

# Appendix 11H Salmonid Population Modeling

## 11H.1 Introduction

This appendix provides SALMOD model outputs for the Project. SALMOD simulates Sacramento River populations of winter-run, spring-run, fall-run, and late-fall run Chinook salmon to assess potential flow- and temperature-related effects on early life stages. The interpretation of SALMOD outputs presented in this appendix is provided in Chapter 11, *Aquatic Biological Resources*, for Impacts FISH-2, FISH-3, and FISH-4. Table 1a-1 through Table 1d-4 compare the mortality of each Chinook salmon race by life stage and source between the No Action Alternative and Alternatives 1A, 1B, 2, and 3. Table 2a-1 through Table 2d-4 compare the annual potential production of each Chinook salmon race between the No Action Alternative and Alternatives 1A, 1B, 2, and 3. Figure B-a-1 through Figure B-d-19 provide exceedance plots of SALMOD outputs for all alternatives for winter-run, spring-run, fall-run, and late fall-run Chinook salmon for multiple metrics. These metrics include annual mortality, habitat-based mortality, and temperature-based mortality for early life stages.

**Table 1a-1 Mortality of Winter-Run Chinook Salmon by Life-stage and Source**  
**NOACTION 011221 vs. Alternative 1A 011221**

Long-term Average and Average by Water Year Type Annual Mortality								
Analysis Period	Pre-Spawn Mortality	Eggs Flow	Annual Mortality <sup>4</sup> (# of Fish/year)				Juvenile Habitat	Total
			Eggs - Temperature	Fry - Temperature	Fry - Habitat	Juvenile Temperature		
			Long-term					
Full Simulation Period <sup>1</sup>								
NOACTION 011221	9,120	389,672	50,758	757	104,686	178	6	555,178
Alternative 1A 011221	8,898	378,899	46,043	1,031	105,768	284	5	540,928
Difference	-222	-10,773	-4,715	274	1,082	106	-1	-14,250
Percent Difference <sup>3</sup>	-2	-3	-9	36	1	60	-18	-3
Water Year Types <sup>2</sup>								
Wet (31.7%)								
NOACTION 011221	9,600	354,281	465	0	133,868	0	2	498,217
Alternative 1A 011221	9,030	348,719	512	0	133,833	0	1	492,094
Difference	-571	-5,563	47	0	-35	0	-1	-6,123
Percent Difference	-6	-2	10	0	0	0	-63	-1
Above Normal (14.6%)								
NOACTION 011221	9,000	301,027	391,942	6,056	100,886	1,423	11	810,346
Alternative 1A 011221	9,600	292,432	351,770	8,246	104,505	2,270	5	768,828
Difference	600	-8,595	-40,172	2,190	3,619	847	-6	-41,518
Percent Difference	7	-3	-10	36	4	60	-56	-5
Below Normal (17.1%)								
NOACTION 011221	7,929	368,975	2,522	0	94,025	0	7	473,457
Alternative 1A 011221	7,931	356,293	3,468	0	95,199	0	4	462,895
Difference	3	-12,682	946	0	1,173	0	-3	-10,562
Percent Difference	0	-3	38	0	1	0	-43	-2
Dry (22%)								
NOACTION 011221	9,334	456,215	1,819	0	91,838	0	10	559,217
Alternative 1A 011221	9,001	449,917	2,054	0	91,397	0	9	552,377
Difference	-333	-6,298	235	0	-441	0	-2	-6,840
Percent Difference	-4	-1	13	0	0	0	-16	-1
Critical (14.6%)								
NOACTION 011221	9,251	464,556	5,090	0	76,338	0	0	555,235
Alternative 1A 011221	9,004	436,192	5,575	0	79,904	0	8	530,682
Difference	-248	-28,364	484	0	3,566	0	8	-24,553
Percent Difference	-3	-6	10	0	5	0	0	-4

<sup>1</sup> Based on the 80-year simulation period

<sup>2</sup> As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999). Water years may not correspond to the biological years in SALMOD.

<sup>3</sup> Relative difference of the annual average

<sup>4</sup> Mortality values do not include base mortality

**Table 1a-2 Mortality of Winter-Run Chinook Salmon by Life-stage and Source**  
**NOACTION 011221 vs. Alternative 1B 011221**

Long-term Average and Average by Water Year Type Annual Mortality								
Analysis Period	Pre-Spawn Mortality	Eggs Flow	Annual Mortality <sup>4</sup> (# of Fish/year)				Juvenile Habitat	Total
			Eggs - Temperature	Fry - Temperature	Fry - Habitat	Juvenile Temperature		
Long-term								
Full Simulation Period <sup>1</sup>								
NOACTION 011221	9,120	389,672	50,758	757	104,686	178	6	555,178
Alternative 1B 011221	8,748	369,187	44,041	1,052	105,638	279	2	528,946
Difference	-372	-20,486	-6,717	295	952	101	-4	-26,232
Percent Difference <sup>3</sup>	-4	-5	-13	39	1	57	-65	-5
Water Year Types <sup>2</sup>								
Wet (31.7%)								
NOACTION 011221	9,600	354,281	465	0	133,868	0	2	498,217
Alternative 1B 011221	8,915	327,090	575	0	136,188	0	1	472,770
Difference	-685	-27,192	110	0	2,320	0	-1	-25,447
Percent Difference	-7	-8	24	0	2	0	-38	-5
Above Normal (14.6%)								
NOACTION 011221	9,000	301,027	391,942	6,056	100,886	1,423	11	810,346
Alternative 1B 011221	9,600	287,914	334,627	8,412	105,378	2,232	0	748,163
Difference	600	-13,113	-57,316	2,356	4,492	809	-11	-62,183
Percent Difference	7	-4	-15	39	4	57	-99	-8
Below Normal (17.1%)								
NOACTION 011221	7,929	368,975	2,522	0	94,025	0	7	473,457
Alternative 1B 011221	7,503	348,604	4,791	0	94,071	0	2	454,970
Difference	-426	-20,371	2,269	0	46	0	-5	-18,487
Percent Difference	-5	-6	90	0	0	0	-71	-4
Dry (22%)								
NOACTION 011221	9,334	456,215	1,819	0	91,838	0	10	559,217
Alternative 1B 011221	8,667	435,110	1,871	0	88,619	0	5	534,271
Difference	-667	-21,105	52	0	-3,220	0	-6	-24,945
Percent Difference	-7	-5	3	0	-4	0	-57	-4
Critical (14.6%)								
NOACTION 011221	9,251	464,556	5,090	0	76,338	0	0	555,235
Alternative 1B 011221	9,251	453,251	5,107	0	78,688	0	1	546,298
Difference	-1	-11,305	17	0	2,351	0	1	-8,937
Percent Difference	0	-2	0	0	3	0	0	-2

<sup>1</sup> Based on the 80-year simulation period

<sup>2</sup> As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999). Water years may not correspond to the biological years in SALMOD.

<sup>3</sup> Relative difference of the annual average

<sup>4</sup> Mortality values do not include base mortality

**Table 1a-3 Mortality of Winter-Run Chinook Salmon by Life-stage and Source**  
**NOACTION 011221 vs. Alternative 2 011221**

Long-term Average and Average by Water Year Type Annual Mortality								
Analysis Period	Pre-Spawn Mortality	Eggs Flow	Annual Mortality <sup>1</sup> (# of Fish/year)				Juvenile Habitat	Total
			Eggs - Temperature	Fry - Temperature	Fry - Habitat	Juvenile Temperature		
			Long-term					
Full Simulation Period <sup>1</sup>								
NOACTION 011221	9,120	389,672	50,758	757	104,686	178	6	555,178
Alternative 2 011221	9,160	379,977	46,438	1,050	104,177	283	4	541,090
Difference	40	-9,695	-4,320	293	-510	106	-2	-14,088
Percent Difference <sup>3</sup>	0	-2	-9	39	0	59	-26	-3
Water Year Types <sup>2</sup>								
Wet (31.7%)								
NOACTION 011221	9,600	354,281	465	0	133,868	0	2	498,217
Alternative 2 011221	9,491	351,693	512	0	130,408	0	1	492,104
Difference	-109	-2,589	47	0	-3,460	0	-1	-6,113
Percent Difference	-1	-1	10	0	-3	0	-62	-1
Above Normal (14.6%)								
NOACTION 011221	9,000	301,027	391,942	6,056	100,886	1,423	11	810,346
Alternative 2 011221	9,300	292,850	351,177	8,400	104,284	2,268	5	768,283
Difference	300	-8,177	-40,766	2,344	3,398	845	-6	-42,062
Percent Difference	3	-3	-10	39	3	59	-56	-5
Below Normal (17.1%)								
NOACTION 011221	7,929	368,975	2,522	0	94,025	0	7	473,457
Alternative 2 011221	8,789	353,327	6,213	0	94,513	0	8	462,849
Difference	860	-15,648	3,691	0	488	0	1	-10,608
Percent Difference	11	-4	146	0	1	0	13	-2
Dry (22%)								
NOACTION 011221	9,334	456,215	1,819	0	91,838	0	10	559,217
Alternative 2 011221	9,001	450,797	2,036	0	90,266	0	9	552,108
Difference	-333	-5,418	217	0	-1,573	0	-2	-7,109
Percent Difference	-4	-1	12	0	-2	0	-17	-1
Critical (14.6%)								
NOACTION 011221	9,251	464,556	5,090	0	76,338	0	0	555,235
Alternative 2 011221	9,001	438,731	5,528	0	79,392	0	0	532,652
Difference	-250	-25,826	437	0	3,055	0	0	-22,584
Percent Difference	-3	-6	9	0	4	0	0	-4

<sup>1</sup> Based on the 80-year simulation period

<sup>2</sup> As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999). Water years may not correspond to the biological years in SALMOD.

<sup>3</sup> Relative difference of the annual average

<sup>4</sup> Mortality values do not include base mortality

**Table 1a-4 Mortality of Winter-Run Chinook Salmon by Life-stage and Source**  
**NOACTION 011221 vs. Alternative 3 020121**

Long-term Average and Average by Water Year Type Annual Mortality								
Analysis Period	Pre-Spawn Mortality	Eggs Flow	Annual Mortality <sup>4</sup> (# of Fish/year)				Juvenile Habitat	Total
			Eggs - Temperature	Fry - Temperature	Fry - Habitat	Juvenile Temperature		
Long-term								
Full Simulation Period <sup>1</sup>								
NOACTION 011221	9,120	389,672	50,758	757	104,686	178	6	555,178
Alternative 3 020121	8,673	361,625	32,099	663	109,384	241	4	512,689
Difference	-447	-28,047	-18,659	-94	4,698	63	-2	-42,489
Percent Difference <sup>3</sup>	-5	-7	-37	-12	4	35	-29	-8
Water Year Types <sup>2</sup>								
Wet (31.7%)								
NOACTION 011221	9,600	354,281	465	0	133,868	0	2	498,217
Alternative 3 020121	9,031	313,541	535	0	139,815	0	1	462,922
Difference	-570	-40,740	70	0	5,947	0	-1	-35,295
Percent Difference	-6	-11	15	0	4	0	-57	-7
Above Normal (14.6%)								
NOACTION 011221	9,000	301,027	391,942	6,056	100,886	1,423	11	810,346
Alternative 3 020121	8,400	340,977	237,904	5,302	102,830	1,926	5	697,344
Difference	-600	39,950	-154,039	-754	1,944	504	-6	-113,001
Percent Difference	-7	13	-39	-12	2	35	-56	-14
Below Normal (17.1%)								
NOACTION 011221	7,929	368,975	2,522	0	94,025	0	7	473,457
Alternative 3 020121	7,074	335,899	5,836	0	97,575	0	10	446,394
Difference	-854	-33,076	3,314	0	3,550	0	3	-27,063
Percent Difference	-11	-9	131	0	4	0	46	-6
Dry (22%)								
NOACTION 011221	9,334	456,215	1,819	0	91,838	0	10	559,217
Alternative 3 020121	9,167	410,853	1,493	0	96,228	0	5	517,747
Difference	-167	-45,362	-326	0	4,390	0	-5	-41,470
Percent Difference	-2	-10	-18	0	5	0	-52	-7
Critical (14.6%)								
NOACTION 011221	9,251	464,556	5,090	0	76,338	0	0	555,235
Alternative 3 020121	9,251	439,185	5,532	0	82,426	0	2	536,396
Difference	-1	-25,371	442	0	6,088	0	2	-18,840
Percent Difference	0	-5	9	0	8	0	0	-3

<sup>1</sup> Based on the 80-year simulation period

<sup>2</sup> As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999). Water years may not correspond to the biological years in SALMOD.

<sup>3</sup> Relative difference of the annual average

<sup>4</sup> Mortality values do not include base mortality

**Table 1b-1 Mortality of Spring-Run Chinook Salmon by Life-stage and Source**  
**NOACTION 011221 vs. Alternative 1A 011221**

Long-term Average and Average by Water Year Type Annual Mortality								
Analysis Period	Pre-Spawn Mortality	Eggs Flow	Annual Mortality <sup>4</sup> (# of Fish/year)				Juvenile Habitat	Total
			Eggs - Temperature	Fry - Temperature	Fry - Habitat	Juvenile Temperature		
Long-term								
Full Simulation Period <sup>1</sup>								
NOACTION 011221	5,266	3,944	18,785	0	2,682	2	0	30,678
Alternative 1A 011221	2,920	3,866	20,853	0	2,666	1	0	30,307
Difference	-2,346	-77	2,068	0	-16	0	0	-371
Percent Difference <sup>3</sup>	-45	-2	11	0	-1	-26	0	-1
Water Year Types <sup>2</sup>								
Wet (31.7%)								
NOACTION 011221	341	4,879	2,329	0	2,211	0	0	9,761
Alternative 1A 011221	447	4,408	2,249	0	2,161	0	0	9,264
Difference	105	-471	-81	0	-50	0	0	-497
Percent Difference	31	-10	-3	0	-2	0	0	-5
Above Normal (14.6%)								
NOACTION 011221	40,862	1,435	96,688	0	2,495	0	0	141,479
Alternative 1A 011221	21,662	1,818	111,609	0	2,284	0	0	137,372
Difference	-19,200	383	14,921	0	-211	0	0	-4,107
Percent Difference	-47	27	15	0	-8	0	0	-3
Below Normal (17.1%)								
NOACTION 011221	21	3,407	11,239	0	2,825	0	0	17,492
Alternative 1A 011221	70	3,589	13,296	0	3,013	0	0	19,967
Difference	49	181	2,057	0	188	0	0	2,476
Percent Difference	233	5	18	0	7	0	0	14
Dry (22%)								
NOACTION 011221	38	3,581	9,081	0	3,218	0	0	15,919
Alternative 1A 011221	42	3,694	9,103	0	3,058	0	0	15,897
Difference	4	112	22	0	-160	0	0	-22
Percent Difference	9	3	0	0	-5	0	0	0
Critical (14.6%)								
NOACTION 011221	232	5,176	12,881	0	2,887	12	0	21,187
Alternative 1A 011221	300	4,982	11,976	0	3,089	9	0	20,355
Difference	68	-194	-906	0	202	-3	0	-832
Percent Difference	29	-4	-7	0	7	-26	0	-4

<sup>1</sup> Based on the 80-year simulation period

<sup>2</sup> As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999). Water years may not correspond to the biological years in SALMOD.

<sup>3</sup> Relative difference of the annual average

<sup>4</sup> Mortality values do not include base mortality

**Table 1b-2 Mortality of Spring-Run Chinook Salmon by Life-stage and Source**  
**NOACTION 011221 vs. Alternative 1B 011221**

Long-term Average and Average by Water Year Type Annual Mortality								
Analysis Period	Pre-Spawn Mortality	Eggs Flow	Annual Mortality <sup>4</sup> (# of Fish/year)				Juvenile Habitat	Total
			Eggs - Temperature	Fry - Temperature	Fry - Habitat	Juvenile Temperature		
Long-term								
Full Simulation Period <sup>1</sup>								
NOACTION 011221	5,266	3,944	18,785	0	2,682	2	0	30,678
Alternative 1B 011221	2,192	3,736	21,698	0	2,664	1	0	30,292
Difference	-3,074	-208	2,913	0	-17	0	0	-386
Percent Difference <sup>3</sup>	-58	-5	16	0	-1	-21	0	-1
Water Year Types <sup>2</sup>								
Wet (31.7%)								
NOACTION 011221	341	4,879	2,329	0	2,211	0	0	9,761
Alternative 1B 011221	462	4,277	2,009	0	2,213	0	0	8,961
Difference	121	-602	-320	0	2	0	0	-800
Percent Difference	35	-12	-14	0	0	0	0	-8
Above Normal (14.6%)								
NOACTION 011221	40,862	1,435	96,688	0	2,495	0	0	141,479
Alternative 1B 011221	15,858	1,643	113,276	0	2,416	0	0	133,192
Difference	-25,004	209	16,588	0	-79	0	0	-8,287
Percent Difference	-61	15	17	0	-3	0	0	-6
Below Normal (17.1%)								
NOACTION 011221	21	3,407	11,239	0	2,825	0	0	17,492
Alternative 1B 011221	71	3,229	17,669	0	2,855	0	0	23,824
Difference	50	-179	6,430	0	31	0	0	6,332
Percent Difference	240	-5	57	0	1	0	0	36
Dry (22%)								
NOACTION 011221	38	3,581	9,081	0	3,218	0	0	15,919
Alternative 1B 011221	38	3,635	8,181	0	3,022	0	0	14,876
Difference	0	54	-900	0	-196	0	0	-1,044
Percent Difference	-1	1	-10	0	-6	0	0	-7
Critical (14.6%)								
NOACTION 011221	232	5,176	12,881	0	2,887	12	0	21,187
Alternative 1B 011221	258	5,049	13,022	0	3,091	9	0	21,429
Difference	26	-127	141	0	204	-2	0	242
Percent Difference	11	-2	1	0	7	-21	0	1

<sup>1</sup> Based on the 80-year simulation period

<sup>2</sup> As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999). Water years may not correspond to the biological years in SALMOD.

<sup>3</sup> Relative difference of the annual average

<sup>4</sup> Mortality values do not include base mortality

**Table 1b-3 Mortality of Spring-Run Chinook Salmon by Life-stage and Source**  
**NOACTION 011221 vs. Alternative 2 011221**

Long-term Average and Average by Water Year Type Annual Mortality								
Analysis Period	Pre-Spawn Mortality	Eggs Flow	Annual Mortality <sup>4</sup> (# of Fish/year)				Juvenile Habitat	Total
			Eggs - Temperature	Fry - Temperature	Fry - Habitat	Juvenile Temperature		
Long-term								
Full Simulation Period <sup>1</sup>								
NOACTION 011221	5,266	3,944	18,785	0	2,682	2	0	30,678
Alternative 2 011221	2,975	3,892	22,526	0	2,638	1	0	32,033
Difference	-2,290	-51	3,741	0	-44	0	0	1,355
Percent Difference <sup>3</sup>	-43	-1	20	0	-2	-24	0	4
Water Year Types <sup>2</sup>								
Wet (31.7%)								
NOACTION 011221	341	4,879	2,329	0	2,211	0	0	9,761
Alternative 2 011221	445	4,521	2,269	0	2,154	0	0	9,390
Difference	104	-359	-60	0	-57	0	0	-371
Percent Difference	31	-7	-3	0	-3	0	0	-4
Above Normal (14.6%)								
NOACTION 011221	40,862	1,435	96,688	0	2,495	0	0	141,479
Alternative 2 011221	22,119	1,751	111,128	0	2,282	0	0	137,280
Difference	-18,743	317	14,440	0	-213	0	0	-4,199
Percent Difference	-46	22	15	0	-9	0	0	-3
Below Normal (17.1%)								
NOACTION 011221	21	3,407	11,239	0	2,825	0	0	17,492
Alternative 2 011221	76	3,454	21,250	0	2,983	0	0	27,762
Difference	55	46	10,011	0	158	0	0	10,271
Percent Difference	262	1	89	0	6	0	0	59
Dry (22%)								
NOACTION 011221	38	3,581	9,081	0	3,218	0	0	15,919
Alternative 2 011221	43	3,753	9,029	0	3,048	0	0	15,873
Difference	4	172	-53	0	-170	0	0	-47
Percent Difference	11	5	-1	0	-5	0	0	0
Critical (14.6%)								
NOACTION 011221	232	5,176	12,881	0	2,887	12	0	21,187
Alternative 2 011221	286	5,034	14,315	0	2,968	9	0	22,612
Difference	55	-142	1,434	0	81	-3	0	1,425
Percent Difference	24	-3	11	0	3	-24	0	7

<sup>1</sup> Based on the 80-year simulation period

<sup>2</sup> As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999). Water years may not correspond to the biological years in SALMOD.

<sup>3</sup> Relative difference of the annual average

<sup>4</sup> Mortality values do not include base mortality



**Table 1b-4 Mortality of Spring-Run Chinook Salmon by Life-stage and Source**  
**NOACTION 011221 vs. Alternative 3 020121**

Long-term Average and Average by Water Year Type Annual Mortality								
Analysis Period	Pre-Spawn Mortality	Eggs Flow	Annual Mortality <sup>4</sup> (# of Fish/year)				Juvenile Habitat	Total
			Eggs - Temperature	Fry - Temperature	Fry - Habitat	Juvenile Temperature		
Long-term								
Full Simulation Period <sup>1</sup>								
NOACTION 011221	5,266	3,944	18,785	0	2,682	2	0	30,678
Alternative 3 020121	580	3,716	22,952	0	2,621	2	0	29,870
Difference	-4,686	-228	4,167	0	-61	0	0	-808
Percent Difference <sup>3</sup>	-89	-6	22	0	-2	-9	0	-3
Water Year Types <sup>2</sup>								
Wet (31.7%)								
NOACTION 011221	341	4,879	2,329	0	2,211	0	0	9,761
Alternative 3 020121	457	4,112	2,142	0	2,220	0	0	8,932
Difference	116	-768	-187	0	10	0	0	-829
Percent Difference	34	-16	-8	0	0	0	0	-8
Above Normal (14.6%)								
NOACTION 011221	40,862	1,435	96,688	0	2,495	0	0	141,479
Alternative 3 020121	2,886	1,355	124,637	0	2,459	0	0	131,337
Difference	-37,975	-80	27,949	0	-36	0	0	-10,142
Percent Difference	-93	-6	29	0	-1	0	0	-7
Below Normal (17.1%)								
NOACTION 011221	21	3,407	11,239	0	2,825	0	0	17,492
Alternative 3 020121	85	3,119	19,707	0	2,908	0	0	25,819
Difference	64	-288	8,469	0	83	0	0	8,328
Percent Difference	305	-8	75	0	3	0	0	48
Dry (22%)								
NOACTION 011221	38	3,581	9,081	0	3,218	0	0	15,919
Alternative 3 020121	47	4,247	7,371	0	2,817	0	0	14,482
Difference	9	666	-1,710	0	-401	0	0	-1,437
Percent Difference	22	19	-19	0	-12	0	0	-9
Critical (14.6%)								
NOACTION 011221	232	5,176	12,881	0	2,887	12	0	21,187
Alternative 3 020121	300	4,723	10,459	0	2,994	11	0	18,486
Difference	68	-453	-2,422	0	107	-1	0	-2,701
Percent Difference	29	-9	-19	0	4	-9	0	-13

<sup>1</sup> Based on the 80-year simulation period

<sup>2</sup> As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999). Water years may not correspond to the biological years in SALMOD.

