

NECHAKO RIVER FLOW CONTROL

1998/1999

NECHAKO FISHERIES CONSERVATION PROGRAM
Data Report No. RM98-4

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ABSTRACT

The 1998/1999 Nechako River Flow Control Project was undertaken to ensure effective release of the Short Term Annual Water Allocation, as defined in the 1987 Settlement Agreement (Anon. 1987), which specifies a mean release of $36.8 \text{ m}^3/\text{s}$ at Skins Lake Spillway with the intent of achieving a mean annual flow of $41.7 \text{ m}^3/\text{s}$ in the Nechako River below Cheslatta Falls. Spilling beyond that required for the Short Term Annual Water Allocation occurred throughout the period resulting in higher than normal discharges. The recorded mean annual Skins Lake Spillway release was $58.3 \text{ m}^3/\text{s}$, and the mean annual flow in the Nechako River below Cheslatta Falls was recorded at $64.1 \text{ m}^3/\text{s}$. Excluding July and August cooling water releases and releases of excess water from the reservoir during the 1998/1999 water year (April 1, 1998 to March 31, 1999) indicate that the actual mean annual Skins Lake Spillway release was $36.8 \text{ m}^3/\text{s}$. This report presents a comparison of recorded mean annual and mean monthly flows and the Short Term Flow Regime defined in the Settlement Agreement.

INTRODUCTION

The Settlement Agreement specifies the Short Term and Long Term Annual Water Allocation from Nechako Reservoir and the Short Term and Long Term flow regime in the Nechako River below Cheslatta Falls. The Short Term Annual Water Allocation specifies a mean annual release of $36.8 \text{ m}^3/\text{s}$ at Skins Lake Spillway with the intent of achieving a mean annual flow of $41.7 \text{ m}^3/\text{s}$ in the Nechako River below Cheslatta Falls.

This report provides a summary of recorded mean daily Skins Lake Spillway releases and flows in the Nechako River below Cheslatta Falls for the period April 1, 1998 to March 31, 1999. Also included is a comparison of recorded mean monthly flows and Short Term Flow Regime, defined in the Settlement Agreement, for Skins Lake Spillway and the Nechako River below Cheslatta Falls.

In April to June, 1998, spilling of excess water from the Nechako Reservoir occurred resulting in higher than normal discharges.

OBJECTIVE AND RATIONALE

The objective of the Nechako River flow management project is to ensure that the Short Term Annual Water Allocation, as set out in the Settlement Agreement is achieved effectively. This objective will be achieved by scheduling Nechako Reservoir releases appropriately to ensure the water allocation is utilized efficiently to produce a flow regime in the Nechako River most conducive to biological objectives.

DATA REQUIREMENTS AND SOURCES

Project data requirements include mean daily Skins Lake Spillway releases and mean daily flows in the Nechako River below Cheslatta Falls. Data for the period April 1, 1998 to March 31, 1999 are preliminary Water Survey of Canada (WSC) data and were obtained in response to ongoing data requests to WSC.

RESULTS

A comparison of Settlement Agreement and operational mean monthly Skins Lake Spillway releases is presented in Figure 1. The operational release is defined as the Water Survey of Canada recorded release made by Alcan in response to Nechako Fisheries Conservation Program (NFCP) direction, less forced spills and additional flows as required for cooling purposes, as per the 1998 Summer Water Temperature and Flow Management Project (Triton 1998). The mean annual release for the 1998/1999 water year was $36.8 \text{ m}^3/\text{s}$. The Settlement Agreement Short Term annual water allocation specifies a mean annual release of $36.8 \text{ m}^3/\text{s}$.

An operational release in excess of the specified $36.8 \text{ m}^3/\text{s}$ is due to the nature of the required spillway gate settings (especially during winter months) in response to changing reservoir elevations. Spillway gate settings are established by Alcan in response to release recommendations made by Triton Environmental Consultants Ltd. (TECL) under the auspices

of the NFCP, and are based on the current reservoir elevation and anticipated reservoir inflow. During ice free conditions the spillway settings are reviewed periodically, typically weekly, to ensure the requested releases are achieved. Each year, during the fall, Alcan sets the gate(s) once for the entire upcoming winter. The winter release is typically set above the requested release in anticipation of the decreasing reservoir elevation due to low winter inflows. This release regulation scheme may result in differences between the recorded releases and the annual water allocation specified in the Settlement Agreement.

