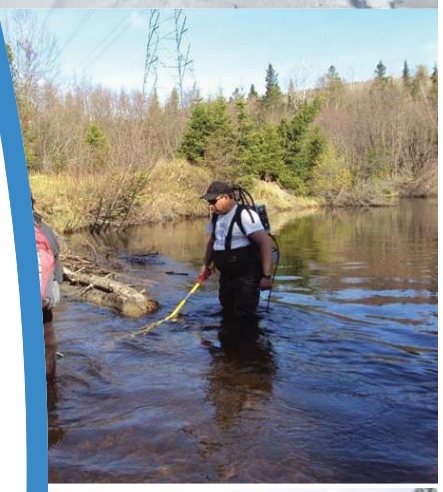
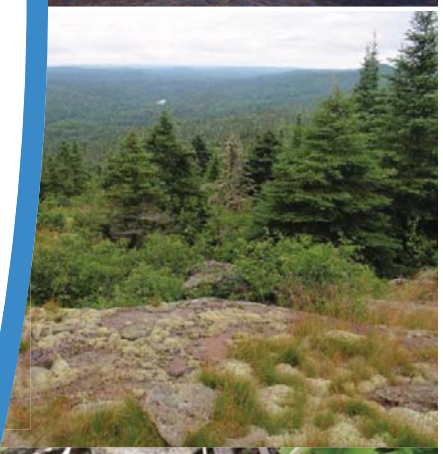
ENVIRONMENTAL ASSESSMENT FOR THE MARATHON PGM-Cu PROJECT AT MARATHON, ONTARIO



STILLWATER CANADA INC. MARATHON PGM-Cu PROJECT

SUPPORTING INFORMATION DOCUMENT No. 20 - BASELINE HYDROLOGIC CONDITIONS AT THE MARATHON PGM-Cu PROJECT SITE



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APPENDICES

ACRONYMS AND ABBREVIATIONS

ABA	Acid-Base Accounting
AOC	Area of Concern
AR Act	Aggregate Resources Act (Ontario)
ASL	Above Sea Level
BC	Before Christ
BC MELP	British Columbia Ministry of Environment and Land Protection
BC MOE	British Columbia Ministry of the Environment
BHP	BHP Engineering Pty Ltd.
BNA	Bingwi Neyaashi Anishinaabek First Nation
BOD	Biochemical Oxygen Demand
BP	Before Present
BZA	Biinjitaawabik Zaaging Anishinaabek First Nation
ca	Circa
$CaCO_3$	Calcium Carbonate
CALA	Canadian Association for Laboratory Accreditation
CARs	Canadian Aviation Regulations
CCME	Canadian Council of Ministers of the Environment
CEA Act	Canadian Environmental Assessment Act (Canada)
CEA Agency	Canadian Environmental Assessment Agency
CEP Act	Canadian Environmental Protection Act (Canada)
CEQG	Canadian Environmental Quality Guidelines
CFS Act	Crown Forest Sustainability Act (Ontario)
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
COSSARO	Committee on the Status of Species at Risk in Ontario
CPR	Canadian Pacific Railway
Cu	Copper
CYSP	Marathon Municipal Airport
DFO	Fisheries and Oceans Canada
DO	Dissolved Oxygen
DOC	Dissolved Organic Carbon
e.g.	For example
EA	Environmental Assessment
EC	Environment Canada
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMRD	Extraction Metallurgy Research Divisions

EP Act	Environmental Protection Act (Ontario)
ES Act	Endangered Species Act (Ontario)
ESA	Environmentally Sensitive Area
Fe	Iron
FWC Act	Fish and Wildlife Conservation Act (Ontario)
GFN	Ginoogaming First Nation
HADD	Harmful Alteration, Disruption, Destruction
HO	Harmonization Order
HO	Harmonization Order
Hwy	Highway
IBA	Impacts and Benefits Agreement
ICP-MS	Inductively Couple Plasma Mass Spectrometry
IMT	Incident Managament Team
INAC	Indian and Northern Affairs Canada
IRI Act	International River Improvements Act (Canada)
JCC	Joint Consultation Committee
JORC	Joint Ore Reserves Committee
JRP	Joint Review Panel
km	Kilometre
kV	Kilovolt
LIDAR	Light Detection And Ranging
LL58	Lake Lake No. 58 First Nation
LRI Act	Lakes and Rivers Improvement Act (Ontario)
LSA	Local Study Area
m	Metre
M Act	Mining Act (Ontario)
MBC Act	Migratory Birds Convention Act (Canada)
MDL	Method Detection Limit
MMEEM	Metal Mining Environmental Effects Monitoring
MMER	Metal Mining Effluent Regulations (Canada)
MNDMF	Ministry of Northern Development, Mines and Forestry
MoC	Ontario Mintsry of Culture
MOU	Memorandum of Understanding
MPGM	Marathon PGM Corporation
MPI	Marathon Pulp Inc.
MPMO	Major Projects Management Office
MRSA	Mine Rock Storage Area
MTO	Ministry of Transporation

N	Nitrogen
NEB	National Energy Board
NI	National Instrument
NoC	Notice of Commencement
NPRI	National Pollution Release Inventory
NRCan	Natural Resources Canada
NTU	Nephelometric Turbidity Units
NWP Act	Navigable Waters Protection Act (Canada)
NWPP	Navigable Waters Protection Program
O. Reg	Ontario Regulation
OB	Overburden
OBBN	Ontario Benthos Biomonitoring Network
ODWS	Ontario Drinking Water Standards
OEA Act	Ontario Environmental Assessment Act (Ontario)
OGS	Ontario Geological Survey
OH Act	Ontario Heritage Act (Ontario)
OMNR	Ontario Ministry of Natural Resources
OMOE	Ontario Ministry of the Environment
OMOEE	Ontario Ministry of the Environment and Energy
ON	Ontario
OWR Act	Ontario Water Resources Act (Ontario)
PC	Parks Canada
PCB	Polychlorinated Biphenyls
PGE	Platinum Group Element
PGM	Platinum Group Metal
PL Act	Public Lands Act (Ontario)
PM	Particulate Matter
PMFN	Pic Mobert First Nation
POW	Prisoner of War
PRFN	Ojibways of the Pic River First Nation
PSMF	Process Solids Management Facility
PTHI Act	Public Transportation and Highway Improvement Act (Ontario)
QA/QC	Quality Assurance Quality Control
RSA	Regional Study Area
SAR	Sodium Absorption Ratio
SAR Act	Species at Risk Act (Canada)
SCI	Stillwater Canada Incorporated
SFL	Sustainable Forestry License

SSA	Site Study Area
SWC	Stillwater Mining Company
TAD	Technical Assessment Document
TC	Transport Canada
TDS	Total Dissolved Solids
TGCL	True Grit Consulting Limited
TK	Traditional Knowledge
TKN	Total Kjeldahl Nitrogen
TOC	Total Organic Carbon
ToR	Terms of Reference
TPD	Tonnes Per Day
TSS	Total Suspended Solids
TSX	Toronto Stock Exchange
URL	Uniform Resource Locator
VA	Voluntary Agreement
VEC	Valued Ecosystem Component
WWII	World War Two

1.0 Introduction

Stillwater Canada Inc. (SCI) proposes to develop a platinum group metals (PGMs), copper (Cu) and possibly iron (Fe) open-pit mine and milling operation near Marathon, Ontario. A Notice of Commencement (NoC) of an environmental assessment (EA) in relation to the proposed Marathon PGM-Cu Project (the "Project") was filed by the Canadian Environmental Assessment Agency (CEA Agency) under Section 5 of the Canadian Environmental Assessment Act on April 29, 2010 (updated July 19, 2010).

The EA was referred to an independent Review Panel by the Federal Minister of the Environment on October 7, 2010. On March 23, 2011 SCI entered into a Voluntary Agreement (VA) with the Province of Ontario to have the Project subject to the Ontario Environmental Assessment Act (OEA Act). This agreement was the instrument that permitted the provincial government to issue a Harmonization Order (HO) under Section 18(2) of the Canada-Ontario Agreement on Environmental Assessment Cooperation to establish a Joint Review Panel for the Project between the Minister of the Environment, Canada and the Minister of the Environment, Ontario.

The HO was issued on March 25, 2011. The Terms of Reference (ToR) for the Project Environmental Impact Statement (EIS) and the agreement establishing the Joint Review Panel (JRP) were issued on August 8, 2011.

The following provides an overview of the proposed development including its location, surrounding land uses, the exploration history of the site and the primary conceptual features of the mining and milling facilities. The information provided below, in the Environmental Impact Statement Report and supporting technical studies is based on the conceptual mine design for the Project. The conceptual design provides planning level information for the environmental assessment process. Final detailed design will commence following EA approval in concordance with the concepts presented herein.

1.1 Project Location

The Project is located approximately 10 km north of the Town of Marathon, Ontario (Figure 1.1.1). The town, with a population of 3,353 (2011 Census), is situated adjacent to the Trans-Canada Highway 17 (Hwy 17) on the northeast shore of Lake Superior, about 300 km east and 400 km northwest (by highway) of Thunder Bay and Sault Ste. Marie, respectively.

The centre of the Project footprint sits at approximately 48° 47' N latitude and 86° 19' W longitude. The Project site is in an area characterized by relatively dense vegetation, comprised largely of a birch and, to a lesser extent, spruce-dominated mixed wood forest. The terrain is moderate to steep, with frequent bedrock outcrops and prominent east to west oriented valleys. The climate of this area is typical of northern areas within the Canadian Shield, with long winters and short, warm summers.

FIGURE 1.1.1: LOCATION OF THE PROPOSED MARATHON PGM-Cu PROJECT SITE NEAR MARATHON, ONTARIO

1.2 Surrounding Land Uses

The Project site lies partially within the municipal boundaries of the Town of Marathon, as well as partially within the unorganized townships of Pic, O'Neil and McCoy. The primary zoning designation within the Project Site is 'rural'.

In the immediate vicinity of the Project there are several authorized aggregate sites, including SCI's licensed aggregate site located to the northeast of Hwy 17 along the existing site access road (Camp 19 Road).

The Marathon Municipal Airport (CYSP), which operates as a Registered Airport (Aerodrome class) under the Canadian Aviation Regulations (CARs; Subsection 302), is adjacent to, and south of the Project site. The airport occupies a land area of approximately 219 hectares and is accessed from Hwy 17.

Several First Nations and Métis peoples claim the Project site as falling within their traditional land use boundaries. Based on Aboriginal accounts, prior to the construction of the forestry road, the land and water uses associated with (or close to) the site would have typically been limited to the Pic River corridor, the Bamoo's Lake-Hare Lake-Lake Superior corridor and the Lake Superior shoreline and near-shore area, rather than the interior of the Project site. Traditional land and water uses (or rights conferred by Treaty) that can be ascribed to the site could include:

- Hunting;
- Trapping;
- Fishing; and,
- Plant harvesting for food, cultural and medicinal uses.

Primary industries supporting the Town of Marathon, as well as the region, have historically been forestry, pulp and paper, mining and tourism. The Project site is located within the Big Pic Forest Management Area. The Big Pic Forest includes Crown land east and north of Lake Superior and is generally north, south and west of the community of Manitouwadge and includes the communities of Marathon, Caramat and Hillsport.

Until July 2010 the forest was managed under the authority of a Sustainable Forest License (SFL), which was held by Marathon Pulp Inc. This SFL was revoked, with the forest reverting to the Crown as a Crown Forest. Until recently, Marathon Pulp Inc. (MPI) operated a kraft pulp mill in Marathon on the shore of Peninsula Harbour. The mill announced its indefinite shut down (effective at the end of February 2009) on February 11, 2009, and as a result there has been a significant downturn in the local economy. A second mill operated in Terrace Bay was temporarily closed in December 2011.

The Hemlo Mining Camp is located 30 km to the southeast. There are currently two mines in production at the Camp (David Bell Mine, Williams Mine), which are estimated to be in operations until 2025.

1.3 Exploration History of the Site

Exploration for copper and nickel deposits on the Project site started in the 1920s and continued until the 1940s with the discovery of titaniferous magnetite and disseminated chalcopyrite occurrences. During the past four decades, the site has undergone several phases of exploration and economic evaluation, including geophysical surveys, prospecting, trenching, diamond drill programs, geological studies, resource estimates, metallurgical studies, mining studies, and economic analyses. These studies have successively enhanced the knowledge base of the deposit.

In 1963, Anaconda acquired the Marathon property and carried out systematic exploration work including diamond drilling of 36,531 m in 173 drill holes. This culminated in the discovery of a large copper-PGM deposit. Anaconda discontinued further work on the project in the early 1980s due to low metal prices at the time.

In 1985, Fleck purchased a 100% interest in the Marathon PGM-Cu Project with the objective of improving the project economics by focusing on the platinum group element (PGE) values of the deposit. The Fleck drilling totalled 3,615 m in 37 diamond drill holes. In 1986, H.A. Symons carried out a feasibility study for Fleck based on a 9,000 tonnes per day conventional flotation plant with marketing of copper concentrate and Kilborn Limited carried out a prefeasibility review for Fleck that included preliminary results from the Lakefield pilot plant tests (Kilborn Limited, 1987). The feasibility study indicated a low internal rate of return which was confirmed by Teck Corporation who concluded the project was uneconomic due to low metal prices at the time. On June 10, 1998, Fleck changed its name to PolyMet Mining Corp.

In 2000, Geomaque acquired certain rights to the Marathon PGM-Cu Project through an option agreement with Polymet. Geomaque and its consultants carried out a study of the economic potential of the Marathon PGM-Cu Project. The study included a review of the geology and drill hole database, interpretation of the mineralized zones, statistics and geostatistics, computerized block model, resource estimation, open pit design and optimization, metallurgy, process design, environmental aspects, capital and operating cost.

Marathon PGM Corp. acquired the Marathon PGM-Cu deposit from Polymet in December 2003. Marathon PGM Corp. funded programs of advanced exploration and diamond drilling on a continuous basis between June 2004 and 2009. Approximately 320 holes and 65,000 m were drilled from 2007 to 2009 to define and expand the resource and for condemnation holes outside of the pit area. A feasibility study was published in 2008 and updated in January 2010.

Stillwater Mining Company (SWC) and Marathon PGM entered into an agreement on September 7, 2010 pursuant to which SWC would acquire all of the outstanding shares of Marathon PGM. The acquisition agreement received ministerial approval under the Investment Canada Act on November 24, 2010 and the agreement closed on November 30, 2010. On December 31, 2010 Stillwater Mining Company formed a Canadian corporation, Stillwater Canada Inc. In March 2012, MC MINING LTD (MC) purchased 25% interest in Stillwater Canada Inc. who is the proponent of the Marathon PGM-Cu Project.

1.4 Project Overview

The Project is based on the development of an open pit mining and milling operation. The conceptual general layout of the components of the mine site, the transmission line corridor and access road is provided in Figure 3 below. One primary pit and a satellite pit complex to the south (currently envisaged to be comprised of four satellite pits) are proposed to be mined. Ore will be processed (crushed, ground, concentrated) at an on-site processing facility. Final concentrates containing copper and platinum group metals will be transported off-site via road and/or rail to a smelter and refinery for subsequent metal extraction and separation. The total mineral reserve (proven and probable) is estimated to be approximately 91.5 million tonnes. It is possible that an iron concentrate may also be produced, depending upon the results of further metallurgical testing and market conditions at that time.

During the operations phase of the Project, ore will be fed to the mill at an average rate of approximately 22,000 tonnes per day. The operating life of the mine is estimated to be approximately 11.5 years. The construction workforce will average approximately 400 people and will be required for between 18 and 24 months. During operations the work force will comprise an estimated 365 workers. The mine workforce will reside in local and surrounding communities, as well as in an Accommodations Complex that will be constructed in the Town of Marathon.

Approximately 288 million tonnes of mine rock[1] will be excavated. It is estimated that between eighty five to ninety percent of this material is non-acid generating (NAG) and will be permanently stored in a purposefully built Mine Rock Storage Area (MRSA) located east of the primary pit. The NAG or so-called Type 1 mine rock will also be used in the construction of access roads, dams and other site infrastructure as needed. Drainage from the MRSA will be collected, stored, treated and discharged as necessary to the Pic River. During mine operations, about 20 million tonnes of mine rock could have the potential to generate acid if left exposed for extended periods of time. This mine rock is referred to as Type 2 mine rock or potentially acid generating (PAG). The Type 2 mine rock will be managed on surface during mine operations in temporary stock piles with drainage directed into the open pits. This material will be relocated to the bottom of the primary and satellite pits and covered with water to prevent potential acid generation and covered with Type 1 materials.

Process solids[2] will be managed in the Process Solids Management Facility (PSMF), as well as in the satellite pit complex. The PSMF will be designed to hold approximately 61 million m^3 of material, and its creation will require the construction of dams. Two streams of process solids will be generated. An estimated 85 to 90% of the total amount of process solids produced will be non-acid generating, or so-called Type 1 process solids. The remaining ten to fifteen percent of the process solids could be potentially acid generating and referred to as Type 2 process solids. The Type 2 process solids will be stored below the water table in the PSMF or below water in the pits to mitigate potential acid generation

[1] Mine rock is rock that has been excavated from active mining areas but does not have sufficient ore grades to process for mineral extraction.
[2] Process solids are solids generated during the ore milling process following extraction of the ore (minerals) from the host material.

and covered with Type 1materials. Water collected within the PSMF, as well as water collected around the mine site other than from the MRSA will be managed in the PSMF for eventual reclamation in the milling process. Excess water not needed in the mill will be discharged, following treatment as is necessary, to Hare Lake.

Access to the Project site is currently provided by the Camp 19 Road, opposite Peninsula Road at Hwy 17. The existing road runs east towards the Pic River before turning north along the river to the Project site (approximately 8 km). The existing road will be upgraded and utilized from its junction with Hwy 17 for approximately 2.0 km. At this point a new road running north will be constructed to the future plant site. The primary rationale for developing the new road is to move traffic away from the Pic River. The new section of road will link two sections of forest access roads located on the site.

Power to the Project site will be provided via a new 115 kV transmission line that will be constructed from a junction point on the Terrace Bay-Manitouwadge transmission line (M2W Line) located to the northwest of the primary pit. The new transmission line will run approximately 4.1 km to a substation at the mill site. The width of the transmission corridor will be approximately 30 m.

Disturbed areas of the Project footprint will be reclaimed in a progressive manner during all Project phases. Natural drainage patterns will be restored as much as possible. The ultimate goal of mine decommissioning will be to reclaim land within the Project footprint to permit future use by resident biota and as determined through consultation with the public, Aboriginal peoples and government. A certified Closure Plan for the Project will be prepared as required by Ontario Regulation (O.Reg.) 240/00 as amended by O.Reg.194/06 “Mine Development and Closure under Part VII of the Mining Act” and “Mine Rehabilitation Code of Ontario”.

Maps showing the existing features and topography of the site, as well as the proposed conceptual development of the site are provided in Figures 1.4.1 and 1.4.2.

1.5 Scope of Work

Calder Engineering Ltd. (CEL) was retained by Stillwater Canada Inc. to conduct a baseline hydrology study for the Project. The purpose of the work was to review the available technical information, and summarize and assess both regional and local hydrologic data in the study area in support of the overall EA process under the Canadian Environmental Assessment Act (CEA Act).

Specific work conducted by CEL included delineation of drainage patterns, review and assessment of both regional and local hydrologic data, review and assistance with the Project stream flow monitoring program, and reduction and assessment of collected stream flow data.

1.6 Report Format

Section 1, is common to all EA documents being produced for the Project, and provides the background and context for the project. Section 2 builds on the site description provided in Section 1 with an emphasis on factors that will influence study area hydrology. Described

in Section 3 is available baseline information. Provided in Section 4 is a description of the stream flow monitoring program implemented for the Project. Provided in Section 5 is an assessment of available baseline information.

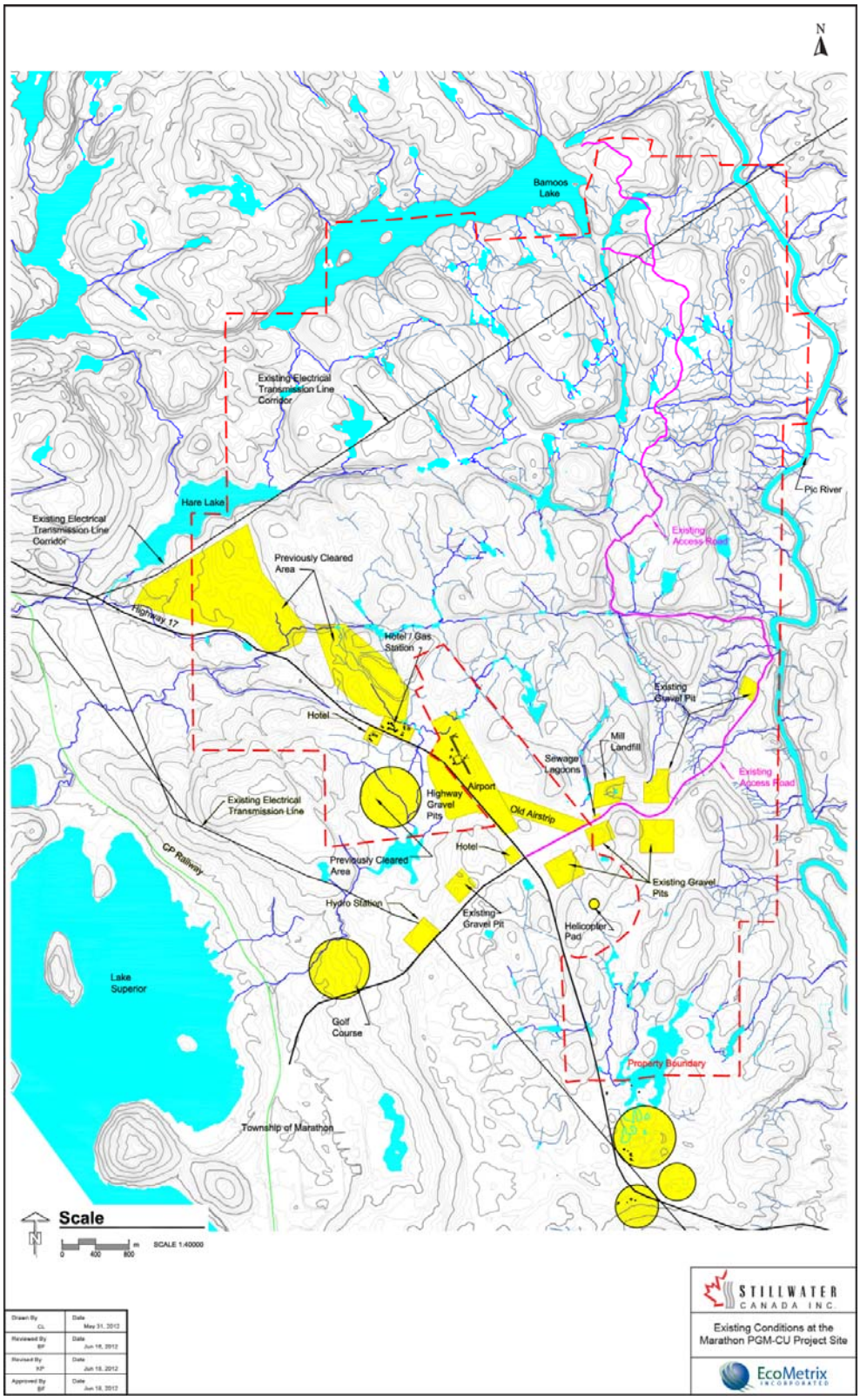


FIGURE 1.4.1 EXISTING CONDITIONS AT THE MARTHON PGM-Cu PROJECT SITE

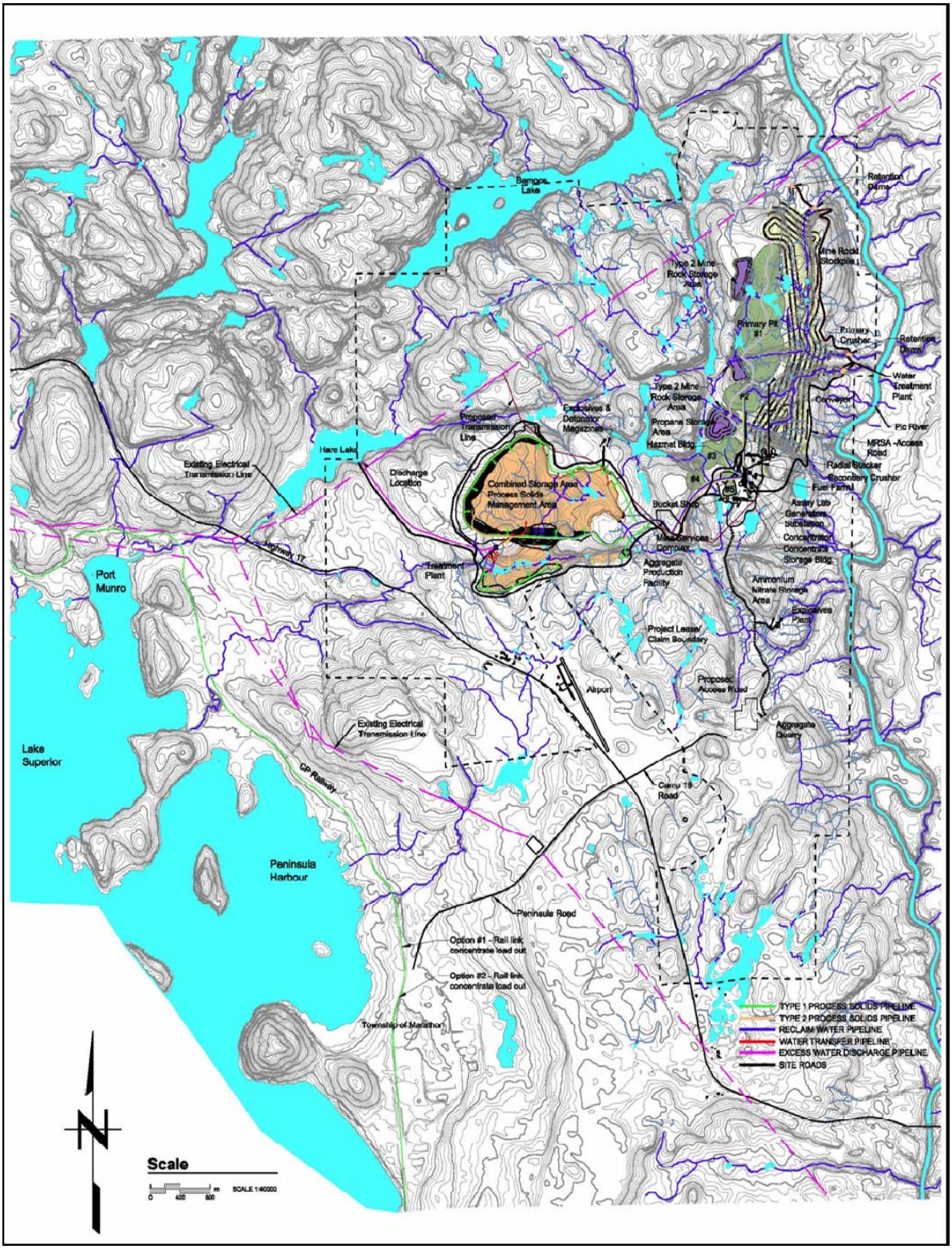


FIGURE 1.4.2 MARATHON PGM-Cu PROJECT CONCEPTUAL GENERAL SITE LAYOUT

2.0 SITE SETTING

2.1 Regional Physiography

As reported by True Grit Consulting Ltd. (2011), the regional physiography of the area is strongly influenced by the massive and rugged bedrock hills which dominate the landscape through the area and the glacial activity that occurred during the Wisconsinan Stage of the Pleistocene Epoch. Relief in excess of 150 metres (m) is common and the slopes of the sides of hills and valleys are complex and steep. Drainage is generally good, with localized areas of poor drainage (organics).

Higher elevations consist almost entirely of rugged bedrock with a thin veneer of ground moraine. Within the valleys, in particular the Pic River valley, thick sequences of glaciolacustrine silt and clay have been deposited. These deposits were formed as the ice margin retreated northward and the ancestral Lake Superior inundated the valleys. One significant physiographic feature is the presence of a glaciofluvial delta northeast and east of the Town of Marathon and south of the project area which contains extensive deposits of sand and gravel. These deposits were formed where glacial melt waters entered the paleo-Lake Superior Basin.

2.2 Regional Hydrology and Climate

Based on climate normals for Marathon, the mean annual precipitation in the study area is 826.5 millimetres (mm), which varies from a mean monthly low in February of 49.9 mm to a mean monthly high in September of 90.6 mm. Snowfall in the region has historically occurred as early as September, however, significant snow pack accumulation typically does not result until late November when mean daily temperatures are below freezing. Mean annual snowfall is approximately 238.2 centimetres (cm), representing approximately 29% of the annual precipitation. In the spring, the snowmelt tends to begin by mid-March with the majority of the accumulated snow pack depleting between April 1st and May 1st.

Mean daily temperatures vary from a low of -13.9^{o} Celsius in January to a high of 14.6^{o} Celsius in August. Mean annual evapotranspiration in the Marathon area has been reported as 488.2 mm by Environment Canada.

Further information on regional hydrology and climate is provided in Section 3.

2.3 Surface Water Drainage Patterns

General surface drainage patterns and topographic relief in the study area are shown on Figure 2.3.1. Drainage in the study area is either in a generally easterly direction to the Pic River via a series of small watercourses, southwest through a watercourse designated as “Stream 6” to Lake Superior (e.g., Sub-Basin 106 on Figure 2.3.1), or in a generally westerly direction to Hare Lake. Hake Lake receives flow from both Bamoo’s Lake and Seeley Lake, and ultimately drains to Lake Superior via Hare Creek. All surface water drainage ultimately discharges to Lake Superior.

As shown on Figure 2.3.1, the study area was delineated into 8 major sub-basins. These are designated as numbers 101 through 108 and are summarized in Table 2.3.1. The drainage basin boundaries were delineated for each sub-basin using 5-metre contour interval data from ALOS stereo coverage acquired on September 2nd, 2009.

For general reference purposes, the total drainage area of these 8 sub-basins is approximately 7,263 hectares or 72.6 square kilometres. The drainage area of the Pic River immediately to the east of the Project is approximately 4,270 square kilometres.

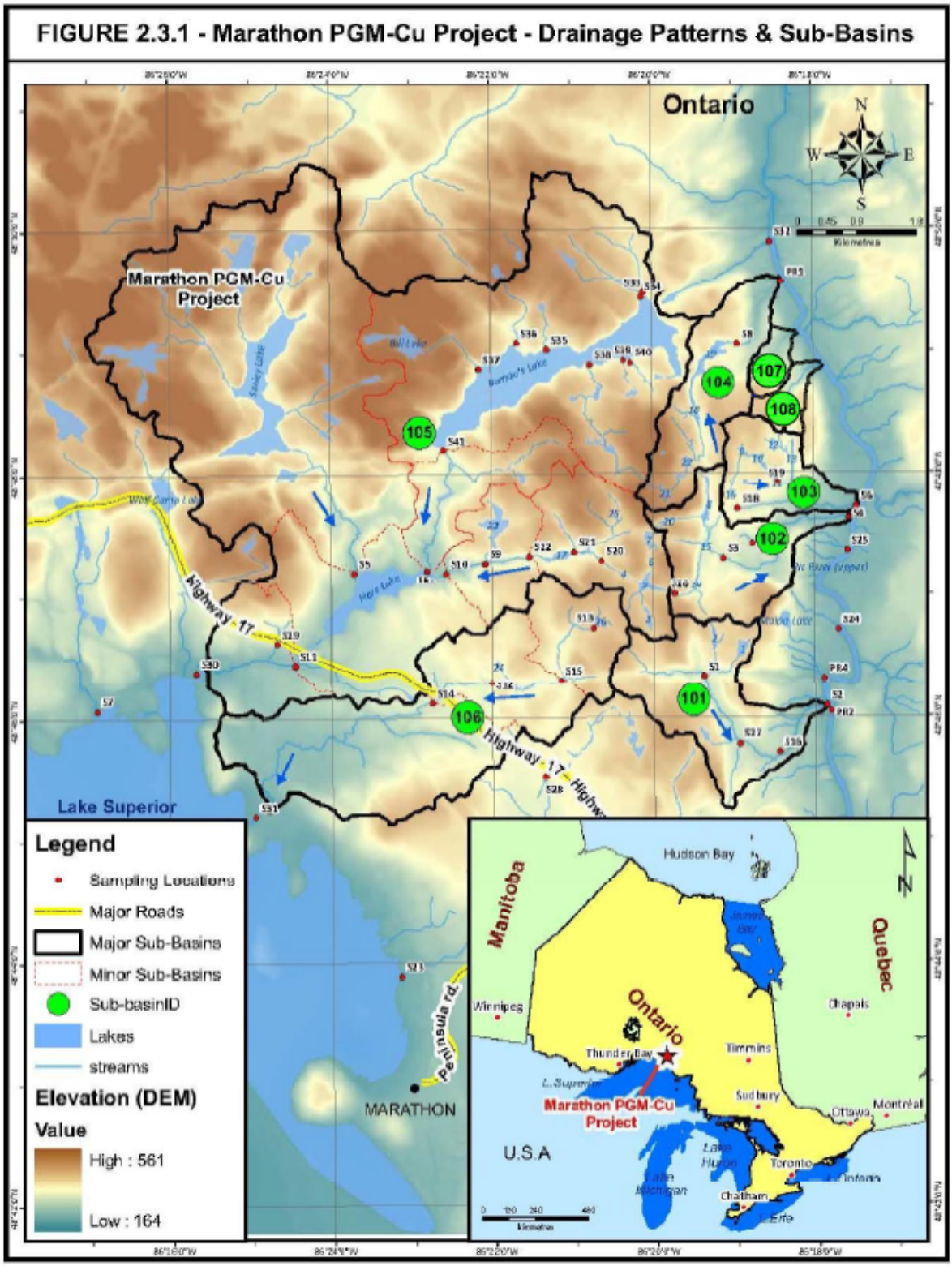
TABLE 2.3.1
SUMMARY OF SUB-BASIN CHARACTERISTICS

Sub-Basin No.	Drainage Area (ha)	Lakes/Major Water Bodies	Drainage Path/Outlet
101	435	Lakes 1, 2	Pic River
102	347	Lakes 8, 14, 15, 20	Pic River
103	211	Lakes 9, 10, 11, 12, 13, 16	Pic River
104	339	Lakes 18, 19, 21, 22	Pic River
105[2]	4,833	Lakes 3, 4, 5, 6, 7, 17, 23, 25, Bamoo's Lake, Hare Lake, Seeley Lake, Bill Lake, and Hare Creek	Lake Superior at Port Munroe
106[3]	1,098	Lakes 24 and 26	Lake Superior at Sturdee Cove
107	49	-	Pic River
108	53	-	Pic River

Note:

1. Refer to Figure 2.3.1 for the location of sub-basins and lake or major water bodies.
2. Sub-basin 105 is further discretized into 5 minor basins at node locations S5 (1,808 ha), S10 (563 ha), S11 (4,598 ha), S22 (352 ha), and S41 (1,419 ha).
3. Sub-basin 106 is further discretized into 2 minor basins at stream monitoring locations S14 (489 ha) and S15 (205 ha).

FIGURE 2.3.1 - Marathon PGM-Cu Project - Drainage Patterns & Sub-Basins



3.0 BASELINE DATA REVIEW

3.1 Existing Information

The following existing baseline information is available and was reviewed:

- regional climatic information available from Environmental Canada (EC) weather stations;
- regional hydrometric stream flow data available from Water Survey of Canada (WSC); and
- local stream flow data collected in the study area in the Fall of 2007 and Spring of 2008 in support of previous technical studies for the Project.

3.2 Historical Climatic Information

Historical climate data was collected from the following Environment Canada's (EC) weather stations:

- Marathon (Station ID 6044959)
- Marathon Airport (Station ID 6044961)
- Pukaskwa National Park (Station ID 6046770)
- Hemlo Battle Mountain (Station ID 6043452).

Summarized in Table 3.2.1 for these stations are the station location, available data record, average annual precipitation, and air temperature variation. The location of these stations is shown on Figure 3.2.1. The archived datasets are available at:

http://www.climate.weatheroffice.gc.ca/climateData/canada_e.html

None of these stations were active after 2004. Two (2) alternate weather stations with more recent climatic data are available in the proximity of the Project (e.g., Marathon 'A': Station ID No. 6044962 and Pukaskwa (AUT): Station ID No. 6046767). These stations were not included in Table 3.2.1 due to limited or missing data sets; however, they are a useful resource for future climatic information.

The closest weather station was 'Marathon Airport' (Station ID 6044961) situated 4 km southwest of the Project. It has 11 years of archived weather data from 1989-1999. The mean annual precipitation from this database is 847.9 mm.

The 'Marathon' (Station ID 6044959) weather station was located 8 km southwest of the Project and has 32 years of archived weather data from 1952 to 1983. This station is closer to the Project than either the Pukaskwa National Park and Hemlo Battle Mountain weather stations. The mean annual precipitation from the Marathon weather station database is 826.5 mm.

FIGURE 3.2.1 - Marathon PGM-Cu Mining Project

TABLE 3.2.1
SUMMARY OF CLIMATIC STATIONS WITHIN 35 KM OF THE MARATHON PROJECT SITE

Station Name	Station ID	Data Record	Distance from Site (km)	Elevation (m)	Latitude	Longitude	Average Annual Precipitation (mm)	Average Annual Snowfall (mm)	Mean Temperature Range (°C)
Marathon	6044959	1952 - 1983 (32)	8 km (SW)	189.0	48°43'00" N	86°24'00" W	826.5	238.1	-13.9 to 14.6
Marathon Airport	6044961	1989 - 1999 (11)	4 km (SW)	315.5	48°45'20" N	86°20'40" W	847.9	236.3	-15.2 to 15.0
Pukaskwa Nat. Park	6046770	1984 - 2004 (21)	15 km (S)	192.0	48°36'00" N	86°18'00" W	737.3	196.7	-13.4 to 15.4
Hemlo Battle Mountain	6043452	1986 – 2001 (16)	30 km (E)	335.0	48°42'00" N	85°53'00" W	766.1	197.8	-14.7 to 16.8

Note:
1. Units: km – kilometre, m – metre, mm – millimetre, °C - degrees Celsius.

Based on the information presented in Table 3.2.1, both the Marathon and Marathon Airport weather stations recorded comparable average annual precipitation, average annual snowfall, and mean temperature range. Due to longer record of archived data at the Marathon station (32 years), it is considered more representative of climatic normals than the Marathon Airport station (11 years).

The daily data available at Marathon weather station includes; total rain, total snow, total precipitation, mean, maximum & minimum air temperature, wind speed & direction, relative humidity, solar radiation, and barometric pressure. The area receives approximately 826.5 mm of precipitation annually, which varies from a mean monthly low in February of 49.9 mm to a mean monthly high in September of 90.6 mm. Summarized in Table 3.2.2 is the distribution of mean monthly precipitation throughout the year. Snowfall in the region has historically occurred as early as September, however, significant snow pack accumulation typically does not result until late November when mean daily temperatures are below freezing. Mean annual snowfall is approximately 238.2 centimetres (cm), representing approximately 29% of the annual precipitation. In the spring, the snowmelt tends to begin by mid-March with the majority of the accumulated snow pack depleting between April 1st and May 1st.

TABLE 3.2.2
MEAN MONTHLY PRECIPITATION AT THE MARATHON WEATHER STATION

Month	Mean Monthly Precipitation (mm)
January	67.3
February	49.9
March	59.3
April	55.7
May	65.7
June	79.9
July	74.7
August	80.1
September	90.6
October	75.6
November	65.6
December	62.0
TOTAL:	826.5

Note:
1. Units: mm – millimetre

Mean daily temperatures vary from a low of -13.9° Celsius in January to a high of 14.6° Celsius in August. Mean annual evapotranspiration in the marathon area has been reported as 488.2 mm by Environment Canada.

Precipitation amounts for mean, dry and wet years are summarized in Table 3.2.3. The values for the dry and wet years were computed using the Log-Normal probability distribution, mean monthly precipitation from the Marathon weather station, and scaling the data using annual precipitation from both the Marathon and Marathon Airport weather stations.

Since no pan evaporation data is available near the Local Study Area (LSA), estimates of annual evaporation and evapotranspiration were obtained from maps within the Hydrological Atlas of Canada (1978) and water budget values for the period 1959-1981 as computed by Environment Canada (Golder Associates, 2007). The average annual lake evaporation and evapotranspiration obtained from Hydrological Atlas of Canada for the Marathon area are approximately 510 mm and 465 mm, respectively, while the mean annual evapotranspiration is 488.2 mm, according to the Environment Canada's water budget values for the period 1959-1981.

TABLE 3.2.3
FREQUENCY ANALYSIS USING MARATHON PRECIPITATION DATA

Annual Return Period	Average Annual Precipitation (mm)	
	Wet Year	Dry Year
Average	826.5	
10-Year	1,046.5	652.6
25-Year	1,196.3	570.9
50-Year	1,321.1	516.9
100-Year	1,457.9	468.4

Note:
1. Units: mm – millimeter

3.3 Regional Hydrometric Stream Flow Data

There is minimal regional hydrologic data in the Project area and available data is representative of large river systems (e.g., Pic River with a drainage area of 4,270 square kilometres upstream of the project site). Hydrologic data from stations within a 35 km radius of the Project were used to assess the regional hydrologic characteristics. These included the Little Pic River near Coldwell (02BA003), the Pic River near Marathon (02BB003), the Black River near Marathon (02BB002), and Cedar Creek near Hemlo (02BB004).

The station locations are shown in Figure 3.2.1 and summarized in Table 3.3.1.

Summarized in Table 3.3.2 are mean monthly flows for the regional hydrometric stations. Provided in Table 3.3.3 are minimum and maximum mean daily flows. Summaries have also been attached in Appendix A and the archived datasets are available at:

http://www.wsc.ec.gc.ca/applications/H2O/index-eng.cfm.

This information is further discussed in Section 5.1.

3.4 Local Study Area Stream Flow Data

Local stream flow data is available from Golder Associates (2009) that was collected as part of previous technical studies for the Project. This data consists of 31 manual spot flow measurements in the Fall of 2007 and Spring of 2008 on streams 1 to 6 and Hare Creek. These have been attached in Appendix A.

The data collected by Golder Associates was augmented with additional data collected by True Grit Consulting Ltd. as part of the Project's stream flow monitoring program. This monitoring program was conducted from 2008 to 2011, and comprised of both manual spot flow measurements and the installation and maintenance of six continuous stream flow stations. The stream flow monitoring program is further described in Section 4.0.

TABLE 3.3.1
REGIONAL HYDROMETRIC STATIONS IN THE PROXIMITY OF LSA

Station Name	Station ID	Data Record	Drainage Area (km^2)	Latitude	Longitude	Average Yearly Flow (m^3/s)
Little Pic River near Coldwell	02BA003	1972 – 2010 (38)	1320	48°50'56" N	86°36'25" W	15.7
Pic River near Marathon	02BB003	1970 – 2010 (40)	4270	48°46'26" N	86°17'47" W	51.5
Black River near Marathon	02BB002	1967 – 1990 (23)	1980	48°41'20" N	86°12'45" W	26.6
Cedar Creek near Hemlo	02BB004	1984 – 2010 (26)	201	48°42'22" N	85°54'33" W	2.26

Note:
1. Units: km^2 – square kilometre, m^3/s – cubic metres per second.
2. Data from 2011 is not available.

TABLE 3.3.2
MONTHLY MEAN FLOWS FOR REGIONAL HYDROMETRIC STATIONS

Month	Little Pic River near Coldwell	Pic River near Marathon	Black River near Marathon	Cedar Creek near Hemlo
January	4.98	14.5	7.47	0.840
February	3.88	10.5	5.19	0.550
March	4.28	11.1	6.08	0.555
April	30.5	94.1	55.1	4.25
May	44.8	155	83.8	6.84
June	21.2	72.0	33.9	2.42
July	13.9	48.3	21.6	1.84
August	9.17	32.1	14.7	0.984
September	11.3	35.3	16.9	1.16
October	18.6	60.9	29.5	2.88
November	16.8	52.0	28.9	3.08
December	8.25	28.3	14.5	1.63
Mean Annual Flow	**15.7**	**51.5**	**26.6**	**2.26**

Note:
1. All flows are reported in cubic metre per second (cms).
2. Data record:
    i. Little Pic River (02BA003): July 1972 to December 2010
    ii. Pic River (02BB003): March 1970 to December 2010
    iii. Black River (02BB002): November 1967 to December 1990
    iv. Cedar Creek (02BB004): December 1984 to December 2010

TABLE 3.3.3
MINIMUM AND MAXIMUM MEAN DAILY FLOWS FOR REGIONAL HYDROMETRIC STATIONS BY MONTH

Month	Little Pic River near Coldwell		Pic River near Marathon		Black River near Marathon		Cedar Creek near Hemlo	
	Min	Max	Min	Max	Min	Max	Min	Max
January	2.06	12.0	4.56	42.8	2.28	16.2	0.265	3.22
February	1.98	9.10	4.45	19.8	1.45	12.1	0.201	1.48
March	1.57	60.6	4.05	178	1.15	45.6	0.181	5.86
April	2.11	218	4.20	643	1.98	246	0.246	36.7
May	5.42	262	15.5	723	11.5	301	0.496	32.9
June	4.24	269	8.33	546	6.17	154	0.097	12.2
July	2.93	221	6.81	449	1.68	118	0.100	20.9
August	1.80	77.6	3.17	262	0.541	124	0.049	5.43
September	1.64	136	3.09	342	0.032	168	0.025	5.66
October	1.89	176	4.61	486	0.290	145	0.042	16.3
November	2.00	137	3.23	236	2.82	124	0.424	33.9
December	1.57	52.2	4.81	197	3.38	55	0.359	8.00

Note:
1. All flows are reported in cubic metre per second (cms).
2. Data record:
   i. Little Pic River (02BA003): July 1972 to December 2010
   ii. Pic River (02BB003): March 1970 to December 2010
   iii. Black River (02BB002): November 1967 to December 1990
   iv. Cedar Creek (02BB004): December 1984 to December 2010

4.0 BASELINE STREAM FLOW MONITORING

4.1 Monitoring Program

A baseline stream flow monitoring program was implemented during open-water conditions typically from May through October. The program operated from August 2008 to November 2011 to characterize seasonal and annual variations in surface water hydrology. The stream flow monitoring program comprised of the installation and maintenance of continuous water level recorders and manual flow measurements. Implementation of the program was undertaken by True Grit Consulting Ltd.

4.2 Methodology

4.2.1 Manual Flow Measurements

Manual measurements of stream flow were undertaken using the Velocity-Area Method. With this approach, the discharge is calculated from a series of velocity measurements and associated cross-section areas. Measurements were typically made with a portable velocity meter for flow, and a 1 metre staff gauge graduate in 1 centimetre increments for depth.

4.2.2 Continuous Stream Flow Gauging Stations

Continuous stream flow data was obtained using water pressure recorders. Water pressures were recorded at 15-minute intervals as instantaneous data points using a HOBO Water Level Data Logger at each automated gauging site. In addition, a HOBO Water Level Data Logger was installed in the study area “out of the water” to provide barometric pressure compensation.

Recorded water pressures were converted to flows using a water level or water pressure versus flow relationship (Rating Curve) established for each gauging site. The Rating Curves were determined based on manual flow measurements.

4.3 Monitoring Locations

Manual flow measurements were made at 41 locations in the study area. The locations of manual flow measurements are shown on Figure 2.3.1 (the sampling locations are denoted as sites S1 to S41).

Continuous stream flow data was recorded at six locations in the Local Study Area (LSA). Table 4.3.1 lists the stations and periods with continuous stream flow data available. Two automated gauging stations (S15 and S22) were monitored in 2008, four stations (S10, S11, S14, and S41) were monitored in 2009, three stations (S11, S14, and S41) were monitored in 2010 and two stations (S11 and S14) were monitored in 2011. The locations of these stations are shown on Figure 2.3.1.

In general, the automated gauging stations were installed annually after the peak of the spring melt and removed in November prior to freeze-up.

TABLE 4.3.1
LSA STREAM FLOW MONITORING STATIONS, 2008 – 2011

Station Name	Continuous Sampling Period	Manual flow Measurements	Drainage Area (km^2)	Latitude	Longitude	Rating Curve Equation used[2]	R^2
S15	7/8/2008 – 11/20/2008	5	2.05	48°46'18.3" N	86°21'09.1" W	$Q = 0.093h - 0.016$	0.85
S22	7/8/2008 – 11/20/2008	5	3.52	48°47'19.6" N	86°21'31.9" W	$Q = 404.876h^{9.928}$	0.89
S10	4/20/2009 – 11/5/2009	6	5.63	48°47'11.4" N	86°22'34.0" W	$Q = 0.005e^{9.773h}$	0.91
S11	5/8/2009 – 11/5/2009 5/3/2010 – 10/29/2010 4/13/2011 – 10/31/2011	7 4 3	45.98	48°46'26.4" N	86°24'27.0" W	$Q = 0.071p^{9.026}$ $Q = 0.071p^{9.026}$ $Q = 0.000013e^{8.337p}$	0.83 0.83 0.85
S14	4/20/2009 – 11/5/2009 5/3/2010 – 10/29/2010 5/12/2011 – 10/29/2011	8 4 3	4.89	48°46'7.4" N	86°22'44.9" W	$Q = 0.006p^{7.140}$	0.73
S41	3/8/2009 – 11/4/2009 5/6/2010 – 11/11/2010	4 3	14.19	48°48'11.9" N	86°22'35.6" W	$Q = 0.135p^{6.956}$	0.82

Note:
1. Units: km^2 – square kilometre, m^3/s – cubic metres per second.
2. In these equations, Q represents flow rate in m^3/s, and *h* and *p* represents water level and uncorrected water pressure in metres respectively.

4.4 Stream Flow Data

The data from manual flow measurements collected from August 2008 through October 2011 is provided in Appendix A.

The data from the continuous stream flow monitoring is provided in Appendix B in the form of hydrographs. Sample hydrographs for the S11 station (near the outlet of Hare Lake) in 2009, 2010 and 2011 are provided in Figures 4.4.1. The scale on the hydrographs was set to a maximum of 7 m^3/s to allow for easy comparison between the years. As such, the 2011 hydrograph was cut off for two days from May 2 to May 4 to preserve a reasonable scaling for the rest of the year. The maximum flow during this period was 15.3m^3/s. The hydrographs are typical for the LSA, with high flows through the spring period (e.g., May and early June), low summer flows from June to September, and slightly higher flows associated with the fall period (e.g., October and November).

With respect to the continuous stream flow data, where possible, the recorded water pressures were converted to water levels by adjusting the barologger reading for altitude and subtracting that value from the levelogger's reading to get the air pressure adjusted water level in metres. Due to a malfunction in the barologger during the 2010 field program the water pressure data (in metres) could not be adjusted for the barometric pressure. The recorded pressure data was not converted to levels for S11, S14 and S41 for this reason.

Rating Curves were used to determine the flow from the recorded data. For S22 (2008), S15 (2009), and S10 (2009), Rating Curves were prepared using recorded water level and flow. Due to the malfunction previously mentioned, Rating Curves for S11, S14 and S41 were prepared using recorded water pressure and flow. Rating Curve plots and regression equations for each gauging station are provided in Appendix B.

Table 4.3.1 provides the continuous and manual measurement data record periods, and rating curve equations established at each station. The accuracy of the regression equations in estimating flow based on the continuous stage data is expressed by the coefficient of correlation (or R^2) shown in Table 4.3.1. When the R^2 value is closer to 1.0, the variance in data is low (or higher predictability). For the six continuous stream flow monitoring stations, R^2 values ranged from 0.73 to 0.91, indicating good correlation between the flow and water pressure or level.

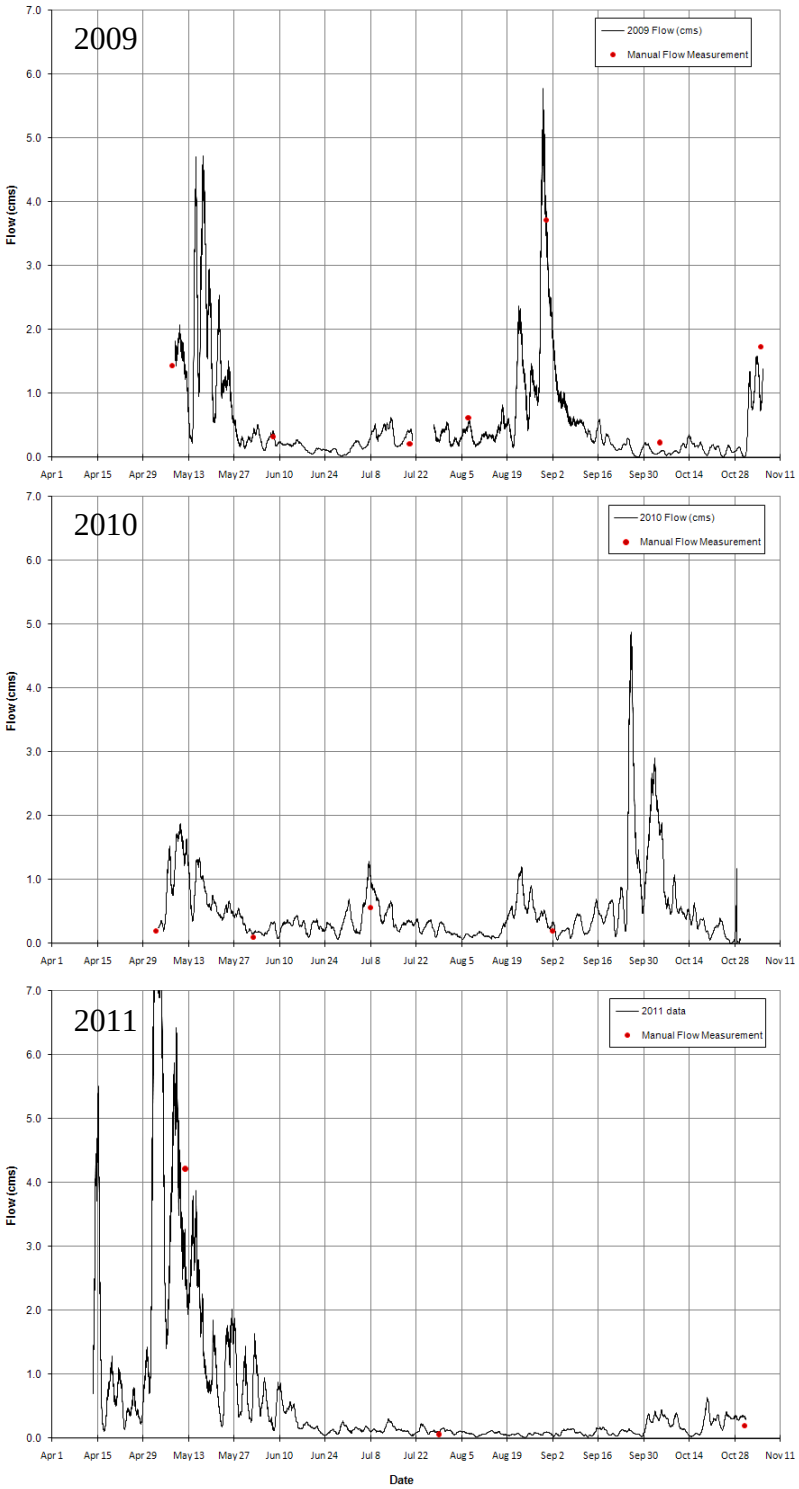


FIGURE 4.4.1
2009 TO 2011 HYDROGRAPHS FOR STATION S11
(HARE CREEK NEAR OUTLET OF HARE LAKE)

The monthly mean flows for the record period (April 2008 through October 2011) are summarized for the LSA in Table 4.4.1. Table 4.4.2 summarizes by year the monthly minimum and maximum flows for these stations. Some months (indicated by [3]) represent only a partial data set (i.e., less than 15 days) and are not used for data analysis in Section 5. In general, inter-annual variation was observed for stations with multiple years for monitoring. However, the flow pattern was similar across the stations and years with the peak flows generally occurring in May, and low flows during the months of July and August. It is noted that recorded peak flows in 2009 occurred in the month of August and in 2010 in the month of September. For the month of August, low monthly mean flows were recorded during 2008 and 2010, while higher flows were noticed during 2009. There is no gauged data available from November to April. It should be noted that the LSA values do not necessarily reflect the peak or minimum values for each year due to fact that freshet and winter months were not monitored.

Only two stations recorded data during 2011: S11 and S14. The mean monthly flows during May and June were higher than those in 2009 and 2010 for S11; the remainder of the 2011 had lower flows at S11 (Figure 4.4.2). The mean monthly flows for S14 in 2011 were typically lower than those from 2009 and 2010 (Figure 4.4.3).

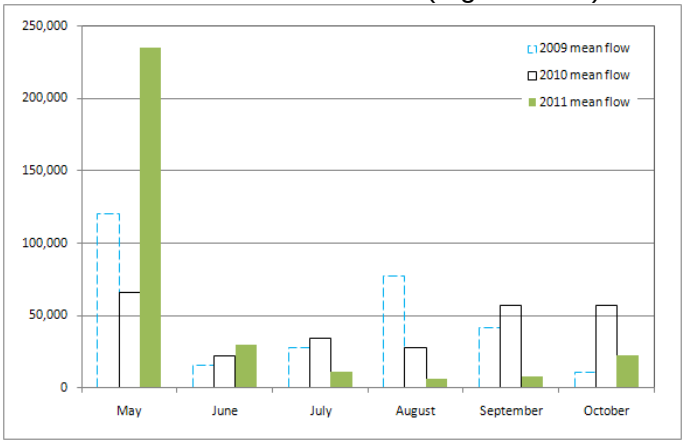


FIGURE 4.4.2 S11 MEAN MONTHLY FLOW COMPARISON BY YEAR

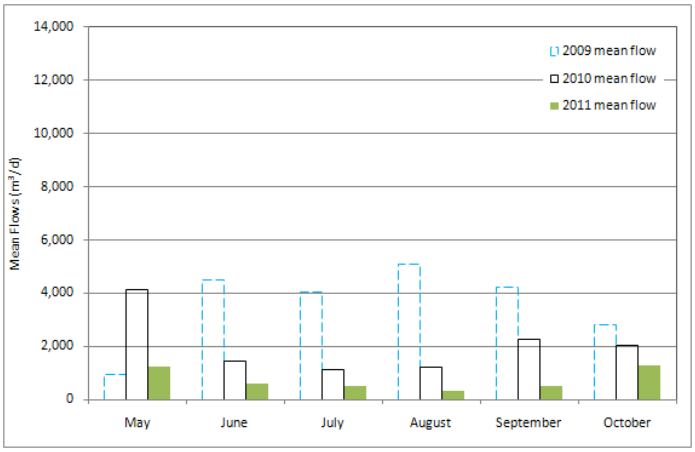


FIGURE 4.4.3 S14 MEAN MONTHLY FLOW COMPARISON BY YEAR

TABLE 4.4.1
MONTHLY MEAN FLOWS FOR LSA GAUGED STREAMS, 2008 – 2011

Station Name	Year	April	May	June	July	August	September	October	November
S15	2008	-[2]	-[2]	-[2]	0.007	0.001	0.006	0.008	0.011
S22	2008	-[2]	-[2]	-[2]	0.009	0.004	0.022	0.046	0.078
S10	2009	0.275[3]	0.173	0.024	0.081	0.164	0.098	0.113	0.239[3]
S11	2009	-[2]	1.389	0.179	0.319	0.893	0.479	0.121	1.102[3]
S14	2009	0.055[3]	0.011[3]	0.052	0.047	0.059	0.049	0.033	0.064[3]
S41	2009	-[2]	-[2]	-[2]	-[2]	0.417	0.310	0.102	0.386[3]
S11	2010	-[2]	0.761	0.252	0.397	0.326	0.665	0.657	-[2]
S14	2010	-[2]	0.048	0.017	0.013	0.014	0.026	0.024	-[2]
S41	2010	-[2]	0.143	0.064	0.081	0.054	0.105	0.141	0.206[3]
S11	2011	0.991	2.718	0.348	0.131	0.070	0.090	0.261	-[2]
S14	2011	-[2]	0.014	0.007	0.006	0.004	0.006	0.015	-[2]

Note:

1. Flow values are in cubic meters per second and represent average stream flow of the month.
2. No data is available for this month.
3. Partial data (i.e., less than 15 days) is available for this month. Data was not used for analysis in Section 5.

TABLE 4.4.2
MINIMUM AND MAXIMUM FLOWS FOR LSA GAUGED STREAMS BY MONTH AND YEAR, 2008 – 2011

Station Name	Year	April		May		June		July		August		September		October		November	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
S15	2008	-[2]	-[2]	-[2]	-[2]	-[2]	-[2]	0.000	0.012	0.000	0.010	0.000	0.025	0.003	0.023	0.003	0.031
S22	2008	-[2]	-[2]	-[2]	-[2]	-[2]	-[2]	0.001	0.020	0.001	0.026	0.001	0.297	0.000	0.289	0.008	0.532
S10	2009	0.177[3]	0.463[3]	0.030	0.473	0.009	0.045	0.012	0.359	0.064	0.766	0.042	0.185	0.075	0.447	0.205[3]	0.289[3]
S11	2009	-[2]	-[2]	0.130	4.722	0.023	0.515	0.059	0.625	0.148	5.787	0.005	2.582	0.008	0.609	0.628[3]	1.582[3]
S14	2009	0.007[3]	0.128[3]	0.007[3]	0.017[3]	0.019	0.083	0.011	0.082	0.020	0.238	0.006	0.086	0.007	0.068	0.045[3]	0.081[3]
S41	2009	-[2]	-[2]	-[2]	-[2]	-[2]	-[2]	-[2]	-[2]	0.099	1.511	0.008	1.150	0.009	0.261	0.225[3]	0.584[3]
S11	2010	-[2]	-[2]	0.151	1.863	0.065	0.554	0.086	1.273	0.057	1.185	0.042	4.907	0.007	2.910	-[2]	-[2]
S14	2010	-[2]	-[2]	0.009	0.118	0.004	0.045	0.002	0.066	0.002	0.067	0.002	0.149	0.001	0.095	-[2]	-[2]
S41	2010	-[2]	-[2]	0.039	0.289	0.016	0.132	0.025	0.213	0.017	0.152	0.007	0.566	0.002	0.3466	0.021[3]	0.547[3]
S11	2011	0.108	5.515	0.180	15.262	0.046	1.637	0.035	0.307	0.011	0.130	0.014	0.293	0.025	0.634	-[2]	-[2]
S14	2011	-[2]	-[2]	0.003	0.028	0.002	0.019	0.002	0.012	0.001	0.006	0.001	0.020	0.001	0.042	-[2]	-[2]

Note:

1. Flow values are in cubic meters per second and represent minimum and maximum stream flow of the month.
2. No data is available for this month.
3. Partial data (i.e. less than 15 days) is available for this month. Data was not used for analysis in Section 5.

5.0 Baseline Hydrology Assessment

The regional hydrologic data and information from the stream flow monitoring program were analyzed to provide information on the hydrological characteristics of the study area. The main objectives were:

- to provide baseline information on local drainage patterns, flow paths, and flow characteristics;
- to review regional hydrometric data and assess hydrologic similarity with hydrologic conditions found at the LSA; and
- to provide estimates of mean, maximum, and minimum flows.

5.1 Regional Hydrometric Stream flow Data

Monthly summaries of the mean and recorded maximum and minimum stream flows for the regional hydrometric stations are provided in Tables 3.3.2 and 3.3.3.

The regional hydrometric stations represent typically larger drainage basins (i.e., 201 km^2 through 4270 km^2). To compare them with stream flow datasets from the Project site, a ratio of the monthly mean stream flow (Q) in m^3/s to the drainage area (A) in hectares was computed for each regional station. The Q/A ratios were calculated from January to December months for all 4 stations and are provided in Table 5.1.1 and Figure 5.2.1.1.

In general, the hydrology of the region is characterized by large snowmelt runoff during the freshet (i.e., April, May, and early June) which quickly tapers off to low summer base flow through July to September. Annual low stream flow typically occurs in the winter months (i.e., January through March) but can also occur in the summer during the months of July, August and September. Moderately higher rates of runoff were noted during the months of October and November months (Table 5.1.1).

5.1.1 Runoff Coefficient and Q/A Ratio

The monthly variation of runoff coefficient and rate of runoff of the Pic River are presented in Table 5.1.1.1. The Project is located partly in the Pic River watershed. Monthly mean stream flow values from 'Pic River at Marathon (1970-2010)' and monthly mean precipitation from 'Marathon' weather station were used to compute runoff coefficient and rate of runoff on monthly basis. The highest runoff coefficient of 1.51 (due to snowmelt) occurs in May, and the lowest runoff-coefficient of 0.14 occurs in January. This distribution shows the influence of winter snow accumulation. An average annual runoff coefficient of 0.47 was computed.

TABLE 5.1.1.1
MONTHLY ESTIMATES OF HYDROLOGICAL CHARACTERISTICS FOR PIC RIVER WATERSHED

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual
Marathon Precipitation (mm/month)	67.3	49.9	59.3	55.7	65.7	79.9	74.7	80.1	90.6	75.6	65.6	62.0	826.5
Pic River Discharge (m^3/s)	14.5	10.5	11.1	94.1	155	72.0	48.3	32.1	35.3	60.9	52.0	28.3	51.5
Discharge (mm/month)	9.14	5.95	6.96	57.1	97.2	43.7	30.3	20.1	21.43	38.2	31.6	17.8	31.6
Runoff Coefficient	0.14	0.12	0.12	1.03	1.48	0.55	0.41	0.25	0.24	0.50	0.48	0.29	0.47
Rate of Runoff (L/s/km2)	3.40	2.46	2.60	22.0	36.3	16.9	11.3	7.52	8.27	14.3	12.2	6.63	12.0

Note:
1. Units: mm/month – millimetre per month, m^3/s – cubic metres per second, $L/s/km^2$ - litre per second per square kilometres

5.1.2 Flood Frequency Analysis

Flood frequency analyses were completed on data sets associated with four regional hydrometric stream flow stations. For each station, the peak instantaneous flow for the 2-year through 100-year return periods were calculated using the Log-Pearson III distribution. The estimated instantaneous peaks are listed in Table 5.1.2.1.

TABLE 5.1.2.1 INSTANTANTANEOUS PEAK FLOWS FOR REGIONAL HYDROMETRIC STATIONS

Location	Return Period (years)					
	2	**5**	**10**	**25**	**50**	**100**
Little Pic River near Marathon	124	180	217	263	296	329
Pic River near Marathon	391	541	610	672	705	729
Black River near Marathon	189	233	253	271	281	289
Cedar Creek at Hanlo	15	23	28	34	39	43

Note:
1. Peak flow values are in cubic meters per second.
2. Return period flood magnitudes derived from Log-Pearson III frequency distribution analysis of peak instantaneous flows.

5.1.3 Low Flow Conditions

Low flow conditions were determined by review of available information provided in a report prepared for the Ministry of the Environment (MOE) on low flow characteristics in Ontario (Cumming Cockburn Limited, 1990). Based on this information, consecutive 7-day and 30-day duration average low flows have been summarized in Table 5.1.3.1. As shown, the estimated 7-day duration twenty year (7Q20) low flows are 2.945 cms, 4.448 cms, and 0.070 cms for Black River near Marathon (1980 km^2), Pic River near Marathon (4270 km^2), and Little Pic River near Coldwell (1320 km^2), respectively. In addition, the table provides estimated 7-day and 30-day low flows for the 2-year through 200-year return periods.

Review of Water Survey of Canada data indicates that annual low flows typically occur in the winter during the months of February and March but can also occur in the summer during the months of August and September.

TABLE 5.1.3.1
ESTIMATED LOW FLOWS FOR REGIONAL HYDROMETRIC STATIONS

Return Period (Years)	Black River near Marathon (02BB002)		Pic River near Marathon (02BB003)		Little Pic River near Coldwell (02BA003)	
	7-day[3]	30-day[4]	7-day[3]	30-day[4]	7-day[3]	30-day[4]
2	4.010	4.258	7.353	7.852	2.778	2.945
5	3.382	3.568	5.586	5.838	2.344	2.454
10	3.120	3.259	4.893	5.058	2.178	2.248
20	**2.945**[5]	3.040	**4.448**[5]	4.558	**2.074**[5]	2.109
50	2.793	2.836	4.080	4.149	1.990	1.987
100	2.716	2.727	3.904	3.955	1.951	1.925
200	2.661	2.646	3.784	3.823	1.925	1.881

Note:

1. All flows are reported in cubic metres per second (cms).
2. Low flows estimated based on data from a report prepared for the Ministry of Environment (MOE) on low flow characteristics in Ontario (Cumming Cockburn Limited, 1990)
3. The value represents 7 consecutive day average low flow, corresponding to various recurrence intervals.
4. The value represents 30 consecutive day average low flow, corresponding to various recurrence intervals.
5. This value represents the **$7Q_{20}$ low flow**, and refers to the lowest mean flow for seven consecutive days that have a 20-year recurrence interval period.

5.2 Local Hydrometric Stream Flow Data

Monthly summaries of the mean and recorded maximum and minimum stream flows for the continuous hydrometric stations in the LSA are provided in Tables 4.4.1 and 4.4.2.

5.2.1 Q/A Ratio

In order to calculate flows at the sub-basin scale, relationships between drainage area and monthly mean stream-flows were computed from the available datasets. This included computation of 'Rate of Runoff (Q/A)' for both regional and LSA hydrometric stream flow stations. The Q/A ratios were computed as monthly mean stream flow (Q) in cubic metres per day divided by the drainage area (A) in hectares. Summarized in Table 5.2.1.1 are mean monthly rates of runoff for the respective stream flow monitoring stations by year.

TABLE 5.2.1.1
MEAN MONTHLY RATES OF RUNOFF AT LSA HYDROMETRIC STATIONS

Station	Area (ha)	Year	May	Jun	Jul	Aug	Sept	Oct	Nov
S22	352	2008	-[2]	-[2]	2.16	1.10	5.32	11.31	19.12
S15	205	2008	-[2]	-[2]	2.83	0.55	2.37	3.46	4.73
S10	563	2009	26.60	3.72	12.43	25.17	14.98	17.32	-[2]
S11	4598	2009	26.10	3.35	5.98	16.77	8.99	2.28	-[2]
S11	4598	2010	14.31	4.74	7.47	6.13	12.49	12.35	-[2]
S11	4598	2011	51.08	6.54	2.46	1.32	1.69	4.90	-[2]
S14	489	2009	-[3]	9.23	8.22	10.44	8.61	5.77	-[2]
S14	489	2010	8.40	2.94	2.33	2.45	4.61	4.18	-[2]
S14	489	2011	2.53	1.24	0.99	0.62	1.03	2.60	-[2]
S41	1419	2009	-[2]	-[2]	-[2]	25.37	18.87	6.20	-[2]
S41	1419	2010	8.68	3.88	4.97	3.29	6.40	8.56	-[2]

Note:
1. All runoff rates reported in m^3/day/ha
2. No data available for this month
3. May 2009 for S14 was excluded as only five days of data was recorded

The respective data sets fore each station were combined and the mean monthly rates of runoff are provided in Table 5.2.1.2. Also provided in Table 5.2.1.2 are rates of runoff for the regional hydrometric stations. The latter provide information for periods in which stream flow data in the LSA is not available (i.e., November through April). The information is shown graphically in Figure 5.2.1.1.

