SYSTEM OPERATIONAL REQUEST: #2007-1

The following State, Federal, and Tribal Salmon Managers have participated in the preparation and support this SOR: U.S. Fish & Wildlife Service, Idaho Department of Fish and Game, Oregon Department of Fish and Wildlife, the Washington Department of Fish and Wildlife, Nez Perce Tribe, Shoshone-Bannock Tribes, and the Columbia River Inter-Tribal Fish Commission.

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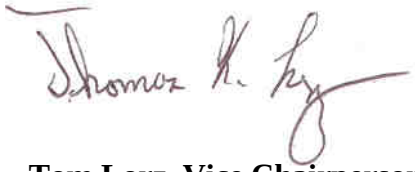

FROM: **Tom Lorz, Vice Chairperson, Salmon Managers**

DATE: **January 30, 2007**

SUBJECT: **Grand Coulee Operations and Chum Flows**

SPECIFICATIONS:

Operate Grand Coulee Dam conservatively to better assure the ability to try and maintain the minimum 13.0-foot tailwater elevation below Bonneville Dam through chum salmon emergence, Vernita Bar flows, and to assure reaching the April 10 upper rule curve.

JUSTIFICATION:

Grand Coulee Reservoir is at an elevation of 1274.1 feet (1-29-07) and has drafted 4.5 feet in the last week (1-23-07 to 1-29-07) and 13.0 feet over the last 19 days (1-11-07 to 1-29-07). Between January 11th and January 29th, the Bonneville project tailwater has averaged 16.1 feet, well above the 13.0-foot minimum chum elevation. Based on the January final Water Supply Forecast (WSF) both the end of January and end of February FC elevations at Grand Coulee are 1290 feet (full) and the end of March FC elevation is 1269.2 feet. At the current draft rate, Grand Coulee will be within one foot of its end of March FC elevation by early next week.

It is also important to note that the month of January has been a relatively dry month. In particular, between January 1st and January 29th, precipitation has been 86% of average in Upper Columbia Basins, 36% of average in Middle Columbia Basins, 32% of average in Lower Snake Basins, and 21% of average in Upper and Middle Snake Basins (CRITFC Weekly Precipitation Update, attached). Additionally, Snowpack has decreased 4% in Columbia Basins above the Snake River Confluence (101% of average on January 1st, 2007 to 97% of average on January 29th), 15% in Snake River Basins (87% of average on January 1st, 2007 to 72% of average on January 29th), and 14% in Lower Columbia Basins (101% of average on January 1st, 2007 to 87% of average on January 29th)[1].

Considering that both precipitation and snowpack have been declining over the month of January, it is likely that February Final WSFs will decrease relative to January Final WSFs. Decreased water supply forecasts will equate to higher flood control elevations. If Grand Coulee continues to draft at a rate that is well above that needed to maintain chum elevations below Bonneville Dam, it is our concern that Grand Coulee will be in a situation where it is well below its future flood control elevations. This situation would force a decision between refilling Grand Coulee to its April 10th Flood Control elevation (possibly impacting refill) or maintaining chum flows. A reduction in chum flows this year could be particularly devastating. According to a document produced by the USFWS, "Distribution and Elevation calculations for 217 Chum redds mapped in the Ives Is. Complex during the 2006 Spawning Season December 22, 2006," a significant number (nearly 50%) of chum redds will be impacted even by minimal reductions in Bonneville Tailwater below 13.0 feet (see attached document and Table 1).

Table 1. Distribution of chum redds vs. 10 Kcfs flow band for both the original analysis conducted for 177 redds mapped through 11-22-2006 and all redds including the additional 40 redds mapped through 12-22-2006.

	Redds through 11-22-06			All Redds - 12-22-06			
	Flow Band	*Redds*	*% Total*	*Flow Band*	*Redds*	*% Total*	*Redd Delta*
	120 - steady	18	10.2%	120 - steady	42	19.4%	24
	120-130	67	37.9%	120-130	75	34.6%	8
13.0 Bon.	130-140	62	35.0%	130-140	66	30.4%	4
Tailwater	140-150	15	8.5%	140-150	15	6.9%	0
	150-160	12	6.8%	150-160	15	6.9%	3
	160-170	3	1.7%	160-170	4	1.8%	1
		177	100.0%		217	100.0%	

NOTE: USFWS has not been able to get spawning numbers or redds for the three Columbia mainstem sites to compare to the potential impacts at Ives Island.