A comparison of recorded and Settlement Agreement mean monthly flows in the Nechako River below Cheslatta Falls is presented in Figure 2. The Settlement Agreement Short Term annual water allocation specifies an approximate mean annual flow of $41.7 \text{ m}^3/\text{s}$ in the Nechako River below Cheslatta Falls (plus additional flows as required for cooling pur-

poses). Recorded mean daily Skins Lake Spillway releases and flow in the Nechako River below Cheslatta Falls for the 1998/1999 water year are presented in Table 1. The recorded mean annual Skins Lake Spillway release (including summer cooling water releases and spills) was $123.5 \text{ m}^3/\text{s}$. The recorded mean annual flow in the Nechako River below Cheslatta falls was $136.0 \text{ m}^3/\text{s}$.

The recorded inflow between Skins Lake Spillway and Nechako River below Cheslatta Falls is subject to gauging error in either, or both gauges. During dry years, the inflow may be less than the combined gauging error (approximately plus or minus 5% for each gauge) resulting in a recorded negative inflow between upstream and downstream gauging stations. During wet years, similar gauging error may be present, but the inflow may be in excess of the combined gauging error resulting in recorded positive inflow, although possibly less than the actual inflow.

Figure 1
Comparison Between Recorded and Settlement Agreement
Skins Lake Spillway Releases, April 1998 to March 1999

