



**FIRST MINING
GOLD**



APPENDIX M

HYDROLOGY TECHNICAL SUPPORT DOCUMENTS

- M-1 Baseline Hydrology Report**
- M-2 Mine Site Water Balance
- M-3 Receiver Water Balance



2022 Hydrology Baseline Report

Springpole Gold Project

First Mining Gold Corp.

ONS2104

Prepared by:
WSP Canada Inc.

October 2024



2022 Hydrology Baseline Report

Springpole Gold Project

Red Lake District, Northwest Ontario
Project #ONS2104

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EXECUTIVE SUMMARY

First Mining Gold Corp. proposes to develop an open pit gold and silver mine with supporting facilities known as the Springpole Gold Project (Project). The Project is located in a remote area of northwestern Ontario, approximately 110 kilometres (km) northeast of the Municipality of Red Lake and 145 km north of the Municipality of Sioux Lookout.

An environmental assessment pursuant to the *Canadian Environmental Assessment Act, 2012* (SC 2012, c. 19, s. 52) and the Ontario *Environmental Assessment Act* (RSO 1990, c. E.18) is required to be completed for the Project. This document is one of a series of baseline reports prepared by WSP Canada Inc. on behalf of FMG to describe the current environmental conditions in the area. During the consultation process, project-specific input from regulatory agencies and Indigenous communities have been considered at key milestones of the environmental assessment process including baseline studies, alternatives, assessment approach, mitigation and monitoring where appropriate.

The proposed Project is situated between two prominent lakes, Birch Lake and Springpole Lake. The local Springpole Lake watershed area is approximately 97.5 km², however the total area reporting to the Springpole Lake outflow is approximately 1,372 km². Overall, Springpole has a maximum depth of 35.1 m and an average depth of 6.3 m. It is estimated to have a volume of approximately 190 million m³. Regionally, Springpole Lake flows through the Birch River towards Lake St. Joseph to the south.

Climatic and hydrological baseline monitoring has been conducted at the Project site during three separate monitoring campaigns. The first was conducted in 2011/2012 and consisted of the installation of an on-site weather station. It recorded hourly measurements of temperature, precipitation, snow depth, humidity, air pressure, windspeed and direction between January 2012 and November 2013. Additionally, five flow monitoring stations were established in the Springpole and Birch Lake watersheds throughout the 2011 and 2012 open water seasons.

The second monitoring campaign was established in 2020 and consisted of the installation of a new on-site weather station near the existing Project camp site. It continues to record temperature, rainfall, humidity, air pressure, wind and gust speed, wind direction, and evaporation on a 15-minute interval. It also included the installation of 16 flow monitoring stations at new and former monitoring sites, as well as eight lake level logging stations within Springpole Lake. Flow measurements were conducted between June and October 2020.

The third, and current, monitoring campaign was established in 2021 and consists of four flow and level monitoring stations at previously monitored locations: Springpole Lake inflow from Cromarty Lake, Springpole Lake outflow, and two unnamed tributaries on the Southeast Arm of Springpole Lake. Additionally, six lake level monitoring stations were established on Springpole Lake, Birch Lake, and smaller inland lakes within the Project area. Manual flow and level measurements were conducted at an approximately monthly interval during the months of June to October, from 2021 to 2022. Winter low-flow measurements were also conducted at some stations in February 2022 and 2023. This monitoring campaign is currently ongoing and will extend into 2023.

Select regional climate and hydrometric stations with long-term records have been identified to help characterize site conditions. The Project site climate conditions (i.e., climate normal, return periods wet and dry years and monthly temperature) were characterized using the statistics derived from the Red Lake stations operated by Environment and Climate Change Canada. Under climate normal conditions, annual precipitation estimated for the Project area is 686.4 mm. Average annual lake evaporation of 460 mm for the Project area was estimated using published information.

The Water Survey of Canada (WSC) station at Sturgeon River at McDougall Mills (05QA004) was identified to be most representative of the Project site's runoff conditions based on a comparison of total runoff yields reported at the Project site, as well as the watershed's characteristics. By pro-rating long-term flow statistics from this WSC station, it was estimated that flows would be highest in June and lowest in March. Average monthly flows at the Springpole Lake outflow are estimated to range from 5.4 to 22.9 m³/s, with an annual mean runoff yield of 280.1 mm. Its natural runoff coefficient is estimated at approximately 36%. Low flow runoff depths were estimated with a regression analysis using a number of regional WSC stations. The 7Q20, defined as the lowest consecutive 7-day average flow that is expected to occur in 20-year return period was estimated to be approximately 1.35 m³/s at the Springpole Lake outflow.

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- Attachment B Factual Report - Hydrology Program
- Attachment C Meteorology Report
- Attachment D 2011 Hydrology Baseline Study
- Attachment E Hydrology 2012 Baseline Study Report
- Attachment F 2021 - 2022 Baseline Data Summary
- Attachment G SEI Bathymetric Report

1.0 INTRODUCTION

First Mining Gold Corp. proposes to develop, operate and eventually decommission and close an open pit gold and silver mine and ore process plant with supporting facilities known as the Springpole Gold Project (Project). The Project is located in a remote area of northwestern Ontario, approximately 110 kilometres (km) northeast of the Municipality of Red Lake and 145 km north of the Municipality of Sioux Lookout (Figure 1-1).

An environmental assessment (EA) pursuant to the *Canadian Environmental Assessment Act, 2012* (SC 2012, c. 19, s. 52) and the Ontario *Environmental Assessment Act* (RSO 1990, c. E.18) is required to be completed for the Project. This report is one of a series of Technical Support Documents prepared by WSP Canada Inc. on behalf of First Mining Gold Corp. This document describes the current environmental conditions and update existing information. This introduction is included in each baseline document, such that the reports can be read independent of one another. Other environmental baseline reports in the series address the following environmental aspects:

- Air Quality;
- Ambient Light;
- Sound and Vibration;
- Hydrogeology;
- Surface Water Quality;
- Aquatic Resources;
- Terrestrial Resources; and
- Socioeconomic.

This report presents the climatic and hydrologic conditions in and around the Project site, based primarily on publicly available data as well as site investigations conducted during 2011 to 2012, 2020, and 2021 to 2022.

During the consultation process, project-specific input from regulatory agencies and Indigenous communities was considered at key milestones of the environmental assessment process including baseline studies, alternatives, assessment approach, mitigation and monitoring where appropriate. Non-confidential information from Indigenous Traditional Knowledge and Traditional Land Use studies will be presented where applicable to the Project. An overview of the consultation input and key Indigenous information considered during the effects assessment will be summarized in the Environmental Impact Statement and Environmental Assessment.

1.1 General Setting

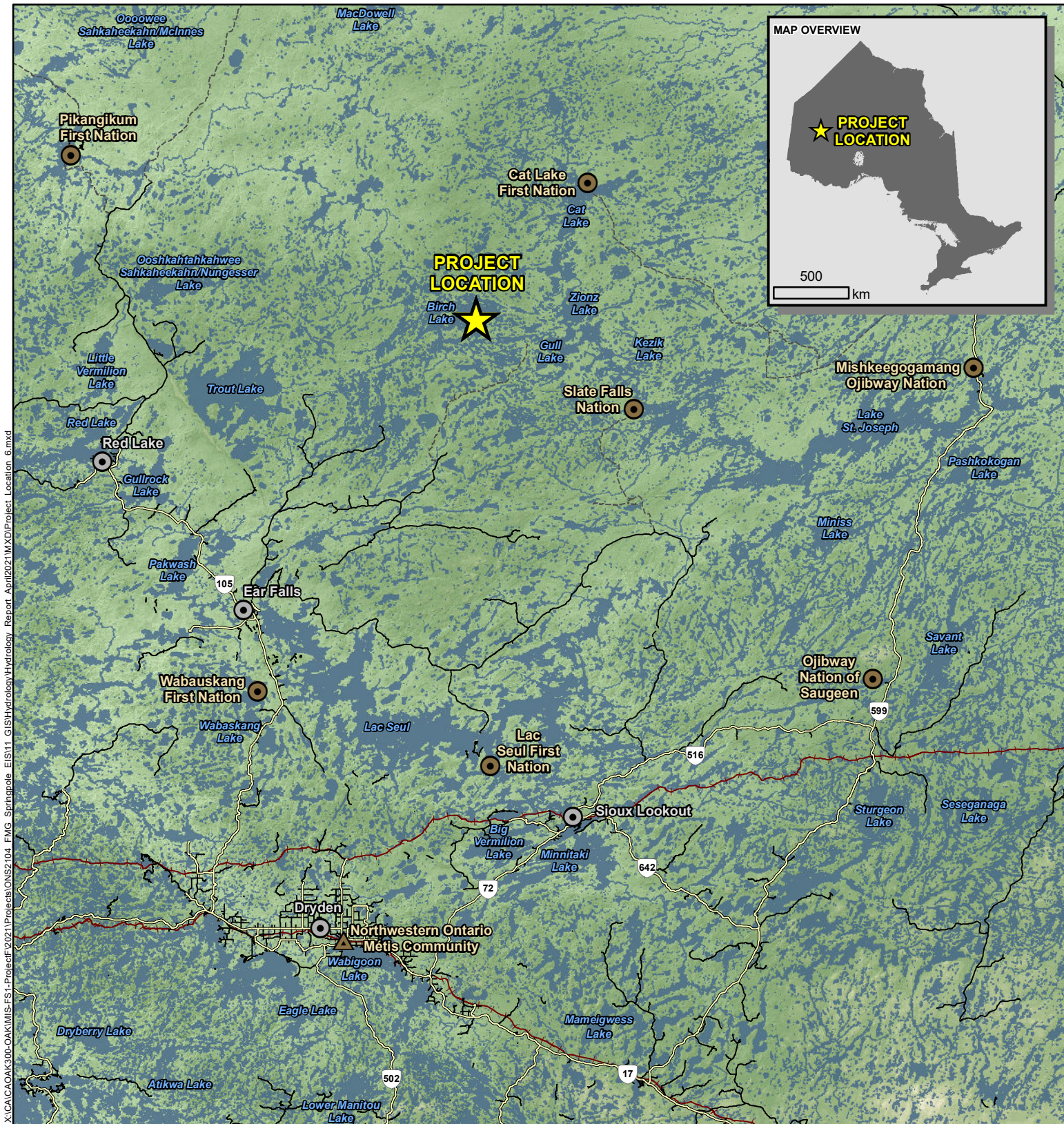
The region is underlain by glaciated terrain characteristic of a large part of the Canadian Shield. Land areas are generally of low relief with less than 30 metres (m) of local elevation, with numerous lakes and watercourses. The proposed main Project site is centered between Springpole Lake and Birch Lake which are both part of the regional Birch Lake watershed (Figure 2-1).

Tree cover generally consists of mature spruce, balsam, birch and poplar, with black spruce and muskeg swamps occupying low-lying areas. The use of the lands within and adjoining the site is generally wilderness. The Project site has been subject to mineral exploration intermittently since the 1920's and more recently dating back to 2009. There are no nearby permanent residences, although seasonal residences are present

on Birch Lake and Johnson Island within Springpole Lake. The identified potentially affected or interested Indigenous communities are signatories of Treaty #3, Treaty #5 or Treaty #9.

1.2 Study Objectives

The Project is currently undergoing the completion of federal and provincial environmental assessment processes and will require permits prior to development. This Hydrology Baseline Report characterizes the local climate and hydrologic conditions of the Project in support of the regulatory processes and provides a summary of the field data collected up until the end of 2022.



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LEGEND

- Project Location
- Railway
- Town
- First Nation Reserve
- Northwestern Ontario Métis Community
- Highway
- Secondary Road
- Resource / Winter Road

NOTES:
- Topographic information extracted from LIO, MNRF.



SPRINGPOLE GOLD PROJECT

Project Location

Datum: NAD83
Projection: UTM Zone 18N



PROJECT N°: ONS2104

FIGURE: 1-1

SCALE: 1:1,500,000

DATE: September 2024

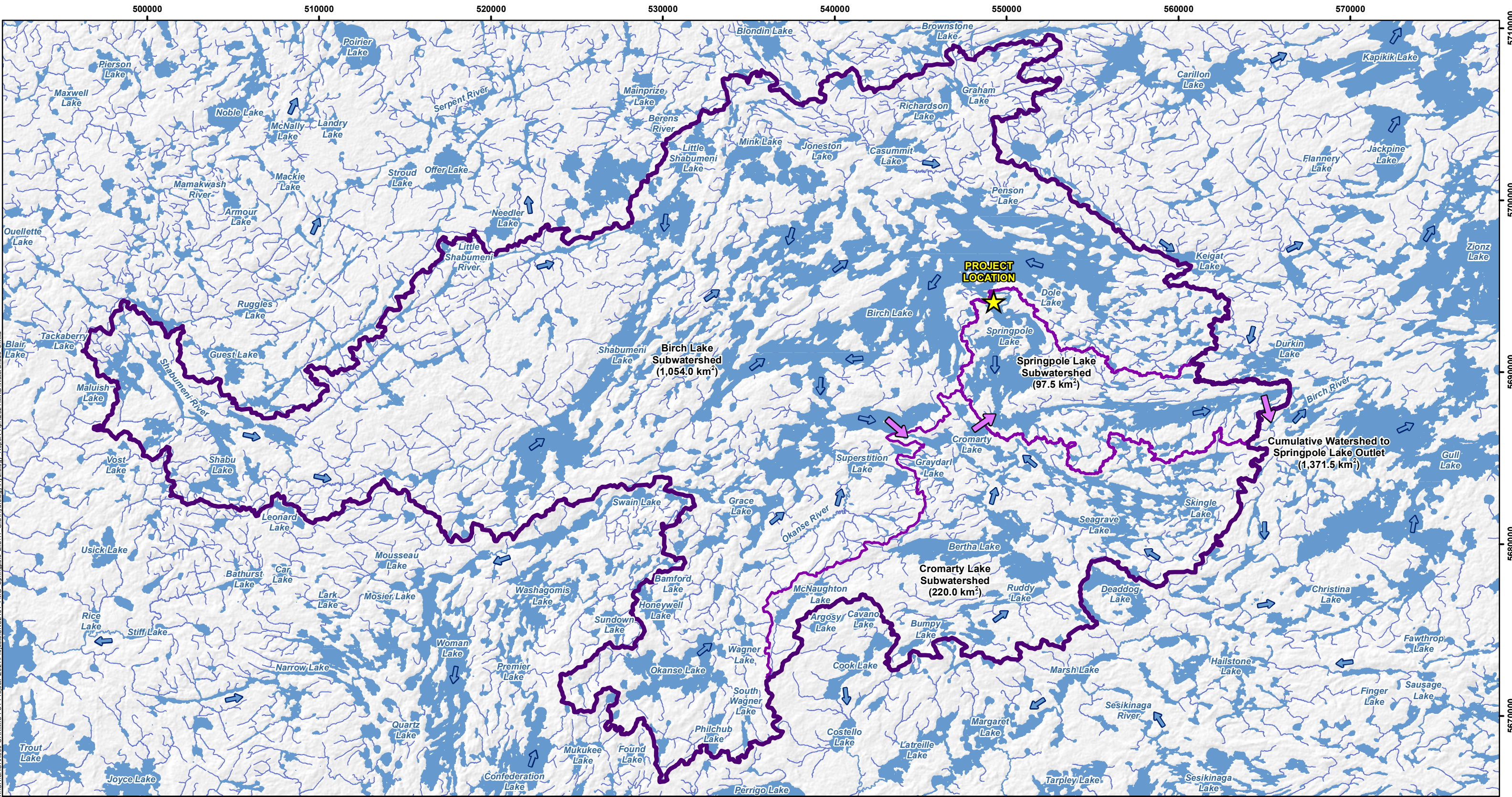


2.0 LOCAL AND REGIONAL HYDROLOGIC SETTING

The proposed Project is situated between two prominent lakes, Birch Lake and Springpole Lake (Figure 2-1).

The local Springpole Lake watershed area is approximately 97.5 square kilometres (km²), however the total area reporting to the Springpole Lake outflow is approximately 1,372 km². The local Springpole Lake drainage basin is approximately 70% surface water and 30% covered by forest and wetlands. Birch Lake is a regional lake, upstream of Springpole Lake, with a watershed area of approximately 1,054 km². The elevation of the surface water in Birch Lake is approximately 1.8 to 2.3 metres (m) higher than the water in Springpole Lake, depending on the season.

At a regional scale, Birch Lake flows further west then south before discharging into Exit Bay through an open river channel into Satterly Lake. From there, it flows through Bumpy Creek into Cromarty Lake where it joins the Springpole Lake watershed. Springpole Lake flows through the Birch River towards Lake St. Joseph to the south. Historically, Lake St. Joseph discharged into the Albany River which ultimately flowed to James Bay. In 1957 the hydroelectric dam constructed at the lower end of Lake St. Joseph at Rat Rapids was converted to a diversion dam as part of the Manitoba - Ontario Lake St. Joseph Diversion Agreement. The diversion dam has resulted in an average annual water flow of 86 cubic metres per second (m³/sec) being redirected from the Albany River east towards Lac Seul through the Root River, and onwards to the Nelson River watershed to the west.



LEGEND

- Project Location
- Cumulative Watershed to Springpole Lake Outlet (1,371.5 km²)
- Subwatershed (Labelled with Name and Local Area)
- Watercourse
- Waterbody
- Flow Direction
- Watershed Outlet Flow Direction

Datum: NAD83
Projection: UTM Zone 15N

NOTES:

- Topographic information extracted from LIO, MNR.
- Watershed delineations based on data provided by Aquasphera, data obtained through the Ontario Flow Assessment Tool (OFAT) and LIDAR provided by First Mining Gold, 2020.

SPRINGPOLE GOLD PROJECT				
Regional Watersheds				
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">PROJECT N°: ONS2104</td> <td style="width: 50%;">FIGURE: 2-1</td> </tr> <tr> <td>SCALE: 1:210,000</td> <td>DATE: September 2024</td> </tr> </table>	PROJECT N°: ONS2104	FIGURE: 2-1	SCALE: 1:210,000	DATE: September 2024
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3.0 CLIMATE CONDITIONS

3.1 Methodology

This report compiles climate data from site-specific field programs, regional Environment and Climate Change Canada (ECCC) stations, as well as other sources summarized in previous reporting as referenced therein. The report characterizes the Project's climate conditions by comparing the available site data to the longer-term regional records and estimating statistical and design conditions. The climate stations discussed in the following sections are presented in Figure 3-1.

3.2 Data Sources

3.2.1 Site Weather Station

An on-site weather station (Springpole Station) was installed approximately 100 m northwest of the Project camp in September 2011. It was programmed to record hourly measurements of temperature, precipitation, snow depth, humidity, air pressure, windspeed and direction. This data, recorded between January 2012 and November 2013, was logged on a Campbell Scientific CR200-200X series data logger, and presented in the *Meteorology 2012 Baseline Study Report* (DST, 2013a), provided in Attachment A.

A new on-site weather station was installed by FMG in June 2020 near the existing Project camp site. It records temperature, rainfall, humidity, air pressure, wind and gust speed, wind direction, and evaporation on a 15-minute interval. Based on a review of the specifications of this weather station, it should be noted that rainfall records are only appropriate for non-winter months, as the rain gauge was not heated. Monthly summaries of this data until September 2020 have been summarized in the *Hydrology Program Factual Report* (Fracflow, 2021), provided as Attachment B.

In August 2021, it was identified by WSP that the rain gauge was missing a component and thus precipitation data prior to and including August 2021 may not be reliable. In fall 2022, a heated rain gauge was commissioned to allow for winter precipitation measurements. To date, precipitation data from the new on-site weather station includes April 2022 to November 2022. On-site evaporation data have also been collected by FMG, however are limited to August 2021 (partial data), and May 2022 to September 2022. Section 3.3 further discusses the climate data.

3.2.2 Meteorology Report

Ausenco Engineers Canada Inc. (Ausenco) prepared a *Meteorology Report* in December 2020 to support the Pre-Feasibility Study (PFS). It compiled data from Casummit Lake weather station to characterize the site's climate conditions for the PFS. The Casummit Lake Station is located approximately 11 km northwest of the site. Historical climate data from this weather station were obtained from the World Weather Online (worldweatheronline.com) by FMG and supplied to Ausenco. Statistics presented in the *Meteorology Report* are based on historical data from Casummit Lake weather station for the period from 2008 to 2020 (partial data available for 2020). *The Meteorology Report* (Ausenco, 2020) is provided as Attachment C.

3.2.3 Environment and Climate Change Canada

In addition to the weather stations described in the previous sections, climate stations operated by ECCC within 150 km radius of the Project site were also considered in summarizing the climatic conditions for the Project. Information for these climate stations is summarized in Table 3-1.

3.2.4 Hydrological Atlas of Canada

The Canadian National Committee for the International Hydrological Decade published a set of maps which concern the major climatic and hydrological parameters for the Canadian mainland and islands. The maps have been compiled as the Hydrological Atlas of Canada (1978a). Two maps have been referenced in this study to support estimates for annual precipitation and mean annual lake evaporation. The annual precipitation map shows the annual precipitation isolines derived based on records from selected national precipitation network stations for the period from 1941 to 1970. The mean annual lake evaporation map shows the annual loss of water isolines through the evaporation process from the surfaces of open water bodies based on the records from 1957 to 1966. Information presented in these maps were compared with the climate information derived from other resources described in this report to assist the characterization of climate conditions for the Project area.

3.3 Summary of Climate Data

3.3.1 Precipitation

The climate normals precipitation for selected ECCC climate stations are summarized in Table 3-2 and Figure 3-2. Based on climate normals, the average annual precipitation at the four identified regional ECCC climate stations ranged from 677.1 millimetres (mm) to 776.7 mm. The seasonal trends for the selected ECCC stations show that the maximum precipitation is expected to occur in June or July when the largest proportion of precipitation falls in the form of summer showers and thunderstorms.

The average annual precipitation for Casummit Lake based on records from 2009 to 2019 is 450.2 mm (Attachment C). Most of the historical records obtained for the abovementioned selected ECCC stations for the period from 2009 to 2019 are incomplete and therefore cannot be compared directly with the value of 450.2 mm from Casummit Lake Station. However, the records from the selected ECCC stations for the period from 2009 to 2019 are generally within the range of 600 to 700 mm. In addition, the average annual precipitation for Casummit Lake is also much lower than the values presented in Hydrological Atlas of Canada (1978a) for the Project area (600 mm to 700 mm, Figure 3-3).

It is indicated in the *Meteorology Report* (Attachment C) that the total precipitation in 2012 recorded at Casummit Lake was 444.9 mm which is comparable to that recorded at the Springpole weather station (476.8 mm). However, these values are significantly lower than those recorded at the selected ECCC climate stations during 2012 (Table 3-3) which ranged from 730 mm to 841 mm. The historical records from Casummit Lake for 2012 are not publicly available from World Weather Online (World Weather Online, 2021). Additionally, station installation and maintenance information are not available. Therefore the 2012 precipitation data for Casummit Lake as described in the *Meteorology Report* (Attachment C) cannot be verified further. For the data recorded at the Springpole Station in 2012, it is noted that the total precipitation recorded for several months (i.e., March, May, June and September) are significantly lower than those recorded at the selected ECCC stations. Some of the factors that might have contributed to the accuracy of the data collected at the 2012 Springpole Station include placement/positioning of the weather station and insufficient maintenance (e.g., bird droppings, algae growth and spiders) which may have prevented operation of the tipping bucket. This station was abandoned in October 2013.

Data collection is ongoing at the new Springpole weather station installed in June 2020. Table 3-4 summarizes the monthly precipitation data available for Springpole Station between April 2022 to November 2022, as well as data collected at the selected ECCC stations and Casummit Lake station for the same time period. Data from ECCC Red Lake station are not available for 2022. For Casummit Lake, the data presented in Table 3-4 are rainfall only as total precipitation data are not available for 2022 from the World Weather Online website. In general, the ECCC stations show slightly more precipitation (10 to 22%) than

the precipitation recorded at the Springpole station for the period from April 2022 to November 2022. However, they all exhibit similar trends, with the greatest precipitation in the spring compared to fall. It is also worth noting that the rainfall depth recorded at Casummit Lake are much lower than those recorded at the ECCC stations and the Springpole station from July to September when total precipitation depths are equivalent as rainfall depths.

Given the uncertainties presented in historical data collected from the Springpole Station, ongoing data collection from the Springpole Station will continue to be compared against the selected regional climate stations. Casummit Lake Station is closest in proximity to the Project site. However, the discrepancies in historical data between Casummit Lake Station and the selected ECCC stations remains to be clarified. Until the Springpole Station weather data confirms that the Casummit Lake Station is representative, and until it can be confirmed that the Casummit Lake Station data was collected using approved methodologies, the Project site has been characterized using the historical data from ECCC Red Lake for the purposes of this report. Under climate normal conditions, annual precipitation estimated for the Project area is 686.4 mm. Among the ECCC stations assessed, Red Lake and Ear Falls stations are the closest to the Project site, and the Red Lake station provides more full year records for long-term statistics.

3.3.1.1 Wet and Dry Years of Various Return Periods

Among the climate stations listed in Table 3-1, stations near Sioux Lookout provides 93 years of complete precipitation records, and stations near Red Lake provide 48 years of complete precipitation records. Stations near Pickle Lake and Ear Falls provide 47 years and 46 years of complete precipitation records, respectively. Although the Sioux Lookout station provides the largest dataset for analysis of long-term statistics, it is also further away from the Project site (145 km from the Project site). Therefore, historical climate data from Red Lake stations were used for the analysis of wet and dry years with various return periods. The return period wet year analysis was performed using the Gumbel distribution with the Method of Moments. Weibull distribution with the Method of Moments was used for the return period dry year analysis. Annual precipitations for various return periods are summarized in Table 3-5, with 1:100 wet and dry years expected to receive 1,050 mm and 345 mm of precipitation, respectively.

3.3.1.2 Design Storm Events

Design return period storm events are characterized by Intensity Duration Frequency (IDF) curves. This information is normally used in conjunction with other hydrology information to assist the design of flood protection infrastructure, such as sediment ponds, dams and culverts across access roads. The information can be obtained from ECCC for selected climates stations in Canada or from the Ontario Ministry of Transportation (MTO) web-based application (i.e., MTO IDF Look-up Tool). The IDF information presented in this report was obtained using the MTO application. IDF statistics for the Project site are provided in Table 3-6 and IDF curves are presented on Figure 3-4.

3.3.1.3 Snow and Rainfall

The climate normal snow and rainfall statistics for Red Lake A station (ID 6016975) are summarized in Table 3-7. Annual rainfall under climate normal conditions is 515.7 mm. Monthly rainfall is normally high in June and July when summer showers and thunderstorms occur.

Snow normally starts in late September and ends in early June. Similar trend has been observed at Casummit Lake Station (World Weather Online, 2021) as shown in Figure 3-5. Snow starts to accumulate in October and is expected to melt completely by May. Snow depth is usually deepest in January and February. Average snow depth in February is 48.0 centimetres (cm).

3.3.2 Temperature

The climate in Northern Ontario is primarily continental, with generally cold winters and mild summers. The climate normal temperature statistics for Red Lake A station (ID 6016975) are summarized in Table 3-8. As shown in Table 3-8, the coldest month is January with daily average temperature of -18.3 °C. The warmest month is July with daily average temperature of 18.1 °C. The daily average temperature typically drops below zero in November and remains below zero until March. Similar trends are observed from data recorded at the Casummit Lake Station and the Springpole site weather station as shown in Figure 3-6.

3.3.3 Evaporation

Lake evaporation was calculated previously by SRK (2019) using the WREVAP version 1.0 evaporation software and data from five ECCC stations (Figure 3-7) situated around the Project site and results are summarized in Table 3-9. The average annual evaporation predicted by SRK for the Project site is 546 mm which is the average of the lake evaporation calculated using the data from the five ECCC stations. This value is above the mean annual lake evaporation (400 to 500 mm) for the area as shown in Hydrological Atlas of Canada (1978b). Among the five stations used by SRK, Bissett is the closest station to the Project site, the mean annual evaporation calculated for this station is 598.7 mm (SRK, 2019) which is consistent with the information presented in Figure 3-8 from the Hydrological Atlas of Canada (1978b). It is however, approximately 100 mm higher than the upper boundary (500 mm) of the data from Hydrological Atlas of Canada (1978b) for the Project area. Therefore, the average annual lake evaporation data from Bissett station is not considered representative for the Project site. In addition, average annual lake evaporation data calculated for Winnipeg International Airport and Atikokan stations (Table 3-9) are higher than 500 mm. Among the five stations used for the analysis by SRK, three stations reported the average annual lake evaporation data within the range of 570 to 650 mm which are significantly higher than the 400 to 500 mm range for the Project area as shown in Hydrological Atlas of Canada (1978b). The average annual lake evaporation from Bissett, Winnipeg International Airport and Atikokan stations would drive the overall average of the annual lake evaporation for the five stations to be higher. Therefore, the average annual evaporation of 546 mm predicted by SRK is not considered representative for the Project area.

In addition to the lake evaporation data from the SRK report (2019), lake evaporation data and estimations are also discussed in the *Meteorology Report* (Attachment C). The average annual lake evaporation, interpolated based on data from Hydrological Atlas of Canada (1978b) for the Project site, is 460 mm. Monthly distributions of the lake evaporation were based on distributions derived from the calculations of potential evapotranspiration using Hargreaves equation.

In addition to the data from Attachment C, monthly lake evaporation was also calculated using monthly temperature values obtained from Red Lake climate normals (Table 3-8) and the Hamon equation. Table 3-10 summarizes the lake evaporation information from Attachment C and the results from Hamon equation. The lake evaporation rates calculated with the Hamon equation generated a similar average annual lake evaporation (460 mm) to those from Attachment C. In the absence of long-term evaporation data near the Project site, an average annual lake evaporation of 460 mm interpolated in Attachment C, and supported by the Hamon equation, are used in this baseline report to characterize the evaporation conditions for the Project site.

Pan evaporation data collected by FMG for Springpole Station for the summer of 2022 are presented in Table 3-11. It is worth noting that pan evaporation are normally higher than the lake evaporation due to the extra heat taken in through the pan's side. The ratio between the pan evaporation and lake evaporation is between 1.3 to 1.7 (Penman, 1948). The pan evaporation rates presented in Table 3-11 are higher than the lake evaporation rates presented in Table 3-10, except for July. The ratio of pan evaporation and lake

evaporation ranges from 0.97 to 1.5, which is generally in agreement with the ratio discussed above. Therefore, the lake evaporation estimated with the Hamon equation are considered reasonable. Data collection from the Springpole Station is ongoing and will continue to be compared against other data sources for the Project site (Table 3-10).

Table 3-1: Regional Environment and Climate Change Canada (ECCC) Climate Stations

Station Name	Station ID	NAD 83 UTM Zone 15 N		Distance from Site (km)	Period of Records
		Easting	Northing		
Ear Falls	6012198	484677	5609074	108	1928-1999
Ear Falls (AUT)	6012199	484342	5608766		1999-2021
Red Lake	6016974	443945	5657543	110	1994
Red Lake A	6016970	444432	5657599		1930-2021
	6016971 6016975				
Red Lake Forestry	6016979	442777	5657556		1959-1960
Sioux Lookout	6037770 6037768	580997	5554070	145	1914-1938
Sioux Lookout A	6037775 6037776	578642	5552182		1953-2021
Sioux Lookout Airport	6037800	578249	5551898		2018-2021
Sioux Lookout HWOS	6037773	578642	5552182		2013
Pickle Lake (AUT)	6016525	693319	5703448	147	1930-2021
Pickle Lake A	6016528	693582	5703149		1990-2021
	6016527 6016529				

Notes:

1. Period of records listed in the table refer to the daily records, except for the Red Lake Station (ID 6016974). For Red Lake Station (ID 6016974), only hourly data are available.
2. Climate normals for 1981 to 2010 are available for Sioux Lookout A, Red Lake A, Pickle Lake A. For Ear Falls, the climate normals are available for 1971 to 2000.

Table 3-2: Climate Normals Monthly Precipitation for Selected ECCC Climate Stations

Station ID	Period	Jan (mm)	Feb (mm)	Mar (mm)	Apr (mm)	May (mm)	June (mm)	July (mm)	Aug (mm)	Sept (mm)	Oct (mm)	Nov (mm)	Dec (mm)	Annual Total (mm)
Sioux Lookout A	1981-2010	34.8	22.9	32.9	43.8	85.8	113.7	97.3	89.3	92.1	70.9	55.8	37.4	776.7
Red Lake A	1981-2010	26.8	17.3	28.4	34	73.4	99	103.4	88.3	83	59.7	42.9	30.2	686.4
Pickle Lake A	1981-2010	26.8	18.9	30.8	37	71.3	100.5	106.7	88.3	98.7	67.5	50.7	31.5	728.5
Ear Falls	1971-2000	31.4	22.5	31	32.6	57.5	95.7	96.3	100.9	85	49.5	38.9	35.8	677.1

Note:

The climate normals for 1981 to 2010 are not available for Ear Falls Station (Station ID 6012198). Therefore, data from this station for 1971 to 2000 are included in this table.

Table 3-3: 2012 Monthly Precipitation for Selected ECCC Stations, Springpole Station and Casummit Lake Station

Station ID	Period	Jan (mm)	Feb (mm)	Mar (mm)	Apr (mm)	May (mm)	Jun (mm)	Jul (mm)	Aug (mm)	Sep (mm)	Oct (mm)	Nov (mm)	Dec (mm)	Annual Total (mm)	Days of Records
Ear Falls (AUT) (ID 6012199)	2012	29.2	25.8	46.2	18.1	100.2	150.1	167.3	60.2	29	111.1	25.8	19.7	782.7	362
Red Lake A (ID 6016975)	2012	24.8	23.4	61.4	11.8	102.8	138.8	113.8	82.2	49.8	65.5	32.4	23.3	730.0	325
Pickle Lake (AUT) (ID 6016525)	2012	41.4	16.2	50	24.8	114	138.2	110.4	73.8	8.2	99.4	40.3	42.1	758.8	364
Sioux Lookout A (ID 6037775)	2012	35.4	25.5	76.4	45	134.3	121.4	101.4	79	45.7	104.6	29.1	43.5	841.3	366
Springpole Station	2012	20.3	7.1	58.4	1.8	89.7	17.3	23.4	119.1	0.8	94.2	21.1	23.6	476.8	366
Casummit Lake	2012	22.3	12.4	47.8	10.3	68.7	59.6	52.8	36.6	18.6	72.1	27.3	16.5	445.0	n/a

Notes:

Monthly precipitation data for Casummit Lake based on information provided in *Meteorological Report* (Attachment C)

n/a: not available

Table 3-4: 2022 Monthly Precipitation for Select ECCC Stations and Springpole Station

Station ID	Period	Jan (mm)	Feb (mm)	Mar (mm)	Apr (mm)	May (mm)	Jun (mm)	Jul (mm)	Aug (mm)	Sep (mm)	Oct (mm)	Nov (mm)	Dec (mm)	Days of Records	Total of Apr - Nov (mm)
Ear Falls (AUT) (ID 6012199)	2022	17.3	20.6	19.0	86.9	137.2	71.7	92.3	71.1	35.6	40.2	47.2	41.5	362	582.2
Pickle Lake (AUT) (ID 6016525)		20.0	19.7	30.9	94.9	68.6	104.3	134.8	72.9	38.5	51.4	31.7	33.5	362	597.1
Sioux Lookout A (ID 6037776)		18.5	18.2	32.8	97.8	138.0	69.7	74.2	93.5	38.9 (note #2)	27.8 (note #2)	9.3	20.2	363	549.2
Casummit Lake (see note #3)		11.5	12.5	12.0	42.4	45.0	28.5	46.6	33.1	15.7	15.6	12.3	13.5	n/a	239.2
Springpole Station (new)		-	-	-	73.8	123.6	108.8	139.6	42.8	24.1*	38.2*	17.5*	-	244	488.6

* Indicates data obtained from heated rain gauge.

Notes:

1. Precipitation data prior to August 2021 for Springpole Station are not reliable due to missing climate station component. Winter months in 2021 are not reliable as the rain gauge is not heated. Incomplete months not shown (i.e., months with >98% missing records).
2. There is no/trace precipitation recorded at Sioux Lookout A (ID 6037776) for September and October 2022. Precipitation data for September and October 2022 are based on data recorded at Sioux Lookout Airport station (ID 6037800) which is approximately 490 m southwest of the Sioux Lookout A station (ID 6037776).
3. Data presented for Casummit Lake were rainfall data only as total precipitation data were not publicly available from the World Weather Online website.

Table 3-5: Wet and Dry Years for Various Return Periods

Return Period (Year)	Annual Precipitation (mm)	
	Wet Year	Dry Year
Mean Annual Precipitation	667.0	
Climate Normals (1981-2010)	686.4	
5 years	756	565
10 years	828	502
25 years	920	432
50 years	988	386
100 years	1,050	345
200 years	1,120	309

Note:

Wet and dry year analysis is based on 48 years of records from Red Lake stations.

Table 3-6: Intensity-Duration-Frequency Statistics for Project Site

Duration	Rainfall Depth (mm)								
	5-min	10-min	15-min	30-min	1-hr	2-hr	6-hr	12-hr	24-hr
2-year	9.8	12.1	13.6	16.8	20.7	25.5	35.5	43.7	53.9
5-year	13.3	16.3	18.4	22.7	28.0	34.5	48.0	59.2	72.9
10-year	15.6	19.2	21.7	26.7	32.9	40.5	56.4	69.5	85.6
25-year	18.5	22.7	25.7	31.7	39.0	48.0	66.9	82.4	101.5
50-year	20.6	25.4	28.7	35.3	43.5	53.6	74.6	91.9	113.2
100-year	22.7	27.9	31.6	38.9	47.9	59.0	82.1	101.2	124.7

Note:

Intensity Duration Frequency information for the Project site was obtained from MTO (2023) using Project site coordinates (51.395833, -92.295833).

Table 3-7: Climate Normal Rainfall and Snowfall Statistics for Red Lake A Station (ID 6016975)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Rainfall (mm)	0.3	1.3	6.9	17.7	66.9	98.8	103.4	88.3	82.0	40.9	8.4	0.7	515.7
Snowfall (cm)	35.5	22.1	26.0	18.2	7.0	0.3	0.0	0.0	1.1	21.1	42.9	39.4	213.6
Total Precipitation (mm)	26.8	17.3	28.4	34	73.4	99	103.4	88.3	83	59.7	42.9	30.2	686.4
Average Snow Depth (cm)	43.0	48.0	39.0	10.0	0.0	0.0	0.0	0.0	0.0	1.0	10.0	26.0	15.0
Snow Depth at Month-end (cm)	48.0	48.0	27.0	1.0	0.0	0.0	0.0	0.0	0.0	3.0	17.0	35.0	15.0

Source:
ECCC (2021)

Table 3-8: Climate Normal Air Temperature Statistics for Red Lake A Station

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Daily Average (°C)	-18.3	-15	-7.4	2.2	9.6	15.1	18.1	17	11	3.7	-5.7	-15.3	1.3
Standard Deviation	3.7	4	3	2.8	2.2	1.9	1.4	1.6	1.7	1.7	3.5	3.9	1.2
Daily Maximum (°C)	-12.7	-8.6	-0.8	8.6	16	21.1	23.8	22.7	16	7.8	-2	-10.5	6.8
Daily Minimum (°C)	-23.9	-21.3	-13.9	-4.2	3.1	9.1	12.4	11.4	5.9	-0.4	-9.4	-20	-4.3

Source:
ECCC (2021)

Table 3-9: Lake Evaporation for Five Stations around the Project Site

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Winnipeg Int'l A	0.0	0.0	0.3	64.3	105.7	129.6	147.3	116.3	56.0	24.8	0.0	0.0	644.3
Thompson A	0.0	0.0	1.3	49.5	85.6	105.4	107.1	80.3	39.8	6.8	0.0	0.0	475.8
Atikokan	0.0	0.0	3.5	60.9	97.5	109.4	124.7	94.0	52.1	28.0	0.0	0.0	570.1
Bissett	0.0	0.0	2.9	62.2	105.2	119.0	136.0	101.5	48.8	23.1	0.0	0.0	598.7
Moosonee	0.0	0.0	0.8	20.1	68.5	94.7	104.4	82.7	46.2	21.0	0.0	0.0	438.4
Average	0.0	0.0	1.8	51.4	92.5	111.6	123.9	95.0	48.6	20.7	0.0	0.0	545.5

Source:
SRK (2019)

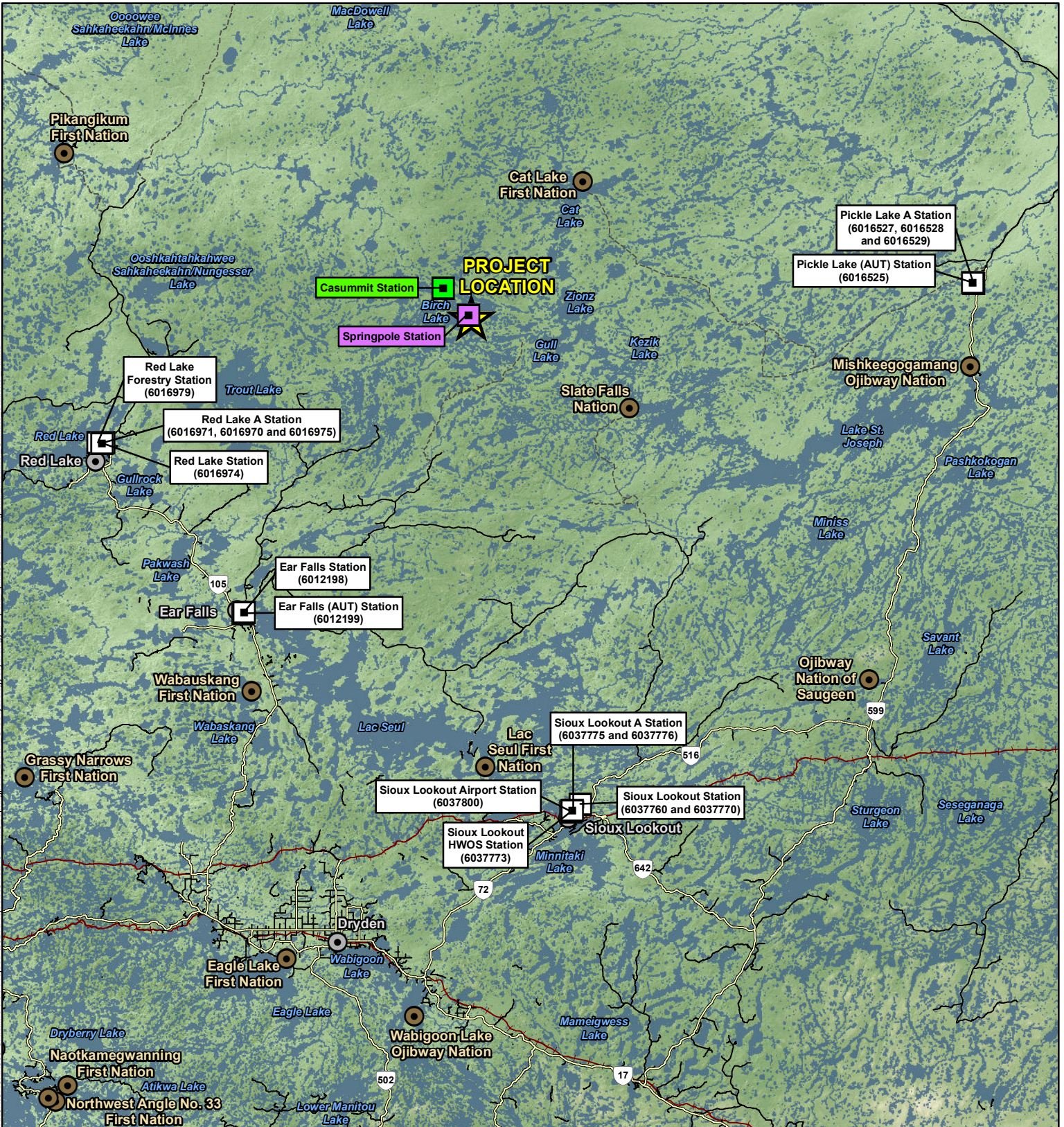
Table 3-10: Average Annual Lake Evaporation for Project Site

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Lake Evaporation – Ausenco (2020) (mm)	0.8	2.6	16.6	39.0	67.6	85.4	105.9	78.7	44.7	13.5	4.0	1.2	460.0
Lake Evaporation - Hamon Equation (mm)	0	0	0	32.4	61.3	88.6	106.6	90.3	52.4	28.4	0	0	460.0

Table 3-11: 2022 Monthly Pan Evaporation for Springpole Station

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Pan Evaporation (mm)	-	-	-	-	92.8	119.1	103.1	96.8	76.5	-	-	-

X:\CALC\OAK\300-OAK\MIS-FS1-Project\2021\Projects\ONS2104_FMG_Springpole_EIS11_GIS\Hydrology\Hydrology_Report_April2021\MXD\Regional_Weather_Climate_Stations_7.mxd



LEGEND

- ★ Project Location
- Town
- First Nation Reserve
- Highway
- Secondary Road
- - - Resource / Winter Road
- +— Railway
- ECCC Climate Station (Labelled with Station Name and Number)
- Onsite Meteorological Station (Labelled with Station Name)
- World Weather Online Meteorological Station (Labelled with Station Name)

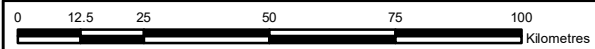
NOTES:
 - Topographic information extracted from LIO, MNRF.

Datum: NAD83
 Projection: UTM Zone 15N

SPRINGPOLE GOLD PROJECT

Regional and Local Climate Stations

PROJECT N ^o : ONS2104	FIGURE: 3-1
SCALE: 1:1,500,000	DATE: September 2024



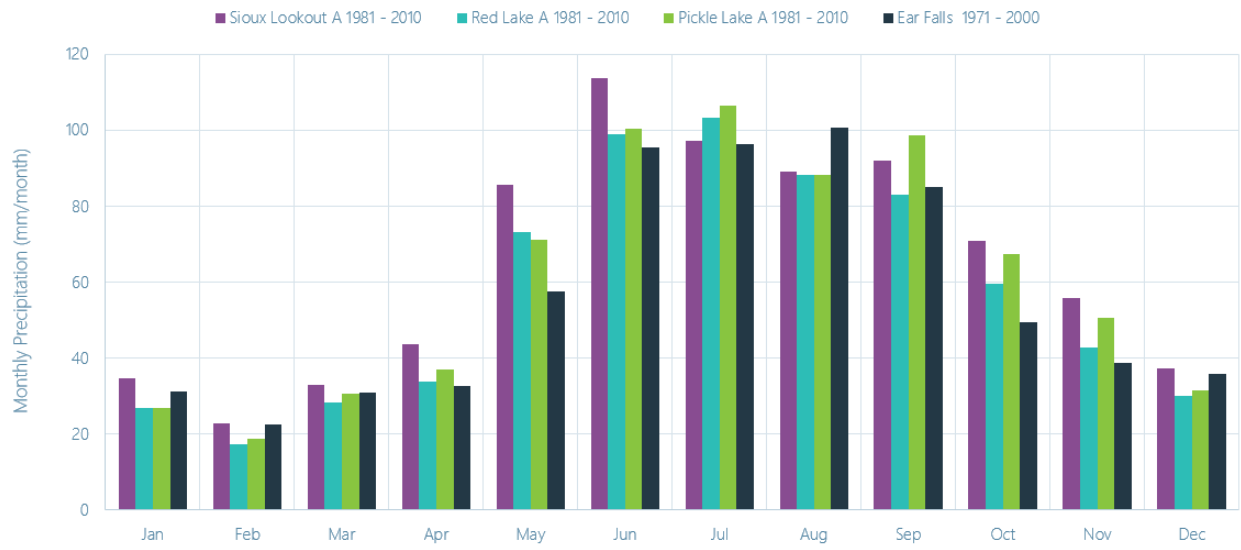


Figure 3-2: Monthly Precipitations for Select ECC Climate Stations



Source:
Hydrological Atlas of Canada (1978a)

Figure 3-3: Annual Precipitation

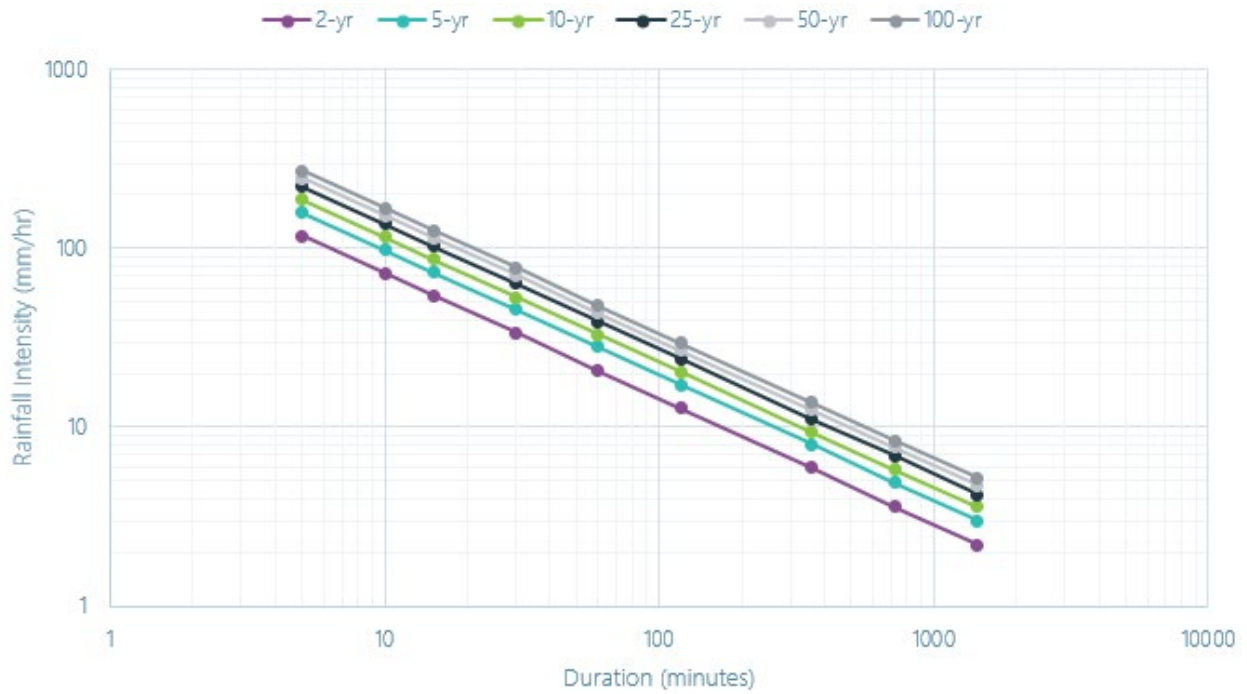


Figure 3-4: Intensity-Duration-Frequency Curves for Project Site

Source:
 MTO (2023)

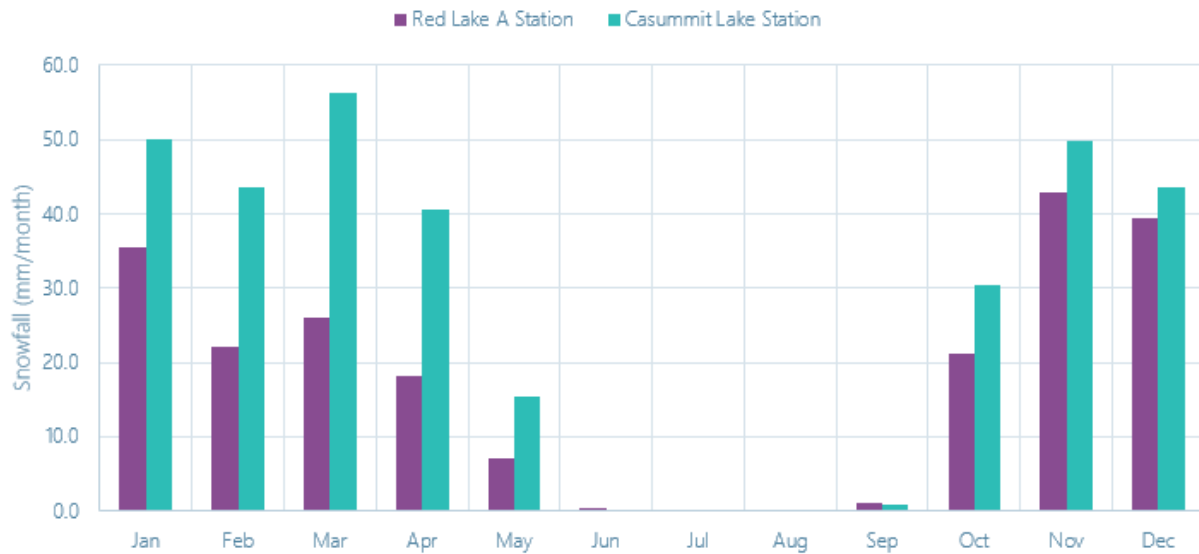


Figure 3-5: Snowfall at Red Lake A Station and Casummit Lake Station

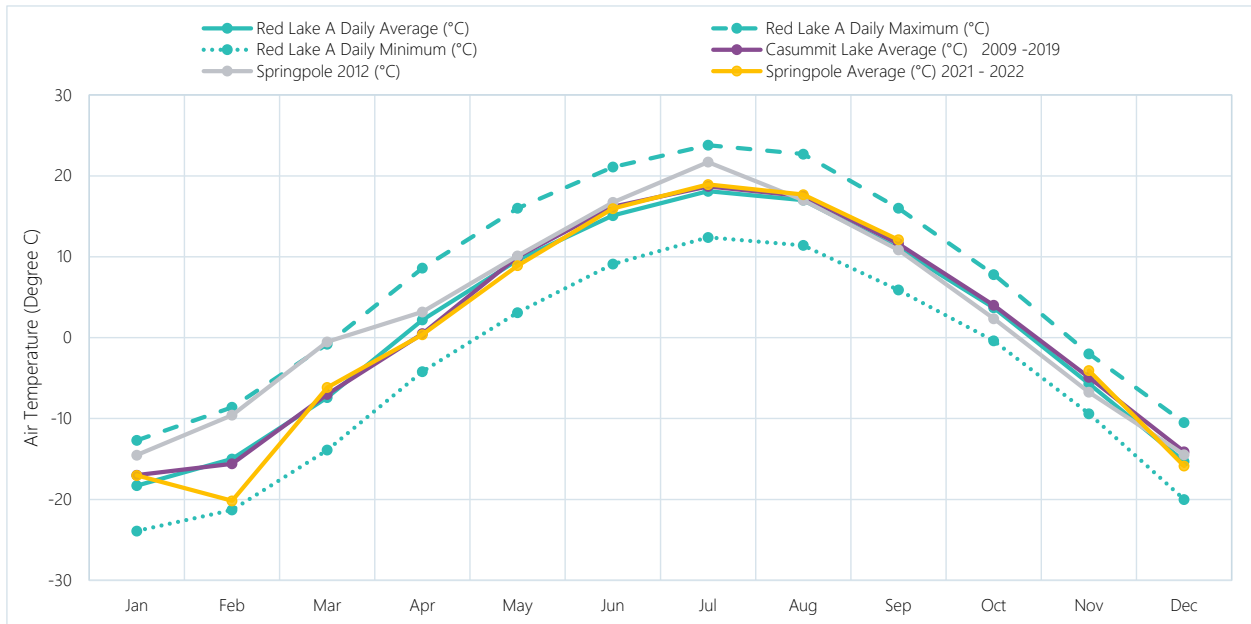


Figure 3-6: Air Temperature at Red Lake A station, Casummit Lake Station and Springpole Station



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LEGEND

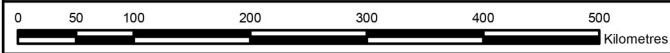
- Project Location
- ECCC Lake Evaporation Stations
(Labelled with Station Name and Number)

NOTES:
- Background image extracted from ESRI Basemaps online.

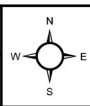


SPRINGPOLE GOLD PROJECT

Lake Evaporation Stations



Datum: NAD83
Projection: UTM Zone 15N

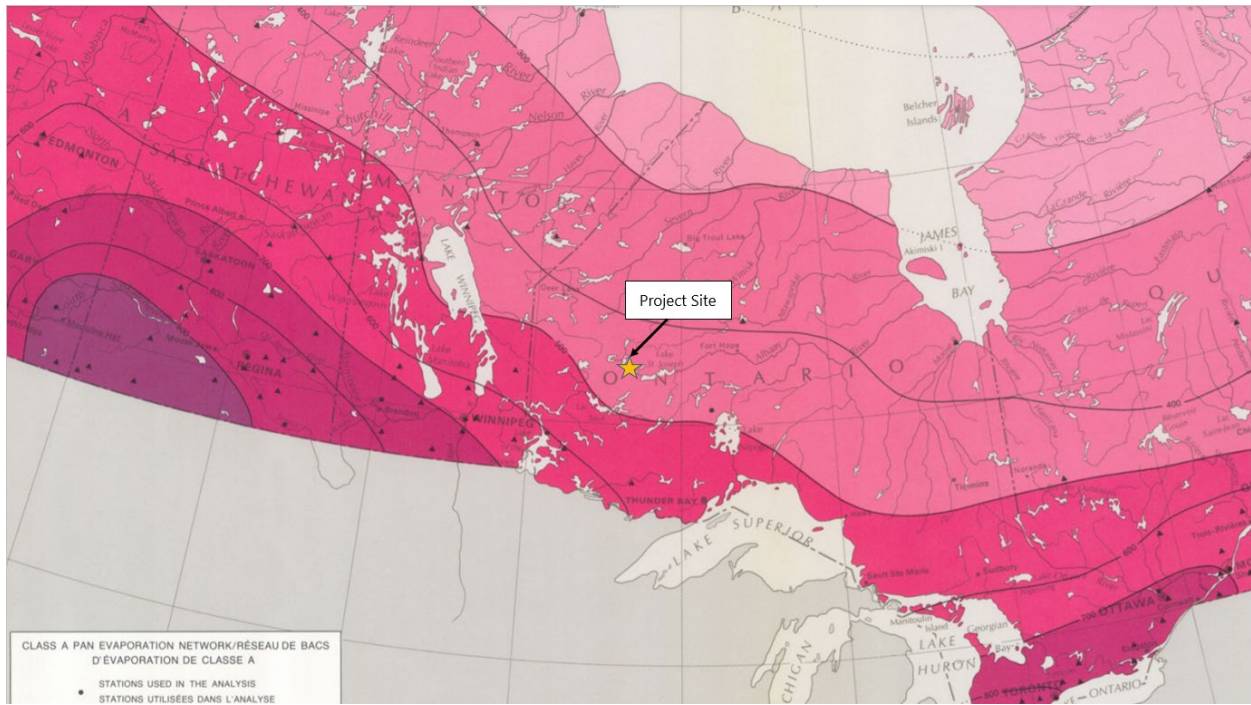


PROJECT N^o: ONS2104

FIGURE: 3-7

SCALE: 1:6,500,000

DATE: May 2023



Source:
Hydrological Atlas of Canada (1978b)

Figure 3-8: Mean Annual Lake Evaporation

4.0 HYDROLOGICAL CONDITIONS

4.1 Methodology

This section characterizes the Project's hydrological and runoff conditions by compiling data collected through site-specific field programs as well as longer-term regional Water Survey of Canada (WSC) flow records.