TABLE 5.2.1.2
MEAN MONTHLY RATES OF RUNOFF AT LSA HYDROMETRIC STATIONS

Station	Data Record	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
S22	2008	-[2]	-[2]	-[2]	-[2]	-[2]	-[2]	2.16	1.10	5.32	11.31	19.12	-[2]
S15	2008	-[2]	-[2]	-[2]	-[2]	-[2]	-[2]	2.83	0.55	2.37	3.46	4.73	-[2]
S10	2009	-[2]	-[2]	-[2]	-[2]	26.60	3.72	12.43	25.17	14.98	17.32	-[2]	-[2]
S11	2009-2011	-[2]	-[2]	-[2]	-[2]	30.50	4.88	5.30	8.07	7.72	6.51	-[2]	-[2]
S14	2009-2011	-[2]	-[2]	-[2]	-[2]	5.47	4.47	3.84	4.50	4.75	4.18	-[2]	-[2]
S41	2009-2010	-[2]	-[2]	-[2]	-[2]	8.68	3.88	4.97	14.33	12.63	7.38	-[2]	-[2]
Little Pic	1972-2010	3.26	2.54	2.80	19.96	29.32	13.88	9.10	6.00	7.40	12.17	11.00	5.40
Pic River	1970-2010	2.93	2.12	2.25	19.04	31.36	14.57	9.77	6.50	7.14	12.32	10.52	5.73
Black River	1967-1990	3.26	2.26	2.65	24.04	36.57	14.79	9.43	6.41	7.37	12.87	12.61	6.33
Cedar Creek	1984-2010	3.61	2.36	2.39	18.27	29.40	10.40	7.91	4.23	4.99	12.38	13.24	7.01
Average Rate of Runoff (m^3/day/ha)		3.27	2.32	2.52	20.33	24.74	8.82	6.77	5.74	7.47	9.99	11.87	6.12
Average Rate of Runoff (L/s/km^2)		3.78	2.69	2.92	23.53	28.63	10.21	7.84	6.65[4]	8.64	11.56	13.74	7.08
Minimum Rate of Runoff (m^3/day/ha)		2.93	2.12	2.25	18.27	5.47	3.72	2.16	0.55	2.37	3.46	4.73	5.40
Maximum Rate of Runoff (m^3/day/ha)		3.61	2.54	2.80	24.04	36.57	14.79	12.43	25.17	14.98	17.32	19.12	7.01

Note:

1. The values represent rate of runoff calculated as ratio of monthly discharge (Q) in cubic metre per day to area (A) in hectare at each station. Average Rate of runoff is also provided in litres per second per square kilometre (L/s/km^2) units.
2. No data is available for this month.
3. The months with Partial data (i.e., less than 15 days) are not shown in this Table.
4. For the August month, the 'Average Rate of Runoff' represents the average of flow/area ratios for all stations, except Station S10. This value was considered as an outlier due to heavy rainfall events during the month and didn't represent the overall mean monthly flow characteristics at LSA. Nonetheless, it was used to represent the 'Maximum Rate of Runoff' for the August month.

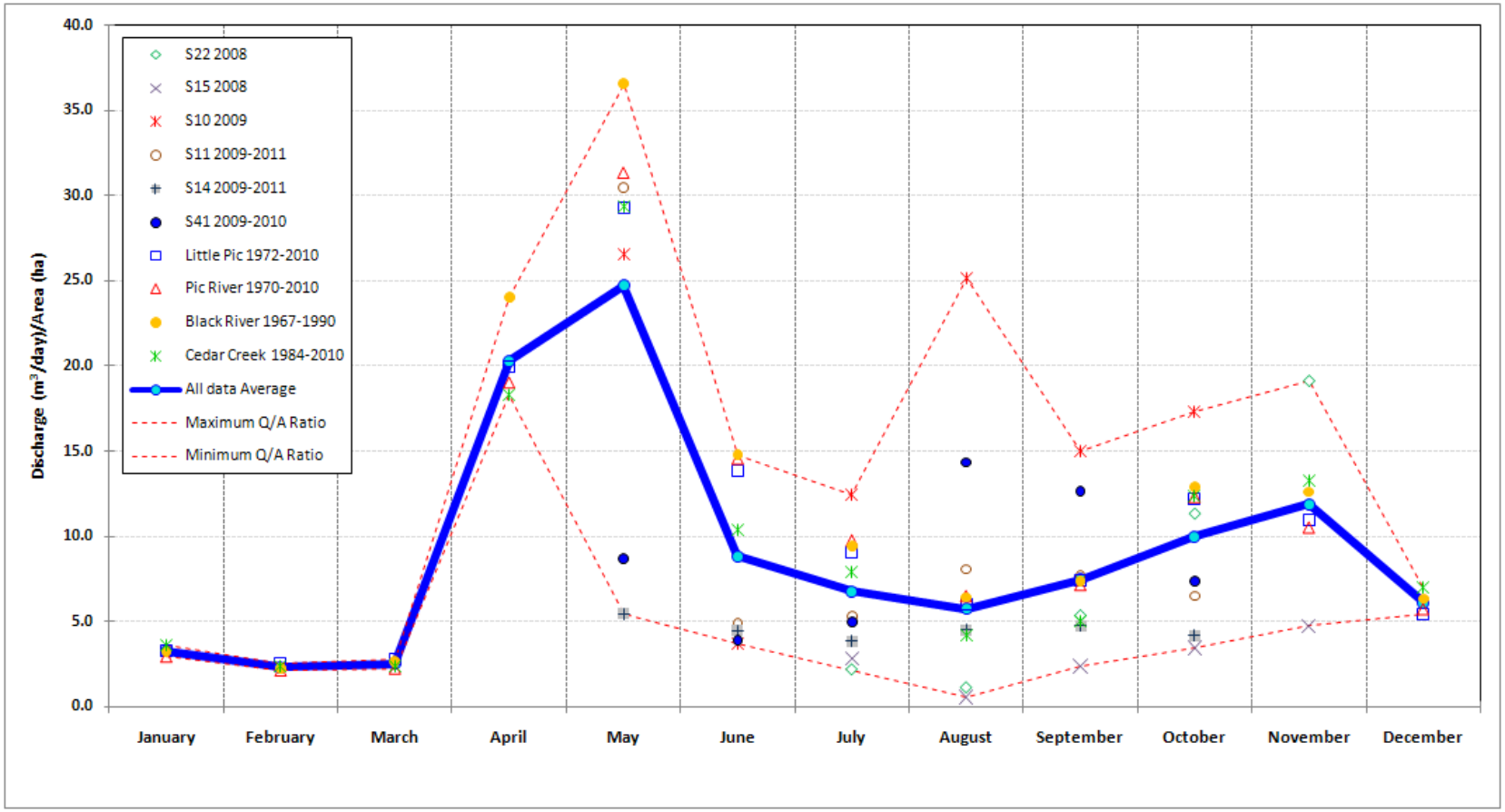


FIGURE 5.2.1.1
Average Monthly Discharge (Q) to Area (A) Ratios for individual stations and the regional Average, Maximum, and Minimum ratios.

5.2.2 Monthly Mean Stream Flow

The continuous stream flow data from the LSA was used to establish relationships between mean monthly flow and drainage area. This was undertaken to allow estimates of flow at locations in the study area where flow data was unavailable. Summarized in Table 5.2.2.1 are derived relationships between mean monthly flow and drainage area.

Due to unavailable or partial datasets from the November through April months, regression relationships for these months could not be derived. Instead, the Q/A ratios from regional hydrometric stream flow stations were used to compute stream flow at sub-basin scale for November through April. Table 5.2.2.2 provides a summary of the calculated monthly mean flow rates at different locations in the LSA.

TABLE 5.2.2.1
RELATIONSHIP BETWEEN MONTHLY MEAN FLOW RATE & DRAINAGE AREA

Month	Relationship between Q (m^3/d) and A $(ha)^3$	R-squared
May[2]	Q = 19.192379(A)	0.94
Jun[2]	Q = 4.048116(A)	0.99
Jul[2]	Q = 6.608220(A)	0.97
Aug[2]	Q = 11.752338(A)	0.95
Sep[2]	Q = 10.874483(A)	0.99
Oct[2]	Q = 7.444042(A)	0.95

Note:
1. In the equations, Q represents monthly mean flow rate in cubic metre per day, and A represents total drainage area in hectares, R-squared – Coefficient of Determination.
2. The Relationship between Q (m^3/d) and A (ha) for May and June months are based on monthly mean flows from S10, S11, S14, and S41 stations; and for July through October are based on monthly mean flows from S22, S15, S10, S11, S14, and S41 stations.
3. Intercept was forced to be zero.

TABLE 5.2.2.2
SUMMARY OF MONTHLY MEAN FLOW RATES AT DIFFERENT STUDY AREA LOCATIONS

Sub basin	Outlet Node	Area (ha)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Avg.
101	S2	435	1,422	1,011	1,098	8,851	8,357	1,763	2,877	5,117	4,735	3,241	5,168	2,663	3,825
102	S4	347	1,132	805	874	7,044	6,651	1,403	2,290	4,072	3,768	2,580	4,113	2,119	3,044
103	S6	211	689	490	532	4,288	4,048	854	1,394	2,479	2,294	1,570	2,504	1,290	1,853
104	outlet	339	1,108	788	855	6,896	6,510	1,373	2,242	3,987	3,689	2,525	4,026	2,074	2,980
105	S30	4,833	15,786	11,228	12,190	98,257	92,763	19,566	31,940	56,803	52,560	35,980	57,370	29,556	42,455
	S5	1,808	5,906	4,201	4,560	36,759	34,703	7,320	11,949	21,250	19,663	13,460	21,463	11,057	15,883
	S10	563	1,838	1,307	1,419	11,441	10,801	2,278	3,719	6,614	6,120	4,189	6,680	3,441	4,943
	S11	4,598	15,018	10,682	11,597	93,476	88,249	18,614	30,386	54,039	50,003	34,229	54,578	28,118	40,389
	S22	352	1,150	818	888	7,158	6,758	1,425	2,327	4,138	3,829	2,621	4,180	2,153	3,093
	S41	1,419	4,635	3,296	3,579	28,847	27,234	5,744	9,377	16,677	15,431	10,563	16,843	8,677	12,464
106	S31	1,098	3,588	2,552	2,770	22,331	21,083	4,447	7,259	12,910	11,946	8,177	13,039	6,717	9,649
	S12	377	1,232	876	951	7,667	7,238	1,527	2,492	4,432	4,101	2,808	4,477	2,306	3,313
	S14	489	1,597	1,136	1,233	9,938	9,382	1,979	3,230	5,745	5,316	3,639	5,802	2,989	4,294
	S15	205	669	476	517	4,164	3,931	829	1,353	2,407	2,227	1,525	2,431	1,252	1,799
107	outlet	49	160	114	124	996	940	198	324	576	533	365	582	300	430
108	outlet	53	173	123	134	1,077	1,017	215	350	623	576	395	629	324	466

Note:
1. Flow values represent monthly mean flows in cubic meters per day.
2. Refer to Figure 2.3.1 for the location of sub-basins and outlet nodes.

5.2.3 Flood Flow Analysis

Flood flow analysis was completed for each catchment area in the LSA. The analysis was completed using the Northern Ontario Hydrology Method described in the MTO's Drainage Management Manual (MTO, 1997). This method requires the basin area, storage area (area of lakes and wetlands), return period, and the type of node (normal or lake). The method was developed for ungauged streams with watersheds between 1 km^2 and 100 km^2 in area; additionally, it requires that the basin be in the Canadian Shield and that the ratio of storage area to basin area be at least 6% at lake-outlet nodes. The sub-catchments in the LSA meet all of these criteria.

Other methods to estimate peak flows, such as frequency analysis on the measured stream flow data, or scaling of the peak flows at the regional stations, are not suitable due to the short record of the continuous stream flow data (at most three years for six stations), the annual monitoring period excluding much of the spring freshet, and the size disparity between the catchment areas of the local stations and the regional stations.

The instantaneous peak flows and daily maximum flows were calculated for the 2, 5, 10, 25, 50 and 100-year return periods for catchments in the LSA using the Northern Ontario Hydrology Method. The instantaneous peak flows for each major sub-basin are reported in Table 5.2.3.1 and for the gauged streams in Table 5.2.3.2. The instantaneous peak flows for the further subdivided catchments, daily maximum flows and further details are given in Appendix C.

TABLE 5.2.3.1 INSTANTANTANEOUS PEAK FLOWS FOR SUB BASINS

Sub basin	Outlet Node	Return Period (years)					
		2	5	10	25	50	100
101	S2	2.566	3.755	4.539	5.539	6.282	7.025
102	S4	2.121	3.103	3.750	4.576	5.190	5.804
103	S6	1.251	1.820	2.195	2.674	3.029	3.385
104	outlet	1.464	2.111	2.524	3.035	3.408	3.770
105	S30	9.821	13.644	16.027	18.817	20.768	22.619
106	S31	6.470	9.544	11.571	14.156	16.077	17.998
107	outlet	0.642	0.951	1.155	1.415	1.609	1.803
108	outlet	0.681	1.008	1.224	1.500	1.705	1.911

Note:
1. Flood flow values are in cubic meters per second.
2. Flood flows calculated using the Northern Ontario Hydrology Method

TABLE 5.2.3.2 INSTANTANTANEOUS PEAK FLOWS FOR GAUGED STREAMS

Outlet Node	Max Measured Flow[3]		Years of Flow Data	Return Period (years)					
	Flow	Year		2	5	10	25	50	100
S15	0.031	2008	1	1.566	2.301	2.786	3.404	3.863	4.323
S22	0.532	2008	1	1.497	2.156	2.578	3.097	3.477	3.844
S10	0.766	2009	1	2.142	3.082	3.678	4.409	4.939	5.449
S41[4]	1.511	2009	2	2.103	2.816	3.245	3.730	4.057	4.360
S11	15.261	2011	3	9.088	12.602	14.755	17.299	19.068	20.753
S14	0.238	2009	3	3.057	4.489	5.433	6.638	7.533	8.429

Note:
1. Flood flow values are in cubic meters per second.
2. Flood flows calculated using the Northern Ontario Hydrology Method.
3. Maximum flow measured in 15-minute intervals from continuous gauging data.
4. Lake-outlet node.

With the exception of Station S11, none of the maximum observed flows exceeded the peak instantaneous flow for the 2-year return period. This could be due to a variety of factors. One explanation is the length of the data record. There is only a 50% likelihood that the two-year return period flow would be exceeded at least once in any given 1-year period; in a two-year period, the likelihood is 75%; and, with a three-year period, the likelihood is 87.5%. As the number of years of record increase, it is expected that the maximum observed flows would increase and become more similar to the calculated peak flows. A second explanation is that the continuous stream flow monitoring did not necessarily capture the freshet where the largest flows are expected. A third reason is that the standard relative error in the method is reported to be 30% and the error in individual applications has the potential to be larger (MTO, 1997).

The maximum flow at Station S11 is close to the 10-year return period and occurred in 2011. Since Station S14 was the only other station measured in 2011, it is interesting that the maximum measured flow at S14 did not exceed even the 2-year return flow and nor did it occur in 2011. This is most likely due to S14's position upstream of a beaver dam, with the beaver dam moderating the flows.

5.2.4 Low Flow Conditions

The low flow for each sub-basin were assessed by applying the unit area average low flow relationships established for the Northwestern Region of Ontario (Cumming Cockburn Limited, 1990) and are listed in Table 5.2.4.1 by sub basin and in Table 5.2.4.2 for the gauged streams.

TABLE 5.2.4.1
ESTIMATED 7-DAY DURATION LOW FLOWS BY SUB BASIN

Sub basin	Outlet Node	Return Period (years)			
		2	5	10	20
101	S2	0.009	0.006	0.005	0.004
102	S4	0.007	0.005	0.004	0.003
103	S6	0.004	0.003	0.002	0.002
104	outlet	00.07	0.005	0.004	0.003
105	S30	0.096	0.069	0.057	0.048
106	S31	0.022	0.016	0.013	0.011
107	outlet	0.001	<0.001	<0.001	<0.001
108	outlet	0.001	<0.001	<0.001	<0.001

Note:
1. Low flow values are in cubic meters per second.
2. Flows calculated using relationships developed by Cumming Cockburn Ltd.

TABLE 5.2.4.2 ESTIMATED 7-DAY DURATION LOW FLOWS FOR GAUGED STREAMS

Outlet Node	Min Measured 7-day Flow[3]		Years of flow data	Return Period (years)			
	Flow	Year		2	5	10	20
S15	<0.001	2008	1	0.004	0.003	0.002	0.002
S22	0.002	2008	1	0.007	0.005	0.004	0.004
S10	0.015	2009	1	0.011	0.008	0.007	0.006
S41	0.048	2010	2	0.028	0.020	0.017	0.014
S11	0.048	2011	3	0.091	0.066	0.054	0.046
S14	0.003	2011	3	0.010	0.007	0.006	0.005

Note:
1. Low flow values are in cubic meters per second and represent the lowest mean flow for 7 consecutive days for each return period.
2. Flows calculated using relationships developed by Cumming Cockburn Ltd.
3. Values from the continuous gauging data.

5.3 Hydrologic Characteristics of Major Project Sub-Basins

The surface water drainage patterns in the vicinity of the Project site are shown in Figure 2.3.1. According to the proposed mine footprint, six streams will be potentially impacted by the Marathon Project. Of these, streams 1, 2, 3, and 4 flow easterly and eventually drain into the Pic River. These streams are associated with sub-basins 101, 102, 103 and 104,

respectively. Within Sub-basin 105, Stream 5 flows westerly into the Hare Lake, and eventually drains into Lake Superior via Hare Creek at outlet node S30. Stream 6 flows in the southwest direction, crossing Highway 17, and finally discharges into Lake Superior at Sturdee Cove at outlet node S31, approximately 4 km from the Marathon Mine. Stream 6 is associated with Sub-basin 106.

Based on the available contour data (or Digital Elevation Model, DEM) and existing site hydrology, the LSA can be discretized into eight major sub-basins (i.e. Sub-Basin 101, 102, 103, 104, 105, 106, 107, and 108). Sub-basins 105 and 106 were further sub-divided into six (6) and three (3) minor basins, respectively, according to site drainage pattern and stream monitoring locations. The characteristics of each sub-basin are summarized in Table 2.3.1. Provided in Figure 2.3.1 are the locations of lakes, ponds, and streams, with respect to the delineated sub-basins. Table 5.2.2.2 provides a summary of the calculated monthly mean flow rates at different locations in the LSA.

With respect to Table 5.2.2.2, the flow values for May through October are calculated using the relationships (Table 5.2.1.1) developed from the LSA stream flow monitoring data. Flow values for November through April are calculated using 'Average Q/A Ratios' from Table 5.1.1 based on historical flows at the regional hydrometric stations. Review of this table indicates that peak flows typically occur in April and May, and low flows in February and March.

5.3.1 Sub-Basin 101 (Stream 1 Watershed)

Sub-Basin 101 comprises approximately 435 hectares. This sub-basin includes Stream 1 and headwater lakes 1 and 2. Stream 1 flows in a southeast direction and empties into the Pic River at outlet node S2 (551619.748 E, 5401907.181 N).

Manual stream flow measurements were made at 3 sites in this sub-basin from 2008 to 2010 (S1, S2, and S16). Sampling locations S1 and S16 represent the upstream flow locations, while S2 represents the outlet node and is situated immediately upstream of the confluence of Stream 1 and Pic River. A total of 17 manual flow measurements were made at stream outlet location S2 from 2008 to 2010. During this period, a minimum discharge of 0.0004 m^3/s was recorded on July 29, 2008 and a maximum discharge of 0.1299 m^3/s on November 3, 2009.

As shown in Table 5.2.2.2, the predicted monthly mean flows at S2 range from a low of 1,011 m^3/day (0.012 cms) in February to a high of 8,851 m^3/day (0.102 cms) in April, with an annual mean flow rate of 3,825 m^3/day (0.044 cms).

5.3.2 Sub-Basin 102 (Stream 2 Watershed)

Sub-Basin 102 comprises approximately 347 hectares. Stream 2 is located in this sub-basin and flows in an eastern direction, emptying into the Pic River approximately 2 km upstream of the mouth of Stream 1. Stream 2 empties into the Pic River at outlet node S4 (551964.616 E, 5404755.763 N). Major lakes and ponds in the sub-basin include; lakes 8, 14, 15, and 20.

Manual stream flow measurements were made in this sub-basin at 3 locations from 2008 to 2010 (S3, S4, and S17). S4 represents the downstream flow location, at the confluence of Stream 2 and the Pic River. A total of 15 manual flow measurements were made at outlet location S4 from 2008 to 2010. During this period, a minimum discharge of 0.0002 m^3/s was recorded on August 25, 2008 and a maximum discharge of 0.1580 m^3/s on May 5, 2009.

As shown in Table 5.2.2.2, the predicted monthly mean flows range from a low of 805 m^3/day (0.009 cms) in February to a high of 7,044 m^3/day (0.082 cms) in April, with an annual mean flow rate of 3,044 m^3/day (0.035 cms).

5.3.3 Sub-Basin 103 (Stream 3 Watershed)

Sub-Basin 103 comprises approximately 211 hectares. Stream 3 is located in this sub-basin and flows in an eastern direction and empties into the Pic River approximately 150 m upstream of the mouth of Stream 2 at outlet node S6 (552074.788 E, 5404966.443 N). Sub-basin 103 contains Stream 3 and Lakes 9, 10, 11, 12, 13, and 16.

Stream flows were monitored at three sites in this sub-basin from 2008 to 2010 (S6, S18, and S19). Site S6 represents the downstream flow location, and is situated at the confluence of Stream 3 and Pic River. A total of 15 manual flow measurements were made at downstream location S6 from 2008 to 2010 (from May through November). During this period, a minimum discharge of 0 m^3/s was recorded on August 25, 2008 and a maximum discharge of 0.0841 m^3/s on May 5, 2009.

As shown in Table 5.2.2.2, the predicted monthly mean flows ranged from a low of 490 m^3/day (0.006 cms) in February to a high of 4,288 m^3/day (0.050 cms) in April, with an annual mean flow rate of 1,853 m^3/day (or, 0.021 cms).

5.3.4 Sub-Basin 104 (Stream 4 Watershed and Claw Lake)

Sub-Basin 104 comprises approximately 339 hectares. Stream 4 is located in this sub-basin and flows northeast and empties into the Pic River approximately 4 km upstream of the mouth of Stream 3 (at 550877.486 E, 5408429.376 E). Sub-basin 104 includes Stream 4 and Lakes 18, 19, 21 and 22.

Manual stream flow measurements were taken at S8, which is located immediately below Lake 19. A total of 16 manual flow measurements were made at the downstream location S8 from 2008 to 2010 (from May through November). During this period, a minimum discharge of 0.003 m^3/s was recorded on August 31, 2010 and a maximum discharge of 0.1278 m^3/s on May 4, 2009.
As shown in Table 5.2.2.2, the predicted monthly mean flows range from a low of 788 m^3/day (0.009 cms) in February to a high of 6,896 m^3/day (0.081 cms) in April, with an annual mean flow rate of 2,980 m^3/day (0.034 cms).

5.3.5 Sub-Basin 105 (Stream 5 and Hare Creek)

Sub-Basin 105 drains a total area of approximately 4,833 hectares, and includes Stream 5, Bamoo's Lake, Seeley Lake, Bill Lake, Hare Lake and Hare Creek, and smaller lakes such as Lakes 3, 4, 5, 6, 7, 17, 23, and 25. Sub-Basin 105 was divided into 5 smaller

catchments, corresponding to nodes S5, S10, S11, S22, and S41. The respective lakes, Stream 5, and major/minor sub-basins are shown in Figure 2.3.1. Stream 5 flows southwest towards Hare Lake, and empties into Lake Superior at Port Munroe at outlet node S30.

Manual stream flow measurements were taken at multiple locations: S5, S8, S10, S11, S20, S21, S22, S29, S33, S34, S35, S36, S37, S38, S39, S40, and S41. The flow from Seeley Lake discharges into Hare Lake at stream monitoring location S5. Sites S11 and S41 are located immediately downstream of Hare Lake and Bamoo's Lake, respectively.

Continuous stream flow monitoring was undertaken at nodes S10 (2009), S11 (2009-2011), S22 (2008) and S41 (2009-2010). In general, the automated gauging stations were installed annually after the peak of the spring melt and removed in November prior to freeze-up.

As shown in Table 5.2.2.2, the predicted monthly mean flows at S30 (i.e., Lake Superior at Port Munroe) range from a low of 11,228 m^3/day (0.130 cms) in February to a high of 98,257 m^3/day (1.137 cms) in April, with an annual mean flow rate of 42,455 m^3/day (0.491 cms). Similarly, the predicted monthly mean flows at S11 (i.e., the outlet of Hare Lake) range from a low of 10,682 m^3/day (0.124 cms) in February to a high of 93,476 m^3/day (1.082 cms) in April, with an annual mean flow rate of 40,389 m^3/day (0.467 cms).

5.3.6 Sub-Basin 106 (Stream 6)

Sub-Basin 106 drains a total area of approximately 1,098 hectares, and includes Stream 6 and lakes 24 and 26. It was divided into 3 smaller catchments, corresponding to nodes S12, S15, and S14 (Table 5.3.2). Stream 6 flows south and discharges into Lake Superior at Sturdee Cove at outlet node S31 (542939 E, 5400193 N).

Manual stream flow measurements were taken at 4 locations from 2008 to 2011: S12, S13, S14, and S15). A total of 22 manual flow measurements were made at the downstream location S14 from 2008 to 2011 (from May through November). During this period, a minimum discharge of 0.0043 m^3/s was recorded on November 21, 2008 and a maximum discharge of 0.447 m^3/s on October 30, 2009.

Continuous stream flow monitoring was undertaken at nodes S14 (2009-2011) and S15 (2008). In general, the automated gauging stations were installed annually after the peak of the spring melt and removed in November prior to freeze-up.

As shown in Table 5.2.2.2, the predicted monthly mean flows at S31 ranged from a low of 2,552 m^3/day (0.029 cms) in February to a high of 22,331 m^3/day (0.258 cms) during April, with an annual mean flow rate of 9,649 m^3/day (0.112 cms).

5.3.7 Sub-Basin 107

Sub-basin 107 drains approximately 49 hectares and comprises an unnamed tributary which flows northeast to the Pic River. No flow data was collected for this basin.

As shown in Table 5.2.2.2, the predicted monthly mean flows from the catchment at the outlet range from a low of 114 m^3/day (0.001 cms) in February to a high of 996 m^3/day (0.012 cms) in April, with annual mean flow rate of 430 m^3/day (0.005 cms).

5.3.8 Sub-Basin 108

Sub-basin 108 drains approximately 53 hectares and contains an unnamed tributary which flows northeast towards the Pic River. No flow data was collected for this basin.

As shown in Table 5.2.2.2, the predicted monthly mean flows from the catchment range from a low of 123 m^3/day (0.001 cms) in February to a high of 1,077 m^3/day (0.012 cms) in April, with annual mean flow rate of 466 m^3/day (0.005 cms).

5.3.9 Pic River

The Pic River is situated to the east of the Project. Sub-basins 101, 102, 103, and 104 flow into the Pic River directly. The Pic River is a large, low- to medium-gradient river with a width of approximately 20 to 30 metres in vicinity of the Project. The water of the Pic River is typically turbid with elevated levels of suspended clay and silt. Bank erosion is present along much of the shoreline.

Pic River has a drainage area of approximately 4,270 square kilometres. Flow and level data have been recorded by Water Survey of Canada (WSC) at Pic River near Marathon (Station ID No. 02BB003), and this information is available from 1970-2010. The flow characteristics of the Pic River have been summarized in Section 3 (e.g., Tables 3.3.2 and 3.3.3) and in Section 5 (e.g., Tables 5.1.1.1, 5.1.2.1 and 5.1.3.1).

Review of Water Survey of Canada data indicates that annual low flows typically occur in the winter during the months of February and March, and that peak flows occur in May in conjunction with the spring freshet.

References

Cumming Cockburn Ltd. 1990. A Report on Low Flow Characteristics in Ontario.

Golder Associates. 2007. Climate Data for Marathon PGM Project. Technical Memorandum prepared for Marathon PGM Corporation. March 7, 2007.

Golder Associates. 2009. Marathon Platinum Group Metals – Copper (PGM-Cu) Mining Project, Baseline Assessment of Aquatic and Terrestrial Environments. Final Report prepared for Marathon PGM Corporation. January 16, 2009.

Hydrological Atlas of Canada. 1978.
http://atlas.nrcan.gc.ca/site/english/maps/archives/#hydrological_atlas_1978

Ministry of Transportation of Ontario. 1997. Drainage Management Manual.

True Grit Consulting Ltd. 2011. Baseline Report – Hydrogeology, Marathon PGM-Cu Project. Draft Report prepared for Stillwater Canada Inc. December 7, 2011.

APPENDIX A

MARATHON PGM-Cu PROJECT SITE
MARATHON, ONTARIO

MANUAL STREAM FLOW MEASUREMENTS (S1 THROUGH S41)

FLOW SUMMARIES FOR REGIONAL HYDROMETRIC STATIONS (WATER SURVEY OF CANADA)

Marathon PGM
Summary of Field Data
Location S1

	3-Jul-08			29-Jul-08			26-Aug-07			25-Sep-08			24-Oct-08			18-Nov-08			7-May-09			11-Jun-09		
Distance Panel (m)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Flow (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)
0										0.00	NA	0.00000	0.00	NA	0.00000									
0.2	0	NM	-	0.00	NA	0.00000				0.03	NA	0.00000	0.03	NA	0.00000	0.00	NA	0.00000						
0.3							0.00	NA	0.00000										0.00	0.03	0.00000	0.00	NA	0.00000
0.4	0.22	NM	-	0.12	<0.01	0.00007	0.19	<0.01	0.00010	0.28	<0.01	0.00017	0.20	<0.01	0.00012	0.25	<0.01	0.00015	0.10	0.03	0.00018	0.20	NA	0.00000
0.45																								
0.6	0.25	NM	-	0.36	<0.01	0.00022	0.35	<0.01	0.00021	0.40	<0.01	0.00024	0.32	<0.01	0.00020	0.40	<0.01	0.00024	0.36	0.36	0.00793	0.36	NA	0.00000
0.8	0.30	NM	-	0.36	<0.01	0.00022	0.37	<0.01	0.00023	0.41	<0.01	0.00025	0.43	<0.01	0.00026	0.43	<0.01	0.00026	0.38	0.30	0.00684	0.42	0.07	0.00168
1.0	0.32	NM	-	0.38	<0.01	0.00023	0.38	<0.01	0.00023	0.43	<0.01	0.00026	0.36	<0.01	0.00022	0.36	<0.01	0.00022	0.39	0.05	0.00126	0.42	0.03	0.00084
1.2	0.28	NM	-	0.34	<0.01	0.00021	0.34	<0.01	0.00021	0.40	<0.01	0.00024	0.41	<0.01	0.00025	0.50	<0.01	0.00031	0.35	0.56	0.01191	0.40	0.03	0.00080
1.4	0.28	NM	-	0.09	<0.01	0.00004	0.28	<0.01	0.00013	0.31	<0.01	0.00014	0.35	<0.01	0.00021	0.33	<0.01	0.00020	0.32	0.59	0.01153	0.36	0.10	0.00162
1.5				0.00	NA	0.00000	0.00	NA	0.00000	0.03	NA	0.00000										0.00	NA	0.00000
1.6	0	NA	-							0.00	NA	0.00000	0.04	NA	0.00000	0.05	NA	0.00000	0.00	NA	0.00000			
1.8													0.00	NA	0.00000	0.00	NA	0.00000						
2.0																								
2.2																								
2.4																								
2.6																								
2.8																								
3.0																								
3.2																								
3.4																								
3.6																								
3.8																								
4.0																								
Total Stream Width (m)	1.4			1.3			1.3			1.6			1.8			1.6			1.4			1.3		
Stake Measurement (m)	-			-			0.624			0.580			0.583			0.580			0.615			0.580		
Total Discharge (m^3/s)	-			0.00099			0.00111			0.00131			0.00126			0.00138			0.03964			0.00494		
Field Chemistry																								
Temp (^oC)	18.5			15.3			17.6			15.3			5.1			0			5.3			15.6		
pH	7.34			7.39			7.05			6.91			7.03			7.90			8.27			7.60		
EC (uS)	25			100			138			67			60			26			23			43		
DO (mg/L)	1.06			6.78			2.05			4.30			4.70			4.07			1.23			0.25		
Appearance	clear			cloudy brown			slightly tannic			slightly tannic			slightly tannic			tannic			clear yellow tinge			clear		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
The interval that stake is located for increased precision in water height fluctuations is 1.0m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate
*1 Downgradient beaver dam impeded the flow of water and flooded channel.
*2 Stream section moved upstream due to beaver dam flooding at former location.

Marathon PGM
Summary of Field Data
Location S1

	6-Aug-09 (*2)			31-Aug-09			8-Oct-09			3-Nov-09			5-May-10			15-Jul-10			2-Sep-10		
Distance Panel (m)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)
0																					
0.2																					
0.3							0.00	NA	0.00000				0.00	NA	0.00000						
0.4				0.00	NA	0.00000	0.02	NA	0.00000	0.00	NA	0.00000	0.03	0.00	0.00000	0.00	NA	0.00000	0.00	NA	0.00000
0.45	0.00	NA	0.00000																		
0.6	0.01	NA	0.00000	0.05	0.20	0.00061	0.05	0.07	0.00021	0.05	0.12	0.00037	0.05	0.04	0.00012	0.00	NA	0.00000	0.00	NA	0.00000
0.8	0.01	NA	0.00000	0.05	0.92	0.00281	0.03	0.07	0.00013	0.06	0.60	0.00220	0.06	1.38	0.00505	0.00	NA	0.00000	0.01	0.00	0.00000
1.0	0.02	NA	0.00000	0.00	NA	0.00000	0.04	0.14	0.00034	0.03	0.70	0.00128	0.06	0.45	0.00165	0.02	0.00	0.00000	0.05	0.08	0.00024
1.2	0.09	0.67	0.00368	0.11	1.55	0.01040	0.08	0.27	0.00132	0.12	0.89	0.00651	0.10	1.64	0.01000	0.00	NA	0.00000	0.07	0.13	0.00056
1.4	0.11	0.23	0.00116	0.13	0.70	0.00555	0.12	0.12	0.00088	0.14	1.28	0.01093	0.15	0.73	0.00668	0.07	0.13	0.00056	0.07	0.05	0.00021
1.5	0.00	NA	0.00000																		
1.6	0.05	0.19	0.00043	0.02	NA	0.00000	0.01	0.01	0.00001	0.10	0.52	0.00317	0.01	NA	0.00000	0.06	0.07	0.00026	0.00	NA	0.00000
1.8	0.01	NA	0.00000	0.05	0.38	0.00116	0.05	0.05	0.00015	0.09	0.92	0.00505	0.05	0.59	0.00180	0.00	NA	0.00000	0.01	0.00	0.00000
2.0	0.00	NA	0.00000	0.07	NA	0.00000	0.02	0.02	0.00002	0.00	NA	0.00000	0.00	NA	0.00000				0.03	0.05	0.00009
2.2				0.03	NA	0.00000	0.00	NA	0.00000				0.03	0.00	0.00000				0.00	NA	0.00000
2.4				0.00	NA	0.00000							0.00	NA	0.00000				0.00	NA	0.00000
2.6																					
2.8																					
3.0																					
3.2																					
3.4																					
3.6																					
3.8																					
4.0																					
Total Stream Width (m)	1.6			2.0			2.0			1.6			2.2			1.4			2.0		
Stake Measurement (m)	NA			NA			NA			NA			NA			NA			NA		
Total Discharge (m^3/s)	0.00484			0.01937			0.00288			0.02129			0.02530			0.00081			0.00110		
Field Chemistry																					
Temp (^oC)	15.7			13.6			13.6			13.6			4.8			19.5			15.0		
pH	7.74			7.17			7.17			7.17			7.76			7.97			6.28		
EC (uS)	29			23			23			23			43			62			-		
DO (mg/L)	4.55			1.92			1.92			1.92			12.39			5.48			7.74		
Appearance	clear slt. Yellow			clear slt. Yellow			clear slt. Yellow			clear slt. Yellow			clear slt. Yellow			clear			clear		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
The interval that stake is located for increased precision in water height fluctuations is 1.0m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate
*1 Downgradient beaver dam impeded the flow of water and flooded channel.
*2 Stream section moved upstream due to beaver dam flooding at former location.

Marathon PGM
Summary of Stream Field Data
Location S2

Diameter of Culvert (m) 1.5	8-Jul-08	29-Jul-08	26-Aug-08	22-Sep-08	21-Oct-08	18-Nov-08	8-May-09	11-Jun-09	15-Jul-09	4-Aug-09	1-Sep-09	5-Oct-09	3-Nov-09	4-May-10	31-May-10	15-Jul-10	30-Aug-10
	Depth (m)	Depth (m)	Depth (m)	Depth (m)	Depth (m)	Depth (m)	Depth (m)	Depth (m)	Depth (m)	Depth (m)	Depth (m)	Depth (m)	Depth (m)	Depth (m)	Depth (m)	Depth (m)	Depth (m)
	0.13	0.01	0.04	0.02	0.04	0.11	0.11	0.11	0.04	0.09	0.12	0.03	0.15	0.05	0.01	0.01	0.02
Total Discharge (m^3/s)	0.09613	0.00039	0.00777	0.00174	0.00777	0.06752	0.06752	0.06752	0.00583	0.03903	0.08117	0.00418	0.12994	0.01255	0.00039	0.00039	0.00174
Field Chemistry																	
Temp (^oC)	12.4	12.6	11.0	10.0	4.3	0.1	4.3	14.1	12.2	13.8	12.3	9.1	2.7	12.1	11.8	15.5	18.2
pH	8.05	7.78	7.89	7.59	8.06	8.13	7.64	7.05	8.33	8.24	8.05	8.07	7.23	7.46	7.35	7.57	6.25
EC (uS)	167	338	425	262	225	106	59	205	240	113	95	244	62	105	428	476	401
DO (mg/L)	4.05	2.80	6.55	5.30	3.48	4.20	3.19	0.53	4.06	4.09	2.75	2.02	1.66	10.09	5.10	3.44	-
Appearance	cloudy brown	cloudy brown	clear	clear	clear	slightly tannic	yellow tinge	clear	light brn	clear, slt. ylw	clear, slt. ylw	clear	sl. Tannic	slt yellow	-	clear	clear, trace SS

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s

Marathon PGM
Summary of Stream Field Data
Location S3

	1-Jul-08			29-Jul-08			26-Aug-08			24-Sep-08			23-Oct-08			18-Nov-08			5-May-09			11-Jun-09		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0																								
0.2																								
0.3																								
0.4	0.00	NA	-																0.00	NA	0.00000			
0.45																								
0.5																0.00	NA	0.00000				0.00	NA	0.00000
0.6	0.07	NM	-													0.03	NA	0.00000	0.09	0.85	0.00468	0.01	<0.01	0.00000
0.8	0.08	NM	-													0.00	NA	0.00000	0.07	0.72	0.00308	0.00	NA	0.00000
1.0	0.15	NM	-													0.00	NA	0.00000	0.07	0.00	0.00000	0.00	NA	0.00000
1.2	0.06	NM	-													0.00	NA	0.00000	0.03	0.00	0.00000	0.00	NA	0.00000
1.4	0.06	NM	-													0.01	NA	0.00000	0.03	0.00	0.00000	0.00	NA	0.00000
1.6	0.08	NM	-													0.05	0.31	0.00095	0.06	0.75	0.00276	0.00	NA	0.00000
1.7				0.00	NA	0.00000				0.00	NA	0.00000	0.00	NA	0.00000									
1.78							0.00	NA	0.00000															
1.8	0.19	NM	-	0.04	NA	0.00000	0.04	NA	0.00000	0.06	<0.01	0.00003	0.06	<0.01	0.00003	0.05	0.52	0.00159	0.10	1.31	0.00801	0.03	0.07	0.00012
2.0	0.08	NM	-	0.04	NA	0.00000	0.04	NA	0.00000	0.05	<0.01	0.00003	0.09	<0.01	0.00005	0.15	0.78	0.00714	0.19	1.41	0.01635	0.01	<0.01	0.00001
2.2	0.17	NM	-	0.03	NA	0.00000	0.02	NA	0.00000	0.03	NA	0.00000	0.04	NA	0.00000	0.09	0.94	0.00516	0.12	0.69	0.00504	0.01	<0.01	0.00001
2.4	0.13	NM	-	0.00	NA	0.00000	0.01	NA	0.00000	0.01	NA	0.00000	0.03	NA	0.00000	0.09	0.75	0.00412	0.13	0.79	0.00624	0.02	<0.01	0.00001
2.6	0.22	NM	-	0.11	<0.01	0.00007	0.06	<0.01	0.00004	0.15	0.65	0.00595	0.15	0.31	0.00284	0.22	0.21	0.00282	0.21	1.15	0.01471	0.08	0.16	0.00080
2.8	0.16	NM	-	0.00	NA	0.00000	0.00	NA	0.00000	0.04	1.07	0.00261	0.06	2.04	0.00747	0.12	1.8	0.01318	0.15	1.84	0.01681	0.06	1.05	0.00384
3.0	0.05	NM	-	0.00	NA	0.00000	0.00	NA	0.00000	0.09	<0.01	0.00005	0.00	NA	0.00000	0.00	NA	0.00000	0.02	0.00	0.00000	0.00	NA	0.00000
3.2	0.03	NM	-	0.00	NA	0.00000	0.00	NA	0.00000	0.22	<0.01	0.00013	0.00	NA	0.00000	0.00	NA	0.00000	0.03	0.00	0.00000	0.00	NA	0.00000
3.4	0.15	NM	-	0.20	0.59	0.00720	0.19	0.32	0.00371	0.24	0.29	0.00425	0.28	0.22	0.00376	0.31	1.26	0.02383	0.38	1.18	0.02738	0.00	NA	0.00000
3.6	0.42	NM	-	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.07	0.23	0.00098
3.7																								
3.8	0.32	NM	-	0.09	<0.01	0.00005													0.25	0.20	0.00300	0.00	NA	0.00000
3.95																								
4.0	0.09	NM	-	0.00	NA	0.00000													0.05	0.03	0.00010			
4.2	0.00	NA	-																0.00	NA	0.00000			
Total Stream Width (m)	3.8			2.3			1.8			1.9			1.9			3.1			3.8			3.3		
Stake Measurement (m)	-			-			0.938			0.940			0.918			0.868			0.815			0.940		
Total Discharge (m^3/s)	-			0.00732			0.00375			0.01305			0.01414			0.05877			0.10817			0.00577		
Field Chemistry																								
Temp (^{o}C)	14.8			17.7			17.4			14.6			4.9			0			10.5			15.4		
pH	7.28			7.50			7.10			7.40			7.42			7.46			7.34			7.06		
EC (uS)	29			73			97			54			41			42			30			61		
DO (mg/L)	2.11			5.96			4.96			3.52			4.43			3.71			1.6			0.19		
Appearance	clear			slightly tannic			clear			slightly tannic			clear			clear			clear			clear		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
The interval that stake is located for increased precision in water height fluctuations is 2.0m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate

Marathon PGM
Summary of Stream Field Data
Location S3

	15-Jul-09			6-Aug-09			6-Aug-09			7-Oct-09			3-Nov-09			5-May-10			15-Jul-10			1-Sep-10		
Distance Panel (m)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)
0																								
0.2																								
0.3																								
0.4							0.00	NA	0.00000										0.00	NA	0.00000			
0.45				0.00	NA	0.00000																		
0.5													0.00	NA	0.00000	0.00	NA	0.00000						
0.6				0.01	<0.01	0.00000	0.02	0.00	0.00000				0.06	0.24	0.00066	0.01	NA	0.00000	0.00	0.00	0.00000	0.00	NA	0.00000
0.8				0.00	NA	0.00000	0.01	NA	0.00000				0.02	0.20	0.00024	0.02	NA	0.00000	0.00	0.00	0.00000	0.00	0.00	0.00000
1.0				0.00	NA	0.00000	0.00	NA	0.00000				0.04	0.97	0.00237	0.00	NA	0.00000	0.00	0.00	0.00000	0.00	0.00	0.00000
1.2				0.00	NA	0.00000	0.00	NA	0.00000				0.03	0.31	0.00057	0.00	NA	0.00000	0.00	0.00	0.00000	0.00	0.00	0.00000
1.4				0.00	NA	0.00000	0.00	NA	0.00000				0.03	0.26	0.00048	0.00	NA	0.00000	0.00	0.00	0.00000	0.00	0.00	0.00000
1.6	0.05	0.37	0.00113	0.01	<0.01	0.00000	0.02	0.00	0.00000				0.05	0.60	0.00183	0.03	0.34	0.00062	0.00	0.00	0.00000	0.00	0.00	0.00000
1.7																								
1.78																								
1.8	0.00	NA	0	0.00	NA	0.00000	0.06	0.58	0.00212	0.00	NA	0.00000	0.03	1.05	0.00192	0.07	0.64	0.00273	0.01	0.00	0.00000	0.00	0.00	0.00000
2.0	0.03	<0.01	0.00002	0.05	0.36	0.00110	0.04	0.40	0.00098	0.02	NA	0.00000	0.09	0.65	0.00357	0.08	0.81	0.00395	0.03	0.24	0.00044	0.00	0.00	0.00000
2.2	0.03	<0.01	0.00002	0.03	0.95	0.00174	0.05	0.92	0.00281	0.02	NA	0.00000	0.10	0.19	0.00116	0.07	0.86	0.00367	0.00	0.00	0.00000	0.01	0.12	0.00007
2.4	0.02	<0.01	0.00001	0.02	<0.01	0.00001	0.01	NA	0.00000	0.01	NA	0.00000	0.08	0.09	0.00044	0.05	0.93	0.00284	0.00	0.00	0.00000	0.00	0.00	0.00000
2.6	0.09	0.11	0.00060	0.06	0.80	0.00293	0.10	1.56	0.00952	0.09	0.13	0.00071	0.15	1.50	0.01373	0.10	0.43	0.00262	0.05	0.14	0.00043	0.01	0.00	0.00000
2.8	0.04	0.37	0.00090	0.09	0.63	0.00346	0.10	1.26	0.00769	0.03	1.02	0.00187	0.10	1.46	0.00891	0.12	1.79	0.01310	0.07	0.23	0.00098	0.05	0.50	0.00153
3.0	0.00	NA	0.00000	0.14	1.88	0.01606	0.15	1.01	0.00924	0.00	NA	0.00000	0.00	NA	0.00000	0.01	NA	0.00000	0.02	0.30	0.00037	0.09	0.25	0.00137
3.2	0.02	<0.01	0.00001	0.00	NA	0.00000	0.02	0.00	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.01	NA	0.00000	0.00	0.00	0.00000	0.00	0.00	0.00000
3.4	0.04	0.36	0.00088	0.00	NA	0.00000	0.05	0.62	0.00189	0.03	NA	0.00000	0.05	0.42	0.00128	0.08	0.86	0.00420	0.00	0.00	0.00000	0.00	0.00	0.00000
3.6	0.00	NA	0.00000	0.01	<0.01	0.00001	0.21	0.02	0.00019	0.00	NA	0.00000	0.06	0.65	0.00238	0.05	0.75	0.00229	0.00	0.00	0.00000	0.20	0.07	0.00085
3.7							0.00	NA	0.00000															
3.8	0.00	NA	0.00000	0.08	0.33	0.00141							0.00	0.00	0.00000	0.15	0.18	0.00165	0.19	0.08	0.00093	0.00	0.00	0.00000
3.95				0.00	NA	0.00000																		
4.0																0.00	NA	0.00000	0.00	0.00	0.00000	0.00	NA	0.00000
4.2																								
Total Stream Width (m)	2.2			3.5			3.4			1.8			3.3			3.5			3.8			3.4		
Stake Measurement (m)	0.940			NA			NA			NA			NA			NA			NA			NA		
Total Discharge (m^3/s)	0.00357			0.02671			0.03443			0.00258			0.03952			0.03767			0.00314			0.00382		
Field Chemistry																								
Temp (^oC)	14.6			14.1			12.3			10.4			3.4			7.3			21.2			20.3		
pH	7.36			7.49			7.76			7.34			6.94			7.99			8.01			6.53		
EC (uS)	72			47			43			69			29			40			63			-		
DO (mg/L)	3.21			3.89			4.1			2.2			1.89			10.85			6.23			6.90		
Appearance	clear			clear			clear slightly yellow			clear slightly tannic			clear slightly tannic			slightly cloudy			slightly cloudy			clear		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
The interval that stake is located for increased precision in water height fluctuations is 2.0m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate

Marathon PGM
Summary of Stream Field Data
Location S4

	8-Jul-08			30-Jul-08			25-Aug-08			22-Sep-08			21-Oct-08			19-Nov-08			5-May-09			10-Jun-09		
Distance Panel (m)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)
0																								
0.2																								
0.4																								
0.6																								
0.8	0.00	NA	-							*	*	*				**	**	**						
1.0	0.09	NM	-							*	*	*				**	**	**						
1.2	0.58	NM	-	0.00	NA	0.00000				*	*	*				**	**	**						
1.4	0.58	NM	-	0.01	NA	0.00000	0.00	NA	0.00000	*	*	*	0.00	NA	0.00000	**	**	**	0.00	NA	0.00000	0.00	NA	0.00000
1.5																								
1.6	0.65	NM	-	0.08	<0.01	0.00005	0.01	NA	0.00000	*	*	*	0.05	NA	0.00000	**	**	**						
1.8	0.66	NM	-	0.09	<0.01	0.00005	0.01	0.00	0.00000	*	*	*	0.11	<0.01	0.00007	**	**	**	0.52	0.16	0.00781	0.08	0.07	0.00048
2.0	0.63	NM	-	0.08	<0.01	0.00005	0.00	NA	0.00000	*	*	*	0.07	<0.01	0.00004	**	**	**	0.51	0.30	0.00919	0.05	<0.01	0.00003
2.2	0.66	NM	-	0.08	0.32	0.00156	0.01	NA	0.00000	*	*	*	0.07	0.19	0.00081	**	**	**	0.48	0.36	0.01057	0.07	0.33	0.00140
2.4	0.67	NM	-	0.13	0.59	0.00468	0.20	0.00	0.00000	*	*	*	0.12	0.49	0.00359	**	**	**	0.57	0.46	0.01597	0.08	0.49	0.00240
2.6	0.69	NM	-	0.12	0.63	0.00461	0.13	<0.01	0.00008	*	*	*	0.19	0.46	0.00533	**	**	**	0.53	0.59	0.01909	0.12	0.46	0.00336
2.8	0.72	NM	-	0.20	0.58	0.00708	0.11	<0.01	0.00007	*	*	*	0.19	0.46	0.00533	**	**	**	0.52	0.56	0.01769	0.14	0.43	0.00364
3.0	0.65	NM	-	0.15	0.57	0.00522	0.12	<0.01	0.00007	*	*	*	0.18	0.35	0.00384	**	**	**	0.49	0.56	0.01667	0.16	0.39	0.00384
3.2	0.63	NM	-	0.05	0.57	0.00174	0.00	NA	0.00000	*	*	*	0.06	0.39	0.00143	**	**	**	0.51	0.56	0.01735	0.16	0.33	0.00320
3.4	0.58	NM	-	0.04	<0.01	0.00002				*	*	*	0.00	NA	0.00000	**	**	**	0.50	0.62	0.01901	0.12	0.26	0.00192
3.5				0.00	NA	0.00000				*	*	*				**	**	**						
3.6	0.55	NM	-							*	*	*				**	**	**	0.59	0.30	0.01063	0.02	0.00	0.00000
3.8	0.45	NM	-							*	*	*				**	**	**	0.58	0.20	0.00696	0.00	NA	0.00000
4.0	0.35	NM	-							*	*	*				**	**	**	0.59	0.20	0.00708			
4.2	0.19	NM	-							*	*	*				**	**	**	0.00	NA	0.00000			
4.4	0.07	NM	-							*	*	*				**	**	**						
4.6	0.00	NA	-							*	*	*				**	**	**						
4.8																								
5.0								`																
Total Stream Width (m)	3.8			2.3			1.8			*			2.0			**			2.8			2.4		
Total Discharge (m^3/s)	-			0.0250527			0.00022			*			0.02044			**			0.15802			0.02028		
Field Chemistry																								
Temp (^oC)	14.5			14.1			12.8			*			4.3			**			6.0			10.8		
pH	8.03			7.99			8.01			*			8.05			**			8.06			7.31		
EC (uS)	165			170			277			*			230			**			113			204		
DO (mg/L)	4.15			5.12			6.55			*			3.93			**			2.23			0.55		
Appearance	cloudy brown			slightly tannic			clear			*			clear			**			cloudy turbid			slightly cloudy and turbid		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
Interval that stake is located for increased precision in water height fluctuations is 3.0m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate
* Due to the low water conditions the Pic River was non navigatable by boat
** The upper portion of the Pic River was frozen and was non navigatable by boat

Marathon PGM
Summary of Stream Field Data
Location S4

	14-Jul-09			4-Aug-09			1-Sep-09			8-Oct-09			3-May-10			8-Jul-10			1-Sep-10		
Distance Panel (m)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)
0																					
0.2																					
0.4																					
0.6																					
0.8																					
1.0																					
1.2																					
1.4	0.00	NA	0.00000				0.00	NA	0.00000	0.00	NA	0.00000				0.00	NA	0.00000			
1.5													0.00	NA	0.00000						
1.6	0.02	<0.01	0.00001	0.16	0.13	0.00095	0.24	0.16	0.00234	0.10	0.04	0.00024	0.09	0.04	0.00016	0.00	NA	0.00000	0.00	NA	0.00000
1.8	0.02	<0.01	0.00001	0.14	0.33	0.00282	0.19	0.52	0.00603	0.07	0.06	0.00026	0.08	0.06	0.00029	0.02	1.20	0.00146	0.00	0.00	0.00000
2.0	0.01	0.13	0.00004	0.14	0.51	0.00436	0.18	0.57	0.00626	0.11	0.03	0.00020	0.10	0.03	0.00018	0.03	0.22	0.00040	0.00	0.00	0.00000
2.2	0.04	<0.01	0.00002	0.16	0.58	0.00566	0.21	0.58	0.00743	0.09	0.13	0.00071	0.12	0.13	0.00095	0.07	0.45	0.00192	0.03	NA	0.00000
2.4	0.03	0.27	0.00049	0.18	0.79	0.00867	0.22	0.67	0.00899	0.11	0.22	0.00148	0.13	0.22	0.00174	0.09	0.44	0.00242	0.05	0.15	0.00046
2.6	0.10	0.43	0.00262	0.22	0.67	0.00899	0.25	0.64	0.00976	0.12	0.24	0.00176	0.16	0.24	0.00234	0.11	0.43	0.00289	0.07	0.23	0.00098
2.8	0.11	0.46	0.00309	0.24	0.65	0.00952	0.27	0.71	0.01169	0.14	0.19	0.00162	0.19	0.19	0.00220	0.12	0.25	0.00183	0.09	0.22	0.00121
3.0	0.11	0.38	0.00255	0.22	0.62	0.00832	0.22	0.72	0.00966	0.14	0.18	0.00154	0.18	0.18	0.00198	0.10	0.28	0.00171	0.09	0.19	0.00104
3.2	0.04	<0.01	0.00002	0.14	0.62	0.00529	0.17	0.86	0.00892	0.10	0.16	0.00098	0.14	0.16	0.00137	0.06	0.29	0.00106	0.02	0.14	0.00017
3.4	0.00	NA	0.00000	0.10	0.38	0.00232	0.07	0.61	0.00260	0.03	0.09	0.00016	0.10	0.09	0.00055	0.00	NA	0.00000	0.00	NA	0.00000
3.5																					
3.6				0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000			
3.8																0.00	NA	0.00000			
4.0																					
4.2																					
4.4																					
4.6																					
4.8																					
5.0																					
Total Stream Width (m)	2.0			2.0			2.2			2.2			1.5			2.4			1.8		
Total Discharge (m^3/s)	0.00887			0.05690			0.07369			0.00895			0.01177			0.01369			0.00386		
Field Chemistry																					
Temp (^oC)	16.0			13.4			12.0			6.5			9.5			16.8			17.6		
pH	8.32			8.25			8.11			8			8.1			7.70			7.43		
EC (uS)	230			127			116			209			281			182			-		
DO (mg/L)	0.19			5.85			3.61			1.74			14.36			8.80			8.08		
Appearance	cloudy slt. turbid			slt. grey, cloudy			slt. brown, cloudy			clear			Cloudy, brown with some suspended solids			Grey, slt. cloudy			Clear, slt. cloudy		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
Interval that stake is located for increased precision in water height fluctuations is 3.0m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate
* Due to the low water conditions the Pic River was non navigatable by boat
** The upper portion of the Pic River was frozen and was non navigatable by boat

Marathon PGM
Summary of Stream Field Data
Location S5

	7-Jul-08			31-Jul-08			27-Aug-08			22-Sep-08			22-Oct-08			19-Nov-08			8-May-08			10-Jun-09		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0																								
0.2																								
0.4																								
0.6																								
0.8																								
1.0																								
1.2																			0.00	NA	0.00000			
1.3										0.00	NA	0.00000	0.00	NA	0.00000	*	*	*						
1.4	0.00	NA	-				0.00	NA	0.00000	0.04	NA	0.00000	0.07	<0.01	0.00003	*	*	*	0.24	0.03	0.00048			
1.6	0.12	NM	-	0.00	NA	0.00000	0.05	<0.01	0.00003	0.11	<0.01	0.00007	0.12	<0.01	0.00007	*	*	*	0.41	0.03	0.00082	0.00	NA	0.00000
1.8	0.15	NM	-	0.09	<0.01	0.00005	0.07	<0.01	0.00004	0.13	<0.01	0.00008	0.13	<0.01	0.00008	*	*	*	0.50	0.07	0.00200	0.04	0.00	0.00000
2.0	0.22	NM	-	0.09	<0.01	0.00005	0.09	<0.01	0.00005	0.16	<0.01	0.00010	0.16	<0.01	0.00010	*	*	*	0.57	0.13	0.00456	0.12	0.23	0.00168
2.2	0.24	NM	-	0.14	<0.01	0.00009	0.10	<0.01	0.00006	0.16	0.19	0.00185	0.18	<0.01	0.00011	*	*	*	0.58	1.25	0.04411	0.14	0.26	0.00224
2.4	0.25	NM	-	0.15	0.50	0.00458	0.09	0.31	0.00170	0.16	0.60	0.00586	0.20	0.45	0.00549	*	*	*	0.57	0.72	0.02510	0.16	0.20	0.00192
2.6	0.21	NM	-	0.13	0.90	0.00714	0.10	0.36	0.00220	0.17	0.67	0.00695	0.20	0.66	0.00805	*	*	*	0.59	0.72	0.02598	0.17	0.85	0.00885
2.8	0.25	NM	-	0.15	0.63	0.00576	0.10	0.32	0.00195	0.19	0.45	0.00522	0.22	1.06	0.01423	*	*	*	0.60	1.74	0.06364	0.16	0.85	0.00833
3.0	0.25	NM	-	0.15	0.53	0.00485	0.10	0.59	0.00360	0.19	0.78	0.00904	0.21	0.84	0.01076	*	*	*	0.60	1.74	0.06364	0.18	0.56	0.00612
3.2	0.27	NM	-	0.17	1.00	0.01037	0.12	0.29	0.00212	0.18	0.65	0.00714	0.22	1.28	0.01718	*	*	*	0.60	1.80	0.06604	0.20	0.72	0.00881
3.4	0.26	NM	-	0.16	0.66	0.00644	0.10	0.29	0.00177	0.20	0.32	0.00390	0.22	0.40	0.00537	*	*	*	0.60	1.44	0.05283	0.19	0.95	0.01103
3.6	0.26	NM	-	0.15	0.27	0.00247	0.12	0.32	0.00234	0.18	0.83	0.00911	0.20	0.78	0.00952	*	*	*	0.59	1.08	0.03897	0.19	0.36	0.00418
3.8	0.25	NM	-	0.16	0.59	0.00576	0.10	<0.01	0.00006	0.16	0.55	0.00537	0.19	0.90	0.01043	*	*	*	0.61	1.54	0.05738	0.17	0.59	0.00612
4.0	0.25	NM	-	0.15	0.35	0.00320	0.10	0.36	0.00220	0.14	0.94	0.00803	0.16	0.38	0.00371	*	*	*	0.61	1.38	0.05127	0.14	0.75	0.00644
4.2	0.22	NM	-	0.14	0.77	0.00658	0.10	0.32	0.00195	0.15	0.58	0.00531	0.18	0.55	0.00604	*	*	*	0.59	1.54	0.05550	0.15	0.66	0.00600
4.4	0.25	NM	-	0.15	0.43	0.00393	0.09	<0.01	0.00005	0.16	0.67	0.00654	0.17	0.62	0.00643	*	*	*	0.62	1.41	0.05335	0.19	0.66	0.00760
4.6	0.27	NM	-	0.15	0.65	0.00595	0.09	0.30	0.00165	0.15	0.58	0.00531	0.17	0.60	0.00622	*	*	*	0.62	1.48	0.05584	0.16	0.59	0.00576
4.8	0.23	NM	-	0.11	0.31	0.00208	0.08	<0.01	0.00005	0.11	0.46	0.00309	0.09	0.56	0.00307	*	*	*	0.57	1.51	0.05247	0.15	0.72	0.00660
5.0	0.23	NM	-	0.11	<0.01	0.00007	0.05	<0.01	0.00003	0.12	0.27	0.00198	0.14	0.53	0.00453	*	*	*	0.58	0.89	0.03134	0.04	0.46	0.00112
5.2	0.21	NM	-	0.12	<0.01	0.00007	0.06	<0.01	0.00004	0.09	0.28	0.00154	0.12	0.60	0.00439	*	*	*	0.54	1.35	0.04431	0.03	0.07	0.00012
5.4	0.22	NM	-	0.12	0.20	0.00146	0.00	NA	0.00000	0.07	0.40	0.00171	0.11	0.72	0.00483	*	*	*	0.56	1.02	0.03474	0.08	0.39	0.00192
5.6	0.15	NM	-	0.05	<0.01	0.00003	0.06	<0.01	0.00004	0.11	0.39	0.00262	0.14	0.69	0.00589	*	*	*	0.53	0.95	0.03076	0.07	0.49	0.00210
5.8	0.20	NM	-	0.10	<0.01	0.00006	0.05	NA	0.00000	0.12	0.35	0.00256	0.12	0.57	0.00417	*	*	*	0.56	1.41	0.04819	0.09	0.36	0.00198
6.0	0.16	NM	-	0.09	0.36	0.00198	0.04	NA	0.00000	0.10	0.47	0.00287	0.13	0.61	0.00484	*	*	*	0.57	1.12	0.03879	0.10	0.43	0.00260
6.2	0.16	NM	-	0.06	0.65	0.00238	0.04	NA	0.00000	0.11	1.05	0.00705	0.13	0.88	0.00698	*	*	*	0.54	1.21	0.03999	0.09	0.46	0.00252
6.4	0.20	NM	-	0.06	1.46	0.00534	0.02	NA	0.00000	0.11	1.12	0.00752	0.16	0.82	0.00800	*	*	*	0.54	1.57	0.05187	0.08	0.43	0.00208
6.6	0.22	NM	-	0.10	1.36	0.00830	0.05	0.94	0.00287	0.16	1.01	0.00986	0.19	0.63	0.00730	*	*	*	0.58	1.05	0.03714	0.08	0.07	0.00032
6.8	0.24	NM	-	0.14	1.05	0.00897	0.12	0.19	0.00139	0.21	0.45	0.00576	0.24	0.66	0.00966	*	*	*	0.61	1.48	0.05494	0.10	1.08	0.00660
7.0	0.29	NM	-	0.19	<0.01	0.00012	0.14	<0.01	0.00009	0.22	0.73	0.00980	0.27	1.01	0.01663	*	*	*	0.67	1.48	0.06034	0.14	0.20	0.00168
7.2	0.32	NM	-	0.21	0.96	0.01230	0.14	<0.01	0.00009	0.22	0.37	0.00497	0.27	0.32	0.00527	*	*	*	0.68	1.31	0.05444	0.22	0.33	0.00440
7.4	0.31	NM	-	0.21	0.72	0.00922	0.14	0.65	0.00555	0.23	0.27	0.00379	0.24	0.23	0.00337	*	*	*	0.69	1.28	0.05386	0.22	1.08	0.01453
7.6	0.31	NM	-	0.20	0.48	0.00586	0.11	0.49	0.00329	0.18	<0.01	0.00011	0.21	<0.01	0.00013	*	*	*	0.66	1.28	0.05151	0.21	1.18	0.01513
7.8	0.29	NM	-	0.18	0.36	0.00395	0.07	0.19	0.00081	0.14	<0.01	0.00009	0.18	<0.01	0.00011	*	*	*	0.67	1.05	0.04291	0.19	0.59	0.00684
8.0	0.22	NM	-	0.13	0.33	0.00262	0.04	NA	0.00000	0.13	<0.01	0.00008	0.13	<0.01	0.00008	*	*	*	0.63	1.08	0.04161	0.14	0.66	0.00560
8.2	0.21	NM	-	0.11	0.17	0.00114	0.04	NA	0.00000	0.12	<0.01	0.00007	0.16	<0.01	0.00010	*	*	*	0.60	0.85	0.03122	0.12	0.62	0.00456
8.4	0.18	NM	-	0.09	0.63	0.00346	0.02	NA	0.00000	0.09	<0.01	0.00005	0.14	<0.01	0.00009	*	*	*	0.57	1.02	0.03536	0.08	0.66	0.00320
8.5							0.00	NA	0.00000							*	*	*						
8.6	0.15	NM	-	0.08	<0.01	0.00005				0.00	NA	0.00000	0.08	<0.01	0.00004	*	*	*	0.55	0.03	0.00110	0.00	NA	0.00000
8.7													0.00	NA	0.00000	*	*	*						
8.8	0.00	NA	-	0.00	NA	0.00000										*	*	*	0.03	NA	0.00000			
8.9																								
Total Stream Width (m)	7.4			7.2			7.1			7.3			7.4			*			7.6			7.0		
Stake Measurement (m)	-			-			0.755			0.695			0.663			*			0.275			0.700		
Total Discharge (m^3/s)	-			0.1366705			0.03601			0.14535			0.19329			*			1.49840			0.16903		
Field Chemistry																								
Temp (^oC)	17.4			19.7			16.0			12.5			7.2			*			3.8			11		
pH	7.49			7.91			8.01			7.52			7.98			*			8.30			6.87		
EC (uS)	21			34			42			23			20			*			15			27		
DO (mg/L)	1.84			7.26			6.61			3.70			3.59			*			0.9			0.45		
Appearance	clear			clear			clear			clear			clear			*			clear			clear		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
The interval that stake is located for increased precision in water height fluctuations is 3.4m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate
* The road was snowed in making access to Hare Lake unavailable.
Afterwards an aerial view determined that the adjacent bays to the discharge points were also frozen.

Marathon PGM
Summary of Stream Field Data
Location S5

	21-Jul-09			4-Aug-09			31-Aug-09			8-Oct-09			8-Oct-09			4-May-10			9-Jul-10			1-Sep-10		
Distance Panel (m)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)
0							0.00	NA	0.00000															
0.2							0.03	NA	0.00000															
0.4																								
0.6							0.05	NA	0.00000															
0.8																								
1.0							0.28	0.01	0.00034															
1.2																								
1.3													0.00	NA	0.00000				0.00	NA	0.00000			
1.4	0.00	NA	0.00000	0.00	NA	0.00000	0.05	0.07	0.00038	0.00	NA	0.00000							0.06	0.20	0.00055	0.00	NA	0.00000
1.6	0.05	0.09	0.00027	0.14	0.06	0.00051							0.22	NA	0.00000	0	NA	0.00000	0.13	0.26	0.00206	0.07	0.13	0.00056
1.8	0.07	0.26	0.00111	0.17	0.05	0.00052	0.50	0.78	0.04758	0.12	NA	0.00000				0.07	0.02	0.00009	0.09	0.57	0.00313	0.05	0.16	0.00049
2.0	0.06	0.31	0.00113	0.20	0.26	0.00317							0.28	0.24	0.00820	0.13	0.02	0.00016	0.19	0.37	0.00429	0.15	0.41	0.00375
2.2	0.13	0.18	0.00143	0.23	0.44	0.00617	0.50	1.62	0.09882	0.16	0.52	0.01015				0.14	0.05	0.00043	0.22	0.41	0.00550	0.16	0.52	0.00508
2.4	0.11	0.45	0.00302	0.24	1.22	0.01786							0.33	1.62	0.06522	0.17	0.20	0.00207	0.21	0.30	0.00384	0.15	0.49	0.00448
2.6	0.13	0.58	0.00460	0.25	1.15	0.01754	0.52	1.91	0.12117	0.16	0.44	0.00859				0.15	0.37	0.00339	0.20	0.67	0.00817	0.15	0.61	0.00558
2.8	0.11	0.65	0.00436	0.24	1.16	0.01698							0.34	1.77	0.07342	0.18	0.80	0.00878	0.23	0.63	0.00884	0.16	0.48	0.00468
3.0	0.13	0.62	0.00492	0.23	1.02	0.01431	0.52	1.15	0.07296	0.18	0.49	0.01076				0.18	1.16	0.01274	0.21	0.73	0.00935	0.16	0.49	0.00478
3.2	0.09	0.88	0.00483	0.24	1.35	0.01976							0.35	2.07	0.08839	0.20	1.13	0.01379	0.21	0.38	0.00487	0.16	0.36	0.00351
3.4	0.14	0.32	0.00273	0.22	0.77	0.01033	0.50	1.32	0.08052	0.16	0.42	0.00820				0.18	1.60	0.01757	0.18	0.70	0.00769	0.14	0.51	0.00436
3.6	0.14	0.35	0.00299	0.24	1.26	0.01845							0.34	1.25	0.05185	0.18	0.60	0.00659	0.20	0.74	0.00903	0.15	0.41	0.00375
3.8	0.10	0.20	0.00122	0.24	0.63	0.00922	0.51	1.47	0.09146	0.19	0.28	0.00649				0.19	1.18	0.01368	0.00	NA	0.00000	0.00	NA	0.00000
4.0	0.10	0.39	0.00238	0.23	0.60	0.00842							0.30	1.62	0.05929	0.17	1.33	0.01379	0.00	NA	0.00000	0.00	NA	0.00000
4.2	0.14	0.26	0.00222	0.24	0.92	0.01347	0.49	1.17	0.06994	0.18	0.18	0.00395				0.14	1.02	0.00871	0.16	0.59	0.00576	0.00	NA	0.00000
4.4	0.13	0.61	0.00484	0.25	0.86	0.01312							0.32	0.68	0.02655	0.19	0.76	0.00881	0.11	0.69	0.00463	0.07	0.63	0.00269
4.6	0.12	0.53	0.00388	0.24	0.49	0.00717	0.42	1.29	0.06610	0.15	0.32	0.00586				0.17	0.76	0.00788	0.00	NA	0.00000	0.00	NA	0.00000
4.8	0.02	NA	0.00000	0.14	0.50	0.00427							0.24	0.46	0.01347	0.17	1.07	0.01110	0.13	0.16	0.00127	0.07	0.38	0.00162
5.0	0.01	NA	0.00000	0.12	0.45	0.00329	0.41	0.97	0.04852	0.09	0.25	0.00275				0.06	0.72	0.00264	0.16	0.01	0.00010	0.00	NA	0.00000
5.2	0.07	0.33	0.00141	0.18	0.29	0.00318							0.26	0.53	0.01681	0.14	0.69	0.00589	0.00	NA	0.00000	0.00	NA	0.00000
5.4	0.05	0.25	0.00076	0.14	0.27	0.00231	0.44	1.13	0.06066	0.08	0.45	0.00439				0.10	0.36	0.00220	0.00	NA	0.00000	0.00	NA	0.00000
5.6	0.06	0.03	0.00011	0.16	0.26	0.00254							0.25	0.51	0.01556	0.06	0.46	0.00168	0.00	NA	0.00000	0.00	NA	0.00000
5.8	0.06	0.10	0.00037	0.17	0.50	0.00519	0.44	1.01	0.05422	0.12	0.26	0.00381				0.11	0.36	0.00242	0.00	NA	0.00000	0.00	NA	0.00000
6.0	0.06	0.31	0.00113	0.14	0.58	0.00495							0.21	0.82	0.02101	0.09	0.58	0.00318	0.00	NA	0.00000	0.12	0.03	0.00022
6.2	0.07	0.62	0.00265	0.17	0.95	0.00985	0.45	1.36	0.07466	0.10	0.10	0.00122				0.09	0.59	0.00324	0.15	0.06	0.00055	0.14	0.13	0.00111
6.4	0.05	0.35	0.00107	0.12	0.94	0.00688							0.28	1.17	0.03997	0.09	0.69	0.00379	0.19	0.26	0.00301	0.18	0.20	0.00220
6.6	0.07	1.07	0.00457	0.17	0.71	0.00736	0.55	1.09	0.07314	0.12	0.12	0.00176				0.10	0.99	0.00604	0.25	0.51	0.00778	0.19	0.15	0.00174
6.8	0.06	0.10	0.00037	0.19	0.43	0.00498							0.28	1.25	0.04270	0.11	0.91	0.00611	0.24	0.17	0.00249	0.18	0.10	0.00110
7.0	0.16	0.15	0.00146	0.30	0.77	0.01409	0.56	1.53	0.10453	0.22	0.22	0.00590				0.12	0.42	0.00307	0.28	0.11	0.00188	0.21	0.38	0.00487
7.2	0.17	0.59	0.00612	0.29	1.09	0.01928							0.40	1.94	0.09467	0.11	0.29	0.00195	0.13	0.59	0.00468	0.00	NA	0.00000
7.4	0.14	1.29	0.01102	0.30	0.88	0.01610	0.47	1.20	0.06881	0.22	0.22	0.00590				0.22	1.14	0.01530	0.28	0.61	0.01042	0.17	0.41	0.00425
7.6	0.13	0.80	0.00634	0.29	1.05	0.01857							0.36	1.19	0.05226	0.19	1.12	0.01298	0.25	0.51	0.00778	0.18	0.40	0.00439
7.8	0.11	0.89	0.00597	0.23	1.00	0.01403				0.17	0.17	0.00353				0.20	0.65	0.00793	0.23	0.44	0.00617	0.17	0.28	0.00290
8.0	0.08	0.32	0.00156	0.22	1.08	0.01449							0.28	0.68	0.02323	0.15	0.98	0.00897	0.17	0.43	0.00446	0.12	0.34	0.00249
8.2	0.03	NA	0.00000	0.20	0.30	0.00366	0.00	NA	0.00000	0.11	0.11	0.00148				0.11	0.17	0.00114	0.16	0.27	0.00264	0.10	0.19	0.00116
8.4	0.03	NA	0.00000	0.16	0.59	0.00432			0				0.26	0.48	0.01523	0.08	0.58	0.00283	0.00	NA	0.00000	0.00	NA	0.00000
8.5	0.00	NA	0.00000	0.00	NA	0.00000																		
8.6										0.00	0.00	0.00000				0.10	0.74	0.00451						
8.7																								
8.8													0.00	NA	0.00000	0.03	0.08	0.00011						
8.9																0.00	NA	0.00000						
Total Stream Width (m)	7.1			7.1			8.0			7.2			7.5			7.3			7.1			7.0		
Stake Measurement (m)	0.700																							
Total Discharge (m^3/s)	0.09084			0.33637			1.13347			0.08473			0.70782			0.22553			0.13092			0.07176		
Field Chemistry																								
Temp (^oC)	17.7			16.6			16.1			9.2			4.2			10.5			18.6			21.5		
pH	7.48			7.73			6.86			7.40			5.49			6.96			6.68			6.94		
EC (uS)	31			20			14			26			13			16			18			-		
DO (mg/L)	1.76			4.03			2.77			1.76			1.54			10.81			7.73			8.00		
Appearance	clear			clear			clear			clear slightly tannic			clear			clear, slightly yellow			clear			clear		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
The interval that stake is located for increased precision in water height fluctuations is 3.4m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate
* The road was snowed in making access to Hare Lake unavailable.
Afterwards an aerial view determined that the adjacent bays to the discharge points were also frozen.

