

INTERNATIONAL KOOTENAY LAKE BOARD OF CONTROL

2003 Annual Report to the International Joint Commission



201 – 401 Burrard Street
Vancouver, BC V6C 3S5
Canada

4735 East Marginal Way South
Seattle, Washington 98134-2385
U.S.A

Summary

Throughout 2003, the Applicant, Aquila Networks Canada, regulated the level of Kootenay Lake below the maximum prescribed limits according to the 1938 Kootenay Lake Order with the exception of one minor exceedance (not considered a violation) that occurred immediately prior to the commencement of spring rise. The maximum instantaneous water level for the lake at Queens Bay was observed at 07:15 PST on June 19th at elevation 533.090 metres¹ (1748.98 feet). The minimum instantaneous water level was observed at 08:00 PST on March 12th at elevation 529.994 metres (1738.83 feet). Kootenay Lake discharged 20.8 cubic kilometres (16.9 million acre-feet) of water in 2003, with an average flow of 660 cubic metres per second (23,300 cubic feet per second).

The Board and the Applicant jointly determined the commencement of the spring rise to be 00:00 PST on April 25th.

At the request of the Commission, the Board provided advice on appropriate water level targets for Duck Lake to prevent unduly low winter levels. The Commission incorporated this advice into a 2003 Supplementary Order for Duck Lake. The Board also provided extensive advice to the Commission for its review of the 1949, 1950, 1956 and 1970 Duck Lake Orders.

The discharge control works at the outlet of Duck Lake were operated during the year largely in accordance with the terms and conditions of the 1950, 1956 and 1970 Orders, and the 2003 Supplementary Order of Approval. However, the outlet gates were not opened on the recession of the Kootenay freshet per Section 7 of the Order. As a result, the lake did not rise to the specified 1745 foot level until late in the year.

The Board held its annual business meeting and a public meeting in Creston, British Columbia, on September 11th. The minutes of those meetings were forwarded to IJC headquarters and are posted on the Kootenay Board web page. Following the public meeting, the Commission held a Public Hearing concerning the Duck Lake Orders.

The Commission terminated its Duck Lake Orders on December 9, 2003.

¹ All elevations are referred to G.S.C. 1928 datum.

2003 Annual Report

This Annual Report covers the operations of Aquila Networks Canada with respect to their management of the water level of Kootenay Lake by controlling discharge through and around Corra Linn Dam in accordance with requirements of the Order of the International Joint Commission dated November 11, 1938. [Aquila cooperates with BC Hydro, which also manages a lake level control structure—the Kootenay Canal Plant—at the lake’s outlet.] It also covers the operations of Creston Valley Wildlife Management Authority in controlling flow through the outlet works of Duck Lake in accordance with the Orders of the International Joint Commission dated October 12, 1950, April 3, 1956 and March 31, 1970, and the Supplementary Order of January 9, 2003.

Details leading up to the appointment of the Board by Order of the Commission dated November 11, 1938, are fully covered in the First Annual Report.

BOARD MEMBERSHIP

The Board members during 2003 were as follows:

for the United States,

Colonel Ralph Graves, District Engineer, Seattle District,
United States Army, Corps of Engineers, Seattle, Washington
January 1st to July 30th;

Colonel Debra M. Lewis, District Engineer, Seattle District,
United States Army, Corps of Engineers, Seattle, Washington
beginning July 31st ;

Ms. Kathy Peter, District Chief,
United States Geological Survey, Boise, Idaho;

and for Canada,

Mr. Kirk Johnstone, Manager, Aquatic and Atmospheric Sciences,
Environment Canada, Vancouver, British Columbia;

Mr. James Mattison, Executive Director,
Land and Water BC, Inc., Victoria, British Columbia.

**1938 KOOTENAY LAKE ORDER
SECTIONS 2(4) 2(5) AND 2(6)**

2(4) ...the Applicant shall be permitted to store water in the main body of Kootenay Lake to a maximum elevation of 1745.32, Geodetic Survey of Canada datum, 1928 adjustment (i.e. six feet above zero of the Nelson gauge), in accordance with the rule curve detailed in Sub-section (5).

(5) That after the high water of the spring and early summer flood and when the lake level at Nelson on its falling stage recedes to elevation 1743.32, Geodetic Survey of Canada datum, 1928 adjustment, the gates of the dam may be so operated as to retain it at said level until August 31st, and after said date, the level of the main body of the lake may be raised to elevation 1745.32, which shall be the maximum storage level until January 7, and thereafter it shall be lowered so that it shall not exceed elevation 1744 on February 1, elevation 1742.4 on March 1, and elevation 1739.32 (i.e. zero of the Nelson gauge) on or about April 1, except under extraordinary natural high inflow conditions, when sufficient gates shall be opened and remain open throughout such period of excess so as to lower the level of the main body of Kootenay Lake to the storage level at that time obtaining as above defined.