4.2 Data Sources

Hydrometric baseline monitoring has been conducted at the Project site during three separate monitoring campaigns, collecting over two years of baseline data. The first was conducted by DST in 2011/2012. The second was undertaken by Fracflow in 2020. The third, and ongoing, monitoring program commenced in 2021 by WSP. A summary of current and past hydrometric stations used throughout the various hydrometric programs is provided in Table 4-1 and Figure 4-1.

Bathymetric reporting of the lakes and inland water bodies around the Project have been carried out by FMG and Story Environmental Inc. (SEI) in 2018 and 2020, respectively (Attachment G).

4.2.1 2011/2012 Field Monitoring Program

The first hydrometric field program was initiated in June 2011. Five hydrometric monitoring stations were installed at and near the Project site by DST (SPR-HS1 to SPR-HS5). Two hydrometric monitoring stations (SPR-HS3, SPR-HS4) were removed prior to freeze up in 2011 and re-installed in the same location in May 2012. The SPR-HS4 station was removed permanently in July 2012 as it was considered to be redundant. An additional station (SPR-HS6) was installed in July 2012. This monitoring program (June 2011 to October 2012) is summarized in *2011 Hydrology Baseline Study* (DST, 2012) and *Hydrology 2012 Baseline Study Report* (DST, 2013a), presented in Appendices D and E. Attachment E provides rating curves that were developed for SPR-HS1, SPR-HS2, SPR-HS3 and SPR-HS5. Included with the rating curves were the coefficient of determination (r^2) values which, with the exception of SPR-HS1, demonstrated a relatively low to moderate correlation. The rating curve generated for SPR-HS1 provided a relatively strong correlation (r^2 of 0.9824) and approximately +/-15% error from the manual measurements. It was reported that flows at SPR-HS4 and SPR-HS6 were too low to generate rating curves.

4.2.2 2020 Field Monitoring Program

The second hydrometric field program was completed in 2020. New hydrometric stations were established at the sites of the former stations, as well as at new locations.

The 2020 field program is summarized in *Factual Report – Hydrology Program* (Fracflow, 2021), provided as Attachment B. This program used flumes and v-notch weirs in the smaller creeks and channels to improve flow measurement accuracy. It consisted of a total of 16 flow monitoring stations (generally referred to as F1 to F16), with a varying number of manual measurements ranging from June to October 2020. Attachment B provides continuous flow records for the program duration which have been converted from Levellogger data using rating curves. The rating curves were not provided. With the exception of F1-A and F6, all stations are understood to have been left in place following October 2020.

During the program, eight lake Levelloggers (L1 to L8) were installed in Springpole Lake between June and October 2020. Station co-ordinates for these Levelloggers as well as the benchmarks used by Stantec during a September 2020 survey are provided in Attachment B. Levellogger data has not been provided, apart from those measured at L5, F7-HS1 (L2) and F8-HS7-L4. No Levelloggers were established outside of Springpole Lake and surrounding tributaries.

4.2.3 2021-2022 (Ongoing) Field Monitoring Program

A third, and ongoing, hydrometric field campaign was initiated by WSP (formerly Wood) in May 2021. It has currently collected two years of baseline data. The physical extent of this program is provided in Figure 4-1. During 2021, a number of flow and level stations from the previous monitoring programs were re-established. This included the flow monitoring stations at the inflow and outflow of Springpole Lake (F7-HS1, F8-HS7), smaller local watersheds (F11-HS2, F13), as well as the lake level monitoring stations in Springpole Lake (L1B-FFC, L7-FFC). In addition, new lake level monitoring stations were established in Birch Lake and local inland water bodies near the Project site (L10, L11, L12, and L13).

For stations F7-HS1, F8-HS7, L1B-FFC, and L7-FFC, geodetic benchmarks from the 2020 monitoring campaign were tied in to yield a geodetic water surface elevation. A geodetic survey was carried out in August 2022 at the following stations: F7-HS1, L10, L11, L12, and L1B-FFC.

Manual flow and water level measurements were conducted approximately monthly during the open water season (June to February).

Furthermore, during low flow periods, spot flow measurements were conducted at stations F5-HS5 and F3-HS4. Lowest flows were generally observed between August and September.

Two winter monitoring programs were also conducted in February 2022 and February 2023 to document winter low flows and visually inspect ice conditions across Springpole Lake.

4.2.4 Bathymetric Reporting

Two bathymetric surveys were conducted by SEI in September 2017 as well as August/September 2019. The 2017 survey focussed on two segments of the Springpole Lake North Basin, while the 2019 survey covered all of Springpole Lake. SEI processed this data to estimate the volume of Springpole Lake, as well as the portion to be dewatered for mining activities in *Springpole Lake Bathymetry and Dewatering Area and Volume Calculations* (SEI, 2020). This report is provided in Attachment G.

An earlier report, *Fish Community and Habitat Existing Conditions Report* (FMG and C. Portt and Associates, 2018) documented bathymetric data for Springpole Lake, Birch Lake and Seagrave Lake, as well as select small inland water bodies near the Project. The source of the Springpole Lake and Seagrave Lake bathymetric data were not indicated in the report, however it was indicated that the Ministry of Natural Resources and Forestry (MNRF) Lake Survey Data was the source for the Birch Lake bathymetry.

4.2.5 Water Survey of Canada

Long-term historical WSC data from available hydrometric stations are useful in determining regional runoff trends and statistics. Seven WSC stations were considered by WSP for representativeness to the Project watersheds, based on their proximity from the Project site, as well as period of record and drainage area. All stations considered are natural watersheds (flow is not regulated by an upstream dam) and produce a similar annual runoff yield.

4.3 Lake Levels and Bathymetric Monitoring Data

This section summarizes the bathymetric and lake level monitoring data captured by the various monitoring programs and data sources described in Section 4.2. An analysis and extrapolation of seasonal water level trends for Springpole Lake is presented in Section 4.8.

4.3.1 Springpole Lake

Springpole Lake has a surface area of 28.6 km², has a predominantly rocky heterogeneous shoreline, and contains numerous islands and rocky shoals. There are a number of small tributary streams flowing into Springpole Lake. The Birch River is the largest tributary and enters at the southwest end of Springpole Lake through a short section of rapids below Cromarty Lake (15U 548646 5687018). The outflow of Springpole Lake is also through the Birch River, at the east end, into Gull Lake (15U 565192, 5687848).

Springpole Lake has a large, generally circular, North Basin connected to the long, narrow east arm of the lake by a narrow channel (referred to as the Springpole Southeast Arm). The northern portion is 4.5 km wide and 6.5 km long. It is generally deeper and more open than the Springpole Southeast Arm and has large areas of water exceeding 30 m in depth. The Springpole Southeast Arm is 17.7 km long. Much of that length is a narrow channel bound by a steep bedrock wall along the north shore. The more open areas of the arm extend to the south where the slope of the topography is gentler. There is also a deep portion in the Southeast Arm, reaching 26 m in depth. Overall, Springpole Lake has a maximum depth of 35.1 m and an average depth of 6.3 m. It is estimated to have a volume of approximately 190 million m³.

Eight lake water level monitoring stations were established in Springpole Lake during the 2020 field monitoring program. Three of these stations located in the North Basin, Southeast Arm, and at the outflow were carried forward into the ongoing field program (L1B-FFC, L7-FFC, F8-HS7, respectively). A comparison of geodetic water level data from these stations demonstrates that the water levels across Springpole Lake remains relatively consistent throughout the entire water body. Average daily water levels at all three lake level stations are provided in Figure 4-2. For almost the entirety of the period of record, these water levels are functionally the same. As such, Springpole Lake levels are understood to be outflow controlled, with no difference in hydraulic head across the lake under all observed water levels. The greatest difference between water levels was 6 cm throughout the period of record, and no one station remained consistently higher than the others. It is expected that the actual difference between the Springpole Lake stations is smaller than 6 cm, as this difference is observed at station L7-FFC in the early months of 2022. During ice break up in this period logger data indicates that the L7-FFC experienced a sudden shift, likely due to ice effects. The actual elevation between this point and the next topographic survey conducted in June 2022 was approximated based on the datum prior to the sudden shift. It is during this period of approximation that the maximum variation of the Springpole Lake stations occurs (6cm).

Beginning in May 2022, a large and sudden increase in the water levels of Birch, Cromarty and Springpole Lakes was observed. This was likely a result of high snowfall and consistent low temperatures during the 2021 to 2022 winter, followed by a rapid and late snowmelt. The increase in water level during this period was approximately 2.5 times larger than any peak water level observed in the previous two monitoring campaigns. These high water levels altered the typical hydraulic activity of the lake system in the Project area, and affected flow measurements at stations F7-HS1, F11-HS2 and F13. The effects of these backwater conditions on the flow stations are outlined in subsequent sections.

To provide the longest continuous period of record for Springpole Lake level stations, data from several Springpole Lake stations were combined to form a continuous time series for Springpole Lake water levels (Figure 4-2). This approach is considered reasonable due to the consistent water levels observed across Springpole Lake noted above.

Water levels in Springpole Lake varied by approximately 2.1 m during the period of record, with a peak water elevation of approximately 392.8 metres above sea level (masl), and a minimum water level of approximately 390.70 masl. An analysis and extrapolation of seasonal water level trends for Springpole Lake is presented in Section 4.8.

4.3.2 Cromarty and Birch Lake

A hydrometric flow and water level monitoring station was established on Cromarty Lake (F7-HS1) during the 2020 monitoring campaign. This station was carried forward into the ongoing monitoring campaign.

Similar to Springpole Lake, FracFlow and WSP level data from Cromarty Lake were combined to form a continuous period of record from June 2020 to October 2022 (Figure 4-3). All water level data was collected at the outflow of Cromarty Lake (F7-HS1). A brief gap in the data from December 2020 to March 2021 is attributed to the logger freezing. Over the monitoring period, water levels in Cromarty Lake were observed to vary between 391.25 masl and 392.92 masl.

A new lake level station on Birch Lake (L10) was also initialized during the 2021 monitoring campaign. The level of Birch Lake varied between 393.05 masl and 393.95 masl over the period of record. Due an instrumentation failure, level data is missing for Birch Lake from February 23 to June 8, 2022. Birch Lake remained approximately 1.7 m higher than Cromarty Lake, and 1.8 m to 2.3 m above Springpole Lake.

Under typical flow and level conditions, the level of Cromarty Lake varied from 0.25 m to 1.1 m above Springpole Lake. During the 2022 freshet, high level conditions were observed from May to September 2022, and the levels of Cromarty Lake and Springpole Lake converged with the levels in Cromarty Lake being approximately 0.05 m higher than Springpole Lake at times. The levels of Cromarty Lake and Springpole Lake were functionally linked during this period.

A comparison of the water level data from the Springpole Lake stations, as well as Birch and Cromarty Lakes, is provided in Figure 4-4.

4.3.3 Local Inland Waterbodies

Three new lake level monitoring stations were initiated in May 2021 at local inland waterbodies near the Project site. The stations were located on Lake-1 (L11), Lake-19 (L12), and Dole Lake (L13). Due to instrumentation issues, there is a data gap from October 2021 to June 2022 at L12. Geodetic elevations are available for stations L11 and L12, with station L13 being presented on a relative datum. A geodetic survey of this station is planned for 2023. A comparison of Lake-1, Lake-19 and Birch Lake water surface elevations is provided in Figure 4-5. The relative water surface elevation of Dole Lake is provided in Figure 4-6.

Local inland waterbodies Lake-1 (L11) and Lake-19 (L12) appear much less sensitive to the elevated level conditions observed in the Springpole Lake system. A maximum variation of approximately 0.6 m was observed for L11, and 0.25 m for L12. A sudden water elevation drop of approximately 0.45 m was observed at station L11 in early December 2021. Observations from field staff indicate this drop was the result of a downstream beaver dam failure, rather than natural hydraulic activity.

Comparing Figure 4-5 and Figure 4-6, Dole Lake exhibits a very similar trend to Birch Lake over the monitoring period. Additionally, no visible difference in water level is apparent between the two waterbodies at the outflow of Dole Lake into Birch Lake. A planned geodetic survey of station L13 will provide further insight on the hydraulic relationship between Dole Lake and Birch Lake. Dole Lake demonstrates a maximum variation of approximately 0.9 m, with the lowest level in March 2022, and the highest level in June 2022.

4.4 Springpole Lake Flow Data and Rating Curves

This section summarizes the flow monitoring data captured by the various monitoring programs and presents the rating curves and hydrographs developed for the Project.

4.4.1.1 Summary of Previous Flow Monitoring Data

A comprehensive record of flow through Springpole Lake has been captured by flow monitoring stations established at its inflow (from Cromarty Lake) and its outflow (into Gull Lake). All baseline programs have monitored the inflow (SPR-HS1 / F7-HS1), while monitoring of the outflow (F8-HS7) which began in 2020.

During the 2011/2012 field program, eight manual flow measurements were conducted at the Springpole Lake inflow (SPR-HS1) with flows ranging between 2 cubic metres per second (m^3/s) and $38 \text{ m}^3/\text{s}$ (Figure 4-3 and Figure 4-4; Appendices D and E). This data produced a preliminary rating curve with a strong correlation (r^2 of 0.9824; Attachment E). It is suspected that this curve substantially overestimates flows at the high end, as no stage measurement was recorded for the highest flow measurement of $38.15 \text{ m}^3/\text{s}$.

Additional flow measurements were conducted at the inflow of Springpole Lake (F7-HS1) during the 2020 field program. The 2020 flow records are provided in Attachment B, however the rating curves used to convert levellogger data to the flows presented were not. Since the measurements conducted in 2020 were conducted with new instrumentation and new benchmarks, they cannot be added to the rating curve produced following the 2011/2012 program.

Additional discharge measurements were conducted at stations F7-HS1 (Springpole Lake inflow) and F8-HS7 (Springpole Lake outflow) during the 2020 field program, with flows ranging from 7.96 to $19.84 \text{ m}^3/\text{s}$. Stage measurements taken at this station were only presented in terms on an average depth, rather than an elevation tied to any permanent benchmarks. The depth measurements were converted to the datum used by WSP by comparing average depths measured against known water surface elevations. Due to the lack of precision involved in this method, these measurements were not used to develop new rating curves for these stations. The 2020 FracFlow flow records are provided in Attachment B.

4.4.2 Recent Springpole Lake Rating Curve Development and Hydrographs

Between May 2021 and February 2023, 12 additional stage-discharge measurements were collected at station F7-HS1 (Springpole Lake inflow), and 14 additional stage-discharge measurements F8-HS7 (Springpole Lake outflow). Flows ranged from 5.44 to $53.85 \text{ m}^3/\text{s}$ at F7-HS1 and from 3.99 to $58.12 \text{ m}^3/\text{s}$ at station F8-HS7.

Beginning in May 2022, flows and lake levels far in excess of any previously recorded data were observed throughout the Project. These unusually high levels in Springpole Lake resulted in backwater effects at the outflow of Cromarty Lake. This affected four stage-discharge measurements collected at this station between June and August 2022. These measurements exhibited higher stages than would be expected for the recorded flow and were not deemed suitable for use in rating curve development.

All measurements collected at station F8-HS7 were deemed valid for rating curve development. During the 2022 high water level event, the station was unimpacted due to a large hydraulic disconnect downstream of the station (large elevation drop into Gull Lake).

Two winter monitoring programs were also conducted in February 2022 and February 2023 to document winter low flows and visually inspect ice conditions across Springpole Lake. During both programs, consistent ice cover was noted over much of Springpole Lake, with the exception of the inflow and outflow of Springpole Lake, as well as compromised sections in the narrows of the Southeast Arm where flow concentrates. Stations F7-HS1 (Springpole Lake inflow) and F8-HS7 (Springpole Lake outflow) remained ice-free, suggesting that rating curves developed for these stations may be applied throughout the year. Flows measured at F8-HS7 during February 2023 were the lowest in the period of record. Due to unsafe ice conditions, no flow measurement could be completed at F7-HS1 during the winter monitoring programs in 2022 and 2023.

Rating curves for both stations were developed using a linear regression in log space. Both rating curves are robust for the range of flows measured, with no measurements exceeding a 15% error from the curve computed flow. These curves were used to convert the continuous time series water level data into time series flow data.

Due to the lack of any backwater interference at station F8-HS7, this curve has a number of measurements that are likely on the high end of expected flows. As such, it should be expected to perform fairly well across all anticipated flow conditions. This curve is considered the key indicator of overall flows through Springpole Lake.

The curve developed for F7-HS1 is valid for non-backwater affected conditions up to about the maximum non-backwater affected flow of 26 m³/s, at a stage of 391.80 masl.

Rating curves for stations F8-HS7 and F7-HS1 are provided in Figure 4-7 and Figure 4-8, respectively. Hydrographs for F8-HS7 and F7-HS1 are provided in Figure 4-9 and Figure 4-10, respectively. A comparison hydrograph of both stations is provided in Figure 4-11.

The catchment area reporting to the inflow of Springpole Lake via Cromarty Lake is approximately 1,274 km², while the catchment area reporting to the outflow is 1,372 km² (Figure 2-1). Average flows over the period of record were 13.35 m³/s and 13.65 m³/s for the inflow and outflow respectively. Flows at both stations are generally highest in June and July, and lowest between October and March.

4.4.3 Backwater Flow Approximation

To approximate flows through station F7-HS1 during the backwater period, an adjustment factor was applied to the water level data during the backwater period. The period of backwater influence was determined to be from May 9, 2022 to September 14, 2022 by comparing the geodetic levels of Cromarty Lake and Springpole Lake. Using the measured backwater flows during this period, the expected water level under non-backwater affected conditions was calculated from the rating curve. This expected non-backwater level was subtracted from the actual measured stage for each of the backwater affected measurements to yield an adjustment factor. This factor was then interpolated between the manual measurements, as well as the start and end dates of the backwater period. The interpolated factor was subtracted from the water level data to yield an adjusted water level, which was then used to calculate an approximated backwater flow. The period of approximated backwater flow is identified on Figure 4-10.

4.5 Smaller Local Watersheds – Flow Data and Rating Curves

Additional flow monitoring stations with substantially smaller catchment areas were established within the Springpole Lake watershed during the 2011/2012 and 2020 field programs. These stations are summarized in Table 4-1.

Two of these stations were carried forward into the 2021-2022 field campaign with the intention of developing a rating curve for F11-HS2 and F13. During the 2020 monitoring campaign, all of the small watershed monitoring stations were fitted with flumes, weirs or channels to improve the accuracy of flow measurement using level data. During the initial monitoring and reconnaissance trip in May 2021, it was observed that several of these flume structures were in poor condition following the 2021 freshet, with significant portions of the flow escaping the confinement structures. As a result, the flow data recovered from these stations during this period is not considered accurate, and the level data is not representative of open channel behaviour. These flumes were removed during subsequent trips, and the stations converted to open channel rating curve stations.

4.5.1 Seasonal Behaviour

Seasonal trends indicate that some of the smaller sub-watersheds, such as SPR-HS5 (1.9 km²), respond quickly to precipitation events and may produce zero flow during the early spring and late summer / fall. They identified near-zero flows during August (observed in 2011 and 2012). A similar period of record was logged at F4 (0.6 km²) and F9-A (1.5 km²). F9-A also showed zero flows during August, while F4 portrayed characteristics of an intermittent stream for that same period (Attachment B).

Similar trends were also observed during the 2011/2012 monitoring campaign of smaller watersheds. A comparison hydrograph of stations SPR-HS2 (F11-HS2), SPR-HS3 and SPR-HS5, from the 2011/2012 monitoring campaign is provided in Figure 4-16. SPR-HS3 and SPR-HS5 exhibit a relatively quick response to precipitation events, and zero flow conditions in the late summer / fall. F11-HS2 generally showed flow year-round, with lower flow conditions in the late summer / fall.

During the more recent monitoring campaign, F11-HS2 (9.3 km²) and F13 (3.5 km²) have exhibited continuous flows throughout the open water season. Continuation of flow under winter conditions appears dependent on seasonal conditions. During the February 2022 monitoring trip, no flow was located at either station.

4.5.2 Rating Curve Development

To facilitate continuous hydrographs for stations F11-HS2 and F13, rating curves were developed for these stations. Due to the small catchment sizes and comparatively small flows, there is a higher degree of scattering observed at these stations compared to the larger watersheds. Additionally, both of these stations were impacted by backwater effects from the elevated Springpole Lake level conditions present in spring/summer 2022. Continuous level plots for stations F11-HS2 and F13 are provided in Figure 4-12 and Figure 4-13, respectively.

Station F11-HS2 is located high enough above the typical water levels of Springpole Lake that backwater conditions receded by July 2022, limiting the impacted stage discharge measurements to June 2022 only. Eight suitable stage-discharge measurements were collected at this station between 2021 and 2022. This station was also monitored by DST from 2011/2012, with an additional 10 stage-discharge measurements collected. There was a significant degree of scattering observed in all measurements, both due to the accuracy of flow measurement equipment during low flows. Three of these measurements were concluded to align well enough with the 2021 and 2022 data to use in rating curve development. It should be noted that developing accurate and robust rating curves for tributaries of this size is generally very challenging, as debris or any small changes to stream form greatly impact the level / flow relationship.

The rating curve for F11-HS2 was developed using the same method outlined in Section 4.4.2. The curve is of limited accuracy, with the highest error being approximately 75%, with typical error of approximately 20%. Furthermore, as these smaller watersheds tend to be more sensitive to rainfall events and early season runoff, it is very difficult to capture the peak flows. Considerable extrapolation, beyond the highest collected measurement, is necessary for the water level data observed when these peak flow events occurred. The rating curve for station F11-HS2 is presented in Figure 4-14. The F11-HS2 rating curve was used to compute a real-time flow series from the continuous level data. It should be noted that backwater effects were present at this station from May to July 2022. The backwater flows during this period were approximated using the same method outlined in Section 4.4.2. The hydrograph for F11-HS2, including backwater affected periods is provided in Figure 4-15. It should be noted that during the early season runoff, the rating curve is extrapolating flows greater than twice the magnitude of the largest manual measurement.

The aforementioned backwater effects had more substantial impact on station F13, as backwater conditions were present from June to late July 2022. No previous open channel monitoring had been conducted at this station, and as a result, only six suitable stage-discharge points were available, three of which occurred under very similar flow and level conditions. This data was not sufficient to develop a rating curve of any utility. Monitoring will remain ongoing at this station.

During the winter monitoring trips conducted in February of 2022 and 2023, ice cover was observed at stations F11-HS2 and F13. It is expected that the open water rating curve developed for these stations would slightly over-estimate flow during winter conditions. Manual flow measurements under the ice were conducted at these stations in February 2023. Using this flow measurement, a correction factor could be derived to estimate the ice impacted flow from the 2022 to 2023 winter period at station F11-HS2. The frozen period was estimated using temperature data collected from the loggers. The ice correction factor was calculated as the measured water surface minus the rating curve water surface elevation associated with the measured flow. The correction factor for station F11-HS2 in February 2023 was calculated to be approximately 0.122 m. The ice correction factor was linearly interpolated between the frozen and ice-free dates to determine the corrected discharge. An under-ice measurement was not conducted in the winter of 2021 to 2022. Therefore directly measured water levels were used to estimate flows, likely leading to a slight overestimation.

4.6 Local and Regional Runoff Characteristics and Flow Statistics

Since long-term flow records do not exist for the Project site, nearby WSC gauges with long-term records were reviewed in order to characterize local runoff characteristics and develop flow statistics for the Project. Historical flow records for nearby WSC stations, summarized in Section 4.2.5, were compared to the continuous flow data collected in the Project area over the 2011/2012, 2020, and 2021-2022 monitoring periods. WSC records were compared to data from the inflow and outflow of Springpole Lake SPR-HS1 (2011/2012), F7-HS1 (2020-2022), as well as the smaller local watersheds F8-HS7 (2020-2022), and F11-HS2 (2021-2022).

4.6.1 Springpole Lake Runoff and Flow Comparisons

A comparison of monthly runoff yields over the monitoring periods for stations F7-HS1 and F8-HS7 are summarized in Figure 4-23 to Figure 4-27. Only the WSC stations with the best fit are presented in the figures.

Average monthly and annual runoff yields were calculated using continuous water surface elevation data converted to time series flow data using rating curves provided in Section 4.4.

Based on the comparison of WSC flow records and the continuous flow data collected at the Project-related stations, three WSC stations were identified to be representative of the Springpole Lake catchment areas. In order of largest to smallest watershed areas, these are Cat River below Wesleyan Lake (04GA002), Sturgeon River at McDougall Mills (05QA004) and Pashkokogan River at the outlet of Pashkokogan Lake (04GA003). The catchment areas of these gauges are 1.6 to 4.2 times larger than that at the Springpole Lake inflow (SPR-HS1 / F7-HS1) or outflow (F8-HS7), however they are within the same order of magnitude. A comparison of the annual and period of record hydrographs for the referenced WSC stations to the Springpole Lake data is provided in Figure 4-17 to Figure 4-22. The hydrographs from these gauges follow similar monthly trends to the continuous data collected at the Springpole Lake flow stations.

During the fall of 2021, a large secondary flow peak was observed at WSC stations Sturgeon River at McDougall Mills and Pashkokogan River at the outlet of Pashkokogan Lake. This secondary peak was not observed at Cat River below Wesleyan Lake, or at the Springpole Lake flow stations. Based on precipitation

records in the area, this appears to have been caused by a regional storm that did not have significant impact on the Cat River or Springpole site watersheds. This can be observed in Figure 4-21.

These stations also show comparable total runoff yields over their respective monitoring periods as summarized in the embedded tables of Figure 4-23 to Figure 4-27. There are periodic gaps in the site flow data available due to equipment failures or frozen loggers. Where these gaps are present, the largest period with complete records for all stations is compared.

The WSC stations at Sturgeon River at McDougall Mills and Cat River Below Wesleyan Lake align best with the site data. Generally, the spring freshet at Sturgeon River occurs prior to that at Cat River, and the collected Springpole Lake data falls somewhere in the middle, slightly closer to the timing of the Sturgeon River. In terms of total runoff, the collected Springpole Lake data aligns closer to that of Sturgeon River (this is true for the 2012 data, and 2020 to 2022 data).

The WSC station at Sturgeon River at McDougall Mills (05QA004) was selected from the three WSC stations to act as a basis for the development of flow statistics for the Project site based on its fit with historical data for all monitoring data sets (both monthly trends and total runoff), particularly the data from F8-HS7, which is supported by a relatively strong rating curve. Additionally, this station has a lengthy period of record (1961 to 2022) and completeness of record. A comparison of watershed land covers was also conducted using Ontario Watershed Information Tool (OWIT) which identified that the percentage of water cover (approximately 26%) was comparable to that of F7-HS1 and F8-HS7 (approximately 30%).

Cat River below Wesleyan Lake (04GA002) also showed many similar characteristics to the Project watershed, particularly in the timing and shape of the freshet period. However, the total runoff yield, both over the period of record, and on an annual basis for 2012 and 2022 is significantly lower. The percentage of the water cover within the Cat River watershed is higher than the Project area at 39%, which likely indicates more lake attenuation of peak flows. This is likely why data from the Cat River shows a later spring freshet compared to Sturgeon River.

The calculated average annual runoff for the Sturgeon River at McDougall Mills watershed is approximately 280.1 mm, resulting in a runoff coefficient of approximately 0.36. This is based on an annual precipitation of 776.7 mm from ECCC Station at Sioux lookout, located adjacent to the Sturgeon River at McDougall Mills watershed. For reference the average annual runoff at Cat River is approximately 271 mm.

Monthly and annual runoff statistics (mean, 1st percentile, 99th percentile) for Sturgeon River at McDougall Mills (05QA004) were calculated, as presented in Table 4-3. These values were pro-rated to the Springpole Lake catchment areas at F7-HS1 and F8-HS7 as presented in Table 4-4. Mean monthly values were pro-rated directly using catchment area, however the 1st and 99th percentile monthly values are annualized monthly values, not 1st and 99th percentile values calculated from individual monthly data. For example, the mean monthly F7-HS1 runoff values were multiplied by a factor of (23.5/39.4) where 23.5 m³/s is the 1st percentile annual flow and 39.4 m³/s is the mean annual flow.

4.6.2 Small Tributary Runoff Comparison

A comparison of monthly runoff yields over the monitoring period for station F11-HS2 is summarized in Figure 4-28. Only the WSC stations with the best fit are presented in the figure. This was not completed for other small stations monitored during the 2011/2012 monitoring campaign, as the flow data available for these stations were not considered accurate enough to compare monthly runoff yields.

Average monthly runoff yields were calculated using the hydrograph generated in Section 4.5. As previously discussed, the accuracy of the flow data provided by this rating curve is limited, particularly during the early season freshet and periods of backwater interference.

Based on the comparison of the WSC flow records, two WSC stations were identified as most representative of the smaller Springpole Lake sub-catchments. These stations are Roseberry River above Roseberry Lakes (04CA003) and Long-Legged River below Long-Legged Lake (05QE012). These stations are two orders of magnitude larger in catchment area compared to station F11-HS2, however they are the smallest regional WSC stations available. Additionally, Sturgeon River at McDougal Mills (05QA004) was considered due to its high degree of comparability to the larger Springpole Lake catchments.

A comparison of the monthly runoff yields of the reference stations to F11-HS2 is provided in Figure 4-28. The runoff at station F11-HS2 produces a relatively high runoff in the spring, however much lower runoff in the summer than the regional WSC stations. This is likely a function of the much larger size of the regional WSC stations.

From the selected stations, Sturgeon River above McDougall Mills was selected as the most representative based on flow data available from station F11-HS2. This conclusion was drawn based on the timing of peak flows, and approximate match to the runoff yield to station F11-HS2. Long-Legged River below Long Legged lake also matches these criteria reasonably well, but produces lower annual runoff than was observed at station F11-HS2. The runoff yield data suggests that the behaviour of the small tributaries within the Project area is somewhere between Sturgeon River at McDougall Mills and Long-Legged River below Long-Legged Lake. The calculated average annual runoff for the Long-Legged River below Long-Legged Lake is only 204 mm, which is one of the smallest of the regional WSC stations. The high degree of correlation to the larger Springpole Lake catchments was also a factor in the selection of the Sturgeon River at McDougal Mills station for the small tributaries. Further monitoring of small tributaries in the Project area may be able to further refine this estimate.

4.7 Low Flow Conditions

A low flow frequency hydrologic analysis was conducted. Three probabilistic distributions were considered: Lognormal, Log-Pearson Type III, and Double Gumbel. Eight reference WSC stations, summarized in Table 4-3, were considered to estimate low flows through Springpole Lake. A Kolmogorov-Smirnov normality test was conducted on the log annual 7-day average minimum flow data from each of the reference stations to assess suitability of the Lognormal distribution. Based on this analysis, the Lognormal distribution was deemed appropriate for all stations excluding English River at Umfreville (05QA002).

Commonly used low flow indices were estimated at the inflow and outflow of Springpole Lake (F7-HS1 and F8-HS7). These include the 7Q2, 7Q5, 7Q10 and 7Q20 low flow conditions, defined as the lowest consecutive 7-day average flow that is expected to occur in a 2-, 5-, 10-, or 20-year return periods, respectively. Low flows are typically correlated to the watershed size, as smaller watersheds experience lower low flow conditions compared to larger ones. For this reason, a regression analysis has been conducted on the relationship between each flow condition and watershed size.

The 7Q20 low flows for each station considered were calculated using the aforementioned distributions, and plotted against the respective drainage area of the station. A regression analysis was completed for each distribution to yield a line of best fit. A comparison of the distributions considered is provided in Figure 4-29 to Figure 4-32.

Based on the analysis of the multiple distributions, it was determined that the Log-Pearson Type III yielded the most conservative low flow estimates for 10- and 20-year return periods, while the Lognormal distribution yielded the most conservative estimates for the 2- and 5-year return periods.

The low flow indices for each of the WSC stations is summarized using the most conservative distribution for each return period in Table 4-6.

Based on the regression analyses, the resulting 7-day low flow values for the Springpole Lake inflow (F7-HS1) and outflow (F8-HS7) using the most conservative distribution for each return period are provided in Table 4-7. For the 7Q20 low flow condition, the Log-Pearson Type III distribution was the most conservative, yielding a flow rate of 1.35 m³/s at Springpole Lake outflow.

4.8 Springpole Lake Level Analysis

Water levels across Springpole Lake, including the North Basin and Southeast Arm, are understood to be equal and controlled by the lake outflow into Gull Lake (via Birch River). As described in Section 4.3.1, water level monitoring confirms this understanding, with no difference in hydraulic head observed across the three lake level monitoring stations under all observed water levels and flow conditions.

As such, the Springpole Lake outflow rating curve (Section 4.4.2) and runoff statistics for the Springpole Lake watershed (Section 4.6.1 and 4.7) have been used to estimate seasonal water level trends across Springpole Lake. Figure 4-33 presents the estimated Springpole Lake water levels during average conditions, as well as the annualized 1st and 99th percentile flow conditions (as determined in Table 4-4). Monthly 1st and 99th percentile data were also calculated based on individual monthly data and are generally more extreme than the annualized values. The monthly 1st and 99th percentile data are also provided in Figure 4-33.

Average monthly water levels recorded from 2012, and 2020 to 2022 are plotted for comparison purposes.

During an average year, water levels are anticipated to be lowest in March and highest in June, with approximately 1 m in seasonal variation observed between. The average annual elevation of Springpole Lake is approximately 391.28 masl.

Water levels in June 2022 were unusually high throughout Springpole Lake. This was triggered by high snowfall during the 2021 to 2022 winter, combined with a late and sudden freshet in Spring 2022. During June 2022, the water level of Springpole Lake exceeded the monthly 1st percentile condition. These conditions persisted into July, before falling below the mean in September, due to a drier latter part of the year.

The water level of Springpole Lake associated with the expected 7Q20 low flow condition is approximately 390.4 masl. For reference, the lowest average 7 day water level in Springpole Lake observed to date was 390.67 masl, and occurred in March 2022.

Table 4-1: Historical and Current Hydrometric Monitoring Stations

Station	Station Location	Location (UTM)	Catchment Area (km ²)	Status	Monitoring Parameters	Period of Record	Installed Instrumentation	Consultant	Manual Monitoring Parameters	Manual Measurements and Frequency	Rating Curve	Time Series Data Available
F7-HS1	Springpole Lake Inflow	15U 548571 5687013	1274	Active	Water Level, Flow	Jun 2011 - Oct 2012	Staff gauge, water level logger	DST (SPR-HS1)	Flow measurement, topographic survey	10	Y	15 min continuous level data
					Water Level, Flow	Jun 2020 - Dec 2020, March 2021 - May 2021	Water level logger	FracFlow (F7-HS1)	Flow measurement, topographic survey	3	N	60 min continuous level data
					Water Level, Flow	May 2021 - Oct 2022	Water level logger	WSP (F7-HS1)	Flow measurement, topographic survey	12	Y	15 min continuous level data
F8-HS7	Springpole Lake Outflow	15U 565207 5687857	1372	Active	Water Level, Flow	Jun 2020 - May 2021	Water level logger	FracFlow (F8-HS7)	Flow measurement, topographic survey	3	N	60 min continuous level data
					Water Level, Flow	May 2021 - Jul 2022, Aug 2022 - Feb 2023	Water level logger	WSP (F7-HS1)	Flow measurement, topographic survey	14	Y	15 min continuous level data
F11-HS2	Springpole Lake Tributary	15U 555816 5688878	9.3	Active	Water Level, Flow	Jun 2011 - Oct 2012	Staff gauge, water level logger	DST (SPR-HS2)	Flow measurement, topographic survey	10	Y	15 min continuous level data
					Water Level, Flow	Jul 2020 - May 2021	Flume, water level logger	FracFlow (F11-HS2)	Flow measurement, topographic survey	4	N	60 min continuous level data
					Water Level, Flow	Aug 2021 - Oct 2022	Water level logger	WSP (F11-HS2)	Flow measurement, topographic survey	11	Y	15 min continuous level data
F13	Springpole Lake Tributary	15U 553138 5687623	3.5	Active	Water Level, Flow	Aug 2020 - May 2021	Flume, water level logger	FracFlow	Flow measurement, topographic survey	5	N	60 min continuous level data
					Water Level, Flow	Aug 2021 - Sep 2022	Water level logger	WSP	Flow measurement, topographic survey	9	Y	15 min continuous level data
L1B-FFC	Springpole Lake northern basin	15U 550361 5691677	-	Active	Water Level	Oct 2020 - Aug 2021	Water level logger	FracFlow	Topographic survey	-	N/A	60 min continuous level data
					Water Level	Aug 2021 - Oct 2022	Water level logger	WSP	Topographic survey	11	N/A	15 min continuous level data
L7-FFC	Springpole Lake southeast arm	15U 553434 5687914	-	Active	Water Level	Oct 2020 - Aug 2021	Water level logger	FracFlow	Topographic survey	-	N/A	60 min continuous level data
					Water Level	Aug 2021 - Oct 2022	Water level logger	WSP	Topographic survey	11	N/A	15 min continuous level data
L10	Birch Lake	15U 548842 5694377	-	Active	Water Level	May 2021 - Oct 2022, Jun 2022 - Oct 2022	Water level logger	WSP	Topographic survey	13	N/A	15 min continuous level data
L11	Lake-1	15U 549543 5694553	-	Active	Water Level	May 2021 - Oct 2022	Water level logger	WSP	Topographic survey	13	N/A	15 min continuous level data
L12	Lake-19	15U 551216 5694351	-	Active	Water Level	May 2021 - Oct 2022, Jun 2022 - Oct 2022	Water level logger	WSP	Topographic survey	13	N/A	15 min continuous level data
L13	Dole Lake	15U 552315 5694874	-	Active	Water Level	May 2021 - Oct 2022	Water level logger	WSP	Topographic survey	13	N/A	15 min continuous level data
F3-HS4	Springpole Lake Tributary	15U 550118 5693336	1.3	Deactivated, spot low flow measurements taken	Flow	Jun 2021 - Oct 2021, Sep 2022	None	WSP (F3-HS4)	Spot flow flow measurement	6	N	N/A
					Water Level, Flow	Sep 2020 - Oct 2020	Flume, water level logger	FracFlow (F3-HS4)	Flow measurement, water depth measurement	3		60 min continuous level data
					Water Level, Flow	June 2011 - June 2012	Topographic benchmarks, water level logger	DST (SPR-HS4)	Flow measurement, topographic survey	6		15 min continuous level data
F5-HS5	Birch Lake Tributary	15U 547210 5692389	1.91	Deactivated, spot low flow measurements taken	Flow	Jun 2021 - Oct 2021, Sep 2022 - Oct 2022	None	WSP (F5-HS5)	Spot flow flow measurement	5	N	N/A
					Water Level, Flow	Jul 2020 - Oct 2020	Flume, water level logger	FracFlow (F5-HS5)	Flow measurement, water depth measurement	3		60 min continuous level data
					Water Level, Flow	Jun 2011 - Oct 2012	Topographic benchmarks, water level logger	DST (SPR-HS5)	Flow measurement, topographic survey	10	Y	15 min continuous level data
L1-FFC	Springpole Lake	15U 548948 5693925	-	Deactivated	Water Level	No data provided.	Water level logger	FracFlow	Topographic survey	3	N/A	60 min continuous level data
L5-FFC	Springpole Lake	15U 549081 5691101	-	Deactivated	Water Level	Jun 2020 - Oct 2020	Water level logger	FracFlow	Topographic survey	3	N/A	60 min continuous level data
L6-FFC	Springpole Lake	15U 549242 5688604	-	Deactivated	Water Level	No data provided.	Water level logger	FracFlow	Topographic survey	3	N/A	60 min continuous level data

Table 4-1: Historical and Current Hydrometric Monitoring Stations

Station	Station Location	Location (UTM)	Catchment Area (km ²)	Status	Monitoring Parameters	Period of Record	Installed Instrumentation	Consultant	Manual Monitoring Parameters	Manual Measurements and Frequency	Rating Curve	Time Series Data Available
F1-A	Birch Lake Tributary	15U 547533 5695001	Not provided.	Deactivated	Water Level, Flow	Jul 2020	V notch weir, water level logger	FracFlow	Flow measurement, water depth measurement	2	N	60 min continuous level data
F4	Springpole Lake Tributary	15U 549230 5693189	Not provided.	Deactivated	Water Level, Flow	Jul 2020 - Oct 2020	Flume, water level logger	FracFlow	Flow measurement, water depth measurement	4	N	60 min continuous level data
F9-A	Dole Lake Tributary	15U 548057 5691566	Not provided.	Deactivated	Water Level, Flow	Jul 2020 - Oct 2020	Channel, water level logger	FracFlow	Flow measurement, water depth measurement	3	N	60 min continuous level data
F10-HS6	Springpole Lake Tributary	15U 552040 5690046	Not provided.	Deactivated	Water Level, Flow	Sep 2020 - Oct 2020	Flume, water level logger	FracFlow	Flow measurement, water depth measurement	3	N	60 min continuous level data
F12	Springpole Lake Tributary	15U 557164 5688255	Not provided.	Deactivated	Water Level, Flow	Sep 2020	V notch weir, water level logger	FracFlow	Flow measurement, water depth measurement	2	N	60 min continuous level data
F14	Springpole Lake Tributary	15U 555307 5686142	Not provided.	Deactivated	Water Level, Flow	Jul 2020 - Sep 2020	Flume, water level logger	FracFlow	Flow measurement, water depth measurement	4	N	60 min continuous level data
F15	Springpole Lake Tributary	15U 560626 5687076	Not provided.	Deactivated	Water Level, Flow	Sep 2020	Flume, water level logger	FracFlow	Flow measurement, water depth measurement	4	N	60 min continuous level data
SPR-HS3	Birch Lake Tributary	15U 556005 5693228	11.84	Deactivated	Water Level, Flow	Jun 2011 - Oct 2012	Topographic benchmarks, water level logger	DST	Flow measurement, topographic survey	10	Y	15 min continuous level data
SPR-HS6	Springpole Lake Tributary	15U 552040 5690046	1.65	Deactivated	Water Level, Flow	Jul 2012 - Oct 2012	Topographic benchmarks, water level logger	DST	Flow measurement, topographic survey	4	N	15 min continuous level data

Table 4-2: Manual Flow Measurements

Date	Consultant	Springpole Lake Inflow	Springpole Lake Outflow
		Station F7-HS1	Station F8-HS7
		(m ³ /s)	(m ³ /s)
2-Jun-11	DST	11.40	-
16-Aug-11	DST	4.47	-
27-Sep-11	DST	2.36	-
1-Nov-11	DST	1.92	-
30-Apr-12	DST	7.45	-
6-Jun-12	DST	9.66	-
7-Jul-12	DST	38.15	-
9-Aug-12	DST	24.23	-
17-Sep-12	DST	14.29	-
14-Oct-12	DST	4.58	-
22-Jun-20	FracFlow	7.96	16.41
20-Jul-20	FracFlow	15.35	17.25
14-Sep-20	FracFlow	19.84	9.82
19-May-21	WSP	7.34	6.76
15-Jun-21	WSP	26.13	17.15
7-Aug-21	WSP	10.35	12.10
25-Aug-21	WSP	7.83	9.61
22-Sep-21	WSP	6.95	8.32
14-Oct-21	WSP	5.44	6.47
23-Feb-22	WSP	-	4.89
8-Jun-22	WSP	53.85	58.12
6-Jul-22	WSP	36.30	43.09
26-Jul-22	WSP	27.21	32.31
23-Aug-22	WSP	18.92	23.39
13-Sep-22	WSP	10.79	14.66
18-Oct-22	WSP	5.95	7.73
15-Feb-23	WSP	-	3.99

Table 4-3: Regional WSC Stations

Station ID	Station Name	Drainage Area (km ²)	Average Annual Runoff (mm)	Period of Record	Complete Years of Record*	Distance from Site (km)	Direction from Site (km)
04GA002	Cat River below Wesleyan Lake	5,390	274	1970-2019	45	52.44	South
					(scattered data gaps, 2003, 2005-2006)		
05QC003	Trout Lake River above Big Falls	2,330	239	1970-2015	46	78.48	West
05QA004	Sturgeon River at McDougall Mills	4,439	282	1961-2020	59	146.21	South
04GA003	Pashkokogan River at Outlet of Pashkokogan Lake	2,230	301	1968-2020	13	149.83	East
					(significant data gaps, 1968-1977, 1983-2011)		
05QE008	Cedar River below Wabaskang Lake	1,960	188	1946-2019	49	121.47	Southwest
					(significant data gap, 1946-1969)		
05QA002	English River at Umfreville	6,230	298	1921-2020	99	180.27	South
04CA003	Roseberry River above Roseberry Lakes	619	287	1967-2020	40	140.85	North
					(significant data gaps, 1992-2000, 2008, 2010, 2011, 2017)		
05QE012	Long-Legged River below Long-Legged Lake	548	204	1980-2023	44	145.82	Southwest

Note:
The Complete Years of Record excludes the years with missing data within the Period of Record

Table 4-4: Monthly and Annual Flow Statistics for Sturgeon River at McDougall Mills (05QA004)

Year	Flow (m³/s)													Mean Annual Runoff (mm)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean	
1961	-	-	-	-	-	-	-	-	19.4	17.3	15.2	14.6	-	-
1962	13.8	12.9	12	12.3	40.6	62.8	40.1	43.1	47.7	29.7	22.1	24.5	30.2	214.5
1963	21.9	17.5	14.9	19.8	33.2	60.2	52	43.8	27.9	17.4	12.8	13.4	28	198.9
1964	14.2	15.7	14.3	22	122	70.3	69.3	59	128	92	51.1	34.3	57.8	410.6
1965	26.6	21.3	19.9	19.5	54.5	62.9	52.5	35.1	26.9	49.5	51.4	39.6	38.4	272.8
1966	32.1	26.8	21.7	24.2	112	133	76	42.1	24.1	15.3	14.8	14.6	44.8	318.3
1967	14.4	14.2	14	24.8	71.2	81.9	51.6	44.1	28.4	17.1	15.5	15.1	32.8	233.0
1968	14.8	14.4	13.9	24.2	99.4	155	93	79.8	62.2	58.9	57	36.7	59.2	420.6
1969	29.4	28.1	22.5	30.9	73.2	114	71	75.7	66.6	60.8	44.7	36.5	54.5	387.2
1970	27.6	22.6	20.1	18.7	80.1	83.9	49.4	38.3	61.7	70.5	70.4	45.9	49.2	349.5
1971	37.2	30.1	23.6	34.8	77.1	81.8	51.5	30.3	25	71.3	134	67.1	55.3	392.9
1972	42.6	31	25.4	21.8	63.7	44.4	32.6	26.2	18.1	23.4	26.8	22.1	31.6	224.5
1973	18.2	15.8	15.9	21.2	44.8	37.9	51.6	47.3	42.7	47.8	40.4	31.3	34.7	246.5
1974	24.7	21.1	19.1	23	129	160	60.4	26.5	33.7	37.9	35	29.6	50	355.2
1975	26.4	23.5	20.5	28.9	81.2	60.5	38.6	25.8	18.2	16.8	21.9	18	31.8	225.9
1976	15.4	13.8	13.3	44.3	66	37.5	30.3	15.7	9.31	6.68	4.99	4.79	21.8	154.9
1977	4.83	5.04	6.46	12	29	34.7	35.4	24.3	31.9	33.9	23.1	22.4	22	156.3
1978	19.6	17.1	14.4	15.2	73.9	116	61.5	43	35.5	29	20.1	17.2	38.6	274.2
1979	14.8	13.4	14.2	21.6	82.8	57.7	38	31.1	46	32	50.7	35.9	36.6	260.0
1980	26.4	24	20.1	23.6	50.3	26.9	14.8	13.7	18.1	25.9	27.9	20.9	24.4	173.3
1981	16.8	14.7	13.8	20.5	34.2	41.8	54.9	26.3	13.6	10.4	9.95	10.4	22.4	159.1
1982	10.5	10.5	10.4	11.7	56.5	60.5	42.1	35.9	25.7	37	38	29.6	30.8	218.8
1983	23.4	19.3	17.8	17.2	29.8	43.2	47	32.2	18.6	14.4	15	17.7	24.7	175.5
1984	17.7	16.7	15.1	26.2	69.2	74.6	57.4	42.6	25.1	18.9	20.6	24.3	34.1	242.3
1985	23.5	18.8	15.5	37.6	177	113	106	70.2	73.9	100	62.5	42.4	70.5	500.9
1986	29.6	22.6	18.4	35.1	103	52.7	28.3	21.5	17.7	29.2	25	20.6	33.7	239.4
1987	16.2	13.2	11.5	16.4	20.3	19.9	13.3	12.2	12.9	11.2	12	12.4	14.3	101.6
1988	11	9.69	9.98	13.9	38	51.7	55.3	36.3	67.8	99.7	66.8	51.3	42.7	303.4
1989	39.1	29.1	21.8	22.5	110	73.4	43.6	24.8	16.4	11.2	9.17	8.84	34.2	243.0
1990	9.47	9.6	9.27	12.2	60.4	66.1	79.1	41.1	21.1	15.1	12	12.1	29.1	206.7
1991	13	12.4	10.9	14.9	47.7	46.8	45.2	23.7	17.8	28	33.3	33.9	27.4	194.7
1992	26	21.3	18	22.2	125	77	41.1	40.6	119	84.3	51.5	37.6	55.3	392.9
1993	28.9	22.2	17.3	16.2	30.5	35.2	36.1	34.9	98.6	76.8	49.6	34.5	40.1	284.9
1994	25.4	20.8	17.6	16.7	20.9	26.7	26.9	30.4	29.9	26.3	53	51	28.8	204.6
1995	32.5	25.8	23.1	26.5	53.1	62.1	41.2	28.8	16.9	13.1	15.2	17	29.6	210.3
1996	16.4	15.2	13.5	13.2	63.4	66.4	43	38.5	34.4	47.1	82.5	66.7	41.7	296.2
1997	43.9	32.2	26	32	87.3	61.1	37	22.5	17.4	15	19	18.9	34.4	244.4
1998	16.7	14.9	13.2	13.4	16.5	22.8	17.4	12.6	13.2	30.6	45.9	31.4	20.8	147.8
1999	22.6	18.8	16.4	28.5	62.1	54	66.9	47	43.6	72	68	40.8	45.2	321.1
2000	31.1	25.7	22.2	26.7	58.5	89.4	73.2	55.4	41.3	31.3	45.7	34.2	44.6	316.9
2001	25.7	22.1	19.4	29	103	93.4	62.3	58.2	38.6	32.2	52.3	42.8	48.4	343.8
2002	31.8	25.6	22	30.6	89.3	122	77.4	36.9	24.6	16.7	13.5	12.8	42	298.4
2003	12.9	12	11.3	13.9	26	22.3	26.3	30.8	42.4	64.2	43.7	33.5	28.4	201.8
2004	28.5	24.4	21.6	33.7	117	112	75.2	54.1	123	74.8	85.8	56.8	67.3	478.1
2005	41.9	32.4	26.1	66.7	90.1	85.2	111	46.3	29	22.6	24.4	29.2	50.5	358.8
2006	26.5	23.2	19.5	55.8	81.6	63.1	36.1	22	13.5	11.1	11.2	11.9	31.3	222.4
2007	12.5	11.8	10.6	13.9	27.8	113	102	48.7	46.4	122	99.9	57.7	55.7	395.7
2008	38.4	29.4	24.1	31.4	105	128	135	80.7	39	48.5	67.2	45.5	64.5	458.2

Table 4-4: Monthly and Annual Flow Statistics for Sturgeon River at McDougall Mills (05QA004)

Year	Flow (m ³ /s)													Mean Annual Runoff (mm)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean	
2009	32.7	26.6	23.1	31.6	121	102	71.2	102	75.8	36.7	38.2	34.2	58.2	413.5
2010	26.4	21.5	19.3	19	34.1	53.2	71	75	43.1	33.6	31.2	30.3	38.3	272.1
2011	25.4	21.4	18.8	33.1	104	65	33.9	19.6	10.6	6.82	5.54	5.1	29.2	207.4
2012	5.93	6.97	13.1	62.6	49.3	121	79.3	52.4	30	21.2	21.1	18.6	40.1	284.9
2013	17.9	18	16.7	15.6	98.8	134	77.6	62	85.7	59.7	42.5	36.4	55.5	394.3
2014	30	25.3	22.6	23.1	159	176	111	71.2	41.6	36.9	36.1	29.2	63.7	452.5
2015	24.2	21.4	17.7	30.3	104	89.1	59.4	41.4	29.1	20.8	48.8	58.1	45.5	323.2
2016	35.2	26.1	22.8	35.5	51.2	49.8	45.7	42.5	43	55.1	55.5	45.9	42.4	301.2
2017	35.3	27.9	26.1	51.2	83	91.4	53.3	29	19.5	27.6	22.6	20.7	40.7	289.1
2018	18	15.9	13.8	12.2	44.5	39.6	26	15.4	10.5	23.3	46	31.9	24.8	176.2
2019	24.2	21.2	19	24.2	64.5	49.3	39.1	30.1	44.2	92.6	59.4	38.5	42.3	300.5
2020	31.2	25.3	20.5	21.1	46.8	61.5	46.3	26.6	32.4	27.5	23.7	19.8	31.9	226.6
2021	17.2	15.2	12.5	19.7	38	43	21.5	12.1	16.6	35.5	23	18.5	22.8	162.0
2022	10.9	9.4	9.5	12.0	140.0	91.0	51.1	39.5	22.0	16.1	11.8	10.8	35.3	251.1
Mean	23.5	19.8	17.3	25.1	72.5	74.2	54.7	39.7	38.0	38.9	37.7	29.5	39.4	280.1
1st Percentile	5.5	6.2	8.1	11.9	18.8	21.3	14.2	12.2	10.0	6.8	5.3	5.0	18.2	155.0
99th Percentile	43.1	32.3	26.1	64.2	166.2	166.4	120.6	89.2	125.0	108.6	113.2	66.9	68.6	457.7
Mean Runoff (mm)	14.2	10.8	10.5	14.7	43.8	43.3	33.0	23.9	22.2	23.5	22.0	17.8	23.3	280.1

Table 4-5: Annualized Monthly and Annual Flow Statistics for Springpole Lake at F7-HS1 and F8-HS7

Pro-Rated Monthly Flows (m³/s) at F7-HS1

Watershed Area = 1,274 km²

	Flow (m ³ /s)													Mean Annual Runoff (mm)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean	
Mean	6.7	5.7	5.0	7.2	20.8	21.3	15.7	11.4	10.9	11.2	10.8	8.5	11.3	280.1
1st Percentile*	3.1	2.6	2.3	3.3	9.6	9.8	7.2	5.3	5.0	5.2	5.0	3.9	5.2	155.0
99th Percentile*	11.7	9.9	8.7	12.5	36.2	37.0	27.3	19.8	19.0	19.4	18.8	14.7	19.7	457.7

Pro-Rated Monthly Flows (m³/s) at F8-HS7

Watershed Area = 1,372 km²

	Flow (m ³ /s)													Mean Annual Runoff (mm)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean	
Mean	7.3	6.1	5.4	7.8	22.4	22.9	16.9	12.3	11.7	12.0	11.7	9.1	12.2	280.1
1st Percentile*	3.3	2.8	2.5	3.6	10.4	10.6	7.8	5.7	5.4	5.5	5.4	4.2	5.6	155.0
99th Percentile*	12.6	10.6	9.3	13.5	39.0	39.9	29.4	21.3	20.4	20.9	20.3	15.9	21.2	457.7

Notes:

* The 1st and 99th percentile monthly values are annualized monthly values, pro-rated using annual flow statistics, not 1st and 99th percentile values calculated from individual monthly data. For example, the mean monthly F7-HS1 runoff values were multiplied by a factor of (23.5/39.4) where 23.5 m³/s is the 1st percentile annual flow and 39.4 m³/s is the mean annual flow, as summarized in Table 4-4.

Table 4-6: WSC Station Low Flow Indices

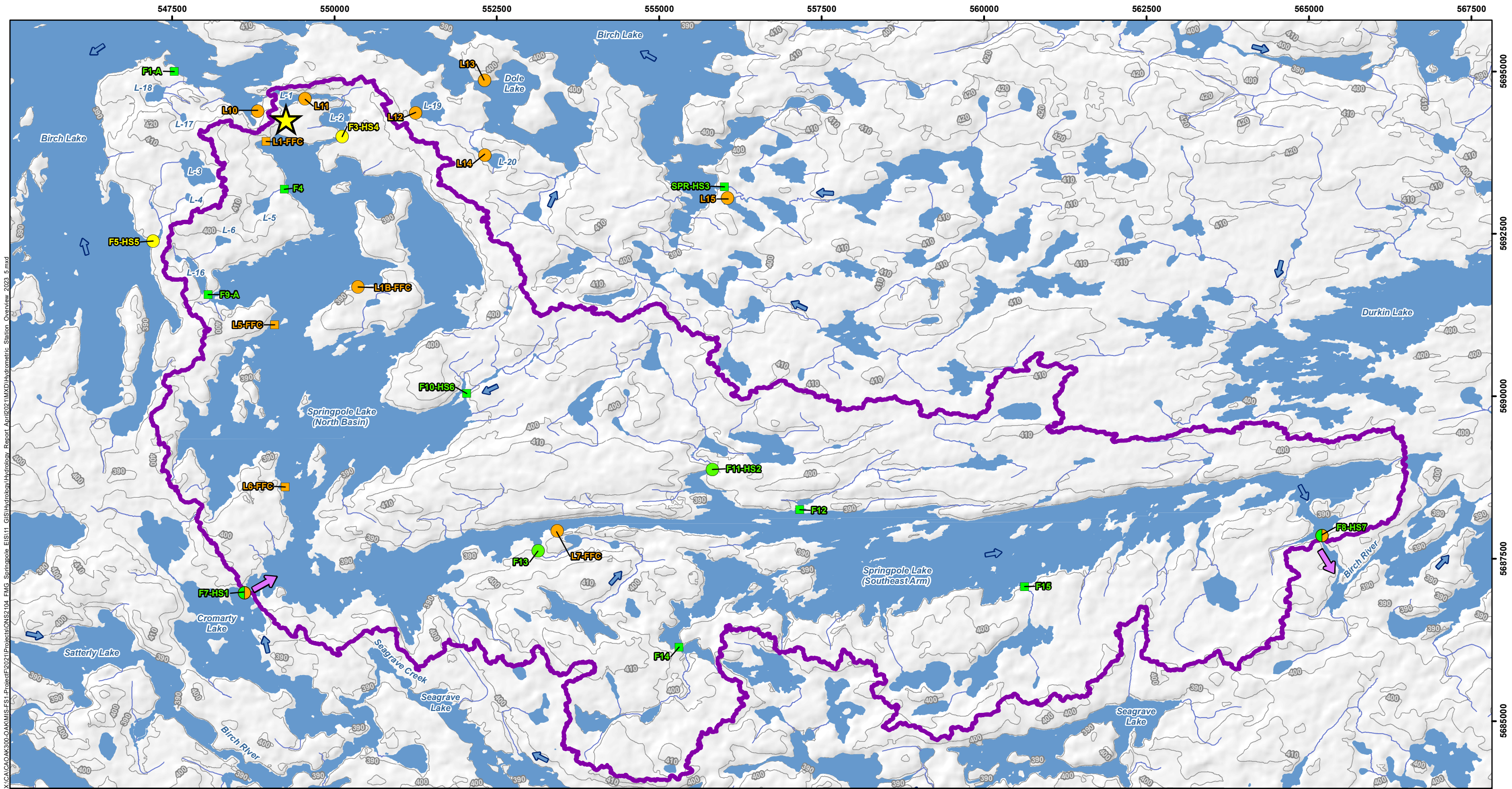
WSC Station	Distribution	05QA004	04GA002	04GA003	04CA003	05QE008	05QE012	05QC003
		Sturgeon River at McDougall Mills	Cat River Below Wesleyan Lake	Pashkokogan River at Outlet of Pashkokogan Lake	Roseberry River above Roseberry Lakes	Cedar River below Wabaskang Lake	Long-Legged River below Long-Legged Lake	Trout Lake River above Big Falls
Catchment Area (km ²)		4,440	5,390	2,230	619	1,690	548	2,330
7-Day Low Flows (m ³ /s)								
20	Log-Pearson Type III	6.63	11.24	4.01	0.27	1.99	0.34	4.17
10	Log-Pearson Type III	8.20	13.05	4.87	0.36	2.45	0.43	5.04
5	Lognormal	9.87	14.99	5.91	0.44	3.07	0.56	5.44
2	Lognormal	13.47	18.93	8.19	0.63	4.58	0.90	7.99

Notes:

Regression relationships for each of the low flow indices with respect to drainage area were derived to allow for the estimation of low flow conditions at HS1 and HS7. These are provided in Figures 4-29 to 4-32.

