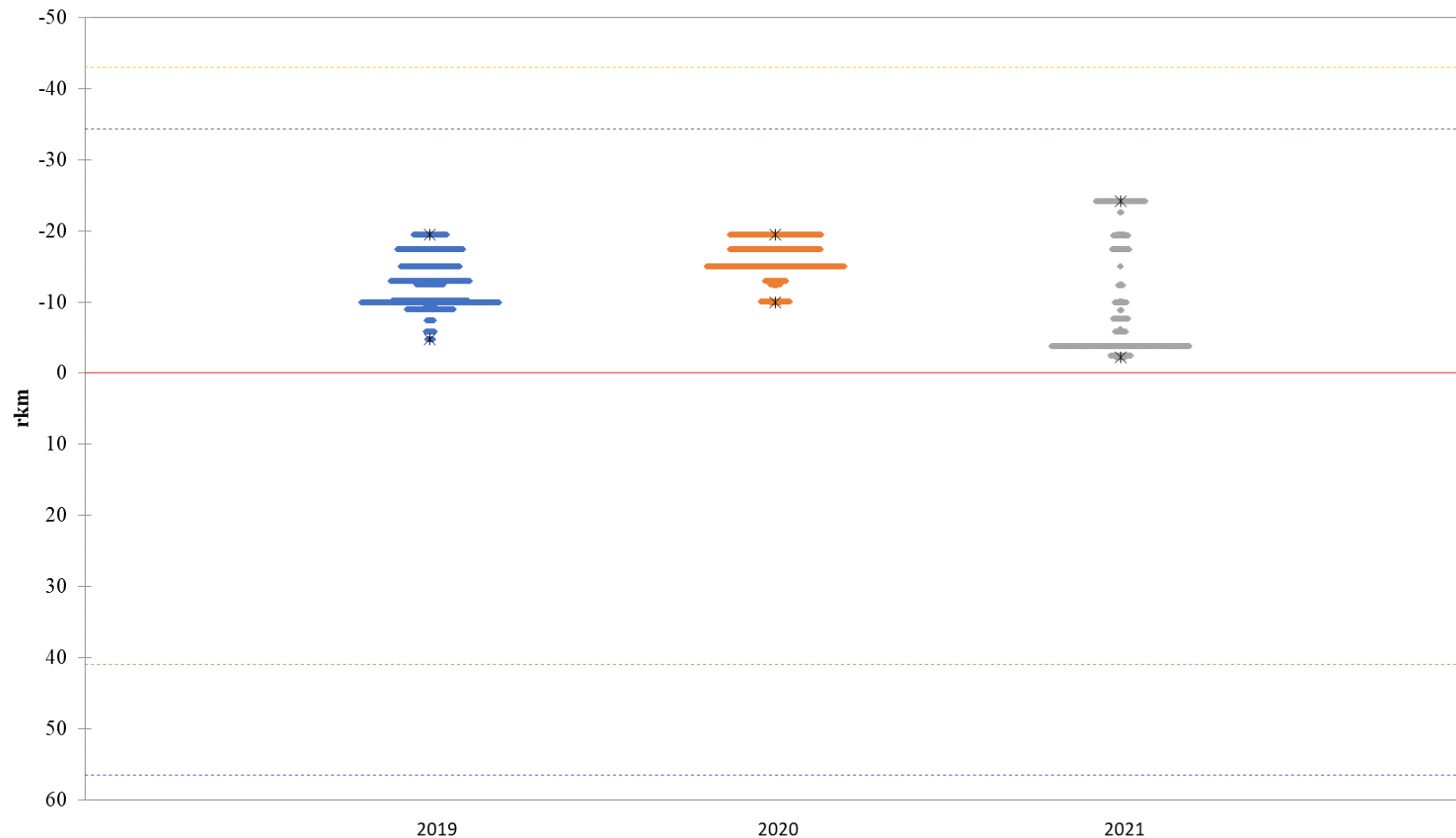


Figure A6-16: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7032) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

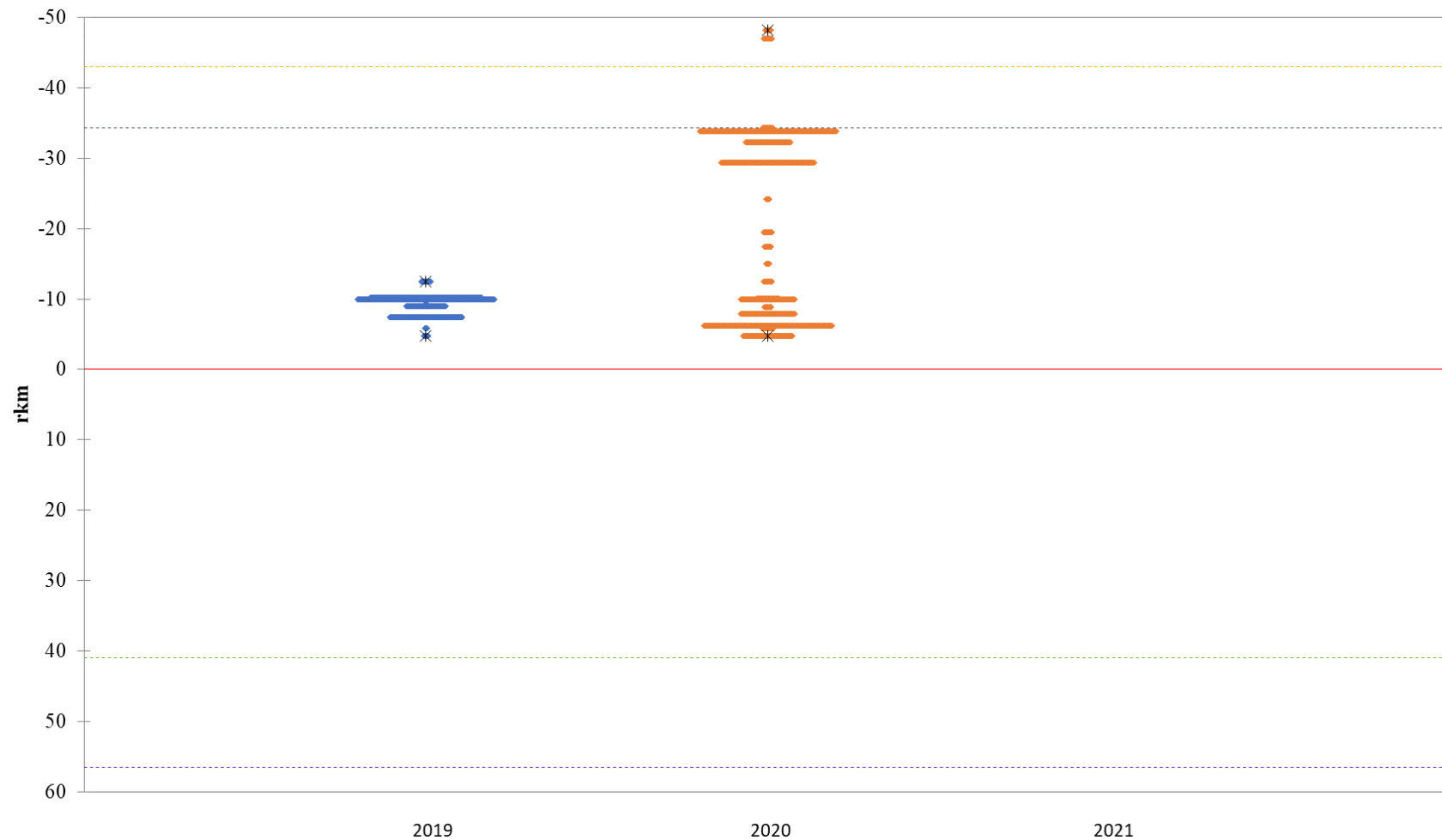


Figure A6-17: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7033) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

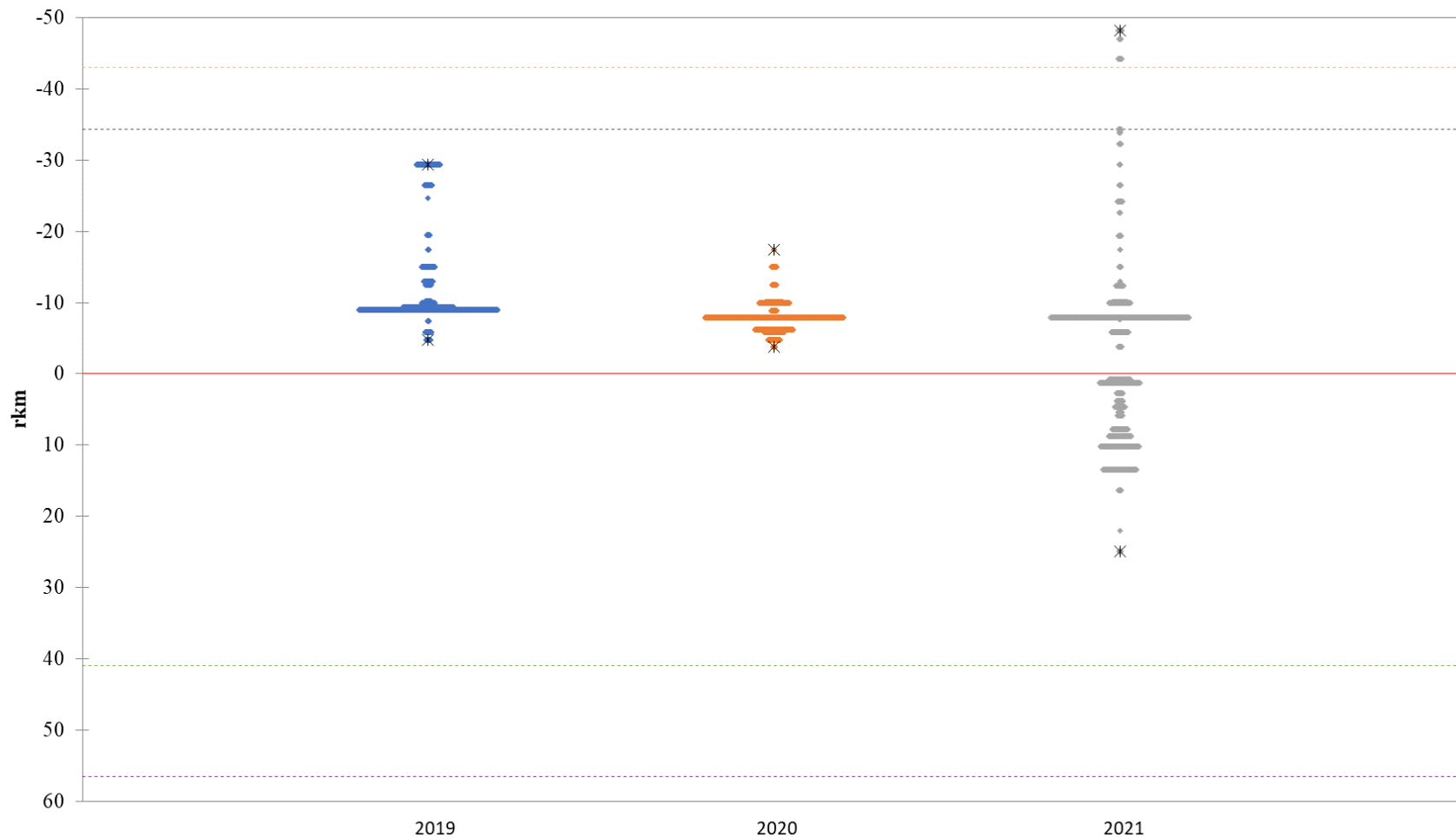


Figure A6-18: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7034) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

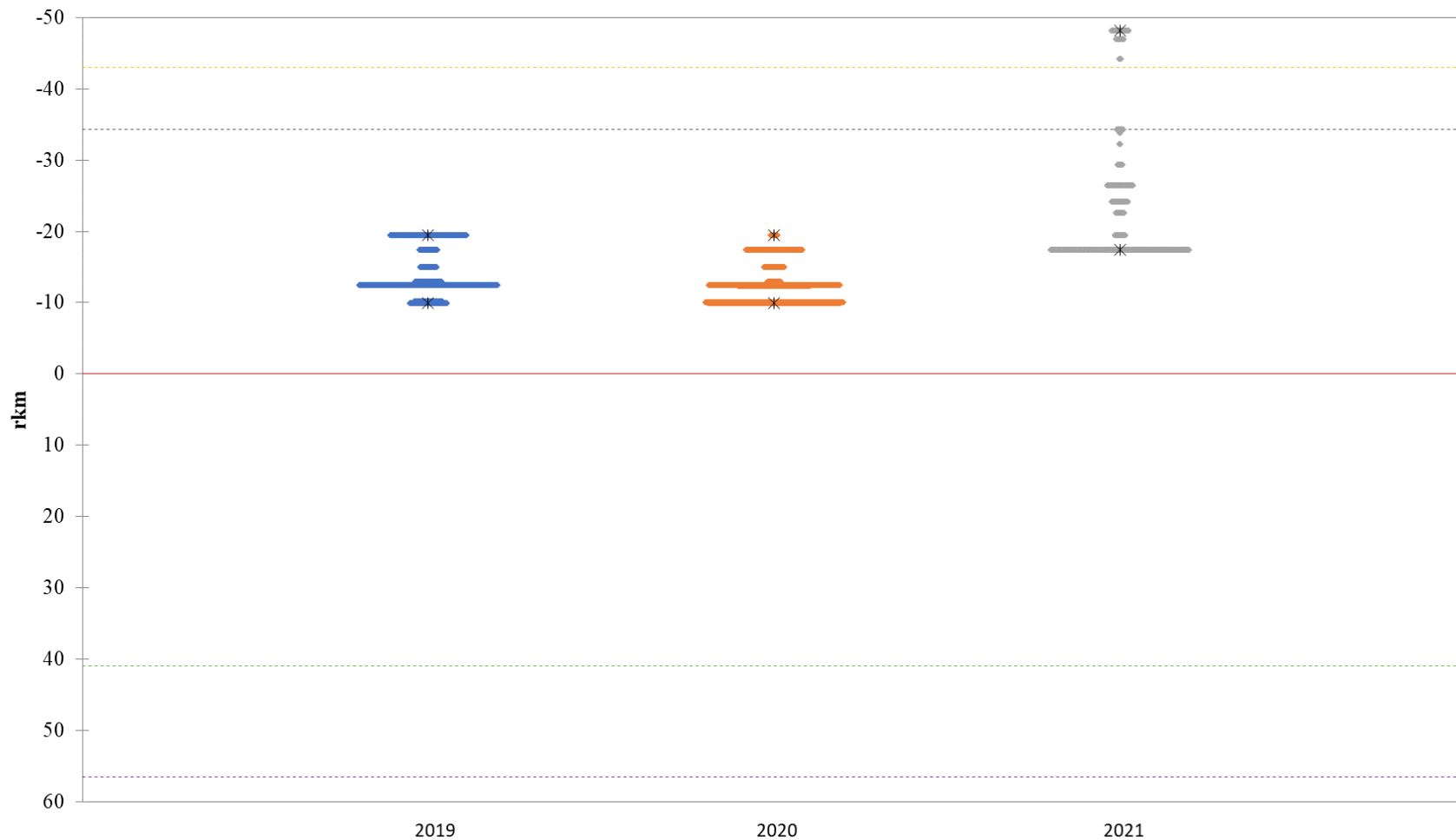


Figure A6-19: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7053) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

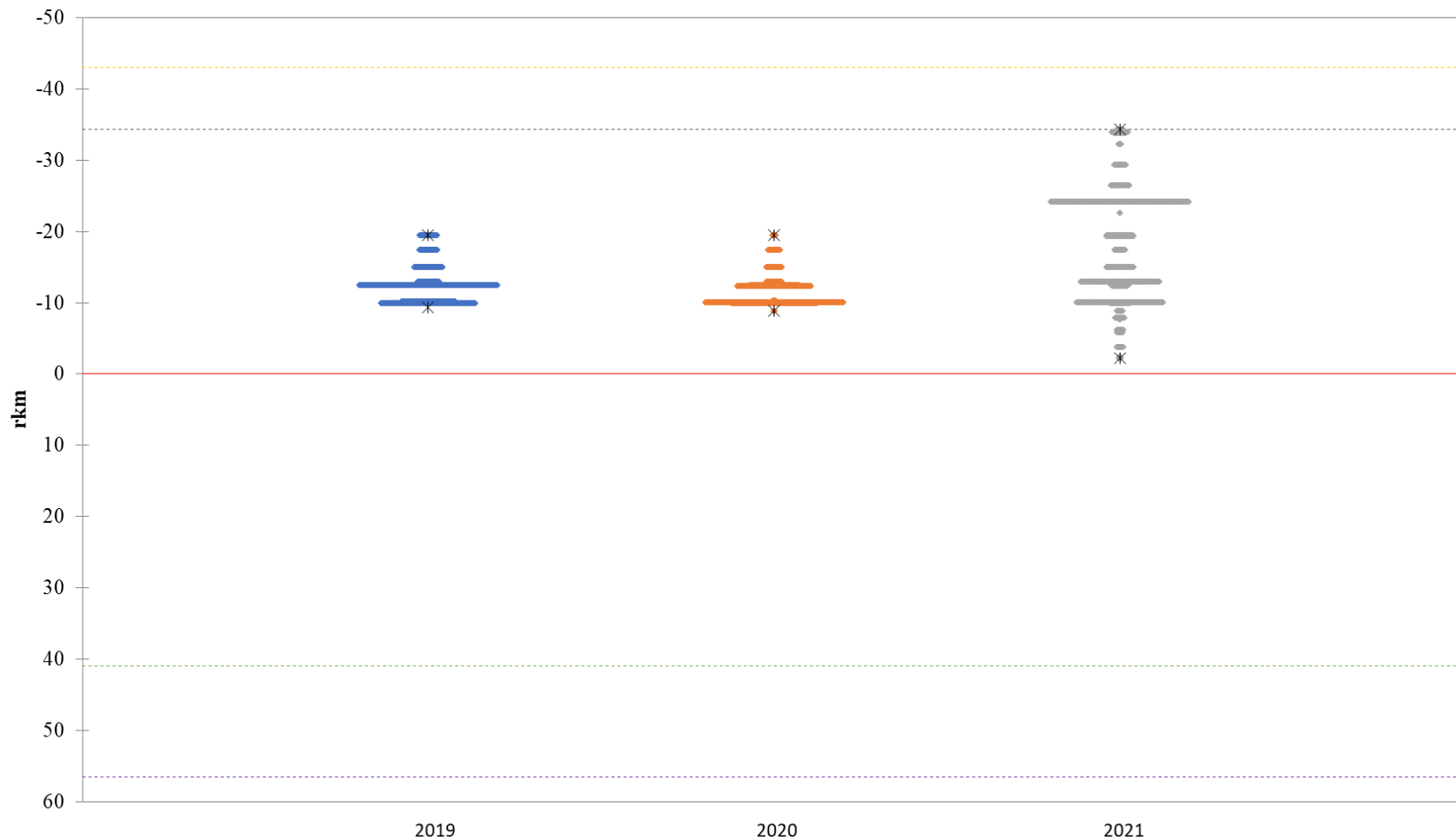


Figure A6-20: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7056) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

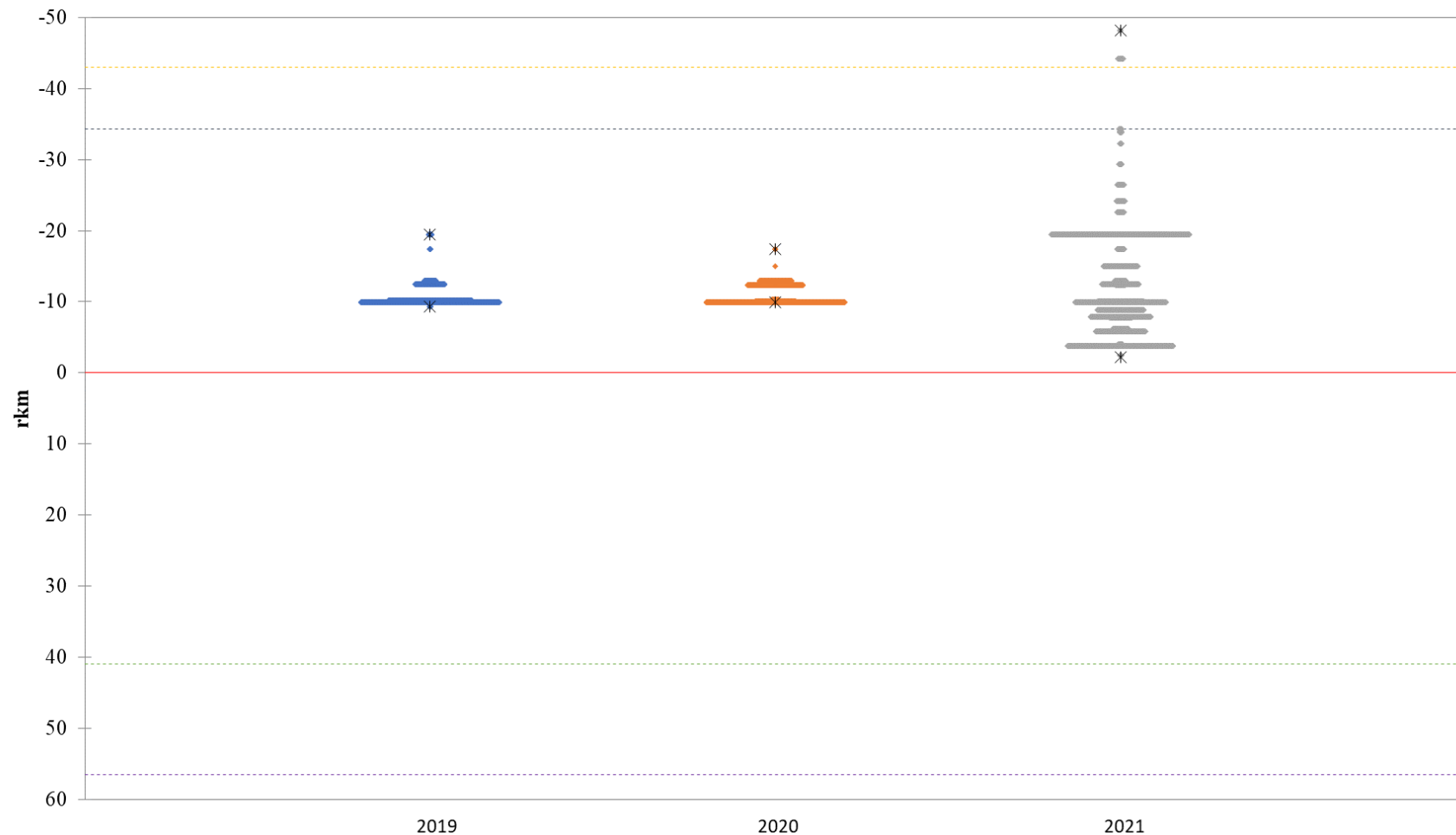


Figure A6-21: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7059) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

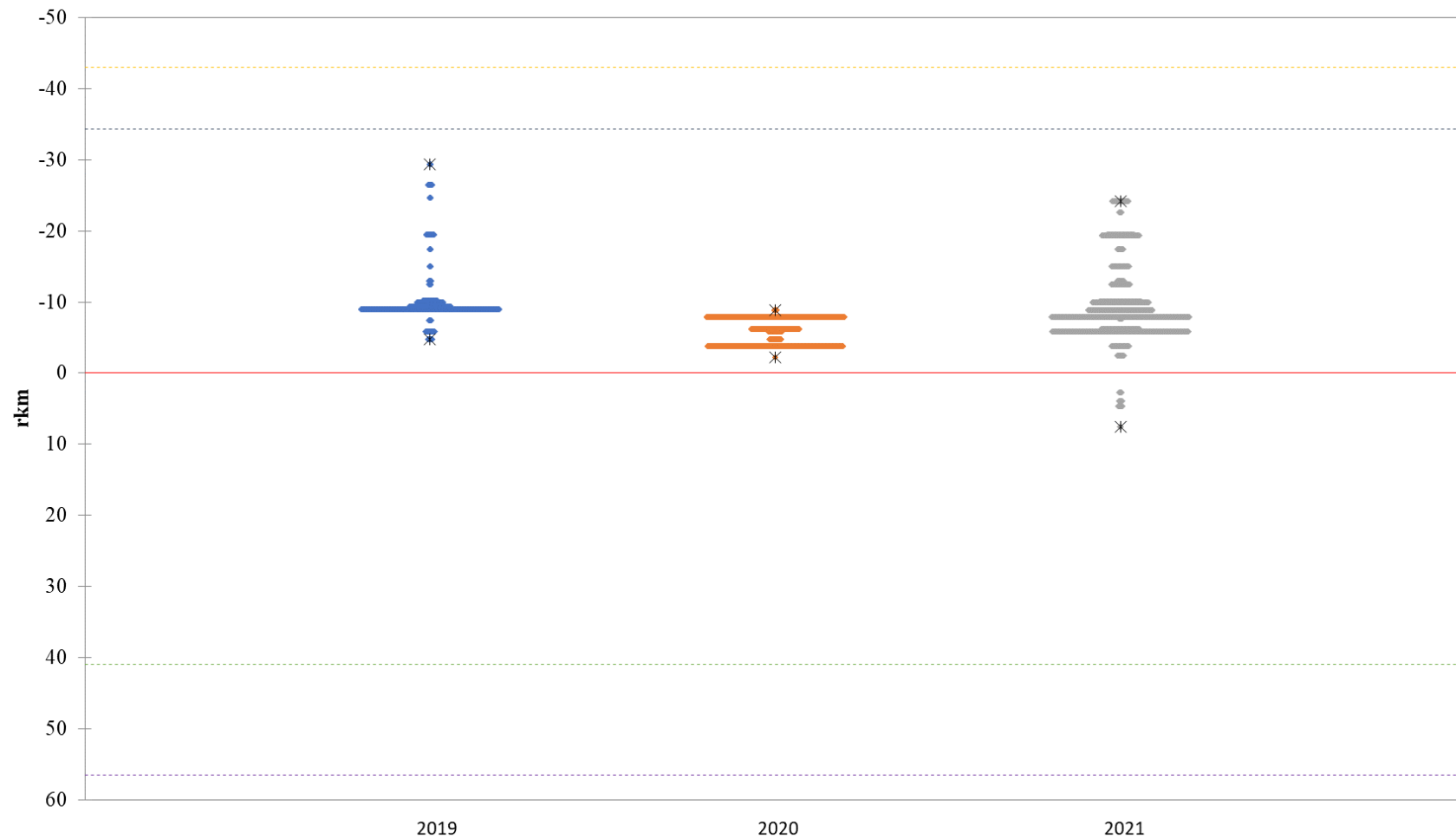


Figure A6-22: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7061) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

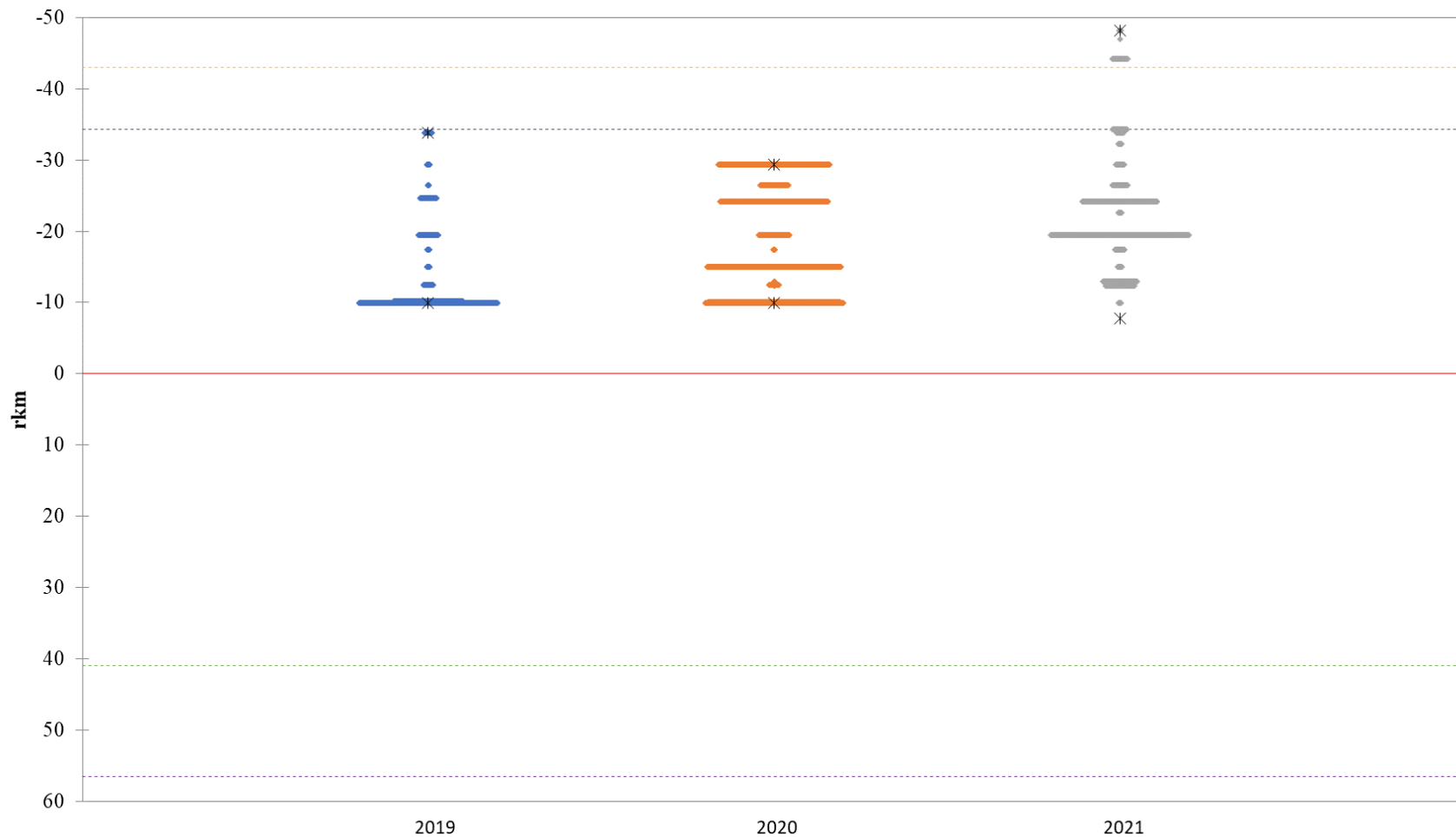


Figure A6-23: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7064) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

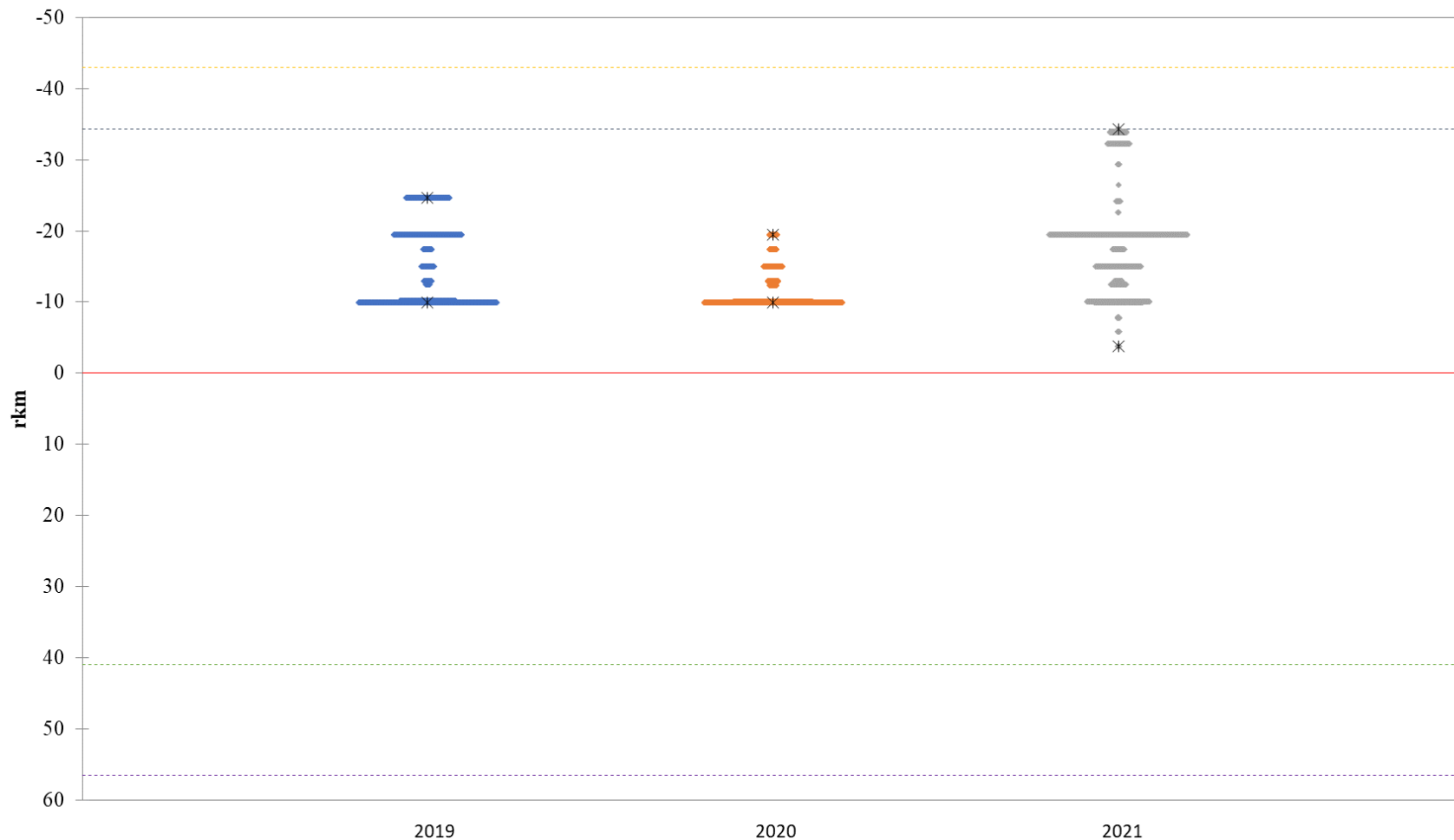


Figure A6-24: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7065) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

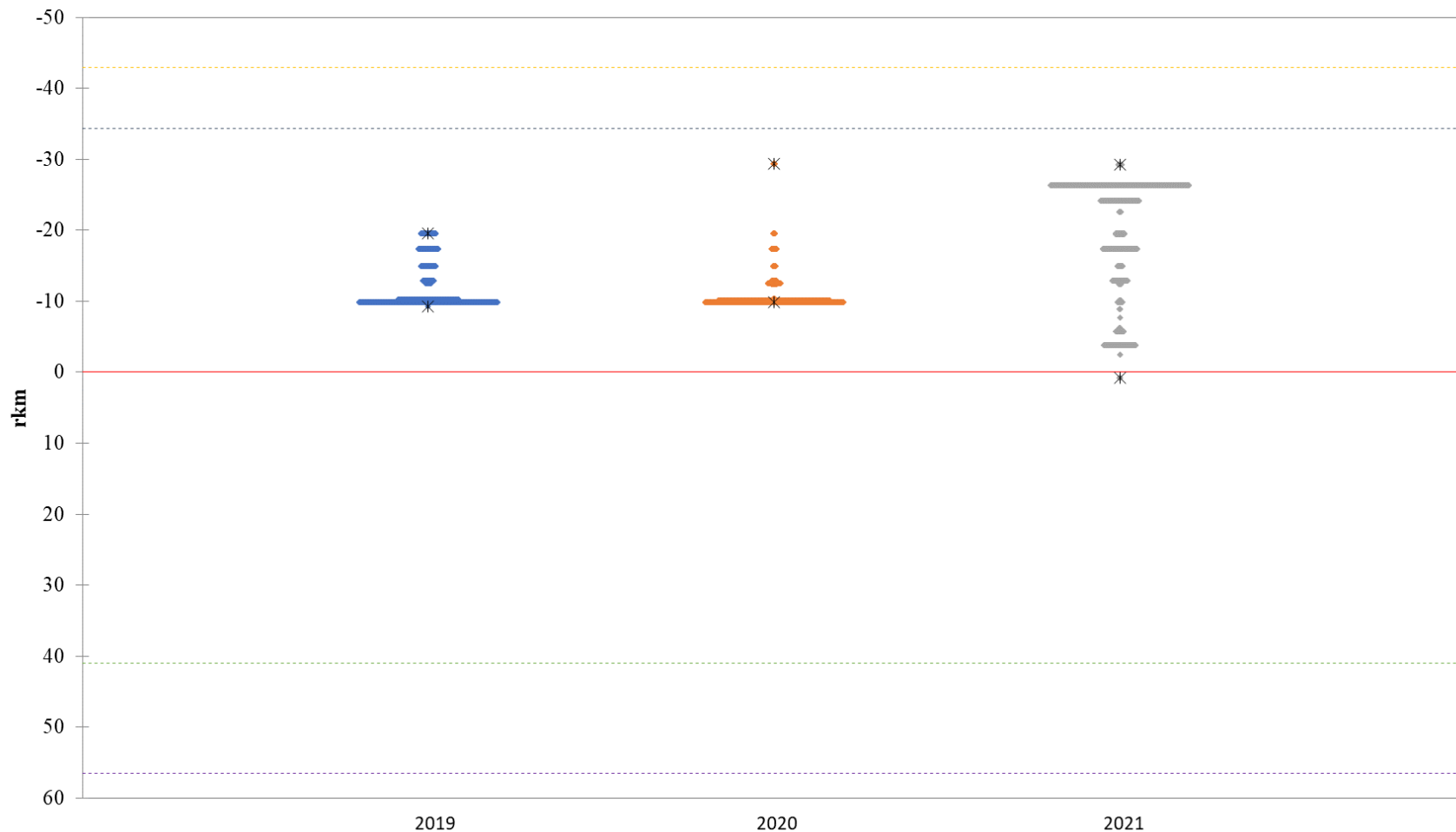


Figure A6-25: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7066) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

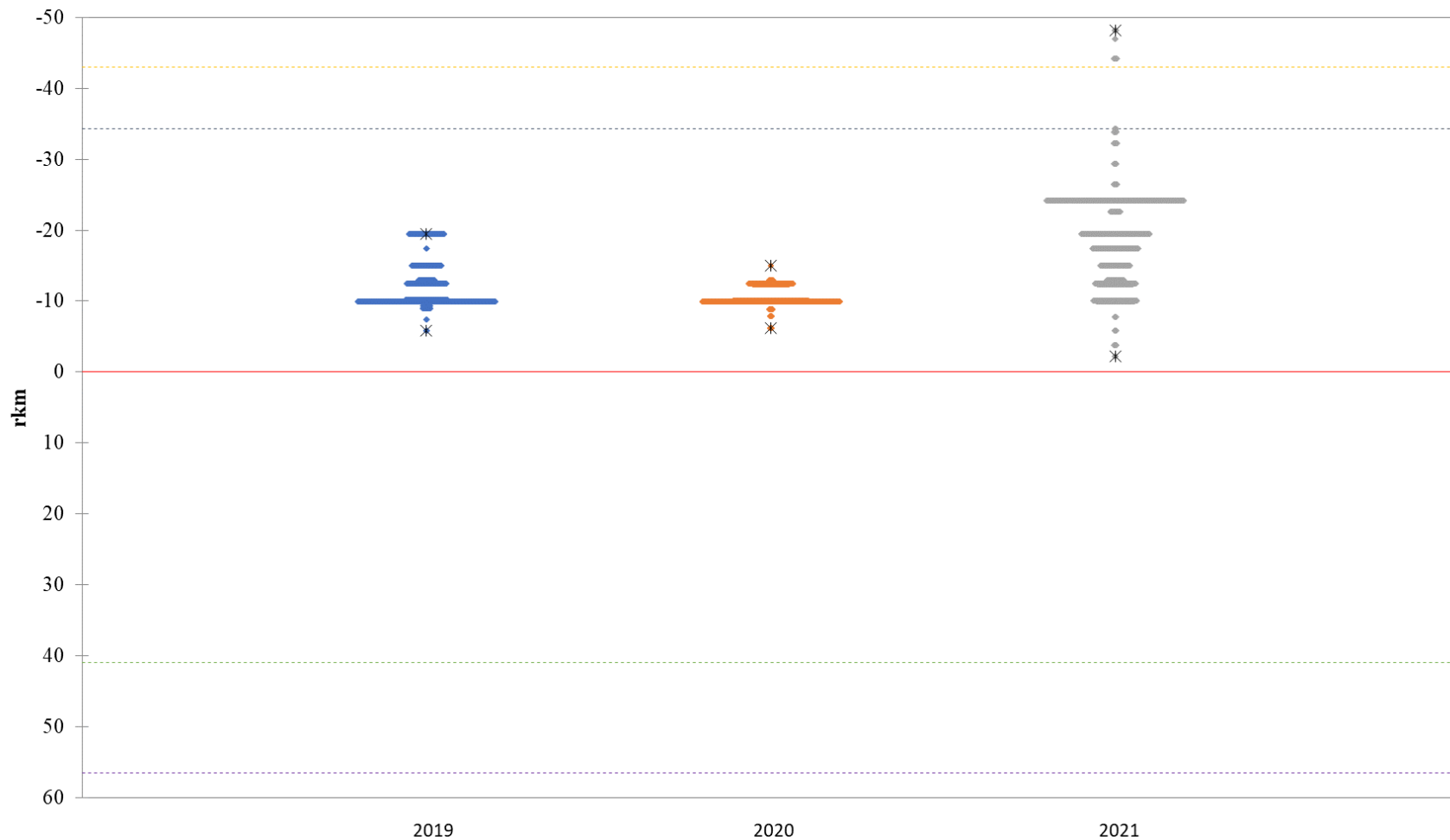


Figure A6-26: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7067) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

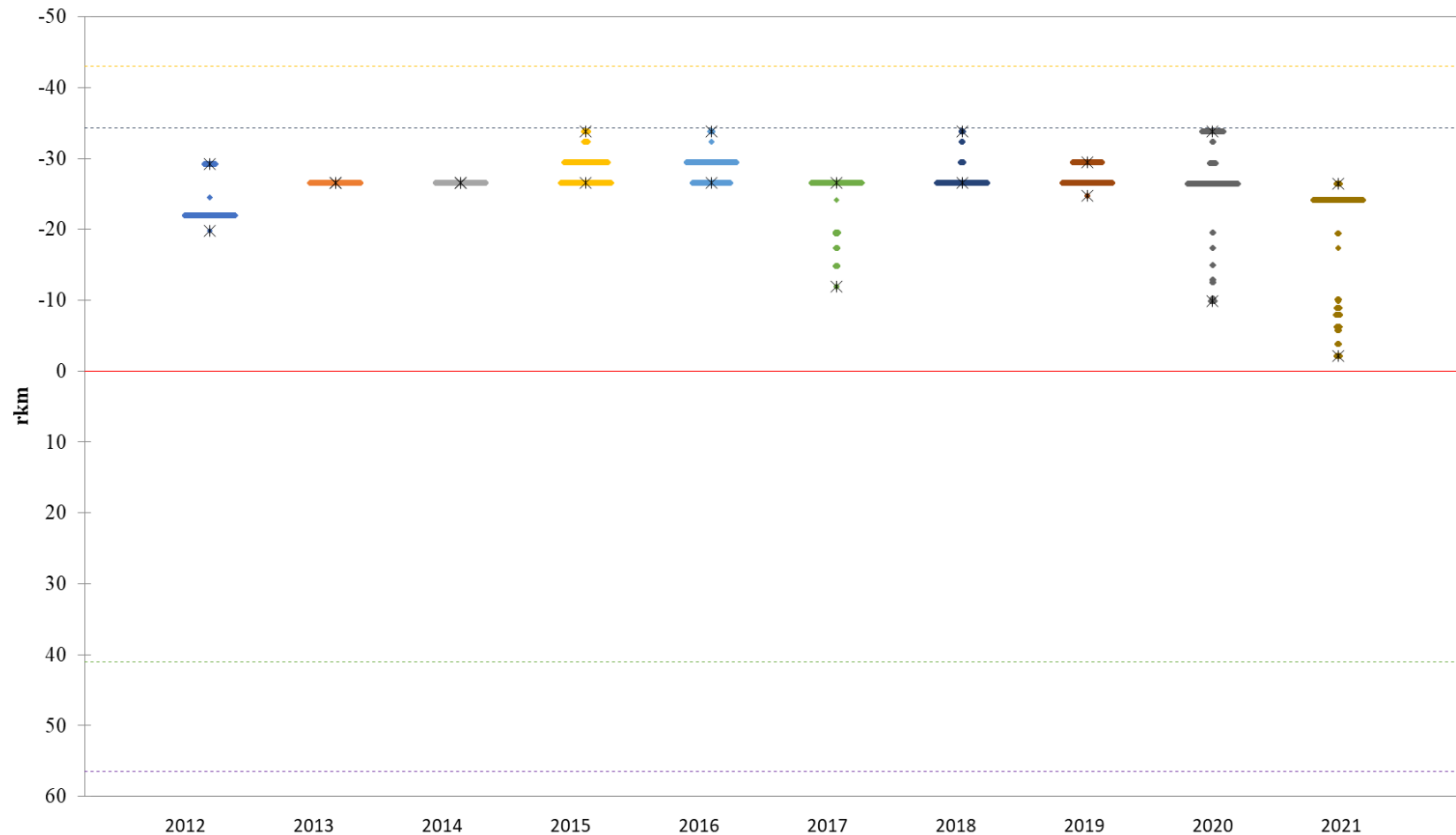


Figure A6-27: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16026) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2012 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

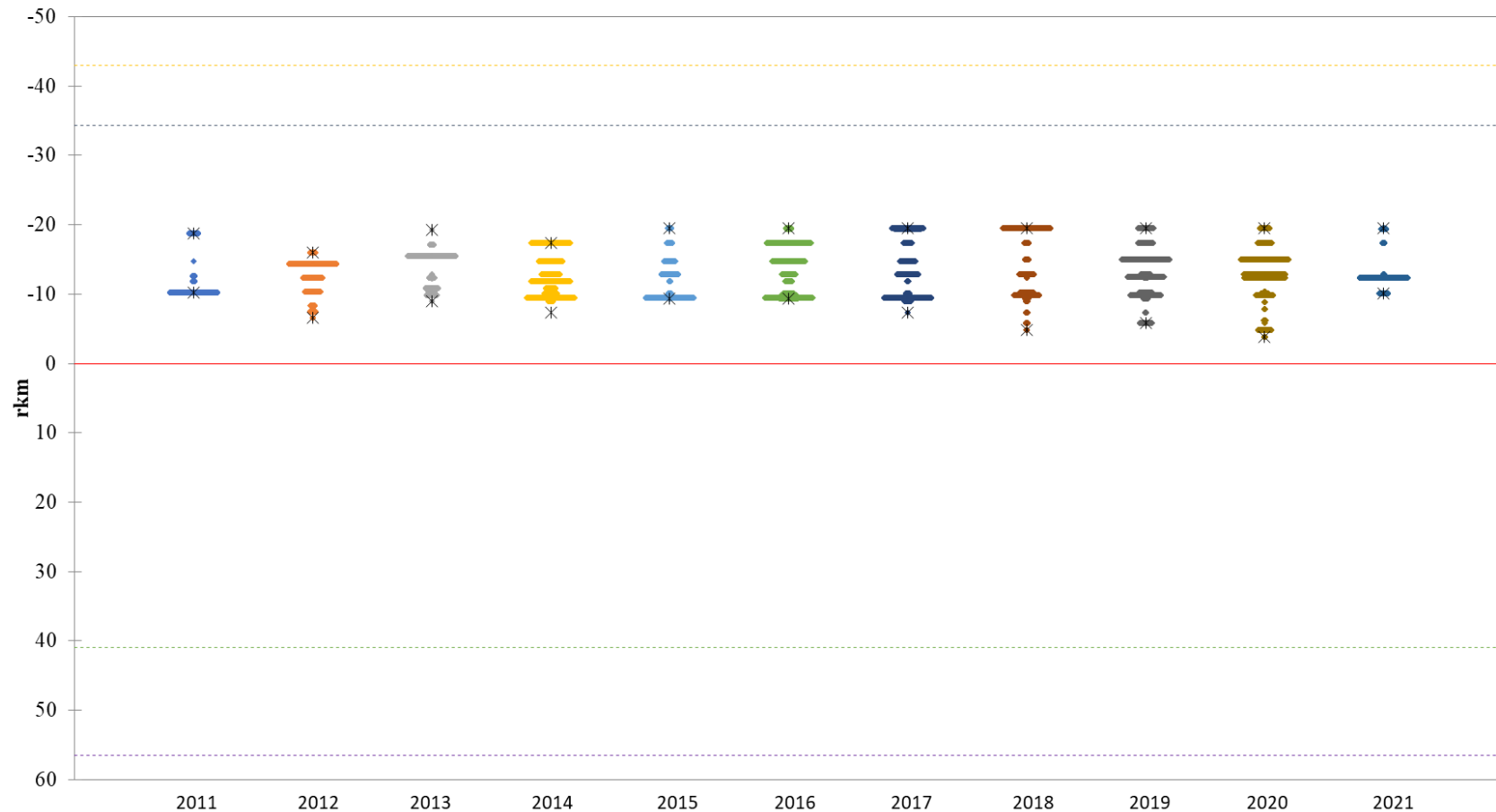


Figure A6-28: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16036) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

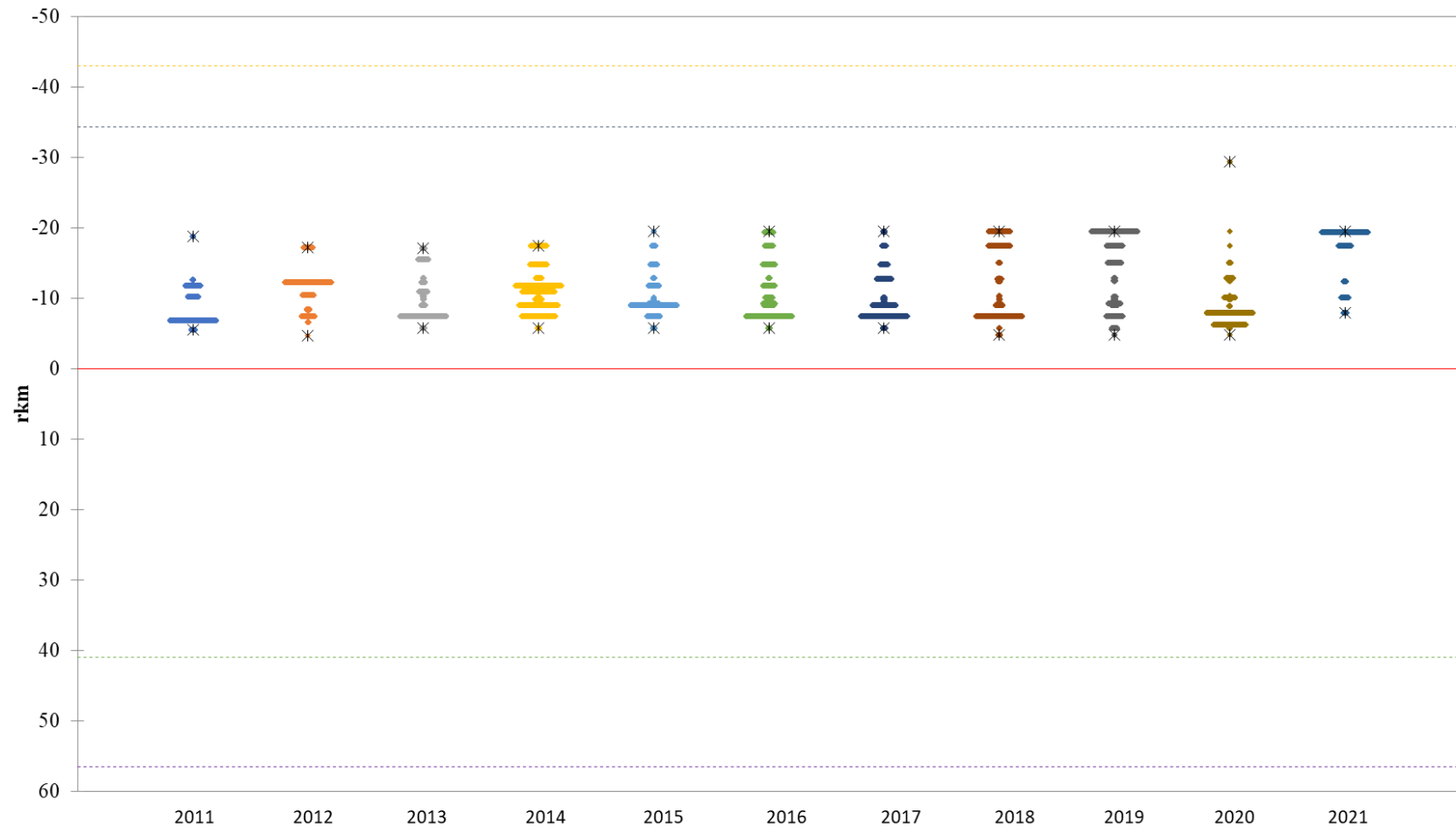


Figure A6-29: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16039) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

