

# Rook I Project

## Environmental Impact Statement

Annex IV.2: Hydrometric Monitoring Characterization Report



# HYDROMETRIC MONITORING CHARACTERIZATION BASELINE REPORT FOR THE ROOK I PROJECT

Prepared for:

**NexGen Energy Ltd.**

Prepared by:

**WSP Canada Inc.**

April 2024

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## Executive Summary

The hydrometric monitoring baseline report is a component of a comprehensive baseline program that documents the natural and socio-economic environments in the anticipated area of the Rook I Project (Project). The hydrometric monitoring baseline program was undertaken to provide context from which effects on hydrological conditions from the Project can be assessed in the Rook I Environmental Impact Statement.

This report characterizes local hydrological conditions of lakes and streams in the area of the Project through detailed monitoring. No data were previously available for most of the lakes and streams included in this baseline study, and this field monitoring program therefore fills an important environmental knowledge gap in the area of the Project.

The monitoring program included the following surveys and types of monitoring:

- late winter snow surveys within Patterson Lake watershed in 2018 and 2019;
- water level monitoring at eight stations on lakes and ponds in the Clearwater River watershed;
- streamflow monitoring at 12 stations on streams and rivers in the Clearwater River watershed;
- water level and streamflow monitoring at Hodge Lake and its outflow in the Hodge Creek watershed;
- sediment sampling of channel bed substrate for particle size in the Clearwater River below Patterson, Beet, and Naomi lakes; and
- suspended sediment (i.e., particles entrained within the water column) and bed load sediment (i.e., particles moving along the streambed) sampling at three streamflow monitoring stations downstream of Patterson Lake.

Snow accumulation available for snowmelt in Patterson Lake watershed was calculated from field snow surveys conducted in 11 terrain types; these types were based on slope and aspect (i.e., the direction the slope faces), and included lake and lake-edge terrain types. Snow water equivalent (SWE) results from the field surveys were compared with weekly SWE maps provided by Environment and Climate Change Canada (ECCC) throughout the winter and with data from the European Space Agency's Global Snow Monitoring for Climate Research (GlobSnow) Project. The comparison of the 2018 and 2019 snow surveys to the GlobSnow and ECCC weekly SWE maps provided confidence that the field survey SWE results in the anticipated area of the Project could be adequately approximated using the remote sensing data for 2020.

The hydrology monitoring program included nine stations along the Clearwater River mainstem (i.e., main channel) from its headwaters at Broach Lake to a location far downstream near Highway 955 above Warner Rapids, as well as numerous tributaries close to the proposed Project. Data collection was conducted year-round at several stations and seasonally during the open-water period at most other stations. A total of 11 field visits were completed between August 2018 and December 2020, and a wide range of water level and streamflow conditions were observed. Unit-area runoff values measured at the hydrometric monitoring stations were compared with long-term statistics at regional hydrometric stations to provide an indication of whether conditions in 2018 to 2020 were drier, wetter, or near average.

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The main objective of this study has been met in that a wide range of hydrological conditions were observed at 22 waterbody and watercourse hydrometric stations, which provides sufficient and detailed information to support an Environmental Assessment for the Project.

**If referencing this report, please use the following citation:**

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### **APPENDIX B**

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### **APPENDIX E**

Total Suspended Solids and Bed Load Laboratory Results

## Abbreviations and Units of Measure

Acronym	Definition
1-D	one-dimensional
ADCP	acoustic Doppler current profiler
ADV	acoustic Doppler velocimeter
CCIN	Canadian Cryospheric Information Network
CR	Clearwater River
EA	Environmental Assessment
ECCC	Environment and Climate Change Canada
ERA-Interim	European Re-analysis Interim
GGA	Generalized Gradient Approximation
GPS	global positioning system
HC	Hodge Creek
HEC-RAS	Hydrologic Engineering Center – River Analysis System
ID	identification
LSA	local study area
MS	main stem
NexGen	NexGen Energy Ltd.
NRCan	Natural Resources Canada
OWRC	open water rating curve
Project	Rook I Project
QA	quality assurance
QC	quality control
RSA	regional study area
RTK	real-time kinematic
SWE	snow water equivalent
TBRG	tipping bucket rain gauge
TI	tributary inflow
TLU	traditional land use
TSS	total suspended solids
UTM	Universal Transverse Mercator
WB	waterbody
WC	watercourse
WSC	Water Survey of Canada
WSE	water surface elevation



Units	Definition
%	percent
<	less than
°	degree
°C	degrees Celsius
cm	centimetre
g	gram
g/cm <sup>3</sup>	grams per cubic centimetre
km	kilometre
km <sup>2</sup>	square kilometre
L/s/km <sup>2</sup>	litres per second per square kilometre
m	metre
m <sup>3</sup> /s	cubic metres per second
masl	metres above sea level
mg/L	milligrams per litre
mm	millimetre
Mm <sup>3</sup>	million cubic metres

## 1.0 INTRODUCTION

The Rook I Project (Project) is a proposed new uranium mining and milling operation that is 100% owned by NexGen Energy Ltd. (NexGen). The Project would be located in northwestern Saskatchewan, approximately 40 km east of the Saskatchewan-Alberta border, 130 km north of the town of La Loche, and 640 km northwest of the city of Saskatoon (Figure 1). The Project would reside within Treaty 8 territory and within the Métis Homeland. At a regional scale, the Project would be situated within the southern Athabasca Basin adjacent to Patterson Lake, and along the upper Clearwater River system (Figure 2). Access to the Project would be from an existing road off of Highway 955. The Project would include underground and surface facilities to support the extraction and processing of uranium ore from the Arrow deposit, a land-based, basement-hosted, high-grade uranium deposit.

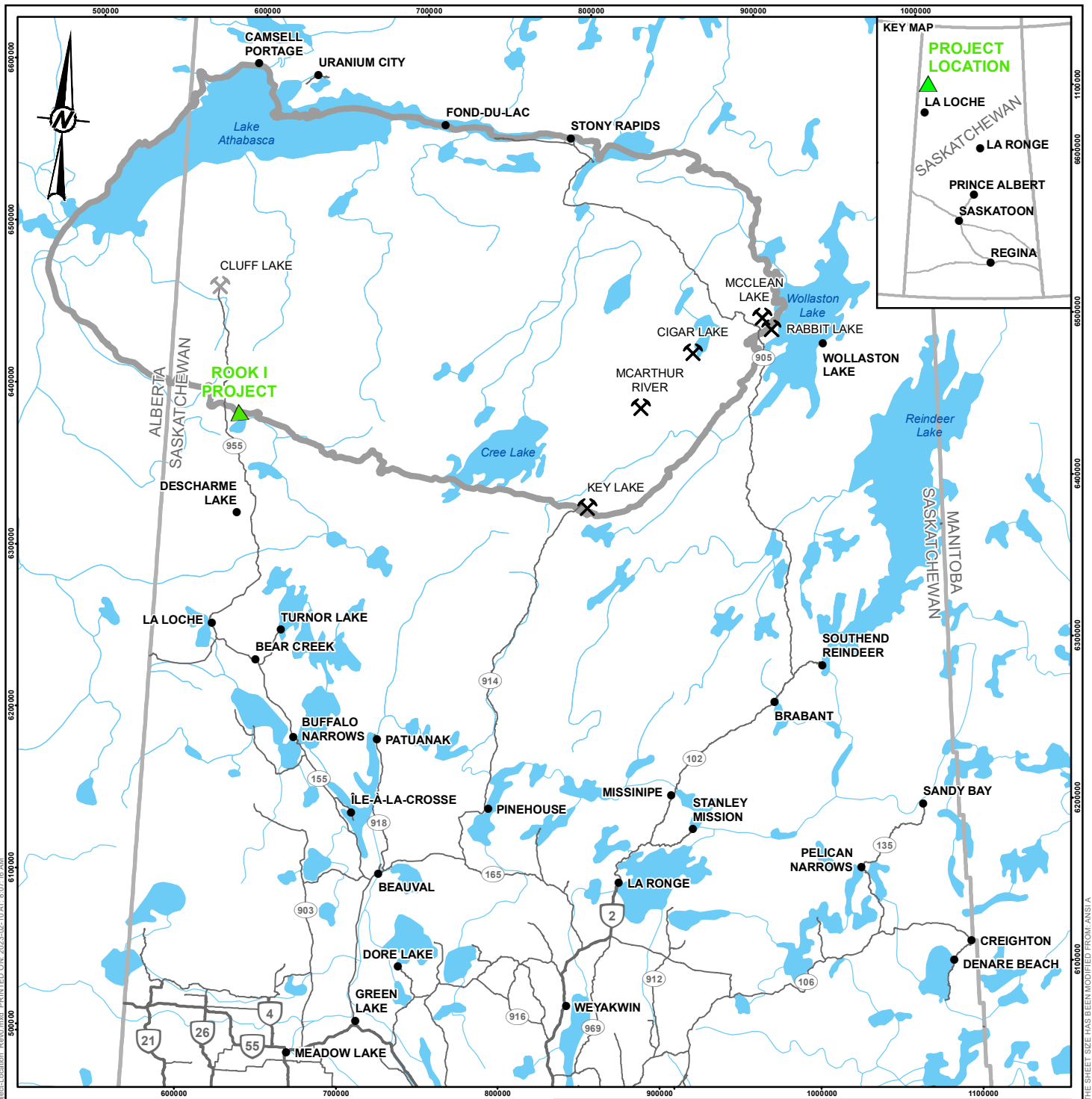
The hydrometric monitoring baseline report represents a component of a comprehensive baseline program that documents the natural and socio-economic environments in the anticipated area of the Project. The hydrometric monitoring baseline program was undertaken to provide context from which Project environmental hydrometric monitoring effects could be assessed in the Environmental Impact Statement (EIS).

Since exploration at the Project commenced in 2013, NexGen has engaged regularly and established relationships with local First Nation and Métis Groups (collectively referred to as Indigenous Groups) and northern communities, specifically those closest and with greatest access to the proposed Project. NexGen respects the rights of Indigenous Peoples and the unique relationship Indigenous Peoples have with the environment and recognizes the importance of full and open discussion with interested or potentially affected Indigenous communities regarding the development, operation, and decommissioning of the proposed Project. Engagement activities to date, as well as future planned engagement activities, reflect the value NexGen places on meaningful engagement with Indigenous Peoples and northern communities who could be potentially affected by the proposed Project. Engagement mechanisms have included, but are not limited to: meetings with leadership, workshops and community information sessions, Project site tours, establishing Joint Working Groups to support the gathering and incorporation of Indigenous and Local Knowledge throughout the Environmental Assessment (EA) process, and providing funding for Traditional Land Use (TLU) Studies<sup>1</sup> to understand how the proposed Project may interact with the Indigenous communities traditional use of the anticipated area of the Project.

Feedback received during engagement activities was documented for contribution to the EIS for the Project; examples of feedback received include discussion of concerns, interests, potential adverse effects, mitigation, and design alternatives. Many baseline studies were initiated in advance of formal engagement on the EA for the Project; however, engagement during the execution of baseline studies has helped inform the understanding of baseline conditions and confirmed components of the natural and socio-economic environments that required study. A summary of feedback related to the hydrometric monitoring baseline program is presented in the Hydrology Baseline Road Map (Annex IV).

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<sup>1</sup> Traditional Land Use Studies include all land use studies developed by the Project's affected Indigenous Groups, including Traditional Land Use and Occupancy studies, Traditional Knowledge and Use studies, and Indigenous Rights and Knowledge studies, henceforth referred collectively as TLU studies.



**LEGEND**

- POPULATED PLACE
- ▲ PROJECT LOCATION
- ⌵ URANIUM MINING FACILITY (ACTIVE)
- ⌵ URANIUM MINING FACILITY (DECOMMISSIONED)
- PRIMARY HIGHWAY
- SECONDARY HIGHWAY
- WATERCOURSE
- WATERBODY
- ▭ ATHABASCA BASIN BOUNDARY



**REFERENCE(S)**

1. BASE DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.  
 PROJECTION: UTM ZONE 12 DATUM: NAD 83

CLIENT



PROJECT  
**ROOK I PROJECT**

TITLE  
**LOCATION OF THE ROOK I PROJECT, SASKATCHEWAN**

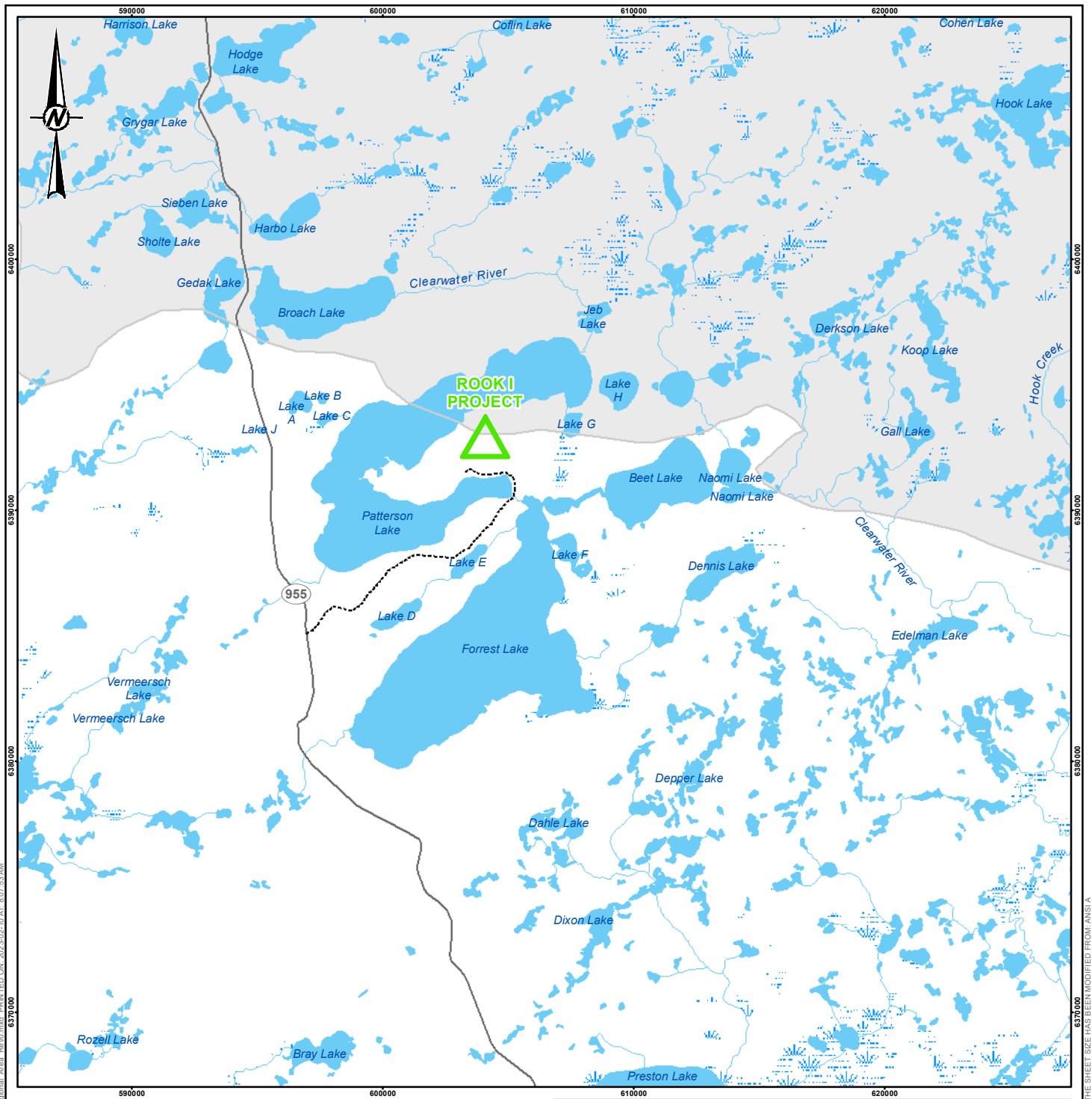
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APPROVED	MM

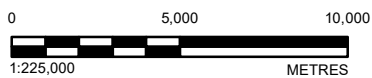
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**LEGEND**

- SECONDARY HIGHWAY
- WATERCOURSE
- WATERBODY
- WETLAND
- ATHABASCA BASIN
- PROJECT LOCATION
- EXISTING ACCESS ROAD



**REFERENCE(S)**

1. BASE DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.  
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CLIENT



PROJECT

**ROOK I PROJECT**

TITLE

**REGIONAL AREA OF THE ROOK I PROJECT**

CONSU

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DESIGNED JMC

PREPARED NO/AK

REVIEWED JMC

APPROVED MM

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## 2.0 STUDY OBJECTIVE

The overall objective of the hydrometric baseline report was to describe the existing hydrological conditions in the baseline study area to support an EA for the Project. Specifically, the objectives of the hydrology baseline study were to characterize:

- snow accumulation available for melt at the basin scale;
- spatial and seasonal variation of water surface elevation (WSE) and discharge; and
- sediment transport characteristics.

The field studies completed in support of the hydrological baseline included:

- late winter snow surveys in April 2018 and March 2019;
- hydrometric monitoring of eight watercourses and eight waterbodies within the hydrology regional study area (RSA);
- hydrometric monitoring at three stations downstream of the RSA along the Clearwater River;
- hydrometric monitoring at one watercourse and one waterbody outside of the RSA along Hodge Creek;
- geodetic (an elevation of a given point on land above a published vertical datum reference system) GPS (global positioning system) RTK (real-time kinematic) surveys of key hydrometric station benchmarks; and
- suspended and bed load sediment sampling at three locations along the Clearwater River mainstem (i.e., main channel) downstream of Patterson Lake.

## 3.0 STUDY AREAS

The study areas for the hydrology baseline program include the following (Figure 3):

- local study area (LSA): the Clearwater River watershed to Naomi Lake outlet; and
- RSA: the Clearwater River watershed above the Mirror River confluence.

The Project would be located adjacent to Patterson Lake near the headwaters of the Clearwater River system at Broach Lake. The Clearwater River Upper Reach flows from the area near Broach Lake through a series of lakes including Patterson, Forrest, Beet, and Naomi lakes in order from upstream to downstream. The upper Clearwater River flows over a distance of 41.5 km from Broach to Naomi lakes; this area is dominated by glaciolacustrine terrain (Annex IV.3). From Naomi Lake, the Clearwater River flows another 20 km southeast before reaching the Mirror River confluence. Below the Mirror River confluence, the Clearwater River deepens with higher flow volumes from the Mirror River, and the channel form becomes meandering within a well-defined river valley. Farther downstream, the Clearwater River flows through Lloyd Lake, which is just upstream of the Clearwater River Provincial Park; the downstream end of the park is at the Saskatchewan–Alberta border.

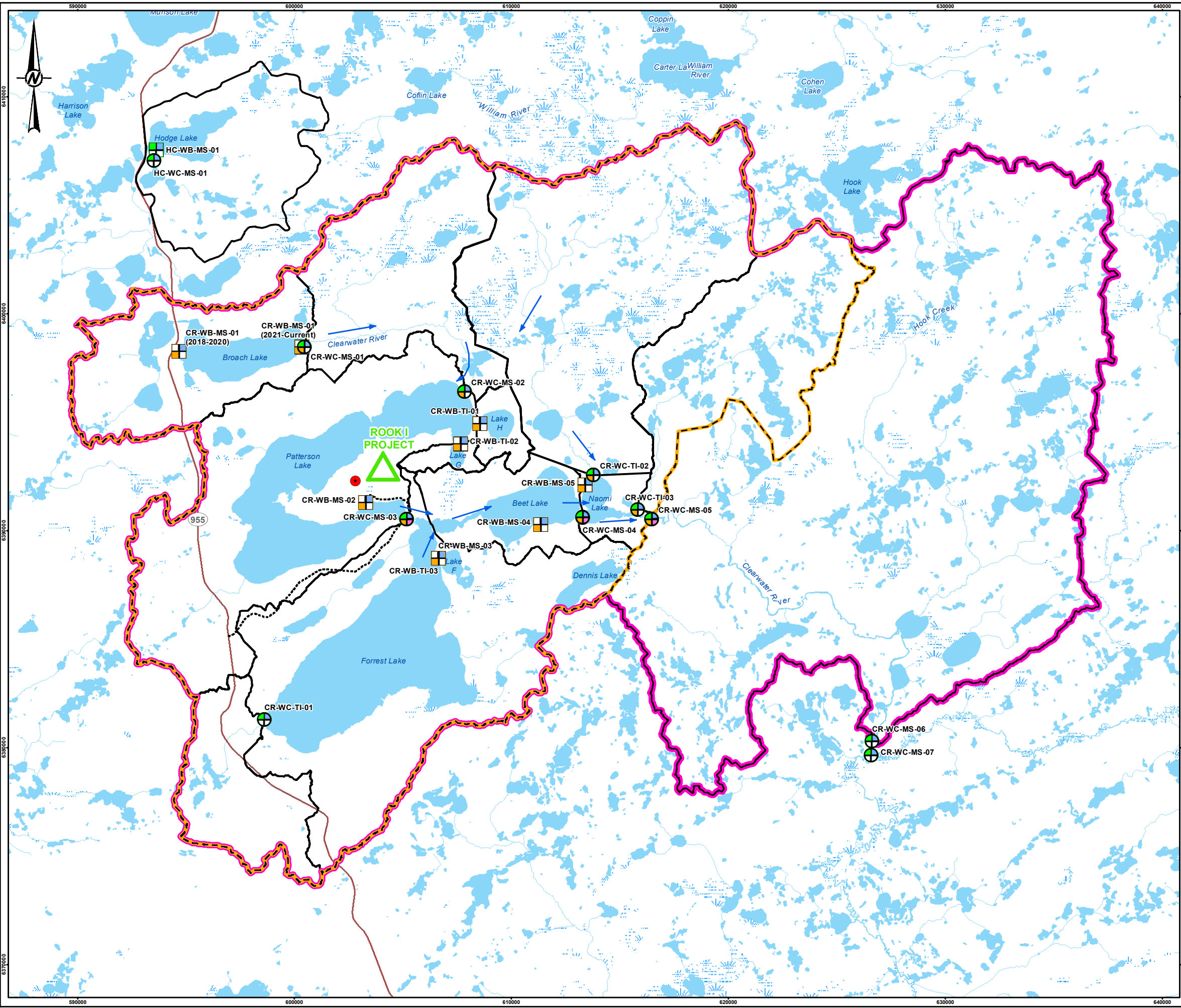
Based on hydrological characteristics of the region and a screening-level assessment of the potential direct effects of the Project, the LSA is defined as the Clearwater River watershed up to the Naomi Lake outlet

(Figure 3). The Clearwater River watershed above the Naomi Lake outlet drains an area of 685 km<sup>2</sup>. Direct effects on hydrology may include changes to flows and water levels.

The RSA for hydrology includes waterbodies and watercourses within the Clearwater River watershed above the Mirror River confluence, which includes the LSA (Figure 3). The Clearwater River watershed above the Mirror River confluence drains an area of 1,070 km<sup>2</sup>. The spatial extent of the Clearwater River watershed above the Mirror River confluence is expected to provide an ecologically relevant RSA for the EA. The RSA spans an area that provides habitat requirements for a discernible population unit of large-bodied fish species where cumulative effects may occur. The hydrometric stations in the RSA are shown in Figure 3.

The hydrological baseline studies collected sufficient data over approximately three years at numerous locations within the LSA and RSA and a wide range of hydrological conditions was observed. Hydrological baseline studies focused on the Clearwater River watershed to the Patterson Lake outlet and along the main lake chain downstream, including Forrest Lake, Beet Lake, Naomi Lake, and the reaches of the Clearwater River separating these lakes. Additional data were collected in small waterbodies adjacent to Patterson Lake (i.e., Lakes G and H), and upstream of Patterson Lake (i.e., Broach Lake, Broach Lake outflow, and the Clearwater River above Patterson Lake).

There are three hydrometric stations at locations of interest downstream of the RSA boundary, referred to as far-field stations. These locations contribute valuable information about hydrological variation in the upper Clearwater River and include the Clearwater River downstream of the Mirror River confluence, at the Lloyd Lake outlet, and above Warner Rapids. Hodge Lake and its outlet were added as reference monitoring locations in 2020; these stations are north of the Clearwater River watershed. Locations and watershed boundaries for the three far-field hydrometric stations and Hodge Lake reference stations relevant to the hydrology baseline are shown in Figure 4.



**LEGEND**

- FLOW DIRECTION
- SECONDARY HIGHWAY
- WATERCOURSE
- WATERBODY
- WETLAND
- PROJECT FEATURES
- EXISTING ACCESS ROAD
- PROJECT LOCATION

**WATERBODY HYDROMETRIC STATIONS**

- DISCHARGE
- SURVEYED BENCHMARK (GEODETIC DATUM)
- TOTAL SUSPENDED SOLIDS AND BEDLOAD
- WATER SURFACE ELEVATION

**WATERCOURSE HYDROMETRIC STATIONS**

- DISCHARGE
- SURVEYED BENCHMARK (GEODETIC DATUM)
- TOTAL SUSPENDED SOLIDS AND BEDLOAD
- WATER SURFACE ELEVATION
- HYDROLOGY LOCAL STUDY AREA
- HYDROLOGY REGIONAL STUDY AREA
- WATERSHED

**REFERENCE(S)**

1. BASE DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.
2. WATERSHEDS DELINEATED BY GOLDER USING GREENKENUUE SOFTWARE BASED ON CANADIAN DIGITAL ELEVATION DATA AND NATIONAL HYDROGRAPHIC NETWORK WATERCOURSES.

PROJECTION: UTM ZONE 12 DATUM: NAD 83

CLIENT

**NexGen**  
Energy Ltd.

PROJECT

**ROOK I PROJECT**

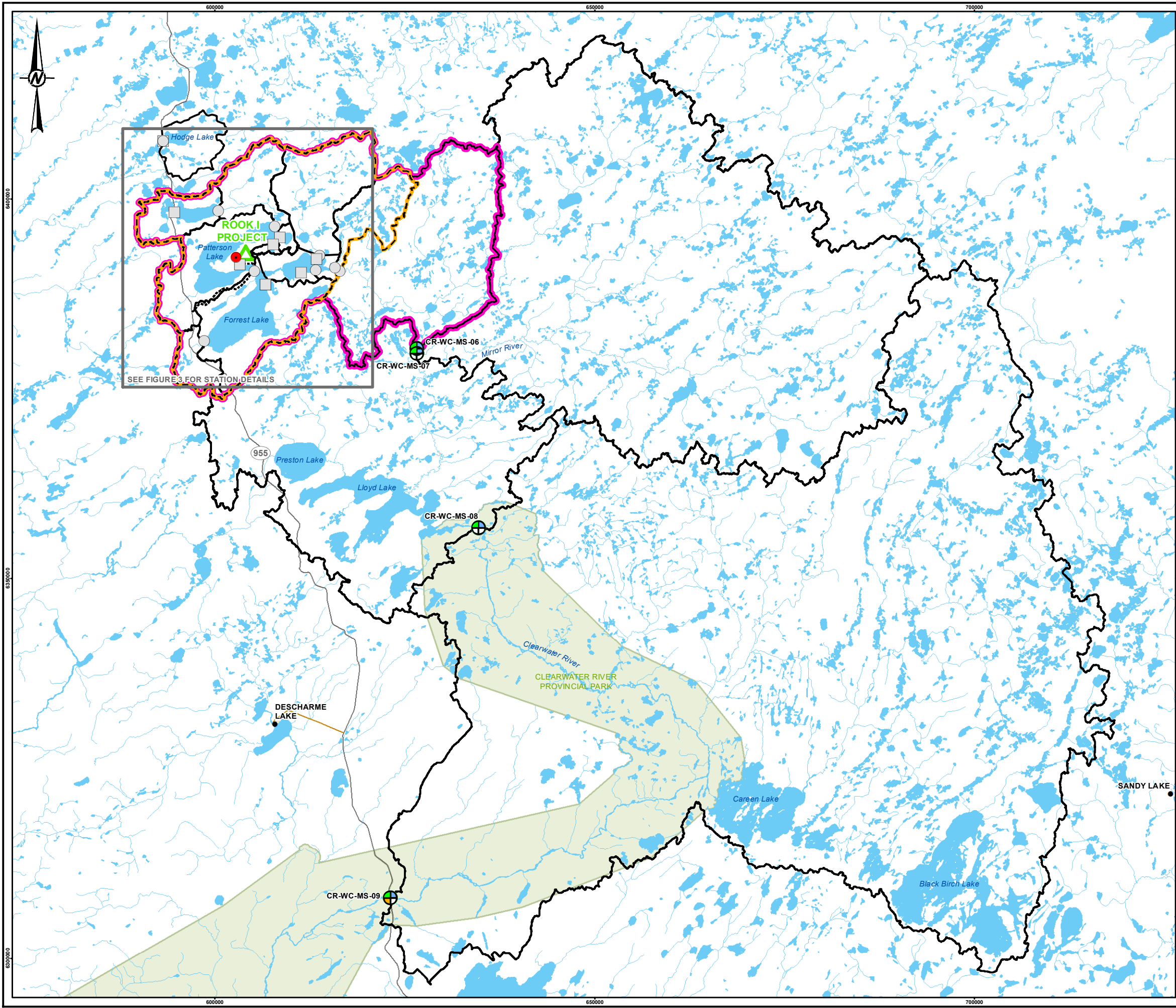
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	APPROVED	RWP

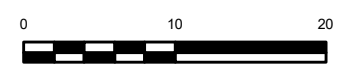
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**LEGEND**

- POPULATED PLACE
- SECONDARY HIGHWAY
- LOCAL ROAD
- WATERCOURSE
- PARK
- WATERBODY
- EXISTING ACCESS ROAD
- ▲ PROJECT LOCATION
- METEOROLOGICAL STATION
- WATERBODY HYDROMETRIC STATIONS**
- DISCHARGE
- SURVEYED BENCHMARK (GEODETIC DATUM)
- TOTAL SUSPENDED SOLIDS AND BEDLOAD
- WATER SURFACE ELEVATION
- WATERCOURSE HYDROMETRIC STATIONS**
- DISCHARGE
- SURVEYED BENCHMARK (GEODETIC DATUM)
- TOTAL SUSPENDED SOLIDS AND BEDLOAD
- WATER SURFACE ELEVATION
- HYDROLOGY LOCAL STUDY AREA
- HYDROLOGY REGIONAL STUDY AREA
- WATERSHED



**REFERENCE(S)**

1. PROJECT FEATURES OBTAINED FROM NEXGEN, OCTOBER 28, 2019.
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PROJECTION: UTM ZONE 12 DATUM: NAD 83

CLIENT

PROJECT  
**ROOK I PROJECT**

TITLE  
**FAR-FIELD HYDROMETRIC STATIONS**

CONSULTANT	WSP	YYYY-MM-DD	2023-10-25
DESIGNED	JH	REVIEWED	JD
PREPARED	NO	APPROVED	RWP

PROJECT NO. 20138965      PHASE      REV. 0      FIGURE 4

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## 4.0 METHODS

### 4.1 Review of Existing Information

No publicly available hydrometric data collected within the RSA were available for use in the baseline study. The Rook I Meteorological Station (Figure 3) was in place before the commencement of the hydrometric baseline program; its data were used in the current study, and details are provided in Section 4.3.

### 4.2 Approach

The hydrological baseline data collection from 2018 to 2020 included the following main components:

- Local meteorological conditions were monitored from 2018 to 2020.
- Snow surveys were completed in the Patterson Lake watershed in April 2018 and March 2019.
- Hydrometric monitoring was conducted from 2018 to 2020:
  - Hydrometric stations were established in August 2018 at eight waterbodies (i.e., lakes or ponds) and 12 watercourses (i.e., flowing channels such as rivers, creeks, streams, brooks), and monitored until September 2020. Additional hydrometric stations were established at Hodge Lake and its outflow in June 2020 and monitored until September 2020.
  - Three local benchmarks were installed at each hydrometric station and surveyed during each field visit using an optical level.
  - Geodetic elevations for benchmarks at the 15 hydrometric stations were obtained in October 2018 using both real-time kinematic (RTK) and station occupation (static) global positioning service (GPS) survey methods. Four Global Navigation Satellite System (GNSS) receivers were used: two receivers were used as an RTK base and rover system, while the other two receivers were used to perform static surveys at various survey control points. Static surveys allowed for post-processing of the GNSS data using the Canadian Spatial Reference System Precise Point Positioning (CSRS-PPP). Horizontal positions were established in Universal Transverse Mercator North American Datum of 1983 (UTM NAD83 Zone 12).
  - Discharge and WSE were measured during the field visits completed between August 2018 and September 2020. Continuous records of WSE were developed for the waterbodies and watercourses with installed Solinst Levellogger pressure transducers, which compensated for barometric pressure and corrected to geodetic or local benchmark elevations using the field WSE surveys. Discharge records were derived for watercourses using stage-discharge rating curves for the same period that Levellogger pressure transducers were installed.
- Sediment sampling was conducted from 2018 to 2020:
  - total suspended solids (TSS) was sampled on numerous dates at the same time that discharge was measured;
  - sediment discharge was measured; and
  - bed material samples were collected at three hydrometric stations along the Clearwater River mainstem.

The following sections describe the field data collection and data analysis methods used for each of the main study components, followed by quality assurance / quality control (QA/QC) used to confirm the integrity of the data.

## 4.3 Local Meteorological Data

Local meteorological data, in particular precipitation and air temperature, provided valuable baseline information about seasonal and annual variations in hydrological conditions near the proposed Project. Precipitation data were used to interpret the rainfall-response and recession of waterbody and watercourse hydrographs. Air temperature data were used to interpret mid-winter cold snaps that can influence water level hydrographs, as well as help to define the spring thaw and fall freeze-up hydrographs.

### 4.3.1 Data Collection

Local meteorological conditions were monitored at the Rook I Meteorological Station, located near the exploration camp (UTM NAD83 12V 602795 E 6392291 N, 550 m). The Rook I Meteorological Station has operated since installation on 13 September 2018 (Figure 3).

The meteorological variables measured included air temperature, total precipitation, humidity, solar radiation, rainfall, and wind speed. Total precipitation, which is of principal interest for providing context for the hydrometric monitoring, was measured using a Geonor T-200B total precipitation gauge, which reported cumulative precipitation in millimetres on an hourly interval. The Geonor gauge was equipped with an Alter-style wind shield to improve rainfall and snowfall catch efficiency. A Campbell-scientific CR1000 data logger was installed in an enclosure and the power supply consisted of a 20-watt solar panel and 26 Amp-hour battery. The station has a 10 m anemometer tower (used to measure wind speed and direction), where the air temperature sensor was installed at a height of 2 m, and the Geonor and Alter shield were installed at a height of 2.5 m.

Prior to 15 September 2018, local precipitation was measured using a TE525M tipping bucket rain gauge (TBRG) (UTM NAD83 12V 604501 E 6393442 N) installed at a height of 1.5 m above ground. The TBRG measured rainfall rates, but not total precipitation as it is measured by the Geonor gauge. As a result, total precipitation during months where snowfall would have occurred was under-estimated before 15 September 2018. As such, only the Geonor gauge data were relied upon for this report.

More detail on the Rook I Meteorological Station is provided in the atmospheric studies characterization report (Annex I, Atmospheric Baseline Report). The calculation methods and the data completeness requirements followed the guidance provided by ECCC (ECCC 2020a) and the World Meteorology Organization (WMO 2017).

### 4.3.2 Data Analysis

Raw hourly cumulative precipitation values observed at the Geonor gauge were rounded to the nearest 0.01 mm and corrected for gauge catch efficiency hourly. At certain times during the period of record, the Geonor gauge would have caught more than 100% (i.e., over-catch) or less than 100% of the actual total precipitation that fell, depending mainly on the wind speed. Catch efficiency correction was necessary to properly account for the influence of wind on precipitation measurements. Therefore, catch efficiency correction at the meteorological station was based on wind speed measured at 10 m height, corrected to the wind speed at the height of the Geonor gauge, and assumed a roughness value for the surrounding area. Rainfall corrections used a method outlined in Devine and Mekis 2008, and snowfall corrections used a method outlined in MacDonald and Pomeroy 2007.

The precipitation data presented in this report are daily total precipitation values. The TBRG rainfall rates for each day were added together to obtain total daily rainfall values. The Geonor gauge accumulated precipitation over time, and raw hourly data were converted to total precipitation measured each day.

Local data collected by the Rook I Meteorological Station were compared to regional historical meteorological data and climate normal obtained from Environment and Climate Change Canada (ECCC 2019).

## 4.4 Snow Surveys

The annual end of winter snowpack surveys provided valuable baseline information about seasonal and inter-annual variation of hydrological conditions near the proposed Project. The snowpack surveys provided information needed to validate measured snowfall, calibrate estimated atmospheric losses of snow to sublimation, and establish the end of winter water volume available to melt during the spring freshet, which occurs for approximately two to three weeks every mid- to late April. The snowpack survey data was also important to validate remote sensing data with ground-based measurements to characterize uncertainties or bias in the remote sensing data. In a similar approach to the overall hydrological modelling, the few years with field-based snow surveys were used to check the validity of a much longer remote sensing data record that spans a 40-year period.

Spring snowmelt often provides the largest volume of runoff into a watershed each year, and the highest water levels and peak flows often occur during spring freshet. A snow survey program was completed late in the winters of 2017-2018 and 2018-2019, with the objective of establishing the pre-freshet snowpack conditions in the Patterson Lake watershed. A stratified snow survey design was used, which involved selecting numerous snow survey plots in a wide range of terrain types (e.g., terrestrial, lake, or lake edge) and landscape features (e.g., slope and aspect) that were representative of the watershed. The snow survey results were weighted according to the proportional areal coverage of each terrain type in the watershed. Results are expressed as a snow water equivalent (SWE), which can be visualized as the depth of water on the ground surface if the entire snowpack were to melt at once. The SWE is reported in units of millimetres depth of melted SWE.

Two years of end-of-year SWE data collection provides a sufficient baseline for the Patterson Lake watershed; however additional data collection was planned. In 2020, a snow survey was planned for late March to early April but was not completed. A stop-work order was implemented 26 March 2020 (at the early stage of the COVID-19 outbreak in Canada), and the window to complete the snow survey had passed once discussions about the program had restarted (Golder 2020). Instead, local SWE was estimated with remote sensing and regional SWE data. The two years of comparison of field and remote sensing data provide confidence that available remote sensing data provided adequate estimates of end-of-winter SWE for the proposed Project, while a third end-of-winter snow survey was completed March 2021 to provide further validation (Golder 2020).

### 4.4.1 Data Collection

Stratified snow surveys were completed at the end of winter in 2018 and 2019. The 2018 survey was completed from 15 April 2018 to 16 April 2018, and the 2019 survey was completed from 21 March 2019 to 23 March 2019. The 2018 field survey was conducted during the onset of the spring freshet, and as a result, timing of the field survey presented challenges for access and sample collection. Temperatures were above the freezing point during this survey and some snowmelt was noted on south-facing slopes. In some cases, access to planned sampling points was restricted as a result of a low number of cut lines, a large number of regenerating burn areas populated by dense jack pine, or rapidly changing spring conditions in low-lying waterbodies and watercourses. In

particular, the planned snow survey plots on lakes could not all be completed safely, and the single lake plot completed in 2018 was assumed to be representative of the snow conditions on lakes.

The 2019 survey was conducted from 21 March 2019 to 23 March 2019. Although the 2019 field survey was conducted earlier in the year than in 2018, air temperatures were well above normal, and snowmelt had started by the beginning of the snow survey. Average daily temperatures were at or above 0°C on 11 March 2019, 17 March 2019 to 22 March 2019, 25 March 2019, and 26 March 2019. As a result, the maximum surface SWE may not have been captured by the 2019 survey; however, the timing and magnitude of the peak SWE was estimated through the use of remote sensing methods.

For all surveys, photos were taken at each plot, and the plot location was documented with a handheld GPS. Results were entered into standard snow survey data entry sheets. The type and density of terrestrial vegetation was noted, as were the slope and aspect. Slope was estimated with an inclinometer and classified as flat if less than 1° from the horizon, low slope if less than 10°, and high slope of between 10° and 33°. Aspect (i.e., the direction the slope faces) was noted to the nearest of cardinal directions (i.e., north, east, south, west) or flat for instances with no slope.

At each snow survey plot, snow depth was measured to the nearest centimetre at three locations using a snow probe or metal measuring stick. The average snow depth at each plot was obtained as the average of the three measurements. Plots were located a minimum of 50 m from any disturbed area such as a road or trail.

Snow density was measured once at each plot using a snow corer with a cutting blade at its base. A cradle hanging digital scale was used for snow sampling, which was tared (i.e., unladen weight set to zero) at the beginning of each day and periodically throughout the day (or before each measurement if there was a build-up of ice or snow inside). The snow corer sampling tube was pushed slowly through the snowpack until it reached the ground surface, and a snow depth reading was made. The tube was then twisted into the soil to get a “plug” of soil and prevent granular snow at the bottom of the sample from falling out. If a plug could not be obtained, the field staff dug around the corer with a shovel, slid the blade of the shovel under the corer, and lifted out the corer with the blade against it to prevent the snow from falling out. The sampler tube was held horizontally, and its weight was measured using the digital scale. The “loaded” weight (i.e., sampler, cradle, and snow) were recorded on the data sheet.

#### 4.4.2 Data Analysis

The average snow depth at each plot was obtained as the average of three measurements made with a metal ruler. Snow density was calculated as follows:

$$\rho_s = \frac{w_s}{d_s \pi R^2} \quad \text{Equation 1}$$

Where,  $\rho_s$  is snow density in units of grams per cubic centimetre [g/cm<sup>3</sup>],  $w_s$  is weight of snow [g] calculated as loaded weight minus tare of the scale,  $d_s$  is snow depth [cm],  $\pi = 3.14159$  [dimensionless], and  $R$  is snow corer sampling tube radius [cm].

Using the snow density and average snow depth for each survey plot, the SWE [mm] was then calculated as follows:

$$SWE = \rho_s * d_s * 10 \quad \text{Equation 2}$$

The mean SWE in the Patterson Lake watershed was estimated by weighting the SWE results for the various terrain types by total area of that terrain type in the watershed. Snow depth and snow density were measured at 34 plots in 2018 and 50 plots in 2019, distributed over 11 terrain types in 2019 and nine in 2018. For the purposes of the snow survey, the Patterson Lake watershed was divided into Lake, Lake Edge, and Terrestrial categories. Terrestrial areas were further sub-divided into terrain types by slope and aspect, which accounts for primary drivers of snow accumulation, redistribution by wind, and losses to sublimation and evaporation (Table 1). The Lake area was taken to be the area classified as “Lake” in the Southern Digital Landcover set (Saskatchewan Research Council 2000). The Lake Edge area was established as a 30 m buffer around the perimeter of Patterson Lake. Based on observations during the field snow surveys, the terrestrial landscape consists primarily of open canopy jack pine stands and regenerating jack pine burns. As a result, the Terrestrial landcovers were grouped together as one aggregate landcover class, which was further subdivided by aspect (i.e., flat, facing north, east, south, or west) and slope (i.e., flat is classified as a slope of less than 1°, low slope less than 10°; and slope of 10° to 33°).

**Table 1: Patterson Lake Terrain Type Classification for 2018 and 2019 Sample Points**

Terrain Classification	Area (km <sup>2</sup> )	Percentage of Cover (%)	Number of Snow Survey Plots	
			2018	2019
Lake	59.5	22.5	1	10
Lake Edge	6.5	2.5	3	1
Terrestrial: flat, low slope	39.5	15.0	n/d	7
Terrestrial: north, low slope	33.9	12.8	4	6
Terrestrial: north, 10° to 33°	1.21	0.5	5	1
Terrestrial: west, low slope	34.5	13.1	3	6
Terrestrial: west, 10° to 33°	0.59	0.2	5	1
Terrestrial: south, low slope	38.0	14.4	3	7
Terrestrial: south, 10° to 33°	1.4	0.5	8	1
Terrestrial: east, low slope	48.2	18.2	n/d	9
Terrestrial: east, 10° to 33°	0.88	0.3	2	1
<b>Total</b>	<b>264.2</b>	<b>100.0</b>	<b>34</b>	<b>50</b>

n/d = no data.

For regional context, local SWE data obtained from the snow surveys in Patterson Lake watershed were compared to publicly available regional SWE data, including a regional SWE snow pillow monitoring station and remotely sensed maps of SWE for the Canadian Prairie provinces (i.e., Alberta, Saskatchewan, and Manitoba). Alberta Environment provides hourly SWE data at Gordon Lake Lookout (Station 07CE801) (Government of Alberta 2020). This station is located 137 km southwest of the proposed Project and is within the Clearwater River watershed in Alberta. Gordon Lake Lookout is at an elevation of 500 masl, which is approximately 40 m lower than the elevation of Patterson Lake.

The SWE results obtained during the snow surveys were also compared with passive microwave remote sensing data published by ECCC (2020b) and available on the Canadian Cryospheric Information Network (CCIN) website (CCIN 2020). These data cover the Canadian Prairie provinces and provide a snapshot of SWE for all locations,

weekly throughout the winter. Data are provided on maps with increments of SWE over a 10 mm range (e.g., 80 mm to 90 mm SWE). These data provided a comparison for approximately the same location as the anticipated area of the Project.

## 4.5 Hydrometric Monitoring

Twenty-two hydrometric monitoring stations were included in the baseline hydrology program to provide field data for a wide range of sub-watershed sizes, waterbody sizes, and other physical factors. Monitoring covered both open-water and ice-covered conditions, and wide ranges of water levels and discharge conditions were captured between August 2018 and September 2020. Monitoring was also conducted through the winter of 2020-2021. Watercourse station locations were chosen along straight reaches with uniform flow characteristics (e.g., not highly turbulent flow, near-uniform depth, and near-uniform velocities across the channel at the measurement locations); however, the gradient is relatively low between some of the waterbodies included in the program, and backwater<sup>2</sup> from the downstream waterbodies was observed at several watercourse stations which was an expected occurrence, especially when water levels were high. Waterbody station locations were chosen to facilitate easy access by boat, and at relatively sheltered locations to reduce fluctuations in water levels influenced by wind and waves.

Hydrometric station numbers and names, the period of operation, and watershed areas contributing to each station are provided in Table 2 for watercourses and Table 3 for waterbodies. The locations of the stations are shown in Figure 3 and Figure 4. The naming convention adopted for the hydrometric stations used the following naming convention: the first pair of letters indicates the watershed, with CR indicating the Clearwater River and HC indicating Hodge Creek. The second pair of letters identifies whether the hydrometric station is a waterbody, WB (i.e., lake or pond), or watercourse, WC (i.e., flowing channels referred to colloquially as rivers, creeks, streams, and brooks). The third pair of letters indicates whether the waterbody or watercourse is on the mainstem (MS) of the drainage system or if it is a tributary (TI). The two-digit numbers at the end of the Station ID are sequential, starting upstream and increasing in the downstream direction.

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<sup>2</sup> Backwater is measured at a hydrometric station where stage was observed to be above the base stage-discharge rating curve when the stage is on the y-axis.

**Table 2: Watercourse Hydrometric Station Details**

Station ID	Station Name	Period of Operation	Watershed Area (km <sup>2</sup> )
CR-WC-MS-01	Clearwater River below Broach Lake	7 August 2018 to 24 September 2020	56.4
CR-WC-MS-02	Clearwater River above Patterson Lake	6 August 2018 to 23 September 2020	121
CR-WC-MS-03	Clearwater River below Patterson Lake	4 August 2018 to 26 September 2020	264
CR-WC-MS-04	Clearwater River below Beet Lake	5 August 2018 to 25 September 2020	473
CR-WC-MS-05	Clearwater River below Naomi Lake	5 August 2018 to 25 September 2020	685
CR-WC-MS-06	Clearwater River above Mirror River confluence	3 August 2018 to 24 September 2020	1,070
CR-WC-MS-07	Clearwater River below Mirror River confluence	3 August 2018 to 24 September 2020 <sup>(a)</sup>	3,300
CR-WC-MS-08	Clearwater River at the Lloyd Lake outlet	4 August 2018 to 24 September 2020	4,370
CR-WC-MS-09	Clearwater River at Warner Rapids	8 August 2018 to 29 September 2020	9,590
CR-WC-TI-01	Tributary inflow above Forrest Lake	6 August 2018 to 3 October 2019 <sup>(b)</sup>	34.8
CR-WC-TI-02	Tributary inflow to Naomi Lake	5 August 2018 to 27 September 2020	134
CR-WC-TI-03	Tributary inflow Downstream of Naomi Lake	5 August 2018 to 26 September 2020	67.5
HC-WC-MS-01	Hodge Creek below Hodge Lake	8 June 2020 to 28 September 2020	52.6

- a) Only instantaneous measurements of discharge (2018 and 2019) and water surface elevation (2019 only) were monitored at Station CR-WC-MS-07 to measure the inflows from the Mirror River for comparison with flows upstream of the Clearwater River-Mirror River confluence.
- b) Station monitoring was discontinued after 2019 due to beaver dam activity at the station.

**Table 3: Hydrometric Monitoring Program Waterbody Stations**

Station ID	Description	Period of Operation	Cumulative Watershed Area (km <sup>2</sup> )
CR-WB-MS-01	Broach Lake	7 August 2018 to 28 September 2020	56.4
CR-WB-TI-01	Lake H	6 August 2018 to 23 September 2020	7.36
CR-WB-TI-02	Lake G	6 August 2018 to 23 September 2020	3.75
CR-WB-MS-02	Patterson Lake	4 August 2018 to 26 September 2020	264
CR-WB-MS-03	Forrest Lake	2 August 2018 to 25 September 2020	445
CR-WB-TI-03	Lake F	2 August 2018 to 25 September 2020	9.73
CR-WB-MS-04	Beet Lake	5 August 2018 to 25 September 2020	473
CR-WB-MS-05	Naomi Lake	5 August 2018 to 27 September 2020	685
HC-WB-MS-01	Hodge Lake	8 June 2020 to 28 September 2020	52.6

## 4.5.1 Data Collection

### 4.5.1.1 Benchmark Installation and Geodetic Benchmark Survey

Water surface elevations of waterbodies and watercourses were measured at hydrometric stations using periodic optical level surveys relative to local benchmarks. The benchmark coordinates and elevations for the watercourse stations are presented in Table 4. The benchmark coordinates and elevations for the waterbody stations are

presented in Table 5. A detailed summary of the geodetic benchmark surveys is provided in Appendix A, Geodetic Survey Summary.

For the stations that were easily accessible, RTK GPS surveying equipment and static surveys were used to establish the geodetic elevation of local benchmarks between 29 September 2018 and 2 October 2018. Surveys were conducted at 15 watercourse and waterbody hydrometric stations considered important locations for the baseline program within the LSA, and also at CR-WC-MS-09 where a published Natural Resources Canada (NRCAN) control point was located. Unless otherwise stated, the WSE referenced is geodetic based on the 2018 survey throughout this report. The accuracy of the RTK survey benchmark elevations was expected to be approximately plus or minus 0.03 m in consideration of the density of trees around each benchmark. Where a geodetic survey was not possible, an assumed elevation of 100 m was assigned to the primary benchmark, and elevations for the other benchmarks were determined relative to that elevation based on an optical level survey. The use of repeated surveys of WSE relative to non-geodetic benchmarks is a standard method to maintain the vertical datum at hydrometric stations over time.

Three benchmarks were installed or adopted (if in place already) at each of the 22 hydrometric stations. The primary benchmark was named BM1 and was usually rebar driven into the ground, and the second and third benchmarks (BM2 and BM3) were usually 3/8-inch diameter lag bolts installed at the base of large tree trunks and marked with yellow survey tags (Figure 5). Other suitable benchmarks installed or adopted included large boulders or a galvanized steel pipe driven into the ground. The purpose of the second and third benchmarks was to check if the primary benchmark heaved or shifted vertically between field visits.

Two complete levelling surveys were conducted for each station during each field visit using an optical level. The accuracy of each survey was verified by opening and closing on the primary benchmark, and was deemed acceptable if the survey closed at equal to or less than 0.005 m. The results of the two surveys at each site were also compared and were deemed acceptable if they agreed within 0.01 m and if they did not the survey was repeated. Elevations of each benchmark were also compared with previous field visits. Movement of the primary benchmark relative to the secondary benchmark was checked.

**Table 4: Geodetic and Local Benchmark Survey Results at Watercourse Hydrometric Monitoring Stations**

Station Name and Number	October 2018 Benchmark Coordinates and Elevation (m)	Benchmark Elevations (m) as of September 2020 and Details
Clearwater River below Broach Lake (CR-WC-MS-01)	BM1: 6398465.1 N 600437.4 E and 527.604 BM2: 6398466.1 N 600439.3 E and 527.766 BM3: 6398467 N 600433 E and 528 <sup>(a)</sup>	BM1: No Change BM2: 527.787 BM3: 527.801
Clearwater River above Patterson Lake (CR-WC-MS-02)	BM1: 6396407.6 N 607825.0 E and 499.344 BM2: 6396409.9 N 607824.8 E and 499.186 BM3: 6396407.7 N 607826.4 E and 499.290	BM1: 499.413 BM2: 499.200 BM3: 499.293
Clearwater River below Patterson Lake (CR-WC-MS-03)	BM1: 6390535.7 N 605166.6 E and 499.699 BM2: 6390536.8 N 605168.0 E and 499.975 BM3: 6390535.8 N 605161.7 E and 499.569	BM1: No Change BM2: 499.991 BM3: No Change

**Table 4: Geodetic and Local Benchmark Survey Results at Watercourse Hydrometric Monitoring Stations**

Station Name and Number	October 2018 Benchmark Coordinates and Elevation (m)	Benchmark Elevations (m) as of September 2020 and Details
Clearwater River below Beet Lake (CR-WC-MS-04)	BM1: 6390617.6 N 613269.7 E and 498.788 BM2: 6390616.0 N 613267.1 E and 498.750 BM3: 6390618.8 N 613268.1 E and 498.741	BM1: No Change BM2: 498.769 BM3: 498.719
Clearwater River below Naomi Lake (CR-WC-MS-05)	BM1: 6390518.0 N 616451.7 E and 498.867 BM2: 6390515.7 N 616453.8 E and 498.711 BM3: 6390516.7 N 616452.0 E and 498.855	BM1: 498.879 BM2: 498.897 BM3: 498.733
Clearwater River above Mirror River Confluence (CR-WC-MS-06)	BM1: 6380305.0 N 626600.0 E and 100.000 BM2: 6380300.0 N 626599.0 E and 100.098 BM3: 6380299.0 N 626595.0 E and 100.197 (Non-Geodetic)	BM1 to BM3: No Change
Clearwater River below Mirror River Confluence (CR-WC-MS-07) <sup>(b)</sup>	BM1: 6379687.0 N 626541.0 E and 100.000 BM2: 6379688.0 N 626543.0 E and 100.074 BM3: 6379688.0 N 626537.0 E and 99.181 (Non-Geodetic)	BM1 to BM3: No Change
Clearwater River at the Lloyd Lake outlet (CR-WC-MS-08)	BM1: 6356667.0 N 634720.0 E and 100.000 BM2: 6356660.0 N 634730.0 E and 98.635 (Non-Geodetic)	Downstream of Rapids: BM1: No Change BM2: No Change At WSC Station 07CD006: S73-76: 100.000; (WSP) 5.493 m (WSC) S73-75: 97.553 (WSP 3.048 m (WSC)
Clearwater River at Warner Rapids (CR-WC-MS-09)	BM1: 6307938.7 N 623078.0 E and 400.339 BM2: 6307933.0 N 623076.0 E and 400.454 BM3: 6307937.0 N 623077.0 E and 400.975 BM4: 6307936.0 N 623087.0 E and 399.207	BM1 to BM2: No Change BM3: 400.990 BM4: Not surveyed in 2020
Tributary inflow above Forrest Lake (CR-WC-TI-01) <sup>(c)</sup>	BM1: 6381301 N 598609 E and 499.969 BM2: 6381297 N 598613 E and 501.119 BM3: 6381299 N 598602 E and 500.369 BM4: 6381302 N 598609 E and 500.229	BM1 to BM4: No Change
Tributary inflow to Naomi Lake (CR-WC-TI-02)	BM1: 6392567.9 N 613764.2 E and 499.139 BM2: 6392557.9 N 613770.5 E and 499.175 BM3: 6392573.7 N 613765.0 E and 498.982	BM1 and BM3: No Change BM2: 499.147
Tributary inflow Downstream of Naomi Lake (CR-WC-TI-03)	BM1: 6390961.2 N 615808.2 E and 498.912 BM2: 6390967.7 N 615802.6 E and 499.505 BM3: 6,390951.3 N 615802.2 E and 499.062	BM1: 498.897 <sup>(d)</sup> BM2: 499.569 BM3: 499.046

**Table 4: Geodetic and Local Benchmark Survey Results at Watercourse Hydrometric Monitoring Stations**

Station Name and Number	October 2018 Benchmark Coordinates and Elevation (m)	Benchmark Elevations (m) as of September 2020 and Details
Hodge Creek below Hodge Lake (HC-WC-MS-01)	BM1: 6407639.2 N 593181.9 E and 100.000 <sup>(e)</sup> BM2: 6407639.6 N 593182.4 E and 100.353 <sup>(e)</sup> BM3: 6407639.0 N 593182.0 E and 99.785 <sup>(e)</sup> (Non-Geodetic)	BM1 to BM3: No Change

Note: All coordinates referenced are in UTM Zone 12 and North American Datum 1983 (NAD83). “No Change” in benchmark elevation is defined as a surveyed difference of less than 0.010 m for optical level surveys but allows for additional error in the RTK survey vertical elevations. Benchmark coordinates and elevations measured in October 2018 by RTK GPS survey and elevations updated using optical levelling survey in October 2019.

- a) BM3 at CR-WC-MS-01 was not surveyed by RTK GPS in fall 2018. The coordinates are based on handheld GPS coordinates reported here to the nearest metre and vertical elevation surveyed relative to BM1 using an optical level.
- b) All benchmarks for the Station CR-WC-MS-07 were installed in May 2019.
- c) Benchmarks for CR-WC-TI-01 are based on handheld GPS coordinates reported to the nearest metre and vertical elevation relative to lake level for Forrest Lake are reported to the nearest 0.001 m but may be accurate to the nearest 0.1 m.
- d) This benchmark was not stable between August 2018 and October 2019 as BM2, BM3, and the top of the staff gauge all moved upward by approximately 0.015 m relative to BM1; therefore, BM1 likely moved downward by 0.015 m.
- e) Benchmarks established June 2020.

**Table 5: Geodetic Benchmark Survey Results at Waterbody Hydrometric Monitoring Stations**

Station Name and Number	October 2018 Benchmark Coordinates and Elevations (m)	Benchmark Elevations (m) as of September 2020 and Details
Broach Lake (CR-WB-MS-01)	BM1: 6398271.6 N 594670.3 E and 528.068 BM2: 6398271.1 N 594672.3 E and 527.725 BM3: 6398269.3 N 594670.6 E and 528.250	BM1 to BM3: No Change
Lake H (CR-WB-TI-01)	BM1: 6394930.9 N 608522.5 E and 500.675 BM2: 6394933.0 N 608527.5 E and 501.642 BM3: 6394925.4 N 608526.7 E and 501.358	BM1: No Change BM2: 6394917.0 N 608506.0 E and 501.098 <sup>(a)</sup> BM3: 6394917.0 N 608509.0 E and 501.009 <sup>(b)</sup>
Lake G (CR-WB-TI-02)	BM1: 6393993.9 N 607640.9 E and 500.171 BM2: 6393996.2 N 607643.5 E and 499.860 BM3: 6393993.0 N 607648.5 E and 500.250	BM1: 500.141 BM2: 499.979 <sup>(c)</sup> BM3: 500.223
Patterson Lake (CR-WB-MS-02)	BM1: 6391309.7 N 603271.0 E and 500.139 BM2: 6391312.3 N 603278.8 E and 500.424 BM3: 6391308.1 N 603277.1 E and 500.624	BM1: 500.080 BM2: 500.361 BM3: 500.560
Forrest Lake (CR-WB-MS-03)	BM1: 6388736.0 N 606636.8 E and 500.175 BM2: 6388731.9 N 606644.8 E and 500.278 BM3: 6388745.3 N 606641.5 E and 499.638	BM1 to BM3: No Change
Lake F (CR-WB-TI-03)	BM1: 6388736.0 N 606636.8 E and 500.175 BM2: 6388731.9 N 606644.8 E and 500.278 BM3: 6388745.3 N 606641.5 E and 499.638	BM1 to BM3: No Change
Beet Lake (CR-WB-MS-04)	BM1: 6390290.8 N 611334.2 E and 500.067 BM2: 6390289.7 N 611334.3 E and 500.133 BM3: 6390294.5 N 611337.1 E and 499.238	BM1 to BM3: No Change
Naomi Lake (CR-WB-MS-05)	BM1: 6392109.9 N 613375.5 E and 500.296 BM2: 6392109.4 N 613383.6 E and 498.847 BM3: 6392122.5 N 613379.0 E and 499.497	BM1: No Change BM2: 498.914 BM3: No Change

Station Name and Number	October 2018 Benchmark Coordinates and Elevations (m)	Benchmark Elevations (m) as of September 2020 and Details
Hodge Lake (HC-WB-MS-01)	BM1: 6407639.2 N 593181.9 E and 100.000 <sup>(d)</sup> BM2: 6407639.6 N 593182.4 E and 100.353 <sup>(d)</sup> BM3: 6407639.0 N 593182.0 E and 99.785 <sup>(d)</sup> (Non-Geodetic)	BM1 to BM3: No Change

Note: All coordinates referenced are in UTM Zone 12 and North American Datum 1983 (NAD83). “No Change” in benchmark elevation is defined as a surveyed difference of less than 0.010 m.

- a) Benchmark replaced in August 2020. Benchmark supporting tree had fallen.
- b) Benchmark replaced in June 2020. Benchmark supporting tree had fallen.
- c) Benchmark replaced in June 2019.
- d) Benchmark established June 2020.

Figure 5: Typical Benchmarks Installed during the Hydrometric Program in 2018

a) Lag Bolt



b) Rebar



#### **4.5.1.2 Water Surface Elevation Monitoring**

Non-vented Solinst Levellogger pressure transducers (Levelloggers), which monitor combined air and water pressure, were installed at the hydrometric stations during the initial site visit. Pressure and water temperature were recorded every 30 or 60 minutes at each station during its period of operation, and field visits were required to retrieve the locally stored data. At most stations, the Levellogger was deployed inside a tubular aluminum housing threaded onto an aluminum plate that rested on the stream bottom. At Hodge Lake and Hodge Creek below Hodge Lake, the Levelloggers were secured to an aluminum clamp with a stake driven into the stream bottom by hand. For watercourses, Levelloggers were deployed as close to the discharge measurement cross-section as possible, on firm substrate, and at a depth of 0.3 m to 1.0 m. For waterbodies, Levelloggers were deployed near shore, in a sheltered location, if possible, on firm substrate, and at a depth of 0.3 m to 0.5 m.

Since atmospheric pressure varies with time, pressure measured with the Levelloggers was converted to water depth by subtracting the barometric pressure measured with Solinst Barologgers (Barologgers). Barologgers were installed at three locations: Clearwater River below Broach Lake, within Patterson Lake, and Clearwater River above Warner Rapids. The recommended maximum distance between a Barologger and corresponding Levellogger is 30 km horizontal distance and 300 m elevation change (Solinst 2018). The closest Barologger was used to correct Levellogger data. Water depth records at each hydrometric station were then converted to WSE values using an offset correction based on the difference between the primary benchmark elevation and the WSE of the watercourse or waterbody surveyed during each field visit.

During each monitoring station visit, a levelling survey was conducted with an optical level to measure the WSE at each hydrometric station relative to local benchmarks. A description of the benchmarks for each station are provided in Section 4.5.1.1 and Appendix A. Section 4.7 provides further discussion on data QA and checking effort, and Section 5.5 discusses data confidence and uncertainties for these measurements.

Staff gauges were installed at all hydrometric stations within the LSA, as they provide a means of verifying the WSE survey results. Each staff gauge was attached to a length of 19 mm diameter rebar or T-post driven into the stream bed at the discharge measurement cross-section. The staff gauges were installed so that approximately 1 m of rebar extended above the stream bed. For stability purposes, the length of rebar used was approximately 2 m. If a staff gauge was installed at a hydrometric station, a staff gauge reading was made concurrent with the optical level survey, and the top of the staff gauge was surveyed relative to the primary benchmark. Staff gauge readings were estimated to the nearest millimetre if conditions allowed. The elevation of the top of the staff gauge was surveyed at its highest point during levelling surveys.

#### **4.5.1.3 Discharge Measurements**

In watercourses that could not be waded, a Sontek M9 acoustic doppler current profiler (ADCP) was used to measure discharge. RiverSurveyor Live software was used to collect measurements and complete data review in the field, and the field results were reviewed a second time in the office. A compass calibration was completed daily prior to the first ADCP measurement. Magnetic declination from true north for the field location and date was entered in the software based on NRCan (2020) website values. Typically, more than three discharge measurements were collected at each site during a single field visit. An average discharge was estimated from a minimum of three discharge measurements having results within 5%. Although moving beds were not observed at most sites, the GPS-Generalized Gradient Approximation (GGA) track reference (i.e., boat velocity calculated from GPS data) was usually preferred over the bottom track reference method (i.e., boat velocity calculated from

river bottom data), as the channel widths were more realistic using the GPS-GGA track reference compared to measured widths.

A Sontek FlowTracker acoustic Doppler velocimeter (ADV) was used to measure discharge in watercourses that were wadable. Manual discharge measurements were conducted according to the Water Survey of Canada (WSC) standard described by Terzi et al. (1994). Velocity and depth measurements used for discharge calculation were collected using the ADV and a top-setting wading rod. The mid-section method (i.e., in which both depth and velocity are measured at numerous points across the channel transect and area is calculated based on the depth at each point multiplied by the interval between points) was used to measure discharge, and the sampling time for velocity was 40 seconds.

## 4.5.2 Data Analysis

### 4.5.2.1 Data Management and Correction

The Aquarius Time Series Software (Aquarius) was used to store and make corrections to hydrology data, perform and document QA/QC, and develop rating curves for the watercourses. Discharge time series were derived from these rating curve relationships. Data uploaded to Aquarius included WSE and discharge, as well as the continuous WSE records from the barometrically compensated Levellogger data. Total precipitation data and water temperature records were also uploaded and used to interpret hydrographs.

For the hydrometric stations that had Levelloggers in place over the winters of 2018-2019 and 2019-2020, water levels were corrected for the overwinter backwater as these data were used for calibration of the regional hydrology model (EIS Appendix 9A). There is higher uncertainty in the corrected under-ice water level data, but it was reasonably assumed that water levels receded gradually over the winter under the ice until the beginning of the spring freshet, which was in mid-March in 2019 and mid-April in 2020. Water surface elevation surveys were conducted in late March 2019 at selected hydrometric stations, which allowed for accurate backwater corrections at those stations. The winter discharge records were further corrected using discharge measurements (or unit-area discharge estimates for the stations not visited in late March 2019), if required.

The WSC (2012) reference was used as a guide for all hydrometric data corrections. The following are the most common basic data corrections made for waterbody and watercourse stations:

- Stage (for watercourses) or water level (for waterbody) offset corrections to the vertical gauge datum established relative to local benchmarks. Offset corrections were made to the field stage or water level survey results.
- Drift corrections to stage or water level logger readings were made between two field survey results if required (i.e., if the logger readings differed from the corresponding field survey result by more than 0.003 m).
- Data were deleted from the record for any time period that the logger was removed from the water.
- Stage-discharge rating curves were initially fit to the stage-discharge paired data using a power equation, and the base equation or curves were adjusted over time as more data became available.
- Temporary stage-shifts were applied to the base rating curves when stage-discharge points did not fit within about 0.01 m or 5% of the base rating curve. Shifts were usually above the base rating curve when backwater conditions occurred.

As described in WSC (2012): “many factors can affect the stage discharge relationship and require its adjustment. Examples are backwater due to beaver dams, weed growth or ice and scour or deposition in the channel. In those situations, shifts are then applied to the stage-discharge relationship. Shifts are temporary adjustments to base rating that apply until the cause for the change has receded or been confirmed as permanent and a new rating is developed.”

#### **4.5.2.2 Rating Curve Development**

Water surface elevation values were converted to stage values by subtracting a consistent offset (i.e., stage datum) at each hydrometric station; the stage datum was generally a value slightly below the minimum bed elevation at the watercourse, so that stage values were always positive and representative of the maximum water depth across the watercourse. Stage was related to discharge using an empirical equation referred to as the open water rating curve (OWRC), developed based on sets of manual stage and discharge measurements at each station.

The rating curve relating Patterson Lake WSE and lake outflow was developed based on simulations from a 1-D Hydrologic Engineering Center – River Analysis System (HEC-RAS) hydraulic model developed for the reach of the Clearwater River that separates Patterson Lake and Forrest Lake (EIS Appendix 9B). As more data were collected in 2019 and 2020, rating curves for watercourse stations were developed from the paired stage and discharge measurements.

Rating curves were developed in Aquarius and following guidance in WSC (2012). At several stations, stage-shifts were applied to correct the base rating curve to the value of stage-discharge points that were at least 0.003 m above (or less frequently, below) the curve. At CR-WC-MS-09, no stage-shifts were used, and at two stations, only small shifts were required (i.e., CR-WC-MS-01, CR-WC-MS-08), while larger stage-shifts of over 0.1 m were required at all remaining stations for at least one field visit (Appendix B). Several stations experienced seasonal backwater due to aquatic vegetation growth in the channel in the summer months or due to ice in the channel or downstream, and a few stations were occasionally backwatered by downstream waterbodies, particularly when lake water levels increased. Negative shift values indicate backwater conditions when the stage is higher for a given discharge. Stage-shifts were applied for most field visits, although not for the stage-discharge points that defined the base rating curve which had no shift applied. Stage-shifts were also occasionally applied in between field visits at transitions such as before and after spring thaw, or when backwater conditions were increasing (e.g., prior to documentation of beaver dams downstream of a station or aquatic vegetation growth, or as water levels rose in downstream waterbodies). Stage-shift reports were exported from Aquarius for most hydrometric stations for QA/QC documentation purposes (Appendix B). Anomalous stage-discharge measurements that fell below the base rating curve occurred at CR-WC-MS-03 and CR-WC-MS-04 and were corrected using positive stage shifts; more extensive effort was made in these cases to identify and resolve potential errors in WSE levelling surveys and discharge manual measurements, and that station’s time series was compared to results from other stations.

The OWRCs are based on a relatively wide range of WSE and discharge conditions that occurred, with the lowest water levels and discharges measured in 2018 and the highest water levels and discharges measured in 2020. At most stations in the LSA, field visits were conducted monthly or every two months during the open water period, with one late-winter field visit conducted in March 2019. A higher number of field visits increases confidence in the

WSE and derived discharge time series records. Hydrometric stations closest to Patterson Lake were considered the highest priority and were visited most frequently.

The OWRCs with six or fewer paired discharge-stage data points are currently classed as preliminary. These stations were not visited as often during the monitoring program, as they were considered lower priority due to their location being farther from Patterson Lake, being outside the LSA, or because they were not easy to access when ice cover was in place in early spring. Monitoring at hydrometric Station CR-WC-TI-01 was discontinued due to the station being continuously affected by beaver dams and/or Forrest Lake water levels, as well as having low flows.

## 4.6 Sediment

Watercourses transport solid material as suspended particles that are held in suspension by the turbulence of the flowing water, and as bed load where solid particles bounce, roll, or slide along the stream bed (Henderson 1966). Suspended and bed load sediment transport were measured periodically at key watercourse locations in the RSA downstream of Patterson Lake: hydrometric stations CR-WC-MS-03, CR-WC-MS-04, and CR-WC-MS-05. These locations had relatively uniform depths across the channel and were characterized by fine to medium sand substrate with relatively uniform ripple bed form.

### 4.6.1 Data Collection

Sediment data collection included repeated sampling for suspended sediment and monitoring bed load at three watercourse locations, and one-time sampling of bed material to obtain a particle size distribution for the stream beds.

Suspended sediment measurements involved collecting surface water samples from the watercourses using grab samples from the middle of the water column. The samples were submitted to the Saskatchewan Research Council in Saskatoon for laboratory analysis of TSS. Duplicate TSS samples were taken during the 2018 field visits and were within acceptable margin of error, and duplicate samples were not taken in 2019 or 2020 field visits.

Bed load sampling was initially attempted at each of the three hydrometric stations in August 2018 using a Helley-Smith handheld wading bed load sampler with a large nylon mesh sediment collection bag. Instantaneous bed load sampling was initially conducted in a uniform cross-section at several equally spaced points across each station cross-section for a period of 10 minutes at each point. However, this method did not collect a measurable amount of sediment at any of the three stations. The Helley-Smith sampler is known to be unsuitable for characterizing bed load of some streams and bed forms based on the median diameter of bed material measured < 1.0 mm at these locations (Section 5.4.1) (Pickering 1979; Boning 1990). Once these results were obtained in 2018, no further attempts were made to use the Helley-Smith sampler.

For subsequent field visits, a test sample was completed at a higher velocity location at each station to determine if there was enough bed load transport occurring over a period of 60 minutes to warrant further sampling at lower velocity locations. If a measurable amount of bed load was not collected over a 60-minute period, a measurement of "Not Detected" was assigned and no further sampling was completed at lower velocity locations. During the field visits in 2019 (all three stations) and June 2020 (CR-WC-MS-03 only), an alternative bed load transport monitoring method was used whereby a square aluminum plate, with 0.25 m sides and thickness of about 0.007 m, was installed flush with the stream bed with a sampling bag at the downstream end. This plate and

sample bag were left in place for a longer period of time (i.e., 1 hour to 38 hours depending on the site visit), and the sediment that migrated onto the plate or into the bag during that time was collected and rinsed into a plastic sampling bag, labelled, and double bagged.

The width of the plate perpendicular to the flow direction was used to estimate the total load over the sampling period. The total bed load material sampled was then submitted to the WSP soils laboratory in Saskatoon as a single composite sample to determine the sample dry weight. Only sampling periods exceeding 24 hours yielded sufficient sediment mass to submit for laboratory analysis; a mass of 300 g is normally required to conduct a sieve test.

For all visits following June 2020, a similar method of extended duration was used with the Helley-Smith handheld wading bed load sampler instead of the square aluminum plate. The width of the Helley-Smith sampler perpendicular to the flow was used to estimate the total load over the sampling period. The sampler was left in place for similar durations (i.e., 1 hour to 38 hours depending on the site visit) with the exception of July 2020 at CR-WC-MS-04, when it was deployed for approximately 67 hours due to thunderstorms and monitoring prioritizing.

Representative bed substrate samples were also collected at hydrometric stations CR-MS-WC-03, CR-MS-WC-04, and CR-MS-WC-05 in 2018 to characterize bed material grain size distribution. Bed material samples were collected with a shovel and sediment bag, double bagged, labelled, and submitted to the WSP soils laboratory in Saskatoon for particle size analysis. A combination of sieve method and the hydrometer method was used to test a subset of each sample to determine the particle size distribution.

#### 4.6.2 Data Analysis

When sufficient sample was collected during bed load sampling as described in Section 4.6.1, the sediment samples were submitted to the WSP soils laboratory in Saskatoon to obtain the particle size distribution results. Channel bed substrate particle size was determined using standard laboratory methods and was based on combined mechanical sieve and hydrometer methods.

The TSS concentrations were analyzed by an accredited laboratory using a standard gravimetric TSS analytical method for the examination of water and wastewater (APHA-AWWA-WEF 2018). The detection limit used in the analyses was 1 mg/L.

Bed load sediment data were collected, reviewed, and related to stream parameters including channel width, velocity, and discharge. Bed load sediment concentrations ( $C_{SED}$ ) were calculated as follows:

$$C_{SED} = \frac{M_{Dry}}{Q \times t \times 1000}$$

Where,  $C_{SED}$  = bed load sediment concentration (mg/L),  $M_{Dry}$  = sample mass dry weight (mg),  $Q$  = discharge ( $m^3/s$ ), and  $t$  = sample collection time (s). Daily total sediment loads were also calculated based on the dry mass of the samples collected relative to sampler width and multiplied by the total channel width.

$$SL = \left( \frac{M_{Dry}}{W \times t} \right) W_b$$

Where,  $SL$  = bed load (tonnes/day),  $M_{Dry}$  = oven dried sample mass (tonnes),  $W$  = sampler width (m),  $t$  = sample collection time (days),  $W_b$  = total channel width (m).

Suspended sediment, bed load, and channel substrate results obtained are provided in Section 5.4.

## 4.7 Quality Assurance and Quality Control

Quality assurance (QA) and quality control (QC) practices determine data integrity and are relevant to all aspects of the study, from sample collection to data analysis and reporting. The QA encompasses management and technical practices designed to confirm that the data generated are of consistent high quality. The QC is an aspect of QA and includes the procedures used to measure and evaluate data quality, and the corrective actions to be taken when data quality objectives are not met.

The QA/QC information for the main components of this study is outlined in this section.

### 4.7.1 Meteorological Data

The meteorological station instrumentation, including the Geonor gauge, was installed according to manual specifications by experienced technical staff. This instrumentation was installed at standard heights above ground and considering fetch distances (i.e., un-obstructed distance over which the wind blows) relative to forested areas and occupied buildings. Meteorological data were reviewed by qualified staff. Details on the meteorological instrumentation and data collection are provided in Section 4.3.

### 4.7.2 Snow Surveys

Standard techniques were used for the snow surveys completed in late winter of 2018 and 2019 (Section 4.4). Detailed work instructions including proposed snow survey locations, and maps were provided to the field crew prior to the surveys. Care was taken to avoid placement of snow survey plots within 50 m of a disturbed area such as a road.

Soil plugs were obtained at the base of the snow cores wherever possible to reduce underestimation of snow density through verification of reaching the soil layers below. If snow was observed to be lost from a core when it was removed from the snowpack, a second replacement snow core was taken. The scales used for measuring weight of the snow cores were calibrated with standard weights prior to the surveys, and the scale was zeroed regularly in the field.

### 4.7.3 Hydrometric Monitoring

Field equipment was calibrated throughout the field programs, following manufacturer specifications, and all samples were collected by experienced personnel. Specific work instructions outlining each field task in detail were provided to, and followed by, field personnel. Field notes were recorded in waterproof field books and on pre-printed waterproof field data sheets in either pencil or indelible ink. Data sheets were checked at the end of each field day for completeness and accuracy and were scanned into electronic copies at the completion of the field program.

To provide QA on levelling surveys of water surface elevations, two levelling surveys were completed at each station during each field visit so that WSE results could be compared; for most field visits, the surveys were started and finished on the primary benchmark to provide additional confidence in the WSE results. If the results of the two levelling surveys differed by 0.005 m or less, then that was considered a good result; differences of up

to 0.010 m were considered adequate. If lake conditions were windy and wavy, the WSE levelling survey and staff gauge readings were not always within the 0.010 m accuracy, and these weather conditions and reading instances were documented when they occurred. Section 4.5.1 provides further discussion on data QA and checking effort, and Section 5.5 discusses data confidence and uncertainties for these measurements.

Discharge during the field visits was measured with a Sontek Flowtracker ADV, Flowtracker2 ADV, and RiverSurveyor M9 Acoustic Doppler current profiler (ADCP). These devices do not require recalibration; however, QA tests were completed prior to starting measurements and a compass calibration was completed for the ADCP before use. Quality control measures were applied to the ADCP and ADV results following the field programs to check the following:

- the correct offsets and magnetic declination were used for the ADCP;
- there was minimal missing data;
- depth and velocity measuring spacing for the measurements were logical;
- the ADCP speed did not greatly exceed stream velocity;
- the ADCP tilt, pitch, and roll were minimal;
- each ADCP discharge measurement accepted was within 5% of the averaged discharge measurements; and
- the ADV percent uncertainty, number of measurement verticals, and measurement flags were reviewed.

