

Columbia River Inter-Tribal Fish Commission 2001 River Operations Plan

February 21, 2001

Overview

The Columbia River Inter-Tribal Fish Commission presents the 2001 River Operations Plan for the Federal Columbia River Power System (FCRPS) and the Hells Canyon Complex (FERC No. 1971). The Plan contains detailed recommendations for decision making, dam operations, including flows, reservoir elevations, spill and fish facility operations. It also contains recommendations for water acquisition and energy conservation. Both will contribute to increased mainstem salmon protection.

The region is facing an unprecedented scenario for anadromous fish passage and survival. At this writing, the 2001 runoff year is the third worst year in the 70 year record, and power emergencies have aggressively depleted basin reservoirs of critical water for anadromous fish. For example, Lake Roosevelt is presently about 32 feet lower than it was in February 1977, the worst water year on record. With the mid-February volume runoff forecast at 59% of normal, the Basin's 2001 accumulated precipitation is presented in Attachment 1.

Every day that passes diminishes water management options for anadromous fish. The Plan offers a holistic, water management paradigm that avoids the weaknesses of week-to-week trade offs common to the Technical Management Team decisions.

At the same time, record numbers of adult returns are forecasted back to the Basin, and tens of millions of juvenile salmon will be outmigrating through the hydrosystem. Spring chinook and steelhead stocks at the upper end of the basin are at the most risk for collapse and cannot afford mainstem impacts of even one low survival year.

Given these severe circumstances, the Plan offers a direction to "spread the pain" among river users. Key Plan objectives include maximizing salmon protection and keeping the Bonneville Power Administration economically whole. We believe that these two objectives can be best met by carefully following the Plan recommendations.

The Plan provides specific bi-weekly flow and reservoir recommendations at various index points in the Basin (Attachment 2). Limited runoff is allocated between spring migrations and storage for summer migrations. Spring and summer spill programs are fully implemented (Attachment 3). The Plan also contains specific recommendations and guidelines for power peaking, water management during the treaty fisheries, fish facility operations and mainstem research (Attachment 4).

The Plan is a significant compromise to what the Commission recommended in the *Wy-Kan-Ush-Mi Wa-Kish-Wit (Spirit of the Salmon)* restoration plan for mainstem salmon protection. In fact, given the water situation, even the NMFS 2000 FCRPS Biological Opinion flows targets and reservoir elevations will not be met. However, if carefully implemented, the Plan will establish mainstem habitat and passage conditions that will limit substantial injury and mortality to the majority of the 2001 juvenile and adult migrations. The Commission urges the federal government and Idaho Power Company to commit to implement the recommendations in this plan.

Key Plan Recommendations

Decision Making

- Tribes must have a seat at the federal executive committee table.
- The Technical Management Team (TMT) does not work for tribes. The federal operators and NMFS should use CBFWA as the technical forum to discuss river operations where tribes can have input. Issues should be raised to the executive committee table

Energy and Water Conservation

- Late winter and early spring flows below Bonneville are maintained to meet BPA's stated economic viability criteria.¹
- BPA should immediately invoke aggressive energy conservation measures, beyond voluntary pleas to the public. BPA should offer customers economic incentives to conserve energy.
- Irrigators in the Upper Snake and the Columbia Basin Irrigation Project should be "bought out" by BPA for mainstem water withdrawals and energy normally consumed by agricultural production. Water and land acquisition programs should be implemented immediately.
- BPA should renew the contract with Idaho Power to allow flexibility in flow augmentation through power exchanges.

¹ On January 31, BPA estimated that flows of 125-130 kcfs below Bonneville Dam until April are necessary to generate enough power to avoid depleting working capital reserves. These flows also give reasonable protection for chum redds.

Runoff Forecast (Attachment 1)

- The Plan assumes that the current 70% of normal precipitation pattern will continue into spring, while the NW River Forecast Center continues to predict “near normal” precipitation.² CRITFC believes a continuing pattern of below normal precipitation is likely. Runoff in the Plan is based upon 70% of normal precipitation.

Flow and Reservoir Management (Attachment 2)

- Available storage and runoff is shaped to meet peaking hydrographs at Priest Rapids, Lower Granite and The Dalles index points. The object is to provide some flushing flows during the main portions of the juvenile and adult migrations.
- Meeting Clean Water Act standards for dissolved gas and temperature is a high priority; juvenile salmon should be left in river to avoid high temperatures in screen and transportation systems.
- Reservoirs are left with some storage at the end of the migration season as a buffer for a probable 2002 *El Nino* water year, as is being forecasted by scientists at the University of Washington and Canadian climatologist Dr. Landscheidt.
- Refill of Dworshak Reservoir is a high priority. Drafting of Dworshak should be stopped immediately. Some small volumes are allocated for spring flows, but the majority of flow is dedicated to summer migrants and temperature control to attempt to meet Clean Water Act standards. Dworshak fills to msl 1585 feet by July 1 for summer migrants and temperature control. Dworshak is left at msl 1520 feet at the end of the September migration.
- Brownlee storage augments Snake River spring flows and to a lesser extent, early summer flows. Idaho Power Company is asked to follow plan recommendations. NMFS should release a biological opinion for the Hells Canyon Complex that includes Plan recommendations.
- The 427 kaf flow augmentation from the upper Snake is fully provided. This water is passed through the Hells Canyon Complex to augment early summer flows.

² To estimate the 70% precipitation level in the flow projections, the NW River Forecast Center’s average precipitation projections were reduced by 5% at all basin index points found in Attachment 2.

- Lake Roosevelt reservoir elevation is restricted to msl 1220 feet by mid-April, which allows runoff refill for spring flows, Hanford Reach juvenile outmigration protection and summer flows.
- Banks Lake provides 200 kaf in August for flow augmentation and energy production. This volume remains in Lake Roosevelt instead of being pumped into Banks Lake.
- Canadian storage is primarily released in the late winter and spring in order to leave some storage in Lake Roosevelt for salmon migrations and energy needs. An additional 700 kaf from Canadian storage is allocated for downstream flows.
- Libby storage is managed for sturgeon flows and downstream salmon migrations. Libby is drafted to avoid drafting Dworshak, which has temperature control capacity. Libby is drafted to msl 2325 feet by the end of May and then fills to msl 2359 feet by September.
- Hungry Horse is drafted in late winter and spring to msl 3488.5 feet to provide spring flows and summer storage at downstream reservoirs and then fills to msl 3504 feet by late July.
- Power peaking is restricted to avoid stranding of Hanford Reach juvenile chinook, especially during the key fry susceptibility period (April 1-30). Fluctuations during this period should not exceed plus or minus 10 kcfs during a 24 hour period. Monitoring of the reach during emergence and early migration for impacts and emergency protocols are implemented.
- Power peaking is restricted to avoid impacts to fish ladders and other fish passage facilities and to allow proper conduct of treaty fisheries.

Spill (Attachment 3)

- Repeatedly, spill has been demonstrated to be the most effective and safest means of juvenile project passage and is the only means to enhance survival in the face of low flows (Fishery Managers 1994). Spill also best protects the beneficial use under the Clean Water Act by providing salmon access to lower temperatures found at depth in the reservoirs instead of higher temperatures found in dam bypass and transportation systems. Spill also provides safer downstream passage for steelhead kelts and adults that fallback over dams than powerhouse routes.
- The 2000 Biological Opinion spring and summer spill should be fully implemented in the Lower Columbia and nighttime spring and summer spill should be implemented in the Snake River.

- The Corps of Engineers should complete their timely application for a total dissolved gas waiver to the appropriate water quality agencies.

Dam Facility Operations and Research (Attachment 4)

- Fish facilities should be operated according to CRITFC and other salmon managers' recommendations for the Corps of Engineers' 2001 Fish Passage Plan. Inspection of facilities should be increased to daily intervals with tribal participation made possible by the federal operators.
- Fish facilities have full components of spare parts and backup systems, consistent with salmon managers' 2001 Fish Passage Plan recommendations.
- Monitoring systems for water quality are installed throughout the dams and reservoirs by the federal operators with real-time tracking.
- Mainstem research that involves fish handling and tagging and modifications to fish protection measures should be extremely limited and should meet consensus tribal and fishery agency approval.

Attachments 1-4

Reference: Fishery Managers (Columbia River Inter-Tribal Fish Commission, Idaho Department of Fish and Game, Oregon Department of Fish and Wildlife, U.S. Fish and Wildlife Service, Washington Department of Fish and Wildlife). 1994. Scientific Rationale for Implementing a Spring and Summer spill program to increase juvenile salmonid survival in the Snake and Columbia Rivers. CRITFC. Portland, Oregon.

