Table B-I. ESU parameters and estimates of risk of decline. These analyses did not correct for hatchery fish.

							50% Decline			90% Decline	
		μ	σ^2	λ	upper 95% conf interval of λ	lower 95% conf interval of λ	Most likely time to reach (years)	24 year Risk Metric	100 year Risk Metric	Most likely time to reach (years)	24 year Risk Metric	100 year Risk Metric
Chinook	**Lower Columbia**	-0.023	0.139	0.977	1.260	0.758	1.15	0.470	0.564	12.52	0.169	0.500
	Upper Columbia Spr	-0.158	0.038	0.854	0.957	0.762	2.66	0.999	1.000	12.47	0.939	1.000
	Snake River Spr/Sum	0.012	0.057	1.012	1.151	0.890	2.79	0.202	0.223	30.12	0.014	0.072
	Snake River Fall	-0.041	0.012	0.960	1.028	0.896	9.48	0.715	0.959	46.53	0.006	0.956
	Upper Williamette	-0.058	0.080	0.943	1.113	0.800	1.94	0.694	0.857	17.61	0.257	0.892
Chum	**Columbia River Chum**	0.035	0.027	1.035	1.134	0.945	5.50	0.029	0.029	40.82	0.000	0.000
Steelhead	**Lower Columbia**	-0.051	0.000	0.951	0.958	0.944	13.60	1.000	1.000	40.94	0.000	1.000
	Middle Columbia	-0.091	0.003	0.913	0.956	0.872	7.14	1.000	1.000	22.40	0.317	1.000
	Upper Columbia	-0.102	0.035	0.903	1.018	0.801	3.44	0.973	1.000	15.97	0.565	1.000
	Snake River	-0.023	0.001	0.978	0.991	0.964	29.11	0.091	1.000	90.30	0.000	0.434
	Upper Williamette	-0.074	0.069	0.928	1.082	0.797	2.19	0.801	0.995	14.94	0.343	0.974

Table B-2a. Results of Decline Analyses for ESU Level assuming that hatchery fish have no in-stream reproduction.

							50% Decline			90% Decline	
		μ	σ^2	λ	upper 95% conf interval of λ	lower 95% conf interval of λ	Most likely time to reach (years)	24 year Risk Metric	100 year Risk Metric	Most likely time to reach (years)	24 year Risk Metric	100 year Risk Metric
Chinook	**Lower Columbia**	-0.016	0.116	0.984	1.241	0.781	1.38	0.426	0.512	15.13	0.124	0.417
	Upper Columbia Spr	-0.164	0.038	0.849	0.950	0.758	2.63	1.000	1.000	12.12	0.957	1.000
	Snake River Spr/Sum	-0.037	0.010	0.964	1.017	0.913	10.75	0.649	0.938	52.49	0.002	0.914
	Snake River Fall	-0.064	0.051	0.938	1.085	0.811	2.90	0.775	0.935	21.82	0.244	0.964
	Upper Williamette	0.009	0.237	1.009	1.340	0.760	0.67	0.352	0.370	7.44	0.146	0.256
Chum	**Columbia River Chum**	0.035	0.027	1.035	1.134	0.945	5.50	0.029	0.029	40.82	0.000	0.000
Steelhead	**Lower Columbia**	-0.025	0.000	0.975	0.983	0.968	27.41	0.050	1.000	82.87	0.000	0.956
	Middle Columbia	-0.126	0.000	0.882	0.887	0.877	5.50	1.000	1.000	16.50	1.000	1.000
	Upper Columbia	-0.061	0.040	0.941	1.070	0.828	3.61	0.782	0.996	21.65	0.194	0.970
	Snake River	-0.095	0.009	0.910	0.965	0.857	5.91	1.000	1.000	20.43	0.476	1.000
	Upper Williamette	-0.058	0.049	0.943	1.073	0.829	3.05	0.742	0.990	20.08	0.202	0.944

Table B-2b. Results of Decline Analyses for ESU Level assuming that hatchery fish have in stream reproduction equal to wild-born fish.

							50% Decline			90% Decline	
		μ	$\sigma 2$	λ	upper 95% conf interval of λ	lower 95% conf interval of λ	Most likely time to reach (years)	24 year Risk Metric	100 year Risk Metric	Most likely time to reach (years)	24 year Risk Metric	100 year Risk Metric
Chinook	**Lower Columbia**	-0.130	0.139	0.878	1.132	0.681	1.10	0.909	0.984	9.24	0.675	0.998
	Upper Columbia Spr	-0.184	0.038	0.832	0.932	0.742	2.43	1.000	1.000	10.93	0.986	1.000
	Snake River Spr/Sum	-0.228	0.057	0.796	0.906	0.701	1.81	1.000	1.000	8.60	0.996	1.000
	Snake River Fall	-0.152	0.012	0.859	0.920	0.802	3.87	1.000	1.000	14.41	0.995	1.000
	Upper Williamette	-0.462	0.080	0.630	0.743	0.534	1.04	1.000	1.000	4.45	1.000	1.000
Chum	**Columbia River Chum**	0.035	0.027	1.035	1.134	0.945	5.50	0.029	0.029	40.82	0.000	0.000
Steelhead	**Lower Columbia**	-0.252	0.000	0.777	0.783	0.771	2.74	1.000	1.000	8.24	1.000	1.000
	Middle Columbia	-0.284	0.003	0.753	0.788	0.719	2.39	1.000	1.000	7.26	1.000	1.000
	Upper Columbia	-0.413	0.035	0.662	0.746	0.587	1.40	1.000	1.000	4.74	1.000	1.000
	Snake River	-0.359	0.001	0.699	0.709	0.689	1.93	1.000	1.000	5.79	1.000	1.000
	Upper Williamette	-0.144	0.069	0.866	1.009	0.743	1.94	0.984	1.000	10.30	0.814	1.000

Table B-3. Summary of ESU parameters for the three methods: 1) no hatchery correction, 2) hatchery fish do not breed, 3) hatchery fish breed at rates equal to wild fish.

	ESU	No hatchery correction = estimate hatchery reproduction = 0		Hatchery fish pulled from count, no hatchery fish reproduction		Hatchery fish pulled from count, hatchery fish reproduction = wild born fish	
		μ	$\sigma 2$	μ	$\sigma 2$	μ	$\sigma 2$
Chinook	**Lower Columbia**	-0.023	0.139	-0.016	0.116	-0.130	0.139
	Upper Columbia Spr	-0.158	0.038	-0.164	0.038	-0.184	0.038
	Snake River Spr/Sum	0.012	0.057	-0.037	0.010	-0.228	0.057
	Snake River Fall	-0.041	0.012	-0.064	0.051	-0.152	0.012
	Upper Williamette	-0.058	0.080	0.009	0.237	-0.462	0.080
Chum	**Columbia River Chum**	0.035	0.027	0.035	0.027	0.035	0.027
Steelhead	**Lower Columbia**	-0.051	0.000	-0.025	0.000	-0.252	0.000
	Middle Columbia	-0.091	0.003	-0.126	0.000	-0.284	0.003
	Upper Columbia	-0.102	0.035	-0.061	0.040	-0.413	0.035
	Snake River	-0.023	0.001	-0.095	0.009	-0.359	0.001
	Upper Williamette	-0.074	0.069	-0.058	0.049	-0.144	0.069

Table B-4. Results of Dennis Extinction Analysis for individual stocks. Two thresholds (1fish/generation, 90% decline). This analysis makes no correction for hatchery fish. NA indicates time series too short, data failed the sigma^2<0 test, or that data is an index count and not appropriate for population size estimate.

							Extinction			90% decline			
Species	ESU	Stream	pop size est	μ	σ2	λ	24 year Risk Metric	48 year Risk Metric	100 year Risk Metric	24 year Risk Metric	48 year Risk Metric	100 year Risk Metric	NA Comments
Chinook	**Lower Columbia**	Bear Creek	507	-0.138	0.199	0.871	0.13	0.64	0.98	0.68	0.92	0.99	var plot not very linear
		Big Creek	5964	-0.023	0.039	0.977	0.00	0.00	0.00	0.03	0.19	0.50	
		Clatskanie	57	-0.069	0.439	0.933	0.37	0.63	0.84	0.42	0.59	0.76	
		Cowlitz Tule	NA	-0.028	0.103	0.972	NA	NA	NA	0.15	0.33	0.56	index data;
		Elochoman	NA	0.041	0.435	1.042	NA	NA	NA	0.15	0.18	0.18	index data;
		Germany	NA	-0.021	0.140	0.979	NA	NA	NA	0.16	0.31	0.48	index data; var plot not very linear
		Gnat	211	-0.016	0.453	0.984	0.13	0.30	0.51	0.28	0.37	0.46	
		Grays Tule	NA	-0.108	0.418	0.897	NA	NA	NA	0.54	0.74	0.91	index data;
		Kalama Spring	NA	-0.117	0.142	0.889	NA	NA	NA	0.61	0.90	0.99	index data; var plot not very linear
		Kalama	NA	0.034	0.517	1.035	NA	NA	NA	0.19	0.21	0.21	index data;
		Klaskanine	54	-0.067	0.273	0.935	0.28	0.58	0.84	0.39	0.60	0.80	var plot not very linear
		Lewis R Bright	NA	-0.009	0.043	0.991	NA	NA	NA	0.02	0.10	0.25	index data;
		Lewis Spring	NA	-0.052	0.417	0.950	NA	NA	NA	0.37	0.52	0.67	index data;
		Lewis, E Fk Tule	NA	-0.008	0.021	0.992	NA	NA	NA	0.00	0.03	0.14	index data;
		Mill Fall	615	-0.164	0.179	0.849	0.15	0.76	1.00	0.78	0.97	1.00	var plot not very linear
		Plympton	5983	-0.002	0.144	0.998	0.00	0.00	0.03	0.11	0.20	0.29	
		Sandy Late	4263	-0.016	0.015	0.984	0.00	0.00	0.00	0.00	0.03	0.28	
		Sandy Tule	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
		Skamokawa	NA	-0.146	0.041	0.864	NA	NA	NA	0.89	1.00	1.00	index data;
		Youngs	38	-0.012	1.043	0.988	0.49	0.63	0.75	0.34	0.40	0.46	
Chinook	**U. Columbia**	Methow River	433	-0.136	0.214	0.873	0.15	0.65	0.97	0.67	0.91	0.99	
		Entiat	173	-0.144	0.041	0.866	0.06	0.92	1.00	0.88	1.00	1.00	
		Wenatchee	805	-0.211	0.025	0.810	0.02	1.00	1.00	1.00	1.00	1.00	var plot not very linear
Chinook	**Snake R. Spr/Sum**	Bear Creek	736	0.017	0.146	1.017	0.00	0.00	0.03	0.07	0.12	0.15	
		Imnaha River	1175	-0.039	0.030	0.962	0.00	0.00	0.04	0.05	0.36	0.82	
		Johnson Creek	457	0.010	0.048	1.010	0.00	0.00	0.00	0.01	0.03	0.07	
		Marsh Creek	291	-0.013	0.127	0.987	0.00	0.04	0.19	0.13	0.25	0.39	
		Minam River	582	0.031	0.167	1.032	0.00	0.01	0.03	0.06	0.09	0.09	
		Poverty Creek	1055	0.006	0.097	1.006	0.00	0.00	0.02	0.05	0.12	0.18	
		Sulphur Creek	207	0.039	0.411	1.040	0.05	0.12	0.21	0.15	0.17	0.17	
Chinook	**Snake R. Basin**	Snake River Basin	2199	-0.041	0.012	0.960	0.00	0.00	0.00	0.01	0.33	0.96	var plot not very linear
Chinook	**Upper Williamette**	McKenzie River abov	6859	0.009	0.237	1.009	0.00	0.01	0.05	0.15	0.21	0.26	

Table B-4. continued

Species	ESU	Stream	pop size est	μ	σ2	λ	Extinction 24 year Risk Metric	Extinction 48 year Risk Metric	Extinction 100 year Risk Metric	90% decline 24 year Risk Metric	90% decline 48 year Risk Metric	90% decline 100 year Risk Metric	NA Comments
Chum	**Columbia River**	Grays R west fork	NA	0.209	0.205	1.233	NA	NA	NA	0.00	0.00	0.00	index data; var plot not very linear
		Grays R mouth to hea	NA	-0.045	0.125	0.956	NA	NA	NA	0.24	0.48	0.73	index data; var plot not very linear
		Hardy Creek	NA	0.045	0.061	1.046	NA	NA	NA	0.00	0.00	0.00	index data; var plot not very linear
		Crazy J	NA	0.146	0.031	1.158	NA	NA	NA	0.00	0.00	0.00	index data; var plot not very linear
		Hamilton	NA	-0.084	0.054	0.919	NA	NA	NA	0.40	0.86	1.00	index data; var plot not very linear
		Hamilton Springs	NA	0.106	0.590	1.112	NA	NA	NA	0.10	0.10	0.10	index data;
Steelhead	**Lower Columbia**	Clackamas Sum	9065	-0.112	0.011	0.894	0.00	0.00	0.98	0.77	1.00	1.00	
		Clackamas Win	3123	-0.040	0.004	0.961	0.00	0.00	0.00	0.00	0.20	1.00	var plot not very linear
		Coweeman Win	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
		Eagle Ck Win	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
		Green River Win	660	-0.102	0.212	0.903	0.06	0.40	0.86	0.53	0.79	0.96	
		Hood River Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
		Hood River Win	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
		Kalama Sum	18843	-0.030	0.015	0.971	0.00	0.00	0.00	0.00	0.16	0.71	
		Kalama River Win	6294	-0.001	0.008	0.999	0.00	0.00	0.00	0.00	0.00	0.00	var plot not very linear
		Lewis River Win	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
		Panther Ck Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
		Sandy Win	6012	-0.058	0.030	0.943	0.00	0.00	0.06	0.14	0.66	0.98	
		Toutle Win	3008	-0.133	0.001	0.875	0.00	0.00	1.00	1.00	1.00	1.00	var plot not very linear
		TroutCk Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
		Washougal Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
		Washougal River Win	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
		Wind Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
Steelhead	**Mid Columbia**	Beaver Creek Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
		Deschutes R Sum	70500	-0.038	0.017	0.963	0.00	0.00	0.00	0.01	0.29	0.87	
		Mill Ck Sum	62	-0.007	0.050	0.993	0.00	0.01	0.11	0.03	0.10	0.24	
		Shitike Ck Sum	94	-0.077	0.007	0.926	0.00	0.08	1.00	0.14	0.99	1.00	var plot not very linear
		Warm Springs Nfh Su	1031	-0.098	0.050	0.907	0.00	0.09	0.92	0.52	0.94	1.00	
		Eightmile Ck Win	NA	-0.106	1.443	0.899	NA	NA	NA	0.52	0.63	0.76	index data; var plot not very linear
		Ramsey Ck Win	NA	0.002	0.379	1.002	NA	NA	NA	0.22	0.29	0.34	index data; var plot not very linear
		Fifteen Mile Ck Win	NA	-0.097	0.045	0.908	NA	NA	NA	0.51	0.94	1.00	index data;
		Touchet R Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
		Umtilla R Sum	9809	-0.046	0.005	0.955	0.00	0.00	0.00	0.00	0.41	1.00	var plot not very linear
		Yakima R Sum	5561	0.024	0.012	1.024	0.00	0.00	0.00	0.00	0.00	0.00	
Steelhead	**Upper Columbia**	Upper Columbia River	7708	-0.102	0.035	0.903	0.00	0.00	0.78	0.57	0.98	1.00	
Steelhead	**Snake R. Basin**	Snake River Sthead A	299161	0.000	0.000	1.000	0.00	0.00	0.00	0.00	0.00	0.00	var plot not very linear
		Snake River Sthead I	100455	-0.049	0.023	0.952	0.00	0.00	0.00	0.06	0.52	0.96	
Steelhead	**Upper Williamette**	Mollala	2644	-0.080	0.109	0.923	0.00	0.05	0.59	0.41	0.75	0.96	
		N Santiam R	5653	-0.075	0.055	0.927	0.00	0.00	0.37	0.33	0.79	0.99	
		S Santiam	3730	-0.068	0.057	0.934	0.00	0.00	0.33	0.28	0.72	0.97	
		Calapooia	416	-0.075	0.188	0.928	0.04	0.29	0.74	0.41	0.67	0.88	

Table B-5. Results of Dennis Extinction Analysis for individual stocks. Two thresholds (1fish/generation, 90% decline). This analysis incorporated the % spawners that were hatchery but assumed that hatchery fish do not reproduce. NA indicates that no hatchery data were available, that the data failed the sigma^2 > 0 test, or that the data are index counts and are not appropriate for population size estimates.

							Extinction			90% decline			
Species	ESU	Stream	pop size est	μ	σ2	λ	24 year Risk Metric	48 year Risk Metric	100 year Risk Metric	24 year Risk Metric	48 year Risk Metric	100 year Risk Metric	NA Comments
Chinook	**Lower Columbia**	Bear Creek	253	-0.138	0.199	0.871	0.21	0.73	0.98	0.68	0.92	0.99	var plot not very linear
		Big Creek	2982	-0.023	0.039	0.977	0.00	0.00	0.00	0.03	0.19	0.50	
		Clatskanie	28	-0.069	0.439	0.933	0.48	0.71	0.88	0.42	0.59	0.76	
		Cowlitz Tule	NA	-0.028	0.103	0.972	NA	NA	NA	0.15	0.33	0.56	index data;
		Elochoman	NA	0.041	0.435	1.042	NA	NA	NA	0.15	0.18	0.18	index data;
		Germany	NA	-0.021	0.140	0.979	NA	NA	NA	0.16	0.31	0.48	index data; var plot not very linear
		Gnat	105	-0.016	0.453	0.984	0.18	0.37	0.57	0.28	0.37	0.46	
		Grays Tule	NA	-0.108	0.418	0.897	NA	NA	NA	0.54	0.74	0.91	index data;
		Kalama Spring	NA	-0.117	0.142	0.889	NA	NA	NA	0.61	0.90	0.99	index data; var plot not very linear
		Kalama	NA	0.034	0.517	1.035	NA	NA	NA	0.19	0.21	0.21	index data;
		Klaskanine	27	-0.067	0.273	0.935	0.40	0.67	0.88	0.39	0.60	0.80	var plot not very linear
		Lewis R Bright	NA	-0.009	0.043	0.991	NA	NA	NA	0.02	0.10	0.25	index data;
		Lewis Spring	NA	-0.052	0.417	0.950	NA	NA	NA	0.37	0.52	0.67	index data;
		Lewis, E Fk Tule	NA	-0.008	0.021	0.992	NA	NA	NA	0.00	0.03	0.14	index data;
		Mill Fall	307	-0.164	0.179	0.849	0.25	0.83	1.00	0.78	0.97	1.00	var plot not very linear
		Plympton	2991	-0.002	0.144	0.998	0.00	0.00	0.04	0.11	0.20	0.29	
		Sandy Late	4135	-0.016	0.015	0.984	0.00	0.00	0.00	0.00	0.03	0.28	
		Sandy Tule	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
		Skamokawa	NA	-0.146	0.041	0.864	NA	NA	NA	0.89	1.00	1.00	index data;
		Youngs	19	-0.012	1.043	0.988	0.58	0.70	0.80	0.34	0.40	0.46	
Chinook	**U. Columbia Spr**	Methow River	324	-0.141	0.264	0.868	0.24	0.71	0.97	0.67	0.90	0.99	
		Entiat	159	-0.138	0.031	0.871	0.03	0.92	1.00	0.88	1.00	1.00	
		Wenatchee	745	-0.216	0.022	0.806	0.03	1.00	1.00	1.00	1.00	1.00	
Chinook	**Snake R. Spr/Sum**	Bear Creek	736	0.017	0.146	1.017	0.00	0.00	0.03	0.07	0.12	0.15	
		Imnaha River	657	-0.078	0.041	0.925	0.00	0.03	0.78	0.33	0.85	1.00	
		Johnson Creek	457	0.010	0.048	1.010	0.00	0.00	0.00	0.01	0.03	0.07	
		Marsh Creek	291	-0.013	0.127	0.987	0.00	0.04	0.19	0.13	0.25	0.39	
		Minam River	338	-0.005	0.156	0.995	0.00	0.04	0.17	0.13	0.23	0.33	
		Poverty Creek	1051	0.006	0.080	1.006	0.00	0.00	0.01	0.04	0.09	0.16	
		Sulphur Creek	207	0.039	0.411	1.040	0.05	0.12	0.21	0.15	0.17	0.17	
Chinook	**Snake R. Basin**	Snake River Basin	1505	-0.064	0.051	0.938	0.00	0.00	0.40	0.24	0.69	0.96	
Chinook	**Upper Williamette**	McKenzie River above Leaburg Dam	4704	0.030	0.206	1.031	0.00	0.00	0.01	0.09	0.12	0.12	

Table B-5. continued

Species	ESU	Stream	pop size est	μ	σ2	λ	Extinction 24 year Risk Metric	Extinction 48 year Risk Metric	Extinction 100 year Risk Metric	90% decline 24 year Risk Metric	90% decline 48 year Risk Metric	90% decline 100 year Risk Metric	NA Comments
Chum	**Columbia River**	Grays R west fork	NA	0.209	0.205	1.233	NA	NA	NA	0.00	0.00	0.00	index data; var plot not very linear
		Grays R mouth to he	NA	-0.045	0.125	0.956	NA	NA	NA	0.24	0.48	0.73	index data; var plot not very linear
		Hardy Creek	NA	0.045	0.061	1.046	NA	NA	NA	0.00	0.00	0.00	index data; var plot not very linear
		Crazy J	NA	0.146	0.031	1.158	NA	NA	NA	0.00	0.00	0.00	index data; var plot not very linear
		Hamilton	NA	-0.084	0.054	0.919	NA	NA	NA	0.40	0.86	1.00	index data; var plot not very linear
		Hamilton Springs	NA	0.106	0.590	1.112	NA	NA	NA	0.10	0.10	0.10	index data;
Steelhead	**Lower Columbia**	Clackamas Sum	2720	-0.112	0.011	0.894	0.00	0.00	1.00	0.77	1.00	1.00	
		Clackamas Win	937	-0.040	0.004	0.961	0.00	0.00	0.00	0.00	0.20	1.00	var plot not very linear
		Coweeman Win	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
		Eagle Ck Win	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
		Green River Win	660	-0.102	0.212	0.903	0.06	0.40	0.86	0.53	0.79	0.96	
		Hood River Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
		Hood River Win	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
		Kalama Sum	5902	0.035	0.030	1.035	0.00	0.00	0.00	0.00	0.00	0.00	
		Kalama River Win	4228	0.006	0.007	1.006	0.00	0.00	0.00	0.00	0.00	0.00	
		Lewis River Win	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
		Panther Ck Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
		Sandy Win	3471	-0.057	0.028	0.944	0.00	0.00	0.09	0.13	0.65	0.98	
		Toutle Win	3008	-0.133	0.001	0.875	0.00	0.00	1.00	1.00	1.00	1.00	var plot not very linear
		TroutCk Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
		Washougal Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
		Washougal River Wi	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
		Wind Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
Steelhead	**Mid Columbia**	Beaver Creek Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
		Deschutes R Sum	9157	-0.146	0.004	0.864	0.00	0.00	1.00	1.00	1.00	1.00	
		Mill Ck Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
		Shitike Ck Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
		Warm Springs Nfh S	1031	-0.098	0.050	0.907	0.00	0.09	0.92	0.52	0.94	1.00	
		Eightmile Ck Win	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
		Ramsey Ck Win	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
		Fifteen Mile Ck Win	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
		Touchet R Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
		Umtilla R Sum	5867	-0.111	0.003	0.895	0.00	0.00	1.00	0.91	1.00	1.00	var plot not very linear
		Yakima R Sum	5213	0.044	0.017	1.045	0.00	0.00	0.00	0.00	0.00	0.00	
Steelhead	**Upper Columbia**	Upper Columbia Rive	2137	-0.061	0.040	0.941	0.00	0.00	0.25	0.19	0.67	0.97	
Steelhead	**Snake R. Basin**	Snake River Sthead	33603	-0.078	0.011	0.925	0.00	0.00	0.01	0.20	0.97	1.00	
		Snake River Sthead	11833	-0.114	0.023	0.892	0.00	0.00	0.93	0.73	1.00	1.00	
Steelhead	**Upper Williamette**	Mollala	2010	-0.054	0.075	0.948	0.00	0.01	0.27	0.23	0.56	0.87	
		N Santiam R	4690	-0.075	0.056	0.927	0.00	0.00	0.40	0.33	0.79	0.99	
		S Santiam	3730	-0.030	0.029	0.971	0.00	0.00	0.00	0.03	0.23	0.65	
		Calapooia	416	-0.075	0.188	0.928	0.04	0.29	0.74	0.41	0.67	0.88	

Table B-6. Results of Dennis Extinction Analysis for individual stocks. Two thresholds (1fish/generation, 90% decline). This analysis incorporated the % spawners that were hatchery and assumed that hatchery fish produce the same number of offspring as wild born fish. NA indicates that no hatchery data were available, that the data failed the sigma^2 > 0 test, or that data are index counts which are inappropriate for a population size estimate.

