

1999 Lower Boise River Sediment Target Summary

LBWC TAC Meeting

November 29, 2012

CH2M HILL

Background

- CH2M HILL was under contract to LBWC for technical support
- Funding from legislature, via DEQ to WAG
- TAC meetings
- Sediment Problem Assessment and Target Development in Appendix G of 1999 TMDL
- Steve Miller was principal researcher and author of the 1998 tech memos in G

Problem Assessment/Allocations

- Extensive review of sediment and flow data for the mainstem river
- Three hydrologic seasons selected, each about 120 days:
 - High flow (flood operation)
 - Irrigation season
 - Low flow (non-irrigation)
- General understanding was that high TSS concentrations were related to first flush effects
- Limited duration data to confirm

Targets Selected Based **in Part** on Two Models

- Acute (80 mg/L over 14 days)
 - Anderson (1996)
- Chronic (50 mg/L over 60 days)
 - Newcombe and Jensen (1996)
- Both based on numerous field and laboratory studies of effects of sediment on various fish species and life stages
- Severity of Effect Level (SEV) is an important parameter and policy decision

$$z = SEV$$

TMDL Appendix G version of Anderson (1996)
Model

$$z = 0.637 + 0.740 \ln(y) + 0.864 \ln(x)$$

Correct citation:

Anderson, P.G. 1996. Sediment generation from forestry operations and associated effects on aquatic ecosystems. Proceedings of the Forest-Fish Conference: Land Management Practices Affecting Aquatic Ecosystems, May 1-4, 1996, Calgary, Alberta. pp-pp.

SEV Choice

- SEVs range from 0 (nil effect) to 14 (80-100% mortality)
- SEV = 9 was chosen
- Clear threshold between behavioral/sublethal and lethal/para-lethal effects
- SEV 8 = Indications of major physiological stress (reductions in feeding rate and success)
- SEV 9 = Reduced growth rate (delayed hatching, reduced fish density)
- SEV 10 = 0-20% mortality (increased predation, severe to moderate habitat degradation)

TSS, y (mg/L)	Calculated Duration, x (days)					
	Acute Habitat Model (Anderson, 1996)	Model Number (Newcombe and Jensen, 1996)				
		1	2	3	4	6
1	666	19932	192556	5348	5	41
5	168	2812	14990	1043	3	22
10	93	1210	4992	516	3	17
15	65	739	2624	342	2	14
20	51	520	1662	255	2	13
25	42	397	1167	203	2	12
30	36	318	874	169	2	11
35	32	263	684	145	2	10
40	28	224	554	126	2	10
45	26	194	459	112	2	9
50	23	171	389	101	2	9
55	22	152	334	91	2	8
60	20	137	291	84	2	8
65	19	124	256	77	2	8
70	18	113	228	71	2	8
75	17	104	204	67	1	7
80	16	96	184	62	1	7
85	15	89	167	59	1	7
90	14	83	153	55	1	7
100	13	73	129	50	1	7
110	12	65	111	45	1	6
120	11	59	97	41	1	6
130	10	53	85	38	1	6
140	10	49	76	35	1	6
150	9	45	68	33	1	6
160	9	41	61	31	1	6
170	8	38	56	29	1	5

Basis for Selection

- Acute – 80 mg/L over 14 days:
 - Anderson model
 - Other studies/criteria indicating 80 mg/L upper level
- Chronic – 50 mg/L over 60 days:
 - 60 days is $\sim \frac{1}{2}$ of each of the 3 seasons
 - General understanding that first flush is < 60 days
 - N&J alone suggests 80 mg/L for ~ 60 days
 - “Weight of evidence” and margin of safety approach cautioned for < 80 mg/L:
 - Acute effect was 80 mg/L
 - N&J alone would allow 50 mg/L for 100 days
 - SEV 8 versus SEV 9
 - Consideration of non-salmonids, early life stages of fish, and fish habitat