All field data were transcribed into an online database. Data entry, summary tables, and statistical analyses were reviewed by a second qualified scientist or engineer.

Hydrometric program data collection methods are provided in detail in Section 4.5.

#### **4.7.4 Sediment Sampling and Measurements**

Suspended sediment sampling and bed load measurements were obtained during the baseline program period along the Clearwater River downstream of Patterson Lake (Section 4.6).

As mentioned in Section 4.6, an external laboratory was used to obtain water sample results for TSS, and a detection limit of 1 mg/L was used for all the tests. Chain-of-custody forms were used to track shipment and receipt of samples submitted to laboratories. Standard test methods were used. Results from duplicate samples for TSS from fall 2018 were identical and usually not detectable or very low. Due to this, duplicate TSS samples were not taken in 2019 or 2020 field visits.

The particle size analysis and dry weight of bed load samples were submitted to a qualified soils laboratory and standard methods were used. Additional QA/QC methods included using specific work instructions for every field visit to provide detailed instructions to the field crew, and field data were reviewed following each field trip.

## 5.0 RESULTS

### 5.1 Meteorological Data

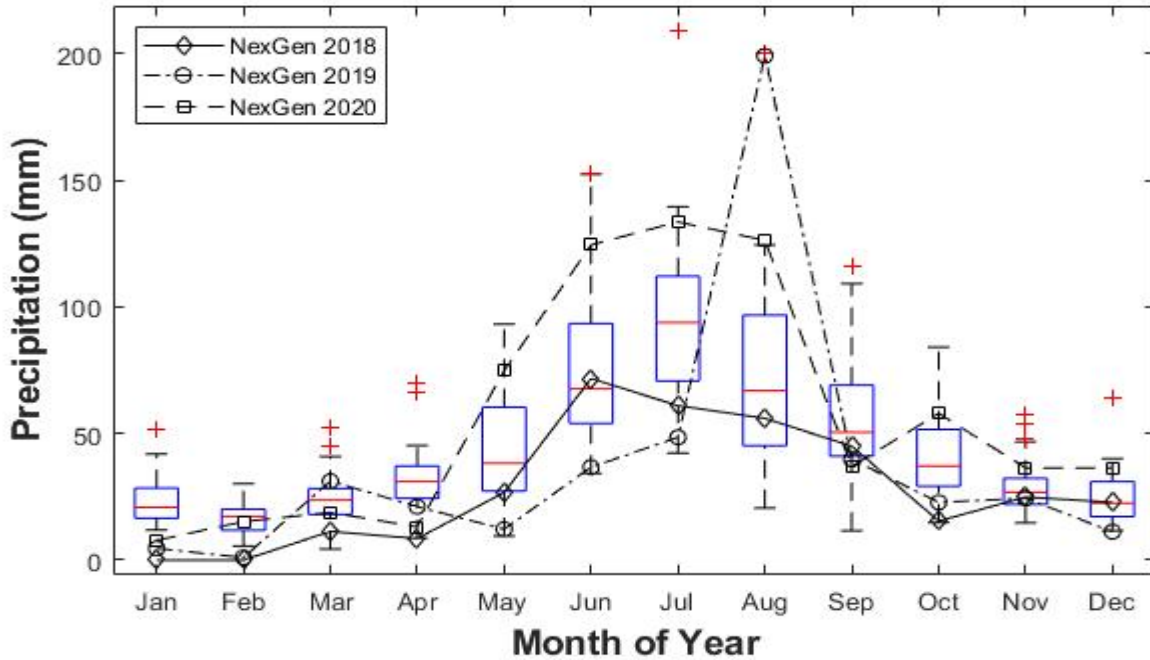
Monthly total precipitation in the anticipated area of the Project in 2018 to 2020 are presented in Figure 6 alongside long-term European Re-analysis Interim (ERA-Interim) data to provide historical context. In Figure 6, the schematic plot describes the variability of monthly precipitation over a 42-year period from 1979 to 2020. In Figure 7, 2018 to 2020 monthly average air temperature is presented with historical variability in the anticipated area of the Project over a 42-year period from 1979 to 2020. The length of the box in the plots represents the inter-quartile range (i.e., 25th and 75th inter-quartiles), with the median denoted by the horizontal line within the box. The whiskers represent the minimum and maximum values of the central 50% of the dataset. Any outliers are represented by “+” sign.

In 2018, observed precipitation at Rook I Meteorological Station was below normal in every month except June, November, and December. In 2019, observed precipitation was also below normal in every month except May, August, November, and December. In August 2019, total precipitation at Rook I Meteorological Station was 206.4 mm, which exceeded the maximum August precipitation in the ERA-Interim records in the anticipated area of the Project and was about three times higher than the mean August precipitation of 73.1 mm. The largest rainfall events at Rook I Meteorological Station occurred over multiple days: 56 mm of rainfall between 1 August 2019 and 3 August 2019, and 92 mm between 17 August 2019 and 18 August 2019.

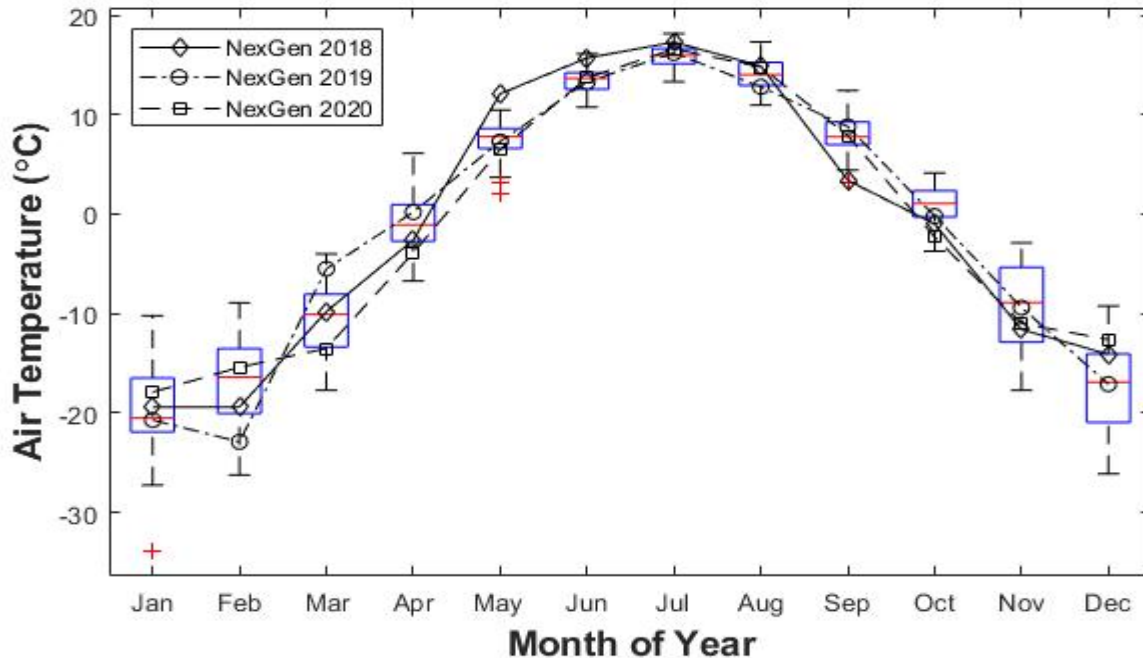
Total annual precipitation in the anticipated area of the Project was 361.6 mm in 2018, 495.3 mm in 2019 measured up to 26 October 2019, and 603.4 mm in 2020 measured from 29 April 2020 to 3 November 2020. Precipitation data from 26 October 2019 to 28 April 2020 appeared erroneous and were well above other regional meteorological station data; therefore, the data have been intentionally omitted. Mean annual precipitation was 531 mm for the years 1979 to 2019 based on ERA-Interim data. Hence 2018, and possibly also 2019, was below the long-term average value, and 2020 was above the long-term average value.

Monthly average air temperatures in 2018 to 2020 are presented in Figure 7, alongside historical temperatures for the anticipated area of the Project from 1979 to 2019 based on ERA-Interim data. In general, observed air temperatures in 2018 and 2019 followed long-term average conditions with occasional exceptions.

**Figure 6: Monthly Precipitation Records for 2018 to 2020 at Rook I Meteorological Station Compared to Long-Term ERAI Records (1979 to 2019)**



**Figure 7: Monthly Air Temperature Records for 2018 to 2020 Relative to Long-Term (1979 to 2019) Records**



## 5.2 Snow Surveys

Snow survey results for the Patterson Lake watershed, collected between 15 April 2018 and 17 April 2018 and between 21 March 2019 and 23 March 2019, are presented in Table 6. Detailed snow survey results are included in Appendix C, Snow Survey Data.

The average SWE on the ground on 17 April 2018 (i.e., at the end of the 2018 snow survey) for all terrain types, not weighted by area, was 78.5 mm and ranged from 31.3 mm to 104.5 mm. The average SWE on the ground on 23 March 2019 (i.e., at the end of the 2019 snow survey) for all terrain types, not weighted by area, was 75.5 mm and ranged from 62.8 mm to 91.5 mm. The area-weighted SWE for the Patterson Lake watershed was estimated to be 74.0 mm in 2018 and 70.0 mm in 2019. This corresponds to an estimated snowpack available for melt of 19.6 million cubic metres (Mm<sup>3</sup>) in 2018 and 18.4 Mm<sup>3</sup> in 2019 in the Patterson Lake watershed. The total volume of snow available for melt was expected to have peaked in advance of the field surveys in both 2018 and 2019.

Based on the weather and observations made during both years' snow surveys, some melt likely occurred prior to the surveys; therefore, these results likely underestimate the volume available for melt in Patterson Lake watershed. Additionally, no adjustment was made to account for sublimation losses between the time of the surveys and when the snowpack had fully melted, although blowing snow-sublimation losses would have been minimal as snowmelt had started and losses to wind-blown sublimation are typically minimal once melting of the snowpack begins. In spring 2018, snowmelt occurred relatively soon after the survey; therefore, this loss may have been small. In spring 2019, the spring freshet extended from the initial melt in March to early or mid-May; therefore, additional sublimation losses would be expected. No survey was conducted in 2020.

**Table 6: Snow Survey Summary Results, April 2018 and March 2019**

Terrain Type	2018			2019		
	Sample Mean Depth (cm)	Sample Mean Density (g/cm <sup>3</sup> )	Sample SWE (mm)	Sample Mean Depth (cm)	Sample Mean Density (g/cm <sup>3</sup> )	Sample SWE (mm)
Lake	22.0	0.14	31.3	22.9	0.33	75.1
Lake Edge	47.9	0.16	78.8	26.3	0.29	75.7
Terrestrial: flat, low slope <sup>(a)</sup>	65.3	0.14	87.6	29.5	0.24	69.8
Terrestrial: north, low slope	61.3	0.14	88.4	32.9	0.19	64.1
Terrestrial: north, 10° to 33°	60.3	0.15	88.5	37.7	0.24	91.5
Terrestrial: west, low slope	84.0	0.14	104.5	31.6	0.26	78.0
Terrestrial: west, 10° to 33°	58.4	0.11	68.4	35.3	0.24	86.5
Terrestrial: south, low slope	51.6	0.13	70.0	31.0	0.22	65.2
Terrestrial: south, 10° to 33°	43.7	0.16	70.7	24.0	0.30	70.9
Terrestrial: east, low slope <sup>(b)</sup>	70.8	0.12	87.5	31.7	0.21	62.8
Terrestrial: east, 10° to 33°	70.8	0.12	87.5	43.0	0.21	91.1
<b>All Types</b>	<b>57.8</b>	<b>0.14</b>	<b>78.5</b>	<b>31.4</b>	<b>0.25</b>	<b>75.5</b>

a) No sample points were collected for Terrestrial: Flat, Low Slope terrain type and was assumed to be the average of low slope observations in all directions.

b) In 2018, Terrestrial: East, Low Slope was assumed to be the same as Terrestrial: East, High Slope as the results are similar to observations for north facing slopes in 2019.

SWE = snow water equivalent.

For late winter 2020, SWE values for the Patterson Lake watershed were estimated using data collected from regional remote sensing data and ground-based methods. Ground-based methods are important in validating the remote sensing data.

Comparison of local snow survey results to regional SWE conditions was possible based on publicly available regional measurements, as well as remotely sensed maps of SWE. Publicly available measurements of SWE are available at Gordon Lake Lookout snow pillow station. At the time of snow surveys from 15 April 2018 to 17 April 2018, SWE at Station 07CE801 was relatively stable at around 128 mm, and from 6 March 2018 to 19 April 2018, SWE at Station 07CE801 generally exceeded 120 mm. These values are much higher than the 74 mm of weighted SWE average measured at the anticipated area of the Project on the same dates. This is likely due to differences in snow pack at the two locations.

In 2019, peak SWE of 93 mm occurred at Station 07CE801 on 20 March 2019. At the time of snow surveys from 21 March 2019 to 23 March 2019, SWE was slightly lower than the peak and steadily melting such that it decreased from 86 mm to 67 mm over the three-day period. These values are similar to the 70 mm of weighted SWE average measured at the anticipated area of the Project on the same dates.

In 2020, peak SWE of 127 mm occurred at Station 07CE801 on 12 April 2020. From 1 April to 2020 to 17 April 2020, SWE of 120 mm or greater was sustained, followed by steady snowmelt beginning 21 April 2020 and ending 27 April 2020. No local snow surveys were completed in 2020 that could be compared with regional values.

Additional regional context was gained by reviewing weekly estimates of SWE for the Canadian Prairie provinces published by ECCC, accessed through CCIN (CCIN 2020; ECCC 2020b). Weekly snapshots from the expected peak annual condition between 22 March 2018 and 1 April 2018 up to the time of the snow survey show that snow ablation (i.e., reduction) and snow melt likely began before the snow survey (Figure 8a to Figure 8d). In Figure 8, the anticipated area of the Project is indicated in the weekly snapshots by a black star in northwest Saskatchewan. The estimated SWE in place on 15 April 2018 validates the SWE shown in Figure 8c for the anticipated area of the Project, which is approximately 70 mm. The peak SWE of between 100 mm and 110 mm occurred the week of 1 April 2018. This value is close to the peak SWE in 2018 of 124 mm estimated using Global Snow Monitoring for Climate Research (GlobSnow) data (ESA 2020) for the anticipated area of the Project and is close to the long-term average peak SWE of 115 mm using the GlobSnow data for 1980 to 2019 (ESA 2020).

In winter 2019, weekly snapshots were obtained for dates between 22 February 2019 and 1 April 2019 that include the peak annual SWE and the timing of the snow survey (CCIN 2020; ECCC 2020b).

Figure 9 includes six snapshots that show snow ablation and melt had likely started before the snow survey was completed. The estimated SWE on 21 March 2019 validates the SWE shown in Figure 9 for the anticipated area of the Project, which appears to be roughly between 80 mm and 90 mm. The peak SWE of between 100 mm and 110 mm appears to have occurred during the week of 1 March 2019. This is close to the peak SWE in 2018 of 119 mm estimated using GlobSnow data (ESA 2020) for the anticipated area of the Project, and is close to the long-term average peak SWE of 115 mm.

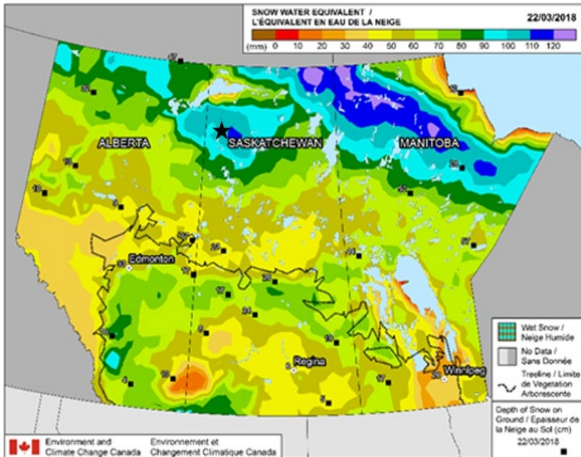
In winter 2020, weekly snapshots in late-winter 2020 were obtained for dates between 22 February 2020 and 22 April 2020 that include the peak annual SWE (CCIN 2020; ECCC 2020b).

Figure 10 includes nine snapshots that show that snow ablation and melt likely began in mid-April 2020, which is similar to GlobSnow and Station 07CE801. Peak snowpack between 100 mm and 110 mm is validated by GlobSnow data, which has a maximum value of 115 mm. GlobSnow and ECCC values are slightly lower than those for Station 07CE801.

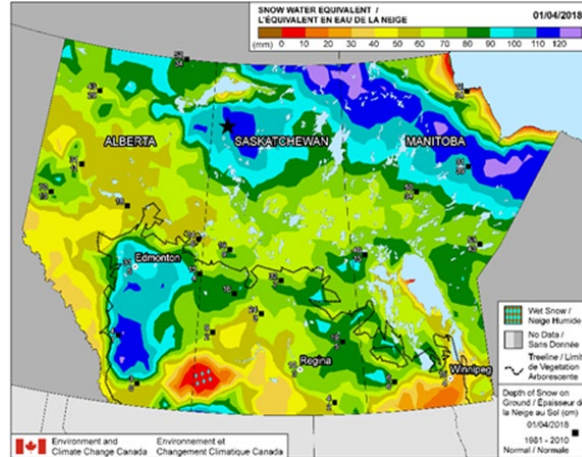
Based on the comparison of results in previous years, SWE at the anticipated area of the Project can be adequately approximated using the remote sensing data for 2020.

Figure 8: Weekly Snow Water Equivalent Estimates, March and April 2018

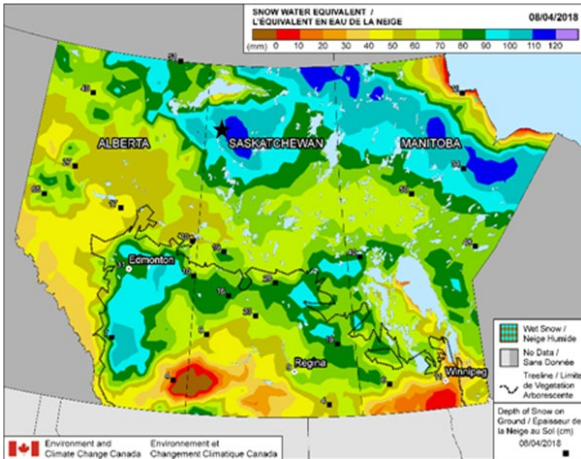
a) 22 March 2018



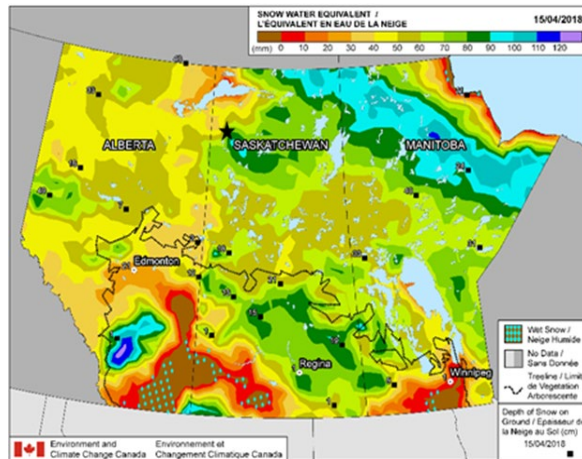
b) 1 April 2018



c) 8 April 2018



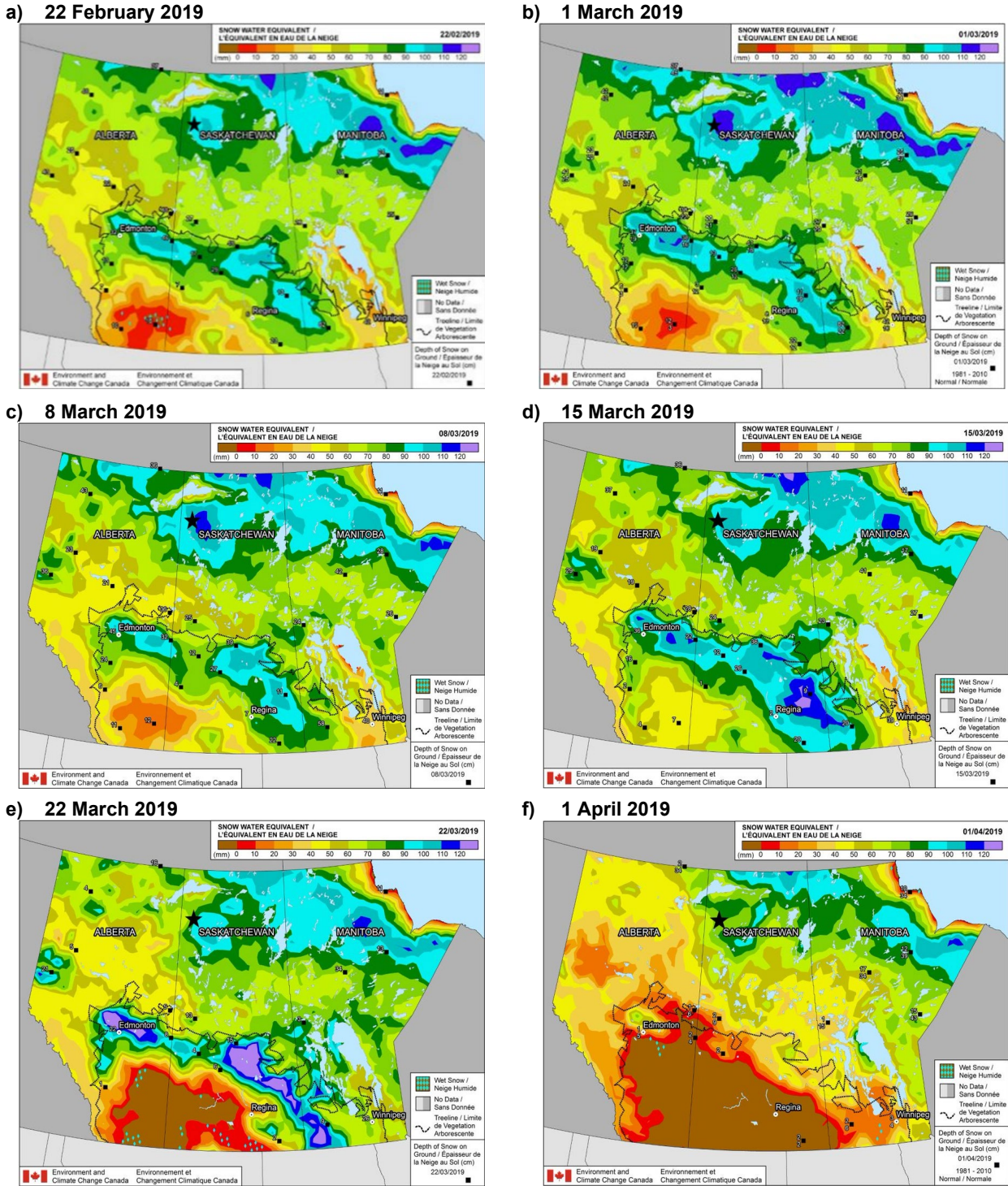
d) 15 April 2018



Source: ECCC 2020b.

Note: Project location is indicated in the snapshots by a black star immediately northwest of the label for Saskatchewan.

Figure 9: Weekly Snow Water Equivalent Estimates, February to April 2019

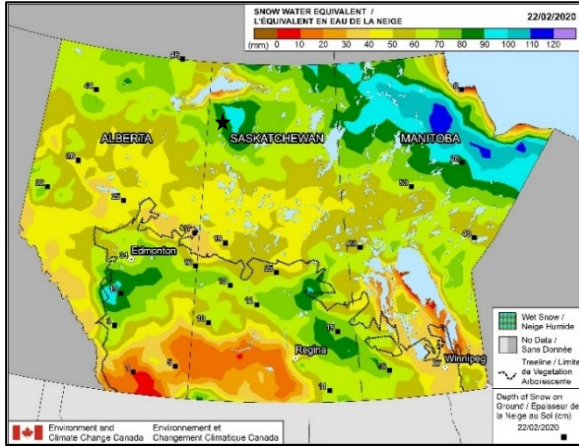


Source: ECCC 2020b.

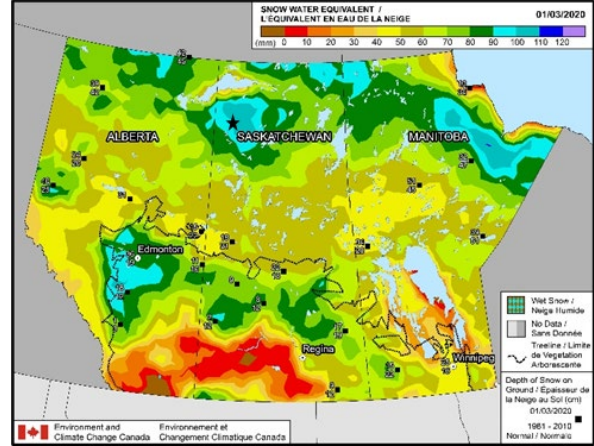
Note: Project location is indicated in the snapshots by a black star immediately northwest of the label for Saskatchewan.

Figure 10: Weekly Snow Water Equivalent Estimates, February to April 2020

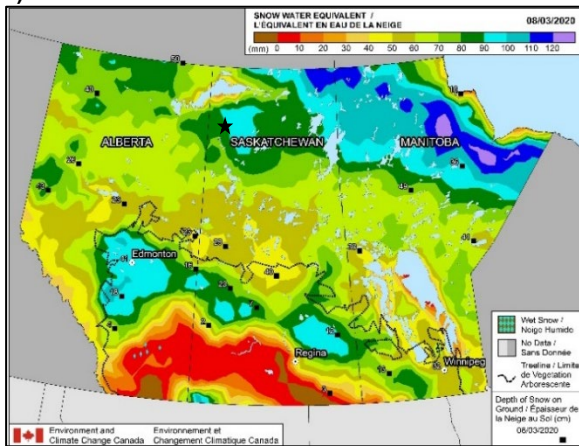
a) 22 February 2020



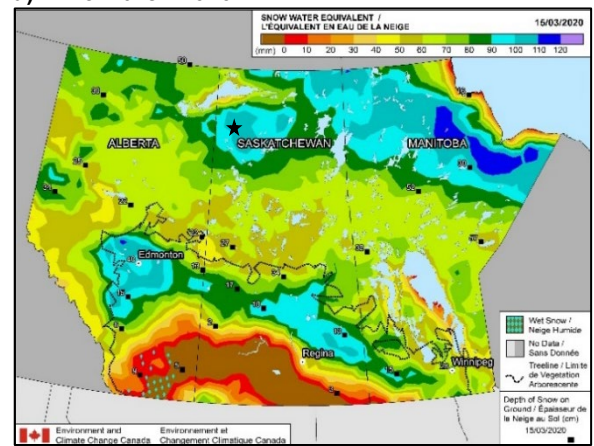
b) 1 March 2020



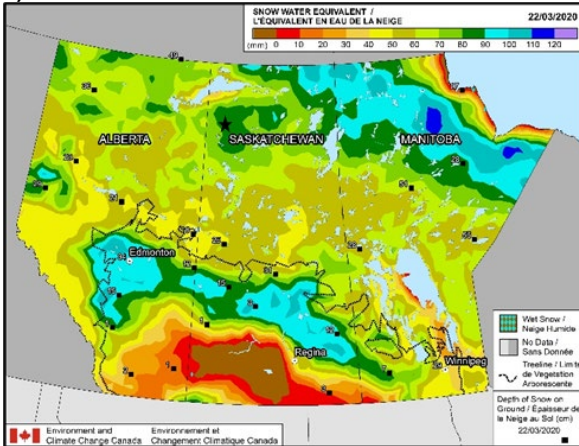
c) 8 March 2020



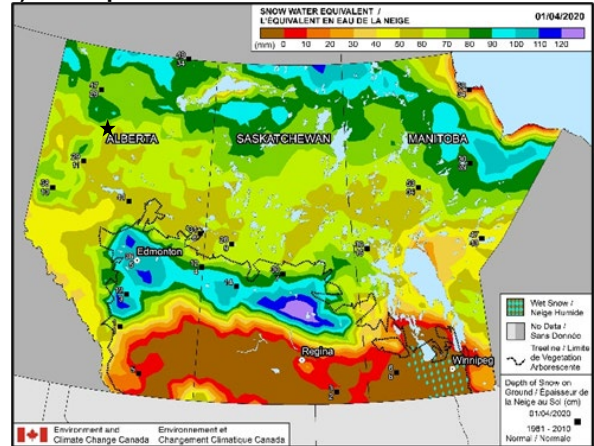
d) 15 March 2020



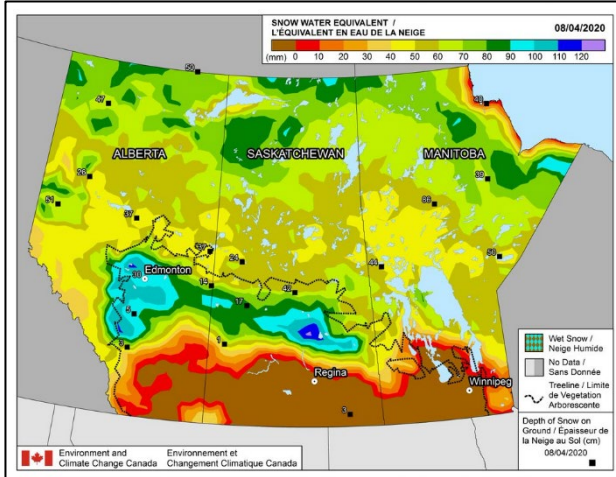
e) 22 March 2020



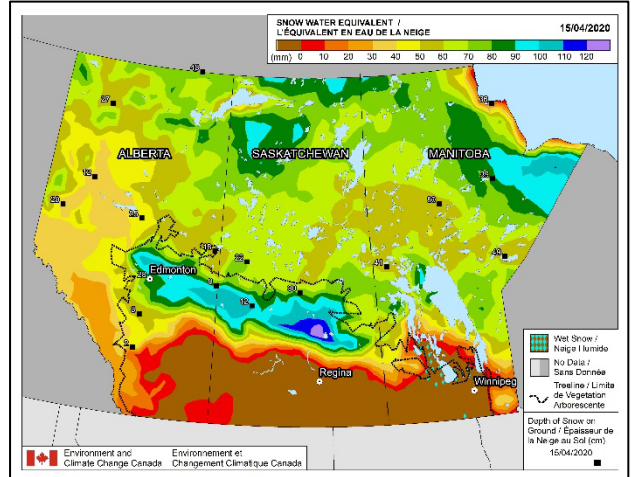
f) 1 April 2020



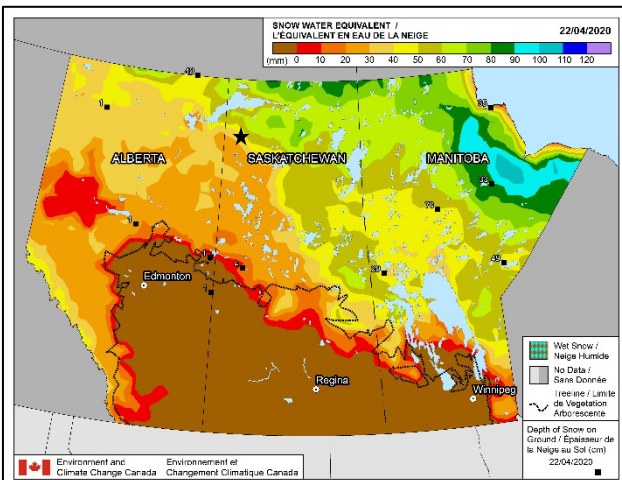
g) 8 April 2020



h) 15 April 2020



i) 22 April 2020



Source: ECCC 2020b.

Note: Project location is indicated in the snapshots by a black star immediately northwest of the label for Saskatchewan.

## 5.3 Hydrometric Monitoring

### 5.3.1 Watercourse Hydrometric Monitoring

Discharge and WSE data collected for each hydrometric station during the 2018 to 2020 hydrology field programs are provided in the following subsections. Daily mean WSE and discharge data are included in Appendix D, Hydrometric Monitoring Daily Data.

Only paired WSE and discharge measurements that were considered to be unaffected by backwater were used to develop the OWRC base curve equation. Stage-shifts were applied to the stage-discharge points that were affected by backwater. Small stage-shifts were applied to the OWRC to improve the derived discharge time series; the rating curve stage-shift report is included in Appendix B.

### 5.3.1.1 Station CR-WC-MS-01: Clearwater River below Broach Lake

Hydrometric monitoring work at the Clearwater River below Broach Lake (i.e., CR-WC-MS-01) began in 2018 in support of the hydrological baseline. The station is located approximately 20 m downstream of the Broach Lake outlet (Figure 3) and is shown in Figure 11. The field results for CR-WC-MS-01 are summarized in Table 7.

The OWRC, calibrated using available field measurements, is shown in Figure 12. A wide range of WSE (i.e., 0.296 m) and discharge (i.e., 0.140 m<sup>3</sup>/s to 0.631 m<sup>3</sup>/s) were measured during the monitoring period from August 2018 to September 2020, as shown in Table 7. This hydrometric station is located in the Clearwater River Upper Reach, which has a relatively higher slope than reaches farther downstream and may only experience minor backwater from terrestrial vegetation such as sweet gale (*Myrica gale*) hanging over the channel banks, as shown in Figure 11, or due to ice cover in winter. Based on the quality of discharge measurements and good fit of the stage-discharge rating curve over a wide range of conditions, the derived discharge records provide a good representation of baseline conditions at this location.

The daily mean WSE and discharge series derived from the Levellogger and OWRC, along with observed precipitation and air temperature, are presented in Figure 13.

**Table 7: Summary of Hydrometric Monitoring Results, CR-WC-MS-01**

Date and Time	WSE <sup>(a)</sup> (masl)	Staff Gauge Reading (m)	Discharge (m <sup>3</sup> /s)
7 August 2018 14:30	526.819	0.288	0.310
30 September 2018 17:50	526.701	0.170	0.140
4 June 2019 12:15	526.831	0.295	0.307
29 September 2019 14:00	526.808	0.265	0.264
3 May 2020 08:00	526.933	0.382	0.465
6 June 2020 14:27	526.940	0.394	0.546
11 July 2020 14:45	526.997	0.453	0.631
22 August 2020 10:16	526.970	0.423	0.547
24 September 2020 15:15	526.932	0.395	0.441

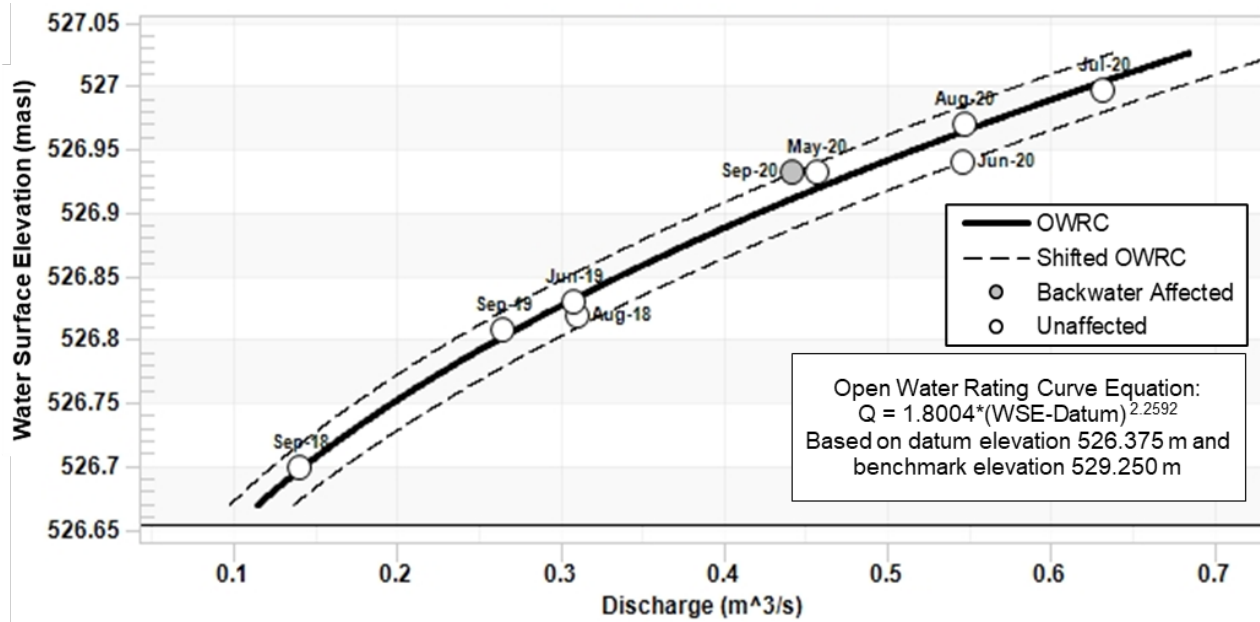
a) Water surface elevation (WSE) measured by levelling survey relative to rebar benchmark, CR-WC-MS-01\_BM1.  
 masl = metres above sea level.

**Figure 11: Clearwater River at CR-WC-MS-01**



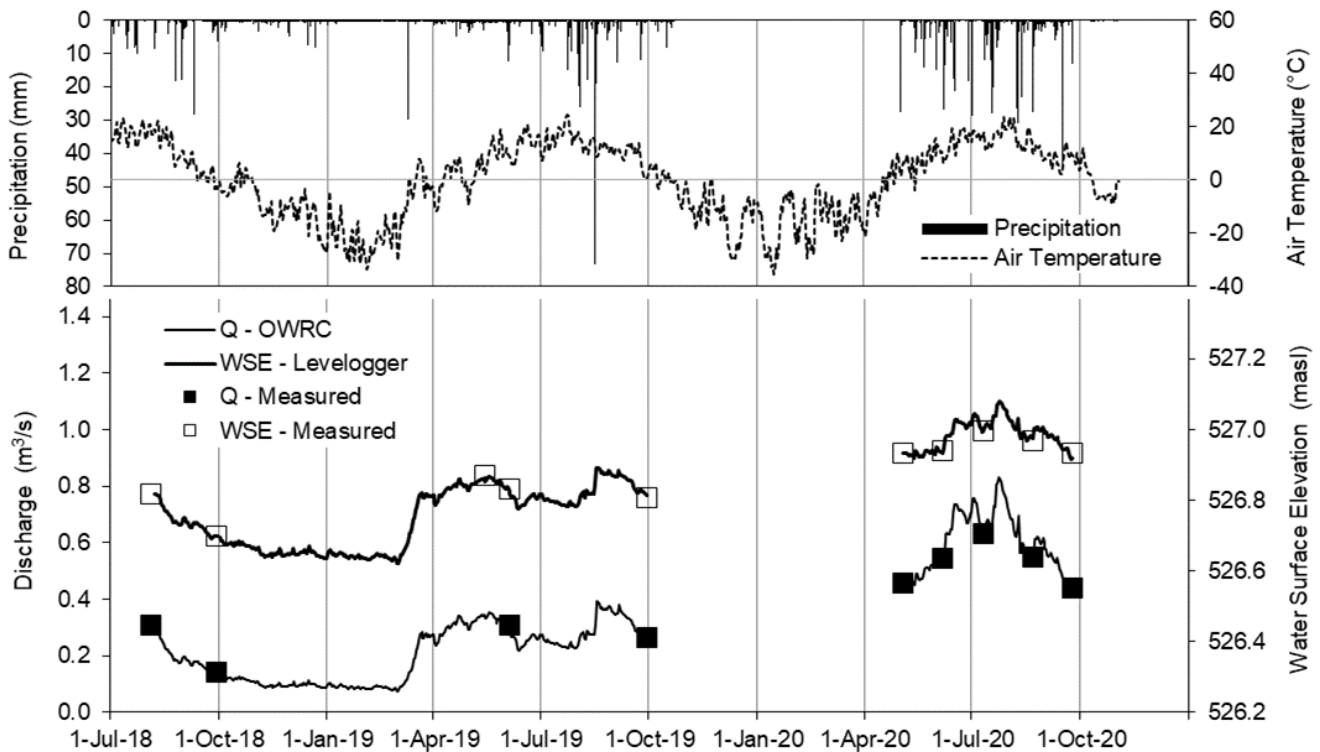
Note: View of CR-WC-MS-01 from the discharge transect on 24 September 2020; view is facing upstream (west).

Figure 12: Open Water Rating Curve for CR-WC-MS-01



OWRC = open water rating curve; Q = discharge (m³/s); WSE = water surface elevation.

Figure 13: CR-WC-MS-01 Water Surface Elevation and Discharge, 2018 to 2020



OWRC = open water rating curve; Q = discharge (m³/s) WSE = water surface elevation.

### 5.3.1.2 Station CR-WC-MS-02: Clearwater River above Patterson Lake

Hydrometric monitoring at the Clearwater River above Patterson Lake (i.e., CR-WC-MS-02) began in August 2018. The station is located about 60 m upstream of Patterson Lake (Figure 3) and is shown in Figure 14. The field results for CR-WC-MS-02 are summarized in Table 8. The OWRC base curve equation was fit to the spring 2019 and spring 2020 field measurements that were unaffected by backwatering from Patterson Lake as shown in Figure 15. There was extensive backwater at this station once Patterson Lake levels increased following spring freshet, particularly in 2020 as the lake levels remained relatively high.

As this station has uniform water depth and velocities at its gauge location, the nine discharge measurements made with an ADV between August 2018 and September 2020 had good accuracy. A wide range of WSE (i.e., 0.315 m) and discharge (i.e., from 0.400 m<sup>3</sup>/s to 2.54 m<sup>3</sup>/s) were measured during the monitoring period, which provides confidence in the derived discharge time series as shown in Table 8.

The daily mean WSE and derived discharge time series, along with observed precipitation and air temperature, are presented in Figure 16.

**Table 8: Summary of Hydrometric Monitoring Results, Station CR-WC-MS-02**

Date and Time	WSE <sup>(a)</sup> (masl)	Staff Gauge Reading (m)	Discharge (m <sup>3</sup> /s)
6 August 2018 11:00	498.656	n/d	0.680
2 October 2018 11:42	498.615	n/d	0.400
25 March 2019 11:00	498.575	0.465	0.600
6 May 2019 17:15	498.597	0.487	0.693
3 June 2019 16:50	498.573	0.478	0.553
1 October 2019 13:00	498.651	0.555	0.806
4 May 2020 07:45	498.734	0.674	2.54
4 June 2020 17:10	498.773	0.723	1.36
9 July 2020 14:40	498.845	0.762	1.11
19 August 2020 15:09	498.882	0.808	1.40
24 August 2020 09:20	498.888	0.805	n/d
23 September 2020 13:59	498.856	0.785	1.16

a) Water surface elevation (WSE) measured by levelling survey using rebar benchmark, CR-WC-MS-02\_BM1.

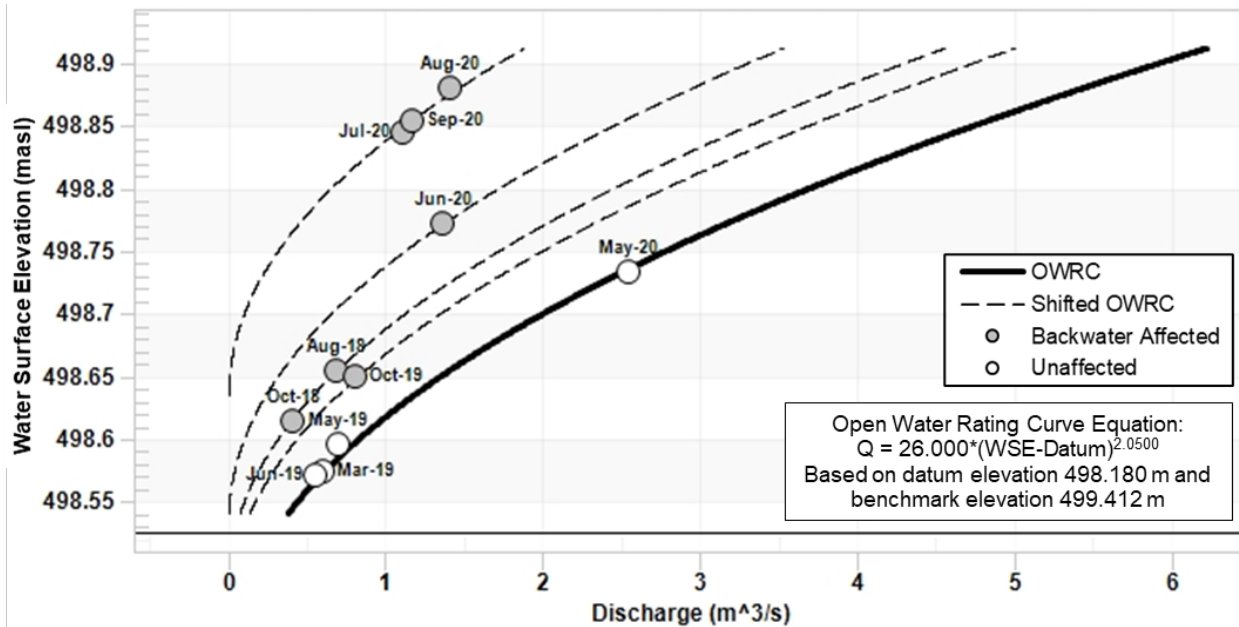
n/d = no measurement.

Figure 14: Clearwater River at Station CR-WC-MS-02



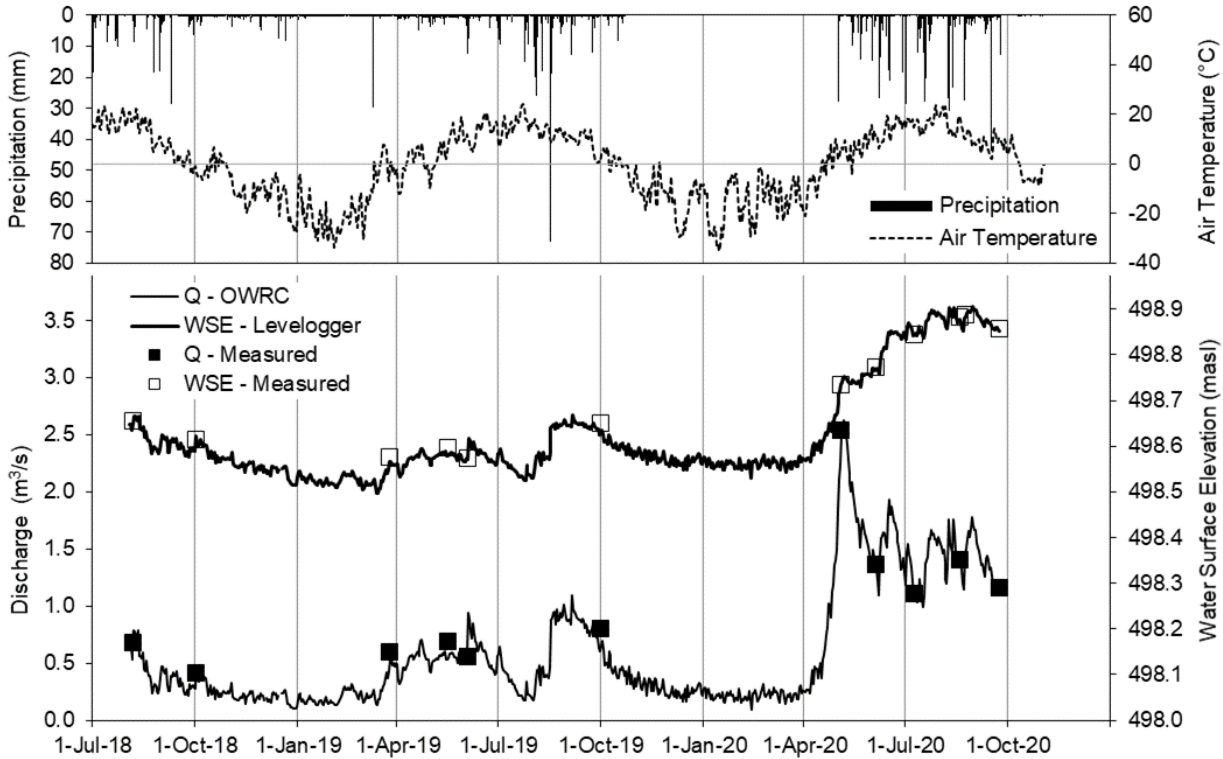
Note: View of CR-WC-MS-02 on 23 September 2020; view is facing upstream (northeast).

Figure 15: Open Water Rating Curve for Station CR-WC-MS-02



OWRC = open water rating curve; Q = discharge (m<sup>3</sup>/s); WSE = water surface elevation.

**Figure 16: Station CR-WC-MS-02 Water Surface Elevation and Discharge, 2018 to 2020**



OWRC = open water rating curve; Q = discharge; WSE = water surface elevation.

**5.3.1.3 Station CR-WC-MS-03: Clearwater River below Patterson Lake**

Hydrometric monitoring at the Clearwater River below Patterson Lake (i.e., CR-WC-MS-03) began in August 2018. The hydrometric monitoring station is located approximately 100 m downstream of the Patterson Lake outlet and 10 m upstream of the access road bridge (Figure 3), and is shown in Figure 17. The field results for CR-WC-MS-03 are summarized in Table 9.

**Table 9: Summary of Hydrometric Monitoring Results, Station CR-WC-MS-03**

Date and Time	WSE <sup>(a)</sup> (masl)	Staff Gauge Reading (m)	Discharge (m <sup>3</sup> /s)	TSS (mg/L)	Bed Load (mg/L)
4 August 2018 14:30	498.584	0.320	1.16	<1	0
29 September 2018 17:50	498.496	0.180	0.983	<1	0
26 March 2019 14:27	498.536	0.288	0.984	n/d	n/d
15 May 2019 17:15	498.534	0.290	1.46	n/d	n/d
18 May 2019 16:45	498.531	0.290	1.42	<1	0
4 June 2019 17:15	498.533	0.291	1.33	<1	0
30 September 2019 16:00	n/d	n/d	n/d	<1	0
30 September 2019 16:30	498.564	0.322	1.17	n/d	n/d
2 May 2020 20:03	498.661	0.430	1.59	n/d	n/d
3 May 2020 10:30	498.669	0.445	1.56	n/d	n/d
4 May 2020 15:00	498.688	0.465	1.62	n/d	n/d
6 June 2020 17:00	498.758	0.517	2.22	n/d	n/d
8 June 2020 08:32	n/d	n/d	n/d	<1	0
10 July 2020 16:18	498.794	0.550	2.35	n/d	n/d
14 July 2020 07:33	n/d	n/d	n/d	1	0
23 August 2020 15:24	498.842	0.602	2.32	n/d	n/d
24 August 2020 11:15	498.845	0.600	n/d	n/d	n/d
25 August 2020 07:48	n/d	n/d	n/d	<1	0
26 September 2020 14:57	498.831	0.590	2.16	<1	n/d
28 September 2020 10:15	n/d	n/d	n/d	<1	0

a) Water surface elevation (WSE) measured by levelling survey using rebar benchmark, CR-WC-MS-03\_BM1.

TSS = total suspended solids; n/d = no data; masl = metres above sea level; < = less than.

**Figure 17: Clearwater River below Patterson Lake, Station CR-WC-MS-03**



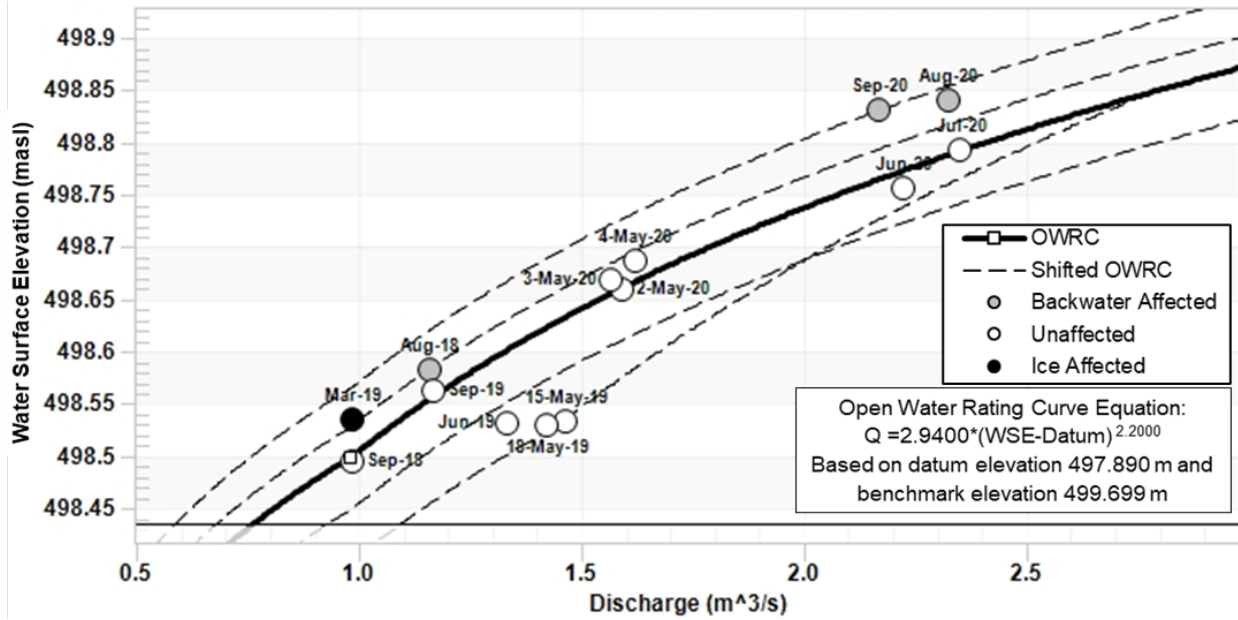
Note: View of CR-WC-MS-03 measurement cross-section and bed load sample location 26 September 2020 facing upstream (west).

The OWRC for CR-WC-MS-03 was developed using a calibrated 1-D HEC-RAS hydraulic model for the Clearwater River reach between Patterson and Forrest lakes. The rating curve relates the WSE of Patterson Lake to discharge at the outlet with the WSE elevations from the station location. The OWRC and field measurements are shown in Figure 18. The rating curve is supported by 14 coincident stage-discharge measurement points, as this was the most frequently visited station due to its importance as the outflow of Patterson Lake. There were 15 levelling surveys completed between August 2018 and September 2020. Three stage-discharge points measured in May 2019 and June 2019 were below the base rating curve and no levelling or discharge error or physical cause was identified; therefore, this issue was resolved for the derived discharge time series by using a stage-shift over this period that relies on the high accuracy of the discharge measurements made during these field visits (Appendix A).

As this station has uniform water depth and velocities at its gauge location, the numerous discharge measurements made with an ADV between August 2018 and September 2020 were sufficiently accurate. A wide range of WSE (i.e., 0.350 m) and discharge (i.e., from 0.980 m<sup>3</sup>/s to 2.30 m<sup>3</sup>/s) were measured during this period as shown in Table 9. Based on these factors, there is high confidence in the derived discharge time series during the open water monitoring period.

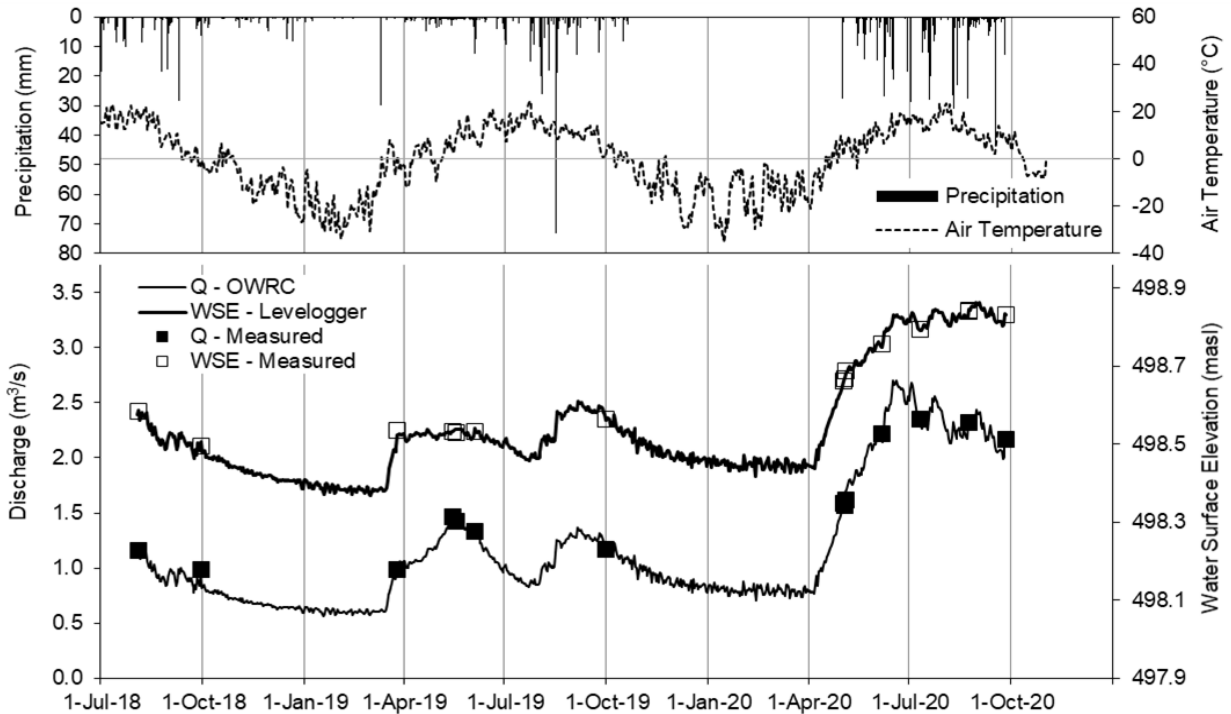
The rating curve shift report is included in Appendix B. The daily mean WSE and discharge series derived from the Levelogger and OWRC, along with observed precipitation and air temperature, are presented in Figure 19.

Figure 18: Open Water Rating Curve for Station CR-WC-MS-03



OWRC = open water rating curve; Q = discharge (m<sup>3</sup>/s); WSE = water surface elevation.

Figure 19: Station CR-WC-MS-03 Water Surface Elevation and Discharge, 2018 to 2020



OWRC = open water rating curve; masl = metres above sea level; Q = discharge (m<sup>3</sup>/s); WSE = water surface elevation.

### 5.3.1.4 Station CR-WC-MS-04: Clearwater River below Beet Lake

Hydrometric monitoring work at the Clearwater River below Beet Lake (i.e., CR-WC-MS-04) began in 2018 in support of the hydrological baseline. The station is located approximately 300 m downstream of the Beet Lake outlet (Figure 3) and is shown in Figure 20. The field results for CR-WC-MS-04 are summarized in Table 10.

The OWRC was developed based on nine coincident stage and discharge measurements (Figure 21). A WSE survey was not completed in June 2019 due to bear activity at the station. The daily mean WSE and discharge time series derived from the Levellogger and OWRC is presented in Figure 22 along with observed precipitation and air temperature. Due to a programming error, the Levellogger records for CR-MS-WC-04 stopped on 4 July 2019 for the remainder of 2019. To infill the gap in the discharge time series for the remainder of the year, the Levellogger records for Beet Lake (i.e., Station CR-WB-MS-04) were used along with the rating curve for CR-WC-MS-04.

**Table 10: Summary of Hydrometric Monitoring Results, CR-WC-MS-04**

Date and Time	WSE <sup>(a)</sup> (masl)	Staff Gauge Reading (m)	Discharge (m <sup>3</sup> /s)	TSS (mg/L)	Bed Load (mg/L)
5 August 2018 13:00	498.253	0.475	1.92	0	0
1 October 2018 15:42	498.185	n/d	1.70	0	0
28 March 2019 10:36	498.358	0.580	2.14	n/d	n/d
1 June 2019 16:45	n/d	0.380	2.54	2	n/d
2 October 2019 15:45	498.284	0.498	1.83	<1	n/d
3 May 2020 15:30	498.427	0.715	4.85	n/d	n/d
5 June 2020 13:20	498.439	0.676	5.50	n/d	n/d
6 June 2020 10:00	n/d	n/d	n/d	3	0
10 July 2020 13:30	498.468	0.698	4.80	n/d	n/d
13 July 2020 10:57	n/d	n/d	n/d	2	0
20 August 2020 12:30	498.507	0.738	3.87	n/d	n/d
21 August 2020 10:36	n/d	n/d	n/d	<1	0
25 September 2020 11:45	498.508	0.750	4.65	<1	n/d
26 September 2020 8:41	n/d	n/d	n/d	<1	0

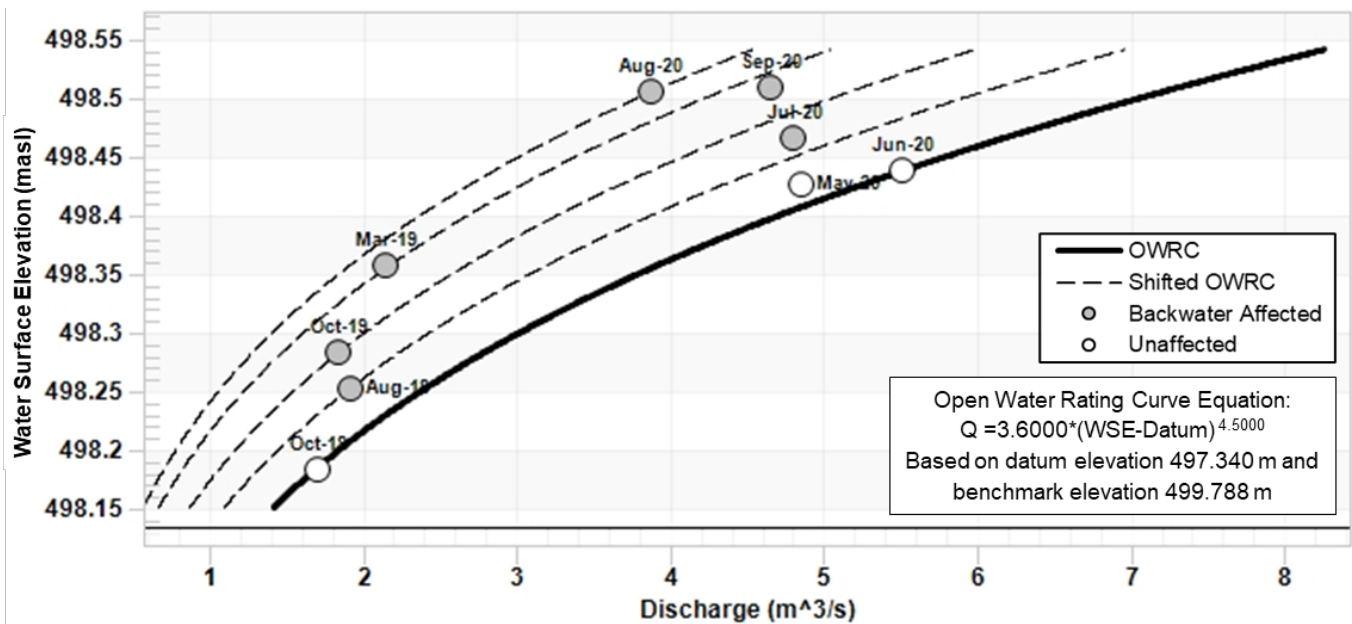
a) Water surface elevation (WSE) measured by levelling survey using rebar benchmark, CR-WC-MS-04\_BM1.  
 TSS = total suspended solids; n/d = no data; masl = metres above sea level; < = less than.

Figure 20: Clearwater River below Beet Lake, Station CR-WC-MS-04



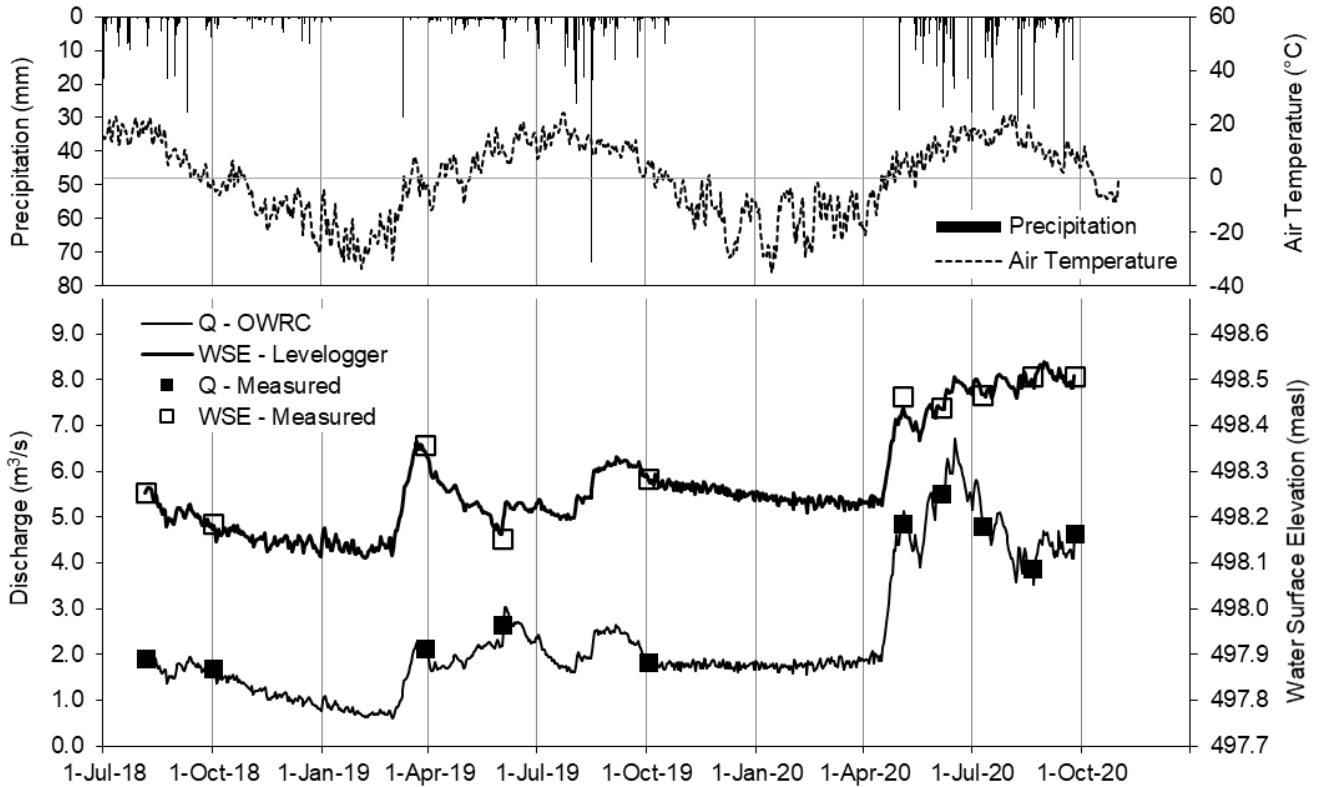
Note: View of CR-WC-MS-04 on 25 September 2020; view is from the right bank (when facing downstream) facing upstream (northeast).

Figure 21: Open Water Rating Curve for Station CR-WC-MS-04



OWRC = open water rating curve; Q = discharge (m<sup>3</sup>/s); WSE = water surface elevation.

**Figure 22: Station CR-WC-MS-04 Water Surface Elevation and Discharge, 2018 to 2020**



OWRC = open water rating curve; Q = discharge ( $m^3/s$ ); WSE = water surface elevation.

### 5.3.1.5 Station CR-WC-MS-05: Clearwater River below Naomi Lake

Hydrometric monitoring at the Clearwater River below Naomi Lake (i.e., CR-WC-MS-05) began in 2018. The station is located approximately 1 km downstream of the Naomi Lake outlet (Figure 3) and is shown in Figure 23. The field results for CR-WC-MS-05 are summarized in Table 11.

The OWRC equation was fit to the field measurements not apparently affected by backwater and was supported by eight coincident stage and discharge measurements (Figure 24). The OWRC was manually adjusted to the points unaffected by backwatering, and stage-shifts were applied to the affected points. The rating curve shift report is included in Appendix B. The daily mean WSE and discharge time series derived from the Levelogger and OWRC, along with observed precipitation and air temperature, are presented in Figure 25.

Due to operator error, the Levelogger records for CR-WC-MS-05 stopped on 4 July 2019, and for the remainder of the year (i.e., through 2 October 2019), the Levelogger records for Naomi Lake Station CR-WB-MS-05 were used to derive discharge. Discharge measurements for CR-WC-MS-05 were used along with WSE measurements from CR-WB-MS-05 to develop an additional preliminary OWRC equation for the period of 4 July 2019 to 2 October 2019. Station CR-WB-MS-05 Levelogger records are not as accurate a representation of CR-WC-MS-05 WSE, due to the distance between the two stations and the increased variation in WSE in the waterbody due to waves during windy periods. Based on the wide range of WSE (i.e., 0.406 m) Table 11, and accurate discharge

measurements made for CR-WC-MS-05 (i.e., ranging from 2.90 m<sup>3</sup>/s to 8.23 m<sup>3</sup>/s), derived discharge was considered adequate for the purposes of characterizing hydrology at this location for the open water period. Although there were no under-ice field measurements taken at this station, the derived discharge was checked against unit-discharge records for other stations, and time series data fall within the expected range.

**Table 11: Summary of Hydrometric Monitoring Results, CR-WC-MS-05**

Date and Time	WSE <sup>(a)</sup> (masl)	Staff Gauge Reading (m)	Discharge (m <sup>3</sup> /s)	TSS (mg/L)	Bed Load (mg/L)
5 August 2018 13:00	498.182	0.773	2.95	0	0
1 October 2018 14:38	498.123	n/d	3.01	0	0
1 June 2019 13:00	498.079	0.670	2.90	<1	n/d
2 October 2019 11:00	498.240	0.837	3.51	<1	n/d
5 June 2020 10:40	498.396	n/d	8.23	n/d	n/d
5 June 2020 17:18	n/d	n/d	n/d	3	0
10 July 2020 09:30	498.392	0.965	6.30	n/d	n/d
10 July 2020 15:00	n/d	n/d	n/d	2	0
20 August 2020 10:30	498.462	n/d <sup>(b)</sup>	5.83	n/d	n/d
20 August 2020 15:50	n/d	n/d <sup>(b)</sup>	n/d	<1	0
25 September 2020 9:44	498.485	n/d <sup>(b)</sup>	7.38	2	n/d
27 September 2020 9:40	n/d	n/d <sup>(b)</sup>	n/d	2	0

a) Water surface elevation (WSE) measured by levelling survey using rebar benchmark, CR-WC-MS-05\_BM1.

b) Staff gauge completely submerged.

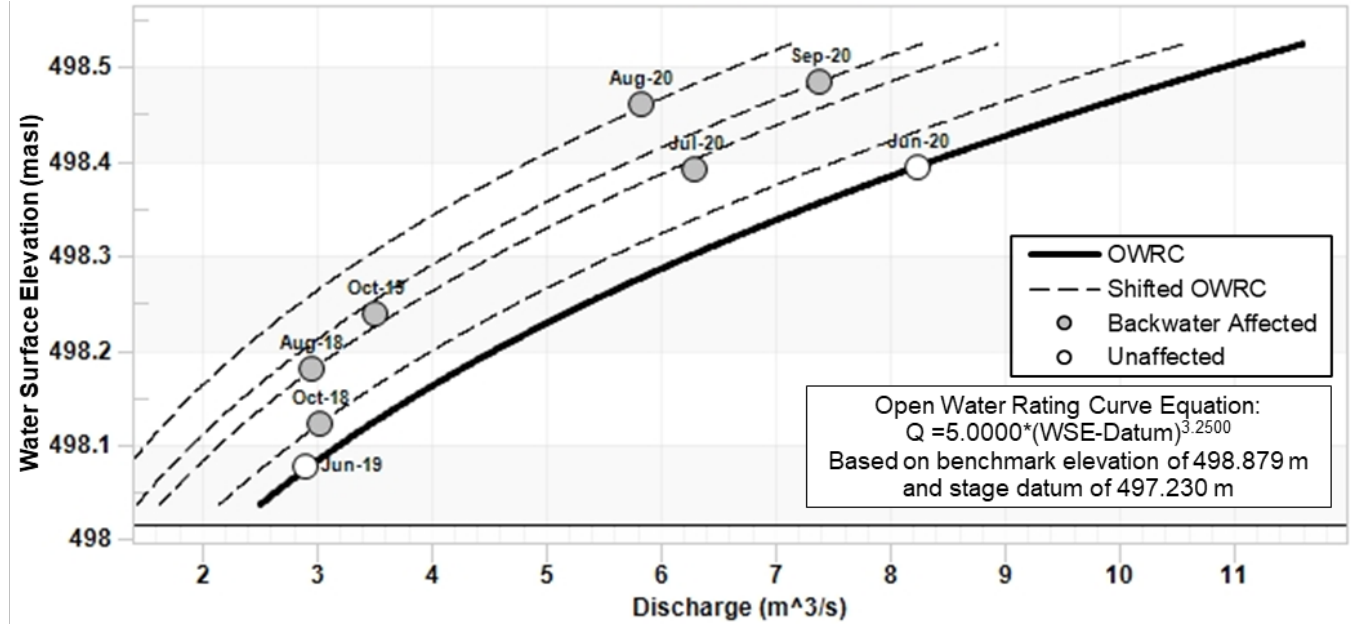
TSS = total suspended solids; n/d = no data; < = less than.

**Figure 23: Clearwater River below Naomi Lake, CR-WC-MS-05**



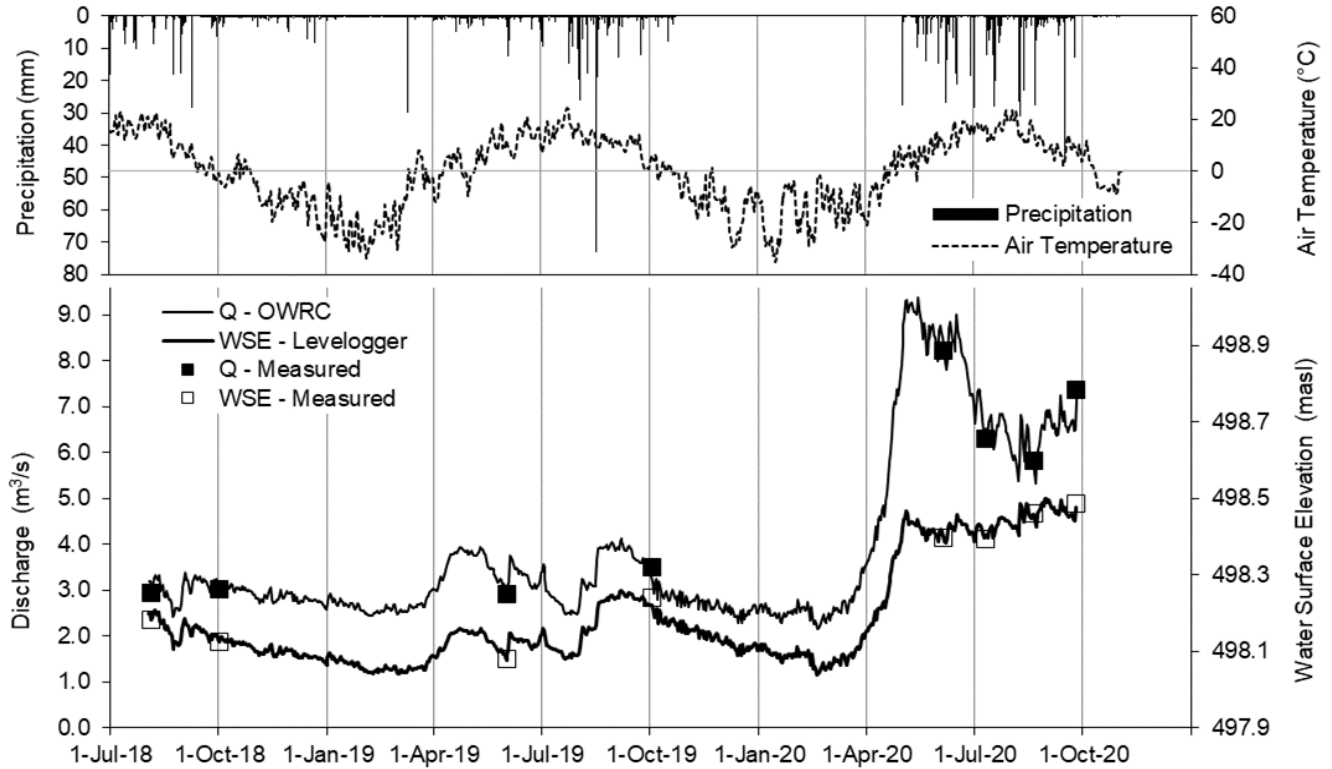
Note: View of CR-WC-MS-05 measurement cross-section on 20 August 2020; view is from the right bank (when facing downstream) facing upstream (northeast).

Figure 24: Open Water Rating Curve for CR-WC-MS-05



OWRC = open water rating curve; Q = discharge (m<sup>3</sup>/s); WSE = water surface elevation.

Figure 25: CR-WC-MS-05 Water Surface Elevation and Discharge, 2018 to 2020



OWRC = open water rating curve; Q = discharge (m<sup>3</sup>/s); WSE = water surface elevation.

### 5.3.1.6 Station CR-WC-MS-06: Clearwater River above Mirror River Confluence

Hydrometric monitoring at the Clearwater River above Mirror River confluence station (i.e., CR-WC-MS-06) began in 2018. The station is located approximately 600 m upstream of the confluence (Figure 4). This station marks the farthest downstream point of the RSA. The field results for CR-WC-MS-06 are summarized in Table 12. The Clearwater River at CR-WC-MS-06 is shown in Figure 26.

The OWRC was based on eight coincident stage and discharge field measurements, as shown in Figure 27. The curve is fit through the May 2019, June 2020, and July 2020 points only, as backwater was observed during the late summer and fall visits in 2018 to 2020 and was attributed to observed dense vegetation in the channel at this location. The OWRC was manually adjusted to the points unaffected by backwater and stage-shifts were applied to the affected points. The rating curve shift report is included in Appendix B.

The daily mean WSE and discharge series derived from the Levellogger and OWRC, along with observed precipitation and air temperature, are presented in Figure 28. A data gap occurred from 1 July 2020 to 11 July 2020 when the Levellogger was found to be physically removed from the water. A wide range of WSE (i.e., 0.801 m) and discharge (i.e., 3.80 m<sup>3</sup>/s to 12.7 m<sup>3</sup>/s) were measured at this hydrometric station (Table 12).

**Table 12: Summary of Hydrometric Monitoring Results, CR-WC-MS-06**

Date and Time	WSE <sup>(a)</sup> (m; non-geodetic)	Staff Gauge Reading (m)	Discharge (m <sup>3</sup> /s)
4 August 2018 11:30	97.193	n/a	3.80
2 October 2018 13:00	97.198	n/a	4.75
17 May 2019 15:00	97.223	n/a	6.72
4 October 2019 12:00	97.571	n/a	5.80
4 May 2020 10:32	97.994	n/a	n/d
7 June 2020 12:15	97.938	n/a	12.7
11 July 2020 11:15	97.795	n/a	10.4
21 August 2020 13:30	97.848	n/a	9.30
24 September 2020 11:55	97.955	n/a	9.28

a) Water surface elevation (WSE) measured by levelling survey using anchor bolt in tree benchmark, CR-WC-MS-06\_BM1.