							Extinction			90% decline			
Species	ESU	Stream	pop size est	μ	σ2	λ	24 year Risk Metric	48 year Risk Metric	100 year Risk Metric	24 year Risk Metric	48 year Risk Metric	100 year Risk Metric	NA Comments
Chinook	**Lower Columbia**	Bear Creek	507	-0.348	0.199	0.706	0.87	1.00	1.00	1.00	1.00	1.00	var plot not very linear
		Big Creek	5964	-0.198	0.039	0.820	0.00	0.75	1.00	0.99	1.00	1.00	
		Clatskanie	57	-0.257	0.439	0.773	0.84	0.99	1.00	0.88	0.99	1.00	
		Cowlitz Tule	NA	-0.223	0.103	0.800	NA	NA	NA	0.97	1.00	1.00	index data;
		Elochoman	NA	-0.157	0.435	0.855	NA	NA	NA	0.68	0.87	0.98	index data;
		Germany	NA	-0.210	0.140	0.811	NA	NA	NA	0.93	1.00	1.00	index data; var plot not very linear
		Gnat	211	-0.201	0.453	0.818	0.55	0.90	0.99	0.78	0.94	1.00	
		Grays Tule	NA	-0.305	0.418	0.737	NA	NA	NA	0.94	1.00	1.00	index data;
		Kalama Spring	NA	-0.301	0.142	0.740	NA	NA	NA	1.00	1.00	1.00	index data; var plot not very linear
		Kalama	NA	-0.150	0.517	0.861	NA	NA	NA	0.64	0.84	0.96	index data;
		Klaskanine	54	-0.256	0.273	0.774	0.87	1.00	1.00	0.93	1.00	1.00	var plot not very linear
		Lewis R Bright	NA	-0.031	0.043	0.969	NA	NA	NA	0.06	0.29	0.65	index data;
		Lewis Spring	NA	-0.232	0.417	0.793	NA	NA	NA	0.85	0.98	1.00	index data;
		Lewis, E Fk Tule	NA	-0.008	0.021	0.992	NA	NA	NA	0.00	0.03	0.14	index data;
		Mill Fall	615	-0.352	0.179	0.703	0.87	1.00	1.00	1.00	1.00	1.00	var plot not very linear
		Plympton	5983	-0.183	0.144	0.833	0.01	0.57	1.00	0.87	0.99	1.00	
		Sandy Late	4263	-0.024	0.015	0.976	0.00	0.00	0.00	0.00	0.09	0.53	
		Sandy Tule	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
		Skamokawa	NA	-0.335	0.041	0.715	NA	NA	NA	1.00	1.00	1.00	index data;
		Youngs	38	-0.201	1.043	0.818	0.78	0.92	0.99	0.69	0.85	0.96	
Chinook	**U. Columbia Spr**	Methow River	433	-0.172	0.214	0.842	0.25	0.82	1.00	0.79	0.97	1.00	
		Entiat	173	-0.222	0.041	0.801	0.60	1.00	1.00	1.00	1.00	1.00	
		Wenatchee	805	-0.231	0.025	0.794	0.08	1.00	1.00	1.00	1.00	1.00	var plot not very linear
Chinook	**Snake R. Spr/Sum**	Bear Creek	736	0.017	0.146	1.017	0.00	0.00	0.03	0.07	0.12	0.15	
		Imnaha River	1175	-0.137	0.030	0.872	0.00	0.37	1.00	0.88	1.00	1.00	
		Johnson Creek	457	0.010	0.048	1.010	0.00	0.00	0.00	0.01	0.03	0.07	
		Marsh Creek	291	-0.013	0.127	0.987	0.00	0.04	0.19	0.13	0.25	0.39	
		Minam River	582	-0.082	0.167	0.921	0.02	0.27	0.77	0.43	0.72	0.93	
		Poverty Creek	1055	-0.011	0.097	0.989	0.00	0.00	0.05	0.09	0.21	0.35	
		Sulphur Creek	207	0.039	0.411	1.040	0.05	0.12	0.21	0.15	0.17	0.17	
Chinook	**Snake R. Basin**	Snake River Basin	2199	-0.152	0.012	0.859	0.00	0.31	1.00	0.99	1.00	1.00	var plot not very linear
Chinook	**Upper Williamette**	McKenzie River abo\	6859	-0.128	0.237	0.880	0.01	0.28	0.85	0.63	0.87	0.98	

Table B-6. continued

Species	ESU	Stream	pop size est	μ	σ2	λ	Extinction 24 year Risk Metric	Extinction 48 year Risk Metric	Extinction 100 year Risk Metric	90% decline 24 year Risk Metric	90% decline 48 year Risk Metric	90% decline 100 year Risk Metric	NA Comments
Chum	**Columbia River**	Grays R west fork	NA	0.209	0.205	1.233	NA	NA	NA	0.00	0.00	0.00	index data; var plot not very linear
		Grays R mouth to he	NA	-0.045	0.125	0.956	NA	NA	NA	0.24	0.48	0.73	index data; var plot not very linear
		Hardy Creek	NA	0.045	0.061	1.046	NA	NA	NA	0.00	0.00	0.00	index data; var plot not very linear
		Crazy J	NA	0.146	0.031	1.158	NA	NA	NA	0.00	0.00	0.00	index data; var plot not very linear
		Hamilton	NA	-0.084	0.054	0.919	NA	NA	NA	0.40	0.86	1.00	index data; var plot not very linear
		Hamilton Springs	NA	0.106	0.590	1.112	NA	NA	NA	0.10	0.10	0.10	index data;
Steelhead	**Lower Columbia**	Clackamas Sum	9065	-0.345	0.011	0.708	0.05	1.00	1.00	1.00	1.00	1.00	
		Clackamas Win	3123	-0.310	0.004	0.734	0.02	1.00	1.00	1.00	1.00	1.00	var plot not very linear
		Coweeman Win	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
		Eagle Ck Win	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
		Green River Win	660	-0.102	0.212	0.903	0.06	0.40	0.86	0.53	0.79	0.96	
		Hood River Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
		Hood River Win	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
		Kalama Sum	18843	-0.300	0.015	0.741	0.00	1.00	1.00	1.00	1.00	1.00	
		Kalama River Win	6294	-0.122	0.008	0.885	0.00	0.00	1.00	0.93	1.00	1.00	var plot not very linear
		Lewis River Win	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
		Panther Ck Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
		Sandy Win	6012	-0.184	0.030	0.832	0.00	0.57	1.00	0.99	1.00	1.00	
		Toutle Win	3008	-0.133	0.001	0.875	0.00	0.00	1.00	1.00	1.00	1.00	var plot not very linear
		TroutCk Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
		Washougal Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
		Washougal River Wi	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
		Wind Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
Steelhead	**Mid Columbia**	Beaver Creek Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
		Deschutes R Sum	70500	-0.291	0.017	0.748	0.00	1.00	1.00	1.00	1.00	1.00	
		Mill Ck Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
		Shitike Ck Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
		Warm Springs Nfh S	1031	-0.098	0.050	0.907	0.00	0.09	0.92	0.52	0.94	1.00	
		Eightmile Ck Win	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
		Ramsey Ck Win	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
		Fifteen Mile Ck Win	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
		Touchet R Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
		Umtilla R Sum	9809	-0.101	0.005	0.904	0.00	0.00	0.91	0.64	1.00	1.00	var plot not very linear
		Yakima R Sum	5561	0.008	0.012	1.008	0.00	0.00	0.00	0.00	0.00	0.00	
Steelhead	**Upper Columbia**	Upper Columbia Rive	7708	-0.413	0.035	0.662	0.87	1.00	1.00	1.00	1.00	1.00	
Steelhead	**Snake R. Basin**	Snake River Sthead	299161	-0.331	0.000	0.718	0.00	1.00	1.00	1.00	1.00	1.00	var plot not very linear
		Snake River Sthead	100455	-0.320	0.023	0.726	0.00	1.00	1.00	1.00	1.00	1.00	
Steelhead	**Upper Williamette**	Mollala	2644	-0.203	0.109	0.816	0.04	0.83	1.00	0.94	1.00	1.00	
		N Santiam R	5653	-0.121	0.055	0.886	0.00	0.05	0.94	0.70	0.98	1.00	
		S Santiam	3730	-0.161	0.057	0.851	0.00	0.42	1.00	0.91	1.00	1.00	
		Calapooia	416	-0.075	0.188	0.928	0.04	0.29	0.74	0.41	0.67	0.88	

Table B-7. Summary of the parameter estimates for the three methods of accounting for hatchery fish.

			No hatchery correction			Hatchery fish have 0 reproduction			Hatchery fish = reproduction of wild fish		
Species	ESU	Stream	μ	σ2	λ	μ	σ2	λ	μ	σ2	λ
Chinook	**Lower Columbia**	Bear Creek	-0.138	0.199	0.871	-0.138	0.199	0.871	-0.348	0.199	0.706
		Big Creek	-0.023	0.039	0.977	-0.023	0.039	0.977	-0.198	0.039	0.820
		Clatskanie	-0.069	0.439	0.933	-0.069	0.439	0.933	-0.257	0.439	0.773
		Cowlitz Tule	-0.028	0.103	0.972	-0.028	0.103	0.972	-0.223	0.103	0.800
		Elochoman	0.041	0.435	1.042	0.041	0.435	1.042	-0.157	0.435	0.855
		Germany	-0.021	0.140	0.979	-0.021	0.140	0.979	-0.210	0.140	0.811
		Gnat	-0.016	0.453	0.984	-0.016	0.453	0.984	-0.201	0.453	0.818
		Grays Tule	-0.108	0.418	0.897	-0.108	0.418	0.897	-0.305	0.418	0.737
		Kalama Spring	-0.117	0.142	0.889	-0.117	0.142	0.889	-0.301	0.142	0.740
		Kalama	0.034	0.517	1.035	0.034	0.517	1.035	-0.150	0.517	0.861
		Klaskanine	-0.067	0.273	0.935	-0.067	0.273	0.935	-0.256	0.273	0.774
		Lewis R Bright	-0.009	0.043	0.991	-0.009	0.043	0.991	-0.031	0.043	0.969
		Lewis Spring	-0.052	0.417	0.950	-0.052	0.417	0.950	-0.232	0.417	0.793
		Lewis, E Fk Tule	-0.008	0.021	0.992	-0.008	0.021	0.992	-0.008	0.021	0.992
		Mill Fall	-0.164	0.179	0.849	-0.164	0.179	0.849	-0.352	0.179	0.703
		Plympton	-0.002	0.144	0.998	-0.002	0.144	0.998	-0.183	0.144	0.833
		Sandy Late	-0.016	0.015	0.984	-0.016	0.015	0.984	-0.024	0.015	0.976
		Sandy Tule	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Skamokawa	-0.146	0.041	0.864	-0.146	0.041	0.864	-0.335	0.041	0.715
		Youngs	-0.012	1.043	0.988	-0.012	1.043	0.988	-0.201	1.043	0.818
Chinook	**U. Columbia**	Methow River	-0.136	0.214	0.873	-0.141	0.264	0.868	-0.172	0.214	0.842
		Entiat	-0.144	0.041	0.866	-0.138	0.031	0.871	-0.222	0.041	0.801
		Wenatchee	-0.211	0.025	0.810	-0.216	0.022	0.806	-0.231	0.025	0.794
Chinook	**Snake R. Spr/Sum**	Bear Creek	0.017	0.146	1.017	0.017	0.146	1.017	0.017	0.146	1.017
		Imnaha River	-0.039	0.030	0.962	-0.078	0.041	0.925	-0.137	0.030	0.872
		Johnson Creek	0.010	0.048	1.010	0.010	0.048	1.010	0.010	0.048	1.010
		Marsh Creek	-0.013	0.127	0.987	-0.013	0.127	0.987	-0.013	0.127	0.987
		Minam River	0.031	0.167	1.032	-0.005	0.156	0.995	-0.082	0.167	0.921
		Poverty Creek	0.006	0.097	1.006	0.006	0.080	1.006	-0.011	0.097	0.989
		Sulphur Creek	0.039	0.411	1.040	0.039	0.411	1.040	0.039	0.411	1.040
Chinook	**Snake R. Basin Fall**	Snake River Basin	-0.041	0.012	0.960	-0.064	0.051	0.938	-0.152	0.012	0.859
Chinook	**Upper Williamette**	McKenzie R., Leaburg D.	0.009	0.237	1.009	0.030	0.206	1.031	-0.128	0.237	0.880

Table B-7. continued

Species	ESU	Stream	No hatchery correction			Hatchery fish have 0 reproduction			Hatchery fish = reproduction of wild fish		
			μ	σ2	λ	μ	σ2	λ	μ	σ2	λ
Chum	**Columbia River**	Grays R west fork	0.209	0.205	1.233	0.209	0.205	1.233	0.209	0.205	1.233
		Grays R mouth to head	-0.045	0.125	0.956	-0.045	0.125	0.956	-0.045	0.125	0.956
		Hardy Creek	0.045	0.061	1.046	0.045	0.061	1.046	0.045	0.061	1.046
		Crazy J	0.146	0.031	1.158	0.146	0.031	1.158	0.146	0.031	1.158
		Hamilton	-0.084	0.054	0.919	-0.084	0.054	0.919	-0.084	0.054	0.919
		Hamilton Springs	0.106	0.590	1.112	0.106	0.590	1.112	0.106	0.590	1.112
Steelhead	**Lower Columbia**	Clackamas Sum	-0.112	0.011	0.894	-0.112	0.011	0.894	-0.345	0.011	0.708
		Clackamas Win	-0.040	0.004	0.961	-0.040	0.004	0.961	-0.310	0.004	0.734
		Coweeman Win	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Eagle Ck Win	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Green River Win	-0.102	0.212	0.903	-0.102	0.212	0.903	-0.102	0.212	0.903
		Hood River Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Hood River Win	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Kalama Sum	-0.030	0.015	0.971	0.035	0.030	1.035	-0.300	0.015	0.741
		Kalama River Win	-0.001	0.008	0.999	0.006	0.007	1.006	-0.122	0.008	0.885
		Lewis River Win	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Panther Ck Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Sandy Win	-0.058	0.030	0.943	-0.057	0.028	0.944	-0.184	0.030	0.832
		Toutle Win	-0.133	0.001	0.875	-0.133	0.001	0.875	-0.133	0.001	0.875
		TroutCk Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Washougal Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Washougal River Win	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Wind Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA
Steelhead	**Mid Columbia**	Beaver Creek Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Deschutes R Sum	-0.038	0.017	0.963	-0.146	0.004	0.864	-0.291	0.017	0.748
		Mill Ck Sum	-0.007	0.050	0.993	NA	NA	NA	NA	NA	NA
		Shitike Ck Sum	-0.077	0.007	0.926	NA	NA	NA	NA	NA	NA
		Warm Springs Nfh Sum	-0.098	0.050	0.907	-0.098	0.050	0.907	-0.098	0.050	0.907
		Eightmile Ck Win	-0.106	1.443	0.899	NA	NA	NA	NA	NA	NA
		Ramsey Ck Win	0.002	0.379	1.002	NA	NA	NA	NA	NA	NA
		Fifteen Mile Ck Win	-0.097	0.045	0.908	NA	NA	NA	NA	NA	NA
		Touchet R Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Umtilla R Sum	-0.046	0.005	0.955	-0.111	0.003	0.895	-0.101	0.005	0.904
		Yakima R Sum	0.024	0.012	1.024	0.044	0.017	1.045	0.008	0.012	1.008
Steelhead	**Upper Columbia**	Upper Columbia River	-0.102	0.035	0.903	-0.061	0.040	0.941	-0.413	0.035	0.662
Steelhead	**Snake R. Basin**	Snake River Sthead A-ru	0.000	0.000	1.000	-0.078	0.011	0.925	-0.331	0.000	0.718
		Snake River Sthead B-ru	-0.049	0.023	0.952	-0.114	0.023	0.892	-0.320	0.023	0.726
Steelhead	**Upper Williamette**	Mollala	-0.080	0.109	0.923	-0.054	0.075	0.948	-0.203	0.109	0.816
		N Santiam R	-0.075	0.055	0.927	-0.075	0.056	0.927	-0.121	0.055	0.886
		S Santiam	-0.068	0.057	0.934	-0.030	0.029	0.971	-0.161	0.057	0.851
		Calapooia	-0.075	0.188	0.928	-0.075	0.188	0.928	-0.075	0.188	0.928

Table B-8. Summary of the percent increase in lambda required to reduce risk of extinction and probability that stock is 90% below current levels in 100 years. Note that these results depend on the variability and that small stocks with high variability (for example many of the Lower Columbia Chinook stock) require higher increases relative to stocks with lower variability. NAs indicate too little data, no hatchery data, or that the data failed the sigma^2 >0 test, or index data as opposed to Total Live Count data which in unsuitable for obtaining a total living current and future spawner estimate (needed for extinction

			No hatchery correction = estimate hatchery reproduction = 0			Hatchery fish pulled from count, no hatchery fish reproduction			Hatchery fish pulled from count, hatchery fish reproduction = wild born fish			
Stock	ESU	Species	λ	Percent increase in λ for < .05% chance of extinction in 100 yrs	Percent increase in λ for < .05% chance of 90% decline in yr 100	λ	Percent increase in λ for < .05% chance of extinction in 100 yrs	Percent increase in λ for < .05% chance of 90% decline in yr 100	λ	Percent increase in λ for < .05% chance of extinction in 100 yrs	Percent increase in λ for < .05% chance of 90% decline in yr 100	NA Comment
Bear Creek	Lower Columbia River	Chinook	0.87	18	22	0.87	20	22	0.71	46	51	var plot not very linear
Big Creek	Lower Columbia River	Chinook	0.98	0	4	0.98	0	4	0.82	16	24	
Clatskanie	Lower Columbia River	Chinook	0.93	25	22	0.93	29	22	0.77	51	47	
Cowlitz Tule	Lower Columbia River	Chinook	0.97	NA	6	0.97	NA	6	0.80	NA	29	index data;
Elochoman	Lower Columbia River	Chinook	1.04	NA	9	1.04	NA	9	0.85	NA	33	index data;
Germany	Lower Columbia River	Chinook	0.98	NA	7	0.98	NA	7	0.81	NA	29	index data; var plot not very linear
Gnat	Lower Columbia River	Chinook	0.98	14	16	0.98	16	16	0.82	37	40	
Grays Tule	Lower Columbia River	Chinook	0.90	NA	26	0.90	NA	26	0.74	NA	54	index data;
Kalama Spring	Lower Columbia River	Chinook	0.89	NA	18	0.89	NA	18	0.74	NA	41	index data; var plot not very linear
Kalama	Lower Columbia River	Chinook	1.03	NA	12	1.03	NA	12	0.86	NA	35	index data;
Klaskanine	Lower Columbia River	Chinook	0.94	18	16	0.94	20	16	0.77	42	40	var plot not very linear
Lewis R Bright	Lower Columbia River	Chinook	0.99	NA	3	0.99	NA	3	0.97	NA	5	index data;
Lewis Spring	Lower Columbia River	Chinook	0.95	NA	19	0.95	NA	19	0.79	NA	43	index data;
Lewis, E Fk Tule	Lower Columbia River	Chinook	0.99	NA	1	0.99	NA	1	0.99	NA	1	index data;
Mill Fall	Lower Columbia River	Chinook	0.85	21	25	0.85	22	25	0.70	46	50	var plot not very linear
Plympton	Lower Columbia River	Chinook	1.00	0	5	1.00	0	5	0.83	19	26	
Sandy Late	Lower Columbia River	Chinook	0.98	0	2	0.98	0	2	0.98	0	3	
Sandy Tule	Lower Columbia River	Chinook	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
Skamokawa	Lower Columbia River	Chinook	0.86	NA	17	0.86	NA	17	0.72	NA	42	index data;
Youngs	Lower Columbia River	Chinook	0.99	50	30	0.99	65	30	0.82	81	57	

Table B-8. continued

Stock	ESU	Species	No hatchery correction = estimate hatchery reproduction = 0			Hatchery fish pulled from count, no hatchery fish reproduction			Hatchery fish pulled from count, hatchery fish reproduction = wild born fish			NA Comment
			λ	Percent increase in λ for < .05% chance of extinction in 100 yrs	Percent increase in λ for < .05% chance of 90% decline in yr 100	λ	Percent increase in λ for < .05% chance of extinction in 100 yrs	Percent increase in λ for < .05% chance of 90% decline in yr 100	λ	Percent increase in λ for < .05% chance of extinction in 100 yrs	Percent increase in λ for < .05% chance of 90% decline in yr 100	
Methow River	Upper Columbia River	Chinook	0.87	19	22	0.87	22	25	0.84	24	27	
Entiat	Upper Columbia River	Chinook	0.87	14	17	0.87	13	16	0.80	24	27	
Wenatchee	Upper Columbia River	Chinook	0.81	19	24	0.81	20	25	0.79	22	27	var plot not very linear
Bear Creek	Snake River Spring/Summer	Chinook	1.02	0	3	1.02	0	3	1.02	0	3	
Imnaha River	Snake River Spring/Summer	Chinook	0.96	0	5	0.93	6	10	0.87	11	16	
Johnson Creek	Snake River Spring/Summer	Chinook	1.01	0	1	1.01	0	1	1.01	0	1	
Marsh Creek	Snake River Spring/Summer	Chinook	0.99	3	6	0.99	3	6	0.99	3	6	
Minam River	Snake River Spring/Summer	Chinook	1.03	0	2	0.99	3	6	0.92	11	15	
Poverty Creek	Snake River Spring/Summer	Chinook	1.01	0	3	1.01	0	2	0.99	1	5	
Sulphur Creek	Snake River Spring/Summer	Chinook	1.04	7	9	1.04	7	9	1.04	7	9	
Snake River Basin	Snake River Basin Fall	Chinook	0.96	0	4	0.94	4	9	0.86	10	16	var plot not very linear
McKenzie River at	Upper Willamette Chinook	Chinook	1.01	0	7	1.03	0	3	0.88	15	22	
Grays R west fork	Columbia River	Chum	1.23	NA	0	1.23	NA	0	1.23	NA	0	index data; var plot not very linear
Grays R mouth to	Columbia River	Chum	0.96	NA	9	0.96	NA	9	0.96	NA	9	index data; var plot not very linear
Hardy Creek	Columbia River	Chum	1.05	NA	0	1.05	NA	0	1.05	NA	0	index data; var plot not very linear
Crazy J	Columbia River	Chum	1.16	NA	0	1.16	NA	0	1.16	NA	0	index data; var plot not very linear
Hamilton	Columbia River	Chum	0.92	NA	11	0.92	NA	11	0.92	NA	11	index data; var plot not very linear
Hamilton Springs	Columbia River	Chum	1.11	NA	6	1.11	NA	6	1.11	NA	6	index data;
Clackamas Sum	Lower Columbia River	Steelhead	0.89	4	12	0.89	6	12	0.71	32	41	
Clackamas Win	Lower Columbia River	Steelhead	0.96	0	3	0.96	0	3	0.73	28	35	var plot not very linear
Coweeman Win	Lower Columbia River	Steelhead	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
Eagle Ck Win	Lower Columbia River	Steelhead	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
Green River Win	Lower Columbia River	Steelhead	0.90	14	18	0.90	14	18	0.90	14	18	
Hood River Sum	Lower Columbia River	Steelhead	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
Hood River Win	LowerColumbiaESU	Steelhead	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
Kalama Sum	Lower Columbia River	Steelhead	0.97	0	3	1.04	0	0	0.74	25	35	
Kalama River Win	Lower Columbia River	Steelhead	1.00	0	0	1.01	0	0	0.89	6	12	var plot not very linear
Lewis River Win	Lower Columbia River	Steelhead	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
Panther Ck Sum	Lower Columbia River	Steelhead	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
Sandy Win	Lower Columbia River	Steelhead	0.94	1	7	0.94	1	7	0.83	14	21	