Attachment 3

2001 Spill Program Schedule

Spring Spill

- | | |
|--|---|
| Bonneville, The Dalles, John Day | - Follow timing and levels in 2000 FCRPS Biological Opinion, |
| Lower Granite, Little Goose,
Lower Monumental, McNary | - Spill to the total dissolved gas cap during 12 nighttime hours from April 10- June 20 |

Summer Spill

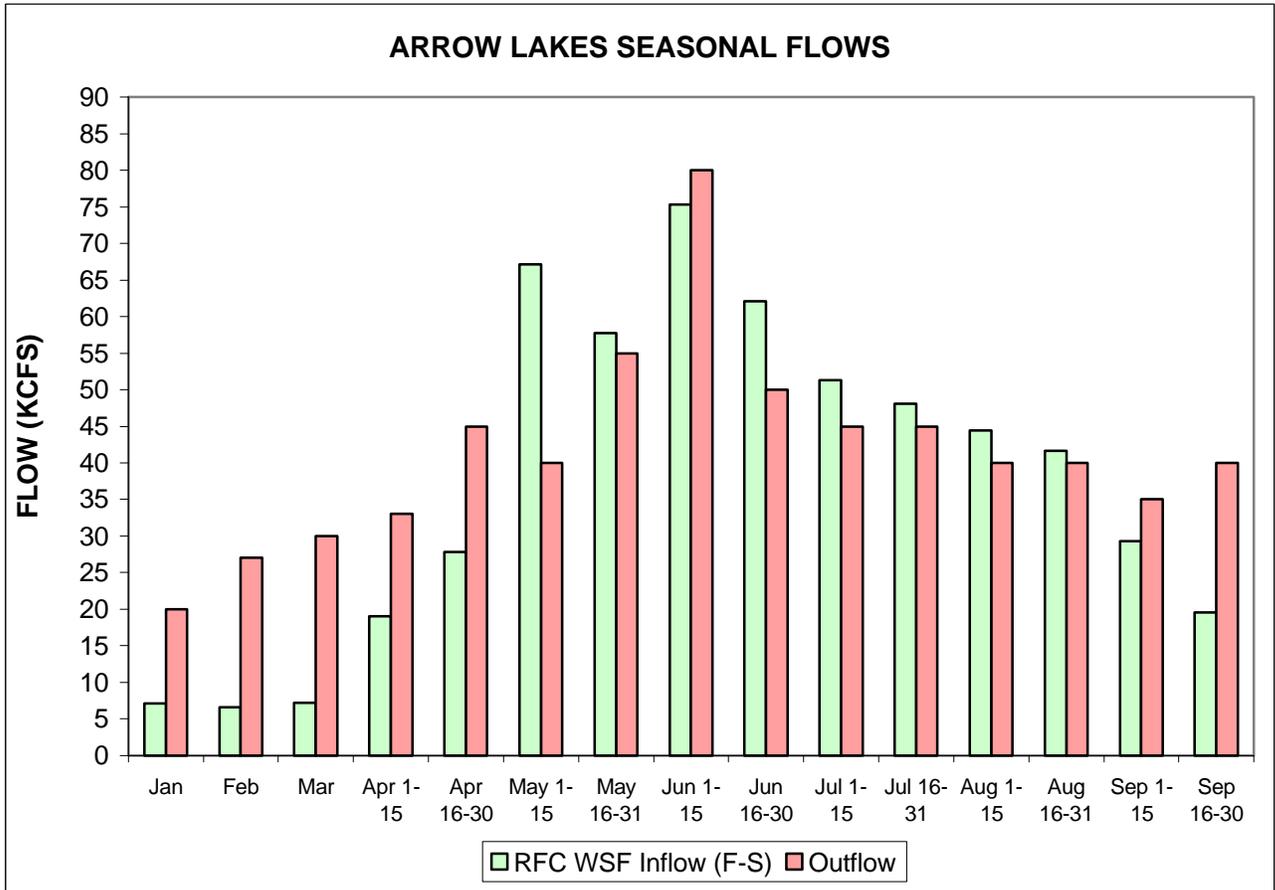
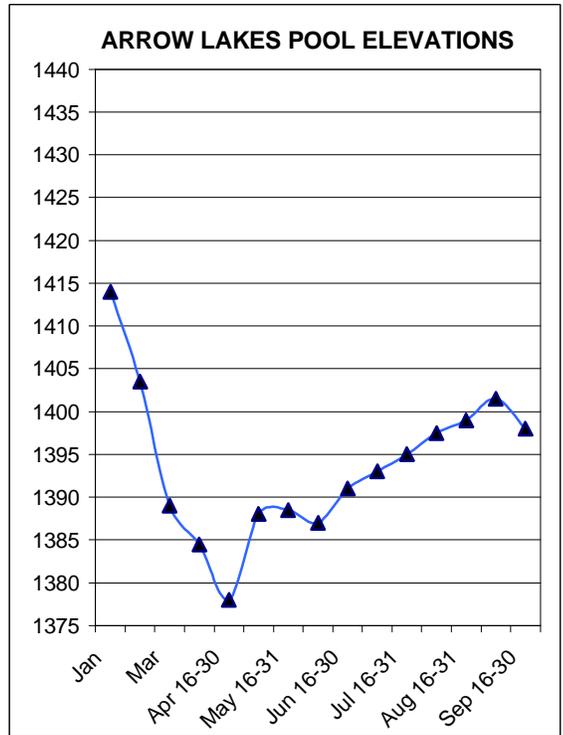
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|--|---|
| Bonneville, The Dalles, John Day | - Follow timing and levels in 2000 FCRPS Biological Opinion |
| McNary, Lower Granite,
Lower Monumental, Ice Harbor | - Nighttime spill for 12 hours to meet 80% Fish Passage Efficiency Standard from June 20- August 31 |

Columbia River at Arrow Lakes (ARDB)

22-Feb-01	Outflow	RFC WSF	Inflow (F-S)	Storage	Arrow Pool
WY 2001	(CRITFC)	64%	Change	Elevation	
"ALT-DRY"	(kcfs)	(kcfs)	(KaF)	end-of-period	(feet)
"-5% to all"					
Dec				1418.4	
Jan	20	7	-794	1414.0	
Feb	27	7	-1131	1403.5	
Mar	30	7	-1402	1389.0	
Apr 1-15	33	19	-415	1384.5	
Apr 16-30	45	28	-510	1378.0	
May 1-15	40	67	807	1388.0	
May 16-31	55	58	88	1388.5	
Jun 1-15	80	75	-140	1387.0	
Jun 16-30	50	62	360	1391.0	
Jul 1-15	45	51	187	1393.0	
Jul 16-31	45	48	198	1395.0	
Aug 1-15	40	44	233	1397.5	
Aug 16-31	40	42	150	1399.0	
Sep 1-15	35	29	279	1401.5	
Sep 16-30	40	20	-358	1398.0	
Total (KaF):	19,909	17,251	-1654	REV= 700 KaF	

CRITFC Hydro Program

mid-FEB 2001 WS FORECAST

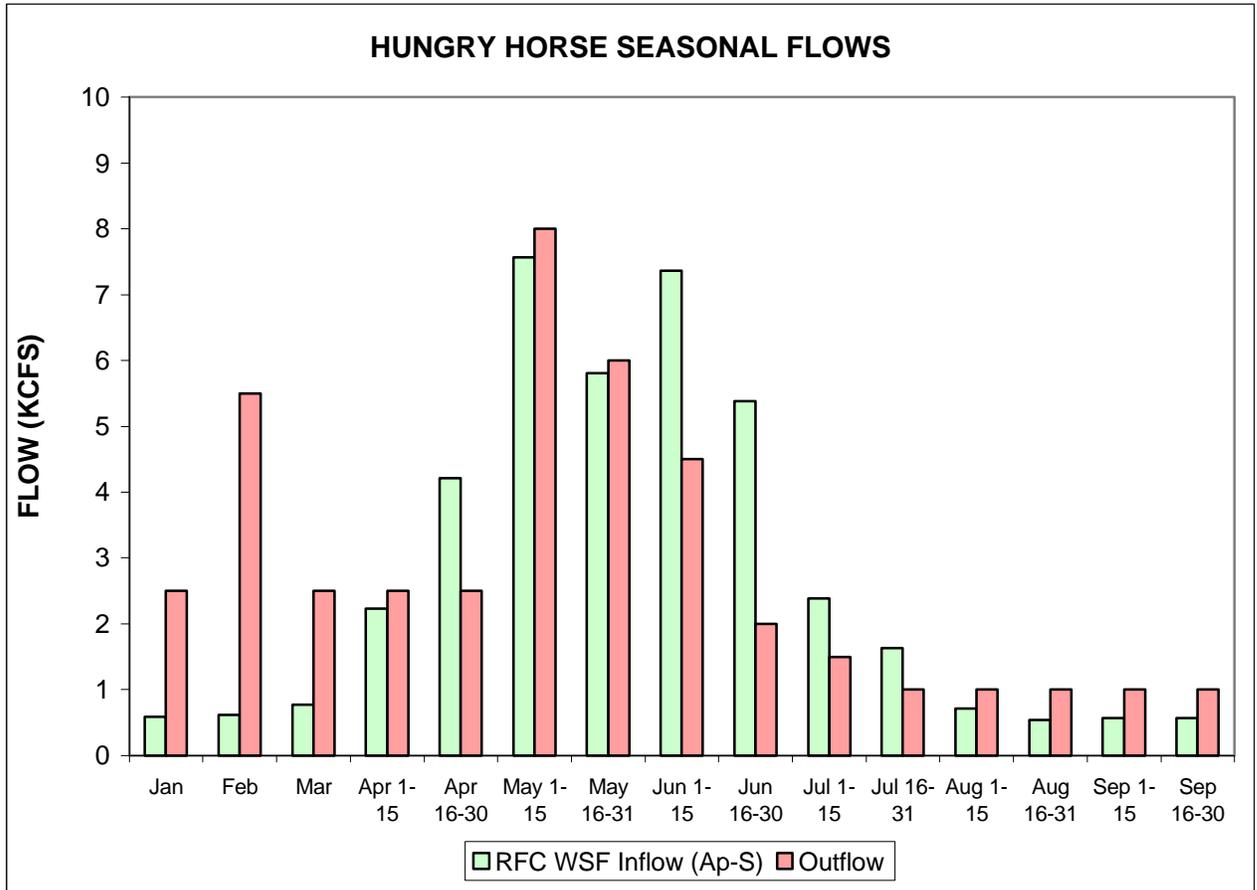
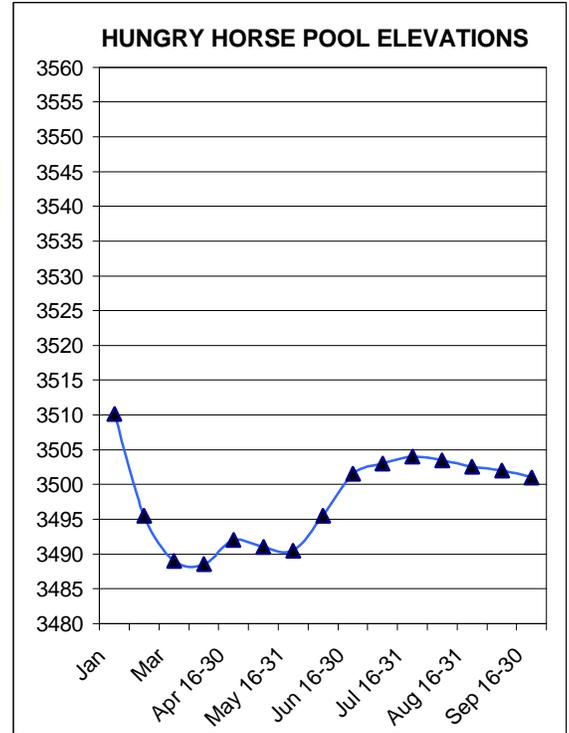