Table 4-7: Estimated Springpole Lake Low Flow Indices

Station	Catchment Area (km ²)	Distribution	F8-HS7		F7-HS1	
			1,372		1,274	
7-Day Low Flow			m ³ /s	m ³ /day	m ³ /s	m ³ /day
7Q20		Log-Pearson Type III	1.35	116,831	1.20	103,678
7Q10		Log-Pearson Type III	1.69	145,672	1.50	129,623
7Q5		Lognormal	2.05	177,359	1.83	158,315
7Q2		Lognormal	3.00	259,103	2.69	232,525



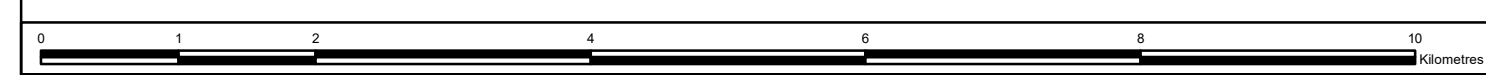
- LEGEND**
- Project Location
 - Springpole Lake Subwatershed
 - Contour (10 m intervals)
 - Watercourse
 - Waterbody
 - Flow Direction
 - Watershed Outlet Flow Direction
 - Continuous Open Channel Flow Measurement Station
 - Low-Flow Spot Measurement Station
 - Continuous Lake Level Monitoring Station
 - Decommissioned Flow Station
 - Decommissioned Lake Level Station

NOTES:
- Topographic information extracted from LIO, MNRF.



SPRINGPOLE GOLD PROJECT

Hydrometric Station Overview



Datum: NAD83
Projection: UTM Zone 15N



PROJECT N°: ONS2104
SCALE: 1:55,000

FIGURE: 4-1
DATE: September 2024

X:\CACA\AK300-OAKMIS-FS1-Project\2021\Projects\ONS2104_FMG_Springpole_EIS11_GIS\Hydrology\Hydrology_Report_April2021\MXD\Hydrometric_Station_Overview_2023_5.mxd

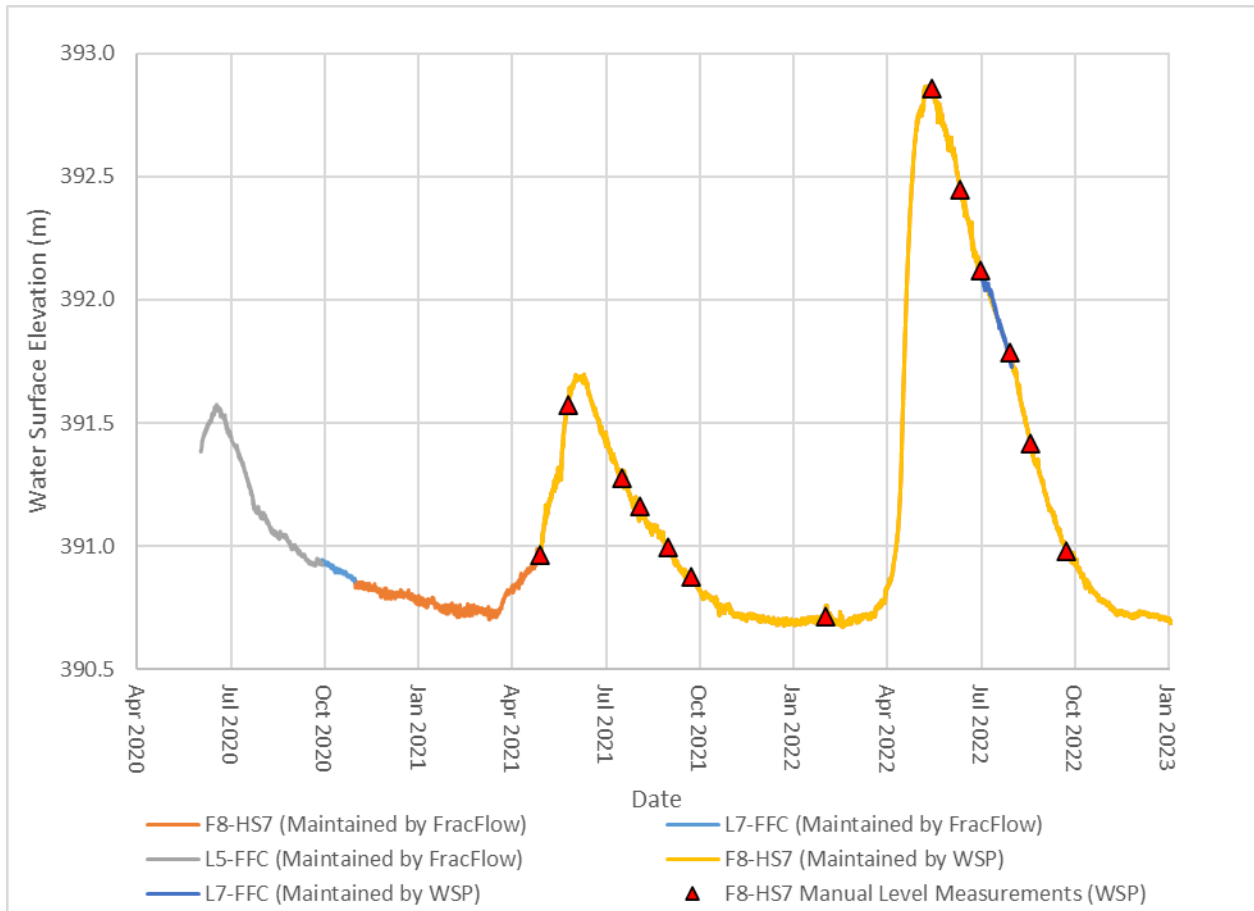


Figure 4-2: Combined Springpole Lake Level Data

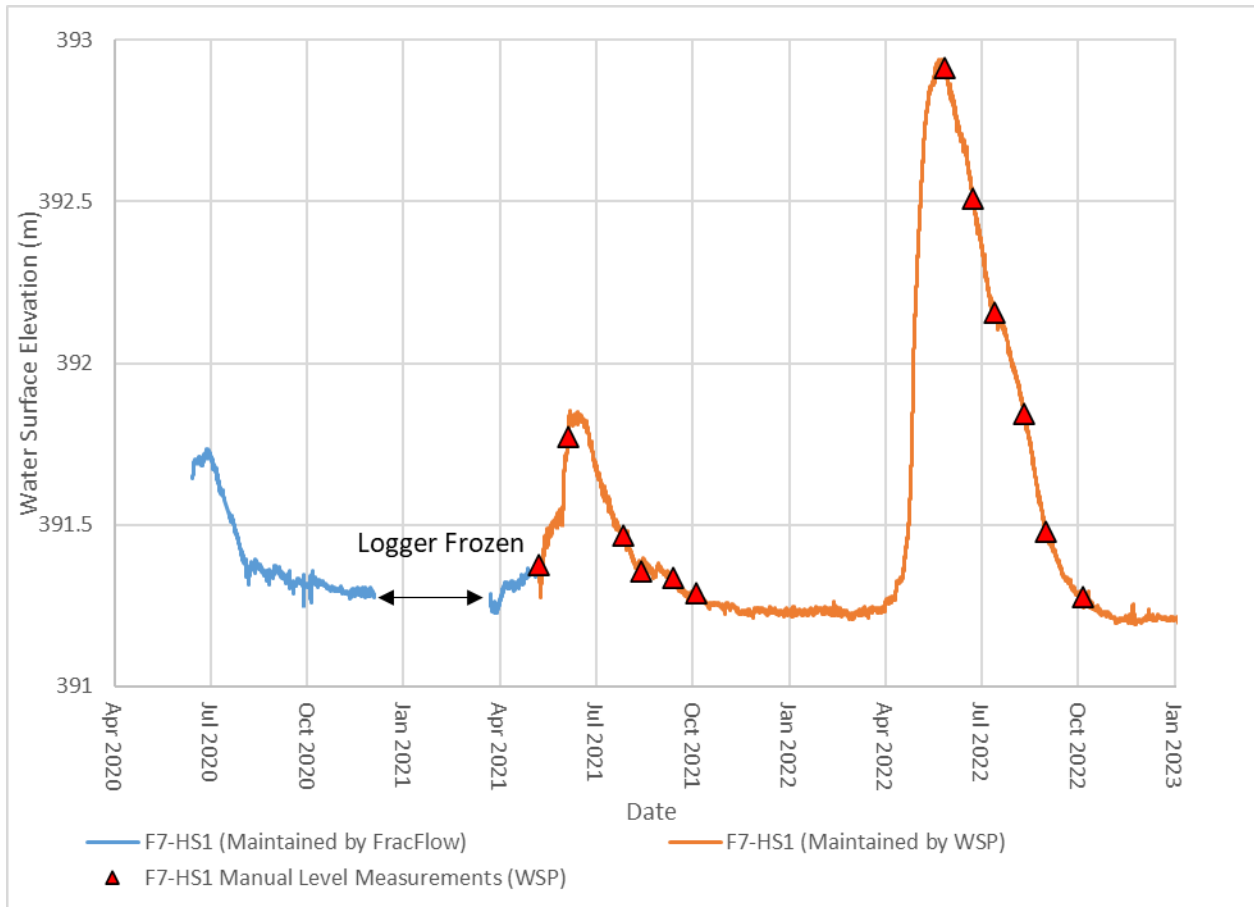


Figure 4-3: Combined Cromarty Lake Level Data

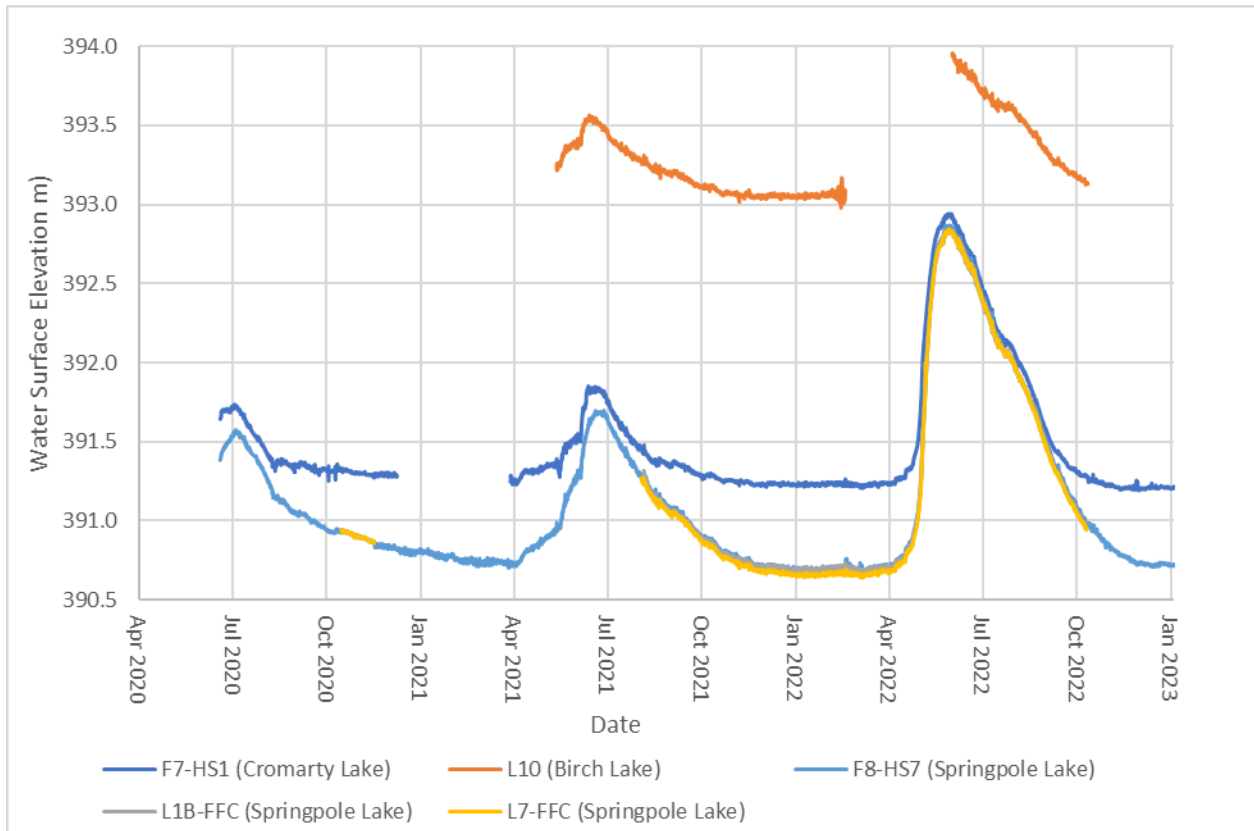


Figure 4-4: Cromarty, Birch, and Springpole Lake Level Comparison

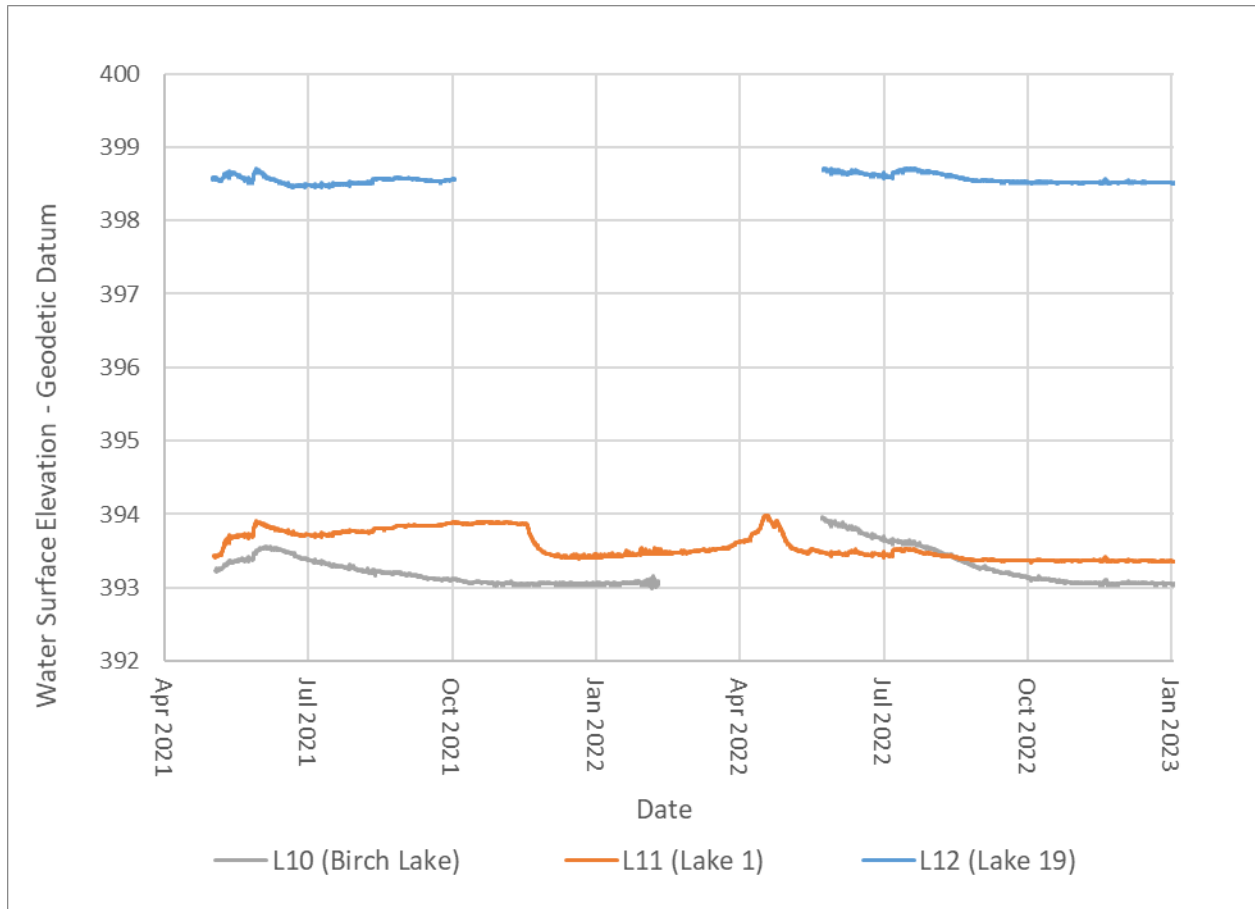


Figure 4-5: Birch Lake, Lake 1, Lake 19 Level Comparison (Geodetic Datum)

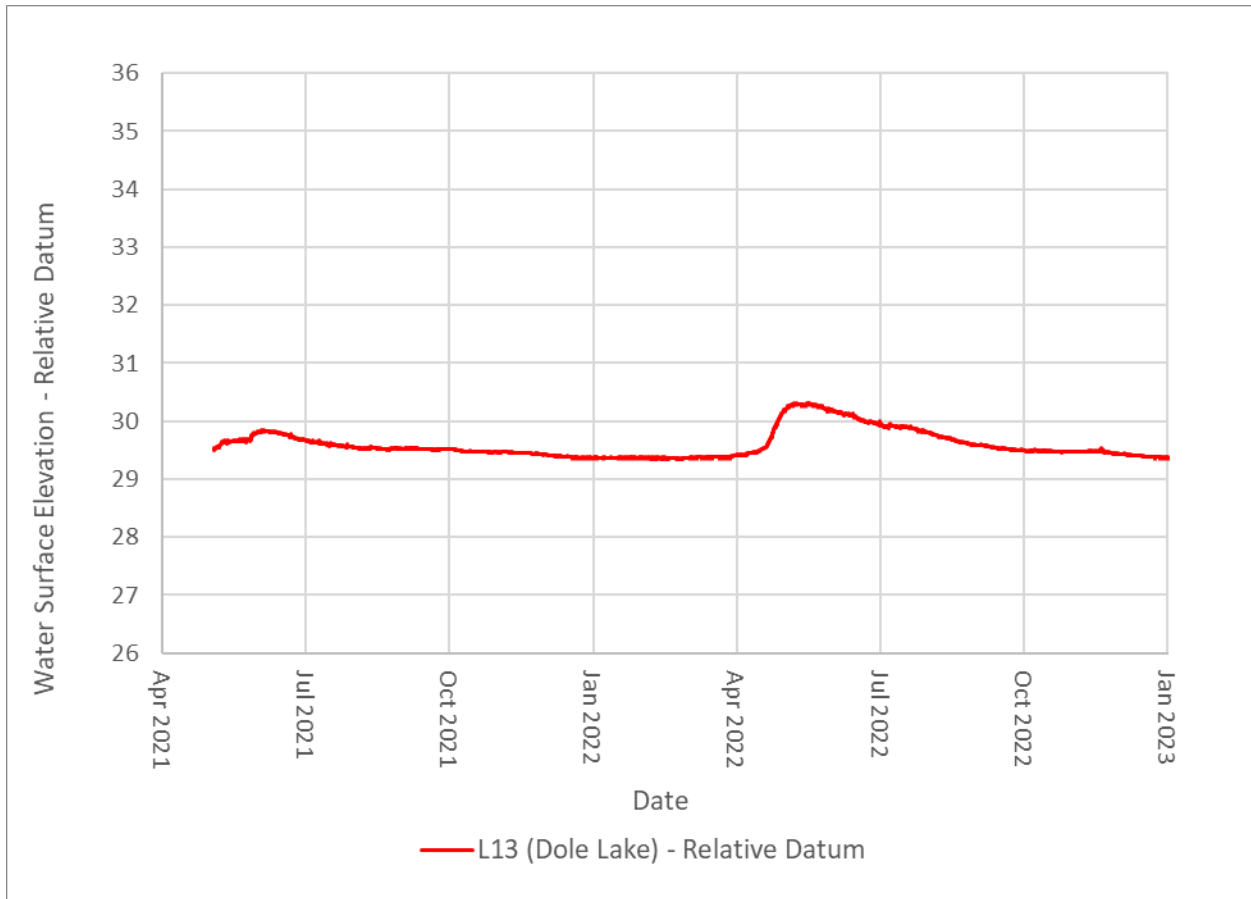


Figure 4-6: Dole Lake Level (Relative Datum)

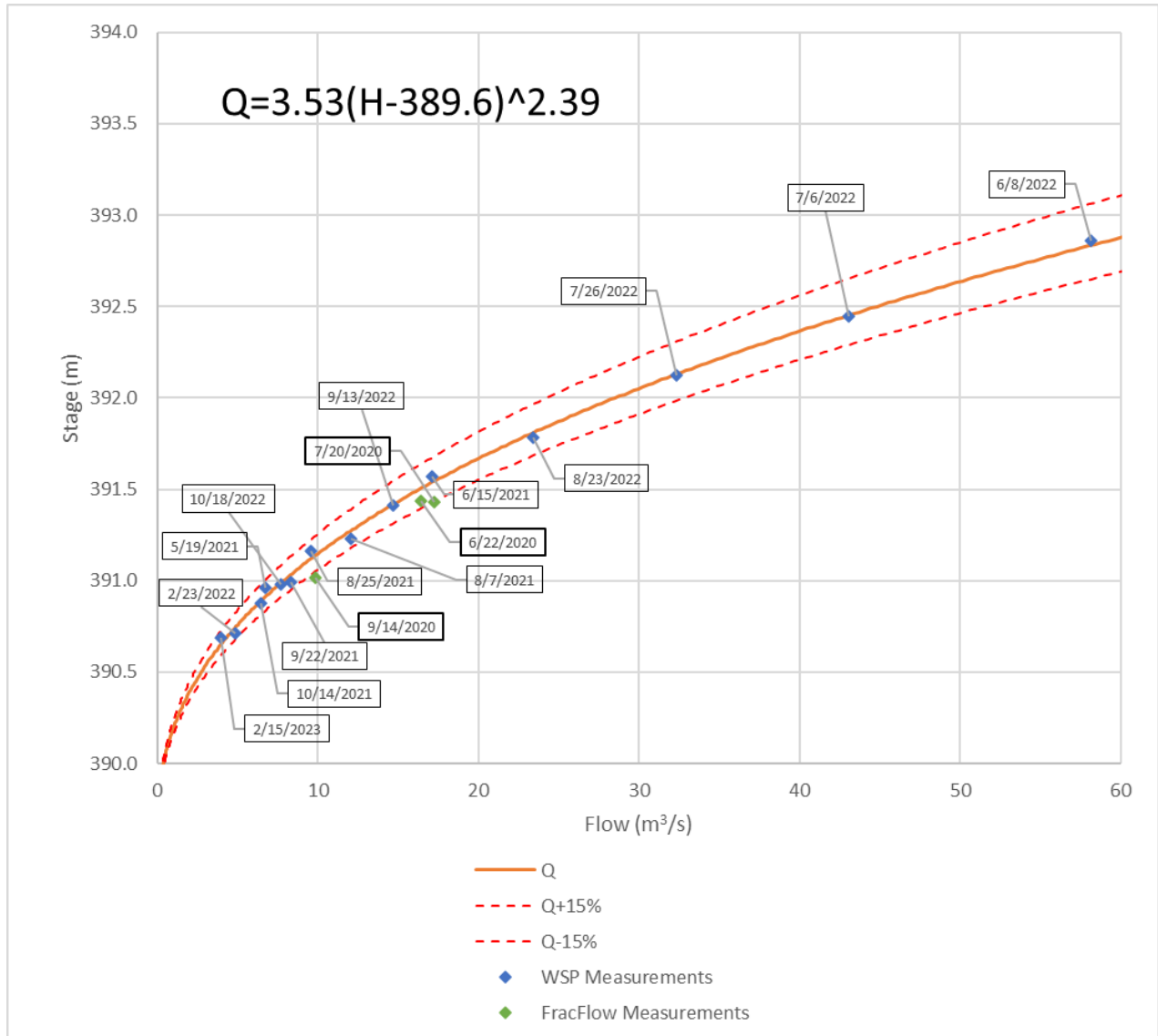


Figure 4-7: F8-HS7 (Springpole Lake Outflow) Rating Curve

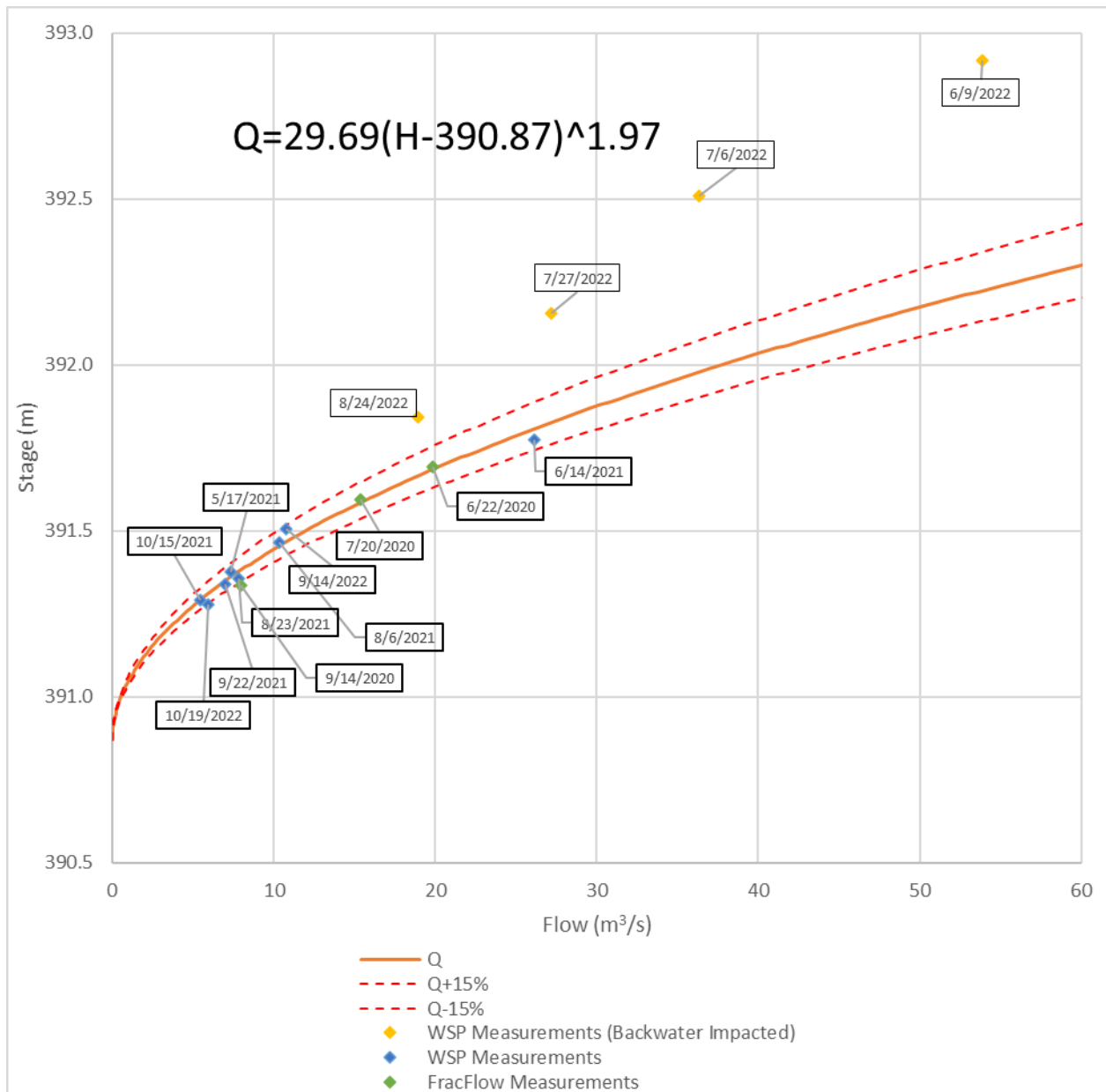


Figure 4-8: F7-HS1 (Springpole Lake Inflow) Rating Curve

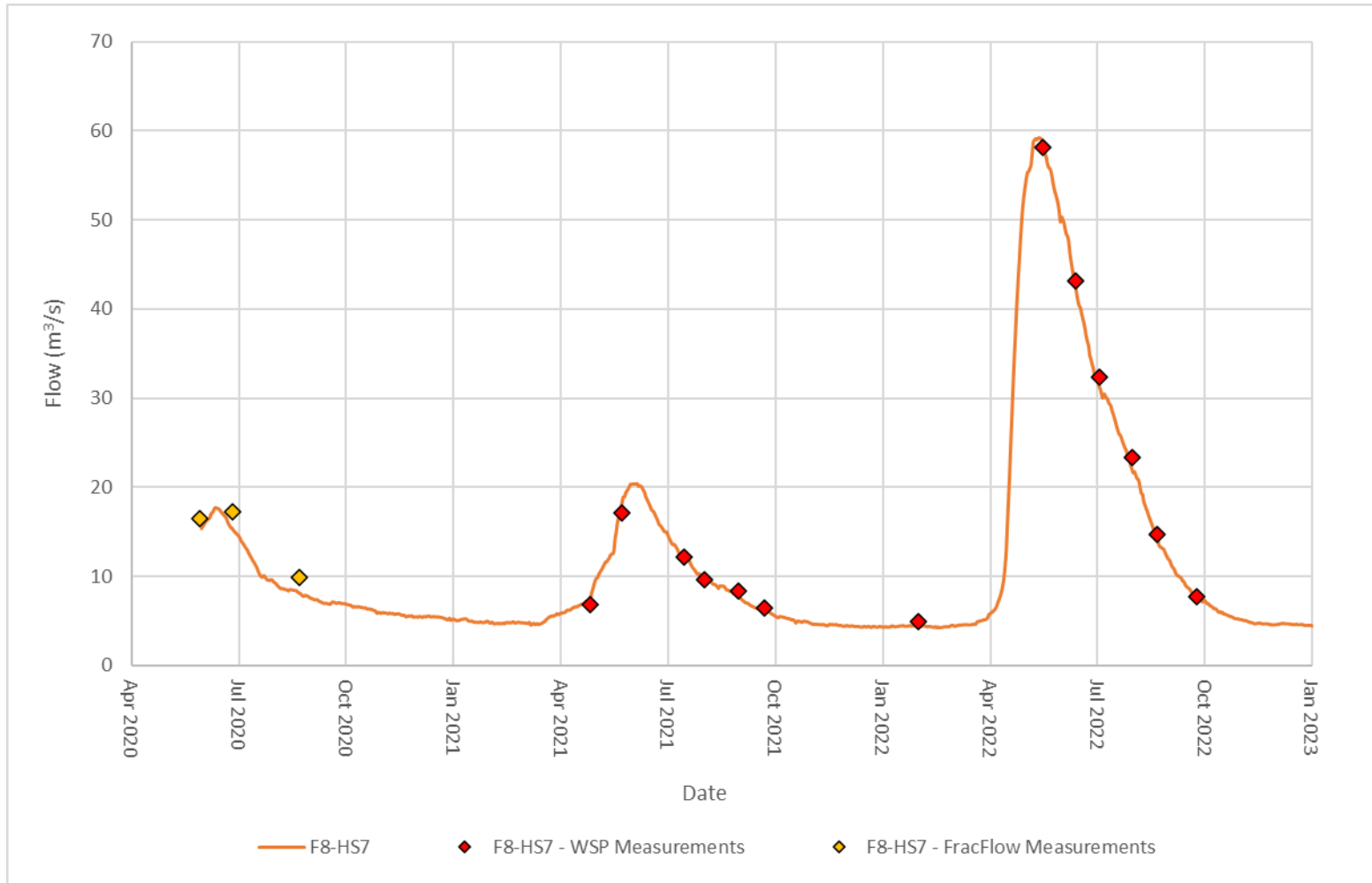


Figure 4-9: F8-HS7 (Springpole Lake Outflow) Hydrograph

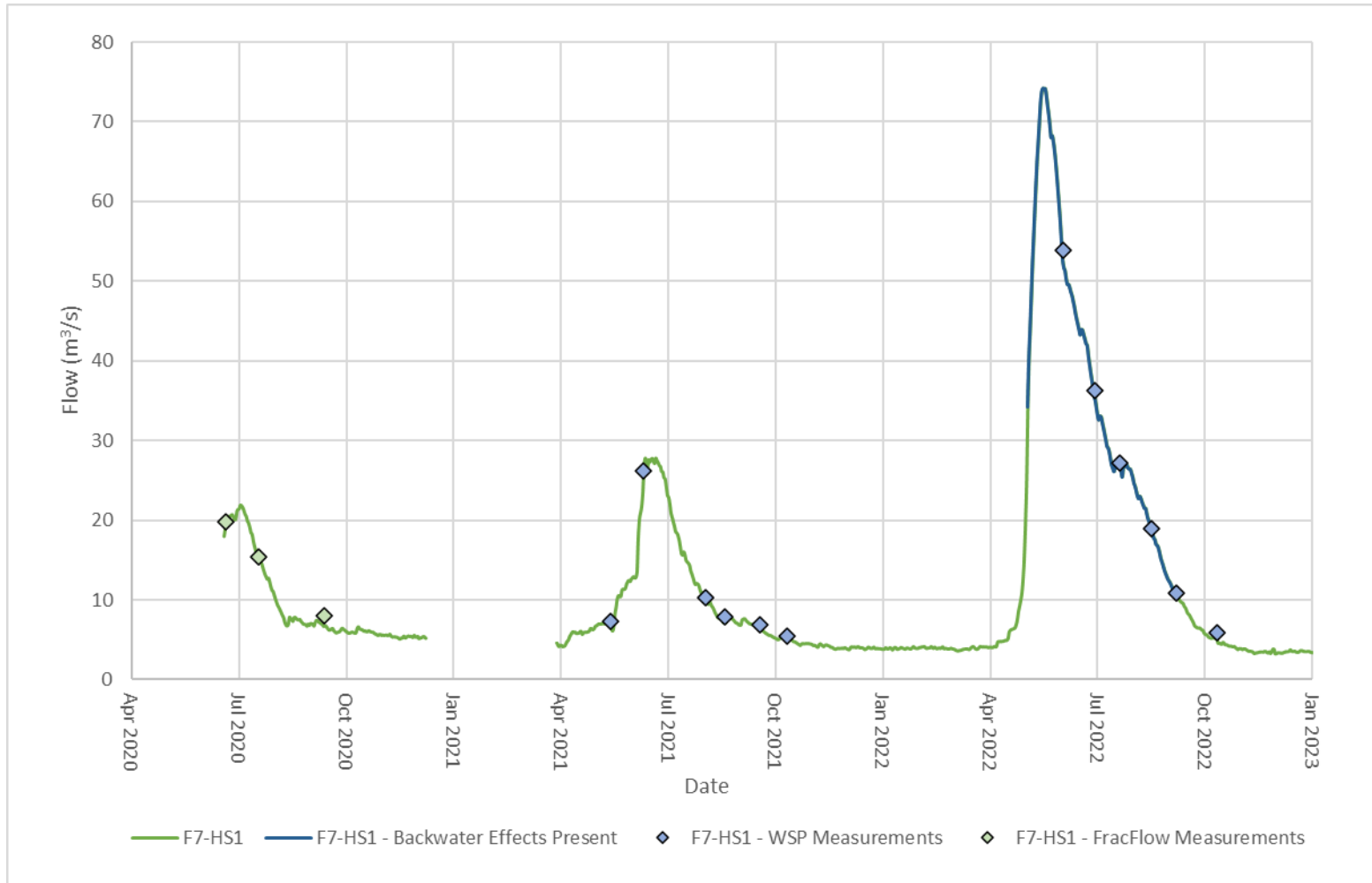


Figure 4-10: F7-HS1 (Springpole Lake Inflow) Hydrograph

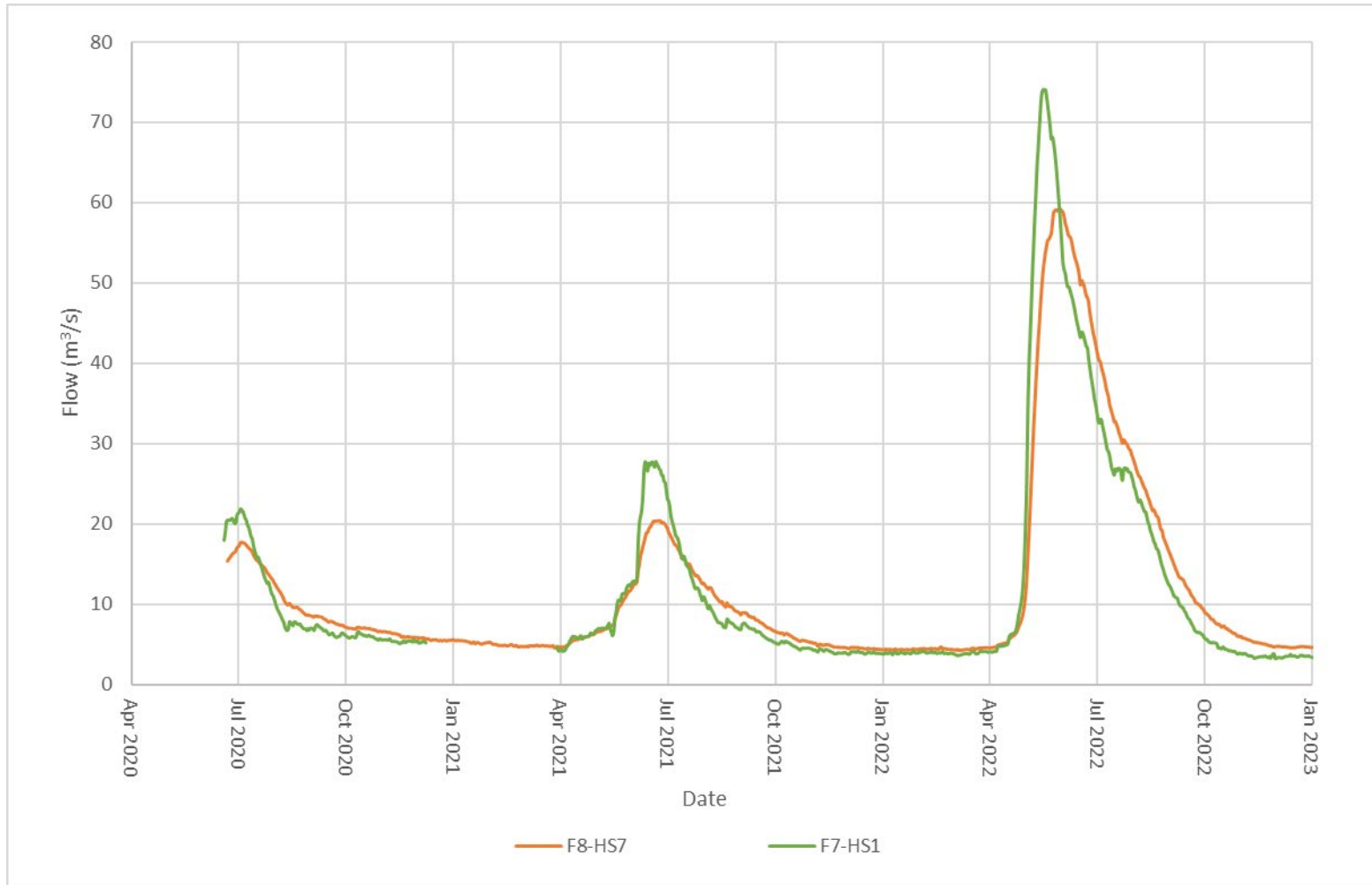


Figure 4-11: F8-HS7 (Springpole Lake Outflow) and F7-HS1 (Springpole Lake Inflow) Hydrographs

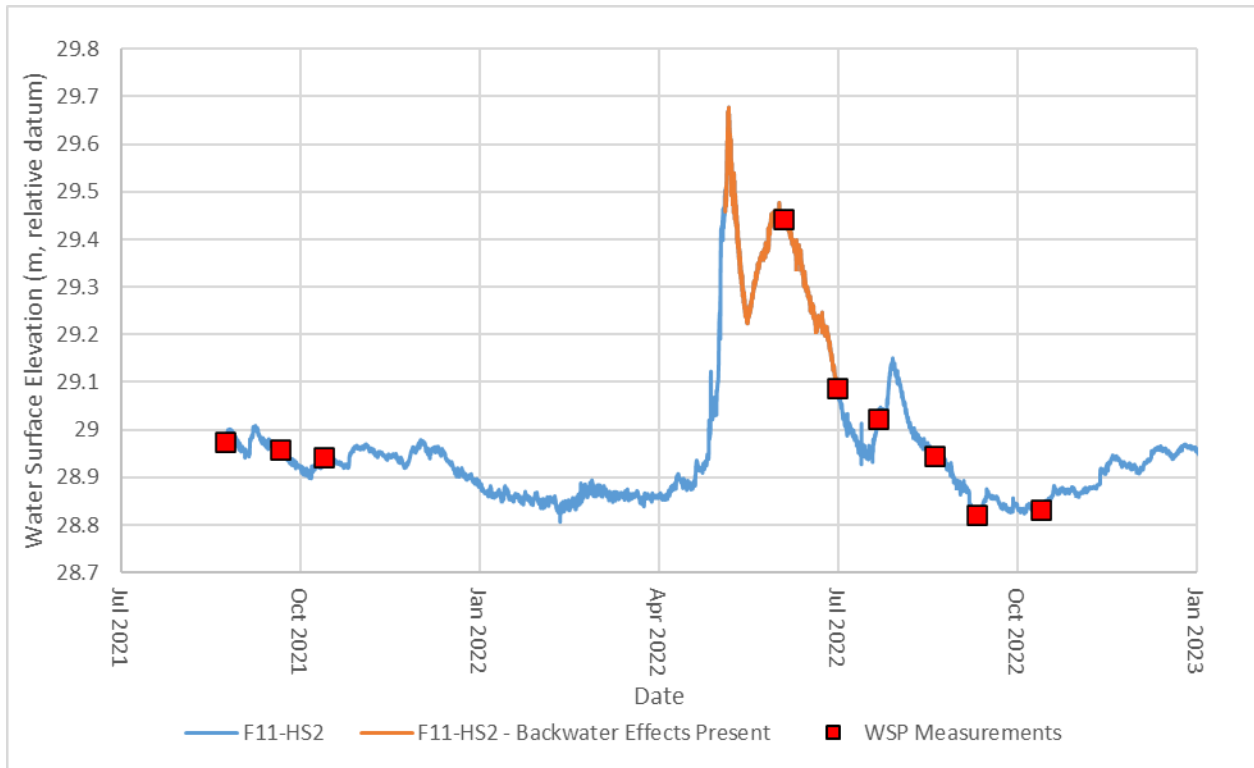


Figure 4-12: F11-HS2 Continuous Water Levels

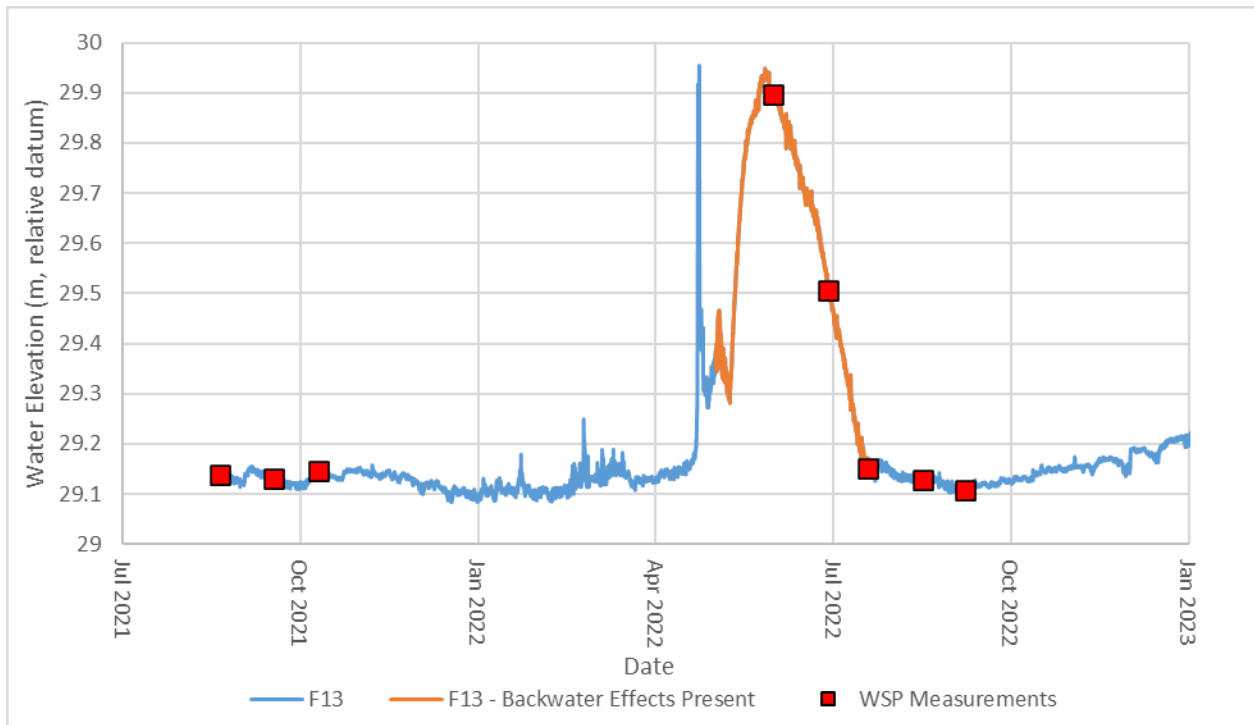


Figure 4-13: F13 Continuous Water Levels

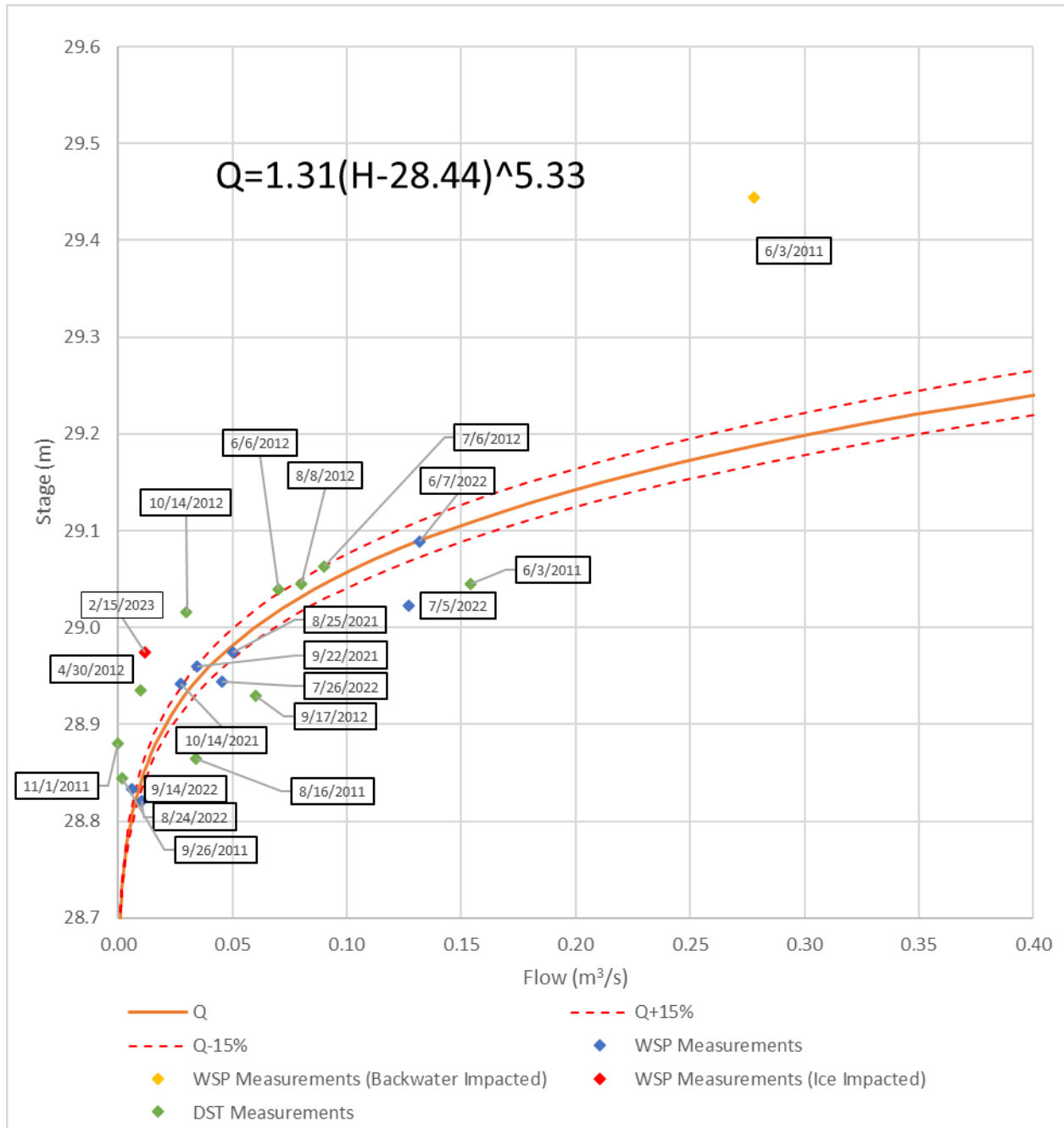


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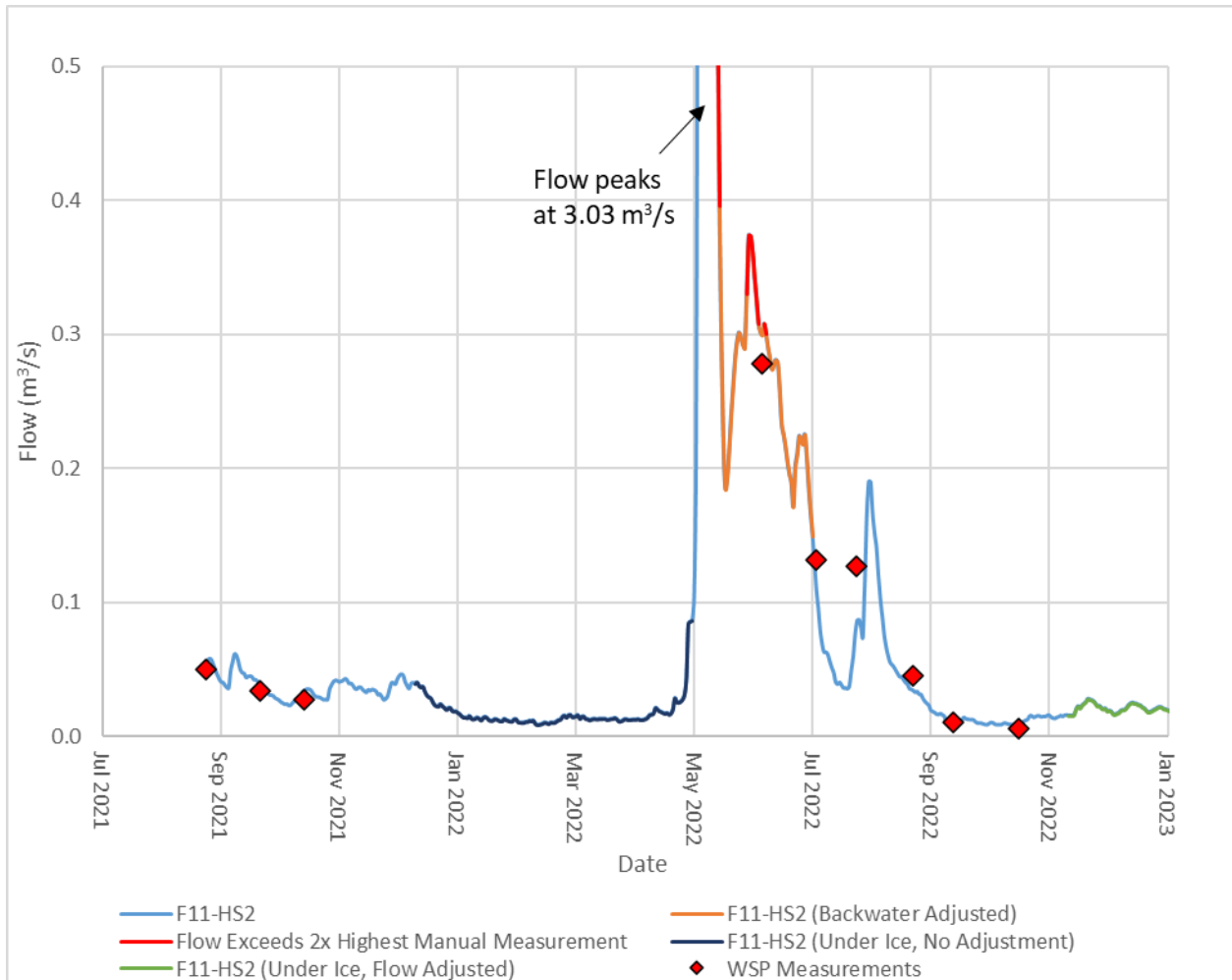


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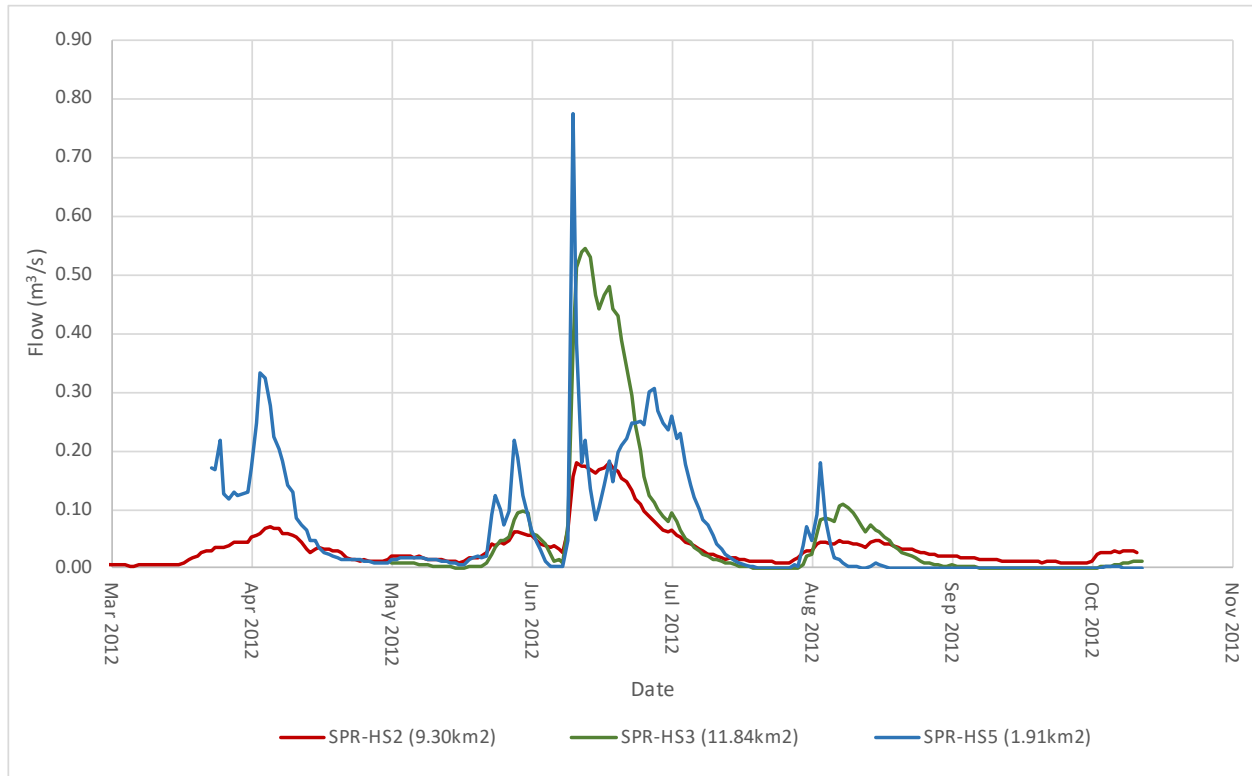


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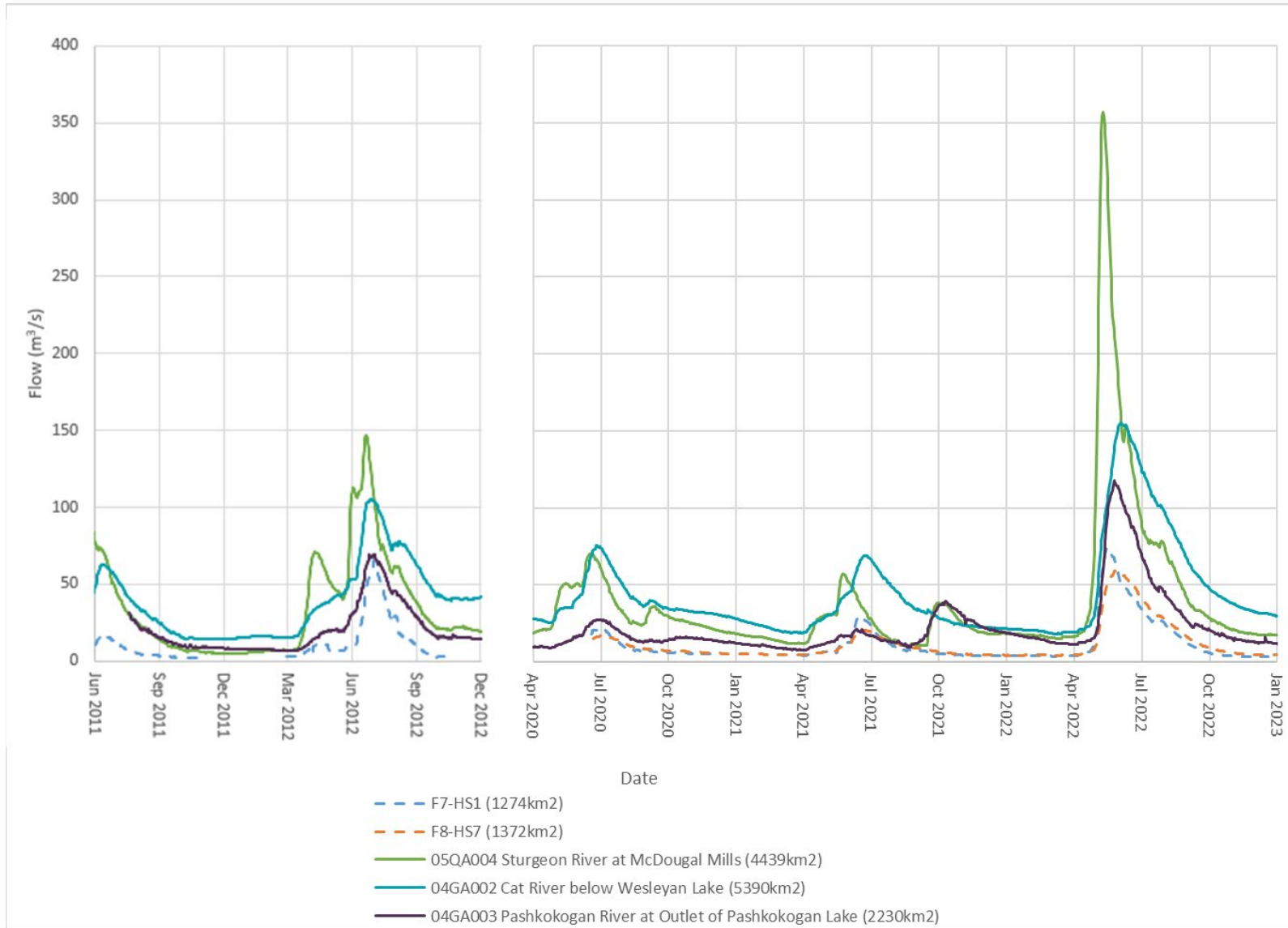