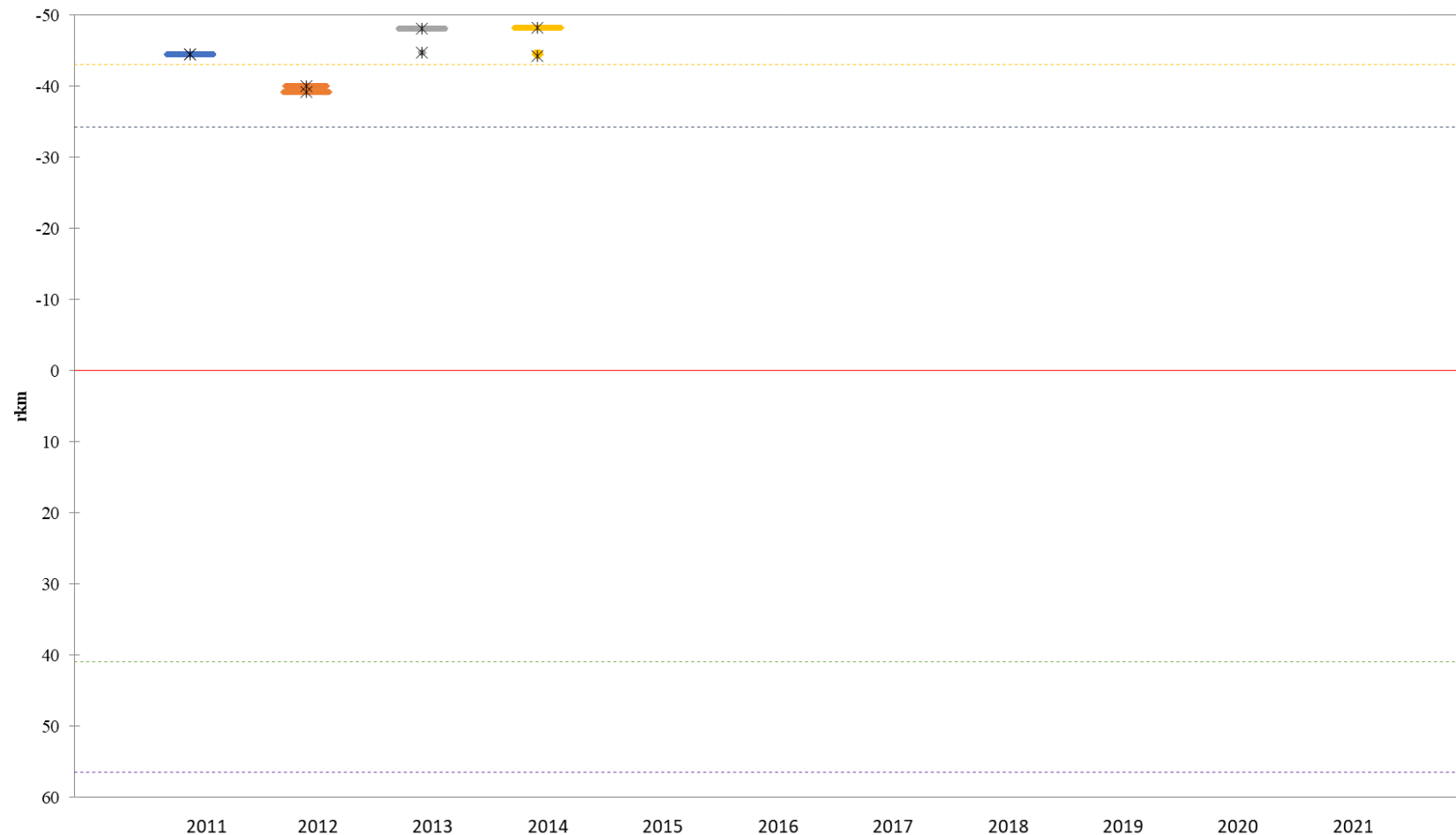


Figure A6-30: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16042) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

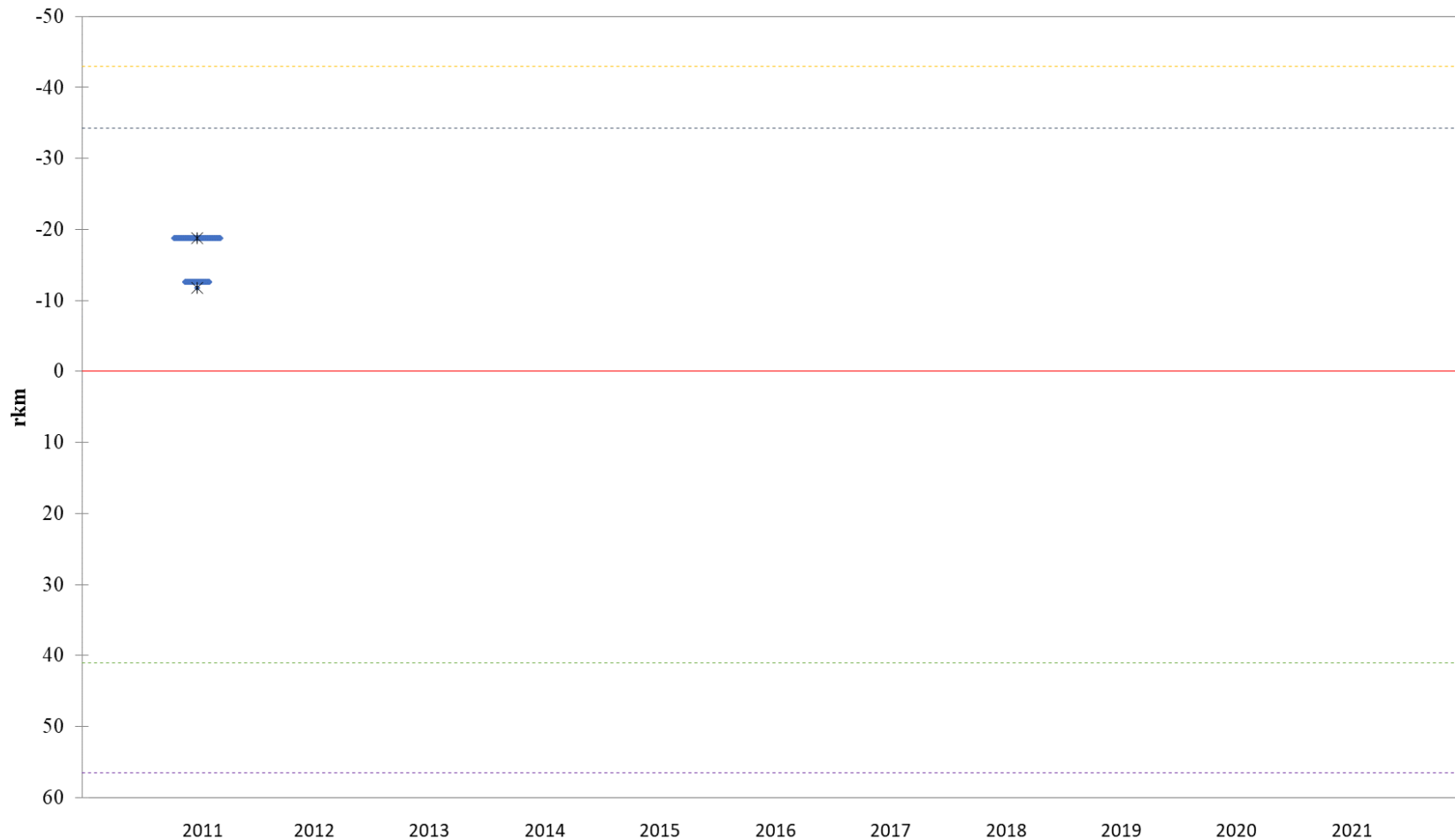


Figure A6-31: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16045) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

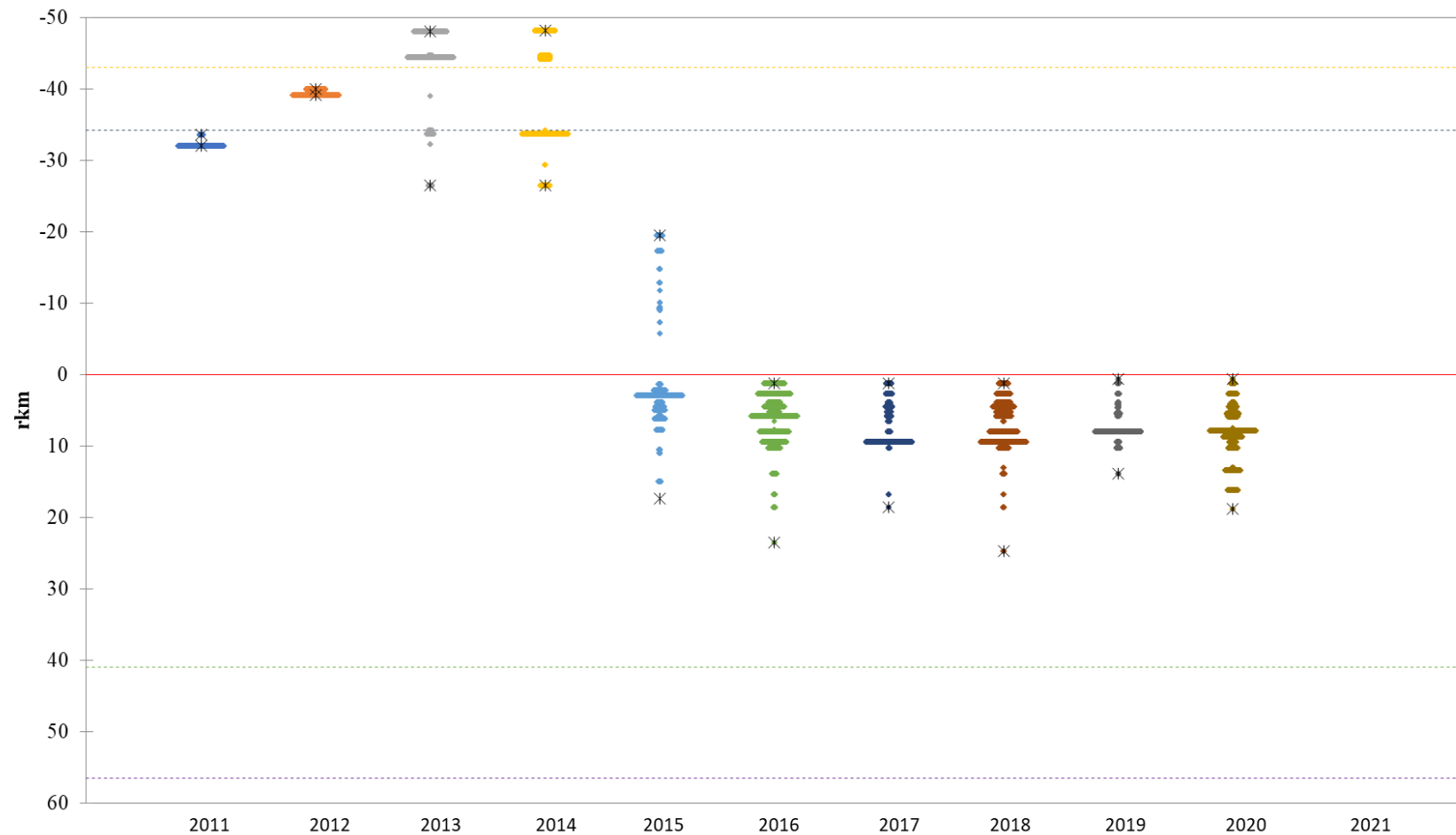


Figure A6-32: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16048) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

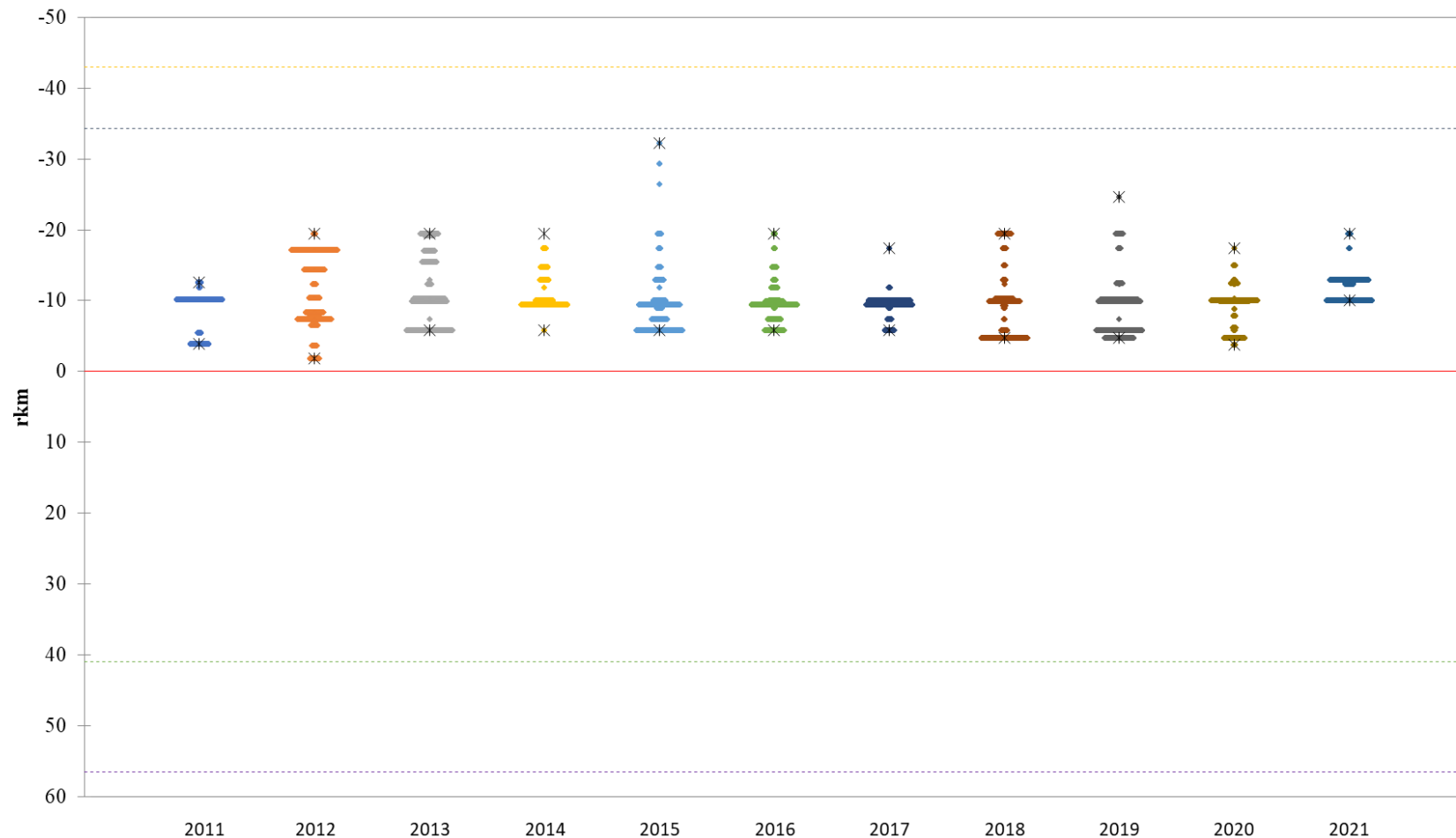


Figure A6-33: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16051) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

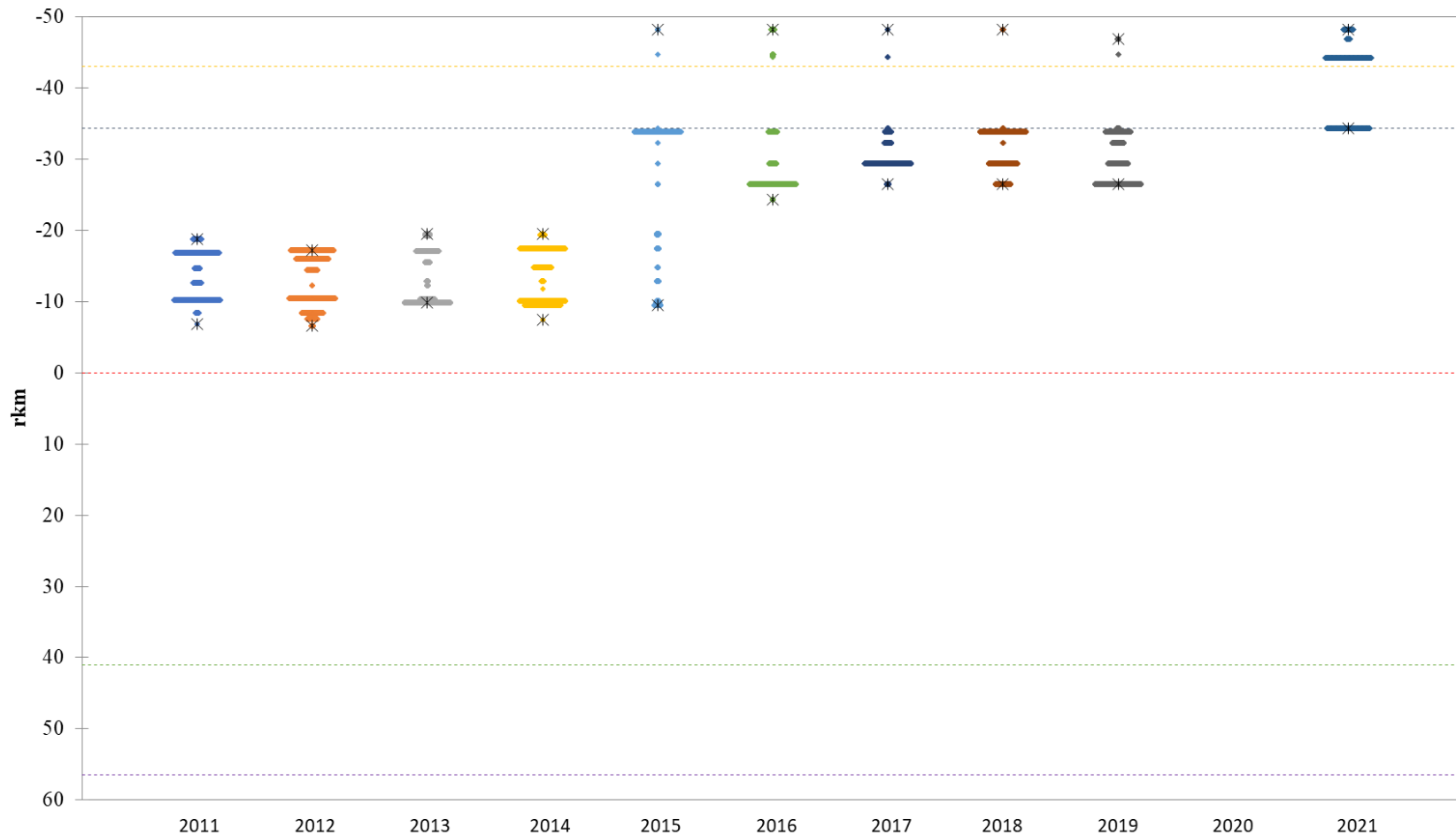


Figure A6-34: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16054) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

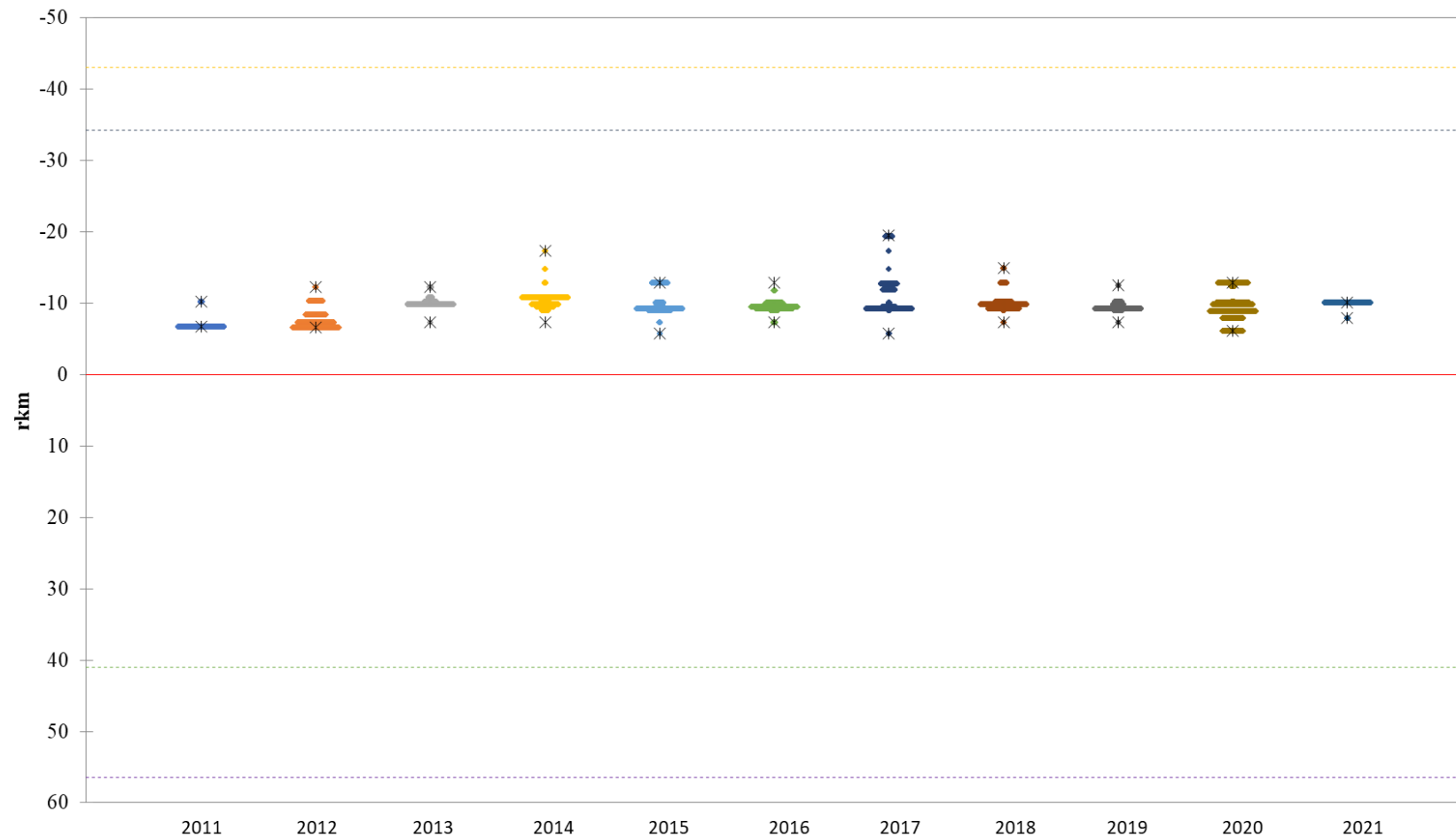


Figure A6-35: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16055) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

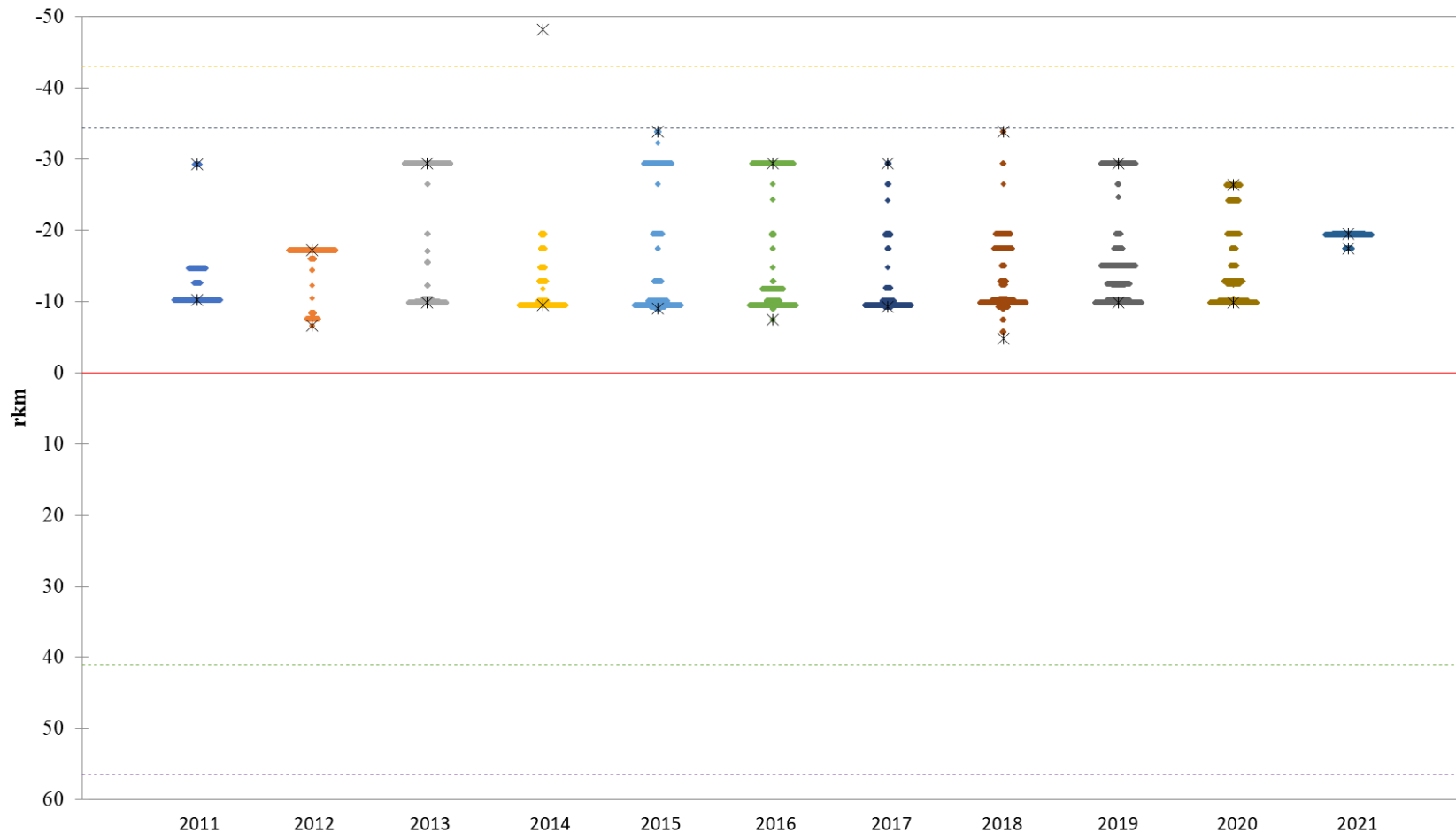


Figure A6-36: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16056) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

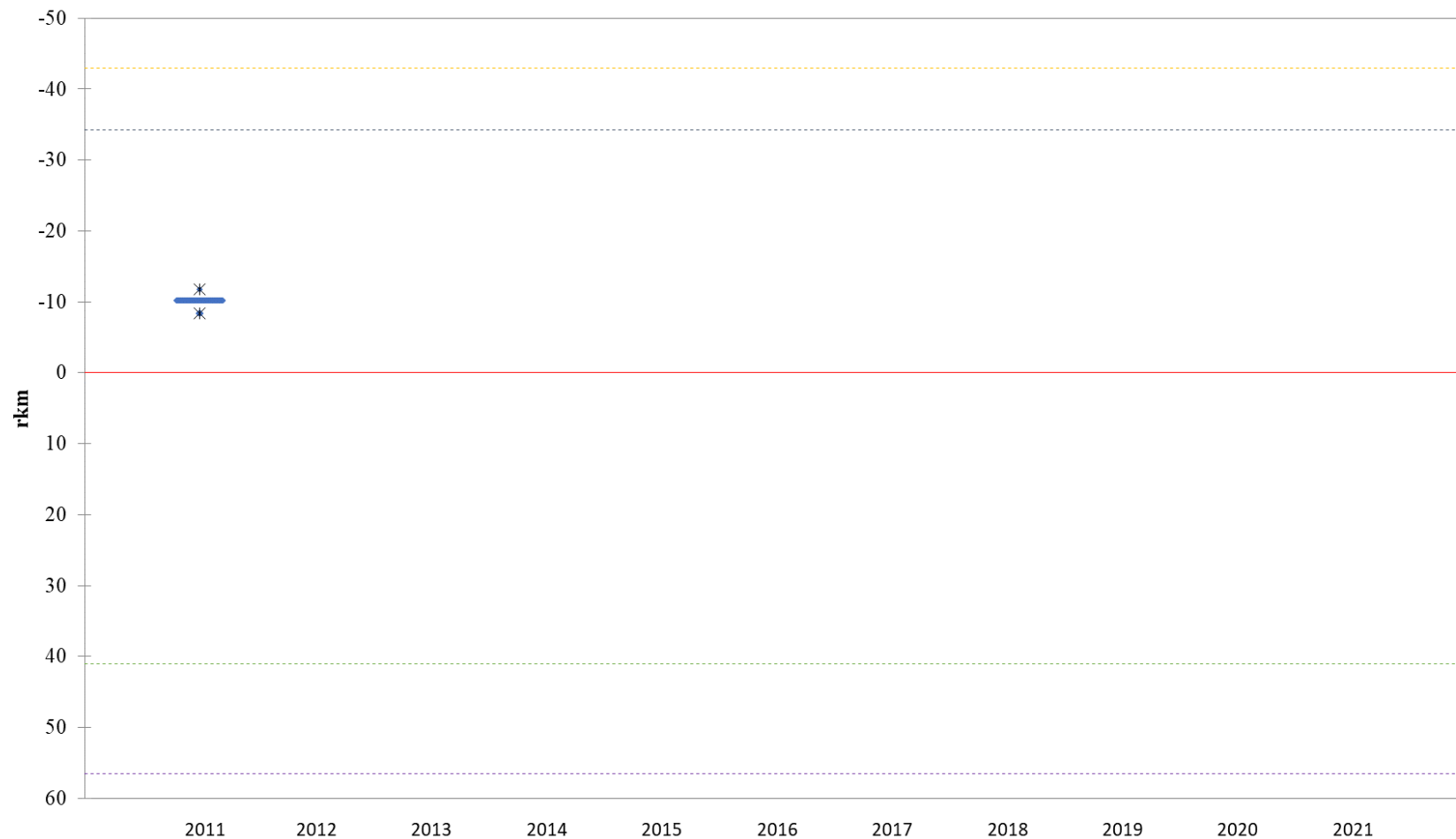


Figure A6-37: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16057) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

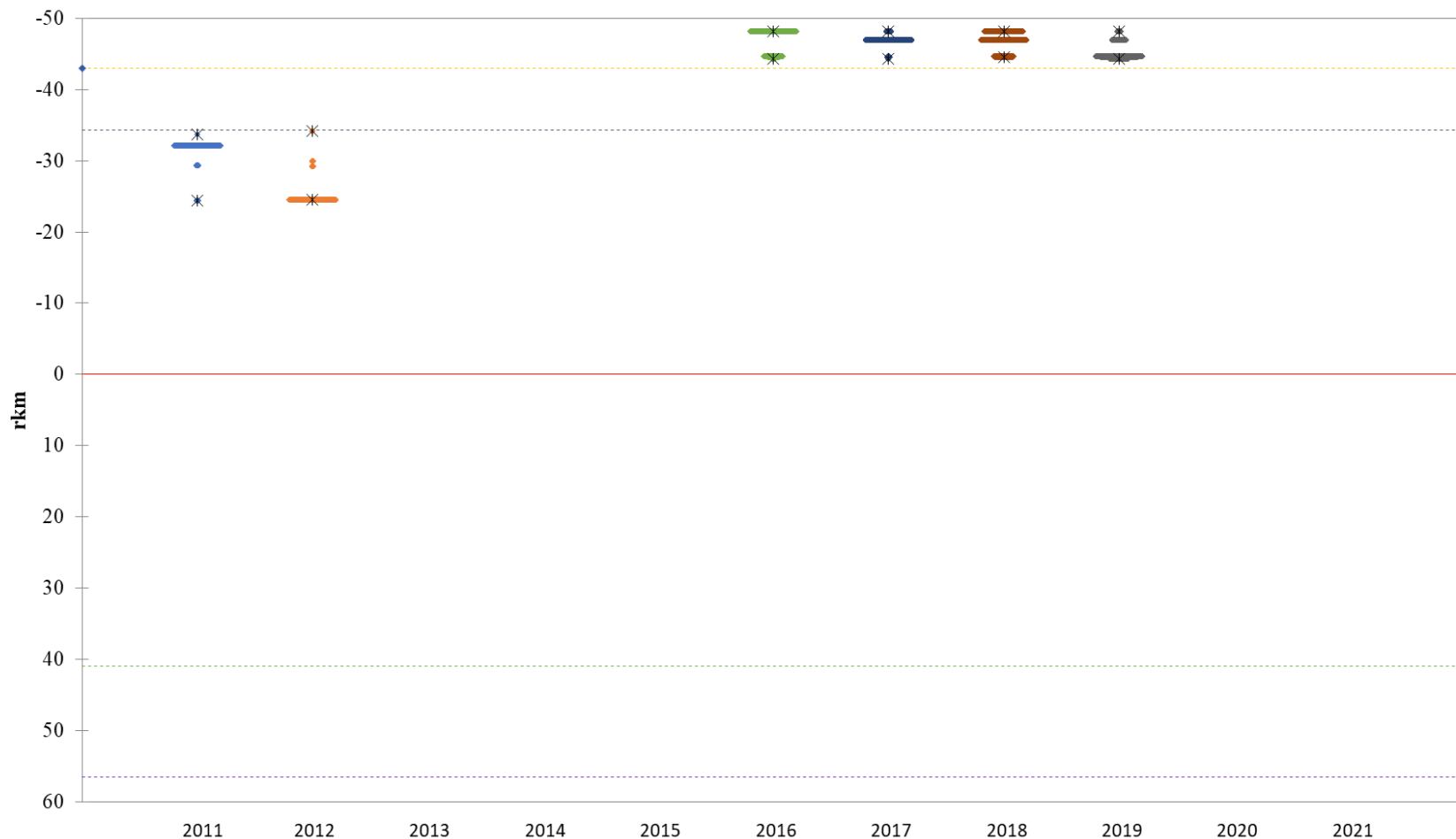


Figure A6-38: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16058) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

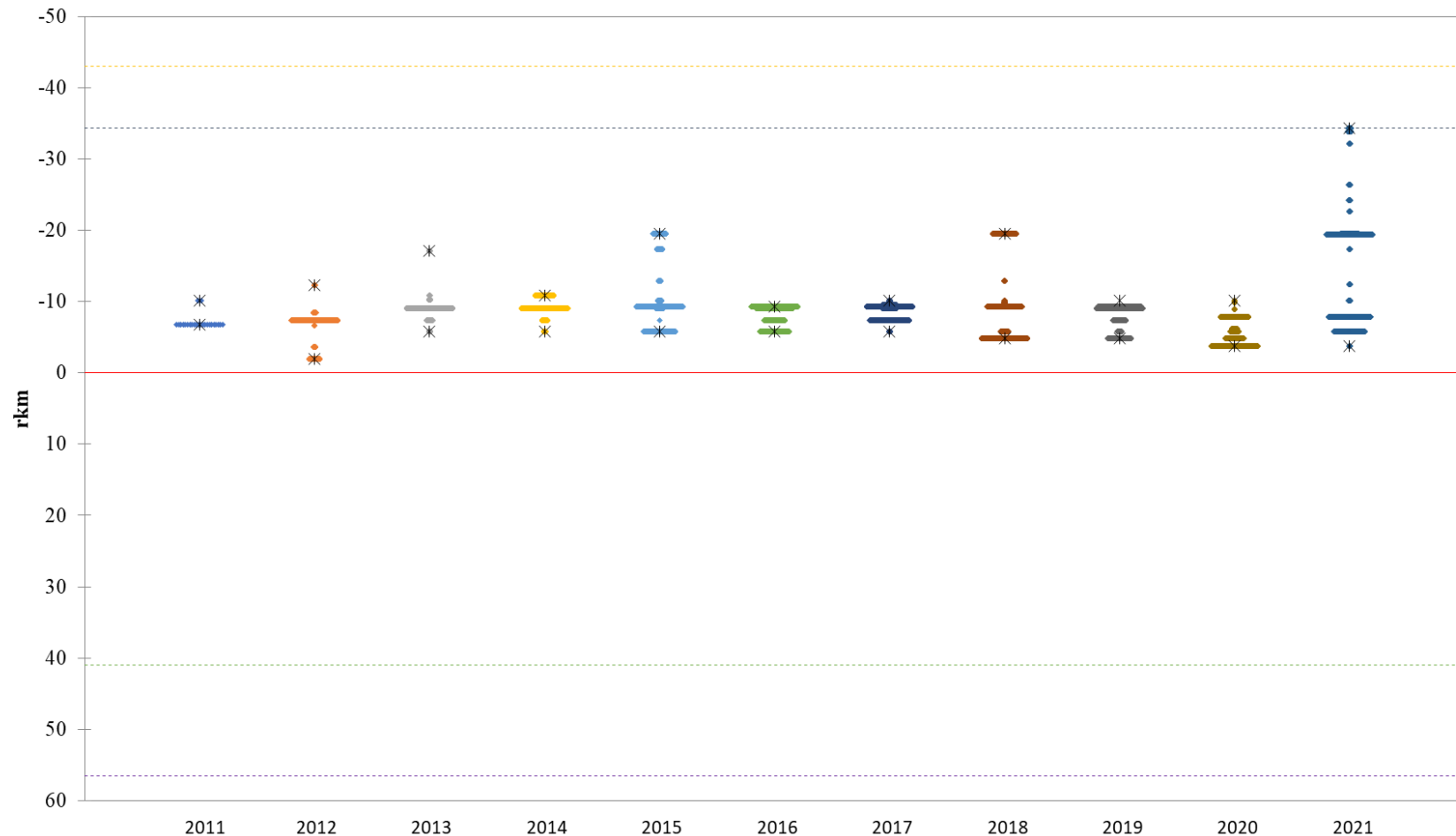


Figure A6-39: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16059) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

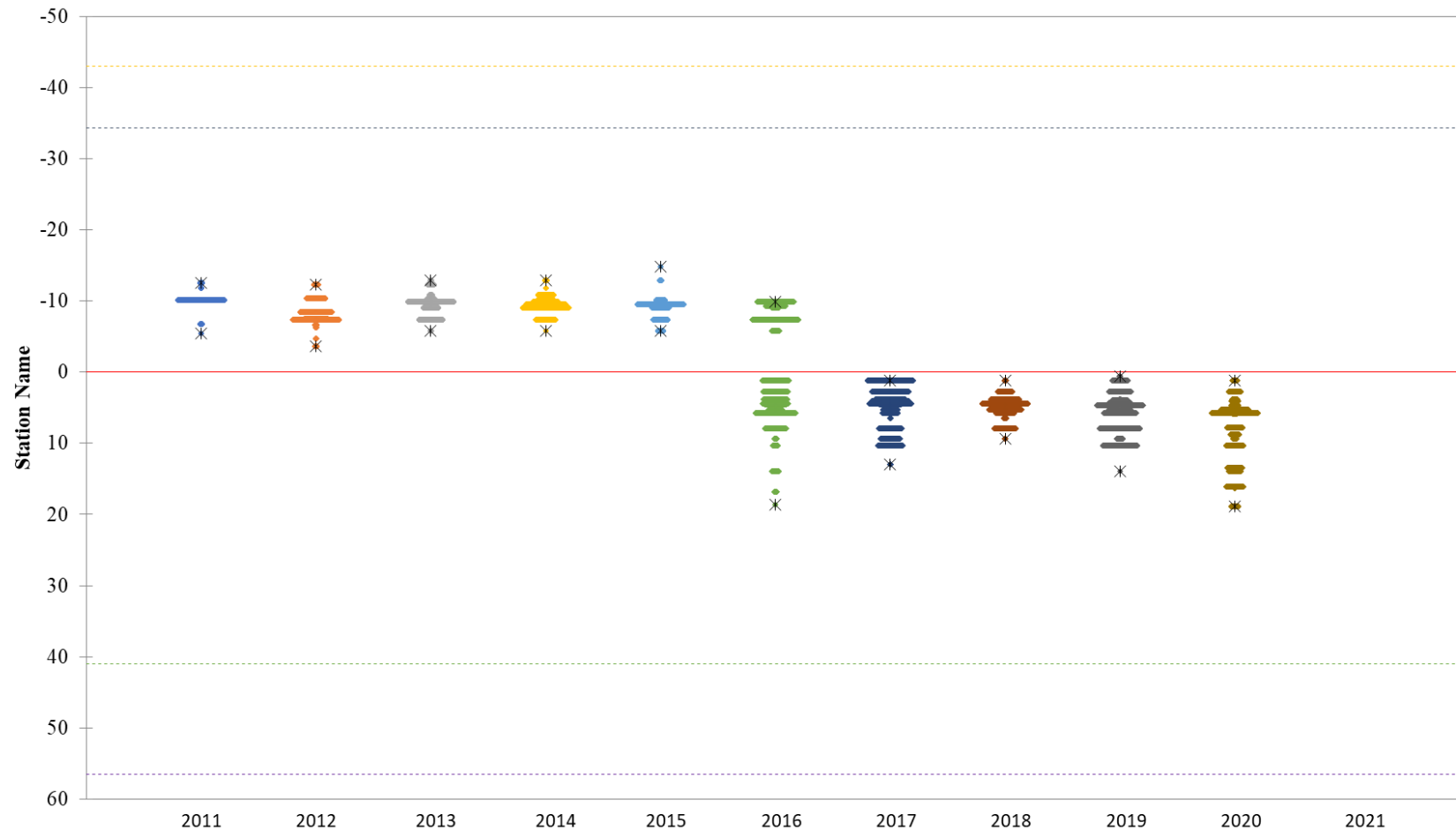


Figure A6-40: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16060) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

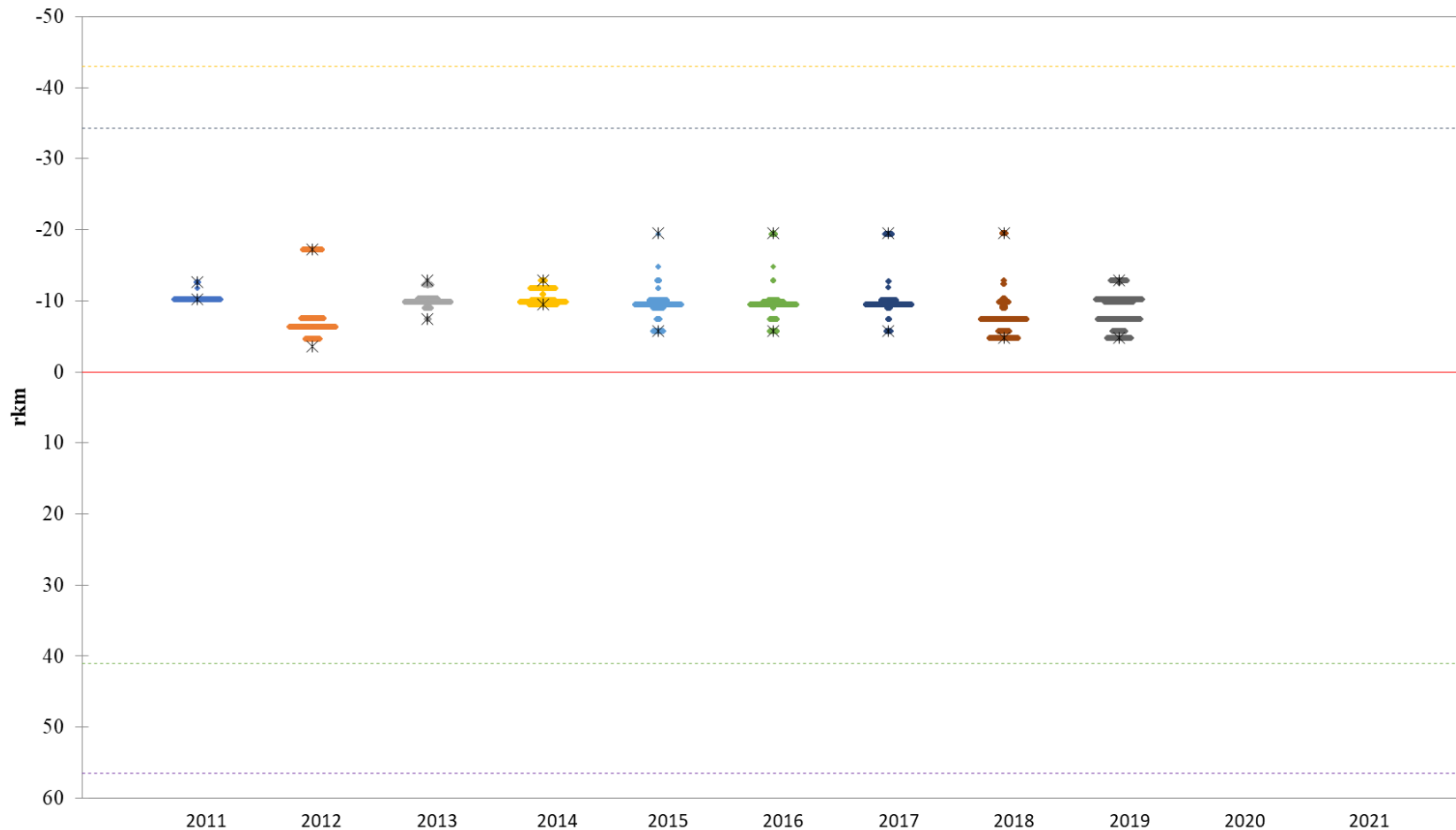


Figure A6-41: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16061) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

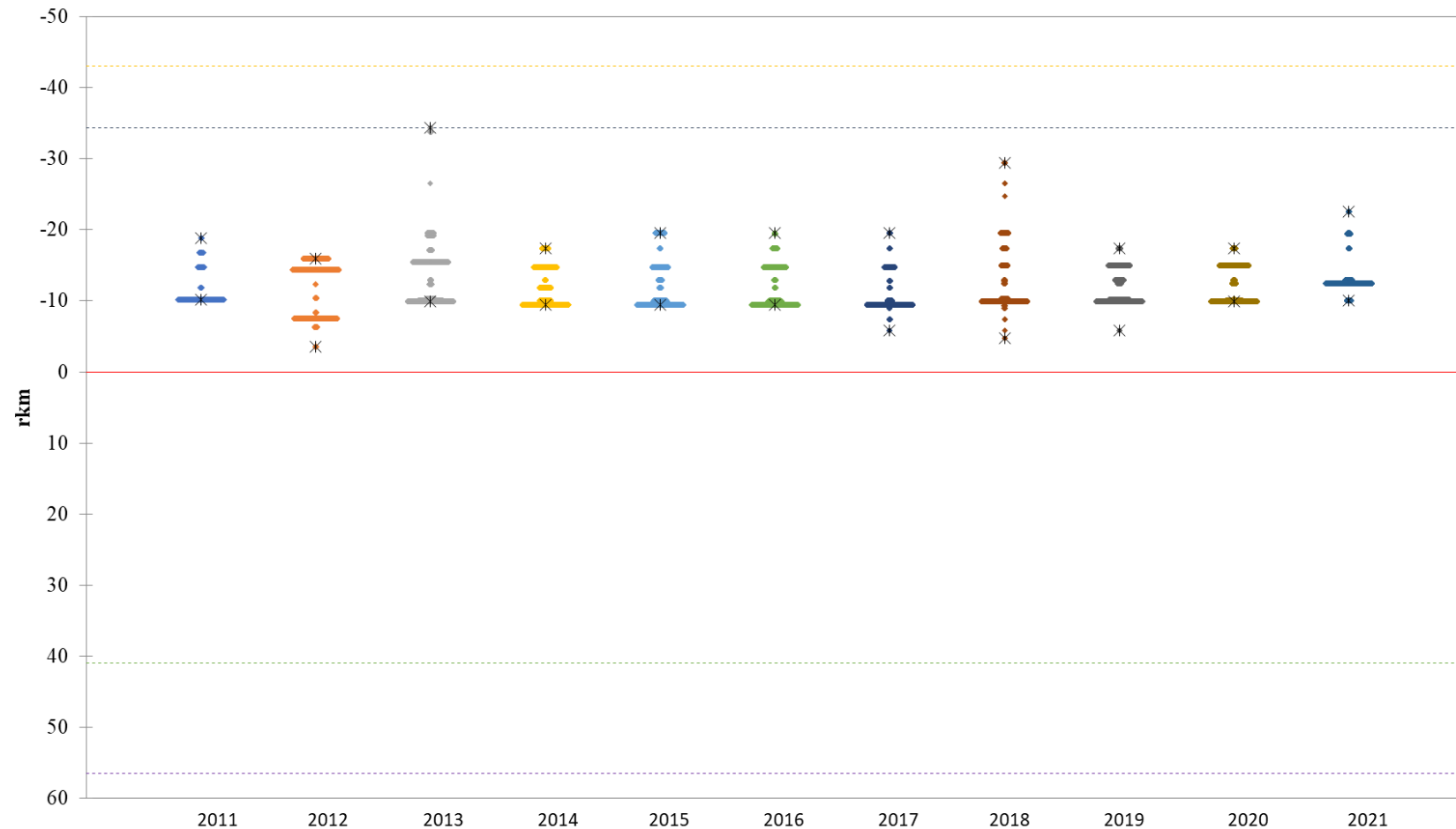


Figure A6-42: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16062) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