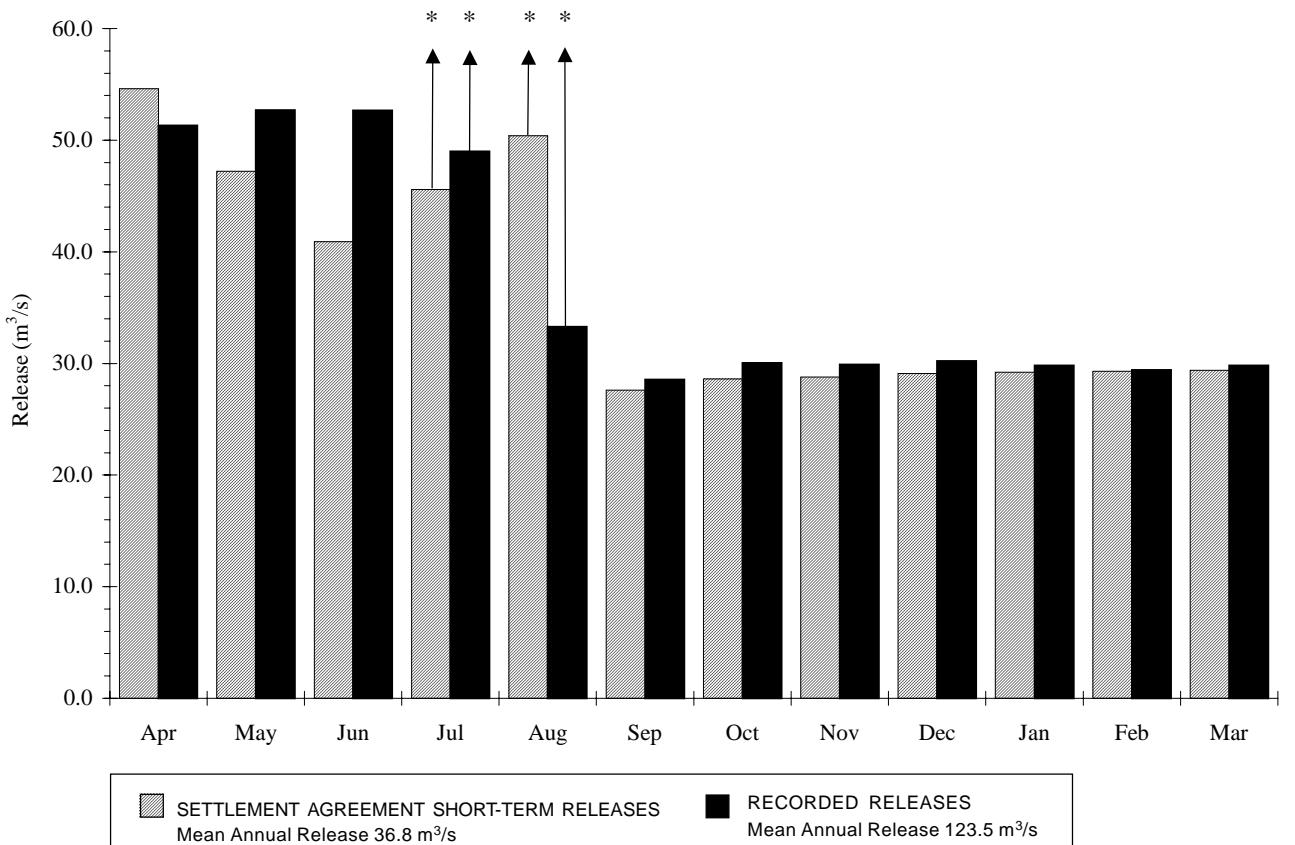
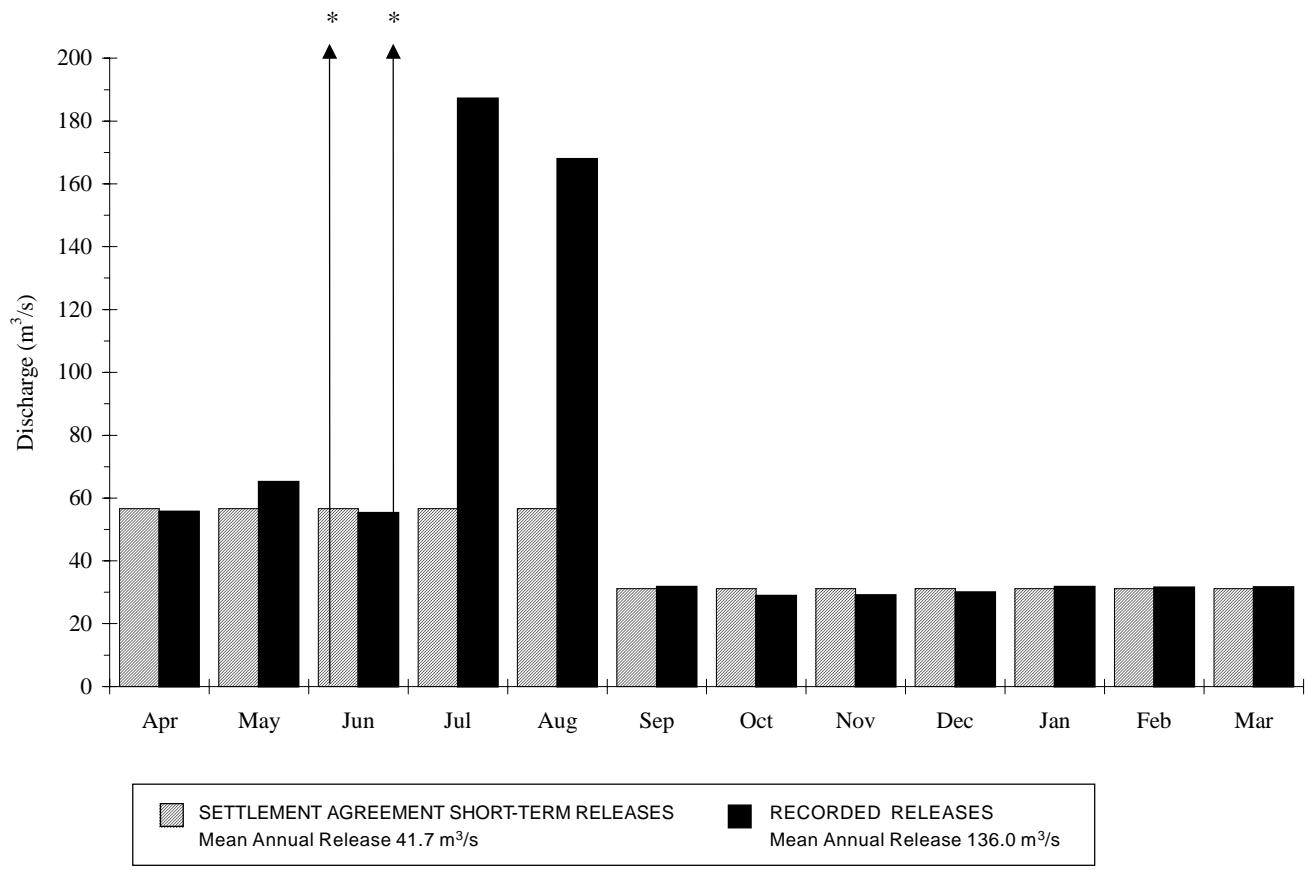