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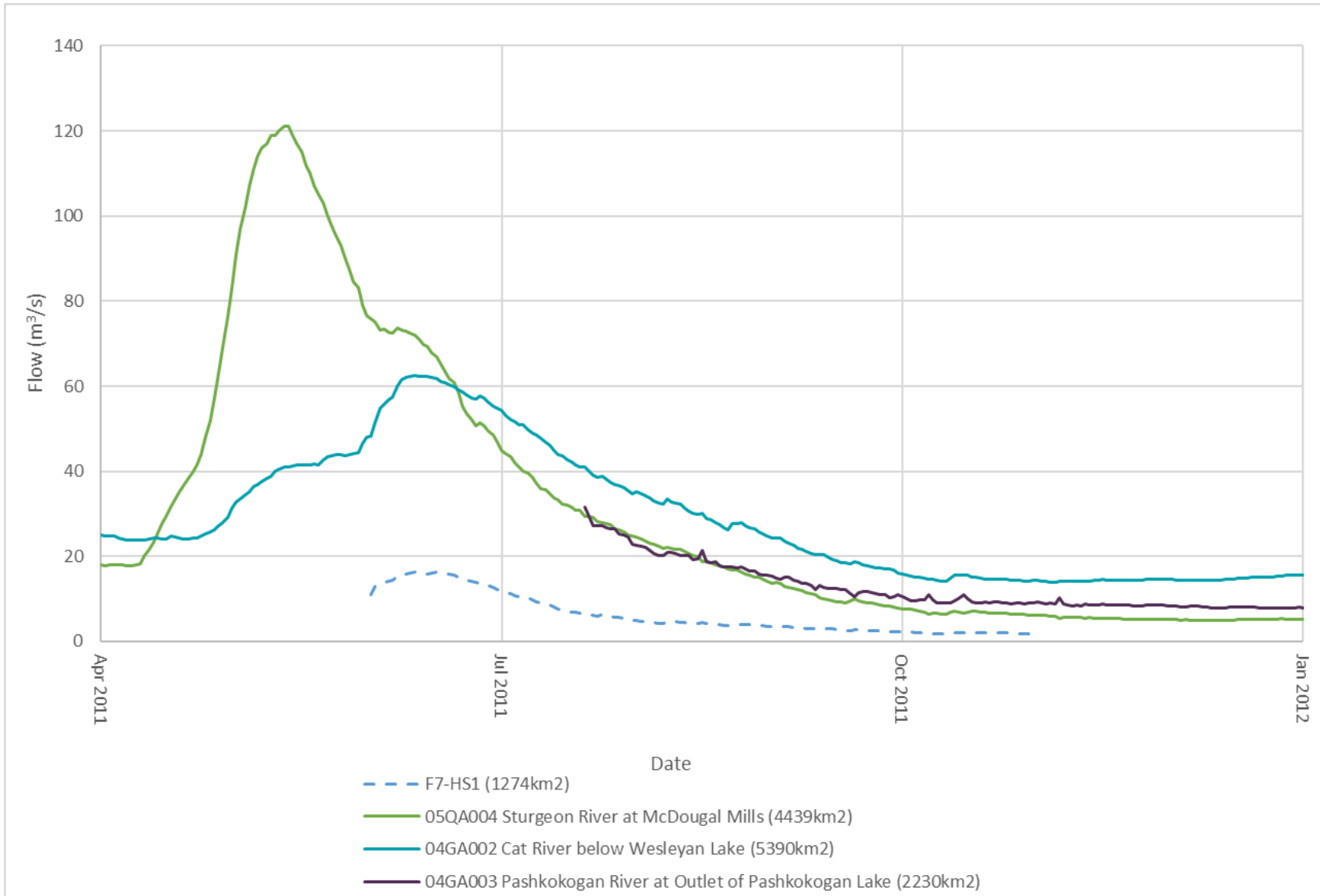


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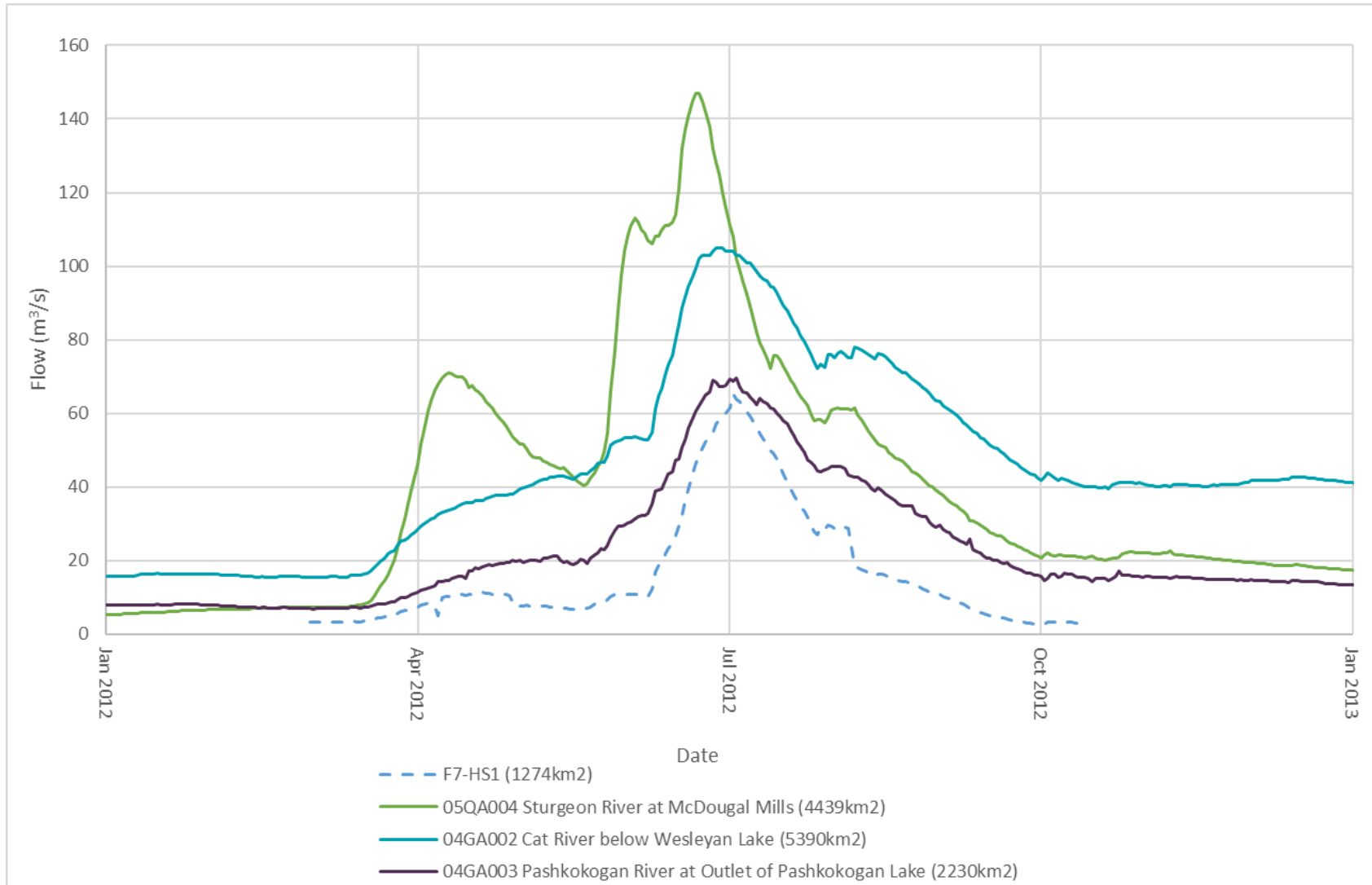


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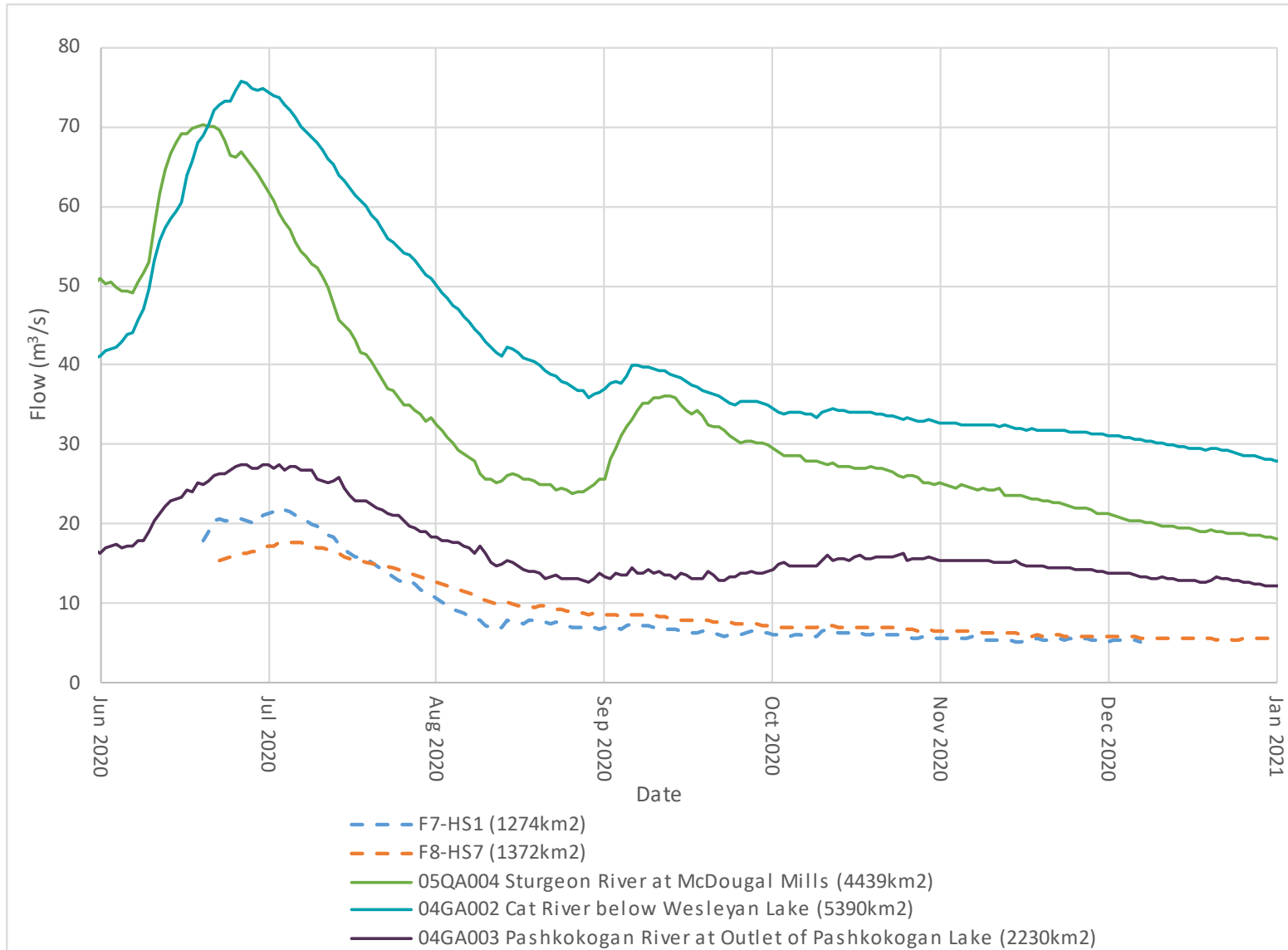


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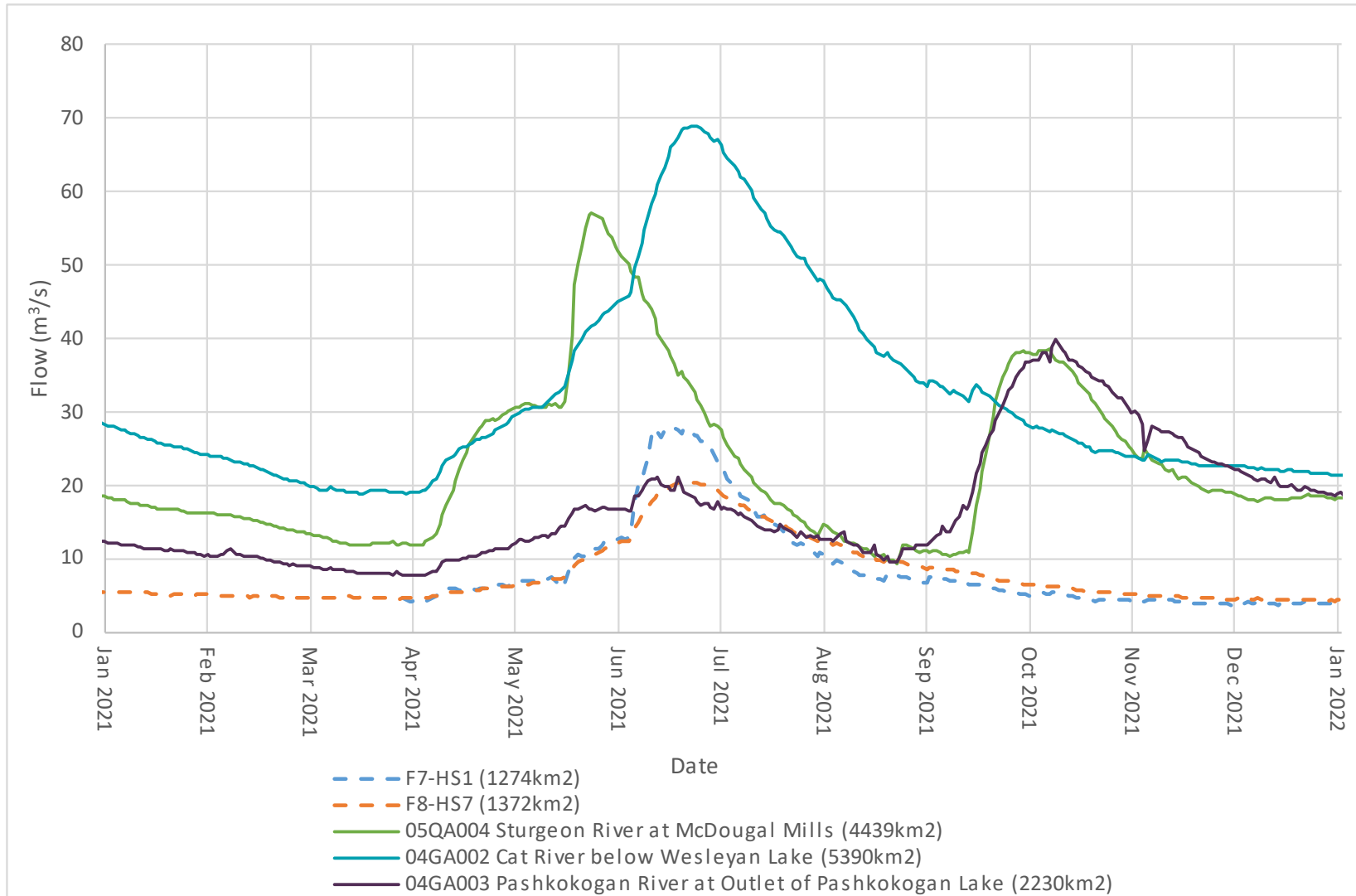


Figure 4-21: 2021 Springpole Lake Daily Average Flow Comparison

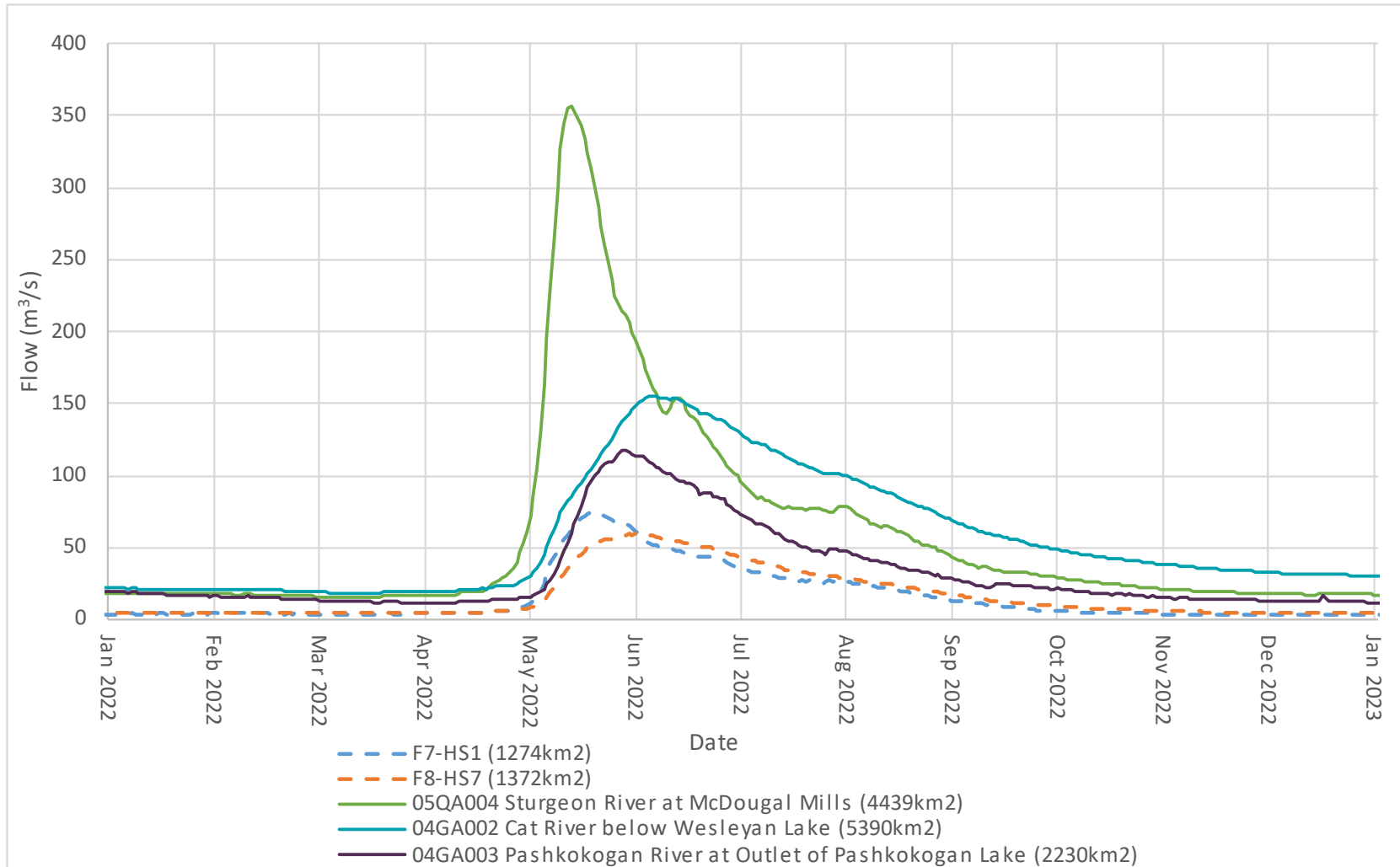


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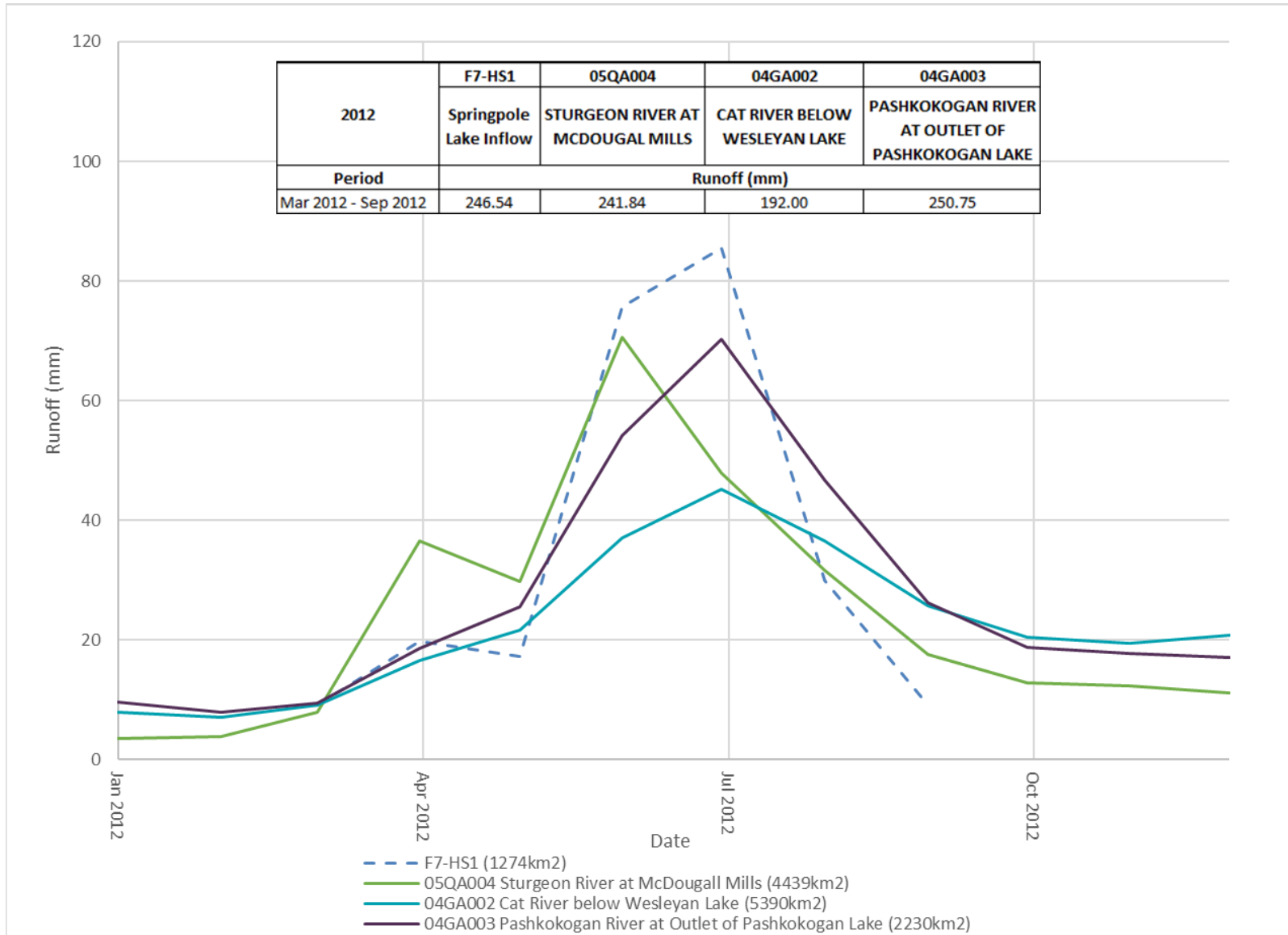


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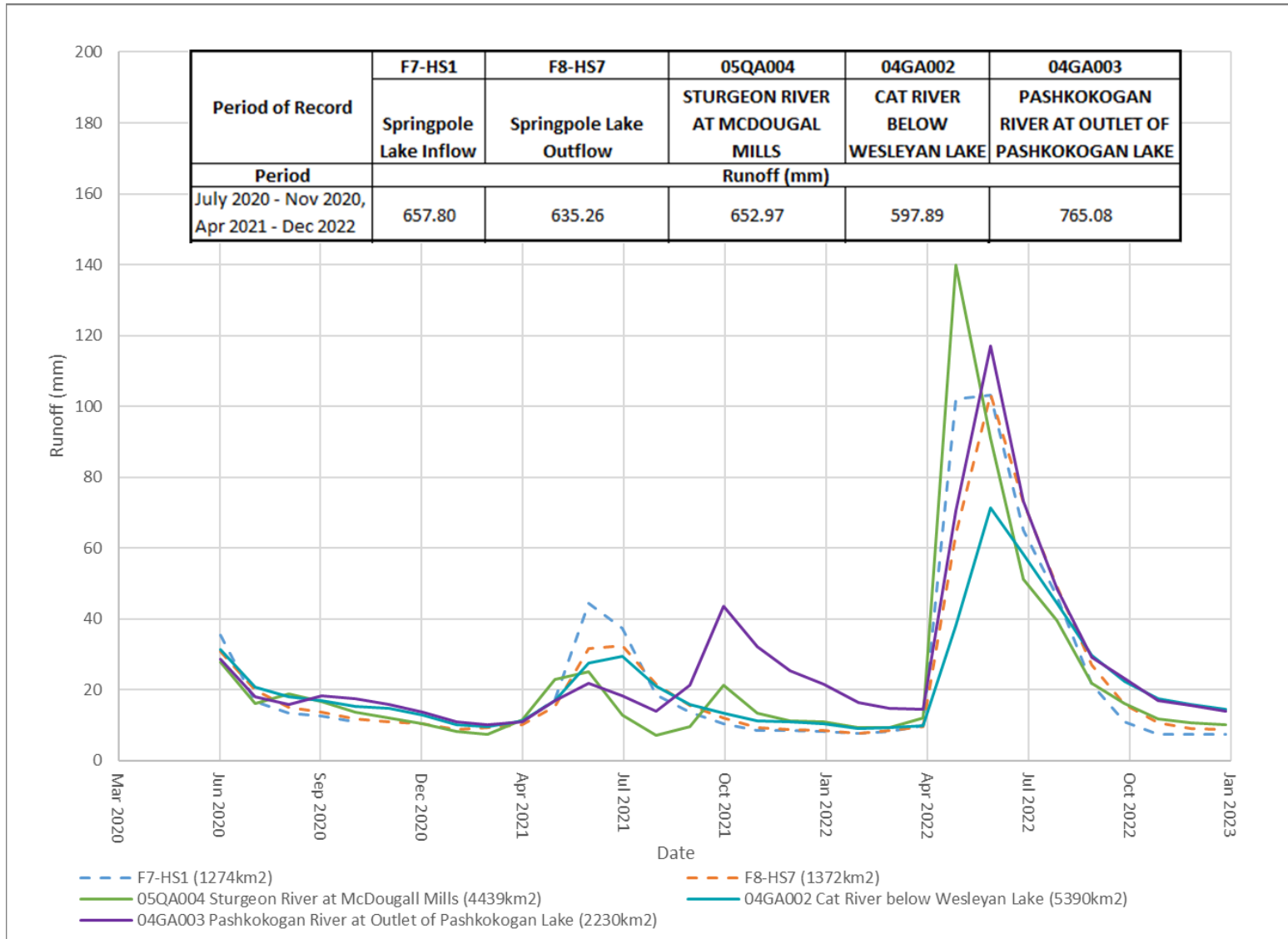


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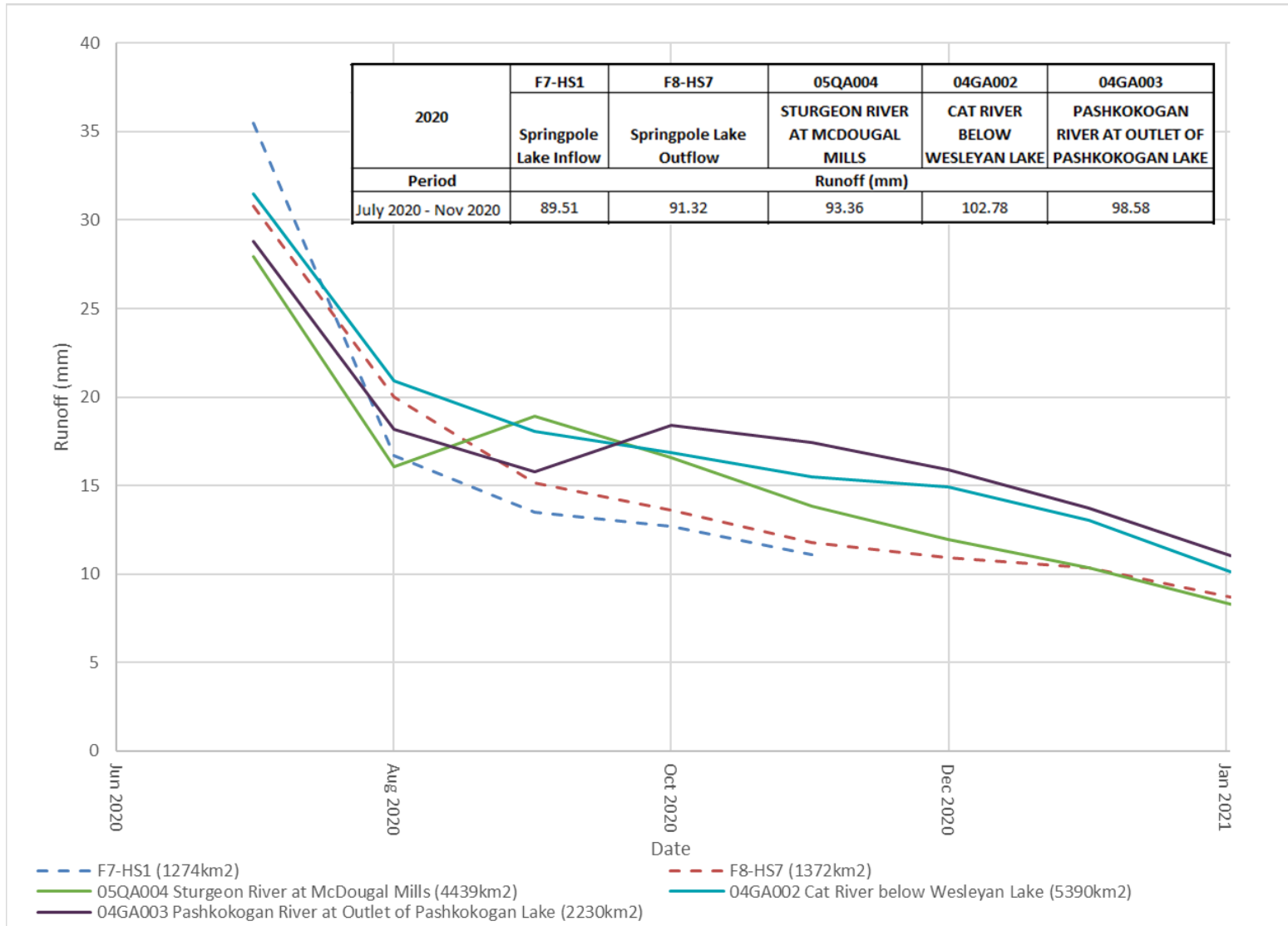


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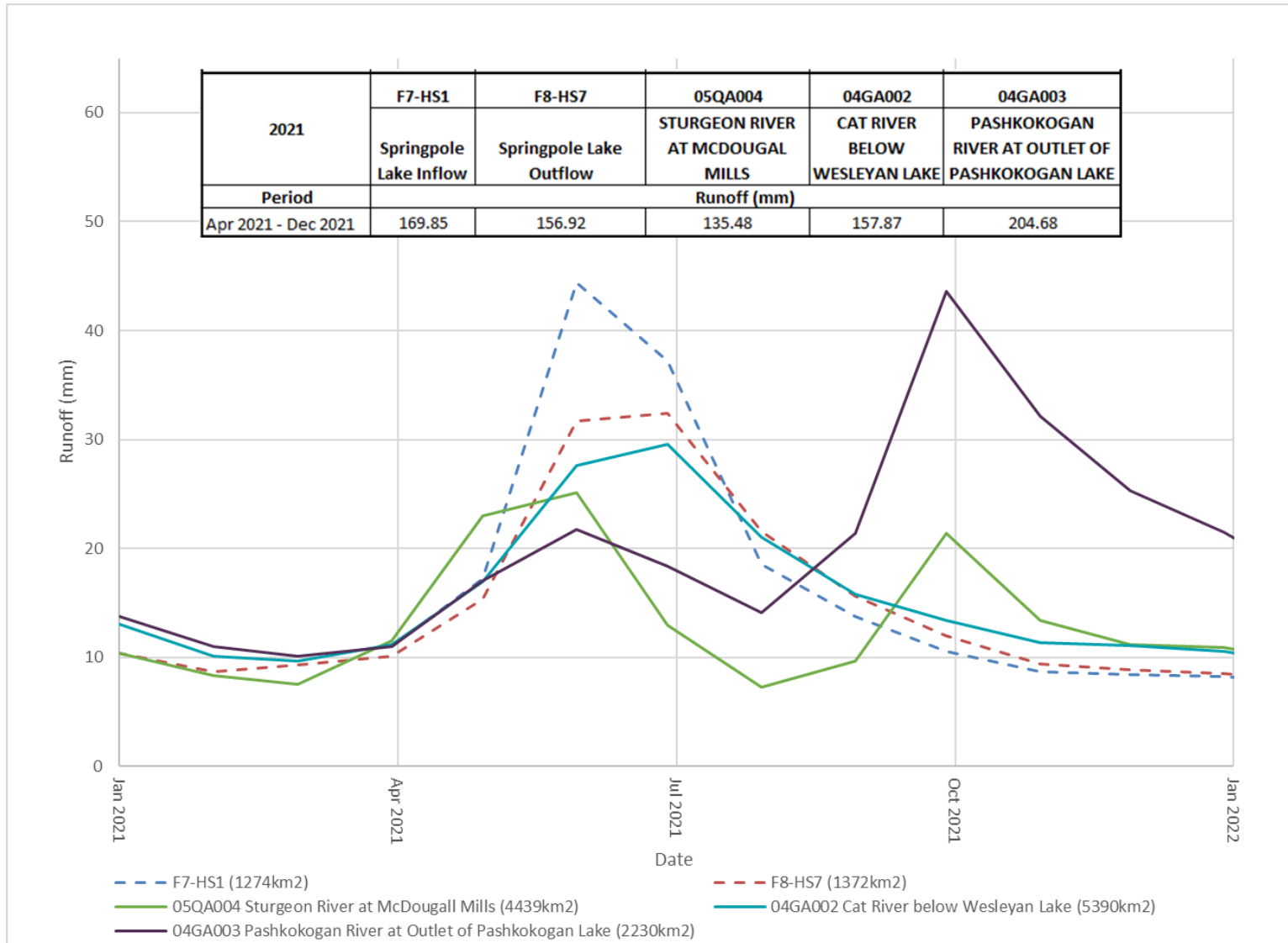


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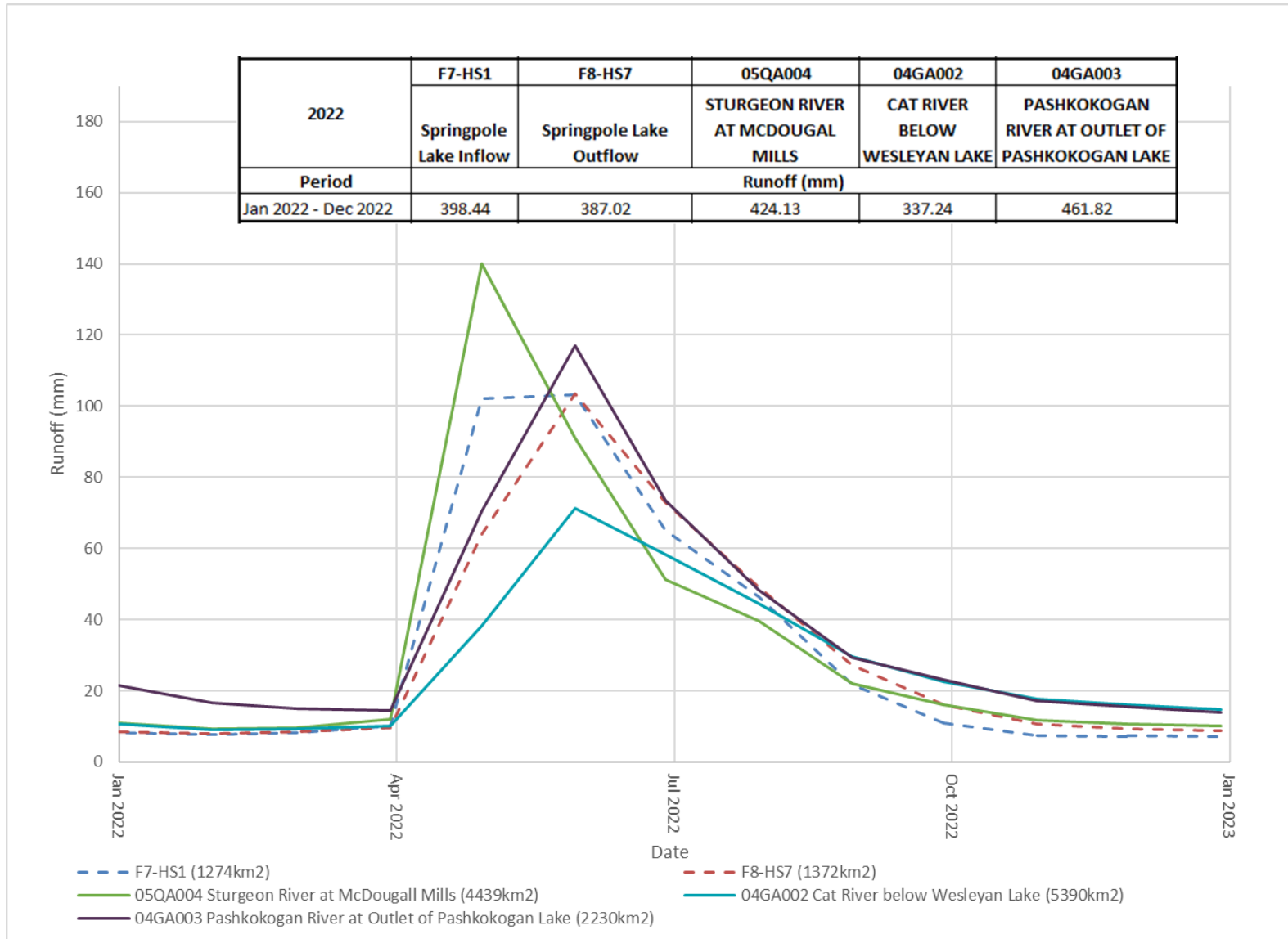


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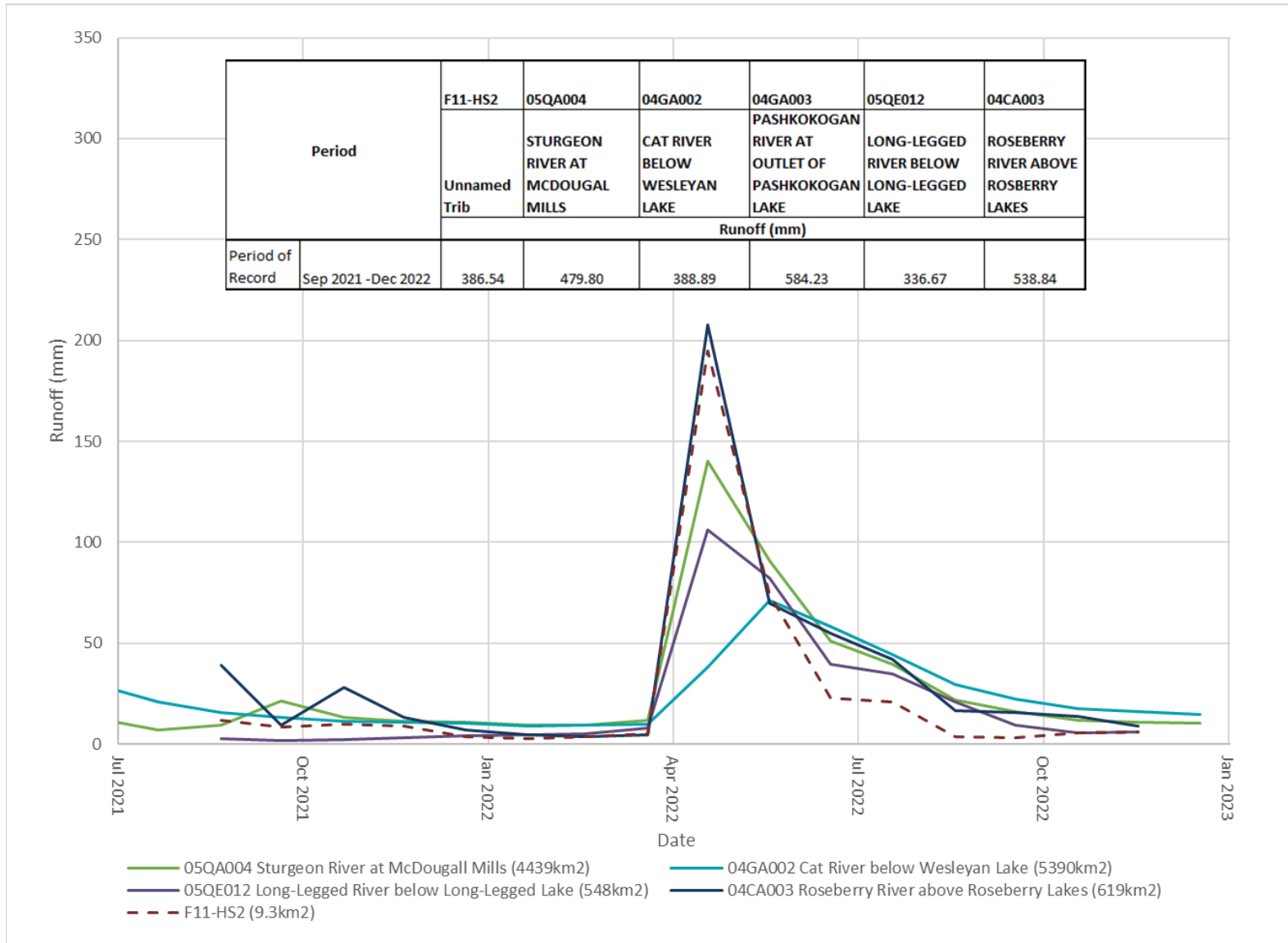


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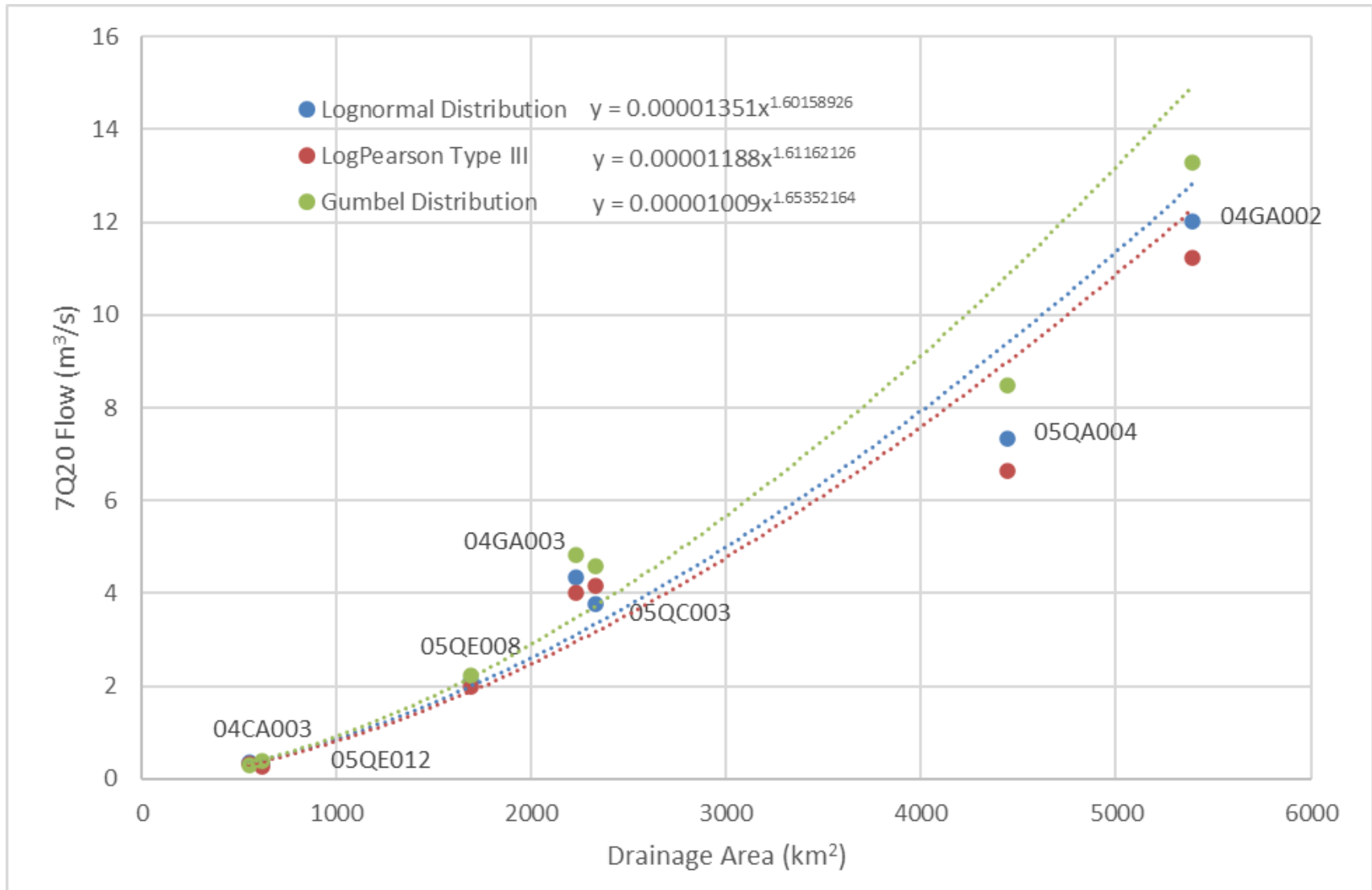


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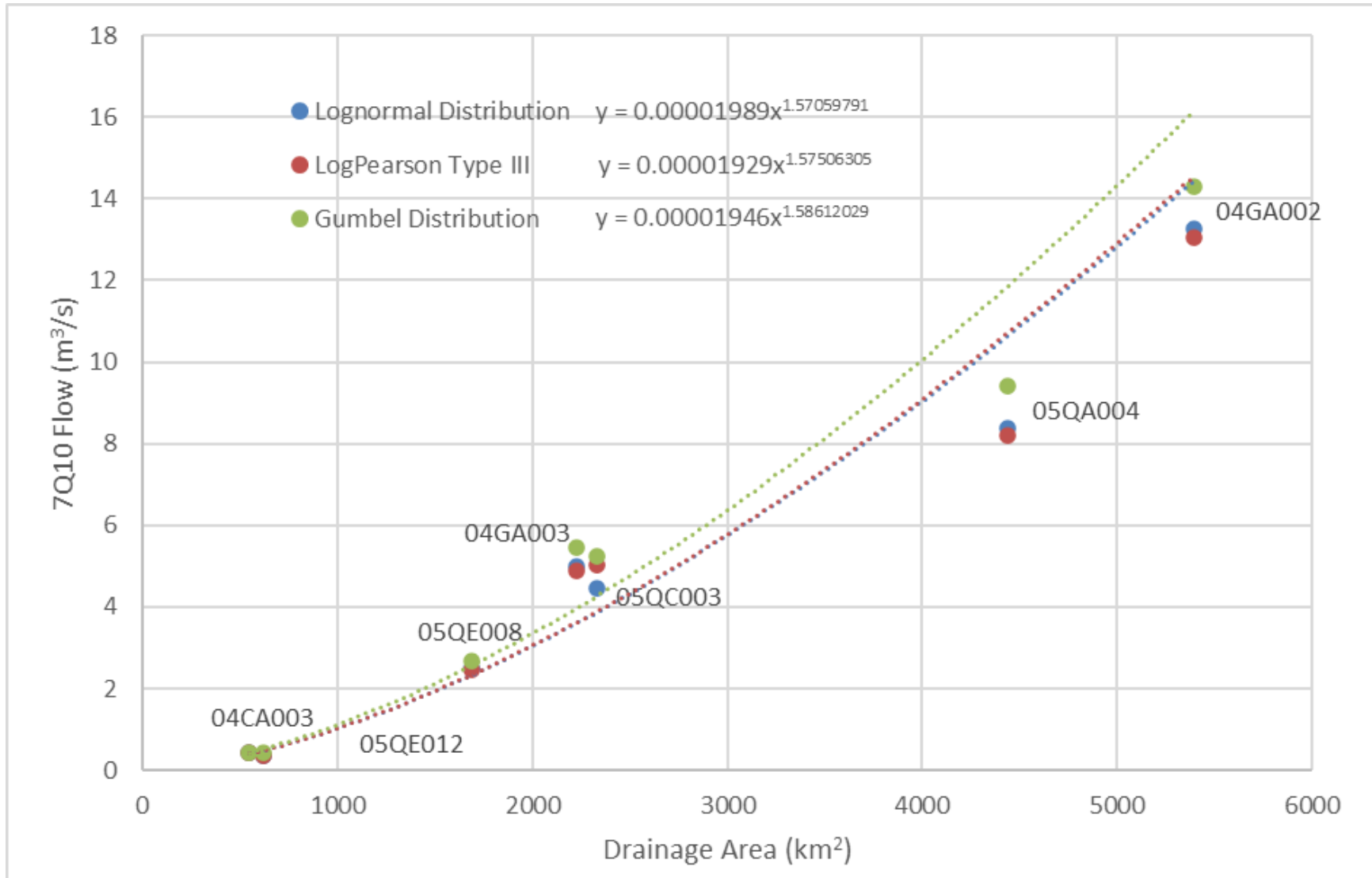


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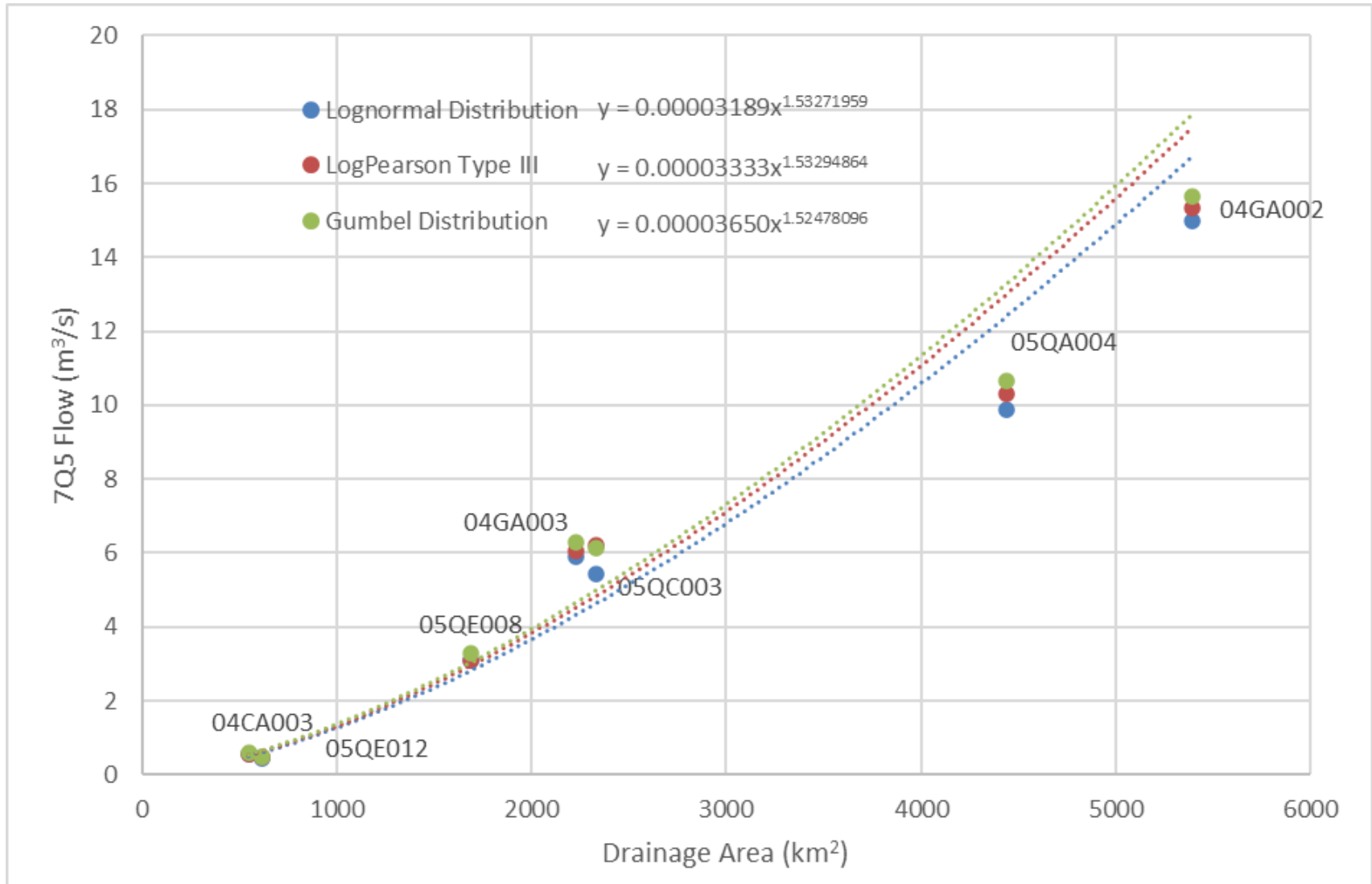


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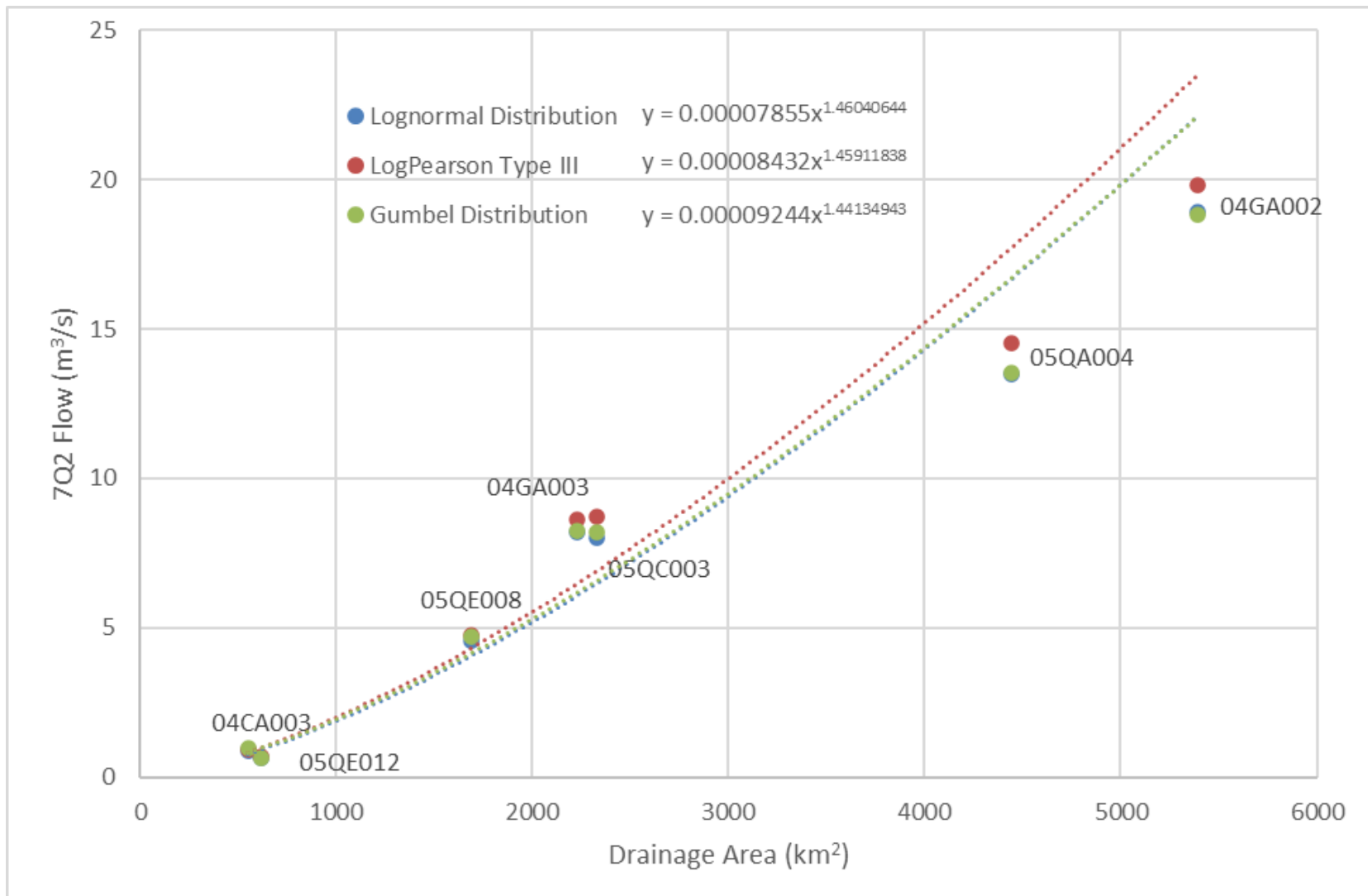


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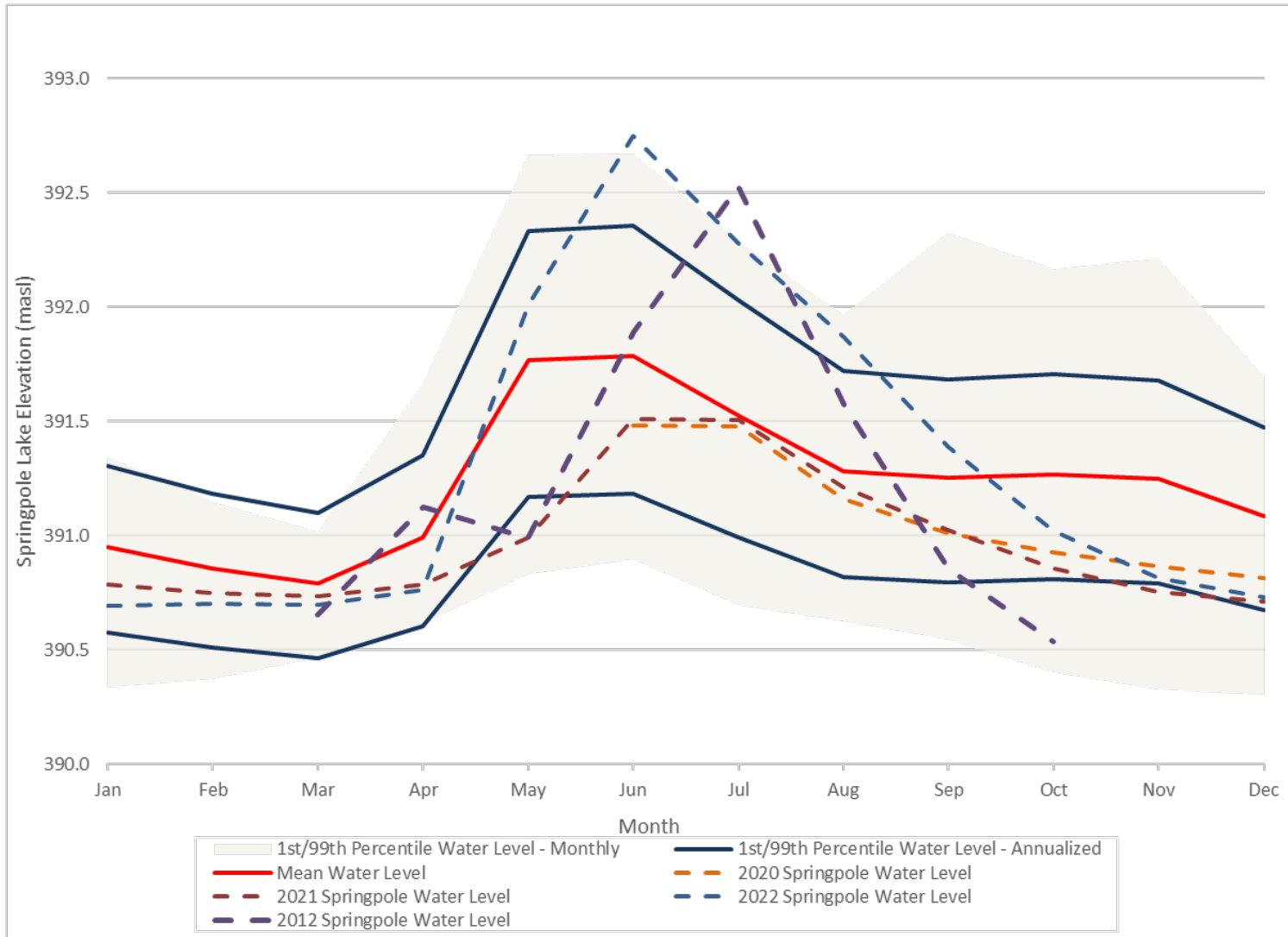


Figure 4-33: Springpole Lake Monthly Average Water Levels

*Mean and Extreme water levels calculated based on prorated flows from WSC station Sturgeon River at McDougall Mills, using the rating curve for station F8-HS7

5.0 SUMMARY AND CONCLUSIONS

Meteorological and hydrological data collection has generally taken place during three periods: 2011 to 2012, 2020 and 2021 to 2022.

