APPENDICES

Appendix A NEZ PERCE SETTLEMENT COMPONENTS

A.1 Introduction

The Nez Perce Water Rights Settlement (Nez Perce Tribe et al. 2004) consists of three components, including the Snake River Flow, the Salmon/Clearwater, and the Nez Perce Tribal. Details of the Snake River Flow component are described in Section 1.4 and Appendix C of the 2007 Upper Snake BA and Chapters 2 and Appendix B of the 2004 Upper Snake BA. Its elements are incorporated into the proposed actions that Reclamation is consulting on in this Remand. Information about elements of the other two components that provide potential benefits to ESA-listed anadromous fish are described below.

A.2 Salmon/Clearwater Component

A.2.1 Salmon and Clearwater Habitat Trust Fund

As part of the Settlement, the United States will contribute $38 million (in 2004 dollars) over the course of five years, beginning in 2007, for fish and habitat protection projects. The purpose of the fund is to supplement monies otherwise available for habitat protection and restoration in the Salmon and Clearwater River basins. Congress has appropriated the 2007 dollars; the out-year funding is anticipated to be appropriated on an annual basis.

The fund will be divided into two accounts: (1) one-third of the United States' contribution to the fund will be placed into an account for which the Nez Perce Tribe will develop a process for administration, and (2) the remainder will be placed into an account for the State of Idaho (State) to implement the Section 6 Cooperative Agreements. The Section 6 Cooperative Agreements are intended to satisfy the requirements of section 7(a) (2) of the ESA. The State will collaborate with the Nez Perce Tribe and the United States to determine how to direct use of the Section 6 account.

The Nez Perce Tribe has not formally dedicated any portion of this funding towards any specific fish or habitat improvement project at this time. The agreement anticipates the State's portion will be used for activities such as riparian fencing, riparian plantings, restoration of large woody debris, improving or protecting flow

conditions to augment stream flows, stabilizing sediment sources, and correcting man-made passage barriers such as unscreened diversions, stream crossings, or culverts.

A.2.2 Salmon/Clearwater Minimum Streamflows

As part of the Settlement, implemented in part through the Snake River Water Rights Act of 2004 (Public Law 108-447), the State of Idaho agreed to adopt minimum streamflows in the Salmon and Clearwater River basins. These basins contain critical spawning and rearing habitat for ESA-listed spring Chinook, steelhead ("A" and "B" run), and fall Chinook salmon. The Idaho Water Resource Board (IWRB) now holds in trust for the public, minimum streamflow rights on over 200 rivers, streams, and creeks in the Salmon and Clearwater River basins that the Tribe identified (Tribal Priority Streams) as having important salmon and steelhead spawning and rearing habitat. The intent of establishing minimum streamflows is to ensure these streams are not dewatered to a level that impairs spawning and rearing or other ecological functions that support salmon, steelhead, and the aquatic environment.

The minimum streamflows are subordinated to water rights existing prior to April 1, 2005, and to future domestic, commercial, municipal, and industrial (DCMI) water rights. In issuing any new water rights for future uses that may affect the instream flows, the Idaho Department of Water Resources will consider the local public interest under Idaho Code Section 42-203(A)5, including but not limited to the protection of fish and wildlife habitat, aquatic life, recreation, aesthetic beauty, transportation and navigation values, and water quality.

The Tribal Priority Streams have been divided into "A" and "B" list groups based on the level of existing use; streams on the "A" list are considered non-developed and streams on the "B" list are considered developed. Tribal Priority Streams have minimum stream flows and future non-DCMI use levels assigned based on land classification, except for streams identified as "Special Areas." Special Area streams address certain special resource value areas or areas of special concern relative to local uses as agreed to by parties to the Settlement. Land classification was established based on the predominant land ownership and, where appropriate, Federal land classification existing in a particular stream's basin.

A.2.2.1 "A" List Tribal Priority Streams

Minimum streamflows were determined based on categories determined by ownership of the lands within the basin. Four ownership categories were identified: (1) State and private, (2) Federal non-wilderness, (3) wilderness/Wild and Scenic, and (4) Special Areas.

For each category, minimum streamflows have been set by month based on estimated hydrology of unimpaired flows, and a reservation for future non-DCMI use equal to a percentage of the minimum monthly median flow value from the estimated hydrology. Minimum streamflows, future allocations, and the floor flow are based on exceedance values. The individual minimum streamflows have been decreed as quantities in cubic feet per second as will the future allocation for non-DCMI uses and floor flows. Because these flows are based on estimated flow, the IWRB can, after government to government consultation with the Nez Perce Tribe, change these decreed flows based upon actual flows, if such data become available.

For State and private basins, minimum streamflows have been established for each month of the year at the 50 percent exceedance level of the estimated unimpaired flow, subordinated to a future non-DCMI use in the amount of 25 percent of the lowest median monthly unimpaired flow value.

For Federal, non-wilderness basins, minimum streamflows have been decreed for each month of the year at 40 percent exceedance level of the estimated unimpaired flow, subordinated to a future non-DCMI use in the amount of 10 percent of the lowest median monthly unimpaired flow value.

For Federal wilderness and Wild and Scenic basins, minimum streamflows have been decreed for each month of the year at the 30 percent exceedance level of the estimated unimpaired flow, subordinated to a future non-DCMI use in the amount of 5 percent of the lowest median monthly unimpaired flow value.

The Special Areas include watersheds that hold special values including high value habitat for fish resources, other special values, and areas where future development opportunities would be preserved. The minimum streamflows and reservations for future non-DCMI use for the special areas differ from the land-based formula described above. Special Areas include:

- **Lower Salmon River below Long Tom Bar to the mouth**: Minimum streamflows for the lower Salmon River downstream of the Wild and Scenic reach are consistent with the existing State application filed for the lower Salmon River below Hammer Creek. The State application for the minimum streamflow in the lower Salmon River addresses the reach from the mouth to Hammer Creek. The minimum streamflows reach in the application will be extended to include the reach of the Salmon below the Little Salmon River. The minimum streamflows in the reach between the Little Salmon and designated Wild and Scenic River reach are based on the downstream reach and adjusted for the inflow from the Little Salmon River. The State minimum streamflow is consistent with the Wild and Scenic instream flow for the main Salmon River.

- **South Fork Salmon River and tributaries contained within the Tribal Priority Stream List**: Minimum streamflows are decreed for each month of the year at the 40 percent exceedance level of the estimated unimpaired hydrology, subordinated to a future non-DCMI use in the amount of 5 percent of the lowest median monthly unimpaired flow value.
- **Upper Salmon River basin**: The upper Salmon River basin includes a number of tributaries that meet the criteria for "B" list streams. Minimum streamflows established for the tributaries or the mainstem Salmon River are in accord with Wild and Scenic River instream flows and future allocations.
- **Lolo Creek**: Minimum streamflows are decreed for each month of the year at the 40 percent exceedance level of the estimated unimpaired hydrology, subordinated to a future non-DCMI use in the amount of 10 percent of the lowest median monthly unimpaired flow value.
- **Bedrock Creek**: Minimum streamflows are decreed for each month of the year at the 40 percent exceedance level of the estimated unimpaired hydrology, subordinated to a future non-DCMI use in the amount of 10 percent of the lowest median monthly unimpaired flow value.
- **Upper North Fork Clearwater River, Breakfast Creek**: Minimum streamflows are decreed for each month of the year at the 40 percent exceedance level of the estimated unimpaired hydrology, subordinated to a future non-DCMI use in the amount of 10 percent of the lowest median monthly unimpaired flow value.

Future Uses for "A" List streams

The future use allocations will provide water for non-DCMI uses. The parties will study the overlap of existing uses and future use to determine if additional criteria will assist the parties in allocating future use. The goal is to avoid reducing streamflows to a level where the unimpaired 80 percent exceedance value is the flow that normally occurs in the stream due to the combination of existing and future use.

A.2.2.2 "B" List Tribal Priority Streams

Minimum streamflows and other non-flow-related actions were developed by the parties, in conjunction with local stakeholders and communities.

A.2.3 Idaho Forestry Program

The State, NMFS, and the USFWS will enter into a Section 6 cooperative agreement to implement a forest practices program that provides specific stream protection measures, including establishment of riparian no-harvest and restricted-harvest zones,

road management measures to reduce delivery of sediment to streams, and culvert replacement requirements to eliminate fish passage barriers. Adaptive management measures, coupled with effectiveness monitoring, will allow for program changes as necessary to achieve the program's objectives. All State forest lands in the Salmon and Clearwater River basins are currently implementing the program terms; the program will be opened to private enrollment once the cooperative agreement is finalized.

A.2.4. Lemhi River Habitat Improvement Agreements

The State, NMFS, and USFWS are currently developing a Section 6 cooperative agreement in conjunction with local water users to establish minimum flows, reconnect tributary streams, and undertake other habitat improvement measures in the Lemhi River basin. An interim agreement provides for minimum flows on the mainstem of the Lemhi River to address fish passage requirements. Once completed, a similar program will be established on the Pahsimeroi River.

A.3 Nez Perce Tribal Component

As part of the Settlement, the Nez Perce Tribe, in conjunction with an intergovernmental board consisting of the Tribe, Army Corps of Engineers, BPA, NMFS, and the State, controls the use of 200,000 acre-feet of stored water in Dworshak Reservoir, located on the North Fork Clearwater River on the Reservation. This water can be used for flow augmentation and temperature control (cooling) in the lower Snake River in August and September. This water is part of the 1.2 million acre-feet that is drafted annually for flow augmentation and temperature control. Prior to the Settlement, 1.2 million acre-feet was drafted by August 31 of each year. This measure is intended to benefit juvenile and adult fall Chinook and adult steelhead by shaping cool flows into September.

Appendix B THE UPPER SNAKE MODSIM MODEL - 2007 VERSION

B.1 Modifications Made to 2004 Version of the MODSIM Model

The MODSIM model network of the Snake River basin was developed to replicate historical data and system operations over a defined period of record. After the model had been calibrated to observed data, it was then configured to represent proposed operational conditions for analyses performed in the Upper Snake BA. Reclamation has continually updated and improved this Upper Snake River Basin MODSIM model since its initial development in 1992. These enhancements to the model are designed to incorporate new information and logic as a means of best representing the physical system or potential operational changes. For example, in 2004, additional years were added to the observed data set to create a 1928 to 2000 period of record, the current level of irrigation diversions were incorporated, and groundwater influences were integrated into the model configuration. This 2004 MODSIM version was used to conduct analyses in the 2004 Upper Snake BA (USBR 2004b). Appendix E of the 2004 Upper Snake BA and Larson (2003) describe these model improvements.

In 2007, Reclamation revised the Upper Snake River MODSIM model to capture current groundwater irrigation practices above King Hill and within the Payette River basin in the model configuration. These revisions do not reflect a material change in Upper Snake project operations as described in the 2004 Upper Snake BA and supporting documents, but rather a better model representation of ground water and surface water interactions based on the current conditions. Therefore, the 2007 MODSIM results are not directly comparable to the 2004 MODSIM results because of the model refinements. The following text provides some general information about the improvements incorporated into the 2007 version of MODSIM.

B.1.1 Snake River – Above King Hill

The 2004 MODSIM model presented in the 2004 Upper Snake BA assumed that 1.5 million acre-feet of total groundwater pumping occurred on the Eastern Snake River Plain above King Hill. A recent study conducted by the Idaho Water Resources Research Institute (Contor et al. 2004) determined that roughly 2.0 million acre-feet of

groundwater pumping currently occurs above King Hill. Therefore, the 2007 MODSIM model incorporated a total of 2.0 million acre-feet of groundwater pumping, to represent these current irrigation practices above King Hill. However, the modeled increase of 0.5 million acre-feet of groundwater pumping does not equate to a modeled decreased flow in the Snake River of 0.5 million acre-feet by 2000. The influence of this additional pumping, assuming that it is held constant in the future, will not be realized for many years due to the aquifer influence and interaction.

In order to accommodate the 2 million acre-feet of groundwater pumping as reported by Contor et al. (2004), acreages assumed to be irrigated by ground water were linearly increased between the years 1980 and 2000. The total acreage was increased such that the average volume of groundwater pumped between the years 1996 and 2000, equaled approximately 2 million acre-feet.

B.1.2 Payette River Basin

The 2007 Upper Snake MODSIM model also reflects revisions to incorporate irrigation influences in the Payette River basin. Historical return flows were estimated by taking estimated historical diversions and using rule of thumb infiltration and lag parameters. These estimated historical return flows were subtracted from the local gains data set to separate base flow from return flows as a result of historical surface water irrigation diversion. These same return flow assumptions are used in the model to estimate return flows from future irrigation diversion in the modeled scenarios.

B.1.3 Summary

The 2007 Upper Snake MODSIM model was used to analyze the proposed action flow regime into Brownlee Reservoir. Its configuration and assumptions were developed based on the current available information. Reclamation's proposed action scenario model network can be described as the calibrated model network under current surface water diversion development, current level of groundwater pumping, and proposed reservoir operation protocol.

For each of the numerous basins comprising the Snake River drainage, various methods and techniques were used to develop the unique scenario configurations presented in the 2007 Upper Snake BA. Differing levels of data availability, study development, and current system knowledge dictated the assumptions used. Sophisticated techniques were used for the Snake River above King Hill to account for aquifer influences and less refined methodologies were used in other reaches to define model configurations.

