

MONITORING THE ROBERT S. KERR DAM AND
ITS MISSISSIPPIAN BEDROCK FOUNDATION
USING SATELLITE AND BATHYMETRIC
SURVEYS

By

JOSHUA K. KELTZ

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University of Texas at Dallas

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Thesis Approved:

Dr. Daniel A. Laó-Dávila

Thesis Adviser

Dr. Ahmed Ismail

Dr. Jim Puckette

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Abstract:

The Grand River Dam Authority (GRDA) contracted and funded the Boone Pickens School of Geology to conduct studies over several of GRDA's dams along the Grand River system to better analyze the dams' structural integrity. One of these dams, the Robert S. Kerr Dam, was the primary dam where a continuous Global Navigation Satellite System (GNSS) survey was conducted along with bathymetric and Interferometric Synthetic Aperture Radar (InSAR) surveys to monitor the motion of the dam and the condition of the bedrock foundation upon which Kerr Dam is constructed. The GNSS survey and InSAR data when compared with meteorological and water level data illustrated that the Kerr Dam has not undergone any motion that is anomalous to seasonal temperature change. Bathymetric surveys were limited to qualitative analysis due to varying data resolutions demonstrate that the spillway of Kerr Dam is undergoing erosional events though these events are not implicated in the dam's motion.

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CHAPTER I

BACKGROUND

Dam failures can pose a high risk to human life and infrastructure, as with the Rapid City, South Dakota dam failure which claimed 237 lives and damaged more than \$60 million in infrastructure during the summer of 1972 (ASDSO, 2023). A dam may fail due to many different factors, including but not limited to foundational defects, cracking, and inadequate upkeep (ASDSO, 2023). The Boone Pickens School of Geology at Oklahoma State University (OSU) has worked closely with the Grand River Dam Authority (GRDA) for several years with the goal of evaluating the structural integrity of the Pensacola and R. S. Kerr hydroelectric dams, as well as the Salina Pumped Storage Project. The driving cause for this cooperation is rooted in concerns surrounding the impact of geologic structures in the limestone bedrock of these facilities to the stability of the dams. Located along the Grand River system, these dams provide places of recreation, mechanisms for controlling flooding, and electricity to the region of northeastern Oklahoma. This infrastructure demands the utmost level of safety and efficiency, and it is of vital importance to assess potential hazards for effective solutions. Several methods for assessing the stability of these dams are being implemented, ranging from analyzing core samples to various geophysical studies.

This project will focus on the efficacy of implementing a continuous GNSS (Global Navigation Satellite Systems) survey for movement monitoring at the R. S. Kerr Dam and provide an idea about how such a survey can aid in the monitoring of the other sites.

Interferometric Synthetic Aperture Radar (InSAR) data from Rezatec, a third party, will also be analyzed to aid in movement detection. Additionally, the bathymetry of Kerr Dam’s spillway will be analyzed from surveys done the years 2017, 2019, and 2020 as well as from a geophysical survey contracted by OSU in 2022 to investigate the erosion of bedrock from scouring. The question this project seeks to answer is whether the deformation structures in the dam’s bedrock or erosion of the spillway is causing movement accommodation. The principal hypothesis is that these factors have not resulted in movement affecting the dam.

Geologic Setting

The Robert S. Kerr Dam is located near Locust Grove, Oklahoma which is in the northeastern part of the state (Figure 1). It dams the Hudson Lake on its eastern side and controls the flow of the Neosho River towards its western side. The dam is characterized as a concrete block and earth-fill dam hybrid that is approximately 1.2 km in length, with the concrete block portion accounting for about 360m (Figure 2). The dam stands at about 165m above sea level.

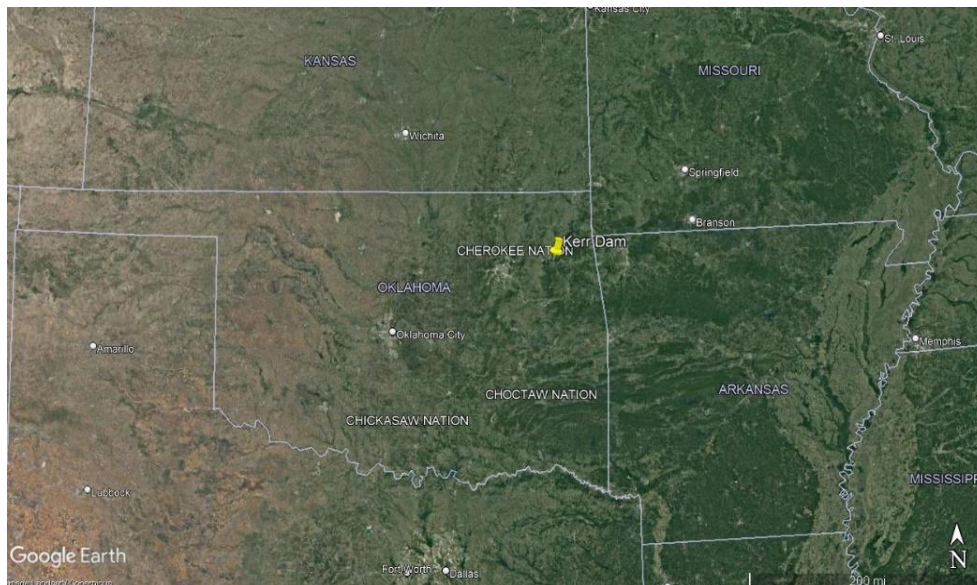


Figure 1: Location of Kerr Dam within the state of Oklahoma. Yellow pin represents Kerr Dam’s location. Image courtesy of Google Earth.

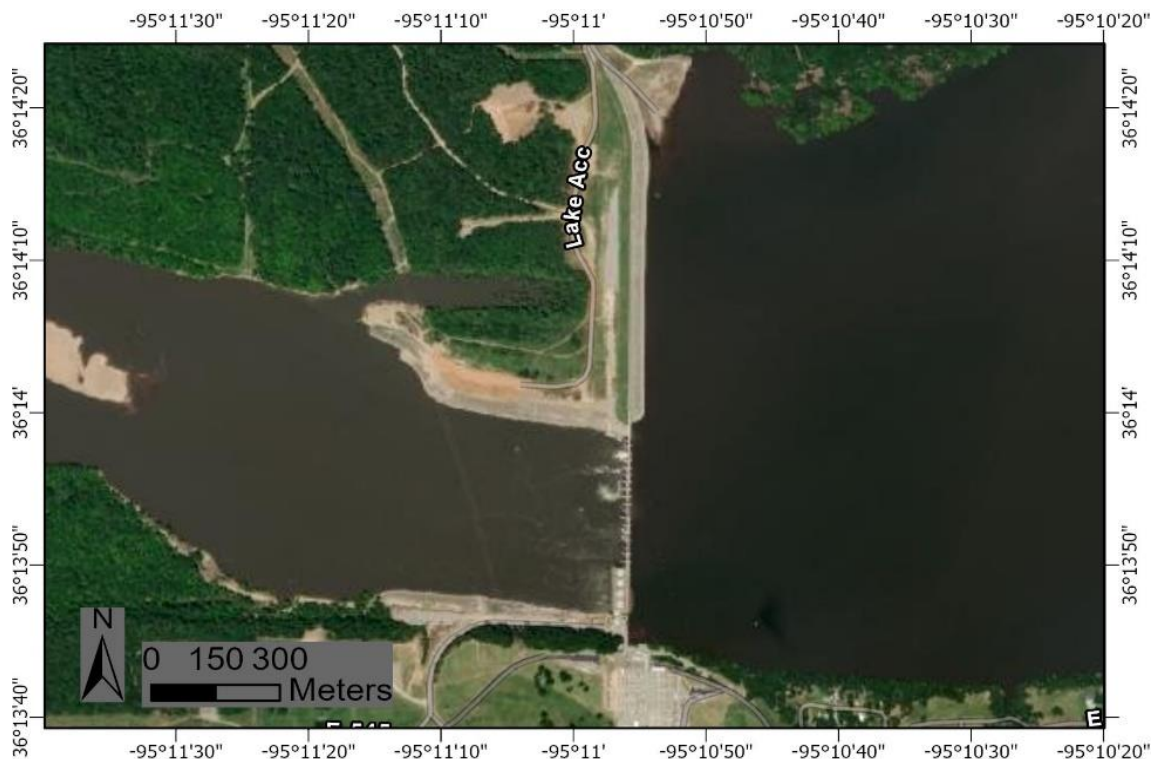


Figure 2: Satellite Image of Kerr Dam. Northern portion of dam is earthen with the concrete block portion controlling dam outflow.

The geology of the area is important in assessing the dam's stability, as the characteristics and behaviors of the bedrock impact the deformation responses of the dam. The geologic setting of the R.S. Kerr Dam is characterized as the Springfield Structural Plain of the Ozark Uplift (Huffman, 1960). The Springfield Structural Plain is one of the three physiographic provinces that make up the Ozark Uplift, along with the Salem Platform and Boston Mountains. The Ozark Uplift is a large dome structure located predominantly in southern Missouri but includes parts of northeastern Oklahoma and northwestern Arkansas (Huffman, 1960). The geology of the Ozark Uplift is characterized by a Precambrian granite basement overlain by Cambrian, Ordovician, Silurian, Devonian, Mississippian, and Pennsylvanian sedimentary rocks (Huffman, 1958).

The geology surrounding Kerr Dam is composed of predominantly Mississippian carbonates with occurrences of Pennsylvanian carbonates, shales, and sandstones (Huffman, 1958). The Mississippian units are the Kinderhookian-aged St. Joe Group, which is the oldest unit

exposed in the area. The next oldest is the Osagean-aged Reeds Spring, followed by the Meramecian-aged Moorefield, Chesterian-aged Hindsville, and Fayetteville Formations (Huffman, 1960; Figure 3). The Pennsylvanian units are not very pronounced in the area, with only small occurrences of the Morrow series and Atoka Formation. Other units in the area are Quaternary deposits of terrace gravels and alluvium, which used to be part of a network of flood plains many of which are now under the Hudson Lake or downstream of Kerr Dam (Huffman, 1958; Figure 3).

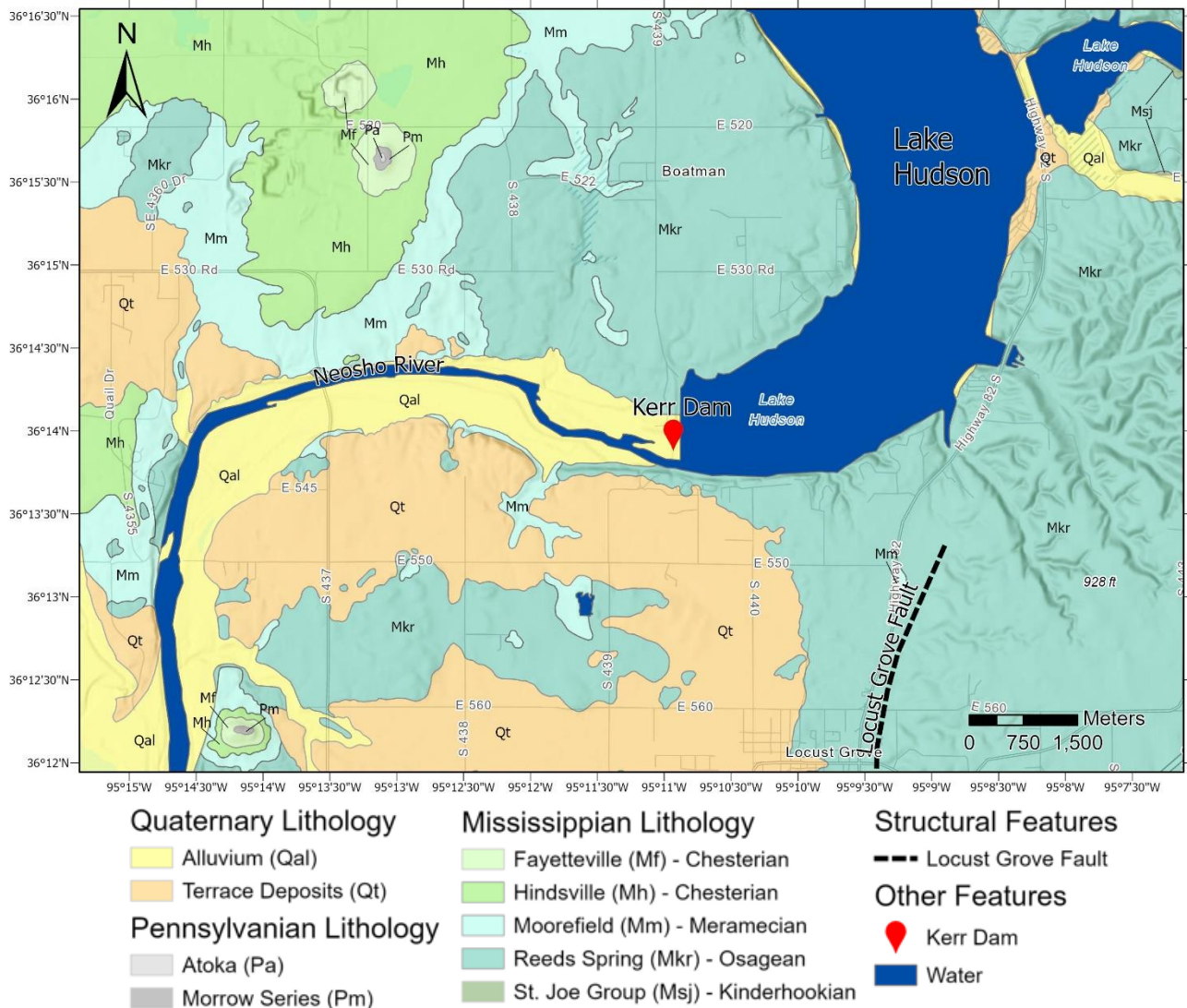


Figure 3: Geologic map of area surrounding Kerr Dam. Adapted from Huffman, (1958).

All the dams within the scope of the OSU/GRDA project rest predominantly on the Reeds Spring Formation. The Reeds Spring Formation is the primary unit of interest when evaluating the stability of these structures as it is the foundation. Huffman (1960) classifies the Reeds Spring Formation's stratigraphy as thinly bedded chert with beds of finely crystalline limestone, all of which can be as much as 175 ft (53.3 m) in thickness. The Reeds Spring Formation is also resistant to weathering, forming near-vertical cliffs when exposed in stream valleys (Huffman, 1960). Around Kerr Dam, the Reeds Spring is oriented nearly flat with a shallow dip between 3.0 and 6.0 degrees towards west-southwest (GRDA, 2007). The outcrop of the Reeds Spring west of the dam's powerhouse is significantly more fractured compared to the outcrops observed at the other dams within the OSU/GRDA project (Laó-Dávila and Ismail, 2021). The fractures in the Reeds Spring at Kerr strike northwest, with few instances of fractures striking northeast (Laó-Dávila and Ismail, 2021). Below the Reeds Spring Formation lies the 0-25-foot-thick (7.6 m) St. Joe Group, which Huffman classifies as a "gray, fine-to-medium crystalline, nodular weathering limestone and green calcareous shale". Below the St. Joe Group rests the Chattanooga shale, which is a black, fissile shale that Huffman states to be a source rock for hydrocarbons (1960).

Seismicity

An important element to the stability of the dam is the regional seismicity, as well as the location of any relevant faults. In terms of seismicity, the region of northeastern Oklahoma is relatively inactive with most earthquakes possessing low enough magnitude that they are often unnoticed (GRDA, 2012). The earthquake which occurred closest to Kerr Dam had a magnitude of 2.2 and an epicenter near Twin Oaks, Oklahoma, located about 18 miles east of the dam (GRDA, 2012). The greatest perceived impacts of these earthquakes are thought to occur from soil liquefaction and ground shaking (GRDA, 2012). The November 2011 earthquake near Prague, Oklahoma was reported to be felt at the Kerr Dam, however, ground acceleration

estimations were less than half of the threshold the dam was built to withstand (GRDA, 2012). The epicenter of this earthquake was located about 100 miles west-southwest of Kerr Dam (GRDA, 2012). Regarding faults, the two most prominent faults in the area are the Locust Grove and Seneca faults, formed likely as a result of the elevation of the Ozark Uplift in the mid-Pennsylvanian (Huffman 1960). The north-northeast trending Locust Grove Fault is the closest of the two faults, located roughly 2.5 miles southeast of Kerr Dam. The Seneca Fault, also known as the Seneca Graben, at its point nearest Kerr Dam is located roughly seven miles northwest from the dam (GRDA, 2012).

CHAPTER II

LITERATURE REVIEW

A primary element in maintaining the safety of dams is monitoring movement, as the influence of nature's hydrologic and geologic forces exerted on a dam can cause deformation that can lead to hazardous situations (Vazquez-Ontiveros et al., 2021). Existing methods of monitoring dam movement include differential leveling surveys for tracking vertical displacement and collimation surveys for tracking horizontal displacement (FERC, 2015). Additionally, high-precision GNSS surveys have been used with success in monitoring dam structures, often in tandem with other methods such as gravity-based plumb lines, coordimeters, pendulums, or angular collimators (Barzaghi et al., 2018). Other newer methods used in dam monitoring are both space-borne and terrestrial Synthetic Aperture Radar. At Kerr, monitoring is done with water level recorders, embankment piezometers and observation wells, gallery piezometers and drains, weirs for measuring seepage, crack gauges, and lastly alignment monuments (GRDA, 2012).

These alignment monuments were installed in 1990 for tracking horizontal and vertical movements via trilateration (prior to 1993, triangulation). However, the surveys did not yield reproducible results. Thus, GPS instruments were implemented in 1998 that improved precision, but not to the satisfaction of the GRDA (GRDA, 2012). The monitoring schedule of the piezometers, weirs, and drains is outlined in Table 1 (GRDA, 2012):

Table 1: Instrumentation Monitoring Frequency

Facility	Lake Hudson Pool Elevation (feet NGVD)	Minimum Frequency	
		Inspection Patrols	Instrument Readings ^a
Kerr Dam	625 or less	Weekly	Monthly
	Between 625 & 628	Twice daily	Every two days
	Greater than 628	Three times daily	Daily

Note: (GRDA, 2012).

The monitoring schedule is adjusted according to the dam’s water level, whereas the crack gauges are read semiannually, and alignment (or GPS) surveys are conducted annually (GRDA, 2012).

GNSS Survey: Previous Studies

Global Navigation Satellite Systems (GNSS) is a term for every existing navigation satellite constellation put into orbit regardless of origin, whereas GPS refers to the constellation developed and launched by the USA. Other primary constellations of GNSS are GLONASS by Russia, Galileo by the European Union, and BeiDou by China.

The idea to monitor deformation along dams using GNSS surveys is decades in age, with the idea tracing back to 1988 when DeLoach (1989) highlights GPS monitoring as a potentially more economical solution than the current methods of geodetic surveying. Early dam monitoring with GPS occurred later at the Pacoima Dam in southern California (Behr et al., 1995). Since then, many groups have implemented this technique and experimented with other methods in addition to GNSS surveys to provide a better glimpse into how the structure of interest is behaving. Continuous GNSS processing has multiple aspects that impact the results of the survey in terms of both hardware and software; however, assuming the hardware elements are properly set up and the area is favorable, the biggest influential factors tend to be contingent upon how

software and various post-processing techniques are applied to the gathered data. With this in mind, special attention will be given to post-processing techniques in this review.

Pacoima Dam

Examining early implementations of GNSS surveys applied to monitoring dams will help to outline a general primer for reference when analyzing more modern techniques. The Pacoima Dam survey consisted of two GPS stations along the Pacoima Dam in order to monitor the dam's movement while also paying attention to three other surrounding stations established by the Southern California Integrated GPS Network (SCIGN; Behr et al., 1998). The data gathered were processed using the GAMIT software package and time series were generated from GLOBK, a Kalman filter adjustment software. The results of this survey gave a timeseries that tracked millimeter-level movements over the nearly three-year survey duration. This dataset was then used for analyzing the dam's deformation and was correlated with regional meteorological data to determine rates of deformation relative to temperature, and it exhibited a sinusoidal shape that correlated to the seasonal rise and fall of temperatures.

GNSS and Dams Today

The primary changes since Pacoima are the number of post-processing methods available, as well as the different software programs that implement these techniques. To better understand these changes, it is important to understand the two primary techniques of collecting and processing GNSS data. The first method is known as relative positioning (RP), and the other is known as precise point positioning (PPP). RP, also called differential positioning, takes known locations of a base station, Continuously Operating Reference Stations (CORS), or from IGS stations as reference points. These known reference points can transmit locational information to the receiver that is monitoring the location in question, and because the baseline between the two stations is significantly less than a satellite's orbit height, the receivers will record similar errors which allow

for higher error resolution. These errors can be resolved through differencing the pseudorange and carrier phase observables between receivers to eliminate clock errors, thus the name differential positioning (Nistor and Buda, 2012, Taylan et al., 2013). PPP works differently from RP primarily because it does not utilize reference point(s) and only requires a single receiver. The reason for this is that PPP utilizes precise satellite clock estimates instead of between-receiver differencing (Nistor and Buda, 2012). While both of these methods are capable of yielding mm-level accuracy, studies conducted by Yigit et al. (2016) demonstrated that RP methods proved to be marginally more accurate than PPP given the same length observation period, though PPP was capable of delivering competitive results if allotted a lengthier observation time.

InSAR and Dams

Another proven form of motion monitoring is by InSAR. InSAR is a method of analyzing movement which originates from SAR data. Radar resolution is a function of the size of the sensor's aperture; a larger aperture grants higher spatial resolution (Herndon et al., 2021). SAR takes advantage of a larger 'synthetic' aperture that utilizes a sequence of radar acquisitions from a smaller antenna that are combined to achieve an image with higher resolution than the antenna size would normally allow for (Herndon et al., 2021). Space-borne SAR satellites orbit the earth with the SAR sensor oriented towards the ground at an oblique angle perpendicular to the satellite's path of travel (GSI, 2021). InSAR, in summary, takes two radar images gathered by SAR satellite of the same location at different times and measures the amount of change that takes place between when the images were taken (Herndon et al., 2021). This is done through measuring the difference between the radar phase signal at the first take and the second image take (Herndon et al., 2021). Because InSAR is measuring the difference between two phases, it is only capable of measuring displacement occurring towards or away from the sensor's line of sight (GSI, 2021). InSAR has successfully been implemented in many projects requiring high precision motion detection, such as in the case of the Pertusillo dam in Basilicata, Italy.

Pertusillo Dam, Basilicata, Italy

In the case of the Pertusillo dam, Milillo et. al (2016) describes the implementation of InSAR to monitor seasonal deformation. The Pertusillo dam is described as an arch-gravity dam on an artificial lake with the purpose to supply water and produce electricity. Its dimensions are 357m in length and 98m in height. In their experiments, they utilized SAR images from the TerraSAR-X and COSMO-SkyMed satellites. After post-processing the data, the results exhibited the seasonal motion of the dam with precision on the scale of a few millimeters.

CHAPTER III

METHODOLOGY

Three different components were implemented to provide insight into Kerr Dam's stability: First, a continuous GNSS survey was carried out from Spring of 2021 through October of 2022. The results of this survey provide the data needed to determine how the dam is moving. Second, an analysis of the bathymetry of Kerr Dam's spillway was conducted to give insight into the rate of the bedrock scouring. Third, an analysis of InSAR data produced by Rezatec provides better insight into vertical motion of the dam as well as any anomalous areas of the dam experiencing greater amounts of movement.

GNSS Survey: Hardware and Site Setup

Monitoring Kerr Dam's deformation with a GNSS survey was the primary focus of this project and gives strong insight into how Kerr Dam is moving. The setup at Kerr Dam consists of six Trimble NetR9 GNSS receivers each equipped with a Zephyr Model 2 antenna (Figures 4, 5). Additionally, a control station located southwest of Kerr Dam was setup to compare movement of stable ground with the data collected from the crest of the structure, designated as KER1 (Figure 4). This setup is installed on steel pipes fixed in concrete across the crest of the dam's concrete block section (Figure 4). Each GNSS station is powered directly from electrical outlets running along the dam. The sky available at Kerr Dam is largely free of multipath sources, however mobile

gate hoists atop the dam could cause sources of multipath if they moved too close to the antennas.

Once the survey was set up, each receiver was configured to record observations every 30 seconds for a 24-hour period throughout the survey. Each data file comprises 24 hours of data. Firuzabadi and King (2012) demonstrated that longer session times result in higher precision, as more time helps to “average out effects of multipath and fluctuations in the atmospheric delay”. Raw data were collected manually by making a trip to Kerr Dam on a monthly basis. Raw data were downloaded onto a personal laptop and quickly uploaded to a limited access group-use lab computer in order to prevent accidental data loss. Intermittent site visits allowed for observing any significant changes to the area that may have impacted the quality of these data as well as keeping tabs on the conditions of the instruments. Next, the post-processing methods used with the raw data will be discussed.



Figure 4: Layout of the stations along Kerr Dam’s crest and reference station KER1.



Figure 5: Station configuration of KER4. Each station consists of the Zephyr Model 2 antenna with the Trimble NetR9 receiver stored in a weatherproof Pelican case. Monument is affixed into the structure of the dam.

GNSS Survey: Data & Post-Processing Methods

The receivers of our configuration implemented only the GPS constellation until May 2022, when the GLONASS constellations were added to increase the number of satellites visible during the observation periods.

The Trimble NetR9 receivers utilized in this survey give daily raw data files as ‘.T02’ formatted files which needed to be converted into Receiver Independent Exchange (RINEX) formatted files, which, as the name suggests, is a universal format for usage with various post-processing software. To convert raw data files into RINEX, the free ‘ConvertToRINEX’ software from Trimble was used.

Post-processing of the GPS data was done initially through the Online Positioning User Service (OPUS) program which is maintained by the National Oceanic and Atmospheric Administration (NOAA). OPUS is a user-friendly program that accepts a RINEX file from a specific station and processes it using the Program for Adjustment of GPS Ephemerides (PAGES)

software, created by the National Geodetic Survey (NGS). Parameters that the user defines using OPUS are the antenna type, height, and the RINEX file from one observation. OPUS solutions are calculated using relative positioning methods, where the software implements three of the closest surrounding Continually Operating Reference Stations (CORS) to correct its position. The CORS that are used at the Kerr Dam are within a ~120km baseline of the stations, which falls within an acceptable distance even if only a single CORS was used (Figure 6; Firuzabadi and King, 2012).

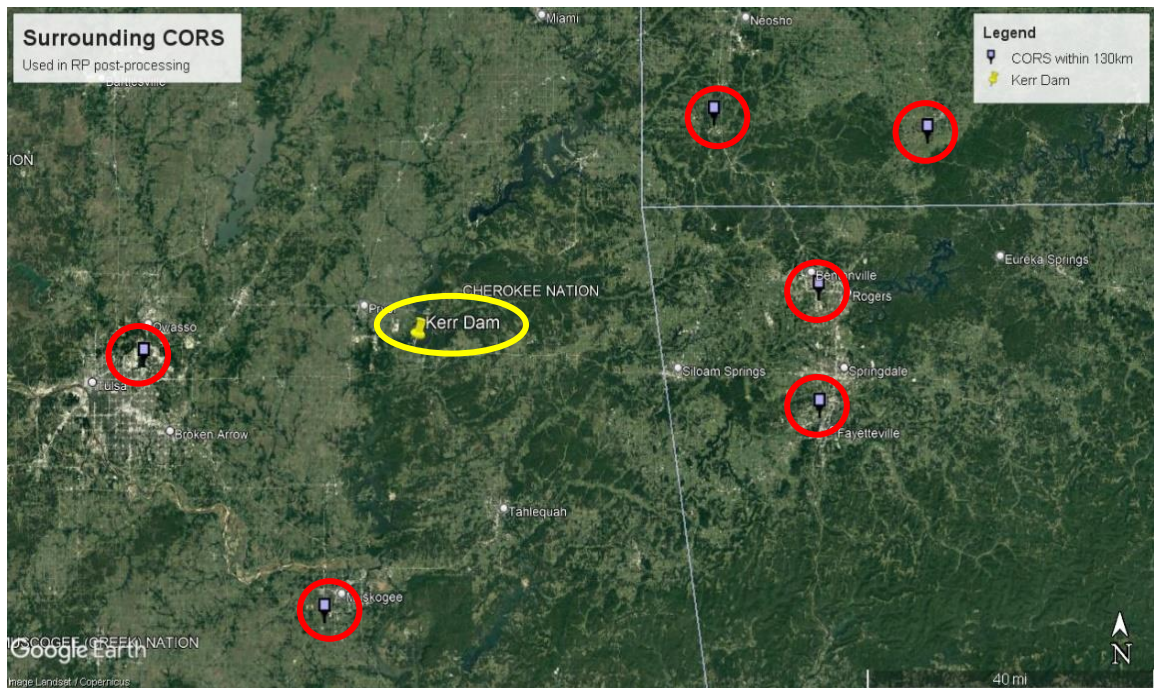


Figure 6: Continually Operating Reference Station(s) (CORS) surrounding Kerr Dam. Each CORS is within ~120 km from the dam—the acceptable baseline for best accuracy (Firuzabadi and King, 2012). Red circles are CORS, yellow ellipse is Kerr Dam. Note: CORS data obtained from (NGS(A), 2021).

Post-processing was also conducted using the Canadian Spatial Reference System (CSRS) PPP service produced by Natural Resources Canada (NRCAN). NRCAN data was added alongside the OPUS data starting May 22nd of 2022. KER2 was processed using OPUS until June 9th, 2022 in order to serve as a comparison of the two post-processing methods. The goal of implementing the CSRS-PPP service was to increase precision of the dataset, as CSRS-PPP,

while using a positioning method slightly less accurate than RP, is capable of using GLONASS constellation data in its final processing thus increasing the number of satellites during the observation periods.

GNSS Survey: Data Analysis

The GNSS survey was conducted from April 22nd, 2021, through October 13th, 2022. Using Microsoft Excel, data gathered over the 17-month period will be displayed as three time series for each station: one of vertical motion, one of north-south motion, and one of east-west motion (18 time series across 6 stations). Additionally, a time series comparing all of the stations with data concerning water levels of the dam and air temperature will be plotted to account for varying hydrologic cycles and thermal conditions in order to outline the typical movement of the dam throughout the year. This combination of data has been successfully implemented at other dams such as the Pacoima Dam (Behr et al., 1998) for modeling dam motions and will help highlight any deviations from conventional water level and temperature motions, indicating potential instabilities in the foundational basement rock or other factors requiring intervention.

The GNSS time series were generated from three days of data (05/12/2022 – 05/14/2022) from the KER1 control station and the daily observations from each station across the dam's crest. The raw datafiles from KER1 were processed once using OPUS, and then processed using NRCAN. The mean of the KER1 OPUS solutions for the three days was calculated along with the mean of the three KER1 NRCAN solutions, giving an average KER1 OPUS northing, easting, and elevation as well as an average KER1 NRCAN northing, easting, and elevation. The average KER1 OPUS northing was then subtracted from every individual daily northing OPUS solution at each station, yielding the daily northing distance from KER1 to the respective station along the dam (KER2-7). The median of these daily northing distances was taken, and then subtracted from each of the daily northing distances to KER1 giving the daily northing difference from the

median northing distance to KER1. This operation was conducted for the OPUS easting and elevation, as well. Additionally, the same workflow was executed for the NRCAN-processed solutions. The OPUS and NRCAN derived differences were then combined into a single column spanning the length of the survey, and then plotted on a chart showing how the differences from the median distance to KER1 change on a day-to-day basis. Additionally, the peak-to-peak errors (the discrepancies of the baseline distances between CORS) were added to each daily measurement by dividing the value by two and affixing an error bar to the chart.

Along with creating the time series for each station's movement, the trendlines for each station's movement along the northing, easting, and vertical axis were compared with the dam's water level both on the upstream and downstream side (headwater and tailwater, respectively; data provided from the GRDA's daily readings) as well as the air temperature from the closest NOAA (National Oceanic and Atmospheric Association) weather station with daily readings located in Spavinaw, Oklahoma. Air temperature datasets were obtained from the NOAA's Climate Data Online website.

Bathymetry Analysis: Data

In addition to a GNSS survey, the bathymetry of the dam's spillway was analyzed to aid in understanding the motion of the dam by providing insight into the conditions of the bedrock foundation. Four bathymetry surveys have been conducted on the Kerr spillway: the first occurring November 6th-8th in 2017, the second from July 22nd-23rd in 2019, the third November 6th-8th in 2020, and the final over April 13th, 19th, and 21st in 2022.

Previous sonar surveys conducted by Nautilus Marine Group LLC for the GRDA in 2017 and by Abbott Underwater Acoustics LLC for the GRDA in 2019 and 2020 displayed that both local and large-scale scouring events were occurring at the dam, with undercutting occurring at

the apron of the dam’s spillway (Abbott Underwater Acoustics, 2019 & 2020, Nautilus Marine Group LLC, 2017).

The sonar data was gathered by first putting the sonar equipment on a gimbaled tripod in the water at the top of the riverbed using scanning ranges of 90, 150, and 300 ft (27.4 , 45.7 , 91.4 m, respectively) to acquire a complete image of the dam apron and riverbed. The second method used for gathering the data was by mounting the sonar equipment to the stern of a watercraft oriented in the vertical position to allow the gathering of profiling and bathymetric survey data (Abbott Underwater Acoustics, 2020). These data were precise to a hundredth of a foot (Abbott Underwater Acoustics, 2020). The horizontal coordinate system of each survey was defined as the State Plane Projection for North Oklahoma of the NAD83 (North American Datum 1983) datum. The vertical coordinate system was defined as the North American Vertical Datum 1988 (NAVD88). Units for both datums were measured in US feet.

Bathymetry Analysis: Processing Workflow

The bathymetry data were first converted to Comma Separated Value (CSV) files using Microsoft Excel, where it was then loaded into ArcGIS Pro for processing.

Once coordinate systems were established in ArcGIS Pro, the point data was displayed. Each survey differed significantly in the amount of data points as well as the extent by which they were distributed. Table 2 highlights the differences in datapoint numbers, and Figures 7a-d portray the spread of datapoints for each survey.

Table 2: Number of datapoints for bathymetry surveys.

Survey Year	2017	2019	2020	2022
Datapoints Used	45,728	209,559	217,571	8632

The 2022 survey had a several erroneous datapoints that pointed to locations outside the state of Oklahoma and were thus removed from the calculation; the 2022 survey data was the only dataset that had errors of this variety. Next, digital elevation models (DEMs) were generated using ArcGIS Pro's Geostatistical Wizard simple kriging algorithm. The algorithm required the specific field on the dataset to be defined, which in this case is the elevation measurements. After the elevation measurements were selected, the algorithm allowed for the type of variogram model to be selected, where covariance was selected. Additionally, the geostatistical wizard allows accounting for anisotropic data, which in the preliminary selection best modeled the data. The resultant layers from the kriging runs were exported as 'Raster' files.

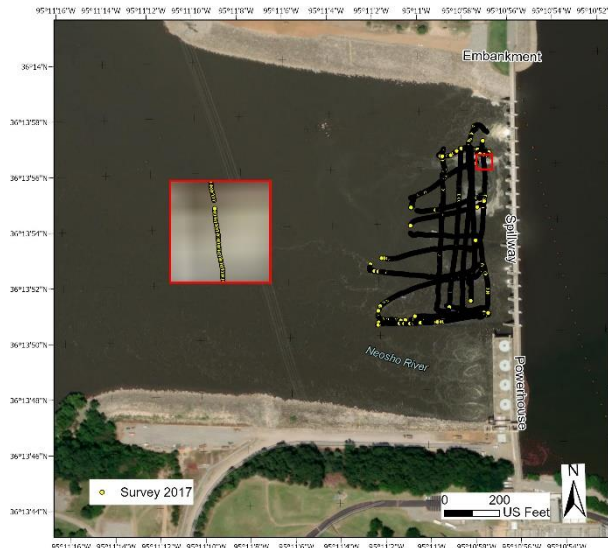


Figure 7a: Point distribution of 2017 bathymetry survey. Red box is magnified view of the datapoints taken during the survey.



Figure 7b: Point distribution of 2019 bathymetry survey. Red box is magnified view of the datapoints taken during the survey.

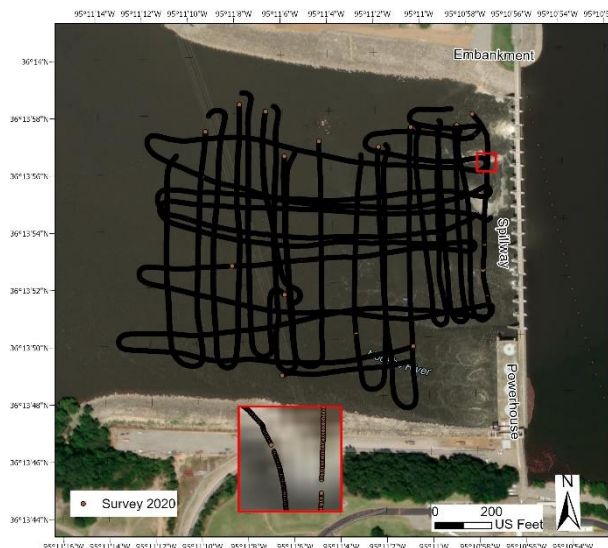


Figure 7c: Point distribution of 2020 bathymetry survey. Red box is magnified view of the datapoints taken during the survey.



Figure 7d: Point distribution of 2022 bathymetry survey. Red box is magnified view of the datapoints taken during the survey.

The 2017 survey, conducted by Nautilus Marine Group, covered most of the area behind the immediate spillway however did not cover the area behind the powerhouse or further downstream (Figure 7a). The 2019 and 2020 survey, both conducted by Abbott Underwater Acoustics, had the broadest extents with both surveys encompassing the immediate spillway, some of the powerhouse, and downstream region of the dam (Figures 7b, 7c). Nautilus Marine Group

appears to be the precursor name to Abbott Underwater Acoustics, as they were both owned by the same president. The 2022 survey, conducted by Underwater Consultants International, Inc., covered most of the area that the previous 2019 and 2020 surveys covered, though without coverage by the powerhouse (Figure 7d).

The next step was to difference the DEMs using the ‘Minus 3D Analyst’ tool in ArcGIS Pro, which takes two raster layers as input and takes the difference of the two rasters on a pixel-by-pixel basis. The result of this tool is a raster displaying the difference of the pixels between the two input raster DEMs. This operation will highlight the key areas of change between survey years.

Bathymetry Analysis: Dataset Limitations

One major limiting factor in performing change detection between DEMs is when datasets are of differing quality (particularly concerning spatial resolution and positional uncertainty), which can have a significant impact on the quantitative accuracy and informative value of the change detection (Okay et al., 2019). Normally, change detection between DEMs is done using datasets which were gathered via airborne laser scanning (ALS) where number of datapoints for an area similar in size to the Kerr Dam spillway is on the scale of millions (Okay et al., 2019); bathymetric surveys at Kerr have tens of thousands of datapoints at most. Despite the discrepancy in the number of datapoints, the operations performed on the DEMs are similar which means that similar limitations are faced when assessing the change in the dam’s bathymetry.

The bathymetry data were gathered by different surveyors and cover different spatial extents behind the spillway of the dam, as well as different numbers of points were taken across each survey. The 2017 survey covers the least amount of area but has a point density similar to the 2019 and 2020 surveys (Table 2, Figures 7a, 7b, 7c, 7d), however has a different layout of these points. The 2022 survey was gathered by a different surveyor and has the lowest amount of datapoints despite covering the second largest survey area. The 2019 and 2020 surveys are the

most consistent surveys with the most datapoints and a similar gathering path. Due to these factors, the change detection will be constrained to the 2019 and 2020 survey datasets.

InSAR Data Analysis

The other portion of monitoring Kerr Dam's movement is being conducted by Rezatec, a third-party company specializing in remote sensing, where InSAR data has been collected over the whole of Kerr Dam for the past 6 years. InSAR data gathered over the whole of Kerr Dam was partitioned into hexagonal cells that each have a measurement of vertical motion. The cells that overlap with the respective GNSS stations are where the InSAR data is implemented for comparison (Figure 8). The data used by Rezatec for motion monitoring are from the Sentinel 1 SAR satellite, initially at 5x20m per pixel which Rezatec then resamples to a resolution of 15x15 m per pixel. The movement readings from Rezatec are precise to 2-3 mm for each measurement (every 12 days) and can resolve to 2 mm over longer periods of time (Rezatec, 2021). This data will be analyzed for usage in monitoring the vertical motions of Kerr Dam.



Figure 8: Hexagons represent the approximate extent of InSAR measurements that overlap with GNSS stations.

CHAPTER IV

FINDINGS

GNSS: Background

The GNSS survey was concluded on October 13th of 2022. Over the duration of the survey, all the receivers were powered off for a 5-day period from May 15th through May 19th, 2021, for maintenance on the dam. Station KER2 suffered some technical problems which required the station to be removed and sent away for repairs starting July 22nd, 2021. The station was reinstalled October 7th, 2021. Additionally, station KER5 suffered instances of anomalously high error and was thus removed from the dam for troubleshooting starting April 15th, 2022, and was reoccupied on May 11th, 2022 using a different Trimble NetR9 receiver. Overall, each of the stations reflected elements which were unique, however a general trend is apparent when examining each axis of movement (northing, easting, and elevation).

With the Kerr Dam survey, the OPUS service has consistently delivered coordinates with RMS accuracy on the scale of around 1.5 cm and peak-to-peak errors (the discrepancies of the baseline distances between CORS) of 1 cm (+/- 0.5 cm). With NRCAN, the peak-to-peak errors were able to be resolved to around 0.2 cm (+/- 0.1 cm; Figures 9-15, 18-24, 27-33).

Each time series had a 5-point moving average trendline added to better ascertain movement patterns. In general, the northing trendlines for each station do not show any significant departure from the established baseline and stay around the 0 cm mark, suggesting that

the dam does not have any significant north-south motion (Figures 16 and 17). The northing trendline for KER2 differs from the other stations and is situated further north than the other trendlines, though this station suffered significant periods of downtime and the gaps in the data impact the calculations for difference from the median distance to the control station (KER1). The consequence of this gap in data is apparent in the easting and vertical trendlines, as well (Figures 16, 17, 25, 26, 34, and 35).

Lake Head and Tailwater Elevation and Temperature Data

The head and tailwater elevation are taken relative to the North American Vertical Datum 1988 (NAVD88). The headwater elevation remains relatively constant throughout the duration of the survey at 620 ft (188.9 m) and the tailwater fluctuates from just below 560 ft (170.6 m) at its minimum to slightly over 580 ft (176.7 m) at its maximum. The temperature data exhibits a rising behavior and falling behavior coinciding with seasonal changes, with a minimum of just over 10° F and a maximum of just under 110° F. The KER5 station has a unique trendline with high error levels and has been omitted from the water level and temperature comparison because similar behavior is not reflected in any other station.

GNSS: Northing Data

Survey data for north-south movements are displayed in Figures 9-15. Positive deviation from the baseline indicates northward motion, whereas negative deviation indicates southward motion. The northing data across each station overall tends to not reflect significant deviation of movement throughout the survey duration. KER3, KER4, KER6, and KER7 all reflect similar profiles of movement with variation from the calculated difference within 0.75 cm from the zero baseline, though frequently less (Figures 10, 11, 14, 15). In all of the time series except KER2, a dip in the data followed by significantly lower peak to peak errors can be observed at May 22nd,

2022 from when NRCAN PPP was used instead of OPUS. The data from station KER2 was transitioned to processing with NRCAN later, starting from June 9th, 2022.

KER2 varies from the other stations with a progressively northward trend from the baseline over the course of April through July and followed by the gap from the receiver downtime. The series continues with the northward trend settling back to the baseline and moving southward at less than 0.5 cm from roughly late November 2021 through February 2022. Afterwards, the data trends back to the baseline and similarly reflects the trends of the other stations for the rest of the survey (Figure 9).

The KER5 station overall similarly reflects the trends of KER3, KER4, KER6, and KER7, however is wrought with extremely high levels of error for several periods (see Figure 12). Figure 13 portrays the overall magnitude of error relative to the trend of other measurements. The first period occurred from mid-August of 2021 and ended in October 2021, followed by the next period of error starting in November 2021 going through December of 2021. The error did not occur as drastically after these periods, however the general time series of KER5 possesses larger peak-to-peak errors than the other stations.

Northing trendlines in general stay very close to the 0.00 cm baseline and hover around this baseline for the duration of the survey (Figures 16 and 17). KER2's trendline is situated further north than the other surveys and has a large area where the station was down for maintenance, but in general still follows a similar profile as the other stations (Figures 16 and 17). The northing trendlines do not appear to have any relationship with either the air temperature or water levels, as when the temperature or water levels (specifically the levels of tailwater) change, the northing trendline remains constant.

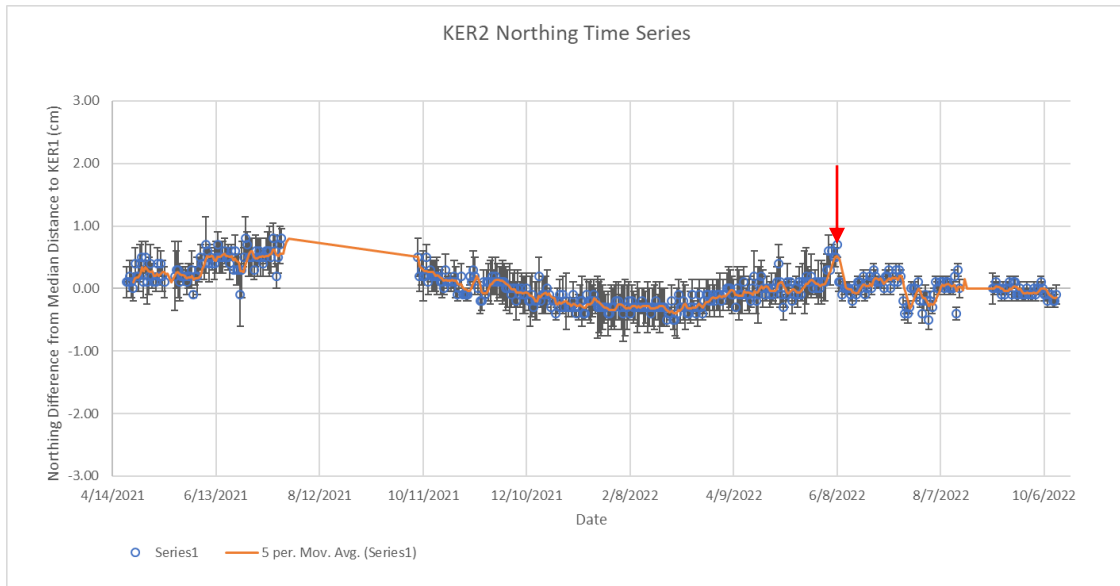


Figure 9: Timeseries of KER2 station with OPUS and NRCAN calculated coordinates. Arrow indicates when NRCAN was implemented with GPS + GLONASS. Bars on each measurement represent peak-to-peak errors and orange line represents a 5-point moving average trendline.

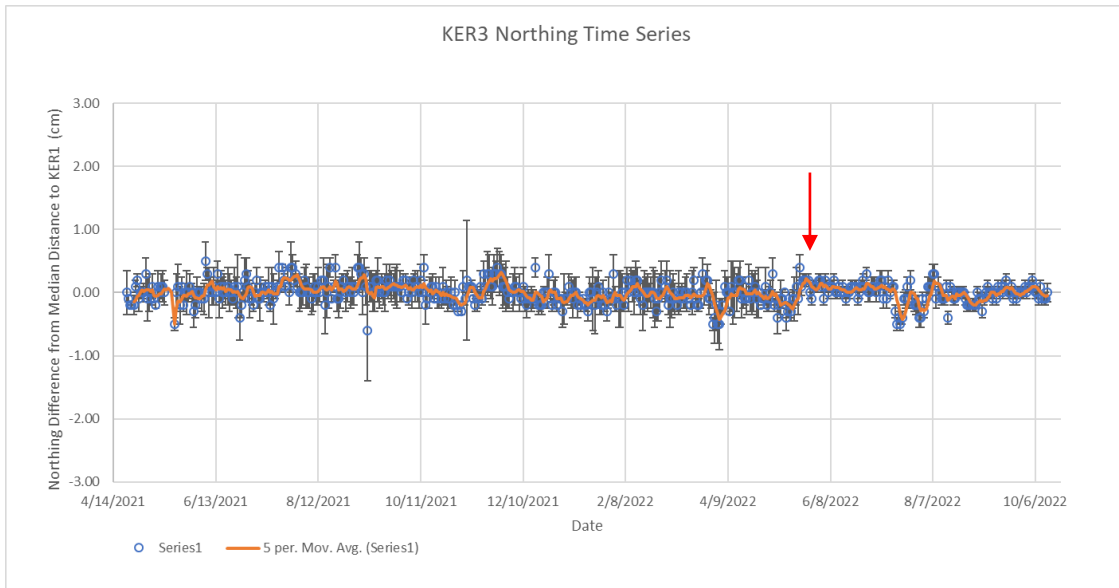


Figure 10: Timeseries of KER3 station with OPUS and NRCAN calculated coordinates. Arrow indicates when NRCAN was implemented with GPS + GLONASS. Bars on each measurement represent peak-to-peak errors and orange line represents a 5-point moving average trendline.

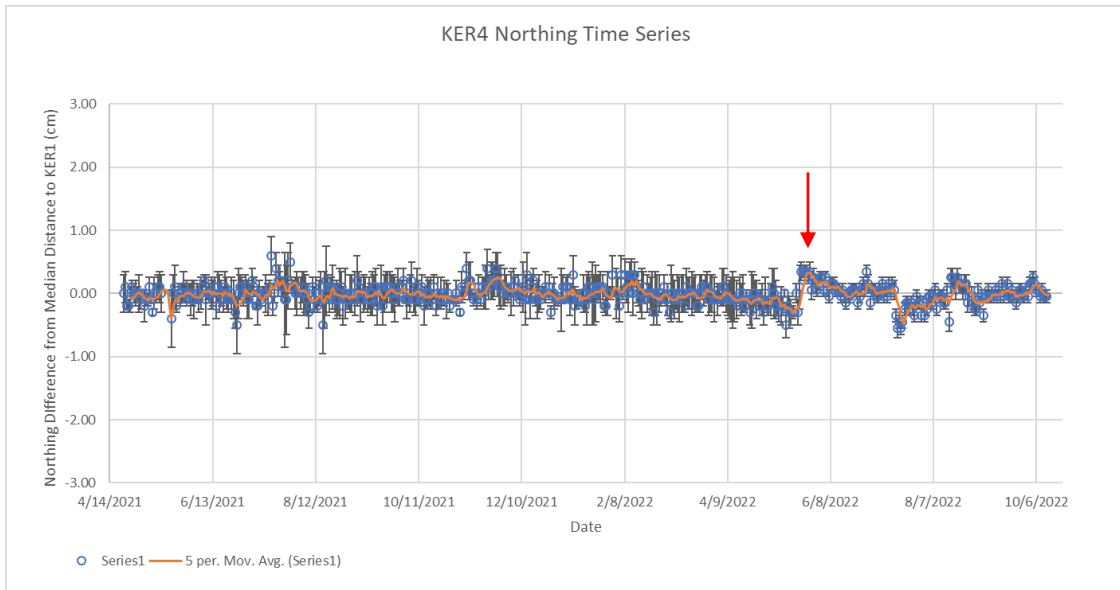


Figure 11: Timeseries of KER4 station with OPUS and NRCAN calculated coordinates. Arrow indicates when NRCAN was implemented with GPS + GLONASS. Bars on each measurement represent peak-to-peak errors and orange line represents a 5-point moving average trendline.

