

TABLE 16

**VARIATION 3:
STAFF ESTIMATE OF HYDROPOWER-RELATED LOSSES
USING CURRENT POTENTIAL RUN SIZE AS A BASIS¹**

(Numbers of Smolts Produced by Area)

Areas of Production	Spring Chinook		Summer Chinook		Fall Chinook		Coho		Steelhead		Sockeye	
	Hatchery	Natural	Hatchery	Natural	Hatchery	Natural	Hatchery	Natural	Hatchery	Natural	Hatchery	Natural
Between 1 & 2 Dams	4,917,000	864,000	---	---	4,431,000	---	1,750,000	269,000	160,000	197,000	---	---
Between 2 & 3 Dams	765,000	1,407,000	---	---	---	2,057,000	---	331,000	130,000	105,000	---	---
Between 3 & 4 Dams	---	4,273,000	---	---	2,580,000	2,025,000	---	---	48,000	458,000	---	---
Between 4 & 5 Dams	514,000	3,112,000	---	---	8,520,000	21,938,000	---	---	359,000	355,000	---	---
Between 5 & 6 Dams	---	---	---	---	---	---	---	---	---	---	---	---
Between 6 & 7 Dams	---	---	---	---	840,000	---	---	---	220,000	1,000	---	---
Between 7 & 8 Dams	1,640,000	887,000	---	556,000	---	---	---	---	---	94,000	---	316,000
Between 8 & 9 Dams	6,251,000	16,905,000	1,364,000	14,159,000	360,000	24,000	320,000	232,000	4,472,000	1,885,000	---	460,000
Above Wells and Below Chief Joseph dams	800,000	1,266,000	1,344,000	1,295,000	---	---	---	---	368,000	78,000	---	748,000

¹ Percent hydropower loss is computed using benefits allocation instead of repayment allocation.

TABLE 16 (cont.)

Number of Smolts Produced (Thousands)

<u>Area of Production</u>	<u>Spring Chinook</u>	<u>Summer Chinook</u>	<u>Fall Chinook</u>	<u>Coho</u>	<u>Steelhead</u>	<u>Sockeye</u>
Between 1 & 2 Dams	5.781	0	4.431	2.019	357	0
Between 2 & 3 Dams	2.172	0	2.057	331	235	0
Between 3 & 4 Dams	4.273	0	4.605	0	506	0
Between 4 & 5 Dams	3.626	0	30.458	0	714	0
Between 5 & 6 Dams	0	0	0	0	0	0
Between 6 & 7 Dams	0	0	840	0	221	0
Between 7 & 8 Dams	2.527	556	0	0	94	316
Between 8 & 9 Dams	23.156	15.523	384	552	6.357	460
Above Wells and Below Chief Joseph	2.066	2.639	0	0	446	748
Above Chief Joseph Dam	0	0	0	0	0	0
Above Hells Canyon Dam	0	0	0	0	0	0
Totals:	43.601	18,718	42,775	2,902	8,930	1,524

All Species Total: 118,450,000

TABLE 16 (cont.)

Smolts to River Mouth With Dams (Thousands)

<u>Area of Production</u>	<u>Spring Chinook</u>	<u>Summer Chinook</u>	<u>Fall Chinook</u>	<u>Coho</u>	<u>Steelhead</u>	<u>Sockeye</u>
Between 1 & 2 Dams	4.625	0	3.545	1.615	286	0
Between 2 & 3 Dams	1.390	0	1.316	212	150	0
Between 3 & 4 Dams	2.188	0	2.358	0	259	0
Between 4 & 5 Dams	1.485	0	12.476	0	292	0
Between 5 & 6 Dams	0	0	0	0	0	0
Between 6 & 7 Dams	0	0	220	0	58	0
Between 7 & 8 Dams	530	117	0	0	20	66
Between 8 & 9 Dams	3.885	2.604	64	93	1,067	77
Above Wells and Below Chief Joseph	277	354	0	0	60	100
Above Chief Joseph Dam	0	0	0	0	0	0
Above Hells Canyon Dam	0	0	0	0	0	0
Totals:	14.380	3.075	19.979	1.920	2,192	244

All Species Total: 41.789.000

TABLE 16 (cont.)

Number of Adults at River Mouth With Dams (Thousands)

<u>Area of Production</u>	<u>Spring Chinook</u>	<u>Summer Chinook</u>	<u>Fall Chinook</u>	<u>Coho</u>	<u>Steelhead</u>	<u>Sockeye</u>
Between 1 & 2 Dams	92	0	142	129	29	0
Between 2 & 3 Dams	28	0	53	17	15	0
Between 3 & 4 Dams	44	0	94	0	26	0
Between 4 & 5 Dams	30	0	499	0	29	0
Between 5 & 6 Dams	0	0	0	0	0	0
Between 6 & 7 Dams	0	0	9	0	6	0
Between 7 & 8 Dams	11	5	0	0	2	7
Between 8 & 9 Dams	78	104	3	7	107	8
Above Wells and Below Chief Joseph	6	14	0	0	6	10
Above Chief Joseph Dam	0	0	0	0	0	0
Above Hells Canyon Dam	0	0	0	0	0	0
Totals:	288	123	799	154	219	24

All Species Total: 1,607,000

TABLE 16 (cont.)