Table B-8. continued

Stock	ESU	Species	No hatchery correction = estimate hatchery reproduction = 0			Hatchery fish pulled from count, no hatchery fish reproduction			Hatchery fish pulled from count, hatchery fish reproduction = wild born fish			NA Comment
			λ	Percent increase in λ for < .05% chance of extinction in 100 yrs	Percent increase in λ for < .05% chance of 90% decline in yr 100	λ	Percent increase in λ for < .05% chance of extinction in 100 yrs	Percent increase in λ for < .05% chance of 90% decline in yr 100	λ	Percent increase in λ for < .05% chance of extinction in 100 yrs	Percent increase in λ for < .05% chance of 90% decline in yr 100	
Toutle Win	Lower Columbia River	Steelhead	0.88	6	13	0.88	6	13	0.88	6	13	var plot not very linear
TroutCk Sum	Lower Columbia River	Steelhead	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
Washougal Sum	Lower Columbia River	Steelhead	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
Washougal River \	Lower Columbia River	Steelhead	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
Wind Sum	Lower Columbia River	Steelhead	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
Beaver Creek Sun	Middle Columbia	Steelhead	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
Deschutes R Sum	Middle Columbia	Steelhead	0.96	0	4	0.86	7	15	0.75	23	34	
Mill Ck Sum	Middle Columbia	Steelhead	0.99	1	3	NA	NA	NA	NA	NA	NA	
Shitike Ck Sum	Middle Columbia	Steelhead	0.93	5	8	NA	NA	NA	NA	NA	NA	var plot not very linear
Warm Springs Nfh	Middle Columbia Steelhead	Steelhead	0.91	8	12	0.91	8	12	0.91	8	12	
Eightmile Ck Win	Middle Columbia	Steelhead	0.90	NA	52	NA	NA	NA	NA	NA	NA	index data; var plot not very linear
Ramsey Ck Win	Middle Columbia	Steelhead	1.00	NA	12	NA	NA	NA	NA	NA	NA	index data; var plot not very linear
Fifteen Mile Ck Wi	Middle Columbia	Steelhead	0.91	NA	12	NA	NA	NA	NA	NA	NA	index data;
Touchet R Sum	Middle Columbia	Steelhead	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
Umtilla R Sum	Middle Columbia	Steelhead	0.96	0	4	0.90	4	11	0.90	3	10	var plot not very linear
Yakima R Sum	Middle Columbia	Steelhead	1.02	0	0	1.04	0	0	1.01	0	0	
Upper Columbia R	Upper Columbia River	Steelhead	0.90	5	12	0.94	3	8	0.66	43	53	
Snake River Sthea	Snake River	Steelhead	1.00	0	0	0.93	0	8	0.72	24	37	var plot not very linear
Snake River Sthea	Snake River	Steelhead	0.95	0	6	0.89	5	13	0.73	26	38	
Mollala	Upper Williamette	Steelhead	0.92	7	12	0.95	3	8	0.82	21	27	
N Santiam R	Upper Williamette	Steelhead	0.93	4	10	0.93	4	10	0.89	9	15	
S Santiam	Upper Williamette	Steelhead	0.93	3	9	0.97	0	4	0.85	13	20	
Calapooia	Upper Williamette	Steelhead	0.93	11	14	0.93	11	14	0.93	11	14	

Table B-9. Summary of the percent increase in lambda required to reduce risk of extinction and probability that stock is 90% below current levels in 48 years. Note that these results depend on the variability and that small stocks with high variability (for example many of the Lower Columbia Chinook stock) require higher increases relative to stocks with lower variability. NAs indicate too little data, no hatchery data, or that the data failed the sigma^2 >0 test. ID indicates index data as opposed to Total Live Count data which in unsuitable for obtaining a total living current and future spawner estimate (needed for extinction estimates).

			No hatchery correction = estimate hatchery reproduction = 0			Hatchery fish pulled from count, no hatchery fish reproduction			Hatchery fish pulled from count, hatchery fish reproduction = wild born fish			
Stock	ESU	Species	λ	Percent increase in λ for < .05% chance of extinction in 48 yrs	Percent increase in λ for < .05% chance of 90% decline in yr 48	λ	Percent increase in l for < .05% chance of extinction in 48 yrs	Percent increase in l for < .05% chance of 90% decline in yr 48	λ	Percent increase in l for < .05% chance of extinction in 48 yrs	Percent increase in l for < .05% chance of 90% decline in yr 48	NA Comment
Bear Creek	Lower Columbia River	Chinook	0.87	15	22	0.87	17	22	0.71	42	51	var plot not very linear
Big Creek	Lower Columbia River	Chinook	0.98	0	3	0.98	0	3	0.82	7	22	
Clatskanie	Lower Columbia River	Chinook	0.93	24	22	0.93	28	22	0.77	50	47	
Cowlitz Tule	Lower Columbia River	Chinook	0.97	NA	6	0.97	NA	6	0.80	NA	29	index data;
Elochoman	Lower Columbia River	Chinook	1.04	NA	9	1.04	NA	9	0.85	NA	33	index data;
Germany	Lower Columbia River	Chinook	0.98	NA	7	0.98	NA	7	0.81	NA	29	index data; var plot not very linear
Gnat	Lower Columbia River	Chinook	0.98	12	16	0.98	15	16	0.82	35	40	
Grays Tule	Lower Columbia River	Chinook	0.90	NA	26	0.90	NA	26	0.74	NA	54	index data;
Kalama Spring	Lower Columbia River	Chinook	0.89	NA	18	0.89	NA	18	0.74	NA	41	index data; var plot not very linear
Kalama	Lower Columbia River	Chinook	1.03	NA	12	1.03	NA	12	0.86	NA	35	index data;
Klaskanine	Lower Columbia River	Chinook	0.94	16	16	0.94	19	16	0.77	40	40	var plot not very linear
Lewis R Bright	Lower Columbia River	Chinook	0.99	NA	2	0.99	NA	2	0.97	NA	4	index data;
Lewis Spring	Lower Columbia River	Chinook	0.95	NA	19	0.95	NA	19	0.79	NA	43	index data;
Lewis, E Fk Tule	Lower Columbia River	Chinook	0.99	NA	0	0.99	NA	0	0.99	NA	0	index data;
Mill Fall	Lower Columbia River	Chinook	0.85	16	25	0.85	18	25	0.70	40	50	var plot not very linear
Plympton	Lower Columbia River	Chinook	1.00	0	5	1.00	0	5	0.83	11	26	
Sandy Late	Lower Columbia River	Chinook	0.98	0	0	0.98	0	0	0.98	0	1	
Sandy Tule	Lower Columbia River	Chinook	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
Skamokawa	Lower Columbia River	Chinook	0.86	NA	16	0.86	NA	16	0.72	NA	40	index data;
Youngs	Lower Columbia River	Chinook	0.99	50	30	0.99	65	30	0.82	81	57	

Table B-9. continued

Stock	ESU	Species	No hatchery correction = estimate hatchery reproduction = 0			Hatchery fish pulled from count, no hatchery fish reproduction			Hatchery fish pulled from count, hatchery fish reproduction = wild born fish			NA Comment
			λ	Percent increase in l for < .05% chance of extinction in 48 yrs	Percent increase in l for < .05% chance of 90% decline in yr 48	λ	Percent increase in l for < .05% chance of extinction in 48 yrs	Percent increase in l for < .05% chance of 90% decline in yr 48	λ	Percent increase in l for < .05% chance of extinction in 48 yrs	Percent increase in l for < .05% chance of 90% decline in yr 48	
Methow River	Upper Columbia River	Chinook	0.87	16	22	0.87	19	25	0.84	20	27	
Entiat	Upper Columbia River	Chinook	0.87	10	16	0.87	9	15	0.80	19	25	
Wenatchee	Upper Columbia River	Chinook	0.81	12	23	0.81	13	23	0.79	15	25	var plot not very linear
Bear Creek	Snake River Spring/Summe	Chinook	1.02	0	3	1.02	0	3	1.02	0	3	
Imnaha River	Snake River Spring/Summe	Chinook	0.96	0	4	0.93	0	9	0.87	4	14	
Johnson Creek	Snake River Spring/Summe	Chinook	1.01	0	0	1.01	0	0	1.01	0	0	
Marsh Creek	Snake River Spring/Summe	Chinook	0.99	0	6	0.99	0	6	0.99	0	6	
Minam River	Snake River Spring/Summe	Chinook	1.03	0	2	0.99	0	6	0.92	7	15	
Poverty Creek	Snake River Spring/Summe	Chinook	1.01	0	3	1.01	0	2	0.99	0	4	
Sulphur Creek	Snake River Spring/Summe	Chinook	1.04	5	9	1.04	5	9	1.04	5	9	
Snake River Basir	Snake River Basin Fall	Chinook	0.96	0	2	0.94	0	8	0.86	2	14	var plot not very linear
McKenzie River al	Upper Williamette Chinook	Chinook	1.01	0	7	1.03	0	3	0.88	8	22	
Grays R west fork	Columbia River	Chum	1.23	NA	0	1.23	NA	0	1.23	NA	0	index data; var plot not very linear
Grays R mouth to	Columbia River	Chum	0.96	NA	9	0.96	NA	9	0.96	NA	9	index data; var plot not very linear
Hardy Creek	Columbia River	Chum	1.05	NA	0	1.05	NA	0	1.05	NA	0	index data; var plot not very linear
Crazy J	Columbia River	Chum	1.16	NA	0	1.16	NA	0	1.16	NA	0	index data; var plot not very linear
Hamilton	Columbia River	Chum	0.92	NA	10	0.92	NA	10	0.92	NA	10	index data; var plot not very linear
Hamilton Springs	Columbia River	Chum	1.11	NA	6	1.11	NA	6	1.11	NA	6	index data;
Clackamas Sum	Lower Columbia River	Steelhead	0.89	0	10	0.89	0	10	0.71	20	38	
Clackamas Win	Lower Columbia River	Steelhead	0.96	0	1	0.96	0	1	0.73	18	32	var plot not very linear
Coweeman Win	Lower Columbia River	Steelhead	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
Eagle Ck Win	Lower Columbia River	Steelhead	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
Green River Win	Lower Columbia River	Steelhead	0.90	11	18	0.90	11	18	0.90	11	18	
Hood River Sum	Lower Columbia River	Steelhead	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
Hood River Win	LowerColumbiaESU	Steelhead	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
Kalama Sum	Lower Columbia River	Steelhead	0.97	0	2	1.04	0	0	0.74	14	33	
Kalama River Win	Lower Columbia River	Steelhead	1.00	0	0	1.01	0	0	0.89	0	10	var plot not very linear
Lewis River Win	Lower Columbia River	Steelhead	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
Panther Ck Sum	Lower Columbia River	Steelhead	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
Sandy Win	Lower Columbia River	Steelhead	0.94	0	6	0.94	0	5	0.83	5	20	

Table B-9. continued

Stock	ESU	Species	No hatchery correction = estimate hatchery reproduction = 0			Hatchery fish pulled from count, no hatchery fish reproduction			Hatchery fish pulled from count, hatchery fish reproduction = wild born fish			NA Comment
			λ	Percent increase in l for < .05% chance of extinction in 48 yrs	Percent increase in l for < .05% chance of 90% decline in yr 48	λ	Percent increase in l for < .05% chance of extinction in 48 yrs	Percent increase in l for < .05% chance of 90% decline in yr 48	λ	Percent increase in l for < .05% chance of extinction in 48 yrs	Percent increase in l for < .05% chance of 90% decline in yr 48	
Toutle Win	Lower Columbia River	Steelhead	0.88	0	10	0.88	0	10	0.88	0	10	var plot not very linear
TroutCk Sum	Lower Columbia River	Steelhead	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
Washougal Sum	Lower Columbia River	Steelhead	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
Washougal River '	Lower Columbia River	Steelhead	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
Wind Sum	Lower Columbia River	Steelhead	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
Beaver Creek Sun	Middle Columbia	Steelhead	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
Deschutes R Sum	Middle Columbia	Steelhead	0.96	0	3	0.86	0	12	0.75	10	32	
Mill Ck Sum	Middle Columbia	Steelhead	0.99	0	2	NA	NA	NA	NA	NA	NA	
Shitike Ck Sum	Middle Columbia	Steelhead	0.93	1	6	NA	NA	NA	NA	NA	NA	var plot not very linear
Warm Springs Nfh	Middle Columbia Steelhead	Steelhead	0.91	2	11	0.91	2	11	0.91	2	11	
Eightmile Ck Win	Middle Columbia	Steelhead	0.90	NA	52	NA	NA	NA	NA	NA	NA	index data; var plot not very linear
Ramsey Ck Win	Middle Columbia	Steelhead	1.00	NA	12	NA	NA	NA	NA	NA	NA	index data; var plot not very linear
Fifteen Mile Ck W	Middle Columbia	Steelhead	0.91	NA	11	NA	NA	NA	NA	NA	NA	index data;
Touchet R Sum	Middle Columbia	Steelhead	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
Umtilla R Sum	Middle Columbia	Steelhead	0.96	0	2	0.90	0	8	0.90	0	8	var plot not very linear
Yakima R Sum	Middle Columbia	Steelhead	1.02	0	0	1.04	0	0	1.01	0	0	
Upper Columbia R	Upper Columbia River	Steelhead	0.90	0	11	0.94	0	7	0.66	32	51	
Snake River Sthea	Snake River	Steelhead	1.00	0	0	0.93	0	6	0.72	8	34	var plot not very linear
Snake River Sthea	Snake River	Steelhead	0.95	0	4	0.89	0	11	0.73	13	37	
Mollala	Upper Williamette	Steelhead	0.92	1	12	0.95	0	8	0.82	14	27	
N Santiam R	Upper Williamette	Steelhead	0.93	0	9	0.93	0	9	0.89	1	14	
S Santiam	Upper Williamette	Steelhead	0.93	0	8	0.97	0	3	0.85	6	19	
Calapooia	Upper Williamette	Steelhead	0.93	8	14	0.93	8	14	0.93	8	14	

Table B-10a. Snake River spring/summer chinook index stocks under alternative scenarios for future ocean conditions. Low: current conditions; med: two additional years of data projected from brood year returns to date; high: medium projection plus three additional years at new long term average r/s.

	age struct						
	1	**2**	**3**	**4**	**5**	**6**	**7**
Bear Creek	0.000	0.000	0.028	0.215	0.757	0.000	0.000
Imnaha River	0.000	0.000	0.048	0.419	0.533	0.000	0.000
Johnson Creek	0.000	0.000	0.143	0.364	0.493	0.000	0.000
Marsh Creek	0.000	0.000	0.030	0.254	0.716	0.000	0.000
Minam River	0.000	0.000	0.087	0.648	0.265	0.000	0.000
Poverty Creek	0.000	0.000	0.211	0.357	0.432	0.000	0.000
Sulphur Creek	0.000	0.000	0.069	0.251	0.680	0.000	0.000

raw data => low

	1980	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**
Bear Creek	42	151	83	171	137	295	224	456	1109	91	185	181	173	709	33	16	56	225	372	72					
Imnaha River	183	453	590	435	557	699	479	448	606	203	173	251	363	1178	115	97	219	474	159	282					
Johnson Creek	55	102	93	152	36	178	129	175	332	103	141	151	180	357	50	20	49	236	119	49					
Marsh Creek	16	115	71	60	100	196	171	268	395	80	101	72	114	216	9	0	18	110	164	0					
Minam River	43	50	104	103	101	625	357	569	493	197	331	189	102	267	22	45	233	140	122	96					
Poverty Creek	163	187	192	337	220	341	233	554	844	261	572	538	578	866	209	81	135	363	396	153					
Sulphur Creek	12	43	17	49	0	62	385	67	607	43	170	213	21	263	0	4	23	43	140	0					

raw data + 2 yrs => med

												r/s proj. for extended time series				**1.5**	**3.1**	**2.25**	**0.75**					
Bear Creek	42	151	83	171	137	295	224	456	1109	91	185	181	173	709	33	16	56	225	372	72	69.2	248.3			
Imnaha River	183	453	590	435	557	699	479	448	606	203	173	251	363	1178	115	97	219	474	159	282	413.1	814.3			
Johnson Creek	55	102	93	152	36	178	129	175	332	103	141	151	180	357	50	20	49	236	119	49	146.2	281.5			
Marsh Creek	16	115	71	60	100	196	171	268	395	80	101	72	114	216	9	0	18	110	164	0	21.3	105.6			
Minam River	43	50	104	103	101	625	357	569	493	197	331	189	102	267	22	45	233	140	122	96	512.5	403.5			
Poverty Creek	163	187	192	337	220	341	233	554	844	261	572	538	578	866	209	81	135	363	396	153	374.7	535.9			
Sulphur Creek	12	43	17	49	0	62	385	67	607	43	170	213	21	263	0	4	23	43	140	0	28.5	79.7			

raw data + 5 yrs => high

												r/s proj. for extended time series				**1.5**	**3.1**	**2.25**	**0.896**	**0.896**	**0.896**	**0.896**			
Bear Creek	42	151	83	171	137	295	224	456	1109	91	185	181	173	709	33	16	56	225	372	72	69.2	249.8	457.5	268.1	68.2
Imnaha River	183	453	590	435	557	699	479	448	606	203	173	251	363	1178	115	97	219	474	159	282	413.1	815.4	640.2	199.5	324.5
Johnson Creek	55	102	93	152	36	178	129	175	332	103	141	151	180	357	50	20	49	236	119	49	146.2	284.0	307.4	87.5	105.7
Marsh Creek	16	115	71	60	100	196	171	268	395	80	101	72	114	216	9	0	18	110	164	0	21.3	106.3	214.4	105.5	7.7
Minam River	43	50	104	103	101	625	357	569	493	197	331	189	102	267	22	45	233	140	122	96	512.5	405.1	161.7	124.6	351.9
Poverty Creek	163	187	192	337	220	341	233	554	844	261	572	538	578	866	209	81	135	363	396	153	374.7	548.1	508.8	273.3	283.0
Sulphur Creek	12	43	17	49	0	62	385	67	607	43	170	213	21	263	0	4	23	43	140	0	28.5	81.1	97.2	86.8	11.4

Table B-10b. Snake River spring/summer chinook index stocks under alternative scenarios for future ocean conditions. Low: current conditions; med: two additional years of data projected from brood year returns to date; high: medium projection plus three additional years at new long term average r/s. Hatchery fish and wild fish are not separated.

Recruits/Spawner Future Conditions			μ	σ^2	λ	λ + 95%CI	λ - 95%CI	P_{ext} 24yr	P_{ext} 48yr	P_{ext} 100yr	50% decline 24yr	50% decline 48yr	50% decline 100yr	90% decline 24yr	90% decline 48yr	90% decline 100yr
	low	Bear Creek	0.017	0.145	1.017	1.248	0.829	0.000	0.005	0.032	0.277	0.284	0.284	0.073	0.119	0.147
		Imnaha River	-0.039	0.030	0.962	1.055	0.877	0.000	0.000	0.045	0.614	0.838	0.969	0.053	0.360	0.823
		Johnson Creek	0.009	0.048	1.010	1.136	0.897	0.000	0.000	0.001	0.196	0.225	0.228	0.009	0.035	0.070
		Marsh Creek	-0.013	0.127	0.987	1.195	0.816	0.002	0.037	0.189	0.413	0.489	0.567	0.127	0.248	0.389
		Minam River	0.031	0.167	1.032	1.285	0.828	0.000	0.006	0.025	0.236	0.236	0.236	0.064	0.090	0.093
		Poverty Creek	0.006	0.097	1.006	1.188	0.851	0.000	0.001	0.016	0.293	0.327	0.342	0.055	0.116	0.178
		Sulphur Creek	0.040	0.411	1.040	1.468	0.738	0.048	0.121	0.206	0.300	0.300	0.300	0.150	0.172	0.172
	medium	Bear Creek	0.028	0.123	1.029	1.226	0.863	0.000	0.001	0.007	0.212	0.212	0.212	0.041	0.066	0.072
		Imnaha River	-0.006	0.027	0.994	1.079	0.916	0.000	0.000	0.000	0.244	0.357	0.472	0.003	0.037	0.146
		Johnson Creek	0.033	0.041	1.034	1.144	0.934	0.000	0.000	0.000	0.067	0.067	0.067	0.001	0.003	0.003
		Marsh Creek	0.002	0.110	1.002	1.183	0.849	0.000	0.009	0.068	0.326	0.368	0.397	0.075	0.150	0.228
		Minam River	0.068	0.167	1.070	1.313	0.872	0.000	0.000	0.001	0.123	0.123	0.123	0.025	0.025	0.025
		Poverty Creek	0.027	0.083	1.027	1.186	0.890	0.000	0.000	0.001	0.170	0.170	0.170	0.018	0.035	0.041
		Sulphur Creek	0.050	0.348	1.051	1.412	0.783	0.020	0.062	0.116	0.256	0.256	0.256	0.112	0.125	0.125
	high	Bear Creek	0.032	0.109	1.033	1.201	0.889	0.000	0.000	0.002	0.181	0.181	0.181	0.028	0.046	0.046
		Imnaha River	0.001	0.053	1.001	1.112	0.901	0.000	0.000	0.001	0.261	0.319	0.362	0.019	0.070	0.147
		Johnson Creek	0.036	0.048	1.037	1.146	0.938	0.000	0.000	0.000	0.072	0.072	0.072	0.002	0.004	0.004
		Marsh Creek	0.012	0.105	1.012	1.173	0.873	0.000	0.003	0.027	0.270	0.289	0.289	0.052	0.101	0.143
		Minam River	0.057	0.159	1.059	1.270	0.882	0.000	0.000	0.002	0.145	0.145	0.145	0.030	0.034	0.034
		Poverty Creek	0.027	0.076	1.027	1.165	0.906	0.000	0.000	0.000	0.160	0.160	0.160	0.014	0.030	0.035
		Sulphur Creek	0.047	0.288	1.048	1.339	0.820	0.010	0.041	0.086	0.245	0.245	0.245	0.096	0.111	0.111

Table B-10b. Continued.