(6) ...throughout the period of flood flow in each and every year, (i.e. from the commencement of the spring rise in March or April until the level of the lake at Nelson returns to elevation 1743.32, Geodetic Survey of Canada, 1928 adjustment, on the falling stage), a sufficient number of gates and sluiceways of the dam shall be opened to provide, in conjunction with the flow through the turbines, for the lowering of the main body of Kootenay Lake ... by at least the amounts ... as follows:

Discharge from Kootenay Lake under original conditions (in second feet) [vs.] Amount of lowering to be affected on the main body of Kootenay Lake (in feet)

10,000.....	1.0
25,000.....	1.3
50,000.....	1.7
75,000.....	2.1
100,000.....	2.6
125,000.....	3.0
150,000.....	3.2
175,000.....	3.5
200,000.....	3.8
225,000.....	4.0

Aquila regulated the level of Kootenay Lake in accordance with the 1938 Order throughout 2003. The company maintained water levels below the upper prescribed limits except for the period April 18th to 24th immediately prior to the declaration of the commencement of spring rise. During that period of low water levels, the lake was under natural control at Grohman Narrows. This exceedance is not considered a violation of the Order. (The date selected to represent the commencement of spring rise is based on several factors, including the trend in water levels during the previous few days and the weather forecast for the coming days. The weather forecast this season did not indicate that a sustained rise to freshet was imminent until April 25th. Even after the declaration, snowmelt did not occur in earnest for another month.)

The maximum instantaneous water level of 533.090 metres (1748.98 feet) for the lake at Queens Bay was reached on June 19th at 07:15 PST. The minimum instantaneous water level was observed on March 12th, elevation 529.994 metres (1738.83 feet). The maximum daily mean outflow was 1,778 m³/s (62,800 cfs) on June 21st; the minimum was 289 m³/s (10,200 cfs) on March 11th. Relative to the 73-year period of record (1931 to 2003), this year's maximum water level ranked 50th highest, and the minimum ranked the 22nd lowest. Water levels in the lake have

**INTERNATIONAL KOOTENAY LAKE
BOARD OF CONTROL**

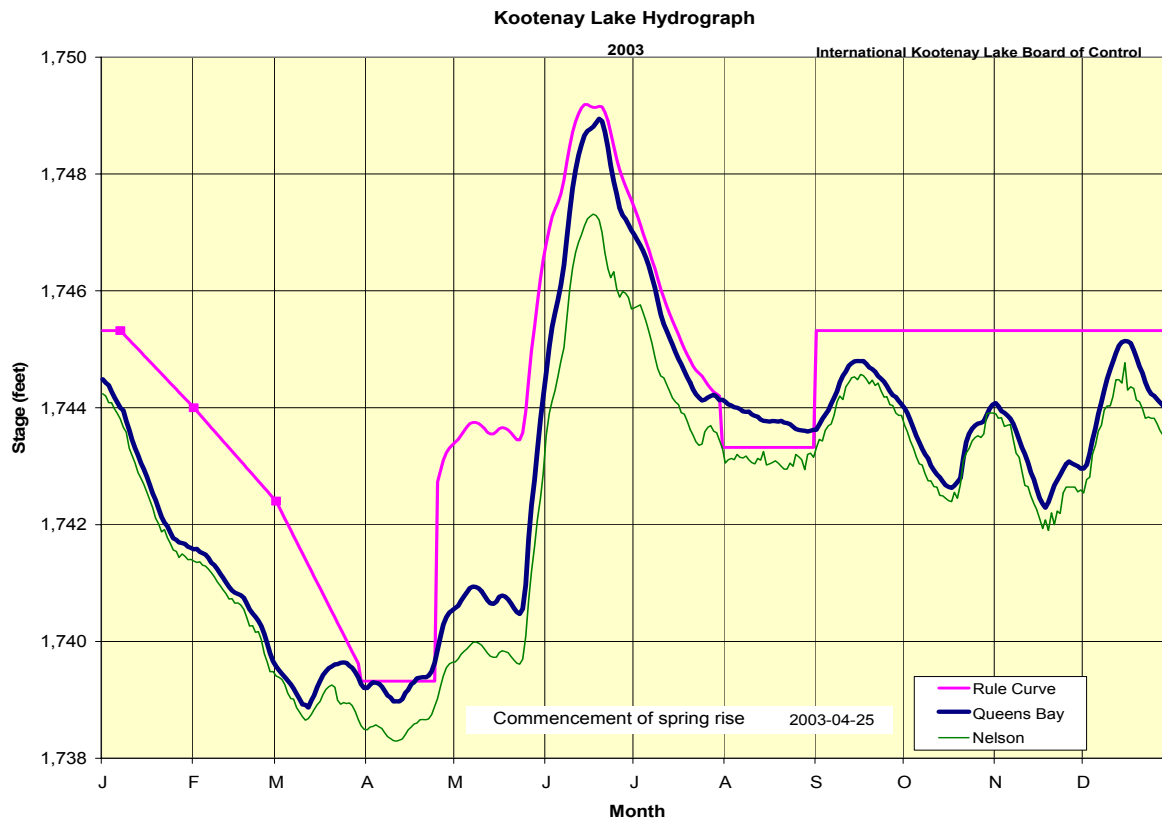
ranged from a high of 537.042 metres (1761.95 feet) in 1961 to a low of 529.563 metres (1737.41 feet) in 1944.

