Table 1 - 2008 Spill Patterns

Note: The following is provided as the spill pattern at The Dalles, which acknowledges the fact that spillbays 10 through 23 are red tagged and can not be used.

The Dalles

Discharge Distribution Patterns

Acceptable Fish Passage Patterns

Spillway Bay Number									Total	Total	40% Spill Total
1	2	3	4	5	6	7	8	9	Feet	Spill	River
vertical gate opening (ft.)									(ft)	Kcfs	Kcfs
4									4	6	15.0
4	4								8	12	30.0
6	6								12	18	45.0
		4	4	4	4				16	24	60.0
	4	4	4	4	4				20	30	75.0
4	4	4	4	4	4				24	36	90.0
4.5	4.5	4.5	4.5	4.5	4.5				27	41	101.3
5	5	5	5	5	5				30	45	112.5
5.5	5.5	5.5	5.5	5.5	5.5				33	50	123.8
6	6	6	6	6	6				36	54	135.0
6.5	6.5	6.5	6.5	6.5	6.5				39	59	146.3
7	7	7	7	7	7				42	63	157.5
7.5	7.5	7.5	7.5	7.5	7.5				45	68	168.8
8	8	8	8	8	8				48	72	180.0
8.5	8.5	8.5	8.5	8.5	8.5				51	77	191.3
9	9	9	9	9	9				54	81	202.5
9.5	9.5	9.5	9.5	9.5	9.5				57	86	213.8
10	10	10	10	10	10				60	90	225.0
10.5	10.5	10.5	10.5	10.5	10.5				63	95	236.3
11	11	11	11	11	11				66	99	247.5
11.5	11.5	11.5	11.5	11.5	11.5				69	104	258.8
12	12	12	12	12	12				72	108	270.0
12.5	12.5	12.5	12.5	12.5	12.5				75	113	281.3
13	13	13	13	13	13				78	117	292.5
13.5	13.5	13.5	13.5	13.5	13.5				81	122	303.8
14	14	14	14	14	14				84	126	315.0
14	14	14	14	14	14	4			88	132	330.0
14	14	14	14	14	14	6			90	135	337.5
14	14	14	14	14	14	8			92	138	345.0
14	14	14	14	14	14	10			94	141	352.5
14	14	14	14	14	14	12			96	144	360.0
14	14	14	14	14	14	10	4		98	147	367.5
14	14	14	14	14	14	10	6		100	150	375.0
14	14	14	14	14	14	10	8		102	153	382.5
14	14	14	14	14	14	10	10		104	156	390.0
14	14	14	14	14	14	12	10		106	159	397.5
14	14	14	14	14	14	10	10	4	108	162	405.0
14	14	14	14	14	14	12	10	4	110	165	412.5
14	14	14	14	14	14	12	10	6	112	168	420.0
14	14	14	14	14	14	12	10	8	114	171	427.5
14	14	14	14	14	14	12	10	10	116	174	435.0
14	14	14	14	14	14	12	12	10	118	177	442.5
14	14	14	14	14	14	12	12	12	120	180	450.0
14	14	14	14	14	14	13	13	13	123	185	
14	14	14	14	14	14	14	14	14	126	189	
14	14	15	15	15	15	14	14	14	130	195	
14	14	15	15	15	15	15	15	15	133	200	
14	14	16	16	16	16	15	15	15	137	206	
14	14	16	16	16	16	16	16	16	140	210	
14	14	17	17	17	17	16	16	16	144	216	
14	14	17	17	17	17	17	17	17	147	221	
14	14	18	18	18	18	17	17	17	151	227	
14	14	18	18	18	18	18	18	18	154	231	
14	14	19	19	19	19	18	18	18	158	237	
14	14	19	19	19	19	19	19	19	161	242	
14	14	20	20	20	20	19	19	19	165	248	
14	14	20	20	20	20	20	20	20	168	252	
14	17	21	21	21	21	21	21	21	178	267	
14	17	22	22	22	22	22	22	22	185	278	
14	17	23	23	23	23	23	23	23	192	288	
14	17	24	24	24	24	24	24	24	199	299	
14	17	25	25	25	25	25	25	25	206	309	
14	17	26	26	26	26	26	26	26	213	320	
14	20	26	26	26	26	26	26	26	216	324	
14	20	27	27	27	27	27	27	27	223	335	
14	23	27	27	27	27	27	27	27	226	339	
14	23	28	28	28	28	28	28	28	233	350	
14	28	28	28	28	28	28	28	28	238	357	
18	28	28	28	28	28	28	28	28	242	363	
22	28	28	28	28	28	28	28	28	246	369	
28	28	28	28	28	28	28	28	28	252	378	