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Marathon PGM
Summary of Stream Field Data
Location S6

	8-Jul-08			30-Jul-08			25-Aug-08			22-Sep-08			21-Oct-08			19-Nov-08			5-May-09			10-Jun-09		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0																								
0.2																								
0.4																								
0.6																								
0.8	0.00	NA	-							*	*	*	0.00	NA	0.00000	**	**	**	0	NA	0.00000			
0.9				0.00	NA	0.00000				*	*	*				**	**	**				0.00	NA	0.00000
1.0	0.03	NM	-	0.02	NA	0.00000				*	*	*	0.02	<0.01	0.00001	**	**	**	0.13	0.23	0.00182	0.11	0.03	0.00017
1.1							0.00	NA	0.00000	*	*	*				**	**	**						
1.2	0.10	NM	-	0.09	0.52	0.00285	0.01	NA	0.00000	*	*	*	0.07	0.86	0.00367	**	**	**	0.15	0.36	0.00330	0.14	0.59	0.00504
1.4	0.10	NM	-	0.08	0.45	0.00220	0.03	0.00	0.00000	*	*	*	0.07	0.77	0.00329	**	**	**	0.21	0.75	0.00967	0.13	0.66	0.00520
1.6	0.10	NM	-	0.07	<0.01	0.00004	0.02	0.00	0.00000	*	*	*	0.05	<0.01	0.00003	**	**	**	0.17	0.95	0.00987	0.10	0.23	0.00140
1.7							0.00	NA	0.00000	*	*	*				**	**	**						
1.8	0.05	NM	-	0.05	0.00	0.00000				*	*	*	0.01	<0.01	0.00001	**	**	**	0.11	1.21	0.00815	0.02	NA	0.00000
2.0	0.04	NM	-	0.02	0.00	0.00000				*	*	*	0.04	<0.01	0.00002	**	**	**	0.08	0.23	0.00112	0.03	NA	0.00000
2.2	0.05	NM	-	0.02	0.00	0.00000				*	*	*	0.03	<0.01	0.00002	**	**	**	0.09	1.28	0.00702	0.02	NA	0.00000
2.4	0.04	NM	-	0.01	NA	0.00000				*	*	*	0.00	<0.01	0.00000	**	**	**	0.09	1.31	0.00720	0.01	NA	0.00000
2.6	0.03	NM	-	0.02	0.00	0.00000				*	*	*	0.01	<0.01	0.00001	**	**	**	0.08	1.41	0.00688	0.01	NA	0.00000
2.8	0.04	NM	-	0.02	0.00	0.00000				*	*	*	0.03	<0.01	0.00002	**	**	**	0.07	1.41	0.00602	0.01	NA	0.00000
3.0	0.03	NM	-	0.03	0.00	0.00000				*	*	*	0.02	<0.01	0.00001	**	**	**	0.08	1.35	0.00656	0.01	NA	0.00000
3.2	0.02	NM	-	0.01	NA	0.00000				*	*	*	0.01	<0.01	0.00001	**	**	**	0.07	0.72	0.00308	0.01	NA	0.00000
3.4	0.00	NA	-	0.00	NA	0.00000				*	*	*	0.00	NA	0.00000	**	**	**	0.06	0.85	0.00312	0.01	NA	0.00000
3.6																			0.06	0.95	0.00348	0.00	NA	0.00000
3.8																			0.05	1.08	0.00330	0.02	NA	0.00000
4.0																			0.07	0.82	0.00350	0.03	NA	0.00000
4.2																								
4.4																								
4.6																								
4.8																								
Total Stream Width (m)	2.6			2.5			0.6			*			2.6			**			3.2			3.1		
Total Discharge (m^3/s)	-			0.00509			0			*			0.00709			**			0.08412			0.01181		
Field Chemistry																								
Temp (^oC)	14.9			14.1			14.9			*			4.0			**			4.2			11.2		
pH	7.93			8.09			8.00			*			8.03			**			7.84			7.28		
EC (uS)	113			174			390			*			320			**			88			156		
DO (mg/L)	3.47			6.15			6.82			*			3.75			**			1.14			0.39		
Appearance	slightly tannic			clear			clear			*			clear			**			slightly cloudy turbid			NA		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
Could not advance measuring stake through stream bed
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate
* Due to the low water conditions the Pic River was non navigatable by boat
** The upper portion of the Pic River was frozen and was non navigatable by boat

Marathon PGM
Summary of Stream Field Data
Location S6

	14-Jul-09			4-Aug-09			1-Sep-09			8-Oct-09			3-May-10			8-Jul-10			1-Sep-10		
Distance Panel (m)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)
0																					
0.2																					
0.4																					
0.6																					
0.8							0.00	NA	0.00000				0	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000
0.9	0.00	NA	0.00000	0.00	NA	0.00000															
1.0	0.08	0.04	0.00020	0.10	<0.01	0.00005	0.10	0.01	0.00006	0.00	NA	0.00000	0.15	0.00	0.00000	0.10	0.03	0.00018	0.07	0.02	0.00009
1.1										0.11	0.29	0.00097									
1.2	0.11	0.47	0.00315	0.16	0.42	0.00410	0.19	0.65	0.00753	0.14	0.28	0.00179	0.18	0.78	0.00856	0.10	0.11	0.00067	0.13	0.09	0.00071
1.4	0.11	0.15	0.00101	0.07	1.17	0.00500	0.18	0.92	0.01010	0.08	0.01	0.00005	0.12	0.62	0.00454	0.15	0.32	0.00293	0.14	0.04	0.00034
1.6	0.04	0.04	0.00010	0.12	0.55	0.00403	0.14	0.55	0.00470	0.05	0.02	0.00006	0.08	0.22	0.00107	0.09	0.26	0.00143	0.05	0.00	0.00000
1.7																					
1.8	0.03	<0.01	0.00002	0.07	0.08	0.00034	0.12	0.56	0.00410	0.02	0.00	0.00000	0.03	0.07	0.00013	0.03	0.01	0.00002	0.00	NA	0.00000
2.0	0.01	<0.01	0.00001	0.04	0.16	0.00039	0.05	0.41	0.00125	0.01	NA	0.00000	0.04	0.65	0.00159	0.00	NA	0.00000	0.00	NA	0.00000
2.2	0.01	<0.01	0.00000	0.05	0.71	0.00217	0.05	1.08	0.00329	0.01	NA	0.00000	0.04	0.26	0.00063	0.01	NA	0.00000	0.00	NA	0.00000
2.4	0.00	NA	0.00000	0.05	0.27	0.00082	0.05	1.05	0.00320	0.01	NA	0.00000	0.03	0.22	0.00040	0.02	0.00	0.00000	0.00	NA	0.00000
2.6	0.01	<0.01	0.00001	0.03	<0.01	0.00002	0.05	0.92	0.00281	0.01	NA	0.00000	0.03	0.51	0.00093	0.01	NA	0.00000	0.00	NA	0.00000
2.8	0.01	<0.01	0.00000	0.03	<0.01	0.00002	0.04	0.80	0.00195	0.01	NA	0.00000	0.03	0.32	0.00059	0.00	NA	0.00000	0.00	NA	0.00000
3.0	0.01	<0.01	0.00000	0.02	<0.01	0.00001	0.04	1.07	0.00261	0.01	NA	0.00000	0.02	0.00	0.00000	0.00	NA	0.00000	0.00	NA	0.00000
3.2	0.00	NA	0.00000	0.03	<0.01	0.00002	0.05	0.89	0.00271	0.01	NA	0.00000	0.02	0.00	0.00000	0.00	NA	0.00000	0.00	NA	0.00000
3.4				0.03	<0.01	0.00002	0.03	1.01	0.00185	0.01	NA	0.00000	0.01	NA	0.00000	0.00	NA	0.00000			
3.6				0.03	<0.01	0.00002	0.04	0.89	0.00217	0.01	NA	0.00000	0.02	0.00	0.00000	0.00	NA	0.00000			
3.8				0.02	<0.01	0.00001	0.04	0.83	0.00203	0.02	0.00	0.00000	0.03	0.12	0.00022	0.00	NA	0.00000			
4.0				0.05	0.33	0.00101	0.06	0.67	0.00245	0.02	0.08	0.00010	0.03	0.13	0.00024	0.00	NA	0.00000			
4.2				0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0	NA	0.00000	0.00	NA	0.00000			
4.4																					
4.6																					
4.8																					
Total Stream Width (m)	2.3			3.3			3.4			3.2			3.2			3.4			2.4		
Total Discharge (m^3/s)	0.00449			0.01801			0.05282			0.00297			0.01890			0.00523			0.00114		
Field Chemistry																					
Temp (^oC)	19.5			13.1			13.2			7.2			8.5			16.0			16.9		
pH	8.29			8.19			8.40			8.08			7.67			7.64			7.52		
EC (uS)	216			6.07			89			168			127			202			-		
DO (mg/L)	0.25			108			3.23			1.92			11.54			9.29			9.42		
Appearance	NA			slightly cloud, light grey			clear			clear			Slight cloudy, light grey			clear			clear		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
Could not advance measuring stake through stream bed
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate
* Due to the low water conditions the Pic River was non navigatable by boat
** The upper portion of the Pic River was frozen and was non navigatable by boat

Marathon PGM
Summary of Hydrogeological Field Data
Location S7

	7-Jul-08			30-Jul-08			29-Aug-08			25-Sep-08			20-Oct-08			17-Nov-08			9-Jun-09			14-Jul-09		
Distance Panel (m)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)
0																								
0.2																								
0.4																								
0.6																								
0.8	0.00	NA	-	0.00	NA	0.00000				0.00	NA	0.00000				0.00	NA	0.00000						
0.9							0.00	NA	0.00000				0.00	NA	0.00000				0.00	NA	0.00000	0.00	NA	0.00000
1.0	0.14	NM	-	0.05	0.00	0.00000	0.02	0.00	0.00000	0.02	0.00	0.00000	0.06	<0.01	0.00003	0.23	0.45	0.00631	0.03	0.23	0.00032	0.06	0.29	0.00080
1.2	0.12	NM	-	0.08	<0.01	0.00005	0.02	0.00	0.00000	0.05	0.00	0.00000	0.09	0.60	0.00329	0.26	1.20	0.01903	0.06	0.62	0.00228	0.07	0.36	0.00154
1.4	0.24	NM	-	0.10	<0.01	0.00006	0.09	<0.01	0.00005	0.08	<0.01	0.00005	0.08	<0.01	0.00005	0.22	2.70	0.03623	0.07	0.75	0.00322	0.07	0.26	0.00111
1.6	0.26	NM	-	0.14	0.35	0.00299	0.06	<0.01	0.00004	0.13	0.28	0.00222	0.16	0.41	0.00400	0.29	1.83	0.03237	0.12	0.92	0.00672	0.10	0.53	0.00323
1.8	0.23	NM	-	0.10	0.24	0.00146	0.08	<0.01	0.00005	0.18	<0.01	0.00011	0.12	1.23	0.00900	0.33	0.67	0.01349	0.13	0.10	0.00078	0.14	0.23	0.00196
2.0	0.18	NM	-	0.19	0.80	0.00927	0.18	<0.01	0.00011	0.20	1.52	0.01854	0.17	0.40	0.00415	0.40	1.56	0.03806	0.18	0.03	0.00036	0.13	0.06	0.00048
2.2	0.28	NM	-	0.22	<0.01	0.00013	0.17	0.16	0.00166	0.26	<0.01	0.00016	0.27	0.41	0.00675	0.34	2.31	0.04791	0.21	0.75	0.00967	0.20	0.51	0.00622
2.4	0.30	NM	-	0.20	<0.01	0.00012	0.17	<0.01	0.00010	0.25	<0.01	0.00015	0.24	0.12	0.00176	0.40	0.25	0.00610	0.17	1.31	0.01361	0.16	1.86	0.01815
2.6	0.22	NM	-	0.20	0.60	0.00732	0.12	0.21	0.00154	0.25	0.31	0.00473	0.23	0.57	0.00800	0.35	0.17	0.00363	0.19	0.62	0.00722	0.19	0.37	0.00429
2.8	0.23	NM	-	0.17	0.61	0.00633	0.20	<0.01	0.00012	0.22	0.63	0.00845	0.19	0.59	0.00684	0.37	0.29	0.00655	0.19	0.03	0.00038	0.19	0.01	0.00012
3.0	0.27	NM	-	0.20	0.53	0.00647	0.18	<0.01	0.00011	0.20	0.56	0.00683	0.22	0.57	0.00765	0.38	0.21	0.00487	0.18	0.00	0.00000	0.22	0.01	0.00013
3.2	0.09	NM	-	0.02	<0.01*	0.00001	0.21	<0.01*	0.00013	0.16	<0.01*	0.00010	0.21	<0.01*	0.00013	0.14	<0.01*	0.00009	0.12	0.06	0.00043	0.19	0.01	0.00012
3.4	0.34	NM	-	0.26	0.31	0.00492	0.14	<0.01	0.00009	0.25	0.31	0.00473	0.22	0.06	0.00081	0.40	0.44	0.01074	0.22	0.82	0.01101	0.22	0.18	0.00242
3.6	0.30	NM	-	0.23	0.42	0.00589	0.15	<0.01	0.00009	0.20	0.32	0.00390	0.23	0.89	0.01249	0.41	1.60	0.04002	0.20	0.92	0.01121	0.20	0.54	0.00659
3.8	0.28	NM	-	0.19	0.75	0.00869	0.23	<0.01	0.00014	0.20	0.41	0.00500	0.22	1.64	0.02201	0.36	2.18	0.04787	0.22	0.85	0.01145	0.19	0.35	0.00406
4.0	0.30	NM	-	0.26	0.76	0.01205	0.09	0.30	0.00165	0.18	0.72	0.00791	0.27	0.83	0.01367	0.34	2.78	0.05766	0.19	1.18	0.01369	0.24	0.80	0.01171
4.2	0.30	NM	-	0.23	0.85	0.01193	0.18	0.42	0.00461	0.22	1.14	0.01530	0.32	0.31	0.00605	0.35	1.80	0.03843	0.24	0.39	0.00576	0.26	1.01	0.01602
4.4	0.27	NM	-	0.22	0.52	0.00698	0.07	0.20	0.00085	0.18	<0.01	0.00011	0.22	0.22	0.00295	0.35	0.30	0.00640	0.22	0.10	0.00132	0.22	0.81	0.01087
4.6	0.19	NM	-	0.11	0.24	0.00161	0.02	<0.01	0.00001	0.14	<0.01	0.00009	0.23	<0.01	0.00014	0.23	0.21	0.00295	0.18	0.03	0.00036	0.19	0.57	0.00661
4.8	0.13	NM	-	0.09	<0.01	0.00005	0.05	<0.01	0.00003	0.08	<0.01	0.00005	0.18	<0.01	0.00011	0.22	0.21	0.00282	0.07	<0.01	0.00004	0.13	0.02	0.00016
5.0	0.16	NM	-	0.09	<0.01	0.00005	0.07	<0.01	0.00004	0.06	<0.01	0.00004	0.11	<0.01	0.00007	0.28	0.12	0.00205	0.15	<0.01	0.00009	0.16	0.00	0.00000
5.2	0.19	NM	-	0.13	<0.01	0.00008	0.06	<0.01	0.00004	0.10	<0.01	0.00006	0.13	<0.01	0.00008	0.27	<0.01	0.00016	0.16	<0.01	0.00010	0.22	0.01	0.00013
5.4	0.19	NM	-	0.12	<0.01	0.00007	0.06	<0.01	0.00004	0.12	<0.01	0.00007	0.12	<0.01	0.00007	0.35	<0.01	0.00021	0.17	<0.01	0.00010	0.28	0.13	0.00222
5.6	0.19	NM	-	0.13	<0.01	0.00008	0.28	<0.01	0.00017	0.28	<0.01	0.00017	0.15	<0.01	0.00009	0.35	<0.01	0.00021	0.26	<0.01	0.00016	0.29	0.10	0.00177
5.8	0.31	NM	-	0.25	<0.01	0.00015	0.25	<0.01	0.00015	0.27	<0.01	0.00016	0.33	<0.01	0.00020	0.44	<0.01	0.00027	0.28	<0.01	0.00017	0.29	0.06	0.00106
6.0	0.36	NM	-	0.30	<0.01	0.00018	0.26	<0.01	0.00016	0.25	<0.01	0.00015	0.32	<0.01	0.00020	0.47	<0.01	0.00029	0.27	<0.01	0.00016	0.34	0.03	0.00062
6.2	0.29	NM	-	0.28	<0.01	0.00017	0.15	<0.01	0.00009	0.31	<0.01	0.00019	0.37	<0.01	0.00023	0.45	<0.01	0.00027	0.22	<0.01	0.00013	0.30	0.06	0.00110
6.4	0.30	NM	-	0.24	<0.01	0.00015	0.01	<0.01	0.00000	0.23	<0.01	0.00014	0.31	<0.01	0.00019	0.22	<0.01	0.00013	0.31	0.10	0.00186	0.20	<0.01	0.00012
6.6	0.13	NM	-	0.07	<0.01	0.00004	0.00	NA	0.00000	0.06	<0.01	0.00004	0.07	<0.01	0.00004	0.23	<0.01	0.00014	0.19	0.03	0.00038	0.00	NA	0.00000
6.8	0.14	NM	-	0.01	NA	0.00000				0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000			
7.0	0.00	NA	-	0.00	NA	0.00000																		
7.2																								
7.4																								
Total Stream Width (m)	6.2			6.2			5.7			6.0			5.9			6.0			5.9			6.6		
Stake Measurement (m)	-			-			0.719			0.685			0.656			0.564								
Total Discharge (m^3/s)	-			0.08732			0.01207			0.07945			0.11104			0.42527			0.10300			0.10360		
Field Chemistry																								
Temp (^oC)	19.4			17.5			14.5			12.0			9.5			0.9			14.8			15.4		
pH	7.26			8.09			7.53			7.00			6.90			7.35			6.07			7.34		
EC (uS)	59			65			57			60			59			70			70			75		
DO (mg/L)	2.01			4.56			6.04			2.10			2.44			2.89			0.30			0.24		
Appearance	slightly tannic			clear			clear			clear			clear			slightly tannic			clear w/ yellow tinge			clear		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
The Interval that stake is located for increased precision in water height fluctuations is 5.6m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate
* Flow taken behind large rock

Marathon PGM
Summary of Hydrogeological Field Data
Location S7

	4-Aug-09			1-Sep-09			5-Oct-09			4-May-10			6-Jul-10			7-Sep-10		
Distance Panel (m)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)
0																		
0.2																		
0.4													0.00	NA	0.00000			
0.6													0.08	NA	0.00000			
0.8													0.35	0.09	0.00192			
0.9	0.00	NA	0.00000				0.00	NA	0.00000	0	NA	0.00000						
1.0	0.15	0.30	0.00206	0.00	NA	0.00000	0.04	0.18	0.00033	0.12	0.26	0.00143	0.45	0.07	0.00192			
1.2	0.07	1.70	0.00726	0.26	0.15	0.00238	0.00	NA	0.00000	0.10	0.60	0.00366	0.43	0.08	0.00210	0.00	NA	0.00000
1.4	0.14	1.46	0.01247	0.27	0.95	0.01565	0.01	NA	0.00000	0.18	1.20	0.01318	0.46	0.04	0.00112	0.05	0.42	0.00128
1.6	0.11	1.68	0.01127	0.26	1.56	0.02474	0.08	0.04	0.00017	0.12	0.17	0.00124	0.35	0.07	0.00149	0.05	0.19	0.00058
1.8	0.20	0.00	0.00000	0.30	2.10	0.03843	0.12	0.18	0.00132	0.07	0.00	0.00000	0.36	0.09	0.00198	0.09	0.17	0.00093
2.0	0.25	0.25	0.00381	0.32	NA	0.00000	0.16	0.07	0.00068	0.02	NA	0.00000	0.26	0.00	0.00000	0.00	NA	0.00000
2.2	0.24	2.33	0.03411	0.35	2.80	0.05978	0.17	0.42	0.00436	0.23	1.60	0.02245	0.25	0.00	0.00000	0.15	0.05	0.00046
2.4	0.23	0.14	0.00196	0.37	2.65	0.05981	0.14	0.16	0.00137	0.32	0.49	0.00956	0.25	0.01	0.00015	0.10	0.23	0.00140
2.6	0.26	0.01	0.00016	0.35	0.02	0.00043	0.19	0.72	0.00834	0.26	0.00	0.00000	0.25	0.00	0.00000	0.14	0.45	0.00384
2.8	0.26	0.00	0.00000	0.31	0.00	0.00000	0.15	0.05	0.00046	0.32	0.00	0.00000	0.24	0.02	0.00029	0.15	0.70	0.00641
3.0	0.26	0.15	0.00238	0.36	0.00	0.00000	0.20	0.04	0.00049	0.33	0.00	0.00000	0.30	0.16	0.00293	0.17	0.10	0.00104
3.2	0.26	0.78	0.01237	0.37	0.00	0.00000	0.01	NA	0.00000	0.31	0.00	0.00000	0.36	0.40	0.00878	0.16	0.03	0.00029
3.4	0.27	1.61	0.02652	0.35	0.32	0.00683	0.16	0.00	0.00000	0.20	0.16	0.00195	0.34	1.28	0.02655	0.15	0.00	0.00000
3.6	0.29	1.67	0.02954	0.36	1.34	0.02943	0.19	0.00	0.00000	0.33	0.32	0.00644	0.38	1.13	0.02619	0.16	0.09	0.00088
3.8	0.31	2.60	0.04917	0.34	2.52	0.05226	0.20	0.22	0.00268	0.31	0.77	0.01456	0.33	1.13	0.02275	0.15	0.08	0.00073
4.0	0.30	2.65	0.04850	0.40	2.30	0.05612	0.22	0.52	0.00698	0.33	1.14	0.02295	0.31	0.55	0.01040	0.11	0.38	0.00255
4.2	0.29	1.12	0.01981	0.42	2.78	0.07122	0.17	0.47	0.00487	0.28	1.16	0.01981	0.31	0.17	0.00321	0.22	0.20	0.00268
4.4	0.28	0.95	0.01623	0.38	2.35	0.05447	0.18	0.65	0.00714	0.34	0.37	0.00767	0.32	NA	0.00000	0.21	0.53	0.00679
4.6	0.20	0.34	0.00415	0.40	0.85	0.02074	0.07	0.53	0.00226	0.33	0.12	0.00242	0.35	NA	0.00000	0.22	0.44	0.00590
4.8	0.20	0.04	0.00049	0.36	0.32	0.00703	0.10	0.08	0.00049	0.27	0.00	0.00000	0.29	NA	0.00000	0.15	0.24	0.00220
5.0	0.22	0.00	0.00000	0.35	0.01	0.00021	0.08	0.35	0.00171	0.20	0.00	0.00000	0.33	0.21	0.00425	0.13	0.05	0.00040
5.2	0.21	0.01	0.00013	0.30	0.00	0.00000	0.11	0.20	0.00134	0.27	0.00	0.00000	0.28	0.65	0.01110	0.12	0.02	0.00015
5.4	0.23	0.00	0.00000	0.34	0.13	0.00270	0.15	0.11	0.00101	0.42	0.00	0.00000	0.35	0.91	0.01943	0.11	0.06	0.00040
5.6	0.31	0.00	0.00000	0.34	0.15	0.00311	0.23	0.16	0.00224	0.39	0.00	0.00000	0.32	0.07	0.00137	0.28	0.03	0.00051
5.8	0.32	0.00	0.00000	0.49	0.05	0.00149	0.23	0.06	0.00084	0.35	0.00	0.00000	0.30	0.02	0.00037	0.25	0.02	0.00030
6.0	0.40	0.00	0.00000	0.40	0.06	0.00146	0.31	0.03	0.00057	0.40	0.03	0.00073	0.20	1.68	0.02050	0.27	0.05	0.00082
6.2	0.35	0.00	0.00000	0.42	0.00	0.00000	0.31	0.02	0.00038	0.42	0.01	0.00026	0.22	1.19	0.01597	0.25	0.06	0.00091
6.4	0.28	0.00	0.00000	0.49	0.01	0.00030	0.17	0.02	0.00021	0.42	0.00	0.00000	0.13	0.72	0.00571	0.28	0.02	0.00034
6.6	0.12	0.00	0.00000	0.47	0.04	0.00115	0.10	NA	0.00000	0.38	0.00	0.00000	0.15	0.52	0.00476	0.27	0.03	0.00049
6.8	0.06	0.00	0.00000	0.38	0.01	0.00023	0.00	NA	0.00000	0.22	0.00	0.00000	0	NA	0.00000	0.16	0.02	0.00020
7.0	0.00	NA	0.00000	0.28	0.04	0.00068				0.00	NA	0.00000				0.00	NA	0.00000
7.2				0.17	0.03	0.00031												
7.4				0.00	NA	0.00000												
Total Stream Width (m)	6.1			6.4			5.9			6.1			6.4			5.8		
Stake Measurement (m)																		
Total Discharge (m^3/s)	0.28238			0.51066			0.05023			0.12831			0.19332			0.04250		
Field Chemistry																		
Temp (^oC)	13.3			13.3			9.9			10.4			17.9			18.3		
pH	7.55			7.55			7.25			7.29			7.28			6.79		
EC (uS)	72			72			63			66			87			-		
DO (mg/L)	5.80			5.80			1.31			10.22			7.27			8.95		
Appearance	clear			clear			slightly yellow			clear, slightly yellow			clear, slightly yellow			clear, slightly yellow		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
The Interval that stake is located for increased precision in water height fluctuations is 5.6m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate
* Flow taken behind large rock

Marathon PGM
Summary of Stream Field Data
Location S8

	1-Jul-08			28-Jul-08			26-Aug-08			24-Sep-08			22-Oct-08			18-Nov-08			4-May-09			11-Jun-09		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0																								
0.2																								
0.4																								
0.6	0.00	NA	-																					
0.7										0.00	NA	0.00000												
0.8	0.03	NM	-							0.03	0.26	0.00036	0.00	NA	0.00000				0.00	NA	0.00000			
0.9																0.00	NA	0.00000						
0.95				0.00	NA	0.00000																0.00	NA	0.00000
0.98							0.00	NA	0.00000															
1.0	0.31	NM	-	0.14	0.60	0.00320	0.13	0.23	0.00100	0.10	0.18	0.00110	0.13	1.85	0.01467	0.24	1.98	0.02174	0.32	1.54	0.03010	0.14	1.21	0.00648
1.2	0.35	NM	-	0.16	0.20	0.00195	0.14	0.27	0.00231	0.13	<0.01	0.00008	0.16	0.23	0.00224	0.20	1.96	0.02391	0.32	3.38	0.06596	0.14	0.07	0.00056
1.4	0.30	NM	-	0.06	<0.01	0.00004	0.07	<0.01	0.00004	0.09	<0.01	0.00005	0.13	<0.01	0.00008	0.17	1.30	0.01348	0.22	2.13	0.02862	0.11	0.07	0.00044
1.6	0.29	NM	-	0.08	<0.01	0.00005	0.06	<0.01	0.00004	0.00	NA	0.00000	0.00	NA	0.00000	0.17	0.29	0.00301	0.21	0.20	0.00252	0.00	NA	0.00000
1.8	0.23	NM	-	0.05	<0.01	0.00003	0.00	NA	0.00000							0.00	NA	0.00000	0.01	NA	0.00000			
1.9																								
2.0	0.09	NM	-	0.00	NA	0.00000										0.01	NA	0.00000	0.06	0.13	0.00048			
2.2	0.10	NM	-													0.00	NA	0.00000	0.08	0.03	0.00016			
2.4	0.01	NM	-																					
2.6	0.00	NA	-																					
2.8																								
3.0																								
3.2																								
3.4																								
3.6																								
3.8																								
4.0																								
Total Stream Width (m)	2.0			1.1			0.8			0.9			0.8			1.3			1.4			0.7		
Stake Measurement (m)	-			-			0.810			0.898			0.859			0.786						0.868		
Total Discharge (m^3/s)	-			0.00527			0.00339			0.00159			0.01699			0.06214			0.12784			0.00748		
Field Chemistry																								
Temp (^{0}C)	15.6			24.3			20.3			14.6			5.2			1.3			9.0			11.9		
pH	7.17			6.91			7.34			7.73			7.52			7.78			6.9			6.65		
EC (uS)	26			29			33			33			29			34			24			32		
DO (mg/L)	0.81			4.64			5.75			2.27			5.03			2.26			N/A			0.57		
Appearance	slightly tannic			slightly tannic			tannic			slightly tannic			clear			clear			clear, slightly yellow			clear		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
The Interval that stake is located for increased precision in water height fluctuations is 1.2m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate

Marathon PGM
Summary of Stream Field Data
Location S8

	15-Jul-09			6-Aug-09			1-Sep-09			7-Oct-09			3-Nov-09			5-May-10			13-Jul-10			31-Aug-10		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0																								
0.2																								
0.4																								
0.6																								
0.7																			0.00	NA	0.00000			
0.8	0.00	NA	0.00000																0.00	NA	0.00000			
0.9										0.00	NA	0.00000												
0.95																0.00	NA	0.00000						
0.98																								
1.0	0.11	0.05	0.00034	0.00	NA	0.00000	0.00	NA	0.00000	0.15	0.16	0.00110	0.00	NA	0.00000	0.11	1.30	0.00545	0.11	0.62	0.00416	0.00	NA	0.00000
1.2	0.12	0.09	0.00066	0.18	1.19	0.01307	0.21	2.34	0.02998	0.19	0.33	0.00382	0.25	2.21	0.03370	0.18	0.90	0.00988	0.16	0.50	0.00488	0.06	0.04	0.00015
1.4	0.08	0.02	0.00010	0.12	0.20	0.00146	0.29	0.64	0.01132	0.20	0.11	0.00134	0.30	1.59	0.02910	0.21	0.01	0.00013	0.18	0.13	0.00143	0.08	0.02	0.00010
1.6	0.05	0.09	0.00027	0.15	<0.01	0.00009	0.22	0.00	0.00000	0.14	0.14	0.00120	0.23	0.15	0.00210	0.15	0.00	0.00000	0.12	0.07	0.00051	0.05	0.01	0.00003
1.8	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	0.00	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.01	0.02	0.00001
1.9				0.00	NA	0.00000							0.03	0.00	0.00000									
2.0							0.02	0.00	0.00000				0.00	NA	0.00000				0.00	NA	0.00000	0.00	NA	0.00000
2.2							0.00	NA	0.00000															
2.4																								
2.6																								
2.8																								
3.0																								
3.2																								
3.4																								
3.6																								
3.8																								
4.0																								
Total Stream Width (m)	1.0			0.9			1.2			0.9			1.0			0.9			1.3			1.0		
Stake Measurement (m)																								
Total Discharge (m^3/s)	0.00137			0.01462			0.04130			0.00746			0.06490			0.01546			0.01098			0.00029		
Field Chemistry																								
Temp (^{0}C)	17.7			16.8			19.7			19.7			4.3			11.6			23.6			19.5		
pH	7.43			7.61			7.59			7.59			6.56			7.46			7.28			6.32		
EC (uS)	46			36			16			16			37			33			45			21		
DO (mg/L)	0.47			5.52			2.3			2.3			1.53			9.51			7.17			-		
Appearance	clear			clear			clear slightly yellow			clear slightly yellow			slightly tannic			clear, slightly yellow			clear			clear, tr. organics		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
The Interval that stake is located for increased precision in water height fluctuations is 1.2m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate

Marathon PGM
Summary of Field Data
Location S9

	2-Jul-08			1-Jul-31			26-Aug-08			23-Sep-08			22-Oct-08			20-Nov-08			7-May-09			8-Jun-09		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0	0.00	NA	-																0.00	NA	0.00000			
0.2	0.09	NM	-													0.00	NA	0.00000	0.22	0.10	0.00132			
0.25																								
0.3				0.00	NA	0.00000				0.00	NA	0.00000	0.00	NA	0.00000									
0.4	0.12	NM	-	0.04	NA	0.00000				0.02	NA	0.00000	0.01	<0.01	0.00000	0.07	<0.01	0.00004	0.29	0.82	0.01451			
0.5							0.00	NA	0.00000													0.00	NA	0.00000
0.6	0.17	NM	-	0.05	NA	0.00000	0.01	NA	0.00000	0.06	<0.01	0.00004	0.10	<0.01	0.00006	0.15	<0.01	0.00009	0.35	0.69	0.01471	0.06	0.06	0.00016
0.8	0.27	NM	-	0.16	<0.01	0.00010	0.07	<0.01	0.00004	0.13	<0.01	0.00008	0.11	<0.01	0.00007	0.22	<0.01	0.00013	0.40	0.56	0.01361	0.14	0.02	0.00017
1.0	0.38	NM	-	0.22	<0.01	0.00013	0.18	<0.01	0.00011	0.33	<0.01	0.00020	0.26	<0.01	0.00016	0.30	<0.01	0.00018	0.54	0.59	0.01945	0.20	0.02	0.00024
1.2	0.37	NM	-	0.25	<0.01	0.00015	0.16	<0.01	0.00010	0.19	<0.01	0.00012	0.21	<0.01	0.00013	0.26	<0.01	0.00016	0.53	1.18	0.03819	0.21	0.08	0.00102
1.4	0.43	NM	-	0.29	<0.01	0.00018	0.23	<0.01	0.00014	0.29	<0.01	0.00018	0.29	0.12	0.00212	0.33	<0.01	0.00020	0.33	1.05	0.02113	0.18	0.01	0.00011
1.6	0.36	NM	-	0.28	<0.01	0.00017	0.19	<0.01	0.00012	0.22	<0.01	0.00013	0.22	0.38	0.00510	0.31	<0.01	0.00019	0.50	0.82	0.02502	0.26	0.01	0.00016
1.8	0.40	NM	-	0.26	<0.01	0.00016	0.24	<0.01	0.00015	0.22	<0.01	0.00013	0.14	0.36	0.00307	0.29	<0.01	0.00018	0.48	0.56	0.01633	0.25	0.06	0.00092
2.0	0.50	NM	-	0.38	0.31	0.00719	0.23	<0.01	0.00014	0.23	<0.01	0.00014	0.29	0.12	0.00212	0.27	<0.01	0.00016	0.47	1.57	0.04515	0.27	0.27	0.00445
2.2	0.55	NM	-	0.33	0.30	0.00604	0.35	<0.01	0.00021	0.28	0.14	0.00239	0.38	0.38	0.00881	0.43	0.40	0.01049	0.56	1.38	0.04707	0.23	0.30	0.00421
2.4	0.56	NM	-	0.30	0.21	0.00384	0.26	<0.01	0.00016	0.32	0.25	0.00488	0.32	0.36	0.00703	0.38	0.48	0.01113	0.51	2.00	0.06226	0.31	0.32	0.00605
2.6	0.42	NM	-	0.34	0.26	0.00539	0.26	<0.01	0.00016	0.31	<0.01	0.00019	0.33	0.30	0.00604	0.36	0.57	0.01252	0.55	1.90	0.06384	0.26	0.17	0.00270
2.8	0.48	NM	-	0.35	0.19	0.00406	0.24	<0.01	0.00015	0.31	<0.01	0.00019	0.31	<0.01	0.00019	0.39	0.35	0.00833	0.50	0.69	0.02101	0.26	0.18	0.00285
3.0	0.46	NM	-	0.14	0.27	0.00231	0.13	<0.01	0.00008	0.32	<0.01	0.00020	0.34	<0.01	0.00021	0.35	0.21	0.00448	0.41	1.18	0.02954	0.24	0.13	0.00190
3.2	0.36	NM	-	0.17	0.52	0.00539	0.07	<0.01	0.00004	0.12	<0.01	0.00007	0.12	0.38	0.00278	0.20	0.55	0.00671	0.46	1.18	0.03314	0.11	0.18	0.00121
3.4	0.28	NM	-	0.10	0.21	0.00128	0.00	NA	0.00000	0.16	<0.01	0.00010	0.16	<0.01	0.00010	0.19	0.50	0.00580	0.37	0.95	0.02147	0.16	0.12	0.00117
3.6	0.24	NM	-	0.03	NA	0.00000				0.13	<0.01	0.00008	0.11	<0.01	0.00007	0.20	0.30	0.00366	0.10	0.07	0.00040	0.08	0.13	0.00063
3.65				0.00	NA	0.00000																		
3.75																								
3.8	0.20	NM	-							0.09	<0.01	0.00004	0.05	<0.01	0.00003	0.00	NA	0.00000	0.03	NA	0.00000	0.05	<0.01	0.00003
3.9										0.00	NA	0.00000												
4.0	0.09	NM	-										0.00	NA	0.00000				0.04	NA	0.00000	0.00	NA	0.00000
4.2	0.00	NA	-																0.00	NA	0.00000			
Total Stream Width (m)	4.2			3.4			2.9			3.6			3.7			3.6			4.2			3.5		
Total Discharge (m^3/s)	-			0.03639			0.00159			0.00915			0.03809			0.06445			0.48816			0.02799		
Field Chemistry																								
Temp (^{o}C)	14.7			16.7			14.9			12.9			3.5			0			7.4			15.6		
pH	5.36			7.49			6.63			6.21			6.58			6.96			8.52			8.95		
EC (uS)	8			10			15			11			10			3			10			14		
DO (mg/L)	1.37			6.03			6.47			5.48			4.33			2.76			2.6			0.31		
Appearance	slightly tannic			slightly tannic			tannic			slightly tannic			slightly tannic			slightly tannic			yellow tinge			clear		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
Could not advance measuring stake through stream bed
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate

Marathon PGM
Summary of Field Data
Location S9

	13-Jul-09			5-Aug-09			2-Sep-09			6-Oct-09			5-Nov-09			6-May-10			14-Jul-10			30-Aug-10		
Distance Panel (m)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)
0																								
0.2							0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000				0	0.00	0.00000
0.25				0.00	NA	0.00000																		
0.3																								
0.4				0.06	0.00	0.00000	0.07	0.04	0	0.01	NA	0.00000	0.15	0.06	0.00055	0.12	0.12	0.00088	0.00	NA	0.00000	0.00	0.00	0.00000
0.5																								
0.6	0.00	NA	0.00000	0.10	0.03	0.00018	0.11	0.10	0.00067	0.06	0.05	0.00018	0.18	0.16	0.00176	0.16	0.16	0.00156	0.00	NA	0.00000	0.00	0.00	0.00000
0.8	0.13	0.01	0.00008	0.16	0.10	0.00098	0.18	0.21	0.00231	0.08	0.06	0.00029	0.25	0.44	0.00671	0.22	0.22	0.00295	0.08	0.03	0.00015	0.01	0.08	0.00005
1.0	0.18	0.01	0.00011	0.19	0.35	0.00406	0.29	0.39	0.00690	0.16	0.07	0.00068	0.29	0.55	0.00973	0.32	0.32	0.00625	0.09	0.09	0.00049	0.08	0.11	0.00054
1.2	0.20	0.03	0.00037	0.20	0.27	0.00329	0.32	0.15	0.00293	0.25	0.08	0.00122	0.36	0.38	0.00834	0.35	0.35	0.00747	0.21	0.04	0.00051	0.20	0.02	0.00024
1.4	0.16	0.02	0.00020	0.26	<0.01	0.00016	0.34	0.06	0.00124	0.23	0.01	0.00014	0.28	0.23	0.00393	0.30	0.30	0.00549	0.12	0.01	0.00007	0.18	0.01	0.00011
1.6	0.25	0.07	0.00107	0.28	0.04	0.00068	0.38	0.10	0.00232	0.25	0.03	0.00046	0.34	0.11	0.00228	0.40	0.40	0.00976	0.11	0.01	0.00007	0.20	0.03	0.00037
1.8	0.22	0.03	0.00040	0.31	0.20	0.00378	0.32	0.01	0.00020	0.23	0.07	0.00098	0.34	0.21	0.00436	0.33	0.33	0.00664	0.15	0.06	0.00055	0.15	0.01	0.00009
2.0	0.25	0.05	0.00076	0.29	0.26	0.00460	0.29	0.22	0.00389	0.20	0.05	0.00061	0.25	0.32	0.00488	0.34	0.34	0.00705	0.15	0.05	0.00046	0.19	0.02	0.00023
2.2	0.21	0.03	0.00038	0.30	0.42	0.00769	0.45	0.31	0.00851	0.24	0.15	0.00220	0.37	0.31	0.00700	0.35	0.35	0.00747	0.20	0.08	0.00098	0.35	0.09	0.00192
2.4	0.30	0.20	0.00366	0.37	0.66	0.01490	0.45	0.60	0.01647	0.36	0.24	0.00527	0.49	0.82	0.02451	0.45	0.45	0.01235	0.34	0.03	0.00062	0.40	0.17	0.00415
2.6	0.25	0.20	0.00305	0.34	0.56	0.01161	0.36	0.33	0.00725	0.32	0.08	0.00156	0.42	0.23	0.00589	0.44	0.44	0.01181	0.26	0.04	0.00063	0.25	0.17	0.00259
2.8	0.24	0.17	0.00249	0.32	0.45	0.00878	0.38	0.32	0.00742	0.30	0.14	0.00256	0.42	0.16	0.00410	0.37	0.37	0.00835	0.25	0.07	0.00107	0.20	0.07	0.00085
3.0	0.23	0.19	0.00267	0.30	0.28	0.00512	0.31	0.28	0.00529	0.28	0.08	0.00137	0.25	0.83	0.01266	0.24	0.24	0.00351	0.20	0.05	0.00061	0.19	0.06	0.00070
3.2	0.08	0.01	0.00005	0.20	0.38	0.00464	0.21	0.66	0.00845	0.19	0.06	0.00070	0.25	1.45	0.02211	0.24	0.24	0.00351	0.20	0.08	0.00098	0.15	0.10	0.00092
3.4	0.15	0.01	0.00009	0.21	0.50	0.00641	0.22	0.85	0.01141	0.15	0.06	0.00055	0.20	0.76	0.00927	0.22	0.22	0.00295	0.10	0.11	0.00067	0.15	0.12	0.00110
3.6	0.06	0.02	0.00007	0.16	0.35	0.00342	0.17	0.55	0.00570	0.11	0.09	0.00060	0.23	0.12	0.00168	0.27	0.27	0.00389	0.16	0.03	0.00029	0.07	0.07	0.00030
3.65																								
3.75																0.00	NA	0.00000						
3.8	0.03	<0.01	0.00001	0.17	0.24	0.00187	0.21	0.07	0.00067	0.10	0.03	0.00014	0.00	NA	0.00000				0.15	0.03	0.00027	0.00	0.00	0.00000
3.9	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000												
4.0																			0.10	0.01	0.00006			
4.2																			0.00	NA	0.00000			
Total Stream Width (m)	3.3			3.7			3.7			3.7			3.6			3.6			3.8			3.6		
Total Discharge (m^3/s)	0.01546			0.08216			0.09180			0.01951			0.12976			0.10191			0.00849			0.01415		
Field Chemistry																								
Temp (^oC)	17.3			14.9			13.6			7.8			2.1			10.3			20.8			19.4		
pH	8.83			6.64			5.83			7.11						5.18			7.8			8.66		
EC (uS)	12			10			8			12			9			9			22			17		
DO (mg/L)	0.23			4.2			3.5			1.39			1.07			9.76			6.35			7.48		
Appearance	clear			clear, yellow			clear, yellow			clear, yellow			slightly tannic			clear, slt. Yellow			clear, slt. Yellow			clear, no colour		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
Could not advance measuring stake through stream bed
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate

Marathon PGM
Summary of Stream Field Data
Location S10

	7-Jul-08			31-Jul-08			27-Aug-08			22-Sep-08			21-Oct-08			19-Nov-08			7-May-09			10-Jun-09		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0																								
0.2										0.00	NA	0.00000				*	*	*	0.00	NA	0.00000			
0.4	0.00	NA	-	0.00	NA	0.00000	0.00	NA	0.00000	0.39	<0.01	0.00024	0.00	NA	0.00000	*	*	*	0.14	0.10	0.00126			
0.6	0.19	NM	-	0.36	<0.01	0.00022	0.33	<0.01	0.00020	0.43	<0.01	0.00026	0.33	<0.01	0.00020	*	*	*						
0.8	0.33	NM	-	0.38	<0.01	0.00023	0.57	<0.01	0.00035	0.65	<0.01	0.00040	0.54	<0.01	0.00033	*	*	*	0.28	0.03	0.00112	0.00	NA	0.00000
1.0	0.35	NM	-	0.46	<0.01	0.00028	0.58	<0.01	0.00035	0.63	<0.01	0.00038	0.58	<0.01	0.00035	*	*	*						
1.2	0.38	NM	-	0.50	<0.01	0.00031	0.61	<0.01	0.00037	0.59	<0.01	0.00036	0.17	<0.01	0.00010	*	*	*	0.30	0.36	0.01321	0.02	0.00	0.00000
1.4	0.43	NM	-	0.47	<0.01	0.00029	0.57	<0.01	0.00035	0.59	<0.01	0.00036	0.60	<0.01	0.00037	*	*	*						
1.6	0.43	NM	-	0.52	<0.01	0.00032	0.55	<0.01	0.00034	0.55	<0.01	0.00034	0.55	<0.01	0.00034	*	*	*	0.33	0.52	0.02113	0.06	0.07	0.00048
1.8	0.43	NM	-	0.52	<0.01	0.00032	0.51	<0.01	0.00031	0.55	<0.01	0.00034	0.52	<0.01	0.00032	*	*	*						
2.0	0.43	NM	-	0.49	<0.01	0.00030	0.50	<0.01	0.00031	0.56	<0.01	0.00034	0.53	<0.01	0.00032	*	*	*	0.45	0.52	0.02882	0.12	0.10	0.00144
2.2	0.45	NM	-	0.49	<0.01	0.00030	0.50	<0.01	0.00031	0.59	<0.01	0.00036	0.55	<0.01	0.00034	*	*	*						
2.3																								
2.4	0.47	NM	-	0.51	<0.01	0.00031	0.52	<0.01	0.00032	0.59	<0.01	0.00036	0.57	<0.01	0.00035	*	*	*	0.49	0.46	0.02746	0.19	0.10	0.00228
2.6	0.47	NM	-	0.53	<0.01	0.00032	0.55	<0.01	0.00034	0.61	<0.01	0.00037	0.57	<0.01	0.00035	*	*	*						
2.8	0.47	NM	-	0.53	<0.01	0.00032	0.56	<0.01	0.00034	0.60	<0.01	0.00037	0.58	<0.01	0.00035	*	*	*	0.51	0.46	0.02858	0.19	0.10	0.00228
3.0	0.48	NM	-	0.52	<0.01	0.00032	0.55	<0.01	0.00034	0.59	<0.01	0.00036	0.59	<0.01	0.00036	*	*	*						
3.2	0.47	NM	-	0.51	<0.01	0.00031	0.54	<0.01	0.00033	0.60	<0.01	0.00037	0.60	<0.01	0.00037	*	*	*	0.45	0.33	0.01801	0.13	0.03	0.00052
3.4	0.46	NM	-	0.50	<0.01	0.00031	0.54	<0.01	0.00033	0.59	<0.01	0.00036	0.59	<0.01	0.00036	*	*	*						
3.6	0.44	NM	-	0.49	<0.01	0.00030	0.53	<0.01	0.00032	0.57	<0.01	0.00035	0.55	<0.01	0.00034	*	*	*	0.40	0.72	0.03522	0.12	0.00	0.00000
3.8	0.43	NM	-	0.48	<0.01	0.00029	0.50	<0.01	0.00031	0.55	<0.01	0.00034	0.55	<0.01	0.00034	*	*	*						
4.0	0.40	NM	-	0.46	<0.01	0.00028	0.49	<0.01	0.00030	0.55	<0.01	0.00034	0.53	<0.01	0.00032	*	*	*	0.41	0.79	0.03939	0.12	0.03	0.00048
4.2	0.40	NM	-	0.46	<0.01	0.00028	0.49	<0.01	0.00030	0.58	<0.01	0.00035	0.55	<0.01	0.00034	*	*	*						
4.4	0.42	NM	-	0.49	<0.01	0.00030	0.52	<0.01	0.00032	0.61	<0.01	0.00037	0.57	<0.01	0.00035	*	*	*	0.43	0.56	0.02926	0.13	0.00	0.00000
4.6	0.45	NM	-	0.51	<0.01	0.00031	0.56	<0.01	0.00034	0.66	<0.01	0.00040	0.60	<0.01	0.00037	*	*	*						
4.8	0.50	NM	-	0.50	<0.01	0.00031	0.62	<0.01	0.00038	0.69	<0.01	0.00042	0.64	<0.01	0.00039	*	*	*	0.45	0.66	0.03602	0.17	0.10	0.00204
5.0	0.55	NM	-	0.51	<0.01	0.00031	0.64	<0.01	0.00039	0.72	<0.01	0.00044	0.67	<0.01	0.00041	*	*	*						
5.2	0.56	NM	-	0.50	<0.01	0.00031	0.67	<0.01	0.00041	0.74	<0.01	0.00045	0.70	<0.01	0.00043	*	*	*	0.55	0.52	0.03522	0.23	0.10	0.00276
5.4	0.60	NM	-	0.56	0.14	0.00478	0.70	<0.01	0.00043	0.76	<0.01	0.00046	0.72	<0.01	0.00044	*	*	*						
5.6	0.52	NM	-	0.66	<0.01	0.00040	0.72	<0.01	0.00044	0.77	<0.01	0.00047	0.74	<0.01	0.00045	*	*	*	0.59	0.98	0.07085	0.27	0.13	0.00324
5.8	0.61	NM	-	0.67	<0.01	0.00041	0.72	<0.01	0.00044	0.81	<0.01	0.00049	0.78	<0.01	0.00048	*	*	*				0.27	0.20	0.00324
6.0	0.66	NM	-	0.71	0.28	0.01213	0.76	<0.01	0.00046	0.85	<0.01	0.00052	0.80	<0.01	0.00049	*	*	*	0.63	0.43	0.03278	0.27	0.13	0.00324
6.2	0.67	NM	-	0.72	<0.01	0.00044	0.77	<0.01	0.00047	0.89	<0.01	0.00054	0.82	<0.01	0.00050	*	*	*						
6.4	0.72	NM	-	0.77	<0.01	0.00047	0.83	<0.01	0.00051	0.46	<0.01	0.00028	0.88	<0.01	0.00054	*	*	*	0.48	0.13	0.00769	0.26	0.13	0.00416
6.45																								
6.6	0.70	NM	-	0.18	<0.01	0.00011	0.44	<0.01	0.00027	0.10	<0.01	0.00006	0.28	<0.01	0.00017	*	*	*						
6.8	0.03	NM	-	0.04	0.00	0.00000	0.09	<0.01	0.00005	0.08	<0.01	0.00005	0.13	<0.01	0.00008	*	*	*	0.25	0.30	0.00901	0.12	0.07	0.00096
7.0	0.00	NA	-	0.00	NA	0.00000	0.03	NA	0.00000	0.03	<0.01	0.00002	0.07	<0.01	0.00004	*	*	*						
7.2							0.00	NA	0.00000	0.00	NA	0.00000	0.02	<0.01	0.00001	*	*	*	0.20	0.13	0.00320	0.00	NA	0.00000
7.4													0.00	NA	0.00000	*	*	*						
7.6																			0.12	0.03	0.00048			
7.8																								
8.0																			0.08	0.07	0.00064			
8.2																								
8.4																			0.06	0.03	0.00018			
8.55																								
8.6																			0.00	NA	0.00000			
Total Stream Width (m)	6.6			6.6			6.0			7.0			7.0			*			8.4			6.4		
Stake Measurement (m)	-			-			0.134			0.080			0.100			*			0.058					
Total Discharge (m^3/s)	-			0.02587			0.01100			0.01191			0.01127			*			0.43953			0.02714		
Field Chemistry																								
Temp (^{o}C)	18.5			18.3			19.2			11.2			6.2			*			8.1			11.9		
pH	6.50			7.15			7.00			7.11			7.10			*			6.82			7.11		
EC (uS)	15			17			39			17			13			*			16			16		
DO (mg/L)	2.71			5.69			4.10			4.32			3.21			*			1.16			0.34		
Appearance	slightly tannic			slightly tannic			slightly tannic			slightly tannic			slightly tannic			*			clear w/ slt. yellow			slightly yellow, clear		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
The interval that stake is located for increased precision in water height fluctuations is 1.6m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate
Downgradient beaver dam impeded the flow of water and flooded channel.
* The road was snowed in making access to Hare Lake unavailable.
Afterwards an aerial view determined that the adjacent bays to the discharge points were also frozen.

Marathon PGM
Summary of Stream Field Data
Location S10

	5-Aug-09			31-Aug-09			8-Oct-09			5-Nov-09			4-May-10			9-Jul-10			1-Sep-10		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0																					
0.2										0.00	NA	0.00000							0.00	NA	0.00000
0.4	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.07	0.09	0.00058				0.00	NA	0.00000	0.23	0.01	0.00014
0.6																0.16	0.06	0.00059	0.28	0.03	0.00051
0.8	0.20	0.13	0.00317	0.22	0.03	0.00081	0.15	0.05	0.00092	0.21	0.03	0.00077				0.21	0.04	0.00051	0.31	0.03	0.00057
1.0																0.23	0.03	0.00042	0.33	0.02	0.00040
1.2	0.22	0.10	0.00268	0.25	0.01	0.00031	0.20	0.05	0.00122	0.25	0.02	0.00061				0.25	0.07	0.00107	0.38	0.03	0.00070
1.4																0.26	0.07	0.00111	0.36	0.04	0.00088
1.6	0.24	0.11	0.00322	0.28	0.08	0.00273	0.22	0.04	0.00107	0.28	0.07	0.00239				0.24	0.1	0.00146	0.38	0.03	0.00070
1.8																0.30	0.09	0.00165	0.42	0.03	0.00077
2.0	0.29	0.09	0.00318	0.33	0.22	0.00886	0.28	0.04	0.00137	0.33	0.18	0.00725				0.32	0.1	0.00195	0.44	0.06	0.00161
2.2																0.36	0.15	0.00329	0.43	0.07	0.00184
2.3													0.00	NA	0.00000						
2.4	0.36	0.14	0.00615	0.38	0.17	0.00788	0.32	0.05	0.00195	0.38	0.23	0.01066	0.03	1.05	0.00144	0.34	0.12	0.00249	0.42	0.06	0.00154
2.6													0.03	0.53	0.00097	0.32	0.11	0.00215	0.44	0.06	0.00161
2.8	0.38	0.13	0.00603	0.39	0.22	0.01047	0.44	0.05	0.00268	0.39	0.32	0.01523	0.01	0.32	0.00020	0.35	0.11	0.00235	0.44	0.04	0.00107
3.0													0.00	NA	0.00000	0.35	0.11	0.00235	0.42	0.04	0.00102
3.2	0.34	0.22	0.00913	0.34	0.26	0.01078	0.27	0.05	0.00165	0.33	0.31	0.01248	0.00	NA	0.00000	0.33	0.13	0.00262	0.41	0.05	0.00125
3.4													0.00	NA	0.00000	0.32	0.07	0.00137	0.39	0.09	0.00214
3.6	0.30	0.22	0.00805	0.30	0.34	0.01244	0.26	0.06	0.00190	0.29	0.4	0.01415	0.00	NA	0.00000	0.33	0.08	0.00161	0.41	0.09	0.00225
3.8													0.00	NA	0.00000	0.33	0.11	0.00221	0.41	0.11	0.00275
4.0	0.30	0.10	0.00366	0.30	0.37	0.01354	0.26	0.04	0.00127	0.31	0.37	0.01399	0.00	NA	0.00000	0.32	0.07	0.00137	0.39	0.07	0.00167
4.2													0.00	NA	0.00000	0.34	0.1	0.00207	0.40	0.06	0.00146
4.4	0.32	0.23	0.00898	0.34	0.26	0.01078	0.29	0.05	0.00177	0.32	0.41	0.01601	0.00	NA	0.00000	0.35	0.06	0.00128	0.41	0.08	0.00200
4.6													0.04	0.18	0.00044	0.36	0.12	0.00264	0.49	0.05	0.00149
4.8	0.35	0.22	0.00939	0.40	0.35	0.01708	0.34	0.05	0.00207	0.38	0.36	0.01669	0.06	0.28	0.00102	0.40	0.11	0.00268	0.50	0.06	0.00183
5.0													0.09	0.47	0.00258	0.40	0.11	0.00268	0.52	0.09	0.00285
5.2	0.41	0.22	0.01100	0.45	0.35	0.01922	0.39	0.06	0.00285	0.43	0.31	0.01626	0.10	0.68	0.00415	0.44	0.14	0.00376	0.56	0.04	0.00137
5.4													0.13	1.64	0.01301	0.44	0.12	0.00322	0.59	0.05	0.00180
5.6	0.46	0.22	0.00926	0.50	0.41	0.01876	0.45	0.04	0.00220	0.50	0.34	0.02074	0.11	1.48	0.00993	0.50	0.11	0.00336	0.57	0.05	0.00174
5.8	0.47	0.17	0.00487	0.48	0.38	0.01113				0.47	0.17	0.00487	0.10	1.49	0.00909	0.49	0.06	0.00179	0.50	0.08	0.00244
6.0	0.42	0.15	0.00576	0.50	0.39	0.01784	0.43	0.04	0.00210	0.49	0.27	0.01211	0.12	0.84	0.00615	0.46	0.08	0.00224	0.54	0.1	0.00329
6.2													0.07	0.07	0.00030	0.46	0.09	0.00253	0.47	0.04	0.00115
6.4	0.45	0.02	0.00110	0.45	0.17	0.00933	0.39	0.05	0.00238	0.42	0.06	0.00307	0.02	0.02	0.00002	0.42	0.1	0.00256	0.41	0.02	0.00050
6.45													0.00	NA	0.00000						
6.6																0.34	0.09	0.00187	0.45	0.03	0.00082
6.8	0.29	0.05	0.00177	0.31	0.08	0.00303	0.28	0.05	0.00171	0.27	0.02	0.00066				0.28	0.12	0.00205	0.30	0.05	0.00092
7.0																0.23	0.07	0.00098	0.27	0.05	0.00082
7.2	0.12	NA	0.00000	0.14	0.01	0.00017	0.16	0.04	0.00078	0.14	0.03	0.00051				0.16	0.06	0.00059	0.00	NA	0.00000
7.4																0.14	0.07	0.00060			
7.6	0.08	NA	0.00000	0.10	0.01	0.00012	0.05	0.04	0.00031	0.11	0.04	0.00054				0.08	0.00	0.00000			
7.8																0.00	NA	0.00000			
8.0	0.01	NA	0.00000	0.04	0.00	0.00000				0.02	NA	0.00000									
8.2							0.00	NA	0.00000												
8.4	0.00	NA	0.00000	0.00	NA	0.00000				0.00	NA	0.00000									
8.55																					
8.6																					
Total Stream Width (m)	8.0			8.0			7.8			8.2			2.30			7.40			7.00		
Stake Measurement (m)				0.480			0.480			0.480											
Total Discharge (m^3/s)	0.09742			0.17528			0.03020			0.16957			0.04929			0.06746			0.04790		
Field Chemistry																					
Temp (^{o}C)	15.2			14.7			9.2			3			11.2			18.6			22.8		
pH	6.18			6.01			7.33			5.20			7.63			6.68			7.55		
EC (uS)	13			15			13			12			9			18			-		
DO (mg/L)	3.15			2.27			1.58			1.39			10.07			7.73			6.73		
Appearance	clear slt. yellow			clear. yellow			clear slightly tannic			clear slightly tannic			clear, slightly yellow			clear, slightly yellow			clear, slightly cloudy		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
The interval that stake is located for increased precision in water height fluctuations is 1.6m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate
Downgradient beaver dam impeded the flow of water and flooded channel.
* The road was snowed in making access to Hare Lake unavailable.
Afterwards an aerial view determined that the adjacent bays to the discharge points were also frozen.

Marathon PGM
Summary of Stream Field Data
Location S11

	3-Jul-08			28-Jul-08			25-Aug-08			22-Sep-08			21-Oct-08			21-Nov-08			21-Nov-08			8-May-09		
Distance Panel (m)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)
0																								
0.7	0.00	NA	-	0.00	NA	0.00000																		
1.2										0.00	NA	0.00000												
1.3							0.00	NA	0.00000				0.00	NA	0.00000							0.00	NA	0.00000
1.4	0.43	NM	-	0.12	0.27	0.00692	0.07	<0.01	0.00009	0.12	<0.01	0.00016	0.14	<0.01	0.00017	0.00	NA	0.00000	*	*	*	0.44	0.09	0.00483
2.1	0.40	NM	-	0.11	0.08	0.00188	0.06	0.49	0.00628	0.11	<0.01	0.00023	0.13	0.50	0.01388	0.22	0.92	0.04321	*	*	*	0.43	0.58	0.05325
2.8	0.47	NM	-	0.10	1.09	0.02327	0.10	0.96	0.02050	0.12	0.88	0.02255	0.15	1.20	0.03843	0.24	1.95	0.09992	*	*	*	0.40	0.87	0.07430
3.5	0.47	NM	-	0.10	0.34	0.00726	0.03	0.27	0.00173	0.14	0.43	0.01285	0.15	0.85	0.02722	0.20	2.39	0.10205	*	*	*	0.34	1.09	0.07912
4.2	0.39	NM	-	0.08	0.62	0.01059	0.05	<0.01	0.00011	0.09	0.84	0.01614	0.11	0.99	0.02325	0.20	1.97	0.08412	*	*	*	0.47	1.28	0.12844
4.9	0.39	NM	-	0.14	0.25	0.00747	0.08	<0.01	0.00017	0.14	0.46	0.01375	0.17	0.51	0.01851	0.23	2.06	0.10116	*	*	*	0.42	1.44	0.12912
5.6	0.33	NM	-	0.13	0.79	0.02193	0.09	0.33	0.00634	0.16	1.01	0.03450	0.10	1.18	0.02519	0.15	2.31	0.07398	*	*	*	0.45	0.80	0.07686
6.3	0.35	NM	-	0.08	0.52	0.00888	0.03	NA	0.00000	0.19	0.43	0.01744	0.10	0.66	0.01409	0.60	1.53	0.19599	*	*	*	0.36	1.00	0.07686
7.0	0.29	NM	-	0.02	NA	0.00000	0.00	NA	0.00000	0.03	NA	0.00000	0.04	NA	0.00000	0.12	0.98	0.02511	*	*	*	0.34	1.07	0.07767
7.7	0.22	NM	-	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.03	NA	0.00000	*	*	*	0.24	1.27	0.06507
8.4	0.24	NM	-	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.06	0.68	0.00871	*	*	*	0.24	1.32	0.06764
9.1	0.22	NM	-	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.05	NA	0.00000	*	*	*	0.25	1.12	0.05978
9.8	0.42	NM	-	0.04	NA	0.00000	0.00	NA	0.00000	0.05	NA	0.00000	0.10	<0.01	0.00021	0.21	0.35	0.01569	*	*	*	0.37	0.82	0.06478
10.5	0.55	NM	-	0.12	0.25	0.00640	0.01	NA	0.00000	0.16	<0.01	0.00034	0.22	0.51	0.02395	0.28	1.14	0.06815	*	*	*	0.50	1.21	0.12917
11.2	0.68	NM	-	0.28	0.43	0.02571	0.19	<0.01	0.00041	0.31	0.53	0.03508	0.35	0.74	0.05530	0.47	1.62	0.16256	*	*	*	0.70	0.65	0.09714
11.9	0.76	NM	-	0.42	0.88	0.07891	0.30	0.26	0.01665	0.45	0.90	0.08647	0.48	1.29	0.13220	0.57	1.37	0.16672	*	*	*	0.80	0.65	0.11102
12.6	0.66	NM	-	0.30	0.66	0.03170	0.21	0.22	0.00740	0.32	0.65	0.04441	0.33	1.40	0.09864	0.54	1.60	0.18446	*	*	*	0.70	0.82	0.12255
12.95				0.00	NA	0.00000	0.00	NA	0.00000										*	*	*			
13.10																								
13.3	0.26	NM	-							0.00	NA	0.00000	0.00	NA	0.00000	0.11	<0.01	0.00017	*	*	*	0.35	0.27	0.02018
13.6																0.00	NA	0.00000	*	*	*			
13.8																								
14.0	0.00	NA	-																			0.00	NA	0.00000
14.1																								
Total Stream Width (m)	13.3			12.3			11.7			12.1			12.0			12.2						12.7		
Total Discharge (m^3/s)	-			0.231			0.060			0.284			0.471			1.332						1.438		
Field Chemistry																								
Temp (^oC)	16.1			23.5			20.9			14.0			9.0			2.3			3.3			-		
pH	7.40			7.46			8.20			7.33			7.60			7.68			7.86			-		
EC (uS)	15			22			25			31			23			27			0			-		
DO (mg/L)	0.97			5.60			6.78			4.73			3.84			3.87			0.64			-		
Appearance	clear			clear			clear			clear			clear			clear			clear			-		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
The interval that stake is located for increased precision in water height fluctuations is 5.6m
Logger set 5/3/10 at distance of 11.2m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate
* Lake still partially frozen cannot assess flow

Marathon PGM
Summary of Stream Field Data
Location S11

	8-Jun-09			20-Jul-09			7-Aug-09			31-Aug-09			5-Oct-09			5-Nov-09			3-May-10			2-Jun-10		
Distance Panel (m)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity **(m/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)
0																								
0.7																								
1.2																								
1.3	0.00	NA	0.00000							0	NA	0.00000	0.00	NA	0.00000				0.00	NA	0.00000			
1.4	0.60	0.30	0.02196	0.00	NA	0.00000	0.00	NA	0.00000	0	0.20	0.01074	0.13	NA	0.00000	0.00	NA	0.00000	0.15	0.04	0.00073	0.00	NA	0.00000
2.1	0.15	0.42	0.01345	0.13	0.13	0.01183	0.21	0.77	0.03452	0.23	1.52	0.07464	0.12	0.39	0.00999	0.31	1.21	0.08008	0.08	0.66	0.01127	0.10	0.43	0.00918
2.8	0.19	1.22	0.04949	0.08	0.29	0.01624	0.24	1.11	0.05688	0.43	3.15	0.28919	0.08	0.40	0.00683	0.23	2.13	0.10459	0.09	1.06	0.02037	0.05	0.65	0.00694
3.5	0.06	1.14	0.01460	0.03	0.29	0.00609	0.09	1.48	0.02844	0.43	2.62	0.24053	0.03	NA	0.00000	0.17	2.30	0.08348	0.05	0.82	0.00875	0.03	NA	0.00000
4.2	0.12	0.85	0.02178	0.10	0.20	0.01400	0.21	1.15	0.05156	0.41	2.42	0.21183	0.09	0.45	0.00865	0.22	2.36	0.11085	0.17	0.82	0.02976	0.13	0.42	0.01166
4.9	0.08	0.49	0.00837	0.11	0.30	0.02310	0.17	1.06	0.03847	0.35	2.76	0.20624	0.08	0.46	0.00786	0.21	1.96	0.08788	0.10	0.86	0.01836	0.07	0.17	0.00254
5.6	0.12	0.51	0.01307	0.08	0.16	0.00896	0.12	0.98	0.02511	0.35	2.92	0.21820	0.06	0.10	0.00128	0.20	1.94	0.08284	0.09	0.64	0.01230	0.06	0.39	0.00500
6.3	0.07	0.49	0.00732	0.09	0.15	0.00945	0.14	0.70	0.02092	0.38	3.13	0.25394	0.07	0.40	0.00598	0.20	1.48	0.06320	0.09	0.53	0.01018	0.05	0.24	0.00256
7.0	0.02	0.17	0.00073	0.06	0.01	0.00042	0.10	0.16	0.00342	0.28	3.05	0.18233	0.00	NA	0.00000	0.17	1.32	0.04791	0.01	NA	0.00000	0.00	NA	0.00000
7.7	0.00	NA	0.00000	0.00	NA	0.00000	0.01	NA	0.00000	0.24	4.05	0.20752	0.00	NA	0.00000	0.10	1.00	0.02135	0.10	NA	0.00000	0.00	NA	0.00000
8.4	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.24	3.21	0.16448	0.00	NA	0.00000	0.03	NA	0.00000	0.03	NA	0.00000	0.00	NA	0.00000
9.1	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.18	1.60	0.06149	0.00	NA	0.00000	0.07	1.98	0.02959	0.07	NA	0.00000	0.00	NA	0.00000
9.8	0.05	0.03	0.00032	0.03	0.00	0.00000	0.10	0.66	0.01409	0.42	3.02	0.27080	0.00	NA	0.00000	0.19	0.92	0.03732	0.01	NA	0.00000	0.00	NA	0.00000
10.5	0.15	0.02	0.00064	0.08	0.02	0.00112	0.17	0.70	0.02541	0.53	2.25	0.25460	0.08	NA	0.00000	0.30	1.71	0.10953	0.15	0.20	0.00640	0.05	NA	0.00000
11.2	0.32	0.82	0.05602	0.30	0.14	0.02940	0.42	1.42	0.12733	0.64	2.30	0.31427	0.26	0.50	0.02776	0.47	2.31	0.23180	0.34	0.55	0.03992	0.21	NA	0.00000
11.9	0.48	1.12	0.11478	0.39	0.32	0.08736	0.50	1.65	0.17614	0.82	2.54	0.44468	0.30	0.74	0.04740	0.60	1.57	0.20112	0.42	0.35	0.03138	0.35	0.75	0.05604
12.6	0.02	0.70	0.00363	0.02	<0.01	0.00014	0.02	<0.01	0.00004	0.83	1.32	0.23391	0.42	1.29	0.11567	0.54	3.50	0.40352	0.00	0.00	0.00000	0.00	NA	0.00000
12.95																								
13.10																								
13.3				0.00	NA	0.00000	0.09	0.89	0.01710	0.30	1.20	0.07686	0.02	NA	0.00000	0.21	0.88	0.03945	0.07	0.65	0.00971	0.04	0.65	0.00555
13.6	0.00	NA	0.00000																					
13.8																								
14.0							0.00	NA	0.00000	0	NA	0.00000	0.00	NA	0.00000	0.00	0.00	0.00000	0.00	NA	0.00000	0.00	NA	0.00000
14.1																								
Total Stream Width (m)	12.3			11.9			12.6			12.7			12.7			12.6			12.7			12.6		
Total Discharge (m^3/s)	0.326			0.208			0.619			3.716			0.231			1.734			0.199			0.099		
Field Chemistry																								
Temp (^oC)	10.0			19.7			-			16.4			10.8			4.7			8.1			16.6		
pH	6.76			7.95			-			8.35			7.68			5.74			10.16			7.24		
EC (uS)	16			21			-			17			19			13			14			39		
DO (mg/L)	0.29			1.97			-			3.57			2.38			1.93			11.27			9.45		
Appearance	clear w/ slightly yellow			clear			-			clear			clear			clear			clear			clear		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
The interval that stake is located for increased precision in water height fluctuations is 5.6m
Logger set 5/3/10 at distance of 11.2m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate
* Lake still partially frozen cannot assess flow

