Keefer & Peery
Univ. Idaho

13 Jan 2006

For: David Clugston, USACE and Ron Boyce, ODFW

From: Matt Keefer and Chris Peery, University of Idaho

Re: Preliminary summary of adult escapement upstream from Lower Granite Dam

The escapement estimates below are based on reported harvest, agency collections at hatcheries and weirs, mobile radio-tracking in tributaries, and especially records of fish at fixed antennas. Fixed sites included: 3 Clearwater sites (mouth, SF Clearwater, and Lochsa), 4 Salmon sites (Riggins, SF salmon, MF Salmon, and Upper Salmon at NF junction) 1 Grande Ronde site (mouth), 1 Imnaha site (mouth), and 1-4 Snake sites (near Asotin in all years plus 3 sites in Hells Canyon downstream from the Salmon confluence in 2000 and 2001.

In our opinion, the areas of greatest uncertainty for the Chinook salmon estimates are for those fish last recorded at the Clearwater mouth and at the Riggins site on the Salmon. Uncertainty is higher for steelhead, because of overwintering, because of more potential spawning sites that were monitored infrequently, and because harvest efforts were much higher and more widespread.

We have some stock-specific estimates (based on juvenile PIT tag locations) similar to those for the runs at large below. However, samples sizes are small for all groups except the mixed-stock samples that were PIT-tagged at Lower Granite Dam. As such, we have not included the PIT tag data here. It is available if needed.

Note that fish with fin clips were less likely to escape in almost all cases; this is due at least in part to greater harvest effort for hatchery fish, but may also reflect reduced homing abilities for these fish. Also note that fish that fell back at Hydrosystem dams were less likely to be successful in nearly all cases. This is consistent with our other fallback-related summaries and suggests that Hydrosystem experiences likely carryover (i.e. have delayed effects) upstream from Lower Granite Dam. The comparison below in tables 4 and 5 is very basic (fallback versus non-fallback fish), but probably indicates that the effect is genuine.

We wish to emphasize that these estimates are preliminary -- they were assembled quickly and the analysis was cursory. Additional finer-resolution details on final fish records are available if needed, and relationships between Hydrosystem experiences and final fish disposition are of course possible.

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Table 1. Estimated fates and final locations of **all** radio-tagged spring–summer Chinook salmon and steelhead that passed Lower Granite Dam. Equations at bottom are for a variety of potential escapement estimates, with differing criteria for success. Many alternatives are possible, including estimates where harvested fish are censored.

	Chinook Salmon				Steelhead		
Numbers of Fish	2000	2001	2002	2003	2000	2001	2002
a) Snake unknown	5	10	4	12	54	64	67
b) Snake harvest	1	5	0	0	30	19	41
c) Tributary harvest	48	101	84	54	81	85	74
d) Hatchery/weir	91	69	75	42	75	43	36
e) Secondary tribs	58	194	112	133	65	51	111
f) GRR/IMR mainstem	13	43	25	20	15	51	49
g) CWR: mouth to S Fork	8	15	16	8	32	60	58
h) CWR: above S Fork	3	4	5	1	5	0	0
i) SAL: Riggins to N Fork	1	34	22	25	33	57	66
j) SAL: above N Fork	5	15	8	14	17	11	20
(T) Total	233	490	351	309	407	441	522
Proportions							
(T-a)/T	0.979	0.980	0.989	0.961	0.867	0.855	0.872
(T-a-b-c)/T	0.768	0.763	0.749	0.786	0.595	0.619	0.651
(T-a-b-c-g)/T	0.734	0.733	0.704	0.761	0.516	0.483	0.540
(T-a-b-c-g-i)/T	0.730	0.663	0.641	0.680	0.435	0.354	0.414

Table 2. Estimated fates and final locations of **fin-clipped** radio-tagged spring–summer Chinook salmon and steelhead that passed Lower Granite Dam.

	Chinook Salmon				Steelhead		
Numbers of Fish	2000	2001	2002	2003	2000	2001	2002
a) Snake unknown	3	8	3	7	40	26	28
b) Snake harvest	1	1	0	0	27	15	30
c) Tributary harvest	44	98	73	39	78	74	57
d) Hatchery/weir	75	47	48	34	73	36	29
e) Secondary tribs	28	68	36	36	43	21	24
f) GRR/IMR mainstem	1	5	5	5	8	18	21
g) CWR: mouth to S Fork	8	10	10	6	23	44	31
h) CWR: above S Fork	2	4	3	1	4	0	0
i) SAL: Riggins to N Fork	1	25	21	19	19	33	20
j) SAL: above N Fork	0	0	0	1	16	8	8
T) Total	163	266	202	148	331	275	248
Proportions							
(T-a)/T	0.982	0.9970	0.985	0.953	0.879	0.905	0.887
(T-a-b-c)/T	0.706	0.598	0.609	0.689	0.562	0.582	0.536
(T-a-b-c-g)/T	0.656	0.560	0.559	0.649	0.492	0.422	0.411
(T-a-b-c-g-i)/T	0.650	0.466	0.455	0.520	0.435	0.302	0.331

Table 3. Estimated fates and final locations of radio-tagged spring–summer Chinook salmon and steelhead **with no fin clips** that passed Lower Granite Dam.