Figure 2
Comparison Between Recorded and Settlement Agreement Flows
in Nechako River Below Cheslatta Falls, April 1998 to March 1999



REFERENCES

- Anonymous. 1987. *Settlement Agreement 1997*.
- Triton Environmental Consultants Ltd. 1998. *The 1998 Summer Water Temperature and Flow Management Project. Nechako Fisheries Conservation Program Technical Report No. RM96-1. In review.*

Table 1
Observed Skins Lake Spillway Releases and Flows in Nechako River Below Cheslatta Falls
1998/1999 Water Year (April 1, 1998 to March 31, 1999)

Note: Records are preliminary WSC data

Date 1998/1999	Skins Lake Spillway Release (m ³ /s)	Nechako R. Below Cheslatta Falls (cfs)	
Apr-01	51.7	1,826	53.9
Apr-02	51.7	1,826	53.9
Apr-03	51.7	1,826	53.7
Apr-04	51.6	1,822	53.3
Apr-05	52.1	1,840	53.3
Apr-06	51.5	1,819	53.5
Apr-07	54.3	1,918	53.6
Apr-08	51.5	1,819	53.7
Apr-09	51.5	1,819	53.8
Apr-10	51.4	1,815	53.9
Apr-11	51.3	1,812	53.9
Apr-12	51.4	1,815	54.0
Apr-13	51.3	1,812	54.1
Apr-14	51.3	1,812	54.1
Apr-15	51.2	1,808	54.2
Apr-16	51.1	1,805	54.2
Apr-17	51.1	1,805	54.3
Apr-18	51.1	1,805	54.6
Apr-19	51.1	1,805	55.5
Apr-20	51.0	1,801	56.0
Apr-21	50.9	1,798	56.5
Apr-22	50.9	1,798	56.9
Apr-23	50.9	1,798	57.3
Apr-24	50.9	1,798	58.2
Apr-25	50.8	1,794	59.0
Apr-26	50.8	1,794	59.2
Apr-27	50.8	1,794	59.3
Apr-28	50.8	1,794	60.2
Apr-29	50.8	1,794	61.3
Apr-30	50.8	1,794	62.3
May-01	50.9	1,798	63.6
May-02	51.0	1,801	64.9
May-03	51.0	1,801	65.7
May-04	51.4	1,815	66.4
May-05	51.3	1,812	67.1
May-06	51.5	1,819	67.4
May-07	51.5	1,819	67.5
May-08	51.7	1,826	67.6
May-09	51.8	1,829	67.6
May-10	52.0	1,836	67.7

Table 1 (continued)
 Observed Skins Lake Spillway Releases and Flows in Nechako River Below Cheslatta Falls
 1998/1999 Water Year (April 1, 1998 to March 31, 1999)