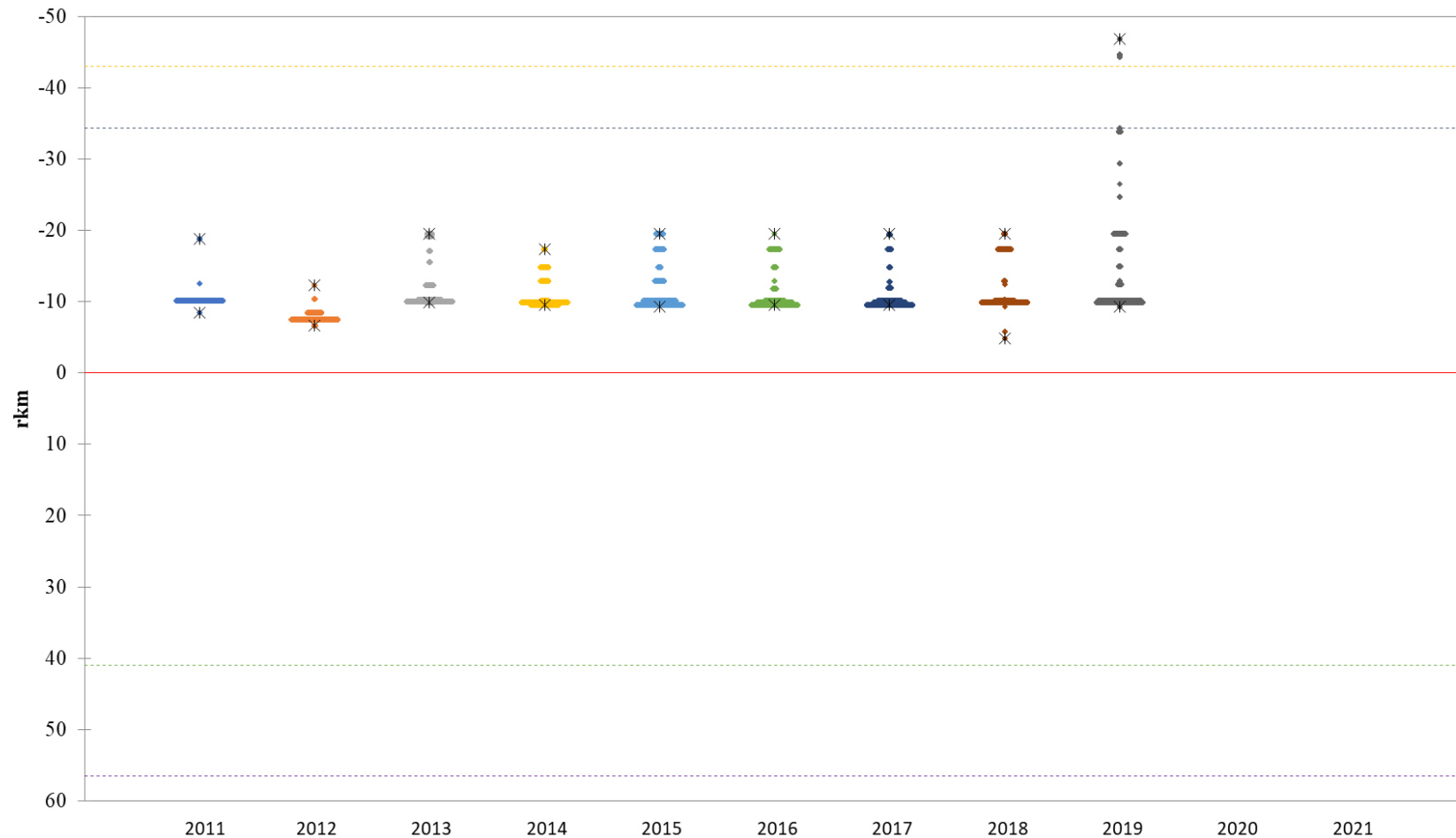


Figure A6-43: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16063) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

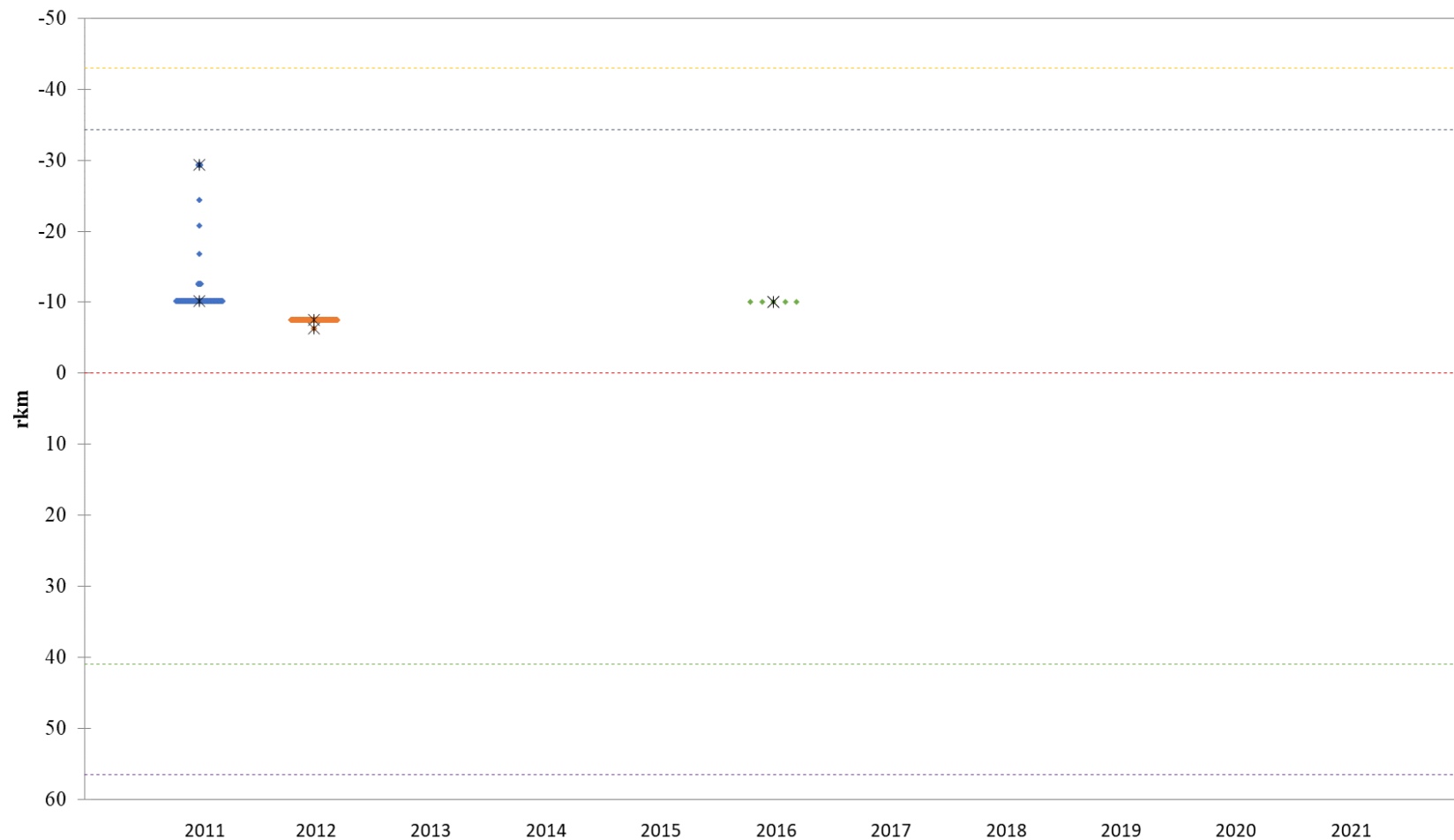


Figure A6-44: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16064) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

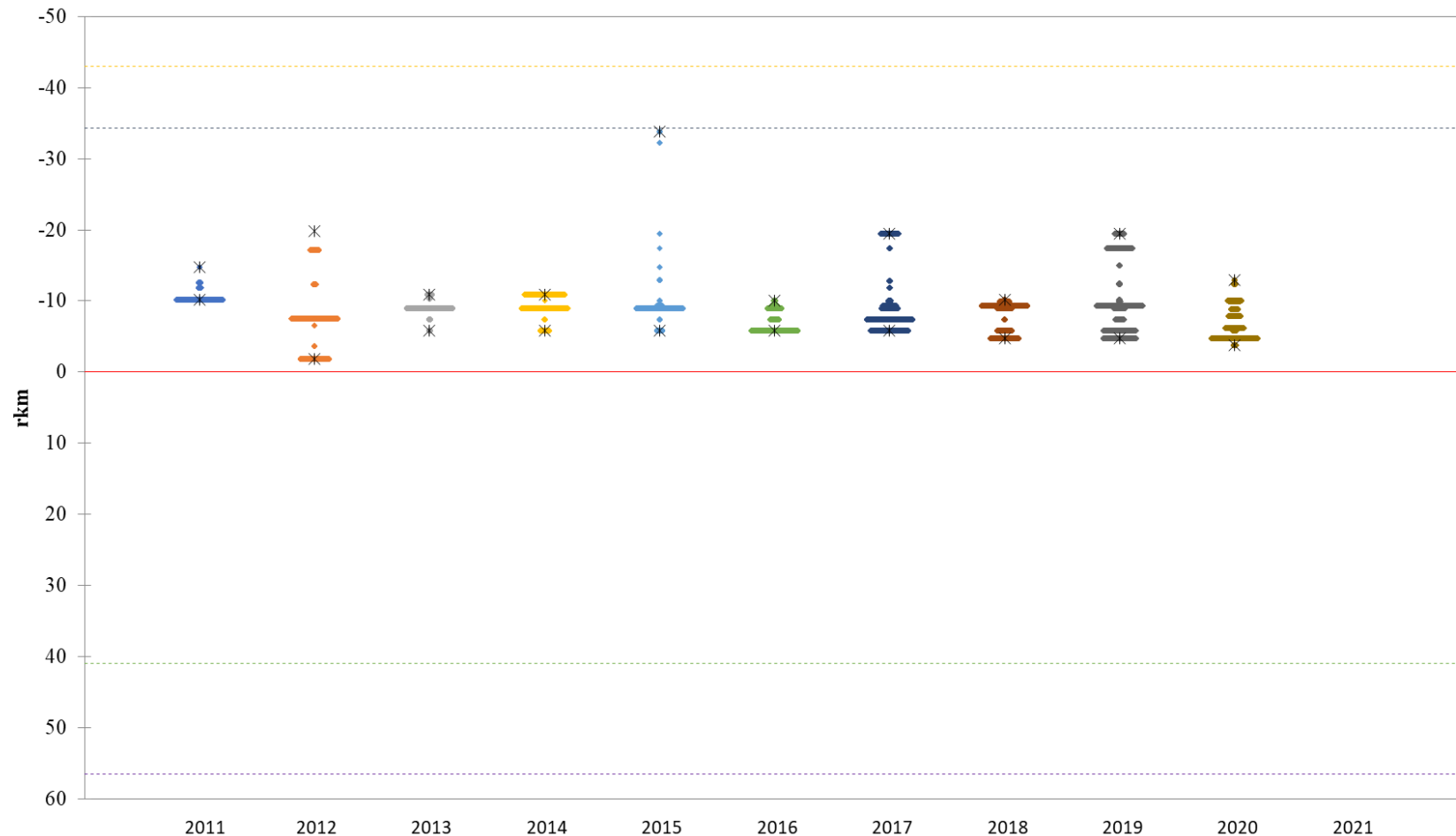


Figure A6-45: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16065) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

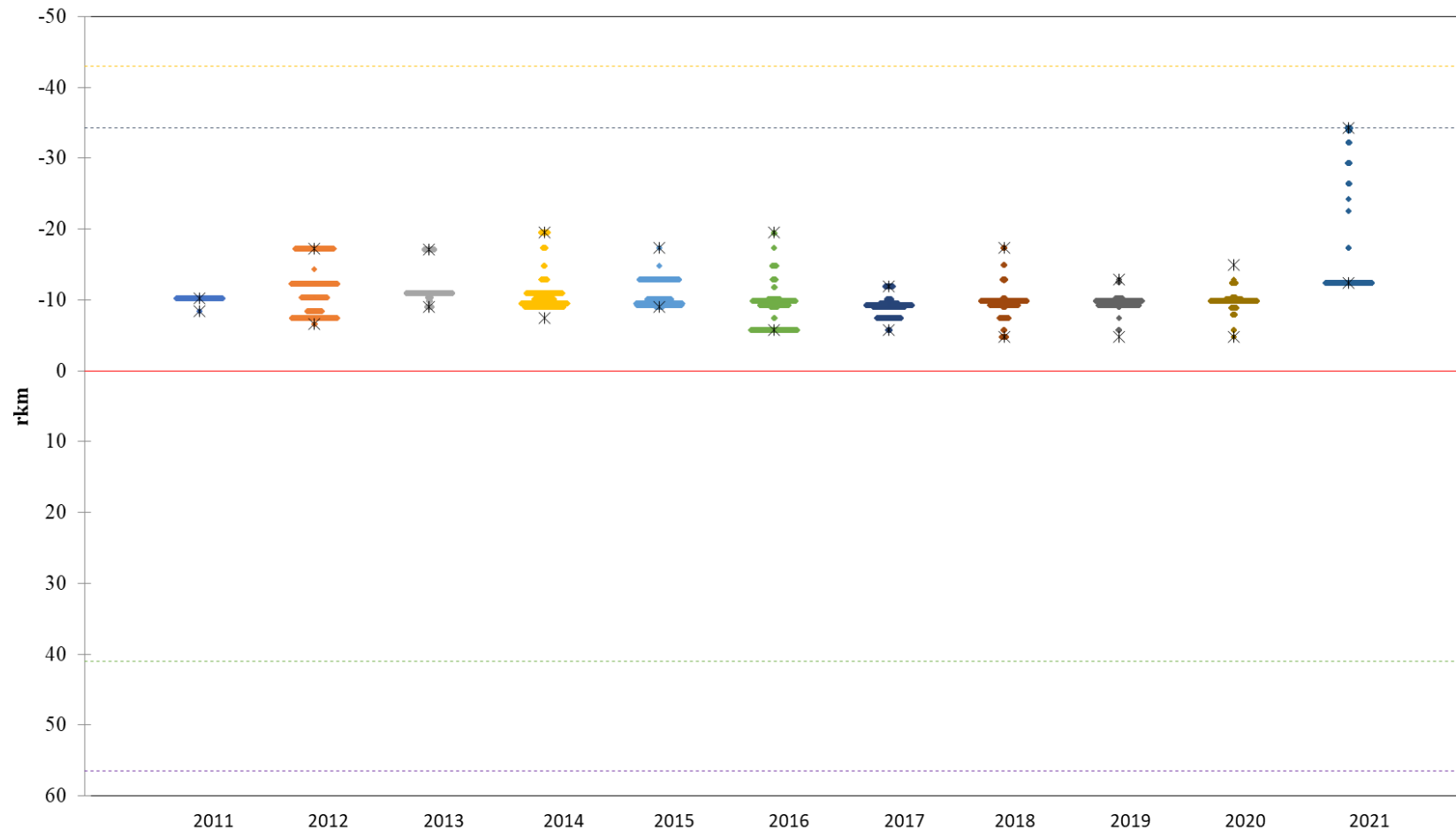


Figure A6-46: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16066) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

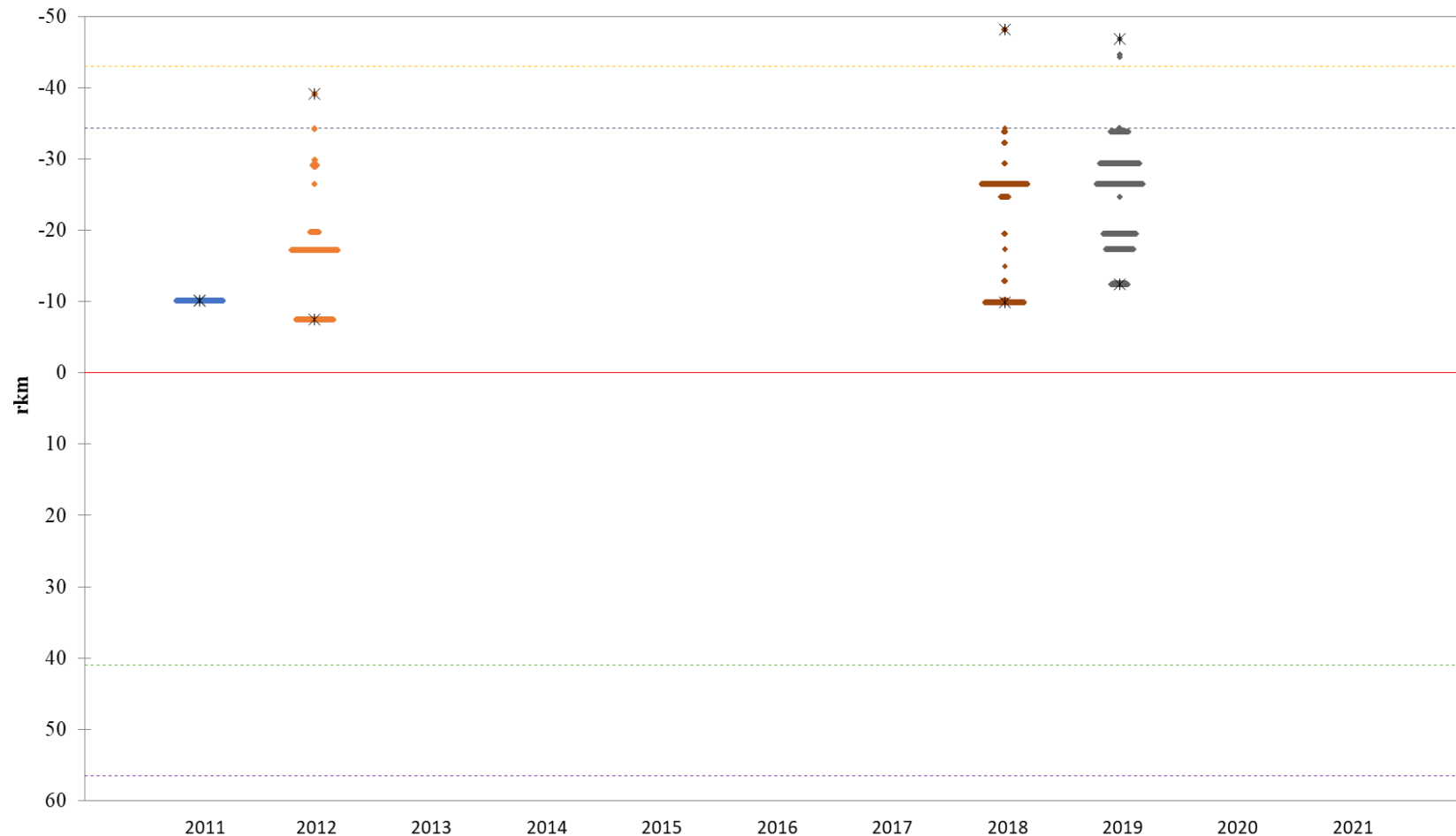


Figure A6-47: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16067) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

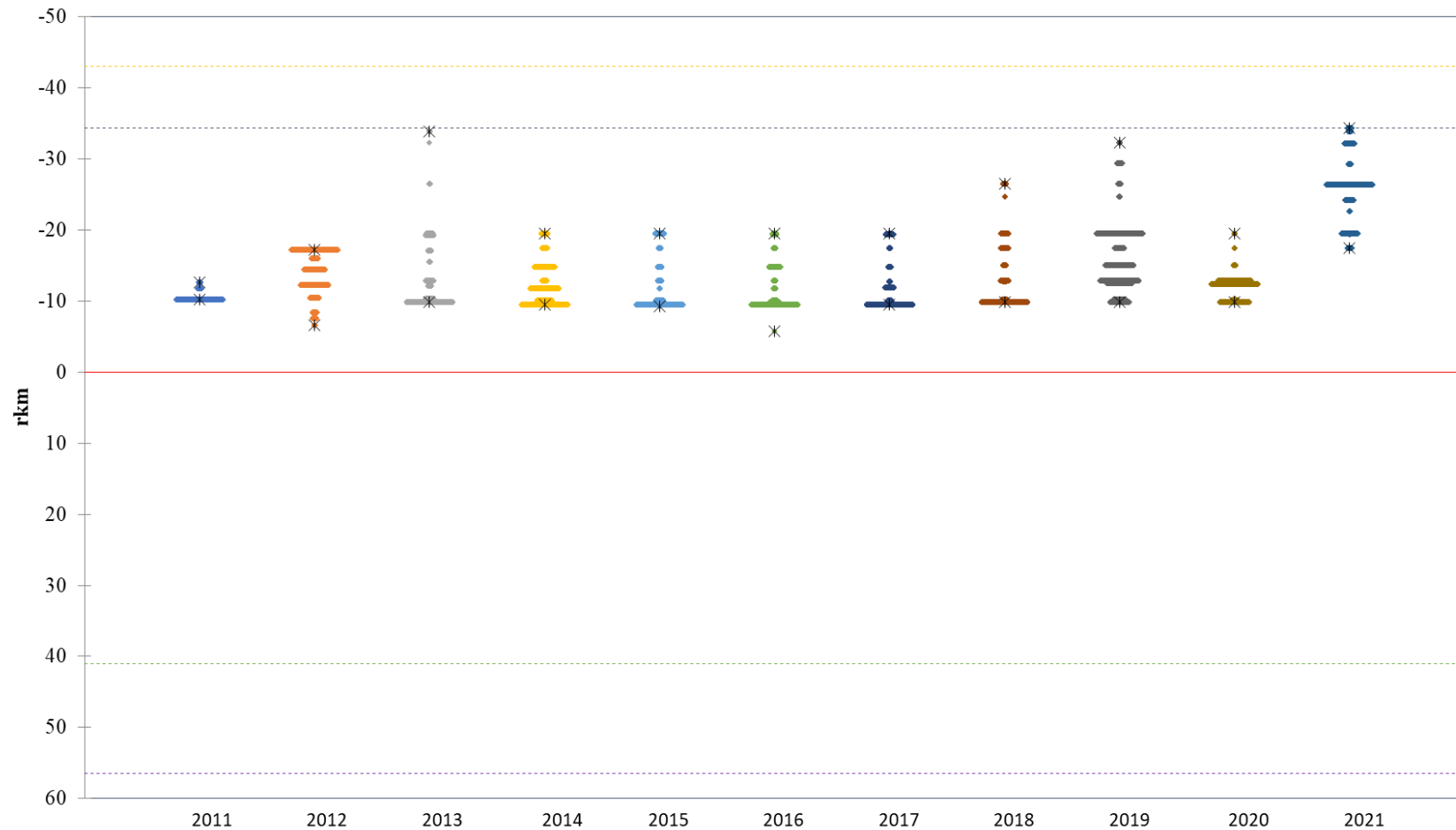


Figure A6-48: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16068) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

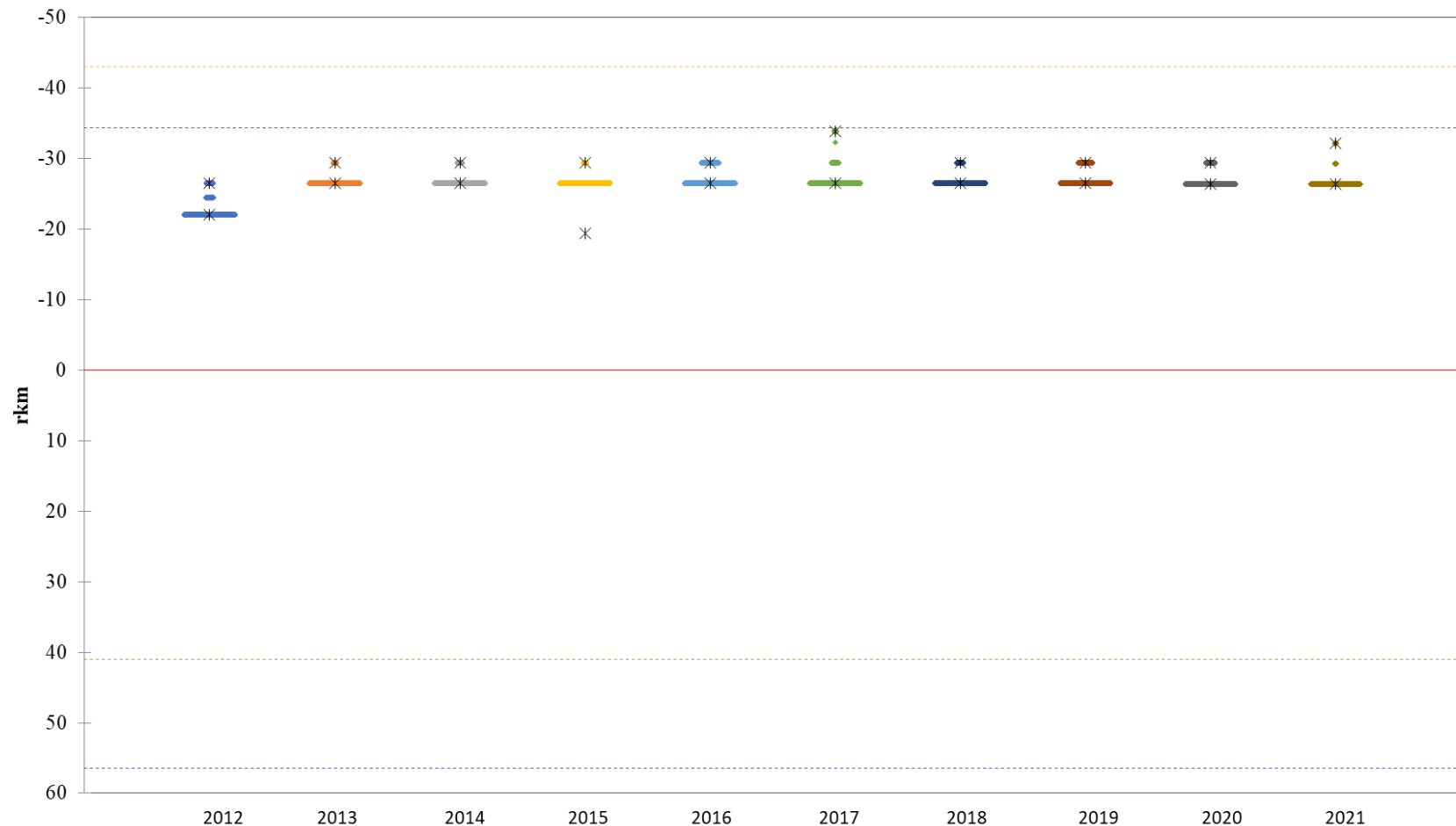


Figure A6-49: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16069) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2012 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

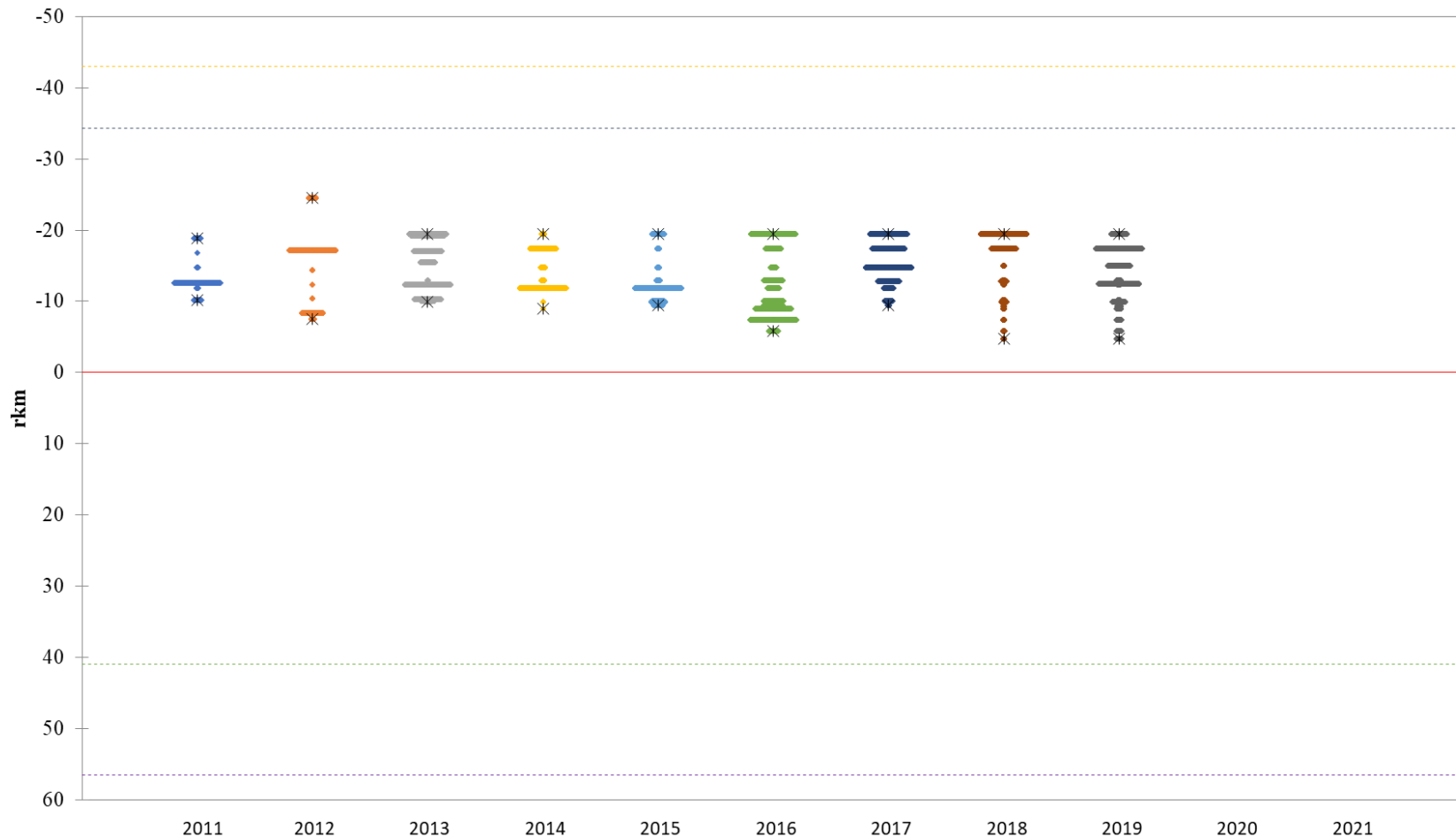


Figure A6-50: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16070) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

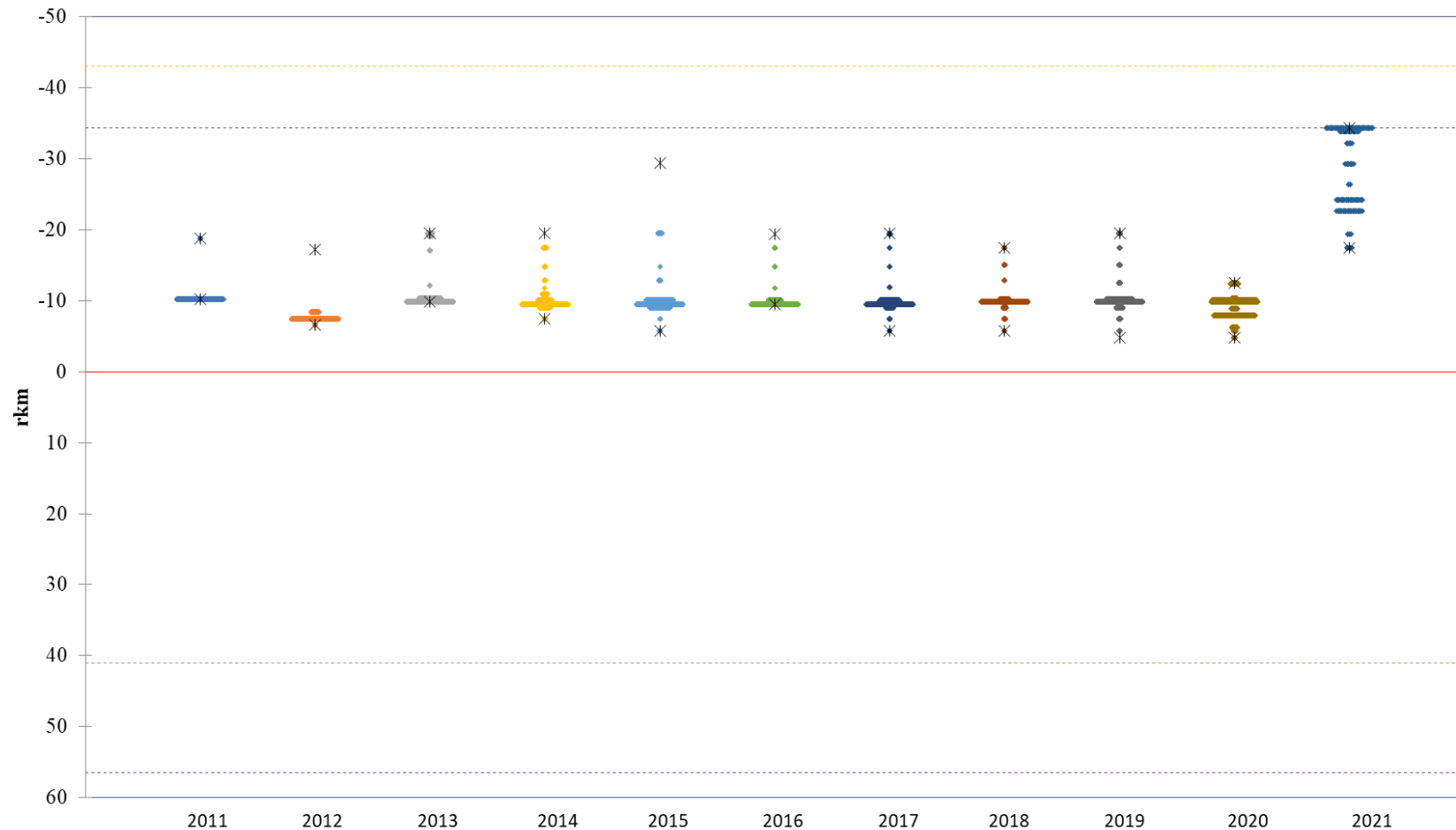


Figure A6-51: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16071) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2012 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

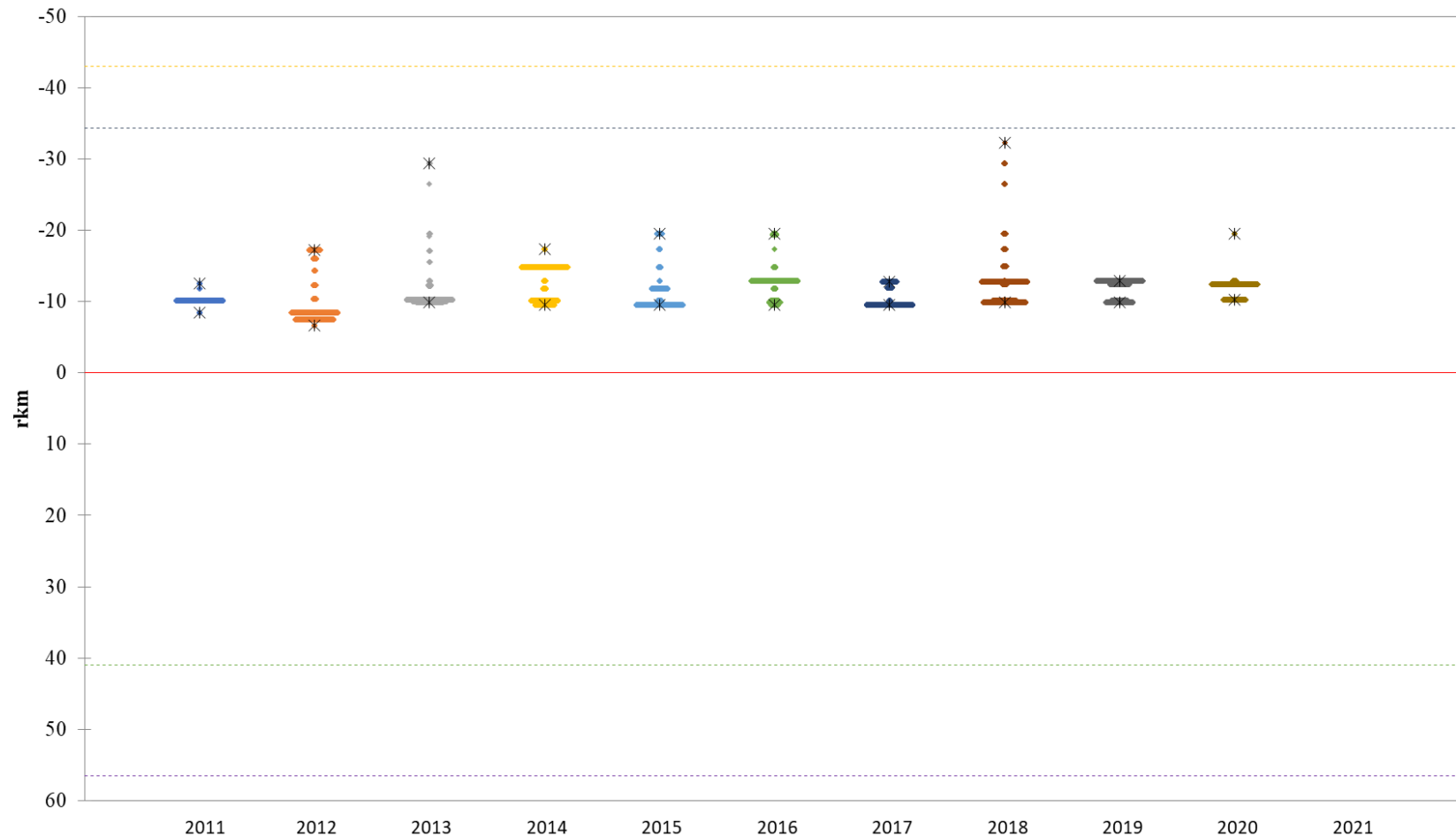


Figure A6-52: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16072) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

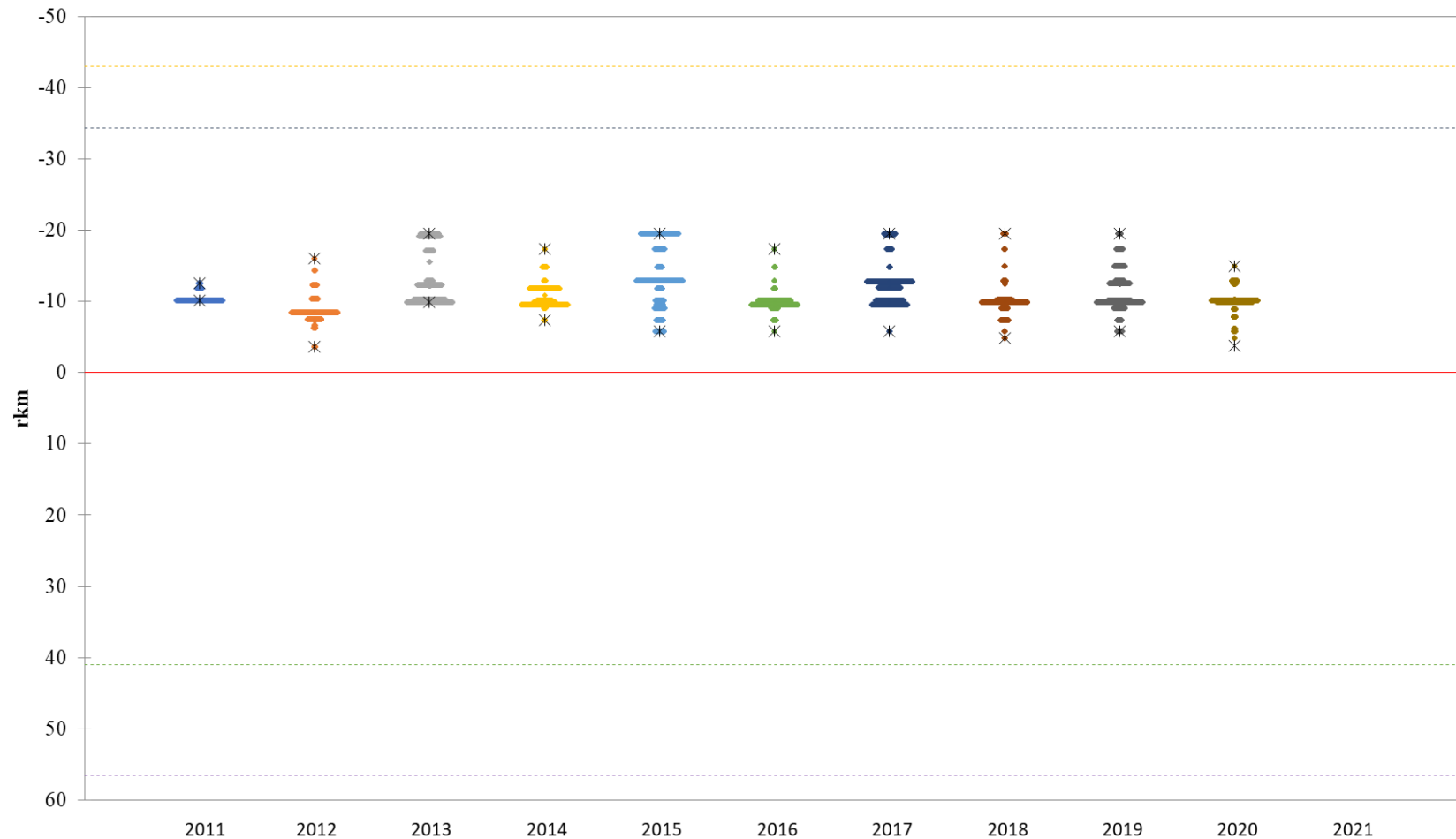


Figure A6-53: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16073) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

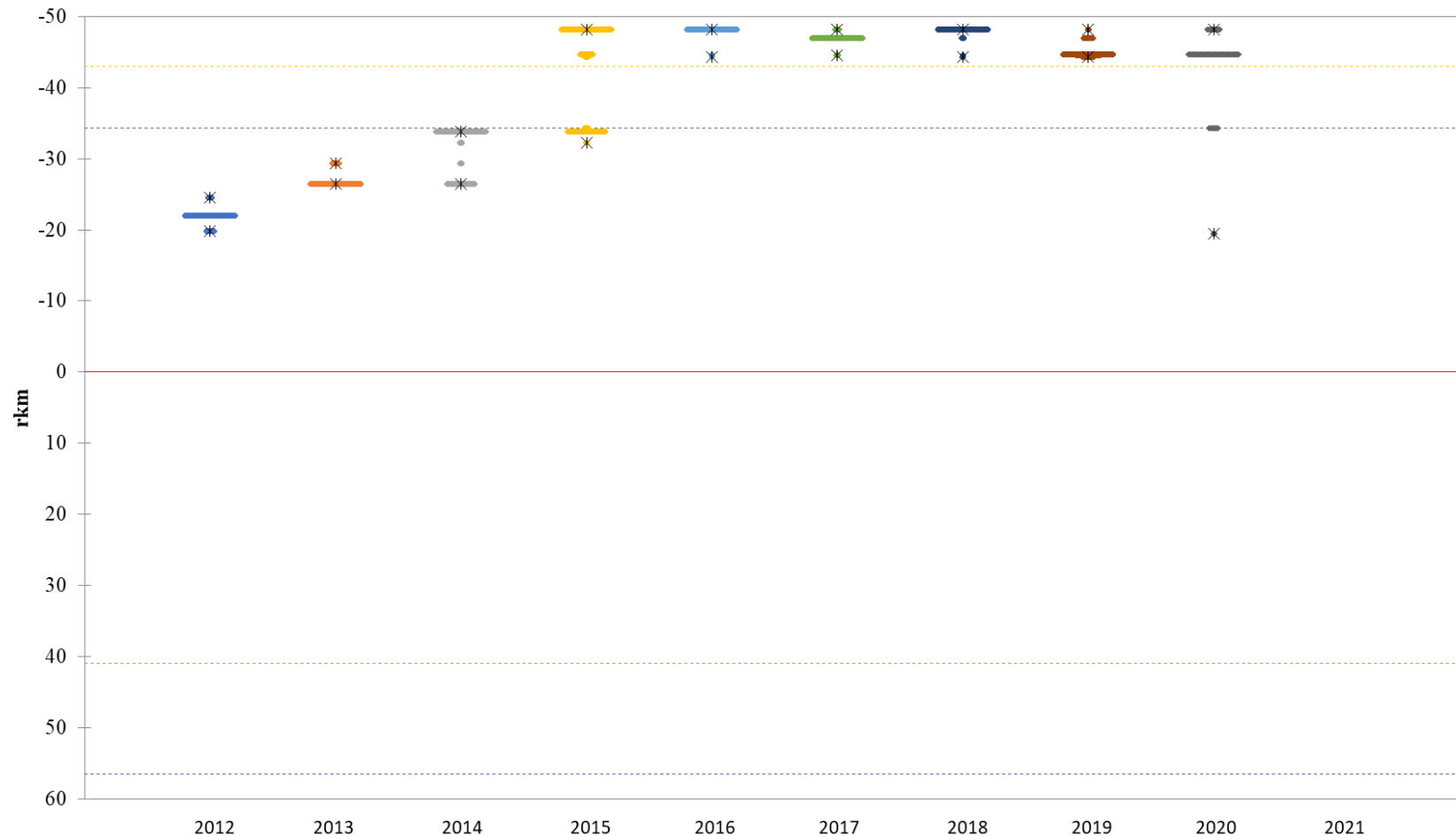


Figure A6-54: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16074) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

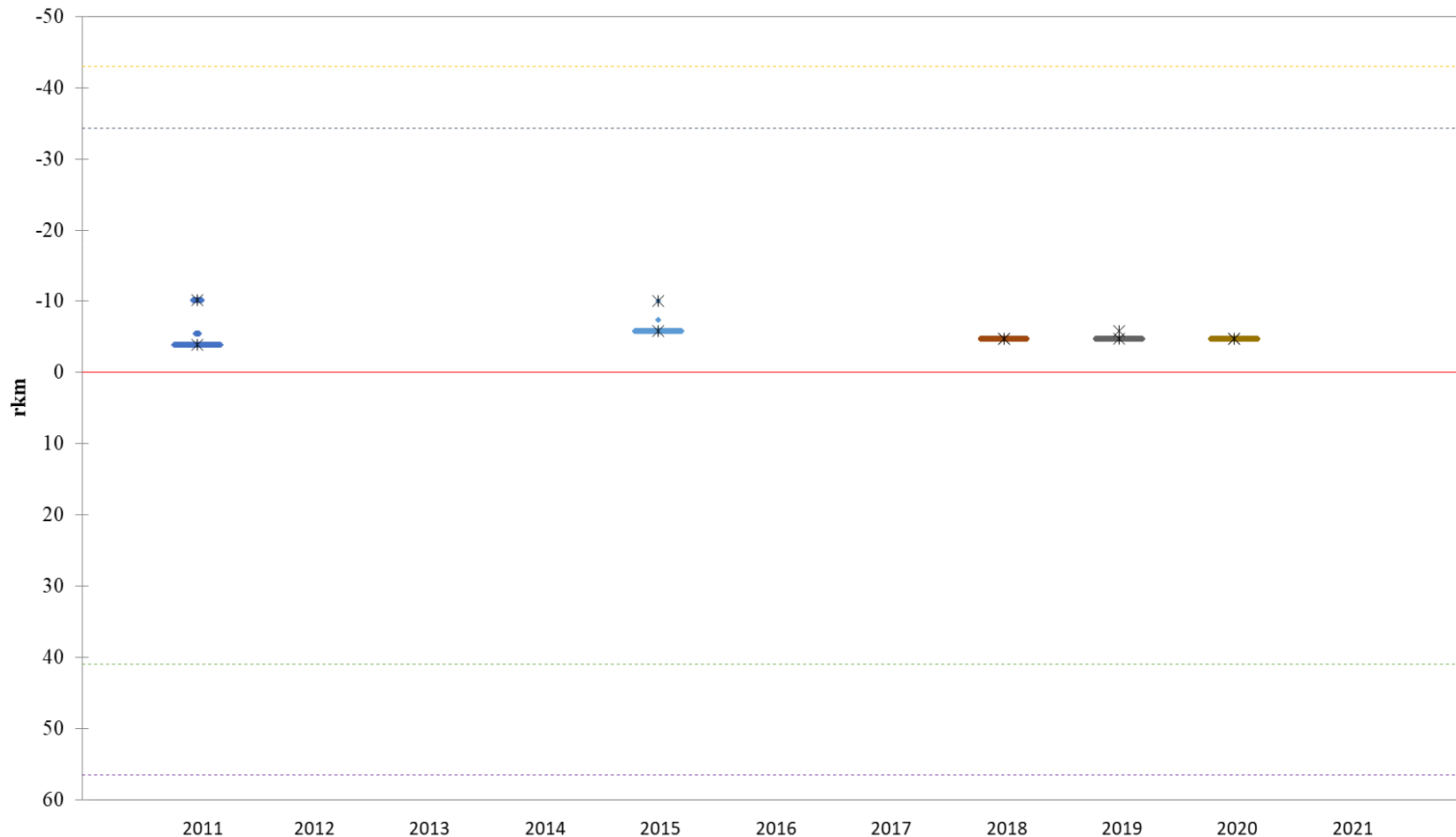


Figure A6-55: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16075) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