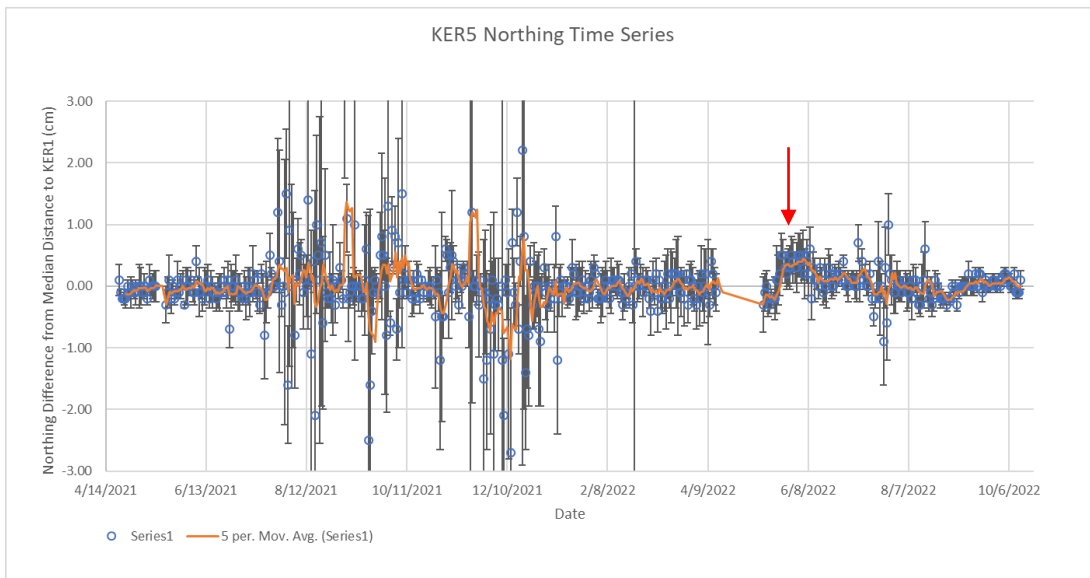


Figure 12: Timeseries of KER5 station with OPUS and NRCAN calculated coordinates. Arrow indicates when NRCAN was implemented with GPS + GLONASS. Bars on each measurement represent peak-to-peak errors and orange line represents a 5-point moving average trendline.

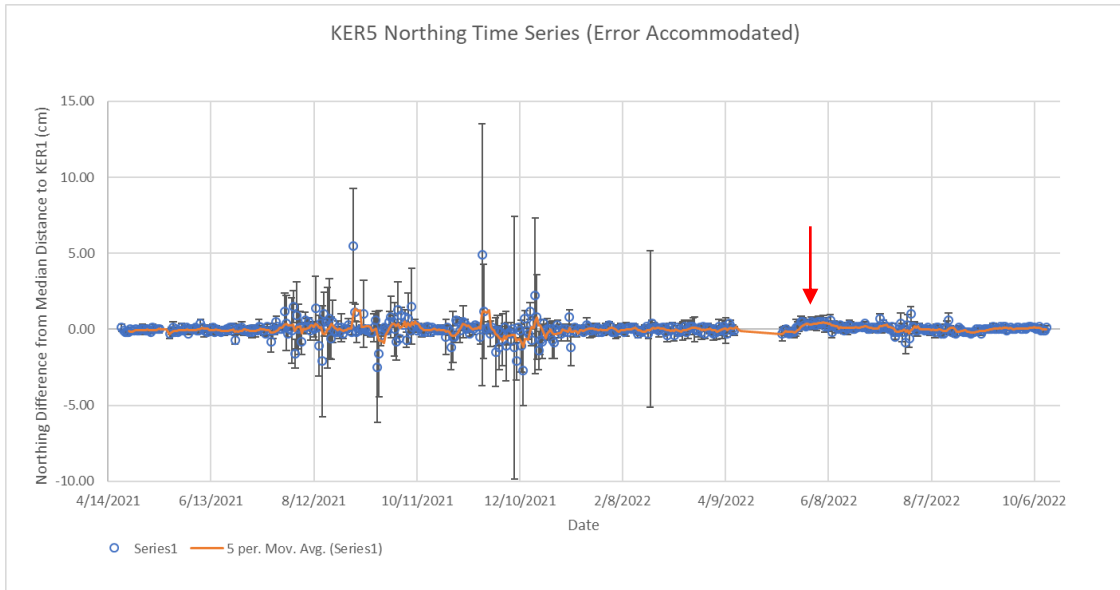


Figure 13: Timeseries of KER5 station with OPUS and NRCAN calculated coordinates. Vertical axis is exaggerated to encapsulate error levels. Arrow indicates when NRCAN was implemented with GPS + GLONASS. Bars on each measurement represent peak-to-peak errors and orange line represents a 5-point moving average trendline.

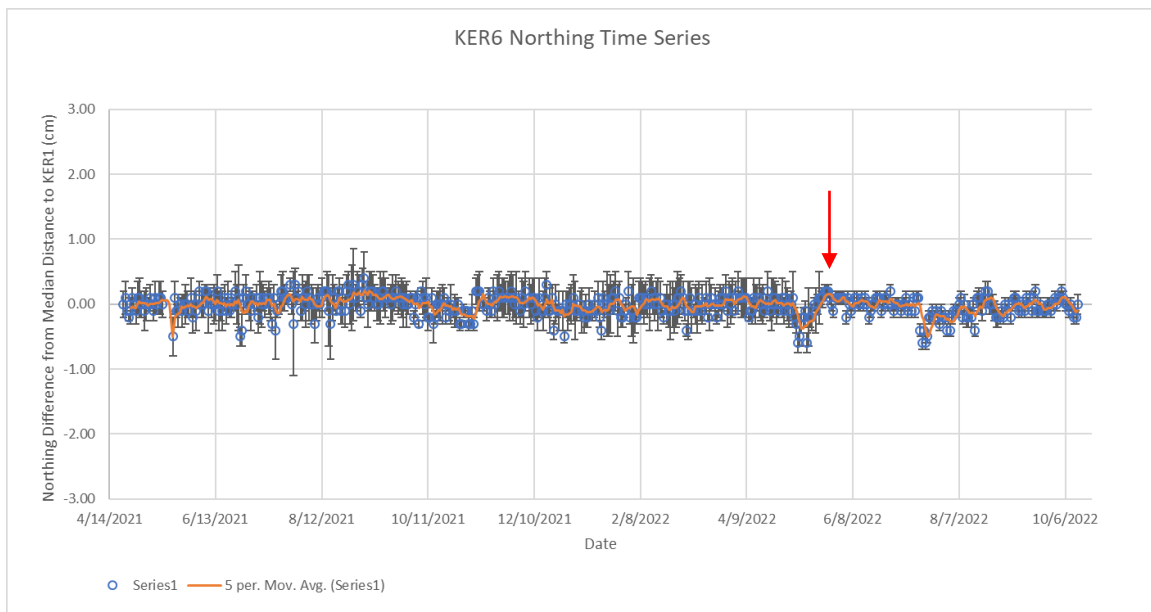


Figure 14: Timeseries of KER6 station with OPUS and NRCAN calculated coordinates. Arrow indicates when NRCAN was implemented with GPS + GLONASS. Bars on each measurement represent peak-to-peak errors and orange line represents a 5-point moving average trendline.

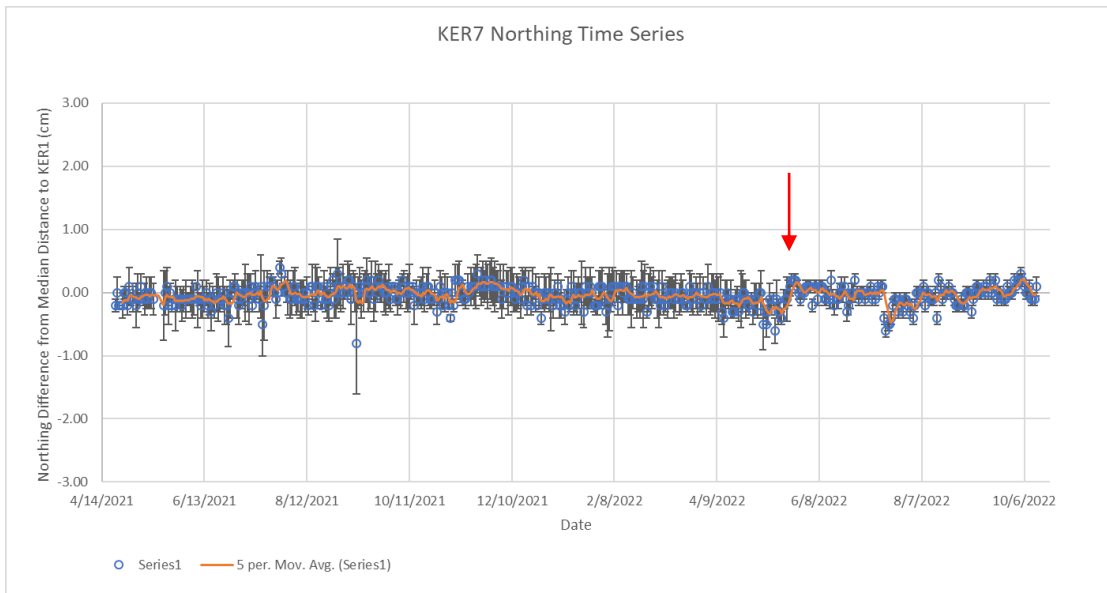


Figure 15: Timeseries of KER7 station with OPUS and NRCAN calculated coordinates. Arrow indicates when NRCAN was implemented with GPS + GLONASS. Bars on each measurement represent peak-to-peak errors and orange line represents a 5-point moving average trendline.

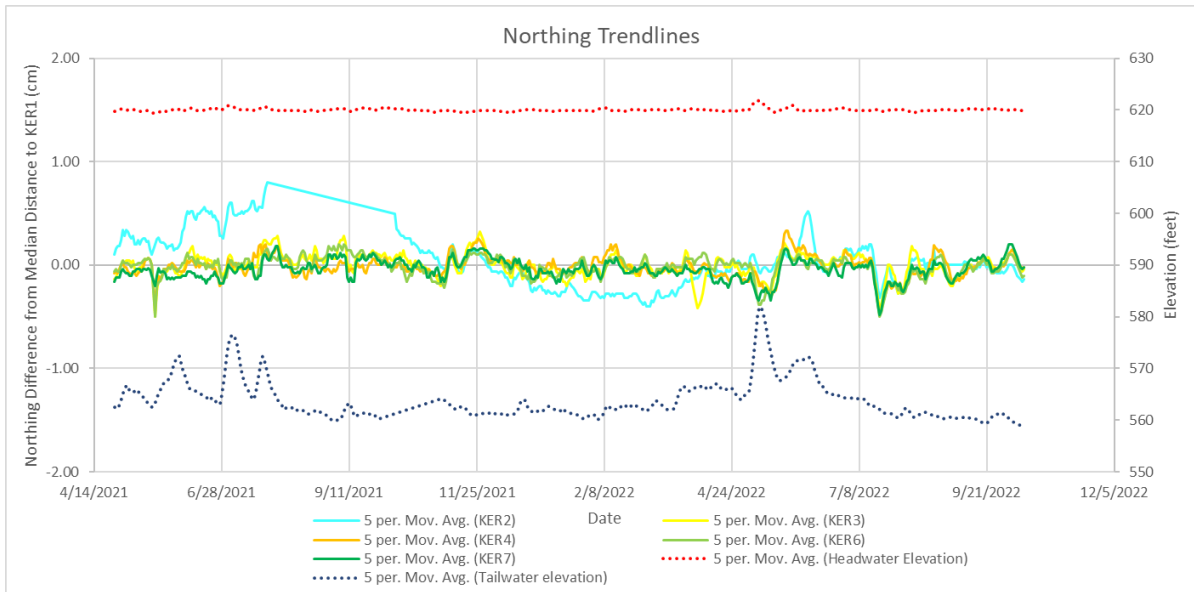


Figure 16: Station northing trendlines compared with head and tailwater elevations. Headwaters were held constant throughout survey. Red dotted line represents headwater elevation, blue dotted line represents tailwater elevation. Solid lines represent 5-point moving average trendlines of each GNSS station.

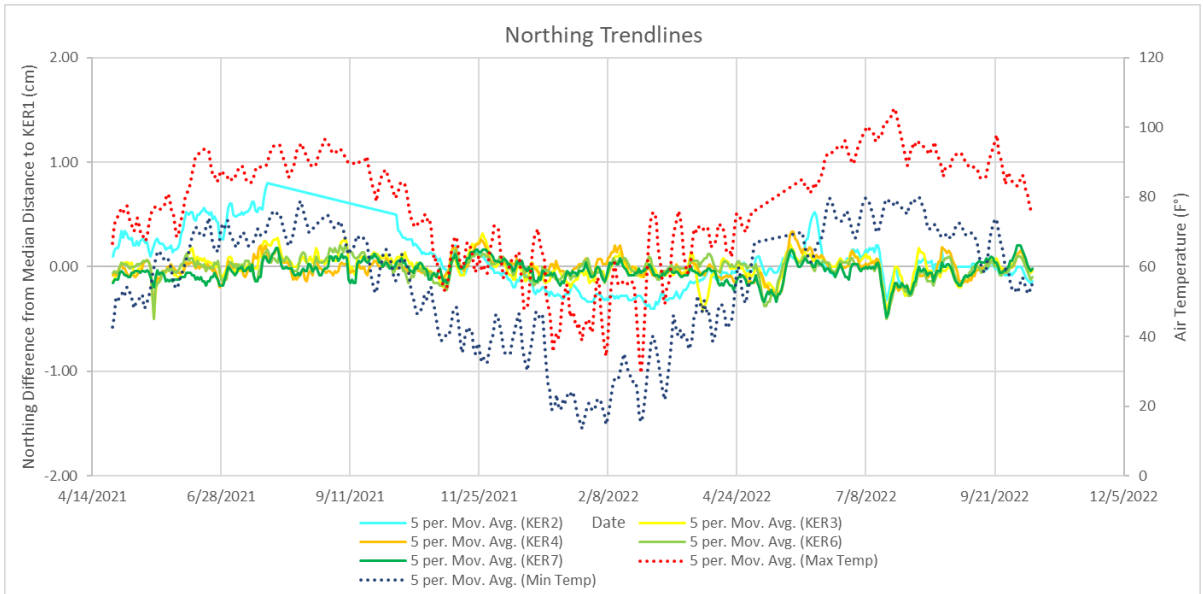


Figure 17: Station northing trendlines compared with air temperature at Spavinaw, OK. Red dotted line represents maximum daily temperature, blue dotted line represents minimum daily temperature. Solid lines represent 5-point moving average trendlines of each GNSS station.

GNSS: Easting Data

Regarding the easting time series, positive deviation from the baseline indicates eastward motion (upstream) motion and negative deviation indicates westward (downstream) motion. KER2 and KER5 both show inconsistencies in the easting data, as mentioned previously with the northing data: KER2 has a significant gap in the data from July 2021 through October 2021 (Figure 18), and KER5 is wrought with error over the same periods (Figure 21). As with the northing time series, the data dips and error bars narrow when NRCAN was implemented in each station's post processing. The survey data from monitoring the east-west axis of movement shows an oscillation of upstream (eastward) and downstream (westward) motion over a several month period (Figures 18-24). The stations move eastward from survey onset and plateau at about 0.5 cm in roughly mid-August 2021, when a gradual westward (downstream) motion occurs until the beginning of February 2022 where it evens out at about -0.6 cm until March 2022. After March 2022, the trend begins eastward again. The survey concluded in mid-October 2022 where the trend was beginning to see the early stages of returning to the baseline.

The easting trendlines exhibit a general rising (upstream movement) and falling (downstream movement) over the course of the survey that does not appear to be impacted by the dam's water levels (Figure 25). The air temperature data appears to coincide with the easting movements; when the temperature rises, the measurements indicate an upstream motion and a downstream motion as the temperature falls (Figure 26). The dam's motion does not appear to take place immediately when the temperature begins to change; when the temperature reaches its highest, the dam's motion reaches its highest after a period of time following the maximum temperature (Figure 26). This lag in motion manifests itself with low temperatures, as well.

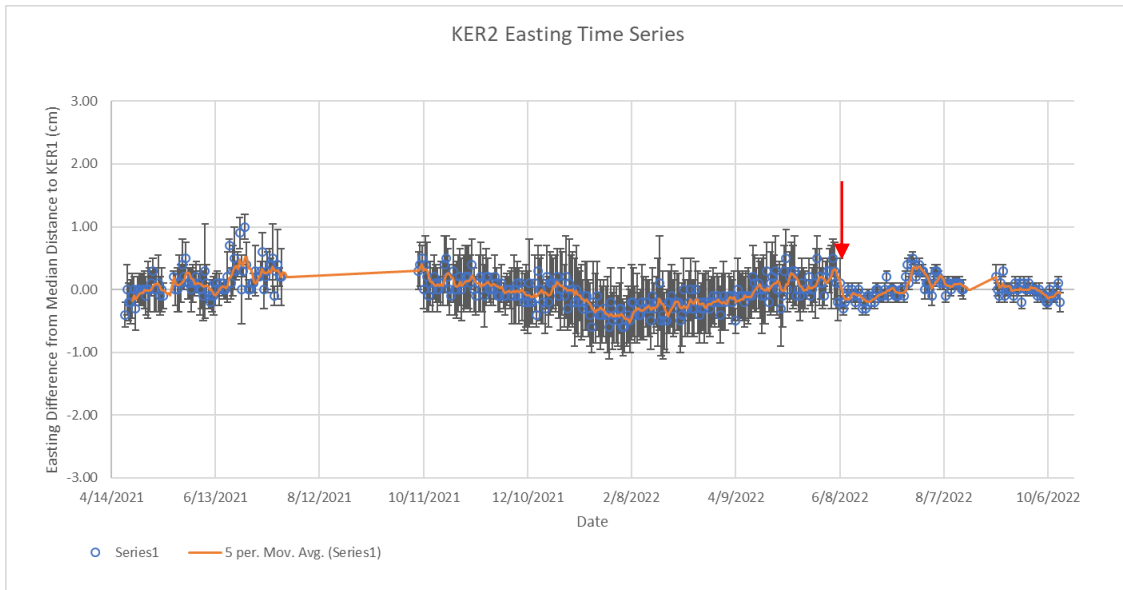


Figure 18: Timeseries of KER2 station with OPUS and NRCAN calculated coordinates. Arrow indicates when NRCAN was implemented with GPS + GLONASS. Bars on each measurement represent peak-to-peak errors and orange line represents a 5-point moving average trendline.

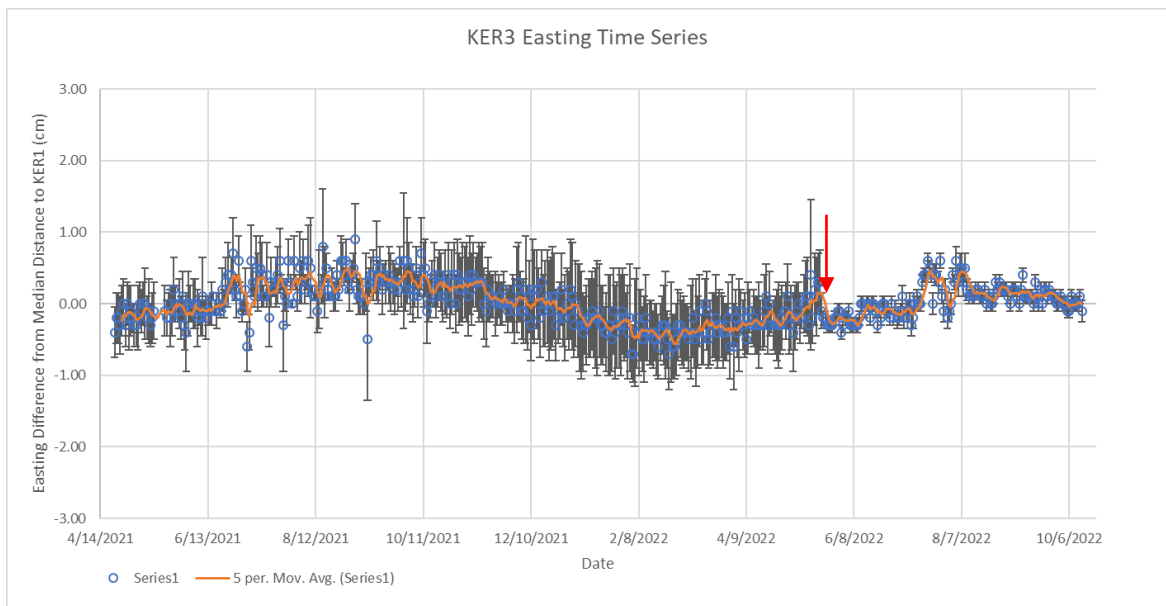


Figure 19: Timeseries of KER3 station with OPUS and NRCAN calculated coordinates. Arrow indicates when NRCAN was implemented with GPS + GLONASS. Bars on each measurement represent peak-to-peak errors and orange line represents a 5-point moving average trendline.

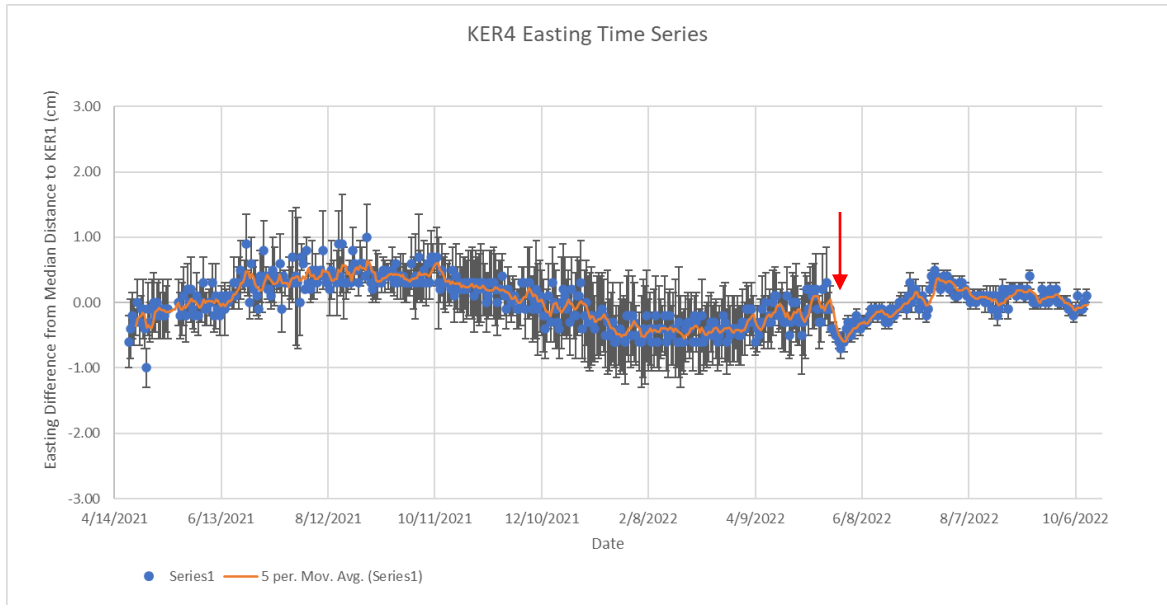


Figure 20: Timeseries of KER4 station with OPUS and NRCAN calculated coordinates. Arrow indicates when NRCAN was implemented with GPS + GLONASS. Bars on each measurement represent peak-to-peak errors and orange line represents a 5-point moving average trendline.

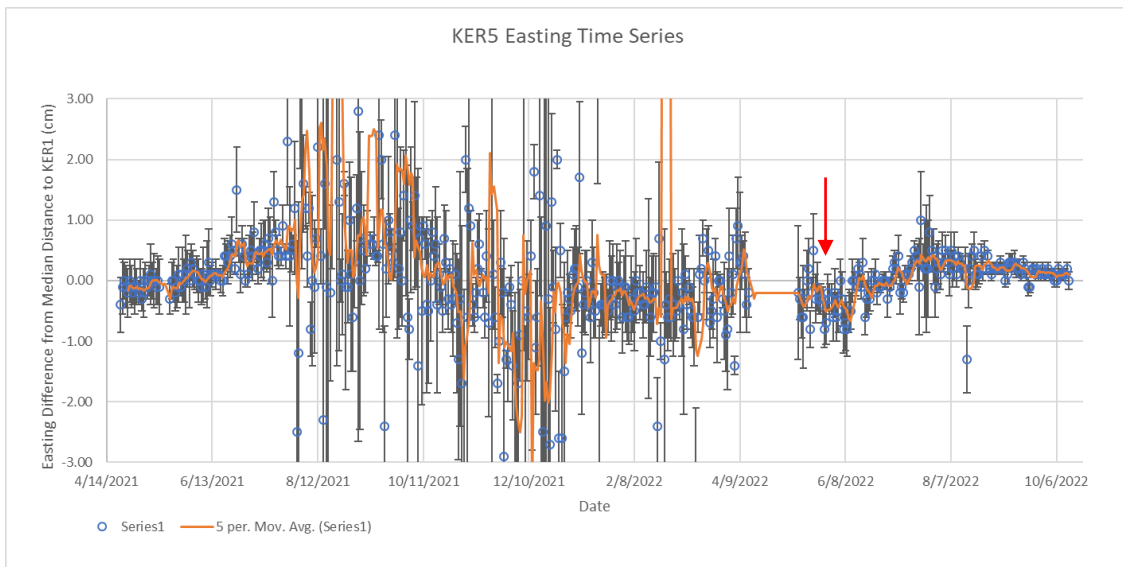


Figure 21: Timeseries of KER5 station with OPUS and NRCAN calculated coordinates. Arrow indicates when NRCAN was implemented with GPS + GLONASS. Bars on each measurement represent peak-to-peak errors and orange line represents a 5-point moving average trendline.

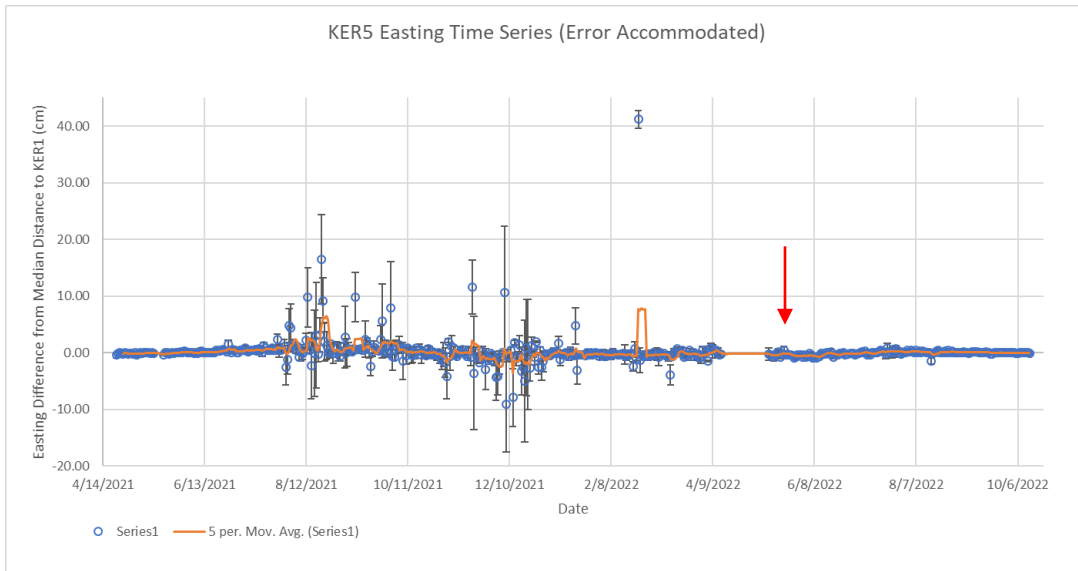


Figure 22: Timeseries of KER5 station with OPUS and NRCAN calculated coordinates. Exaggerated axis to encapsulate error levels. Arrow indicates when NRCAN was implemented with GPS + GLONASS. Bars on each measurement represent peak-to-peak errors and orange line represents a 5-point moving average trendline.

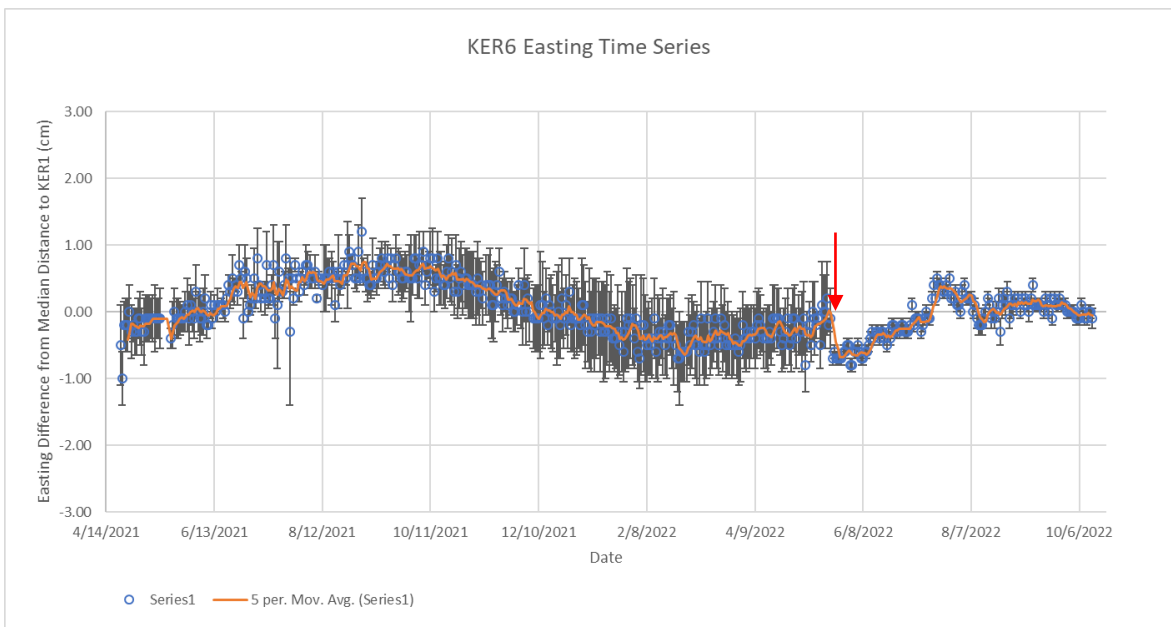


Figure 23: Timeseries of KER6 station with OPUS and NRCAN calculated coordinates. Arrow indicates when NRCAN was implemented with GPS + GLONASS. Bars on each measurement represent peak-to-peak errors and orange line represents a 5-point moving average trendline.

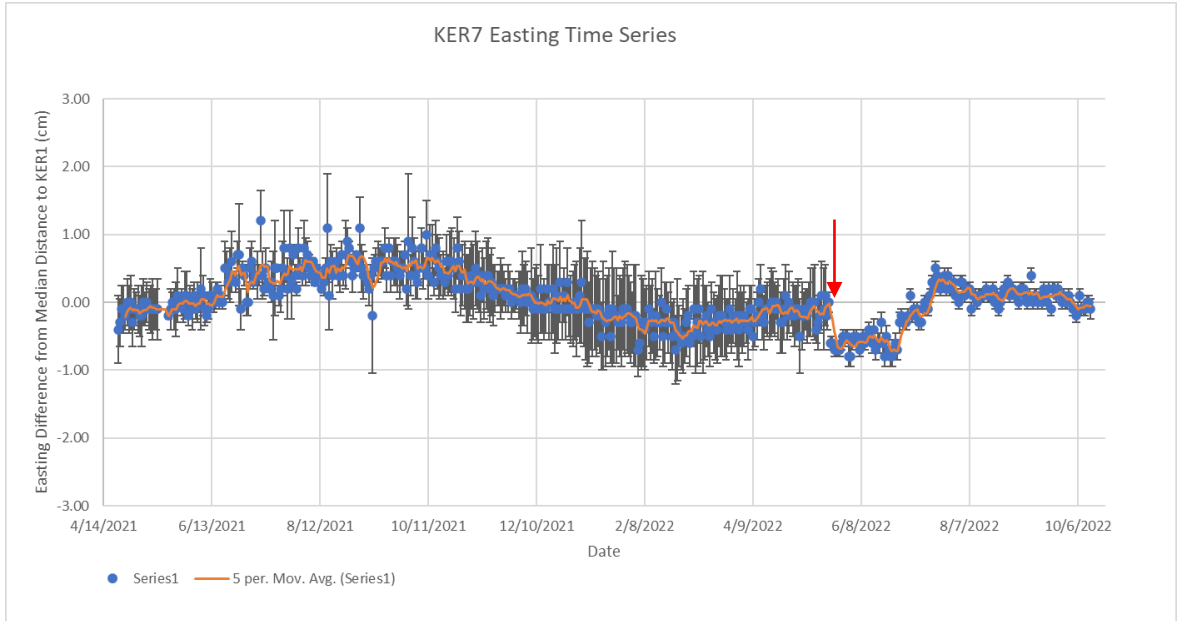


Figure 24: Timeseries of KER7 station with OPUS and NRCAN calculated coordinates. Arrow indicates when NRCAN was implemented with GPS + GLONASS. Bars on each measurement represent peak-to-peak errors and orange line represents a 5-point moving average trendline.

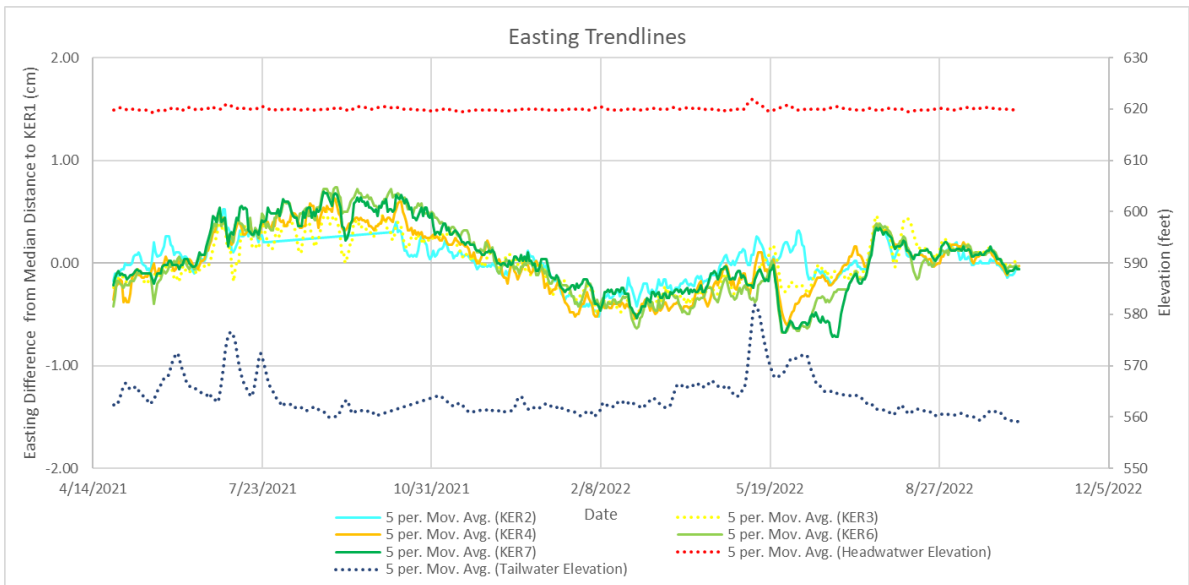


Figure 25: Station easting trendlines compared with head and tailwater elevations. Headwaters were held constant throughout survey. Red dotted line represents headwater elevation, blue dotted line represents tailwater elevation. Solid lines represent 5-point moving average trendlines of each GNSS station.

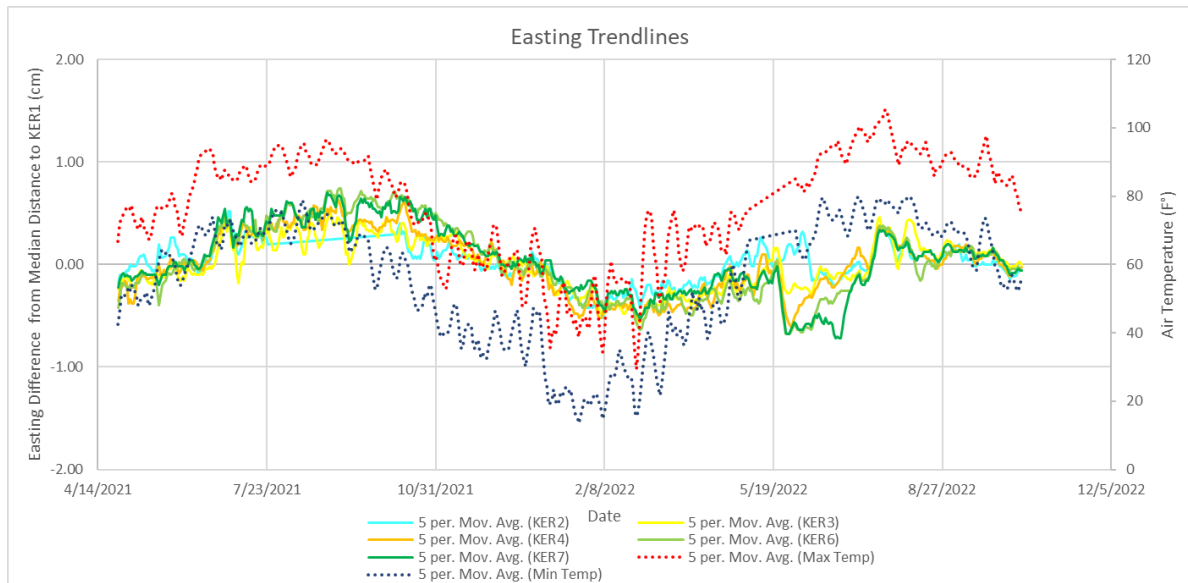


Figure 26: Station easting trendlines compared with air temperature from Spavinaw, OK. Red dotted line represents maximum daily temperature, blue dotted line represents minimum daily temperature. Solid lines represent 5-point moving average trendlines of each GNSS station.

GNSS: Vertical Data with InSAR

The vertical data from the GNSS survey was plotted along the InSAR data collected by Rezatec. Positive deviation from the baseline indicates vertical motion, whereas negative deviation indicates downward motion. The GNSS data overall had wider error margins with the vertical monitoring, often times with peak-to-peak errors encompassing as much as 1 cm or more (Figures 27-33). Each station reflects a similar pattern of fluctuations starting at around 0.5 cm in April and then begins to shift below the baseline into negative values in mid-June 2021 (Figures 27-33). The InSAR data does not cover as many days but has higher resolution (0.2-0.3 cm) than the GNSS data. InSAR data lies primarily within the error bars of the GNSS data, except towards the later part of the survey from July 5th to August 22nd, 2022 where the InSAR data displays negative values of as much as -1 cm where the GNSS data sits around 0.75 cm (Figures 27-33).

The vertical trendlines for the GNSS data exhibit the highest degree of fluctuation than both the easting and northing examples, with maximum values at nearly 1.5 cm and minimum values at nearly -1.5 cm (Figures 34 and 35). The vertical motions do not reflect any movement coinciding with the water levels of the dam (Figure 34), but there does appear to be a relationship

with the air temperature data (Figure 35) where the trendlines move downwards as the temperatures rise and then down as the temperature falls. The InSAR data from Rezatec demonstrates a much less varied vertical movement trend (Figures 36 and 37), with a trend in negative values starting April 2021 and going through to December 2021. The InSAR data begins to trend towards positive values during February 2022, but begins to descend in April 2022. Similar to the GNSS data, the water level does not appear to have any impact on the vertical movement (Figure 36); however, there appears to be a similar correlation as the GNSS data when examining temperature (Figure 37).

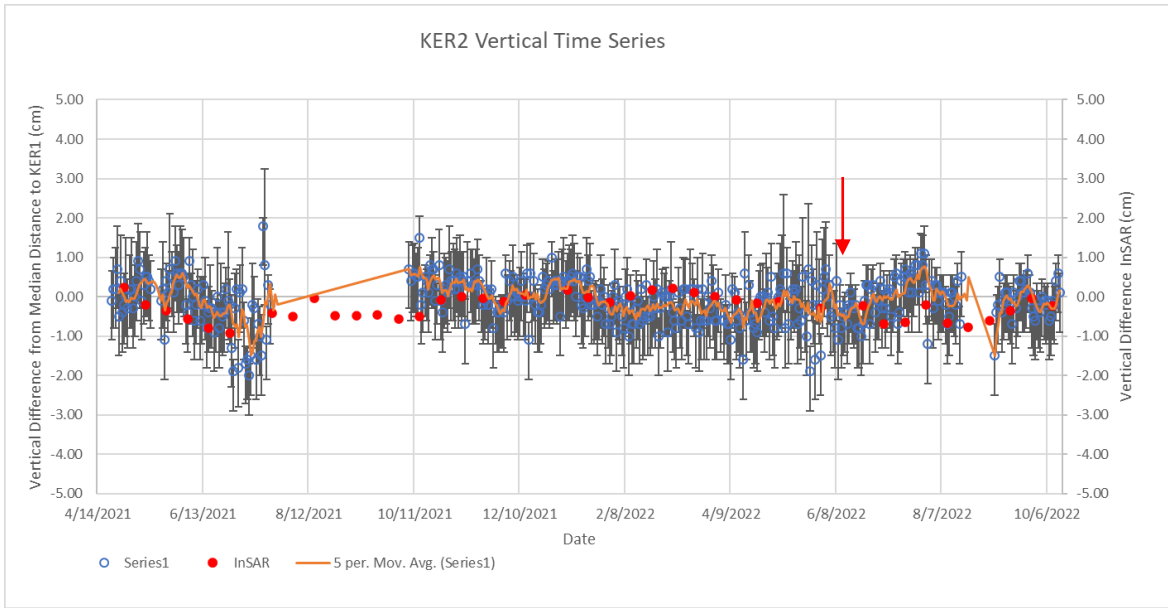


Figure 27: Timeseries of KER2 station with OPUS and NRCAN calculated coordinates. Arrow indicates when NRCAN was implemented with GPS + GLONASS. Bars on each measurement represent peak-to-peak errors and orange line represents a 5-point moving average trendline.

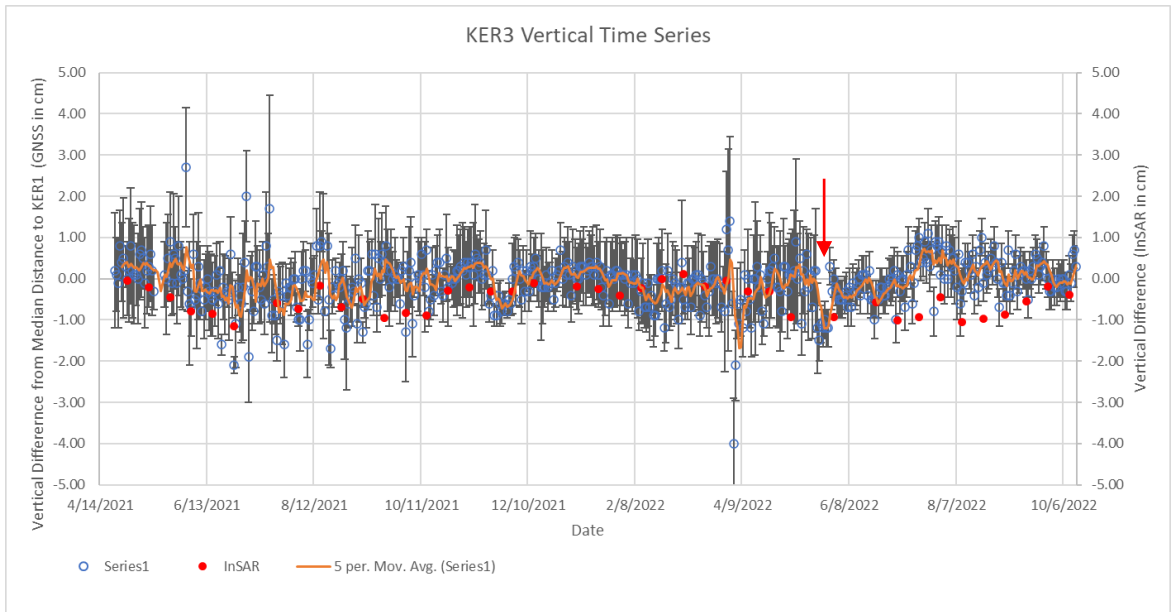


Figure 28: Timeseries of KER3 station with OPUS and NRCAN calculated coordinates. Arrow indicates when NRCAN was implemented with GPS + GLONASS. Bars on each measurement represent peak-to-peak errors and orange line represents a 5-point moving average trendline.

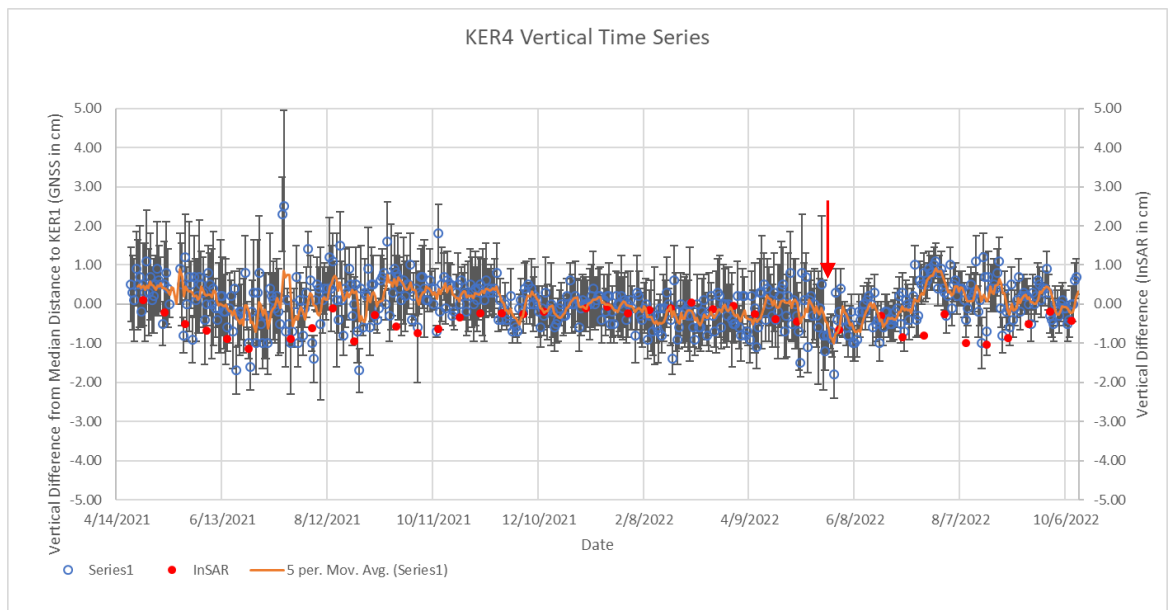


Figure 29: Timeseries of KER4 station with OPUS and NRCAN calculated coordinates. Arrow indicates when NRCAN was implemented with GPS + GLONASS. Bars on each measurement represent peak-to-peak errors and orange line represents a 5-point moving average trendline.

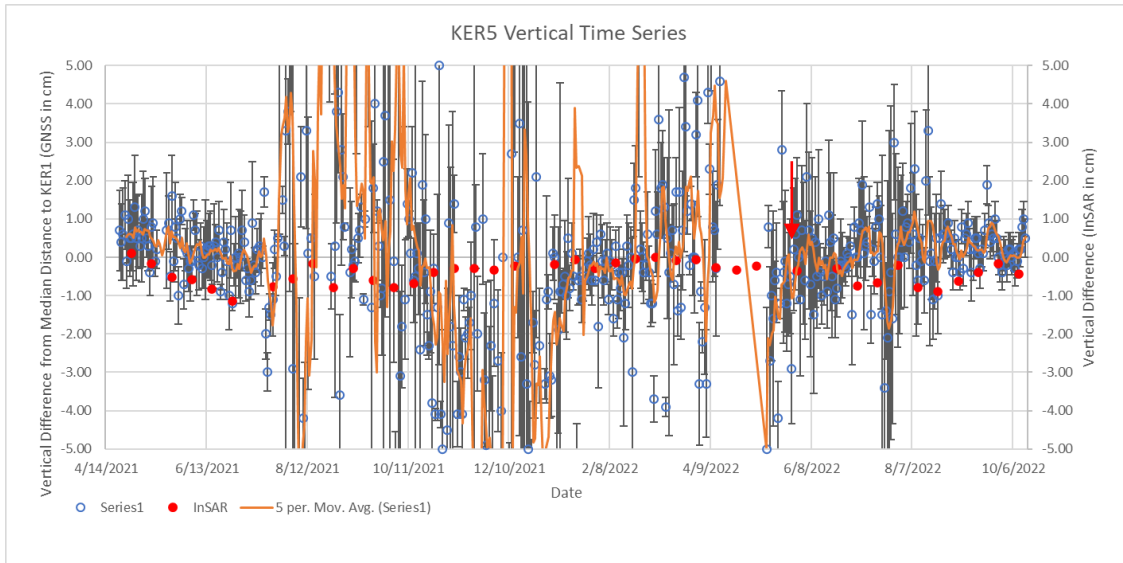


Figure 30: Timeseries of KER5 station with OPUS and NRCAN calculated coordinates. Arrow indicates when NRCAN was implemented with GPS + GLONASS. Bars on each measurement represent peak-to-peak errors and orange line represents a 5-point moving average trendline.

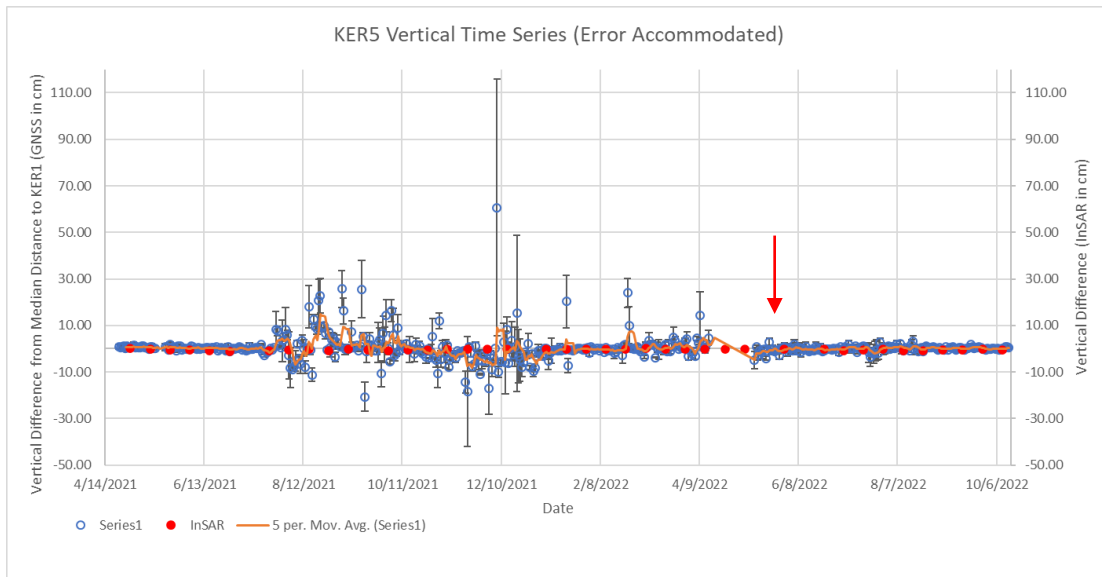


Figure 31: Timeseries of KER5 station with OPUS and NRCAN calculated coordinates. Arrow indicates when NRCAN was implemented with GPS + GLONASS. Bars on each measurement represent peak-to-peak errors and orange line represents a 5-point moving average trendline.

