DRAFT

# ABITIBI RIVER AT ABITIBI CANYON NATURAL FLOW METRICS DATA SHEET

| Station Information | |
|---|---|
| Site ID | 4ME2 |
| River Name | Abitibi River |
| Site Name | Abitibi Canyon |
| Region | Northeastern |
| District | Cochrane |
| Drainage Area | 22900 km$^2$ |
| Owner | OPG |
| Plant Capacity | 529.1 cms |
| Spill Capacity | 1157.5 cms |

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 1971 to 1999 (29 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 (1971 - 1999):

## I. Streamflow Time Series

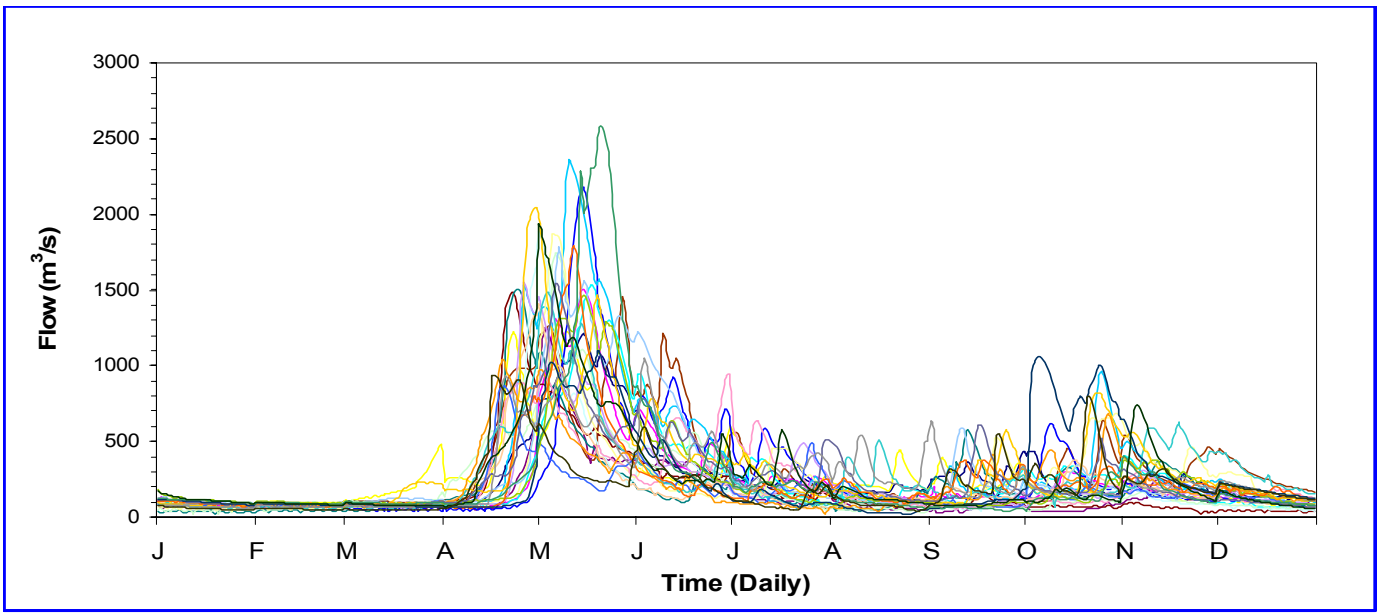



**Figure 1:** Annual daily flow hydrographs from 1971 to 1999.

| Descriptive Metric | Value |
|---|---|
| Mean Annual Flow | 243.5 m$^3$/s |
| 20% Time Exceeded Flow | 321.0 m$^3$/s |
| Median Flow | 134.0 m$^3$/s |
| 80% Time Exceeded Flow | 78.4 m$^3$/s |
| Month of Max. Median Flow | May |
| Month of Min. Median Flow | February |
| Mean Rising Rate of Change of Flow | 48.5 m$^3$/s/day |
| Mean Falling Rate of Change of Flow | -27.2 m$^3$/s/day |
| **Extreme Low Flow Conditions:** | |
| 7-day-average low flow in 2-year return period, $7Q_2$ | 59.6 m$^3$/s |
| 7-day-average low flow in 10-year return period, $7Q_{10}$ | 38.6 m$^3$/s |
| 7-day-average low flow in 20-year return period, $7Q_{20}$ | 31.7 m$^3$/s |
| **Target Metrics** | **Value** |
| Riparian Flows ($Q_2$ - $Q_{20}$) | 1327 - 1880 m$^3$/s |
| Bankfull Flows ($Q_{1.5}$ - $Q_{1.7}$) | 1327 - 1407 m$^3$/s |