S. F. Flathead River at Hungry Horse (HGH)

22-Feb-01	Outflow	RFC WSF	Inflow (Ap-S)	HGH Pool
WY 2001	(CRITFC)	54%	Storage	Elevation
	(kcfs)	(kcfs)	Change	(feet)
			(KaF)	end-of-period
Dec				3518.0
Jan	2.5	1	-118	3510.1
Feb	5.5	1	-271	3495.5
Mar	2.5	1	-106	3489.0
Apr 1-15	2.5	2	-8	3488.5
Apr 16-30	2.5	4	51	3492.0
May 1-15	8.0	8	-13	3491.0
May 16-31	6.0	6	-6	3490.5
Jun 1-15	4.5	7	85	3495.5
Jun 16-30	2.0	5	101	3501.5
Jul 1-15	1.5	2	26	3503.0
Jul 16-31	1.0	2	20	3504.0
Aug 1-15	1.0	1	-9	3503.5
Aug 16-31	1.0	1	-14	3502.5
Sep 1-15	1.0	1	-13	3502.0
Sep 16-30	1.0	1	-13	3501.0
Total (KaF):	968	1,179	208	<i>No FC draft</i>

CRITFC Hydro Program

mid-FEB 2001 WS FORECAST

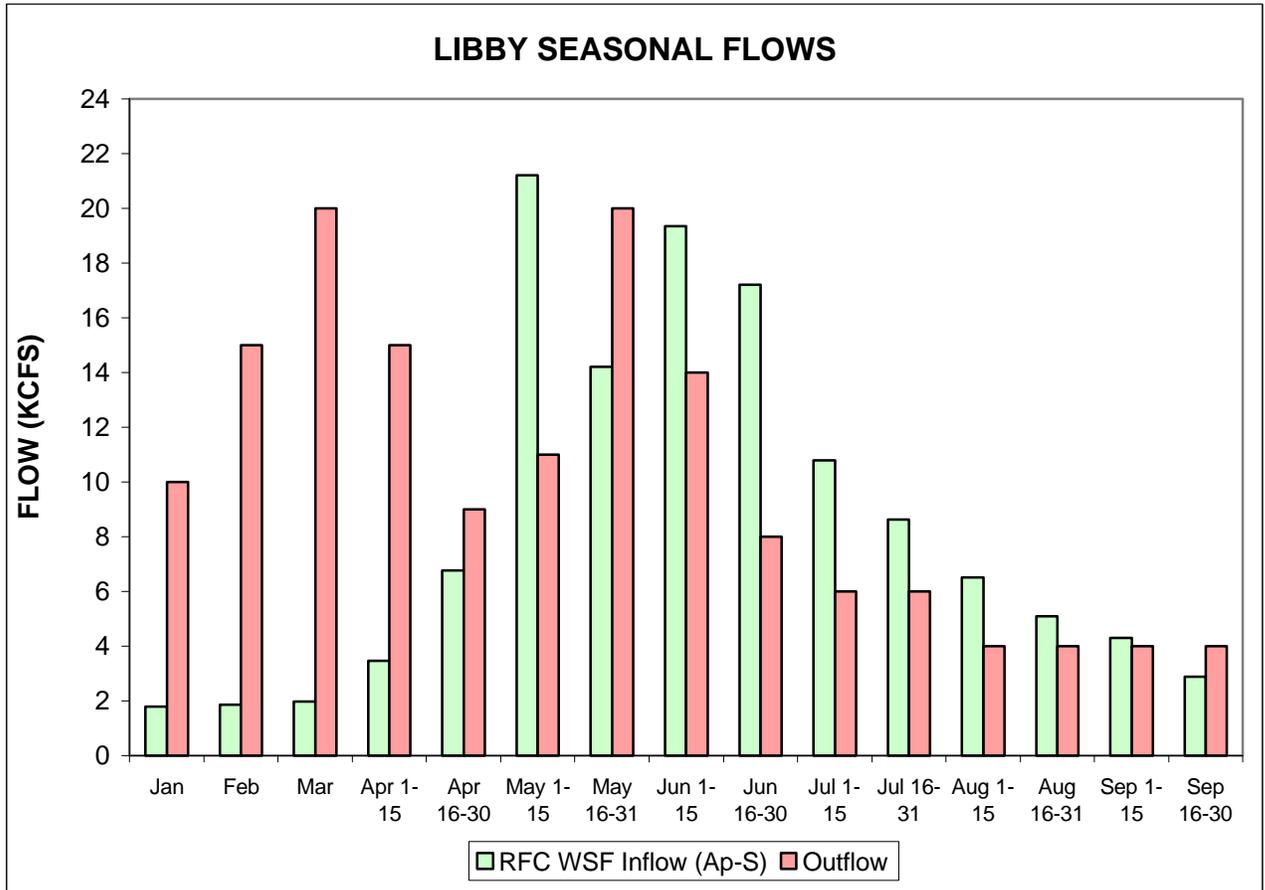
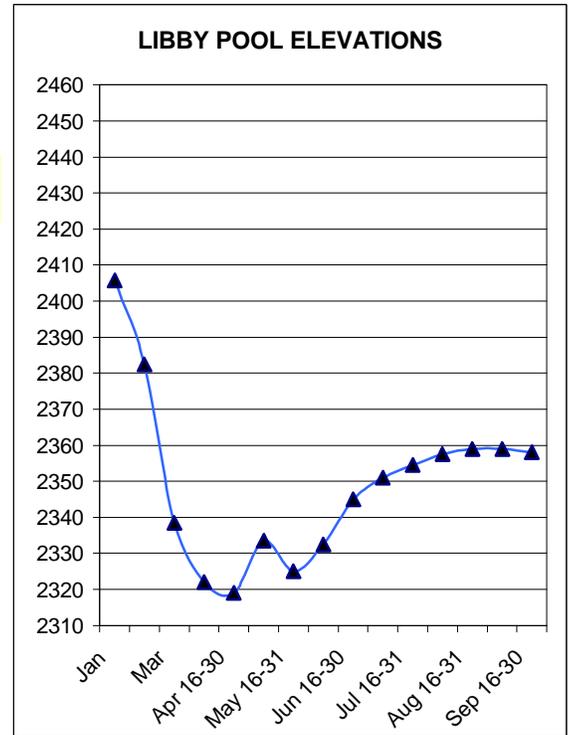


Kootenay River at Libby (LIB)

22-Feb-01	Outflow (CRITFC)	RFC WSF Inflow (Ap-S)	Storage Change (KaF)	Libby Pool Elevation (feet)
WY 2001	(kcfs)	(kcfs)	(KaF)	end-of-period
Dec				2411.5
Jan	10	2	-506	2405.8
Feb	15	2	-730	2382.5
Mar	20	2	-1108	2338.5
Apr 1-15	15	3	-343	2322.0
Apr 16-30	9	7	-66	2319.0
May 1-15	11	21	303	2333.5
May 16-31	20	14	-184	2325.0
Jun 1-15	14	19	159	2332.5
Jun 16-30	8	17	273	2345.0
Jul 1-15	6	11	143	2351.0
Jul 16-31	6	9	83	2354.5
Aug 1-15	4	7	75	2357.5
Aug 16-31	4	5	32	2359.0
Sep 1-15	4	4	9	2359.0
Sep 16-30	4	3	-34	2358.0
Total (KaF):	3,176	3,640	450	<i>No FC draft</i>