	Chinook Salmon				Steelhead		
Numbers of Fish	2000	2001	2002	2003	2000	2001	2002
a) Snake unknown	2	2	1	5	14	38	39
b) Snake harvest	0	4	0	0	3	4	11
c) Tributary harvest	4	3	8	15	3	11	17
d) Hatchery/weir	16	22	27	8	2	7	7
e) Secondary tribs	30	126	76	97	22	30	87
f) GRR/IMR mainstem	12	38	20	15	7	33	28
g) CWR: mouth to S Fork	0	5	6	2	9	16	27
h) CWR: above S Fork	1	0	2	0	1	0	0
i) SAL: Riggins to N Fork	0	9	1	6	14	24	46
j) SAL: above N Fork	5	15	8	13	1	3	12
T) Total	70	224	149	161	76	166	274
Proportions							
(T-a)/T	0.971	0.991	0.993	0.969	0.816	0.771	0.858
(T-a-b-c)/T	0.914	0.960	0.940	0.876	0.737	0.681	0.755
(T-a-b-c-g)/T	0.914	0.938	0.899	0.863	0.618	0.584	0.657
(T-a-b-c-g-i)/T	0.914	0.897	0.893	0.826	0.434	0.440	0.489

Table 4. Estimated fates and final locations of radio-tagged spring–summer Chinook salmon and steelhead that passed Lower Granite Dam **and fell back during migration**.

	Chinook Salmon				Steelhead		
Numbers of Fish	2000	2001	2002	2003	2000	2001	2002
a) Snake unknown	3	3	1	5	14	17	17
b) Snake harvest	0	2	0	0	14	4	10
c) Tributary harvest	18	12	19	9	12	17	17
d) Hatchery/weir	28	6	14	8	10	11	5
e) Secondary tribs	15	22	21	21	11	6	12
f) GRR/IMR mainstem	4	3	4	2	2	8	5
g) CWR: mouth to S Fork	5	4	8	0	7	19	11
h) CWR: above S Fork	1	1	1	0	1	0	0
i) SAL: Riggins to N Fork	0	3	7	7	5	10	7
j) SAL: above N Fork	0	0	0	2	2	4	4
T) Total	74	56	75	54	78	96	88
Proportions							
(T-a)/T	0.959	0.946	0.987	0.907	0.821	0.823	0.807
(T-a-b-c)/T	0.716	0.696	0.733	0.741	0.487	0.604	0.500
(T-a-b-c-g)/T	0.649	0.625	0.627	0.741	0.397	0.406	0.375
(T-a-b-c-g-i)/T	0.649	0.571	0.533	0.611	0.333	0.302	0.295

Table 5. Estimated fates and final locations of radio-tagged spring–summer Chinook salmon and steelhead that passed Lower Granite Dam and **did not fall back during migration**.

	Chinook Salmon				Steelhead		
Numbers of Fish	2000	2001	2002	2003	2000	2001	2002
a) Snake unknown	2	7	3	7	40	47	50
b) Snake harvest	1	3	0	0	16	15	31
c) Tributary harvest	30	89	65	45	69	68	57
d) Hatchery/weir	63	63	61	34	65	32	31
e) Secondary tribs	43	172	91	112	54	45	99
f) GRR/IMR mainstem	9	40	21	18	13	43	44
g) CWR: mouth to S Fork	3	11	8	8	25	41	47
h) CWR: above S Fork	2	3	4	1	4	0	0
i) SAL: Riggins to N Fork	1	31	15	18	28	47	59
j) SAL: above N Fork	5	15	8	12	15	7	16
T) Total	159	434	276	255	329	345	434
Proportions							
(T-a)/T	0.987	0.984	0.989	0.973	0.878	0.864	0.885
(T-a-b-c)/T	0.792	0.772	0.754	0.796	0.620	0.623	0.682
(T-a-b-c-g)/T	0.774	0.747	0.725	0.765	0.544	0.504	0.574
(T-a-b-c-g-i)/T	0.767	0.675	0.670	0.694	0.459	0.368	0.438