Number of Adults at Spawning Grounds With Dams (Thousands)

<u>Area of Production</u>	<u>Spring Chinook</u>	<u>Summer Chinook</u>	<u>Fall Chinook</u>	<u>Coho</u>	<u>Steelhead</u>	<u>Sockeye</u>
Between 1 & 2 Dams	88	0	135	123	27	0
Between 2 & 3 Dams	25	0	48	15	14	0
Between 3 & 4 Dams	38	0	81	0	22	0
Between 4 & 5 Dams	24	0	406	0	24	0
Between 5 & 6 Dams	0	0	0	0	0	0
Between 6 & 7 Dams	0	0	6	0	4	0
Between 7 & 8 Dams	7	3	0	0	1	5
Between 8 & 9 Dams	52	69	2	5	71	5
Above Wells and Below Chief Joseph	3	9	0	0	4	6
Above Chief Joseph Dam	0	0	0	0	0	0
Above Hells Canyon Dam	0	0	0	0	0	0
Totals:	237	81	678	143	167	16

All Species Total: 1,322,000

TABLE 16 (cont.)

Number of Adults at Spawning Grounds Without Dams (Thousands)

<u>Area of Production</u>	<u>Spring Chinook</u>	<u>Summer Chinook</u>	<u>Fall Chinook</u>	<u>Coho</u>	<u>Steelhead</u>	<u>Sockeye</u>
Between 1 & 2 Dams	116	0	177	162	36	0
Between 2 & 3 Dams	43	0	82	26	24	0
Between 3 & 4 Dams	85	0	184	0	51	0
Between 4 & 5 Dams	73	0	1,218	0	71	0
Between 5 & 6 Dams	0	0	0	0	0	0
Between 6 & 7 Dams	0	0	34	0	22	0
Between 7 & 8 Dams	51	22	0	0	9	32
Between 8 & 9 Dams	463	621	15	44	636	46
Above Wells and Below Chief Joseph	41	106	0	0	45	75
Above Chief Joseph Dam	213	592	276	232	101	1,761
Above Hells Canyon Dam	222	1,221	560	0	140	14
Totals:	1,307	2,562	2,547	464	1,134	1,927

All Species Total: 9,941,000

TABLE 16 (cont.)

Dam Produced Salmon and Steelhead Loss (Thousands)

<u>Area of Production</u>	<u>Spring Chinook</u>	<u>Summer Chinook</u>	<u>Fall Chinook</u>	<u>Coho</u>	<u>Steelhead</u>	<u>Sockeye</u>
Between 1 & 2 Dams	28	0	43	39	9	0
Between 2 & 3 Dams	18	0	35	11	10	0
Between 3 & 4 Dams	48	0	103	0	28	0
Between 4 & 5 Dams	48	0	812	0	48	0
Between 5 & 6 Dams	0	0	0	0	0	0
Between 6 & 7 Dams	0	0	27	0	18	0
Between 7 & 8 Dams	43	19	0	0	8	27
Between 8 & 9 Dams	412	552	14	39	565	41
Above Wells and Below Chief Joseph	38	97	0	0	41	68
Above Chief Joseph Dam	213	592	276	232	101	1,761
Above Hells Canyon Dam	222	1,221	560	0	140	14
Totals:	1,070	2,480	1,869	321	967	1,911

All Species Total: 8,619,000

TABLE 16 (cont.)

Hydropower-Related Salmon and Steelhead Loss (Thousands)

<u>Area of Production</u>	<u>Spring Chinook</u>	<u>Summer Chinook</u>	<u>Fall Chinook</u>	<u>Coho</u>	<u>Steelhead</u>	<u>Sockeye</u>
Between 1 & 2 Dams	26	0	40	36	8	0
Between 2 & 3 Dams	17	0	33	11	9	0
Between 3 & 4 Dams	45	0	97	0	27	0
Between 4 & 5 Dams	45	0	763	0	45	0
Between 5 & 6 Dams	0	0	0	0	0	0
Between 6 & 7 Dams	0	0	25	0	17	0
Between 7 & 8 Dams	41	18	0	0	8	25
Between 8 & 9 Dams	387	519	13	37	531	38
Above Wells and Below Chief Joseph	36	91	0	0	38	64
Above Chief Joseph Dam	145	403	188	158	69	1,197
Above Hells Canyon Dam	111	611	280	0	70	7
Totals:	853	1,640	1,439	242	821	1,333

All Species Total: 6,327,000

TABLE 17

VARIATION 3:
STAFF ESTIMATE OF HYDROPOWER RESPONSIBILITY
USING ALTERNATIVE 2

Total Loss	7-14 million
	X
Percent Hydropower Purpose of Dams	71% ¹
	=
Hydropower Responsibility	5-10 million

¹ Average of benefits allocations of 94 percent for areas currently available to salmon and steelhead, 68 percent for the area above Grand Coulee Dam, and 50 percent for the area above Hells Canyon Dam.