Meteorological data collected from the Project site has been supplemented with regional ECCC data with longer records. Climate data collected at the Springpole site weather stations were compared to the data from the regional climate stations, and similar trends were observed in precipitation, temperature, and evaporation rates.

The results of this analysis indicated that ECCC Ear Falls and Red Lake stations were the most suitable reference stations for the Project site. Red Lake station was selected due its location and period of record.

Several hydrometric monitoring campaigns have included flow monitoring stations and lake level monitoring stations. In general, flow monitoring data from the smaller tributaries (less than 2 km²), show rapid responses to precipitation events, and produce zero flow during the late summer / fall periods. Slightly larger watersheds (2 to 10 km²) within the Project area, have observed flow throughout the year. The much larger Springpole Lake watershed (1,372 km²), has consistently shown the highest annual flow in the spring.

The current (ongoing) hydrometric monitoring program consists of four flow monitoring stations and six lake level monitoring stations. Flows measured at the outflow of Springpole Lake vary from 3.99 to 58.12 m³/s over the monitoring period. Rating curves and subsequent hydrographs were developed for Springpole Lake inflow and outflow stations.

Flows in Springpole Lake tend to peak in early June, and trend downward over the course of the summer and fall. Flows tend to reach a minimum and remain consistent from January to early April. In the spring of 2022, unusually high runoff caused by heavy snowfall in the winter of 2021 to 2022 combined with a late freshet caused extraordinarily high flows and water levels in Springpole Lake.

Based on a comparison of the hydrographs and monthly runoff yields against regional Water Survey of Canada stations, Sturgeon River at McDougall Mills was selected as the most representative of hydrological conditions within the Project area. Prorating based on drainage area from this station, the expected mean flow through Springpole Lake outflow is 12.2 m³/s, with an annual runoff of 280.1 mm.

Based on an analysis of WSC Sturgeon River at McDougall Mills historical data and the Springpole Lake outflow rating curve, the mean water level of Springpole Lake is approximately 391.28 masl. The 1st and 99th percentile mean water levels are 390.8 masl and 391.7 masl respectively.

A low flow analysis was conducted using multiple regional WSC stations. Based on this analysis, the expected 7Q20 low flow at Springpole Lake outflow is 1.35 m³/s.

Further monitoring of the meteorologic and hydrologic conditions within Springpole Lake and the Project area to support future permitting is planned to continue into 2023.

6.0 CLOSING

This 2022 Hydrology Baseline Report was prepared for First Mining Gold Corp. by WSP Canada Inc. The quality of information, conclusions and scheduling estimates contained herein is consistent with the level of effort involved in WSP's services and based on: i) information available at the time of preparation; ii) data supplied by outside sources; and iii) the assumptions, conditions and qualifications set forth in this report.

Should you have any questions, please do not hesitate to contact either Mark Ruthven 416-524-5928 or Mei Ling Tamkei 647-523-9932.

Regards,
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Attachment A Meteorology 2012 Baseline Study Report



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**SPRINGPOLE GOLD PROJECT
METEOROLOGY
2012 BASELINE STUDY REPORT**

Final Report

DST File No.: OE-KN-014468

Date: March 2013

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EXECUTIVE SUMMARY

Gold Canyon Resources Inc. (Gold Canyon) is a Canadian-based mineral exploration company. Gold Canyon holds a 100% interest in the Springpole Gold Project situated in the Red Lake Mining District of northwestern Ontario, approximately one hundred and ten kilometres northeast of the Town of Red Lake.

The Springpole Gold Project is expected to require the completion of federal and provincial environmental assessments and permits prior to development. To support ongoing drilling activities and project permitting, Gold Canyon retained DST Consulting Engineers Inc. (DST) in 2011, and again in 2012, to gather environmental baseline data for the submission of environmental reports. The Meteorology Baseline Study Report presents the 2012 meteorological baseline data in the context of local, regional, and global trends.

An on-site meteorological station was installed at the Springpole Gold Project site in September 2011. This station records hourly measurements of temperature, humidity, air pressure, wind speed and direction, precipitation and snow depth. Data collected from this station is supported by publicly available data from Environment Canada's Red Lake, Red Lake 'A' and Pickle Lake (AUT) automated weather stations to characterize regional climatic conditions.

The region of the Springpole Gold Project experiences a humid continental climate with cold winters and warm summers. In 2012, the minimum regional air temperature was $-35.6\text{ }^{\circ}\text{C}$ (January 18, 2012) and the maximum regional temperature was $34.8\text{ }^{\circ}\text{C}$ (July 11, 2012), recorded at Red Lake and at Springpole, respectively. The average regional temperature in 2012 was $2.4\text{ }^{\circ}\text{C}$, averaged between the Red Lake and Pickle Lake (AUT) stations. In general, 2012 regional temperatures were similar to those of the previous 6 years, but the annual temperature was about $1\text{ }^{\circ}\text{C}$ warmer than the long term climate normal (1971-2000).

The monthly atmospheric pressure data displayed no apparent seasonal variation or trends in 2012. The three stations do however follow the same pattern of fluctuation. There was identifiable variation in atmospheric pressure within the Project region due to differences in elevation of the three meteorological stations. Air pressure at Springpole is generally slightly lower than at Red Lake or Pickle Lake (AUT) due to the meteorological station being at a higher elevation.

Relative humidity data from the three meteorological stations displayed a moderately humid climate with seasonal variability for 2012. Average monthly humidity ranged from 55.8% in April (Red Lake) to 89.7% in October (Pickle Lake (AUT)). Seasonally, the region is less humid in the late spring through summer and more humid in the autumn and winter.

Total precipitation in 2012, including rain and snow, was 726.6 mm at Red Lake, 673.4 mm at Pickle Lake (AUT), and 476.8 mm at Springpole. Compared with the 6 previous years, 2012 saw average amounts of precipitation at both Red Lake and Pickle Lake (AUT) stations.

Compared to the long-term precipitation normal for 1971-2000, Red Lake recorded 94% of average precipitation, while Pickle Lake (AUT) recorded 114% of average precipitation.

The maximum snowpack depth reached was 64 cm at Springpole (March 7, 2012), 39 cm at Pickle Lake (AUT) (March 9, 2012), and 53 cm at Red Lake (March 8, 2012). Red Lake both started and finished 2012 with a shallower snowpack than observed at the other two stations. The Springpole station had the greatest quantity of accumulated snowfall throughout the year, including the deepest snowpacks to start and finish 2012, and the maximum snowpack depth reached.

The two predominant wind directions observed at Springpole were northwest, the direction of the majority of strong winds, and southeast, the direction of the majority of light air winds. At Pickle Lake (AUT), predominant wind directions included west to northwest and southwest to southeast. At Red Lake, predominant wind directions included west to southwest and southeast. For all three stations, the highest percentage of strong winds originated from the northwest to southwest. Winds were more evenly distributed at Pickle Lake (AUT) and Red Lake than Springpole. The highest wind speeds sustained over 1 hour were 9.0 m/s at Springpole, 13.3 m/s at Pickle Lake (AUT), and 12.5 m/s at Red Lake. The most frequent wind speed was light air (0.5-1.8 m/s) at Springpole (September to December) and gentle breeze (3.3-5.4 m/s) at Red Lake A and Pickle Lake (AUT).

Daily average insolation on a horizontal surface ranged from a high of 23.3 MJ/m²/d in July to a low of 2.7 MJ/m²/d in December (NASA, 2013). Solar radiation strongly correlates to the solar cycle. The highest levels occur in the Northern Hemisphere, in which the Springpole Gold Project is located, when inclined towards the Sun (summer months), and lowest levels when inclined away from the Sun (winter months).

It is recommended that on-site meteorological data continue to be collected through 2013.

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Appendix C: Springpole 2013 Meteorological Data

1. INTRODUCTION

1.1 Introduction

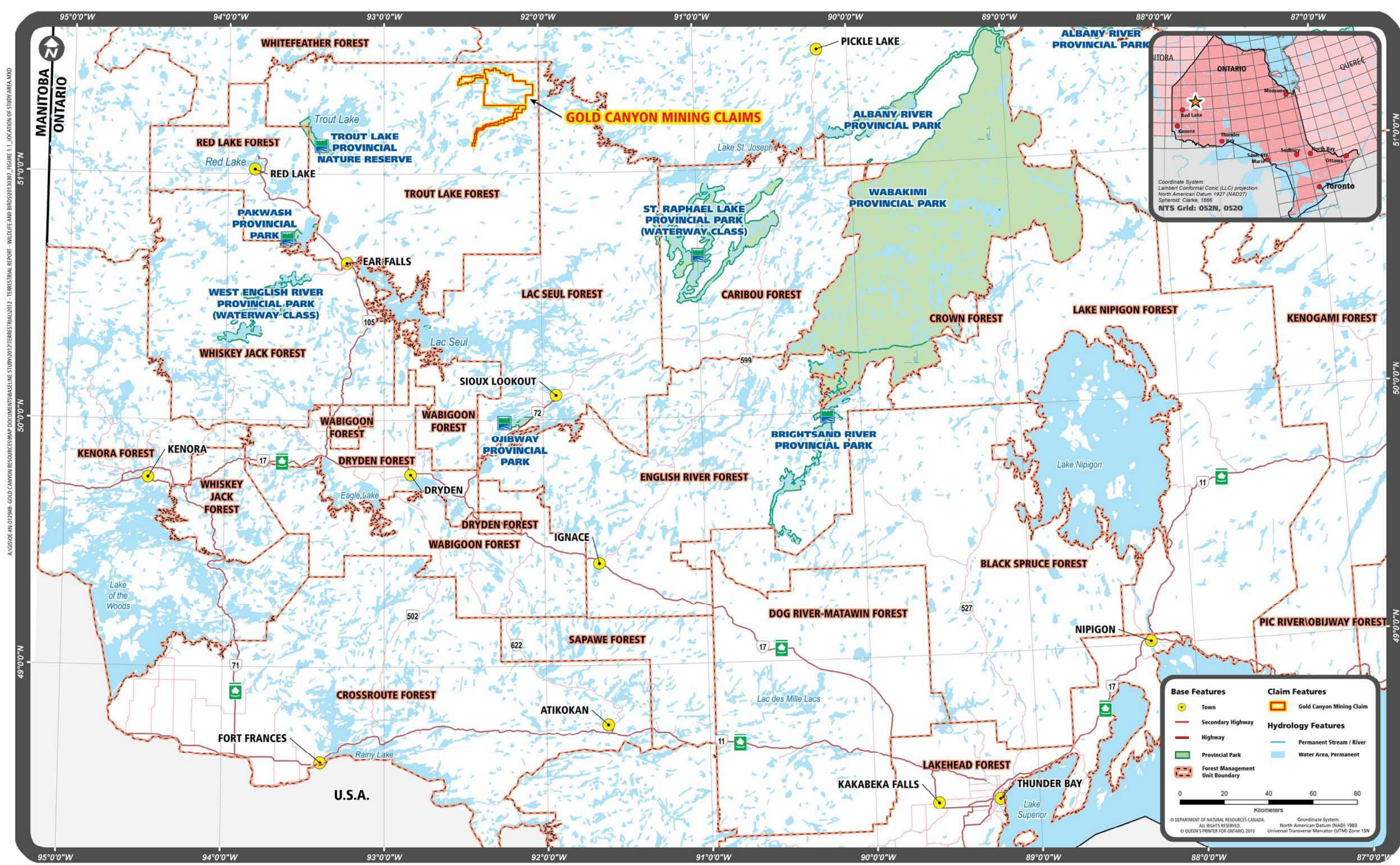
Gold Canyon Resources Inc. (Gold Canyon) is a growing mineral exploration company which holds a 100% interest in the large Springpole Gold Project (the Project), situated in the prolific Red Lake Mining District of northwestern Ontario (Figure 1.1). The Springpole property is comprised of mining patents as well as mining claims covering an area of approximately 32,375 hectares which extends from the north end of Springpole Lake and connects to the end of the current Wenasaga Road. The property has been explored intermittently for gold since the 1920s. Gold Canyon obtained the property in 1998 and has explored and expanded its land position since that time.

The Project is expected to require the completion of federal and provincial environmental assessments and permits prior to development. To support on-going drilling activities and project permitting, Gold Canyon retained DST Consulting Engineers Inc. (DST) to gather baseline data and submit annual environmental reports summarizing data collection efforts. DST has collected and reported on baseline data since 2011.

The 2012 Baseline Assessment Study includes the following components:

- Meteorology;
- Hydrology;
- Aquatics – Surface Water, Sediment Quality and Benthic Invertebrates Community;
- Fisheries;
- Terrestrial Wildlife, including Birds;
- Vegetation and Wetlands.

The following report presents the results of the 2012 Meteorology Baseline Study.



AUGISOE-NH-012948- GOLD CANYON RESOURCES MAP DOCUMENTS\BASELINE STUDY\2017\TERRESTRIAL\2017 - TERRESTRIAL REPORT - WILDLIFE AND BIRD\2017\30907_FIGURE 1.1_LOCATION OF STUDY AREA.MXD

Figure 1.1: Location of Study Area Springpole Gold Project

1.2 Objectives

The objective of the meteorology baseline study is to characterize the meteorology at the Springpole Gold Project area prior to potential site development. Specific objectives include:

- Collect and interpret on-site meteorological data in the context of local, regional and global weather for the following parameters:
 - Temperature;
 - Relative Humidity;
 - Atmospheric Pressure;
 - Precipitation;
 - Snow Depth;
 - Wind Speed and Direction; and
 - Solar Radiation.

2. METHODOLOGY

Meteorology baseline studies were conducted in 2011 and 2012 for the Springpole Gold Project in support of project planning, environmental assessment and permitting requirements. Meteorological data was collected for the project area using both publicly available data and the Springpole on-site automated meteorological station data. The following is a summary of the methods that were used for the baseline meteorology studies. The results from these studies are summarized in Chapter 3 of this report.

The meteorological baseline program for the Springpole Gold Project began in 2011 with the review of publicly available data for several automated weather stations operated by Environment Canada, including meteorological stations in Red Lake and Pickle Lake. In September 2011, an automated weather station was installed by DST at the Springpole Gold Project, and data has been recorded on a continuous basis since the installation was completed. Below is a description of the methods that were used for the 2012 meteorological baseline program.

2.1 Meteorological Data

The Springpole Gold Project meteorology baseline study was conducted to include and consider global climate and weather patterns, regional weather, and site-specific weather conditions.

Global weather data for 2012 was obtained from the United States Department of Commerce National Oceanic and Atmospheric Administration (NOAA) report from the National Climatic Data Center entitled State of the Climate: Global Analysis - Annual 2012 (available online at <http://www.ncdc.noaa.gov/sotc/global/2012/13>), and from the Environment Canada Climate Trends and Variations Bulletins (available online at <http://www.ec.gc.ca/adsc-cmda/default.asp?lang=En&n=4A21B114-1>). The information gathered from the above sources was used to provide a summary of the major global weather patterns that occurred in 2012 for comparison to regional and local weather trends for the same time period.

Regional meteorological data was collected from Environment Canada- Meteorological Services of Canada (MSC) meteorological stations within the region of the Project:

- Red Lake 'A', located at the Red Lake Regional Airport;
- Red Lake, also located at the Red Lake Regional Airport; and
- Pickle Lake (AUT), located at the Pickle Lake Airport.

In 2012, Environment Canada switched many of its existing meteorological stations over to NAV CANADA sensors and reporting tools. The Red Lake 'A' and Pickle Lake 'A' stations were decommissioned as a result of this switch. For ease of data accessibility and analysis, all 2012 Pickle Lake weather data used in this report was taken from the Pickle Lake (AUT) station. The

daily and hourly meteorological data for Red Lake was recorded at Red Lake 'A' until May 10, 2012, at which time data reporting switched to the Red Lake station. The two datasets were combined and are referred to as Red Lake in the report. When past years' data from Pickle Lake and Pickle Lake 'A' is used in this report, it is clearly identified.

On-site meteorological data was collected using the automated meteorological station installed in September 2011 by DST. Details of the installed station and types of data collected were described in the 2011 meteorological baseline report. This station, referred to as the Springpole station in this report, is located approximately 100 m northwest of the project camp. The metadata for the stations included in this study is summarized in Table 2.1 below and their locations are shown in Figure 2.1.

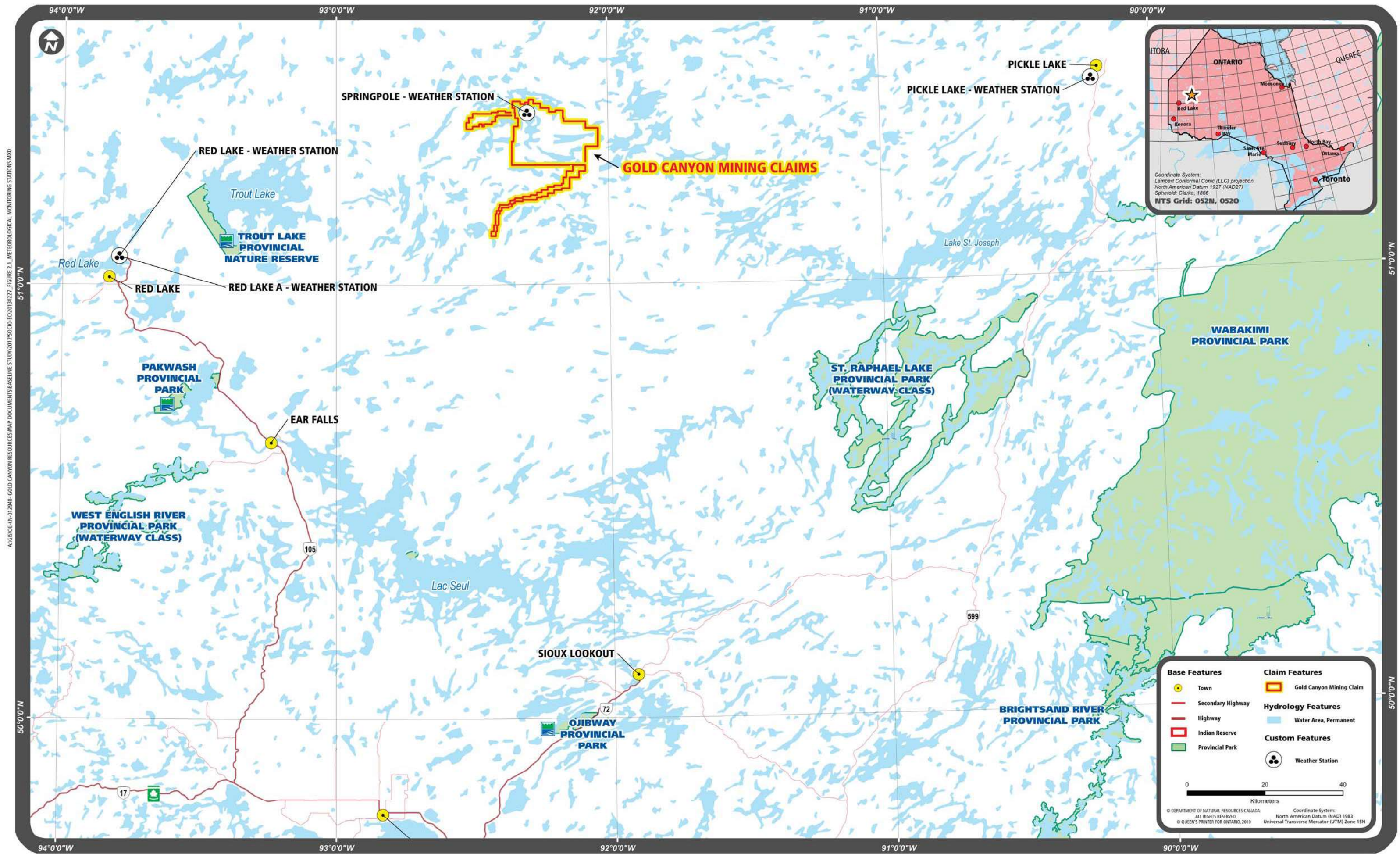
Table 2.1: Metadata for the Meteorological Stations included in 2012 Baseline Study

Station Name	Climate ID ¹	Latitude	Longitude	Elevation (masl) ²	Distance from Project Site (km)	Years of Available Data
SPRINGPOLE	N/A	51°23' 47.73" N	92°17' 50.75" W	409.1	0	2011-2012
RED LAKE 'A'	6016975	51°04' 01.000" N	93°47' 35.000" W	385.9	110.8	1953-2012
RED LAKE	6016970	51°04' 02.000" N	93°47' 35.007" W	385.9	110.8	2012
PICKLE LAKE (AUT)	6016525	51°26' 57.001" N	90°13' 04.007" W	390.8	144.5	1955-2012

Notes:

1 - Unique station identifier used by the MSC

2 - Metres above sea level



A:\GIS\OE-KN-014468-GIS\DOCUMENTS\BASELINE\STUMP\2017\50500-FC001\30272_FIGURE 2.1_METEOROLOGICAL MONITORING STATIONS.MXD

Figure 2.1: Meteorological Monitoring Stations
Springpole Gold Project

2.2 Data Analysis

Raw hourly data from the Springpole, Pickle Lake (AUT) and Red Lake meteorological stations were analysed to calculate daily, monthly and yearly summaries as appropriate. The 2012 raw data for the Springpole station is included in Appendix A.

Temperature analyses involved the calculation of the mean daily, mean daily maximum, and mean daily minimum temperatures for each month at all three stations. Mean relative humidity and mean atmospheric pressure were also calculated for each month at all three stations. Graphical depictions of these results are shown in Section 3. Graphs showing the standard deviation for the monthly mean air temperature, mean relative humidity, and mean air pressure for the Springpole site are provided in Appendix B. Atmospheric pressure data is recorded at Springpole in mBar units. The raw atmospheric pressure data is retained in mBar in Appendix A, but converted to the SI unit of kPa for discussion in this report. Total precipitation, including rain and snow, is presented for each month.

Snow depth data was processed to calculate actual snow depth at the Springpole site. The snow depth sensor uses an ultrasonic pulse to measure the distance between the instrument and the snow (or ground) surface. This information, calibrated to air temperature, is recorded by the datalogger. To translate the recorded measurement to actual snow depth, an adjustment value was used based on the sensor measurements of a snow-free ground surface. For the 2012 data, this value was observed to be 232 cm. The graphed adjusted data is included in the results of this report, and the raw data is included in Appendix A. Snow depth data from Pickle Lake (AUT) and Red Lake did not require processing.

Wind data was analysed using the WRPlotView computer software (Lakes Environmental Software, 2011, Version 7.0.0). To input the data into this program, wind speed was converted from m/s to knots and rounded to the nearest knot. The data was graphed using 36 wind direction groups and 6 wind classes. The wind classes were selected to represent equal wind speed ranges across the full range of data. All wind speeds less than 0.5 m/s (approximately 1 knot) were considered to be calm winds.

Wind speed data was also graphically analysed in its original units of m/s. For these graphs, wind speeds were classified according to the Beaufort Scale (Transport Canada, 2003) for comparative purposes only.

Solar radiation data is not available from any of the three meteorological stations. Data for daily average insolation on a horizontal surface was obtained for the area of the Panoramic TBN site from NASA's Climatology Resource for Agroclimatology Daily Averaged Data (NASA, 2012). This database provides solar radiation and surface meteorological data collected by NASA satellites for areas of 1° latitude by 1° longitude covering the surface of the Earth. The data used in this report is for the 1° region with a lower left corner of 48° North and 89° West, which includes the Springpole site location.

3. RESULTS

3.1 Regional Climate

The climate in Northern Ontario is primarily continental, with generally cold winters and mild summers. The largest proportion of precipitation falls in the form of summer showers and thunderstorms, although winter snowfall amounts can be substantial (Bryson, 1974). Precipitation amounts in Northern Ontario decrease as one moves from southeast to northwest, a reflection of the decreasing influence of moisture transported from the Great Lakes and the Gulf of Mexico.

The region is dominated by three major air mass groups – arctic air masses that bring cold and relatively dry air from the north, temperate air masses from the Pacific, and with a smaller influence, tropical air masses that bring warm moist air from the south.

The local Springpole Gold Project area topography is generally “rugged”. The area has a general elevation ranging from 350 to 450 masl and possesses few barriers to oncoming weather systems. The Springpole Gold Project area is approximately 400 km inland from Lake Superior. Due to this distance, the influence of Lake Superior’s moderating effect that results in cooler summer temperatures and warmer winter temperatures for an area along the lakeshore extending inland is expected to be minimal (Phillips, 1978). Hudson Bay, located 600 km to the north may also cause some of the continental characteristics to change, but the general pattern will remain (Bryson, 1974).

3.2 2012 Global Weather

The NOAA Global Analysis for 2012 (NOAA, 2012) provides the following information on the 2012 global trends:

- A weak-to-moderate La Niña (the relatively cool water phase of the equatorial Pacific Ocean, which tends to force lower than normal atmospheric pressure over western and northern Canada) was present during the first three months of 2012. Neutral sea surface temperature and atmospheric pressure conditions began in the spring and remained for the rest of the year. The combination of La Niña and neutral sea surface conditions resulted in higher than normal temperatures across northern Ontario for most of 2012.
- The 2012 global average land surface temperature was 9.4°C and ranked as the 7th warmest on record (since 1880). The 2012 global average ocean temperature was 16.55°C and ranked as the 10th warmest on record. The 2012 global average combined land and ocean temperature was 14.47°C and ranked as the 10th warmest on record.
- 2012 was the 36th consecutive year since 1976 that the yearly global temperature was above average. The warmest year on record was 2010, which was 0.66°C above average. All 12 years in the 21st century (2000-2012) rank among the 14 warmest since records began in 1880.

- The 2012 global precipitation was near average on balance across the globe. This followed the two wettest years on record in 2010 and 2011.

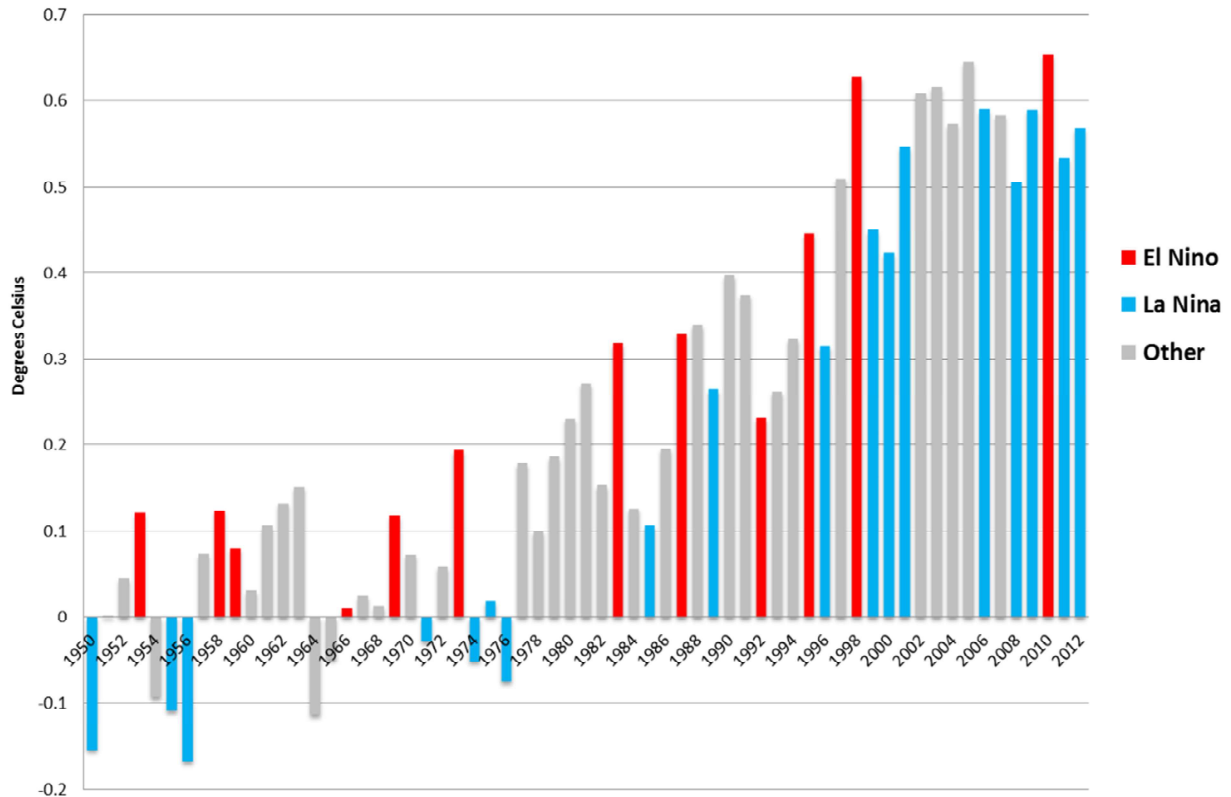


Figure 3.1: 1950-2012 Annual Global Temperature Anomalies, in °C, from the 20th Century Average. Years influenced by El Niño or El Niña are labelled (NOAA, 2012).

3.3 2012 Regional Weather

Temperature anomalies were above average for most of Canada, including northwestern Ontario, for 2012 (Figure 3.2). Overall, winter temperatures were the 3rd warmest across the country since national records began in 1948 with an average temperature of 3.6°C above average (NOAA, 2012). The summer of 2012 was Canada’s warmest since 1948 with temperatures 1.9°C above average across the country (NOAA, 2012). Overall, the January–November period for 2012 was the 4th warmest since recording began in 1948 (NOAA, 2012). Figure 3.2 indicates that temperatures in the northwestern Ontario region were approximately 2.0°C above average for 2012.

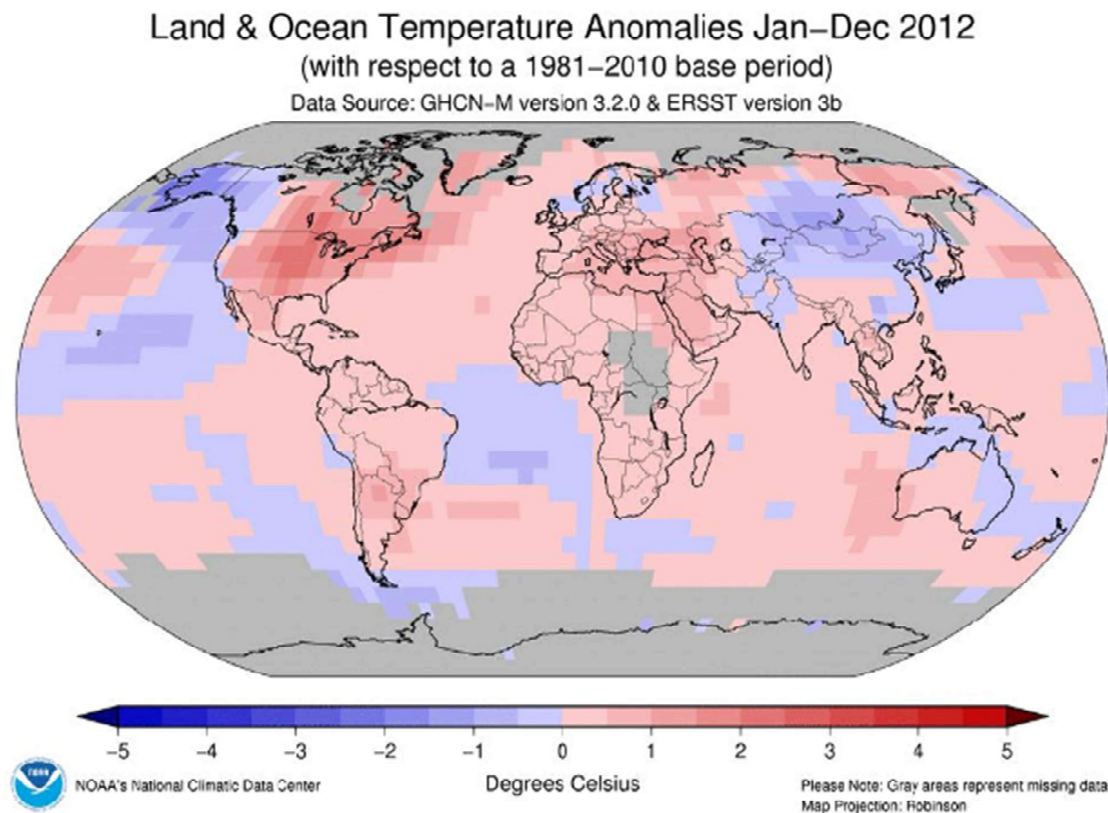


Figure 3.2: Land & Ocean Temperature Anomalies for 2012 in Reference to a 1981-2010 Base Period (NOAA, 2012).

Precipitation anomalies were variable across Canada and throughout the year. Overall, the 2011/ 2012 winter was the 2nd driest since 1948 with precipitation 18% below the 1961-1990 normal (Winter Summary 2011/2012, Environment Canada, 2012). Precipitation across Canada for the remainder of 2012 was near normal.

For the Thunder Bay region, varying trends were observed. Precipitation from December 2011-February 2012 was 10-20% below normal. The Thunder Bay region had a wetter spring than Canada as a whole owing to a significant rainfall event in the region at the end of May 2012; departures above normal were about 40-50% for the region. Precipitation departures during the summer months ranged from 10-20% below normal, indicating that the summer months were drier than the national trend. Departures from normal in the autumn months ranged from 10%-20% below normal. This is greater than the national average of 2% below normal.

The main significant weather event in the Thunder Bay region in 2012 was an extreme rainfall event at the end of May. Upwards of 120 mm of rain fell on the region during the two day storm

period (The year of the urban flood, Environment Canada, 2012). Total rainfall in May was 206 mm, which was 310% above normal for the month.

3.4 2011 Local Weather

Data recorded at the Springpole Gold Project on-site meteorological station is discussed below with the data from the Red Lake and Pickle Lake (AUT) stations operated by Environment Canada. Processed data from the on-site meteorological station is included in Appendix A, and in the form of graphs in Appendix B.

3.4.1 Air Temperature

Air temperatures in the Springpole study area ranged from a minimum of $-35.6\text{ }^{\circ}\text{C}$ on January 18, 2012 to a maximum of $34.8\text{ }^{\circ}\text{C}$ on July 11, 2012. The minimum temperature was recorded at the Red Lake station, while the maximum temperature was recorded at the Springpole station.

Overall in 2012, the coldest month in the region was December with mean daily minimum and maximum temperatures of $-19.6\text{ }^{\circ}\text{C}$ and $-11.3\text{ }^{\circ}\text{C}$ respectively (Figures 3.3 and 3.4). The warmest month was July with mean daily minimum and maximum temperatures of $14.6\text{ }^{\circ}\text{C}$ and $27.6\text{ }^{\circ}\text{C}$ respectively. That July is the warmest month is typical in comparison with long-term trends in the region. December as the coldest month represents a departure from 2011 where January was the coldest month.

There is little variability between the three stations in terms of minimum and maximum daily temperatures. Springpole mean daily minimum temperatures are slightly warmer than those observed at Pickle Lake (AUT) and Red Lake. Maximum daily temperatures for the three stations appear similar across the year.

As shown in Figure 3.5, mean monthly temperatures ranged from a minimum of $-15.4\text{ }^{\circ}\text{C}$ in December to a maximum of $21.0\text{ }^{\circ}\text{C}$ in July. Overall, Springpole appears to have very similar temperatures to those recorded at Red Lake and Pickle Lake.

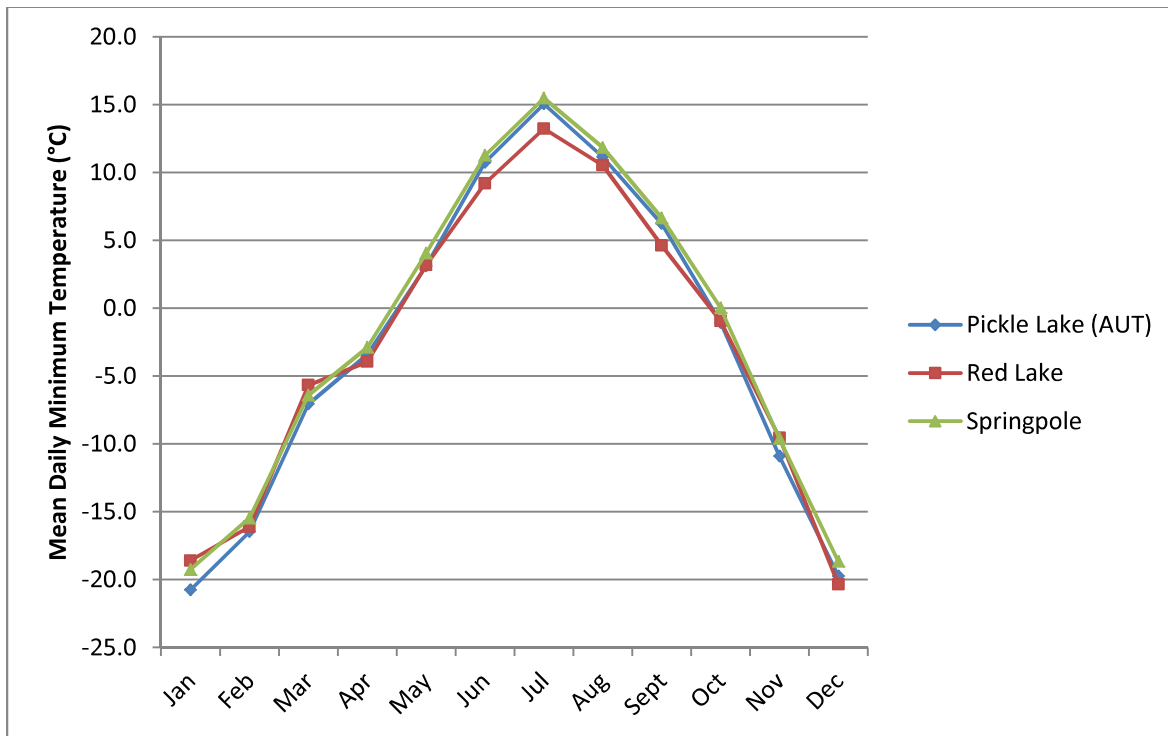


Figure 3.3: 2012 Mean Daily Minimum Temperatures

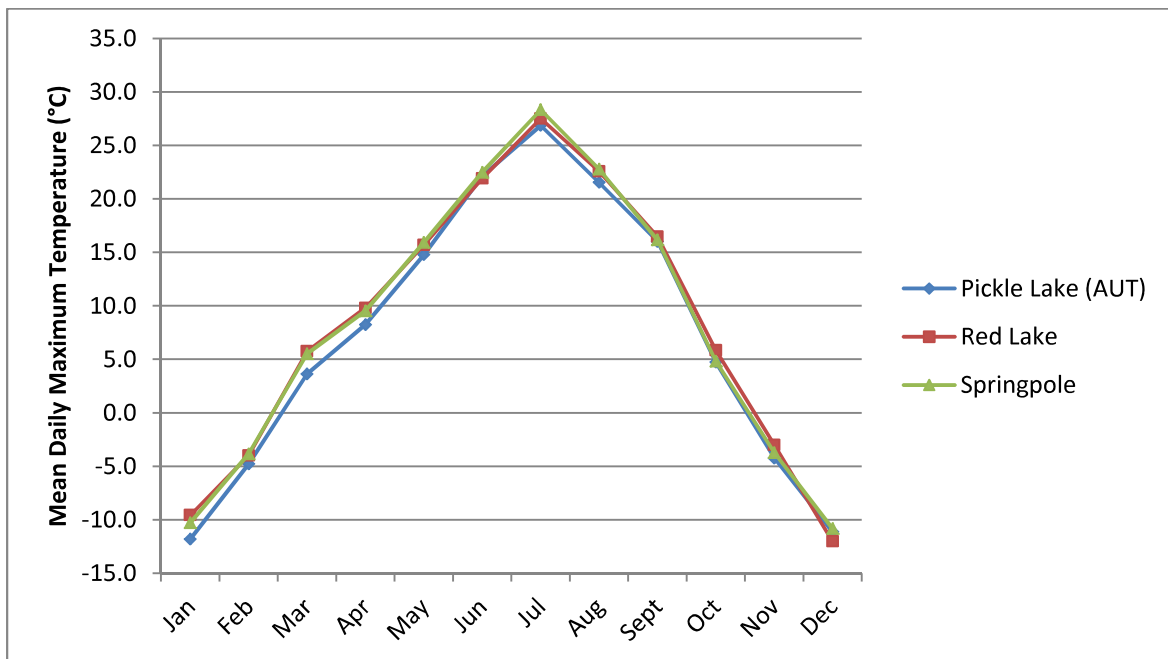


Figure 3.4: 2012 Mean Daily Maximum Temperatures

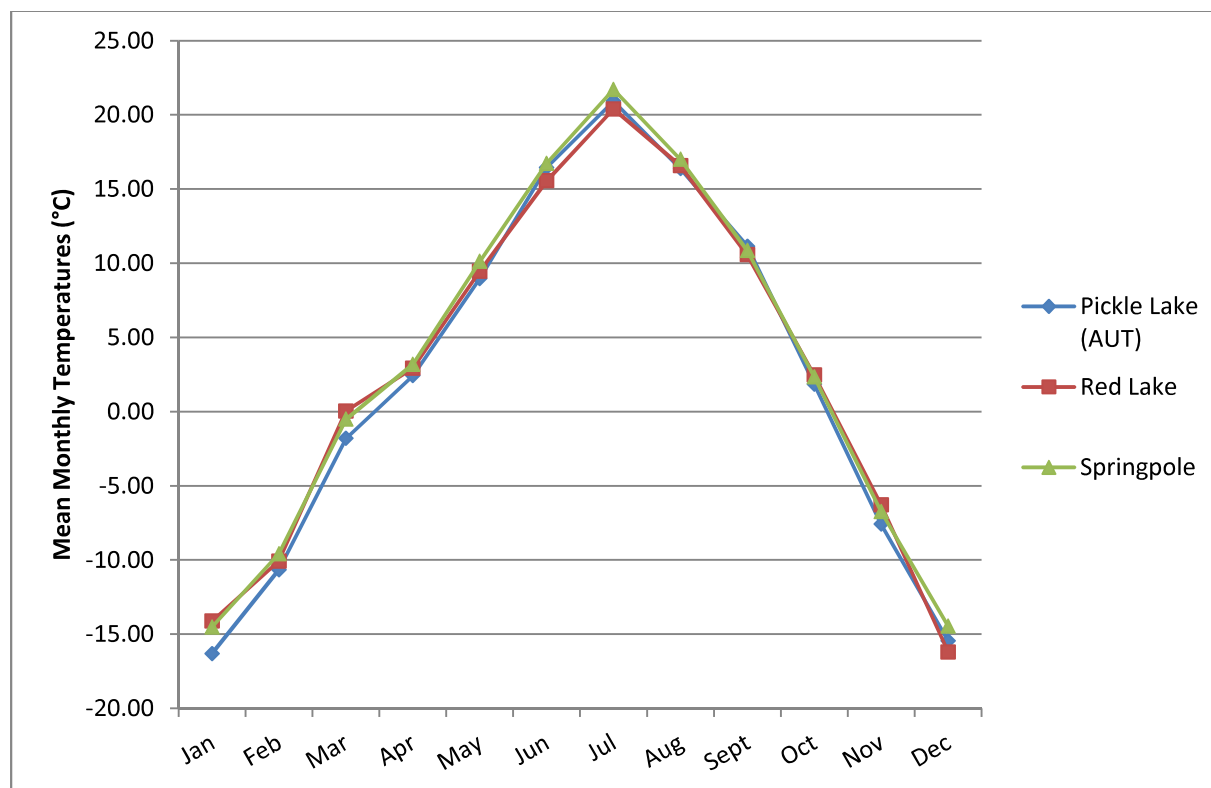


Figure 3.5: 2012 Mean Monthly Temperatures

When placed in the context of recent historical data (Figure 3.6), 2012 temperatures follow similar trends to the six previous years, with some exceptions. January 2012 temperatures were the warmest observed since January 2006 and were significantly warmer than those observed in 2011 by approximately 5°C. July temperatures were the highest across the time period and warmer than 2011 temperatures by approximately 1.5°C. December temperatures were cooler than those in 2011 by approximately 3°C, but similar to those observed from 2006-2010.

In Figure 3.7, mean monthly temperatures for 2006 through 2012 have been compared to the climate normal temperatures for 1971-2000, a period of 30 years, for each respective station. The Springpole data was compared to the average of the Red Lake and Pickle Lake normals. On the graph 68% of the data have positive values, indicating that the recent weather in the region is generally warmer than the historical normals.

On a yearly scale (Table 3.1), only in 2008 were mean temperatures lower than normal for both Red Lake and Pickle Lake. A linear regression performed on the data (as shown in Figure 3.7) supports that recent weather is warmer than the historical climate by approximately 1°C. The regression also suggests that there is a warming trend of approximately 0.2°C per year.

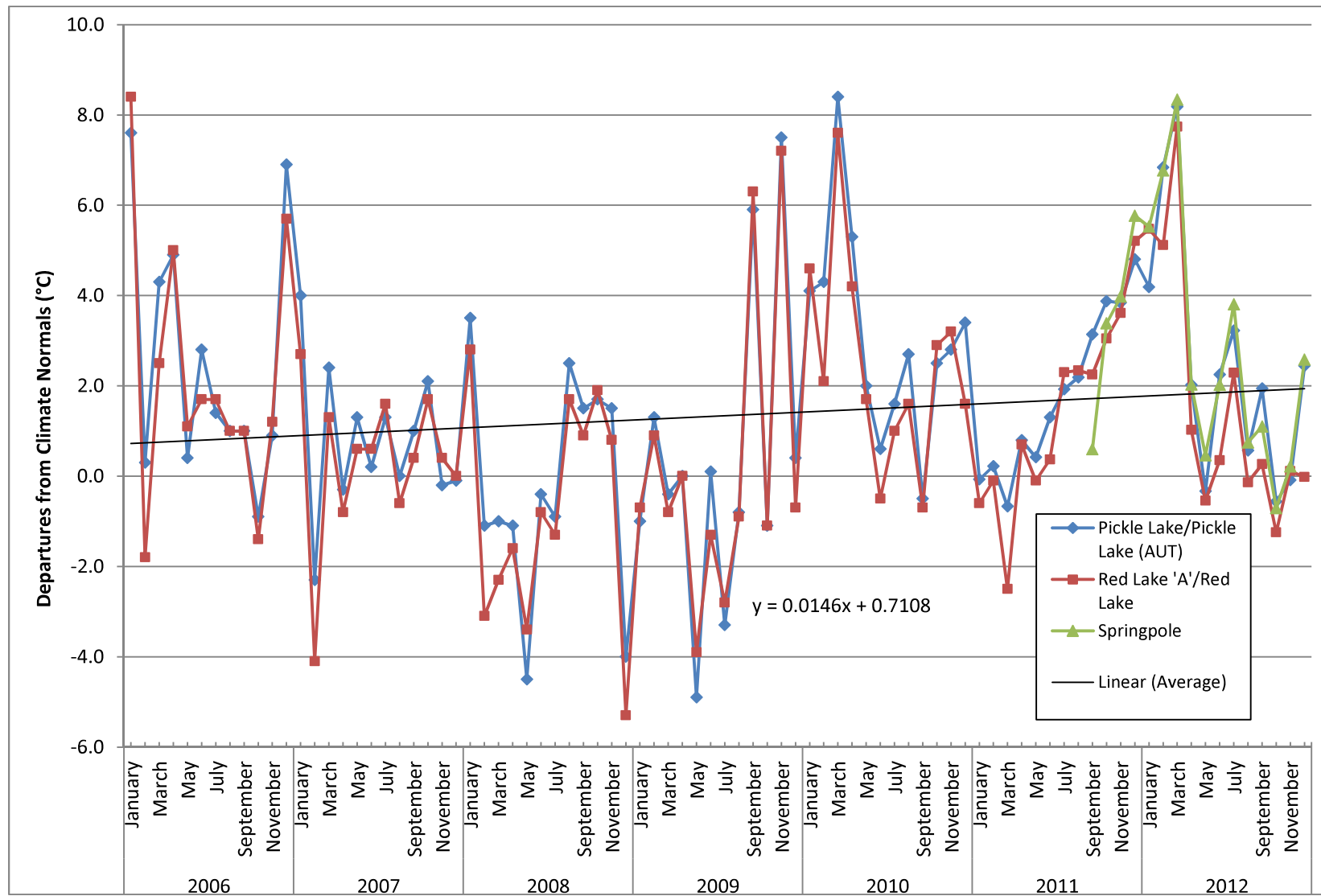


Figure 3.7: 2006-2012 Temperature Departures from Climate Normals for 1971-2000, with Trendline

Table 3.1: Mean Annual Temperature Departures from 1971-2000 Climate Normals; in °C

Year	Red Lake 'A'/Red Lake		Pickle Lake/Pickle Lake (AUT)	
	Mean Annual Temperature	Departure from Normal	Mean Annual Temperature	Departure from Normal
2006	3.1	2.2	2.2	2.6
2007	1.2	0.3	0.4	0.8
2008	0.1	-0.8	-0.6	-0.2
2009	1.1	0.2	-0.1	0.3
2010	3.3	2.4	2.7	3.1
2011	2.3	1.4	1.4	1.8
2012	2.6	1.7	2.2	2.6
1971-2000 Normal	0.9		-0.4	

3.4.2 Atmospheric Pressure

Atmospheric pressure data is presented as monthly averages in Figure 3.8 for the Pickle Lake (AUT), Red Lake, and Springpole meteorological stations. There is no apparent seasonal pattern to the atmospheric pressure fluctuations however the pattern of fluctuation between months is relatively consistent. Very little fluctuation in atmospheric pressure occurs at either station from July through September. The Springpole data is consistently slightly lower than that of the other two stations, and with the exception of March, the Red Lake data is consistently higher than the other two stations. An explanation for the difference in atmospheric pressure is interpreted to be the difference in elevation between the stations. The Red Lake and Pickle Lake (AUT) stations are closer in elevation, with elevations of 385.9 m and 390.8 m, respectively, whereas the Springpole station has a slightly higher elevation of approximately 409.1 m. Thus, using an established equation (PSAS, 2004) to calculate standard atmospheric pressure, and assuming constant temperature and humidity, the calculated pressure at Springpole is 96.5 kPa. This is 0.3 kPa lower than standard pressure at Red Lake of 96.8 kPa and 0.2 kPa lower than the standard pressure at Pickle Lake (AUT) of 96.7 kPa. This calculation is consistent with the measured results at the three stations and the graphical representation of the results.

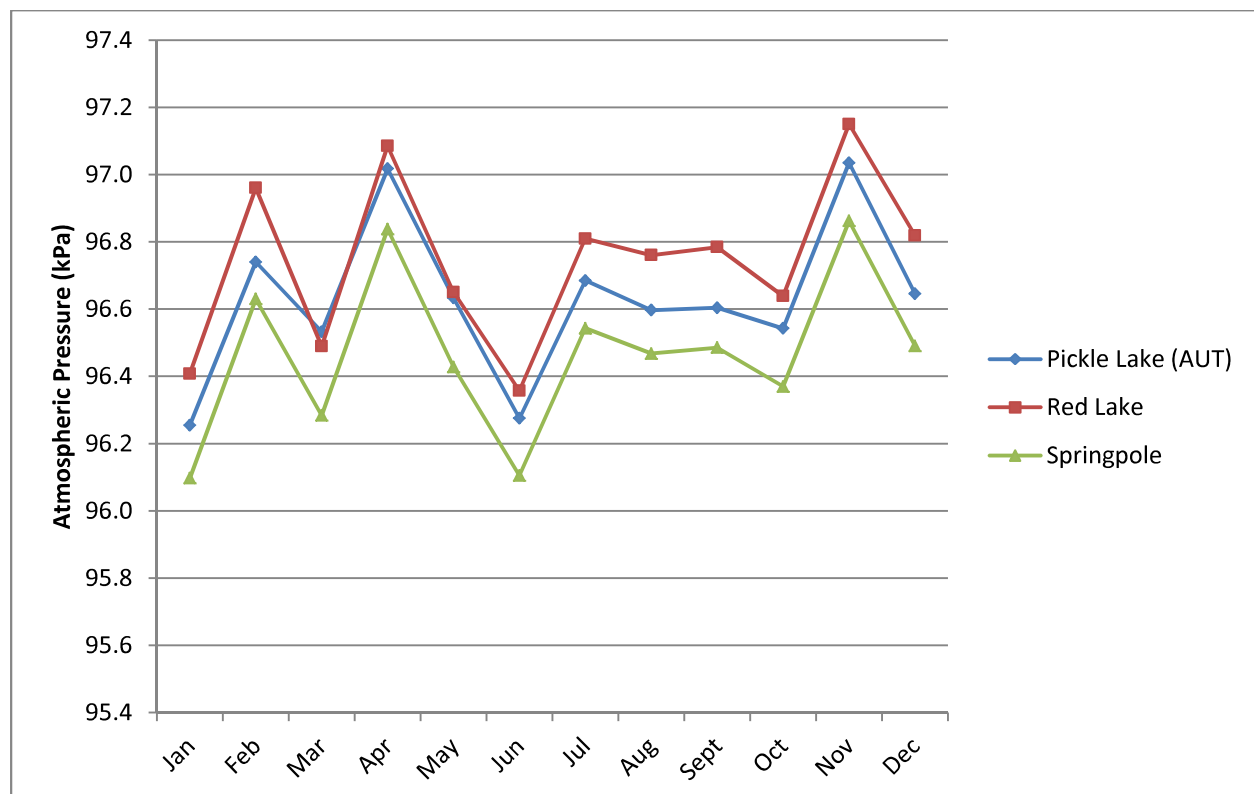


Figure 3.8: 2012 Average Monthly Atmospheric Pressure

3.4.3 Relative Humidity

Relative humidity data from the Red Lake, Pickle Lake (AUT) and Springpole meteorological stations for 2012 indicate a moderately humid climate with seasonal variability (Figure 3.9). Average monthly humidity ranged from a low of 55.8% in April (Red Lake) to a high of 89.7% in October (Pickle Lake). Seasonally, the region is less humid in late spring through midsummer and more humid in the autumn and winter months. Relative humidity between the three stations is similar. With the exception of June through October, Red Lake had the lowest recorded relative humidity.

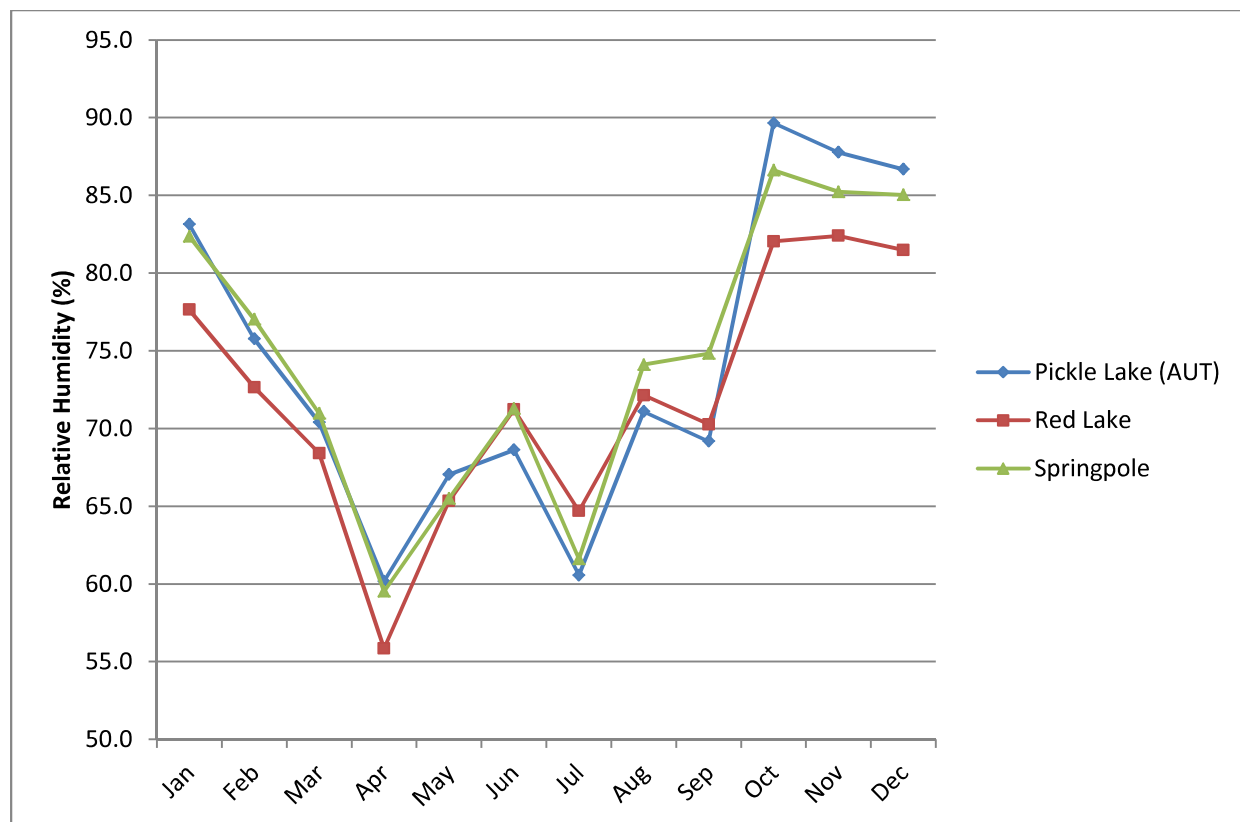


Figure 3.9: 2012 Average Monthly Relative Humidity

3.4.4 Precipitation

The 2012 total monthly precipitation, including rain and snow, is shown in Figure 3.10 for the three meteorological stations. Precipitation in early 2012 was relatively low in January and February. This is consistent with the below normal precipitation observed in early winter in northern Ontario as discussed in section 3.1.3. Precipitation levels increased during the summer months and decreased in September through December. For all of 2012, the total rainfall was 673.4 mm for Pickle Lake (AUT), 726.6 mm for Red Lake, and 476.8 mm for Springpole. The average of these three values is 625.6 mm. This is lower than the 2011 average of 678.7 mm recorded at the Red Lake and Pickle Lake stations. The 2011 average did not include precipitation recorded at Springpole as a full year data set was not available for Springpole in 2011.

