Station Information

Site ID	2JE6
River Name	Montreal River
Site Name	Matabitchuan
Region	Northeastern
District	North Bay
Drainage Area	979 km²
Owner	OPG

Flow metrics are provided for the waterpower facility based on simulated natural flows as described in the draft *Waterpower Science Transfer Report 1.0* (MNR 2003). The target metrics provided are described in the *Aquatic Ecosystem Guidelines* (MNR 2002) and the *Waterpower Science Strategy* (MNR 2002). Metrics are based on simulated natural daily flow from 1973 to 1999 (27 yrs). Other descriptive metrics have been included in the data sheet to provide a more complete description of the ranges of streamflow on the river system and to facilitate comparisons between river systems.
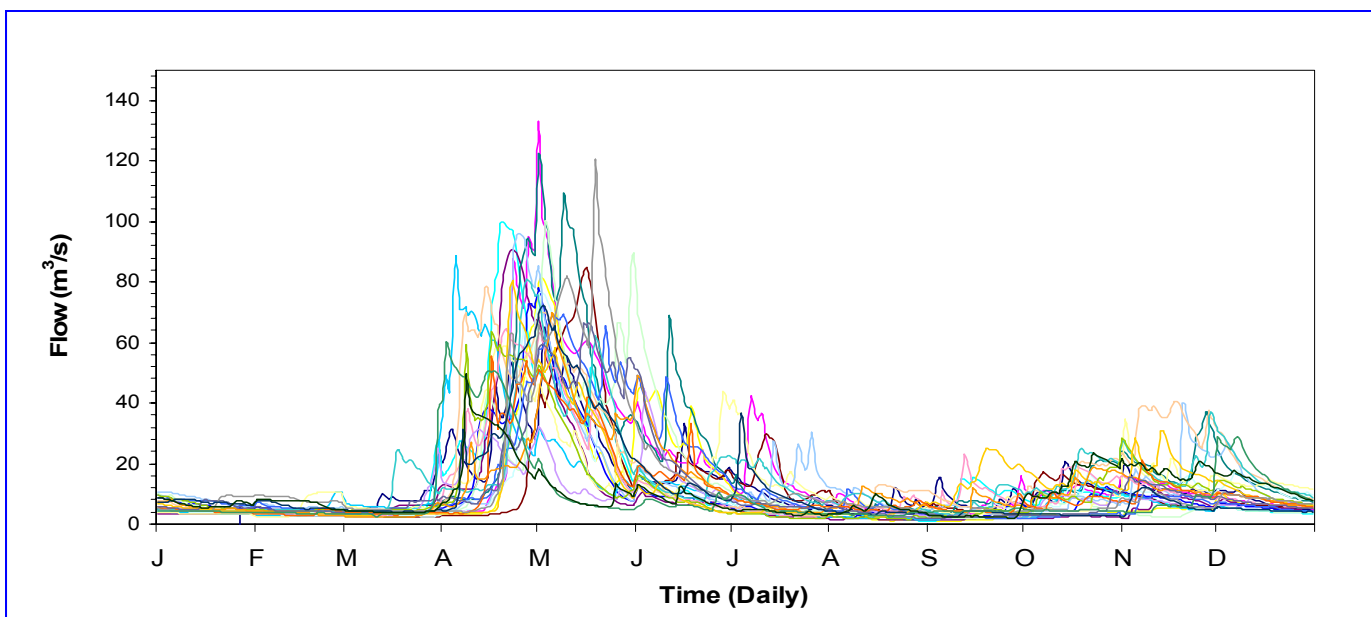
Annual (1973 - 1999):

I. Streamflow Time Series

Figure 1: Annual daily flow hydrographs from 1973 to 1999.

Descriptive Metric	Value
Mean Annual Flow	12.1 m³/s
20% Time Exceeded Flow	15.0 m³/s
Median Flow	6.4 m³/s
80% Time Exceeded Flow	3.8 m³/s
Month of Max. Median Flow	May
Month of Min. Median Flow	March
Mean Rising Rate of Change of Flow	3.3 m³/s/day
Mean Falling Rate of Change of Flow	-1.2 m³/s/day
Extreme Low Flow Conditions:	
7-day-average low flow in 2-year return period, $7Q_2$	2.3 m³/s
7-day-average low flow in 10-year return period, $7Q_{10}$	1.5 m³/s
7-day-average low flow in 20-year return period, $7Q_{20}$	1.2 m³/s
Target Metrics	**Value**
Riparian Flows (Q_2 - Q_{20})	76 - 120 m³/s
Bankfull Flows ($Q_{1.5}$ - $Q_{1.7}$)	67 - 70 m³/s

Table 1: Annual flow metrics based on 27 years of data.