TABLE 18

VARIATION 4:
 STAFF ESTIMATE OF HYDROPOWER-RELATED LOSSES
 USING PRE-1850 RUN SIZE AS A BASIS¹

Fish Distribution (Percentage)

<u>Area of Production</u>	<u>Spring Chinook</u>	<u>Summer Chinook</u>	<u>Fall Chinook</u>	<u>Coho</u>	<u>Steelhead</u>	<u>Sockeye</u>
Below Bonneville	0.151	0.000	0.248	0.437	0.171	0.000
Between 1 & 2 Dams	0.009	0.000	0.010	0.049	0.022	0.000
Between 2 & 3 Dams	0.033	0.000	0.004	0.000	0.041	0.001
Between 3 & 4 Dams	0.045	0.000	0.004	0.000	0.052	0.000
Between 4 & 5 Dams	0.061	0.018	0.029	0.135	0.061	0.021
Between 5 & 6 Dams	0.000	0.000	0.022	0.000	0.000	0.000
Between 6 & 7 Dams	0.007	0.000	0.064	0.021	0.011	0.000
Between 7 & 8 Dams	0.026	0.012	0.022	0.027	0.011	0.008
Between 8 & 9 Dams	0.325	0.420	0.174	0.139	0.359	0.016
Between 9 & 10 Dams	0.042	0.041	0.000	0.020	0.020	0.303
Above Chief Joseph Dam	0.147	0.166	0.140	0.173	0.105	0.647
Above Hells Canyon Dam	0.153	0.342	0.284	0.000	0.146	0.005

¹ This variation assumes that the percent of operational hydropower loss (that occurring below the blocked areas) is 100 percent because, in theory, the dams could be operated for fish passage if it were not for hydropower.

TABLE 18 (cont.)

Calculation Parameters

	<u>Spring Chinook</u>	<u>Summer Chinook</u>	<u>Fall Chinook</u>	<u>Coho</u>	<u>Steelhead</u>	<u>Sockeye</u>
Total Adult Production (thousands)	1,449	3,569	1,971	1,342	959	2,722
Ocean Survival	0.02	0.04	0.04	0.08	0.10	0.10
Juvenile Down- stream Survival (per dam passed)	0.80	0.80	0.80	0.80	0.80	0.80
Adult Down- stream Survival (per dam passed)	0.95	0.95	0.95	0.95	0.95	0.95

CALCULATIONS

Number of Adults Without Dams (Thousands)

<u>Spring Chinook</u>	<u>Summer Chinook</u>	<u>Fall Chinook</u>	<u>Coho</u>	<u>Steelhead</u>	<u>Sockeye</u>
1,449	3,569	1,971	1,342	959	2,722

Number of Smolts Without Dams (Thousands)

<u>Spring Chinook</u>	<u>Summer Chinook</u>	<u>Fall Chinook</u>	<u>Coho</u>	<u>Steelhead</u>	<u>Sockeye</u>
72.450	89.225	49.275	16.775	9.590	27.220

TABLE 18 (cont.)

Numerical Distribution of Smolts Produced Without Dams (Thousands)

<u>Area of Production</u>	<u>Spring Chinook</u>	<u>Summer Chinook</u>	<u>Fall Chinook</u>	<u>Cono</u>	<u>Steelhead</u>	<u>Sockeye</u>
Below Bonneville	10,940	0	12,220	7,331	1,640	0
Between 1 & 2 Dams	652	0	493	822	211	0
Between 2 & 3 Dams	2,391	0	197	0	393	27
Between 3 & 4 Dams	3,260	0	197	0	499	0
Between 4 & 5 Dams	4,419	1,606	1,429	2,265	585	572
Between 5 & 6 Dams	0	0	1,084	0	0	0
Between 6 & 7 Dams	507	0	3,154	352	105	0
Between 7 & 8 Dams	1,884	1,071	1,084	453	105	218
Between 8 & 9 Dams	23,546	37,475	8,574	2,332	3,443	436
Between 9 & 10 Dams	3,043	3,658	0	336	192	8,248
Above Chief Joseph Dam	10,650	14,811	6,899	2,902	1,007	17,611
Above Hells Canyon Dam	11,085	30,515	13,994	0	1,400	136
Totals:	72,378	89,136	49,324	16,792	9,580	27,247

TABLE 18 (cont.)

Number of Smolts at River Mouth With Dams (Thousands)

<u>Area of Production</u>	<u>Spring Chinook</u>	<u>Summer Chinook</u>	<u>Fall Chinook</u>	<u>Coho</u>	<u>Steelhead</u>	<u>Sockeye</u>
Below Bonneville	10.940	0	12.220	7.331	1.640	0
Between 1 & 2 Dams	522	0	394	658	169	0
Between 2 & 3 Dams	1.530	0	126	0	252	17
Between 3 & 4 Dams	1.669	0	101	0	255	0
Between 4 & 5 Dams	1.810	658	585	928	240	234
Between 5 & 6 Dams	0	0	355	0	0	0
Between 6 & 7 Dams	133	0	827	92	28	0
Between 7 & 8 Dams	395	225	227	95	22	46
Between 8 & 9 Dams	3.950	6.287	1.438	391	578	73
Between 9 & 10 Dams	408	491	0	45	26	1,107
Above Chief Joseph Dam	0	0	0	0	0	0
Above Hells Canyon Dam	0	0	0	0	0	0
Totals:	21.358	7,661	16,274	9,539	3,208	1,477

TABLE 18 (cont.)