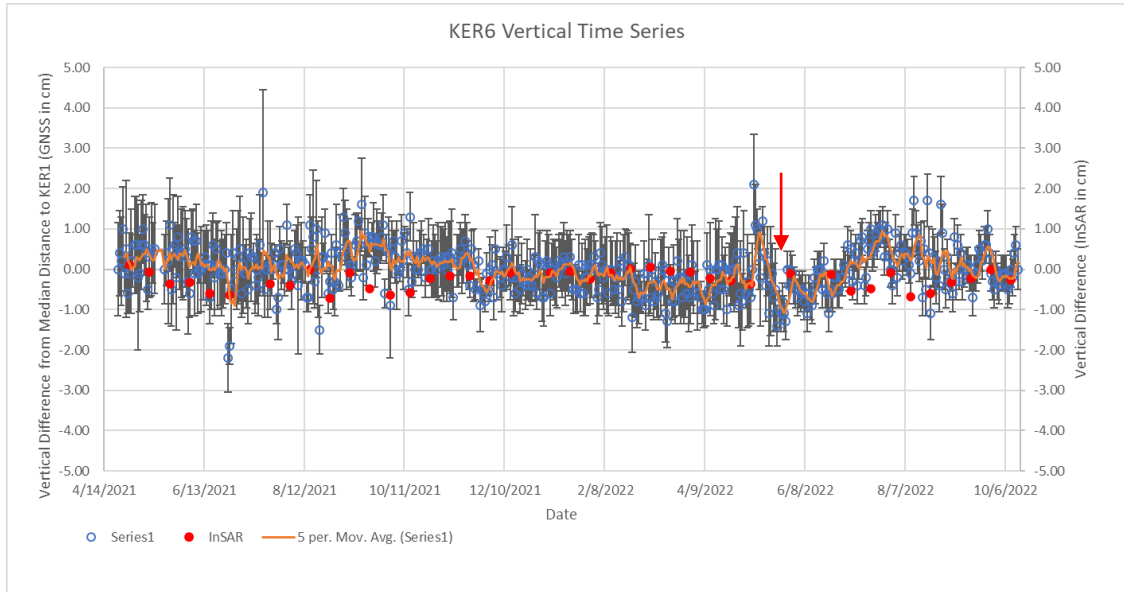


Figure 32: Timeseries of KER6 station with OPUS and NRCAN calculated coordinates. Arrow indicates when NRCAN was implemented with GPS + GLONASS. Bars on each measurement represent peak-to-peak errors and orange line represents a 5-point moving average trendline.

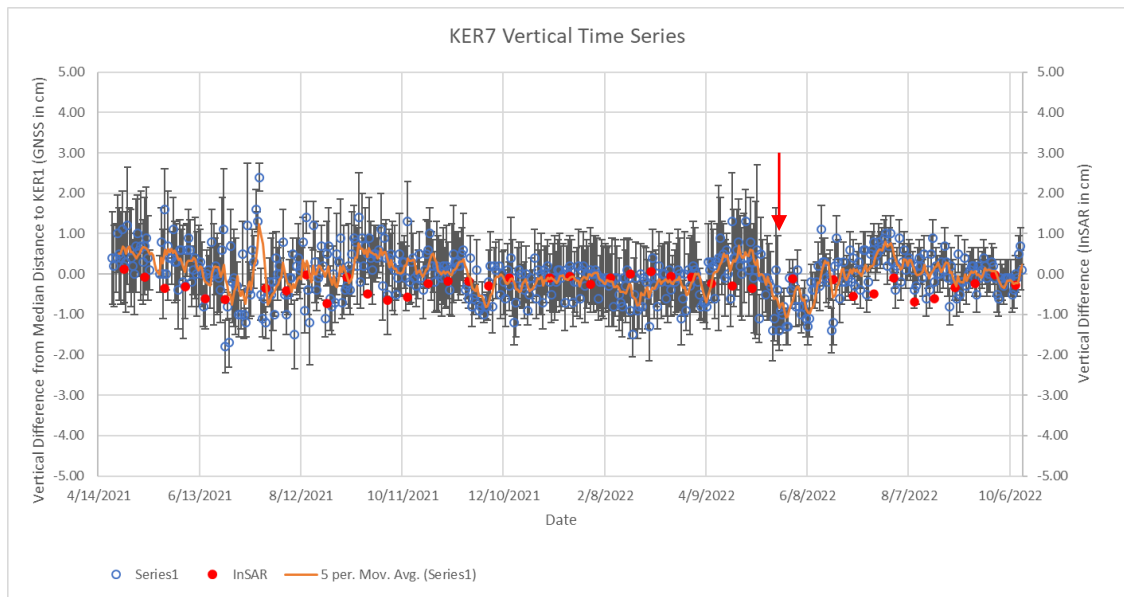


Figure 33: Timeseries of KER7 station with OPUS and NRCAN calculated coordinates. Arrow indicates when NRCAN was implemented with GPS + GLONASS. Bars on each measurement represent peak-to-peak errors and orange line represents a 5-point moving average trendline.

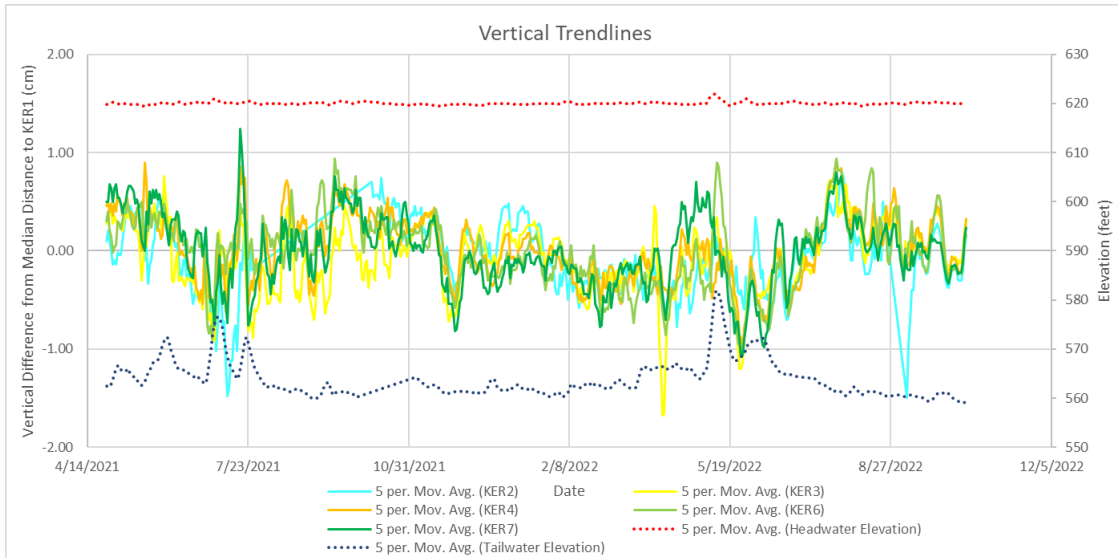


Figure 34: Station vertical trendlines compared with head and tailwater elevations. Headwaters were held constant throughout survey. Red dotted line represents headwater elevation, blue dotted line represents tailwater elevation. Solid lines represent 5-point moving average trendlines of each GNSS station.

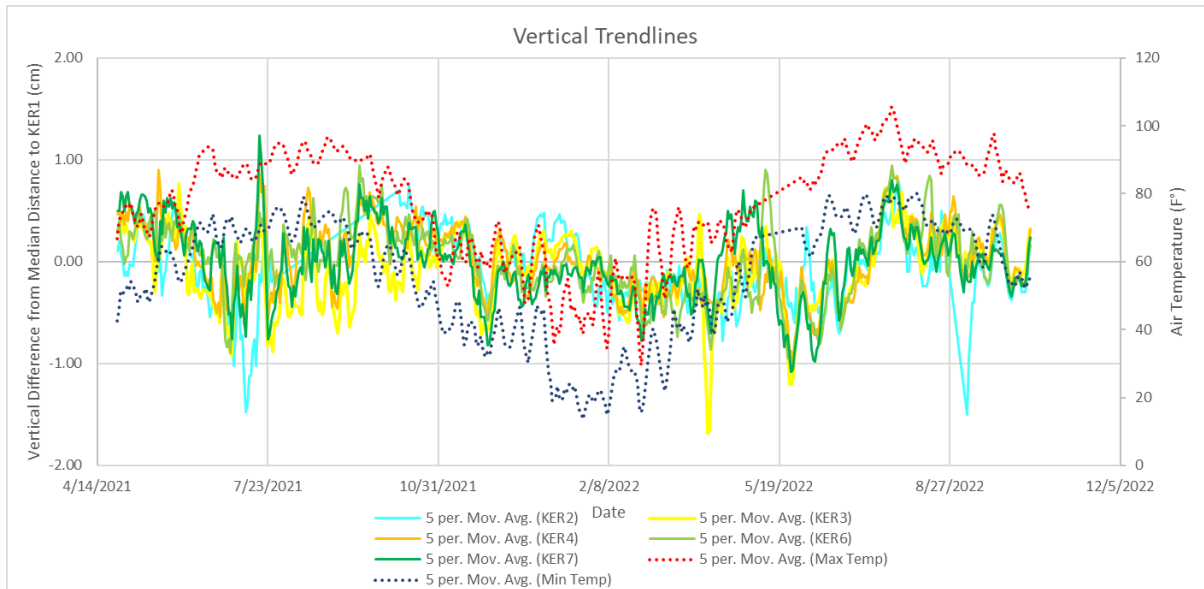


Figure 35: Station vertical trendlines compared with air temperature at Spavinaw, OK. Red dotted line represents maximum daily temperature, blue dotted line represents minimum daily temperature. Solid lines represent 5-point moving average trendlines of each GNSS station.

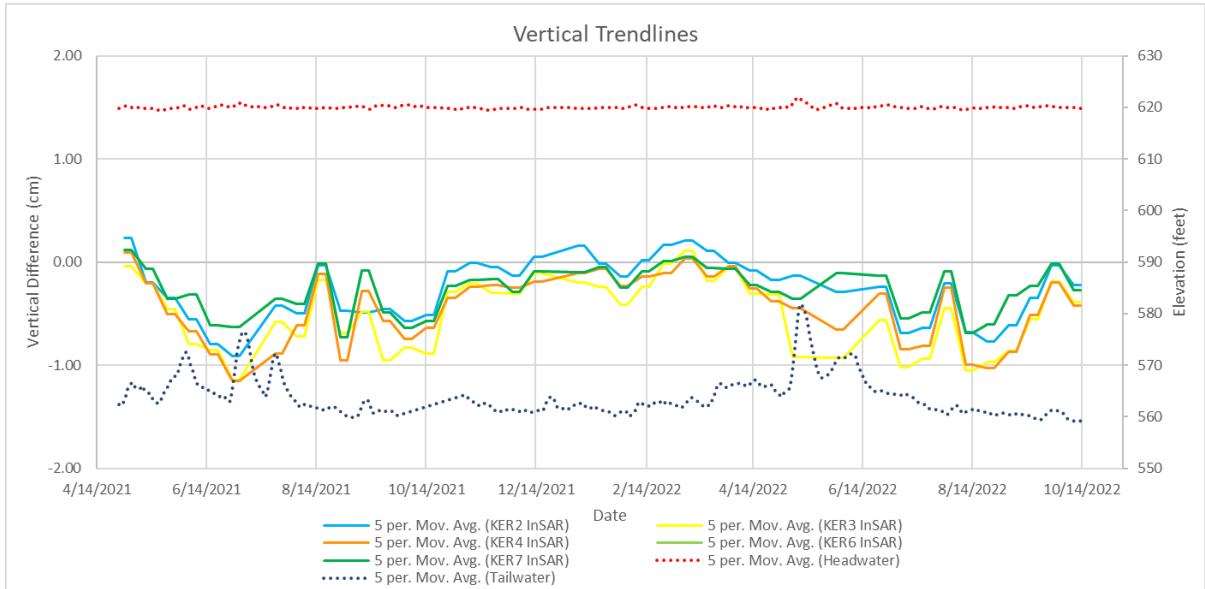


Figure 36: InSAR vertical trendlines compared with head and tailwater elevation. Headwaters were held constant throughout survey. Red dotted line represents headwater elevation, blue dotted line represents tailwater elevation. Solid lines represent 5-point moving average trendlines of each GNSS station.

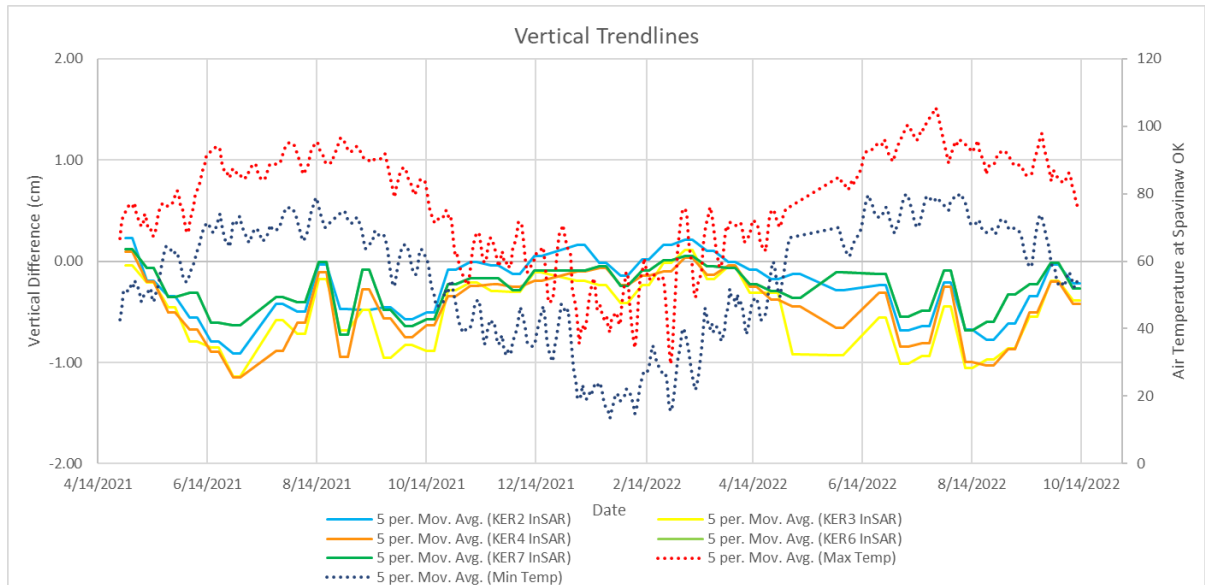


Figure 37: InSAR vertical trendlines compared with air temperature from Spavinaw, OK. Red dotted line represents maximum daily temperature, blue dotted line represents minimum daily temperature. Solid lines represent 5-point moving average trendlines of each GNSS station.

Bathymetry Data: Survey DEMs

The 2017 survey DEM shows the area behind the spillway for about 300 ft (91.4 m) downstream, but not behind the powerhouse (Figure 38). This DEM shows an area of lower elevation immediately behind the northern region of the dam (Area 1; Figure 38). Moving farther downstream from Area 1, the bathymetry rises in elevation sharply and remains relatively consistent farther downstream (Figure 38). Area 2 represents a larger depression in the bathymetry with a more irregular shape; larger variations in the bathymetry elevation are present, however the overall area is lower than the portion north of Area 2 and west of Area 1 (Figure 38). There are several sharp corners in the western portion of Area 2 towards the edge of the DEM where the elevation changes abruptly (Figure 38). One interesting feature in the 2017 DEM is that next to Area 2 at the eastern edge of the DEM, an abrupt rise in elevation is present (Figure 38).

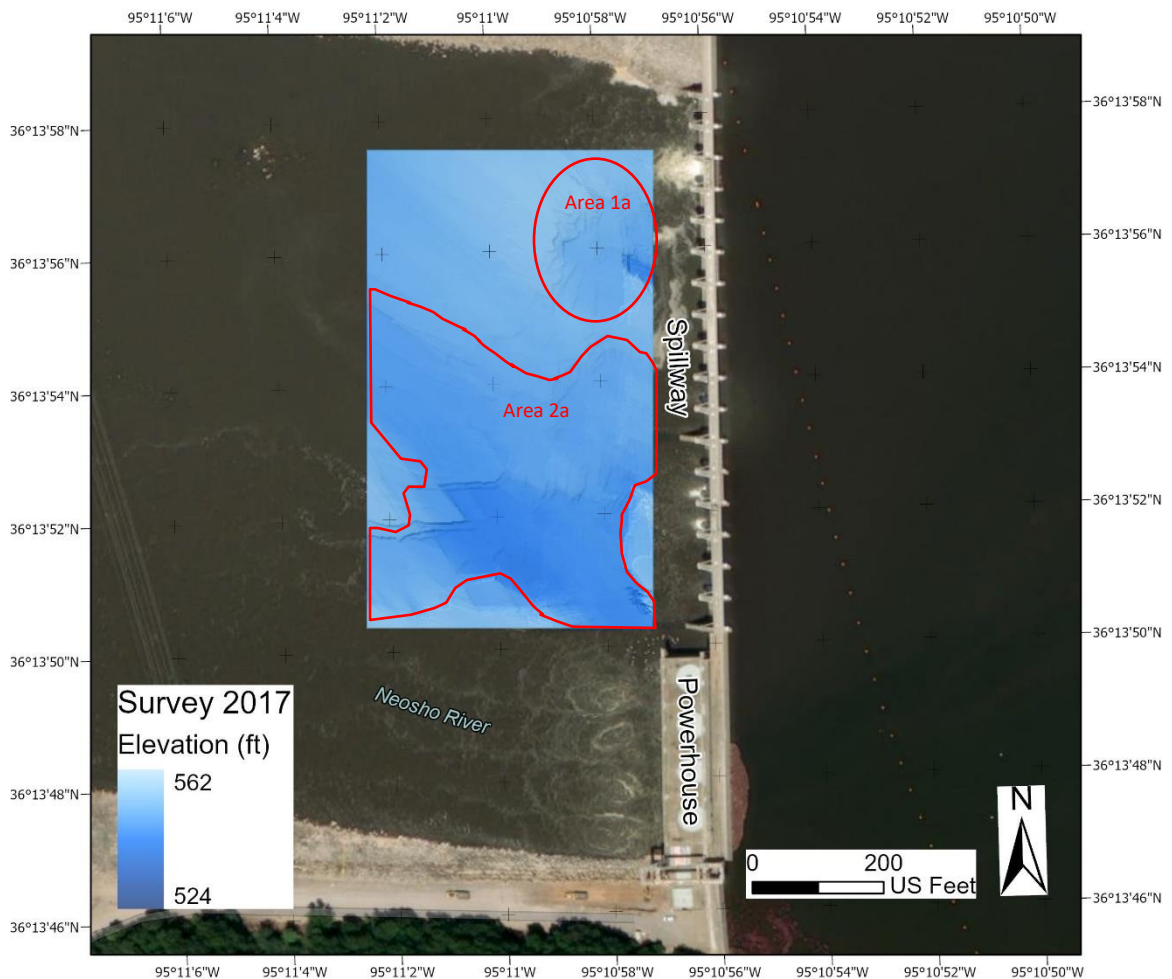


Figure 38: Extent of the 2017 bathymetry survey. Area 1a and 2a represent regions of interest pertaining to the characteristics of the bathymetry.

The 2019 and 2020 survey DEMs are the same in extent with the highest point densities, covering all the area of 2017 as well as some of the region behind the powerhouse (though the point density is not very high in this area). Both DEMs cover the furthest area behind the spillway extending to about 1400 ft (426.7 m) downstream. The 2019 and 2020 DEMs show a much larger area of lower elevation behind the spillway of the dam that extends about 1000 ft (304.8 m) downstream (Area 1b, Figure 39; Area 1c, Figure 40). The deepest areas of the bathymetry are behind the spillway covering a similar extent as the 2017 DEM, however Areas 2b and 3b (Figure 39) represent an overall broader scale and deeper level of erosion than shown in the 2017 DEM. The 2019 DEM shows an area behind the powerhouse (Area 4b; Figure 39) that is one of the deepest areas of the survey, however the 2020 DEM shows an irregularly shaped gain in elevation

in the same area (Area 1c; Figure 40). It is important to note that the area behind the dam's powerhouse on both the 2019 and 2020 DEMs have very little data coverage (Figure 7b and 7c). The area of elevation observed in the 2017 DEM on the eastern edge (Figure 8) is observed in both the 2019 and 2020 DEMs as well (Figure 39 and 40), however has been reduced in size and extent.

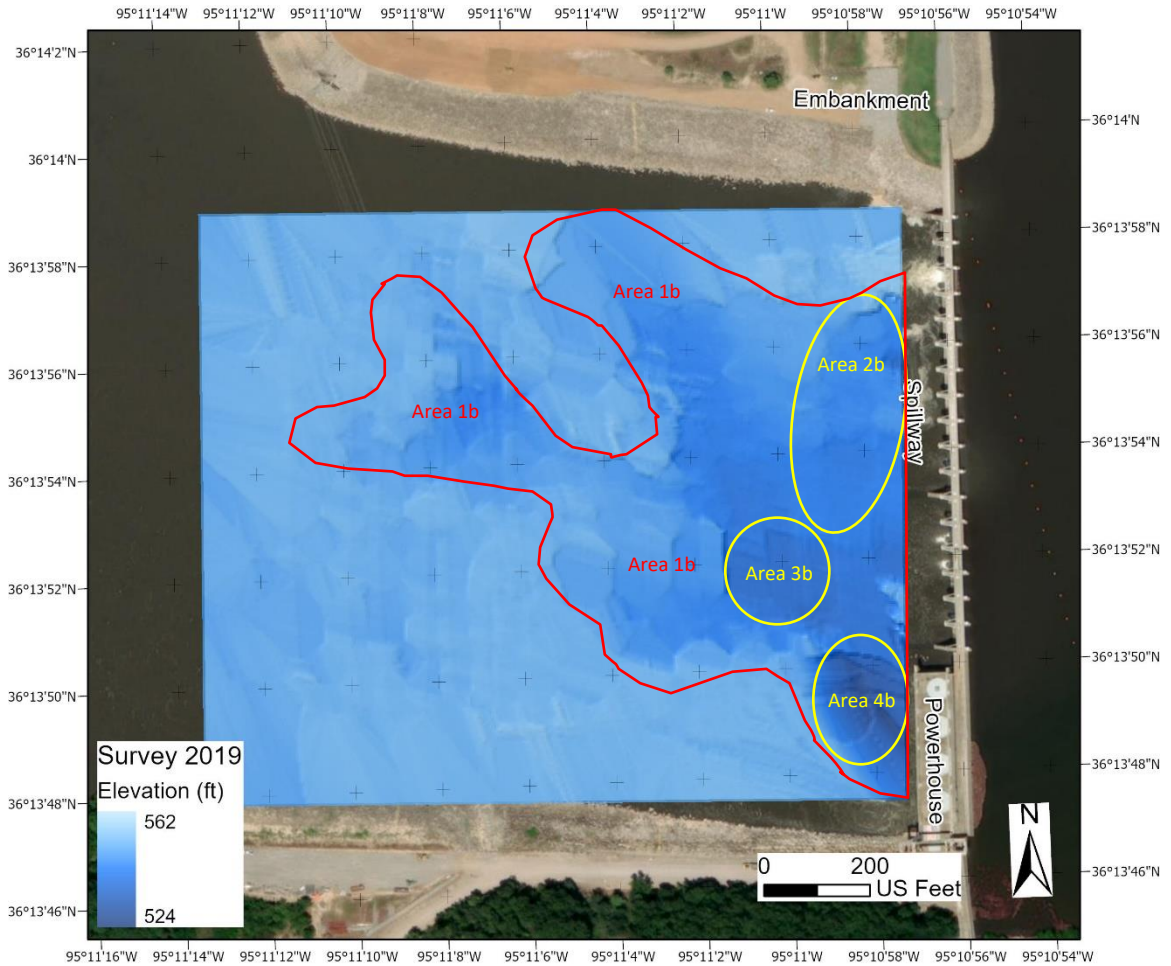


Figure 39: Extent of the 2019 bathymetry survey. Area 1b represents network of significant erosion of the spillway where Areas 2b, 3b, and 4b highlight deepest areas of erosion.

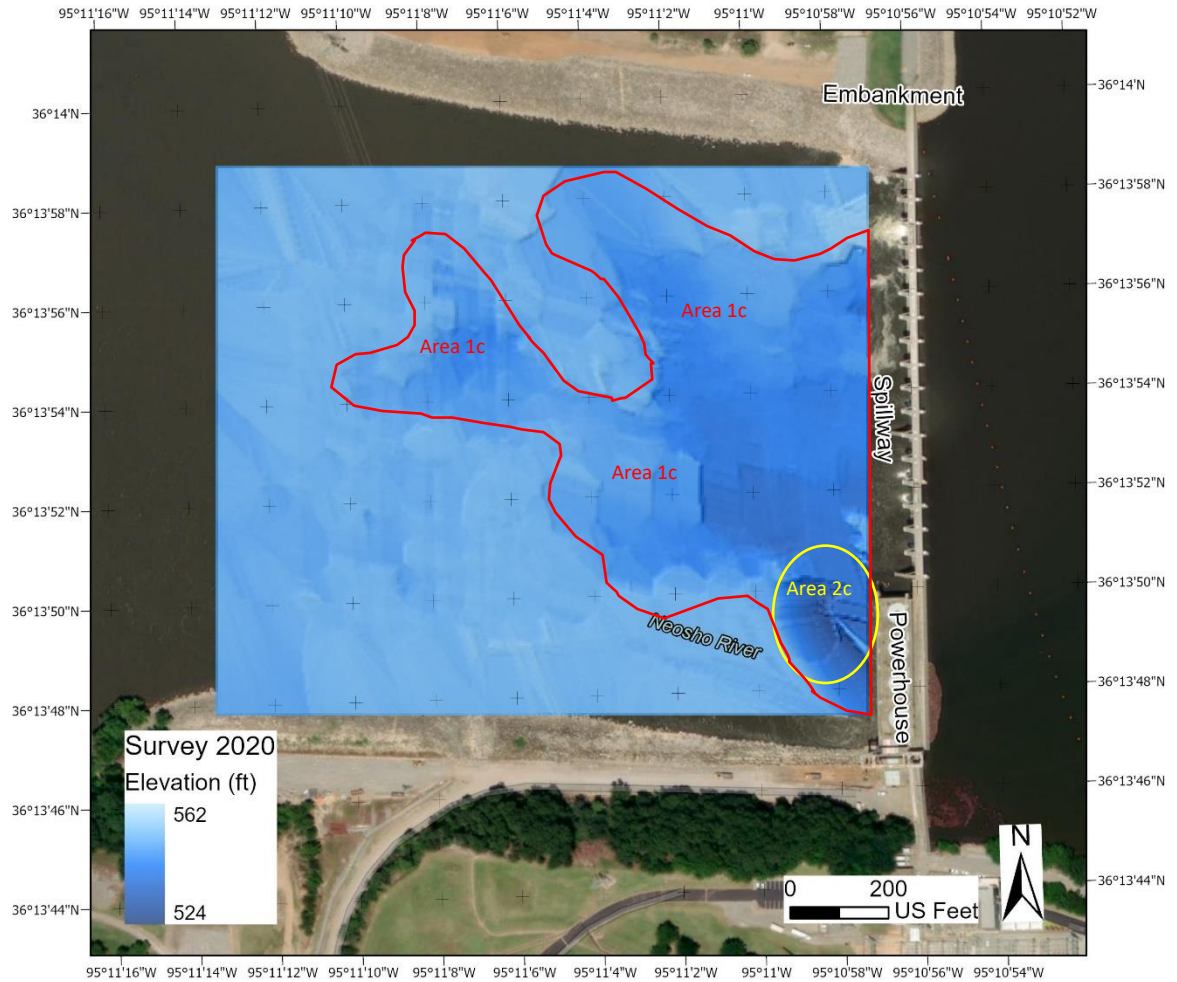


Figure 40: Extent of the 2020 bathymetry survey. Area 1c represents same area of erosion as in Figure 39, Area 2c highlights the elevation gain behind the dam powerhouse.

The 2022 survey DEM is the lowest resolution out of all the survey DEMs and covers much of the area that the 2019 and 2020 surveys covered, however did not cover as far downstream or any area behind the powerhouse (Figure 41). The 2022 DEM shows the area of significant erosion similarly to the 2019 and 2020 surveys (Area 1d; Figure 41), although the area of raised elevation is not present in the eastern edge of the image. The 2022 DEM covers further up on the northern embankment of the spillway than the other DEMs as can be seen in the northern edges of the DEM (Figure 41). The deepest area where erosion was most severe coincides with the areas observed in the 2019 and 2020 surveys (Area 2d; Figure 41).

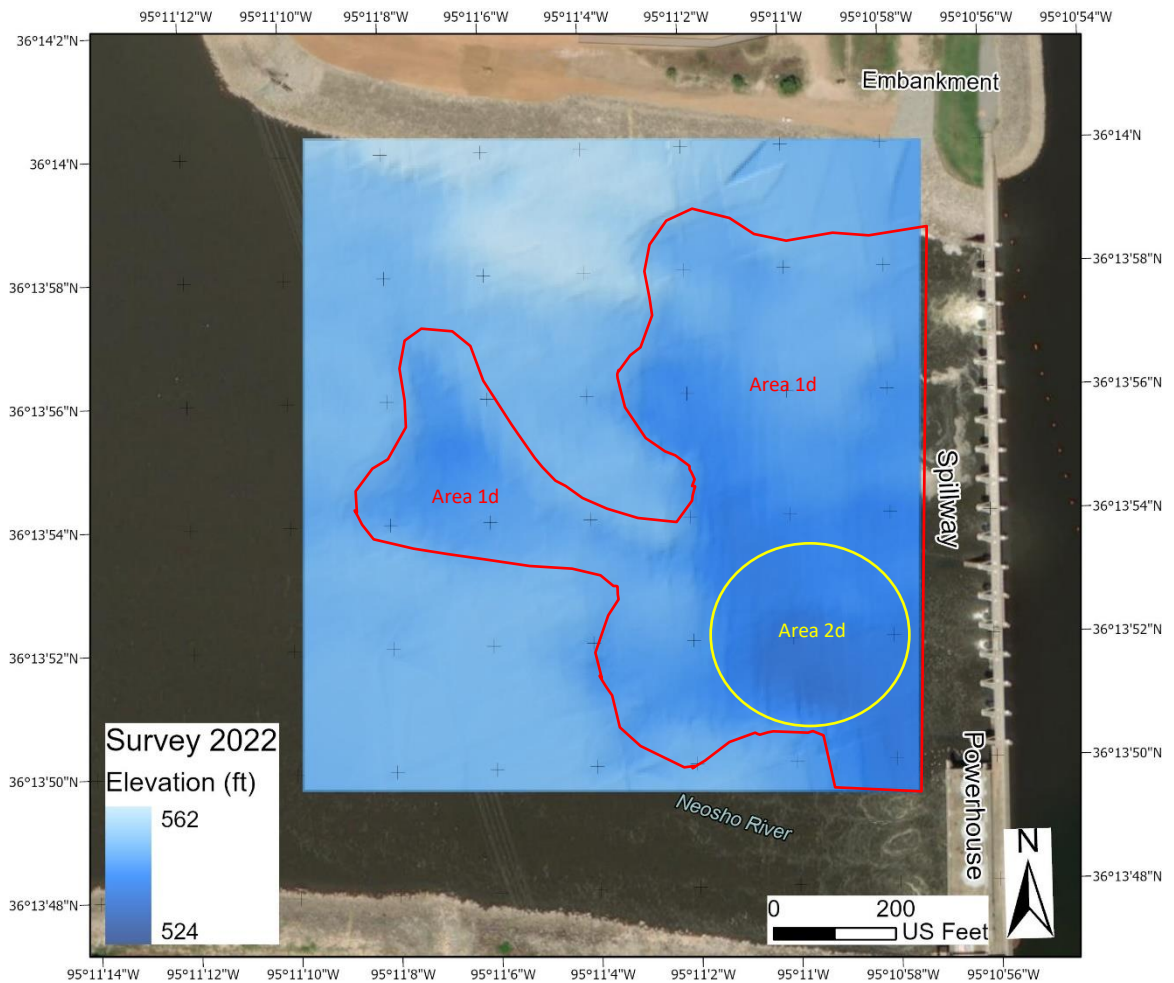


Figure 41: Extent of the 2022 bathymetry survey. Area 1d correlates with the channel of erosion present whereas area 2d represents deepest part of erosion.

Bathymetry Data: DEM Differencing

The bathymetry data for 2019 data was subtracted from the 2020 data using the ‘Minus’ tool in ArcGIS Pro in order to highlight key areas of change between the surveys. The overall area yielded many changes in values that are beyond the precision of the provided data (results yielding values to the thousandth of a foot), however many key areas yielded differences that were within the precision of the data (Figures 42 and 43).

In order to better visualize the areas of change because the scale of changes is initially difficult to discern, the symbology was exaggerated by removing 3% of the maximum and minimum values to create Figure 43. In this figure, areas of darker blue represent areas of erosion and areas of yellow represent areas of elevation gain. Prominent instances of erosion take place running north to south in the center of the DEM, whereas instances of elevation gain can be observed in northeast and southeast corners (Figure 43). The magnitude of these changes is on the scale of around -0.15 ft in the central portions. The areas of elevation gain in the southeast corner take place where the point density of both the 2019 and 2020 surveys is quite limited.

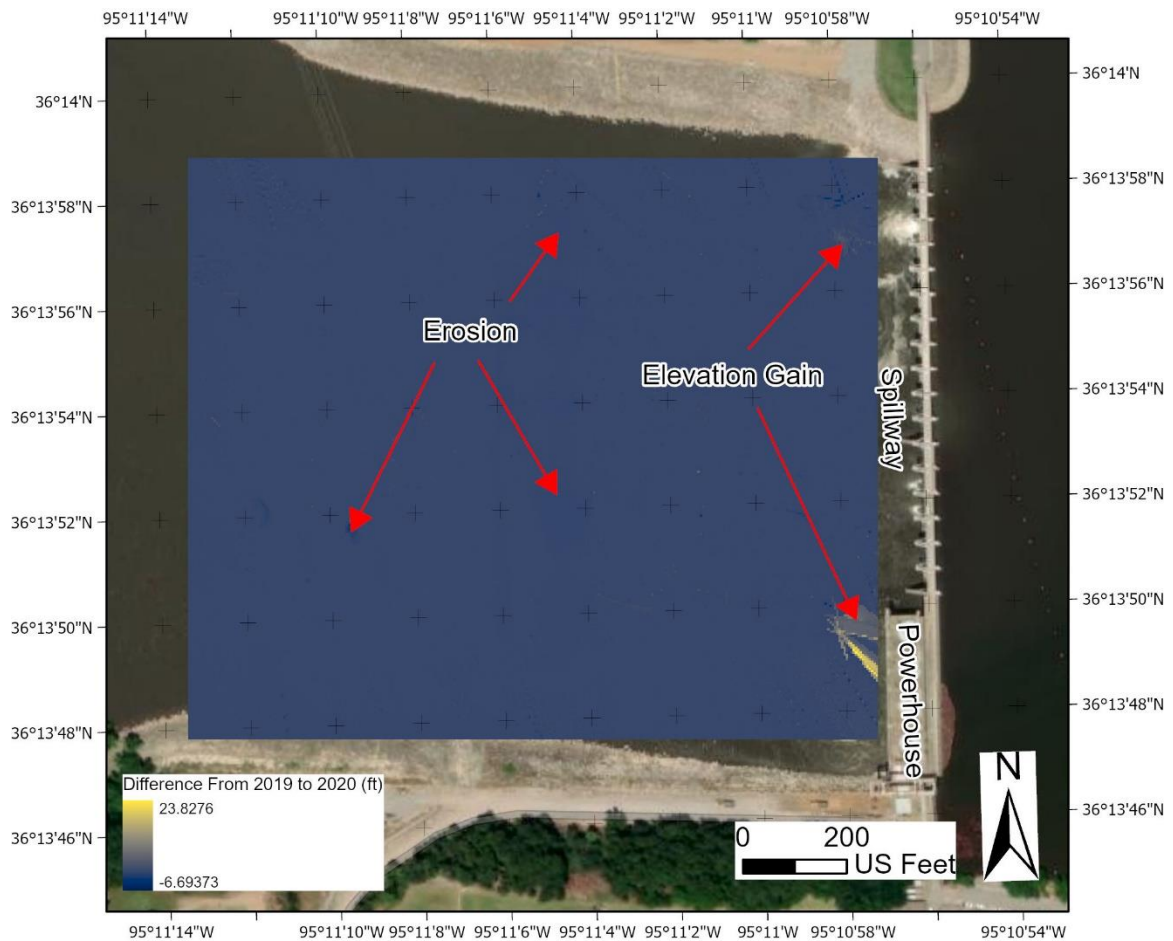


Figure 42: Unaltered DEM reflecting areas of change between 2019 and 2020.

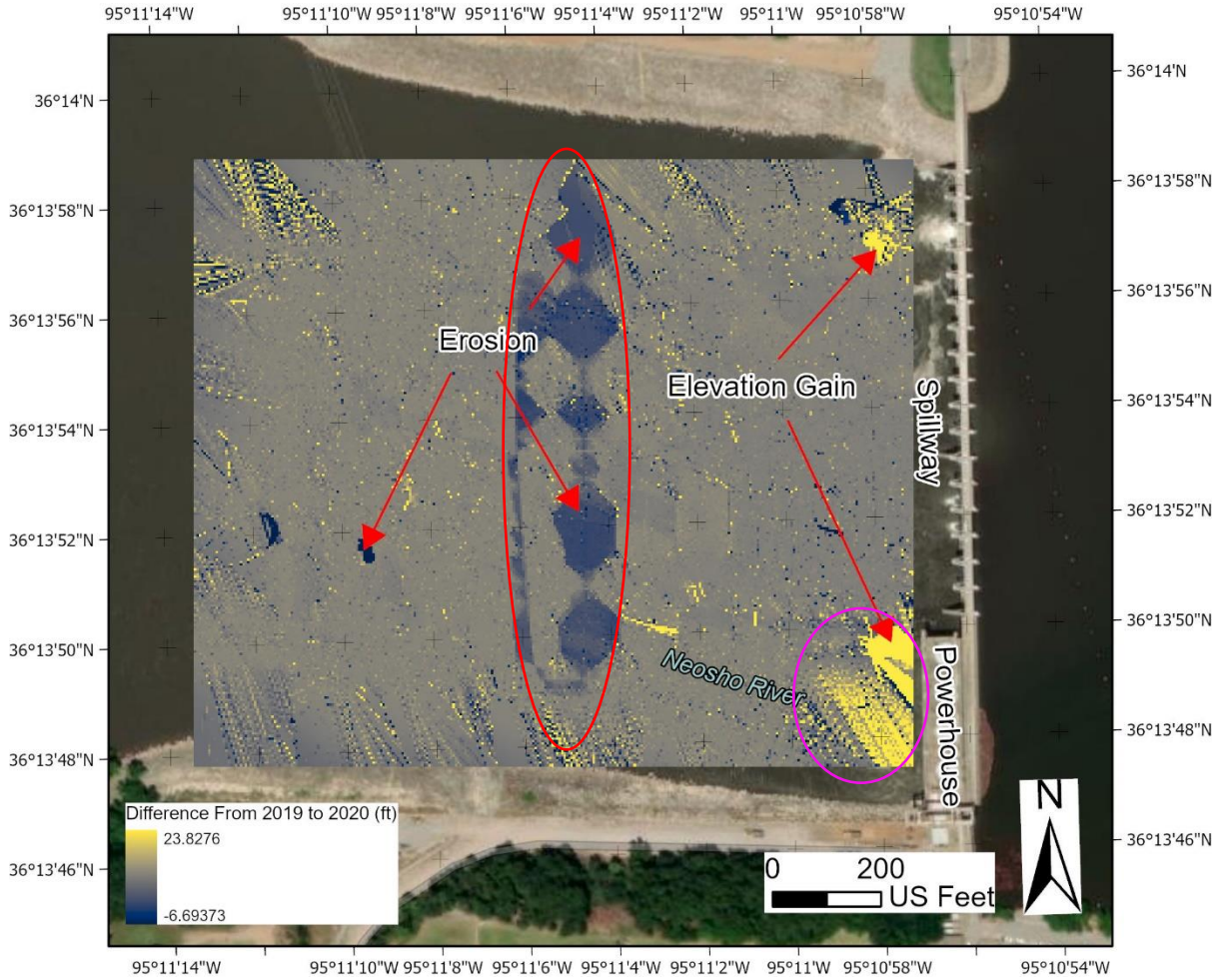


Figure 43: Enhanced DEM of difference between 2019 and 2020 with exaggerated symbology. Red circles illustrate areas of erosion on the magnitude of around 0.15 ft. Pink circle represents elevation gain behind powerhouse with low datapoint density.

CHAPTER V

DISCUSSION

GNSS Survey

One of the notable changes that occurred during the survey was the transition in post-processing from OPUS to NRCAN-PPP, where the transition marks a decrease in the size of the error bars for daily observations granting a higher level of accuracy to the survey. This transition helped grant better insight into the dam movements, because where error bars overlap, any movement occurring within those error bars cannot be discerned. The transition to NRCAN-PPP also factored in observations from the GLONASS constellation which brought the number of satellites from around 8-9 with only GPS to as much as 26 with GLONASS and GPS, which contributed to the decreased error.

The results from KER5 are relegated to that particular station and are therefore considered to be the product of poor signal acquisition rather than from physical movement. As mentioned previously, KER5 was removed for troubleshooting the anomalously high error. Upon reinstallation of a new receiver, the errors had decreased, but were still significantly higher than any of the other stations. The source of these errors needs to be further investigated. One plausible source is the position of the mobile gate hoists atop the dam (Figure 44). If one of these vehicles were placed in the vicinity of the antenna, the signal reflections coming off the vehicles would provide a source for the signal degradation. InSAR data for the area of KER5 does not

reflect the same trend in motion which supports the interpretation that the data from KER5 is not representing true movements.



Figure 44: Mobile gate hoist parked near KER3 antenna. Parking hoist near antennas is likely causing signal deterioration from signal reflecting off vehicle and into the antenna. Possible cause of KER5’s poor accuracy.

When comparing the data with head and tailwater elevation, there is no apparent correlation with any component of movement (northing, easting, or elevation) or with the InSAR (Figures 20, 29, 38, and 36). When these data are compared with temperature data from the nearest station with daily temperature in Spavinaw, Oklahoma, there is no apparent correlation with the northing data from any station (Figure 21).

On the other hand, easting data across all stations correlates to the air temperature data (Figure 30) suggesting seasonal movement driven by temperature, similar to that of the Pacoima Dam (Behr et al., 1998). The dam’s lag response to the rise and fall of temperatures could be explained by the dam taking time to reach temperature equilibrium with the surrounding air. The vertical and InSAR data both exhibit some degree of a negative correlation when compared with temperature (Figure 35 and 37).

Based on the results of the GNSS survey, the Kerr Dam is stable and does not experience motion anomalous to seasonal movement at the level of precision the survey provides. The easting motion associated with upstream and downstream movement appears to be a normal temperature response that occurs in dams, as seen at the Pacoima Dam (Behr et al., 1998). The magnitude of movement occurring with the Kerr Dam's easting axis (around 0.5 cm from the baseline at the minimum or maximum) is comparable with the minimum or maximum easting movements at Pacoima Dam (Behr et al., 1998). The lack of motion occurring on the north-south axis of movement is likely due to the land that the dam is built into on the north and south sides, which could negate the effects of temperature-associated motion. The vertical motion monitoring with GNSS possesses the highest level of errors which makes it difficult to discern real motion from instrument error, however supplemental InSAR data helped compensate for this weakness and adds a beneficial element of broader-scale coverage of the dam.

In general, the continuous GNSS survey provided an effective way for monitoring the Kerr Dam's motion in the sense of horizontal (east, west, north, and south) and supports the idea that the dam was stable during the survey period. GNSS surveying overall comes with limitations for monitoring vertical motions and strongly benefits from supplemental InSAR monitoring to provide a clearer and more accurate insight into vertical motions. The continuous nature of the Kerr Dam GNSS survey does come with the inherent challenge of long occupation times, therefore future work of implementing campaign-style surveys would provide insightful data for developing a repeatable procedure for motion monitoring that does not depend on continuous occupation. In terms of equipment, utilizing seven stations on one structure provides redundancy and reduces errors associated with using fewer stations such as unexpected losses of power or erroneous data as in the case of the KER5 station, however, may inhibit continuously monitoring multiple structures. The Pacoima Dam only implemented one control station off the dam and one monitoring station on the dam (Behr et al., 1998), therefore investigating reducing the number of

stations per structure may prove insightful in increasing the number of dams being monitored while reducing the amount of time needed to perform multiple continuous surveys.

Bathymetry Analysis

Overall, the bathymetry data were limited by the varying point density and resolution which proved difficult to analyze in a quantitative sense. In general, the larger limiting factors of the analysis were that the surveys were conducted over different areas and varied in resolutions.

The DEMs of the surveys do provide better insight into areas where scouring is more prominent and the overarching condition of the bedrock. A network of eroded areas that extend from near the dam powerhouse to the northern part of the dam are clearly visible across all survey years. From 2017 to 2019, the area appears to grow more prominent, which aligns with the reports from the surveyors (Nautilus Marine Group, 2017, Abbott Underwater Acoustics, 2019). From 2019 to 2020, not much change has occurred according to the DEMs over the 9-month period between the surveys, which suggests that changes to the bedrock may depend on other factors rather than only time. Other factors may consist of utilizing certain spillway gates on the dam more frequently than others, which could also explain the irregular areas of erosion. The 2022 data provides a less detailed view of the spillway bathymetry, however, they still highlight the general form of the erosion network.

The change detected between 2019 and 2020 can serve as qualitative data to highlight some areas where erosion may be taking place over a shorter period of time, however the areas of elevation gain in southeast corner (Figures 42 and 43) do not have sufficient data coverage to be conclusive. The change detection highlights that the bedrock further downstream is undergoing erosion, however, did not provide insight into bedrock loss at the toe of the dam as desired.

Previous bathymetric survey reports implemented profiling sonar data as well as bathymetry data, which provided a cross-sectional view of areas that were of interest for

evaluating erosion (Nautilus Marine Group, 2017, Abbott Underwater Acoustics 2019 & 2020, Underwater Consultants International, 2022). This profiling data provided better insight into the amount of bedrock lost at the toe of the dam as well as instances of undercutting. The bathymetry DEMs could be implemented as a guide for discerning where further sonar profiling would benefit determining the condition of the bedrock.

The bathymetric surveys do highlight an ongoing situation with Kerr Dam's foundation, the Reeds Spring Formation, where erosion of the spillway is occurring. Based on the GNSS and InSAR data, bathymetry data, and previous bathymetry reports, the rate of erosion does not appear to present an immediate problem to the dam's stability, however, is a situation that should be addressed in order to maintain the high standards of safety. A bathymetric survey done during a period where the flow from the dam is temporarily ceased could provide a stronger glimpse into the nature of the bedrock behind the powerhouse as well as at the toe of the dam.

Conclusion

The GRDA has cooperated with OSU to assess the stability of a number of dams in the northeastern region of Oklahoma along the Grand River. The R.S. Kerr Dam is one of these dams, which lies within the Springfield Structural Plain of the Ozark Uplift, and rests upon the Mississippian Reeds Spring Formation, a unit consisting of chert and limestone with fractures striking northwest to northeast around the dam. GNSS surveys along with InSAR and bathymetry surveys were conducted over the R.S. Kerr Dam to monitor the movement of the dam, which provided insight into whether the fractured nature of the Reeds Spring Formation was generating a movement accommodation response in the dam. The GNSS survey coupled with the InSAR data revealed that the dam has not experienced any significant motion beyond a seasonal motion that correlates with the rise and fall of the surrounding air temperature. The bathymetry data

revealed that several areas of erosion are occurring at the spillway of the dam, however these areas do not appear to be contributing to the dam's movement.