CRITFC Hydro Program

mid-FEB 2001 WS FORECAST

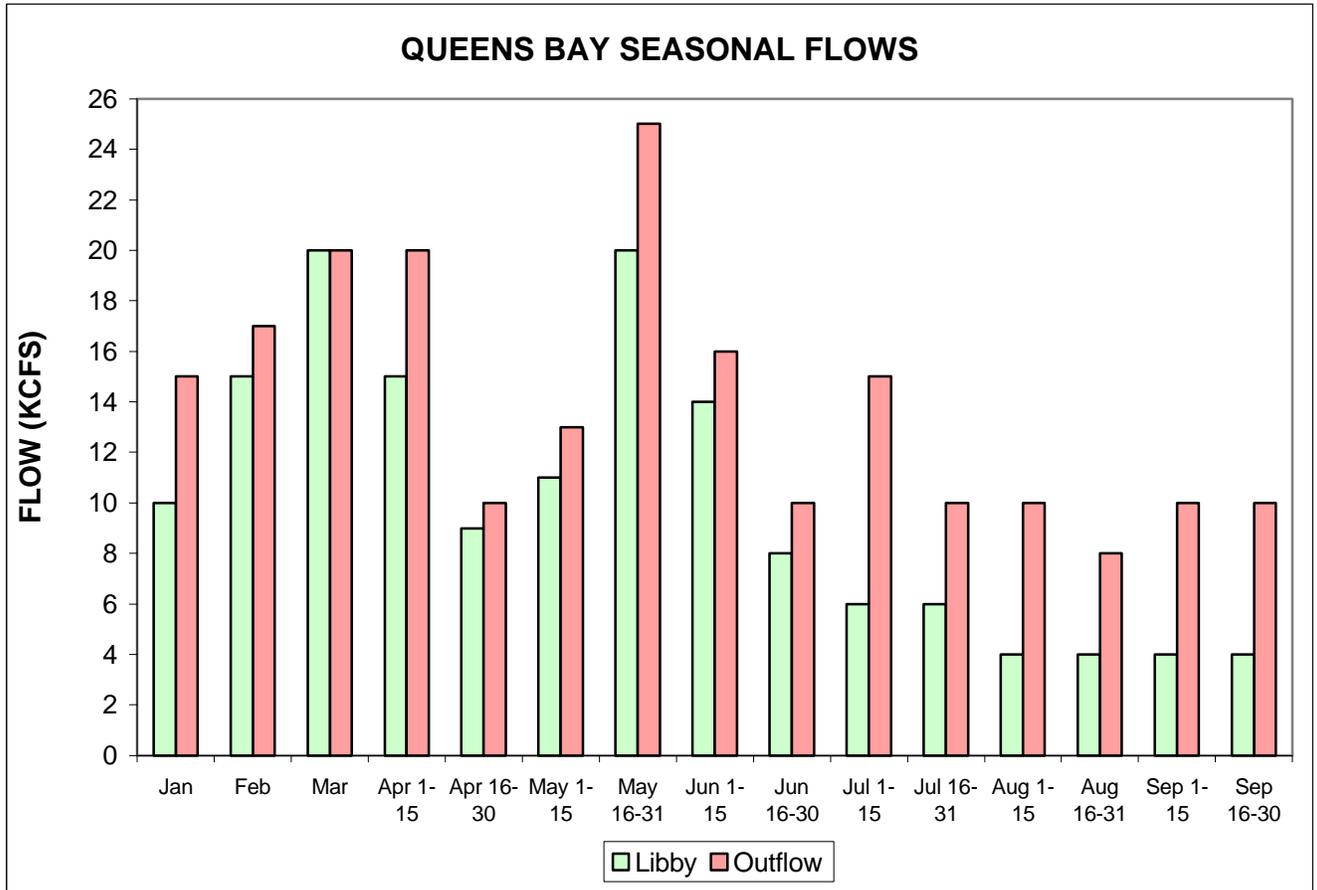
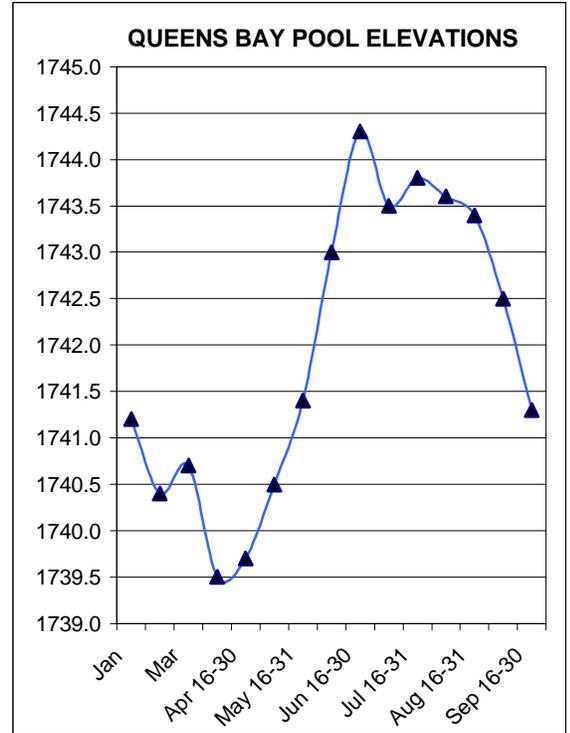


Kootenay River at Queens Bay (QBYB)

22-Feb-01	Outflow Libby	RFC WSF	Inflow (F-S)	Pool Elevation
WY 2001	Outflow Duncan	Storage	Change	end-of-period
	(CRITFC) (kcfs)	(CRITFC) (kcfs)	71% (kcfs)	(KaF)
Dec				1742.5
Jan	15	10	1	-269
Feb	17	15	0	-85
Mar	20	20	1	31
Apr 1-15	20	15	1	-119
Apr 16-30	10	9	1	15
May 1-15	13	11	5	79
May 16-31	25	20	8	100
Jun 1-15	16	14	8	170
Jun 16-30	10	8	7	142
Jul 1-15	15	6	6	-85
Jul 16-31	10	6	5	35
Aug 1-15	10	4	5	-23
Aug 16-31	8	4	3	-22
Sep 1-15	10	4	3	-100
Sep 16-30	10	4	2	-126
Total (KaF):	4,748	3,176	1,660	66

CRITFC Hydro Program

mid-FEB 2001 WS FORECAST

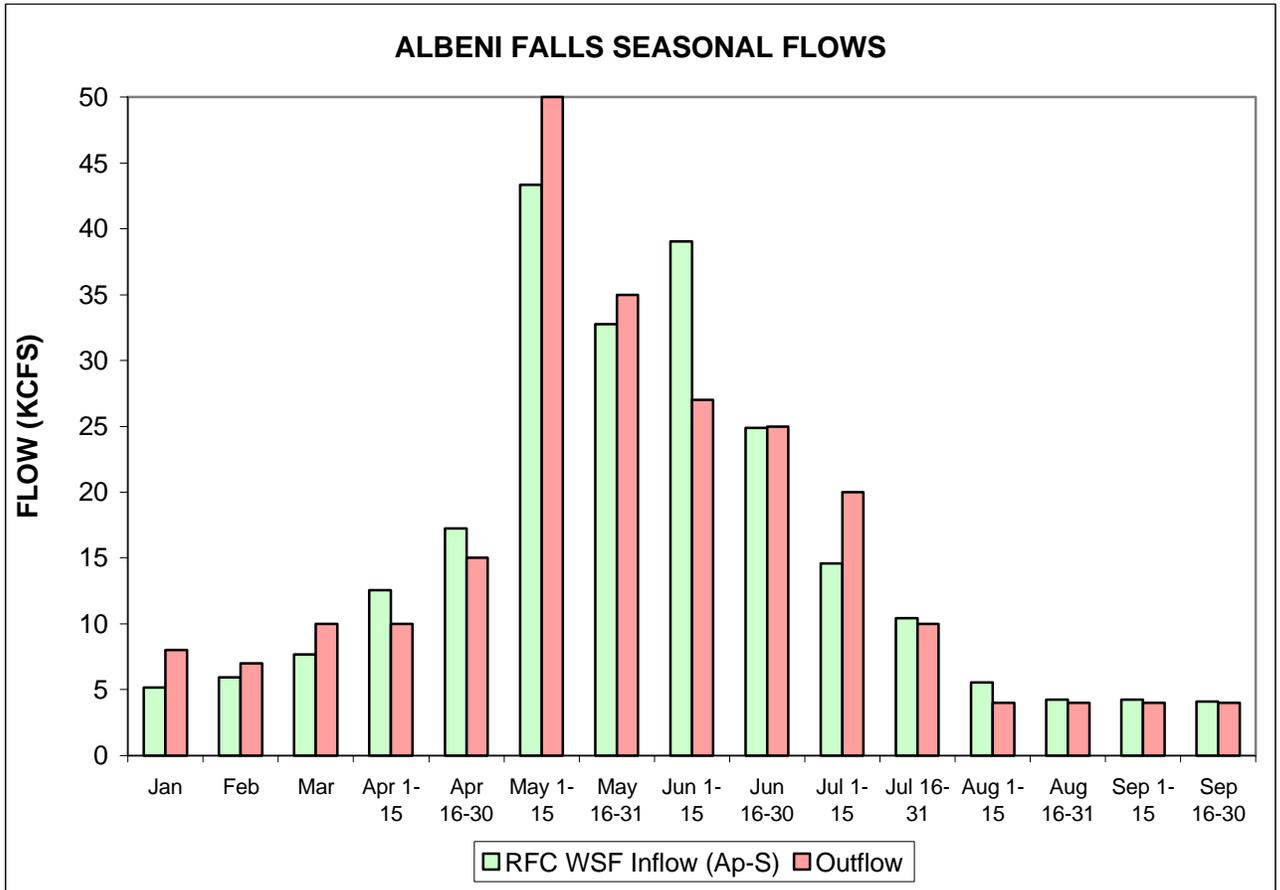
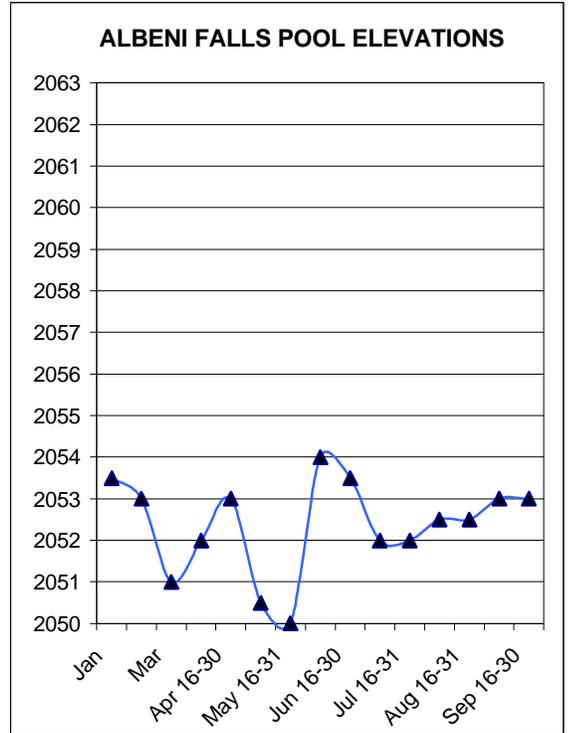