[1] Data used from the Natural Resource Conservation Service ftp://ftp.wcc.nrcs.usda.gov/data/snow/update/columbia/

As you are aware, this is not a new issue for this time of year. The Salmon Managers have shared similar concerns about Grand Coulee winter drafts in previous years. For example, on April 6th of 2004, the Salmon Managers unanimously signed a Joint Technical Staff memo that voiced significant concerns over Grand Coulee winter drafts[2]. Also, in 2005, every agency comment to the Water Management Plan included concerns about excessive wintertime drafting[3].

[2] Document available at http://www.fpc.org/documents/joint_technical/38-04.pdf.

[3] http://www.nwd-wc.usace.army.mil/tmt/documents/wmp/2005/draft/comments/washington.pdf. http://www.nwd-wc.usace.army.mil/tmt/documents/wmp/2005/draft/comments/IDFG_20050118.pdf. http://www.nwd-wc.usace.army.mil/tmt/documents/wmp/2005/draft/comments/critfc_20041215.pdf. http://www.nwd-wc.usace.army.mil/tmt/documents/wmp/2005/draft/comments/critfc_20041217.pdf.

Water Year 2007	**Precipitation** January 1 - 29	(inches) Seasonal (Oct. 1 - now)	Pro-rated Monthly Temp. (degF)
Portland	58%	116%	-1.7
UPPER-COLUMBIA:			
Penticton	76%	152%	-0.7
Kamloops	83%	115%	-2
Revelstoke	90%	113%	1.8
Cranbrook	93%	157%	-0.5
Creston	msg	msg	-1.3
average:	86%	134%	-0.5
Normal:	1.92	7.23	23.6
MIDDLE-COLUMBIA:			
Pendleton	33%	86%	-2.7
Redmond	62%	99%	-3.4
Yakima	27%	105%	-0.8
Wenatchee	17%	126%	-1.3
Spokane	39%	115%	-2.1
average:	36%	106%	-2.1
Normal:	1.24	4.86	30.1
LOWER SNAKE:			
Lewiston	14%	97%	-2.4
Stanley	52%	157%	-4.4
Challis	30%	189%	-4.5
average:	32%	148%	-3.8
Normal:	1.04	4.19	22.6
UPPER and MIDDLE SNAKE:			
McCall	17%	68%	-8.2
Ontario	3%	62%	1.7
Boise	15%	76%	-1.2
Twin Falls	17%	109%	-2.2
Burley	24%	94%	-4.9
Pocatello	37%	92%	-6.2
Idaho Falls	32%	82%	-6.4
average:	21%	83%	-3.9
Normal:	1.95	5.21	25.3

Forecasted Daily Rain (in inches), BON dam area:	
30-Jan	0
31-Jan	0
1-Feb	0
2-Feb	0
3-Feb	0
4-Feb	0.15
5-Feb	0

Distribution and Elevation calculations for 217 Chum redds mapped in the Ives Is. Complex during the 2006 Spawning Season
December 22, 2006.