Table 2 - Depth Average Velocities on The Dalles Spillway Shelf while Maximizing Spill through Bays 1-9

			Powerhouse = 0 Kcfs			Powerhouse = 100 Kcfs			Powerhouse = 150 Kcfs			Powerhouse = 200 Kcfs			Powerhouse = 250 Kcfs		
Gate Opening	Q per bay	Total Spill	Total River	Tailwater	Depth Average Velocity	Total River	Tailwater	Depth Average Velocity	Total River	Tailwater	Depth Average Velocity	Total River	Tailwater	Depth Average Velocity	Total River	Tailwater	Depth Average Velocity
ft	Kcfs	Kcfs	Kcfs	ft	fps	Kcfs	ft	fps	Kcfs	ft	fps	Kcfs	ft	fps	Kcfs	ft	fps
14.0	21.0	180.0	180.0	77.0	39.1	280.0	79.4	30.6	330.0	80.8	27.4	380.0	82.1	24.8	430.0	83.5	22.5
14.0	21.0	184.5	184.5	77.1	38.6	284.5	79.6	30.3	334.5	80.9	27.2	384.5	82.2	24.6	434.5	83.7	22.3
14.0	21.0	189.0	189.0	77.2	38.2	289.0	79.7	30.0	339.0	81.0	26.9	389.0	82.4	24.4	439.0	83.8	22.2
15.0	22.5	195.0	195.0	77.3	40.3	295.0	79.8	31.7	345.0	81.2	28.5	395.0	82.5	25.8	445.0	84.0	23.5
15.0	22.5	199.5	199.5	77.4	39.8	299.5	79.9	31.4	349.5	81.3	28.2	399.5	82.7	25.6	449.5	84.1	23.3
16.0	24.0	205.5	205.5	77.6	41.8	305.5	80.1	33.1	355.5	81.4	29.8	405.5	82.8	27.0	455.5	84.3	24.6
16.0	24.0	210.0	210.0	77.7	41.3	310.0	80.2	32.7	360.0	81.6	29.5	410.0	83.0	26.7	460.0	84.4	24.4
17.0	25.5	216.0	216.0	77.8	43.3	316.0	80.4	34.3	366.0	81.7	31.0	416.0	83.1	28.1	466.0	84.6	25.6
17.0	25.5	220.5	220.5	77.9	42.8	320.5	80.5	34.0	370.5	81.9	30.7	420.5	83.3	27.9	470.5	84.7	25.4
18.0	27.0	226.5	226.5	78.1	44.6	326.5	80.7	35.6	376.5	82.0	32.1	426.5	83.4	29.2	476.5	84.9	26.6
18.0	27.0	231.0	231.0	78.2	44.1	331.0	80.8	35.2	381.0	82.1	31.8	431.0	83.6	28.9	481.0	85.0	26.4
19.0	28.5	237.0	237.0	78.3	45.9	337.0	80.9	36.7	387.0	82.3	33.2	437.0	83.7	30.2	487.0	85.2	27.6
19.0	28.5	241.5	241.5	78.5	45.4	341.5	81.1	36.4	391.5	82.4	32.9	441.5	83.9	29.9	491.5	85.3	27.4
20.0	30.0	247.5	247.5	78.6	47.1	347.5	81.2	37.8	397.5	82.6	34.2	447.5	84.0	31.2	497.5	85.5	28.5
20.0	30.0	252.0	252.0	78.7	46.6	352.0	81.3	37.5	402.0	82.7	33.9	452.0	84.2	30.9	502.0	85.7	28.3
21.0	31.5	267.0	267.0	79.1	47.3	367.0	81.8	38.2	417.0	83.2	34.6	467.0	84.6	31.6	517.0	86.1	29.0
22.0	33.0	277.5	277.5	79.4	48.4	377.5	82.0	39.2	427.5	83.5	35.6	477.5	84.9	32.5	527.5	86.4	29.8
23.0	34.5	288.0	288.0	79.6	49.4	388.0	82.3	40.1	438.0	83.8	36.5	488.0	85.2	33.4	538.0	86.8	30.7
24.0	36.0	298.5	298.5	79.9	50.3	398.5	82.6	41.0	448.5	84.1	37.3	498.5	85.6	34.2	548.5	87.1	31.4
25.0	37.5	309.0	309.0	80.2	51.3	409.0	82.9	41.9	459.0	84.4	38.2	509.0	85.9	35.0	559.0	87.4	32.2
26.0	39.0	319.5	319.5	80.5	52.1	419.5	83.2	42.7	469.5	84.7	39.0	519.5	86.2	35.7	569.5	87.7	32.9
26.0	39.0	324.0	324.0	80.6	51.6	424.0	83.4	42.3	474.0	84.8	38.7	524.0	86.3	35.5	574.0	87.9	32.7
27.0	40.5	334.5	334.5	80.9	52.4	434.5	83.7	43.1	484.5	85.1	39.4	534.5	86.6	36.2	584.5	88.2	33.4
27.0	40.5	339.0	339.0	81.0	52.0	439.0	83.8	42.7	489.0	85.3	39.1	539.0	86.8	35.9	589.0	88.4	33.1
28.0	42.0	349.5	349.5	81.3	52.7	449.5	84.1	43.5	499.5	85.6	39.8	549.5	87.1	36.6	599.5	88.7	33.8
28.0	42.0	357.0	357.0	81.5	51.9	457.0	84.3	42.9	507.0	85.8	39.3	557.0	87.3	36.2	607.0	88.9	33.4
28.0	42.0	363.0	363.0	81.6	51.3	463.0	84.5	42.4	513.0	86.0	38.9	563.0	87.5	35.8	613.0	89.1	33.1
28.0	42.0	369.0	369.0	81.8	50.7	469.0	84.7	42.0	519.0	86.2	38.5	569.0	87.7	35.5	619.0	89.3	32.8
28.0	42.0	378.0	378.0	82.1	49.8	478.0	84.9	41.3	528.0	86.4	37.9	578.0	88.0	35.0	628.0	89.6	32.4