Marathon PGM
Summary of Stream Field Data
Location S11

	8-Jul-10			2-Sep-10			12-May-11			29-Jul-11			31-Oct-11		
Distance Panel (m)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m3/s)	Depth (m)	Velocity (ft/s)	Flow (m3/s)	Depth (m)	Velocity (ft/s)	Flow (m3/s)
0															
0.7															
1.2															
1.3				0.00	NA	0.00000	0	0	0.00000	0	NA	0.00000	0	0	0.00000
1.4	0.00	NA	0.00000	0.11	0.02	0.00000	0.47	1.05	0.06021	0.07	0.05	0.00043	0.1	0.33	0.00403
2.1	0.12	0.64	0.01640	0.09	0.22	0.00423	0.44	1.25	0.11743	0.06	0.36	0.00461	0.08	1.23	0.02101
2.8	0.13	1.31	0.03636	0.07	0.88	0.01315	0.53	3.99	0.45149	0.04	0.59	0.00504	0.07	0.44	0.00658
3.5	0.11	0.91	0.02137	0.09	0.35	0.00673	0.43	3.24	0.29745	0.06	0.18	0.00231	0.11	0.58	0.01362
4.2	0.21	0.80	0.03587	0.10	0.51	0.01089	0.45	3.52	0.33818	0.07	0.24	0.00359	0.1	0.47	0.01003
4.9	0.12	0.83	0.02126	0.06	0.15	0.00192	0.44	2.52	0.23673	0.05	0.19	0.00203	0.09	0.8	0.01537
5.6	0.12	0.85	0.02178	0.09	0.18	0.00346	0.44	2.71	0.25458	0.03	0.13	0.00083	0.08	0.37	0.00632
6.3	0.12	0.94	0.02408	0.06	0.22	0.00282	0.43	2.65	0.24328	0.04	0.09	0.00077	0.03	0	0.00000
7.0	0.04	0.47	0.00401	0.00	0.00	0.00000	0.37	3.15	0.24883	0	NA	0.00000	0	0	0.00000
7.7	0.00	NA	0.00000	0.00	0.00	0.00000	0.32	3.9	0.26645	0	NA	0.00000	0	0	0.00000
8.4	0.00	NA	0.00000	0.00	0.00	0.00000	0.3	2.94	0.18831	0	NA	0.00000	0	0	0.00000
9.1	0.00	NA	0.00000	0.00	0.00	0.00000	0.25	1.81	0.09661	0	NA	0.00000	0	0	0.00000
9.8	0.07	0.03	0.00045	0.06	0.00	0.00000	0.4	1.25	0.10675	0	NA	0.00000	0.13	0	0.00000
10.5	0.20	0.31	0.01324	0.22	0.05	0.00235	0.54	2.24	0.25825	0.02	0.04	0.00017	0.25	0.46	0.02455
11.2	0.34	1.15	0.08348	0.34	0.65	0.04718	0.65	1.67	0.23175	0.17	0.09	0.00327	0.3	0.81	0.05188
11.9	0.46	1.90	0.18660	0.45	1.07	0.10280	0.77	2.11	0.34687	0.31	0.3	0.01986	0	0	0.00000
12.6	0.00	NA	0.00000	0.00	0.00	0.00000	0.44	3.2	0.30061	0	NA	0.00000	0.36	0.7	0.04612
12.95															
13.10													0	0	0
13.3	0.90	0.52	0.09992	0.00	NA	0.00000	0.75	0.94	0.15052	0.1	0.68	0.01037			
13.6										0.64	0.22	0.01074			
13.8										0.0	NA	0.00000			
14.0	0.00	NA	0.00000				0.140	1.370	0.02340						
14.1							0	0	0.00000						
Total Stream Width (m)	12.6			12.0			12.8			12.5			11.8		
Total Discharge (m^3/s)	0.565			0.196			4.217693			0.063108			0.199507		
Field Chemistry															
Temp (^oC)	21.2			22.5			7.8			19.3			6.1		
pH	7.27			6.92			7.58			7.68			7.61		
EC (uS)	19			-			19			20			18		
DO (mg/L)	7.72			7.92			9.46			7.61			6.82		
Appearance	clear			clear			clear			clear			clear		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
The interval that stake is located for increased precision in water height fluctuations is 5.6m
Logger set 5/3/10 at distance of 11.2m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate
* Lake still partially frozen cannot assess flow

Marathon PGM
Summary of Stream Field Data
Location S12

	3-Jul-08			28-Jul-08			28-Aug-08			24-Sep-08			23-Oct-08			20-Nov-08			28-May-09			10-Jun-09		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0																								
0.2																								
0.4	0.00	NA	-																0.00	NA	0.00000	0.00	NA	0.00000
0.6	0.40	NM	-	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.57	0.43	0.01483	0.19	0.16	0.00190
0.8	0.40	NM	-	0.16	0.32	0.00312	0.13	0.25	0.00198	0.19	0.38	0.00440	0.22	0.37	0.00497	0.27	0.35	0.00576	0.58	0.89	0.03134	0.22	0.23	0.00308
1.0	0.37	NM	-	0.12	0.27	0.00198	0.11	<0.01	0.00007	0.17	0.56	0.00581	0.21	0.37	0.00474	0.25	0.55	0.00839	0.54	1.15	0.03782	0.19	0.30	0.00342
1.2	0.36	NM	-	0.09	0.31	0.00170	0.06	<0.01	0.00004	0.11	0.50	0.00336	0.14	0.43	0.00367	0.20	0.50	0.00610	0.50	0.98	0.03002	0.17	0.33	0.00340
1.4	0.29	NM	-	0.03	0.00	0.00000	0.00	NA	0.00000	0.06	0.37	0.00135	0.09	0.38	0.00209	0.13	0.36	0.00285	0.48	1.28	0.03746	0.14	0.49	0.00420
1.6	0.25	NM	-	0.00	NA	0.00000				0.05	0.00	0.00000	0.07	0.39	0.00167	0.11	0.45	0.00302	0.44	0.92	0.02466	0.08	0.46	0.00224
1.8	0.22	NM	-							0.02	0.00	0.00000	0.03	0.00	0.00000	0.09	0.35	0.00192	0.46	1.12	0.03130	0.09	0.39	0.00216
2.0	0.20	NM	-							0.00	NA	0.00000	0.02	NA	0.00000	0.08	<0.01	0.00005	0.44	0.66	0.01761	0.03	<0.01	0.00002
2.2	0.19	NM	-										0.00	NA	0.00000	0.06	<0.01	0.00004	0.39	0.85	0.02029	0.01	<0.01	0.00001
2.4	0.15	NM	-													0.04	NA	0.00000	0.36	0.72	0.01585	0.00	NA	0.00000
2.45																								
2.6	0.11	NM	-													0.00	NA	0.00000	0.35	0.62	0.01331			
2.8	0.10	NM	-																0.30	0.46	0.00841			
2.95																								
3.0	0.01	NM	-																0.23	0.49	0.00690			
3.2	0.00	NA	-																0.16	0.16	0.00160			
3.4																			0.15	0.30	0.00270			
3.6																			0.14	0.10	0.00084			
3.8																			0.00	NA	0.00000			
4.0																								
Total Stream Width (m)	2.8			1.0			0.8			1.4			1.6			2.0			3.4			2.0		
Stake Measurement (m)	-			-			0.720			0.660			0.634			0.580			0.540			0.190		
Total Discharge (m^3/s)	-			0.00680			0.00209			0.01492			0.01713			0.02813			0.29495			0.02044		
Field Chemistry																								
Temp (^{o}C)	16.9			23.8			16.1			16.9			3.7			2.2			7.8			11.4		
pH	6.65			7.25			7.43			7.40			7.32			7.67			7.45			7.23		
EC (uS)	27			49			57			22			25			24			17			62		
DO (mg/L)	1.19			5.12			5.75			3.44			4.54			5.04			1.3			0.37		
Appearance	slightly tannic			slightly tannic			slightly tannic			tannic			tannic			slightly tannic			slightly yellow			slightly yellow		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
The interval that stake is located for increased precision in water height fluctuations is 1.0m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate

Marathon PGM
Summary of Stream Field Data
Location S12

	20-Jul-09			5-Aug-09			1-Sep-09			6-Oct-09			4-Nov-09			5-May-10			15-Jul-10			30-Aug-10		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0																								
0.2																								
0.4																						0.00	NA	0.00000
0.6	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.14	0.30	0.00256
0.8	0.16	0.29	0.00283	0.24	0.40	0.00586	0.30	0.70	0.01281	0.21	0.30	0.00384	0.42	0.76	0.01947	0.35	0.69	0.01473	0.13	0.04	0.00032	0.13	0.22	0.00174
1.0	0.13	0.39	0.00309	0.21	0.56	0.00717	0.27	0.73	0.01202	0.18	0.32	0.00351	0.36	0.72	0.01581	0.29	0.62	0.01097	0.10	0.09	0.00055	0.12	0.32	0.00234
1.2	0.10	0.18	0.00110	0.19	0.56	0.00649	0.24	0.60	0.00878	0.14	0.36	0.00307	0.36	0.65	0.01427	0.28	0.51	0.00871	0.08	0.10	0.00049	0.08	0.34	0.00166
1.4	0.04	0.08	0.00020	0.12	0.59	0.00432	0.19	0.77	0.00892	0.06	0.32	0.00117	0.29	0.62	0.01097	0.23	0.50	0.00702	0.04	0.00	0.00000	0.04	0.20	0.00049
1.6	0.01	<0.01	0.00001	0.10	0.62	0.00378	0.16	0.74	0.00722	0.06	0.35	0.00128	0.28	0.64	0.01093	0.21	0.66	0.00845	0.00	NA	0.00000	0.01	NA	0.00000
1.8	0.00	NA	0.00000	0.07	0.62	0.00265	0.12	0.62	0.00454	0.02	NA	0.00000	0.25	0.62	0.00946	0.17	0.60	0.00622	0.00	NA	0.00000	0.00	NA	0.00000
2.0				0.06	0.50	0.00183	0.11	0.54	0.00362	0.00	NA	0.00000	0.23	0.60	0.00842	0.17	0.57	0.00591	0.00	NA	0.00000			
2.2				0.02	<0.01	0.00001	0.08	0.60	0.00293				0.20	0.57	0.00695	0.14	0.42	0.00359	0.00	NA	0.00000			
2.4				0.01	<0.01	0.00000	0.06	0.44	0.00161				0.18	0.50	0.00549	0.12	0.34	0.00249	0.00	NA	0.00000			
2.45				0.00	NA	0.00000																		
2.6							0.04	NA	0.00000				0.16	0.40	0.00390	0.10	0.30	0.00183	0.00	NA	0.00000			
2.8							0.00	NA	0.00000				0.13	0.2	0.00159	0.06	0.1	0.00032						
2.95																0.00	NA	0.00000						
3.0													0.00	NA	0.00000									
3.2																								
3.4																								
3.6																								
3.8																								
4.0																								
Total Stream Width (m)	1.2			2.0			2.2			1.4			2.4			2.4			2.0			1.4		
Stake Measurement (m)																								
Total Discharge (m^3/s)	0.00722			0.03211			0.06246			0.01288			0.10568			0.07024			0.00135			0.00880		
Field Chemistry																								
Temp (^oC)	16.6			17.1			15.6			15.6			2.2			8.0			19.5			24.5		
pH	7.25			7.56			7.23			7.23			6.67			8.15			7.75			7.27		
EC (uS)	38			19			16			16			12			21			56			84		
DO (mg/L)	1.55			5.23			2			2			1.31			11.19			6.55			-		
Appearance	slt. yellow, clear			clear, yellow			clear, yellow			clear, yellow			slight tannic			clear, slt. Yellow			clear, slt. Yellow, trace SS			clear, yellow		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
The interval that stake is located for increased precision in water height fluctuations is 1.0m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate

Marathon PGM
Summary of Stream Field Data
Location S13

	2-Jul-08			31-Jul-08			27-Aug-08			23-Sep-08			22-Oct-08			20-Nov-08			6-May-09			9-Jun-09		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0																								
0.2																								
0.4																								
0.6																								
0.8	0.00	NA	-	0.00	NA	-	DRY	NA	NA				0.00	NA	0.00000		FROZEN							
0.9										0.00	NA	0.00000					FROZEN							
1.0	0.04	NM	-	0.04	NA	-	DRY	NA	NA	0.10	<0.01	0.00005	0.08	<0.01	0.00005		FROZEN							
1.2	0.02	NM	-	0.04	NA	-	DRY	NA	NA	0.07	<0.01	0.00003	0.07	<0.01	0.00004		FROZEN							
1.3				0.00	NA	-	DRY	NA	NA								FROZEN							
1.4							DRY	NA	NA	0.00	NA	0.00000					FROZEN							
1.4	0.00	NA	-				DRY	NA	NA				0.01	NA	0.00000		FROZEN							
1.6													0.00	NA	0.00000		FROZEN							
1.8																								
2.0																								
Total Stream Width (m)	0.6			0.5			-			0.5			0.8			-			-			-		
Stake Measurement (m)	-			-			-			0.890			0.882			-			-			-		
Total Discharge (m^3/s)	-			-			-			0.00009			0.00009			-			-			-		
Field Chemistry																								
Temp (^{o}C)	14.6			15.0			-			14.7			5.8			-			5.9			11.7		
pH	4.59			6.37			-			5.75			6.21			-			6.31			6.86		
EC (uS)	11			9			-			12			10			-			12			12		
DO (mg/L)	1.29			6.80			-			4.77			3.83			-			1.30			0.68		
Appearance	slightly tannic			slightly tannic			-			slightly tannic			clear			-			No Longer Representative			Clear		

	21-Jul-09			6-Aug-09			2-Sep-09			6-Oct-09			3-Nov-09			7-May-10			14-Jul-10			30-Aug-10		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0																								
0.2																								
0.4																								
0.6																								
0.8																								
0.9																								
1.0																								
1.2																								
1.3																								
1.4																								
1.4																								
1.6																								
1.8																								
2.0																								
Total Stream Width (m)	-			-			-			-			-			-			-			-		
Stake Measurement (m)	-			-			-			-			-			-			-			-		
Total Discharge (m^3/s)	-			-			-			-			-			-			-			-		
Field Chemistry																								
Temp (^{o}C)	13.7			15.7			17.0			9.8			2.1			3.6			26.0			28.5		
pH	7.01			5.9			5.16			7.07			4.31			4.46			8.6			6.95		
EC (uS)	8			10			14			17			12			13			24			18		
DO (mg/L)	2.38			4.77			6.03			1.77			2.10			9.18			7.10			-		
Appearance	clear slt. Orange			clear, yellow			clear, yellow			clear, slt. Brn			sl. tannic			clear, slt. Yellow			Lots of organics			Floating organics, rusty coloured		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
FROZEN - The stream channel was frozen right to the streambed
Upgradient beaver dam has diverted stream flow towards another channel leaving the target stream very low
The lower limit of the flow meter is 0.01ft/s
The interval that stake is located for increased precision in water height fluctuations is 1.2m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate

Marathon PGM
Summary of Stream Field Data
Location S14

	2-Jul-08			28-Jul-08			25-Aug-08			22-Sep-08			21-Oct-08			21-Nov-08			5-May-09			8-Jun-09		
Distance Panel (m)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)
0																								
0.2																								
0.4																								
0.6																								
0.8													0.00	NA	0.00000									
1.0													0.28	<0.01	0.00017	0.00	NA	0.00000				0.00	NA	0.00000
1.15										0.00	NA	0.00000												
1.2	0.00	NA	-	0.00	NA	0.00000				0.14	<0.01	0.00005	0.35	<0.01	0.00021	0.02	NA	0.00000	0.00	NA	0.00000	0.26	0.05	0.00079
1.3							0.00	NA	0.00000															
1.4	0.06	NM	-	0.09	<0.01	0.00005	0.12	<0.01	0.00005	0.29	<0.01	0.00018	0.42	<0.01	0.00026	0.09	<0.01	0.00005	0.03	NA	0.00000	0.33	0.04	0.00081
1.5																								
1.6	0.15	NM	-	0.19	<0.01	0.00012	0.65	<0.01	0.00040	0.78	<0.01	0.00048	0.47	<0.01	0.00029	0.14	<0.01	0.00009	0.12	0.79	0.00576	0.37	0.07	0.00158
1.8	0.39	NM	-	0.66	<0.01	0.00040	0.63	<0.01	0.00038	0.77	<0.01	0.00047	0.89	<0.01	0.00054	0.56	<0.01	0.00034	0.56	0.46	0.01569	0.80	0.03	0.00146
2.0	0.58	NM	-	0.60	<0.01	0.00037	0.46	<0.01	0.00028	0.76	<0.01	0.00046	0.82	<0.01	0.00050	0.49	<0.01	0.00030	0.52	0.10	0.00312	0.79	0.05	0.00241
2.2	0.54	NM	-	0.56	<0.01	0.00034	0.55	<0.01	0.00034	0.68	<0.01	0.00041	0.74	<0.01	0.00045	0.41	<0.01	0.00025	0.50	0.07	0.00200	0.68	0.07	0.00290
2.4	0.45	NM	-	0.49	<0.01	0.00030	0.53	<0.01	0.00032	0.53	<0.01	0.00032	0.75	<0.01	0.00046	0.42	<0.01	0.00026	0.40	1.25	0.03042	0.72	0.04	0.00176
2.6	0.58	NM	-	0.63	<0.01	0.00038	0.62	<0.01	0.00038	0.77	<0.01	0.00047	0.92	<0.01	0.00056	0.59	<0.01	0.00036	0.48	1.12	0.03266	0.72	0.07	0.00307
2.8	0.68	NM	-	0.66	<0.01	0.00040	0.71	<0.01	0.00043	0.84	<0.01	0.00051	0.94	<0.01	0.00057	0.61	<0.01	0.00037	0.57	0.69	0.02396	0.77	0.02	0.00094
3.0	0.37	NM	-	0.69	<0.01	0.00042	0.67	<0.01	0.00041	0.69	<0.01	0.00042	0.96	<0.01	0.00059	0.63	<0.01	0.00038	0.56	1.02	0.03474	0.82	0.10	0.00500
3.2	0.48	NM	-	0.66	<0.01	0.00040	0.45	<0.01	0.00027	0.80	<0.01	0.00049	0.93	<0.01	0.00057	0.60	<0.01	0.00037	0.53	1.18	0.03819	0.75	0.05	0.00229
3.4	0.48	NM	-	0.51	<0.01	0.00031	0.51	<0.01	0.00031	0.77	<0.01	0.00047	0.94	<0.01	0.00057	0.61	<0.01	0.00037	0.59	1.02	0.03660	0.70	0.09	0.00384
3.6	0.42	NM	-	0.57	<0.01	0.00035	0.49	<0.01	0.00030	0.64	<0.01	0.00039	0.80	<0.01	0.00049	0.47	<0.01	0.00029	0.54	0.92	0.03026	0.72	0.06	0.00264
3.8	0.53	NM	-	0.37	<0.01	0.00023	0.30	<0.01	0.00018	0.68	<0.01	0.00041	0.83	<0.01	0.00051	0.50	<0.01	0.00031	0.43	0.07	0.00172	0.73	0.07	0.00312
4.0	0.31	NM	-	0.51	<0.01	0.00031	0.32	<0.01	0.00020	0.68	<0.01	0.00041	0.83	<0.01	0.00051	0.50	<0.01	0.00031	0.48	0.03	0.00096	0.69	0.02	0.00084
4.2	0.46	NM	-	0.33	<0.01	0.00020	0.52	<0.01	0.00020	0.66	<0.01	0.00040	0.78	<0.01	0.00048	0.45	<0.01	0.00027	0.26	0.56	0.00885	0.67	0.00	0.00000
4.25							0.00	NA	0.00000															
4.3																								
4.4	0.00	NA	-	0.21	<0.01	0.00013				0.00	NA	0.00000	0.06	<0.01	0.00004	0.00	NA	0.00000	0.41	0.79	0.01969	0.02	NA	0.00000
4.6				0.00	NA	0.00000							0.02	<0.01	0.00002				0.00	0.00	0.00000	0.00	NA	0.00000
4.8																								
4.9													0.00	NA	0.00000									
Total Stream Width (m)	3.2			3.4			3.0			3.3			4.1			3.4			3.4			3.6		
Total Discharge (m^3/s)	-			0.005			0.004			0.006			0.008			0.004			0.285			0.033		
Field Chemistry																								
Temp (^oC)	12.8			20.3			18.5			11.6			5.7			0			11.6			15.2		
pH	6.71			7.27			7.67			7.33			7.45			7.30			7.02			7.33		
EC (uS)	17			69			87			50			45			47			18			35		
DO (mg/L)	1.77			4.82			5.21			4.45			4.19			4.21			0.73			0.27		
Appearance	slightly tannic			slightly tannic			slightly tannic			tannic			slightly tannic			slightly tannic			clear			clear slightly yellow tinge		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
Downgradient beaver dam is impeding natural water flow
The interval that stake is located for increased precision in water height fluctuations is 2.6m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate

Marathon PGM
Summary of Stream Field Data
Location S14

	21-Jul-09			7-Aug-09			3-Sep-09			5-Oct-09			5-Nov-09			3-May-10			31-May-10			8-Jul-10		
Distance Panel (m)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)
0																								
0.2																								
0.4																								
0.6																								
0.8										0.00	NA	0.00000				0.00	NA	0.00000						
1.0	0.00	NA	0.00000							0.10	NA	0.00000				0.01	NA	0.00000						
1.15				0.00	NA	0.00000	0.00	NA	0.00000															
1.2	0.17	0.03	0.00031	0.06	0.03	0.00007	0.06	0.03	0.00007	0.12	0.02	0.00015	0.00	NA	0.00000	0.05	0.00	0.00000						
1.3																								
1.4	0.23	0.03	0.00042	0.22	0.04	0.00054	0.27	0.06	0.00099	0.15	0.03	0.00027	0.24	0.00	0.00000	0.22	0.06	0.00081						
1.5																						0.00	NA	0.00000
1.6	0.66	0.02	0.00081	0.27	0.05	0.00082	0.30	0.03	0.00055	0.27	0.08	0.00132	0.32	0.04	0.00078	0.64	0.09	0.00351				0.44	0.01	0.00020
1.8	0.60	0.03	0.00110	0.67	0.02	0.00082	0.49	0.06	0.00179	0.47	0.10	0.00287	0.61	0.15	0.00558	0.28	0.07	0.00120	0.00	NA	0.00000	0.49	0.07	0.00209
2.0	0.52	0.06	0.00190	0.65	0.06	0.00238	0.70	0.07	0.00299	0.59	0.03	0.00108	0.76	0.03	0.00139	0.62	0.08	0.00303	0.41	0.00	0.00000	0.42	0.00	0.00000
2.2	0.58	0.04	0.00142	0.68	0.02	0.00083	0.65	0.08	0.00317	0.62	0.01	0.00038	0.69	0.11	0.00463	0.64	0.03	0.00117	0.37	0.01	0.00023	0.36	0.00	0.00000
2.4	0.61	0.07	0.00260	0.65	0.11	0.00436	0.66	0.18	0.00725	0.66	0.11	0.00443	0.73	0.34	0.01514	0.62	0.25	0.00946	0.39	0.00	0.00000	0.46	0.41	0.01150
2.6	0.54	0.06	0.00198	0.61	0.13	0.00484	0.65	0.19	0.00753	0.70	0.05	0.00214	0.71	0.22	0.00953	0.65	0.39	0.01546	0.40	0.02	0.00049	0.39	0.33	0.00785
2.8	0.61	0.08	0.00298	0.67	0.13	0.00531	0.70	0.17	0.00726	0.67	0.06	0.00245	0.76	0.21	0.00974	0.67	0.32	0.01308	0.41	0.00	0.00000	0.45	0.06	0.00165
3.0	0.64	0.10	0.00390	0.72	0.11	0.00483	0.70	0.09	0.00384	0.64	0.06	0.00234	0.76	0.47	0.02179	0.68	0.15	0.00622	0.42	0.08	0.00205	0.45	0.23	0.00631
3.2	0.69	0.10	0.00421	0.52	0.08	0.00254	0.62	0.11	0.00416	0.56	0.11	0.00376	0.63	0.28	0.01068	0.64	0.18	0.00703	0.23	0.05	0.00070	0.35	0.24	0.00512
3.4	0.61	0.04	0.00149	0.66	0.13	0.00523	0.67	0.09	0.00368	0.60	0.03	0.00110	0.75	0.25	0.01144	0.59	0.21	0.00756	0.47	0.07	0.00201	0.39	0.07	0.00167
3.6	0.55	0.03	0.00101	0.59	0.09	0.00324	0.60	0.09	0.00329	0.46	0.01	0.00028	0.68	0.05	0.00207	0.55	0.26	0.00872	0.34	0.02	0.00041	0.39	0.06	0.00143
3.8	0.60	0.03	0.00110	0.58	0.06	0.00212	0.42	0.08	0.00205	0.00	NA	0.00000	0.59	0.05	0.00180	0.58	0.06	0.00212	0.32	0.03	0.00059	0.41	0.08	0.00200
4.0	0.55	0.05	0.00168	0.60	0.03	0.00110	0.53	0.06	0.00194				0.69	0.06	0.00253	0.60	0.05	0.00183	0.31	0.02	0.00038	0.35	0.07	0.00149
4.2	0.00	NA	0.00000	0.61	0.04	0.00112	0.09	0.02	0.00007				0.15	0.05	0.00046	0.01	NA	0.00000	0.00	NA	0.00000	0.37	0.09	0.00203
4.25							0.00	NA	0.00000															
4.3				0.00	NA	0.00000																		
4.4													0.00	NA	0.00000							0.00	NA	0.00000
4.6																						0.00	NA	0.00000
4.8																						0.00	NA	0.00000
4.9																						0.00	NA	0.00000
Total Stream Width (m)	3.2			3.2			3.1			3.0			3.2			3.4			2.4			3.4		
Total Discharge (m^3/s)	0.027			0.040			0.051			0.023			0.098			0.081			0.007			0.043		
Field Chemistry																								
Temp (^oC)	19.6			15.6			14.4			9.8			2.1			11.3			19.3			19.3		
pH	7.20			7.98			7.73			8.17			6.31			7.94			7.54			7.54		
EC (uS)	56			28			29			49			15			21			31			31		
DO (mg/L)	3.22			5.90			4.86			1.80			1.56			8.80			6.44			6.44		
Appearance	clear slightly yellow			clear, slightly yellow			clear, slightly yellow			slightly yellow			slightly tannic			clear, slightly yellow			-			-		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
Downgradient beaver dam is impeding natural water flow
The interval that stake is located for increased precision in water height fluctuations is 2.6m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate

Marathon PGM
Summary of Stream Field Data
Location S14

Distance Panel	2-Sep-10			13-Apr-11			12-May-11			29-Jul-11			31-Oct-11		
(m)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)
0															
0.2															
0.4															
0.6															
0.8															
1.0													0.00	0.00	0.00000
1.15															
1.2							0.00	0.00	0.00000				0.00	0.00	0.00000
1.3															
1.4							0.08	0.01	0.00005	0.00	NA	0.00000	0.09	0.00	0.00000
1.5															
1.6	0.00	NA	0.00000				0.09	0.33	0.00181	0.00	NA	0.00000	0.62	0.00	0.00000
1.8	0.35	0.02	0.00043				0.58	0.43	0.01521	0.17	0.00	0.00000	0.48	0.00	0.00000
2.0	0.29	0.05	0.00088	0.00	NA	0.00000	0.51	0.04	0.00124	0.18	0.00	0.00000	0.35	0.25	0.00534
2.2	0.21	0.02	0.00026	0.57	0.91	0.03164	0.39	0.46	0.01094	0.03	0.00	0.00000	0.42	0.24	0.00615
2.4	0.27	0.07	0.00115	0.58	1.19	0.04210	0.50	0.97	0.02959	0.12	0.44	0.00322	0.41	0.29	0.00725
2.6	0.22	0.06	0.00081	0.51	1.37	0.04262	0.44	1.45	0.03892	0.08	0.00	0.00000	0.54	0.21	0.00692
2.8	0.34	0.08	0.00166	0.59	1.45	0.05219	0.57	0.81	0.02816	0.23	0.02	0.00028	0.55	0.00	0.00000
3.0	0.28	0.04	0.00068	0.59	1.04	0.03743	0.52	0.74	0.02347	0.16	0.27	0.00264	0.45	0.00	0.00000
3.2	0.30	0.02	0.00037	0.62	0.84	0.03177	0.30	1.39	0.02544	0.17	0.16	0.00166			
3.4	0.25	0.03	0.00046	0.58	1.93	0.06828	0.47	1.22	0.03498	0.17	0.38	0.00394	0.37	0.27	0.00914
3.6	0.26	0.02	0.00032	0.56	1.85	0.06320	0.48	0.05	0.00146	0.06	0.00	0.00000	0.35	0.00	0.00000
3.8	0.22	0.05	0.00067	0.55	2.18	0.07314	0.36	0.65	0.01427	0.00	0.00	0.00000	0.00	0.00	0.00000
4.0	0.00	NA	0.00000	0.55	1.89	0.06341	0.38	0.25	0.00580	0.00	0.00	0.00000	0.00	0.00	0.00000
4.2	0.00	NA	0.00000	0.50	1.18	0.03599	0.40	1.20	0.02928	0.03	0.05	0.00009	0.00	0.00	0.00000
4.25															
4.3															
4.4				0.31	1.83	0.03461	0.00	0.00	0.00000	0.00	0.00	0.00000			
4.6				0.13	0.76	0.00603	0.00	0.00	0.00000	0.00	0.00	0.00000			
4.8				0.00	NA	0.00000									
4.9															
Total Stream Width (m)	3.3			2.7			3.1			3.1			2.0		
Total Discharge (m^3/s)	0.008			0.582			0.261			0.012			0.035		
Field Chemistry															
Temp (^oC)	17.2			0.2			6.9			14.8			1.5		
pH	6.50			5.70			6.93			7.41			9.72		
EC (uS)	-			17			10			62			54		
DO (mg/L)	7.61			-			-			8.63			7.15		
Appearance	clear, slightly yellow			clear, slightly yellow			clear, slightly yellow			clear, yellow			clear, slightly yellow		

October 30, 2009 by Calder			
Distance (m)	Depth (m)	Velocity **(m/s)	Flow (m^3/s)
1			
1.1	0	0	0
1.25	0.625	0.190625	0.023828
1.5	0.69	0.21045	0.036303
1.75	0.71	0.22	0.03844
2	0.70	0.21	0.03683
2.25	0.75	0.23	0.04289
2.5	0.78	0.24	0.04639
2.75	0.75	0.23	0.04289
3	0.68	0.21	0.03526
3.25	0.70	0.21	0.03736
3.5	0.74	0.23	0.04175
3.75	0.80	0.24	0.04880
4	0.36	0.11	0.00988
4.25	0.29	0.09	0.00641
4.5	0.00	0.00	0.00000
Total Stream Width (m)	3.4		
Total Discharge (m^3/s)	0.447		

Notes
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The lower limit of the flow meter is 0.01ft/s
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Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate

Marathon PGM
Summary of Stream Field Data
Location S15

	3-Jul-08			8-Jul-08			28-Jul-08			28-Aug-08			22-Sep-08			23-Oct-08			20-Nov-08			8-May-09			10-Jun-09		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0																											
0.2																											
0.4																											
0.6	0.00	NA	-																								
0.75																											
0.8	0.09	NM	-	0.00	NA	-	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000				0.00	NA	0.00000			
0.9																			0.00	NA	0.00000						
1.0	0.32	NM	-	0.14	NM	-	0.07	<0.01	0.00004	0.04	NA	0.00000	0.05	NA	0.00000	0.10	<0.01	0.00006	0.16	<0.01	0.00007	0.32	0.03	0.00064	0.00	NA	0.00000
1.2	0.40	NM	-	0.25	NM	-	0.18	<0.01	0.00011	0.17	<0.01	0.00010	0.18	<0.01	0.00011	0.20	<0.01	0.00012	0.15	<0.01	0.00009	0.39	0.07	0.00156	0.07	0.20	0.00084
1.4	0.41	NM	-	0.24	NM	-	0.08	<0.01	0.00005	0.17	<0.01	0.00010	0.20	<0.01	0.00012	0.22	<0.01	0.00013	0.18	0.35	0.00384	0.50	0.03	0.00100	0.10	0.39	0.00240
1.6	0.43	NM	-	0.26	NM	-	0.19	<0.01	0.00011	0.18	<0.01	0.00011	0.23	0.39	0.00547	0.21	0.23	0.00295	0.19	0.26	0.00301	0.59	0.23	0.00827	0.13	0.36	0.00286
1.8	0.42	NM	-	0.23	NM	-	0.07	<0.01	0.00004	0.13	<0.01	0.00008	0.15	<0.01	0.00009	0.15	<0.01	0.00009	0.21	<0.01	0.00013	0.47	0.89	0.02540	0.13	0.16	0.00130
2.0	0.29	NM	-	0.09	NM	-	0.12	<0.01	0.00007	0.02	NA	0.00000	0.05	NA	0.00000	0.09	<0.01	0.00005	0.12	<0.01	0.00007	0.40	1.02	0.02482	0.16	0.26	0.00256
2.2	0.20	NM	-	0.08	NM	-	0.01	NA	0.00000	0.00	NA	0.00000	0.05	NA	0.00000	0.06	<0.01	0.00004	0.09	<0.01	0.00005	0.38	0.69	0.01597	0.08	0.56	0.00272
2.4	0.22	NM	-	0.07	NM	-	0.00	NA	0.00000				0.03	NA	0.00000	0.04	<0.01	0.00002	0.07	<0.01	0.00004	0.36	0.92	0.02017	0.04	0.13	0.00032
2.6	0.19	NM	-	0.06	NM	-	0.00	NA	0.00000				0.02	NA	0.00000	0.04	<0.01	0.00002	0.09	<0.01	0.00005	0.37	0.85	0.01925	0.06	0.00	0.00000
2.8	0.21	NM	-	0.06	NM	-	0.00	NA	0.00000				0.02	NA	0.00000	0.03	<0.01	0.00002	0.06	<0.01	0.00004	0.35	0.72	0.01541	0.05	0.00	0.00000
3.0	0.18	NM	-	0.02	NM	-							0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.34	0.56	0.01157	0.00	NA	0.00000
3.2	0.00	NA	-	0.00	NA	-																0.03	NA	0.00000			
3.4																						0.00	NA	0.00000			
3.6																											
3.7																											
3.75																											
3.8																											
4.0																											
Total Stream Width (m)	2.6			2.4			1.8			1.4			2.2			2.2			2.1			2.6			2.0		
Stake Measurement (m)	-			-			0.034			0.187			0.142			0.127			0.101								
Total Discharge (m^3/s)							0.00043			0.00040			0.00580			0.00351			0.00741			0.14405			0.01301		
Field Chemistry																											
Temp (^oC)	13.0			23.1			23.1			15.6			15.8			4.2			0			5.6			11.1		
pH	6.35			7.02			7.02			7.28			7.19			7.06			7.10			6.69			8.65		
EC (uS)	12			50			50			53			23			20			23			10			35		
DO (mg/L)	1.31			5.19			5.19			5.58			3.34			3.96			5.17			1.99			38		
Appearance	slightly tannic			slightly tannic			clear			clear			slightly tannic			tannic			slightly tannic			clear to cloudy			slight yellow tinge		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
The interval that stake and data logger are located for increased precision in water height fluctuations is 1.6m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate

Marathon PGM
Summary of Stream Field Data
Location S15

	20-Jul-09			5-Aug-09			1-Sep-09			6-Oct-09			4-Nov-09			5-May-10			15-Jul-10			30-Aug-10		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0																								
0.2																								
0.4																								
0.6																								
0.75				0.00	NA	0.00000																		
0.8				0.47	0.01	0.00018	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	0.00	0.00000
0.9																								
1.0	0.00	NA	0.00000	0.51	0.04	0.00124	0.53	0.02	0.00065	0.57	0.05	0.00174	0.61	0.08	0.00298	0.66	0.06	0.00242	0.10	0.04	0.00024	0.07	0.08	0.00034
1.2	0.07	0.07	0.00030	0.60	0.06	0.00220	0.60	0.05	0.00183	0.63	0.06	0.00231	0.63	0.05	0.00192	0.68	0.09	0.00373	0.20	0.04	0.00049	0.30	0.07	0.00128
1.4	0.11	0.20	0.00134	0.69	0.06	0.00253	0.63	0.11	0.00423	0.69	0.06	0.00253	0.71	0.06	0.00260	0.73	0.12	0.00534	0.25	0.03	0.00046	0.34	0.08	0.00166
1.6	0.14	0.11	0.00094	0.78	0.01	0.00048	0.68	0.16	0.00664	0.72	0.05	0.00220	0.72	0.04	0.00176	0.76	0.35	0.01623	0.26	0.18	0.00285	0.27	0.02	0.00033
1.8	0.16	0.12	0.00117	0.61	0.09	0.00335	0.53	0.18	0.00582	0.65	0.05	0.00198	0.65	0.05	0.00198	0.62	0.38	0.01437	0.20	0.01	0.00012	0.26	0.03	0.00048
2.0	0.15	0.11	0.00101	0.69	0.05	0.00210	0.43	0.25	0.00656	0.63	0.05	0.00192	0.52	0.10	0.00317	0.55	0.47	0.01577	0.14	0.01	0.00009	0.12	0.11	0.00081
2.2	0.06	0.12	0.00044	0.64	0.06	0.00234	0.42	0.13	0.00333	0.61	0.06	0.00223	0.47	0.20	0.00573	0.51	0.26	0.00809	0.02	0.00	0.00000	0.05	0.06	0.00018
2.4	0.07	0.02	0.00009	0.60	0.13	0.00476	0.46	0.17	0.00477	0.57	0.06	0.00209	0.50	0.16	0.00488	0.47	0.46	0.01319	0.00	0.00	0.00000	0.05	0.04	0.00012
2.6	0.07	0.05	0.00021	0.60	0.04	0.00146	0.42	0.16	0.00410	0.58	0.05	0.00177	0.47	0.15	0.00430	0.52	0.37	0.01174	0.00	0.00	0.00000	0.04	0.00	0.00000
2.8	0.05	<0.01	0.00003	0.58	0.08	0.00283	0.41	0.17	0.00425	0.55	0.06	0.00201	0.22	0.12	0.00161	0.20	0.31	0.00378	0.00	0.00	0.00000	0.06	0.08	0.00029
3.0	0.00	NA	0.00000	0.54	0.06	0.00198	0.30	0.15	0.00275	0.42	0.05	0.00128	0.17	0.12	0.00124	0.48	0.27	0.00791	0.00	0.00	0.00000	0.05	0.00	0.00000
3.2				0.25	0.02	0.00031	0.09	0.03	0.00016	0.14	0.03	0.00026	0.11	0.05	0.00034	0.21	0.08	0.00102	0.00	0.00	0.00000	0.00	0.00	0.00000
3.4				0.23	0.05	0.00070	0.07	0.03	0.00013	0.09	0.03	0.00016	0.00	NA	0.00000	0.15	0.04	0.00037	0.00	0.00	0.00000	0.00	0.00	0.00000
3.6				0.20	0.05	0.00053	0.02	NA	0.00000	0.07	NA	0.00000				0.13	0.07	0.00042						
3.7																0.00	NA	0.00000						
3.75				0.00	NA	0.00000	0.00	NA	0.00000															
3.8										0.00	NA	0.00000												
4.0																								
Total Stream Width (m)	2.0			3.0			3.0			3.0			2.6			2.9			2.6			2.6		
Stake Measurement (m)																								
Total Discharge (m^3/s)	0.00553			0.02699			0.04521			0.02247			0.03251			0.10437			0.00425			0.00549		
Field Chemistry																								
Temp (^oC)	18.0			15.0			13.8			13.8			1.7			7.1			18.0			21.9		
pH	6.97			7.83			7.67			7.67			8.27			7.58			7.59			8.06		
EC (uS)	39			20			17			17			13			16			50			83		
DO (mg/L)	1.45			5.27			1.73			1.73			1.18			10.97			5.64			-		
Appearance	slightly yellow, clear			clear, yellow			clear, yellow			clear, yellow			slight tannic			clear, slt. Yellow			clear			clear, yellowish colour		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
The interval that stake and data logger are located for increased precision in water height fluctuations is 1.6m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate

Marathon PGM
Summary of Stream Field Data
Location S16

	3-Jul-08			1-Aug-08			28-Aug-08			22-Sep-08			20-Oct-08			18-Nov-08			7-May-09			14-Jul-09		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0	0.00	NA	-										0.00	NA	0.00000	0.00	NA	0.00000						
0.05										0.00	NA	0.00000												
0.1				0.00	NA	0.00000	0.00	NA	0.00000															
0.2	0.15	NM	-	0.06	0.47	0.00129	0.03	NA	0.00000	0.04	NA	0.00000	0.08	<0.01	0.00005	0.28	<0.01	0.00017				0.10	0.24	0.00110
0.4	0.20	NM	-	0.08	<0.01	0.00005	0.09	<0.01	0.00005	0.05	0.28	0.00085	0.12	0.33	0.00242	0.28	0.24	0.00410	0.00	0.00	0.00000	0.09	0.46	0.00253
0.6	0.19	NM	-	0.06	1.62	0.00593	0.06	0.43	0.00157	0.07	0.70	0.00299	0.11	1.05	0.00705	0.24	0.40	0.00586	0.29	0.79	0.01393	0.04	0.70	0.00171
0.8	0.13	NM	-	0.04	1.10	0.00268	0.04	0.74	0.00181	0.07	0.61	0.00260	0.10	1.20	0.00732	0.23	0.42	0.00589	0.33	0.95	0.01915	0.05	0.41	0.00125
1.0	0.18	NM	-	0.06	0.74	0.00271	0.05	0.47	0.00143	0.09	0.48	0.00264	0.09	0.37	0.00203	0.22	0.58	0.00778	0.37	0.69	0.01555	0.05	0.26	0.00079
1.2	0.19	NM	-	0.07	1.14	0.00487	0.04	0.71	0.00173	0.07	1.45	0.00619	0.08	1.63	0.00795	0.24	1.14	0.01669	0.39	1.05	0.02498	0.04	0.73	0.00178
1.4	0.15	NM	-	0.05	NA	0.00000	0.02	NA	0.00000	0.09	<0.01	0.00005	0.06	<0.01	0.00004	0.18	0.56	0.00615	0.34	1.08	0.02245	0.00	NA	0.00000
1.6	0.10	NM	-	0.04	NA	0.00000	0.00	NA	0.00000	0.02	NA	0.00000	0.00	NA	0.00000	0.18	1.29	0.01416	0.36	0.66	0.01441	0.00	NA	0.00000
1.7										0.00	NA	0.00000												
1.8	0.08	NM	-	0.03	NA	0.00000										0.17	0.64	0.00664	0.39	0.69	0.01639	0.01	<0.01	0.00001
2.0	0.04	NM	-	0.00	NA	0.00000										0.07	0.17	0.00045	0.39	1.05	0.02498	0.00	NA	0.00000
2.05																0.00	NA	0.00000						
2.2	0.00	NA	-																0.00	0.00	0.00000			
2.4																								
2.6																								
2.8																								
3.0																								
Total Stream Width (m)	2.2			1.9			1.5			1.7			1.6			2.1			1.8			1.8		
Stake Measurement (m)	-			-			0.912			0.945			0.917			0.760			0.745			0.940		
Total Discharge (m^3/s)	-			0.01753			0.00660			0.01533			0.02685			0.06790			0.15184			0.00916		
Field Chemistry																								
Temp (^{o}C)	14.3			15.1			12.8			11.1			7.1			0.0			8.3			13.4		
pH	7.74			8.31			8.26			7.90			7.60			8.05			8.60			8.40		
EC (uS)	85			210			273			219			205			93			19			214		
DO (mg/L)	1.20			7.35			6.60			5.45			3.17			4.08			3.02			0.36		
Appearance	clear			clear			clear			clear			slightly tannic			clear			clear w/ slt. yellow tinge			clear		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
The interval that stake is located for increased precision in water height fluctuations is 0.4m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate
Dry - Streambed Dry

Marathon PGM
Summary of Stream Field Data
Location S16

	7-Aug-09			31-Aug-09			5-Oct-09			4-Nov-09			5-May-10			16-Jul-10			31-Aug-10		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000				0.00	NA	0.00000			
0.05													0.00	NA	0.00000						
0.1																					
0.2	0.09	0.25	0.00137	0.16	0.56	0.00547	0.05	0.17	0.00052	0.17	0.84	0.00871	0.20	0.89	0.00950	0.00	0.00	0.00000			
0.4	0.09	0.62	0.00340	0.17	0.46	0.00477	0.07	0.11	0.00047	0.21	1.05	0.01849	0.19	0.87	0.01008	0.00	0.00	0.00000	DRY	NA	NA
0.6	0.12	0.80	0.00586	0.14	0.69	0.00589	0.05	0.22	0.00067	0.20	0.76	0.01623	0.20	1.11	0.01354	0.00	0.00	0.00000	DRY	NA	NA
0.8	0.10	1.15	0.00702	0.19	1.30	0.01507	0.06	1.25	0.00458	0.16	1.13	0.02206	0.21	0.85	0.01089	0.00	0.00	0.00000	DRY	NA	NA
1.0	0.13	1.10	0.00872	0.18	1.38	0.01515	0.07	0.96	0.00410	0.18	1.29	0.02833	0.20	1.06	0.01293	0.02	0.07	0.00009	DRY	NA	NA
1.2	0.09	1.78	0.00977	0.17	1.34	0.01390	0.06	0.84	0.00307	0.15	1.51	0.02763	0.20	1.02	0.01244	0.00	0.00	0.00000	DRY	NA	NA
1.4	0.13	1.34	0.01063	0.23	2.22	0.03115	0.00	NA	0.00000	0.14	1.07	0.01828	0.22	1.69	0.02268	0.00	0.00	0.00000	DRY	NA	NA
1.6	0.05	0.98	0.00299	0.12	1.84	0.01347				0.08	1.73	0.01055	0.15	1.34	0.01226	0.00	0.00	0.00000	DRY	NA	NA
1.7																			DRY	NA	NA
1.8	0.05	0.66	0.00201	0.11	1.21	0.00812				0.13	0.69	0.00547	0.13	1.69	0.01340	0.00	0.00	0.00000			
2.0	0.05	0.41	0.00078	0.08	0.93	0.00284				0.00	NA	0.00000	0.08	0.88	0.00268	0.00	0.00	0.00000			
2.05	0.00	NA	0.00000	0.00	NA	0.00000							0.00	NA	0.00000			0.00000			
2.2																					
2.4																					
2.6																					
2.8																					
3.0																					
Total Stream Width (m)	2.1			2.1			1.4			2.0			2.0			2.0			0.0		
Stake Measurement (m)																					
Total Discharge (m^3/s)	0.05255			0.11581			0.01341			0.15575			0.12042			0.00009			-		
Field Chemistry																					
Temp (^oC)	13.0			11.4			11.4			3.0			6.3			14.9			-		
pH	8.33			7.91			7.91			6.69			7.67			7.86			-		
EC (uS)	115			79			79			66			66			311			-		
DO (mg/L)	5.99			3.95			3.95			1.51			11.83			6.55			-		
Appearance	clear			slt. Yellow			slt. Yellow			clear			slt cloud, slt brown, trace S.S.			Clear, with SS			-		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
The interval that stake is located for increased precision in water height fluctuations is 0.4m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate
Dry - Streambed Dry

Marathon PGM
Summary of Stream Field Data
Location S17

	1-Jul-08			29-Jul-08			26-Aug-08			24-Sep-08			23-Oct-08			18-Nov-08			5-May-09			11-Jun-09		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0																								
0.2																								
0.4																								
0.6																								
0.8																								
1.0																								
1.2	0.00	NA	NA				DRY	NA	NA	DRY	NA	NA	DRY	NA	NA	DRY	NA	NA				0.00	NA	0.00
1.3				0.00	NA	0.00	DRY	NA	NA	DRY	NA	NA	DRY	NA	NA	DRY	NA	NA	0.00	NA	0.00			
1.35							DRY	NA	NA	DRY	NA	NA	DRY	NA	NA	DRY	NA	NA						
1.4	0.04	NM	NM	0.01	0.00	0.00	DRY	NA	NA	DRY	NA	NA	DRY	NA	NA	DRY	NA	NA	0.04	0.30	0.01	0.02	0.00	0.00
1.55							DRY	NA	NA	DRY	NA	NA	DRY	NA	NA	DRY	NA	NA						
1.6	0.02	NM	NM	0.01	0.00	0.00	DRY	NA	NA	DRY	NA	NA	DRY	NA	NA	DRY	NA	NA	0.02	0.00	0.00	0.00	NA	0.00
1.8	0.01	NM	NM	0.00	0.00	0.00	DRY	NA	NA	DRY	NA	NA	DRY	NA	NA	DRY	NA	NA	0.00	0.00	0.00			
2.0	0.02	NM	NM	0.01	0.00	0.00	DRY	NA	NA	DRY	NA	NA	DRY	NA	NA	DRY	NA	NA	0.01	0.00	0.00			
2.05				0.00	NA	0.00													0.00	NA	0.00			
2.2	0.00	NA	NA																					
2.4																								
2.6																								
2.8																								
3.0																								
Total Stream Width (m)	1.0			0.75			-			-			-			-			-			-		
Total Discharge (m^3/s)	0.00000			0.00000			0.00000			0.00000			0.00000			0.00000			0.00919			0.00000		
Field Chemistry																								
Temp (^{o}C)	10.8			12.6			-			-			-			-			2.7			12.9		
pH	8.00			7.90			-			-			-			-			7.95			6.14		
EC (uS)	217			400			-			-			-			-			221			362		
DO (mg/L)	2.50			4.83			-			-			-			-			2.14			0.62		
Appearance	slightly cloudy brown			slightly cloudy brown			-			-			-			-			cloudy turbid silty			clear		

	15-Jul-09			6-Aug-09			2-Sep-09			5-Oct-09			3-Nov-09			5-May-10			15-Jul-10			2-Sep-10		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0																								
0.2																								
0.4																								
0.6																								
0.8																								
1.0																								
1.2										DRY	NA	NA	0.00	NA	0.00				DRY	NA	NA	DRY	NA	NA
1.3	0.00	NA	0.00	0.00	NA	0.00				DRY	NA	NA				0.00	NA	0.00	DRY	NA	NA	DRY	NA	NA
1.35							0.00	NA	0.00	DRY	NA	NA							DRY	NA	NA	DRY	NA	NA
1.4	0.02	0.00	0.00	0.02	NA	0.00	0.02	0.00	0.00	DRY	NA	NA	0.02	0.00	0.00	0.06	0.61	0.02	DRY	NA	NA	DRY	NA	NA
1.55							0.00	NA	0.00	DRY	NA	NA							DRY	NA	NA	DRY	NA	NA
1.6	0.00	0.00	0.00	0.00	NA	0.00				DRY	NA	NA	0.00	NA	0.00	0.00	0.00	0.00	DRY	NA	NA	DRY	NA	NA
1.8	0.01	0.00	0.00							DRY	NA	NA				0.05	0.18	0.01	DRY	NA	NA	DRY	NA	NA
2.0	0.00	NA	0.00							DRY	NA	NA				0.00	NA	0.00	DRY	NA	NA	DRY	NA	NA
2.05																								
2.2																								
2.4																								
2.6																								
2.8																								
3.0																								
Total Stream Width (m)	-			-			0.20			-			0.40			0.70			-			-		
Total Discharge (m^3/s)	0.00000			0.00000			0.00000			-			-			0.02493			-			-		
Field Chemistry																								
Temp (^{o}C)	10.9			12.1			12.4						3.4			1.9			-			-		
pH	8.21			8.26			8.2						7.25			7.55			-			-		
EC (uS)	373			377			349						268			200			-			-		
DO (mg/L)	1.67			3.57			3.13						1.69			13.35			-			-		
Appearance	light brown			clear			cloudy, grey						sl. tannic			cloudy, silty, lt. brown			-			-		

Notes
NM - Not Measured
DRY - Dry steambed
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
Could not advance measuring stake through stream bed

Marathon PGM
Summary of Stream Field Data
Location S18

	1-Jul-08			29-Jul-08			26-Aug-08			24-Sep-08			23-Oct-08			18-Nov-08			4-May-09			11-Jun-09		
Distance Panel (m)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)
0																								
0.2																								
0.4																								
0.6	0.00	NA	-																					
0.7																								
0.8	0.01	NM	-	0.00	NA	-				0.00	NA	-	0.00	NA	-	0.00	NA	0.00000	0.00	NA	0.00000			
0.85																								
1.0	0.06	NM	-	0.01	NA	-				0.01	NA	-	0.01	NA	-	0.04	<0.01	0.00002	0.02	<0.01	0.00001	0	NA	0
1.1							0.00	NA	-															
1.2	0.06	NM	-	0.02	NA	-	0.01	NA	-	0.01	NA	-	0.03	NA	-	0.04	0.70	0.00171	0.05	<0.01	0.00003	0.01	<0.01	0.00001
1.4	0.08	NM	-	0.02	NA	-	0.01	NA	-	0.02	NA	-	0.03	NA	-	0.06	0.93	0.00340	0.06	0.75	0.00276	0.02	<0.01	0.00001
1.6	0.10	NM	-	0.03	NA	-	0.02	NA	-	0.03	NA	-	0.04	NA	-	0.05	0.56	0.00171	0.08	1.31	0.00640	0.02	<0.01	0.00001
1.8	0.08	NM	-	0.01	NA	-	0.01	NA	-	0.02	NA	-	0.03	NA	-	0.06	0.40	0.00146	0.07	0.92	0.00392	0.02	<0.01	0.00001
2.0	0.09	NM	-	0.03	NA	-	0.02	NA	-	0.02	NA	-	0.03	NA	-	0.06	0.43	0.00157	0.08	0.72	0.00352	0.02	<0.01	0.00001
2.2	0.09	NM	-	0.00	NA	-	0.00	NA	-	0.00	NA	-	0.00	NA	-	0.00	NA	0.00000	0.01	NA	0.00000	0	NA	0
2.3																								
2.4	0.00	NA	-																					
2.6																								
2.8																								
3.0																								
3.2																								
3.4																								
3.6																								
3.8																								
4.0																								
Total Stream Width (m)	1.8			1.4			1.1			1.4			1.4			1.4			1.4			1.2		
Stake Measurement (m)	-			-			0.887			0.875			0.866			0.847			0.835			0.880		
Total Discharge (m^3/s)	-			-			-			-			-			0.00988			0.01665			0.00005		
Field Chemistry																								
Temp (^oC)	12.5			14.0			14.3			13.0			5.2			0.2			8.4			11.0		
pH	7.05			7.12			6.66			7.22			6.82			7.50			6.27			6.46		
EC (uS)	33			60			113			88			78			48			39			63		
DO (mg/L)	2.55			6.81			4.63			2.97			4.70			3.52			0.97			0.52		
Appearance	clear			slightly tannic			clear			slightly tannic			slightly tannic			clear			clear			clear		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
The interval that stake is located for increased precision in water height fluctuations is 2.0m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate

Marathon PGM
Summary of Stream Field Data
Location S18

	14-Jul-09			6-Aug-09			6-Aug-09			7-Oct-09			8-Nov-09			5-May-10			15-Jul-10			1-Sep-10		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0																								
0.2																								
0.4																								
0.6																						0.00	NA	0.00000
0.7													0.00	NA	0.00000									
0.8							0.00	NA	0.00000	0.00	NA	0.00000	0.05	0.08	0.00018	0.00	NA	0.00000	0.00	NA	0.00000	0.00	0.00	0.00000
0.85				0.00	NA	0.00000																		
1.0	0.00	NA	0.00000	0.02	<0.01	0.00001	0.03	0.36	0.00066	0.03	NA	0.00000	0.06	0.23	0.00084	0.03	0.13	0.00024	0.00	0.00	0.00000	0.10	0.00	0.00000
1.1																								
1.2	0.01	<0.01	0.00000	0.01	<0.01	0.00001	0.02	NA	0.00000	0.03	NA	0.00000	0.06	0.61	0.00223	0.03	0.42	0.00077	0.00	0.00	0.00000	0.10	0.00	0.00000
1.4	0.02	<0.01	0.00001	0.03	0.69	0.00126	0.03	0.88	0.00161	0.03	NA	0.00000	0.07	0.60	0.00256	0.05	0.46	0.00140	0.01	0.00	0.00000	0.10	0.00	0.00000
1.6	0.03	<0.01	0.00002	0.03	0.44	0.00081	0.03	0.68	0.00124	0.02	NA	0.00000	0.07	0.58	0.00248	0.04	0.30	0.00073	0.02	0.27	0.00033	0.10	0.00	0.00000
1.8	0.02	<0.01	0.00001	0.03	0.42	0.00077	0.05	0.23	0.00070	0.03	0.13	0.00024	0.07	0.64	0.00273	0.05	0.26	0.00079	0.00	0.00	0.00000	0.30	0.07	0.00128
2.0	0.03	<0.01	0.00002	0.05	0.37	0.00113	0.05	0.36	0.00110	0.04	0.05	0.00012	0.09	0.36	0.00198	0.06	0.20	0.00073	0.02	0.07	0.00009	0.00	NA	0.00000
2.2	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.03	0.10	0.00014			
2.3																			0.00	0.00	0.00000			
2.4																								
2.6																								
2.8																								
3.0																								
3.2																								
3.4																								
3.6																								
3.8																								
4.0																								
Total Stream Width (m)	1.2			1.4			1.4			1.4			1.5			1.4			1.5			1.4		
Stake Measurement (m)																								
Total Discharge (m^3/s)	0.00006			0.00398			0.00531			0.00036			0.01301			0.00467			0.00055			0.00128		
Field Chemistry																								
Temp (^{o}C)	12.0			13.5			14.8			7.4			3.5			7.0			17.1			17.6		
pH	7.27			7.29			7.42			7.30			6.63			7.15			7.77			6.55		
EC (uS)	84			59			46			81			43			51			93			-		
DO (mg/L)	1.41			4.08			5.70			2.08			1.62			11.22			5.95			6.14		
Appearance	clear			clear, slt. ylw			clear, slt. ylw			clear, slightly tannic			slt. tannic			clear, slt. Yellow			clear, trace organics			clear		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
The interval that stake is located for increased precision in water height fluctuations is 2.0m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate

Marathon PGM
Summary of Stream Field Data
Location S19

	1-Jul-08			29-Jul-08			26-Aug-08			24-Sep-08			23-Oct-08			18-Nov-08			5-May-09			11-Jun-09		
Distance Panel (m)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)
0.0	0.00	NA	-																					
0.2	0.03	NM	-										0.00	NA	-									
0.3																0.00	NA	0.00000				0.00	NA	0.00000
0.35										0.00	NA	-							0.00	NA	0.00000			
0.37				0.00	NA	-	0.00	NA	-															
0.4	0.17	NM	-	0.02	NA	-	0.01	NA	-	0.02	NA	-	0.04	NA	-	0.10	<0.01	0.00005	0.09	0.10	0.00034	0.02	<0.01	0.00001
0.6	0.17	NM	-	0.01	NA	-	0.01	NA	-	0.03	NA	-	0.05	NA	-	0.10	0.88	0.00537	0.11	1.12	0.00748	0.03	0.26	0.00048
0.65							0.00	NA	-															
0.8	0.18	NM	-	0.01	NA	-				0.01	NA	-	0.02	NA	-	0.10	0.61	0.00372	0.12	0.46	0.00336	0.02	<0.01	0.00001
0.85				0.00	NA	-				0.00	NA	-												
1.0	0.16	NM	-										0.01	NA	-	0.08	0.3	0.00146	0.11	0.10	0.00066	0.02	<0.01	0.00001
1.2	0.14	NM	-										0.00	NA	-	0.07	<0.01	0.00004	0.11	0.92	0.00616	0.01	<0.01	0.00001
1.4	0.14	NM	-													0.06	<0.01	0.00004	0.10	0.23	0.00140	0.01	<0.01	0.00001
1.6	0.13	NM	-													0.07	<0.01	0.00004	0.16	0.07	0.00064	0.00	NA	0.00000
1.7																								
1.8	0.01	NM	-													0.00	NA	0.00000	0.00	NA	0.00000			
2.0	0.00	NA	-																					
2.2																								
2.4																								
2.6																								
2.8																								
3.0																								
Total Stream Width (m)	2.0			0.5			0.3			0.5			1.0			1.5			1.5			1.3		
Stake Measurement (m)	-			-			0.900			0.890			0.869			0.812			0.782			0.870		
Total Discharge (m^3/s)	-			-			-			-			-			0.01072			0.02005			0.00053		
Field Chemistry																								
Temp (^oC)	15.4			14.2			13.8			13.0			6.2			0			7.2			13.7		
pH	7.20			7.56			6.81			7.27			7.22			6.96			6.84			6.48		
EC (uS)	29			30			27			16			18			39			NA			29		
DO (mg/L)	2.02			4.48			4.74			2.84			4.49			3.10			0.64			0.24		
Appearance	clear			clear			clear			clear			clear			clear			slightly yellow tinge			clear		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
The interval that stake is located for increased precision in water height fluctuations is 0.6m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate

Marathon PGM
Summary of Stream Field Data
Location S19

	15-Jul-09			6-Aug-09			2-Sep-09			7-Oct-09			3-Nov-09			5-May-10			15-Jul-10			2-Sep-10		
Distance Panel (m)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)
0.0																								
0.2																								
0.3										0.00	NA	0.00000	0.00	NA	0.00000									
0.35	0.00	NA	0.00000	0.00	NA	0.00000																		
0.37																								
0.4	0.03	<0.01	0.00001	0.05	0.04	0.00008	0.00	NA	0.00000	0.07	0.09	0.00029	0.07	0.11	0.00035	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000
0.6	0.02	<0.01	0.00001	0.05	0.14	0.00043	0.09	0.55	0.00302	0.07	0.14	0.00060	0.90	0.25	0.01373	0.06	0.60	0.00220	0.02	0.00	0.00000	0.00	0.00	0.00000
0.65																								
0.8	0.02	<0.01	0.00001	0.06	0.93	0.00340	0.10	0.34	0.00207	0.08	0.15	0.00073	0.80	0.27	0.01318	0.07	1.00	0.00427	0.01	0.00	0.00000	0.01	0.00	0.00000
0.85																								
1.0	0.02	<0.01	0.00001	0.05	0.24	0.00073	0.08	0.27	0.00132	0.07	0.07	0.00030	0.80	0.48	0.02342	0.04	0.07	0.00017	0.00	0.00	0.00000	0.05	0.08	0.00024
1.2	0.01	<0.01	0.00001	0.03	<0.01	0.00002	0.07	0.09	0.00038	0.06	0.05	0.00018	0.06	0.20	0.00073	0.05	0.05	0.00015	0.00	0.00	0.00000	0.07	0.13	0.00056
1.4	0.00	NA	0.00000	0.02	<0.01	0.00001	0.07	0.20	0.00085	0.06	0.07	0.00026	0.06	0.02	0.00007	0.05	0.33	0.00101	0.00	0.00	0.00000	0.07	0.05	0.00021
1.6				0.02	<0.01	0.00001	0.06	0.22	0.00081	0.04	NA	0.00000	0.05	NA	0.00000	0.03	0.05	0.00007	0.00	0.00	0.00000	0.00	0.00	0.00000
1.7				0.00	NA	0.00000				0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	0.00	0.00000			
1.8							0.00	NA	0.00000										0.00	NA	0.00000	0.01	0.00	0.00000
2.0																						0.03	0.05	0.00009
2.2																						0.00	0.00	0.00000
2.4																						0.00	NA	0.00000
2.6																								
2.8																								
3.0																								
Total Stream Width (m)	1.1			1.4			1.4			1.4			1.4			1.3			1.6			2.0		
Stake Measurement (m)	0.840																							
Total Discharge (m^3/s)	0.00005			0.00468			0.00845			0.00236			0.05148			0.00786			0.00000			0.00101		
Field Chemistry																								
Temp (^oC)	13			14.6			14.6			14.6			3.6			7.9			16.5			13.2		
pH	6.75			7.47			7.47			7.47			5.93			6.51			8.09			8.51		
EC (uS)	62			27			27			27			14			19			47			-		
DO (mg/L)	1.53			5.51			5.51			5.51			1.48			10.52			6.59			8.42		
Appearance	clear			clear, slt. ylw			clear, slt. ylw			clear, slt. ylw			slt. tannic			clear, slt. Yellow			clear, trace organics			clear		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
The interval that stake is located for increased precision in water height fluctuations is 0.6m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate

Marathon PGM
Summary of Stream Field Data
Location S20

	2-Jul-08			31-Jul-08			26-Aug-08			23-Sep-08			22-Oct-08			20-Nov-08			6-May-09			8-Jun-09		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0	0.00	NA	-										0.00	NA	0.00000				0.00	NA	0.00000			
0.2	0.30	NM	-	0.00	NA	0.00000				0.00	NA	0.00000	0.03	NA	0.00000	0.00	NA	0.00000	0.12	0.13	0.00096	0.00	NA	0.00000
0.38							0.00	NA	-															
0.4	0.15	NM	-	0.02	NA	0.00000	0.01	NA	-	0.00	NA	0.00000	0.02	NA	0.00000	0.05	0.83	0.00253	0.14	2.30	0.01961	0.02	NA	0.00000
0.6	0.18	NM	-	0.09	0.44	0.00242	0.05	NA	-	0.07	<0.01	0.00004	0.10	<0.01	0.00006	0.12	1.02	0.00747	0.19	0.69	0.00799	0.08	0.40	0.00195
0.8	0.15	NM	-	0.04	<0.01	0.00002	0.02	NA	-	0.06	<0.01	0.00004	0.05	NA	0.00000	0.08	0.64	0.00312	0.16	0.89	0.00865	0.05	0.23	0.00070
1.0	0.11	NM	-	0.05	0.66	0.00201	0.02	NA	-	0.04	NA	0.00000	0.25	0.56	0.00854	0.09	0.78	0.00428	0.23	0.79	0.01105	0.04	0.45	0.00110
1.2	0.10	NM	-	0.06	<0.01	0.00004	0.05	NA	-	0.08	<0.01	0.00005	0.06	<0.01	0.00004	0.07	0.06	0.00026	0.20	0.89	0.01081	0.01	NA	0.00000
1.4	0.10	NM	-	0.03	<0.01	0.00002	0.00	NA	-	0.00	NA	0.00000	0.02	NA	0.00000	0.07	<0.01	0.00004	0.18	1.05	0.01153	0.01	NA	0.00000
1.6	0.08	NM	-	0.03	<0.01	0.00002							0.00	NA	0.00000	0.03	NA	0.00000	0.10	0.89	0.00540	0.01	NA	0.00000
1.8	0.01	NM	-	0.00	NA	0.00000										0.02	NA	0.00000	0.07	0.07	0.00028	0.00	NA	0.00000
1.85																								
1.9																								
2.0	0.00	NA	-													0.00	NA	0.00000	0.00	NA	0.00000			
2.2																								
2.4																								
2.6																								
2.8																								
3.0																								
3.2																								
3.4																								
3.6																								
3.8																								
4.0																								
Total Stream Width (m)	2.0			1.6			1.0			1.2			1.6			1.8			2.0			1.6		
Stake Measurement (m)	-			-			0.964			0.938			0.916			0.908						0.600		
Total Discharge (m^3/s)	-			0.00453			-			0.00013			0.00864			0.01770			0.07627			0.00375		
Field Chemistry																								
Temp (^oC)	16.4			16.6			13.6			12.7			4.0			0.1			4.8			15.4		
pH	5.19			6.88			5.84			4.92			5.40			7.84			4.75			7.53		
EC (uS)	8			6			8			9			7			11			8			9		
DO (mg/L)	1.17			5.60			5.25			4.79			3.66			5.08			0.53			0.21		
Appearance	clear			slightly tannic			clear			slightly tannic			clear			slightly tannic			clear slight orange tinge			clear		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
The interval that stake is located for increased precision in water height fluctuations is 0.6m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate

Marathon PGM
Summary of Stream Field Data
Location S20

	13-Jul-09			5-Aug-09			2-Sep-09			6-Oct-09			5-Nov-09			6-May-10			14-Jul-10			30-Aug-10		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0										0.00	NA	0.00000	0.00	NA	0.00000							0.00	0.00	0.00000
0.2	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.02	NA	0.00000	0.09	0.02	0.00010	0.00	NA	0.00000	0.00	NA	0.00000	0.00	0.00	0.00000
0.38																								
0.4	0.01	<0.01	0.00000	0.05	0.39	0.00119	0.06	0.78	0.00285	0.09	0.15	0.00082	0.09	0.82	0.00450	0.06	0.82	0.00300	0.00	NA	0.00000	0.00	0.00	0.00000
0.6	0.09	0.53	0.00291	0.11	1.70	0.01141	0.12	1.35	0.00988	0.08	0.35	0.00171	0.15	0.96	0.00878	0.10	0.96	0.00586	0.03	0.07	0.00013	0.00	0.00	0.00000
0.8	0.04	0.23	0.00056	0.10	0.22	0.00134	0.11	0.16	0.00107	0.06	0.33	0.00121	0.12	0.22	0.00161	0.09	0.22	0.00121	0.04	0.13	0.00032	0.01	0.00	0.00000
1.0	0.08	NA	0.00000	0.09	0.50	0.00275	0.10	0.40	0.00244	0.00	NA	0.00000	0.11	0.18	0.00121	0.11	0.18	0.00121	0.03	0.10	0.00018	0.02	0.23	0.00028
1.2	0.01	NA	0.00000	0.12	0.94	0.00688	0.07	0.72	0.00307				0.05	0.80	0.00244	0.13	0.80	0.00634	0.04	0.11	0.00027	0.00	0.11	0.00000
1.4	0.09	NA	0.00000	0.06	0.43	0.00157	0.12	0.02	0.00015				0.05	0.65	0.00198	0.10	0.65	0.00397	0.01	NA	0.00000	0.00	NA	0.00000
1.6	0.00	NA	0.00000	0.04	0.05	0.00012	0.04	0.24	0.00059				0.07	0.07	0.00030	0.05	0.07	0.00021	0.00	NA	0.00000			
1.8				0.00	NA	0.00000	0.01	NA	0.00000				0.00	NA	0.00000	0.01	NA	0.00000	0.00	NA	0.00000			
1.85																0.00	NA	0.00000						
1.9							0.00	NA	0.00000															
2.0																			0.00	NA	0.00000			
2.2																								
2.4																								
2.6																								
2.8																								
3.0																								
3.2																								
3.4																								
3.6																								
3.8																								
4.0																								
Total Stream Width (m)	1.4			1.6			1.7			1.0			1.8			1.7			1.8			1.4		
Stake Measurement (m)																								
Total Discharge (m^3/s)	0.00347			0.02526			0.02006			0.00374			0.02093			0.02180			0.00090			0.00028		
Field Chemistry																								
Temp (^oC)	16.9			16.0			14.9			14.9			2.4			8.4			16.4			18.0		
pH	7.63			6.25			6.32			6.32			4.24			5.60			10.33			7.74		
EC (uS)	9			9			8			8			7			6			13			11		
DO (mg/L)	0.02			3.63			3.53			3.53			2.07			11.75			4.35			5.96		
Appearance	clear with floating particles			clear, slt. Yellow			clear, slt. Yellow			clear, slt. Yellow			slightly tannic			-			-			Clear trace SS		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
The interval that stake is located for increased precision in water height fluctuations is 0.6m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate

Marathon PGM
Summary of Stream Field Data
Location S21

	2-Jul-08	31-Jul-08	27-Aug-08	23-Sep-08	22-Oct-08	20-Nov-08	6-May-09	8-Jun-09	13-Jul-09	5-Aug-09	21-Sep-09	6-Oct-09	5-Nov-09	6-May-10	14-Jul-10	30-Aug-10
Field Chemistry																
Temp (^{o}C)	19.3	20.5	22.8	17	3.3	0	8.3	20.2	20.4	17.3	15.5	10	1.5	12.6	21.9	22.4
pH	5.21	5.94	6.64	6.14	6	7.08	6.09	7.19	6.8	7.51	7.43	5.57	5.05	8.64	9.45	9.2
EC (uS)	13	27	9	11	9	2	13	16	53	15	14	8	10	7	15	14
DO (mg/L)	1.4	2.06	3.7	1.35	2.21	3.75	1.53	0.24	0.08	4.64	5.47	2.38	2.36	9.25	4.03	6.9
Appearance	slightly tannic	tannic	tannic	tannic	tannic	cloudy brown	yellow tinge	yellow tinge	-	clear slt. brn	clear	slt. brn	slt. tannic	clear, slt. Yellow	clear, slt. Yellow	clear, slt. Yellow, some organics
Notes																
Downgradient beaver dam flooded the channel and made it impossible to do a reasonable cross-section.																