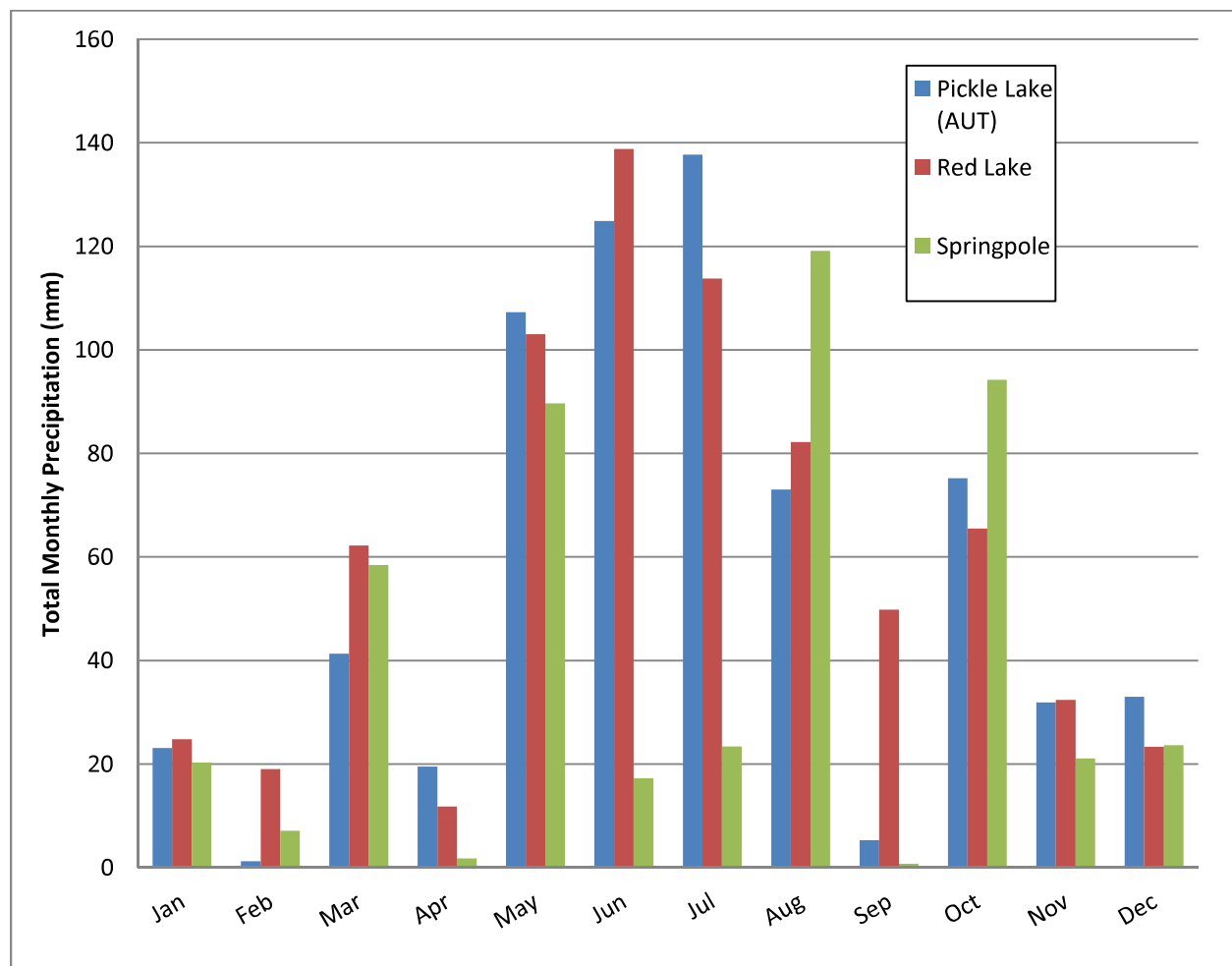


Figure 3.10: 2012 Total Monthly Precipitation

There are notable differences in precipitation between the stations. The Springpole station recorded considerably less precipitation in April, June, July, and September, and considerably higher amounts in August and October. The Red Lake station recorded considerably more precipitation than both Pickle Lake (AUT) and Springpole in September. Precipitation amounts

at Pickle Lake (AUT) and Red Lake station were generally more comparable than those recorded at Springpole. It is not clear why the Springpole precipitation amounts vary so greatly from those recorded at the other two stations, both of which are located less than 150 km from the Springpole project site.

Compared with the 6 previous years, 2012 experienced normal precipitation at both Red Lake and Pickle Lake (Table 3.2). The year started out with very little precipitation in January and February (Figure 3.11). Precipitation recorded at Springpole in 2012 was below normal.

Table 3.2: 2006-2012 Total Precipitation (mm)

Year	Red Lake 'A'/Red Lake	Pickle Lake/Pickle Lake (AUT)
2006	676.5	703.6
2007	914.6	900.8
2008	744.7	756.9
2009	816.1	863.2
2010	1063.2	715.4
2011	652.9	508.7
2012	726.6	673.4
1971-2000 normal	640.0	717.4

In comparison with the 30-year precipitation normals (1971 to 2000) of 640.0 mm/yr for Red Lake and 717.4 mm/yr for Pickle Lake, 2012 was a near normal year for precipitation at the respective stations. Figure 3.12 shows the difference in precipitation between the 2006-2012 data and the monthly normals for 1971-2000. In this figure, approximately 55% of the data is below the 1971-2000 normals, however there are peak precipitation months in the summer that are much higher than the normals. A simple linear regression of the data suggests that the climate is wetter at present than from 1971-2000, but also that there is a decreasing trend of about 2.1 mm/yr. The results of the regression provide a possible precipitation trend for the Springpole Gold region however the results are not expected to be completely accurate owing to the relatively short time period used in the analysis.

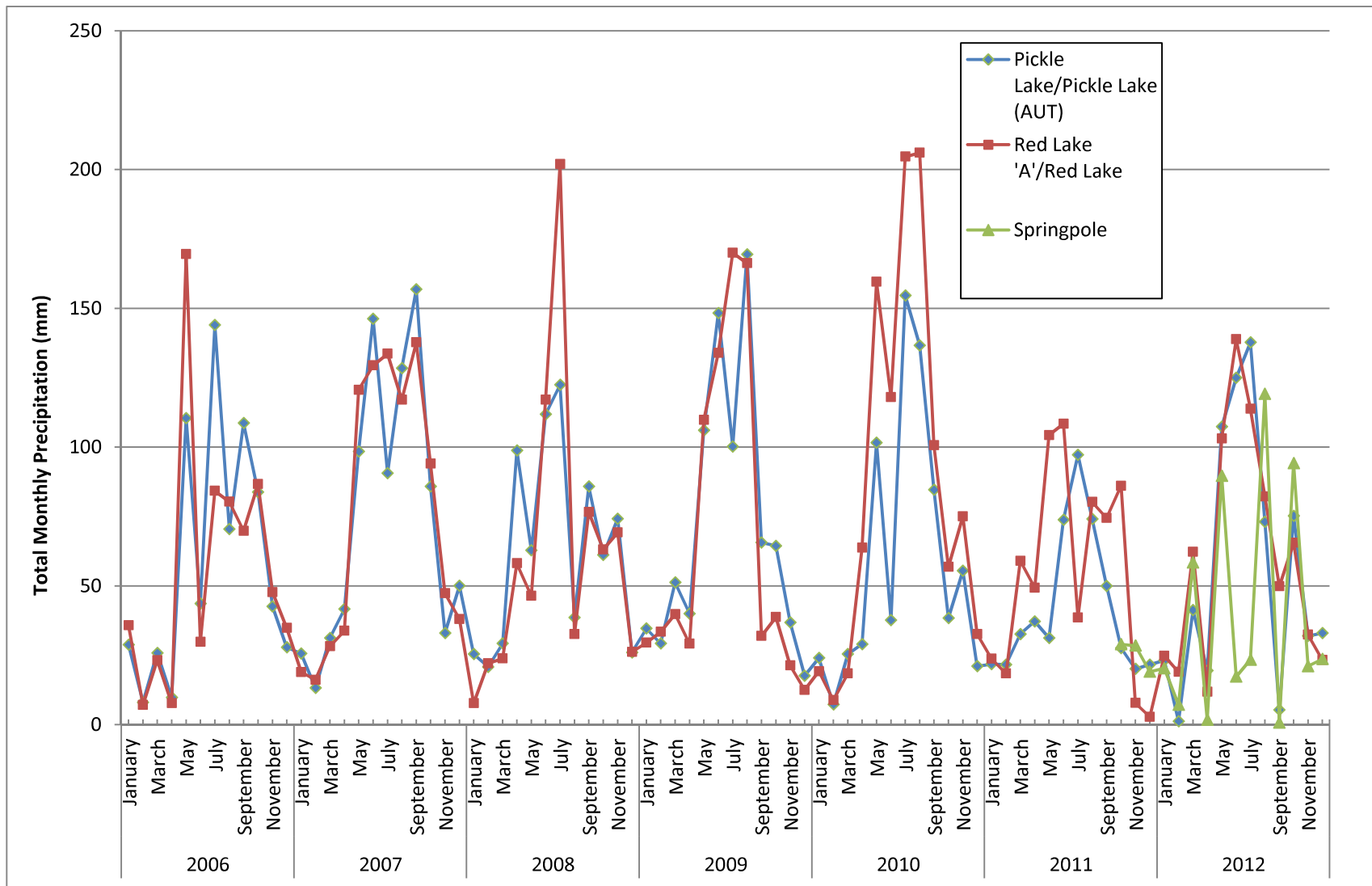


Figure 3.11: 2006-2012 Monthly Precipitation

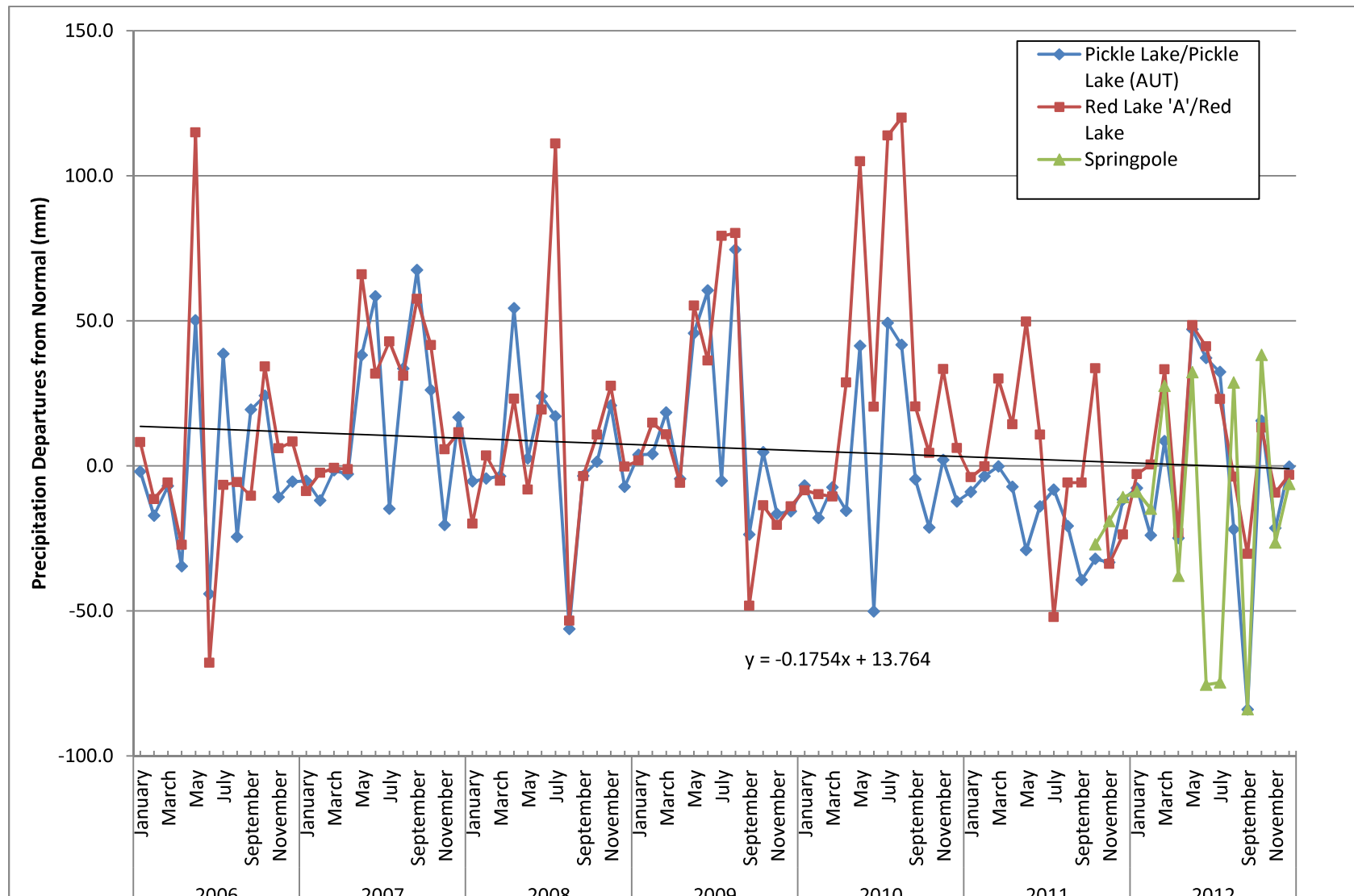


Figure 3.12: Precipitation Anomalies Compared to Normals for 1971-2000, with Trendline

3.4.5 Snow

Hourly snow depth measurements recorded at the Springpole meteorological station are presented in Figure 3.13. In the figure, snowfall events are evidenced by up-sloping trends, which are often followed by relatively gradual downward trends representing the compaction or melting of the snowpack. The Springpole station registered 30 cm of snow on January 1, 2012 to start the year. The maximum snow depth reached was 64 cm on March 7, 2012. The snowpack persisted until mid-March when the spring melt occurred, largely over a one-week period. The first major snowfall event at Springpole in the early winter occurred on November 11 when approximately 9 cm of snowfall accumulated on the ground. The snowpack dissipated to approximately 3 cm by mid-November and provided the base layer of snow that persisted through the end of 2012. Snowfall events from November 20th onward resulted in a snowpack depth of 41 cm at the end of 2012.

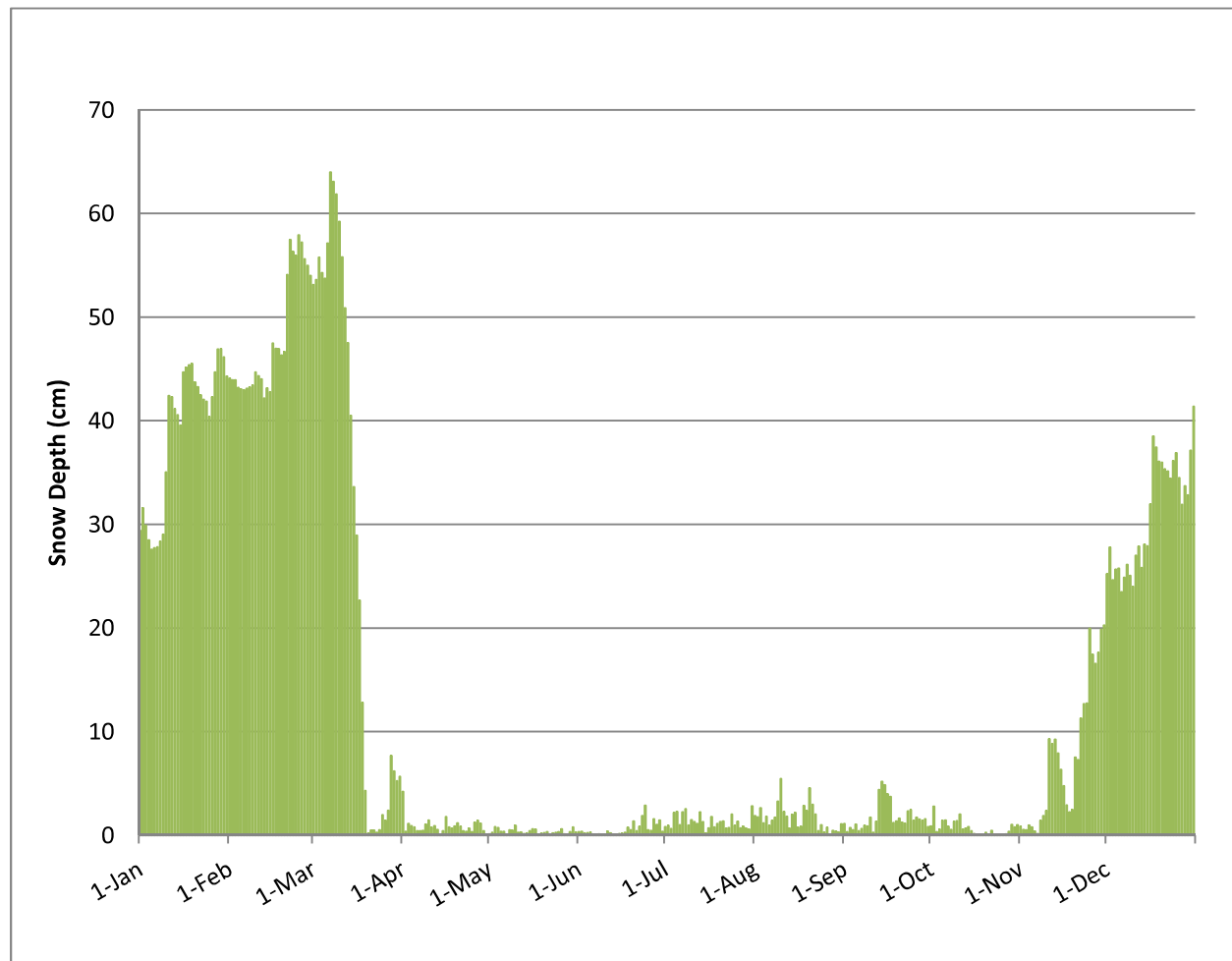


Figure 3.13: 2012 Springpole Snow Depths

Daily snow depth measurements recorded at Pickle Lake (AUT) meteorological station are presented in Figure 3.14. At Pickle Lake (AUT), 2012 started with at least 21 cm of snow on the

ground. The snow depth fluctuated throughout January and February before reaching a maximum depth of 39 cm on March 9, 2012. Accumulated snow dissipated rapidly after the maximum depth was reached in a mid-March thaw. The late-March/early-April snowfall also dissipated rapidly. The first major snowfall in early winter occurred on October 9-10 when approximately 9 cm of snow accumulated on the ground. A snowfall event on November 9 resulted in the accumulation of 3 cm of snow on the ground and provided the base of the snowpack. After reaching an accumulated depth of 39 cm on December 19, 2012, the snowpack dissipated and was 33 cm at the end of December. Compared to Springpole, Pickle Lake (AUT) both began and finished the year with a shallower snowpack. The maximum snow depth of 39 cm was also less than was observed at Springpole.

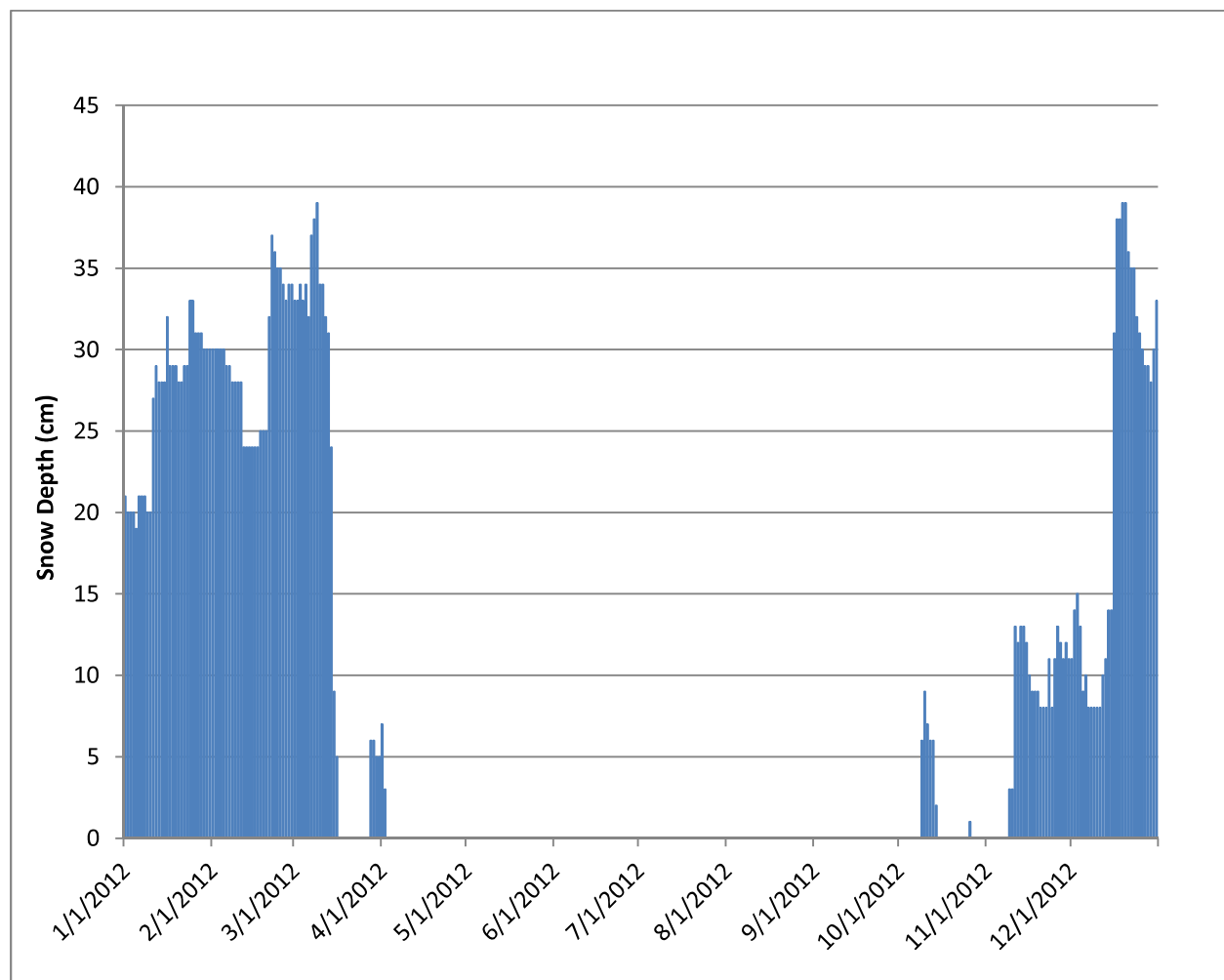


Figure 3.14: 2012 Pickle Lake (AUT) Snow Depths

Daily snow depth measurements recorded at the Red Lake meteorological station are presented in Figure 3.15. At Red Lake, 2012 started with at least 20 cm of snow on the ground. The snow depth continued to increase until the maximum snow depth of 53 cm was reached on March 8. Accumulated snow dissipated rapidly in a mid-March thaw. A late-March snowfall saw

approximately 11 cm accumulate and dissipate by April 2nd. The first major snowfall in early winter occurred on October 5 when approximately 24 cm of snow accumulated on the ground. This snowpack dissipated into late October when a snowfall of approximately 3 cm on October 29 provided the base of the winter snowpack. Minor snowfall events over November and December resulted in a snowpack depth of 17 cm at the end of 2012. Compared to Springpole and Pickle Lake (AUT), Red lake both began and finished the year with a shallower snowpack. The maximum snow depth of 53 cm was also less than was observed at Springpole but greater than observed at Pickle Lake (AUT). The maximum snow pack depth was also observed at all three stations in early March.

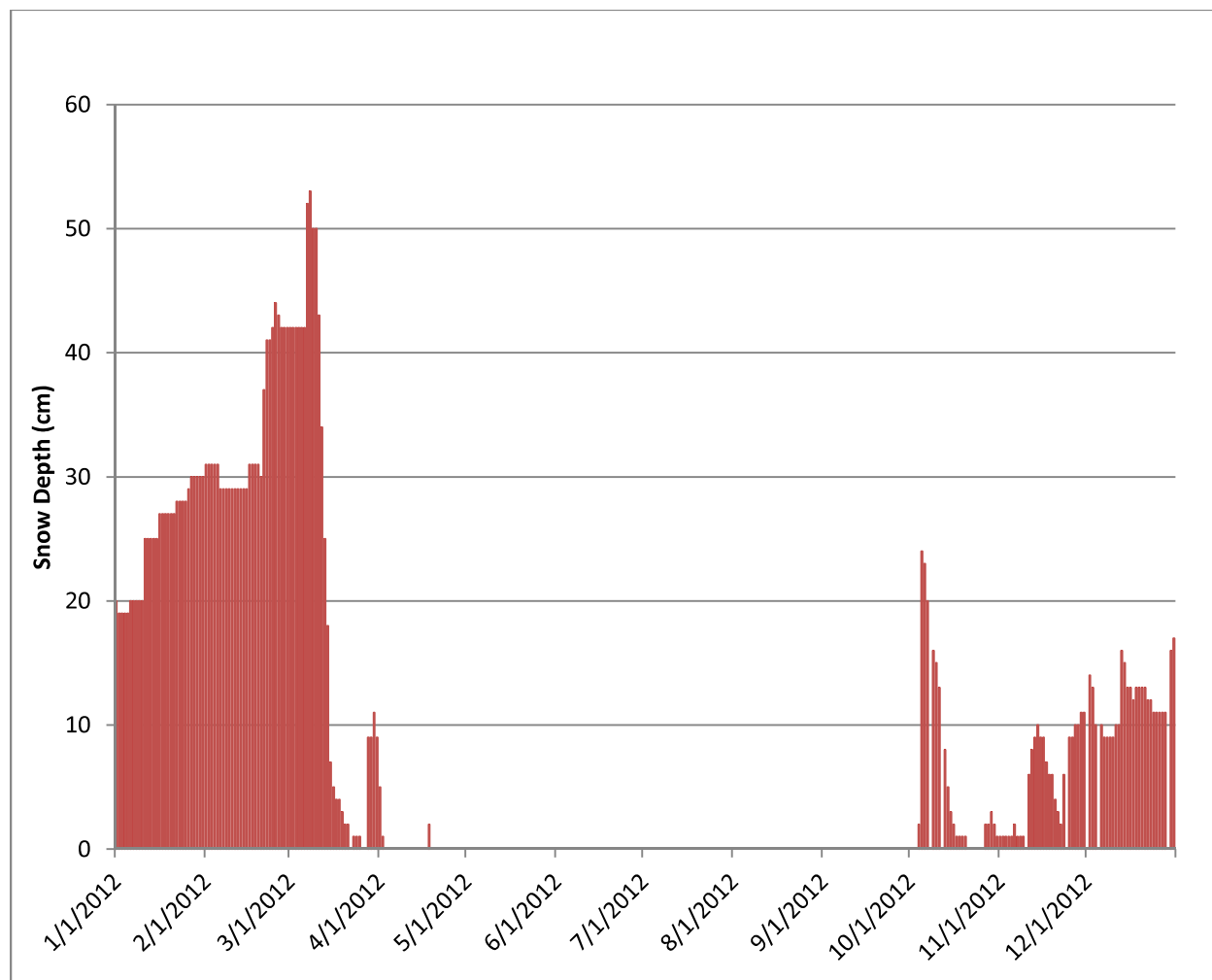


Figure 3.15: 2012 Red Lake Snow Depth

3.4.6 Wind

Data from the Springpole station indicates that for 2012, average daily wind speeds ranged from 0.3 m/s to 5.8 m/s. The highest wind speed sustained over 1 hour was 9.0 m/s. Calm periods, with wind speeds less than 0.5 m/s (1 knot) occurred 9.4% of the time (Figure 3.16). The wind class with the highest frequency at 50.3% was for 0.5-1.8 m/s, the category of 'light air' according to the Beaufort Scale (Transport Canada, 2003).

Data from the Pickle Lake (AUT) station indicates that for 2102, the highest wind speed sustained over 1 hour was 13.3 m/s. Calm periods with winds less than 0.5 m/s (1 knot) occurred 0.8% of the time (Figure 3.16). The wind class with the highest frequency at 36.1% was from 3.3-5.4 m/s, the category of 'gentle breeze' according to the Beaufort Scale.

Data from the Red Lake station indicates that for 2012, the highest wind speed sustained over 1 hour was 12.5 m/s. Calm periods with wind speeds less than 0.5 m/s (1 knot) occurred 5.7% of the time (Figure 3.16). The wind class with the highest frequency of 35.6% was from 3.3-5.4 m/s, the category of 'gentle breeze' according to the Beaufort Scale.

The highest percentage of calm and light air was observed at Springpole. All three stations recorded similar percentages of light breeze. Both Pickle Lake (AUT) and Red Lake recorded significantly higher percentages of stronger winds (moderate breeze and higher) than at Springpole. The higher percentage of stronger winds may be attributed to the placement of the meteorological stations near water bodies resulting in higher wind speeds.

Springpole wind speed and directions modelled on a Wind Rose plot (Figure 3.17) show that there is a distinctly bimodal wind distribution during 2012. More than 25% of the time the winds came from the northwest, including most of the strongest winds above 3.5 m/s. The secondary wind direction is southeast, from which the winds came about 20% of the time. This wind direction represents wind blowing across the project area from Springpole Lake. The greatest proportion of light air, wind speeds less than 2 m/s, came from this direction. Very little wind came from the north to east sector or from the southwest. Analysis of the data according to time of day suggested that there is no apparent pattern of wind speed or direction based on time of day.

The 2012 wind data for both Pickle Lake (AUT) and Red Lake show a distribution of wind from all directions (Figure 3.18 and Figure 3.19), with no apparent dominant wind direction. The strongest winds come from the southwest to northwest, consistent with the expected prevailing wind direction (Klock et al., 2002).

Overall, the wind data recorded at Springpole appears to have little similarity to that of Pickle Lake and Red Lake.

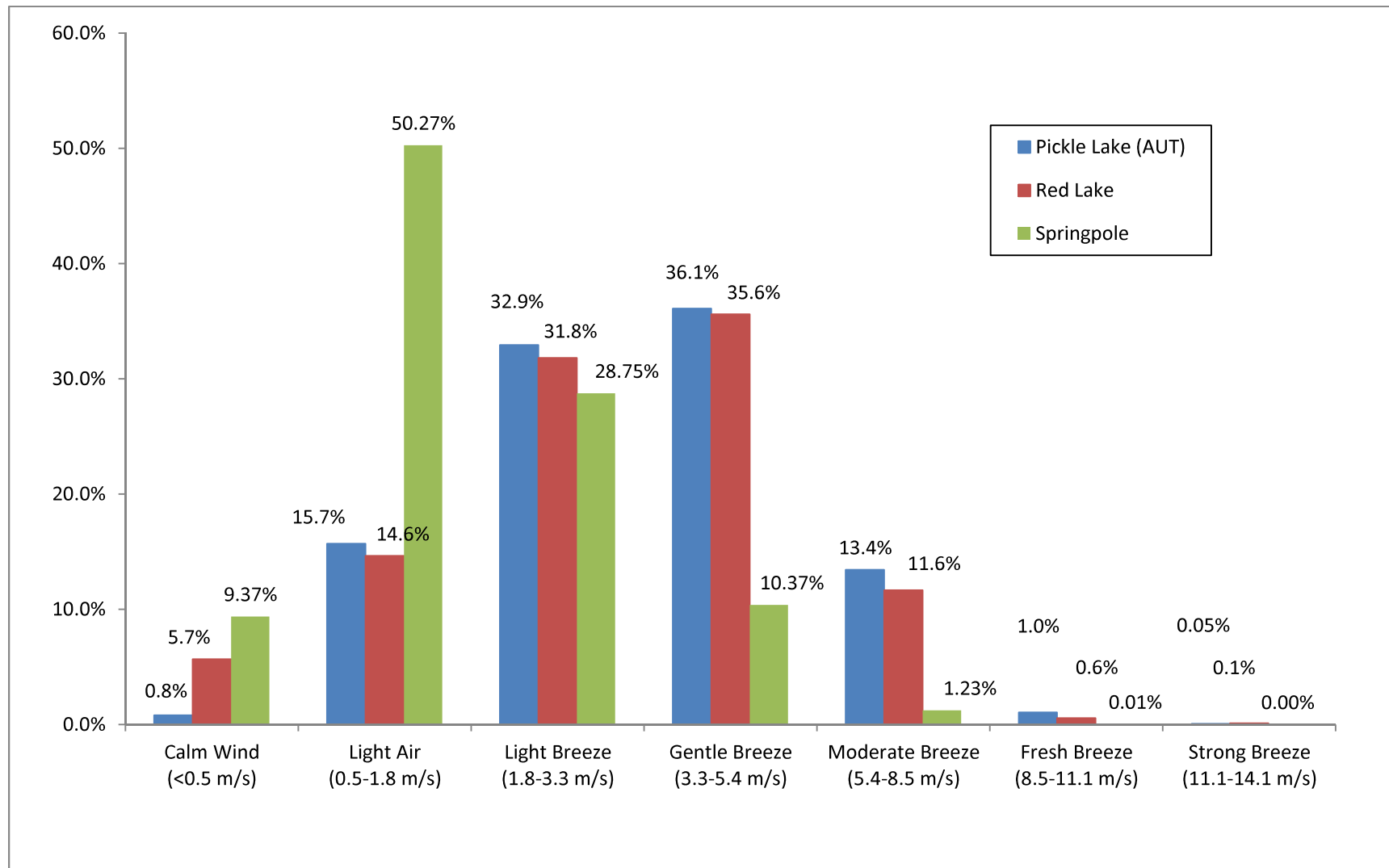
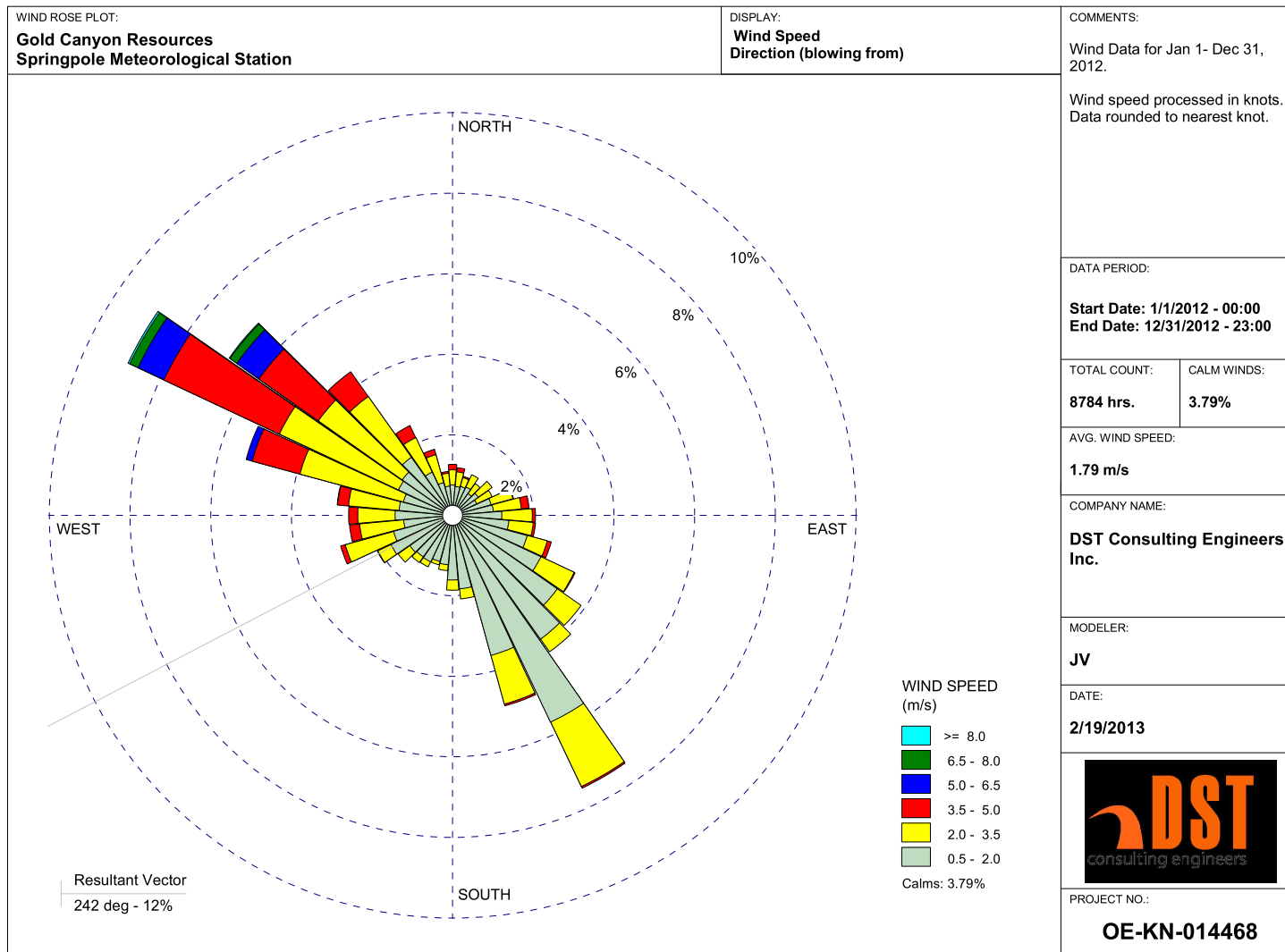
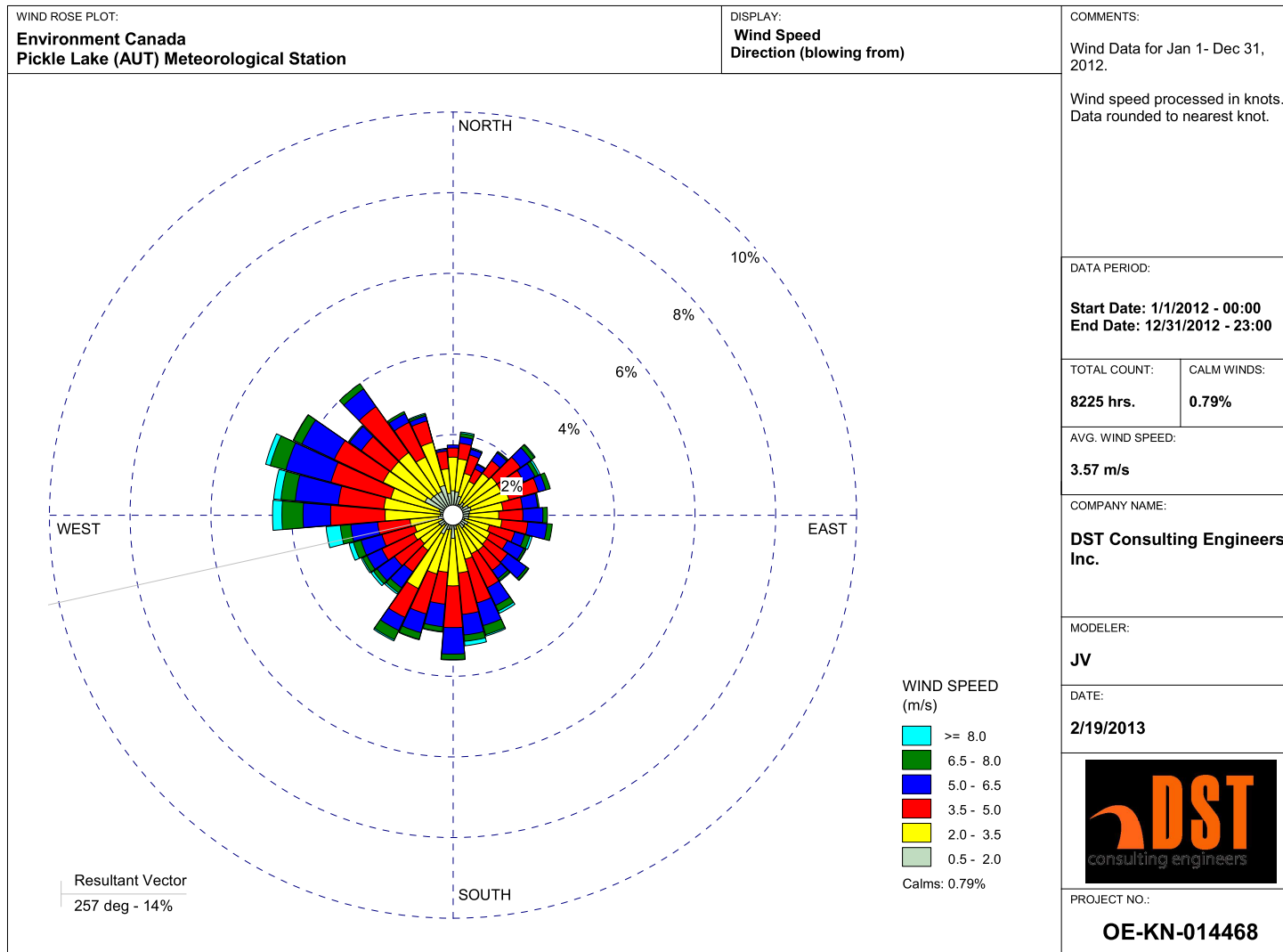


Figure 3.16: Wind Class Frequency Distribution for 2012



WRPLOT View - Lakes Environmental Software

Figure 3.17: Springpole Wind Rose for 2012



WRPLOT View - Lakes Environmental Software

Figure 3.18: Pickle Lake (AUT) Wind Rose for 2012

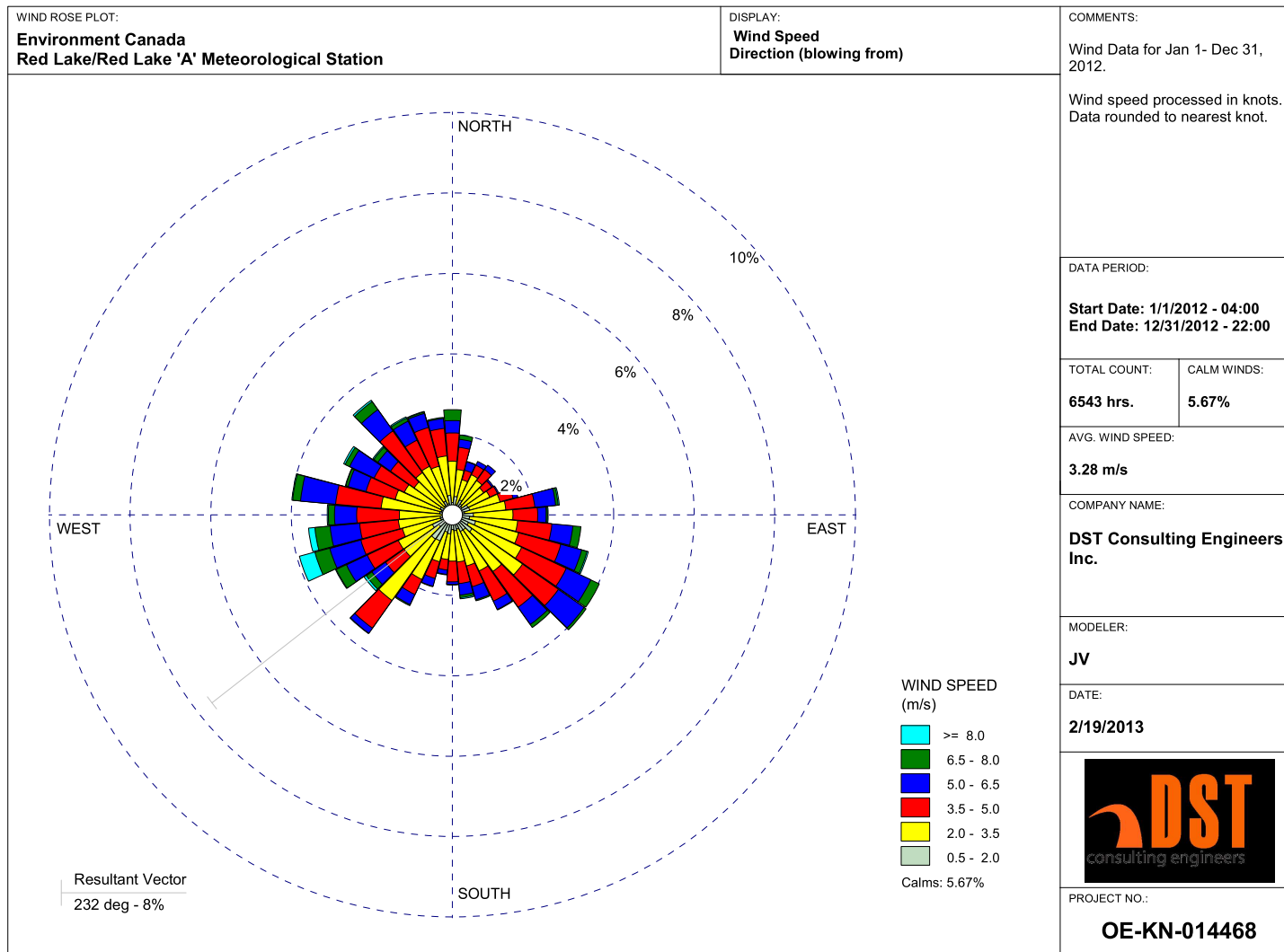


Figure 3.19: Red Lake Wind Rose for 2012

3.4.7 Solar Radiation

The daily average insolation on a horizontal surface was obtained for the region of the Springpole site from NASA's Climatology Resource for Agroclimatology Daily Averaged Data. This data is presented in Table 3.3 as monthly averages.

This data shows that the region of the Springpole Gold Project receives most sunlight energy during the summer months, with energy peaking in July at an average of 23.3 MJ/m²/d, and the least amount during the winter with minimal sunlight energy in December at an average of 2.7 MJ/m²/d. The sun provides more than six times the energy during the months surrounding the summer solstice (May, June and July) than during those months around the winter solstice (November, December and January).

Table 3.3: Average Insolation on a Horizontal Surface at the Springpole Gold Project (Source: NASA, 2013)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2012 Year
Average Insolation (MJ/m²/d)	3.8	8.4	11.8	18.5	17.3	18.3	23.3	15.8	12.2	5.6	3.3	2.7	11.7

4. SUMMARY AND RECOMMENDATIONS

4.1 Summary

The climate in Northern Ontario is primarily continental, with generally cold winters and mild summers. This region is dominated by three major air mass groups – arctic air masses that can bring cold and relatively dry air from the north, temperate air masses that come in from the Pacific, and with a smaller influence, tropical air masses that bring warm moist air to the region from the south. Generally the local Springpole Lake area topography poses few barriers to oncoming weather systems.

La Niña was present during the first three months of 2012, and was followed by neutral sea surface climatic conditions for the remainder of the year. Globally, 2012 temperatures were above normal while average precipitation was near average on balance across the globe. Northwestern Ontario experienced above normal temperatures and below normal precipitation.

Based on analysis of data from the Springpole, Red Lake 'A', Red Lake, and Pickle Lake (AUT) meteorological stations, the Springpole Gold Project area and region experienced the following in 2012:

- The minimum air temperature was -35.6 °C (January 18, 2012) and the maximum was 34.8 °C (July 11, 2012), recorded at Red Lake and Springpole, respectively.
- Regionally, the coldest month in 2012 was December with a mean temperature of -15.4 °C and the warmest month was July with a mean temperature of 21.0 °C.
- In general, 2012 temperatures were warmer than those observed in 2011, but similar to those of 2006-2010. The average temperature was about 2.4 °C warmer than the long-term average temperature for 1971-2000.
- Monthly atmospheric pressure data displayed no apparent seasonal variation in 2012. Variation in atmospheric pressure between meteorological stations within the region is attributable to differences in elevation of the meteorological stations. Air pressure at Springpole is generally lower than that of Pickle Lake (AUT) and Red Lake due to a higher elevation. The region of the project area varied in relative humidity from 55.8% to 89.7%. The spring and summer are less humid than the autumn and winter.
- The total precipitation in 2012 was 726.6 mm at Red Lake, 673.4 mm at Pickle Lake (AUT), and 476.8 mm at Springpole. Compared to the 1971-2000 normals, the amount of precipitation that occurred in 2012 was near-normal.
- As of December 31, 2012, the snow depth at Springpole was approximately 41 cm. This was the deepest end of year snowpack of the three stations. The maximum snow depth recorded was 64 cm at Springpole on March 7, 2012.

-
- The distribution of wind at Springpole was distinctly bimodal, with predominant wind directions of northwest and southeast. The Red Lake and Pickle Lake (AUT) data displayed more balanced distribution of wind direction than observed at Springpole, with no dominant wind direction. The most frequent wind speed was light air (0.5-1.8 m/s) at Springpole and gentle breeze (3.3-5.4 m/s) at Red Lake and Pickle Lake (AUT). The highest wind speed sustained over 1 hour at Springpole was 9.0 m/s.
 - Daily average insolation, ranged from a high of 20.6 MJ/m²/d in July to a low of 2.7 MJ/m²/d in December, 2012. Solar radiation strongly correlates to the Earth's position relative to the sun. The highest levels are observed when the Northern Hemisphere, in which the Springpole Gold Project is located, is inclined towards the Sun, and lowest levels when inclined away from the Sun.

4.2 Recommendations

It is recommended that meteorological data collection continue for the on-site monitoring station to monitor the local weather and climate trends in the project area. The data should be summarized on an annual basis. Data from the Red Lake, and Pickle Lake (AUT) meteorological stations contribute to the understanding of the meteorology of the project area. It is recommended that data from these stations continues to be studied in conjunction with that of the on-site data.

5. CLOSURE

We appreciate this opportunity to provide environmental services to you. If you have any questions or comments, please contact the undersigned.