<sup>3</sup> Relative difference of the annual average

<sup>4</sup> Mortality values do not include base mortality

**Table 1c-1 Mortality of Fall-Run Chinook Salmon by Life-stage and Source  
NOACTION 011221 vs. Alternative 1A 011221**

Long-term Average and Average by Water Year Type Annual Mortality								
Analysis Period	Pre-Spawn Mortality	Eggs Flow	Annual Mortality <sup>4</sup> (# of Fish/year)				Total	
			Eggs - Temperature	Fry - Temperature	Fry - Habitat	Juvenile Temperature		Juvenile Habitat
Long-term								
Full Simulation Period <sup>1</sup>								
NOACTION 011221	679,120	1,567,969	183,984	687	5,497,027	16,253	409,349	8,354,390
Alternative 1A 011221	616,765	1,577,386	211,411	706	5,469,192	19,354	410,914	8,305,729
Difference	-62,355	9,417	27,427	20	-27,835	3,101	1,565	-48,661
Percent Difference <sup>3</sup>	-9	1	15	3	-1	19	0	-1
Water Year Types <sup>2</sup>								
Wet (31.7%)								
NOACTION 011221	1,008	3,794,900	14,826	1,328	5,929,397	14,612	109,469	9,865,540
Alternative 1A 011221	1,147	3,817,710	14,679	1,483	5,869,840	17,901	106,573	9,829,334
Difference	139	22,810	-147	155	-59,557	3,290	-2,895	-36,206
Percent Difference	14	1	-1	12	-1	23	-3	0
Above Normal (14.6%)								
NOACTION 011221	5,396,514	228,774	576,009	90	5,681,441	3,219	217,218	12,103,264
Alternative 1A 011221	4,897,805	228,845	748,930	152	5,757,701	3,977	206,799	11,844,207
Difference	-498,709	71	172,921	61	76,260	757	-10,419	-259,057
Percent Difference	-9	0	30	68	1	24	-5	-2
Below Normal (17.1%)								
NOACTION 011221	770	686,544	261,505	95	5,308,797	4,798	426,966	6,689,475
Alternative 1A 011221	0	685,724	321,279	183	5,374,099	9,427	431,410	6,822,121
Difference	-770	-821	59,774	88	65,302	4,629	4,444	132,646
Percent Difference	-100	0	23	92	1	96	1	2
Dry (22%)								
NOACTION 011221	2,020	516,160	174,312	256	5,098,008	16,638	702,477	6,509,871
Alternative 1A 011221	1,740	522,450	176,515	349	5,055,588	21,994	737,430	6,516,066
Difference	-280	6,290	2,202	93	-42,420	5,356	34,953	6,195
Percent Difference	-14	1	1	36	-1	32	5	0
Critical (14.6%)								
NOACTION 011221	24,261	464,988	147,873	1,132	5,224,679	43,456	758,958	6,665,346
Alternative 1A 011221	25,168	469,811	113,900	634	5,092,045	42,935	726,730	6,471,223
Difference	907	4,823	-33,973	-498	-132,634	-521	-32,227	-194,123
Percent Difference	4	1	-23	-44	-3	-1	-4	-3

<sup>1</sup> Based on the 80-year simulation period

<sup>2</sup> As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999). Water years may not correspond to the biological years in SALMOD.

<sup>3</sup> Relative difference of the annual average

<sup>4</sup> Mortality values do not include base mortality

**Table 1c-2 Mortality of Fall-Run Chinook Salmon by Life-stage and Source**  
**NOACTION 011221 vs. Alternative 1B 011221**

Long-term Average and Average by Water Year Type Annual Mortality								
Analysis Period	Pre-Spawn Mortality	Eggs Flow	Annual Mortality <sup>4</sup> (# of Fish/year)			Juvenile Temperature	Juvenile Habitat	Total
			Eggs - Temperature	Fry - Temperature	Fry - Habitat			
Long-term								
Full Simulation Period <sup>1</sup>								
NOACTION 011221	679,120	1,567,969	183,984	687	5,497,027	16,253	409,349	8,354,390
Alternative 1B 011221	560,637	1,602,605	239,392	676	5,472,615	18,900	399,171	8,293,997
Difference	-118,483	34,636	55,408	-11	-24,412	2,648	-10,178	-60,392
Percent Difference <sup>3</sup>	-17	2	30	-2	0	16	-2	-1
Water Year Types <sup>2</sup>								
Wet (31.7%)								
NOACTION 011221	1,008	3,794,900	14,826	1,328	5,929,397	14,612	109,469	9,865,540
Alternative 1B 011221	382	3,895,088	14,518	1,464	5,908,852	17,960	103,501	9,941,766
Difference	-626	100,188	-308	136	-20,545	3,349	-5,968	76,226
Percent Difference	-62	3	-2	10	0	23	-5	1
Above Normal (14.6%)								
NOACTION 011221	5,396,514	228,774	576,009	90	5,681,441	3,219	217,218	12,103,264
Alternative 1B 011221	4,452,024	231,320	802,165	144	5,824,231	7,069	189,397	11,506,349
Difference	-944,490	2,546	226,156	54	142,790	3,849	-27,821	-596,916
Percent Difference	-18	1	39	59	3	120	-13	-5
Below Normal (17.1%)								
NOACTION 011221	770	686,544	261,505	95	5,308,797	4,798	426,966	6,689,475
Alternative 1B 011221	314	684,375	421,387	252	5,300,652	9,944	409,214	6,826,137
Difference	-456	-2,169	159,882	157	-8,145	5,146	-17,752	136,662
Percent Difference	-59	0	61	165	0	107	-4	2
Dry (22%)								
NOACTION 011221	2,020	516,160	174,312	256	5,098,008	16,638	702,477	6,509,871
Alternative 1B 011221	1,263	525,478	163,115	236	4,990,175	15,996	711,567	6,407,829
Difference	-757	9,318	-11,197	-20	-107,833	-643	9,090	-102,042
Percent Difference	-37	2	-6	-8	-2	-4	1	-2
Critical (14.6%)								
NOACTION 011221	24,261	464,988	147,873	1,132	5,224,679	43,456	758,958	6,665,346
Alternative 1B 011221	24,471	465,253	159,733	568	5,158,706	45,603	734,294	6,588,629
Difference	211	265	11,860	-564	-65,973	2,147	-24,663	-76,718
Percent Difference	1	0	8	-50	-1	5	-3	-1

<sup>1</sup> Based on the 80-year simulation period

<sup>2</sup> As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999). Water years may not correspond to the biological years in SALMOD.

<sup>3</sup> Relative difference of the annual average

<sup>4</sup> Mortality values do not include base mortality

<sup>1</sup> Based on the 80-year simulation period

<sup>2</sup> As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999). Water years may not correspond to the biological years in SALMOD.

<sup>3</sup> Relative difference of the annual average

<sup>4</sup> Mortality values do not include base mortality

**Table 1c-3 Mortality of Fall-Run Chinook Salmon by Life-stage and Source**  
**NOACTION 011221 vs. Alternative 2 011221**

Long-term Average and Average by Water Year Type Annual Mortality								
Analysis Period	Pre-Spawn Mortality	Eggs Flow	Annual Mortality <sup>4</sup> (# of Fish/year)				Juvenile Habitat	Total
			Eggs -	Fry -		Juvenile		
			Temperature	Temperature	Fry - Habitat	Temperature		
Long-term								
Full Simulation Period <sup>1</sup>								
NOACTION 011221	679,120	1,567,969	183,984	687	5,497,027	16,253	409,349	8,354,390
Alternative 2 011221	617,056	1,583,189	248,478	711	5,470,794	19,020	402,744	8,341,993
Difference	-62,064	15,221	64,494	24	-26,234	2,768	-6,605	-12,397
Percent Difference <sup>3</sup>	-9	1	35	3	0	17	-2	0
Water Year Types <sup>2</sup>								
Wet (31.7%)								
NOACTION 011221	1,008	3,794,900	14,826	1,328	5,929,397	14,612	109,469	9,865,540
Alternative 2 011221	1,269	3,838,537	14,772	1,491	5,920,248	17,857	101,833	9,896,007
Difference	261	43,636	-53	162	-9,149	3,245	-7,636	30,467
Percent Difference	26	1	0	12	0	22	-7	0
Above Normal (14.6%)								
NOACTION 011221	5,396,514	228,774	576,009	90	5,681,441	3,219	217,218	12,103,264
Alternative 2 011221	4,898,762	228,461	747,101	152	5,723,192	3,938	211,877	11,813,483
Difference	-497,752	-313	171,092	62	41,751	719	-5,340	-289,782
Percent Difference	-9	0	30	68	1	22	-2	-2
Below Normal (17.1%)								
NOACTION 011221	770	686,544	261,505	95	5,308,797	4,798	426,966	6,689,475
Alternative 2 011221	534	682,865	460,992	248	5,352,146	9,207	397,937	6,903,929
Difference	-236	-3,680	199,487	153	43,349	4,409	-29,029	214,454
Percent Difference	-31	-1	76	161	1	92	-7	3
Dry (22%)								
NOACTION 011221	2,020	516,160	174,312	256	5,098,008	16,638	702,477	6,509,871
Alternative 2 011221	1,911	521,839	171,671	306	4,999,700	20,940	740,828	6,457,195
Difference	-109	5,679	-2,641	50	-98,308	4,302	38,351	-52,676
Percent Difference	-5	1	-2	20	-2	26	5	-1
Critical (14.6%)								
NOACTION 011221	24,261	464,988	147,873	1,132	5,224,679	43,456	758,958	6,665,346
Alternative 2 011221	25,168	467,949	206,601	634	5,131,705	42,680	712,258	6,586,994
Difference	907	2,961	58,727	-498	-92,974	-776	-46,700	-78,352
Percent Difference	4	1	40	-44	-2	-2	-6	-1

<sup>1</sup> Based on the 80-year simulation period

<sup>2</sup> As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999). Water years may not correspond to the biological years in SALMOD.

<sup>3</sup> Relative difference of the annual average

<sup>4</sup> Mortality values do not include base mortality

**Table 1c-4 Mortality of Fall-Run Chinook Salmon by Life-stage and Source**  
**NOACTION 011221 vs. Alternative 3 020121**

Long-term Average and Average by Water Year Type Annual Mortality								
Analysis Period	Pre-Spawn Mortality	Eggs Flow	Annual Mortality <sup>4</sup> (# of Fish/year)				Juvenile Habitat	Total
			Eggs -	Fry -		Juvenile		
			Temperature	Temperature	Fry - Habitat	Temperature		
Long-term								
Full Simulation Period <sup>1</sup>								
NOACTION 011221	679,120	1,567,969	183,984	687	5,497,027	16,253	409,349	8,354,390
Alternative 3 020121	262,927	1,668,231	331,663	680	5,456,495	18,044	375,929	8,113,969
Difference	-416,193	100,262	147,679	-7	-40,532	1,791	-33,421	-240,421
Percent Difference <sup>3</sup>	-61	6	80	-1	-1	11	-8	-3
Water Year Types <sup>2</sup>								
Wet (31.7%)								
NOACTION 011221	1,008	3,794,900	14,826	1,328	5,929,397	14,612	109,469	9,865,540
Alternative 3 020121	713	4,077,768	14,522	1,436	5,818,562	18,061	98,579	10,029,640
Difference	-296	282,867	-303	107	-110,835	3,449	-10,890	164,100
Percent Difference	-29	7	-2	8	-2	24	-10	2
Above Normal (14.6%)								
NOACTION 011221	5,396,514	228,774	576,009	90	5,681,441	3,219	217,218	12,103,264
Alternative 3 020121	2,069,584	254,094	1,642,974	126	5,911,296	7,060	185,321	10,070,455
Difference	-3,326,930	25,320	1,066,966	36	229,856	3,841	-31,897	-2,032,809
Percent Difference	-62	11	185	40	4	119	-15	-17
Below Normal (17.1%)								
NOACTION 011221	770	686,544	261,505	95	5,308,797	4,798	426,966	6,689,475
Alternative 3 020121	754	695,701	440,321	290	5,251,836	9,910	374,947	6,773,760
Difference	-16	9,157	178,816	195	-56,961	5,112	-52,019	84,285
Percent Difference	-2	1	68	205	-1	107	-12	1
Dry (22%)								
NOACTION 011221	2,020	516,160	174,312	256	5,098,008	16,638	702,477	6,509,871
Alternative 3 020121	966	519,633	155,509	256	5,079,164	19,956	646,678	6,422,163
Difference	-1,054	3,473	-18,803	0	-18,844	3,318	-55,799	-87,708
Percent Difference	-52	1	-11	0	0	20	-8	-1
Critical (14.6%)								
NOACTION 011221	24,261	464,988	147,873	1,132	5,224,679	43,456	758,958	6,665,346
Alternative 3 020121	24,321	483,531	63,501	593	5,097,783	33,784	730,715	6,434,228
Difference	60	18,542	-84,372	-539	-126,896	-9,672	-28,242	-231,118
Percent Difference	0	4	-57	-48	-2	-22	-4	-3

<sup>1</sup> Based on the 80-year simulation period

<sup>2</sup> As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999). Water years may not correspond to the biological years in SALMOD.

<sup>3</sup> Relative difference of the annual average

<sup>4</sup> Mortality values do not include base mortality

**Table 1d-1 Mortality of LateFall-Run Chinook Salmon by Life-stage and Source  
NOACTION 011221 vs. Alternative 1A 011221**

Long-term Average and Average by Water Year Type Annual Mortality								
Analysis Period	Pre-Spawn Mortality	Eggs Flow	Annual Mortality <sup>4</sup> (# of Fish/year)				Total	
			Eggs -	Fry -	Juvenile	Juvenile		
			Temperature	Temperature	Fry - Habitat	Temperature		
Long-term								
Full Simulation Period <sup>1</sup>								
NOACTION 011221	0	493,970	58,222	193	1,881,741	10,613	16,294	2,461,033
Alternative 1A 011221	0	494,307	63,499	292	1,866,228	8,474	17,927	2,450,727
Difference	0	338	5,276	99	-15,514	-2,139	1,632	-10,307
Percent Difference <sup>3</sup>	0	0	9	51	-1	-20	10	0
Water Year Types <sup>2</sup>								
Wet (31.7%)								
NOACTION 011221	0	1,211,664	39,966	190	1,550,879	9	4,946	2,807,654
Alternative 1A 011221	0	1,211,582	43,196	236	1,547,742	39	6,195	2,808,989
Difference	0	-82	3,230	45	-3,137	30	1,249	1,335
Percent Difference	0	0	8	24	0	321	25	0
Above Normal (14.6%)								
NOACTION 011221	0	646,238	36,350	50	1,737,198	7	3,388	2,423,230
Alternative 1A 011221	0	653,984	40,606	67	1,739,484	16	4,188	2,438,345
Difference	0	7,746	4,256	17	2,287	9	800	15,115
Percent Difference	0	1	12	34	0	134	24	1
Below Normal (17.1%)								
NOACTION 011221	0	42,050	58,869	146	2,105,037	0	8,827	2,214,928
Alternative 1A 011221	0	41,357	61,107	327	2,069,091	0	11,996	2,183,877
Difference	0	-693	2,238	180	-35,946	0	3,170	-31,051
Percent Difference	0	-2	4	123	-2	0	36	-1
Dry (22%)								
NOACTION 011221	0	32,077	87,547	182	2,181,053	808	21,893	2,323,559
Alternative 1A 011221	0	30,903	100,806	320	2,170,104	707	22,749	2,325,589
Difference	0	-1,174	13,259	138	-10,949	-101	856	2,030
Percent Difference	0	-4	15	75	-1	-12	4	0
Critical (14.6%)								
NOACTION 011221	0	32,153	71,264	390	2,009,583	69,516	51,954	2,234,859
Alternative 1A 011221	0	30,695	73,395	522	1,969,412	55,337	54,479	2,183,841
Difference	0	-1,458	2,131	133	-40,171	-14,179	2,526	-51,018
Percent Difference	0	-5	3	34	-2	-20	5	-2

<sup>1</sup> Based on the 80-year simulation period

<sup>2</sup> As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999). Water years may not correspond to the biological years in SALMOD.

<sup>3</sup> Relative difference of the annual average

<sup>4</sup> Mortality values do not include base mortality

**Table 1d-2 Mortality of LateFall-Run Chinook Salmon by Life-stage and Source**  
**NOACTION 011221 vs. Alternative 1B 011221**

Long-term Average and Average by Water Year Type Annual Mortality								
Analysis Period	Pre-Spawn Mortality	Eggs Flow	Annual Mortality <sup>4</sup> (# of Fish/year)				Juvenile Habitat	Total
			Eggs -	Fry -		Juvenile		
			Temperature	Temperature	Fry - Habitat	Temperature		
Long-term								
Full Simulation Period <sup>1</sup>								
NOACTION 011221	0	493,970	58,222	193	1,881,741	10,613	16,294	2,461,033
Alternative 1B 011221	0	494,538	64,197	231	1,860,955	7,537	21,336	2,448,794
Difference	0	568	5,975	38	-20,786	-3,076	5,042	-12,240
Percent Difference <sup>3</sup>	0	0	10	19	-1	-29	31	0
Water Year Types <sup>2</sup>								
Wet (31.7%)								
NOACTION 011221	0	1,211,664	39,966	190	1,550,879	9	4,946	2,807,654
Alternative 1B 011221	0	1,215,207	43,854	228	1,555,467	34	5,579	2,820,370
Difference	0	3,543	3,889	38	4,588	25	634	12,717
Percent Difference	0	0	10	20	0	272	13	0
Above Normal (14.6%)								
NOACTION 011221	0	646,238	36,350	50	1,737,198	7	3,388	2,423,230
Alternative 1B 011221	0	645,362	40,840	79	1,654,501	50	4,058	2,344,891
Difference	0	-876	4,490	30	-82,697	43	671	-78,339
Percent Difference	0	0	12	60	-5	637	20	-3
Below Normal (17.1%)								
NOACTION 011221	0	42,050	58,869	146	2,105,037	0	8,827	2,214,928
Alternative 1B 011221	0	43,033	68,882	333	2,084,250	0	10,881	2,207,379
Difference	0	983	10,014	187	-20,786	0	2,054	-7,549
Percent Difference	0	2	17	128	-1	0	23	0
Dry (22%)								
NOACTION 011221	0	32,077	87,547	182	2,181,053	808	21,893	2,323,559
Alternative 1B 011221	0	30,828	96,099	161	2,164,406	488	32,750	2,324,732
Difference	0	-1,248	8,552	-21	-16,647	-320	10,858	1,173
Percent Difference	0	-4	10	-12	-1	-40	50	0
Critical (14.6%)								
NOACTION 011221	0	32,153	71,264	390	2,009,583	69,516	51,954	2,234,859
Alternative 1B 011221	0	29,719	74,416	347	1,979,203	49,401	64,952	2,198,038
Difference	0	-2,434	3,153	-42	-30,380	-20,115	12,998	-36,821
Percent Difference	0	-8	4	-11	-2	-29	25	-2

<sup>1</sup> Based on the 80-year simulation period

<sup>2</sup> As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999). Water years may not correspond to the biological years in SALMOD.

<sup>3</sup> Relative difference of the annual average

<sup>4</sup> Mortality values do not include base mortality

<sup>1</sup> Based on the 80-year simulation period

<sup>2</sup> As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999). Water years may not correspond to the biological years in SALMOD.

<sup>3</sup> Relative difference of the annual average

<sup>4</sup> Mortality values do not include base mortality

**Table 1d-3 Mortality of LateFall-Run Chinook Salmon by Life-stage and Source**  
**NOACTION 011221 vs. Alternative 2 011221**

Long-term Average and Average by Water Year Type Annual Mortality								
Analysis Period	Pre-Spawn Mortality	Eggs Flow	Annual Mortality <sup>4</sup> (# of Fish/year)				Juvenile Habitat	Total
			Eggs - Temperature	Fry - Temperature	Fry - Habitat	Juvenile Temperature		
			Long-term					
Full Simulation Period <sup>1</sup>								
NOACTION 011221	0	493,970	58,222	193	1,881,741	10,613	16,294	2,461,033
Alternative 2 011221	0	494,301	63,224	258	1,870,820	8,674	19,245	2,456,522
Difference	0	332	5,002	65	-10,921	-1,939	2,950	-4,511
Percent Difference <sup>3</sup>	0	0	9	34	-1	-18	18	0
Water Year Types <sup>2</sup>								
Wet (31.7%)								
NOACTION 011221	0	1,211,664	39,966	190	1,550,879	9	4,946	2,807,654
Alternative 2 011221	0	1,211,469	43,489	218	1,561,712	39	5,136	2,822,063
Difference	0	-195	3,523	27	10,833	30	191	14,409
Percent Difference	0	0	9	14	1	326	4	1
Above Normal (14.6%)								
NOACTION 011221	0	646,238	36,350	50	1,737,198	7	3,388	2,423,230
Alternative 2 011221	0	653,966	40,832	67	1,738,859	16	3,201	2,436,939
Difference	0	7,727	4,481	17	1,662	9	-187	13,710
Percent Difference	0	1	12	34	0	134	-6	1
Below Normal (17.1%)								
NOACTION 011221	0	42,050	58,869	146	2,105,037	0	8,827	2,214,928
Alternative 2 011221	0	41,631	60,392	326	2,062,831	0	11,754	2,176,935
Difference	0	-419	1,524	180	-42,205	0	2,927	-37,994
Percent Difference	0	-1	3	123	-2	0	33	-2
Dry (22%)								
NOACTION 011221	0	32,077	87,547	182	2,181,053	808	21,893	2,323,559
Alternative 2 011221	0	30,980	98,227	297	2,158,033	702	28,206	2,316,445
Difference	0	-1,096	10,680	115	-23,020	-106	6,313	-7,114
Percent Difference	0	-3	12	63	-1	-13	29	0
Critical (14.6%)								
NOACTION 011221	0	32,153	71,264	390	2,009,583	69,516	51,954	2,234,859
Alternative 2 011221	0	30,480	75,441	367	1,995,691	56,677	58,480	2,217,136
Difference	0	-1,674	4,177	-23	-13,892	-12,838	6,527	-17,723
Percent Difference	0	-5	6	-6	-1	-18	13	-1

<sup>1</sup> Based on the 80-year simulation period

<sup>2</sup> As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999). Water years may not correspond to the biological years in SALMOD.