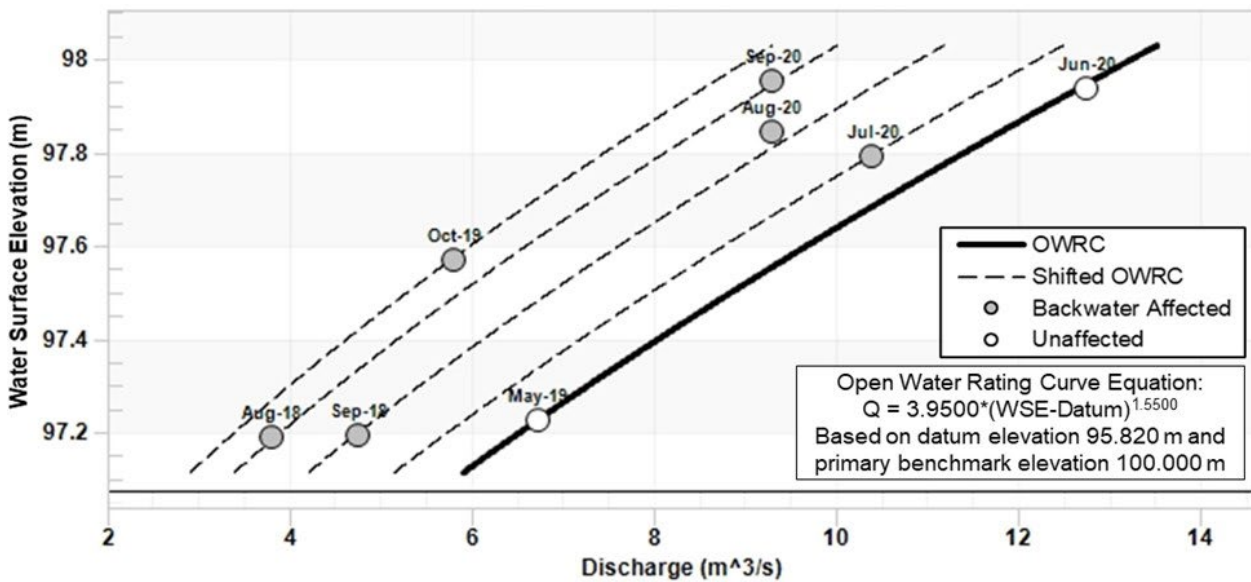
TSS = total suspended solids; n/a = not applicable as no staff gauge installed; n/d = no data.

Figure 26: Clearwater River above Mirror River Confluence, CR-WC-MS-06



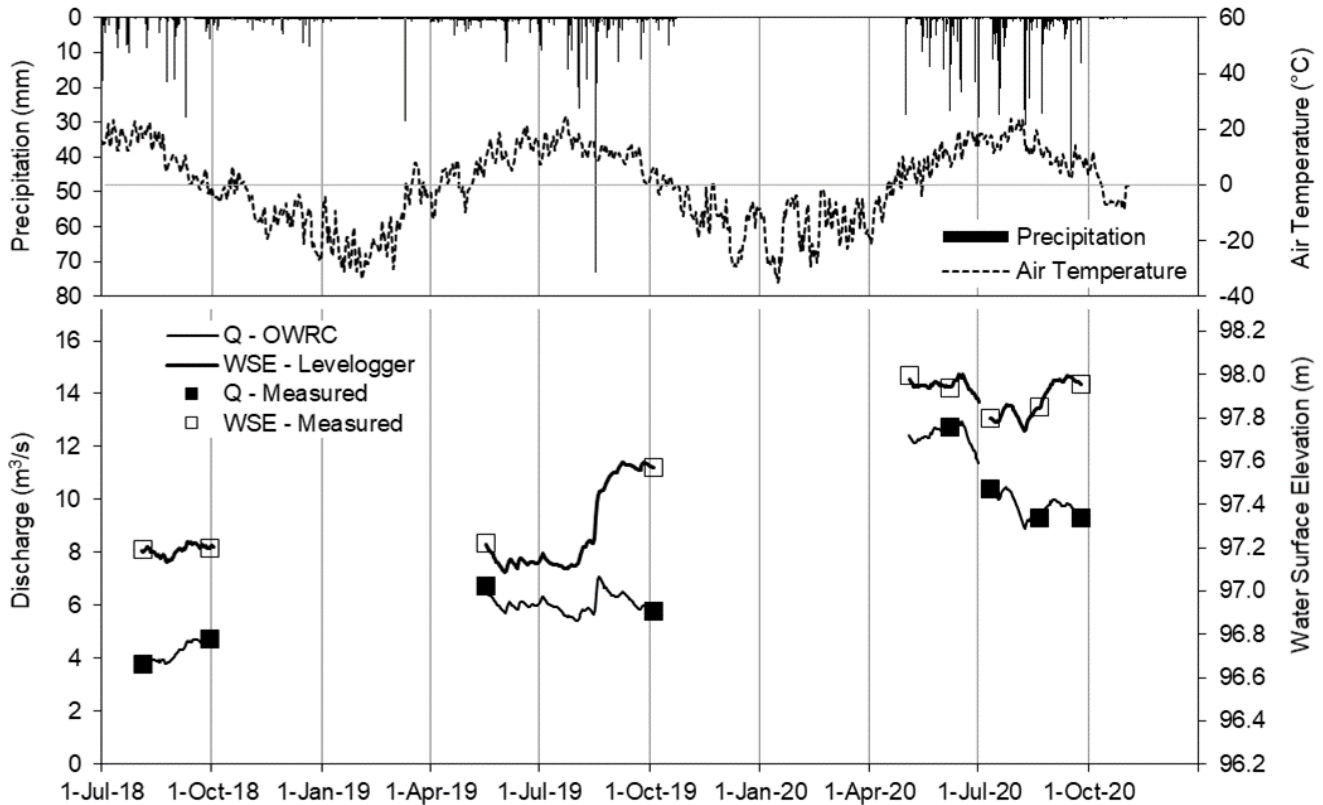
Note: View of CR-WC-MS-06 facing downstream (south) on 24 September 2020 from right bank (when facing downstream).

Figure 27: Open Water Rating Curve for CR-WC-MS-06



OWRC = open water rating curve; Q = discharge (m³/s); WSE = water surface elevation.

**Figure 28: CR-WC-MS-06 Water Surface Elevation and Discharge, 2018 to 2020**



OWRC = open water rating curve; Q = discharge (m<sup>3</sup>/s); WSE = water surface elevation.

### 5.3.1.7 Station CR-WC-MS-07: Clearwater River below Mirror River Confluence

Hydrometric monitoring work at the Clearwater River below Mirror River confluence station (i.e., CR-WC-MS-07) began in 2018. The station is located just downstream of the confluence (Figure 4). The field results for CR-WC-MS-07 are summarized in Table 13. The Clearwater River at CR-WC-MS-07 is shown in Figure 29. Discharge was monitored at CR-WC-MS-07 to measure the inflows from the Mirror River by comparison with flows in the Clearwater River upstream of the Mirror River confluence. An OWRC was developed beginning in 2019, as benchmarks were first installed in May 2019; the stage-discharge points fit the base curve well (Figure 30). A wide range of WSE (i.e., 0.758 m) and discharge (i.e., 15.7 m<sup>3</sup>/s to 34.5 m<sup>3</sup>/s) was measured at this station between August 2018 and September 2020 (Table 13).

The measured WSE and discharge data for this station, along with observed precipitation and air temperature, are presented in Figure 31. No Levellogger was installed at this station. Discharge measured upstream of the Mirror River confluence (i.e., CR-WC-MS-06) was approximately 30% of discharge measured at CR-WC-MS-07 on the same dates which is an expected results as the watershed area of CR-WC-MS-06 is about one-third that of the Clearwater River downstream of the confluence.

**Table 13: Summary of Hydrometric Monitoring Results, CR-WC-MS-07**

Date and Time	WSE <sup>(a)</sup> (m; non-geodetic)	Staff Gauge Reading (m)	Discharge (m <sup>3</sup> /s)
4 August 2018 12:30	n/a	n/a	15.7
2 October 2018 14:00	n/a	n/a	18.0
17 May 2019 17:00	97.953	n/a	20.3
4 October 2019 14:15	98.328	n/a	24.9
7 June 2020 15:50	98.711	n/a	34.2
11 July 2020 13:06	98.558	n/a	30.9
21 August 2020 15:13	98.596	n/a	30.6
24 September 2020 13:36	98.711	n/a	34.5

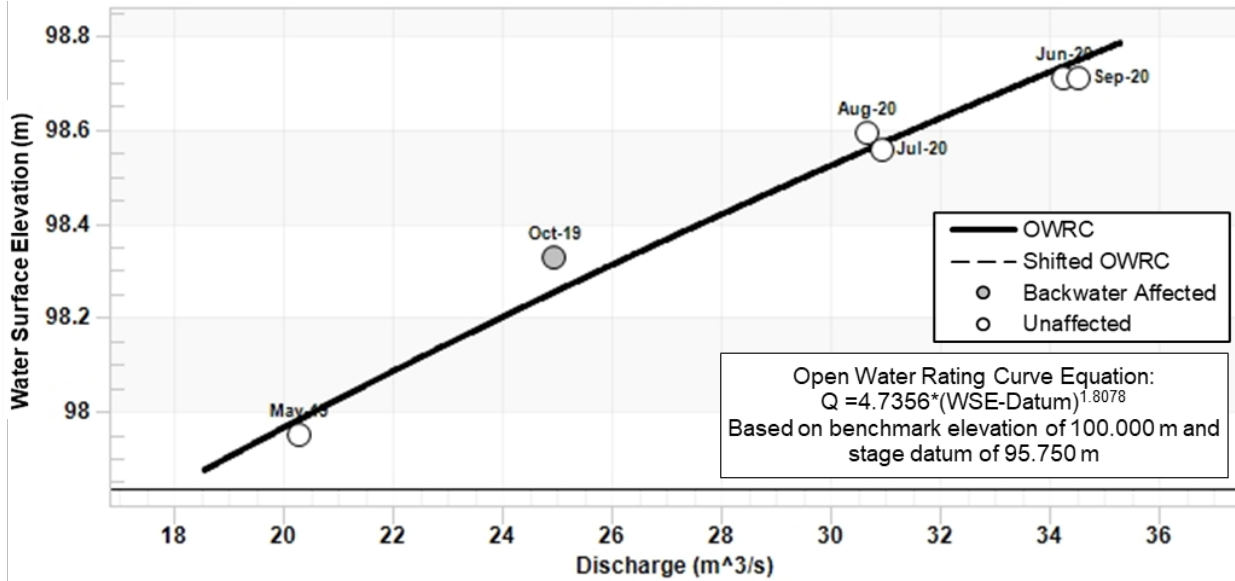
a) Water surface elevation (WSE) measured by levelling survey using anchor bolt in tree benchmark, CR-WC-MS-07\_BM1.  
 n/a = not applicable as no staff gauge and/or benchmarks installed.

**Figure 29: Clearwater River below Mirror River Confluence, CR-WC-MS-07**



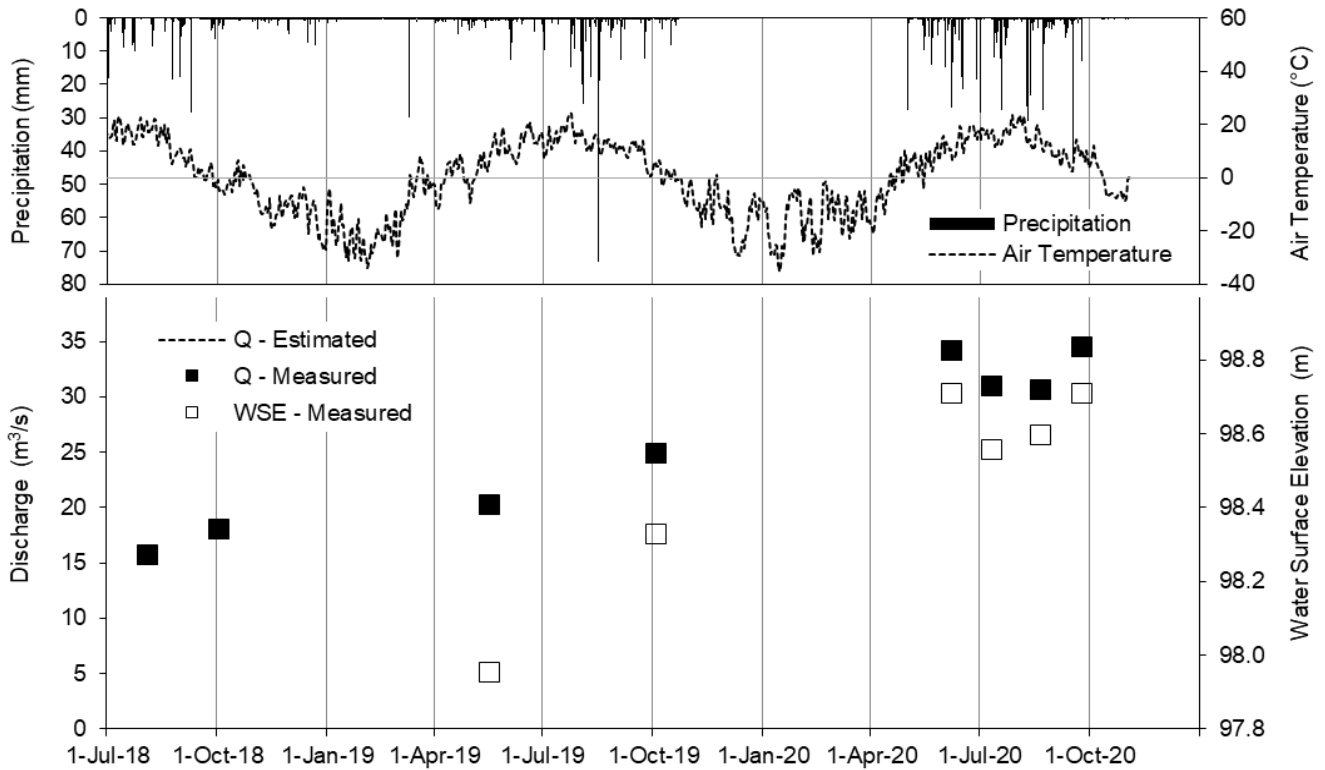
Note: View of CR-WC-MS-07 on 24 September 2020; view is from the right bank (when facing downstream) facing downstream (west).

Figure 30: Open Water Rating Curve for CR-WC-MS-07



OWRC = open water rating curve; Q = discharge (m³/s); WSE = water surface elevation.

Figure 31: CR-WC-MS-07 Water Surface Elevation and Discharge, 2018 to 2020



OWRC = open water rating curve; Q = discharge (m³/s); WSE = water surface elevation.

### 5.3.1.8 Station CR-WC-MS-08: Clearwater River at the Lloyd Lake Outlet

Hydrometric monitoring at the Clearwater River at the Lloyd Lake outlet (i.e., CR-WC-MS-08) began in 2018. The station is located near the historical WSC Station 07CD006. The WSC operated the hydrometric station on the Clearwater River at the Lloyd Lake outlet (WSC Station 07CD006) between 1973 and 1995 (ECCC 2016); this station was located approximately 45 km southeast and downstream of the anticipated area of the Project (Figure 4). CR-WC-MS-08 is within the boundaries of Clearwater River Provincial Park (Figure 4).

Prior to June 2020, measurements at CR-WC-MS-08 were collected at a location approximately 500 m downstream of the discontinued WSC Station 07CD006. This previous river cross section located just downstream of CR-WC-MS-08, rather than at WSC Station 07CD006, had been selected to improve safety associated with increased distance from downstream rapids and preferred helicopter landing locations. However, during the 7 June 2020 visit, a helicopter landing location deemed more safe than previous landing locations during high water levels was observed upstream of the rapids at the WSC Station 07CD006; from that date onward, this location upstream of the WSC station became the preferred hydrometric monitoring location. WSE was also periodically measured at the original downstream station to develop a WSE relationship between the two stations. The river cross-section at WSC Station 07CD006 is shown on Figure 32.

The field results for CR-WC-MS-08 are summarized in Table 14. The OWRC for data collected at the original downstream hydrometric station is presented in Figure 33. The daily mean WSE and discharge series derived from the Levellogger and OWRC, along with observed precipitation and air temperature, are presented in Figure 34. This station was not visited in June 2019, October 2019, or May 2020 due to logistical challenges, because it is downstream of the hydrology RSA and sufficient data had already been collected during the historical record.

**Table 14: Summary of Hydrometric Monitoring Results, CR-WC-MS-08**

Date and Time	WSE <sup>(a,b)</sup> (m; non-geodetic)	WSE (m; non-geodetic)	Staff Gauge Reading (m)	Discharge (m <sup>3</sup> /s)
04 August 2018 11:30	97.995	n/d	n/a	25.2
02 October 2018 14:38	97.986	n/d	n/a	23.7
17 May 2019 17:00	98.040	n/d	n/a	26.1
7 June 2020 08:15	98.473	96.765	n/a	50.0
11 July 2020 08:50	n/d	96.718	n/a	43.9
23 August 2020 11:05	98.346	96.664	n/a	39.9
24 September 2020 07:53	98.374	96.673	n/a	43.8

Note: Water surface elevation (WSE) measured at Historical WSC Station 07CD006 using WSC benchmarks S7375 and S7376.

- a) WSE measured by levelling survey using anchor bolt in tree benchmark, CR-WC-MS-08\_BM1.
- b) WSE measured at WSP hydrometric station.

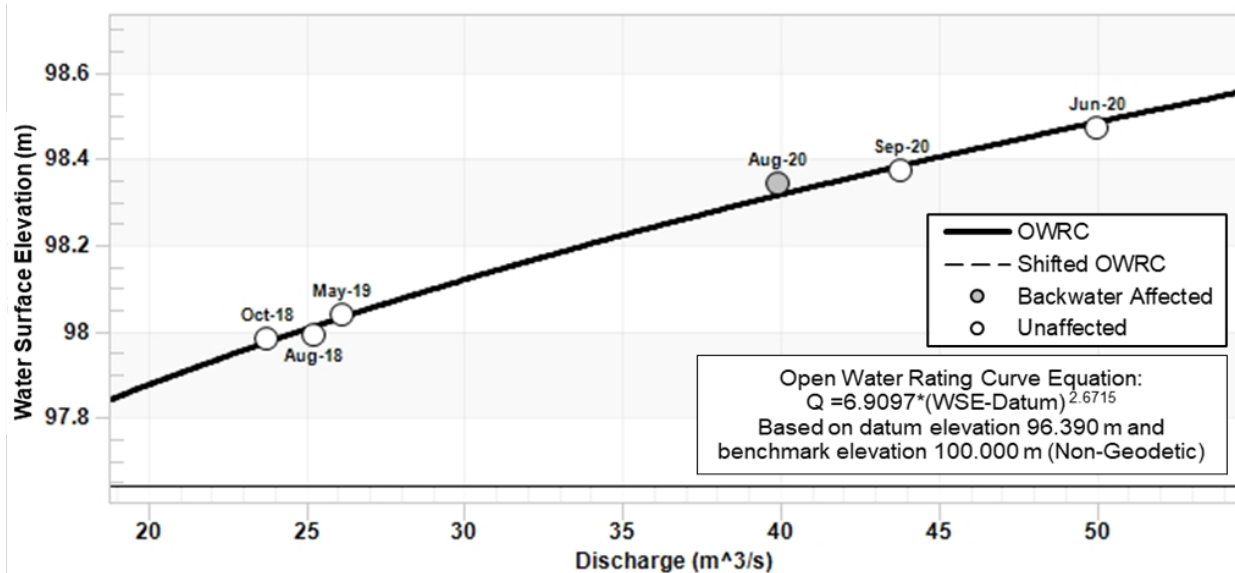
n/a = not applicable as no staff gauge and/or benchmarks installed; n/d = no data.

Figure 32: Clearwater River at Lloyd Lake, CR-WC-MS-08



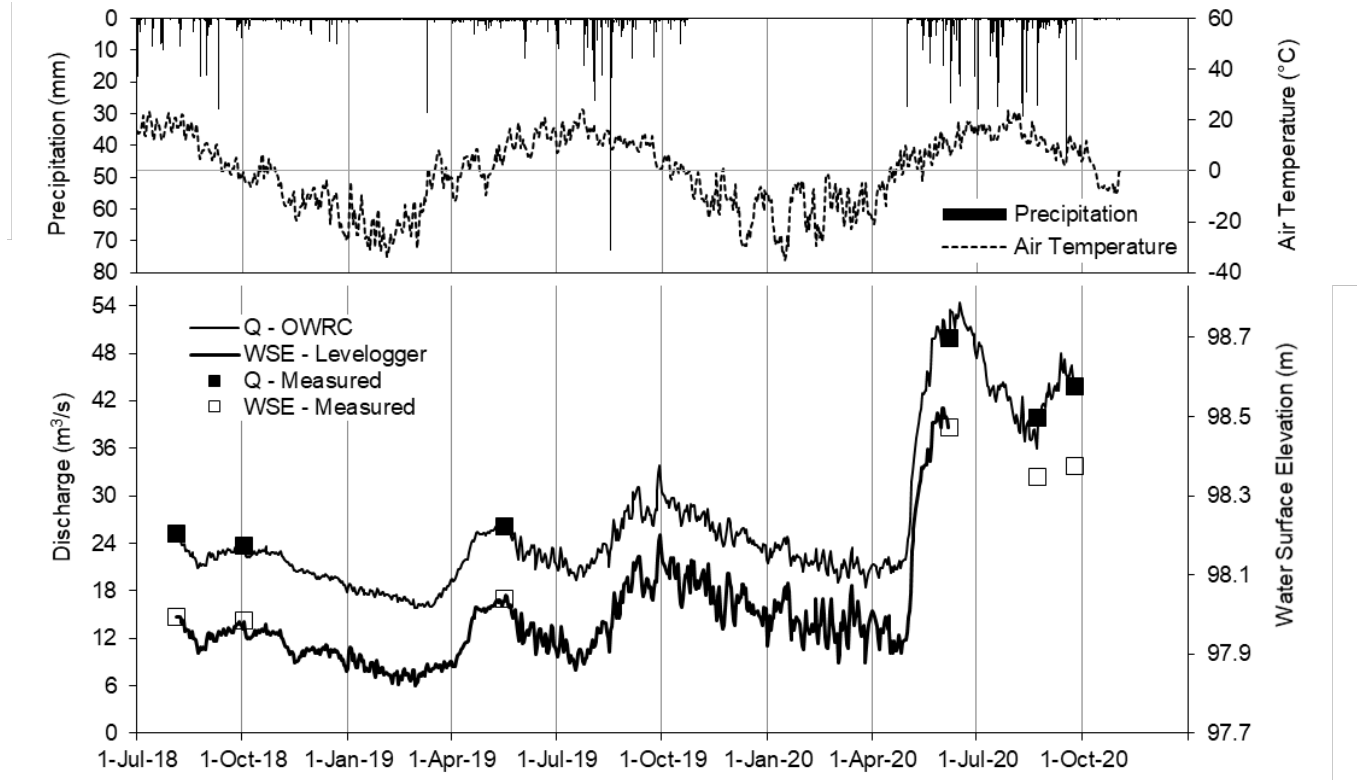
Note: View CR-WC-MS-08 near historical WSC station on 24 September 2020; view is from the right bank (when facing downstream) facing upstream (west).

Figure 33: Open Water Rating Curve for CR-WC-MS-08 at the WSP Hydrometric Station



OWRC = open water rating curve; Q = discharge (m³/s); WSE = water surface elevation.

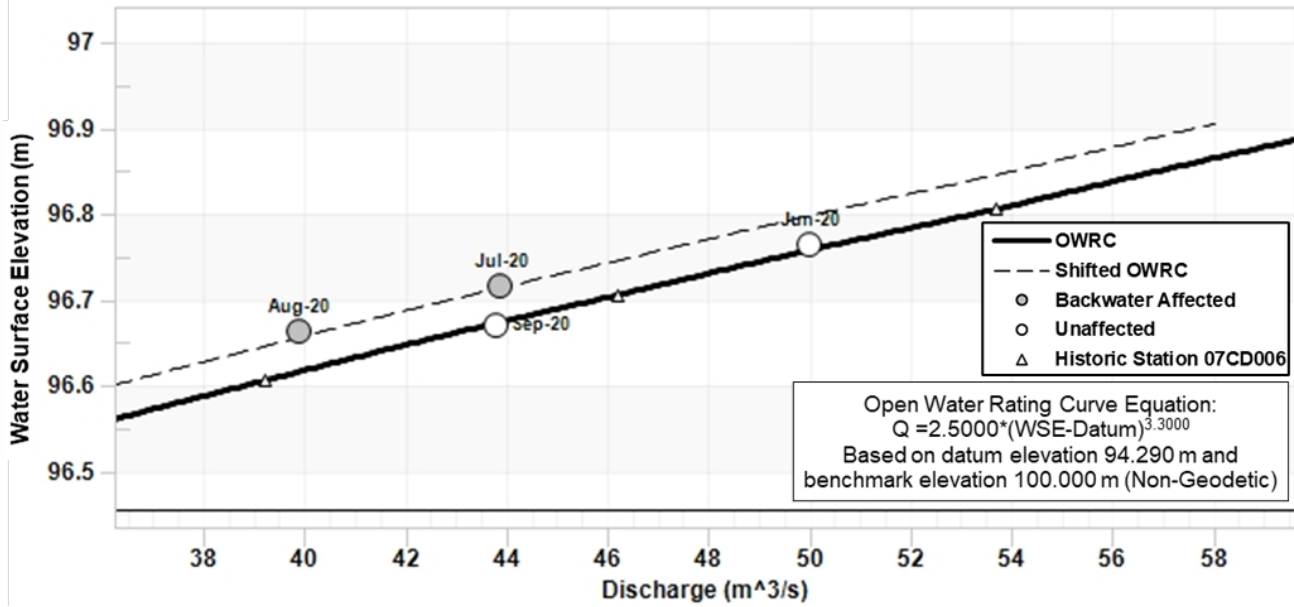
**Figure 34: CR-WC-MS-08 Water Surface Elevation and Discharge at the WSP Hydrometric Station, 2018 to 2020**



OWRC = open water rating curve; Q = discharge (m³/s); WSE = water surface elevation.

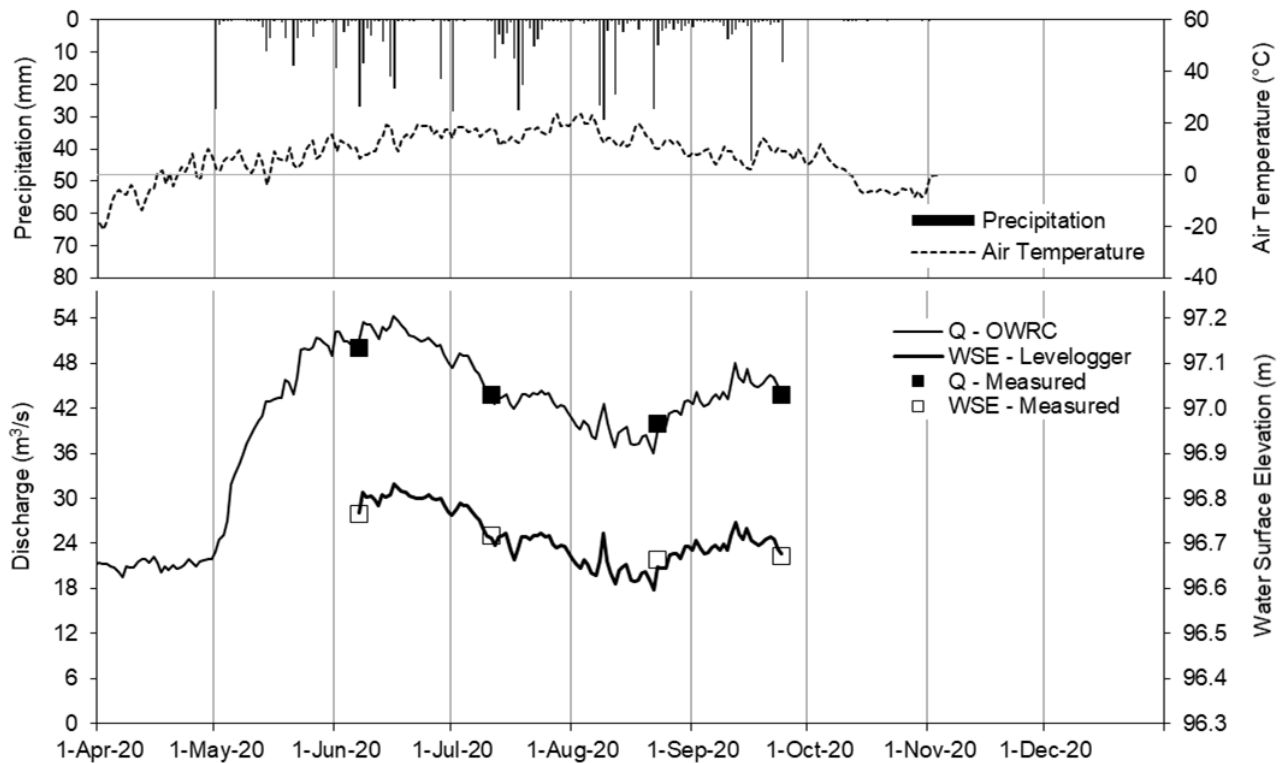
The OWRC for data collected at the WSC Station 07CD006 are presented in Figure 35. The most recent WSC stage-discharge rating table from 1995, for Station 07CD006 was verified in summer 2020. Of the four total measurements, two measurements perfectly fit the OWRC and two more were only 6% to 7% above the curve during the summer months (July and August 2020). The high flows measured 7 June 2020 exceeded all historically measured flows at the station. The daily mean WSE and discharge series derived from the Levellogger and OWRC, along with observed precipitation and air temperature, are presented in Figure 36.

**Figure 35: Open Water Rating Curve for CR-WC-MS-08 at the Historical WSC Station 07CD006**



OWRC = open water rating curve; Q = discharge (m³/s); WSE = water surface elevation.

**Figure 36: CR-WC-MS-08 Water Surface Elevation and Discharge at the Historical WSC Station 07CD006, 2020**



OWRC = open water rating curve; Q = discharge (m³/s); WSE = water surface elevation.

### 5.3.1.9 Station CR-WC-MS-09: Clearwater River at Warner Rapids

Hydrometric monitoring at the Clearwater River at Warner Rapids (i.e., CR-WC-MS-09) began in 2018. The station is located approximately 100 m upstream of Warner Rapids (Figure 4). The field activities completed at CR-WC-MS-09 are summarized in Table 15. The Clearwater River at CR-WC-MS-09 is shown in Figure 37. The rating curve calibrated using available field measurements is shown in Figure 38. No rating curve shifts were required for this station as no backwatering was observed. The daily mean WSE and discharge series derived from the Levelogger and OWRC, along with observed precipitation and air temperature, are presented in Figure 39.

**Table 15: Summary of Hydrometric Monitoring Results, CR-WC-MS-09**

Date and Time	WSE <sup>(a)</sup> (masl)	Staff Gauge Reading (m)	Discharge (m <sup>3</sup> /s)
8 August 2018 10:30	398.744	n/a	46.9
4 October 2018 11:00	398.759	n/a	47.1
29 March 2019 12:23	398.967	n/a	33.1
14 May 2019 16:45	398.807	n/a	51.6
30 May 2019 16:50	398.721	n/a	n/d
5 June 2019 09:40	398.757	n/a	46.7
5 October 2019 09:30	399.047	n/a	67.4
5 May 2020 07:10	399.607	n/a	n/d
8 June 2020 15:10	399.542	n/a	118
14 July 2020 09:35	399.369	n/a	96.4
25 August 2020 09:11	399.513	n/a	111
29 September 2020 09:43	399.441	n/a	104

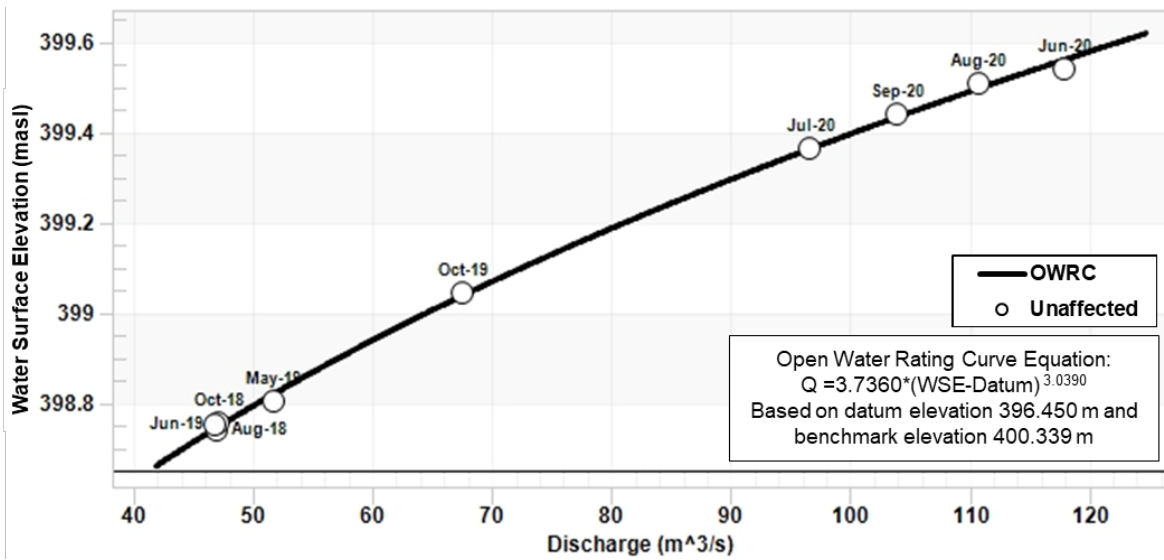
a) Water surface elevation (WSE) measured by levelling survey using anchor bolt in tree benchmark, CR-WC-MS-09\_BM1.  
 n/a = not applicable as a staff gauge was not installed; n/d = no data; masl = metres above sea level.

Figure 37: Clearwater River at Warner Rapids, CR-WC-MS-09



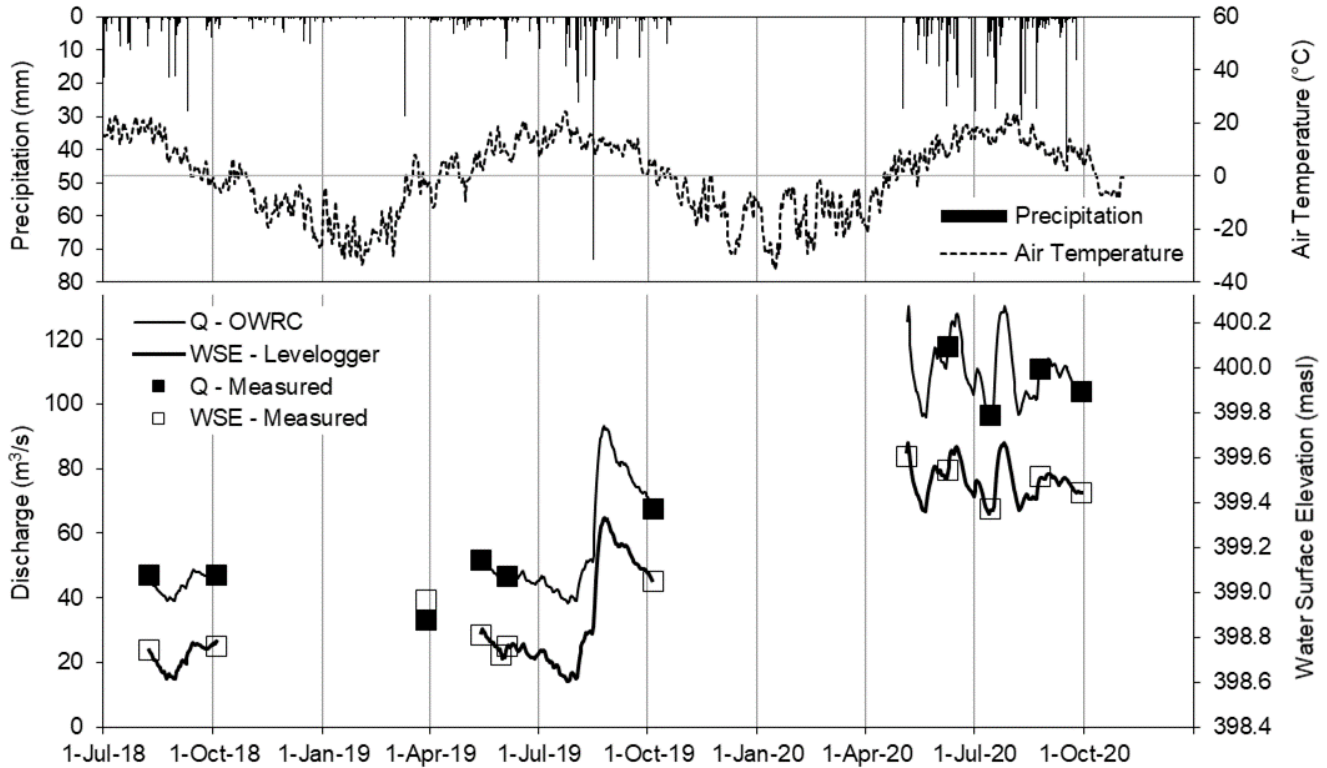
Note: View of CR-WC-MS-09 on 29 September 2020; view is from the right bank (when facing downstream) facing downstream (west).

Figure 38: Open Water Rating Curve for CR-WC-MS-09



OWRC = open water rating curve; Q = discharge (m³/s); WSE = water surface elevation.

**Figure 39: CR-WC-MS-09 Water Surface Elevation and Discharge, 2018 to 2020**



OWRC = open water rating curve; Q = discharge ( $m^3/s$ ); WSE = water surface elevation.

### 5.3.1.10 Station CR-WC-TI-01: Tributary Inflow above Forrest Lake

Hydrometric monitoring at the Clearwater River Tributary Inflow above Forrest Lake (i.e., CR-WC-TI-01) began in 2018. The station is sited on an unnamed tributary located at the southwest corner of Forrest Lake (Figure 3). The field results for CR-WC-TI-01 are summarized in Table 16. The tributary inflow to Forrest Lake at CR-WC-TI-01 is shown in Figure 40.

The rating curve was based on available field measurements as shown in Figure 41. The daily mean WSE and discharge series derived from the Levellogger and OWRC, along with observed precipitation and air temperature, are presented in Figure 42. During every field visit in 2019, a beaver dam was found downstream of the station and dismantled. Backwater corrections (i.e., stage-shifts) were made to the discharge record that coincided with the beaver activity over time; therefore, the uncertainty in the discharge record at this station is high. The Levellogger and its base could not be located during the fall 2019 field visit; therefore, the water level and discharge time series end on 31 May 2019. A beaver may have relocated the Levellogger.

Monitoring at CR-WC-TI-01 was discontinued following the September 2019 field visit as persistent beaver activity resulted in relatively poor-quality data. This tributary is a minor inflow to the Clearwater River system, and discontinuing the station was not consequential for the hydrology baseline.

**Table 16: Summary of Hydrometric Monitoring Results, CR-WC-TI-01**

Date and Time	WSE <sup>(a)</sup> (masl)	Staff Gauge Reading (m)	Discharge (m <sup>3</sup> /s)
2 August 2018 14:00	499.379	0.303	0.028
3 October 2018 16:30	499.259	0.260	0.034
15 May 2019 10:30	499.331	0.300	0.039
31 May 2019 13:10	499.883 <sup>(b)</sup>	0.980 <sup>(b)</sup>	n/d
31 May 2019 14:30	499.318 <sup>(c)</sup>	0.270 <sup>(c)</sup>	0.044
29 September 2019 12:00	499.363	0.322	0.053

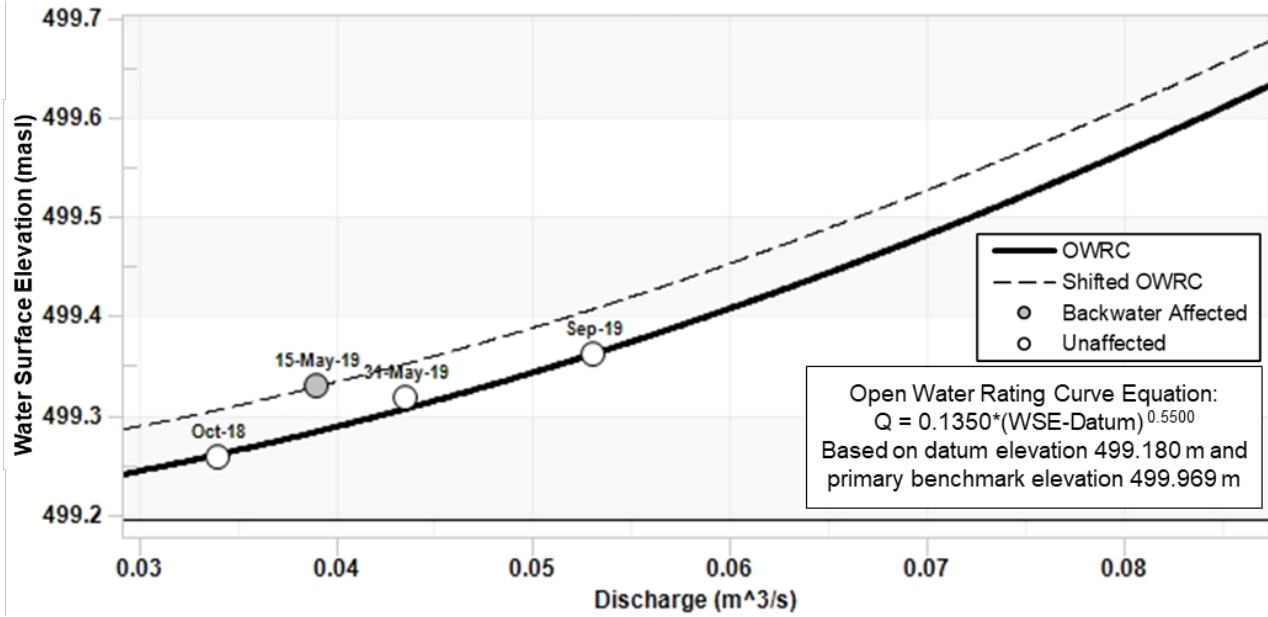
- a) Water surface elevation (WSE) measured by levelling survey using rebar benchmark, CR-WC-TI-01\_BM1.
  - b) Measured before the beaver dam was dismantled.
  - c) Measured after the beaver dam was dismantled.
- n/d = no measurement; masl = metres above sea level.

**Figure 40: Beaver Dam at Clearwater River Tributary Inflow above Forrest Lake, CR-WC-TI-01**



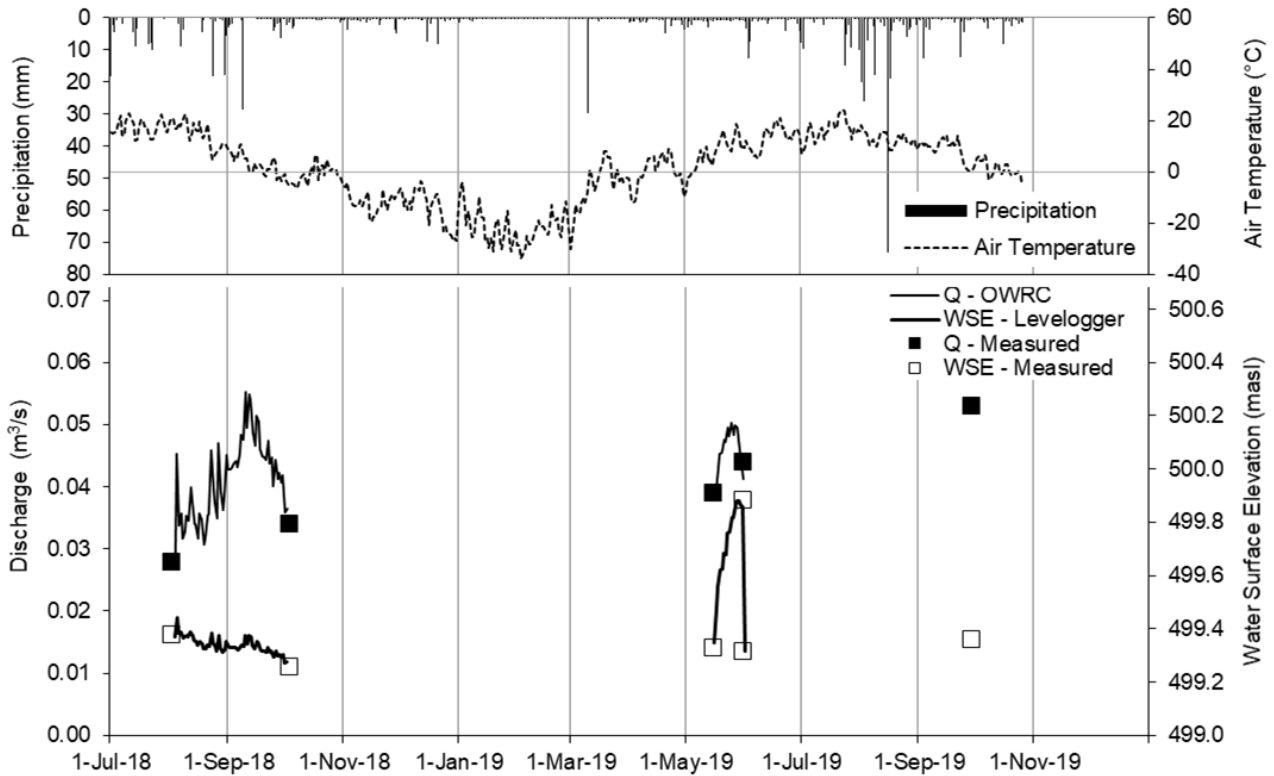
Note: View is facing upstream, 31 May 2019; view of inflow facing upstream.

**Figure 41: Preliminary Open Water Rating Curve for CR-WC-TI-01**



OWRC = open water rating curve; Q = discharge (m<sup>3</sup>/s); WSE = water surface elevation.

**Figure 42: CR-WC-TI-01 Water Surface Elevation and Discharge, 2018 and 2019**



OWRC = open water rating curve; Q = discharge (m<sup>3</sup>/s); WSE = water surface elevation.

### 5.3.1.11 Station CR-WC-TI-02: Clearwater River Tributary Inflow to Naomi Lake

Hydrometric monitoring at the Clearwater River tributary inflow to Naomi Lake (i.e., CR-WC-TI-02) began in 2018. The station is located approximately 50 m upstream of the mouth of Naomi Lake and may be subject to backwater from the Clearwater River at Naomi Lake (Figure 3). The field results for CR-WC-TI-02 are summarized in Table 17. The watercourse at CR-WC-TI-02 is shown in Figure 43.

The OWRC was developed using eight field measurements, as shown in Figure 44. A wide range of WSE (i.e., 0.358 m) and discharge (i.e., 0.454 m<sup>3</sup>/s to 1.71 m<sup>3</sup>/s) were measured during the open water monitoring period from August 2018 to September 2020 (Table 17). This station was observed to experience backwater that may be attributed to Naomi Lake being located downstream of the station, and/or to aquatic emergent vegetation growth during the summer that required stage-shift corrections for specific periods.

The daily mean WSE and discharge series derived from the Levellogger and OWRC, along with observed precipitation and air temperature, are presented in Figure 45.

**Table 17: Summary of Hydrometric Monitoring Results CR-WC-TI-02**

Date and Time	WSE <sup>(a)</sup> (masl)	Staff Gauge Reading (m)	Discharge (m <sup>3</sup> /s)
5 August 2018 13:00	498.259	0.190	0.464
1 October 2018 15:30	498.223	0.140	0.628
28 March 2019 12:00	n/d	n/d	0.561
2 June 2019 11:45	498.159	0.053	0.454
2 October 2019 14:15	498.311	0.211	1.02
6 June 2020 10:50	498.449	0.375	1.71
13 July 2020 08:30	498.499	0.435	0.866
21 August 2020 08:33	498.517	0.468	1.44
27 September 2020 10:00	498.511	0.471	1.37

a) Water surface elevation (WSE) measured by levelling survey using rebar benchmark, CR-WC-TI-02\_BM1.

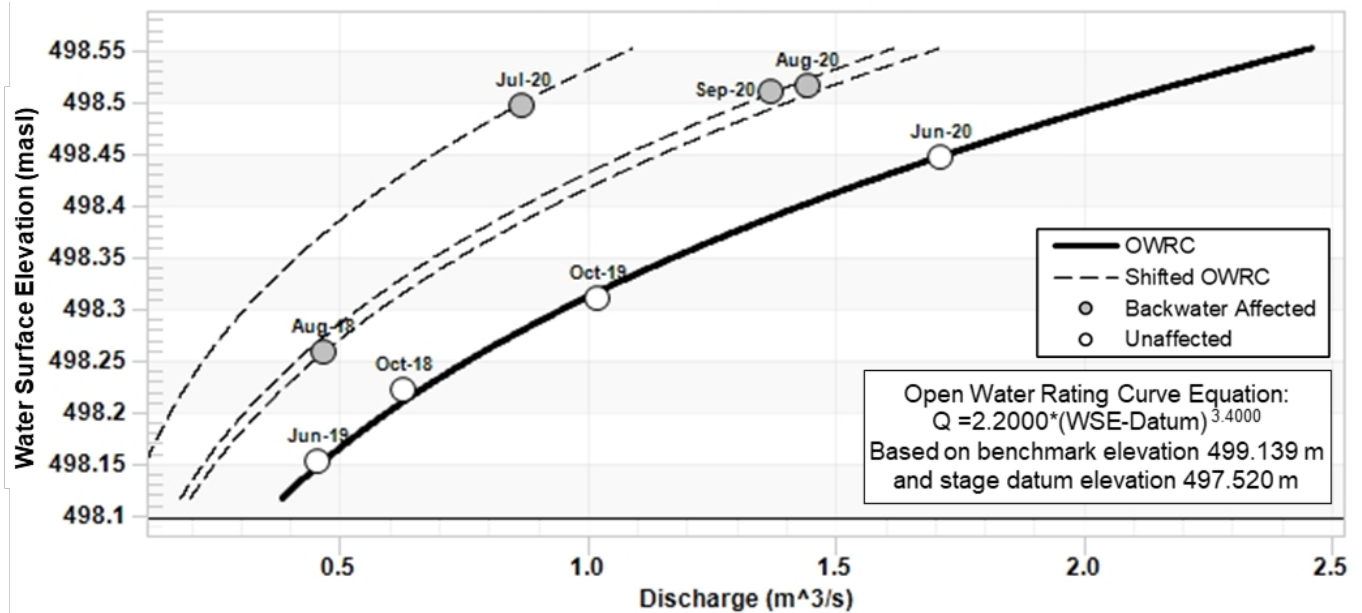
n/d = no data; masl = metres above sea level.

Figure 43: Clearwater River Tributary Inflow to Naomi Lake, CR-WC-TI-02



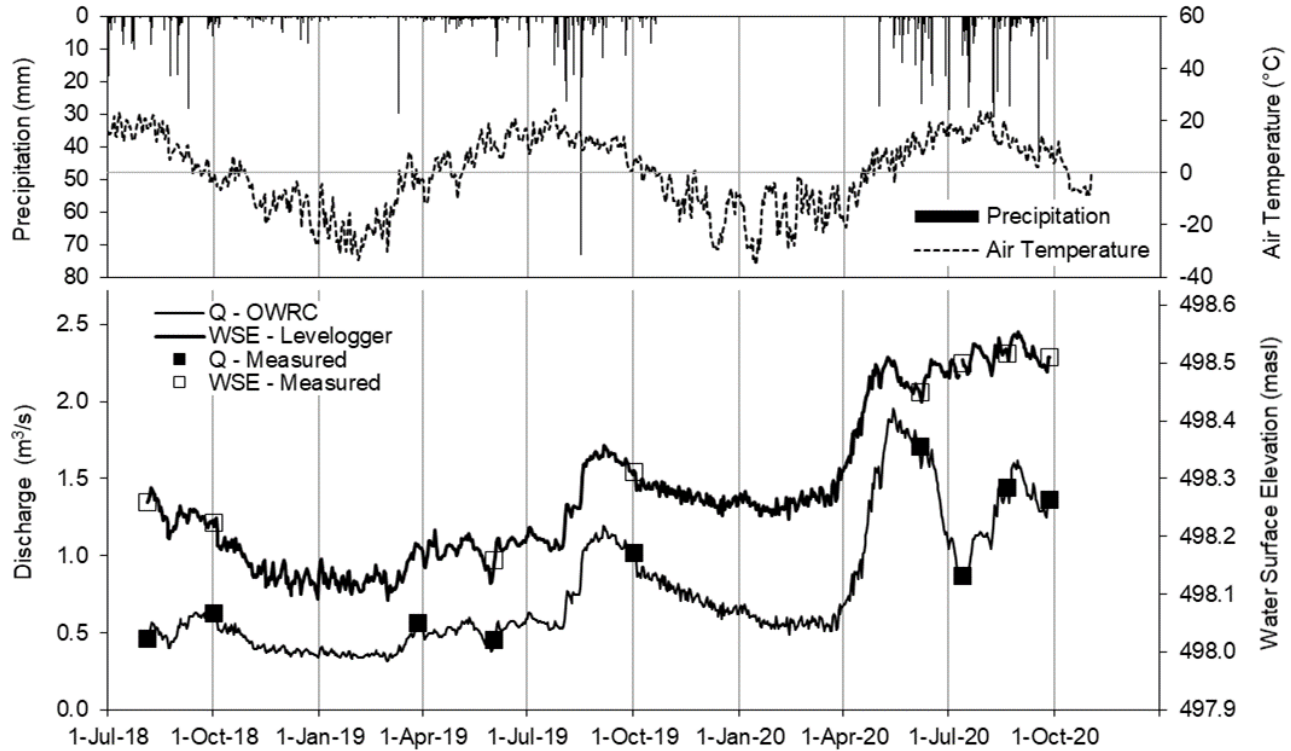
Note: View of CR-WC-TI-02 on 21 August 2020; view is from the right bank (when facing downstream) facing upstream (north).

Figure 44: Open Water Rating Curve for CR-WC-TI-02



OWRC = open water rating curve; Q = discharge (m³/s); WSE = water surface elevation.

**Figure 45: CR-WC-TI-02 Water Surface Elevation and Discharge, 2018 to 2020**



OWRC = open water rating curve; Q = discharge (m<sup>3</sup>/s); WSE = water surface elevation.

**5.3.1.12 Station CR-WC-TI-03: Clearwater River Tributary Inflow Downstream of Naomi Lake**

Hydrometric monitoring at the Clearwater River tributary inflow downstream of Naomi Lake (i.e., CR-WC-TI-03) began in 2018. The station is located approximately 100 m upstream of the Clearwater River tributary inflow (Figure 3). The field results for CR-WC-TI-03 are summarized in Table 18. The unnamed tributary at CR-WC-TI-03 is shown in Figure 46.

The OWRC was based on nine field measurements, as shown in Figure 47. A wide range of WSE (i.e., 0.356 m) and discharge (i.e., 0.255 m<sup>3</sup>/s to 0.848 m<sup>3</sup>/s) were measured during the open water monitoring periods from August 2018 to September 2020. This station was observed to experience backwater that may be attributed to aquatic and terrestrial vegetation growth during the summer, and/or sandy bed mobility that required stage-shift corrections for specific periods.

The daily mean WSE and discharge series derived from the Levelogger and OWRC, along with observed precipitation and air temperature, are presented in Figure 48.

**Table 18: Summary of Hydrometric Monitoring Results, CR-WC-TI-03**

Date and Time	WSE <sup>(a)</sup> (masl)	Staff Gauge Reading (m)	Discharge (m <sup>3</sup> /s)
5 August 2018 13:30	498.337	0.460	0.255
1 October 2018 16:00	498.307	0.435	0.375
1 June 2019 14:40	498.247	0.329	0.307
2 October 2019 12:00	498.404 <sup>(b)</sup>	0.496	0.542
4 May 2020 12:28	498.510	0.718	0.829
5 June 2020 15:43	498.489	0.688	0.748
10 July 2020 11:25	498.551	0.730	0.693
20 August 2020 13:58	498.603	0.792	0.707
26 September 2020 09:15	498.593	0.795	0.848

a) Water surface elevation (WSE) measured by levelling survey using anchor bolt in tree benchmark, CR-TI-WC-03\_BM1.

b) This is based on BM1 assumed elevation of 498.897 masl as of 2 October 2019 field visit.

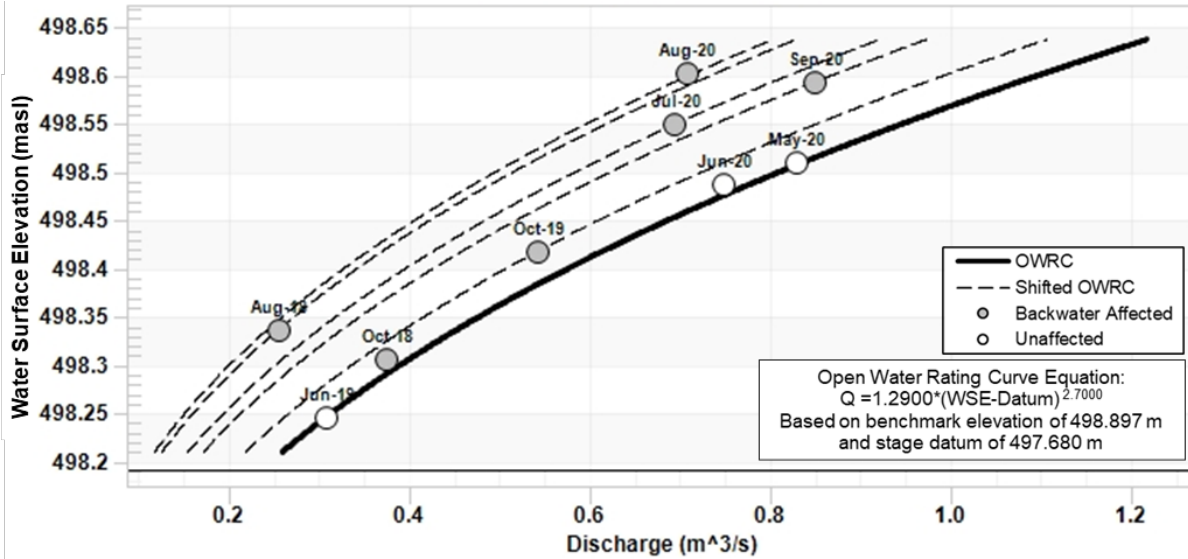
masl = metres above sea level.

**Figure 46: Clearwater River Tributary Inflow downstream of Naomi Lake, CR-WC-TI-03**



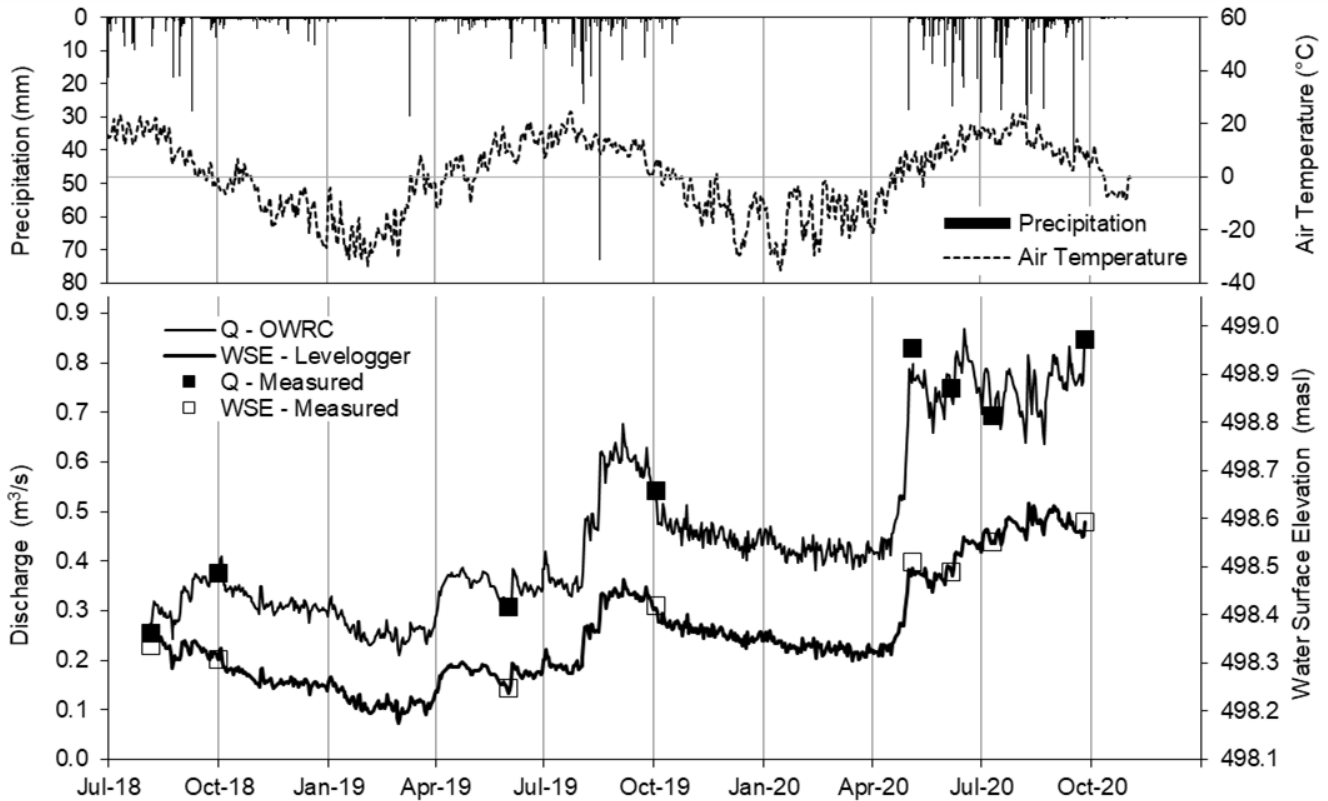
Note: View of CR-WC-TI-03 downstream of discharge transect 26 September 2020; view is from the right bank when facing upstream (northeast).

Figure 47: Open Water Rating Curve for CR-WC-TI-03



OWRC = open water rating curve; Q = discharge (m<sup>3</sup>/s); WSE = water surface elevation.

Figure 48: CR-WC-TI-03 Water Surface Elevation and Discharge, 2018 to 2020



OWRC = open water rating curve; Q = discharge (m<sup>3</sup>/s); WSE = water surface elevation.

### 5.3.1.13 Station HC-WC-MS-01: Hodge Creek below Hodge Lake

Hydrometric monitoring at Hodge Creek below Hodge Lake (i.e., HC-WC-MS-01) began in 2020. The station is located approximately 10 m downstream of the Hodge Lake outlet (Figure 3). The field results for Station HC-WC-MS-01 are summarized in Table 19. Hodge Creek at HC-WC-MS-01 is shown in Figure 49.

The preliminary rating curve was based on four field measurements in 2020, as shown in Figure 50. Derived discharge results are considered adequate for the open water period in 2020 and provide spatially variable results outside the LSA.

The daily mean WSE and discharge series derived from the Levellogger and OWRC, along with observed precipitation and air temperature, are presented in Figure 51.

**Table 19: Summary of Hydrometric Monitoring Results, HC-WC-MS-01**

Date and Time	WSE <sup>(a)</sup> (m; non-geodetic)	Staff Gauge Reading (m)	Discharge (m <sup>3</sup> /s)
8 June 2020 10:10	99.277	0.445	0.568
12 July 2020 11:30	99.291	0.460	0.550
22 August 2020 14:45	99.367	0.540	0.817
28 September 2020 11:05	99.339	0.520	0.758

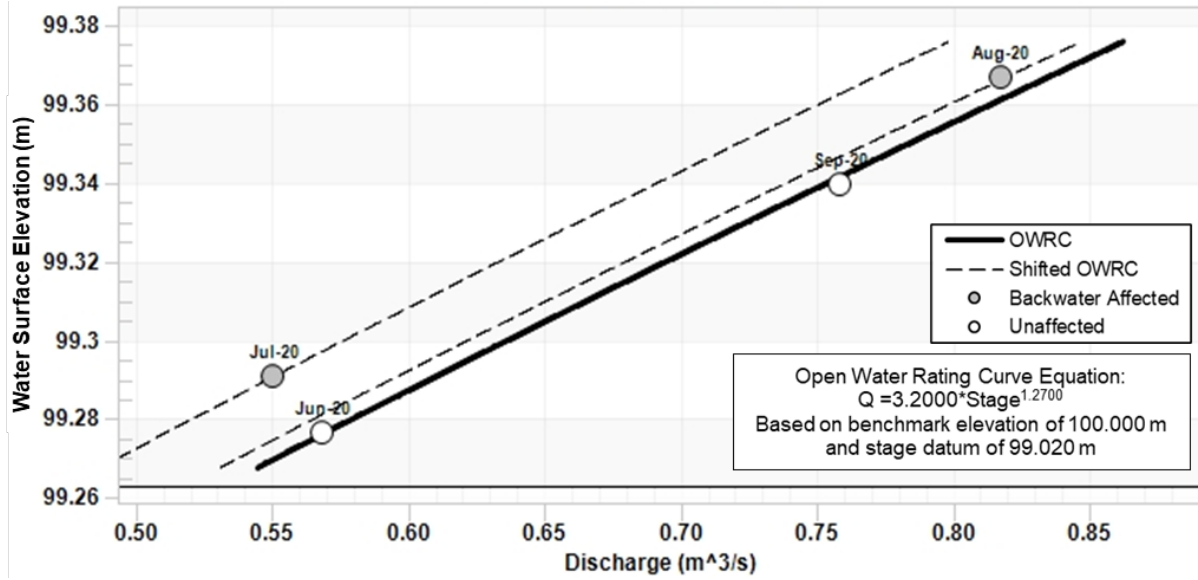
a) Water surface elevation (WSE) measured by levelling survey using rebar benchmark, HC-WC-MS-01\_BM1.

**Figure 49: Hodge Creek below Hodge Lake, HC-WC-MS-01**



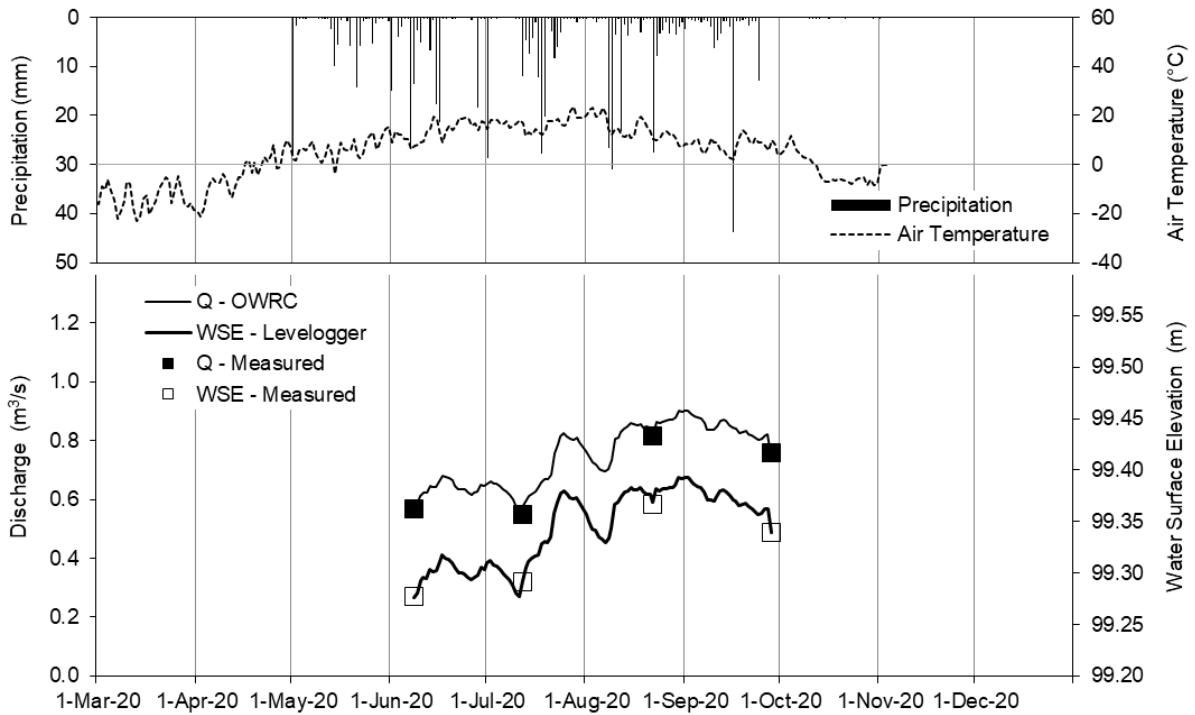
Note: View of HC-WC-MS-01 from the discharge measurement cross-section on 28 September 2020; view is facing downstream (west).

**Figure 50: Preliminary Open Water Rating Curve for HC-WC-MS-01**



OWRC = open water rating curve; Q = discharge (m<sup>3</sup>/s); WSE = water surface elevation.

**Figure 51: HC-WC-MS-01 Water Surface Elevation and Discharge, 2020**



OWRC = open water rating curve; Q = discharge (m<sup>3</sup>/s); WSE = water surface elevation.

### 5.3.2 Waterbody Hydrometric Monitoring

The WSE data collected for each hydrometric station during the 2018 to 2020 hydrology field programs are provided in the following subsections. Daily mean WSE and discharge data are included in Appendix D.

#### 5.3.2.1 Station CR-WB-MS-01: Broach Lake

Broach Lake has a surface area of approximately 9.2 km<sup>2</sup> and is located at the headwaters of the Clearwater River (Figure 3). Hydrometric monitoring at Broach Lake (i.e., CR-WB-MS-01) began in August 2018. The station is located on the west shore of the lake. The field activities completed at CR-WB-MS-01 are summarized in Table 20. The daily mean WSE record derived from the Levellogger, along with observed precipitation and air temperature, are presented in Figure 52.

**Table 20: Summary of Hydrometric Monitoring Results, CR-WB-MS-01**

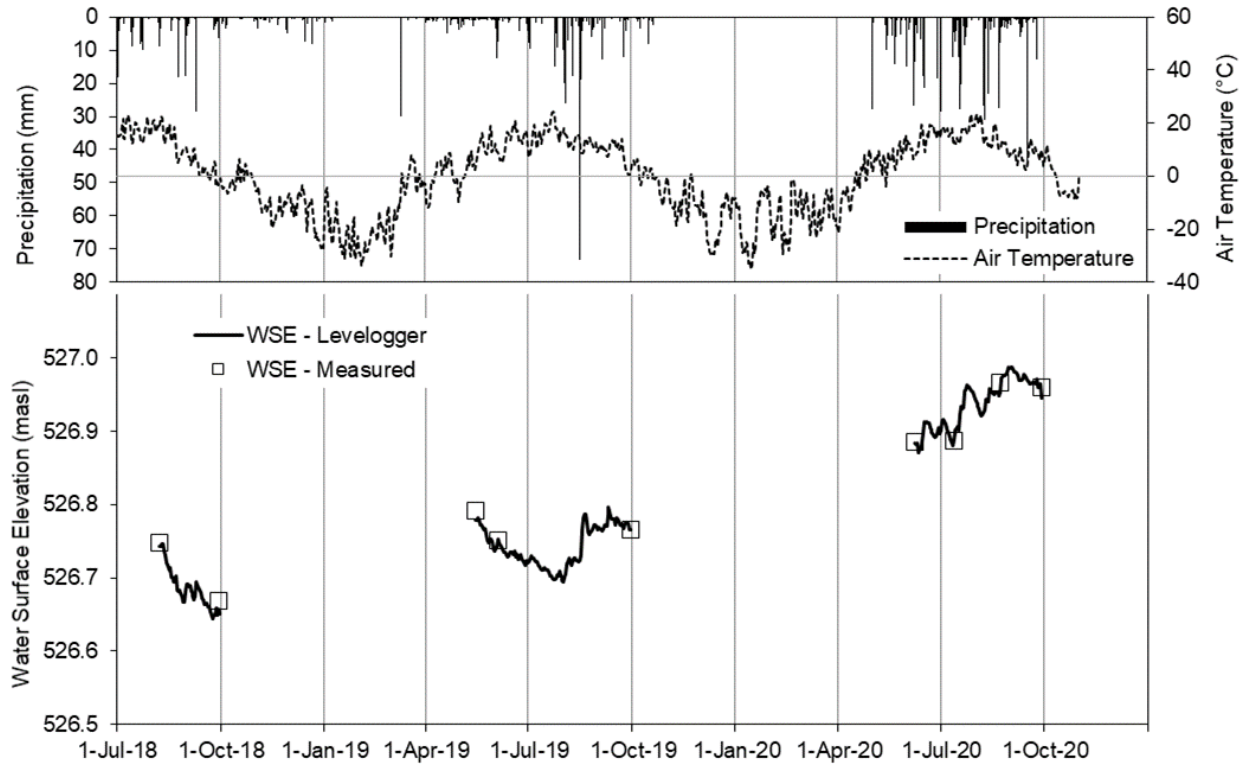
Date and Time	WSE <sup>(a)</sup> (masl)	Staff Gauge Reading (m)
7 August 2018 15:30	526.748	0.275
29 September 2018 16:11	526.668	0.185
15 May 2019 13:45	526.792	0.150
4 June 2019 14:00	526.751	0.152
29 September 2019 16:15	526.766	0.162
8 June 2020 09:10	526.885	n/d <sup>(b)</sup>
12 July 2020 13:00	526.887	n/d <sup>(b)</sup>
22 August 2020 16:50	526.966	0.430
28 September 2020 13:05	526.960	0.430

a) Water surface elevation (WSE) measured by levelling survey using rebar benchmark, CR-WB-MS-01\_BM1.

b) Staff gauge lying on lake bed, re-established 22 August 2020.

n/d = no measurement; masl = metres above sea level.

**Figure 52: CR-WB-MS-01 Water Surface Elevation, 2018 to 2020**



WSE = water surface elevation.

**5.3.2.2 Station CR-WB-MS-02: Patterson Lake**

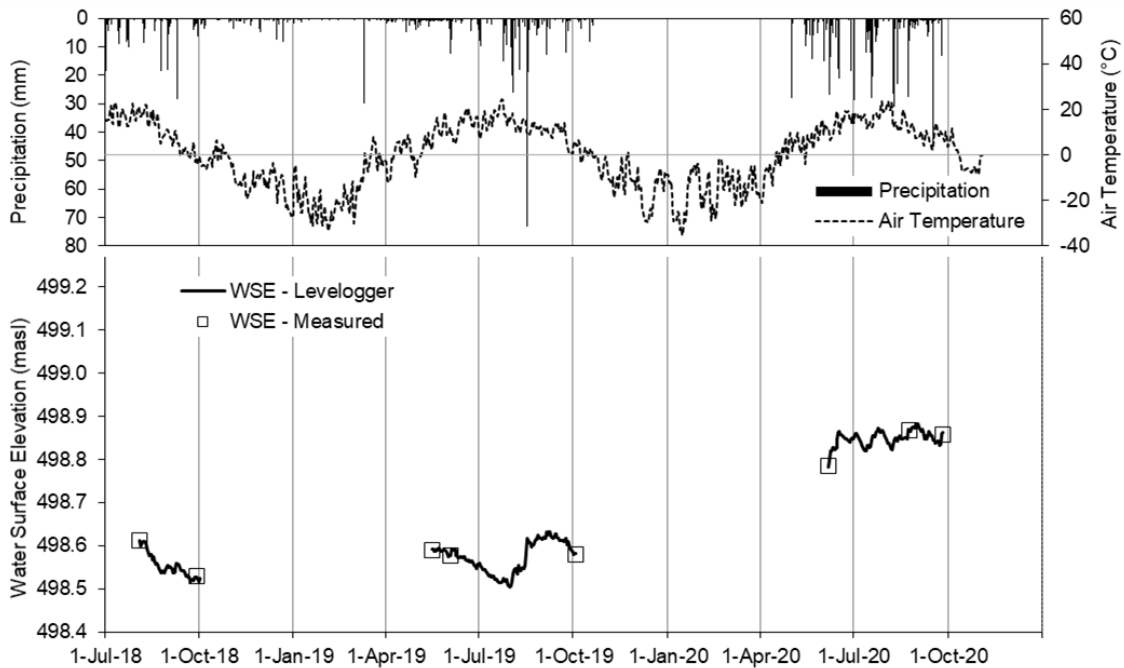
Patterson Lake has a surface area of approximately 38.2 km<sup>2</sup> and is located downstream of Broach Lake and upstream of Forrest Lake (Figure 3). Hydrometric monitoring work at Patterson Lake (i.e., Station CR-WB-MS-02) began in 2018. The station is located on the southeast side of the lake. The field activities completed at CR-WB-MS-02 are summarized in Table 21. The daily mean WSE record derived from the Levellogger, along with observed precipitation and air temperature, are presented in Figure 53.

**Table 21: Summary of Hydrometric Monitoring Results, CR-WB-MS-02**

Date and Time	WSE <sup>(a)</sup> (masl)	Staff Gauge Reading (m)
4 August 2018 08:30	498.612	0.415
29 September 2018 12:00	498.530	0.330
18 May 2019 16:10	498.585	0.830
3 June 2019 19:00	498.578	0.820
3 October 2019 15:15	498.581	0.845
6 June 2020 18:55	498.786	n/d <sup>(b)</sup>
10 July 2020 18:00	n/d <sup>(c)</sup>	n/d <sup>(b)</sup>
24 August 2020 12:45	498.868	n/d <sup>(b)</sup>
26 September 2020 17:21	498.857	n/d <sup>(b)</sup>

- a) Water surface elevation (WSE) measured by levelling survey using rebar benchmark, CR-WB-MS-02\_BM1.
  - b) Staff gauge completely submerged.
  - c) Survey error was identified, and this result was likely an overestimate and has been omitted.
- n/d = no data; masl = metres above sea level.

**Figure 53: CR-WB-MS-02 Water Surface Elevation, 2018 to 2020**



WSE = water surface elevation.

### 5.3.2.3 Station CR-WB-MS-03: Forrest Lake

Forrest Lake has a surface area of approximately 40.1 km<sup>2</sup> and is located at the downstream end of Patterson Lake and upstream of Beet Lake (Figure 3). Hydrometric monitoring work at Forrest Lake (i.e., Station CR-WB-MS-03) began in 2018. The station is located on the northeast shore of the lake. The field activities completed at CR-WB-MS-03 are summarized in Table 22. The daily mean WSE record derived from the Levellogger, along with observed precipitation and air temperature, are presented in Figure 54.

