



PUBLIC UTILITY DISTRICT NO. 1 of CHELAN COUNTY
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February 28, 2013

VIA ELECTRONIC FILING

Honorable Kimberly D. Bose, Secretary
Nathaniel J. Davis, Sr., Deputy Secretary
FEDERAL ENERGY REGULATORY COMMISSION
888 First Street, NE
Washington, DC 20426

Re: **Lake Chelan Hydroelectric Project No. 637-022**
Article 405b – 2012 Annual Lake Level Report dated February 28, 2013

Dear Secretary Bose and Deputy Secretary Davis:

The Federal Energy Regulatory Commission (Commission) issued the “Order Modifying and Approving Operations Compliance and Monitoring Plan (Plan), Article 405” on November 30, 2007. The Plan satisfied the License Article 405 requirement of the “Order on Offer of Settlement and Issuing New License”¹ (License) and “Order on Rehearing”² for the Lake Chelan Hydroelectric Project (Project) on November 6, 2006, and April 19, 2007, respectively.

Under Ordering Paragraph (C) modifying the Plan under Article 405, Chelan PUD is required to file the following report with the Commission.

(C) The licensee shall file annually with the Commission by February 28, beginning in 2009, their Annual Lake Level Report. The licensee shall allow the resource agencies, Tribes and non-governmental organizations specified under Article 405, 30 days to provide comments and/or recommendations on their report before filing with the Commission. The filing shall include comments and/or recommendations from the consulted entities and the licensee’s response to any comments. If the licensee does not adopt a recommendation, the report shall include the licensee’s reasons, based on project-specific information. Based on review of the report, the Commission reserves the right to require changes to the project to ensure compliance with the license.

¹ 117 FERC ¶ 62,129

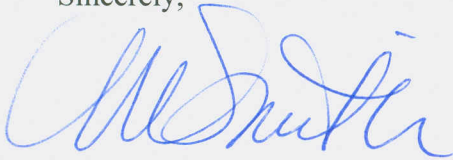
² 119 FERC ¶ 61,055

*Ms. Kimberly D. Bose, Secretary
Mr. Nathaniel J. Davis, Sr., Deputy Secretary
Federal Energy Regulatory Commission*

In accordance with the above Order requirement, Chelan PUD hereby files the 2012 Annual Lake Level Report dated February 28, 2013. This report compares monthly actual and minimum (target) lake levels; and runoff volume forecasts and other factors influencing achievement of targeted lake levels. A final draft of this report was provided to the resource agencies, Tribes and non-governmental organizations specified for 30-day review, which ended February 25.³ No comments were received.

Please do not hesitate to contact me or Waikele Frantz (509-661-4627) of my office regarding any questions or comments regarding this plan.

Sincerely,



Michelle Smith
Licensing and Compliance Manager
michelle.smith@chelanpud.org
(509) 661-4180

cc: Erich Gaedeke, FERC-PRO

Enclosure: Lake Chelan 2012 Annual Lake Level Report

³ This correspondence is available at the following Internet address:
http://www.chelanpud.org/departments/licensingCompliance/LC_implementation/corres/40039.pdf

**LAKE CHELAN
ANNUAL LAKE LEVEL REPORT
2012**

LICENSE ARTICLE 405

FINAL

**LAKE CHELAN HYDROELECTRIC PROJECT
FERC Project No. 637**

February 28, 2013



**Public Utility District No. 1 of Chelan County
Wenatchee, Washington**

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EXECUTIVE SUMMARY

Chelan PUD received a new license (License) from the Federal Energy Regulatory Commission (FERC)¹ on November 6, 2006, authorizing Chelan PUD to operate the Lake Chelan Project (Project) for a period of 50 years. License Article 405 requires Chelan PUD to annually file with FERC a report comparing monthly actual and minimum (target) lake levels; and runoff volume forecasts and other factors influencing achievement of minimum (target) lake levels.

The Project is operated to make every reasonable effort to meet seven operating objectives and to the extent practicable, obtain minimum (target) elevations May through October, within reasonable predictive probability. Lake level objectives and minimum (target) elevations in the Project License are intended to balance constraints for flood control, recreation, protection of fish resources, prevention of erosion, maintaining minimum flows in the Chelan River, and power generation.

During 2012, Chelan PUD managed lake levels as runoff forecasts evolved through winter and spring. Specifically, initial forecasts on February 1 and March 1 were 100% of average runoff. On April 1, runoff forecasts had increased to 120% of average. Actual runoff for April 1 – July 31 was 125% of average. Lake levels were successfully managed using generation and spill as defined in Chapter 8 of the Lake Chelan Comprehensive Plan².

The table below compares monthly actual and minimum (target) lake level elevations in September and October 2011 and May – October 2012. September and October 2011 are included because Chelan PUD manages lake levels following an annual Operating Cycle, generally beginning in September, which starts to release water from Lake Chelan to meet operating objectives and for power generation from September through March, and then refills Lake Chelan from April through July, with a target of reaching 1,098 feet on July 1.

Date	License Minimum (Target) Elevation (feet)	Actual Elevation (feet) (end-of-day values recorded at 2400 hrs)	Difference between Actual Elevation and Minimum (Target) Elevation
September 7, 2011	1098.7	1098.9	+0.2
October 1, 2011	1097.2	1097.5	+0.3
May 1, 2012	1087.6	1087.9	+0.3
June 1, 2012	1094.0	1094.4	+0.4
July 1, 2012	1098.0	1098.3	+0.3
August 1, 2012	1099.0	1099.9	+0.9
September 7, 2012	1098.7	1098.9	+0.2
October 1, 2012	1097.2	1097.4	+0.2

¹ Federal Energy Regulatory Commission Order on Offer of Settlement and Issuing New License and Order on Rehearing for the Lake Chelan Hydroelectric Project No. 637 were issued November 6, 2006, and April 19, 2007, respectively, to the Public Utility District No. 1 of Chelan County.

² Final Lake Chelan Comprehensive Settlement Agreement for the Lake Chelan Project No. 637, dated October 8, 2003.

SECTION 1: INTRODUCTION

The Lake Chelan Hydroelectric Project (Project) is owned and operated by Public Utility District No. 1 of Chelan County (Chelan PUD). Chelan PUD received a new license (License) from the Federal Energy Regulatory Commission (FERC) on November 6, 2006, authorizing Chelan PUD to operate Lake Chelan dam and powerhouse for a period of 50 years. As part of normal operation of the Project, Chelan PUD withdraws water from Lake Chelan for power generation, which results in lake levels being lowered during the winter in order to make room for spring runoff, and refill during spring and early summer when inflows to Lake Chelan increase from melting snow. During the public process associated with relicensing the Project, Chelan PUD held a number of meetings and negotiating sessions with representatives of local property owners, resort owners and other stakeholders with an interest in the effect of the Project's operation on the timing of drawdown and refill of Lake Chelan. As a result of the negotiations, a set of priorities and schedule for lake level operations were developed and incorporated into a settlement agreement, which was signed by state and federal land and resource management agencies, the City of Chelan and other stakeholders. FERC included those lake level operating priorities and schedule into the License.