<sup>3</sup> Relative difference of the annual average

<sup>4</sup> Mortality values do not include base mortality



**Table 1d-4 Mortality of LateFall-Run Chinook Salmon by Life-stage and Source**  
**NOACTION 011221 vs. Alternative 3 020121**

Long-term Average and Average by Water Year Type Annual Mortality								
Analysis Period	Pre-Spawn Mortality	Eggs Flow	Annual Mortality <sup>4</sup> (# of Fish/year)				Juvenile Habitat	Total
			Eggs -	Fry -		Juvenile		
			Temperature	Temperature	Fry - Habitat	Temperature		
Long-term								
Full Simulation Period <sup>1</sup>								
NOACTION 011221	0	493,970	58,222	193	1,881,741	10,613	16,294	2,461,033
Alternative 3 020121	0	504,404	64,171	239	1,865,776	4,223	18,292	2,457,106
Difference	0	10,434	5,949	46	-15,965	-6,390	1,998	-3,927
Percent Difference <sup>3</sup>	0	2	10	24	-1	-60	12	0
Water Year Types <sup>2</sup>								
Wet (31.7%)								
NOACTION 011221	0	1,211,664	39,966	190	1,550,879	9	4,946	2,807,654
Alternative 3 020121	0	1,241,614	44,137	225	1,564,127	31	4,833	2,854,968
Difference	0	29,950	4,172	35	13,249	22	-113	47,314
Percent Difference	0	2	10	18	1	240	-2	2
Above Normal (14.6%)								
NOACTION 011221	0	646,238	36,350	50	1,737,198	7	3,388	2,423,230
Alternative 3 020121	0	651,668	41,839	94	1,680,852	50	3,546	2,378,048
Difference	0	5,429	5,489	45	-56,346	43	158	-45,181
Percent Difference	0	1	15	91	-3	637	5	-2
Below Normal (17.1%)								
NOACTION 011221	0	42,050	58,869	146	2,105,037	0	8,827	2,214,928
Alternative 3 020121	0	43,542	64,886	295	2,032,370	5	16,370	2,157,467
Difference	0	1,492	6,017	149	-72,667	5	7,543	-57,461
Percent Difference	0	4	10	102	-3	0	85	-3
Dry (22%)								
NOACTION 011221	0	32,077	87,547	182	2,181,053	808	21,893	2,323,559
Alternative 3 020121	0	30,870	96,120	232	2,128,497	697	32,295	2,288,710
Difference	0	-1,207	8,573	50	-52,556	-111	10,402	-34,849
Percent Difference	0	-4	10	27	-2	-14	48	-1
Critical (14.6%)								
NOACTION 011221	0	32,153	71,264	390	2,009,583	69,516	51,954	2,234,859
Alternative 3 020121	0	32,370	77,433	335	2,085,011	26,996	40,982	2,263,126
Difference	0	216	6,170	-55	75,428	-42,520	-10,972	28,267
Percent Difference	0	1	9	-14	4	-61	-21	1

<sup>1</sup> Based on the 80-year simulation period

<sup>2</sup> As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999). Water years may not correspond to the biological years in SALMOD.

<sup>3</sup> Relative difference of the annual average

<sup>4</sup> Mortality values do not include base mortality

**Table 2a-1 Annual Potential Production for Winter-Run Chinook Salmon,  
NOACTION 011221 vs. Alternative 1A 011221**

<b>Long-term Average and Average by Water Year Type Annual Production</b>	
<b>Analysis Period</b>	<b>Annual Potential Production (# of Fish/year)</b>
<b>Long-term</b>	
<b>Full Simulation Period<sup>1</sup></b>	
NOACTION 011221	1,927,994
Alternative 1A 011221	1,935,464
Difference	7,470
Percent Difference <sup>3</sup>	0.4
<b>Water Year Types<sup>2</sup></b>	
<b>Wet (31.7%)</b>	
NOACTION 011221	1,930,166
Alternative 1A 011221	1,933,662
Difference	3,496
Percent Difference	0.2
<b>Above Normal (14.6%)</b>	
NOACTION 011221	1,796,018
Alternative 1A 011221	1,814,424
Difference	18,406
Percent Difference	1.0
<b>Below Normal (17.1%)</b>	
NOACTION 011221	1,970,579
Alternative 1A 011221	1,979,272
Difference	8,693
Percent Difference	0.4
<b>Dry (22%)</b>	
NOACTION 011221	1,933,233
Alternative 1A 011221	1,935,508
Difference	2,275
Percent Difference	0.1
<b>Critical (14.6%)</b>	
NOACTION 011221	1,975,725
Alternative 1A 011221	1,989,062
Difference	13,337
Percent Difference	0.7
<sup>1</sup> Based on the 80-year simulation period	
<sup>2</sup> As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999). Water years may not correspond to the biological years in SALMOD.	
<sup>3</sup> Relative difference of the annual average	

**Table 2a-2 Annual Potential Production for Winter-Run Chinook Salmon,  
NOACTION 011221 vs. Alternative 1B 011221**

<b>Long-term Average and Average by Water Year Type Annual Production</b>	
<b>Analysis Period</b>	<b>Annual Potential Production (# of Fish/year)</b>
<b>Long-term</b>	
<b>Full Simulation Period<sup>1</sup></b>	
NOACTION 011221	1,927,994
Alternative 1B 011221	1,940,421
Difference	12,427
Percent Difference <sup>3</sup>	0.6
<b>Water Year Types<sup>2</sup></b>	
<b>Wet (31.7%)</b>	
NOACTION 011221	1,930,166
Alternative 1B 011221	1,940,975
Difference	10,809
Percent Difference	0.6
<b>Above Normal (14.6%)</b>	
NOACTION 011221	1,796,018
Alternative 1B 011221	1,822,958
Difference	26,939
Percent Difference	1.5
<b>Below Normal (17.1%)</b>	
NOACTION 011221	1,970,579
Alternative 1B 011221	1,983,087
Difference	12,508
Percent Difference	0.6
<b>Dry (22%)</b>	
NOACTION 011221	1,933,233
Alternative 1B 011221	1,945,620
Difference	12,387
Percent Difference	0.6
<b>Critical (14.6%)</b>	
NOACTION 011221	1,975,725
Alternative 1B 011221	1,979,531
Difference	3,806
Percent Difference	0.2
<sup>1</sup> Based on the 80-year simulation period	
<sup>2</sup> As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999). Water years may not correspond to the biological years in SALMOD.	
<sup>3</sup> Relative difference of the annual average	

**Table 2a-3 Annual Potential Production for Winter-Run Chinook Salmon,  
NOACTION 011221 vs. Alternative 2 011221**

<b>Long-term Average and Average by Water Year Type Annual Production</b>	
<b>Analysis Period</b>	<b>Annual Potential Production (# of Fish/year)</b>
<b>Long-term</b>	
<b>Full Simulation Period<sup>1</sup></b>	
NOACTION 011221	1,927,994
Alternative 2 011221	1,935,385
Difference	7,391
Percent Difference <sup>3</sup>	0.4
<b>Water Year Types<sup>2</sup></b>	
<b>Wet (31.7%)</b>	
NOACTION 011221	1,930,166
Alternative 2 011221	1,934,619
Difference	4,453
Percent Difference	0.2
<b>Above Normal (14.6%)</b>	
NOACTION 011221	1,796,018
Alternative 2 011221	1,811,729
Difference	15,710
Percent Difference	0.9
<b>Below Normal (17.1%)</b>	
NOACTION 011221	1,970,579
Alternative 2 011221	1,980,821
Difference	10,242
Percent Difference	0.5
<b>Dry (22%)</b>	
NOACTION 011221	1,933,233
Alternative 2 011221	1,935,511
Difference	2,278
Percent Difference	0.1
<b>Critical (14.6%)</b>	
NOACTION 011221	1,975,725
Alternative 2 011221	1,986,895
Difference	11,169
Percent Difference	0.6
<sup>1</sup> Based on the 80-year simulation period	
<sup>2</sup> As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999). Water years may not correspond to the biological years in SALMOD.	
<sup>3</sup> Relative difference of the annual average	

**Table 2a-4 Annual Potential Production for Winter-Run Chinook Salmon,  
NOACTION 011221 vs. Alternative 3 020121**

<b>Long-term Average and Average by Water Year Type Annual Production</b>	
<b>Analysis Period</b>	<b>Annual Potential Production (# of Fish/year)</b>
<b>Long-term</b>	
<b>Full Simulation Period<sup>1</sup></b>	
NOACTION 011221	1,927,994
Alternative 3 020121	1,950,501
Difference	22,507
Percent Difference <sup>3</sup>	1.2
<b>Water Year Types<sup>2</sup></b>	
<b>Wet (31.7%)</b>	
NOACTION 011221	1,930,166
Alternative 3 020121	1,950,201
Difference	20,034
Percent Difference	1.0
<b>Above Normal (14.6%)</b>	
NOACTION 011221	1,796,018
Alternative 3 020121	1,849,042
Difference	53,024
Percent Difference	3.0
<b>Below Normal (17.1%)</b>	
NOACTION 011221	1,970,579
Alternative 3 020121	1,987,497
Difference	16,918
Percent Difference	0.9
<b>Dry (22%)</b>	
NOACTION 011221	1,933,233
Alternative 3 020121	1,955,276
Difference	22,043
Percent Difference	1.1
<b>Critical (14.6%)</b>	
NOACTION 011221	1,975,725
Alternative 3 020121	1,985,377
Difference	9,652
Percent Difference	0.5
<sup>1</sup> Based on the 80-year simulation period	
<sup>2</sup> As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999). Water years may not correspond to the biological years in SALMOD.	
<sup>3</sup> Relative difference of the annual average	

**Table 2b-1 Annual Potential Production for Spring-Run Chinook Salmon,  
NOACTION 011221 vs. Alternative 1A 011221**

<b>Long-term Average and Average by Water Year Type Annual Production</b>	
<b>Analysis Period</b>	<b>Annual Potential Production (# of Fish/year)</b>
<b>Long-term</b>	
<b>Full Simulation Period<sup>1</sup></b>	
NOACTION 011221	446,054
Alternative 1A 011221	446,027
Difference	-28
Percent Difference <sup>3</sup>	0.0
<b>Water Year Types<sup>2</sup></b>	
<b>Wet (31.7%)</b>	
NOACTION 011221	446,722
Alternative 1A 011221	446,858
Difference	136
Percent Difference	0.0
<b>Above Normal (14.6%)</b>	
NOACTION 011221	400,639
Alternative 1A 011221	401,618
Difference	979
Percent Difference	0.2
<b>Below Normal (17.1%)</b>	
NOACTION 011221	449,067
Alternative 1A 011221	447,656
Difference	-1,411
Percent Difference	-0.3
<b>Dry (22%)</b>	
NOACTION 011221	457,582
Alternative 1A 011221	457,783
Difference	201
Percent Difference	0.0
<b>Critical (14.6%)</b>	
NOACTION 011221	461,649
Alternative 1A 011221	461,699
Difference	50
Percent Difference	0.0

<sup>1</sup> Based on the 80-year simulation period

<sup>2</sup> As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999). Water years may not correspond to the biological years in SALMOD.

<sup>3</sup> Relative difference of the annual average

**Table 2b-2 Annual Potential Production for Spring-Run Chinook Salmon,  
NOACTION 011221 vs. Alternative 1B 011221**

<b>Long-term Average and Average by Water Year Type Annual Production</b>	
<b>Analysis Period</b>	<b>Annual Potential Production (# of Fish/year)</b>
<b>Long-term</b>	
<b>Full Simulation Period<sup>1</sup></b>	
NOACTION 011221	446,054
Alternative 1B 011221	445,878
Difference	-176
Percent Difference <sup>3</sup>	0.0
<b>Water Year Types<sup>2</sup></b>	
<b>Wet (31.7%)</b>	
NOACTION 011221	446,722
Alternative 1B 011221	446,702
Difference	-20
Percent Difference	0.0
<b>Above Normal (14.6%)</b>	
NOACTION 011221	400,639
Alternative 1B 011221	403,529
Difference	2,890
Percent Difference	0.7
<b>Below Normal (17.1%)</b>	
NOACTION 011221	449,067
Alternative 1B 011221	445,669
Difference	-3,398
Percent Difference	-0.8
<b>Dry (22%)</b>	
NOACTION 011221	457,582
Alternative 1B 011221	457,906
Difference	323
Percent Difference	0.1
<b>Critical (14.6%)</b>	
NOACTION 011221	461,649
Alternative 1B 011221	461,587
Difference	-62
Percent Difference	0.0
<sup>1</sup> Based on the 80-year simulation period	
<sup>2</sup> As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999). Water years may not correspond to the biological years in SALMOD.	
<sup>3</sup> Relative difference of the annual average	

**Table 2b-3 Annual Potential Production for Spring-Run Chinook Salmon,  
NOACTION 011221 vs. Alternative 2 011221**

<b>Long-term Average and Average by Water Year Type Annual Production</b>	
<b>Analysis Period</b>	<b>Annual Potential Production (# of Fish/year)</b>
<b>Long-term</b>	
<b>Full Simulation Period<sup>1</sup></b>	
NOACTION 011221	446,054
Alternative 2 011221	445,208
Difference	-846
Percent Difference <sup>3</sup>	-0.2
<b>Water Year Types<sup>2</sup></b>	
<b>Wet (31.7%)</b>	
NOACTION 011221	446,722
Alternative 2 011221	446,788
Difference	66
Percent Difference	0.0
<b>Above Normal (14.6%)</b>	
NOACTION 011221	400,639
Alternative 2 011221	401,682
Difference	1,043
Percent Difference	0.3
<b>Below Normal (17.1%)</b>	
NOACTION 011221	449,067
Alternative 2 011221	443,966
Difference	-5,101
Percent Difference	-1.1
<b>Dry (22%)</b>	
NOACTION 011221	457,582
Alternative 2 011221	457,698
Difference	116
Percent Difference	0.0
<b>Critical (14.6%)</b>	
NOACTION 011221	461,649
Alternative 2 011221	460,773
Difference	-875
Percent Difference	-0.2
<sup>1</sup> Based on the 80-year simulation period	
<sup>2</sup> As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999). Water years may not correspond to the biological years in SALMOD.	
<sup>3</sup> Relative difference of the annual average	



**Table 2b-4 Annual Potential Production for Spring-Run Chinook Salmon,  
NOACTION 011221 vs. Alternative 3 020121**

<b>Long-term Average and Average by Water Year Type Annual Production</b>	
<b>Analysis Period</b>	<b>Annual Potential Production (# of Fish/year)</b>
<b>Long-term</b>	
<b>Full Simulation Period<sup>1</sup></b>	
NOACTION 011221	446,054
Alternative 3 020121	445,451
Difference	-603
Percent Difference <sup>3</sup>	-0.1
<b>Water Year Types<sup>2</sup></b>	
<b>Wet (31.7%)</b>	
NOACTION 011221	446,722
Alternative 3 020121	446,481
Difference	-240
Percent Difference	-0.1
<b>Above Normal (14.6%)</b>	
NOACTION 011221	400,639
Alternative 3 020121	402,740
Difference	2,101
Percent Difference	0.5
<b>Below Normal (17.1%)</b>	
NOACTION 011221	449,067
Alternative 3 020121	444,394
Difference	-4,673
Percent Difference	-1.0
<b>Dry (22%)</b>	
NOACTION 011221	457,582
Alternative 3 020121	457,349
Difference	-233
Percent Difference	-0.1
<b>Critical (14.6%)</b>	
NOACTION 011221	461,649
Alternative 3 020121	462,198
Difference	549
Percent Difference	0.1
<sup>1</sup> Based on the 80-year simulation period	
<sup>2</sup> As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999). Water years may not correspond to the biological years in SALMOD.	
<sup>3</sup> Relative difference of the annual average	

**Table 2c-1 Annual Potential Production for Fall-Run Chinook Salmon,  
NOACTION 011221 vs. Alternative 1A 011221**

<b>Long-term Average and Average by Water Year Type Annual Production</b>	
<b>Analysis Period</b>	<b>Annual Potential Production (# of Fish/year)</b>
<b>Long-term</b>	
<b>Full Simulation Period<sup>1</sup></b>	
NOACTION 011221	18,215,670
Alternative 1A 011221	18,235,927
Difference	20,256
Percent Difference <sup>3</sup>	0.1
<b>Water Year Types<sup>2</sup></b>	
<b>Wet (31.7%)</b>	
NOACTION 011221	17,062,773
Alternative 1A 011221	17,087,773
Difference	25,000
Percent Difference	0.1
<b>Above Normal (14.6%)</b>	
NOACTION 011221	17,175,665
Alternative 1A 011221	17,241,937
Difference	66,272
Percent Difference	0.4
<b>Below Normal (17.1%)</b>	
NOACTION 011221	18,947,118
Alternative 1A 011221	18,889,514
Difference	-57,604
Percent Difference	-0.3
<b>Dry (22%)</b>	
NOACTION 011221	19,176,506
Alternative 1A 011221	19,176,192
Difference	-315
Percent Difference	0.0
<b>Critical (14.6%)</b>	
NOACTION 011221	19,285,676
Alternative 1A 011221	19,379,002
Difference	93,326
Percent Difference	0.5
<sup>1</sup> Based on the 80-year simulation period	
<sup>2</sup> As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999). Water years may not correspond to the biological years in SALMOD.	
<sup>3</sup> Relative difference of the annual average	

**Table 2c-2 Annual Potential Production for Fall-Run Chinook Salmon,  
NOACTION 011221 vs. Alternative 1B 011221**

<b>Long-term Average and Average by Water Year Type Annual Production</b>	
<b>Analysis Period</b>	<b>Annual Potential Production (# of Fish/year)</b>
<b>Long-term</b>	
<b>Full Simulation Period<sup>1</sup></b>	
NOACTION 011221	18,215,670
Alternative 1B 011221	18,233,807
Difference	18,137
Percent Difference <sup>3</sup>	0.1
<b>Water Year Types<sup>2</sup></b>	
<b>Wet (31.7%)</b>	
NOACTION 011221	17,062,773
Alternative 1B 011221	17,018,019
Difference	-44,754
Percent Difference	-0.3
<b>Above Normal (14.6%)</b>	
NOACTION 011221	17,175,665
Alternative 1B 011221	17,334,317
Difference	158,652
Percent Difference	0.9
<b>Below Normal (17.1%)</b>	
NOACTION 011221	18,947,118
Alternative 1B 011221	18,904,670
Difference	-42,448
Percent Difference	-0.2
<b>Dry (22%)</b>	
NOACTION 011221	19,176,506
Alternative 1B 011221	19,235,262
Difference	58,756
Percent Difference	0.3
<b>Critical (14.6%)</b>	
NOACTION 011221	19,285,676
Alternative 1B 011221	19,332,732
Difference	47,056
Percent Difference	0.2
<sup>1</sup> Based on the 80-year simulation period	
<sup>2</sup> As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999). Water years may not correspond to the biological years in SALMOD.	
<sup>3</sup> Relative difference of the annual average	

**Table 2c-3 Annual Potential Production for Fall-Run Chinook Salmon,  
NOACTION 011221 vs. Alternative 2 011221**

<b>Long-term Average and Average by Water Year Type Annual Production</b>	
<b>Analysis Period</b>	<b>Annual Potential Production (# of Fish/year)</b>
<b>Long-term</b>	
<b>Full Simulation Period<sup>1</sup></b>	
NOACTION 011221	18,215,670
Alternative 2 011221	18,227,958
Difference	12,288
Percent Difference <sup>3</sup>	0.1
<b>Water Year Types<sup>2</sup></b>	
<b>Wet (31.7%)</b>	
NOACTION 011221	17,062,773
Alternative 2 011221	17,049,033
Difference	-13,740
Percent Difference	-0.1
<b>Above Normal (14.6%)</b>	
NOACTION 011221	17,175,665
Alternative 2 011221	17,255,309
Difference	79,645
Percent Difference	0.5
<b>Below Normal (17.1%)</b>	
NOACTION 011221	18,947,118
Alternative 2 011221	18,882,055
Difference	-65,063
Percent Difference	-0.3
<b>Dry (22%)</b>	
NOACTION 011221	19,176,506
Alternative 2 011221	19,211,399
Difference	34,892
Percent Difference	0.2
<b>Critical (14.6%)</b>	
NOACTION 011221	19,285,676
Alternative 2 011221	19,354,560
Difference	68,884
Percent Difference	0.4
<sup>1</sup> Based on the 80-year simulation period	
<sup>2</sup> As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999). Water years may not correspond to the biological years in SALMOD.	
<sup>3</sup> Relative difference of the annual average	

**Table 2c-4 Annual Potential Production for Fall-Run Chinook Salmon,  
NOACTION 011221 vs. Alternative 3 020121**

<b>Long-term Average and Average by Water Year Type Annual Production</b>	
<b>Analysis Period</b>	<b>Annual Potential Production (# of Fish/year)</b>
<b>Long-term</b>	
<b>Full Simulation Period<sup>1</sup></b>	
NOACTION 011221	18,215,670
Alternative 3 020121	18,294,178
Difference	78,507
Percent Difference <sup>3</sup>	0.4
<b>Water Year Types<sup>2</sup></b>	
<b>Wet (31.7%)</b>	
NOACTION 011221	17,062,773
Alternative 3 020121	16,985,039
Difference	-77,734
Percent Difference	-0.5
<b>Above Normal (14.6%)</b>	
NOACTION 011221	17,175,665
Alternative 3 020121	17,786,237
Difference	610,573
Percent Difference	3.6
<b>Below Normal (17.1%)</b>	
NOACTION 011221	18,947,118
Alternative 3 020121	18,941,658
Difference	-5,460
Percent Difference	0.0
<b>Dry (22%)</b>	
NOACTION 011221	19,176,506
Alternative 3 020121	19,236,372
Difference	59,866
Percent Difference	0.3
<b>Critical (14.6%)</b>	
NOACTION 011221	19,285,676
Alternative 3 020121	19,385,242
Difference	99,567
Percent Difference	0.5
<sup>1</sup> Based on the 80-year simulation period	
<sup>2</sup> As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999). Water years may not correspond to the biological years in SALMOD.	
<sup>3</sup> Relative difference of the annual average	