Monthly output for the modeled scenarios used in the hydrologic analyses described in this document are presented in Table B-1 on the following pages.

Table B-1. MODSIM model output of monthly flows into Brownlee Reservoir under the Proposed Action scenario (in acre-feet) (Upper Snake MODSIM – May 2007)

Year	October	November	December	January	February	March	April	May	June	July	August	September	TOTAL
1928	801,417	1,073,837	1,089,560	1,268,371	882,581	1,941,625	1,700,483	2,914,897	1,396,898	823,690	759,308	726,944	15,379,611
1929	790,130	994,306	826,890	955,787	583,845	1,163,930	1,152,144	1,248,292	1,145,000	742,868	725,803	616,165	10,945,160
1930	742,595	884,464	893,615	624,940	868,268	823,970	890,598	895,424	727,358	716,703	683,945	588,169	9,340,049
1931	750,764	764,424	734,266	721,495	603,932	866,912	787,927	660,917	500,508	524,473	453,549	493,492	7,862,659
1932	630,584	757,324	717,788	703,631	465,029	1,237,628	1,642,107	1,685,044	1,515,227	795,315	639,615	642,268	11,431,560
1933	781,464	951,826	861,221	720,458	636,761	842,944	997,252	1,176,099	1,712,055	730,698	634,492	650,189	10,695,459
1934	758,441	925,756	922,271	886,718	725,333	782,634	801,433	614,652	561,969	465,279	424,033	475,579	8,344,098
1935	625,553	727,716	695,945	709,425	632,167	730,504	1,138,897	1,011,343	951,141	630,571	603,803	601,598	9,058,663
1936	748,327	883,082	814,527	767,601	782,350	656,891	2,036,526	1,677,743	1,252,958	713,961	686,428	680,633	11,701,027
1937	753,089	894,793	848,083	651,416	618,575	654,592	1,061,465	924,578	752,410	519,333	500,176	575,214	8,753,724
1938	788,205	879,282	1,036,051	1,039,009	948,699	1,384,077	2,263,442	2,519,403	1,720,933	1,072,998	772,351	739,700	15,164,150
1939	893,208	975,777	912,082	848,349	701,772	1,303,963	1,690,119	1,226,703	739,945	639,722	508,302	589,507	11,029,449
1940	813,074	779,211	748,926	927,766	1,117,859	1,431,221	1,645,610	1,308,503	923,231	676,169	577,651	678,898	11,628,119
1941	911,527	900,055	849,881	847,850	903,701	1,121,211	1,075,786	1,202,618	1,267,812	732,855	718,407	711,022	11,242,725
1942	828,092	943,080	1,016,190	854,285	885,554	722,355	1,871,565	1,328,454	1,573,796	775,130	653,540	705,968	12,158,009
1943	880,553	1,022,448	1,080,088	1,647,672	1,651,958	2,410,664	4,202,696	2,157,093	1,926,121	1,470,631	835,866	854,129	20,139,919
1944	1,064,911	1,223,540	1,216,252	1,076,379	912,030	928,636	930,176	896,564	1,046,233	730,904	677,835	650,579	11,354,039
1945	807,826	883,698	772,597	792,230	945,079	856,064	895,709	1,712,114	1,612,405	807,006	709,937	741,933	11,536,598
1946	872,915	988,476	1,082,715	1,233,286	940,518	2,127,757	3,223,844	2,433,054	1,329,859	846,282	789,119	772,556	16,640,381
1947	904,804	971,323	1,072,390	1,031,086	1,129,184	1,428,265	1,404,147	1,899,597	1,431,098	779,420	751,618	721,590	13,524,522
1948	873,067	967,485	945,302	1,042,938	971,037	963,506	1,319,140	2,063,486	2,199,902	852,439	752,376	706,134	13,656,812
1949	876,280	921,679	862,503	715,005	822,533	1,337,443	1,706,394	2,521,256	1,376,864	736,471	725,161	665,706	13,267,295
1950	825,573	860,698	770,632	1,011,842	1,048,605	1,634,227	1,965,906	1,686,848	1,788,789	1,050,651	711,783	752,495	14,108,049
1951	967,907	1,224,762	1,333,572	1,578,427	1,502,553	1,682,395	2,677,976	2,216,304	1,483,098	849,488	786,221	739,629	17,042,332
1952	1,005,809	1,192,986	1,283,348	1,495,996	1,287,158	1,012,966	4,820,184	4,140,844	2,100,376	1,014,121	740,690	734,488	20,828,966
1953	871,569	926,262	877,906	1,265,479	1,030,401	1,050,980	1,501,133	1,829,566	2,402,509	1,018,866	735,128	769,117	14,278,916
1954	917,904	968,463	941,512	982,809	937,209	1,143,598	1,625,389	1,870,528	1,294,265	826,376	752,468	682,480	12,943,001
1955	838,210	953,375	883,403	795,403	680,094	711,109	960,933	1,099,856	1,201,772	758,456	666,078	588,162	10,136,851
1956	783,270	861,616	1,320,527	1,710,753	1,436,557	1,832,670	2,686,578	2,413,438	2,308,923	840,187	792,110	756,551	17,743,180
1957	976,790	1,023,020	996,250	1,112,707	1,357,290	1,834,521	2,132,977	3,229,883	1,955,184	796,009	741,695	757,761	16,914,087
1958	944,849	931,470	946,909	989,230	1,327,669	1,099,206	2,411,443	3,222,302	1,725,794	820,123	785,292	736,456	15,940,743
1959	810,940	854,165	813,641	820,098	752,619	745,870	1,020,915	1,026,270	1,169,462	694,161	717,600	800,810	10,226,551
1960	905,151	882,600	840,781	690,262	836,892	1,223,985	1,415,103	1,051,557	1,139,658	642,235	602,954	584,809	10,815,987
1961	776,179	847,026	734,182	675,904	857,383	834,272	738,079	811,323	816,501	535,729	449,187	512,664	8,588,429
1962	786,245	735,001	695,764	764,872	1,004,411	868,628	1,844,800	1,586,617	1,268,373	704,923	682,683	645,295	11,587,612
1963	939,312	1,032,270	1,051,923	816,975	1,190,472	768,328	1,015,996	1,384,672	1,697,615	751,850	682,968	641,650	11,974,031
1964	776,302	912,256	856,880	709,882	639,993	818,290	1,408,271	1,515,024	2,251,467	770,972	721,198	727,352	12,107,887

Table B-1. MODSIM model output of monthly flows into Brownlee Reservoir under the Proposed Action scenario (in acre-feet) (Upper Snake MODSIM – May 2007)

Year	October	November	December	January	February	March	April	May	June	July	August	September	TOTAL
1965	843,699	913,367	1,611,115	1,771,939	2,102,453	1,840,265	2,716,006	2,439,244	2,124,828	1,101,249	836,145	783,835	19,084,145
1966	988,258	981,903	1,050,609	1,164,781	874,117	1,041,061	1,142,197	1,033,580	762,990	605,105	475,077	550,995	10,670,673
1967	825,637	791,372	773,063	1,140,438	976,092	970,230	991,108	1,509,104	2,149,027	844,540	693,442	691,441	12,355,494
1968	859,346	926,690	865,060	1,001,572	1,169,040	1,083,857	652,189	999,254	1,219,176	669,428	829,639	639,519	10,914,770
1969	832,035	965,476	889,149	1,327,694	1,037,123	935,004	3,010,016	2,962,140	1,472,679	786,890	746,905	753,113	15,718,224
1970	850,389	810,206	751,925	1,536,106	1,062,113	1,259,345	1,035,409	2,237,880	2,219,237	1,017,639	752,846	853,932	14,387,027
1971	897,703	1,018,583	892,666	2,408,658	1,888,079	2,123,432	2,948,231	3,527,238	2,509,789	1,304,930	744,183	771,056	21,034,548
1972	1,237,556	1,414,406	1,192,140	2,152,808	1,638,923	3,951,984	2,184,443	2,648,955	2,682,145	952,454	808,498	877,002	21,741,314
1973	1,011,683	1,245,121	1,320,047	1,479,841	1,123,308	1,169,805	1,191,855	1,501,768	1,024,731	680,740	664,142	731,306	13,144,347
1974	878,061	1,179,296	1,154,286	2,143,215	1,460,684	2,586,156	3,155,834	2,473,667	2,616,665	1,086,071	770,612	772,237	20,276,784
1975	994,803	1,020,892	994,898	1,567,203	1,301,264	1,561,531	1,776,452	2,935,986	2,721,455	1,510,733	879,594	817,449	18,082,260
1976	1,142,403	1,258,953	1,459,388	1,531,547	1,300,308	1,830,603	2,779,064	2,778,834	2,023,298	811,646	937,615	884,484	18,738,143
1977	906,933	1,130,402	994,259	927,628	790,137	729,490	523,676	557,591	496,563	489,545	387,156	500,427	8,433,807
1978	669,105	721,471	917,662	965,250	1,047,021	1,342,894	1,731,476	1,974,825	1,276,087	906,100	704,571	852,214	13,108,676
1979	798,848	827,987	767,744	992,956	1,028,970	1,337,339	1,190,118	1,534,279	957,498	653,810	617,675	615,950	11,323,174
1980	749,108	742,061	683,646	1,023,639	1,027,897	1,047,439	1,773,038	2,225,167	1,847,436	809,384	657,497	835,441	13,421,753
1981	822,075	927,255	1,113,894	993,423	1,110,176	952,128	1,186,908	1,135,548	1,420,370	696,571	710,982	695,616	11,764,946
1982	829,034	858,166	1,020,498	1,288,995	2,122,170	2,235,195	2,770,158	3,110,182	2,019,578	1,421,514	782,499	890,800	19,348,789
1983	1,346,466	1,310,704	1,447,034	2,306,868	1,945,532	3,651,896	2,666,970	3,081,916	2,509,916	1,271,216	1,008,632	871,799	23,418,949
1984	1,324,959	1,584,342	1,540,899	2,082,526	1,710,227	2,917,325	3,636,203	4,119,188	3,446,588	1,246,060	1,035,301	1,042,174	25,685,792
1985	1,162,651	1,575,848	1,235,334	1,282,337	1,122,940	1,343,311	2,755,212	2,147,407	1,009,823	727,040	733,722	825,360	15,920,985
1986	896,283	825,232	672,853	1,423,844	2,671,066	3,533,047	3,181,365	2,504,867	2,102,678	898,489	748,897	868,789	20,327,410
1987	934,646	1,135,744	1,041,378	1,282,966	964,452	1,009,716	805,442	738,278	708,843	609,987	513,678	595,587	10,340,717
1988	670,560	705,215	691,025	663,724	657,650	698,775	720,797	686,468	649,870	479,919	424,558	538,442	7,587,003
1989	685,673	728,949	672,287	701,409	661,198	1,607,863	2,014,344	1,424,394	975,981	675,117	703,700	689,188	11,540,103
1990	799,736	858,286	775,575	690,572	585,137	790,328	845,923	814,861	836,316	643,543	603,318	576,988	8,820,583
1991	718,075	723,780	589,944	665,130	615,211	649,448	625,845	858,234	733,883	577,580	437,449	593,208	7,787,787
1992	683,518	823,664	763,038	616,817	726,598	682,312	601,382	525,351	463,412	401,385	339,098	405,335	7,031,910
1993	564,270	640,247	608,064	682,634	599,013	1,623,723	1,785,684	2,445,977	1,423,099	774,959	718,806	635,589	12,502,065
1994	782,975	780,225	771,241	758,420	629,462	736,920	792,536	778,167	556,682	525,599	445,504	511,670	8,069,401
1995	684,536	668,345	693,898	1,050,019	1,132,853	1,485,312	1,579,824	2,284,797	2,005,390	1,045,804	690,864	730,784	14,052,426
1996	897,195	904,848	1,345,392	1,655,219	2,035,793	2,206,480	2,966,617	2,708,836	1,707,674	923,323	784,369	795,269	18,931,015
1997	920,828	943,789	1,260,550	2,937,831	2,351,257	2,677,855	3,172,291	3,481,158	2,753,655	1,225,620	987,953	846,567	23,559,354
1998	1,348,628	1,187,337	1,071,269	1,774,641	1,279,283	1,684,532	1,698,583	3,506,352	2,537,965	1,043,366	759,140	810,154	18,701,250
1999	912,341	1,130,184	1,175,782	1,604,440	1,460,515	2,534,252	2,633,171	2,465,652	2,452,784	887,206	785,391	774,436	18,816,154
2000	883,840	871,312	853,814	1,240,080	1,344,725	1,383,505	1,808,712	1,253,951	827,098	717,242	721,041	744,713	12,650,033
Average	868,174	954,126	959,011	1,155,117	1,098,231	1,399,893	1,776,880	1,870,876	1,527,571	820,258	693,039	703,980	13,827,157

Table B-1. MODSIM Model Output of monthly flows into Brownlee Reservoir under the Proposed Action Scenario (in cfs) (Upper Snake MODSIM – May 2007)