License Article 405 requires Chelan PUD to annually file with FERC a report comparing monthly actual and minimum (target) lake levels; and runoff volume forecasts and other factors influencing achievement of minimum (target) lake levels. The License sets a minimum lake level elevation of 1,079 feet and a maximum lake level elevation at 1,100 feet. Chelan PUD manages lake levels according to license operating objectives and for power generation. Typically, the lake is managed to refill April through July, with a target of reaching 1,098 feet on July 1 for recreation. Chelan PUD makes every reasonable effort to manage the lake level at full, between 1,098 – 1,100 feet above mean sea level, from July through early September to benefit recreational use of the lake. The degree to which water is released from the lake and the resulting annual minimum lake elevation is managed by Chelan PUD based on predicted inflow from rain and snowmelt. Chelan PUD monitors snowfall in the Lake Chelan runoff basin and predicts snowmelt runoff timing and volume on a monthly basis from December – August.

The License also establishes minimum (target) lake levels for the period from May 1 – October 1 that Chelan PUD will try to attain consistent with the license operating objectives for flood control, protection of fish resources and prevention of erosion. Chelan PUD manages power generation and spill to reach lake level minimum (targets) by using runoff volume and precipitation forecasts, past experience with runoff timing and actual lake levels. This report of lake level operations documents available information and Chelan PUD's decisions regarding operation of the powerhouse for lake level management and attainment of minimum (target) lake levels beginning September 2011 (beginning of the annual Operating Cycle) through October 2012.

SECTION 2: LAKE CHELAN LAKE LEVELS, INFLOWS AND OUTFLOWS

Chelan PUD operates Lake Chelan lake elevations per License Article 302 and 405 to meet FERC required minimum (1,079 feet) and maximum (1,100 feet) water level elevations. Lake level objectives in the Project License include monthly minimum (target) lake levels for May 1 through October 1, which are intended to balance the needs of recreation, erosion, and fish protection (Table 2-1 below). Chelan PUD manages lake levels based on monitoring of snowpack water content, lake level, and projected precipitation and runoff timing. As stated in License Articles 302 and 405, monthly minimum (target) lake elevations are managed with the following objectives in mind:

- Maintaining minimum flows in the Chelan River (this objective has priority over lake levels);
- Reducing high flows in the Chelan River (this objective has priority over lake levels);
- Satisfying regulatory requirements for flood control (adjusting lake level);
- Providing usable lake levels for recreation (which varies between elevation 1,090 feet and 1,098 feet, depending on the slope of the shoreline and boat dock configurations);
- Reduce shoreline erosion;
- Preventing fish passage blockages (due to tributary barriers); and
- Minimizing the effect of refill on attainment of flow objectives for salmon in the mainstem Columbia River.

2.1 Lake Levels – Actual Compared to Minimum (Targets)

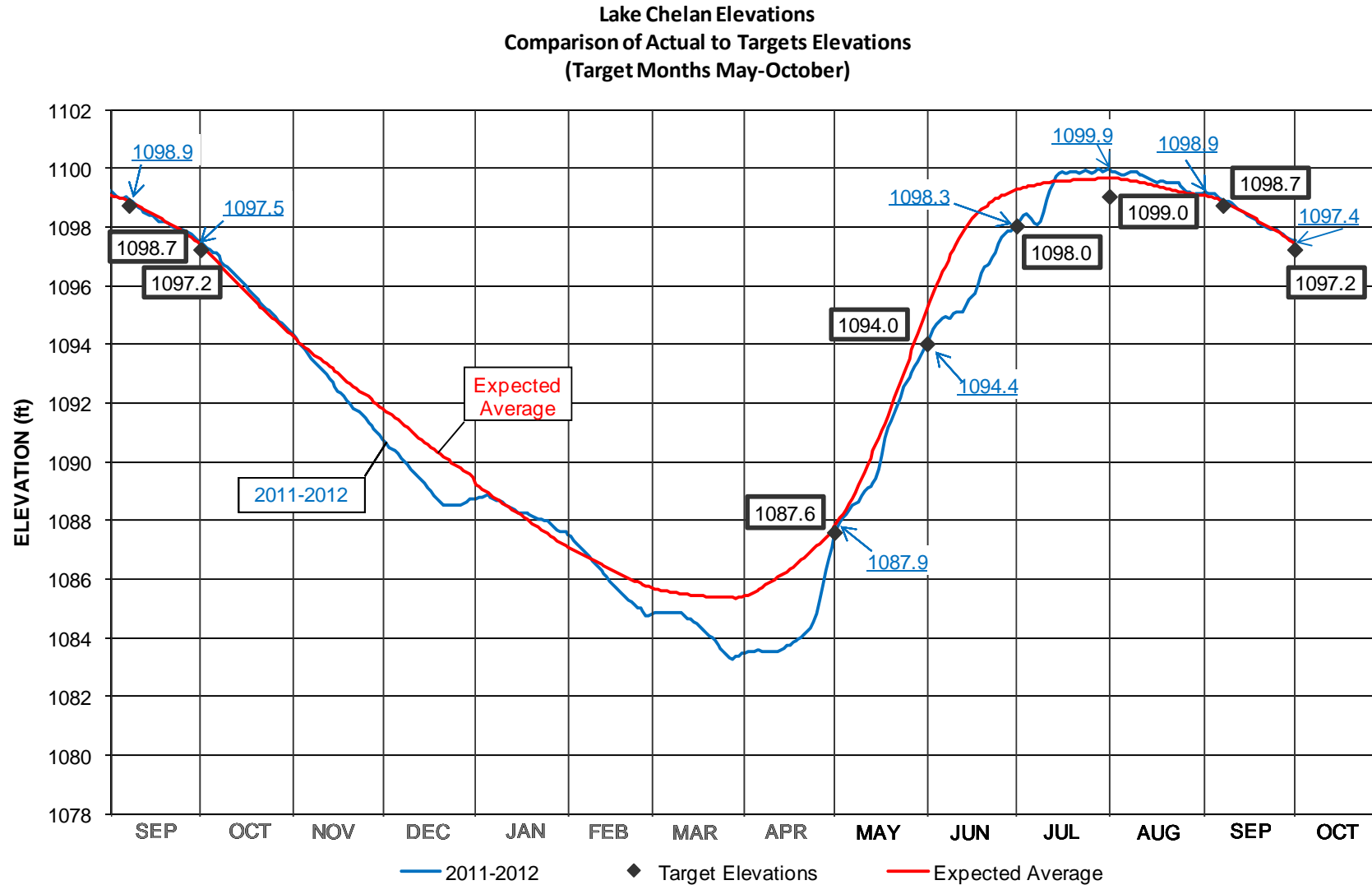
Table 2-1 shows the minimum (target) elevations contained in the project license compared to actual elevations in September and October 2011 and May – October 2012. September and October 2011 are included because Chelan PUD manages lake levels following an annual Operating Cycle, generally beginning in September, which starts to release water from Lake Chelan to meet operating objectives and for power generation from September through March, and then refills Lake Chelan from April through July, with a target of reaching 1,098 feet on July 1.