Marathon PGM
Summary of Stream Field Data
Location S22

	2-Jul-08			8-Jul-08			31-Jul-08			26-Aug-08			23-Sep-08			22-Oct-08			20-Nov-08			6-May-09			8-Jun-09		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0	0.00	NA	-																			0.00	NA	0.00000			
0.2	0.15	NM	-	0.00	NA	-	0.00	NA	0.00000							0.00	NA	0.00000	0.00	NA	0.00000	0.05	0.82	0.00250			
0.25													0.00	NA	0.00000												
0.3																											
0.4	0.12	NM	-	0.01	NM	-	0.02	NA	0.00000				0.01	NA	0.00000	0.05	<0.01	0.00003	0.08	<0.01	0.00005	0.21	1.12	0.01429			
0.6	0.11	NM	-	0.01	NM	-	0.00	NA	0.00000				0.00	NA	0.00000	0.04	<0.01	0.00002	0.05	NA	0.00000	0.07	1.28	0.00546			
0.8	0.04	NM	-	0.00	NM	-	0.00	NA	0.00000				0.00	NA	0.00000	0.00	<0.01	0.00000	0.03	NA	0.00000	0.20	0.16	0.00200			
1.0	0.10	NM	-	0.00	NM	-	0.00	NA	0.00000				0.00	NA	0.00000	0.03	<0.01	0.00002	0.06	<0.01	0.00004	0.19	0.20	0.00228			
1.2	0.11	NM	-	0.01	NM	-	0.04	NA	0.00000	0.00	NA	0.00000	0.04	NA	0.00000	0.08	<0.01	0.00005	0.10	<0.01	0.00006	0.18	0.07	0.00072	0.00	NA	0.00000
1.3																											
1.4	0.17	NM	-	0.04	NM	-	0.06	<0.01	0.00004	0.01	NA	0.00000	0.04	NA	0.00000	0.09	<0.01	0.00005	0.08	<0.01	0.00005	0.26	0.30	0.00468	0.07	0.06	0.00026
1.6	0.27	NM	-	0.16	NM	-	0.16	<0.01	0.00010	0.09	<0.01	0.00005	0.16	<0.01	0.00010	0.19	<0.01	0.00012	0.21	<0.01	0.00013	0.33	0.82	0.01651	0.14	0.01	0.00009
1.8	0.28	NM	-	0.16	NM	-	0.21	<0.01	0.00013	0.10	<0.01	0.00006	0.17	<0.01	0.00010	0.20	<0.01	0.00012	0.24	<0.01	0.00015	0.34	0.16	0.00340	0.18	0.06	0.00066
2.0	0.46	NM	-	0.31	NM	-	0.35	<0.01	0.00021	0.16	<0.01	0.00010	0.32	<0.01	0.00020	0.34	<0.01	0.00021	0.36	<0.01	0.00022	0.50	0.43	0.01301	0.28	0.06	0.00102
2.2	0.36	NM	-	0.31	NM	-	0.36	<0.01	0.00022	0.23	<0.01	0.00014	0.26	<0.01	0.00016	0.29	<0.01	0.00018	0.33	<0.01	0.00020	0.53	0.62	0.02015	0.24	0.05	0.00073
2.4	0.34	NM	-	0.26	NM	-	0.35	<0.01	0.00021	0.28	<0.01	0.00017	0.26	<0.01	0.00016	0.29	<0.01	0.00018	0.32	<0.01	0.00020	0.55	0.85	0.02862	0.27	0.17	0.00280
2.6	0.49	NM	-	0.29	NM	-	0.38	0.15	0.00348	0.34	<0.01	0.00021	0.37	<0.01	0.00023	0.35	<0.01	0.00021	0.37	0.34	0.00767	0.50	1.15	0.03502	0.27	0.19	0.00313
2.8	0.43	NM	-	0.33	NM	-	0.34	0.17	0.00353	0.27	<0.01	0.00016	0.33	<0.01	0.00020	0.36	0.32	0.00703	0.39	0.44	0.01047	0.58	1.12	0.03947	0.33	0.18	0.00362
3.0	0.45	NM	-	0.44	NM	-	0.36	0.18	0.00395	0.29	<0.01	0.00018	0.34	0.14	0.00290	0.39	0.20	0.00476	0.41	0.45	0.01125	0.60	1.12	0.04083	0.40	0.18	0.00439
3.2	0.33	NM	-	0.24	NM	-	0.33	0.13	0.00262	0.36	<0.01	0.00022	0.37	<0.01	0.00023	0.35	<0.01	0.00021	0.35	0.17	0.00363	0.46	0.85	0.02394	0.28	0.21	0.00359
3.4	0.35	NM	-	0.34	NM	-	0.33	<0.01	0.00020	0.29	<0.01	0.00018	0.37	<0.01	0.00023	0.23	<0.01	0.00014	0.28	<0.01	0.00017	0.61	0.62	0.02320	0.28	0.10	0.00171
3.6	0.49	NM	-	0.38	NM	-	0.39	<0.01	0.00024	0.23	<0.01	0.00014	0.38	<0.01	0.00023	0.33	<0.01	0.00020	0.36	<0.01	0.00022	0.62	0.43	0.01613	0.32	0.05	0.00098
3.8	0.46	NM	-	0.27	NM	-	0.35	<0.01	0.00021	0.29	<0.01	0.00018	0.35	<0.01	0.00021	0.34	<0.01	0.00021	0.39	<0.01	0.00024	0.58	0.72	0.02554	0.36	0.05	0.00110
4.0	0.45	NM	-	0.25	NM	-	0.26	<0.01	0.00016	0.19	<0.01	0.00012	0.36	<0.01	0.00022	0.29	<0.01	0.00018	0.31	<0.01	0.00019	0.44	0.43	0.01145	0.22	0.04	0.00054
4.2	0.40	NM	-	0.31	NM	-	0.32	<0.01	0.00020	0.29	<0.01	0.00018	0.31	<0.01	0.00019	0.34	<0.01	0.00021	0.37	<0.01	0.00023	0.51	0.10	0.00306	0.33	0.05	0.00101
4.4	0.33	NM	-	0.23	NM	-	0.24	<0.01	0.00015	0.15	<0.01	0.00009	0.23	<0.01	0.00014	0.24	<0.01	0.00015	0.24	<0.01	0.00015	0.39	0.03	0.00078	0.18	0.01	0.00011
4.6	0.22	NM	-	0.16	NM	-	0.15	<0.01	0.00009	0.07	<0.01	0.00004	0.13	<0.01	0.00008	0.17	<0.01	0.00010	0.18	<0.01	0.00011	0.33	<0.01	0.00020	0.12	<0.01	0.00007
4.8	0.00	NA	-	0.08	NM	-	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.12	<0.01	0.00007	0.00	NA	0.00000	0.00	NA	0.00000
4.85																											
5.0				0.00	NA	-													0.00	NA	0.00000						
Total Stream Width (m)	4.4			5.4			4.6			3.6			4.55			4.6			4.8			4.8			3.6		
Stake Measurement (m)	-			-			-			0.348			0.290			0.267			0.240			0.105			0.400		
Total Discharge (m^3/s)	-			-			0.01573			0.00221			0.00557			0.01437			0.03548			0.33324			0.02580		
Field Chemistry																											
Temp (^oC)	15.2			-			18.3			14.5			13.4			4.4			0			7.3			17.5		
pH	5.53			-			7.71			7.96			6.84			7.20			7.50			4.17			8.11		
EC (uS)	9			-			8			13			9			7			18			10			14		
DO (mg/L)	1.34			-			6.28			4.93			5.74			4.28			2.23			0.52			0.28		
Appearance	slightly tannic			-			slightly tannic			tannic			tannic			slightly tannic			slightly tannic			clear slight yellow tinge			clear		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
The Interval that stake and data logger are located for increased precision in water height fluctuations is 3.0m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate

Marathon PGM
Summary of Stream Field Data
Location S22

	13-Jul-09			5-Aug-09			2-Sep-09			6-Oct-09			5-Nov-09			6-May-10			14-Jul-10			30-Aug-10		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0																								
0.2													0.00	NA	0.00000									
0.25																								
0.3				0.00	NA	0.00000	0.00	NA	0.00000							0.00	NA	0.00000						
0.4				0.06	0.08	0.00022	0.08	0.08	0.00029				0.15	0.13	0.00119	0.13	0.34	0.00202						
0.6				0.00	NA	0.00000	0.00	NA	0.00000				0.06	0.39	0.00143	0.04	0.27	0.00066						
0.8				0.01	<0.01	0.00001	0.02	NA	0.00000				0.07	0.00	0.00000	0.08	0.07	0.00034						
1.0				0.08	<0.01	0.00005	0.03	NA	0.00000				0.08	0.00	0.00000	0.08	0.02	0.00010						
1.2	0.00	NA	0.00000	0.13	0.11	0.00087	0.09	0.16	0.00088	0.00	NA	0.00000	0.06	0.05	0.00018	0.07	0.13	0.00056				0.00	0.00	0.00000
1.3																			0.00	NA	0.00000			
1.4	0.05	0.05	0.00015	0.12	0.06	0.00044	0.09	0.11	0.00060	0.01	NA	0.00000	0.18	0.12	0.00132	0.19	0.15	0.00174	0.03	NA	0.00000	0.02	0.00	0.00000
1.6	0.17	0.05	0.00052	0.23	0.06	0.00084	0.21	0.20	0.00256	0.14	0.01	0.00009	0.26	0.35	0.00555	0.11	0.09	0.00060	0.00	NA	0.00000	0.00	0.00	0.00000
1.8	0.22	0.01	0.00013	0.31	0.07	0.00132	0.15	0.06	0.00055	0.10	0.03	0.00018	0.33	0.35	0.00705	0.19	0.35	0.00406	0.20	0.41	0.00500	0.08	0.03	0.00015
2.0	0.28	0.11	0.00188	0.31	0.19	0.00359	0.30	0.30	0.00549	0.23	0.07	0.00098	0.39	0.41	0.00975	0.35	0.30	0.00641	0.16	0.04	0.00039	0.21	0.03	0.00038
2.2	0.28	0.02	0.00034	0.30	0.21	0.00384	0.35	0.07	0.00149	0.21	0.12	0.00154	0.28	0.61	0.01042	0.39	0.30	0.00714	0.19	0.02	0.00023	0.26	0.03	0.00048
2.4	0.30	0.06	0.00110	0.34	0.48	0.00996	0.32	0.33	0.00644	0.19	0.14	0.00162	0.46	0.60	0.01684	0.39	0.32	0.00761	0.26	0.02	0.00032	0.23	0.01	0.00014
2.6	0.29	0.02	0.00035	0.38	0.48	0.01113	0.36	0.44	0.00966	0.30	0.20	0.00366	0.53	0.60	0.01940	0.39	0.33	0.00785	0.30	0.06	0.00110	0.21	0.01	0.00013
2.8	0.37	0.03	0.00068	0.48	0.51	0.01493	0.38	0.55	0.01275	0.37	0.18	0.00406	0.45	0.52	0.01427	0.48	0.58	0.01698	0.35	0.02	0.00043	0.30	0.04	0.00073
3.0	0.45	0.08	0.00220	0.46	0.50	0.01403	0.48	0.55	0.01610	0.42	0.17	0.00436	0.46	0.48	0.01347	0.52	0.69	0.02189	0.31	0.04	0.00076	0.28	0.10	0.00171
3.2	0.41	0.04	0.00100	0.32	0.42	0.00820	0.40	0.52	0.01269	0.35	0.14	0.00299	0.27	0.20	0.00329	0.48	0.61	0.01786	0.32	0.03	0.00059	0.30	0.06	0.00110
3.4	0.38	0.02	0.00046	0.37	0.34	0.00767	0.33	0.22	0.00443	0.29	0.09	0.00159	0.39	0.35	0.00833	0.43	0.00	0.00000	0.29	0.03	0.00053	0.30	0.01	0.00018
3.6	0.35	0.05	0.00107	0.39	0.06	0.00143	0.40	0.01	0.00024	0.32	0.06	0.00117	0.36	0.27	0.00593	0.45	0.08	0.00220	0.15	0.06	0.00055	0.23	0.03	0.00042
3.8	0.39	0.06	0.00143	0.28	0.05	0.00085	0.40	0.02	0.00049	0.36	0.05	0.00110	0.34	0.33	0.00684	0.42	0.35	0.00897	0.24	0.01	0.00015	0.32	0.00	0.00000
4.0	0.26	0.03	0.00048	0.31	0.02	0.00038	0.30	0.11	0.00201	0.23	0.07	0.00098	0.37	0.30	0.00677	0.35	0.24	0.00512	0.27	0.03	0.00049	0.20	0.04	0.00049
4.2	0.32	0.03	0.00059	0.21	0.08	0.00102	0.35	0.15	0.00320	0.28	0.05	0.00085	0.29	0.05	0.00088	0.41	0.15	0.00375	0.13	0.02	0.00016	0.26	0.01	0.00016
4.4	0.15	0.03	0.00027	0.18	0.02	0.00022	0.19	0.02	0.00023	0.15	0.00	0.00000	0.22	NA	0.00000	0.25	0.00	0.00000	0.00	NA	0.00000	0.08	0.01	0.00005
4.6	0.16	0.06	0.00059	0.00	NA	0.00000	0.21	0.00	0.00000	0.13	0.00	0.00000	0.00	NA	0.00000	0.21	0.00	0.00000				0.06	NA	0.00000
4.8	0.00	NA	0.00000				0.12	0.00	0.00000	0.00	NA	0.00000				0.17	0.00	0.00000				0.00	0.00	0.00000
4.85																0.00	NA	0.00000						
5.0							0.00	NA	0.00000													0.00	0.00	0.00000
Total Stream Width (m)	3.6			4.3			4.7			3.6			4.4			4.6			3.1			3.6		
Stake Measurement (m)	0.220																							
Total Discharge (m^3/s)	0.01323			0.08101			0.08012			0.02517			0.13291			0.11585			0.01069			0.00611		
Field Chemistry																								
Temp (^oC)	9.5			15.2			14.4			14.4			2.7			11.3			21			20.3		
pH	7.99			6.30			6.76			6.76			4.23			5.78			10.11			8.45		
EC (uS)	12			13			11			11			10			9			15			20		
DO (mg/L)	0.06			6.66			3.71			3.71			2.23			9.48			5.48			6.36		
Appearance	clear tr. floating particulate			clear slt. Yellow			clear slt. Yellow			clear slt. Yellow			slt. Tannic			clear, slt. Yellow			clear, slt. yellow/orange			clear, slt. Yellow		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
The Interval that stake and data logger are located for increased precision in water height fluctuations is 3.0m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate

Marathon PGM
Summary of Stream Field Data
Location S23

	7-Jul-08			31-Jul-08			28-Aug-08			25-Sep-08			20-Oct-08			17-Nov-08			9-Jun-09			14-Jul-09		
Distance Panel (m)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)
0																								
0.2	0.00	NA	-										0.00	NA	0.00000	0.00	NA	0.00000						
0.3				0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000							0.00	NA	0.00000	0.00	NA	0.00000
0.4	0.09	NM	-	0.03	0.35	0.00048	0.06	<0.01	0.00003	0.10	<0.01	0.00005	0.12	<0.01	0.00007	0.11	0.30	0.00201	0.02	NA	0.00000	0.07	0.18	0.00058
0.5																								
0.6	0.13	NM	-	0.10	0.75	0.00458	0.08	0.31	0.00151	0.13	0.39	0.00309	0.12	0.24	0.00176	0.12	0.11	0.00081	0.05	0.43	0.00130	0.08	0.24	0.00117
0.8	0.15	NM	-	0.12	1.03	0.00754	0.10	0.93	0.00567	0.12	0.50	0.00366	0.21	0.61	0.00781	0.17	0.83	0.00861	0.10	0.72	0.00440	0.10	0.36	0.00220
1.0	0.16	NM	-	0.14	0.74	0.00632	0.13	0.85	0.00674	0.10	0.97	0.00592	0.20	0.73	0.00891	0.20	0.91	0.01110	0.10	0.72	0.00440	0.10	0.19	0.00116
1.2	0.18	NM	-	0.17	1.57	0.01628	0.16	1.40	0.01366	0.16	1.36	0.01327	0.18	1.33	0.01460	0.17	1.14	0.01182	0.11	1.18	0.00793	0.11	0.67	0.00450
1.4	0.20	NM	-	0.21	1.45	0.01857	0.20	0.95	0.01159	0.18	0.88	0.00966	0.17	1.45	0.01504	0.19	1.22	0.01414	0.13	1.12	0.00885	0.13	0.92	0.00730
1.6	0.21	NM	-	0.20	1.68	0.02050	0.18	1.40	0.01537	0.13	1.44	0.01142	0.16	1.50	0.01464	0.16	1.88	0.01835	0.15	1.28	0.01171	0.14	0.83	0.00709
1.8	0.10	NM	-	0.10	2.00	0.01220	0.12	1.65	0.01208	0.11	1.77	0.01188	0.15	1.75	0.01601	0.17	2.02	0.02095	0.11	1.54	0.01035	0.13	1.06	0.00841
2.0	0.18	NM	-	0.19	2.29	0.02654	0.13	1.69	0.01340	0.11	2.16	0.01449	0.15	1.38	0.01263	0.12	1.87	0.01369	0.13	1.74	0.01379	0.12	1.06	0.00776
2.2	0.15	NM	-	0.12	2.23	0.01632	0.12	1.60	0.01171	0.09	1.86	0.01021	0.15	1.74	0.01592	0.17	2.18	0.02261	0.08	1.51	0.00736	0.13	0.13	0.00099
2.4	0.14	NM	-	0.10	0.27*	0.00165	0.09	0.06*	0.00033	0.10	<0.01*	0.00006	0.12	<0.01*	0.00007	0.17	0.38*	0.00394	0.11	0.85	0.00572	0.13	0.15	0.00119
2.6	0.14	NM	-	0.11	2.35	0.01577	0.15	2.01	0.01839	0.14	0.96	0.00820	0.15	1.56	0.01427	0.16	1.67	0.01630	0.10	0.43	0.00260	0.11	0.18	0.00121
2.8	0.19	NM	-	0.17	1.93	0.02001	0.14	1.66	0.01418	0.13	0.89	0.00706	0.15	1.12	0.01025	0.18	1.46	0.01603	0.12	1.08	0.00793	0.11	0.11	0.00074
3.0	0.18	NM	-	0.16	1.45	0.01415	0.14	1.34	0.01144	0.11	1.15	0.00772	0.16	1.07	0.01044	0.16	1.28	0.01249	0.12	1.31	0.00961	0.13	0.93	0.00737
3.2	0.18	NM	-	0.15	1.60	0.01464	0.15	1.58	0.01446	0.12	1.26	0.00922	0.16	1.32	0.01288	0.18	1.40	0.01537	0.13	1.02	0.00807	0.14	0.83	0.00709
3.4	0.20	NM	-	0.18	1.15	0.01263	0.14	1.01	0.00863	0.12	0.82	0.00600	0.15	0.80	0.00732	0.17	1.43	0.01483	0.11	0.85	0.00572	0.11	0.61	0.00409
3.6	0.17	NM	-	0.15	0.67	0.00613	0.12	0.53	0.00388	0.13	0.23	0.00182	0.15	<0.01	0.00009	0.19	<0.01	0.00012	0.10	0.46	0.00280	0.10	0.40	0.00244
3.7																								
3.8	0.11	NM	-	0.14	0.26	0.00222	0.11	<0.01	0.00007	0.07	<0.01	0.00004	0.10	<0.01	0.00006	0.15	<0.01	0.00009	0.04	0.33	0.00080	0.07	0.22	0.00094
3.9																								
4.0	0.04	NM	-	0.02	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.11	<0.01	0.00007	0.00	NA	0.00000	0.01	NA	0.00000
4.05																								
4.1				0.00	NA	0.00000																0.00	NA	0.00000
4.2	0.00	NA	-													0.03	NA	0.00000						
4.4																0.00	NA	0.00000						
Total Stream Width (m)	4.0			3.7			3.7			3.7			3.8			4.2			3.7			3.8		
Stake Measurement (m)	-			-			0.842			0.872			0.812			0.792								
Total Discharge (m^3/s)	-			0.21653			0.16314			0.12378			0.16278			0.20332			0.11333			0.06621		
Field Chemistry																								
Temp (^oC)	15.6			15.7			15.0			12.0			7.8			0.2			13.5			14.4		
pH	8.07			8.32			8.17			7.99			7.40			7.93			6.57			8.46		
EC (uS)	204			305			338			371			366			289			308			410		
DO (mg/L)	4.07			3.46			7.40			3.56			3.25			3.64			0.57			0.32		
Appearance	slightly tannic			slightly tannic			clear			clear			clear			clear			clear			clear		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
The interval that stake is located for increased precision in water height fluctuations is 2.2m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate
*[1] - River crossing adjusted due to storm causing change in stream channel (See photos)
* Flow taken behind large rock

Marathon PGM
Summary of Stream Field Data
Location S23

	4-Aug-09			1-Sep-09			5-Oct-09			4-May-10			6-Jul-10			2-Sep-10 *1		
Distance Panel (m)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)
0																0.00	NA	0.00000
0.2																0.10	NA	0.00000
0.3	0.00	NA	0.00000	0.00	NA	0.00000							0.00	NA	0.00000			
0.4	0.04	0.20	0.00037	0.06	0.01	0.00003				0.00	NA	0.00000	0.03	NA	0.00000	0.11	NA	0.00000
0.5							0.00	NA	0.00000									
0.6	0.05	0.17	0.00052	0.13	0.13	0.00103	0.05	NA	0.00000	0.10	0.03	0.00018	0.03	NA	0.00000	0.15	NA	0.00000
0.8	0.11	0.49	0.00329	0.15	0.66	0.00604	0.12	0.04	0.00029	0.11	0.04	0.00027	0.05	0.71	0.00217	0.17	0.71	0.00736
1.0	0.13	0.82	0.00650	0.17	1.08	0.01120	0.44	0.32	0.00859	0.13	0.29	0.00230	0.10	1.25	0.00763	0.16	1.25	0.01220
1.2	0.13	0.78	0.00619	0.18	1.35	0.01482	0.07	0.78	0.00333	0.12	0.49	0.00359	0.11	1.81	0.01215	0.16	1.81	0.01767
1.4	0.14	1.27	0.01085	0.18	1.77	0.01943	0.10	1.05	0.00641	0.11	0.58	0.00389	0.13	1.82	0.01443	0.09	1.82	0.00999
1.6	0.17	1.19	0.01234	0.19	1.45	0.01681	0.09	1.33	0.00730	0.12	0.18	0.00132	0.14	2.02	0.01725	0.05	2.02	0.00616
1.8	0.12	1.40	0.01025	0.18	1.65	0.01812	0.09	0.73	0.00401	0.11	1.45	0.00973	0.13	2.24	0.01776	0.00	2.24	0.00000
2.0	0.14	1.28	0.01093	0.19	1.70	0.01970	0.09	0.91	0.00500	0.14	0.84	0.00717	0.13	1.68	0.01332			
2.2	0.15	1.35	0.01235	0.19	2.22	0.02573	0.08	1.15	0.00561	0.13	0.78	0.00619	0.12	2.05	0.01501			
2.4	0.16	1.12	0.01093	0.20	1.97	0.02403	0.07	1.38	0.00589	0.14	1.41	0.01204	0.10	1.65	0.01007			
2.6	0.13	1.68	0.01332	0.21	1.97	0.02524	0.08	1.10	0.00537	0.15	1.31	0.01199	0.10	1.01	0.00616			
2.8	0.15	1.38	0.01263	0.21	1.40	0.01793	0.06	1.30	0.00476	0.12	1.21	0.00886	0.11	1.03	0.00691			
3.0	0.17	1.63	0.01690	0.18	1.65	0.01812	0.07	1.04	0.00444	0.12	1.44	0.01054	0.12	1.08	0.00791			
3.2	0.13	1.27	0.01007	0.16	1.46	0.01425	0.09	0.65	0.00357	0.11	0.98	0.00658	0.14	0.55	0.00470			
3.4	0.13	1.11	0.00880	0.17	1.25	0.01296	0.09	0.55	0.00302	0.07	1.02	0.00436	0.11	0.31	0.00208			
3.6	0.09	0.77	0.00423	0.13	0.83	0.00658	0.05	0.25	0.00057	0.06	0.46	0.00168	0.10	0.51	0.00311			
3.7							0.00	NA	0.00000									
3.8	0.07	0.50	0.00214	0.10	0.83	0.00506				0.07	0.31	0.00132	0.02	NA	0.00000			
3.9													0.00	NA	0.00000			
4.0	0.02	NA	0.00000	0.05	0.38	0.00072				0.00	NA	0.00000						
4.05	0.00	NA	0.00000			0.00000												
4.1						0.00000												
4.2				0.02	NA	0.00000												
4.4				0.00	NA	0.00000												
Total Stream Width (m)	3.8			3.9			3.2			3.6			3.6			1.8		
Stake Measurement (m)																		
Total Discharge (m^3/s)	0.15260			0.25781			0.06815			0.09200			0.14064			0.05338		
Field Chemistry																		
Temp (^oC)	13.1			12.8			9.1			11.3			18.4			15.7		
pH	8.43			8.20			8.19			7.88			7.85			7.60		
EC (uS)	285			200			352			289			390			-		
DO (mg/L)	5.53			3.13			1.24			10.60			8.60			8.57		
Appearance	clear slightly yellow			clear slightly yellow			clear			clear			clear with S.S.			clear		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
The interval that stake is located for increased precision in water height fluctuations is 2.2m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate
*1 - River crossing adjusted due to storm causing change in stream channel (See photos)
* Flow taken behind large rock

Marathon PGM
Summary of Stream Field Data
Location S24

	8-Jul-08			30-Jul-08			25-Aug-08			22-Sep-08			21-Oct-08			19-Nov-08			5-May-09			10-Jun-09		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0																								
0.2																								
0.4																								
0.6																								
0.8																								
0.95							0	NA	-	*	*	*				**	**	**						
1.0				0.00	NA	0.00000	0.01	NA	-	*	*	*				**	**	**	0.00	NA	0.00000	0.00	NA	0.00000
1.1										*	*	*	0.00	NA	-	**	**	**						
1.15																								
1.2	0.00	NA	-	0.04	NA	0.00000	0.01	NA	-	*	*	*	0.02	NA	-	**	**	**	0.05	1.18	0.00360	0.01	<0.01	0.00001
1.4	0.03	NM	-	0.06	0.41	0.00150	0.04	NA	-	*	*	*	0.05	NA	-	**	**	**	0.04	0.95	0.00232	0.01	<0.01	0.00001
1.6	0.10	NM	-	0.04	NA	0.00000	0	NA	-	*	*	*	0.00	NA	-	**	**	**	0.03	NA	0.00000	0.00	NA	0.00000
1.75																								
1.8	0.00	NA	-	0.00	NA	0.00000				*	*	*				**	**	**	0.05	0.36	0.00110			
2.0																			0.00	NA	0.00000			
2.2																								
2.4																								
2.6																								
2.8																								
3.0																								
3.2																								
3.4																								
3.6																								
3.8																								
4.0																								
Total Stream Width (m)	0.6			0.8			0.65			*			0.5			**			0.8			0.6		
Stake Measurement (m)	-			-			0.742			*			0.699			0.675			0.694					
Total Discharge (m^3/s)	-			0.00150			-			*			-			**			0.00702			-		
Field Chemistry																								
Temp (^{o}C)	10.9			12.0			11.7			*			4.4			0.9			2.4			8.7		
pH	8.21			8.19			8.23			*			8.18			8.16			7.93			6.03		
EC (uS)	405			369			415			*			410			408			273			436		
DO (mg/L)	4.19			5.27			8.10			*			3.95			4.76			2.31			0.92		
Appearance	cloudy white			slightly tannic			clear			*			clear			cloudy white			light brown cloudy turbid			slightly cloudy turbid		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
The interval that stake is located for increased precision in water height fluctuations 1.4m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate
* Due to the low water conditions the Pic River was non navigatable by boat
** The stream was frozen and completely drifted in with snow making a stream profile very inaccurate and difficult

Marathon PGM
Summary of Stream Field Data
Location S24

	14-Jul-09			4-Aug-09			1-Sep-09			8-Oct-09			3-May-10			8-Jul-10			1-Sep-10		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0																					
0.2																					
0.4																					
0.6																					
0.8																					
0.95													**	**	**	DRY	NA	NA	DRY	NA	NA
1.0	0.00	NA	0.00000				0.00	NA	0.00000	0.00	NA	0.00000	**	**	**	DRY	NA	NA	DRY	NA	NA
1.1													**	**	**	DRY	NA	NA	DRY	NA	NA
1.15				0.00	NA	0.00000										DRY	NA	NA	DRY	NA	NA
1.2	0.03	<0.01	0.00001	0.02	<0.01	0.00001	0.09	0.14	0.00077	0.05	1.10	0.00336	**	**	**	DRY	NA	NA	DRY	NA	NA
1.4	0.02	<0.01	0.00002	0.03	<0.01	0.00002	0.07	0.22	0.00094	0.06	0.08	0.00029	**	**	**	DRY	NA	NA	DRY	NA	NA
1.6				0.03	<0.01	0.00002	0.12	0.26	0.00167	0.07	0.08	0.00030	**	**	**	DRY	NA	NA	DRY	NA	NA
1.75				0.00	NA	0.00000	0.00	0.00	0.00000	0.00	NA	0.00000				DRY	NA	NA	DRY	NA	NA
1.8	0.03	NA	0.00000										**	**	**	DRY	NA	NA	DRY	NA	NA
2.0	0.00	NA	0.00000																		
2.2																					
2.4																					
2.6																					
2.8																					
3.0																					
3.2																					
3.4																					
3.6																					
3.8																					
4.0																					
Total Stream Width (m)	1.0			0.6			0.5			0.8			0.0			0.0			0.0		
Stake Measurement (m)																					
Total Discharge (m^3/s)	-			0.00004			0.00337			0.00395			0.00000			0.00000			0.00000		
Field Chemistry																					
Temp (^oC)	11.9			11.0			11.9			6.8			-			-			-		
pH	8.28			8.47			8.35			8.38			-			-			-		
EC (uS)	-			366			349			457			-			-			-		
DO (mg/L)	0.47			6.32			1.96			2.20			-			-			-		
Appearance	light brown cloudy turbid			slt. cloudy/grey			slt. cloudy/grey			clear			-			-			-		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
The interval that stake is located for increased precision in water height fluctuations 1.4m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate
* Due to the low water conditions the Pic River was non navigatable by boat
** The stream was frozen and completely drifted in with snow making a stream profile very inaccurate and difficult

Marathon PGM
Summary of Stream Field Data
Location S25

	8-Jul-08			30-Jul-08			25-Aug-08			22-Sep-08			21-Oct-08			19-Nov-08			5-May-09			10-Jun-09		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0.0																								
0.2																								
0.4																								
0.6																						0.00	NA	0.00000
0.8	0.00	NA	-	0.00	NA	0.00000	DRY	NA	-	*	*	*	0.00	NA	0.00000	**	**	**	0.00	NA	0.00000	0.10	0.26	0.00160
0.95																								
1.0	0.10	NM	-	0.04	0.61	0.00149	DRY	NA	-	*	*	*	0.07	<0.01	0.00004	**	**	**	0.10	0.62	0.00380	0.02	NA	0.00000
1.2	0.06	NM	-	0.08	<0.01	0.00004	DRY	NA	-	*	*	*	0.00	NA	0.00000	**	**	**	0.10	0.46	0.00210	0.00	NA	0.00000
1.3				0.00	NA	0.00000	DRY	NA	-	*	*	*				**	**	**	0.00	NA	0.00000			
1.35																								
1.4	0.00	NA	-				DRY	NA	-	*	*	*				**	**	**						
1.6																								
1.8																								
2.0																								
Total Stream Width (m)	0.6			0.5			-			*			0.4			**			0.5			0.6		
Total Discharge (m^3/s)	-			0.00153			-			*			0.00004			**			0.00590			0.00160		
Field Chemistry																								
Temp (^{o}C)	11.2			12.4			-			*			4.2			**			1.7			7.7		
pH	8.02			8.04			-			*			8.08			**			7.94			7.24		
EC (uS)	363			343			-			*			320			**			281			380		
DO (mg/L)	3.65			5.80			-			*			3.87			**			3.40			0.74		
Appearance	clear			clear			-			*			clear			**			light brown turbid silty			cloudy turbid		

	14-Jul-09			4-Aug-09			1-Sep-09			8-Oct-09			8-Jul-10			1-Sep-10		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0.0																		
0.2																		
0.4																		
0.6																		
0.8	0.00	NA	0.00000				0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	DRY	NA	NA
0.95				0.00	NA	0.00000										DRY	NA	NA
1.0	0.03	<0.01	0.00002	0.01	<0.01	0.00001	0.08	0.44	0.00215	0.02	NA	0.00000	0.10	0.13	0.00079	DRY	NA	NA
1.2	0.03	<0.01	0.00001	0.05	<0.01	0.00003	0.14	0.21	0.00179	0.09	0.53	0.00218	0.11	0.04	0.00027	DRY	NA	NA
1.3	0.00	NA	0.00000							0.09	0.02	0.00005				DRY	NA	NA
1.35				0.00	NA	0.00000										DRY	NA	NA
1.4							0.10	0.04	0.00024	0.09	0.03	0.00012	0.07	0.05	0.00021	DRY	NA	NA
1.6							0.00	NA	0.00000	0.03	NA	0.00000	0.00	NA	0.00000	DRY	NA	NA
1.8										0.00	NA	0.00000						
2.0																		
Total Stream Width (m)	0.5			0.4			0.8			1.0			0.8			0.0		
Total Discharge (m^3/s)	0.00003			0.00003			0.00418			0.00236			0.00127			-		
Field Chemistry																		
Temp (^{o}C)	11.4			12.0			10.3			6.6			13.8			-		
pH	8.3			8.35			8.03			8.18			7.97			-		
EC (uS)	471			385			377			432			215			-		
DO (mg/L)	0.27			6.30			1.94			2.36			7.36			-		
Appearance	light grey cloudy			slt. cloudy, lt. grey			slt. cloudy, lt. grey			slt. cloudy, lt. grey			slt. cloudy, lt. grey			-		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
DRY-Streambed is dry
The lower limit of the flow meter is 0.01ft/s
Could not advance measuring stake through stream bed
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate
* Due to the low water conditions the Pic River was non navigatable by boat
** The upper portion of the Pic River was frozen and was non navigatable by boat

Marathon PGM
Summary of Stream Field Data
Location S26

	1-Jul-08			29-Jul-08			27-Aug-08			24-Sep-08			23-Oct-08			18-Nov-08			8-May-09			9-Jun-09		
Distance Panel (m)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)
0																								
0.2																								
0.4																								
0.6																								
0.8																								
1.0																								
1.1																								
1.2	0.00	NA	-																					
1.3				0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000
1.35																								
1.4	0.06	NM	-	0.05	NA	0.00000	0.06	<0.01	0.00003	0.06	<0.01	0.00003	0.07	<0.01	0.00003	0.07	<0.01	0.00003	0.16	0.07	0.00048	0.03	0.03	0.00005
1.6	0.08	NM	-	0.10	0.30	0.00183	0.06	<0.01	0.00004	0.07	0.19	0.00081	0.08	0.36	0.00176	0.10	0.25	0.00153	0.18	0.07	0.00072	0.06	0.07	0.00024
1.8	0.10	NM	-	0.15	<0.01	0.00009	0.10	<0.01	0.00006	0.12	<0.01	0.00007	0.14	<0.01	0.00009	0.12	<0.01	0.00007	0.22	0.26	0.00352	0.13	0.03	0.00026
2.0	0.12	NM	-	0.13	<0.01	0.00008	0.08	<0.01	0.00005	0.11	<0.01	0.00007	0.13	<0.01	0.00008	0.16	<0.01	0.00010	0.26	2.23	0.03538	0.14	0.03	0.00028
2.1																								
2.2	0.07	NM	-	0.08	<0.01	0.00003	0.04	<0.01	0.00002	0.09	<0.01	0.00003	0.11	<0.01	0.00005	0.12	<0.01	0.00007	0.16	0.98	0.00720	0.06	0.03	0.00008
2.25				0.00	NA	0.00000				0.00	NA	0.00000										0.00	NA	0.00000
2.3							0.00	NA	0.00000				0.00	NA	0.00000				0.00	NA	0.00000			
2.4	0.00	NA	-													0.00	NA	0.00000						
2.6																								
2.8																								
3.0																								
3.2																								
3.4																								
3.6																								
3.8																								
4.0																								
Total Stream Width (m)	1.2			1.0			1.0			1.0			1.0			1.1			1.0			1.0		
Stake Measurement (m)	-			-			0.985			0.968			0.650			0.954			0.850			0.969		
Total Discharge (m^3/s)	-			0.00203			0.00019			0.00101			0.00200			0.00180			0.04731			0.00090		
Field Chemistry																								
Temp (^oC)	11.4			15.3			14.6			12.6			5.7			0.5			4.9			9.8		
pH	6.10			6.90			7.22			6.80			6.60			6.74			7.34			7.98		
EC (uS)	9			12			11			10			9			16			10			11		
DO (mg/L)	2.28			5.64			5.98			3.78			4.48			3.80			1.21			0.32		
Appearance	clear			orangish			clear			clear			clear			clear			clear w/ yellow tinge			clear		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
The interval that stake is located for increased precision in water height fluctuations is 2.0m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate

Marathon PGM
Summary of Stream Field Data
Location S26

	20-Jul-09			6-Aug-09			3-Sep-09			6-Oct-09			5-Nov-09			7-May-10			13-Jul-10			31-Aug-10		
Distance Panel (m)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)	Depth (m)	Velocity (ft/s)	Flow (m^3/s)
0																								
0.2																								
0.4																								
0.6																								
0.8																								
1.0																								
1.1										0.00	NA	0.00000												
1.2										0.06	0.06		0.00	NA	0.00000									
1.3																								
1.35																0.00	NA	0.00000						
1.4	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.01	0.08	0.00006	0.16	NA	0.00000	0.09	0.02	0.00007	0.00	NA	0.00000	0.00	NA	0.00000
1.6	0.06	0.01	0.00004	0.08	0.21	0.00102	0.09	0.06	0.00033	0.13	0.20	0.00159	0.19	0.03	0.00035	0.07	0.09	0.00038	0.05	0.02	0.00006	0.05	0.05	0.00015
1.8	0.11	0.02	0.00013	0.13	0.06	0.00048	0.11	0.11	0.00074	0.12	0.07	0.00051	0.23	0.02	0.00028	0.13	0.03	0.00024	0.06	0.06	0.00022	0.11	0.01	0.00007
2.0	0.12	0.03	0.00022	0.14	0.01	0.00009	0.15	0.03	0.00027	0.09	0.05	0.00021	0.25	0.18	0.00275	0.13	0.24	0.00190	0.07	0.05	0.00021	0.08	0.02	0.00010
2.1										0.00	NA	0.00000												
2.2	0.04	0.01	0.00002	0.05	<0.01	0.00002	0.06	0.01	0.00002				0.19	0.32	0.00232	0.08	0.29	0.00088	0.08	0.03	0.00015	0.04	0.07	0.00017
2.25	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000				0.00	NA	0.00000	0.00	NA	0.00000						
2.3																								
2.4																			0.03	0.02	0.00004	0.00	NA	0.00000
2.6																			0.00	NA	0.00000			
2.8																								
3.0																								
3.2																								
3.4																								
3.6																								
3.8																								
4.0																								
Total Stream Width (m)	0.9			0.9			0.9			0.9			0.9			0.9			1.2			1.0		
Stake Measurement (m)																								
Total Discharge (m^3/s)	0.00041			0.00161			0.00136			0.00237			0.00569			0.00348			0.00068			0.00049		
Field Chemistry																								
Temp (^oC)	13.3			12.3			11.3			8.5			8.5			5.7			18.0			17.0		
pH	6.45			6.97			6.76			7.97			7.97			8.34			7.79			6.57		
EC (uS)	16			14			15			12			12			6			13			-		
DO (mg/L)	1.85			3.31			4.81			3.48			3.48			11.92			7.45			6.75		
Appearance	clear			clear			clear			clear			clear			clear, slt. Ylw, tr. SS			clear, slt. Ylw, tr. SS			clear, slt. Ylw, tr. Org.		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
The interval that stake is located for increased precision in water height fluctuations is 2.0m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate

Marathon PGM
Summary of Stream Field Data
Location S27

	1-Aug-08	28-Aug-08	24-Sep-08	23-Oct-08	18-Nov-08	8-May-09	9-Jun-09	7-Aug-09	3-Sep-09	7-Oct-09	4-Nov-09	7-May-10	14-Jul-10	31-Aug-10
Field Chemistry														
Temp (^{o}C)	13.4	11.6	11.8	3.5	0.0	3.6	9.2	8.6	9.6	7.4	3.3	2.1	*[1]	*[1]
pH	8.07	7.94	7.84	7.87	8.03	8.78	6.63	8.34	8.24	7.36	6.76	7.66	*[1]	*[1]
EC (uS)	264	310	325	310	90	73	188	183	139	294	105	114	*[1]	*[1]
DO (mg/L)	8.63	7.14	4.73	4.60	4.38	3.31	0.71	4.30	5.10	1.65	1.92	14.78	*[1]	*[1]
Appearance	clear	clear	clear	clear		clear	clear	clear	clear	clear	clear	clear	*[1]	*[1]
Stake Measurement (m)	-	0.65	0.648	0.734	0.59	0.574	-	-	-	-	-	-	-	-

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
Stake measurements are taken from the top of the stake to the surface of the water
The total height of the stake above the streambed is 0.705m
*[1] - streambed dry

Marathon PGM
Summary of Stream Field Data
Location S28

	1-Jul-08			28-Jul-08			25-Aug-08			22-Sep-08			21-Oct-08			17-Nov-08			10-Jun-09			15-Jul-09		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0																								
0.2																								
0.4	0.00	NA	-										0.00	NA	0.00000	0.00	NA	0.00000						
0.6	0.25	NM	-										0.07	<0.01	0.00004	0.11	0.56	0.00376						
0.7																								
0.8	0.28	NM	-	DRY	NA	NA	DRY	NA	NA	DRY	NA	NA	0.06	<0.01	0.00004	0.11	0.60	0.00403				0.00	NA	0.00000
1.0	0.29	NM	-	DRY	NA	NA	DRY	NA	NA	DRY	NA	NA	0.05	<0.01	0.00003	0.08	0.50	0.00244	0.00	NA	0.00000	0.01	<0.01	0.00001
1.2	0.24	NM	-	DRY	NA	NA	DRY	NA	NA	DRY	NA	NA	0.05	<0.01	0.00003	0.06	0.25	0.00092	0.04	0.33	0.00080	0.01	<0.01	0.00001
1.4	0.17	NM	-	DRY	NA	NA	DRY	NA	NA	DRY	NA	NA	0.06	<0.01	0.00004	0.06	0.27	0.00099	0.03	0.26	0.00048	0.02	<0.01	0.00001
1.6	0.17	NM	-	DRY	NA	NA	DRY	NA	NA	DRY	NA	NA	0.07	<0.01	0.00004	0.14	0.15	0.00128	0.04	0.26	0.00064	0.03	<0.01	0.00002
1.8	0.23	NM	-	DRY	NA	NA	DRY	NA	NA	DRY	NA	NA	0.08	<0.01	0.00005	0.12	<0.01	0.00007	0.05	0.30	0.00090	0.01	<0.01	0.00000
2.0	0.23	NM	-	DRY	NA	NA	DRY	NA	NA	DRY	NA	NA	0.07	<0.01	0.00004	0.11	<0.01	0.00007	0.00	NA	0.00000	0.00	NA	0.00000
2.05				DRY	NA	NA	DRY	NA	NA	DRY	NA	NA												
2.1																								
2.2	0.00	NA	-										0.00	NA	0.00000	0.00	NA	0.00000						
2.4																								
2.6																								
2.8																								
3.0																								
Total Stream Width (m)	1.4			-			-			-			1.8			1.8			1.0			1.2		
Total Discharge (m^3/s)	-			-			-			-			0.00031			0.01355			0.00282			0.00005		
Field Chemistry																								
Temp (^{o}C)	12.8			-			-			-			4.1			0.5			11.5			13.8		
pH	7.15			-			-			-			7.20			7.52			7.35			7.96		
EC (uS)	28			-			-			-			30			26			70			71		
DO (mg/L)	1.60			-			-			-			4.02			3.67			0.66			8.02		
Appearance	slightly tannic			-			-			-			slightly tannic			tannic			slightly yellow tinge			clear, yellow tinge		

	5-Aug-09			2-Sep-09			5-Oct-09			3-Nov-09			4-May-10			1-Jun-10			15-Jul-10			2-Sep-10		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0																								
0.2																								
0.4							0.00	NA	0.00000	0.00	NA	0.00000												
0.6	0.00	NA	0.00000	0.00	NA	0.00000	0.01	NA	0.00000	0.12	0.03	0.00022												
0.7													0.00	NA	0.00000	DRY	NA	NA	DRY	NA	NA	DRY	NA	NA
0.8	0.03	<0.01	0.00002	0.04	0.64	0.00156	0.02	NA	0.00000	0.13	0.24	0.00190	0.06	0.24	0.00066	DRY	NA	NA	DRY	NA	NA	DRY	NA	NA
1.0	0.04	0.35	0.00085	0.03	0.45	0.00082	0.02	NA	0.00000	0.18	0.66	0.00725	0.06	0.66	0.00242	DRY	NA	NA	DRY	NA	NA	DRY	NA	NA
1.2	0.05	0.45	0.00137	0.05	0.46	0.00140	0.02	NA	0.00000	0.18	0.75	0.00824	0.08	0.75	0.00366	DRY	NA	NA	DRY	NA	NA	DRY	NA	NA
1.4	0.05	0.26	0.00079	0.03	0.22	0.00040	0.03	0.36	0.00066	0.20	0.49	0.00598	0.10	0.49	0.00299	DRY	NA	NA	DRY	NA	NA	DRY	NA	NA
1.6	0.07	0.36	0.00154	0.04	0.25	0.00061	0.05	0.15	0.00046	0.25	0.51	0.00778	0.12	0.51	0.00373	DRY	NA	NA	DRY	NA	NA	DRY	NA	NA
1.8	0.09	0.35	0.00192	0.05	0.21	0.00064	0.04	0.05	0.00012	0.30	0.51	0.00933	0.14	0.51	0.00436	DRY	NA	NA	DRY	NA	NA	DRY	NA	NA
2.0	0.07	0.16	0.00043	0.01	NA	0.00000	0.05	0.06	0.00011	0.16	0.24	0.00234	0.16	0.24	0.00146	DRY	NA	NA	DRY	NA	NA	DRY	NA	NA
2.05	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000				0.00	NA	0.00000									
2.1																								
2.2										0.00	NA	0.00000												
2.4																								
2.6																								
2.8																								
3.0																								
Total Stream Width (m)	1.5			1.5			1.5			1.8			1.35			-			-			-		
Total Discharge (m^3/s)	0.00692			0.00544			0.00135			0.04304			0.01928			0.00000			0.00000			0.00000		
Field Chemistry																								
Temp (^{o}C)	15.0			13.4			8.7			3.5			12.1			-			-			-		
pH	8.14			7.65			7.94			7.37			6.74			-			-			-		
EC (uS)	40			50			100			17			25			-			-			-		
DO (mg/L)	5.87			4.34			1.74			1.60			12.10			-			-			-		
Appearance	clear, yellow			clear, yellow			clear, yellow			slight tannic			clear, yellow			-			-			-		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
DRY - Dry steambed
The lower limit of the flow meter is 0.01ft/s
Could not advance measuring stake through stream bed
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate

Marathon PGM
Summary of Stream Field Data
Location S29

	30-Jun-08			28-Jul-08			25-Aug-08			24-Sep-08			21-Oct-08			17-Nov-08			5-May-09			11-Jun-09		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0.0																								
0.2																								
0.4																								
0.6																								
0.8																								
1.0																								
1.2																								
1.4																								
1.6																								
1.8																								
2.0																								
2.2																								
2.4	0.00	NA	-																					
2.55																								
2.6	0.02	NM	-										0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000			
2.8	0.06	NM	-										0.01	NA	0.00000	0.03	NA	0.00000	0.01	NA	0.00000			
2.85				0.00	NA	0.00000																		
2.90							0.00	NA	0.00000	0.00	NA	0.00000										0.00	NA	0.00000
3.0	0.03	NM	-	0.05	<0.01	0.00003	0.03	NA	0.00000	0.05	<0.01	0.00002	0.11	0.32	0.00215	0.12	0.33	0.00242	0.05	0.69	0.00210	0.03	0.33	0.00045
3.2	0.15	NM	-	0.07	<0.01	0.00004	0.03	NA	0.00000	0.06	<0.01	0.00004	0.30	<0.01	0.00018	0.15	0.32	0.00293	0.13	1.18	0.00937	0.05	0.49	0.00150
3.4	0.17	NM	-	0.09	<0.01	0.00005	0.05	NA	0.00000	0.07	<0.01	0.00004	0.13	<0.01	0.00008	0.15	<0.01	0.00009	0.11	0.72	0.00484	0.08	0.39	0.00192
3.6	0.20	NM	-	0.09	<0.01	0.00005	0.06	<0.01	0.00004	0.09	<0.01	0.00005	0.16	<0.01	0.00010	0.16	<0.01	0.00010	0.13	0.36	0.00286	0.06	0.33	0.00120
3.8	0.16	NM	-	0.06	0.65	0.00238	0.02	NA	0.00000	0.05	NA	0.00000	0.12	<0.01	0.00007	0.13	<0.01	0.00008	0.11	0.30	0.00198	0.06	0.16	0.00060
3.85																								
3.90																								
4.0	0.13	NM	-	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.10	0.16	0.00100	0.05	0.16	0.00050
4.2	0.00	NA	-																0.00	NA	0.00000	0.00	NA	0.00000
Total Stream Width (m)	1.8			1.2			1.1			1.1			1.4			1.4			1.6			1.3		
Stake Measurement (m)	-			-			0.608			0.582			0.512			0.497			0.490			0.545		
Total Discharge (m^3/s)	-			0.00256			0.00004			0.00016			0.00258			0.00561			0.02215			0.00617		
Field Chemistry																								
Temp (^oC)	10.0			11.9			12.5			10.0			5.6			0.9			6.6			9.7		
pH	7.26			7.68			7.67			7.23			7.25			7.70			7.45			7.52		
EC (uS)	46			94			96			69			60			37			64			71		
DO (mg/L)	1.50			3.64			6.43			4.55			3.61			3.75			1.11			0.74		
Appearance	clear			clear			clear			clear			clear			clear			clear			clear		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
The interval that stake is located for increased precision in water height fluctuations is 3.4m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate

Marathon PGM
Summary of Stream Field Data
Location S29

	15-Jul-09			5-Aug-09			31-Aug-09			8-Oct-09			5-Nov-09			4-May-10			15-Jul-10			2-Sep-10		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0.0																								
0.2																								
0.4																								
0.6																								
0.8																								
1.0																								
1.2																								
1.4																								
1.6																								
1.8																								
2.0																			0.00	NA	0.00000			
2.2													0.00	NA	0.00000				0.00	0.00	0.00000			
2.4													0.04	0.02	0.00005				0.00	0.00	0.00000	0.00	NA	0.00000
2.55																0.00	NA	0.00000						
2.6							0.00	NA	NA	0.00	NA	0.00000	0.05	0.77	0.00235	0.01	NA	0.00000	0.00	0.00	0.00000	0.00	NA	0.00000
2.8							0.06	0.26	0.00095	0.02	NA	0.00000	0.09	1.31	0.00719	0.05	0.15	0.00046	0.00	0.00	0.00000	0.00	NA	0.00000
2.85																								
2.90	0.00	NA	0.00000																					
3.0	0.01	NA	0.00000	0.07	0.63	0.00202	0.07	0.55	0.00235	0.07	0.21	0.00090	0.14	0.29	0.00248	0.06	0.52	0.00190	0.00	0.00	0.00000	0.00	NA	0.00000
3.2	0.02	NA	0.00000	0.10	0.77	0.00470	0.08	0.93	0.00454	0.08	0.06	0.00029	0.15	0.20	0.00183	0.08	0.72	0.00351	0.00	0.00	0.00000	0.03	0.10	0.00018
3.4	0.07	0.14	0.00060	0.07	0.31	0.00132	0.12	0.62	0.00454	0.10	0.04	0.00024	0.08	0.02	0.00010	0.11	0.16	0.00107	0.02	0.05	0.00006	0.03	0.09	0.00016
3.6	0.06	0.31	0.00113	0.07	0.15	0.00064	0.12	0.40	0.00293	0.10	0.17	0.00104	0.00	NA	0.00000	0.12	0.03	0.00022	0.03	0.09	0.00016	0.03	0.09	0.00016
3.8	0.06	0.18	0.00066	0.09	0.20	0.00069	0.07	0.18	0.00077	0.05	0.01	0.00003				0.07	0.01	0.00004	0.01	0.09	0.00005	0.00	NA	0.00000
3.85				0.00	NA	0.00000																		
3.90																						0.00	NA	0.00000
4.0	0.05	0.06	0.00018				0.03	NA	0.00000	0.03	NA	0.00000				0.00	NA	0.00000	0.00	0.00	0.00000			
4.2	0.00	NA	0.00000				0.00	NA	0.00000										0.00	0.00	0.00000			
Total Stream Width (m)	1.3			0.9			1.8			1.4			1.6			1.45			2.20			1.50		
Stake Measurement (m)																								
Total Discharge (m^3/s)	0.00257			0.00937			0.01512			0.00250			0.00440			0.00721			0.00028			0.00051		
Field Chemistry																								
Temp (^oC)	9.9			10.0			11.1			8.0			3.1			7.9			14.3			14.8		
pH	8.15			7.46			7.16			7.46			6.28			7.54			7.87			6.13		
EC (uS)	53			47			44			68			24			30			72			-		
DO (mg/L)	6.47			3.90			1.96			2.00			1.83			11.12			7.29			6.81		
Appearance	clear			clear			clear			clear			clear			clear			clear			clear		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
The lower limit of the flow meter is 0.01ft/s
The interval that stake is located for increased precision in water height fluctuations is 3.4m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate

Marathon PGM
Summary of Stream Field Data
Location S30

	7-Jul-08	30-Jul-08	29-Aug-08	25-Sep-08	20-Oct-08	17-Nov-08	9-Jun-09	14-Jul-09	4-Aug-09	1-Sep-09	5-Oct-09	4-May-10	6-Jul-10	2-Sep-10
Field Chemistry														
Temp (^{o}C)	18.6	17.2	15.1	12.3	10.7	4.1	13.5	15.9	15.6	14.7	11.3	7.2	18.4	18.1
pH	7.54	8.14	7.55	7.49	7.20	7.67	6.40	7.40	7.86	7.54	7.30	7.79	6.87	6.08
EC (uS)	43	373	115	55	46	27	57	47	39	27	64	44	52	-
DO (mg/L)	2.88	3.73	6.09	3.12	2.85	3.00	0.40	0.27	5.96	2.65	1.24	11.16	8.18	8.42
Appearance	clear	clear	clear	clear	clear	clear	yellow tinge	clear	clear	clear	Slt. Yellow	clear	clear	clear
Stake Measurement (m)	-	-	0.206	0.39	0.449	0.478	-	-	-		-	-	-	-

Notes
Section of stream is too wide and deep for a stream crossing.
Stake measurements are taken from the top of the stake to the surface of the water
The total height of the stake above the streambed is 0.579m

Marathon PGM
Summary of Stream Field Data
Location S31

	7-Jul-08			30-Jul-08			29-Aug-08			25-Sep-08			20-Oct-08			17-Nov-08			9-Jun-09			4-Aug-09		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0																								
0.2	0.00	NA	-																					
0.3																								
0.4	0.26	NM	-	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	FROZEN			0.00	NA	0.00000			
0.45																						0.00	NA	0.00000
0.6	0.29	NM	-	0.40	0.38	0.00927	0.38	<0.01	0.00023	0.25	0.14	0.00214	0.54	0.85	0.02800	FROZEN			0.16	0.33	0.00320	0.36	0.18	0.00346
0.8	0.36	NM	-	0.41	0.16	0.00400	0.40	<0.01	0.00024	0.27	<0.01	0.00016	0.47	0.52	0.01491	FROZEN			0.29	0.30	0.00522	0.41	0.32	0.00800
1.0	0.41	NM	-	0.39	0.29	0.00690	0.40	<0.01	0.00024	0.28	0.32	0.00547	0.44	1.45	0.03892	FROZEN			0.22	0.13	0.00176	0.33	0.66	0.01329
1.2	0.37	NM	-	0.38	<0.01	0.00023	0.33	<0.01	0.00020	0.26	<0.01	0.00016	0.51	1.30	0.04044	FROZEN			0.22	0.07	0.00088	0.33	0.40	0.00805
1.4	0.36	NM	-	0.35	0.51	0.01089	0.19	0.24	0.00278	0.20	0.11	0.00134	0.53	1.19	0.03847	FROZEN			0.26	0.16	0.00260	0.30	0.62	0.01135
1.6	0.31	NM	-	0.34	0.56	0.01161	0.29	0.15	0.00265	0.22	0.22	0.00295	0.58	1.12	0.03963	FROZEN			0.30	0.16	0.00300	0.31	0.68	0.01286
1.8	0.33	NM	-	0.39	0.50	0.01190	0.32	<0.01	0.00020	0.24	0.20	0.00293	0.57	1.08	0.03755	FROZEN			0.42	0.39	0.01009	0.35	0.64	0.01366
2.0	0.42	NM	-	0.44	0.61	0.01637	0.37	<0.01	0.00023	0.35	<0.01	0.00021	0.53	1.06	0.03427	FROZEN			0.48	0.59	0.01729	0.40	0.56	0.01366
2.2	0.37	NM	-	0.40	0.90	0.02196	0.34	0.20	0.00415	0.31	<0.01	0.00019	0.55	0.62	0.02080	FROZEN			0.44	0.43	0.01145	0.42	0.70	0.01793
2.4	0.31	NM	-	0.33	0.82	0.01651	0.29	0.36	0.00637	0.28	0.19	0.00325	0.52	1.30	0.04124	FROZEN			0.40	0.39	0.00961	0.28	0.85	0.01452
2.6	0.25	NM	-	0.29	0.40	0.00708	0.29	0.13	0.00230	0.12	<0.01	0.00007	0.38	1.10	0.02550	FROZEN			0.30	0.30	0.00540	0.25	0.25	0.00381
2.8	0.16	NM	-	0.22	<0.01	0.00013	0.23	<0.01	0.00014	0.03	NA	0.00000	0.24	0.93	0.01021	FROZEN			0.20	0.30	0.00360	0.24	0.24	0.00351
2.9										0.00	NA	0.00000	0.22	<0.01	0.00013	FROZEN								
3.0	0.10	NM	-	0.16	<0.01	0.00010	0.13	<0.01	0.00008							FROZEN			0.09	0.16	0.00088	0.12	0.08	0.00059
3.2	0.04	NM	-	0.09	NA	0.00000	0.05	<0.01	0.00003				0.17	<0.01	0.00013	FROZEN			0.00	NA	0.00000	0.08	0.02	0.00010
3.4	0.00	NA	-	0.03	NA	0.00000	0.00	NA	0.00000				0.11	<0.01	0.00007	FROZEN						0.01	<0.01	0.00001
3.6				0.00	NA	0.00000							0.12	0.44	0.00322	FROZEN						0.00	NA	0.00000
3.8				0.02	NA	0.00000							0.15	1.06	0.00970	FROZEN						0.00	NA	0.00000
4.0				0.02	NA	0.00000							0.13	0.75	0.00595	FROZEN						0.02	<0.01	0.00001
4.2				0.01	NA	0.00000							0.16	<0.01	0.00010	FROZEN						0.00	NA	0.00000
4.4				0.04	NA	0.00000							0.18	<0.01	0.00011	FROZEN						0.00	NA	0.00000
4.6				0.05	NA	0.00000							0.00	NA	0.00000	FROZEN						0.03	<0.01	0.00001
4.65																						0.00	NA	0.00000
4.70																								
4.8				0.00	NA	0.00000																		
5.0																								
Total Stream Width (m)	3.2			4.4			3.0			2.5			4.2			-			2.8			4.2		
Stake Measurement (m)	-			-			0.356			0.414			0.214			-			0.200					
Total Discharge (m^3/s)	-			0.11695			0.01984			0.01887			0.38934			-			0.07499			0.12482		
Field Chemistry																								
Temp (^{o}C)	15.3			14.8			12.2			10.5			8.1			-			13.4			12.9		
pH	7.62			7.87			7.69			7.48			7.10			-			6.63			7.65		
EC (uS)	100			155			261			168			143			-			171			99		
DO (mg/L)	2.30			4.63			6.35			3.40			3.21			-			0.50			6.13		
Appearance	slightly tannic			slightly tannic			clear			slightly tannic			tannic			-			clear w/ yellow tinge			clear w/ yellow tinge		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
FROZEN - The stream channel was frozen which made the sampling location unaccessable.
The lower limit of the flow meter is 0.01ft/s
The iInterval that stake is located for increased precision in water height fluctuations is 2.8m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate

Marathon PGM
Summary of Stream Field Data
Location S31

	1-Sep-09			5-Oct-09			4-May-10			6-Jul-10			2-Sep-10		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0															
0.2										0.00	NA	0.00000			
0.3													0.00	NA	0.00000
0.4				0.00	NA	0.00000				0.05	NA	0.00000	0.17	0.03	0.00023
0.45	0.00	NA	0.00000				0.00	NA	0.00000						
0.6	0.38	0.37	0.00750	0.22	0.03	0.00040	0.21	0.61	0.00684	0.03	NA	0.00000	0.23	0.13	0.00182
0.8	0.48	0.48	0.01405	0.31	0.02	0.00038	0.33	0.26	0.00523	0.02	NA	0.00000	0.21	0.01	0.00013
1.0	0.45	0.25	0.00686	0.31	0.05	0.00095	0.29	0.71	0.01256	0.00	NA	0.00000	0.23	0.02	0.00028
1.2	0.46	0.26	0.00730	0.30	0.26	0.00476	0.33	0.04	0.00081	0.00	NA	0.00000	0.24	0.06	0.00088
1.4	0.53	0.25	0.00808	0.28	0.20	0.00342	0.32	0.33	0.00644	0.01	NA	0.00000	0.40	0.09	0.00220
1.6	0.45	0.40	0.01098	0.29	0.20	0.00354	0.39	0.51	0.01213	0.05	0.01	0.00003	0.51	0.13	0.00404
1.8	0.52	0.69	0.02189	0.35	0.28	0.00598	0.52	0.81	0.02569	0.16	0.13	0.00127	0.49	0.10	0.00299
2.0	0.55	0.49	0.01644	0.40	0.31	0.00756	0.55	0.62	0.02080	0.39	0.51	0.01213	0.44	0.12	0.00322
2.2	0.58	0.47	0.01663	0.43	0.27	0.00708	0.51	0.59	0.01835	0.45	0.25	0.00686	0.43	0.11	0.00289
2.4	0.54	0.48	0.01581	0.38	0.28	0.00649	0.52	0.63	0.01998	0.40	0.89	0.02172	0.15	0.06	0.00055
2.6	0.47	0.15	0.00430	0.27	0.08	0.00132	0.45	0.35	0.00961	0.65	0.80	0.03172	0.06	0.01	0.00004
2.8	0.40	0.38	0.00927	0.22	0.15	0.00201	0.33	0.02	0.00040	0.64	0.61	0.02381	0.09	0.00	0.00000
2.9															
3.0	0.28	0.49	0.00837	0.03	NA	0.00000	0.16	0.06	0.00059	0.56	0.20	0.00683	0.00	NA	0.00000
3.2	0.18	0.15	0.00165	0.00	NA	0.00000	0.06	0.00	0.00000	0.46	0.12	0.00337	0.00	NA	0.00000
3.4	0.08	0.00	0.00000				0.01	NA	0.00000	0.38	0.50	0.01159	0.00	NA	0.00000
3.6	0.02	0.00	0.00000				0.00	NA	0.00000	0.36	0.32	0.00703	0.00	NA	0.00000
3.8	0.03	0.03	0.00005							0.42	0.55	0.01409	0.00	NA	0.00000
4.0	0.06	0.37	0.00135							0.35	0.29	0.00619	0.00	NA	0.00000
4.2	0.06	0.53	0.00194							0.00	0.00	0.00000	0.00	NA	0.00000
4.4	0.08	0.03	0.00015												
4.6	0.15	0.00	0.00000												
4.65															
4.70	0.00	NA	0.00000												
4.8															
5.0															
Total Stream Width (m)	4.3			2.8			3.2			4.0			3.9		
Stake Measurement (m)															
Total Discharge (m^3/s)	0.15263			0.04388			0.13944			0.14664			0.01927		
Field Chemistry															
Temp (^{o}C)	10.3			8.7			7.3			15.5			16.1		
pH	7.17			7.50			7.54			6.79			6.45		
EC (uS)	59			164			77			101			-		
DO (mg/L)	2.72			1.77			11.17			8.75			7.61		
Appearance	clear w/ yellow tinge			clear w/ yellow tinge			clear w/ yellow tinge			clear w/ yellow tinge			clear w/ yellow tinge		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
FROZEN - The stream channel was frozen which made the sampling location unaccessable.
The lower limit of the flow meter is 0.01ft/s
The iInterval that stake is located for increased precision in water height fluctuations is 2.8m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate

Marathon PGM
Summary of Stream Field Data
Location S32

	14-Jul-09			4-Aug-09			1-Sep-09			8-Oct-09			3-May-10			8-Jul-10			31-Aug-10		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0																					
0.2																					
0.4																					
0.6																					
0.8	0.00	NA	0.00000				0.00	0.00	0.00000	0.00	NA	0.00000				0.00	NA	0.00000	0.00	NA	0.00000
1.0	0.03	0.43	0.00079	0.00	NA*	0.00000	0.12	0.51	0.00373	0.17	0.10	0.00104				0.04	0.13	0.00032	0.00	0.00	0.00000
1.1													0.00	NA	0.00000						
1.2	0.02	<0.01	0.00001	0.08	0.74*	0.00361	0.23	0.65	0.01038	0.14	0.14	0.00120	0.05	1.15	0.00263	0.07	0.12	0.00051	0.11	0.55	0.00369
1.4	0.01	<0.01	0.00001	0.05	1.14*	0.00348	0.21	0.73	0.00948	0.15	0.20	0.00183	0.07	1.95	0.00833	0.00	NA	0.00000	0.14	0.13	0.00111
1.6	0.01	<0.01	0.00001	0.05	1.25*	0.00348	0.12	0.37	0.00542	0.06	0.09	0.00033	0.08	1.80	0.00878	0.18	0.09	0.00099	0.06	0.08	0.00029
1.8	0.01	<0.01	0.00001	0.07	1.36*	0.00487	0.09	0.04	0.00406	0.00	NA	0.00000	0.00	NA	0.00000	0.15	0.08	0.00073	0.00	0.00	0.00000
2.0	0.00	NA	0.00000	0.00	NA*	0.00000	0.12	0.00	0.00542	0.07	NA	0.00000				0.10	0.86	0.00525	0.00	NA	0.00000
2.2							0.12	0.00	0.00542	0.00	NA	0.00000				0.15	0.12	0.00110			
2.4							0.13	0.00	0.00587							0.00	NA	0.00000			
2.6							0.03	0.00	0.00135							0.00	NA	0.00000			
2.8							0.00	0.00	0.00000							0.00	NA	0.00000			
2.9																					
3.0																					
Total Stream Width (m)	1.2			1.0			2.0			1.4			0.7			2.0			1.2		
Total Discharge (m^3/s)	0.00082			0.01543			0.05113			0.00439			0.01974			0.00889			0.00509		
Field Chemistry																					
Temp (^oC)	20.7			12.6			14.2			6.6			6.7			14.3			16.4		
pH	8.67			8.38			7.74			8.17			8.12			7.79			7.32		
EC (uS)	237			146			54			214			150			175			-		
DO (mg/L)	0.17			6.40			1.65			2.02			12.16			9.59			9.11		
Appearance	clear			clear, brown			clear, slt. Yellow						Silty, cloudy, brown			Cloudy, brown/grey			clear, slt. Cloudy		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
FROZEN - The stream channel was frozen which made the sampling location unaccessable.
The lower limit of the flow meter is 0.01ft/s
The iInterval that stake is located for increased precision in water height fluctuations is 2.8m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate
*Moved stream crossing upstream because of influence from Pic River (last round data may be suspect)

Marathon PGM
Summary of Hydrogeological Field Data
Location S33

	3-Aug-09			2-Sep-09			7-Oct-09			4-Nov-09			6-May-10			13-Jul-10			31-Aug-10		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
-0.2										0.00	NA	0.00000									
0				0.00	NA	0.00000				0.08	0.36	0.00132				0.00	NA	0.00000	0.00	NA	0.00000
0.05													0.00	NA	0.00000						
0.1	0.00	NA	0.00000	0.01	0.36	0.00005				0.05	0.73	0.00111									
0.2	0.01	<0.01	0.00000	0.05	0.47	0.00108	0.00	NA	0.00000	0.20	0.49	0.00448	0.02	NA	0.00000	0.05	0.28	0.00085	0.00	0.00	0.00000
0.4	0.09	0.51	0.00280	0.15	0.38	0.00348	0.05	0.27	0.00082	0.26	1.55	0.02458	0.01	NA	0.00000	0.07	0.07	0.00030	0.03	0.10	0.00018
0.6	0.22	0.34	0.00456	0.19	1.08	0.01252	0.18	0.30	0.00329	0.26	0.91	0.01443	0.12	0.13	0.00095	0.04	0.08	0.00020	0.00	0.00	0.00000
0.8	0.19	0.08	0.00093	0.21	1.01	0.01294	0.16	0.16	0.00156	0.05	0.42	0.00128	0.18	0.26	0.00285	0.04	0.35	0.00085	0.07	0.17	0.00073
1.0	0.09	0.61	0.00335	0.15	0.66	0.00604	0.05	0.30	0.00092	0.00	NA	0.00000	0.18	0.16	0.00176	0.00	NA	0.00000	0.08	0.29	0.00142
1.2	0.00	NA	0.00000	0.04	0.51	0.00124	0.00	NA	0.00000				0.12	0.20	0.00146				0.00	0.00	0.00000
1.4				0.00	NA	0.00000							0.01	NA	0.00000						
1.6													0.00	NA	0.00000						
1.8																					
2.0																					
2.2																					
2.4																					
2.6																					
2.8																					
2.9																					
3.0																					
Total Stream Width (m)	1.1			1.4			1.0			1.2			1.6			1.0			1.2		
Stake Measurement (m)																					
Total Discharge (m^3/s)	0.01164			0.03735			0.00659			0.04721			0.00703			0.00220			0.00232		
Field Chemistry																					
Temp (^{o}C)	14.4			14.6			6.2			2.3			4.2			11.7			17.8		
pH	7.41			7.44			7.2			6.80			7.49			8.11			7.91		
EC (uS)	31			27			36			22			24			46			66		
DO (mg/L)	1.65			2.05			2.16			1.57			12.49			10.71			-		
Appearance	clear			clear			clear			clear			clear			clear			clear, yellow tinge		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
FROZEN - The stream channel was frozen which made the sampling location unaccessable.
The lower limit of the flow meter is 0.01ft/s
The iInterval that stake is located for increased precision in water height fluctuations is 2.8m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate

Marathon PGM
Summary of Hydrogeological Field Data
Location S34

	3-Aug-09			2-Sep-09			7-Oct-09			4-Nov-09			6-May-10			13-Jul-10			31-Aug-10		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0																					
0.2																					
0.4																					
0.6																					
0.8							0.00	NA	0.00000	0.00	NA	0.00000									
0.9	0.00	NA	0.00000	0.00	NA	0.00000							0.00	NA	0.00000						
1.0	0.13	0.25	0.00149	0.19	0.23	0.00200	0.01	NA	0.00000	0.28	0.09	0.00154	1.00	0.19	0.00869	0.00	NA	0.00000	0.00	0.00	0.00000
1.2	0.12	0.24	0.00176	0.16	0.15	0.00146	0.07	0.21	0.00090	0.27	0.16	0.00264	1.20	0.14	0.01025	0.03	0.09	0.00016	0.03	0.18	0.00025
1.4	0.08	0.28	0.00137	0.26	0.05	0.00079	0.06	0.16	0.00059	0.19	0.73	0.00846	1.40	0.18	0.01537	0.03	1.95	0.00357	0.02	0.04	0.00002
1.5																			0.00	0.00	0.00000
1.6	0.09	0.34	0.00140	0.12	0.27	0.00148	0.04	0.03	0.00005	0.15	0.47	0.00430	1.60	0.11	0.00939	0.00	NA	0.00000			
1.7	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000							0.00	NA	0.00000			
1.75													0.00	NA	0.00000						
1.8										0.00	NA	0.00000									
2.0																					
2.2																					
2.4																					
2.6																					
2.8																					
2.9																					
3.0																					
Total Stream Width (m)	0.8			0.8			0.9			1.0			0.9			0.7			0.5		
Stake Measurement (m)																					
Total Discharge (m^3/s)	0.00601			0.00574			0.00154			0.01693			0.04371			0.00373			0.00027		
Field Chemistry																					
Temp (^oC)				16.9			7.1			2.3			8.5			18.1			19.1		
pH	7.28			7.48			7.55			6.62			7.00			7.86			7.62		
EC (uS)	15			14			17			12			15			22			50		
DO (mg/L)	1.64			2.15			2.25			1.40			11.35			9.28			-		
Appearance	clear slight yellow			clear, slight yellow			clear			slight tannic			clear			clear			clear		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
FROZEN - The stream channel was frozen which made the sampling location unaccessable.
The lower limit of the flow meter is 0.01ft/s
The iInterval that stake is located for increased precision in water height fluctuations is 2.8m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate

Marathon PGM
Summary of Hydrogeological Field Data
Location S35

	3-Aug-09			2-Sep-09			7-Oct-09			4-Nov-09			6-May-10			13-Jul-10			31-Aug-10		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0																					
0.2										0.00	NA	0.00000									
0.4										0.12	0.50	0.00366									
0.6										0.04	1.37	0.00334									
0.8										0.07	0.38	0.00162									
0.95	0.00	NA	0.00000																		
1.0	0.06	0.65	0.00149							0.13	0.65	0.00515				0.00	NA	0.00000			
1.15													0.00	NA	0.00000						
1.2	0.08	0.85	0.00415	0.00	NA	0.00000	0.00	NA	0.00000	0.19	0.82	0.00713	0.06	0.19	0.00043	0.01	NA	0.00000	0.00	0.00	0.00000
1.3										0.00	NA	0.00000									
1.4	0.02	NA	0.00000	0.07	1.52	0.00649	0.06	0.55	0.00201				0.08	0.49	0.00239	0.00	NA	0.00000	0.00	0.00	0.00000
1.6	0.01	NA	0.00000	0.01	NA	0.00000	0.01	NA	0.00000				0.05	0.24	0.00073	0.00	NA	0.00000	0.00	0.00	0.00000
1.8	0.12	0.37	0.00271	0.07	0.52	0.00222	0.03	NA	0.00000				0.02	NA	0.00000	0.06	NA	0.00000	0.00	0.00	0.00000
2.0	0.07	0.01	0.00003	0.03	NA	0.00000	0.05	NA	0.00000				0.14	0.05	0.00032	0.09	0.58	0.00239	0.10	0.23	0.00105
2.1	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000				0.10	0.01	0.00005	0.00	NA	0.00000	0.00	NA	0.00000
2.2																					
2.3													0.00	NA	0.00000						
2.4																					
2.6																					
2.8																					
2.9																					
3.0																					
Total Stream Width (m)	1.2			0.9			0.9			1.1			1.15			1.15			0.90		
Stake Measurement (m)																					
Total Discharge (m^3/s)	0.00838			0.00871			0.00201			0.02091			0.00392			0.00239			0.00105		
Field Chemistry																					
Temp (^{0}C)	13.2			12.8			6.2			2.6			4.3			12.6			17.7		
pH	7.35			7.47			6.98			6.47			7.77			8.00			6.48		
EC (uS)	16			15			17			13			13			25			53		
DO (mg/L)	0.72			2.27			2.16			1.76			12.73			9.11			-		
Appearance	clear			clear, sl. yellow			clear			clear			clear			clear			clear		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
FROZEN - The stream channel was frozen which made the sampling location unaccessable.
The lower limit of the flow meter is 0.01ft/s
The iInterval that stake is located for increased precision in water height fluctuations is 2.8m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate

Marathon PGM
Summary of Hydrogeological Field Data
Location S36

	3-Aug-09			2-Sep-09			7-Oct-09			4-Nov-09			6-May-10			13-Jul-10			31-Aug-10		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0																					
0.2																					
0.4																					
0.6																					
0.8																					
1.0																					
1.2																					
1.4																					
1.6										0.00	NA	0.00000									
1.7													0.00	NA	0.00000						
1.8	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.06	NA	0.00000	0.07	0.04	0.00013	0.00	NA	0.00000	0.00	0.00	0.00000
2.0	0.12	0.01	0.00007	0.09	0.20	0.00110	0.09	0.07	0.00038	0.16	0.08	0.00078	0.14	NA	0.00000	0.06	0.24	0.00088	0.05	0.06	0.00018
2.2	0.09	1.16	0.00637	0.13	1.92	0.01523	0.08	0.43	0.00210	0.17	0.13	0.00130	0.15	0.42	0.00384	0.07	0.15	0.00064	0.06	0.11	0.00040
2.4	0.09	1.68	0.00922	0.07	1.63	0.00696	0.01	NA	0.00000	0.12	2.42	0.01771	0.14	0.65	0.00555	0.02	0.75	0.00092	0.04	0.00	0.00000
2.6	0.12	1.55	0.01135	0.17	0.08	0.00083	0.10	0.82	0.00500	0.14	2.05	0.01751	0.15	0.68	0.00622	0.05	0.59	0.00180	0.04	0.65	0.00159
2.8	0.13	1.30	0.01031	0.10	0.38	0.00232	0.05	0.19	0.00058	0.14	0.49	0.00418	0.15	0.24	0.00220	0.10	0.8	0.00488	0.09	0.25	0.00137
3.0	0.09	0.20	0.00110	0.03	0.39	0.00071	0.00	NA	0.00000	0.09	0.12	0.00066	0.06	0.1	0.00037	0.02	0.34	0.00041	0.00	0.00	0.00000
3.2	0.13	0.26	0.00129	0.11	0.35	0.00147	0.07	0.10	0.00027	0.11	0.59	0.00396	0.08	0.17	0.00083	0.00	NA	0.00000	0.04	0.02	0.00005
3.25	0.00	NA	0.00000	0.00	0.00	0.00000	0.00	0.00	0.00000												
3.3																0.00	NA	0.00000			
3.4										0.00	NA	0.00000	0.00	NA	0.00000				0.00	0.00	0.00000
3.6																					
3.8																					
4.0																					
Total Stream Width (m)	1.5			1.5			1.5			1.8			1.7			1.6			1.6		
Stake Measurement (m)																					
Total Discharge (m^3/s)	0.03971			0.02861			0.00833			0.04610			0.01914			0.00953			0.00359		
Field Chemistry																					
Temp (^oC)	13.6			15.5			7.2			2.8			3.3			17.1			19.2		
pH	6.80			6.68			7.10			6.29			6.03			7.14			6.49		
EC (uS)	12			12			12			9			9			18			89		
DO (mg/L)	1.76			5.87			2.41			1.24			12.84			7.77			-		
Appearance	clear slight yellow			sl. tannic			clear			clear			clear, slt. yellow			clear, slight yellow			clear, slight yellow		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
FROZEN - The stream channel was frozen which made the sampling location unaccessable.
The lower limit of the flow meter is 0.01ft/s
The iInterval that stake is located for increased precision in water height fluctuations is 2.8m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate

Marathon PGM
Summary of Hydrogeological Field Data
Location S37

	3-Aug-09			2-Sep-09			7-Oct-09			4-Nov-09			6-May-10			13-Jul-10			31-Aug-10		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0																					
0.2																			0.00	NA	0.00000
0.3				0.00	NA	0.00000															
0.4				0.04	0.15	0.00027				0.00	NA	0.00000							0.00	NA	0.00000
0.5													0.00	NA	0.00000						
0.6				0.01	NA	0.00000				0.05	0.45	0.00137	0.01	NA	0.00000	0.00	NA	0.00000	0.00	0.00	0.00000
0.8				0.01	NA	0.00000				0.04	0.35	0.00085	0.04	0.00	0.00000	0.00	NA	0.00000	0.00	0.00	0.00000
1.0				0.09	0.02	0.00011	0.00	NA	0.00000	0.02	NA	0.00000	0.11	0.03	0.00020	0.00	NA	0.00000	0.00	0.00	0.00000
1.2	0.00	NA	0.00000	0.11	0.54	0.00362	0.07	NA	0.00000	0.08	0.28	0.00137	0.19	0.06	0.00070	0.02	0.00	0.00000	0.00	0.00	0.00000
1.4	0.10	0.02	0.00012	0.21	0.43	0.00551	0.13	0.15	0.00119	0.16	0.80	0.00781	0.27	0.28	0.00461	0.03	0.00	0.00000	0.06	0.11	0.00040
1.6	0.18	0.16	0.00176	0.20	1.02	0.01244	0.19	0.06	0.00070	0.23	0.94	0.01319	0.29	0.16	0.00283	0.13	0.17	0.00135	0.12	0.05	0.00037
1.8	0.23	0.97	0.01361	0.28	0.65	0.01110	0.29	0.32	0.00566	0.34	0.83	0.01721	0.28	0.09	0.00154	0.05	0.12	0.00037	0.08	0.10	0.00049
2.0	0.22	0.60	0.00805	0.31	0.25	0.00473	0.28	0.12	0.00205	0.35	0.20	0.00427	0.12	0.00	0.00000	0.20	0.15	0.00183	0.20	0.13	0.00159
2.2	0.28	0.54	0.00922	0.28	0.10	0.00171	0.19	0.11	0.00127	0.29	0.11	0.00195	0.11	0.02	0.00013	0.14	0.13	0.00111	0.19	0.09	0.00104
2.4	0.21	0.18	0.00231	0.15	0.14	0.00128	0.13	0.07	0.00056	0.04	NA	0.00000	0.07	0.00	0.00000	0.08	0.09	0.00044	0.15	0.04	0.00037
2.45													0.00	NA	0.00000						
2.6	0.11	0.01	0.00007	0.12	0.00	0.00000	0.08	NA	0.00000	0.00	NA	0.00000				0.07	NA	0.00000	0.05	0.09	0.00027
2.8	0.08	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000							0.00	NA	0.00000	0.00	0.00	0.00000
2.85	0.00	NA	0.00000																		
2.9																0.00	NA	0.00000			
3.0																					
3.2																					
3.4																					
3.6																					
3.8																					
Total Stream Width (m)	1.8			2.5			2.0			2.2			2.0			2.3			2.6		
Stake Measurement (m)																					
Total Discharge (m^3/s)	0.03514			0.04078			0.01143			0.04802			0.01001			0.00509			0.00453		
Field Chemistry																					
Temp (^{o}C)	14.8			15.6			6.3			2.3			3.9			14.5			18.2		
pH	6.79			7.57			6.94			6.40			6.47			7.81			6.75		
EC (uS)	8			7			6			6			6			10			39		
DO (mg/L)	1.62			5.78			1.70			1.53			12.77			9.14			-		
Appearance	clear									clear			clear			clear			clear		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
FROZEN - The stream channel was frozen which made the sampling location unaccessable.
The lower limit of the flow meter is 0.01ft/s
The iInterval that stake is located for increased precision in water height fluctuations is 2.8m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate

Marathon PGM
Summary of Hydrogeological Field Data
Location S38

	3-Aug-09			2-Sep-09			7-Oct-09			4-Nov-09			6-May-10			13-Jul-10			31-Aug-10		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0																					
0.1																0.00	NA	0.00000			
0.2							0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0	NA	0.00000
0.25	0.00	NA	0.00000	0.00	NA	0.00000															
0.4	0.13	0.66	0.00458	0.22	0.45	0.00528	0.11	0.24	0.00161	0.24	0.72	0.01054	0.12	2.00	0.01464	0.04	0.25	0.00061	0.18	0.02	0.00022
0.6	0.20	0.30	0.00366	0.19	0.18	0.00209	0.16	0.05	0.00049	0.23	0.85	0.01193	0.16	0.01	0.00010	0.15	0.18	0.00165	0.06	0.03	0.00011
0.8	0.13	0.01	0.00008	0.10	0.00	0.00000	0.00	NA	0.00000	0.17	NA	0.00000	0.13	0.00	0.00000	0.08	NA	0.00000	0.00	0.00	0.00000
1.0	0.12	0.01	0.00007	0.14	0.04	0.00034	0.10	NA	0.00000	0.16	NA	0.00000	0.14	0.11	0.00094	0.13	0.46	0.00365	0.06	0.05	0.00018
1.2	0.13	0.47	0.00373	0.13	0.33	0.00262	0.12	0.02	0.00015	0.20	0.95	0.01159	0.15	0.42	0.00384	0.01	0.00	0.00000	0.05	0.37	0.00113
1.4	0.21	0.40	0.00512	0.25	0.07	0.00107	0.25	0.03	0.00046	0.29	0.97	0.01716	0.20	0.05	0.00061	0.17	0.31	0.00321	0.21	0.21	0.00269
1.6	0.28	0.35	0.00598	0.34	0.25	0.00519	0.32	0.25	0.00488	0.36	0.25	0.00549	0.26	0.19	0.00301	0.30	0.19	0.00348	0.29	0.04	0.00071
1.8	0.00	NA	0.00000	0.03	0.24	0.00044	0.00	NA	0.00000	0.03	NA	0.00000	0.01	NA	0.00000	0.00	0.00	0.00000	0.00	0.00	0.00000
2.0	0.23	0.25	0.00351	0.24	0.39	0.00571	0.12	0.09	0.00066	0.25	0.14	0.00214	0.15	0.03	0.00027	0.16	0.34	0.00332	0.06	0.10	0.00037
2.2	0.28	0.07	0.00120	0.24	0.03	0.00044	0.18	0.15	0.00165	0.28	0.62	0.01059	0.24	0.08	0.00088	0.14	0.35	0.00224	0.16	0.17	0.00124
2.3													0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000
2.4	0.00	NA	0.00000	0.00	0.00	0.00000	0.00	NA	0.00000	0.00	NA	0.00000									
2.6																					
2.8																					
2.9																					
3.0																					
Total Stream Width (m)	2.2			2.2			2.2			2.2			2.1			2.2			2.1		
Stake Measurement (m)																					
Total Discharge (m^3/s)	0.02792			0.02317			0.00989			0.06943			0.02430			0.01816			0.00665		
Field Chemistry																					
Temp (^{o}C)	17.5			16.1			7.3			2.9			8.3			18.3			20.5		
pH	5.64			6.81			7.00			3.90			7.30			7.32			8.59		
EC (uS)	9			10			6			9			8			9			39		
DO (mg/L)	1.62			3.77			2.54			1.51			11.40			8.03			-		
Appearance	clear slightly yellow			clear slightly yellow			slightly yellow			sl. tannic			clear, slt. Yellow			clear			clear, yellow tinge		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
FROZEN - The stream channel was frozen which made the sampling location unaccessable.
The lower limit of the flow meter is 0.01ft/s
The iInterval that stake is located for increased precision in water height fluctuations is 2.8m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate

Marathon PGM
Summary of Hydrogeological Field Data
Location S39

	3-Aug-09	2-Sep-09	7-Oct-09	4-Nov-09	6-May-10	13-Jul-10	31-Aug-10
Field Chemistry							
Temp (^{o}C)	17.3	15.1	7.2	3.2	6.5	17	18.5
pH	6.36	5.97	7.24	4.53	8.23	7.23	7.15
EC (uS)	7	7	8	7	7	10	48
DO (mg/L)	1.87	4.50	2.90	1.51	12.17	7.81	-
Appearance	clear, yellow	clear, yellow	clear, yellow	sl. tannic	clear, slt. Yellow	clear, slt. Yellow	clear, slt. Yellow, tr. Organics
Notes Water fall and water disipates through blast rock. Impossible to do crossing.							

Marathon PGM
Summary of Hydrogeological Field Data
Location S40

	3-Aug-09			2-Sep-09			7-Oct-09			4-Nov-09			6-May-10			13-Jul-10			31-Aug-10		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0																					
0.2																					
0.4																					
0.6																					
0.8																					
1.0																					
1.2																					
1.4																					
1.6																					
1.8																					
1.9													0.00	NA	0.00000						
2.0													0.12	0.14	0.00077	0.00	NA	0.00000	0.00	NA	0.00000
2.1	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000									
2.2	0.11	0.14	0.00070	0.09	0.15	0.00062	0.09	0.09	0.00037	0.13	0.50	0.00297	0.12	0.15	0.00110	0.00	0.00	0.00000	0.00	0.00	0.00000
2.4	0.09	0.07	0.00038	0.08	0.08	0.00039	0.08	0.07	0.00034	0.14	0.63	0.00538	0.10	0.11	0.00067	0.05	0.06	0.00018	0.04	0.13	0.00032
2.6	0.02	NA	0.00000	0.00	NA	0.00000	0.09	0.04	0.00022	0.11	0.07	0.00047	0.16	0.01	0.00010	0.01	0.00	0.00000	0.04	0.00	0.00000
2.8	0.16	0.24	0.00234	0.17	0.29	0.00301	0.16	0.11	0.00107	0.17	0.07	0.00073	0.20	0.05	0.00061	0.01	0.00	0.00000	0.00	0.00	0.00000
3.0	0.17	0.11	0.00114	0.14	0.18	0.00154	0.13	0.05	0.00040	0.17	0.13	0.00135	0.14	0.01	0.00005	0.09	0.00	0.00000	0.08	0.06	0.00029
3.05													0.00	NA	0.00000						
3.2	0.13	0.06	0.00036	0.09	0.06	0.00025	0.10	0.04	0.00018	0.15	0.13	0.00119				0.04	0.15	0.00037	0.09	0.08	0.00044
3.3	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000												
3.4										0.00	NA	0.00000				0.06	0.12	0.00044	0.07	0.04	0.00017
3.6																0.00	NA	0.00000	0.00	NA	0.00000
3.8																					
4.0																					
Total Stream Width (m)	1.2			1.2			1.2			1.3			1.2			1.6			1.6		
Stake Measurement (m)																					
Total Discharge (m^3/s)	0.00493			0.00580			0.00258			0.01209			0.00330			0.00099			0.00122		
Field Chemistry																					
Temp (^{o}C)	18.1			17.7			7			2.8			4.4			15.3			18.3		
pH	6.67			6.94			7.00			5.95			7.11			7.19			9.60		
EC (uS)	14			17			20			12			9			26			49		
DO (mg/L)	5.40			3.93			1.59			1.68			12.87			6.32			-		
Appearance	clear slightly yellow			clear, slightly yellow			clear, slightly yellow			sl. tannic			-			clear, trace SS, slightly yellow			clear, trace org., slt. yellow		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
FROZEN - The stream channel was frozen which made the sampling location unaccessable.
The lower limit of the flow meter is 0.01ft/s
The iInterval that stake is located for increased precision in water height fluctuations is 2.8m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate

Marathon PGM
Summary of Hydrogeological Field Data
Location S41

	3-Aug-09			2-Sep-09			7-Oct-09			4-Nov-09			6-May-10			13-Jul-10			31-Aug-10		
Distance Panel	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow	Depth	Velocity	Flow
(m)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)	(m)	(ft/s)	(m^3/s)
0																					
0.2																					
0.4																					
0.6																					
0.8																					
1.0																					
1.2																0.00	NA	0.00000	0.00	0.00	0.00000
1.4	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000				0.12	0.52	0.00381	0.00	0.00	0.00000
1.5													0.00	NA	0.00000						
1.6	0.30	0.78	0.01427	0.38	1.70	0.03941	0.14	0.20	0.00256	0.35	0.97	0.03106	0.25	0.12	0.00137	0.30	0.33	0.00604	0.11	0.20	0.00134
1.8	0.37	0.69	0.01557	0.44	1.80	0.04831							0.32	0.08	0.00156	0.33	0.23	0.00463	0.13	0.16	0.00127
2.0	0.42	0.68	0.01742	0.50	1.51	0.04606	0.25	0.13	0.00397	0.47	0.85	0.04874	0.37	0.07	0.00158	0.32	0.18	0.00351	0.22	0.08	0.00107
2.2	0.43	0.21	0.00551	0.52	0.02	0.00063							0.34	0.10	0.00207	0.22	0.09	0.00121	0.21	0.05	0.00064
2.4	0.40	<0.01	0.00024	0.49	0.00	0.00000	0.18	0.23	0.00505	0.42	0.25	0.01281	0.24	0.00	0.00000	0.18	0.53	0.00582	0.20	0.01	0.00012
2.6	0.28	0.72	0.01230	0.42	0.04	0.00102							0.23	0.07	0.00098	0.12	0.85	0.00622	0.15	0.02	0.00018
2.8	0.24	0.86	0.01259	0.36	0.00	0.00000	0.09	0.73	0.00802	0.33	0.58	0.02335	0.11	0.22	0.00148	0.22	1.29	0.01731	0.10	0.04	0.00024
3.0	0.26	1.87	0.02966	0.25	1.06	0.01617							0.21	0.60	0.00769	0.25	0.95	0.01449	0.00	0.00	0.00000
3.2	0.22	2.05	0.02751	0.32	2.75	0.05368	0.08	0.18	0.00176	0.30	3.12	0.11419	0.26	0.56	0.00888	0.29	0.38	0.00672	0.05	0.25	0.00076
3.4	0.50	1.81	0.05521	0.44	2.80	0.07515							0.32	0.33	0.00644	0.40	0.00	0.00000	0.12	0.30	0.00220
3.6	0.90	1.02	0.05600	0.47	2.58	0.07397	0.19	1.16	0.02689	0.43	1.22	0.06400	0.39	0.12	0.00285	0.38	0.00	0.00000	0.15	0.25	0.00229
3.8	0.47	0.28	0.00803	0.56	2.48	0.08472							0.40	0.00	0.00000	0.00	NA	0.00000	0.27	0.36	0.00593
4.0	0.42	<0.01	0.00026	0.56	0.52	0.01776	0.23	0.07	0.00196	0.50	0.20	0.01220	0.35	0.00	0.00000	0.00	NA	0.00000	0.25	0.00	0.00000
4.2	0.40	<0.01	0.00024	0.50	0.30	0.00915							0.00	NA	0.00000	0.00	NA	0.00000	0.21	0.00	0.00000
4.4	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	0.00	0.00000
4.6	0.00	NA	0.00000	0.00	NA	0.00000							0.00	NA	0.00000	0.00	NA	0.00000	0.00	0.00	0.00000
4.8	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.10	0.41	0.00250	0.00	0.00	0.00000
5.0	0.00	NA	0.00000	0.00	NA	0.00000							0.00	NA	0.00000	0.03	0.67	0.00123	0.00	0.00	0.00000
5.2	0.00	NA	0.00000	0.01	NA	0.00000	0.00	NA	0.00000	0.00	NA	0.00000	0.04	0.52	0.00127	0.19	0.07	0.00081	0.00	0.00	0.00000
5.4	0.13	3.42	0.02712	0.21	2.40	0.03074							0.13	0.05	0.00040	0.17	0.93	0.00964	0.01	0.00	0.00000
5.6	0.30	0.40	0.00732	0.33	3.10	0.06240	0.00	NA	0.00000	0.21	2.44	0.06251	0.22	0.00	0.00000	0.13	0.37	0.00293	0.01	0.00	0.00000
5.8	0.26	0.20	0.00317	0.40	2.04	0.04978							0.17	0.75	0.00778	0.23	2.06	0.02890	0.12	0.52	0.00381
6.0	0.24	2.51	0.03675	0.35	2.66	0.05679	0.14	0.32	0.00547	0.32	2.95	0.11517	0.22	0.29	0.00389	0.09	2.24	0.01230	0.05	1.86	0.00567
6.2	0.29	0.33	0.00584	0.38	1.80	0.04172							0.25	0.35	0.00534	0.17	1.13	0.01172	0.07	0.00	0.00000
6.4	0.37	4.72	0.10653	0.44	2.43	0.06522	0.17	1.36	0.02821	0.38	2.41	0.11173	0.12	0.05	0.00037	0.21	0.41	0.00525	0.13	1.20	0.00952
6.6	0.20	0.06	0.00073	0.30	1.28	0.02342							0.15	0.23	0.00210	0.00	NA	0.00000	0.00	0.00	0.00000
6.8	0.36	1.15	0.02525	0.32	1.54	0.03006	0.06	0.45	0.00329	0.26	2.14	0.06788	0.19	0.43	0.00498				0.00	0.00	0.00000
7.0	0.25	0.12	0.00183	0.37	0.72	0.01625							0.17	0.03	0.00031				0.05	0.75	0.00229
7.2	0.22	0.01	0.00013	0.37	0.14	0.00316	0.00	NA	0.00000	0.32	0.04	0.00117	0.07	0.05	0.00019				0.11	0.02	0.00013
7.35													0.00	NA	0.00000						
7.4	0.10	<0.01	0.00006	0.24	0.19	0.00278													0.00	0.00	0.00000
7.6	0.05	<0.01	0.00002	0.15	0.35	0.00200				0.11	0.28	0.00282									
7.65	0.00	NA	0.00000	0.00	NA	0.00000															
7.8										0.00	NA	0.00000									
8.0																					
Total Stream Width (m)	6.3			6.3			0.0			6.4			6.2			5.4			6.2		
Stake Measurement (m)																					
Total Discharge (m^3/s)	0.470			0.850			0.087			0.668			0.062			0.145			0.037		
Field Chemistry																					
Temp (^{o}C)	18.1			15.9			15.9			5.8			6.5			21			19.4		
pH	7.63			7.62			7.62			6.49			6.80			7.66			6.49		
EC (uS)	16			15			15			13			14			19			52		
DO (mg/L)	4.62			3.33			3.33			1.29			11.82			8.20			-		
Appearance	clear			clear			clear			clear			-			clear			clear		

Notes
NM - Not Measured
NA - Water is too shallow to activate flow meter
FROZEN - The stream channel was frozen which made the sampling location unaccessable.
The lower limit of the flow meter is 0.01ft/s
Logger installed 5/6/2010 at 6.2 metres
The iInterval that stake is located for increased precision in water height fluctuations is 2.8m
Stake measurements are taken from the top of the stake to the surface of the water
Flow measurements <0.01ft/s are taken as 0.01ft/s to approximate a total flow rate

DISCHARGE DATA

STREAM:	Stream 1 upstream	PROJECT #:	07-1118-0012
TRANSECT:		LOCATION:	Marathon
DATE:	Sept 25, 2007	WIDTH (m):	2.83 m

Description	Station Distance (m)	Depth (m)	VELOCITY (m/s) 0.2 depth	0.8 depth	0.6 depth	Angle of Flow (degrees)	Discharge (m^3/s)
WE RDB	0.00	0.00			0.00		0.000
	0.10	0.06			0.00		0.000
	0.20	0.11			0.00		0.000
	0.30	0.11			0.01		0.000
	0.40	0.11			0.00		0.000
	0.60	0.20			-0.05		-0.002
	0.80	0.20			0.01		0.000
	1.00	0.36			0.15		0.011
	1.20	0.40			-0.02		-0.002
	1.40	0.27			0.01		0.001
	1.60	0.21			0.00		0.000
	1.80	0.19			-0.03		-0.001
	2.00	0.20			0.01		0.000
	2.20	0.14			-0.03		-0.001
	2.40	0.10			-0.02		0.000
	2.60	0.11			-0.02		0.000
WE LDB	2.83	0.00			0.00		0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
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							0.000
							0.000
							0.000
					TOTAL STREAM DISCHARGE		0.006

DISCHARGE DATA

STREAM:	Stream 1 upstream	PROJECT #:	07-1118-0012
TRANSECT:		LOCATION:	Marathon
DATE:	November 28, 2007	WIDTH (m):	1.91

Description	Station Distance (m)	Depth (m)	VELOCITY (m/s) 0.2 depth	VELOCITY (m/s) 0.8 depth	VELOCITY (m/s) 0.6 depth	Angle of Flow (degrees)	Discharge (m^3/s)
WE LDB	0.64	0.00			0.00		0.000
	0.75	0.14			0.06		0.001
	0.85	0.12			0.09		0.001
	0.95	0.09			0.08		0.001
	1.05	0.13			0.09		0.001
	1.15	0.12			0.08		0.001
	1.25	0.14			0.05		0.001
	1.35	0.14			0.05		0.001
	1.50	0.12			0.11		0.002
	1.60	0.09			0.09		0.001
	1.70	0.06			0.05		0.000
	1.80	0.08			0.04		0.000
	1.90	0.08			0.09		0.001
	2.10	0.06			0.03		0.000
	2.32	0.07			0.02		0.000
	2.48	0.07			0.01		0.000
WE RDB	2.55	0.00			0.00		0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
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							0.000
							0.000
							0.000
			TOTAL STREAM DISCHARGE				0.011

DISCHARGE DATA

STREAM:	Stream 1 upstream	PROJECT #:	07-1118-0012
TRANSECT:		LOCATION:	Marathon
DATE:	March 18, 2008	WIDTH (m):	2.00

Description	Station Distance (m)	Depth (m)	VELOCITY (m/s) 0.2 depth	VELOCITY (m/s) 0.8 depth	VELOCITY (m/s) 0.6 depth	Angle of Flow (degrees)	Discharge (m³/s)
WE LDB	0.40	0.00			0.00		0.000
	0.65	0.15			-0.01		0.000
	0.80	0.14			-0.01		0.000
	0.90	0.14			0.01		0.000
	1.00	0.13			0.00		0.000
	1.10	0.12			0.02		0.000
	1.20	0.11			0.00		0.000
	1.30	0.10			0.01		0.000
	1.40	0.11			0.02		0.000
	1.50	0.12			0.00		0.000
	1.60	0.12			-0.02		0.000
	1.70	0.09			0.03		0.000
	1.80	0.12			0.02		0.000
	1.90	0.10			0.00		0.000
	2.00	0.10			0.01		0.000
	2.10	0.10			0.00		0.000
	2.20	0.12			0.01		0.000
WE RDB	2.40	0.00			0.00		0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
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							0.000
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							0.000
							0.000
							0.000
							0.000
			TOTAL STREAM DISCHARGE				0.001

DISCHARGE DATA

STREAM:	Stream 1 upstream	PROJECT #:	07-1192-0096
TRANSECT:	1	LOCATION:	Marathon PGM
DATE:	April 29, 2008	WIDTH (m):	2.45

Description	Station Distance (m)	Depth (m)	VELOCITY (m/s) 0.2 depth	0.8 depth	0.6 depth	Angle of Flow (degrees)	Discharge (m^3/s)
RBD (WE)	0	0					0.000
	0.2	0.07			0.08		0.001
	0.4	0.08			0.08		0.001
	0.6	0.06			0.20		0.002
	0.8	0.12			0.10		0.002
	1	0.11			0.09		0.002
	1.2	0.12			0.01		0.000
	1.4	0.14			0.13		0.004
	1.6	0.18			0.13		0.005
	1.8	0.22			0.11		0.005
	2	0.12			0.08		0.002
	2.2	0.1			0.04		0.001
	2.4	0.08			-0.03		0.000
LBD(WE)	2.45	0			0.00		0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
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							0.000
							0.000
				TOTAL STREAM DISCHARGE			0.025

DISCHARGE DATA

STREAM: Stream 1 downstream
PROJECT #: 07-1118-0012
TRANSECT:
LOCATION: Marathon
DATE: September 28, 2007
WIDTH (m): 1.6 m

Description	Station Distance (m)	Depth (m)	VELOCITY (m/s) 0.2 depth	VELOCITY (m/s) 0.8 depth	VELOCITY (m/s) 0.6 depth	Angle of Flow (degrees)	Discharge (m^3/s)
WE RDB	0.60	0.10			-0.04		0.000
	0.70	0.06			0.36		0.002
	0.80	0.08			0.21		0.002
	0.90	0.08			0.25		0.002
	1.00	0.08			0.31		0.002
	1.10	0.08			0.22		0.002
	1.20	0.08			0.22		0.002
	1.30	0.08			0.30		0.002
	1.40	0.08			0.44		0.004
	1.50	0.08			0.44		0.004
	1.60	0.10			0.34		0.003
	1.70	0.10			0.15		0.002
	1.80	0.08			0.15		0.001
	1.90	0.06			0.10		0.001
	2.00	0.04			0.01		0.000
	2.10	0.04			0.00		0.000
WE LDB	2.20	0.00			0.00		0.000
							0.000
							0.000
							0.000
							0.000
							0.000
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							0.000
							0.000
				TOTAL STREAM DISCHARGE			0.028

DISCHARGE DATA

STREAM:	Stream 1 downstream	PROJECT #:	07-1118-0012
TRANSECT:		LOCATION:	Marathon
DATE:	November 28, 2007	WIDTH (m):	1.73 m

Description	Station Distance (m)	Depth (m)	VELOCITY (m/s) 0.2 depth	VELOCITY (m/s) 0.8 depth	VELOCITY (m/s) 0.6 depth	Angle of Flow (degrees)	Discharge (m^3/s)
WE RDB	0.95	0.00			0.000		0.000
	1.10	0.08			0.080		0.001
	1.30	0.08			0.040		0.001
	1.50	0.16			0.000		0.000
	1.60	0.18			0.030		0.001
	1.82	0.20			0.150		0.005
	1.90	0.19			0.170		0.003
	2.00	0.13			0.200		0.003
	2.10	0.15			0.320		0.005
	2.20	0.14			0.610		0.009
	2.30	0.16			0.110		0.002
	2.40	0.13			0.020		0.000
	2.50	0.09			0.190		0.002
WE LDB	2.68	0.00			0.000		0.000
							0.000
							0.000
							0.000
							0.000
							0.000
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							0.000
					TOTAL STREAM DISCHARGE		0.030

DISCHARGE DATA							
STREAM:	Stream 1 downstream			PROJECT #:	07-1118-0012		
TRANSECT:				LOCATION:	Marathon		
DATE:	March 18, 2008			WIDTH (m):	1.40 m		

Description	Station Distance (m)	Depth (m)	VELOCITY (m/s) 0.2 depth	0.8 depth	0.6 depth	Angle of Flow (degrees)	Discharge (m^3/s)
WE LDB	0.75	0.00			0.00		0.000
	1.00	0.04			-0.04		0.000
	1.10	0.05			-0.03		0.001
	1.20	0.05			0.12		0.001
	1.30	0.06			0.13		0.000
	1.40	0.05			0.02		0.000
	1.50	0.04			0.03		0.000
	1.60	0.08			0.03		0.000
	1.70	0.12			0.03		0.000
	1.80	0.12			0.01		0.000
	1.90	0.08			-0.04		0.000
	2.00	0.07			0.01		0.000
WE RDB	2.15	0.00			0.00		0.000
							0.000
							0.000
							0.000
							0.000
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				TOTAL STREAM DISCHARGE			0.001

DISCHARGE DATA							
STREAM:	Stream 1 downstream			PROJECT #:	07-1193-0096		
TRANSECT:	1			LOCATION:	Marathon PGM		
DATE:	April 30, 2008			WIDTH (m):	2.4		

Description	Station Distance (m)	Depth (m)	VELOCITY (m/s) 0.2 depth	0.8 depth	0.6 depth	Angle of Flow (degrees)	Discharge (m^3/s)
RDB(WE)	0	0			0.00		0.000
	0.2	0.06			0.06		0.001
	0.4	0.12			0.26		0.006
	0.6	0.12			0.33		0.008
	0.8	0.12			0.51		0.012
	1	0.12			0.57		0.014
	1.2	0.13			0.53		0.014
	1.4	0.13			0.59		0.015
	1.6	0.17			0.59		0.020
	1.8	0.14			0.44		0.012
	2	0.09			0.17		0.003
	2.2	0.04			0.15		0.001
LBD(WE)	2.4	0			0.00		0.000
							0.000
							0.000
							0.000
							0.000
							0.000
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							0.000
							0.000
							0.000
					TOTAL STREAM DISCHARGE		0.107

Prepared by: JB
Reviewed by: JD

DISCHARGE DATA

STREAM:	Stream 2 upstream	PROJECT #:	07-1118-0012
TRANSECT:		LOCATION:	Marathon
DATE:	September 25, 2007	WIDTH (m):	3.15 m

Description	Station Distance (m)	Depth (m)	VELOCITY (m/s) 0.2 depth	0.8 depth	0.6 depth	Angle of Flow (degrees)	Discharge (m^3/s)
WE RDB	0.00	0.00			0.00		0.000
	0.20	0.14			-0.01		0.000
	0.40	0.18			0.01		0.000
	0.60	0.31			0.04		0.002
	0.80	0.35			0.05		0.004
	1.00	0.40			0.11		0.009
	1.20	0.47			0.12		0.011
	1.40	0.49			0.11		0.011
	1.60	0.44			0.13		0.011
	1.80	0.44			0.15		0.013
	2.00	0.37			0.13		0.010
	2.20	0.34			0.07		0.005
	2.40	0.25			0.05		0.003
	2.60	0.18			0.04		0.001
	2.80	0.14			0.02		0.001
	3.00	0.01			0.00		0.000
WE LDB	3.15	0.00			0.00		0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
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							0.000
							0.000
							0.000
							0.000
				TOTAL STREAM DISCHARGE			0.080

DISCHARGE DATA

STREAM:	Stream 2 upstream		PROJECT #:	07-1118-0012		
TRANSECT:		LOCATIOI	LOCATION:	Marathon		
DATE:	November 28, 2007		WIDTH (m):	1.98		

Description	Station Distance (m)	Depth (m)	VELOCITY (m/s) 0.2 depth	0.8 depth	0.6 depth	Angle of Flow (degrees)	Discharge (m^3/s)
WE RDB	1.25	0.00			0.00		0.000
	1.45	0.39			0.09		0.005
	1.55	0.40			0.10		0.004
	1.65	0.48			0.10		0.005
	1.75	0.51			0.11		0.006
	1.85	0.48			0.11		0.004
	1.90	0.51			0.12		0.005
	2.00	0.44			0.12		0.007
	2.15	0.45			0.13		0.009
	2.30	0.34			0.12		0.005
	2.40	0.38			0.10		0.004
	2.50	0.35			0.07		0.002
	2.60	0.33			0.04		0.001
	2.70	0.30			0.04		0.001
	2.80	0.26			0.05		0.001
	2.90	0.21			0.01		0.000
	3.00	0.19			0.00		0.000
	3.10	0.10			0.02		0.000
WE LDB	3.23	0.00			0.00		0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
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							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
					TOTAL STREAM DISCHARGE		0.059

DISCHARGE DATA

STREAM: Stream 2 upstream	PROJECT #: 07-1118-0012
TRANSECT:	LOCATION: Marathon
DATE: March 18, 2008	WIDTH (m): 1.9

Description	Station Distance (m)	Depth (m)	VELOCITY (m/s) 0.2 depth	0.8 depth	0.6 depth	Angle of Flow (degrees)	Discharge (m³/s)
WE RDB	0.30	0.00			0.00		0.000
	0.50	0.38			0.01		0.001
	0.70	0.38			0.02		0.001
	0.80	0.40			0.01		0.000
	0.90	0.36			0.01		0.000
	1.00	0.28			0.01		0.000
	1.10	0.30			0.02		0.001
	1.20	0.25			0.02		0.001
	1.30	0.20			0.03		0.001
	1.40	0.23			0.01		0.000
	1.50	0.18			0.00		0.000
	1.60	0.17			-0.01		0.000
	1.70	0.14			0.00		0.000
	1.85	0.12			0.00		0.000
	1.95	0.10			-0.01		0.000
	2.10	0.08			-0.01		0.000
WE LDB	2.20	0.00			0.00		0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
			TOTAL STREAM DISCHARGE				0.004

Prepared by: JB
Reviewed by: JD

DISCHARGE DATA

STREAM: Stream 2 upstream PROJECT #: 07-1192-0096

RANSECT: 1 LOCATION: Marathon PGM

DATE: April 29, 2008 WIDTH (m): 2.9

Description	Station Distance (m)	Depth (m)	VELOCITY (m/s) 0.2 depth	0.8 depth	0.6 depth	Angle of Flow (degrees)	Discharge (m^3/s)
RDB(WE)	0	0			0.00		0.000
	0.2	0.03			0.08		0.000
	0.4	0.06			0.02		0.000
	0.6	0.17			0.07		0.002
	0.8	0.17			0.11		0.004
	1	0.27			0.14		0.008
	1.2	0.35			0.16		0.011
	1.4	0.36			0.17		0.012
	1.6	0.32			0.21		0.013
	1.8	0.31			0.19		0.012
	2	0.28			0.16		0.009
	2.2	0.16			0.12		0.004
	2.4	0.13			0.11		0.003
	2.6	0.09			0.110		0.002
	2.8	0.03			-0.040		0.000
LBD(WE)	2.9	0			0.000		0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
				TOTAL STREAM DISCHARGE			0.081

DISCHARGE DATA							
STREAM:	Stream 2 downstream			PROJECT #:	07-1118-0012		
TRANSECT:				LOCATION:	Marathon		
DATE:	September 29, 2007			WIDTH (m):	2.4 m		

Description	Station Distance (m)	Depth (m)	VELOCITY (m/s) 0.2 depth	0.8 depth	0.6 depth	Angle of Flow (degrees)	Discharge (m^3/s)
WE RDB	1.10	0.00			0.00		0.000
	1.20	0.10			0.09		0.001
	1.30	0.10			0.16		0.002
	1.40	0.10			0.25		0.003
	1.50	0.14			0.25		0.004
	1.60	0.14			0.22		0.003
	1.70	0.14			0.22		0.003
	1.80	0.12			0.40		0.005
	1.90	0.12			0.61		0.007
	2.00	0.08			0.45		0.004
	2.10	0.08			0.19		0.002
	2.20	0.00			0.00		0.000
WE LDB	3.50	0.00			0.00		0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
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							0.000
							0.000
							0.000
							0.000
							0.000
					TOTAL STREAM DISCHARGE		0.032

DISCHARGE DATA

STREAM: Stream 3 upstream
PROJECT #: 07-1118-0012
TRANSECT:
LOCATION: Marathon
DATE: September 27, 2007
WIDTH (m): 1.65 m

Description	Station Distance (m)	Depth (m)	VELOCITY (m/s) 0.2 depth	0.8 depth	0.6 depth	Angle of Flow (degrees)	Discharge (m^3/s)
WE LDB	0.13	0.00			0.00		0.000
	0.20	0.16			0.00		0.000
	0.30	0.17			0.03		0.001
	0.44	0.21			0.00		0.000
	0.50	0.22			0.01		0.000
	0.60	0.22			0.01		0.000
	0.70	0.22			0.01		0.000
	0.80	0.22			0.00		0.000
	0.90	0.22			0.02		0.000
	1.00	0.22			0.04		0.001
	1.10	0.24			0.02		0.000
	1.20	0.24			0.01		0.000
	1.30	0.23			0.00		0.000
	1.40	0.19			0.02		0.000
	1.50	0.10			0.01		0.000
	1.60	0.08			-0.01		0.000
WE RDB	1.78	0.00			0.00		0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
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							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
				TOTAL STREAM DISCHARGE			0.004

DISCHARGE DATA

STREAM:	Stream 3 upstream	PROJECT #:	07-1118-0012
TRANSECT:		LOCATION:	Marathon
DATE:	November 29, 2007	WIDTH (m):	1.35 m

Description	Station Distance (m)	Depth (m)	VELOCITY (m/s) 0.2 depth	0.8 depth	0.6 depth	Angle of Flow (degrees)	Discharge (m^3/s)
WE RDB	1.38	0.00			0.000		0.000
	1.50	0.21			0.020		0.000
	1.60	0.22			0.000		0.000
	1.70	0.19			0.010		0.000
	1.80	0.22			0.000		0.000
	1.90	0.24			0.000		0.000
	2.00	0.27			0.010		0.000
	2.10	0.28			0.010		0.000
	2.20	0.23			0.010		0.000
	2.30	0.24			0.020		0.000
	2.40	0.24			0.030		0.001
	2.50	0.23			0.060		0.001
	2.60	0.17			0.060		0.001
WE LDB	2.73	0.00			0.000		0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
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							0.000
							0.000
							0.000
							0.000
							0.000
TOTAL STREAM DISCHARGE							0.005

DISCHARGE DATA			
STREAM:	Stream 3 upstream	PROJECT #:	07-1192-0096
RANSECT:	1	LOCATION:	Marathon PGM
DATE:	April 29, 2008	WIDTH (m):	1.1

Description	Station Distance (m)	Depth (m)	VELOCITY (m/s) 0.2 depth	0.8 depth	0.6 depth	Angle of Flow (degrees)	Discharge (m^3/s)
LBD(WE)	0.2	0			0.00		0.000
	0.4	0.04			0.12		0.001
	0.6	0.04			0.12		0.001
	0.8	0.1			0.14		0.003
	1	0.1			0.15		0.003
	1.2	0.06			-0.02		0.000
RDB(WE)	1.3	0			0.00		0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
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							0.000
							0.000
							0.000
				TOTAL STREAM DISCHARGE			0.008

DISCHARGE DATA

STREAM:	Stream 3 downstream	PROJECT #:	07-1118-0012
TRANSECT:		LOCATION:	Marathon
DATE:	September 29, 2007	WIDTH (m):	1.35 m

Description	Station Distance (m)	Depth (m)	VELOCITY (m/s) 0.2 depth	0.8 depth	0.6 depth	Angle of Flow (degrees)	Discharge (m^3/s)
WE RDB	2.45	0.00			0.00		0.000
	2.50	0.02			0.07		0.000
	2.60	0.04			0.18		0.001
	2.70	0.06			0.33		0.002
	2.80	0.06			0.25		0.002
	2.90	0.08			0.26		0.002
	3.00	0.12			0.21		0.003
	3.10	0.12			0.26		0.003
	3.20	0.12			0.06		0.001
	3.30	0.10			0.06		0.001
	3.40	0.11			0.29		0.003
	3.50	0.06			0.18		0.001
	3.60	0.06			0.14		0.001
	3.70	0.04			0.05		0.000
WE LDB	3.80	0.00			0.00		0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
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							0.000
							0.000
							0.000
							0.000
				TOTAL STREAM DISCHARGE			0.019

DISCHARGE DATA

STREAM: Stream 4 upstream PROJECT #: 07-1118-0012
TRANSECT: LOCATION: Marathon
DATE: September 27, 2007 WIDTH (m): 1.96 m

Description	Station Distance (m)	Depth (m)	VELOCITY (m/s) 0.2 depth	0.8 depth	0.6 depth	Angle of Flow (degrees)	Discharge (m^3/s)
WE LDB	0.49	0.00			0.00		0.000
	0.72	0.06			-0.02		0.000
	0.87	0.09			0.01		0.000
	1.00	0.16			0.10		0.002
	1.10	0.12			0.10		0.001
	1.20	0.12			0.08		0.001
	1.32	0.33			0.06		0.002
	1.44	0.13			0.02		0.000
	1.55	0.14			0.02		0.000
	1.65	0.12			0.02		0.000
	1.74	0.15			0.02		0.000
	1.81	0.11			0.01		0.000
	1.95	0.04			-0.01		0.000
	2.14	0.02			0.00		0.000
WE RDB	2.45	0.00			0.00		0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
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							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
				TOTAL STREAM DISCHARGE			0.007

DISCHARGE DATA

STREAM: Stream 4 downstream PROJECT #: 07-1118-0012
TRANSECT: LOCATION: Marathon
DATE: September 28, 2007 WIDTH (m): 2.7 m

Description	Station Distance (m)	Depth (m)	VELOCITY (m/s) 0.2 depth	0.8 depth	0.6 depth	Angle of Flow (degrees)	Discharge (m^3/s)
WE RDB	0.20	0.08			0.04		0.000
	0.30	0.12			0.24		0.003
	0.40	0.24			0.19		0.005
	0.50	0.24			0.19		0.005
	0.60	0.26			0.07		0.002
	0.70	0.28			0.19		0.005
	0.80	0.28			0.19		0.005
	0.90	0.30			0.11		0.003
	1.00	0.30			0.10		0.003
	1.10	0.30			0.12		0.004
	1.20	0.26			0.11		0.003
	1.30	0.26			0.11		0.003
	1.40	0.22			0.09		0.002
	1.50	0.22			0.07		0.002
	1.60	0.22			0.07		0.002
	1.70	0.22			0.04		0.001
	1.80	0.18			0.03		0.001
	1.90	0.18			0.03		0.001
	2.00	0.18			-0.01		0.000
	2.10	0.18			0.00		0.000
	2.20	0.18			0.00		0.000
	2.30	0.20			0.01		0.000
	2.40	0.20			-0.01		0.000
	2.50	0.20			-0.01		0.000
	2.60	0.20			-0.01		0.000
	2.70	0.22			-0.04		-0.001
	2.80	0.22			-0.04		-0.001
WE LDB	2.90	0.22			-0.04		0.012
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
					TOTAL STREAM DISCHARGE		0.057

DISCHARGE DATA

STREAM:	Stream 4 downstream	PROJECT #:	07-1118-0012
TRANSECT:		LOCATION:	Marathon
DATE:	November 29, 2007	WIDTH (m):	2.45

Description	Station Distance (m)	Depth (m)	VELOCITY (m/s) 0.2 depth	0.8 depth	0.6 depth	Angle of Flow (degrees)	Discharge (m^3/s)
WE RDB	0.90	0.00			0.00		0.000
	1.15	0.21			0.00		0.000
	1.30	0.17			0.00		0.000
	1.40	0.18			0.01		0.000
	1.50	0.25			0.01		0.000
	1.60	0.15			0.00		0.000
	1.70	0.18			0.01		0.000
	1.80	0.27			0.03		0.001
	1.90	0.34			0.09		0.003
	2.00	0.45			0.10		0.005
	2.10	0.55			0.10		0.006
	2.20	0.46			0.04		0.002
	2.30	0.46			0.04		0.002
	2.40	0.37			0.04		0.001
	2.50	0.37			0.04		0.001
	2.60	0.43			0.04		0.002
	2.70	0.37			0.04		0.001
	2.80	0.30			0.03		0.001
	2.90	0.24			0.01		0.000
	3.00	0.29			0.00		0.000
	3.10	0.26			0.01		0.000
	3.25	0.00			0.00		0.000
WE LDB	3.35	0.00			0.00		0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
					TOTAL STREAM DISCHARGE		0.026

DISCHARGE DATA

STREAM:	Stream 4 downstream			PROJECT #:	07-1192-0096		
RANSECT:	1			LOCATION:	Marathon PGM		
DATE:	April 30, 2008			WIDTH (m):	3.1		

Description	Station Distance (m)	Depth (m)	VELOCITY (m/s) 0.2 depth	0.8 depth	0.6 depth	Angle of Flow (degrees)	Discharge (m^3/s)
RDB(WE)	0	0			0.00		0.000
	0.2	0.19			0.31		0.012
	0.4	0.2			0.25		0.010
	0.6	0.34			0.27		0.018
	0.8	0.34			0.24		0.016
	1	0.34			0.22		0.015
	1.2	0.3			0.18		0.011
	1.4	0.32			0.14		0.009
	1.6	0.28			0.15		0.008
	1.8	0.26			0.13		0.007
	2	0.28			0.07		0.004
	2.2	0.26			0.12		0.006
	2.4	0.28			0.10		0.006
	2.6	0.3			0.000		0.000
	2.8	0.32			-0.020		-0.001
	3	0.32			0.020		0.001
LBD(WE)	3.1	0			0.000		0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
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							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
					TOTAL STREAM DISCHARGE		0.122

DISCHARGE DATA

STREAM: Stream 5 upstream PROJECT #: 07-1118-0012

TRANSECT: LOCATION: Marathon

DATE: September 26, 2007 WIDTH (m): 4.74 m

Description	Station Distance (m)	Depth (m)	VELOCITY (m/s) 0.2 depth	0.8 depth	0.6 depth	Angle of Flow (degrees)	Discharge (m^3/s)
WE RDB	0.29	0.00			0.00		0.000
	0.60	0.42			0.00		0.000
	0.90	0.44			0.01		0.001
	1.05	0.48			0.02		0.002
	1.30	0.36			0.01		0.001
	1.60	0.55			0.03		0.004
	1.80	0.57			0.02		0.002
	2.00	0.60			0.02		0.003
	2.25	0.60			0.06		0.009
	2.50	0.56			0.07		0.009
	2.70	0.56			0.06		0.007
	2.90	0.59			0.06		0.007
	3.10	0.51			0.04		0.004
	3.30	0.57			0.06		0.007
	3.50	0.55			0.09		0.012
	3.80	0.47			0.07		0.009
	4.05	0.45			0.04		0.004
	4.27	0.42			0.03		0.003
	4.53	0.26			0.03		0.002
	4.80	0.22			0.00		0.000
WE LDB	5.03	0.06			0.00		0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
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							0.000
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							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
					TOTAL STREAM DISCHARGE		0.086

Stream Discharge Calculations (2007-2008)

DISCHARGE DATA

STREAM:	Stream 5 upstream	PROJECT #:	07-1118-0012
TRANSECT:		LOCATION:	Marathon
DATE:	November 29, 2007	WIDTH (m):	3.72

Description	Station Distance (m)	Depth (m)	VELOCITY (m/s) 0.2 depth	0.8 depth	0.6 depth	Angle of Flow (degrees)	Discharge (m^3/s)
WE RDB	0.40	0.00			0.00		0.000
	0.60	0.26			0.01		0.001
	0.80	0.18			0.02		0.001
	1.00	0.30			0.01		0.001
	1.20	0.30			0.00		0.000
	1.40	0.32			0.01		0.001
	1.60	0.32			0.00		0.000
	1.80	0.39			0.01		0.001
	2.00	0.36			0.02		0.001
	2.20	0.34			0.05		0.003
	2.40	0.28			0.05		0.003
	2.60	0.29			0.05		0.003
	2.80	0.35			0.08		0.006
	3.00	0.41			0.06		0.004
	3.15	0.42			0.11		0.008
	3.35	0.45			0.07		0.006
	3.55	0.37			0.06		0.005
	3.80	0.31			0.07		0.005
	4.00	0.23			0.04		0.001
WE LDB	4.12	0.13			0.01		-0.003
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
Checked JD							0.000
					TOTAL STREAM DISCHARGE		0.047

DISCHARGE DATA

STREAM: Stream 5 upstream PROJECT #: 07-1192-0096

RANSECT: 1 LOCATION: Marathon PGM

DATE: April 29, 2008 WIDTH (m): 2.8

Description	Station Distance (m)	Depth (m)	VELOCITY (m/s) 0.2 depth	0.8 depth	0.6 depth	Angle of Flow (degrees)	Discharge (m^3/s)
LBD(WE)	0	0			0.00		0.000
	0.2	0.1			0.02		0.000
	0.4	0.16			0.03		0.001
	0.6	0.17			0.04		0.001
	0.8	0.21			0.09		0.004
	1	0.22			0.11		0.005
	1.2	0.4			0.08		0.006
	1.4	0.49			0.11		0.011
	1.6	0.6			0.19		0.023
	1.8	0.54			0.18		0.019
	2	0.52			0.14		0.015
	2.2	0.52			0.14		0.015
	2.4	0.54			0.14		0.015
	2.6	0.38			0.090		0.007
RDB(WE)	2.8	0			0.000		0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
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							0.000
							0.000
							0.000
							0.000
							0.000
					TOTAL STREAM DISCHARGE		0.122

DISCHARGE DATA

STREAM: Stream 5 downstream | PROJECT #: 07-1118-0012

TRANSECT: | LOCATION: Marathon

DATE: September 26, 2007 | WIDTH (m): 4.85 m

Description	Station Distance (m)	Depth (m)	VELOCITY (m/s) 0.2 depth	VELOCITY (m/s) 0.8 depth	VELOCITY (m/s) 0.6 depth	Angle of Flow (degrees)	Discharge (m^3/s)
WE RDB	0.00	0.00			0.00		0.000
	0.40	0.30			0.06		0.006
	0.65	0.31			0.12		0.011
	1.00	0.20			0.10		0.007
	1.30	0.34			0.11		0.009
	1.50	0.36			0.09		0.010
	1.90	0.60			0.05		0.009
	2.10	0.63			0.04		0.005
	2.30	0.68			0.03		0.004
	2.50	0.71			0.03		0.004
	2.70	0.67			0.06		0.008
	2.90	0.68			0.05		0.007
	3.10	0.67			0.05		0.010
	3.50	0.55			0.08		0.015
	3.80	0.48			0.07		0.010
	4.10	0.44			0.03		0.004
	4.40	0.37			0.04		0.006
WE LDB	4.85	0.00			0.00		0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
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							0.000
							0.000
							0.000
				TOTAL STREAM DISCHARGE			0.125

DISCHARGE DATA							
STREAM:	Stream 5 downstream			PROJECT #:	07-1192-0096		
TRANSECT:	1			LOCATION:	Marathon PGM		
DATE:	April 29, 2008			WIDTH (m):	5.75		
Description	Station Distance (m)	Depth (m)	VELOCITY (m/s) 0.2 depth	0.8 depth	0.6 depth	Angle of Flow (degrees)	Discharge (m^3/s)
RDB(WE)	0	0			0.00		0.000
	0.25	0.06			0.00		0.000
	0.5	0.12			0.00		0.000
	0.75	0.25			-0.01		-0.001
	1	0.29			-0.01		-0.001
	1.25	0.24			-0.02		-0.001
	1.5	0.24			0.00		0.000
	1.75	0.24			0.08		0.005
	2	0.3			0.06		0.005
	2.25	0.26			0.24		0.016
	2.5	0.28			0.26		0.018
	2.75	0.32			0.17		0.014
	3	0.32			0.27		0.022
	3.25	0.34			0.270		0.023
	3.5	0.35			0.320		0.028
	3.75	0.4			0.200		0.020
	4	0.36			0.160		0.014
	4.25	0.28			0.240		0.017
	4.5	0.18			0.270		0.012
	4.75	0.18			0.290		0.013
	5	0.18			0.010		0.000
	5.25	0.16			0.000		0.000
	5.5	0.4			0.000		0.000
LBD(WE)	5.75	0			0.000		0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
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							0.000
							0.000
							0.000
							0.000
							0.000
					TOTAL STREAM DISCHARGE		0.204

DISCHARGE DATA

STREAM: Stream 6 upstream | PROJECT #: 07-1118-0012
TRANSECT: | LOCATION: Marathon
DATE: November 29, 2007 | WIDTH (m): 0.97

Description	Station Distance (m)	Depth (m)	VELOCITY (m/s) 0.2 depth	0.8 depth	0.6 depth	Angle of Flow (degrees)	Discharge (m^3/s)
WE RDB	0.50	0.00			0.00		0.000
	0.70	0.14			0.00		0.000
	0.80	0.14			0.02		0.000
	0.90	0.16			0.01		0.000
	1.00	0.16			0.01		0.000
	1.10	0.19			0.01		0.000
	1.20	0.19			0.02		0.000
	1.30	0.19			0.00		0.000
	1.40	0.10			-0.01		0.000
WE LDB	1.47	0.00			0.00		0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
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							0.000
							0.000
							0.000
				TOTAL STREAM DISCHARGE			0.001

DISCHARGE DATA							
STREAM:	Stream 6 upstream			PROJECT #:	07-1192-0096		
RANSECT:	1			LOCATION:	Marathon		
DATE:	April 30, 2008			WIDTH (m):	1.55		
Description	Station Distance (m)	Depth (m)	VELOCITY (m/s) 0.2 depth	0.8 depth	0.6 depth	Angle of Flow (degrees)	Discharge (m^3/s)
RDB(WE)	0	0			0.00		0.000
	0.2	0.14			0.03		0.001
	0.4	0.22			0.06		0.003
	0.6	0.22			0.06		0.003
	0.8	0.23			0.12		0.006
	1	0.24			0.11		0.005
	1.2	0.2			0.01		0.000
	1.4	0.14			0.06		0.001
LBD(WE)	1.55	0			0.00		0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
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							0.000
							0.000
				TOTAL STREAM DISCHARGE			0.019

DISCHARGE DATA

STREAM: Stream 6 downstream PROJECT #: 07-1118-0012
TRANSECT: LOCATION: Marathon
DATE: November 28, 2007 WIDTH (m): 1.57

Description	Station Distance (m)	Depth (m)	VELOCITY (m/s) 0.2 depth	0.8 depth	0.6 depth	Angle of Flow (degrees)	Discharge (m^3/s)
WE RDB	0.65	0.00			0.00		0.000
	0.84	0.20			0.07		0.002
	0.90	0.20			0.15		0.002
	0.95	0.20			0.17		0.003
	1.05	0.26			0.20		0.004
	1.12	0.30			0.13		0.003
	1.22	0.34			0.10		0.003
	1.30	0.32			0.25		0.007
	1.40	0.32			0.13		0.004
	1.50	0.31			0.17		0.005
	1.58	0.28			0.18		0.005
	1.68	0.22			0.12		0.003
	1.80	0.25			-0.03		-0.001
	2.00	0.10			0.00		0.000
WE LDB	2.22	0.00			0.00		0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
							0.000
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							0.000
							0.000
				TOTAL STREAM DISCHARGE			0.039

DISCHARGE DATA							
STREAM:	Stream 6 downstream			PROJECT #:	07-1192-0096		
RANSECT:	1			LOCATION:	Marathon		
DATE:	April 30, 2008			WIDTH (m):	3.7		
Description	Station Distance (m)	Depth (m)	VELOCITY (m/s) 0.2 depth	0.8 depth	0.6 depth	Angle of Flow (degrees)	Discharge (m³/s)
LDB(WE)	0	0			0.00		0.000
	0.2	0.06			-0.02		0.000
	0.5	0.12			-0.01		0.000
	0.7	0.36			0.06		0.004
	0.9	0.46			0.09		0.008
	1.1	0.48			0.18		0.017
	1.3	0.46			0.20		0.018
	1.5	0.6			0.18		0.022
	1.7	0.68			0.13		0.018
	1.9	0.56			0.18		0.020
	2.1	0.5			0.27		0.027
	2.3	0.48			0.19		0.018
	2.5	0.46			0.01		0.001
	2.7	0.44			-0.010		-0.001
	2.9	0.4			-0.010		-0.001
	3.1	0.38			0.010		0.001
	3.3	0.32			0.000		0.000
	3.5	0.12			0.000		0.000
RBD(WE)	3.7	0			0.000		0.000
							0.000
							0.000
							0.000
							0.000
							0.000
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							0.000
							0.000
							0.000
							0.000
							0.000
				TOTAL STREAM DISCHARGE			0.152

DISCHARGE DATA

STREAM: Hare Creek (Highway) PROJECT #: 07-1118-0012

TRANSECT: LOCATION: Marathon

DATE: September 30, 2007 WIDTH (m): 5.4

Description	Station Distance (m)	Depth (m)	VELOCITY (m/s) 0.2 depth	0.8 depth	0.6 depth	Angle of Flow (degrees)	Discharge (m^3/s)
WE RDB	0.80	0.04			0.00		0.000
	0.90	0.06			0.09		0.001
	1.00	0.10			0.09		0.001
	1.10	0.10			0.11		0.001
	1.20	0.12			0.17		0.002
	1.30	0.12			0.19		0.002
	1.40	0.18			0.36		0.006
	1.50	0.18			0.61		0.011
	1.60	0.20			0.78		0.016
	1.70	0.20			0.78		0.016
	1.80	0.20			0.79		0.016
	1.90	0.20			0.83		0.017
	2.00	0.20			0.65		0.020
	2.20	0.20			0.80		0.024
	2.30	0.22			0.86		0.019
	2.40	0.22			0.89		0.020
	2.50	0.20			1.03		0.021
	2.60	0.22			1.05		0.023
	2.70	0.22			1.03		0.023
	2.80	0.24			1.00		0.024
	2.90	0.24			1.06		0.025
	3.00	0.26			1.12		0.029
	3.10	0.30			1.02		0.031
	3.20	0.22			0.88		0.019
	3.30	0.22			1.11		0.024
	3.40	0.22			1.10		0.024
	3.50	0.28			1.00		0.028
	3.60	0.24			1.01		0.028
	3.70	0.30			0.91		0.022
	3.80	0.34			0.93		0.028
	3.90	0.36			0.99		0.034
	4.00	0.38			0.41		0.015
	4.10	0.40			0.42		0.016
	4.20	0.42			0.50		0.020
	4.30	0.40			0.61		0.026
	4.40	0.46			0.58		0.023
	4.50	0.44			0.61		0.028
	4.60	0.44			0.45		0.020
	4.70	0.44			0.72		0.032
	4.80	0.44			0.65		0.029
	5.00	0.50			0.79		#REF!

DISCHARGE DATA

STREAM:	Hare Creek (Highway)	PROJECT #:	07-1118-0012
TRANSECT:		LOCATION:	Marathon
DATE:	September 30, 2007	WIDTH (m):	5.4

Description	Station Distance (m)	Depth (m)	VELOCITY (m/s) 0.2 depth	0.8 depth	0.6 depth	Angle of Flow (degrees)	Discharge (m^3/s)
	5.10	0.44			0.70		#REF!
	5.20	0.44			0.71		0.031
	5.30	0.44			0.66		0.029
	5.40	0.40			0.48		0.021
	5.50	0.40			0.27		0.011
	5.60	0.40			0.25		0.010
	5.70	0.38			0.21		0.008
	5.80	0.38			0.16		0.006
	5.90	0.28			0.18		0.007
	6.00	0.24			0.14		0.004
WE LDB	6.20	0.00			0.00		0.000
							0.000
					TOTAL STREAM DISCHARGE		#REF!