**Table 1:** Annual flow metrics based on 29 years of data.

## II. Flow Duration

| Time Exceeded % | Flow $m^3/s$ |
|---|---|
| 0.10 | 2269.00 |
| 1.00 | 1436.00 |
| 5.00 | 868.00 |
| 10.00 | 568.00 |
| 20.00 | 321.00 |
| 30.00 | 224.00 |
| 40.00 | 172.00 |
| 50.00 | 134.00 |
| 60.00 | 107.00 |
| 70.00 | 90.60 |
| 80.00 | 78.40 |
| 90.00 | 67.20 |
| 95.00 | 57.40 |
| 99.00 | 40.20 |
| 99.90 | 27.50 |

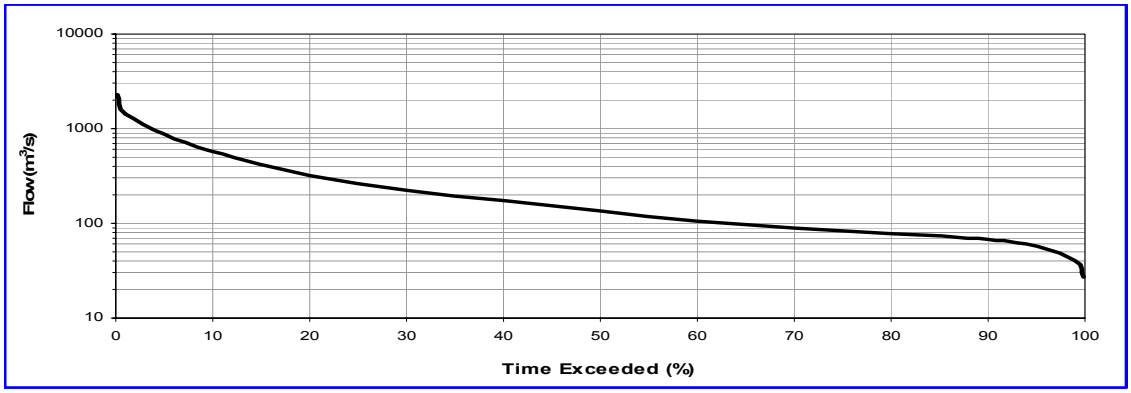



**Table 2 & Figure 2:** Flow duration table and curve displaying flow vs. percent time exceeded over 29 years.

## III. Flood Frequency Analysis

| Return Period yrs | Flow $m^3/s$ |
|---|---|
| 1.05 | 923 |
| 1.25 | 1180 |
| 1.50 | 1327 |
| 1.70 | 1407 |
| 2 | 1500 |
| 5 | 1880 |
| 10 | 2100 |
| 20 | 2300 |
| 50 | 2550 |
| 100 | 2720 |

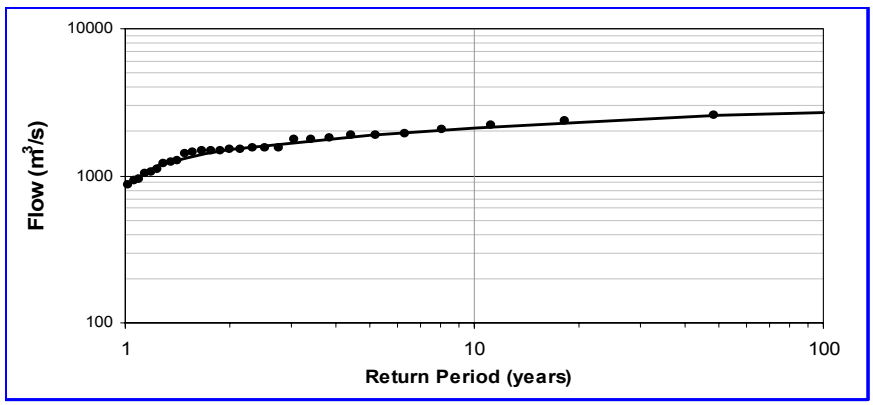



**Table 3 and Figure 3 :** Flood frequency analysis and curve fitted by the *Log Pearson Type III* probability distribution.