Year	October	November	December	January	February	March	April	May	June	July	August	September	Average
1928	13,034	18,046	17,720	20,628	15,344	31,578	28,578	47,406	23,476	13,396	12,349	12,217	21,148
1929	12,850	16,710	13,448	15,544	10,513	18,930	19,362	20,302	19,242	12,082	11,804	10,355	15,095
1930	12,077	14,864	14,533	10,164	15,634	13,401	14,967	14,563	12,224	11,656	11,123	9,885	12,924
1931	12,210	12,847	11,942	11,734	10,874	14,099	13,242	10,749	8,411	8,530	7,376	8,293	10,859
1932	10,255	12,727	11,674	11,443	8,085	20,128	27,597	27,405	25,464	12,935	10,402	10,794	15,742
1933	12,709	15,996	14,006	11,717	11,465	13,709	16,759	19,127	28,772	11,884	10,319	10,927	14,783
1934	12,335	15,558	14,999	14,421	13,060	12,728	13,469	9,996	9,444	7,567	6,896	7,992	11,539
1935	10,174	12,230	11,318	11,538	11,383	11,881	19,140	16,448	15,984	10,255	9,820	10,110	12,523
1936	12,170	14,841	13,247	12,484	13,601	10,683	34,225	27,286	21,057	11,611	11,164	11,438	16,151
1937	12,248	15,037	13,793	10,594	11,138	10,646	17,839	15,037	12,645	8,446	8,135	9,667	12,102
1938	12,819	14,777	16,850	16,898	17,082	22,510	38,038	40,974	28,921	17,451	12,561	12,431	20,943
1939	14,527	16,398	14,834	13,797	12,636	21,207	28,403	19,950	12,435	10,404	8,267	9,907	15,230
1940	13,223	13,095	12,180	15,089	19,434	23,277	27,655	21,281	15,515	10,997	9,395	11,409	16,046
1941	14,825	15,126	13,822	13,789	16,272	18,235	18,079	19,559	21,306	11,919	11,684	11,949	15,547
1942	13,468	15,849	16,527	13,894	15,945	11,748	31,453	21,605	26,449	12,606	10,629	11,864	16,836
1943	14,321	17,183	17,566	26,797	29,745	39,206	70,629	35,082	32,370	23,918	13,594	14,354	27,897
1944	17,319	20,562	19,780	17,506	15,856	15,103	15,632	14,581	17,583	11,887	11,024	10,933	15,647
1945	13,138	14,851	12,565	12,884	17,017	13,923	15,053	27,845	27,097	13,125	11,546	12,469	15,959
1946	14,197	16,612	17,609	20,057	16,935	34,605	54,178	39,570	22,349	13,763	12,834	12,983	22,974
1947	14,715	16,324	17,441	16,769	20,332	23,229	23,597	30,894	24,050	12,676	12,224	12,127	18,698
1948	14,199	16,259	15,374	16,962	16,882	15,670	22,169	33,559	36,971	13,864	12,236	11,867	18,834
1949	14,251	15,489	14,027	11,628	14,810	21,751	28,677	41,004	23,139	11,978	11,794	11,188	18,311
1950	13,427	14,465	12,533	16,456	18,881	26,578	33,038	27,434	30,062	17,087	11,576	12,646	19,515
1951	15,741	20,583	21,688	25,671	27,055	27,362	45,005	36,045	24,924	13,816	12,787	12,430	23,592
1952	16,358	20,049	20,872	24,330	22,377	16,474	81,006	67,344	35,298	16,493	12,046	12,343	28,749
1953	14,175	15,566	14,278	20,581	18,553	17,093	25,227	29,755	40,375	16,570	11,956	12,925	19,755
1954	14,928	16,276	15,312	15,984	16,875	18,599	27,316	30,421	21,751	13,440	12,238	11,469	17,884
1955	13,632	16,022	14,367	12,936	12,246	11,565	16,149	17,887	20,196	12,335	10,833	9,884	14,004
1956	12,739	14,480	21,476	27,823	24,975	29,806	45,149	39,251	38,803	13,664	12,882	12,714	24,480
1957	15,886	17,192	16,202	18,096	24,439	29,836	35,846	52,529	32,858	12,946	12,063	12,735	23,386
1958	15,366	15,654	15,400	16,088	23,906	17,877	40,526	52,406	29,003	13,338	12,772	12,377	22,059
1959	13,189	14,355	13,233	13,338	13,552	12,130	17,157	16,691	19,653	11,289	11,671	13,458	14,143
1960	14,721	14,833	13,674	11,226	14,549	19,906	23,782	17,102	19,153	10,445	9,806	9,828	14,919
1961	12,623	14,235	11,940	10,993	15,438	13,568	12,404	13,195	13,722	8,713	7,305	8,616	11,896
1962	12,787	12,352	11,316	12,439	18,085	14,127	31,003	25,804	21,316	11,464	11,103	10,845	16,053
1963	15,276	17,348	17,108	13,287	21,436	12,496	17,074	22,520	28,529	12,228	11,107	10,783	16,599
1964	12,625	15,331	13,936	11,545	11,126	13,308	23,667	24,640	37,837	12,539	11,729	12,224	16,709

Table B-1. MODSIM Model Output of monthly flows into Brownlee Reservoir under the Proposed Action Scenario (in cfs) (Upper Snake MODSIM – May 2007)

Year	October	November	December	January	February	March	April	May	June	July	August	September	Average
1965	13,721	15,350	26,202	28,818	37,857	29,929	45,644	39,671	35,709	17,910	13,599	13,173	26,465
1966	16,072	16,501	17,087	18,943	15,739	16,931	19,195	16,810	12,822	9,841	7,726	9,260	14,744
1967	13,428	13,299	12,573	18,547	17,575	15,779	16,656	24,543	36,116	13,735	11,278	11,620	17,096
1968	13,976	15,574	14,069	16,289	20,324	17,627	10,960	16,251	20,489	10,887	13,493	10,747	15,057
1969	13,532	16,225	14,461	21,593	18,674	15,206	50,585	48,175	24,749	12,798	12,147	12,656	21,733
1970	13,830	13,616	12,229	24,982	19,124	20,481	17,401	36,396	37,296	16,550	12,244	14,351	19,875
1971	14,600	17,118	14,518	39,173	33,997	34,534	49,547	57,365	42,178	21,223	12,103	12,958	29,109
1972	20,127	23,770	19,388	35,012	28,493	64,273	36,711	43,081	45,075	15,490	13,149	14,739	29,942
1973	16,453	20,925	21,469	24,067	20,226	19,025	20,030	24,424	17,221	11,071	10,801	12,290	18,167
1974	14,280	19,819	18,773	34,856	26,301	42,060	53,036	40,230	43,975	17,663	12,533	12,978	28,042
1975	16,179	17,157	16,180	25,488	23,430	25,396	29,854	47,749	45,736	24,570	14,305	13,738	24,982
1976	18,579	21,157	23,735	24,908	22,606	29,772	46,704	45,193	34,003	13,200	15,249	14,864	25,831
1977	14,750	18,997	16,170	15,086	14,227	11,864	8,801	9,068	8,345	7,962	6,296	8,410	11,665
1978	10,882	12,125	14,924	15,698	18,853	21,840	29,098	32,117	21,445	14,736	11,459	14,322	18,125
1979	12,992	13,915	12,486	16,149	18,528	21,750	20,001	24,953	16,091	10,633	10,046	10,351	15,658
1980	12,183	12,471	11,118	16,648	17,870	17,035	29,797	36,189	31,047	13,163	10,693	14,040	18,521
1981	13,370	15,583	18,116	16,156	19,990	15,485	19,947	18,468	23,870	11,329	11,563	11,690	16,297
1982	13,483	14,422	16,597	20,963	38,212	36,352	46,554	50,582	33,940	23,119	12,726	14,970	26,827
1983	21,898	22,027	23,534	37,518	35,031	59,392	44,820	50,123	42,181	20,674	16,404	14,651	32,354
1984	21,548	26,626	25,060	33,869	29,732	47,446	61,108	66,992	57,922	20,265	16,838	17,514	35,410
1985	18,909	26,483	20,091	20,855	20,220	21,847	46,303	34,924	16,971	11,824	11,933	13,871	22,019
1986	14,577	13,868	10,943	23,157	48,095	57,460	53,465	40,738	35,337	14,613	12,180	14,600	28,253
1987	15,201	19,087	16,936	20,865	17,366	16,421	13,536	12,007	11,913	9,920	8,354	10,009	14,301
1988	10,906	11,852	11,238	10,794	11,433	11,364	12,113	11,164	10,921	7,805	6,905	9,049	10,462
1989	11,151	12,250	10,934	11,407	11,905	26,149	33,852	23,166	16,402	10,980	11,445	11,582	15,935
1990	13,006	14,424	12,614	11,231	10,536	12,853	14,216	13,252	14,055	10,466	9,812	9,697	12,180
1991	11,678	12,164	9,595	10,817	11,077	10,562	10,518	13,958	12,333	9,393	7,114	9,969	10,765
1992	11,116	13,842	12,410	10,032	12,632	11,097	10,107	8,544	7,788	6,528	5,515	6,812	9,702
1993	9,177	10,760	9,889	11,102	10,786	26,407	30,009	39,780	23,916	12,603	11,690	10,681	17,233
1994	12,734	13,112	12,543	12,335	11,334	11,985	13,319	12,656	9,355	8,548	7,245	8,599	11,147
1995	11,133	11,232	11,285	17,077	20,398	24,156	26,550	37,159	33,702	17,008	11,236	12,281	19,435
1996	14,591	15,206	21,881	26,920	35,392	35,885	49,856	44,055	28,698	15,016	12,757	13,365	26,135
1997	14,976	15,861	20,501	47,779	42,337	43,551	53,312	56,616	46,277	19,933	16,068	14,227	32,620
1998	21,933	19,954	17,423	28,862	23,035	27,396	28,546	57,025	42,652	16,969	12,346	13,615	25,813
1999	14,838	18,993	19,122	26,094	26,298	41,216	44,252	40,100	41,220	14,429	12,773	13,015	26,029
2000	14,374	14,643	13,886	20,168	23,378	22,501	30,396	20,394	13,900	11,665	11,727	12,515	17,462
Average	14,119	16,035	15,597	18,786	19,597	22,767	29,861	30,427	25,672	13,340	11,271	11,831	19,109

Table B-1. MODSIM Model Output of monthly flows into Brownlee Reservoir under the Without Reclamation Scenario (in acre-feet) (Upper Snake MODSIM –May 2007)