II. Flow Duration

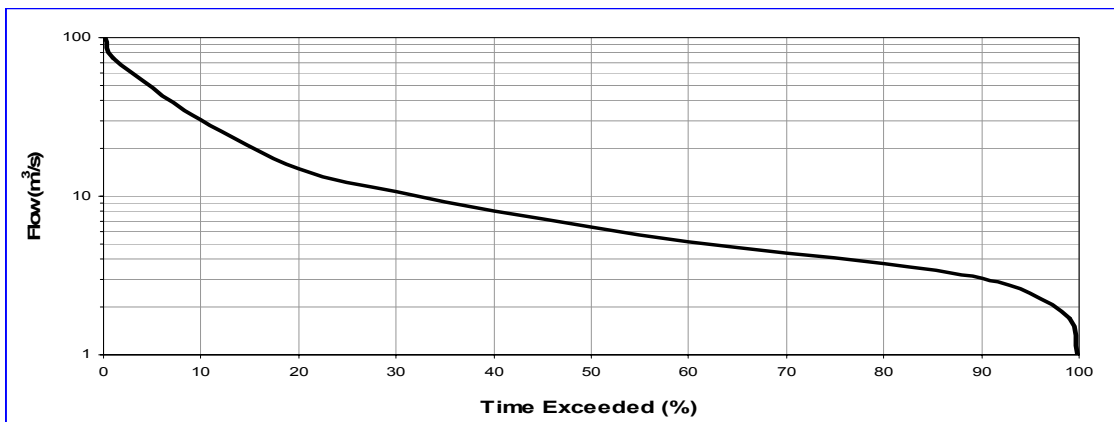| Time Exceeded %	Flow m³/s
0.10	100.00
1.00	74.80
5.00	47.90
10.00	30.20
20.00	15.00
30.00	10.60
40.00	8.11
50.00	6.37
60.00	5.17
70.00	4.39
80.00	3.78
90.00	3.03
95.00	2.46
99.00	1.70
99.90	1.00

Table 2 & Figure 2: Flow duration table and curve displaying flow vs. percent time exceeded over 27 years.

III. Flood Frequency Analysis

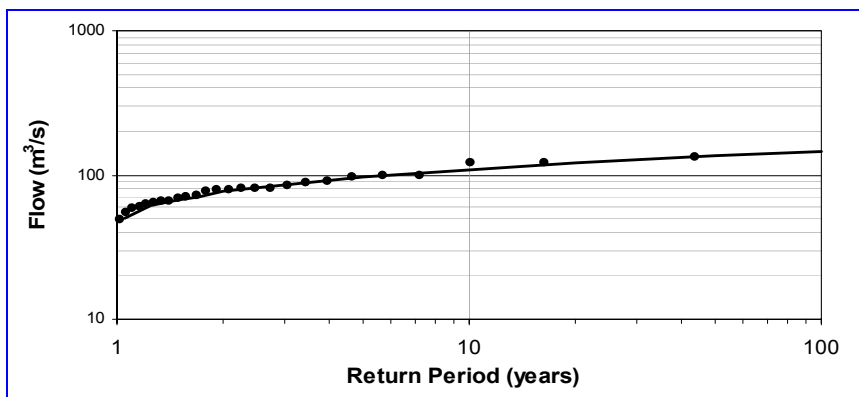| Return Period yrs	Flow m³/s
1.05	50
1.25	62
1.50	67
1.70	70
2	76
5	96
10	108
20	120
50	135
100	146

Table 3 and Figure 3 : Flood frequency analysis and curve fitted by the *Log Pearson Type III* probability distribution.