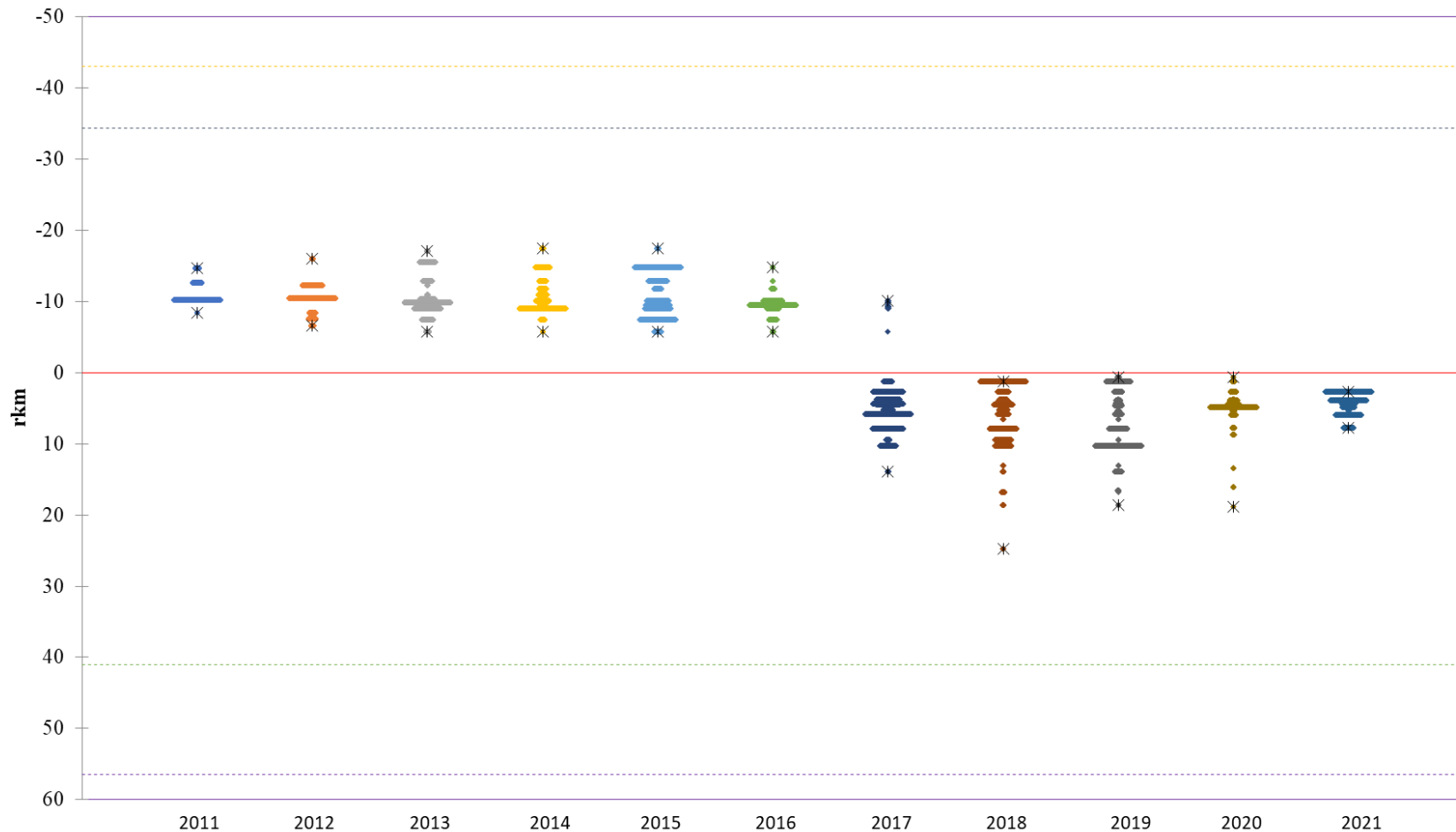


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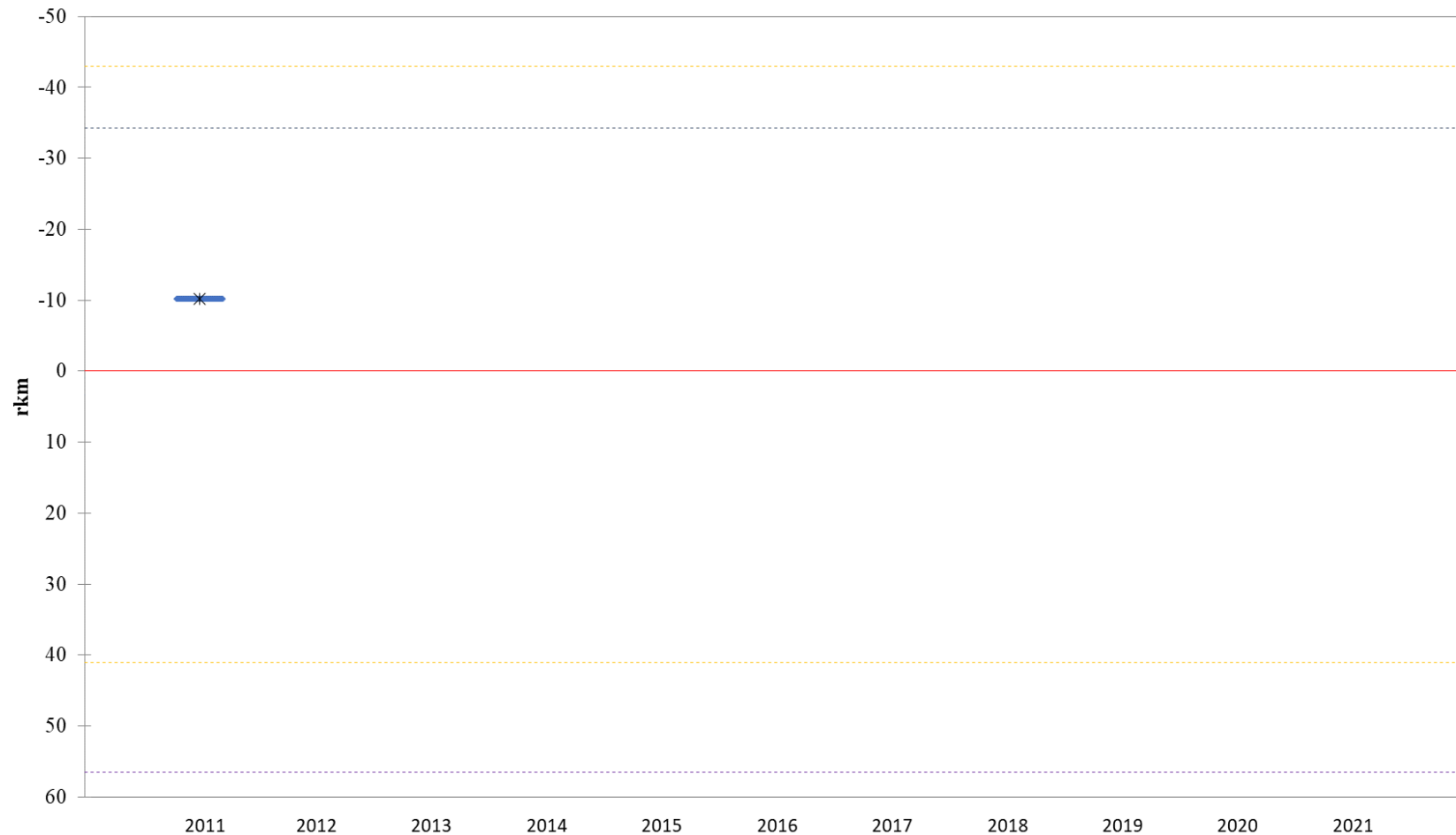


Figure A6-57: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16077) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

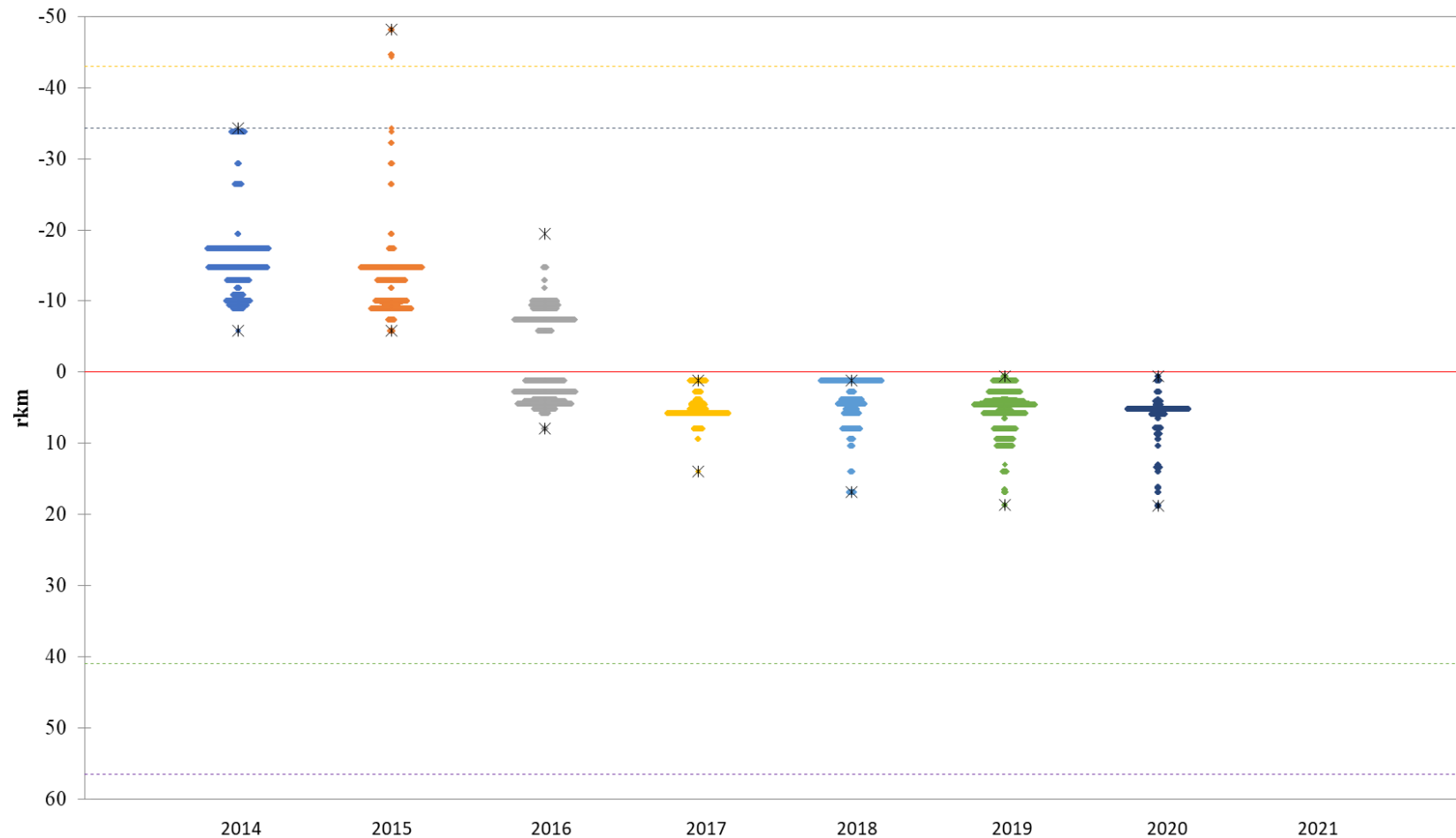


Figure A6-58: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #32174) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2014 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

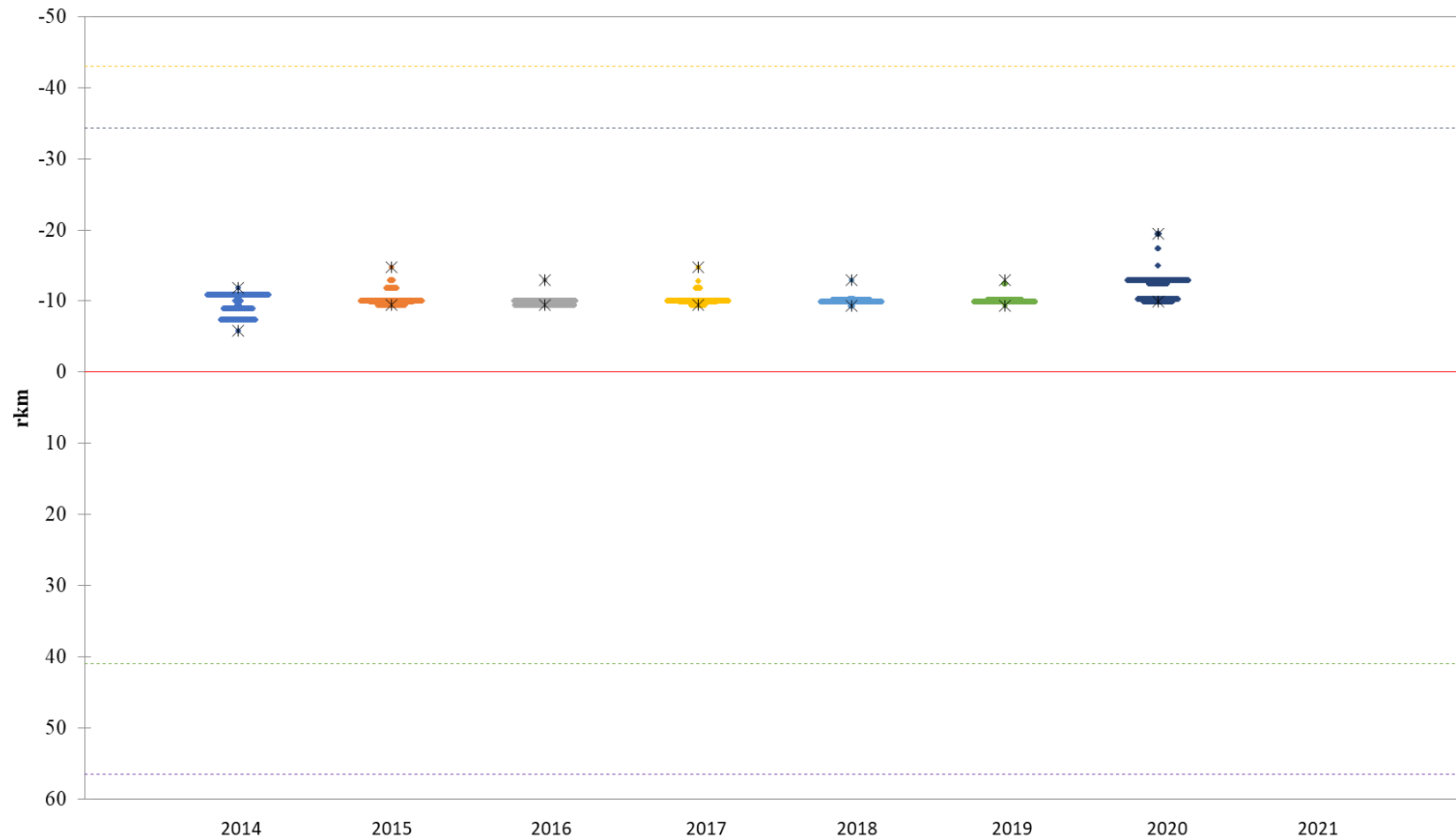


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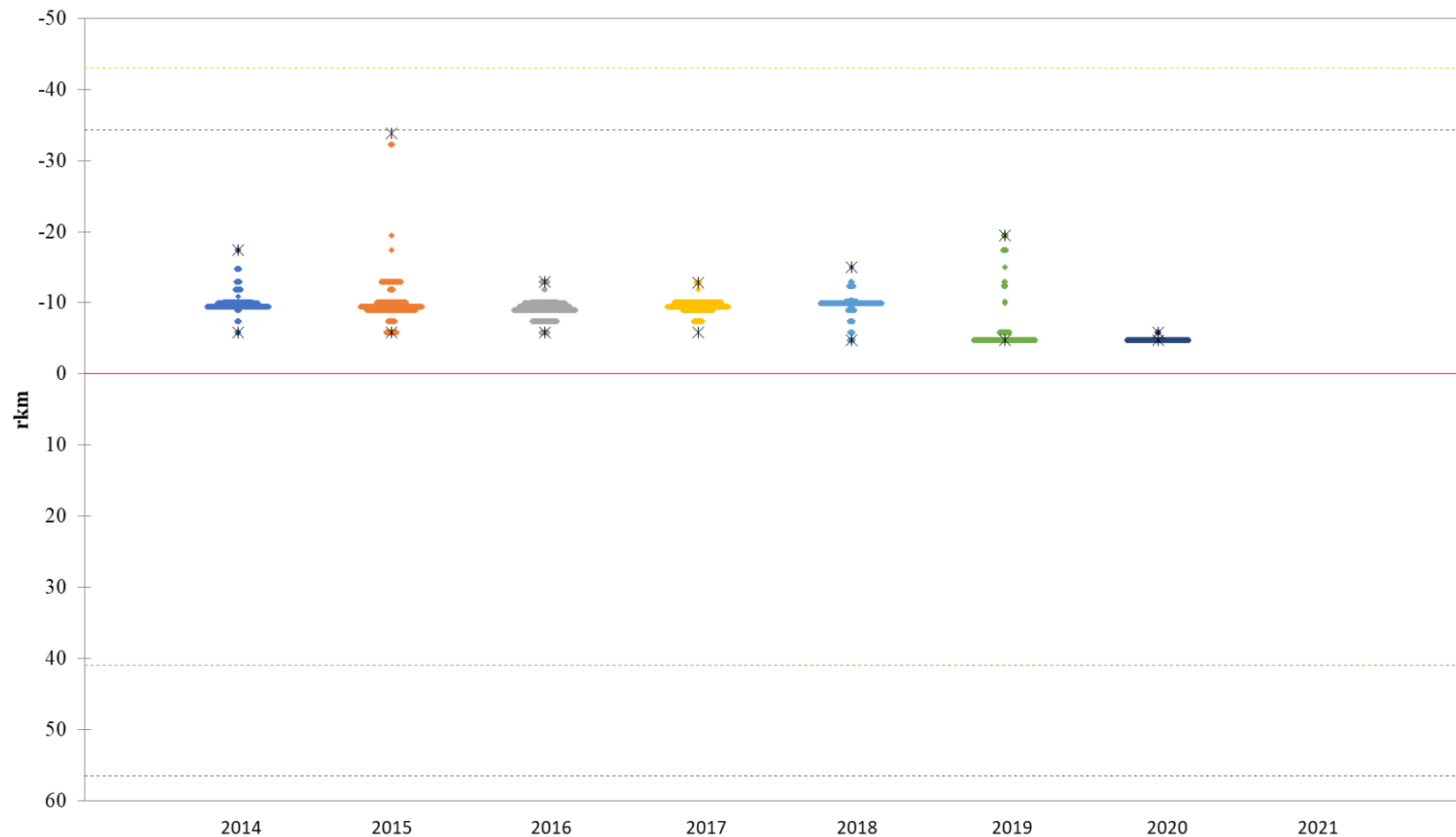


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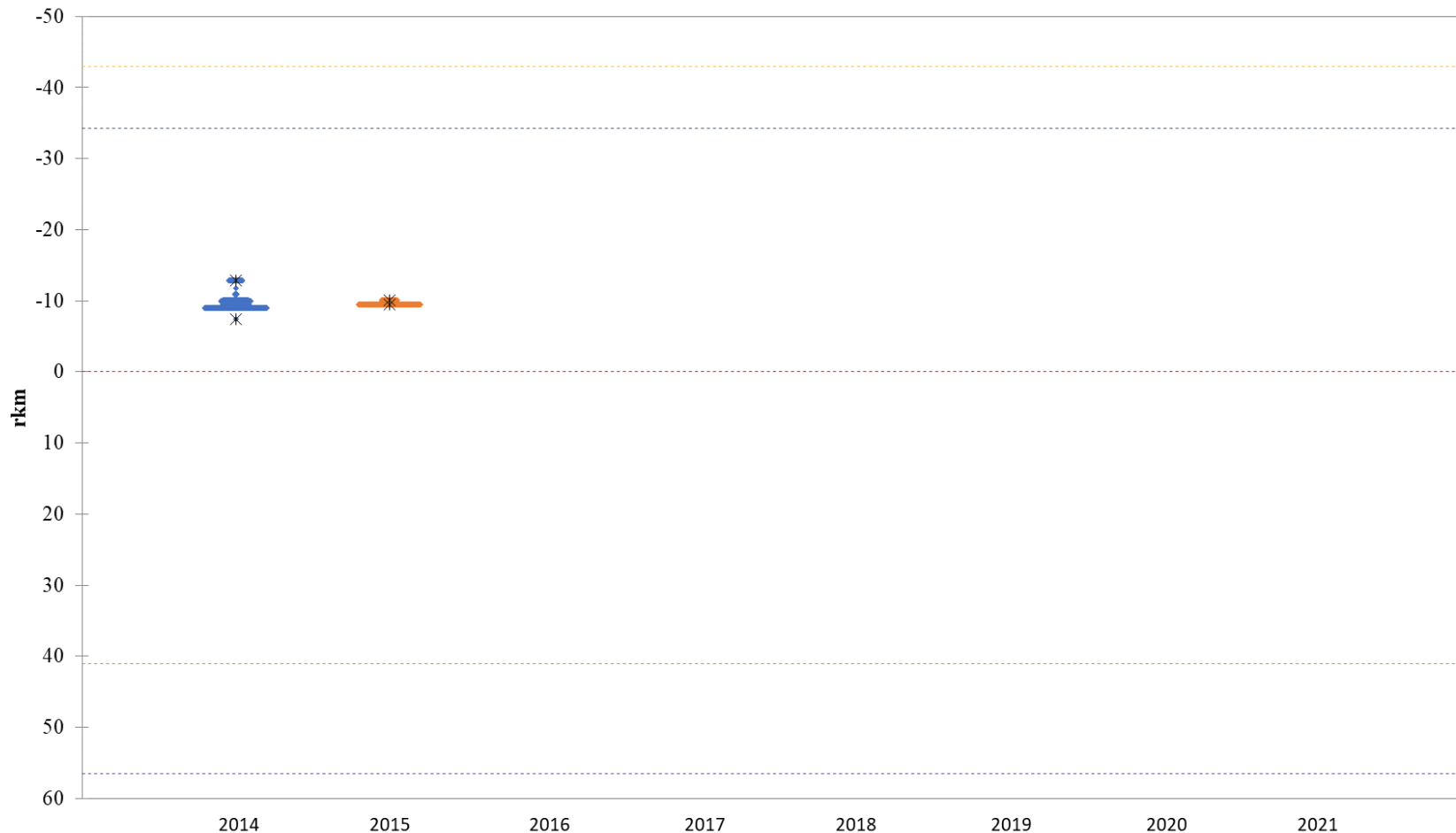


Figure A6-61: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #32177) in the Keeyask reservoir in relation to the Keeyask GS (rkm 0), from May 1, 2014 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

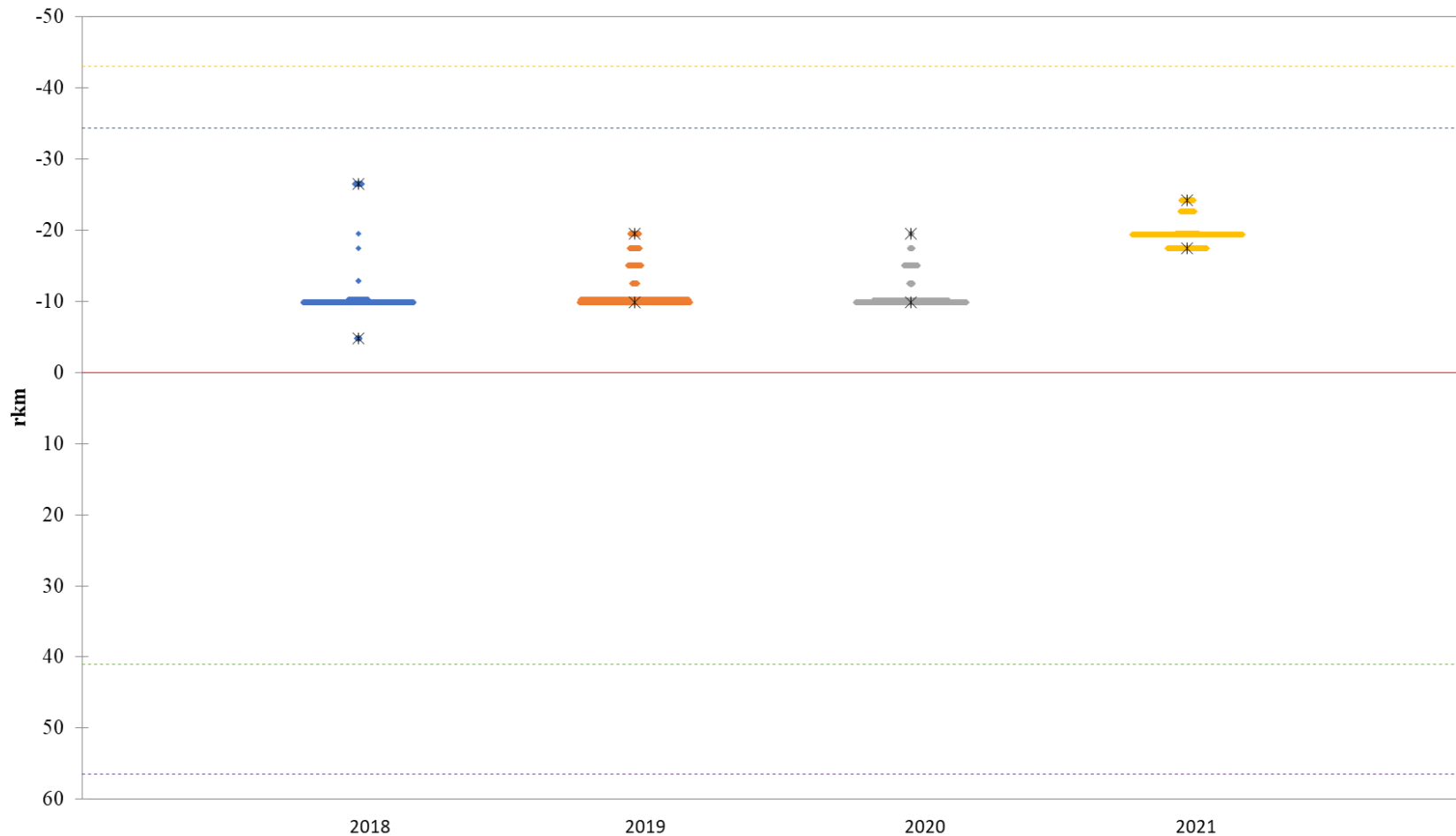


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APPENDIX 7:

DETECTION RANGES FOR LAKE STURGEON TAGGED AND MONITORED BETWEEN 2011 AND 2021 IN STEPHENS LAKE

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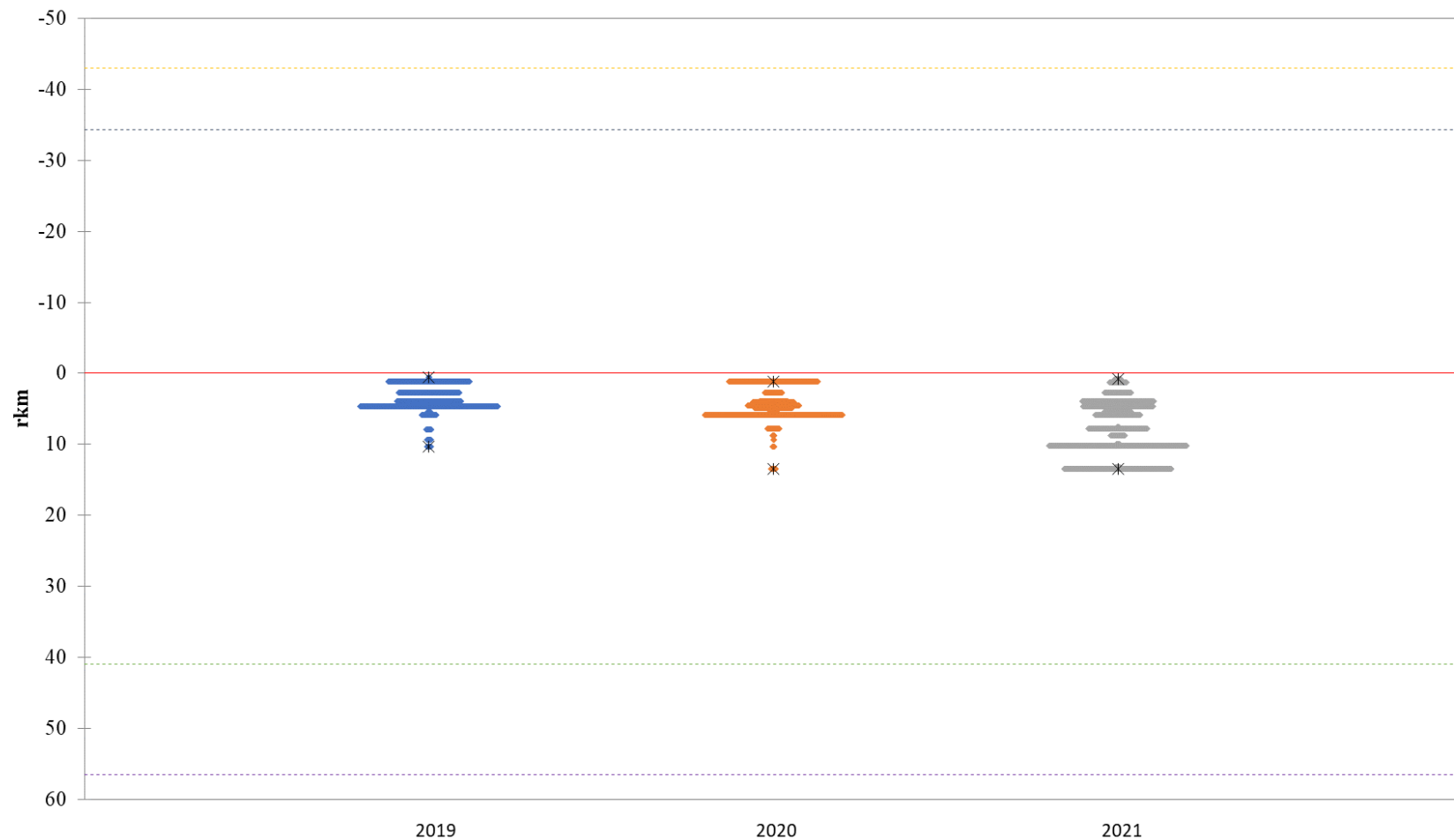


Figure A7-1: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7035) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

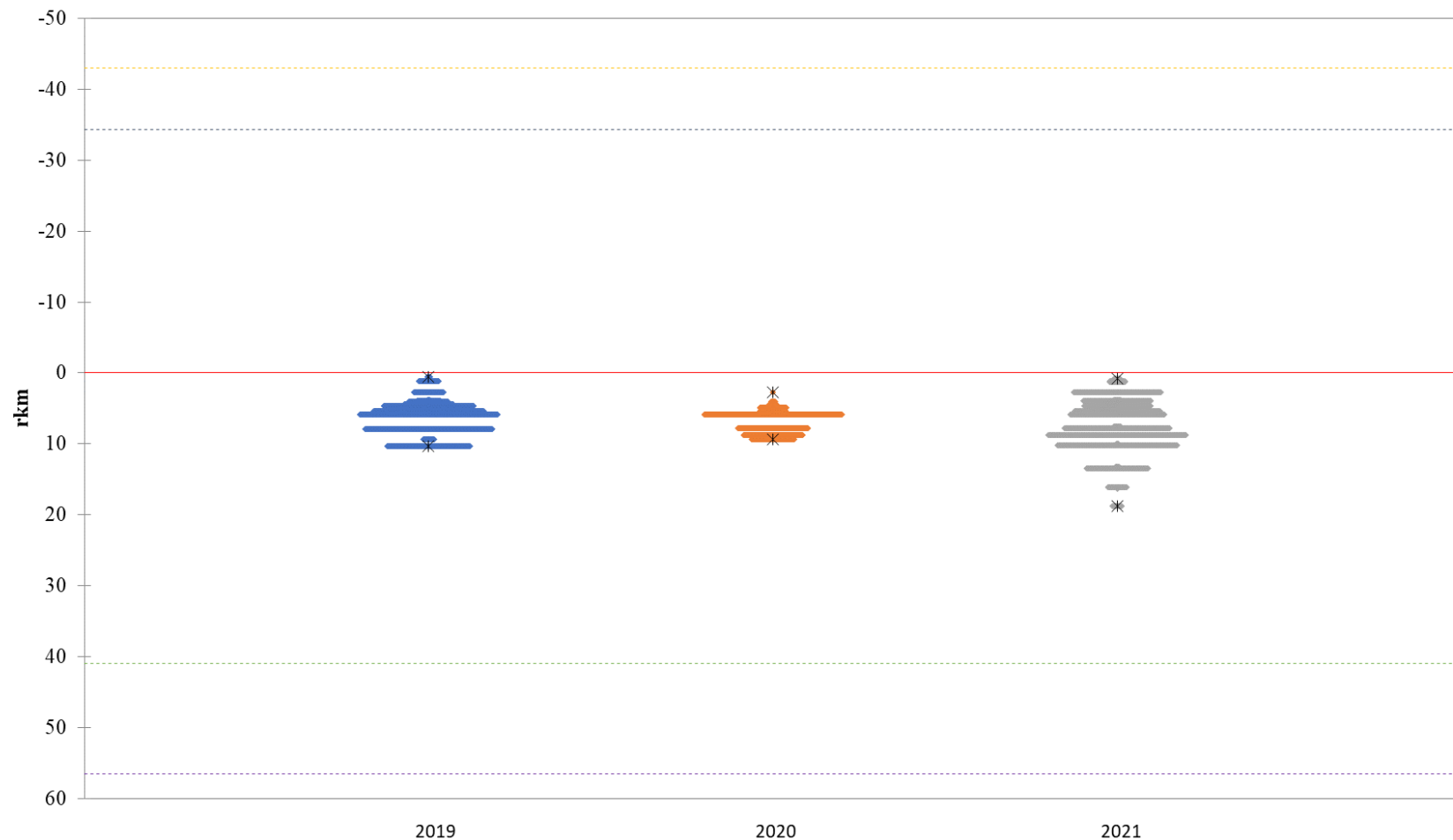


Figure A7-2: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7036) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

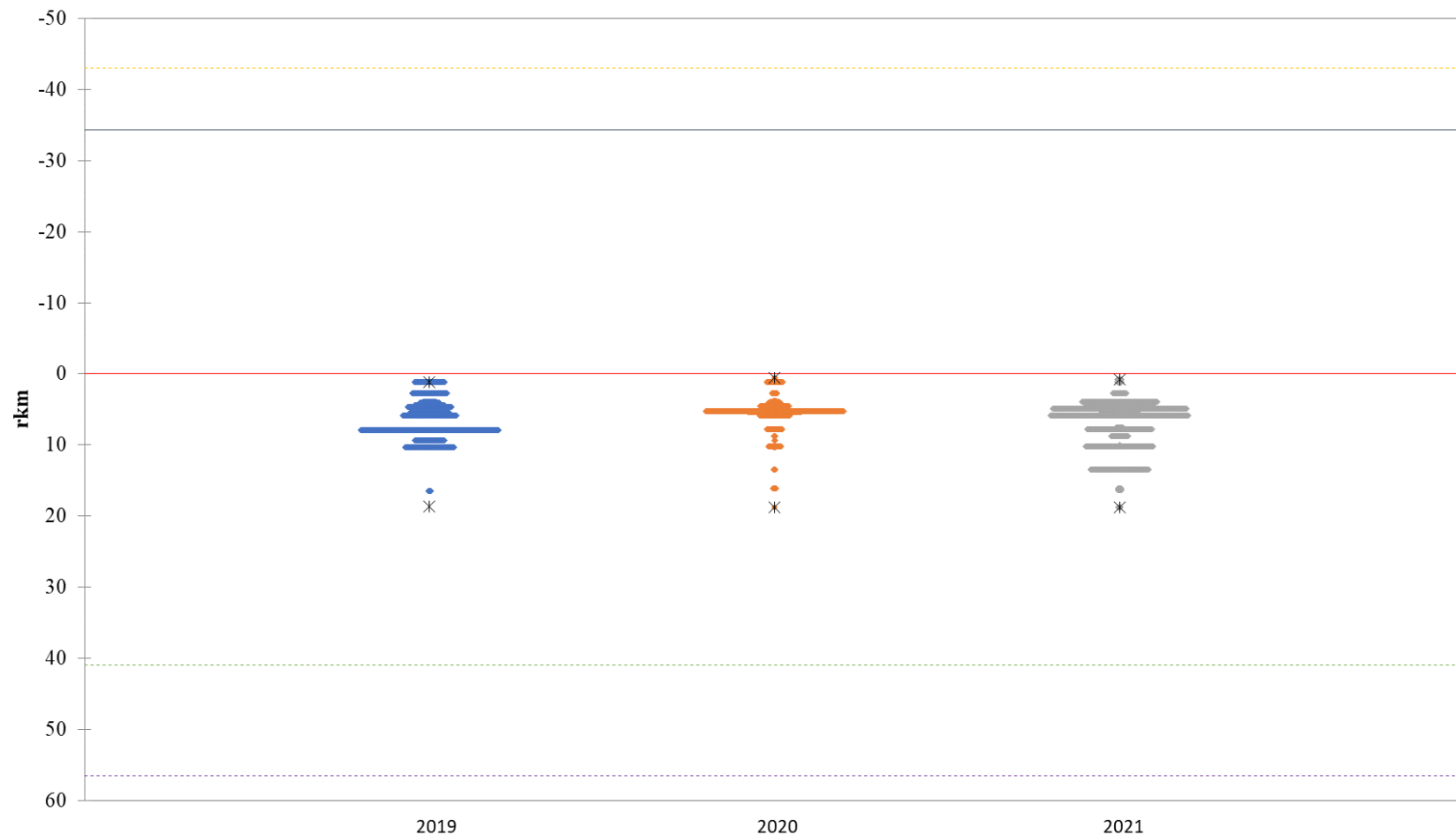


Figure A7-3: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7037) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

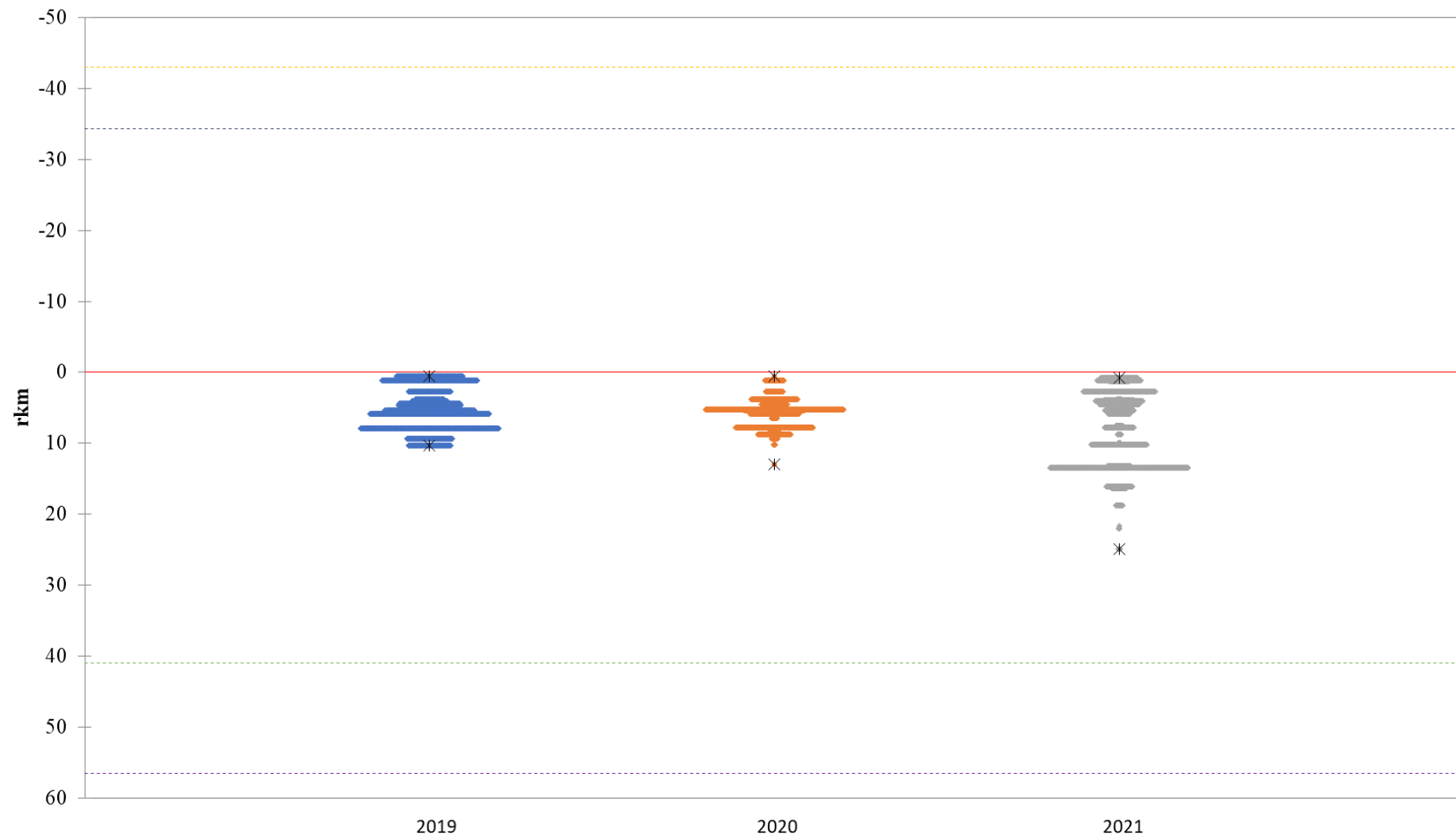


Figure A7-4: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7038) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

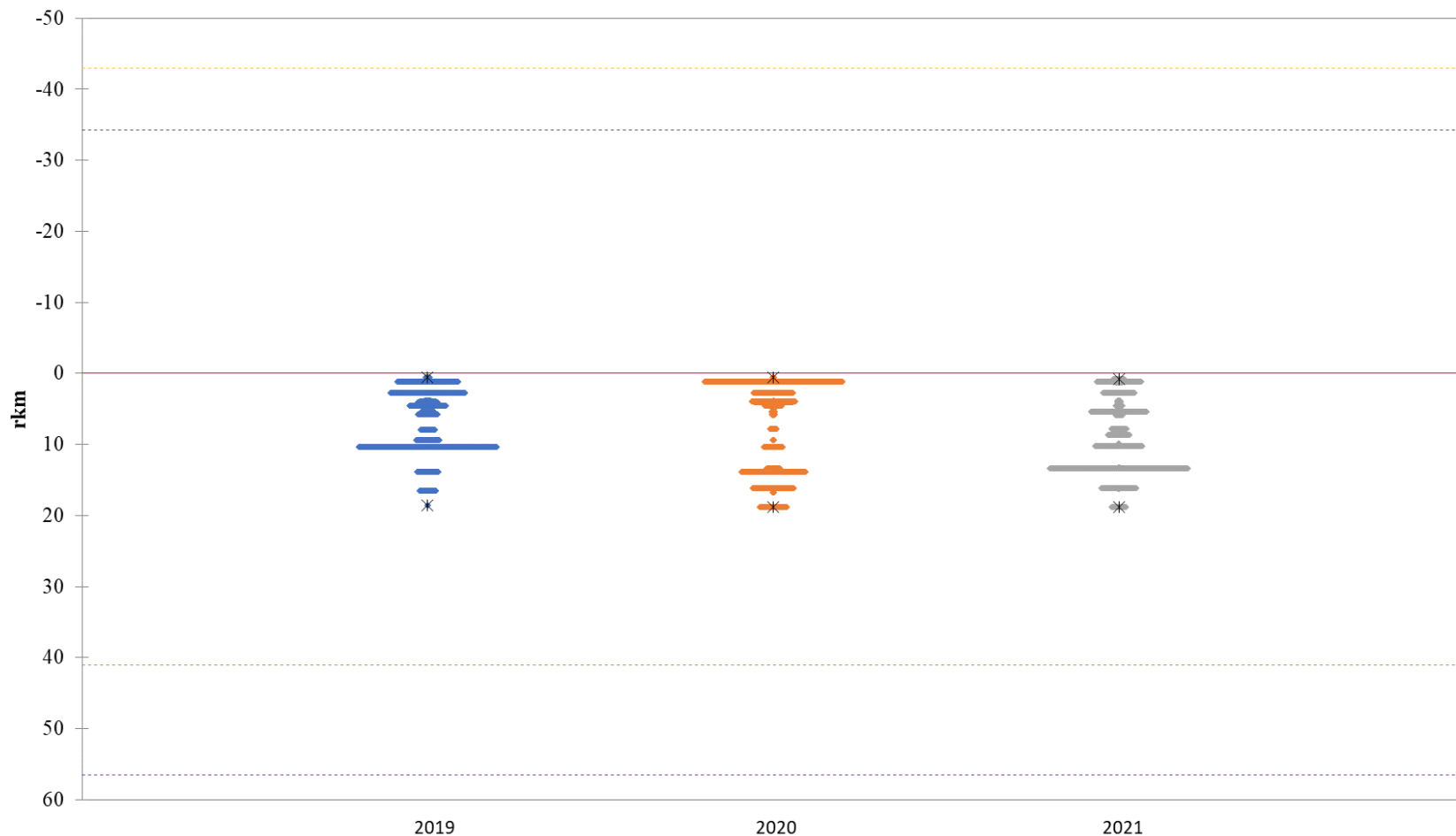


Figure A7-5: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7039) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

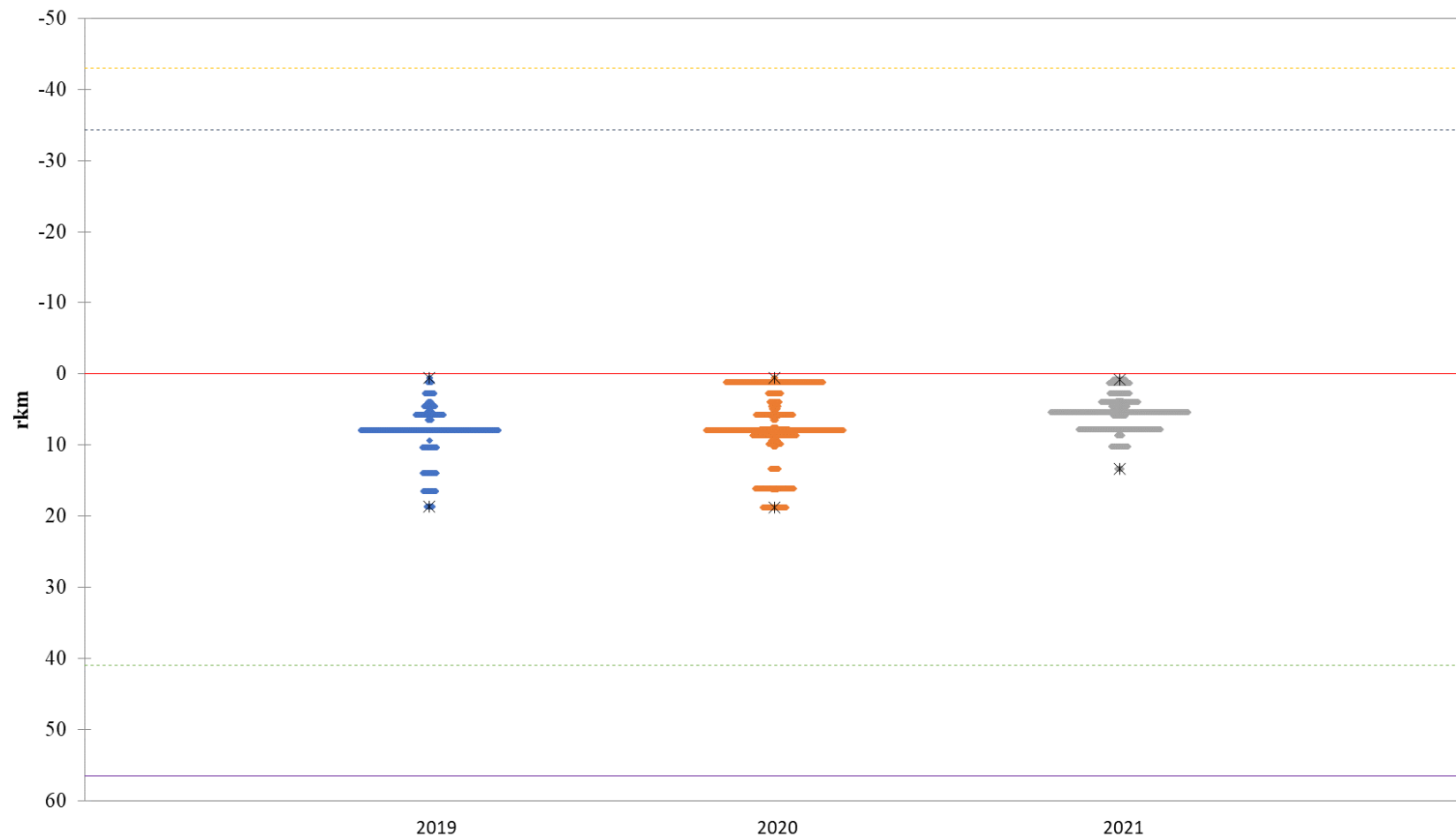


Figure A7-6: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7040) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

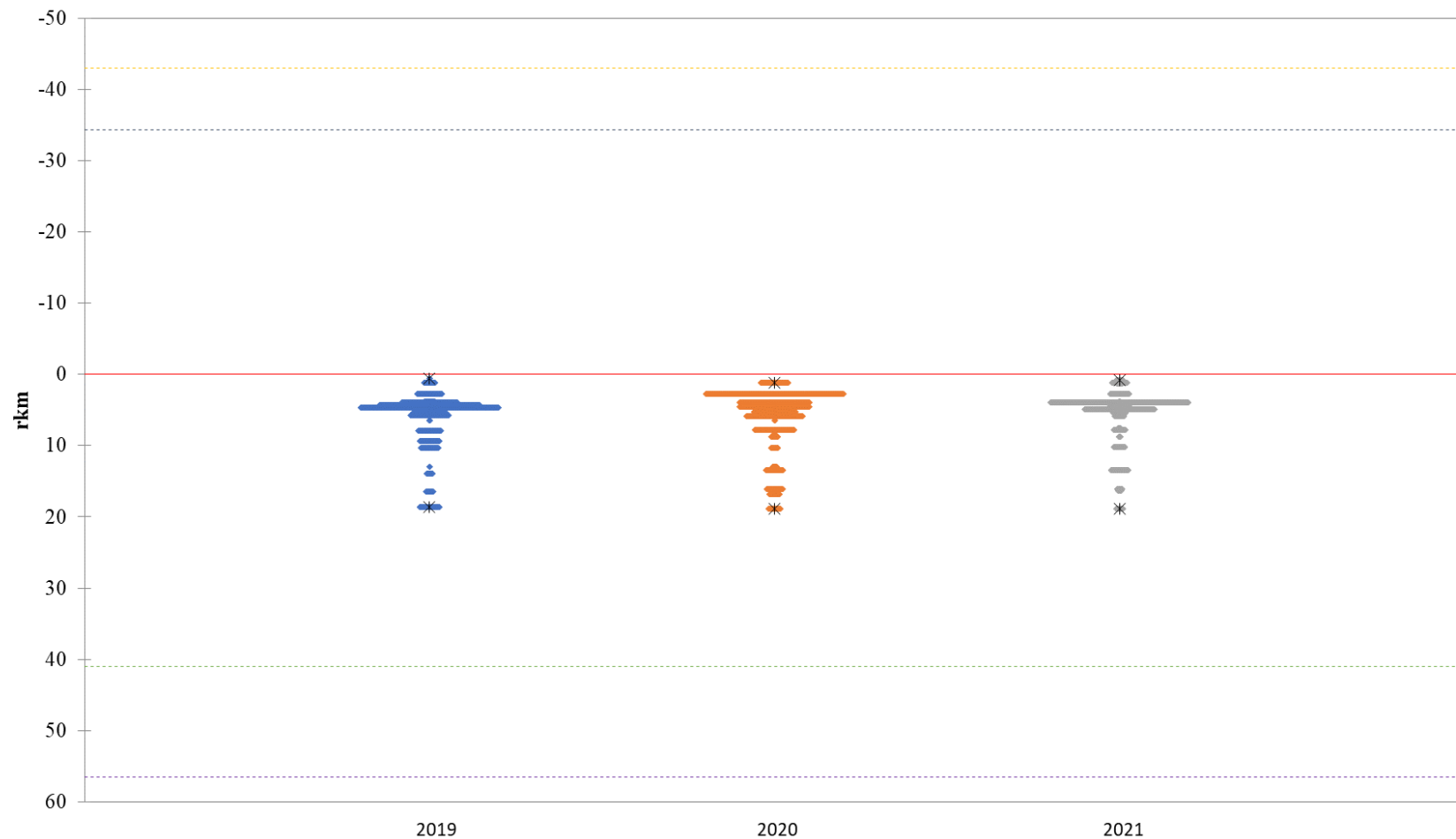


Figure A7-7: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7041) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