**Table 22: Summary of Hydrometric Monitoring Results, CR-WB-MS-03**

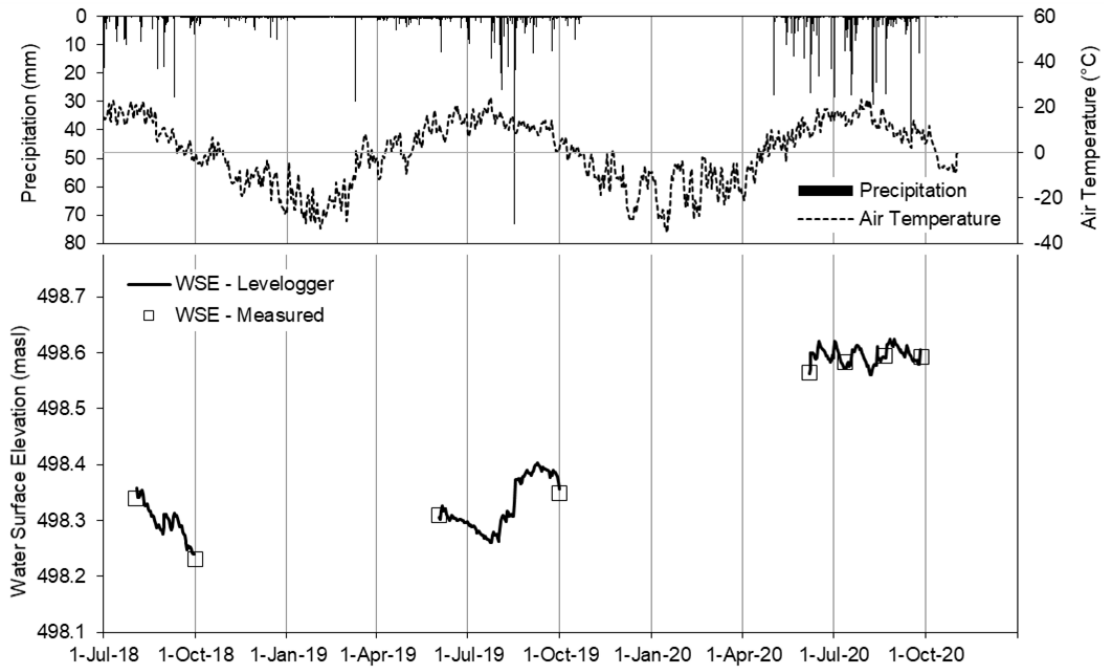
Date and Time	WSE <sup>(a)</sup> (masl)	Staff Gauge Reading (m)
2 August 2018 16:15	498.340	0.395
1 October 2018 15:52	498.230	0.275
2 June 2019 17:30	498.310	0.475
30 September 2019 14:00	498.349	0.515
6 June 2020 08:05	498.565	n/d <sup>(b)</sup>
12 July 2020 08:40	498.584	n/d <sup>(b)</sup>
21 August 2020 11:07	498.594	0.380
25 September 2020 15:37	498.592	0.370

a) Water surface elevation (WSE) measured by levelling survey using rebar benchmark, CR-WB-MS-03\_BM1.

b) Staff gauge lying on lake bed. Re-established 21 August 2020.

n/d = no data; masl = metres above sea level.

**Figure 54: Station CR-WB-MS-03 Water Surface Elevation, 2018 to 2020**



WSE = water surface elevation.

### 5.3.2.4 Station CR-WB-MS-04: Beet Lake

Beet Lake has a surface area of approximately 8.66 km<sup>2</sup> and is located downstream of Forrest Lake and upstream of Naomi Lake (Figure 3). Hydrometric monitoring at Beet Lake (i.e., CR-WB-MS-04) began in 2018. The station is located on the south shore of the lake. The field activities completed at CR-WB-MS-04 are summarized in Table 23. The daily mean WSE record derived from the Levellogger, along with observed precipitation and air temperature, are presented in Figure 55.

**Table 23: Summary of Hydrometric Monitoring Results, CR-WB-MS-04**

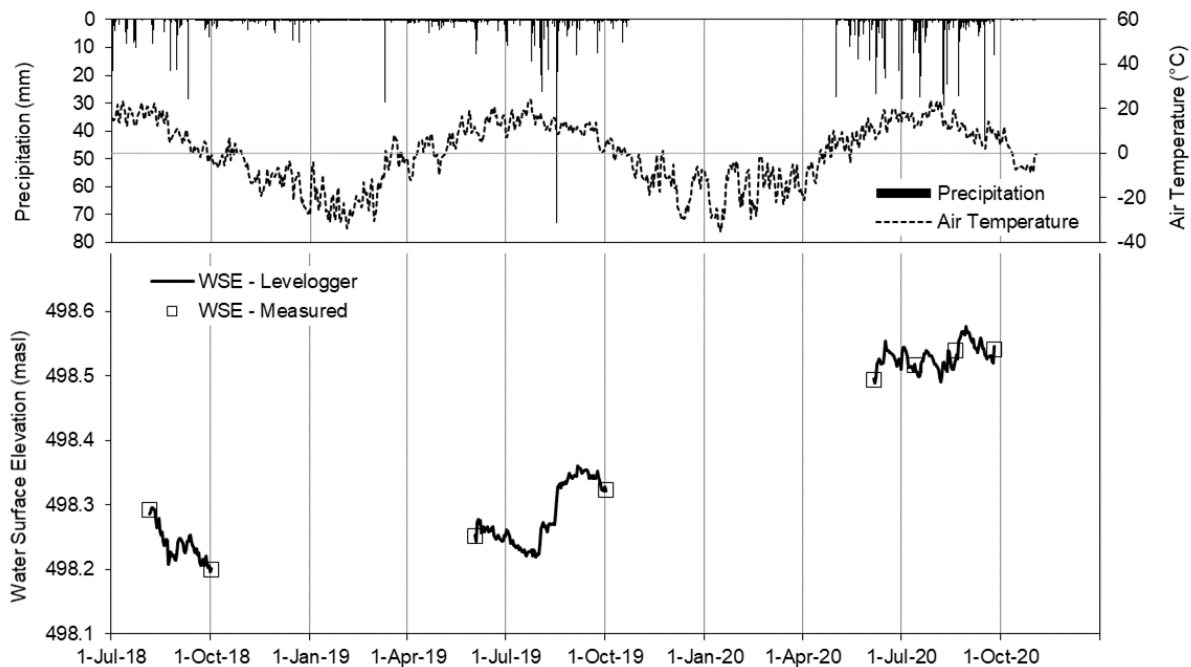
Date and Time	WSE <sup>(a)</sup> (masl)	Staff Gauge Reading (m)
5 August 2018 14:30	498.291	0.330
1 October 2018 14:27	498.200	n/d
2 June 2019 16:30	498.252	0.265
2 October 2019 17:00	498.323	0.342
6 June 2020 09:00	498.494	n/d <sup>(b)</sup>
13 July 2020 11:20	498.517	n/d <sup>(b)</sup>
20 August 2020 16:30	498.539	0.710
25 September 2020 14:20	498.541	0.725

a) Water surface elevation (WSE) measured by levelling survey using rebar benchmark, CR-WB-MS-04\_BM1.

b) Staff gauge sheared, likely due to ice. Re-established 20 August 2020.

n/d = no data; masl = metres above sea level.

**Figure 55: CR-WB-MS-04 Water Surface Elevation, 2018 to 2020**



WSE = water surface elevation.

### 5.3.2.5 Station CR-WB-MS-05: Naomi Lake

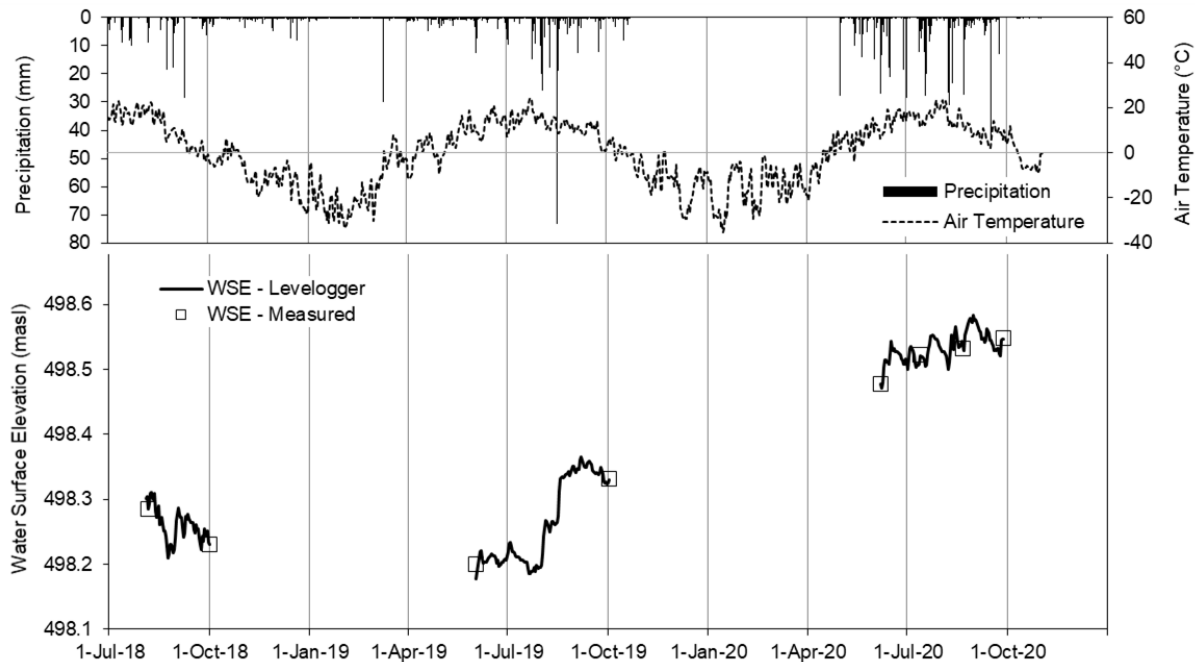
Naomi Lake has a surface area of approximately 2.4 km<sup>2</sup>, is located downstream of Beet Lake and meets the Clearwater River downstream at the southeast end of the lake (Figure 3). Hydrometric monitoring work at Naomi Lake (i.e., CR-WB-MS-05) began in 2018. The station is located on the northwest shore of Naomi Lake. The field activities completed at CR-WB-MS-05 are summarized in Table 24. The daily mean WSE record derived from the Levellogger, along with observed precipitation and air temperature, are presented in Figure 56.

**Table 24: Summary of Hydrometric Monitoring Results, CR-WB-MS-05**

Date and Time	WSE <sup>(a)</sup> (masl)	Staff Gauge Reading (m)
5 August 2018 16:00	498.285	0.235
1 October 2018 13:00	498.230	0.180
2 June 2019 14:00	498.200	0.028
2 October 2019 11:00	498.331	0.175
6 June 2020 10:15	498.487	0.300
13 July 2020 10:20	498.524	0.368
21 August 2020 10:07	498.532	0.385
27 September 2020 12:08	498.548	0.390

a) Water surface elevation (WSE) measured by levelling survey using rebar benchmark, CR-WB-MS-05\_BM1.  
 masl = metres above sea level.

**Figure 56: CR-WB-MS-05 Water Surface Elevation, 2018 to 2020**



WSE = water surface elevation.

### 5.3.2.6 Station CR-WB-TI-01: Lake H

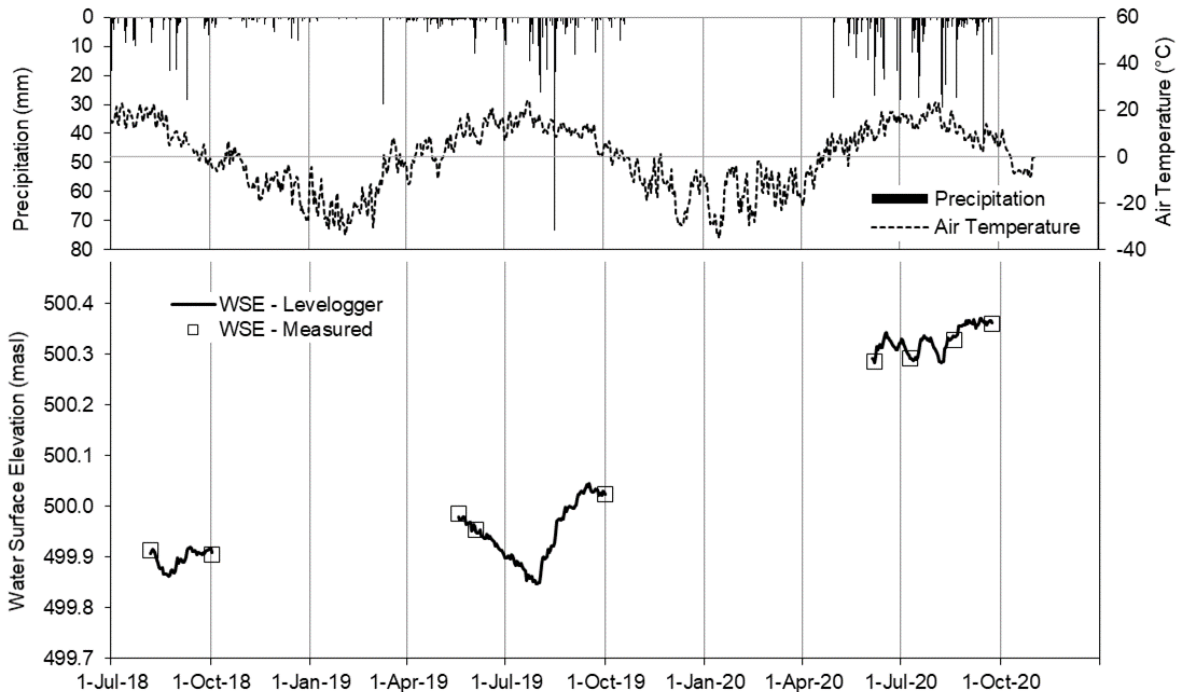
Lake H has a surface area of approximately 1.7 km<sup>2</sup> and is located near the upstream portion of Patterson Lake (Figure 3). Hydrometric monitoring at Lake H (i.e., CR-WB-TI-01) began in 2018. The station is located on the southwest shore of Lake H. The field activities completed at CR-WB-TI-01 are summarized in Table 25. The daily mean WSE record derived from the Levellogger, along with observed precipitation and air temperature, are presented in Figure 57.

**Table 25: Summary of Hydrometric Monitoring Results, CR-WB-TI-01**

Date and Time	WSE <sup>(a)</sup> (masl)	Staff Gauge Reading (m)
6 August 2018 11:00	499.900	0.264
2 October 2018 15:00	499.900	0.245
18 May 2019 11:45	499.985	0.230
3 June 2019 15:05	499.954	0.195
1 October 2019 11:00	500.024	0.260
4 June 2020 16:10	500.285	0.525
9 July 2020 13:50	500.291	0.525
19 August 2020 14:00	500.329	0.570
23 September 2020 13:09	500.360	0.600

a) Water surface elevation (WSE) measured by levelling survey using rebar benchmark, CR-WB-TI-01\_BM1.  
 masl = metres above sea level.

**Figure 57: CR-WB-TI-01 Water Surface Elevation, 2018 to 2020**



WSE = water surface elevation.

### 5.3.2.7 Station CR-WB-TI-02: Lake G

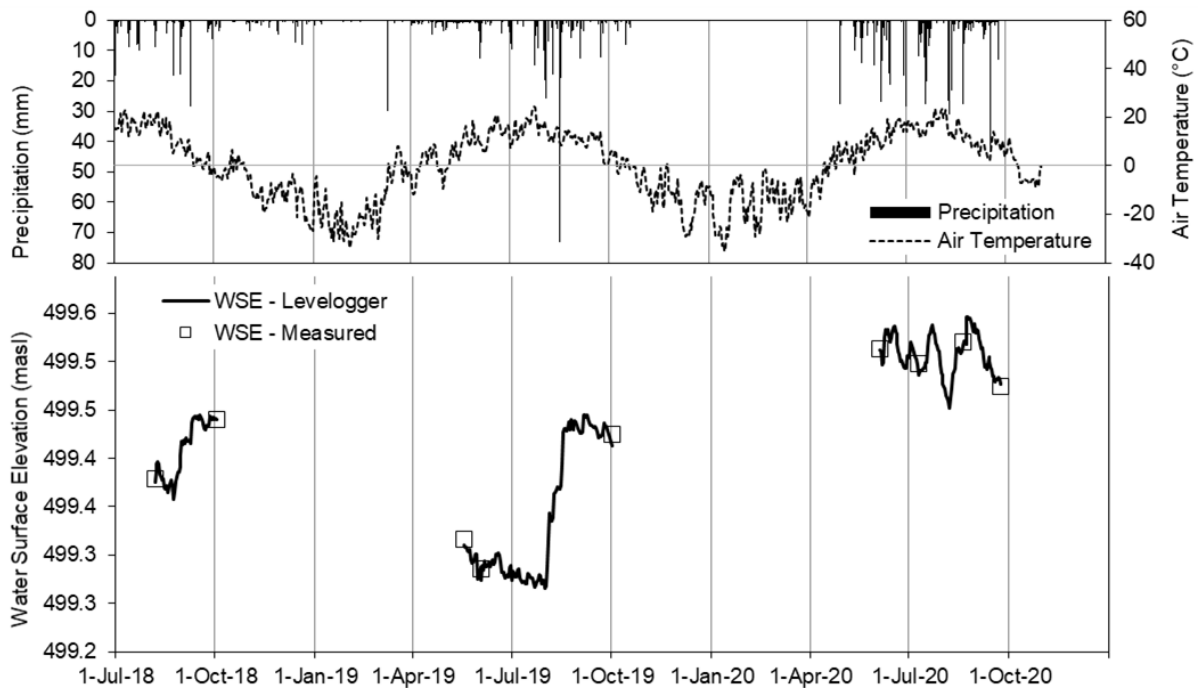
Lake G has a surface area of approximately 0.57 km<sup>2</sup> and is located near the upstream portion of Patterson Lake (Figure 3). Hydrometric monitoring at Lake G (i.e., CR-WB-TI-02) began in 2018 in support of the hydrological baseline. The CR-WB-TI-02 station is located on the north shore of Lake G. The field activities completed at CR-WB-TI-02 are summarized in Table 26. The daily mean WSE record derived from the Levellogger, along with observed precipitation and air temperature, are presented in Figure 58.

**Table 26: Summary of Hydrometric Monitoring Results, CR-WB-TI-02**

Date and Time	WSE <sup>(a)</sup> (masl)	Staff Gauge Reading (m)
6 August 2018 13:00	499.379	0.306
2 October 2018 16:00	499.440	0.375
18 May 2019 10:45	499.316	0.575
3 June 2019 10:25	499.286	0.548
1 October 2019 10:15	499.425	0.675
4 June 2020 15:15	499.513	0.773
9 July 2020 12:46	499.498	0.748
19 August 2020 13:05	499.521	0.778
23 September 2020 12:05	499.474	0.738

a) Water surface elevation (WSE) measured by levelling survey using anchor bolt in tree benchmark, CR-WB-TI-02\_BM1.  
 masl = metres above sea level.

**Figure 58: CR-WB-TI-02 Water Surface Elevation, 2018 to 2020**



WSE = water surface elevation.

### 5.3.2.8 Station CR-WB-TI-03: Lake F

Lake F has a surface area of approximately 1.19 km<sup>2</sup> and is located near adjacent to the north basin of Forrest Lake (Figure 3 and Figure 4). Hydrometric monitoring at Lake F (i.e., CR-WB-TI-03) began in 2018. The field activities completed at CR-WB-TI-03 are summarized in Table 27. Lake F was monitored opportunistically as it is near CR-WB-MS-03. Monitoring activities included instantaneous measurements of WSE during field visits. A Levellogger was not installed at this station as it is considered a lower priority due to its location on a small waterbody far from the proposed Project.

**Table 27: Summary of Hydrometric Monitoring Results, CR-WB-TI-03**

Date and Time	WSE <sup>(a)</sup> (masl)	Staff Gauge Reading (m)
2 August 2018 13:00	498.795	0.410
1 October 2018 16:00	498.797	0.400
30 September 2019 14:15	499.022	0.543
6 June 2020 08:05	499.345	0.915
12 July 2020 08:40	499.405	0.962
21 August 2020 11:07	499.425	0.990
25 September 2020 15:37	499.500	n/d <sup>(b)</sup>

a) Water surface elevation (WSE) measured by levelling survey using rebar benchmark, CR-WB-TI-03\_BM1.

b) Staff gauge submerged.

n/d = no measurement; masl = metres above sea level.

### 5.3.2.9 Station HC-WB-MS-01: Hodge Lake

Hodge Lake has a surface area of approximately 13.02 km<sup>2</sup> and is located approximately 16 km north of Broach Lake (Figure 3). Hydrometric monitoring at the Hodge Lake (i.e., HC-WB-MS-01) began in June 2020 in support of the hydrological baseline. The station is located on the west shore of Hodge Lake near the outlet. The field activities completed at HC-WB-MS-02 are summarized in Table 28. The daily mean WSE record derived from the Levellogger, along with observed precipitation and air temperature, are presented in Figure 59.

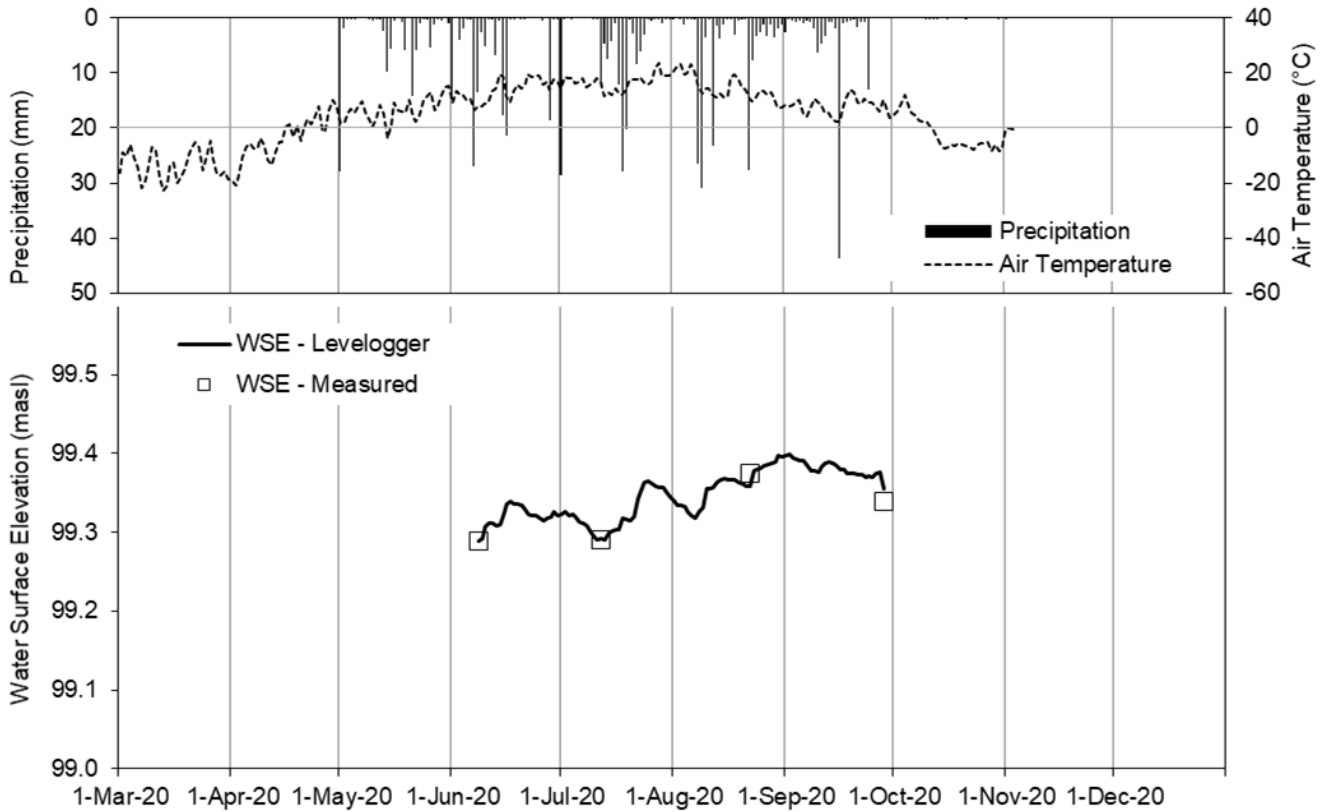
**Table 28: Summary of Hydrometric Monitoring Results, HC-WB-MS-01**

Date and Time	WSE <sup>(a)</sup> (masl)	Staff Gauge Reading (m)
8 June 2020 10:10	99.289	0.450
12 July 2020 11:30	99.290	0.460
22 August 2020 14:45	99.375	0.555
28 September 2020 11:05	99.339	0.520

a) Water surface elevation (WSE) measured by levelling survey using rebar benchmark, HC-WB-MS-01\_BM1.

masl = metres above sea level.

**Figure 59: HC-WB-MS-01 Water Surface Elevation, 2020**



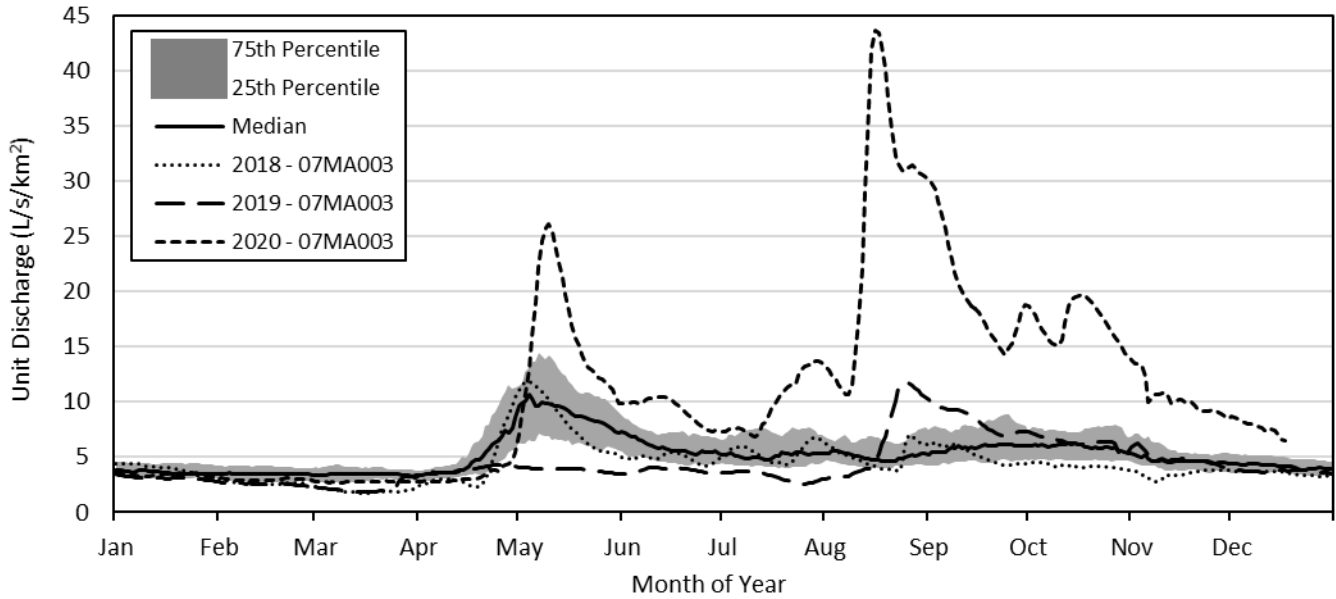
WSE = water surface elevation.

### 5.3.3 Comparison to Historical Regional Records

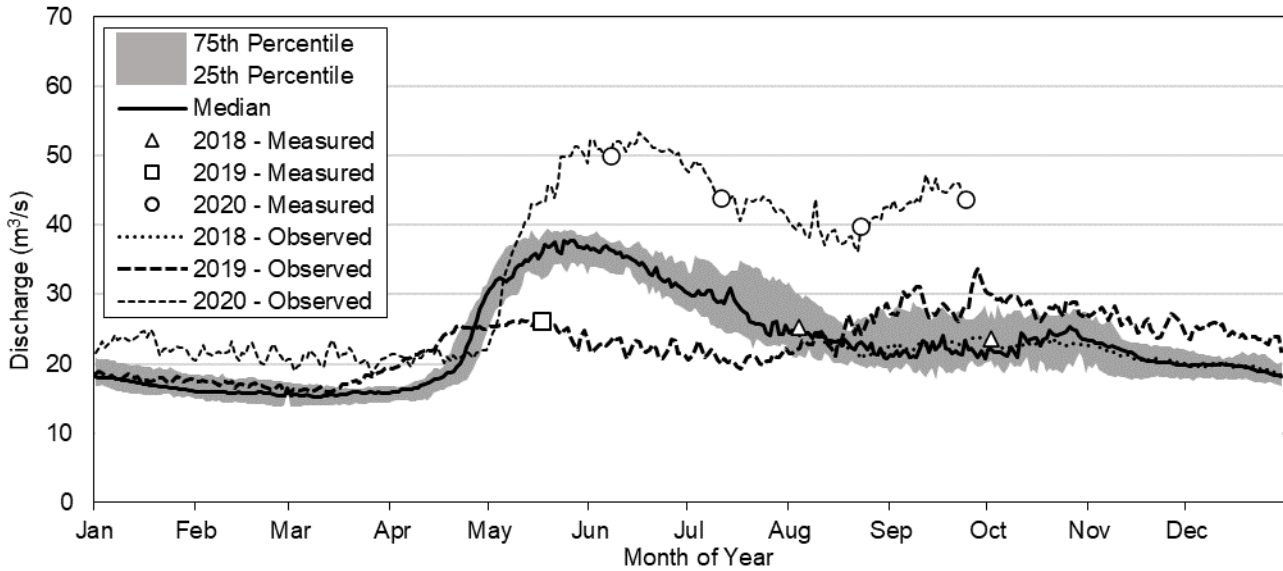
The 2018, 2019, and 2020 hydrometric baseline study provisional discharge records for the Douglas River (i.e., WSC Station 07MA003) were compared with long-term values for the years 1975 to 2020 (Figure 60; WSC 2020). Most of 2018 and 2019 had near or below normal discharge including spring 2018. The August 2019 peak flow that occurred on the Douglas River was well above normal conditions for that time of year and would be close to a 1-in-2-year flood event for that station. Discharge measured in 2020 was above normal beginning in early May until the end of the year. The August 2020 peak flow was approximately timed with the 2019 peak and a secondary peak in 2018. The August 2020 peak flow would be greater than the 1-in-100-year flood event for that station.

A comparison of 2018, 2019, and 2020 hydrometric baseline study discharge records for the Clearwater River at Outlet of Lloyd Lake (CR-WC-MS-08) with historical observations for the Clearwater River (i.e., WSC Station 07CD006) is shown in Figure 61 (WSC 2020). Discharge records at CR-WC-MS-08 were near normal in 2018. Discharge observed in May to August 2019 was well below normal, and in September 2019 through April 2020 was above normal. During 2020 freshet, the observed discharge was well above normal, and this trend continued through October 2020.

**Figure 60: Comparison of 2018 to 2020 Hydrographs for the Douglas River near Cluff Lake (Station 07MA003) with Long-Term Discharge Records**



**Figure 61: Comparison of 2018 to 2020 Observations at the Clearwater River at Outlet of Lloyd Lake to Historical Observations at Station 07CD006 Clearwater River at Outlet of Lloyd Lake, 1974 to 1995**



## 5.4 Sediment

### 5.4.1 Bed Substrate Particle Size

River bed substrate samples were collected in October 2018 at three hydrometric stations on the Clearwater River downstream of Patterson Lake to characterize particle size. At all three hydrometric stations, the bed was observed to be uniform and composed of fine to medium sand. Characteristic particle sizes are summarized in Table 29. The full grain size distributions analyzed for each of the samples are included in Appendix E, Total Suspended Solids and Bed Load Laboratory Results.

**Table 29: Bed Substrate Characteristics at Selected Stations on the Clearwater River**

Watercourse	Hydrometric Station	Sample Number	D <sub>15</sub> (mm)	D <sub>50</sub> (mm)	D <sub>85</sub> (mm)
Clearwater River below Patterson Lake	CR-WC-MS-03	SL6312	0.177	0.282	0.393
Clearwater River below Beet Lake	CR-WC-MS-04	SL6313	0.189	0.306	0.422
Clearwater River below Naomi Lake	CR-WC-MS-05	SL6314	0.271	0.381	0.673

Note: Samples collected October 2018.

D = particle size diameter, with the subscript number referring to the percentage of particles that are finer than this size.

### 5.4.2 Suspended and Bed Load

Suspended load and bed load observations were made during each field visit in 2018, 2019, and 2020 at three hydrometric stations on the Clearwater River downstream of Patterson Lake. The measured TSS concentration in the water column and bed load concentration are summarized in Table 30. The highest TSS measured was 3 mg/L at CR-WC-MS-04 on 6 June 2020 and at CR-WC-MS-05 on 5 June 2020 which coincided with the highest discharge measured during the monitoring program. Measurements of 2 mg/L TSS were obtained at CR-WC-MS-04 on 1 June 2019 and 13 July 2020 and at CR-WC-MS-05 on 13 July 2020. All the remaining TSS samples were at or below the detection limit of 1 mg/L.

For bed load, if insufficient mass or no mass could be collected within the sampling duration, these samples were not submitted to the laboratory for further analysis and are indicated as “not detected” in Table 30. Even the highest bed load concentrations were low concentrations compared to many natural streams when measured over a period of hours at CR-WC-MS-03 of 0.0029 mg/L on 4 Jun 2019 and 0.0028 mg/L on 4 June 2019, which correspond to slightly higher mean velocities than the other results shown in Table 30. No regional sediment monitoring data are available for the Clearwater River in Saskatchewan (including the RSA) or surrounding watersheds for comparison with the local sampling results.

**Table 30: Suspended and Bed Load Sampling Results, 2018 to 2020**

Hydrometric Station and Watercourse	Date	TSS (mg/L)	Bed Load (mg/L)	Bed Load Sampling Duration (s)	Daily Load (t/d)	Discharge (m <sup>3</sup> /s)	Mean Velocity (m/s)
Clearwater River below Patterson Lake CR-WC-MS-03	4 August 2018	<1	Not Detected	3,600	Not Detected	1.16	0.250
	1 October 2018	<1	Not Detected	3,600	Not Detected	0.98	0.253
	18 May 2019	<1	0.0021	60,480	0.0083	1.46	0.318
	4 June 2019	<1	0.0028	49,800	0.0102	1.33	0.282
	30 September 2019	<1	0.0010	86,400	0.0031	1.17	0.234
	3 May 2020	n/d	Not Detected	88,500	Not Detected	1.56	0.241
	8 June 2020	<1	0.0000	138,420	0.0002	2.22	0.311
	14 July 2020	1	0.0002	69,120	0.0049	2.35	0.307
	25 August 2020	<1	0.0003	69,900	0.0090	2.32	0.294
	28 September 2020	<1	0.0001	75,000	0.0041	2.16	0.232
Clearwater River below Beet Lake CR-WC-MS-04	5 August 2018	<1	Not Detected	3,600	Not Detected	1.92	0.133
	1 October 2018	<1	Not Detected	3,600	Not Detected	1.70	0.242
	1 June 2019	2	Not Detected	6,060	Not Detected	2.54	0.242
	2 October 2019	<1	Washload only	1,500	0.0043	1.83	0.108
	6 June 2020	3	0.0001	57,900	0.0108	5.50	0.261
	13 July 2020	2	0.0001	243,540	0.0074	4.80	0.266
	21 August 2020	<1	0.0000	66,420	0.0013	3.87	0.184
26 September 2020	<1	0.0001	67,560	0.0087	4.65	0.248	
Clearwater River below Naomi Lake CR-WC-MS-05	5 August 2018	<1	Not Detected	3,600	Not Detected	2.95	0.208
	1 October 2018	<1	Not Detected	3,600	Not Detected	3.01	0.250
	1 June 2019	<1	Not Detected	6,060	Not Detected	2.90	0.157
	2 October 2019	<1	Washload only	90,660	0.0000	3.51	0.219
	5 June 2020	3	0.0000	18,180	0.0062	8.23	0.402
	10 July 2020	2	0.0001	16,200	0.0098	6.30	0.377
	20 August 2020	<1	0.0000	14,100	0.0010	5.82	0.307
	27 September 2020	2	0.0000	88,320	0.0037	7.38	0.358

TSS = total suspended solids; < = less than.

## 5.5 Uncertainty and Limitations

The purpose of this section is to identify the key sources of uncertainty and discuss how uncertainty has been addressed to increase the level of confidence in results. The confidence in hydrology results are related to:

- natural variability in meteorological and hydrological conditions over time;
- period of baseline data collection and timing of field visits in relation to natural variability; and
- accuracy of baseline data collected, methods used, and application of QA/QC measures.

### 5.5.1 Natural Variability over Time

The baseline hydrology program and field visits documented in this report occurred over a limited period of two calendar years with data collected in three open-water seasons. Short-term records such as this do not usually adequately characterize the entire range of natural variability of hydrology that long-term records would. However, the hydrology records collected capture both relatively dry and wet periods, which is a better result than expected in a short-term record. The range of water level and discharge conditions measured during the 2018 and 2019 field visits at the hydrometric stations was relatively low; however, as additional data were collected in 2020, the upper ranges of many rating curves became more reliable, and these uncertainties were reduced.

As described in Section 5.0, baseline hydrology data including total precipitation, peak SWE for the winters of 2017-2018 and 2018-2019, and water levels and discharge records were all collected during relatively dry to near-average precipitation conditions. Exceptional events were also recorded. For instance, the total monthly recorded precipitation in August 2019 exceeded historical precipitation for this month based on long-term European Re-analysis Interim (ERA-I) data from 1979 to 2019.

Based on a comparison of 2018 and 2019 discharge at the Douglas River (i.e., WSC Station 07MA003), most of this baseline period had near normal or below normal discharge, including spring 2018 and 2019. The peak flow that occurred in August 2019 and early September 2019 on the Douglas River was well above normal conditions for that time of year but would be just below a 1-in-2-year flood event for that station. With the exception of the winter 2019 to 2020 discharge, nearly all of 2020 was well above normal conditions, including one portion above the 1-in-100-year flood.

No snow survey was completed in 2020. The limited baseline data collection period may not characterize the full range of hydrological conditions that could occur. End-of-winter snow surveys are important in characterizing the interannual variation of snowfall, sublimation, and water available during spring freshet. Ground-based measurements are valuable for validating the publicly available remote sensing data. Comparing the 2018 and 2019 snow surveys to the remote sensing data provided some confidence that the 2020 remote sensing data provided an adequate representation of the conditions at the Project site; the ground-based data further increased this confidence and reduce the uncertainty.

### 5.5.2 Period of Baseline Data Collection

The hydrology assessment relies on a combination of available climate and hydrometric data and short-term monitoring of flows and water levels in the RSA and farther downstream. Hydrology data were collected at numerous stations over a period of just over two years, which is a relatively short period of time. However, most stations were visited several times or more frequently which increased the validity of the data set, and a wide range of conditions were observed between August 2018 and September 2020, which lends additional confidence to the results.

### 5.5.3 Data Collection Methods and Quality Assurance and Quality Control

A high level of prediction confidence was maintained during data collection and analysis by managing uncertainty as follows:

- Carefully selecting sites.
- Using standard methods and QA/QC in the field program.

- 
- Correcting data.
  - Using corrected datasets (e.g., precipitation data were adjusted).
  - Comparing short-term data from the baseline study with long-term data observed at regional stations that would be most representative of the anticipated area of the Project, as well as with long-term results from the calibrated hydrological model.

The delineation of watershed boundaries and the stream network was determined for the 22 hydrology stations using digital elevation model and mapped stream network data and compared with visible streams, wetlands, and upland features shown on recent satellite imagery for the region. Canadian Digital Elevation Data for the surrounding region were used as the digital elevation model base data (NRCan 2019a). The mapped stream network was represented by the National Hydrologic Network dataset for the region (NRCan 2019b). These data were imported to the ECCC software ENSIM (GreenKenue 2010) and used to delineate watershed boundaries for hydrometric station locations. These initial watershed boundaries and stream network results were plotted on satellite imagery using Google Earth Pro to compare them with features on the ground. Although the topography in general in this region is sufficient to be confident in the boundaries, there is less certainty in watershed boundary locations and flow directions in flatter areas such as peatlands. For example, some peatlands flow out in multiple directions and have varying water levels and connections to downstream areas. The focus of QC effort was on these more difficult areas, and more effort was placed on QC in the RSA. These uncertainties affect the synthesized flow and flood frequency results, which are based on watershed areas.

Uncertainties in the results of the hydrometric monitoring study were reduced using the QA and QC methods identified in Section 4.7. However, there are still limits in accuracy and precision of measurements, in understanding/interpretation of the physical processes affecting the hydrology data analysis, and limits in the physical range of water level and flow conditions that occurred during the monitoring period that leads to uncertainty in extrapolation of flows beyond the measured values.

Uncertainties in discharge measurements can be attributed to precision in channel width, depth, and velocity measurements, and particularly the number of verticals and number of points in each vertical (WMO 2010). Increasing the duration of velocity measurements decreases the influence from natural variations or pulsations over time due to turbulence; this influence was reduced by measuring for a standard 40-second period for each vertical. An increased number of verticals and increased number of points in each vertical also increases confidence in discharge results with the ADV. The standard number of measurement verticals proposed for a cross-section for this program was 20, with more verticals located near the thalweg, which is deepest point of the cross-section and therefore is the line of lowest elevation along the watercourse. Increased points in each vertical were required whenever the water depth exceeded 0.75 m. This standard was not universally carried out as some stream channels were too narrow to obtain 20 measurement verticals with the proper spacing for the current meter used.

Discharge during the field visits was measured with a Sontek Flowtracker ADV, Flowtracker2 ADV, and RiverSurveyor M9 ADCP. These devices do not require recalibration; however, the QA tests were completed prior to starting measurements and the ADCP received an additional compass calibration before use. The range of discharge measured at most hydrometric stations was well within the acceptable range for the equipment used. The range of uncertainty measured with the ADVs varied with each site; most measurements had low uncertainty

(5%), but one station (CR-WC-TI-01) had low flows and a narrow channel such that uncertainty was usually high (>10%).

The objective was to have at least three, preferably four, ADCP measurements that were within 5% of the averaged discharge measurements, and the average discharge was used. Although most sites did not have visibly moving beds, the GPS-Generalized Gradient Approximation (GGA) track reference usually provided a more accurate channel width than the bottom tracking track reference mode.

Water level surveys were typically completed using an optical level, and the accuracy of these surveys is up to 1 cm (0.01 m) but was usually less. Two complete water level surveys (including survey of all local benchmarks) were conducted for each hydrometric station during each field visit. The results of the two complete water level surveys were compared to each other: A measurement was considered good quality if the difference was within 5 mm, and acceptable if within 1 cm. In windy and wavy exposed locations, particularly on the waterbodies with large fetch, the water level survey results were expected to have larger variance, and a difference greater than 1 cm was sometimes deemed acceptable based on professional opinion. The benchmark elevations and top of staff gauge elevations were compared to previous elevation results and potential for movement or heaving of the primary benchmark was identified in some cases.

Two stations were located in predominantly organic terrain including CR-TI-WC-02 and Lake G CR-TI-WB-02 and had benchmarks that were not likely to be as stable over time as at other stations. Over the course of the monitoring period, benchmarks were occasionally lost due to beavers cutting down the trees that the survey spikes had been embedded in, or due to these trees falling down from extreme wind events or other natural causes. However, three benchmarks were always maintained at each hydrometric station and any lost benchmarks were replaced during the next field visit with no consequence to data quality or continued data collection.

Staff gauge readings were compared with previous field visit results at each site that had a staff gauge, and the survey to the top of the staff gauge was used to estimate alternate WSE, which were then compared with the direct WSE readings. Staff gauges were used to provide a QC on the WSE surveys to local benchmarks which provide more reliable data. Staff gauges often shifted position or were lost during the winter, however. In all of these cases, staff gauges were re-established and re-surveyed during the next field visit with no consequence to data quality or continued data collection.

Aquarius software was used to store and correct the hydrometric data and check or generate stage-discharge rating curves. Continuous water level records were corrected using the water level survey measurements and compared with local precipitation and air temperature records to assist with QC and corrections. For the hydrometric stations that had Levelloggers in place over the winter of 2018-2019, water levels were corrected over the winter for backwater using WSE survey data from late March 2019. There is uncertainty in the corrected data prior to that field visit; however, it was assumed that water levels receded gradually over the winter under the ice until mid-March when air temperatures increased, and snowmelt started. Using discharge measurements or unit-area discharge estimates for the stations not visited in late March 2019, the winter discharge records were further corrected, if required. For the hydrometric stations that had Levelloggers in place over the winter of 2019-2020, water levels were corrected similarly using WSE survey data from early May 2020 or early June 2020. Similar procedures were followed to complete the winter discharge records.

As part of standard field practice, rating curves were extrapolated above and below the measured water level and discharge records in 2018 to 2020; in most cases, the rating curve extrapolation function in Aquarius was used to extrapolate discharge from higher water levels. Higher confidence was placed on periods when water levels were within the range of measured stage-discharge values. To understand and address uncertainty in extrapolating higher discharge from the rating curves, unit-area runoff hydrographs for all the watercourse stations were plotted together for comparison. This QC step was completed for all streamflow stations and provided an indication of when the upper end of the rating curves needed to be modified. The upper extrapolated regions of the rating curves were adjusted if required to avoid overestimating peak discharge.

Backwater can cause discharge to be overestimated for a given stage value. There is more uncertainty in the results at certain streamflow stations that experienced, or were inferred to have had, backwater conditions during the open-water periods. All streamflow stations experience backwater during ice-covered conditions. Stations with noted potential for backwater conditions included:

- Observations of dense aquatic vegetation in the channel at CR-WC-MS-06 and CR-WC-TI-02.
- Beaver dams and beaver activity at the inflow to Forrest Lake at CR-WC-TI-01.
- Observed or inferred conditions during ice-covered periods at all the streamflow stations.
- Due to the low gradients in this area – the location of tributary inflow stations near the confluence with the Clearwater River and/or upstream of its waterbodies causes increased uncertainty for the monitoring periods in between field measurements (e.g., CR-WC-MS-02 is located upstream of Patterson Lake and was backwatered as lake levels increased in 2020, as well as CR-WC-TI-01, CR-WC-TI-02, and CR-WC-TI-03).

Backwater effects are alleviated using frequent (e.g., monthly) field measurements of coincident stage and discharge, which allow the base stage-discharge curves (unaffected by backwater) to be shifted upward to provide a more correct derived discharge. Hydrometric monitoring for this program included frequent measurements at key locations such as along the Clearwater River main stem in the LSA which greatly improves confidence in the results and reduces uncertainty. Stage-shifts are a method used to improve the discharge data derived from the stage-discharge rating curves. They were used for the stage-discharge pairs in which stage was 5% above or below the rating curves (WSC 2012). The magnitudes and dates of stage shifts for each rating curve were summarized in Appendix B.

## 6.0 SUMMARY

Extensive baseline hydrology field data were collected at 22 hydrometric monitoring stations with most located in the hydrology RSA in the Clearwater River watershed. This included eight waterbody and 12 watercourse locations in the Clearwater River watershed, and one watercourse and one waterbody in the adjacent Hodge Creek watershed. The monitoring period included in this report started in August 2018 and continued to September 2020; 11 field visits were conducted during this time. The hydrology field program also included snow surveys in late winter, which provided results for snow accumulation available for snowmelt in Patterson Lake watershed, suspended sediment sampling and bed load monitoring at three locations in the LSA downstream of Patterson Lake. Local meteorological data from the Rook I Meteorological Station were also collected and used to support interpretation of hydrology monitoring data.

A wide range of hydrological conditions were observed during the monitoring period with lower water levels and flows in 2018 and spring 2019 and higher water levels and flows observed throughout the 2020 open water season. Water level and discharge observations during the 2020 open-water period were well above long-term average values at the Douglas and Clearwater rivers at regional Water Survey of Canada gauging stations. At most local hydrometric stations, the highest water level and discharge were recorded following heavy rainfalls in August and mid-September 2020.

The high number of field visits made at key locations in the LSA, and the wide range of conditions observed, increases confidence in the hydrology results. Therefore, the main objective of this study has been met in that the hydrology baseline provides sufficient and detailed information to support an EA for the Project.

Results from the hydrology monitoring program met the overall objective of describing the existing hydrological conditions in the baseline study area to support an EA for the Project.

## 7.0 CLOSING

WSP is pleased to submit this report to NexGen in support of the Environmental Assessment for the Rook I Project. For details on the limitations and use of information presented in this report, please refer to the Study Limitations section following this page. If you have any questions or require additional details related to this study, please contact the undersigned.

WSP Canada Inc.

Jacoby Donnelly, BSc, EIT  
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Jaime Hogan, MSc, PGeo  
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JD/NS/RP/JH/ir/jr

Association of Professional Engineers & Geoscientists of Saskatchewan		
CERTIFICATE OF AUTHORIZATION		
WSP Canada Inc.		
Number <b>C0868</b>		
Permission to Consult held by:		
Discipline	Sk. Reg. No.	Signature
<i>Water Resources</i>	<i>22672</i>	<i>[Signature]</i>

## 8.0 STUDY LIMITATIONS

This report has been prepared by WSP Canada Inc. (WSP) for NexGen Energy Ltd. (Client) and for the express purpose of supporting the Environmental Assessment (EA) of the proposed Rook I Project. This report is provided for the exclusive use by the Client. WSP authorizes use of this report by other parties involved in, and for the specific and identified purpose of, the EA review process. Any other use of this report by others is prohibited and is without responsibility to WSP.

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WSP has prepared this report in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering and science professions currently practicing under similar conditions in the jurisdiction in which the services are provided, subject to the time limits and physical constraints applicable to this report. No other warranty expressed or implied is made. The findings and conclusions documented in this report have been prepared for the specific site, design objective, development and purpose described to WSP by the Client. The factual data, interpretations and recommendations pertain to a specific project as described in this report and are not applicable to any other project or site location. Any change of or variation in the site conditions, purpose or development plans, or if the project is not initiated within a reasonable time frame after the date of this report, may alter the validity of the report.

The scope and the period of WSP's services are as described in WSP's proposal, and are subject to restrictions and limitations. WSP did not perform a complete assessment of all possible conditions or circumstances that may exist at the site referenced in the report. If a service is not expressly indicated, do not assume it has been provided. If a matter is not addressed, do not assume that any determination has been made by WSP in regard to it. Any assessments, designs and advice made in this report are based on the conditions indicated from published sources and the investigation described. No warranty is included, either express or implied, that the actual conditions will conform exactly to the assessments contained in this report. Where data supplied by the Client or other external sources (including without limitation, other consultants, laboratories, public databases), including previous site investigation data, have been used, it has been assumed that the information is correct unless otherwise stated. No responsibility is accepted by WSP for incomplete or inaccurate data supplied by others.

The passage of time affects the information and assessment provided in this report. WSP's opinions are based upon information that existed at the time of the production of the report. The Services provided allowed WSP to form no more than an opinion of the actual conditions of the site at the time the site was visited and cannot be used to assess the effect of any subsequent changes in the quality of the site, or its surroundings, or any laws or regulations.

The report is of a summary nature and is not intended to stand alone without reference to the instructions given to WSP by the Client, communications between WSP and the Client, and to any other reports prepared by WSP for the Client relative to the specific site described in the report. In order to properly understand the suggestions, recommendations and opinions expressed in this report, reference must be to the foregoing and to the entirety of the report. WSP cannot be responsible for use of portions of the report without reference to the entire report.

The information, recommendations and opinions expressed in this report are for the sole benefit of the Client and were prepared for the specific purpose set out herein. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, is the responsibility of such third parties. WSP accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

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**APPENDIX A**

**Geodetic Survey Summary**

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## TECHNICAL MEMORANDUM

**DATE** April 7, 2021

**Reference No.** 19114981

**TO** Susan Mathieu  
NexGen Energy Ltd.

**CC** Ross Phillips, Marci Mehl

**FROM** Kyle Nontell

**EMAIL** [kyle\\_nontell@golder.com](mailto:kyle_nontell@golder.com)

### TOPOGRAPHIC SURVEYS COMPLETED FOR HYDROLOGICAL BASELINE 2018

## 1.0 INTRODUCTION

The Rook I Project (Project) is a proposed new uranium mining and milling operation that is 100% owned by NexGen Energy Ltd. (NexGen). The Project is located in northwestern Saskatchewan, approximately 40 km east of the Alberta-Saskatchewan border, 130 km north of the town of La Loche, and 640 km northwest of the city of Saskatoon. The Project resides within Treaty 8 territory and within the Homeland of the Metis. At a regional scale, the Project is situated within the southern Athabasca Basin adjacent to Patterson Lake, along the upper Clearwater River system. Access to the Project will be from an existing road off Highway 955.

The Project would include underground and surface facilities to support the extraction and processing of uranium ore from the Arrow deposit, a land-based, basement hosted, high grade uranium deposit. The terrain and soils baseline report is a component of a comprehensive baseline program that documents the natural and socio-economic environments in the anticipated area of the Project. The terrain and soils baseline program was undertaken to provide context from which effects to terrain and soils from the Project can be assessed in the Rook I Environmental Impact Statement.

## 2.0 SURVEY METHODS

### 2.1 Survey Setup

The 2018 survey program required both Real-Time Kinematic (RTK) and Static Occupation (Static) surveys be performed. Golder utilized four GNSS receivers – two receivers were used as an RTK base and rover system, while the remaining receivers were available to perform Static surveys at various survey control points.

The GNSS receivers used during the program were Sokkia GRX2 units which have 226 satellite tracking channels and one (1) watt UHF2 internal radios.

All Static surveys were performed using tripods and tri-brachs to ensure stable positioning during the occupations, with the exception of the occupation at the geodetic monument 94V063 where the tribrach was placed directly on top of the plate on the concrete pier.

All RTK surveys were performed using a base station receiver affixed to a tripod and tribrach and a rover receiver attached to a two-piece carbon fibre pole. During the RTK survey at the hydrometric station on the Clearwater

River directly upstream of the Highway 955 bridge crossing, the base station receiver's tribrach was placed directly on top of the plate of geodetic monument 94V063.

## **2.2 Control Points**

The survey data collection relied on eight control points; four of these control points were intended for use only during the field program which they were installed. Details of the four long-term control points are summarized in Table 1. A photograph of 94V063 at the time of the survey is shown on Figure 1.

**Table 1: NexGen Rook I Survey Control Information**

ID	Northing (m)	Easting (m)	Elevation (m)	Location	Type	Date (yyyy-mm-dd)	Method	Length of Occupation (hh:mm:ss)	Sigma Y (m)	Sigma X (m)	Sigma Z (m)
94V063	6307623.834	623044.631	415.419	Approximately 250 m south of the HWY 955 bridge crossing the Clearwater River	Concrete pier monument	2018-09-29	Static Occupation	18:04:45	0.005	0.008	0.014
Golder CP1	6391350.689	603199.134	506.962	At the south west edge of the Rook 1 camp. South of the parking area on the crest of the slope towards Patterson Lake.	600 mm x 15 mm rebar	2018-10-02	Static Occupation	24:00:15	0.003	0.004	0.009
Golder CP2	6390524.359	605154.616	500.168	Approximately 20 m southwest of the south abutment of the bridge crossing the Clearwater River on the Rook 1 camp access road.	600 mm x 15 mm rebar	2018-10-02	RTK Averaging	20 seconds (performed twice)	0.002	0.001	0.002
Golder CP11	6398241.468	594649.090	528.652	Approximately 20 m north of the Broach Lake boat launch at the northern edge of the vehicle turnaround area.	600 mm x 15 mm rebar	2018-09-30	Static Occupation	7:26:00	0.005	0.010	0.020

Notes: All coordinates are in UTM Zone 12, NAD83

- 94V063 exhibits signs of damage to the concrete pier which are not expected to affect the stability of the monument. The centering bolt at the top of the pier was missing and the plate appeared slightly damaged at the time of the field program. The damage found on the plate is not expected to have significant impact on the accuracy of the Static occupation. Photographs are provided below.
- CP11 has been retained to maintain consistency with communications from NRCan.



**Figure 1: Geodetic Monument 94V063 at the Time of Golder’s Static Survey**

### **3.0 GEODETIC SURVEY OF HYDROMETRIC STATION BENCHMARKS**

Local benchmarks established at each watercourse and waterbody hydrometric station were surveyed using RTK survey equipment in reference to geodetic control established through Static surveys. The results of the survey are summarized in Table 2. This will allow all water surface elevation surveys completed throughout the monitoring program to be related to a consistent, geodetic datum. This task is considered essential to improve the quality and future value of the data collected during the baseline monitoring program, and will tie the bathymetry and water level data into the site’s topographic surfaces, support ESIA modeling activities, and allow data comparison between sites.

### **4.0 STREAM CHANNEL SURVEY**

A stream channel survey of a reach of the Clearwater River was completed on 2 October and 3 October 2018 downstream of Patterson Lake extending to the inlet of Forrest Lake. The survey data collected will be used to characterize channel geomorphology and inform estimates of potential bank erosion and bed scour associated with changes in flows associated with Project activities. A plan showing the cross sections surveyed as part of the stream channel survey is presented in Figure 2.

**Table 2: Hydrometric Station Geodetic BM Data**

Sr. No.	Name	Station	Field Site ID	Northing (m)	Easting (m)	Elevation (m)	Field BM ID
1	Clearwater River below Broach Lake	CR-WC-MS-01	Broach Lake east	6398465.111	600437.410	527.604	BROACH LK WEST BM3 REBAR
				6398466.136	600439.333	527.766	BROACH LK WEST BM2
				6398624.904	600436.801	528.356	BROACH LK WEST CP101
2	Broach Lake	CR-WB-MS-01	Broach Lake west	6398269.315	594670.637	528.250	CAN NORTH BM1
				6398271.122	594672.261	527.725	CAN NORTH BM2
				6398271.571	594670.321	528.068	CAN NORTH REBAR BM3
3	Clearwater River above Patterson Lake	CR-WC-MS-02	North Patterson Lake Tributary	6396407.687	607826.372	499.290	NORTH PATTERSON TRIB SOUTH BM
				6396409.975	607824.797	499.186	NORTH PATTERSON TRIB NORTH BM
				6396407.655	607825.052	499.344	NORTH PATTERSON TRIB REBAR BM
4	Lake H	CR-WB-MS-02	Lake H	6394933.031	608527.545	501.642	LK H BM1
				6394925.401	608526.724	501.358	LK H BM3
				6394930.916	608522.481	500.675	LK H BM2 REBAR
5	Lake G	CR-WB-MS-03	Lake G	6393993.920	607640.945	500.171	LK G BM1
				6393993.003	607648.552	500.250	LK G BM3
6	Patterson Lake	CR-WB-MS-04	Patterson Lake at camp	6391308.068	603277.066	500.351	BM1
				6391312.349	603278.840	500.585	BM2
				6391309.701	603270.978	500.139	BM3
			Patterson Lake West	6389233.534	597607.292	500.840	PATTERSON WEST NORTH BM
				6389229.266	597606.521	500.694	PATTERSON WEST SOUTH BM
				6389231.895	597605.668	501.165	PATTERSON WEST REBAR

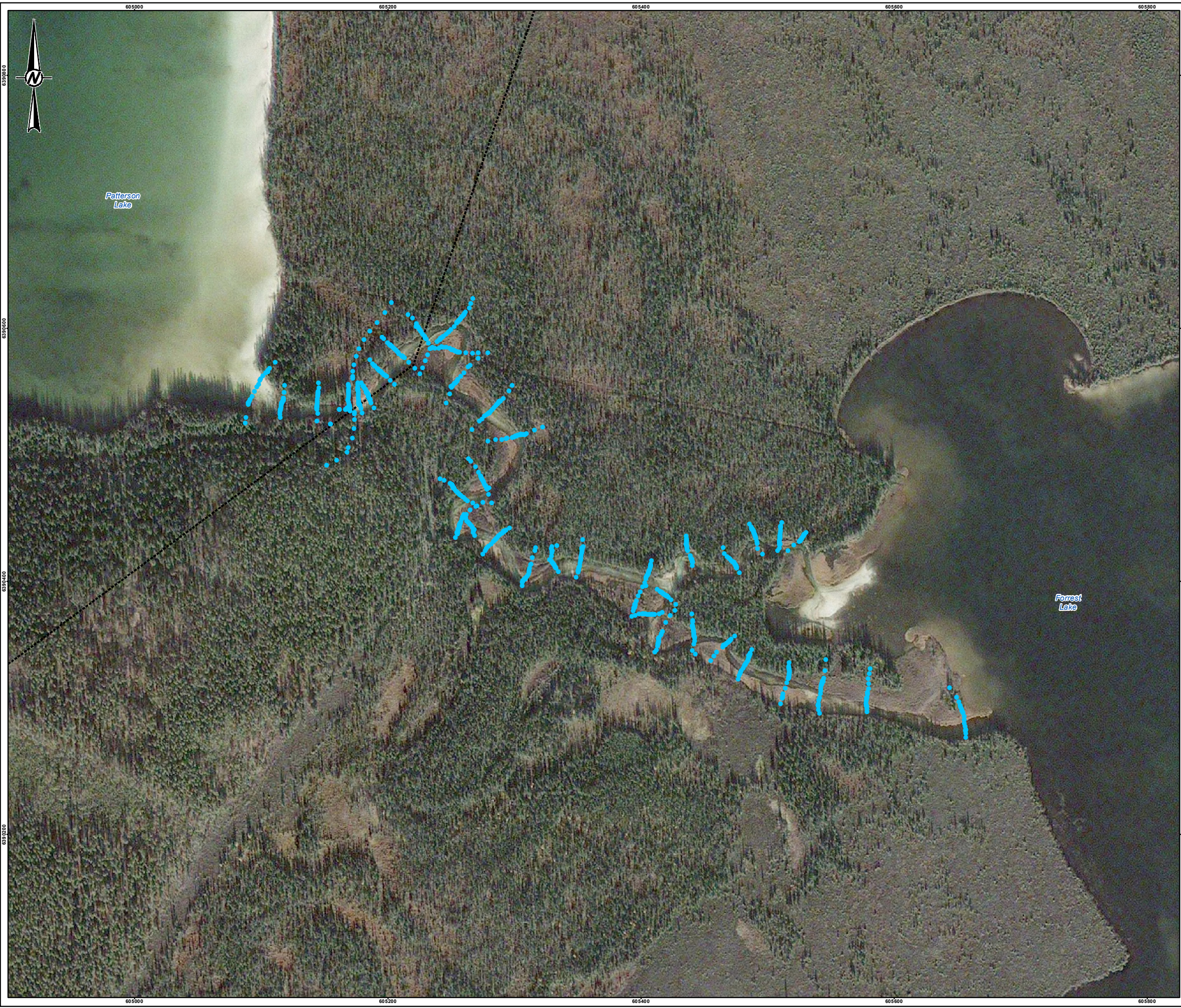
**Table 2: Hydrometric Station Geodetic BM Data**

Sr. No.	Name	Station	Field Site ID	Northing (m)	Easting (m)	Elevation (m)	Field BM ID
7	Clearwater River below Patterson Lake	CR-WC-MS-03	Clearwater at access road bridge	6390535.777	605161.710	499.975	RIVER BM WEST
				6390536.771	605167.781	499.569	RIVER BM EAST
				6390535.707	605166.562	499.699	RIVER BM REBAR
9	Forrest Lake	CR-WB-MS-05	Forrest Lake / Lake F	6388735.981	606636.803	500.175	FOREST LK REBAR BM
				6388731.958	606644.797	500.278	FOREST LK SOUTH BM
				6388745.306	606641.476	499.621	FOREST LK NORTH BM
11	Beet Lake	CR-WB-MS-07	Beet Lake	6390290.831	611334.239	500.067	REBAR BM
				6390289.754	611334.316	500.133	SOUTH BM
				6390294.489	611337.066	499.238	NORTH BM
12	Clearwater River below Beet Lake	CR-WC-MS-04	Clearwater River DS of Beet Lake	6390618.789	613268.095	498.741	NORTH BM
				6390616.048	613267.102	498.750	SOUTH BM
				6390617.622	613269.728	498.788	REBAR BM
13	Tributary Inflow to Naomi Lake	CR-WC-TI-02	North end of Naomi Lake	6392557.918	613770.515	498.982	NAOMI NORTH BM1
				6392573.689	613765.014	499.175	NAOMI NORTH GOLDER BM1
				6392567.894	613764.181	499.139	NAOMI NORTH REBAR BM
14	Naomi Lake	CR-WB-MS-08	Northwest end of Naomi Lake	6392109.920	613375.547	500.296	NAOMI NW REBAR BM
				6392109.416	613383.590	498.847	NAOMI NW SOUTH BM
15	Tributary Inflow Downstream of Naomi Lake	CR-WC-TI-03	Clearwater Tributary DS of Naomi Lake	6390951.279	615802.259	499.062	NAOMI TRIB BM3
				6390961.232	615808.257	498.912	NAOMI TRIB BM1
				6390967.717	615802.627	499.505	NAOMI TRIB BM2

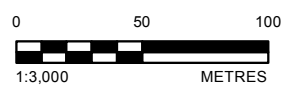
**Table 2: Hydrometric Station Geodetic BM Data**

Sr. No.	Name	Station	Field Site ID	Northing (m)	Easting (m)	Elevation (m)	Field BM ID
16	Clearwater River below Naomi Lake	CR-WC-MS-05	Clearwater River DS of Naomi Lake	6390515.704	616453.763	498.855	BM SOUTH
				6390516.746	616451.983	498.711	BM NORTH
				6390517.983	616451.735	498.867	BM REBAR
19	Clearwater River at Warner Rapids	CR-WC-MS-08	Clearwater at 955	6307938.673	623078.305	400.339	YELLOW TAG BM1

Notes: All coordinates are in UTM Zone 12, NAD83.



- LEGEND**
- STREAM SURVEY POINT
  - EXISTING ACCESS ROAD (APPROXIMATE)




**REFERENCE(S)**  
 1. IMAGERY OBTAINED FROM THE CLIENT, SEPT. 2018. IMAGERY DATE: 2015.  
 PROJECTION: UTM ZONE 12 DATUM: NAD 83

CLIENT 

PROJECT  
 ROOK 1 PROJECT

TITLE  
**STREAM SURVEY LOCATIONS**

CONSULTANT	YYYY-MM-DD	2019-01-31
	DESIGNED	RP
	PREPARED	LMS
	REVIEWED	NPS
	APPROVED	NPS

PROJECT NO.	PHASE	REV.	FIGURE
1899581	2003	0	<b>2</b>

PATH: G:\Client\NexGen\Rook1\Project\_SAKS\909\_PROJ\CTS\1899581\_Rook1\StreamChannelSurvey\2\_PRODUCTION\AKD\Caddis\Tree\TreeMemo\Fig\_1899581\_StreamSurvey.mxd

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

## 5.0 CLOSURE

We trust that this memo sufficiently documents the survey work completed in 2018 at the NexGen Rook I site.

Prepared By:

Reviewed by:

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*Principal, Senior Water Resources Specialist*

KN/RWP/NPS/pls/jlb

[https://golderassociates.sharepoint.com/sites/122721/project files/5 technical work/02\\_hydrology/03 - reporting/07 - 2020 hydrometric report/appendices/appendix a - geodetic survey summary/appendixb.docx](https://golderassociates.sharepoint.com/sites/122721/project%20files/5%20technical%20work/02_hydrology/03_reporting/07_2020_hydrometric_report/appendices/appendix%20a-geodetic_survey_summary/appendixb.docx)



**APPENDIX B**

**Rating Curve Shift Reports**

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Table B-1: 2018-20 Rating Shift Report for CR-WC-MS-01

SHIFT REPORT

STATION NUMBER CR-WC-MS-01 Clearwater River below Broach Lake  
 Date Processed: 2020-12-15 09:49:07 By JHogan

Rating QR # 001

SHIFT CURVES  
 2018-08-01 - 2020-09-30  
 DD 1, Discharge (m<sup>3</sup>/s)

		STARTS	ENDS	INPUT	SHIFT	INPUT	SHIFT	INPUT	SHIFT
		-----	-----	-----	-----	-----	-----	-----	-----
PRV:	2018-05-01	7:09:24 [UTC-06:00]		526.820	0.015				
1	2018-09-15	7:09:24 [UTC-06:00]		526.800	0.000				
2	2020-05-03	7:09:24 [UTC-06:00]		526.930	-0.015				
3	2020-06-06	14:09:24 [UTC-06:00]		526.940	0.024				
4	2020-09-24	14:09:24 [UTC-06:00]		526.930	-0.020				

Table B-2: 2018-20 Rating Shift Report for CR-WC-MS-02

SHIFT REPORT

STATION NUMBER CR-WC-MS-02 Clearwater river above Patterson lake

Date Processed: 2020-12-17 12:51:41 By JHogan

Rating QR # 001

SHIFT CURVES

2018-08-01 - 2020-09-30

DD 1, Discharge (m<sup>3</sup>/s)

	STARTS	ENDS	INPUT	SHIFT	INPUT	SHIFT	INPUT	SHIFT
	-----	-----	-----	-----	-----	-----	-----	-----
PRV:	2018-08-01	12:00:00 [UTC-06:00]		498.655	-0.070			
1	2018-08-01	12:00:00 [UTC-06:00]		498.655	-0.070			
2	2018-10-02	12:00:00 [UTC-06:00]		498.610	-0.065			
3	2019-03-25	12:00:00 [UTC-06:00]		498.550	0.000			
4	2019-05-16	13:50:00 [UTC-06:00]		498.590	-0.015			
5	2019-06-03	13:50:00 [UTC-06:00]		498.650	-0.004			
6	2019-10-01	13:00:00 [UTC-06:00]		498.650	-0.050			
7	2020-04-15	12:00:00 [UTC-06:00]		498.600	-0.050			
8	2020-05-04	12:00:00 [UTC-06:00]		498.730	0.000			
9	2020-06-04	12:00:00 [UTC-06:00]		498.880	-0.120			
10	2020-07-09	12:00:00 [UTC-06:00]		498.850	-0.220			
11	2020-08-19	12:00:00 [UTC-06:00]		498.940	-0.220			
12	2020-09-23	12:00:00 [UTC-06:00]		498.870	-0.220			

Table B-3: 2018-20 Rating Shift Report for CR-WC-MS-03

SHIFT REPORT

STATION NUMBER CR-WC-MS-03 Clearwater River below Patterson Lake  
 Date Processed: 2020-12-13 14:52:20 By JHogan

Rating # 002

SHIFT CURVES  
 2018-08-01 - 2020-09-30  
 DD 1, Discharge (m<sup>3</sup>/s)

	STARTS	ENDS	INPUT	SHIFT	INPUT	SHIFT	INPUT	SHIFT
PRV:	2018-08-04	0:00:00 [UTC-06:00]	498.580	-0.029				
1	2018-08-04	0:00:00 [UTC-06:00]	498.580	-0.029				
2	2019-04-15	0:00:00 [UTC-06:00]	498.500	0.000				
3	2019-05-01	0:00:00 [UTC-06:00]	498.550	0.050				
4	2019-05-15	0:00:00 [UTC-06:00]	498.530	0.100	498.850	0.000		
5	2019-06-04	0:00:00 [UTC-06:00]	498.530	0.070	498.850	0.000		
6	2019-06-30	0:00:00 [UTC-06:00]	498.560	0.000				
7	2020-05-01	0:00:00 [UTC-06:00]	498.660	0.000				
8	2020-06-02	0:00:00 [UTC-06:00]	498.760	0.016				
9	2020-07-03	0:00:00 [UTC-06:00]	498.790	0.000				
10	2020-08-15	0:00:00 [UTC-06:00]	498.840	-0.052				
11	2020-09-16	0:00:00 [UTC-06:00]	498.830	-0.066				

Table B-4: 2018-20 Rating Shift Report for CR-WC-MS-04

SHIFT REPORT

STATION NUMBER CR-WC-MS-04 Clearwater River below Beet Lake  
 Date Processed: 2020-12-14 20:51:04 By JHogan

Rating QR # 001

SHIFT CURVES  
 2018-08-01 - 2020-09-30  
 DD 1, Discharge (m<sup>3</sup>/s)

	STARTS	ENDS	INPUT	SHIFT	INPUT	SHIFT	INPUT	SHIFT
	-----	-----	-----	-----	-----	-----	-----	-----
PRV:	2018-08-05	13:00:00 [UTC-06:00]		498.250	-0.045			
1	2018-08-05	13:00:00 [UTC-06:00]		498.250	-0.045			
2	2018-10-01	15:00:00 [UTC-06:00]		498.190	0.000			
3	2019-03-28	10:36:00 [UTC-06:00]		498.355	-0.125			
4	2019-05-10	16:45:00 [UTC-06:00]		0.100	0.000			
5	2019-06-01	16:45:00 [UTC-06:00]		498.150	0.075			
6	2019-07-10	16:45:00 [UTC-06:00]		498.300	0.000			
7	2019-10-02	16:45:00 [UTC-06:00]		498.285	-0.083			
8	2020-05-03	15:00:00 [UTC-06:00]		498.425	-0.016			
9	2020-06-05	13:00:00 [UTC-06:00]		498.400	0.000			
10	2020-07-10	14:00:00 [UTC-06:00]		498.460	-0.060			
11	2020-08-20	14:00:00 [UTC-06:00]		498.500	-0.150			
12	2020-09-25	14:00:00 [UTC-06:00]		498.510	-0.110			

Table B-5: 2018-20 Rating Shift Report for CR-WC-MS-05

SHIFT REPORT

STATION NUMBER CR-WC-MS-05 Clearwater River Below Naomi Lake  
 Date Processed: 2020-12-15 12:42:32 By JHogan

Rating QR # 001

SHIFT CURVES  
 2018-08-01 - 2020-09-30  
 DD 1, Discharge (m<sup>3</sup>/s)

	STARTS	ENDS	INPUT	SHIFT	INPUT	SHIFT	INPUT	SHIFT
	-----	-----	-----	-----	-----	-----	-----	-----
PRV:	2018-08-03	0:00:00 [UTC-06:00]	498.180	-0.100				
1	2018-08-03	0:00:00 [UTC-06:00]	498.180	-0.100				
2	2018-10-01	0:00:00 [UTC-06:00]	498.120	-0.037				
3	2019-03-28	0:00:00 [UTC-06:00]	0.100	0.000				
4	2019-05-16	0:00:00 [UTC-06:00]	498.100	0.000				
5	2019-06-01	13:00:00 [UTC-06:00]	498.075	0.000				
6	2019-10-02	11:00:00 [UTC-06:00]	498.240	-0.110				
7	2020-05-03	11:00:00 [UTC-06:00]	498.200	0.000				
8	2020-06-05	11:00:00 [UTC-06:00]	498.200	0.000				
9	2020-07-10	11:00:00 [UTC-06:00]	498.390	-0.088				
10	2020-08-20	11:00:00 [UTC-06:00]	498.460	-0.180				
11	2020-09-25	11:00:00 [UTC-06:00]	498.480	-0.128				

Table B-6: 2018-20 Rating Shift Report for CR-WC-MS-06

SHIFT REPORT

STATION NUMBER CR-WC-MS-06 Clearwater River above Mirror River Confluence  
 Date Processed: 2020-12-14 12:21:54 By JHogan

Rating QR # 001

SHIFT CURVES  
 2018-08-01 - 2020-09-30  
 DD 1, Discharge (m<sup>3</sup>/s)

	STARTS	ENDS	INPUT	SHIFT	INPUT	SHIFT	INPUT	SHIFT
	-----	-----	-----	-----	-----	-----	-----	-----
PRV:	2018-08-01	14:23:55 [UTC-06:00]			97.220	-0.390		
1	2018-08-01	14:23:55 [UTC-06:00]			97.220	-0.390		
2	2018-09-29	12:54:00 [UTC-06:00]			97.800	-0.255		
3	2019-05-17	14:23:55 [UTC-06:00]			97.200	0.000		
4	2019-07-16	14:23:55 [UTC-06:00]			97.300	0.000		
5	2019-08-18	14:23:55 [UTC-06:00]			97.380	-0.150		
6	2019-08-30	14:23:55 [UTC-06:00]			97.570	-0.360		
7	2019-09-29	14:23:55 [UTC-06:00]			97.570	-0.475		
8	2020-06-07	14:23:55 [UTC-06:00]			97.900	0.000		
9	2020-07-11	14:23:55 [UTC-06:00]			97.800	-0.110		
10	2020-08-21	14:23:55 [UTC-06:00]			97.800	-0.290		
11	2020-09-22	14:23:55 [UTC-06:00]			97.960	-0.400		

Table B-7: 2018-20 Rating Shift Report for CR-WC-MS-08

SHIFT REPORT

STATION NUMBER CR-WC-MS-08 Clearwater River at Lloyd Lake  
 Date Processed: 2020-12-22 09:58:30 By JHogan

Rating # HQ4

SHIFT CURVES  
 2020-06-07 - 2020-09-30  
 DD 1, Discharge (m<sup>3</sup>/s)

		STARTS	ENDS	INPUT	SHIFT	INPUT	SHIFT	INPUT	SHIFT
		-----	-----	-----	-----	-----	-----	-----	-----
PRV:	2020-06-07	8:54:37 [UTC-06:00]		96.765	0.000				
1	2020-06-07	8:54:37 [UTC-06:00]		96.765	0.000				
2	2020-07-01	8:54:37 [UTC-06:00]		96.700	-0.040				
3	2020-08-23	8:54:37 [UTC-06:00]		96.664	-0.040				
4	2020-09-24	8:54:37 [UTC-06:00]		96.700	0.000				

Table B-8: 2018-19 Rating Shift Report for CR-WC-TI-01

SHIFT REPORT

STATION NUMBER CR-WC-TI-01 Tributary Inflow above Forrest Lake  
 Date Processed: 2020-12-22 14:02:08 By jdonnelly

Rating QR # 001

SHIFT CURVES  
 2018-08-01 - 2020-09-30  
 DD 1, Discharge (m<sup>3</sup>/s)

		STARTS	ENDS	INPUT	SHIFT	INPUT	SHIFT	INPUT	SHIFT
		-----	-----	-----	-----	-----	-----	-----	-----
PRV:	2018-08-01	0:00:00 [UTC-06:00]		499.380	-0.140				
1	2018-08-01	0:00:00 [UTC-06:00]		499.380	-0.140				
2	2018-09-10	0:00:00 [UTC-06:00]		499.360	0.000				
3	2019-05-10	0:00:00 [UTC-06:00]		499.330	-0.045				
4	2019-05-15	23:00:00 [UTC-06:00]		499.330	-0.045				
5	2019-05-16	3:00:00 [UTC-06:00]		499.400	-0.200				
6	2019-05-31	0:00:00 [UTC-06:00]		499.600	-0.570				

Table B-9: 2018-20 Rating Shift Report for CR-WC-TI-02

SHIFT REPORT

STATION NUMBER CR-WC-TI-02 Tributary Inflow to Naomi Lake  
 Date Processed: 2020-12-15 12:32:32 By JHogan

Rating QR # 001

SHIFT CURVES  
 2018-08-01 - 2020-09-30  
 DD 1, Discharge (m<sup>3</sup>/s)

	STARTS	ENDS	INPUT	SHIFT	INPUT	SHIFT	INPUT	SHIFT
	-----	-----	-----	-----	-----	-----	-----	-----
PRV:	2018-08-01	14:46:21 [UTC-07:00]	498.250	-0.105				
1	2018-08-01	14:46:21 [UTC-07:00]	498.250	-0.105				
2	2018-10-01	4:00:00 [UTC-07:00]	498.220	-0.010				
3	2019-10-02	4:00:00 [UTC-07:00]	498.300	0.000				
4	2020-04-20	4:00:00 [UTC-07:00]	498.400	-0.100				
5	2020-05-20	4:00:00 [UTC-07:00]	498.500	0.000				
6	2020-06-06	4:00:00 [UTC-07:00]	498.400	0.000				
7	2020-07-13	8:00:00 [UTC-07:00]	498.500	-0.220				
8	2020-08-21	8:00:00 [UTC-07:00]	498.500	-0.120				

Table B-10: 2018-20 Rating Shift Report for CR-WC-TI-03

SHIFT REPORT

STATION NUMBER CR-WC-TI-03 Tributary Inflow D/S of Naomi Lake  
 Date Processed: 2020-12-16 09:21:14 By JHogan

Rating # 002B

SHIFT CURVES  
 2018-08-01 - 2020-09-30  
 DD 1, Discharge (m<sup>3</sup>/s)

		STARTS	ENDS	INPUT	SHIFT	INPUT	SHIFT	INPUT	SHIFT
		-----	-----	-----	-----	-----	-----	-----	-----
PRV:	2018-08-02	13:00:00 [UTC-07:00]		498.335	-0.130				
1	2018-08-02	13:00:00 [UTC-07:00]		498.335	-0.130				
2	2018-10-02	12:00:00 [UTC-07:00]		498.310	-0.014				
3	2019-06-01	14:40:00 [UTC-07:00]		498.250	0.000				
4	2019-10-02	12:00:00 [UTC-07:00]		498.419	-0.034				
5	2020-05-04	11:00:00 [UTC-07:00]		498.510	0.000				
6	2020-06-05	15:00:00 [UTC-07:00]		498.490	-0.013				
7	2020-07-10	11:00:00 [UTC-07:00]		498.550	-0.096				
8	2020-08-20	11:00:00 [UTC-07:00]		498.600	-0.140				
9	2020-09-26	9:31:00 [UTC-07:00]		498.590	-0.078				



**APPENDIX C**

**Snow Survey Data**

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Year	Point (Object ID)	Easting	Northing	Summarized Landcover	Slope Classification	Aspect Classification	Mean Depth (cm)	Depth in Snow Tube (cm)	Snow Sample Mass (kg)	Snow Sample Volume (cm <sup>3</sup> )	Density (g/cm <sup>3</sup> )	SWE (mm)	
15 to 16 April 2018	022	605195	6396914	Jack Pine, Tall Shrub	Low Slope	W	66.3	74	0.56	4,299	0.13	89.0	
	023	605210	6396733	Open Canopy, Jack Pine, Ecosite C	Low Slope	W	70.0	70	0.54	4,066	0.13	93.0	
	024	605063	6396756	Open Canopy, Mature Jack Pine, Ecosite C	10-33	S	41.0	40	0.42	2,324	0.18	74.1	
	025	605041	6396727	Black Spruce, Dominant Treed Bog	Low Slope	S	64.0	58	0.49	3,369	0.15	93.1	
	026	605271	6396897	Shrub, Jack Pine	10-33	E	74.0	66	0.45	3,834	0.12	86.9	
	027	605307	6396956	Shrub, Jack Pine	10-33	W	63.3	68	0.30	3,950	0.08	48.1	
	028	603021	6396557	Shrub, Jack Pine	Low Slope	N	76.7	72	0.43	4,182	0.10	78.8	
	029	602970	6396510	Open Canopy, Jack Pine	10-33	N	63.0	63	0.52	3,660	0.14	89.5	
	030	603075	6396531	Open Canopy, Jack Pine	10-33	W	30.7	26	0.14	1,510	0.09	28.4	
	031	602759	6396451	Open Canopy, Jack Pine	Low Slope	N	54.3	60	0.57	3,485	0.16	88.9	
	032	602627	6396347	Open Canopy, Jack Pine	10-33	E	67.7	70	0.53	4,066	0.13	88.2	
	033	602118	6396202	Open Canopy, Jack Pine	10-33	S	46.3	42	0.52	2,440	0.21	98.8	
	034	602073	6396165	Tall Shrub, Jack Pine	10-33	N	70.7	76	0.60	4,415	0.14	96.0	
	035	601848	6396064	Tall Shrub, Jack Pine	10-33	N	61.3	62	0.56	3,601	0.16	95.4	
	036	601560	6396027	Tall Shrub, Jack Pine	10-33	S	66.7	64	0.52	3,718	0.14	93.2	
	037	600399	6395883	Tall Shrub, Jack Pine	10-33	W	73.0	80	0.78	4,647	0.17	122.5	
	038	594337	6398222	Open Canopy, Jack Pine	10-33	N	53.0	60	0.52	3,485	0.15	79.1	
	039	594324	6398205	Open Canopy, Jack Pine	Low Slope	N	52.3	52	0.55	3,021	0.18	95.3	
	041	596123	6390222	Tall Shrub, Jack Pine	10-33	W	59.0	60	0.39	3,485	0.11	66.0	
	043	596064	6390076	Tall Shrub, Jack Pine	10-33	S	34.7	42	0.34	2,440	0.14	48.3	
	044	605261	6390814	Black Spruce Bog	Low Slope	N	57.7	72	0.66	4,182	0.16	91.0	
	045	604013	6391415	Black Spruce, Jack Pine	10-33	S	56.7	58	0.59	3,369	0.18	99.2	
	046	603237	6391297	Lake	Lake	E	22.0	23	0.19	1,356	0.14	31.3	
	047	603293	6391357	Black Spruce	Low Slope	S	51.3	61	0.45	3,543	0.13	65.2	
	048	603373	6391488	Black Spruce	Low Slope	S	39.3	42	0.32	2,440	0.13	51.6	
	049	603384	6391332	Lake Edge	Lake	S	60.7	64	0.65	3,718	0.17	106.1	
	050	603284	6391310	Lake Edge	Lake	S	51.0	44	0.39	2,556	0.15	77.8	
	051	604523	6393494	Tall Shrub, Jack Pine	Low Slope	W	84.0	88	0.80	5,112	0.16	131.5	
	052	603057	6391181	Black Spruce	10-33	S	23.7	30	0.29	1,743	0.17	39.4	
	053	603028	6391181	Black Spruce	10-33	S	39.7	42	0.34	2,440	0.14	55.3	
	054	603038	6391157	Lake Shore	Lake	W	32.0	42	0.40	2,440	0.16	52.5	
	055	599785	6387109	Tall Shrub, Jack Pine (See Comments)	10-33	W	66.0	62	0.42	3,601	0.12	77.0	
	056	596371	6387008	Black Spruce	10-33	N	58.7	64	0.52	3,718	0.14	82.1	
	057	596158	6387264	Open Canopy, Jack Pine	10-33	S	40.7	55	0.45	3,195	0.14	57.3	
	21 to 23 March, 2019	1	604825	6391544	Jack pine	10-33	S	24.0	23	0.30	1,016	0.30	70.9
		2	601287	6390389	Jack pine -partially closed	Low slope	S	24.3	27	0.34	1,193	0.29	69.4
		3	601346	6390391	Jack pine	Low slope	S	33.0	34	0.45	1,502	0.30	98.9
		4	603634	6391521	Mature jack pine - open	Low slope	S	32.3	34	0.24	1,502	0.16	51.7
		5	603493	6396640	Mature jack pine - open	Low slope	E	27.7	28	0.25	1,237	0.20	55.9
		6	603258	6396584	Mature jack pine - open	Low slope	E	23.3	25	0.23	1,104	0.21	48.6
		7	603838	6396918	Mature jack pine - open	Low slope	E	46.7	49	0.33	2,165	0.15	71.1
		8	601034	6395746	Jack pine -open	Low slope	S	36.0	36	0.23	1,590	0.14	50.6
		9	597761	6395978	Jack pine	Low slope	S	27.7	25	0.38	1,546	0.25	68.0
		10	604999	6391440	Jack pine	Low slope	S	37.3	42	0.29	1,856	0.16	58.3
		11	604945	6391483	Jack pine	Low slope	S	27.3	28	0.27	1,237	0.22	59.7
		12	605144	6391396	Jack pine	Low slope	W	28.7	30	0.45	1,325	0.34	97.3
		13	605126	6391350	Jack pine	Low slope	W	40.7	45	0.16	1,988	0.08	32.7
		14	605024	6390434	Mature black spruce -open	Low slope	N	33.0	34	0.29	1,502	0.19	63.7
		15	604997	6390417	Mature black spruce -open	Low slope	N	49.3	49	0.40	2,165	0.18	91.2
		16	601367	6388182	Mature jack pine- semi open	Low slope	N	29.3	31	0.24	1,370	0.18	51.4
		17	601327	6388186	Mature jack pine- open	Low slope	N	26.0	29	0.19	1,281	0.15	38.6
		18	607968	6396339	Old burn jack pine -very open	Flat	N/A	14.7	16	0.27	707	0.38	56.0
		19	608008	6396292	Old burn jack pine -very open	Flat	N/A	34.3	35	0.46	1,546	0.30	102.1
		20	597270	6385290	Jack pine	Flat	N/A	35.7	35	0.31	1,546	0.20	71.5
		21	597296	6385327	Jack pine	Flat	N/A	41.3	42	0.40	1,856	0.22	89.1
		22	594282	6397398	Mature jack pine -open	Flat	N/A	21.7	22	0.13	972	0.13	29.0
		23	594302	6397357	Mature jack pine -open	Flat	N/A	28.7	30	0.24	1,325	0.18	51.9
24		595705	6389752	Mature jack pine -open	Flat	N/A	30.0	36	0.47	1,590	0.30	88.7	
25		595718	6396246	Jack pine -open	10-33	W	35.3	37	0.40	1,635	0.24	86.5	
26		594900	6395568	Mature jack pine - open	Low slope	N	23.3	25	0.24	1,104	0.22	50.7	
27		595731	6396302	Jack pine -partially closed	10-33	N	37.7	41	0.44	1,811	0.24	91.5	
28		598041	6396035	Mature jack pine - open	Low slope	E	45.0	49	0.28	2,165	0.13	58.2	
29		598309	6396014	Mature jack pine - open	Low slope	E	29.0	30	0.25	1,325	0.19	54.7	
30		597839	6392158	Mature mixed -open	Low slope	E	17.3	18	0.29	795	0.36	63.2	
31		597955	6392569	Mature mixed -open	Low slope	E	29.7	30	0.38	1,325	0.29	85.1	
32		599282	6395948	Jack pine -open	Low slope	W	27.3	30	0.34	1,325	0.26	70.1	
33		599325	6395942	Jack pine -open	Low slope	W	28.7	30	0.37	1,325	0.28	80.0	
34		600552	6395865	Jack pine -open	Low slope	W	34.0	36	0.32	1,590	0.20	68.4	
35		600607	6395859	Jack pine -open	Low slope	W	30.0	29	0.51	1,281	0.40	119.4	
36		601435	6396005	Mature jack pine - open	Low slope	E	37.0	37	0.32	1,635	0.20	72.4	
37		601439	6396045	Mature jack pine - open	Low slope	E	29.7	31	0.26	1,370	0.19	56.3	
38		602229	6396027	Mature jack pine - open	Low slope	E	43.0	47	0.44	2,076	0.21	91.1	
39		602116	6396080	Jack pine - open	Low slope	N	36.3	37	0.40	1,635	0.24	88.9	
40		603283	6391304	Lake edge	Flat	N/A	26.3	26	0.33	1,149	0.29	75.7	
41		598382	6391073	Lake	Flat	N/A	31.3	32	0.77	1,414	0.54	170.7	
42		602968	6390366	Lake	Flat	N/A	14.7	16	0.07	707	0.10	14.5	
43		599727	6389685	Lake	Flat	N/A	15.0	16	0.21	707	0.30	44.6	
44		607396	6395868	Lake	Flat	N/A	31.3	32	0.27	1,414	0.19	59.8	
45		599569	6392809	Lake	Flat	N/A	24.7	26	0.37	1,149	0.32	79.5	
46		601448	6393624	Lake	Flat	N/A	23.3	24	0.11	1,060	0.10	24.2	
47		608751	6395117	Lake	Flat	N/A	13.3	15	0.33	663	0.50	66.4	
48		594989	6398179	Lake	Flat	N/A	23.7	24	0.39	1,060	0.37	87.1	
49		595857	6398163	Lake	Flat	N/A	34.7	35	0.55	1,546	0.36	123.3	
50		596694	6398016	Lake	Flat	N/A	17.0	18	0.38	795	0.48	81.2	

Note: All coordinates are in UTM Zone 12 NAD 83. cm = centimetres; kg=kilograms; cm<sup>3</sup> = cubic centimetres; g/cm<sup>3</sup> = grams per cubic centimetre.