Figure 2-1 provides a graph showing daily average lake levels, with the elevation at the target dates highlighted.

Table 2-1 Comparison of Actual (end-of-day values, recorded at 2400 hrs) and Minimum (Target) Elevations.

Date	License Minimum (Target) Elevation (feet)	2012 Actual Elevations (feet)	Difference between Actual Elevation and Minimum (Target) Elevation
September 7, 2011	1098.7	1098.9	+0.2
October 1, 2011	1097.2	1097.5	+0.3
May 1, 2012	1087.6	1087.9	+0.3
June 1, 2012	1094.0	1094.4	+0.4
July 1, 2012	1098.0	1098.3	+0.3
August 1, 2012	1099.0	1099.9	+0.9
September 7, 2012	1098.7	1098.9	+0.2
October 1, 2012	1097.2	1097.4	+0.2

Figure 2-1. Lake Chelan Daily Surface Elevations (end-of-day values) in 2011-2012 compared to License Minimum (Target) Elevations and Expected Average Elevations.



2.2 Lake Chelan Inflows and Outflows

The total inflow of water into Lake Chelan is not measured directly due to a number of small tributaries that are not gauged for flow. The principal tributary, the Stehekin River, is gauged and flow information is published by the United States Geological Survey (USGS). Daily average inflow to Lake Chelan can be estimated from calculations using the daily change in lake level, measured powerhouse discharge, and calculated spillway discharge. These calculations are subject to error due to lake level fluctuations from Seiche events caused by down lake winds or from differences in barometric pressure between the upper and lower lake. This measurement variability and unmeasured irrigation and municipal water withdrawals from the lake result in calculated inflows being imprecise and fluctuating from day to day, even resulting in negative values at times. Daily inflow estimates reported here have been smoothed using a five-day moving average of inflow estimates, which results in a time lag between the estimate and sudden changes in inflows due to weather events. The value of these inflow estimates is to document how lake level management is affected by storm events and inflow variability from timing of snowmelt runoff events.

Outflows from the Project's operations are measured at the powerhouse turbines and calculated from the spillway gate openings and low level outlet. These outflows are tabulated as hourly averages at the end of each hour. Daily average flows are the average of each hourly flow from the hour ending at 0100 through the hour ending at 2400. Hourly flow data is available from Chelan PUD and spreadsheet tabulations of hourly outflow are available on the Chelan PUD web site. A tabulation of average daily outflows, estimated inflow and average daily lake levels is presented in Appendix A. In addition, daily average lake levels from the USGS gauge at Lakeside and Stehekin River flows are provided in this tabulation.

SECTION 3: SUMMARY OF LAKE LEVEL MANAGEMENT DECISIONS

Chelan PUD controls the drafting and refilling of Lake Chelan with the aid of several snow monitoring locations that are used to predict total volume of snowmelt inflows and, in combination with weather forecasts, potential near-term changes in the timing of that snowmelt. Predicted snowfall from the National Weather Service and other sources is used to forewarn of potential limits to the amount of water that can be drafted from Lake Chelan for power generation, while still assuring that refill will occur by the summer recreation season. As the winter progresses, runoff volume forecasts specific to the Lake Chelan basin become available to predict the volume that can be withdrawn from the lake for generation. When snowfall is predicted to be low, Chelan PUD reduces or curtails withdrawals from the lake. As an example, during the drought winter of 2000-2001, Chelan PUD curtailed generation in late December of 2000 and did not draft any significant amounts of water from the lake until the following April, when the runoff forecast indicated that lake refill was reasonably expected. In a more typical year with average or low snowfall, reductions in powerhouse operations may take place in the late winter or spring.

In most years, except those with drought conditions or late runoff, Chelan PUD operates the powerhouse throughout the winter and spring while monitoring lake levels and the condition of the snow pack to determine a lake level management strategy. This strategy is designed to spill water within parameters necessary to address flood control and to prevent high spill events which could cause extensive erosion in the Chelan River. Protection of recently constructed fish habitat in the Chelan River was, and will continue to be, a primary factor in managing the spill of excess water through the term of the License.

Chelan PUD is currently implementing a hydropower system simulation model (CHEOPS) developed specifically for managing Lake Chelan lake level operations. The CHEOPS model uses historical information to provide a predictive tool for making operating decision based upon the entire data set of Lake Chelan hydrologic variables that Chelan PUD began collecting in 1952. Each year, the simulation model, in conjunction with professional experience, and actual hydrologic behavior of the lake environment provides the best available basis for balancing license objectives and the likelihood of being within reasonable predictive probability of meeting monthly lake elevation minimum (targets³). In some years, minimum (target) elevations during refill are affected by late runoff and therefore met as soon as practicable so as not to interfere with meeting the other objectives.

3.1 Runoff Forecasts

April 1 through July 31, 2012 Runoff Forecasts for the Chelan Basin were produced on February 1, March 1, and April 1 of 2012. The February and March forecasts predicted average runoff volume, while the April forecast predicted higher than average runoff volume. Runoff volume forecasts, lake level and volume required to refill are shown below in Table 3-1.

Actual runoff for April 1 – July 31 was 125% of average. Lake levels were successfully managed using generation and spill as defined in Chapter 8 of the Lake Chelan Comprehensive Plan.

³ Section 3.1, Final Lake Chelan Comprehensive Settlement Agreement for the Lake Chelan Project No. 637, dated October 8, 2003.

Table 3-1. Runoff Volume Forecasts for April – July 2012

Date	Forecasted Runoff Volume (SFD)	Forecasted Percent of Average Runoff	Actual Lake Elevation (feet) (end-of-day values, recorded at 2400 hrs)	Feet Above/Below Average (period of record 1952-1995)	Volume to Refill to 1,100 ft (SFD)
February 1	525,100	100%	1087.5	+0.4	205,146
March 1	525,100	100%	1084.9	-0.8	247,816
April 1	630,120	120%	1083.5	-1.9	270,792

3.2 Decisions Related To Objectives

As stated previously, the February and March forecasts predicted average runoff volume, while the April forecast predicted higher than average runoff volume. Chelan PUD managed Lake Chelan through winter and spring with the intent of meeting license objectives and minimum (target) elevations. Although the runoff timing was late, all actual monthly minimum (target) elevations were within the expected ranges required under the project license to meet license objectives.