% increase in λ to reach P_{ext} = 0.05 24yr	% increase in λ to reach P_{ext} = 0.01 24yr	% increase in λ to reach P_{ext} = 0.05 48yr	% increase in λ to reach P_{ext} = 0.01 48yr	% increase in λ to reach P_{ext} = 0.05 100yr	% increase in λ to reach P_{ext} = 0.01 100yr	% increase in λ (p=0.05) to prevent 90% decline 24yr	% increase in λ (p=0.01) to prevent 90% decline 24yr	% increase in λ (p=0.05) to prevent 90% decline 48yr	% increase in λ (p=0.01) to prevent 90% decline 48yr	% increase in λ (p=0.05) to prevent 90% decline 100yr	% increase in λ (p=0.01) to prevent 90% decline 100yr	comments
0.000	0.000	0.000	0.000	0.000	2.000	2.000	7.500	3.000	7.500	3.000	7.500	
0.000	0.000	0.000	0.000	0.000	1.500	0.500	3.000	3.500	5.500	5.000	6.000	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.000	0.500	2.000	
0.000	0.000	0.000	3.000	3.000	5.500	4.000	9.000	5.500	9.000	5.500	9.000	
0.000	0.000	0.000	0.000	0.000	2.000	1.500	7.000	2.000	7.000	2.000	7.000	
0.000	0.000	0.000	0.000	0.000	1.000	0.500	5.000	2.500	5.500	2.500	5.500	
0.000	9.500	5.000	13.000	7.000	13.500	8.500	18.500	8.500	18.500	8.500	18.500	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	4.500	1.000	4.500	1.000	4.500	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.500	1.000	2.500	var plot not very linear
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
0.000	0.000	0.000	0.000	0.500	3.000	1.500	6.500	3.000	6.500	3.500	6.500	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.500	0.000	3.500	0.000	3.500	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.500	0.000	2.500	0.000	2.500	
0.000	3.500	1.000	8.000	3.500	9.000	5.500	14.500	5.500	14.500	5.500	14.500	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.000	0.000	3.500	0.000	3.500	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.500	1.000	3.000	1.500	3.000	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
0.000	0.000	0.000	0.000	0.000	1.500	0.500	5.000	2.000	5.500	2.000	5.500	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	4.000	0.000	4.000	0.000	4.000	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	2.000	0.000	2.000	
0.000	0.500	0.000	5.000	2.000	6.500	4.000	12.000	4.000	12.000	4.000	12.000	

Table B-10c. Snake River spring/summer chinook index stocks under alternative scenarios for future ocean conditions. Low: current conditions; med: two additional years of data projected from brood year returns to date; high: medium projection plus three additional years at new long term average r/s. Hatchery fish are assumed to have no reproduction.

Recruits/Spawner Future Conditions			μ	σ^2	λ	λ + 95%CI	λ - 95%CI	P_{ext} 24yr	P_{ext} 48yr	P_{ext} 100yr	50% decline 24yr	50% decline 48yr	50% decline 100yr	90% decline 24yr	90% decline 48yr	90% decline 100yr
	low	Bear Creek	0.017	0.145	1.017	1.248	0.829	0.000	0.005	0.032	0.277	0.284	0.284	0.073	0.119	0.147
		Imnaha River	-0.078	0.041	0.925	1.031	0.830	0.000	0.033	0.784	0.882	0.985	1.000	0.330	0.847	0.997
		Johnson Creek	0.009	0.048	1.010	1.136	0.897	0.000	0.000	0.001	0.196	0.225	0.228	0.009	0.035	0.070
		Marsh Creek	-0.013	0.127	0.987	1.195	0.816	0.002	0.037	0.189	0.413	0.489	0.567	0.127	0.248	0.389
		Minam River	-0.005	0.156	0.995	1.230	0.805	0.003	0.040	0.170	0.384	0.435	0.482	0.130	0.227	0.326
		Poverty Creek	0.006	0.080	1.006	1.170	0.864	0.000	0.000	0.008	0.276	0.313	0.330	0.039	0.095	0.156
		Sulphur Creek	0.040	0.411	1.040	1.468	0.738	0.048	0.121	0.206	0.300	0.300	0.300	0.150	0.172	0.172
	medium	Bear Creek	0.028	0.123	1.029	1.226	0.863	0.000	0.001	0.007	0.212	0.212	0.212	0.041	0.066	0.072
		Imnaha River	-0.040	0.053	0.961	1.078	0.856	0.000	0.001	0.133	0.593	0.779	0.925	0.117	0.405	0.769
		Johnson Creek	0.033	0.041	1.034	1.144	0.934	0.000	0.000	0.000	0.067	0.067	0.067	0.001	0.003	0.003
		Marsh Creek	0.002	0.110	1.002	1.183	0.849	0.000	0.009	0.068	0.326	0.368	0.397	0.075	0.150	0.228
		Minam River	0.036	0.171	1.037	1.275	0.843	0.000	0.004	0.019	0.221	0.221	0.221	0.059	0.080	0.080
		Poverty Creek	0.027	0.069	1.027	1.172	0.901	0.000	0.000	0.000	0.149	0.149	0.149	0.011	0.024	0.029
		Sulphur Creek	0.050	0.348	1.051	1.412	0.783	0.020	0.062	0.116	0.256	0.256	0.256	0.112	0.125	0.125
	high	Bear Creek	0.032	0.109	1.033	1.201	0.889	0.000	0.000	0.002	0.181	0.181	0.181	0.028	0.046	0.046
		Imnaha River	-0.028	0.089	0.972	1.115	0.848	0.000	0.005	0.114	0.494	0.623	0.759	0.132	0.321	0.565
		Johnson Creek	0.036	0.048	1.037	1.146	0.938	0.000	0.000	0.000	0.072	0.072	0.072	0.002	0.004	0.004
		Marsh Creek	0.012	0.105	1.012	1.173	0.873	0.000	0.003	0.027	0.270	0.289	0.289	0.052	0.101	0.143
		Minam River	0.030	0.171	1.030	1.244	0.853	0.000	0.006	0.028	0.243	0.243	0.243	0.068	0.096	0.100
		Poverty Creek	0.027	0.065	1.027	1.154	0.914	0.000	0.000	0.000	0.141	0.141	0.141	0.009	0.021	0.025
		Sulphur Creek	0.047	0.288	1.048	1.339	0.820	0.010	0.041	0.086	0.245	0.245	0.245	0.096	0.111	0.111

Table B-10c. Continued.

% increase in λ to reach P_{ext} = 0.05 24yr	% increase in λ to reach P_{ext} = 0.01 24yr	% increase in λ to reach P_{ext} = 0.05 48yr	% increase in λ to reach P_{ext} = 0.01 48yr	% increase in λ to reach P_{ext} = 0.05 100yr	% increase in λ to reach P_{ext} = 0.01 100yr	% increase in λ (p=0.05) to prevent 90% decline 24yr	% increase in λ (p=0.01) to prevent 90% decline 24yr	% increase in λ (p=0.05) to prevent 90% decline 48yr	% increase in λ (p=0.01) to prevent 90% decline 48yr	% increase in λ (p=0.05) to prevent 90% decline 100yr	% increase in λ (p=0.01) to prevent 90% decline 100yr	comments
0.000	0.000	0.000	0.000	0.000	2.000	2.000	7.500	3.000	7.500	3.000	7.500	
0.000	0.000	0.000	1.500	5.500	7.000	5.500	8.500	8.500	10.500	9.500	11.000	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.000	0.500	2.000	
0.000	0.000	0.000	3.000	3.000	5.500	4.000	9.000	5.500	9.000	5.500	9.000	
0.000	0.000	0.000	3.500	3.000	6.000	4.500	10.500	5.500	10.500	5.500	10.500	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.500	1.500	4.500	2.000	4.500	
0.000	9.500	5.000	13.000	7.000	13.500	8.500	18.500	8.500	18.500	8.500	18.500	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	4.500	1.000	4.500	1.000	4.500	
0.000	0.000	0.000	0.000	1.500	3.000	2.500	5.500	5.000	7.500	6.000	7.500	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
0.000	0.000	0.000	0.000	0.500	3.000	1.500	6.500	3.000	6.500	3.500	6.500	
0.000	0.000	0.000	0.000	0.000	1.500	1.000	7.000	1.500	7.000	1.500	7.000	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.500	0.000	1.500	0.000	1.500	
0.000	3.500	1.000	8.000	3.500	9.000	5.500	14.500	5.500	14.500	5.500	14.500	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.000	0.000	3.500	0.000	3.500	
0.000	0.000	0.000	0.000	1.500	3.500	3.500	8.000	5.500	8.500	6.000	8.500	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
0.000	0.000	0.000	0.000	0.000	1.500	0.500	5.000	2.000	5.500	2.000	5.500	
0.000	0.000	0.000	0.000	0.000	2.000	1.500	7.500	2.500	7.500	2.500	7.500	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.500	0.000	1.500	
0.000	0.500	0.000	5.000	2.000	6.500	4.000	12.000	4.000	12.000	4.000	12.000	

Table B-10d. Snake River spring/summer chinook index stocks under alternative scenarios for future ocean conditions. Low: current conditions; med: two additional years of data projected from brood year returns to date; high: medium projection plus three additional years at new long term average r/s. Hatchery fish are assumed to reproduce at 20% of wild reproductive rates.

Recruits/Spawner Future Conditions			μ	σ^2	λ	λ + 95%CI	λ - 95%CI	P_{ext} 24yr	P_{ext} 48yr	P_{ext} 100yr	50% decline 24yr	50% decline 48yr	50% decline 100yr	90% decline 24yr	90% decline 48yr	90% decline 100yr
	low	Bear Creek	0.017	0.145	1.017	1.248	0.829	0.000	0.005	0.032	0.277	0.284	0.284	0.073	0.119	0.147
		Imnaha River	-0.095	0.024	0.909	0.989	0.837	0.000	0.033	0.974	0.981	1.000	1.000	0.488	0.982	1.000
		Johnson Creek	0.009	0.048	1.010	1.136	0.897	0.000	0.000	0.001	0.196	0.225	0.228	0.009	0.035	0.070
		Marsh Creek	-0.013	0.127	0.987	1.195	0.816	0.002	0.037	0.189	0.413	0.489	0.567	0.127	0.248	0.389
		Minam River	-0.024	0.153	0.976	1.203	0.791	0.005	0.067	0.290	0.478	0.570	0.673	0.185	0.338	0.514
		Poverty Creek	0.002	0.083	1.002	1.170	0.858	0.000	0.000	0.013	0.300	0.347	0.378	0.048	0.115	0.193
		Sulphur Creek	0.040	0.411	1.040	1.468	0.738	0.048	0.121	0.206	0.300	0.300	0.300	0.150	0.172	0.172
	medium	Bear Creek	0.028	0.123	1.029	1.226	0.863	0.000	0.001	0.007	0.212	0.212	0.212	0.041	0.066	0.072
		Imnaha River	-0.059	0.032	0.943	1.030	0.863	0.000	0.000	0.287	0.797	0.959	0.998	0.154	0.666	0.978
		Johnson Creek	0.033	0.041	1.034	1.144	0.934	0.000	0.000	0.000	0.067	0.067	0.067	0.001	0.003	0.003
		Marsh Creek	0.002	0.110	1.002	1.183	0.849	0.000	0.009	0.068	0.326	0.368	0.397	0.075	0.150	0.228
		Minam River	0.015	0.164	1.015	1.243	0.829	0.000	0.009	0.048	0.297	0.306	0.306	0.090	0.140	0.173
		Poverty Creek	0.024	0.072	1.024	1.171	0.896	0.000	0.000	0.000	0.167	0.167	0.167	0.014	0.032	0.040
		Sulphur Creek	0.050	0.348	1.051	1.412	0.783	0.020	0.062	0.116	0.256	0.256	0.256	0.112	0.125	0.125
	high	Bear Creek	0.032	0.109	1.033	1.201	0.889	0.000	0.000	0.002	0.181	0.181	0.181	0.028	0.046	0.046
		Imnaha River	-0.049	0.068	0.952	1.072	0.846	0.000	0.005	0.238	0.647	0.821	0.947	0.188	0.510	0.840
		Johnson Creek	0.036	0.048	1.037	1.146	0.938	0.000	0.000	0.000	0.072	0.072	0.072	0.002	0.004	0.004
		Marsh Creek	0.012	0.105	1.012	1.173	0.873	0.000	0.003	0.027	0.270	0.289	0.289	0.052	0.101	0.143
		Minam River	0.007	0.163	1.007	1.211	0.838	0.001	0.013	0.071	0.330	0.354	0.362	0.105	0.171	0.226
		Poverty Creek	0.024	0.067	1.025	1.153	0.910	0.000	0.000	0.000	0.157	0.157	0.157	0.011	0.027	0.034
		Sulphur Creek	0.047	0.288	1.048	1.339	0.820	0.010	0.041	0.086	0.245	0.245	0.245	0.096	0.111	0.111

Table B-10d. Continued.

% increase in λ to reach P_{ext} = 0.05 24yr	% increase in λ to reach P_{ext} = 0.01 24yr	% increase in λ to reach P_{ext} = 0.05 48yr	% increase in λ to reach P_{ext} = 0.01 48yr	% increase in λ to reach P_{ext} = 0.05 100yr	% increase in λ to reach P_{ext} = 0.01 100yr	% increase in λ (p=0.05) to prevent 90% decline 24yr	% increase in λ (p=0.01) to prevent 90% decline 24yr	% increase in λ (p=0.05) to prevent 90% decline 48yr	% increase in λ (p=0.01) to prevent 90% decline 48yr	% increase in λ (p=0.05) to prevent 90% decline 100yr	% increase in λ (p=0.01) to prevent 90% decline 100yr	comments
0.000	0.000	0.000	0.000	0.000	2.000	2.000	7.500	3.000	7.500	3.000	7.500	
0.000	0.000	0.000	1.500	6.000	7.000	5.500	8.000	9.000	10.500	10.500	11.500	760.5823364
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.000	0.500	2.000	455.8529968
0.000	0.000	0.000	3.000	3.000	5.500	4.000	9.000	5.500	9.000	5.500	9.000	291.4599915
0.000	0.000	1.000	5.000	4.500	7.500	6.500	12.500	7.500	12.500	7.500	12.500	386.8822327
0.000	0.000	0.000	0.000	0.000	0.500	0.000	4.000	2.000	5.000	2.500	5.000	1050.903564
0.000	9.500	5.000	13.000	7.000	13.500	8.500	18.500	8.500	18.500	8.500	18.500	207.1329956
0.000	0.000	0.000	0.000	0.000	0.000	0.000	4.500	1.000	4.500	1.000	4.500	
0.000	0.000	0.000	0.000	2.000	3.500	2.500	5.000	5.500	7.500	7.000	8.500	1238.341431
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	695.0429077
0.000	0.000	0.000	0.000	0.500	3.000	1.500	6.500	3.000	6.500	3.500	6.500	364.6679993
0.000	0.000	0.000	0.000	0.000	3.000	3.000	8.500	3.500	8.500	3.500	8.500	770.5761719
0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	2.000	0.000	2.000	1532.840454
0.000	3.500	1.000	8.000	3.500	9.000	5.500	14.500	5.500	14.500	5.500	14.500	267.7546997
0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.000	0.000	3.500	0.000	3.500	
0.000	0.000	0.000	0.000	3.000	4.500	4.500	8.000	6.500	9.500	7.500	9.500	1398.393799
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	816.0499268
0.000	0.000	0.000	0.000	0.000	1.500	0.500	5.000	2.000	5.500	2.000	5.500	445.9266663
0.000	0.000	0.000	1.000	1.000	4.000	3.500	9.500	4.500	9.500	4.500	9.500	759.562561
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.500	0.000	1.500	0.000	1.500	1659.392334
0.000	0.500	0.000	5.000	2.000	6.500	4.000	12.000	4.000	12.000	4.000	12.000	290.3299255

Table B-10e. Snake River spring/summer chinook index stocks under alternative scenarios for future ocean conditions. Low: current conditions; med: two additional years of data projected from brood year returns to date; high: medium projection plus three additional years at new long term average r/s. Hatchery fish are assumed to reproduce at 25% of wild reproductive rates.

Recruits/Spawner Future Conditions			μ	σ^2	λ	λ + 95%CI	λ - 95%CI	P_{ext} 24yr	P_{ext} 48yr	P_{ext} 100yr	50% decline 24yr	50% decline 48yr	50% decline 100yr	90% decline 24yr	90% decline 48yr	90% decline 100yr
	low	Bear Creek	0.017	0.145	1.017	1.248	0.829	0.000	0.005	0.032	0.277	0.284	0.284	0.073	0.119	0.147
		Imnaha River	-0.099	0.022	0.906	0.982	0.836	0.000	0.037	0.987	0.989	1.000	1.000	0.534	0.990	1.000
		Johnson Creek	0.009	0.048	1.010	1.136	0.897	0.000	0.000	0.001	0.196	0.225	0.228	0.009	0.035	0.070
		Marsh Creek	-0.013	0.127	0.987	1.195	0.816	0.002	0.037	0.189	0.413	0.489	0.567	0.127	0.248	0.389
		Minam River	-0.029	0.153	0.972	1.198	0.788	0.005	0.075	0.325	0.500	0.601	0.713	0.200	0.367	0.559
		Poverty Creek	0.001	0.084	1.001	1.170	0.857	0.000	0.000	0.015	0.306	0.355	0.391	0.051	0.120	0.202
		Sulphur Creek	0.040	0.411	1.040	1.468	0.738	0.048	0.121	0.206	0.300	0.300	0.300	0.150	0.172	0.172
	medium	Bear Creek	0.028	0.123	1.029	1.226	0.863	0.000	0.001	0.007	0.212	0.212	0.212	0.041	0.066	0.072
		Imnaha River	-0.063	0.029	0.939	1.022	0.863	0.000	0.000	0.351	0.838	0.977	1.000	0.171	0.731	0.991
		Johnson Creek	0.033	0.041	1.034	1.144	0.934	0.000	0.000	0.000	0.067	0.067	0.067	0.001	0.003	0.003
		Marsh Creek	0.002	0.110	1.002	1.183	0.849	0.000	0.009	0.068	0.326	0.368	0.397	0.075	0.150	0.228
		Minam River	0.010	0.163	1.010	1.237	0.826	0.000	0.010	0.060	0.317	0.335	0.335	0.099	0.159	0.204
		Poverty Creek	0.023	0.073	1.023	1.171	0.894	0.000	0.000	0.000	0.172	0.172	0.172	0.015	0.034	0.043
		Sulphur Creek	0.050	0.348	1.051	1.412	0.783	0.020	0.062	0.116	0.256	0.256	0.256	0.112	0.125	0.125
	high	Bear Creek	0.032	0.109	1.033	1.201	0.889	0.000	0.000	0.002	0.181	0.181	0.181	0.028	0.046	0.046
		Imnaha River	-0.054	0.065	0.948	1.065	0.844	0.000	0.006	0.282	0.683	0.857	0.967	0.207	0.560	0.885
		Johnson Creek	0.036	0.048	1.037	1.146	0.938	0.000	0.000	0.000	0.072	0.072	0.072	0.002	0.004	0.004
		Marsh Creek	0.012	0.105	1.012	1.173	0.873	0.000	0.003	0.027	0.270	0.289	0.289	0.052	0.101	0.143
		Minam River	0.002	0.162	1.002	1.204	0.834	0.001	0.015	0.088	0.353	0.388	0.411	0.116	0.194	0.266
		Poverty Creek	0.024	0.068	1.024	1.153	0.909	0.000	0.000	0.000	0.161	0.161	0.161	0.012	0.028	0.036
		Sulphur Creek	0.047	0.288	1.048	1.339	0.820	0.010	0.041	0.086	0.245	0.245	0.245	0.096	0.111	0.111

Table B-10e. Continued.

% increase in λ to reach P_{ext} = 0.05 24yr	% increase in λ to reach P_{ext} = 0.01 24yr	% increase in λ to reach P_{ext} = 0.05 48yr	% increase in λ to reach P_{ext} = 0.01 48yr	% increase in λ to reach P_{ext} = 0.05 100yr	% increase in λ to reach P_{ext} = 0.01 100yr	% increase in λ (p=0.05) to prevent 90% decline 24yr	% increase in λ (p=0.01) to prevent 90% decline 24yr	% increase in λ (p=0.05) to prevent 90% decline 48yr	% increase in λ (p=0.01) to prevent 90% decline 48yr	% increase in λ (p=0.05) to prevent 90% decline 100yr	% increase in λ (p=0.01) to prevent 90% decline 100yr	comments
0.000	0.000	0.000	0.000	0.000	2.000	2.000	7.500	3.000	7.500	3.000	7.500	
0.000	0.000	0.000	1.500	6.500	7.500	5.500	8.000	9.000	11.000	11.000	12.000	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.000	0.500	2.000	
0.000	0.000	0.000	3.000	3.000	5.500	4.000	9.000	5.500	9.000	5.500	9.000	
0.000	0.000	1.500	5.500	5.000	8.000	7.000	13.000	8.000	13.000	8.000	13.000	
0.000	0.000	0.000	0.000	0.000	0.500	0.500	4.500	2.000	5.000	2.500	5.000	
0.000	9.500	5.000	13.000	7.000	13.500	8.500	18.500	8.500	18.500	8.500	18.500	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	4.500	1.000	4.500	1.000	4.500	
0.000	0.000	0.000	0.000	2.500	3.500	2.500	5.000	6.000	7.500	7.500	8.500	var plot not very linear
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
0.000	0.000	0.000	0.000	0.500	3.000	1.500	6.500	3.000	6.500	3.500	6.500	
0.000	0.000	0.000	0.500	0.500	3.500	3.000	9.000	4.000	9.000	4.000	9.000	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	2.000	0.000	2.000	
0.000	3.500	1.000	8.000	3.500	9.000	5.500	14.500	5.500	14.500	5.500	14.500	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.000	0.000	3.500	0.000	3.500	
0.000	0.000	0.000	0.000	3.000	5.000	4.500	8.500	7.000	10.000	7.500	10.000	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
0.000	0.000	0.000	0.000	0.000	1.500	0.500	5.000	2.000	5.500	2.000	5.500	
0.000	0.000	0.000	1.000	1.500	4.500	4.000	10.000	5.000	10.000	5.000	10.000	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.500	0.000	2.000	0.000	2.000	
0.000	0.500	0.000	5.000	2.000	6.500	4.000	12.000	4.000	12.000	4.000	12.000	

Table B-10f. Snake River spring/summer chinook index stocks under alternative scenarios for future ocean conditions. Low: current conditions; med: two additional years of data projected from brood year returns to date; high: medium projection plus three additional years at new long term average r/s. Hatchery fish are assumed to reproduce at 50% of wild reproductive rates.