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APPENDICES

1. *GNSS KERI Control Station: OPUS-Calculated Values*

	<u>Northing Mean(m)</u>	<u>Easting Mean(m)</u>	<u>Elev. Mean(m)</u>
	4011551.933	303564.254	175.620
Date	<u>Northing(m)</u>	<u>Easting(m)</u>	<u>Elevation(m)</u>
5/12/2022	4011551.933	303564.255	175.607
5/13/2022	4011551.932	303564.254	175.620
5/14/2022	4011551.933	303564.253	175.634

2. *GNSS KERI Control Station: NRCAN-Calculated Values*

	<u>Northing Mean(m)</u>	<u>Easting Mean(m)</u>	<u>Elev. Mean(m)</u>
	4011551.941	303564.276	175.686
Date	<u>Northing(m)</u>	<u>Easting(m)</u>	<u>Elevation(m)</u>
5/12/2022	4011551.940	303564.275	175.686
5/13/2022	4011551.941	303564.276	175.690
5/14/2022	4011551.942	303564.276	175.683

3. GNSS Station Raw Data: KER2

			<u>KER2</u>			
<u>Date</u>	<u>Northing(m)</u>	<u>Peak to Peak Error (m)</u>	<u>Easting(m)</u>	<u>Peak to Peak Error</u>	<u>Elevation(m)</u>	<u>Peak to Peak Error</u>
4/22/2021	4011734.109	0.005	303882.43	0.004	166.669	0.015
4/23/2021	4011734.109	0	303882.434	0.008	166.672	0.016
4/24/2021	4011734.11	0.005	303882.432	0.006	166.672	0.021
4/25/2021	4011734.109	0.005	303882.432	0.007	166.677	0.022
4/26/2021	4011734.108	0.004	303882.433	0.007	166.665	0.012
4/27/2021	4011734.112	0.005	303882.434	0.004	166.674	0.023
4/28/2021	4011734.11	0.001	303882.431	0.007	166.666	0.011
4/29/2021	4011734.11	0.005	303882.434	0.004	166.668	0.016
4/30/2021	4011734.112	0.006	303882.434	0.005	166.67	0.03
5/1/2021	4011734.113	0.005	303882.434	0.005	166.667	0.015
5/2/2021	4011734.109	0.005	303882.434	0.005	166.672	0.017
5/3/2021	4011734.113	0.005	303882.434	0.006	166.672	0.026
5/4/2021	4011734.109	0.007	303882.433	0.006	166.667	0.016
5/5/2021	4011734.11	0.006	303882.434	0.009	166.67	0.016
5/6/2021	4011734.112	0.006	303882.434	0.007	166.674	0.02
5/7/2021	4011734.11	0.004	303882.435	0.004	166.679	0.019
5/8/2021	4011734.109	0.001	303882.437	0.004	166.677	0.019
5/9/2021	4011734.109	0.003	303882.434	0.007	166.669	0.012
5/10/2021	4011734.112	0.005	303882.434	0.007	166.673	0.017
5/11/2021	4011734.11	0.003	303882.435	0.009	166.675	0.015
5/12/2021	4011734.112	0.004	303882.433	0.006	166.675	0.023
5/13/2021	4011734.11	0.005	303882.434	0.007	166.674	0.013
5/14/2021	4011734.109	0.005	303882.433	0.004	166.672	0.014
5/15/2021						
5/16/2021						
5/17/2021						
5/18/2021						
5/19/2021						
5/20/2021	4011734.11	0.011	303882.436	0.002	166.669	0.016

5/21/2021	4011734.111	0.006	303882.434	0.005	166.672	0.024
5/22/2021	4011734.111	0.009	303882.434	0.007	166.659	0.017
5/23/2021	4011734.109	0.006	303882.435	0.009	166.674	0.009
5/24/2021	4011734.11	0.002	303882.435	0.006	166.671	0.011
5/25/2021	4011734.11	0.003	303882.438	0.008	166.677	0.028
5/26/2021	4011734.11	0.003	303882.436	0.004	166.675	0.013
5/27/2021	4011734.109	0.004	303882.439	0.005	166.671	0.014
5/28/2021	4011734.11	0.004	303882.435	0.005	166.679	0.018
5/29/2021	4011734.11	0.004	303882.435	0.005	166.676	0.014
5/30/2021	4011734.111	0.006	303882.434	0.007	166.673	0.017
5/31/2021	4011734.107	0.001	303882.435	0.006	166.676	0.024
6/1/2021	4011734.11	0.003	303882.435	0.004	166.676	0.022
6/2/2021	4011734.11	0.006	303882.436	0.005	166.675	0.02
6/3/2021	4011734.111	0.004	303882.435	0.003	166.668	0.015
6/4/2021	4011734.113	0.004	303882.434	0.008	166.666	0.007
6/5/2021	4011734.112	0.003	303882.434	0.006	166.679	0.012
6/6/2021	4011734.112	0.005	303882.433	0.008	166.673	0.006
6/7/2021	4011734.115	0.009	303882.437	0.015	166.67	0.024
6/8/2021	4011734.114	0.001	303882.435	0.006	166.664	0.018
6/9/2021	4011734.112	0.006	303882.433	0.004	166.668	0.012
6/10/2021	4011734.113	0.002	303882.432	0.002	166.672	0.01
6/11/2021	4011734.112	0.002	303882.433	0.005	166.664	0.022
6/12/2021	4011734.112	0.005	303882.433	0.006	166.668	0.014
6/13/2021	4011734.113	0.005	303882.434	0.005	166.673	0.004
6/14/2021	4011734.115	0.004	303882.435	0.004	166.669	0.022
6/15/2021	4011734.113	0.005	303882.434	0.005	166.662	0.014
6/16/2021	4011734.113	0.005	303882.435	0.001	166.666	0.013
6/17/2021	4011734.113	0.005	303882.434	0.002	166.667	0.022
6/18/2021	4011734.114	0.004	303882.434	0.003	166.667	0.009
6/19/2021	4011734.113	0.003	303882.434	0.003	166.661	0.013
6/20/2021	4011734.113	0.004	303882.436	0.008	166.666	0.007
6/21/2021	4011734.112	0.005	303882.441	0.002	166.67	0.025
6/22/2021	4011734.114	0.002	303882.435	0.005	166.662	0.013
6/23/2021	4011734.111	0.001	303882.437	0.008	166.666	0.025
6/24/2021	4011734.114	0.005	303882.439	0.01	166.665	0.011
6/25/2021	4011734.111	0.005	303882.437	0.003	166.666	0.015

6/26/2021	4011734.111	0.005	303882.438	0.004	166.672	0.011
6/27/2021	4011734.107	0.01	303882.443	0.005	166.669	0.035
6/28/2021	4011734.111	0.009	303882.434	0.011	166.668	0.013
6/29/2021	4011734.113	0.003	303882.437	0.002	166.657	0.027
6/30/2021	4011734.116	0.007	303882.444	0.004	166.651	0.006
7/1/2021	4011734.115	0.004	303882.438	0.007	166.667	0.018
7/2/2021	4011734.113	0.006	303882.434	0.003	166.672	0.01
7/3/2021	4011734.113	0.006	303882.434	0.001	166.652	0.014
7/4/2021	4011734.113	0.006	303882.435	0.001	166.671	0.014
7/5/2021	4011734.111	0.003	303882.435	0.003	166.672	0.021
7/6/2021	4011734.114	0.005	303882.437	0.008	166.664	0.009
7/7/2021	4011734.113	0.006	303882.436	0.001	166.653	0.009
7/8/2021	4011734.114	0.004	303882.436	0.001	166.654	0.006
7/9/2021	4011734.113	0.006	303882.437	0.003	166.65	0.006
7/10/2021	4011734.112	0.004	303882.44	0.006	166.655	0.019
7/11/2021	<i>4011734.113</i>	<i>0.001</i>	<i>303882.434</i>	<i>0.006</i>	<i>166.668</i>	<i>0.021</i>
7/12/2021	4011734.114	0.004	303882.436	0.005	166.667	0.016
7/13/2021	4011734.114	0.006	303882.437	0.006	166.654	0.009
7/14/2021	4011734.114	0.008	303882.438	0.005	166.663	0.013
7/15/2021	4011734.113	0.005	303882.438	0.002	166.66	0.015
7/16/2021	4011734.116	0.005	303882.439	0.011	166.655	0.021
7/17/2021	4011734.114	0.005	303882.433	0.003	166.688	0.004
7/18/2021	4011734.11	0.004	303882.437	0.003	166.678	0.049
7/19/2021	4011734.113	0.005	303882.438	0.011	166.659	0.007
7/20/2021	4011734.115	0.006	303882.436	0.003	166.673	0.005
7/21/2021	4011734.116	0.003	303882.436	0.009	166.668	0.008
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10/8/2021	4011734.113	0.006	303882.437	0.006	166.677	0.014
10/9/2021	4011734.11	0.005	303882.438	0.007	166.674	0.004
10/10/2021	4011734.111	0.005	303882.439	0.004	166.676	0.014
10/11/2021	4011734.11	0.008	303882.434	0.006	166.676	0.015

10/12/2021	4011734.11	0.001	303882.438	0.009	166.675	0.012
10/13/2021	4011734.113	0.004	303882.436	0.011	166.675	0.015
10/14/2021	4011734.109	0.004	303882.433	0.005	166.685	0.011
10/15/2021	4011734.111	0.004	303882.435	0.007	166.668	0.007
10/16/2021	4011734.11	0.005	303882.434	0.007	166.671	0.009
10/17/2021	4011734.11	0.005	303882.436	0.007	166.675	0.006
10/18/2021	4011734.11	0.005	303882.435	0.006	166.674	0.006
10/19/2021	4011734.11	0.006	303882.434	0.007	166.671	0.01
10/20/2021	4011734.11	0.003	303882.434	0.004	166.678	0.005
10/21/2021	4011734.109	0.004	303882.435	0.007	166.677	0.016
10/22/2021	4011734.109	0.005	303882.435	0.007	166.677	0.009
10/23/2021	4011734.108	0.002	303882.438	0.009	166.669	0.013
10/24/2021	4011734.111	0.005	303882.439	0.007	166.673	0.001
10/25/2021	4011734.109	0.002	303882.436	0.009	166.678	0.018
10/26/2021	4011734.109	0.003	303882.434	0.008	166.669	0.005
10/27/2021	4011734.109	0.003	303882.433	0.002	166.666	0.012
10/28/2021	4011734.109	0.002	303882.437	0.01	166.672	0.018
10/29/2021	4011734.11	0.005	303882.434	0.008	166.673	0.014
10/30/2021	4011734.109	0.005	303882.434	0.009	166.671	0.016
10/31/2021	4011734.107	0.002	303882.435	0.009	166.677	0.022
11/1/2021	4011734.108	0.001	303882.436	0.009	166.674	0.015
11/2/2021	4011734.11	0.004	303882.434	0.01	166.674	0.019
11/3/2021	4011734.107	0.001	303882.435	0.009	166.672	0.02
11/4/2021	4011734.107	0.001	303882.436	0.01	166.676	0.018
11/5/2021	4011734.107	0.002	303882.436	0.01	166.672	0.018
11/6/2021	4011734.107	0.002	303882.436	0.01	166.675	0.021
11/7/2021	4011734.11	0.003	303882.435	0.009	166.674	0.015
11/8/2021	4011734.109	0	303882.438	0.008	166.675	0.013
11/9/2021	4011734.111	0.006	303882.434	0.007	166.663	0.013
11/10/2021	4011734.11	0.006	303882.433	0.006	166.674	0.02
11/11/2021						
11/12/2021	4011734.108	0.002	303882.435	0.009	166.676	0.012
11/13/2021	4011734.106	0.004	303882.436	0.011	166.673	0.018
11/14/2021	4011734.106	0.003	303882.435	0.009	166.673	0.013
11/15/2021	4011734.109	0.004	303882.433	0.01	166.673	0.018
11/16/2021	4011734.107	0.001	303882.436	0.009	166.677	0.015

11/17/2021	4011734.109	0.004	303882.436	0.006	166.674	0.013
11/18/2021	4011734.109	0.006	303882.434	0.004	166.671	0.006
11/19/2021	4011734.109	0.007	303882.434	0.005	166.668	0.004
11/20/2021	4011734.11	0.006	303882.434	0.005	166.669	0.006
11/21/2021	4011734.109	0.004	303882.436	0.007	166.672	0.016
11/22/2021	4011734.11	0.006	303882.435	0.005	166.668	0.007
11/23/2021	4011734.109	0.006	303882.433	0.005	166.671	0.002
11/24/2021	4011734.109	0.005	303882.433	0.005	166.672	0.014
11/25/2021	4011734.109	0.005	303882.435	0.006	166.662	0.006
11/26/2021	4011734.109	0.007	303882.433	0.004	166.668	0.004
11/27/2021	4011734.109	0.006	303882.433	0.006	166.666	0.006
11/28/2021	4011734.108	0.007	303882.434	0.005	166.666	0.006
11/29/2021	4011734.108	0.006	303882.434	0.004	166.667	0.006
11/30/2021	4011734.108	0.008	303882.434	0.006	166.667	0.007
12/1/2021	4011734.107	0.004	303882.433	0.009	166.666	0.007
12/2/2021	4011734.108	0.005	303882.434	0.011	166.676	0.009
12/3/2021	4011734.108	0.006	303882.433	0.009	166.669	0.013
12/4/2021	4011734.106	0.006	303882.435	0.007	166.674	0.01
12/5/2021	4011734.108	0.006	303882.433	0.009	166.67	0.013
12/6/2021	4011734.107	0.004	303882.435	0.009	166.675	0.016
12/7/2021	4011734.108	0.005	303882.433	0.008	166.67	0.011
12/8/2021	4011734.107	0.006	303882.432	0.009	166.671	0.007
12/9/2021	4011734.107	0.006	303882.433	0.01	166.669	0.008
12/10/2021	4011734.108	0.005	303882.432	0.01	166.67	0.015
12/11/2021	4011734.106	0.003	303882.435	0.014	166.674	0.015
12/12/2021	4011734.106	0.008	303882.432	0.007	166.67	0.012
12/13/2021	4011734.107	0.007	303882.432	0.007	166.669	0.011
12/14/2021	4011734.105	0.002	303882.435	0.009	166.676	0.014
12/15/2021	4011734.106	0.006	303882.43	0.004	166.659	0.009
12/16/2021	4011734.106	0.006	303882.437	0.008	166.676	0.015
12/17/2021	4011734.11	0.006	303882.434	0.01	166.67	0.002
12/18/2021	4011734.106	0.002	303882.434	0.011	166.674	0.014
12/19/2021	4011734.107	0.006	303882.432	0.007	166.668	0.01
12/20/2021	4011734.107	0.006	303882.431	0.008	166.666	0.012
12/21/2021	4011734.107	0.006	303882.436	0.01	166.666	0.007
12/22/2021	4011734.108	0.006	303882.432	0.008	166.668	0.01

12/23/2021	4011734.107	0.002	303882.435	0.01	166.675	0.009
12/24/2021	4011734.105	0.002	303882.435	0.009	166.672	0.01
12/25/2021	4011734.106	0.001	303882.435	0.008	166.673	0.011
12/26/2021	4011734.106	0.001	303882.435	0.009	166.674	0.01
12/27/2021	4011734.104	0.002	303882.436	0.009	166.672	0.007
12/28/2021	4011734.106	0.004	303882.433	0.007	166.68	0.008
12/29/2021	4011734.107	0.005	303882.434	0.013	166.673	0.007
12/30/2021	4011734.105	0.001	303882.435	0.01	166.674	0.011
12/31/2021	4011734.107	0.006	303882.433	0.01	166.673	0.013
1/1/2022	4011734.105	0.001	303882.436	0.013	166.674	0.015
1/2/2022	4011734.106	0.009	303882.431	0.007	166.665	0.012
1/3/2022	4011734.105	0.003	303882.435	0.014	166.674	0.016
1/4/2022	4011734.105	0.001	303882.434	0.011	166.675	0.02
1/5/2022	4011734.105	0.003	303882.434	0.012	166.672	0.014
1/6/2022	4011734.107	0.004	303882.432	0.014	166.674	0.014
1/7/2022	4011734.105	0.003	303882.434	0.014	166.674	0.018
1/8/2022	4011734.104	0.001	303882.432	0.011	166.675	0.014
1/9/2022	4011734.105	0.004	303882.433	0.008	166.676	0.019
1/10/2022	4011734.106	0.005	303882.432	0.012	166.674	0.019
1/11/2022	4011734.106	0.008	303882.431	0.009	166.67	0.013
1/12/2022	4011734.104	0.002	303882.433	0.011	166.675	0.012
1/13/2022	4011734.104	0.002	303882.433	0.011	166.675	0.01
1/14/2022	4011734.107	0.005	303882.431	0.009	166.668	0.012
1/15/2022	4011734.106	0.006	303882.43	0.01	166.667	0.011
1/16/2022	4011734.106	0.007	303882.428	0.008	166.67	0.011
1/17/2022	4011734.106	0.005	303882.432	0.013	166.677	0.016
1/18/2022	4011734.107	0.005	303882.431	0.011	166.674	0.013
1/19/2022	4011734.106	0.004	303882.433	0.011	166.675	0.017
1/20/2022	4011734.105	0.01	303882.43	0.007	166.668	0.007
1/21/2022	4011734.105	0.008	303882.43	0.011	166.668	0.011
1/22/2022	4011734.105	0.009	303882.43	0.009	166.669	0.01
1/23/2022	4011734.105	0.007	303882.431	0.009	166.665	0.01
1/24/2022	4011734.105	0.005	303882.43	0.009	166.669	0.008
1/25/2022	4011734.105	0.004	303882.43	0.012	166.672	0.017
1/26/2022	4011734.104	0.007	303882.428	0.01	166.668	0.013
1/27/2022	4011734.104	0.002	303882.432	0.011	166.67	0.015

1/28/2022	4011734.105	0.007	303882.429	0.009	166.663	0.013
1/29/2022	4011734.105	0.006	303882.43	0.009	166.667	0.012
1/30/2022	4011734.105	0.007	303882.43	0.009	166.663	0.009
1/31/2022	4011734.106	0.006	303882.429	0.008	166.665	0.013
2/1/2022	4011734.106	0.006	303882.431	0.008	166.67	0.007
2/2/2022	4011734.105	0.004	303882.431	0.013	166.673	0.018
2/3/2022	4011734.105	0.007	303882.428	0.009	166.661	0.014
2/4/2022	4011734.104	0.009	303882.428	0.008	166.669	0.011
2/5/2022	4011734.105	0.009	303882.429	0.008	166.668	0.009
2/6/2022	4011734.105	0.007	303882.43	0.009	166.665	0.008
2/7/2022	4011734.106	0.006	303882.429	0.01	166.662	0.012
2/8/2022	4011734.104	0.001	303882.432	0.012	166.67	0.014
2/9/2022	4011734.106	0.005	303882.432	0.011	166.672	0.016
2/10/2022	4011734.105	0.005	303882.43	0.009	166.66	0.011
2/11/2022	4011734.105	0.004	303882.431	0.011	166.668	0.015
2/12/2022	4011734.105	0.008	303882.43	0.007	166.663	0.013
2/13/2022	4011734.105	0.006	303882.43	0.008	166.663	0.011
2/14/2022	4011734.105	0.002	303882.432	0.012	166.667	0.019
2/15/2022	4011734.106	0.004	303882.431	0.01	166.669	0.01
2/16/2022	4011734.105	0.006	303882.432	0.008	166.663	0.014
2/17/2022	4011734.105	0.005	303882.431	0.009	166.672	0.007
2/18/2022	4011734.105	0.008	303882.431	0.009	166.664	0.012
2/19/2022	4011734.105	0.006	303882.429	0.009	166.665	0.008
2/20/2022	4011734.104	0.001	303882.433	0.009	166.673	0.013
2/21/2022	4011734.105	0.006	303882.431	0.008	166.665	0.01
2/22/2022	4011734.105	0.007	303882.432	0.008	166.665	0.01
2/23/2022	4011734.106	0.006	303882.432	0.014	166.667	0.009
2/24/2022	4011734.105	0.004	303882.435	0.015	166.67	0.018
2/25/2022	4011734.105	0.008	303882.429	0.011	166.667	0.015
2/26/2022	4011734.105	0.006	303882.43	0.014	166.672	0.02
2/27/2022	4011734.105	0.006	303882.429	0.009	166.66	0.009
2/28/2022	4011734.105	0.006	303882.429	0.01	166.667	0.008
3/1/2022	4011734.103	0.002	303882.432	0.01	166.671	0.012
3/2/2022	4011734.104	0.001	303882.432	0.01	166.67	0.012
3/3/2022	4011734.104	0.002	303882.433	0.01	166.67	0.015
3/4/2022	4011734.106	0.005	303882.431	0.009	166.661	0.011

3/5/2022	4011734.103	0.003	303882.432	0.01	166.67	0.008
3/6/2022	4011734.103	0.005	303882.432	0.009	166.672	0.024
3/7/2022	4011734.104	0.008	303882.432	0.009	166.666	0.007
3/8/2022	4011734.107	0.005	303882.429	0.01	166.664	0.009
3/9/2022	4011734.105	0.005	303882.43	0.01	166.662	0.01
3/10/2022	4011734.105	0.001	303882.434	0.01	166.671	0.013
3/11/2022	4011734.106	0.006	303882.431	0.009	166.667	0.009
3/12/2022	4011734.105	0.007	303882.431	0.009	166.664	0.011
3/13/2022	4011734.104	0.001	303882.432	0.01	166.672	0.016
3/14/2022	4011734.104	0.002	303882.434	0.01	166.672	0.015
3/15/2022	4011734.105	0.005	303882.431	0.009	166.665	0.003
3/16/2022	4011734.107	0.005	303882.431	0.009	166.663	0.006
3/17/2022	4011734.105	0.002	303882.434	0.009	166.672	0.02
3/18/2022	4011734.104	0.002	303882.432	0.01	166.672	0.013
3/19/2022	4011734.105	0.006	303882.43	0.009	166.67	0.009
3/20/2022	4011734.107	0.005	303882.431	0.008	166.662	0.007
3/21/2022	4011734.105	0.001	303882.432	0.009	166.672	0.016
3/22/2022	4011734.104	0.002	303882.431	0.011	166.661	0.009
3/23/2022	4011734.106	0.004	303882.432	0.01	166.664	0.011
3/24/2022	4011734.107	0.005	303882.432	0.01	166.672	0.018
3/25/2022	4011734.107	0.005	303882.431	0.009	166.664	0.011
3/26/2022	4011734.106	0.005	303882.432	0.008	166.664	0.007
3/27/2022	4011734.106	0.001	303882.433	0.009	166.67	0.012
3/28/2022	4011734.107	0.005	303882.432	0.008	166.667	0.006
3/29/2022	4011734.106	0.005	303882.433	0.007	166.674	0.013
3/30/2022	4011734.107	0.005	303882.432	0.008	166.669	0.018
3/31/2022	4011734.107	0.005	303882.43	0.009	166.664	0.012
4/1/2022	4011734.107	0.007	303882.432	0.009	166.664	0.011
4/2/2022	4011734.106	0.001	303882.433	0.011	166.671	0.012
4/3/2022	4011734.107	0.005	303882.432	0.009	166.666	0.007
4/4/2022						
4/5/2022	4011734.108	0.005	303882.433	0.007	166.664	0.008
4/6/2022	4011734.108	0.007	303882.433	0.006	166.668	0.015
4/7/2022	4011734.108	0.006	303882.432	0.007	166.663	0.01
4/8/2022	4011734.107	0.006	303882.433	0.008	166.663	0.006
4/9/2022	4011734.107	0.005	303882.429	0.004	166.659	0.011

4/10/2022	4011734.105	0.001	303882.434	0.01	166.672	0.008
4/11/2022	4011734.108	0.007	303882.433	0.008	166.671	0.008
4/12/2022	4011734.107	0.008	303882.433	0.007	166.664	0.012
4/13/2022	4011734.107	0.006	303882.433	0.008	166.666	0.012
4/14/2022	4011734.107	0.006	303882.432	0.008	166.662	0.007
4/15/2022	4011734.109	0.005	303882.433	0.008	166.665	0.009
4/16/2022	4011734.107	0.002	303882.433	0.009	166.654	0.015
4/17/2022	4011734.107	0.005	303882.433	0.007	166.676	0.021
4/18/2022	4011734.107	0.006	303882.433	0.007	166.664	0.009
4/19/2022	4011734.106	0.002	303882.436	0.01	166.673	0.015
4/20/2022	4011734.108	0.003	303882.435	0.009	166.666	0.016
4/21/2022	4011734.11	0.008	303882.434	0.007	166.666	0.002
4/22/2022	4011734.106	0.004	303882.435	0.008	166.662	0.006
4/23/2022	4011734.107	0.009	303882.434	0.009	166.663	0.006
4/24/2022	4011734.109	0.005	303882.433	0.012	166.661	0.011
4/25/2022	4011734.11	0.005	303882.434	0.011	166.669	0.015
4/26/2022	4011734.108	0.006	303882.433	0.009	166.67	0.016
4/27/2022	4011734.107	0.002	303882.437	0.009	166.67	0.017
4/28/2022	4011734.108	0.004	303882.432	0.003	166.666	0.012
4/29/2022	4011734.108	0.001	303882.435	0.01	166.67	0.022
4/30/2022	4011734.107	0.004	303882.436	0.011	166.671	0.013
5/1/2022	4011734.108	0.005	303882.435	0.009	166.664	0.009
5/2/2022	4011734.107	0.002	303882.437	0.011	166.675	0.017
5/3/2022	4011734.108	0.005	303882.434	0.008	166.665	0.005
5/4/2022	4011734.109	0.005	303882.434	0.009	166.662	0.011
5/5/2022	4011734.112	0.006	303882.431	0.012	166.669	0.014
5/6/2022	4011734.109	0.008	303882.433	0.01	166.67	0.017
5/7/2022	4011734.107	0.003	303882.437	0.008	166.672	0.023
5/8/2022	4011734.105	0.004	303882.439	0.009	166.671	0.029
5/9/2022	4011734.107	0.004	303882.434	0.007	166.676	0.04
5/10/2022	4011734.109	0.006	303882.436	0.008	166.662	0.009
5/11/2022	4011734.108	0.003	303882.437	0.009	166.676	0.013
5/12/2022	4011734.109	0	303882.436	0.01	166.663	0.013
5/13/2022	4011734.106	0.004	303882.437	0.011	166.669	0.012
5/14/2022	4011734.107	0.003	303882.433	0.003	166.672	0.014
5/15/2022	4011734.108	0.004	303882.434	0.007	166.671	0.011

5/16/2022	4011734.107	0.004	303882.433	0.008	166.672	0.024
5/17/2022	4011734.109	0.005	303882.435	0.008	166.663	0.03
5/18/2022	4011734.107	0.002	303882.434	0.007	166.667	0.027
5/19/2022	4011734.109	0.006	303882.434	0.006	166.664	0.017
5/20/2022	4011734.109	0.01	303882.434	0.003	166.675	0.03
5/21/2022	4011734.11	0.009	303882.436	0.006	166.666	0.021
5/22/2022	4011734.109	0.005	303882.433	0.003	166.66	0.018
5/23/2022	4011734.109	0.004	303882.434	0.007	166.677	0.033
5/24/2022	4011734.11	0.007	303882.435	0.006	166.651	0.013
5/25/2022	4011734.108	0.002	303882.435	0.011	166.674	0.018
5/26/2022	4011734.109	0.004	303882.439	0.007	166.668	0.018
5/27/2022	4011734.108	0.003	303882.436	0.009	166.654	0.019
5/28/2022	4011734.109	0.007	303882.435	0.005	166.673	0.027
5/29/2022	4011734.108	0.003	303882.435	0.008	166.668	0.023
5/30/2022	4011734.109	0.007	303882.433	0.003	166.655	0.011
5/31/2022	4011734.109	0.006	303882.436	0.005	166.672	0.025
6/1/2022	4011734.109	0.006	303882.437	0.004	166.675	0.025
6/2/2022	4011734.111	0.005	303882.437	0.007	166.677	0.024
6/3/2022	4011734.114	0.005	303882.436	0.01	166.67	0.008
6/4/2022	4011734.111	0.005	303882.439	0.006	166.673	0.015
6/5/2022	4011734.114	0.002	303882.437	0.009	166.665	0.012
6/6/2022	4011734.113	0.003	303882.435	0.008	166.666	0.01
6/7/2022	4011734.113	0.003	303882.432	0.006	166.662	0.019
6/8/2022	4011734.115	0.004	303882.435	0.008	166.674	0.019
6/9/2022	4011734.118	0.003	303882.454	0.002	166.742	0.01
6/10/2022	4011734.118	0.002	303882.453	0.002	166.751	0.01
6/11/2022	4011734.116	0.002	303882.454	0.002	166.745	0.01
6/12/2022	4011734.117	0.002	303882.455	0.002	166.748	0.01
6/13/2022	4011734.117	0.002	303882.456	0.002	166.749	0.01
6/14/2022	4011734.117	0.002	303882.455	0.002	166.746	0.01
6/15/2022	4011734.117	0.002	303882.456	0.002	166.751	0.01
6/16/2022	4011734.116	0.002	303882.455	0.002	166.754	0.01
6/17/2022	4011734.115	0.002	303882.454	0.002	166.751	0.01
6/18/2022	4011734.117	0.002	303882.455	0.002	166.75	0.01
6/19/2022	4011734.116	0.002	303882.456	0.002	166.751	0.01
6/20/2022	4011734.118	0.002	303882.455	0.002	166.745	0.01

6/21/2022	4011734.118	0.002	303882.453	0.002	166.745	0.01
6/22/2022	4011734.117	0.002	303882.454	0.002	166.743	0.01
6/23/2022	4011734.119	0.002	303882.453	0.002	166.746	0.01
6/24/2022	4011734.116	0.002	303882.455	0.002	166.752	0.01
6/25/2022	4011734.117	0.003	303882.455	0.002	166.756	0.01
6/26/2022	4011734.118	0.002	303882.454	0.002	166.756	0.01
6/27/2022	4011734.119	0.002	303882.455	0.002	166.746	0.01
6/28/2022	4011734.117	0.002	303882.454	0.002	166.755	0.01
6/29/2022	4011734.12	0.002	303882.456	0.002	166.756	0.01
6/30/2022	4011734.119	0.002	303882.456	0.002	166.749	0.009
7/1/2022	4011734.118	0.002	303882.455	0.002	166.752	0.009
7/2/2022	4011734.118	0.002	303882.455	0.002	166.752	0.009
7/3/2022	4011734.118	0.002	303882.455	0.002	166.757	0.009
7/4/2022	4011734.118	0.002	303882.456	0.002	166.75	0.009
7/5/2022	4011734.117	0.002	303882.458	0.002	166.755	0.009
7/6/2022	4011734.119	0.002	303882.455	0.002	166.75	0.009
7/7/2022	4011734.119	0.002	303882.456	0.002	166.754	0.009
7/8/2022	4011734.12	0.002	303882.456	0.002	166.755	0.009
7/9/2022	4011734.117	0.002	303882.456	0.002	166.748	0.009
7/10/2022	4011734.119	0.002	303882.455	0.002	166.754	0.009
7/11/2022	4011734.118	0.002	303882.455	0.002	166.758	0.009
7/12/2022	4011734.12	0.002	303882.455	0.002	166.759	0.009
7/13/2022	4011734.118	0.002	303882.456	0.002	166.746	0.009
7/14/2022	4011734.12	0.002	303882.456	0.002	166.749	0.009
7/15/2022	4011734.119	0.002	303882.455	0.002	166.757	0.009
7/16/2022	4011734.115	0.002	303882.458	0.002	166.758	0.009
7/17/2022	4011734.113	0.002	303882.46	0.002	166.76	0.009
7/18/2022	4011734.114	0.002	303882.457	0.002	166.758	0.009
7/19/2022	4011734.113	0.003	303882.46	0.003	166.754	0.011
7/20/2022	4011734.114	0.002	303882.461	0.002	166.759	0.009
7/21/2022	4011734.117	0.002	303882.46	0.002	166.754	0.009
7/22/2022	4011734.117	0.002	303882.458	0.002	166.758	0.009
7/23/2022	4011734.117	0.002	303882.459	0.002	166.761	0.009
7/24/2022	4011734.116	0.002	303882.46	0.002	166.761	0.009
7/25/2022	4011734.118	0.002	303882.459	0.002	166.754	0.009
7/26/2022	4011734.115	0.002	303882.459	0.002	166.764	0.01

7/27/2022	4011734.113	0.003	303882.456	0.003	166.761	0.015
7/28/2022	4011734.115	0.003	303882.457	0.003	166.764	0.014
7/29/2022	4011734.116	0.003	303882.457	0.003	166.756	0.015
7/30/2022	4011734.115	0.003	303882.456	0.003	166.741	0.014
7/31/2022	4011734.112	0.003	303882.455	0.003	166.756	0.013
8/1/2022	4011734.115	0.003	303882.458	0.003	166.757	0.011
8/2/2022	4011734.114	0.002	303882.459	0.002	166.75	0.009
8/3/2022	4011734.116	0.002	303882.459	0.002	166.756	0.009
8/4/2022	4011734.118	0.002	303882.458	0.002	166.756	0.009
8/5/2022	4011734.117	0.002	303882.457	0.002	166.752	0.009
8/6/2022	4011734.117	0.002	303882.457	0.002	166.754	0.009
8/7/2022	4011734.118	0.002	303882.457	0.002	166.754	0.009
8/8/2022	4011734.118	0.002	303882.455	0.002	166.754	0.009
8/9/2022	4011734.117	0.002	303882.457	0.002	166.751	0.009
8/10/2022	4011734.118	0.002	303882.457	0.002	166.746	0.009
8/11/2022	4011734.118	0.002	303882.456	0.002	166.748	0.009
8/12/2022	4011734.117	0.002	303882.457	0.002	166.754	0.009
8/13/2022	4011734.117	0.002	303882.457	0.002	166.754	0.009
8/14/2022	4011734.117	0.002	303882.457	0.002	166.753	0.009
8/15/2022	4011734.119	0.002	303882.457	0.002	166.751	0.009
8/16/2022	4011734.113	0.002	303882.457	0.002	166.757	0.009
8/17/2022	4011734.12	0.002	303882.456	0.002	166.746	0.009
8/18/2022	4011734.117	0.003	303882.456	0.003	166.758	0.013
8/19/2022						
8/20/2022						
8/21/2022						
8/22/2022						
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8/24/2022						
8/25/2022						
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8/27/2022						
8/28/2022						
8/29/2022						
8/30/2022						
8/31/2022						

9/1/2022						
9/2/2022						
9/3/2022						
9/4/2022						
9/5/2022						
9/6/2022	4011734.117	0.005	303882.458	0.004	166.738	0.016
9/7/2022	4011734.117	0.002	303882.456	0.002	166.749	0.009
9/8/2022	4011734.118	0.002	303882.455	0.002	166.751	0.009
9/9/2022	4011734.117	0.002	303882.457	0.002	166.758	0.009
9/10/2022	4011734.117	0.002	303882.459	0.002	166.749	0.009
9/11/2022	4011734.116	0.002	303882.455	0.002	166.752	0.009
9/12/2022	4011734.117	0.002	303882.456	0.002	166.754	0.009
9/13/2022	4011734.116	0.002	303882.456	0.002	166.754	0.009
9/14/2022	4011734.117	0.002	303882.456	0.002	166.752	0.009
9/15/2022	4011734.117	0.002	303882.456	0.002	166.751	0.009
9/16/2022	4011734.118	0.002	303882.455	0.002	166.746	0.009
9/17/2022	4011734.116	0.002	303882.457	0.002	166.754	0.009
9/18/2022	4011734.118	0.002	303882.456	0.002	166.75	0.009
9/19/2022	4011734.118	0.002	303882.456	0.002	166.753	0.009
9/20/2022	4011734.116	0.002	303882.457	0.002	166.757	0.009
9/21/2022	4011734.116	0.002	303882.454	0.002	166.757	0.009
9/22/2022	4011734.117	0.002	303882.457	0.002	166.754	0.009
9/23/2022	4011734.116	0.002	303882.456	0.002	166.754	0.009
9/24/2022	4011734.116	0.002	303882.456	0.002	166.755	0.009
9/25/2022	4011734.116	0.002	303882.457	0.002	166.759	0.009
9/26/2022	4011734.117	0.002	303882.456	0.002	166.754	0.009
9/27/2022	4011734.116	0.002	303882.456	0.002	166.75	0.009
9/28/2022	4011734.116	0.002	303882.456	0.002	166.748	0.009
9/29/2022	4011734.116	0.002	303882.456	0.002	166.747	0.009
9/30/2022	4011734.117	0.002	303882.455	0.002	166.752	0.009
10/1/2022	4011734.116	0.002	303882.456	0.002	166.75	0.009
10/2/2022	4011734.117	0.002	303882.455	0.002	166.749	0.009
10/3/2022	4011734.117	0.002	303882.455	0.002	166.753	0.009
10/4/2022	4011734.118	0.002	303882.455	0.002	166.752	0.009
10/5/2022	4011734.117	0.002	303882.454	0.002	166.751	0.009
10/6/2022	4011734.116	0.002	303882.454	0.002	166.752	0.009

10/7/2022	4011734.116	0.002	303882.456	0.002	166.747	0.009
10/8/2022	4011734.115	0.002	303882.455	0.002	166.748	0.009
10/9/2022	4011734.116	0.002	303882.455	0.002	166.752	0.009
10/10/2022	4011734.116	0.002	303882.455	0.002	166.751	0.009
10/11/2022	4011734.115	0.002	303882.456	0.002	166.757	0.009
10/12/2022	4011734.115	0.002	303882.457	0.002	166.759	0.009
10/13/2022	4011734.116	0.003	303882.454	0.003	166.754	0.01

4. **GNSS Station Raw Data: KER3**

			<u>KER3</u>			-
	<u>Northing Mean(m)</u>		<u>Easting Mean(m)</u>		<u>Elev. Mean(m)</u>	-
	4011794.395		303884.4587		166.6751271	
<u>Date</u>	<u>Northing(m)</u>	<u>Peak to Peak Error (m)</u>	<u>Easting(m)</u>	<u>Peak to Peak Error (m)</u>	<u>Elevation(m)</u>	<u>Peak to Peak Error (m)</u>
4/22/2021	4011794.394	0.007	303884.449	0.007	166.657	0.028
4/23/2021	4011794.393	0.001	303884.451	0.007	166.656	0.018
4/24/2021	4011794.392	0	303884.451	0.007	166.654	0.022
4/25/2021	4011794.392	0.001	303884.45	0.008	166.663	0.017
4/26/2021	4011794.392	0.003	303884.452	0.007	166.659	0.019
4/27/2021	4011794.395	0.002	303884.453	0.007	166.66	0.029
4/28/2021	4011794.396	0.002	303884.45	0.006	166.658	0.01
4/29/2021	4011794.393	0.004	303884.453	0.006	166.655	0.018
4/30/2021	4011794.394	0.002	303884.451	0.009	166.657	0.025
5/1/2021	4011794.394	0.002	303884.452	0.007	166.663	0.028
5/2/2021	4011794.394	0.003	303884.451	0.004	166.657	0.023
5/3/2021	4011794.397	0.005	303884.45	0.006	166.656	0.024
5/4/2021	4011794.393	0.007	303884.45	0.006	166.656	0.015
5/5/2021	4011794.394	0.006	303884.451	0.009	166.655	0.022
5/6/2021	4011794.393	0.002	303884.453	0.006	166.661	0.022
5/7/2021	4011794.395	0.004	303884.452	0.006	166.662	0.023
5/8/2021	4011794.393	0.001	303884.453	0.006	166.66	0.015
5/9/2021	4011794.392	0.001	303884.453	0.01	166.654	0.022

5/10/2021	4011794.395	0.005	303884.451	0.006	166.657	0.021
5/11/2021	4011794.394	0.003	303884.452	0.009	166.658	0.02
5/12/2021	4011794.395	0.004	303884.45	0.006	166.661	0.023
5/13/2021	4011794.395	0.005	303884.451	0.007	166.657	0.022
5/14/2021	4011794.394	0.004	303884.452	0.008	166.652	0.009
5/15/2021						
5/16/2021						
5/17/2021						
5/18/2021						
5/19/2021						
5/20/2021	4011794.389	0.002	303884.452	0.007	166.656	0.016
5/21/2021	4011794.394	0.006	303884.451	0.005	166.655	0.027
5/22/2021	4011794.395	0.007	303884.453	0.003	166.66	0.021
5/23/2021	4011794.392	0.006	303884.451	0.008	166.664	0.024
5/24/2021	4011794.395	0.003	303884.452	0.007	166.654	0.016
5/25/2021	4011794.392	0.002	303884.455	0.009	166.661	0.029
5/26/2021	4011794.394	0.003	303884.453	0.005	166.66	0.015
5/27/2021	4011794.394	0.007	303884.452	0.003	166.654	0.02
5/28/2021	4011794.394	0.003	303884.453	0.007	166.663	0.024
5/29/2021	4011794.395	0.004	303884.451	0.006	166.656	0.016
5/30/2021	4011794.394	0.003	303884.454	0.007	166.655	0.015
5/31/2021	4011794.391	0.005	303884.45	0.007	166.657	0.008
6/1/2021	4011794.392	0.004	303884.449	0.011	166.682	0.029
6/2/2021	4011794.394	0.005	303884.453	0.009	166.652	0.01
6/3/2021	4011794.394	0.002	303884.453	0.005	166.649	0.03
6/4/2021	4011794.394	0.002	303884.452	0.003	166.648	0.014
6/5/2021	4011794.393	0.004	303884.453	0.007	166.661	0.019
6/6/2021	4011794.393	0.005	303884.453	0.007	166.65	0.004
6/7/2021	4011794.399	0.006	303884.451	0.008	166.651	0.026
6/8/2021	4011794.397	0.002	303884.452	0.004	166.658	0.026
6/9/2021	4011794.394	0.008	303884.451	0.005	166.654	0.018
6/10/2021	4011794.395	0.003	303884.454	0.011	166.647	0.002
6/11/2021	4011794.394	0.004	303884.452	0.003	166.65	0.019
6/12/2021	4011794.395	0.006	303884.451	0.006	166.653	0.016
6/13/2021	4011794.394	0.004	303884.452	0.004	166.655	0.016
6/14/2021	4011794.397	0.004	303884.452	0.004	166.652	0.019

6/15/2021	4011794.393	0.006	303884.453	0.006	166.651	0.02
6/16/2021	4011794.395	0.005	303884.454	0.001	166.65	0.018
6/17/2021	4011794.394	0.005	303884.452	0.001	166.652	0.017
6/18/2021	4011794.395	0.004	303884.452	0.005	166.656	0.015
6/19/2021	4011794.394	0.004	303884.453	0.003	166.649	0.017
6/20/2021	4011794.395	0.006	303884.452	0.002	166.657	0.014
6/21/2021	4011794.394	0.006	303884.455	0.006	166.639	0.005
6/22/2021	4011794.394	0.004	303884.453	0.004	166.653	0.016
6/23/2021	4011794.393	0.002	303884.456	0.007	166.651	0.019
6/24/2021	4011794.395	0.006	303884.457	0.009	166.652	0.008
6/25/2021	4011794.394	0.005	303884.455	0.001	166.65	0.02
6/26/2021	4011794.395	0.01	303884.457	0.005	166.661	0.018
6/27/2021	4011794.39	0.007	303884.46	0.01	166.651	0.011
6/28/2021	4011794.392	0.004	303884.455	0.003	166.634	0.004
6/29/2021	4011794.394	0.003	303884.454	0.006	166.644	0.021
6/30/2021	4011794.396	0.007	303884.459	0.007	166.653	0.014
7/1/2021	4011794.397	0.005	303884.454	0.004	166.649	0.014
7/2/2021	4011794.395	0.005	303884.452	0.003	166.649	0.019
7/3/2021	4011794.393	0.006	303884.453	0.003	166.653	0.026
7/4/2021	4011794.393	0.002	303884.455	0.006	166.659	0.02
7/5/2021	4011794.392	0.002	303884.447	0.007	166.675	0.022
7/6/2021	4011794.394	0.003	303884.449	0.005	166.636	0.022
7/7/2021	4011794.396	0.004	303884.459	0.01	166.654	0.013
7/8/2021	4011794.393	0.003	303884.456	0.004	166.652	0.019
7/9/2021	4011794.393	0.007	303884.454	0.003	166.647	0.006
7/10/2021	4011794.394	0.003	303884.458	0.009	166.658	0.022
7/11/2021	4011794.394	0.003	303884.456	0.008	166.658	0.01
7/12/2021	4011794.395	0.002	303884.458	0.009	166.653	0.018
7/13/2021	4011794.394	0.002	303884.457	0.009	166.65	0.011
7/14/2021	4011794.395	0.006	303884.454	0.003	166.656	0.016
7/15/2021	4011794.392	0.002	303884.454	0.001	166.649	0.015
7/16/2021	4011794.395	0.006	303884.457	0.009	166.663	0.026
7/17/2021	4011794.393	0.008	303884.451	0.008	166.658	0.016
7/18/2021	4011794.394	0.002	303884.456	0.007	166.672	0.055
7/19/2021	4011794.395	0.002	303884.455	0.002	166.646	0.018
7/20/2021	4011794.398	0.005	303884.455	0.002	166.65	0.012

7/21/2021	4011794.395	0.002	303884.456	0.007	166.646	0.009
7/22/2021	4011794.398	0.001	303884.457	0.008	166.64	0.01
7/23/2021	4011794.396	0.002	303884.459	0.009	166.652	0.013
7/24/2021	4011794.395	0.001	303884.456	0.002	166.651	0.014
7/25/2021	4011794.397	0.002	303884.45	0.013	166.649	0.02
7/26/2021	4011794.394	0.004	303884.454	0.004	166.639	0.016
7/27/2021	4011794.398	0.008	303884.453	0.006	166.654	0.009
7/28/2021	4011794.398	0.004	303884.459	0.006	166.651	0.004
7/29/2021	4011794.396	0.002	303884.456	0.002	166.653	0.009
7/30/2021	4011794.397	0.004	303884.453	0.001	166.653	0.014
7/31/2021	4011794.395	0.002	303884.459	0.007	166.655	0.008
8/1/2021	4011794.394	0.006	303884.456	0.002	166.655	0.013
8/2/2021	4011794.394	0.005	303884.454	0.004	166.648	0.007
8/3/2021	4011794.394	0.004	303884.458	0.01	166.645	0.003
8/4/2021	4011794.396	0.004	303884.456	0.006	166.645	0.015
8/5/2021	4011794.395	0.007	303884.459	0.006	166.655	0.013
8/6/2021	4011794.394	0.005	303884.455	0.004	166.657	0.014
8/7/2021	4011794.394	0.005	303884.456	0.002	166.657	0.01
8/8/2021	4011794.393	0.005	303884.459	0.01	166.639	0.016
8/9/2021	4011794.394	0.006	303884.458	0.014	166.645	0.005
8/10/2021	4011794.395	0.004	303884.455	0.001	166.655	0.017
8/11/2021	4011794.394	0.004	303884.454	0.001	166.654	0.012
8/12/2021	4011794.395	0.006	303884.454	0.001	166.656	0.009
8/13/2021	4011794.394	0.003	303884.452	0.006	166.663	0.018
8/14/2021	4011794.396	0.001	303884.455	0.011	166.65	0.007
8/15/2021	4011794.396	0.007	303884.455	0.004	166.663	0.026
8/16/2021	4011794.392	0.009	303884.461	0.016	166.664	0.005
8/17/2021	4011794.394	0.008	303884.456	0.01	166.658	0.035
8/18/2021	4011794.395	0.007	303884.458	0.004	166.647	0.002
8/19/2021	4011794.398	0.003	303884.455	0.003	166.663	0.011
8/20/2021	4011794.393	0.001	303884.454	0.001	166.65	0.032
8/21/2021	4011794.395	0.002	303884.456	0.004	166.638	0.009
8/22/2021	4011794.398	0.004	303884.454	0.004	166.653	0.013
8/23/2021	4011794.393	0.004	303884.454	0.004	166.651	0.006
8/24/2021	4011794.393	0.006	303884.457	0.004	166.657	0.006
8/25/2021	4011794.394	0.005	303884.455	0.003	166.654	0.003

8/26/2021	4011794.395	0.004	303884.459	0.007	166.653	0.012
8/27/2021	4011794.396	0.002	303884.459	0.005	166.655	0.012
8/28/2021	4011794.394	0.006	303884.457	0.002	166.657	0.014
8/29/2021	4011794.395	0.005	303884.459	0.006	166.645	0.019
8/30/2021	4011794.395	0.003	303884.456	0.003	166.643	0.03
8/31/2021	4011794.394	0.005	303884.455	0.006	166.649	0.012
9/1/2021	4011794.395	0.006	303884.457	0.004	166.65	0.011
9/2/2021	4011794.394	0.004	303884.458	0.004	166.653	0.019
9/3/2021	4011794.395	0.002	303884.462	0.01	166.652	0.006
9/4/2021	4011794.398	0.004	303884.455	0.004	166.66	0.016
9/5/2021	4011794.398	0.008	303884.454	0.005	166.644	0.009
9/6/2021	4011794.397	0.005	303884.454	0.005	166.655	0.021
9/7/2021	4011794.394	0.007	303884.454	0.005	166.654	0.012
9/8/2021	4011794.397	0.005	303884.453	0.003	166.642	0.005
9/9/2021	4011794.395	0.006	303884.456	0.008	166.648	0.005
9/10/2021	4011794.388	0.016	303884.448	0.017	166.649	0.012
9/11/2021	4011794.395	0.005	303884.456	0.004	166.657	0.019
9/12/2021	4011794.395	0.005	303884.457	0.005	166.657	0.014
9/13/2021	4011794.394	0.006	303884.457	0.007	166.661	0.007
9/14/2021	4011794.394	0.006	303884.456	0.003	166.651	0.01
9/15/2021	4011794.396	0.003	303884.459	0.011	166.661	0.024
9/16/2021	4011794.396	0.007	303884.456	0.006	166.648	0.012
9/17/2021	4011794.394	0.005	303884.458	0.006	166.66	0.019
9/18/2021	4011794.395	0.004	303884.455	0.007	166.655	0.018
9/19/2021	4011794.394	0.004	303884.457	0.003	166.661	0.02
9/20/2021	4011794.394	0.006	303884.456	0.006	166.659	0.009
9/21/2021	4011794.396	0.005	303884.456	0.002	166.663	0.019
9/22/2021	4011794.395	0.004	303884.457	0.008	166.657	0.02
9/23/2021	4011794.396	0.005	303884.456	0.008	166.653	0.019
9/24/2021	4011794.395	0.005	303884.456	0.006	166.657	0.02
9/25/2021	4011794.395	0.004	303884.455	0.007	166.655	0.013
9/26/2021	4011794.395	0.006	303884.456	0.004	166.656	0.018
9/27/2021	4011794.395	0.007	303884.455	0.006	166.655	0.009
9/28/2021	4011794.395	0.001	303884.459	0.004	166.655	0.008
9/29/2021	4011794.395	0.005	303884.456	0.007	166.649	0.01
9/30/2021	4011794.394	0.003	303884.459	0.019	166.657	0.004

10/1/2021	4011794.396	0.002	303884.455	0.006	166.658	0.014
10/2/2021	4011794.396	0.002	303884.459	0.012	166.642	0.024
10/3/2021	4011794.393	0.001	303884.458	0.007	166.654	0.015
10/4/2021	4011794.394	0.004	303884.455	0.007	166.657	0.021
10/5/2021	4011794.395	0.003	303884.454	0.007	166.659	0.022
10/6/2021	4011794.394	0.005	303884.455	0.005	166.644	0.016
10/7/2021	4011794.396	0.002	303884.458	0.006	166.651	0.001
10/8/2021	4011794.395	0.005	303884.454	0.006	166.654	0.005
10/9/2021	4011794.395	0.005	303884.456	0.004	166.656	0.018
10/10/2021	4011794.394	0.005	303884.46	0.01	166.655	0.018
10/11/2021	4011794.396	0.005	303884.457	0.009	166.661	0.008
10/12/2021	4011794.394	0.001	303884.458	0.008	166.656	0.01
10/13/2021	4011794.398	0.004	303884.452	0.009	166.653	0.022
10/14/2021	4011794.392	0.006	303884.453	0.005	166.662	0.01
10/15/2021	4011794.393	0.003	303884.454	0.006	166.647	0.007
10/16/2021	4011794.394	0.005	303884.456	0.006	166.65	0.01
10/17/2021	4011794.395	0.003	303884.457	0.009	166.656	0.013
10/18/2021	4011794.395	0.004	303884.454	0.006	166.651	0.01
10/19/2021	4011794.393	0.001	303884.456	0.007	166.657	0.012
10/20/2021	4011794.395	0.003	303884.457	0.007	166.659	0.013
10/21/2021	4011794.393	0.003	303884.456	0.008	166.659	0.016
10/22/2021	4011794.394	0.005	303884.454	0.007	166.652	0.006
10/23/2021	4011794.393	0.003	303884.456	0.009	166.651	0.013
10/24/2021	4011794.395	0.006	303884.454	0.006	166.656	0.003
10/25/2021	4011794.393	0.002	303884.457	0.009	166.66	0.021
10/26/2021	4011794.394	0.004	303884.453	0.007	166.653	0.019
10/27/2021	4011794.393	0.004	303884.456	0.009	166.655	0.007
10/28/2021	4011794.393	0.003	303884.457	0.009	166.654	0.008
10/29/2021	4011794.394	0.005	303884.453	0.008	166.655	0.014
10/30/2021	4011794.392	0.002	303884.457	0.01	166.655	0.013
10/31/2021	4011794.394	0.004	303884.455	0.01	166.657	0.022
11/1/2021	4011794.392	0.001	303884.455	0.009	166.657	0.017
11/2/2021	4011794.391	0	303884.456	0.011	166.658	0.018
11/3/2021	4011794.392	0.001	303884.456	0.01	166.657	0.023
11/4/2021	4011794.391	0.001	303884.456	0.011	166.659	0.017
11/5/2021	4011794.395	0.005	303884.454	0.011	166.656	0.016