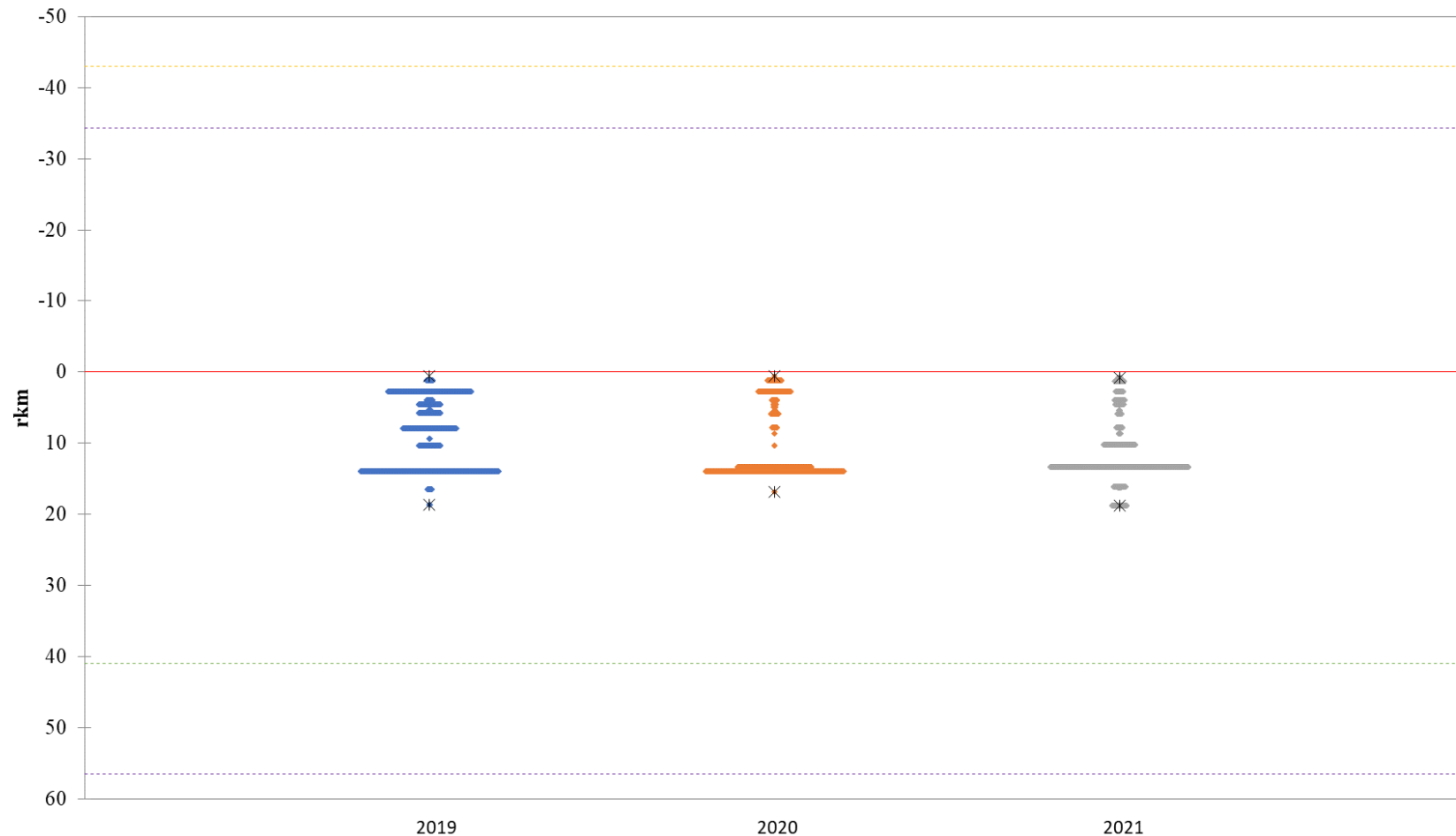


Figure A7-8: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7042) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

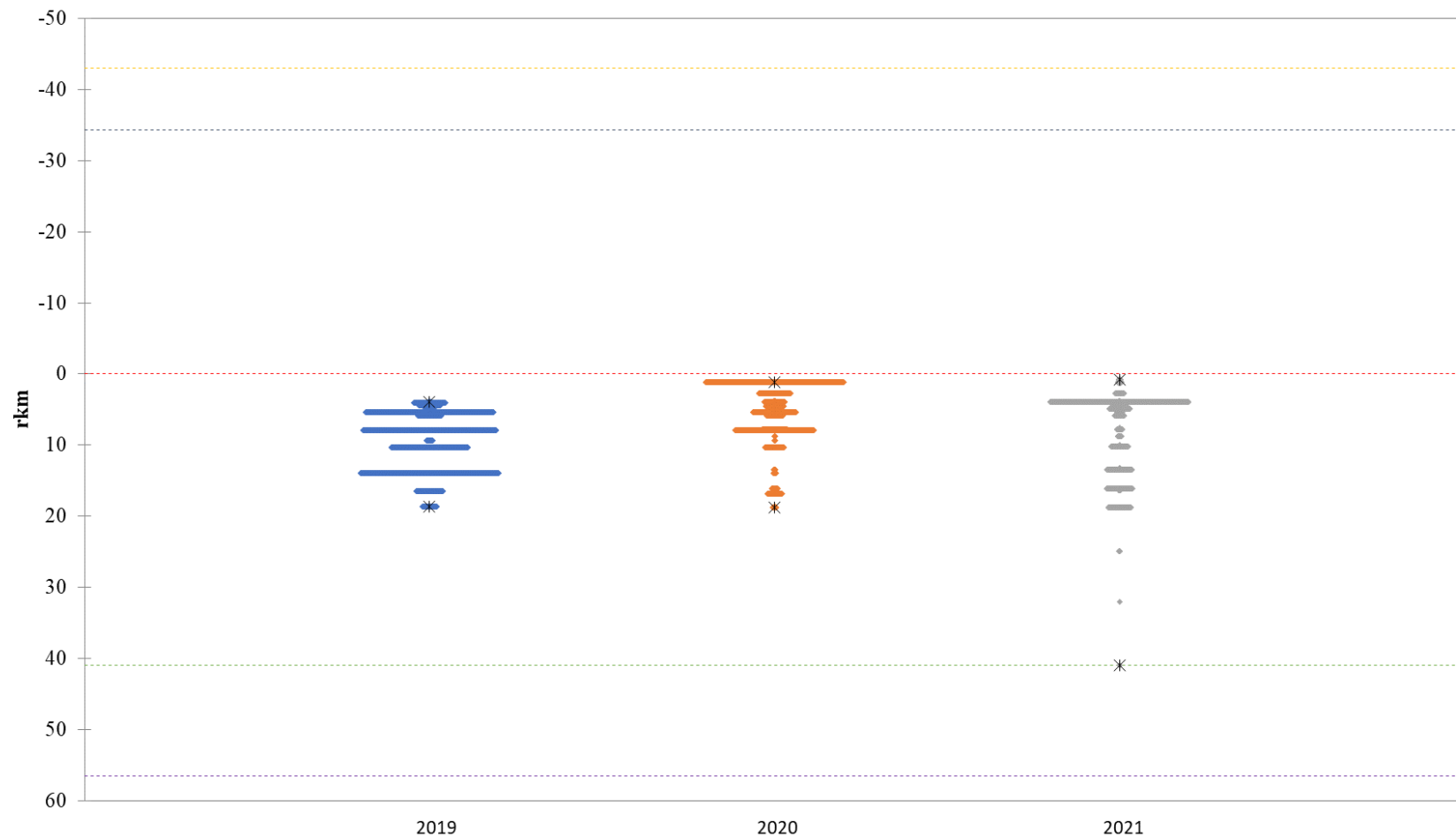


Figure A7-9: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7043) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

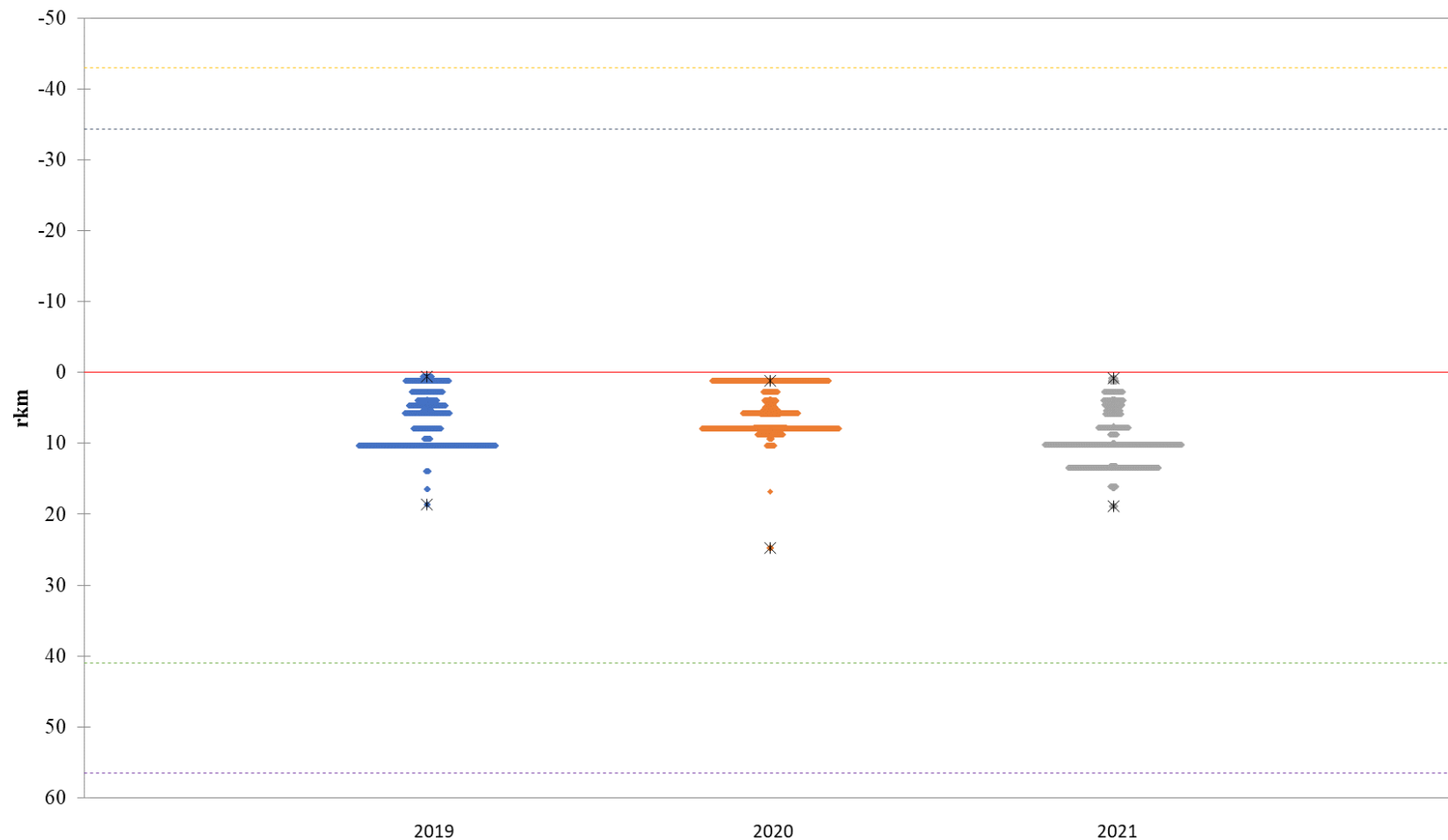


Figure A7-10: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7044) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

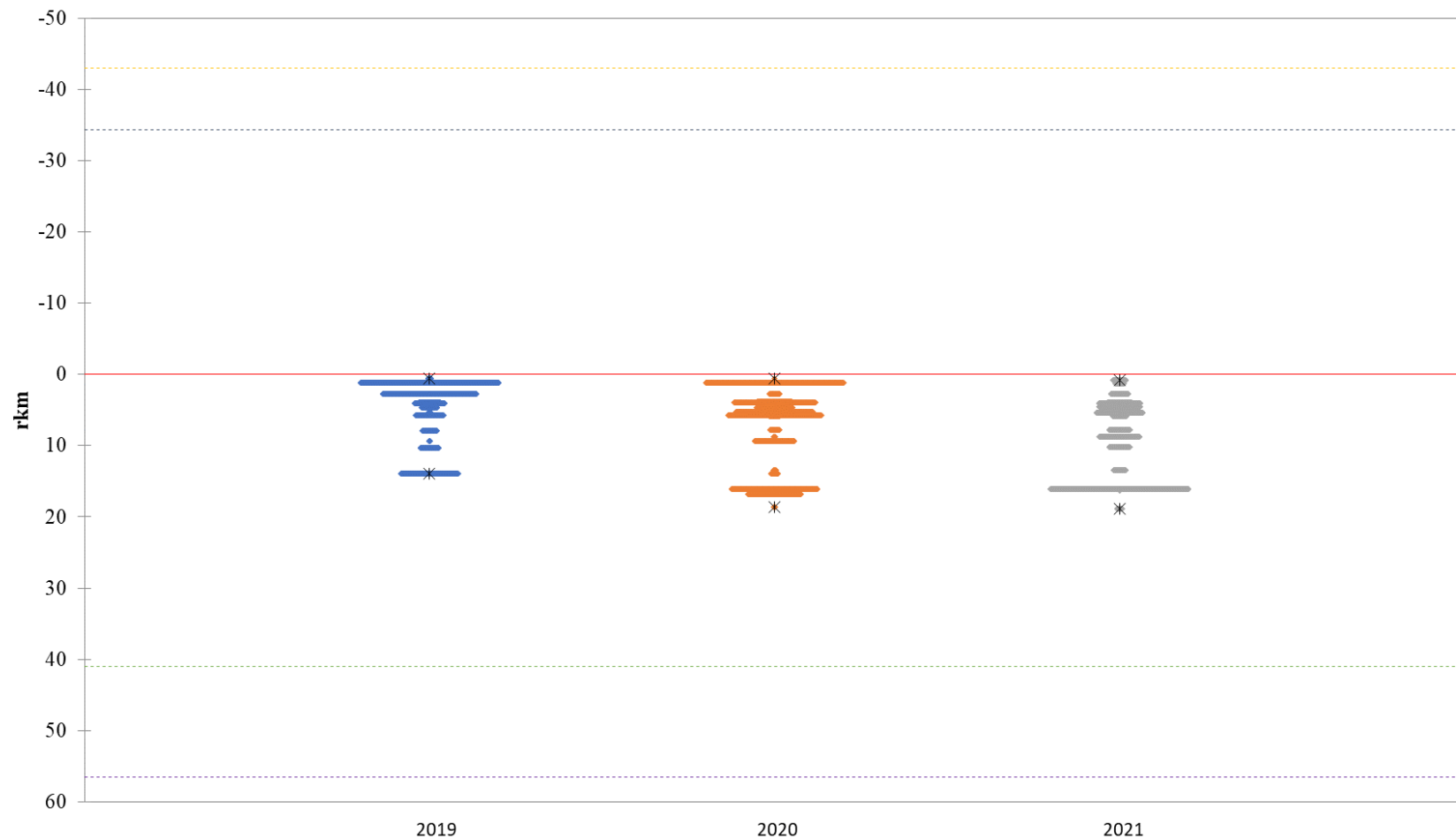


Figure A7-11: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7045) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

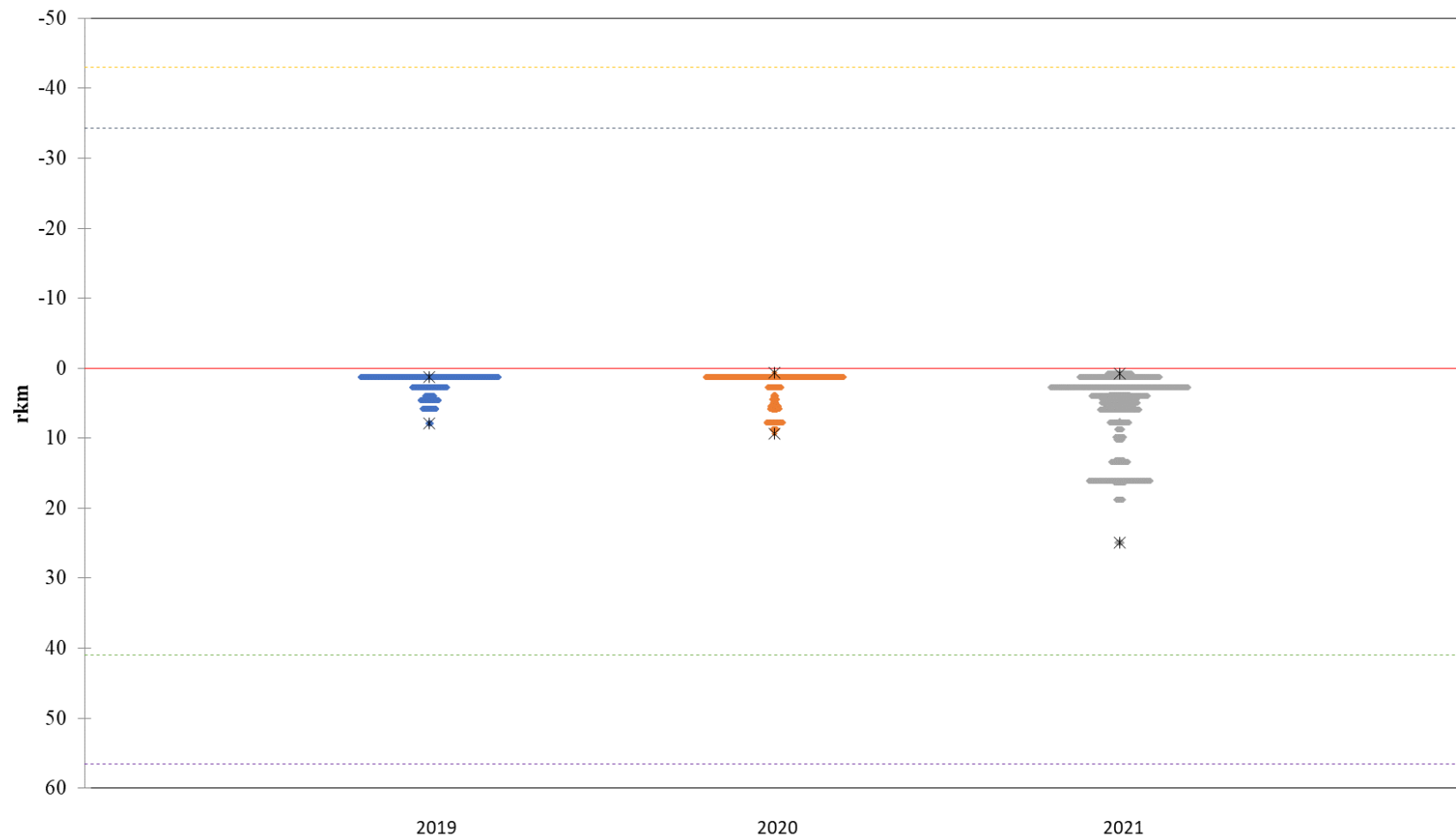


Figure A7-12: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7046) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

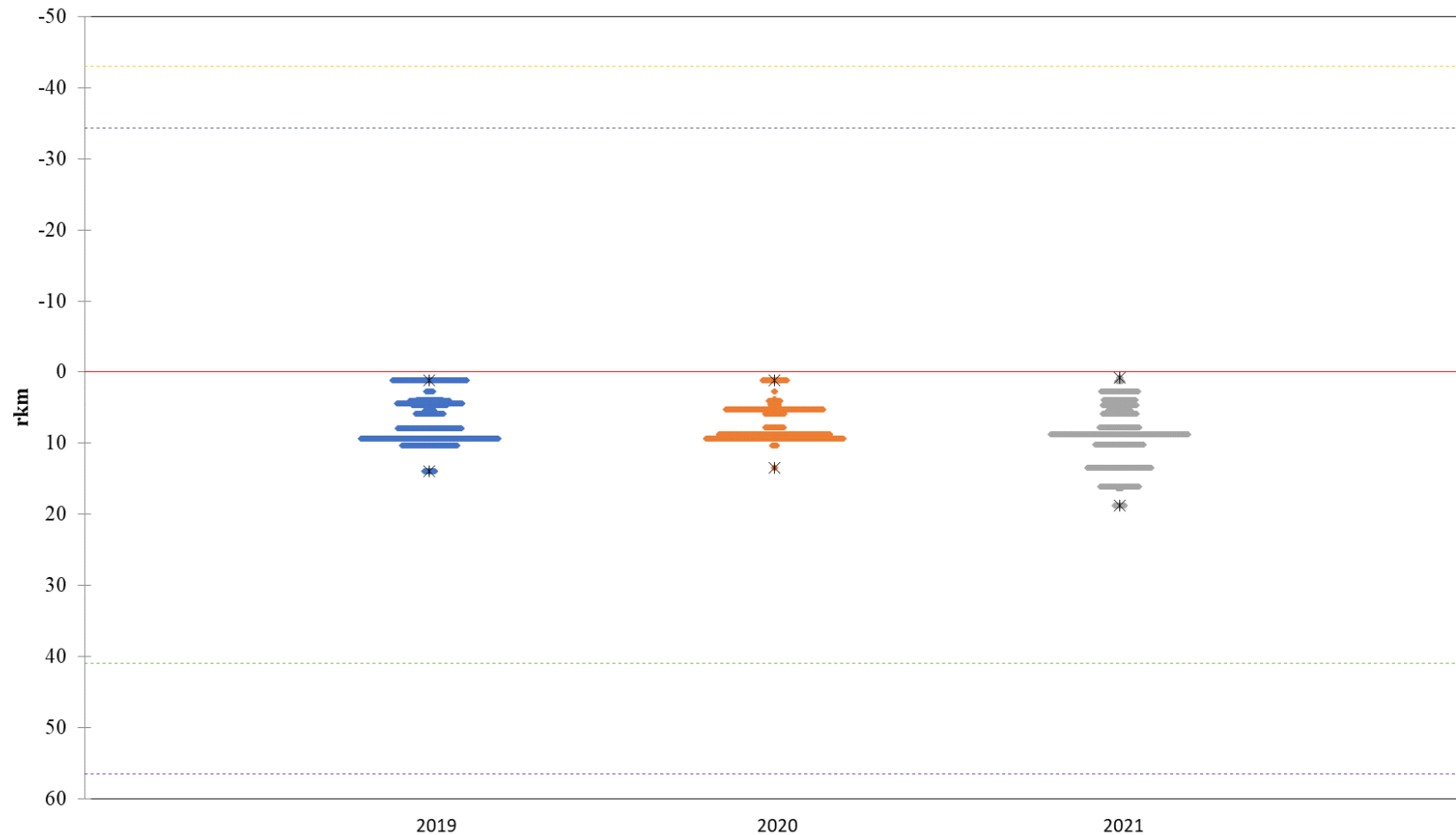


Figure A7-13: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7047) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

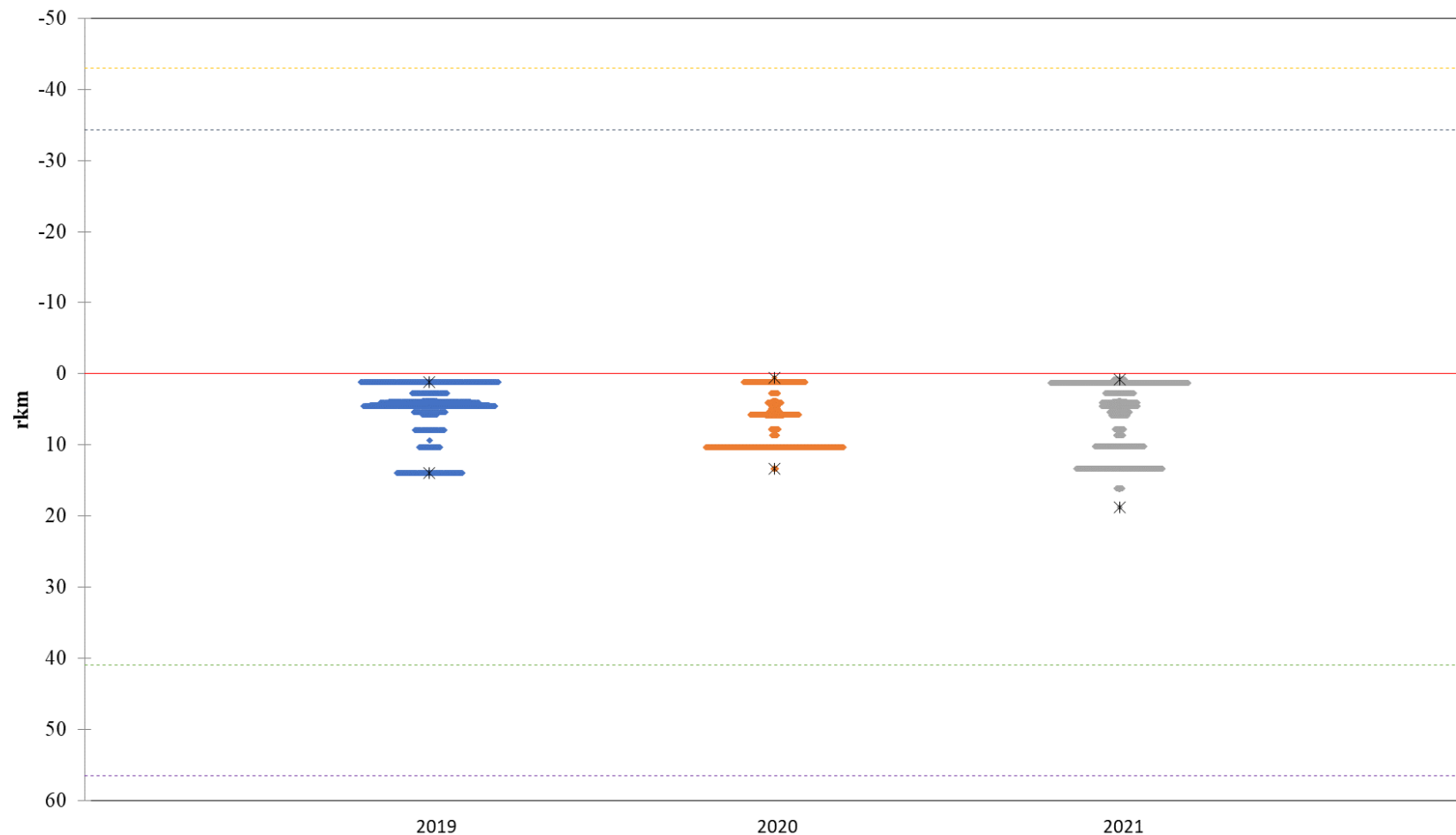


Figure A7-14: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7048) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

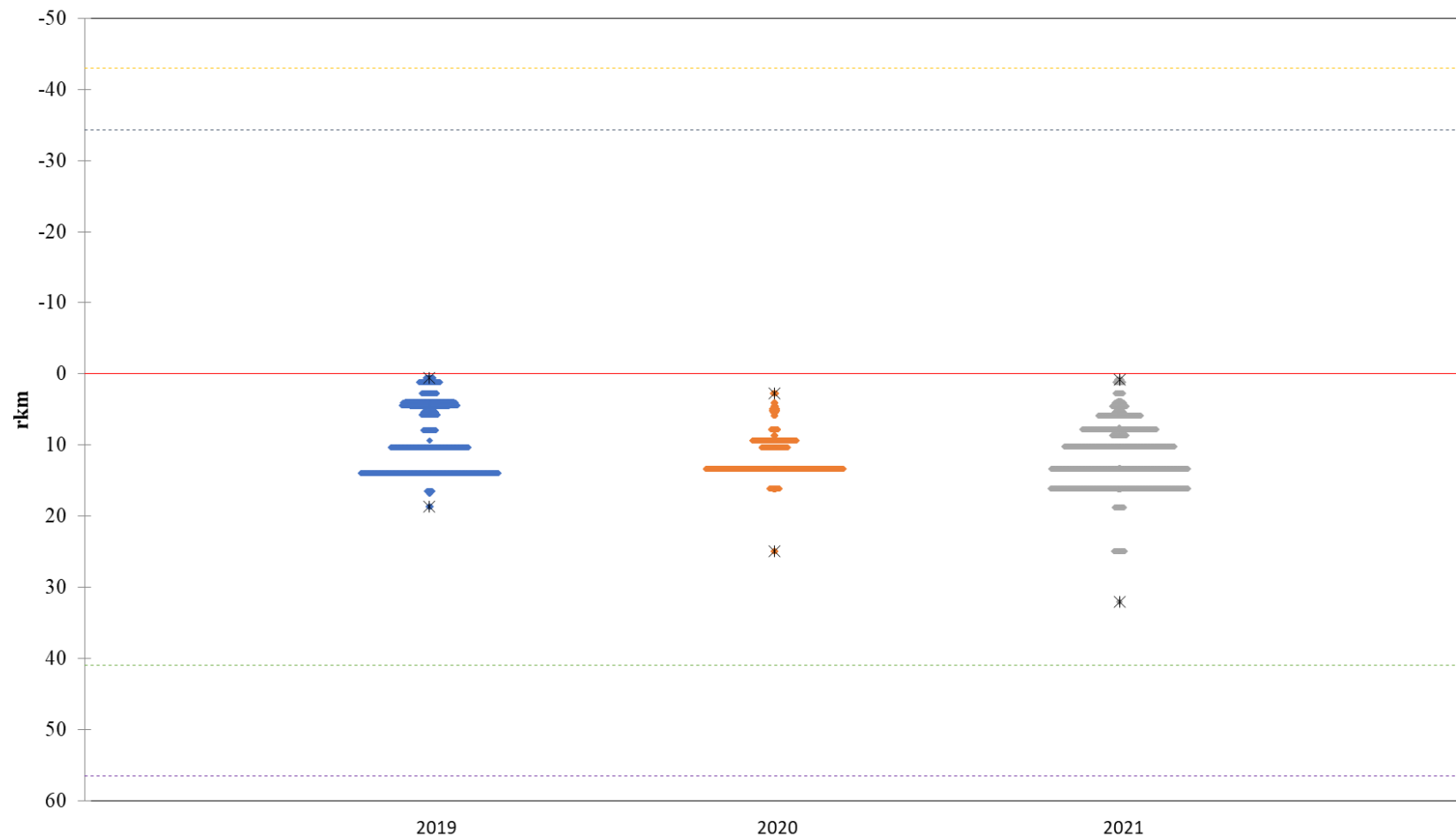


Figure A7-15: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7049) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

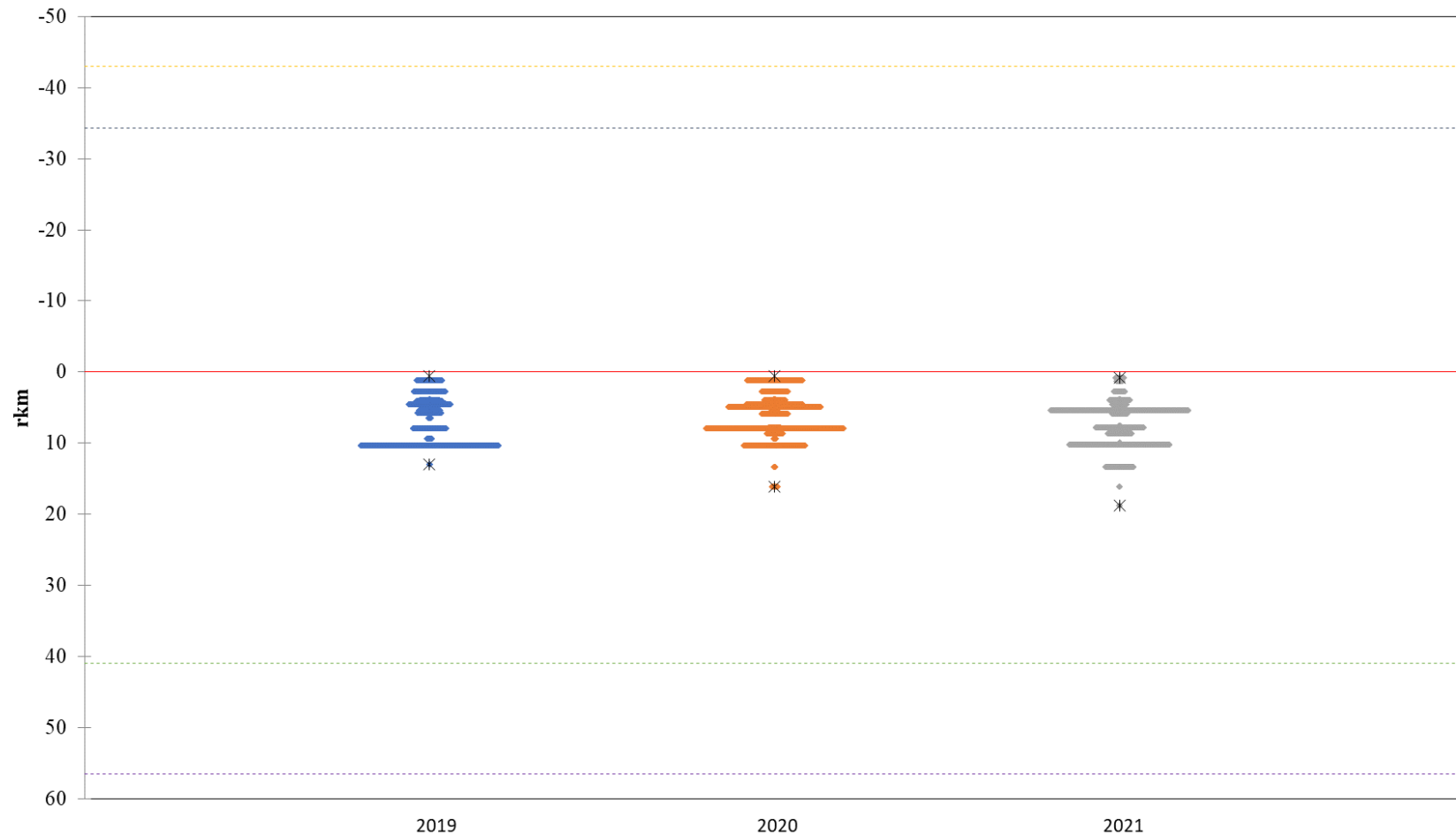


Figure A7-16: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7050) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

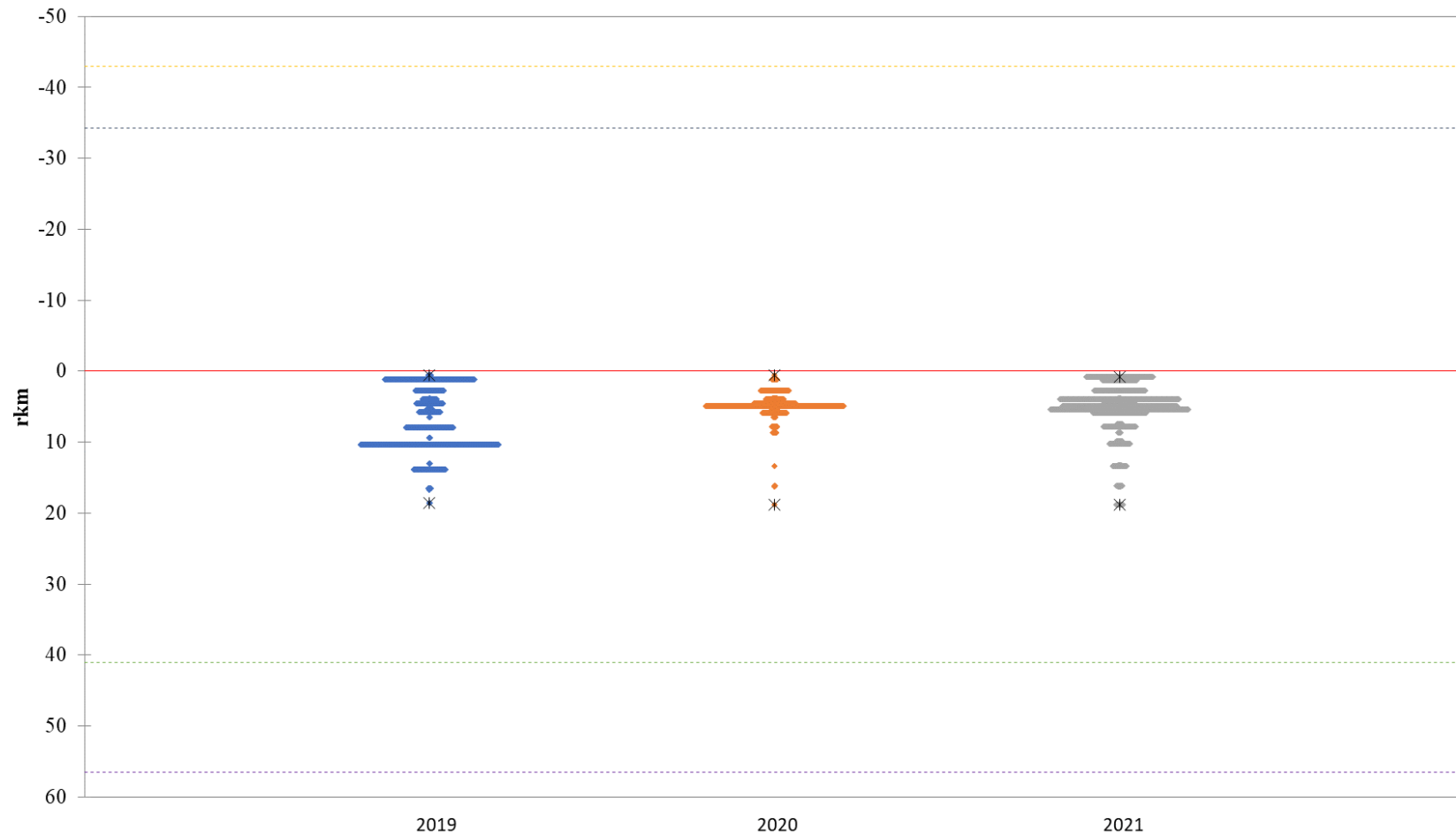


Figure A7-17: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7051) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

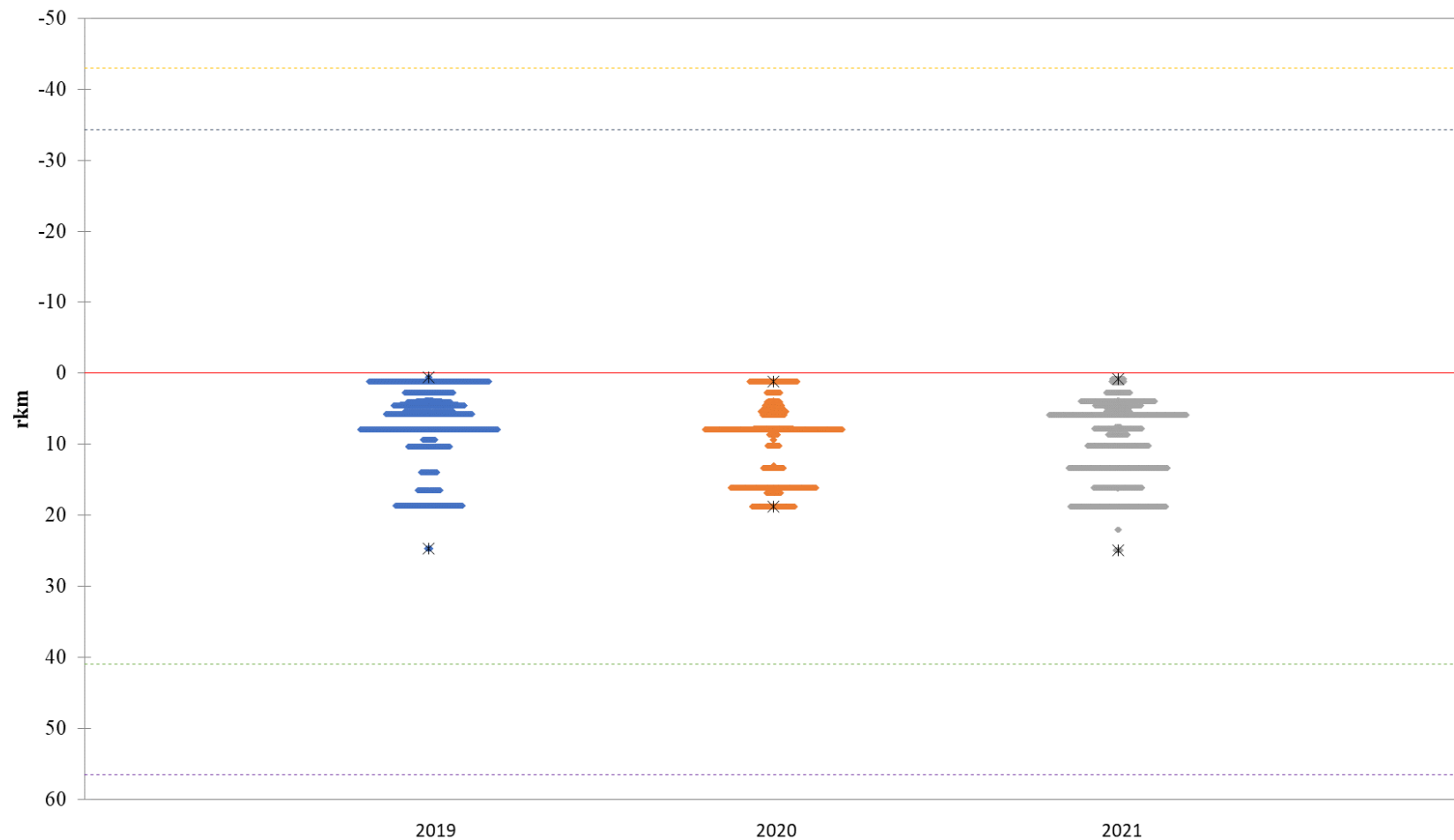


Figure A7-18: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7052) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

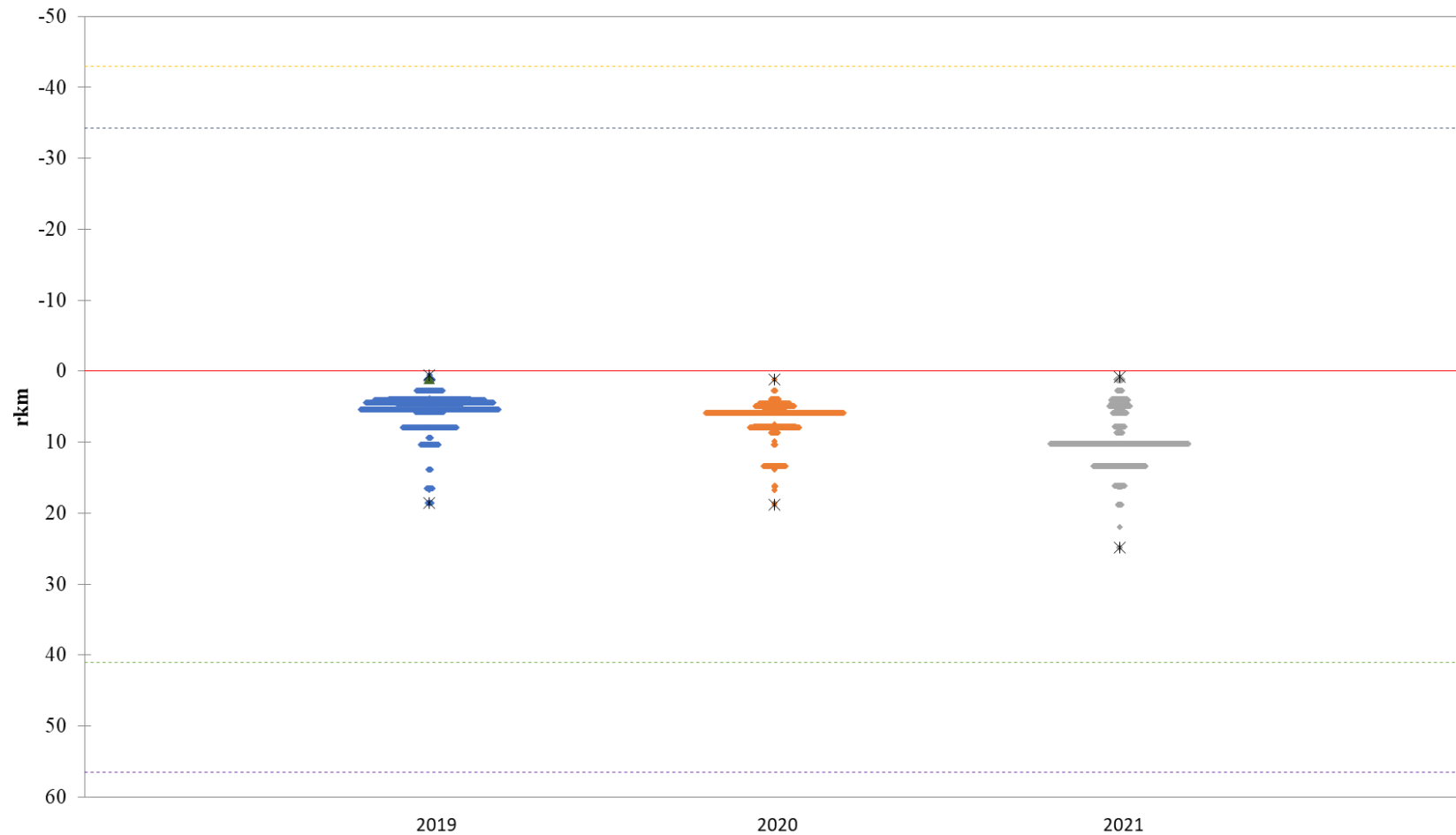


Figure A7-19: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7054) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

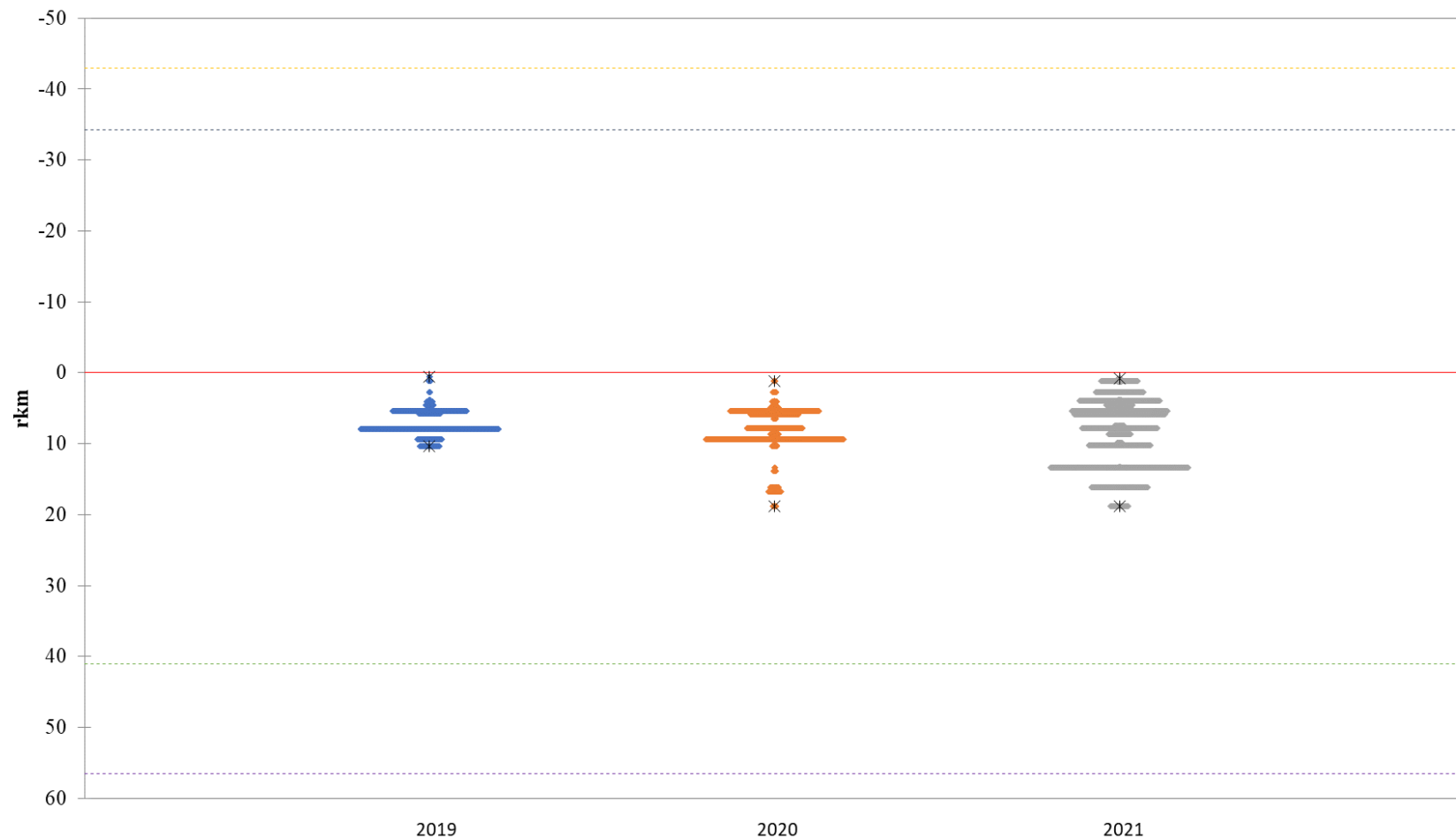


Figure A7-20: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7055) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

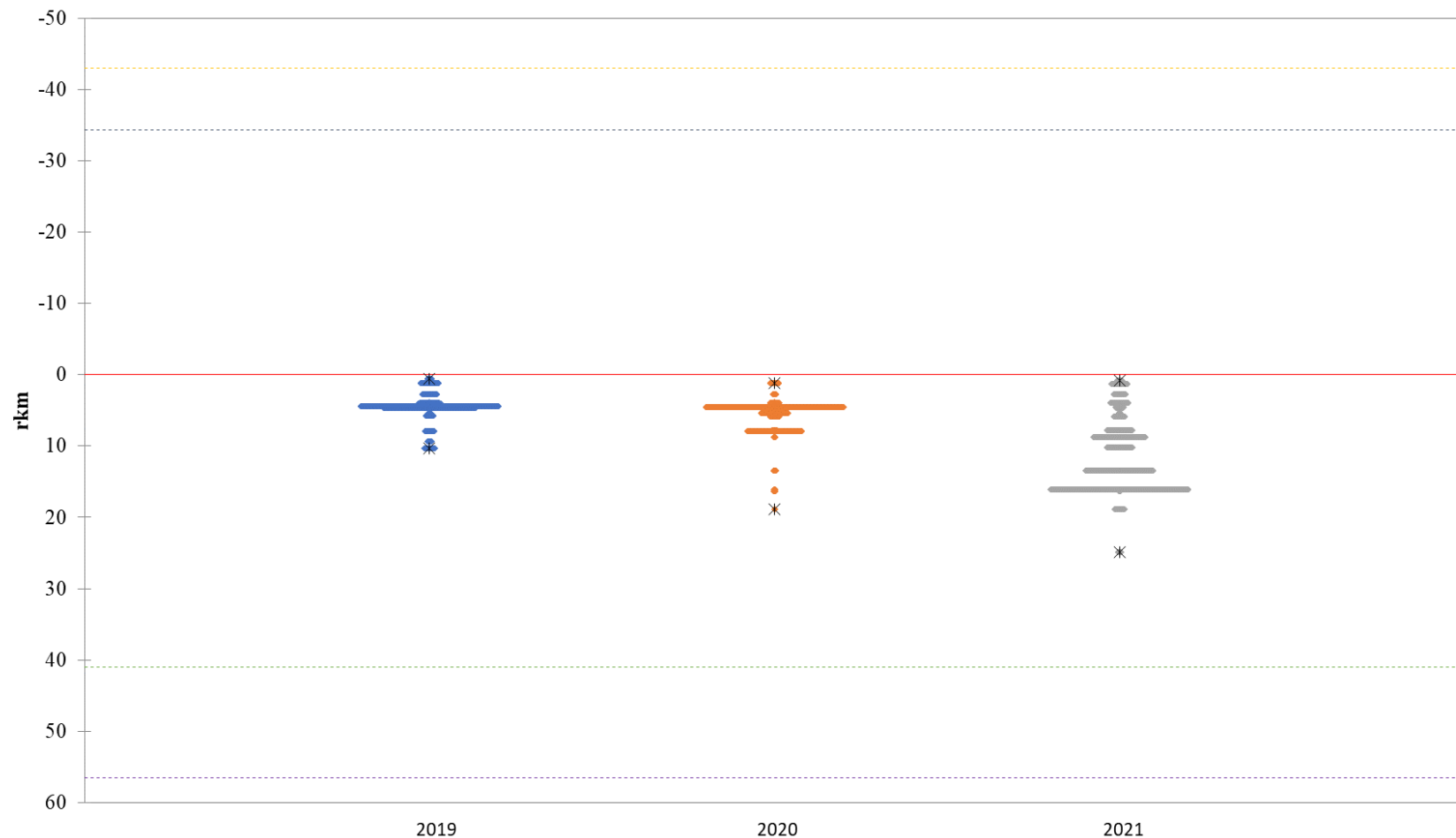


Figure A7-21: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7057) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