**APPENDIX D**

**Hydrometric Monitoring Daily Data**

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**Table D-1a: 2018 Daily Precipitation at NexGen Rook I Site**

Date	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.0	0.0	0.0	0.0	6.4	1.3	18.3	0.0	2.9	0.3	0.9	0.0
2	0.0	0.0	0.0	0.0	0.3	6.1	2.1	0.0	2.2	2.2	0.1	0.0
3	0.0	0.0	0.0	0.0	0.5	0.7	4.3	0.0	1.9	1.6	3.6	0.0
4	0.0	0.0	0.0	0.0	0.3	5.2	0.6	0.0	0.0	0.5	0.3	0.0
5	0.0	0.0	0.0	0.0	0.0	5.3	0.0	0.0	0.0	3.5	0.7	0.0
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.0	2.5	0.8	0.0
7	0.0	0.0	0.0	0.0	0.0	0.0	2.1	8.8	0.0	0.2	0.4	0.0
8	0.0	0.0	0.0	0.0	1.6	0.0	0.0	3.7	0.6	0.2	0.9	0.0
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.5	0.2	0.9	0.0
10	0.0	0.0	1.7	0.0	0.0	11.9	0.0	0.0	0.0	0.3	1.1	0.0
11	0.0	0.0	6.8	0.0	0.0	2.6	0.0	0.0	0.0	0.1	0.4	0.0
12	0.0	0.0	4.4	0.0	0.0	3.2	0.0	0.0	0.0	0.3	0.1	0.0
13	0.0	0.0	0.0	0.0	2.7	2.4	4.6	0.0	0.0	0.4	1.7	0.0
14	0.0	0.0	0.0	0.1	0.0	1.6	8.8	0.0	0.0	0.1	0.2	0.0
15	0.0	0.0	0.0	0.0	0.0	0.0	3.3	0.0	0.0	0.2	0.8	0.0
16	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2	0.4	0.2	0.0
17	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0
18	0.0	0.0	0.0	1.0	0.0	0.0	0.0	4.4	0.2	0.8	0.0	0.0
19	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.9	0.1	0.6	0.0	0.0
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.8	0.0	0.0
21	0.0	0.0	0.0	2.5	0.0	0.0	8.2	0.0	0.3	0.2	0.0	0.0
22	0.0	0.0	0.0	5.3	0.0	0.0	7.6	0.0	0.2	0.3	0.0	0.0
23	0.0	0.0	0.0	0.0	0.0	0.0	10.1	0.6	0.3	0.2	0.0	0.0
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.4	0.1	0.3	0.0	0.0
25	0.0	0.0	0.0	0.0	11.0	0.0	0.0	1.2	4.0	0.1	0.0	0.0
26	0.0	0.0	0.0	0.0	6.8	14.6	0.0	0.0	3.0	0.2	0.0	0.0
27	0.0	0.0	0.0	0.0	0.0	2.6	0.0	0.0	2.0	0.3	0.0	0.0
28	0.0	0.0	0.0	0.2	0.3	7.7	0.0	0.2	1.6	0.4	0.0	0.0
29	0.0	-	0.0	0.0	0.0	15.8	0.6	0.8	6.3	0.1	0.0	0.0
30	0.0	-	0.0	0.0	0.0	0.1	0.0	17.9	0.1	1.4	0.0	0.0
31	0.0	-	0.0	-	0.0	-	0.0	5.6	-	0.6	-	0.0

Note: Precipitation data in table is in millimetres. Prior to September 15, 2018 precipitation was rainfall monitored by a tipping bucket. As a result solid precipitation before that time would be under reported. Following September 15, 2018 a Geonor total precipitation gauge was installed.

ND= No data.

**Table D-1b: 2019 Daily Precipitation at NexGen Rook I Site**

Date	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	1.6	0.2	0.5	1.7	0.4	1.1	8.0	10.1	0.2	0.0	ND	ND
2	0.1	0.1	0.1	1.0	3.2	3.5	9.6	19.9	0.9	0.0	ND	ND
3	0.2	0.3	0.1	1.1	1.2	12.6	0.2	26.0	0.3	0.0	ND	ND
4	0.3	0.5	0.1	1.0	2.4	7.5	0.0	0.4	12.8	0.0	ND	ND
5	0.4	0.4	0.1	0.2	0.8	1.0	0.1	7.1	2.9	0.6	ND	ND
6	0.1	0.4	0.1	0.9	0.8	0.4	0.2	0.0	0.2	1.5	ND	ND
7	0.7	0.3	0.2	1.4	0.7	0.1	0.1	0.0	3.6	0.6	ND	ND
8	1.3	0.2	0.2	1.1	0.7	1.2	1.6	2.7	0.2	3.5	ND	ND
9	0.2	0.2	0.1	0.1	0.6	0.3	0.2	18.0	0.2	0.4	ND	ND
10	0.0	0.2	29.9	1.3	1.0	0.6	0.0	0.1	0.2	0.3	ND	ND
11	0.1	0.2	0.1	0.6	0.5	0.2	0.1	0.2	0.1	0.8	ND	ND
12	0.0	0.1	0.3	0.3	1.2	0.7	0.1	1.5	0.2	0.5	ND	ND
13	0.2	0.5	0.3	0.2	3.0	1.9	2.1	0.1	0.6	0.3	ND	ND
14	0.2	0.4	0.5	0.1	0.9	0.9	0.2	2.7	0.2	0.1	ND	ND
15	0.5	0.3	0.2	0.3	0.9	0.1	0.1	0.1	0.1	0.1	ND	ND
16	0.3	0.0	1.1	0.3	0.5	0.2	0.1	73.2	0.0	8.2	ND	ND
17	0.3	0.4	0.2	0.9	0.8	0.2	0.1	18.9	0.1	1.0	ND	ND
18	0.3	0.3	0.2	0.4	0.9	0.1	0.3	4.1	0.1	0.3	ND	ND
19	0.2	0.1	0.2	0.6	0.8	0.1	0.1	1.3	0.1	1.3	ND	ND
20	0.0	0.3	0.3	5.0	0.7	0.1	0.2	0.1	1.6	2.5	ND	ND
21	0.0	0.2	0.4	0.5	0.6	0.3	0.1	0.0	0.1	0.3	ND	ND
22	0.2	0.1	0.3	0.2	0.8	0.2	0.1	1.2	0.1	0.2	ND	ND
23	0.3	0.2	0.5	2.6	0.7	4.2	0.1	0.2	12.2	ND	ND	ND
24	0.3	0.2	0.3	0.9	0.8	0.7	15.0	2.4	1.1	ND	ND	ND
25	0.1	0.2	0.1	0.8	1.1	0.1	5.0	0.5	4.3	ND	ND	ND
26	0.0	0.0	0.5	0.8	0.6	0.1	2.3	6.0	0.2	ND	ND	ND
27	0.3	0.1	0.5	0.8	0.5	0.1	9.3	3.8	0.8	ND	ND	ND
28	0.5	0.3	0.1	0.8	0.3	0.1	0.0	3.2	0.9	ND	ND	ND
29	0.2	-	0.3	2.2	0.6	2.0	0.1	0.1	0.2	ND	ND	ND
30	0.0	-	0.5	3.9	0.9	4.1	0.1	0.2	0.2	ND	ND	ND
31	0.1	-	0.3	-	0.6	-	0.1	2.2	-	ND	-	ND

Note: Precipitation data in table is in millimetres. Prior to September 15, 2018 precipitation was rainfall monitored by a tipping bucket. As a result solid precipitation before that time would be under reported. Following September 15, 2018 a Geonor total precipitation gauge was installed.

ND= No data.

**Table D-1c: 2020 Daily Precipitation at NexGen Rook I Site**

Date	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	ND	ND	ND	ND	27.9	14.7	28.9	0.1	2.5	0.0	0.2	ND
2	ND	ND	ND	ND	1.8	0.1	0.5	0.3	0.3	0.0	0.0	ND
3	ND	ND	ND	ND	0.1	3.9	0.1	0.4	0.5	0.0	0.0	ND
4	ND	ND	ND	ND	0.1	1.9	0.1	1.2	0.7	0.0	ND	ND
5	ND	ND	ND	ND	0.1	0.2	0.1	0.1	0.6	0.0	ND	ND
6	ND	ND	ND	ND	0.1	0.3	0.2	0.1	1.0	0.0	ND	ND
7	ND	ND	ND	ND	0.1	27.1	0.1	0.3	0.5	0.0	ND	ND
8	ND	ND	ND	ND	0.1	13.3	0.1	26.7	0.7	0.0	ND	ND
9	ND	ND	ND	ND	0.3	2.6	0.1	31.2	2.0	0.0	ND	ND
10	ND	ND	ND	ND	0.4	5.1	0.2	4.2	6.2	0.1	ND	ND
11	ND	ND	ND	ND	0.2	0.2	0.1	0.4	4.7	0.1	ND	ND
12	ND	ND	ND	ND	0.1	0.2	12.1	23.4	3.2	0.1	ND	ND
13	ND	ND	ND	ND	2.5	6.8	4.9	2.2	0.7	0.1	ND	ND
14	ND	ND	ND	ND	9.9	0.8	7.6	4.2	0.8	0.0	ND	ND
15	ND	ND	ND	ND	5.6	17.8	4.6	1.7	1.9	0.0	ND	ND
16	ND	ND	ND	ND	0.5	21.3	1.1	0.3	43.7	0.1	ND	ND
17	ND	ND	ND	ND	0.0	0.3	12.2	0.3	0.9	0.0	ND	ND
18	ND	ND	ND	ND	0.8	0.1	28.2	3.1	0.7	0.0	ND	ND
19	ND	ND	ND	ND	5.8	0.0	20.0	0.6	0.5	0.0	ND	ND
20	ND	ND	ND	ND	0.0	0.1	0.2	0.3	0.2	0.0	ND	ND
21	ND	ND	ND	ND	14.3	0.1	2.9	0.2	1.7	0.1	ND	ND
22	ND	ND	ND	ND	6.0	0.0	8.4	27.9	0.7	0.0	ND	ND
23	ND	ND	ND	ND	0.9	0.1	6.0	7.6	0.7	0.0	ND	ND
24	ND	ND	ND	ND	0.1	0.0	3.1	4.8	13.0	0.0	ND	ND
25	ND	ND	ND	ND	0.1	0.0	0.2	5.5	0.0	0.0	ND	ND
26	ND	ND	ND	ND	5.4	0.5	0.6	1.4	0.0	0.0	ND	ND
27	ND	ND	ND	ND	1.5	0.0	0.2	3.8	0.0	0.0	ND	ND
28	ND	ND	ND	ND	0.3	18.5	0.2	1.8	0.0	0.0	ND	ND
29	ND	ND	ND	0.0	0.4	0.1	1.0	3.7	0.0	0.0	ND	ND
30	ND	-	ND	0.0	0.1	0.2	0.2	1.5	0.0	0.1	ND	ND
31	ND	-	ND	-	1.1	-	0.1	0.0	-	0.0	-	ND

Note: Precipitation data in table is in millimetres. Prior to September 15, 2018 precipitation was rainfall monitored by a tipping bucket. As a result solid precipitation before that time would be under reported. Following September 15, 2018 a Geonor total precipitation gauge was installed.

ND= No data.

**Table D-2a: 2018 Daily Precipitation at ECCC Fort McMurry Station (ID: 3062697)**

Date	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.0	ND	ND	0.0	0.5	1.4	0.0	1.2	2.3	0.0	0.0	0.0
2	0.0	ND	0.0	0.0	0.0	4.3	11.4	0.0	ND	ND	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.5	ND	0.0	0.0	ND	1.1	0.0
4	0.0	0.0	0.0	0.0	0.0	ND	ND	0.0	0.0	ND	0.0	0.0
5	0.0	0.0	1.6	0.0	0.0	ND	0.0	0.0	0.0	ND	0.0	0.0
6	ND	0.0	ND	0.0	0.0	ND	ND	0.5	0.0	ND	0.0	0.0
7	ND	0.0	0.0	0.0	0.0	ND	6.5	0.0	0.8	0.0	0.0	0.0
8	0.5	0.0	0.0	0.0	0.0	ND	ND	0.0	16.8	0.0	0.0	ND
9	5.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.4	0.0	0.0	ND
10	ND	0.0	0.0	0.0	0.0	1.5	0.0	0.0	ND	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	ND	0.0	0.0	ND	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0	14.0	ND	0.0	ND	0.0	0.0	0.0
13	0.0	ND	0.0	0.0	0.0	3.3	1.4	0.0	ND	0.0	0.2	0.0
14	0.0	ND	0.0	0.0	0.0	ND	6.5	0.0	0.0	0.0	0.0	0.0
15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	0.0	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	0.0	0.0	0.0	ND	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	ND	0.0	0.0	0.0	0.0	0.0	7.0	0.8	0.0	0.0	0.0	0.0
19	ND	ND	ND	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0
20	0.0	0.0	ND	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0
21	0.0	0.0	0.0	0.0	0.0	0.0	54.9	0.0	0.0	0.0	0.0	0.0
22	1.0	0.0	0.0	0.0	0.0	ND	6.0	0.0	0.0	0.0	ND	0.0
23	0.0	0.0	0.0	0.0	0.0	ND	14.3	1.9	0.0	0.0	0.0	0.2
24	0.0	0.0	2.7	0.0	0.0	0.0	12.5	ND	0.0	0.0	0.2	0.0
25	0.0	0.0	0.0	0.0	0.8	12.5	0.0	ND	0.0	0.0	0.0	0.0
26	ND	0.0	ND	0.0	3.2	ND	0.0	ND	ND	0.0	0.0	0.0
27	ND	0.0	ND	0.0	0.0	22.5	0.0	0.0	ND	0.0	0.0	0.0
28	ND	0.0	0.0	0.0	0.0	12.4	0.0	0.5	ND	0.0	0.0	1.5
29	0.0	-	0.0	0.0	0.0	3.5	0.0	7.9	ND	0.8	0.0	0.0
30	ND	-	0.0	0.0	0.0	4.2	4.3	3.4	ND	0.0	0.0	0.0
31	0.0	-	0.0	-	0.0	-	0.0	5.5	-	0.0	-	0.0

Note: Precipitation data in table is in millimetres.

ND= No data.

**Table D-2b: 2019 Daily Precipitation at ECCC Fort McMurry Station (ID: 3062697)**

Date	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.2	0.0	0.0	ND	0.2	7.0	12.7	1.0	0.0	0.0	0.0	0.0
2	0.0	2.2	0.0	ND	0.0	3.5	5.1	11.5	0.8	0.0	0.0	0.0
3	0.0	0.1	0.0	1.1	5.1	6.3	0.4	0.4	0.0	12.2	0.6	0.0
4	0.0	0.0	0.0	0.0	0.0	1.6	0.4	0.8	2.9	0.0	0.0	0.0
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.6	0.7	4.8	0.0	0.0
6	0.0	0.0	0.0	3.6	0.4	0.0	0.0	0.5	0.0	0.0	0.0	0.0
7	0.7	0.0	0.0	2.6	0.0	0.0	0.0	0.0	11.4	2.4	0.0	0.0
8	0.3	0.0	0.0	0.0	0.0	0.0	5.5	6.4	0.8	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0	1.0	0.4	2.3	0.0	0.0	0.0	0.0
10	0.0	0.0	5.3	1.2	0.2	0.0	1.5	0.0	0.0	0.0	0.0	0.0
11	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.6	0.0	0.0	0.0	0.0
13	0.0	0.0	0.0	0.0	0.0	1.2	0.7	2.0	0.0	0.0	0.4	0.0
14	0.0	0.0	0.0	0.0	0.0	16.6	5.8	1.0	0.0	0.0	0.2	0.1
15	0.0	0.0	0.0	0.0	0.0	1.8	0.0	5.5	0.0	3.7	1.3	0.0
16	0.4	0.0	0.0	0.0	0.0	0.0	0.0	41.6	0.0	2.2	0.0	0.0
17	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.2	3.9	0.0
18	0.0	0.0	0.0	0.0	0.0	0.0	23.3	0.0	0.2	0.0	2.0	1.2
19	0.0	0.0	0.0	0.8	0.0	2.0	0.0	0.0	0.0	0.4	0.0	0.0
20	0.3	0.0	0.0	0.8	0.0	1.6	0.0	0.0	2.0	0.0	0.0	0.0
21	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	1.0	0.0	0.0
22	0.0	0.0	0.0	0.0	0.0	7.5	0.0	2.7	0.0	0.0	0.0	0.0
23	0.0	0.0	0.0	0.0	0.0	8.4	0.0	0.0	2.2	1.2	0.0	0.0
24	0.0	0.0	0.0	0.0	0.0	9.0	15.0	0.0	0.0	0.0	0.0	0.0
25	0.0	0.0	0.0	0.0	0.0	0.0	3.6	0.0	ND	0.0	0.0	0.0
26	0.0	0.0	0.0	0.0	0.0	0.0	2.7	0.7	0.0	0.0	0.0	0.0
27	3.0	0.0	0.0	0.0	0.0	3.3	7.9	0.6	0.0	1.7	0.0	0.0
28	0.0	0.0	0.0	0.0	0.0	18.1	0.0	3.4	0.0	0.2	0.0	0.0
29	0.1	-	0.0	0.5	0.0	21.2	0.0	ND	0.0	0.0	0.0	0.0
30	0.0	-	0.0	0.2	0.0	1.2	2.2	0.0	0.0	1.6	0.0	0.0
31	0.0	-	0.0	-	0.0	-	0.0	0.8	-	0.2	-	1.2

Note: Precipitation data in table is in millimetres.

ND= No data.

**Table D-2c: 2020 Daily Precipitation at ECCC Fort McMurry Station (ID: 3062697)**

Date	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.0	0.0	0.0	0.0	0.0	29.2	16.1	0.0	2.4	0.4	7.3	0.0
2	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	5.9	0.0	0.0	4.8	0.0	0.0	0.0
4	0.0	0.0	0.0	2.9	0.0	3.7	0.5	0.0	1.2	0.5	0.0	0.4
5	0.0	0.0	0.0	2.1	0.0	0.2	2.3	0.0	2.1	0.4	0.0	0.0
6	0.0	0.0	0.0	1.7	0.0	4.9	0.0	0.0	0.0	0.0	0.0	0.0
7	0.9	0.0	0.0	0.2	0.0	34.9	0.0	4.5	1.7	1.0	0.0	0.7
8	0.5	0.0	0.0	0.0	2.5	6.2	0.0	4.4	0.0	8.7	0.0	0.0
9	0.0	0.0	0.8	0.4	0.0	1.7	0.0	0.6	1.8	0.0	0.0	0.0
10	1.0	0.2	0.0	ND	0.0	1.6	3.4	1.6	1.2	5.0	0.0	0.0
11	2.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	7.2	33.0	0.0	0.0
12	2.6	0.0	0.0	0.0	0.0	0.0	15.0	8.2	0.0	0.0	0.0	0.0
13	0.6	0.0	0.0	0.0	0.0	1.2	23.1	0.0	0.0	0.0	0.2	0.0
14	1.5	0.0	0.0	0.0	2.3	1.8	5.9	3.6	0.0	0.0	0.0	0.0
15	0.4	0.0	0.0	0.0	0.0	9.3	0.0	0.0	0.0	0.0	0.0	0.0
16	0.5	0.3	0.0	0.0	5.4	0.0	0.0	0.0	0.0	0.0	0.0	0.1
17	3.4	0.0	0.0	0.0	0.0	0.0	22.8	0.0	0.0	0.0	0.0	5.5
18	0.2	0.0	0.0	0.0	0.7	0.0	7.9	0.0	ND	0.0	0.0	9.3
19	0.0	0.0	0.0	0.0	2.4	0.0	0.0	0.2	0.0	0.0	0.0	0.2
20	0.0	10.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0
21	0.0	1.2	0.0	0.0	9.9	0.0	3.7	ND	0.6	0.0	0.0	0.0
22	0.0	0.0	ND	1.4	9.8	0.0	3.2	43.6	0.0	0.0	0.0	ND
23	0.0	0.0	0.0	1.7	0.4	0.0	0.2	0.5	0.0	0.0	0.0	ND
24	0.0	0.0	0.0	0.8	0.4	0.0	1.4	2.8	20.5	0.0	0.0	ND
25	0.2	0.0	0.0	0.0	0.2	0.2	1.0	2.3	0.2	0.0	0.0	ND
26	0.0	0.0	0.6	0.0	0.0	0.0	0.0	2.8	1.7	0.0	0.0	ND
27	2.1	0.0	0.0	0.0	0.0	6.0	0.0	8.2	0.2	1.4	0.6	ND
28	0.0	0.2	0.0	0.0	0.0	8.7	0.0	0.0	0.2	0.2	0.0	ND
29	0.0	0	0.0	0.0	0.0	10.1	4.0	20.7	ND	0.0	0.0	ND
30	1.0	0.04667	0.0	0.0	0.0	2.0	0.0	7.2	0.2	0.0	0.0	ND
31	3.9	-	0.0	-	2.2	-	0.0	2.5	-	0.0	-	ND

Note: Precipitation data in table is in millimetres.

ND= No data.

**Table D-3a: 2018 Daily Precipitation at ECCC Key lake Station (ID: 4063755 & 4063753)**

Date	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.0	0.0	0.0	0.0	1.2	9.4	0.8	0.0	4.4	0.0	0.0	0.2
2	0.0	0.0	0.2	0.0	2.0	6.4	0.0	0.0	0.4	2.2	0.0	0.0
3	0.0	1.0	0.0	0.0	0.4	1.4	0.4	17.4	13.4	0.5	3.1	0.0
4	0.0	0.2	0.0	0.4	0.4	3.6	5.8	0.0	0.2	0.0	0.7	0.4
5	0.0	0.0	5.2	0.0	0.0	1.9	0.0	1.8	0.0	3.8	0.2	0.4
6	4.2	0.2	0.6	0.0	0.0	0.2	2.0	4.0	0.0	0.2	0.6	0.0
7	0.8	0.0	0.0	0.0	0.0	0.0	6.2	0.0	1.2	0.2	0.8	0.0
8	3.0	0.0	0.0	0.0	7.2	0.0	0.0	0.0	1.2	0.2	0.0	0.0
9	3.4	1.8	1.6	0.0	0.0	0.0	0.0	0.0	11.2	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0	12.6	0.0	0.0	0.4	0.0	0.5	0.0
11	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	1.6	0.0	0.2	0.0
12	0.0	1.4	ND	0.0	0.4	1.4	0.0	0.0	6.4	0.0	0.2	0.2
13	0.0	1.2	ND	0.0	0.0	0.0	1.0	0.0	1.2	0.0	0.0	0.0
14	0.0	0.0	0.0	3.4	0.2	0.0	36.6	0.0	0.0	0.2	0.7	0.0
15	0.0	0.0	0.0	2.0	0.0	0.0	1.2	0.0	0.0	0.8	0.6	0.9
16	0.0	0.8	0.0	0.0	0.0	0.0	3.4	0.0	0.0	0.7	0.2	0.2
17	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	0.4	0.2	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.2	0.0
19	2.0	0.6	0.0	0.0	0.0	0.0	0.0	6.6	0.0	0.3	0.0	0.0
20	2.6	0.0	2.6	0.0	0.0	0.0	4.6	0.0	0.0	0.0	0.2	0.0
21	0.0	0.0	1.8	0.6	0.0	3.6	22.9	0.0	0.0	0.3	1.2	4.8
22	1.4	0.0	0.2	8.6	0.0	0.0	3.4	0.0	0.0	0.0	0.0	2.7
23	0.0	1.6	2.4	0.0	0.0	0.0	5.6	0.0	0.0	0.0	0.0	0.0
24	0.0	1.0	0.0	0.0	0.0	0.0	0.0	13.2	0.0	0.2	0.2	0.0
25	0.0	0.0	0.4	0.0	11.6	0.0	0.0	1.8	11.8	0.0	0.2	0.9
26	0.0	0.0	0.8	0.0	0.2	27.7	0.0	0.0	2.0	0.0	0.0	1.3
27	0.0	2.0	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.8	0.0	1.0
28	0.0	0.0	0.4	0.0	5.6	2.5	0.0	3.4	ND	0.2	0.0	0.8
29	12.4	-	0.0	0.0	0.0	7.4	2.0	3.4	0.0	0.0	1.5	0.2
30	8.8	-	0.0	0.2	0.0	11.6	2.4	4.1	0.2	0.4	0.2	0.0
31	0.0	-	0.0	-	0.0	-	2.6	7.7	-	0.2	-	0.0

Note: Precipitation data in table is in millimetres. Station ID: 4063755 Jan 1, 2018 - Sep 29, 2018. Station ID: 4063753 Sep 30, 2018 - Nov ND= No data.

**Table D-3b: 2019 Daily Precipitation at ECCC Key lake Station (ID: 4063755 & 4063753)**

Date	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	2.0	0.2	0.4	3.8	0.2	0.0	5.4	0.0	0.0	0.0	0.3	0.0
2	1.2	0.7	0.0	0.5	0.0	7.9	4.7	0.0	0.0	0.0	0.1	0.0
3	0.2	0.7	0.0	0.2	3.5	4.1	0.6	44.6	3.2	0.0	1.6	1.0
4	0.2	0.0	0.0	0.7	1.6	6.0	0.9	1.4	1.2	0.1	0.0	0.0
5	0.4	0.0	0.0	0.0	0.2	0.8	0.0	0.0	10.5	0.7	0.0	0.1
6	1.6	0.0	0.2	0.0	0.2	0.2	0.0	2.4	0.2	3.7	0.1	2.6
7	4.6	0.0	0.0	1.6	1.2	25.6	0.0	0.0	2.8	0.7	0.1	0.0
8	2.9	0.0	0.2	2.0	0.2	6.1	0.7	0.0	0.0	2.7	0.8	0.2
9	0.0	0.0	0.0	0.2	0.0	0.2	5.2	2.9	0.0	0.3	0.0	0.0
10	0.0	0.0	0.0	0.0	8.2	2.1	0.0	0.0	0.0	0.0	0.6	0.0
11	0.0	0.0	0.0	0.3	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
12	0.0	1.3	1.5	0.2	0.4	0.0	0.0	0.6	0.9	0.0	0.1	0.0
13	0.0	0.6	0.2	0.0	0.6	0.0	2.5	6.9	0.1	0.5	0.9	0.0
14	9.2	0.0	0.2	0.3	0.2	9.8	13.0	5.4	0.1	0.2	0.0	1.3
15	0.2	0.0	0.2	0.2	0.0	1.4	0.0	0.0	0.0	0.2	4.3	0.0
16	0.2	0.0	0.2	0.0	0.0	0.2	0.0	20.8	0.0	0.5	0.0	0.0
17	0.0	0.0	0.4	0.0	0.0	0.0	0.0	25.4	0.7	3.0	1.0	1.6
18	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	1.6	3.2	1.7
19	0.2	0.7	0.0	1.7	0.0	0.0	0.0	1.8	0.0	0.1	0.0	0.3
20	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	3.7	0.1	0.3
21	0.2	0.2	0.0	0.2	0.0	4.3	0.0	0.0	0.0	0.3	0.0	0.0
22	0.2	0.6	0.0	0.0	0.0	2.4	0.0	0.0	0.0	0.0	0.1	0.0
23	0.3	0.2	0.0	0.0	0.0	2.5	0.0	0.0	14.3	0.1	0.0	0.0
24	0.2	0.2	0.0	0.4	0.0	0.4	5.4	1.7	1.7	0.7	0.0	0.0
25	0.0	0.0	0.0	0.2	0.3	5.0	1.4	0.0	0.3	0.0	0.9	1.2
26	0.0	0.7	0.0	1.4	0.2	ND	0.0	4.7	1.7	0.5	0.6	1.0
27	0.2	1.1	0.2	0.2	0.2	ND	0.0	0.0	0.0	1.1	0.0	0.4
28	0.2	1.0	2.6	0.0	0.0	0.0	0.2	1.1	4.5	0.0	0.1	0.4
29	0.2	-	0.2	0.2	0.0	22.0	0.0	0.0	0.1	0.0	0.0	0.0
30	0.7	-	0.2	6.1	0.0	3.4	2.1	1.3	0.0	0.0	0.0	0.1
31	1.9	-	0.7	-	0.2	-	0.4	0.3	-	0.4	-	0.0

Note: Precipitation data in table is in millimetres. Station ID: 4063755 Jan 1, 2018 - Sep 29, 2018. Station ID: 4063753 Sep 30, 2018 - Nov ND= No data.

**Table D-3c: 2020 Daily Precipitation at ECCC Key lake Station (ID: 4063755 & 4063753)**

Date	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.2	1.1	0.1	0.2	3.0	5.9	11.0	0.0	0.7	0.0	0.0	0.5
2	0.1	1.8	2.0	5.8	0.1	0.0	17.6	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.4	0.0	0.0	5.4	6.7	0.0	0.0	1.1	0.0	0.0
4	5.3	0.0	0.5	0.0	0.0	1.8	0.5	0.0	0.0	1.4	ND	0.0
5	0.0	0.0	0.0	0.0	0.0	0.0	14.3	0.0	4.7	0.5	1.7	ND
6	1.5	0.3	1.4	1.8	0.0	0.0	0.0	0.0	0.5	3.2	1.0	0.1
7	0.0	0.0	0.0	3.1	0.0	8.8	0.0	0.0	0.0	1.0	0.0	2.6
8	0.0	0.1	0.1	0.8	0.4	0.5	0.0	45.9	0.2	7.4	0.0	0.0
9	0.5	0.5	0.1	0.0	0.0	6.0	0.0	40.0	3.9	0.4	0.0	0.0
10	0.0	0.3	0.0	0.1	0.0	1.5	0.8	16.1	9.5	4.1	3.1	0.0
11	0.4	0.0	2.4	0.0	0.0	0.1	0.0	28.4	11.5	4.8	0.0	0.0
12	1.0	0.0	0.0	0.2	0.0	0.0	22.5	ND	1.9	3.2	0.0	2.6
13	0.4	2.6	0.1	0.0	0.0	0.0	0.0	ND	2.2	3.1	0.0	0.0
14	1.5	2.3	0.0	0.0	2.2	0.0	1.9	0.3	0.0	0.1	0.0	0.0
15	0.0	0.0	0.0	0.0	0.0	5.4	4.3	1.8	0.7	0.8	0.4	1.4
16	0.0	0.0	0.4	0.0	0.0	17.3	0.0	0.1	0.0	1.7	0.0	0.6
17	2.3	0.0	0.0	1.0	0.0	0.0	1.9	0.0	0.0	1.1	0.5	5.4
18	0.0	0.0	0.0	1.1	0.0	0.0	5.7	2.0	0.0	2.0	1.3	0.2
19	0.0	0.0	0.0	3.5	1.4	0.0	0.0	7.2	0.0	0.1	0.0	2.5
20	0.0	0.0	0.0	0.0	0.0	0.0	5.2	0.0	0.0	0.0	0.0	2.1
21	0.2	0.0	0.2	1.0	13.7	0.0	0.6	0.0	0.0	0.0	0.0	0.9
22	0.0	0.0	0.2	2.3	5.1	0.0	1.2	1.1	0.0	0.6	0.0	ND
23	0.0	0.2	0.0	0.1	3.0	0.8	2.9	2.5	0.0	0.2	0.6	ND
24	0.1	0.1	0.0	0.0	0.0	0.5	8.1	0.0	1.4	0.1	0.3	ND
25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	5.4	0.2	ND	ND
26	0.0	1.4	1.8	2.6	2.2	1.9	0.0	2.8	0.1	0.6	0.0	ND
27	0.0	0.0	0.6	0.0	21.9	5.8	0.0	2.4	0.0	2.7	2.3	ND
28	0.0	3.2	2.7	0.0	1.0	3.8	0.0	0.0	3.0	0.4	0.0	ND
29	0.0	0.0	1.4	0.1	0.0	0.0	7.5	4.7	0.5	0.2	0.0	ND
30	0.0	-	4.2	0.0	0.0	1.3	0.0	2.4	0.0	0.4	0.0	ND
31	1.1	-	2.4	-	7.5	-	0.0	1.2	-	1.2	-	ND

Note: Precipitation data in table is in millimetres. Station ID: 4063755 Jan 1, 2018 - Sep 29, 2018. Station ID: 4063753 Sep 30, 2018 - Nov ND= No data.

**Table D-4a: 2018 Daily Water Surface Elevation for CR-WB-**

DATE	2018				
	AUG	SEP	OCT	NOV	DEC
1	ND	526.691	ND	ND	ND
2	ND	526.688	ND	ND	ND
3	ND	526.689	ND	ND	ND
4	ND	526.682	ND	ND	ND
5	ND	526.680	ND	ND	ND
6	ND	526.675	ND	ND	ND
7	526.742	526.670	ND	ND	ND
8	526.743	526.676	ND	ND	ND
9	526.747	526.694	ND	ND	ND
10	526.747	526.689	ND	ND	ND
11	526.738	526.687	ND	ND	ND
12	526.730	526.684	ND	ND	ND
13	526.720	526.679	ND	ND	ND
14	526.717	526.673	ND	ND	ND
15	526.712	526.671	ND	ND	ND
16	526.710	526.665	ND	ND	ND
17	526.714	526.664	ND	ND	ND
18	526.701	526.665	ND	ND	ND
19	526.700	526.661	ND	ND	ND
20	526.694	526.660	ND	ND	ND
21	526.698	526.655	ND	ND	ND
22	526.703	526.649	ND	ND	ND
23	526.684	526.645	ND	ND	ND
24	526.681	526.649	ND	ND	ND
25	526.683	526.649	ND	ND	ND
26	526.679	526.659	ND	ND	ND
27	526.675	526.656	ND	ND	ND
28	526.668	526.650	ND	ND	ND
29	526.667	526.657	ND	ND	ND
30	526.681	526.651	ND	ND	ND
31	526.691	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-4b: 2019 Daily Water Surface Elevation for CR-WB-MS-01**

DATE	2019											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	ND	ND	ND	ND	ND	526.736	526.722	526.694	526.769	ND	ND	ND
2	ND	ND	ND	ND	ND	526.739	526.725	526.700	526.767	ND	ND	ND
3	ND	ND	ND	ND	ND	526.743	526.731	526.706	526.766	ND	ND	ND
4	ND	ND	ND	ND	ND	526.753	526.726	526.720	526.764	ND	ND	ND
5	ND	ND	ND	ND	ND	526.746	526.727	526.722	526.767	ND	ND	ND
6	ND	ND	ND	ND	ND	526.744	526.724	526.728	526.772	ND	ND	ND
7	ND	ND	ND	ND	ND	526.742	526.722	526.720	526.770	ND	ND	ND
8	ND	ND	ND	ND	ND	526.738	526.721	526.717	526.771	ND	ND	ND
9	ND	ND	ND	ND	ND	526.736	526.718	526.724	526.787	ND	ND	ND
10	ND	ND	ND	ND	ND	526.735	526.716	526.728	526.796	ND	ND	ND
11	ND	ND	ND	ND	ND	526.732	526.715	526.726	526.790	ND	ND	ND
12	ND	ND	ND	ND	ND	526.729	526.712	526.724	526.784	ND	ND	ND
13	ND	ND	ND	ND	ND	526.730	526.711	526.724	526.780	ND	ND	ND
14	ND	ND	ND	ND	ND	526.735	526.711	526.722	526.781	ND	ND	ND
15	ND	ND	ND	ND	526.779	526.734	526.715	526.723	526.780	ND	ND	ND
16	ND	ND	ND	ND	526.778	526.734	526.713	526.732	526.772	ND	ND	ND
17	ND	ND	ND	ND	526.782	526.732	526.712	526.766	526.782	ND	ND	ND
18	ND	ND	ND	ND	526.779	526.736	526.710	526.782	526.780	ND	ND	ND
19	ND	ND	ND	ND	526.773	526.729	526.708	526.787	526.777	ND	ND	ND
20	ND	ND	ND	ND	526.773	526.733	526.703	526.787	526.772	ND	ND	ND
21	ND	ND	ND	ND	526.770	526.731	526.702	526.787	526.773	ND	ND	ND
22	ND	ND	ND	ND	526.765	526.726	526.699	526.776	526.770	ND	ND	ND
23	ND	ND	ND	ND	526.768	526.726	526.697	526.762	526.768	ND	ND	ND
24	ND	ND	ND	ND	526.760	526.731	526.698	526.759	526.774	ND	ND	ND
25	ND	ND	ND	ND	526.751	526.725	526.699	526.763	526.776	ND	ND	ND
26	ND	ND	ND	ND	526.748	526.724	526.705	526.764	526.776	ND	ND	ND
27	ND	ND	ND	ND	526.754	526.721	526.703	526.767	526.773	ND	ND	ND
28	ND	ND	ND	ND	526.753	526.717	526.709	526.772	526.766	ND	ND	ND
29	ND	-	ND	ND	526.750	526.723	526.703	526.772	526.766	ND	ND	ND
30	ND	-	ND	ND	526.741	526.720	526.700	526.770	ND	ND	ND	ND
31	ND	-	ND	-	526.740	-	526.696	526.767	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-4c: 2020 Daily Water Surface Elevation for CR-WB-MS-01**

DATE	2020											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	ND	ND	ND	ND	ND	ND	526.903	526.940	526.988	ND	ND	ND
2	ND	ND	ND	ND	ND	ND	526.915	526.938	526.988	ND	ND	ND
3	ND	ND	ND	ND	ND	ND	526.916	526.934	526.984	ND	ND	ND
4	ND	ND	ND	ND	ND	ND	526.913	526.931	526.982	ND	ND	ND
5	ND	ND	ND	ND	ND	ND	526.910	526.924	526.981	ND	ND	ND
6	ND	ND	ND	ND	ND	ND	526.903	526.921	526.980	ND	ND	ND
7	ND	ND	ND	ND	ND	ND	526.899	526.923	526.976	ND	ND	ND
8	ND	ND	ND	ND	ND	526.884	526.896	526.926	526.970	ND	ND	ND
9	ND	ND	ND	ND	ND	526.883	526.889	526.930	526.969	ND	ND	ND
10	ND	ND	ND	ND	ND	526.884	526.885	526.944	526.970	ND	ND	ND
11	ND	ND	ND	ND	ND	526.871	526.880	526.942	526.972	ND	ND	ND
12	ND	ND	ND	ND	ND	526.877	526.889	526.940	526.977	ND	ND	ND
13	ND	ND	ND	ND	ND	526.876	526.900	526.959	526.977	ND	ND	ND
14	ND	ND	ND	ND	ND	526.886	526.902	526.955	526.976	ND	ND	ND
15	ND	ND	ND	ND	ND	526.899	526.904	526.954	526.973	ND	ND	ND
16	ND	ND	ND	ND	ND	526.913	526.906	526.953	526.970	ND	ND	ND
17	ND	ND	ND	ND	ND	526.911	526.902	526.951	526.969	ND	ND	ND
18	ND	ND	ND	ND	ND	526.914	526.923	526.954	526.965	ND	ND	ND
19	ND	ND	ND	ND	ND	526.912	526.934	526.954	526.966	ND	ND	ND
20	ND	ND	ND	ND	ND	526.912	526.931	526.953	526.966	ND	ND	ND
21	ND	ND	ND	ND	ND	526.905	526.932	526.949	526.966	ND	ND	ND
22	ND	ND	ND	ND	ND	526.902	526.955	526.953	526.966	ND	ND	ND
23	ND	ND	ND	ND	ND	526.899	526.957	526.974	526.965	ND	ND	ND
24	ND	ND	ND	ND	ND	526.897	526.963	526.973	526.971	ND	ND	ND
25	ND	ND	ND	ND	ND	526.894	526.962	526.975	526.960	ND	ND	ND
26	ND	ND	ND	ND	ND	526.892	526.960	526.977	526.963	ND	ND	ND
27	ND	ND	ND	ND	ND	526.894	526.957	526.976	526.964	ND	ND	ND
28	ND	ND	ND	ND	ND	526.899	526.955	526.978	526.946	ND	ND	ND
29	ND	ND	ND	ND	ND	526.905	526.953	526.981	ND	ND	ND	ND
30	ND	-	ND	ND	ND	526.898	526.949	526.988	ND	ND	ND	ND
31	ND	-	ND	-	ND	-	526.944	526.986	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-5a: 2018 Daily Water Surface Elevation for CR-WB-**

DATE	2018				
	AUG	SEP	OCT	NOV	DEC
1	ND	498.551	498.518	ND	ND
2	ND	498.552	498.526	ND	ND
3	ND	498.549	ND	ND	ND
4	498.612	498.547	ND	ND	ND
5	498.601	498.538	ND	ND	ND
6	498.605	498.538	ND	ND	ND
7	498.611	498.539	ND	ND	ND
8	498.610	498.547	ND	ND	ND
9	498.609	498.559	ND	ND	ND
10	498.605	498.558	ND	ND	ND
11	498.593	498.557	ND	ND	ND
12	498.584	498.553	ND	ND	ND
13	498.577	498.544	ND	ND	ND
14	498.581	498.543	ND	ND	ND
15	498.580	498.542	ND	ND	ND
16	498.566	498.542	ND	ND	ND
17	498.574	498.538	ND	ND	ND
18	498.562	498.529	ND	ND	ND
19	498.560	498.533	ND	ND	ND
20	498.558	498.527	ND	ND	ND
21	498.560	498.526	ND	ND	ND
22	498.554	498.517	ND	ND	ND
23	498.546	498.519	ND	ND	ND
24	498.543	498.521	ND	ND	ND
25	498.538	498.519	ND	ND	ND
26	498.542	498.527	ND	ND	ND
27	498.540	498.526	ND	ND	ND
28	498.538	498.526	ND	ND	ND
29	498.545	498.526	ND	ND	ND
30	498.551	498.522	ND	ND	ND
31	498.555	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-5b: 2019 Daily Water Surface Elevation for CR-WB-MS-02**

DATE	2019											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	ND	ND	ND	ND	ND	498.575	498.558	498.508	498.615	498.581	ND	ND
2	ND	ND	ND	ND	ND	498.577	498.559	498.520	498.619	498.582	ND	ND
3	ND	ND	ND	ND	ND	498.577	498.553	498.538	498.618	498.582	ND	ND
4	ND	ND	ND	ND	ND	498.591	498.551	498.546	498.619	ND	ND	ND
5	ND	ND	ND	ND	ND	498.592	498.546	498.547	498.634	ND	ND	ND
6	ND	ND	ND	ND	ND	498.590	498.545	498.547	498.626	ND	ND	ND
7	ND	ND	ND	ND	ND	498.593	498.545	498.539	498.632	ND	ND	ND
8	ND	ND	ND	ND	ND	498.589	498.540	498.534	498.633	ND	ND	ND
9	ND	ND	ND	ND	ND	498.578	498.538	498.554	498.622	ND	ND	ND
10	ND	ND	ND	ND	ND	498.578	498.532	498.547	498.620	ND	ND	ND
11	ND	ND	ND	ND	ND	498.571	498.531	498.543	498.618	ND	ND	ND
12	ND	ND	ND	ND	ND	498.572	498.533	498.548	498.619	ND	ND	ND
13	ND	ND	ND	ND	ND	498.575	498.527	498.550	498.627	ND	ND	ND
14	ND	ND	ND	ND	ND	498.575	498.530	498.548	498.627	ND	ND	ND
15	ND	ND	ND	ND	ND	498.573	498.529	498.554	498.621	ND	ND	ND
16	ND	ND	ND	ND	498.593	498.575	498.522	498.584	498.621	ND	ND	ND
17	ND	ND	ND	ND	498.592	498.575	498.523	498.617	498.617	ND	ND	ND
18	ND	ND	ND	ND	498.588	498.568	498.523	498.612	498.613	ND	ND	ND
19	ND	ND	ND	ND	498.588	498.567	498.521	498.607	498.612	ND	ND	ND
20	ND	ND	ND	ND	498.593	498.566	498.517	498.607	498.613	ND	ND	ND
21	ND	ND	ND	ND	498.592	498.566	498.514	498.599	498.613	ND	ND	ND
22	ND	ND	ND	ND	498.590	498.563	498.515	498.603	498.609	ND	ND	ND
23	ND	ND	ND	ND	498.594	498.564	498.514	498.602	498.614	ND	ND	ND
24	ND	ND	ND	ND	498.592	498.564	498.517	498.610	498.617	ND	ND	ND
25	ND	ND	ND	ND	498.587	498.560	498.525	498.615	498.602	ND	ND	ND
26	ND	ND	ND	ND	498.587	498.555	498.519	498.614	498.609	ND	ND	ND
27	ND	ND	ND	ND	498.589	498.552	498.518	498.618	498.599	ND	ND	ND
28	ND	ND	ND	ND	498.590	498.551	498.523	498.626	498.591	ND	ND	ND
29	ND	-	ND	ND	498.589	498.548	498.510	498.620	498.589	ND	ND	ND
30	ND	-	ND	ND	498.588	498.558	498.506	498.618	498.588	ND	ND	ND
31	ND	-	ND	-	498.582	-	498.506	498.618	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-5c: 2020 Daily Water Surface Elevation for CR-WB-MS-02**

DATE	2020											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	ND	ND	ND	ND	ND	ND	498.852	498.850	498.880	ND	ND	ND
2	ND	ND	ND	ND	ND	ND	498.860	498.845	498.883	ND	ND	ND
3	ND	ND	ND	ND	ND	ND	498.860	498.838	498.873	ND	ND	ND
4	ND	ND	ND	ND	ND	ND	498.856	498.839	498.869	ND	ND	ND
5	ND	ND	ND	ND	ND	ND	498.855	498.832	498.865	ND	ND	ND
6	ND	ND	ND	ND	ND	498.781	498.850	498.826	498.871	ND	ND	ND
7	ND	ND	ND	ND	ND	498.801	498.845	498.823	498.861	ND	ND	ND
8	ND	ND	ND	ND	ND	498.819	498.841	498.835	498.848	ND	ND	ND
9	ND	ND	ND	ND	ND	498.820	498.833	498.844	498.854	ND	ND	ND
10	ND	ND	ND	ND	ND	498.827	498.828	498.850	498.849	ND	ND	ND
11	ND	ND	ND	ND	ND	498.827	498.823	498.846	498.855	ND	ND	ND
12	ND	ND	ND	ND	ND	498.821	498.820	498.841	498.866	ND	ND	ND
13	ND	ND	ND	ND	ND	498.825	498.821	498.851	498.861	ND	ND	ND
14	ND	ND	ND	ND	ND	498.828	498.832	498.851	498.856	ND	ND	ND
15	ND	ND	ND	ND	ND	498.847	498.832	498.856	498.855	ND	ND	ND
16	ND	ND	ND	ND	ND	498.863	498.828	498.849	498.845	ND	ND	ND
17	ND	ND	ND	ND	ND	498.866	498.829	498.847	498.845	ND	ND	ND
18	ND	ND	ND	ND	ND	498.858	498.845	498.848	498.837	ND	ND	ND
19	ND	ND	ND	ND	ND	498.857	498.856	498.851	498.841	ND	ND	ND
20	ND	ND	ND	ND	ND	498.855	498.854	498.850	498.843	ND	ND	ND
21	ND	ND	ND	ND	ND	498.852	498.852	498.849	498.844	ND	ND	ND
22	ND	ND	ND	ND	ND	498.850	498.863	498.848	498.843	ND	ND	ND
23	ND	ND	ND	ND	ND	498.848	498.865	498.869	498.833	ND	ND	ND
24	ND	ND	ND	ND	ND	498.847	498.874	498.867	498.836	ND	ND	ND
25	ND	ND	ND	ND	ND	498.846	498.873	498.866	498.860	ND	ND	ND
26	ND	ND	ND	ND	ND	498.841	498.871	498.874	498.862	ND	ND	ND
27	ND	ND	ND	ND	ND	498.840	498.863	498.874	ND	ND	ND	ND
28	ND	ND	ND	ND	ND	498.848	498.864	498.875	ND	ND	ND	ND
29	ND	ND	ND	ND	ND	498.849	498.868	498.873	ND	ND	ND	ND
30	ND	-	ND	ND	ND	498.847	498.862	498.882	ND	ND	ND	ND
31	ND	-	ND	-	ND	-	498.856	498.875	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-6a: 2018 Daily Water Surface Elevation for CR-WB-**

DATE	2018				
	AUG	SEP	OCT	NOV	DEC
1	ND	498.307	ND	ND	ND
2	ND	498.312	ND	ND	ND
3	498.359	498.305	ND	ND	ND
4	498.341	498.304	ND	ND	ND
5	498.341	498.299	ND	ND	ND
6	498.345	498.289	ND	ND	ND
7	498.352	498.284	ND	ND	ND
8	498.352	498.289	ND	ND	ND
9	498.354	498.308	ND	ND	ND
10	498.347	498.313	ND	ND	ND
11	498.331	498.308	ND	ND	ND
12	498.326	498.309	ND	ND	ND
13	498.329	498.304	ND	ND	ND
14	498.329	498.297	ND	ND	ND
15	498.321	498.289	ND	ND	ND
16	498.318	498.290	ND	ND	ND
17	498.316	498.291	ND	ND	ND
18	498.307	498.280	ND	ND	ND
19	498.309	498.276	ND	ND	ND
20	498.308	498.274	ND	ND	ND
21	498.300	498.263	ND	ND	ND
22	498.294	498.258	ND	ND	ND
23	498.286	498.247	ND	ND	ND
24	498.288	498.255	ND	ND	ND
25	498.292	498.251	ND	ND	ND
26	498.288	498.253	ND	ND	ND
27	498.284	498.249	ND	ND	ND
28	498.282	498.242	ND	ND	ND
29	498.276	498.240	ND	ND	ND
30	498.289	498.240	ND	ND	ND
31	498.310	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-6b: 2019 Daily Water Surface Elevation for CR-WB-MS-03**

DATE	2019											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	ND	ND	ND	ND	ND	ND	498.294	498.269	498.384	ND	ND	ND
2	ND	ND	ND	ND	ND	498.305	498.291	498.285	498.381	ND	ND	ND
3	ND	ND	ND	ND	ND	498.302	498.292	498.300	498.386	ND	ND	ND
4	ND	ND	ND	ND	ND	498.319	498.289	498.306	498.389	ND	ND	ND
5	ND	ND	ND	ND	ND	498.326	498.289	498.309	498.396	ND	ND	ND
6	ND	ND	ND	ND	ND	498.317	498.290	498.308	498.399	ND	ND	ND
7	ND	ND	ND	ND	ND	498.318	498.288	498.302	498.400	ND	ND	ND
8	ND	ND	ND	ND	ND	498.321	498.286	498.298	498.403	ND	ND	ND
9	ND	ND	ND	ND	ND	498.311	498.282	498.316	498.400	ND	ND	ND
10	ND	ND	ND	ND	ND	498.308	498.277	498.315	498.397	ND	ND	ND
11	ND	ND	ND	ND	ND	498.303	498.280	498.308	498.393	ND	ND	ND
12	ND	ND	ND	ND	ND	498.301	498.281	498.310	498.388	ND	ND	ND
13	ND	ND	ND	ND	ND	498.303	498.278	498.311	498.392	ND	ND	ND
14	ND	ND	ND	ND	ND	498.309	498.276	498.307	498.396	ND	ND	ND
15	ND	ND	ND	ND	ND	498.308	498.275	498.308	498.394	ND	ND	ND
16	ND	ND	ND	ND	ND	498.305	498.274	498.333	498.392	ND	ND	ND
17	ND	ND	ND	ND	ND	498.303	498.269	498.372	498.392	ND	ND	ND
18	ND	ND	ND	ND	ND	498.304	498.272	498.373	498.391	ND	ND	ND
19	ND	ND	ND	ND	ND	498.303	498.268	498.374	498.391	ND	ND	ND
20	ND	ND	ND	ND	ND	498.301	498.267	498.375	498.388	ND	ND	ND
21	ND	ND	ND	ND	ND	498.301	498.266	498.369	498.377	ND	ND	ND
22	ND	ND	ND	ND	ND	498.302	498.264	498.375	498.386	ND	ND	ND
23	ND	ND	ND	ND	ND	498.302	498.261	498.366	498.380	ND	ND	ND
24	ND	ND	ND	ND	ND	498.302	498.261	498.367	498.389	ND	ND	ND
25	ND	ND	ND	ND	ND	498.300	498.273	498.379	498.386	ND	ND	ND
26	ND	ND	ND	ND	ND	498.301	498.280	498.378	498.386	ND	ND	ND
27	ND	ND	ND	ND	ND	498.297	498.274	498.382	498.382	ND	ND	ND
28	ND	ND	ND	ND	ND	498.296	498.274	498.387	498.379	ND	ND	ND
29	ND	-	ND	ND	ND	498.296	498.275	498.390	498.369	ND	ND	ND
30	ND	-	ND	ND	ND	498.298	498.269	498.386	498.355	ND	ND	ND
31	ND	-	ND	-	ND	-	498.262	498.385	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-6c: 2020 Daily Water Surface Elevation for CR-WB-MS-03**

DATE	2020											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	ND	ND	ND	ND	ND	ND	498.601	498.587	498.616	ND	ND	ND
2	ND	ND	ND	ND	ND	ND	498.620	498.583	498.614	ND	ND	ND
3	ND	ND	ND	ND	ND	ND	498.618	498.575	498.609	ND	ND	ND
4	ND	ND	ND	ND	ND	ND	498.610	498.577	498.605	ND	ND	ND
5	ND	ND	ND	ND	ND	ND	498.604	498.567	498.603	ND	ND	ND
6	ND	ND	ND	ND	ND	498.563	498.599	498.561	498.606	ND	ND	ND
7	ND	ND	ND	ND	ND	498.573	498.591	498.561	498.599	ND	ND	ND
8	ND	ND	ND	ND	ND	498.600	498.583	498.569	498.601	ND	ND	ND
9	ND	ND	ND	ND	ND	498.599	498.582	498.575	498.596	ND	ND	ND
10	ND	ND	ND	ND	ND	498.599	498.577	498.579	498.592	ND	ND	ND
11	ND	ND	ND	ND	ND	498.598	498.573	498.578	498.602	ND	ND	ND
12	ND	ND	ND	ND	ND	498.591	498.574	498.577	498.612	ND	ND	ND
13	ND	ND	ND	ND	ND	498.588	498.572	498.610	498.607	ND	ND	ND
14	ND	ND	ND	ND	ND	498.590	498.580	498.593	498.601	ND	ND	ND
15	ND	ND	ND	ND	ND	498.610	498.583	498.591	498.597	ND	ND	ND
16	ND	ND	ND	ND	ND	498.620	498.576	498.587	498.594	ND	ND	ND
17	ND	ND	ND	ND	ND	498.615	498.577	498.585	498.589	ND	ND	ND
18	ND	ND	ND	ND	ND	498.610	498.591	498.590	498.585	ND	ND	ND
19	ND	ND	ND	ND	ND	498.607	498.605	498.592	498.587	ND	ND	ND
20	ND	ND	ND	ND	ND	498.605	498.601	498.593	498.587	ND	ND	ND
21	ND	ND	ND	ND	ND	498.604	498.601	498.591	498.585	ND	ND	ND
22	ND	ND	ND	ND	ND	498.600	498.610	498.591	498.588	ND	ND	ND
23	ND	ND	ND	ND	ND	498.593	498.609	498.615	498.580	ND	ND	ND
24	ND	ND	ND	ND	ND	498.594	498.614	498.615	498.580	ND	ND	ND
25	ND	ND	ND	ND	ND	498.589	498.613	498.618	498.606	ND	ND	ND
26	ND	ND	ND	ND	ND	498.588	498.611	498.624	ND	ND	ND	ND
27	ND	ND	ND	ND	ND	498.582	498.606	498.620	ND	ND	ND	ND
28	ND	ND	ND	ND	ND	498.587	498.607	498.614	ND	ND	ND	ND
29	ND	ND	ND	ND	ND	498.596	498.601	498.610	ND	ND	ND	ND
30	ND	-	ND	ND	ND	498.591	498.597	498.624	ND	ND	ND	ND
31	ND	-	ND	-	ND	-	498.591	498.617	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-7a: 2018 Daily Water Surface Elevation for CR-WB-**

DATE	2018				
	AUG	SEP	OCT	NOV	DEC
1	ND	498.248	498.201	ND	ND
2	ND	498.249	ND	ND	ND
3	ND	498.247	ND	ND	ND
4	ND	498.243	ND	ND	ND
5	498.285	498.240	ND	ND	ND
6	498.290	498.229	ND	ND	ND
7	498.295	498.226	ND	ND	ND
8	498.295	498.233	ND	ND	ND
9	498.295	498.244	ND	ND	ND
10	498.293	498.244	ND	ND	ND
11	498.278	498.253	ND	ND	ND
12	498.265	498.254	ND	ND	ND
13	498.268	498.243	ND	ND	ND
14	498.279	498.237	ND	ND	ND
15	498.260	498.235	ND	ND	ND
16	498.253	498.228	ND	ND	ND
17	498.259	498.225	ND	ND	ND
18	498.244	498.232	ND	ND	ND
19	498.238	498.223	ND	ND	ND
20	498.240	498.225	ND	ND	ND
21	498.247	498.211	ND	ND	ND
22	498.245	498.207	ND	ND	ND
23	498.208	498.211	ND	ND	ND
24	498.216	498.216	ND	ND	ND
25	498.227	498.207	ND	ND	ND
26	498.222	498.220	ND	ND	ND
27	498.223	498.207	ND	ND	ND
28	498.216	498.203	ND	ND	ND
29	498.214	498.206	ND	ND	ND
30	498.225	498.197	ND	ND	ND
31	498.241	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-7b: 2019 Daily Water Surface Elevation for CR-WB-MS-04**

DATE	2019											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	ND	ND	ND	ND	ND	ND	498.252	498.224	498.341	498.327	ND	ND
2	ND	ND	ND	ND	ND	498.254	498.262	498.240	498.345	498.322	ND	ND
3	ND	ND	ND	ND	ND	498.244	498.260	498.264	498.346	ND	ND	ND
4	ND	ND	ND	ND	ND	498.273	498.251	498.273	498.345	ND	ND	ND
5	ND	ND	ND	ND	ND	498.278	498.241	498.267	498.361	ND	ND	ND
6	ND	ND	ND	ND	ND	498.271	498.244	498.268	498.357	ND	ND	ND
7	ND	ND	ND	ND	ND	498.276	498.246	498.263	498.358	ND	ND	ND
8	ND	ND	ND	ND	ND	498.256	498.237	498.258	498.355	ND	ND	ND
9	ND	ND	ND	ND	ND	498.262	498.237	498.268	498.349	ND	ND	ND
10	ND	ND	ND	ND	ND	498.266	498.234	498.271	498.350	ND	ND	ND
11	ND	ND	ND	ND	ND	498.259	498.235	498.269	498.352	ND	ND	ND
12	ND	ND	ND	ND	ND	498.263	498.238	498.270	498.355	ND	ND	ND
13	ND	ND	ND	ND	ND	498.265	498.230	498.271	498.354	ND	ND	ND
14	ND	ND	ND	ND	ND	498.266	498.234	498.270	498.354	ND	ND	ND
15	ND	ND	ND	ND	ND	498.258	498.231	498.270	498.351	ND	ND	ND
16	ND	ND	ND	ND	ND	498.261	498.227	498.288	498.342	ND	ND	ND
17	ND	ND	ND	ND	ND	498.260	498.228	498.311	498.347	ND	ND	ND
18	ND	ND	ND	ND	ND	498.265	498.231	498.329	498.344	ND	ND	ND
19	ND	ND	ND	ND	ND	498.267	498.224	498.330	498.342	ND	ND	ND
20	ND	ND	ND	ND	ND	498.254	498.221	498.333	498.345	ND	ND	ND
21	ND	ND	ND	ND	ND	498.250	498.226	498.327	498.341	ND	ND	ND
22	ND	ND	ND	ND	ND	498.247	498.227	498.335	498.341	ND	ND	ND
23	ND	ND	ND	ND	ND	498.248	498.228	498.331	498.344	ND	ND	ND
24	ND	ND	ND	ND	ND	498.253	498.227	498.334	498.352	ND	ND	ND
25	ND	ND	ND	ND	ND	498.251	498.230	498.336	498.343	ND	ND	ND
26	ND	ND	ND	ND	ND	498.246	498.221	498.333	498.338	ND	ND	ND
27	ND	ND	ND	ND	ND	498.245	498.231	498.339	498.332	ND	ND	ND
28	ND	ND	ND	ND	ND	498.244	498.228	498.343	498.324	ND	ND	ND
29	ND	-	ND	ND	ND	498.245	498.220	498.349	498.325	ND	ND	ND
30	ND	-	ND	ND	ND	498.253	498.224	498.347	498.322	ND	ND	ND
31	ND	-	ND	-	ND	-	498.223	498.342	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-7c: 2020 Daily Water Surface Elevation for CR-WB-MS-04**

DATE	2020											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	ND	ND	ND	ND	ND	ND	498.510	498.519	498.569	ND	ND	ND
2	ND	ND	ND	ND	ND	ND	498.536	498.519	498.567	ND	ND	ND
3	ND	ND	ND	ND	ND	ND	498.545	498.515	498.561	ND	ND	ND
4	ND	ND	ND	ND	ND	ND	498.545	498.513	498.556	ND	ND	ND
5	ND	ND	ND	ND	ND	ND	498.541	498.508	498.553	ND	ND	ND
6	ND	ND	ND	ND	ND	498.495	498.537	498.498	498.558	ND	ND	ND
7	ND	ND	ND	ND	ND	498.490	498.530	498.491	498.545	ND	ND	ND
8	ND	ND	ND	ND	ND	498.499	498.514	498.501	498.543	ND	ND	ND
9	ND	ND	ND	ND	ND	498.518	498.513	498.520	498.543	ND	ND	ND
10	ND	ND	ND	ND	ND	498.527	498.514	498.521	498.537	ND	ND	ND
11	ND	ND	ND	ND	ND	498.523	498.514	498.514	498.545	ND	ND	ND
12	ND	ND	ND	ND	ND	498.518	498.508	498.507	498.558	ND	ND	ND
13	ND	ND	ND	ND	ND	498.520	498.519	498.539	498.552	ND	ND	ND
14	ND	ND	ND	ND	ND	498.520	498.506	498.538	498.543	ND	ND	ND
15	ND	ND	ND	ND	ND	498.534	498.508	498.525	498.544	ND	ND	ND
16	ND	ND	ND	ND	ND	498.554	498.501	498.514	498.534	ND	ND	ND
17	ND	ND	ND	ND	ND	498.541	498.498	498.511	498.532	ND	ND	ND
18	ND	ND	ND	ND	ND	498.540	498.500	498.511	498.526	ND	ND	ND
19	ND	ND	ND	ND	ND	498.539	498.518	498.518	498.529	ND	ND	ND
20	ND	ND	ND	ND	ND	498.537	498.523	498.524	498.530	ND	ND	ND
21	ND	ND	ND	ND	ND	498.536	498.523	498.534	498.532	ND	ND	ND
22	ND	ND	ND	ND	ND	498.535	498.535	498.527	498.531	ND	ND	ND
23	ND	ND	ND	ND	ND	498.533	498.535	498.554	498.523	ND	ND	ND
24	ND	ND	ND	ND	ND	498.532	498.539	498.558	498.520	ND	ND	ND
25	ND	ND	ND	ND	ND	498.526	498.538	498.563	498.546	ND	ND	ND
26	ND	ND	ND	ND	ND	498.524	498.537	498.569	ND	ND	ND	ND
27	ND	ND	ND	ND	ND	498.515	498.532	498.570	ND	ND	ND	ND
28	ND	ND	ND	ND	ND	498.521	498.532	498.566	ND	ND	ND	ND
29	ND	ND	ND	ND	ND	498.527	498.532	498.564	ND	ND	ND	ND
30	ND	-	ND	ND	ND	498.524	498.528	498.577	ND	ND	ND	ND
31	ND	-	ND	-	ND	-	498.523	498.566	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-8a: 2018 Daily Water Surface Elevation for CR-WB-**

DATE	2018				
	AUG	SEP	OCT	NOV	DEC
1	ND	498.277	498.230	ND	ND
2	ND	498.287	ND	ND	ND
3	498.302	498.277	ND	ND	ND
4	498.305	498.273	ND	ND	ND
5	498.285	498.272	ND	ND	ND
6	498.294	498.256	ND	ND	ND
7	498.309	498.241	ND	ND	ND
8	498.311	498.249	ND	ND	ND
9	498.305	498.274	ND	ND	ND
10	498.300	498.268	ND	ND	ND
11	498.309	498.278	ND	ND	ND
12	498.282	498.271	ND	ND	ND
13	498.272	498.264	ND	ND	ND
14	498.280	498.264	ND	ND	ND
15	498.290	498.264	ND	ND	ND
16	498.261	498.254	ND	ND	ND
17	498.263	498.249	ND	ND	ND
18	498.273	498.262	ND	ND	ND
19	498.261	498.254	ND	ND	ND
20	498.252	498.254	ND	ND	ND
21	498.252	498.241	ND	ND	ND
22	498.244	498.231	ND	ND	ND
23	498.210	498.222	ND	ND	ND
24	498.216	498.244	ND	ND	ND
25	498.231	498.236	ND	ND	ND
26	498.230	498.255	ND	ND	ND
27	498.226	498.249	ND	ND	ND
28	498.218	498.246	ND	ND	ND
29	498.223	498.251	ND	ND	ND
30	498.240	498.234	ND	ND	ND
31	498.268	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-8b: 2019 Daily Water Surface Elevation for CR-WB-MS-05**

DATE	2019											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	ND	ND	ND	ND	ND	ND	498.219	498.199	498.341	498.326	ND	ND
2	ND	ND	ND	ND	ND	498.178	498.232	498.216	498.346	498.330	ND	ND
3	ND	ND	ND	ND	ND	498.190	498.235	498.244	498.348	ND	ND	ND
4	ND	ND	ND	ND	ND	498.210	498.228	498.267	498.346	ND	ND	ND
5	ND	ND	ND	ND	ND	498.220	498.219	498.266	498.360	ND	ND	ND
6	ND	ND	ND	ND	ND	498.221	498.219	498.260	498.365	ND	ND	ND
7	ND	ND	ND	ND	ND	498.208	498.217	498.257	498.360	ND	ND	ND
8	ND	ND	ND	ND	ND	498.202	498.212	498.250	498.356	ND	ND	ND
9	ND	ND	ND	ND	ND	498.203	498.212	498.259	498.350	ND	ND	ND
10	ND	ND	ND	ND	ND	498.203	498.212	498.266	498.349	ND	ND	ND
11	ND	ND	ND	ND	ND	498.203	498.211	498.266	498.349	ND	ND	ND
12	ND	ND	ND	ND	ND	498.206	498.210	498.263	498.356	ND	ND	ND
13	ND	ND	ND	ND	ND	498.210	498.207	498.262	498.358	ND	ND	ND
14	ND	ND	ND	ND	ND	498.212	498.206	498.263	498.356	ND	ND	ND
15	ND	ND	ND	ND	ND	498.212	498.206	498.265	498.354	ND	ND	ND
16	ND	ND	ND	ND	ND	498.216	498.203	498.274	498.345	ND	ND	ND
17	ND	ND	ND	ND	ND	498.214	498.203	498.313	498.343	ND	ND	ND
18	ND	ND	ND	ND	ND	498.213	498.203	498.332	498.342	ND	ND	ND
19	ND	ND	ND	ND	ND	498.213	498.195	498.333	498.340	ND	ND	ND
20	ND	ND	ND	ND	ND	498.209	498.186	498.335	498.341	ND	ND	ND
21	ND	ND	ND	ND	ND	498.202	498.185	498.334	498.340	ND	ND	ND
22	ND	ND	ND	ND	ND	498.206	498.188	498.335	498.339	ND	ND	ND
23	ND	ND	ND	ND	ND	498.196	498.189	498.338	498.341	ND	ND	ND
24	ND	ND	ND	ND	ND	498.200	498.190	498.340	498.349	ND	ND	ND
25	ND	ND	ND	ND	ND	498.204	498.196	498.343	498.344	ND	ND	ND
26	ND	ND	ND	ND	ND	498.204	498.189	498.337	498.340	ND	ND	ND
27	ND	ND	ND	ND	ND	498.206	498.199	498.342	498.326	ND	ND	ND
28	ND	ND	ND	ND	ND	498.208	498.197	498.346	498.325	ND	ND	ND
29	ND	-	ND	ND	ND	498.206	498.194	498.351	498.327	ND	ND	ND
30	ND	-	ND	ND	ND	498.213	498.195	498.351	498.324	ND	ND	ND
31	ND	-	ND	-	ND	-	498.195	498.345	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-8c: 2020 Daily Water Surface Elevation for CR-WB-MS-05**