IV. Low Flow Frequency Analysis (Performed using 7-day-average low flow)

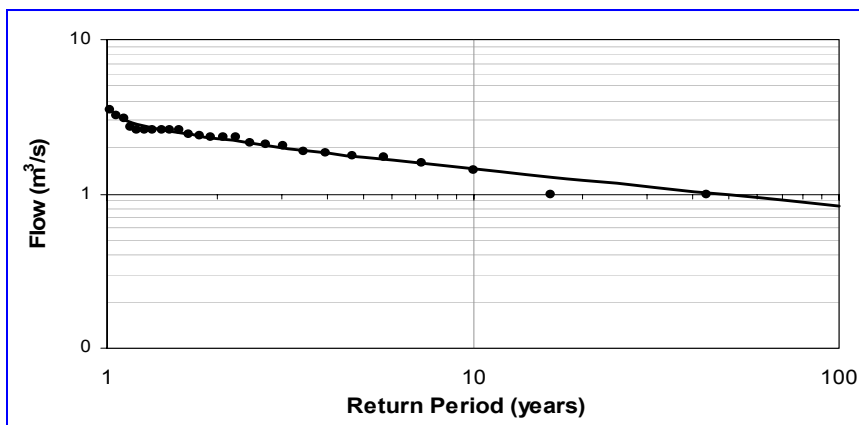| Return Period yrs	Flow m³/s
1.005	3.6
1.01	3.5
1.11	3.0
1.25	2.8
2	2.3
5	1.7
10	1.5
20	1.2
50	1.0
100	0.8

Table 4 and Figure 4: 7-day-average low flow frequency analysis and curve fitted by the *Gumble III* probability distribution.
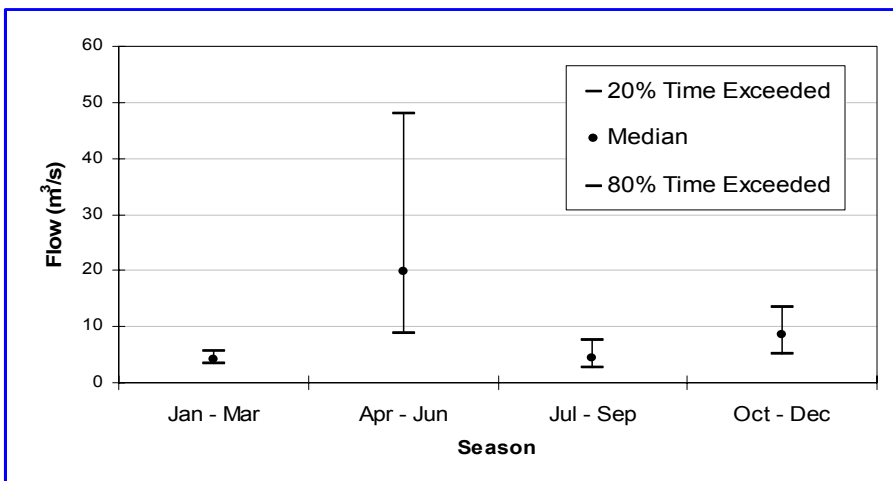
Seasonal:

I. Flow Duration

Table 5 and Figure 5: Seasonal median flow duration for determining minimum flow targets.
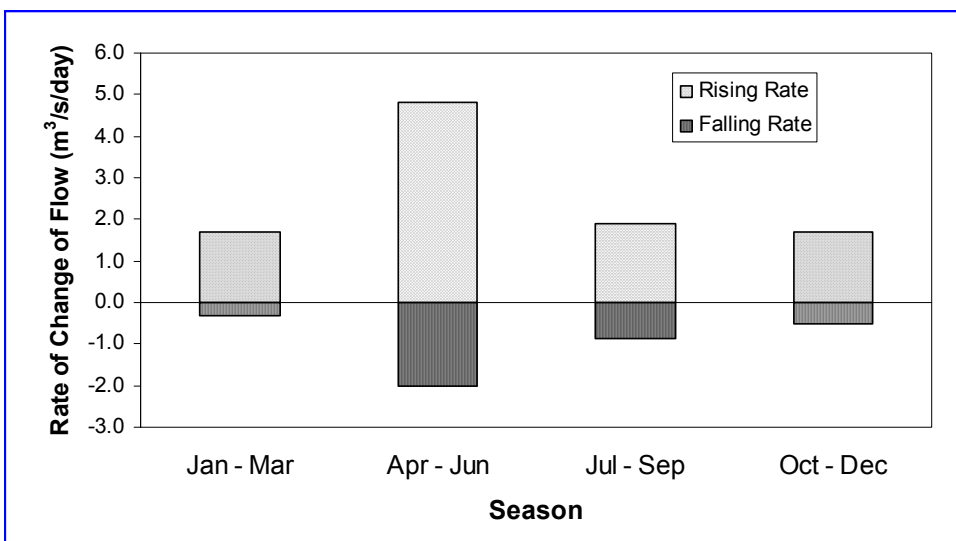
Season	20% Time Exceeded m^3/s	Median m^3/s	80% Time Exceeded m^3/s
Jan - Mar	5.6	4.3	3.4
Apr - Jun	47.9	19.8	8.9
Jul - Sep	7.5	4.4	2.7
Oct - Dec	13.5	8.6	5.1