Note: Records are preliminary WSC data

Date 1998/1999	Skins Lake Spillway Release (m ³ /s)	Nechako R. Below Cheslatta Falls (m ³ /s)	
	(cfs)	(cfs)	
May-11	52.1	1,840	67.6
May-12	52.2	1,843	67.4
May-13	52.3	1,847	67.1
May-14	52.4	1,851	66.6
May-15	52.6	1,858	66.2
May-16	52.7	1,861	66.0
May-17	52.8	1,865	65.4
May-18	53.0	1,872	64.7
May-19	53.0	1,872	64.4
May-20	53.2	1,879	64.0
May-21	53.3	1,882	63.8
May-22	53.4	1,886	63.7
May-23	53.5	1,889	63.6
May-24	53.6	1,893	63.5
May-25	53.8	1,900	63.4
May-26	54.0	1,907	63.2
May-27	53.0	1,872	62.9
May-28	54.4	1,921	62.9
May-29	54.6	1,928	63.2
May-30	54.8	1,935	62.7
May-31	55.0	1,942	62.4
Jun-01	52.4	1,851	61.8
Jun-02	52.5	1,854	60.2
Jun-03	52.7	1,861	58.9
Jun-04	52.8	1,865	58.1
Jun-05	52.9	1,868	57.9
Jun-06	53.0	1,872	57.4
Jun-07	53.1	1,875	56.7
Jun-08	53.2	1,879	56.5
Jun-09	53.3	1,882	56.4
Jun-10	53.4	1,886	55.6
Jun-11	53.5	1,889	55.2
Jun-12	53.5	1,889	55.1
Jun-13	53.6	1,893	54.3
Jun-14	53.7	1,896	53.9
Jun-15	53.7	1,896	53.7
Jun-16	53.7	1,896	53.5
Jun-17	53.8	1,900	53.4
Jun-18	53.8	1,900	53.5
Jun-19	53.8	1,900	53.7
Jun-20	53.9	1,903	53.9

Table 1 (continued)
Observed Skins Lake Spillway Releases and Flows in Nechako River Below Cheslatta Falls
1998/1999 Water Year (April 1, 1998 to March 31, 1999)

Note: Records are preliminary WSC data

Date 1998/1999	Skins Lake Spillway Release (m ³ /s)	Nechako R. Below Cheslatta Falls (cfs)
Jun-21	53.9	1,903
Jun-22	50.8	1,794
Jun-23	51.2	1,808
Jun-24	51.2	1,808
Jun-25	51.2	1,808
Jun-26	51.3	1,812
Jun-27	51.3	1,812
Jun-28	51.3	1,812
Jun-29	51.7	1,826
Jun-30	49.4	1,745
Jul-01	50.1	1,769
Jul-02	49.5	1,748
Jul-03	49.6	1,752
Jul-04	49.6	1,752
Jul-05	49.7	1,755
Jul-06	97.9	3,457
Jul-07	227.7	8,041
Jul-08	227.5	8,034
Jul-09	302.9	10,697
Jul-10	453.2	16,005
Jul-11	14.2	501
Jul-12	309.9	10,944
Jul-13	80.4	2,839
Jul-14	264.4	9,337
Jul-15	307.6	10,863
Jul-16	452.0	15,962
Jul-17	453.0	15,998
Jul-18	159.0	5,615
Jul-19	452.5	15,980
Jul-20	451.3	15,938
Jul-21	281.2	9,931
Jul-22	99.0	3,496
Jul-23	283.1	9,998
Jul-24	282.7	9,984
Jul-25	282.1	9,962
Jul-26	281.6	9,945
Jul-27	281.1	9,927
Jul-28	255.1	9,009
Jul-29	280.1	9,892
Jul-30	279.6	9,874

Table 1 (continued)
Observed Skins Lake Spillway Releases and Flows in Nechako River Below Cheslatta Falls
1998/2000 Water Year (April 1, 1998 to March 31, 1999)