Three primary lake level objectives, flood control, reducing high flows in the Chelan River, and providing useable lake levels for recreation influenced project operations March through June. Generation and spill were managed throughout the month of June to meet the July 1 minimum (target) of 1,098.0 feet. Chelan PUD began spilling on May 23 for 7 days, and again on June 31 through July 29 to manage the refill rate of Lake Chelan in order to meet license objectives, lake elevation minimum (targets), and protect fish habitat in the Chelan River. Further spill to manage lake levels occurred July 31- August 1. The August 1 minimum (target) elevation of 1,099.0 feet was met on July 10. Chelan River peak daily average flow was 6,057 cfs (spill plus low level outlet flow) on July 16.

Inflows continued to exceed powerhouse capacity through July and spill for lake level management was continued through August 1. Inflows generally declined through the remainder of August, with some lake storage drafted for generation during the latter half of August. The lake level was maintained at or above 1,099.0 feet through the month of August.

3.3 Public Outreach

Chelan PUD recognizes the importance of communicating with residents and property owners regarding plans for management of lake levels as operations change due to License requirements and runoff forecasts. During 2012, Chelan PUD held public meetings on February 27 and October 9, 2012, respectively, in Chelan to discuss how the lake level is managed to comply with the intent of the license requirements and the multiple objectives negotiated during the relicensing process. Additionally, Chelan PUD regularly publicized availability of its web page link for information related to lake levels, runoff forecasts and other information.

***APPENDIX A: DAILY AVERAGE LAKE CHELAN ELEVATIONS,
INFLOW AND OUTFLOW***

DAILY AVERAGE LAKE CHELAN ELEVATIONS, INFLOW AND OUTFLOW

Date	Chelan	USGS	Stehekin	Total ⁴	Powerhouse	Low Level Outlet Flow	Spill Gate Flow	Total Outflow
	PUD Lake Elevation (ft)	Lake Elevation (ft)	River Flow (cfs)	Estimated Inflow (cfs)	Turbine Flow (cfs)			
9/1/2011	1099.2	1099.2	885	1060	2349	84	0	2433
9/2/2011	1099.1	1099.1	787	731	2304	84	0	2388
9/3/2011	1099.0	1099.0	723	616	2264	84	0	2348
9/4/2011	1099.0	1099.0	668	830	867	84	0	951
9/5/2011	1099.0	1099.0	641	892	20	85	0	105
9/6/2011	1099.0	1099.0	648	1023	1763	84	0	1846
9/7/2011	1098.9	1098.9	653	1153	2397	84	0	2481
9/8/2011	1098.9	1098.9	714	1282	2393	83	0	2476
9/9/2011	1098.8	1098.8	837	1184	2393	83	0	2475
9/10/2011	1098.7	1098.7	909	1188	2390	83	0	2473
9/11/2011	1098.6	1098.6	962	1247	2387	250	0	2636
9/12/2011	1098.5	1098.5	959	1209	2395	226	0	2621
9/13/2011	1098.5	1098.5	884	1285	2400	84	0	2485
9/14/2011	1098.4	1098.4	755	1014	2208	84	0	2292
9/15/2011	1098.4	1098.4	668	883	1477	84	0	1561
9/16/2011	1098.3	1098.3	625	450	1557	84	0	1641
9/17/2011	1098.2	1098.2	505	680	1560	84	0	1644
9/18/2011	1098.2	1098.2	474	493	10	85	0	95
9/19/2011	1098.2	1098.2	540	552	1603	84	0	1687
9/20/2011	1098.1	1098.1	490	698	1598	84	0	1682
9/21/2011	1098.0	1098.1	440	911	1597	84	0	1680
9/22/2011	1098.0	1098.0	487	751	1729	84	0	1813
9/23/2011	1097.9	1098.0	772	859	1217	83	0	1300
9/24/2011	1097.9	1097.9	769	986	1184	237	0	1421
9/25/2011	1097.9	1097.9	681	1158	1240	352	0	1591
9/26/2011	1097.9	1097.9	798	1329	1473	236	0	1709
9/27/2011	1097.8	1097.9	1360	1225	2375	112	0	2487
9/28/2011	1097.8	1097.8	844	1196	2382	82	0	2464
9/29/2011	1097.6	1097.7	609	1222	2386	82	0	2468
9/30/2011	1097.6	1097.6	502	965	2380	83	0	2463
10/1/2011	1097.5	1097.5	588	842	2385	85	0	2470
10/2/2011	1097.4	1097.4	611	941	2382	85	0	2467
10/3/2011	1097.3	1097.3	606	1000	2318	85	0	2402
10/4/2011	1097.2	1097.2	605	1141	1973	85	0	2058
10/5/2011	1097.1	1097.2	537	1122	2393	85	0	2478
10/6/2011	1097.1	1097.1	468	925	2394	85	0	2478
10/7/2011	1097.0	1097.0	389	855	2400	85	0	2484
10/8/2011	1096.8	1096.8	370	770	2392	84	0	2476
10/9/2011	1096.7	1096.7	358	577	2397	84	0	2481
10/10/2011	1096.6	1096.6	355	643	2405	84	0	2489
10/11/2011	1096.5	1096.6	611	840	2397	83	0	2480
10/12/2011	1096.4	1096.5	626	831	2401	83	0	2484

⁴ The total estimated inflow is based on calculations from changes in lake water surface elevation, which is highly variable due to wind, measurement error and other factors. Thus, daily inflow estimates may be obviously too low (even negative, which is impossible) or too high when compared to the inflow from the Stehekin River. When the estimated inflow is averaged over a period of ten days or more, it is reasonably accurate and useful to determine the proportion of inflow coming from high elevation snow melt versus low elevation runoff and rainfall. Inflows in early spring typically have a high contribution from low elevation sources, whereas late summer and fall inflow is predominately from the Stehekin River.