Number of Adults at River Mouth With Dams (Thousands)

<u>Area of Production</u>	<u>Spring Chinook</u>	<u>Summer Chinook</u>	<u>Fall Chinook</u>	<u>Coho</u>	<u>Steelhead</u>	<u>Sockeye</u>
Below Bonneville	219	0	489	586	164	0
Between 1 & 2 Dams	10	0	16	53	17	0
Between 2 & 3 Dams	31	0	5	0	25	2
Between 3 & 4 Dams	33	0	4	0	26	0
Between 4 & 5 Dams	36	26	23	74	24	23
Between 5 & 6 Dams	0	0	14	0	0	0
Between 6 & 7 Dams	3	0	33	7	3	0
Between 7 & 8 Dams	8	9	9	8	2	5
Between 8 & 9 Dams	79	251	58	31	58	7
Between 9 & 10 Dams	8	20	0	4	3	111
Above Chief Joseph Dam	0	0	0	0	0	0
Above Hells Canyon Dam	0	0	0	0	0	0
Totals:	427	306	651	763	321	148

TABLE 18 (cont.)

Number of Adults at Spawning Grounds With Dams (Thousands)

<u>Area of Production</u>	<u>Spring Chinook</u>	<u>Summer Chinook</u>	<u>Fall Chinook</u>	<u>Coho</u>	<u>Steelhead</u>	<u>Sockeye</u>
Below Bonneville	219	0	489	586	164	0
Between 1 & 2 Dams	10	0	15	50	16	0
Between 2 & 3 Dams	28	0	5	0	23	2
Between 3 & 4 Dams	29	0	3	0	22	0
Between 4 & 5 Dams	29	21	19	60	20	19
Between 5 & 6 Dams	0	0	11	0	0	0
Between 6 & 7 Dams	2	0	24	5	2	0
Between 7 & 8 Dams	6	6	6	5	2	3
Between 8 & 9 Dams	52	167	38	21	38	5
Between 9 & 10 Dams	5	12	0	2	2	70
Above Chief Joseph Dam	0	0	0	0	0	0
Above Hells Canyon Dam	0	0	0	0	0	0
Totals:	379	207	611	731	288	98

All Species Total: 2,314,000

TABLE 18 (cont.)

Number of Adults at Spawning Grounds Without Dams (Thousands)

<u>Area of Production</u>	<u>Spring Chinook</u>	<u>Summer Chinook</u>	<u>Fall Chinook</u>	<u>Coho</u>	<u>Steelhead</u>	<u>Sockeye</u>
Below Bonneville	219	0	489	586	164	0
Between 1 & 2 Dams	13	0	20	66	21	0
Between 2 & 3 Dams	48	0	8	0	39	3
Between 3 & 4 Dams	65	0	8	0	50	0
Between 4 & 5 Dams	88	64	57	181	58	57
Between 5 & 6 Dams	0	0	43	0	0	0
Between 6 & 7 Dams	10	0	126	28	11	0
Between 7 & 8 Dams	38	43	43	36	11	22
Between 8 & 9 Dams	471	1,499	343	187	344	44
Between 9 & 10 Dams	61	146	0	27	19	825
Above Chief Joseph Dam	213	592	276	232	101	1,761
Above Hells Canyon Dam	222	1,221	560	0	140	14
Totals:	1,448	3,565	1,973	1,343	958	2,725

All Species Total: 12,012,000

TABLE 18 (cont.)

Dam Produced Salmon and Steelhead Loss (Thousands)

<u>Area of Production</u>	<u>Spring Chinook</u>	<u>Summer Chinook</u>	<u>Fall Chinook</u>	<u>Coho</u>	<u>Steelhead</u>	<u>Sockeye</u>
Below Bonneville	0	0	0	0	0	0
Between 1 & 2 Dams	3	0	5	16	5	0
Between 2 & 3 Dams	20	0	3	0	17	1
Between 3 & 4 Dams	37	0	4	0	28	0
Between 4 & 5 Dams	59	43	38	121	39	38
Between 5 & 6 Dams	0	0	32	0	0	0
Between 6 & 7 Dams	8	0	102	23	9	0
Between 7 & 8 Dams	32	37	37	31	9	19
Between 8 & 9 Dams	419	1,332	305	166	306	39
Between 9 & 10 Dams	56	134	0	25	18	755
Above Chief Joseph Dam	213	592	276	232	101	1,761
Above Hells Canyon Dam	222	1,221	560	0	140	14
Totals:	1,068	3,359	1,362	613	670	2,626

All Species Total: 9,698,000

TABLE 18 (cont.)