Sincerely,

For DST CONSULTING ENGINEERS INC.,



Laura Ritchie, P.Ge.
Project Manager



Milan Makusa, Ing., P.Ge.
Senior Technical Advisor

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APPENDIX A:
Springpole 2012 Meteorological Data

Springpole Gold Project Meteorological Station Data

Station Name: Springpole

January 1 to December 31, 2012

TIMESTAMP	Wind Speed	Wind Direction	Wind Direction - Std Dev	Average Air Temperature	Average Distance to Snow	Average Snow Depth	Adjusted Snow Depth	Relative Humidity	Precipitation	Atmospheric Pressure
	m/s	degrees	degrees	degrees C	cm	cm	cm	%	mm	mBar
1/1/2012 0:00	2.064278	280.0586	20.17636	-2.655915	233.572	-203.4327	28.5673	90.74944	0	952.8421
1/1/2012 1:00	2.636968	285.6839	18.97093	-3.139678	233.4777	-203.4174	28.5826	92.72289	0	952.9753
1/1/2012 2:00	3.411351	284.7944	20.39723	-3.7182	233.4684	-203.6235	28.3765	94.00342	0	952.6934
1/1/2012 3:00	3.761619	287.9885	18.98459	-4.630198	233.4133	-203.2343	28.7657	88.93779	0	953.1221
1/1/2012 4:00	3.406357	287.896	19.26296	-5.446147	233.4484	-203.5777	28.4223	90.65787	0	953.4614
1/1/2012 5:00	2.66082	279.3964	21.3067	-6.009649	233.5945	-202.8603	29.1397	90.66093	0	953.4713
1/1/2012 6:00	2.971655	282.7542	19.72911	-6.234385	233.4474	-204.1119	27.8881	92.24517	0	953.8494
1/1/2012 7:00	4.174325	295.784	14.52612	-6.300761	233.5112	-203.4556	28.5444	91.92924	0	954.4006
1/1/2012 8:00	5.856422	302.5032	12.88984	-6.385359	233.5387	-203.0816	28.9184	88.0373	0	955.3242
1/1/2012 9:00	6.732815	304.3777	12.74622	-7.347693	232.9832	-202.9824	29.0176	87.57027	0	956.8041
1/1/2012 10:00	6.590291	302.7703	12.50338	-7.540735	233.0963	-202.8146	29.1854	87.02081	0	958.1014
1/1/2012 11:00	6.618645	304.1073	12.96081	-7.541415	233.5423	-202.9748	29.0252	85.06111	0	958.9716
1/1/2012 12:00	6.940214	307.5038	12.73263	-7.655594	233.7094	-203.8142	28.1858	82.27417	0	959.6007
1/1/2012 13:00	6.56253	305.3039	12.71223	-7.841303	235.1782	-205.9815	26.0185	85.76775	0	960.3485
1/1/2012 14:00	8.128015	307.3832	13.04703	-8.953676	235.5874	-202.5093	29.4907	81.19969	0	961.1554
1/1/2012 15:00	7.64992	308.7995	12.5409	-10.02208	232.6348	-201.5783	30.4217	82.30927	0	962.6543
1/1/2012 16:00	7.41045	304.9865	12.99748	-11.03274	231.4303	-201.1738	30.8262	83.17313	0	964.3324
1/1/2012 17:00	7.104053	306.5044	12.76331	-11.72866	231.3639	-201.4104	30.5896	81.55225	0	966.0046
1/1/2012 18:00	6.8538	303.9909	12.74865	-12.09697	231.203	-201.2425	30.7575	84.62154	0	967.3285
1/1/2012 19:00	7.199769	305.2954	12.8091	-12.52586	231.2156	-200.9754	31.0246	81.25005	0	968.4141
1/1/2012 20:00	6.353724	306.0259	12.78166	-12.94779	231.2378	-201.3036	30.6964	82.555	0	969.1938
1/1/2012 21:00	6.705443	303.927	12.16562	-13.61195	231.1829	-201.0594	30.9406	84.67954	0	969.4747
1/1/2012 22:00	6.835939	304.8503	12.76147	-13.99527	230.9423	-200.6778	31.3222	78.78058	0	970.0831
1/1/2012 23:00	6.595795	308.5468	13.29802	-14.61404	231.0923	-201.1662	30.8338	78.79584	0	970.9066
1/2/2012 0:00	6.601251	310.3274	13.65098	-15.16329	230.9674	-200.9067	31.0933	79.21708	0	971.5483
1/2/2012 1:00	6.423166	306.9014	12.78247	-15.42582	230.9886	-201.2807	30.7193	80.14504	0	972.2748
1/2/2012 2:00	6.675571	308.8646	13.47837	-16.21999	231.0014	-200.8839	31.1161	77.84193	0	973.153
1/2/2012 3:00	6.64059	310.4638	12.26048	-17.02711	230.9689	-201.006	30.994	76.73082	0	974.2075
1/2/2012 4:00	5.335793	312.0151	12.11998	-17.93305	230.8135	-200.8686	31.1314	78.55927	0	975.1845
1/2/2012 5:00	4.734488	311.0458	10.70377	-18.50337	230.7338	-200.9373	31.0627	81.28668	0	975.7537
1/2/2012 6:00	5.294212	311.4302	11.83451	-19.09875	230.7849	-200.8457	31.1543	79.5147	0	976.925
1/2/2012 7:00	4.808982	312.5988	14.35349	-20.27266	230.7357	-200.5939	31.4061	80.84407	0	978.2382
1/2/2012 8:00	4.608904	309.4458	10.72852	-21.82803	230.5604	-200.4641	31.5359	81.85139	0	979.0515
1/2/2012 9:00	4.442016	309.3553	11.23732	-22.98178	230.4802	-200.4946	31.5054	79.89474	0	980.0601
1/2/2012 10:00	3.911039	308.7259	12.0012	-23.37092	230.5567	-200.426	31.574	76.47899	0	981.0525
1/2/2012 11:00	3.661196	308.3274	12.16504	-22.83963	230.8486	-198.1442	33.8558	70.6426	0	981.4387
1/2/2012 12:00	3.584254	303.748	11.59225	-21.84881	230.8622	-195.9083	36.0917	66.8697	0	981.4241
1/2/2012 13:00	3.262538	302.4498	13.6126	-20.81124	230.8379	-200.8533	31.1467	64.8001	0	981.0118
1/2/2012 14:00	3.124844	293.3962	14.51971	-20.15097	231.0647	-199.0447	32.9553	64.05071	0	980.6614
1/2/2012 15:00	3.065417	293.9577	14.9856	-19.91006	231.6308	-201.4638	30.5362	65.76928	0	980.6205
1/2/2012 16:00	2.185403	294.3886	11.96276	-20.35755	231.0154	-201.3722	30.6278	70.84101	0	980.5818
1/2/2012 17:00	1.647762	282.5366	11.51989	-21.28661	230.9711	-200.9754	31.0246	75.54797	0	980.2363
1/2/2012 18:00	1.443223	284.5009	11.81514	-22.33937	230.7443	-200.2047	31.7953	77.2879	0	979.9529
1/2/2012 19:00	1.197136	283.5379	14.45491	-23.57942	230.4807	-200.7236	31.2764	81.47136	0	980.0506
1/2/2012 20:00	1.224215	284.5136	14.39318	-24.10232	230.4129	-200.8152	31.1848	80.7296	0	980.0003
1/2/2012 21:00	0.5094389	196.3188	67.45854	-25.58081	230.3306	-200.632	31.368	80.25494	0	979.0502
1/2/2012 22:00	0.5444744	170.1716	31.2845	-25.80523	230.462	-200.3115	31.6885	79.67344	0	977.8875
1/2/2012 23:00	0.7618544	150.8719	24.67834	-24.9245	230.4598	-201.0594	30.9406	80.66245	0	976.7524
1/3/2012 0:00	0.8723283	137.5382	10.61272	-23.77701	230.6415	-201.0594	30.9406	80.67465	0	975.6641
1/3/2012 1:00	0.8441945	151.2762	11.7338	-23.47325	230.5641	-200.4183	31.5817	80.96159	0	974.2239
1/3/2012 2:00	1.070995	150.7726	11.65444	-23.22905	230.6544	-200.8686	31.1314	80.80286	0	972.7955
1/3/2012 3:00	1.22017	153.9604	11.99317	-22.38448	230.8244	-200.7236	31.2764	79.71617	0	971.623
1/3/2012 4:00	1.66692	152.1468	13.39746	-20.86943	231.0863	-201.4257	30.5743	75.48692	0	969.9686
1/3/2012 5:00	1.994308	154.3564	14.22351	-19.78723	231.2131	-201.3722	30.6278	69.0034	0	968.2775
1/3/2012 6:00	2.21567	156.7455	17.54868	-17.93744	231.3442	-201.4409	30.5591	66.92312	0	966.599
1/3/2012 7:00	2.520928	156.9523	17.68807	-17.18345	231.6079	-201.6775	30.3225	68.09222	0	964.1876
1/3/2012 8:00	2.570841	158.2056	19.05554	-16.426	231.7687	-201.9751	30.0249	68.67373	0.254	961.8621
1/3/2012 9:00	3.123803	155.4729	18.65716	-15.84569	231.8398	-201.8912	30.1088	68.13649	0	959.5685
1/3/2012 10:00	3.249556	156.0934	17.61872	-14.6108	232.0457	-202.0972	29.9028	63.89809	0	957.5056
1/3/2012 11:00	2.523601	164.9526	23.85242	-12.47523	232.1819	-205.1803	26.8197	55.42586	0	956.1028
1/3/2012 12:00	2.280612	177.4314	29.91087	-10.59989	233.2021	-203.0053	28.9947	58.55162	0	954.9966
1/3/2012 13:00	2.09752	190.4841	34.6964	-9.873536	232.8046	-203.3945	28.6055	58.20822	0	953.6732
1/3/2012 14:00	1.910239	199.9225	33.12109	-9.120936	232.9465	-200.1741	31.8259	57.07879	0	952.8972
1/3/2012 15:00	1.502162	209.0866	35.22683	-9.398981	233.0359	-202.929	29.071	62.89229	0	952.7817
1/3/2012 16:00	1.318906	190.2145	25.3938	-9.700995	232.7673	-202.7459	29.2541	67.01318	0	952.4775
1/3/2012 17:00	0.9899755	205.8895	32.57628	-10.69542	232.6505	-202.3719	29.6281	72.37489	0	952.8544

1/3/2012 18:00	0.775928	200.7056	24.64149	-11.71243	232.3657	-202.227	29.773	78.53942	0	953.6864
1/3/2012 19:00	1.041025	217.7411	27.17513	-11.86888	232.257	-202.3719	29.6281	78.68594	0	953.9469
1/3/2012 20:00	2.080542	253.9464	25.77248	-10.8444	232.4174	-202.639	29.361	79.46891	0	953.9208
1/3/2012 21:00	2.395066	277.2238	21.32555	-10.80719	232.7029	-203.1351	28.8649	84.5437	0	954.1466
1/3/2012 22:00	3.000518	290.9889	16.08401	-10.46166	232.6821	-202.494	29.506	87.41458	0	954.7811
1/3/2012 23:00	4.722759	299.4308	12.46396	-9.42888	232.8183	-202.8603	29.1397	88.64322	0	955.9046
1/4/2012 0:00	3.675238	295.5087	13.75461	-9.454785	232.8809	-202.7764	29.2236	90.51746	0	956.6831
1/4/2012 1:00	2.897949	293.6111	15.32366	-9.79044	232.9311	-202.639	29.361	90.14047	0	957.4387
1/4/2012 2:00	3.231109	293.8283	14.50583	-9.300323	232.8807	-202.7383	29.2617	89.7467	0	958.1733
1/4/2012 3:00	2.344759	286.0014	16.26864	-8.867878	233.0885	-203.2953	28.7047	90.30379	0	958.7444
1/4/2012 4:00	3.100841	292.614	14.28363	-8.044044	233.1735	-203.1961	28.8039	89.94969	0	959.0321
1/4/2012 5:00	4.068582	293.7945	14.15331	-7.549643	233.2904	-203.2343	28.7657	88.78516	0	959.2073
1/4/2012 6:00	4.135981	297.9667	13.18386	-7.448393	233.3792	-203.5471	28.4529	90.08553	0	959.3826
1/4/2012 7:00	4.109337	296.786	13.67629	-7.655309	233.4512	-203.6158	28.3842	90.37857	0	959.6437
1/4/2012 8:00	2.844924	287.5336	17.30166	-7.601022	233.4501	-203.5777	28.4223	89.89474	0	960.0186
1/4/2012 9:00	2.193238	282.3214	18.46107	-7.42799	233.4539	-202.9824	29.0176	89.16214	0	959.8423
1/4/2012 10:00	2.93834	287.7439	17.43832	-7.225155	233.5722	-203.6922	28.3078	87.69389	0	960.5629
1/4/2012 11:00	2.530455	285.784	20.02691	-6.724162	233.6557	-203.7456	28.2544	86.40421	0	960.4745
1/4/2012 12:00	3.840843	297.6803	15.40091	-6.660014	233.7128	-203.8677	28.1323	84.97411	0	960.0237
1/4/2012 13:00	4.779721	302.6407	12.86736	-6.637547	233.8974	-203.7227	28.2773	83.22045	0	959.7972
1/4/2012 14:00	5.039136	303.0151	12.18876	-6.822998	233.7451	-203.8753	28.1247	84.13161	0	960.7013
1/4/2012 15:00	3.99224	301.9531	12.26999	-6.789802	233.7469	-203.3487	28.6513	84.5086	0	961.3642
1/4/2012 16:00	3.359173	302.2814	12.96728	-6.600244	233.8179	-203.9364	28.0636	84.10262	0	962.1312
1/4/2012 17:00	2.908119	301.3922	12.84643	-6.468554	233.8797	-203.9135	28.0865	80.95701	0	962.8449
1/4/2012 18:00	3.105387	299.6237	12.22676	-6.586452	233.8857	-203.8371	28.1629	80.55103	0	963.2675
1/4/2012 19:00	2.623472	297.1157	11.4048	-6.783867	233.7986	-203.8219	28.1781	80.39687	0	963.6054
1/4/2012 20:00	2.333633	316.382	17.94691	-6.973201	233.905	-204.0508	27.9492	79.74822	0	963.3725
1/4/2012 21:00	1.765652	343.2426	22.97491	-7.989762	233.8977	-203.7532	28.2468	76.19968	0	963.7192
1/4/2012 22:00	1.013075	346.4643	26.0812	-8.749734	233.8182	-203.5014	28.4986	75.44876	0	963.6993
1/4/2012 23:00	0.3875798	12.3678	28.88064	-9.00957	233.6899	-203.8219	28.1781	73.27233	0	963.3647
1/5/2012 0:00	0.4642241	54.11938	27.95515	-9.221932	233.6994	-203.7303	28.2697	78.18076	0	962.7942
1/5/2012 1:00	0.7635618	83.90038	22.55183	-9.639184	233.678	-203.3564	28.6436	78.66611	0	962.0595
1/5/2012 2:00	0.5559914	87.3993	20.81966	-9.956886	233.6159	-203.7227	28.2773	82.29553	0	961.7188
1/5/2012 3:00	1.059433	118.3411	20.32997	-10.02109	233.5571	-203.5548	28.4452	82.15054	0	961.16
1/5/2012 4:00	1.218662	126.2027	20.38842	-10.06004	233.6578	-203.944	28.056	84.31477	0	960.165
1/5/2012 5:00	1.493757	124.9345	21.06018	-9.981145	233.9018	-203.8905	28.1095	84.81538	0	959.1481
1/5/2012 6:00	1.864007	129.7685	18.99349	-9.97118	233.964	-204.2721	27.7279	89.997	0	957.6125
1/5/2012 7:00	1.851221	129.9218	21.6277	-10.02272	234.2154	-204.0966	27.9034	90.79371	0	956.3551
1/5/2012 8:00	2.298737	127.1447	20.13607	-9.817108	234.0144	-204.1805	27.8195	89.19267	0	954.7263
1/5/2012 9:00	2.054958	132.9132	19.32347	-9.500627	234.1118	-203.6998	28.3002	88.776	0	953.6912
1/5/2012 10:00	2.327104	133.9078	19.72152	-8.866504	234.2047	-204.3255	27.6745	87.22227	0	952.1501
1/5/2012 11:00	2.420263	136.3605	22.07907	-7.910734	234.4665	-204.5774	27.4226	85.58461	0	950.2135
1/5/2012 12:00	1.805341	133.8713	21.60015	-6.764419	234.5806	-204.5163	27.4837	84.00341	0	948.6421
1/5/2012 13:00	1.375389	138.7357	23.77679	-5.982677	234.7286	-204.5392	27.4608	83.16397	0	947.5971
1/5/2012 14:00	1.397843	147.98	22.38828	-5.657088	234.7368	-204.791	27.209	83.33033	0	946.4778
1/5/2012 15:00	1.070404	130.3885	21.65661	-5.500813	234.8164	-204.9131	27.0869	84.28271	0	945.7458
1/5/2012 16:00	0.9585034	97.98585	30.53599	-5.666836	234.9221	-204.9666	27.0334	87.34438	0	945.7581
1/5/2012 17:00	1.395336	104.1452	33.32439	-6.845663	234.9835	-204.8139	27.1861	89.98632	0	945.7609
1/5/2012 18:00	0.7289265	129.1189	21.19549	-6.919745	235.0392	-205.1879	26.8121	89.24456	0	945.89
1/5/2012 19:00	0.6212504	59.21369	29.10241	-7.150538	235.1805	-205.1879	26.8121	91.74609	0	946.1283
1/5/2012 20:00	0.9156962	92.56724	28.57275	-7.82582	235.1726	-205.0658	26.9342	96.55226	0	945.5057
1/5/2012 21:00	0.5904414	95.17859	23.39253	-7.907053	235.1216	-204.9055	27.0945	95.76014	0	945.2603
1/5/2012 22:00	0.6775042	75.02171	25.85198	-7.927032	235.0604	-204.9055	27.0945	95.74029	0	945.4272
1/5/2012 23:00	0.5177667	117.7795	22.46646	-7.831013	234.895	-204.9437	27.0563	93.6249	0	945.3049
1/6/2012 0:00	0.6324767	35.4324	32.35067	-7.951596	234.9424	-204.9208	27.0792	93.75616	0	945.5
1/6/2012 1:00	0.8236116	68.01949	20.67597	-8.152458	234.8285	-204.2111	27.7889	93.99731	0	945.2915
1/6/2012 2:00	0.9403579	71.70575	26.30361	-8.290496	234.4527	-204.4553	27.5447	93.64628	0	944.9736
1/6/2012 3:00	0.9181077	79.79098	27.89248	-8.364846	234.5508	-204.0813	27.9187	92.74579	0	945.1229
1/6/2012 4:00	0.6548063	51.34528	25.04955	-8.387212	234.5981	-204.4782	27.5218	91.38284	0	945.8109
1/6/2012 5:00	0.4991804	9.19201	27.10378	-8.580607	234.6403	-204.44	27.56	91.75066	0	946.3392
1/6/2012 6:00	0.7589272	23.876	23.7614	-8.808925	234.5461	-204.4019	27.5981	91.508	0	946.7337
1/6/2012 7:00	0.7225331	59.8459	31.56108	-9.001529	234.5596	-204.295	27.705	90.59988	0	947.1693
1/6/2012 8:00	0.8258162	352.082	26.62404	-9.06963	234.4612	-204.3255	27.6745	92.24976	0	947.8282
1/6/2012 9:00	1.322371	337.1248	18.90914	-9.216914	234.4616	-203.9058	28.0942	94.38651	0	948.7917
1/6/2012 10:00	1.310362	337.3362	22.2079	-9.178526	234.3173	-204.5774	27.4226	92.69542	0	949.8544
1/6/2012 11:00	1.5643	343.174	25.59942	-9.254711	234.2595	-204.15	27.85	91.43626	0	950.8554
1/6/2012 12:00	1.397312	347.8076	25.0029	-9.252612	234.181	-203.9135	28.0865	89.98785	0	951.3722
1/6/2012 13:00	1.423733	339.4209	23.78686	-9.110436	234.1698	-204.3408	27.6592	88.36544	0	951.7194
1/6/2012 14:00	1.223327	335.2601	23.40331	-8.973999	234.2431	-203.9898	28.0102	88.83247	0	952.0823
1/6/2012 15:00	1.338976	329.3232	20.33784	-9.166	234.0388	-203.8905	28.1095	89.54371	0	952.9496
1/6/2012 16:00	2.39147	316.7694	14.26399	-9.709867	234.0614	-203.9974	28.0026	89.48571	0	954.1125
1/6/2012 17:00	2.575098	316.5132	13.43685	-10.32538	233.927	-204.1577	27.8423	88.76227	0	955.3524
1/6/2012 18:00	3.112129	314.0585	13.07148	-10.99599	233.96	-203.4556	28.5444	89.2232	0	956.4219
1/6/2012 19:00	2.366133	318.7227	15.43625	-11.43598	234.405	-204.3103	27.6897	88.50891	0	957.2442

1/6/2012 20:00	2.251623	315.4603	14.71569	-11.66044	234.446	-204.5697	27.4303	86.99334	0	957.9496
1/6/2012 21:00	3.039928	313.1514	12.43331	-12.03252	234.6485	-205.2413	26.7587	87.86178	0	958.5402
1/6/2012 22:00	2.521622	314.4268	12.25993	-12.35939	234.9895	-203.9287	28.0713	85.15726	0	959.0263
1/6/2012 23:00	2.777323	312.9121	13.18985	-12.58688	234.1371	-204.5392	27.4608	86.48815	0	959.4763
1/7/2012 0:00	2.843891	311.6326	12.13221	-12.68635	234.5933	-203.6922	28.3078	85.63956	0	959.9462
1/7/2012 1:00	2.270771	313.858	11.67616	-12.90541	232.8544	-203.6235	28.3765	86.71404	0	960.4656
1/7/2012 2:00	2.035342	306.7182	12.1892	-13.11335	234.0004	-206.0426	25.9574	87.46037	0	960.9001
1/7/2012 3:00	2.805474	309.4692	12.98644	-13.59266	233.9377	-203.0435	28.9565	83.5257	0	961.5441
1/7/2012 4:00	2.20806	315.6068	16.23989	-13.97231	233.3182	-203.9058	28.0942	83.98968	0	962.2678
1/7/2012 5:00	1.903069	318.7081	15.59219	-14.33247	234.7729	-203.5014	28.4986	83.06935	0	962.92
1/7/2012 6:00	1.528715	317.9601	14.65384	-14.54263	232.9173	-202.7153	29.2847	85.32209	0	963.573
1/7/2012 7:00	1.167135	315.288	13.26197	-14.61242	232.6257	-203.4174	28.5826	85.22289	0	964.2978
1/7/2012 8:00	1.211683	307.6105	11.56551	-14.83097	234.8649	-204.4019	27.5981	86.34164	0	964.8581
1/7/2012 9:00	0.4871655	331.0277	22.54882	-14.78474	233.2463	-202.6467	29.3533	82.7412	0	965.5029
1/7/2012 10:00	0.5755828	329.9353	23.03946	-14.51598	232.6144	-202.7153	29.2847	78.82789	0	966.1202
1/7/2012 11:00	0.8522262	317.8873	17.36737	-14.02946	233.0423	-203.509	28.491	79.28271	0	966.9608
1/7/2012 12:00	0.7397971	320.173	26.34878	-13.33607	235.8412	-204.6613	27.3387	75.84865	0	966.9769
1/7/2012 13:00	0.842846	273.3873	51.12942	-12.71762	234.6017	-204.4324	27.5676	72.32301	0	966.7513
1/7/2012 14:00	1.009179	287.9772	29.66806	-12.61804	233.9455	-204.089	27.911	76.76897	0	966.8196
1/7/2012 15:00	0.4781824	286.1572	38.2817	-12.53868	234.073	-203.1656	28.8344	77.12917	0	966.9883
1/7/2012 16:00	0.218398	237.1893	40.61595	-12.59357	235.0322	-207.0652	24.9348	82.03301	0	967.2469
1/7/2012 17:00	0.1126065	190.3409	28.02931	-12.92018	237.7831	-207.7443	24.2557	85.92039	0	967.9563
1/7/2012 18:00	0.1493567	78.67898	35.85893	-13.17736	235.1398	-212.0713	19.9287	87.20244	0	968.2635
1/7/2012 19:00	0.03238496	111.1984	6.380216	-13.51119	236.0425	-203.9287	28.0713	88.03119	0	968.2433
1/7/2012 20:00	0.05085854	77.18455	25.41951	-13.79729	232.3715	-201.853	30.147	87.97167	0	968.4854
1/7/2012 21:00	0.06543681	126.7329	3.382835	-14.11869	231.9277	-201.563	30.437	86.44541	0	968.4222
1/7/2012 22:00	0.1174321	146.9482	5.36593	-14.45228	231.9294	-201.853	30.147	87.55042	0	968.4927
1/7/2012 23:00	0.1257675	139.1838	6.119471	-14.72034	232.7158	-205.1497	26.8503	87.15817	0	968.6161
1/8/2012 0:00	0.06971717	219.6081	5.242329	-15.06302	234.6614	-201.6699	30.3301	85.73113	0	968.8035
1/8/2012 1:00	0.06489226	246.295	15.57372	-16.38812	233.4341	-203.448	28.552	85.56325	0	969.092
1/8/2012 2:00	0.1062326	330.4162	5.617757	-17.95937	232.8266	-202.7993	29.2007	89.58492	0	969.335
1/8/2012 3:00	0.1001781	173.674	19.32315	-18.5191	232.5671	-202.7764	29.2236	85.24731	0	969.299
1/8/2012 4:00	0.3175069	224.8785	28.06669	-19.73945	232.7776	-203.1351	28.8649	84.0553	0	969.2911
1/8/2012 5:00	0.1102127	314.0159	13.76268	-21.14383	232.7893	-201.5249	30.4751	82.4329	0	969.1606
1/8/2012 6:00	0.1848496	149.6446	11.42539	-22.23725	233.3036	-201.212	30.788	82.00555	0	969.345
1/8/2012 7:00	0.1620286	143.7031	4.67915	-23.1423	233.8935	-204.0127	27.9873	80.77538	0	969.7791
1/8/2012 8:00	0.2776968	160.6007	11.57121	-24.19825	234.042	-206.6225	25.3775	79.4277	0	969.662
1/8/2012 9:00	0.6776187	192.0336	18.81507	-24.46605	233.382	-203.5929	28.4071	84.33308	0	969.4235
1/8/2012 10:00	0.8673621	199.9412	18.39653	-20.48246	234.032	-202.7077	29.2923	81.50188	0	969.2747
1/8/2012 11:00	0.8740446	128.2957	16.55797	-17.3044	233.4853	-203.6922	28.3078	85.10384	0	968.7491
1/8/2012 12:00	1.05694	134.9698	15.21599	-13.90686	233.1958	-203.3869	28.6131	84.56508	0	967.485
1/8/2012 13:00	1.151556	161.194	26.55849	-10.79945	233.6954	-204.2798	27.7202	84.83522	0	966.1499
1/8/2012 14:00	1.526217	164.8284	25.68202	-9.023005	234.272	-205.0658	26.9342	85.34347	0	964.2438
1/8/2012 15:00	1.738381	165.9525	22.2636	-7.584013	233.9327	-204.6079	27.3921	87.19481	0	962.8819
1/8/2012 16:00	1.779076	166.3367	22.52142	-7.145824	233.4092	-203.1274	28.8726	91.11575	0	961.4891
1/8/2012 17:00	2.118069	171.252	23.91282	-6.453227	233.317	-202.8298	29.1702	91.26532	0	960.1484
1/8/2012 18:00	2.276329	182.4336	25.2131	-5.392242	233.6078	-203.8219	28.1781	89.58797	0	958.9689
1/8/2012 19:00	2.166738	186.8456	29.54925	-4.279911	234.6096	-206.1265	25.8735	88.04645	0	957.5992
1/8/2012 20:00	2.312563	177.6282	28.27765	-3.736644	235.9615	-205.5008	26.4992	88.21587	0	955.6472
1/8/2012 21:00	2.537104	176.6254	29.69095	-3.236027	234.6644	-204.3942	27.6058	91.37827	0	953.4704
1/8/2012 22:00	2.318911	180.2689	29.23766	-2.86993	235.7162	-202.868	29.132	92.1307	0	951.6089
1/8/2012 23:00	2.144798	192.049	31.63456	-2.404391	233.1912	-204.3561	27.6439	90.45183	0	950.5414
1/9/2012 0:00	2.135056	212.1201	39.68105	-2.039405	234.4055	-202.8985	29.1015	92.43291	0	949.8427
1/9/2012 1:00	2.271333	231.014	35.44296	-1.853813	233.2594	-203.3945	28.6055	92.18108	0	949.0063
1/9/2012 2:00	2.503654	246.1732	28.50003	-1.591973	233.138	-202.6543	29.3457	90.01685	0	948.5267
1/9/2012 3:00	2.290072	242.6693	29.11701	-1.635783	232.8611	-202.9977	29.0023	89.51776	0	948.1088
1/9/2012 4:00	2.837564	259.4679	27.10877	-1.625401	232.6915	-203.0053	28.9947	89.38498	0	948.134
1/9/2012 5:00	3.438321	279.6684	21.86272	-1.353241	232.7175	-201.9751	30.0249	90.36483	0	948.2549
1/9/2012 6:00	3.759903	287.7273	20.02897	-1.151054	232.7853	-202.6543	29.3457	91.1539	0	948.6857
1/9/2012 7:00	4.475923	293.9884	15.2875	-1.160959	232.4893	-202.0667	29.9333	91.79493	0	949.5399
1/9/2012 8:00	4.598672	295.2742	14.90941	-1.190971	232.1349	-202.349	29.651	88.91795	0	950.2122
1/9/2012 9:00	4.895213	296.708	14.39437	-1.100285	232.2447	-202.3872	29.6128	86.17222	0	950.8611
1/9/2012 10:00	4.13168	296.2117	14.0715	-1.045182	232.4427	-202.3567	29.6433	84.45518	0	951.8937
1/9/2012 11:00	4.329972	299.085	12.42823	-0.8969916	232.5472	-201.8759	30.1241	90.18016	0	952.9307
1/9/2012 12:00	4.344835	303.1475	13.87357	-0.9990606	233.2644	-203.9287	28.0713	85.62887	0	953.6474
1/9/2012 13:00	3.988881	299.0987	13.19378	-0.4250185	233.8607	-203.6387	28.3613	82.86941	0	953.98
1/9/2012 14:00	5.357146	302.4328	13.02458	-0.2199643	233.9575	-204.3484	27.6516	80.76928	0	954.6851
1/9/2012 15:00	5.399379	304.348	12.53529	-0.4765717	234.1295	-204.1805	27.8195	77.94572	0	955.86
1/9/2012 16:00	4.389469	304.7859	12.94136	-0.797047	233.5953	-203.2037	28.7963	79.87185	0	957.1221
1/9/2012 17:00	2.812047	302.4233	11.81663	-1.051145	233.4796	-202.784	29.216	81.94297	0	958.2039
1/9/2012 18:00	2.264585	310.9946	16.10483	-1.257498	233.2134	-203.5166	28.4834	84.31782	0	959.1048
1/9/2012 19:00	1.246542	322.4244	19.28526	-1.780094	233.3311	-202.6772	29.3228	85.66702	0	959.5711
1/9/2012 20:00	0.863628	331.1832	18.11094	-2.084099	233.0912	-203.5319	28.4681	85.80592	0	959.8592
1/9/2012 21:00	0.8798286	356.961	27.48378	-2.630401	233.0968	-203.1122	28.8878	85.22594	0	960.3441

1/9/2012 22:00	0.8974203	58.36909	33.04951	-3.690728	232.9585	-203.1885	28.8115	86.04706	0	960.7999
1/9/2012 23:00	0.7401896	99.76828	24.13955	-4.03182	232.8681	-202.8298	29.1702	87.12307	0	960.5967
1/10/2012 0:00	0.8382108	117.0395	19.51585	-4.114165	232.7136	-202.9595	29.0405	87.3749	0	960.4208
1/10/2012 1:00	1.170356	124.9369	17.45863	-4.449438	232.5201	-202.4635	29.5365	88.95	0	960.0101
1/10/2012 2:00	1.195814	126.8926	18.10731	-4.631902	232.3741	-202.2498	29.7502	89.36971	0	959.9656
1/10/2012 3:00	1.668356	128.0126	19.67977	-4.66362	232.3675	-202.4864	29.5136	90.68687	0	959.0953
1/10/2012 4:00	1.703713	128.3144	18.12179	-4.610467	232.2759	-203.2724	28.7276	95.9326	0	958.4155
1/10/2012 5:00	1.702103	122.9647	22.71516	-4.758885	222.6936	-200.5328	31.4672	95.78761	0	957.121
1/10/2012 6:00	1.639868	119.3627	24.41417	-5.015658	228.9638	-197.4345	34.5655	94.91764	0	957.103
1/10/2012 7:00	2.471975	123.1624	21.61735	-5.624084	210.5945	-197.8924	34.1076	95.59988	0	956.2946
1/10/2012 8:00	2.753762	116.7094	23.51639	-6.104045	226.5058	-196.6332	35.3668	93.81569	0	954.688
1/10/2012 9:00	2.630925	120.3411	23.06351	-6.453741	228.1049	-195.8701	36.1299	95.1649	0	954.0555
1/10/2012 10:00	2.11734	117.3483	21.53354	-6.253117	224.742	-194.176	37.824	95.17405	0	953.8178
1/10/2012 11:00	1.984363	104.6713	20.76758	-6.321948	224.2365	-194.4049	37.5951	94.28272	0	953.8938
1/10/2012 12:00	2.32336	101.9178	21.84842	-6.920219	224.3387	-194.672	37.328	93.82484	0	953.7911
1/10/2012 13:00	2.096032	90.71911	24.0381	-7.924431	224.5162	-194.5957	37.4043	95.17558	0	953.8627
1/10/2012 14:00	1.57399	94.3877	24.10997	-8.214694	224.5424	-194.4736	37.5264	94.80623	0	954.1348
1/10/2012 15:00	1.791952	88.11305	23.55737	-8.736491	224.6683	-194.9925	37.0075	94.71618	0	954.5707
1/10/2012 16:00	1.785936	92.44537	23.54764	-9.292022	224.2527	-194.5728	37.4272	95.06721	0	955.157
1/10/2012 17:00	1.63308	100.8013	25.03565	-9.673122	224.5209	-194.733	37.267	94.89932	0	955.838
1/10/2012 18:00	1.914406	105.2593	23.49387	-9.945387	224.7134	-195.1451	36.8549	93.96221	0	955.989
1/10/2012 19:00	1.838588	111.2226	23.6796	-10.17976	224.7478	-194.7559	37.2441	93.88895	0	956.2397
1/10/2012 20:00	1.874801	114.4554	23.40329	-10.63457	224.7348	-194.7407	37.2593	93.12429	0	956.4444
1/10/2012 21:00	1.331015	104.596	24.33241	-10.81559	224.9323	-195.1985	36.8015	92.44054	0	956.9805
1/10/2012 22:00	1.724958	106.2401	23.33228	-11.11193	225.1032	-195.0536	36.9464	92.10629	0	956.6725
1/10/2012 23:00	1.912832	105.4761	23.85776	-11.37151	224.8971	-194.1454	37.8546	90.51134	0	956.3385
1/11/2012 0:00	1.863333	99.75176	22.39393	-11.6981	223.5307	-193.1	38.9	90.26563	0.254	956.355
1/11/2012 1:00	1.836719	96.62726	24.29529	-12.20409	223.1074	-193.9089	38.0911	88.62032	1.016	956.2557
1/11/2012 2:00	2.090045	81.49911	22.07457	-13.14565	222.2196	-190.2916	41.7084	88.805	1.016	956.4575
1/11/2012 3:00	1.798449	80.08923	24.02954	-13.6359	214.5719	-189.8643	42.1357	88.04034	1.016	956.7673
1/11/2012 4:00	2.076604	80.0956	22.71697	-13.9615	220.399	-188.5899	43.4101	87.92893	0	956.8027
1/11/2012 5:00	1.958987	79.29308	26.97588	-14.18219	218.9514	-187.4452	44.5548	87.81293	0	956.8647
1/11/2012 6:00	1.593851	71.59737	25.69711	-14.35037	217.6935	-187.9259	44.0741	86.30347	0	957.6675
1/11/2012 7:00	1.239764	42.52955	31.21822	-14.68701	217.6742	-188.2236	43.7764	85.52813	0	958.4683
1/11/2012 8:00	1.47978	42.13203	30.50626	-15.24348	217.7774	-187.9336	44.0664	83.45243	0	959.3045
1/11/2012 9:00	1.504927	50.9048	30.71558	-15.52057	217.9088	-188.1702	43.8298	83.03729	0	959.7025
1/11/2012 10:00	1.399276	50.26683	33.81317	-15.47842	219.5079	-189.1622	42.8378	81.60719	0	960.549
1/11/2012 11:00	1.241717	27.92721	34.34471	-15.24307	218.6998	-188.857	43.143	80.7067	0.508	960.8394
1/11/2012 12:00	1.261731	19.61906	32.90013	-15.13729	218.6884	-189.0249	42.9751	81.57973	0.508	960.9442
1/11/2012 13:00	1.163176	14.9018	34.43919	-15.19993	219.0895	-189.8643	42.1357	79.02172	0.508	961.0498
1/11/2012 14:00	1.357797	358.5862	29.96953	-15.35902	220.0407	-190.6274	41.3726	78.77599	0.508	961.1528
1/11/2012 15:00	1.679041	353.8518	23.53241	-15.56803	221.1815	-193.3747	38.6253	79.58338	0	961.5541
1/11/2012 16:00	1.189348	352.8829	25.75665	-15.36298	222.1374	-191.5737	40.4263	82.42221	0	962.2254
1/11/2012 17:00	1.220417	347.5412	23.68612	-15.56311	221.0411	-190.6808	41.3192	83.2937	0	963.014
1/11/2012 18:00	1.349225	334.9448	19.33703	-15.93211	220.5574	-189.0096	42.9904	84.04615	0	963.565
1/11/2012 19:00	1.709187	325.8382	17.61791	-16.70578	218.652	-188.422	43.578	84.33766	0	963.8293
1/11/2012 20:00	1.360388	325.9534	16.60441	-17.70502	218.4349	-188.483	43.517	84.54523	0	964.0096
1/11/2012 21:00	1.166889	327.1053	13.63807	-18.89894	218.3943	-188.6586	43.3414	84.72228	0	964.5576
1/11/2012 22:00	1.454031	324.498	12.70371	-20.04487	218.4133	-188.7578	43.2422	84.23235	0	964.3784
1/11/2012 23:00	1.468148	323.9329	14.67125	-20.42567	218.3516	-188.4296	43.5704	84.97258	0	964.6519
1/12/2012 0:00	1.475141	324.9433	12.40794	-20.95537	218.5281	-188.132	43.868	84.46587	0	964.9355
1/12/2012 1:00	1.756127	318.8232	8.412795	-21.5886	218.5545	-188.9409	43.0591	84.25829	0	964.7688
1/12/2012 2:00	1.452838	331.4753	15.26915	-21.68588	218.6046	-188.6128	43.3872	83.00677	0	965.1343
1/12/2012 3:00	0.8691728	336.1091	11.31231	-22.41274	218.8512	-190.6808	41.3192	81.07301	0	965.6981
1/12/2012 4:00	0.8937594	331.3195	7.155663	-23.24572	218.9475	-189.0172	42.9828	80.34804	0	965.8109
1/12/2012 5:00	1.090726	322.4604	4.095267	-24.37358	219.0556	-188.4754	43.5246	83.0266	0	965.6919
1/12/2012 6:00	0.962243	328.1228	7.153248	-23.64779	218.6744	-188.422	43.578	84.66122	0	965.5431
1/12/2012 7:00	2.369655	320.5283	15.5638	-19.72313	218.9249	-189.2691	42.7309	84.20946	0	965.4948
1/12/2012 8:00	2.065619	318.5309	16.55321	-19.03015	219.4268	-189.5896	42.4104	84.67343	0	965.6229
1/12/2012 9:00	2.372013	317.9562	15.99834	-19.0868	219.6261	-190.0398	41.9602	84.32545	0	965.8323
1/12/2012 10:00	3.043654	311.7574	12.10408	-19.06471	219.7056	-189.9177	42.0823	83.27843	0	966.2304
1/12/2012 11:00	3.85609	313.8364	12.74498	-19.19212	219.919	-190.1314	41.8686	82.4329	0	966.5671
1/12/2012 12:00	3.097309	317.6627	14.46228	-19.07669	220.0658	-190.2153	41.7847	79.2705	0	966.3856
1/12/2012 13:00	2.259995	322.9503	18.05192	-18.34944	220.209	-190.5358	41.4642	75.92496	0	966.0374
1/12/2012 14:00	2.166764	327.9274	21.06669	-17.88111	220.3102	-190.1009	41.8991	75.5434	0	965.7128
1/12/2012 15:00	2.152618	326.0526	19.36701	-17.88832	220.3047	-190.0093	41.9907	77.58704	0	965.8993
1/12/2012 16:00	2.05293	327.144	19.34003	-18.24928	220.2224	-190.4443	41.5557	78.95457	0.508	966.3114
1/12/2012 17:00	1.771901	329.1421	19.99295	-18.73102	220.2549	-190.2459	41.7541	81.35842	1.524	966.7419
1/12/2012 18:00	2.181418	323.4891	18.50747	-19.36773	220.2613	-190.1772	41.8228	77.80682	0.508	967.1442
1/12/2012 19:00	1.664499	322.2901	15.57571	-20.64561	220.2839	-190.5358	41.4642	80.90207	0	967.3647
1/12/2012 20:00	1.475695	315.5288	6.734747	-22.35149	220.0341	-189.2233	42.7767	82.33522	0	967.5048
1/12/2012 21:00	0.9272956	324.2866	13.03608	-21.37493	220.0138	-189.9253	42.0747	82.36422	0	967.5735
1/12/2012 22:00	0.7836239	336.8515	18.95299	-21.22198	220.1631	-190.4443	41.5557	80.87002	0	967.4784
1/12/2012 23:00	0.9807385	318.8762	7.409098	-22.90201	220.2525	-190.3222	41.6778	83.04797	0	967.3924

1/13/2012 0:00	0.9161311	306.269	7.109805	-23.82205	220.1609	-190.3145	41.6855	79.7589	0	967.067
1/13/2012 1:00	0.8830455	303.3875	8.817034	-24.97519	219.9952	-189.643	42.357	77.35506	0	966.7747
1/13/2012 2:00	0.8736612	313.3672	7.326436	-26.64616	220.0184	-190.0169	41.9831	78.89809	0	966.8334
1/13/2012 3:00	0.8216567	309.3937	7.816363	-27.63835	219.9129	-189.2538	42.7462	79.99853	0	966.8841
1/13/2012 4:00	0.3372107	317.4059	16.17426	-28.07741	219.9148	-189.8262	42.1738	77.64046	0	966.9924
1/13/2012 5:00	0.3719028	315.9154	4.309465	-29.4726	219.8108	-189.704	42.296	77.15816	0	966.7896
1/13/2012 6:00	0.3443024	311.0078	45.71782	-30.53429	219.7177	-195.748	36.252	77.24975	0	966.718
1/13/2012 7:00	0.2433581	320.2197	15.49113	-30.74147	220.0177	-189.4217	42.5783	77.37795	0	966.7318
1/13/2012 8:00	0.02522276	109.4795	9.405048	-29.82775	219.8739	-190.0703	41.9297	77.12611	0	966.6099
1/13/2012 9:00	0	0	0	-27.76731	220.2427	-190.0932	41.9068	76.74914	0	966.6499
1/13/2012 10:00	0.1158079	125.7273	5.444733	-25.63052	220.6225	-191.1158	40.8842	77.41916	0	966.7689
1/13/2012 11:00	0.7019375	128.2308	13.00961	-24.18968	220.9532	-191.6882	40.3118	79.07056	0	966.6959
1/13/2012 12:00	0.6018569	136.6281	24.59261	-21.22995	221.5181	-191.1082	40.8918	74.61391	0	966.1645
1/13/2012 13:00	0.7581362	136.1125	40.94408	-19.86836	221.6025	-191.5203	40.4797	76.33399	0	965.2874
1/13/2012 14:00	1.264603	137.2427	18.48921	-19.06712	221.5029	-191.1998	40.8002	72.79461	0	964.6194
1/13/2012 15:00	0.8731532	148.2145	21.9765	-18.37912	221.4803	-190.9937	41.0063	75.79369	0	964.5544
1/13/2012 16:00	0.5917836	146.0292	14.91672	-18.20217	221.2606	-191.1387	40.8613	77.01928	0	964.5957
1/13/2012 17:00	0.09891108	139.7799	55.85298	-18.20988	221.0859	-191.0395	40.9605	81.77355	0	964.9372
1/13/2012 18:00	0.7655433	126.9101	92.30574	-19.27845	220.9502	-191.4821	40.5179	82.84805	0.508	965.3205
1/13/2012 19:00	0.9216074	145.9826	14.53084	-19.41385	220.9315	-190.9556	41.0444	83.1716	0	964.9464
1/13/2012 20:00	0.668446	153.6868	10.84124	-19.02151	221.0159	-191.0777	40.9223	82.69083	0	965.0965
1/13/2012 21:00	0.2800533	148.0573	10.81208	-18.60343	221.1756	-190.5969	41.4031	82.50463	0	965.0386
1/13/2012 22:00	0.5093673	153.4088	11.32055	-18.74949	221.0504	-191.4134	40.5866	81.37063	0	965.1753
1/13/2012 23:00	0.8542221	155.9724	14.96205	-18.71458	221.1917	-191.1998	40.8002	81.7125	0	964.9617
1/14/2012 0:00	0.9123619	154.197	15.09708	-18.77155	221.1994	-191.1311	40.8689	81.96281	0	964.6718
1/14/2012 1:00	0.6710851	145.7923	13.29601	-18.74879	221.2159	-191.299	40.701	82.35353	0	964.5321
1/14/2012 2:00	0.736934	147.8882	10.18318	-18.67187	221.2543	-191.0243	40.9757	82.35049	0	964.4627
1/14/2012 3:00	0.5936885	152.0193	14.30598	-18.481	221.2517	-190.9937	41.0063	82.36116	0	964.8301
1/14/2012 4:00	0.6609096	149.5861	14.74778	-18.37458	221.4364	-191.6271	40.3729	82.68015	0	965.0661
1/14/2012 5:00	0.9455578	147.3147	13.85227	-18.3643	221.6471	-191.505	40.495	83.22808	0	964.9833
1/14/2012 6:00	0.8152279	140.9862	16.75758	-18.26903	221.5947	-191.2532	40.7468	83.48449	0	965.1953
1/14/2012 7:00	0.8704699	138.5716	19.27954	-18.16933	221.6286	-191.5661	40.4339	82.7641	0	965.5122
1/14/2012 8:00	0.9900864	148.3836	13.67506	-18.17571	221.5496	-191.5737	40.4263	83.01745	0	965.6208
1/14/2012 9:00	0.7630548	137.5024	18.13246	-17.95474	221.6984	-192.0011	39.9989	81.07301	0	965.9854
1/14/2012 10:00	0.879144	135.5479	17.09217	-17.2701	221.9911	-191.1998	40.8002	78.06934	0	966.3315
1/14/2012 11:00	0.9646118	130.6184	21.53807	-16.1284	222.5253	-189.5438	42.4562	73.34254	0	966.6289
1/14/2012 12:00	0.9834084	122.8885	23.80334	-14.5398	223.0018	-191.2608	40.7392	75.50372	0	966.5117
1/14/2012 13:00	1.219891	149.4039	31.05521	-12.95808	222.9525	-194.0081	37.9919	69.95731	0	966.2728
1/14/2012 14:00	0.937879	140.5356	35.03872	-12.86406	222.5066	-188.0862	43.9138	69.53454	0	966.2222
1/14/2012 15:00	1.139424	137.6215	22.90482	-12.34972	223.3284	-192.7489	39.2511	71.28057	6.096001	966.5084
1/14/2012 16:00	0.5028763	157.7868	15.53607	-13.46601	222.1598	-191.65	40.35	77.03302	0.508	966.8204
1/14/2012 17:00	0.7587778	118.7851	28.7801	-14.07749	221.8128	-191.9705	40.0295	82.33675	0	967.2281
1/14/2012 18:00	1.016091	118.8113	23.45966	-14.64436	221.8105	-191.6882	40.3118	83.04034	0	967.6287
1/14/2012 19:00	0.969448	113.7243	22.55514	-14.88241	221.9768	-191.8713	40.1287	84.73449	0	967.7086
1/14/2012 20:00	1.186223	131.404	23.50611	-15.02979	221.8146	-191.7187	40.2813	84.94358	0	967.7307
1/14/2012 21:00	1.055938	132.8727	21.80571	-15.10924	221.6864	-191.8103	40.1897	85.38925	0	967.873
1/14/2012 22:00	0.8184671	132.6322	22.42521	-15.13055	221.7516	-191.7492	40.2508	85.22441	0	967.9177
1/14/2012 23:00	0.679288	129.0623	21.13512	-15.15896	221.7723	-191.4974	40.5026	85.70061	0	968.016
1/15/2012 0:00	0.7651101	117.4216	19.08755	-15.30695	221.8649	-192.1232	39.8768	86.16458	0	967.6777
1/15/2012 1:00	0.9054299	122.8426	16.45039	-15.28641	221.8074	-191.7492	40.2508	86.59805	0	967.2992
1/15/2012 2:00	0.9958306	136.3876	13.33786	-15.50094	221.8948	-191.8484	40.1516	87.02692	0	967.0757
1/15/2012 3:00	0.7540655	123.9383	11.47511	-16.38169	221.7721	-191.5661	40.4339	87.99456	0	967.0302
1/15/2012 4:00	0.8697753	123.1703	15.72607	-16.22999	221.6217	-191.5203	40.4797	87.16581	0	966.7087
1/15/2012 5:00	1.127162	133.7055	13.43208	-15.7833	221.8529	-191.6958	40.3042	87.34896	0	966.3946
1/15/2012 6:00	1.119162	140.1909	15.50655	-15.28963	221.6729	-191.734	40.266	87.44817	0	965.8036
1/15/2012 7:00	1.035137	143.5862	17.75231	-14.63598	222.0583	-192.1537	39.8463	87.26958	0	965.5096
1/15/2012 8:00	1.148651	147.3691	15.46043	-14.23028	222.1092	-191.8713	40.1287	87.73968	0	965.0632
1/15/2012 9:00	0.9517865	144.9489	16.87815	-13.6671	222.2778	-192.2453	39.7547	87.41458	0	964.4959
1/15/2012 10:00	1.024837	140.2555	21.12227	-12.56564	222.5627	-193.0313	38.9687	85.65329	0	964.1219
1/15/2012 11:00	1.462387	147.5717	19.56729	-11.38793	223.3058	-193.7334	38.2666	83.75616	0	963.4631
1/15/2012 12:00	1.476665	143.6379	21.34844	-9.806	223.9065	-194.0081	37.9919	84.27813	0	962.4128
1/15/2012 13:00	1.270059	143.0452	20.60904	-8.76191	224.1121	-194.4659	37.5341	81.66977	0	961.4088
1/15/2012 14:00	1.552105	144.5794	21.58073	-7.242559	223.3175	-192.1155	39.8845	83.74395	0	960.3977
1/15/2012 15:00	1.617899	144.2148	19.05418	-7.182769	222.3286	-192.4208	39.5792	88.16245	0	959.4474
1/15/2012 16:00	1.943085	131.6182	21.29184	-7.30517	222.1092	-191.6348	40.3652	90.44115	0	957.7776
1/15/2012 17:00	2.202641	124.1559	19.69432	-7.434518	222.1063	-192.4208	39.5792	92.70763	0	956.6035
1/15/2012 18:00	2.522569	132.3046	20.58504	-7.383593	223.9093	-196.0075	35.9925	93.10598	0	955.1644
1/15/2012 19:00	2.082543	148.6929	19.06219	-7.07353	223.1807	-192.2376	39.7624	94.40482	0	954.395
1/15/2012 20:00	2.041741	145.0738	20.85842	-6.771255	221.887	-191.3066	40.6934	94.5895	0	952.7369
1/15/2012 21:00	2.336237	150.8875	20.512	-6.323286	221.3389	-192.9855	39.0145	94.22778	0	950.9379
1/15/2012 22:00	1.326914	162.6212	26.0793	-5.717826	215.4506	-7.838814	40	96.21191	0	951.0994
1/15/2012 23:00	1.35761	154.0179	17.04452	-5.351198	204.4053	-191.7034	40.2966	96.08065	0	950.0844
1/16/2012 0:00	0.9388542	179.3474	31.08831	-4.837413	220.1098	-189.7498	42.2502	97.13071	0	949.485
1/16/2012 1:00	1.21415	209.7647	37.56797	-4.166469	219.7097	-188.9486	43.0514	97.7519	0	949.116

1/16/2012 2:00	2.052509	254.7869	29.58448	-3.611871	219.136	-189.0172	42.9828	97.19023	0	949.3071
1/16/2012 3:00	4.405012	292.0943	16.94573	-4.356011	216.9955	-195.6946	36.3054	91.02723	0	949.9744
1/16/2012 4:00	6.608678	298.0671	13.24426	-6.513025	221.5577	-187.1171	44.8829	89.5025	0	951.4554
1/16/2012 5:00	6.816314	299.078	12.62529	-10.45215	217.3066	-187.1705	44.8295	86.00433	0	953.6626
1/16/2012 6:00	6.14889	300.2886	13.01599	-12.53657	217.1872	-186.8194	45.1806	83.52874	0	955.5263
1/16/2012 7:00	5.729567	303.7586	11.91842	-14.03397	216.6841	-186.7507	45.2493	84.53455	0	957.4455
1/16/2012 8:00	4.714898	302.8724	11.15599	-15.19417	216.4529	-186.2852	45.7148	85.88528	0	958.6551
1/16/2012 9:00	4.278225	303.3845	11.45422	-16.20958	216.2641	-186.621	45.379	84.53455	0	959.6495
1/16/2012 10:00	4.981965	302.2247	11.61781	-16.43124	216.4883	-186.5676	45.4324	83.689	0	960.9866
1/16/2012 11:00	4.350076	299.9995	13.82786	-16.37458	216.6954	-187.0789	44.9211	81.98266	0	962.0978
1/16/2012 12:00	3.633766	300.0303	15.52505	-16.13671	216.8951	-182.233	49.767	77.87093	0	962.9373
1/16/2012 13:00	4.474099	301.1252	13.2023	-15.90058	217.1221	-187.4452	44.5548	79.08125	0	963.3193
1/16/2012 14:00	3.807026	303.048	13.93642	-15.43642	216.8745	-187.2926	44.7074	78.64321	0	964.0425
1/16/2012 15:00	3.71777	305.91	13.20241	-15.96409	217.066	-187.1171	44.8829	79.83827	0	964.5798
1/16/2012 16:00	3.519623	312.0581	15.17039	-16.69316	216.9744	-186.7737	45.2263	81.4332	0	965.4181
1/16/2012 17:00	2.942434	310.5972	16.37474	-17.383	216.8693	-187.3002	44.6998	82.94114	0	966.7374
1/16/2012 18:00	2.801523	312.3693	11.33144	-18.43256	216.8994	-186.4989	45.5011	84.67954	0	967.7949
1/16/2012 19:00	2.343633	303.6634	10.97129	-19.57417	216.8656	-186.7889	45.2111	84.03852	0	968.7038
1/16/2012 20:00	2.412044	308.1487	11.1704	-19.73506	216.8544	-186.8652	45.1348	84.01409	0	969.1891
1/16/2012 21:00	2.026325	308.8496	8.800547	-20.69966	216.8673	-186.0792	45.9208	84.66885	0	969.7091
1/16/2012 22:00	1.868092	310.3276	8.141815	-21.84302	216.7399	-186.8118	45.1882	81.99334	0	970.1741
1/16/2012 23:00	1.94903	312.0826	8.177671	-22.59909	216.5207	-186.7737	45.2263	81.87734	0	970.3857
1/17/2012 0:00	1.668352	312.4215	7.200123	-24.10717	216.5387	-185.8503	46.1497	81.99487	0	970.8012
1/17/2012 1:00	1.011018	313.201	7.351565	-24.72802	216.3638	-185.6747	46.3253	81.2058	0	970.9156
1/17/2012 2:00	0.5978679	316.6298	11.83723	-25.19467	215.9582	-186.3234	45.6766	83.95152	0	971.0511
1/17/2012 3:00	0.5529867	333.2323	23.44181	-24.75588	216.1527	-186.2318	45.7682	80.80897	0	971.8051
1/17/2012 4:00	0.3971431	304.0687	14.71886	-24.35079	216.2938	-186.621	45.379	80.07178	0	971.8356
1/17/2012 5:00	0.2944616	324.5522	17.57596	-24.3453	216.3367	-186.5829	45.4171	80.21983	0	971.2217
1/17/2012 6:00	0.899959	318.0181	19.05964	-24.23958	216.2911	-186.7889	45.2111	82.80225	0	971.0397
1/17/2012 7:00	0.3662434	288.7441	16.46555	-23.79976	216.4872	-186.7202	45.2798	82.50768	0	970.7712
1/17/2012 8:00	1.148837	295.6717	14.05912	-23.29058	216.5018	-186.8423	45.1577	83.49517	0	970.7653
1/17/2012 9:00	0.7717398	284.6071	19.12354	-22.66239	216.7662	-186.972	45.028	82.97778	0	970.5886
1/17/2012 10:00	1.621786	292.0858	17.17371	-21.81413	217.2061	-187.6741	44.3259	81.38284	0	970.5884
1/17/2012 11:00	1.632467	286.2077	23.37706	-21.05003	217.642	-187.5062	44.4938	79.10873	0	970.4869
1/17/2012 12:00	2.335328	296.3393	17.67651	-20.57746	218.2287	-188.0023	43.9977	76.95975	0	970.0577
1/17/2012 13:00	2.532166	290.5995	18.61857	-20.25681	217.8376	-188.7272	43.2728	73.49669	0	969.4128
1/17/2012 14:00	3.135386	294.0227	16.01858	-20.23369	218.9096	-188.4983	43.5017	73.62643	0	968.9287
1/17/2012 15:00	3.264792	294.6862	17.10637	-20.70225	217.919	-187.1094	44.8906	73.06628	0	968.8792
1/17/2012 16:00	3.168857	289.4953	16.90263	-22.08648	217.1503	-187.2086	44.7914	74.18503	0	969.282
1/17/2012 17:00	2.757668	293.4656	13.96379	-23.7405	216.7717	-186.5752	45.4248	75.60139	0	969.7811
1/17/2012 18:00	2.29142	292.5544	11.60652	-25.08712	216.5471	-186.0563	45.9437	77.09865	0	969.842
1/17/2012 19:00	2.349056	295.8897	10.9906	-26.22119	216.4336	-186.4379	45.5621	77.85262	0	969.8714
1/17/2012 20:00	2.344733	293.8382	11.70938	-27.06157	216.3537	-186.9186	45.0814	77.35354	0	970.0287
1/17/2012 21:00	2.782662	295.6382	13.24624	-27.49509	216.4213	-185.9876	46.0124	76.8056	0	969.9248
1/17/2012 22:00	2.121332	290.2208	18.0752	-27.6705	216.3912	-186.8957	45.1043	77.16885	0	969.8167
1/17/2012 23:00	2.271624	298.8745	13.06742	-27.76047	216.4319	-186.476	45.524	76.88955	0	969.5658
1/18/2012 0:00	2.729918	301.0956	12.43212	-27.86943	216.4031	-186.2471	45.7529	76.07148	0	969.3157
1/18/2012 1:00	2.323318	294.3862	11.64056	-28.58344	216.4576	-185.6442	46.3558	76.30347	0	969.2893
1/18/2012 2:00	2.258534	298.0111	10.29603	-29.65192	216.3338	-186.2395	45.7605	75.41213	0	969.3112
1/18/2012 3:00	1.510253	289.1938	14.33744	-30.7365	216.2287	-186.5142	45.4858	75.29003	0	968.9875
1/18/2012 4:00	0.5676396	245.6072	18.8357	-31.76783	216.048	-186.0181	45.9819	76.99944	0	968.5637
1/18/2012 5:00	0.5829324	221.9044	12.78823	-32.83115	215.8749	-185.6442	46.3558	76.74303	0	968.1238
1/18/2012 6:00	0.6944665	236.9915	13.21624	-33.26444	215.8578	-185.98	46.02	74.86879	0	967.7163
1/18/2012 7:00	0.1786631	235.5036	8.375196	-33.96387	215.8525	-185.5603	46.4397	75.69907	0	967.4855
1/18/2012 8:00	0.1799585	183.6774	7.831616	-33.19761	215.974	-186.4073	45.5927	75.20303	0	967.36
1/18/2012 9:00	0.1275885	159.3176	18.07256	-32.37209	216.2274	-186.0105	45.9895	74.81995	0	967.408
1/18/2012 10:00	0.08998387	147.0961	9.088453	-30.51884	216.6516	-186.7126	45.2874	72.1948	0	966.7917
1/18/2012 11:00	0.549581	248.1699	94.39462	-29.02933	217.1469	-187.0484	44.9516	71.24853	0	966.3174
1/18/2012 12:00	0.7609254	293.0031	35.58455	-28.2085	217.3581	-187.6283	44.3717	67.68929	0	965.5526
1/18/2012 13:00	0.9072646	317.7314	15.46244	-27.62345	217.2435	-187.262	44.738	65.30987	0	964.0935
1/18/2012 14:00	0.9089088	317.378	14.78623	-27.04428	217.2947	-187.2697	44.7303	64.52843	0	962.9648
1/18/2012 15:00	0.8594765	321.3712	15.27582	-26.77209	217.2089	-186.7355	45.2645	65.99516	0	962.0063
1/18/2012 16:00	0.6151024	319.662	14.67558	-26.75125	217.1299	-186.9263	45.0737	68.49516	0	961.247
1/18/2012 17:00	0.2310808	256.9791	23.1885	-26.98013	216.9512	-186.621	45.379	73.49516	0	960.9557
1/18/2012 18:00	0.2602272	243.0016	9.843102	-27.21724	216.8785	-187.6283	44.3717	74.04003	0	961.1376
1/18/2012 19:00	0.7687575	286.8525	15.0277	-27.13269	216.9775	-186.7431	45.2569	75.09772	0	961.0178
1/18/2012 20:00	1.80257	302.7523	7.861857	-27.44696	216.9461	-187.2926	44.7074	76.11421	0	960.9484
1/18/2012 21:00	2.291724	300.17	9.327846	-28.23432	216.908	-187.2315	44.7685	76.55376	0	960.6718
1/18/2012 22:00	1.805537	295.6615	9.745704	-29.15721	216.8231	-186.8347	45.1653	76.88497	0	960.3484
1/18/2012 23:00	1.710391	285.0572	10.23615	-30.12312	216.7506	-186.7431	45.2569	76.93686	0	960.1917
1/19/2012 0:00	1.830236	281.4672	12.23677	-30.74319	216.6062	-186.6592	45.3408	77.27416	0	959.9879
1/19/2012 1:00	1.546186	272.9231	16.65732	-31.1812	216.5993	-186.6286	45.3714	77.22838	0	960.112
1/19/2012 2:00	1.355767	268.8123	16.61273	-31.45102	216.6121	-186.5523	45.4477	76.45609	0	960.1038
1/19/2012 3:00	0.5130741	218.4416	23.785	-32.29231	216.3037	-185.8579	46.1421	74.1774	0	960.0217