DATE	2020											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	ND	ND	ND	ND	ND	ND	498.500	498.530	498.578	ND	ND	ND
2	ND	ND	ND	ND	ND	ND	498.517	498.528	498.574	ND	ND	ND
3	ND	ND	ND	ND	ND	ND	498.532	498.527	498.570	ND	ND	ND
4	ND	ND	ND	ND	ND	ND	498.536	498.524	498.564	ND	ND	ND
5	ND	ND	ND	ND	ND	ND	498.532	498.520	498.559	ND	ND	ND
6	ND	ND	ND	ND	ND	498.477	498.529	498.511	498.559	ND	ND	ND
7	ND	ND	ND	ND	ND	498.471	498.523	498.501	498.547	ND	ND	ND
8	ND	ND	ND	ND	ND	498.479	498.509	498.511	498.546	ND	ND	ND
9	ND	ND	ND	ND	ND	498.504	498.503	498.530	498.548	ND	ND	ND
10	ND	ND	ND	ND	ND	498.514	498.508	498.554	498.542	ND	ND	ND
11	ND	ND	ND	ND	ND	498.515	498.507	498.539	498.544	ND	ND	ND
12	ND	ND	ND	ND	ND	498.511	498.508	498.531	498.563	ND	ND	ND
13	ND	ND	ND	ND	ND	498.511	498.522	498.557	498.557	ND	ND	ND
14	ND	ND	ND	ND	ND	498.508	498.520	498.566	498.546	ND	ND	ND
15	ND	ND	ND	ND	ND	498.524	498.518	498.555	498.545	ND	ND	ND
16	ND	ND	ND	ND	ND	498.543	498.514	498.542	498.540	ND	ND	ND
17	ND	ND	ND	ND	ND	498.533	498.505	498.534	498.537	ND	ND	ND
18	ND	ND	ND	ND	ND	498.529	498.507	498.535	498.530	ND	ND	ND
19	ND	ND	ND	ND	ND	498.532	498.522	498.539	498.531	ND	ND	ND
20	ND	ND	ND	ND	ND	498.528	498.532	498.543	498.530	ND	ND	ND
21	ND	ND	ND	ND	ND	498.528	498.538	498.537	498.533	ND	ND	ND
22	ND	ND	ND	ND	ND	498.527	498.552	498.529	498.533	ND	ND	ND
23	ND	ND	ND	ND	ND	498.525	498.551	498.554	498.525	ND	ND	ND
24	ND	ND	ND	ND	ND	498.523	498.553	498.564	498.522	ND	ND	ND
25	ND	ND	ND	ND	ND	498.516	498.551	498.570	498.545	ND	ND	ND
26	ND	ND	ND	ND	ND	498.515	498.548	498.575	498.547	ND	ND	ND
27	ND	ND	ND	ND	ND	498.509	498.546	498.579	498.546	ND	ND	ND
28	ND	ND	ND	ND	ND	498.509	498.547	498.575	ND	ND	ND	ND
29	ND	ND	ND	ND	ND	498.517	498.544	498.572	ND	ND	ND	ND
30	ND	-	ND	ND	ND	498.514	498.538	498.584	ND	ND	ND	ND
31	ND	-	ND	-	ND	-	498.534	498.576	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-9a: 2018 Daily Water Surface Elevation for CR-WB-**

DATE	2018				
	AUG	SEP	OCT	NOV	DEC
1	ND	499.888	499.917	ND	ND
2	ND	499.893	499.910	ND	ND
3	ND	499.896	ND	ND	ND
4	ND	499.894	ND	ND	ND
5	ND	499.889	ND	ND	ND
6	499.906	499.891	ND	ND	ND
7	499.912	499.894	ND	ND	ND
8	499.914	499.900	ND	ND	ND
9	499.912	499.914	ND	ND	ND
10	499.909	499.918	ND	ND	ND
11	499.900	499.918	ND	ND	ND
12	499.894	499.919	ND	ND	ND
13	499.888	499.917	ND	ND	ND
14	499.880	499.912	ND	ND	ND
15	499.877	499.912	ND	ND	ND
16	499.877	499.914	ND	ND	ND
17	499.879	499.911	ND	ND	ND
18	499.867	499.905	ND	ND	ND
19	499.866	499.910	ND	ND	ND
20	499.867	499.908	ND	ND	ND
21	499.866	499.906	ND	ND	ND
22	499.864	499.907	ND	ND	ND
23	499.862	499.905	ND	ND	ND
24	499.865	499.908	ND	ND	ND
25	499.873	499.906	ND	ND	ND
26	499.874	499.912	ND	ND	ND
27	499.871	499.913	ND	ND	ND
28	499.868	499.913	ND	ND	ND
29	499.873	499.916	ND	ND	ND
30	499.885	499.916	ND	ND	ND
31	499.898	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-9b: 2019 Daily Water Surface Elevation for CR-WB-TI-01**

DATE	2019											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	ND	ND	ND	ND	ND	499.964	499.898	499.849	499.997	500.024	ND	ND
2	ND	ND	ND	ND	ND	499.961	499.897	499.865	499.997	ND	ND	ND
3	ND	ND	ND	ND	ND	499.949	499.903	499.886	500.000	ND	ND	ND
4	ND	ND	ND	ND	ND	499.948	499.899	499.898	500.002	ND	ND	ND
5	ND	ND	ND	ND	ND	499.948	499.896	499.900	500.015	ND	ND	ND
6	ND	ND	ND	ND	ND	499.949	499.905	499.897	500.023	ND	ND	ND
7	ND	ND	ND	ND	ND	499.953	499.902	499.898	500.025	ND	ND	ND
8	ND	ND	ND	ND	ND	499.941	499.897	499.900	500.029	ND	ND	ND
9	ND	ND	ND	ND	ND	499.942	499.888	499.915	500.030	ND	ND	ND
10	ND	ND	ND	ND	ND	499.939	499.883	499.909	500.029	ND	ND	ND
11	ND	ND	ND	ND	ND	499.937	499.892	499.913	500.026	ND	ND	ND
12	ND	ND	ND	ND	ND	499.937	499.890	499.921	500.032	ND	ND	ND
13	ND	ND	ND	ND	ND	499.944	499.883	499.921	500.037	ND	ND	ND
14	ND	ND	ND	ND	ND	499.942	499.884	499.921	500.043	ND	ND	ND
15	ND	ND	ND	ND	ND	499.937	499.889	499.927	500.039	ND	ND	ND
16	ND	ND	ND	ND	ND	499.942	499.882	499.948	500.044	ND	ND	ND
17	ND	ND	ND	ND	ND	499.938	499.878	499.971	500.037	ND	ND	ND
18	ND	ND	ND	ND	499.980	499.935	499.875	499.972	500.031	ND	ND	ND
19	ND	ND	ND	ND	499.973	499.932	499.874	499.976	500.029	ND	ND	ND
20	ND	ND	ND	ND	499.973	499.930	499.854	499.976	500.029	ND	ND	ND
21	ND	ND	ND	ND	499.975	499.921	499.865	499.974	500.031	ND	ND	ND
22	ND	ND	ND	ND	499.979	499.926	499.864	499.977	500.034	ND	ND	ND
23	ND	ND	ND	ND	499.979	499.922	499.857	499.975	500.032	ND	ND	ND
24	ND	ND	ND	ND	499.974	499.917	499.859	499.989	500.033	ND	ND	ND
25	ND	ND	ND	ND	499.964	499.915	499.862	499.999	500.022	ND	ND	ND
26	ND	ND	ND	ND	499.966	499.913	499.853	499.990	500.026	ND	ND	ND
27	ND	ND	ND	ND	499.967	499.912	499.853	499.996	500.027	ND	ND	ND
28	ND	ND	ND	ND	499.968	499.908	499.853	499.999	500.022	ND	ND	ND
29	ND	-	ND	ND	499.969	499.904	499.847	500.000	500.029	ND	ND	ND
30	ND	-	ND	ND	499.951	499.898	499.848	499.999	500.027	ND	ND	ND
31	ND	-	ND	-	499.953	-	499.850	499.998	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-9c: 2020 Daily Water Surface Elevation for CR-WB-TI-01**

DATE	2020											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	ND	ND	ND	ND	ND	ND	500.329	500.311	500.367	ND	ND	ND
2	ND	ND	ND	ND	ND	ND	500.328	500.308	500.367	ND	ND	ND
3	ND	ND	ND	ND	ND	ND	500.320	500.303	500.363	ND	ND	ND
4	ND	ND	ND	ND	ND	500.292	500.314	500.296	500.363	ND	ND	ND
5	ND	ND	ND	ND	ND	500.289	500.310	500.285	500.361	ND	ND	ND
6	ND	ND	ND	ND	ND	500.284	500.304	500.286	500.369	ND	ND	ND
7	ND	ND	ND	ND	ND	500.295	500.302	500.285	500.362	ND	ND	ND
8	ND	ND	ND	ND	ND	500.316	500.299	500.286	500.353	ND	ND	ND
9	ND	ND	ND	ND	ND	500.308	500.292	500.285	500.358	ND	ND	ND
10	ND	ND	ND	ND	ND	500.316	500.292	500.311	500.357	ND	ND	ND
11	ND	ND	ND	ND	ND	500.319	500.289	500.314	500.363	ND	ND	ND
12	ND	ND	ND	ND	ND	500.313	500.289	500.320	500.371	ND	ND	ND
13	ND	ND	ND	ND	ND	500.314	500.291	500.333	500.371	ND	ND	ND
14	ND	ND	ND	ND	ND	500.324	500.294	500.331	500.367	ND	ND	ND
15	ND	ND	ND	ND	ND	500.333	500.290	500.327	500.365	ND	ND	ND
16	ND	ND	ND	ND	ND	500.341	500.294	500.330	500.362	ND	ND	ND
17	ND	ND	ND	ND	ND	500.344	500.306	500.332	500.364	ND	ND	ND
18	ND	ND	ND	ND	ND	500.333	500.321	500.337	500.359	ND	ND	ND
19	ND	ND	ND	ND	ND	500.332	500.329	500.335	500.362	ND	ND	ND
20	ND	ND	ND	ND	ND	500.329	500.329	500.334	500.364	ND	ND	ND
21	ND	ND	ND	ND	ND	500.326	500.331	500.337	500.366	ND	ND	ND
22	ND	ND	ND	ND	ND	500.321	500.337	500.339	500.367	ND	ND	ND
23	ND	ND	ND	ND	ND	500.317	500.332	500.355	500.363	ND	ND	ND
24	ND	ND	ND	ND	ND	500.316	500.333	500.355	ND	ND	ND	ND
25	ND	ND	ND	ND	ND	500.314	500.328	500.356	ND	ND	ND	ND
26	ND	ND	ND	ND	ND	500.310	500.330	500.356	ND	ND	ND	ND
27	ND	ND	ND	ND	ND	500.310	500.327	500.357	ND	ND	ND	ND
28	ND	ND	ND	ND	ND	500.316	500.332	500.358	ND	ND	ND	ND
29	ND	ND	ND	ND	ND	500.321	500.326	500.358	ND	ND	ND	ND
30	ND	-	ND	ND	ND	500.322	500.319	500.366	ND	ND	ND	ND
31	ND	-	ND	-	ND	-	500.314	500.359	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-10a: 2018 Daily Water Surface Elevation for CR-WE**

DATE	2018				
	AUG	SEP	OCT	NOV	DEC
1	ND	499.414	499.441	ND	ND
2	ND	499.419	499.440	ND	ND
3	ND	499.415	ND	ND	ND
4	ND	499.421	ND	ND	ND
5	ND	499.418	ND	ND	ND
6	499.376	499.418	ND	ND	ND
7	499.387	499.419	ND	ND	ND
8	499.394	499.415	ND	ND	ND
9	499.397	499.436	ND	ND	ND
10	499.394	499.441	ND	ND	ND
11	499.384	499.442	ND	ND	ND
12	499.381	499.443	ND	ND	ND
13	499.378	499.441	ND	ND	ND
14	499.378	499.444	ND	ND	ND
15	499.369	499.440	ND	ND	ND
16	499.369	499.445	ND	ND	ND
17	499.372	499.443	ND	ND	ND
18	499.365	499.441	ND	ND	ND
19	499.371	499.437	ND	ND	ND
20	499.374	499.436	ND	ND	ND
21	499.377	499.431	ND	ND	ND
22	499.372	499.430	ND	ND	ND
23	499.358	499.434	ND	ND	ND
24	499.366	499.433	ND	ND	ND
25	499.377	499.435	ND	ND	ND
26	499.381	499.444	ND	ND	ND
27	499.386	499.442	ND	ND	ND
28	499.386	499.441	ND	ND	ND
29	499.392	499.443	ND	ND	ND
30	499.404	499.440	ND	ND	ND
31	499.417	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-10b: 2019 Daily Water Surface Elevation for CR-WB-TI-02**

DATE	2019											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	ND	ND	ND	ND	ND	499.281	499.274	499.267	499.428	499.413	ND	ND
2	ND	ND	ND	ND	ND	499.288	499.283	499.288	499.426	ND	ND	ND
3	ND	ND	ND	ND	ND	499.273	499.281	499.315	499.426	ND	ND	ND
4	ND	ND	ND	ND	ND	499.289	499.278	499.343	499.427	ND	ND	ND
5	ND	ND	ND	ND	ND	499.284	499.277	499.339	499.444	ND	ND	ND
6	ND	ND	ND	ND	ND	499.294	499.284	499.340	499.444	ND	ND	ND
7	ND	ND	ND	ND	ND	499.288	499.286	499.336	499.443	ND	ND	ND
8	ND	ND	ND	ND	ND	499.288	499.276	499.339	499.445	ND	ND	ND
9	ND	ND	ND	ND	ND	499.290	499.274	499.363	499.440	ND	ND	ND
10	ND	ND	ND	ND	ND	499.292	499.271	499.365	499.437	ND	ND	ND
11	ND	ND	ND	ND	ND	499.287	499.273	499.367	499.434	ND	ND	ND
12	ND	ND	ND	ND	ND	499.293	499.273	499.371	499.435	ND	ND	ND
13	ND	ND	ND	ND	ND	499.296	499.270	499.369	499.433	ND	ND	ND
14	ND	ND	ND	ND	ND	499.290	499.270	499.368	499.432	ND	ND	ND
15	ND	ND	ND	ND	ND	499.293	499.273	499.372	499.433	ND	ND	ND
16	ND	ND	ND	ND	ND	499.300	499.281	499.395	499.431	ND	ND	ND
17	ND	ND	ND	ND	ND	499.300	499.280	499.427	499.430	ND	ND	ND
18	ND	ND	ND	ND	499.311	499.302	499.277	499.431	499.428	ND	ND	ND
19	ND	ND	ND	ND	499.308	499.300	499.277	499.431	499.422	ND	ND	ND
20	ND	ND	ND	ND	499.307	499.293	499.277	499.429	499.424	ND	ND	ND
21	ND	ND	ND	ND	499.305	499.283	499.271	499.431	499.423	ND	ND	ND
22	ND	ND	ND	ND	499.303	499.282	499.267	499.438	499.424	ND	ND	ND
23	ND	ND	ND	ND	499.306	499.282	499.270	499.430	499.428	ND	ND	ND
24	ND	ND	ND	ND	499.295	499.280	499.273	499.440	499.436	ND	ND	ND
25	ND	ND	ND	ND	499.292	499.277	499.274	499.438	499.433	ND	ND	ND
26	ND	ND	ND	ND	499.293	499.277	499.280	499.429	499.433	ND	ND	ND
27	ND	ND	ND	ND	499.297	499.280	499.278	499.437	499.428	ND	ND	ND
28	ND	ND	ND	ND	499.301	499.277	499.270	499.439	499.425	ND	ND	ND
29	ND	-	ND	ND	499.301	499.287	499.273	499.438	499.421	ND	ND	ND
30	ND	-	ND	ND	499.275	499.290	499.274	499.435	499.417	ND	ND	ND
31	ND	-	ND	-	499.282	-	499.266	499.431	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-10c: 2020 Daily Water Surface Elevation for CR-WB-TI-02**

DATE	2020											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	ND	ND	ND	ND	ND	ND	499.506	499.476	499.534	ND	ND	ND
2	ND	ND	ND	ND	ND	ND	499.520	499.475	499.532	ND	ND	ND
3	ND	ND	ND	ND	ND	ND	499.517	499.472	499.524	ND	ND	ND
4	ND	ND	ND	ND	ND	499.512	499.513	499.465	499.519	ND	ND	ND
5	ND	ND	ND	ND	ND	499.511	499.509	499.462	499.513	ND	ND	ND
6	ND	ND	ND	ND	ND	499.497	499.505	499.459	499.514	ND	ND	ND
7	ND	ND	ND	ND	ND	499.499	499.503	499.453	499.504	ND	ND	ND
8	ND	ND	ND	ND	ND	499.525	499.497	499.463	499.494	ND	ND	ND
9	ND	ND	ND	ND	ND	499.533	499.487	499.473	499.497	ND	ND	ND
10	ND	ND	ND	ND	ND	499.529	499.490	499.487	499.493	ND	ND	ND
11	ND	ND	ND	ND	ND	499.533	499.491	499.490	499.498	ND	ND	ND
12	ND	ND	ND	ND	ND	499.527	499.490	499.493	499.505	ND	ND	ND
13	ND	ND	ND	ND	ND	499.521	499.491	499.513	499.501	ND	ND	ND
14	ND	ND	ND	ND	ND	499.525	499.493	499.512	499.494	ND	ND	ND
15	ND	ND	ND	ND	ND	499.532	499.493	499.514	499.492	ND	ND	ND
16	ND	ND	ND	ND	ND	499.535	499.499	499.510	499.484	ND	ND	ND
17	ND	ND	ND	ND	ND	499.537	499.499	499.509	499.485	ND	ND	ND
18	ND	ND	ND	ND	ND	499.531	499.516	499.511	499.479	ND	ND	ND
19	ND	ND	ND	ND	ND	499.529	499.528	499.517	499.482	ND	ND	ND
20	ND	ND	ND	ND	ND	499.518	499.528	499.522	499.482	ND	ND	ND
21	ND	ND	ND	ND	ND	499.512	499.535	499.519	499.483	ND	ND	ND
22	ND	ND	ND	ND	ND	499.508	499.539	499.519	499.482	ND	ND	ND
23	ND	ND	ND	ND	ND	499.500	499.531	499.546	499.477	ND	ND	ND
24	ND	ND	ND	ND	ND	499.501	499.528	499.546	ND	ND	ND	ND
25	ND	ND	ND	ND	ND	499.498	499.519	499.544	ND	ND	ND	ND
26	ND	ND	ND	ND	ND	499.495	499.517	499.545	ND	ND	ND	ND
27	ND	ND	ND	ND	ND	499.493	499.512	499.541	ND	ND	ND	ND
28	ND	ND	ND	ND	ND	499.493	499.511	499.537	ND	ND	ND	ND
29	ND	ND	ND	ND	ND	499.506	499.497	499.532	ND	ND	ND	ND
30	ND	-	ND	ND	ND	499.503	499.488	499.539	ND	ND	ND	ND
31	ND	-	ND	-	ND	-	499.486	499.530	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-11: 2020 Daily Water Surface Elevation for HC-WB-MS-01**

DATE	2020											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	ND	ND	ND	ND	ND	ND	99.323	99.341	99.398	ND	ND	ND
2	ND	ND	ND	ND	ND	ND	99.326	99.334	99.399	ND	ND	ND
3	ND	ND	ND	ND	ND	ND	99.322	99.334	99.395	ND	ND	ND
4	ND	ND	ND	ND	ND	ND	99.322	99.332	99.392	ND	ND	ND
5	ND	ND	ND	ND	ND	ND	99.319	99.326	99.391	ND	ND	ND
6	ND	ND	ND	ND	ND	ND	99.314	99.322	99.391	ND	ND	ND
7	ND	ND	ND	ND	ND	ND	99.312	99.318	99.385	ND	ND	ND
8	ND	ND	ND	ND	ND	99.289	99.308	99.327	99.378	ND	ND	ND
9	ND	ND	ND	ND	ND	99.292	99.300	99.331	99.378	ND	ND	ND
10	ND	ND	ND	ND	ND	99.307	99.294	99.355	99.377	ND	ND	ND
11	ND	ND	ND	ND	ND	99.311	99.291	99.356	99.383	ND	ND	ND
12	ND	ND	ND	ND	ND	99.312	99.293	99.357	99.388	ND	ND	ND
13	ND	ND	ND	ND	ND	99.308	99.291	99.363	99.390	ND	ND	ND
14	ND	ND	ND	ND	ND	99.309	99.298	99.366	99.388	ND	ND	ND
15	ND	ND	ND	ND	ND	99.325	99.302	99.369	99.384	ND	ND	ND
16	ND	ND	ND	ND	ND	99.336	99.303	99.367	99.380	ND	ND	ND
17	ND	ND	ND	ND	ND	99.338	99.304	99.366	99.379	ND	ND	ND
18	ND	ND	ND	ND	ND	99.336	99.319	99.367	99.375	ND	ND	ND
19	ND	ND	ND	ND	ND	99.337	99.316	99.363	99.375	ND	ND	ND
20	ND	ND	ND	ND	ND	99.334	99.315	99.362	99.375	ND	ND	ND
21	ND	ND	ND	ND	ND	99.327	99.319	99.359	99.373	ND	ND	ND
22	ND	ND	ND	ND	ND	99.323	99.342	99.358	99.373	ND	ND	ND
23	ND	ND	ND	ND	ND	99.322	99.355	99.378	99.371	ND	ND	ND
24	ND	ND	ND	ND	ND	99.321	99.363	99.380	99.372	ND	ND	ND
25	ND	ND	ND	ND	ND	99.318	99.366	99.381	99.370	ND	ND	ND
26	ND	ND	ND	ND	ND	99.315	99.362	99.385	99.375	ND	ND	ND
27	ND	ND	ND	ND	ND	99.318	99.358	99.385	99.376	ND	ND	ND
28	ND	ND	ND	ND	ND	99.319	99.357	99.387	99.355	ND	ND	ND
29	ND	ND	ND	ND	ND	99.326	99.357	99.389	ND	ND	ND	ND
30	ND	-	ND	ND	ND	99.321	99.352	99.397	ND	ND	ND	ND
31	ND	-	ND	-	ND	-	99.346	99.396	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-12a: 2018 Daily Water Surface Elevation for CR-WC**

DATE	2018				
	AUG	SEP	OCT	NOV	DEC
1	ND	526.750	ND	526.662	526.648
2	ND	526.747	526.694	526.663	526.649
3	ND	526.743	526.686	526.667	526.665
4	ND	526.739	526.684	526.654	526.648
5	ND	526.736	526.678	526.651	526.645
6	ND	526.728	526.677	526.648	526.647
7	526.818	526.723	526.675	526.646	526.645
8	526.820	526.723	526.674	526.645	526.648
9	526.816	526.736	526.677	526.641	526.653
10	526.815	526.736	526.678	526.643	526.653
11	526.809	526.735	526.680	526.643	526.653
12	526.799	526.736	526.676	526.643	526.660
13	526.793	526.733	526.669	526.647	526.654
14	526.788	526.729	526.675	526.649	526.649
15	526.783	526.726	526.681	526.641	526.660
16	526.772	526.726	526.675	526.649	526.669
17	526.769	526.724	526.679	526.645	526.657
18	526.770	526.720	526.685	526.646	526.655
19	526.762	526.714	526.675	526.652	526.655
20	526.758	526.710	526.682	526.650	526.657
21	526.754	526.707	526.680	526.662	526.655
22	526.748	526.704	526.673	526.655	526.650
23	526.737	526.697	526.675	526.643	526.645
24	526.738	526.697	526.670	526.642	526.643
25	526.739	526.692	526.672	526.644	526.642
26	526.737	526.697	526.673	526.646	526.641
27	526.735	526.700	526.670	526.647	526.640
28	526.731	526.697	526.668	526.645	526.638
29	526.729	526.699	526.666	526.650	526.637
30	526.734	526.699	526.666	526.648	526.637
31	526.746	-	526.665	-	526.637

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-12b: 2019 Daily Water Surface Elevation for CR-WC-MS-01**

DATE	2019											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	526.651	526.637	526.622	526.815	526.827	526.833	526.813	526.788	526.869	ND	ND	ND
2	526.658	526.637	526.620	526.794	526.841	526.840	526.818	526.793	526.867	ND	ND	ND
3	526.660	526.635	526.633	526.788	526.844	526.834	526.807	526.810	526.867	ND	ND	ND
4	526.654	526.633	526.647	526.793	526.845	526.826	526.802	526.819	526.868	ND	ND	ND
5	526.647	526.633	526.646	526.797	526.847	526.817	526.800	526.823	526.886	ND	ND	ND
6	526.651	526.633	526.652	526.815	526.849	526.810	526.804	526.824	526.876	ND	ND	ND
7	526.647	526.636	526.660	526.815	526.849	526.811	526.805	526.811	526.872	ND	ND	ND
8	526.642	526.638	526.666	526.813	526.854	526.812	526.799	526.808	526.871	ND	ND	ND
9	526.641	526.641	526.674	526.819	526.856	526.808	526.798	526.828	526.868	ND	ND	ND
10	526.647	526.644	526.686	526.822	526.856	526.799	526.796	526.825	526.866	ND	ND	ND
11	526.649	526.647	526.704	526.830	526.859	526.780	526.796	526.818	526.863	ND	ND	ND
12	526.655	526.650	526.706	526.833	526.861	526.776	526.797	526.817	526.859	ND	ND	ND
13	526.649	526.645	526.710	526.835	526.859	526.780	526.794	526.819	526.857	ND	ND	ND
14	526.648	526.644	526.724	526.836	526.863	526.784	526.795	526.820	526.857	ND	ND	ND
15	526.644	526.645	526.746	526.832	526.854	526.785	526.795	526.819	526.856	ND	ND	ND
16	526.645	526.644	526.751	526.835	526.857	526.787	526.793	526.846	526.852	ND	ND	ND
17	526.641	526.641	526.772	526.839	526.864	526.788	526.791	526.893	526.844	ND	ND	ND
18	526.638	526.641	526.784	526.842	526.867	526.792	526.789	526.893	526.840	ND	ND	ND
19	526.637	526.646	526.801	526.844	526.866	526.801	526.786	526.891	526.830	ND	ND	ND
20	526.642	526.642	526.815	526.839	526.865	526.802	526.785	526.888	526.828	ND	ND	ND
21	526.644	526.638	526.819	526.850	526.863	526.807	526.787	526.879	526.822	ND	ND	ND
22	526.644	526.638	526.820	526.858	526.857	526.809	526.786	526.880	526.821	ND	ND	ND
23	526.638	526.635	526.806	526.860	526.856	526.816	526.784	526.876	526.828	ND	ND	ND
24	526.635	526.631	526.806	526.855	526.852	526.818	526.784	526.875	526.833	ND	ND	ND
25	526.638	526.629	526.817	526.847	526.844	526.818	526.792	526.878	526.827	ND	ND	ND
26	526.643	526.636	526.818	526.845	526.855	526.815	526.798	526.875	526.824	ND	ND	ND
27	526.647	526.639	526.809	526.841	526.853	526.809	526.788	526.882	526.821	ND	ND	ND
28	526.639	526.632	526.814	526.842	526.852	526.805	526.790	526.883	526.819	ND	ND	ND
29	526.635	-	526.810	526.842	526.843	526.809	526.786	526.880	526.815	ND	ND	ND
30	526.638	-	526.811	526.828	526.838	526.817	526.784	526.874	ND	ND	ND	ND
31	526.640	-	526.815	-	526.835	-	526.783	526.871	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-12c: 2020 Daily Water Surface Elevation for CR-WC-MS-01**

DATE	2020											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	ND	ND	ND	ND	ND	526.953	527.027	527.035	526.991	ND	ND	ND
2	ND	ND	ND	ND	ND	526.948	527.043	527.029	526.992	ND	ND	ND
3	ND	ND	ND	ND	526.933	526.941	527.044	527.025	526.980	ND	ND	ND
4	ND	ND	ND	ND	526.935	526.936	527.038	527.025	526.980	ND	ND	ND
5	ND	ND	ND	ND	526.934	526.937	527.037	527.012	526.981	ND	ND	ND
6	ND	ND	ND	ND	526.932	526.934	527.025	527.002	526.986	ND	ND	ND
7	ND	ND	ND	ND	526.931	526.947	527.012	527.000	526.981	ND	ND	ND
8	ND	ND	ND	ND	526.930	526.975	527.005	527.012	526.976	ND	ND	ND
9	ND	ND	ND	ND	526.928	526.981	527.003	527.032	526.972	ND	ND	ND
10	ND	ND	ND	ND	526.929	526.982	526.994	526.990	526.971	ND	ND	ND
11	ND	ND	ND	ND	526.928	526.982	526.996	526.975	526.980	ND	ND	ND
12	ND	ND	ND	ND	526.925	526.982	527.006	526.975	526.971	ND	ND	ND
13	ND	ND	ND	ND	526.921	526.990	527.013	526.992	526.962	ND	ND	ND
14	ND	ND	ND	ND	526.939	526.991	527.017	526.989	526.957	ND	ND	ND
15	ND	ND	ND	ND	526.938	527.015	527.014	526.979	526.952	ND	ND	ND
16	ND	ND	ND	ND	526.929	527.027	527.007	526.970	526.943	ND	ND	ND
17	ND	ND	ND	ND	526.925	527.028	527.003	526.972	526.944	ND	ND	ND
18	ND	ND	ND	ND	526.923	527.028	527.018	526.978	526.944	ND	ND	ND
19	ND	ND	ND	ND	526.926	527.024	527.039	526.984	526.947	ND	ND	ND
20	ND	ND	ND	ND	526.923	527.021	527.037	526.980	526.946	ND	ND	ND
21	ND	ND	ND	ND	526.929	527.023	527.040	526.974	526.933	ND	ND	ND
22	ND	ND	ND	ND	526.940	527.020	527.070	526.974	526.924	ND	ND	ND
23	ND	ND	ND	ND	526.941	527.019	527.073	527.003	526.917	ND	ND	ND
24	ND	ND	ND	ND	526.939	527.017	527.081	527.004	526.918	ND	ND	ND
25	ND	ND	ND	ND	526.938	527.013	527.077	527.007	ND	ND	ND	ND
26	ND	ND	ND	ND	526.933	527.004	527.075	527.007	ND	ND	ND	ND
27	ND	ND	ND	ND	526.941	527.005	527.065	527.000	ND	ND	ND	ND
28	ND	ND	ND	ND	526.939	527.013	527.061	526.997	ND	ND	ND	ND
29	ND	ND	ND	ND	526.939	527.021	527.058	527.002	ND	ND	ND	ND
30	ND	-	ND	ND	526.935	527.015	527.053	527.008	ND	ND	ND	ND
31	ND	-	ND	-	526.931	-	527.042	526.999	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-13a: 2018 Mean Daily Discharge for CR-WC-MS-01**

DATE	2018				
	AUG	SEP	OCT	NOV	DEC
1	ND	0.198	ND	0.106	0.095
2	ND	0.195	0.136	0.107	0.095
3	ND	0.189	0.128	0.110	0.108
4	ND	0.185	0.126	0.099	0.095
5	ND	0.181	0.121	0.097	0.092
6	ND	0.173	0.120	0.095	0.094
7	0.293	0.166	0.118	0.093	0.092
8	0.295	0.167	0.117	0.093	0.094
9	0.289	0.180	0.120	0.089	0.098
10	0.287	0.181	0.121	0.091	0.098
11	0.279	0.180	0.122	0.091	0.098
12	0.264	0.181	0.119	0.091	0.103
13	0.257	0.177	0.113	0.094	0.099
14	0.249	0.173	0.118	0.096	0.095
15	0.242	0.169	0.124	0.089	0.104
16	0.228	0.169	0.118	0.095	0.112
17	0.223	0.167	0.121	0.092	0.101
18	0.224	0.163	0.127	0.093	0.100
19	0.214	0.156	0.118	0.098	0.099
20	0.209	0.152	0.124	0.096	0.101
21	0.204	0.149	0.122	0.106	0.099
22	0.197	0.146	0.116	0.100	0.095
23	0.184	0.139	0.118	0.091	0.091
24	0.186	0.139	0.114	0.090	0.090
25	0.186	0.134	0.115	0.092	0.090
26	0.184	0.139	0.116	0.093	0.088
27	0.181	0.142	0.114	0.093	0.087
28	0.177	0.139	0.111	0.092	0.086
29	0.175	0.141	0.109	0.096	0.085
30	0.180	0.141	0.110	0.094	0.085
31	0.194	-	0.108	-	0.086

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

Table D-13b: 2019 Mean Daily Discharge for CR-WC-MS-01												
DATE	2019											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.096	0.085	0.074	0.274	0.291	0.298	0.269	0.234	0.351	ND	ND	ND
2	0.102	0.085	0.072	0.246	0.312	0.309	0.276	0.240	0.348	ND	ND	ND
3	0.103	0.083	0.081	0.238	0.317	0.301	0.260	0.264	0.349	ND	ND	ND
4	0.099	0.082	0.092	0.244	0.318	0.288	0.253	0.276	0.349	ND	ND	ND
5	0.093	0.082	0.091	0.251	0.321	0.275	0.251	0.281	0.379	ND	ND	ND
6	0.096	0.082	0.095	0.275	0.324	0.265	0.256	0.283	0.362	ND	ND	ND
7	0.093	0.084	0.102	0.274	0.325	0.267	0.257	0.264	0.356	ND	ND	ND
8	0.089	0.085	0.107	0.271	0.333	0.269	0.250	0.260	0.354	ND	ND	ND
9	0.088	0.087	0.113	0.280	0.335	0.262	0.247	0.289	0.350	ND	ND	ND
10	0.093	0.090	0.124	0.284	0.335	0.250	0.245	0.284	0.346	ND	ND	ND
11	0.094	0.092	0.141	0.296	0.340	0.225	0.245	0.274	0.341	ND	ND	ND
12	0.099	0.094	0.144	0.300	0.344	0.220	0.246	0.273	0.335	ND	ND	ND
13	0.094	0.090	0.148	0.303	0.340	0.224	0.242	0.275	0.332	ND	ND	ND
14	0.094	0.090	0.162	0.305	0.347	0.230	0.244	0.277	0.331	ND	ND	ND
15	0.090	0.091	0.186	0.299	0.332	0.231	0.243	0.276	0.329	ND	ND	ND
16	0.091	0.090	0.192	0.303	0.336	0.234	0.241	0.317	0.323	ND	ND	ND
17	0.088	0.088	0.218	0.309	0.347	0.235	0.238	0.392	0.311	ND	ND	ND
18	0.086	0.087	0.233	0.315	0.353	0.240	0.235	0.392	0.305	ND	ND	ND
19	0.085	0.091	0.255	0.318	0.352	0.253	0.231	0.390	0.291	ND	ND	ND
20	0.088	0.088	0.275	0.310	0.350	0.254	0.230	0.383	0.288	ND	ND	ND
21	0.091	0.085	0.281	0.326	0.346	0.260	0.232	0.368	0.279	ND	ND	ND
22	0.090	0.085	0.283	0.340	0.337	0.264	0.232	0.370	0.277	ND	ND	ND
23	0.085	0.083	0.262	0.342	0.334	0.273	0.229	0.362	0.287	ND	ND	ND
24	0.083	0.080	0.263	0.335	0.328	0.276	0.228	0.362	0.295	ND	ND	ND
25	0.085	0.079	0.277	0.322	0.316	0.276	0.239	0.367	0.285	ND	ND	ND
26	0.089	0.083	0.280	0.318	0.333	0.272	0.248	0.361	0.281	ND	ND	ND
27	0.092	0.086	0.267	0.312	0.330	0.262	0.234	0.373	0.276	ND	ND	ND
28	0.086	0.080	0.273	0.313	0.328	0.258	0.236	0.376	0.273	ND	ND	ND
29	0.084	-	0.268	0.314	0.313	0.263	0.231	0.370	0.268	ND	ND	ND
30	0.085	-	0.269	0.292	0.306	0.275	0.229	0.360	ND	ND	ND	ND
31	0.087	-	0.275	-	0.302	-	0.228	0.355	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

Table D-13c: 2020 Mean Daily Discharge for CR-WC-MS-01												
DATE	2020											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	ND	ND	ND	ND	ND	0.559	0.719	0.707	0.579	ND	ND	ND
2	ND	ND	ND	ND	ND	0.551	0.758	0.692	0.580	ND	ND	ND
3	ND	ND	ND	ND	0.454	0.540	0.759	0.683	0.555	ND	ND	ND
4	ND	ND	ND	ND	0.460	0.531	0.743	0.682	0.552	ND	ND	ND
5	ND	ND	ND	ND	0.460	0.536	0.740	0.649	0.555	ND	ND	ND
6	ND	ND	ND	ND	0.458	0.532	0.709	0.627	0.563	ND	ND	ND
7	ND	ND	ND	ND	0.458	0.559	0.676	0.620	0.553	ND	ND	ND
8	ND	ND	ND	ND	0.458	0.618	0.659	0.648	0.541	ND	ND	ND
9	ND	ND	ND	ND	0.457	0.631	0.654	0.694	0.533	ND	ND	ND
10	ND	ND	ND	ND	0.462	0.633	0.633	0.595	0.529	ND	ND	ND
11	ND	ND	ND	ND	0.462	0.631	0.635	0.563	0.547	ND	ND	ND
12	ND	ND	ND	ND	0.458	0.632	0.658	0.563	0.529	ND	ND	ND
13	ND	ND	ND	ND	0.452	0.648	0.673	0.598	0.508	ND	ND	ND
14	ND	ND	ND	ND	0.490	0.649	0.683	0.590	0.497	ND	ND	ND
15	ND	ND	ND	ND	0.489	0.704	0.675	0.568	0.487	ND	ND	ND
16	ND	ND	ND	ND	0.474	0.734	0.656	0.548	0.469	ND	ND	ND
17	ND	ND	ND	ND	0.468	0.734	0.648	0.551	0.469	ND	ND	ND
18	ND	ND	ND	ND	0.468	0.735	0.682	0.563	0.469	ND	ND	ND
19	ND	ND	ND	ND	0.475	0.723	0.732	0.575	0.475	ND	ND	ND
20	ND	ND	ND	ND	0.471	0.714	0.725	0.566	0.472	ND	ND	ND
21	ND	ND	ND	ND	0.485	0.719	0.730	0.553	0.445	ND	ND	ND
22	ND	ND	ND	ND	0.509	0.711	0.805	0.552	0.429	ND	ND	ND
23	ND	ND	ND	ND	0.513	0.708	0.813	0.612	0.416	ND	ND	ND
24	ND	ND	ND	ND	0.512	0.702	0.833	0.614	0.417	ND	ND	ND
25	ND	ND	ND	ND	0.512	0.691	0.821	0.621	ND	ND	ND	ND
26	ND	ND	ND	ND	0.504	0.668	0.815	0.619	ND	ND	ND	ND
27	ND	ND	ND	ND	0.523	0.671	0.787	0.603	ND	ND	ND	ND
28	ND	ND	ND	ND	0.521	0.688	0.776	0.596	ND	ND	ND	ND
29	ND	ND	ND	ND	0.524	0.705	0.767	0.605	ND	ND	ND	ND
30	ND	-	ND	ND	0.517	0.692	0.753	0.619	ND	ND	ND	ND
31	ND	-	ND	-	0.511	-	0.726	0.597	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-14a: 2018 Daily Water Surface Elevation for CR-WC**

DATE	2018				
	AUG	SEP	OCT	NOV	DEC
1	ND	498.624	498.589	498.570	498.555
2	ND	498.623	498.621	498.575	498.544
3	498.648	498.617	498.605	498.586	ND
4	498.648	498.615	498.600	498.562	498.549
5	498.634	498.620	498.606	498.558	498.541
6	498.647	498.597	498.614	498.556	498.546
7	498.666	498.587	498.606	498.555	498.540
8	498.665	498.587	498.600	498.554	498.536
9	498.661	498.611	498.604	498.553	498.556
10	498.656	498.609	498.601	498.558	498.557
11	498.666	498.616	498.601	498.558	498.553
12	498.638	498.610	498.590	498.557	ND
13	498.639	498.610	498.573	498.565	498.553
14	498.636	498.617	498.579	498.562	498.543
15	498.642	498.602	498.589	498.542	498.547
16	498.622	498.595	498.573	498.558	ND
17	498.619	498.594	498.577	498.559	ND
18	498.632	498.606	498.585	498.560	498.552
19	498.618	498.596	498.564	498.567	498.552
20	498.612	498.599	498.580	498.563	498.556
21	498.612	498.586	498.578	ND	498.557
22	498.603	498.579	498.567	498.566	498.546
23	498.584	498.579	498.574	498.546	498.529
24	498.592	498.588	498.567	498.542	498.527
25	498.599	498.577	498.573	498.548	498.525
26	498.598	498.596	498.576	498.554	498.520
27	498.594	498.589	498.575	498.555	498.517
28	498.588	498.594	498.571	498.547	498.516
29	498.584	498.596	498.570	498.558	498.516
30	498.592	498.591	498.574	498.555	498.515
31	498.610	-	498.573	-	498.515

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-14b: 2019 Daily Water Surface Elevation for CR-WC-MS-02**

DATE	2019											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	498.534	498.517	498.506	498.561	498.558	498.565	498.585	498.530	498.644	498.631	498.585	498.556
2	498.543	498.517	498.507	498.539	498.571	498.573	498.594	498.542	498.645	498.636	498.578	498.561
3	498.545	498.514	498.514	498.532	498.575	498.572	498.584	498.564	498.646	498.627	498.589	498.568
4	498.538	498.511	498.523	498.537	498.575	498.617	498.572	498.579	498.642	498.608	498.597	498.578
5	498.528	498.509	498.515	498.541	498.576	498.612	498.567	498.576	498.668	498.611	498.588	498.564
6	498.534	498.510	498.515	498.558	498.578	498.601	498.567	498.586	498.657	498.611	498.576	498.559
7	498.529	498.517	498.517	498.558	498.578	498.593	498.566	498.569	498.655	498.605	498.572	498.573
8	498.522	498.520	498.516	498.555	498.582	498.609	498.564	498.559	498.653	498.625	498.581	498.557
9	498.521	498.526	498.517	498.561	498.583	498.600	498.564	498.584	498.651	498.619	498.590	498.570
10	498.529	498.532	498.522	498.564	498.583	498.592	498.552	498.587	498.650	498.608	498.581	498.565
11	498.532	498.539	498.528	498.571	498.586	498.591	498.553	498.572	498.649	498.602	498.562	498.557
12	498.539	498.544	498.512	498.573	498.587	498.582	498.557	498.573	498.650	498.598	498.582	498.558
13	498.532	498.537	498.497	498.575	498.585	498.585	498.551	498.576	498.648	498.602	498.590	498.563
14	498.531	498.536	498.496	498.576	498.588	498.591	498.550	498.576	498.652	498.606	498.588	498.549
15	498.525	498.539	498.507	498.571	498.579	498.593	498.548	498.571	498.649	498.595	498.569	498.562
16	498.526	498.539	498.508	498.573	498.579	498.586	498.546	498.586	498.643	498.590	498.585	498.573
17	498.521	498.535	498.525	498.577	498.580	498.583	498.542	498.639	498.647	498.591	498.570	498.548
18	498.517	498.535	498.522	498.580	498.585	498.585	498.539	498.642	498.644	498.603	498.590	498.578
19	498.516	498.545	498.529	498.582	498.585	498.583	498.532	498.646	498.639	498.601	498.588	498.558
20	498.522	498.539	498.533	498.576	498.585	498.576	498.533	498.648	498.642	498.606	498.574	498.566
21	498.526	498.533	498.541	498.586	498.584	498.574	498.535	498.636	498.637	498.603	498.563	498.566
22	498.525	498.531	498.549	498.594	498.579	498.567	498.533	498.651	498.642	498.594	498.574	498.576
23	498.517	498.527	498.541	498.595	498.579	498.566	498.529	498.641	498.644	498.600	498.565	498.565
24	498.513	498.519	498.549	498.590	498.576	498.570	498.525	498.642	498.651	498.582	498.572	498.572
25	498.517	498.516	498.565	498.581	498.570	498.566	498.525	498.649	498.642	498.597	498.575	498.570
26	498.524	498.525	498.567	498.579	498.581	498.566	498.558	498.644	498.640	498.605	498.589	498.574
27	498.529	498.531	498.558	498.574	498.580	498.563	498.537	498.648	498.638	498.581	498.573	498.579
28	498.519	498.518	498.562	498.574	498.581	498.558	498.538	498.651	498.637	498.595	498.562	498.583
29	498.514	-	498.558	498.574	498.572	498.562	498.537	498.658	498.627	498.582	498.564	498.581
30	498.518	-	498.558	498.560	498.569	498.583	498.535	498.652	498.624	498.575	498.561	498.564
31	498.521	-	498.561	-	498.567	-	498.531	498.645	-	498.590	-	498.562

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-14c: 2020 Daily Water Surface Elevation for CR-WC-MS-02**

DATE	2020											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	498.573	498.551	498.554	498.570	498.697	498.772	498.834	498.887	498.897	ND	ND	ND
2	498.576	498.574	498.565	498.569	498.714	498.771	498.861	498.885	498.897	ND	ND	ND
3	498.572	498.564	498.564	498.573	498.720	498.765	498.870	498.880	498.888	ND	ND	ND
4	498.555	498.548	498.576	498.573	498.734	498.767	498.866	498.883	498.885	ND	ND	ND
5	498.569	498.555	498.567	498.573	498.740	498.771	498.865	498.875	498.882	ND	ND	ND
6	498.574	498.553	498.568	498.567	498.750	498.766	498.861	498.861	498.877	ND	ND	ND
7	498.563	498.559	498.565	498.584	498.752	498.757	498.853	498.857	498.872	ND	ND	ND
8	498.554	498.558	498.554	498.602	498.750	498.789	498.842	498.871	498.873	ND	ND	ND
9	498.564	498.551	498.555	498.581	498.748	498.805	498.844	498.903	498.868	ND	ND	ND
10	498.551	498.555	498.547	498.606	498.743	498.810	498.847	498.888	498.864	ND	ND	ND
11	498.555	498.569	498.571	498.603	498.739	498.815	498.843	498.884	498.876	ND	ND	ND
12	498.556	498.552	498.573	498.603	498.738	498.817	498.847	498.882	498.879	ND	ND	ND
13	498.563	498.529	498.569	498.591	498.737	498.815	498.862	498.903	498.875	ND	ND	ND
14	498.562	498.566	498.556	498.604	498.746	498.813	498.851	498.895	498.869	ND	ND	ND
15	498.566	498.566	498.543	498.611	498.742	498.838	498.853	498.880	498.870	ND	ND	ND
16	498.556	498.565	498.556	498.587	498.740	498.851	498.845	498.871	498.864	ND	ND	ND
17	498.559	498.572	498.564	498.609	498.738	498.844	498.838	498.871	498.857	ND	ND	ND
18	498.567	498.564	498.560	498.612	498.736	498.852	498.847	498.872	498.857	ND	ND	ND
19	498.549	498.550	498.565	498.619	498.742	498.850	498.873	498.878	498.856	ND	ND	ND
20	498.548	498.553	498.550	498.629	498.741	498.848	498.875	498.869	498.859	ND	ND	ND
21	498.560	498.559	498.552	498.626	498.730	498.850	498.878	498.858	498.860	ND	ND	ND
22	498.567	498.569	498.564	498.632	498.746	498.849	498.891	498.852	498.856	ND	ND	ND
23	498.561	498.574	498.567	498.650	498.758	498.849	498.890	498.880	498.852	ND	ND	ND
24	498.563	498.582	498.566	498.646	498.756	498.846	498.897	498.884	ND	ND	ND	ND
25	498.569	498.563	498.555	498.633	498.756	498.845	498.894	498.890	ND	ND	ND	ND
26	498.567	498.558	498.555	498.652	498.757	498.842	498.895	498.896	ND	ND	ND	ND
27	498.562	498.564	498.576	498.655	498.758	498.834	498.891	498.896	ND	ND	ND	ND
28	498.563	498.564	498.580	498.668	498.758	498.840	498.890	498.892	ND	ND	ND	ND
29	498.550	498.572	498.566	498.668	498.757	498.848	498.886	498.897	ND	ND	ND	ND
30	498.556	-	498.573	498.674	498.754	498.840	498.892	498.905	ND	ND	ND	ND
31	498.554	-	498.570	-	498.751	-	498.889	498.900	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-15a: 2018 Mean Daily Discharge for CR-WC-MS-02**

DATE	2018				
	AUG	SEP	OCT	NOV	DEC
1	ND	0.473	0.279	0.239	0.219
2	ND	0.470	0.481	0.263	0.175
3	0.635	0.426	0.368	0.324	ND
4	0.634	0.413	0.341	0.205	0.200
5	0.528	0.452	0.383	0.191	0.168
6	0.627	0.311	0.434	0.182	0.190
7	0.784	0.256	0.386	0.181	0.167
8	0.776	0.257	0.361	0.177	0.153
9	0.747	0.393	0.380	0.176	0.241
10	0.705	0.380	0.365	0.197	0.244
11	0.790	0.424	0.366	0.200	0.228
12	0.562	0.390	0.301	0.196	ND
13	0.567	0.386	0.220	0.234	0.234
14	0.547	0.433	0.257	0.225	0.190
15	0.593	0.340	0.303	0.143	0.210
16	0.450	0.300	0.222	0.208	ND
17	0.432	0.298	0.242	0.214	ND
18	0.520	0.367	0.290	0.221	0.234
19	0.426	0.312	0.190	0.253	0.239
20	0.388	0.325	0.266	0.237	0.259
21	0.389	0.257	0.260	ND	0.266
22	0.338	0.226	0.206	0.256	0.216
23	0.236	0.225	0.240	0.170	0.147
24	0.277	0.271	0.210	0.152	0.141
25	0.317	0.220	0.239	0.181	0.133
26	0.306	0.313	0.257	0.207	0.117
27	0.290	0.276	0.251	0.212	0.110
28	0.259	0.300	0.239	0.182	0.106
29	0.240	0.312	0.232	0.231	0.107
30	0.281	0.287	0.253	0.220	0.105
31	0.382	-	0.251	-	0.108

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

Table D-15b: 2019 Mean Daily Discharge for CR-WC-MS-02												
DATE	2019											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.180	0.157	0.155	0.489	0.422	0.498	0.580	0.179	0.869	0.655	0.335	0.190
2	0.221	0.159	0.159	0.352	0.501	0.563	0.643	0.237	0.878	0.694	0.297	0.212
3	0.232	0.148	0.191	0.316	0.524	0.552	0.561	0.354	0.877	0.622	0.358	0.250
4	0.200	0.137	0.234	0.338	0.521	0.940	0.471	0.437	0.838	0.486	0.415	0.296
5	0.160	0.133	0.199	0.365	0.529	0.888	0.437	0.416	1.10	0.503	0.355	0.227
6	0.184	0.139	0.198	0.464	0.537	0.779	0.431	0.482	0.974	0.506	0.288	0.205
7	0.168	0.165	0.213	0.456	0.536	0.711	0.420	0.365	0.956	0.464	0.266	0.271
8	0.141	0.181	0.209	0.436	0.568	0.846	0.405	0.309	0.933	0.608	0.314	0.195
9	0.140	0.207	0.213	0.476	0.573	0.766	0.402	0.461	0.904	0.559	0.368	0.257
10	0.172	0.236	0.241	0.490	0.564	0.693	0.333	0.474	0.892	0.480	0.314	0.232
11	0.184	0.274	0.270	0.538	0.587	0.676	0.336	0.375	0.879	0.440	0.217	0.196
12	0.219	0.301	0.195	0.558	0.597	0.602	0.356	0.380	0.884	0.413	0.321	0.202
13	0.187	0.266	0.139	0.565	0.575	0.625	0.321	0.397	0.862	0.440	0.366	0.223
14	0.184	0.267	0.135	0.570	0.600	0.671	0.313	0.393	0.894	0.471	0.356	0.164
15	0.162	0.282	0.182	0.535	0.528	0.681	0.298	0.364	0.868	0.400	0.253	0.219
16	0.170	0.283	0.184	0.550	0.532	0.626	0.284	0.465	0.807	0.369	0.338	0.272
17	0.149	0.262	0.269	0.572	0.539	0.600	0.264	0.876	0.840	0.371	0.259	0.162
18	0.137	0.267	0.257	0.595	0.581	0.612	0.247	0.905	0.807	0.452	0.364	0.312
19	0.134	0.320	0.295	0.603	0.587	0.590	0.212	0.938	0.766	0.436	0.354	0.201
20	0.160	0.294	0.315	0.560	0.590	0.539	0.214	0.952	0.787	0.470	0.280	0.239
21	0.176	0.261	0.368	0.631	0.584	0.516	0.219	0.837	0.739	0.445	0.225	0.237
22	0.176	0.252	0.417	0.698	0.556	0.467	0.212	0.976	0.782	0.390	0.279	0.288
23	0.145	0.235	0.372	0.705	0.554	0.456	0.190	0.872	0.795	0.428	0.235	0.234
24	0.131	0.203	0.426	0.659	0.540	0.484	0.173	0.883	0.849	0.321	0.266	0.265
25	0.147	0.189	0.533	0.589	0.498	0.454	0.172	0.941	0.769	0.410	0.284	0.257
26	0.175	0.234	0.547	0.566	0.597	0.451	0.337	0.895	0.745	0.466	0.359	0.278
27	0.200	0.261	0.476	0.532	0.586	0.430	0.222	0.921	0.724	0.316	0.273	0.306
28	0.160	0.203	0.504	0.533	0.592	0.396	0.221	0.948	0.715	0.398	0.216	0.329
29	0.143	-	0.475	0.529	0.533	0.417	0.218	1.02	0.629	0.321	0.228	0.316
30	0.157	-	0.473	0.426	0.513	0.562	0.206	0.951	0.607	0.281	0.215	0.231
31	0.171	-	0.498	-	0.504	-	0.186	0.886	-	0.365	-	0.218

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-15c: 2020 Mean Daily Discharge for CR-WC-MS-02**

DATE	2020											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.274	0.170	0.190	0.258	1.83	1.50	1.19	1.54	1.67	ND	ND	ND
2	0.289	0.278	0.243	0.251	2.10	1.44	1.47	1.51	1.67	ND	ND	ND
3	0.268	0.230	0.225	0.270	2.24	1.33	1.54	1.46	1.56	ND	ND	ND
4	0.192	0.159	0.291	0.270	2.49	1.30	1.46	1.50	1.51	ND	ND	ND
5	0.260	0.190	0.245	0.271	2.53	1.32	1.41	1.39	1.49	ND	ND	ND
6	0.278	0.179	0.254	0.240	2.63	1.22	1.34	1.24	1.42	ND	ND	ND
7	0.224	0.205	0.235	0.334	2.60	1.10	1.21	1.19	1.36	ND	ND	ND
8	0.184	0.201	0.182	0.442	2.50	1.44	1.06	1.35	1.37	ND	ND	ND
9	0.229	0.173	0.186	0.315	2.41	1.59	1.05	1.76	1.31	ND	ND	ND
10	0.172	0.187	0.155	0.471	2.28	1.61	1.08	1.55	1.26	ND	ND	ND
11	0.186	0.257	0.265	0.446	2.16	1.65	1.04	1.51	1.41	ND	ND	ND
12	0.192	0.179	0.270	0.450	2.08	1.63	1.08	1.48	1.44	ND	ND	ND
13	0.221	0.095	0.253	0.373	2.01	1.57	1.24	1.75	1.40	ND	ND	ND
14	0.216	0.240	0.194	0.454	2.09	1.51	1.12	1.65	1.32	ND	ND	ND
15	0.236	0.239	0.141	0.504	1.98	1.79	1.15	1.46	1.34	ND	ND	ND
16	0.194	0.231	0.193	0.365	1.90	1.93	1.06	1.35	1.26	ND	ND	ND
17	0.206	0.265	0.229	0.534	1.82	1.80	0.989	1.34	1.19	ND	ND	ND
18	0.242	0.226	0.209	0.571	1.74	1.87	1.08	1.36	1.19	ND	ND	ND
19	0.165	0.166	0.233	0.649	1.76	1.81	1.37	1.43	1.17	ND	ND	ND
20	0.158	0.181	0.166	0.751	1.70	1.73	1.40	1.32	1.21	ND	ND	ND
21	0.215	0.203	0.174	0.744	1.51	1.73	1.43	1.20	1.22	ND	ND	ND
22	0.243	0.249	0.229	0.818	1.67	1.68	1.59	1.14	1.17	ND	ND	ND
23	0.216	0.278	0.240	1.02	1.76	1.64	1.58	1.45	1.13	ND	ND	ND
24	0.224	0.321	0.237	1.01	1.70	1.56	1.67	1.50	ND	ND	ND	ND
25	0.252	0.224	0.186	0.903	1.64	1.51	1.63	1.58	ND	ND	ND	ND
26	0.240	0.201	0.186	1.13	1.60	1.45	1.64	1.66	ND	ND	ND	ND
27	0.217	0.225	0.292	1.18	1.56	1.32	1.59	1.65	ND	ND	ND	ND
28	0.222	0.234	0.310	1.36	1.52	1.35	1.58	1.61	ND	ND	ND	ND
29	0.167	0.268	0.237	1.40	1.46	1.42	1.53	1.68	ND	ND	ND	ND
30	0.192	-	0.271	1.49	1.37	1.29	1.60	1.78	ND	ND	ND	ND
31	0.193	-	0.258	-	1.30	-	1.57	1.71	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-16a: 2018 Daily Water Surface Elevation for CR-WC**

DATE	2018				
	AUG	SEP	OCT	NOV	DEC
1	ND	498.530	498.480	498.441	498.419
2	ND	498.526	498.484	498.437	498.416
3	498.575	498.528	498.473	498.441	498.411
4	498.586	498.519	498.466	498.440	498.413
5	498.562	498.521	498.469	498.433	498.408
6	498.567	498.503	498.467	498.440	498.411
7	498.582	498.486	498.463	498.429	498.402
8	498.576	498.497	498.463	498.426	498.406
9	498.570	498.528	498.467	498.431	498.407
10	498.568	498.517	498.461	498.434	498.407
11	498.580	498.531	498.469	498.426	498.406
12	498.554	498.524	498.468	498.426	498.409
13	498.540	498.522	498.462	498.430	498.408
14	498.536	498.515	498.458	498.431	498.407
15	498.554	498.508	498.470	498.421	498.409
16	498.525	498.501	498.458	498.422	498.407
17	498.528	498.495	498.461	498.423	498.409
18	498.545	498.504	498.464	498.422	498.405
19	498.527	498.497	498.456	498.425	498.406
20	498.511	498.503	498.456	498.422	498.407
21	498.508	498.490	498.455	498.423	498.406
22	498.516	498.478	498.446	498.427	498.409
23	498.500	498.464	498.454	498.421	498.405
24	498.498	498.488	498.442	498.416	498.400
25	498.511	498.472	498.444	498.418	498.408
26	498.509	498.504	498.445	498.419	498.404
27	498.501	498.495	498.444	498.418	498.409
28	498.488	498.483	498.441	498.417	498.402
29	498.490	498.507	498.443	498.420	498.398
30	498.508	498.478	498.445	498.419	498.387
31	498.521	-	498.439	-	498.386

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-16b: 2019 Daily Water Surface Elevation for CR-WC-MS-03**

DATE	2019											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	498.408	498.386	498.369	498.527	498.516	498.514	498.509	498.465	498.592	498.568	498.509	498.459
2	498.408	498.382	498.377	498.513	498.523	498.515	498.516	498.480	498.587	498.569	498.498	498.464
3	498.407	498.382	498.383	498.507	498.527	498.520	498.502	498.502	498.588	498.564	498.515	498.472
4	498.399	498.383	498.386	498.508	498.525	498.541	498.499	498.511	498.587	498.547	498.501	498.481
5	498.390	498.384	498.380	498.514	498.525	498.534	498.492	498.513	498.611	498.554	498.510	498.466
6	498.400	498.384	498.383	498.524	498.526	498.531	498.490	498.520	498.606	498.555	498.494	498.460
7	498.396	498.380	498.382	498.524	498.523	498.532	498.493	498.505	498.604	498.547	498.487	498.478
8	498.385	498.377	498.380	498.521	498.526	498.532	498.489	498.498	498.607	498.576	498.499	498.459
9	498.386	498.383	498.382	498.525	498.530	498.519	498.488	498.525	498.599	498.560	498.508	498.474
10	498.397	498.385	498.386	498.525	498.529	498.522	498.480	498.518	498.596	498.545	498.494	498.470
11	498.400	498.388	498.389	498.529	498.531	498.512	498.479	498.509	498.593	498.538	498.469	498.459
12	498.402	498.391	498.385	498.530	498.531	498.508	498.481	498.507	498.586	498.532	498.494	498.463
13	498.396	498.372	498.381	498.528	498.527	498.515	498.474	498.514	498.592	498.542	498.489	498.465
14	498.398	498.380	498.381	498.528	498.533	498.523	498.477	498.507	498.595	498.543	498.492	498.449
15	498.386	498.385	498.383	498.524	498.532	498.519	498.481	498.510	498.595	498.528	498.472	498.463
16	498.389	498.383	498.389	498.522	498.536	498.515	498.470	498.546	498.586	498.521	498.489	498.475
17	498.379	498.378	498.410	498.523	498.539	498.510	498.468	498.583	498.586	498.525	498.468	498.441
18	498.371	498.385	498.439	498.526	498.538	498.508	498.467	498.580	498.581	498.536	498.495	498.479
19	498.380	498.393	498.448	498.526	498.539	498.510	498.468	498.580	498.582	498.533	498.492	498.454
20	498.398	498.385	498.459	498.523	498.539	498.507	498.462	498.579	498.588	498.540	498.480	498.464
21	498.399	498.384	498.473	498.529	498.537	498.513	498.460	498.564	498.582	498.533	498.466	498.459
22	498.397	498.385	498.486	498.537	498.539	498.502	498.460	498.572	498.580	498.521	498.476	498.468
23	498.385	498.379	498.483	498.535	498.537	498.506	498.459	498.574	498.586	498.531	498.470	498.452
24	498.377	498.375	498.482	498.530	498.533	498.508	498.465	498.574	498.599	498.504	498.479	498.460
25	498.389	498.378	498.492	498.527	498.528	498.507	498.476	498.582	498.592	498.527	498.482	498.458
26	498.398	498.391	498.525	498.523	498.525	498.500	498.470	498.585	498.597	498.542	498.484	498.461
27	498.395	498.390	498.525	498.519	498.530	498.496	498.467	498.586	498.592	498.510	498.479	498.463
28	498.375	498.372	498.527	498.519	498.529	498.495	498.478	498.594	498.582	498.510	498.464	498.466
29	498.376	-	498.523	498.520	498.524	498.492	498.462	498.598	498.575	498.477	498.467	498.464
30	498.391	-	498.523	498.512	498.525	498.508	498.463	498.594	498.562	498.497	498.463	498.445
31	498.396	-	498.528	-	498.516	-	498.463	498.592	-	498.517	-	498.442

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-16c: 2020 Daily Water Surface Elevation for CR-WC-MS-03**

DATE	2020											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	498.460	498.435	498.430	498.447	498.652	498.754	498.815	498.823	498.860	ND	ND	ND
2	498.463	498.472	498.446	498.442	498.661	498.758	498.830	498.820	498.863	ND	ND	ND
3	498.460	498.456	498.445	498.445	498.670	498.763	498.839	498.815	498.853	ND	ND	ND
4	498.442	498.436	498.462	498.441	498.682	498.757	498.835	498.818	498.847	ND	ND	ND
5	498.458	498.449	498.450	498.443	498.684	498.751	498.827	498.808	498.843	ND	ND	ND
6	498.468	498.448	498.453	498.439	498.693	498.749	498.819	498.803	498.849	ND	ND	ND
7	498.455	498.454	498.449	498.464	498.700	498.762	498.813	498.803	498.840	ND	ND	ND
8	498.446	498.452	498.438	498.488	498.701	498.789	498.799	498.814	498.826	ND	ND	ND
9	498.460	498.443	498.441	498.461	498.695	498.790	498.795	498.835	498.833	ND	ND	ND
10	498.445	498.447	498.430	498.497	498.691	498.797	498.793	498.829	498.829	ND	ND	ND
11	498.449	498.466	498.462	498.497	498.695	498.793	498.795	498.820	498.840	ND	ND	ND
12	498.450	498.445	498.463	498.505	498.704	498.794	498.793	498.816	498.849	ND	ND	ND
13	498.458	498.417	498.459	498.498	498.713	498.801	498.797	498.827	498.839	ND	ND	ND
14	498.455	498.464	498.442	498.515	498.713	498.802	498.807	498.830	498.833	ND	ND	ND
15	498.459	498.456	498.425	498.526	498.704	498.815	498.806	498.835	498.836	ND	ND	ND
16	498.446	498.453	498.442	498.522	498.703	498.832	498.801	498.824	498.822	ND	ND	ND
17	498.448	498.462	498.451	498.539	498.707	498.827	498.796	498.823	498.816	ND	ND	ND
18	498.459	498.451	498.445	498.546	498.704	498.828	498.814	498.822	498.813	ND	ND	ND
19	498.433	498.433	498.450	498.555	498.713	498.833	498.828	498.833	498.816	ND	ND	ND
20	498.431	498.436	498.430	498.564	498.710	498.829	498.828	498.829	498.816	ND	ND	ND
21	498.445	498.440	498.431	498.569	498.714	498.826	498.825	498.824	498.816	ND	ND	ND
22	498.453	498.451	498.446	498.578	498.729	498.827	498.843	498.822	498.815	ND	ND	ND
23	498.443	498.457	498.446	498.590	498.730	498.825	498.840	498.846	498.803	ND	ND	ND
24	498.442	498.466	498.443	498.594	498.737	498.827	498.847	498.846	498.806	ND	ND	ND
25	498.449	498.440	498.428	498.596	498.745	498.824	498.845	498.845	498.835	ND	ND	ND
26	498.444	498.435	498.428	498.613	498.746	498.813	498.843	498.853	498.833	ND	ND	ND
27	498.440	498.442	498.454	498.616	498.747	498.810	498.838	498.854	ND	ND	ND	ND
28	498.444	498.444	498.461	498.626	498.738	498.810	498.839	498.854	ND	ND	ND	ND
29	498.430	498.454	498.441	498.631	498.741	498.819	498.837	498.853	ND	ND	ND	ND
30	498.444	-	498.450	498.639	498.745	498.815	498.837	498.864	ND	ND	ND	ND
31	498.440	-	498.446	-	498.744	-	498.830	498.858	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-17a: 2018 Mean Daily Discharge for CR-WC-MS-03**

DATE	2018				
	AUG	SEP	OCT	NOV	DEC
1	ND	0.990	0.830	0.720	0.668
2	ND	0.978	0.844	0.709	0.662
3	1.23	0.982	0.808	0.720	0.648
4	1.16	0.953	0.784	0.718	0.654
5	1.08	0.960	0.794	0.698	0.642
6	1.10	0.897	0.787	0.720	0.648
7	1.15	0.839	0.777	0.688	0.626
8	1.13	0.877	0.779	0.681	0.637
9	1.11	0.986	0.789	0.695	0.640
10	1.11	0.949	0.771	0.703	0.641
11	1.15	0.997	0.797	0.681	0.637
12	1.06	0.974	0.793	0.682	0.646
13	1.02	0.969	0.777	0.694	0.643
14	1.00	0.945	0.764	0.695	0.640
15	1.06	0.920	0.801	0.670	0.646
16	0.968	0.896	0.764	0.673	0.641
17	0.979	0.874	0.775	0.676	0.646
18	1.03	0.908	0.784	0.672	0.637
19	0.975	0.881	0.760	0.681	0.640
20	0.921	0.904	0.761	0.672	0.643
21	0.911	0.857	0.758	0.677	0.642
22	0.936	0.818	0.732	0.688	0.647
23	0.882	0.776	0.755	0.671	0.638
24	0.876	0.852	0.720	0.658	0.625
25	0.923	0.803	0.726	0.664	0.647
26	0.916	0.908	0.729	0.667	0.636
27	0.885	0.878	0.727	0.665	0.649
28	0.842	0.836	0.718	0.662	0.632
29	0.850	0.920	0.724	0.670	0.623
30	0.914	0.821	0.729	0.668	0.597
31	0.959	-	0.714	-	0.596

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-17b: 2019 Mean Daily Discharge for CR-WC-MS-03**

DATE	2019											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.648	0.602	0.571	1.06	1.20	1.27	1.01	0.853	1.29	1.20	1.01	0.832
2	0.649	0.594	0.589	1.02	1.24	1.27	1.03	0.906	1.27	1.20	0.971	0.849
3	0.647	0.594	0.604	0.996	1.27	1.29	0.984	0.982	1.27	1.19	1.03	0.877
4	0.627	0.596	0.610	1.00	1.27	1.35	0.974	1.01	1.27	1.13	0.979	0.911
5	0.605	0.598	0.598	1.02	1.29	1.32	0.950	1.02	1.37	1.15	1.01	0.855
6	0.629	0.601	0.605	1.05	1.30	1.30	0.942	1.04	1.34	1.15	0.955	0.835
7	0.619	0.591	0.603	1.05	1.31	1.29	0.955	0.995	1.34	1.13	0.930	0.897
8	0.593	0.583	0.599	1.04	1.33	1.28	0.937	0.970	1.35	1.23	0.974	0.832
9	0.597	0.599	0.604	1.05	1.36	1.22	0.936	1.06	1.32	1.17	1.00	0.885
10	0.624	0.603	0.613	1.05	1.37	1.22	0.905	1.03	1.30	1.12	0.957	0.870
11	0.632	0.610	0.622	1.07	1.39	1.18	0.901	1.01	1.29	1.10	0.868	0.834
12	0.637	0.619	0.611	1.07	1.41	1.15	0.910	1.00	1.27	1.08	0.958	0.846
13	0.621	0.574	0.603	1.06	1.41	1.17	0.882	1.02	1.29	1.11	0.940	0.853
14	0.627	0.592	0.603	1.07	1.44	1.19	0.895	1.00	1.30	1.11	0.949	0.801
15	0.598	0.604	0.607	1.06	1.45	1.17	0.910	1.01	1.30	1.07	0.876	0.846
16	0.606	0.600	0.623	1.06	1.45	1.14	0.869	1.13	1.27	1.04	0.939	0.887
17	0.583	0.589	0.678	1.07	1.45	1.12	0.863	1.26	1.27	1.05	0.864	0.775
18	0.564	0.606	0.760	1.10	1.45	1.10	0.859	1.24	1.25	1.09	0.961	0.902
19	0.586	0.625	0.788	1.11	1.44	1.10	0.862	1.25	1.25	1.08	0.950	0.816
20	0.630	0.606	0.825	1.10	1.44	1.08	0.842	1.24	1.27	1.10	0.906	0.850
21	0.631	0.604	0.871	1.14	1.43	1.09	0.835	1.19	1.25	1.08	0.858	0.833
22	0.626	0.607	0.918	1.17	1.42	1.05	0.836	1.22	1.25	1.04	0.891	0.863
23	0.598	0.593	0.907	1.18	1.41	1.05	0.831	1.22	1.27	1.08	0.871	0.811
24	0.579	0.583	0.903	1.17	1.39	1.05	0.854	1.22	1.32	0.992	0.901	0.837
25	0.610	0.591	0.939	1.17	1.37	1.04	0.891	1.25	1.29	1.06	0.914	0.828
26	0.630	0.623	1.05	1.17	1.35	1.01	0.871	1.26	1.31	1.11	0.919	0.838
27	0.624	0.619	1.05	1.17	1.36	0.989	0.860	1.27	1.29	1.01	0.900	0.847
28	0.575	0.578	1.06	1.18	1.35	0.976	0.899	1.30	1.25	1.01	0.850	0.858
29	0.579	-	1.04	1.19	1.33	0.955	0.844	1.31	1.23	0.898	0.859	0.851
30	0.615	-	1.04	1.17	1.32	1.00	0.848	1.30	1.18	0.967	0.847	0.787
31	0.626	-	1.06	-	1.29	-	0.845	1.29	-	1.03	-	0.779

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-17c: 2020 Mean Daily Discharge for CR-WC-MS-03**

DATE	2020											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.835	0.756	0.745	0.795	1.54	2.19	2.52	2.31	2.40	ND	ND	ND
2	0.846	0.878	0.796	0.778	1.59	2.22	2.63	2.28	2.42	ND	ND	ND
3	0.837	0.822	0.787	0.787	1.64	2.25	2.69	2.24	2.35	ND	ND	ND
4	0.780	0.759	0.843	0.777	1.70	2.20	2.65	2.25	2.30	ND	ND	ND
5	0.832	0.800	0.804	0.782	1.71	2.16	2.58	2.18	2.27	ND	ND	ND
6	0.865	0.797	0.815	0.769	1.76	2.15	2.51	2.14	2.31	ND	ND	ND
7	0.822	0.817	0.800	0.851	1.80	2.23	2.45	2.13	2.25	ND	ND	ND
8	0.792	0.810	0.767	0.934	1.81	2.41	2.34	2.19	2.15	ND	ND	ND
9	0.837	0.783	0.776	0.840	1.78	2.41	2.31	2.33	2.19	ND	ND	ND
10	0.789	0.794	0.743	0.967	1.76	2.46	2.28	2.28	2.16	ND	ND	ND
11	0.800	0.860	0.845	0.970	1.78	2.43	2.29	2.21	2.23	ND	ND	ND
12	0.804	0.790	0.845	0.996	1.83	2.43	2.27	2.18	2.29	ND	ND	ND
13	0.828	0.706	0.832	0.970	1.89	2.48	2.29	2.24	2.22	ND	ND	ND
14	0.818	0.849	0.780	1.02	1.89	2.49	2.35	2.25	2.18	ND	ND	ND
15	0.834	0.824	0.727	1.06	1.84	2.58	2.34	2.28	2.19	ND	ND	ND
16	0.791	0.814	0.777	1.05	1.84	2.70	2.29	2.20	2.10	ND	ND	ND
17	0.797	0.843	0.806	1.10	1.87	2.66	2.25	2.20	2.06	ND	ND	ND
18	0.831	0.808	0.786	1.13	1.85	2.67	2.36	2.19	2.05	ND	ND	ND
19	0.751	0.752	0.806	1.16	1.90	2.70	2.46	2.26	2.06	ND	ND	ND
20	0.745	0.760	0.741	1.19	1.89	2.66	2.45	2.22	2.07	ND	ND	ND
21	0.792	0.771	0.746	1.21	1.92	2.64	2.42	2.19	2.07	ND	ND	ND
22	0.813	0.808	0.791	1.24	2.00	2.64	2.54	2.17	2.06	ND	ND	ND
23	0.782	0.826	0.790	1.28	2.02	2.62	2.51	2.33	1.99	ND	ND	ND
24	0.778	0.858	0.783	1.30	2.06	2.63	2.56	2.33	2.01	ND	ND	ND
25	0.801	0.774	0.736	1.30	2.11	2.61	2.53	2.32	2.18	ND	ND	ND
26	0.786	0.757	0.735	1.37	2.12	2.52	2.51	2.37	2.17	ND	ND	ND
27	0.771	0.779	0.820	1.38	2.13	2.49	2.46	2.38	ND	ND	ND	ND
28	0.785	0.786	0.840	1.43	2.07	2.49	2.46	2.37	ND	ND	ND	ND
29	0.744	0.816	0.774	1.45	2.10	2.56	2.44	2.36	ND	ND	ND	ND
30	0.786	-	0.802	1.48	2.13	2.52	2.43	2.44	ND	ND	ND	ND
31	0.777	-	0.790	-	2.12	-	2.37	2.39	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-18a: 2018 Daily Water Surface Elevation for CR-WC**

DATE	2018				
	AUG	SEP	OCT	NOV	DEC
1	ND	498.219	498.180	498.148	498.161
2	ND	498.221	498.182	498.146	498.158
3	ND	498.219	498.173	498.160	498.132
4	ND	498.216	498.147	498.134	498.147
5	498.252	498.212	498.158	498.143	498.134
6	498.257	498.201	498.174	498.148	498.142
7	498.262	498.199	498.166	498.150	498.125
8	498.263	498.206	498.159	498.150	498.135
9	498.262	498.217	498.166	498.154	498.146
10	498.261	498.217	498.168	498.158	498.145
11	498.246	498.226	498.175	498.152	498.140
12	498.234	498.227	498.173	498.157	498.159
13	498.236	498.217	498.160	498.164	498.157
14	498.248	498.211	498.159	498.165	498.150
15	498.228	498.209	498.175	498.138	498.145
16	498.222	498.202	498.171	498.126	498.121
17	498.228	498.200	498.175	498.131	498.137
18	498.214	498.207	498.181	498.130	498.140
19	498.207	498.198	498.169	498.138	498.146
20	498.210	498.200	498.171	498.140	498.154
21	498.216	498.186	498.181	498.144	498.160
22	498.215	498.182	498.165	498.156	498.154
23	498.178	498.186	498.172	498.145	498.145
24	498.186	498.192	498.167	498.137	498.133
25	498.197	498.183	498.163	498.144	498.137
26	498.192	498.196	498.167	498.149	498.132
27	498.194	498.183	498.165	498.151	498.132
28	498.187	498.179	498.161	498.146	498.124
29	498.186	498.183	498.157	498.153	498.123
30	498.196	498.173	498.156	498.157	498.116
31	498.213	-	498.153	-	498.113

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-18b: 2019 Daily Water Surface Elevation for CR-WC-MS-04**

DATE	2019											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	498.152	498.122	498.115	498.319	498.214	498.162	498.231	498.198	498.312	498.295	498.267	498.265
2	498.170	498.124	498.130	498.299	498.227	498.193	498.240	498.214	498.315	498.287	498.261	498.252
3	498.175	498.117	498.155	498.288	498.228	498.207	498.236	498.238	498.317	498.281	498.272	498.259
4	498.156	498.114	498.172	498.284	498.227	498.232	498.228	498.247	498.315	498.275	498.265	498.268
5	498.135	498.112	498.172	498.288	498.223	498.234	498.218	498.241	498.331	498.280	498.271	498.254
6	498.150	498.111	498.183	498.299	498.226	498.231	498.221	498.241	498.327	498.281	498.261	498.249
7	498.140	498.113	498.197	498.288	498.225	498.228	498.222	498.237	498.328	498.268	498.259	498.264
8	498.128	498.113	498.204	498.277	498.228	498.219	498.214	498.232	498.325	498.293	498.268	498.248
9	498.126	498.124	498.217	498.276	498.228	498.219	498.213	498.242	498.319	498.290	498.277	498.261
10	498.142	498.127	498.238	498.273	498.231	498.217	498.211	498.244	498.320	498.279	498.269	498.256
11	498.149	498.131	498.267	498.274	498.232	498.216	498.212	498.242	498.321	498.273	498.251	498.247
12	498.162	498.139	498.270	498.273	498.231	498.224	498.214	498.242	498.324	498.267	498.270	498.247
13	498.147	498.124	498.274	498.269	498.222	498.224	498.206	498.244	498.324	498.275	498.270	498.251
14	498.149	498.125	498.280	498.265	498.223	498.228	498.210	498.243	498.323	498.279	498.269	498.239
15	498.131	498.131	498.293	498.260	498.215	498.230	498.207	498.243	498.320	498.266	498.256	498.249
16	498.136	498.132	498.307	498.257	498.210	498.231	498.203	498.261	498.310	498.260	498.267	498.259
17	498.128	498.126	498.317	498.255	498.212	498.231	498.203	498.283	498.316	498.264	498.254	498.237
18	498.124	498.136	498.335	498.256	498.208	498.230	498.206	498.301	498.313	498.277	498.276	498.259
19	498.123	498.156	498.345	498.259	498.208	498.227	498.200	498.302	498.310	498.276	498.275	498.242
20	498.138	498.143	498.350	498.259	498.207	498.223	498.196	498.305	498.314	498.282	498.266	498.250
21	498.145	498.140	498.360	498.263	498.205	498.218	498.201	498.298	498.310	498.278	498.253	498.248
22	498.145	498.142	498.364	498.268	498.202	498.218	498.202	498.306	498.309	498.270	498.262	498.256
23	498.128	498.131	498.349	498.268	498.193	498.214	498.203	498.302	498.313	498.275	498.258	498.244
24	498.121	498.132	498.348	498.261	498.188	498.213	498.202	498.305	498.320	498.258	498.265	498.250
25	498.132	498.136	498.358	498.253	498.182	498.218	498.205	498.307	498.310	498.271	498.268	498.248
26	498.148	498.154	498.357	498.248	498.177	498.212	498.196	498.304	498.306	498.276	498.271	498.250
27	498.148	498.154	498.346	498.240	498.182	498.216	498.205	498.310	498.299	498.259	498.269	498.253
28	498.123	498.129	498.346	498.237	498.186	498.219	498.202	498.313	498.291	498.275	498.256	498.252
29	498.118	-	498.339	498.231	498.179	498.221	498.194	498.320	498.292	498.261	498.257	498.255
30	498.128	-	498.333	498.214	498.164	498.231	498.198	498.318	498.289	498.255	498.253	498.238
31	498.133	-	498.329	-	498.163	-	498.197	498.313	-	498.273	-	498.237

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-18c: 2020 Daily Water Surface Elevation for CR-WC-MS-04**

DATE	2020											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	498.256	498.218	498.243	498.230	498.419	498.439	498.467	498.488	498.533	ND	ND	ND
2	498.254	498.252	498.240	498.232	498.417	498.442	498.485	498.485	498.536	ND	ND	ND
3	498.253	498.243	498.232	498.231	498.429	498.439	498.497	498.482	498.526	ND	ND	ND
4	498.237	498.228	498.246	498.231	498.437	498.437	498.501	498.484	498.519	ND	ND	ND
5	498.243	498.238	498.236	498.222	498.428	498.436	498.501	498.478	498.516	ND	ND	ND
6	498.254	498.236	498.238	498.235	498.420	498.437	498.496	498.469	498.519	ND	ND	ND
7	498.247	498.240	498.237	498.244	498.420	498.435	498.490	498.460	498.505	ND	ND	ND
8	498.239	498.239	498.227	498.248	498.415	498.448	498.478	498.476	498.500	ND	ND	ND
9	498.249	498.231	498.229	498.222	498.416	498.469	498.468	498.507	498.506	ND	ND	ND
10	498.236	498.234	498.220	498.244	498.404	498.480	498.469	498.509	498.498	ND	ND	ND
11	498.239	498.239	498.244	498.239	498.397	498.477	498.468	498.494	498.507	ND	ND	ND
12	498.239	498.232	498.245	498.238	498.390	498.470	498.463	498.482	498.526	ND	ND	ND
13	498.245	498.210	498.242	498.227	498.391	498.473	498.476	498.507	498.514	ND	ND	ND
14	498.243	498.244	498.229	498.236	498.408	498.474	498.479	498.518	498.503	ND	ND	ND
15	498.247	498.237	498.215	498.239	498.395	498.486	498.481	498.512	498.509	ND	ND	ND
16	498.236	498.235	498.227	498.225	498.387	498.507	498.470	498.493	498.495	ND	ND	ND
17	498.238	498.241	498.234	498.252	498.383	498.500	498.460	498.490	498.494	ND	ND	ND
18	498.246	498.233	498.229	498.262	498.366	498.496	498.468	498.490	498.488	ND	ND	ND
19	498.227	498.218	498.234	498.280	498.381	498.498	498.480	498.496	498.491	ND	ND	ND
20	498.225	498.221	498.218	498.299	498.389	498.494	498.490	498.501	498.492	ND	ND	ND
21	498.237	498.225	498.219	498.312	498.396	498.493	498.493	498.494	498.495	ND	ND	ND
22	498.244	498.234	498.230	498.330	498.412	498.493	498.506	498.483	498.494	ND	ND	ND
23	498.237	498.239	498.232	498.356	498.423	498.487	498.508	498.509	498.482	ND	ND	ND
24	498.237	498.247	498.230	498.366	498.435	498.486	498.512	498.515	498.481	ND	ND	ND
25	498.242	498.228	498.218	498.368	498.439	498.481	498.510	498.520	498.509	ND	ND	ND
26	498.239	498.223	498.218	498.397	498.442	498.476	498.507	498.529	ND	ND	ND	ND
27	498.235	498.229	498.232	498.395	498.445	498.470	498.503	498.534	ND	ND	ND	ND
28	498.239	498.230	498.239	498.414	498.435	498.475	498.504	498.531	ND	ND	ND	ND
29	498.227	498.239	498.229	498.402	498.432	498.481	498.502	498.525	ND	ND	ND	ND
30	498.237	-	498.235	498.402	498.425	498.478	498.499	498.540	ND	ND	ND	ND
31	498.234	-	498.232	-	498.416	-	498.493	498.534	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-19a: 2018 Mean Daily Discharge for CR-WC-MS-04**

DATE	2018				
	AUG	SEP	OCT	NOV	DEC
1	ND	1.79	1.64	1.22	1.17
2	ND	1.81	1.66	1.20	1.14
3	ND	1.80	1.57	1.30	0.975
4	ND	1.77	1.36	1.12	1.06
5	1.90	1.75	1.44	1.17	0.977
6	1.95	1.66	1.56	1.19	1.02
7	2.01	1.64	1.49	1.21	0.918
8	2.03	1.71	1.44	1.20	0.974
9	2.03	1.83	1.48	1.22	1.04
10	2.02	1.83	1.49	1.25	1.02
11	1.88	1.93	1.54	1.20	0.986
12	1.77	1.95	1.51	1.23	1.10
13	1.80	1.85	1.41	1.27	1.08
14	1.92	1.80	1.40	1.27	1.04
15	1.75	1.79	1.52	1.09	1.00
16	1.70	1.74	1.47	1.01	0.863
17	1.75	1.72	1.51	1.03	0.944
18	1.63	1.79	1.55	1.03	0.959
19	1.58	1.71	1.45	1.07	0.991
20	1.62	1.75	1.46	1.08	1.03
21	1.68	1.63	1.53	1.10	1.06
22	1.68	1.60	1.40	1.18	1.03
23	1.38	1.64	1.45	1.09	0.965
24	1.44	1.70	1.40	1.04	0.897
25	1.54	1.62	1.37	1.08	0.914
26	1.51	1.75	1.39	1.11	0.884
27	1.53	1.64	1.37	1.12	0.880
28	1.48	1.62	1.34	1.08	0.834
29	1.47	1.66	1.30	1.12	0.825
30	1.57	1.58	1.29	1.14	0.785
31	1.72	-	1.26	-	0.766

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

Table D-19b: 2019 Mean Daily Discharge for CR-WC-MS-04												
DATE	2019											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.974	0.704	0.591	1.88	1.72	2.20	2.34	1.61	2.47	1.95	1.77	1.84
2	1.08	0.710	0.648	1.73	1.85	2.56	2.43	1.75	2.50	1.87	1.71	1.72
3	1.11	0.677	0.762	1.65	1.90	2.70	2.35	1.97	2.51	1.81	1.81	1.79
4	0.986	0.657	0.841	1.64	1.91	3.02	2.24	2.05	2.48	1.76	1.75	1.87
5	0.860	0.646	0.836	1.71	1.91	3.02	2.11	1.98	2.66	1.81	1.81	1.75
6	0.942	0.639	0.895	1.83	1.96	2.96	2.12	1.97	2.60	1.82	1.72	1.70
7	0.879	0.645	0.973	1.75	1.98	2.88	2.12	1.92	2.59	1.70	1.71	1.84
8	0.814	0.644	1.01	1.68	2.05	2.73	2.00	1.86	2.55	1.94	1.79	1.69
9	0.801	0.687	1.08	1.70	2.08	2.71	1.98	1.95	2.46	1.91	1.88	1.82
10	0.879	0.698	1.22	1.69	2.13	2.66	1.93	1.96	2.46	1.81	1.81	1.77
11	0.912	0.713	1.42	1.73	2.19	2.63	1.93	1.93	2.47	1.76	1.65	1.69
12	0.987	0.748	1.44	1.75	2.21	2.70	1.95	1.92	2.49	1.71	1.83	1.70
13	0.896	0.674	1.47	1.74	2.15	2.68	1.86	1.93	2.47	1.78	1.83	1.73
14	0.906	0.676	1.52	1.72	2.20	2.70	1.88	1.91	2.45	1.83	1.82	1.63
15	0.803	0.702	1.62	1.70	2.14	2.70	1.85	1.90	2.40	1.71	1.70	1.73
16	0.828	0.699	1.74	1.70	2.13	2.69	1.80	2.09	2.28	1.66	1.81	1.82
17	0.781	0.673	1.82	1.72	2.19	2.67	1.79	2.32	2.33	1.69	1.69	1.62
18	0.757	0.714	2.00	1.75	2.18	2.63	1.81	2.51	2.28	1.81	1.90	1.83
19	0.752	0.806	2.09	1.81	2.22	2.58	1.74	2.51	2.25	1.81	1.90	1.67
20	0.824	0.741	2.14	1.84	2.25	2.49	1.70	2.53	2.27	1.87	1.81	1.75
21	0.853	0.723	2.25	1.90	2.27	2.41	1.74	2.44	2.22	1.83	1.70	1.73
22	0.849	0.728	2.27	1.98	2.27	2.39	1.74	2.52	2.20	1.76	1.78	1.81
23	0.759	0.676	2.11	2.00	2.21	2.32	1.73	2.46	2.23	1.82	1.75	1.70
24	0.726	0.676	2.09	1.97	2.19	2.29	1.72	2.48	2.30	1.66	1.82	1.76
25	0.773	0.691	2.18	1.91	2.15	2.32	1.74	2.50	2.18	1.78	1.85	1.74
26	0.852	0.773	2.16	1.89	2.14	2.24	1.64	2.45	2.12	1.83	1.88	1.77
27	0.847	0.770	2.04	1.85	2.23	2.26	1.72	2.50	2.04	1.67	1.86	1.80
28	0.720	0.653	2.04	1.85	2.31	2.27	1.68	2.54	1.95	1.83	1.74	1.79
29	0.695	-	1.99	1.81	2.28	2.27	1.61	2.60	1.95	1.70	1.76	1.82
30	0.737	-	1.96	1.68	2.15	2.36	1.63	2.56	1.91	1.65	1.72	1.67
31	0.757	-	1.96	-	2.19	-	1.61	2.49	-	1.82	-	1.66

Note: elevations in table are in metres (arbitrary datum).  
 - = day not present in month; ND = no data.