Year	October	November	December	January	February	March	April	May	June	July	August	September	TOTAL
1928	1,231,615	1,720,548	1,578,118	1,550,994	1,091,520	2,410,327	2,038,960	4,319,005	1,874,794	573,372	386,867	524,625	19,300,745
1929	865,401	1,283,891	1,045,790	1,093,123	719,095	1,634,459	1,608,860	1,973,965	1,465,386	422,515	318,028	404,796	12,835,309
1930	718,564	1,104,708	1,216,103	904,904	1,261,306	1,306,207	1,438,586	1,528,856	844,066	395,106	361,865	450,681	11,530,952
1931	890,517	1,108,080	1,051,833	995,486	891,785	1,253,482	883,912	804,043	469,152	328,014	306,551	395,345	9,378,200
1932	791,224	1,000,272	1,007,104	936,461	682,317	1,862,048	2,347,026	3,144,175	2,413,054	549,748	304,482	434,959	15,472,870
1933	641,184	1,174,757	1,039,961	1,043,348	871,734	1,201,114	1,588,375	1,789,447	2,483,538	458,704	319,553	438,494	13,050,209
1934	612,602	1,082,894	1,172,515	1,251,726	1,061,836	1,279,038	1,041,043	757,286	502,749	325,497	286,101	364,118	9,737,405
1935	785,425	1,010,808	986,592	945,080	876,870	1,089,145	1,900,545	1,790,822	1,524,212	384,186	292,652	376,893	11,963,230
1936	577,996	1,057,501	980,921	1,065,556	1,096,751	1,178,895	3,174,103	3,591,442	1,883,021	403,379	345,871	461,475	15,816,911
1937	602,899	1,064,028	1,058,687	886,279	870,577	1,081,340	1,377,859	1,401,187	848,291	378,972	325,132	429,534	10,324,785
1938	925,512	1,198,710	1,543,996	1,211,318	1,069,796	1,855,474	3,007,761	3,754,619	2,848,352	863,560	409,949	497,902	19,186,949
1939	896,623	1,288,495	1,211,047	1,069,873	863,738	1,930,112	2,174,336	1,858,744	599,822	371,906	312,110	439,265	13,016,071
1940	974,909	1,067,692	1,096,904	1,106,422	1,356,338	2,063,083	1,990,155	1,607,956	886,152	383,706	316,113	533,952	13,383,382
1941	1,088,190	1,271,206	1,213,152	1,165,306	1,338,587	1,668,363	1,332,607	1,523,351	1,326,161	486,839	397,290	526,594	13,337,646
1942	809,690	1,316,948	1,524,921	1,182,339	1,197,341	1,170,241	2,918,489	2,252,978	2,042,175	547,847	335,794	494,333	15,793,096
1943	753,952	1,427,186	1,541,633	1,796,762	1,572,039	2,405,914	4,722,667	3,280,383	3,281,304	1,669,002	494,452	597,762	23,543,056
1944	887,404	1,565,700	1,239,587	1,080,166	1,074,187	1,176,556	1,180,803	1,177,103	1,515,276	446,774	325,015	441,995	12,110,566
1945	673,367	1,234,888	1,115,609	1,163,237	1,410,314	1,333,928	1,479,662	2,833,352	2,320,302	612,342	354,834	503,170	15,035,005
1946	889,236	1,328,379	1,441,810	1,350,662	990,425	2,255,758	3,641,839	3,396,962	1,887,844	551,668	380,820	583,104	18,698,507
1947	1,037,021	1,472,325	1,596,215	1,135,774	1,339,872	1,555,871	1,649,572	2,846,129	1,919,156	515,302	361,738	519,100	15,948,075
1948	903,402	1,297,076	1,290,276	1,294,502	1,172,917	1,222,011	1,741,155	2,799,933	2,611,857	542,397	351,255	493,781	15,720,562
1949	862,202	1,221,709	1,149,974	1,013,997	1,108,641	1,893,332	2,458,385	3,379,009	1,616,536	401,054	328,085	451,907	15,884,831
1950	896,846	1,255,653	1,143,754	1,161,873	1,244,420	1,768,671	2,262,428	2,521,139	2,978,035	1,006,680	372,543	499,545	17,111,587
1951	1,070,523	1,458,518	1,477,018	1,238,411	1,742,571	1,563,334	3,116,452	3,460,338	2,170,452	600,799	426,747	518,181	18,843,344
1952	1,117,048	1,391,250	1,531,134	1,280,514	1,143,566	1,049,934	5,308,948	5,544,499	2,662,405	760,283	358,591	532,167	22,680,339
1953	799,639	1,161,871	1,203,622	1,667,095	1,286,882	1,338,825	1,826,830	2,093,850	3,394,845	809,984	365,976	494,811	16,444,230
1954	755,071	1,254,864	1,227,684	1,257,113	1,260,596	1,440,392	1,852,775	2,756,640	1,724,061	587,628	370,630	476,749	14,964,203
1955	813,211	1,205,779	1,126,280	1,074,730	909,791	1,061,116	1,307,211	1,741,152	1,636,333	510,722	327,683	420,859	12,134,867
1956	735,897	1,268,477	2,014,768	1,856,028	1,233,730	1,905,922	2,881,782	4,005,066	3,329,000	567,754	407,311	503,914	20,709,649
1957	951,220	1,360,211	1,366,642	1,102,328	1,530,139	2,159,227	2,119,396	4,296,277	2,923,278	506,485	367,204	501,696	19,184,103
1958	914,289	1,202,425	1,308,206	1,183,246	1,705,012	1,371,348	2,622,167	4,335,925	2,109,278	484,036	403,037	519,781	18,158,750
1959	689,460	1,226,723	1,276,191	1,234,956	1,107,301	1,129,663	1,464,684	1,644,911	1,735,276	403,406	337,406	624,702	12,874,679
1960	1,025,501	1,159,223	1,112,114	1,022,252	1,172,632	1,892,231	1,765,173	1,424,716	1,156,820	328,096	326,878	426,579	12,812,215
1961	918,084	1,223,385	1,039,950	922,514	1,214,382	1,263,232	887,593	1,115,805	884,022	288,915	245,239	399,129	10,402,250
1962	1,055,693	1,117,180	1,046,977	940,283	1,519,636	1,323,807	2,474,926	2,651,795	1,973,443	434,149	331,259	433,504	15,302,652
1963	939,067	1,273,703	1,305,232	1,005,360	1,787,680	1,090,163	1,327,998	2,080,195	2,218,056	468,296	302,283	457,937	14,255,970
1964	673,821	1,204,296	1,090,248	1,051,020	914,738	1,191,681	1,964,392	2,372,946	3,056,285	560,495	346,079	491,832	14,917,833

Table B-1. MODSIM Model Output of monthly flows into Brownlee Reservoir under the Without Reclamation Scenario (in acre-feet) (Upper Snake MODSIM –May 2007)

Year	October	November	December	January	February	March	April	May	June	July	August	September	TOTAL
1965	688,631	1,202,446	2,312,170	1,716,533	1,976,445	1,576,915	2,946,493	3,637,764	3,587,000	1,094,613	529,895	546,666	21,815,571
1966	829,189	1,224,436	1,129,630	1,201,419	971,198	1,318,221	1,452,858	1,658,176	646,996	316,902	298,096	405,535	11,452,656
1967	915,836	1,149,359	1,149,309	1,261,730	1,068,456	1,194,045	1,107,433	2,295,683	3,198,093	626,779	319,795	443,426	14,729,944
1968	846,379	1,210,311	1,112,759	1,064,744	1,405,648	1,351,473	921,341	1,436,668	1,808,888	346,443	492,865	458,427	12,455,946
1969	847,055	1,302,897	1,196,326	1,735,402	1,209,119	1,253,993	3,877,839	3,825,576	1,776,378	482,713	364,303	551,164	18,422,765
1970	873,047	1,146,443	1,133,757	2,002,531	1,300,760	1,410,807	1,086,720	2,927,788	3,313,135	784,772	394,587	618,096	16,992,443
1971	857,304	1,462,136	1,276,114	2,170,384	1,441,145	1,754,222	2,862,443	4,826,143	4,363,061	1,416,648	386,020	522,961	23,338,581
1972	1,086,975	1,490,465	1,413,705	1,665,307	1,253,510	3,855,147	2,408,535	3,779,690	4,130,041	680,873	457,620	630,220	22,852,088
1973	1,189,413	1,422,381	1,470,753	1,560,017	1,223,127	1,496,016	1,598,309	2,212,929	1,199,016	391,435	360,150	559,228	14,682,774
1974	957,266	1,716,087	1,633,359	1,964,121	1,092,145	2,429,492	3,057,247	3,574,555	4,430,345	928,444	440,735	511,323	22,735,119
1975	988,897	1,243,582	1,245,501	1,235,596	1,288,097	1,736,737	1,835,699	3,630,985	4,181,914	1,687,911	494,178	562,786	20,131,883
1976	1,174,322	1,348,154	1,590,962	1,399,306	1,241,708	1,606,070	2,903,016	4,147,081	2,614,946	579,802	616,930	700,472	19,922,769
1977	1,010,019	1,159,102	1,166,430	1,085,091	978,117	979,493	504,052	517,892	399,234	246,311	216,969	374,947	8,637,657
1978	860,448	1,048,231	1,472,429	1,347,262	1,311,403	1,968,331	2,443,079	3,067,734	2,544,281	766,280	365,729	610,901	17,806,108
1979	744,747	1,058,220	1,018,717	1,096,688	1,223,771	1,724,860	1,517,124	2,372,014	1,270,034	333,079	324,498	435,247	13,118,999
1980	738,094	984,189	1,041,711	1,435,341	1,493,422	1,360,481	2,029,728	3,185,183	2,390,760	603,933	324,550	677,410	16,264,802
1981	790,621	1,202,012	1,447,792	1,271,002	1,412,654	1,360,799	1,553,381	1,779,848	1,591,043	389,679	331,535	505,221	13,635,587
1982	821,674	1,245,031	1,597,636	1,211,144	2,446,614	2,145,307	2,644,906	4,272,277	3,706,339	1,789,414	451,284	667,385	22,999,011
1983	1,216,910	1,385,950	1,659,060	1,698,351	1,517,724	3,562,038	2,728,198	4,324,952	4,146,597	1,419,725	614,219	632,437	24,906,161
1984	1,259,506	1,722,275	1,707,498	1,659,478	1,363,304	2,701,500	3,802,871	5,367,175	4,712,394	1,346,740	492,269	704,347	26,839,357
1985	1,181,187	1,578,719	1,438,646	1,318,975	1,187,558	1,576,319	3,168,834	2,856,166	1,167,535	397,845	347,677	667,070	16,886,531
1986	1,045,292	1,252,568	1,151,334	1,062,853	2,775,288	3,736,584	3,416,575	3,227,633	3,663,159	622,136	391,640	651,337	22,996,399
1987	1,132,887	1,325,433	1,237,976	1,219,254	1,186,017	1,450,303	1,044,092	888,377	504,412	381,475	342,305	450,503	11,163,034
1988	808,399	1,083,036	1,075,010	1,034,461	1,001,612	1,121,358	1,173,009	915,659	637,011	285,804	256,745	403,944	9,796,048
1989	758,096	1,075,450	1,032,622	987,238	948,127	2,675,772	2,808,795	2,464,032	1,497,512	353,223	364,347	494,572	15,459,786
1990	852,785	1,099,684	1,037,936	1,074,245	903,190	1,316,248	1,348,779	1,007,071	949,802	320,816	300,308	414,690	10,625,554
1991	752,891	1,031,636	876,037	1,006,138	936,246	1,093,141	888,007	1,874,252	1,216,938	357,768	271,610	439,835	10,744,499
1992	562,447	1,100,153	1,029,884	934,731	1,093,766	1,094,507	694,268	614,748	308,976	289,754	236,720	338,065	8,298,019
1993	671,854	904,617	952,608	983,314	858,682	2,886,175	2,556,638	3,938,183	2,388,074	548,571	427,832	453,504	17,570,052
1994	812,659	951,367	1,051,580	1,074,642	946,348	1,158,013	966,684	1,004,963	408,018	282,417	259,354	357,323	9,273,368
1995	891,173	978,419	1,091,389	1,381,881	1,650,709	2,131,387	1,980,842	3,283,083	3,259,532	978,427	372,395	509,063	18,508,300
1996	896,719	1,234,726	1,577,142	1,295,499	1,833,300	1,987,176	2,872,384	3,791,169	3,400,387	671,483	424,197	552,725	20,536,907
1997	876,246	1,359,136	1,743,634	2,846,850	1,733,376	2,306,599	3,114,568	5,225,324	4,224,679	1,177,506	489,772	629,801	25,727,491
1998	1,205,994	1,279,804	1,238,981	1,467,174	1,212,733	1,936,210	1,938,974	4,581,868	3,221,414	822,656	391,971	603,860	19,901,639
1999	1,081,302	1,270,017	1,312,770	1,418,784	1,307,826	2,392,934	2,525,560	3,495,563	3,793,140	649,762	448,700	518,173	20,214,531
2000	852,431	1,215,443	1,237,898	1,319,533	1,588,964	1,679,889	2,223,327	1,920,449	807,435	378,871	336,299	562,530	14,123,069
Average	888,397	1,240,072	1,277,173	1,280,110	1,261,276	1,694,586	2,121,672	2,709,379	2,172,237	612,063	367,692	504,526	16,129,185

Table B-1. MODSIM Model Output of monthly flows into Brownlee Reservoir under the Without Reclamation Scenario (in cfs) (Upper Snake MODSIM – May 2007)

Year	October	November	December	January	February	March	April	May	June	July	August	September	Average
1928	20,030	28,915	25,666	25,225	18,976	39,200	34,266	70,242	31,507	9,325	6,292	8,817	26,538
1929	14,074	21,577	17,008	17,778	12,948	26,582	27,038	32,103	24,627	6,872	5,172	6,803	17,715
1930	11,686	18,565	19,778	14,717	22,711	21,243	24,176	24,864	14,185	6,426	5,885	7,574	15,984
1931	14,483	18,622	17,106	16,190	16,057	20,386	14,855	13,077	7,884	5,335	4,986	6,644	12,969
1932	12,868	16,810	16,379	15,230	11,862	30,283	39,443	51,135	40,553	8,941	4,952	7,310	21,314
1933	10,428	19,742	16,913	16,968	15,696	19,534	26,694	29,103	41,737	7,460	5,197	7,369	18,070
1934	9,963	18,199	19,069	20,357	19,119	20,802	17,495	12,316	8,449	5,294	4,653	6,119	13,486
1935	12,774	16,987	16,045	15,370	15,789	17,713	31,940	29,125	25,615	6,248	4,760	6,334	16,558
1936	9,400	17,772	15,953	17,330	19,067	19,173	53,343	58,409	31,645	6,560	5,625	7,755	21,836
1937	9,805	17,882	17,218	14,414	15,676	17,586	23,156	22,788	14,256	6,163	5,288	7,219	14,288
1938	15,052	20,145	25,111	19,700	19,263	30,176	50,547	61,063	47,868	14,044	6,667	8,368	26,500
1939	14,582	21,654	19,696	17,400	15,552	31,390	36,541	30,230	10,080	6,048	5,076	7,382	17,969
1940	15,855	17,943	17,839	17,994	23,580	33,553	33,446	26,151	14,892	6,240	5,141	8,973	18,467
1941	17,698	21,363	19,730	18,952	24,103	27,133	22,395	24,775	22,287	7,918	6,461	8,850	18,472
1942	13,168	22,132	24,800	19,229	21,559	19,032	49,047	36,641	34,320	8,910	5,461	8,308	21,884
1943	12,262	23,985	25,072	29,222	28,306	39,128	79,367	53,350	55,144	27,144	8,041	10,046	32,589
1944	14,432	26,312	20,160	17,567	18,675	19,135	19,844	19,144	25,465	7,266	5,286	7,428	16,726
1945	10,951	20,753	18,144	18,918	25,394	21,694	24,867	46,080	38,994	9,959	5,771	8,456	20,832
1946	14,462	22,324	23,449	21,966	17,834	36,686	61,203	55,246	31,726	8,972	6,193	9,799	25,822
1947	16,866	24,743	25,960	18,472	24,126	25,304	27,722	46,288	32,253	8,381	5,883	8,724	22,060
1948	14,692	21,798	20,984	21,053	20,391	19,874	29,261	45,537	43,894	8,821	5,713	8,298	21,693
1949	14,022	20,532	18,703	16,491	19,962	30,792	41,315	54,954	27,167	6,523	5,336	7,595	21,949
1950	14,586	21,102	18,601	18,896	22,407	28,765	38,021	41,002	50,048	16,372	6,059	8,395	23,688
1951	17,410	24,511	24,021	20,141	31,377	25,425	52,374	56,277	36,476	9,771	6,940	8,708	26,119
1952	18,167	23,381	24,902	20,826	19,881	17,076	89,220	90,173	44,743	12,365	5,832	8,943	31,292
1953	13,005	19,526	19,575	27,113	23,172	21,774	30,701	34,053	57,052	13,173	5,952	8,316	22,784
1954	12,280	21,089	19,966	20,445	22,698	23,426	31,137	44,832	28,974	9,557	6,028	8,012	20,704
1955	13,226	20,264	18,317	17,479	16,382	17,257	21,968	28,317	27,500	8,306	5,329	7,073	16,785
1956	11,968	21,317	32,767	30,185	21,448	30,997	48,430	65,136	55,946	9,234	6,624	8,469	28,543
1957	15,470	22,859	22,226	17,928	27,552	35,116	35,618	69,872	49,127	8,237	5,972	8,431	26,534
1958	14,869	20,207	21,276	19,244	30,700	22,303	44,067	70,517	35,448	7,872	6,555	8,735	25,149
1959	11,213	20,616	20,755	20,085	19,938	18,372	24,615	26,752	29,162	6,561	5,487	10,498	17,838
1960	16,678	19,481	18,087	16,625	20,386	30,774	29,665	23,171	19,441	5,336	5,316	7,169	17,677
1961	14,931	20,560	16,913	15,003	21,866	20,545	14,917	18,147	14,856	4,699	3,988	6,708	14,428
1962	17,169	18,775	17,027	15,292	27,363	21,530	41,593	43,127	33,165	7,061	5,387	7,285	21,231
1963	15,272	21,405	21,228	16,351	32,189	17,730	22,318	33,831	37,276	7,616	4,916	7,696	19,819
1964	10,959	20,239	17,731	17,093	15,903	19,381	33,013	38,592	51,363	9,116	5,628	8,266	20,607