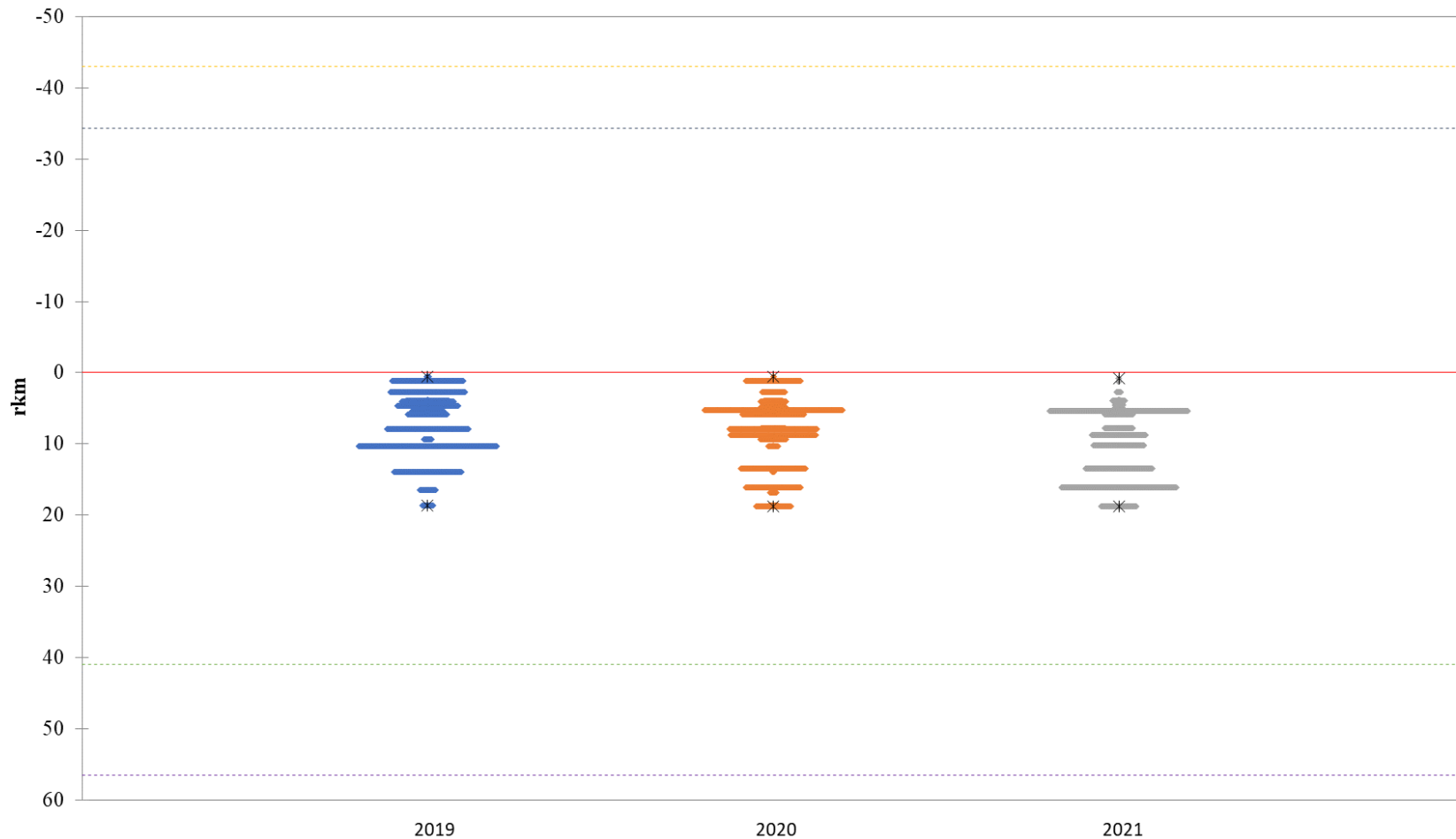


Figure A7-22: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7058) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

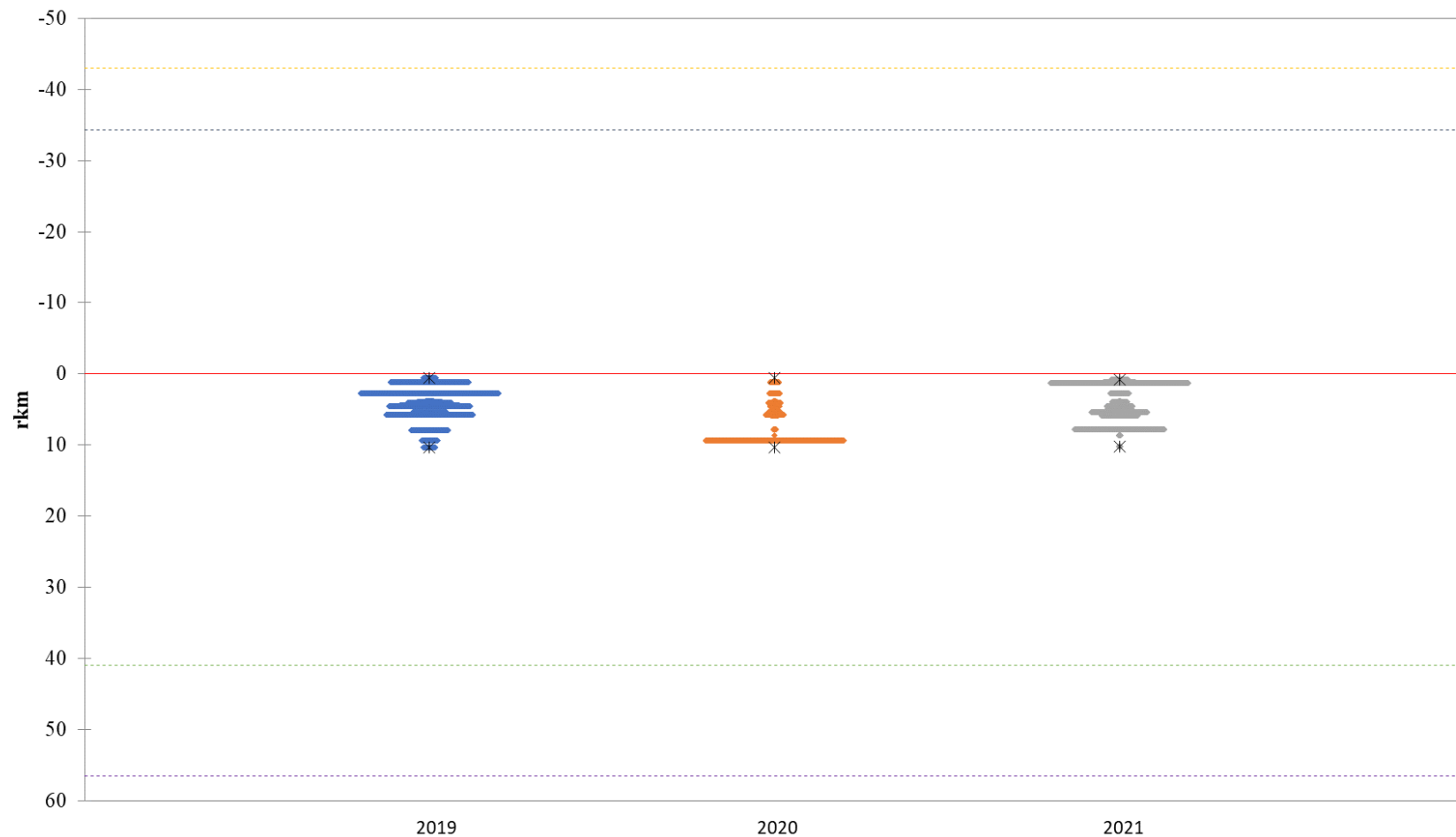


Figure A7-23: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7060) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

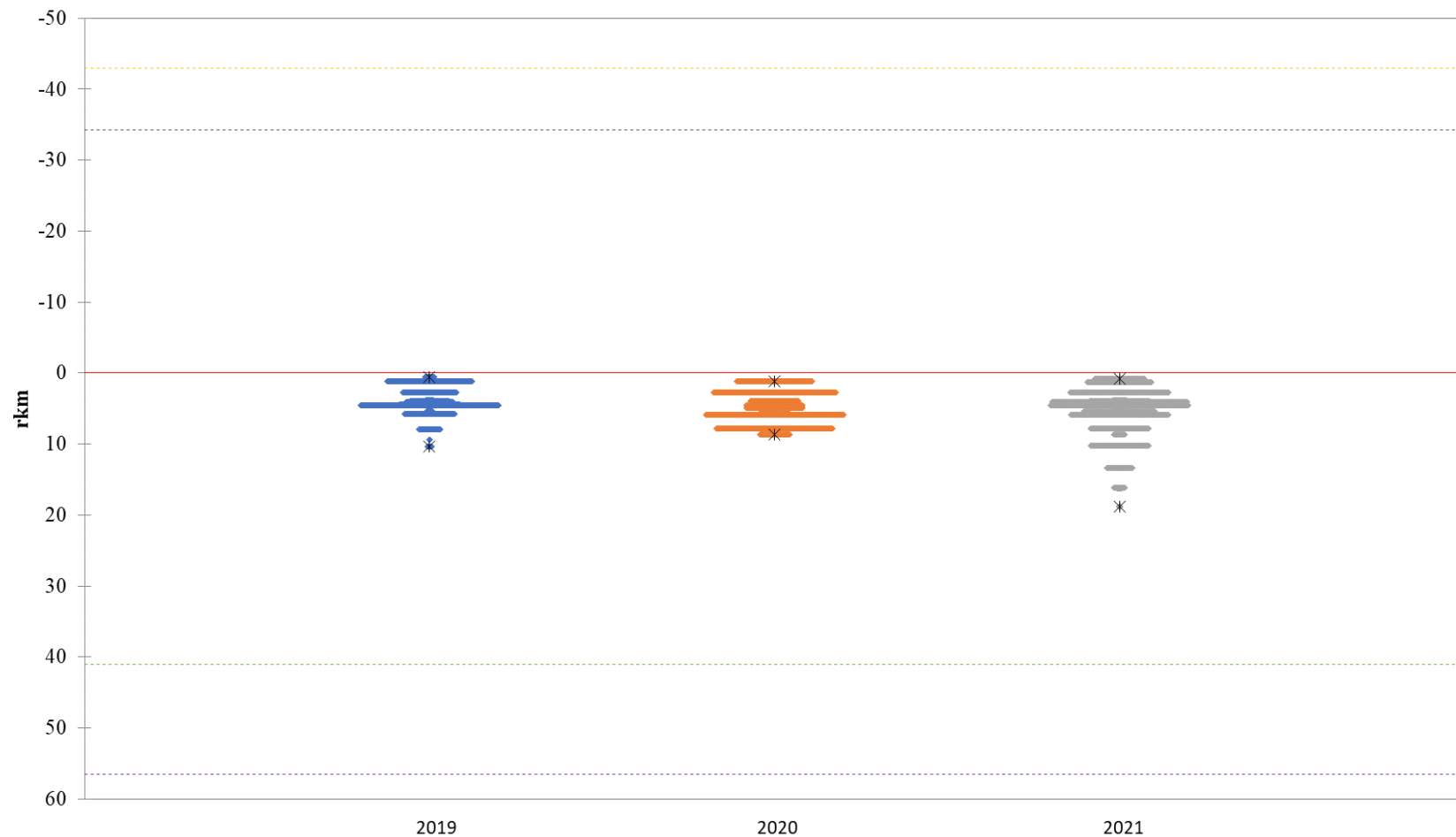


Figure A7-24: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7062) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

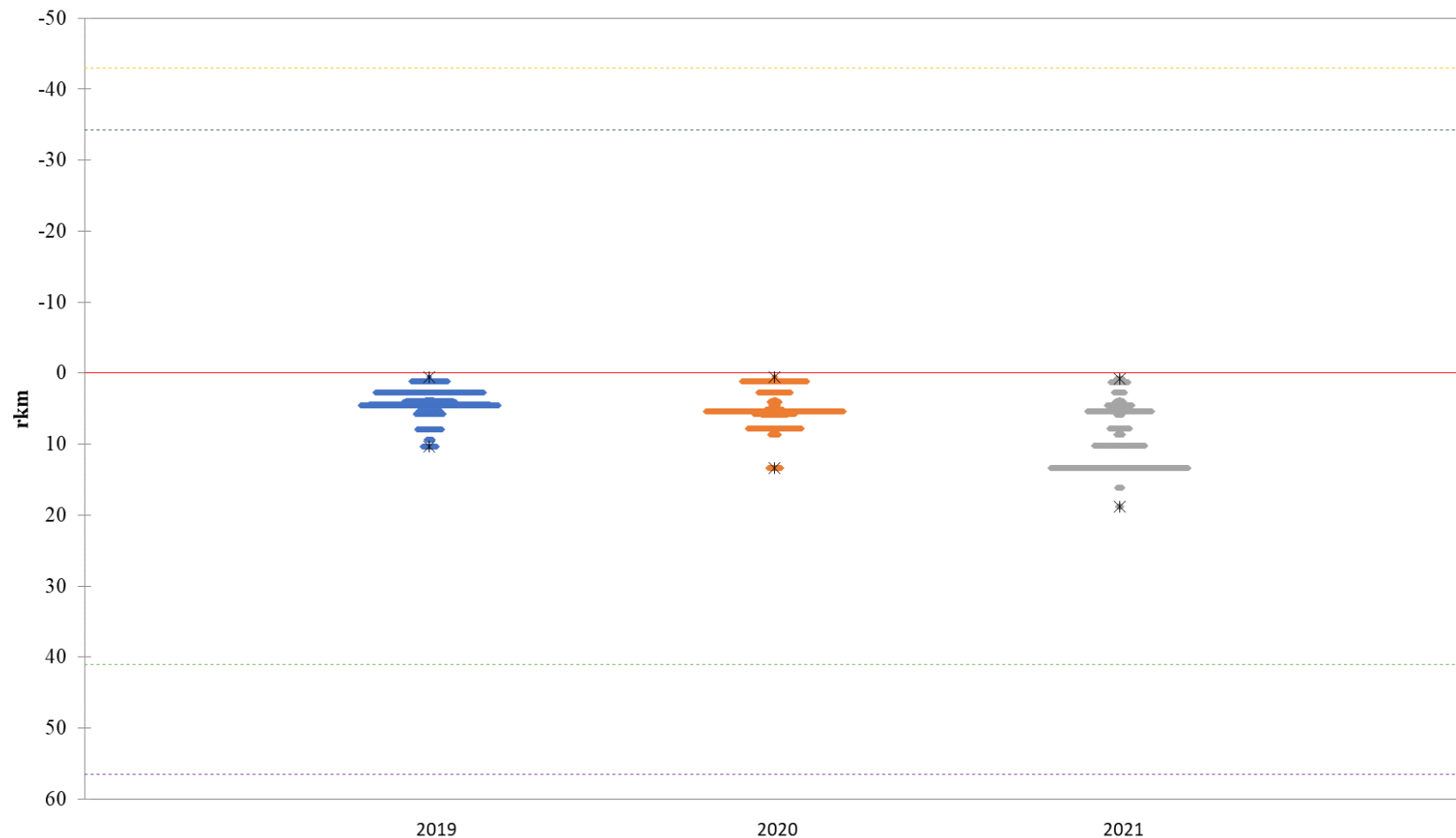


Figure A7-25: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #7063) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2019 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

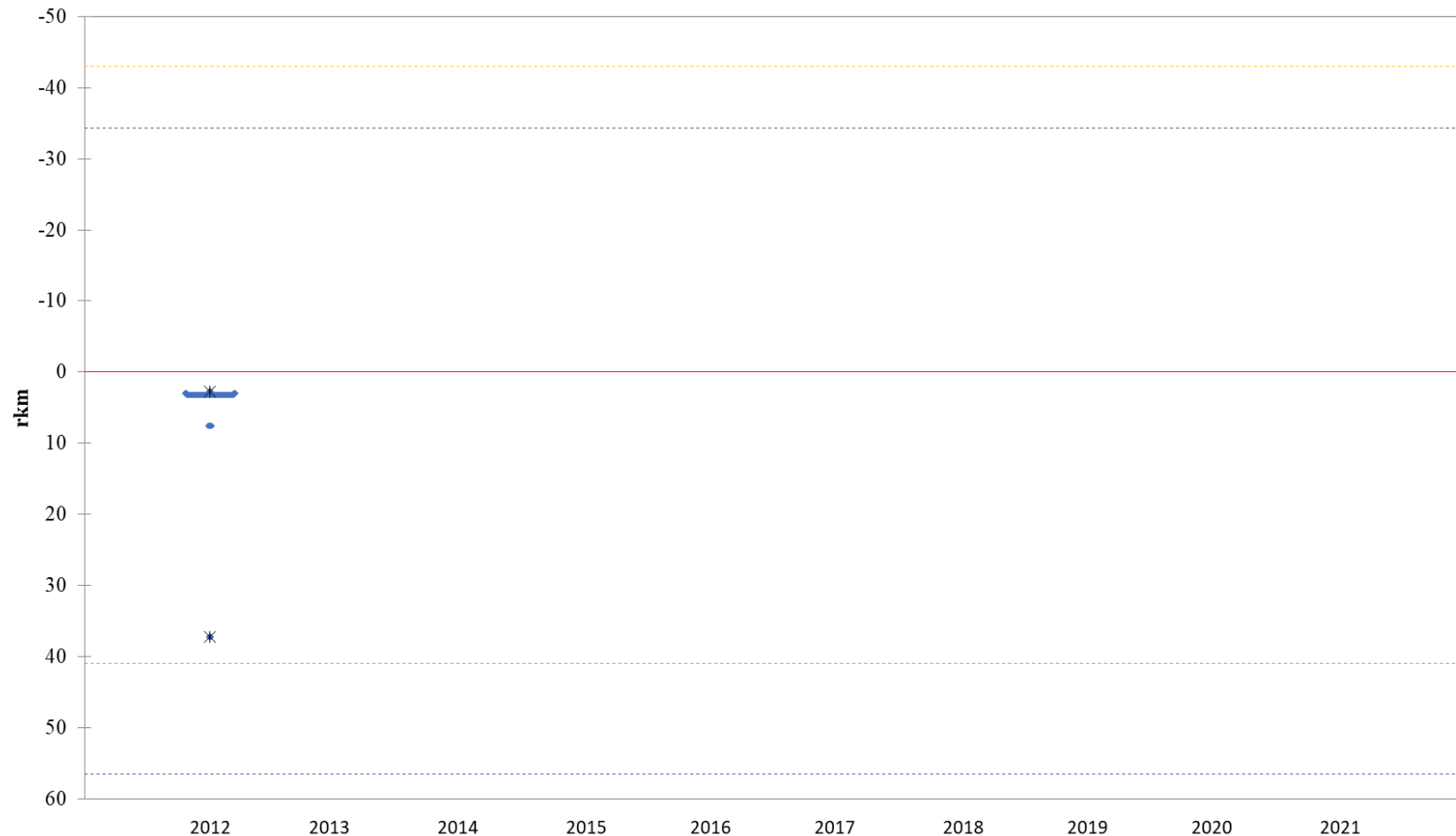


Figure A7-26: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16018) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2012 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

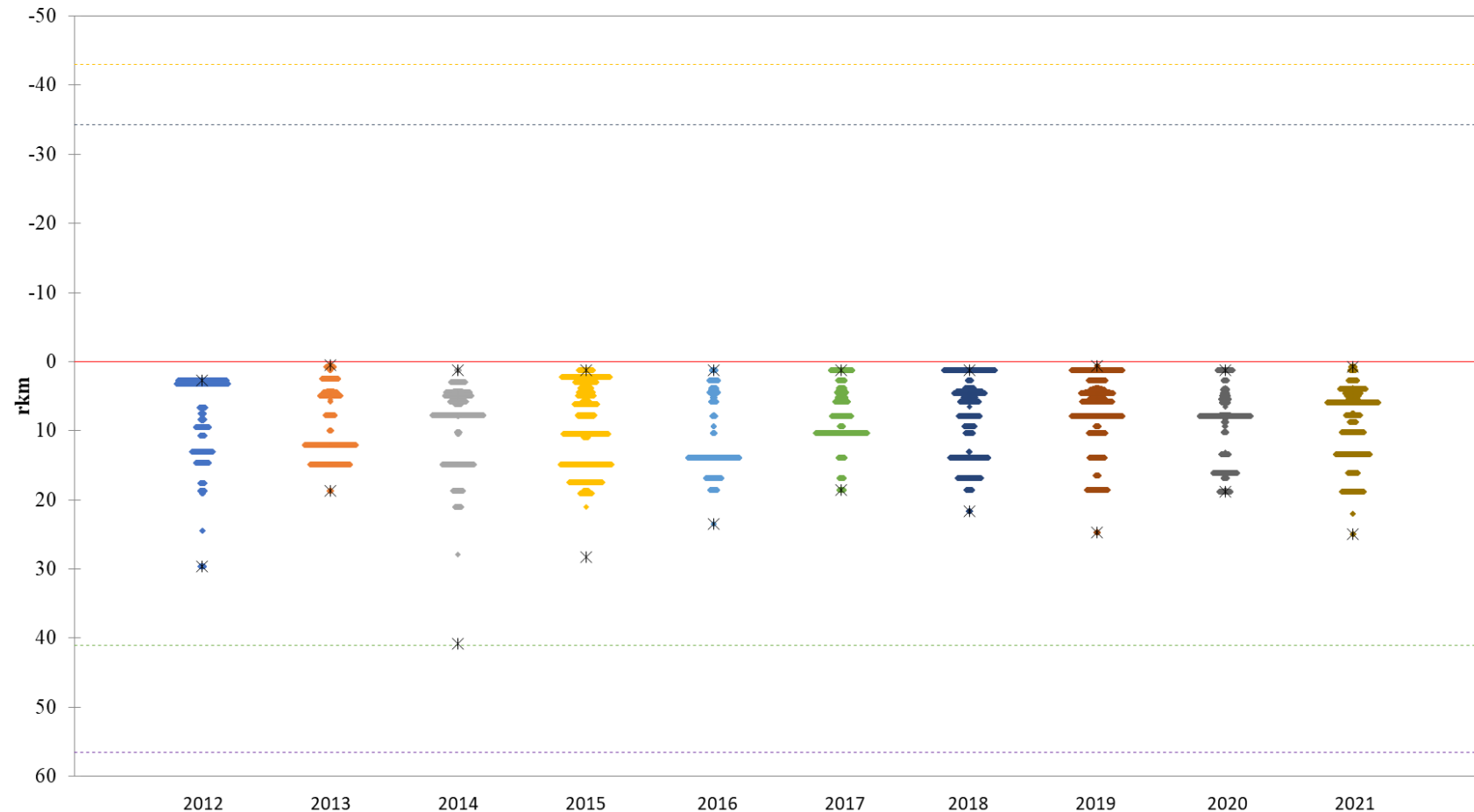


Figure A7-27: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16019) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2012 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

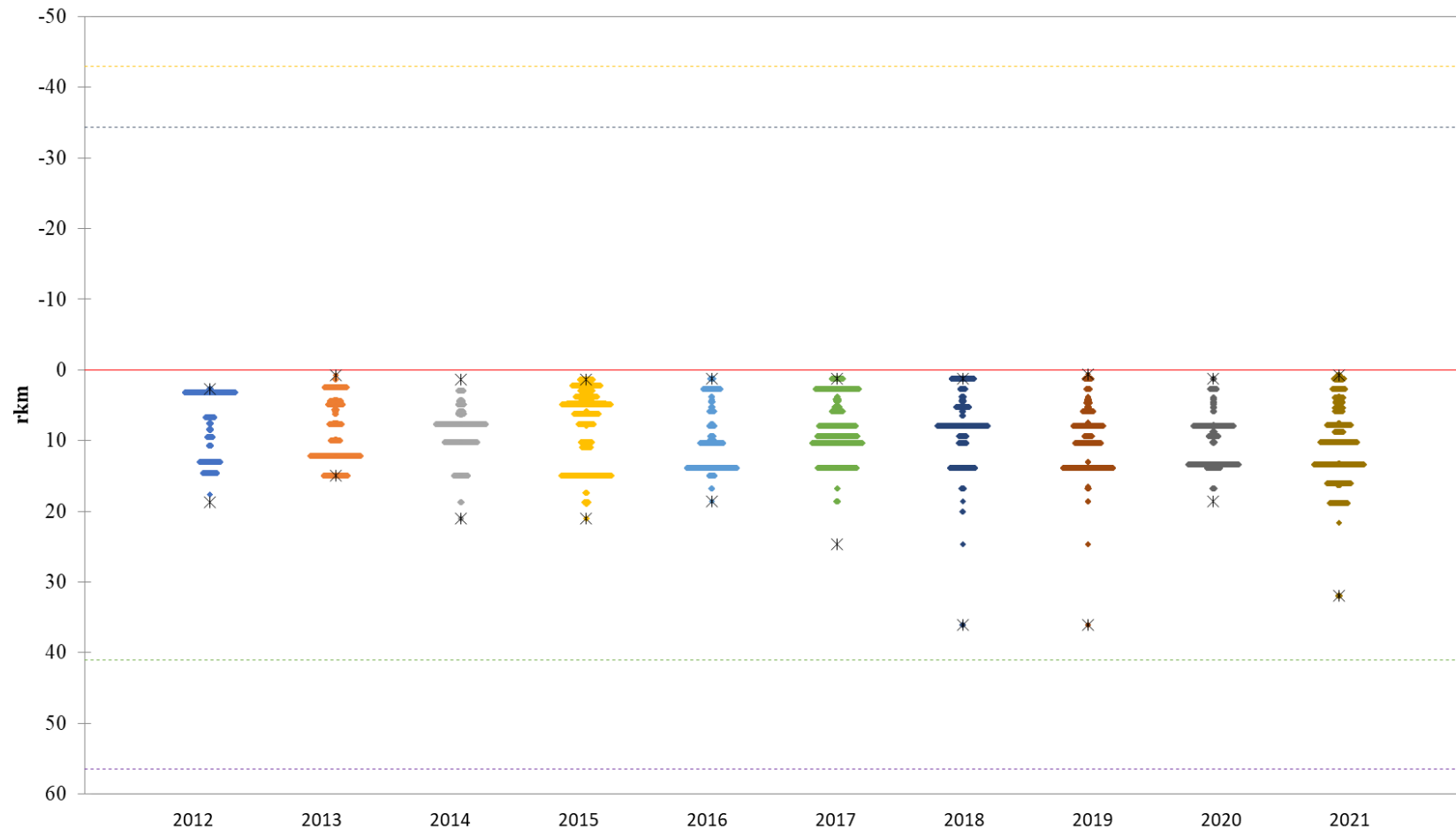


Figure A7-28: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16020) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2012 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

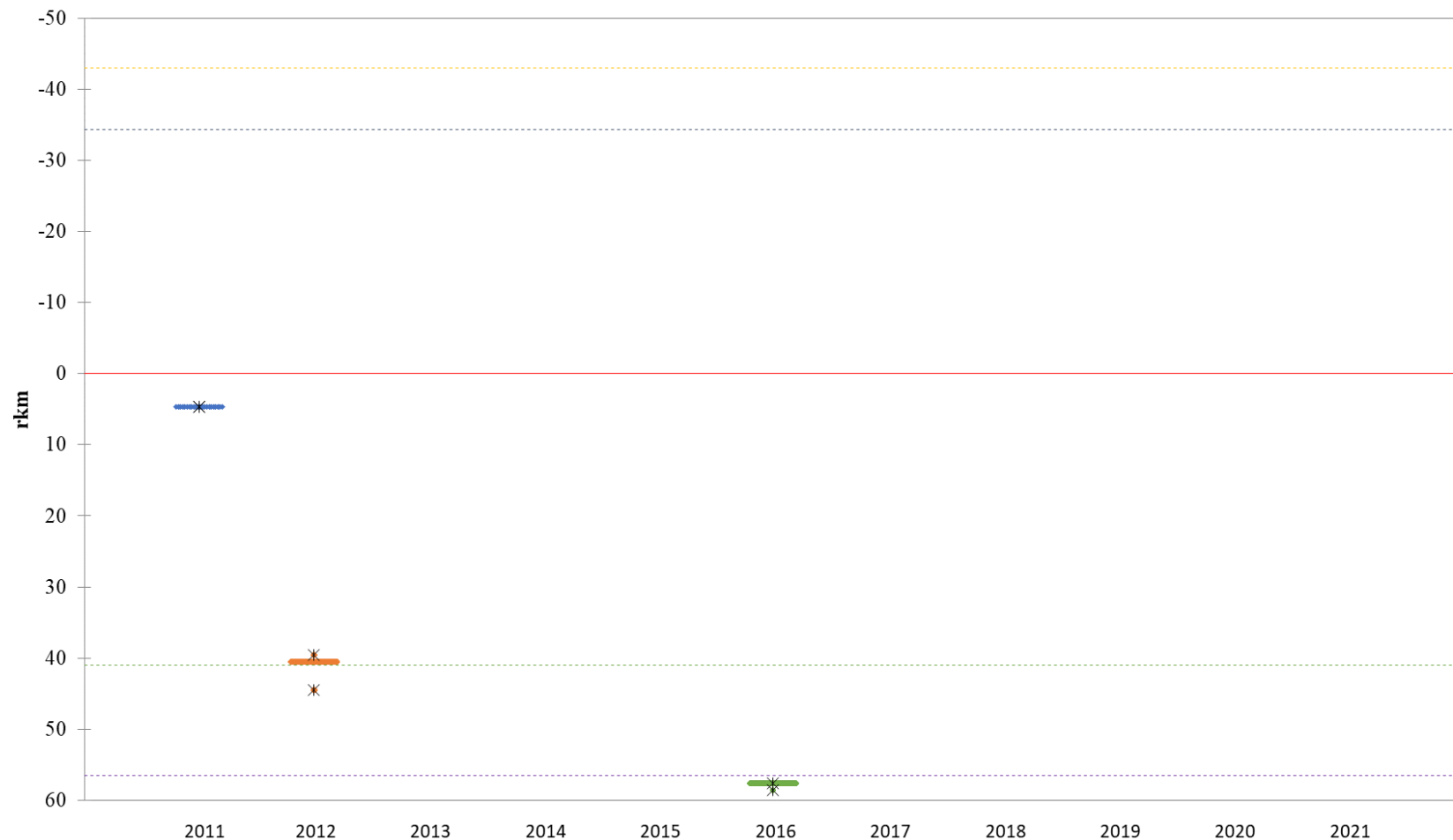


Figure A7-29: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16021) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

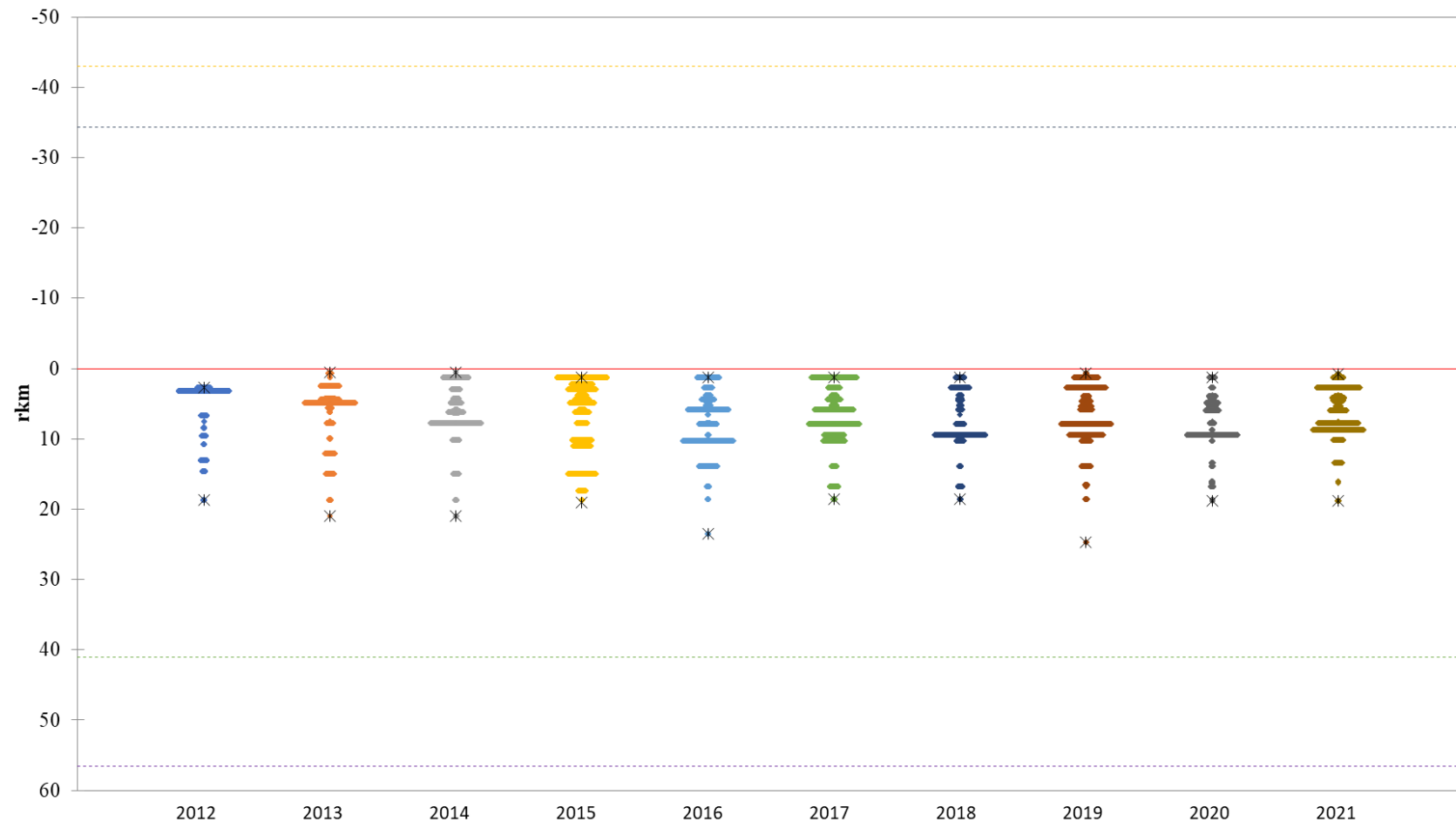


Figure A7-30: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16022) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2012 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

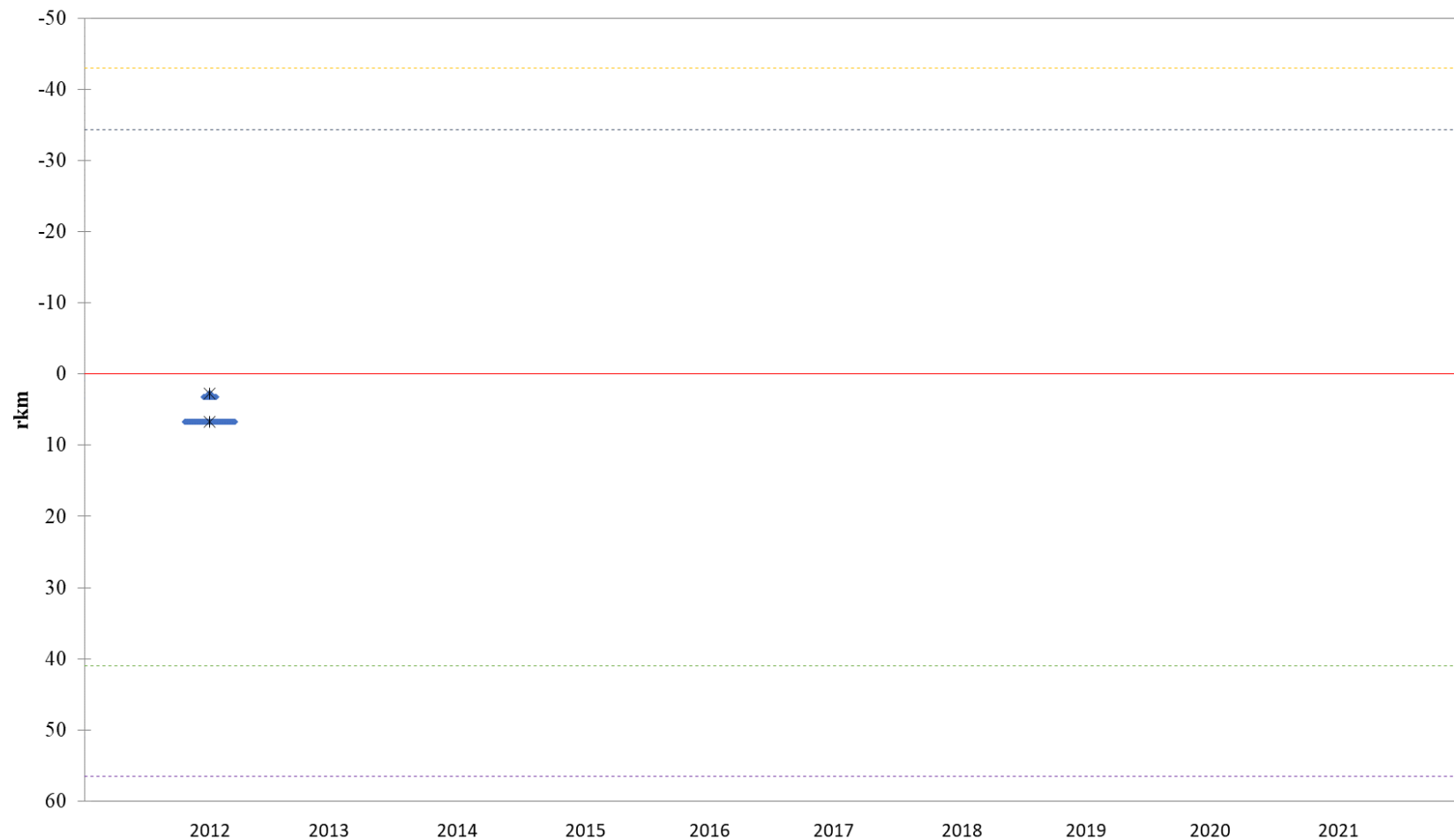


Figure A7-31: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16024) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2012 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

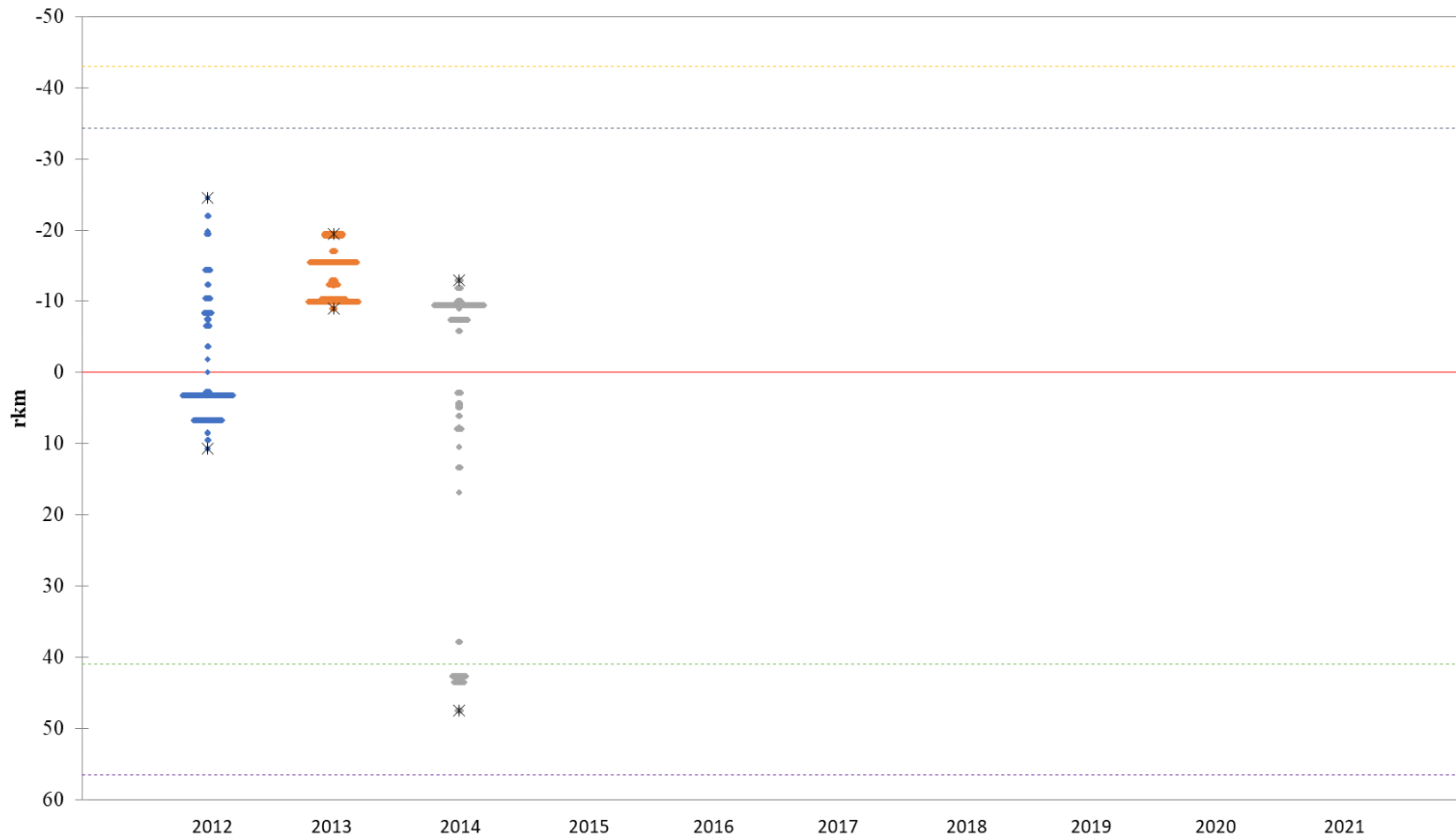


Figure A7-32: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16025) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2012 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

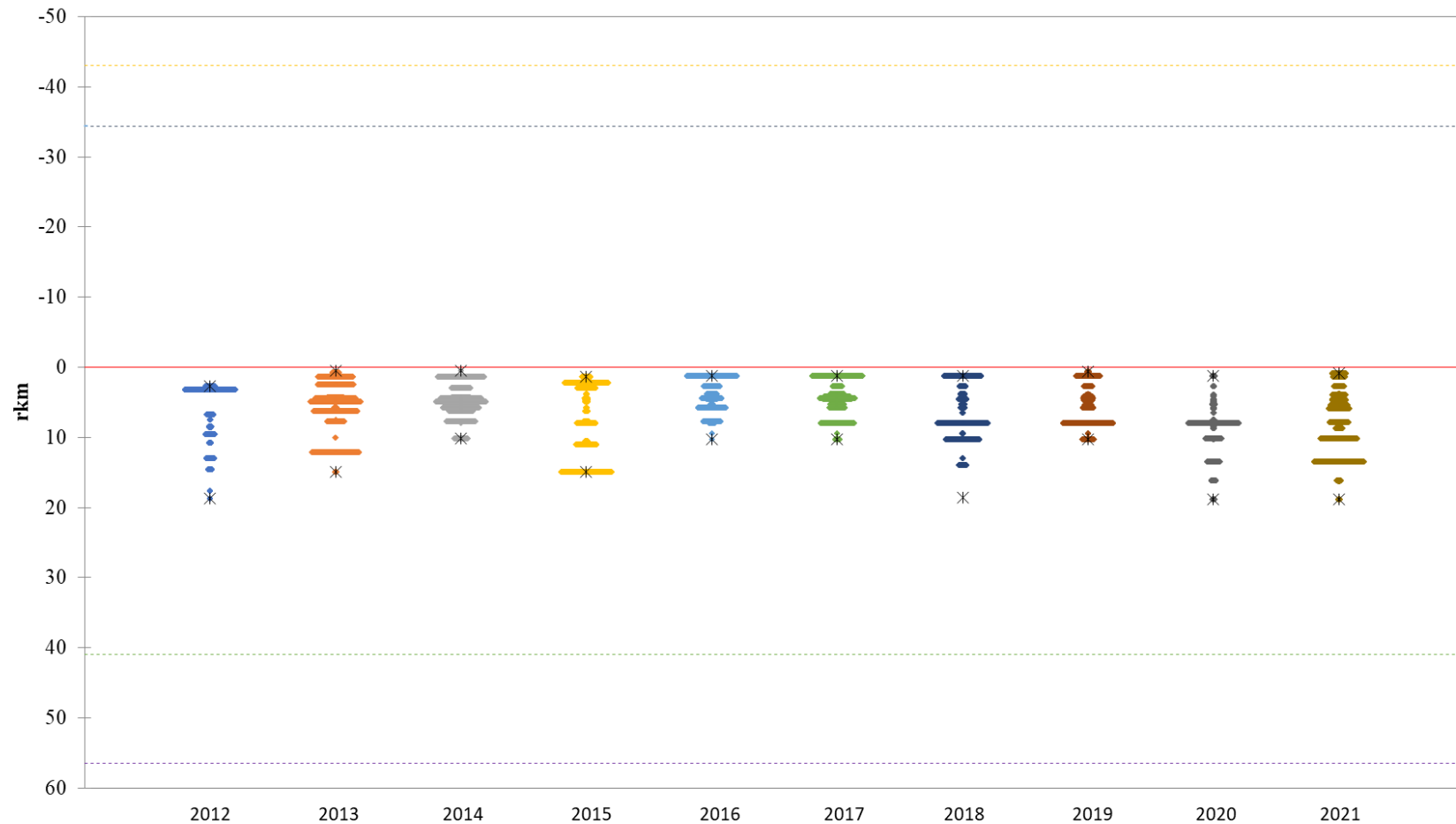


Figure A7-33: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16027) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2012 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

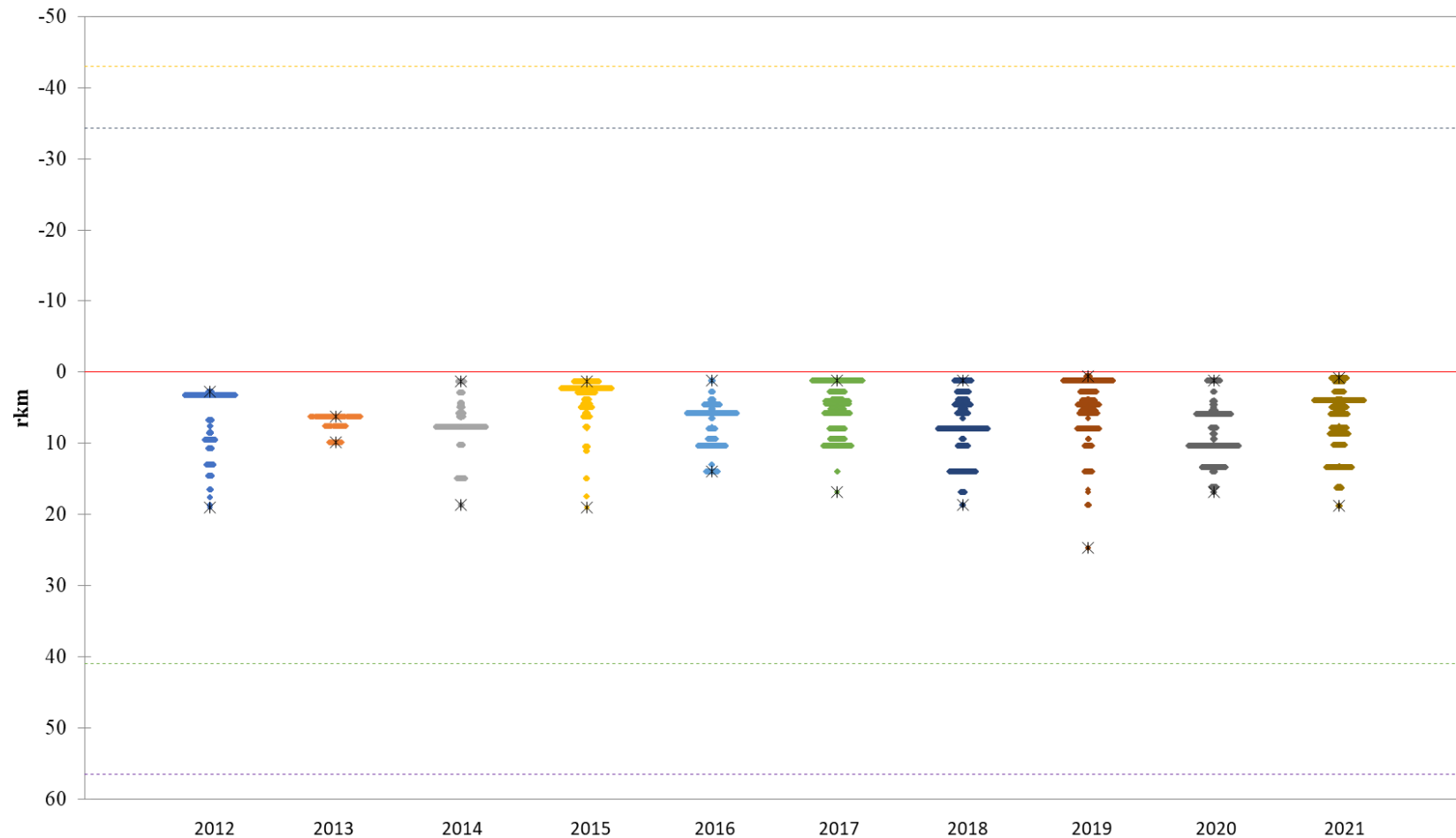


Figure A7-34: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16028) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2012 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

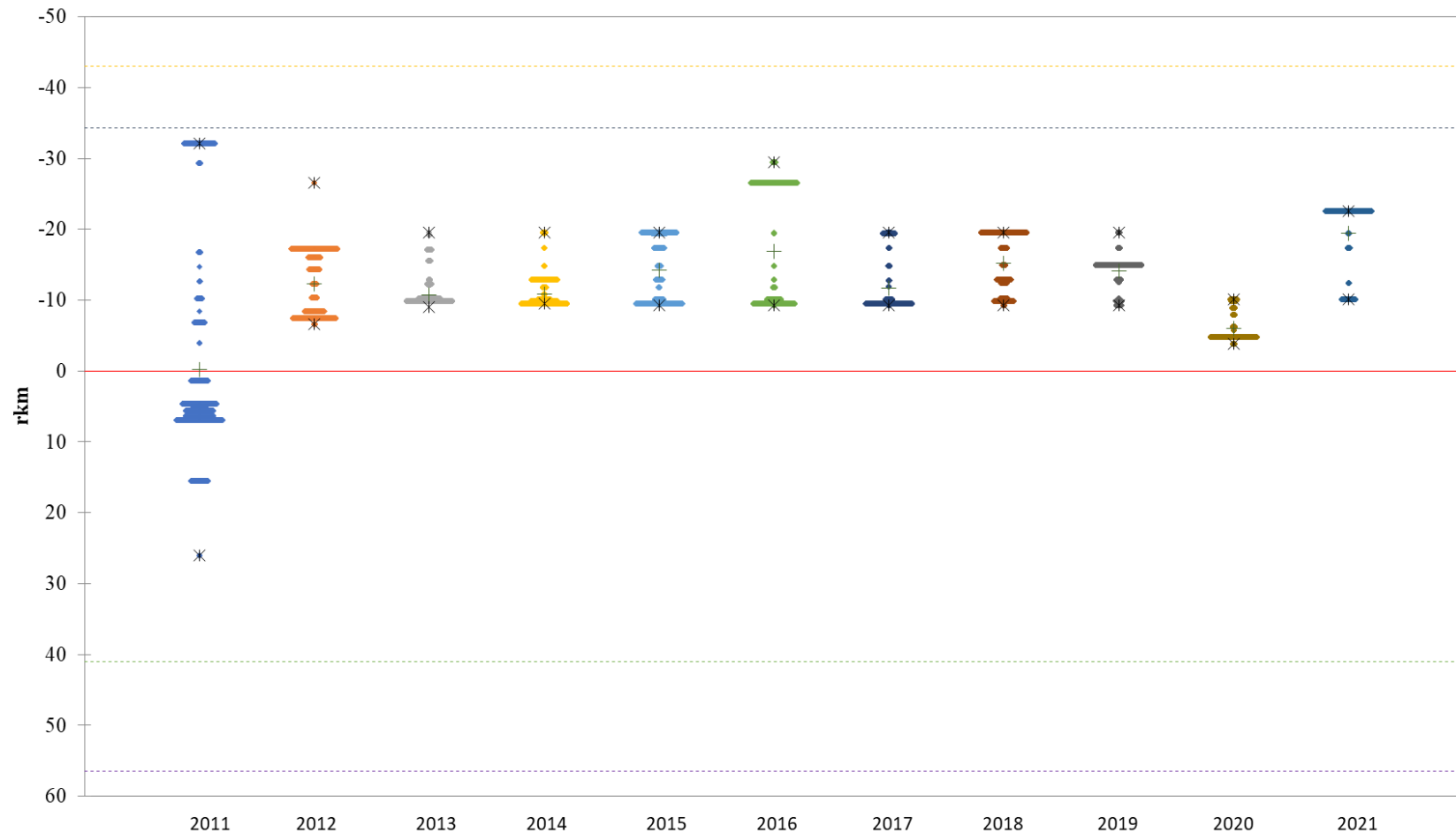


Figure A7-35: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16029) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