Hydropower-Related Salmon and Steelhead Loss (Thousands)

<u>Area of Production</u>	<u>Spring Chinook</u>	<u>Summer Chinook</u>	<u>Fall Chinook</u>	<u>Coho</u>	<u>Steelhead</u>	<u>Sockeye</u>
Below Bonneville	0	0	0	0	0	0
Between 1 & 2 Dams	3	0	5	16	5	0
Between 2 & 3 Dams	20	0	3	0	17	1
Between 3 & 4 Dams	37	0	4	0	28	0
Between 4 & 5 Dams	59	43	38	121	39	38
Between 5 & 6 Dams	0	0	32	0	0	0
Between 6 & 7 Dams	8	0	102	23	9	0
Between 7 & 8 Dams	32	37	37	31	9	19
Between 8 & 9 Dams	419	1,332	305	166	306	39
Between 9 & 10 Dams	56	134	0	25	18	755
Above Chief Joseph Dam	196	545	254	214	93	1,620
Above Hells Canyon Dam	111	610	280	0	70	7
Totals:	940	2,701	1,060	594	592	2,479

All Species Total: 8,366,000

TABLE 19

VARIATION 4:
 STAFF ESTIMATE OF HYDROPOWER-RELATED LOSSES
 USING CURRENT RUN SIZE AS A BASIS¹

Fish Distribution (Percentage)

Area of Production	Spring Chinook	Summer Chinook	Fall Chinook		Coho	Steelhead	Sockeye
			Hatchery	Natural			
Between 1 & 2 Dams	0.027	0.000	0.260	0.175	0.176	0.047	0.000
Between 2 & 3 Dams	0.128	0.000	0.000	0.234	0.109	0.054	0.000
Between 3 & 4 Dams	0.000	0.000	0.150	0.000	0.031	0.107	0.000
Between 4 & 5 Dams	0.084	0.047	0.510	0.508	0.244	0.095	0.000
Between 5 & 6 Dams	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Between 6 & 7 Dams	0.021	0.000	0.050	0.000	0.000	0.023	0.000
Between 7 & 8 Dams	0.033	0.019	0.000	0.020	0.040	0.022	0.210
Between 8 & 9 Dams	0.654	0.870	0.020	0.063	0.359	0.614	0.296
Between 9 & 10 Dams	0.053	0.064	0.000	0.000	0.046	0.038	0.493
Above Chief Joseph Dam	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Above Hells Canyon Dam	0.000	0.000	0.000	0.000	0.000	0.000	0.000

¹ This variation assumes that the percent of operational hydropower loss (that occurring below the blocked ares) is 100 percent because, in theory, the dams could be operated for fish passage if it were not for hydropower.

TABLE 19 (cont.)

Calculation Parameters

	<u>Spring Chinook</u>	<u>Summer Chinook</u>	<u>Fall Chinook</u>		<u>Coho</u>	<u>Steelhead</u>	<u>Sockeye</u>
			<u>Hatchery</u>	<u>Natural</u>			
Total Adult Production (thousands)	92	77	334	360	179	143	58
Ocean Survival	0.02	0.04	0.04	0.04	0.08	0.10	0.10
Juvenile Down- stream Survival (per dam passed)	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adult Down- stream Survival (per dam passed)	0.95	0.95	0.95	0.95	0.95	0.95	0.95

CALCULATIONS

Number of Adults at River Mouth with Dams (Thousands)

<u>Spring Chinook</u>	<u>Summer Chinook</u>	<u>Fall Chinook</u>		<u>Coho</u>	<u>Steelhead</u>	<u>Sockeye</u>
		<u>Hatchery</u>	<u>Natural</u>			
92	77	334	360	179	143	58

Number of Smolts at River Mouth with Dams (Thousands)

<u>Spring Chinook</u>	<u>Summer Chinook</u>	<u>Fall Chinook</u>		<u>Coho</u>	<u>Steelhead</u>	<u>Sockeye</u>
		<u>Hatchery</u>	<u>Natural</u>			
4.600	1.925	8.350	9.000	2.238	1.430	580

TABLE 19 (cont.)

Number of Smolts Produced (Thousands)

<u>Area of Production</u>	<u>Spring Chinook</u>	<u>Summer Chinook</u>	<u>Fall Chinook</u>	<u>Coho</u>	<u>Steelhead</u>	<u>Sockeye</u>
Between 1 & 2 Dams	155	0	4.683	492	84	0
Between 2 & 3 Dams	920	0	3.291	381	121	0
Between 3 & 4 Dams	0	0	2.446	135	299	0
Between 4 & 5 Dams	943	221	21.559	1,333	332	0
Between 5 & 6 Dams	0	0	0	0	0	0
Between 6 & 7 Dams	368	0	1,593	0	125	0
Between 7 & 8 Dams	724	174	858	427	150	581
Between 8 & 9 Dams	17,931	9,982	4,375	4,788	5,233	1,023
Between 9 & 10 Dams	1,816	918	0	767	405	2,130
Above Chief Joseph Dam	0	0	0	0	0	0
Above Hells Canyon Dam	0	0	0	0	0	0
Totals:	22,859	11,295	38,804	8,323	6,749	3,734

TABLE 19 (cont.)

Number of Smolts at River Mouth Without Dams (Thousands)

<u>Area of Production</u>	<u>Spring Chinook</u>	<u>Summer Chinook</u>	<u>Fall Chinook</u>	<u>Coho</u>	<u>Steelhead</u>	<u>Sockeye</u>
Between 1 & 2 Dams	155	0	4,683	492	84	0
Between 2 & 3 Dams	920	0	3,291	381	121	0
Between 3 & 4 Dams	0	0	2,446	135	299	0
Between 4 & 5 Dams	943	221	21,559	1,333	332	0
Between 5 & 6 Dams	0	0	0	0	0	0
Between 6 & 7 Dams	368	0	1,593	0	125	0
Between 7 & 8 Dams	724	174	858	427	150	581
Between 8 & 9 Dams	17,931	9,982	4,375	4,788	5,233	1,023
Between 9 & 10 Dams	1,816	918	0	767	405	2,130
Above Chief Joseph Dam	0	0	0	0	0	0
Above Hells Canyon Dam	0	0	0	0	0	0
Totals:	22,859	11,295	38,804	8,323	6,749	3,734

TABLE 19 (cont.)