Table D-19c: 2020 Mean Daily Discharge for CR-WC-MS-04												
DATE	2020											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	1.84	1.59	1.90	1.87	4.72	5.48	5.15	4.29	4.60	ND	ND	ND
2	1.83	1.90	1.88	1.89	4.69	5.55	5.51	4.19	4.68	ND	ND	ND
3	1.82	1.82	1.80	1.88	4.94	5.48	5.74	4.10	4.51	ND	ND	ND
4	1.67	1.68	1.94	1.88	5.12	5.46	5.80	4.10	4.40	ND	ND	ND
5	1.73	1.77	1.84	1.80	4.94	5.42	5.75	3.96	4.36	ND	ND	ND
6	1.84	1.75	1.87	1.94	4.79	5.41	5.59	3.76	4.44	ND	ND	ND
7	1.77	1.80	1.85	2.03	4.79	5.35	5.41	3.57	4.21	ND	ND	ND
8	1.70	1.79	1.76	2.07	4.71	5.60	5.13	3.81	4.13	ND	ND	ND
9	1.80	1.72	1.78	1.81	4.74	6.06	4.89	4.33	4.26	ND	ND	ND
10	1.68	1.75	1.71	2.03	4.52	6.27	4.87	4.32	4.14	ND	ND	ND
11	1.71	1.81	1.94	1.98	4.38	6.17	4.80	4.00	4.33	ND	ND	ND
12	1.72	1.74	1.95	1.98	4.26	5.95	4.65	3.76	4.70	ND	ND	ND
13	1.77	1.55	1.93	1.87	4.29	5.98	4.88	4.15	4.49	ND	ND	ND
14	1.75	1.86	1.80	1.96	4.62	5.95	4.89	4.32	4.30	ND	ND	ND
15	1.79	1.79	1.67	2.00	4.39	6.21	4.89	4.17	4.44	ND	ND	ND
16	1.70	1.77	1.79	1.86	4.25	6.71	4.62	3.80	4.21	ND	ND	ND
17	1.72	1.84	1.86	2.15	4.18	6.49	4.39	3.70	4.20	ND	ND	ND
18	1.80	1.77	1.82	2.26	3.89	6.34	4.50	3.68	4.11	ND	ND	ND
19	1.63	1.63	1.86	2.47	4.16	6.34	4.69	3.74	4.20	ND	ND	ND
20	1.61	1.66	1.71	2.71	4.32	6.20	4.84	3.79	4.23	ND	ND	ND
21	1.73	1.70	1.73	2.89	4.47	6.13	4.85	3.68	4.30	ND	ND	ND
22	1.79	1.78	1.84	3.14	4.79	6.09	5.08	3.52	4.30	ND	ND	ND
23	1.72	1.84	1.85	3.55	5.02	5.92	5.07	3.97	4.10	ND	ND	ND
24	1.73	1.92	1.84	3.72	5.29	5.85	5.11	4.11	4.11	ND	ND	ND
25	1.78	1.74	1.73	3.75	5.39	5.68	5.03	4.22	4.65	ND	ND	ND
26	1.75	1.70	1.74	4.28	5.47	5.54	4.92	4.40	ND	ND	ND	ND
27	1.72	1.76	1.87	4.25	5.55	5.36	4.80	4.51	ND	ND	ND	ND
28	1.75	1.77	1.94	4.60	5.32	5.43	4.77	4.47	ND	ND	ND	ND
29	1.66	1.85	1.85	4.38	5.27	5.54	4.70	4.39	ND	ND	ND	ND
30	1.75	ND	1.91	4.39	5.13	5.42	4.59	4.69	ND	ND	ND	ND
31	1.73	ND	1.88	ND	4.95	ND	4.44	4.61	ND	ND	ND	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-20a: 2018 Daily Water Surface Elevation for CR-WC**

DATE	2018				
	AUG	SEP	OCT	NOV	DEC
1	ND	498.172	498.124	498.100	498.105
2	ND	498.184	498.138	498.098	498.103
3	498.199	498.171	498.138	498.099	498.088
4	498.200	498.169	498.132	498.088	498.098
5	498.181	498.167	498.129	498.094	498.086
6	498.189	498.155	498.128	498.095	498.094
7	498.203	498.141	498.124	498.091	498.082
8	498.207	498.141	498.129	498.092	498.081
9	498.200	498.161	498.123	498.104	498.087
10	498.196	498.164	498.123	498.101	498.086
11	498.202	498.171	498.130	498.097	498.083
12	498.179	498.165	498.129	498.105	498.093
13	498.172	498.159	498.116	498.114	498.094
14	498.177	498.162	498.116	498.118	498.091
15	498.182	498.162	498.123	498.094	498.089
16	498.159	498.154	498.120	498.086	498.084
17	498.156	498.151	498.121	498.088	498.086
18	498.166	498.157	498.124	498.087	498.084
19	498.156	498.150	498.119	498.092	498.084
20	498.148	498.150	498.118	498.093	498.085
21	498.146	498.142	498.124	498.100	498.087
22	498.137	498.137	498.118	498.112	498.085
23	498.107	498.125	498.121	498.099	498.084
24	498.112	498.139	498.118	498.093	498.080
25	498.125	498.131	498.114	498.096	498.082
26	498.124	498.143	498.118	498.102	498.079
27	498.121	498.144	498.113	498.108	498.079
28	498.116	498.141	498.114	498.103	498.073
29	498.118	498.144	498.110	498.102	498.072
30	498.131	498.131	498.107	498.102	498.067
31	498.161	-	498.106	-	498.064

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-20b: 2019 Daily Water Surface Elevation for CR-WC-MS-05**

DATE	2019											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	498.081	498.049	498.040	498.085	498.148	498.077	498.145	498.094	498.236	498.221	498.160	498.117
2	498.091	498.050	498.043	498.086	498.152	498.094	498.160	498.111	498.241	498.220	498.146	498.121
3	498.096	498.046	498.049	498.084	498.152	498.100	498.154	498.139	498.243	498.208	498.155	498.129
4	498.089	498.045	498.051	498.089	498.147	498.148	498.134	498.162	498.241	498.188	498.154	498.136
5	498.079	498.044	498.045	498.101	498.144	498.146	498.114	498.161	498.255	498.208	498.157	498.122
6	498.086	498.043	498.045	498.109	498.146	498.142	498.114	498.155	498.260	498.212	498.158	498.118
7	498.079	498.043	498.047	498.103	498.145	498.134	498.112	498.152	498.255	498.172	498.154	498.129
8	498.072	498.042	498.045	498.102	498.150	498.129	498.107	498.145	498.251	498.208	498.161	498.110
9	498.070	498.047	498.045	498.106	498.151	498.131	498.107	498.154	498.245	498.199	498.167	498.122
10	498.076	498.048	498.050	498.112	498.159	498.130	498.107	498.161	498.244	498.185	498.158	498.115
11	498.079	498.050	498.059	498.120	498.155	498.124	498.106	498.161	498.244	498.179	498.135	498.105
12	498.085	498.053	498.056	498.129	498.155	498.130	498.105	498.158	498.251	498.173	498.152	498.103
13	498.078	498.046	498.054	498.136	498.150	498.130	498.102	498.157	498.253	498.182	498.151	498.106
14	498.077	498.047	498.052	498.142	498.147	498.130	498.101	498.158	498.251	498.187	498.153	498.089
15	498.069	498.050	498.053	498.148	498.137	498.124	498.101	498.160	498.249	498.173	498.134	498.103
16	498.074	498.050	498.053	498.147	498.128	498.127	498.098	498.169	498.240	498.165	498.149	498.113
17	498.070	498.048	498.053	498.148	498.124	498.129	498.098	498.208	498.238	498.169	498.130	498.088
18	498.067	498.053	498.057	498.150	498.124	498.127	498.098	498.227	498.237	498.182	498.149	498.117
19	498.066	498.063	498.058	498.151	498.124	498.128	498.090	498.228	498.235	498.180	498.151	498.095
20	498.071	498.056	498.058	498.149	498.124	498.119	498.081	498.230	498.236	498.185	498.144	498.103
21	498.072	498.054	498.059	498.153	498.122	498.112	498.080	498.229	498.235	498.178	498.129	498.102
22	498.071	498.055	498.059	498.156	498.115	498.111	498.083	498.230	498.234	498.168	498.135	498.112
23	498.063	498.050	498.051	498.159	498.111	498.106	498.084	498.233	498.236	498.173	498.129	498.102
24	498.059	498.051	498.051	498.157	498.105	498.110	498.085	498.235	498.244	498.152	498.134	498.110
25	498.063	498.053	498.063	498.155	498.100	498.118	498.091	498.238	498.239	498.171	498.139	498.109
26	498.070	498.061	498.072	498.154	498.100	498.110	498.084	498.232	498.235	498.179	498.147	498.113
27	498.069	498.061	498.074	498.152	498.105	498.116	498.094	498.237	498.221	498.149	498.143	498.118
28	498.058	498.048	498.081	498.153	498.103	498.119	498.092	498.241	498.220	498.177	498.128	498.121
29	498.054	-	498.083	498.153	498.093	498.127	498.089	498.246	498.222	498.157	498.128	498.119
30	498.056	-	498.085	498.148	498.096	498.142	498.090	498.246	498.219	498.148	498.124	498.103
31	498.055	-	498.088	-	498.084	-	498.090	498.240	-	498.168	-	498.102

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-20c: 2020 Daily Water Surface Elevation for CR-WC-MS-05**

DATE	2020											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	498.115	498.085	498.054	498.152	498.421	498.414	498.387	498.427	498.491	ND	ND	ND
2	498.119	498.113	498.067	498.154	498.444	498.419	498.406	498.423	498.496	ND	ND	ND
3	498.118	498.101	498.067	498.161	498.447	498.412	498.425	498.421	498.487	ND	ND	ND
4	498.101	498.085	498.082	498.166	498.466	498.408	498.431	498.429	498.476	ND	ND	ND
5	498.113	498.095	498.074	498.171	498.462	498.399	498.432	498.424	498.472	ND	ND	ND
6	498.118	498.092	498.077	498.168	498.433	498.387	498.429	498.415	498.477	ND	ND	ND
7	498.108	498.096	498.078	498.186	498.436	498.382	498.419	498.404	498.464	ND	ND	ND
8	498.098	498.094	498.069	498.203	498.439	498.396	498.406	498.430	498.459	ND	ND	ND
9	498.106	498.086	498.072	498.183	498.440	498.427	498.397	498.485	498.467	ND	ND	ND
10	498.091	498.088	498.065	498.210	498.434	498.435	498.399	498.481	498.458	ND	ND	ND
11	498.092	498.103	498.088	498.210	498.431	498.429	498.405	498.455	498.470	ND	ND	ND
12	498.090	498.086	498.091	498.215	498.431	498.421	498.398	498.439	498.498	ND	ND	ND
13	498.095	498.063	498.089	498.209	498.429	498.426	498.417	498.465	498.478	ND	ND	ND
14	498.091	498.091	498.077	498.223	498.444	498.417	498.424	498.486	498.467	ND	ND	ND
15	498.094	498.068	498.063	498.230	498.433	498.431	498.430	498.483	498.476	ND	ND	ND
16	498.083	498.053	498.078	498.213	498.427	498.456	498.412	498.457	498.460	ND	ND	ND
17	498.084	498.060	498.089	498.235	498.421	498.446	498.396	498.451	498.456	ND	ND	ND
18	498.091	498.053	498.088	498.245	498.406	498.442	498.404	498.449	498.450	ND	ND	ND
19	498.073	498.039	498.096	498.264	498.421	498.441	498.420	498.457	498.453	ND	ND	ND
20	498.070	498.041	498.084	498.284	498.412	498.433	498.430	498.458	498.455	ND	ND	ND
21	498.082	498.046	498.088	498.296	498.391	498.431	498.432	498.441	498.457	ND	ND	ND
22	498.090	498.055	498.103	498.315	498.393	498.431	498.447	498.427	498.457	ND	ND	ND
23	498.083	498.062	498.109	498.341	498.419	498.431	498.448	498.459	498.444	ND	ND	ND
24	498.084	498.071	498.112	498.349	498.406	498.429	498.452	498.466	498.443	ND	ND	ND
25	498.091	498.054	498.106	498.346	498.413	498.422	498.448	498.470	498.477	ND	ND	ND
26	498.090	498.051	498.110	498.361	498.418	498.415	498.447	498.483	ND	ND	ND	ND
27	498.088	498.058	498.136	498.354	498.420	498.407	498.442	498.489	ND	ND	ND	ND
28	498.093	498.059	498.144	498.362	498.410	498.410	498.440	498.486	ND	ND	ND	ND
29	498.084	498.070	498.135	498.376	498.407	498.412	498.440	498.481	ND	ND	ND	ND
30	498.094	-	498.145	498.388	498.399	498.405	498.438	498.498	ND	ND	ND	ND
31	498.092	-	498.147	-	498.386	-	498.434	498.500	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-21a: 2018 Mean Daily Discharge for CR-WC-MS-05**

DATE	2018				
	AUG	SEP	OCT	NOV	DEC
1	ND	3.23	3.03	2.83	2.96
2	ND	3.38	3.19	2.81	2.94
3	3.18	3.24	3.20	2.82	2.77
4	3.20	3.22	3.13	2.71	2.89
5	2.99	3.22	3.09	2.78	2.76
6	3.10	3.09	3.09	2.79	2.84
7	3.27	2.93	3.05	2.75	2.72
8	3.33	2.95	3.11	2.76	2.72
9	3.26	3.20	3.04	2.90	2.78
10	3.22	3.24	3.05	2.86	2.77
11	3.31	3.34	3.13	2.82	2.74
12	3.05	3.27	3.12	2.91	2.85
13	2.99	3.22	2.97	3.02	2.86
14	3.06	3.26	2.96	3.06	2.83
15	3.12	3.29	3.05	2.80	2.82
16	2.88	3.20	3.02	2.71	2.76
17	2.86	3.17	3.04	2.74	2.78
18	2.98	3.26	3.06	2.73	2.77
19	2.88	3.19	3.01	2.79	2.76
20	2.80	3.20	3.01	2.80	2.78
21	2.79	3.12	3.08	2.88	2.80
22	2.71	3.07	3.01	3.01	2.79
23	2.41	2.95	3.05	2.87	2.78
24	2.48	3.12	3.02	2.81	2.73
25	2.62	3.04	2.98	2.84	2.76
26	2.61	3.20	3.01	2.92	2.73
27	2.59	3.21	2.97	2.98	2.73
28	2.55	3.20	2.99	2.93	2.67
29	2.59	3.25	2.94	2.92	2.66
30	2.74	3.10	2.91	2.92	2.61
31	3.08	-	2.90	-	2.59

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-21b: 2019 Mean Daily Discharge for CR-WC-MS-05**

DATE	2019											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	2.77	2.50	2.47	3.01	3.79	2.92	3.41	2.52	3.87	3.32	2.78	2.50
2	2.87	2.51	2.49	3.02	3.83	3.10	3.58	2.69	3.92	3.30	2.64	2.55
3	2.93	2.47	2.56	2.99	3.85	3.16	3.49	2.98	3.93	3.17	2.75	2.63
4	2.85	2.46	2.59	3.05	3.77	3.76	3.24	3.24	3.90	2.94	2.74	2.71
5	2.75	2.45	2.53	3.20	3.74	3.71	2.99	3.21	4.08	3.18	2.78	2.58
6	2.83	2.45	2.53	3.29	3.76	3.65	2.98	3.14	4.13	3.24	2.79	2.53
7	2.76	2.45	2.55	3.21	3.74	3.54	2.95	3.08	4.05	2.79	2.75	2.66
8	2.69	2.44	2.53	3.21	3.81	3.47	2.89	2.99	3.99	3.19	2.83	2.47
9	2.67	2.49	2.53	3.25	3.83	3.48	2.87	3.09	3.89	3.10	2.90	2.59
10	2.73	2.51	2.58	3.33	3.93	3.45	2.86	3.17	3.86	2.94	2.82	2.52
11	2.76	2.52	2.68	3.42	3.88	3.36	2.84	3.15	3.86	2.88	2.58	2.43
12	2.83	2.56	2.65	3.53	3.88	3.42	2.82	3.10	3.94	2.82	2.77	2.42
13	2.75	2.49	2.63	3.63	3.81	3.41	2.78	3.08	3.95	2.92	2.76	2.45
14	2.75	2.50	2.61	3.71	3.77	3.40	2.76	3.08	3.91	2.99	2.78	2.30
15	2.67	2.54	2.62	3.78	3.64	3.32	2.74	3.09	3.87	2.84	2.58	2.43
16	2.72	2.54	2.63	3.78	3.52	3.34	2.71	3.19	3.74	2.76	2.76	2.54
17	2.68	2.52	2.63	3.79	3.47	3.36	2.70	3.66	3.70	2.80	2.56	2.30
18	2.66	2.58	2.68	3.81	3.47	3.32	2.69	3.91	3.67	2.95	2.76	2.59
19	2.64	2.68	2.69	3.83	3.48	3.32	2.59	3.92	3.64	2.94	2.79	2.38
20	2.70	2.61	2.69	3.79	3.47	3.21	2.50	3.93	3.64	2.99	2.72	2.46
21	2.71	2.59	2.71	3.86	3.45	3.11	2.48	3.91	3.62	2.93	2.57	2.46
22	2.71	2.61	2.71	3.90	3.36	3.10	2.50	3.91	3.58	2.82	2.63	2.56
23	2.62	2.56	2.63	3.93	3.31	3.03	2.50	3.94	3.60	2.88	2.58	2.47
24	2.59	2.57	2.62	3.91	3.24	3.06	2.50	3.94	3.70	2.66	2.64	2.55
25	2.62	2.59	2.76	3.88	3.18	3.14	2.55	3.98	3.62	2.87	2.70	2.55
26	2.70	2.68	2.85	3.87	3.19	3.04	2.47	3.89	3.55	2.97	2.79	2.59
27	2.69	2.67	2.88	3.84	3.24	3.10	2.56	3.93	3.37	2.64	2.75	2.64
28	2.58	2.55	2.96	3.85	3.22	3.12	2.53	3.99	3.34	2.96	2.59	2.69
29	2.54	-	2.99	3.85	3.10	3.20	2.49	4.04	3.36	2.74	2.60	2.67
30	2.56	-	3.01	3.79	3.14	3.38	2.49	4.02	3.31	2.65	2.56	2.51
31	2.55	-	3.04	-	3.00	-	2.48	3.93	-	2.87	-	2.50

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-21c: 2020 Mean Daily Discharge for CR-WC-MS-05**

DATE	2020											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	2.64	2.50	2.34	3.62	8.42	8.67	6.64	6.04	6.78	ND	ND	ND
2	2.69	2.80	2.48	3.65	8.81	8.77	6.97	5.92	6.92	ND	ND	ND
3	2.68	2.67	2.48	3.76	8.96	8.60	7.32	5.84	6.77	ND	ND	ND
4	2.51	2.52	2.63	3.82	9.29	8.52	7.39	5.94	6.57	ND	ND	ND
5	2.64	2.62	2.56	3.90	9.35	8.29	7.37	5.82	6.52	ND	ND	ND
6	2.70	2.59	2.60	3.87	9.08	7.97	7.25	5.61	6.64	ND	ND	ND
7	2.60	2.64	2.61	4.13	9.19	7.81	7.00	5.39	6.43	ND	ND	ND
8	2.50	2.63	2.52	4.39	9.27	8.07	6.68	5.80	6.36	ND	ND	ND
9	2.59	2.55	2.56	4.11	9.28	8.72	6.44	6.83	6.53	ND	ND	ND
10	2.45	2.58	2.49	4.50	9.14	8.85	6.44	6.69	6.38	ND	ND	ND
11	2.46	2.74	2.74	4.51	9.07	8.65	6.52	6.14	6.66	ND	ND	ND
12	2.45	2.57	2.77	4.60	9.06	8.41	6.33	5.81	7.24	ND	ND	ND
13	2.50	2.34	2.76	4.52	9.02	8.46	6.67	6.25	6.87	ND	ND	ND
14	2.47	2.63	2.63	4.73	9.39	8.20	6.75	6.61	6.68	ND	ND	ND
15	2.50	2.40	2.50	4.86	9.13	8.47	6.82	6.51	6.89	ND	ND	ND
16	2.40	2.26	2.66	4.60	8.97	9.01	6.43	5.97	6.59	ND	ND	ND
17	2.41	2.33	2.79	4.95	8.82	8.70	6.08	5.81	6.55	ND	ND	ND
18	2.49	2.27	2.78	5.12	8.47	8.54	6.19	5.75	6.46	ND	ND	ND
19	2.32	2.14	2.87	5.46	8.82	8.45	6.46	5.84	6.55	ND	ND	ND
20	2.30	2.17	2.74	5.80	8.62	8.22	6.60	5.83	6.60	ND	ND	ND
21	2.42	2.22	2.79	6.05	8.12	8.11	6.59	5.55	6.68	ND	ND	ND
22	2.49	2.31	2.96	6.41	8.16	8.07	6.85	5.33	6.72	ND	ND	ND
23	2.43	2.38	3.04	6.93	8.78	8.00	6.83	5.93	6.48	ND	ND	ND
24	2.44	2.48	3.08	7.11	8.48	7.89	6.86	6.08	6.49	ND	ND	ND
25	2.52	2.31	3.01	7.06	8.63	7.69	6.74	6.19	7.20	ND	ND	ND
26	2.52	2.29	3.07	7.39	8.74	7.48	6.68	6.46	ND	ND	ND	ND
27	2.50	2.36	3.38	7.24	8.80	7.25	6.54	6.60	ND	ND	ND	ND
28	2.56	2.39	3.49	7.43	8.56	7.27	6.46	6.58	ND	ND	ND	ND
29	2.47	2.49	3.38	7.70	8.49	7.26	6.42	6.51	ND	ND	ND	ND
30	2.58	-	3.52	7.94	8.32	7.06	6.32	6.88	ND	ND	ND	ND
31	2.57	-	3.55	-	8.01	-	6.20	6.93	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-22a: 2018 Daily Water Surface Elevation for CR-WC**

DATE	2018				
	AUG	SEP	OCT	NOV	DEC
1	ND	97.178	97.2088	ND	ND
2	ND	97.183	97.203	ND	ND
3	97.1884	97.191	ND	ND	ND
4	97.1802	97.195	ND	ND	ND
5	97.185	97.189	ND	ND	ND
6	97.1889	97.189	ND	ND	ND
7	97.199	97.196	ND	ND	ND
8	97.206	97.194	ND	ND	ND
9	97.205	97.204	ND	ND	ND
10	97.199	97.224	ND	ND	ND
11	97.180	97.228	ND	ND	ND
12	97.184	97.222	ND	ND	ND
13	97.180	97.224	ND	ND	ND
14	97.182	97.215	ND	ND	ND
15	97.170	97.223	ND	ND	ND
16	97.164	97.222	ND	ND	ND
17	97.170	97.222	ND	ND	ND
18	97.154	97.222	ND	ND	ND
19	97.153	97.217	ND	ND	ND
20	97.162	97.207	ND	ND	ND
21	97.167	97.198	ND	ND	ND
22	97.161	97.205	ND	ND	ND
23	97.139	97.212	ND	ND	ND
24	97.135	97.209	ND	ND	ND
25	97.142	97.203	ND	ND	ND
26	97.139	97.207	ND	ND	ND
27	97.143	97.198	ND	ND	ND
28	97.147	97.199	ND	ND	ND
29	97.150	97.200	ND	ND	ND
30	97.159	97.2063	ND	ND	ND
31	97.174	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-22b: 2019 Daily Water Surface Elevation for CR-WC-MS-06**

DATE	2019											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	ND	ND	ND	ND	ND	97.093	97.143	97.121	97.548	97.5788	ND	ND
2	ND	ND	ND	ND	ND	97.088	97.157	97.128	97.547	97.5759	ND	ND
3	ND	ND	ND	ND	ND	97.090	97.172	97.147	97.547	97.572	ND	ND
4	ND	ND	ND	ND	ND	97.113	97.173	97.169	97.552	97.5709	ND	ND
5	ND	ND	ND	ND	ND	97.135	97.163	97.188	97.566	ND	ND	ND
6	ND	ND	ND	ND	ND	97.146	97.153	97.202	97.576	ND	ND	ND
7	ND	ND	ND	ND	ND	97.143	97.144	97.203	97.584	ND	ND	ND
8	ND	ND	ND	ND	ND	97.131	97.137	97.202	97.593	ND	ND	ND
9	ND	ND	ND	ND	ND	97.126	97.133	97.218	97.592	ND	ND	ND
10	ND	ND	ND	ND	ND	97.120	97.129	97.227	97.588	ND	ND	ND
11	ND	ND	ND	ND	ND	97.112	97.126	97.232	97.584	ND	ND	ND
12	ND	ND	ND	ND	ND	97.106	97.124	97.230	97.582	ND	ND	ND
13	ND	ND	ND	ND	ND	97.110	97.124	97.225	97.580	ND	ND	ND
14	ND	ND	ND	ND	ND	97.139	97.122	97.220	97.582	ND	ND	ND
15	ND	ND	ND	ND	ND	97.151	97.124	97.220	97.581	ND	ND	ND
16	ND	ND	ND	ND	ND	97.152	97.120	97.247	97.578	ND	ND	ND
17	ND	ND	ND	ND	97.214	97.146	97.118	97.336	97.574	ND	ND	ND
18	ND	ND	ND	ND	97.204	97.139	97.116	97.406	97.568	ND	ND	ND
19	ND	ND	ND	ND	97.191	97.133	97.115	97.444	97.565	ND	ND	ND
20	ND	ND	ND	ND	97.183	97.128	97.109	97.457	97.562	ND	ND	ND
21	ND	ND	ND	ND	97.179	97.123	97.105	97.462	97.559	ND	ND	ND
22	ND	ND	ND	ND	97.176	97.125	97.104	97.465	97.557	ND	ND	ND
23	ND	ND	ND	ND	97.166	97.131	97.103	97.467	97.561	ND	ND	ND
24	ND	ND	ND	ND	97.157	97.131	97.103	97.476	97.577	ND	ND	ND
25	ND	ND	ND	ND	97.148	97.133	97.113	97.496	97.585	ND	ND	ND
26	ND	ND	ND	ND	97.135	97.132	97.111	97.506	97.592	ND	ND	ND
27	ND	ND	ND	ND	97.131	97.130	97.115	97.516	97.592	ND	ND	ND
28	ND	ND	ND	ND	97.125	97.128	97.121	97.527	97.587	ND	ND	ND
29	ND	-	ND	ND	97.118	97.126	97.118	97.535	97.5861	ND	ND	ND
30	ND	-	ND	ND	97.108	97.1344	97.119	97.541	97.5833	ND	ND	ND
31	ND	-	ND	-	97.099	-	97.116	97.545	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-22c: 2020 Daily Water Surface Elevation for CR-WC-MS-06**

DATE	2020											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	ND	ND	ND	ND	ND	97.947	97.873	97.818	97.970	ND	ND	ND
2	ND	ND	ND	ND	ND	97.946	ND	97.811	97.973	ND	ND	ND
3	ND	ND	ND	ND	ND	97.942	ND	97.800	97.972	ND	ND	ND
4	ND	ND	ND	ND	97.977	97.948	ND	97.785	97.972	ND	ND	ND
5	ND	ND	ND	ND	97.967	97.945	ND	97.774	97.969	ND	ND	ND
6	ND	ND	ND	ND	97.959	97.942	ND	97.762	97.975	ND	ND	ND
7	ND	ND	ND	ND	97.949	97.940	ND	97.750	97.971	ND	ND	ND
8	ND	ND	ND	ND	97.941	97.944	ND	97.741	97.966	ND	ND	ND
9	ND	ND	ND	ND	97.940	97.951	ND	97.745	97.968	ND	ND	ND
10	ND	ND	ND	ND	97.944	97.964	ND	97.775	97.968	ND	ND	ND
11	ND	ND	ND	ND	97.948	97.970	97.799	97.794	97.975	ND	ND	ND
12	ND	ND	ND	ND	97.945	97.970	97.797	97.795	97.987	ND	ND	ND
13	ND	ND	ND	ND	97.949	97.984	97.791	97.807	97.994	ND	ND	ND
14	ND	ND	ND	ND	97.948	98.000	97.785	97.811	97.992	ND	ND	ND
15	ND	ND	ND	ND	97.950	97.990	97.777	97.821	97.991	ND	ND	ND
16	ND	ND	ND	ND	97.951	97.986	97.785	97.832	97.987	ND	ND	ND
17	ND	ND	ND	ND	97.949	98.003	97.778	97.838	97.984	ND	ND	ND
18	ND	ND	ND	ND	97.947	97.991	97.788	97.844	97.975	ND	ND	ND
19	ND	ND	ND	ND	97.945	97.989	97.806	97.847	97.972	ND	ND	ND
20	ND	ND	ND	ND	97.938	97.975	97.816	97.843	97.968	ND	ND	ND
21	ND	ND	ND	ND	97.936	97.959	97.832	97.845	97.965	ND	ND	ND
22	ND	ND	ND	ND	97.953	97.946	97.845	97.849	97.965	ND	ND	ND
23	ND	ND	ND	ND	97.950	97.932	97.851	97.877	97.958	ND	ND	ND
24	ND	ND	ND	ND	97.961	97.931	97.864	97.890	97.953	ND	ND	ND
25	ND	ND	ND	ND	97.969	97.928	97.855	97.904	ND	ND	ND	ND
26	ND	ND	ND	ND	97.967	97.915	97.858	97.914	ND	ND	ND	ND
27	ND	ND	ND	ND	97.962	97.915	97.857	97.923	ND	ND	ND	ND
28	ND	ND	ND	ND	97.962	97.902	97.856	97.929	ND	ND	ND	ND
29	ND	ND	ND	ND	97.957	97.892	97.847	97.937	ND	ND	ND	ND
30	ND	-	ND	ND	97.952	97.890	97.838	97.953	ND	ND	ND	ND
31	ND	-	ND	-	97.955	-	97.830	97.955	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-23a: 2018 Mean Daily Discharge for CR-WC-MS-06**

DATE	2018				
	AUG	SEP	OCT	NOV	DEC
1	ND	4.19	4.81	ND	ND
2	ND	4.24	4.78	ND	ND
3	3.85	4.30	ND	ND	ND
4	3.81	4.34	ND	ND	ND
5	3.85	4.32	ND	ND	ND
6	3.89	4.33	ND	ND	ND
7	3.96	4.39	ND	ND	ND
8	4.02	4.39	ND	ND	ND
9	4.03	4.47	ND	ND	ND
10	4.01	4.61	ND	ND	ND
11	3.90	4.65	ND	ND	ND
12	3.94	4.63	ND	ND	ND
13	3.93	4.66	ND	ND	ND
14	3.96	4.61	ND	ND	ND
15	3.90	4.68	ND	ND	ND
16	3.88	4.69	ND	ND	ND
17	3.93	4.71	ND	ND	ND
18	3.84	4.72	ND	ND	ND
19	3.85	4.70	ND	ND	ND
20	3.92	4.65	ND	ND	ND
21	3.96	4.61	ND	ND	ND
22	3.94	4.67	ND	ND	ND
23	3.82	4.73	ND	ND	ND
24	3.82	4.72	ND	ND	ND
25	3.87	4.70	ND	ND	ND
26	3.87	4.74	ND	ND	ND
27	3.90	4.70	ND	ND	ND
28	3.94	4.72	ND	ND	ND
29	3.97	4.74	ND	ND	ND
30	4.05	4.79	ND	ND	ND
31	4.15	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-23b: 2019 Mean Daily Discharge for CR-WC-MS-06**

DATE	2019											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	ND	ND	ND	ND	ND	5.74	6.10	5.43	6.37	5.84	ND	ND
2	ND	ND	ND	ND	ND	5.71	6.19	5.46	6.33	5.84	ND	ND
3	ND	ND	ND	ND	ND	5.72	6.30	5.55	6.30	5.82	ND	ND
4	ND	ND	ND	ND	ND	5.89	6.31	5.67	6.31	5.82	ND	ND
5	ND	ND	ND	ND	ND	6.04	6.24	5.78	6.39	ND	ND	ND
6	ND	ND	ND	ND	ND	6.11	6.16	5.84	6.43	ND	ND	ND
7	ND	ND	ND	ND	ND	6.10	6.11	5.82	6.47	ND	ND	ND
8	ND	ND	ND	ND	ND	6.01	6.05	5.78	6.50	ND	ND	ND
9	ND	ND	ND	ND	ND	5.97	6.02	5.86	6.47	ND	ND	ND
10	ND	ND	ND	ND	ND	5.93	5.99	5.89	6.41	ND	ND	ND
11	ND	ND	ND	ND	ND	5.87	5.98	5.89	6.35	ND	ND	ND
12	ND	ND	ND	ND	ND	5.84	5.96	5.85	6.31	ND	ND	ND
13	ND	ND	ND	ND	ND	5.86	5.96	5.78	6.27	ND	ND	ND
14	ND	ND	ND	ND	ND	6.06	5.95	5.71	6.25	ND	ND	ND
15	ND	ND	ND	ND	ND	6.15	5.96	5.68	6.22	ND	ND	ND
16	ND	ND	ND	ND	ND	6.16	5.93	5.84	6.17	ND	ND	ND
17	ND	ND	ND	ND	6.61	6.12	5.89	6.44	6.11	ND	ND	ND
18	ND	ND	ND	ND	6.53	6.06	5.84	6.92	6.05	ND	ND	ND
19	ND	ND	ND	ND	6.44	6.03	5.80	7.09	5.99	ND	ND	ND
20	ND	ND	ND	ND	6.38	5.99	5.73	7.06	5.94	ND	ND	ND
21	ND	ND	ND	ND	6.35	5.95	5.67	6.96	5.90	ND	ND	ND
22	ND	ND	ND	ND	6.33	5.97	5.63	6.85	5.86	ND	ND	ND
23	ND	ND	ND	ND	6.26	6.01	5.60	6.74	5.86	ND	ND	ND
24	ND	ND	ND	ND	6.19	6.01	5.57	6.68	5.94	ND	ND	ND
25	ND	ND	ND	ND	6.13	6.02	5.60	6.70	5.97	ND	ND	ND
26	ND	ND	ND	ND	6.04	6.02	5.56	6.64	6.00	ND	ND	ND
27	ND	ND	ND	ND	6.01	6.01	5.55	6.58	5.97	ND	ND	ND
28	ND	ND	ND	ND	5.97	5.99	5.56	6.53	5.90	ND	ND	ND
29	ND	-	ND	ND	5.92	5.97	5.51	6.47	5.88	ND	ND	ND
30	ND	-	ND	ND	5.85	6.03	5.48	6.39	5.86	ND	ND	ND
31	ND	-	ND	-	5.79	-	5.43	6.37	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

Table D-23c: 2020 Mean Daily Discharge for CR-WC-MS-06												
DATE	2020											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	ND	ND	ND	ND	ND	12.6	11.4	9.80	10.0	ND	ND	ND
2	ND	ND	ND	ND	ND	12.6	ND	9.70	10.0	ND	ND	ND
3	ND	ND	ND	ND	ND	12.6	ND	9.57	9.97	ND	ND	ND
4	ND	ND	ND	ND	12.4	12.7	ND	9.41	9.95	ND	ND	ND
5	ND	ND	ND	ND	12.3	12.7	ND	9.28	9.89	ND	ND	ND
6	ND	ND	ND	ND	12.3	12.7	ND	9.14	9.91	ND	ND	ND
7	ND	ND	ND	ND	12.2	12.7	ND	9.01	9.84	ND	ND	ND
8	ND	ND	ND	ND	12.1	12.7	ND	8.90	9.77	ND	ND	ND
9	ND	ND	ND	ND	12.2	12.7	ND	8.90	9.76	ND	ND	ND
10	ND	ND	ND	ND	12.2	12.8	ND	9.11	9.73	ND	ND	ND
11	ND	ND	ND	ND	12.3	12.8	10.4	9.22	9.77	ND	ND	ND
12	ND	ND	ND	ND	12.3	12.8	10.4	9.20	9.84	ND	ND	ND
13	ND	ND	ND	ND	12.3	12.9	10.3	9.26	9.87	ND	ND	ND
14	ND	ND	ND	ND	12.3	13.0	10.2	9.26	9.82	ND	ND	ND
15	ND	ND	ND	ND	12.4	12.9	10.1	9.30	9.79	ND	ND	ND
16	ND	ND	ND	ND	12.4	12.8	10.1	9.35	9.73	ND	ND	ND
17	ND	ND	ND	ND	12.4	13.0	10.0	9.37	9.67	ND	ND	ND
18	ND	ND	ND	ND	12.4	12.8	10.1	9.38	9.57	ND	ND	ND
19	ND	ND	ND	ND	12.4	12.8	10.2	9.37	9.51	ND	ND	ND
20	ND	ND	ND	ND	12.3	12.6	10.2	9.30	9.45	ND	ND	ND
21	ND	ND	ND	ND	12.3	12.4	10.3	9.29	9.40	ND	ND	ND
22	ND	ND	ND	ND	12.5	12.3	10.4	9.29	9.36	ND	ND	ND
23	ND	ND	ND	ND	12.5	12.1	10.4	9.49	9.31	ND	ND	ND
24	ND	ND	ND	ND	12.6	12.1	10.5	9.57	9.26	ND	ND	ND
25	ND	ND	ND	ND	12.7	12.0	10.4	9.66	ND	ND	ND	ND
26	ND	ND	ND	ND	12.7	11.9	10.4	9.72	ND	ND	ND	ND
27	ND	ND	ND	ND	12.7	11.8	10.3	9.76	ND	ND	ND	ND
28	ND	ND	ND	ND	12.7	11.7	10.3	9.79	ND	ND	ND	ND
29	ND	ND	ND	ND	12.7	11.6	10.2	9.82	ND	ND	ND	ND
30	ND	-	ND	ND	12.6	11.5	10.0	9.93	ND	ND	ND	ND
31	ND	-	ND	-	12.7	-	9.93	9.92	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-24a: 2018 Daily Water Surface Elevation for CR-WC**

DATE	2018				
	AUG	SEP	OCT	NOV	DEC
1	ND	97.951	97.965	97.948	97.918
2	ND	97.953	97.981	97.954	97.916
3	ND	97.938	97.957	97.960	97.902
4	97.994	97.950	97.943	97.942	97.909
5	97.996	97.947	97.941	97.939	97.904
6	97.993	97.933	97.942	97.930	97.913
7	97.993	97.933	97.940	97.921	97.901
8	97.988	97.933	97.942	97.918	97.910
9	97.980	97.948	97.947	97.918	97.913
10	97.980	97.958	97.950	97.908	97.917
11	97.984	97.955	97.960	97.899	97.913
12	97.957	97.949	97.950	97.904	97.925
13	97.963	97.955	97.947	97.907	97.921
14	97.959	97.963	97.956	97.901	97.915
15	97.959	97.953	97.962	97.878	97.905
16	97.944	97.947	97.954	97.881	97.894
17	97.943	97.957	97.960	97.883	97.913
18	97.956	97.968	97.964	97.884	97.904
19	97.939	97.961	97.959	97.893	97.907
20	97.940	97.964	97.961	97.895	97.912
21	97.937	97.956	97.974	97.905	97.906
22	97.922	97.954	97.951	97.908	97.908
23	97.901	97.956	97.957	97.896	97.901
24	97.907	97.969	97.951	97.897	97.890
25	97.918	97.970	97.948	97.906	97.896
26	97.912	97.977	97.956	97.915	97.884
27	97.917	97.977	97.957	97.913	97.889
28	97.914	97.983	97.954	97.910	97.871
29	97.913	97.975	97.951	97.913	97.870
30	97.912	97.973	97.953	97.911	97.856
31	97.937	-	97.953	-	97.863

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-24b: 2019 Daily Water Surface Elevation for CR-WC-MS-08 at Golder Hydrometric Station**

DATE	2019											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	97.909	97.849	97.826	97.881	98.010	97.974	97.907	97.937	98.095	98.134	98.085	98.019
2	97.916	97.850	97.830	97.869	98.016	97.926	97.893	97.918	98.058	98.127	98.067	97.984
3	97.914	97.853	97.847	97.868	98.018	97.929	97.907	97.920	98.060	98.123	98.077	97.971
4	97.896	97.851	97.852	97.870	98.016	97.944	97.928	97.932	98.058	98.112	98.092	98.026
5	97.883	97.848	97.844	97.883	98.021	97.953	97.969	97.938	98.082	98.105	98.105	98.048
6	97.899	97.846	97.854	97.898	98.023	97.960	97.946	97.967	98.132	98.109	98.114	98.030
7	97.878	97.840	97.855	97.899	98.021	97.949	97.905	97.962	98.114	98.090	98.081	98.038
8	97.865	97.827	97.845	97.902	98.028	97.963	97.913	97.955	98.123	98.126	98.048	98.044
9	97.865	97.847	97.851	97.913	98.034	97.979	97.936	97.953	98.136	98.144	98.096	98.067
10	97.887	97.851	97.867	97.914	98.036	97.970	97.924	97.982	98.145	98.142	98.128	98.075
11	97.900	97.849	97.877	97.922	98.032	97.978	97.895	97.982	98.146	98.142	98.075	98.077
12	97.897	97.858	97.863	97.927	98.037	97.944	97.879	97.980	98.113	98.105	98.028	98.051
13	97.880	97.824	97.857	97.929	98.037	97.900	97.898	97.979	98.069	98.093	98.046	98.069
14	97.885	97.842	97.856	97.929	98.033	97.919	97.884	97.953	98.047	98.114	98.072	98.015
15	97.858	97.845	97.862	97.932	98.022	97.951	97.888	97.941	98.062	98.128	98.028	98.009
16	97.867	97.840	97.862	97.953	98.035	97.965	97.886	97.907	98.054	98.065	98.034	98.031
17	97.863	97.836	97.866	97.972	98.034	97.962	97.871	97.961	98.075	98.026	97.985	98.014
18	97.856	97.857	97.874	97.987	98.048	97.932	97.859	97.969	98.092	98.019	98.000	98.005
19	97.858	97.864	97.871	97.994	98.046	97.922	97.876	98.008	98.087	98.039	98.050	98.023
20	97.879	97.847	97.867	97.989	98.025	97.933	97.903	98.056	98.068	98.077	98.072	98.000
21	97.878	97.852	97.873	98.001	98.018	97.951	97.911	98.032	98.070	98.100	98.016	98.007
22	97.877	97.850	97.873	98.017	98.023	97.941	97.912	97.992	98.042	98.094	97.983	98.007
23	97.855	97.837	97.857	98.020	98.003	97.906	97.902	98.028	98.037	98.123	97.962	98.008
24	97.843	97.833	97.866	98.014	97.992	97.901	97.881	97.991	98.068	98.081	97.972	97.997
25	97.863	97.838	97.880	98.012	98.003	97.916	97.874	98.004	98.085	98.056	98.014	97.994
26	97.884	97.860	97.874	98.012	98.014	97.939	97.888	98.038	98.082	98.136	98.059	97.986
27	97.870	97.860	97.866	98.010	97.979	97.972	97.889	98.057	98.139	98.123	98.105	97.971
28	97.854	97.821	97.875	98.014	97.955	97.968	97.913	98.031	98.185	98.132	98.104	98.019
29	97.855	-	97.871	98.017	97.933	97.922	97.907	98.078	98.201	98.134	98.081	98.015
30	97.867	-	97.874	98.007	97.983	97.918	97.904	98.080	98.166	98.074	98.069	98.015
31	97.866	-	97.882	-	98.003	-	97.922	98.083	-	98.063	-	97.937

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

Table D-24c: 2020 Daily Water Surface Elevation for CR-WC-MS-08 at Golder Hydrometric Station												
DATE	2020											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	97.921	97.911	97.952	98.008	97.954	98.522	ND	ND	ND	ND	ND	ND
2	97.948	97.958	97.879	98.003	97.995	98.522	ND	ND	ND	ND	ND	ND
3	97.998	98.010	97.900	97.995	98.011	98.501	ND	ND	ND	ND	ND	ND
4	97.959	97.964	97.919	97.981	98.056	98.501	ND	ND	ND	ND	ND	ND
5	97.987	97.960	97.980	97.969	98.162	98.493	ND	ND	ND	ND	ND	ND
6	97.992	97.951	97.961	97.937	98.188	98.473	ND	ND	ND	ND	ND	ND
7	98.038	97.964	98.008	97.911	98.218	ND	ND	ND	ND	ND	ND	ND
8	98.010	97.975	97.989	97.963	98.243	ND	ND	ND	ND	ND	ND	ND
9	98.026	97.958	97.964	97.959	98.269	ND	ND	ND	ND	ND	ND	ND
10	98.030	97.971	97.925	97.954	98.286	ND	ND	ND	ND	ND	ND	ND
11	98.014	97.981	97.915	97.980	98.305	ND	ND	ND	ND	ND	ND	ND
12	98.006	98.041	97.992	97.994	98.326	ND	ND	ND	ND	ND	ND	ND
13	98.026	97.956	98.049	97.988	98.338	ND	ND	ND	ND	ND	ND	ND
14	98.037	97.928	98.074	97.963	98.372	ND	ND	ND	ND	ND	ND	ND
15	98.063	97.973	98.014	97.996	98.370	ND	ND	ND	ND	ND	ND	ND
16	98.071	97.972	97.974	97.958	98.376	ND	ND	ND	ND	ND	ND	ND
17	98.040	98.014	97.993	97.901	98.380	ND	ND	ND	ND	ND	ND	ND
18	98.079	98.039	97.999	97.934	98.379	ND	ND	ND	ND	ND	ND	ND
19	98.059	97.999	98.033	97.903	98.418	ND	ND	ND	ND	ND	ND	ND
20	97.985	97.943	98.005	97.934	98.413	ND	ND	ND	ND	ND	ND	ND
21	97.935	97.917	97.961	97.910	98.386	ND	ND	ND	ND	ND	ND	ND
22	97.976	97.914	97.944	97.909	98.424	ND	ND	ND	ND	ND	ND	ND
23	97.984	97.949	97.959	97.923	98.484	ND	ND	ND	ND	ND	ND	ND
24	97.961	98.010	97.972	97.949	98.486	ND	ND	ND	ND	ND	ND	ND
25	97.980	98.039	97.936	97.930	98.484	ND	ND	ND	ND	ND	ND	ND
26	97.996	97.982	97.878	97.901	98.489	ND	ND	ND	ND	ND	ND	ND
27	97.987	97.959	97.918	97.930	98.509	ND	ND	ND	ND	ND	ND	ND
28	97.986	97.931	97.951	97.934	98.508	ND	ND	ND	ND	ND	ND	ND
29	97.977	97.948	97.976	97.936	98.499	ND	ND	ND	ND	ND	ND	ND
30	97.947	ND	97.987	97.935	98.492	ND	ND	ND	ND	ND	ND	ND
31	97.920	ND	98.000	ND	98.471	ND	ND	ND	ND	ND	ND	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-24d: 2020 Daily Water Surface Elevation for CR-WC-MS-08 at Historical WSC Station**

DATE	2020											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	ND	ND	ND	ND	ND	ND	96.763	96.668	96.686	ND	ND	ND
2	ND	ND	ND	ND	ND	ND	96.777	96.656	96.707	ND	ND	ND
3	ND	ND	ND	ND	ND	ND	96.790	96.646	96.687	ND	ND	ND
4	ND	ND	ND	ND	ND	ND	96.785	96.664	96.678	ND	ND	ND
5	ND	ND	ND	ND	ND	ND	96.785	96.654	96.681	ND	ND	ND
6	ND	ND	ND	ND	ND	ND	96.773	96.633	96.692	ND	ND	ND
7	ND	ND	ND	ND	ND	96.769	96.759	96.628	96.696	ND	ND	ND
8	ND	ND	ND	ND	ND	96.814	96.752	96.661	96.686	ND	ND	ND
9	ND	ND	ND	ND	ND	96.804	96.733	96.723	96.698	ND	ND	ND
10	ND	ND	ND	ND	ND	96.805	96.717	96.661	96.685	ND	ND	ND
11	ND	ND	ND	ND	ND	96.796	96.713	96.634	96.716	ND	ND	ND
12	ND	ND	ND	ND	ND	96.784	96.697	96.609	96.747	ND	ND	ND
13	ND	ND	ND	ND	ND	96.807	96.714	96.640	96.719	ND	ND	ND
14	ND	ND	ND	ND	ND	96.802	96.718	96.647	96.710	ND	ND	ND
15	ND	ND	ND	ND	ND	96.809	96.723	96.652	96.734	ND	ND	ND
16	ND	ND	ND	ND	ND	96.832	96.685	96.618	96.707	ND	ND	ND
17	ND	ND	ND	ND	ND	96.823	96.664	96.615	96.700	ND	ND	ND
18	ND	ND	ND	ND	ND	96.816	96.687	96.618	96.696	ND	ND	ND
19	ND	ND	ND	ND	ND	96.812	96.715	96.633	96.701	ND	ND	ND
20	ND	ND	ND	ND	ND	96.804	96.714	96.636	96.709	ND	ND	ND
21	ND	ND	ND	ND	ND	96.803	96.710	96.615	96.715	ND	ND	ND
22	ND	ND	ND	ND	ND	96.801	96.717	96.598	96.709	ND	ND	ND
23	ND	ND	ND	ND	ND	96.799	96.716	96.649	96.689	ND	ND	ND
24	ND	ND	ND	ND	ND	96.803	96.723	96.645	96.676	ND	ND	ND
25	ND	ND	ND	ND	ND	96.808	96.714	96.646	ND	ND	ND	ND
26	ND	ND	ND	ND	ND	96.801	96.717	96.674	ND	ND	ND	ND
27	ND	ND	ND	ND	ND	96.796	96.700	96.678	ND	ND	ND	ND
28	ND	ND	ND	ND	ND	96.801	96.690	96.676	ND	ND	ND	ND
29	ND	ND	ND	ND	ND	96.784	96.695	96.668	ND	ND	ND	ND
30	ND	-	ND	ND	ND	96.770	96.693	96.692	ND	ND	ND	ND
31	ND	-	ND	-	ND	-	96.681	96.694	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-25a: 2018 Mean Daily Discharge for CR-WC-MS-08**

DATE	2018				
	AUG	SEP	OCT	NOV	DEC
1	ND	22.7	23.2	22.6	20.2
2	ND	22.8	23.9	22.8	20.1
3	ND	22.2	23.0	23.1	19.6
4	24.4	22.7	22.4	22.3	19.7
5	24.5	22.6	22.3	22.2	19.6
6	24.4	22.0	22.4	22.0	19.8
7	24.4	22.0	22.3	21.7	19.5
8	24.2	22.0	22.4	21.6	19.7
9	23.8	22.6	22.5	21.6	19.8
10	23.8	23.0	22.7	21.4	19.9
11	24.0	22.9	23.1	21.1	19.8
12	22.9	22.6	22.7	21.2	20.1
13	23.2	22.9	22.5	21.3	20.0
14	23.0	23.2	22.9	21.1	19.8
15	23.0	22.8	23.1	20.5	19.6
16	22.4	22.6	22.8	20.5	19.3
17	22.4	22.9	23.1	20.5	19.8
18	22.9	23.4	23.2	20.4	19.6
19	22.2	23.1	23.0	20.6	19.6
20	22.3	23.2	23.1	20.5	19.8
21	22.2	22.9	23.6	20.7	19.6
22	21.6	22.8	22.7	20.7	19.6
23	20.8	22.9	22.9	20.3	19.5
24	21.0	23.4	22.7	20.3	19.2
25	21.4	23.4	22.6	20.4	19.3
26	21.2	23.7	22.9	20.5	19.0
27	21.4	23.7	22.9	20.4	19.1
28	21.3	24.0	22.8	20.3	18.7
29	21.3	23.6	22.7	20.2	18.7
30	21.2	23.6	22.8	20.1	18.3
31	22.2	-	22.8	-	17.8

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-25b: 2019 Mean Daily Discharge for CR-WC-MS-08**

DATE	2019											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	18.6	17.4	15.9	19.5	25.1	23.6	21.0	22.1	28.7	30.5	27.4	24.8
2	18.8	17.5	15.9	19.2	25.3	21.8	20.5	21.5	27.1	30.2	26.9	23.9
3	18.8	17.6	16.3	19.4	25.4	21.9	21.0	21.5	27.2	30.0	27.2	23.6
4	18.3	17.5	16.3	19.7	25.3	22.5	21.8	22.0	27.1	29.5	27.5	24.9
5	18.0	17.5	16.1	20.2	25.5	22.8	23.4	22.2	28.2	29.2	27.8	25.4
6	18.4	17.4	16.3	20.7	25.6	23.1	22.5	23.3	30.4	29.4	28.1	24.9
7	17.9	17.3	16.3	20.7	25.5	22.6	21.0	23.1	29.6	28.5	27.1	25.1
8	17.6	16.9	16.0	20.9	25.8	23.2	21.3	22.9	30.0	29.3	26.2	25.2
9	17.6	17.3	16.1	21.3	26.1	23.8	22.1	22.8	30.6	29.8	27.5	25.8
10	18.2	17.4	16.4	21.3	26.2	23.4	21.7	23.9	31.1	29.7	28.3	26.0
11	18.5	17.3	16.6	21.6	26.0	23.8	20.6	23.9	31.1	29.7	26.9	26.0
12	18.4	17.5	16.2	21.8	26.2	22.4	20.0	23.9	29.6	28.6	25.6	25.3
13	18.0	16.6	16.0	21.9	26.2	20.8	20.7	23.8	27.6	28.2	26.0	25.7
14	18.1	17.0	16.0	21.9	26.0	21.5	20.2	22.8	26.6	28.8	26.7	24.3
15	17.5	17.0	16.2	22.0	25.6	22.7	20.3	22.3	27.3	29.1	25.5	24.1
16	17.7	16.8	16.3	22.8	26.1	23.3	20.3	21.0	26.9	27.4	25.6	24.6
17	17.6	16.7	16.6	23.5	26.1	23.1	19.7	23.1	27.9	26.4	24.4	24.2
18	17.5	17.2	17.0	24.1	26.7	22.0	19.3	23.4	28.6	26.2	24.7	23.9
19	17.5	17.3	17.1	24.4	26.6	21.6	19.9	25.0	28.4	26.6	26.0	24.3
20	18.1	16.8	17.1	24.2	25.7	22.0	20.9	27.0	27.5	27.6	26.5	23.7
21	18.0	16.9	17.5	24.7	25.4	22.7	21.2	26.0	27.6	28.2	25.0	23.9
22	18.0	16.8	17.6	25.4	25.6	22.3	21.2	24.3	26.4	28.0	24.2	23.8
23	17.5	16.4	17.2	25.5	24.8	21.0	20.9	25.8	26.2	28.7	23.7	23.8
24	17.2	16.3	17.7	25.2	24.3	20.8	20.1	24.3	27.5	27.6	23.9	23.5
25	17.7	16.4	18.3	25.2	24.8	21.4	19.9	24.8	28.3	26.9	24.9	23.4
26	18.3	16.8	18.3	25.1	25.2	22.2	20.3	26.2	28.2	29.0	26.0	23.2
27	17.9	16.8	18.2	25.1	23.8	23.5	20.4	27.1	30.8	28.6	27.2	22.8
28	17.5	15.8	18.6	25.2	22.9	23.4	21.3	25.9	33.0	28.8	27.1	24.0
29	17.5	-	18.6	25.3	22.0	21.6	21.0	28.0	33.8	28.9	26.5	23.8
30	17.9	-	18.9	24.9	24.0	21.5	20.9	28.1	32.0	27.2	26.1	23.8
31	17.9	-	19.4	-	24.8	-	21.6	28.2	-	26.9	-	21.9

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-25c: 2020 Mean Daily Discharge for CR-WC-MS-08**

DATE	2020											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	21.5	20.4	20.7	21.4	22.8	52.2	47.4	40.6	42.6	ND	ND	ND
2	22.1	21.5	19.0	21.3	24.5	52.2	48.4	39.8	44.2	ND	ND	ND
3	23.2	22.7	19.5	21.2	25.1	50.9	49.3	39.2	42.8	ND	ND	ND
4	22.3	21.6	19.9	21.0	27.0	50.8	49.0	40.3	42.3	ND	ND	ND
5	22.9	21.5	21.3	20.8	31.9	50.4	48.9	39.6	42.6	ND	ND	ND
6	23.0	21.2	20.8	20.1	33.1	49.1	48.0	38.3	43.4	ND	ND	ND
7	24.1	21.5	21.9	19.6	34.6	50.7	47.0	37.9	43.8	ND	ND	ND
8	23.4	21.8	21.4	20.9	35.9	53.4	46.6	40.2	43.2	ND	ND	ND
9	23.8	21.3	20.8	20.9	37.3	53.2	45.2	42.6	44.1	ND	ND	ND
10	23.8	21.6	19.9	20.8	38.2	53.2	44.0	40.1	43.3	ND	ND	ND
11	23.4	21.8	19.6	21.5	39.2	52.3	43.7	38.3	45.7	ND	ND	ND
12	23.2	23.3	21.4	21.9	40.4	51.2	42.6	36.9	48.0	ND	ND	ND
13	23.6	21.2	22.8	21.9	41.0	52.9	43.3	38.7	46.1	ND	ND	ND
14	23.9	20.5	23.5	21.4	43.0	52.4	43.5	39.2	45.5	ND	ND	ND
15	24.5	21.5	21.9	22.2	42.9	52.8	43.8	39.5	47.3	ND	ND	ND
16	24.7	21.5	20.9	21.4	43.2	54.4	42.6	37.3	45.4	ND	ND	ND
17	23.9	22.5	21.3	20.2	43.4	53.6	42.0	37.1	45.0	ND	ND	ND
18	24.9	23.1	21.4	21.0	43.4	52.9	42.9	37.3	44.8	ND	ND	ND
19	24.3	22.1	22.3	20.4	45.7	52.5	43.9	38.3	45.3	ND	ND	ND
20	22.4	20.7	21.5	21.2	45.4	51.8	43.8	38.5	46.0	ND	ND	ND
21	21.2	20.1	20.5	20.7	43.8	51.6	43.5	37.1	46.5	ND	ND	ND
22	22.2	20.0	20.0	20.8	46.1	51.2	44.0	36.0	46.2	ND	ND	ND
23	22.3	20.8	20.4	21.2	49.8	51.0	43.9	39.3	44.8	ND	ND	ND
24	21.8	22.2	20.7	21.8	49.9	51.1	44.4	39.1	43.9	ND	ND	ND
25	22.2	23.0	19.8	21.5	49.8	51.4	43.8	39.3	ND	ND	ND	ND
26	22.5	21.5	18.5	20.9	50.1	50.8	44.0	41.3	ND	ND	ND	ND
27	22.3	20.9	19.3	21.7	51.3	50.3	42.7	41.6	ND	ND	ND	ND
28	22.3	20.3	20.1	21.8	51.3	50.5	42.1	41.6	ND	ND	ND	ND
29	22.0	20.6	20.6	21.9	50.7	49.1	42.5	41.1	ND	ND	ND	ND
30	21.3	-	20.9	22.0	50.2	48.0	42.3	42.9	ND	ND	ND	ND
31	20.7	-	21.2	-	49.0	-	41.4	43.1	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-26a: 2018 Daily Water Surface Elevation for CR-WC**

DATE	2018				
	AUG	SEP	OCT	NOV	DEC
1	ND	398.655	398.766	ND	ND
2	ND	398.668	398.777	ND	ND
3	ND	398.668	398.770	ND	ND
4	ND	398.694	398.779	ND	ND
5	ND	398.697	ND	ND	ND
6	ND	398.694	ND	ND	ND
7	ND	398.689	ND	ND	ND
8	398.741	398.682	ND	ND	ND
9	398.732	398.710	ND	ND	ND
10	398.724	398.729	ND	ND	ND
11	398.711	398.737	ND	ND	ND
12	398.697	398.748	ND	ND	ND
13	398.698	398.763	ND	ND	ND
14	398.692	398.778	ND	ND	ND
15	398.674	398.772	ND	ND	ND
16	398.670	398.765	ND	ND	ND
17	398.664	398.768	ND	ND	ND
18	398.657	398.768	ND	ND	ND
19	398.649	398.766	ND	ND	ND
20	398.645	398.763	ND	ND	ND
21	398.645	398.760	ND	ND	ND
22	398.631	398.756	ND	ND	ND
23	398.616	398.756	ND	ND	ND
24	398.625	398.749	ND	ND	ND
25	398.634	398.750	ND	ND	ND
26	398.626	398.750	ND	ND	ND
27	398.623	398.756	ND	ND	ND
28	398.621	398.760	ND	ND	ND
29	398.613	398.765	ND	ND	ND
30	398.613	398.772	ND	ND	ND
31	398.649	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-26b: 2019 Daily Water Surface Elevation for CR-WC-MS-09**

DATE	2019											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	ND	ND	ND	ND	ND	398.706	398.725	398.617	399.265	399.087	ND	ND
2	ND	ND	ND	ND	ND	398.717	398.737	398.618	399.255	399.075	ND	ND
3	ND	ND	ND	ND	ND	398.712	398.744	398.671	399.232	399.064	ND	ND
4	ND	ND	ND	ND	ND	398.741	398.736	398.709	399.213	399.053	ND	ND
5	ND	ND	ND	ND	ND	398.757	398.740	398.735	399.215	ND	ND	ND
6	ND	ND	ND	ND	ND	398.765	398.738	398.758	399.205	ND	ND	ND
7	ND	ND	ND	ND	ND	398.755	398.717	398.775	399.202	ND	ND	ND
8	ND	ND	ND	ND	ND	398.760	398.698	398.780	399.212	ND	ND	ND
9	ND	ND	ND	ND	ND	398.770	398.697	398.798	399.213	ND	ND	ND
10	ND	ND	ND	ND	ND	398.769	398.687	398.819	399.211	ND	ND	ND
11	ND	ND	ND	ND	ND	398.764	398.690	398.814	399.205	ND	ND	ND
12	ND	ND	ND	ND	ND	398.752	398.686	398.820	399.209	ND	ND	ND
13	ND	ND	ND	ND	ND	398.740	398.665	398.826	399.201	ND	ND	ND
14	ND	ND	ND	ND	398.820	398.737	398.665	398.828	399.194	ND	ND	ND
15	ND	ND	ND	ND	398.835	398.744	398.667	398.816	399.174	ND	ND	ND
16	ND	ND	ND	ND	398.828	398.753	398.678	398.847	399.166	ND	ND	ND
17	ND	ND	ND	ND	398.820	398.763	398.675	398.941	399.157	ND	ND	ND
18	ND	ND	ND	ND	398.806	398.771	398.664	399.053	399.142	ND	ND	ND
19	ND	ND	ND	ND	398.800	398.753	398.639	399.136	399.136	ND	ND	ND
20	ND	ND	ND	ND	398.791	398.735	398.632	399.205	399.130	ND	ND	ND
21	ND	ND	ND	ND	398.780	398.724	398.630	399.253	399.126	ND	ND	ND
22	ND	ND	ND	ND	398.779	398.722	398.624	399.292	399.124	ND	ND	ND
23	ND	ND	ND	ND	398.778	398.720	398.623	399.301	399.123	ND	ND	ND
24	ND	ND	ND	ND	398.775	398.712	398.616	399.324	399.109	ND	ND	ND
25	ND	ND	ND	ND	398.758	398.711	398.601	399.332	399.103	ND	ND	ND
26	ND	ND	ND	ND	398.760	398.707	398.604	399.320	399.101	ND	ND	ND
27	ND	ND	ND	ND	398.754	398.710	398.608	399.325	399.105	ND	ND	ND
28	ND	ND	ND	ND	398.744	398.701	398.635	399.320	399.105	ND	ND	ND
29	ND	-	ND	ND	398.746	398.712	398.644	399.312	399.100	ND	ND	ND
30	ND	-	ND	ND	398.728	398.719	398.639	399.292	399.090	ND	ND	ND
31	ND	-	ND	-	398.717	-	398.628	399.271	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-26c: 2020 Daily Water Surface Elevation for CR-WC-MS-09**

DATE	2020											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	ND	ND	ND	ND	ND	399.545	399.454	399.525	399.529	ND	ND	ND
2	ND	ND	ND	ND	ND	399.542	399.486	399.494	399.528	ND	ND	ND
3	ND	ND	ND	ND	ND	399.522	399.501	399.460	399.520	ND	ND	ND
4	ND	ND	ND	ND	ND	399.520	399.496	399.438	399.511	ND	ND	ND
5	ND	ND	ND	ND	399.629	399.519	399.488	399.412	399.512	ND	ND	ND
6	ND	ND	ND	ND	399.668	399.505	399.473	399.390	399.518	ND	ND	ND
7	ND	ND	ND	ND	399.626	399.502	399.454	399.368	399.509	ND	ND	ND
8	ND	ND	ND	ND	399.569	399.532	399.434	399.371	399.497	ND	ND	ND
9	ND	ND	ND	ND	399.532	399.562	399.406	399.380	399.487	ND	ND	ND
10	ND	ND	ND	ND	399.500	399.590	399.384	399.400	399.478	ND	ND	ND
11	ND	ND	ND	ND	399.478	399.624	399.373	399.414	399.486	ND	ND	ND
12	ND	ND	ND	ND	399.460	399.630	399.357	399.428	399.495	ND	ND	ND
13	ND	ND	ND	ND	399.436	399.624	399.348	399.438	399.503	ND	ND	ND
14	ND	ND	ND	ND	399.434	399.617	399.365	399.432	399.508	ND	ND	ND
15	ND	ND	ND	ND	399.418	399.645	399.365	399.426	399.509	ND	ND	ND
16	ND	ND	ND	ND	399.404	399.648	399.365	399.417	399.505	ND	ND	ND
17	ND	ND	ND	ND	399.378	399.638	399.382	399.417	399.498	ND	ND	ND
18	ND	ND	ND	ND	399.363	399.614	399.459	399.417	399.490	ND	ND	ND
19	ND	ND	ND	ND	399.372	399.597	399.533	399.425	399.482	ND	ND	ND
20	ND	ND	ND	ND	399.366	399.574	399.585	399.422	399.472	ND	ND	ND
21	ND	ND	ND	ND	399.361	399.547	399.620	399.414	399.464	ND	ND	ND
22	ND	ND	ND	ND	399.402	399.522	399.642	399.416	399.456	ND	ND	ND
23	ND	ND	ND	ND	399.441	399.496	399.651	399.471	399.448	ND	ND	ND
24	ND	ND	ND	ND	399.472	399.478	399.653	399.499	399.442	ND	ND	ND
25	ND	ND	ND	ND	399.496	399.470	399.653	399.508	399.447	ND	ND	ND
26	ND	ND	ND	ND	399.516	399.461	399.667	399.508	399.447	ND	ND	ND
27	ND	ND	ND	ND	399.541	399.455	399.656	399.508	399.445	ND	ND	ND
28	ND	ND	ND	ND	399.562	399.450	399.645	399.505	399.444	ND	ND	ND
29	ND	ND	ND	ND	399.558	399.439	399.617	399.506	399.444	ND	ND	ND
30	ND	-	ND	ND	399.547	399.427	399.589	399.524	ND	ND	ND	ND
31	ND	-	ND	-	399.531	-	399.557	399.525	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-27a: 2018 Mean Daily Discharge for CR-WC-MS-09**

DATE	2018				
	AUG	SEP	OCT	NOV	DEC
1	ND	41.3	47.9	ND	ND
2	ND	42.1	48.7	ND	ND
3	ND	42.1	48.2	ND	ND
4	ND	43.6	48.8	ND	ND
5	ND	43.7	ND	ND	ND
6	ND	43.5	ND	ND	ND
7	ND	43.3	ND	ND	ND
8	46.4	42.9	ND	ND	ND
9	45.8	44.5	ND	ND	ND
10	45.3	45.7	ND	ND	ND
11	44.6	46.1	ND	ND	ND
12	43.7	46.8	ND	ND	ND
13	43.8	47.8	ND	ND	ND
14	43.5	48.7	ND	ND	ND
15	42.4	48.3	ND	ND	ND
16	42.1	47.9	ND	ND	ND
17	41.8	48.1	ND	ND	ND
18	41.4	48.1	ND	ND	ND
19	41.0	47.9	ND	ND	ND
20	40.7	47.8	ND	ND	ND
21	40.7	47.6	ND	ND	ND
22	40.0	47.3	ND	ND	ND
23	39.1	47.3	ND	ND	ND
24	39.6	46.9	ND	ND	ND
25	40.1	47.0	ND	ND	ND
26	39.7	47.0	ND	ND	ND
27	39.5	47.3	ND	ND	ND
28	39.4	47.6	ND	ND	ND
29	39.0	47.9	ND	ND	ND
30	39.0	48.3	ND	ND	ND
31	41.0	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-27b: 2019 Mean Daily Discharge for CR-WC-MS-09**