11/6/2021	4011794.393	0.002	303884.457	0.011	166.659	0.016
11/7/2021	4011794.396	0.019	303884.455	0.01	166.658	0.019
11/8/2021	4011794.395	0.001	303884.457	0.009	166.659	0.017
11/9/2021	4011794.395	0.001	303884.456	0.007	166.656	0.025
11/10/2021	4011794.395	0.002	303884.456	0.008	166.661	0.024
11/11/2021	4011794.393	0.001	303884.456	0.011	166.66	0.011
11/12/2021	4011794.392	0.002	303884.456	0.01	166.658	0.013
11/13/2021	4011794.393	0.004	303884.456	0.011	166.659	0.015
11/14/2021	4011794.393	0.003	303884.453	0.01	166.655	0.015
11/15/2021	4011794.395	0.005	303884.452	0.01	166.656	0.015
11/16/2021	4011794.393	0.002	303884.455	0.009	166.662	0.019
11/17/2021	4011794.397	0.004	303884.454	0.007	166.656	0.014
11/18/2021	4011794.395	0.005	303884.454	0.006	166.649	0.009
11/19/2021	4011794.397	0.007	303884.454	0.006	166.651	0.004
11/20/2021	4011794.397	0.006	303884.453	0.009	166.657	0.01
11/21/2021	4011794.395	0.004	303884.453	0.006	166.646	0.005
11/22/2021	4011794.395	0.006	303884.454	0.006	166.646	0.005
11/23/2021	4011794.397	0.006	303884.453	0.006	166.651	0.006
11/24/2021	4011794.397	0.004	303884.453	0.006	166.649	0.011
11/25/2021	4011794.398	0.006	303884.455	0.005	166.647	0.006
11/26/2021	4011794.397	0.007	303884.453	0.005	166.649	0.005
11/27/2021	4011794.397	0.006	303884.452	0.006	166.649	0.006
11/28/2021	4011794.395	0.007	303884.453	0.005	166.647	0.003
11/29/2021	4011794.395	0.006	303884.453	0.005	166.65	0.008
11/30/2021	4011794.395	0.008	303884.453	0.008	166.649	0.006
12/1/2021	4011794.394	0.005	303884.452	0.009	166.655	0.017
12/2/2021	4011794.393	0.003	303884.455	0.012	166.658	0.014
12/3/2021	4011794.394	0	303884.456	0.011	166.657	0.017
12/4/2021	4011794.394	0.006	303884.454	0.007	166.659	0.011
12/5/2021	4011794.395	0.006	303884.452	0.008	166.655	0.014
12/6/2021	4011794.395	0.003	303884.452	0.009	166.65	0.012
12/7/2021	4011794.394	0.001	303884.455	0.015	166.657	0.012
12/8/2021	4011794.394	0.006	303884.451	0.009	166.652	0.01
12/9/2021	4011794.393	0.002	303884.454	0.01	166.657	0.01
12/10/2021	4011794.395	0.006	303884.45	0.01	166.652	0.01
12/11/2021	4011794.393	0.004	303884.455	0.014	166.658	0.017

12/12/2021	4011794.392	0.004	303884.454	0.013	166.657	0.008
12/13/2021	4011794.393	0.003	303884.455	0.011	166.658	0.014
12/14/2021	4011794.393	0.002	303884.453	0.01	166.66	0.012
12/15/2021	4011794.393	0.004	303884.451	0.011	166.655	0.011
12/16/2021	4011794.393	0.003	303884.456	0.009	166.655	0.014
12/17/2021	4011794.398	0.003	303884.452	0.01	166.653	0.026
12/18/2021	4011794.393	0.002	303884.453	0.012	166.653	0.018
12/19/2021	4011794.392	0.003	303884.454	0.013	166.653	0.01
12/20/2021	4011794.392	0.002	303884.452	0.014	166.656	0.013
12/21/2021	4011794.392	0.003	303884.453	0.013	166.653	0.012
12/22/2021	4011794.394	0.002	303884.454	0.014	166.654	0.01
12/23/2021	4011794.394	0.002	303884.454	0.012	166.657	0.01
12/24/2021	4011794.394	0.005	303884.45	0.01	166.65	0.006
12/25/2021	4011794.397	0.006	303884.451	0.007	166.654	0.012
12/26/2021	4011794.393	0.001	303884.452	0.008	166.656	0.008
12/27/2021	4011794.392	0.002	303884.455	0.01	166.657	0.008
12/28/2021	4011794.394	0.004	303884.451	0.008	166.662	0.013
12/29/2021	4011794.394	0.005	303884.451	0.012	166.655	0.013
12/30/2021	4011794.392	0.002	303884.453	0.01	166.658	0.014
12/31/2021	4011794.393	0.001	303884.452	0.011	166.656	0.016
1/1/2022	4011794.393	0.001	303884.455	0.014	166.659	0.017
1/2/2022	4011794.391	0.005	303884.454	0.015	166.656	0.016
1/3/2022	4011794.393	0.008	303884.45	0.009	166.651	0.013
1/4/2022	4011794.393	0.002	303884.453	0.012	166.658	0.018
1/5/2022	4011794.393	0.002	303884.452	0.013	166.657	0.015
1/6/2022	4011794.395	0.004	303884.451	0.015	166.655	0.015
1/7/2022	4011794.394	0.005	303884.45	0.015	166.655	0.017
1/8/2022	4011794.393	0.006	303884.449	0.011	166.658	0.017
1/9/2022	4011794.394	0.005	303884.45	0.008	166.658	0.013
1/10/2022	4011794.394	0.005	303884.45	0.011	166.658	0.019
1/11/2022	4011794.392	0.004	303884.451	0.011	166.656	0.015
1/12/2022	4011794.393	0.002	303884.451	0.011	166.657	0.011
1/13/2022	4011794.392	0.002	303884.452	0.011	166.659	0.015
1/14/2022	4011794.393	0	303884.451	0.011	166.658	0.015
1/15/2022	4011794.392	0.002	303884.451	0.014	166.658	0.019
1/16/2022	4011794.392	0.002	303884.451	0.016	166.656	0.014

1/17/2022	4011794.391	0.003	303884.452	0.013	166.659	0.018
1/18/2022	4011794.394	0.005	303884.45	0.011	166.656	0.016
1/19/2022	4011794.394	0.003	303884.45	0.011	166.658	0.018
1/20/2022	4011794.393	0.01	303884.449	0.007	166.653	0.011
1/21/2022	4011794.392	0.009	303884.449	0.011	166.651	0.015
1/22/2022	4011794.394	0.005	303884.45	0.014	166.655	0.018
1/23/2022	4011794.395	0.005	303884.45	0.014	166.657	0.016
1/24/2022	4011794.393	0.005	303884.448	0.009	166.649	0.011
1/25/2022	4011794.392	0.003	303884.452	0.012	166.656	0.016
1/26/2022	4011794.394	0.004	303884.449	0.013	166.656	0.018
1/27/2022	4011794.392	0.002	303884.45	0.012	166.655	0.014
1/28/2022	4011794.391	0.003	303884.451	0.014	166.657	0.017
1/29/2022	4011794.394	0.005	303884.45	0.014	166.657	0.017
1/30/2022	4011794.393	0.002	303884.452	0.012	166.656	0.018
1/31/2022	4011794.393	0.002	303884.451	0.012	166.656	0.015
2/1/2022	4011794.397	0.006	303884.45	0.009	166.656	0.012
2/2/2022	4011794.393	0.004	303884.449	0.013	166.655	0.018
2/3/2022	4011794.392	0.002	303884.451	0.015	166.656	0.018
2/4/2022	4011794.393	0.009	303884.446	0.007	166.649	0.012
2/5/2022	4011794.393	0.009	303884.446	0.008	166.654	0.012
2/6/2022	4011794.394	0.006	303884.449	0.015	166.656	0.018
2/7/2022	4011794.392	0.002	303884.451	0.014	166.654	0.011
2/8/2022	4011794.394	0.005	303884.449	0.012	166.656	0.019
2/9/2022	4011794.396	0.004	303884.45	0.01	166.655	0.019
2/10/2022	4011794.394	0.006	303884.448	0.009	166.647	0.009
2/11/2022	4011794.396	0.004	303884.448	0.012	166.652	0.016
2/12/2022	4011794.395	0.005	303884.451	0.012	166.654	0.019
2/13/2022	4011794.394	0.007	303884.449	0.008	166.648	0.01
2/14/2022	4011794.396	0.006	303884.449	0.009	166.648	0.012
2/15/2022	4011794.396	0.004	303884.449	0.009	166.654	0.021
2/16/2022	4011794.394	0.004	303884.448	0.008	166.648	0.016
2/17/2022	4011794.393	0.005	303884.449	0.008	166.651	0.01
2/18/2022	4011794.392	0.008	303884.448	0.01	166.646	0.015
2/19/2022	4011794.394	0.007	303884.447	0.009	166.646	0.01
2/20/2022	4011794.394	0.005	303884.449	0.008	166.655	0.017
2/21/2022	4011794.394	0.006	303884.45	0.008	166.655	0.02

2/22/2022	4011794.394	0.003	303884.45	0.011	166.655	0.014
2/23/2022	4011794.394	0.005	303884.45	0.015	166.657	0.02
2/24/2022	4011794.394	0.008	303884.448	0.008	166.643	0.011
2/25/2022	4011794.393	0.009	303884.446	0.01	166.649	0.019
2/26/2022	4011794.391	0.003	303884.449	0.014	166.657	0.018
2/27/2022	4011794.393	0.007	303884.447	0.009	166.648	0.011
2/28/2022	4011794.394	0.006	303884.447	0.009	166.65	0.013
3/1/2022	4011794.396	0.006	303884.448	0.01	166.655	0.018
3/2/2022	4011794.394	0.001	303884.45	0.01	166.654	0.018
3/3/2022	4011794.395	0.005	303884.45	0.009	166.653	0.018
3/4/2022	4011794.396	0.006	303884.449	0.009	166.645	0.014
3/5/2022	4011794.392	0.003	303884.449	0.01	166.653	0.007
3/6/2022	4011794.393	0.009	303884.449	0.008	166.659	0.03
3/7/2022	4011794.393	0.006	303884.449	0.008	166.65	0.007
3/8/2022	4011794.394	0.006	303884.448	0.009	166.648	0.006
3/9/2022	4011794.393	0.005	303884.449	0.013	166.654	0.018
3/10/2022	4011794.392	0.002	303884.451	0.011	166.654	0.012
3/11/2022	4011794.394	0.007	303884.448	0.008	166.648	0.013
3/12/2022	4011794.393	0.004	303884.449	0.015	166.655	0.016
3/13/2022	4011794.394	0.003	303884.449	0.01	166.655	0.015
3/14/2022	4011794.393	0.003	303884.452	0.01	166.656	0.016
3/15/2022	4011794.394	0.005	303884.448	0.007	166.656	0.02
3/16/2022	4011794.394	0.006	303884.449	0.009	166.646	0.01
3/17/2022	4011794.393	0	303884.453	0.007	166.655	0.021
3/18/2022	4011794.392	0.001	303884.452	0.011	166.654	0.015
3/19/2022	4011794.394	0.007	303884.448	0.008	166.651	0.009
3/20/2022	4011794.396	0.004	303884.449	0.009	166.648	0.01
3/21/2022	4011794.393	0.001	303884.45	0.009	166.652	0.022
3/22/2022	4011794.392	0.002	303884.45	0.009	166.658	0.012
3/23/2022	4011794.392	0.002	303884.451	0.012	166.655	0.018
3/24/2022	4011794.394	0.005	303884.449	0.01	166.655	0.018
3/25/2022	4011794.397	0.005	303884.45	0.01	166.654	0.02
3/26/2022	4011794.394	0.004	303884.45	0.009	166.655	0.019
3/27/2022	4011794.396	0.003	303884.449	0.01	166.654	0.019
3/28/2022	4011794.396	0.005	303884.449	0.008	166.648	0.012
3/29/2022	4011794.393	0.005	303884.449	0.008	166.653	0.01

3/30/2022	4011794.393	0.003	303884.451	0.01	166.647	0.029
3/31/2022	4011794.389	0.002	303884.447	0.009	166.667	0.028
4/1/2022	4011794.39	0.008	303884.452	0.01	166.662	0.049
4/2/2022	4011794.392	0.008	303884.447	0.012	166.669	0.041
4/3/2022	4011794.389	0.006	303884.451	0.008	166.649	0.006
4/4/2022	4011794.389	0.008	303884.449	0.007	166.615	0.022
4/5/2022	4011794.391	0.004	303884.45	0.013	166.634	0.017
4/6/2022	4011794.392	0.002	303884.452	0.006	166.649	0.017
4/7/2022	4011794.395	0.005	303884.45	0.007	166.644	0.007
4/8/2022	4011794.394	0.005	303884.45	0.009	166.65	0.018
4/9/2022	4011794.394	0.005	303884.448	0.004	166.643	0.014
4/10/2022	4011794.391	0.001	303884.451	0.01	166.656	0.012
4/11/2022	4011794.395	0.008	303884.452	0.006	166.647	0.004
4/12/2022	4011794.394	0.01	303884.45	0.005	166.655	0.024
4/13/2022	4011794.394	0.008	303884.451	0.008	166.65	0.014
4/14/2022	4011794.394	0.006	303884.45	0.008	166.643	0.014
4/15/2022	4011794.396	0.004	303884.45	0.008	166.655	0.021
4/16/2022	4011794.396	0.006	303884.45	0.012	166.655	0.037
4/17/2022	4011794.393	0.006	303884.45	0.007	166.658	0.022
4/18/2022	4011794.394	0.005	303884.45	0.007	166.653	0.017
4/19/2022	4011794.393	0.002	303884.452	0.01	166.656	0.019
4/20/2022	4011794.393	0.005	303884.454	0.009	166.647	0.016
4/21/2022	4011794.396	0.005	303884.45	0.008	166.644	0.006
4/22/2022	4011794.393	0.004	303884.453	0.009	166.652	0.013
4/23/2022	4011794.394	0.007	303884.451	0.004	166.655	0.013
4/24/2022	4011794.394	0.006	303884.45	0.007	166.657	0.028
4/25/2022	4011794.395	0.005	303884.45	0.008	166.657	0.023
4/26/2022	4011794.393	0.006	303884.45	0.01	166.658	0.01
4/27/2022	4011794.394	0.008	303884.45	0.012	166.66	0.015
4/28/2022	4011794.392	0	303884.45	0.008	166.653	0.019
4/29/2022	4011794.393	0.001	303884.451	0.009	166.653	0.02
4/30/2022	4011794.393	0.003	303884.452	0.005	166.652	0.029
5/1/2022	4011794.395	0.006	303884.452	0.008	166.647	0.01
5/2/2022	4011794.392	0.002	303884.454	0.009	166.658	0.023
5/3/2022	4011794.393	0.004	303884.45	0.008	166.658	0.01
5/4/2022	4011794.394	0.004	303884.451	0.009	166.652	0.023

5/5/2022	4011794.397	0.005	303884.449	0.011	166.656	0.017
5/6/2022	4011794.392	0.002	303884.451	0.009	166.656	0.02
5/7/2022	4011794.393	0.002	303884.452	0.008	166.656	0.022
5/8/2022	4011794.39	0.005	303884.453	0.006	166.657	0.029
5/9/2022	4011794.392	0.003	303884.451	0.007	166.664	0.04
5/10/2022	4011794.393	0.006	303884.451	0.003	166.655	0.022
5/11/2022	4011794.393	0.003	303884.453	0.008	166.66	0.018
5/12/2022	4011794.394	0	303884.454	0.01	166.644	0.015
5/13/2022	4011794.39	0.004	303884.454	0.011	166.657	0.021
5/14/2022	4011794.391	0.002	303884.45	0.005	166.652	0.02
5/15/2022	4011794.392	0.004	303884.457	0.021	166.661	0.012
5/16/2022	4011794.391	0.003	303884.451	0.007	166.653	0.026
5/17/2022	4011794.393	0.003	303884.455	0.01	166.656	0.018
5/18/2022	4011794.393	0.007	303884.454	0.011	166.648	0.015
5/19/2022	4011794.395	0.006	303884.456	0.008	166.657	0.017
5/20/2022	4011794.393	0.005	303884.456	0.009	166.657	0.03
5/21/2022	4011794.398	0.004	303884.452	0.005	166.643	0.022
5/22/2022	4011794.4	0.003	303884.472	0.002	166.717	0.01
5/23/2022	4011794.401	0.002	303884.472	0.002	166.721	0.009
5/24/2022	4011794.401	0.002	303884.471	0.002	166.72	0.009
5/25/2022	4011794.401	0.002	303884.471	0.002	166.722	0.009
5/26/2022	4011794.401	0.002	303884.471	0.002	166.72	0.009
5/27/2022	4011794.399	0.002	303884.471	0.002	166.72	0.009
5/28/2022	4011794.398	0.002	303884.472	0.002	166.735	0.009
5/29/2022	4011794.4	0.002	303884.472	0.002	166.729	0.009
5/30/2022	4011794.4	0.002	303884.473	0.002	166.732	0.009
5/31/2022	4011794.4	0.002	303884.473	0.002	166.73	0.009
6/1/2022	4011794.401	0.002	303884.47	0.002	166.728	0.009
6/2/2022	4011794.401	0.002	303884.471	0.002	166.727	0.009
6/3/2022	4011794.4	0.002	303884.472	0.002	166.727	0.009
6/4/2022	4011794.398	0.002	303884.472	0.002	166.727	0.009
6/5/2022	4011794.401	0.002	303884.473	0.002	166.728	0.009
6/6/2022	4011794.4	0.002	303884.471	0.002	166.729	0.009
6/7/2022	4011794.399	0.002	303884.471	0.002	166.725	0.009
6/8/2022	4011794.4	0.002	303884.471	0.002	166.73	0.009
6/9/2022	4011794.4	0.002	303884.471	0.002	166.725	0.009

6/10/2022	4011794.401	0.002	303884.471	0.002	166.731	0.009
6/11/2022	4011794.399	0.002	303884.472	0.002	166.729	0.009
6/12/2022	4011794.399	0.002	303884.474	0.002	166.73	0.009
6/13/2022	4011794.4	0.002	303884.474	0.002	166.732	0.009
6/14/2022	4011794.399	0.002	303884.473	0.002	166.728	0.009
6/15/2022	4011794.4	0.002	303884.474	0.002	166.733	0.009
6/16/2022	4011794.399	0.002	303884.474	0.002	166.733	0.009
6/17/2022	4011794.398	0.002	303884.472	0.002	166.733	0.009
6/18/2022	4011794.399	0.002	303884.474	0.002	166.728	0.009
6/19/2022	4011794.399	0.002	303884.474	0.002	166.734	0.009
6/20/2022	4011794.4	0.002	303884.473	0.002	166.727	0.009
6/21/2022	4011794.4	0.002	303884.471	0.002	166.727	0.009
6/22/2022	4011794.4	0.002	303884.473	0.002	166.722	0.009
6/23/2022	4011794.4	0.002	303884.472	0.002	166.727	0.009
6/24/2022	4011794.398	0.002	303884.474	0.002	166.727	0.009
6/25/2022	4011794.399	0.002	303884.474	0.002	166.73	0.009
6/26/2022	4011794.4	0.002	303884.473	0.002	166.73	0.009
6/27/2022	4011794.401	0.002	303884.473	0.002	166.728	0.009
6/28/2022	4011794.4	0.002	303884.472	0.002	166.728	0.009
6/29/2022	4011794.402	0.002	303884.474	0.002	166.73	0.009
6/30/2022	4011794.399	0.003	303884.472	0.002	166.732	0.01
7/1/2022	4011794.399	0.003	303884.473	0.003	166.731	0.011
7/2/2022	4011794.4	0.003	303884.472	0.003	166.732	0.011
7/3/2022	4011794.4	0.003	303884.472	0.002	166.734	0.011
7/4/2022	4011794.4	0.003	303884.473	0.002	166.722	0.011
7/5/2022	4011794.399	0.003	303884.475	0.003	166.733	0.011
7/6/2022	4011794.4	0.003	303884.472	0.003	166.729	0.011
7/7/2022	4011794.401	0.003	303884.473	0.003	166.732	0.011
7/8/2022	4011794.401	0.003	303884.473	0.003	166.732	0.011
7/9/2022	4011794.398	0.003	303884.474	0.003	166.725	0.011
7/10/2022	4011794.4	0.003	303884.471	0.003	166.733	0.011
7/11/2022	4011794.398	0.003	303884.472	0.003	166.739	0.011
7/12/2022	4011794.401	0.003	303884.474	0.002	166.735	0.011
7/13/2022	4011794.399	0.002	303884.475	0.002	166.726	0.01
7/14/2022	4011794.4	0.002	303884.474	0.002	166.731	0.009
7/15/2022	4011794.4	0.002	303884.474	0.002	166.739	0.009

7/16/2022	4011794.396	0.002	303884.477	0.002	166.74	0.009
7/17/2022	4011794.394	0.002	303884.478	0.002	166.742	0.009
7/18/2022	4011794.395	0.002	303884.478	0.002	166.736	0.009
7/19/2022	4011794.394	0.002	303884.48	0.002	166.737	0.009
7/20/2022	4011794.395	0.002	303884.479	0.002	166.741	0.009
7/21/2022	4011794.398	0.002	303884.478	0.002	166.736	0.01
7/22/2022	4011794.398	0.003	303884.474	0.003	166.743	0.012
7/23/2022	4011794.4	0.003	303884.478	0.003	166.735	0.012
7/24/2022	4011794.398	0.003	303884.478	0.003	166.739	0.012
7/25/2022	4011794.401	0.003	303884.477	0.003	166.724	0.012
7/26/2022	4011794.398	0.002	303884.48	0.002	166.741	0.01
7/27/2022	4011794.397	0.002	303884.475	0.002	166.74	0.01
7/28/2022	4011794.397	0.003	303884.473	0.003	166.741	0.012
7/29/2022	4011794.397	0.003	303884.476	0.003	166.733	0.012
7/30/2022	4011794.395	0.003	303884.472	0.003	166.739	0.012
7/31/2022	4011794.395	0.003	303884.473	0.003	166.732	0.012
8/1/2022	4011794.398	0.002	303884.474	0.003	166.74	0.01
8/2/2022	4011794.396	0.002	303884.478	0.002	166.732	0.009
8/3/2022	4011794.398	0.002	303884.477	0.002	166.739	0.01
8/4/2022	4011794.4	0.003	303884.48	0.004	166.735	0.015
8/5/2022	4011794.4	0.003	303884.477	0.004	166.737	0.015
8/6/2022	4011794.4	0.003	303884.479	0.004	166.734	0.016
8/7/2022	4011794.402	0.003	303884.479	0.004	166.73	0.016
8/8/2022	4011794.402	0.003	303884.477	0.004	166.738	0.016
8/9/2022	4011794.398	0.003	303884.479	0.004	166.726	0.016
8/10/2022	4011794.4	0.003	303884.476	0.003	166.729	0.011
8/11/2022	4011794.399	0.002	303884.475	0.002	166.731	0.009
8/12/2022	4011794.398	0.002	303884.476	0.002	166.736	0.009
8/13/2022	4011794.398	0.002	303884.475	0.002	166.736	0.009
8/14/2022	4011794.398	0.002	303884.475	0.002	166.734	0.009
8/15/2022	4011794.4	0.002	303884.476	0.002	166.733	0.009
8/16/2022	4011794.395	0.002	303884.476	0.002	166.738	0.009
8/17/2022	4011794.4	0.002	303884.475	0.002	166.728	0.009
8/18/2022	4011794.399	0.002	303884.475	0.002	166.735	0.009
8/19/2022	4011794.398	0.002	303884.475	0.002	166.73	0.009
8/20/2022	4011794.398	0.002	303884.476	0.002	166.739	0.009

8/21/2022	4011794.399	0.002	303884.474	0.002	166.742	0.009
8/22/2022	4011794.399	0.002	303884.475	0.002	166.731	0.009
8/23/2022	4011794.399	0.002	303884.474	0.002	166.736	0.009
8/24/2022	4011794.399	0.002	303884.474	0.002	166.733	0.009
8/25/2022	4011794.399	0.002	303884.475	0.002	166.734	0.009
8/26/2022	4011794.398	0.002	303884.477	0.002	166.737	0.009
8/27/2022	4011794.397	0.002	303884.476	0.002	166.735	0.009
8/28/2022	4011794.397	0.002	303884.477	0.002	166.74	0.009
8/29/2022	4011794.397	0.002	303884.476	0.002	166.736	0.009
8/30/2022	4011794.397	0.002	303884.476	0.002	166.732	0.009
8/31/2022	4011794.397	0.002	303884.476	0.002	166.725	0.009
9/1/2022	4011794.397	0.002	303884.476	0.002	166.736	0.009
9/2/2022	4011794.399	0.002	303884.475	0.002	166.731	0.009
9/3/2022	4011794.398	0.002	303884.474	0.002	166.731	0.009
9/4/2022	4011794.398	0.002	303884.476	0.002	166.728	0.009
9/5/2022	4011794.396	0.002	303884.476	0.002	166.739	0.009
9/6/2022	4011794.398	0.002	303884.476	0.002	166.728	0.009
9/7/2022	4011794.399	0.002	303884.475	0.002	166.731	0.009
9/8/2022	4011794.4	0.002	303884.474	0.002	166.734	0.009
9/9/2022	4011794.399	0.002	303884.476	0.002	166.738	0.009
9/10/2022	4011794.399	0.002	303884.478	0.002	166.729	0.009
9/11/2022	4011794.398	0.002	303884.475	0.002	166.733	0.009
9/12/2022	4011794.399	0.002	303884.475	0.002	166.735	0.009
9/13/2022	4011794.398	0.002	303884.475	0.002	166.734	0.009
9/14/2022	4011794.4	0.002	303884.475	0.002	166.734	0.009
9/15/2022	4011794.399	0.002	303884.475	0.002	166.732	0.009
9/16/2022	4011794.4	0.002	303884.474	0.002	166.727	0.009
9/17/2022	4011794.399	0.002	303884.477	0.002	166.734	0.009
9/18/2022	4011794.4	0.002	303884.475	0.002	166.732	0.009
9/19/2022	4011794.401	0.002	303884.474	0.002	166.735	0.009
9/20/2022	4011794.399	0.002	303884.476	0.002	166.738	0.009
9/21/2022	4011794.399	0.002	303884.474	0.002	166.737	0.009
9/22/2022	4011794.4	0.002	303884.476	0.002	166.733	0.009
9/23/2022	4011794.398	0.002	303884.476	0.002	166.735	0.009
9/24/2022	4011794.399	0.002	303884.475	0.002	166.736	0.009
9/25/2022	4011794.398	0.002	303884.476	0.002	166.74	0.009

9/26/2022	4011794.399	0.002	303884.475	0.002	166.734	0.009
9/27/2022	4011794.399	0.002	303884.475	0.002	166.732	0.009
9/28/2022	4011794.399	0.002	303884.475	0.002	166.729	0.009
9/29/2022	4011794.399	0.002	303884.474	0.002	166.729	0.009
9/30/2022	4011794.4	0.002	303884.474	0.002	166.732	0.009
10/1/2022	4011794.399	0.002	303884.475	0.002	166.73	0.009
10/2/2022	4011794.4	0.002	303884.474	0.002	166.73	0.009
10/3/2022	4011794.4	0.002	303884.474	0.002	166.732	0.009
10/4/2022	4011794.401	0.002	303884.474	0.002	166.731	0.009
10/5/2022	4011794.4	0.002	303884.473	0.002	166.732	0.009
10/6/2022	4011794.399	0.002	303884.473	0.002	166.732	0.009
10/7/2022	4011794.399	0.002	303884.475	0.002	166.729	0.009
10/8/2022	4011794.398	0.002	303884.474	0.002	166.729	0.009
10/9/2022	4011794.4	0.002	303884.474	0.002	166.733	0.009
10/10/2022	4011794.398	0.002	303884.474	0.002	166.731	0.009
10/11/2022	4011794.398	0.002	303884.474	0.002	166.738	0.009
10/12/2022	4011794.398	0.002	303884.475	0.002	166.739	0.009
10/13/2022	4011794.399	0.003	303884.473	0.003	166.735	0.01

5. GNSS Station Raw Data: KER4

			<u>KER4</u>			-
	<u>Northing</u>		<u>Easting</u>		<u>Elev.</u>	
	<u>Mean(m)</u>		<u>Mean(m)</u>		<u>Mean(m)</u>	-
	4011823.649		303885.3963		166.6525553	
<u>Date</u>		<u>Peak to</u>		<u>Peak to</u>		<u>Peak to</u>
	<u>Northing(m)</u>	<u>Peak</u>		<u>Peak</u>		<u>Peak</u>
		<u>Error</u>		<u>Error</u>		<u>Error</u>
		<u>(m)</u>	<u>Easting(m)</u>	<u>(m)</u>	<u>Elevation(m)</u>	<u>(m)</u>
4/22/2021	4011823.648	0.006	303885.384	0.008	166.636	0.019
4/23/2021	4011823.649	0.005	303885.386	0.009	166.634	0.019
4/24/2021	4011823.646	0.001	303885.388	0.007	166.632	0.021
4/25/2021	4011823.646	0.002	303885.387	0.007	166.64	0.019
4/26/2021	4011823.647	0.004	303885.387	0.004	166.636	0.023
4/27/2021	4011823.649	0.002	303885.39	0.007	166.638	0.026

4/28/2021	4011823.648	0.003	303885.387	0.007	166.629	0.006
4/29/2021	4011823.648	0.004	303885.389	0.004	166.636	0.021
4/30/2021	4011823.648	0.002	303885.389	0.009	166.634	0.025
5/1/2021	4011823.648	0.006	303885.386	0.006	166.642	0.026
5/2/2021	4011823.647	0.003	303885.38	0.006	166.634	0.022
5/3/2021	4011823.648	0	303885.389	0.008	166.638	0.022
5/4/2021	4011823.646	0.005	303885.387	0.006	166.632	0.017
5/5/2021	4011823.647	0.002	303885.389	0.009	166.633	0.019
5/6/2021	4011823.647	0.002	303885.39	0.009	166.636	0.015
5/7/2021	4011823.649	0.003	303885.388	0.005	166.64	0.024
5/8/2021	4011823.647	0.001	303885.39	0.006	166.637	0.018
5/9/2021	4011823.645	0.001	303885.389	0.009	166.636	0.014
5/10/2021	4011823.648	0.005	303885.388	0.007	166.626	0.011
5/11/2021	4011823.648	0.003	303885.389	0.009	166.636	0.022
5/12/2021	4011823.649	0.004	303885.388	0.007	166.639	0.026
5/13/2021	4011823.649	0.005	303885.389	0.007	166.635	0.02
5/14/2021	4011823.648	0.006	303885.389	0.009	166.631	0.007
5/15/2021						
5/16/2021						
5/17/2021						
5/18/2021						
5/19/2021						
5/20/2021	4011823.644	0.009	303885.39	0.007	166.64	0.018
5/21/2021	4011823.648	0.006	303885.388	0.007	166.636	0.021
5/22/2021	4011823.649	0.007	303885.389	0.008	166.623	0.009
5/23/2021	4011823.646	0.002	303885.391	0.009	166.643	0.022
5/24/2021	4011823.648	0.002	303885.388	0.008	166.631	0.019
5/25/2021	4011823.647	0.002	303885.392	0.008	166.638	0.028
5/26/2021	4011823.648	0.003	303885.39	0.003	166.636	0.012
5/27/2021	4011823.649	0.005	303885.392	0.01	166.622	0.012
5/28/2021	4011823.648	0.003	303885.389	0.006	166.638	0.021
5/29/2021	4011823.648	0.004	303885.388	0.005	166.632	0.021
5/30/2021	4011823.648	0.003	303885.391	0.007	166.633	0.019
5/31/2021	4011823.647	0.005	303885.388	0.006	166.638	0.029
6/1/2021	4011823.648	0.004	303885.39	0.006	166.636	0.017
6/2/2021	4011823.647	0.006	303885.39	0.006	166.634	0.018

6/3/2021	4011823.647	0.001	303885.393	0.008	166.627	0.023
6/4/2021	4011823.648	0.003	303885.389	0.005	166.631	0.011
6/5/2021	4011823.647	0.004	303885.389	0.005	166.639	0.014
6/6/2021	4011823.648	0.005	303885.39	0.004	166.636	0.016
6/7/2021	4011823.649	0.002	303885.39	0.007	166.631	0.028
6/8/2021	4011823.65	0.002	303885.393	0.006	166.635	0.029
6/9/2021	4011823.647	0.008	303885.388	0.005	166.63	0.015
6/10/2021	4011823.648	0.002	303885.391	0.01	166.627	0.004
6/11/2021	4011823.648	0.003	303885.389	0.003	166.63	0.023
6/12/2021	4011823.648	0.005	303885.388	0.006	166.633	0.029
6/13/2021	4011823.648	0.004	303885.391	0.003	166.633	0.02
6/14/2021	4011823.649	0.003	303885.39	0.002	166.629	0.019
6/15/2021	4011823.646	0.004	303885.389	0.008	166.629	0.027
6/16/2021	4011823.649	0.005	303885.391	0.002	166.625	0.012
6/17/2021	4011823.648	0.006	303885.39	0.002	166.63	0.018
6/18/2021	4011823.648	0.004	303885.391	0.003	166.633	0.008
6/19/2021	4011823.647	0.004	303885.391	0.004	166.624	0.019
6/20/2021	4011823.649	0.005	303885.393	0.008	166.635	0.009
6/21/2021	4011823.648	0.005	303885.391	0.002	166.614	0.012
6/22/2021	4011823.647	0.004	303885.393	0.005	166.628	0.015
6/23/2021	4011823.647	0.001	303885.393	0.008	166.629	0.022
6/24/2021	4011823.648	0.005	303885.395	0.009	166.629	0.014
6/25/2021	4011823.647	0.006	303885.393	0.002	166.628	0.019
6/26/2021	4011823.645	0.005	303885.394	0.005	166.639	0.019
6/27/2021	4011823.643	0.009	303885.399	0.009	166.628	0.007
6/28/2021	4011823.648	0.008	303885.393	0.004	166.621	0.008
6/29/2021	4011823.649	0.004	303885.39	0.005	166.615	0.012
6/30/2021	4011823.649	0.003	303885.396	0.008	166.629	0.016
7/1/2021	4011823.648	0.004	303885.392	0.007	166.634	0.027
7/2/2021	4011823.649	0.004	303885.393	0.007	166.621	0.016
7/3/2021	4011823.647	0.006	303885.391	0.006	166.634	0.027
7/4/2021	4011823.647	0.006	303885.389	0.003	166.639	0.029
7/5/2021	4011823.648	0.003	303885.394	0.008	166.626	0.009
7/6/2021	4011823.65	0.004	303885.393	0.009	166.621	0.013
7/7/2021	4011823.649	0.003	303885.398	0.009	166.628	0.022
7/8/2021	4011823.646	0.001	303885.394	0.003	166.628	0.022

7/9/2021	4011823.646	0.006	303885.392	0.003	166.621	0.016
7/10/2021	4011823.648	0.004	303885.392	0.004	166.635	0.028
7/11/2021	4011823.647	0.002	303885.391	0.004	166.633	0.011
7/12/2021	4011823.648	0.002	303885.395	0.01	166.632	0.02
7/13/2021	4011823.648	0.002	303885.394	0.009	166.63	0.018
7/14/2021	4011823.648	0.006	303885.393	0.003	166.633	0.019
7/15/2021	4011823.647	0.005	303885.393	0.002	166.629	0.022
7/16/2021	4011823.649	0.002	303885.396	0.009	166.626	0.015
7/17/2021	4011823.654	0.006	303885.389	0.007	166.654	0.019
7/18/2021	4011823.646	0.003	303885.394	0.002	166.656	0.049
7/19/2021	4011823.648	0.003	303885.393	0.004	166.624	0.018
7/20/2021	4011823.652	0.005	303885.393	0.001	166.632	0.006
7/21/2021	4011823.65	0.005	303885.393	0.008	166.626	0.011
7/22/2021	4011823.65	0.003	303885.393	0.005	166.621	0.026
7/23/2021	4011823.649	0.003	303885.397	0.014	166.624	0.008
7/24/2021	4011823.649	0.003	303885.393	0.001	166.631	0.008
7/25/2021	4011823.647	0.015	303885.394	0.021	166.638	0.016
7/26/2021	4011823.647	0.011	303885.393	0.02	166.621	0.012
7/27/2021	4011823.65	0.009	303885.39	0.01	166.632	0.014
7/28/2021	4011823.653	0.006	303885.397	0.004	166.629	0.015
7/29/2021	4011823.649	0.002	303885.396	0	166.623	0.01
7/30/2021	4011823.649	0.002	303885.392	0	166.63	0.01
7/31/2021	4011823.648	0.005	303885.398	0.004	166.634	0.013
8/1/2021	4011823.648	0.007	303885.393	0.003	166.645	0.009
8/2/2021	4011823.649	0.003	303885.392	0.004	166.637	0.013
8/3/2021	4011823.648	0.005	303885.395	0.009	166.621	0.004
8/4/2021	4011823.649	0.005	303885.393	0.005	166.617	0.012
8/5/2021	4011823.648	0.007	303885.395	0.005	166.632	0.005
8/6/2021	4011823.648	0.006	303885.393	0.003	166.636	0.014
8/7/2021	4011823.647	0.005	303885.394	0.002	166.635	0.011
8/8/2021	4011823.645	0.005	303885.395	0.001	166.626	0.039
8/9/2021	4011823.646	0.002	303885.398	0.012	166.632	0.017
8/10/2021	4011823.649	0.003	303885.394	0.001	166.635	0.013
8/11/2021	4011823.647	0.004	303885.393	0.001	166.633	0.012
8/12/2021	4011823.648	0.005	303885.393	0.002	166.635	0.011
8/13/2021	4011823.646	0.002	303885.392	0.008	166.643	0.02

8/14/2021	4011823.648	0.004	303885.395	0.009	166.635	0.022
8/15/2021	4011823.649	0.005	303885.394	0.005	166.642	0.014
8/16/2021	4011823.643	0.009	303885.394	0.001	166.636	0.012
8/17/2021	4011823.647	0.009	303885.393	0.01	166.632	0.034
8/18/2021	4011823.65	0.011	303885.399	0.01	166.627	0.007
8/19/2021	4011823.649	0.004	303885.394	0.006	166.646	0.017
8/20/2021	4011823.647	0.004	303885.399	0.015	166.632	0.02
8/21/2021	4011823.649	0.003	303885.393	0.011	166.623	0.01
8/22/2021	4011823.649	0.007	303885.393	0.005	166.635	0.02
8/23/2021	4011823.647	0.004	303885.393	0.003	166.634	0.014
8/24/2021	4011823.647	0.006	303885.395	0.003	166.64	0.011
8/25/2021	4011823.647	0.005	303885.393	0.002	166.636	0.005
8/26/2021	4011823.648	0.008	303885.398	0.007	166.628	0.015
8/27/2021	4011823.649	0.005	303885.396	0.005	166.631	0.014
8/28/2021	4011823.646	0.006	303885.395	0.001	166.636	0.019
8/29/2021	4011823.648	0.008	303885.393	0.004	166.624	0.016
8/30/2021	4011823.647	0.001	303885.396	0.007	166.614	0.011
8/31/2021	4011823.647	0.003	303885.396	0.005	166.635	0.022
9/1/2021	4011823.648	0.006	303885.396	0.001	166.625	0.004
9/2/2021	4011823.648	0.006	303885.394	0.002	166.634	0.017
9/3/2021	4011823.647	0.001	303885.4	0.01	166.633	0.003
9/4/2021	4011823.648	0.007	303885.395	0.003	166.64	0.021
9/5/2021	4011823.65	0.008	303885.393	0.004	166.625	0.014
9/6/2021	4011823.649	0.005	303885.392	0.004	166.636	0.019
9/7/2021	4011823.647	0.007	303885.393	0.005	166.636	0.015
9/8/2021	4011823.647	0.001	303885.394	0.008	166.628	0.007
9/9/2021	4011823.648	0.006	303885.394	0.007	166.627	0.007
9/10/2021	4011823.648	0.005	303885.393	0.001	166.63	0.005
9/11/2021	4011823.647	0.004	303885.393	0.003	166.637	0.013
9/12/2021	4011823.648	0.005	303885.395	0.004	166.638	0.014
9/13/2021	4011823.647	0.005	303885.394	0.005	166.639	0.007
9/14/2021	4011823.648	0.007	303885.395	0.002	166.631	0.008
9/15/2021	4011823.649	0.004	303885.394	0.004	166.647	0.02
9/16/2021	4011823.649	0.006	303885.394	0.005	166.628	0.013
9/17/2021	4011823.646	0.006	303885.395	0.007	166.638	0.027
9/18/2021	4011823.647	0.002	303885.393	0.004	166.634	0.012

9/19/2021	4011823.649	0.007	303885.396	0.002	166.64	0.017
9/20/2021	4011823.646	0.006	303885.393	0.005	166.639	0.009
9/21/2021	4011823.648	0.006	303885.394	0.003	166.638	0.022
9/22/2021	4011823.649	0.005	303885.394	0.007	166.635	0.016
9/23/2021	4011823.649	0.005	303885.394	0.007	166.632	0.018
9/24/2021	4011823.649	0.005	303885.393	0.006	166.637	0.022
9/25/2021	4011823.648	0.006	303885.393	0.006	166.633	0.018
9/26/2021	4011823.648	0.006	303885.393	0.004	166.636	0.015
9/27/2021	4011823.647	0.007	303885.393	0.004	166.636	0.012
9/28/2021	4011823.648	0.003	303885.396	0.008	166.641	0.016
9/29/2021	4011823.649	0.006	303885.393	0.008	166.627	0.003
9/30/2021	4011823.648	0.004	303885.394	0.013	166.633	0.012
10/1/2021	4011823.649	0.002	303885.393	0.006	166.635	0.014
10/2/2021	4011823.65	0.004	303885.397	0.013	166.625	0.028
10/3/2021	4011823.647	0.001	303885.394	0.008	166.634	0.011
10/4/2021	4011823.647	0.006	303885.393	0.006	166.638	0.014
10/5/2021	4011823.647	0.002	303885.395	0.009	166.638	0.016
10/6/2021	4011823.648	0.006	303885.393	0.007	166.635	0.025
10/7/2021	4011823.65	0.006	303885.396	0.006	166.632	0.002
10/8/2021	4011823.647	0.004	303885.393	0.005	166.632	0.006
10/9/2021	4011823.647	0.005	303885.397	0.008	166.637	0.016
10/10/2021	4011823.649	0.006	303885.397	0.004	166.635	0.009
10/11/2021	4011823.648	0.004	303885.396	0.003	166.631	0.003
10/12/2021	4011823.647	0.002	303885.397	0.009	166.635	0.01
10/13/2021	4011823.649	0.004	303885.393	0.014	166.624	0.003
10/14/2021	4011823.646	0.006	303885.392	0.004	166.649	0.015
10/15/2021	4011823.647	0.003	303885.395	0.008	166.629	0.009
10/16/2021	4011823.648	0.005	303885.393	0.008	166.636	0.019
10/17/2021	4011823.648	0.004	303885.393	0.009	166.638	0.012
10/18/2021	4011823.648	0.005	303885.393	0.006	166.63	0.008
10/19/2021	4011823.647	0.001	303885.393	0.007	166.637	0.015
10/20/2021	4011823.649	0.004	303885.392	0.004	166.636	0.011
10/21/2021	4011823.646	0.003	303885.395	0.007	166.636	0.01
10/22/2021	4011823.648	0.005	303885.391	0.008	166.628	0.005
10/23/2021	4011823.647	0.003	303885.394	0.01	166.629	0.009
10/24/2021	4011823.648	0.005	303885.392	0.007	166.634	0.009

10/25/2021	4011823.647	0.002	303885.393	0.009	166.636	0.016
10/26/2021	4011823.648	0.004	303885.392	0.007	166.631	0.007
10/27/2021	4011823.647	0.006	303885.392	0.01	166.637	0.007
10/28/2021	4011823.648	0.003	303885.393	0.008	166.633	0.012
10/29/2021	4011823.646	0.002	303885.392	0.009	166.634	0.014
10/30/2021	4011823.647	0.001	303885.393	0.01	166.629	0.012
10/31/2021	4011823.647	0.001	303885.393	0.01	166.633	0.018
11/1/2021	4011823.647	0.001	303885.393	0.011	166.636	0.018
11/2/2021	4011823.648	0.004	303885.391	0.011	166.634	0.018
11/3/2021	4011823.647	0.001	303885.393	0.01	166.631	0.019
11/4/2021	4011823.645	0.001	303885.392	0.01	166.635	0.019
11/5/2021	4011823.649	0.005	303885.392	0.011	166.632	0.016
11/6/2021	4011823.648	0.002	303885.393	0.012	166.635	0.016
11/7/2021	4011823.649	0.002	303885.393	0.01	166.636	0.013
11/8/2021	4011823.652	0.005	303885.392	0.008	166.634	0.022
11/9/2021	4011823.65	0.006	303885.39	0.009	166.632	0.021
11/10/2021	4011823.65	0.006	303885.391	0.007	166.637	0.019
11/11/2021	4011823.648	0.001	303885.393	0.01	166.635	0.01
11/12/2021	4011823.647	0.002	303885.393	0.01	166.634	0.012
11/13/2021	4011823.648	0.003	303885.393	0.011	166.635	0.012
11/14/2021	4011823.647	0.003	303885.392	0.011	166.634	0.011
11/15/2021	4011823.649	0.004	303885.39	0.01	166.635	0.015
11/16/2021	4011823.647	0.002	303885.392	0.009	166.639	0.015
11/17/2021	4011823.649	0.003	303885.392	0.009	166.627	0.006
11/18/2021	4011823.648	0.005	303885.394	0.007	166.632	0.011
11/19/2021	4011823.649	0.007	303885.391	0.006	166.627	0.005
11/20/2021	4011823.652	0.006	303885.389	0.006	166.63	0.006
11/21/2021	4011823.649	0.004	303885.392	0.007	166.631	0.011
11/22/2021	4011823.65	0.006	303885.391	0.006	166.627	0.005
11/23/2021	4011823.65	0.006	303885.39	0.006	166.628	0.004
11/24/2021	4011823.65	0.005	303885.391	0.006	166.633	0.014
11/25/2021	4011823.652	0.005	303885.391	0.005	166.624	0.006
11/26/2021	4011823.651	0.007	303885.389	0.006	166.626	0.005
11/27/2021	4011823.649	0.006	303885.389	0.006	166.625	0.005
11/28/2021	4011823.649	0.007	303885.39	0.007	166.624	0.006
11/29/2021	4011823.648	0.004	303885.393	0.005	166.63	0.007

11/30/2021	4011823.649	0.006	303885.393	0.005	166.632	0.011
12/1/2021	4011823.649	0.004	303885.389	0.009	166.629	0.011
12/2/2021	4011823.648	0.003	303885.393	0.011	166.635	0.013
12/3/2021	4011823.648	0.001	303885.393	0.011	166.634	0.016
12/4/2021	4011823.648	0.007	303885.391	0.006	166.636	0.001
12/5/2021	4011823.649	0.006	303885.389	0.01	166.631	0.01
12/6/2021	4011823.65	0.001	303885.39	0.011	166.635	0.015
12/7/2021	4011823.648	0.001	303885.392	0.015	166.631	0.014
12/8/2021	4011823.649	0.004	303885.389	0.014	166.633	0.015
12/9/2021	4011823.647	0.002	303885.391	0.011	166.632	0.007
12/10/2021	4011823.648	0.002	303885.39	0.01	166.629	0.013
12/11/2021	4011823.649	0.008	303885.388	0.011	166.625	0.01
12/12/2021	4011823.647	0.008	303885.386	0.009	166.63	0.011
12/13/2021	4011823.651	0.007	303885.388	0.008	166.628	0.01
12/14/2021	4011823.647	0.001	303885.391	0.01	166.634	0.018
12/15/2021	4011823.647	0.006	303885.387	0.006	166.629	0.014
12/16/2021	4011823.649	0.004	303885.393	0.011	166.63	0.009
12/17/2021	4011823.65	0.004	303885.39	0.012	166.631	0.021
12/18/2021	4011823.647	0.002	303885.389	0.012	166.629	0.013
12/19/2021	4011823.647	0.006	303885.387	0.008	166.625	0.012
12/20/2021	4011823.648	0.006	303885.386	0.009	166.626	0.01
12/21/2021	4011823.647	0.003	303885.39	0.014	166.627	0.011
12/22/2021	4011823.648	0.002	303885.392	0.014	166.63	0.009
12/23/2021	4011823.648	0.002	303885.391	0.012	166.631	0.011
12/24/2021	4011823.649	0.005	303885.389	0.009	166.628	0.01
12/25/2021	4011823.648	0.001	303885.39	0.01	166.628	0.009
12/26/2021	4011823.649	0.004	303885.387	0.01	166.633	0.009
12/27/2021	4011823.645	0.002	303885.392	0.01	166.631	0.005
12/28/2021	4011823.648	0.003	303885.388	0.007	166.637	0.009
12/29/2021	4011823.648	0.005	303885.388	0.013	166.631	0.015
12/30/2021	4011823.647	0.002	303885.391	0.012	166.631	0.012
12/31/2021	4011823.647	0.002	303885.391	0.011	166.633	0.018
1/1/2022	4011823.647	0	303885.393	0.013	166.632	0.011
1/2/2022	4011823.647	0.01	303885.386	0.009	166.625	0.012
1/3/2022	4011823.649	0.004	303885.388	0.014	166.63	0.014
1/4/2022	4011823.647	0.001	303885.39	0.013	166.632	0.013

1/5/2022	4011823.649	0.003	303885.387	0.014	166.631	0.014
1/6/2022	4011823.649	0.004	303885.387	0.015	166.631	0.014
1/7/2022	4011823.647	0.005	303885.388	0.015	166.631	0.012
1/8/2022	4011823.647	0.001	303885.387	0.012	166.631	0.018
1/9/2022	4011823.651	0.006	303885.386	0.01	166.633	0.016
1/10/2022	4011823.646	0.006	303885.388	0.012	166.635	0.019
1/11/2022	4011823.647	0.003	303885.388	0.013	166.631	0.013
1/12/2022	4011823.647	0.002	303885.388	0.012	166.632	0.012
1/13/2022	4011823.647	0.002	303885.389	0.011	166.633	0.014
1/14/2022	4011823.648	0.001	303885.388	0.011	166.633	0.015
1/15/2022	4011823.648	0.006	303885.385	0.01	166.627	0.012
1/16/2022	4011823.646	0.002	303885.387	0.016	166.632	0.013
1/17/2022	4011823.647	0.008	303885.385	0.011	166.629	0.012
1/18/2022	4011823.649	0.005	303885.386	0.011	166.633	0.011
1/19/2022	4011823.649	0.003	303885.387	0.012	166.633	0.017
1/20/2022	4011823.648	0.01	303885.384	0.008	166.626	0.01
1/21/2022	4011823.647	0.008	303885.384	0.011	166.629	0.013
1/22/2022	4011823.648	0.009	303885.385	0.009	166.626	0.01
1/23/2022	4011823.649	0.004	303885.386	0.014	166.633	0.013
1/24/2022	4011823.649	0.004	303885.385	0.011	166.631	0.016
1/25/2022	4011823.649	0.005	303885.385	0.012	166.631	0.014
1/26/2022	4011823.649	0.004	303885.384	0.013	166.633	0.021
1/27/2022	4011823.646	0.002	303885.388	0.012	166.63	0.016
1/28/2022	4011823.646	0.003	303885.388	0.014	166.632	0.014
1/29/2022	4011823.648	0.007	303885.385	0.01	166.627	0.012
1/30/2022	4011823.648	0.002	303885.388	0.012	166.631	0.017
1/31/2022	4011823.648	0.002	303885.387	0.012	166.632	0.015
2/1/2022	4011823.651	0.006	303885.385	0.009	166.63	0.011
2/2/2022						
2/3/2022	4011823.648	0.008	303885.384	0.009	166.623	0.014
2/4/2022	4011823.648	0.005	303885.384	0.014	166.634	0.019
2/5/2022	4011823.646	0.005	303885.386	0.015	166.633	0.013
2/6/2022	4011823.651	0.006	303885.385	0.015	166.628	0.014
2/7/2022	4011823.648	0.002	303885.388	0.014	166.627	0.014
2/8/2022	4011823.651	0.005	303885.385	0.011	166.63	0.013
2/9/2022	4011823.649	0.005	303885.386	0.011	166.631	0.013