Note: Records are preliminary WSC data

Date 1998/1999	Skins Lake Spillway Release		Nechako R. Below Cheslatta Falls	
	(m³/s)	(cfs)	(m³/s)	(cfs)
Jul-31	279.1	9,856	293.0	10,347
Aug-01	278.6	9,839	294.0	10,383
Aug-02	277.8	9,811	295.0	10,418
Aug-03	277.3	9,793	296.0	10,453
Aug-04	280.7	9,913	297.0	10,489
Aug-05	283.2	10,001	299.0	10,559
Aug-06	195.4	6,901	300.0	10,595
Aug-07	14.8	523	284.0	10,029
Aug-08	14.8	523	245.0	8,652
Aug-09	14.8	523	209.0	7,381
Aug-10	117.7	4,157	180.0	6,357
Aug-11	170.5	6,021	165.0	5,827
Aug-12	170.4	6,018	164.0	5,792
Aug-13	264.5	9,341	165.0	5,827
Aug-14	299.4	10,573	184.0	6,498
Aug-15	65.0	2,295	202.0	7,134
Aug-16	171.2	6,046	186.0	6,569
Aug-17	114.1	4,029	181.0	6,392
Aug-18	14.7	519	172.0	6,074
Aug-19	14.7	519	152.0	5,368
Aug-20	14.7	519	133.0	4,697
Aug-21	14.7	519	118.0	4,167
Aug-22	14.7	519	106.0	3,743
Aug-23	14.7	519	95.1	3,358
Aug-24	14.7	519	84.0	2,966
Aug-25	14.7	519	74.1	2,617
Aug-26	14.7	519	66.5	2,348
Aug-27	14.7	519	61.1	2,158
Aug-28	14.7	519	55.3	1,953
Aug-29	14.7	519	51.4	1,815
Aug-30	14.7	519	48.0	1,695
Aug-31	14.7	519	44.7	1,579
Sep-01	14.6	516	43.4	1,533
Sep-02	19.6	692	40.8	1,441
Sep-03	29.5	1,042	37.9	1,338
Sep-04	29.4	1,038	35.8	1,264
Sep-05	29.4	1,038	34.4	1,215
Sep-06	29.4	1,038	33.2	1,172
Sep-07	29.4	1,038	32.6	1,151
Sep-08	29.4	1,038	32.2	1,137

Table 1 (continued)
Observed Skins Lake Spillway Releases and Flows in Nechako River Below Cheslatta Falls
1998/1999 Water Year (April 1, 1998 to March 31, 1999)

Note: Records are preliminary WSC data

Date 1998/1999	Skins Lake Spillway Release (m³/s)	Nechako R. Below Cheslatta Falls (m³/s)	Nechako R. Below Cheslatta Falls (cfs)
Sep-09	29.4	1,038	31.6
Sep-10	29.4	1,038	31.4
Sep-11	29.4	1,038	31.2
Sep-12	29.4	1,038	30.7
Sep-13	29.4	1,038	30.3
Sep-14	29.4	1,038	30.1
Sep-15	29.3	1,035	29.8
Sep-16	29.3	1,035	29.5
Sep-17	30.2	1,067	29.0
Sep-18	39.8	1,406	28.3
Sep-19	56.7	2,002	28.5
Sep-20	43.4	1,533	28.8
Sep-21	30.2	1,067	29.9
Sep-22	30.2	1,067	30.5
Sep-23	30.2	1,067	30.5
Sep-24	30.2	1,067	30.5
Sep-25	30.1	1,063	30.4
Sep-26	30.1	1,063	30.3
Sep-27	30.1	1,063	30.3
Sep-28	30.1	1,063	30.1
Sep-29	30.0	1,059	29.8
Sep-30	30.0	1,059	29.4
Oct-01	30.0	1,059	29.4
Oct-02	30.0	1,059	29.6
Oct-03	30.0	1,059	29.7 A 1,049
Oct-04	30.0	1,059	
Oct-05	29.9	1,056	
Oct-06	30.0	1,059	
Oct-07	30.1	1,063	
Oct-08	30.1	1,063	
Oct-09	30.1	1,063	
Oct-10	30.1	1,063	
Oct-11	30.1	1,063	
Oct-12	30.1	1,063	
Oct-13	30.1	1,063	
Oct-14	30.1	1,063	
Oct-15	30.1	1,063	
Oct-16	30.1	1,063	
Oct-17	30.1	1,063	
Oct-18	30.1	1,063	
Oct-19	30.1	1,063	28.6 1,010

Table 1 (continued)

Observed Skins Lake Spillway Releases and Flows in Nechako River Below Cheslatta Falls
1998/1999 Water Year (April 1, 1998 to March 31, 1999)