DATE	2019											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	ND	ND	ND	ND	ND	44.3	45.4	39.2	86.8	71.1	ND	ND
2	ND	ND	ND	ND	ND	45.0	46.2	39.2	85.9	70.2	ND	ND
3	ND	ND	ND	ND	ND	44.6	46.6	42.2	83.7	69.3	ND	ND
4	ND	ND	ND	ND	ND	46.4	46.1	44.5	82.0	68.4	ND	ND
5	ND	ND	ND	ND	ND	47.4	46.3	46.0	82.1	ND	ND	ND
6	ND	ND	ND	ND	ND	47.9	46.2	47.5	81.3	ND	ND	ND
7	ND	ND	ND	ND	ND	47.3	44.9	48.5	81.0	ND	ND	ND
8	ND	ND	ND	ND	ND	47.6	43.8	48.8	81.9	ND	ND	ND
9	ND	ND	ND	ND	ND	48.2	43.7	50.0	82.0	ND	ND	ND
10	ND	ND	ND	ND	ND	48.2	43.1	51.4	81.8	ND	ND	ND
11	ND	ND	ND	ND	ND	47.8	43.3	51.1	81.3	ND	ND	ND
12	ND	ND	ND	ND	ND	47.1	43.1	51.4	81.6	ND	ND	ND
13	ND	ND	ND	ND	ND	46.3	41.9	51.9	81.0	ND	ND	ND
14	ND	ND	ND	ND	51.4	46.2	41.9	52.0	80.3	ND	ND	ND
15	ND	ND	ND	ND	52.4	46.6	42.0	51.2	78.5	ND	ND	ND
16	ND	ND	ND	ND	52.0	47.2	42.6	53.3	77.8	ND	ND	ND
17	ND	ND	ND	ND	51.5	47.8	42.5	59.9	77.0	ND	ND	ND
18	ND	ND	ND	ND	50.5	48.3	41.8	68.4	75.8	ND	ND	ND
19	ND	ND	ND	ND	50.2	47.1	40.4	75.3	75.2	ND	ND	ND
20	ND	ND	ND	ND	49.5	46.0	40.0	81.3	74.7	ND	ND	ND
21	ND	ND	ND	ND	48.8	45.4	39.9	85.7	74.4	ND	ND	ND
22	ND	ND	ND	ND	48.8	45.3	39.6	89.4	74.2	ND	ND	ND
23	ND	ND	ND	ND	48.7	45.1	39.5	90.2	74.2	ND	ND	ND
24	ND	ND	ND	ND	48.5	44.7	39.1	92.4	72.9	ND	ND	ND
25	ND	ND	ND	ND	47.4	44.6	38.3	93.2	72.5	ND	ND	ND
26	ND	ND	ND	ND	47.6	44.3	38.5	92.0	72.3	ND	ND	ND
27	ND	ND	ND	ND	47.2	44.5	38.7	92.5	72.6	ND	ND	ND
28	ND	ND	ND	ND	46.6	44.0	40.2	92.0	72.6	ND	ND	ND
29	ND	-	ND	ND	46.7	44.7	40.7	91.2	72.2	ND	ND	ND
30	ND	-	ND	ND	45.6	45.1	40.4	89.4	71.4	ND	ND	ND
31	ND	-	ND	-	45.0	-	39.8	87.3	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

Table D-27c: 2020 Mean Daily Discharge for CR-WC-MS-09												
DATE	2020											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	ND	ND	ND	ND	ND	116	106	113	114	ND	ND	ND
2	ND	ND	ND	ND	ND	115	109	110	114	ND	ND	ND
3	ND	ND	ND	ND	ND	113	111	106	113	ND	ND	ND
4	ND	ND	ND	ND	ND	113	110	104	112	ND	ND	ND
5	ND	ND	ND	ND	126	113	109	101	112	ND	ND	ND
6	ND	ND	ND	ND	130	111	108	99.0	113	ND	ND	ND
7	ND	ND	ND	ND	125	111	106	96.8	112	ND	ND	ND
8	ND	ND	ND	ND	118	114	104	97.1	110	ND	ND	ND
9	ND	ND	ND	ND	114	118	101	98.0	109	ND	ND	ND
10	ND	ND	ND	ND	111	121	98.4	100	108	ND	ND	ND
11	ND	ND	ND	ND	108	125	97.3	101	109	ND	ND	ND
12	ND	ND	ND	ND	106	126	95.7	103	110	ND	ND	ND
13	ND	ND	ND	ND	104	125	94.8	104	111	ND	ND	ND
14	ND	ND	ND	ND	104	124	96.5	103	112	ND	ND	ND
15	ND	ND	ND	ND	102	128	96.5	103	112	ND	ND	ND
16	ND	ND	ND	ND	100	128	96.5	102	111	ND	ND	ND
17	ND	ND	ND	ND	97.8	127	98.2	102	110	ND	ND	ND
18	ND	ND	ND	ND	96.3	124	106	102	110	ND	ND	ND
19	ND	ND	ND	ND	97.2	122	114	103	109	ND	ND	ND
20	ND	ND	ND	ND	96.6	119	120	102	108	ND	ND	ND
21	ND	ND	ND	ND	96.1	116	124	101	107	ND	ND	ND
22	ND	ND	ND	ND	100	113	127	102	106	ND	ND	ND
23	ND	ND	ND	ND	104	110	128	108	105	ND	ND	ND
24	ND	ND	ND	ND	108	108	128	111	104	ND	ND	ND
25	ND	ND	ND	ND	110	107	128	112	105	ND	ND	ND
26	ND	ND	ND	ND	112	106	130	112	105	ND	ND	ND
27	ND	ND	ND	ND	115	106	129	112	105	ND	ND	ND
28	ND	ND	ND	ND	118	105	127	111	105	ND	ND	ND
29	ND	ND	ND	ND	117	104	124	111	105	ND	ND	ND
30	ND	-	ND	ND	116	103	121	113	ND	ND	ND	ND
31	ND	-	ND	-	114	-	117	114	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-28a: 2018 Daily Water Surface Elevation for CR-WC**

DATE	2018				
	AUG	SEP	OCT	NOV	DEC
1	ND	499.336	499.274	ND	ND
2	ND	499.332	499.277	ND	ND
3	ND	499.329	ND	ND	ND
4	499.370	499.330	ND	ND	ND
5	499.443	499.328	ND	ND	ND
6	499.383	499.320	ND	ND	ND
7	499.388	499.328	ND	ND	ND
8	499.367	499.341	ND	ND	ND
9	499.369	499.334	ND	ND	ND
10	499.376	499.377	ND	ND	ND
11	499.369	499.342	ND	ND	ND
12	499.391	499.376	ND	ND	ND
13	499.377	499.369	ND	ND	ND
14	499.357	499.338	ND	ND	ND
15	499.351	499.325	ND	ND	ND
16	499.339	499.354	ND	ND	ND
17	499.354	499.349	ND	ND	ND
18	499.346	499.323	ND	ND	ND
19	499.325	499.317	ND	ND	ND
20	499.325	499.316	ND	ND	ND
21	499.338	499.314	ND	ND	ND
22	499.336	499.332	ND	ND	ND
23	499.384	499.311	ND	ND	ND
24	499.348	499.317	ND	ND	ND
25	499.333	499.293	ND	ND	ND
26	499.318	499.315	ND	ND	ND
27	499.376	499.299	ND	ND	ND
28	499.332	499.304	ND	ND	ND
29	499.313	499.296	ND	ND	ND
30	499.321	499.302	ND	ND	ND
31	499.351	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-28b: 2019 Daily Water Surface Elevation for CR-WC-TI-01**

DATE	2019											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	ND	ND	ND	ND	ND	499.318	ND	ND	ND	ND	ND	ND
2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
16	ND	ND	ND	ND	499.348	ND	ND	ND	ND	ND	ND	ND
17	ND	ND	ND	ND	499.479	ND	ND	ND	ND	ND	ND	ND
18	ND	ND	ND	ND	499.560	ND	ND	ND	ND	ND	ND	ND
19	ND	ND	ND	ND	499.621	ND	ND	ND	ND	ND	ND	ND
20	ND	ND	ND	ND	499.627	ND	ND	ND	ND	ND	ND	ND
21	ND	ND	ND	ND	499.683	ND	ND	ND	ND	ND	ND	ND
22	ND	ND	ND	ND	499.680	ND	ND	ND	ND	ND	ND	ND
23	ND	ND	ND	ND	499.759	ND	ND	ND	ND	ND	ND	ND
24	ND	ND	ND	ND	499.766	ND	ND	ND	ND	ND	ND	ND
25	ND	ND	ND	ND	499.818	ND	ND	ND	ND	ND	ND	ND
26	ND	ND	ND	ND	499.816	ND	ND	ND	ND	ND	ND	ND
27	ND	ND	ND	ND	499.862	ND	ND	ND	ND	ND	ND	ND
28	ND	ND	ND	ND	499.879	ND	ND	ND	ND	ND	ND	ND
29	ND	-	ND	ND	499.879	ND	ND	ND	ND	ND	ND	ND
30	ND	-	ND	ND	499.865	ND	ND	ND	ND	ND	ND	ND
31	ND	-	ND	-	499.858	-	ND	ND	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-29a: 2018 Mean Daily Discharge for CR-WC-TI-01**

DATE	2018				
	AUG	SEP	OCT	NOV	DEC
1	ND	0.043	0.036	ND	ND
2	ND	0.043	0.037	ND	ND
3	ND	0.043	ND	ND	ND
4	0.029	0.044	ND	ND	ND
5	0.045	0.044	ND	ND	ND
6	0.034	0.043	ND	ND	ND
7	0.036	0.045	ND	ND	ND
8	0.032	0.048	ND	ND	ND
9	0.033	0.048	ND	ND	ND
10	0.035	0.055	ND	ND	ND
11	0.035	0.049	ND	ND	ND
12	0.040	0.055	ND	ND	ND
13	0.038	0.054	ND	ND	ND
14	0.034	0.049	ND	ND	ND
15	0.034	0.047	ND	ND	ND
16	0.032	0.051	ND	ND	ND
17	0.036	0.051	ND	ND	ND
18	0.035	0.046	ND	ND	ND
19	0.031	0.045	ND	ND	ND
20	0.032	0.045	ND	ND	ND
21	0.035	0.044	ND	ND	ND
22	0.036	0.047	ND	ND	ND
23	0.046	0.044	ND	ND	ND
24	0.040	0.045	ND	ND	ND
25	0.037	0.040	ND	ND	ND
26	0.035	0.044	ND	ND	ND
27	0.047	0.041	ND	ND	ND
28	0.039	0.042	ND	ND	ND
29	0.036	0.041	ND	ND	ND
30	0.039	0.042	ND	ND	ND
31	0.045	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-29b: 2019 Mean Daily Discharge for CR-WC-TI-01**

DATE	2019											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
16	ND	ND	ND	ND	0.039	ND	ND	ND	ND	ND	ND	ND
17	ND	ND	ND	ND	0.039	ND	ND	ND	ND	ND	ND	ND
18	ND	ND	ND	ND	0.043	ND	ND	ND	ND	ND	ND	ND
19	ND	ND	ND	ND	0.045	ND	ND	ND	ND	ND	ND	ND
20	ND	ND	ND	ND	0.045	ND	ND	ND	ND	ND	ND	ND
21	ND	ND	ND	ND	0.048	ND	ND	ND	ND	ND	ND	ND
22	ND	ND	ND	ND	0.047	ND	ND	ND	ND	ND	ND	ND
23	ND	ND	ND	ND	0.049	ND	ND	ND	ND	ND	ND	ND
24	ND	ND	ND	ND	0.048	ND	ND	ND	ND	ND	ND	ND
25	ND	ND	ND	ND	0.050	ND	ND	ND	ND	ND	ND	ND
26	ND	ND	ND	ND	0.048	ND	ND	ND	ND	ND	ND	ND
27	ND	ND	ND	ND	0.050	ND	ND	ND	ND	ND	ND	ND
28	ND	ND	ND	ND	0.049	ND	ND	ND	ND	ND	ND	ND
29	ND	-	ND	ND	0.048	ND	ND	ND	ND	ND	ND	ND
30	ND	-	ND	ND	0.044	ND	ND	ND	ND	ND	ND	ND
31	ND	-	ND	-	0.041	-	ND	ND	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-30a: 2018 Daily Water Surface Elevation for CR-WC**

DATE	2018				
	AUG	SEP	OCT	NOV	DEC
1	ND	498.237	498.217	498.148	498.158
2	ND	498.253	498.227	498.152	498.151
3	ND	498.243	498.231	498.152	498.119
4	ND	498.240	498.206	498.135	498.130
5	498.259	498.235	498.183	498.130	498.111
6	498.263	498.237	498.185	498.133	498.116
7	498.272	498.236	498.179	498.130	498.098
8	498.284	498.224	498.177	498.132	498.110
9	498.281	498.230	498.185	498.148	498.121
10	498.277	498.247	498.189	498.141	498.122
11	498.264	498.246	498.199	498.135	498.118
12	498.266	498.245	498.182	498.146	498.140
13	498.266	498.243	498.175	498.154	498.139
14	498.262	498.247	498.190	498.159	498.132
15	498.245	498.247	498.182	498.122	498.126
16	498.251	498.245	498.182	498.112	498.100
17	498.241	498.242	498.195	498.125	498.118
18	498.229	498.235	498.186	498.118	498.124
19	498.233	498.235	498.173	498.130	498.131
20	498.234	498.228	498.196	498.126	498.137
21	498.233	498.233	498.177	498.139	498.144
22	498.222	498.233	498.178	498.154	498.139
23	498.199	498.235	498.186	498.126	498.129
24	498.196	498.222	498.178	498.116	498.117
25	498.210	498.219	498.171	498.121	498.122
26	498.209	498.214	498.172	498.128	498.119
27	498.209	498.223	498.166	498.133	498.120
28	498.217	498.226	498.169	498.129	498.111
29	498.213	498.225	498.163	498.141	498.109
30	498.220	498.228	498.156	498.150	498.102
31	498.240	-	498.155	-	498.092

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-30b: 2019 Daily Water Surface Elevation for CR-WC-TI-02**

DATE	2019											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	498.134	498.118	498.091	498.174	498.174	498.136	498.201	498.184	498.335	498.314	498.280	498.254
2	498.154	498.121	498.094	498.150	498.185	498.152	498.215	498.201	498.337	498.313	498.273	498.258
3	498.160	498.114	498.109	498.145	498.181	498.168	498.215	498.234	498.340	498.310	498.282	498.267
4	498.142	498.109	498.115	498.159	498.187	498.190	498.212	498.256	498.339	498.280	498.275	498.274
5	498.120	498.105	498.104	498.170	498.197	498.197	498.203	498.255	498.357	498.288	498.281	498.260
6	498.135	498.104	498.107	498.192	498.195	498.195	498.202	498.247	498.355	498.285	498.271	498.256
7	498.127	498.107	498.111	498.191	498.194	498.179	498.202	498.242	498.350	498.280	498.268	498.270
8	498.114	498.108	498.109	498.186	498.197	498.177	498.198	498.234	498.349	498.299	498.278	498.253
9	498.110	498.117	498.113	498.184	498.200	498.175	498.199	498.248	498.340	498.298	498.286	498.265
10	498.126	498.120	498.123	498.184	498.193	498.178	498.194	498.254	498.339	498.290	498.277	498.260
11	498.132	498.126	498.140	498.211	498.205	498.179	498.196	498.250	498.341	498.284	498.257	498.251
12	498.147	498.134	498.132	498.186	498.197	498.180	498.196	498.250	498.344	498.283	498.277	498.252
13	498.130	498.120	498.125	498.172	498.191	498.187	498.194	498.249	498.343	498.287	498.276	498.254
14	498.135	498.122	498.121	498.167	498.194	498.192	498.194	498.249	498.343	498.292	498.277	498.241
15	498.118	498.129	498.129	498.162	498.180	498.194	498.194	498.248	498.343	498.282	498.261	498.253
16	498.122	498.129	498.138	498.162	498.178	498.195	498.191	498.264	498.331	498.282	498.276	498.263
17	498.110	498.123	498.143	498.161	498.180	498.196	498.190	498.303	498.333	498.282	498.260	498.237
18	498.105	498.130	498.155	498.165	498.180	498.197	498.192	498.321	498.329	498.292	498.282	498.269
19	498.104	498.151	498.159	498.167	498.177	498.196	498.188	498.323	498.327	498.290	498.280	498.247
20	498.119	498.138	498.161	498.167	498.175	498.194	498.177	498.326	498.328	498.295	498.269	498.256
21	498.130	498.133	498.166	498.178	498.168	498.189	498.176	498.322	498.324	498.292	498.258	498.253
22	498.132	498.135	498.171	498.184	498.167	498.186	498.179	498.332	498.324	498.285	498.267	498.262
23	498.116	498.122	498.161	498.185	498.158	498.183	498.179	498.332	498.326	498.287	498.264	498.250
24	498.109	498.119	498.164	498.185	498.151	498.184	498.180	498.333	498.335	498.270	498.271	498.256
25	498.120	498.121	498.178	498.183	498.141	498.187	498.195	498.339	498.328	498.287	498.273	498.254
26	498.137	498.140	498.187	498.183	498.145	498.189	498.188	498.335	498.326	498.294	498.277	498.257
27	498.140	498.135	498.184	498.180	498.148	498.191	498.185	498.336	498.314	498.278	498.274	498.264
28	498.107	498.108	498.187	498.177	498.148	498.193	498.181	498.343	498.313	498.292	498.261	498.269
29	498.099	-	498.183	498.178	498.140	498.191	498.177	498.347	498.312	498.273	498.264	498.270
30	498.112	-	498.181	498.167	498.119	498.200	498.181	498.344	498.308	498.269	498.260	498.253
31	498.124	-	498.180	-	498.121	-	498.180	498.339	-	498.286	-	498.254

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-30c: 2020 Daily Water Surface Elevation for CR-WC-TI-02**

DATE	2020											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	498.268	498.238	498.252	498.319	498.490	498.456	498.474	498.511	498.547	ND	ND	ND
2	498.274	498.265	498.268	498.319	498.461	498.464	498.490	498.513	498.542	ND	ND	ND
3	498.271	498.251	498.266	498.328	498.458	498.458	498.501	498.511	498.538	ND	ND	ND
4	498.259	498.238	498.281	498.332	498.481	498.456	498.506	498.504	498.532	ND	ND	ND
5	498.269	498.248	498.271	498.338	498.490	498.452	498.502	498.500	498.528	ND	ND	ND
6	498.278	498.247	498.275	498.329	498.494	498.443	498.498	498.489	498.525	ND	ND	ND
7	498.267	498.252	498.272	498.358	498.498	498.433	498.492	498.479	498.513	ND	ND	ND
8	498.259	498.252	498.264	498.377	498.504	498.446	498.477	498.491	498.516	ND	ND	ND
9	498.267	498.246	498.267	498.342	498.511	498.467	498.473	498.508	498.514	ND	ND	ND
10	498.253	498.249	498.259	498.383	498.507	498.475	498.479	498.530	498.509	ND	ND	ND
11	498.254	498.267	498.284	498.379	498.503	498.476	ND	498.517	498.511	ND	ND	ND
12	498.255	498.250	498.283	498.384	498.498	498.478	ND	498.510	498.528	ND	ND	ND
13	498.259	498.230	498.280	498.372	498.496	498.476	498.506	498.541	498.522	ND	ND	ND
14	498.257	498.266	498.266	498.396	498.505	498.476	498.495	498.544	498.510	ND	ND	ND
15	498.259	498.258	498.253	498.404	498.498	498.493	498.495	498.533	498.510	ND	ND	ND
16	498.247	498.258	498.265	498.375	498.488	498.506	498.490	498.520	498.506	ND	ND	ND
17	498.250	498.265	498.271	498.414	498.476	498.497	498.481	498.514	498.501	ND	ND	ND
18	498.256	498.257	498.267	498.417	498.469	498.499	498.484	498.518	498.494	ND	ND	ND
19	498.237	498.244	498.270	498.431	498.475	498.501	498.500	498.523	498.495	ND	ND	ND
20	498.235	498.249	498.256	498.441	498.474	498.497	498.511	498.525	498.494	ND	ND	ND
21	498.248	498.254	498.255	498.444	498.463	498.498	498.518	498.516	498.497	ND	ND	ND
22	498.252	498.264	498.289	498.453	498.463	498.497	498.534	498.504	498.496	ND	ND	ND
23	498.245	498.269	498.296	498.476	498.465	498.497	498.531	498.526	498.489	ND	ND	ND
24	498.245	498.277	498.290	498.472	498.458	498.493	498.533	498.535	498.486	ND	ND	ND
25	498.250	498.258	498.261	498.456	498.465	498.485	498.531	498.544	498.508	ND	ND	ND
26	498.246	498.255	498.268	498.486	498.466	498.484	498.528	498.548	498.509	ND	ND	ND
27	498.243	498.260	498.304	498.478	498.460	498.477	498.527	498.551	498.510	ND	ND	ND
28	498.246	498.262	498.317	498.498	498.458	498.477	498.529	498.547	ND	ND	ND	ND
29	498.236	498.270	498.299	498.493	498.455	498.485	498.523	498.544	ND	ND	ND	ND
30	498.246	-	498.314	498.485	498.451	498.482	498.518	498.554	ND	ND	ND	ND
31	498.244	-	498.314	-	498.448	-	498.514	498.545	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-31a: 2018 Mean Daily Discharge for CR-WC-TI-02**

DATE	2018				
	AUG	SEP	OCT	NOV	DEC
1	ND	0.537	0.612	0.430	0.419
2	ND	0.589	0.645	0.439	0.411
3	ND	0.562	0.662	0.441	0.374
4	ND	0.559	0.583	0.400	0.385
5	0.484	0.548	0.517	0.390	0.364
6	0.498	0.559	0.521	0.396	0.369
7	0.526	0.561	0.508	0.392	0.351
8	0.563	0.530	0.503	0.396	0.363
9	0.558	0.554	0.523	0.415	0.374
10	0.552	0.608	0.535	0.405	0.375
11	0.521	0.609	0.561	0.398	0.370
12	0.531	0.610	0.515	0.411	0.394
13	0.535	0.608	0.497	0.420	0.392
14	0.528	0.625	0.537	0.426	0.384
15	0.488	0.630	0.514	0.382	0.377
16	0.506	0.629	0.514	0.372	0.350
17	0.485	0.623	0.550	0.385	0.367
18	0.458	0.607	0.527	0.377	0.373
19	0.474	0.612	0.491	0.391	0.381
20	0.479	0.595	0.556	0.385	0.387
21	0.480	0.617	0.502	0.399	0.395
22	0.456	0.622	0.506	0.417	0.389
23	0.406	0.631	0.526	0.385	0.378
24	0.403	0.599	0.507	0.373	0.365
25	0.439	0.594	0.486	0.378	0.370
26	0.440	0.584	0.490	0.385	0.366
27	0.444	0.616	0.473	0.390	0.366
28	0.467	0.628	0.481	0.385	0.356
29	0.462	0.629	0.468	0.399	0.355
30	0.485	0.646	0.449	0.410	0.347
31	0.541	-	0.448	-	0.337

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-31b: 2019 Mean Daily Discharge for CR-WC-TI-02**

DATE	2019											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.380	0.352	0.316	0.505	0.508	0.417	0.590	0.543	1.10	1.01	0.809	0.669
2	0.404	0.355	0.323	0.461	0.538	0.455	0.630	0.592	1.10	0.998	0.782	0.680
3	0.411	0.348	0.351	0.459	0.527	0.494	0.632	0.695	1.12	0.985	0.813	0.706
4	0.388	0.342	0.364	0.471	0.545	0.555	0.621	0.769	1.11	0.862	0.784	0.729
5	0.364	0.338	0.342	0.480	0.573	0.576	0.596	0.765	1.20	0.891	0.804	0.682
6	0.380	0.337	0.348	0.499	0.567	0.570	0.593	0.738	1.19	0.875	0.766	0.665
7	0.370	0.339	0.358	0.499	0.563	0.524	0.592	0.721	1.17	0.856	0.756	0.709
8	0.356	0.340	0.355	0.496	0.571	0.520	0.581	0.694	1.16	0.928	0.788	0.654
9	0.352	0.348	0.361	0.495	0.582	0.515	0.582	0.743	1.12	0.924	0.814	0.689
10	0.368	0.352	0.382	0.497	0.562	0.522	0.569	0.762	1.11	0.889	0.780	0.674
11	0.375	0.358	0.420	0.521	0.597	0.525	0.575	0.749	1.12	0.864	0.711	0.642
12	0.391	0.366	0.403	0.501	0.572	0.528	0.576	0.749	1.14	0.857	0.778	0.642
13	0.372	0.351	0.387	0.500	0.556	0.546	0.570	0.745	1.13	0.871	0.771	0.648
14	0.377	0.353	0.378	0.489	0.565	0.560	0.568	0.746	1.13	0.888	0.776	0.606
15	0.358	0.360	0.397	0.475	0.526	0.566	0.569	0.744	1.13	0.849	0.718	0.642
16	0.362	0.359	0.415	0.477	0.521	0.571	0.559	0.802	1.08	0.846	0.766	0.674
17	0.350	0.352	0.427	0.474	0.527	0.572	0.559	0.953	1.08	0.844	0.711	0.590
18	0.344	0.360	0.457	0.483	0.524	0.577	0.564	1.03	1.07	0.880	0.784	0.691
19	0.342	0.384	0.467	0.489	0.518	0.574	0.552	1.04	1.06	0.872	0.775	0.616
20	0.357	0.369	0.471	0.489	0.512	0.567	0.521	1.05	1.06	0.888	0.736	0.644
21	0.369	0.363	0.486	0.518	0.494	0.554	0.520	1.03	1.05	0.874	0.697	0.633
22	0.371	0.364	0.497	0.536	0.490	0.545	0.527	1.08	1.05	0.844	0.724	0.659
23	0.354	0.350	0.473	0.536	0.468	0.538	0.528	1.08	1.06	0.851	0.713	0.620
24	0.346	0.346	0.481	0.538	0.450	0.539	0.532	1.08	1.10	0.786	0.734	0.638
25	0.357	0.348	0.518	0.533	0.427	0.549	0.572	1.11	1.07	0.847	0.742	0.630
26	0.376	0.368	0.541	0.532	0.438	0.553	0.553	1.09	1.06	0.873	0.752	0.638
27	0.379	0.363	0.531	0.523	0.444	0.560	0.545	1.10	1.01	0.810	0.739	0.660
28	0.342	0.333	0.540	0.517	0.444	0.564	0.533	1.13	0.998	0.861	0.696	0.671
29	0.334	-	0.529	0.519	0.426	0.558	0.524	1.15	0.995	0.789	0.702	0.675
30	0.347	-	0.523	0.491	0.377	0.587	0.533	1.14	0.978	0.774	0.687	0.620
31	0.359	-	0.523	-	0.383	-	0.530	1.11	-	0.834	-	0.620

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-31c: 2020 Mean Daily Discharge for CR-WC-TI-02**

DATE	2020											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.662	0.527	0.528	0.682	1.58	1.76	1.05	1.12	1.58	ND	ND	ND
2	0.679	0.605	0.571	0.680	1.44	1.81	1.10	1.14	1.55	ND	ND	ND
3	0.670	0.562	0.563	0.706	1.44	1.77	1.12	1.14	1.53	ND	ND	ND
4	0.629	0.525	0.606	0.719	1.59	1.75	1.11	1.13	1.49	ND	ND	ND
5	0.661	0.549	0.574	0.737	1.66	1.73	1.07	1.12	1.47	ND	ND	ND
6	0.688	0.545	0.587	0.706	1.71	1.66	1.02	1.08	1.45	ND	ND	ND
7	0.649	0.557	0.575	0.806	1.75	1.57	0.973	1.04	1.39	ND	ND	ND
8	0.623	0.556	0.550	0.878	1.82	1.61	0.889	1.11	1.40	ND	ND	ND
9	0.647	0.539	0.556	0.747	1.88	1.70	0.851	1.20	1.39	ND	ND	ND
10	0.601	0.546	0.534	0.895	1.88	1.72	0.851	1.33	1.36	ND	ND	ND
11	0.604	0.597	0.604	0.878	1.88	1.69	ND	1.28	1.38	ND	ND	ND
12	0.605	0.546	0.601	0.895	1.87	1.66	ND	1.25	1.47	ND	ND	ND
13	0.617	0.492	0.589	0.846	1.87	1.61	0.892	1.43	1.44	ND	ND	ND
14	0.607	0.590	0.549	0.940	1.96	1.58	0.858	1.46	1.37	ND	ND	ND
15	0.612	0.565	0.512	0.971	1.93	1.64	0.867	1.42	1.37	ND	ND	ND
16	0.576	0.564	0.541	0.854	1.89	1.69	0.859	1.36	1.35	ND	ND	ND
17	0.583	0.583	0.557	1.01	1.83	1.60	0.835	1.34	1.32	ND	ND	ND
18	0.598	0.558	0.545	1.02	1.81	1.57	0.854	1.38	1.29	ND	ND	ND
19	0.543	0.521	0.551	1.09	1.86	1.55	0.929	1.41	1.29	ND	ND	ND
20	0.537	0.532	0.511	1.13	1.88	1.49	0.983	1.44	1.29	ND	ND	ND
21	0.571	0.544	0.510	1.16	1.80	1.46	1.03	1.40	1.30	ND	ND	ND
22	0.582	0.572	0.605	1.22	1.80	1.43	1.11	1.34	1.30	ND	ND	ND
23	0.559	0.584	0.622	1.36	1.81	1.39	1.11	1.46	1.26	ND	ND	ND
24	0.560	0.607	0.606	1.35	1.77	1.34	1.13	1.51	1.25	ND	ND	ND
25	0.571	0.549	0.518	1.29	1.82	1.27	1.13	1.56	1.36	ND	ND	ND
26	0.559	0.541	0.538	1.47	1.82	1.24	1.13	1.58	1.37	ND	ND	ND
27	0.548	0.554	0.642	1.44	1.78	1.17	1.14	1.60	1.37	ND	ND	ND
28	0.557	0.558	0.682	1.57	1.77	1.14	1.16	1.58	ND	ND	ND	ND
29	0.526	0.580	0.622	1.56	1.75	1.15	1.14	1.56	ND	ND	ND	ND
30	0.553	-	0.670	1.54	1.72	1.11	1.13	1.62	ND	ND	ND	ND
31	0.547	-	0.667	-	1.71	-	1.13	1.57	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-32a: 2018 Daily Water Surface Elevation for CR-WC**

DATE	2018				
	AUG	SEP	OCT	NOV	DEC
1	ND	498.341	498.308	498.259	498.271
2	ND	498.347	498.325	498.258	498.269
3	ND	498.341	498.332	498.257	498.253
4	ND	498.336	498.306	498.251	498.266
5	498.347	498.335	498.292	498.287	498.257
6	498.345	498.325	498.292	498.289	498.260
7	498.362	498.317	498.284	498.266	498.250
8	498.374	498.321	498.282	498.258	498.255
9	498.369	498.344	498.286	498.259	498.260
10	498.365	498.343	498.286	498.264	498.259
11	498.363	498.346	498.289	498.261	498.256
12	498.350	498.343	498.286	498.263	498.267
13	498.347	498.338	498.277	498.266	498.265
14	498.354	498.336	498.286	498.268	498.261
15	498.345	498.334	498.289	498.254	498.255
16	498.338	498.328	498.284	498.247	498.235
17	498.341	498.324	498.287	498.251	498.251
18	498.331	498.330	498.291	498.252	498.253
19	498.330	498.326	498.282	498.256	498.258
20	498.330	498.326	498.285	498.258	498.260
21	498.335	498.317	498.288	498.258	498.261
22	498.321	498.310	498.278	498.266	498.257
23	498.289	498.307	498.282	498.260	498.254
24	498.303	498.317	498.278	498.255	498.250
25	498.314	498.313	498.275	498.258	498.253
26	498.308	498.324	498.276	498.260	498.253
27	498.310	498.322	498.275	498.261	498.255
28	498.307	498.321	498.272	498.259	498.252
29	498.307	498.321	498.269	498.263	498.253
30	498.317	498.312	498.266	498.267	498.250
31	498.345	-	498.264	-	498.243

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-32b: 2019 Daily Water Surface Elevation for CR-WC-TI-03**

DATE	2019											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	498.260	498.205	498.176	498.241	498.276	498.238	498.306	498.294	498.438	498.413	498.372	498.349
2	498.268	498.206	498.185	498.241	498.284	498.245	498.328	498.313	498.439	498.414	498.364	498.352
3	498.272	498.199	498.199	498.251	498.285	498.257	498.314	498.350	498.445	498.407	498.373	498.361
4	498.263	498.196	498.206	498.273	498.285	498.300	498.312	498.374	498.441	498.384	498.366	498.368
5	498.253	498.195	498.195	498.268	498.283	498.296	498.294	498.373	498.474	498.385	498.373	498.354
6	498.259	498.196	498.195	498.278	498.284	498.292	498.291	498.377	498.462	498.386	498.363	498.349
7	498.253	498.199	498.200	498.281	498.284	498.288	498.298	498.361	498.455	498.382	498.361	498.363
8	498.244	498.201	498.199	498.284	498.288	498.291	498.295	498.351	498.453	498.405	498.372	498.345
9	498.239	498.209	498.203	498.287	498.289	498.279	498.296	498.380	498.444	498.398	498.380	498.357
10	498.245	498.212	498.211	498.290	498.297	498.277	498.287	498.380	498.443	498.386	498.371	498.353
11	498.246	498.218	498.229	498.293	498.295	498.270	498.291	498.366	498.442	498.380	498.351	498.344
12	498.251	498.222	498.224	498.293	498.295	498.268	498.295	498.365	498.442	498.376	498.372	498.346
13	498.242	498.206	498.219	498.291	498.293	498.275	498.291	498.366	498.445	498.383	498.371	498.348
14	498.241	498.207	498.215	498.297	498.292	498.282	498.295	498.366	498.447	498.389	498.373	498.335
15	498.230	498.213	498.220	498.293	498.283	498.284	498.298	498.365	498.449	498.375	498.357	498.347
16	498.231	498.213	498.221	498.292	498.278	498.280	498.288	498.395	498.435	498.371	498.371	498.358
17	498.225	498.207	498.219	498.292	498.277	498.274	498.286	498.443	498.442	498.372	498.356	498.331
18	498.220	498.214	498.224	498.293	498.278	498.276	498.292	498.444	498.437	498.385	498.379	498.364
19	498.217	498.234	498.223	498.293	498.278	498.282	498.293	498.441	498.429	498.383	498.376	498.341
20	498.224	498.220	498.219	498.291	498.276	498.278	498.282	498.440	498.438	498.387	498.365	498.349
21	498.229	498.214	498.220	498.297	498.274	498.277	498.280	498.415	498.429	498.382	498.354	498.346
22	498.228	498.215	498.220	498.300	498.268	498.269	498.279	498.433	498.432	498.373	498.363	498.355
23	498.212	498.203	498.201	498.303	498.264	498.272	498.279	498.431	498.441	498.377	498.361	498.343
24	498.206	498.201	498.194	498.300	498.259	498.278	498.278	498.434	498.458	498.357	498.368	498.350
25	498.218	498.204	498.209	498.297	498.254	498.283	498.295	498.446	498.441	498.376	498.372	498.348
26	498.233	498.223	498.216	498.294	498.256	498.281	498.294	498.441	498.439	498.386	498.374	498.352
27	498.234	498.218	498.206	498.289	498.261	498.280	498.299	498.439	498.434	498.375	498.370	498.360
28	498.204	498.186	498.214	498.289	498.261	498.276	498.304	498.450	498.430	498.400	498.358	498.364
29	498.202	-	498.219	498.288	498.255	498.282	498.286	498.456	498.420	498.368	498.360	498.365
30	498.213	-	498.223	498.276	498.253	498.306	498.290	498.449	498.410	498.362	498.355	498.347
31	498.216	-	498.236	-	498.245	-	498.291	498.444	-	498.379	-	498.347

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-32c: 2020 Daily Water Surface Elevation for CR-WC-TI-03**

DATE	2020											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	498.360	498.322	498.318	498.325	498.493	498.489	498.531	498.581	498.617	ND	ND	ND
2	498.365	498.350	498.333	498.321	498.489	498.501	498.550	498.577	498.620	ND	ND	ND
3	498.361	498.339	498.329	498.323	498.482	498.500	498.569	498.575	498.610	ND	ND	ND
4	498.348	498.328	498.344	498.323	498.497	498.500	498.575	498.581	498.600	ND	ND	ND
5	498.358	498.337	498.332	498.323	498.486	498.493	498.578	498.577	498.597	ND	ND	ND
6	498.367	498.336	498.336	498.315	498.484	498.484	498.577	498.566	498.598	ND	ND	ND
7	498.355	498.341	498.332	498.329	498.486	498.482	498.568	498.557	498.588	ND	ND	ND
8	498.347	498.340	498.323	498.339	498.489	498.496	498.556	498.584	498.585	ND	ND	ND
9	498.355	498.333	498.324	498.315	498.490	498.524	498.549	498.632	498.588	ND	ND	ND
10	498.341	498.335	498.315	498.338	498.487	498.531	498.550	498.623	498.581	ND	ND	ND
11	498.342	498.352	498.339	498.334	498.485	498.528	498.553	498.600	498.593	ND	ND	ND
12	498.342	498.333	498.338	498.335	498.485	498.525	498.550	498.588	498.612	ND	ND	ND
13	498.346	498.310	498.334	498.325	498.482	498.529	498.568	498.612	498.597	ND	ND	ND
14	498.343	498.343	498.320	498.336	498.496	498.524	498.573	498.626	498.587	ND	ND	ND
15	498.346	498.335	498.306	498.338	498.486	498.540	498.577	498.620	498.593	ND	ND	ND
16	498.335	498.333	498.317	498.318	498.479	498.562	498.560	498.596	498.581	ND	ND	ND
17	498.337	498.339	498.323	498.342	498.471	498.553	498.546	498.591	498.576	ND	ND	ND
18	498.343	498.330	498.319	498.343	498.459	498.553	498.554	498.592	498.571	ND	ND	ND
19	498.324	498.316	498.323	498.352	498.471	498.553	498.571	498.598	498.572	ND	ND	ND
20	498.323	498.318	498.308	498.357	498.465	498.549	498.580	498.596	498.572	ND	ND	ND
21	498.335	498.322	498.310	498.359	498.446	498.549	498.584	498.578	498.574	ND	ND	ND
22	498.340	498.332	498.320	498.365	498.464	498.552	498.600	498.566	498.573	ND	ND	ND
23	498.332	498.337	498.322	498.382	498.486	498.555	498.599	498.594	498.563	ND	ND	ND
24	498.333	498.345	498.321	498.383	498.475	498.553	498.604	498.600	498.564	ND	ND	ND
25	498.337	498.326	498.312	498.377	498.481	498.548	498.600	498.606	498.593	ND	ND	ND
26	498.334	498.324	498.314	498.382	498.483	498.545	498.599	498.615	498.589	ND	ND	ND
27	498.330	498.329	498.332	498.379	498.484	498.539	498.595	498.618	ND	ND	ND	ND
28	498.333	498.329	498.337	498.408	498.476	498.544	498.594	498.615	ND	ND	ND	ND
29	498.322	498.337	498.323	498.430	498.474	498.548	498.592	498.613	ND	ND	ND	ND
30	498.331	-	498.329	498.451	498.470	498.542	498.590	498.626	ND	ND	ND	ND
31	498.328	-	498.326	-	498.462	-	498.585	498.625	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-33a: 2018 Mean Daily Discharge for CR-WC-TI-03**

DATE	2018				
	AUG	SEP	OCT	NOV	DEC
1	ND	0.336	0.374	0.305	0.325
2	ND	0.348	0.404	0.304	0.323
3	ND	0.343	0.409	0.302	0.300
4	ND	0.338	0.371	0.294	0.318
5	0.274	0.339	0.352	0.348	0.306
6	0.273	0.327	0.352	0.350	0.310
7	0.298	0.318	0.340	0.316	0.296
8	0.318	0.326	0.338	0.304	0.303
9	0.314	0.364	0.344	0.306	0.310
10	0.310	0.365	0.344	0.314	0.309
11	0.311	0.374	0.348	0.309	0.305
12	0.296	0.372	0.344	0.312	0.320
13	0.294	0.367	0.330	0.317	0.318
14	0.306	0.366	0.344	0.320	0.312
15	0.296	0.366	0.348	0.300	0.304
16	0.289	0.360	0.341	0.291	0.277
17	0.296	0.358	0.345	0.296	0.299
18	0.285	0.370	0.352	0.298	0.302
19	0.286	0.366	0.338	0.303	0.308
20	0.289	0.369	0.342	0.306	0.311
21	0.298	0.358	0.347	0.306	0.313
22	0.281	0.351	0.332	0.317	0.307
23	0.243	0.348	0.338	0.309	0.303
24	0.263	0.367	0.333	0.303	0.298
25	0.280	0.363	0.328	0.307	0.302
26	0.274	0.384	0.330	0.309	0.302
27	0.280	0.384	0.328	0.310	0.305
28	0.278	0.386	0.324	0.307	0.301
29	0.281	0.389	0.319	0.314	0.302
30	0.297	0.377	0.316	0.319	0.297
31	0.340	-	0.312	-	0.288

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-33b: 2019 Mean Daily Discharge for CR-WC-TI-03**

DATE	2019											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.312	0.241	0.210	0.293	0.346	0.294	0.384	0.350	0.599	0.531	0.460	0.428
2	0.324	0.244	0.220	0.294	0.359	0.304	0.419	0.380	0.600	0.532	0.446	0.433
3	0.329	0.235	0.238	0.308	0.360	0.320	0.395	0.444	0.613	0.519	0.462	0.449
4	0.317	0.231	0.245	0.339	0.360	0.385	0.391	0.485	0.603	0.475	0.450	0.462
5	0.302	0.231	0.232	0.332	0.358	0.379	0.362	0.483	0.678	0.476	0.463	0.437
6	0.311	0.232	0.232	0.347	0.359	0.371	0.358	0.489	0.650	0.478	0.446	0.429
7	0.303	0.235	0.239	0.352	0.359	0.365	0.368	0.461	0.632	0.472	0.442	0.454
8	0.290	0.238	0.238	0.356	0.365	0.370	0.363	0.441	0.628	0.515	0.462	0.424
9	0.284	0.248	0.242	0.361	0.367	0.351	0.363	0.495	0.607	0.502	0.478	0.444
10	0.292	0.252	0.253	0.365	0.380	0.347	0.349	0.494	0.605	0.479	0.461	0.437
11	0.293	0.259	0.276	0.371	0.376	0.336	0.354	0.468	0.602	0.469	0.426	0.422
12	0.301	0.264	0.268	0.371	0.378	0.331	0.360	0.465	0.601	0.461	0.463	0.425
13	0.288	0.245	0.263	0.368	0.374	0.342	0.354	0.467	0.607	0.475	0.462	0.430
14	0.287	0.246	0.257	0.377	0.372	0.353	0.360	0.466	0.611	0.486	0.466	0.407
15	0.272	0.254	0.264	0.370	0.358	0.355	0.364	0.463	0.613	0.461	0.437	0.428
16	0.274	0.253	0.265	0.369	0.350	0.349	0.348	0.522	0.584	0.454	0.463	0.448
17	0.265	0.245	0.264	0.369	0.348	0.340	0.344	0.619	0.597	0.456	0.436	0.402
18	0.260	0.254	0.269	0.371	0.350	0.342	0.353	0.621	0.586	0.480	0.478	0.459
19	0.256	0.281	0.267	0.371	0.350	0.351	0.355	0.614	0.570	0.476	0.472	0.419
20	0.266	0.262	0.263	0.368	0.348	0.343	0.338	0.610	0.588	0.485	0.454	0.433
21	0.272	0.255	0.265	0.378	0.345	0.342	0.334	0.558	0.569	0.475	0.434	0.428
22	0.271	0.257	0.265	0.383	0.335	0.329	0.332	0.595	0.574	0.459	0.450	0.444
23	0.249	0.241	0.240	0.388	0.330	0.334	0.331	0.590	0.593	0.467	0.447	0.424
24	0.243	0.239	0.232	0.384	0.323	0.343	0.330	0.595	0.628	0.432	0.459	0.436
25	0.257	0.243	0.250	0.378	0.316	0.349	0.355	0.622	0.592	0.466	0.467	0.432
26	0.277	0.266	0.260	0.374	0.319	0.347	0.353	0.608	0.587	0.484	0.471	0.440
27	0.279	0.260	0.248	0.367	0.326	0.344	0.361	0.604	0.576	0.464	0.465	0.455
28	0.241	0.222	0.257	0.366	0.326	0.338	0.368	0.628	0.566	0.513	0.443	0.462
29	0.238	-	0.263	0.364	0.317	0.346	0.340	0.640	0.545	0.453	0.446	0.464
30	0.252	-	0.269	0.346	0.315	0.384	0.345	0.624	0.525	0.443	0.438	0.433
31	0.256	-	0.286	-	0.304	-	0.347	0.613	-	0.473	-	0.433

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-33c: 2020 Mean Daily Discharge for CR-WC-TI-03**

DATE	2020											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.457	0.398	0.400	0.419	0.788	0.749	0.697	0.709	0.799	ND	ND	ND
2	0.465	0.448	0.425	0.413	0.777	0.778	0.737	0.699	0.810	ND	ND	ND
3	0.459	0.427	0.420	0.417	0.760	0.774	0.778	0.691	0.790	ND	ND	ND
4	0.435	0.409	0.445	0.417	0.798	0.774	0.788	0.702	0.769	ND	ND	ND
5	0.454	0.426	0.425	0.417	0.769	0.755	0.789	0.689	0.764	ND	ND	ND
6	0.470	0.424	0.433	0.404	0.764	0.727	0.780	0.663	0.771	ND	ND	ND
7	0.449	0.432	0.426	0.429	0.766	0.716	0.752	0.640	0.750	ND	ND	ND
8	0.435	0.431	0.410	0.446	0.772	0.747	0.718	0.698	0.748	ND	ND	ND
9	0.449	0.420	0.412	0.405	0.776	0.811	0.695	0.816	0.760	ND	ND	ND
10	0.425	0.423	0.397	0.445	0.766	0.823	0.693	0.789	0.745	ND	ND	ND
11	0.427	0.453	0.438	0.439	0.760	0.809	0.697	0.730	0.782	ND	ND	ND
12	0.428	0.420	0.436	0.441	0.758	0.794	0.686	0.697	0.833	ND	ND	ND
13	0.435	0.383	0.431	0.423	0.750	0.799	0.728	0.753	0.798	ND	ND	ND
14	0.430	0.438	0.406	0.443	0.785	0.780	0.736	0.786	0.778	ND	ND	ND
15	0.435	0.424	0.384	0.446	0.759	0.816	0.743	0.768	0.797	ND	ND	ND
16	0.416	0.422	0.402	0.412	0.740	0.868	0.701	0.708	0.771	ND	ND	ND
17	0.420	0.432	0.412	0.455	0.719	0.837	0.666	0.693	0.763	ND	ND	ND
18	0.430	0.417	0.406	0.457	0.690	0.830	0.682	0.691	0.755	ND	ND	ND
19	0.399	0.393	0.413	0.473	0.718	0.824	0.720	0.703	0.761	ND	ND	ND
20	0.396	0.398	0.388	0.483	0.703	0.807	0.739	0.698	0.765	ND	ND	ND
21	0.418	0.404	0.391	0.487	0.659	0.802	0.746	0.660	0.775	ND	ND	ND
22	0.426	0.421	0.408	0.498	0.700	0.804	0.782	0.637	0.777	ND	ND	ND
23	0.413	0.430	0.413	0.531	0.750	0.803	0.779	0.705	0.756	ND	ND	ND
24	0.415	0.445	0.411	0.534	0.722	0.792	0.786	0.723	0.763	ND	ND	ND
25	0.423	0.412	0.396	0.523	0.736	0.775	0.776	0.740	0.841	ND	ND	ND
26	0.417	0.408	0.399	0.534	0.740	0.762	0.770	0.767	0.833	ND	ND	ND
27	0.411	0.417	0.432	0.527	0.743	0.739	0.758	0.780	ND	ND	ND	ND
28	0.417	0.419	0.441	0.587	0.722	0.746	0.751	0.776	ND	ND	ND	ND
29	0.397	0.432	0.416	0.636	0.714	0.750	0.744	0.775	ND	ND	ND	ND
30	0.413	-	0.426	0.684	0.705	0.731	0.736	0.814	ND	ND	ND	ND
31	0.410	-	0.422	-	0.686	-	0.723	0.814	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

**Table D-34: 2020 Daily Water Surface Elevation for HC-WC-MS-01**

DATE	2020											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	ND	ND	ND	ND	ND	ND	99.310	99.357	99.393	ND	ND	ND
2	ND	ND	ND	ND	ND	ND	99.312	99.351	99.393	ND	ND	ND
3	ND	ND	ND	ND	ND	ND	99.308	99.343	99.389	ND	ND	ND
4	ND	ND	ND	ND	ND	ND	99.307	99.341	99.386	ND	ND	ND
5	ND	ND	ND	ND	ND	ND	99.304	99.335	99.384	ND	ND	ND
6	ND	ND	ND	ND	ND	ND	99.299	99.333	99.383	ND	ND	ND
7	ND	ND	ND	ND	ND	ND	99.297	99.329	99.379	ND	ND	ND
8	ND	ND	ND	ND	ND	99.276	99.293	99.334	99.370	ND	ND	ND
9	ND	ND	ND	ND	ND	99.281	99.288	99.343	99.371	ND	ND	ND
10	ND	ND	ND	ND	ND	99.292	99.281	99.367	99.370	ND	ND	ND
11	ND	ND	ND	ND	ND	99.296	99.277	99.369	99.374	ND	ND	ND
12	ND	ND	ND	ND	ND	99.295	99.292	99.374	99.380	ND	ND	ND
13	ND	ND	ND	ND	ND	99.303	99.305	99.378	99.381	ND	ND	ND
14	ND	ND	ND	ND	ND	99.301	99.311	99.379	99.379	ND	ND	ND
15	ND	ND	ND	ND	ND	99.303	99.314	99.383	99.375	ND	ND	ND
16	ND	ND	ND	ND	ND	99.311	99.316	99.381	99.371	ND	ND	ND
17	ND	ND	ND	ND	ND	99.318	99.318	99.380	99.370	ND	ND	ND
18	ND	ND	ND	ND	ND	99.314	99.328	99.383	99.366	ND	ND	ND
19	ND	ND	ND	ND	ND	99.313	99.331	99.378	99.366	ND	ND	ND
20	ND	ND	ND	ND	ND	99.310	99.330	99.377	99.367	ND	ND	ND
21	ND	ND	ND	ND	ND	99.304	99.335	99.376	99.364	ND	ND	ND
22	ND	ND	ND	ND	ND	99.300	99.358	99.368	99.362	ND	ND	ND
23	ND	ND	ND	ND	ND	99.300	99.369	99.382	99.359	ND	ND	ND
24	ND	ND	ND	ND	ND	99.299	99.377	99.380	99.357	ND	ND	ND
25	ND	ND	ND	ND	ND	99.296	99.380	99.381	99.358	ND	ND	ND
26	ND	ND	ND	ND	ND	99.294	99.376	99.382	99.362	ND	ND	ND
27	ND	ND	ND	ND	ND	99.296	99.373	99.383	99.363	ND	ND	ND
28	ND	ND	ND	ND	ND	99.298	99.372	99.384	99.339	ND	ND	ND
29	ND	ND	ND	ND	ND	99.306	99.373	99.385	ND	ND	ND	ND
30	ND	-	ND	ND	ND	99.304	99.368	99.392	ND	ND	ND	ND
31	ND	-	ND	-	ND	-	99.362	99.392	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.

Table D-35: 2020 Mean Daily Discharge for HC-WC-MS-01												
DATE	2020											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	ND	ND	ND	ND	ND	ND	0.655	0.764	0.902	ND	ND	ND
2	ND	ND	ND	ND	ND	ND	0.661	0.747	0.904	ND	ND	ND
3	ND	ND	ND	ND	ND	ND	0.656	0.725	0.891	ND	ND	ND
4	ND	ND	ND	ND	ND	ND	0.654	0.721	0.883	ND	ND	ND
5	ND	ND	ND	ND	ND	ND	0.647	0.702	0.878	ND	ND	ND
6	ND	ND	ND	ND	ND	ND	0.633	0.698	0.875	ND	ND	ND
7	ND	ND	ND	ND	ND	ND	0.625	0.695	0.861	ND	ND	ND
8	ND	ND	ND	ND	ND	0.567	0.616	0.705	0.837	ND	ND	ND
9	ND	ND	ND	ND	ND	0.581	0.601	0.733	0.839	ND	ND	ND
10	ND	ND	ND	ND	ND	0.613	0.580	0.805	0.835	ND	ND	ND
11	ND	ND	ND	ND	ND	0.623	0.570	0.811	0.849	ND	ND	ND
12	ND	ND	ND	ND	ND	0.622	0.575	0.830	0.868	ND	ND	ND
13	ND	ND	ND	ND	ND	0.645	0.592	0.842	0.870	ND	ND	ND
14	ND	ND	ND	ND	ND	0.641	0.610	0.848	0.866	ND	ND	ND
15	ND	ND	ND	ND	ND	0.643	0.619	0.859	0.854	ND	ND	ND
16	ND	ND	ND	ND	ND	0.663	0.626	0.855	0.843	ND	ND	ND
17	ND	ND	ND	ND	ND	0.679	0.637	0.854	0.840	ND	ND	ND
18	ND	ND	ND	ND	ND	0.677	0.656	0.856	0.827	ND	ND	ND
19	ND	ND	ND	ND	ND	0.674	0.669	0.845	0.829	ND	ND	ND
20	ND	ND	ND	ND	ND	0.665	0.670	0.847	0.832	ND	ND	ND
21	ND	ND	ND	ND	ND	0.647	0.685	0.846	0.823	ND	ND	ND
22	ND	ND	ND	ND	ND	0.636	0.756	0.821	0.818	ND	ND	ND
23	ND	ND	ND	ND	ND	0.636	0.788	0.865	0.809	ND	ND	ND
24	ND	ND	ND	ND	ND	0.633	0.816	0.860	0.802	ND	ND	ND
25	ND	ND	ND	ND	ND	0.624	0.824	0.865	0.805	ND	ND	ND
26	ND	ND	ND	ND	ND	0.617	0.814	0.868	0.819	ND	ND	ND
27	ND	ND	ND	ND	ND	0.623	0.806	0.871	0.821	ND	ND	ND
28	ND	ND	ND	ND	ND	0.629	0.804	0.872	0.751	ND	ND	ND
29	ND	ND	ND	ND	ND	0.651	0.810	0.878	ND	ND	ND	ND
30	ND	-	ND	ND	ND	0.645	0.795	0.900	ND	ND	ND	ND
31	ND	-	ND	-	ND	-	0.779	0.899	-	ND	-	ND

Note: elevations in table are in metres (arbitrary datum).

- = day not present in month; ND = no data.



**APPENDIX E**

**Total Suspended Solids and  
Bed Load Laboratory Results**

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## GRAIN SIZE ANALYSIS (Mechanical & Hydrometer)

Project #: 1899581  
 Short Title: NexGen / Rook I Project / Env Baselines  
 Tested by: T.B.

Phase: 3

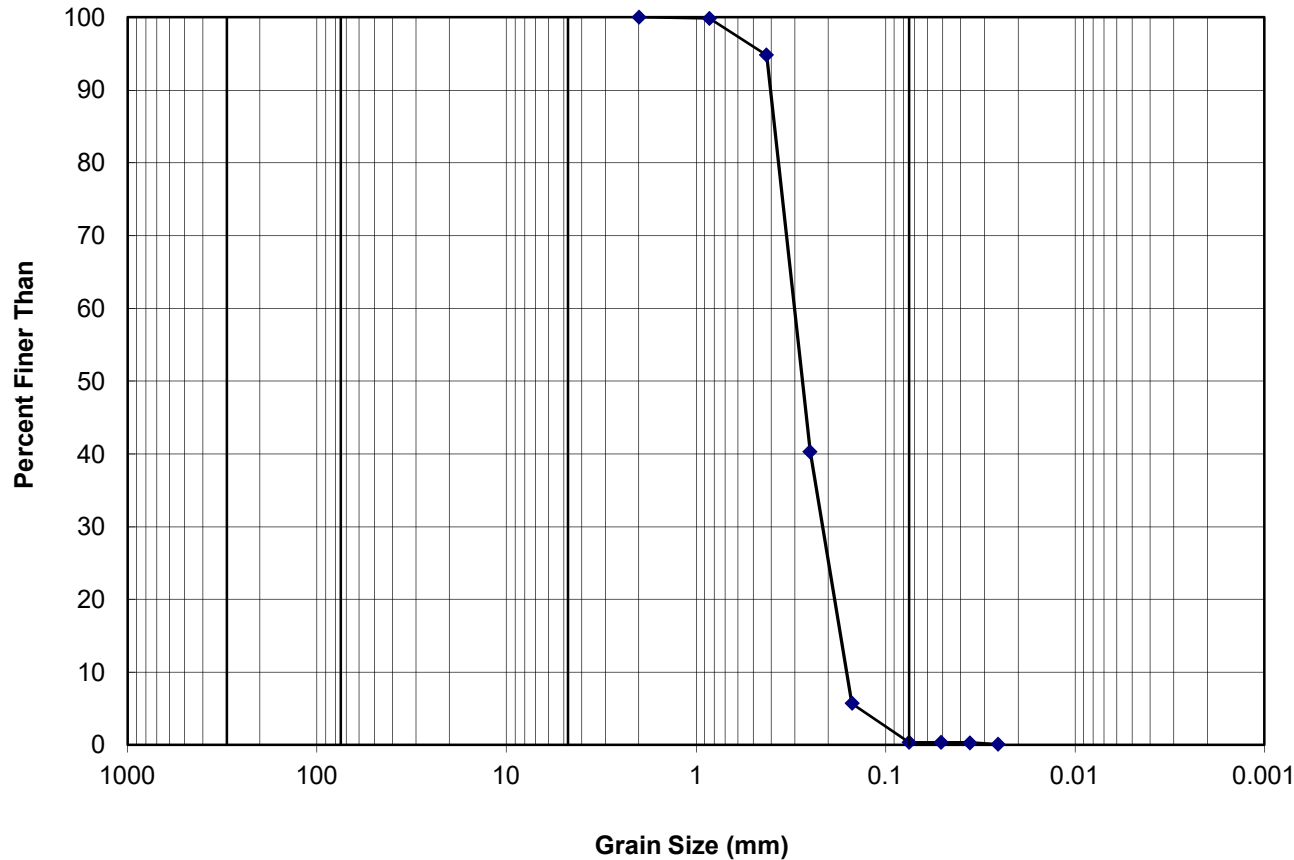
Date: August 28, 2018

Sample #: SL6312  
 Source: Sampled below Patterson Lake.  
 Date Sample Received: August 5, 2018

### Grain Size Analysis Results:

Opening (mm)	Percent Passing (%)
51	100
38	100
25	100
19	100
9.5	100
4.75	100
2.0	100
0.850	100
0.425	95
0.250	40
0.150	5.7
0.075	0.4
0.051	0.4
0.036	0.3
0.025	0.1

**Graphical Analysis**



BOULDERS	COBBLES	GRAVEL		SAND			SILT / CLAY
		Coarse	Fine	Coarse	Medium	Fine	

Comments:

The testing services reported herein have been performed in accordance with the indicated recognized standard, or in accordance with local industry practice. This report is for the sole use of the designated client. This report constitutes a testing service only and does not represent any results interpretation or opinion regarding specification compliance or material suitability. Engineering interpretation can be provided by Golder Associates Ltd. upon request.



## GRAIN SIZE ANALYSIS (Mechanical & Hydrometer)

Project #: 1899581

Phase: 3

Short Title: NexGen / Rook I Project / Env Baselines

Tested by: T.B.

Date: August 28, 2018

Sample #: SL6313

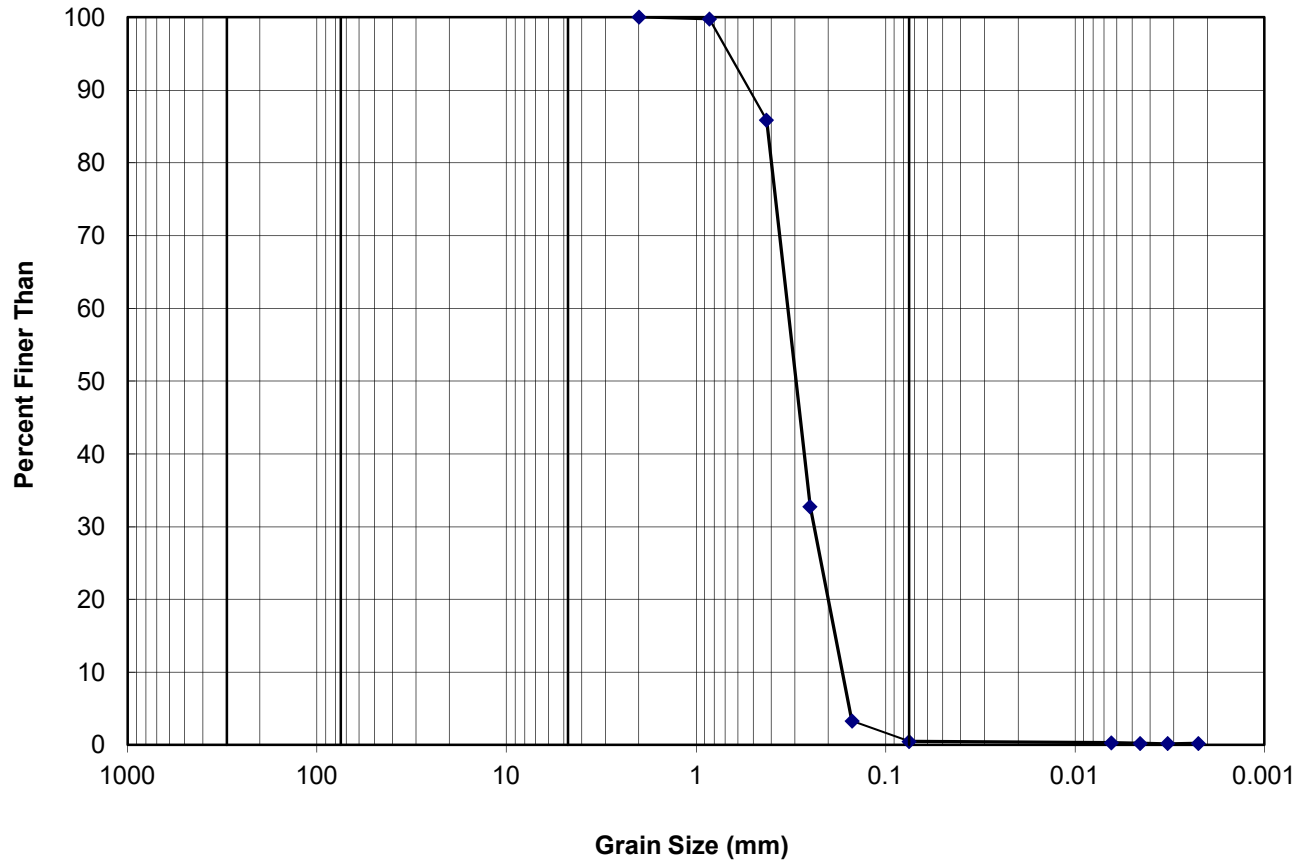
Source: Sampled below Beet Lake.

Date Sample Received: August 5, 2018

### Grain Size Analysis Results:

Opening (mm)	Percent Passing (%)
51	100
38	100
25	100
19	100
9.5	100
4.75	100
2.0	100
0.850	100
0.425	86
0.250	33
0.150	3.3
0.075	0.5
0.006	0.3
0.005	0.2
0.003	0.2
0.002	0.2

**Graphical Analysis**



BOULDERS	COBBLES	GRAVEL		SAND			SILT / CLAY
		Coarse	Fine	Coarse	Medium	Fine	

Comments:

The testing services reported herein have been performed in accordance with the indicated recognized standard, or in accordance with local industry practice. This report is for the sole use of the designated client. This report constitutes a testing service only and does not represent any results interpretation or opinion regarding specification compliance or material suitability. Engineering interpretation can be provided by Golder Associates Ltd. upon request.



## GRAIN SIZE ANALYSIS

(Mechanical & Hydrometer)

Project #: 1899581

Phase: 3

Short Title: NexGen / Rook I Project / Env Baselines

Tested by: T.B.

Date: August 28, 2018

Sample #: SL6314

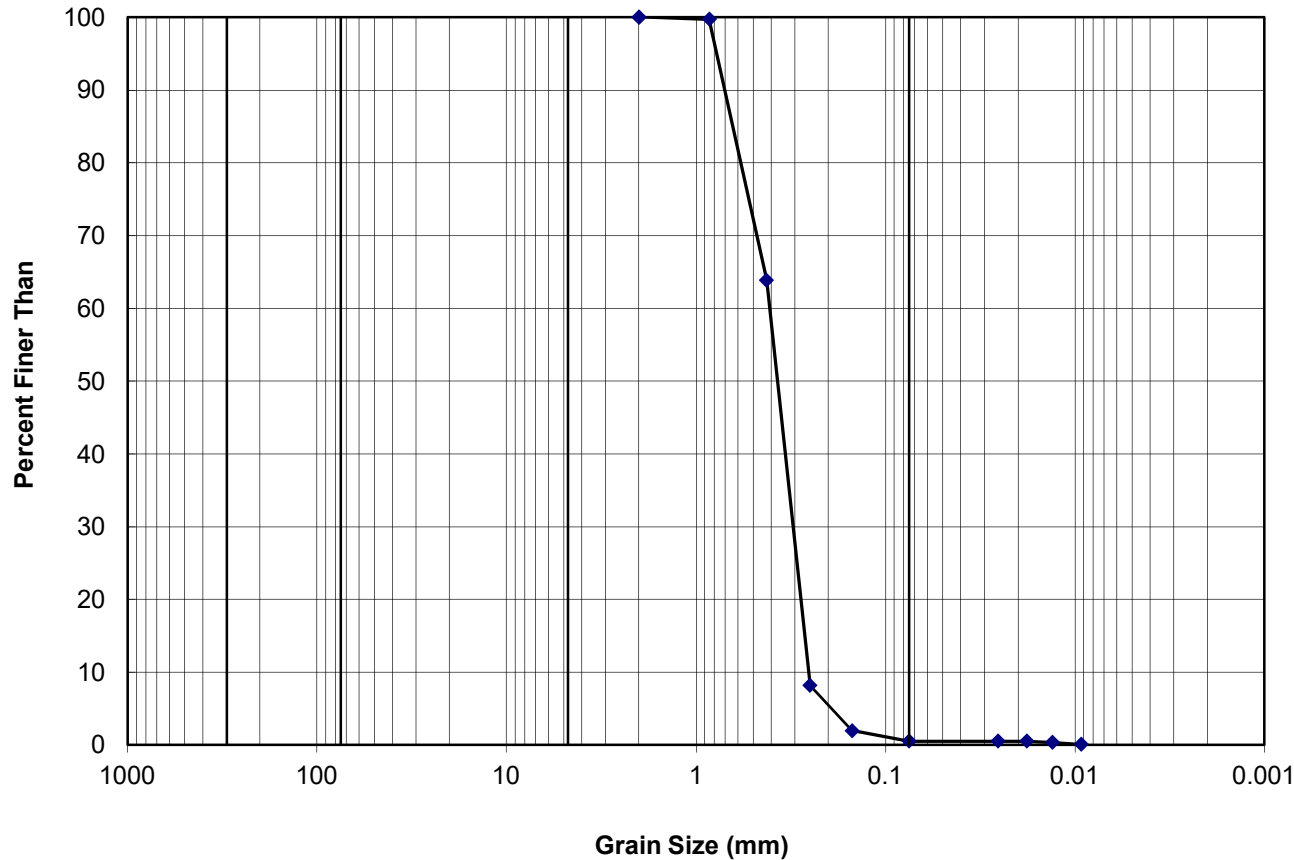
Source: Sampled below Naomi Lake.

Date Sample Received: August 5, 2018

### Grain Size Analysis Results:

Opening (mm)	Percent Passing (%)
51	100
38	100
25	100
19	100
9.5	100
4.75	100
2.0	100
0.850	100
0.425	64
0.250	8.2
0.150	2.0
0.075	0.5
0.025	0.5
0.018	0.5
0.013	0.3
0.009	0.1
0.007	0.0

**Graphical Analysis**



BOULDERS	COBBLES	GRAVEL		SAND			SILT / CLAY
		Coarse	Fine	Coarse	Medium	Fine	

Comments:

The testing services reported herein have been performed in accordance with the indicated recognized standard, or in accordance with local industry practice. This report is for the sole use of the designated client. This report constitutes a testing service only and does not represent any results interpretation or opinion regarding specification compliance or material suitability. Engineering interpretation can be provided by Golder Associates Ltd. upon request.

SRC Group # 2018-10049

Aug 21, 2018

Golder  
1721 8th Street East  
Saskatoon, SK S7H 0T4  
Attn: Ross Phillips

Date Samples Received: Aug-15-2018

Client P.O.: 1899581/3/3006

---

All results have been reviewed and approved by a Qualified Person in accordance with the Saskatchewan Environmental Code, Corrective Action Plan Chapter, for the purposes of certifying a laboratory analysis

Results from Lab Sections 1 and 2 have been authorized by Keith Gipman, Supervisor  
Results from Lab Section 3 have been authorized by Pat Moser, Supervisor  
Results from Lab Sections 4 and 5 have been authorized by Vicky Snook, Supervisor  
Results from Lab Section 6 have been authorized by Marion McConnell, Supervisor

- 
- \* Test methods and data are validated by the laboratory's Quality Assurance Program.
  - \* Routine methods follow recognized procedures from sources such as
    - \* Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF
    - \* Environment Canada
    - \* US EPA
    - \* CANMET
  - \* The results reported relate only to the test samples as provided by the client.
  - \* Samples will be kept for 30 days after the final report is sent. Please contact the lab if you have any special requirements.
  - \* Additional information is available upon request.

This is a final report.

SRC Group # 2018-10049

Aug 21, 2018

Golder

1721 8th Street East  
Saskatoon, SK S7H 0T4  
Attn: Ross Phillips

Date Samples Received: Aug-15-2018

Client P.O.: 1899581/3/3006

<b>32091</b>	<b>08/04/2018 CLEARWATER RIVER BELOW PATTERSON LAKE *WATER*</b>
<b>32092</b>	<b>08/05/2018 CLEARWATER RIVER BELOW BEET LAKE *WATER*</b>
<b>32093</b>	<b>08/05/2018 CLEARWATER RIVER BELOW NAOMI LAKE *WATER*</b>

Analyte	Units	32091	32092	32093
<b>Lab Section 1 (Inorganics)</b>				
Total suspended solids	mg/L	<1	<1	<1

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

SRC Group # 2018-12657

Oct 15, 2018

Golder  
1721 8th Street East  
Saskatoon, SK S7H 0T4  
Attn: Ross Phillips

Date Samples Received: Oct-10-2018

Client P.O.: 1899581/2003/2003

---

All results have been reviewed and approved by a Qualified Person in accordance with the Saskatchewan Environmental Code, Corrective Action Plan Chapter, for the purposes of certifying a laboratory analysis

Results from Lab Sections 1 and 2 have been authorized by Keith Gipman, Supervisor  
Results from Lab Section 3 have been authorized by Pat Moser, Supervisor  
Results from Lab Sections 4 and 5 have been authorized by Vicky Snook, Supervisor  
Results from Lab Section 6 have been authorized by Marion McConnell, Supervisor

- 
- \* Test methods and data are validated by the laboratory's Quality Assurance Program.
  - \* Routine methods follow recognized procedures from sources such as
    - \* Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF
    - \* Environment Canada
    - \* US EPA
    - \* CANMET
  - \* The results reported relate only to the test samples as provided by the client.
  - \* Samples will be kept for 30 days after the final report is sent. Please contact the lab if you have any special requirements.
  - \* Additional information is available upon request.

This is a final report.

SRC Group # 2018-12657

Oct 15, 2018

Golder

1721 8th Street East  
 Saskatoon, SK S7H 0T4  
 Attn: Ross Phillips

Date Samples Received: Oct-10-2018

Client P.O.: 1899581/2003/2003

41121	10/01/2018 17:00 CLEARWATER RIVER BELOW BEET LAKE *WATER*			
41122	10/03/2018 09:00 CLEARWATER RIVER BELOW PATTERSON LAKE *WATER*			
41123	10/01/2018 16:00 CLEARWATER RIVER BELOW NAOMI LAKE *WATER*			
Analyte	Units	41121	41122	41123
<b>Lab Section 1 (Inorganics)</b>				
Total suspended solids	mg/L	<1	<1	<1

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

SRC Group # 2020-6763

Jun 27, 2020

Golder  
1721 8th Street East  
Saskatoon, SK S7H 0T4  
Attn: Jacoby Donnelly

Date Samples Received: Jun-18-2020

Client P.O.: 20138965/1000/1003

---

All results have been reviewed and approved by a Qualified Person in accordance with the Saskatchewan Environmental Code, Corrective Action Plan Chapter, for the purposes of certifying a laboratory analysis

Results from Lab Section 1 authorized by Keith Gipman, Supervisor

---

- \* Test methods and data are validated by the laboratory's Quality Assurance Program.
- \* Routine methods follow recognized procedures from sources such as
  - \* Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF
  - \* Environment Canada
  - \* US EPA
  - \* CANMET
- \* The results reported relate only to the test samples as provided by the client.
- \* Samples will be kept for 30 days after the final report is sent. Please contact the lab if you have any special requirements.
- \* Additional information is available upon request.
- \* Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

This is a final report.

SRC Group # 2020-6763

Jun 27, 2020

Golder

1721 8th Street East  
 Saskatoon, SK S7H 0T4  
 Attn: Jacoby Donnelly

Date Samples Received: Jun-18-2020

Client P.O.: 20138965/1000/1003

30649	06/08/2020 CR-WC-MS-03	*WATER*
30650	06/06/2020 CR-WC-MS-04	*WATER*
30651	06/05/2020 CR-WC-MS-05	*WATER*

Analyte	Units	30649	30650	30651
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**Lab Section 1**

Total suspended solids	mg/L	<1	3±1	3±1
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Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 18.6 °C upon receipt.

SRC Group # 2020-6763

Jun 27, 2020

Golder

**Analyte Methods**

<b>Name</b>	<b>Units</b>	<b>Method</b>
Total suspended solids	mg/L	Chm-206

SRC Group # 2020-7971

Jul 27, 2020

Golder  
1721 8th Street East  
Saskatoon, SK S7H 0T4  
Attn: Jacoby Donnelly

Date Samples Received: Jul-15-2020

Client P.O.: 20138965

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All results have been reviewed and approved by a Qualified Person in accordance with the Saskatchewan Environmental Code, Corrective Action Plan Chapter, for the purposes of certifying a laboratory analysis

Results from Lab Section 1 authorized by Keith Gipman, Supervisor

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- \* Test methods and data are validated by the laboratory's Quality Assurance Program.
- \* Routine methods follow recognized procedures from sources such as
  - \* Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF
  - \* Environment Canada
  - \* US EPA
  - \* CANMET
- \* The results reported relate only to the test samples as provided by the client.
- \* Samples will be kept for 30 days after the final report is sent. Please contact the lab if you have any special requirements.
- \* Additional information is available upon request.
- \* Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

This is a final report.

SRC Group # 2020-7971

Jul 27, 2020

Golder

1721 8th Street East  
Saskatoon, SK S7H 0T4  
Attn: Jacoby Donnelly

Date Samples Received: Jul-15-2020

Client P.O.: 20138965

34159	07/14/2020 CR-WC-MS-03	*WATER*
34160	07/13/2020 CR-WC-MS-04	*WATER*
34161	07/10/2020 CR-WC-MS-05	*WATER*

Analyte	Units	34159	34160	34161
<b>Lab Section 1</b>				
Total suspended solids	mg/L	1±1	2±1	2±1

The temperature of the cooler was 14.8 °C upon receipt.

SRC Group # 2020-7971

Jul 27, 2020

Golder

**Analyte Methods**

<b>Name</b>	<b>Units</b>	<b>Method</b>
Total suspended solids	mg/L	Chm-206

SRC Group # 2020-10042

Sep 04, 2020

Golder  
1721 8th Street East  
Saskatoon, SK S7H 0T4  
Attn: Jacoby Donnelly

Date Samples Received: Aug-26-2020

Client P.O.: 20138965/1000/1005

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All results have been reviewed and approved by a Qualified Person in accordance with the Saskatchewan Environmental Code, Corrective Action Plan Chapter, for the purposes of certifying a laboratory analysis

Results from Lab Section 1 authorized by Keith Gipman, Supervisor

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  - \* Environment Canada
  - \* US EPA
  - \* CANMET
- \* The results reported relate only to the test samples as provided by the client.
- \* Samples will be kept for 30 days after the final report is sent. Please contact the lab if you have any special requirements.
- \* Additional information is available upon request.
- \* Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

This is a final report.

SRC Group # 2020-10042  
 Sep 04, 2020

Golder  
 1721 8th Street East  
 Saskatoon, SK S7H 0T4  
 Attn: Jacoby Donnelly

Date Samples Received: Aug-26-2020

Client P.O.: 20138965/1000/1005

41338	08/25/2020 07:50 CR-WC-MS-03	*WATER*
41339	08/21/2020 10:36 CR-WC-MS-04	*WATER*
41340	08/20/2020 15:50 CR-WC-MS-05	*WATER*

Analyte	Units	41338	41339	41340
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**Lab Section 1**

Total suspended solids	mg/L	<1	<1	<1
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Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 16.7 °C upon receipt.

SRC Group # 2020-10042  
Sep 04, 2020

Golder

**Analyte Methods**

<b>Name</b>	<b>Units</b>	<b>Method</b>
Total suspended solids	mg/L	Chm-206

SRC Group # 2020-11797

Oct 13, 2020

Golder  
1721 8th Street East  
Saskatoon, SK S7H 0T4  
Attn: Jacoby Donnelly

Date Samples Received: Oct-01-2020

Client P.O.: 20138965/1000/1006

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All results have been reviewed and approved by a Qualified Person in accordance with the Saskatchewan Environmental Code, Corrective Action Plan Chapter, for the purposes of certifying a laboratory analysis

Results from Lab Section 1 authorized by Keith Gipman, Supervisor

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- \* Test methods and data are validated by the laboratory's Quality Assurance Program.
- \* Routine methods follow recognized procedures from sources such as
  - \* Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF
  - \* Environment Canada
  - \* US EPA
  - \* CANMET
- \* The results reported relate only to the test samples as provided by the client.
- \* Samples will be kept for 30 days after the final report is sent. Please contact the lab if you have any special requirements.
- \* Additional information is available upon request.
- \* Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

This is a final report.

SRC Group # 2020-11797

Oct 13, 2020

Golder

1721 8th Street East  
 Saskatoon, SK S7H 0T4  
 Attn: Jacoby Donnelly

Date Samples Received: Oct-01-2020

Client P.O.: 20138965/1000/1006

50174 09/28/2020 10:18 CR-WC-MS-03 \*WATER\*  
 50175 09/26/2020 08:43 CR-WC-MS-04 \*WATER\*  
 50176 09/27/2020 09:40 CR-WC-MS-05 \*WATER\*

Analyte	Units	50174	50175	50176
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**Lab Section 1**

Total suspended solids	mg/L	<1	<1	2±1
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Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 22.8 °C upon receipt.

SRC Group # 2020-11797

Oct 13, 2020

Golder

**Analyte Methods**

<b>Name</b>	<b>Units</b>	<b>Method</b>
Total suspended solids	mg/L	Chm-206

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