Recruits/Spawner Future Conditions			μ	σ^2	λ	λ + 95%CI	λ - 95%CI	P_{ext} 24yr	P_{ext} 48yr	P_{ext} 100yr	50% decline 24yr	50% decline 48yr	50% decline 100yr	90% decline 24yr	90% decline 48yr	90% decline 100yr
	low	Bear Creek	0.017	0.145	1.017	1.248	0.829	0.000	0.005	0.032	0.277	0.284	0.284	0.073	0.119	0.147
		Imnaha River	-0.114	0.020	0.892	0.962	0.827	0.000	0.097	1.000	0.998	1.000	1.000	0.736	0.999	1.000
		Johnson Creek	0.009	0.048	1.010	1.136	0.897	0.000	0.000	0.001	0.196	0.225	0.228	0.009	0.035	0.070
		Marsh Creek	-0.013	0.127	0.987	1.195	0.816	0.002	0.037	0.189	0.413	0.489	0.567	0.127	0.248	0.389
		Minam River	-0.049	0.155	0.952	1.176	0.771	0.009	0.128	0.499	0.599	0.728	0.857	0.279	0.507	0.745
		Poverty Creek	-0.003	0.088	0.997	1.169	0.850	0.000	0.001	0.025	0.336	0.396	0.449	0.063	0.148	0.252
		Sulphur Creek	0.040	0.411	1.040	1.468	0.738	0.048	0.121	0.206	0.300	0.300	0.300	0.150	0.172	0.172
	medium	Bear Creek	0.028	0.123	1.029	1.226	0.863	0.000	0.001	0.007	0.212	0.212	0.212	0.041	0.066	0.072
		Imnaha River	-0.081	0.022	0.922	0.994	0.856	0.000	0.001	0.730	0.956	0.999	1.000	0.308	0.936	1.000
		Johnson Creek	0.033	0.041	1.034	1.144	0.934	0.000	0.000	0.000	0.067	0.067	0.067	0.001	0.003	0.003
		Marsh Creek	0.002	0.110	1.002	1.183	0.849	0.000	0.009	0.068	0.326	0.368	0.397	0.075	0.150	0.228
		Minam River	-0.011	0.162	0.989	1.209	0.809	0.001	0.023	0.141	0.416	0.479	0.544	0.152	0.264	0.386
		Poverty Creek	0.019	0.076	1.020	1.170	0.888	0.000	0.000	0.001	0.196	0.198	0.198	0.020	0.045	0.062
		Sulphur Creek	0.050	0.348	1.051	1.412	0.783	0.020	0.062	0.116	0.256	0.256	0.256	0.112	0.125	0.125
	high	Bear Creek	0.032	0.109	1.033	1.201	0.889	0.000	0.000	0.002	0.181	0.181	0.181	0.028	0.046	0.046
		Imnaha River	-0.074	0.055	0.929	1.034	0.834	0.000	0.012	0.551	0.825	0.960	0.998	0.321	0.775	0.984
		Johnson Creek	0.036	0.048	1.037	1.146	0.938	0.000	0.000	0.000	0.072	0.072	0.072	0.002	0.004	0.004
		Marsh Creek	0.012	0.105	1.012	1.173	0.873	0.000	0.003	0.027	0.270	0.289	0.289	0.052	0.101	0.143
		Minam River	-0.021	0.158	0.979	1.174	0.816	0.001	0.032	0.198	0.464	0.549	0.643	0.180	0.322	0.485
		Poverty Creek	0.020	0.070	1.021	1.152	0.904	0.000	0.000	0.000	0.181	0.181	0.181	0.016	0.037	0.051
		Sulphur Creek	0.047	0.288	1.048	1.339	0.820	0.010	0.041	0.086	0.245	0.245	0.245	0.096	0.111	0.111

Table B-10f. Continued.

% increase in λ to reach P_{ext} = 0.05 24yr	% increase in λ to reach P_{ext} = 0.01 24yr	% increase in λ to reach P_{ext} = 0.05 48yr	% increase in λ to reach P_{ext} = 0.01 48yr	% increase in λ to reach P_{ext} = 0.05 100yr	% increase in λ to reach P_{ext} = 0.01 100yr	% increase in λ (p=0.05) to prevent 90% decline 24yr	% increase in λ (p=0.01) to prevent 90% decline 24yr	% increase in λ (p=0.05) to prevent 90% decline 48yr	% increase in λ (p=0.01) to prevent 90% decline 48yr	% increase in λ (p=0.05) to prevent 90% decline 100yr	% increase in λ (p=0.01) to prevent 90% decline 100yr	comments
0.000	0.000	0.000	0.000	0.000	2.000	2.000	7.500	3.000	7.500	3.000	7.500	
0.000	0.000	1.000	2.500	7.500	8.500	7.000	9.000	10.500	12.500	12.500	13.500	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.000	0.500	2.000	
0.000	0.000	0.000	3.000	3.000	5.500	4.000	9.000	5.500	9.000	5.500	9.000	
0.000	0.000	3.500	7.500	7.000	10.000	9.000	15.500	10.000	15.500	10.000	15.500	
0.000	0.000	0.000	0.000	0.000	1.500	1.000	5.000	3.000	6.000	3.000	6.000	
0.000	9.500	5.000	13.000	7.000	13.500	8.500	18.500	8.500	18.500	8.500	18.500	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	4.500	1.000	4.500	1.000	4.500	
0.000	0.000	0.000	0.000	3.500	4.500	4.000	6.000	7.500	9.000	9.000	10.000	var plot not very linear
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
0.000	0.000	0.000	0.000	0.500	3.000	1.500	6.500	3.000	6.500	3.500	6.500	
0.000	0.000	0.000	2.000	2.500	5.500	5.500	11.500	6.500	11.500	6.500	11.500	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.000	0.000	3.000	0.500	3.000	
0.000	3.500	1.000	8.000	3.500	9.000	5.500	14.500	5.500	14.500	5.500	14.500	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.000	0.000	3.500	0.000	3.500	
0.000	0.000	0.000	0.500	4.500	6.500	6.000	9.500	8.500	11.500	9.500	11.500	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
0.000	0.000	0.000	0.000	0.000	1.500	0.500	5.000	2.000	5.500	2.000	5.500	
0.000	0.000	0.000	3.000	3.500	6.500	6.500	12.500	7.500	12.500	7.500	12.500	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000	2.500	0.500	2.500	
0.000	0.500	0.000	5.000	2.000	6.500	4.000	12.000	4.000	12.000	4.000	12.000	

Table B-10g. Snake River spring/summer chinook index stocks under alternative scenarios for future ocean conditions. Low: current conditions; med: two additional years of data projected from brood year returns to date; high: medium projection plus three additional years at new long term average r/s. Hatchery fish are assumed to reproduce at 75% of wild reproductive rates.

Recruits/Spawner Future Conditions			μ	σ^2	λ	λ + 95%CI	λ - 95%CI	P_{ext} 24yr	P_{ext} 48yr	P_{ext} 100yr	50% decline 24yr	50% decline 48yr	50% decline 100yr	90% decline 24yr	90% decline 48yr	90% decline 100yr
	low	Bear Creek	0.017	0.145	1.017	1.248	0.829	0.000	0.005	0.032	0.277	0.284	0.284	0.073	0.119	0.147
		Imnaha River	-0.127	0.024	0.881	0.957	0.812	0.000	0.227	1.000	0.999	1.000	1.000	0.836	1.000	1.000
		Johnson Creek	0.009	0.048	1.010	1.136	0.897	0.000	0.000	0.001	0.196	0.225	0.228	0.009	0.035	0.070
		Marsh Creek	-0.013	0.127	0.987	1.195	0.816	0.002	0.037	0.189	0.413	0.489	0.567	0.127	0.248	0.389
		Minam River	-0.067	0.160	0.936	1.160	0.755	0.014	0.194	0.653	0.677	0.816	0.932	0.359	0.626	0.861
		Poverty Creek	-0.007	0.093	0.993	1.169	0.843	0.000	0.002	0.038	0.364	0.436	0.505	0.077	0.177	0.303
		Sulphur Creek	0.040	0.411	1.040	1.468	0.738	0.048	0.121	0.206	0.300	0.300	0.300	0.150	0.172	0.172
	medium	Bear Creek	0.028	0.123	1.029	1.226	0.863	0.000	0.001	0.007	0.212	0.212	0.212	0.041	0.066	0.072
		Imnaha River	-0.095	0.023	0.909	0.980	0.843	0.000	0.004	0.929	0.984	1.000	1.000	0.490	0.985	1.000
		Johnson Creek	0.033	0.041	1.034	1.144	0.934	0.000	0.000	0.000	0.067	0.067	0.067	0.001	0.003	0.003
		Marsh Creek	0.002	0.110	1.002	1.183	0.849	0.000	0.009	0.068	0.326	0.368	0.397	0.075	0.150	0.228
		Minam River	-0.030	0.164	0.970	1.187	0.793	0.002	0.043	0.257	0.507	0.608	0.719	0.214	0.382	0.572
		Poverty Creek	0.016	0.079	1.016	1.169	0.882	0.000	0.000	0.002	0.220	0.230	0.230	0.026	0.059	0.085
		Sulphur Creek	0.050	0.348	1.051	1.412	0.783	0.020	0.062	0.116	0.256	0.256	0.256	0.112	0.125	0.125
	high	Bear Creek	0.032	0.109	1.033	1.201	0.889	0.000	0.000	0.002	0.181	0.181	0.181	0.028	0.046	0.046
		Imnaha River	-0.090	0.053	0.914	1.014	0.823	0.000	0.028	0.784	0.906	0.989	1.000	0.453	0.900	0.998
		Johnson Creek	0.036	0.048	1.037	1.146	0.938	0.000	0.000	0.000	0.072	0.072	0.072	0.002	0.004	0.004
		Marsh Creek	0.012	0.105	1.012	1.173	0.873	0.000	0.003	0.027	0.270	0.289	0.289	0.052	0.101	0.143
		Minam River	-0.042	0.158	0.959	1.149	0.800	0.002	0.060	0.348	0.565	0.685	0.812	0.253	0.459	0.685
		Poverty Creek	0.017	0.073	1.017	1.151	0.899	0.000	0.000	0.001	0.202	0.208	0.208	0.020	0.047	0.068
		Sulphur Creek	0.047	0.288	1.048	1.339	0.820	0.010	0.041	0.086	0.245	0.245	0.245	0.096	0.111	0.111

Table B-10g. Continued.

% increase in λ to reach P_{ext} = 0.05 24yr	% increase in λ to reach P_{ext} = 0.01 24yr	% increase in λ to reach P_{ext} = 0.05 48yr	% increase in λ to reach P_{ext} = 0.01 48yr	% increase in λ to reach P_{ext} = 0.05 100yr	% increase in λ to reach P_{ext} = 0.01 100yr	% increase in λ (p=0.05) to prevent 90% decline 24yr	% increase in λ (p=0.01) to prevent 90% decline 24yr	% increase in λ (p=0.05) to prevent 90% decline 48yr	% increase in λ (p=0.01) to prevent 90% decline 48yr	% increase in λ (p=0.05) to prevent 90% decline 100yr	% increase in λ (p=0.01) to prevent 90% decline 100yr	comments
0.000	0.000	0.000	0.000	0.000	2.000	2.000	7.500	3.000	7.500	3.000	7.500	
0.000	0.000	2.500	4.000	9.000	10.000	9.000	11.000	12.500	14.000	14.000	15.000	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.000	0.500	2.000	
0.000	0.000	0.000	3.000	3.000	5.500	4.000	9.000	5.500	9.000	5.500	9.000	
0.000	1.500	5.000	9.000	9.000	12.000	11.500	17.500	12.500	17.500	12.500	17.500	
0.000	0.000	0.000	0.000	0.000	2.000	1.500	6.000	3.500	6.500	3.500	6.500	
0.000	9.500	5.000	13.000	7.000	13.500	8.500	18.500	8.500	18.500	8.500	18.500	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	4.500	1.000	4.500	1.000	4.500	
0.000	0.000	0.000	0.000	5.000	6.000	5.500	7.500	9.000	10.500	10.500	11.500	var plot not very linear
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
0.000	0.000	0.000	0.000	0.500	3.000	1.500	6.500	3.000	6.500	3.500	6.500	
0.000	0.000	0.000	4.000	4.500	7.500	7.500	13.500	8.500	13.500	8.500	13.500	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.500	0.500	3.500	1.000	3.500	
0.000	3.500	1.000	8.000	3.500	9.000	5.500	14.500	5.500	14.500	5.500	14.500	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.000	0.000	3.500	0.000	3.500	
0.000	0.000	0.000	1.500	6.000	7.500	7.500	11.000	10.500	13.000	11.500	13.000	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
0.000	0.000	0.000	0.000	0.000	1.500	0.500	5.000	2.000	5.500	2.000	5.500	
0.000	0.000	1.000	5.000	5.500	8.500	8.500	14.500	9.500	14.500	9.500	14.500	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.000	0.000	3.000	0.500	3.000	
0.000	0.500	0.000	5.000	2.000	6.500	4.000	12.000	4.000	12.000	4.000	12.000	

Table B-10h. Snake River spring/summer chinook index stocks under alternative scenarios for future ocean conditions. Low: current conditions; med: two additional years of data projected from brood year returns to date; high: medium projection plus three additional years at new long term average r/s. Hatchery fish are assumed to reproduce at 80% of wild reproductive rates.

Recruits/Spawner Future Conditions			μ	σ^2	λ	λ + 95%CI	λ - 95%CI	P_{ext} 24yr	P_{ext} 48yr	P_{ext} 100yr	50% decline 24yr	50% decline 48yr	50% decline 100yr	90% decline 24yr	90% decline 48yr	90% decline 100yr
	low	Bear Creek	0.017	0.145	1.017	1.248	0.829	0.000	0.005	0.032	0.277	0.284	0.284	0.073	0.119	0.147
		Imnaha River	-0.129	0.025	0.879	0.956	0.808	0.000	0.257	1.000	0.999	1.000	1.000	0.847	1.000	1.000
		Johnson Creek	0.009	0.048	1.010	1.136	0.897	0.000	0.000	0.001	0.196	0.225	0.228	0.009	0.035	0.070
		Marsh Creek	-0.013	0.127	0.987	1.195	0.816	0.002	0.037	0.189	0.413	0.489	0.567	0.127	0.248	0.389
		Minam River	-0.070	0.162	0.933	1.157	0.752	0.016	0.208	0.679	0.691	0.830	0.941	0.375	0.646	0.878
		Poverty Creek	-0.008	0.093	0.992	1.169	0.842	0.000	0.002	0.041	0.370	0.443	0.516	0.080	0.183	0.313
		Sulphur Creek	0.040	0.411	1.040	1.468	0.738	0.048	0.121	0.206	0.300	0.300	0.300	0.150	0.172	0.172
	medium	Bear Creek	0.028	0.123	1.029	1.226	0.863	0.000	0.001	0.007	0.212	0.212	0.212	0.041	0.066	0.072
		Imnaha River	-0.098	0.023	0.907	0.979	0.840	0.000	0.006	0.946	0.986	1.000	1.000	0.523	0.988	1.000
		Johnson Creek	0.033	0.041	1.034	1.144	0.934	0.000	0.000	0.000	0.067	0.067	0.067	0.001	0.003	0.003
		Marsh Creek	0.002	0.110	1.002	1.183	0.849	0.000	0.009	0.068	0.326	0.368	0.397	0.075	0.150	0.228
		Minam River	-0.034	0.164	0.967	1.184	0.789	0.002	0.048	0.283	0.524	0.630	0.747	0.227	0.405	0.606
		Poverty Creek	0.015	0.080	1.015	1.169	0.881	0.000	0.000	0.002	0.224	0.236	0.236	0.028	0.062	0.090
		Sulphur Creek	0.050	0.348	1.051	1.412	0.783	0.020	0.062	0.116	0.256	0.256	0.256	0.112	0.125	0.125
	high	Bear Creek	0.032	0.109	1.033	1.201	0.889	0.000	0.000	0.002	0.181	0.181	0.181	0.028	0.046	0.046
		Imnaha River	-0.093	0.052	0.911	1.011	0.820	0.000	0.033	0.818	0.916	0.992	1.000	0.478	0.915	0.999
		Johnson Creek	0.036	0.048	1.037	1.146	0.938	0.000	0.000	0.000	0.072	0.072	0.072	0.002	0.004	0.004
		Marsh Creek	0.012	0.105	1.012	1.173	0.873	0.000	0.003	0.027	0.270	0.289	0.289	0.052	0.101	0.143
		Minam River	-0.046	0.158	0.955	1.145	0.797	0.002	0.067	0.381	0.583	0.709	0.837	0.269	0.486	0.718
		Poverty Creek	0.017	0.074	1.017	1.151	0.898	0.000	0.000	0.001	0.206	0.214	0.214	0.021	0.050	0.072
		Sulphur Creek	0.047	0.288	1.048	1.339	0.820	0.010	0.041	0.086	0.245	0.245	0.245	0.096	0.111	0.111

Table B-10h. Continued.

% increase in λ to reach P_{ext} = 0.05 24yr	% increase in λ to reach P_{ext} = 0.01 24yr	% increase in λ to reach P_{ext} = 0.05 48yr	% increase in λ to reach P_{ext} = 0.01 48yr	% increase in λ to reach P_{ext} = 0.05 100yr	% increase in λ to reach P_{ext} = 0.01 100yr	% increase in λ (p=0.05) to prevent 90% decline 24yr	% increase in λ (p=0.01) to prevent 90% decline 24yr	% increase in λ (p=0.05) to prevent 90% decline 48yr	% increase in λ (p=0.01) to prevent 90% decline 48yr	% increase in λ (p=0.05) to prevent 90% decline 100yr	% increase in λ (p=0.01) to prevent 90% decline 100yr	comments
0.000	0.000	0.000	0.000	0.000	2.000	2.000	7.500	3.000	7.500	3.000	7.500	
0.000	0.000	2.500	4.000	9.500	10.500	9.000	11.500	13.000	14.500	14.500	15.500	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.000	0.500	2.000	
0.000	0.000	0.000	3.000	3.000	5.500	4.000	9.000	5.500	9.000	5.500	9.000	
0.000	1.500	5.500	9.500	9.500	12.500	11.500	18.000	12.500	18.000	12.500	18.000	
0.000	0.000	0.000	0.000	0.000	2.000	1.500	6.000	3.500	6.500	4.000	6.500	
0.000	9.500	5.000	13.000	7.000	13.500	8.500	18.500	8.500	18.500	8.500	18.500	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	4.500	1.000	4.500	1.000	4.500	
0.000	0.000	0.000	0.000	5.500	6.500	5.500	8.000	9.000	11.000	11.000	12.000	var plot not very linear
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
0.000	0.000	0.000	0.000	0.500	3.000	1.500	6.500	3.000	6.500	3.500	6.500	
0.000	0.000	0.000	4.500	5.000	8.000	8.000	14.000	9.000	14.000	9.000	14.000	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.500	0.500	3.500	1.000	3.500	
0.000	3.500	1.000	8.000	3.500	9.000	5.500	14.500	5.500	14.500	5.500	14.500	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.000	0.000	3.500	0.000	3.500	
0.000	0.000	0.000	2.000	6.500	8.000	8.000	11.500	10.500	13.500	11.500	13.500	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
0.000	0.000	0.000	0.000	0.000	1.500	0.500	5.000	2.000	5.500	2.000	5.500	
0.000	0.000	1.000	5.500	6.000	9.000	9.000	15.000	10.000	15.000	10.000	15.000	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.000	0.000	3.000	1.000	3.000	
0.000	0.500	0.000	5.000	2.000	6.500	4.000	12.000	4.000	12.000	4.000	12.000	

Table B-10i. Snake River spring/summer chinook index stocks under alternative scenarios for future ocean conditions. Low: current conditions; med: two additional years of data projected from brood year returns to date; high: medium projection plus three additional years at new long term average r/s. Hatchery fish are assumed to reproduce at 100% of wild reproductive rates.

Recruits/Spawner Future Conditions			μ	σ^2	λ	λ + 95%CI	λ - 95%CI	P_{ext} 24yr	P_{ext} 48yr	P_{ext} 100yr	50% decline 24yr	50% decline 48yr	50% decline 100yr	90% decline 24yr	90% decline 48yr	90% decline 100yr
	low	Bear Creek	0.017	0.145	1.017	1.248	0.829	0.000	0.005	0.032	0.277	0.284	0.284	0.073	0.119	0.147
		Imnaha River	-0.137	0.030	0.872	0.957	0.795	0.000	0.371	1.000	0.999	1.000	1.000	0.878	1.000	1.000
		Johnson Creek	0.009	0.048	1.010	1.136	0.897	0.000	0.000	0.001	0.196	0.225	0.228	0.009	0.035	0.070
		Marsh Creek	-0.013	0.127	0.987	1.195	0.816	0.002	0.037	0.189	0.413	0.489	0.567	0.127	0.248	0.389
		Minam River	-0.082	0.167	0.921	1.147	0.740	0.022	0.267	0.768	0.738	0.874	0.967	0.434	0.718	0.926
		Poverty Creek	-0.011	0.097	0.989	1.168	0.837	0.000	0.003	0.054	0.392	0.473	0.557	0.092	0.208	0.355
		Sulphur Creek	0.040	0.411	1.040	1.468	0.738	0.048	0.121	0.206	0.300	0.300	0.300	0.150	0.172	0.172
	medium	Bear Creek	0.028	0.123	1.029	1.226	0.863	0.000	0.001	0.007	0.212	0.212	0.212	0.041	0.066	0.072
		Imnaha River	-0.107	0.027	0.898	0.975	0.828	0.000	0.021	0.980	0.991	1.000	1.000	0.635	0.994	1.000
		Johnson Creek	0.033	0.041	1.034	1.144	0.934	0.000	0.000	0.000	0.067	0.067	0.067	0.001	0.003	0.003
		Marsh Creek	0.002	0.110	1.002	1.183	0.849	0.000	0.009	0.068	0.326	0.368	0.397	0.075	0.150	0.228
		Minam River	-0.047	0.167	0.954	1.170	0.777	0.003	0.073	0.391	0.587	0.711	0.838	0.280	0.495	0.723
		Poverty Creek	0.012	0.083	1.012	1.169	0.876	0.000	0.000	0.003	0.243	0.262	0.262	0.033	0.075	0.112
		Sulphur Creek	0.050	0.348	1.051	1.412	0.783	0.020	0.062	0.116	0.256	0.256	0.256	0.112	0.125	0.125
	high	Bear Creek	0.032	0.109	1.033	1.201	0.889	0.000	0.000	0.002	0.181	0.181	0.181	0.028	0.046	0.046
		Imnaha River	-0.105	0.053	0.901	1.000	0.811	0.000	0.060	0.911	0.947	0.997	1.000	0.574	0.956	1.000
		Johnson Creek	0.036	0.048	1.037	1.146	0.938	0.000	0.000	0.000	0.072	0.072	0.072	0.002	0.004	0.004
		Marsh Creek	0.012	0.105	1.012	1.173	0.873	0.000	0.003	0.027	0.270	0.289	0.289	0.052	0.101	0.143
		Minam River	-0.060	0.159	0.941	1.129	0.785	0.004	0.101	0.510	0.651	0.788	0.910	0.331	0.586	0.826
		Poverty Creek	0.014	0.076	1.014	1.150	0.894	0.000	0.000	0.001	0.222	0.236	0.236	0.025	0.059	0.089
		Sulphur Creek	0.047	0.288	1.048	1.339	0.820	0.010	0.041	0.086	0.245	0.245	0.245	0.096	0.111	0.111

Table B-10i. Continued.

% increase in λ to reach P_{ext} = 0.05 24yr	% increase in λ to reach P_{ext} = 0.01 24yr	% increase in λ to reach P_{ext} = 0.05 48yr	% increase in λ to reach P_{ext} = 0.01 48yr	% increase in λ to reach P_{ext} = 0.05 100yr	% increase in λ to reach P_{ext} = 0.01 100yr	% increase in λ (p=0.05) to prevent 90% decline 24yr	% increase in λ (p=0.01) to prevent 90% decline 24yr	% increase in λ (p=0.05) to prevent 90% decline 48yr	% increase in λ (p=0.01) to prevent 90% decline 48yr	% increase in λ (p=0.05) to prevent 90% decline 100yr	% increase in λ (p=0.01) to prevent 90% decline 100yr	comments
0.000	0.000	0.000	0.000	0.000	2.000	2.000	7.500	3.000	7.500	3.000	7.500	
0.000	0.000	3.500	5.500	10.500	11.500	10.500	13.500	14.000	16.000	15.500	17.000	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.000	0.500	2.000	
0.000	0.000	0.000	3.000	3.000	5.500	4.000	9.000	5.500	9.000	5.500	9.000	
0.000	3.000	6.500	11.000	11.000	14.000	13.500	20.000	14.500	20.000	14.500	20.000	
0.000	0.000	0.000	0.000	0.500	2.500	2.500	7.000	4.000	7.500	4.500	7.500	
0.000	9.500	5.000	13.000	7.000	13.500	8.500	18.500	8.500	18.500	8.500	18.500	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	4.500	1.000	4.500	1.000	4.500	
0.000	0.000	0.000	1.000	6.500	7.500	7.000	9.500	10.500	12.500	12.000	13.500	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
0.000	0.000	0.000	0.000	0.500	3.000	1.500	6.500	3.000	6.500	3.500	6.500	
0.000	0.000	1.500	5.500	6.000	9.000	9.500	16.000	10.500	16.000	10.500	16.000	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.000	1.000	4.000	1.500	4.000	
0.000	3.500	1.000	8.000	3.500	9.000	5.500	14.500	5.500	14.500	5.500	14.500	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.000	0.000	3.500	0.000	3.500	
0.000	0.000	0.500	3.000	7.500	9.000	9.000	13.000	12.000	14.500	13.000	14.500	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
0.000	0.000	0.000	0.000	0.000	1.500	0.500	5.000	2.000	5.500	2.000	5.500	
0.000	0.000	2.500	6.500	7.500	10.500	10.500	17.000	11.500	17.000	11.500	17.000	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.500	0.500	3.500	1.000	3.500	
0.000	0.500	0.000	5.000	2.000	6.500	4.000	12.000	4.000	12.000	4.000	12.000	

Table B-11a. Results of Dennis Extinction Analysis for individual stocks and ESUs. Three thresholds (1fish/generation, 50% and 90% decline). This analysis assumes that hatchery fish reproduce at 20% the rate of wild fish. NA, or blank, indicates that the time series was too short, the data failed the sigma^2<0 test, or that the data is an index count and not appropriate for population size estimate.