Note: Records are preliminary WSC data

Date 1998/1999	Skins Lake Spillway Release (m ³ /s)	Nechako R. Below Cheslatta Falls (m ³ /s)	Nechako R. Below Cheslatta Falls (cfs)
Oct-20	30.0	1,059	28.7
Oct-21	30.0	1,059	28.7
Oct-22	30.0	1,059	28.7
Oct-23	30.0	1,059	28.7
Oct-24	30.0	1,059	28.7
Oct-25	30.0	1,059	28.8
Oct-26	30.0	1,059	28.8
Oct-27	30.0	1,059	28.8
Oct-28	30.0	1,059	28.8
Oct-29	30.0	1,059	28.8
Oct-30	30.0	1,059	28.9
Oct-31	30.0	1,059	29.1
Nov-01	30.0	1,059	29.2
Nov-02	30.0	1,059	29.0
Nov-03	30.0	1,059	28.7
Nov-04	29.9	1,056	28.8
Nov-05	29.9	1,056	28.9
Nov-06	29.9	1,056	29.0
Nov-07	29.9	1,056	29.1
Nov-08	29.9	1,056	29.1
Nov-09	29.9	1,056	29.1
Nov-10	29.8	1,052	29.1
Nov-11	29.8	1,052	29.5
Nov-12	29.8	1,052	29.6
Nov-13	29.8	1,052	29.7
Nov-14	29.8	1,052	29.8
Nov-15	29.8	1,052	29.9
Nov-16	29.8	1,052	29.9
Nov-17	29.8	1,052	29.8
Nov-18	29.7	1,049	29.7
Nov-19	29.7	1,049	29.5
Nov-20	29.7	1,049	29.2
Nov-21	29.7	1,049	29.1
Nov-22	29.7	1,049	29.0
Nov-23	29.6	1,045	28.9
Nov-24	29.6	1,045	28.9
Nov-25	29.6	1,045	28.9
Nov-26	29.6	1,045	28.8
Nov-27	30.2	1,067	28.8
Nov-28	30.6	1,081	28.5
Nov-29	30.5	1,077	28.4

Table 1 (continued)
Observed Skins Lake Spillway Releases and Flows in Nechako River Below Cheslatta Falls
1998/1999 Water Year (April 1, 1998 to March 31, 1999)

Note: Records are preliminary WSC data

Date 1998/1999	Skins Lake Spillway Release (m ³ /s)	Nechako R. Below Cheslatta Falls (cfs)
Nov-30	30.5	1,077
Dec-01	30.4	1,074
Dec-02	30.4	1,074
Dec-03	30.4	1,074
Dec-04	30.4	1,074
Dec-05	30.4	1,074
Dec-06	30.3	1,070
Dec-07	30.3	1,070
Dec-08	30.3	1,070
Dec-09	30.3	1,070
Dec-10	30.3	1,070
Dec-11	30.3	1,070
Dec-12	30.3	1,070
Dec-13	30.2	1,067
Dec-14	30.2	1,067
Dec-15	30.2	1,067
Dec-16	30.2	1,067
Dec-17	30.2	1,067
Dec-18	30.2	1,067
Dec-19	30.2	1,067
Dec-20	30.2	1,067
Dec-21	30.2	1,067
Dec-22	30.1	1,063
Dec-23	30.1	1,063
Dec-24	30.1	1,063
Dec-25	30.1	1,063
Dec-26	30.1	1,063
Dec-27	30.1	1,063
Dec-28	30.1	1,063
Dec-29	30.1	1,063
Dec-30	30.0	1,059
Dec-31	30.0	1,059
Jan-01	30.0	1,059
Jan-02	30.0	1,059
Jan-03	30.0	1,059
Jan-04	30.0	1,059
Jan-05	30.0	1,059
Jan-06	30.0	1,059
Jan-07	29.9	1,056
Jan-08	29.9	1,056
Jan-09	29.9	1,056

Table 1 (continued)
Observed Skins Lake Spillway Releases and Flows in Nechako River Below Cheslatta Falls
1998/1999 Water Year (April 1, 1998 to March 31, 1999)