Pend O'Reille River at Albeni Falls (ALF)

22-Feb-01	Outflow	RFC WSF	Inflow (Ap-S)	Storage	ALF Pool
WY 2001	(CRITFC)	45%	(kcfs)	Change	Elevation
	(kcfs)	(kcfs)	(KcF)	(KaF)	end-of-period
Dec					2053.3
Jan	8	5	-173		2053.5
Feb	7	6	-58		2053.0
Mar	10	8	-143		2051.0
Apr 1-15	10	13	76		2052.0
Apr 16-30	15	17	67		2053.0
May 1-15	50	43	-198		2050.5
May 16-31	35	33	-71		2050.0
Jun 1-15	27	39	359		2054.0
Jun 16-30	25	25	-4		2053.5
Jul 1-15	20	15	-161		2052.0
Jul 16-31	10	10	14		2052.0
Aug 1-15	4	6	46		2052.5
Aug 16-31	4	4	8		2052.5
Sep 1-15	4	4	8		2053.0
Sep 16-30	4	4	3		2053.0
Total (KaF):	6,291	6,444	147	No FC draft	

CRITFC Hydro Program

mid-FEB 2001 WS FORECAST

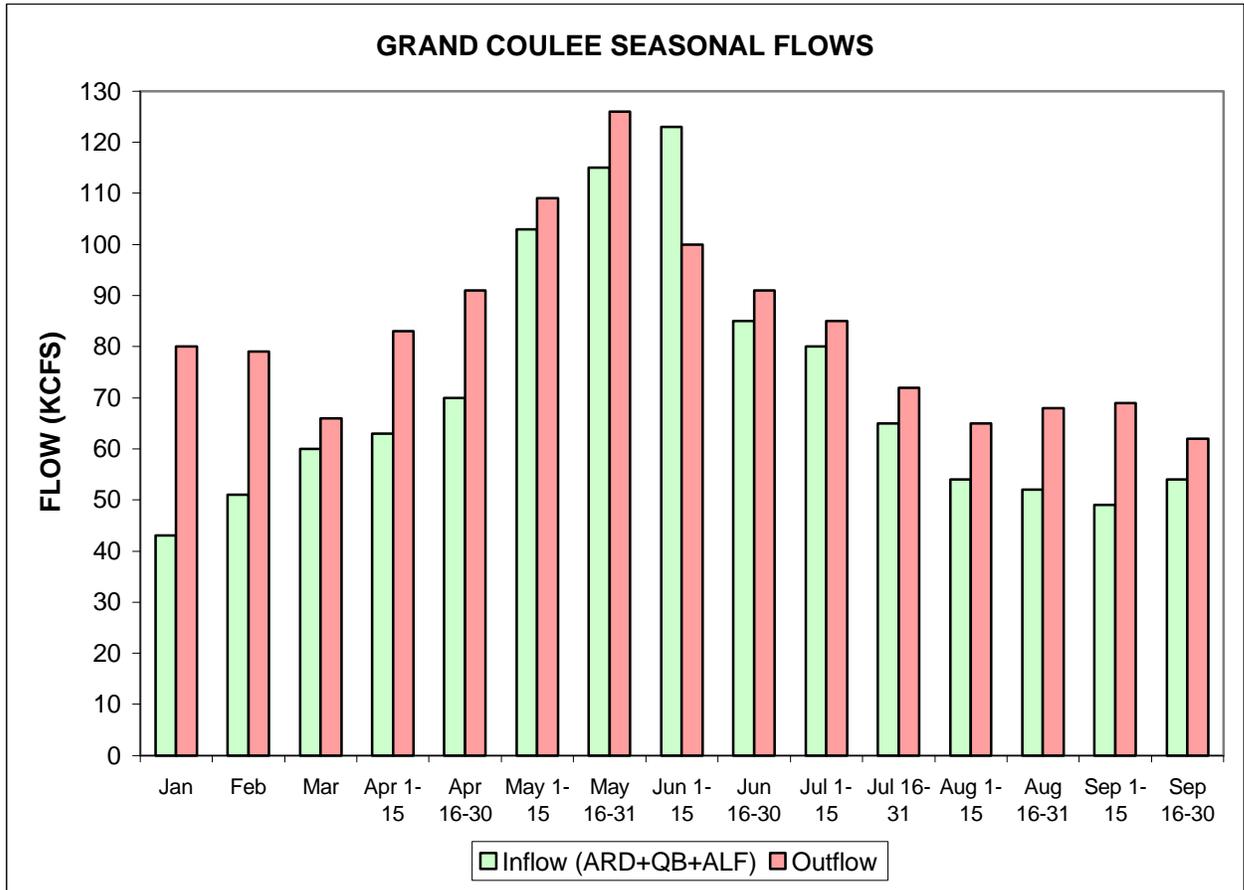
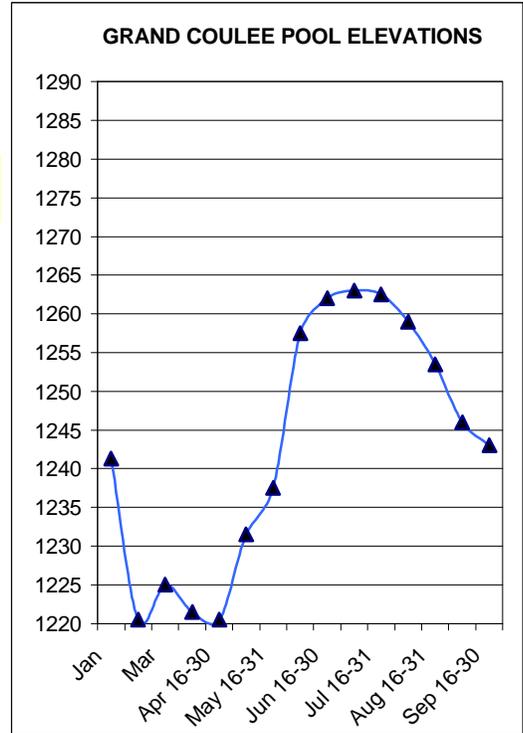


Columbia River at Grand Coulee (GCL)

23-Feb-01	Outflow Inflow (ARD+QB+ALF)				GCL Pool
WY 2001	(CRITFC)	(CRITFC)	Local	Storage	Elevation
	(kcfs)	(kcfs)	50% Flow	Change	(feet)
	(kcfs)	(kcfs)	(kcfs)	(KaF)	end-of-period
Dec					1267.7
Jan	80	43	5	-1963	1241.3
Feb	79	51	7	-1163	1220.5
Mar	66	60	10	238	1225.0
Apr 1-15	83	63	14	-168	1221.5
Apr 16-30	91	70	19	-59	1220.5
May 1-15	109	103	26	589	1231.5
May 16-31	126	115	21	332	1237.5
Jun 1-15	100	123	20	1270	1257.5
Jun 16-30	91	85	17	320	1262.0
Jul 1-15	85	80	7	63	1263.0
Jul 16-31	72	65	6	-42	1262.5
Aug 1-15	65	54	2	-215	1259.0
Aug 16-31	68	52	2	-407	1253.5
Sep 1-15	69	49	2	-500	1246.0
Sep 16-30	62	54	1	-151	1243.0
Total (KaF):	30,880	27,613		1032	Banks=200KaF