II. Rate of Change of Flow

Figure 6 and Table 6: Seasonal rising and falling rates of change of flow for determining ramping rate targets.

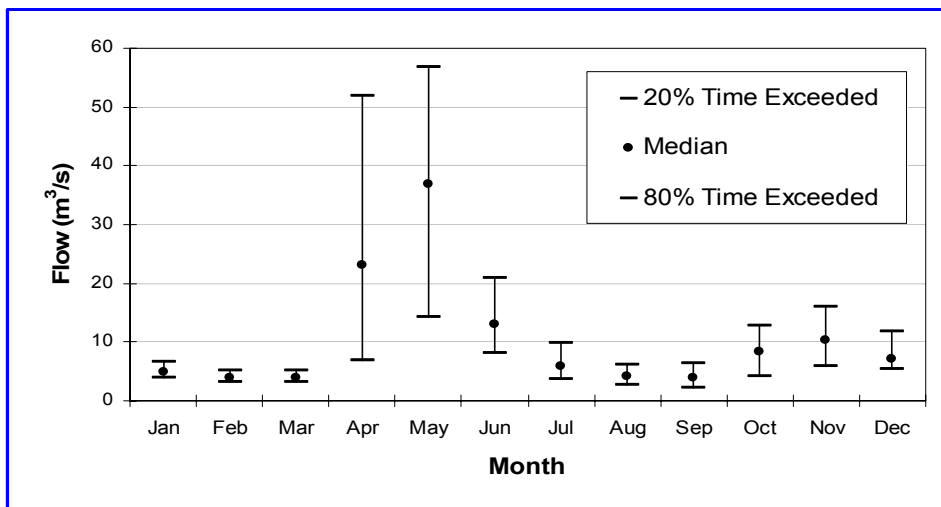| Season	Rising Rate $m^3/s/day$	Falling Rate $m^3/s/day$
Jan - Mar	1.7	-0.3
Apr - Jun	4.8	-2.0
Jul - Sep	1.9	-0.9
Oct - Dec	1.7	-0.5

Monthly:

I. Flow Duration

Table 7 and Figure 7: Monthly median flow duration for determining minimum flow targets.

Month	20% Time Exceeded m^3/s	Median m^3/s	80% Time Exceeded m^3/s
Jan	6.6	4.8	4.0
Feb	5.1	4.0	3.3
Mar	5.1	4.0	3.1
Apr	51.8	23.1	7.0
May	56.9	37.0	14.2
Jun	20.8	13.0	8.1
Jul	9.7	5.8	3.7
Aug	6.1	4.2	2.6
Sep	6.5	3.9	2.3
Oct	12.7	8.2	4.1
Nov	15.9	10.3	6.0
Dec	11.8	7.2	5.4

II. Rate of Change of Flow

Figure 8 and Table 8: Monthly rising and falling rates of change of flow for determining ramping rate targets.

Month	Rising Rate $m^3/s/day$	Falling Rate $m^3/s/day$
Jan	0.2	-0.2
Feb	0.4	-0.2
Mar	3.4	-0.8
Apr	5.3	-2.3
May	4.9	-2.7
Jun	2.3	-1.1
Jul	2.4	-1.0
Aug	0.9	-0.6
Sep	2.0	-0.7
Oct	1.4	-0.5
Nov	2.3	-0.7
Dec	0.7	-0.4