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

| Return Period yrs | Flow $m^3/s$ |
|---|---|
| 1.005 | 87.6 |
| 1.01 | 85.5 |
| 1.11 | 75.4 |
| 1.25 | 70.4 |
| 2 | 59.6 |
| 5 | 46.5 |
| 10 | 38.6 |
| 20 | 31.7 |
| 50 | 23.5 |
| 100 | 17.8 |

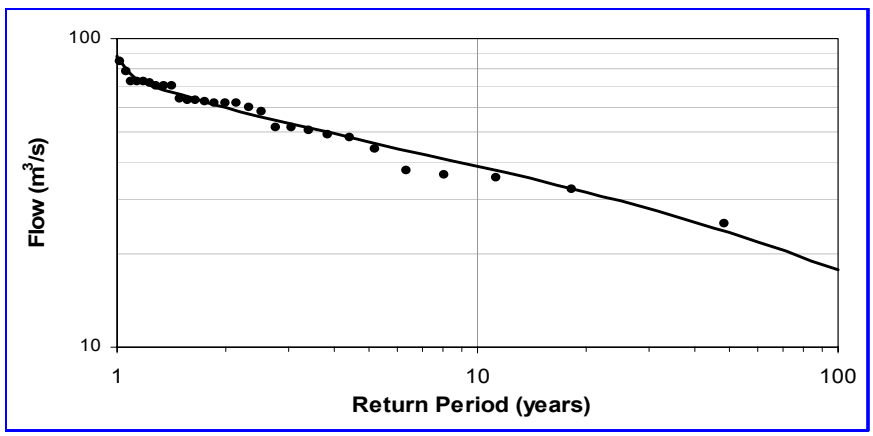


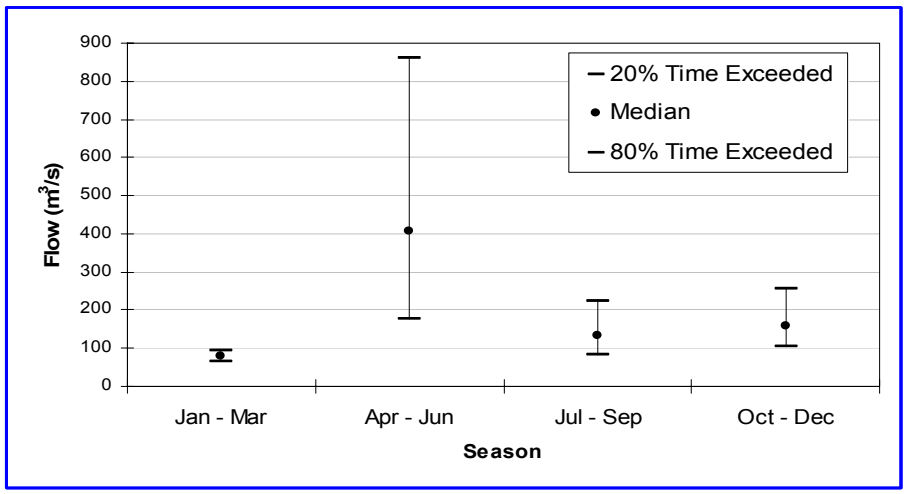

**Table 4 and Figure 4:** 7-day-average low flow frequency analysis and curve fitted by the *Gumble III* probability distribution.

# Seasonal:

## I. Flow Duration

**Table 5 and Figure 5:** Seasonal median flow duration for determining minimum flow targets.

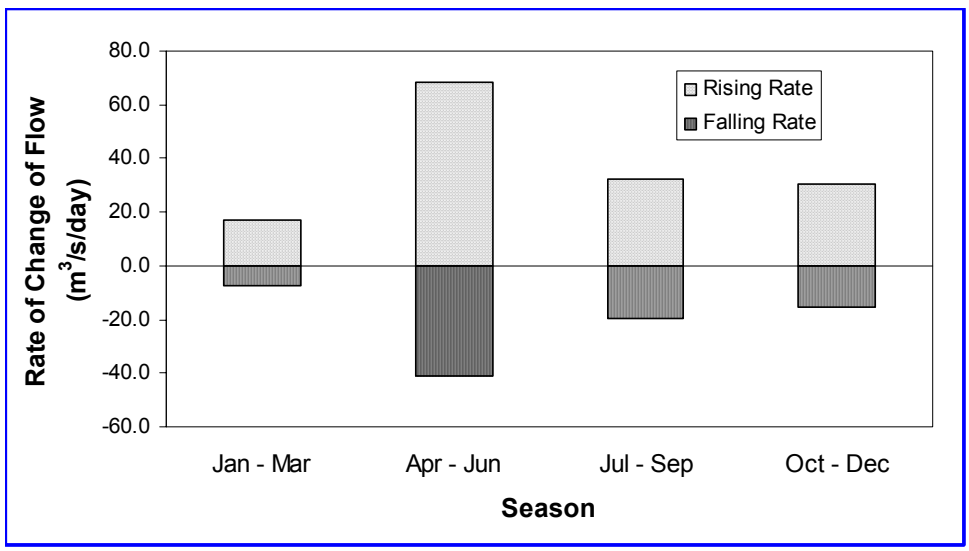
| Season | 20% Time Exceeded $m^3/s$ | Median $m^3/s$ | 80% Time Exceeded $m^3/s$ |
|---|---|---|---|
| Jan - Mar | 94.2 | 79.0 | 66.5 |
| Apr - Jun | 861.0 | 407.0 | 175.0 |
| Jul - Sep | 223.0 | 134.0 | 83.9 |
| Oct - Dec | 254.0 | 160.0 | 106.0 |