Table B-1. MODSIM Model Output of monthly flows into Brownlee Reservoir under the Without Reclamation Scenario (in cfs) (Upper Snake MODSIM – May 2007)

Year	October	November	December	January	February	March	April	May	June	July	August	September	Average
1965	11,200	20,208	37,604	27,917	35,588	25,646	49,517	59,163	60,282	17,802	8,618	9,187	30,228
1966	13,485	20,577	18,372	19,539	17,487	21,439	24,416	26,968	10,873	5,154	4,848	6,815	15,831
1967	14,895	19,316	18,692	20,520	19,239	19,419	18,611	37,336	53,746	10,194	5,201	7,452	20,385
1968	13,765	20,340	18,097	17,316	24,437	21,980	15,484	23,365	30,399	5,634	8,016	7,704	17,211
1969	13,776	21,896	19,456	28,224	21,771	20,394	65,169	62,217	29,853	7,851	5,925	9,263	25,483
1970	14,199	19,267	18,439	32,568	23,421	22,945	18,263	47,616	55,679	12,763	6,417	10,387	23,497
1971	13,943	24,572	20,754	35,298	25,949	28,530	48,105	78,490	73,324	23,040	6,278	8,789	32,256
1972	17,678	25,048	22,992	27,084	21,792	62,698	40,477	61,471	69,408	11,073	7,442	10,591	31,480
1973	19,344	23,904	23,920	25,371	22,024	24,330	26,860	35,990	20,150	6,366	5,857	9,398	20,293
1974	15,568	28,840	26,564	31,943	19,665	39,512	51,379	58,135	74,454	15,100	7,168	8,593	31,410
1975	16,083	20,899	20,256	20,095	23,193	28,245	30,850	59,052	70,279	27,451	8,037	9,458	27,825
1976	19,099	22,656	25,875	22,758	21,587	26,120	48,787	67,446	43,946	9,430	10,033	11,772	27,459
1977	16,426	19,479	18,970	17,647	17,612	15,930	8,471	8,423	6,709	4,006	3,529	6,301	11,959
1978	13,994	17,616	23,947	21,911	23,613	32,012	41,057	49,892	42,758	12,462	5,948	10,267	24,623
1979	12,112	17,784	16,568	17,836	22,035	28,052	25,496	38,577	21,344	5,417	5,277	7,315	18,151
1980	12,004	16,540	16,942	23,344	25,963	22,126	34,111	51,802	40,178	9,822	5,278	11,384	22,458
1981	12,858	20,200	23,546	20,671	25,436	22,131	26,105	28,946	26,738	6,338	5,392	8,491	18,904
1982	13,363	20,923	25,983	19,697	44,054	34,890	44,449	69,482	62,287	29,102	7,339	11,216	31,899
1983	19,791	23,292	26,982	27,621	27,328	57,931	45,849	70,339	69,686	23,090	9,989	10,628	34,377
1984	20,484	28,944	27,770	26,989	23,701	43,936	63,909	87,289	79,194	21,903	8,006	11,837	36,997
1985	19,210	26,531	23,397	21,451	21,383	25,636	53,254	46,451	19,621	6,470	5,654	11,210	23,356
1986	17,000	21,050	18,725	17,286	49,972	60,770	57,417	52,492	61,561	10,118	6,369	10,946	31,976
1987	18,425	22,275	20,134	19,829	21,355	23,587	17,547	14,448	8,477	6,204	5,567	7,571	15,452
1988	13,147	18,201	17,483	16,824	17,413	18,237	19,713	14,892	10,705	4,648	4,176	6,789	13,519
1989	12,329	18,074	16,794	16,056	17,072	43,517	47,203	40,074	25,167	5,745	5,926	8,312	21,356
1990	13,869	18,481	16,880	17,471	16,263	21,407	22,667	16,378	15,962	5,218	4,884	6,969	14,704
1991	12,245	17,337	14,247	16,363	16,858	17,778	14,923	30,482	20,451	5,819	4,417	7,392	14,859
1992	9,147	18,489	16,749	15,202	19,015	17,800	11,668	9,998	5,193	4,712	3,850	5,681	11,459
1993	10,927	15,203	15,493	15,992	15,461	46,939	42,966	64,048	40,133	8,922	6,958	7,621	24,222
1994	13,217	15,988	17,102	17,477	17,040	18,833	16,246	16,344	6,857	4,593	4,218	6,005	12,827
1995	14,494	16,443	17,750	22,474	29,723	34,664	33,289	53,394	54,778	15,913	6,056	8,555	25,628
1996	14,584	20,750	25,650	21,069	31,872	32,318	48,272	61,657	57,145	10,921	6,899	9,289	28,369
1997	14,251	22,841	28,358	46,300	31,211	37,513	52,342	84,982	70,998	19,150	7,965	10,584	35,541
1998	19,614	21,508	20,150	23,861	21,836	31,489	32,586	74,517	54,138	13,379	6,375	10,148	27,467
1999	17,586	21,343	21,350	23,074	23,549	38,917	42,443	56,850	63,746	10,567	7,297	8,708	27,953
2000	13,863	20,426	20,132	21,460	27,624	27,321	37,364	31,233	13,569	6,162	5,469	9,454	19,507
Average	14,448	20,840	20,771	20,819	22,513	27,560	35,656	44,064	36,506	9,954	5,980	8,479	22,299

Table B-1. MODSIM Model Output of monthly flows into Brownlee Reservoir under the Naturalized Flow Scenario (in acre-feet) (Upper Snake MODSIM – May 2007)

Year	October	November	December	January	February	March	April	May	June	July	August	September	Total
1928	1,318,693	1,455,711	1,332,278	1,340,683	890,779	2,343,436	2,281,379	5,314,532	3,165,951	1,696,743	936,899	928,441	23,005,525
1929	1,115,207	996,672	796,682	872,182	513,656	1,479,881	1,818,814	2,900,454	2,700,768	1,182,403	701,314	772,584	15,850,617
1930	921,814	816,231	965,823	680,147	1,061,509	1,149,374	1,664,824	2,379,825	2,069,022	972,222	877,458	797,586	14,355,835
1931	1,113,042	819,067	793,747	772,911	671,151	1,092,558	1,360,924	1,675,172	1,156,049	532,739	482,336	541,087	11,010,783
1932	781,005	690,124	749,025	712,539	464,690	1,721,508	2,651,445	4,165,893	3,781,736	1,544,255	742,060	747,565	18,751,845
1933	884,231	889,166	777,836	808,289	653,390	1,023,058	1,842,453	2,759,440	3,790,521	1,078,144	650,782	678,121	15,835,431
1934	807,891	789,119	908,932	1,021,223	841,529	1,128,031	1,535,147	1,627,859	921,203	513,744	416,986	481,562	10,993,226
1935	775,373	698,183	715,860	715,401	662,501	942,918	2,194,355	2,639,777	2,797,461	1,069,768	570,269	571,615	14,353,481
1936	786,025	771,292	721,063	844,463	861,896	1,016,832	3,566,878	4,580,462	3,162,209	1,070,976	767,790	755,220	18,905,106
1937	818,774	766,595	807,518	665,600	661,836	922,575	1,932,785	2,830,869	2,104,337	917,342	559,399	626,325	13,613,955
1938	897,574	890,760	1,318,583	999,911	883,266	1,795,801	3,564,015	4,751,901	4,090,074	2,099,134	914,358	852,707	23,058,084
1939	1,118,552	1,008,658	965,970	851,323	659,585	1,812,155	2,418,466	2,753,270	1,712,691	967,460	636,739	760,322	15,665,191
1940	947,546	751,482	837,671	893,434	1,150,882	1,974,536	2,542,635	2,954,831	1,967,496	775,393	540,896	869,002	16,205,804
1941	1,073,790	965,831	964,407	954,996	1,095,506	1,615,908	1,903,650	2,899,611	2,547,138	1,063,233	885,281	886,642	16,855,993
1942	1,060,662	1,031,600	1,266,349	943,812	970,461	1,010,573	3,175,260	3,088,144	3,353,997	1,423,167	690,757	802,199	18,816,981
1943	998,517	1,151,769	1,285,878	1,521,570	1,314,014	2,188,004	5,181,790	4,510,036	4,720,969	3,154,867	1,233,264	1,057,296	28,317,974
1944	1,150,665	1,295,163	984,174	849,052	842,282	1,006,753	1,646,399	2,230,885	2,741,567	1,281,862	665,232	743,291	15,437,325
1945	922,770	939,471	848,962	929,914	1,219,494	1,218,158	1,731,723	3,780,321	3,679,074	1,855,079	941,133	969,020	19,035,119
1946	1,109,014	1,021,498	1,169,442	1,109,834	780,681	2,112,712	4,043,532	4,389,811	3,104,073	1,372,160	903,351	1,018,703	22,134,811
1947	1,249,285	1,179,995	1,341,757	912,738	1,178,384	1,438,376	1,892,387	3,798,516	3,129,342	1,494,781	942,454	905,656	19,463,671
1948	1,116,473	991,555	1,029,658	1,071,092	983,029	1,071,776	2,014,154	3,791,726	3,979,228	1,331,820	818,938	843,867	19,043,316
1949	1,070,521	944,723	900,833	782,170	927,487	1,760,845	2,815,433	4,378,554	2,898,149	1,142,050	776,669	761,495	19,158,929
1950	1,121,681	974,434	902,375	944,160	1,087,822	1,652,560	2,560,141	3,471,706	4,388,009	2,545,535	1,068,959	997,326	21,714,708
1951	1,273,131	1,185,513	1,225,206	1,015,834	1,582,424	1,396,864	3,450,517	4,392,046	3,467,860	1,889,229	1,305,499	969,324	23,153,447
1952	1,325,273	1,096,175	1,276,720	1,050,883	898,556	961,486	5,875,044	6,564,132	3,995,391	1,796,460	975,590	936,788	26,752,498
1953	992,219	869,220	949,254	1,489,332	1,096,039	1,206,643	2,090,629	3,091,214	4,783,756	1,909,269	896,065	806,939	20,180,579
1954	981,559	973,458	976,475	1,025,017	1,054,148	1,282,672	2,103,390	3,713,434	2,942,821	1,765,122	905,247	816,696	18,540,039
1955	1,017,544	901,183	854,064	831,298	690,690	879,853	1,514,533	2,682,878	2,945,579	1,341,406	750,988	684,004	15,094,020
1956	953,879	988,023	1,790,376	1,638,864	1,024,974	1,849,680	3,369,618	5,200,762	4,646,279	1,716,553	990,482	907,158	25,076,648
1957	1,183,579	1,059,886	1,096,078	862,336	1,413,603	2,046,310	2,322,576	5,233,987	4,254,316	1,673,167	896,696	907,148	22,949,681
1958	1,114,241	898,500	1,042,983	1,048,535	1,585,806	1,284,866	2,792,960	5,373,290	3,369,854	1,123,086	811,745	847,438	21,293,305
1959	906,392	949,331	1,048,634	1,035,398	923,824	990,634	1,721,541	2,491,052	2,994,345	1,149,756	705,371	1,011,870	15,928,147
1960	1,246,943	879,037	863,478	823,134	967,579	1,756,639	2,423,469	2,604,342	2,445,326	768,443	638,255	678,571	16,095,216
1961	906,379	919,136	790,118	709,830	1,022,319	1,134,704	1,376,963	2,284,169	2,042,596	553,363	446,593	762,897	12,949,067
1962	1,051,662	811,759	794,503	726,311	1,331,166	1,143,925	2,891,372	3,626,084	3,299,589	1,455,509	836,839	760,376	18,729,097
1963	1,194,282	990,881	1,065,450	802,343	1,650,151	926,487	1,576,757	2,985,892	3,567,490	1,284,744	701,722	888,281	17,634,479
1964	788,213	932,814	847,343	834,283	693,884	1,036,975	2,263,970	3,344,197	4,462,825	1,889,131	880,604	866,319	18,840,559