2/10/2022	4011823.648	0.006	303885.384	0.009	166.622	0.01
2/11/2022	4011823.651	0.004	303885.386	0.012	166.628	0.013
2/12/2022	4011823.651	0.005	303885.388	0.012	166.628	0.018
2/13/2022	4011823.648	0.007	303885.384	0.008	166.624	0.012
2/14/2022	4011823.651	0.004	303885.386	0.013	166.628	0.025
2/15/2022	4011823.649	0.005	303885.386	0.009	166.625	0.008
2/16/2022	4011823.648	0.004	303885.386	0.007	166.624	0.016
2/17/2022	4011823.647	0.004	303885.388	0.012	166.63	0.007
2/18/2022	4011823.648	0.008	303885.384	0.009	166.623	0.009
2/19/2022	4011823.649	0.005	303885.385	0.013	166.63	0.017
2/20/2022	4011823.647	0.001	303885.388	0.008	166.63	0.014
2/21/2022	4011823.648	0.006	303885.385	0.009	166.634	0.018
2/22/2022	4011823.648	0.003	303885.386	0.011	166.631	0.008
2/23/2022	4011823.648	0.005	303885.386	0.015	166.627	0.013
2/24/2022	4011823.648	0.007	303885.384	0.008	166.617	0.008
2/25/2022	4011823.645	0.004	303885.387	0.017	166.637	0.018
2/26/2022	4011823.648	0.007	303885.384	0.014	166.629	0.02
2/27/2022	4011823.647	0.008	303885.384	0.009	166.622	0.013
2/28/2022	4011823.648	0.006	303885.384	0.01	166.625	0.011
3/1/2022	4011823.647	0.002	303885.386	0.01	166.631	0.016
3/2/2022	4011823.648	0.001	303885.387	0.009	166.629	0.016
3/3/2022	4011823.649	0.004	303885.386	0.009	166.629	0.018
3/4/2022	4011823.647	0.002	303885.387	0.009	166.63	0.017
3/5/2022	4011823.647	0.005	303885.384	0.009	166.628	0.018
3/6/2022	4011823.645	0.002	303885.388	0.006	166.631	0.029
3/7/2022	4011823.648	0.009	303885.387	0.009	166.628	0.007
3/8/2022	4011823.648	0.006	303885.384	0.01	166.625	0.01
3/9/2022	4011823.647	0.006	303885.384	0.01	166.622	0.008
3/10/2022	4011823.647	0.003	303885.388	0.011	166.631	0.015
3/11/2022	4011823.648	0.006	303885.384	0.009	166.625	0.011
3/12/2022	4011823.647	0.007	303885.385	0.009	166.625	0.012
3/13/2022	4011823.648	0.006	303885.385	0.01	166.629	0.017
3/14/2022	4011823.648	0.006	303885.386	0.01	166.632	0.013
3/15/2022	4011823.646	0.002	303885.387	0.009	166.628	0.012
3/16/2022	4011823.649	0.006	303885.385	0.009	166.623	0.005
3/17/2022	4011823.648	0.005	303885.387	0.006	166.629	0.02

3/18/2022	4011823.648	0.005	303885.386	0.009	166.633	0.007
3/19/2022	4011823.648	0.007	303885.384	0.009	166.628	0.01
3/20/2022	4011823.648	0.005	303885.385	0.009	166.624	0.008
3/21/2022	4011823.648	0.006	303885.386	0.009	166.629	0.021
3/22/2022	4011823.646	0.002	303885.388	0.009	166.634	0.017
3/23/2022	4011823.646	0.002	303885.387	0.012	166.633	0.021
3/24/2022	4011823.648	0.006	303885.384	0.01	166.625	0.011
3/25/2022	4011823.649	0.004	303885.386	0.01	166.631	0.02
3/26/2022	4011823.648	0.004	303885.385	0.009	166.631	0.018
3/27/2022	4011823.649	0.004	303885.386	0.01	166.628	0.016
3/28/2022	4011823.649	0.005	303885.386	0.01	166.631	0.019
3/29/2022	4011823.647	0.005	303885.386	0.006	166.63	0.012
3/30/2022	4011823.648	0.006	303885.386	0.01	166.627	0.024
3/31/2022	4011823.648	0.006	303885.385	0.009	166.626	0.01
4/1/2022	4011823.647	0.007	303885.385	0.009	166.626	0.009
4/2/2022	4011823.647	0.001	303885.387	0.01	166.633	0.018
4/3/2022	4011823.647	0.005	303885.386	0.008	166.625	0.011
4/4/2022	4011823.648	0.002	303885.389	0.008	166.623	0.013
4/5/2022	4011823.647	0.002	303885.389	0.007	166.633	0.014
4/6/2022	4011823.649	0.006	303885.387	0.007	166.633	0.01
4/7/2022	4011823.649	0.006	303885.389	0.008	166.623	0.004
4/8/2022	4011823.648	0.006	303885.387	0.008	166.624	0.007
4/9/2022	4011823.647	0.005	303885.384	0.004	166.622	0.012
4/10/2022	4011823.647	0.006	303885.386	0.007	166.633	0.013
4/11/2022	4011823.647	0.007	303885.385	0.002	166.627	0.015
4/12/2022	4011823.647	0.009	303885.387	0.007	166.63	0.023
4/13/2022	4011823.647	0.007	303885.389	0.01	166.62	0.011
4/14/2022	4011823.647	0.006	303885.387	0.008	166.625	0.01
4/15/2022	4011823.646	0	303885.39	0.009	166.634	0.017
4/16/2022	4011823.648	0.005	303885.387	0.008	166.634	0.029
4/17/2022	4011823.647	0.005	303885.388	0.008	166.636	0.016
4/18/2022	4011823.648	0.006	303885.387	0.008	166.627	0.011
4/19/2022	4011823.646	0.002	303885.39	0.01	166.635	0.015
4/20/2022	4011823.647	0.003	303885.391	0.009	166.631	0.019
4/21/2022	4011823.647	0.001	303885.391	0.007	166.632	0.013
4/22/2022	4011823.645	0.004	303885.388	0.005	166.628	0.016

4/23/2022	4011823.647	0.009	303885.389	0.006	166.634	0.02
4/24/2022	4011823.648	0.006	303885.388	0.01	166.627	0.014
4/25/2022	4011823.648	0.004	303885.387	0.009	166.629	0.024
4/26/2022	4011823.647	0.006	303885.387	0.009	166.633	0.016
4/27/2022	4011823.646	0.001	303885.391	0.009	166.635	0.024
4/28/2022	4011823.647	0.003	303885.385	0.007	166.636	0.019
4/29/2022	4011823.647	0.005	303885.387	0.01	166.624	0.014
4/30/2022	4011823.645	0.004	303885.39	0.009	166.628	0.021
5/1/2022	4011823.648	0.005	303885.39	0.008	166.633	0.022
5/2/2022	4011823.646	0.002	303885.39	0.012	166.639	0.021
5/3/2022	4011823.646	0.003	303885.388	0.009	166.626	0.009
5/4/2022	4011823.647	0.005	303885.387	0.007	166.632	0.021
5/5/2022	4011823.649	0.006	303885.385	0.012	166.631	0.023
5/6/2022	4011823.648	0.008	303885.387	0.01	166.628	0.017
5/7/2022	4011823.647	0.006	303885.388	0.013	166.624	0.02
5/8/2022	4011823.646	0.003	303885.392	0.004	166.616	0.007
5/9/2022	4011823.645	0.003	303885.389	0.008	166.639	0.03
5/10/2022	4011823.646	0.006	303885.392	0.007	166.632	0.019
5/11/2022	4011823.646	0.003	303885.391	0.01	166.638	0.012
5/12/2022	4011823.648	0.001	303885.391	0.01	166.62	0.013
5/13/2022	4011823.643	0.004	303885.392	0.011	166.632	0.01
5/14/2022	4011823.646	0.003	303885.389	0.004	166.633	0.013
5/15/2022	4011823.645	0.005	303885.387	0.008	166.628	0.014
5/16/2022	4011823.645	0.004	303885.387	0.006	166.631	0.018
5/17/2022	4011823.645	0.002	303885.392	0.011	166.628	0.016
5/18/2022	4011823.645	0.001	303885.389	0.005	166.625	0.029
5/19/2022	4011823.648	0.003	303885.393	0.011	166.63	0.015
5/20/2022	4011823.645	0.004	303885.389	0.005	166.636	0.035
5/21/2022	4011823.649	0.007	303885.389	0.007	166.623	0.028
5/22/2022	4011823.655	0.003	303885.409	0.002	166.698	0.01
5/23/2022	4011823.655	0.002	303885.409	0.002	166.702	0.009
5/24/2022	4011823.655	0.002	303885.408	0.002	166.702	0.009
5/25/2022	4011823.655	0.002	303885.408	0.002	166.703	0.009
5/26/2022	4011823.654	0.002	303885.407	0.002	166.701	0.009
5/27/2022	4011823.655	0.003	303885.406	0.003	166.692	0.012
5/28/2022	4011823.652	0.003	303885.407	0.003	166.713	0.012

5/29/2022	4011823.654	0.003	303885.407	0.003	166.706	0.012
5/30/2022	4011823.653	0.003	303885.409	0.003	166.708	0.012
5/31/2022	4011823.652	0.002	303885.41	0.002	166.714	0.01
6/1/2022	4011823.653	0.002	303885.408	0.002	166.706	0.009
6/2/2022	4011823.654	0.002	303885.408	0.002	166.706	0.009
6/3/2022	4011823.654	0.002	303885.41	0.002	166.704	0.009
6/4/2022	4011823.652	0.002	303885.409	0.003	166.702	0.011
6/5/2022	4011823.654	0.002	303885.411	0.002	166.705	0.009
6/6/2022	4011823.652	0.002	303885.41	0.002	166.708	0.009
6/7/2022	4011823.651	0.002	303885.409	0.002	166.7	0.009
6/8/2022	4011823.653	0.002	303885.41	0.002	166.7	0.009
6/9/2022	4011823.653	0.002	303885.41	0.002	166.701	0.009
6/10/2022	4011823.653	0.002	303885.41	0.002	166.708	0.009
6/11/2022	4011823.652	0.002	303885.41	0.002	166.706	0.009
6/12/2022	4011823.652	0.002	303885.411	0.002	166.708	0.009
6/13/2022	4011823.652	0.002	303885.412	0.002	166.71	0.009
6/14/2022	4011823.651	0.002	303885.411	0.002	166.708	0.009
6/15/2022	4011823.652	0.002	303885.412	0.002	166.711	0.009
6/16/2022	4011823.651	0.002	303885.412	0.002	166.712	0.009
6/17/2022	4011823.65	0.002	303885.411	0.002	166.71	0.009
6/18/2022	4011823.651	0.002	303885.412	0.002	166.704	0.009
6/19/2022	4011823.651	0.002	303885.412	0.002	166.713	0.009
6/20/2022	4011823.652	0.002	303885.411	0.002	166.705	0.009
6/21/2022	4011823.652	0.002	303885.41	0.002	166.706	0.009
6/22/2022	4011823.652	0.002	303885.411	0.002	166.7	0.009
6/23/2022	4011823.652	0.002	303885.41	0.002	166.706	0.009
6/24/2022	4011823.65	0.002	303885.412	0.002	166.704	0.009
6/25/2022	4011823.651	0.002	303885.412	0.002	166.708	0.009
6/26/2022	4011823.652	0.002	303885.411	0.002	166.708	0.009
6/27/2022	4011823.653	0.002	303885.412	0.002	166.706	0.009
6/28/2022	4011823.652	0.002	303885.412	0.002	166.705	0.009
6/29/2022	4011823.655	0.002	303885.413	0.002	166.705	0.009
6/30/2022	4011823.653	0.003	303885.413	0.003	166.706	0.01
7/1/2022	4011823.65	0.002	303885.413	0.002	166.708	0.01
7/2/2022	4011823.652	0.002	303885.413	0.003	166.709	0.01
7/3/2022	4011823.652	0.002	303885.412	0.003	166.712	0.01

7/4/2022	4011823.652	0.002	303885.414	0.003	166.705	0.01
7/5/2022	4011823.651	0.002	303885.416	0.003	166.713	0.01
7/6/2022	4011823.651	0.002	303885.413	0.003	166.703	0.01
7/7/2022	4011823.652	0.002	303885.415	0.003	166.711	0.01
7/8/2022	4011823.653	0.002	303885.415	0.003	166.71	0.01
7/9/2022	4011823.651	0.002	303885.414	0.003	166.706	0.01
7/10/2022	4011823.652	0.002	303885.412	0.003	166.709	0.01
7/11/2022	4011823.651	0.002	303885.413	0.003	166.712	0.01
7/12/2022	4011823.653	0.002	303885.414	0.003	166.72	0.01
7/13/2022	4011823.652	0.002	303885.413	0.002	166.706	0.009
7/14/2022	4011823.653	0.002	303885.411	0.002	166.707	0.01
7/15/2022	4011823.652	0.003	303885.412	0.002	166.716	0.01
7/16/2022	4011823.648	0.002	303885.415	0.002	166.715	0.01
7/17/2022	4011823.646	0.003	303885.417	0.002	166.718	0.01
7/18/2022	4011823.647	0.002	303885.416	0.002	166.715	0.009
7/19/2022	4011823.646	0.002	303885.418	0.002	166.716	0.009
7/20/2022	4011823.647	0.002	303885.417	0.002	166.719	0.009
7/21/2022	4011823.649	0.002	303885.416	0.002	166.718	0.009
7/22/2022	4011823.65	0.002	303885.415	0.002	166.718	0.009
7/23/2022	4011823.65	0.002	303885.416	0.002	166.72	0.009
7/24/2022	4011823.649	0.002	303885.417	0.002	166.721	0.009
7/25/2022	4011823.65	0.002	303885.416	0.002	166.714	0.009
7/26/2022	4011823.649	0.002	303885.417	0.002	166.718	0.009
7/27/2022	4011823.648	0.002	303885.415	0.002	166.719	0.009
7/28/2022	4011823.651	0.002	303885.416	0.002	166.714	0.009
7/29/2022	4011823.65	0.002	303885.416	0.002	166.713	0.009
7/30/2022	4011823.65	0.002	303885.414	0.002	166.707	0.009
7/31/2022	4011823.648	0.002	303885.414	0.002	166.712	0.009
8/1/2022	4011823.65	0.002	303885.414	0.002	166.72	0.009
8/2/2022	4011823.648	0.002	303885.416	0.002	166.709	0.009
8/3/2022	4011823.649	0.002	303885.416	0.002	166.715	0.009
8/4/2022	4011823.651	0.002	303885.415	0.002	166.716	0.009
8/5/2022	4011823.651	0.002	303885.415	0.002	166.712	0.009
8/6/2022	4011823.65	0.002	303885.414	0.002	166.714	0.009
8/7/2022	4011823.651	0.002	303885.414	0.002	166.714	0.009
8/8/2022	4011823.652	0.002	303885.413	0.002	166.714	0.009

8/9/2022	4011823.649	0.002	303885.414	0.002	166.711	0.009
8/10/2022	4011823.651	0.002	303885.414	0.002	166.706	0.009
8/11/2022	4011823.651	0.002	303885.413	0.002	166.709	0.009
8/12/2022	4011823.651	0.002	303885.414	0.002	166.713	0.009
8/13/2022	4011823.65	0.002	303885.414	0.002	166.715	0.009
8/14/2022	4011823.65	0.002	303885.414	0.002	166.712	0.009
8/15/2022	4011823.652	0.002	303885.414	0.002	166.713	0.01
8/16/2022	4011823.647	0.003	303885.413	0.003	166.721	0.013
8/17/2022	4011823.654	0.003	303885.414	0.003	166.708	0.013
8/18/2022	4011823.654	0.003	303885.413	0.003	166.711	0.013
8/19/2022	4011823.653	0.003	303885.414	0.003	166.7	0.013
8/20/2022	4011823.652	0.003	303885.412	0.003	166.722	0.012
8/21/2022	4011823.654	0.003	303885.414	0.003	166.717	0.012
8/22/2022	4011823.653	0.003	303885.414	0.003	166.703	0.012
8/23/2022	4011823.653	0.003	303885.411	0.003	166.717	0.013
8/24/2022	4011823.652	0.003	303885.412	0.003	166.714	0.012
8/25/2022	4011823.653	0.003	303885.413	0.003	166.714	0.012
8/26/2022	4011823.653	0.003	303885.415	0.003	166.715	0.013
8/27/2022	4011823.65	0.003	303885.414	0.003	166.714	0.012
8/28/2022	4011823.651	0.003	303885.414	0.003	166.718	0.012
8/29/2022	4011823.651	0.003	303885.412	0.003	166.721	0.012
8/30/2022	4011823.65	0.002	303885.415	0.002	166.709	0.01
8/31/2022	4011823.649	0.002	303885.415	0.002	166.702	0.009
9/1/2022	4011823.649	0.002	303885.415	0.002	166.714	0.009
9/2/2022	4011823.652	0.002	303885.415	0.002	166.708	0.009
9/3/2022	4011823.65	0.002	303885.414	0.002	166.709	0.009
9/4/2022	4011823.651	0.002	303885.415	0.002	166.704	0.009
9/5/2022	4011823.648	0.002	303885.415	0.002	166.715	0.009
9/6/2022	4011823.651	0.002	303885.415	0.002	166.706	0.009
9/7/2022	4011823.651	0.002	303885.414	0.002	166.709	0.009
9/8/2022	4011823.652	0.002	303885.414	0.002	166.711	0.009
9/9/2022	4011823.651	0.002	303885.415	0.002	166.717	0.009
9/10/2022	4011823.651	0.002	303885.417	0.002	166.708	0.009
9/11/2022	4011823.651	0.002	303885.414	0.002	166.712	0.009
9/12/2022	4011823.652	0.002	303885.413	0.002	166.713	0.009
9/13/2022	4011823.651	0.002	303885.413	0.002	166.712	0.009

9/14/2022	4011823.652	0.002	303885.413	0.002	166.712	0.009
9/15/2022	4011823.651	0.002	303885.413	0.002	166.71	0.009
9/16/2022	4011823.653	0.002	303885.413	0.002	166.705	0.009
9/17/2022	4011823.651	0.002	303885.415	0.002	166.713	0.009
9/18/2022	4011823.652	0.002	303885.414	0.002	166.71	0.009
9/19/2022	4011823.653	0.002	303885.413	0.002	166.712	0.009
9/20/2022	4011823.651	0.002	303885.414	0.002	166.716	0.009
9/21/2022	4011823.651	0.002	303885.413	0.002	166.715	0.009
9/22/2022	4011823.652	0.002	303885.415	0.002	166.711	0.009
9/23/2022	4011823.651	0.002	303885.414	0.002	166.714	0.009
9/24/2022	4011823.65	0.002	303885.414	0.002	166.714	0.009
9/25/2022	4011823.651	0.002	303885.415	0.002	166.719	0.009
9/26/2022	4011823.652	0.002	303885.413	0.002	166.713	0.009
9/27/2022	4011823.652	0.002	303885.413	0.002	166.707	0.009
9/28/2022	4011823.651	0.002	303885.413	0.002	166.706	0.009
9/29/2022	4011823.651	0.002	303885.413	0.002	166.705	0.009
9/30/2022	4011823.652	0.002	303885.413	0.002	166.71	0.009
10/1/2022	4011823.651	0.002	303885.413	0.002	166.709	0.009
10/2/2022	4011823.653	0.002	303885.412	0.002	166.707	0.009
10/3/2022	4011823.653	0.002	303885.412	0.002	166.71	0.009
10/4/2022	4011823.654	0.002	303885.412	0.002	166.711	0.009
10/5/2022	4011823.653	0.002	303885.411	0.002	166.709	0.009
10/6/2022	4011823.652	0.002	303885.412	0.002	166.709	0.009
10/7/2022	4011823.652	0.002	303885.414	0.002	166.705	0.009
10/8/2022	4011823.651	0.002	303885.412	0.002	166.706	0.009
10/9/2022	4011823.652	0.002	303885.412	0.002	166.71	0.009
10/10/2022	4011823.651	0.002	303885.412	0.002	166.71	0.009
10/11/2022	4011823.651	0.002	303885.413	0.002	166.716	0.009
10/12/2022	4011823.651	0.002	303885.414	0.002	166.717	0.009

6. GNSS Station Raw Data: KER5

			KER5			
	<u>Northing</u> <u>Mean(m)</u>		<u>Easting</u> <u>Mean(m)</u>		<u>Elev.</u> <u>Mean(m)</u>	
	4011865.618		303886.7766		166.6642347	
Date		<u>Peak to</u> <u>Peak</u>		<u>Peak to</u> <u>Peak</u>		<u>Peak to</u> <u>Peak</u>
	<u>Northing(m)</u>	<u>Error (m)</u>	<u>Easting(m)</u>	<u>Error (m)</u>	<u>Elevation(m)</u>	<u>Error (m)</u>
4/22/2021	4011865.618	0.005	303886.764	0.009	166.648	0.021
4/23/2021	4011865.616	0.001	303886.767	0.009	166.645	0.02
4/24/2021	4011865.615	0	303886.768	0.006	166.647	0.024
4/25/2021	4011865.615	0.002	303886.767	0.007	166.652	0.018
4/26/2021	4011865.615	0.003	303886.766	0.008	166.64	0.014
4/27/2021	4011865.617	0.002	303886.768	0.007	166.651	0.023
4/28/2021	4011865.616	0.001	303886.767	0.007	166.646	0.02
4/29/2021	4011865.616	0.005	303886.766	0.004	166.646	0.017
4/30/2021	4011865.617	0.002	303886.767	0.009	166.647	0.027
5/1/2021	4011865.616	0.002	303886.767	0.006	166.654	0.027
5/2/2021	4011865.616	0.004	303886.766	0.004	166.646	0.022
5/3/2021	4011865.617	0	303886.768	0.007	166.648	0.019
5/4/2021	4011865.617	0.007	303886.765	0.004	166.644	0.012
5/5/2021	4011865.617	0.006	303886.766	0.008	166.646	0.023
5/6/2021	4011865.616	0.002	303886.768	0.006	166.651	0.025
5/7/2021	4011865.617	0.004	303886.767	0.004	166.653	0.017
5/8/2021	4011865.616	0.001	303886.768	0.005	166.646	0.01
5/9/2021	4011865.615	0.002	303886.769	0.01	166.644	0.013
5/10/2021	4011865.618	0.005	303886.768	0.006	166.637	0.012
5/11/2021	4011865.617	0.003	303886.768	0.009	166.649	0.021
5/12/2021	4011865.617	0.004	303886.767	0.006	166.65	0.024
5/13/2021	4011865.617	0.005	303886.768	0.008	166.64	0.008
5/14/2021	4011865.617	0.005	303886.767	0.009	166.643	0.01
5/15/2021						
5/16/2021						
5/17/2021						
5/18/2021						

5/19/2021						
5/20/2021	4011865.614	0.006	303886.765	0.005	166.648	0.03
5/21/2021	4011865.616	0.005	303886.768	0.006	166.65	0.014
5/22/2021	4011865.618	0.008	303886.768	0.007	166.636	0.013
5/23/2021	4011865.615	0.005	303886.766	0.006	166.657	0.021
5/24/2021	4011865.617	0.002	303886.767	0.007	166.64	0.011
5/25/2021	4011865.615	0.002	303886.769	0.009	166.649	0.023
5/26/2021	4011865.616	0.002	303886.767	0.003	166.646	0.01
5/27/2021	4011865.618	0.006	303886.769	0.009	166.631	0.015
5/28/2021	4011865.616	0.002	303886.768	0.007	166.651	0.013
5/29/2021	4011865.617	0.004	303886.769	0.013	166.653	0.007
5/30/2021	4011865.618	0.003	303886.77	0.006	166.634	0.013
5/31/2021	4011865.614	0.001	303886.768	0.009	166.643	0.011
6/1/2021	4011865.617	0.006	303886.771	0.006	166.642	0.017
6/2/2021	4011865.617	0.006	303886.77	0.006	166.638	0.012
6/3/2021	4011865.617	0.003	303886.769	0.005	166.64	0.021
6/4/2021	4011865.618	0.003	303886.769	0.006	166.64	0.008
6/5/2021	4011865.616	0.003	303886.768	0.007	166.652	0.008
6/6/2021	4011865.616	0.004	303886.768	0.004	166.648	0.009
6/7/2021	4011865.621	0.005	303886.767	0.006	166.642	0.022
6/8/2021	4011865.618	0.001	303886.769	0.009	166.639	0.013
6/9/2021	4011865.616	0.008	303886.767	0.004	166.644	0.012
6/10/2021	4011865.616	0.002	303886.769	0.011	166.638	0.01
6/11/2021	4011865.615	0.004	303886.771	0.011	166.641	0.016
6/12/2021	4011865.617	0.006	303886.768	0.005	166.643	0.026
6/13/2021	4011865.617	0.005	303886.769	0.004	166.643	0.015
6/14/2021	4011865.618	0.005	303886.769	0.002	166.644	0.017
6/15/2021	4011865.615	0.003	303886.769	0.005	166.644	0.018
6/16/2021	4011865.617	0.005	303886.769	0	166.639	0.01
6/17/2021	4011865.616	0.005	303886.769	0.002	166.644	0.022
6/18/2021	4011865.616	0.003	303886.768	0.004	166.645	0.009
6/19/2021	4011865.615	0.004	303886.768	0.005	166.641	0.013
6/20/2021	4011865.616	0.005	303886.772	0.006	166.648	0.015
6/21/2021	4011865.616	0.006	303886.772	0.004	166.632	0.004
6/22/2021	4011865.617	0.004	303886.771	0.007	166.637	0.009
6/23/2021	4011865.616	0.001	303886.772	0.007	166.645	0.017

6/24/2021	4011865.618	0.004	303886.774	0.009	166.643	0.005
6/25/2021	4011865.616	0.005	303886.773	0.001	166.64	0.02
6/26/2021	4011865.618	0.006	303886.77	0.002	166.631	0.018
6/27/2021	4011865.61	0.006	303886.783	0.014	166.648	0.025
6/28/2021	4011865.617	0.007	303886.773	0.004	166.629	0.004
6/29/2021	4011865.617	0.005	303886.769	0.006	166.639	0.011
6/30/2021	4011865.617	0.005	303886.774	0.006	166.641	0.021
7/1/2021	4011865.618	0.008	303886.772	0.006	166.639	0.007
7/2/2021	4011865.616	0.006	303886.768	0.002	166.642	0.023
7/3/2021	4011865.616	0.006	303886.769	0.004	166.641	0.024
7/4/2021	4011865.616	0.003	303886.772	0.007	166.648	0.021
7/5/2021	4011865.615	0.002	303886.773	0.008	166.645	0.014
7/6/2021	4011865.617	0.005	303886.772	0.008	166.635	0.011
7/7/2021	4011865.615	0.007	303886.776	0.01	166.638	0.005
7/8/2021	4011865.617	0.006	303886.771	0.004	166.632	0.013
7/9/2021	4011865.616	0.008	303886.77	0.005	166.635	0.01
7/10/2021	4011865.616	0.001	303886.773	0.004	166.65	0.032
7/11/2021	4011865.619	0.009	303886.773	0.009	166.639	0.009
7/12/2021	4011865.618	0.003	303886.773	0.01	166.637	0.011
7/13/2021	4011865.616	0.002	303886.774	0.008	166.643	0.011
7/14/2021	4011865.616	0.006	303886.771	0.003	166.644	0.014
7/15/2021	4011865.614	0.003	303886.775	0.01	166.643	0.019
7/16/2021	4011865.619	0.003	303886.773	0.011	166.641	0.006
7/17/2021	4011865.616	0.006	303886.768	0.012	166.658	0.008
7/18/2021	4011865.609	0.014	303886.781	0.01	166.621	0.013
7/19/2021	4011865.616	0.01	303886.776	0.004	166.611	0.01
7/20/2021	4011865.616	0.005	303886.773	0.005	166.628	0.007
7/21/2021	4011865.622	0.007	303886.772	0.004	166.626	0.011
7/22/2021	4011865.619	0.002	303886.772	0.003	166.63	0.019
7/23/2021	4011865.617	0.002	303886.777	0.007	166.643	0.01
7/24/2021	4011865.617	0.002	303886.773	0.001	166.636	0.01
7/25/2021	4011865.618	0.002	303886.772	0.004	166.646	0.001
7/26/2021	4011865.629	0.024	303886.791	0.021	166.724	0.154
7/27/2021	4011865.621	0.036	303886.772	0.023	166.716	0.042
7/28/2021	4011865.614	0.004	303886.773	0.007	166.656	0.007
7/29/2021	4011865.617	0.001	303886.774	0.003	166.644	0.005

7/30/2021	4011865.616	0.043	303886.78	0.022	166.674	0.177
7/31/2021	4011865.632	0.021	303886.743	0.063	166.679	0.017
8/1/2021	4011865.601	0.019	303886.756	0.05	166.724	0.184
8/2/2021	4011865.626	0.044	303886.816	0.059	166.699	0.04
8/3/2021	4011865.617	0.033	303886.812	0.084	166.612	0.202
8/4/2021	4011865.618	0.022	303886.784	0.016	166.558	0.173
8/5/2021	4011865.609	0.017	303886.78	0.007	166.55	0.011
8/6/2021	4011865.618	0.007	303886.772	0.01	166.563	0.007
8/7/2021	4011865.623	0.01	303886.78	0.005	166.587	0.087
8/8/2021	4011865.619	0.01	303886.76	0.009	166.662	0.026
8/9/2021	4011865.622	0.005	303886.768	0.028	166.599	0.021
8/10/2021	4011865.616	0.012	303886.767	0.022	166.574	0.079
8/11/2021	4011865.618	0.005	303886.775	0.003	166.674	0.051
8/12/2021	4011865.617	0.01	303886.79	0.024	166.642	0.071
8/13/2021	4011865.631	0.042	303886.866	0.105	166.562	0.054
8/14/2021	4011865.618	0.002	303886.772	0.009	166.646	0.002
8/15/2021	4011865.606	0.04	303886.745	0.117	166.82	0.18
8/16/2021	4011865.621	0.01	303886.784	0.015	166.636	0.043
8/17/2021	4011865.596	0.073	303886.767	0.152	166.528	0.056
8/18/2021	4011865.627	0.029	303886.799	0.186	166.766	0.042
8/19/2021	4011865.622	0.003	303886.766	0.029	166.735	0.027
8/20/2021	4011865.618	0.053	303886.8	0.06	166.726	0.049
8/21/2021	4011865.624	0.053	303886.933	0.157	166.846	0.186
8/22/2021	4011865.611	0.028	303886.86	0.081	166.868	0.147
8/23/2021	4011865.622	0.028	303886.788	0.068	166.734	0.041
8/24/2021	4011865.616	0.005	303886.781	0.049	166.74	0.029
8/25/2021	4011865.615	0.003	303886.768	0.007	166.706	0.049
8/26/2021	4011865.618	0.009	303886.769	0.02	166.636	0.017
8/27/2021	4011865.615	0.008	303886.784	0.004	166.712	0.022
8/28/2021	4011865.618	0.018	303886.767	0.034	166.644	0.079
8/29/2021	4011865.614	0.006	303886.767	0.012	166.679	0.058
8/30/2021	4011865.617	0.002	303886.778	0.019	166.684	0.042
8/31/2021	4011865.617	0.004	303886.769	0.032	166.605	0.042
9/1/2021	4011865.62	0.008	303886.762	0.018	166.669	0.06
9/2/2021	4011865.618	0.003	303886.771	0.015	166.662	0.033
9/3/2021	4011865.615	0.003	303886.78	0.011	166.649	0.002

9/4/2021	4011865.672	0.075	303886.796	0.109	166.897	0.159
9/5/2021	4011865.628	0.011	303886.768	0.049	166.802	0.113
9/6/2021	4011865.615	0.014	303886.775	0.022	166.637	0.044
9/7/2021	4011865.616	0.005	303886.773	0.015	166.643	0.025
9/8/2021	4011865.617	0.004	303886.77	0.008	166.639	0.008
9/9/2021	4011865.617	0.006	303886.775	0.009	166.64	0.011
9/10/2021	4011865.627	0.044	303886.867	0.087	166.713	0.09
9/11/2021	4011865.617	0.005	303886.774	0.004	166.646	0.013
9/12/2021	4011865.616	0.006	303886.774	0.003	166.648	0.014
9/13/2021	4011865.617	0.005	303886.775	0.007	166.654	0.007
9/14/2021	4011865.615	0.006	303886.772	0.003	166.63	0.003
9/15/2021	4011865.615	0.004	303886.772	0.002	166.651	0.004
9/16/2021	4011865.618	0.018	303886.792	0.064	166.896	0.249
9/17/2021	4011865.623	0.012	303886.788	0.013	166.692	0.034
9/18/2021	4011865.592	0.073	303886.774	0.029	166.434	0.126
9/19/2021	4011865.601	0.057	303886.744	0.033	166.628	0.097
9/20/2021	4011865.613	0.014	303886.77	0.016	166.659	0.023
9/21/2021	4011865.616	0.007	303886.778	0.021	166.681	0.056
9/22/2021	4011865.618	0.004	303886.776	0.006	166.653	0.006
9/23/2021	4011865.617	0.004	303886.773	0.007	166.644	0.018
9/24/2021	4011865.616	0.003	303886.771	0.006	166.631	0.006
9/25/2021	4011865.622	0.014	303886.792	0.047	166.633	0.035
9/26/2021	4011865.625	0.027	303886.824	0.131	166.666	0.171
9/27/2021	4011865.622	0.008	303886.77	0.02	166.678	0.105
9/28/2021	4011865.617	0.035	303886.776	0.028	166.532	0.109
9/29/2021	4011865.609	0.025	303886.768	0.015	166.707	0.147
9/30/2021	4011865.63	0.036	303886.782	0.015	166.656	0.15
10/1/2021	4011865.611	0.004	303886.847	0.163	166.783	0.138
10/2/2021	4011865.626	0.011	303886.762	0.05	166.64	0.053
10/3/2021	4011865.62	0.002	303886.76	0.01	166.585	0.021
10/4/2021	4011865.625	0.01	303886.778	0.024	166.804	0.095
10/5/2021	4011865.61	0.01	303886.777	0.008	166.7	0.226
10/6/2021	4011865.624	0.034	303886.782	0.031	166.61	0.044
10/7/2021	4011865.616	0.005	303886.776	0.018	166.623	0.032
10/8/2021	4011865.632	0.05	303886.754	0.065	166.73	0.11
10/9/2021	4011865.618	0.006	303886.775	0.007	166.63	0.031

10/10/2021	4011865.62	0.007	303886.763	0.031	166.655	0.018
10/11/2021	4011865.616	0.002	303886.777	0.003	166.651	0.009
10/12/2021	4011865.618	0.006	303886.774	0.005	166.642	0.022
10/13/2021	4011865.618	0.001	303886.764	0.029	166.663	0.024
10/14/2021	4011865.615	0.006	303886.763	0.024	166.635	0.022
10/15/2021	4011865.616	0.007	303886.768	0.02	166.636	0.111
10/16/2021	4011865.615	0.002	303886.776	0.007	166.642	0.016
10/17/2021	4011865.619	0.004	303886.772	0.005	166.638	0.024
10/18/2021	4011865.618	0.005	303886.774	0.019	166.617	0.066
10/19/2021	4011865.615	0.005	303886.764	0.029	166.66	0.054
10/20/2021	4011865.618	0.001	303886.769	0.01	166.637	0.038
10/21/2021	4011865.616	0.002	303886.767	0.006	166.651	0.044
10/22/2021	4011865.617	0.001	303886.763	0.007	166.626	0.021
10/23/2021	4011865.616	0.003	303886.775	0.011	166.618	0.007
<u>10/24/2021</u>	4011865.617	0.005	303886.771	0.017	166.632	0.032
<u>10/25/2021</u>	4011865.617	0.006	303886.765	0.01	166.603	0.048
<u>10/26/2021</u>	4011865.616	0.005	303886.77	0.003	166.638	0.018
<u>10/27/2021</u>	4011865.616	0.002	303886.764	0.009	166.6	0.003
<u>10/28/2021</u>	4011865.612	0.023	303886.765	0.019	166.628	0.059
<u>10/29/2021</u>	4011865.618	0.004	303886.769	0.01	166.691	0.156
<u>10/30/2021</u>	4011865.616	0.006	303886.761	0.023	166.6	0.007
<u>10/31/2021</u>	4011865.605	0.029	303886.755	0.033	166.591	0.062
11/1/2021	4011865.612	0.034	303886.765	0.042	166.532	0.116
11/2/2021	4011865.612	0.007	303886.751	0.052	166.76	0.07
11/3/2021	4011865.623	0.004	303886.727	0.079	166.596	0.074
11/4/2021	4011865.622	0.005	303886.788	0.011	166.65	0.051
11/5/2021	4011865.616	0.015	303886.762	0.049	166.623	0.083
11/6/2021	4011865.62	0.008	303886.78	0.037	166.618	0.122
11/7/2021	4011865.622	0.021	303886.777	0.005	166.655	0.015
11/8/2021	4011865.621	0.005	303886.764	0.007	166.562	0.022
11/9/2021	4011865.617	0.005	303886.762	0.005	166.6	0.017
11/10/2021	4011865.618	0.006	303886.766	0.005	166.615	0.032
11/11/2021	4011865.614	0.003	303886.77	0.016	166.611	0.023
11/12/2021	4011865.618	0.004	303886.774	0.01	166.6	0.039
11/13/2021	4011865.617	0.007	303886.769	0.002	166.63	0.006
11/14/2021	4011865.62	0.002	303886.766	0.005	166.62	0.011

11/15/2021	4011865.619	0.003	303886.762	0.007	166.621	0.023
11/16/2021	4011865.619	0.004	303886.772	0.015	166.624	0.008
11/17/2021	4011865.612	0.01	303886.761	0.031	166.631	0.028
11/18/2021	4011865.666	0.172	303886.884	0.094	166.497	0.095
11/19/2021	4011865.629	0.062	303886.732	0.2	166.457	0.472
11/20/2021	4011865.617	0.005	303886.769	0.018	166.649	0.022
11/21/2021	4011865.617	0.003	303886.762	0.01	166.621	0.03
11/22/2021	4011865.618	0.008	303886.751	0.003	166.563	0.039
11/23/2021	4011865.614	0.017	303886.758	0.001	166.574	0.008
11/24/2021	4011865.618	0.002	303886.771	0.017	166.651	0.034
11/25/2021	4011865.616	0.003	303886.766	0.008	166.609	0.035
11/26/2021	4011865.602	0.045	303886.739	0.072	166.592	0.085
11/27/2021	4011865.616	0.02	303886.755	0.003	166.53	0.009
11/28/2021	4011865.605	0.029	303886.757	0.018	166.588	0.07
11/29/2021	4011865.615	0.008	303886.767	0.003	166.618	0.034
11/30/2021	4011865.61	0.034	303886.764	0.013	166.587	0.046
12/1/2021	4011865.618	0.006	303886.754	0.018	166.629	0.033
12/2/2021	4011865.606	0.046	303886.725	0.082	166.471	0.225
12/3/2021	4011865.614	0.015	303886.726	0.065	166.614	0.037
12/4/2021	4011865.615	0.005	303886.751	0.04	166.549	0.056
12/5/2021	4011865.614	0.015	303886.759	0.015	166.601	0.03
12/6/2021						
12/7/2021	4011865.605	0.173	303886.874	0.235	167.247	1.102
12/8/2021	4011865.596	0.025	303886.677	0.167	166.539	0.047
12/9/2021	4011865.618	0.005	303886.763	0.023	166.585	0.011
12/10/2021	4011865.616	0.009	303886.762	0.014	166.584	0.017
12/11/2021	4011865.606	0.034	303886.772	0.012	166.668	0.166
12/12/2021	4011865.59	0.047	303886.689	0.102	166.581	0.271
12/13/2021	4011865.624	0.011	303886.786	0.009	166.722	0.107
12/14/2021	4011865.616	0.011	303886.757	0.022	166.578	0.025
12/15/2021	4011865.614	0.007	303886.762	0.016	166.641	0.042
12/16/2021	4011865.629	0.011	303886.782	0.033	166.676	0.163
12/17/2021	4011865.61	0.008	303886.736	0.085	166.615	0.052
12/18/2021	4011865.621	0.008	303886.743	0.027	166.648	0.167
12/19/2021	4011865.639	0.102	303886.718	0.215	166.792	0.672
12/20/2021	4011865.625	0.056	303886.777	0.17	166.608	0.23

12/21/2021	4011865.603	0.025	303886.765	0.194	166.591	0.181
12/22/2021	4011865.61	0.019	303886.741	0.045	166.561	0.085
12/23/2021	4011865.609	0.023	303886.781	0.029	166.58	0.027
12/24/2021	4011865.621	0.005	303886.767	0.012	166.624	0.016
12/25/2021	4011865.614	0.008	303886.76	0.027	166.613	0.028
12/26/2021	4011865.617	0.014	303886.788	0.003	166.662	0.084
12/27/2021	4011865.616	0.01	303886.742	0.022	166.559	0.02
12/28/2021	4011865.617	0.01	303886.773	0.009	166.618	0.03
12/29/2021	4011865.61	0.025	303886.742	0.044	166.543	0.044
12/30/2021	4011865.608	0.021	303886.753	0.036	166.558	0.035
12/31/2021	4011865.617	0.004	303886.762	0.003	166.608	0.008
1/1/2022	4011865.62	0.006	303886.766	0.014	166.63	0.054
1/2/2022	4011865.616	0.009	303886.765	0.008	166.632	0.009
1/3/2022	4011865.614	0.009	303886.763	0.009	166.61	0.022
1/4/2022	4011865.617	0.007	303886.769	0.009	166.609	0.019
1/5/2022	4011865.615	0.004	303886.77	0.013	166.642	0.014
1/6/2022	4011865.617	0.002	303886.77	0.014	166.641	0.022
1/7/2022	4011865.615	0.011	303886.767	0.013	166.589	0.08
1/8/2022	4011865.625	0.01	303886.785	0.025	166.622	0.054
1/9/2022	4011865.605	0.024	303886.756	0.02	166.632	0.109
1/10/2022	4011865.616	0.008	303886.764	0.009	166.632	0.011
1/11/2022	4011865.618	0.005	303886.766	0.014	166.634	0.008
1/12/2022	4011865.615	0.006	303886.768	0.01	166.636	0.029
1/13/2022	4011865.617	0.002	303886.764	0.005	166.631	0.023
1/14/2022	4011865.617	0.002	303886.762	0.015	166.646	0.031
1/15/2022	4011865.616	0.005	303886.771	0.014	166.633	0.012
1/16/2022	4011865.615	0.002	303886.766	0.015	166.642	0.016
1/17/2022	4011865.617	0.006	303886.763	0.009	166.636	0.007
1/18/2022	4011865.62	0.009	303886.816	0.064	166.843	0.225
1/19/2022	4011865.619	0.002	303886.737	0.049	166.568	0.059
1/20/2022	4011865.616	0.009	303886.764	0.007	166.635	0.013
1/21/2022	4011865.616	0.008	303886.764	0.011	166.636	0.014
1/22/2022	4011865.617	0.008	303886.764	0.009	166.63	0.012
1/23/2022	4011865.617	0.006	303886.764	0.01	166.635	0.011
1/24/2022	4011865.618	0.006	303886.763	0.007	166.638	0.006
1/25/2022	4011865.615	0.005	303886.768	0.013	166.64	0.012

1/26/2022	4011865.617	0.005	303886.765	0.014	166.642	0.019
1/27/2022	4011865.615	0.001	303886.768	0.012	166.639	0.016
1/28/2022	4011865.616	0.006	303886.764	0.009	166.635	0.013
1/29/2022	4011865.618	0.006	303886.767	0.014	166.643	0.019
1/30/2022	4011865.617	0.007	303886.768	0.006	166.635	0
1/31/2022	4011865.62	0.004	303886.767	0.012	166.645	0.014
2/1/2022	4011865.619	0.004	303886.762	0.012	166.623	0.032
2/2/2022	4011865.615	0.003	303886.767	0.01	166.647	0.01
2/3/2022	4011865.615	0.002	303886.767	0.015	166.64	0.019
2/4/2022	4011865.615	0.008	303886.762	0.008	166.635	0.013
2/5/2022	4011865.616	0.008	303886.762	0.009	166.64	0.011
2/6/2022	4011865.617	0.005	303886.765	0.014	166.642	0.016
2/7/2022	4011865.618	0.006	303886.764	0.009	166.63	0.008
2/8/2022	4011865.617	0.005	303886.763	0.013	166.64	0.018
2/9/2022	4011865.615	0.003	303886.768	0.014	166.639	0.013
2/10/2022	4011865.617	0.009	303886.766	0.004	166.625	0.009
2/11/2022	4011865.618	0.004	303886.766	0.009	166.644	0.008
2/12/2022	4011865.618	0.004	303886.765	0.004	166.63	0.015
2/13/2022	4011865.617	0.003	303886.764	0.011	166.637	0.024
2/14/2022	4011865.618	0.006	303886.764	0.006	166.633	0.012
2/15/2022	4011865.618	0.005	303886.767	0.012	166.637	0.007
2/16/2022	4011865.616	0.003	303886.765	0.033	166.62	0.046
2/17/2022	4011865.614	0.005	303886.762	0.013	166.629	0.014
2/18/2022	4011865.616	0.006	303886.765	0.014	166.644	0.016
2/19/2022	4011865.615	0.003	303886.766	0.013	166.639	0.022
2/20/2022	4011865.616	0.002	303886.767	0.01	166.641	0.016
2/21/2022	4011865.617	0.006	303886.744	0.016	166.611	0.07
2/22/2022	4011865.619	0.002	303886.775	0.025	166.656	0.019
2/23/2022	4011865.614	0.006	303886.758	0.006	166.659	0.022
2/24/2022	4011865.617	0.103	303887.18	0.031	166.88	0.124
2/25/2022	4011865.621	0.004	303886.755	0.043	166.741	0.158
2/26/2022	4011865.618	0.007	303886.764	0.011	166.643	0.02
2/27/2022	4011865.617	0.004	303886.762	0.011	166.641	0.018
2/28/2022	4011865.618	0.005	303886.765	0.013	166.637	0.016
3/1/2022	4011865.616	0.008	303886.762	0.008	166.639	0.008
3/2/2022	4011865.617	0.003	303886.764	0.017	166.647	0.022

3/3/2022	4011865.618	0.004	303886.764	0.012	166.637	0.014
3/4/2022	4011865.618	0.003	303886.763	0.009	166.629	0.012
3/5/2022	4011865.615	0.003	303886.768	0.01	166.629	0.01
3/6/2022	4011865.613	0.008	303886.764	0.005	166.604	0.012
3/7/2022	4011865.618	0.006	303886.766	0.021	166.653	0.032
3/8/2022	4011865.616	0.004	303886.76	0.028	166.647	0.022
3/9/2022	4011865.619	0.005	303886.769	0.006	166.677	0.061
3/10/2022	4011865.613	0.007	303886.764	0.008	166.659	0.024
3/11/2022	4011865.618	0.003	303886.767	0.006	166.66	0.028
3/12/2022	4011865.615	0.003	303886.763	0.009	166.654	0.026
3/13/2022	4011865.615	0.005	303886.762	0.01	166.602	0.005
3/14/2022	4011865.617	0.008	303886.762	0.016	166.646	0.042
3/15/2022	4011865.616	0.012	303886.729	0.036	166.637	0.085
3/16/2022	4011865.619	0.008	303886.762	0.005	166.642	0.015
3/17/2022	4011865.615	0.003	303886.769	0.013	166.648	0.013
3/18/2022	4011865.617	0.012	303886.77	0	166.634	0.042
3/19/2022	4011865.619	0.007	303886.775	0.006	166.658	0.018
3/20/2022	4011865.619	0.005	303886.768	0.004	166.627	0.013
3/21/2022	4011865.619	0.011	303886.769	0.015	166.658	0.044
3/22/2022	4011865.617	0.016	303886.773	0.008	166.628	0.017
3/23/2022	4011865.616	0.003	303886.761	0.008	166.648	0.031
3/24/2022	4011865.616	0.008	303886.763	0.006	166.688	0.091
3/25/2022	4011865.618	0.001	303886.765	0.013	166.675	0.036
3/26/2022	4011865.615	0.009	303886.772	0.006	166.653	0.012
3/27/2022	4011865.619	0.001	303886.762	0.015	166.639	0.005
3/28/2022	4011865.614	0.006	303886.768	0.002	166.655	0.009
3/29/2022	4011865.618	0.005	303886.768	0.002	166.641	0.02
3/30/2022	4011865.618	0.006	303886.765	0.003	166.641	0.029
3/31/2022	4011865.617	0.006	303886.763	0.016	166.673	0.022
4/1/2022	4011865.615	0.004	303886.759	0.012	166.682	0.061
4/2/2022	4011865.614	0.008	303886.76	0.02	166.608	0.032
4/3/2022	4011865.617	0.004	303886.772	0.016	166.632	0.005
4/4/2022	4011865.615	0.009	303886.766	0.008	166.619	0.006
4/5/2022	4011865.619	0.009	303886.769	0.013	166.628	0.035
4/6/2022	4011865.616	0.006	303886.754	0.003	166.608	0.028
4/7/2022	4011865.617	0.012	303886.775	0.01	166.684	0.016

4/8/2022	4011865.619	0.008	303886.777	0.016	166.664	0.013
4/9/2022	4011865.616	0.017	303886.771	0.023	166.784	0.199
4/10/2022	4011865.614	0.004	303886.771	0.009	166.649	0.029
4/11/2022	4011865.621	0.004	303886.772	0.005	166.648	0.024
4/12/2022	4011865.619	0.008	303886.769	0.014	166.638	0.035
4/13/2022	4011865.617	0.006	303886.764	0.009	166.66	0.034
4/14/2022	4011865.616	0.006	303886.766	0.008	166.687	0.065
4/15/2022						
4/16/2022						
4/17/2022						
4/18/2022						
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4/20/2022						
4/21/2022						
4/22/2022						
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5/9/2022						
5/10/2022						
5/11/2022						
5/12/2022	4011865.614	0.009	303886.766	0.022	166.591	0.074
5/13/2022	4011865.616	0.006	303886.765	0.007	166.649	0.011