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Canada

BLACK RIVER NEAR MARATHON

Water Survey of Canada

Burlington, Ontario

Station No. 02BB002

1980 km^2

Monthly Extremes of Daily Discharges in m^3/s for the Period January 1967 - December 1990

	Maximum Daily	Minimum Daily	
JAN	16.2 m^3/sec on Jan 15, 1975	2.28 m^3/sec on Jan 31, 1990	**JAN**
FEB	12.1 m^3/sec on Feb 01, 1975	1.45 m^3/sec on Feb 28, 1990	**FEB**
MAR	45.6 m^3/sec on Mar 31, 1977	1.15 m^3/sec on Mar 19, 1989	**MAR**
APR	246 m^3/sec on Apr 20, 1976	1.98 m^3/sec on Apr 01, 1989	**APR**
MAY	301 m^3/sec on May 12, 1979	11.5 m^3/sec on May 21, 1987	**MAY**
JUN	154 m^3/sec on Jun 14, 1984	6.17 m^3/sec on Jun 30, 1987	**JUN**
JUL	118 m^3/sec on Jul 13, 1982	1.68 m^3/sec on Jul 31, 1989	**JUL**
AUG	124 m^3/sec on Aug 29, 1977	0.541 m^3/sec on Aug 20, 1989	**AUG**
SEP	168 m^3/sec on Sep 10, 1977	0.032 m^3/sec on Sep 20, 1989	**SEP**
OCT	145 m^3/sec on Oct 17, 1983	0.290 m^3/sec on Oct 01, 1989	**OCT**
NOV	124 m^3/sec on Nov 03, 1979	2.82 m^3/sec on Nov 01, 1989	**NOV**
DEC	55.0 m^3/sec* on Dec 04, 1982	3.38 m^3/sec on Dec 30, 1989	**DEC**
EXTREME	301 m^3/sec on May 12, 1979	0.032 m^3/sec on Sep 20, 1989	**EXTREME**

Extremes of Monthly Mean Discharges in m^3/s for the Period January 1967 - December 1990

	Maximum Monthly Mean	Minimum Monthly Mean	
JAN	13.4 m^3/sec in 1975	2.75 m^3/sec in 1990	**JAN**
FEB	9.66 m^3/sec in 1975	1.85 m^3/sec in 1990	**FEB**
MAR	17.0 m^3/sec in 1973	1.35 m^3/sec in 1989	**MAR**
APR	118 m^3/sec in 1968	12.8 m^3/sec in 1978	**APR**
MAY	180 m^3/sec in 1979	21.9 m^3/sec in 1987	**MAY**
JUN	80.4 m^3/sec in 1984	11.5 m^3/sec in 1977	**JUN**
JUL	55.4 m^3/sec in 1968	5.01 m^3/sec in 1989	**JUL**
AUG	40.4 m^3/sec in 1974	1.14 m^3/sec in 1989	**AUG**
SEP	63.1 m^3/sec in 1977	0.296 m^3/sec in 1989	**SEP**
OCT	78.1 m^3/sec in 1982	1.23 m^3/sec in 1989	**OCT**
NOV	61.1 m^3/sec in 1979	5.12 m^3/sec in 1976	**NOV**
DEC	30.0 m^3/sec in 1982	4.09 m^3/sec in 1989	**DEC**
EXTREME	180 m^3/sec in 1979	0.296 m^3/sec in 1989	**EXTREME**

Monthly Mean Discharges in m^3/s for the Period January 1967 - December 1990

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	PERIOD	
1967	------	------	------	------	------	------	------	------	------	------	29.2	11.2	4.37	**1967**
1968	6.32	4.70	6.98	118	31.1	48.7	55.4	27.7	21.7	39.6	34.7	15.0	34.1	**1968**
1969	9.64	7.72	5.88	62.7	74.9	30.8	13.9	5.41	3.37	7.57	9.05	6.84	19.8	**1969**
1970	4.64	4.11	4.09	24.2	91.0	28.1	13.0	4.75	13.4	30.1	31.8	24.4	22.9	**1970**
1971	9.63	6.57	6.04	50.9	99.5	35.6	18.5	14.5	9.06	31.9	60.8	24.5	30.7	**1971**
1972	11.9	6.76	5.29	23.7	108	26.7	21.6	36.0	32.8	31.0	21.4	14.0	28.4	**1972**
1973	8.26	5.43	17.0	76.4	80.7	31.7	24.9	17.2	16.4	20.8	19.7	12.8	27.7	**1973**
1974	8.19	5.94	5.80	30.2	106	43.0	21.6	40.4	43.3	65.1	45.0	18.0	36.2	**1974**

Water Survey of Canada **Station No. 02BB002**

Burlington, Ontario **1980 km^2**

Monthly Mean Discharges in m^3/s for the Period January 1967 - December 1990

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	PERIOD	
1975	13.4	9.66	7.13	27.3	97.8	40.2	7.17	4.29	5.25	13.4	35.3	21.3	23.6	**1975**
1976	8.37	6.51	6.80	116	75.4	55.0	27.7	10.3	5.46	5.76	5.12	4.23	27.1	**1976**
1977	3.99	3.95	12.7	108	47.7	11.5	17.4	19.2	63.1	33.4	26.0	12.7	30.0	**1977**
1978	7.81	4.96	4.13	12.8	74.3	48.1	31.8	12.3	6.64	11.3	9.59	5.59	19.2	**1978**
1979	4.03	3.64	4.64	63.0	180	52.4	12.8	8.19	35.0	52.4	61.1	19.7	41.6	**1979**
1980	7.21	4.18	3.64	51.0	93.6	18.7	12.7	12.4	23.1	32.5	23.0	9.15	24.3	**1980**
1981	5.08	4.84	8.86	63.4	55.0	43.4	19.9	7.84	6.29	7.92	9.16	5.16	19.7	**1981**
1982	3.65	3.12	2.85	20.2	129	30.8	52.6	14.9	20.4	78.1	56.5	30.0	37.2	**1982**
1983	10.9	7.98	9.15	27.2	103	31.4	14.5	5.20	6.37	63.4	29.8	17.3	27.4	**1983**
1984	7.30	6.01	5.58	63.8	72.3	80.4	39.1	14.1	5.94	13.6	25.7	27.7	30.1	**1984**
1985	9.19	5.27	4.75	52.4	46.3	29.3	23.2	33.8	22.9	51.3	35.4	12.6	27.3	**1985**
1986	6.32	3.98	3.12	89.0	57.3	17.2	14.4	12.8	17.4	29.2	27.5	11.8	24.2	**1986**
1987	7.38	5.58	5.10	47.8	21.9	16.0	28.1	21.1	12.2	19.2	26.7	15.4	18.9	**1987**
1988	8.69	4.00	3.36	65.3	89.1	23.2	6.82	7.23	11.7	19.2	40.6	14.4	24.5	**1988**
1989	7.17	2.57	1.35	23.8	139	20.5	5.01	1.14	0.296	1.23	6.55	4.09	17.9	**1989**
1990	2.75	1.85	5.70	50.8	55.8	17.7	14.6	6.57	5.47	19.5	23.0	10.8	17.9	**1990**

	Mean Monthly Discharge in m^3/s	Median Discharge in m^3/s	Lower Quartile in m^3/s	Upper Quartile in m^3/s	Median Cumulative Runoff Depth in mm	
JAN	7.47	7.38	5.08	9.19	9.98	**JAN**
FEB	5.19	4.96	3.98	6.51	16.80	**FEB**
MAR	6.08	5.58	4.09	6.98	24.77	**MAR**
APR	55.1	51.0	27.2	65.3	93.87	**APR**
MAY	83.8	80.7	55.8	103	211.83	**MAY**
JUN	33.9	30.8	20.5	43.4	254.20	**JUN**
JUL	21.6	18.5	13.0	27.7	272.20	**JUL**
AUG	14.7	12.4	6.57	19.2	279.60	**AUG**
SEP	16.9	12.2	5.94	22.9	301.88	**SEP**
OCT	29.5	29.2	13.4	39.6	371.22	**OCT**
NOV	28.9	27.1	20.1	35.4	394.36	**NOV**
DEC	14.5	13.4	9.56	19.3	412.02	**DEC**
PERIOD	26.6	27.1	19.8	30.1		**PERIOD**

This report was produced on May 10, 2012 using the Water Level and Streamflow Statistics application located at http://www.wsc.ec.gc.ca/staflo/index_e.cfm?cname=main_e.cfm

BLACK RIVER NEAR MARATHON (02BB002)

Station: 02BB002 Report Type: Peak Flow for 1990 Refresh Graph View

Peak Discharges (m^3/s)

Year	Maximum Instantaneous Discharge (m^3/s)	Minimum Instantaneous Discharge (m^3/s)	Maximum Daily Discharge (m^3/s)	Minimum Daily Discharge (m^3/s)
1967	----	----	----	----
1968	----	----	229 on Apr 14	4.25 on Feb 29
1969	182 at 06:30 EST on Apr 21	----	174 on Apr 21	3.00 on Sep 20
1970	185 at 11:36 EST on May 02	----	184 on May 02	3.77 on Aug 27
1971	207 at 19:10 EST on May 26	----	205 on May 26	5.89 on Feb 20
1972	199 at 01:00 EST on May 03	----	197 on May 03	4.90 B on Apr 11
1973	189 at 17:18 EST on May 10	----	186 on May 10	4.08 B on Mar 03
1974	162 at 11:08 EST on May 04	----	161 on May 04	5.38 E on Mar 31
1975	199 at 14:04 EST on May 06	----	198 on May 06	3.54 on Aug 20
1976	----	----	246 E on Apr 20	4.02 B on Dec 30
1977	237 at 09:30 EST on Apr 23	----	236 on Apr 23	3.94 B on Feb 11
1978	122 at 11:43 EST on May 16	----	122 on May 16	4.08 B on Mar 19
1979	302 at 16:45 EST on May 12	----	301 on May 12	3.45 B on Feb 21
1980	232 at 17:31 EST on May 02	----	231 on May 02	3.50 B on Mar 22
1981	91.2 at 16:02 EST on Apr 18	----	90.3 on Apr 18	3.86 B on Feb 16
1982	237 at 00:45 EST on May 08	----	234 on May 08	2.77 B on Mar 27
1983	160 at 21:36 EST on May 04	----	159 on May 04	4.36 on Sep 05
1984	155 at 23:53 EST on Jun 13	----	154 on Jun 14	4.84 on Sep 21
1985	233 at 09:29 EST on Apr 25	----	221 on Apr 25	4.60 B on Mar 22
1986	160 at 09:51 EST on Apr 21	----	159 on Apr 21	2.91 B on Mar 24
1987	82.9 at 09:51 EST on Apr 20	----	82.8 on Apr 20	4.64 B on Mar 17
1988	158 at 04:43 EST on May 05	----	157 on May 04	2.44 on Aug 03
1989	206 at 19:05 EST on May 06	----	204 on May 06	0.032 on Sep 20
1990	218 at 22:30 EST on Apr 28	----	213 on Apr 28	1.30 B on Mar 08

Date Modified: 2010-04-30

Environment Canada Environnement Canada

Canada

CEDAR CREEK NEAR HEMLO

Water Survey of Canada
Burlington, Ontario

Station No. 02BB004
201 km^2

Monthly Extremes of Daily Discharges in m^3/s for the Period January 1984 - December 2010

	Maximum Daily	Minimum Daily	
JAN	3.22 m^3/sec on Jan 01, 1985	0.265 m^3/sec on Jan 31, 1998	**JAN**
FEB	1.48 m^3/sec on Feb 01, 1985	0.201 m^3/sec on Feb 28, 1998	**FEB**
MAR	5.86 m^3/sec on Mar 30, 2000	0.181 m^3/sec* on Mar 22, 1998	**MAR**
APR	36.7 m^3/sec* on Apr 26, 2001	0.246 m^3/sec on Apr 06, 2002	**APR**
MAY	32.9 m^3/sec on May 20, 1996	0.496 m^3/sec on May 20, 1987	**MAY**
JUN	12.2 m^3/sec on Jun 01, 1999	0.097 m^3/sec on Jun 28, 2003	**JUN**
JUL	20.9 m^3/sec on Jul 09, 1995	0.100 m^3/sec on Jul 31, 1989	**JUL**
AUG	5.43 m^3/sec on Aug 31, 2009	0.049 m^3/sec on Aug 13, 1989	**AUG**
SEP	5.66 m^3/sec on Sep 30, 1992	0.025 m^3/sec on Sep 12, 1989	**SEP**
OCT	16.3 m^3/sec* on Oct 15, 1997	0.042 m^3/sec on Oct 13, 1989	**OCT**
NOV	33.9 m^3/sec on Nov 04, 1997	0.424 m^3/sec on Nov 04, 1989	**NOV**
DEC	8.00 m^3/sec on Dec 05, 1990	0.359 m^3/sec on Dec 31, 2000	**DEC**
EXTREME	36.7 m^3/sec on Apr 26, 2001	0.025 m^3/sec on Sep 12, 1989	**EXTREME**

Extremes of Monthly Mean Discharges in m^3/s for the Period January 1984 - December 2010

	Maximum Monthly Mean	Minimum Monthly Mean	
JAN	2.27 m^3/sec in 1985	0.327 m^3/sec in 1998	**JAN**
FEB	1.04 m^3/sec in 1985	0.228 m^3/sec in 1998	**FEB**
MAR	1.81 m^3/sec in 2000	0.315 m^3/sec in 2002	**MAR**
APR	11.2 m^3/sec in 2001	1.05 m^3/sec in 2010	**APR**
MAY	15.7 m^3/sec in 1996	0.875 m^3/sec in 2010	**MAY**
JUN	5.71 m^3/sec in 2000	0.622 m^3/sec in 2010	**JUN**
JUL	7.63 m^3/sec in 1995	0.326 m^3/sec in 1988	**JUL**
AUG	2.93 m^3/sec in 2009	0.077 m^3/sec in 1989	**AUG**
SEP	4.04 m^3/sec in 1992	0.044 m^3/sec in 1989	**SEP**
OCT	6.30 m^3/sec in 1985	0.150 m^3/sec in 1989	**OCT**
NOV	14.5 m^3/sec in 1997	0.581 m^3/sec in 1989	**NOV**
DEC	4.20 m^3/sec in 1984	0.395 m^3/sec in 2000	**DEC**
EXTREME	15.7 m^3/sec in 1996	0.044 m^3/sec in 1989	**EXTREME**

Monthly Mean Discharges in m^3/s for the Period January 1984 - December 2010

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	PERIOD	
1984	------	------	------	------	------	------	------	------	------	------	------	4.20	0.479	**1984**
1985	2.27	1.04	0.521	3.35	4.86	2.67	1.41	2.74	2.53	6.30	4.01	2.04	2.82	**1985**
1986	0.863	0.536	0.473	6.80	6.40	0.961	1.10	0.996	2.49	3.23	3.68	1.39	2.41	**1986**
1987	0.687	0.568	0.700	3.61	2.10	2.33	2.08	1.80	0.927	1.15	2.80	2.40	1.77	**1987**
1988	1.03	0.589	0.454	5.40	8.63	2.38	0.326	0.874	1.09	1.31	4.07	2.45	2.38	**1988**
1989	1.20	0.812	0.569	1.66	13.8	2.75	0.430	0.077	0.044	0.150	0.581	0.479	1.90	**1989**
1990	0.391	0.262	0.358	2.64	5.40	1.52	1.80	0.362	0.418	2.29	3.79	2.92	1.86	**1990**
1991	1.22	0.764	0.550	4.52	6.27	2.20	3.56	2.53	1.17	5.02	6.01	2.46	3.04	**1991**

Water Survey of Canada **Station No. 02BB004**

Burlington, Ontario **201 km^2**

Monthly Mean Discharges in m^3/s for the Period January 1984 - December 2010

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	PERIOD	
1992	0.768	0.437	0.323	2.69	11.2	1.22	1.28	0.656	4.04	5.01	3.20	1.59	2.72	**1992**
1993	0.722	0.478	0.397	2.26	7.88	3.10	0.606	0.677	1.28	3.05	2.36	0.952	1.99	**1993**
1994	0.496	0.381	0.367	1.77	8.44	4.64	2.06	1.45	0.744	1.48	1.62	1.02	2.05	**1994**
1995	0.523	0.391	0.747	1.50	6.06	2.09	7.63	0.457	1.15	5.17	2.33	0.605	2.41	**1995**
1996	0.411	0.369	0.357	1.11	15.7	3.44	1.18	2.54	0.751	1.47	2.51	1.07	2.59	**1996**
1997	0.683	0.490	0.432	5.35	10.9	2.14	5.37	0.465	0.605	5.79	14.5	0.793	3.97	**1997**
1998	0.327	0.228	0.343	4.76	1.93	0.794	0.400	0.541	0.392	1.49	0.976	1.01	1.10	**1998**
1999	0.510	0.522	0.497	6.23	8.05	4.48	0.819	0.509	0.617	3.11	2.24	1.76	2.45	**1999**
2000	0.797	0.382	1.81	4.15	7.19	5.71	1.61	0.724	0.505	0.445	0.611	0.395	2.03	**2000**
2001	0.342	0.333	0.450	11.2	7.13	2.08	0.510	0.416	0.416	0.479	1.89	2.92	2.34	**2001**
2002	0.907	0.371	0.315	3.45	4.41	5.06	1.68	0.535	0.508	5.16	1.93	0.847	2.11	**2002**
2003	0.427	0.328	0.414	4.77	9.41	1.07	0.381	0.666	1.19	4.00	2.57	1.94	2.28	**2003**
2004	1.21	0.581	0.741	8.02	6.45	1.79	0.559	0.722	2.73	5.64	3.45	1.39	2.77	**2004**
2005	0.899	0.737	0.592	4.73	3.68	1.40	0.463	0.335	0.304	3.92	3.94	2.34	1.95	**2005**
2006	1.15	0.793	0.556	6.24	4.25	0.997	0.464	0.358	0.462	1.01	0.930	1.21	1.54	**2006**
2007	0.881	0.470	0.519	5.11	3.34	1.98	3.56	0.809	1.38	3.62	2.89	2.01	2.22	**2007**
2008	1.43	0.947	0.628	5.34	7.64	3.78	5.07	0.926	1.01	1.38	1.44	0.841	2.54	**2008**
2009	0.717	0.631	0.586	2.92	5.71	1.66	2.78	2.93	2.56	1.82	3.82	1.75	2.33	**2009**
2010	0.969	0.860	0.730	1.05	0.875	0.622	0.710	0.501	0.934	1.31	1.87	1.10	0.960	**2010**

	Mean Monthly Discharge in m^3/s	Median Discharge in m^3/s	Lower Quartile in m^3/s	Upper Quartile in m^3/s	Median Cumulative Runoff Depth in mm	
JAN	0.840	0.782	0.506	1.06	10.42	**JAN**
FEB	0.550	0.506	0.379	0.744	16.27	**FEB**
MAR	0.555	0.508	0.390	0.601	24.29	**MAR**
APR	4.25	4.34	2.55	5.36	83.19	**APR**
MAY	6.84	6.43	4.37	8.49	172.11	**MAY**
JUN	2.42	2.11	1.36	3.18	206.37	**JUN**
JUL	1.84	1.23	0.498	2.26	230.64	**JUL**
AUG	0.984	0.671	0.463	1.11	246.58	**AUG**
SEP	1.16	0.931	0.494	1.30	270.47	**SEP**
OCT	2.88	2.67	1.31	5.01	296.26	**OCT**
NOV	3.08	2.54	1.81	3.80	330.18	**NOV**
DEC	1.63	1.39	0.952	2.34	357.22	**DEC**
PERIOD	2.26	2.33	1.95	2.59		**PERIOD**

This report was produced on May 10, 2012 using the Water Level and Streamflow Statistics application located at http://www.wsc.ec.gc.ca/staflo/index_e.cfm?cname=main_e.cfm

CEDAR CREEK NEAR HEMLO (02BB004)

Station: 02BB004 Report Type: Peak Flow for 2010 Refresh Graph View

Peak Discharges (m^3/s)

Year	Maximum Instantaneous Discharge (m^3/s)	Minimum Instantaneous Discharge (m^3/s)	Maximum Daily Discharge (m^3/s)	Minimum Daily Discharge (m^3/s)
1984	----	----	----	----
1985	12.0 at 22:23 EST on Apr 25	----	11.8 on Apr 26	0.436 B on Apr 05
1986	13.3 at 19:23 EST on May 01	----	13.1 on May 01	0.157 on Jun 25
1987	5.80 at 12:10 EST on Apr 22	----	5.71 on Apr 22	0.213 on Sep 21
1988	12.0 at 17:02 EST on May 13	----	11.7 on May 13	0.170 on Jul 29
1989	21.2 at 16:33 EST on May 15	----	20.7 on May 15	0.025 on Sep 12
1990	15.0 at 12:32 EST on Apr 29	----	14.2 on Apr 29	0.099 on Sep 07
1991	15.0 at 12:32 EST on Apr 29	----	9.00 on May 03	0.216 on Aug 29
1992	17.6 at 16:06 EST on May 13	----	17.2 on May 13	0.198 E on Aug 24
1993	----	----	14.1 on May 07	0.312 B on Mar 24
1994	13.1 at 13:35 EST on May 16	----	12.9 on May 16	0.367 B on Feb 25
1995	21.5 at 20:47 EST on Jul 09	----	20.9 on Jul 09	0.232 on Aug 09
1996	33.7 at 14:00 EST on Apr 19	----	32.9 on May 20	0.350 B on Apr 08
1997	34.1 at 08:00 EST on Nov 04	----	33.9 on Nov 04	0.360 on Oct 06
1998	7.59 at 13:00 EST on Apr 24	----	7.49 on Apr 24	----
1999	23.1 at 13:00 EST on May 26	0.32 at 13:00 EST on Sep 18	22.6 on May 26	0.333 on Sep 18
2000	15.5 at 16:25 EST on May 11	----	15.0 on May 11	----
2001	37.8 at 17:30 EST on Apr 24	----	36.7 on Apr 26	----
2002	10.9 at 16:00 EST on Jun 23	----	10.6 on Jun 24	----
2003	16.2 at 13:15 EST on May 13	----	15.9 on May 13	0.097 on Jun 28
2004	21.5 at 20:00 EST on Apr 20	0.22 at 01:00 EST on Jul 25	21.2 on Apr 21	0.254 on Jul 24
2005	8.03 at 20:00 EST on Oct 08	0.22A at 17:00 EST on Oct 03	7.99 on Oct 09	0.237 A on Oct 02
2006	9.90 at 07:00 EST on Apr 18	0.26 at 16:00 EST on Sep 07	9.77 on Apr 18	0.279 on Sep 05
2007	10.6 at 01:20 EST on Apr 25	0.20 at 16:00 EST on Aug 17	10.4 on Apr 25	0.239 on Aug 17
2008	17.3 at 05:00 EST on Apr 27	----	16.7 on Apr 27	0.580 B on Mar 29
2009	11.4 at 23:50 EST on Apr 28	----	11.3 on Apr 29	0.545 B on Apr 08
2010	3.44 at 03:26 EST on Oct 29	0.42 at 14:00 EST on Aug 09	3.34 on Oct 29	0.421 on Aug 09

Date Modified: 2010-04-30

Environment Canada Environnement Canada

Canada

LITTLE PIC RIVER NEAR COLDWELL

Water Survey of Canada
Burlington, Ontario

Station No. 02BA003
1320 km^2

Monthly Extremes of Daily Discharges in m^3/s for the Period January 1972 - December 2010

	Maximum Daily	Minimum Daily	
JAN	12.0 m^3/sec on Jan 01, 1985	2.06 m^3/sec* on Jan 31, 1977	**JAN**
FEB	9.10 m^3/sec* on Feb 27, 2000	1.98 m^3/sec* on Feb 25, 1977	**FEB**
MAR	60.6 m^3/sec* on Mar 26, 2000	1.57 m^3/sec* on Mar 27, 1993	**MAR**
APR	218 m^3/sec on Apr 19, 1976	2.11 m^3/sec on Apr 01, 1994	**APR**
MAY	262 m^3/sec on May 11, 1979	5.42 m^3/sec on May 31, 2010	**MAY**
JUN	269 m^3/sec on Jun 30, 2008	4.24 m^3/sec on Jun 30, 1987	**JUN**
JUL	221 m^3/sec* on Jul 01, 2008	2.93 m^3/sec on Jul 19, 1998	**JUL**
AUG	77.6 m^3/sec on Aug 29, 2009	2.23 m^3/sec on Aug 31, 2006	**AUG**
SEP	136 m^3/sec on Sep 16, 2004	1.80 m^3/sec on Sep 30, 2001	**SEP**
OCT	176 m^3/sec on Oct 06, 2005	1.64 m^3/sec on Oct 22, 1989	**OCT**
NOV	137 m^3/sec on Nov 21, 1982	1.89 m^3/sec on Nov 04, 1989	**NOV**
DEC	52.2 m^3/sec on Dec 17, 1984	2.00 m^3/sec on Dec 03, 2006	**DEC**
EXTREME	269 m^3/sec on Jun 30, 2008	1.57 m^3/sec on Mar 27, 1993	**EXTREME**

Extremes of Monthly Mean Discharges in m^3/s for the Period January 1972 - December 2010

	Maximum Monthly Mean	Minimum Monthly Mean	
JAN	8.19 m^3/sec in 1975	2.14 m^3/sec in 1977	**JAN**
FEB	6.04 m^3/sec in 1983	2.01 m^3/sec in 1977	**FEB**
MAR	18.4 m^3/sec* in 2000	2.18 m^3/sec in 1994	**MAR**
APR	73.2 m^3/sec in 1976	6.96 m^3/sec in 2010	**APR**
MAY	91.9 m^3/sec in 1996	9.45 m^3/sec in 2010	**MAY**
JUN	61.4 m^3/sec in 2008	5.87 m^3/sec in 2010	**JUN**
JUL	57.4 m^3/sec in 2008	3.86 m^3/sec in 1998	**JUL**
AUG	33.3 m^3/sec in 1985	2.73 m^3/sec in 2005	**AUG**
SEP	55.9 m^3/sec in 1992	2.29 m^3/sec in 2006	**SEP**
OCT	44.4 m^3/sec in 2007	1.85 m^3/sec in 1989	**OCT**
NOV	35.8 m^3/sec in 2005	2.54 m^3/sec in 2006	**NOV**
DEC	20.2 m^3/sec in 2001	2.41 m^3/sec in 1976	**DEC**
EXTREME	91.9 m^3/sec in 1996	1.85 m^3/sec in 1989	**EXTREME**

Monthly Mean Discharges in m^3/s for the Period January 1972 - December 2010

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	PERIOD	
1972	------	------	------	------	------	------	13.7	13.2	23.0	19.1	10.4	6.08	8.02	**1972**
1973	4.59	4.01	7.82	37.6	38.2	21.8	14.0	7.99	10.9	13.1	15.6	11.6	15.6	**1973**
1974	6.22	4.40	3.45	10.6	55.1	34.6	17.8	21.7	18.7	25.4	16.4	9.81	18.8	**1974**
1975	8.19	4.37	3.90	15.7	53.9	37.4	7.86	3.52	3.76	9.50	22.6	12.0	15.3	**1975**
1976	5.70	4.11	3.62	73.2	34.7	19.2	9.99	5.33	3.17	3.11	2.72	2.41	13.9	**1976**
1977	2.14	2.01	6.16	52.4	25.2	8.68	12.4	8.72	28.5	19.9	20.1	7.93	16.2	**1977**
1978	4.85	3.46	2.75	7.49	38.0	30.6	13.5	5.40	4.09	6.08	4.70	3.14	10.4	**1978**
1979	2.56	2.31	2.80	29.5	76.2	22.3	8.00	5.32	10.0	22.5	26.3	8.72	18.1	**1979**

Water Survey of Canada **Station No. 02BA003**

Burlington, Ontario **1320 km^2**

Monthly Mean Discharges in m^3/s for the Period January 1972 - December 2010

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	PERIOD	
1980	5.51	3.99	3.14	30.2	46.2	13.8	8.92	7.42	19.2	20.6	14.1	6.44	15.0	**1980**
1981	4.22	3.92	4.93	22.7	25.2	27.0	11.1	3.64	2.89	3.49	3.58	2.86	9.62	**1981**
1982	2.62	2.50	2.46	14.3	76.5	17.6	21.1	7.71	9.84	32.2	34.7	16.7	20.0	**1982**
1983	8.10	6.04	6.15	14.0	56.4	17.5	11.8	3.63	4.83	36.5	20.9	9.70	16.4	**1983**
1984	4.72	5.03	4.95	39.6	41.6	49.4	20.6	10.2	5.27	10.1	15.2	18.3	18.7	**1984**
1985	7.45	4.26	3.41	24.7	30.1	21.1	12.0	33.3	18.7	34.1	31.8	8.73	19.2	**1985**
1986	5.83	4.44	3.62	46.0	34.1	12.2	10.4	7.30	8.89	13.7	17.0	6.82	14.2	**1986**
1987	4.70	4.16	3.74	26.2	12.1	8.65	7.37	6.65	6.22	11.9	12.7	6.39	9.22	**1987**
1988	4.92	3.71	3.11	33.3	47.5	16.2	7.15	8.90	13.2	23.3	32.8	11.4	17.1	**1988**
1989	8.06	5.99	4.23	14.9	77.3	15.5	6.22	3.32	2.39	1.85	6.05	3.21	12.5	**1989**
1990	2.64	2.33	3.64	32.1	36.3	16.4	11.4	4.26	3.96	15.9	14.8	6.54	12.6	**1990**
1991	4.71	3.84	3.48	43.2	46.2	15.3	12.5	6.18	8.22	26.7	30.9	11.6	17.8	**1991**
1992	6.87	4.51	3.26	15.3	75.6	15.3	13.6	10.8	55.9	30.9	17.8	10.0	21.7	**1992**
1993	6.75	5.21	2.99	27.5	66.5	20.7	17.2	22.8	18.6	17.4	12.2	6.10	18.8	**1993**
1994	3.34	2.48	2.18	11.3	39.5	33.6	29.1	22.0	11.4	13.3	10.4	6.54	15.5	**1994**
1995	4.47	3.51	3.25	13.0	48.5	13.4	26.2	6.11	7.90	42.1	14.9	5.97	15.9	**1995**
1996	4.79	4.28	3.66	13.4	91.9	30.1	16.1	16.3	7.48	12.4	23.1	7.12	19.3	**1996**
1997	4.36	3.84	3.57	36.7	61.3	26.3	20.6	4.35	2.89	8.91	16.4	3.81	16.1	**1997**
1998	3.40	2.96	3.43	32.1	12.9	7.05	3.86	3.46	2.43	15.1	12.1	7.32	8.84	**1998**
1999	3.25	3.17	3.46	40.7	56.1	28.1	16.9	6.58	11.3	22.2	16.8	9.05	18.2	**1999**
2000	4.95	4.87	18.4	31.9	50.7	41.6	19.3	11.1	6.66	4.17	4.30	2.60	16.7	**2000**
2001	2.59	2.62	2.64	61.4	46.3	16.6	6.36	3.03	2.80	9.10	23.3	20.2	16.4	**2001**
2002	6.42	3.24	2.77	30.5	28.2	24.1	9.78	5.60	5.40	29.5	10.9	6.48	13.6	**2002**
2003	4.79	3.71	3.06	31.7	46.0	8.91	5.96	6.25	9.11	16.8	13.3	6.90	13.1	**2003**
2004	4.50	3.59	8.52	51.6	36.9	12.9	7.56	10.2	38.6	43.5	25.6	8.11	20.9	**2004**
2005	5.89	4.52	3.63	43.5	34.5	14.1	4.38	2.73	2.71	32.7	35.8	15.5	16.7	**2005**
2006	6.27	4.66	3.99	47.2	40.4	9.99	4.69	2.90	2.29	3.65	2.54	2.59	10.9	**2006**
2007	2.71	2.20	2.21	18.0	14.8	17.3	25.8	6.09	17.7	44.4	18.2	8.64	14.9	**2007**
2008	6.69	5.65	4.56	42.6	43.0	61.4	57.4	9.96	6.85	12.7	13.3	6.53	22.5	**2008**
2009	4.85	3.76	3.52	35.8	48.1	12.9	10.8	25.3	12.8	6.08	17.9	6.66	15.8	**2009**
2010	4.52	3.76	6.07	6.96	9.45	5.87	7.14	8.50	10.3	12.2	13.3	11.1	8.30	**2010**

	Mean Monthly Discharge in m^3/s	Median Discharge in m^3/s	Lower Quartile in m^3/s	Upper Quartile in m^3/s	Median Cumulative Runoff Depth in mm	
JAN	4.98	4.79	4.01	6.24	9.72	**JAN**
FEB	3.88	3.88	3.22	4.46	16.88	**FEB**
MAR	4.28	3.54	3.10	4.32	25.20	**MAR**
APR	30.5	31.1	15.2	41.2	83.81	**APR**
MAY	44.8	44.5	34.4	55.3	184.50	**MAY**
JUN	21.2	17.4	13.3	27.3	220.39	**JUN**
JUL	13.9	11.8	7.56	17.2	240.20	**JUL**
AUG	9.17	6.65	4.35	10.2	270.18	**AUG**
SEP	11.3	8.22	3.96	13.2	286.32	**SEP**
OCT	18.6	15.9	9.50	26.7	322.77	**OCT**
NOV	16.8	15.6	12.1	22.6	362.94	**NOV**
DEC	8.25	7.12	6.10	10.0	380.14	**DEC**
PERIOD	15.6	15.9	13.6	18.2		**PERIOD**

This report was produced on May 10, 2012 using the Water Level and Streamflow Statistics application located at http://www.wsc.ec.gc.ca/staflo/index_e.cfm?cname=main_e.cfm

LITTLE PIC RIVER NEAR COLDWELL (02BA003)

Station: 02BA003 Report Type: Peak Flow for 2010 Refresh Graph View

Peak Discharges (m^3/s)

Year	Maximum Instantaneous Discharge (m^3/s)	Minimum Instantaneous Discharge (m^3/s)	Maximum Daily Discharge (m^3/s)	Minimum Daily Discharge (m^3/s)
1972	----	----	----	----
1973	----	----	106 E on Apr 21	3.85 B on Feb 26
1974	99.1 at 02:59 EST on Jun 11	----	90.6 on Jun 11	2.94 B on Apr 10
1975	----	----	119 E on May 07	2.61 on Sep 04
1976	236 at 18:09 EST on Apr 19	----	218 on Apr 19	2.22 on Nov 08
1977	----	----	156 E on Apr 23	1.97 B on Mar 04
1978	86.4 at 00:12 EST on May 10	----	71.6 on May 10	2.55 B on Apr 05
1979	272 at 08:23 EST on May 11	----	262 on May 11	2.22 B on Feb 21
1980	137 at 02:25 EST on May 01	----	132 on May 01	2.95 B on Mar 23
1981	54.6 at 00:19 EST on Jun 16	----	52.1 on Jun 16	2.39 on Oct 12
1982	198 at 23:52 EST on May 05	----	189 on May 06	2.43 B on Mar 10
1983	110 at 21:21 EST on Oct 16	----	96.3 on Oct 17	2.83 on Sep 05
1984	130 at 07:00 EST on Jun 11	----	124 on Jun 11	3.93 B on Feb 10
1985	----	----	103 B on Apr 24	3.28 B on Mar 30
1986	101 at 05:52 EST on Apr 20	----	94.1 on Apr 20	3.49 B on Mar 22
1987	48.3 at 05:24 EST on Apr 18	----	47.8 on Apr 18	3.16 on Sep 04
1988	116 at 19:34 EST on Nov 16	----	95.0 on Nov 17	2.70 B on Mar 23
1989	127 at 00:06 EST on May 06	----	116 on May 06	1.64 on Oct 22
1990	136 at 20:01 EST on Apr 26	----	133 on Apr 26	2.27 B on Mar 01
1991	158 at 22:20 EST on Oct 29	----	150 on Apr 30	3.43 B on Mar 20
1992	160 at 17:08 EST on May 12	----	156 on May 12	2.92 B on Apr 09
1993	136 at 07:22 EST on May 03	----	135 on May 03	1.57 on Mar 27
1994	86.5 at 23:20 EST on May 15	----	76.7 on May 16	2.10 B on Mar 30
1995	113 at 16:48 EST on May 14	----	93.4 on May 15	2.52 B on Mar 12
1996	----	----	173 E on May 21	3.51 B on Mar 28
1997	----	----	----	2.31 on Oct 04
1998	64.1 at 20:00 EST on Apr 14	----	58.8 on Apr 15	1.81 on Sep 10
1999	----	----	----	----
2000	175 at 07:00 EST on May 09	----	168 on May 09	----
2001	185 at 23:00 EST on Apr 23	1.75 at 20:00 EST on Oct 01	166 on Apr 24	1.75 on Oct 02
2002	95.4 at 23:40 EST on Apr 24	----	80.0 on Apr 17	----
2003	139 at 09:00 EST on Apr 21	----	135 on Apr 21	----
2004	174 at 07:56 EST on Apr 19	----	160 on Apr 19	----
2005	189 at 07:01 EST on Oct 06	2.13 at 01:01 EST on Sep 13	176 on Oct 06	2.17 on Sep 10
2006	108 at 00:00 EST on Apr 14	1.52 at 10:56 EST on Nov 24	101 on Apr 14	1.87 on Sep 16
2007	75.6 at 09:51 EST on Oct 10	----	74.4 on Oct 10	1.97 B on Mar 06
2008	299 at 02:01 EST on Jun 30	----	269 on Jun 30	4.20 B on Mar 26

Year	Maximum Instantaneous Discharge (m^3/s)	Minimum Instantaneous Discharge (m^3/s)	Maximum Daily Discharge (m^3/s)	Minimum Daily Discharge (m^3/s)
2009	111 at 22:01 EST on Apr 27	----	102 on Apr 28	2.97 B on Mar 22
2010	50.4 at 02:36 EST on Oct 28	----	46.8 on Oct 28	3.49 B on Feb 16

Date Modified: 2010-04-30

Environment Canada Environnement Canada

Canada

PIC RIVER NEAR MARATHON

Water Survey of Canada
Burlington, Ontario

Station No. 02BB003
4270 km^2

Monthly Extremes of Daily Discharges in m^3/s for the Period January 1970 - December 2010

	Maximum Daily	Minimum Daily	
JAN	42.8 m^3/sec* on Jan 02, 1989	4.56 m^3/sec on Jan 26, 1977	**JAN**
FEB	19.8 m^3/sec* on Feb 27, 2000	4.45 m^3/sec on Feb 23, 1977	**FEB**
MAR	178 m^3/sec on Mar 28, 2000	4.05 m^3/sec* on Mar 21, 2007	**MAR**
APR	643 m^3/sec* on Apr 19, 1976	4.20 m^3/sec on Apr 01, 1982	**APR**
MAY	723 m^3/sec on May 21, 1996	15.5 m^3/sec on May 26, 1998	**MAY**
JUN	546 m^3/sec on Jun 30, 2008	8.33 m^3/sec on Jun 22, 2003	**JUN**
JUL	449 m^3/sec on Jul 01, 2008	6.81 m^3/sec on Jul 31, 2005	**JUL**
AUG	262 m^3/sec* on Aug 17, 1985	3.17 m^3/sec on Aug 14, 1970	**AUG**
SEP	342 m^3/sec on Sep 07, 2004	3.09 m^3/sec on Sep 11, 2005	**SEP**
OCT	486 m^3/sec on Oct 06, 2005	4.61 m^3/sec on Oct 10, 2006	**OCT**
NOV	236 m^3/sec on Nov 19, 2005	3.23 m^3/sec on Nov 08, 1976	**NOV**
DEC	197 m^3/sec on Dec 10, 2001	4.81 m^3/sec* on Dec 29, 1976	**DEC**
EXTREME	723 m^3/sec on May 21, 1996	3.09 m^3/sec on Sep 11, 2005	**EXTREME**

Extremes of Monthly Mean Discharges in m^3/s for the Period January 1970 - December 2010

	Maximum Monthly Mean	Minimum Monthly Mean	
JAN	23.7 m^3/sec* in 2002	4.64 m^3/sec in 1977	**JAN**
FEB	16.4 m^3/sec* in 2006	4.49 m^3/sec in 1977	**FEB**
MAR	51.0 m^3/sec in 2000	4.33 m^3/sec in 1982	**MAR**
APR	215 m^3/sec in 1976	19.2 m^3/sec in 1978	**APR**
MAY	277 m^3/sec in 1992	26.8 m^3/sec in 2010	**MAY**
JUN	175 m^3/sec in 1996	15.1 m^3/sec in 2003	**JUN**
JUL	145 m^3/sec in 2008	12.0 m^3/sec in 2005	**JUL**
AUG	110 m^3/sec in 1985	5.07 m^3/sec in 2005	**AUG**
SEP	162 m^3/sec in 2004	5.19 m^3/sec in 2006	**SEP**
OCT	167 m^3/sec in 1983	6.62 m^3/sec in 1976	**OCT**
NOV	118 m^3/sec in 1985	5.78 m^3/sec in 1976	**NOV**
DEC	92.1 m^3/sec in 2001	5.06 m^3/sec in 1976	**DEC**
EXTREME	277 m^3/sec in 1992	4.33 m^3/sec in 1982	**EXTREME**

Monthly Mean Discharges in m^3/s for the Period January 1970 - December 2010

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	PERIOD	
1970	------	------	6.02	41.5	189	56.9	50.7	21.0	41.9	59.6	65.2	49.4	49.2	**1970**
1971	18.6	12.4	10.4	94.3	185	69.4	37.7	27.5	19.0	76.9	76.5	33.0	55.3	**1971**
1972	16.3	11.2	9.60	43.9	219	56.2	57.6	52.3	55.5	47.9	25.4	18.1	51.4	**1972**
1973	13.2	10.0	16.2	118	144	60.2	51.2	22.7	24.2	30.3	35.7	27.8	46.3	**1973**
1974	11.5	9.01	8.48	45.7	233	98.5	44.8	52.8	43.5	58.4	47.5	27.2	57.1	**1974**
1975	19.4	12.7	10.1	45.9	182	116	40.0	16.2	8.80	23.3	52.8	28.9	46.4	**1975**
1976	15.3	9.72	8.96	215	120	86.6	29.5	17.8	6.89	6.62	5.78	5.06	43.8	**1976**
1977	4.64	4.49	15.9	188	104	36.1	39.2	37.8	101	76.1	62.3	25.3	58.0	**1977**

Water Survey of Canada **Station No. 02BB003**

Burlington, Ontario **4270 km^2**

Monthly Mean Discharges in m^3/s for the Period January 1970 - December 2010

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	PERIOD	
1978	14.5	9.21	6.69	19.2	147	118	50.3	23.8	12.9	14.6	10.9	6.97	36.4	**1978**
1979	5.74	5.34	7.28	113	253	87.9	27.2	29.7	36.2	67.2	72.8	21.3	60.9	**1979**
1980	10.8	8.75	7.43	97.3	173	51.4	26.1	24.4	44.3	57.6	30.4	14.0	45.5	**1980**
1981	9.22	9.10	13.6	86.1	106	81.0	34.7	18.6	9.10	9.83	11.2	8.25	33.1	**1981**
1982	6.38	5.14	4.33	32.3	229	73.6	69.5	25.9	40.8	109	91.3	58.3	62.6	**1982**
1983	23.6	16.1	16.3	42.6	227	66.4	58.9	16.8	27.1	167	65.8	42.9	64.7	**1983**
1984	16.0	13.9	12.4	141	159	153	94.1	38.4	14.8	26.2	43.4	56.5	64.1	**1984**
1985	22.0	12.6	9.98	104	118	83.9	51.7	110	57.1	111	118	38.6	69.9	**1985**
1986	16.5	12.7	11.7	155	155	54.1	37.3	17.2	19.0	39.8	36.3	17.6	47.7	**1986**
1987	11.4	9.42	8.73	74.3	39.1	28.1	41.8	37.5	30.9	57.5	51.6	29.3	35.0	**1987**
1988	14.5	10.2	9.41	112	187	72.9	29.7	37.1	57.0	73.0	98.0	39.9	61.7	**1988**
1989	23.6	16.2	11.4	42.7	243	47.3	16.7	11.8	6.65	9.00	17.4	10.7	38.3	**1989**
1990	9.13	8.00	11.4	91.5	111	58.0	37.6	14.2	11.8	42.0	50.0	24.1	39.1	**1990**
1991	15.1	11.0	9.10	130	119	46.1	27.9	10.5	20.5	75.3	103	28.4	49.7	**1991**
1992	16.9	12.3	9.80	45.1	277	60.1	44.3	44.8	149	97.5	52.8	29.8	70.3	**1992**
1993	19.2	14.9	11.5	88.7	210	76.0	62.1	76.5	65.7	69.3	46.9	21.3	63.9	**1993**
1994	10.5	8.55	7.45	32.7	116	103	85.9	78.5	38.2	43.9	30.2	18.0	48.0	**1994**
1995	13.6	10.5	9.55	26.6	112	45.7	87.9	17.2	22.6	138	44.1	17.8	45.8	**1995**
1996	13.0	10.8	9.85	19.9	267	175	83.9	68.5	24.7	41.7	66.0	28.2	67.7	**1996**
1997	17.0	10.8	7.33	110	193	81.7	79.9	14.6	10.1	27.1	37.3	10.6	50.2	**1997**
1998	8.21	6.83	8.72	91.0	37.4	20.2	12.9	12.3	8.62	43.4	37.9	26.6	26.2	**1998**
1999	11.4	8.85	9.12	129	174	91.0	49.8	17.8	22.0	61.9	53.8	31.4	55.2	**1999**
2000	16.1	12.4	51.0	92.9	159	146	71.2	48.6	23.3	14.7	14.5	9.84	55.1	**2000**
2001	8.74	8.20	7.55	203	143	48.4	20.4	8.18	9.34	32.6	76.4	92.1	54.9	**2001**
2002	23.7	10.7	6.35	101	118	97.8	38.6	21.9	30.8	120	39.0	20.7	52.6	**2002**
2003	13.7	9.37	8.47	132	175	15.1	33.3	29.4	37.1	68.3	46.2	28.9	50.0	**2003**
2004	17.4	11.6	22.0	162	142	51.5	28.6	57.4	162	160	96.1	37.4	78.9	**2004**
2005	18.8	12.5	9.98	144	113	46.9	12.0	5.07	5.52	108	111	70.3	54.9	**2005**
2006	23.1	16.4	12.1	161	140	35.9	14.6	6.97	5.19	8.60	8.18	8.16	36.6	**2006**
2007	7.66	5.80	5.07	56.8	53.3	63.3	102	21.6	59.2	135	67.4	27.3	50.7	**2007**
2008	18.4	14.5	10.4	131	128	138	145	31.1	16.7	37.2	43.3	22.2	61.4	**2008**
2009	13.5	9.28	7.76	76.2	128	39.9	36.5	75.5	33.4	18.3	59.6	20.3	43.3	**2009**
2010	12.0	9.40	16.2	23.2	26.8	15.1	15.8	16.1	33.3	33.5	33.0	29.9	22.1	**2010**

	Mean Monthly Discharge in m^3/s	Median Discharge in m^3/s	Lower Quartile in m^3/s	Upper Quartile in m^3/s	Median Cumulative Runoff Depth in mm	
JAN	14.5	14.5	11.0	18.2	9.07	**JAN**
FEB	10.5	10.3	8.89	12.5	14.76	**FEB**
MAR	11.1	9.60	7.66	11.6	20.95	**MAR**
APR	94.1	92.9	44.5	131	79.90	**APR**
MAY	155	147	117	191	186.75	**MAY**
JUN	72.0	63.3	47.1	89.4	222.59	**JUN**
JUL	48.3	40.0	29.1	60.5	254.69	**JUL**
AUG	32.1	23.8	16.5	41.6	274.42	**AUG**
SEP	35.3	24.7	12.3	42.7	292.81	**SEP**
OCT	60.9	57.5	28.7	76.5	322.83	**OCT**
NOV	52.0	47.5	34.4	66.7	356.97	**NOV**
DEC	28.3	27.2	17.9	32.2	374.10	**DEC**

Water Survey of Canada **Station No. 02BB003**

Burlington, Ontario

4270 km^2

	Mean Monthly Discharge in m^3/s	Median Discharge in m^3/s	Lower Quartile in m^3/s	Upper Quartile in m^3/s	Median Cumulative Runoff Depth in mm	
PERIOD	51.5	51.4	44.6	61.1		**PERIOD**

This report was produced on May 10, 2012 using the Water Level and Streamflow Statistics application located at http://www.wsc.ec.gc.ca/staflo/index_e.cfm?cname=main_e.cfm

Environment Canada Environnement Canada

Canada

PIC RIVER NEAR MARATHON (02BB003)

Station: 02BB003 Report Type: Peak Flow for 2010 Refresh Graph View

Peak Discharges (m^3/s)

Year	Maximum Instantaneous Discharge (m^3/s)	Minimum Instantaneous Discharge (m^3/s)	Maximum Daily Discharge (m^3/s)	Minimum Daily Discharge (m^3/s)
1970	450 at 20:36 EST on May 01	----	439 on May 01	3.17 on Aug 14
1971	484 at 01:54 EST on May 27	----	476 on May 27	10.0 B on Mar 29
1972	433 at 23:11 EST on Apr 30	----	402 on May 01	9.17 B on Apr 02
1973	388 at 07:46 EST on Apr 23	----	385 on Apr 23	8.83 B on Mar 01
1974	317 at 23:28 EST on May 03	----	306 on May 04	6.06 on Dec 26
1975	419 at 06:00 EST on May 07	----	413 on May 07	6.40 on Oct 09
1976	759 at 07:25 EST on Apr 20	----	643 on Apr 19	3.23 on Nov 08
1977	----	----	501 E on Apr 23	4.42 B on Mar 01
1978	----	----	228 E on May 16	6.20 B on Apr 05
1979	609 at 20:27 EST on May 11	----	589 on May 11	5.13 B on Feb 21
1980	450 at 04:20 EST on May 02	----	447 on May 02	7.00 B on Mar 25
1981	156 at 00:44 EST on May 06	----	153 on May 06	6.61 on Oct 05
1982	461 at 14:13 EST on May 07	----	452 on May 07	4.14 B on Mar 28
1983	----	----	428 E on Oct 16	8.08 on Aug 25
1984	322 at 13:16 EST on Jun 11	----	312 on Jun 11	11.7 B on Mar 15
1985	449 at 18:08 EST on Apr 25	----	439 on Apr 25	9.50 B on Mar 25
1986	----	----	360 E on May 06	11.0 E on Aug 14
1987	134 at 18:00 EST on Apr 18	----	132 on Apr 18	8.00 B on Mar 19
1988	----	----	286 E on May 04	8.40 B on Mar 23
1989	----	----	345 E on May 07	5.50 E on Sep 19
1990	----	----	248 E on Apr 24	6.33 B on Mar 14
1991	369 at 12:12 EST on May 01	----	362 on May 01	6.45 E on Aug 24
1992	607 at 18:26 EST on May 13	----	599 on May 14	8.55 B on Apr 10
1993	388 at 21:43 EST on May 05	----	385 on May 05	10.7 B on Mar 23
1994	253 at 14:31 EST on Jun 21	----	246 on Jun 21	6.78 B on Apr 04
1995	244 at 22:42 EST on Oct 04	----	236 on Oct 04	8.26 B on Mar 08
1996	----	----	723 E on May 21	9.64 B on Mar 26
1997	----	----	----	----
1998	141 at 07:00 EST on Apr 15	----	140 on Apr 15	----
1999	383 at 05:00 EST on May 21	----	370 on May 21	----
2000	415 at 23:35 EST on May 09	----	398 on May 09	----
2001	553 at 05:30 EST on Apr 24	4.91 at 10:40 EST on Aug 29	536 on Apr 24	5.09 on Aug 29
2002	305 at 00:20 EST on Apr 20	----	293 on Apr 20	----
2003	549 at 00:00 EST on Apr 22	----	501 on Apr 22	----
2004	424 at 15:00 EST on Apr 19	----	397 on Apr 19	----
2005	537 at 18:00 EST on Oct 06	2.87 at 13:00 EST on Sep 11	486 on Oct 06	3.09 on Sep 11
2006	345 E at 00:00 EST on Apr 14	----	345 E on Apr 14	3.76 on Sep 06
2007	224 at 01:36 EST on Oct 10	----	218 on Oct 10	4.05 B on Mar 21

Year	Maximum Instantaneous Discharge (m^3/s)	Minimum Instantaneous Discharge (m^3/s)	Maximum Daily Discharge (m^3/s)	Minimum Daily Discharge (m^3/s)
2008	569 at 04:56 EST on Jun 30	----	546 on Jun 30	8.45 B on Apr 03
2009	280 at 05:56 EST on Apr 28	7.10B at 00:00 EST on Mar 21	273 on Apr 28	7.10 B on Mar 21
2010	80.4 at 10:16 EST on Oct 28	6.25 at 12:01 EST on Aug 12	77.7 on Oct 28	6.28 on Aug 12

Date Modified: 2010-04-30

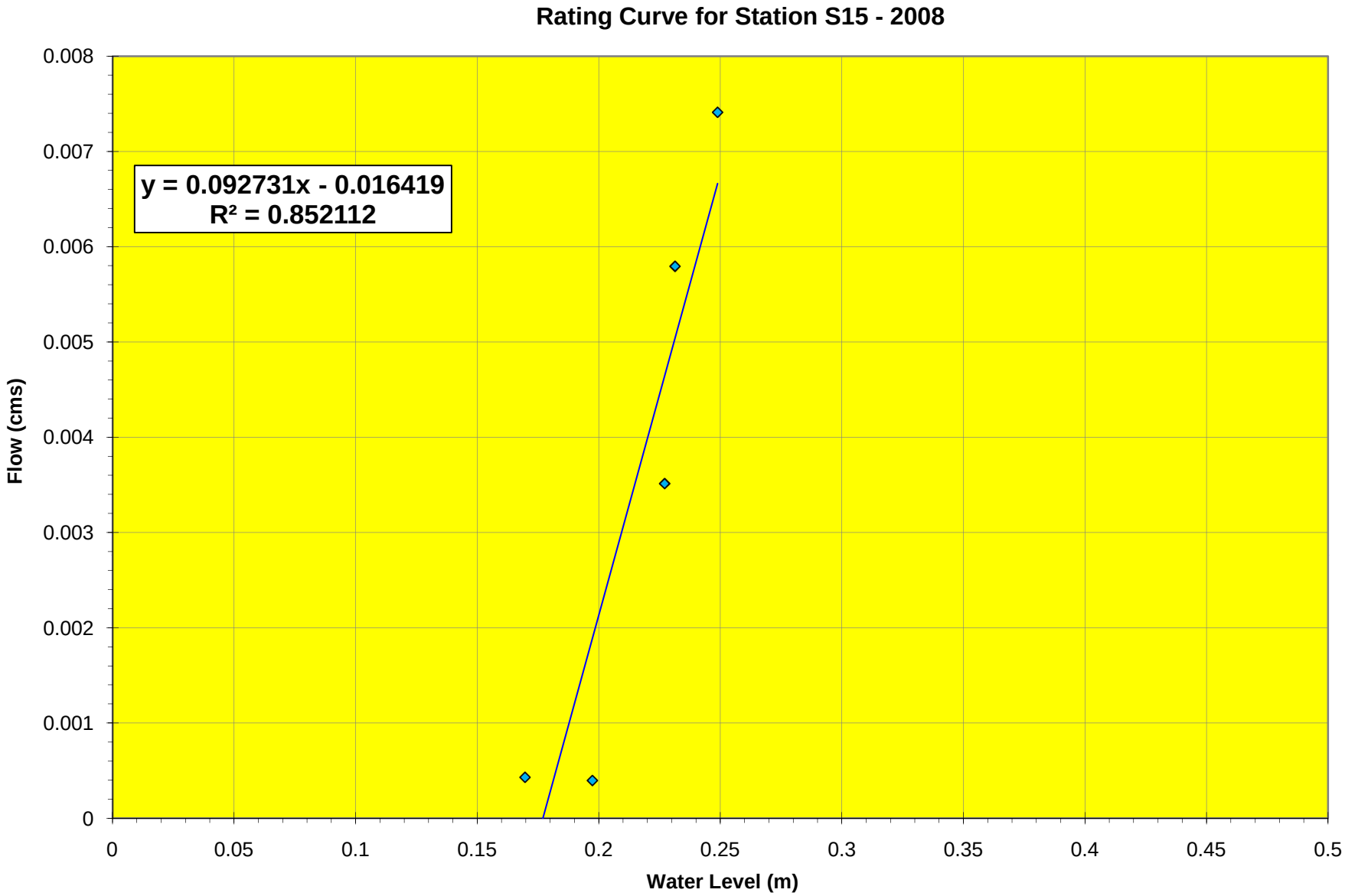
APPENDIX B

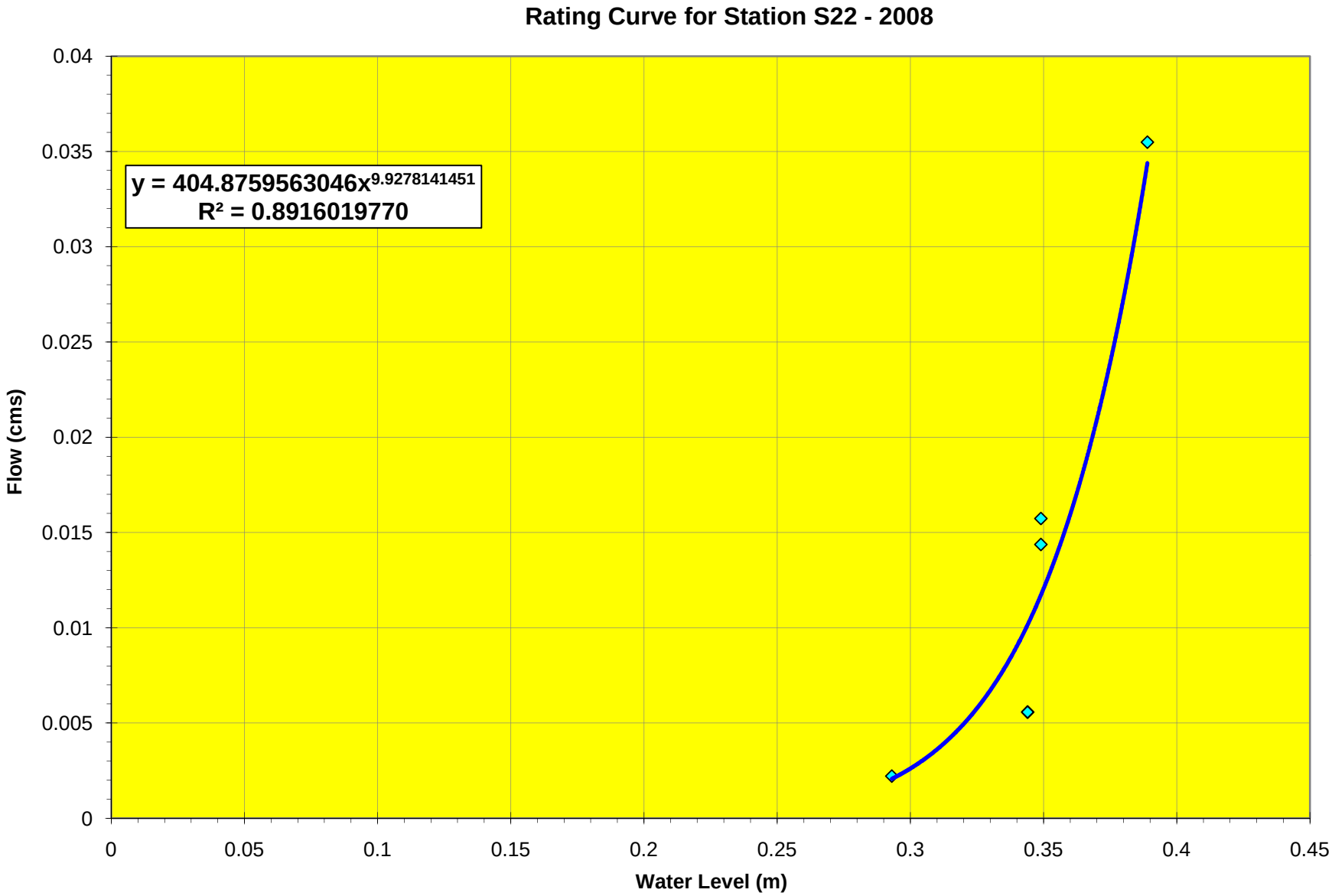
MARATHON PGM-Cu PROJECT SITE
MARATHON, ONTARIO

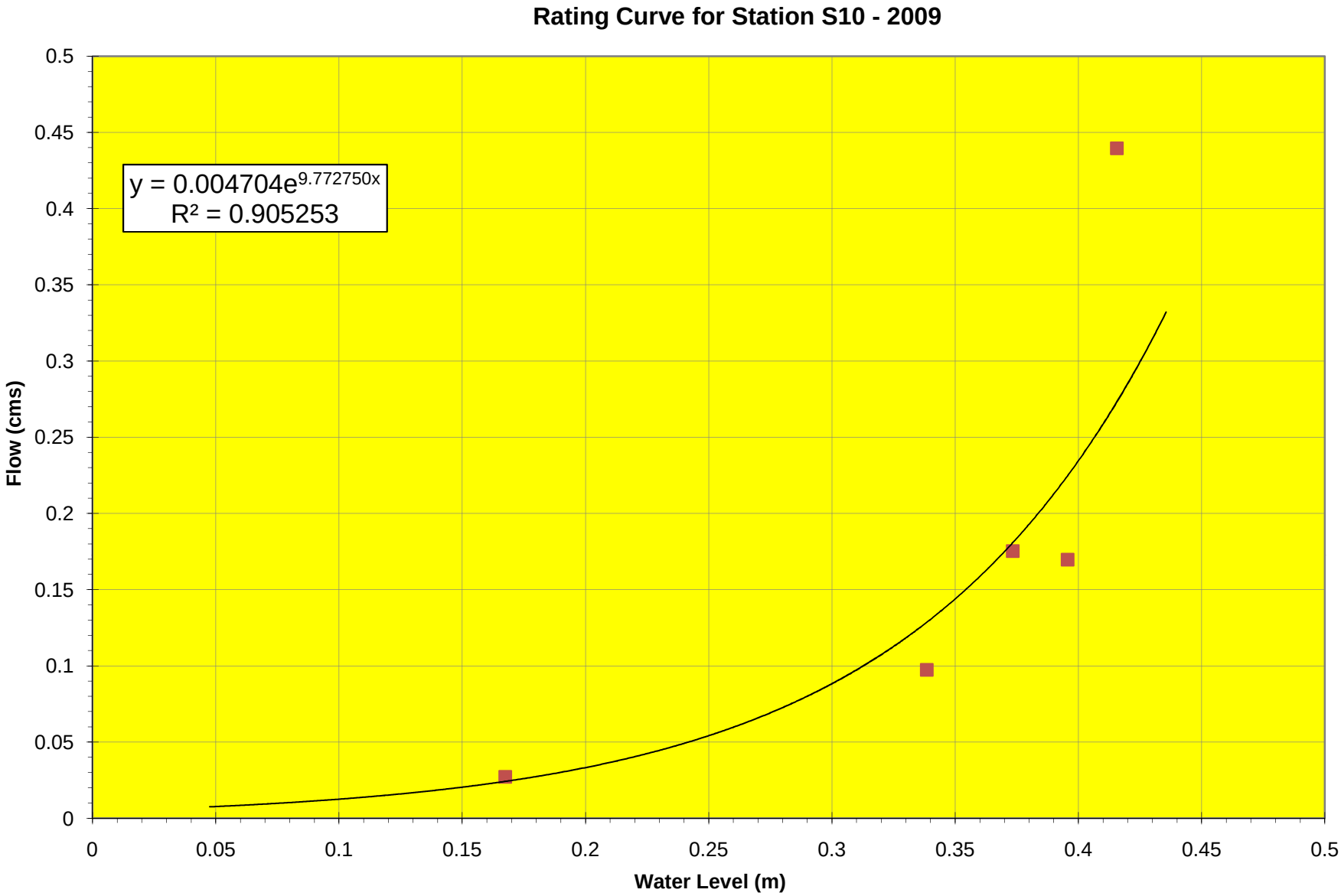
RATING CURVES FOR LSA STREAM FLOW MONITORING STATIONS

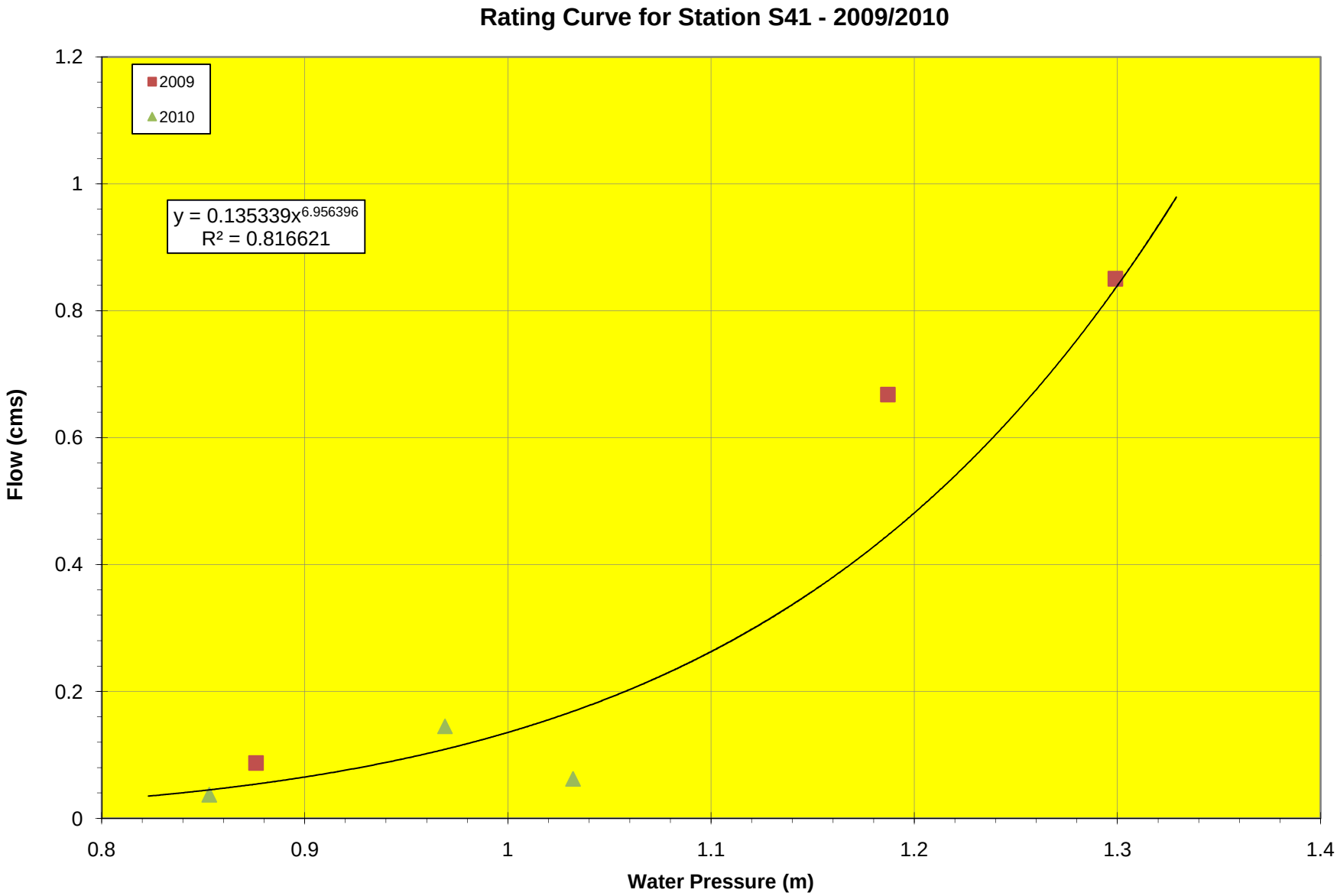
FLOW AND LEVEL/PRESSURE GRAPHS FOR LSA STREAM FLOW MONITORING STATIONS

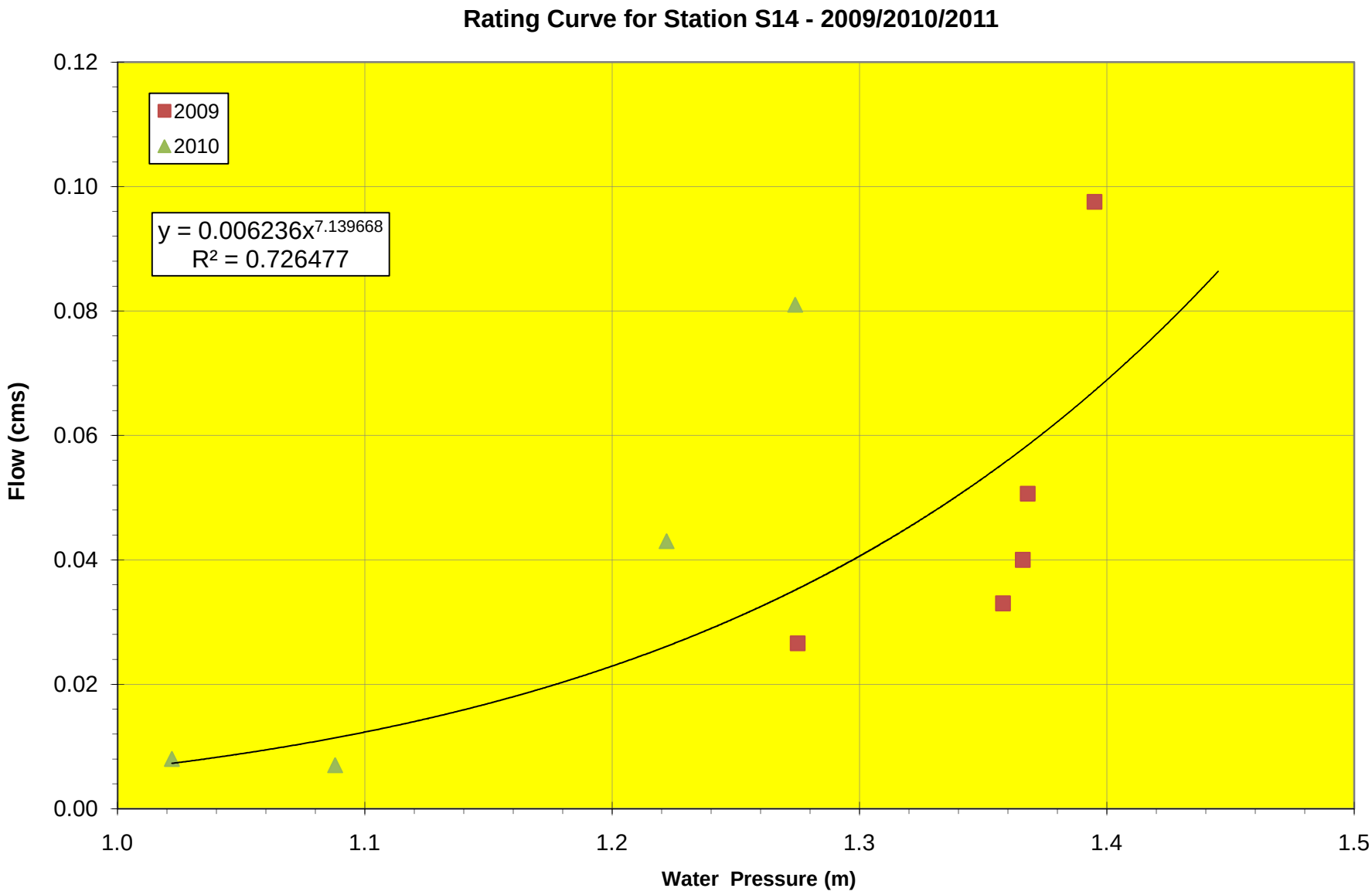
AREA – FLOW RELATIONSHIPS/GRAPHS

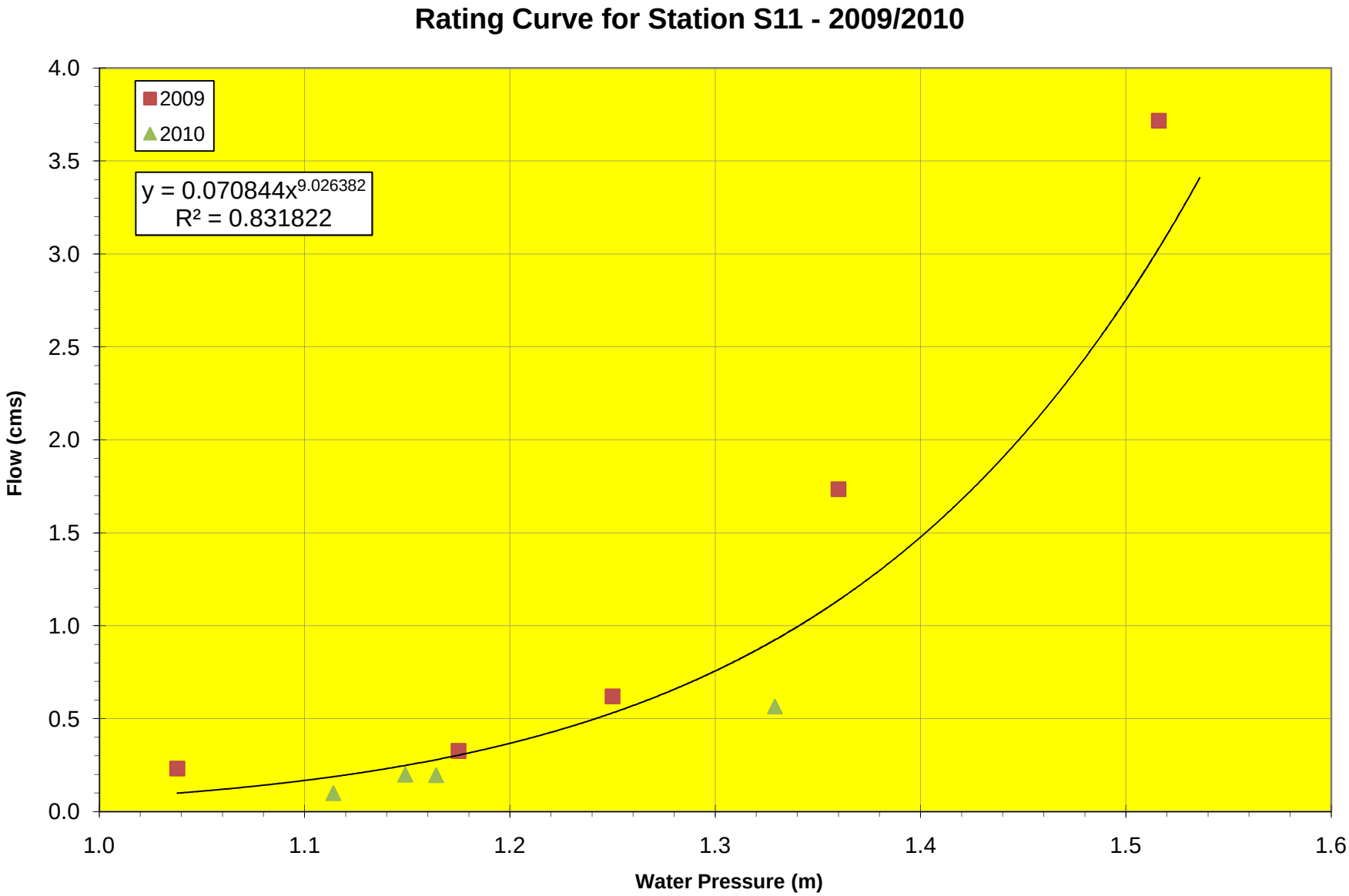

Rating Curve for Station S15 - 2008
y = 0.092731x - 0.016419
R² = 0.852112
Flow (cms)
Water Level (m)
0.008
0.007
0.006
0.005
0.004
0.003
0.002
0.001
0
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5

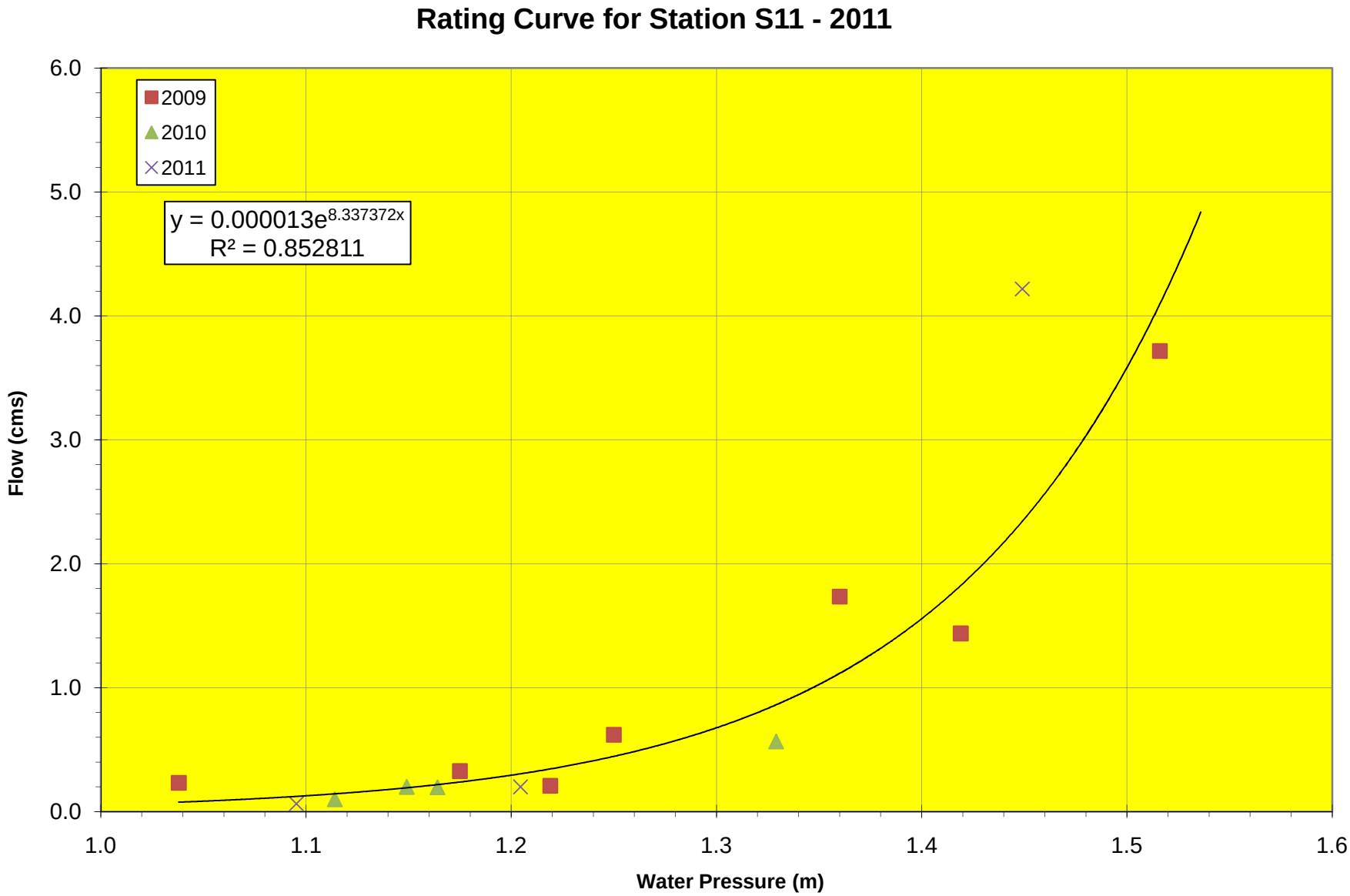

Rating Curve for Station S22 - 2008
y = 404.8759563046x^9.9278141451
R² = 0.8916019770
Flow (cms)
Water Level (m)
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45