Table B-1. MODSIM Model Output of monthly flows into Brownlee Reservoir under the Naturalized Flow Scenario (in acre-feet) (Upper Snake MODSIM – May 2007)

Year	October	November	December	January	February	March	April	May	June	July	August	September	Total
1965	897,731	919,796	2,189,850	1,503,158	1,687,387	1,479,993	3,396,722	4,818,124	5,046,154	2,706,342	1,406,027	1,149,335	27,200,619
1966	1,053,282	952,420	833,070	936,795	755,785	1,178,376	1,690,271	2,599,129	1,844,767	757,936	590,188	754,328	13,946,347
1967	890,841	833,584	888,041	1,045,603	864,045	1,085,320	1,410,242	3,334,532	4,579,251	2,101,457	848,781	828,757	18,710,454
1968	1,076,814	913,566	844,703	824,748	1,252,077	1,242,786	1,198,439	2,335,918	3,105,198	1,226,868	1,315,609	953,331	16,290,057
1969	1,011,073	991,517	925,588	1,514,048	1,009,736	1,129,976	4,371,847	4,836,661	3,126,103	1,390,253	835,959	937,204	22,079,964
1970	1,104,905	853,170	896,814	1,886,542	1,129,412	1,325,477	1,359,147	3,947,809	4,690,406	2,132,216	933,295	1,130,132	21,389,326
1971	1,074,044	1,172,736	1,035,512	2,009,979	1,282,380	1,605,892	3,376,360	6,025,265	5,759,327	3,003,568	1,262,549	1,154,343	28,761,954
1972	1,326,693	1,216,421	1,161,674	1,457,394	1,064,658	3,812,294	2,778,562	4,940,317	5,539,370	2,108,943	1,274,594	1,237,430	27,918,351
1973	1,434,491	1,144,507	1,214,548	1,355,521	1,035,647	1,346,450	1,847,572	3,131,825	2,442,395	1,200,560	831,321	1,080,757	18,065,594
1974	1,159,105	1,449,775	1,416,507	1,832,140	909,033	2,421,216	3,546,221	4,790,278	5,870,978	2,475,564	1,209,863	974,915	28,055,593
1975	1,214,213	969,889	988,164	1,006,557	1,069,202	1,603,557	2,127,484	4,772,861	5,660,714	3,293,202	1,350,981	1,088,819	25,145,644
1976	1,409,374	1,070,915	1,319,952	1,163,507	1,047,250	1,444,205	3,212,229	5,272,371	3,918,079	1,905,292	1,466,396	1,265,754	24,495,323
1977	1,217,086	855,260	894,485	848,170	759,497	812,696	890,109	1,179,464	1,083,704	515,497	463,844	607,534	10,127,347
1978	858,498	736,159	1,213,810	1,121,863	1,121,769	1,968,822	2,941,285	4,096,151	3,945,885	2,299,409	1,042,314	1,121,973	22,467,937
1979	958,712	778,244	758,213	855,213	1,040,003	1,663,454	1,825,003	3,369,029	2,432,627	1,012,719	821,017	676,121	16,190,353
1980	973,940	691,226	777,629	1,240,418	1,355,128	1,274,785	2,388,894	4,207,249	3,738,044	1,656,263	853,421	1,117,522	20,274,518
1981	995,303	893,014	1,200,198	1,056,433	1,259,168	1,253,943	1,822,072	2,765,743	2,911,912	990,752	642,725	717,769	16,509,030
1982	1,058,214	979,540	1,398,286	1,019,022	2,379,073	2,117,966	3,168,880	5,541,419	5,161,153	3,408,784	1,324,864	1,263,555	28,820,755
1983	1,440,661	1,120,967	1,417,420	1,507,279	1,367,976	3,538,566	3,205,332	5,600,939	5,622,038	3,032,393	1,593,595	1,258,726	30,705,892
1984	1,479,743	1,462,559	1,425,025	1,428,822	1,210,556	2,750,648	4,264,940	6,589,449	6,077,690	2,913,002	1,502,418	1,373,214	32,478,066
1985	1,397,145	1,299,894	1,190,103	1,102,031	981,126	1,447,871	3,504,017	3,781,435	2,441,264	1,112,392	827,035	1,200,752	20,285,065
1986	1,262,593	974,360	900,315	850,744	2,706,611	3,763,160	3,741,645	4,361,063	5,074,789	2,047,004	1,190,423	1,297,352	28,170,059
1987	1,348,646	1,058,774	974,435	984,061	998,251	1,365,941	1,581,936	2,225,357	1,362,496	922,582	697,086	703,394	14,222,961
1988	789,201	763,334	797,675	804,547	797,474	975,260	1,636,793	2,222,359	1,760,016	600,605	470,443	598,137	12,215,844
1989	740,851	772,672	765,749	759,028	733,707	2,703,204	3,241,018	3,473,913	2,697,253	1,148,663	852,274	854,554	18,742,887
1990	1,074,829	802,665	774,981	845,754	716,732	1,212,784	1,901,522	2,004,975	2,246,320	940,810	653,274	623,846	13,798,492
1991	892,275	723,808	600,551	781,598	732,487	912,949	1,173,139	2,636,631	2,596,271	1,015,746	637,801	742,723	13,445,978
1992	812,430	786,495	779,023	719,433	909,879	964,627	1,242,595	1,542,503	856,752	661,466	487,792	556,149	10,319,144
1993	653,399	607,660	695,635	759,471	648,878	3,102,247	3,050,457	5,027,544	3,776,577	1,716,125	1,176,396	838,841	22,053,230
1994	1,059,144	688,584	821,153	863,141	736,662	1,018,321	1,374,873	2,288,741	1,141,118	539,021	508,102	506,228	11,545,088
1995	885,719	676,633	834,394	1,195,118	1,463,518	2,084,141	2,328,934	4,242,714	4,524,529	2,579,503	1,065,703	933,136	22,814,041
1996	1,144,803	973,892	1,352,721	1,010,081	1,652,402	1,976,355	3,247,855	4,974,392	4,898,356	2,119,243	1,036,719	1,043,723	25,430,542
1997	1,115,853	1,121,855	1,551,963	2,781,293	1,566,616	2,269,867	3,531,373	6,446,814	5,556,453	2,666,810	1,502,932	1,278,795	31,390,623
1998	1,324,202	1,046,494	1,015,109	1,299,629	1,049,565	1,857,964	2,204,349	5,609,026	4,412,647	2,300,794	1,009,215	1,112,866	24,241,859
1999	1,195,906	974,523	1,062,050	1,216,558	1,148,213	2,374,963	2,991,363	4,516,985	5,168,989	2,149,410	1,225,678	1,041,804	25,066,441
2000	1,082,579	911,498	977,128	1,102,959	1,430,014	1,627,615	2,799,976	3,204,426	2,142,982	1,018,682	716,713	907,400	17,921,971
Average	**1,061,763**	**951,814**	**1,026,000**	**1,065,473**	**1,070,999**	**1,590,271**	**2,499,800**	**3,753,075**	**3,430,023**	**1,576,301**	**891,676**	**892,365**	**19,809,559**

Table B-1. MODSIM Model Output of monthly flows into Brownlee Reservoir under the Naturalized Flow Scenario (in cfs) (Upper Snake MODSIM – May 2007)

Year	October	November	December	January	February	March	April	May	June	July	August	September	Average
1928	21,446	24,464	21,667	21,804	15,486	38,112	38,340	86,433	53,206	27,595	15,237	15,603	31,616
1929	18,137	16,750	12,957	14,185	9,249	24,068	30,566	47,171	45,388	19,230	11,406	12,984	21,841
1930	14,992	13,717	15,708	11,062	19,113	18,693	27,978	38,704	34,771	15,812	14,270	13,404	19,852
1931	18,102	13,765	12,909	12,570	12,085	17,769	22,871	27,244	19,428	8,664	7,844	9,093	15,195
1932	12,702	11,598	12,182	11,588	8,079	27,998	44,559	67,752	63,554	25,115	12,068	12,563	25,813
1933	14,381	14,943	12,650	13,146	11,765	16,638	30,963	44,878	63,702	17,534	10,584	11,396	21,882
1934	13,139	13,262	14,782	16,609	15,153	18,346	25,799	26,475	15,481	8,355	6,782	8,093	15,190
1935	12,610	11,733	11,642	11,635	11,929	15,335	36,877	42,932	47,013	17,398	9,275	9,606	19,832
1936	12,783	12,962	11,727	13,734	14,984	16,537	59,943	74,494	53,143	17,418	12,487	12,692	26,075
1937	13,316	12,883	13,133	10,825	11,917	15,004	32,482	46,040	35,365	14,919	9,098	10,526	18,792
1938	14,598	14,970	21,445	16,262	15,904	29,206	59,895	77,282	68,736	34,139	14,871	14,330	31,803
1939	18,192	16,951	15,710	13,845	11,876	29,472	40,644	44,778	28,783	15,734	10,356	12,778	21,593
1940	15,410	12,629	13,623	14,530	20,008	32,113	42,730	48,056	33,065	12,611	8,797	14,604	22,348
1941	17,464	16,231	15,685	15,532	19,726	26,280	31,992	47,158	42,806	17,292	14,398	14,901	23,289
1942	17,250	17,337	20,595	15,350	17,474	16,435	53,362	50,224	56,366	23,146	11,234	13,481	26,021
1943	16,239	19,356	20,913	24,746	23,660	35,584	87,083	73,349	79,339	51,309	20,057	17,768	39,117
1944	18,714	21,766	16,006	13,809	14,643	16,373	27,669	36,282	46,074	20,847	10,819	12,491	21,291
1945	15,007	15,788	13,807	15,124	21,958	19,811	29,103	61,481	61,829	30,170	15,306	16,285	26,306
1946	18,036	17,167	19,019	18,050	14,057	34,360	67,954	71,393	52,166	22,316	14,692	17,120	30,527
1947	20,318	19,830	21,822	14,844	21,218	23,393	31,803	61,777	52,590	24,310	15,328	15,220	26,871
1948	18,158	16,664	16,746	17,420	17,090	17,431	33,849	61,667	66,873	21,660	13,319	14,182	26,255
1949	17,410	15,877	14,651	12,721	16,700	28,637	47,315	71,210	48,705	18,574	12,631	12,797	26,436
1950	18,242	16,376	14,676	15,355	19,587	26,876	43,025	56,462	73,743	41,399	17,385	16,761	29,991
1951	20,705	19,923	19,926	16,521	28,493	22,718	57,988	71,430	58,279	30,725	21,232	16,290	32,019
1952	21,553	18,422	20,764	17,091	15,621	15,637	98,733	106,755	67,145	29,217	15,866	15,743	36,879
1953	16,137	14,608	15,438	24,222	19,735	19,624	35,134	50,274	80,394	31,051	14,573	13,561	27,896
1954	15,964	16,360	15,881	16,670	18,981	20,861	35,349	60,393	49,456	28,707	14,722	13,725	25,589
1955	16,549	15,145	13,890	13,520	12,437	14,309	25,453	43,633	49,502	21,816	12,214	11,495	20,830
1956	15,513	16,604	29,118	26,654	17,819	30,082	56,628	84,582	78,083	27,917	16,109	15,245	34,530
1957	19,249	17,812	17,826	14,025	25,453	33,280	39,032	85,123	71,496	27,211	14,583	15,245	31,695
1958	18,121	15,100	16,962	17,053	28,554	20,896	46,937	87,388	56,632	18,265	13,202	14,242	29,446
1959	14,741	15,954	17,054	16,839	16,634	16,111	28,931	40,513	50,322	18,699	11,472	17,005	22,023
1960	20,280	14,773	14,043	13,387	16,821	28,569	40,728	42,356	41,095	12,498	10,380	11,404	22,194
1961	14,741	15,447	12,850	11,544	18,408	18,454	23,141	37,148	34,327	9,000	7,263	12,821	17,929
1962	17,104	13,642	12,921	11,812	23,969	18,604	48,591	58,973	55,451	23,672	13,610	12,779	25,927
1963	19,423	16,652	17,328	13,049	29,713	15,068	26,498	48,561	59,954	20,894	11,412	14,928	24,457
1964	12,819	15,676	13,781	13,568	12,063	16,865	38,047	54,388	75,000	30,724	14,322	14,559	25,984

Table B-1. MODSIM Model Output of monthly flows into Brownlee Reservoir under the Naturalized Flow Scenario (in cfs) (Upper Snake MODSIM – May 2007)