5/14/2022	4011865.617	0.005	303886.762	0.007	166.614	0.049
5/15/2022	4011865.615	0.006	303886.762	0.017	166.631	0.034
5/16/2022	4011865.614	0.003	303886.765	0.003	166.625	0.056
5/17/2022	4011865.615	0.003	303886.768	0.01	166.635	0.01
5/18/2022	4011865.615	0.002	303886.77	0.01	166.637	0.026
5/19/2022	4011865.615	0.007	303886.76	0.006	166.599	0.019
5/20/2022	4011865.618	0.011	303886.766	0.005	166.629	0.008
5/21/2022	4011865.618	0.008	303886.773	0.012	166.669	0.031
5/22/2022	4011865.622	0.007	303886.788	0.008	166.71	0.037
5/23/2022	4011865.625	0.007	303886.79	0.008	166.713	0.037
5/24/2022	4011865.625	0.005	303886.788	0.005	166.702	0.025
5/25/2022	4011865.623	0.005	303886.788	0.005	166.707	0.027
5/26/2022	4011865.622	0.005	303886.787	0.006	166.709	0.03
5/27/2022	4011865.623	0.006	303886.783	0.006	166.685	0.029
5/28/2022	4011865.623	0.007	303886.784	0.007	166.716	0.032
5/29/2022	4011865.625	0.006	303886.789	0.006	166.72	0.029
5/30/2022	4011865.624	0.007	303886.788	0.005	166.725	0.03
5/31/2022	4011865.623	0.005	303886.788	0.005	166.714	0.024
6/1/2022	4011865.623	0.008	303886.785	0.008	166.703	0.04
6/2/2022	4011865.625	0.007	303886.789	0.008	166.721	0.034
6/3/2022	4011865.625	0.007	303886.785	0.008	166.715	0.037
6/4/2022	4011865.624	0.007	303886.786	0.007	166.708	0.031
6/5/2022	4011865.625	0.008	303886.791	0.007	166.735	0.038
6/6/2022	4011865.622	0.008	303886.788	0.009	166.721	0.041
6/7/2022	4011865.624	0.007	303886.783	0.008	166.707	0.038
6/8/2022	4011865.622	0.007	303886.784	0.009	166.719	0.042
6/9/2022	4011865.626	0.007	303886.783	0.009	166.699	0.041
6/10/2022	4011865.618	0.007	303886.786	0.007	166.718	0.034
6/11/2022	4011865.623	0.005	303886.786	0.006	166.709	0.027
6/12/2022	4011865.621	0.007	303886.791	0.007	166.724	0.036
6/13/2022	4011865.621	0.003	303886.791	0.003	166.71	0.015
6/14/2022	4011865.62	0.004	303886.79	0.003	166.704	0.015
6/15/2022	4011865.623	0.003	303886.793	0.003	166.709	0.015
6/16/2022	4011865.621	0.004	303886.792	0.004	166.713	0.018
6/17/2022	4011865.619	0.004	303886.79	0.004	166.705	0.019
6/18/2022	4011865.621	0.007	303886.794	0.008	166.725	0.039

6/19/2022	4011865.62	0.007	303886.785	0.006	166.718	0.036
6/20/2022	4011865.623	0.006	303886.788	0.006	166.709	0.032
6/21/2022	4011865.622	0.006	303886.789	0.007	166.719	0.034
6/22/2022	4011865.62	0.004	303886.788	0.004	166.703	0.02
6/23/2022	4011865.62	0.003	303886.791	0.004	166.706	0.015
6/24/2022	4011865.622	0.003	303886.791	0.003	166.712	0.014
6/25/2022	4011865.621	0.004	303886.792	0.005	166.713	0.022
6/26/2022	4011865.622	0.004	303886.789	0.004	166.712	0.017
6/27/2022	4011865.622	0.002	303886.79	0.002	166.712	0.009
6/28/2022	4011865.621	0.002	303886.79	0.002	166.711	0.009
6/29/2022	4011865.624	0.002	303886.791	0.002	166.715	0.009
6/30/2022	4011865.621	0.003	303886.791	0.003	166.714	0.01
7/1/2022	4011865.62	0.003	303886.791	0.003	166.717	0.011
7/2/2022	4011865.62	0.005	303886.788	0.006	166.699	0.026
7/3/2022	4011865.621	0.002	303886.79	0.003	166.722	0.01
7/4/2022	4011865.621	0.003	303886.791	0.003	166.714	0.01
7/5/2022	4011865.621	0.003	303886.793	0.004	166.714	0.016
7/6/2022	4011865.62	0.004	303886.794	0.004	166.723	0.023
7/7/2022	4011865.62	0.005	303886.793	0.005	166.721	0.025
7/8/2022	4011865.627	0.006	303886.795	0.007	166.733	0.033
7/9/2022	4011865.621	0.007	303886.789	0.007	166.715	0.04
7/10/2022	4011865.624	0.004	303886.79	0.004	166.717	0.018
7/11/2022	4011865.621	0.003	303886.789	0.003	166.718	0.013
7/12/2022	4011865.622	0.003	303886.792	0.003	166.727	0.011
7/13/2022	4011865.62	0.003	303886.792	0.003	166.699	0.015
7/14/2022	4011865.62	0.003	303886.792	0.003	166.716	0.014
7/15/2022	4011865.622	0.004	303886.793	0.004	166.713	0.017
7/16/2022	4011865.618	0.002	303886.794	0.002	166.722	0.01
7/17/2022	4011865.615	0.003	303886.796	0.003	166.728	0.011
7/18/2022	4011865.618	0.003	303886.795	0.003	166.724	0.012
7/19/2022	4011865.62	0.005	303886.794	0.006	166.714	0.027
7/20/2022	4011865.624	0.013	303886.79	0.016	166.699	0.083
7/21/2022	4011865.618	0.012	303886.801	0.016	166.68	0.079
7/22/2022	4011865.62	0.004	303886.794	0.006	166.7	0.025
7/23/2022	4011865.611	0.014	303886.793	0.016	166.693	0.082
7/24/2022	4011865.623	0.013	303886.793	0.021	166.705	0.084

7/25/2022	4011865.614	0.012	303886.793	0.016	166.71	0.087
7/26/2022	4011865.63	0.01	303886.799	0.012	166.698	0.055
7/27/2022	4011865.622	0.006	303886.796	0.007	166.744	0.03
7/28/2022	4011865.621	0.008	303886.795	0.009	166.72	0.042
7/29/2022	4011865.619	0.007	303886.79	0.01	166.714	0.047
7/30/2022	4011865.619	0.007	303886.793	0.008	166.714	0.04
7/31/2022	4011865.621	0.006	303886.794	0.007	166.718	0.035
8/1/2022	4011865.62	0.005	303886.792	0.005	166.726	0.025
8/2/2022	4011865.62	0.005	303886.796	0.006	166.714	0.026
8/3/2022	4011865.619	0.003	303886.794	0.003	166.722	0.013
8/4/2022	4011865.62	0.003	303886.796	0.005	166.723	0.015
8/5/2022	4011865.621	0.003	303886.794	0.004	166.718	0.014
8/6/2022	4011865.619	0.006	303886.792	0.007	166.732	0.034
8/7/2022	4011865.619	0.005	303886.796	0.006	166.72	0.032
8/8/2022	4011865.62	0.005	303886.793	0.006	166.737	0.03
8/9/2022	4011865.618	0.007	303886.795	0.008	166.712	0.037
8/10/2022	4011865.621	0.005	303886.792	0.004	166.708	0.023
8/11/2022	4011865.621	0.004	303886.795	0.003	166.719	0.015
8/12/2022	4011865.619	0.003	303886.794	0.003	166.713	0.013
8/13/2022	4011865.617	0.003	303886.793	0.004	166.715	0.015
8/14/2022	4011865.617	0.004	303886.793	0.004	166.708	0.017
8/15/2022	4011865.62	0.007	303886.793	0.007	166.734	0.037
8/16/2022	4011865.621	0.009	303886.778	0.011	166.747	0.044
8/17/2022	4011865.626	0.009	303886.791	0.009	166.713	0.044
8/18/2022	4011865.62	0.005	303886.793	0.005	166.715	0.024
8/19/2022	4011865.618	0.004	303886.795	0.004	166.703	0.021
8/20/2022	4011865.619	0.005	303886.796	0.006	166.713	0.025
8/21/2022	4011865.617	0.004	303886.792	0.005	166.719	0.023
8/22/2022	4011865.618	0.004	303886.792	0.004	166.704	0.02
8/23/2022	4011865.621	0.003	303886.792	0.003	166.719	0.013
8/24/2022	4011865.62	0.004	303886.795	0.004	166.728	0.017
8/25/2022	4011865.619	0.003	303886.793	0.004	166.72	0.015
8/26/2022	4011865.618	0.003	303886.796	0.003	166.72	0.013
8/27/2022	4011865.618	0.002	303886.793	0.002	166.719	0.01
8/28/2022	4011865.618	0.002	303886.795	0.002	166.723	0.009
8/29/2022	4011865.618	0.002	303886.793	0.002	166.719	0.009

8/30/2022	4011865.617	0.002	303886.792	0.002	166.716	0.01
8/31/2022	4011865.618	0.002	303886.793	0.002	166.71	0.009
9/1/2022	4011865.618	0.002	303886.793	0.002	166.719	0.009
9/2/2022	4011865.62	0.002	303886.793	0.002	166.714	0.009
9/3/2022	4011865.619	0.002	303886.793	0.002	166.714	0.009
9/4/2022	4011865.62	0.002	303886.794	0.002	166.71	0.009
9/5/2022	4011865.617	0.002	303886.793	0.002	166.722	0.009
9/6/2022	4011865.619	0.002	303886.793	0.002	166.711	0.009
9/7/2022	4011865.62	0.002	303886.791	0.002	166.719	0.009
9/8/2022	4011865.62	0.003	303886.792	0.003	166.72	0.011
9/9/2022	4011865.62	0.003	303886.794	0.003	166.723	0.011
9/10/2022	4011865.62	0.003	303886.794	0.003	166.716	0.011
9/11/2022	4011865.62	0.003	303886.794	0.003	166.71	0.015
9/12/2022	4011865.622	0.004	303886.794	0.004	166.716	0.016
9/13/2022	4011865.62	0.003	303886.793	0.003	166.719	0.011
9/14/2022	4011865.62	0.003	303886.793	0.003	166.719	0.011
9/15/2022	4011865.62	0.003	303886.793	0.003	166.715	0.011
9/16/2022	4011865.622	0.002	303886.792	0.002	166.711	0.01
9/17/2022	4011865.62	0.002	303886.794	0.002	166.716	0.009
9/18/2022	4011865.622	0.002	303886.793	0.002	166.715	0.009
9/19/2022	4011865.622	0.002	303886.792	0.002	166.721	0.009
9/20/2022	4011865.619	0.003	303886.79	0.003	166.733	0.01
9/21/2022	4011865.62	0.002	303886.79	0.002	166.723	0.009
9/22/2022	4011865.621	0.002	303886.793	0.002	166.718	0.009
9/23/2022	4011865.62	0.002	303886.793	0.002	166.72	0.009
9/24/2022	4011865.62	0.002	303886.792	0.002	166.719	0.009
9/25/2022	4011865.62	0.002	303886.793	0.002	166.724	0.009
9/26/2022	4011865.621	0.002	303886.792	0.002	166.719	0.009
9/27/2022	4011865.621	0.002	303886.792	0.002	166.714	0.009
9/28/2022	4011865.62	0.002	303886.793	0.002	166.712	0.009
9/29/2022	4011865.62	0.002	303886.792	0.002	166.71	0.009
9/30/2022	4011865.621	0.002	303886.792	0.002	166.715	0.009
10/1/2022	4011865.62	0.002	303886.793	0.002	166.714	0.009
10/2/2022	4011865.621	0.002	303886.792	0.002	166.712	0.009
10/3/2022	4011865.622	0.002	303886.792	0.002	166.716	0.009
10/4/2022	4011865.622	0.002	303886.792	0.002	166.716	0.009

10/5/2022	4011865.621	0.002	303886.791	0.002	166.714	0.009
10/6/2022	4011865.621	0.002	303886.791	0.002	166.715	0.009
10/7/2022	4011865.62	0.002	303886.793	0.002	166.711	0.009
10/8/2022	4011865.62	0.002	303886.792	0.002	166.713	0.009
10/9/2022	4011865.622	0.002	303886.792	0.002	166.716	0.009
10/10/2022	4011865.619	0.002	303886.792	0.002	166.716	0.009
10/11/2022	4011865.619	0.002	303886.792	0.002	166.722	0.009
10/12/2022	4011865.619	0.002	303886.793	0.002	166.724	0.009
10/13/2022	4011865.621	0.003	303886.791	0.003	166.719	0.01

7. GNSS Station Raw Data: KER6

	-	-	<u>KER6</u>	-	-	-
	<u>Northing</u>		<u>Easting</u>		<u>Elev.</u>	
	<u>Mean(m)</u>	-	<u>Mean(m)</u>	-	<u>Mean(m)</u>	-
	4011896.73		303887.7871		166.6865422	
<u>Date</u>		<u>Peak to</u>		<u>Peak to</u>		<u>Peak to</u>
	<u>Northing(m)</u>	<u>Peak</u>	<u>Easting(m)</u>	<u>Peak</u>	<u>Elevation(m)</u>	<u>Peak</u>
		<u>Error (m)</u>		<u>Error (m)</u>		<u>Error (m)</u>
4/22/2021	4011896.729	0.004	303887.775	0.012	166.665	0.023
4/23/2021	4011896.73	0.005	303887.77	0.008	166.669	0.021
4/24/2021	4011896.728	0	303887.778	0.007	166.667	0.022
4/25/2021	4011896.727	0.001	303887.778	0.008	166.675	0.021
4/26/2021	4011896.728	0.004	303887.778	0.008	166.664	0.009
4/27/2021	4011896.73	0.003	303887.78	0.008	166.67	0.034
4/28/2021	4011896.729	0.002	303887.777	0.008	166.659	0.01
4/29/2021	4011896.728	0.004	303887.778	0.005	166.664	0.02
4/30/2021	4011896.73	0.005	303887.777	0.007	166.667	0.026
5/1/2021	4011896.73	0.006	303887.777	0.007	166.667	0.013
5/2/2021	4011896.729	0.004	303887.779	0.006	166.671	0.024
5/3/2021	4011896.729	0	303887.779	0.008	166.671	0.024
5/4/2021	4011896.728	0.006	303887.777	0.007	166.663	0.036
5/5/2021	4011896.729	0.005	303887.777	0.01	166.664	0.019

5/6/2021	4011896.729	0.002	303887.779	0.007	166.671	0.022
5/7/2021	4011896.73	0.004	303887.779	0.007	166.675	0.017
5/8/2021	4011896.729	0.001	303887.779	0.007	166.671	0.015
5/9/2021	4011896.728	0.003	303887.779	0.006	166.669	0.024
5/10/2021	4011896.73	0.005	303887.779	0.007	166.66	0.01
5/11/2021	4011896.729	0.003	303887.779	0.01	166.668	0.02
5/12/2021	4011896.73	0.005	303887.779	0.006	166.67	0.023
5/13/2021	4011896.73	0.005	303887.779	0.006	166.669	0.015
5/14/2021	4011896.729	0.004	303887.779	0.009	166.67	0.022
5/15/2021						
5/16/2021						
5/17/2021						
5/18/2021						
5/19/2021						
5/20/2021	4011896.724	0.006	303887.776	0.003	166.665	0.017
5/21/2021	4011896.73	0.005	303887.778	0.007	166.669	0.016
5/22/2021	4011896.728	0.002	303887.78	0.007	166.667	0.031
5/23/2021	4011896.728	0.005	303887.779	0.006	166.676	0.023
5/24/2021	4011896.729	0.002	303887.779	0.006	166.66	0.018
5/25/2021	4011896.728	0.005	303887.779	0.005	166.67	0.027
5/26/2021	4011896.729	0.003	303887.779	0.004	166.671	0.011
5/27/2021	4011896.729	0.006	303887.779	0.004	166.663	0.026
5/28/2021	4011896.729	0.004	303887.78	0.006	166.673	0.02
5/29/2021	4011896.728	0.001	303887.781	0.008	166.668	0.016
5/30/2021	4011896.73	0.006	303887.779	0.008	166.669	0.022
5/31/2021	4011896.727	0.005	303887.781	0.006	166.669	0.023
6/1/2021	4011896.729	0.004	303887.78	0.006	166.67	0.019
6/2/2021	4011896.728	0.006	303887.779	0.006	166.668	0.019
6/3/2021	4011896.729	0.001	303887.783	0.008	166.662	0.026
6/4/2021	4011896.731	0.003	303887.78	0.006	166.659	0.012
6/5/2021	4011896.729	0.004	303887.779	0.007	166.673	0.013
6/6/2021	4011896.729	0.004	303887.779	0.005	166.672	0.016
6/7/2021	4011896.731	0.002	303887.78	0.007	166.664	0.021
6/8/2021	4011896.731	0.002	303887.782	0.007	166.672	0.018
6/9/2021	4011896.728	0.007	303887.778	0.004	166.664	0.02
6/10/2021	4011896.73	0.002	303887.778	0.001	166.665	0.007

6/11/2021	4011896.729	0.004	303887.781	0.004	166.665	0.021
6/12/2021	4011896.729	0.006	303887.779	0.003	166.666	0.017
6/13/2021	4011896.729	0.005	303887.781	0.003	166.668	0.013
6/14/2021	4011896.731	0.005	303887.78	0.003	166.666	0.02
6/15/2021	4011896.728	0.006	303887.781	0.005	166.666	0.017
6/16/2021	4011896.729	0.005	303887.781	0.001	166.658	0.013
6/17/2021	4011896.728	0.006	303887.781	0.002	166.666	0.022
6/18/2021	4011896.73	0.004	303887.781	0.004	166.671	0.016
6/19/2021	4011896.728	0.004	303887.78	0.003	166.663	0.019
6/20/2021	4011896.73	0.005	303887.782	0.001	166.67	0.013
6/21/2021	4011896.728	0.002	303887.784	0.003	166.666	0.022
6/22/2021	4011896.729	0.004	303887.783	0.005	166.664	0.016
6/23/2021	4011896.729	0.002	303887.785	0.007	166.664	0.021
6/24/2021	4011896.731	0.006	303887.783	0.004	166.664	0.017
6/25/2021	4011896.729	0.006	303887.784	0.002	166.665	0.017
6/26/2021	4011896.73	0.01	303887.783	0.004	166.669	0.015
6/27/2021	4011896.724	0.003	303887.787	0.006	166.643	0.017
6/28/2021	4011896.725	0.005	303887.785	0.002	166.646	0.009
6/29/2021	4011896.73	0.004	303887.779	0.006	166.66	0.027
6/30/2021	4011896.731	0.005	303887.786	0.008	166.669	0.021
7/1/2021	4011896.729	0.003	303887.785	0.006	166.662	0.01
7/2/2021	4011896.729	0.005	303887.78	0.003	166.665	0.02
7/3/2021	4011896.728	0.006	303887.781	0.003	166.668	0.023
7/4/2021	4011896.73	0.002	303887.782	0.004	166.67	0.026
7/5/2021	4011896.729	0.003	303887.785	0.009	166.659	0.012
7/6/2021	4011896.73	0.004	303887.782	0.003	166.666	0.024
7/7/2021	4011896.727	0.005	303887.788	0.009	166.664	0.014
7/8/2021	4011896.73	0.008	303887.784	0.001	166.664	0.017
7/9/2021	4011896.729	0.007	303887.782	0.004	166.66	0.017
7/10/2021	4011896.73	0.004	303887.783	0.002	166.669	0.017
7/11/2021	4011896.729	0.004	303887.782	0.005	166.668	0.022
7/12/2021	4011896.73	0.003	303887.787	0.01	166.668	0.007
7/13/2021	4011896.73	0.005	303887.782	0.003	166.661	0.014
7/14/2021	4011896.729	0.005	303887.782	0.002	166.665	0.017
7/15/2021	4011896.726	0.002	303887.784	0.003	166.663	0.019
7/16/2021	4011896.73	0.004	303887.787	0.012	166.671	0.025

7/17/2021	4011896.725	0.009	303887.779	0.006	166.666	0.006
7/18/2021	4011896.728	0.002	303887.781	0.019	166.684	0.051
7/19/2021	4011896.729	0.003	303887.786	0.009	166.66	0.014
7/20/2021	4011896.731	0.005	303887.783	0.001	166.665	0.007
7/21/2021	4011896.731	0.006	303887.783	0.002	166.665	0.024
7/22/2021	4011896.73	0.004	303887.784	0.004	166.666	0.022
7/23/2021	4011896.73	0.002	303887.788	0.01	166.665	0.013
7/24/2021	4011896.73	0.002	303887.785	0.003	166.666	0.007
7/25/2021	4011896.732	0.002	303887.777	0.022	166.669	0.004
7/26/2021	4011896.729	0.003	303887.785	0.003	166.655	0.007
7/27/2021	4011896.726	0.016	303887.782	0.002	166.658	0.021
7/28/2021	4011896.732	0.005	303887.787	0.002	166.67	0.011
7/29/2021	4011896.73	0.002	303887.785	0.001	166.666	0.012
7/30/2021	4011896.731	0.002	303887.783	0.003	166.666	0.009
7/31/2021	4011896.728	0.003	303887.785	0.002	166.665	0.013
8/1/2021	4011896.73	0.007	303887.786	0.001	166.676	0.01
8/2/2021	4011896.73	0.004	303887.784	0.003	166.665	0.011
8/3/2021	4011896.729	0.007	303887.787	0.006	166.666	0.012
8/4/2021	4011896.731	0.005	303887.787	0.004	166.662	0.014
8/5/2021	4011896.73	0.007	303887.786	0.005	166.664	0.002
8/6/2021	4011896.729	0.006	303887.785	0.003	166.67	0.009
8/7/2021	4011896.729	0.005	303887.785	0.001	166.669	0.014
8/8/2021	4011896.726	0.006	303887.786	0.005	166.661	0.034
8/9/2021	4011896.729	0.005	303887.782	0.001	166.667	0.009
8/10/2021	4011896.73	0.004	303887.785	0.002	166.667	0.019
8/11/2021	4011896.729	0.004	303887.785	0	166.667	0.01
8/12/2021	4011896.73	0.006	303887.784	0.001	166.666	0.009
8/13/2021	4011896.731	0.001	303887.785	0.01	166.658	0.007
8/14/2021	4011896.731	0.001	303887.785	0.01	166.658	0.007
8/15/2021	4011896.731	0.006	303887.785	0.006	166.676	0.015
8/16/2021	4011896.728	0.011	303887.786	0.004	166.67	0.016
8/17/2021	4011896.726	0.011	303887.785	0.008	166.673	0.033
8/18/2021	4011896.73	0.007	303887.786	0.003	166.662	0.013
8/19/2021	4011896.73	0.004	303887.781	0.005	166.675	0.024
8/20/2021	4011896.728	0.001	303887.785	0.002	166.665	0.024
8/21/2021	4011896.731	0.001	303887.786	0.011	166.65	0.012

8/22/2021	4011896.731	0.004	303887.784	0.003	166.668	0.02
8/23/2021	4011896.728	0.004	303887.785	0.003	166.668	0.007
8/24/2021	4011896.729	0.006	303887.787	0.002	166.674	0.012
8/25/2021	4011896.728	0.005	303887.785	0.002	166.666	0.004
8/26/2021	4011896.731	0.005	303887.787	0.013	166.659	0.01
8/27/2021	4011896.732	0.004	303887.789	0.005	166.662	0.007
8/28/2021	4011896.729	0.006	303887.788	0.001	166.669	0.009
8/29/2021	4011896.73	0.01	303887.787	0.003	166.66	0.01
8/30/2021	4011896.732	0.011	303887.785	0.003	166.662	0.017
8/31/2021	4011896.73	0.004	303887.785	0.004	166.671	0.02
9/1/2021	4011896.731	0.006	303887.789	0.008	166.661	0.002
9/2/2021	4011896.731	0.005	303887.785	0.002	166.669	0.019
9/3/2021	4011896.728	0.002	303887.792	0.01	166.668	0.002
9/4/2021	4011896.732	0.005	303887.786	0.004	166.678	0.014
9/5/2021	4011896.733	0.008	303887.785	0.004	166.674	0.016
9/6/2021	4011896.73	0.001	303887.785	0.007	166.67	0.02
9/7/2021	4011896.729	0.007	303887.784	0.003	166.671	0.013
9/8/2021	4011896.731	0.006	303887.784	0.004	166.666	0.011
9/9/2021	4011896.731	0.006	303887.787	0.008	166.663	0.009
9/10/2021	4011896.731	0.005	303887.785	0.003	166.666	0.004
9/11/2021	4011896.73	0.004	303887.785	0.005	166.671	0.015
9/12/2021	4011896.729	0.005	303887.786	0.005	166.672	0.014
9/13/2021	4011896.729	0.005	303887.787	0.005	166.677	0.004
9/14/2021	4011896.73	0.008	303887.788	0.005	166.671	0.013
9/15/2021	4011896.731	0.004	303887.786	0.004	166.681	0.023
9/16/2021	4011896.731	0.006	303887.787	0.007	166.663	0.011
9/17/2021	4011896.73	0.006	303887.788	0.004	166.674	0.018
9/18/2021	4011896.73	0.002	303887.785	0.003	166.666	0.01
9/19/2021	4011896.73	0.003	303887.788	0.003	166.673	0.009
9/20/2021	4011896.729	0.006	303887.784	0.005	166.671	0.006
9/21/2021	4011896.73	0.007	303887.787	0.003	166.673	0.007
9/22/2021	4011896.73	0.004	303887.788	0.007	166.673	0.017
9/23/2021	4011896.731	0.005	303887.786	0.007	166.667	0.013
9/24/2021	4011896.73	0.005	303887.786	0.006	166.672	0.016
9/25/2021	4011896.73	0.004	303887.785	0.007	166.671	0.012
9/26/2021	4011896.73	0.006	303887.785	0.006	166.671	0.009

9/27/2021	4011896.729	0.007	303887.786	0.006	166.673	0.012
9/28/2021	4011896.73	0.004	303887.786	0.005	166.676	0.015
9/29/2021	4011896.729	0.007	303887.785	0.01	166.659	0.007
9/30/2021	4011896.729	0.003	303887.785	0.013	166.67	0.007
10/1/2021	4011896.73	0.002	303887.785	0.005	166.669	0.018
10/2/2021	4011896.73	0.001	303887.788	0.007	166.656	0.026
10/3/2021	4011896.727	0.002	303887.788	0.007	166.67	0.014
10/4/2021	4011896.729	0.004	303887.785	0.006	166.672	0.005
10/5/2021	4011896.73	0.002	303887.787	0.01	166.668	0.013
10/6/2021	4011896.726	0.001	303887.787	0.005	166.666	0.022
10/7/2021	4011896.731	0.001	303887.789	0.006	166.664	0.001
10/8/2021	4011896.73	0.005	303887.784	0.006	166.665	0.006
10/9/2021	4011896.729	0.005	303887.786	0.003	166.672	0.013
10/10/2021	4011896.73	0.006	303887.787	0.004	166.667	0.014
10/11/2021	4011896.727	0.004	303887.788	0.008	166.674	0.003
10/12/2021	4011896.727	0.001	303887.788	0.009	166.669	0.012
10/13/2021	4011896.73	0.003	303887.783	0.006	166.66	0.013
10/14/2021	4011896.726	0.006	303887.785	0.004	166.678	0.012
10/15/2021	4011896.727	0.002	303887.788	0.008	166.662	0.008
10/16/2021	4011896.729	0.004	303887.785	0.008	166.668	0.017
10/17/2021	4011896.729	0.004	303887.785	0.008	166.665	0.008
10/18/2021	4011896.729	0.005	303887.784	0.006	166.668	0.008
10/19/2021	4011896.729	0.006	303887.784	0.007	166.665	0.004
10/20/2021	4011896.73	0.003	303887.786	0.008	166.669	0.011
10/21/2021	4011896.727	0.002	303887.788	0.007	166.669	0.016
10/22/2021	4011896.729	0.002	303887.785	0.007	166.67	0.007
10/23/2021	4011896.728	0.003	303887.786	0.01	166.663	0.01
10/24/2021	4011896.729	0.006	303887.783	0.007	166.668	0.009
10/25/2021	4011896.728	0.002	303887.787	0.009	166.67	0.015
10/26/2021	4011896.728	0.005	303887.783	0.008	166.665	0.008
10/27/2021	4011896.728	0.004	303887.785	0.009	166.665	0.014
10/28/2021	4011896.729	0.002	303887.786	0.009	166.667	0.018
10/29/2021	4011896.726	0.002	303887.784	0.009	166.666	0.015
10/30/2021	4011896.726	0.001	303887.785	0.009	166.665	0.014
10/31/2021	4011896.728	0.002	303887.785	0.009	166.667	0.019
11/1/2021	4011896.728	0.001	303887.784	0.01	166.668	0.015

11/2/2021	4011896.728	0	303887.784	0.01	166.667	0.017
11/3/2021	4011896.726	0.002	303887.784	0.01	166.666	0.018
11/4/2021	4011896.726	0.001	303887.784	0.01	166.668	0.017
11/5/2021	4011896.728	0.005	303887.783	0.01	166.665	0.016
11/6/2021	4011896.726	0.002	303887.785	0.011	166.668	0.017
11/7/2021	4011896.731	0.004	303887.783	0.01	166.668	0.018
11/8/2021	4011896.731	0.005	303887.784	0.007	166.669	0.022
11/9/2021	4011896.731	0.006	303887.782	0.008	166.658	0.011
11/10/2021						
11/11/2021	4011896.729	0.001	303887.784	0.009	166.667	0.013
11/12/2021	4011896.729	0.002	303887.784	0.009	166.667	0.013
11/13/2021	4011896.728	0.003	303887.784	0.011	166.67	0.013
11/14/2021	4011896.73	0.003	303887.781	0.01	166.667	0.016
11/15/2021	4011896.729	0.004	303887.781	0.011	166.668	0.013
11/16/2021	4011896.728	0.002	303887.783	0.009	166.672	0.013
11/17/2021	4011896.731	0.004	303887.784	0.006	166.669	0.015
11/18/2021	4011896.729	0.004	303887.786	0.007	166.666	0.012
11/19/2021	4011896.73	0.007	303887.782	0.005	166.661	0.006
11/20/2021	4011896.731	0.006	303887.781	0.008	166.67	0.009
11/21/2021	4011896.73	0.004	303887.783	0.006	166.666	0.018
11/22/2021	4011896.73	0.006	303887.782	0.006	166.66	0.005
11/23/2021	4011896.73	0.006	303887.781	0.007	166.661	0.003
11/24/2021	4011896.73	0.005	303887.782	0.005	166.667	0.006
11/25/2021	4011896.73	0.005	303887.782	0.006	166.656	0.013
11/26/2021	4011896.73	0.007	303887.78	0.006	166.66	0.006
11/27/2021	4011896.731	0.006	303887.78	0.006	166.659	0.004
11/28/2021	4011896.73	0.007	303887.781	0.006	166.657	0.005
11/29/2021	4011896.729	0.004	303887.784	0.005	166.664	0.01
11/30/2021	4011896.73	0.008	303887.781	0.007	166.66	0.003
12/1/2021	4011896.729	0.004	303887.78	0.01	166.665	0.016
12/2/2021	4011896.728	0.004	303887.784	0.011	166.666	0.01
12/3/2021	4011896.73	0.006	303887.78	0.01	166.658	0.011
12/4/2021	4011896.729	0.007	303887.782	0.007	166.67	0.009
12/5/2021	4011896.731	0.006	303887.78	0.009	166.664	0.013
12/6/2021						
12/7/2021	4011896.73	0.006	303887.779	0.009	166.663	0.01

12/8/2021	4011896.729	0.006	303887.779	0.01	166.661	0.013
12/9/2021	4011896.73	0.006	303887.779	0.01	166.665	0.011
12/10/2021	4011896.73	0.006	303887.779	0.01	166.665	0.009
12/11/2021	4011896.728	0.003	303887.781	0.016	166.668	0.016
12/12/2021	4011896.727	0.004	303887.781	0.013	166.666	0.01
12/13/2021	4011896.73	0.006	303887.779	0.008	166.663	0.011
12/14/2021	4011896.728	0.002	303887.782	0.009	166.671	0.019
12/15/2021	4011896.728	0.006	303887.778	0.006	166.663	0.019
12/16/2021	4011896.73	0.006	303887.781	0.008	166.659	0.009
12/17/2021	4011896.732	0.004	303887.78	0.011	166.663	0.011
12/18/2021	4011896.728	0.002	303887.779	0.01	166.665	0.016
12/19/2021	4011896.728	0.007	303887.779	0.007	166.66	0.012
12/20/2021	4011896.73	0.004	303887.779	0.014	166.664	0.015
12/21/2021	4011896.725	0.003	303887.78	0.014	166.662	0.007
12/22/2021	4011896.729	0.006	303887.778	0.01	166.661	0.012
12/23/2021	4011896.728	0.002	303887.782	0.012	166.665	0.015
12/24/2021	4011896.728	0.006	303887.779	0.009	166.661	0.007
12/25/2021	4011896.728	0.001	303887.781	0.009	166.663	0.014
12/26/2021	4011896.728	0.006	303887.779	0.009	166.661	0.008
12/27/2021	4011896.724	0.002	303887.783	0.01	166.664	0.009
12/28/2021	4011896.729	0.004	303887.778	0.008	166.668	0.021
12/29/2021	4011896.728	0.006	303887.779	0.01	166.659	0.008
12/30/2021	4011896.729	0.005	303887.779	0.012	166.667	0.014
12/31/2021	4011896.729	0.006	303887.779	0.011	166.666	0.017
1/1/2022	4011896.73	0.007	303887.779	0.009	166.658	0.012
1/2/2022	4011896.728	0.009	303887.778	0.008	166.658	0.014
1/3/2022	4011896.728	0.003	303887.781	0.014	166.666	0.012
1/4/2022	4011896.728	0.001	303887.781	0.012	166.667	0.015
1/5/2022	4011896.729	0.004	303887.778	0.013	166.666	0.015
1/6/2022	4011896.728	0.007	303887.777	0.009	166.659	0.011
1/7/2022	4011896.727	0.005	303887.779	0.015	166.665	0.013
1/8/2022	4011896.728	0.005	303887.777	0.012	166.665	0.015
1/9/2022	4011896.727	0.003	303887.779	0.012	166.664	0.016
1/10/2022	4011896.729	0.005	303887.778	0.014	166.663	0.015
1/11/2022	4011896.728	0.003	303887.779	0.012	166.667	0.013
1/12/2022	4011896.728	0.003	303887.779	0.011	166.666	0.013

1/13/2022	4011896.729	0.004	303887.777	0.012	166.666	0.016
1/14/2022	4011896.728	0.001	303887.779	0.011	166.668	0.017
1/15/2022	4011896.73	0.005	303887.777	0.015	166.664	0.016
1/16/2022	4011896.727	0.003	303887.777	0.014	166.667	0.015
1/17/2022	4011896.725	0.003	303887.779	0.014	166.666	0.015
1/18/2022	4011896.73	0.005	303887.777	0.012	166.668	0.013
1/19/2022	4011896.729	0.004	303887.779	0.013	166.665	0.015
1/20/2022	4011896.729	0.01	303887.776	0.008	166.66	0.012
1/21/2022	4011896.728	0.008	303887.776	0.01	166.66	0.012
1/22/2022	4011896.729	0.009	303887.776	0.009	166.66	0.011
1/23/2022	4011896.73	0.004	303887.777	0.014	166.666	0.015
1/24/2022	4011896.73	0.005	303887.775	0.009	166.659	0.009
1/25/2022	4011896.731	0.006	303887.777	0.012	166.666	0.011
1/26/2022	4011896.728	0.008	303887.774	0.009	166.659	0.011
1/27/2022	4011896.73	0.005	303887.777	0.012	166.663	0.019
1/28/2022	4011896.727	0.003	303887.779	0.015	166.663	0.014
1/29/2022	4011896.727	0.003	303887.778	0.013	166.666	0.014
1/30/2022	4011896.728	0.002	303887.779	0.012	166.665	0.017
1/31/2022	4011896.729	0.002	303887.778	0.012	166.666	0.016
2/1/2022	4011896.731	0.006	303887.776	0.009	166.668	0.011
2/2/2022	4011896.727	0.002	303887.779	0.013	166.665	0.014
2/3/2022	4011896.728	0.008	303887.774	0.009	166.658	0.013
2/4/2022	4011896.728	0.01	303887.773	0.009	166.66	0.013
2/5/2022	4011896.727	0.005	303887.778	0.015	166.669	0.015
2/6/2022	4011896.727	0.002	303887.778	0.014	166.666	0.019
2/7/2022	4011896.73	0.005	303887.776	0.013	166.663	0.016
2/8/2022	4011896.73	0.006	303887.775	0.011	166.665	0.016
2/9/2022	4011896.73	0.005	303887.776	0.011	166.665	0.022
2/10/2022	4011896.729	0.006	303887.775	0.009	166.659	0.011
2/11/2022	4011896.73	0.005	303887.776	0.012	166.665	0.016
2/12/2022	4011896.729	0.004	303887.779	0.012	166.664	0.016
2/13/2022	4011896.729	0.008	303887.774	0.008	166.66	0.007
2/14/2022	4011896.731	0.005	303887.776	0.013	166.663	0.018
2/15/2022	4011896.73	0.005	303887.777	0.01	166.665	0.018
2/16/2022	4011896.729	0.005	303887.776	0.006	166.66	0.014
2/17/2022	4011896.73	0.005	303887.777	0.013	166.667	0.01

2/18/2022	4011896.729	0.008	303887.775	0.009	166.657	0.012
2/19/2022	4011896.73	0.005	303887.776	0.012	166.664	0.019
2/20/2022	4011896.728	0.002	303887.778	0.008	166.668	0.014
2/21/2022	4011896.727	0.002	303887.778	0.009	166.666	0.017
2/22/2022	4011896.729	0.003	303887.776	0.009	166.666	0.016
2/23/2022	4011896.729	0.006	303887.776	0.014	166.664	0.015
2/24/2022	4011896.728	0.005	303887.775	0.007	166.653	0.017
2/25/2022	4011896.728	0.009	303887.773	0.01	166.66	0.013
2/26/2022	4011896.729	0.007	303887.773	0.014	166.662	0.018
2/27/2022	4011896.728	0.007	303887.774	0.009	166.657	0.013
2/28/2022	4011896.729	0.007	303887.774	0.009	166.658	0.013
3/1/2022	4011896.73	0.008	303887.774	0.009	166.659	0.009
3/2/2022	4011896.73	0.006	303887.774	0.009	166.658	0.008
3/3/2022	4011896.731	0.005	303887.777	0.01	166.664	0.016
3/4/2022	4011896.73	0.005	303887.775	0.009	166.656	0.012
3/5/2022	4011896.728	0.003	303887.777	0.011	166.664	0.007
3/6/2022	4011896.725	0.002	303887.778	0.007	166.666	0.025
3/7/2022	4011896.728	0.009	303887.775	0.01	166.658	0.008
3/8/2022	4011896.73	0.005	303887.775	0.012	166.665	0.015
3/9/2022	4011896.728	0.007	303887.774	0.01	166.657	0.009
3/10/2022	4011896.728	0.002	303887.779	0.011	166.662	0.014
3/11/2022	4011896.729	0.006	303887.775	0.009	166.658	0.01
3/12/2022	4011896.728	0.007	303887.774	0.01	166.659	0.013
3/13/2022	4011896.73	0.005	303887.775	0.01	166.663	0.019
3/14/2022	4011896.728	0.003	303887.779	0.011	166.666	0.014
3/15/2022	4011896.729	0.006	303887.775	0.009	166.665	0.018
3/16/2022	4011896.729	0.002	303887.776	0.009	166.654	0.014
3/17/2022	4011896.73	0.005	303887.777	0.009	166.652	0.013
3/18/2022	4011896.727	0.001	303887.779	0.01	166.664	0.013
3/19/2022	4011896.729	0.008	303887.776	0.009	166.661	0.01
3/20/2022	4011896.73	0.004	303887.775	0.009	166.657	0.009
3/21/2022	4011896.729	0.001	303887.779	0.01	166.662	0.018
3/22/2022	4011896.729	0.005	303887.776	0.01	166.657	0.011
3/23/2022	4011896.727	0.002	303887.778	0.011	166.667	0.021
3/24/2022	4011896.729	0.004	303887.775	0.01	166.663	0.019
3/25/2022	4011896.73	0.004	303887.776	0.011	166.663	0.023

3/26/2022	4011896.729	0.005	303887.775	0.009	166.658	0.009
3/27/2022	4011896.73	0.004	303887.775	0.01	166.663	0.023
3/28/2022	4011896.731	0.005	303887.775	0.009	166.659	0.012
3/29/2022	4011896.728	0.005	303887.776	0.006	166.664	0.018
3/30/2022	4011896.73	0.005	303887.775	0.01	166.659	0.019
3/31/2022	4011896.729	0.006	303887.774	0.01	166.658	0.013
4/1/2022	4011896.73	0.006	303887.775	0.011	166.666	0.02
4/2/2022	4011896.728	0	303887.778	0.01	166.663	0.018
4/3/2022	4011896.73	0.005	303887.776	0.009	166.661	0.007
4/4/2022	4011896.731	0.006	303887.776	0.01	166.661	0.022
4/5/2022	4011896.73	0.002	303887.777	0.008	166.659	0.003
4/6/2022	4011896.73	0.006	303887.776	0.009	166.658	0.008
4/7/2022	4011896.73	0.006	303887.777	0.008	166.655	0.007
4/8/2022	4011896.73	0.006	303887.777	0.008	166.655	0.009
4/9/2022	4011896.73	0.006	303887.776	0.009	166.655	0.008
4/10/2022	4011896.727	0.001	303887.778	0.01	166.666	0.016
4/11/2022	4011896.728	0.003	303887.779	0.009	166.66	0.006
4/12/2022	4011896.728	0.004	303887.778	0.009	166.665	0.023
4/13/2022	4011896.73	0.006	303887.777	0.006	166.659	0.005
4/14/2022	4011896.729	0.006	303887.776	0.009	166.656	0.009
4/15/2022	4011896.73	0.004	303887.776	0.009	166.665	0.025
4/16/2022	4011896.73	0.006	303887.776	0.01	166.665	0.02
4/17/2022	4011896.729	0.005	303887.777	0.008	166.666	0.022
4/18/2022	4011896.729	0.006	303887.776	0.008	166.66	0.01
4/19/2022	4011896.728	0.002	303887.779	0.01	166.666	0.014
4/20/2022	4011896.729	0.003	303887.779	0.01	166.66	0.017
4/21/2022	4011896.731	0.006	303887.779	0.009	166.665	0.011
4/22/2022	4011896.728	0.003	303887.779	0.009	166.655	0.008
4/23/2022	4011896.729	0.008	303887.777	0.007	166.665	0.013
4/24/2022	4011896.73	0.006	303887.775	0.008	166.665	0.018
4/25/2022	4011896.73	0.005	303887.776	0.009	166.665	0.017
4/26/2022	4011896.729	0.006	303887.777	0.01	166.665	0.021
4/27/2022	4011896.728	0.002	303887.779	0.009	166.667	0.022
4/28/2022	4011896.729	0.003	303887.775	0.006	166.669	0.023
4/29/2022	4011896.73	0.006	303887.776	0.01	166.656	0.011
4/30/2022	4011896.728	0.004	303887.779	0.009	166.659	0.026

5/1/2022	4011896.73	0.005	303887.779	0.01	166.657	0.014
5/2/2022	4011896.729	0.005	303887.776	0.009	166.669	0.021
5/3/2022	4011896.728	0.005	303887.778	0.009	166.659	0.007
5/4/2022	4011896.729	0.004	303887.777	0.007	166.662	0.023
5/5/2022	4011896.73	0.008	303887.777	0.012	166.66	0.018
5/6/2022	4011896.727	0.003	303887.779	0.011	166.658	0.013
5/7/2022	4011896.726	0.003	303887.772	0.008	166.665	0.013
5/8/2022	4011896.723	0.003	303887.777	0.006	166.686	0.025
5/9/2022	4011896.724	0.003	303887.778	0.007	166.676	0.02
5/10/2022	4011896.726	0.003	303887.775	0.005	166.675	0.01
5/11/2022	4011896.727	0.003	303887.78	0.009	166.668	0.016
5/12/2022	4011896.728	0.003	303887.779	0.011	166.663	0.024
5/13/2022	4011896.723	0.003	303887.778	0.004	166.677	0.007
5/14/2022	4011896.727	0.009	303887.779	0.002	166.669	0.013
5/15/2022	4011896.727	0.003	303887.775	0.007	166.661	0.018
5/16/2022	4011896.727	0.004	303887.781	0.013	166.667	0.017
5/17/2022	4011896.729	0.002	303887.78	0.011	166.654	0.016
5/18/2022	4011896.728	0.007	303887.78	0.011	166.662	0.027
5/19/2022	4011896.729	0.003	303887.782	0.011	166.664	0.015
5/20/2022	4011896.73	0.008	303887.778	0.002	166.658	0.017
5/21/2022	4011896.73	0.002	303887.779	0.009	166.66	0.02
5/22/2022	4011896.735	0.003	303887.798	0.002	166.73	0.01
5/23/2022	4011896.736	0.002	303887.799	0.002	166.734	0.009
5/24/2022	4011896.736	0.002	303887.798	0.002	166.733	0.009
5/25/2022	4011896.736	0.002	303887.798	0.002	166.736	0.009
5/26/2022	4011896.735	0.002	303887.798	0.002	166.733	0.009
5/27/2022	4011896.734	0.002	303887.798	0.002	166.731	0.009
5/28/2022	4011896.733	0.002	303887.799	0.002	166.744	0.009
5/29/2022	4011896.735	0.002	303887.799	0.002	166.74	0.009
5/30/2022	4011896.735	0.002	303887.8	0.002	166.744	0.009
5/31/2022	4011896.735	0.002	303887.8	0.002	166.743	0.009
6/1/2022	4011896.735	0.002	303887.797	0.002	166.74	0.009
6/2/2022	4011896.735	0.002	303887.797	0.002	166.739	0.009
6/3/2022	4011896.735	0.002	303887.799	0.002	166.737	0.009
6/4/2022	4011896.732	0.002	303887.799	0.002	166.739	0.009
6/5/2022	4011896.735	0.002	303887.8	0.002	166.738	0.009

6/6/2022	4011896.734	0.002	303887.799	0.002	166.739	0.009
6/7/2022	4011896.733	0.002	303887.798	0.002	166.736	0.009
6/8/2022	4011896.734	0.002	303887.798	0.002	166.738	0.009
6/9/2022	4011896.735	0.002	303887.799	0.002	166.733	0.009
6/10/2022	4011896.735	0.002	303887.799	0.002	166.738	0.009
6/11/2022	4011896.734	0.002	303887.8	0.002	166.736	0.009
6/12/2022	4011896.734	0.002	303887.801	0.002	166.735	0.009
6/13/2022	4011896.735	0.002	303887.802	0.002	166.742	0.009
6/14/2022	4011896.734	0.002	303887.801	0.002	166.74	0.009
6/15/2022	4011896.735	0.002	303887.802	0.002	166.744	0.009
6/16/2022	4011896.734	0.002	303887.802	0.002	166.744	0.009
6/17/2022	4011896.732	0.002	303887.801	0.002	166.744	0.009
6/18/2022	4011896.733	0.002	303887.802	0.002	166.739	0.009
6/19/2022	4011896.734	0.002	303887.802	0.002	166.746	0.009
6/20/2022	4011896.734	0.002	303887.801	0.002	166.739	0.009
6/21/2022	4011896.735	0.002	303887.8	0.002	166.738	0.009
6/22/2022	4011896.735	0.002	303887.802	0.002	166.733	0.009
6/23/2022	4011896.735	0.002	303887.801	0.002	166.739	0.009
6/24/2022	4011896.733	0.002	303887.803	0.002	166.738	0.009
6/25/2022	4011896.734	0.002	303887.803	0.002	166.742	0.009
6/26/2022	4011896.735	0.002	303887.802	0.002	166.742	0.009
6/27/2022	4011896.735	0.002	303887.802	0.002	166.739	0.009
6/28/2022	4011896.734	0.002	303887.802	0.002	166.739	0.009
6/29/2022	4011896.736	0.002	303887.803	0.002	166.742	0.009
6/30/2022	4011896.734	0.002	303887.803	0.002	166.742	0.009
7/1/2022	4011896.733	0.002	303887.802	0.002	166.745	0.009
7/2/2022	4011896.734	0.002	303887.802	0.002	166.744	0.009
7/3/2022	4011896.734	0.002	303887.802	0.002	166.75	0.009
7/4/2022	4011896.734	0.002	303887.803	0.002	166.743	0.009
7/5/2022	4011896.733	0.002	303887.806	0.002	166.749	0.009
7/6/2022	4011896.734	0.002	303887.803	0.002	166.741	0.009
7/7/2022	4011896.734	0.002	303887.804	0.002	166.746	0.009
7/8/2022	4011896.735	0.002	303887.804	0.002	166.748	0.009
7/9/2022	4011896.733	0.002	303887.804	0.002	166.74	0.009
7/10/2022	4011896.734	0.002	303887.802	0.002	166.746	0.009
7/11/2022	4011896.733	0.002	303887.803	0.002	166.751	0.009

7/12/2022	4011896.735	0.002	303887.804	0.002	166.752	0.009
7/13/2022	4011896.733	0.002	303887.805	0.002	166.74	0.009
7/14/2022	4011896.735	0.002	303887.804	0.002	166.742	0.009
7/15/2022	4011896.735	0.002	303887.804	0.002	166.749	0.009
7/16/2022	4011896.73	0.002	303887.807	0.002	166.751	0.009
7/17/2022	4011896.728	0.002	303887.809	0.002	166.754	0.009
7/18/2022	4011896.73	0.002	303887.807	0.002	166.748	0.009
7/19/2022	4011896.728	0.002	303887.81	0.002	166.749	0.009
7/20/2022	4011896.729	0.002	303887.809	0.002	166.753	0.009
7/21/2022	4011896.732	0.002	303887.809	0.002	166.751	0.009
7/22/2022	4011896.732	0.002	303887.808	0.002	166.754	0.009
7/23/2022	4011896.733	0.002	303887.808	0.002	166.754	0.009
7/24/2022	4011896.732	0.002	303887.809	0.002	166.755	0.009
7/25/2022	4011896.733	0.002	303887.808	0.002	166.747	0.009
7/26/2022	4011896.732	0.002	303887.81	0.002	166.751	0.009
7/27/2022	4011896.731	0.002	303887.807	0.002	166.754	0.009
7/28/2022	4011896.733	0.002	303887.807	0.002	166.747	0.009
7/29/2022	4011896.732	0.002	303887.808	0.002	166.744	0.009
7/30/2022	4011896.732	0.002	303887.806	0.002	166.74	0.009
7/31/2022	4011896.73	0.002	303887.806	0.002	166.745	0.009
8/1/2022	4011896.732	0.002	303887.805	0.002	166.753	0.009
8/2/2022	4011896.73	0.002	303887.808	0.002	166.742	0.009
8/3/2022	4011896.732	0.002	303887.809	0.002	166.748	0.009
8/4/2022	4011896.733	0.002	303887.807	0.002	166.75	0.009
8/5/2022	4011896.733	0.002	303887.807	0.002	166.746	0.009
8/6/2022	4011896.733	0.002	303887.807	0.002	166.748	0.009
8/7/2022	4011896.734	0.002	303887.807	0.002	166.748	0.009
8/8/2022	4011896.735	0.002	303887.805	0.002	166.747	0.009
8/9/2022	4011896.732	0.002	303887.806	0.002	166.745	0.009
8/10/2022	4011896.734	0.003	303887.804	0.003	166.743	0.012
8/11/2022	4011896.732	0.003	303887.803	0.003	166.753	0.012
8/12/2022	4011896.732	0.003	303887.803	0.003	166.761	0.012
8/13/2022	4011896.733	0.003	303887.803	0.003	166.753	0.011
8/14/2022	4011896.732	0.003	303887.804	0.003	166.749	0.012
8/15/2022	4011896.734	0.002	303887.805	0.002	166.746	0.01
8/16/2022	4011896.73	0.002	303887.807	0.002	166.751	0.009