1/19/2012 4:00	0.282616	188.4782	21.52504	-33.52056	216.4681	-185.98	46.02	76.91396	0	960.034
1/19/2012 5:00	0.411395	150.2954	29.81873	-34.55477	216.393	-186.186	45.814	74.81995	0	959.9838
1/19/2012 6:00	0.2890265	152.4951	30.67917	-35.26077	216.3371	-186.2318	45.7682	73.94083	0	960.2515
1/19/2012 7:00	0.407761	166.8676	36.76842	-35.33631	216.281	-186.4379	45.5621	76.01196	0	960.1482
1/19/2012 8:00	0.5964312	217.158	18.75283	-35.19255	216.3483	-185.6824	46.3176	76.36604	0	960.1718
1/19/2012 9:00	1.253282	241.4288	22.41599	-32.74825	216.2574	-186.621	45.379	74.94205	0	960.685
1/19/2012 10:00	1.199728	230.3297	28.24923	-31.25341	216.9771	-187.201	44.799	73.81873	0	960.7329
1/19/2012 11:00	1.550916	251.5884	29.00239	-29.39837	217.5087	-178.5624	53.4376	72.95334	0	960.8194
1/19/2012 12:00	1.864728	250.89	31.51057	-27.84701	217.6319	-187.4223	44.5777	70.67464	0	960.5546
1/19/2012 13:00	2.036925	249.6789	28.81034	-25.73634	217.9868	-187.8725	44.1275	69.97105	0	959.9006
1/19/2012 14:00	2.269007	261.6144	26.80111	-24.49411	218.1644	-189.3148	42.6852	69.0965	0	959.5178
1/19/2012 15:00	2.118121	253.8552	27.35831	-24.10792	218.1667	-187.5978	44.4022	70.21677	0	959.674
1/19/2012 16:00	1.789344	243.8967	27.59244	-24.35117	217.6605	-187.4528	44.5472	72.26653	0	959.923
1/19/2012 17:00	0.8044907	226.4702	23.16848	-25.12976	217.3123	-187.201	44.799	77.37948	0	960.2379
1/19/2012 18:00	0.7566263	206.1938	20.02296	-26.11096	216.9214	-186.2166	45.7834	78.56995	0	960.4759
1/19/2012 19:00	0.904237	199.1959	19.67979	-26.60831	216.9657	-187.056	44.944	79.997	0	960.3556
1/19/2012 20:00	0.9447676	211.8397	21.77745	-27.03148	216.8969	-186.7355	45.2645	79.17741	0	960.2457
1/19/2012 21:00	1.358549	237.2372	26.37741	-26.85051	216.9348	-187.2239	44.7761	78.71037	0	960.5694
1/19/2012 22:00	1.857025	246.0465	24.44283	-26.40459	217.0707	-186.5905	45.4095	77.46189	0	960.849
1/19/2012 23:00	1.865249	245.3216	21.13402	-26.6466	217.0976	-186.6515	45.3485	77.14748	0	960.8979
1/20/2012 0:00	1.614541	246.8861	22.70934	-27.05447	217.1162	-186.8042	45.1958	77.71068	0	961.0693
1/20/2012 1:00	1.315096	235.9753	25.83789	-27.47502	217.1004	-187.5062	44.4938	77.04828	0	961.1878
1/20/2012 2:00	0.8820544	218.9716	24.40474	-27.89495	216.9872	-186.6897	45.3103	77.64199	0	961.3547
1/20/2012 3:00	0.7768361	227.9126	21.07743	-28.28779	216.9419	-186.8881	45.1119	77.42068	0	961.6292
1/20/2012 4:00	0.8222157	225.1618	18.79667	-28.79359	216.8357	-187.4147	44.5853	78.19602	0	961.9281
1/20/2012 5:00	0.9123259	220.814	20.66325	-29.08592	216.9592	-186.7202	45.2798	78.31355	0	962.3137
1/20/2012 6:00	0.9332207	211.1462	18.3822	-29.32944	216.9146	-187.1705	44.8295	77.9045	0	962.5662
1/20/2012 7:00	0.8845709	204.7773	16.36779	-29.91837	216.9069	-187.0484	44.9516	78.36849	0	962.9026
1/20/2012 8:00	1.102028	211.1624	21.25654	-29.70243	216.8313	-187.2086	44.7914	77.71983	0	963.1364
1/20/2012 9:00	1.077925	232.4969	21.07866	-29.12901	216.9941	-187.4147	44.5853	77.58552	0	963.6332
1/20/2012 10:00	1.322945	256.5788	24.4252	-27.477	217.6797	-187.6894	44.3106	77.30316	0	964.4281
1/20/2012 11:00	2.165001	256.1017	24.64417	-25.71398	218.0423	-202.433	29.567	75.29461	0	964.9493
1/20/2012 12:00	2.228234	263.4769	23.6673	-23.67955	218.7925	-189.3377	42.6623	73.71037	0	964.942
1/20/2012 13:00	2.337872	266.0609	24.01468	-21.70862	218.9456	-188.4525	43.5475	72.39474	0	964.8493
1/20/2012 14:00	2.780855	270.4757	24.48459	-20.42859	218.5704	-189.1851	42.8149	73.62337	0	964.852
1/20/2012 15:00	3.218655	289.5119	20.48608	-20.65335	218.7086	-188.4144	43.5856	69.41396	0	965.1638
1/20/2012 16:00	2.075448	273.9998	22.97263	-20.89475	218.319	-188.3609	43.6391	75.43197	0	965.6428
1/20/2012 17:00	1.579066	253.6098	20.78092	-21.62875	218.2251	-187.7886	44.2114	77.6832	0	966.2508
1/20/2012 18:00	1.146478	240.26	20.50061	-22.82489	217.9127	-187.7581	44.2419	79.47197	0	966.5181
1/20/2012 19:00	1.717131	242.5133	19.81029	-23.1888	217.775	-187.5826	44.4174	80.41977	0	966.6729
1/20/2012 20:00	1.71975	246.3422	21.6276	-23.23803	217.8889	-187.5062	44.4938	80.15115	0	966.8174
1/20/2012 21:00	2.04022	253.5915	24.11129	-23.27069	217.9171	-187.1476	44.8524	79.12399	0	967.1075
1/20/2012 22:00	2.109118	261.7516	20.60684	-23.37531	218.0803	-188.0862	43.9138	79.49334	0	967.2374
1/20/2012 23:00	1.937592	262.6007	19.30326	-24.12612	218.0713	-188.0175	43.9825	78.88589	0	967.3248
1/21/2012 0:00	1.739434	248.5558	21.79186	-24.661	217.99	-187.636	44.364	79.79858	0	967.6036
1/21/2012 1:00	1.547724	244.4106	23.4718	-24.95511	218.0358	-187.7199	44.2801	80.08857	0	967.6279
1/21/2012 2:00	1.057674	228.6854	20.40471	-25.77488	217.8375	-187.9718	44.0282	81.27905	0	967.543
1/21/2012 3:00	1.150387	227.8857	22.09809	-26.06412	217.9163	-188.4525	43.5475	79.57575	0	967.242
1/21/2012 4:00	0.9154244	205.6038	18.36162	-26.82738	217.9413	-188.0328	43.9672	77.48631	0	967.0198
1/21/2012 5:00	0.8525518	202.236	17.2916	-27.44117	217.8859	-188.0557	43.9443	80.3633	0	966.8408
1/21/2012 6:00	0.7175943	180.6281	32.60451	-26.1783	218.1317	-187.9565	44.0435	78.64169	0	966.8962
1/21/2012 7:00	0.8188433	154.4893	10.93461	-26.4096	218.1464	-187.9336	44.0664	78.46465	0	966.811
1/21/2012 8:00	0.829901	146.614	12.17893	-25.89868	218.0846	-188.2083	43.7917	79.19724	0	966.8531
1/21/2012 9:00	0.8351964	166.5058	14.54823	-24.73054	218.241	-188.5975	43.4025	78.45548	0	966.8942
1/21/2012 10:00	0.7123759	166.3834	19.32071	-22.90182	218.5629	-189.208	42.792	77.24975	0	966.6827
1/21/2012 11:00	0.9315328	172.4672	23.0672	-20.73991	218.8124	-189.3759	42.6241	75.29003	0	966.7049
1/21/2012 12:00	1.339529	187.5967	32.15286	-18.79647	219.1587	-189.1622	42.8378	71.33704	0	966.1137
1/21/2012 13:00	1.627411	193.5627	29.05644	-17.60652	219.3854	-188.9714	43.0286	68.41732	0	965.6891
1/21/2012 14:00	1.257319	189.3781	32.46469	-16.86235	219.4935	-189.6659	42.3341	69.31933	0	965.0359
1/21/2012 15:00	1.061283	169.1012	26.38151	-16.45251	219.5715	-189.6735	42.3265	68.76988	0	964.6668
1/21/2012 16:00	1.015321	162.6995	24.25093	-16.47277	219.3806	-189.3988	42.6012	68.85078	0	964.3118
1/21/2012 17:00	1.19465	153.5317	15.06954	-16.93739	219.2302	-189.2157	42.7843	74.38802	0	963.7106
1/21/2012 18:00	1.74041	152.1489	16.4954	-17.18921	219.6497	-190.9327	41.0673	79.55897	0	963.3901
1/21/2012 19:00	1.843526	149.6823	16.7974	-17.47194	219.9126	-188.7349	43.2651	81.40725	0	963.0469
1/21/2012 20:00	1.515912	144.6502	19.3444	-17.44127	218.6087	-188.8951	43.1049	83.38833	0	962.5661
1/21/2012 21:00	1.506759	133.1548	19.93666	-17.17937	218.9942	-189.6735	42.3265	83.62948	0	961.9964
1/21/2012 22:00	1.378992	128.5945	20.24307	-16.85592	219.0172	-188.1549	43.8451	84.26592	0	961.7195
1/21/2012 23:00	1.64225	126.5894	18.48744	-16.67149	218.0359	-187.8725	44.1275	84.17588	0	961.1044
1/22/2012 0:00	1.661286	125.6419	18.56186	-16.49083	218.0659	-187.8496	44.1504	84.41856	0	960.2374
1/22/2012 1:00	1.471466	121.0584	19.31789	-15.92902	218.0291	-188.0862	43.9138	84.70396	0	959.9603
1/22/2012 2:00	1.509742	124.1301	19.14025	-15.47758	218.4764	-188.422	43.578	85.14505	0	959.5978
1/22/2012 3:00	1.51915	122.0864	17.36528	-15.3634	218.4827	-188.4601	43.5399	85.78608	0	959.0828
1/22/2012 4:00	1.289571	117.4537	18.0717	-15.00329	218.5342	-188.2999	43.7001	86.00127	0	958.8541
1/22/2012 5:00	1.561596	119.6968	16.92102	-14.51896	218.5713	-188.3915	43.6085	86.32332	0	958.6392

1/22/2012 6:00	1.149724	113.6143	19.81354	-14.1256	218.6651	-189.0096	42.9904	87.01929	0	958.8198
1/22/2012 7:00	1.057656	104.0883	23.44138	-13.80832	218.9321	-189.1241	42.8759	87.0086	0	958.5147
1/22/2012 8:00	1.307945	101.95	21.45889	-13.66024	219.0152	-189.1088	42.8912	87.16581	0	958.2469
1/22/2012 9:00	1.210407	106.0634	19.66829	-13.48025	219.1599	-189.0096	42.9904	86.60567	0	958.6016
1/22/2012 10:00	1.10803	119.1188	22.43379	-12.59647	218.9289	-189.3072	42.6928	83.81416	0	958.6756
1/22/2012 11:00	1.219253	103.2986	26.38805	-11.30437	219.6264	-189.8719	42.1281	80.22746	0	958.425
1/22/2012 12:00	1.564434	78.69568	25.47357	-10.25394	219.8955	-189.9406	42.0594	79.67344	0	958.4034
1/22/2012 13:00	2.012172	81.55173	23.71725	-9.588606	219.6419	-191.1616	40.8384	79.71617	0	957.8588
1/22/2012 14:00	1.930088	82.38888	24.18589	-8.914298	220.3591	-190.223	41.777	81.03332	0	957.7764
1/22/2012 15:00	1.873789	67.45813	26.94235	-8.650413	220.5469	-190.8106	41.1894	81.1829	0	957.5685
1/22/2012 16:00	2.0607	68.98303	25.64728	-9.107203	220.4659	-190.513	41.487	84.92985	0	957.5251
1/22/2012 17:00	1.770889	67.59509	26.11758	-9.581752	220.3271	-190.4214	41.5786	87.35049	0	957.759
1/22/2012 18:00	2.033988	70.80312	25.61945	-10.10553	220.2019	-190.2916	41.7084	87.69541	0	958.0496
1/22/2012 19:00	2.096621	81.65474	26.20217	-10.58251	220.1044	-190.2611	41.7389	88.43107	0	958.2316
1/22/2012 20:00	1.969157	78.93749	23.60041	-10.88745	220.0522	-190.3145	41.6855	88.85995	0	958.4453
1/22/2012 21:00	1.589046	75.38392	23.68704	-10.84683	220.0813	-190.0093	41.9907	88.87978	0	958.3909
1/22/2012 22:00	1.490219	64.99674	27.11521	-10.89862	220.0834	-190.2688	41.7312	88.77905	0	958.1384
1/22/2012 23:00	1.845213	61.05377	25.80523	-11.23882	219.8305	-189.7117	42.2883	88.70885	0	957.8903
1/23/2012 0:00	1.830927	72.76385	23.34703	-11.59015	219.8239	-190.0093	41.9907	88.47228	0	957.6667
1/23/2012 1:00	1.799386	70.16743	25.83182	-11.73376	220.012	-190.1161	41.8839	88.83247	0	957.5347
1/23/2012 2:00	1.365569	54.5234	29.29121	-11.776	220.1842	-190.4138	41.5862	87.78088	0	957.7923
1/23/2012 3:00	1.309342	33.28212	30.59291	-11.90004	220.1828	-190.2001	41.7999	87.15207	0	957.5986
1/23/2012 4:00	1.6825	47.05593	31.4016	-12.21176	220.0206	-189.9253	42.0747	85.37856	0	957.0771
1/23/2012 5:00	1.831105	63.05872	25.74144	-12.53926	219.8596	-189.7651	42.2349	85.44267	0	957.4985
1/23/2012 6:00	1.632808	53.02687	32.49798	-12.82903	219.8525	-189.5819	42.4181	84.8688	0	957.7235
1/23/2012 7:00	1.408825	46.33788	28.53567	-13.32604	219.7448	-189.4064	42.5936	85.37093	0	957.5955
1/23/2012 8:00	1.643959	38.97211	31.34022	-13.71634	219.8332	-189.5819	42.4181	85.73266	0	957.4616
1/23/2012 9:00	1.528921	17.63085	29.04863	-13.90959	219.707	-189.9559	42.0441	84.09346	0	957.36
1/23/2012 10:00	1.640221	20.32027	33.72652	-13.87672	220.1505	-190.0093	41.9907	81.95366	0	957.3887
1/23/2012 11:00	1.549928	37.91291	34.72248	-13.51063	220.6399	-190.8945	41.1055	78.24791	0	957.332
1/23/2012 12:00	1.695276	11.70749	33.84062	-12.93703	220.8585	-190.9479	41.0521	77.34285	0	956.8782
1/23/2012 13:00	1.998343	1.842186	26.19356	-12.6483	220.7663	-190.719	41.281	76.99638	0	956.6733
1/23/2012 14:00	2.00086	359.1428	25.54246	-12.03444	220.4216	-190.5358	41.4642	76.33247	0	956.5446
1/23/2012 15:00	2.088759	344.0095	26.90478	-11.9477	220.6131	-191.5432	40.4568	80.99212	0	956.7607
1/23/2012 16:00	2.065266	342.7176	23.26083	-12.63998	220.5574	-190.078	41.922	81.01196	0	957.2035
1/23/2012 17:00	2.052197	342.9039	25.00611	-12.95035	219.8702	-189.5972	42.4028	83.33033	0	957.675
1/23/2012 18:00	1.953134	347.7501	24.56984	-13.05999	219.4778	-189.2233	42.7767	83.55316	0	958.6253
1/23/2012 19:00	1.8235	342.8084	23.98498	-13.22749	219.4229	-189.5819	42.4181	84.23693	0	959.4971
1/23/2012 20:00	2.606864	340.0439	19.50718	-13.6488	219.3202	-189.3683	42.6317	84.16825	0	960.105
1/23/2012 21:00	2.164684	347.2353	22.05315	-13.86392	219.1815	-189.414	42.586	84.38039	0	960.4512
1/23/2012 22:00	2.012393	341.9951	19.65281	-13.90625	219.1663	-189.3454	42.6546	84.51929	0	960.9125
1/23/2012 23:00	1.939929	335.7756	18.86732	-14.04098	219.1554	-188.6509	43.3491	84.76653	0	961.4869
1/24/2012 0:00	1.615984	342.0264	21.51547	-14.14643	219.2196	-189.208	42.792	85.12215	0	962.0604
1/24/2012 1:00	1.256256	326.1692	19.05974	-14.24699	219.3551	-189.5285	42.4715	84.65816	0	962.4333
1/24/2012 2:00	1.862584	314.6535	14.30037	-14.36833	219.3643	-189.5514	42.4486	84.00341	0	963.2734
1/24/2012 3:00	2.10906	312.9937	14.74279	-14.55059	219.5003	-189.498	42.502	80.65024	0.254	964.219
1/24/2012 4:00	1.91556	314.7132	13.67889	-14.71964	219.3677	-188.7883	43.2117	79.51012	0	964.8319
1/24/2012 5:00	1.672136	317.0287	16.44149	-14.83591	219.5535	-189.6582	42.3418	80.30988	0	965.4644
1/24/2012 6:00	1.535436	314.8138	14.35061	-14.83831	219.5455	-189.7651	42.2349	79.31782	0	966.22
1/24/2012 7:00	1.60204	314.3203	16.19319	-14.82174	219.5834	-189.7651	42.2349	78.24028	0	967.338
1/24/2012 8:00	0.6656314	324.827	22.53662	-14.64041	219.5602	-189.7117	42.2883	78.61117	0	967.7875
1/24/2012 9:00	1.280614	295.7927	12.90257	-14.51185	219.5748	-189.2309	42.7691	76.33552	0	968.6544
1/24/2012 10:00	0.5219075	289.4384	37.29451	-13.66159	219.6988	-189.9788	42.0212	70.04583	0	969.207
1/24/2012 11:00	0.577798	136.2498	40.0267	-12.21073	220.2065	-190.2535	41.7465	62.31079	0	969.5344
1/24/2012 12:00	1.044674	141.5	21.65511	-11.05492	220.4147	-190.4366	41.5634	58.39595	0	969.4852
1/24/2012 13:00	1.237417	137.2958	20.3583	-9.649829	220.5345	-191.9934	40.0066	57.19632	0	969.4504
1/24/2012 14:00	1.068585	144.7015	24.82844	-8.534458	220.9171	-190.7495	41.2505	50.16487	0	969.2212
1/24/2012 15:00	1.099267	148.7611	20.62613	-8.019323	220.6829	-190.6045	41.3955	53.42952	0	969.2672
1/24/2012 16:00	0.8859768	147.8286	17.60086	-8.419791	220.6559	-190.7114	41.2886	66.84986	0	969.4568
1/24/2012 17:00	1.077742	148.5109	14.91359	-9.02802	220.5513	-190.4672	41.5328	73.69053	0	969.4155
1/24/2012 18:00	1.440734	146.0136	14.90863	-9.897581	220.437	-190.5587	41.4413	74.96342	0	969.2524
1/24/2012 19:00	2.018182	153.3736	14.08412	-9.534245	220.4377	-190.3756	41.6244	74.53301	0	968.9446
1/24/2012 20:00	2.055601	152.9599	15.76511	-9.305093	220.4841	-190.4443	41.5557	74.27203	0	968.7231
1/24/2012 21:00	1.602619	155.1965	17.01129	-9.066419	220.5154	-190.5053	41.4947	79.35293	0	968.496
1/24/2012 22:00	1.31856	164.5868	19.59026	-9.346675	220.5997	-190.5893	41.4107	86.76288	0	968.12
1/24/2012 23:00	1.246636	153.3056	12.82307	-10.91372	220.4191	-190.6198	41.3802	89.33309	0	967.6104
1/25/2012 0:00	1.412691	154.0156	11.92794	-12.11715	220.3729	-190.4061	41.5939	92.46648	0	967.2442
1/25/2012 1:00	0.8685557	160.0872	14.63179	-11.83353	220.2214	-189.7575	42.2425	90.6945	0	966.9082
1/25/2012 2:00	0.9879571	155.0959	15.34317	-11.36268	220.3265	-189.8643	42.1357	92.50769	0	966.7363
1/25/2012 3:00	1.051359	157.5104	18.32188	-10.2688	220.5365	-190.6274	41.3726	91.6942	0	966.6224
1/25/2012 4:00	1.161449	162.4192	14.28681	-10.82571	220.43	-190.0093	41.9907	93.50128	0	966.3071
1/25/2012 5:00	1.646734	152.4129	13.84069	-11.41464	220.3136	-190.5358	41.4642	91.25006	0	965.8425
1/25/2012 6:00	1.63075	153.5422	15.6165	-11.75841	220.3144	-190.8335	41.1665	90.93259	0	965.5525
1/25/2012 7:00	1.238699	152.1308	19.23093	-12.73053	220.3105	-190.1314	41.8686	91.32179	0	965.1923

1/25/2012 8:00	1.357289	155.0346	11.54437	-13.47266	220.1847	-190.223	41.777	92.62979	0	964.5457
1/25/2012 9:00	1.573143	157.8733	14.75514	-11.98554	220.2801	-190.8716	41.1284	90.03821	0	963.8527
1/25/2012 10:00	1.67166	156.0405	19.18704	-9.144368	220.859	-190.9479	41.0521	86.59805	0	963.338
1/25/2012 11:00	1.867594	151.8585	17.36152	-6.441523	221.4955	-187.1476	44.8524	73.05713	0	962.6341
1/25/2012 12:00	1.669729	151.2226	21.2985	-3.195638	221.9309	-204.4553	27.5447	66.39046	0	961.7335
1/25/2012 13:00	1.854594	152.8743	22.00796	-0.9466565	221.8298	-194.1683	37.8317	59.96036	0	960.6514
1/25/2012 14:00	1.898693	153.3326	21.03291	-0.05203447	221.0049	-189.2385	42.7615	58.10138	0	959.7944
1/25/2012 15:00	2.594832	154.0131	18.40149	-0.199535	222.7089	-192.7413	39.2587	62.90907	0	958.842
1/25/2012 16:00	2.284545	155.7665	19.07866	-1.187204	222.0558	-192.4208	39.5792	70.70518	0	958.3566
1/25/2012 17:00	2.615254	155.8803	18.84995	-2.218445	222.2982	-191.9629	40.0371	78.2296	0	957.9445
1/25/2012 18:00	3.088967	156.6257	19.94933	-3.688285	222.7783	-191.1921	40.8079	89.57729	0	956.5878
1/25/2012 19:00	3.016581	153.0318	18.42625	-4.043818	222.1637	-192.23	39.77	95.69146	0	956.6385
1/25/2012 20:00	2.812751	153.0567	18.77489	-3.45253	222.294	-192.3445	39.6555	97.3688	0	955.4237
1/25/2012 21:00	2.879117	153.2429	19.55632	-2.79771	222.464	-192.1232	39.8768	97.2406	0	954.0982
1/25/2012 22:00	2.914039	154.7517	19.14355	-2.293378	222.5082	-192.375	39.625	96.0425	0	952.9434
1/25/2012 23:00	2.709856	154.4608	18.51121	-1.817921	222.5472	-192.1384	39.8616	93.60201	0	952.272
1/26/2012 0:00	2.748237	153.7426	17.62604	-1.651437	222.4283	-192.0926	39.9074	90.4854	0	951.6059
1/26/2012 1:00	3.001152	155.8227	19.17693	-1.640968	222.56	-192.375	39.625	87.86941	0	950.6817
1/26/2012 2:00	2.672471	156.7272	20.13287	-1.991904	223.1475	-193.7563	38.2437	94.70397	0	949.7897
1/26/2012 3:00	2.25205	157.0088	18.08694	-2.327026	224.1269	-196.0303	35.9697	97.26197	0	949.394
1/26/2012 4:00	2.217764	157.8532	20.11886	-2.354776	199.3037	-192.2605	39.7395	96.55379	0	948.75
1/26/2012 5:00	1.835083	165.9279	23.3323	-2.199947	222.2881	-190.1467	41.8533	97.68016	0	948.1903
1/26/2012 6:00	1.714032	169.8398	23.19495	-2.11127	219.7098	-189.0477	42.9523	98.28456	0	947.8546
1/26/2012 7:00	1.78732	178.3452	25.78011	-1.934384	219.2496	-188.857	43.143	98.40056	0	947.4664
1/26/2012 8:00	1.496753	182.3553	27.37596	-1.718674	219.107	-188.9104	43.0896	98.5837	0	947.1201
1/26/2012 9:00	1.375782	184.4237	26.76582	-1.587259	218.9619	-189.1699	42.8301	97.99304	0	946.7236
1/26/2012 10:00	1.347065	201.5316	30.2788	-1.339925	219.3304	-189.1927	42.8073	96.00281	0	946.5772
1/26/2012 11:00	1.327956	217.651	36.07099	-1.153855	219.5711	-189.9559	42.0441	95.21374	0	946.5453
1/26/2012 12:00	2.405069	249.6171	31.87599	-1.381859	219.6288	-189.2614	42.7386	91.28669	0	946.5516
1/26/2012 13:00	3.020582	262.6804	23.92981	-1.609124	219.2567	-188.7501	43.2499	86.98418	0	946.3806
1/26/2012 14:00	3.166126	255.8172	25.85389	-2.50644	219.2614	-188.9562	43.0438	85.87917	0	946.6525
1/26/2012 15:00	3.260589	268.4939	25.61034	-4.479113	218.9351	-188.9638	43.0362	87.44969	0	947.3794
1/26/2012 16:00	3.018821	269.2968	25.27373	-5.27608	219.1622	-189.498	42.502	90.98449	0	947.9359
1/26/2012 17:00	2.582282	271.6679	25.57151	-5.970049	218.6949	-187.8268	44.1732	90.2061	0	948.2275
1/26/2012 18:00	2.923533	277.4296	22.56733	-6.251871	218.3356	-188.422	43.578	89.05836	0	948.6267
1/26/2012 19:00	2.737399	276.8336	22.35081	-6.421102	218.2621	-187.7352	44.2648	90.42435	0	948.8413
1/26/2012 20:00	3.471823	284.4907	19.80894	-6.671271	217.9412	-187.7504	44.2496	90.95092	0	948.8451
1/26/2012 21:00	2.66497	288.9441	18.28793	-6.906267	217.8241	-188.071	43.929	90.54799	0	949.0104
1/26/2012 22:00	3.811191	292.4929	16.1062	-6.737767	218.035	-188.1091	43.8909	90.44572	0	949.2185
1/26/2012 23:00	4.219175	289.4012	17.89578	-6.648191	217.975	-187.9336	44.0664	87.85567	0	949.3688
1/27/2012 0:00	4.822316	290.6763	17.12142	-6.437602	217.6883	-187.7581	44.2419	89.60629	0	949.6947
1/27/2012 1:00	3.15948	284.6877	22.22709	-6.252052	217.7437	-188.1091	43.8909	91.66673	0	949.622
1/27/2012 2:00	2.775333	273.5956	22.18999	-5.810388	217.9931	-188.132	43.868	87.35964	0	949.6312
1/27/2012 3:00	4.726113	290.9993	18.89548	-5.165037	218.0794	-188.1625	43.8375	86.94603	0	949.8015
1/27/2012 4:00	3.186206	280.4783	22.33848	-5.116084	218.2746	-187.781	44.219	83.7058	0	949.7653
1/27/2012 5:00	3.155273	279.9816	22.19698	-5.035502	218.3232	-188.4983	43.5017	83.68443	0	949.5774
1/27/2012 6:00	3.526085	277.873	22.31516	-5.339346	218.0071	-188.1854	43.8146	80.82576	0	949.5754
1/27/2012 7:00	3.50869	269.936	23.46049	-5.734799	217.9506	-188.0023	43.9977	81.19053	0	949.7067
1/27/2012 8:00	3.20387	267.1472	24.08228	-6.612066	217.9238	-187.8802	44.1198	84.58034	0	949.9496
1/27/2012 9:00	2.844515	269.0494	25.01564	-7.303229	217.9511	-187.9107	44.0893	83.77142	0	950.0434
1/27/2012 10:00	3.737914	275.3663	22.92631	-7.099658	217.8579	-188.0633	43.9367	80.13589	0	949.9049
1/27/2012 11:00	3.458652	265.4301	24.65394	-7.077998	218.1714	-187.7733	44.2267	80.85933	0	949.8952
1/27/2012 12:00	3.381436	268.6718	24.83838	-7.277442	218.1716	-188.2159	43.7841	81.53851	0	949.9097
1/27/2012 13:00	3.444652	273.4751	25.3094	-7.348916	218.5295	-188.2388	43.7612	81.33857	0	949.7862
1/27/2012 14:00	3.623106	281.0471	27.24595	-7.512268	218.6876	-188.3075	43.6925	89.66428	0	949.7998
1/27/2012 15:00	5.012712	294.272	15.5927	-8.386405	217.865	-186.8194	45.1806	73.66763	0	950.2719
1/27/2012 16:00	5.858253	294.5651	15.43178	-8.967824	216.4075	-186.2929	45.7071	82.42069	0	950.8
1/27/2012 17:00	4.517099	298.3682	13.57307	-10.1811	215.9662	-185.7968	46.2032	82.5611	0	951.4907
1/27/2012 18:00	3.744782	297.5137	13.21421	-10.86396	215.9358	-186.125	45.875	85.37704	0	952.0771
1/27/2012 19:00	3.63097	296.0923	14.85642	-11.4798	216.1718	-186.3768	45.6232	83.60049	0	952.5085
1/27/2012 20:00	3.781021	293.7269	15.65421	-11.6542	215.9591	-185.7816	46.2184	83.10445	0	952.7805
1/27/2012 21:00	3.967603	294.8936	14.15698	-11.97909	215.7854	-185.835	46.165	83.17007	0	952.6923
1/27/2012 22:00	3.01462	288.9659	17.25856	-12.20676	216.0316	-185.5298	46.4702	85.55103	0	952.5007
1/27/2012 23:00	3.139448	289.2659	16.96969	-12.45453	215.6332	-185.7358	46.2642	82.20853	0	952.4052
1/28/2012 0:00	3.929375	296.567	13.12936	-12.80533	215.6199	-185.3237	46.6763	80.01531	0	952.6003
1/28/2012 1:00	4.353981	299.3338	12.84677	-13.39229	215.3514	-185.2932	46.7068	82.29096	0	952.6627
1/28/2012 2:00	3.161359	295.458	13.39071	-13.75964	215.3977	-185.2474	46.7526	85.16183	0	952.6146
1/28/2012 3:00	3.495961	297.8069	12.17847	-13.95798	215.8217	-185.4763	46.5237	81.25158	0	952.7755
1/28/2012 4:00	4.721269	297.3154	12.71742	-14.68926	215.3087	-185.4687	46.5313	80.76012	0	952.8414
1/28/2012 5:00	4.609869	297.3659	13.7815	-15.03453	215.3467	-185.255	46.745	78.88894	0	953.0983
1/28/2012 6:00	3.979721	297.947	12.36868	-15.49	215.2436	-185.2474	46.7526	82.56263	0	953.3027
1/28/2012 7:00	4.624302	298.9335	12.82149	-15.42216	215.2686	-185.1329	46.8671	82.09712	0	953.3774
1/28/2012 8:00	4.692951	298.064	12.14625	-15.6267	215.3582	-185.1863	46.8137	80.67007	0	953.5734
1/28/2012 9:00	5.414906	299.4218	12.65619	-15.62007	215.209	-184.8735	47.1265	77.01928	0	953.9552

1/28/2012 10:00	5.936824	301.9682	12.07353	-15.38886	215.044	-185.2932	46.7068	75.0901	0	954.4504
1/28/2012 11:00	6.096438	301.5721	12.61791	-15.13608	215.1977	-185.3161	46.6839	72.19174	0	955.0845
1/28/2012 12:00	5.42774	301.2665	13.31015	-14.93464	215.5451	-185.3771	46.6229	73.3868	0	955.4841
1/28/2012 13:00	5.50702	300.4189	13.01023	-14.41234	215.2163	-180.9892	51.0108	72.43288	0	955.4388
1/28/2012 14:00	5.730856	300.1414	13.58753	-13.95482	215.8369	-185.6442	46.3558	72.96556	0	955.8275
1/28/2012 15:00	6.256909	301.9373	12.36722	-13.7638	215.5138	-185.3695	46.6305	72.36574	0	956.3763
1/28/2012 16:00	6.472529	301.72	11.91563	-14.17543	215.463	-185.255	46.745	75.3923	0	957.2615
1/28/2012 17:00	5.361916	300.7147	12.42912	-14.62265	215.4656	-185.4305	46.5695	79.85353	0	958.1257
1/28/2012 18:00	5.485437	301.3196	12.21069	-14.94341	215.3686	-185.6442	46.3558	78.03728	0	958.8552
1/28/2012 19:00	4.68928	301.1362	11.65676	-15.28678	215.271	-185.3084	46.6916	81.48663	0	959.4236
1/28/2012 20:00	5.575773	302.7331	12.10673	-15.60006	215.2287	-185.3924	46.6076	77.10934	0	959.8132
1/28/2012 21:00	5.735913	303.1671	12.34579	-16.18038	215.2596	-185.2779	46.7221	77.6191	0	960.2326
1/28/2012 22:00	5.225517	305.7787	12.15042	-16.68221	215.1908	-185.0948	46.9052	78.71953	0	960.5809
1/28/2012 23:00	5.017933	305.4091	12.45688	-16.88909	215.0388	-184.8582	47.1418	78.43565	0	961.0316
1/29/2012 0:00	4.202767	307.4814	12.03886	-17.1782	215.1743	-184.7056	47.2944	78.60048	0	961.4189
1/29/2012 1:00	4.621668	311.2035	11.74347	-18.13211	215.0907	-185.1634	46.8366	81.17527	0	961.9857
1/29/2012 2:00	4.191603	305.5867	11.87541	-19.17409	214.9405	-185.0261	46.9739	78.48448	0	962.7621
1/29/2012 3:00	3.842527	299.1674	11.92349	-20.14815	214.8676	-184.8277	47.1723	82.56263	0	963.5987
1/29/2012 4:00	3.520723	297.3656	11.40136	-21.13227	214.8013	-184.7895	47.2105	83.863	0	963.8748
1/29/2012 5:00	3.574231	300.5429	10.99181	-21.96432	214.7959	-184.6445	47.3555	84.19115	0	964.1143
1/29/2012 6:00	3.594544	297.8788	10.69531	-22.62735	214.7231	-184.3164	47.6836	83.58216	0	964.2402
1/29/2012 7:00	3.146176	298.7335	10.23007	-23.18229	214.5713	-184.5453	47.4547	82.78241	0	964.6238
1/29/2012 8:00	2.619375	295.1188	12.69655	-23.80055	214.6133	-184.675	47.325	81.63467	0	965.1089
1/29/2012 9:00	2.797533	294.5421	12.80959	-24.06496	214.6264	-184.7819	47.2181	81.51257	0.254	965.4796
1/29/2012 10:00	2.813547	295.006	14.04452	-23.02558	215.2213	-184.6064	47.3936	80.68076	0	965.7245
1/29/2012 11:00	2.8443	292.2906	17.88154	-21.34421	214.5624	-181.5615	50.4385	78.28759	0	966.0632
1/29/2012 12:00	2.784706	295.0168	17.91418	-19.03134	217.0177	-180.5007	51.4993	72.03759	0	966.1665
1/29/2012 13:00	2.615209	290.0638	20.29633	-17.03303	215.2436	-186.1326	45.8674	70.32819	0	966.0291
1/29/2012 14:00	2.619475	292.3332	19.63219	-15.71682	216.5642	-192.4818	39.5182	65.44876	0	965.6597
1/29/2012 15:00	2.714787	278.2581	23.37492	-15.4467	215.887	-186.2929	45.7071	68.22807	0	965.8093
1/29/2012 16:00	2.357992	286.446	19.00983	-15.87714	215.9391	-186.0029	45.9971	71.16915	0	965.8361
1/29/2012 17:00	2.001544	291.2422	13.98248	-16.7434	215.739	-185.5221	46.4779	75.89443	2.032	966.0859
1/29/2012 18:00	0.8033631	249.7452	22.29949	-18.83895	215.3606	-185.1253	46.8747	83.49212	2.032	966.22
1/29/2012 19:00	0.5824046	200.352	16.85051	-20.99723	215.2688	-185.0719	46.9281	82.12917	0	966.0886
1/29/2012 20:00	0.5155029	184.8414	13.04002	-23.04235	215.338	-184.82	47.18	82.61605	0	965.826
1/29/2012 21:00	0.5847133	165.2451	4.724854	-24.48206	214.9954	-185.2245	46.7755	81.29126	0	965.3682
1/29/2012 22:00	0.6281244	165.3169	7.25886	-25.6994	214.9574	-185.3695	46.6305	79.65665	0	964.9839
1/29/2012 23:00	0.761043	152.7095	11.75413	-26.50641	214.7432	-185.2856	46.7144	83.06171	0	964.6667
1/30/2012 0:00	0.7931329	158.0921	9.353294	-26.74288	214.7914	-184.9421	47.0579	80.29614	0	964.506
1/30/2012 1:00	0.6486983	149.7128	7.456702	-26.61936	214.6885	-184.5758	47.4242	79.79706	0	964.2191
1/30/2012 2:00	0.7736578	134.4124	5.644971	-25.93592	214.7931	-185.0642	46.9358	81.01043	0	963.4695
1/30/2012 3:00	0.9891093	130.4666	5.427866	-25.47184	214.999	-185.3695	46.6305	80.31904	0	962.8057
1/30/2012 4:00	0.4619105	123.7606	7.829542	-25.11639	214.596	-184.1027	47.8973	79.13009	0	962.2609
1/30/2012 5:00	0.7031788	132.3959	8.862404	-25.45909	214.7696	-184.8582	47.1418	81.37826	0	961.8679
1/30/2012 6:00	1.160512	132.8578	5.231802	-25.72864	214.8278	-184.904	47.096	80.97533	0.254	961.1149
1/30/2012 7:00	0.9408865	125.8382	10.41579	-24.47094	214.9491	-184.8811	47.1189	83.80042	0	960.6203
1/30/2012 8:00	1.12437	137.6749	14.63904	-24.06534	215.1439	-185.4611	46.5389	83.58828	0	960.369
1/30/2012 9:00	1.21442	131.7262	12.7808	-21.02817	215.4619	-185.7968	46.2032	81.58125	0	959.9289
1/30/2012 10:00	1.36373	138.9916	15.30867	-18.08347	215.9711	-186.4073	45.5927	80.61056	0	959.6961
1/30/2012 11:00	1.527249	138.9454	17.6515	-15.26711	216.7066	-182.5993	49.4007	74.42464	0	959.4305
1/30/2012 12:00	1.632458	137.8298	20.30333	-11.71013	216.2928	-187.056	44.944	66.07604	0.254	959.2655
1/30/2012 13:00	1.636778	145.3329	21.94953	-9.736151	217.0107	-185.5832	46.4168	66.37825	0	958.3992
1/30/2012 14:00	1.83884	146.0727	20.36501	-8.122082	216.8877	-186.9873	45.0127	66.86359	0	957.5206
1/30/2012 15:00	1.644907	150.713	20.37368	-8.190534	217.263	-187.0178	44.9822	73.50279	0	957.4618
1/30/2012 16:00	1.542719	150.6819	21.90913	-8.564643	216.9834	-186.8423	45.1577	76.15237	0	957.2423
1/30/2012 17:00	1.471633	150.1575	19.95657	-8.944554	216.9267	-186.5981	45.4019	78.94999	0	957.2067
1/30/2012 18:00	1.221779	139.5379	19.48741	-9.271496	217.0081	-187.0407	44.9593	81.41488	0	957.7627
1/30/2012 19:00	1.452335	126.5887	19.41499	-9.51025	216.8972	-187.1857	44.8143	80.18015	0	957.9575
1/30/2012 20:00	1.422396	130.1796	19.62193	-9.548241	216.9167	-186.6897	45.3103	80.34193	0	957.8915
1/30/2012 21:00	1.523072	128.4305	18.20238	-9.548218	217.0096	-186.8881	45.1119	81.47594	0	957.6234
1/30/2012 22:00	1.378137	138.9528	18.61116	-9.520973	216.9976	-186.9873	45.0127	83.29829	0	957.4668
1/30/2012 23:00	1.292807	136.9809	15.19353	-9.314646	217.0387	-186.911	45.089	85.1191	0	957.2316
1/31/2012 0:00	1.236337	130.836	15.60527	-9.1275	217.0125	-187.1399	44.8601	85.61514	0	957.1153
1/31/2012 1:00	1.213218	118.2775	20.3774	-9.119309	217.0599	-186.705	45.295	85.3343	0	957.1016
1/31/2012 2:00	1.419413	112.4121	20.27742	-9.31087	217.0404	-186.9644	45.0356	85.3343	0	956.9761
1/31/2012 3:00	1.600044	117.0744	18.00731	-9.508461	217.0645	-187.2239	44.7761	87.06965	0	956.955
1/31/2012 4:00	1.377225	122.5549	15.77371	-9.698062	217.216	-187.3307	44.6693	89.1072	0	956.6656
1/31/2012 5:00	1.107547	103.2201	19.84318	-9.889433	217.3642	-187.7276	44.2724	89.17588	0	956.592
1/31/2012 6:00	1.064312	94.45867	21.29969	-9.849153	217.4178	-187.781	44.219	89.38803	0	956.4341
1/31/2012 7:00	1.157299	97.93385	23.1634	-9.798985	217.4216	-187.6055	44.3945	89.37582	0	956.5042
1/31/2012 8:00	0.9473304	92.74934	24.91299	-9.840852	217.4651	-187.4452	44.5548	89.02173	0	956.7971
1/31/2012 9:00	0.9926606	76.94208	27.49831	-9.965206	217.4751	-187.987	44.013	87.18412	0	957.0235
1/31/2012 10:00	1.47365	86.9012	26.24369	-9.48839	217.7777	-187.1323	44.8677	83.65847	0	957.0046
1/31/2012 11:00	1.385142	114.3376	26.33325	-7.944202	218.1115	-189.063	42.937	73.64321	0	957.1161

1/31/2012 12:00	0.9904362	129.6244	26.9042	-6.064086	218.4705	-188.7349	43.2651	73.35017	0	957.1686
1/31/2012 13:00	0.8632594	127.01	26.41065	-5.572633	218.942	-188.5365	43.4635	74.12093	0	956.9443
1/31/2012 14:00	0.5433255	143.0954	39.97155	-4.823765	218.6078	-188.5136	43.4864	70.77233	0	956.5544
1/31/2012 15:00	0.989654	322.0862	25.93303	-5.161637	218.693	-188.3457	43.6543	75.36941	0	956.6746
1/31/2012 16:00	0.6658478	314.7684	22.47845	-5.296585	218.4814	-188.5822	43.4178	80.83643	0	957.1224
1/31/2012 17:00	0.0661407	311.858	3.090072	-5.442512	218.0446	-188.1854	43.8146	85.29768	0	957.6557
1/31/2012 18:00	0.01929958	303.7453	0.01360101	-6.097777	217.8113	-188.0023	43.9977	91.19053	0	958.325
1/31/2012 19:00	0.03499454	303.5961	0.0331056	-6.874644	217.5484	-187.3689	44.6311	92.29401	0	958.7848
1/31/2012 20:00	0.1176094	246.413	22.09459	-6.918899	217.3549	-187.2468	44.7532	92.30775	0	959.1473
1/31/2012 21:00	0.2104757	212.8697	27.21837	-7.28334	217.0404	-187.2086	44.7914	94.66734	0	959.6075
1/31/2012 22:00	0.3209243	223.3095	13.15535	-7.437796	216.9607	-186.9568	45.0432	91.93382	0	959.9401
1/31/2012 23:00	0.4923025	246.9303	25.7866	-7.394138	217.0731	-187.1399	44.8601	91.66215	0	960.3138
2/1/2012 0:00	0.6942044	269.1111	18.5796	-7.132267	217.2813	-187.3307	44.6693	94.27356	0	960.8181
2/1/2012 1:00	0.4980908	244.8594	24.66196	-6.870662	217.4025	-187.2926	44.7074	93.70428	0	961.1794
2/1/2012 2:00	0.450624	236.0583	22.33861	-6.735097	217.3348	-187.3002	44.6998	94.02479	0	961.6067
2/1/2012 3:00	1.050925	262.6918	18.0089	-6.648686	217.3641	-187.7199	44.2801	94.44756	0	962.1631
2/1/2012 4:00	1.54076	277.3232	18.78235	-6.542287	217.5722	-187.5444	44.4556	94.49335	0	962.6603
2/1/2012 5:00	1.459966	294.3322	14.34222	-6.309912	217.5836	-187.1399	44.8601	94.32546	0	963.1622
2/1/2012 6:00	1.292941	289.6999	14.47116	-6.22043	217.6177	-187.8191	44.1809	94.17741	0	963.6878
2/1/2012 7:00	0.9204636	291.273	15.40417	-6.229926	217.6064	-187.491	44.509	96.91093	0	964.3572
2/1/2012 8:00	0.3915979	274.4999	17.48589	-6.168384	217.6596	-187.7733	44.2267	96.48205	0	964.8211
2/1/2012 9:00	0.3427759	226.5898	21.28975	-5.861299	217.6827	-187.6589	44.3411	94.60629	0	965.5767
2/1/2012 10:00	0.6492699	251.3339	36.04724	-5.274601	217.8007	-187.9489	44.0511	91.99029	0	966.0922
2/1/2012 11:00	0.9222019	251.6022	31.77526	-4.783277	217.928	-187.7962	44.2038	87.07576	0	966.233
2/1/2012 12:00	0.94936	236.0844	34.13248	-4.019132	218.1716	-187.8496	44.1504	87.20854	0	966.2448
2/1/2012 13:00	1.139857	222.0695	32.17307	-3.650989	218.3752	-188.4372	43.5628	87.42374	0	966.184
2/1/2012 14:00	1.015377	224.0822	33.38113	-3.610929	218.353	-188.567	43.433	88.52417	0	966.1276
2/1/2012 15:00	0.9949588	236.9127	29.06733	-3.276039	218.4016	-188.3457	43.6543	89.39719	0	966.1586
2/1/2012 16:00	0.6411211	236.9215	28.12976	-2.980168	218.3246	-188.5059	43.4941	88.54707	0	966.438
2/1/2012 17:00	0.6960707	241.1776	28.34655	-2.987546	218.2499	-188.1015	43.8985	89.35751	0	966.6205
2/1/2012 18:00	0.850202	265.3202	37.76618	-3.227798	218.2362	-188.3228	43.6772	91.68046	0	966.8961
2/1/2012 19:00	0.9928486	207.7358	30.82268	-3.229411	218.2298	-187.8954	44.1046	91.85751	0	967.0267
2/1/2012 20:00	0.6262347	167.2653	15.78111	-3.169801	218.3392	-188.2541	43.7459	92.95947	0	967.1426
2/1/2012 21:00	0.6899638	152.5022	11.47732	-3.285769	218.4217	-188.2465	43.7535	93.5257	0	967.1128
2/1/2012 22:00	0.8457053	154.6821	12.43713	-3.124385	218.3831	-188.277	43.723	92.56721	0	967.2547
2/1/2012 23:00	0.7840152	159.5363	12.25439	-3.120269	218.4813	-188.7272	43.2728	93.56691	0	967.4715
2/2/2012 0:00	0.6808369	152.8545	11.10913	-3.241014	218.4418	-188.4144	43.5856	96.26991	0	967.6738
2/2/2012 1:00	0.4422073	160.9553	13.42705	-3.326973	218.1451	-188.0328	43.9672	96.94756	0	967.8982
2/2/2012 2:00	0.2726277	197.5174	15.84999	-3.215689	217.8715	-187.8802	44.1198	97.32912	0	968.2071
2/2/2012 3:00	0.466843	185.382	15.56951	-3.388542	217.7985	-187.552	44.448	97.32455	0	968.4518
2/2/2012 4:00	0.8307647	202.8133	25.60048	-3.164759	217.6948	-187.6055	44.3945	97.15208	0	968.4774
2/2/2012 5:00	1.196676	246.9681	25.62321	-2.865408	217.8721	-188.1625	43.8375	97.57638	0	968.6481
2/2/2012 6:00	2.074952	284.9011	18.8147	-2.591346	218.0903	-187.9489	44.0511	97.40391	0	969.0348
2/2/2012 7:00	2.238791	293.9447	13.16312	-2.321358	218.107	-188.1702	43.8298	97.97167	0	969.5703
2/2/2012 8:00	2.018311	297.2388	12.49354	-2.191215	218.1456	-188.2846	43.7154	98.67986	0	970.1107
2/2/2012 9:00	2.248591	297.1519	12.19283	-2.033149	218.1826	-188.2159	43.7841	98.79738	0	970.7691
2/2/2012 10:00	2.854275	299.0078	13.2166	-1.812321	218.2513	-188.3838	43.6162	98.73937	0	971.541
2/2/2012 11:00	3.000199	301.6697	12.40201	-1.599299	218.5015	-188.6509	43.3491	97.91063	0.254	972.1647
2/2/2012 12:00	2.682933	301.0639	12.56663	-1.311836	218.5331	-188.2159	43.7841	94.55898	0	972.6744
2/2/2012 13:00	3.009418	299.0598	13.79811	-0.8964071	218.5719	-188.7807	43.2193	89.63986	0	972.8539
2/2/2012 14:00	3.125242	307.6518	14.81517	-0.6870028	218.6604	-188.6738	43.3262	88.80653	0	973.151
2/2/2012 15:00	2.51699	318.5744	18.92774	-1.407546	218.6355	-188.6357	43.3643	91.67283	0	973.7954
2/2/2012 16:00	3.39943	310.004	12.85937	-2.176779	218.3636	-188.1244	43.8756	87.62826	0	974.6656
2/2/2012 17:00	3.8786	305.2976	13.17617	-2.932751	218.196	-188.2388	43.7612	84.84132	0	975.4218
2/2/2012 18:00	2.893558	314.1611	16.20972	-3.852246	218.0247	-187.5062	44.4938	87.9503	0	976.2325
2/2/2012 19:00	2.581496	319.7486	17.75049	-5.00172	217.8701	-187.636	44.364	87.85415	0	976.9821
2/2/2012 20:00	1.995416	332.7595	22.36646	-6.042408	217.7706	-187.6131	44.3869	88.43565	0	977.7123
2/2/2012 21:00	1.703444	339.053	31.52512	-7.082206	217.6655	-187.9031	44.0969	90.055	0	978.4329
2/2/2012 22:00	1.328236	358.9079	24.84726	-8.017262	217.7081	-187.5368	44.4632	87.41611	0	978.9329
2/2/2012 23:00	1.315566	3.008783	27.28402	-8.92482	217.5936	-187.697	44.303	86.54462	0	979.5093
2/3/2012 0:00	0.8998517	61.32826	36.26075	-10.11375	217.4976	-187.2773	44.7227	88.35476	0	980.0622
2/3/2012 1:00	0.4687172	125.3999	71.77515	-10.24465	217.4075	-187.4757	44.5243	88.93473	0	979.8694
2/3/2012 2:00	0.3573803	81.06452	54.57935	-10.2877	217.5096	-187.4757	44.5243	89.18657	0	980.0048
2/3/2012 3:00	0.6458241	149.3196	46.71616	-10.18395	217.4266	-187.8115	44.1885	90.76776	0	979.9885
2/3/2012 4:00	0.7336635	57.72387	84.10391	-10.00092	217.4745	-187.4833	44.5167	90.6823	0	980.3039
2/3/2012 5:00	0.6061547	128.4854	50.69316	-9.923795	217.5135	-187.2697	44.7303	90.62582	0	980.2876
2/3/2012 6:00	0.3126248	150.9726	11.86262	-9.338552	217.54	-187.5139	44.4861	90.05347	0	980.5739
2/3/2012 7:00	0.4494937	142.2534	16.46433	-8.968701	217.5439	-187.262	44.738	90.29004	0	980.488
2/3/2012 8:00	0.4832687	135.3575	12.59491	-8.674438	217.6138	-187.9489	44.0511	91.68656	0	980.3438
2/3/2012 9:00	0.450558	137.4297	13.85438	-7.984643	217.9716	-188.0557	43.9443	95.24121	0	980.1982
2/3/2012 10:00	1.228632	263.4865	29.78133	-6.388844	218.127	-188.2465	43.7535	93.73937	0	979.9246
2/3/2012 11:00	1.480032	262.5704	32.53552	-5.137642	218.3781	-188.4525	43.5475	94.14383	0	979.8594
2/3/2012 12:00	1.675706	262.4653	29.57456	-4.245673	218.4945	-188.7501	43.2499	91.24548	0	979.8302
2/3/2012 13:00	1.590093	243.3415	31.22223	-3.589873	218.7294	-188.8036	43.1964	89.98174	0	979.2365

2/3/2012 14:00	1.430346	245.8034	29.03853	-3.138928	218.7382	-188.9257	43.0743	88.58523	0	978.6937
2/3/2012 15:00	1.61015	241.1475	29.65327	-2.724883	218.7495	-188.7959	43.2041	89.15147	0	978.4952
2/3/2012 16:00	1.438374	245.413	28.92801	-2.495316	218.7545	-188.7272	43.2728	89.86575	0	978.6039
2/3/2012 17:00	2.406277	236.8895	30.41224	-2.592896	218.6567	-188.2999	43.7001	93.06631	0	977.4294
2/3/2012 18:00	2.258374	247.9689	31.68127	-2.401659	218.4807	-188.6357	43.3643	92.79768	0	976.4968
2/3/2012 19:00	2.452526	256.9721	26.94349	-2.074524	218.4373	-187.7733	44.2267	92.97778	0	976.5841
2/3/2012 20:00	1.759512	253.9084	27.95799	-2.243	218.414	-188.7654	43.2346	93.50891	0	976.5626
2/3/2012 21:00	2.471201	259.7455	23.5989	-2.422227	218.4217	-188.0862	43.9138	93.24182	0	976.5971
2/3/2012 22:00	1.877909	253.0895	23.52225	-3.119887	218.294	-188.132	43.868	95.65788	0	976.2063
2/3/2012 23:00	1.989886	250.9493	25.96212	-3.979242	218.1124	-187.8954	44.1046	96.82851	0	975.7613
2/4/2012 0:00	2.057116	259.7128	24.75798	-4.501319	218.0897	-187.6894	44.3106	97.41154	0	975.6583
2/4/2012 1:00	1.785935	270.0266	22.24473	-4.980966	218.2693	-188.1396	43.8604	98.3044	0	975.5891
2/4/2012 2:00	1.772482	285.3014	15.56323	-5.182973	218.4788	-188.3609	43.6391	98.979	0	975.4875
2/4/2012 3:00	1.183709	279.6415	15.27649	-5.693194	218.6308	-188.6128	43.3872	98.88743	0	975.4697
2/4/2012 4:00	0.938534	297.2745	30.50472	-7.129725	218.6145	-188.277	43.723	99.4903	0	975.4583
2/4/2012 5:00	1.086297	260.3678	16.77803	-7.268453	218.4659	-188.0404	43.9596	97.95336	0	975.4585
2/4/2012 6:00	1.213258	287.6565	15.46072	-8.856683	218.5152	-187.9107	44.0893	100	0	975.7224
2/4/2012 7:00	1.461616	278.359	16.36691	-8.240302	218.5463	-189.2385	42.7615	96.37369	0	975.6857
2/4/2012 8:00	1.21601	282.7535	17.507	-8.699581	218.5395	-188.7654	43.2346	94.34682	0	975.6409
2/4/2012 9:00	1.137362	311.7314	16.2204	-9.276011	218.6971	-188.8188	43.1812	94.29951	0	975.7143
2/4/2012 10:00	1.689788	301.2352	17.62564	-7.506378	218.9022	-189.0706	42.9294	94.99853	0	976.1627
2/4/2012 11:00	1.562646	304.3149	19.11374	-6.911979	219.0658	-189.4217	42.5783	93.06325	0	976.4326
2/4/2012 12:00	1.258661	284.3596	30.50536	-5.790601	219.2167	-186.911	45.089	92.89841	0	976.3367
2/4/2012 13:00	2.045047	292.1987	22.06723	-5.052199	219.0496	-184.8582	47.1418	92.78852	0	975.8186
2/4/2012 14:00	2.067866	292.774	22.9138	-4.165908	218.7607	-192.8023	39.1977	87.98998	0	975.6379
2/4/2012 15:00	1.974924	295.2092	22.32323	-3.126671	219.0439	-191.4592	40.5408	82.63894	0	975.4376
2/4/2012 16:00	1.569222	316.7438	11.17953	-2.498917	219.4361	-189.6354	42.3646	83.62795	0	975.6116
2/4/2012 17:00	1.188787	311.7663	6.29083	-2.751901	219.4075	-189.3988	42.6012	89.75433	0	975.9564
2/4/2012 18:00	1.382691	297.9194	6.858459	-3.917187	219.1776	-189.2004	42.7996	96.30347	0	976.032
2/4/2012 19:00	0.3463593	293.9448	20.17467	-5.720637	218.9637	-189.1088	42.8912	99.3804	0	975.7678
2/4/2012 20:00	0.3892684	261.9857	8.032578	-6.915933	218.9474	-188.7959	43.2041	91.82393	0	975.5364
2/4/2012 21:00	0.6048989	236.6492	12.52157	-7.878304	218.9735	-188.7349	43.2651	93.53028	0	975.2265
2/4/2012 22:00	0.9327146	211.936	11.19484	-9.454254	218.8029	-189.0096	42.9904	93.31966	0	974.4801
2/4/2012 23:00	1.05836	212.2515	16.62652	-9.858639	218.8547	-189.2767	42.7233	94.4323	0	973.5648
2/5/2012 0:00	1.114185	237.2968	21.80398	-7.527199	218.9235	-188.9562	43.0438	98.05257	0	972.9501
2/5/2012 1:00	1.358418	236.0217	23.3446	-5.915631	218.9248	-189.3835	42.6165	94.28272	0	972.2747
2/5/2012 2:00	1.408956	251.984	33.06833	-6.125768	218.8441	-189.0325	42.9675	94.88864	0	971.8024
2/5/2012 3:00	1.378524	263.4343	23.38555	-5.399384	218.7785	-189.4064	42.5936	94.82454	0	972.0263
2/5/2012 4:00	1.406139	252.7537	26.2426	-5.609407	218.7867	-188.7501	43.2499	94.69024	0	971.4205
2/5/2012 5:00	1.95092	247.5834	25.82858	-5.464221	218.7022	-188.6204	43.3796	92.44054	0	970.6688
2/5/2012 6:00	2.445605	250.2616	25.3487	-5.130173	218.7075	-188.6738	43.3262	89.69633	0	969.7825
2/5/2012 7:00	2.507571	254.8359	27.61903	-5.013538	218.6894	-188.628	43.372	89.32851	0	969.2718
2/5/2012 8:00	2.177608	251.0101	24.52296	-5.438909	218.6699	-189.3148	42.6852	89.78638	0	968.9284
2/5/2012 9:00	2.013947	241.3492	26.27961	-5.175443	218.8332	-188.6738	43.3262	84.91763	0	968.1457
2/5/2012 10:00	1.37293	231.2916	33.61562	-3.224784	218.8843	-189.1088	42.8912	71.61787	0	967.3766
2/5/2012 11:00	2.073365	234.9032	31.69585	-1.467717	219.3918	-185.2169	46.7831	65.00767	0	966.2862
2/5/2012 12:00	2.008832	237.994	30.78913	0.2144319	220.7315	-186.621	45.379	55.89137	0	965.3413
2/5/2012 13:00	2.102212	245.5515	33.0904	1.999844	221.1533	-192.3445	39.6555	53.46157	0	964.5715
2/5/2012 14:00	2.665552	263.5442	27.00436	3.097572	221.7149	-189.0859	42.9141	50.94478	0	963.9038
2/5/2012 15:00	2.50922	254.58	26.9443	3.436669	220.4387	-182.0499	49.9501	51.16761	0	963.3104
2/5/2012 16:00	2.109169	244.3077	29.47689	2.959594	220.7577	-190.5053	41.4947	56.95669	0	962.6535
2/5/2012 17:00	1.919205	249.1447	23.78717	2.349963	220.3568	-190.284	41.716	60.75248	0	962.3774
2/5/2012 18:00	1.661914	252.5288	22.58686	1.074053	220.0751	-190.2001	41.7999	65.19997	0	962.4026
2/5/2012 19:00	1.993569	261.1249	20.52542	0.2889808	220.244	-190.2382	41.7618	67.54125	0	962.2581
2/5/2012 20:00	1.776294	267.0765	18.28822	-0.5245133	220.203	-189.9177	42.0823	71.4683	0	962.0341
2/5/2012 21:00	1.545648	267.612	18.15136	-1.57367	220.2311	-190.4138	41.5862	76.66672	0	961.7764
2/5/2012 22:00	1.493224	272.1161	14.64997	-2.508889	220.194	-189.9635	42.0365	81.66977	0	961.7167
2/5/2012 23:00	2.04583	283.3859	14.50056	-3.520025	220.1598	-189.8719	42.1281	88.99273	0	961.714
2/6/2012 0:00	2.587226	301.3977	10.45916	-5.509102	220.1204	-189.6735	42.3265	94.77112	0	962.2057
2/6/2012 1:00	2.52923	308.0392	9.011888	-6.334807	219.829	-190.0169	41.9831	94.88254	0	962.6873
2/6/2012 2:00	2.302679	307.3273	10.44935	-4.997216	219.8907	-190.0551	41.9449	94.91611	0	962.9199
2/6/2012 3:00	2.897169	301.5116	9.754851	-4.372798	219.8237	-189.7575	42.2425	94.87491	0	963.603
2/6/2012 4:00	2.727919	308.4421	11.87958	-4.092148	219.8452	-190.1238	41.8762	94.58645	0	964.442
2/6/2012 5:00	2.807633	331.6655	22.12015	-4.158323	219.7606	-190.0169	41.9831	89.55134	0	965.2268
2/6/2012 6:00	3.428481	338.9037	23.80015	-6.918694	219.668	-190.0703	41.9297	84.10567	0	967.1215
2/6/2012 7:00	2.798992	337.0523	22.54167	-9.833427	219.3915	-189.2538	42.7462	84.03546	0	968.8709
2/6/2012 8:00	3.041544	342.0912	22.12229	-11.18819	218.9674	-189.4599	42.5401	83.4097	0	970.3473
2/6/2012 9:00	2.94856	343.848	25.38845	-11.54041	219.5334	-190.0475	41.9525	80.73418	0	971.7487
2/6/2012 10:00	3.31227	339.3798	23.41367	-11.55807	219.7357	-189.7422	42.2578	76.32331	0	973.0441
2/6/2012 11:00	2.912138	342.8662	24.66697	-11.36628	219.2487	-187.2697	44.7303	68.85688	0	974.3531
2/6/2012 12:00	2.589751	334.2078	25.364	-10.68269	220.4581	-187.8954	44.1046	66.60872	0	975.1598
2/6/2012 13:00	3.378284	330.9485	22.25061	-10.51681	219.7921	-191.9934	40.0066	64.63222	0	976.0836
2/6/2012 14:00	3.48527	322.2991	19.04572	-10.99659	219.7393	-189.2767	42.7233	70.49913	0	976.8408
2/6/2012 15:00	3.163926	328.1187	22.76269	-11.70504	219.0172	-188.7425	43.2575	72.68625	0	977.7771