**Table 2d-1 Annual Potential Production for LateFall-Run Chinook Salmon,  
NOACTION 011221 vs. Alternative 1A 011221**

<b>Long-term Average and Average by Water Year Type Annual Production</b>	
<b>Analysis Period</b>	<b>Annual Potential Production (# of Fish/year)</b>
<b>Long-term</b>	
<b>Full Simulation Period<sup>1</sup></b>	
NOACTION 011221	2,880,539
Alternative 1A 011221	2,889,522
Difference	8,983
Percent Difference <sup>3</sup>	0.3
<b>Water Year Types<sup>2</sup></b>	
<b>Wet (31.7%)</b>	
NOACTION 011221	2,758,553
Alternative 1A 011221	2,757,150
Difference	-1,403
Percent Difference	-0.1
<b>Above Normal (14.6%)</b>	
NOACTION 011221	2,899,521
Alternative 1A 011221	2,893,097
Difference	-6,424
Percent Difference	-0.2
<b>Below Normal (17.1%)</b>	
NOACTION 011221	2,923,658
Alternative 1A 011221	2,945,014
Difference	21,356
Percent Difference	0.7
<b>Dry (22%)</b>	
NOACTION 011221	2,943,910
Alternative 1A 011221	2,947,408
Difference	3,498
Percent Difference	0.1
<b>Critical (14.6%)</b>	
NOACTION 011221	2,983,661
Alternative 1A 011221	3,021,779
Difference	38,118
Percent Difference	1.3
<sup>1</sup> Based on the 80-year simulation period	
<sup>2</sup> As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999). Water years may not correspond to the biological years in SALMOD.	
<sup>3</sup> Relative difference of the annual average	

**Table 2d-2 Annual Potential Production for LateFall-Run Chinook Salmon,  
NOACTION 011221 vs. Alternative 1B 011221**

<b>Long-term Average and Average by Water Year Type Annual Production</b>	
<b>Analysis Period</b>	<b>Annual Potential Production (# of Fish/year)</b>
<b>Long-term</b>	
<b>Full Simulation Period<sup>1</sup></b>	
NOACTION 011221	2,880,539
Alternative 1B 011221	2,889,355
Difference	8,816
Percent Difference <sup>3</sup>	0.3
<b>Water Year Types<sup>2</sup></b>	
<b>Wet (31.7%)</b>	
NOACTION 011221	2,758,553
Alternative 1B 011221	2,749,538
Difference	-9,015
Percent Difference	-0.3
<b>Above Normal (14.6%)</b>	
NOACTION 011221	2,899,521
Alternative 1B 011221	2,950,987
Difference	51,465
Percent Difference	1.8
<b>Below Normal (17.1%)</b>	
NOACTION 011221	2,923,658
Alternative 1B 011221	2,930,087
Difference	6,429
Percent Difference	0.2
<b>Dry (22%)</b>	
NOACTION 011221	2,943,910
Alternative 1B 011221	2,943,248
Difference	-662
Percent Difference	0.0
<b>Critical (14.6%)</b>	
NOACTION 011221	2,983,661
Alternative 1B 011221	3,012,571
Difference	28,910
Percent Difference	1.0
<sup>1</sup> Based on the 80-year simulation period	
<sup>2</sup> As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999). Water years may not correspond to the biological years in SALMOD.	
<sup>3</sup> Relative difference of the annual average	

**Table 2d-3 Annual Potential Production for LateFall-Run Chinook Salmon,  
NOACTION 011221 vs. Alternative 2 011221**

<b>Long-term Average and Average by Water Year Type Annual Production</b>	
<b>Analysis Period</b>	<b>Annual Potential Production (# of Fish/year)</b>
<b>Long-term</b>	
<b>Full Simulation Period<sup>1</sup></b>	
NOACTION 011221	2,880,539
Alternative 2 011221	2,885,779
Difference	5,240
Percent Difference <sup>3</sup>	0.2
<b>Water Year Types<sup>2</sup></b>	
<b>Wet (31.7%)</b>	
NOACTION 011221	2,758,553
Alternative 2 011221	2,748,619
Difference	-9,935
Percent Difference	-0.4
<b>Above Normal (14.6%)</b>	
NOACTION 011221	2,899,521
Alternative 2 011221	2,894,131
Difference	-5,390
Percent Difference	-0.2
<b>Below Normal (17.1%)</b>	
NOACTION 011221	2,923,658
Alternative 2 011221	2,947,998
Difference	24,340
Percent Difference	0.8
<b>Dry (22%)</b>	
NOACTION 011221	2,943,910
Alternative 2 011221	2,952,542
Difference	8,632
Percent Difference	0.3
<b>Critical (14.6%)</b>	
NOACTION 011221	2,983,661
Alternative 2 011221	3,003,266
Difference	19,605
Percent Difference	0.7
<sup>1</sup> Based on the 80-year simulation period	
<sup>2</sup> As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999). Water years may not correspond to the biological years in SALMOD.	
<sup>3</sup> Relative difference of the annual average	



**Table 2d-4 Annual Potential Production for LateFall-Run Chinook Salmon,  
NOACTION 011221 vs. Alternative 3 020121**

<b>Long-term Average and Average by Water Year Type Annual Production</b>	
<b>Analysis Period</b>	<b>Annual Potential Production (# of Fish/year)</b>
<b>Long-term</b>	
<b>Full Simulation Period<sup>1</sup></b>	
NOACTION 011221	2,880,539
Alternative 3 020121	2,889,112
Difference	8,573
Percent Difference <sup>3</sup>	0.3
<b>Water Year Types<sup>2</sup></b>	
<b>Wet (31.7%)</b>	
NOACTION 011221	2,758,553
Alternative 3 020121	2,737,640
Difference	-20,914
Percent Difference	-0.8
<b>Above Normal (14.6%)</b>	
NOACTION 011221	2,899,521
Alternative 3 020121	2,937,273
Difference	37,752
Percent Difference	1.3
<b>Below Normal (17.1%)</b>	
NOACTION 011221	2,923,658
Alternative 3 020121	2,957,965
Difference	34,307
Percent Difference	1.2
<b>Dry (22%)</b>	
NOACTION 011221	2,943,910
Alternative 3 020121	2,968,582
Difference	24,672
Percent Difference	0.8
<b>Critical (14.6%)</b>	
NOACTION 011221	2,983,661
Alternative 3 020121	2,977,633
Difference	-6,028
Percent Difference	-0.2
<sup>1</sup> Based on the 80-year simulation period	
<sup>2</sup> As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999). Water years may not correspond to the biological years in SALMOD.	
<sup>3</sup> Relative difference of the annual average	

Figure B-a-1. Annual Potential Production for Winter-Run Chinook Salmon

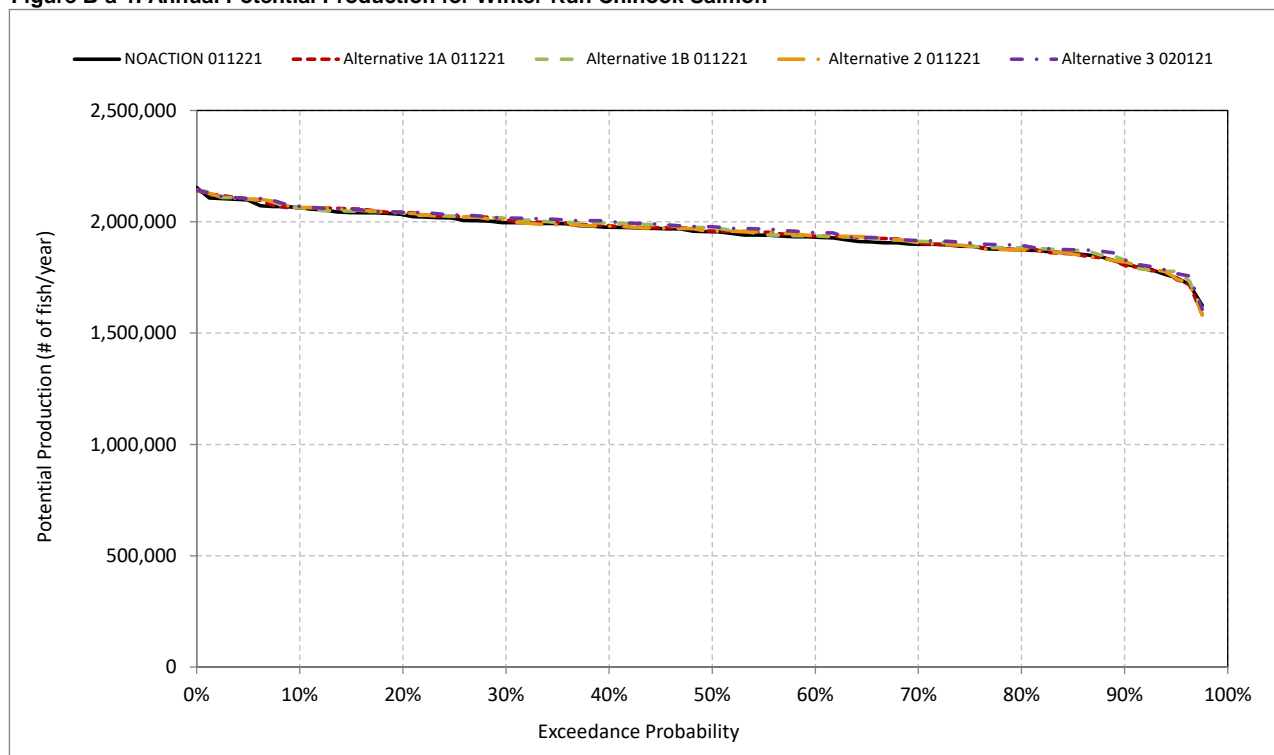


Figure B-a-2. Annual Mortality for Winter-Run Chinook Salmon - Eggs

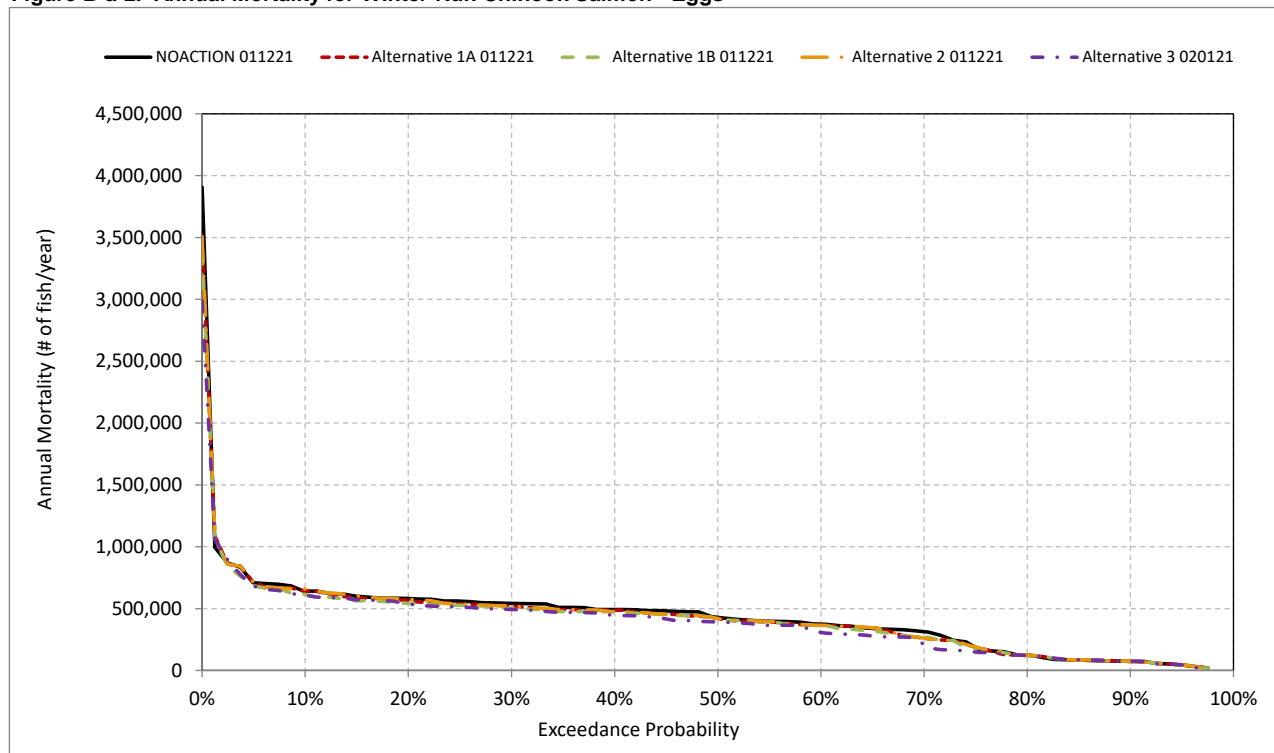


Figure B-a-3. Annual Mortality for Winter-Run Chinook Salmon - Fry

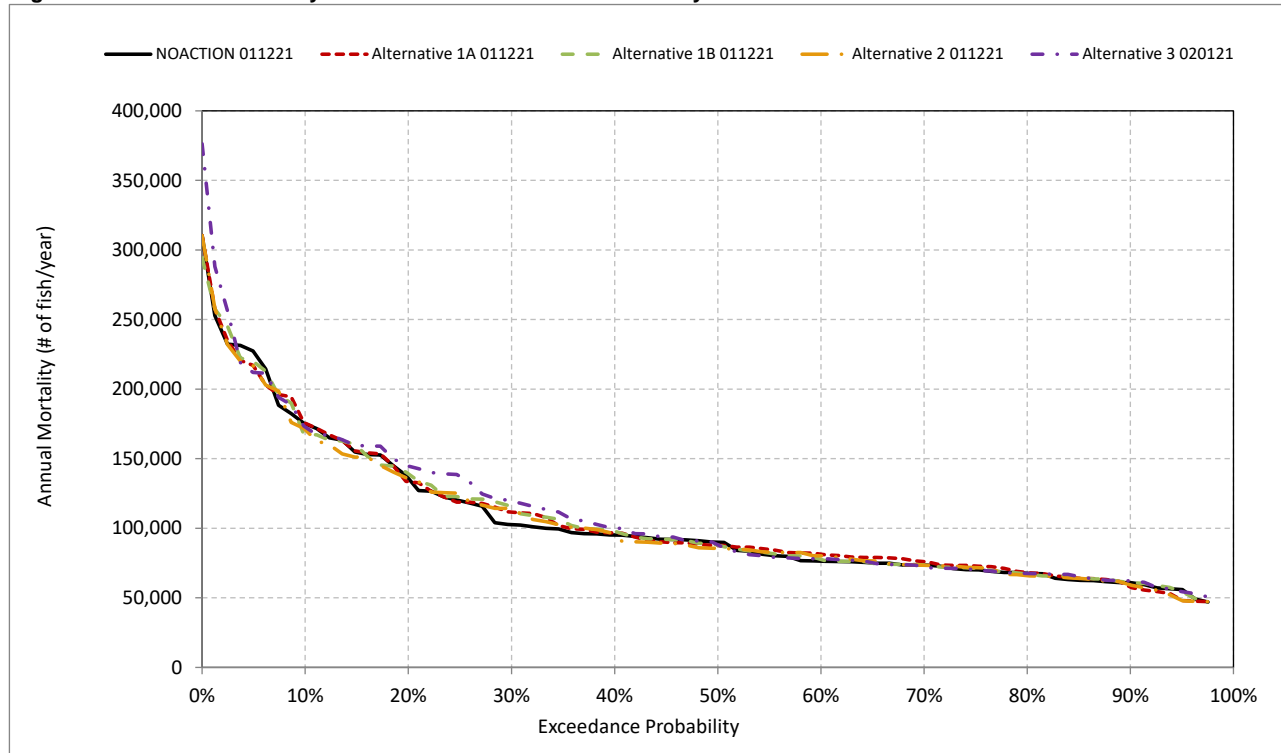


Figure B-a-4. Annual Mortality for Winter-Run Chinook Salmon - Pre-Smolt

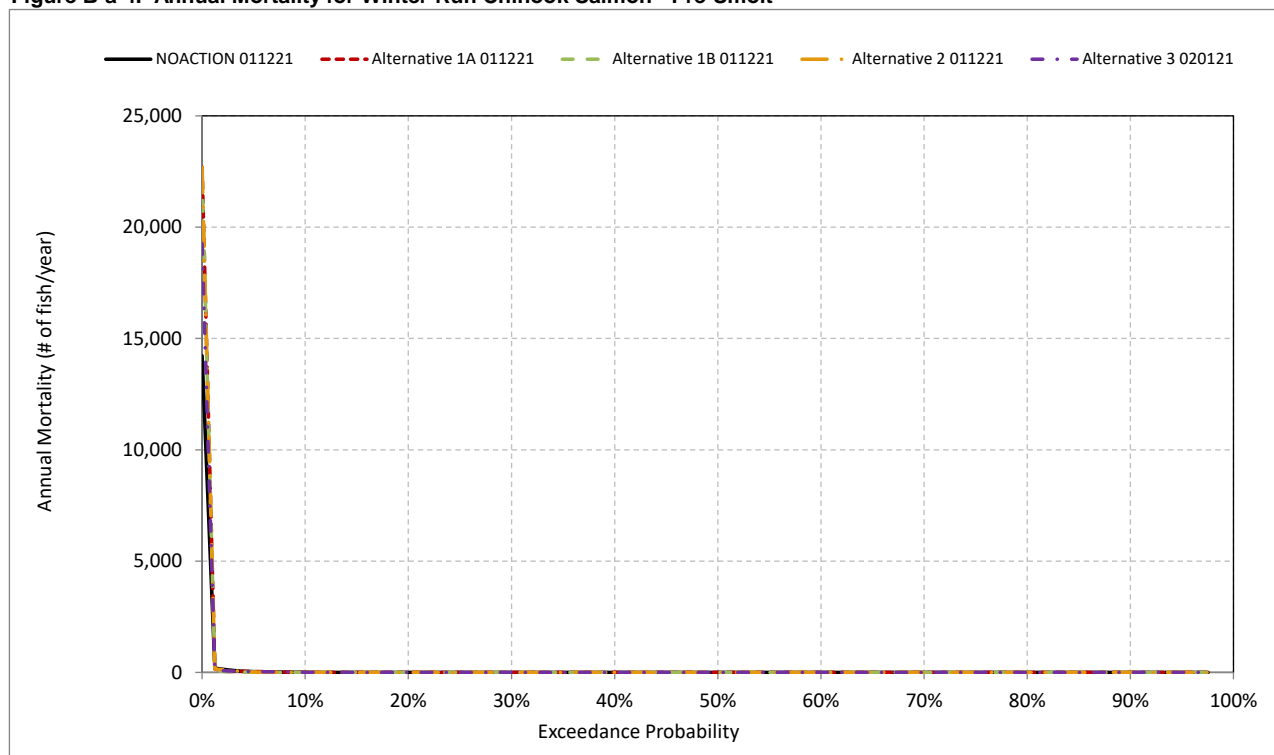


Figure B-a-5. Annual Mortality for Winter-Run Chinook Salmon - Immature Smolt

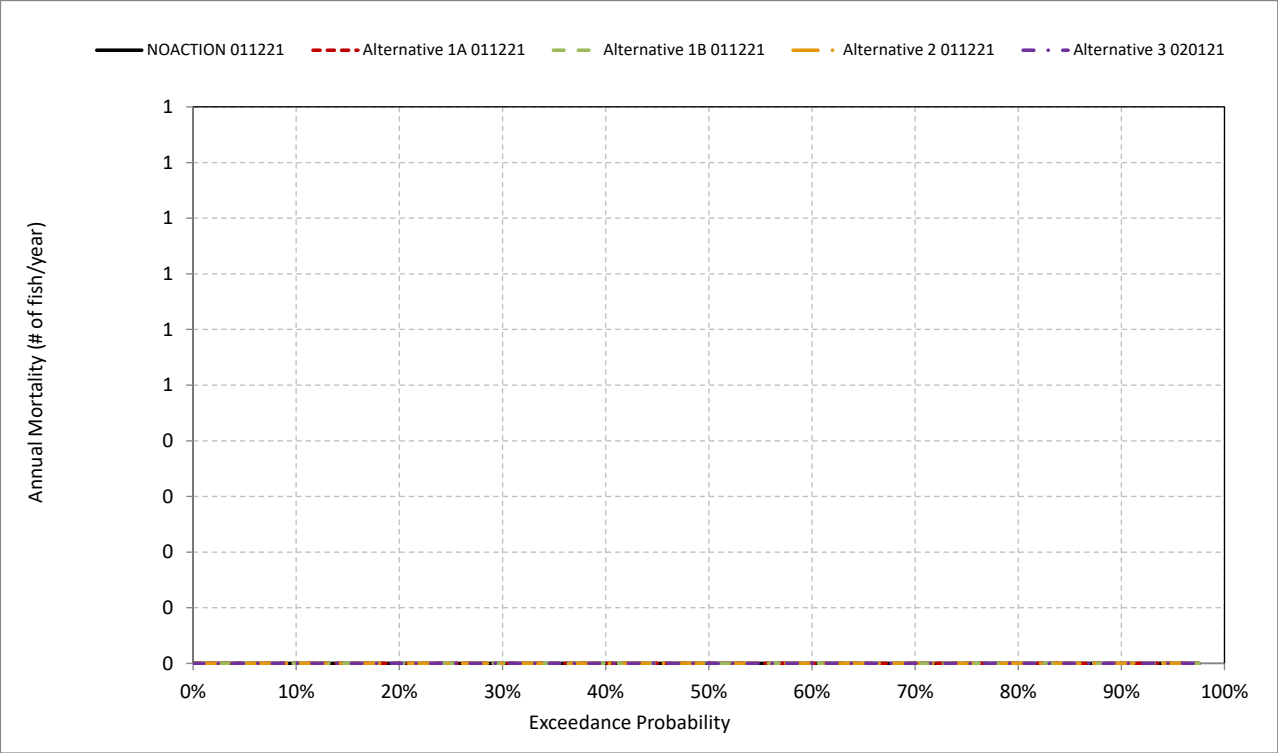


Figure B-a-6. Annual Mortality for Winter-Run Chinook Salmon - Pre- & Immature Smolts