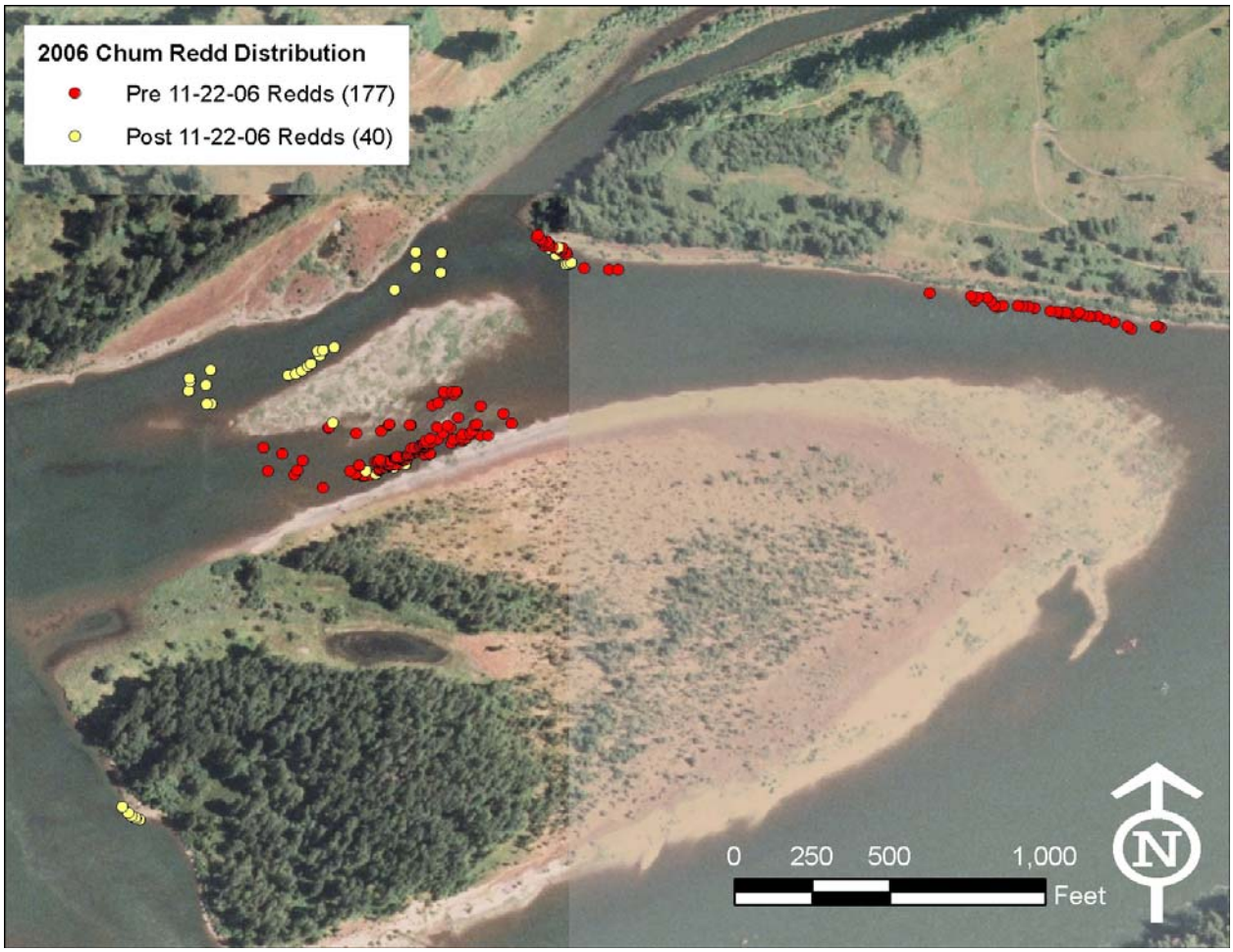

Figure 1. General distribution of all 217 chum redds excavated in the Ives Island complex below Bonneville Dam and mapped with GPS by ODFW/WDFW survey crews. An additional 40 redds were mapped after 11-22-3006. Note: this analysis does not include redds mapped at any of the downstream spawning areas including Multnomah and I-205.

Table 1. Computed redd elevations for all 217 Redds.

Redd Elevations							
7.10	8.89	9.43	9.63	9.80	10.08	10.51	11.35
7.34	8.91	9.43	9.63	9.82	10.09	10.51	11.37
7.73	8.92	9.44	9.63	9.83	10.10	10.51	11.39
8.05	8.95	9.44	9.63	9.84	10.13	10.54	11.41
8.20	8.97	9.45	9.64	9.85	10.17	10.56	11.42
8.30	8.97	9.45	9.64	9.85	10.17	10.58	11.43
8.32	9.01	9.46	9.65	9.86	10.17	10.63	11.43
8.33	9.04	9.47	9.65	9.86	10.17	10.68	11.47
8.33	9.05	9.47	9.66	9.87	10.19	10.69	11.63
8.37	9.08	9.48	9.67	9.88	10.19	10.69	11.71
8.38	9.09	9.49	9.68	9.88	10.20	10.71	11.72
8.48	9.09	9.50	9.68	9.88	10.20	10.74	11.75
8.48	9.12	9.52	9.68	9.88	10.21	10.75	11.78
8.55	9.13	9.54	9.69	9.90	10.21	10.76	11.80
8.59	9.13	9.55	9.69	9.91	10.24	10.76	11.87
8.60	9.15	9.55	9.69	9.92	10.27	10.84	11.93
8.61	9.17	9.55	9.69	9.93	10.27	10.96	11.96
8.62	9.18	9.56	9.69	9.94	10.30	10.96	11.99
8.68	9.18	9.56	9.70	9.94	10.30	10.99	12.19
8.70	9.22	9.56	9.71	9.97	10.31	11.05	12.23
8.75	9.27	9.56	9.71	9.98	10.33	11.06	12.43
8.75	9.28	9.57	9.74	9.99	10.37	11.08	
8.79	9.32	9.58	9.74	10.00	10.41	11.18	
8.81	9.33	9.58	9.74	10.01	10.41	11.20	
8.84	9.36	9.58	9.76	10.04	10.44	11.22	
8.86	9.37	9.60	9.77	10.05	10.44	11.29	
8.87	9.40	9.61	9.78	10.05	10.45	11.32	
8.88	9.42	9.62	9.78	10.08	10.50	11.32	