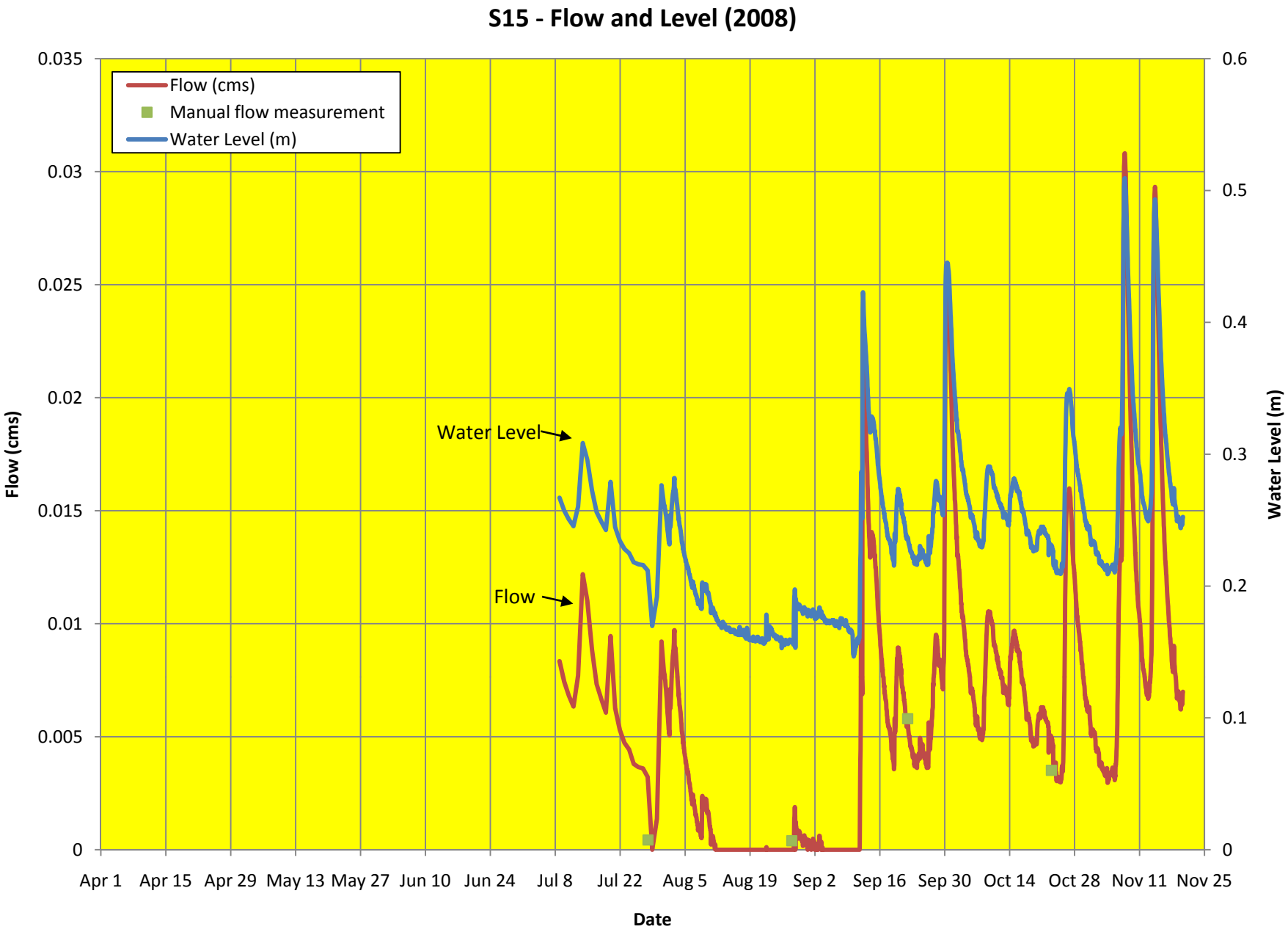

Rating Curve for Station S10 - 2009
y = 0.004704e9.772750x
R² = 0.905253
Flow (cms)
Water Level (m)
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5

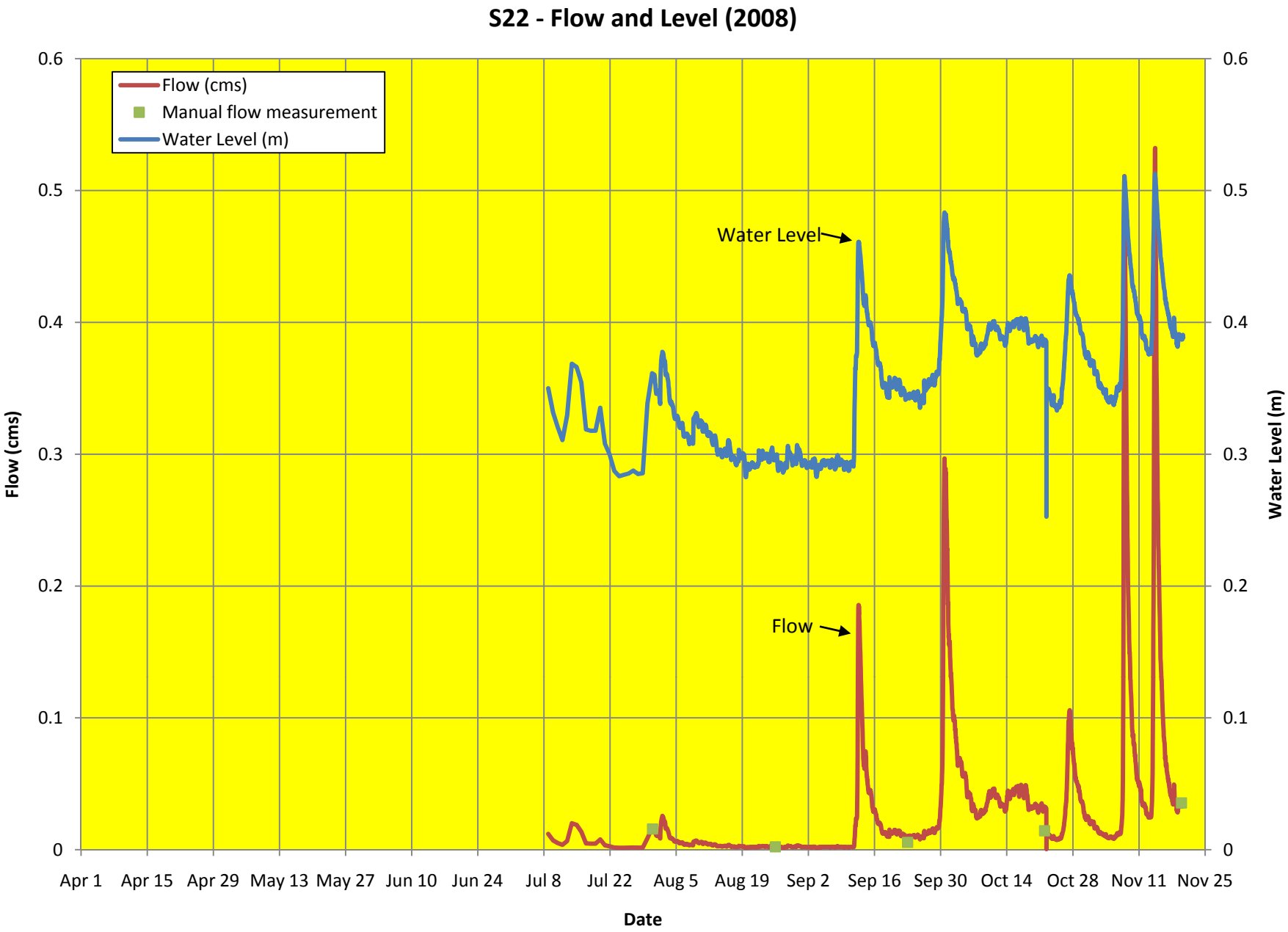

Rating Curve for Station S41 - 2009/2010
2009
2010
y = 0.135339x^6.956396
R² = 0.816621
Flow (cms)
Water Pressure (m)
0
0.2
0.4
0.6
0.8
1
1.2
0.8
0.9
1
1.1
1.2
1.3
1.4

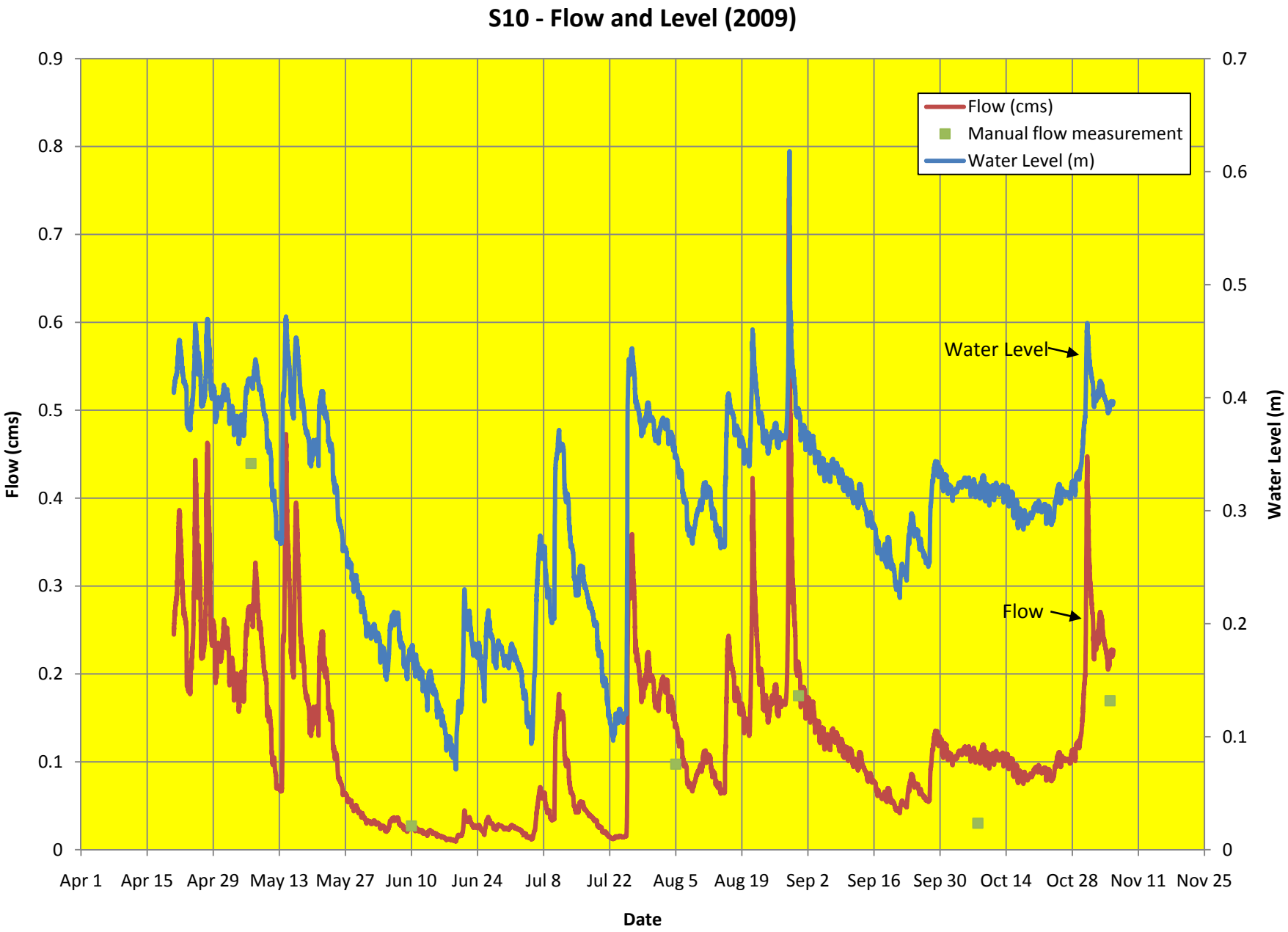

Rating Curve for Station S14 - 2009/2010/2011
2009
2010
y = 0.006236x^7.139668
R² = 0.726477
Flow (cms)
0.12
0.10
0.08
0.06
0.04
0.02
0.00
1.0
1.1
1.2
1.3
1.4
1.5
Water Pressure (m)

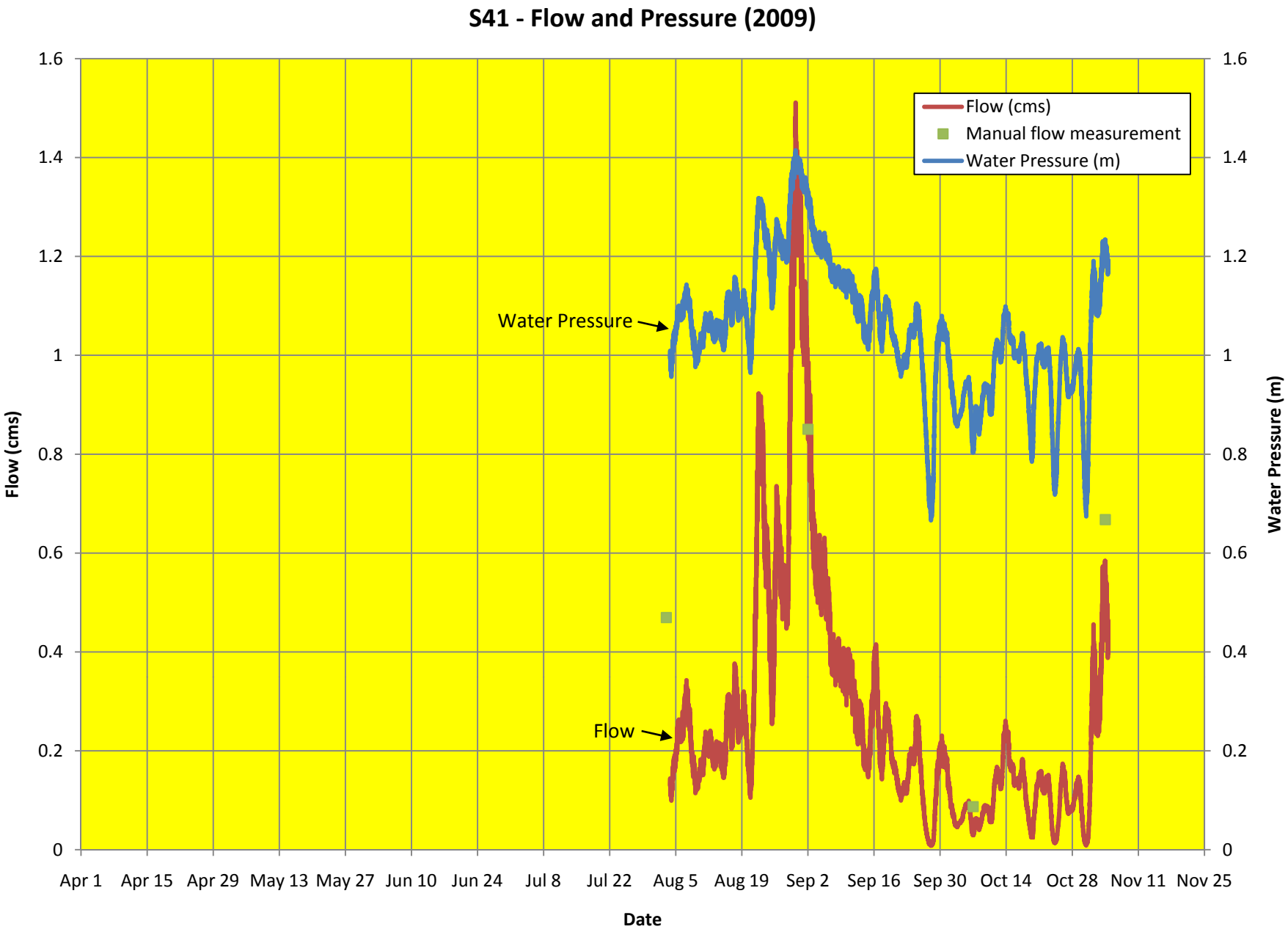

Rating Curve for Station S11 - 2009/2010
2009
2010
y = 0.070844x^9.026382
R² = 0.831822
Flow (cms)
Water Pressure (m)
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1.0
1.1
1.2
1.3
1.4
1.5
1.6

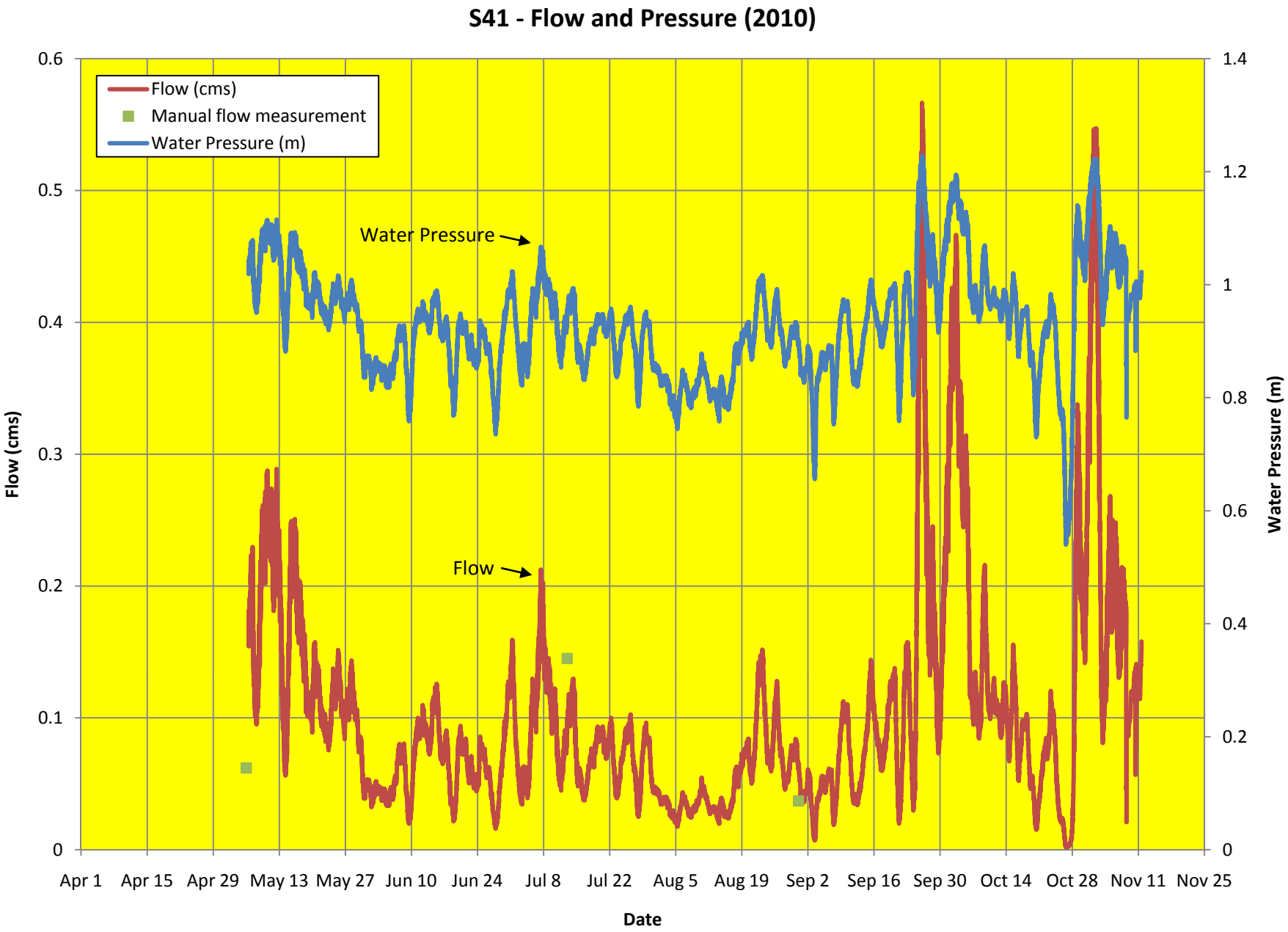

Rating Curve for Station S11 - 2011
2009
2010
2011
y = 0.000013e8.337372x
R² = 0.852811
Flow (cms)
Water Pressure (m)
6.0
5.0
4.0
3.0
2.0
1.0
0.0
1.0
1.1
1.2
1.3
1.4
1.5
1.6

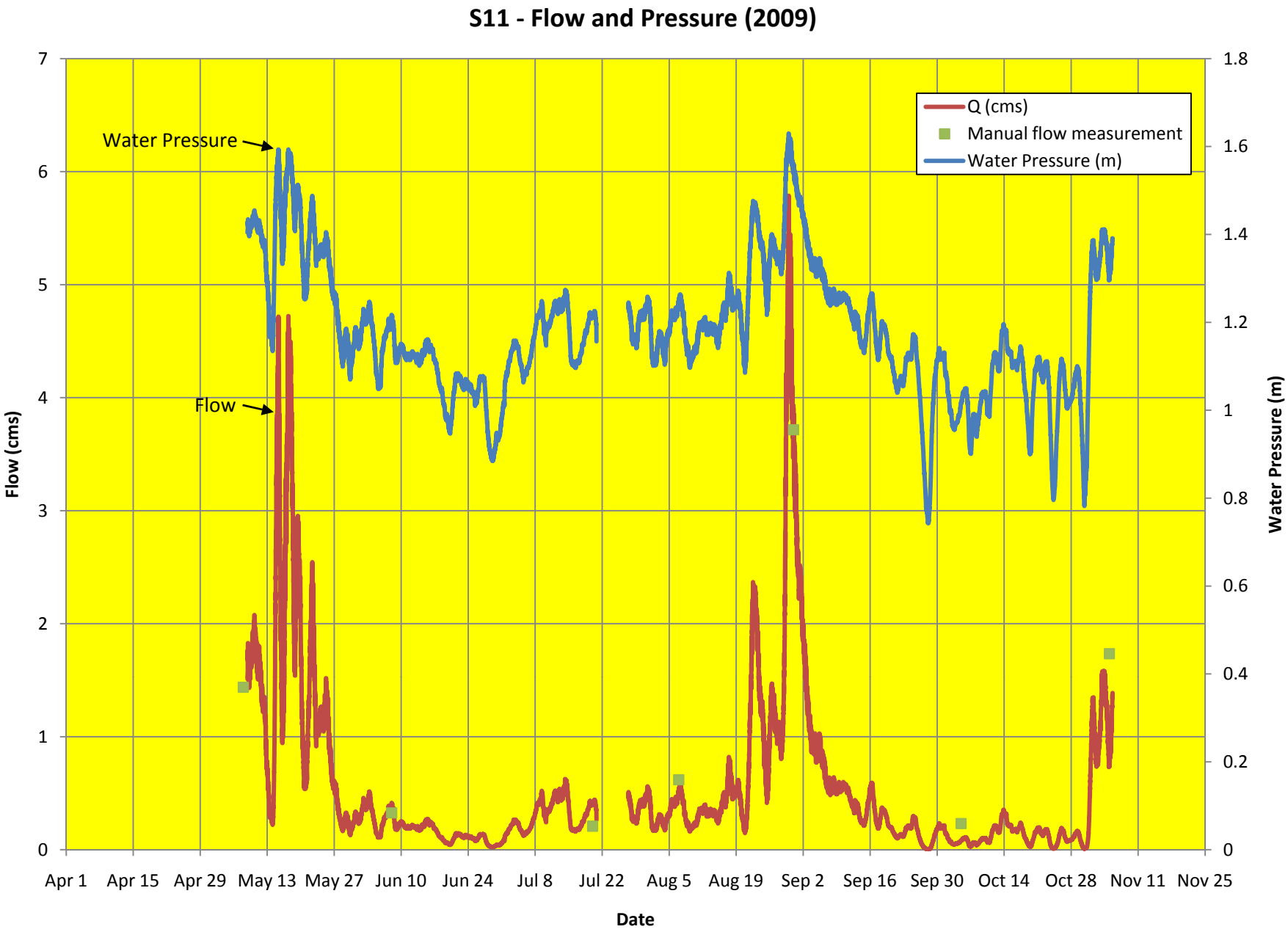

S15 - Flow and Level (2008)
Flow (cms)
Manual flow measurement
Water Level (m)
Water Level
Flow
Flow (cms)
Water Level (m)
Date
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
0.6
0.5
0.4
0.3
0.2
0.1
0
Apr 1
Apr 15
Apr 29
May 13
May 27
Jun 10
Jun 24
Jul 8
Jul 22
Aug 5
Aug 19
Sep 2
Sep 16
Sep 30
Oct 14
Oct 28
Nov 11
Nov 25

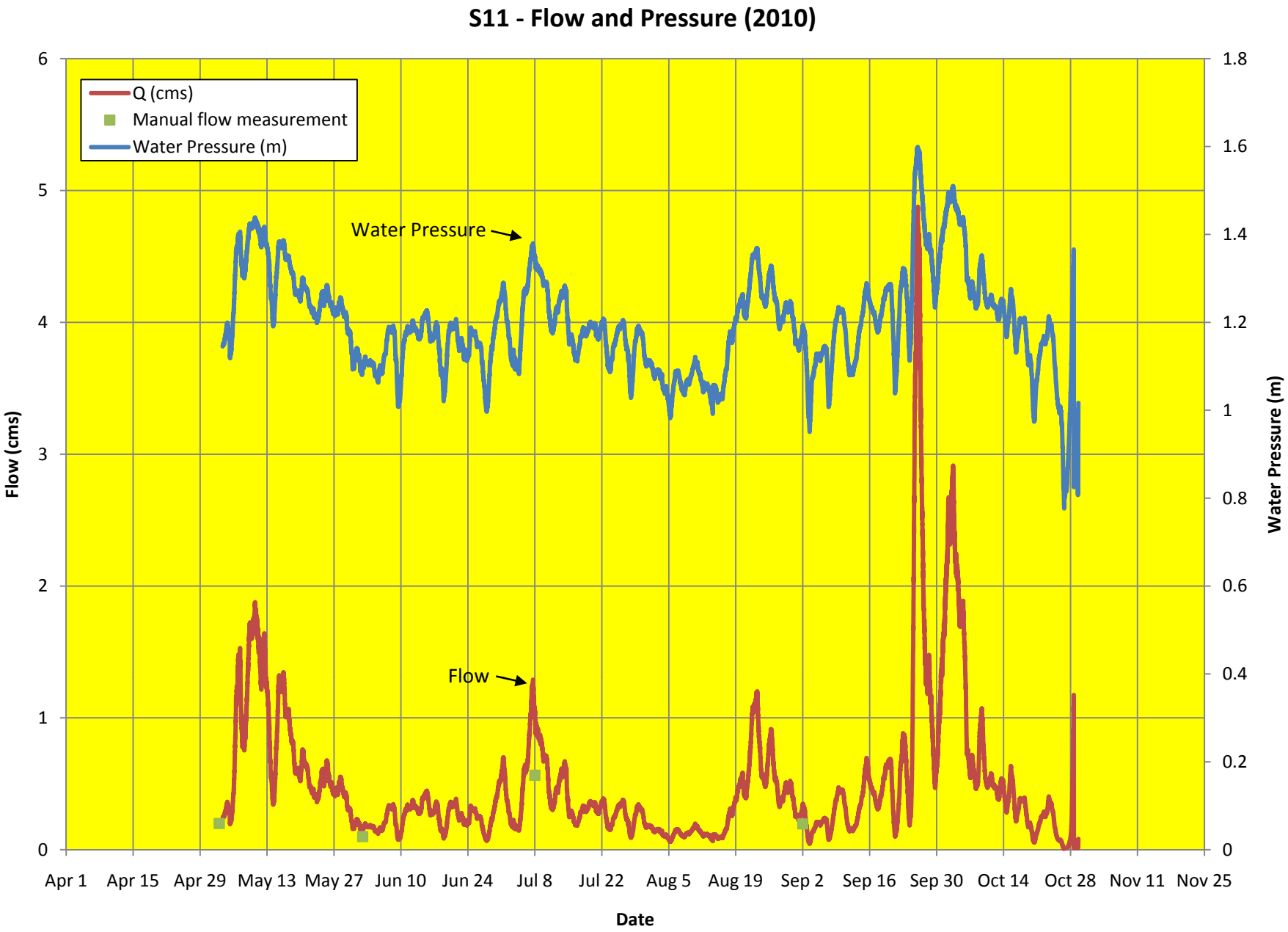

S22 - Flow and Level (2008)
Flow (cms)
Manual flow measurement
Water Level (m)
Water Level
Flow
Flow (cms)
Water Level (m)
Date
0.6
0.5
0.4
0.3
0.2
0.1
0
Apr 1
Apr 15
Apr 29
May 13
May 27
Jun 10
Jun 24
Jul 8
Jul 22
Aug 5
Aug 19
Sep 2
Sep 16
Sep 30
Oct 14
Oct 28
Nov 11
Nov 25

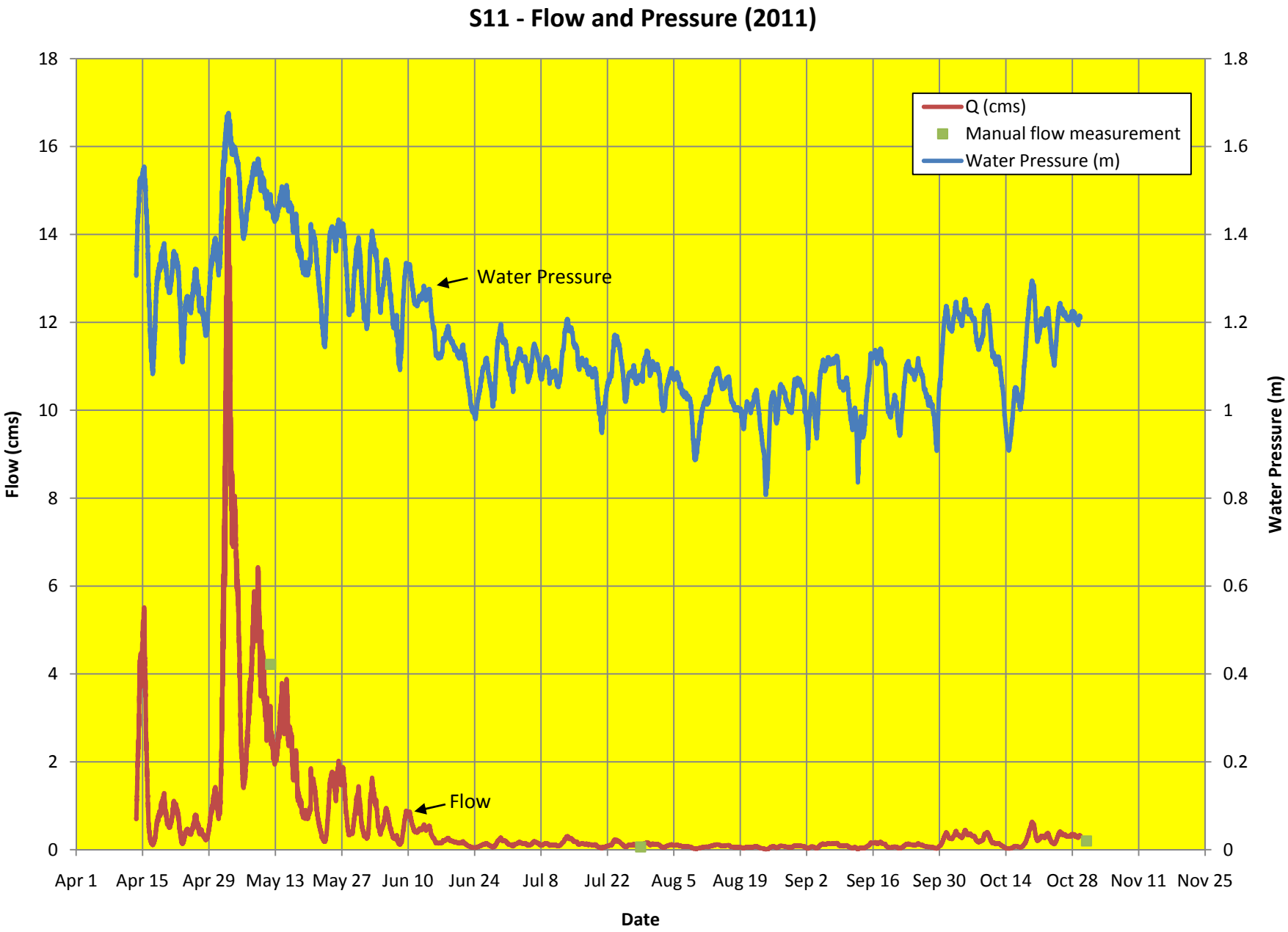

S10 - Flow and Level (2009)
Flow (cms)
Manual flow measurement
Water Level (m)
Water Level
Flow
Flow (cms)
Water Level (m)
Date
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
Apr 1
Apr 15
Apr 29
May 13
May 27
Jun 10
Jun 24
Jul 8
Jul 22
Aug 5
Aug 19
Sep 2
Sep 16
Sep 30
Oct 14
Oct 28
Nov 11
Nov 25

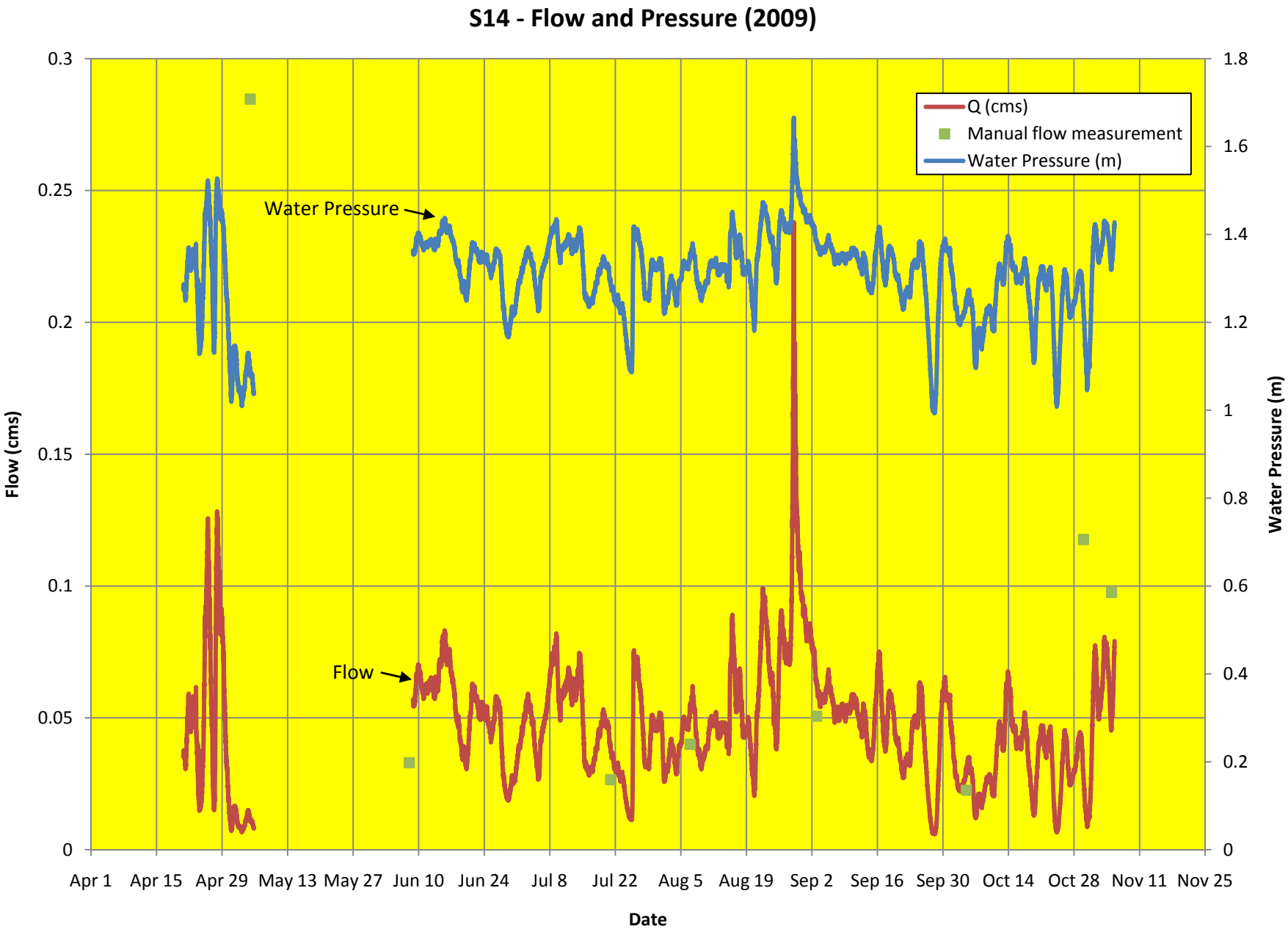

S41 - Flow and Pressure (2009)
Flow (cms)
Manual flow measurement
Water Pressure (m)
Water Pressure
Flow
Flow (cms)
Water Pressure (m)
Date
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Apr 1
Apr 15
Apr 29
May 13
May 27
Jun 10
Jun 24
Jul 8
Jul 22
Aug 5
Aug 19
Sep 2
Sep 16
Sep 30
Oct 14
Oct 28
Nov 11
Nov 25

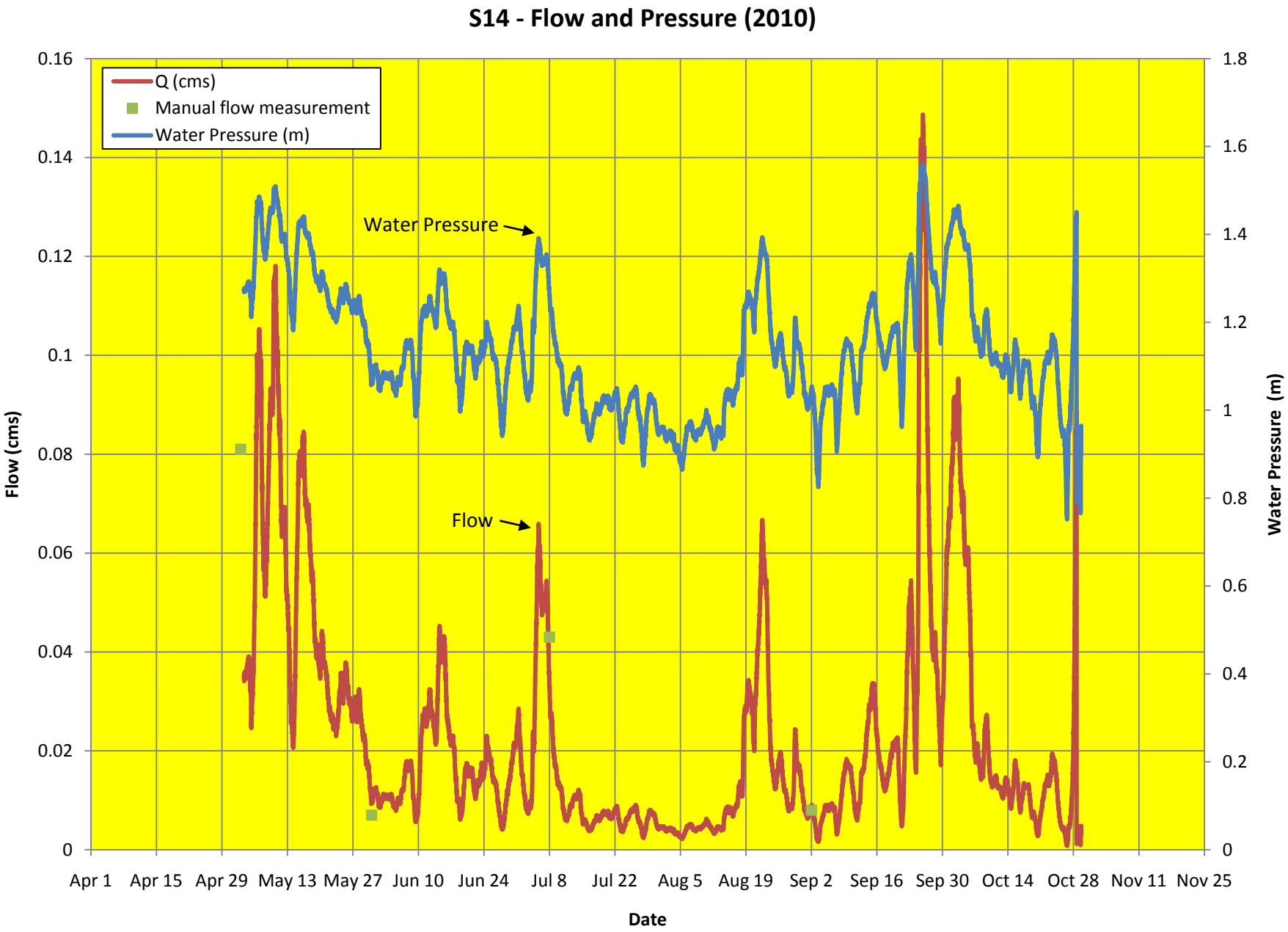

S41 - Flow and Pressure (2010)
Flow (cms)
Manual flow measurement
Water Pressure (m)
Water Pressure
Flow
Flow (cms)
Water Pressure (m)
Date
0.6
0.5
0.4
0.3
0.2
0.1
0
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Apr 1
Apr 15
Apr 29
May 13
May 27
Jun 10
Jun 24
Jul 8
Jul 22
Aug 5
Aug 19
Sep 2
Sep 16
Sep 30
Oct 14
Oct 28
Nov 11
Nov 25

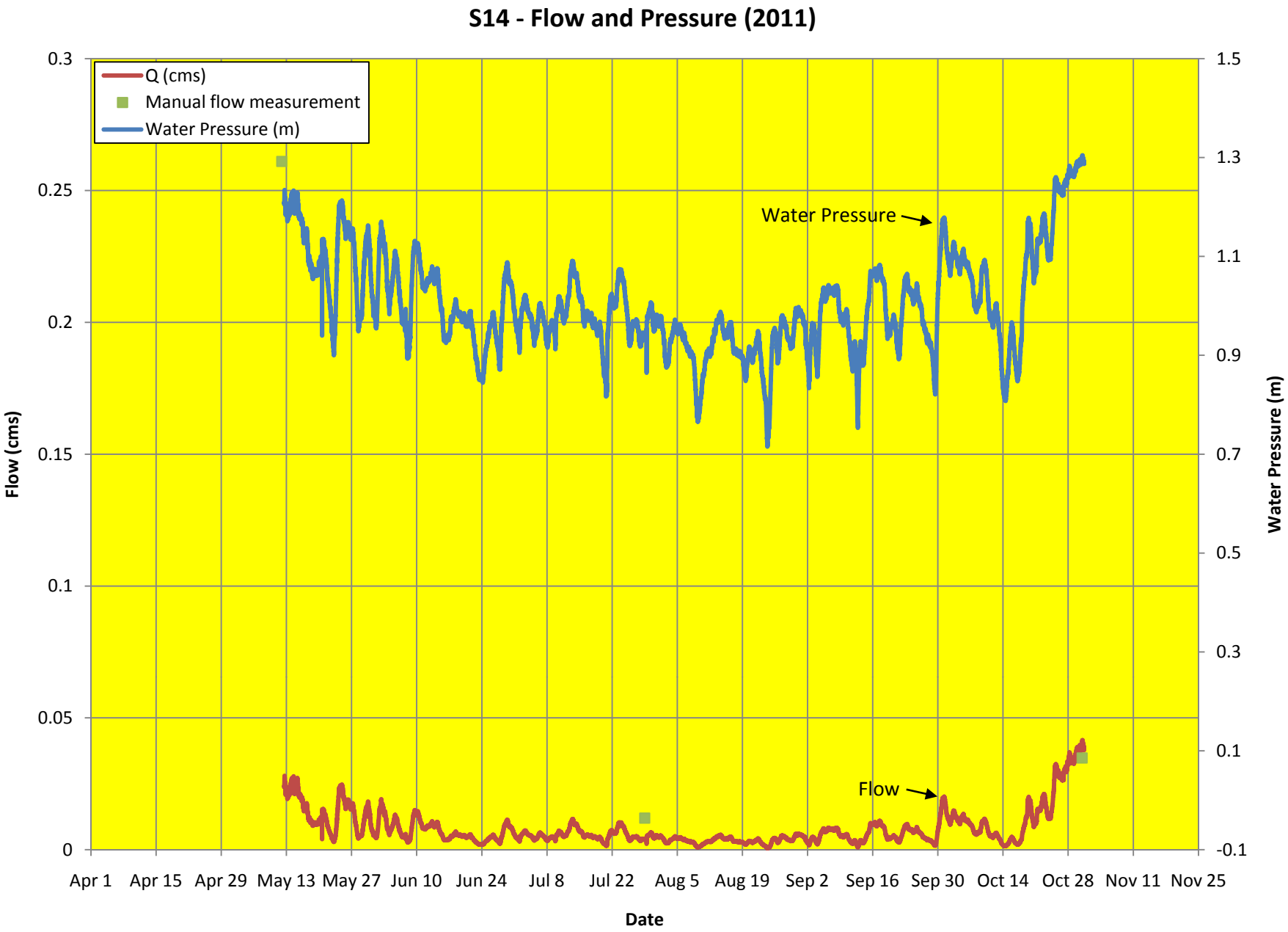

S11 - Flow and Pressure (2009)
Water Pressure
Flow
Q (cms)
Manual flow measurement
Water Pressure (m)
Flow (cms)
Water Pressure (m)
Date
0
1
2
3
4
5
6
7
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
Apr 1
Apr 15
Apr 29
May 13
May 27
Jun 10
Jun 24
Jul 8
Jul 22
Aug 5
Aug 19
Sep 2
Sep 16
Sep 30
Oct 14
Oct 28
Nov 11
Nov 25

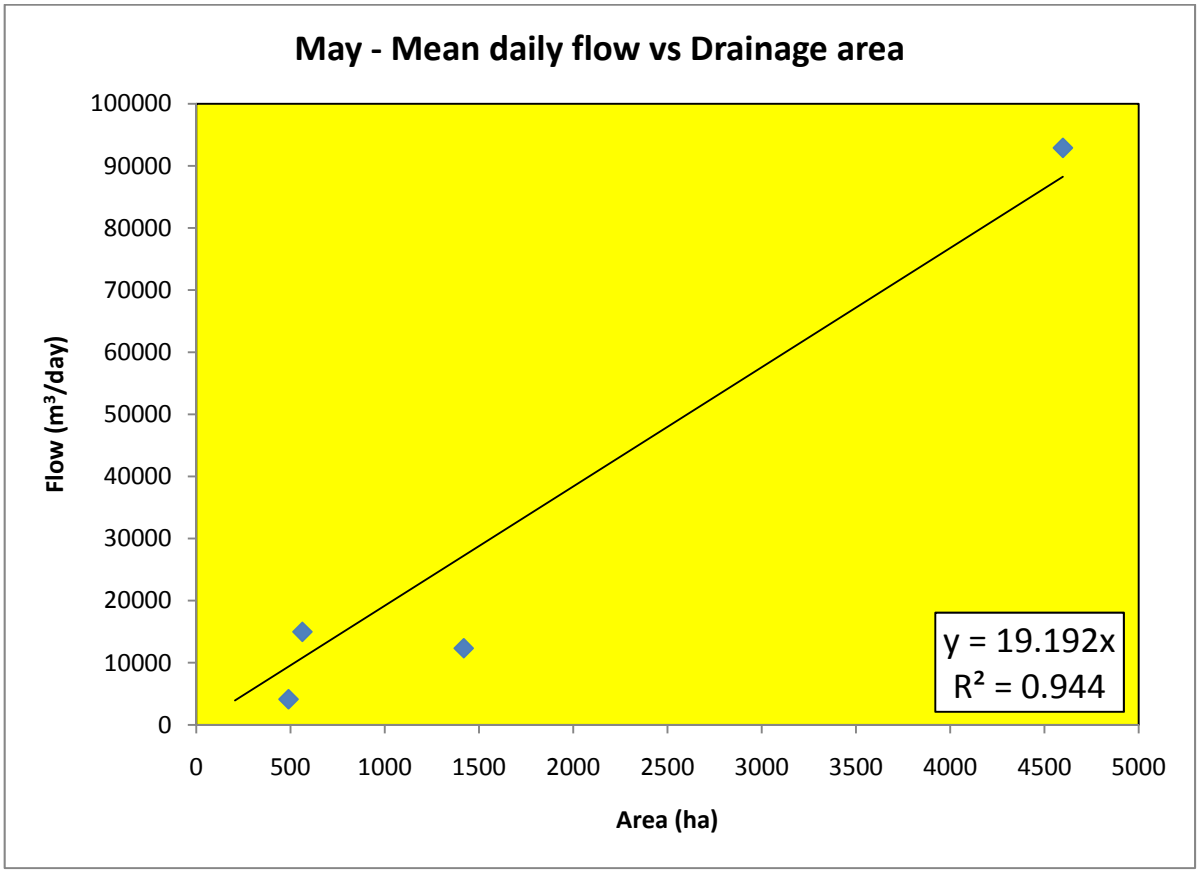

S11 - Flow and Pressure (2010)
Q (cms)
Manual flow measurement
Water Pressure (m)
Water Pressure
Flow
Flow (cms)
Water Pressure (m)
Date
0
1
2
3
4
5
6
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
Apr 1
Apr 15
Apr 29
May 13
May 27
Jun 10
Jun 24
Jul 8
Jul 22
Aug 5
Aug 19
Sep 2
Sep 16
Sep 30
Oct 14
Oct 28
Nov 11
Nov 25

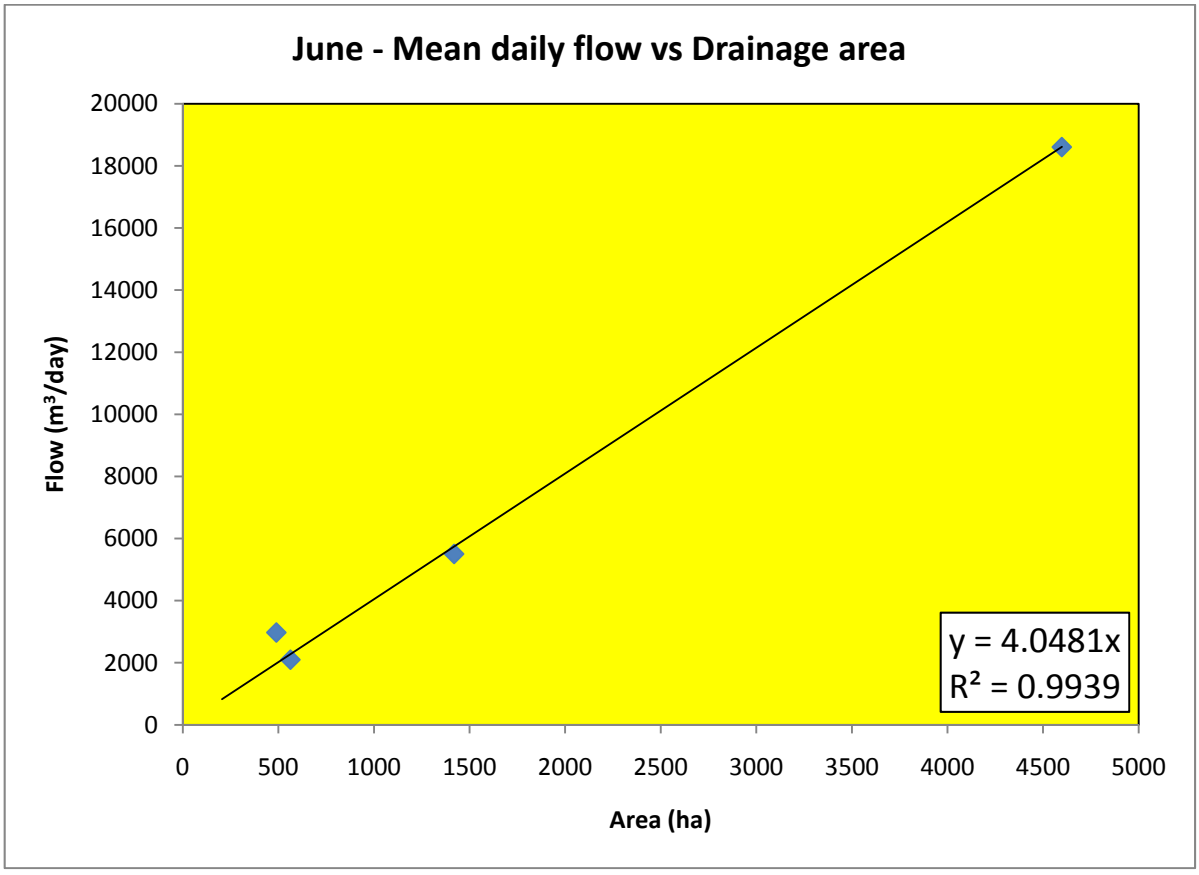

S11 - Flow and Pressure (2011)
Q (cms)
Manual flow measurement
Water Pressure (m)
Water Pressure
Flow
Flow (cms)
Water Pressure (m)
Date
18
16
14
12
10
8
6
4
2
0
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Apr 1
Apr 15
Apr 29
May 13
May 27
Jun 10
Jun 24
Jul 8
Jul 22
Aug 5
Aug 19
Sep 2
Sep 16
Sep 30
Oct 14
Oct 28
Nov 11
Nov 25

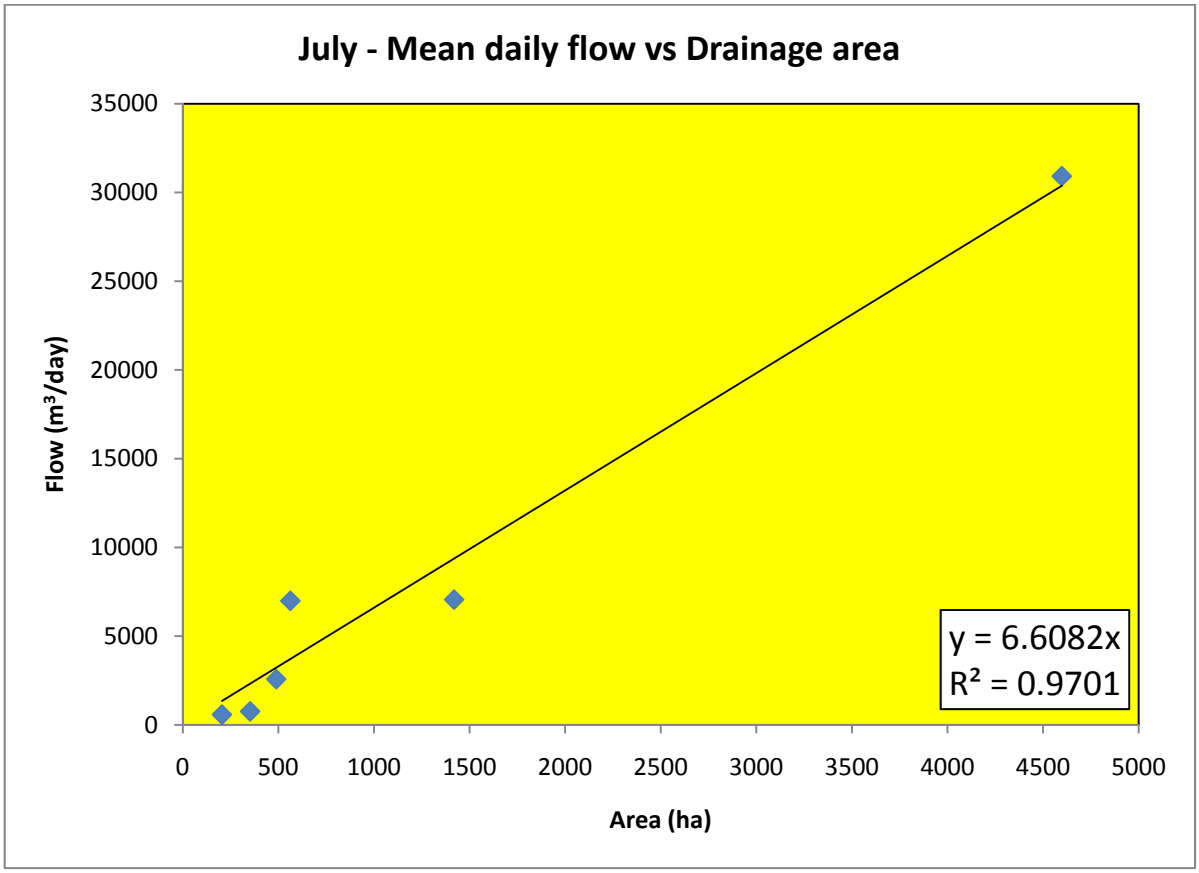

S14 - Flow and Pressure (2009)
Q (cms)
Manual flow measurement
Water Pressure (m)
Water Pressure
Flow
Flow (cms)
Water Pressure (m)
Date
0.3
0.25
0.2
0.15
0.1
0.05
0
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Apr 1
Apr 15
Apr 29
May 13
May 27
Jun 10
Jun 24
Jul 8
Jul 22
Aug 5
Aug 19
Sep 2
Sep 16
Sep 30
Oct 14
Oct 28
Nov 11
Nov 25

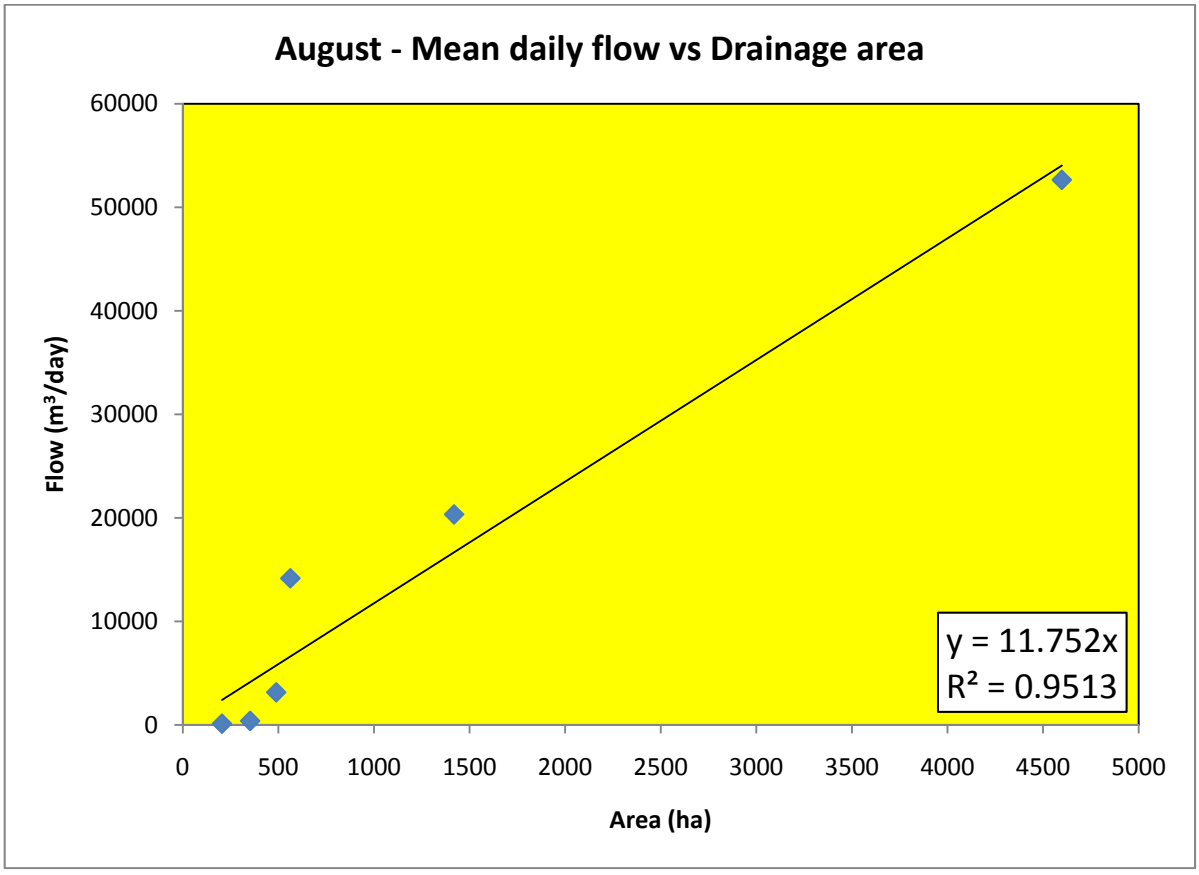

S14 - Flow and Pressure (2010)
Q (cms)
Manual flow measurement
Water Pressure (m)
Water Pressure
Flow
Flow (cms)
Water Pressure (m)
Date
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Apr 1
Apr 15
Apr 29
May 13
May 27
Jun 10
Jun 24
Jul 8
Jul 22
Aug 5
Aug 19
Sep 2
Sep 16
Sep 30
Oct 14
Oct 28
Nov 11
Nov 25

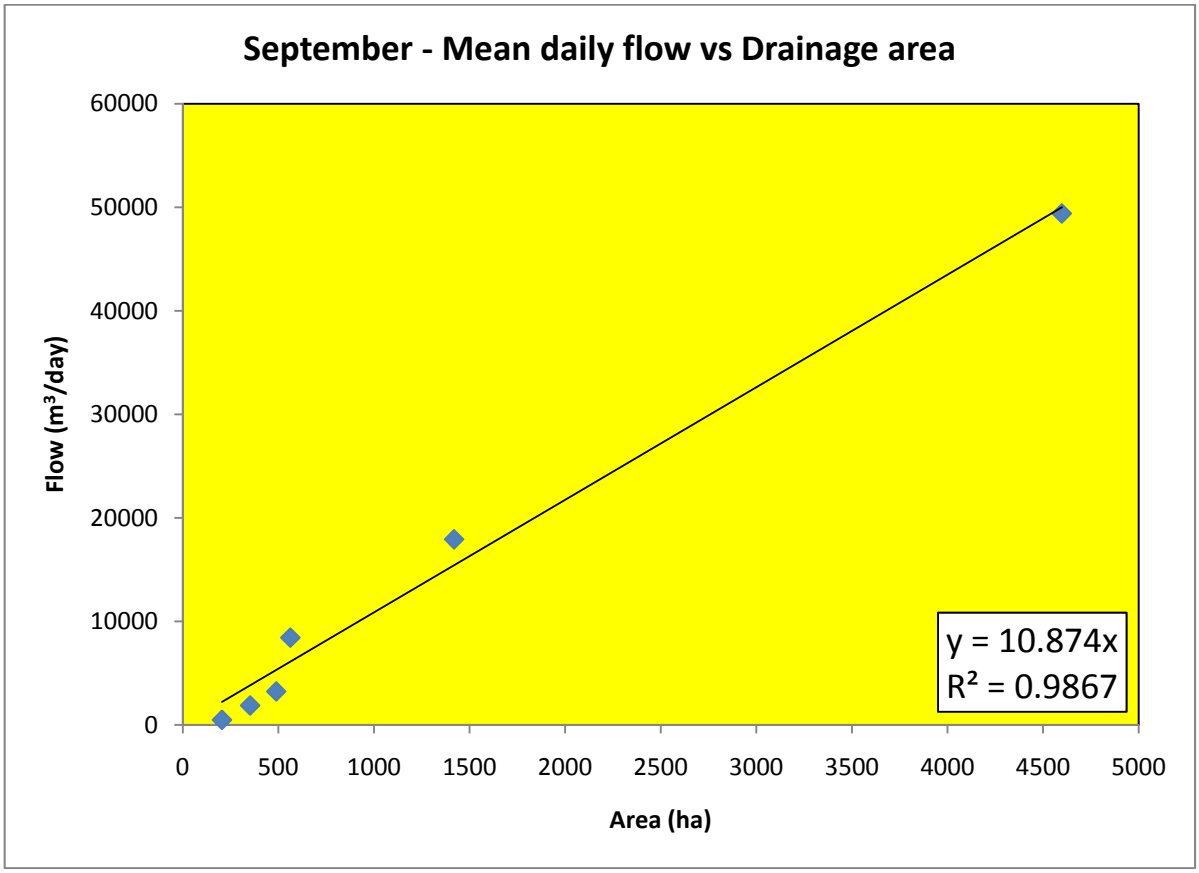

S14 - Flow and Pressure (2011)
Q (cms)
Manual flow measurement
Water Pressure (m)
Water Pressure
Flow
Flow (cms)
Water Pressure (m)
Date
0.3
0.25
0.2
0.15
0.1
0.05
0
1.5
1.3
1.1
0.9
0.7
0.5
0.3
0.1
-0.1
Apr 1
Apr 15
Apr 29
May 13
May 27
Jun 10
Jun 24
Jul 8
Jul 22
Aug 5
Aug 19
Sep 2
Sep 16
Sep 30
Oct 14
Oct 28
Nov 11
Nov 25

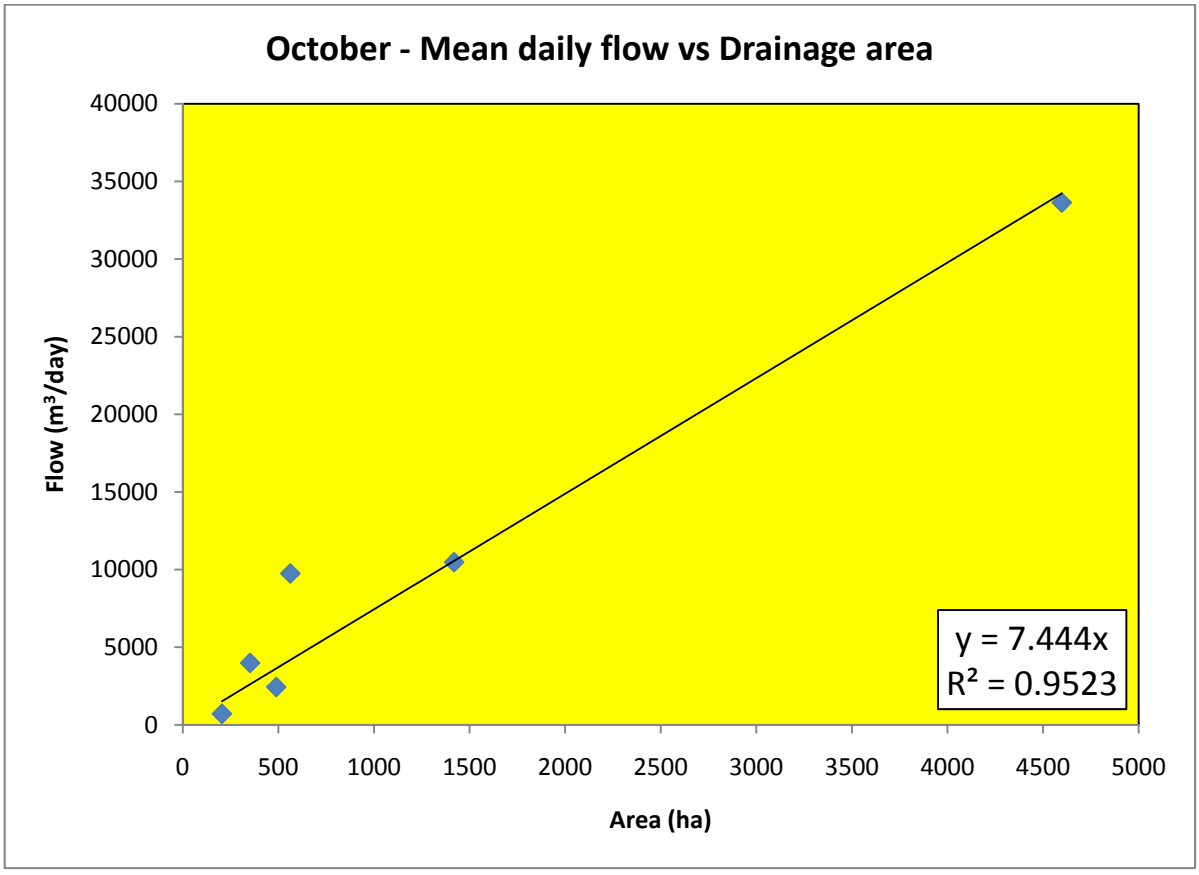

May - Mean daily flow vs Drainage area
Flow (m³/day)
100000
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Area (ha)
y = 19.192x
R² = 0.944


June - Mean daily flow vs Drainage area
Flow (m³/day)
20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Area (ha)
y = 4.0481x
R² = 0.9939


July - Mean daily flow vs Drainage area
Flow (m³/day)
35000
30000
25000
20000
15000
10000
5000
0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Area (ha)
y = 6.6082x
R² = 0.9701


August - Mean daily flow vs Drainage area
Flow (m³/day)
60000
50000
40000
30000
20000
10000
0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Area (ha)
y = 11.752x
R² = 0.9513


September - Mean daily flow vs Drainage area
Flow (m³/day)
60000
50000
40000
30000
20000
10000
0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Area (ha)
y = 10.874x
R² = 0.9867


October - Mean daily flow vs Drainage area
Flow (m³/day)
40000
35000
30000
25000
20000
15000
10000
5000
0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Area (ha)
y = 7.444x
R² = 0.9523

APPENDIX C

MARATHON PGM-Cu PROJECT SITE
MARATHON, ONTARIO

INSTANTANEOUS PEAK AND MAXIMUM DAILY FLOWS FOR CATCHMENTS USING THE NORTHERN ONTARIO METHOD

7-DAY LOW FLOWS BY BASIN USING CUMMING COCKBURN RELATIONSHIPS

INSTANTANEOUS PEAK FLOWS BY SUB BASIN FOR THE 2-YEAR THROUGH 100-YEAR RETURN PERIODS

Subbasin No.	Outlet Node	Basin Area (km^2)	Storage Area (km^2)	Return Period (years)					
				2	5	10	25	50	100
101	S2	4.354	0.077	2.566	3.755	4.539	5.539	6.282	7.025
102	S4	3.465	0.063	2.121	3.103	3.750	4.576	5.190	5.804
103	S6	2.109	0.057	1.251	1.820	2.195	2.674	3.029	3.385
104	outlet	3.392	0.147	1.464	2.111	2.524	3.035	3.408	3.770
105	S30	48.333	4.862	9.821	13.664	16.027	18.817	20.768	22.619
	S5	18.082	1.696	3.931	5.494	6.459	7.598	8.400	9.157
	S10	5.628	0.264	2.142	3.082	3.678	4.409	4.939	5.449
	S11	45.982	4.862	9.088	12.602	14.755	17.299	19.068	20.753
	S22	3.521	0.155	1.497	2.156	2.578	3.097	3.477	3.844
	S41[3]	14.190	2.280	2.103	2.816	3.245	3.730	4.057	4.360
106	S31	10.985	0.059	6.470	9.544	11.571	14.156	16.077	17.998
	S12	3.772	0.059	2.354	3.450	4.172	5.093	5.777	6.462
	S14	4.889	0.059	3.057	4.489	5.433	6.638	7.533	8.429
	S15	2.048	0.023	1.566	2.301	2.786	3.404	3.863	4.323
107	outlet	0.490	0.000	0.642	0.951	1.155	1.415	1.609	1.803
108	outlet	0.530	0.000	0.681	1.008	1.224	1.500	1.705	1.911

Note:

1. Flood flow values are in cubic meters per second.
2. Flood flows calculated using the Northern Ontario Hydrology Method.
3. Lake-outlet node.

MAXIMUM DAILY DISCHARGE BY SUB BASIN FOR THE 2-YEAR THROUGH 100-YEAR RETURN PERIODS

Subbasin No.	Outlet Node	Basin Area (km^2)	Storage Area (km^2)	Return Period (years)					
				2	5	10	25	50	100
101	S2	4.354	0.077	0.719	1.052	1.271	1.551	1.759	1.968
102	S4	3.465	0.063	0.564	0.824	0.996	1.216	1.379	1.542
103	S6	2.109	0.057	0.327	0.476	0.574	0.699	0.792	0.885
104	Outlet	3.392	0.147	0.528	0.761	0.911	1.095	1.229	1.360
105	S30	48.333	4.862	7.902	10.993	12.895	15.140	16.709	18.198
	S5	18.082	1.696	2.825	3.949	4.642	5.461	6.038	6.582
	S10	5.628	0.264	0.899	1.293	1.543	1.849	2.072	2.286
	S11	45.982	4.862	7.417	10.284	12.041	14.117	15.560	16.935
	S22	3.521	0.155	0.549	0.791	0.946	1.136	1.275	1.410
	S41[3]	14.190	2.280	1.896	2.539	2.926	3.363	3.658	3.931
106	S31	10.985	0.059	1.963	2.895	3.510	4.294	4.877	5.459
	S12	3.772	0.059	0.619	0.908	1.098	1.340	1.520	1.700
	S14	4.889	0.059	0.821	1.206	1.460	1.783	2.024	2.264
	S15	2.048	0.023	0.327	0.481	0.582	0.711	0.807	0.903
107	outlet	0.490	0.000	0.073	1.09	0.132	0.162	0.184	0.206
108	outlet	0.530	0.000	0.080	0.118	0.143	0.176	0.200	0.224

Note:

1. Flood flow values are in cubic meters per second.
2. Flood flows calculated using the Northern Ontario Hydrology Method.
3. Lake-outlet node.

7-DAY LOW FLOWS BY SUB BASIN

Subbasin No.	Outlet Node	Basin Area (km^2)	Return Period (years)			
			2	5	10	20
101	S2	4.354	0.009	0.006	0.005	0.004
102	S4	3.465	0.007	0.005	0.004	0.003
103	S6	2.109	0.004	0.003	0.002	0.002
104	Outlet	3.392	0.007	0.005	0.004	0.003
105	S30	48.333	0.096	0.069	0.057	0.048
	S5	18.082	0.036	0.026	0.021	0.018
	S10	5.628	0.011	0.008	0.007	0.006
	S11	45.982	0.091	0.066	0.054	0.046
	S22	3.521	0.007	0.005	0.004	0.004
	S41[3]	14.190	0.028	0.020	0.017	0.014
106	S31	10.985	0.022	0.016	0.013	0.011
	S12	3.772	0.007	0.005	0.004	0.004
	S14	4.889	0.010	0.007	0.006	0.005
	S15	2.048	0.004	0.003	0.002	0.002
107	outlet	0.490	0.001	<0.001	<0.001	<0.001
108	outlet	0.530	0.001	<0.001	<0.001	<0.001

Note:

1. Low flow values are in cubic meters per second and represent the lowest mean flow for 7 days for each return period.
2. Flows calculated using relationships developed by Cumming Cockburn Ltd.