Year	October	November	December	January	February	March	April	May	June	July	August	September	Average
1965	14,600	15,458	35,614	24,447	30,383	24,070	57,084	78,359	84,803	44,014	22,867	19,315	37,585
1966	17,130	16,006	13,549	15,236	13,609	19,164	28,406	42,271	31,002	12,327	9,598	12,677	19,248
1967	14,488	14,009	14,443	17,005	15,558	17,651	23,700	54,231	76,957	34,177	13,804	13,928	25,829
1968	17,513	15,353	13,738	13,413	21,767	20,212	20,140	37,990	52,185	19,953	21,396	16,021	22,473
1969	16,444	16,663	15,053	24,624	18,181	18,377	73,471	78,661	52,536	22,610	13,596	15,750	30,497
1970	17,970	14,338	14,585	30,682	20,336	21,557	22,841	64,205	78,825	34,677	15,179	18,992	29,516
1971	17,468	19,708	16,841	32,689	23,090	26,117	56,742	97,992	96,789	48,848	20,533	19,399	39,685
1972	21,577	20,443	18,893	23,702	18,509	62,001	46,695	80,347	93,092	34,299	20,729	20,796	38,424
1973	23,330	19,234	19,753	22,045	18,648	21,898	31,049	50,934	41,046	19,525	13,520	18,163	24,929
1974	18,851	24,364	23,037	29,797	16,368	39,377	59,596	77,906	98,665	40,261	19,677	16,384	38,690
1975	19,747	16,300	16,071	16,370	19,252	26,079	35,754	77,623	95,131	53,559	21,972	18,298	34,680
1976	22,921	17,997	21,467	18,923	18,207	23,488	53,983	85,747	65,845	30,987	23,849	21,272	33,724
1977	19,794	14,373	14,547	13,794	13,675	13,217	14,959	19,182	18,212	8,384	7,544	10,210	13,991
1978	13,962	12,372	19,741	18,245	20,199	32,020	49,430	66,618	66,313	37,396	16,952	18,855	31,008
1979	15,592	13,079	12,331	13,909	18,726	27,053	30,670	54,792	40,882	16,470	13,353	11,363	22,352
1980	15,840	11,616	12,647	20,173	23,559	20,732	40,147	68,424	62,820	26,937	13,880	18,781	27,963
1981	16,187	15,008	19,519	17,181	22,673	20,393	30,621	44,980	48,936	16,113	10,453	12,062	22,844
1982	17,210	16,462	22,741	16,573	42,837	34,445	53,255	90,123	86,736	55,439	21,547	21,235	39,884
1983	23,430	18,838	23,052	24,514	24,632	57,549	53,867	91,091	94,481	49,317	25,917	21,154	42,320
1984	24,066	24,579	23,176	23,238	21,046	44,735	71,675	107,167	102,139	47,375	24,434	23,078	44,726
1985	22,722	21,845	19,355	17,923	17,666	23,547	58,887	61,499	41,027	18,091	13,450	20,179	28,016
1986	20,534	16,375	14,642	13,836	48,735	61,202	62,880	70,926	85,285	33,291	19,360	21,803	39,072
1987	21,934	17,793	15,848	16,004	17,974	22,215	26,585	36,192	22,898	15,004	11,337	11,821	19,634
1988	12,835	12,828	12,973	13,085	13,864	15,861	27,507	36,143	29,578	9,768	7,651	10,052	16,845
1989	12,049	12,985	12,454	12,344	13,211	43,963	54,467	56,498	45,329	18,681	13,861	14,361	25,850
1990	17,480	13,489	12,604	13,755	12,905	19,724	31,956	32,608	37,751	15,301	10,624	10,484	19,057
1991	14,511	12,164	9,767	12,711	13,189	14,848	19,715	42,881	43,632	16,520	10,373	12,482	18,566
1992	13,213	13,217	12,670	11,700	15,818	15,688	20,883	25,086	14,398	10,758	7,933	9,346	14,226
1993	10,627	10,212	11,313	12,352	11,684	50,453	51,265	81,765	63,467	27,910	19,132	14,097	30,356
1994	17,225	11,572	13,355	14,038	13,264	16,561	23,106	37,223	19,177	8,766	8,263	8,507	15,922
1995	14,405	11,371	13,570	19,437	26,352	33,895	39,139	69,001	76,037	41,952	17,332	15,682	31,514
1996	18,618	16,367	22,000	16,427	28,727	32,142	54,582	80,901	82,320	34,466	16,861	17,540	35,079
1997	18,148	18,853	25,240	45,233	28,208	36,916	59,347	104,847	93,379	43,372	24,443	21,491	43,290
1998	21,536	17,587	16,509	21,136	18,898	30,217	37,045	91,222	74,157	37,419	16,413	18,702	33,404
1999	19,450	16,377	17,273	19,785	20,675	38,625	50,272	73,462	86,868	34,957	19,934	17,508	34,599
2000	17,606	15,318	15,891	17,938	24,861	26,471	47,055	52,115	36,014	16,567	11,656	15,249	24,729
Average	**17,268**	**15,996**	**16,686**	**17,328**	**19,119**	**25,863**	**42,011**	**61,038**	**57,643**	**25,636**	**14,502**	**14,997**	**27,341**

Appendix C BACKGROUND ON UPPER SNAKE FLOW AUGMENTATION

C.1 Introduction

Reclamation began providing additional flows from the upper Snake in 1991. Since 1992, consultations between Reclamation and NMFS under Section 7(a)(2) of the ESA have included the consideration of flow augmentation from Reclamation's upper Snake projects to augment flows in the lower Snake and Columbia Rivers through acquisitions from willing sellers and lessors. Also, as required by Section 8 of the Reclamation Act of 1902, flow augmentation must rely on state protection of augmentation flows under the provisions of State water law.

The 427,000 acre-feet from the upper Snake is one of several regional supplies of water used to help improve conditions for listed salmon and steelhead. In addition to Reclamation's upper Snake River supplies, other sources for flow augmentation within the Columbia River basin include up to 1,200,000 acre-feet from Dworshak Reservoir and up to 237,000 acre-feet from Brownlee Reservoir. Up to 2,428,000 acre-feet from reservoirs at Grand Coulee, Banks Lake, Libby, and Hungry Horse Dams, located on the upper Columbia River, are released to help meet flow objectives on the lower Columbia River at McNary Dam. Up to 1,000,000 acre-feet from Canadian storage (negotiated annually) may also be available.

The accounting for flow augmentation from the Snake River above Milner Dam takes place at the Milner gauge (RM 638.7). During the flow augmentation season, Reclamation makes releases from American Falls Reservoir, which pass through Minidoka and Milner Dams. Reclamation's releases from the Payette and Boise River systems are measured at the Letha and Middleton gauges, respectively. All of Reclamation's flow augmentation water is delivered to the lower Snake River at Brownlee Reservoir and must pass through Idaho Power Company's Hells Canyon Dam before salmon and steelhead are benefited. Reclamation's augmentation flows are most important in the Snake River reach between the toe of Hells Canyon Dam to the confluence of the Snake and Clearwater Rivers, at which point significant volumes of substantially cooler Clearwater River water from Dworshak Reservoir enter the river.

Regardless of where water is secured for flow augmentation in the upper Snake River basin, it ultimately must arrive hundreds of miles further downstream where it can

benefit listed salmon and steelhead. Water is protected from intervening hostile diversion under the provisions of State water law. The active cooperation of the State water rights administrators is essential in assuring that the water Reclamation acquires reaches the targeted stream reaches. Reclamation has worked with the State and water users to develop and consummate sales and rentals of water rights and storage contract entitlements for flow augmentation. In return, a scheme to provide flow augmentation based on State law has meant that local and state water administrators assist Reclamation in determining release rates and account for water released for flow augmentation. State water administrators are also solely responsible for tracking flows downstream and for ensuring that flows are delivered to the targeted locations downstream.

Reclamation has worked diligently to secure State recognition and the concomitant protection of water provided for flow augmentation. The Idaho Legislature has enacted interim legislation since 1992, which has provided interim authority to Reclamation. This legislation has had to be renewed several times during the past decade. The Nez Perce Water Rights Settlement resulted in the amendment of Section 42-1763B, Idaho Code (House Bill 15) by the 2005 Idaho Legislature, authorizing Reclamation's flow augmentation activities through 2034, thus adding greater certainty to Reclamation's ability to provide flow augmentation from its upper Snake projects and protect it to the state line.

Reclamation has taken the following actions over the past several years to secure and improve delivery of water for flow augmentation:

- Permanently reacquired 60,274 acre-feet of storage space in Reclamation project reservoirs in Idaho and dedicated this water to flow augmentation.
- Acquired 17,650 acre-feet of natural flows in Oregon and secured a change in use of the 17,650 acre-feet from the Oregon Water Resources Department in order to protect the water to the state line and ensure its delivery for flow augmentation.
- Reassigned to flow augmentation a total of 98,554 acre-feet of water not contracted to water users.
- Secured (through the Nez Perce Water Rights Settlement) 30-year legislation from the State authorizing the protection of Reclamation flow augmentation releases to the state line.
- Obtained recognition under State law (through the Nez Perce Water Rights Settlement) the ability to deliver in any year water in powerhead space (up to 198,000 acre-feet) located in two reservoirs, if needed, to provide up to 427,000 acre-feet of water for flow augmentation.

- Provided (through the Nez Perce Water Rights Settlement) for the long term rental of 60,000 acre-feet of water acquired from natural flow water right holders along the Snake River. In cooperation with the State, this water has been acquired, which resulted in the permanent fallowing of 25,000 acres of irrigated land.
- Increased (through the Nez Perce Water Rights Settlement) the maximum volume of water that could be provided to 487,000 acre-feet, consisting of 427,000 acre-feet from traditional sources, plus the 60,000 acre-feet of natural flows identified above.
- Worked with the Water District 01 and Water District 65 Rental Pools to ensure the availability of water to rent for flow augmentation.
- Worked with the Water District 01 Rental Pool to develop long term certainty about the volume of water available for rental for different water year types and storage carryover conditions to reduce the uncertainty associated with the willing seller approach.

C.2 Upper Snake Flow Augmentation Sources

Since 1991, the sources used by Reclamation for flow augmentation water have been in two categories: (1) Water stored in projects (the use of uncontracted space, water rentals through the State's rental pools, and powerhead space); and (2) Natural flow water rights (lease or purchase of natural flow rights).

All flow augmentation water is administered through several rental pools located within different drainages in accordance with Idaho State law and includes releases from Reclamation storage space and leases from water users. Reclamation intends to provide salmon flow augmentation from project reservoirs in the Snake River above Milner Dam (Water District 01), the Boise River system (Water District 63), and the Payette River system (Water District 65); from lease of Idaho natural flows; and from acquired natural flows in Oregon. In addition to these long-term and permanent sources, Reclamation relies heavily each year on annual rentals from spaceholders at its projects.

C.2.1 Water Stored in Projects

C.2.1.1 Uncontracted Space (Reclamation Space)

Uncontracted space is space in the reservoir that has not been contracted to a spaceholder or was re-acquired by Reclamation for flow augmentation purposes. Uncontracted space in Reclamation's reservoirs is a reliable source of water in most years. Reclamation relies on this space as much as possible in meeting its

commitment to provide flow augmentation and provides all water accrued annually in this space for flow augmentation purposes. The Boise and Payette rental pool procedures state that this space will be the last to fill (after contracted space). In drier water years when reservoirs do not refill, Reclamation may have little or no water available to provide for flow augmentation from this storage space. Water rentals reduce the carryover volume at the end of the irrigation season. This reduces the likelihood the reservoir will fill the following year in the event of below normal snowpack. Idaho's last-to-fill rule was established in the mid-1980s as a means of avoiding injury to spaceholders who rely on refill of storage the following year. Thus, the parties making water available for salmon flow augmentation have assumed any risks that the evacuated space may fail to refill.

C.2.1.2 Rental Pool

Reclamation relies heavily each year on annual rentals from water users to acquire water for its flow augmentation program. Rental water has comprised as much as 67 percent of the total volume of flow augmentation delivered in wet years but may be only 10 percent of the total volume in dry years. The two major sources of rental pool water are the water districts and the Shoshone-Bannock Tribes.

Rentals from the Districts come from three rental pools (Water District 01 above Milner Dam, Water District 63 in the Boise River system, and Water District 65 in the Payette River system). The amount available for rental varies from year to year and is dependent on runoff, reservoir carryover levels, irrigation demands, and the willingness of spaceholders to make the water available for lease subjecting it to the last-to-fill rule. Negotiation of the Nez Perce Water Rights Settlement led to the development of a chart that identifies water availability from the Water District 01 Rental Pool for flow augmentation. This chart considers total system carryover storage (above Milner Dam) on November 1 and the April 1 runoff forecast for unregulated runoff for the Snake River at Heise (for April 1 through September 30 period) to determine the amount of water available for flow augmentation from the rental pool. This chart has improved the certainty in planning for flow augmentation volumes above Milner Dam.