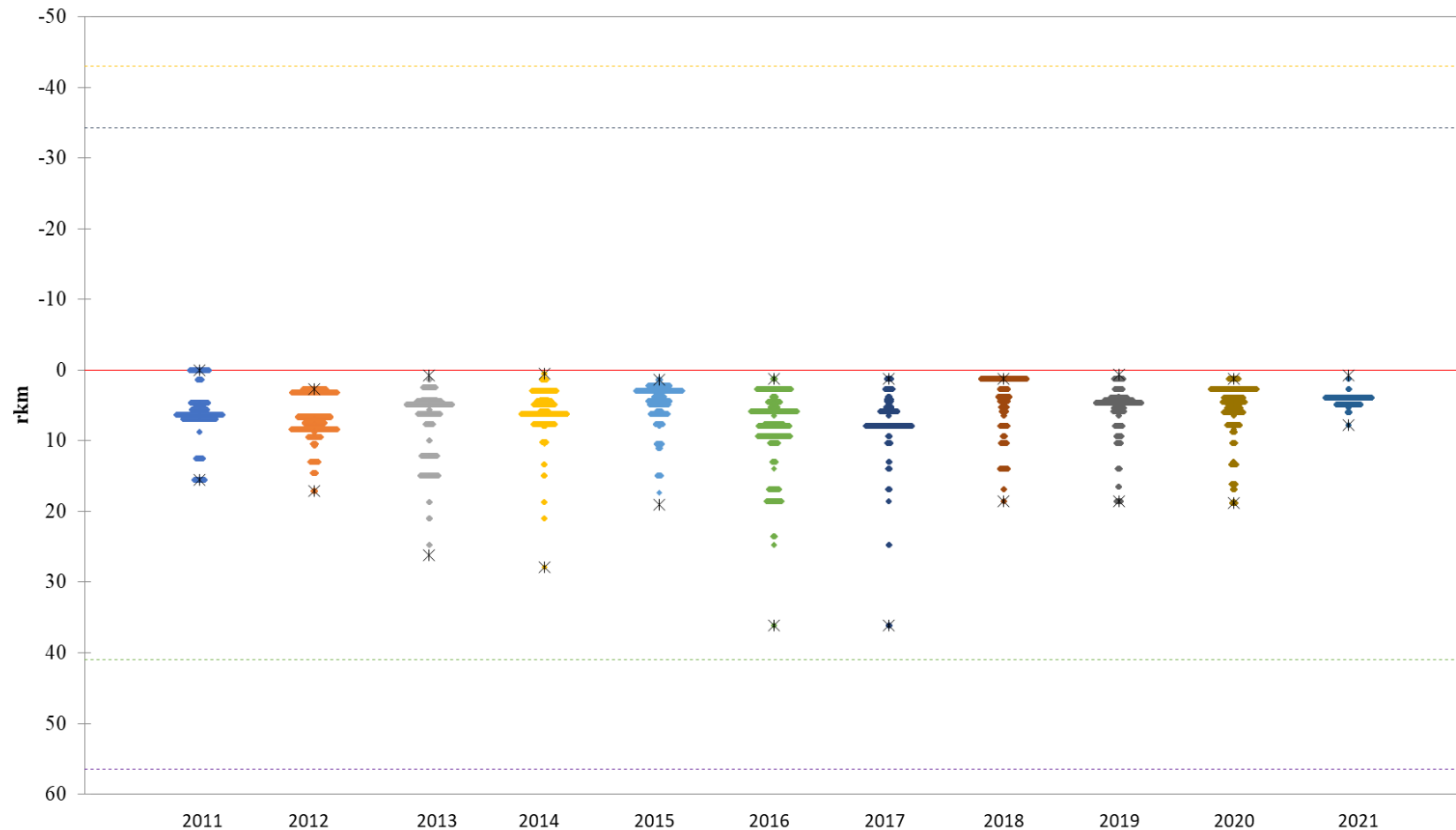


Figure A7-36: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16030) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

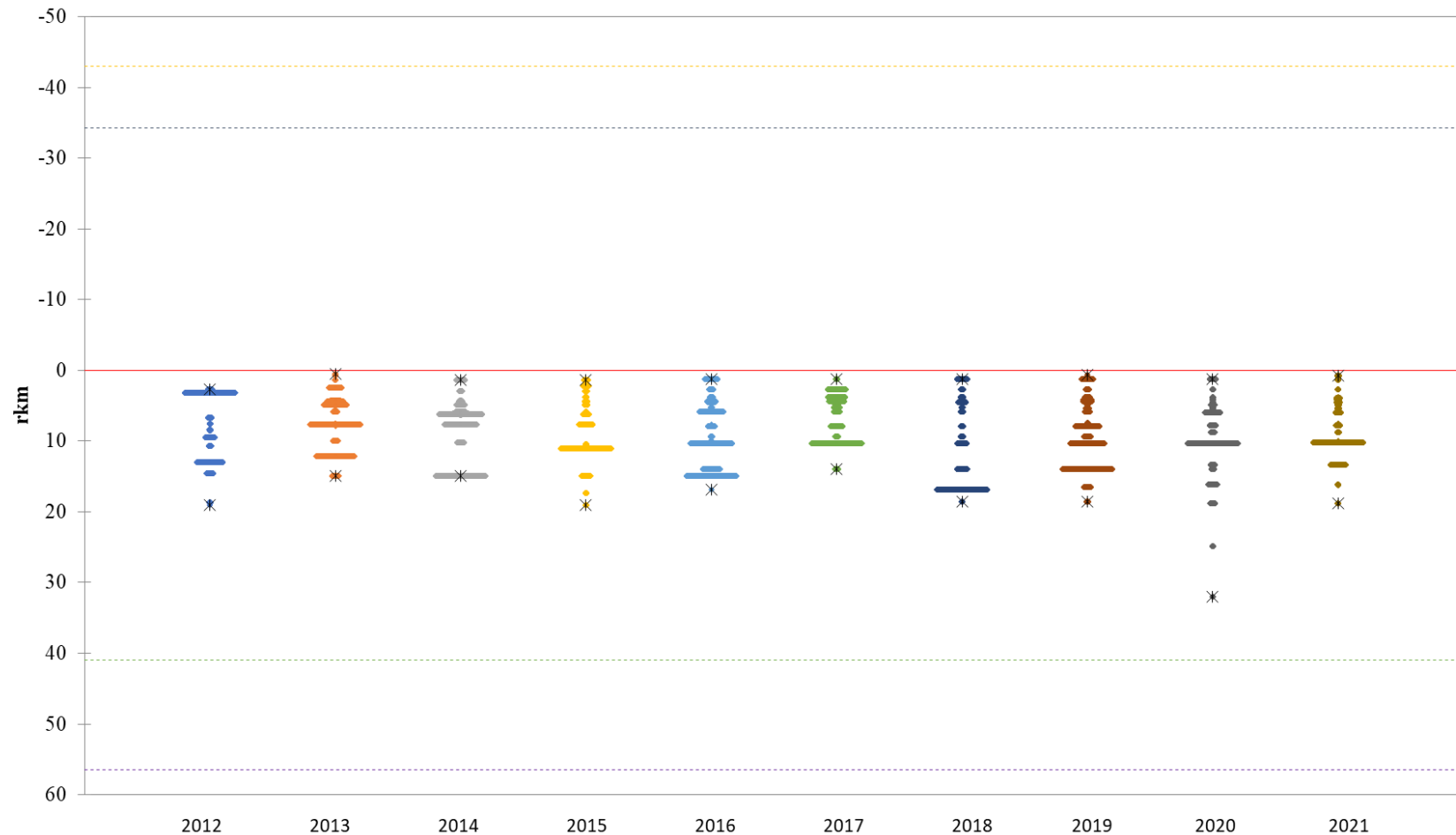


Figure A7-37: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16031) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2012 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

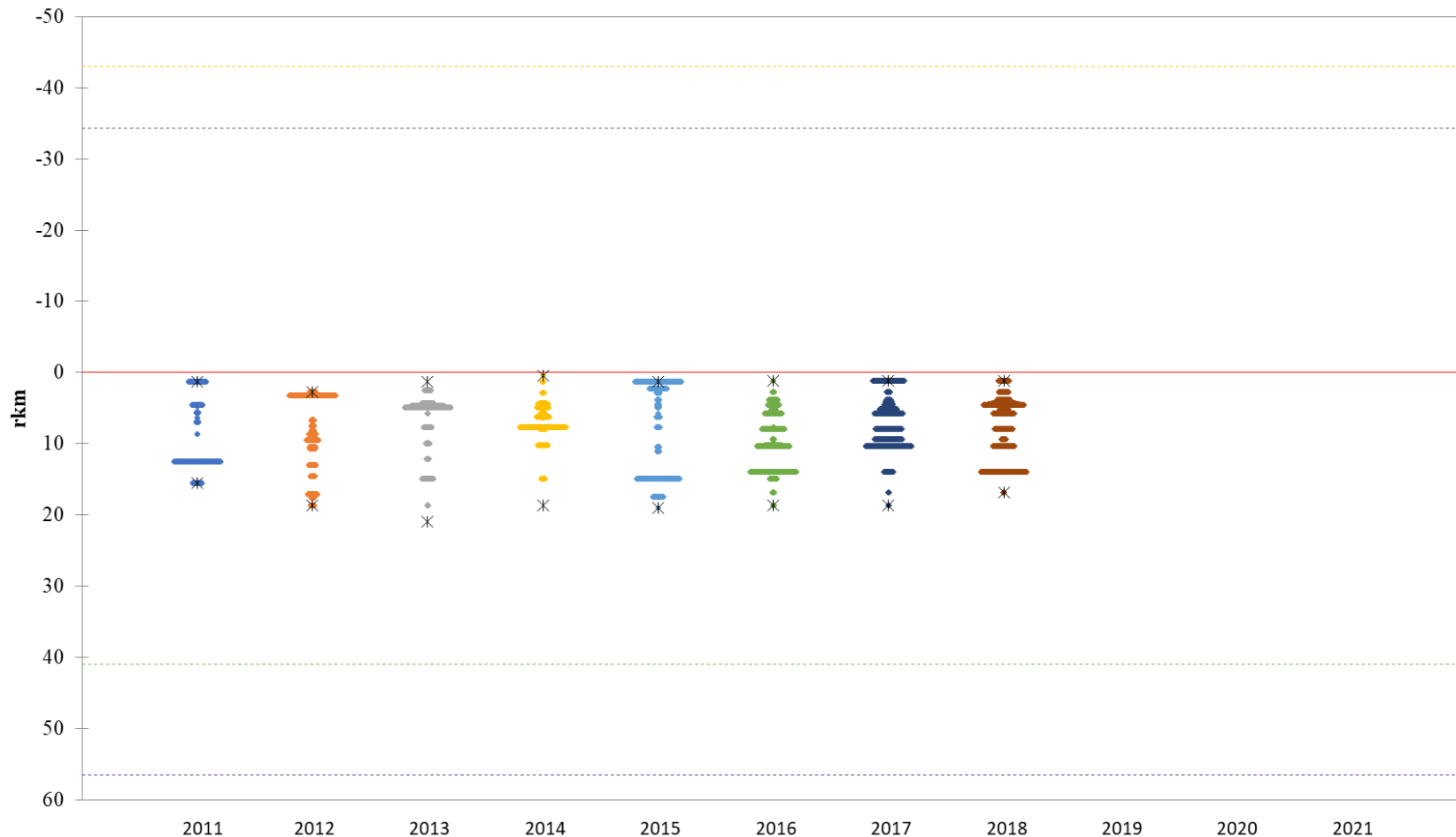


Figure A7-38: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16032) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

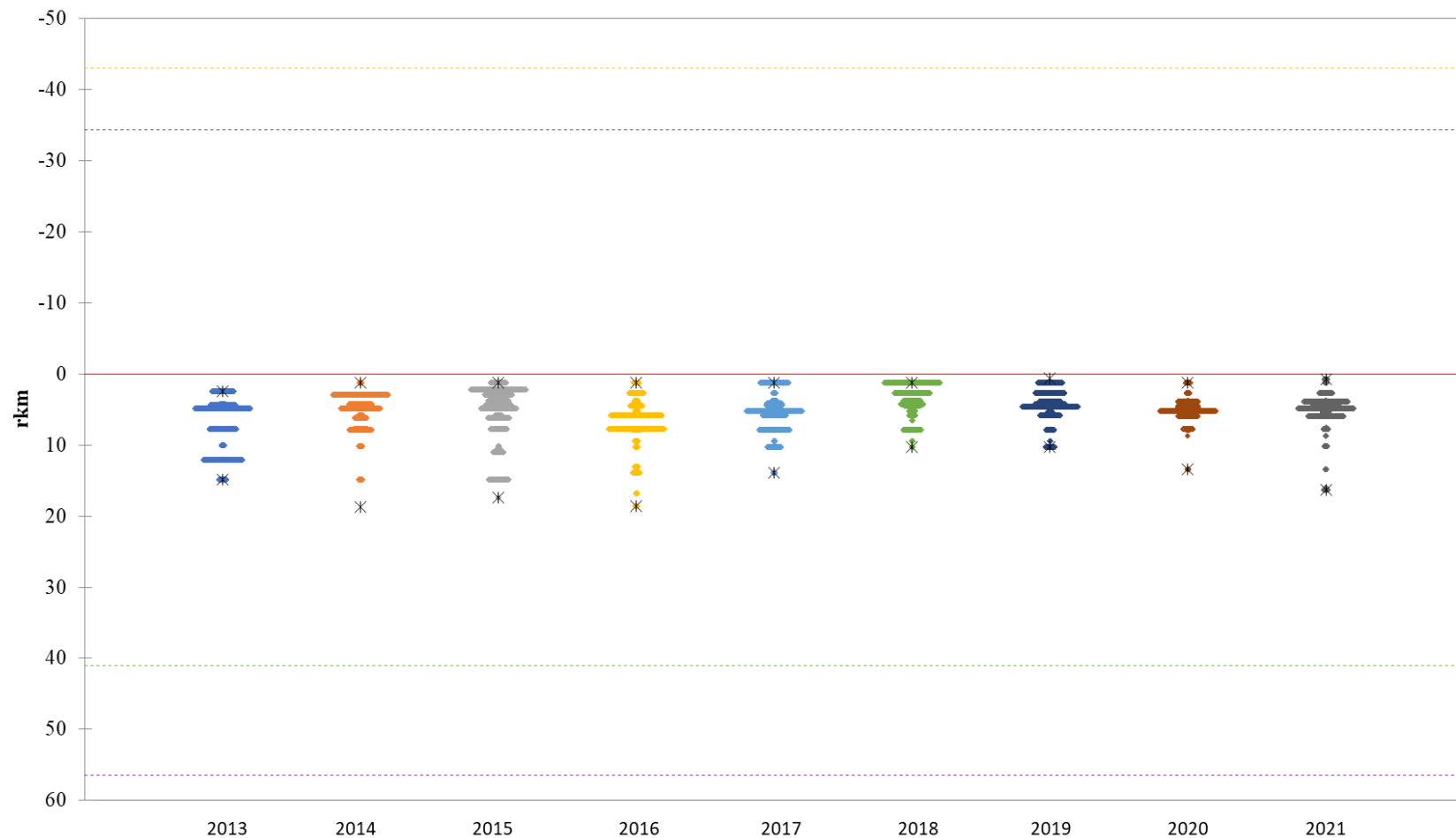


Figure A7-39: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16033) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2013 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

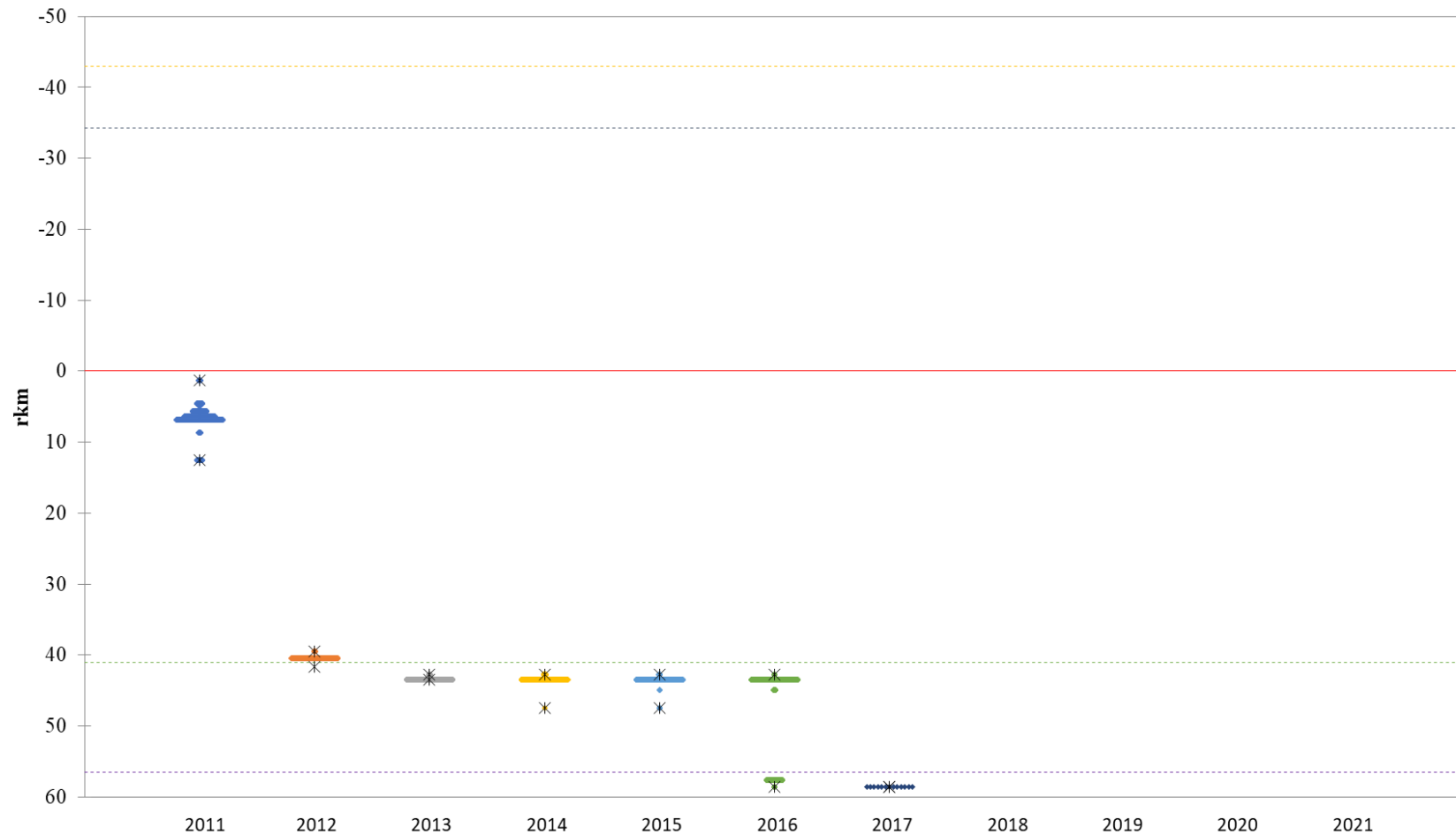


Figure A7-40: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16034) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

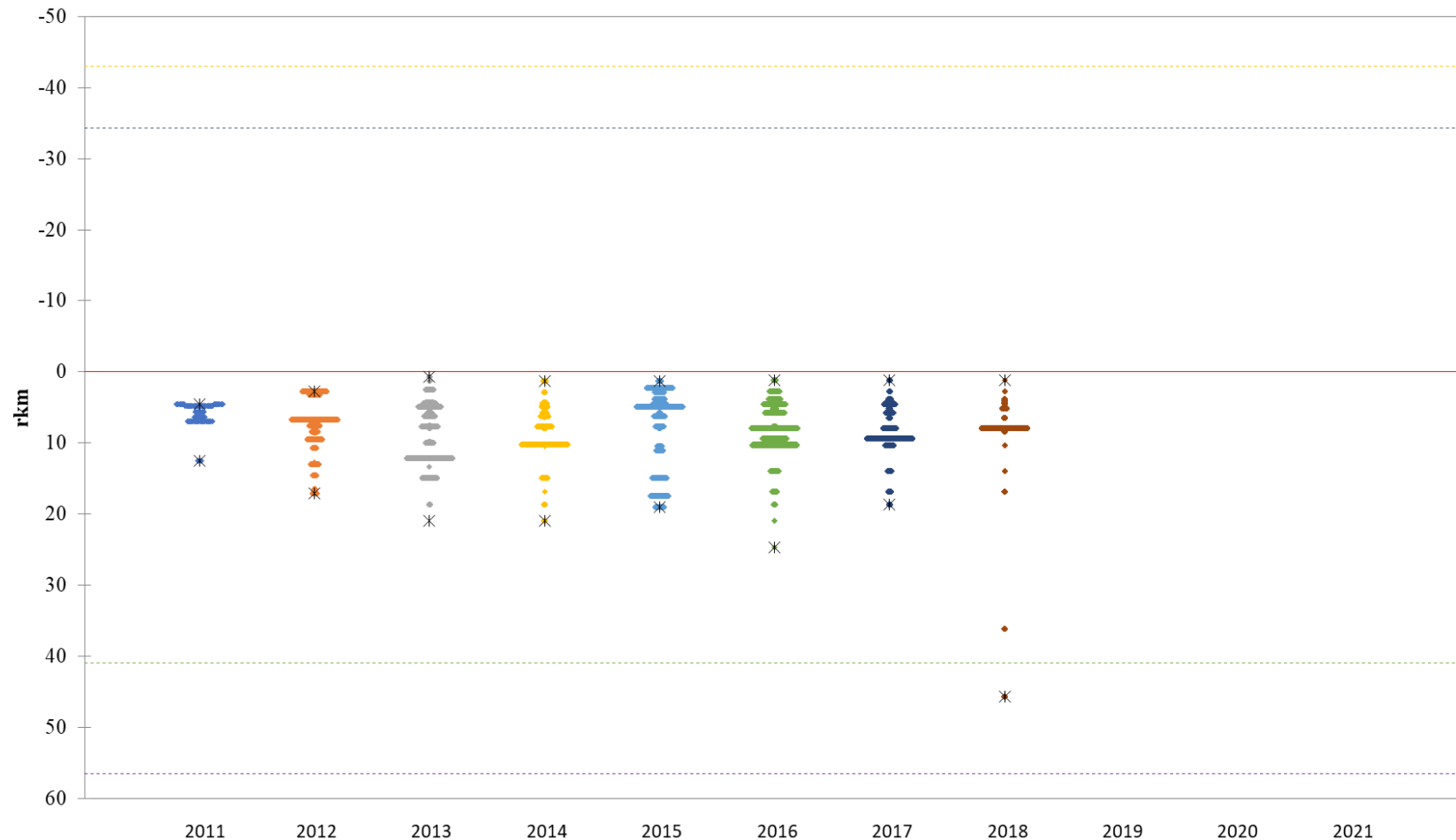


Figure A7-41: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16035) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

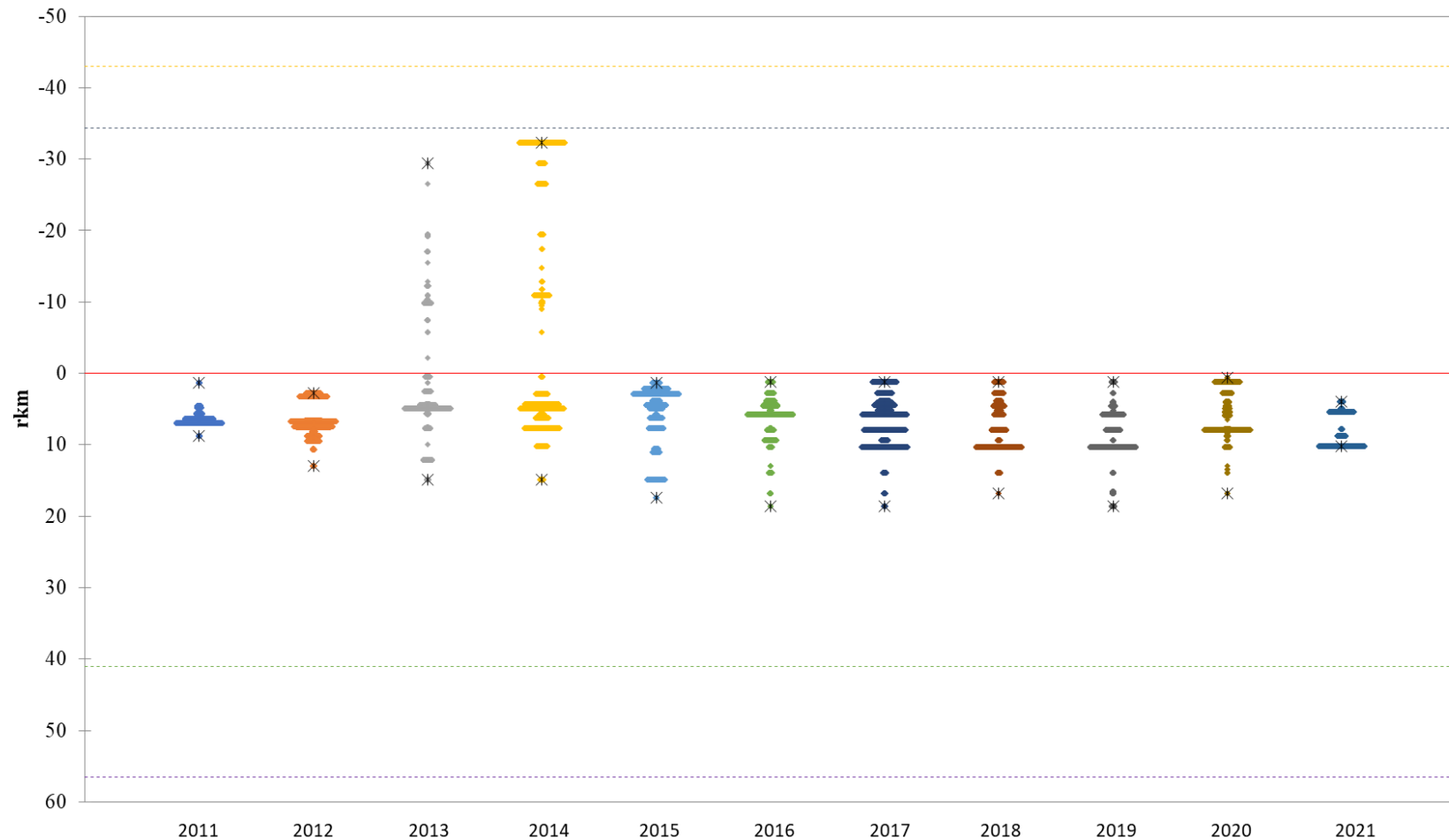


Figure A7-42: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16037) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

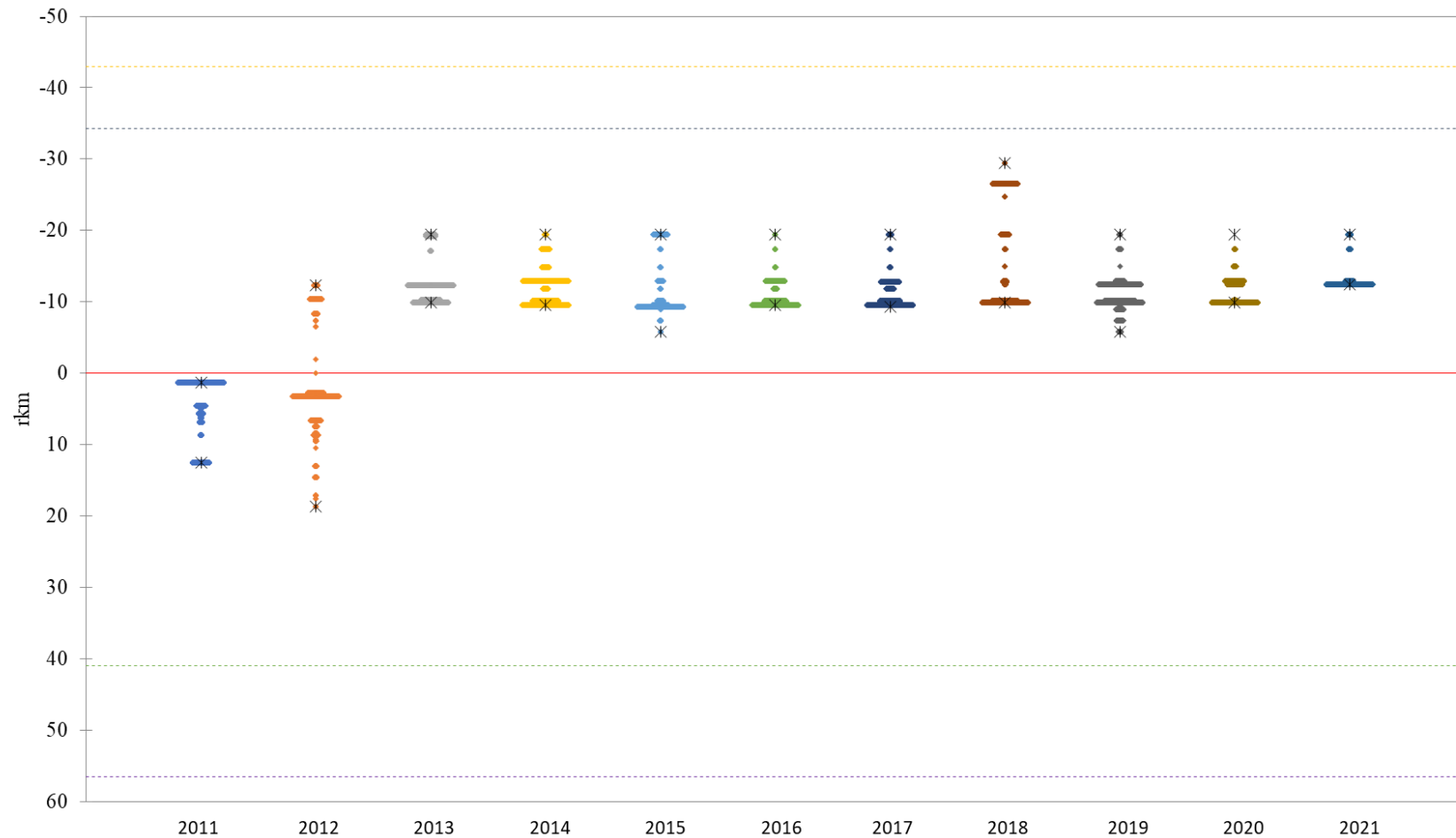


Figure A7-43: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16038) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

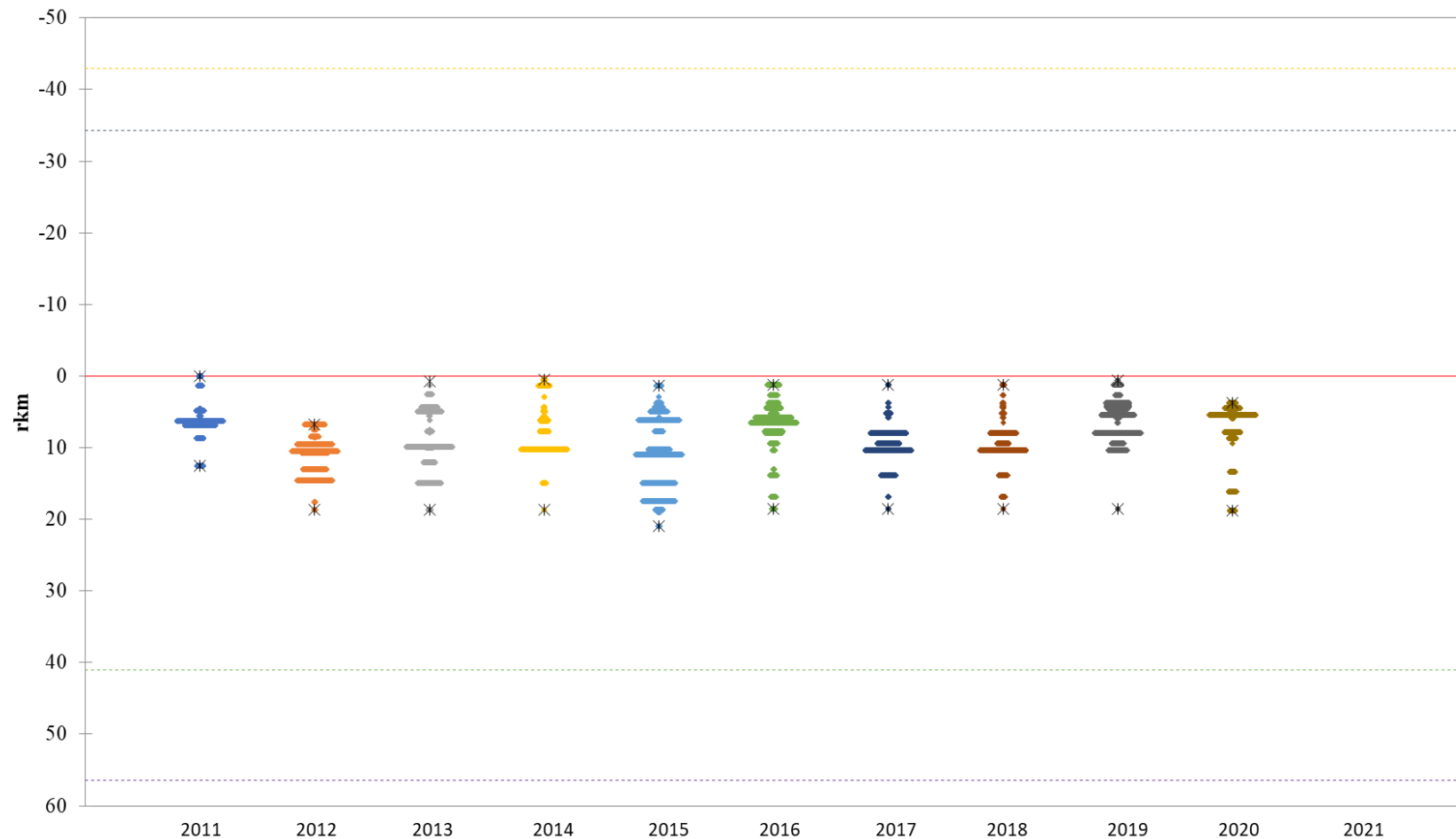


Figure A7-44: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16040) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

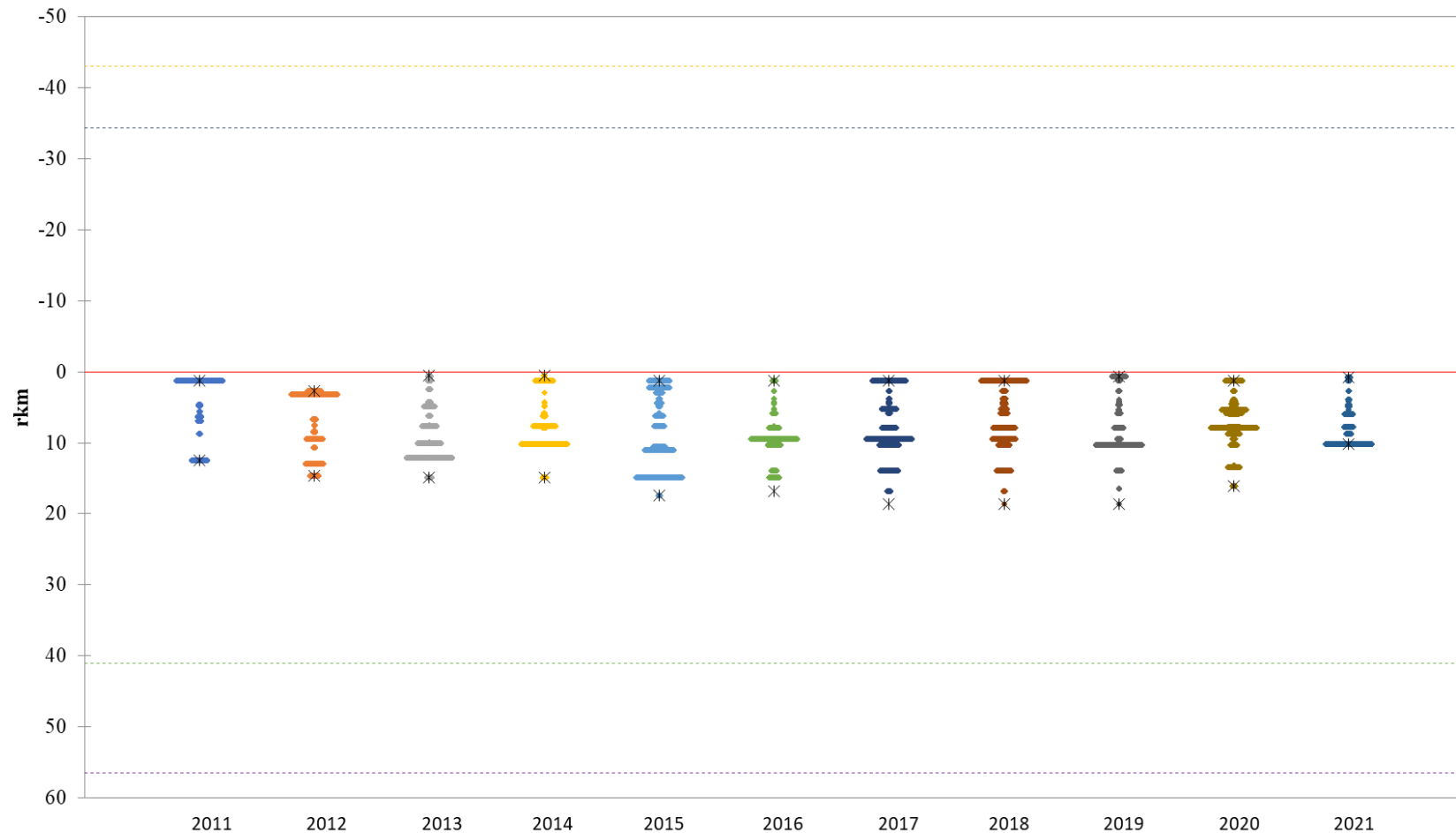


Figure A7-45: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16041) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

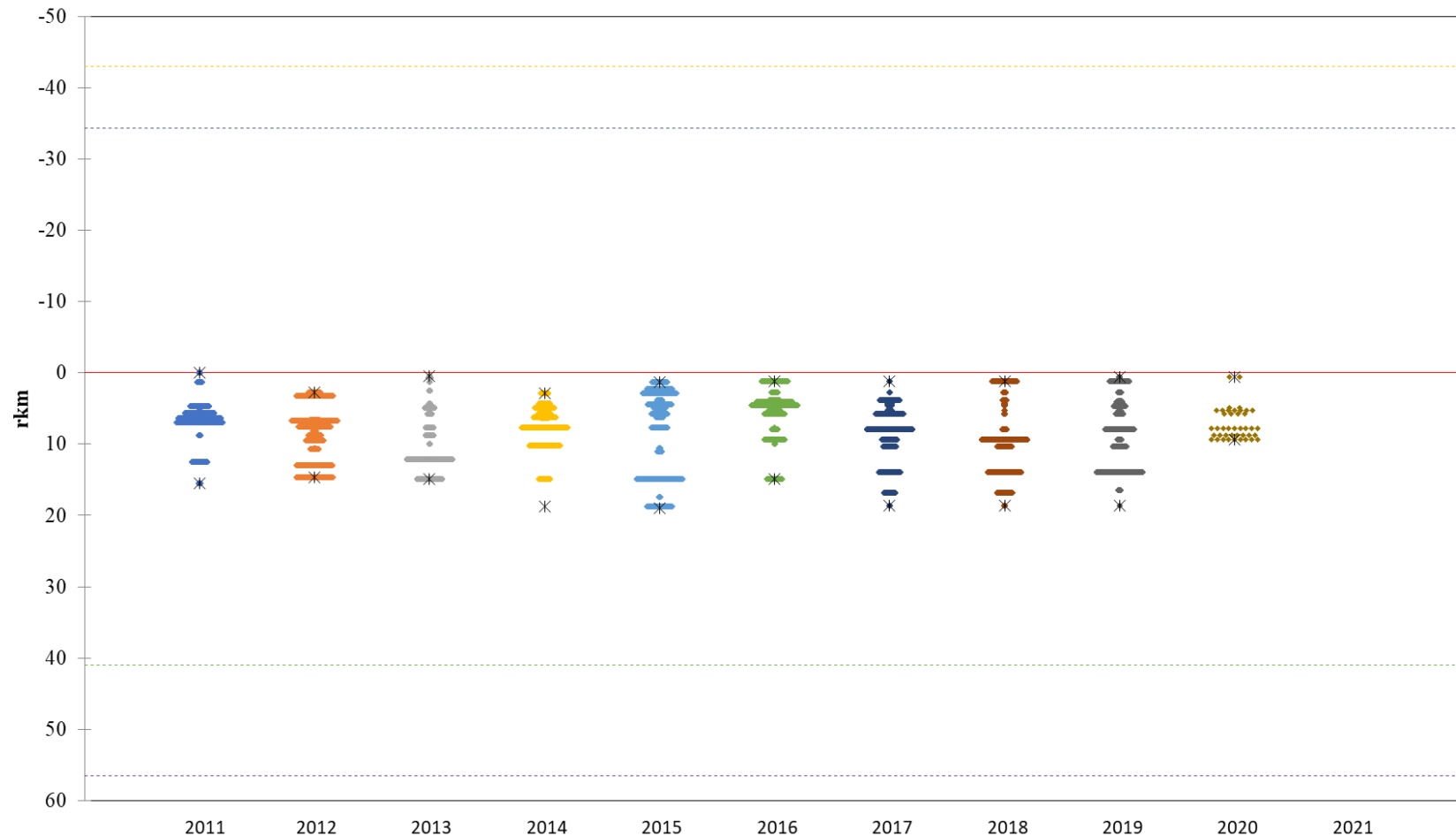


Figure A7-46: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16043) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

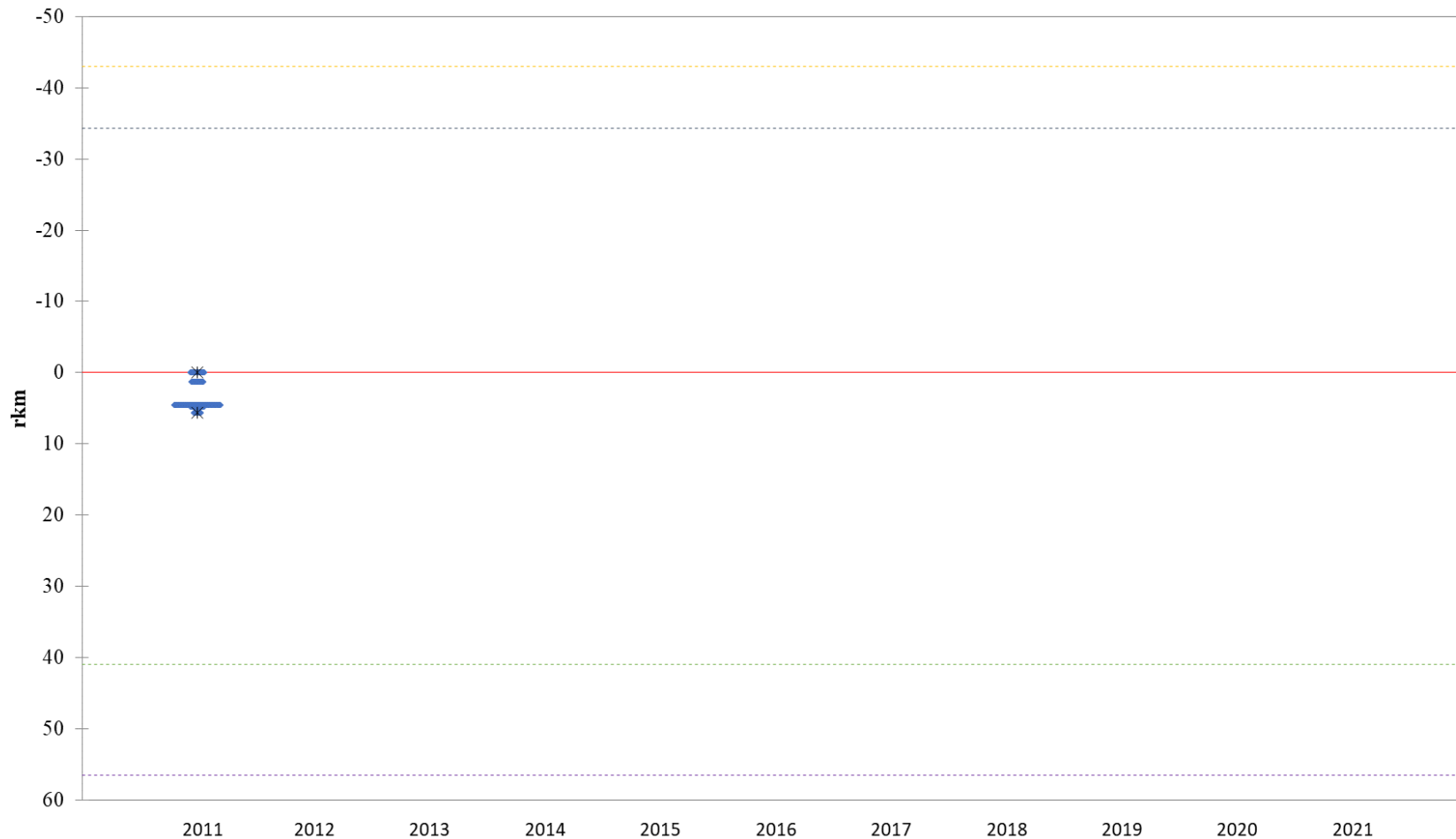


Figure A7-47: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16044) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

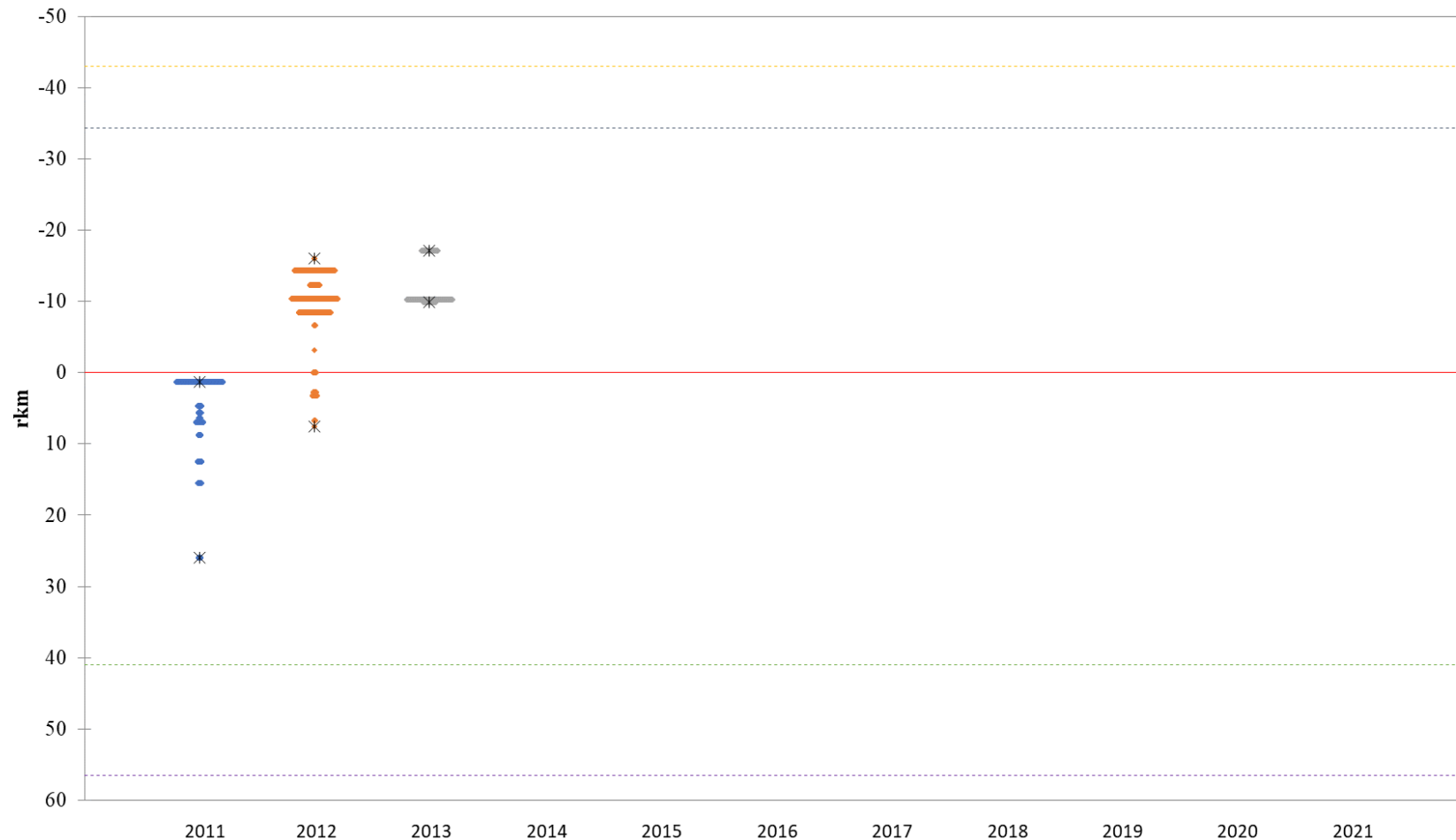


Figure A7-48: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16046) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