DAILY AVERAGE LAKE CHELAN ELEVATIONS, INFLOW AND OUTFLOW

Date	Chelan	USGS	Stehekin	Total ⁴	Powerhouse	Low Level Outlet Flow (cfs)	Spill Gate Flow (cfs)	Total Outflow (cfs)
	PUD Lake Elevation (ft)	Lake Elevation (ft)	River Flow (cfs)	Estimated Inflow (cfs)	Turbine Flow (cfs)			
10/13/2011	1096.3	1096.3	501	821	2403	83	0	2486
10/14/2011	1096.2	1096.2	432	746	2401	102	0	2503
10/15/2011	1096.1	1096.1	381	632	2403	136	0	2539
10/16/2011	1096.0	1096.0	344	603	2405	136	0	2541
10/17/2011	1095.9	1095.9	308	598	2405	136	0	2541
10/18/2011	1095.7	1095.8	287	604	2408	135	0	2544
10/19/2011	1095.6	1095.6	270	572	2403	135	0	2538
10/20/2011	1095.5	1095.5	277	645	2410	110	0	2520
10/21/2011	1095.4	1095.4	310	832	2406	84	0	2490
10/22/2011	1095.3	1095.3	555	903	2409	83	0	2492
10/23/2011	1095.2	1095.2	1220	848	2403	83	0	2486
10/24/2011	1095.1	1095.2	871	869	2408	83	0	2491
10/25/2011	1095.0	1095.0	722	843	2298	82	0	2380
10/26/2011	1094.9	1094.9	599	723	2245	82	0	2328
10/27/2011	1094.8	1094.8	530	700	2415	82	0	2497
10/28/2011	1094.7	1094.7	503	705	2395	82	0	2478
10/29/2011	1094.6	1094.6	491	818	2410	82	0	2492
10/30/2011	1094.5	1094.5	569	856	2408	82	0	2490
10/31/2011	1094.4	1094.4	942	687	2413	83	0	2496
11/1/2011	1094.3	1094.3	736	670	2414	86	0	2500
11/2/2011	1094.2	1094.2	645	721	2413	85	0	2498
11/3/2011	1094.1	1094.1	605	526	2415	85	0	2501
11/4/2011	1094.0	1094.0	557	406	2418	85	0	2503
11/5/2011	1093.8	1093.8	521	435	2423	85	0	2508
11/6/2011	1093.7	1093.7	488	417	2416	84	0	2500
11/7/2011	1093.5	1093.5	481	356	2419	84	0	2503
11/8/2011	1093.4	1093.4	470	436	2419	84	0	2503
11/9/2011	1093.3	1093.3	455	542	2426	84	0	2510
11/10/2011	1093.2	1093.2	436	651	2420	83	0	2504
11/11/2011	1093.1	1093.1	447	602	2433	83	0	2516
11/12/2011	1093.0	1093.0	429	574	2418	83	0	2501
11/13/2011	1092.8	1092.9	420	383	2420	82	0	2502
11/14/2011	1092.7	1092.7	425	289	2430	81	0	2511
11/15/2011	1092.5	1092.6	398	442	2242	81	0	2323
11/16/2011	1092.4	1092.4	366	511	2429	81	0	2510
11/17/2011	1092.3	1092.4	330	485	2426	83	0	2508
11/18/2011	1092.2	1092.2	390	603	2444	84	0	2528
11/19/2011	1092.1	1092.1	357	613	2435	83	0	2518
11/20/2011	1092.0	1092.0	333	599	2424	83	0	2507
11/21/2011	1091.8	1091.8	338	813	2428	83	0	2510
11/22/2011	1091.8	1091.8	350	841	2433	82	0	2515
11/23/2011	1091.7	1091.7	400	1073	2432	82	0	2514
11/24/2011	1091.6	1091.6	443	992	2433	82	0	2515
11/25/2011	1091.5	1091.5	397	870	2430	82	0	2511
11/26/2011	1091.4	1091.4	371	634	2436	81	0	2517
11/27/2011	1091.2	1091.3	421	640	2438	81	0	2519
11/28/2011	1091.1	1091.1	473	507	2433	83	0	2516
11/29/2011	1091.0	1091.0	410	597	2441	84	0	2526
11/30/2011	1090.9		382	513	2438	84	0	2522
12/1/2011	1090.8		359	326	2440	84	0	2524

DAILY AVERAGE LAKE CHELAN ELEVATIONS, INFLOW AND OUTFLOW

Date	Chelan	USGS	Stehekin	Total ⁴	Powerhouse	Low Level Outlet Flow (cfs)	Spill Gate Flow (cfs)	Total Outflow (cfs)
	PUD Lake Elevation (ft)	Lake Elevation (ft)	River Flow (cfs)	Estimated Inflow (cfs)	Turbine Flow (cfs)			
12/2/2011	1090.6		345	348	2444	82	0	2526
12/3/2011	1090.5		330	305	1604	82	0	1686
12/4/2011	1090.4		318	349	1615	83	0	1699
12/5/2011	1090.4		305	345	1572	83	0	1655
12/6/2011	1090.3	1090.3	298	486	2319	82	0	2402
12/7/2011	1090.1	1090.1	294	453	2315	82	0	2398
12/8/2011	1090.0	1090.0	281	301	2318	82	0	2399
12/9/2011	1089.9	1089.9	261	244	2399	82	0	2481
12/10/2011	1089.8	1089.8	266	297	1648	83	0	1732
12/11/2011	1089.7	1089.7	266	309	1653	83	0	1735
12/12/2011	1089.6	1089.6	234	282	1606	83	0	1689
12/13/2011	1089.5	1089.5	218	444	2260	82	0	2343
12/14/2011	1089.4	1089.4	252	460	2296	83	0	2379
12/15/2011	1089.2	1089.3	237	405	2331	84	0	2415
12/16/2011	1089.1	1089.1	228	376	2333	84	0	2416
12/17/2011	1089.0	1089.0	224	386	2330	83	0	2413
12/18/2011	1088.9	1088.9	227	253	2331	83	0	2414
12/19/2011	1088.7	1088.8	225	48	2337	82	0	2419
12/20/2011	1088.6	1088.6	220	8	1728	82	0	1809
12/21/2011	1088.5	1088.6	216	0	469	83	0	551
12/22/2011	1088.5	1088.6	186	-5	457	83	0	540
12/23/2011	1088.5	1088.5	193	96	481	83	0	564
12/24/2011	1088.5	1088.5	217	286	254	83	0	337
12/25/2011	1088.5	1088.5	209	349	193	83	0	276
12/26/2011	1088.5	1088.5	197	543	171	83	0	254
12/27/2011	1088.5	1088.5	201	728	480	83	0	563
12/28/2011	1088.6	1088.6	310	1043	87	83	0	170
12/29/2011	1088.6	1088.7	501	1038	49	86	0	135
12/30/2011	1088.7	1088.8	432	958	46	84	0	130
12/31/2011	1088.8	1088.8	367	811	46	84	0	130
1/1/2012	1088.8	1088.8	320	689	50	84	0	134
1/2/2012	1088.8	1088.8	294	493	60	84	0	143
1/3/2012	1088.8	1088.8	277	788	50	84	0	134
1/4/2012	1088.9	1088.9	261	828	50	84	0	135
1/5/2012	1088.9	1088.9	339	841	1445	83	0	1528
1/6/2012	1088.8	1088.8	309	555	1449	83	0	1532
1/7/2012	1088.7	1088.7	285	678	1442	83	0	1525
1/8/2012	1088.7	1088.7	272	410	51	84	0	135
1/9/2012	1088.7	1088.7	266	408	1438	83	0	1521
1/10/2012	1088.6	1088.6	259	418	1350	83	0	1433
1/11/2012	1088.5	1088.6	233	609	1446	83	0	1529
1/12/2012	1088.5	1088.5	204	439	1443	83	0	1526
1/13/2012	1088.4	1088.4	208	161	1445	83	0	1528
1/14/2012	1088.4	1088.4	230	246	1440	83	0	1523
1/15/2012	1088.3	1088.3	212	245	79	83	0	162
1/16/2012	1088.3	1088.3	183	461	820	83	0	903
1/17/2012	1088.3	1088.3	203	557	829	83	0	912
1/18/2012	1088.2	1088.3	200	820	1278	82	0	1361
1/19/2012	1088.2	1088.2	190	946	1620	82	0	1702
1/20/2012	1088.1	1088.1	180	570	1618	83	0	1702