## 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 | 16.8 | -7.5 |
| Apr - Jun | 68.6 | -40.8 |
| Jul - Sep | 32.2 | -19.6 |
| Oct - Dec | 30.7 | -15.4 |

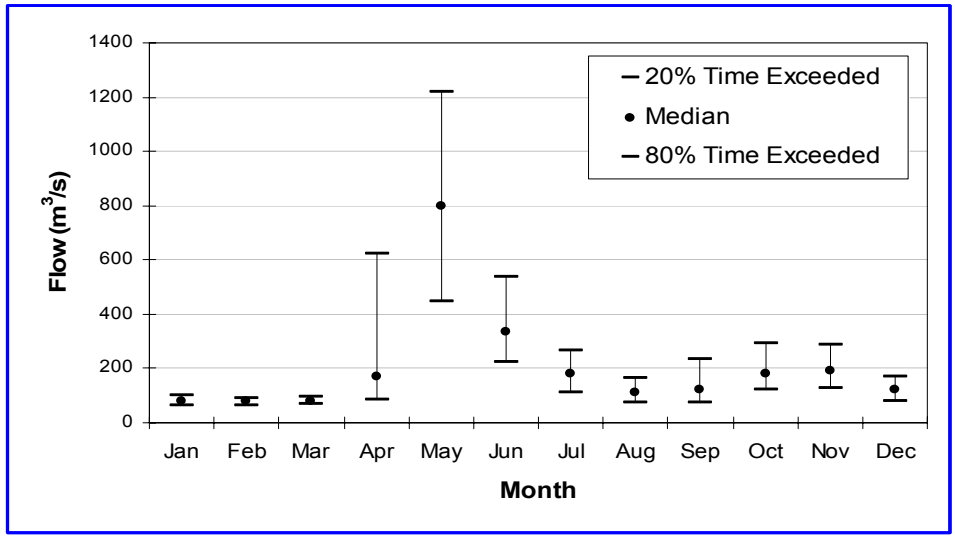


# Monthly:

## I. Flow Duration

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

| Month | 20% Time Exceeded | Median | 80% Time Exceeded |
|---|---|---|---|
| | $m^3/s$ | $m^3/s$ | $m^3/s$ |
| Jan | 100.0 | 79.7 | 64.3 |
| Feb | 89.6 | 77.4 | 66.3 |
| Mar | 95.3 | 79.0 | 69.4 |
| Apr | 621.0 | 170.0 | 85.7 |
| May | 1221.0 | 799.0 | 448.0 |
| Jun | 536.0 | 336.0 | 226.0 |
| Jul | 265.0 | 182.0 | 110.0 |
| Aug | 167.0 | 113.0 | 75.6 |
| Sep | 232.0 | 124.0 | 75.9 |
| Oct | 292.0 | 179.0 | 123.0 |
| Nov | 289.0 | 194.0 | 130.0 |
| Dec | 172.0 | 120.0 | 81.6 |




## 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 | Falling Rate |
|---|---|---|
| | $m^3/s/day$ | $m^3/s/day$ |
| Jan | 0.0 | -9.0 |
| Feb | - | - |
| Mar | 16.8 | -5.0 |
| Apr | 71.2 | -40.1 |
| May | 82.9 | -55.7 |
| Jun | 41.2 | -25.6 |
| Jul | 26.6 | -17.8 |
| Aug | 26.7 | -15.3 |
| Sep | 42.3 | -26.5 |
| Oct | 37.9 | -20.6 |
| Nov | 22.5 | -15.3 |
| Dec | 9.4 | -8.1 |