Species	ESU	Stream	μ	σ^2	λ	λ + 95%CI	λ - 95%CI	P_{ext} 24yr	P_{ext} 48yr	P_{ext} 100yr	50% decline 24yr	50% decline 48yr	50% decline 100yr	90% decline 24yr	90% decline 48yr	90% decline 100yr
Chinook	**Lower Columbia**	ESU	-0.043	0.122	0.958	1.215	0.755	NA	NA	NA	0.579	0.715	0.850	0.229	0.461	0.717
		Bear Creek	-0.193	0.199	0.824	1.117	0.608	0.382	0.916	1.000	0.964	0.997	1.000	0.857	0.988	1.000
		Big Creek	-0.069	0.039	0.933	1.047	0.832	0.000	0.000	0.300	0.842	0.973	0.999	0.252	0.771	0.990
		Clatskanie	-0.118	0.439	0.888	1.307	0.604	0.583	0.831	0.964	0.746	0.862	0.954	0.566	0.770	0.925
		Cowlitz Tule	-0.079	0.103	0.924	1.114	0.766	NA	NA	NA	0.778	0.919	0.988	0.399	0.749	0.960
		Elochoman	-0.011	0.435	0.989	1.452	0.674	NA	NA	NA	0.448	0.486	0.525	0.264	0.349	0.428
		Germany	-0.071	0.140	0.931	1.171	0.741	NA	NA	NA	0.709	0.852	0.956	0.372	0.665	0.900
		Gnat	-0.064	0.453	0.938	1.387	0.634	0.263	0.530	0.780	0.602	0.697	0.804	0.409	0.567	0.731
		Grays Tule	-0.160	0.418	0.852	1.241	0.585	NA	NA	NA	0.840	0.941	0.991	0.687	0.885	0.983
		Kalama Spring	-0.166	0.142	0.847	1.055	0.680	NA	NA	NA	0.963	0.997	1.000	0.818	0.985	1.000
		Kalama	-0.014	0.517	0.986	1.498	0.649	NA	NA	NA	0.460	0.499	0.541	0.289	0.373	0.452
		Klaskanine	-0.117	0.273	0.890	1.224	0.647	0.535	0.840	0.978	0.795	0.912	0.982	0.577	0.819	0.963
		Lewis R Bright	-0.014	0.043	0.986	1.113	0.874	NA	NA	NA	0.361	0.491	0.629	0.026	0.127	0.328
		Lewis Spring	-0.099	0.417	0.906	1.319	0.622	NA	NA	NA	0.703	0.818	0.924	0.510	0.709	0.881
		Lewis, E Fk Tule	-0.008	0.021	0.992	1.079	0.912	NA	NA	NA	0.236	0.374	0.522	0.001	0.027	0.145
		Lewis and Clark	-0.608	2.612	0.544	1.460	0.203	1.001	1.000	1.000	0.960	0.995	1.000	0.940	0.992	1.000
		Mill Fall	-0.213	0.179	0.808	1.100	0.593	0.419	0.954	1.000	0.984	0.999	1.000	0.913	0.997	1.000
		Plympton	-0.050	0.144	0.951	1.187	0.763	0.000	0.022	0.274	0.607	0.741	0.871	0.276	0.514	0.760
		Sandy Late	-0.017	0.015	0.983	1.074	0.899	0.000	0.000	0.000	0.323	0.568	0.807	0.001	0.041	0.323
		Sandy Tule	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Skamokawa	-0.196	0.041	0.822	0.925	0.731	NA	NA	NA	1.000	1.000	1.000	0.992	1.000	1.000
		Youngs	-0.062	1.043	0.940	1.814	0.487	0.630	0.773	0.880	0.562	0.625	0.704	0.434	0.537	0.647
Chinook		ESU	-0.168	0.038	0.845	0.947	0.755	0.000	0.676	1.000	1.000	1.000	1.000	0.965	1.000	1.000
	U. Columbia Spr	Methow River	-0.148	0.252	0.863	1.141	0.652	0.239	0.735	0.981	0.877	0.967	0.998	0.694	0.916	0.994
		Entiat	-0.157	0.031	0.855	0.943	0.774	0.078	0.983	1.000	1.000	1.000	1.000	0.955	1.000	1.000
		Wenatchee	-0.219	0.022	0.803	0.877	0.736	0.034	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Chinook	**Snake R. Spr/Sum**	ESU	-0.092	0.020	0.912	0.983	0.846	0.000	0.000	0.215	0.987	1.000	1.000	0.446	0.986	1.000
		Bear Creek	0.017	0.146	1.017	1.248	0.829	0.000	0.005	0.032	0.277	0.283	0.283	0.073	0.119	0.146
		Imnaha River	-0.095	0.024	0.909	0.989	0.837	0.000	0.033	0.974	0.981	1.000	1.000	0.488	0.982	1.000
		Johnson Creek	0.010	0.048	1.010	1.135	0.898	0.000	0.000	0.001	0.195	0.224	0.226	0.009	0.034	0.068
		Marsh Creek	-0.013	0.127	0.987	1.195	0.816	0.002	0.037	0.190	0.414	0.489	0.568	0.127	0.248	0.389
		Minam River	-0.024	0.152	0.976	1.203	0.791	0.005	0.067	0.291	0.478	0.571	0.673	0.185	0.338	0.515
		Poverty Creek	0.002	0.083	1.002	1.170	0.858	0.000	0.000	0.013	0.299	0.345	0.377	0.048	0.115	0.192
		Sulphur Creek	0.039	0.411	1.040	1.467	0.737	0.049	0.122	0.208	0.301	0.301	0.301	0.151	0.173	0.173

Table B-11a. continued

Species	ESU	Stream	μ	σ^2	λ	λ + 95%CI	λ - 95%CI	P_{ext} 24yr	P_{ext} 48yr	P_{ext} 100yr	50% decline 24yr	50% decline 48yr	50% decline 100yr	90% decline 24yr	90% decline 48yr	90% decline 100yr
Chinook	**Snake R. Fall**	Snake River Basin	-0.085	0.035	0.919	1.036	0.815	0.000	0.007	0.757	0.928	0.995	1.000	0.385	0.914	1.000
Chinook	**U. Williamette**	ESURunsum Upper	-0.200	0.115	0.818	0.997	0.672	0.003	0.556	0.999	0.993	1.000	1.000	0.934	0.999	1.000
		McKenzie River abo	-0.011	0.215	0.989	1.295	0.755	0.000	0.012	0.100	0.426	0.481	0.537	0.185	0.291	0.399
Chum	**Columbia River**	ESU	0.035	0.027	1.035	1.134	0.945	NA	NA	NA	0.029	0.029	0.029	0.000	0.000	0.000
		Grays R west fork	0.209	0.205	1.233	1.587	0.958	NA	NA	NA	0.005	0.005	0.005	0.000	0.000	0.000
		Grays R mouth to he	-0.045	0.125	0.956	1.164	0.785	NA	NA	NA	0.588	0.725	0.859	0.240	0.476	0.732
		Hardy Creek	0.045	0.061	1.046	1.193	0.916	NA	NA	NA	0.072	0.072	0.072	0.003	0.005	0.005
		Crazy J	0.146	0.031	1.158	1.276	1.050	NA	NA	NA	0.000	0.000	0.000	0.000	0.000	0.000
		Hamilton	-0.084	0.054	0.919	1.046	0.807	NA	NA	NA	0.879	0.981	1.000	0.404	0.861	0.996
		Hamilton Springs	0.106	0.590	1.112	1.679	0.736	NA	NA	NA	0.195	0.195	0.195	0.099	0.099	0.099
Steelhead	**Lower Columbia**	ESU	-0.095	0.000	0.909	0.914	0.904	NA	NA	NA	1.000	1.000	1.000	0.317	1.000	1.000
		Clackamas Sum	-0.186	0.011	0.830	0.888	0.776	0.000	0.818	1.000	1.000	1.000	1.000	1.000	1.000	1.000
		Clackamas Win	-0.126	0.004	0.882	0.917	0.848	0.000	0.004	1.000	1.000	1.000	1.000	0.990	1.000	1.000
		Coweeman Win	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Eagle Ck Win	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Green River Win	-0.102	0.212	0.903	1.413	0.577	0.056	0.400	0.864	0.781	0.906	0.980	0.525	0.791	0.957
		Hood River Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Hood River Win	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Kalama Sum	-0.094	0.021	0.911	1.000	0.829	0.000	0.000	0.619	0.985	1.000	1.000	0.470	0.985	1.000
		Kalama River Win	-0.027	0.005	0.974	1.020	0.930	0.000	0.000	0.000	0.440	0.881	0.997	0.000	0.020	0.694
		Lewis River Win	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Panther Ck Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Sandy Win	-0.089	0.028	0.915	1.014	0.825	0.000	0.000	0.681	0.960	0.999	1.000	0.421	0.955	1.000
		Toutle Win	-0.133	0.001	0.875	0.893	0.858	0.000	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
		TroutCk Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Washougal Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Washougal River Wi	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Wind Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Steelhead	**Mid Columbia**	ESU	-0.170	0.001	0.844	0.864	0.824	NA	NA	NA	1.000	1.000	1.000	1.000	1.000	1.000
		Beaver Creek Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Deschutes R Sum	-0.175	0.004	0.840	0.878	0.803	0.000	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
		Mill Ck Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Shitike Ck Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Warm Springs Nfh S	-0.098	0.050	0.907	1.082	0.760	0.000	0.092	0.921	0.934	0.995	1.000	0.516	0.939	1.000
		Eightmile Ck Win	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Ramsey Ck Win	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Fifteen Mile Ck Win	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Touchet R Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B-11a. continued

Species	ESU	Stream	μ	σ^2	λ	λ + 95%CI	λ - 95%CI	P_{ext} 24yr	P_{ext} 48yr	P_{ext} 100yr	50% decline 24yr	50% decline 48yr	50% decline 100yr	90% decline 24yr	90% decline 48yr	90% decline 100yr
Steelhead	**Mid Columbia**	Umtilla R Sum	-0.107	0.004	0.899	0.946	0.853	0.000	0.000	0.999	1.000	1.000	1.000	0.818	1.000	1.000
		Yakima R Sum	0.036	0.016	1.037	1.145	0.938	0.000	0.000	0.000	0.006	0.006	0.006	0.000	0.000	0.000
Steelhead	**Upper Columbia**	ESU	-0.182	0.019	0.833	0.911	0.762	0.000	0.775	1.000	1.000	1.000	1.000	0.999	1.000	1.000
		Upper Columbia Riv	-0.182	0.019	0.833	0.911	0.762	0.000	0.775	1.000	1.000	1.000	1.000	0.999	1.000	1.000
Steelhead		ESU	-0.181	0.003	0.835	0.861	0.809	0.000	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	Snake R. Basin	Snake River Sthead	-0.158	0.003	0.854	0.881	0.827	0.000	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
		Snake River Sthead	-0.180	0.021	0.836	0.917	0.762	0.000	0.052	1.000	1.000	1.000	1.000	0.998	1.000	1.000
Steelhead		ESU	-0.078	0.054	0.925	1.058	0.808	0.000	0.000	0.298	0.851	0.971	0.999	0.352	0.815	0.991
	Upper Williamette	Mollala	-0.092	0.084	0.912	1.080	0.771	0.000	0.069	0.756	0.856	0.968	0.998	0.471	0.852	0.991
		N Santiam R	-0.085	0.056	0.918	1.053	0.801	0.000	0.005	0.558	0.879	0.981	1.000	0.411	0.863	0.996
		S Santiam	-0.064	0.029	0.938	1.036	0.849	0.000	0.000	0.173	0.843	0.978	1.000	0.182	0.744	0.992
		Calapooia	-0.075	0.188	0.928	1.194	0.720	0.037	0.293	0.745	0.699	0.834	0.942	0.407	0.668	0.885

Table B-11a. continued

% increase in λ to reach P_{ext} = 0.05 24yr	% increase in λ to reach P_{ext} = 0.01 24yr	% increase in λ to reach P_{ext} = 0.05 48yr	% increase in λ to reach P_{ext} = 0.01 48yr	% increase in λ to reach P_{ext} = 0.05 100yr	% increase in λ to reach P_{ext} = 0.01 100yr	% increase in λ (p=0.05) to prevent 90% decline 24yr	% increase in λ (p=0.01) to prevent 90% decline 24yr	% increase in λ (p=0.05) to prevent 90% decline 48yr	% increase in λ (p=0.01) to prevent 90% decline 48yr	% increase in λ (p=0.05) to prevent 90% decline 100yr	% increase in λ (p=0.01) to prevent 90% decline 100yr	est. pop. size	tau	comments
NA	NA	NA	NA	NA	NA	7.000	12.000	8.500	12.000	8.500	12.000	NA	4	index data;
13.500	21.000	22.500	27.500	26.000	30.000	28.500	36.500	29.000	36.500	29.000	36.500	304	4	var plot not very linear
0.000	0.000	0.000	0.000	2.500	4.000	4.000	7.000	7.500	9.500	8.500	10.000	3579	4	
31.000	46.000	33.500	47.000	34.000	47.000	28.000	40.500	28.000	40.500	28.000	40.500	34	4	
NA	NA	NA	NA	NA	NA	10.000	15.000	11.500	15.000	12.000	15.000	NA	4	index data;
NA	NA	NA	NA	NA	NA	15.000	26.000	15.000	26.000	15.000	26.000	NA	4	index data;
NA	NA	NA	NA	NA	NA	11.000	17.000	12.000	17.000	12.000	17.000	NA	4	index data; var plot not very linear
15.500	27.000	20.000	30.000	21.500	30.500	21.500	33.500	21.500	33.500	21.500	33.500	126	4	
NA	NA	NA	NA	NA	NA	32.500	45.000	32.500	45.000	32.500	45.000	NA	4	index data;
NA	NA	NA	NA	NA	NA	22.000	28.500	23.500	28.500	23.500	28.500	NA	4	index data; var plot not very linear
NA	NA	NA	NA	NA	NA	17.500	30.000	17.500	30.000	17.500	30.000	NA	4	index data;
21.000	31.000	24.500	32.500	25.500	33.000	22.000	31.000	22.000	31.000	22.000	31.000	32	4	var plot not very linear
NA	NA	NA	NA	NA	NA	0.000	2.000	2.000	4.000	3.000	4.000	NA	4	index data;
NA	NA	NA	NA	NA	NA	25.000	36.500	25.000	36.500	25.000	36.500	NA	4	index data;
NA	NA	NA	NA	NA	NA	0.000	0.000	0.000	1.000	1.000	2.000	NA	4	index data;
0.000	0.000	0.000	0.000	0.000	0.000	187.500	260.000	187.500	260.000	187.500	260.000	1	4	
14.000	21.000	23.500	28.000	27.500	31.000	30.000	38.000	30.500	38.000	30.500	38.000	369	4	var plot not very linear
0.000	0.000	0.000	2.000	4.500	7.000	8.500	14.500	10.000	14.500	10.000	14.500	3590	4	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.500	1.500	2.500	4160	4	
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
NA	NA	NA	NA	NA	NA	18.500	22.000	22.000	24.500	23.000	25.000	NA	4	index data;
67.500	114.500	68.000	114.500	68.000	114.500	36.500	57.000	36.500	57.000	36.500	57.000	23	4	
0.000	0.000	6.500	8.500	14.000	15.500	15.000	18.000	18.500	20.500	19.500	21.000	1928	4	
10.500	18.500	19.000	24.500	22.000	27.000	25.000	34.000	25.000	34.000	25.000	34.000	346	4	
1.000	3.500	10.500	12.500	15.000	16.500	13.000	16.000	16.500	18.500	18.000	19.500	162	4	
0.000	2.000	13.000	14.500	20.000	21.000	19.000	21.500	23.000	25.000	25.000	26.000	757	4	var plot not very linear
0.000	0.000	0.000	0.000	1.500	2.500	4.500	6.500	8.500	10.000	10.000	11.000	33168	4	var plot not very linear
0.000	0.000	0.000	0.000	0.000	2.000	2.000	7.500	3.000	7.500	3.000	7.500	736	4	
0.000	0.000	0.000	1.500	6.000	7.000	5.500	8.000	9.000	10.500	10.500	11.500	760	4	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.000	0.500	2.000	457	4	
0.000	0.000	0.000	3.000	3.000	5.500	4.000	9.000	5.500	9.000	5.500	9.000	291	4	
0.000	0.000	1.000	5.000	4.500	7.500	6.500	12.500	7.500	12.500	7.500	12.500	387	4	
0.000	0.000	0.000	0.000	0.000	0.500	0.000	4.000	2.000	5.000	2.500	5.000	1052	4	
0.000	9.500	5.000	13.000	7.000	13.500	8.500	18.500	8.500	18.500	8.500	18.500	207	4	

Table B-11a. continued

% increase in λ to reach P_{ext} = 0.05 24yr	% increase in λ to reach P_{ext} = 0.01 24yr	% increase in λ to reach P_{ext} = 0.05 48yr	% increase in λ to reach P_{ext} = 0.01 48yr	% increase in λ to reach P_{ext} = 0.05 100yr	% increase in λ to reach P_{ext} = 0.01 100yr	% increase in λ (p=0.05) to prevent 90% decline 24yr	% increase in λ (p=0.01) to prevent 90% decline 24yr	% increase in λ (p=0.05) to prevent 90% decline 48yr	% increase in λ (p=0.01) to prevent 90% decline 48yr	% increase in λ (p=0.05) to prevent 90% decline 100yr	% increase in λ (p=0.01) to prevent 90% decline 100yr	est. pop. size	tau	comments
0.000	0.000	0.000	0.000	5.000	6.000	5.500	8.500	8.500	10.500	10.000	11.500	1644	4	
0.000	0.000	9.500	13.000	18.500	21.500	24.500	30.500	26.500	31.000	26.500	31.000	14421	4	
0.000	0.000	0.000	0.500	2.000	5.000	7.500	14.500	8.000	14.500	8.000	14.500	5135	4	
NA	NA	NA	NA	NA	NA	0.000	0.000	0.000	0.000	0.000	0.000	NA	4	index data; var plot not very linear
NA	NA	NA	NA	NA	NA	0.000	0.000	0.000	0.000	0.000	0.000	NA	4	index data; var plot not very linear
NA	NA	NA	NA	NA	NA	7.500	12.500	8.500	12.500	8.500	12.500	NA	4	index data; var plot not very linear
NA	NA	NA	NA	NA	NA	0.000	0.000	0.000	0.000	0.000	0.000	NA	4	index data; var plot not very linear
NA	NA	NA	NA	NA	NA	0.000	0.000	0.000	0.000	0.000	0.000	NA	4	index data; var plot not very linear
NA	NA	NA	NA	NA	NA	7.000	10.500	10.000	12.500	10.500	12.500	NA	4	index data; var plot not very linear
NA	NA	NA	NA	NA	NA	6.000	18.000	6.000	18.000	6.000	18.000	NA	4	index data;
NA	NA	NA	NA	NA	NA	0.500	0.500	5.500	5.500	8.000	8.000	NA	4	index data; var plot not very linear
0.000	0.000	4.000	5.500	13.000	14.000	13.500	15.000	18.000	19.000	20.000	21.000	3989	4	
0.000	0.000	0.000	0.000	7.000	7.500	5.500	6.500	10.000	10.500	12.000	12.500	1374	4	var plot not very linear
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
0.500	7.500	10.500	14.500	14.000	17.000	17.500	25.500	18.000	25.500	18.000	25.500	660	3	
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
0.000	0.000	0.000	0.000	3.000	4.000	5.000	7.000	8.500	10.000	10.000	11.500	8490	4	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.500	2.000	2.500	4641	4	var plot not very linear
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
0.000	0.000	0.000	0.000	4.000	5.000	5.500	8.000	8.500	10.500	10.000	11.500	3979	4	
0.000	0.000	0.000	0.000	6.000	6.500	5.000	5.000	10.000	10.000	12.500	12.500	3008	4	var plot not very linear
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
NA	NA	NA	NA	NA	NA	9.000	9.500	14.000	14.000	16.500	17.000	NA	4	index data; var plot not very linear
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
0.000	0.000	0.000	0.000	9.000	9.500	11.000	12.000	15.500	16.500	18.000	18.500	21426	4	var plot not very linear
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
0.000	0.000	1.500	3.500	7.500	9.000	8.000	11.500	11.000	13.500	12.000	14.000	1031	4	
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data

Table B-11a. continued

% increase in λ to reach P_{ext} = 0.05 24yr	% increase in λ to reach P_{ext} = 0.01 24yr	% increase in λ to reach P_{ext} = 0.05 48yr	% increase in λ to reach P_{ext} = 0.01 48yr	% increase in λ to reach P_{ext} = 0.05 100yr	% increase in λ to reach P_{ext} = 0.01 100yr	% increase in λ (p=0.05) to prevent 90% decline 24yr	% increase in λ (p=0.01) to prevent 90% decline 24yr	% increase in λ (p=0.05) to prevent 90% decline 48yr	% increase in λ (p=0.01) to prevent 90% decline 48yr	% increase in λ (p=0.05) to prevent 90% decline 100yr	% increase in λ (p=0.01) to prevent 90% decline 100yr	est. pop. size	tau	comments
0.000	0.000	0.000	0.000	3.000	3.500	3.500	4.500	8.000	8.500	10.000	10.500	6655	4	var plot not very linear
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	5283	4	
0.000	0.000	5.000	6.500	13.500	14.500	14.500	16.500	18.500	20.000	20.000	21.500	3251	4	var plot not very linear
0.000	0.000	5.000	6.500	13.500	14.500	14.500	16.500	18.500	20.000	20.000	21.500	3251	4	var plot not very linear
0.000	0.000	0.000	0.000	8.000	8.000	11.000	11.500	16.000	16.500	18.500	18.500	107763	4	
0.000	0.000	0.000	0.000	5.500	6.000	8.500	9.500	13.000	14.000	15.500	16.000	86715	4	var plot not very linear
0.000	0.000	0.500	1.500	11.000	12.000	14.500	16.500	18.500	20.000	20.000	21.000	29557	4	
0.000	0.000	0.000	0.000	3.000	4.500	6.500	10.000	9.000	11.500	10.000	11.500	11165	4	
0.000	0.000	1.000	4.000	7.500	9.500	10.000	14.500	12.000	15.500	12.500	15.500	2136	4	
0.000	0.000	0.000	0.000	4.500	6.500	7.500	11.000	10.000	12.500	11.000	12.500	4883	4	
0.000	0.000	0.000	0.000	1.500	2.500	3.000	5.500	6.000	8.000	7.500	8.500	3730	4	
0.000	5.500	7.500	12.000	11.000	14.500	13.500	20.500	14.000	20.500	14.000	20.500	416	4	

Table B-11b. Results of Dennis Extinction Analysis for individual stocks and ESUs. Three thresholds (1fish/generation, 50% and 90% decline). This analysis assumes that hatchery fish reproduce at 80% the rate of wild fish. NA, or blank, indicates that the time series was too short, the data failed the sigma^2<0 test, or that the data is an index count and not appropriate for population size estimate.