Note: Records are preliminary WSC data

Date 1998/1999	Skins Lake Spillway Release (m ³ /s)	Nechako R. Below Cheslatta Falls (m ³ /s)	(cfs)
Jan-10	29.9	32.0	1,130
Jan-11	29.9	32.3	1,141
Jan-12	29.9	32.3	1,141
Jan-13	29.9	32.0	1,130
Jan-14	29.9	31.8	1,123
Jan-15	29.8	31.8	1,123
Jan-16	29.8	31.8	1,123
Jan-17	29.8	31.8	1,123
Jan-18	29.8	31.8	1,123
Jan-19	29.8	31.4	1,109
Jan-20	29.7	31.4	1,109
Jan-21	29.7	31.4	1,109
Jan-22	29.7	31.7	1,119
Jan-23	29.7	32.6	1,151
Jan-24	29.7	32.6	1,151
Jan-25	29.7	32.3	1,141
Jan-26	29.7	32.3	1,141
Jan-27	29.7	31.7	1,119
Jan-28	29.6	31.5	1,112
Jan-29	29.6	31.5	1,112
Jan-30	29.6	32.6	1,151
Jan-31	29.6	32.0	1,130
Feb-01	29.6	32.0	1,130
Feb-02	29.6	32.0	1,130
Feb-03	29.6	32.0	1,130
Feb-04	29.6	32.0	1,130
Feb-05	29.5	31.4	1,109
Feb-06	29.5	31.0	1,095
Feb-07	29.5	31.2	1,102
Feb-08	29.5	31.4	1,109
Feb-09	29.5	34.7	1,225
Feb-10	29.5	37.5	1,324
Feb-11	29.4	31.4	1,109
Feb-12	29.5	31.1	1,098
Feb-13	29.5	31.1	1,098
Feb-14	29.4	30.8	1,088
Feb-15	29.4	33.0	1,165
Feb-16	29.4	31.1	1,098
Feb-17	29.4	31.1	1,098
Feb-18	29.4	31.1	1,098
Feb-19	29.4	31.1	1,098

Table 1 (continued)
Observed Skins Lake Spillway Releases and Flows in Nechako River Below Cheslatta Falls
1998/1999 Water Year (April 1, 1998 to March 31, 1999)

Note: Records are preliminary WSC data

Date 1998/1999	Skins Lake Spillway Release		Nechako R. Below Cheslatta Falls	
	(m³/s)	(cfs)	(m³/s)	(cfs)
Feb-20	29.3	1,035	31.1	1,098
Feb-21	29.3	1,035	31.1	1,098
Feb-22	29.3	1,035	30.8	1,088
Feb-23	29.3	1,035	30.6	1,081
Feb-24	29.3	1,035	30.5	1,077
Feb-25	29.3	1,035	30.6	1,081
Feb-26	29.2	1,031	31.0	1,095
Feb-27	29.2	1,031	31.1	1,098
Feb-28	29.2	1,031	31.1	1,098
Mar-01	29.2	1,031	31.1	1,098
Mar-02	29.5	1,042	31.1	1,098
Mar-03	30.1	1,063	31.1	1,098
Mar-04	30.1	1,063	31.1	1,098
Mar-05	30.1	1,063	31.1	1,098
Mar-06	30.1	1,063	31.4	1,109
Mar-07	30.0	1,059	31.8	1,123
Mar-08	30.0	1,059	31.8	1,123
Mar-09	30.0	1,059	31.8	1,123
Mar-10	30.0	1,059	31.8	1,123
Mar-11	29.9	1,056	31.8	1,123
Mar-12	29.9	1,056	31.5	1,112
Mar-13	29.9	1,056	31.1	1,098
Mar-14	29.9	1,056	31.5	1,112
Mar-15	29.9	1,056	31.7	1,119
Mar-16	29.8	1,052	31.7	1,119
Mar-17	29.8	1,052	31.7	1,119
Mar-18	29.8	1,052	31.7	1,119
Mar-19	29.8	1,052	31.7	1,119
Mar-20	29.8	1,052	31.7	1,119
Mar-21	29.7	1,049	31.7	1,119
Mar-22	29.7	1,049	31.8	1,123
Mar-23	29.7	1,049	31.8	1,123
Mar-24	29.7	1,049	31.8	1,123
Mar-25	29.7	1,049	32.0	1,130
Mar-26	29.6	1,045	32.0	1,130
Mar-27	29.6	1,045	32.0	1,130
Mar-28	29.6	1,045	32.0	1,130
Mar-29	29.6	1,045	32.0	1,130
Mar-30	29.6	1,045	32.1	1,134
Mar-31	29.6	1,045	32.4	1,144
Mean Annual	59.5	2,100	64.1	2,171
A-Manual Gauge	B-Ice Conditions		E-Estimated	