CRITFC Hydro Program

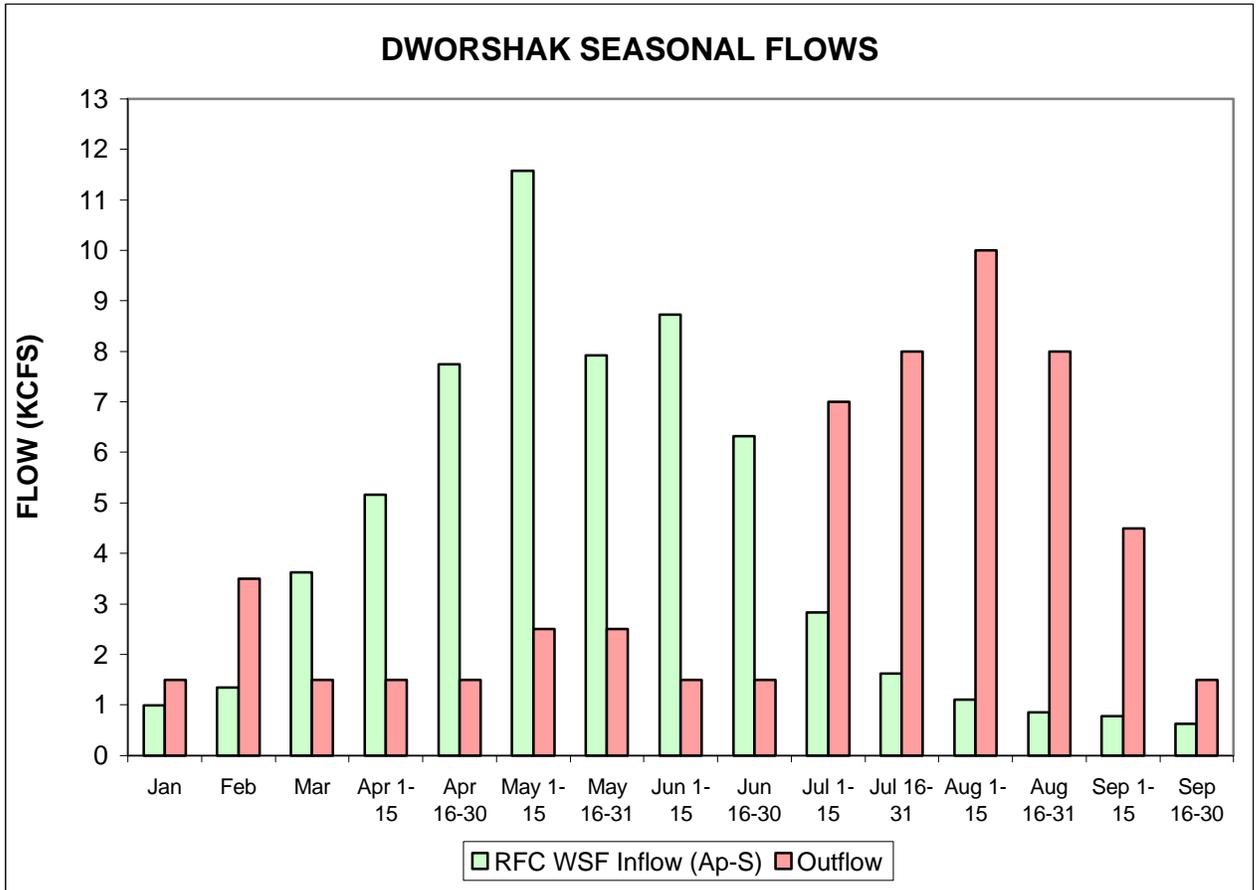
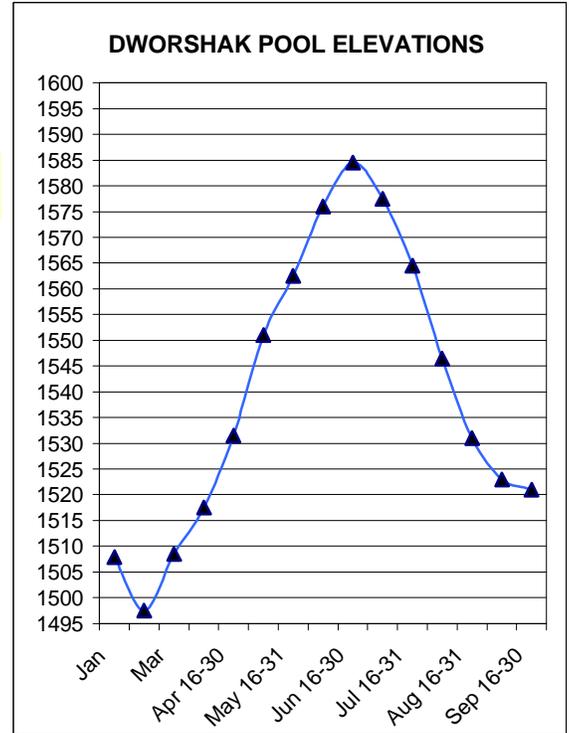
mid-FEB 2001 WS FORECAST



N.F. Clearwater at Dworshak (DWR)

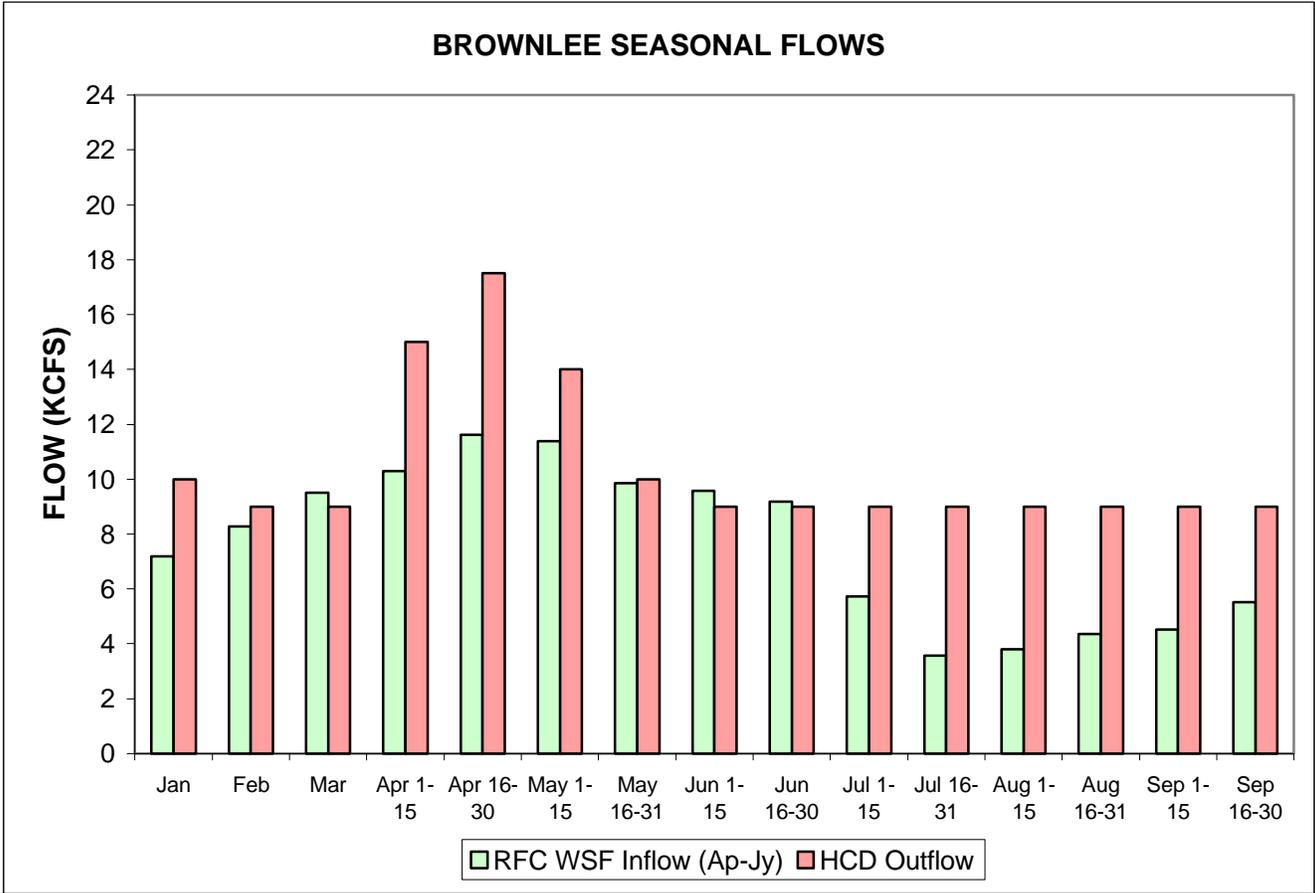
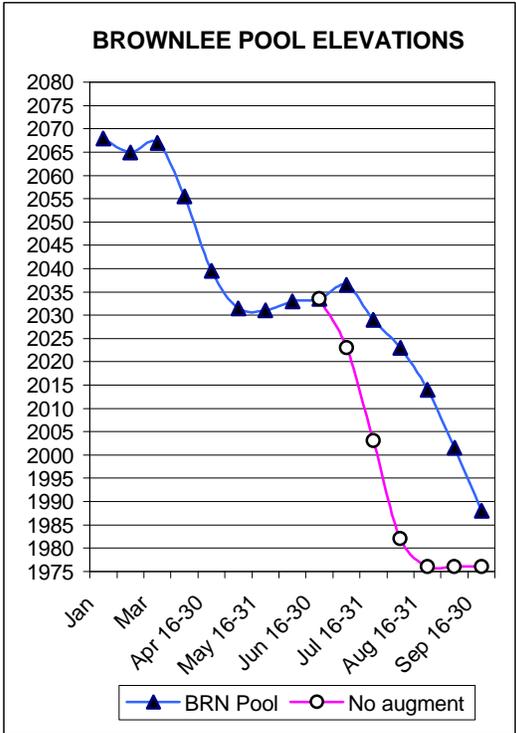
23-Feb-01	Outflow (CRITFC)	RFC WSF Inflow (Ap-S)	Storage Change (KaF)	DWR Pool Elevation (feet) end-of-period
WY 2001	(kcfs)	58% (kcfs)		
Dec				1517.0
Jan	1.5	1.0	-31	1507.9
Feb	3.5	1.3	-120	1497.5
Mar	1.5	3.6	130	1508.5
Apr 1-15	1.5	5.2	109	1517.5
Apr 16-30	1.5	7.7	186	1531.5
May 1-15	2.5	11.6	270	1551.0
May 16-31	2.5	7.9	172	1562.5
Jun 1-15	1.5	8.7	215	1576.0
Jun 16-30	1.5	6.3	143	1584.5
Jul 1-15	7.0	2.8	-124	1577.5
Jul 16-31	8.0	1.6	-202	1564.5
Aug 1-15	10.0	1.1	-265	1546.5
Aug 16-31	8.0	0.8	-213	1531.0
Sep 1-15	4.5	0.8	-111	1523.0
Sep 16-30	1.5	0.6	-26	1521.0
Total (KaF):	1,512	1,671	155	<i>No FC draft</i>

CRITFC Hydro Program **mid-FEB 2001 WS FORECAST**



Snake River at Brownlee (BRN)