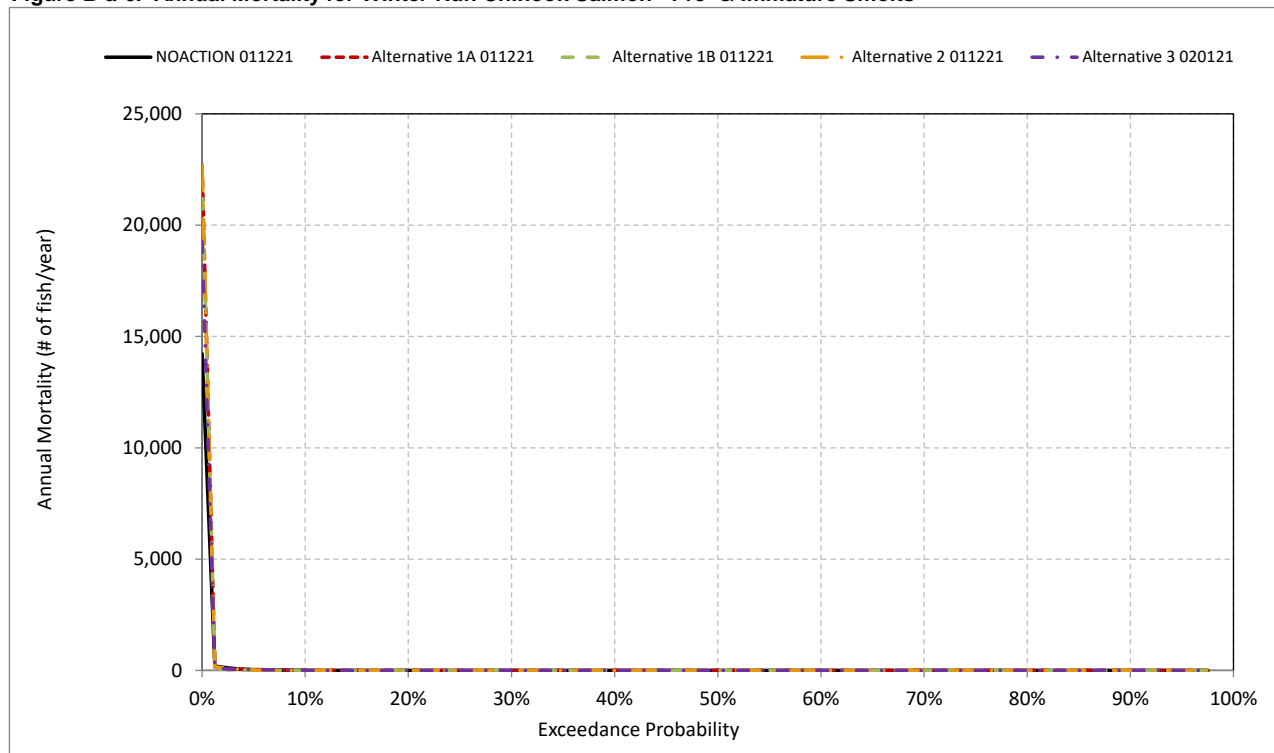


Figure B-a-7. Annual Mortality for Winter-Run Chinook Salmon - All Lifestages

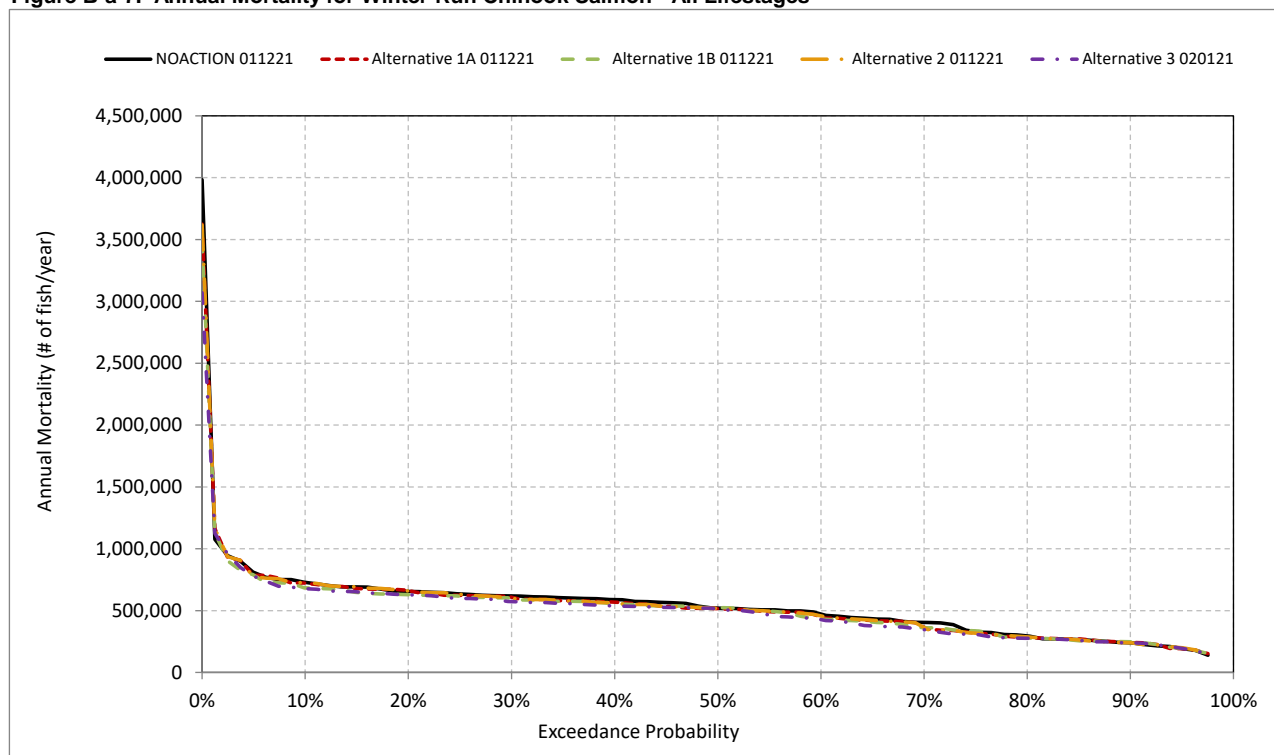




Figure B-a-8. Incubation - Habitat based Annual Mortality for Winter-Run Chinook Salmon

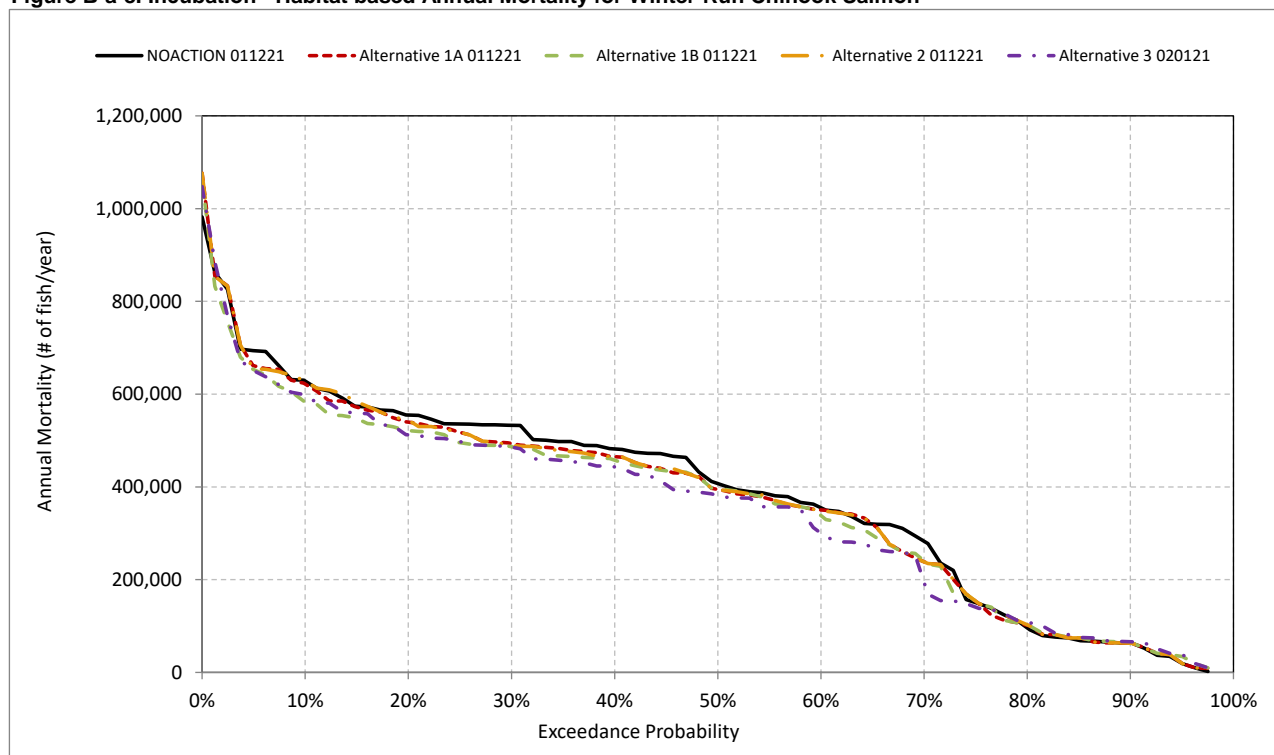


Figure B-a-9. Super-imposition - Habitat based Annual Mortality for Winter-Run Chinook Salmon

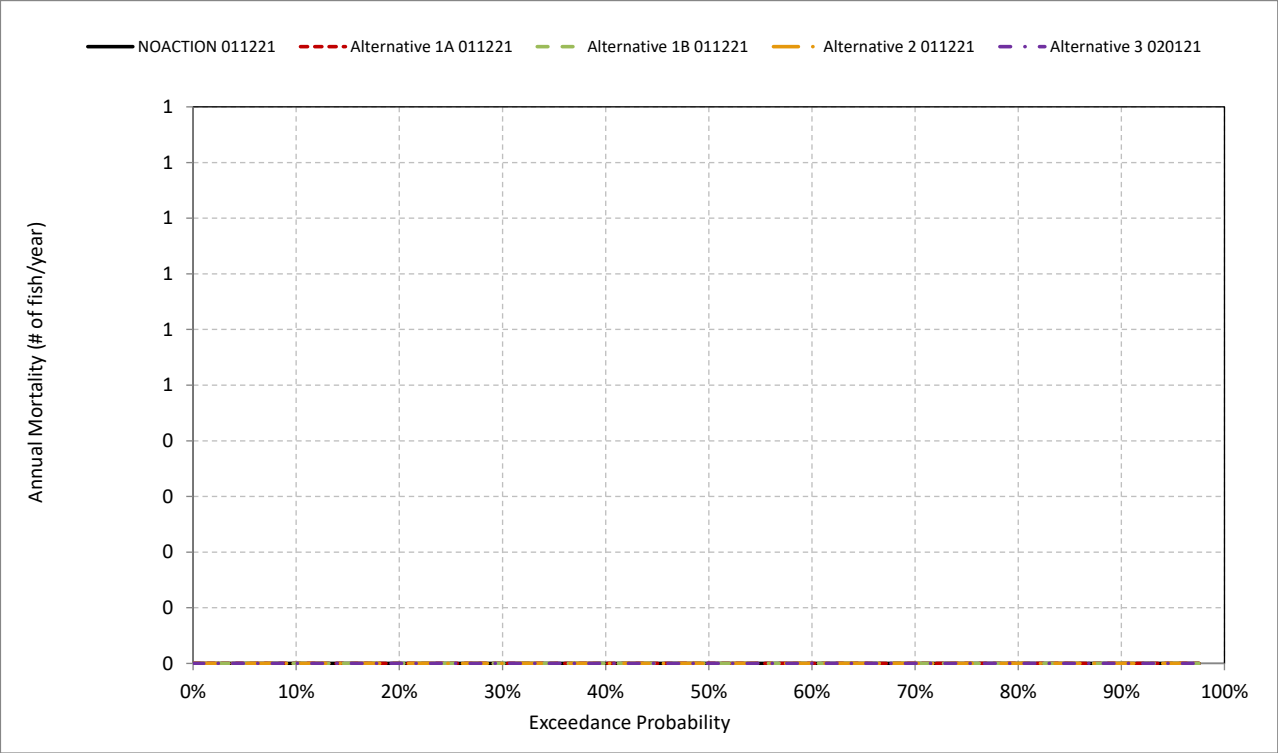


Figure B-a-10. Fry - Habitat based Annual Mortality for Winter-Run Chinook Salmon

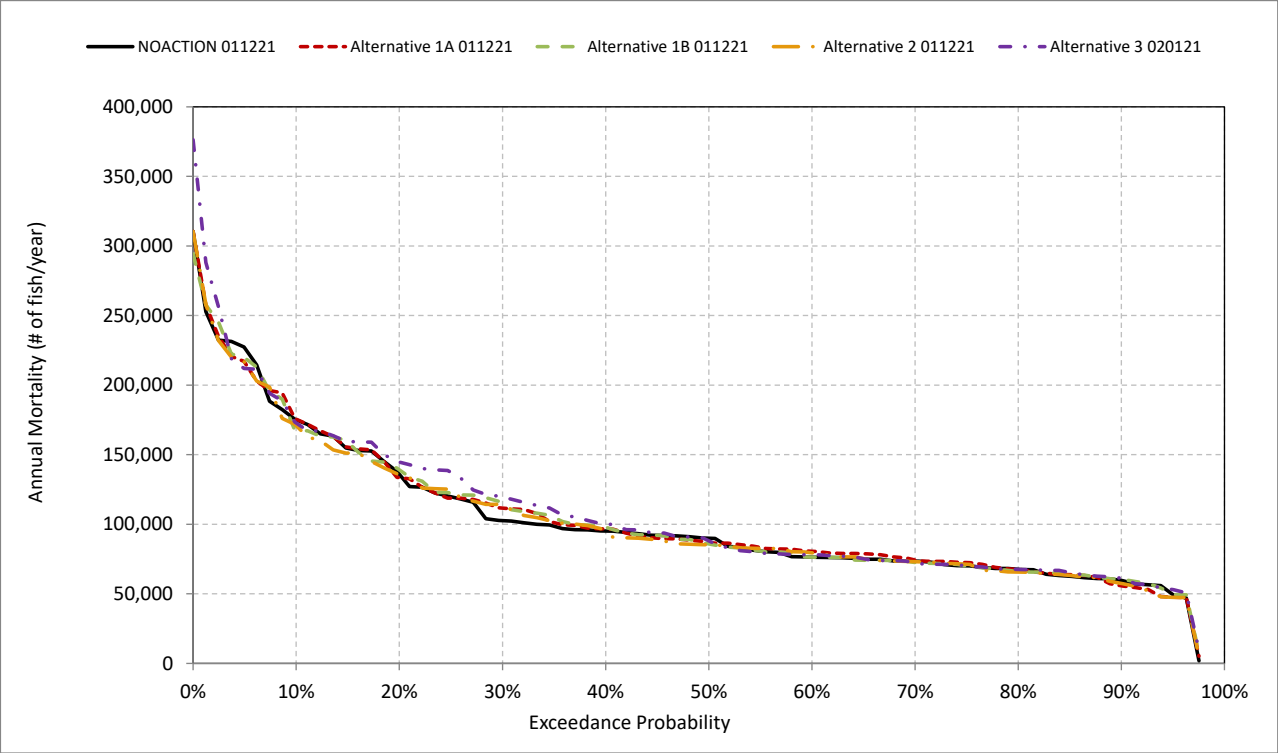


Figure B-a-11. Pre-smolt - Habitat based Annual Mortality for Winter-Run Chinook Salmon

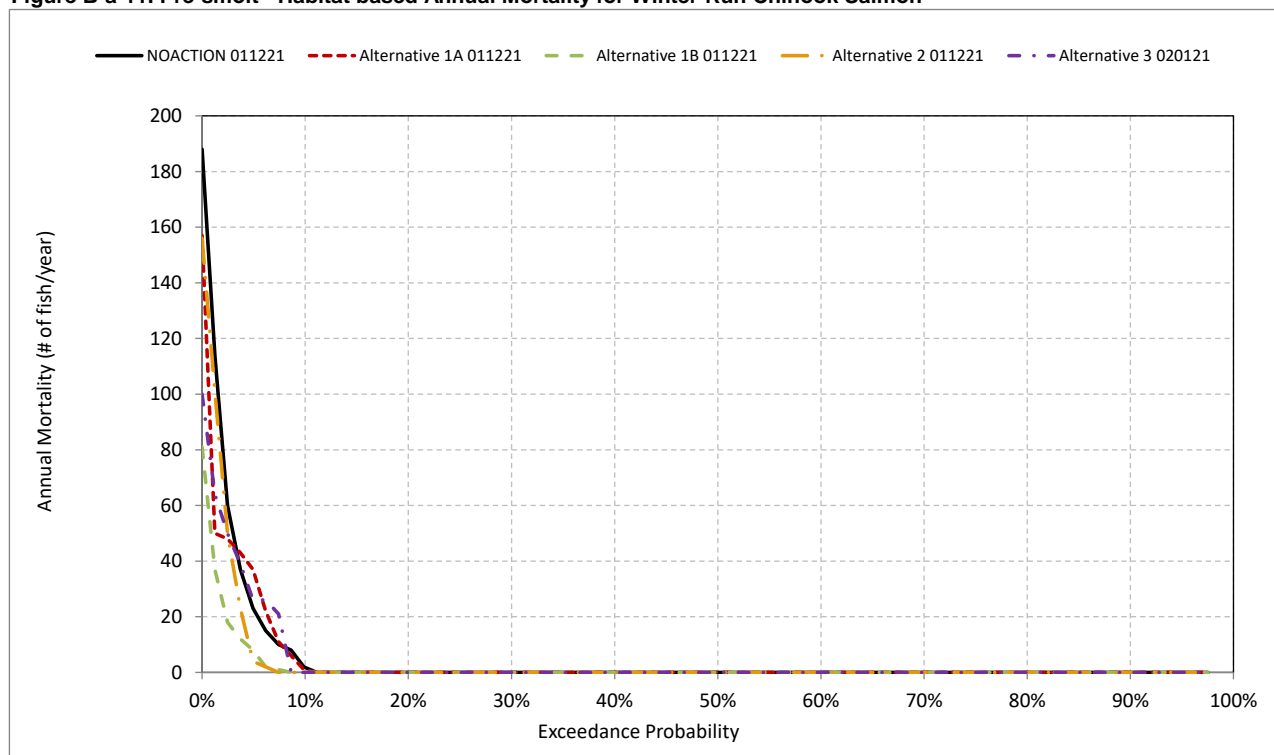


Figure B-a-12. Immature Smolt - Habitat based Annual Mortality for Winter-Run Chinook Salmon

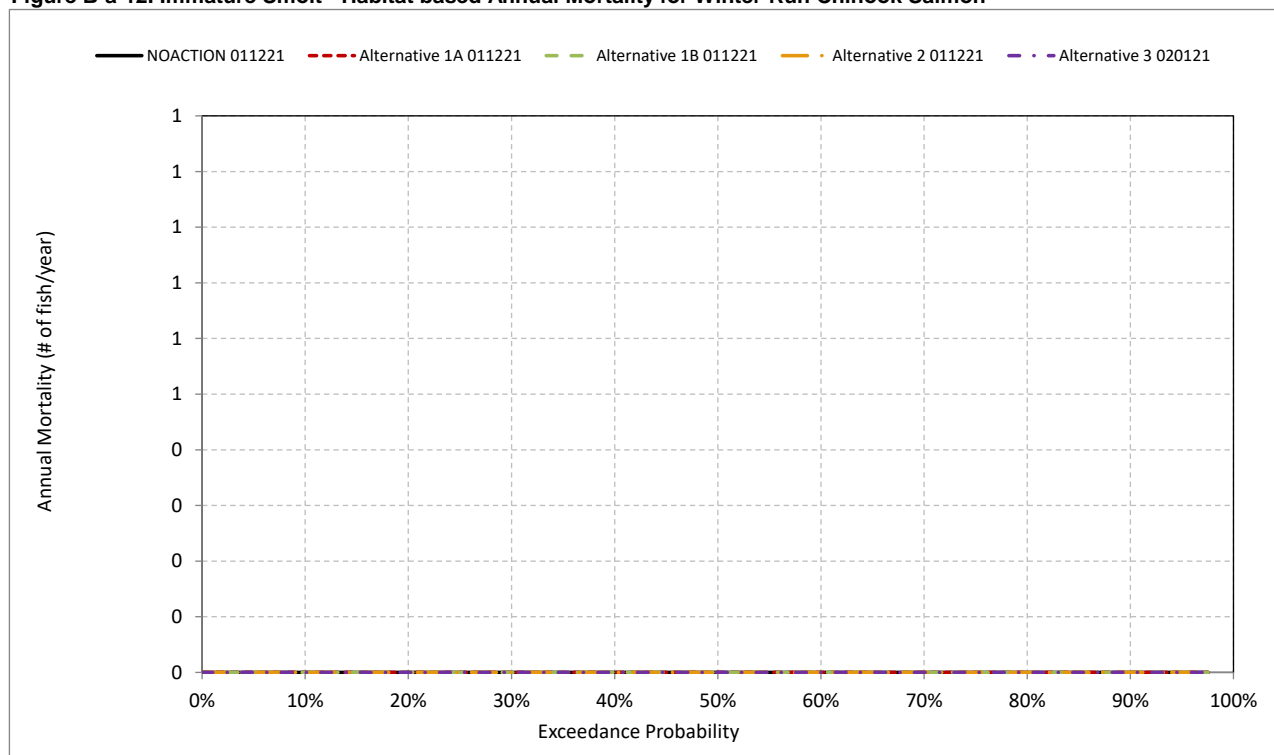


Figure B-a-13. Total Habitat based Annual Mortality for Winter-Run Chinook Salmon