DAILY AVERAGE LAKE CHELAN ELEVATIONS, INFLOW AND OUTFLOW

Date	Chelan	USGS	Stehekin	Total ⁴	Powerhouse	Low Level Outlet Flow (cfs)	Spill Gate Flow (cfs)	Total Outflow (cfs)
	PUD Lake Elevation (ft)	Lake Elevation (ft)	River Flow (cfs)	Estimated Inflow (cfs)	Turbine Flow (cfs)			
1/21/2012	1088.1	1088.1	181	669	1617	84	0	1701
1/22/2012	1088.0	1088.1	180	631	48	85	0	133
1/23/2012	1088.0	1088.1	170	946	1690	84	0	1774
1/24/2012	1088.0	1088.0	170	826	1778	84	0	1862
1/25/2012	1088.0	1088.0	166	1094	1778	84	0	1861
1/26/2012	1087.9	1087.9	165	788	1735	84	0	1819
1/27/2012	1087.8	1087.8	167	423	1788	83	0	1871
1/28/2012	1087.7	1087.7	164	381	1765	83	0	1848
1/29/2012	1087.6	1087.6	260	425	45	84	0	129
1/30/2012	1087.6	1087.7	401	607	1612	83	0	1694
1/31/2012	1087.6	1087.6	366	805	1255	83	0	1337
2/1/2012	1087.5	1087.6	354	1060	2350	82	0	2432
2/2/2012	1087.4	1087.5	325	858	2325	82	0	2406
2/3/2012	1087.3	1087.3	309	756	2350	83	0	2433
2/4/2012	1087.2	1087.2	297	666	2351	83	0	2434
2/5/2012	1087.1	1087.1	286	540	2324	83	0	2407
2/6/2012	1087.0	1087.0	278	585	2343	82	0	2425
2/7/2012	1086.9	1086.9	270	559	2366	82	0	2448
2/8/2012	1086.7	1086.8	265	568	2358	82	0	2440
2/9/2012	1086.6	1086.6	257	614	2360	82	0	2443
2/10/2012	1086.5	1086.5	261	623	2370	82	0	2452
2/11/2012	1086.4	1086.4	261	610	2364	82	0	2446
2/12/2012	1086.3	1086.3	256	598	2362	81	0	2443
2/13/2012	1086.2	1086.2	250	607	2368	82	0	2451
2/14/2012	1086.1	1086.1	244	552	2363	83	0	2446
2/15/2012	1085.9	1086.0	235	520	2372	82	0	2454
2/16/2012	1085.8	1085.8	232	543	2370	82	0	2452
2/17/2012	1085.7	1085.7	225	605	2352	82	0	2434
2/18/2012	1085.6	1085.6	233	582	2298	83	0	2381
2/19/2012	1085.5	1085.5	224	586	2302	83	0	2385
2/20/2012	1085.4	1085.4	215	888	2307	82	0	2389
2/21/2012	1085.3	1085.3	290	903	2305	83	0	2388
2/22/2012	1085.2	1085.2	624	782	2300	84	0	2384
2/23/2012	1085.1	1085.2	515	1067	2310	84	0	2394
2/24/2012	1085.0	1085.1	469	1094	1626	84	0	1710
2/25/2012	1085.0	1085.0	449	501	2378	83	0	2461
2/26/2012	1084.9	1084.9	436	350	2306	82	0	2388
2/27/2012	1084.8	1084.8	410	488	734	83	0	817
2/28/2012	1084.8	1084.8	393	385	241	83	0	324
2/29/2012	1084.8	1084.8	384	362	209	83	0	293
3/1/2012	1084.9	1084.9	369	708	305	83	0	388
3/3/2012	1084.9	1084.9	358	873	624	83	0	707
3/4/2012	1084.9	1084.9	412	757	812	83	0	894
3/5/2012	1084.9	1084.9	504	749	814	83	0	896
3/6/2012	1084.9	1084.9	501	719	566	83	0	649
3/7/2012	1084.9	1084.9	472	757	481	83	0	564
3/8/2012	1084.9	1084.9	454	1014	480	83	0	563
3/9/2012	1084.9	1084.9	445	1009	867	83	0	950
3/10/2012	1084.9	1084.9	464	1073	2323	82	0	2405
3/11/2012	1084.8	1084.8	497	1328	2315	82	0	2398