8/17/2022	4011896.735	0.002	303887.806	0.002	166.737	0.009
8/18/2022	4011896.735	0.003	303887.804	0.003	166.749	0.014
8/19/2022	4011896.734	0.003	303887.805	0.003	166.739	0.013
8/20/2022	4011896.733	0.003	303887.804	0.003	166.761	0.013
8/21/2022	4011896.735	0.003	303887.805	0.003	166.748	0.013
8/22/2022	4011896.736	0.003	303887.807	0.003	166.733	0.013
8/23/2022	4011896.736	0.003	303887.802	0.004	166.747	0.014
8/24/2022	4011896.734	0.003	303887.806	0.004	166.745	0.014
8/25/2022	4011896.734	0.003	303887.807	0.003	166.742	0.013
8/26/2022	4011896.734	0.003	303887.806	0.003	166.746	0.013
8/27/2022	4011896.733	0.003	303887.808	0.003	166.74	0.013
8/28/2022	4011896.732	0.003	303887.804	0.003	166.76	0.014
8/29/2022	4011896.732	0.003	303887.806	0.004	166.753	0.014
8/30/2022	4011896.732	0.002	303887.806	0.003	166.744	0.01
8/31/2022	4011896.733	0.002	303887.807	0.002	166.739	0.009
9/1/2022	4011896.732	0.002	303887.806	0.002	166.747	0.009
9/2/2022	4011896.734	0.002	303887.807	0.002	166.741	0.009
9/3/2022	4011896.733	0.002	303887.805	0.002	166.743	0.009
9/4/2022	4011896.734	0.002	303887.807	0.002	166.738	0.009
9/5/2022	4011896.732	0.002	303887.806	0.002	166.752	0.009
9/6/2022	4011896.734	0.002	303887.807	0.002	166.741	0.009
9/7/2022	4011896.735	0.002	303887.806	0.002	166.75	0.01
9/8/2022	4011896.735	0.002	303887.805	0.003	166.744	0.01
9/9/2022	4011896.734	0.002	303887.807	0.002	166.748	0.009
9/10/2022	4011896.733	0.002	303887.809	0.002	166.741	0.009
9/11/2022	4011896.733	0.002	303887.806	0.002	166.744	0.009
9/12/2022	4011896.734	0.002	303887.806	0.002	166.745	0.009
9/13/2022	4011896.733	0.002	303887.806	0.002	166.745	0.009
9/14/2022	4011896.735	0.002	303887.806	0.002	166.743	0.009
9/15/2022	4011896.734	0.002	303887.806	0.002	166.743	0.009
9/16/2022	4011896.735	0.002	303887.805	0.002	166.737	0.009
9/17/2022	4011896.733	0.002	303887.807	0.002	166.743	0.009
9/18/2022	4011896.735	0.002	303887.806	0.002	166.743	0.009
9/19/2022	4011896.736	0.002	303887.805	0.002	166.745	0.009
9/20/2022	4011896.733	0.002	303887.807	0.002	166.749	0.009
9/21/2022	4011896.733	0.002	303887.804	0.002	166.748	0.009

9/22/2022	4011896.734	0.002	303887.807	0.002	166.746	0.009
9/23/2022	4011896.733	0.002	303887.806	0.002	166.75	0.009
9/24/2022	4011896.733	0.002	303887.806	0.002	166.75	0.009
9/25/2022	4011896.733	0.002	303887.807	0.002	166.754	0.009
9/26/2022	4011896.734	0.002	303887.806	0.002	166.748	0.009
9/27/2022	4011896.734	0.002	303887.806	0.002	166.743	0.009
9/28/2022	4011896.733	0.002	303887.806	0.002	166.741	0.009
9/29/2022	4011896.734	0.002	303887.805	0.002	166.739	0.009
9/30/2022	4011896.735	0.002	303887.805	0.002	166.744	0.009
10/1/2022	4011896.734	0.002	303887.805	0.002	166.741	0.009
10/2/2022	4011896.735	0.002	303887.805	0.002	166.74	0.009
10/3/2022	4011896.735	0.002	303887.805	0.002	166.743	0.009
10/4/2022	4011896.736	0.002	303887.804	0.002	166.743	0.009
10/5/2022	4011896.735	0.002	303887.804	0.002	166.743	0.009
10/6/2022	4011896.734	0.002	303887.804	0.002	166.743	0.009
10/7/2022	4011896.734	0.002	303887.806	0.002	166.739	0.009
10/8/2022	4011896.733	0.002	303887.805	0.002	166.74	0.009
10/9/2022	4011896.734	0.002	303887.804	0.002	166.744	0.009
10/10/2022	4011896.733	0.002	303887.804	0.002	166.742	0.009
10/11/2022	4011896.732	0.002	303887.805	0.002	166.748	0.009
10/12/2022	4011896.732	0.002	303887.805	0.002	166.75	0.009
10/13/2022	4011896.734	0.003	303887.804	0.003	166.744	0.01

8. GNSS Station Raw Data: KER7

			<u>KER7</u>			
	<u>Northing</u>		<u>Easting</u>		<u>Elev.</u>	
	<u>Mean(m)</u>		<u>Mean(m)</u>		<u>Mean(m)</u>	
	4011940.629		303889.2732		166.6693652	
<u>Date</u>		<u>Peak to</u>		<u>Peak to</u>		<u>Peak to</u>
	<u>Northing(m)</u>	<u>Peak</u>		<u>Peak</u>		<u>Peak</u>
		<u>Error (m)</u>	<u>Easting(m)</u>	<u>Error (m)</u>	<u>Elevation(m)</u>	<u>Error (m)</u>
4/22/2021	4011940.626	0.002	303889.262	0.01	166.652	0.023

4/23/2021	4011940.628	0.005	303889.263	0.007	166.65	0.02
4/24/2021	4011940.626	0	303889.265	0.007	166.652	0.017
4/25/2021	4011940.626	0	303889.265	0.007	166.658	0.019
4/26/2021	4011940.626	0.004	303889.264	0.004	166.653	0.023
4/27/2021	4011940.628	0.002	303889.266	0.007	166.652	0.023
4/28/2021	4011940.628	0.002	303889.265	0.007	166.659	0.019
4/29/2021	4011940.626	0.003	303889.266	0.008	166.65	0.018
4/30/2021	4011940.629	0.006	303889.263	0.007	166.651	0.025
5/1/2021	4011940.627	0.002	303889.265	0.006	166.66	0.029
5/2/2021	4011940.627	0.004	303889.265	0.005	166.654	0.021
5/3/2021	4011940.627	0.001	303889.265	0.007	166.652	0.024
5/4/2021	4011940.626	0.007	303889.264	0.006	166.65	0.013
5/5/2021	4011940.628	0.006	303889.264	0.009	166.648	0.02
5/6/2021	4011940.627	0.002	303889.266	0.007	166.655	0.023
5/7/2021	4011940.629	0.004	303889.265	0.005	166.658	0.019
5/8/2021	4011940.627	0.002	303889.266	0.006	166.654	0.013
5/9/2021	4011940.627	0.005	303889.265	0.006	166.655	0.027
5/10/2021	4011940.628	0.005	303889.265	0.007	166.651	0.021
5/11/2021	4011940.627	0.003	303889.265	0.009	166.655	0.024
5/12/2021	4011940.628	0.005	303889.265	0.006	166.657	0.025
5/13/2021	4011940.628	0.005	303889.265	0.006	166.652	0.021
5/14/2021	4011940.627	0.005	303889.265	0.009	166.649	0.01
5/15/2021						
5/16/2021						
5/17/2021						
5/18/2021						
5/19/2021						
5/20/2021	4011940.626	0.011	303889.264	0.001	166.648	0.009
5/21/2021	4011940.628	0.007	303889.265	0.006	166.656	0.017
5/22/2021	4011940.629	0.006	303889.266	0.003	166.648	0.022
5/23/2021	4011940.626	0.006	303889.265	0.006	166.664	0.02
5/24/2021	4011940.628	0.003	303889.265	0.008	166.648	0.008
5/25/2021	4011940.626	0.002	303889.267	0.008	166.655	0.027
5/26/2021	4011940.627		303889.266		166.652	
5/27/2021	4011940.626	0.008	303889.266	0.004	166.652	0.013
5/28/2021	4011940.627	0.004	303889.265	0.004	166.659	0.016

5/29/2021	4011940.627	0.001	303889.267	0.007	166.651	0.02
5/30/2021	4011940.627	0.004	303889.267	0.007	166.651	0.019
5/31/2021	4011940.626	0.005	303889.264	0.003	166.644	0.019
6/1/2021	4011940.627	0.004	303889.266	0.005	166.654	0.015
6/2/2021	4011940.627	0.006	303889.265	0.006	166.654	0.01
6/3/2021	4011940.627	0.002	303889.267	0.004	166.646	0.028
6/4/2021	4011940.627	0.002	303889.265	0.003	166.645	0.016
6/5/2021	4011940.627	0.004	303889.266	0.006	166.654	0.013
6/6/2021	4011940.627	0.006	303889.266	0.003	166.657	0.014
6/7/2021	4011940.627	0.005	303889.268	0.012	166.654	0.015
6/8/2021	4011940.629	0.001	303889.267	0.006	166.646	0.012
6/9/2021	4011940.627	0.009	303889.265	0.005	166.649	0.012
6/10/2021	4011940.627	0.002	303889.264	0.002	166.652	0.02
6/11/2021	4011940.626	0.004	303889.265	0.003	166.648	0.021
6/12/2021	4011940.627	0.006	303889.267	0.005	166.65	0.02
6/13/2021	4011940.627	0.004	303889.267	0.004	166.651	0.016
6/14/2021	4011940.628	0.004	303889.266	0.003	166.648	0.016
6/15/2021	4011940.626	0.004	303889.267	0.004	166.64	0.01
6/16/2021	4011940.627	0.005	303889.268	0.002	166.642	0.015
6/17/2021	4011940.625	0.006	303889.266	0.002	166.648	0.012
6/18/2021	4011940.627	0.004	303889.267	0.003	166.649	0.007
6/19/2021	4011940.626	0.004	303889.266	0.002	166.647	0.015
6/20/2021	4011940.628	0.006	303889.271	0.008	166.656	0.016
6/21/2021	4011940.627	0.007	303889.271	0.005	166.648	0.025
6/22/2021	4011940.627	0.004	303889.269	0.005	166.65	0.014
6/23/2021	4011940.627	0.002	303889.27	0.008	166.648	0.02
6/24/2021	4011940.628	0.005	303889.272	0.009	166.647	0.017
6/25/2021	4011940.626	0.006	303889.27	0.001	166.644	0.016
6/26/2021	4011940.626	0.006	303889.269	0.003	166.654	0.026
6/27/2021	4011940.624	0.009	303889.273	0.004	166.659	0.03
6/28/2021	4011940.627	0.006	303889.273	0.015	166.63	0.013
6/29/2021	4011940.628	0.002	303889.265	0.006	166.64	0.007
6/30/2021	4011940.629	0.002	303889.271	0.002	166.631	0.012
7/1/2021	4011940.629	0.004	303889.27	0.003	166.655	0.018
7/2/2021	4011940.627	0.006	303889.266	0.004	166.646	0.02
7/3/2021	4011940.626	0.006	303889.266	0.004	166.647	0.024

7/4/2021	4011940.627	0.003	303889.271	0.006	166.645	0.024
7/5/2021	4011940.628	0.004	303889.272	0.006	166.645	0.012
7/6/2021	4011940.628	0.004	303889.269	0.002	166.638	0.011
7/7/2021	4011940.628	0.009	303889.27	0.003	166.638	0.007
7/8/2021	4011940.628	0.006	303889.27	0.007	166.653	0.016
7/9/2021	4011940.627	0.008	303889.27	0.003	166.638	0.012
7/10/2021	4011940.629	0.004	303889.278	0.009	166.636	0.007
7/11/2021	4011940.626	0.002	303889.27	0.007	166.66	0.031
7/12/2021	4011940.628	0.003	303889.268	0.002	166.644	0.014
7/13/2021	4011940.629	0.005	303889.271	0.006	166.643	0.011
7/14/2021	4011940.628	0.002	303889.269	0.001	166.654	0.01
7/15/2021	4011940.627	0.004	303889.268	0.001	166.651	0.013
7/16/2021	4011940.629	0.01	303889.269	0.006	166.664	0.01
7/17/2021	4011940.623	0.01	303889.267	0.013	166.661	0.005
7/18/2021	4011940.626	0.011	303889.271	0.014	166.672	0.007
7/19/2021	4011940.628	0.002	303889.271	0.001	166.643	0.013
7/20/2021	4011940.629	0.005	303889.267	0.003	166.637	0.009
7/21/2021	4011940.629	0.003	303889.268	0.007	166.642	0.007
7/22/2021	4011940.63	0.002	303889.271	0.008	166.636	0.008
7/23/2021	4011940.629	0.003	303889.274	0.011	166.644	0.006
7/24/2021	4011940.628	0.001	303889.27	0.002	166.646	0.012
7/25/2021	4011940.627	0.006	303889.268	0.009	166.643	0.028
7/26/2021	4011940.628	0.004	303889.274	0.011	166.646	0.024
7/27/2021	4011940.632	0.002	303889.269	0.011	166.638	0.001
7/28/2021	4011940.631	0.005	303889.273	0.003	166.652	0.013
7/29/2021	4011940.629	0.001	303889.27	0.003	166.648	0.013
7/30/2021	4011940.629	0.003	303889.268	0.002	166.65	0.012
7/31/2021	4011940.628	0.003	303889.274	0.006	166.648	0.008
8/1/2021	4011940.628	0.007	303889.271	0.003	166.656	0.016
8/2/2021	4011940.627	0.006	303889.27	0.003	166.643	0.009
8/3/2021	4011940.627	0.005	303889.274	0.008	166.638	0.01
8/4/2021	4011940.629	0.005	303889.272	0.007	166.643	0.01
8/5/2021	4011940.629	0.006	303889.273	0.004	166.647	0.009
8/6/2021	4011940.627	0.005	303889.271	0.004	166.647	0.013
8/7/2021	4011940.627	0.004	303889.27	0.001	166.653	0.008
8/8/2021	4011940.627	0.006	303889.272	0.001	166.633	0.017

8/9/2021	4011940.627	0.006	303889.269	0.001	166.65	0.014
8/10/2021	4011940.628	0.004	303889.271	0.001	166.652	0.017
8/11/2021	4011940.627	0.004	303889.27	0.001	166.649	0.014
8/12/2021	4011940.628	0.005	303889.27	0.001	166.65	0.009
8/13/2021	4011940.626	0.003	303889.268	0.001	166.656	0.012
8/14/2021	4011940.629	0	303889.269	0.004	166.639	0.011
8/15/2021	4011940.629	0.007	303889.271	0.003	166.662	0.008
8/16/2021	4011940.626	0.002	303889.277	0.016	166.644	0.012
8/17/2021	4011940.628	0.009	303889.267	0.01	166.636	0.021
8/18/2021	4011940.629	0.006	303889.272	0.005	166.649	0.011
8/19/2021	4011940.629	0.003	303889.27	0.007	166.66	0.012
8/20/2021	4011940.626	0.001	303889.271	0.003	166.651	0.02
8/21/2021	4011940.627	0.003	303889.272	0.004	166.644	0.01
8/22/2021	4011940.629	0.005	303889.27	0.003	166.647	0.01
8/23/2021	4011940.627	0.004	303889.27	0.005	166.648	0.011
8/24/2021	4011940.627	0.006	303889.273	0.004	166.655	0.01
8/25/2021	4011940.626	0.005	303889.27	0.003	166.65	0.005
8/26/2021	4011940.629	0.006	303889.273	0.01	166.637	0.009
8/27/2021	4011940.63	0.002	303889.275	0.004	166.653	0.016
8/28/2021	4011940.627	0.006	303889.274	0.002	166.655	0.019
8/29/2021	4011940.628	0.008	303889.272	0.002	166.642	0.016
8/30/2021	4011940.631	0.011	303889.27	0.005	166.64	0.014
8/31/2021	4011940.629	0.006	303889.271	0.002	166.648	0.014
9/1/2021	4011940.628	0.006	303889.273	0.001	166.641	0.01
9/2/2021	4011940.629	0.007	303889.272	0.003	166.653	0.02
9/3/2021	4011940.628	0.002	303889.277	0.009	166.651	0.001
9/4/2021	4011940.629	0.003	303889.271	0.007	166.657	0.019
9/5/2021	4011940.63	0.006	303889.27	0.007	166.641	0.008
9/6/2021	4011940.63	0.005	303889.27	0.003	166.649	0.022
9/7/2021	4011940.627	0.008	303889.269	0.001	166.644	0.007
9/8/2021	4011940.629	0.005	303889.268	0.005	166.645	0.005
9/9/2021	4011940.628	0.006	303889.27	0.003	166.65	0.021
9/10/2021	4011940.62	0.016	303889.264	0.017	166.644	0.012
9/11/2021	4011940.628	0.005	303889.271	0.004	166.653	0.021
9/12/2021	4011940.629	0.006	303889.272	0.004	166.657	0.016
9/13/2021	4011940.627	0.006	303889.272	0.006	166.656	0.008

9/14/2021	4011940.628	0.006	303889.272	0.004	166.65	0.019
9/15/2021	4011940.629	0.005	303889.272	0.005	166.662	0.022
9/16/2021	4011940.63	0.007	303889.272	0.005	166.646	0.013
9/17/2021	4011940.628	0.006	303889.274	0.006	166.657	0.022
9/18/2021	4011940.628	0.005	303889.27	0.005	166.65	0.014
9/19/2021	4011940.63	0.006	303889.274	0.003	166.655	0.019
9/20/2021	4011940.627	0.007	303889.27	0.005	166.653	0.009
9/21/2021	4011940.629	0.008	303889.272	0.004	166.657	0.02
9/22/2021	4011940.629	0.004	303889.272	0.007	166.652	0.018
9/23/2021	4011940.63	0.005	303889.272	0.007	166.649	0.017
9/24/2021	4011940.629	0.005	303889.271	0.007	166.653	0.014
9/25/2021	4011940.629	0.005	303889.27	0.007	166.653	0.014
9/26/2021	4011940.628	0.006	303889.271	0.005	166.652	0.01
9/27/2021	4011940.628	0.007	303889.271	0.005	166.654	0.011
9/28/2021	4011940.628	0.004	303889.273	0.004	166.659	0.018
9/29/2021	4011940.629	0.007	303889.268	0.005	166.645	0.017
9/30/2021	4011940.627	0.004	303889.275	0.02	166.657	0.007
10/1/2021	4011940.629	0.001	303889.27	0.006	166.652	0.019
10/2/2021	4011940.629	0.001	303889.274	0.009	166.643	0.02
10/3/2021	4011940.627	0.002	303889.272	0.007	166.652	0.014
10/4/2021	4011940.627	0.005	303889.27	0.007	166.653	0.01
10/5/2021	4011940.628	0.004	303889.269	0.005	166.65	0.022
10/6/2021	4011940.628	0.005	303889.271	0.005	166.649	0.022
10/7/2021	4011940.63	0.002	303889.274	0.006	166.643	0.003
10/8/2021	4011940.629	0.005	303889.271	0.006	166.647	0.006
10/9/2021	4011940.628	0.005	303889.271	0.003	166.653	0.02
10/10/2021	4011940.628	0.006	303889.276	0.01	166.649	0.013
10/11/2021	4011940.629	0.007	303889.27	0.007	166.651	0.01
10/12/2021	4011940.628	0.002	303889.273	0.009	166.651	0.013
10/13/2021	4011940.629	0.001	303889.273	0.009	166.647	0.016
10/14/2021	4011940.626	0.006	303889.269	0.004	166.661	0.02
10/15/2021	4011940.628	0.004	303889.274	0.008	166.646	0.011
10/16/2021	4011940.627	0.001	303889.272	0.008	166.651	0.02
10/17/2021	4011940.628	0.004	303889.271	0.009	166.652	0.012
10/18/2021	4011940.628	0.005	303889.27	0.006	166.647	0.008
10/19/2021	4011940.629	0.006	303889.27	0.007	166.645	0.01

10/20/2021	4011940.627	0.004	303889.269	0.004	166.648	0.012
10/21/2021	4011940.629	0.004	303889.272	0.008	166.653	0.011
10/22/2021	4011940.629	0.006	303889.27	0.006	166.647	0.003
10/23/2021	4011940.627	0.003	303889.272	0.009	166.644	0.014
10/24/2021	4011940.627	0.003	303889.272	0.01	166.649	0.009
10/25/2021	4011940.627	0.002	303889.271	0.009	166.653	0.017
10/26/2021	4011940.628	0.004	303889.268	0.007	166.654	0.014
10/27/2021	4011940.625	0.004	303889.274	0.009	166.658	0.013
10/28/2021	4011940.627	0.002	303889.272	0.009	166.65	0.017
10/29/2021	4011940.629	0.005	303889.268	0.008	166.65	0.013
10/30/2021	4011940.628	0.005	303889.27	0.009	166.646	0.015
10/31/2021	4011940.626	0.001	303889.27	0.01	166.65	0.022
11/1/2021	4011940.628	0.006	303889.268	0.01	166.648	0.019
11/2/2021	4011940.628	0.005	303889.268	0.01	166.649	0.015
11/3/2021	4011940.626	0.001	303889.269	0.01	166.647	0.019
11/4/2021	4011940.624	0.001	303889.27	0.01	166.65	0.019
11/5/2021	4011940.628	0.005	303889.269	0.011	166.647	0.015
11/6/2021	4011940.626	0.002	303889.271	0.011	166.65	0.02
11/7/2021	4011940.63	0.005	303889.27	0.01	166.649	0.014
11/8/2021	4011940.63	0.005	303889.269	0.009	166.644	0.012
11/9/2021	4011940.63	0.006	303889.267	0.008	166.649	0.023
11/10/2021	4011940.628	0.003	303889.27	0.008	166.653	0.024
11/11/2021	4011940.628	0.004	303889.268	0.009	166.651	0.015
11/12/2021	4011940.627	0.002	303889.27	0.01	166.651	0.015
11/13/2021	4011940.627	0.003	303889.27	0.011	166.65	0.017
11/14/2021	4011940.629	0.004	303889.268	0.01	166.65	0.014
11/15/2021	4011940.628	0.001	303889.269	0.01	166.653	0.013
11/16/2021	4011940.629	0.006	303889.267	0.009	166.654	0.018
11/17/2021	4011940.629	0.004	303889.268	0.007	166.644	0.006
11/18/2021	4011940.629	0.006	303889.268	0.005	166.645	0.006
11/19/2021	4011940.629	0.007	303889.268	0.005	166.642	0.005
11/20/2021	4011940.631	0.006	303889.268	0.009	166.652	0.011
11/21/2021	4011940.629	0.003	303889.268	0.007	166.64	0.01
11/22/2021	4011940.629	0.006	303889.268	0.005	166.642	0.008
11/23/2021	4011940.63	0.006	303889.267	0.005	166.643	0.005
11/24/2021	4011940.629	0.005	303889.268	0.007	166.649	0.015

11/25/2021	4011940.63	0.006	303889.268	0.005	166.639	0.004
11/26/2021	4011940.629	0.007	303889.266	0.005	166.64	0.004
11/27/2021	4011940.63	0.006	303889.267	0.005	166.642	0.008
11/28/2021	4011940.63	0.007	303889.267	0.005	166.638	0.004
11/29/2021	4011940.629	0.006	303889.267	0.004	166.64	0.006
11/30/2021	4011940.629	0.008	303889.267	0.007	166.64	0.007
12/1/2021	4011940.629	0.005	303889.266	0.009	166.646	0.016
12/2/2021	4011940.629	0.005	303889.268	0.011	166.65	0.017
12/3/2021	4011940.629	0.007	303889.267	0.009	166.64	0.013
12/4/2021	4011940.627	0.006	303889.268	0.008	166.65	0.009
12/5/2021	4011940.629	0.007	303889.266	0.009	166.649	0.014
12/6/2021						
12/7/2021	4011940.629	0.005	303889.267	0.014	166.65	0.013
12/8/2021	4011940.628	0.007	303889.265	0.009	166.643	0.012
12/9/2021	4011940.629	0.006	303889.266	0.01	166.648	0.011
12/10/2021	4011940.629	0.006	303889.266	0.011	166.646	0.016
12/11/2021	4011940.628	0.006	303889.265	0.01	166.642	0.014
12/12/2021	4011940.627	0.004	303889.268	0.013	166.649	0.013
12/13/2021	4011940.628	0.006	303889.265	0.007	166.645	0.012
12/14/2021	4011940.628	0.005	303889.265	0.009	166.652	0.02
12/15/2021	4011940.627	0.006	303889.265	0.007	166.647	0.019
12/16/2021	4011940.629	0.006	303889.268	0.007	166.636	0.011
12/17/2021	4011940.63	0.003	303889.266	0.011	166.641	0.017
12/18/2021	4011940.629	0.006	303889.266	0.011	166.645	0.019
12/19/2021	4011940.626	0.003	303889.268	0.013	166.649	0.014
12/20/2021	4011940.629	0.005	303889.265	0.013	166.648	0.016
12/21/2021	4011940.626	0.003	303889.267	0.014	166.645	0.011
12/22/2021	4011940.629	0.006	303889.265	0.009	166.644	0.014
12/23/2021	4011940.628	0.002	303889.269	0.012	166.648	0.014
12/24/2021	4011940.628	0.006	303889.265	0.009	166.639	0.007
12/25/2021	4011940.626	0	303889.267	0.008	166.643	0.01
12/26/2021	4011940.628	0.005	303889.265	0.009	166.647	0.01
12/27/2021	4011940.624	0.002	303889.269	0.01	166.645	0.008
12/28/2021	4011940.627	0.003	303889.265	0.008	166.652	0.014
12/29/2021	4011940.628	0.006	303889.265	0.01	166.642	0.01
12/30/2021	4011940.628	0.005	303889.265	0.011	166.649	0.013

12/31/2021	4011940.627	0.002	303889.266	0.011	166.646	0.016
1/1/2022	4011940.628	0.006	303889.265	0.014	166.648	0.02
1/2/2022	4011940.627	0.01	303889.265	0.008	166.641	0.013
1/3/2022	4011940.626	0.004	303889.267	0.014	166.649	0.012
1/4/2022	4011940.628	0.004	303889.269	0.018	166.648	0.014
1/5/2022	4011940.627	0.003	303889.266	0.013	166.65	0.013
1/6/2022	4011940.629	0.004	303889.265	0.015	166.646	0.014
1/7/2022	4011940.626	0.004	303889.265	0.017	166.643	0.014
1/8/2022	4011940.627	0.006	303889.263	0.012	166.647	0.017
1/9/2022	4011940.626	0.001	303889.265	0.012	166.647	0.021
1/10/2022	4011940.625	0.004	303889.265	0.014	166.646	0.015
1/11/2022	4011940.627	0.003	303889.265	0.012	166.649	0.015
1/12/2022	4011940.628	0.005	303889.264	0.012	166.649	0.018
1/13/2022	4011940.626	0.002	303889.265	0.011	166.647	0.016
1/14/2022	4011940.629	0.005	303889.264	0.011	166.648	0.015
1/15/2022	4011940.628	0.007	303889.261	0.01	166.641	0.014
1/16/2022	4011940.626	0.002	303889.264	0.016	166.649	0.012
1/17/2022	4011940.627	0.005	303889.263	0.013	166.648	0.017
1/18/2022	4011940.628	0.005	303889.264	0.012	166.65	0.015
1/19/2022	4011940.628	0.003	303889.265	0.012	166.649	0.015
1/20/2022	4011940.628	0.01	303889.261	0.008	166.641	0.012
1/21/2022	4011940.625	0.005	303889.265	0.017	166.646	0.015
1/22/2022	4011940.629	0.006	303889.264	0.014	166.646	0.017
1/23/2022	4011940.628	0.005	303889.264	0.014	166.65	0.018
1/24/2022	4011940.628	0.005	303889.263	0.008	166.642	0.01
1/25/2022	4011940.629	0.006	303889.264	0.012	166.649	0.012
1/26/2022	4011940.628	0.005	303889.263	0.013	166.65	0.017
1/27/2022	4011940.626	0.002	303889.265	0.012	166.645	0.018
1/28/2022	4011940.626	0.003	303889.265	0.014	166.648	0.017
1/29/2022	4011940.626	0.003	303889.265	0.013	166.648	0.014
1/30/2022	4011940.629	0.005	303889.264	0.012	166.649	0.021
1/31/2022	4011940.629	0.005	303889.263	0.012	166.648	0.015
2/1/2022	4011940.629	0.006	303889.263	0.009	166.648	0.019
2/2/2022	4011940.627	0.003	303889.264	0.015	166.649	0.017
2/3/2022	4011940.625	0.004	303889.264	0.015	166.648	0.018
2/4/2022	4011940.626	0.01	303889.259	0.008	166.642	0.011

2/5/2022	4011940.627	0.01	303889.26	0.007	166.646	0.013
2/6/2022	4011940.628	0.006	303889.263	0.014	166.647	0.019
2/7/2022	4011940.629	0.006	303889.263	0.013	166.646	0.018
2/8/2022	4011940.629	0.005	303889.262	0.012	166.647	0.017
2/9/2022	4011940.629	0.005	303889.263	0.011	166.647	0.015
2/10/2022	4011940.626	0.003	303889.265	0.011	166.645	0.02
2/11/2022	4011940.629	0.004	303889.263	0.011	166.646	0.014
2/12/2022	4011940.629	0.005	303889.264	0.011	166.646	0.022
2/13/2022	4011940.628	0.007	303889.261	0.008	166.64	0.01
2/14/2022	4011940.629	0.005	303889.264	0.013	166.647	0.019
2/15/2022	4011940.629	0.004	303889.263	0.01	166.647	0.016
2/16/2022	4011940.627	0.005	303889.263	0.008	166.643	0.018
2/17/2022	4011940.627	0.005	303889.266	0.01	166.641	0.009
2/18/2022	4011940.627	0.009	303889.261	0.009	166.64	0.015
2/19/2022	4011940.628	0.005	303889.263	0.012	166.647	0.019
2/20/2022	4011940.627	0.001	303889.265	0.008	166.645	0.018
2/21/2022	4011940.627	0.006	303889.263	0.009	166.649	0.016
2/22/2022	4011940.627	0.004	303889.263	0.012	166.647	0.019
2/23/2022	4011940.627	0.006	303889.261	0.01	166.639	0.014
2/24/2022	4011940.629	0.008	303889.263	0.007	166.633	0.011
2/25/2022	4011940.627	0.009	303889.259	0.01	166.643	0.018
2/26/2022	4011940.629	0.007	303889.262	0.015	166.647	0.018
2/27/2022	4011940.625	0.002	303889.261	0.009	166.639	0.014
2/28/2022	4011940.628	0.006	303889.26	0.008	166.64	0.011
3/1/2022	4011940.629	0.006	303889.261	0.011	166.648	0.015
3/2/2022	4011940.628	0.005	303889.261	0.008	166.64	0.013
3/3/2022	4011940.629	0.005	303889.263	0.01	166.647	0.016
3/4/2022	4011940.627	0.001	303889.264	0.009	166.646	0.017
3/5/2022	4011940.627	0.006	303889.26	0.007	166.643	0.017
3/6/2022	4011940.627	0.009	303889.261	0	166.635	0.017
3/7/2022	4011940.626	0.003	303889.265	0.011	166.647	0.013
3/8/2022	4011940.629	0.005	303889.262	0.013	166.652	0.014
3/9/2022	4011940.627	0.005	303889.263	0.013	166.645	0.016
3/10/2022	4011940.626	0.002	303889.265	0.01	166.647	0.014
3/11/2022	4011940.627	0.006	303889.261	0.008	166.64	0.011
3/12/2022	4011940.628	0.005	303889.263	0.015	166.65	0.017

3/13/2022	4011940.628	0.005	303889.263	0.011	166.646	0.018
3/14/2022	4011940.628	0.005	303889.264	0.009	166.648	0.015
3/15/2022	4011940.627	0.006	303889.262	0.008	166.648	0.015
3/16/2022	4011940.628	0.006	303889.261	0.009	166.642	0.009
3/17/2022	4011940.627	0.001	303889.265	0.008	166.646	0.02
3/18/2022	4011940.627	0.005	303889.263	0.009	166.649	0.018
3/19/2022	4011940.628	0.006	303889.262	0.009	166.644	0.013
3/20/2022	4011940.628	0.004	303889.262	0.01	166.647	0.011
3/21/2022	4011940.627	0.002	303889.264	0.009	166.646	0.016
3/22/2022	4011940.626	0.001	303889.264	0.012	166.647	0.017
3/23/2022	4011940.626	0.002	303889.264	0.012	166.649	0.02
3/24/2022	4011940.629	0.005	303889.263	0.01	166.648	0.018
3/25/2022	4011940.628	0.006	303889.262	0.009	166.637	0.013
3/26/2022	4011940.627	0.005	303889.263	0.007	166.642	0.009
3/27/2022	4011940.628	0.001	303889.265	0.01	166.648	0.021
3/28/2022	4011940.628	0.005	303889.262	0.007	166.639	0.01
3/29/2022	4011940.627	0.005	303889.264	0.008	166.649	0.008
3/30/2022	4011940.628	0.006	303889.263	0.007	166.645	0.024
3/31/2022	4011940.626	0.002	303889.264	0.013	166.648	0.019
4/1/2022	4011940.628	0.005	303889.262	0.011	166.65	0.022
4/2/2022	4011940.627	0.001	303889.264	0.009	166.649	0.021
4/3/2022	4011940.627	0.005	303889.263	0.009	166.648	0.016
4/4/2022	4011940.629	0.007	303889.264	0.009	166.646	0.011
4/5/2022	4011940.627	0.005	303889.263	0.006	166.643	0.013
4/6/2022	4011940.628	0.006	303889.262	0.009	166.64	0.006
4/7/2022	4011940.628	0.006	303889.265	0.007	166.641	0.01
4/8/2022	4011940.627	0.006	303889.265	0.007	166.641	0.01
4/9/2022	4011940.628	0.006	303889.261	0.004	166.64	0.011
4/10/2022	4011940.627	0.007	303889.263	0.007	166.651	0.019
4/11/2022	4011940.628	0.006	303889.264	0.007	166.649	0.005
4/12/2022	4011940.625	0.004	303889.266	0.007	166.651	0.02
4/13/2022	4011940.624	0.006	303889.268	0.007	166.65	0.018
4/14/2022	4011940.627	0.006	303889.264	0.007	166.642	0.01
4/15/2022	4011940.628	0.004	303889.263	0.008	166.651	0.019
4/16/2022	4011940.627	0.003	303889.265	0.007	166.652	0.036
4/17/2022	4011940.627	0.006	303889.265	0.008	166.657	0.02

4/18/2022	4011940.625	0.002	303889.265	0.009	166.652	0.018
4/19/2022	4011940.625	0.002	303889.266	0.01	166.653	0.015
4/20/2022	4011940.627	0.003	303889.266	0.009	166.647	0.019
4/21/2022	4011940.627	0.004	303889.265	0.008	166.654	0.008
4/22/2022	4011940.625	0.003	303889.266	0.005	166.648	0.015
4/23/2022	4011940.627	0.009	303889.265	0.009	166.642	0.014
4/24/2022	4011940.628	0.006	303889.263	0.009	166.661	0.024
4/25/2022	4011940.628	0.004	303889.263	0.009	166.652	0.024
4/26/2022	4011940.627	0.006	303889.265	0.009	166.652	0.019
4/27/2022	4011940.626	0.002	303889.267	0.009	166.654	0.02
4/28/2022	4011940.626	0.003	303889.264	0.007	166.656	0.021
4/29/2022	4011940.627	0.002	303889.266	0.009	166.65	0.025
4/30/2022	4011940.625	0.004	303889.264	0.003	166.648	0.023
5/1/2022	4011940.627	0.005	303889.265	0.008	166.652	0.022
5/2/2022	4011940.627	0.005	303889.264	0.009	166.661	0.016
5/3/2022	4011940.626	0.004	303889.265	0.007	166.652	0.017
5/4/2022	4011940.628	0.003	303889.265	0.009	166.649	0.023
5/5/2022	4011940.628	0.007	303889.261	0.011	166.656	0.022
5/6/2022	4011940.623	0.008	303889.264	0.01	166.651	0.016
5/7/2022	4011940.625	0.002	303889.264	0.007	166.647	0.027
5/8/2022	4011940.623	0.004	303889.265	0.006	166.649	0.034
5/9/2022	4011940.625	0.004	303889.264	0.008	166.654	0.042
5/10/2022	4011940.627	0.005	303889.265	0.008	166.637	0.012
5/11/2022	4011940.626	0.003	303889.266	0.01	166.653	0.018
5/12/2022	4011940.627	0.002	303889.266	0.01	166.647	0.019
5/13/2022	4011940.622	0.004	303889.266	0.011	166.647	0.01
5/14/2022	4011940.627	0.006	303889.262	0.004	166.643	0.009
5/15/2022	4011940.625	0.004	303889.263	0.008	166.647	0.021
5/16/2022	4011940.625	0.003	303889.264	0.005	166.646	0.019
5/17/2022	4011940.624	0.002	303889.267	0.01	166.645	0.017
5/18/2022	4011940.626	0.005	303889.265	0.012	166.634	0.015
5/19/2022	4011940.627	0.003	303889.267	0.009	166.637	0.011
5/20/2022	4011940.627	0.007	303889.264	0.004	166.649	0.031
5/21/2022	4011940.628	0.004	303889.266	0.003	166.644	0.027
5/22/2022	4011940.633	0.003	303889.285	0.002	166.713	0.01
5/23/2022	4011940.634	0.002	303889.285	0.002	166.718	0.009

5/24/2022	4011940.634	0.002	303889.284	0.002	166.717	0.009
5/25/2022	4011940.634	0.002	303889.284	0.002	166.719	0.009
5/26/2022	4011940.633	0.002	303889.284	0.002	166.714	0.009
5/27/2022	4011940.632	0.002	303889.284	0.002	166.714	0.009
5/28/2022	4011940.631	0.002	303889.285	0.002	166.726	0.009
5/29/2022	4011940.632	0.002	303889.286	0.002	166.723	0.009
5/30/2022	4011940.632	0.002	303889.286	0.002	166.726	0.009
5/31/2022	4011940.633	0.002	303889.286	0.002	166.724	0.009
6/1/2022	4011940.633	0.002	303889.283	0.003	166.719	0.01
6/2/2022	4011940.633	0.002	303889.283	0.003	166.728	0.01
6/3/2022	4011940.633	0.002	303889.285	0.002	166.719	0.009
6/4/2022	4011940.63	0.002	303889.286	0.002	166.717	0.009
6/5/2022	4011940.633	0.002	303889.286	0.002	166.719	0.009
6/6/2022	4011940.633	0.002	303889.285	0.002	166.721	0.009
6/7/2022	4011940.631	0.002	303889.284	0.002	166.716	0.009
6/8/2022	4011940.633	0.002	303889.285	0.002	166.714	0.009
6/9/2022	4011940.633	0.002	303889.286	0.002	166.716	0.009
6/10/2022	4011940.633	0.002	303889.285	0.002	166.725	0.009
6/11/2022	4011940.631	0.002	303889.286	0.002	166.723	0.009
6/12/2022	4011940.631	0.002	303889.287	0.002	166.723	0.009
6/13/2022	4011940.632	0.002	303889.286	0.002	166.725	0.01
6/14/2022	4011940.631	0.003	303889.285	0.003	166.729	0.012
6/15/2022	4011940.634	0.003	303889.287	0.003	166.724	0.012
6/16/2022	4011940.631	0.003	303889.284	0.003	166.738	0.012
6/17/2022	4011940.63	0.003	303889.285	0.003	166.73	0.012
6/18/2022	4011940.631	0.003	303889.285	0.003	166.73	0.012
6/19/2022	4011940.631	0.003	303889.288	0.003	166.726	0.012
6/20/2022	4011940.632	0.003	303889.285	0.003	166.725	0.012
6/21/2022	4011940.633	0.003	303889.283	0.003	166.727	0.012
6/22/2022	4011940.632	0.003	303889.286	0.003	166.713	0.011
6/23/2022	4011940.633	0.003	303889.284	0.003	166.715	0.011
6/24/2022	4011940.629	0.003	303889.283	0.003	166.729	0.012
6/25/2022	4011940.63	0.003	303889.283	0.003	166.736	0.011
6/26/2022	4011940.631	0.003	303889.284	0.003	166.73	0.011
6/27/2022	4011940.632	0.003	303889.285	0.003	166.721	0.012
6/28/2022	4011940.632	0.003	303889.284	0.003	166.725	0.011

6/29/2022	4011940.634	0.002	303889.288	0.003	166.73	0.01
6/30/2022	4011940.632	0.002	303889.289	0.002	166.725	0.009
7/1/2022	4011940.631	0.002	303889.288	0.002	166.727	0.009
7/2/2022	4011940.632	0.002	303889.288	0.002	166.726	0.009
7/3/2022	4011940.632	0.002	303889.288	0.002	166.733	0.009
7/4/2022	4011940.632	0.002	303889.289	0.002	166.725	0.009
7/5/2022	4011940.631	0.002	303889.292	0.002	166.731	0.009
7/6/2022	4011940.632	0.002	303889.289	0.002	166.724	0.009
7/7/2022	4011940.632	0.002	303889.29	0.002	166.728	0.009
7/8/2022	4011940.633	0.002	303889.289	0.002	166.73	0.009
7/9/2022	4011940.631	0.002	303889.29	0.002	166.723	0.009
7/10/2022	4011940.632	0.002	303889.288	0.002	166.728	0.009
7/11/2022	4011940.631	0.002	303889.288	0.002	166.733	0.009
7/12/2022	4011940.633	0.002	303889.29	0.002	166.733	0.009
7/13/2022	4011940.632	0.002	303889.291	0.002	166.722	0.009
7/14/2022	4011940.633	0.002	303889.29	0.002	166.725	0.009
7/15/2022	4011940.633	0.002	303889.29	0.002	166.732	0.009
7/16/2022	4011940.628	0.002	303889.292	0.002	166.733	0.009
7/17/2022	4011940.626	0.002	303889.294	0.002	166.735	0.009
7/18/2022	4011940.627	0.002	303889.293	0.002	166.73	0.009
7/19/2022	4011940.627	0.002	303889.296	0.002	166.732	0.009
7/20/2022	4011940.628	0.002	303889.295	0.002	166.735	0.009
7/21/2022	4011940.63	0.002	303889.294	0.002	166.733	0.009
7/22/2022	4011940.631	0.002	303889.293	0.002	166.734	0.009
7/23/2022	4011940.631	0.002	303889.294	0.002	166.736	0.009
7/24/2022	4011940.629	0.002	303889.295	0.002	166.737	0.009
7/25/2022	4011940.631	0.002	303889.293	0.002	166.729	0.009
7/26/2022	4011940.63	0.002	303889.295	0.002	166.734	0.009
7/27/2022	4011940.629	0.002	303889.293	0.002	166.737	0.009
7/28/2022	4011940.631	0.002	303889.293	0.002	166.73	0.009
7/29/2022	4011940.631	0.002	303889.294	0.002	166.728	0.009
7/30/2022	4011940.63	0.002	303889.292	0.002	166.723	0.009
7/31/2022	4011940.629	0.002	303889.292	0.002	166.729	0.009
8/1/2022	4011940.63	0.002	303889.291	0.002	166.736	0.009
8/2/2022	4011940.628	0.002	303889.294	0.002	166.725	0.009
8/3/2022	4011940.63	0.002	303889.294	0.002	166.73	0.009

8/4/2022	4011940.632	0.002	303889.292	0.002	166.733	0.009
8/5/2022	4011940.632	0.002	303889.293	0.002	166.728	0.009
8/6/2022	4011940.631	0.002	303889.293	0.002	166.73	0.009
8/7/2022	4011940.632	0.002	303889.293	0.002	166.731	0.009
8/8/2022	4011940.633	0.002	303889.29	0.002	166.73	0.009
8/9/2022	4011940.63	0.002	303889.292	0.002	166.728	0.009
8/10/2022	4011940.632	0.002	303889.292	0.002	166.723	0.009
8/11/2022	4011940.632	0.002	303889.291	0.002	166.724	0.009
8/12/2022	4011940.631	0.002	303889.292	0.002	166.729	0.009
8/13/2022	4011940.631	0.002	303889.292	0.002	166.731	0.009
8/14/2022	4011940.631	0.002	303889.292	0.002	166.729	0.009
8/15/2022	4011940.632	0.002	303889.292	0.002	166.726	0.009
8/16/2022	4011940.628	0.002	303889.293	0.002	166.732	0.009
8/17/2022	4011940.634	0.002	303889.292	0.002	166.721	0.009
8/18/2022	4011940.633	0.002	303889.292	0.002	166.728	0.009
8/19/2022	4011940.631	0.002	303889.292	0.002	166.723	0.009
8/20/2022	4011940.632	0.002	303889.293	0.002	166.732	0.009
8/21/2022	4011940.632	0.002	303889.291	0.002	166.736	0.009
8/22/2022	4011940.632	0.002	303889.292	0.002	166.725	0.009
8/23/2022	4011940.633	0.002	303889.29	0.002	166.729	0.009
8/24/2022	4011940.632	0.002	303889.291	0.002	166.727	0.009
8/25/2022	4011940.632	0.002	303889.292	0.002	166.727	0.009
8/26/2022	4011940.631	0.002	303889.293	0.002	166.73	0.009
8/27/2022	4011940.63	0.002	303889.293	0.002	166.728	0.009
8/28/2022	4011940.63	0.002	303889.294	0.002	166.734	0.009
8/29/2022	4011940.63	0.002	303889.292	0.002	166.73	0.009
8/30/2022	4011940.631	0.002	303889.293	0.002	166.726	0.009
8/31/2022	4011940.63	0.002	303889.293	0.002	166.719	0.009
9/1/2022	4011940.63	0.002	303889.292	0.002	166.729	0.009
9/2/2022	4011940.632	0.002	303889.292	0.002	166.726	0.009
9/3/2022	4011940.632	0.002	303889.291	0.002	166.725	0.009
9/4/2022	4011940.632	0.002	303889.293	0.002	166.721	0.009
9/5/2022	4011940.629	0.002	303889.293	0.002	166.732	0.009
9/6/2022	4011940.631	0.002	303889.293	0.002	166.722	0.009
9/7/2022	4011940.632	0.002	303889.292	0.002	166.725	0.009
9/8/2022	4011940.633	0.002	303889.291	0.002	166.725	0.009

9/9/2022	4011940.633	0.002	303889.292	0.002	166.731	0.009
9/10/2022	4011940.632	0.002	303889.295	0.002	166.724	0.009
9/11/2022	4011940.632	0.002	303889.291	0.002	166.727	0.009
9/12/2022	4011940.633	0.002	303889.292	0.002	166.728	0.009
9/13/2022	4011940.632	0.002	303889.292	0.002	166.729	0.009
9/14/2022	4011940.633	0.002	303889.291	0.002	166.729	0.009
9/15/2022	4011940.632	0.002	303889.292	0.002	166.726	0.009
9/16/2022	4011940.634	0.002	303889.291	0.002	166.722	0.009
9/17/2022	4011940.632	0.002	303889.293	0.002	166.729	0.009
9/18/2022	4011940.633	0.002	303889.292	0.002	166.726	0.009
9/19/2022	4011940.634	0.002	303889.291	0.002	166.728	0.009
9/20/2022	4011940.631	0.002	303889.293	0.002	166.731	0.009
9/21/2022	4011940.632	0.002	303889.29	0.002	166.729	0.009
9/22/2022	4011940.632	0.002	303889.293	0.002	166.726	0.009
9/23/2022	4011940.631	0.002	303889.293	0.002	166.727	0.009
9/24/2022	4011940.631	0.002	303889.292	0.002	166.727	0.009
9/25/2022	4011940.631	0.002	303889.293	0.002	166.73	0.009
9/26/2022	4011940.633	0.002	303889.292	0.002	166.729	0.009
9/27/2022	4011940.632	0.002	303889.291	0.002	166.726	0.009
9/28/2022	4011940.632	0.002	303889.292	0.002	166.722	0.009
9/29/2022	4011940.632	0.002	303889.291	0.002	166.721	0.009
9/30/2022	4011940.634	0.002	303889.291	0.002	166.726	0.009
10/1/2022	4011940.633	0.002	303889.292	0.002	166.725	0.009
10/2/2022	4011940.634	0.002	303889.291	0.002	166.724	0.009
10/3/2022	4011940.634	0.002	303889.29	0.002	166.726	0.009
10/4/2022	4011940.635	0.002	303889.29	0.002	166.726	0.009
10/5/2022	4011940.634	0.002	303889.289	0.002	166.726	0.009
10/6/2022	4011940.633	0.002	303889.29	0.002	166.726	0.009
10/7/2022	4011940.632	0.002	303889.292	0.002	166.722	0.009
10/8/2022	4011940.632	0.002	303889.29	0.002	166.723	0.009
10/9/2022	4011940.633	0.002	303889.29	0.002	166.727	0.009
10/10/2022	4011940.631	0.002	303889.29	0.002	166.726	0.009
10/11/2022	4011940.631	0.002	303889.291	0.002	166.732	0.009
10/12/2022	4011940.631	0.002	303889.291	0.002	166.734	0.009
10/13/2022	4011940.633	0.003	303889.29	0.003	166.728	0.01

VITA

Joshua Kenneth Keltz

Candidate for the Degree of

Master of Science

Thesis: MONITORING THE ROBERT S. KERR DAM AND ITS MISSISSIPPIAN
FOUNDATION USING SATELLITE AND BATHYMETRIC SURVEYS

Major Field: Geology

Biographical:

Education:

Completed the requirements for the Master of Science in Geology at Oklahoma State University, Stillwater, Oklahoma in May, 2023.

Completed the requirements for the Bachelor of Science in Geosciences at University of Texas at Dallas, Richardson, Texas in 2020.

Experience:

Research Assistant. Summer 2021-May 2023. Boone Pickens School of Geology, Oklahoma State University. Stillwater, Oklahoma.

Exploration Geologist Intern. Summer 2022. Freeport McMoRan Inc., Tucson, Arizona.

Undergraduate Research Assistant. Spring 2020. University of Texas at Dallas. Richardson, Texas.