Rental from the Shoshone–Bannock Tribes is from contracted space in American Falls Reservoir. The Tribes are able to rent water from this space for downstream uses in accordance with the terms of the Fort Hall Water Rights Settlement of 1990. The 1990 Settlement provides that the Tribes' rental will be in accordance with a Tribal water bank; Tribal policy requires that on-reservation water needs are served first. The Tribes usually have adequate space from other sources to meet their irrigation requirements, thereby, resulting in the American Falls Reservoir space available for rental. The Shoshone–Bannock Tribes entered into one long-term lease

with Reclamation to use some of this space for flow augmentation purposes. The last deliveries under that agreement are being made in 2007.

C.2.1.3 Powerhead Space

Powerhead space is part of the inactive capacity in a reservoir intended to provide adequate hydraulic head to generate hydroelectric power. Without this hydraulic head, generating units will operate inefficiently and may need to shut down in extreme conditions. Reclamation relies on powerhead space at Palisades and Anderson Ranch Reservoirs in years when it is unable to acquire sufficient water from the sources described above to obtain up to 427,000 acre-feet for flow augmentation. Reclamation uses this space as a last resort as the last-to-fill rule applies, and if the reservoir does not fill the following year, this space will not fill. Further, using this space affects the ability to generate power and can have effects to ESA-listed bull trout in Anderson Ranch Reservoir. In the past, the State has not recognized the use of powerhead space as a legal beneficial use at Palisades Reservoir under State law. The Nez Perce Water Rights Settlement resulted in the State's agreeing to allow Reclamation to amend its water right to use the powerhead space in Palisades Reservoir for flow augmentation, but not to exceed a flow augmentation total of 427,000 acre-feet when using powerhead.

C.2.2 Natural Flow Water Rights

The Nez Perce Water Rights Settlement authorized the use of up to 60,000 acre-feet of natural flow rights downstream of Milner Dam for flow augmentation. In water rich years, this will increase the volume of water available for augmentation to more than 427,000 acre-feet and up to 487,000 acre-feet. Through a complex series of negotiations, the Idaho Water Resources Board (IWRB) purchased approximately 98,000 acre-feet of water rights from the Bell Rapids Mutual Irrigation Company. Reclamation then entered into a 30-year lease with the State for 60,000 acre-feet of this water for salmon flow augmentation.

Flow augmentation from natural flow rights downstream of Milner Dam occurs during the entire irrigation season, roughly April 1 to October 31. The IWRB lease of 60,000 acre-feet is comprised of 49,500 acre-feet occurring within the April 3 to August 31 period, and 10,500 acre-feet that occurs outside the juvenile outmigration period. Even though these 10,500 acre-feet are delivered outside the April 3 to August 31 period, it nonetheless provides an instream benefit and continued flow augmentation.

Reclamation permanently acquired 17,650 acre-feet of natural flow rights on the Malheur River with supplemental Snake River rights in Oregon.

C.2.3 Summary of Sources of Upper Snake Flow Augmentation

Table C-1 summarizes the sources and potential volumes of salmon flow augmentation water available from the upper Snake River. The volume provided in any given year varies depending on the water year supply, storage carryover in reservoirs, and the willingness of spaceholders to lease water for flow augmentation. Further, State water law, and as stipulated in the Nez Perce Water Rights Settlement, limits total flow augmentation volume to 487,000 acre-feet annually, or 427,000 acre-feet if powerhead space is used.

Table C-1. Sources of salmon flow augmentation water from the upper Snake.

Source	Amount (acre-feet)	Conditions of Use
Snake River above Milner Dam		
Uncontracted space, Reclamation	22,896	Annual accrual determined by State water rights accounting.
Rentals, Water District 01	0 to 205,000	Annual amount stipulated by rental pool rules according to November 1 carryover volume and Apr-Sept runoff forecast on April 1.
Rentals, Tribes	0 to 46,931	The Shoshone-Bannock Tribes have contract space in American Falls Reservoir and can rent water from this space for downstream uses in accordance with the terms of the Fort Hall Water Rights Settlement of 1990.
Palisades Reservoir, powerhead	157,000	Pursuant to Nez Perce Water Rights Settlement, can only be used if sum of all other sources, including natural flows, is less than 427,000 acre-feet; total augmentation cannot exceed 427,000 acre-feet when used.
Boise River System		
Uncontracted space, Reclamation	40,932	Annual accrual determined by State water rights accounting.
Anderson Ranch, powerhead	36,956 [1]	Identified as "powerhead" in Nez Perce Term Sheet; conditions of use same as Palisades's powerhead.
Rentals, Water District 63	0	Rentals of 2000 acre-feet occurred in 1995 and 1997, but this is not considered a reliable source of rental water.
Payette River System		
Uncontracted space, Reclamation	95,000	Annual accrual determined by State water rights accounting.
Rentals, Water District 65	0 to 65,000	Historical range of rentals, but is not capped. Usually minimum of 50,000 acre-feet in all but the driest years.
Malheur River System		
Natural flow water right	17,650	Acquisition of Snake and Malheur River natural flow rights
Rental of Natural Flow		
Natural flow lease	60,000	30-year lease with Idaho Water Resource Board pursuant to Nez Perce Water Rights Settlement

[1] Anderson Ranch inactive space was originally 41,000 acre-feet, but a 1997 sedimentation survey has determined this space is now 36,956 acre-feet

Appendix D UPPER SNAKE RIVER BASIN TEMPERATURE MONITORING

Reclamation has developed and implemented a basin-wide temperature monitoring study for the upper Snake River basin. Data collection for a comprehensive water temperature database in the upper Snake River and major tributaries was initiated in 2004. This temperature data collection activity will provide a continuous water temperature record at points upstream and downstream of major Reclamation storage reservoirs and blocks of irrigated lands in the upper Snake River, as well as Snake River temperatures entering and leaving the Hells Canyon Complex.

A total of 52 strategically placed monitoring sites are located throughout the basin (See Table D-1 and Figure D-1). To supplement the existing stations, the USGS installed water temperature sensors at 10 currently active gaging stations. Reclamation installed real-time temperature sensors at 19 Hydromet stations and placed manual temperature sensors at 12 additional locations.

Table D-1. Upper Snake temperature monitoring locations.

BOR Code	USGS Station	Station Name
USGS Installation		
REXI	13056500	Henry's Fork near Rexburg, ID
PALI	13032500	Snake River near Irwin, ID
LORI	13038500	Snake River at Lorenzo, ID
MNNI	13057000	Snake River nr Menan, ID
BRBI	13068500	Blackfoot River nr Blackfoot, ID
SNAI	13069500	Snake River nr Blackfoot, ID
SKHI	13154500	Snake River at King Hill
HOTI	13168500	Bruneau River near Hot Springs, ID
SNYI	13213100	Snake River at Nyssa, OR
WEII	13269000	Snake River at Weiser, ID
Reclamation Installation, Hydromet		
ISLI	13042500	Henry's Fork near Island Park, ID
TEAI	13055000	Teton River nr St. Anthony, ID
FLGY	13010065	Snake River ab Jackson Lake at Flagg Ranch, WY
JCK	13011000	Snake River nr Moran, ID
ALPY	13022500	Snake River ab Reservoir nr Alpine, WY
AMFI	13077000	Snake River at Neeley, ID
MILI	13081500	Snake River at Milner, ID
ROMO	13181000	Owyhee River near Rome, OR
OWY	13183000	Lake Owyhee and Owyhee River near Nyssa, OR
WARO	13215000	Malheur River bel Warm Springs Res nr Riverside, OR
MALO	--	Malheur River at 36th St. Bridge near Ontario, OR
PARI	13213000	Boise River near Parma, ID
PAYI	13239000	NF Payette River McCall, ID
CSCI	--	NF Payette River at Cascade, ID
HRSI	13247500	Payette River near Horseshoe Bend, ID
PRPI	13251000	Payette River near Payette, ID
MCII	--	Mann Creek at Mann Creek Guard Station, ID
PHL	--	Mason Dam and Phillips Lake near Sumpter, OR
THF	--	Thief Valley Dam and Reservoir near North Powder, OR
Reclamation Installation, PN Regional Laboratory		
THSP	--	Snake River at Niagra Springs
CJST	13171500	Below CJ Strike Dam (above bridge)
BDDI	--	Boise River below Diversion Dam nr Boise, ID
PHBI	--	Payette River at Hartzel Bridge
PRMI	--	Payette River nr Montour, ID
EMM	13249500	Payette River near Plaza Bridge
WEIM	--	Weiser River near Highway 95 Bridge

Table D-1. Upper Snake temperature monitoring locations.

BOR Code	USGS Station	Station Name
GAR101	--	NF Payette River below Cascade Dam
MILI	13087995	Snake River at Murtaugh
SWAI	--	Snake River (Swan Falls) nr Murphy, ID
HCDI	13290450	Snake River at Hells Canyon Dam ID-OR State Line
PRRO	--	Powder River near Richland, OR
Existing Stations with Temperature		
BTSI	13185000	Boise River near Twin Springs, ID
BRFI	13186000	South Fork Boise River near Featherville, ID
AND	13190500	Anderson Ranch Dam and Reservoir
DEDI	13236500	Deadwood River bl Deadwood Res nr Lowman, ID
PRLI	13235000	SF Payette River at Lowman, ID
MADO	--	Malheur River near Drewsey, OR
BEUO	13217500	North Fork Malheur River at Beulah
MABO	--	NF Malheur River above Beulah Res
UNY	--	Unity Reservoir and Burnt River near Unity, OR
PRHO	--	Powder River at Hudspeth Lane near Sumpter, OR
NPDO	--	Powder River abv Thief Valley Res nr. North Powder

--: No Station

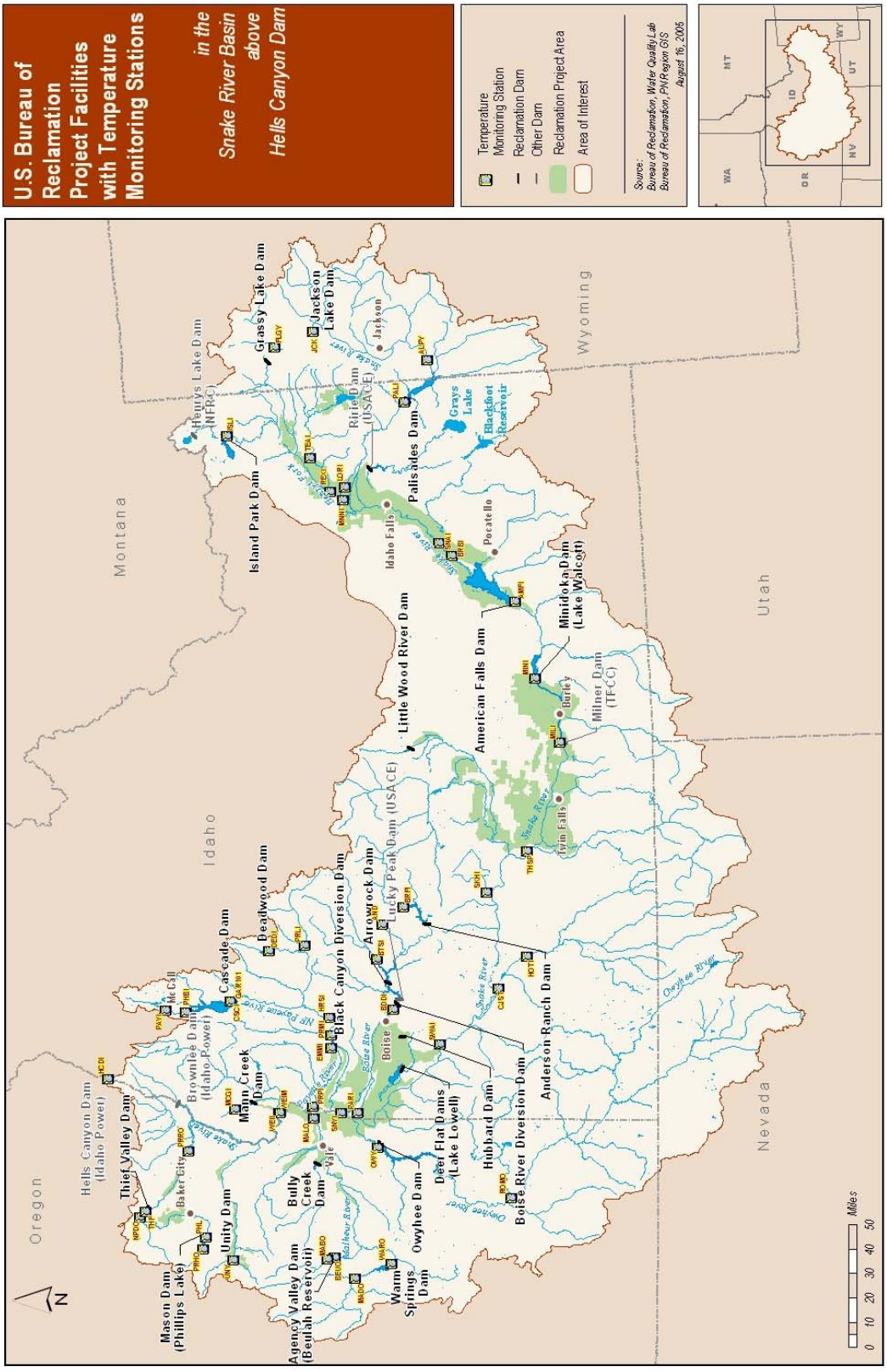

Figure D-1. Upper Snake River basin water temperature monitoring stations.