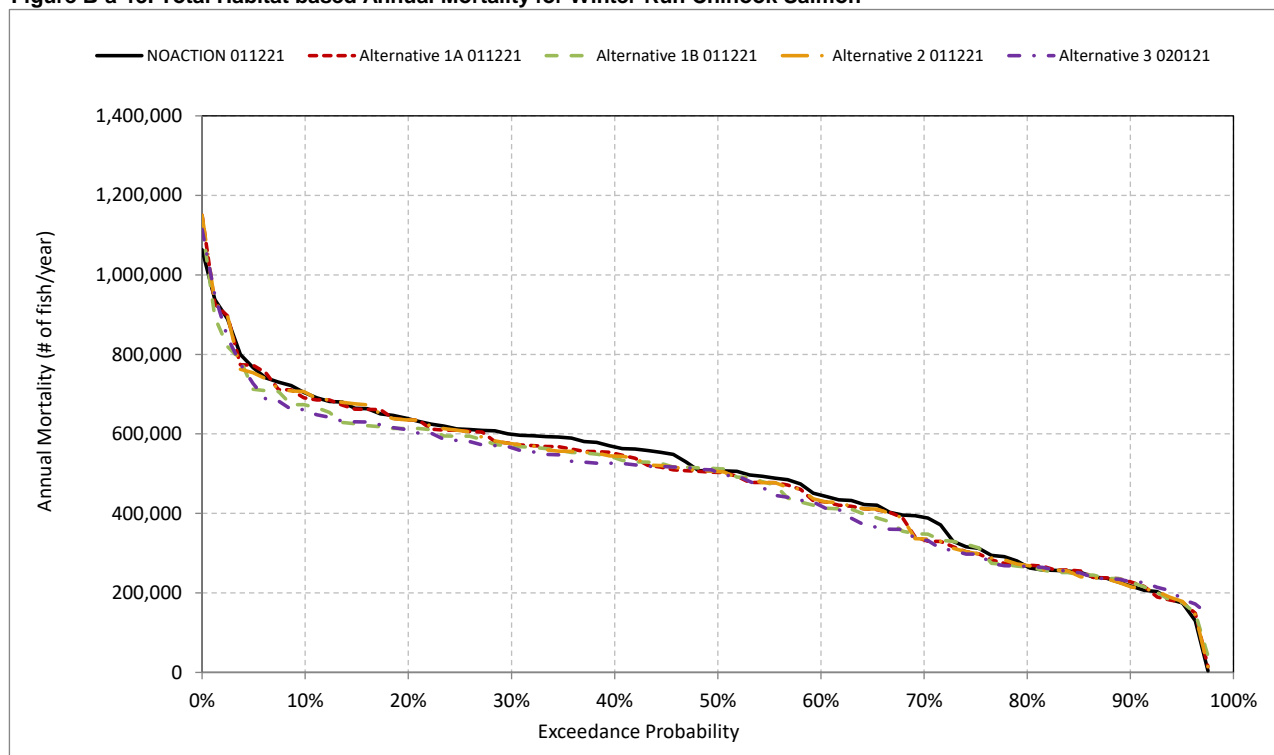


Figure B-a-14. Pre-Spawn Mortality - Temperature based Annual Mortality for Winter-Run Chinook Salmon

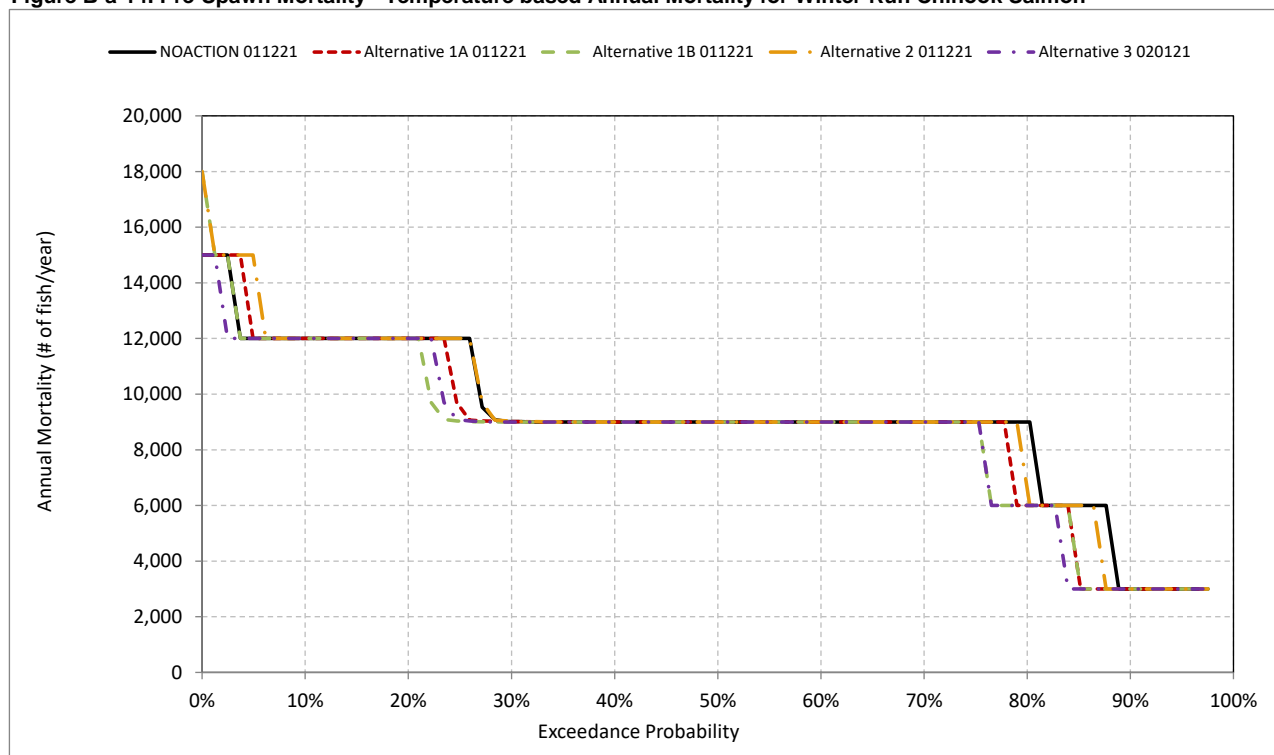


Figure B-a-15. Eggs - Temperature based Annual Mortality for Winter-Run Chinook Salmon

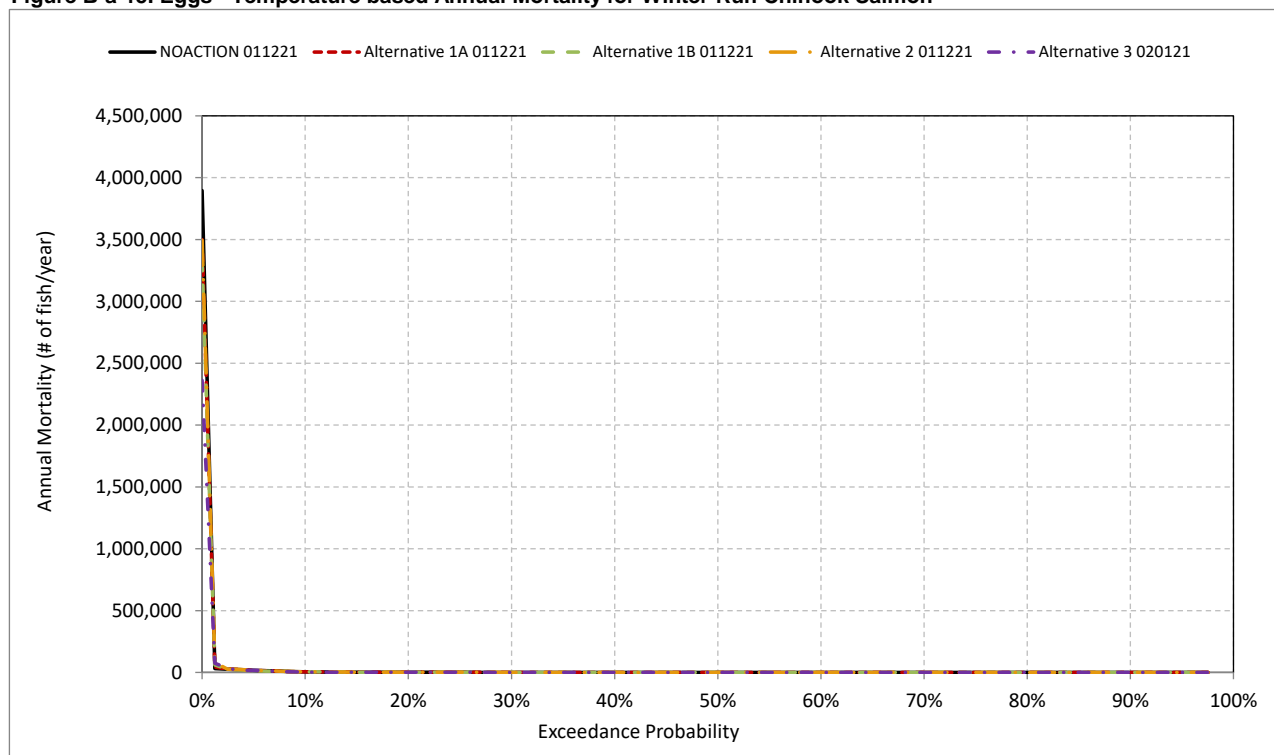




Figure B-a-16. Fry - Temperature based Annual Mortality for Winter-Run Chinook Salmon

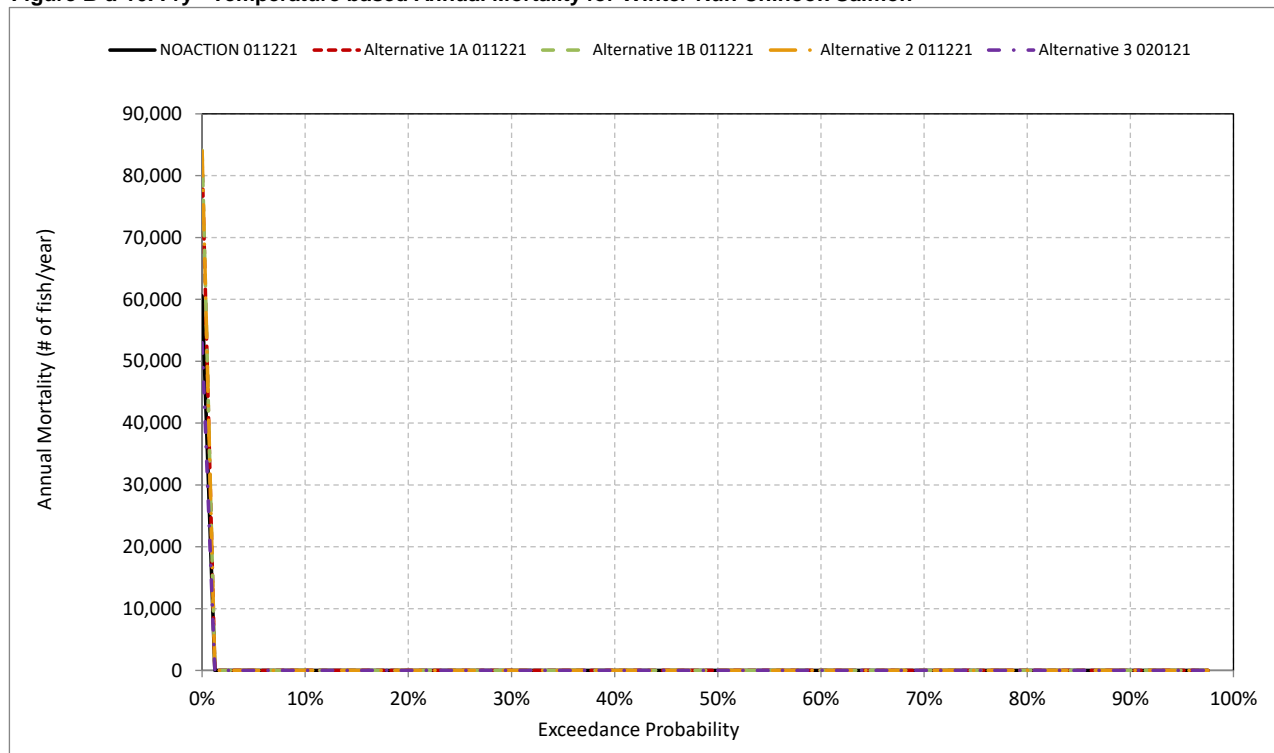


Figure B-a-17. Pre-smolt - Temperature based Annual Mortality for Winter-Run Chinook Salmon

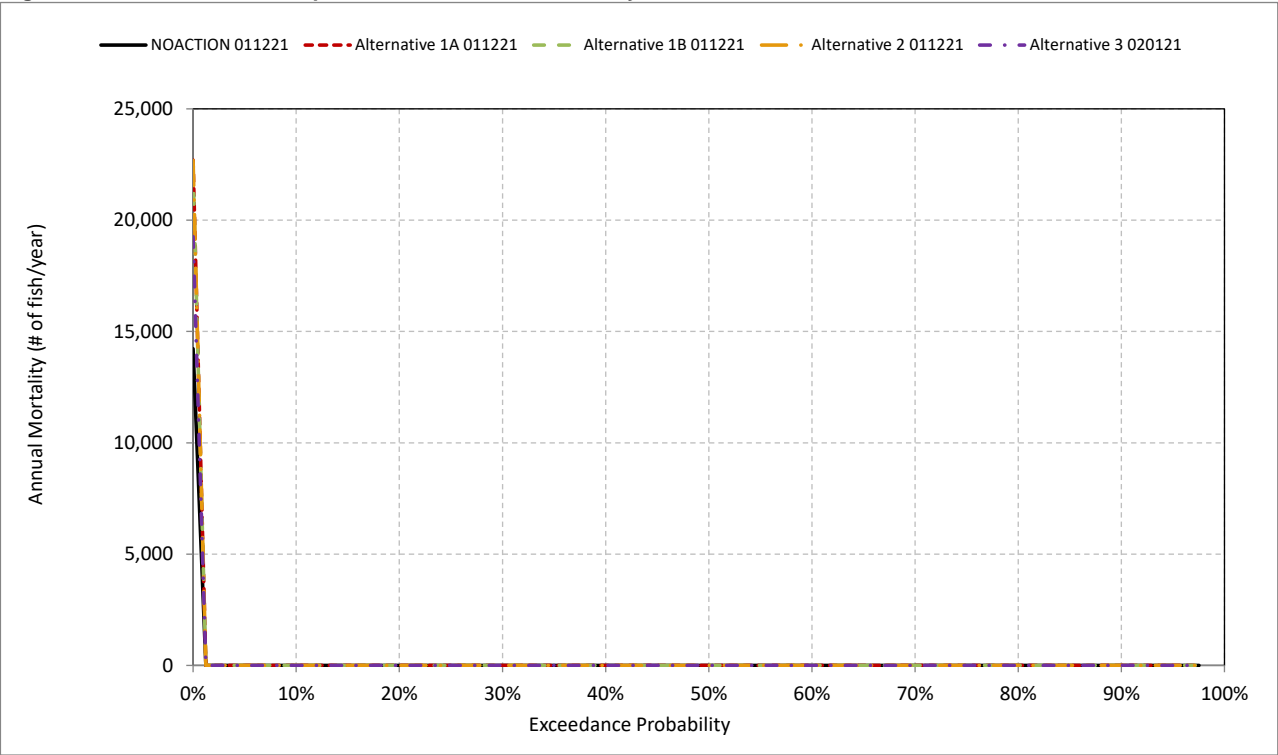
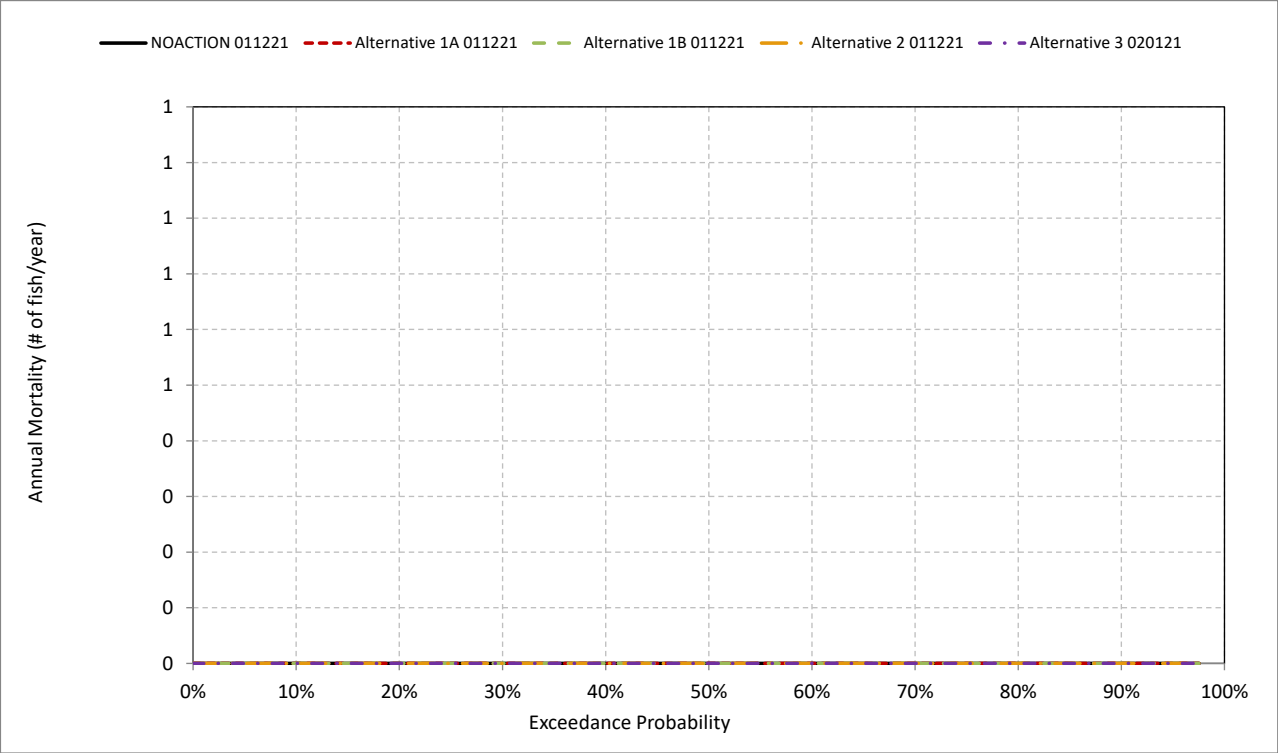


Figure B-a-18. Immature Smolt - Temperature based Annual Mortality for Winter-Run Chinook Salmon



**Figure B-a-19. Total Temperature based Annual Mortality for Winter-Run Chinook Salmon**

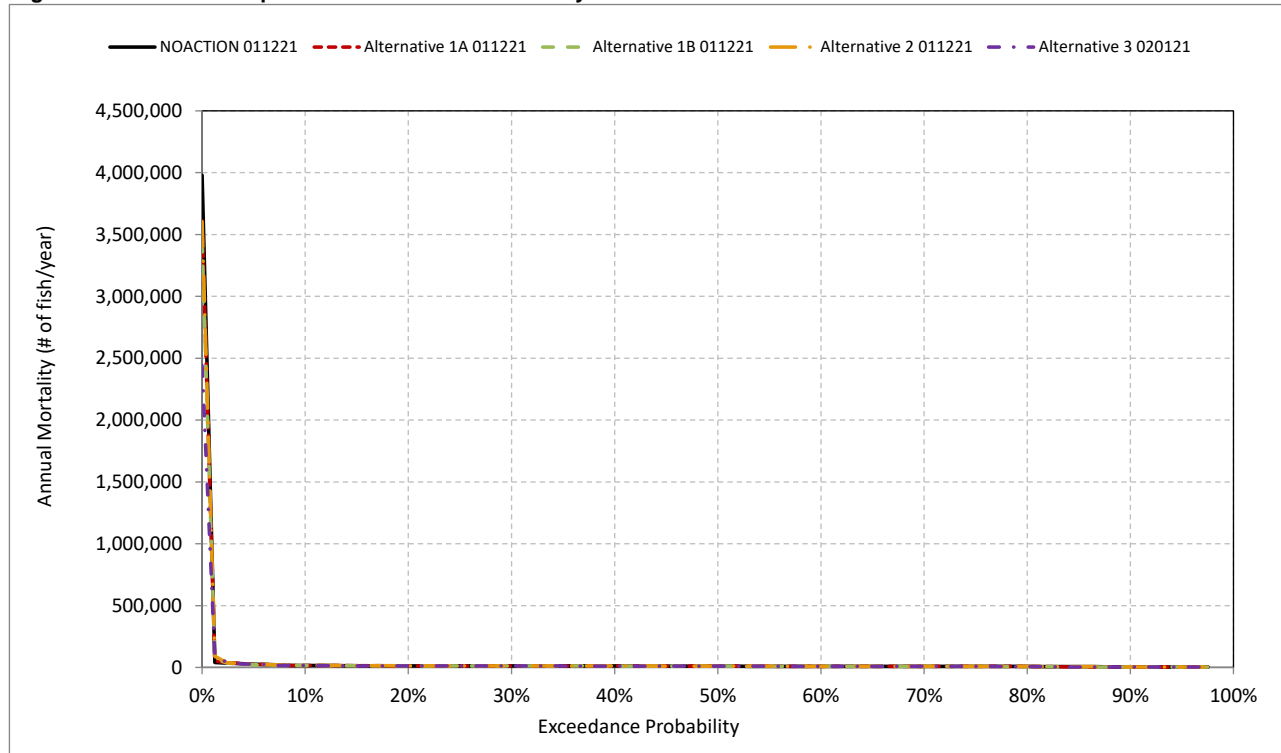
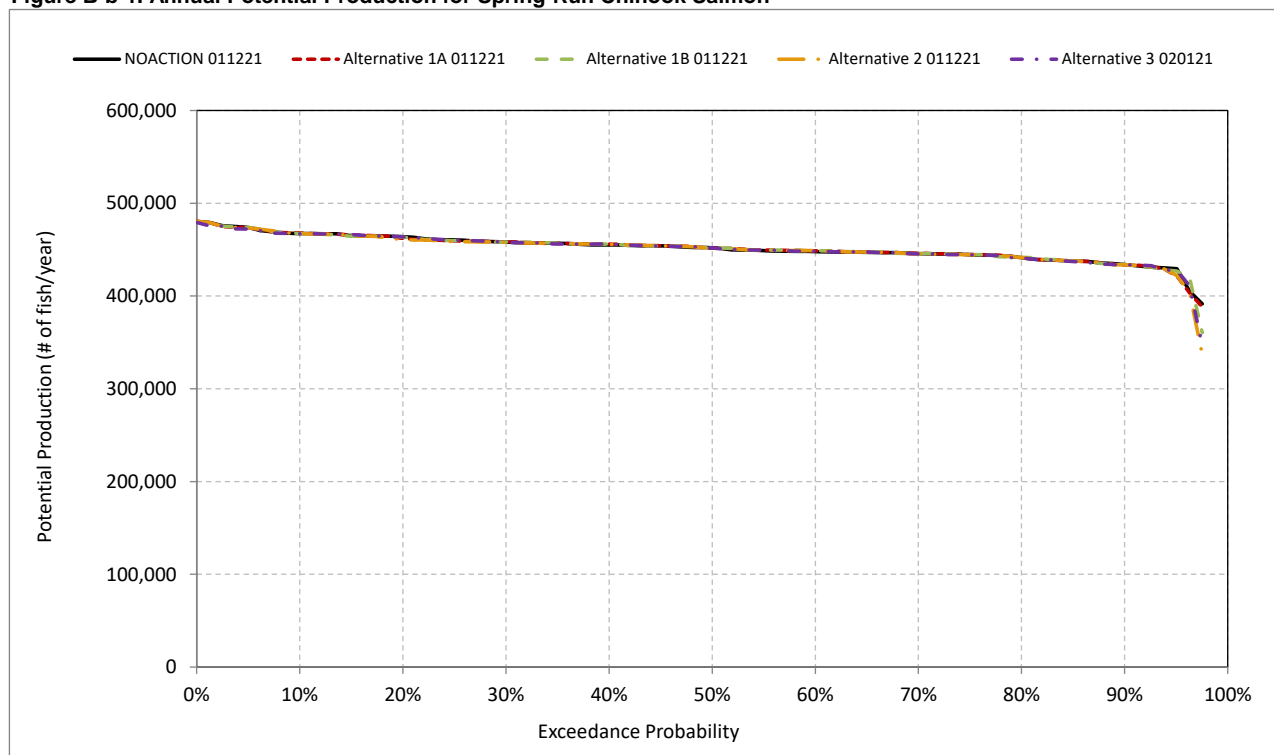