Kootenay Lake discharged 20.8 cubic kilometres (16.9 million acre-feet) of water this year through Corra Linn Dam and the Kootenay Canal Plant, with an average flow of 660 m³/s (23,300 cfs). Relative to the 66 years of available data, the annual volume of flow out of the lake was 50th highest and 16th lowest. Total lake outflow has ranged from a high of 33.8 km³ (27.4 million acre-feet) in 1954 to a low of 13.8 km³ (11.2 million acre-feet) in 1944.

The Board and the Applicant jointly determined the commencement of the spring rise to be 00:00 PST on April 25, 2003.

According to Section 6 of the 1938 Order, the Applicant is responsible for operating a water level gauge at Nelson, among other places. For the history of the gauge until July 29, 2003, Water Survey of Canada operated the gauge and produced the final annual record of daily mean water levels on behalf of the Applicant. This year, Aquila management decided that company staff would henceforth operate the Nelson gauge. As a result, commencing July 30th, water level records for the Nelson gauge reported to and by the Board represent those observed by the Applicant rather than Water Survey of Canada. Aquila has continued to supply the Board with complete records of the regulation of Kootenay Lake as affected by the operations of Corra Linn Dam and the Kootenay Canal Plant.

Attached hereto is a hydrograph showing observed water levels on Kootenay Lake and allowable elevations specified in the November 11, 1938 Order.



DUCK LAKE ORDERS

1950, 1956, and 1970 Orders extract

7. In years of low local spring supply to Duck Lake and when the level of the northerly portion of that Lake is not raised thereby to elevation 1745.0 or is not maintained at or above that elevation during the period when Kootenay Lake is discharging its flood waters, the Applicant or its successor shall, while Kootenay Lake is approaching elevation 1745.0 on its falling stage, open the gates in the Duck Lake outlet structure sufficiently to permit Duck Lake to rise to maximum of elevation 1745.0 and thereafter the gates may be closed until commencement of the storage drawdown period on or about January 7 of the following year.

8. The discharge control works at the outlet of Duck Lake shall be opened by the Applicant or its successor by the 7th day of January of each year and shall remain open during the Kootenay Lake storage drawdown period to permit the level of Duck Lake to recede with that of Kootenay Lake.

2003 Supplementary Order extract

Duck Lake gates are to be operated full open after 7 January 2003, except that gate discharge may be reduced to retain a maximum elevation of 1744 feet, until gates are closed after commencement of the spring rise... shall take effect on 6 February 2003



Commissioner Irene Brooks and Creston Valley Wildlife Management Authority's Brian Stushnoff discussing public concerns about the management of Duck Lake levels.

**INTERNATIONAL KOOTENAY LAKE
BOARD OF CONTROL**

In recent years, low winter and spring water levels on Duck Lake have raised concerns over potential detrimental effects on bass habitat. Having heard this concern from local residents at the 2002 public meeting of the Board, the Commission sought advice from the Board on a more appropriate winter water level regime for the lake. Based on this advice, the Commission decided to implement a supplementary Order concerning the winter drawdown of the lake. Rather than requiring the lake's outlet gates to be opened to lower the water level as much as possible in advance of spring rise, the Supplementary Order, dated January 9th, required the gates to be opened as usual, but allowed the Applicant to attenuate the drawdown to maintain a maximum level of 1744 feet if the Applicant deemed it necessary. This maximum applied until the commencement of spring rise.

With considerable manipulation of the outlet gates, the Applicant was able to bring the lake's level below 1744 feet by about the first of March, and successfully kept it at or below that level until the commencement of spring rise.

During the spring freshet, the lake only reached 1744.78 feet, slightly over two-tenths of a foot lower than the 1745 foot level minimum specified in Section 7 of the Order. The Applicant did not open the gates to allow further filling of the lake with the Kootenay River's freshet waters, as required by that Section. Nevertheless, the Applicant was able to open the gates for a short time in late September, and, together with local inflow, was able to bring the lake above 1745 feet.