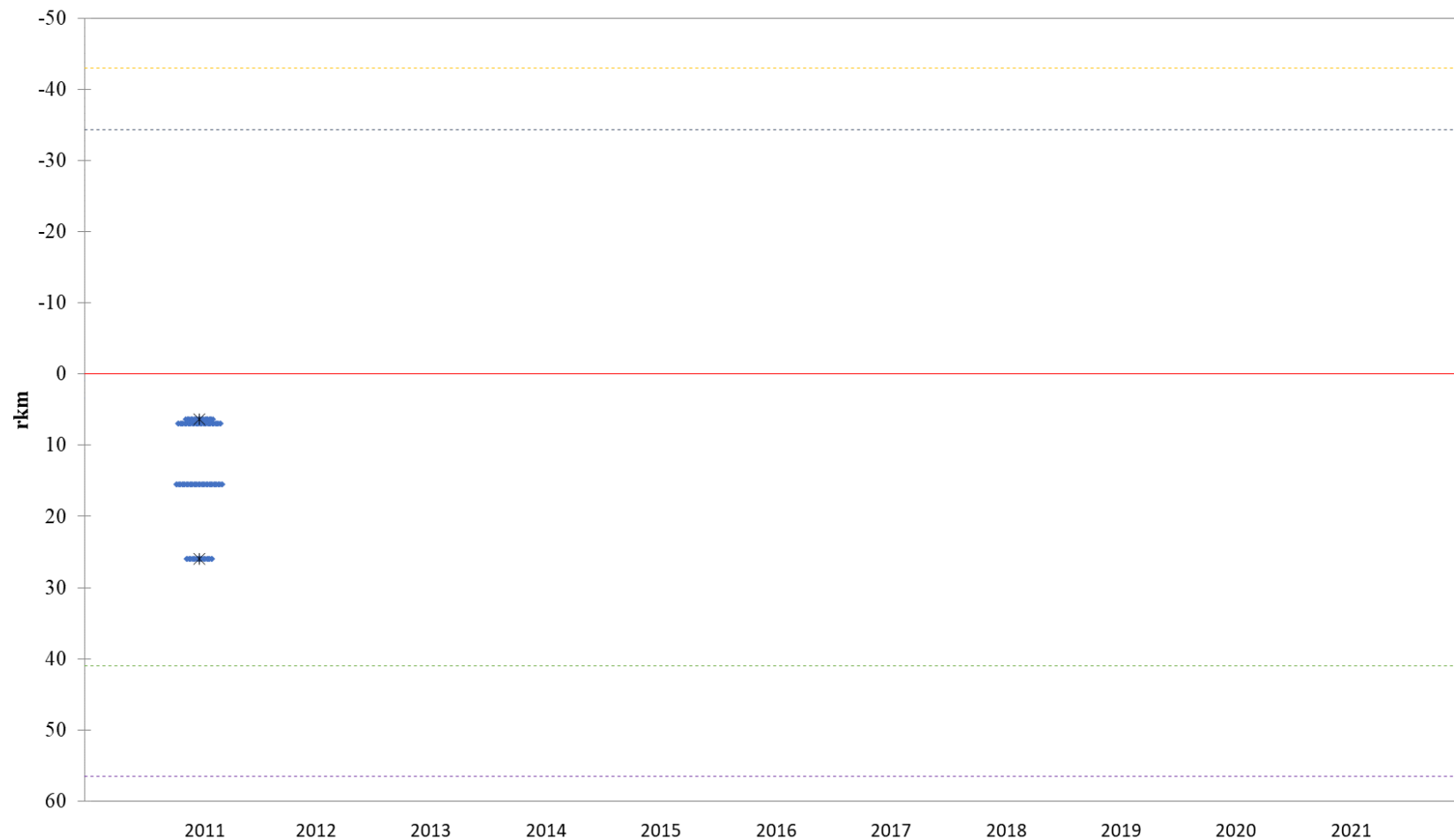


Figure A7-49: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16047) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

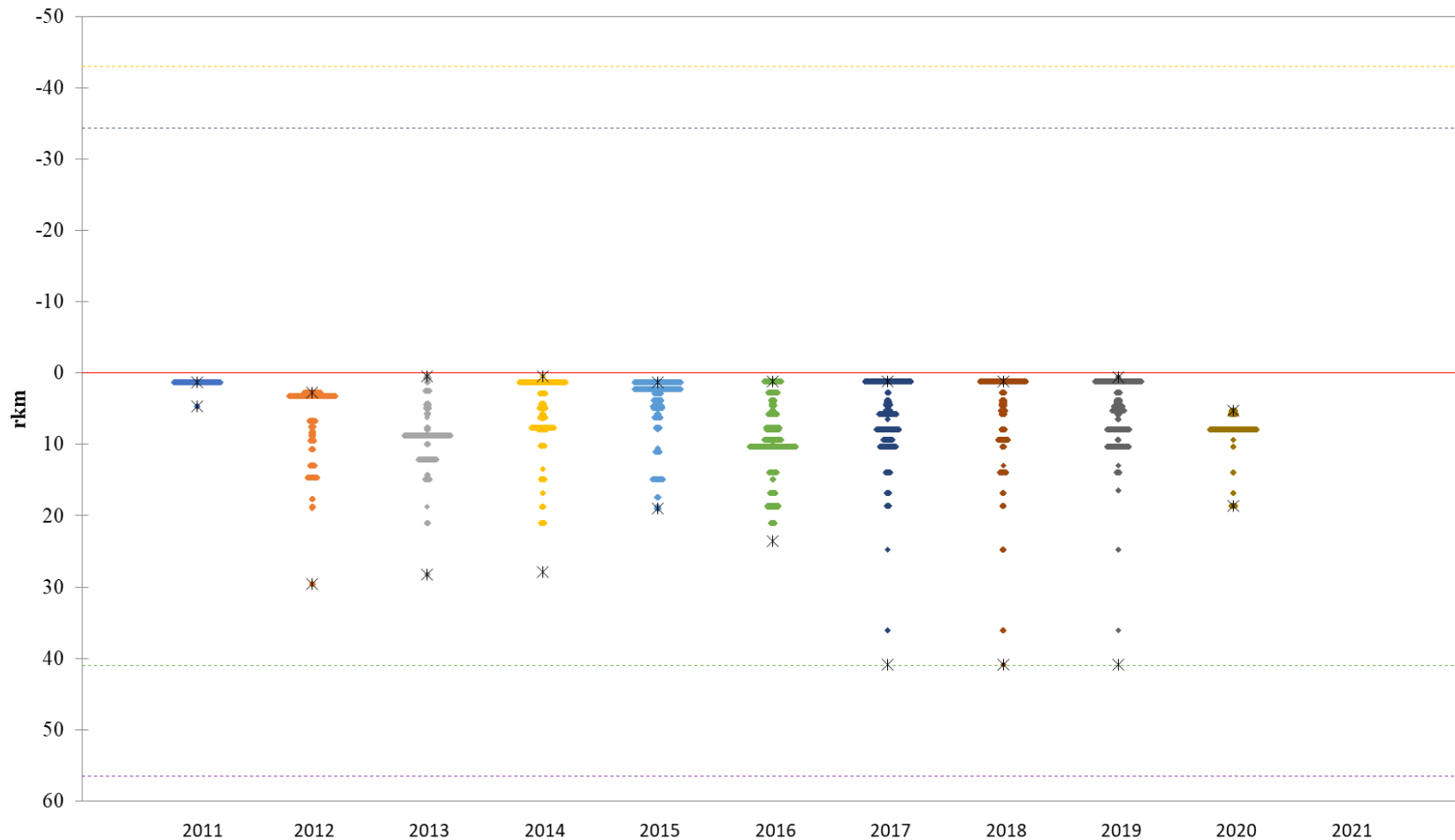


Figure A7-50: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16049) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

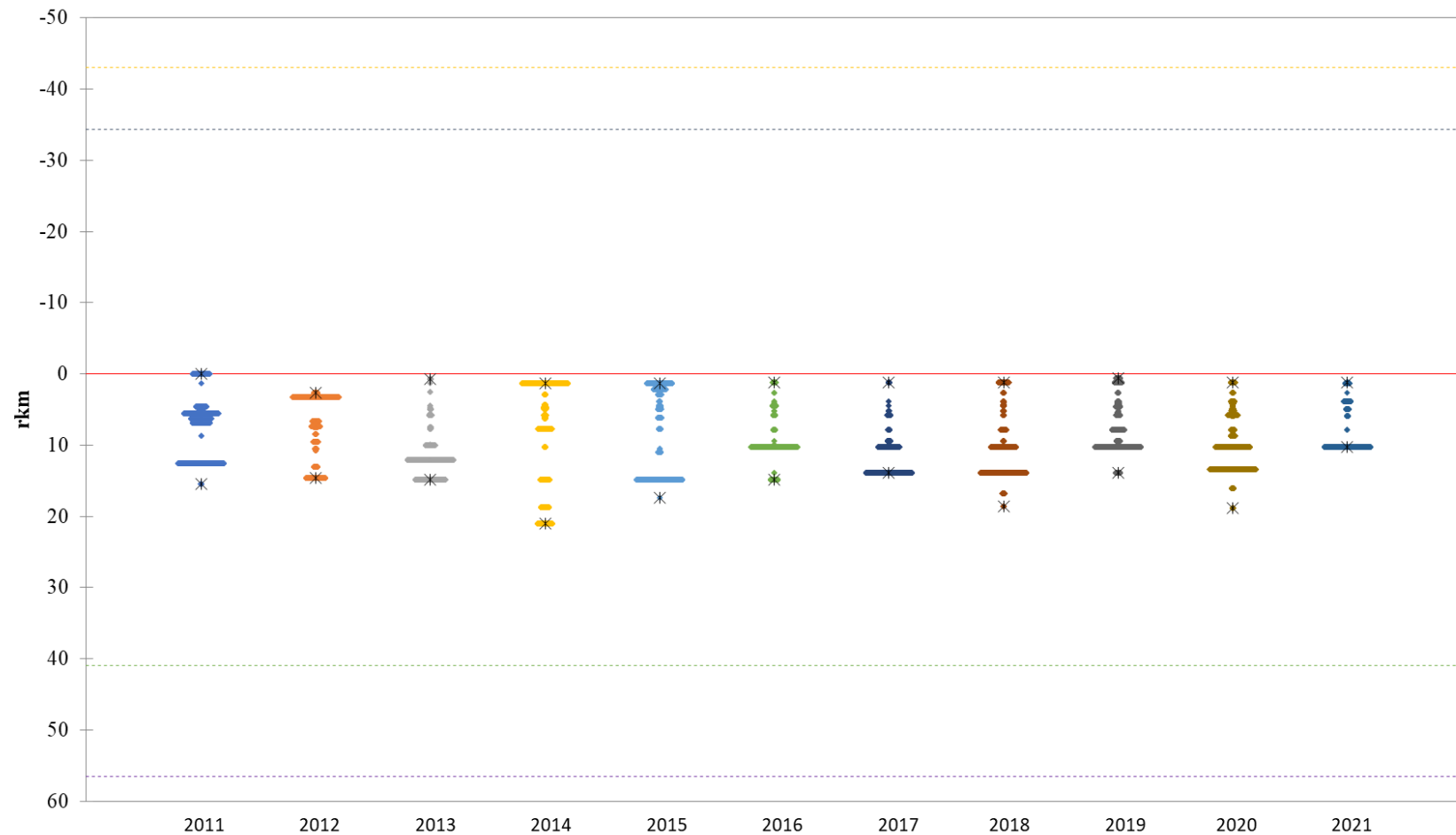


Figure A7-51: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16050) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

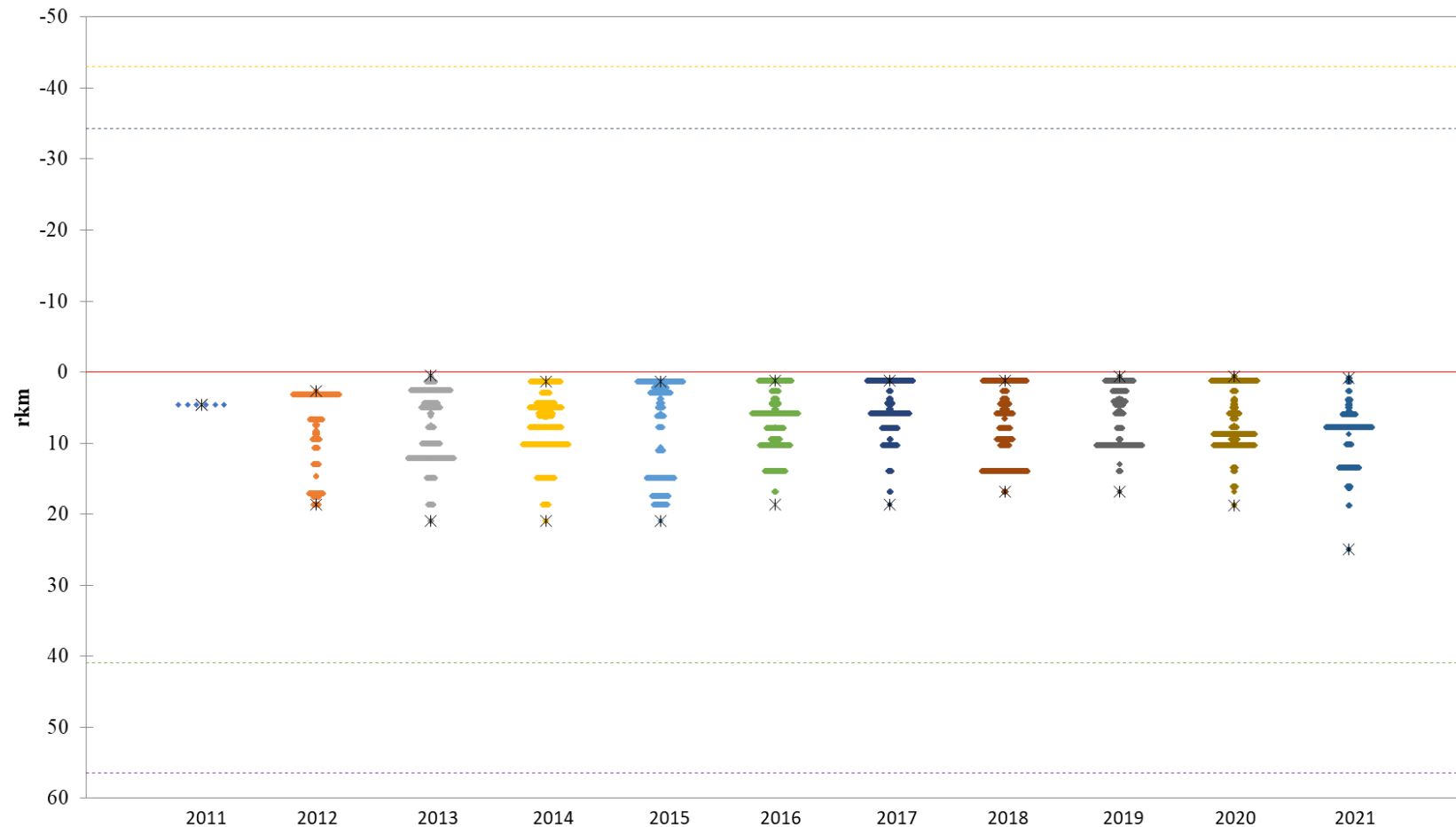


Figure A7-52: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16052) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

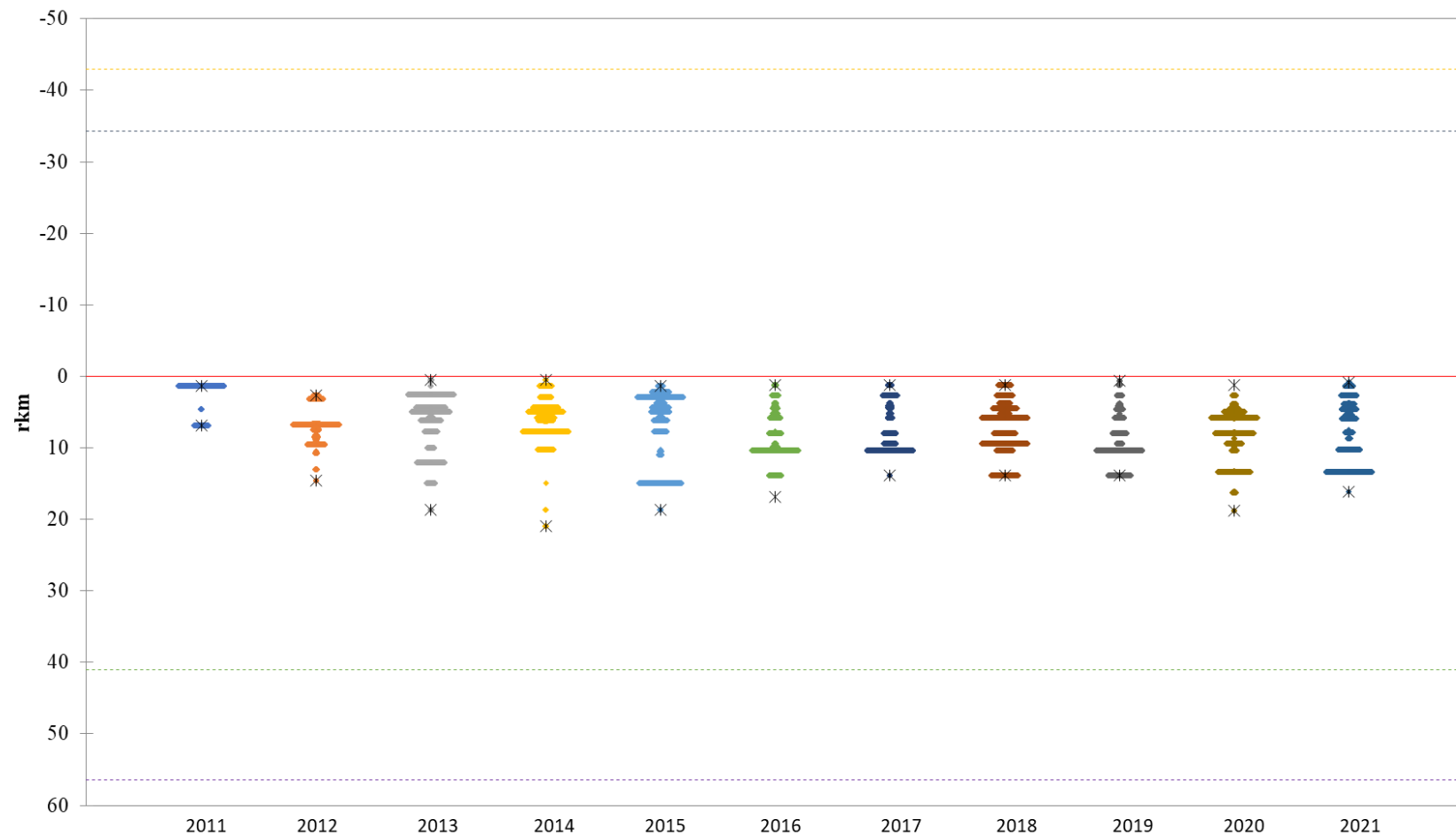


Figure A7-53: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #16053) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2011 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

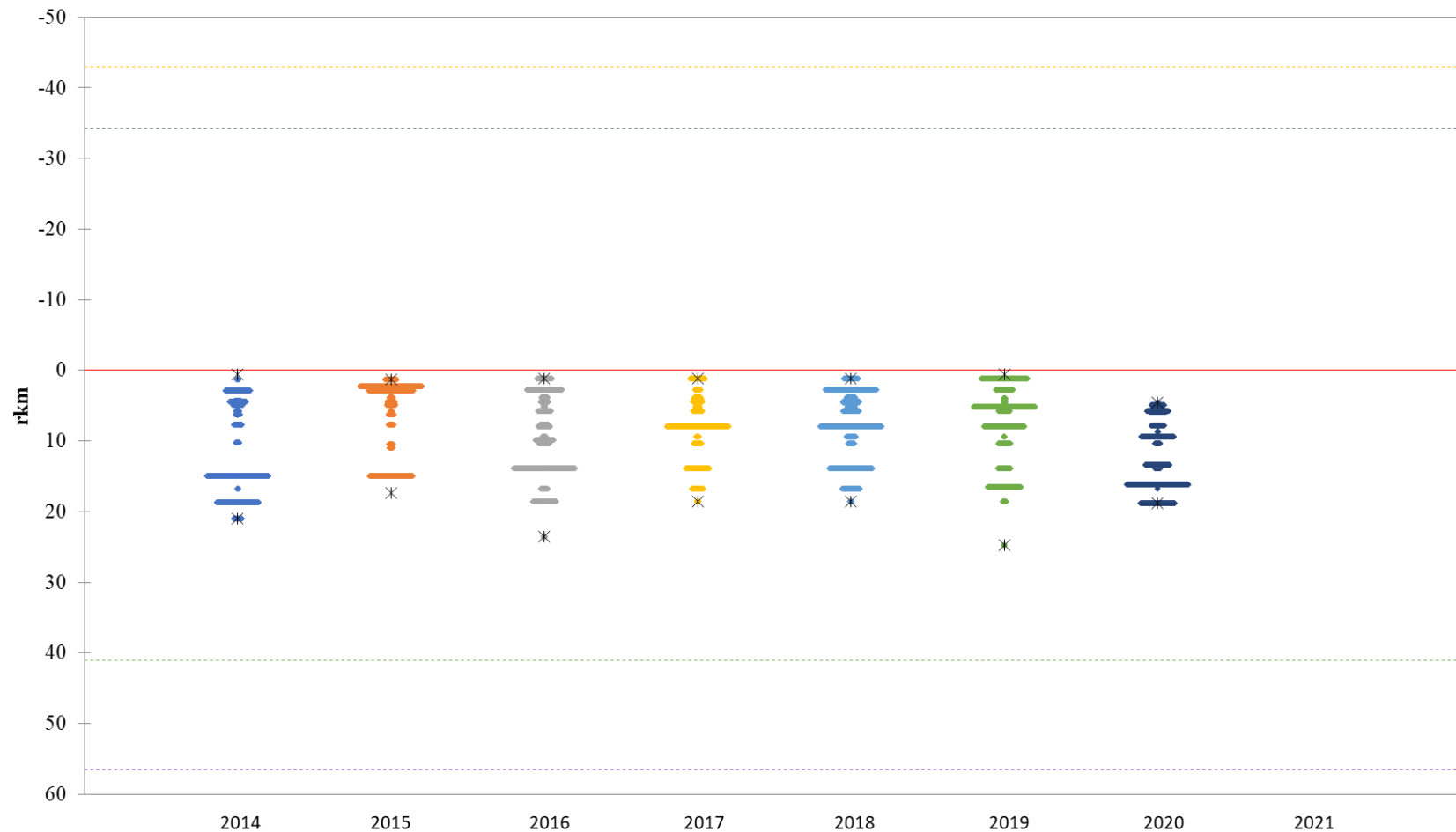


Figure A7-54: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #32167) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2014 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

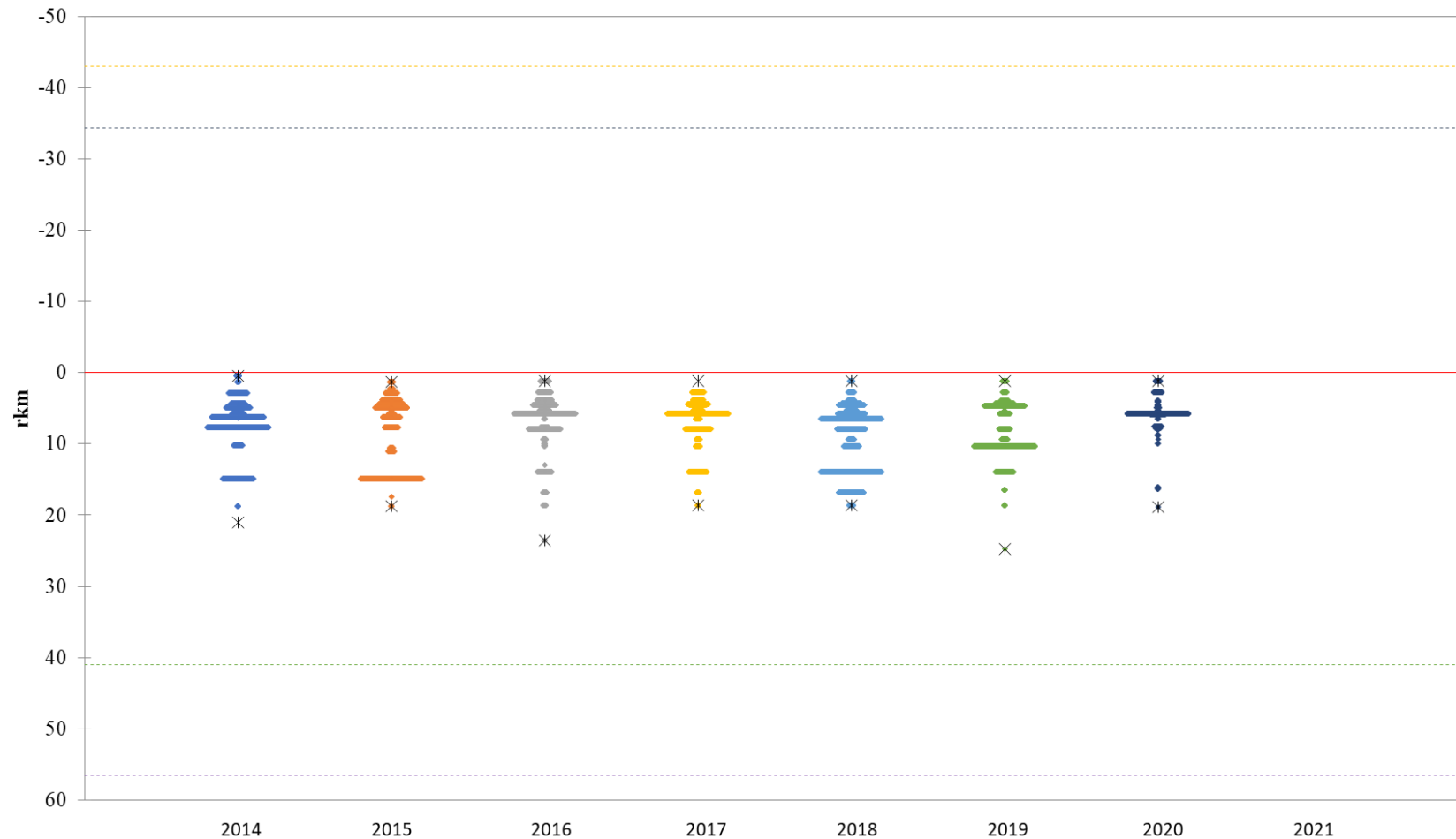


Figure A7-55: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #32168) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2014 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

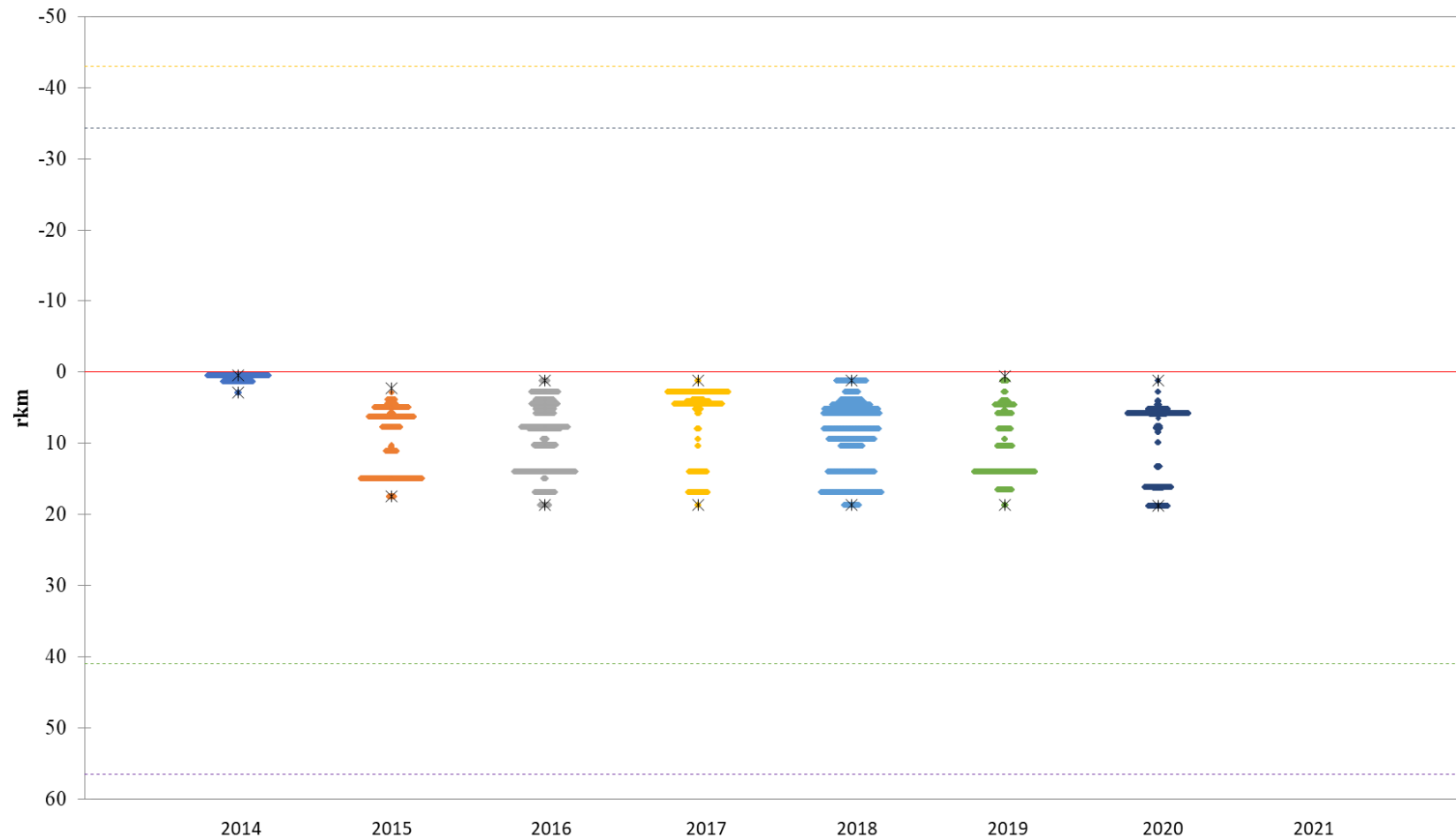


Figure A7-56: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #32169) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2014 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

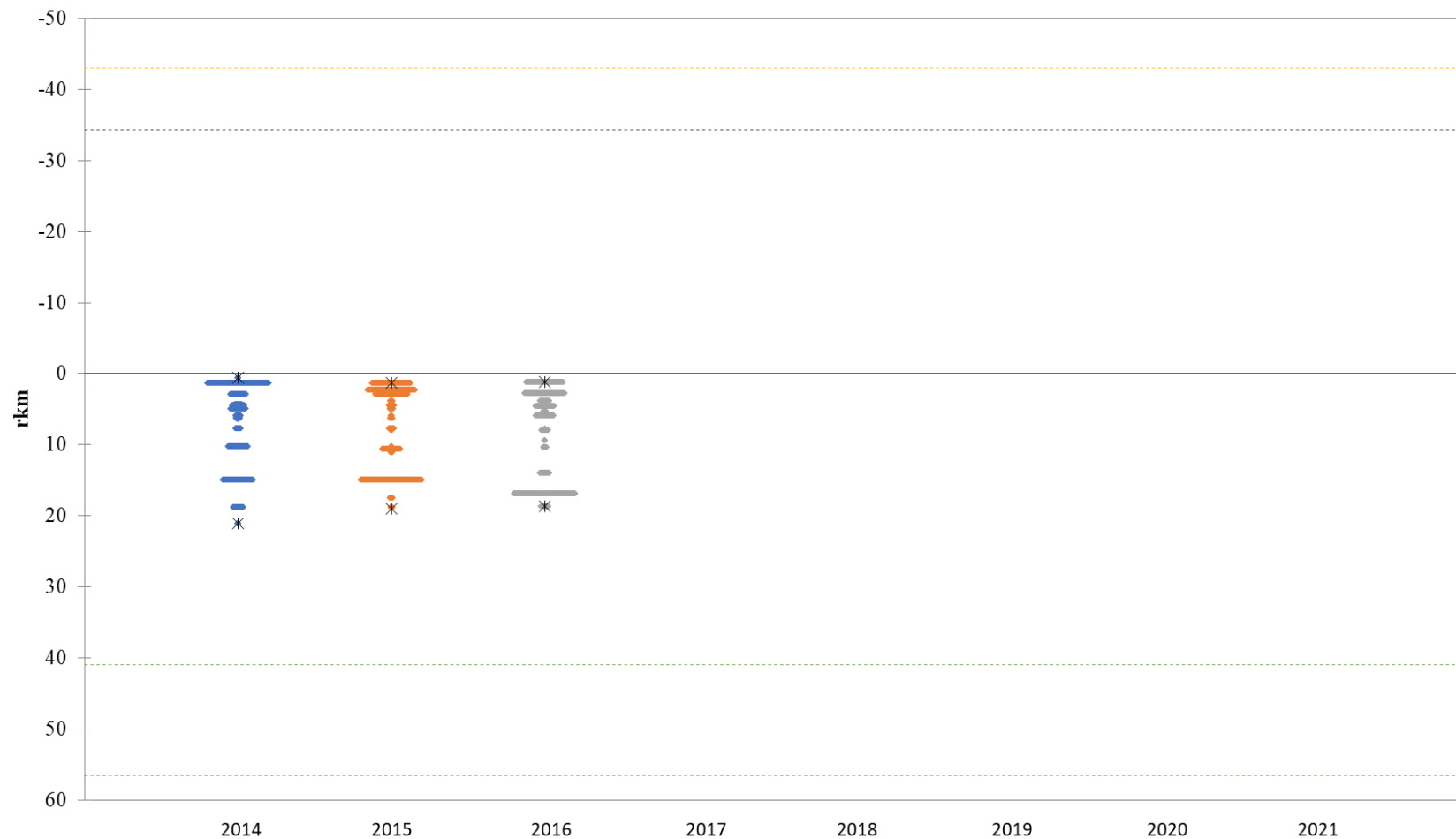


Figure A7-57: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #32170) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2014 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

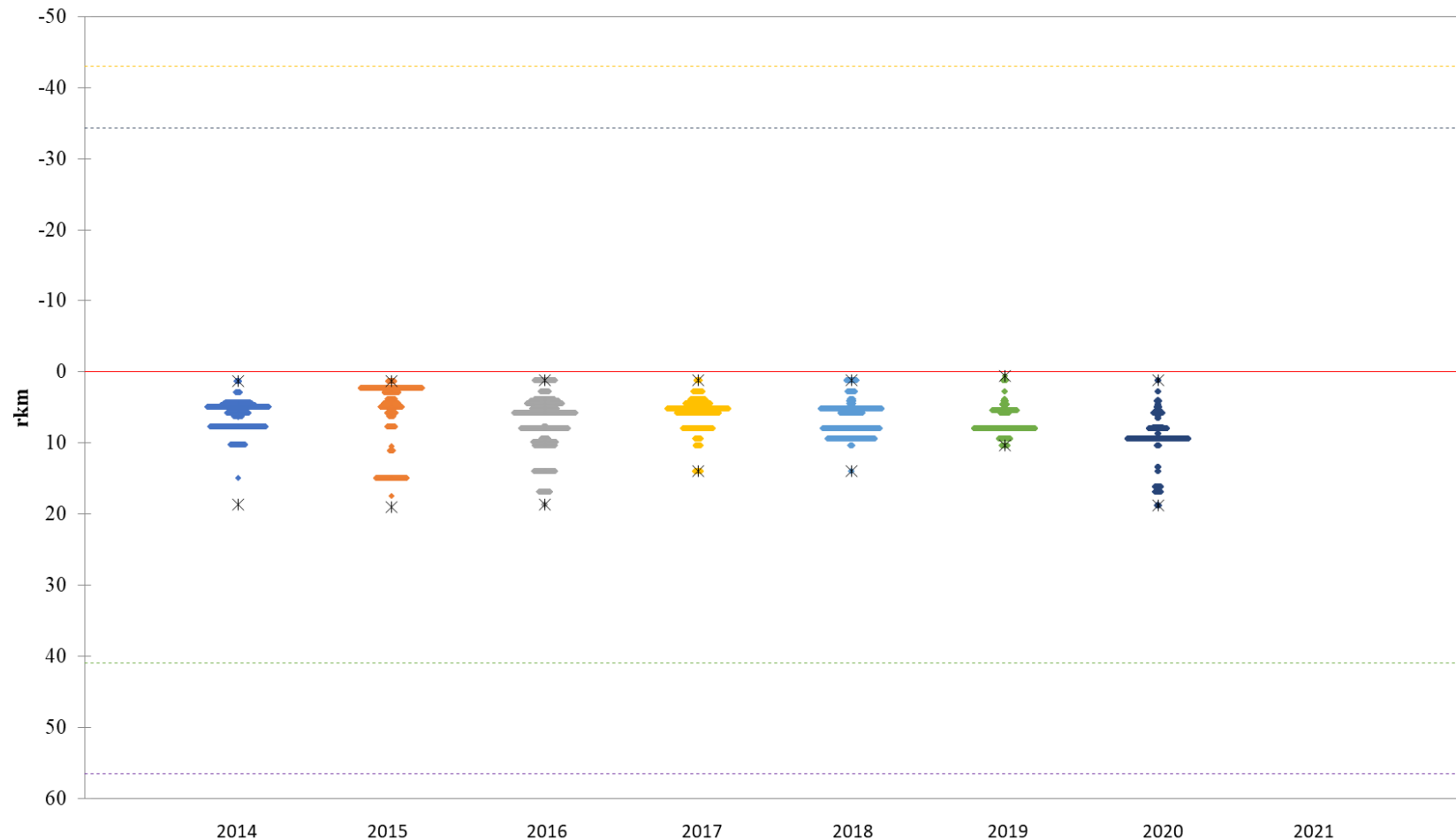


Figure A7-58: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #32171) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2014 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

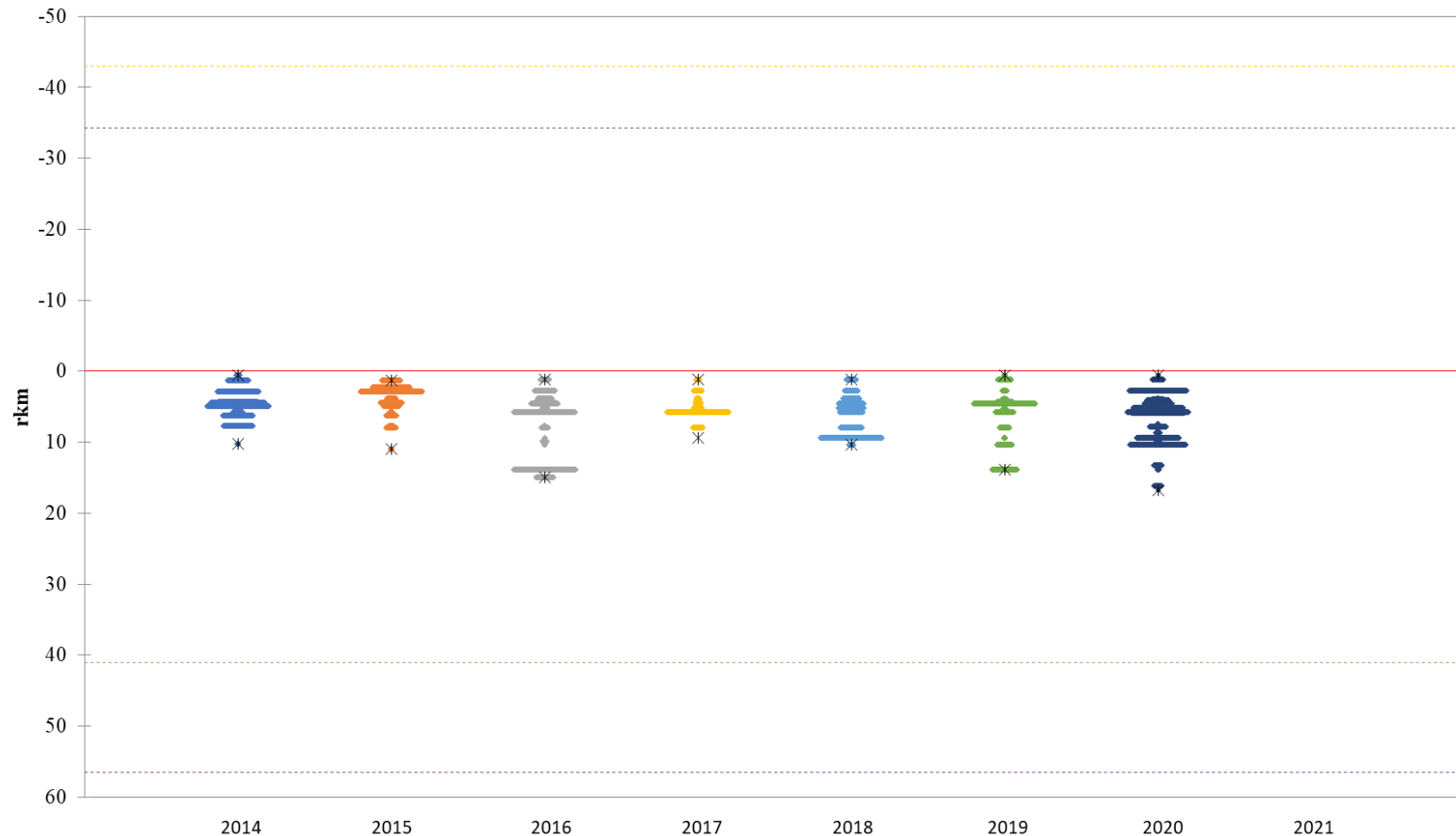


Figure A7-59: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #32172) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2014 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple= Long Spruce GS).

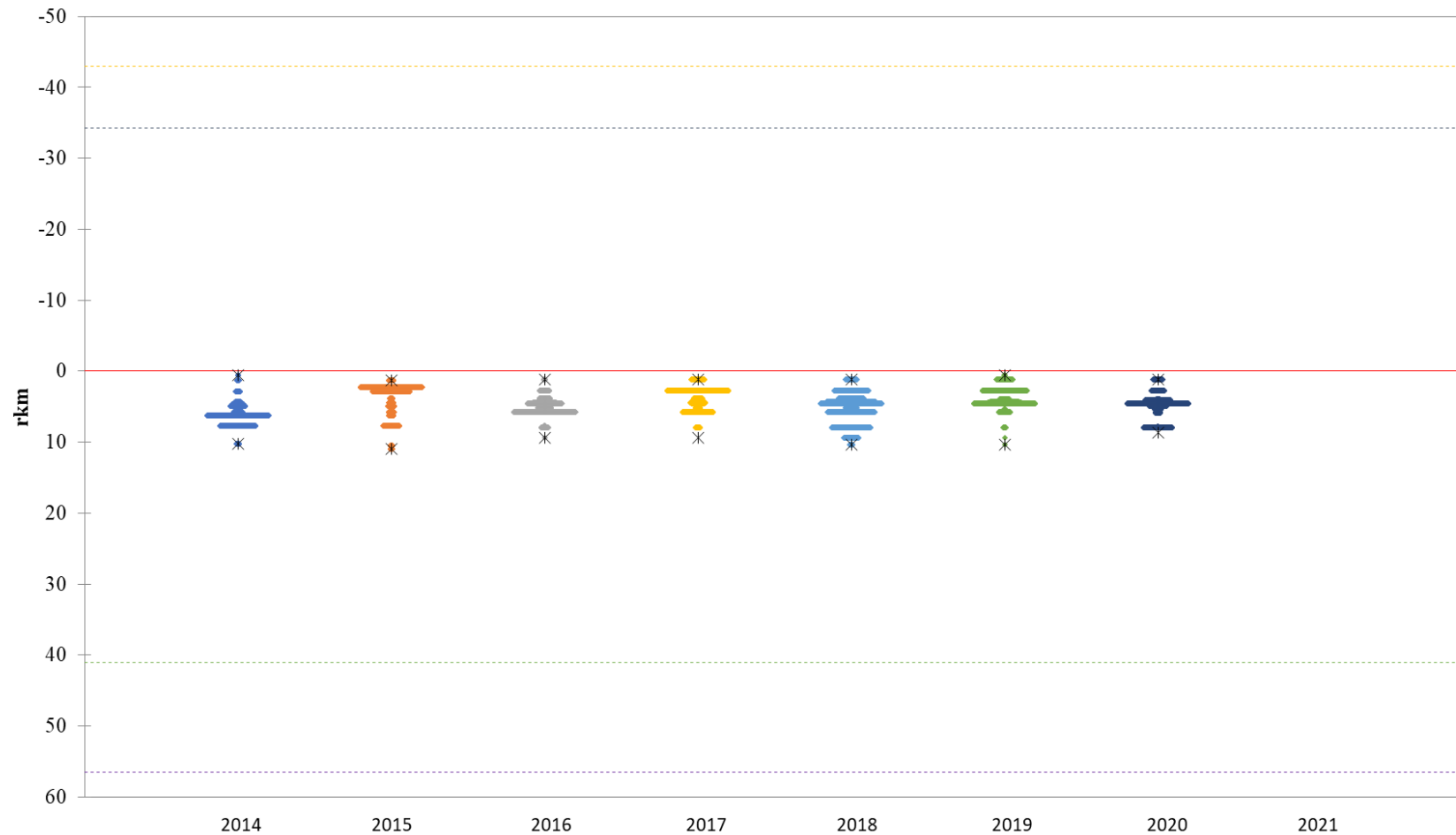


Figure A7-60: Detection ranges and distribution for Lake Sturgeon tagged with an acoustic transmitter (code #32173) in Stephens Lake in relation to the Keeyask GS (rkm 0), from May 1, 2014 to October 10, 2021. Minimum and maximum distances from the Keeyask GS are indicated with a star. Landmarks are indicated with horizontal dotted lines (orange = Clark Lake outlet; blue = Birthday Rapids; red = Keeyask GS; green = Kettle GS; purple = Long Spruce GS).

APPENDIX 8: TAGGING AND RECAPTURE INFORMATION ASSOCIATED WITH ADULT LAKE STURGEON IMPLANTED WITH ACOUSTIC TRANSMITTERS THAT HAVE EXPIRED BETWEEN 2011 AND 2021.

Table A8-1:	Tagging, tag expiry, and subsequent recapture information for adult Lake Sturgeon tagged with acoustic transmitters in the Keeyask reservoir following tag expiry.	341
Table A8-2:	Tagging, tag expiry, and subsequent recapture information for adult Lake Sturgeon tagged with acoustic transmitters in Stephens Lake following tag expiry.	342

Table A8-1: Tagging, tag expiry, and subsequent recapture information for adult Lake Sturgeon tagged with acoustic transmitters in the Keeyask reservoir following tag expiry.

Acoustic Tag	Floy Tag	Tagging Date	Estimated Tag Expiry Date	Date of Last Detection	Location of Last Detection	Recapture Date	Recapture Location	Recapture Program
16042	74399	5-Jun-11	2-Jun-21	8-Aug-14	Clark Lake	-	-	-
16045	77516	18-Aug-11	7-Jun-21	10-Jun-11	Gull Lake	-	-	-
16057	77509	16-Jun-11	13-Jun-21	17-Jun-14	Clark Lake	-	-	-
16058	82631	9-Jun-11	6-Jun-21	6-Oct-19	Clark Lake	-	-	-
16061	77503	21-Jun-11	18-Jun-21	21-Jun-11	Gull Lake	15-Jun-12	Gull Lake	2012 Adult Lake Sturgeon Population Monitoring (Hrenchuk 2013)
						13-Jun-18	Gull Lake	2018 Adult Lake Sturgeon Population Monitoring (Holm and Hrenchuk 2019)
						18-Jun-21	Birthday Rapids	2021 Adult Lake Sturgeon Population Monitoring (Loeppky et al. 2022)
						27-Jun-21	Gull Lake	2021 Adult Lake Sturgeon Population Monitoring (Loeppky et al. 2022)
16063	77514	11-Jun-11	8-Jun-21	2-Jul-19	Clark Lake	-	-	-
16064	80370	12-Jun-11	9-Jun-21	2-Jun-16	Gull Lake	-	-	-
16065	77511	12-Jun-11	9-Jun-21	18-Jan-21	Gull Lake	-	-	-
16067	50826	19-Jun-11	16-Jun-21	24-Jun-19	Clark Lake	16-Jun-20	Kelsey GS	Tag returned by a local resource user in September 2020 and was expired.
16070	77508	16-Jun-11	13-Jun-21	13-Dec-19	Gull Lake	18-Jun-21	Birthday Rapids	2021 Adult Lake Sturgeon Population Monitoring (Loeppky et al. 2022)
16072	77506	21-Jun-11	18-Jun-21	8-Jul-20	Gull Lake	-	-	-
16073	77512	12-Jun-11	9-Jun-21	3-Oct-20	Gull Lake	-	-	-
16074	94030	13-Jun-11	10-Jun-21	19-Jul-20	Gull Lake	-	-	-
16075	50888	10-Jun-11	7-Jun-21	20-Sep-20	Gull Lake	-	-	-
16077	80265	10-Jun-11	7-Jun-21	21-Jun-11	Gull Lake	-	-	-
32174	94117	18-Jun-14	15-Jun-24	25-Aug-20	Stephens Lake	-	-	-
32175	105480	18-Jun-14	15-Jun-24	25-Aug-20	Gull Lake	-	-	-
32176	50853	18-Jun-14	15-Jun-24	25-Aug-20	Gull Lake	-	-	-
32177	105479	18-Jun-14	15-Jun-24	14-Jun-15	Gull Lake	-	-	-

Table A8-2: Tagging, tag expiry, and subsequent recapture information for adult Lake Sturgeon tagged with acoustic transmitters in Stephens Lake following tag expiry.

Acoustic Tag	Floy Tag	Tagging Date	Estimated Tag Expiry Date	Date of Last Detection	Location of Last Detection	Recapture Date	Recapture Location	Recapture Program
16018	93923	13-Jun-12	11-Jun-22	2-Jul-12	Upstream Kettle GS	-	-	-
16024	74416	13-Jun-12	11-Jun-22	25-Jun-12	Stephens Lake	-	-	-
16032	46892	11-Jun-11	8-Jun-21	21-Jan-19	Stephens Lake	-	-	-
16040	74411	9-Jun-11	6-Jun-21	26-Apr-21	Stephens Lake	-	-	-
16043	88788	10-Jun-11	7-Jun-21	17-Sep-12	Stephens Lake	6-Jun-21	Stephens Lake	2021 Adult Lake Sturgeon Population Monitoring (Loeppky et al. 2022)
16044	56208	9-Jun-11	6-Jun-21	17-Sep-12	Stephens Lake	-	-	-
16047	88789	26-Jun-11	23-Jun-21	28-Jun-11	Stephens Lake	-	-	-
16048	94396	7-Jun-11	4-Jun-21	25-Sep-20	Stephens Lake	-	-	-
16049	91174	24-Sep-11	21-Sep-21	25-Jun-20	Stephens Lake	-	-	-
32167	-	11-Jun-14	8-Jun-24	18-Aug-20	Stephens Lake	-	-	-
32168	94234	11-Jun-14	8-Jun-24	18-Aug-20	Stephens Lake	-	-	-
32169	-	13-Jun-14	10-Jun-24	20-Aug-20	Stephens Lake	-	-	-
32170	46844	11-Jun-14	8-Jun-24	30-Oct-16	Stephens Lake	4-Jun-18	Base of Keeyask GS	2018 Adult Lake Sturgeon Population Monitoring (Holm and Hrenchuk 2019)
						8-Jun-18	Stephens Lake	2018 Adult Lake Sturgeon Population Monitoring (Holm and Hrenchuk 2019)
32171	-	13-Jun-14	10-Jun-24	20-Aug-20	Stephens Lake	-	-	-
32172	86136	13-Jun-14	10-Jun-24	18-Aug-20	Stephens Lake	-	-	-
32173	-	13-Jun-14	10-Jun-24	20-Aug-20	Stephens Lake	-	-	-