DAILY AVERAGE LAKE CHELAN ELEVATIONS, INFLOW AND OUTFLOW

Date	Chelan	USGS	Stehekin	Total ⁴	Powerhouse	Low Level Outlet Flow (cfs)	Spill Gate Flow (cfs)	Total Outflow (cfs)
	PUD Lake Elevation (ft)	Lake Elevation (ft)	River Flow (cfs)	Estimated Inflow (cfs)	Turbine Flow (cfs)			
3/12/2012	1084.7	1084.7	503	1274	2352	82	0	2434
3/13/2012	1084.6	1084.6	475	1172	2386	83	0	2469
3/14/2012	1084.5	1084.5	458	1230	2400	83	0	2483
3/15/2012	1084.5	1084.5	458	1235	2396	83	0	2479
3/16/2012	1084.4	1084.4	437	1098	2404	84	0	2488
3/17/2012	1084.3	1084.3	425	1090	2383	85	0	2468
3/18/2012	1084.2	1084.2	403	954	2391	84	0	2475
3/19/2012	1084.1	1084.1	387	896	2399	83	0	2482
3/20/2012	1084.0	1084.0	389	848	2408	83	0	2491
3/21/2012	1083.9	1083.9	360	766	2413	82	0	2495
3/22/2012	1083.8	1083.8	350	743	2415	82	0	2497
3/23/2012	1083.7	1083.7	340	751	2416	82	0	2498
3/24/2012	1083.5	1083.6	332	543	2420	82	0	2502
3/25/2012	1083.4	1083.5	324	349	2413	82	0	2494
3/26/2012	1083.3	1083.4	325	590	1220	82	0	1301
3/27/2012	1083.3	1083.3	335	709	602	82	0	684
3/28/2012	1083.4	1083.3	375	927	664	82	0	746
3/29/2012	1083.4	1083.4	434	1295	792	82	0	874
3/30/2012	1083.5	1083.4	521	1616	792	83	0	874
3/31/2012	1083.5	1083.5	534	1433	786	83	0	868
4/1/2012	1083.5	1083.5	502	1361	788	83	0	871
4/2/2012	1083.5	1083.6	479	1358	793	83	0	875
4/3/2012	1083.5	1083.6	477	1202	792	83	0	875
4/4/2012	1083.6	1083.6	473	1032	1022	83	0	1105
4/5/2012	1083.6	1083.6	461	957	1085	83	0	1168
4/6/2012	1083.5	1083.6	456	950	1000	83	0	1082
4/7/2012	1083.5	1083.5	444	724	791	83	0	875
4/8/2012	1083.5	1083.5	442	750	789	85	0	874
4/9/2012	1083.5	1083.5	466	953	796	85	0	880
4/10/2012	1083.5	1083.5	558	1189	797	85	0	882
4/11/2012	1083.5	1083.6	689	1286	799	86	0	885
4/12/2012	1083.6	1083.6	897	1581	791	86	0	877
4/13/2012	1083.6	1083.6	1100	1673	788	86	0	874
4/14/2012	1083.7	1083.7	1170	1805	794	87	0	881
4/15/2012	1083.8	1083.8	1190	1764	797	87	0	884
4/16/2012	1083.8	1083.8	1300	1918	794	86	0	880
4/17/2012	1083.9	1083.9	1320	1785	798	85	0	883
4/18/2012	1084.0	1084.0	1320	2033	793	86	0	878
4/19/2012	1084.0	1084.0	1320	2153	799	86	0	885
4/20/2012	1084.1	1084.1	1770	2344	794	86	0	881
4/21/2012	1084.2	1084.2	2020	2556	797	87	0	883
4/22/2012	1084.3	1084.3	2140	3250	795	87	0	882
4/23/2012	1084.5	1084.5	3200	4153	243	89	0	332
4/24/2012	1084.8	1084.8	5140	5279	9	91	0	100
4/25/2012	1085.3	1085.3	5490	6433	10	93	0	103
4/26/2012	1085.8	1085.8	5680	7215	14	96	0	110
4/27/2012	1086.3	1086.3	4760	7350	10	97	0	107
4/28/2012	1086.7	1086.7	3810	6999	10	99	0	109
4/29/2012	1087.1	1087.1	3640	6648	10	100	0	110
4/30/2012	1087.4	1087.4	3780	6128	10	102	0	112

DAILY AVERAGE LAKE CHELAN ELEVATIONS, INFLOW AND OUTFLOW

Date	Chelan	USGS	Stehekin	Total ⁴	Powerhouse	Low Level Outlet Flow	Spill Gate Flow	Total Outflow
	PUD Lake Elevation (ft)	Lake Elevation (ft)	River Flow (cfs)	Estimated Inflow (cfs)	Turbine Flow (cfs)			
5/1/2012	1087.7	1087.7	3570	5519	818	316	0	1133
5/2/2012	1088.0	1088.0	3170	5050	1802	467	0	2269
5/3/2012	1088.1	1088.1	2920	4628	1694	473	0	2166
5/4/2012	1088.2	1088.2	2670	4143	809	453	0	1262
5/5/2012	1088.4	1088.4	2460	3724	104	421	0	525
5/6/2012	1088.5	1088.5	2330	3539	1614	421	0	2035
5/7/2012	1088.6	1088.6	2390	3689	2370	409	0	2778
5/8/2012	1088.6	1088.6	2850	4097	1834	391	0	2225
5/9/2012	1088.8	1088.8	3570	4160	570	393	0	963
5/10/2012	1089.0	1089.0	3260	4097	1867	394	0	2261
5/11/2012	1089.1	1089.1	2940	4304	2356	395	0	2751
5/12/2012	1089.2	1089.2	2870	4477	2349	395	0	2744
5/13/2012	1089.3	1089.3	3260	4921	2011	396	0	2407
5/14/2012	1089.4	1089.4	4500	6018	1980	397	0	2377
5/15/2012	1089.7	1089.7	6410	7361	2245	393	0	2639
5/16/2012	1090.2	1090.2	6880	8062	1691	393	0	2084
5/17/2012	1090.8	1090.8	6020	8330	392	396	0	788
5/18/2012	1091.2	1091.2	5000	7960	1190	399	0	1589
5/19/2012	1091.4	1091.4	4310	7197	1885	401	0	2286
5/20/2012	1091.7	1091.7	4100	6585	1415	403	0	1818
5/21/2012	1091.9	1091.9	4590	6602	1663	404	0	2067
5/22/2012	1092.2	1092.2	5630	6550	1560	407	0	1966
5/23/2012	1092.5	1092.5	4850	6412	1558	409	402	2369
5/24/2012	1092.7	1092.8	4130	6153	1846	410	619	2875
5/25/2012	1092.9	1092.9	3710	5824	1547	411	583	2540
5/26/2012	1093.0	1093.0	3610	5441	1947	412	249	2608
5/27/2012	1093.2	1093.2	3890	5375	1542	413	102	2057
5/28/2012	1093.4	1093.4	4400	5431	2282	414	102	2798
5/29/2012	1093.6	1093.6	4430	5612	1746	437	45	2228
5/30/2012	1093.8	1093.8	4030	6239	1834	459	0	2293
5/31/2012	1094.0	1094.0	4540	7176	2220	461	0	2681
6/1/2012	1094.2	1094.3	6050	7922	2268	463	1853	4583
6/2/2012	1094.5	1094.5	7200	8436	2284	464	3614	6362
6/3/2012	1094.7	1094.7	5930	8947	2283	466	3714	6463
6/4/2012	1094.8		4680	8647	2278	467	3759	6504
6/5/2012	1094.9		4530	7595	2273	468	3813	6553
6/6/2012	1094.9		4000	6538	1684	469	3842	5995
6/7/2012	1094.9	1094.9	3410	6030	2100	469	3589	6158
6/8/2012	1094.9	1094.9	2980	5260	804	277	3052	4132
6/9/2012	1095.0	1095.0	2700	4822	10	78	2994	3082
6/10/2012	1095.1	1095.1	2610	4571	10	77	3032	3120
6/11/2012	1095.1	1095.1	2840	5080	1838	78	3029	4944
6/12/2012	1095.1	1095.1	3560	5565	1085	77	2567	3730
6/13/2012	1095.3	1095.3	5240	5994	1414	78	2023	3514
6/14/2012	1095.5	1095.6	5130	6213	1519	78	2422	4019
6/15/2012	1095.7	1095.7	4150	7034	1560	78	3145	4783
6/16/2012	1095.8	1095.8	4360	7932	1093	78	3168	4340
6/17/2012	1096.0	1096.1	7270	8045	20	78	3240	3339
6/18/2012	1096.4	1096.5	6720	8072	1359	79	3218	4656
6/19/2012	1096.7	1096.7	5020	8120	1631	80	3169	4879