Number of Adults at River Mouth Without Dams (Thousands)

<u>Area of Production</u>	<u>Spring Chinook</u>	<u>Summer Chinook</u>	<u>Fall Chinook</u>	<u>Coho</u>	<u>Steelhead</u>	<u>Sockeye</u>
Between 1 & 2 Dams	3	0	187	39	8	0
Between 2 & 3 Dams	18	0	132	30	12	0
Between 3 & 4 Dams	0	0	98	11	30	0
Between 4 & 5 Dams	19	9	862	107	33	0
Between 5 & 6 Dams	0	0	0	0	0	0
Between 6 & 7 Dams	7	0	64	0	13	0
Between 7 & 8 Dams	14	7	34	34	15	58
Between 8 & 9 Dams	359	399	175	383	523	102
Between 9 & 10 Dams	36	37	0	61	40	213
Above Chief Joseph Dam	213	592	276	232	101	1,761
Above Hells Canyon Dam	222	1,221	560	0	140	14
Totals:	892	2,265	2,388	898	916	2,148

TABLE 19 (cont.)

Number of Adults at Spawning Grounds Without Dams (Thousands)

<u>Area of Production</u>	<u>Spring Chinook</u>	<u>Summer Chinook</u>	<u>Fall Chinook</u>	<u>Coho</u>	<u>Steelhead</u>	<u>Sockeye</u>
Between 1 & 2 Dams	3	0	187	39	8	0
Between 2 & 3 Dams	18	0	132	30	12	0
Between 3 & 4 Dams	0	0	98	11	30	0
Between 4 & 5 Dams	19	9	862	107	33	0
Between 5 & 6 Dams	0	0	0	0	0	0
Between 6 & 7 Dams	7	0	64	0	13	0
Between 7 & 8 Dams	14	7	34	34	15	58
Between 8 & 9 Dams	359	399	175	383	523	102
Between 9 & 10 Dams	36	37	0	61	40	213
Above Chief Joseph Dam	213	592	276	232	101	1,761
Above Hells Canyon Dam	222	1,221	560	0	140	14
Totals:	892	2,265	2,388	898	916	2,148

All Species Total: 9,507,000

TABLE 19 (cont.)

Number of Adults at Spawning Grounds With Dams (Thousands)

<u>Area of Production</u>	<u>Spring Chinook</u>	<u>Summer Chinook</u>	<u>Fall Chinook</u>	<u>Coho</u>	<u>Steelhead</u>	<u>Sockeye</u>
Between 1 & 2 Dams	2	0	142	30	6	0
Between 2 & 3 Dams	11	0	76	18	7	0
Between 3 & 4 Dams	0	0	43	5	13	0
Between 4 & 5 Dams	6	3	288	36	11	0
Between 5 & 6 Dams	0	0	0	0	0	0
Between 6 & 7 Dams	1	0	12	0	2	0
Between 7 & 8 Dams	2	1	5	5	2	9
Between 8 & 9 Dams	40	44	19	43	58	11
Between 9 & 10 Dams	3	3	0	5	3	18
Above Chief Joseph Dam	0	0	0	0	0	0
Above Hells Canyon Dam	0	0	0	0	0	0
Totals:	66	52	586	141	104	38

All Species Total: 986,000

TABLE 19 (cont.)

Dam Produced Salmon and Steelhead Loss (Thousands)

<u>Area of Production</u>	<u>Spring Chinook</u>	<u>Summer Chinook</u>	<u>Fall Chinook</u>	<u>Coho</u>	<u>Steelhead</u>	<u>Sockeye</u>
Between 1 & 2 Dams	1	0	45	9	2	0
Between 2 & 3 Dams	8	0	56	13	5	0
Between 3 & 4 Dams	0	0	55	6	17	0
Between 4 & 5 Dams	13	6	575	71	22	0
Between 5 & 6 Dams	0	0	0	0	0	0
Between 6 & 7 Dams	6	0	51	0	10	0
Between 7 & 8 Dams	12	6	29	29	13	50
Between 8 & 9 Dams	319	355	156	340	465	91
Between 9 & 10 Dams	33	34	0	56	37	195
Above Chief Joseph Dam	213	592	276	232	101	1,761
Above Hells Canyon Dam	222	1,221	560	0	140	14
Totals:	826	2,213	1,802	757	812	2,111

All Species Total: 8,522,000

TABLE 19 (cont.)