23-Feb-01	HCD Outflow	RFC WSF Inflow (Ap-Jy)	BRN Pool	No augment		
WY 2001	(CRITFC)	37% USnk Storage	Elevation	Elevation		
	(kcfs)	(kcfs)	(feet)	(feet)		
		Augm. (KaF)	Storage Change (KaF)	end-of-period		
Dec				2070.6		
Jan	10.0	7.2	-173	2067.9		
Feb	9.0	8.3	-41	2065.0		
Mar	9.0	9.5	31	2067.0		
Apr 1-15	15.0	10.3	-140	2055.5		
Apr 16-30	17.5	11.6	-175	2039.5		
May 1-15	14.0	11.4	-78	2031.5		
May 16-31	10.0	9.8	-5	2031.0		
Jun 1-15	9.0	9.6	17	2033.0		
Jun 16-30	9.0	9.2	6	2033.5	2033.5	
Jul 1-15	9.0	5.7	127	2036.5	2023.0	
Jul 16-31	9.0	3.6	100	-72	2029.0	2003.0
Aug 1-15	9.0	3.8	100	-55	2023.0	1982.0
Aug 16-31	9.0	4.3	70	-78	2014.0	1976.0
Sep 1-15	9.0	4.5	30	-103	2001.5	1976.0
Sep 16-30	9.0	5.5	0	-103	1988.0	1976.0
Total (KaF):	2,798	2,153	427	-418	No FC draft	

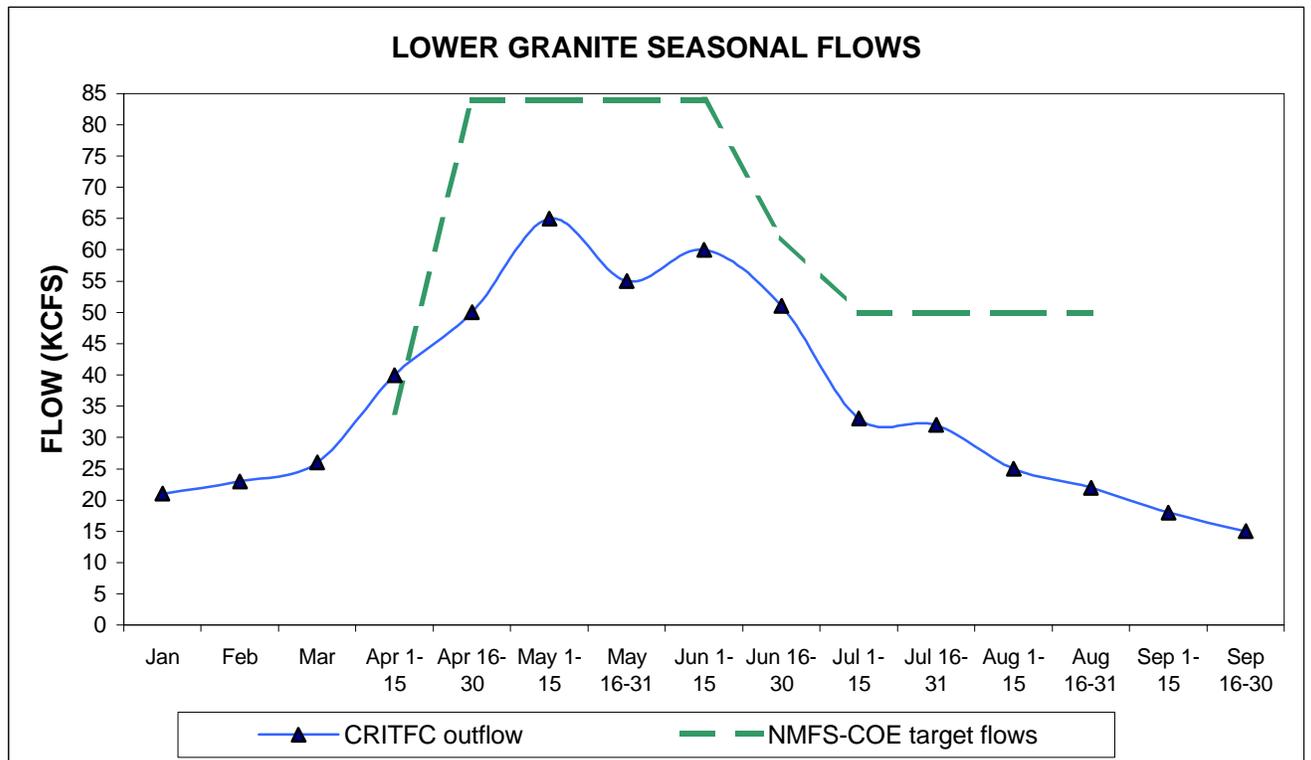


Snake at Lower Granite (LWG)

23-Feb-01	RFC WS Forecast (F-S)		Local flow:	Grand Ronde at Troy (A-J)	Clearwater at: DWR	Orofino	Salmon at: Whitebird	Snake at: Brownlee	NMFS Target	
WY 2001	54%	CRITFC outflow (17 MaF, F-S) (KaF)	65% (kcfs)	65% (kcfs)	(CRITFC) (kcfs)	65% (kcfs)	57% (kcfs)	(CRITFC) (kcfs)	(kcfs)	
		Component	Totals:							
Jan	1207	21	20	1.6	1.5	1.5	2.7	2.6	10	
Feb	1327	23	23	2.5	2.0	3.5	3.5	2.9	9	
Mar	1839	26	26	4.7	2.7	1.5	4.9	3.4	9	
Apr 1-15	1144	40	40	4.2	3.4	1.5	9.7	5.8	15	34
Apr 16-30	1399	50	50	4.2	5.6	1.5	12.6	8.4	17.5	84
May 1-15	2038	65	65	4.3	4.9	2.5	21.3	17.8	14	84
May 16-31	1882	55	55	4.0	4.1	2.5	14.5	19.5	10	84
Jun 1-15	2023	60	60	4.4	3.3	1.5	17.7	24.7	9	84
Jun 16-30	1794	51	51	3.6	2.2	1.5	15.9	19.0	9	62
Jul 1-15	732	33	33	1.4	1.4	7	5.3	9.2	9	50
Jul 16-31	676	32	32	1.3	1.3	8	4.6	8.1	9	50
Aug 1-15	373	25	25	0.3	0.6	10	1.5	3.4	9	50
Aug 16-31	359	22	22	0.3	0.5	8	1.4	3.2	9	50
Sep 1-15	366	18	18	0.2	0.5	4.5	1.3	2.8	9	
Sep 16-30	366	15	15	0.2	0.5	1.5	1.3	2.8	9	

			Sum Total:	Tributary Monthly Totals (KaF):					
JAN-JUL =	16,489	15,839							
FEB-SEP	16,318	16,961	18,435	1,272	1,133	1,805	5,151	4,135	4,940

CRITFC Hydro Program NMFS-COE target flows **mid-FEB 2001 WS FORECAST**

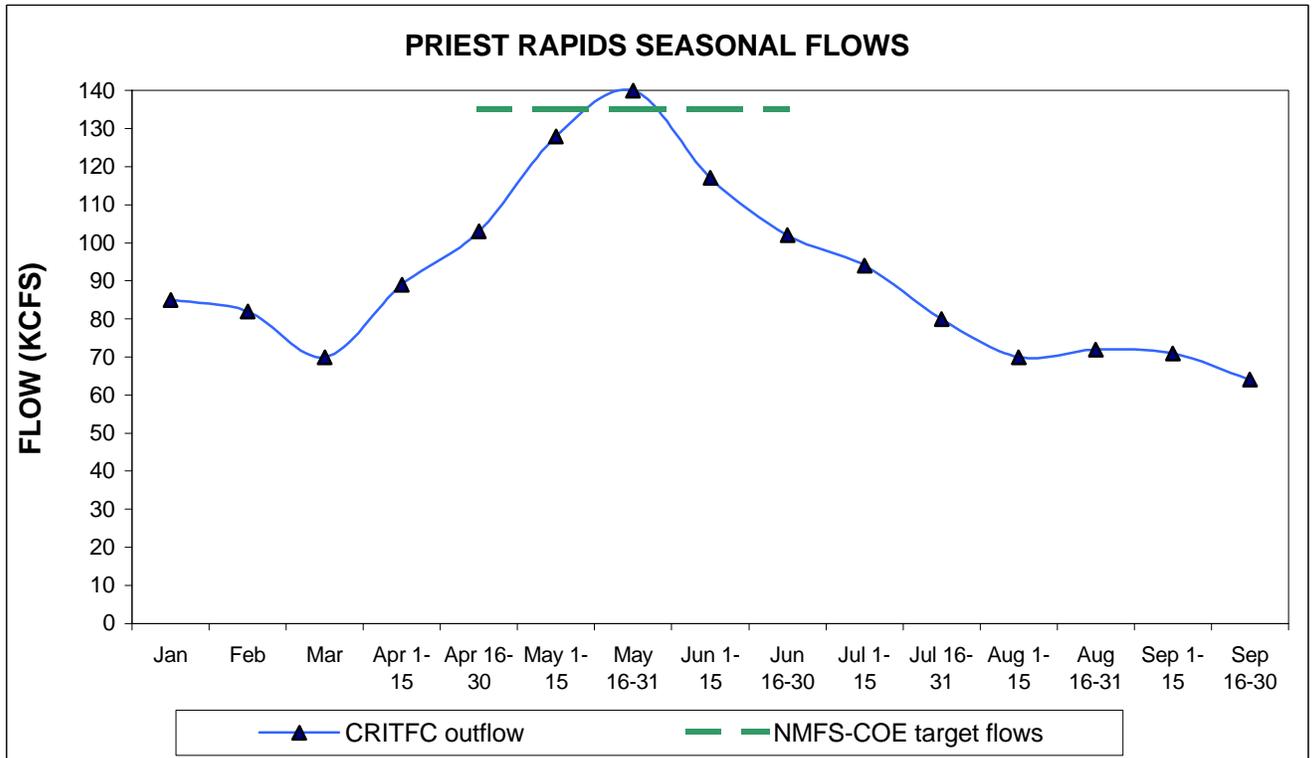


Columbia River at Priest Rapids (PRD)