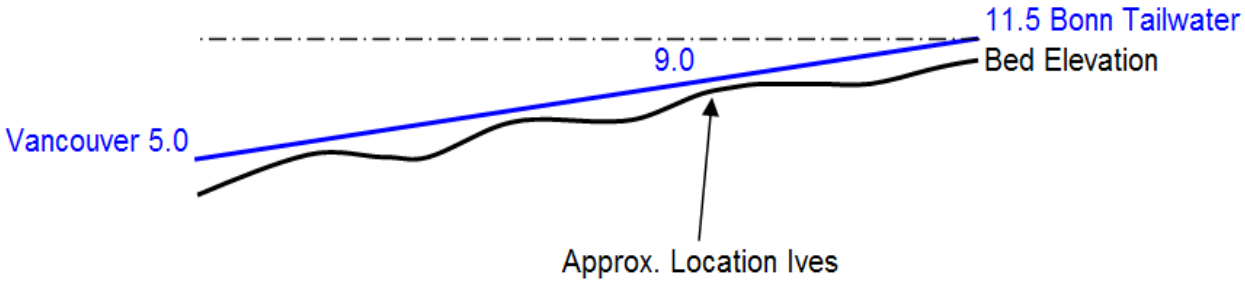

Figure 2. Graphic describing the relationship between the Bonneville tailwater and the chum spawning locations. Water flows downhill, it does not follow the dashed line in the figure above, which if it did would make managing by just redd bed elevations a snap! What we require is the relationship between the Bonneville tailwater and the water surface elevations over the redd spawning areas. Note that the redd elevations computed in Table 1 cannot be used solely as a bases for management.