DAILY AVERAGE LAKE CHELAN ELEVATIONS, INFLOW AND OUTFLOW

Date	Chelan	USGS	Stehekin	Total ⁴	Powerhouse	Low Level Outlet Flow (cfs)	Spill Gate Flow (cfs)	Total Outflow (cfs)
	PUD Lake Elevation (ft)	Lake Elevation (ft)	River Flow (cfs)	Estimated Inflow (cfs)	Turbine Flow (cfs)			
6/20/2012	1096.7	1096.7	4340	8064	2296	80	3164	5540
6/21/2012	1096.8	1096.8	4720	7541	2293	80	3158	5530
6/22/2012	1096.9	1097.0	5590	7490	1640	80	3085	4804
6/23/2012	1097.1	1097.2	6220	7868	2275	80	3070	5426
6/24/2012	1097.4	1097.4	5640	7891	20	80	3124	3224
6/25/2012	1097.7	1097.7	4660	7564	1728	81	3165	4974
6/26/2012	1097.8	1097.8	4350	6935	1316	81	2876	4273
6/27/2012	1097.8	1097.8	3950	6598	2290	82	2711	5082
6/28/2012	1097.9	1097.9	4030	6305	2290	82	2717	5090
6/29/2012	1098.0	1098.0	4710	6758	2259	82	2729	5071
6/30/2012	1098.1	1098.1	5310	7243	2270	82	2968	5321
7/1/2012	1098.2	1098.2	6040	7659	1925	82	3732	5739
7/2/2012	1098.4	1098.4	5500	7625	2272	81	3844	6198
7/3/2012	1098.5	1098.5	5010	7342	1562	81	4453	6096
7/4/2012	1098.4	1098.4	4170	6706	2239	81	4912	7232
7/5/2012	1098.3	1098.3	3770	6093	2287	81	5368	7735
7/6/2012	1098.1	1098.1	4200	5964	2277	81	5598	7956
7/7/2012	1098.1	1098.1	5180	6489	2266	81	4136	6483
7/8/2012	1098.2	1098.2	6310	7269	2262	81	2557	4900
7/9/2012	1098.5	1098.5	7220	7868	1898	81	1435	3413
7/10/2012	1098.9	1098.9	6980	8166	1773	81	1138	2992
7/11/2012	1099.2	1099.2	5890	8574	2215	81	955	3251
7/12/2012	1099.5	1099.5	5760	8581	2255	81	963	3299
7/13/2012	1099.7	1099.7	6200	8440	2203	81	2505	4790
7/14/2012	1099.8	1099.9	6110	8172	2326	81	4272	6679
7/15/2012	1099.9	1099.9	5680	8069	2312	81	5521	7914
7/16/2012	1099.8	1099.8	5510	7589	2304	81	5976	8361
7/17/2012	1099.8	1099.8	5320	7109	2225	81	4292	6598
7/18/2012	1099.9	1099.9	4920	6623	2273	166	3479	5918
7/19/2012	1099.9	1099.9	4450	6255	2387	250	3314	5951
7/20/2012	1099.9	1099.9	4620	5831	2289	250	3904	6443
7/21/2012	1099.8	1099.9	4160	5418	2324	250	3537	6110
7/22/2012	1099.9	1099.9	3510	4621	2310	250	1448	4007
7/23/2012	1099.9	1099.9	3060	3838	2315	250	1010	3575
7/24/2012	1099.9	1099.9	2490	3504	2445	386	503	3335
7/25/2012	1099.9	1099.8	2710	3628	2517	377	98	2992
7/26/2012	1099.9	1099.9	3050	3430	2479	202	51	2732
7/27/2012	1100.0	1100.0	3170	3352	2488	320	791	3599
7/28/2012	1099.9	1100.0	2850	3568	2501	400	1455	4356
7/29/2012	1099.9	1099.9	2560	3614	2500	282	23	2805
7/30/2012	1100.0	1100.0	2520	2939	2475	200	0	2675
7/31/2012	1100.0	1100.0	2400	2725	2508	361	423	3292
8/1/2012	1099.9	1099.9	2160	2714	2507	363	101	2970
8/2/2012	1099.9	1099.9	2050	2331	2501	242	0	2743
8/3/2012	1099.8	1099.9	1940	2077	2482	166	0	2648
8/4/2012	1099.8	1099.8	2010	2493	2486	140	0	2626
8/5/2012	1099.8	1099.8	2380	2548	2476	140	0	2616
8/6/2012	1099.8	1099.9	2570	2709	2486	140	0	2627
8/7/2012	1099.9	1099.9	2340	2866	2484	140	0	2624
8/8/2012	1099.9	1099.9	2230	2691	2482	140	0	2622

DAILY AVERAGE LAKE CHELAN ELEVATIONS, INFLOW AND OUTFLOW

Date	Chelan	USGS	Stehekin	Total ⁴	Powerhouse	Low Level Outlet Flow (cfs)	Spill Gate Flow (cfs)	Total Outflow (cfs)
	PUD Lake Elevation (ft)	Lake Elevation (ft)	River Flow (cfs)	Estimated Inflow (cfs)	Turbine Flow (cfs)			
8/9/2012	1099.9	1099.9	1980	2312	2480	140	0	2620
8/10/2012	1099.8	1099.8	1660	2154	2479	122	0	2601
8/11/2012	1099.8	1099.8	1550	1935	2500	82	0	2582
8/12/2012	1099.7	1099.7	1580	1828	2492	82	0	2574
8/13/2012	1099.7	1099.7	1610	1774	2492	83	0	2575
8/14/2012	1099.6	1099.7	1550	1658	2509	83	0	2592
8/15/2012	1099.6	1099.6	1600	1631	2496	83	0	2579
8/16/2012	1099.5	1099.6	1490	1679	1623	83	0	1705
8/17/2012	1099.6	1099.6	1520	1638	1479	83	0	1562
8/18/2012	1099.6	1099.6	1530	1717	1676	84	0	1760
8/19/2012	1099.5	1099.5	1540	1807	2462	84	0	2546
8/20/2012	1099.5	1099.5	1500	1861	1729	84	0	1813
8/21/2012	1099.5	1099.5	1300	1796	1734	84	0	1818
8/22/2012	1099.5	1099.5	1170	1478	1878	84	0	1962
8/23/2012	1099.5	1099.5	1000	1177	1884	84	0	1968
8/24/2012	1099.4	1099.4	805	978	1813	84	0	1897
8/25/2012	1099.3	1099.3	678	802	1774	84	0	1858
8/26/2012	1099.2	1099.2	617	565	1977	84	0	2061
8/27/2012	1099.2	1099.2	610	652	1825	84	0	1909
8/28/2012	1099.1	1099.1	614	699	1514	84	0	1598
8/29/2012	1099.1	1099.1	576	663	311	84	0	395
8/30/2012	1099.1	1099.1	501	644	317	84	0	401
8/31/2012	1099.1	1099.1	438	541	321	84	0	405