Figure B-b-1. Annual Potential Production for Spring-Run Chinook Salmon



**Figure B-b-2. Annual Mortality for Spring-Run Chinook Salmon - Eggs**

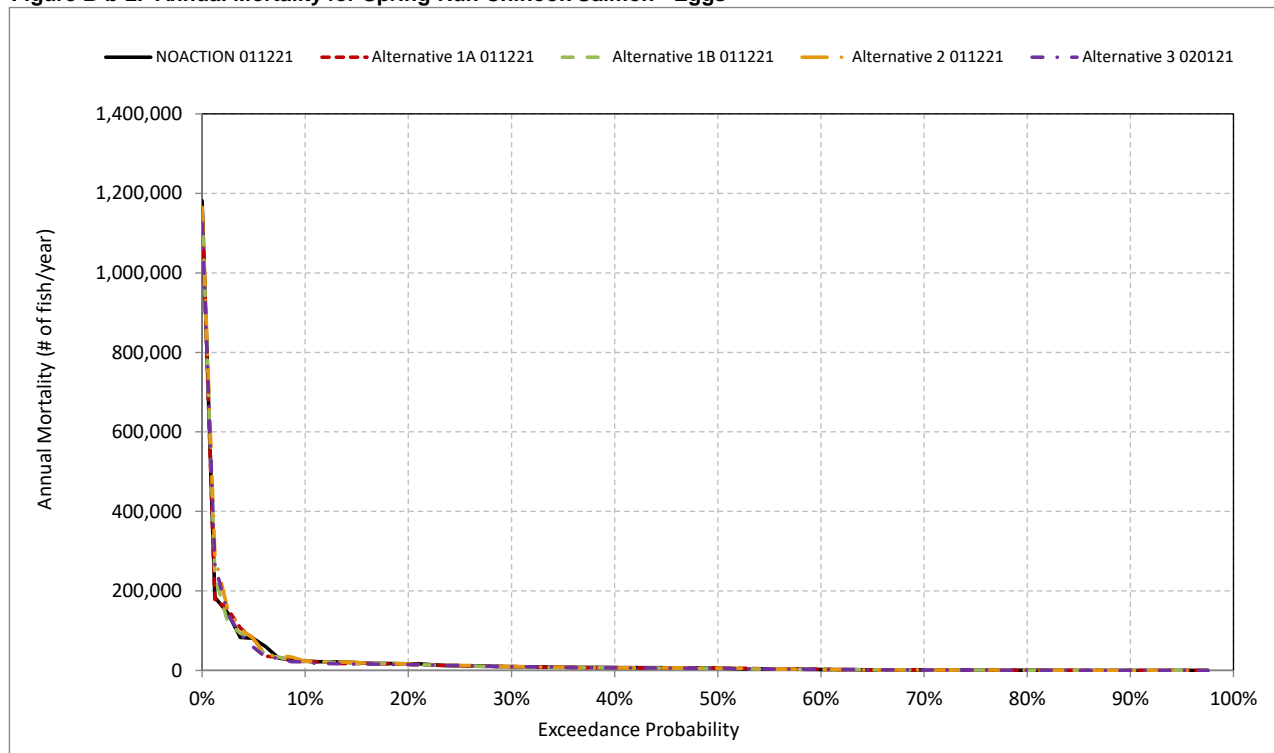
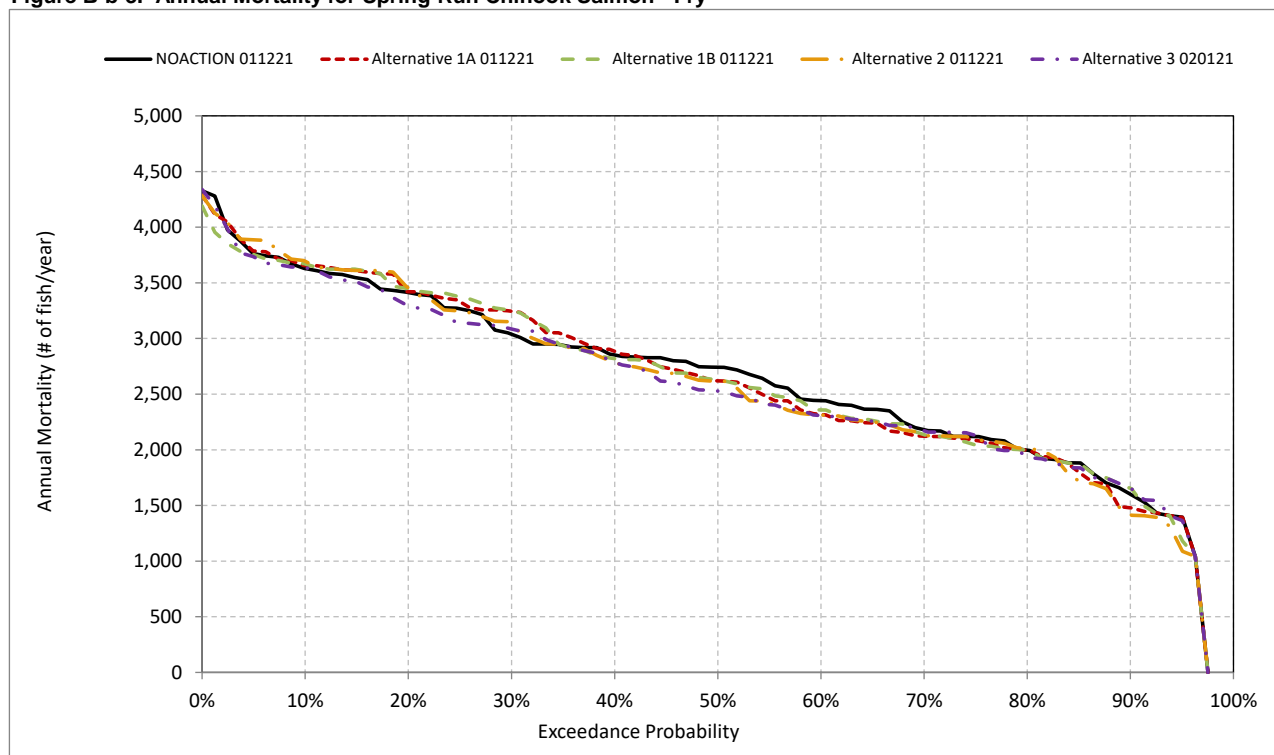


Figure B-b-3. Annual Mortality for Spring-Run Chinook Salmon - Fry



**Figure B-b-4. Annual Mortality for Spring-Run Chinook Salmon - Pre-Smolt**

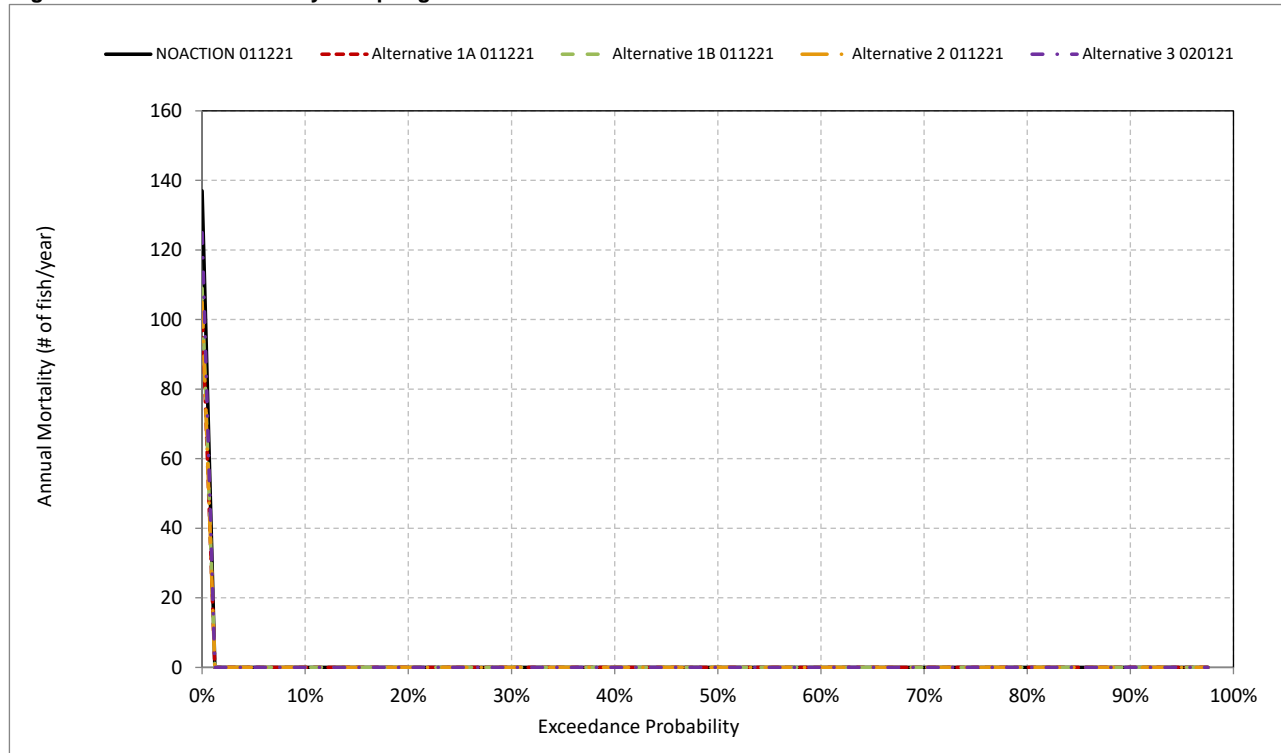




Figure B-b-5. Annual Mortality for Spring-Run Chinook Salmon - Immature Smolt

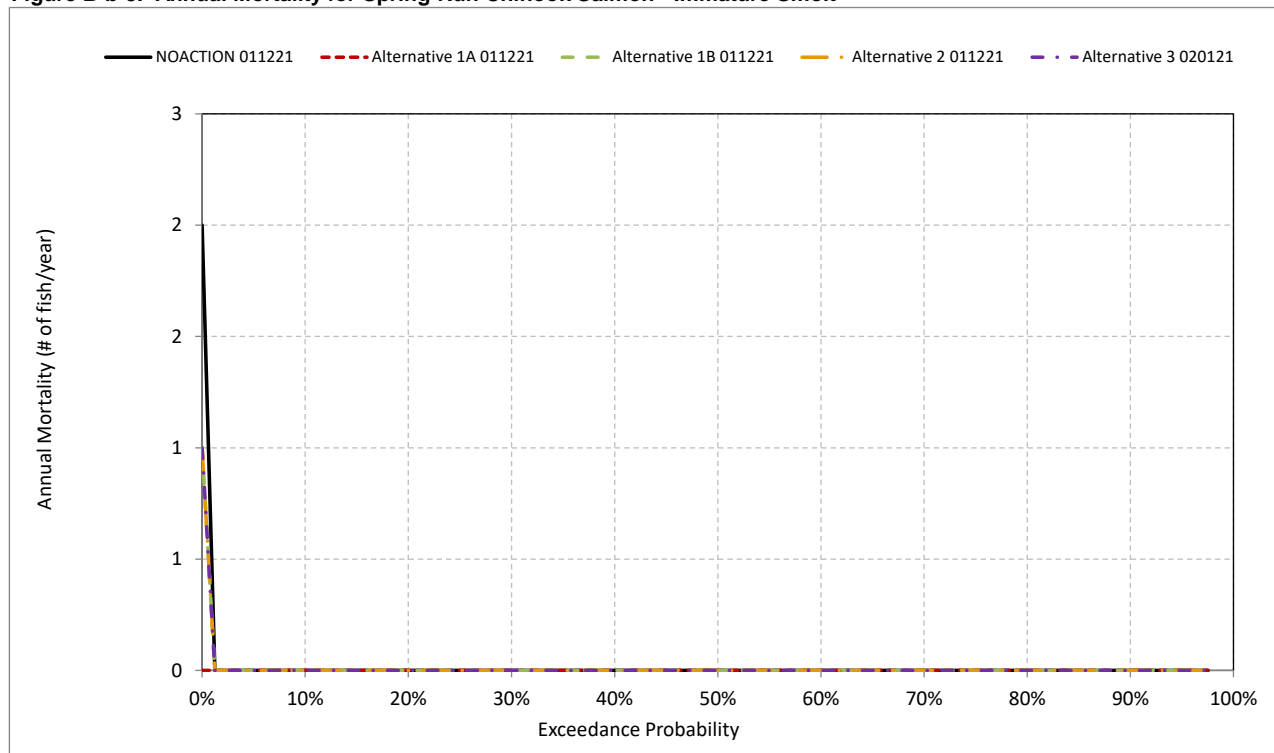


Figure B-b-6. Annual Mortality for Spring-Run Chinook Salmon - Pre- & Immature Smolts

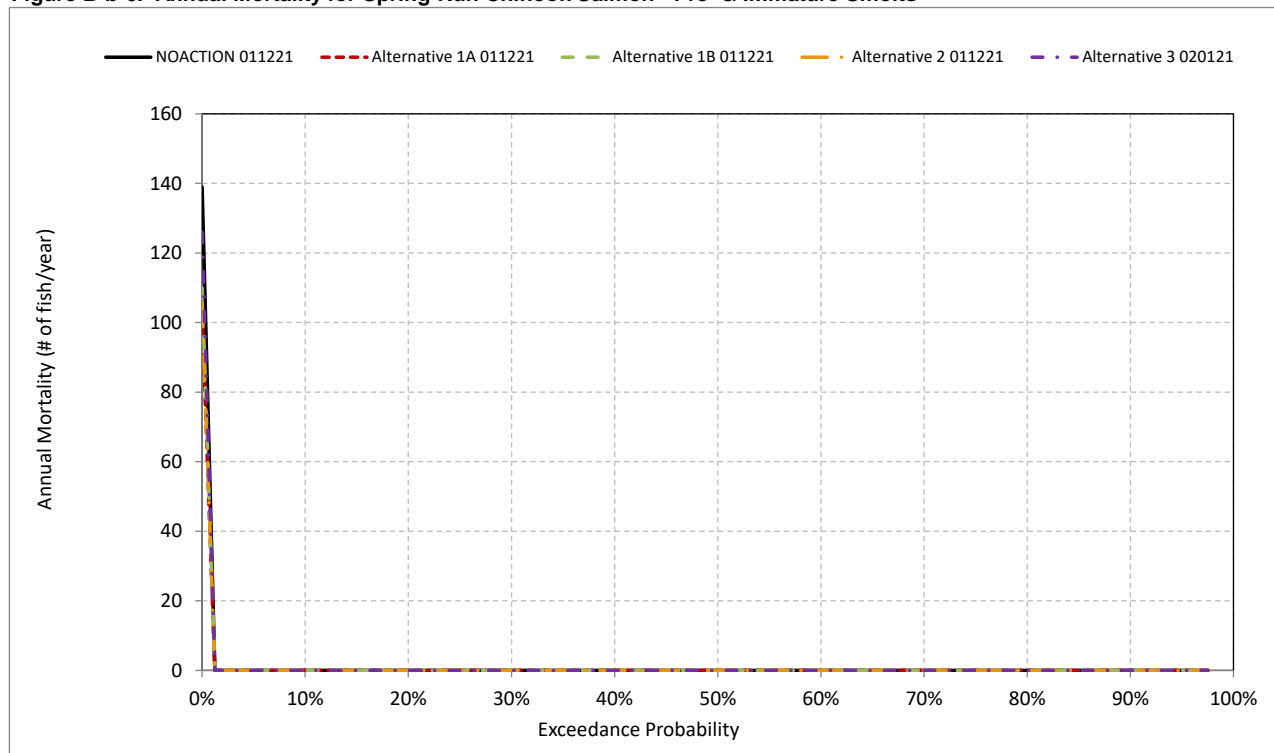


Figure B-b-7. Annual Mortality for Spring-Run Chinook Salmon - All Lifestages

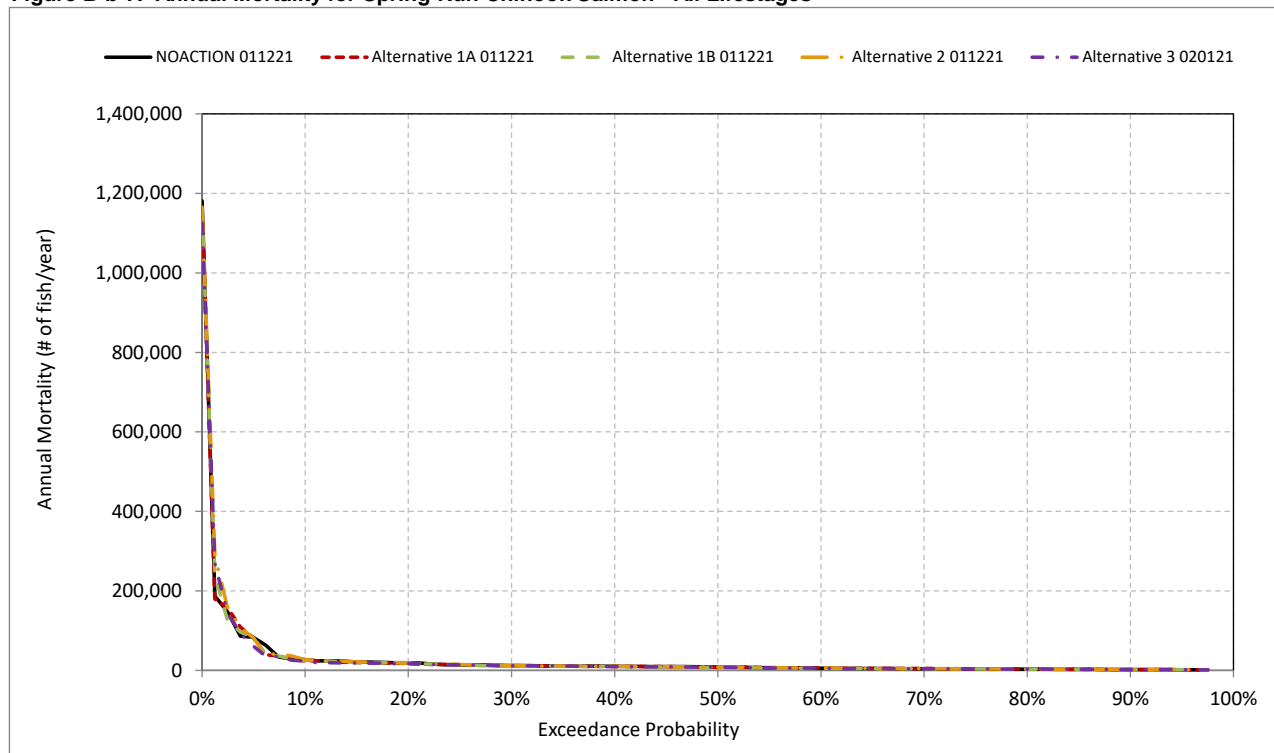


Figure B-b-8. Incubation - Habitat based Annual Mortality for Spring-Run Chinook Salmon

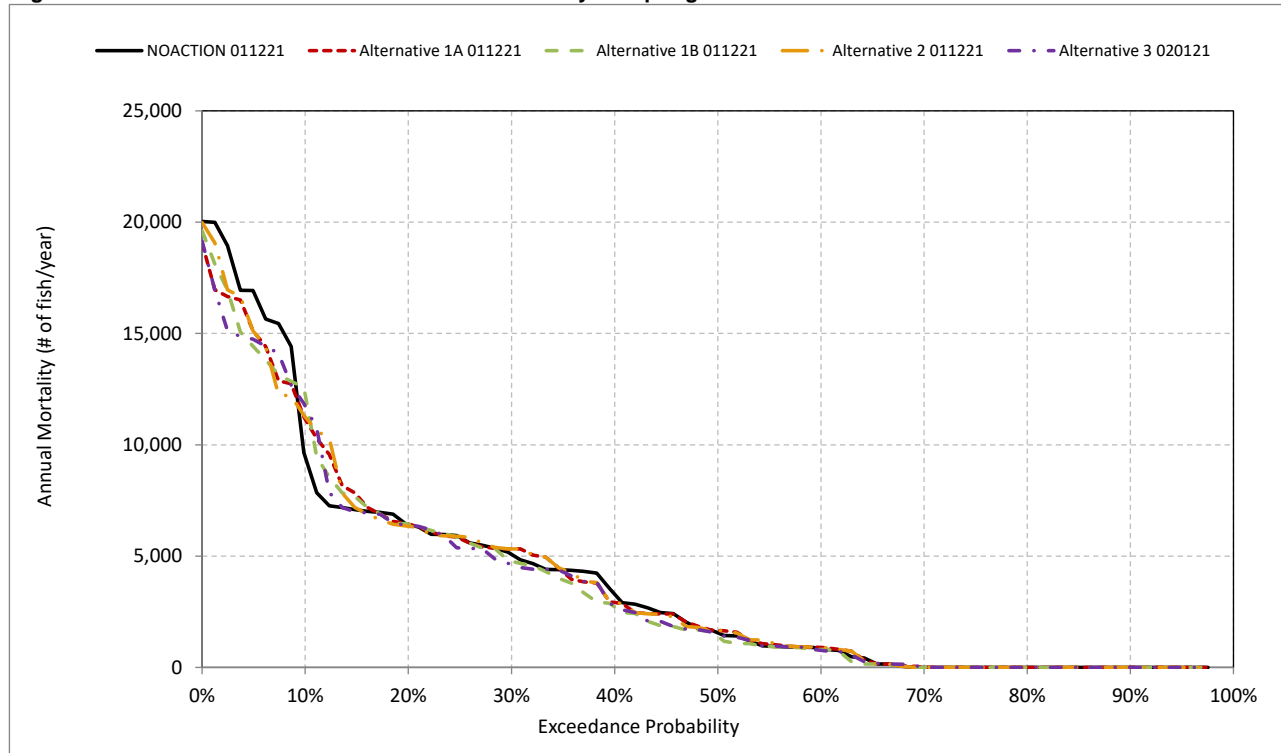


Figure B-b-9. Super-imposition - Habitat based Annual Mortality for Spring-Run Chinook Salmon