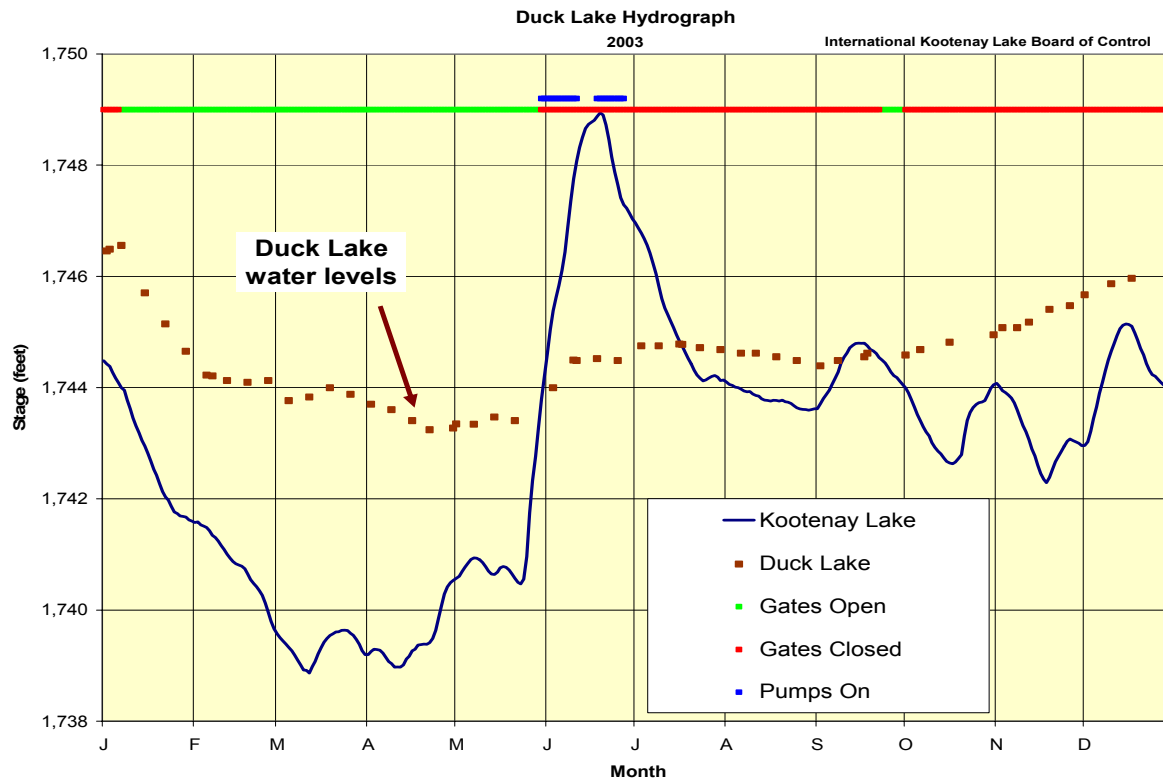
During 2003, the control gates were fully or partially open from January 7th to May 29th, and again from September 23rd to 30th. One pump was operated for the period May 30th to June 11th, and June 18th to 27th.

The elevation of Duck Lake was higher than that of Kootenay Lake at Queens Bay for most of the year except during the approximate periods May 31st to July 17th and September 8th to 21st.

A staff gauge was maintained in Duck Lake and gauge readings were obtained by the Creston Valley Wildlife Management Authority during the year in accordance with the IJC Order of Approval dated March 31, 1970. Water Survey of Canada monitored gauge readings.

Attached hereto is a hydrograph depicting the water levels observed on Duck Lake.

**INTERNATIONAL KOOTENAY LAKE
BOARD OF CONTROL**



As a result of the public concerns expressed about Duck Lake levels specified by the Orders, primarily related to the detrimental effect of low water levels on bass habitat, the Commission decided to review its Orders for Duck Lake. The Orders were originally written when the Commission had evidence (from the International Columbia River Engineering Board dated April 1, 1947) that the dykes surrounding Duck Lake had the rare potential during very high floods to back Kootenay River waters into Idaho. On June 16th, the Board advised the Commission that flood protection afforded by Libby Dam has effectively reduced this potential to near zero. Based on the public concerns and the Board's advice, on February 18, 2003, the Commission formally invited public comment on the Orders, and on July 29th Commissioner Brooks attended the area to undertake a preliminary investigation. Then, the Commission held a Public Hearing on September 11 during which the Commissioners received verbal submissions from interested parties. In light of both the public comments and the Board's advice, the Commission determined that it no longer had a basis for exercising jurisdiction over Duck Lake and decided, on December 9th, to terminate its Duck Lake Orders of August 6, 1949, October 12, 1950, April 3, 1956, and March 31, 1970. As such, this is the final report from this Board that will cover the operation of Duck Lake.