Hydropower-Related Salmon and Steelhead Loss (Thousands)

<u>Area of Production</u>	<u>Spring Chinook</u>	<u>Summer Chinook</u>	<u>Fall Chinook</u>	<u>Coho</u>	<u>Steelhead</u>	<u>Sockeye</u>
Between 1 & 2 Dams	1	0	45	9	2	0
Between 2 & 3 Dams	8	0	56	13	5	0
Between 3 & 4 Dams	0	0	55	6	17	0
Between 4 & 5 Dams	13	6	575	71	22	0
Between 5 & 6 Dams	0	0	0	0	0	0
Between 6 & 7 Dams	6	0	51	0	10	0
Between 7 & 8 Dams	12	6	29	29	13	50
Between 8 & 9 Dams	319	355	156	340	465	91
Between 9 & 10 Dams	33	34	0	56	37	195
Above Chief Joseph Dam	196	545	254	213	93	1,620
Above Hells Canyon Dam	111	611	280	0	70	7
Totals:	698	1,555	1,500	739	734	1,963

All Species Total: 7,189,000

**VARIATION 4:
STAFF ESTIMATE OF HYDROPOWER-RELATED LOSSES
USING CURRENT POTENTIAL RUN SIZE AS A BASIS¹**

(Numbers of Smolts Produced by Area)

Areas of Production	Spring Chinook		Summer Chinook		Fall Chinook		Coho		Steelhead		Sockeye	
	Hatchery	Natural	Hatchery	Natural	Hatchery	Natural	Hatchery	Natural	Hatchery	Natural	Hatchery	Natural
Between 1 & 2 Dams	4,917,000	864,000	---	---	4,431,000	---	1,750,000	269,000	160,000	197,000	---	---
Between 2 & 3 Dams	765,000	1,407,000	---	---	---	2,057,000	---	331,000	130,000	105,000	---	---
Between 3 & 4 Dams	---	4,273,000	---	---	2,580,000	2,025,000	---	---	48,000	458,000	---	---
Between 4 & 5 Dams	514,000	3,112,000	---	---	8,520,000	21,938,000	---	---	359,000	355,000	---	---
Between 5 & 6 Dams	---	---	---	---	---	---	---	---	---	---	---	---
Between 6 & 7 Dams	---	---	---	---	840,000	---	---	---	220,000	1,000	---	---
Between 7 & 8 Dams	1,640,000	887,000	---	556,000	---	---	---	---	---	94,000	---	316,000
Between 8 & 9 Dams	6,251,000	16,905,000	1,364,000	14,159,000	360,000	24,000	320,000	232,000	4,472,000	1,885,000	---	460,000
Above Wells and Below Chief Joseph dams	800,000	1,266,000	1,344,000	1,295,000	---	---	---	---	368,000	78,000	---	748,000

¹ This variation assumes that the percent of operational hydropower loss (that occurring below the blocked areas) is 100 percent because, in theory, the dams could be operated for fish passage if it were not for hydropower

TABLE 20 (cont.)

Number of Smolts Produced (Thousands)

<u>Area of Production</u>	<u>Spring Chinook</u>	<u>Summer Chinook</u>	<u>Fall Chinook</u>	<u>Coho</u>	<u>Steelhead</u>	<u>Sockeye</u>
Between 1 & 2 Dams	5.781	0	4.431	2.019	357	0
Between 2 & 3 Dams	2.172	0	2.057	331	235	0
Between 3 & 4 Dams	4.273	0	4.605	0	506	0
Between 4 & 5 Dams	3.626	0	30.458	0	714	0
Between 5 & 6 Dams	0	0	0	0	0	0
Between 6 & 7 Dams	0	0	840	0	221	0
Between 7 & 8 Dams	2.527	556	0	0	94	316
Between 8 & 9 Dams	23.156	15.523	384	552	6.357	460
Above Wells and Below Chief Joseph	2.066	2.639	0	0	446	748
Above Chief Joseph Dam	0	0	0	0	0	0
Above Hells Canyon Dam	0	0	0	0	0	0
Totals:	43.601	18.718	42.775	2.902	8.930	1,524

All Species Total: 118,450,000

TABLE 20 (cont.)

Smolts to River Mouth With Dams (Thousands)

<u>Area of Production</u>	<u>Spring Chinook</u>	<u>Summer Chinook</u>	<u>Fall Chinook</u>	<u>Coho</u>	<u>Steelhead</u>	<u>Sockeye</u>
Between 1 & 2 Dams	4.625	0	3,345	1,615	286	0
Between 2 & 3 Dams	1,390	0	1,316	212	150	0
Between 3 & 4 Dams	2,188	0	2,358	0	259	0
Between 4 & 5 Dams	1,485	0	12,476	0	292	0
Between 5 & 6 Dams	0	0	0	0	0	0
Between 6 & 7 Dams	0	0	220	0	58	0
Between 7 & 8 Dams	530	117	0	0	20	66
Between 8 & 9 Dams	3,885	2,604	64	93	1,067	77
Above Wells and Below Chief Joseph	277	354	0	0	60	100
Above Chief Joseph Dam	0	0	0	0	0	0
Above Hells Canyon Dam	0	0	0	0	0	0
Totals:	14,380	3,075	19,979	1,920	2,192	244

All Species Total: 41,789,000

TABLE 20 (cont.)