Tailwater Elevation computed assuming a Bonneville Forebay Elevation of 74 feet.

Tailwater Elevation is estimated for the spillway shelf.

The Dalles Lock and Dam
Spillway

The far right column identified the minimum powerhouse flow required to maximize the spill through bays 1-9 and maintain a depth average velocity on the spillway shelf of 30 fps. For example at a 409,500 cfs total river you need a minimum of 134,100 cfs through the powerhouse and you can put 275,400 cfs through the spillway (bays 1-9).

Table 3 - Discharge Per Bay Given a Tailwater and 30 fps Depth Average Velocities on the Spillway Shelf

Tailwater Elevation	Total River Flow Based on Bonneville Forebay Elevation of 74 feet	Critical Depth (TW-68) Assuming critical depth occurring on apron downstream of end sill	Maximum Q per Bay given a depth average velocity of 30 fps	Q through spillway assuming bays 1-9 and 30 fps	Minimum Flow Through Powerhouse - Assuming Spill in Bays 1-9 to 30 fps
ft	cfs	ft	cfs	cfs	cfs
75	70,000	7	12,600	113,400	0
76	103,900	8	14,400	129,600	0
77	137,900	9	16,200	145,800	0
78	171,800	10	18,000	162,000	9,800
79	205,800	11	19,800	178,200	27,600
80	239,700	12	21,600	194,400	45,300
81	273,700	13	23,400	210,600	63,100
82	307,600	14	25,200	226,800	80,800
83	341,600	15	27,000	243,000	98,600
84	375,600	16	28,800	259,200	116,400
85	409,500	17	30,600	275,400	134,100
86	443,500	18	32,400	291,600	151,900
87	477,400	19	34,200	307,800	169,600
88	511,400	20	36,000	324,000	187,400
89	545,300	21	37,800	340,200	205,100
90	579,300	22	39,600	356,400	222,900

2 June 2008; Ebner;CENWP-EC-HD