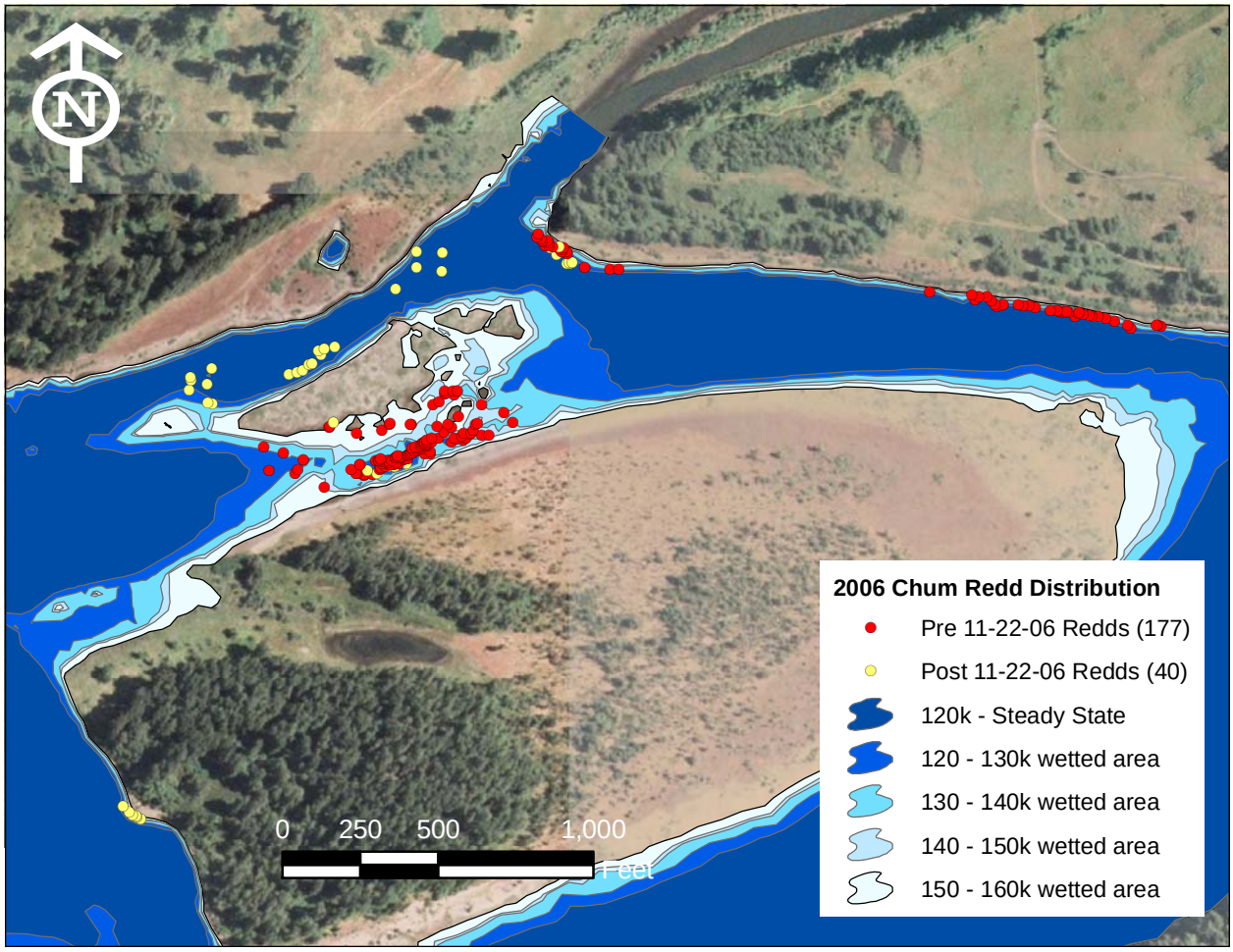

Figure 3. Distribution of chum redds, plotted on modeled wetted area simulations (flow bands) ranging from 120 to 160 kcfs at 10 kcfs intervals.

Table 2. Distribution of chum redds vs. 10kcfs flow band for both the original analysis conducted for 177 redds mapped through 11-22-2006 and all redds including the additional 40 redds mapped through 12-22-2006.

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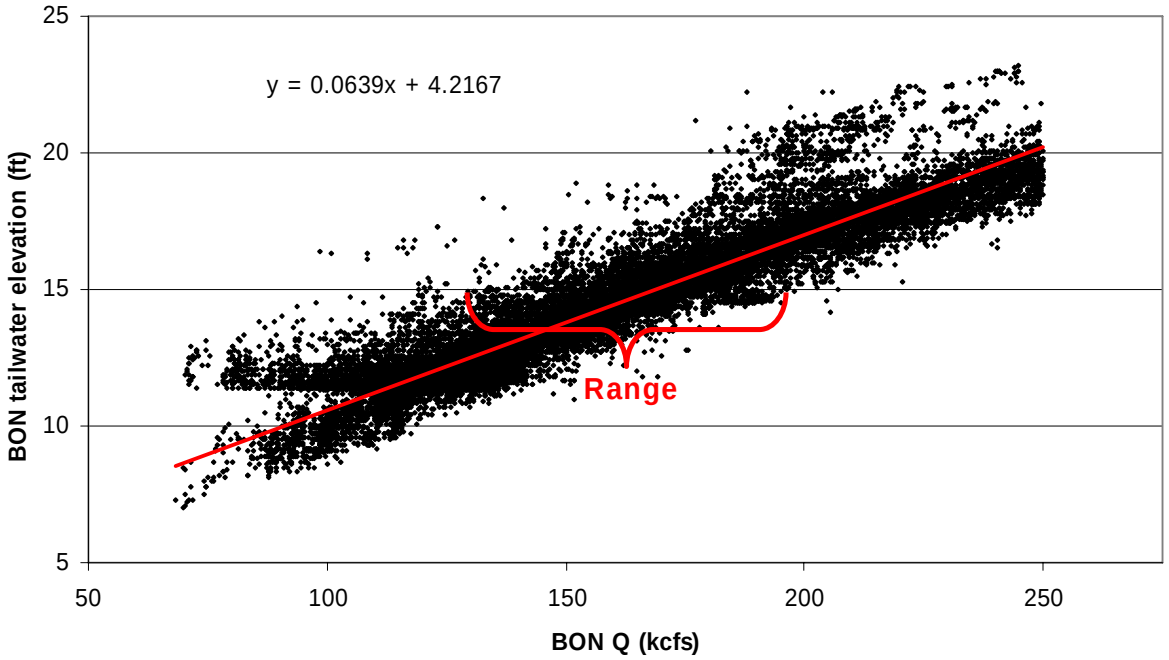

Figure 4. Stage discharge relationship between the USGS Bonneville tailwater gage and Bonneville Discharge using data from 2000 – 2006.

Table 3. This table is based on the relationship of the data in Figure 4 and describes the range of scenarios and problematic nature of managing flows/tailwaters for the Ives Island chum.

		Range	
elevation	Avg Q (kcfs) necessary	min Q	max Q
11.5	114	71	151
12.0	122	71	165
12.5	130	71	160
13.0	**137**	**89**	**162**
13.5	145	103	172
14.0	153	90	173
14.5	161	98	195
15.0	169	119	207
15.5	177	145	211
16.0	184	148	214