Species	ESU	Stream	μ	σ^2	λ	λ + 95%CI	λ - 95%CI	P_{ext} 24yr	P_{ext} 48yr	P_{ext} 100yr	50% decline 24yr	50% decline 48yr	50% decline 100yr	90% decline 24yr	90% decline 48yr	90% decline 100yr
Chinook	**Lower Columbia**	ESU	-0.111	0.135	0.895	1.150	0.696	NA	NA	NA	0.863	0.966	0.998	0.580	0.883	0.992
		Bear Creek	-0.316	0.199	0.729	0.988	0.538	0.799	0.999	1.000	0.999	1.000	1.000	0.992	1.000	1.000
		Big Creek	-0.171	0.039	0.842	0.945	0.751	0.000	0.427	1.000	1.000	1.000	1.000	0.970	1.000	1.000
		Clatskanie	-0.229	0.439	0.795	1.170	0.541	0.796	0.973	0.999	0.930	0.988	1.000	0.837	0.971	0.999
		Cowlitz Tule	-0.193	0.103	0.824	0.994	0.684	NA	NA	NA	0.994	1.000	1.000	0.931	0.999	1.000
		Elochoman	-0.127	0.435	0.881	1.293	0.600	NA	NA	NA	0.767	0.882	0.966	0.591	0.797	0.943
		Germany	-0.181	0.140	0.834	1.048	0.664	NA	NA	NA	0.977	0.999	1.000	0.868	0.993	1.000
		Gnat	-0.173	0.453	0.841	1.245	0.569	0.490	0.845	0.986	0.853	0.949	0.993	0.712	0.901	0.987
		Grays Tule	-0.275	0.418	0.760	1.107	0.521	NA	NA	NA	0.969	0.997	1.000	0.913	0.993	1.000
		Kalama Spring	-0.273	0.142	0.761	0.947	0.611	NA	NA	NA	0.999	1.000	1.000	0.990	1.000	1.000
		Kalama	-0.122	0.517	0.885	1.345	0.583	NA	NA	NA	0.737	0.850	0.945	0.570	0.762	0.915
		Klaskanine	-0.227	0.273	0.797	1.097	0.579	0.815	0.988	1.000	0.968	0.998	1.000	0.890	0.991	1.000
		Lewis R Bright	-0.027	0.043	0.974	1.099	0.863	NA	NA	NA	0.480	0.659	0.830	0.052	0.240	0.572
		Lewis Spring	-0.205	0.417	0.815	1.187	0.559	NA	NA	NA	0.909	0.979	0.999	0.796	0.954	0.998
		Lewis, E Fk Tule	-0.008	0.021	0.992	1.079	0.912	NA	NA	NA	0.236	0.374	0.522	0.001	0.027	0.145
		Lewis and Clark	-0.721	2.612	0.486	1.304	0.181	1.000	1.000	1.000	0.982	0.999	1.000	0.971	0.998	1.000
		Mill Fall	-0.324	0.179	0.723	0.985	0.531	0.803	1.000	1.000	1.000	1.000	1.000	0.996	1.000	1.000
		Plympton	-0.156	0.144	0.856	1.068	0.686	0.006	0.394	0.978	0.949	0.995	1.000	0.780	0.975	1.000
		Sandy Late	-0.022	0.015	0.978	1.068	0.895	0.000	0.000	0.000	0.397	0.676	0.899	0.002	0.073	0.481
		Sandy Tule	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Skamokawa	-0.306	0.041	0.736	0.828	0.654	NA	NA	NA	1.000	1.000	1.000	1.000	1.000	1.000
		Youngs	-0.172	1.043	0.842	1.624	0.437	0.749	0.901	0.977	0.754	0.857	0.947	0.642	0.800	0.927
Chinook		ESU	-0.180	0.038	0.835	0.936	0.745	0.000	0.795	1.000	1.000	1.000	1.000	0.983	1.000	1.000
	U. Columbia Spr	Methow River	-0.166	0.223	0.847	1.102	0.651	0.249	0.799	0.994	0.923	0.987	1.000	0.767	0.959	0.999
		Entiat	-0.207	0.038	0.813	0.907	0.729	0.469	1.000	1.000	1.000	1.000	1.000	0.997	1.000	1.000
		Wenatchee	-0.228	0.025	0.796	0.872	0.727	0.067	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Chinook	**Snake R. Spr/Sum**	ESU	-0.201	0.050	0.818	0.922	0.726	0.000	0.203	1.000	1.000	1.000	1.000	0.989	1.000	1.000
		Bear Creek	0.017	0.146	1.017	1.248	0.829	0.000	0.005	0.032	0.277	0.283	0.283	0.073	0.119	0.146
		Imnaha River	-0.129	0.025	0.879	0.956	0.808	0.000	0.257	1.000	0.999	1.000	1.000	0.847	1.000	1.000
		Johnson Creek	0.010	0.048	1.010	1.135	0.898	0.000	0.000	0.001	0.195	0.224	0.226	0.009	0.034	0.068
		Marsh Creek	-0.013	0.127	0.987	1.195	0.816	0.002	0.037	0.190	0.414	0.489	0.568	0.127	0.248	0.389
		Minam River	-0.070	0.162	0.933	1.157	0.752	0.016	0.208	0.680	0.691	0.830	0.941	0.375	0.647	0.878
		Poverty Creek	-0.008	0.093	0.992	1.169	0.842	0.000	0.002	0.040	0.369	0.443	0.515	0.079	0.183	0.312
		Sulphur Creek	0.039	0.411	1.040	1.467	0.737	0.049	0.122	0.208	0.301	0.301	0.301	0.151	0.173	0.173

Table B-11b. continued

Species	ESU	Stream	μ	σ^2	λ	λ + 95%CI	λ - 95%CI	P_{ext} 24yr	P_{ext} 48yr	P_{ext} 100yr	50% decline 24yr	50% decline 48yr	50% decline 100yr	90% decline 24yr	90% decline 48yr	90% decline 100yr
Chinook	**Snake R. Fall**	Snake River Basin	-0.137	0.014	0.872	0.940	0.808	0.000	0.110	1.000	1.000	1.000	1.000	0.957	1.000	1.000
Chinook	**U. Williamette**	ESURunsum Upper	-0.420	0.083	0.657	0.777	0.556	0.403	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
		McKenzie River abo	-0.104	0.233	0.901	1.194	0.680	0.006	0.178	0.722	0.777	0.901	0.978	0.533	0.789	0.953
Chum	**Columbia River**	ESU	0.035	0.027	1.035	1.134	0.945	NA	NA	NA	0.029	0.029	0.029	0.000	0.000	0.000
		Grays R west fork	0.209	0.205	1.233	1.587	0.958	NA	NA	NA	0.005	0.005	0.005	0.000	0.000	0.000
		Grays R mouth to he	-0.045	0.125	0.956	1.164	0.785	NA	NA	NA	0.588	0.725	0.859	0.240	0.476	0.732
		Hardy Creek	0.045	0.061	1.046	1.193	0.916	NA	NA	NA	0.072	0.072	0.072	0.003	0.005	0.005
		Crazy J	0.146	0.031	1.158	1.276	1.050	NA	NA	NA	0.000	0.000	0.000	0.000	0.000	0.000
		Hamilton	-0.084	0.054	0.919	1.046	0.807	NA	NA	NA	0.879	0.981	1.000	0.404	0.861	0.996
		Hamilton Springs	0.106	0.590	1.112	1.679	0.736	NA	NA	NA	0.195	0.195	0.195	0.099	0.099	0.099
Steelhead	**Lower Columbia**	ESU	-0.223	0.000	0.800	0.806	0.795	NA	NA	NA	1.000	1.000	1.000	1.000	1.000	1.000
		Clackamas Sum	-0.315	0.011	0.729	0.780	0.682	0.004	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
		Clackamas Win	-0.276	0.004	0.759	0.789	0.730	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
		Coweeman Win	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Eagle Ck Win	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Green River Win	-0.102	0.212	0.903	1.413	0.577	0.056	0.400	0.864	0.781	0.906	0.980	0.525	0.791	0.957
		Hood River Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Hood River Win	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Kalama Sum	-0.265	0.016	0.767	0.832	0.707	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
		Kalama River Win	-0.102	0.006	0.903	0.951	0.858	0.000	0.000	0.972	1.000	1.000	1.000	0.639	1.000	1.000
		Lewis River Win	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Panther Ck Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Sandy Win	-0.164	0.030	0.849	0.943	0.764	0.000	0.291	1.000	1.000	1.000	1.000	0.973	1.000	1.000
		Toutle Win	-0.133	0.001	0.875	0.893	0.858	0.000	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
		TroutCk Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Washougal Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Washougal River Wi	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Wind Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Steelhead	**Mid Columbia**	ESU	-0.261	0.002	0.770	0.804	0.738	NA	NA	NA	1.000	1.000	1.000	1.000	1.000	1.000
		Beaver Creek Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Deschutes R Sum	-0.267	0.015	0.766	0.833	0.705	0.000	0.986	1.000	1.000	1.000	1.000	1.000	1.000	1.000
		Mill Ck Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Shitike Ck Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Warm Springs Nfh S	-0.098	0.050	0.907	1.082	0.760	0.000	0.092	0.921	0.934	0.995	1.000	0.516	0.939	1.000
		Eightmile Ck Win	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Ramsey Ck Win	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Fifteen Mile Ck Win	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Touchet R Sum	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B-11b. continued

Species	ESU	Stream	μ	σ^2	λ	λ + 95%CI	λ - 95%CI	P_{ext} 24yr	P_{ext} 48yr	P_{ext} 100yr	50% decline 24yr	50% decline 48yr	50% decline 100yr	90% decline 24yr	90% decline 48yr	90% decline 100yr
Steelhead	**Mid Columbia**	Umtilla R Sum	-0.101	0.004	0.904	0.957	0.853	0.000	0.000	0.943	1.000	1.000	1.000	0.656	1.000	1.000
		Yakima R Sum	0.015	0.013	1.015	1.110	0.928	0.000	0.000	0.000	0.030	0.038	0.038	0.000	0.000	0.000
Steelhead	**Upper Columbia**	ESU	-0.372	0.030	0.689	0.771	0.616	0.580	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
		Upper Columbia Riv	-0.372	0.030	0.689	0.771	0.616	0.580	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Steelhead		ESU	-0.327	0.001	0.721	0.733	0.710	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	Snake R. Basin	Snake River Sthead	-0.300	0.001	0.741	0.752	0.731	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
		Snake River Sthead	-0.295	0.022	0.745	0.820	0.676	0.000	0.997	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Steelhead	**Upper Williamette**	ESU	-0.129	0.066	0.879	1.020	0.757	0.000	0.044	0.932	0.972	0.999	1.000	0.736	0.986	1.000
		Mollala	-0.180	0.104	0.836	1.008	0.693	0.017	0.688	1.000	0.989	1.000	1.000	0.899	0.998	1.000
		N Santiam R	-0.113	0.056	0.894	1.025	0.779	0.000	0.032	0.894	0.959	0.998	1.000	0.635	0.971	1.000
		S Santiam	-0.141	0.049	0.869	0.988	0.764	0.000	0.196	0.997	0.993	1.000	1.000	0.841	0.998	1.000
		Calapooia	-0.075	0.188	0.928	1.194	0.720	0.037	0.293	0.745	0.699	0.834	0.942	0.407	0.668	0.885

Table B-11b. continued

% increase in λ to reach P_{ext} = 0.05 24yr	% increase in λ to reach P_{ext} = 0.01 24yr	% increase in λ to reach P_{ext} = 0.05 48yr	% increase in λ to reach P_{ext} = 0.01 48yr	% increase in λ to reach P_{ext} = 0.05 100yr	% increase in λ to reach P_{ext} = 0.01 100yr	% increase in λ (p=0.05) to prevent 90% decline 24yr	% increase in λ (p=0.01) to prevent 90% decline 24yr	% increase in λ (p=0.05) to prevent 90% decline 48yr	% increase in λ (p=0.01) to prevent 90% decline 48yr	% increase in λ (p=0.05) to prevent 90% decline 100yr	% increase in λ (p=0.01) to prevent 90% decline 100yr	est. pop. size	tau	comments
NA	NA	NA	NA	NA	NA	15.000	21.000	16.500	21.000	16.500	21.000	NA	4	index data;
26.000	34.500	37.000	43.000	41.500	46.000	45.000	54.500	45.500	54.500	45.500	54.500	456	4	var plot not very linear
0.000	0.000	4.500	6.500	13.000	14.500	15.500	18.500	19.000	21.000	20.000	21.500	5368	4	
42.000	57.500	46.000	59.500	47.000	59.500	43.000	56.500	43.000	56.500	43.000	56.500	51	4	
NA	NA	NA	NA	NA	NA	23.000	28.500	25.000	29.000	25.000	29.000	NA	4	index data;
NA	NA	NA	NA	NA	NA	29.000	41.500	29.000	41.500	29.000	41.500	NA	4	index data;
NA	NA	NA	NA	NA	NA	24.000	30.500	25.000	30.500	25.000	30.500	NA	4	index data; var plot not very linear
26.000	38.500	31.500	42.000	33.500	43.000	35.500	49.000	35.500	49.000	35.500	49.000	190	4	
NA	NA	NA	NA	NA	NA	49.000	63.000	49.000	63.000	49.000	63.000	NA	4	index data;
NA	NA	NA	NA	NA	NA	35.500	43.000	37.000	43.000	37.000	43.000	NA	4	index data; var plot not very linear
NA	NA	NA	NA	NA	NA	31.000	44.500	31.000	44.500	31.000	44.500	NA	4	index data;
32.500	42.500	36.500	45.500	38.000	46.000	36.000	46.500	36.000	46.500	36.000	46.500	48	4	var plot not very linear
NA	NA	NA	NA	NA	NA	0.500	3.500	3.000	5.000	4.000	5.500	NA	4	index data;
NA	NA	NA	NA	NA	NA	38.500	52.000	38.500	52.000	38.500	52.000	NA	4	index data;
NA	NA	NA	NA	NA	NA	0.000	0.000	0.000	1.000	1.000	2.000	NA	4	index data;
0.000	0.000	0.000	0.000	0.000	0.000	221.500	302.500	221.500	302.500	221.500	302.500	1	4	
24.500	32.500	36.500	42.000	41.500	45.500	45.000	54.000	46.000	54.000	46.000	54.000	553	4	var plot not very linear
0.000	0.000	8.000	12.500	15.500	18.500	21.000	27.500	22.000	27.500	22.000	27.500	5385	4	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.500	2.000	2.000	3.000	4237	4	
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
NA	NA	NA	NA	NA	NA	32.500	36.000	36.000	39.000	37.500	39.500	NA	4	index data;
76.500	120.500	78.000	121.000	78.000	121.000	52.500	75.500	52.500	75.500	52.500	75.500	34	4	
0.000	0.000	7.500	9.500	15.000	16.500	16.500	19.500	20.000	22.000	21.000	22.500	2096	4	
10.500	18.000	19.500	25.000	23.000	27.500	26.000	34.500	26.000	34.500	26.000	34.500	411	4	
6.500	9.500	16.500	19.000	21.500	23.000	19.500	23.000	23.000	25.500	24.500	26.000	170	4	
0.500	3.000	14.000	15.500	21.000	22.500	20.500	23.000	24.500	26.500	26.000	27.500	793	4	var plot not very linear
0.000	0.000	3.000	5.000	14.000	16.000	20.000	24.000	23.000	26.000	24.000	26.000	62664	4	
0.000	0.000	0.000	0.000	0.000	2.000	2.000	7.500	3.000	7.500	3.000	7.500	736	4	
0.000	0.000	2.500	4.000	9.500	10.500	9.000	11.500	13.000	14.500	14.500	15.500	1071	4	
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.000	0.500	2.000	457	4	
0.000	0.000	0.000	3.000	3.000	5.500	4.000	9.000	5.500	9.000	5.500	9.000	291	4	
0.000	1.500	5.500	9.500	9.500	12.500	11.500	18.000	12.500	18.000	12.500	18.000	533	4	
0.000	0.000	0.000	0.000	0.000	2.000	1.500	6.000	3.500	6.500	4.000	6.500	1054	4	
0.000	9.500	5.000	13.000	7.000	13.500	8.500	18.500	8.500	18.500	8.500	18.500	207	4	

Table B-11b. continued

% increase in λ to reach P_{ext} = 0.05 24yr	% increase in λ to reach P_{ext} = 0.01 24yr	% increase in λ to reach P_{ext} = 0.05 48yr	% increase in λ to reach P_{ext} = 0.01 48yr	% increase in λ to reach P_{ext} = 0.05 100yr	% increase in λ to reach P_{ext} = 0.01 100yr	% increase in λ (p=0.05) to prevent 90% decline 24yr	% increase in λ (p=0.01) to prevent 90% decline 24yr	% increase in λ (p=0.05) to prevent 90% decline 48yr	% increase in λ (p=0.01) to prevent 90% decline 48yr	% increase in λ (p=0.05) to prevent 90% decline 100yr	% increase in λ (p=0.01) to prevent 90% decline 100yr	est. pop. size	tau	comments
0.000	0.000	1.000	2.000	8.500	9.500	8.500	10.500	12.500	14.000	14.500	15.500	2060	4	var plot not very linear
9.000	13.500	31.500	35.500	44.500	47.500	52.500	59.000	55.500	60.000	56.000	60.000	37105	4	
0.000	0.000	5.500	11.000	12.000	15.500	19.000	27.000	19.000	27.000	19.000	27.000	6428	4	
NA	NA	NA	NA	NA	NA	0.000	0.000	0.000	0.000	0.000	0.000	NA	4	index data; var plot not very linear
NA	NA	NA	NA	NA	NA	0.000	0.000	0.000	0.000	0.000	0.000	NA	4	index data; var plot not very linear
NA	NA	NA	NA	NA	NA	7.500	12.500	8.500	12.500	8.500	12.500	NA	4	index data; var plot not very linear
NA	NA	NA	NA	NA	NA	0.000	0.000	0.000	0.000	0.000	0.000	NA	4	index data; var plot not very linear
NA	NA	NA	NA	NA	NA	0.000	0.000	0.000	0.000	0.000	0.000	NA	4	index data; var plot not very linear
NA	NA	NA	NA	NA	NA	7.000	10.500	10.000	12.500	10.500	12.500	NA	4	index data; var plot not very linear
NA	NA	NA	NA	NA	NA	6.000	18.000	6.000	18.000	6.000	18.000	NA	4	index data;
NA	NA	NA	NA	NA	NA	14.000	14.500	19.500	20.000	22.500	22.500	NA	4	index data; var plot not very linear
0.000	0.000	17.000	18.000	28.000	29.000	29.500	31.000	34.000	35.500	36.500	37.500	7796	4	
0.000	0.000	13.500	14.500	23.500	24.000	22.500	23.500	27.500	28.500	30.500	31.000	2685	4	var plot not very linear
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
0.500	7.500	10.500	14.500	14.000	17.000	17.500	25.500	18.000	25.500	18.000	25.500	660	3	
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
0.000	0.000	10.000	11.500	21.000	22.000	24.000	26.000	28.500	30.000	30.500	31.500	16255	4	
0.000	0.000	0.000	0.000	3.000	3.500	3.500	4.500	8.000	8.500	10.000	10.500	5881	4	var plot not very linear
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
0.000	0.000	3.000	5.000	11.500	13.000	13.500	16.500	17.000	19.000	18.500	20.000	5504	4	
0.000	0.000	0.000	0.000	6.000	6.500	5.000	5.000	10.000	10.000	12.500	12.500	3008	4	var plot not very linear
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data
NA	NA	NA	NA	NA	NA	20.000	21.000	25.500	26.000	28.000	28.500	NA	4	index data;
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
0.000	0.000	7.500	8.500	19.500	20.500	24.000	26.000	28.500	30.000	30.500	31.500	58232	4	
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
0.000	0.000	1.500	3.500	7.500	9.000	8.000	11.500	11.000	13.500	12.000	14.000	1031	4	
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No hatchery data
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not enough data

Table B-11b. continued

% increase in λ to reach P_{ext} = 0.05 24yr	% increase in λ to reach P_{ext} = 0.01 24yr	% increase in λ to reach P_{ext} = 0.05 48yr	% increase in λ to reach P_{ext} = 0.01 48yr	% increase in λ to reach P_{ext} = 0.05 100yr	% increase in λ to reach P_{ext} = 0.01 100yr	% increase in λ (p=0.05) to prevent 90% decline 24yr	% increase in λ (p=0.01) to prevent 90% decline 24yr	% increase in λ (p=0.05) to prevent 90% decline 48yr	% increase in λ (p=0.01) to prevent 90% decline 48yr	% increase in λ (p=0.05) to prevent 90% decline 100yr	% increase in λ (p=0.01) to prevent 90% decline 100yr	est. pop. size	tau	comments
0.000	0.000	0.000	0.000	2.500	3.000	3.000	4.000	7.500	8.000	9.500	10.000	9020	4	var plot not very linear
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	5491	4	
7.000	9.500	26.500	28.500	37.000	39.000	40.000	43.500	44.500	47.000	46.000	48.000	6594	4	
7.000	9.500	26.500	28.500	37.000	39.000	40.000	43.500	44.500	47.000	46.000	48.000	6594	4	
0.000	0.000	7.500	7.500	23.000	23.000	27.500	28.000	33.000	33.500	36.500	36.500	311624	4	var plot not very linear
0.000	0.000	5.000	5.500	20.000	20.000	24.000	24.000	29.500	30.000	32.500	33.000	246050	4	var plot not very linear
0.000	0.000	10.500	12.000	23.500	24.500	28.500	31.000	33.000	35.000	34.500	36.000	82730	4	
0.000	0.000	0.000	2.500	8.500	10.500	13.000	17.000	15.500	18.500	16.000	18.500	12123	4	
0.000	1.500	11.000	14.500	18.000	20.500	21.500	27.000	23.500	27.500	23.500	27.500	2517	4	
0.000	0.000	0.000	2.000	7.500	9.000	10.500	14.000	13.000	15.500	14.000	16.000	5460	4	
0.000	0.000	3.000	5.000	10.500	12.500	13.000	16.500	16.000	18.500	17.000	18.500	3730	4	
0.000	5.500	7.500	12.000	11.000	14.500	13.500	20.500	14.000	20.500	14.000	20.500	416	4	

Table B-12. For Snake River Basin Steelhead (Runs A and B), what are the effects on extinction risk if actual breeding population are smaller than the entire run. For A-Run fish, pseudo-populations were defined as 10% and 25% of total run, similarly for B-Run fish at 33% and 67% of total run. The influence of hatchery fish was explored by varying the breeding efficacy of hatchery fish (Not considered, 0, 20, 80 and 100%).