23-Feb-01	RFC	RIS	WS Forecast (Ap-S)	Local flow	Wenatchee at Peshastin	Lake Chelan	Methow at Pateros	Okanogan Tonasket	Columbia at Coulee	NMFS Target
WY 2001	60%	CRITFC outflow	(34 MaF, A-S)	52% (kcfs)	52% (kcfs)	(CRITFC) (kcfs)	52% (kcfs)	50% (kcfs)	(CRITFC) (kcfs)	(kcfs)
Totals:										
Jan	1636	85	84	0.0	0.9	2.2	0.2	0.6	80	
Feb	1673	82	82	0.4	0.9	1.1	0.2	0.6	79	
Mar	2364	70	70	0.7	1.0	1.1	0.3	0.7	66	
Apr 1-15	2249	89	89	0.3	1.6	2.7	0.7	1.1	83	
Apr 16-30	2924	103	103	0.3	2.9	5.8	1.2	1.8	91	135
May 1-15	6407	128	128	0.4	5.6	2.7	4.2	6.5	109	135
May 16-31	4805	140	140	0.5	3.7	2.0	2.9	4.5	126	135
Jun 1-15	6244	117	117	2.2	5.7	1.5	3.8	4.1	100	135
Jun 16-30	5203	102	102	1.8	2.8	1.1	2.5	2.6	91	135
Jul 1-15	3966	94	94	1.4	2.0	2.4	1.1	2.0	85	
Jul 16-31	3661	80	80	1.3	1.4	2.8	1.0	1.8	72	
Aug 1-15	2431	70	70	0.3	0.9	2.6	0.4	0.8	65	
Aug 16-31	1985	72	72	0.2	0.8	1.6	0.3	0.7	68	
Sep 1-15	1288	71	71	0.0	0.5	1.1	0.2	0.5	69	
Sep 16-30	1097	64	64	0.0	0.4	1.1	0.2	0.4	62	

	RIS	PRD	Sum Total:	Tributary Monthly Totals (KaF):						
JAN-JUL =	41,133	39,900								
APR-SEP	42,260	34,177	34,203	266	852	829	564	813	30,880	

CRITFC Hydro Program NMFS-COE target flows **mid-FEB 2001 WS FORECAST**



Columbia River at The Dalles (TDA)

23-Feb-01 RFC WS Forecast (Ap-S)
WY 2001 63% CRITFC outflow
 (51 MaF, Ap-S)
 (KaF) (kcfs) Component

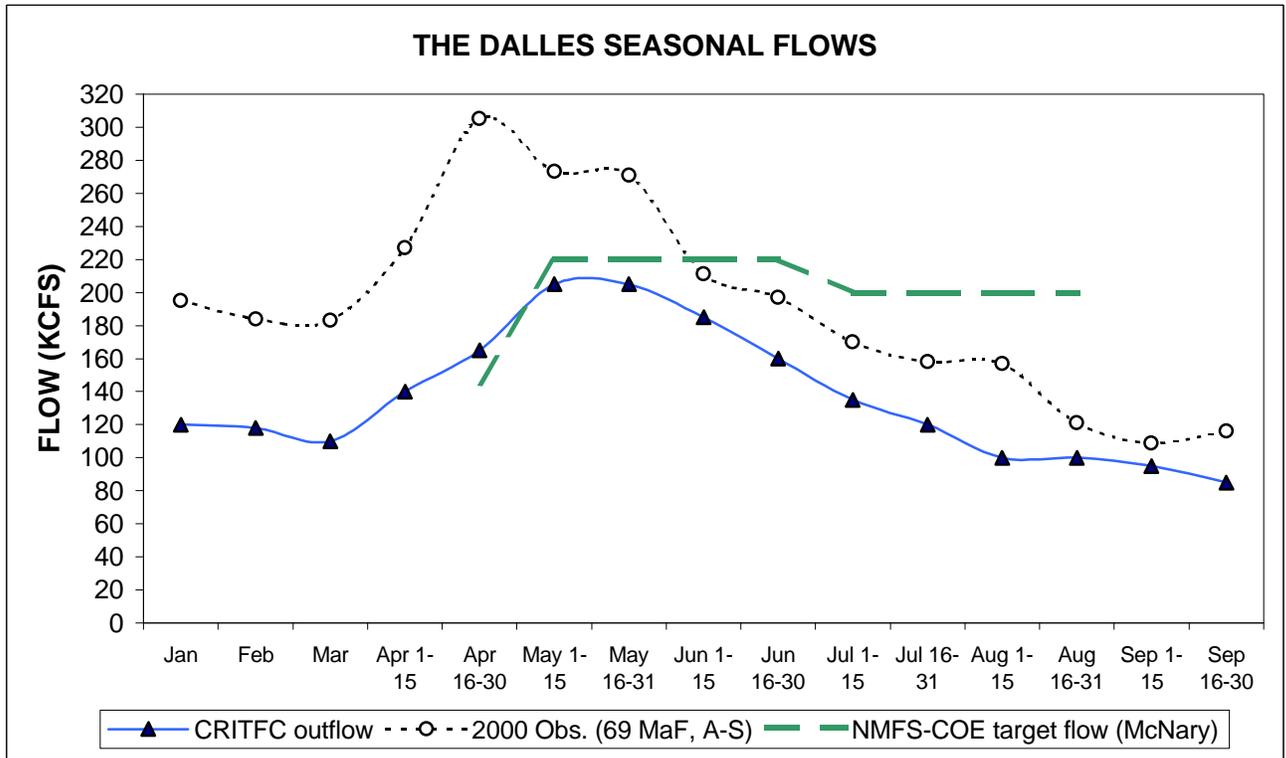
The Dalles Local	Deschutes at Moody	John Day at Service Crk	Columbia at McNary	2000 Obs Flows	NMFS Target				
(kcfs)	(kcfs)	(kcfs)	(kcfs)	(kcfs)	(kcfs)				
60%	69%	61%	(CRITFC)						
Totals:									
Jan	3762	120	117	0.2	4.9	1.3	110	195	
Feb	4067	118	118	1.0	5.2	1.6	110	184	
Mar	5469	110	110	1.0	5.0	2.4	101	183	
Apr 1-15	3762	140	140	1.0	3.7	2.9	133	227	
Apr 16-30	4598	165	165	1.1	4.2	3.2	157	305	145
May 1-15	7664	205	205	1.3	4.4	3.4	196	273	220
May 16-31	8642	205	205	1.0	3.8	2.6	198	271	220
Jun 1-15	9818	185	185	1.4	3.7	1.7	179	211	220
Jun 16-30	8707	160	161	1.2	3.7	1.4	155	197	220
Jul 1-15	5156	135	133	0.4	3.3	0.4	129	170	200
Jul 16-31	4759	120	117	0.4	3.1	0.4	113	158	200
Aug 1-15	2709	100	100	0.3	3.2	0.1	96	157	200
Aug 16-31	2603	100	99	0.3	3.2	0.1	95	121	200
Sep 1-15	1877	95	94	0.2	3.1	0.1	91	109	
Sep 16-30	1732	85	84	0.2	3.1	0.1	81	116	

Sum Total:
 JAN-JUL = 66,404 60,477
 APR-SEP 62,027 51,265 51,099

Tributary Monthly Totals (KaF):
 266 1,278 503 49,053
mid-FEB 2001 WS FORECAST

CRITFC Hydro Program 2000 Obs. (69 MaF, A-S)

NMFS-COE target flow (McNary)



OUTFLOW SUMMATION AND BALANCE

mid-FEB 2001 WS FORECAST

23-Feb-01

(kcfs)	Lower Columbia		Lower Snake				Upper Columbia								
	TDA	TDA local	LWG	BRN	DWR	PRD	GCL	GCL deficit	ARDB	Queens			ALF		HGH
Jan	120	14	21	10	2	85	80	42	20	15	10	8	6	2.5	
Feb	118	13	23	9	4	82	79	35	27	17	15	7	2	5.5	
Mar	110	14	26	9	2	70	66	16	30	20	20	10	8	2.5	
Apr 1-15	140	11	40	15	2	89	83	34	33	20	15	10	8	2.5	
Apr 16-30	165	12	50	18	2	103	91	40	45	10	9	15	13	2.5	
May 1-15	205	12	65	14	3	128	109	32	40	13	11	50	42	8	
May 16-31	205	10	55	10	3	140	126	32	55	25	20	35	29	6	
Jun 1-15	185	8	60	9	2	117	100	-3	80	16	14	27	23	4.5	
Jun 16-30	160	7	51	9	2	102	91	23	50	10	8	25	23	2	
Jul 1-15	135	8	33	9	7	94	85	12	45	15	6	20	19	1.5	
Jul 16-31	120	8	32	9	8	80	72	13	45	10	6	10	9	1	
Aug 1-15	100	5	25	9	10	70	65	13	40	10	4	4	3	1	
Aug 16-31	100	6	22	9	8	72	68	18	40	8	4	4	3	1	
Sep 1-15	95	6	18	9	5	71	69	22	35	10	4	4	3	1	
Sep 16-30	85	6	15	9	2	64	62	9	40	10	4	4	3	1	

Mica min: 0.1-10 kcfs

Arrow min: 5-10 kcfs

Queens Bay min: 5 kcfs