Number of Adults at River Mouth With Dams (Thousands)

<u>Area of Production</u>	<u>Spring Chinook</u>	<u>Summer Chinook</u>	<u>Fall Chinook</u>	<u>Coho</u>	<u>Steelhead</u>	<u>Sockeye</u>
Between 1 & 2 Dams	92	0	142	129	29	0
Between 2 & 3 Dams	28	0	53	17	15	0
Between 3 & 4 Dams	44	0	94	0	26	0
Between 4 & 5 Dams	30	0	499	0	29	0
Between 5 & 6 Dams	0	0	0	0	0	0
Between 6 & 7 Dams	0	0	9	0	6	0
Between 7 & 8 Dams	11	5	0	0	2	7
Between 8 & 9 Dams	78	104	3	7	107	8
Above Wells and Below Chief Joseph	6	14	0	0	6	10
Above Chief Joseph Dam	0	0	0	0	0	0
Above Hells Canyon Dam	0	0	0	0	0	0
Totals:	288	123	799	154	219	24

All Species Total: 1,607,000

TABLE 20 (cont.)

Number of Adults at Spawning Grounds With Dams (Thousands)

<u>Area of Production</u>	<u>Spring Chinook</u>	<u>Summer Chinook</u>	<u>Fall Chinook</u>	<u>Coho</u>	<u>Steelhead</u>	<u>Sockeye</u>
Between 1 & 2 Dams	88	0	135	123	27	0
Between 2 & 3 Dams	25	0	48	15	14	0
Between 3 & 4 Dams	38	0	81	0	22	0
Between 4 & 5 Dams	24	0	406	0	24	0
Between 5 & 6 Dams	0	0	0	0	0	0
Between 6 & 7 Dams	0	0	6	0	4	0
Between 7 & 8 Dams	7	3	0	0	1	5
Between 8 & 9 Dams	52	69	2	5	71	5
Above Wells and Below Chief Joseph	3	9	0	0	4	6
Above Chief Joseph Dam	0	0	0	0	0	0
Above Hells Canyon Dam	0	0	0	0	0	0
Totals:	237	81	678	143	167	16

All Species Total: 1,322,000

TABLE 20 (cont.)

Number of Adults at Spawning Grounds Without Dams (Thousands)

<u>Area of Production</u>	<u>Spring Chinook</u>	<u>Summer Chinook</u>	<u>Fall Chinook</u>	<u>Coho</u>	<u>Steelhead</u>	<u>Sockeye</u>
Between 1 & 2 Dams	116	0	177	162	36	0
Between 2 & 3 Dams	43	0	82	26	24	0
Between 3 & 4 Dams	85	0	184	0	51	0
Between 4 & 5 Dams	73	0	1,218	0	71	0
Between 5 & 6 Dams	0	0	0	0	0	0
Between 6 & 7 Dams	0	0	34	0	22	0
Between 7 & 8 Dams	51	22	0	0	9	32
Between 8 & 9 Dams	463	621	15	44	636	46
Above Wells and Below Chief Joseph	41	106	0	0	45	75
Above Chief Joseph Dam	213	592	276	232	101	1,761
Above Hells Canyon Dam	222	1,221	560	0	140	14
Totals:	1,307	2,562	2,547	464	1,134	1,927

All Species Total: 9,941,000

TABLE 20 (cont.)

Dam Produced Salmon and Steelhead Loss (Thousands)

<u>Area of Production</u>	<u>Spring Chinook</u>	<u>Summer Chinook</u>	<u>Fall Chinook</u>	<u>Coho</u>	<u>Steelhead</u>	<u>Sockeye</u>
Between 1 & 2 Dams	28	0	43	39	9	0
Between 2 & 3 Dams	18	0	35	11	10	0
Between 3 & 4 Dams	48	0	103	0	28	0
Between 4 & 5 Dams	48	0	812	0	48	0
Between 5 & 6 Dams	0	0	0	0	0	0
Between 6 & 7 Dams	0	0	27	0	18	0
Between 7 & 8 Dams	43	19	0	0	8	27
Between 8 & 9 Dams	412	552	14	39	565	41
Above Wells and Below Chief Joseph	38	97	0	0	41	68
Above Chief Joseph Dam	213	592	276	232	101	1,761
Above Hells Canyon Dam	222	1,221	560	0	140	14
Totals:	1,070	2,480	1,869	321	967	1,911

All Species Total: 8,619,000

TABLE 20 (cont.)

Hydropower-Related Salmon and Steelhead Loss (Thousands)

<u>Area of Production</u>	<u>Spring Chinook</u>	<u>Summer Chinook</u>	<u>Fall Chinook</u>	<u>Coho</u>	<u>Steelhead</u>	<u>Sockeye</u>
Between 1 & 2 Dams	28	0	43	39	9	0
Between 2 & 3 Dams	18	0	35	11	10	0
Between 3 & 4 Dams	48	0	103	0	28	0
Between 4 & 5 Dams	48	0	812	0	48	0
Between 5 & 6 Dams	0	0	0	0	0	0
Between 6 & 7 Dams	0	0	27	0	18	0
Between 7 & 8 Dams	43	19	0	0	8	27
Between 8 & 9 Dams	412	552	14	39	565	41
Above Wells and Below Chief Joseph	38	97	0	0	41	68
Above Chief Joseph Dam	196	545	254	213	93	1,620
Above Hells Canyon Dam	111	611	280	0	70	7
Totals:	942	1,823	1,567	303	889	1,763

All Species Total: 7,287,000