	Stream	μ	σ^2	λ	λ + 95%CI	λ - 95%CI	P_{ext} 24yr	P_{ext} 48yr	P_{ext} 100yr	50% decline 24yr	50% decline 48yr	50% decline 100yr	90% decline 24yr	90% decline 48yr	90% decline 100yr
Hatchery = NULL	A-Run, total	0.000	0.000	1.000	1.013	0.987	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000
	A-Run, 10%	0.000	0.000	1.000	1.013	0.987	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000
	A-Run, 25%	0.000	0.000	1.000	1.013	0.987	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000
	B-Run, total	-0.049	0.023	0.952	1.049	0.865	0.000	0.000	0.000	0.742	0.943	0.997	0.062	0.515	0.957
	B-Run, 33%	-0.049	0.023	0.952	1.049	0.865	0.000	0.000	0.000	0.742	0.943	0.997	0.062	0.515	0.957
	B-Run, 67%	-0.049	0.023	0.952	1.049	0.865	0.000	0.000	0.000	0.742	0.943	0.997	0.062	0.515	0.957
Hatchery = 0.00	A-Run, total	-0.078	0.011	0.925	0.987	0.868	0.000	0.000	0.007	0.988	1.000	1.000	0.197	0.974	1.000
	A-Run, 10%	-0.078	0.011	0.925	0.987	0.868	0.000	0.000	0.390	0.988	1.000	1.000	0.197	0.974	1.000
	A-Run, 25%	-0.078	0.011	0.925	0.987	0.868	0.000	0.000	0.124	0.988	1.000	1.000	0.197	0.974	1.000
	B-Run, total	-0.115	0.023	0.892	0.983	0.809	0.000	0.000	0.927	0.997	1.000	1.000	0.727	0.999	1.000
	B-Run, 33%	-0.115	0.023	0.892	0.983	0.809	0.000	0.005	0.986	0.997	1.000	1.000	0.727	0.999	1.000
	B-Run, 67%	-0.115	0.023	0.892	0.983	0.809	0.000	0.001	0.957	0.997	1.000	1.000	0.727	0.999	1.000
Hatchery = 0.20	A-Run, total	-0.158	0.003	0.854	0.881	0.828	0.000	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	A-Run, 10%	-0.158	0.003	0.854	0.881	0.827	0.000	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	A-Run, 25%	-0.158	0.003	0.854	0.881	0.828	0.000	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	B-Run, total	-0.180	0.021	0.836	0.917	0.762	0.000	0.053	1.000	1.000	1.000	1.000	0.998	1.000	1.000
	B-Run, 33%	-0.180	0.021	0.836	0.917	0.762	0.000	0.306	1.000	1.000	1.000	1.000	0.998	1.000	1.000
	B-Run, 67%	-0.180	0.021	0.836	0.917	0.762	0.000	0.112	1.000	1.000	1.000	1.000	0.998	1.000	1.000
Hatchery = 0.80	A-Run, total	-0.300	0.001	0.741	0.752	0.731	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	A-Run, 10%	-0.300	0.001	0.741	0.752	0.731	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	A-Run, 25%	-0.300	0.001	0.741	0.752	0.731	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	B-Run, total	-0.295	0.022	0.745	0.820	0.676	0.000	0.997	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	B-Run, 33%	-0.295	0.022	0.745	0.820	0.676	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	B-Run, 67%	-0.295	0.022	0.745	0.820	0.676	0.000	0.999	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Hatchery = 1.0	A-Run, total	-0.331	0.000	0.718	0.727	0.709	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	A-Run, 10%	-0.331	0.000	0.718	0.727	0.709	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	A-Run, 25%	-0.331	0.000	0.718	0.727	0.709	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	B-Run, total	-0.320	0.023	0.726	0.800	0.659	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	B-Run, 33%	-0.320	0.023	0.726	0.800	0.659	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
	B-Run, 67%	-0.320	0.023	0.726	0.800	0.659	0.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Table B-12. continued

% increase in λ to reach P_{ext} = 0.05 24yr	% increase in λ to reach P_{ext} = 0.01 24yr	% increase in λ to reach P_{ext} = 0.05 48yr	% increase in λ to reach P_{ext} = 0.01 48yr	% increase in λ to reach P_{ext} = 0.05 100yr	% increase in λ to reach P_{ext} = 0.01 100yr	% increase in λ (p=0.05) to prevent 90% decline 24yr	% increase in λ (p=0.01) to prevent 90% decline 24yr	% increase in λ (p=0.05) to prevent 90% decline 48yr	% increase in λ (p=0.01) to prevent 90% decline 48yr	% increase in λ (p=0.05) to prevent 90% decline 100yr	% increase in λ (p=0.01) to prevent 90% decline 100yr	est. pop. size	tau	comments
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	299161	4	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	29916	4	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	74791	4	
0.00	0.00	0.00	0.00	0.00	0.00	0.50	2.50	4.00	5.50	5.50	6.50	100455	4	
0.00	0.00	0.00	0.00	0.00	0.00	0.50	2.50	4.00	5.50	5.50	6.50	33150	4	
0.00	0.00	0.00	0.00	0.00	0.00	0.50	2.50	4.00	5.50	5.50	6.50	67305	4	
0.00	0.00	0.00	0.00	0.00	0.00	2.00	3.50	6.00	7.00	7.50	8.50	33595	4	
0.00	0.00	0.00	0.00	1.50	2.50	2.00	3.50	6.00	7.00	7.50	8.50	3359	4	
0.00	0.00	0.00	0.00	1.00	1.50	2.00	3.50	6.00	7.00	7.50	8.50	8399	4	
0.00	0.00	0.00	0.00	5.00	6.00	7.50	9.50	11.00	12.50	12.50	13.50	11820	4	
0.00	0.00	0.00	0.00	6.00	7.50	7.50	9.50	11.00	12.50	12.50	13.50	3901	4	
0.00	0.00	0.00	0.00	5.50	6.50	7.50	9.50	11.00	12.50	12.50	13.50	7920	4	
0.00	0.00	0.00	0.00	5.50	6.00	8.50	9.50	13.00	14.00	15.50	16.00	86708	4	
0.00	0.00	0.00	0.00	8.00	8.50	8.50	9.50	13.00	14.00	15.50	16.00	8671	4	
0.00	0.00	0.00	0.00	7.00	7.50	8.50	9.50	13.00	14.00	15.50	16.00	21677	4	
0.00	0.00	0.50	1.50	11.00	12.00	14.50	16.50	18.50	20.00	20.00	21.00	29547	4	
0.00	0.00	2.50	4.00	12.00	13.50	14.50	16.50	18.50	20.00	20.00	21.00	9750	4	
0.00	0.00	1.00	2.50	11.50	12.50	14.50	16.50	18.50	20.00	20.00	21.00	19797	4	
0.00	0.00	5.00	5.50	20.00	20.00	24.00	24.00	29.50	30.00	32.50	33.00	246048	4	
0.00	0.00	10.00	10.50	22.50	23.00	24.00	24.00	29.50	30.00	32.50	33.00	24605	4	
0.00	0.00	8.00	8.50	21.50	22.00	24.00	24.00	29.50	30.00	32.50	33.00	61513	4	
0.00	0.00	10.50	12.00	23.50	24.50	28.50	31.00	33.00	35.00	34.50	36.00	82728	4	
0.00	0.00	13.00	14.50	24.50	26.00	28.50	31.00	33.00	35.00	34.50	36.00	27300	4	
0.00	0.00	11.00	13.00	24.00	25.00	28.50	31.00	33.00	35.00	34.50	36.00	55428	4	
0.00	0.00	8.00	8.00	23.50	23.50	27.50	28.00	33.50	34.00	37.00	37.00	299161	4	
0.00	0.00	13.00	13.50	26.50	26.50	27.50	28.00	33.50	34.00	37.00	37.00	29916	4	
0.00	0.00	11.00	11.00	25.00	25.50	27.50	28.00	33.50	34.00	37.00	37.00	74791	4	
0.00	0.00	12.50	14.50	26.00	27.50	32.00	34.50	36.50	38.50	38.00	39.50	100455	4	
0.00	0.00	15.50	17.00	27.50	29.00	32.00	34.50	36.50	38.50	38.00	39.50	33150	4	
0.00	0.00	13.50	15.50	26.50	28.00	32.00	34.50	36.50	38.50	38.00	39.50	67305	4	

Table B-13a. Upper Columbia River spring chinook index stocks under alternative scenarios for future ocean conditions. Low: current conditions; med: two additional years of data projected from brood year returns to date; high: medium projection plus three additional

	age struct						
	1	**2**	**3**	**4**	**5**	**6**	**7**
Entiat	0.000	0.000	0.090	0.610	0.300	0.000	0.000
Methow	0.000	0.000	0.110	0.530	0.360	0.000	0.000
Wenatchee	0.000	0.000	0.089	0.487	0.423	0.001	0.000

raw data => low

	1980	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**
Entiat	334	296	334	334	265	359	327	200	209	115	259	100	131	312	75	18	25	62	47						
Methow	438	467	558	861	929	1232	909	1496	1641	1144	1104	550	1630	1357	293	33	0	298	0						
Wenatchee	1519	1595	1819	3286	2341	4529	2674	1878	1692	1349	927	552	1080	1179	275	51	179	307	155						

raw data + 2 yrs =>

															r/s proj. for extended time series:	**0.5**	**1.00**	**2.00**	**1.41**	**0.50**					
Entiat	334	296	334	334	265	359	327	200	209	115	259	100	131	312	75	18	25	62	47	26.4	43.6	70.7			
Methow	438	467	558	861	929	1232	909	1496	1641	1144	1104	550	1630	1357	293	33	0	298	0	70.2	58.1	222.9			
Wenatchee	1519	1595	1819	3286	2341	4529	2674	1878	1692	1349	927	552	1080	1179	275	51	179	307	155	114.7	234.4	369.0			

raw data + 5 yrs => l

															r/s proj. for extended time series:	**0.5**	**1.00**	**2.00**	**1.41**	**0.595**	**0.595**	**0.595**	**0.595**			
Entiat	334	296	334	334	265	359	327	200	209	115	259	100	131	312	75	18	25	62	47	26.4	43.6	71.1	44.8	20.3	24.4
Methow	438	467	558	861	929	1232	909	1496	1641	1144	1104	550	1630	1357	293	33	0	298	0	70.2	58.1	222.9	156.0	25.9	48.0
Wenatchee	1519	1595	1819	3286	2341	4529	2674	1878	1692	1349	927	552	1080	1179	275	51	179	307	155	114.7	234.4	370.3	233.9	84.7	116.4

Table B-13b. Upper Columbia River spring chinook stocks under alternative scenarios for future ocean conditions. Low: current conditions; med: two additional years of data projected from brood year returns to date; high: medium projection plus three additional years at new long term average r/s.

Species	ESU	future cond.	Stream	μ	σ^2	λ	λ + 95%CI	λ - 95%CI	P_{ext} 24yr	P_{ext} 48yr	P_{ext} 100yr	50% decline 24yr	50% decline 48yr	50% decline 100yr	90% decline 24yr	90% decline 48yr	90% decline 100yr
Chinook	**Upper Columbia**	Low	Entiat	-0.144	0.041	0.866	0.969	0.773	0.055	0.917	1.000	0.997	1.000	1.000	0.878	0.999	1.000
			Methow	-0.136	0.214	0.873	1.130	0.674	0.152	0.654	0.972	0.872	0.966	0.997	0.666	0.907	0.993
			Wenatchee	-0.211	0.025	0.810	0.889	0.738	0.021	0.999	1.000	1.000	1.000	1.000	1.000	1.000	1.000
		Med	Entiat	-0.110	0.047	0.896	0.998	0.805	0.008	0.542	0.997	0.967	0.999	1.000	0.622	0.976	1.000
	Hatchery = NULL		Methow	-0.109	0.271	0.897	1.163	0.691	0.126	0.515	0.894	0.774	0.896	0.975	0.549	0.791	0.951
			Wenatchee	-0.158	0.029	0.853	0.932	0.781	0.000	0.752	1.000	1.000	1.000	1.000	0.964	1.000	1.000
		High	Entiat	-0.103	0.058	0.902	1.007	0.808	0.017	0.518	0.990	0.933	0.994	1.000	0.554	0.942	1.000
			Methow	-0.094	0.252	0.911	1.145	0.724	0.090	0.429	0.838	0.736	0.863	0.958	0.491	0.736	0.920
			Wenatchee	-0.140	0.075	0.869	0.989	0.764	0.008	0.546	0.997	0.977	0.999	1.000	0.785	0.990	1.000
Chinook	**Upper Columbia**	Low	Entiat	-0.138	0.031	0.871	0.961	0.790	0.026	0.917	1.000	0.999	1.000	1.000	0.879	1.000	1.000
			Methow	-0.142	0.264	0.868	1.156	0.652	0.237	0.713	0.974	0.859	0.957	0.996	0.668	0.897	0.990
			Wenatchee	-0.215	0.022	0.806	0.878	0.740	0.026	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
		Med	Entiat	-0.100	0.030	0.905	0.987	0.830	0.000	0.373	0.997	0.977	1.000	1.000	0.541	0.980	1.000
	Hatchery = 0.0		Methow	-0.101	0.337	0.904	1.208	0.676	0.156	0.510	0.859	0.729	0.849	0.947	0.517	0.737	0.911
			Wenatchee	-0.158	0.029	0.854	0.933	0.781	0.000	0.755	1.000	1.000	1.000	1.000	0.963	1.000	1.000
		High	Entiat	-0.094	0.043	0.910	1.001	0.828	0.004	0.392	0.987	0.938	0.996	1.000	0.483	0.938	1.000
			Methow	-0.083	0.334	0.921	1.199	0.707	0.117	0.419	0.779	0.676	0.794	0.905	0.456	0.662	0.849
			Wenatchee	-0.139	0.083	0.870	0.996	0.760	0.010	0.540	0.996	0.970	0.999	1.000	0.769	0.986	1.000
Chinook	**Upper Columbia**	Low	Entiat	-0.157	0.032	0.855	0.943	0.774	0.078	0.982	1.000	1.000	1.000	1.000	0.955	1.000	1.000
			Methow	-0.148	0.252	0.862	1.141	0.652	0.239	0.735	0.981	0.877	0.967	0.998	0.694	0.916	0.994
			Wenatchee	-0.219	0.022	0.804	0.877	0.736	0.034	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
		Med	Entiat	-0.117	0.032	0.890	0.973	0.814	0.003	0.634	1.000	0.992	1.000	1.000	0.713	0.996	1.000
	Hatchery = 0.2		Methow	-0.111	0.321	0.895	1.188	0.674	0.166	0.550	0.895	0.762	0.881	0.967	0.552	0.780	0.940
			Wenatchee	-0.162	0.029	0.850	0.928	0.779	0.000	0.801	1.000	1.000	1.000	1.000	0.972	1.000	1.000
		High	Entiat	-0.109	0.045	0.897	0.989	0.814	0.011	0.580	0.998	0.967	0.999	1.000	0.614	0.976	1.000
			Methow	-0.092	0.314	0.912	1.178	0.706	0.122	0.453	0.823	0.710	0.832	0.936	0.487	0.708	0.891
			Wenatchee	-0.143	0.081	0.867	0.991	0.759	0.011	0.572	0.997	0.975	0.999	1.000	0.789	0.989	1.000
Chinook	**Upper Columbia**	Low	Entiat	-0.207	0.038	0.813	0.907	0.729	0.468	1.000	1.000	1.000	1.000	1.000	0.997	1.000	1.000
			Methow	-0.166	0.223	0.847	1.102	0.651	0.250	0.800	0.994	0.923	0.987	1.000	0.767	0.959	0.999
			Wenatchee	-0.228	0.025	0.796	0.872	0.727	0.066	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
		Med	Entiat	-0.161	0.042	0.852	0.944	0.768	0.090	0.964	1.000	0.999	1.000	1.000	0.938	1.000	1.000
	Hatchery = 0.8		Methow	-0.139	0.282	0.870	1.135	0.668	0.201	0.666	0.963	0.845	0.948	0.994	0.654	0.882	0.985
			Wenatchee	-0.173	0.029	0.841	0.918	0.770	0.001	0.901	1.000	1.000	1.000	1.000	0.987	1.000	1.000
		High	Entiat	-0.146	0.054	0.864	0.961	0.777	0.098	0.905	1.000	0.993	1.000	1.000	0.854	0.998	1.000
			Methow	-0.118	0.265	0.888	1.124	0.702	0.143	0.563	0.924	0.802	0.919	0.985	0.584	0.828	0.968
			Wenatchee	-0.152	0.076	0.859	0.978	0.754	0.014	0.662	0.999	0.986	1.000	1.000	0.842	0.996	1.000
Chinook	**Upper Columbia**	Low	Entiat	-0.222	0.041	0.801	0.897	0.715	0.603	1.000	1.000	1.000	1.000	1.000	0.999	1.000	1.000
			Methow	-0.172	0.214	0.842	1.090	0.650	0.255	0.820	0.996	0.935	0.991	1.000	0.789	0.968	0.999
			Wenatchee	-0.231	0.025	0.794	0.871	0.723	0.079	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
		Med	Entiat	-0.174	0.047	0.841	0.936	0.755	0.164	0.984	1.000	0.999	1.000	1.000	0.961	1.000	1.000
	Hatchery = 1.0		Methow	-0.147	0.271	0.863	1.119	0.665	0.214	0.702	0.975	0.868	0.962	0.997	0.686	0.907	0.992
			Wenatchee	-0.177	0.029	0.838	0.915	0.767	0.001	0.922	1.000	1.000	1.000	1.000	0.990	1.000	1.000
		High	Entiat	-0.157	0.058	0.855	0.954	0.766	0.154	0.944	1.000	0.995	1.000	1.000	0.893	0.999	1.000
			Methow	-0.126	0.252	0.881	1.109	0.701	0.152	0.601	0.946	0.829	0.939	0.991	0.616	0.860	0.980
			Wenatchee	-0.155	0.075	0.856	0.974	0.753	0.016	0.691	1.000	0.988	1.000	1.000	0.856	0.997	1.000

Table B-13b. continued

% increase in λ to reach P_{ext} = 0.05 24yr	% increase in λ to reach P_{ext} = 0.01 24yr	% increase in λ to reach P_{ext} = 0.05 48yr	% increase in λ to reach P_{ext} = 0.01 48yr	% increase in λ to reach P_{ext} = 0.05 100yr	% increase in λ to reach P_{ext} = 0.01 100yr	% increase in λ (p=0.05) to prevent 90% decline 24yr	% increase in λ (p=0.01) to prevent 90% decline 24yr	% increase in λ (p=0.05) to prevent 90% decline 48yr	% increase in λ (p=0.01) to prevent 90% decline 48yr	% increase in λ (p=0.05) to prevent 90% decline 100yr	% increase in λ (p=0.01) to prevent 90% decline 100yr	est. pop. size	tau	comments
0.5	3.5	9.5	12.0	14.0	16.0	12.5	16.0	16.0	18.0	17.0	18.5	172.9	4	
6.5	13.5	15.5	20.5	19.0	23.0	22.0	30.0	22.0	30.0	22.0	30.0	432.9	4	
0.0	1.0	12.0	14.0	19.0	20.5	18.5	21.5	22.5	24.5	24.0	25.5	805.2	4	var plot not very linear
0.0	0.0	6.0	8.0	10.5	12.0	9.0	12.5	12.0	14.5	13.0	15.0	202.1	4	
6.0	14.0	14.0	20.0	17.5	22.5	21.0	30.0	21.0	30.0	21.0	30.0	458.5	4	
0.0	0.0	6.0	8.0	13.0	14.5	13.0	15.5	16.5	18.5	18.0	19.5	989.6	4	var plot not very linear
0.0	1.5	6.5	9.0	10.5	12.5	9.5	13.0	12.0	15.0	13.0	15.0	167.2	4	
3.5	11.0	12.0	17.5	15.5	20.0	18.5	27.0	18.5	27.0	18.5	27.0	449.2	4	
0.0	0.0	7.5	10.5	13.5	15.5	15.0	19.5	17.5	20.5	18.0	20.5	871.8	4	
0.0	1.5	8.5	10.0	13.0	14.5	11.0	13.5	14.5	16.5	15.5	17.0	159.2	4	
11.0	19.0	18.5	25.0	22.0	27.0	24.5	34.0	24.5	34.0	24.5	34.0	324.2	4	
0.0	1.5	12.5	14.0	19.5	20.5	18.5	21.0	22.5	24.5	24.5	25.5	745.6	4	
0.0	0.0	3.5	5.5	8.5	9.5	6.5	9.5	10.0	12.0	11.5	12.5	202.1	4	
8.5	17.5	16.0	23.0	19.0	25.0	22.5	32.5	22.5	32.5	22.5	32.5	421.9	4	
0.0	0.0	6.0	8.0	13.0	14.5	13.0	15.5	16.5	18.5	18.0	19.5	974.8	4	var plot not very linear
0.0	0.0	4.5	6.5	9.0	10.5	7.5	10.5	10.5	12.5	11.5	13.0	167.2	4	
6.0	14.5	13.5	20.5	16.5	22.5	20.0	30.0	20.0	30.0	20.0	30.0	449.2	4	
0.0	0.5	8.0	11.0	13.5	16.0	15.5	20.0	17.5	21.0	18.0	21.0	871.8	4	
1.0	3.5	10.5	12.5	15.0	16.5	13.0	16.0	16.5	18.5	18.0	19.5	162.0	4	
10.5	18.5	19.0	24.5	22.0	27.0	25.0	34.0	25.0	34.0	25.0	34.0	345.9	4	
0.0	2.0	13.0	14.5	20.0	21.0	19.0	21.5	23.0	25.0	25.0	26.0	757.6	4	
0.0	0.0	5.5	7.5	10.5	12.0	8.5	11.5	12.0	14.0	13.5	14.5	202.1	4	
8.5	17.5	16.5	23.5	19.5	25.5	23.0	33.0	23.0	33.0	23.0	33.0	429.2	4	
0.0	0.0	6.5	8.5	13.5	14.5	13.5	16.0	17.0	19.0	18.5	20.0	977.7	4	var plot not very linear
0.0	0.5	6.0	8.5	10.5	12.0	9.0	12.5	12.0	14.5	13.0	14.5	167.2	4	
6.0	14.5	14.0	20.5	17.0	22.5	20.5	30.5	20.5	30.5	20.5	30.5	449.2	4	
0.0	0.5	8.0	11.0	14.0	16.0	15.5	20.0	18.0	21.0	18.5	21.0	871.8	4	
6.5	9.5	16.5	19.0	21.5	23.0	19.5	23.0	23.0	25.5	24.5	26.0	170.1	4	
10.5	18.0	19.5	25.0	23.0	27.5	26.0	34.5	26.0	34.5	26.0	34.5	411.1	4	
0.5	3.0	14.0	15.5	21.0	22.5	20.5	23.0	24.5	26.5	26.0	27.5	793.3	4	
1.5	4.5	11.0	13.5	16.0	17.5	14.5	18.0	18.0	20.0	19.0	20.5	202.1	4	var plot not very linear
9.5	18.0	18.0	24.5	21.5	27.0	25.0	34.5	25.0	34.5	25.0	34.5	451.2	4	
0.0	0.0	7.5	9.5	14.5	16.0	14.5	17.5	18.0	20.0	19.5	21.0	986.7	4	var plot not very linear
2.0	5.5	11.0	13.5	15.0	17.0	14.0	17.5	17.0	19.5	18.0	19.5	167.2	4	
6.5	14.5	15.0	21.0	18.5	23.5	22.0	31.0	22.0	31.0	22.0	31.0	449.2	4	
0.0	1.0	9.0	12.0	15.0	17.0	16.5	21.0	19.0	22.0	19.5	22.0	871.8	4	
8.5	11.5	18.5	21.0	23.5	25.0	21.5	25.0	25.0	27.5	26.5	28.0	172.9	4	
10.0	18.0	19.5	25.0	23.5	27.5	26.5	34.5	26.5	34.5	26.5	34.5	432.9	4	
1.0	3.5	14.5	16.0	21.5	23.0	21.0	23.5	25.0	27.0	26.5	28.0	805.2	4	
3.5	6.5	13.0	15.5	17.5	19.5	16.5	20.0	19.5	22.0	20.5	22.5	202.1	4	var plot not very linear
10.0	18.5	18.5	25.0	22.0	27.5	25.5	35.0	25.5	35.0	25.5	35.0	458.5	4	
0.0	0.0	8.0	10.0	15.0	16.5	15.0	18.0	18.5	20.5	20.0	21.5	989.6	4	var plot not very linear
3.5	7.0	12.5	15.0	16.5	18.5	15.5	19.5	18.5	21.0	19.0	21.0	167.2	4	
7.0	15.0	15.5	21.5	19.0	24.0	22.5	31.0	22.5	31.0	22.5	31.0	449.2	4	
0.0	1.0	9.0	12.0	15.0	17.5	16.5	21.0	19.0	22.5	19.5	22.5	871.8	4	