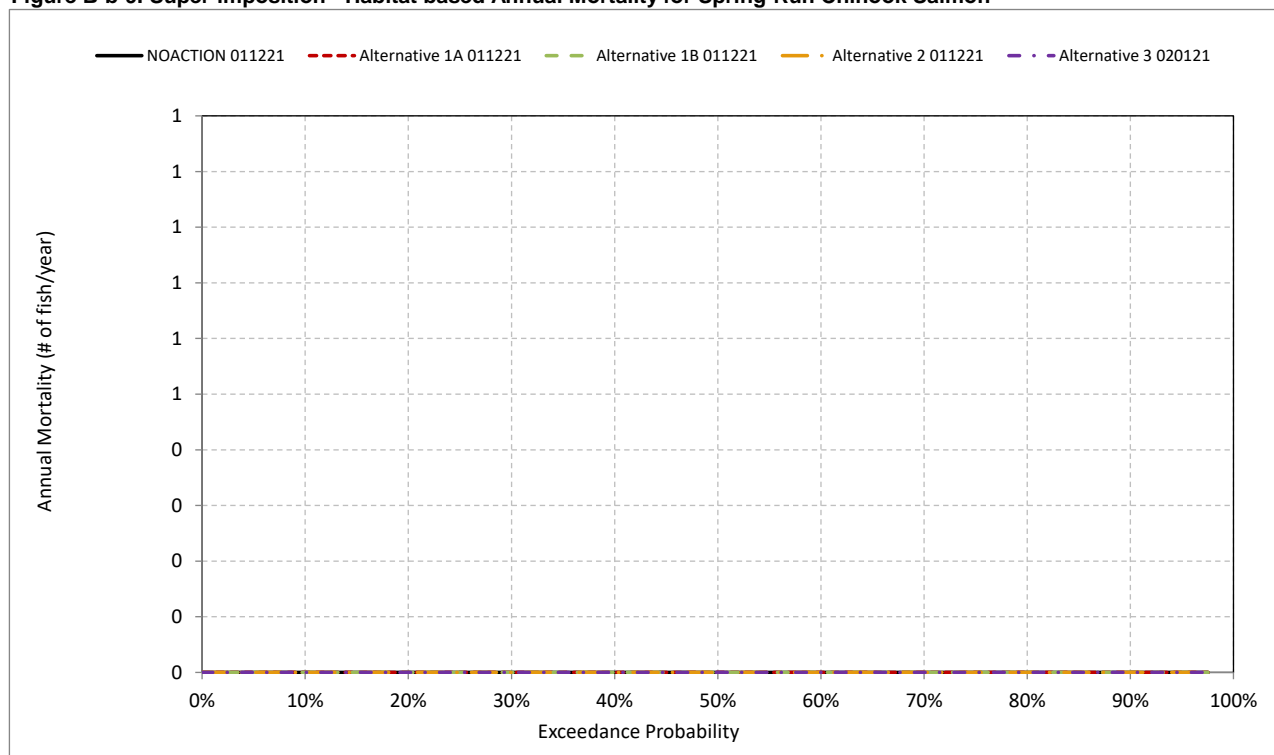


Figure B-b-10. Fry - Habitat based Annual Mortality for Spring-Run Chinook Salmon

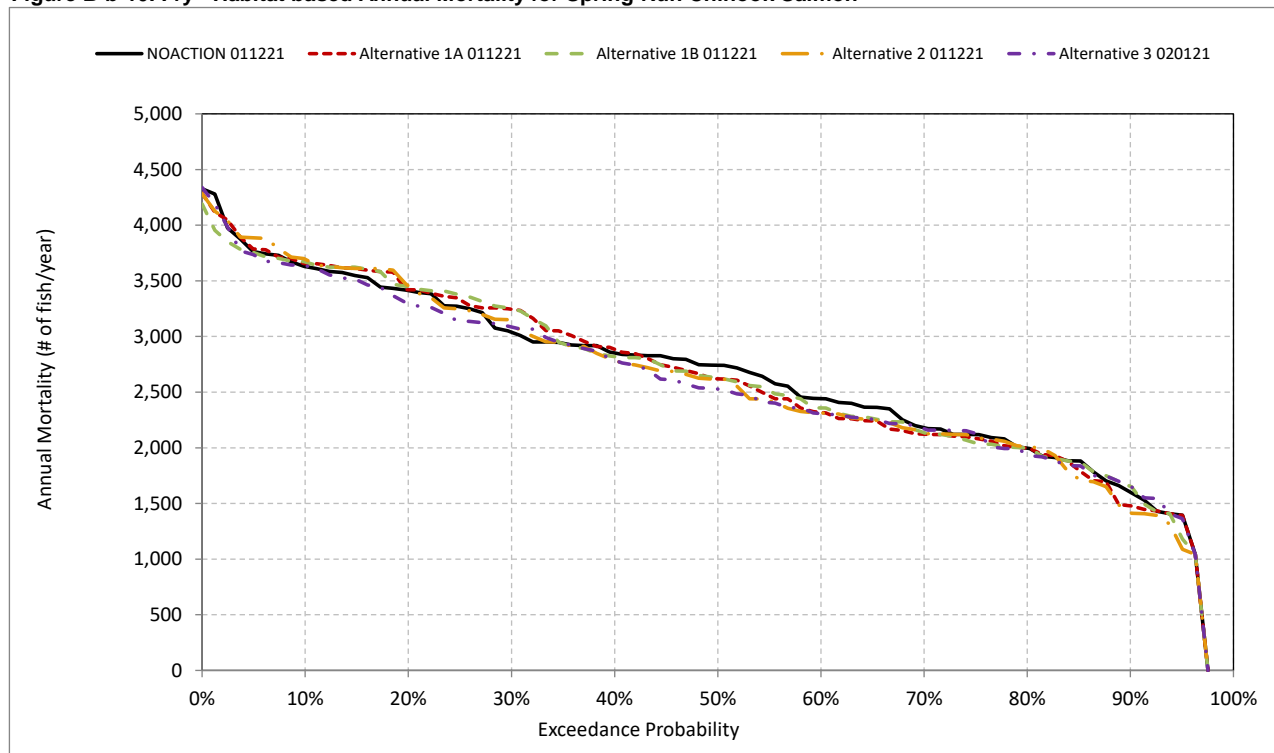


Figure B-b-11. Pre-smolt - Habitat based Annual Mortality for Spring-Run Chinook Salmon

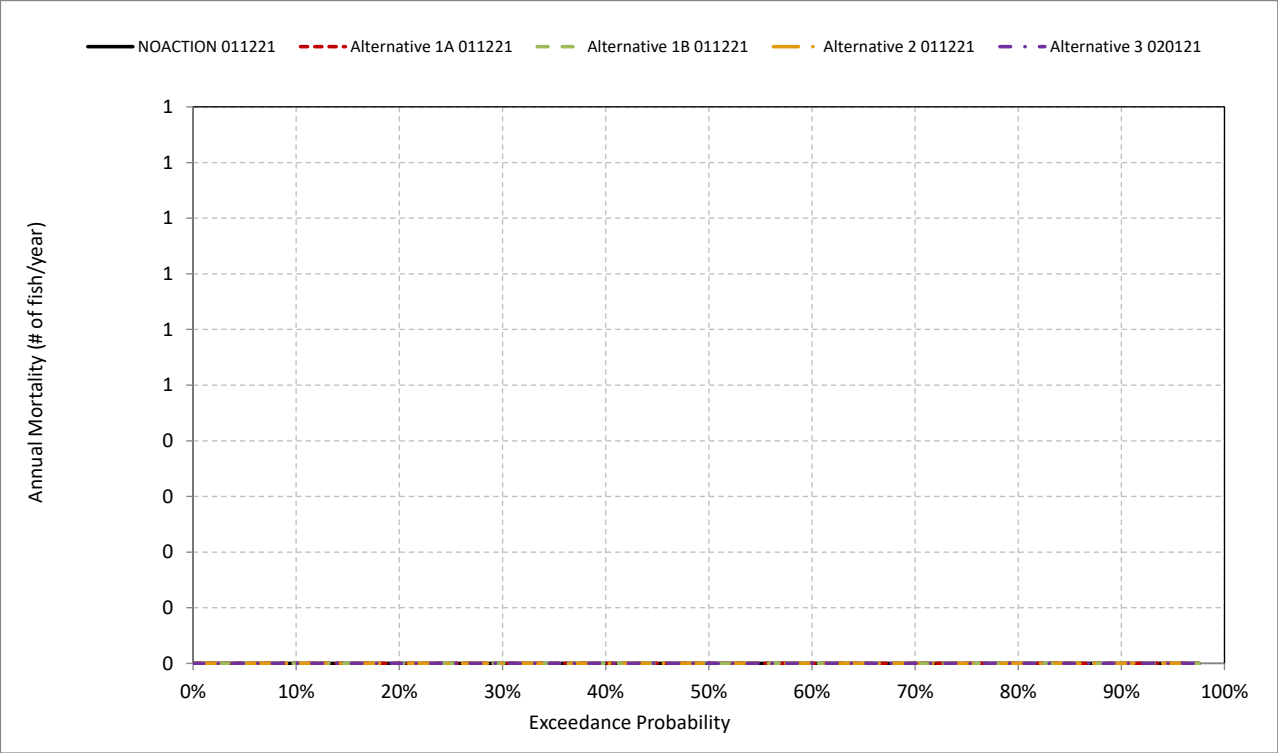


Figure B-b-12. Immature Smolt - Habitat based Annual Mortality for Spring-Run Chinook Salmon

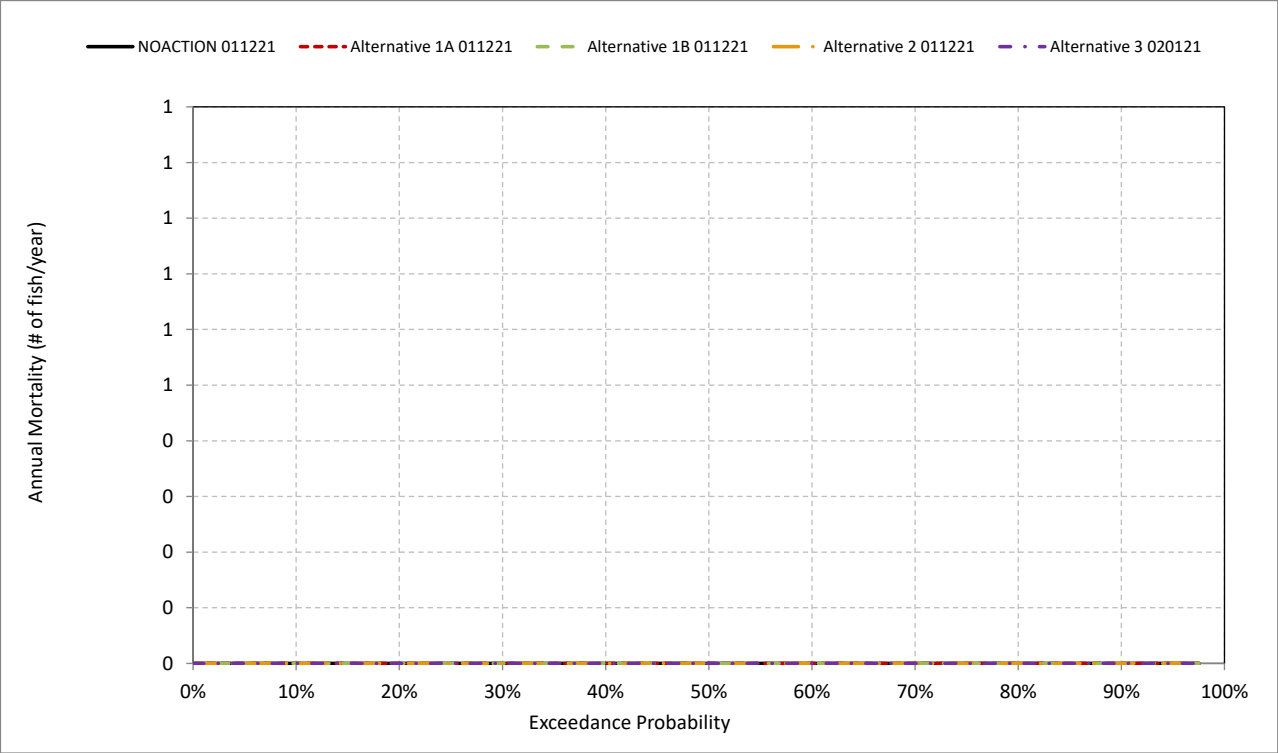




Figure B-b-13. Total Habitat based Annual Mortality for Spring-Run Chinook Salmon

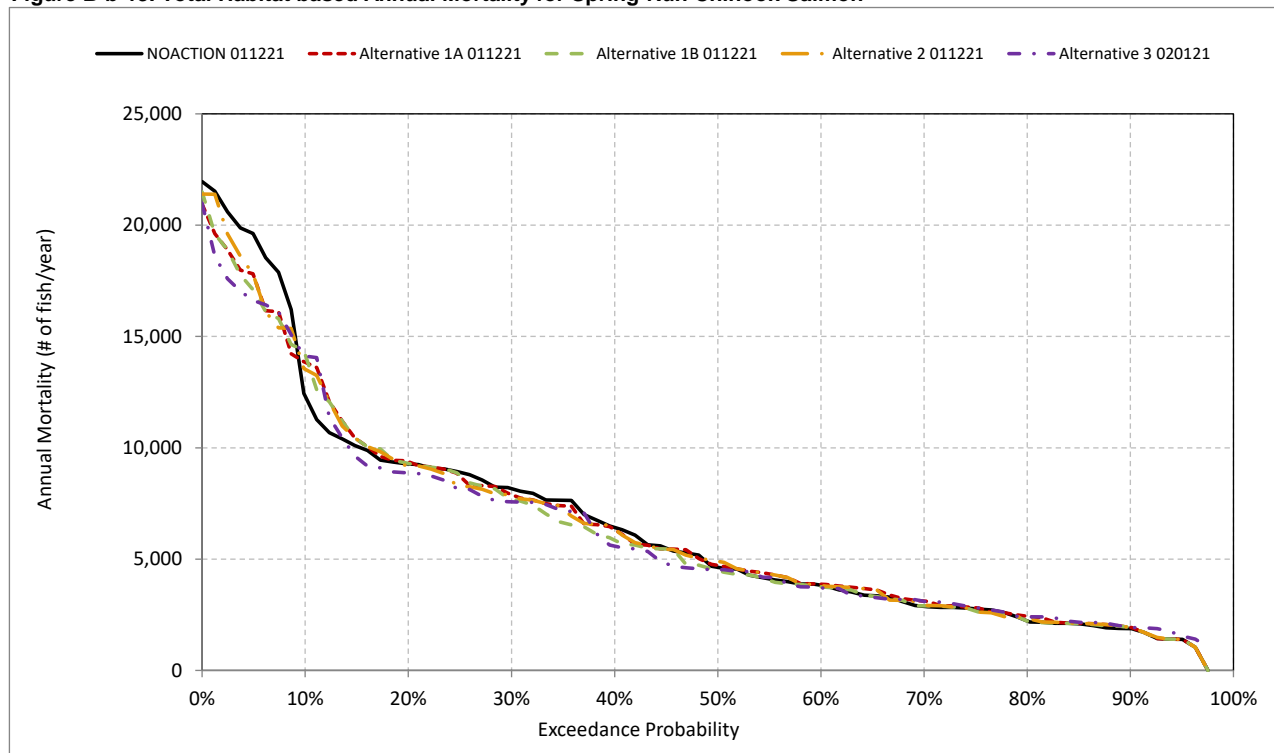


Figure B-b-14. Pre-Spawn Mortality - Temperature based Annual Mortality for Spring-Run Chinook Salmon

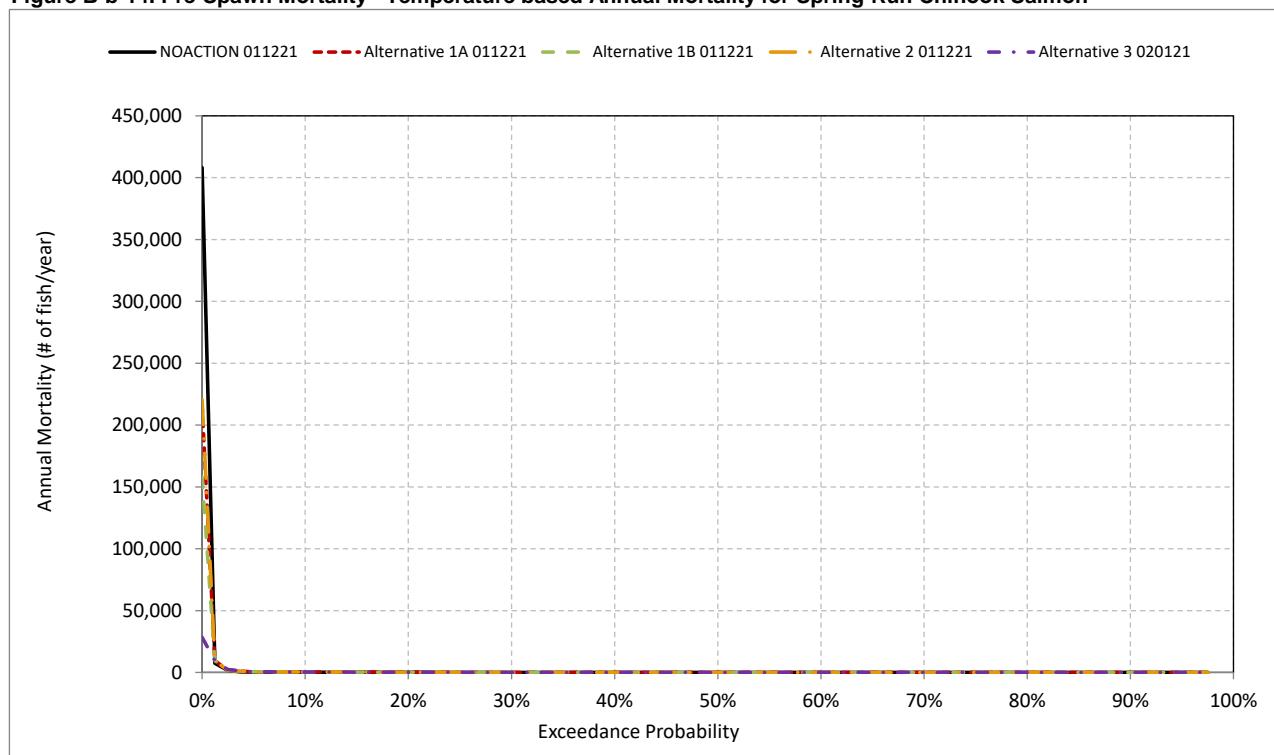


Figure B-b-15. Eggs - Temperature based Annual Mortality for Spring-Run Chinook Salmon

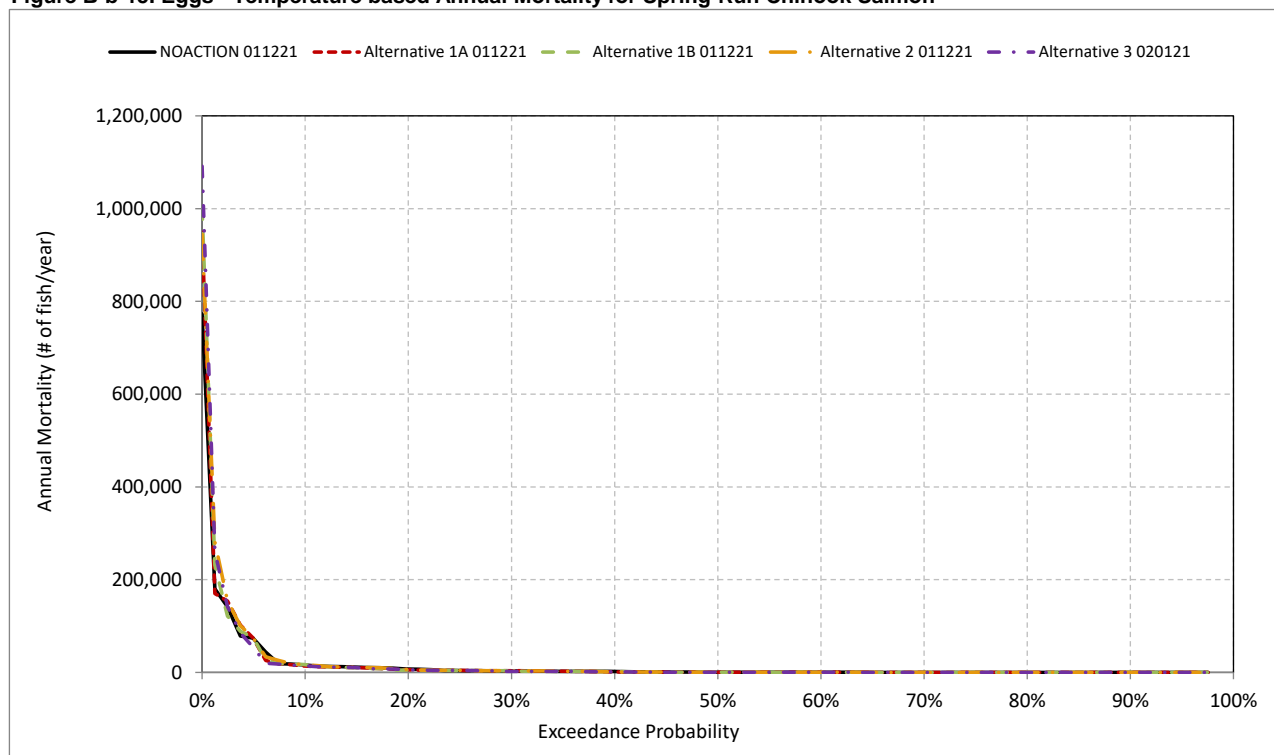


Figure B-b-16. Fry - Temperature based Annual Mortality for Spring-Run Chinook Salmon

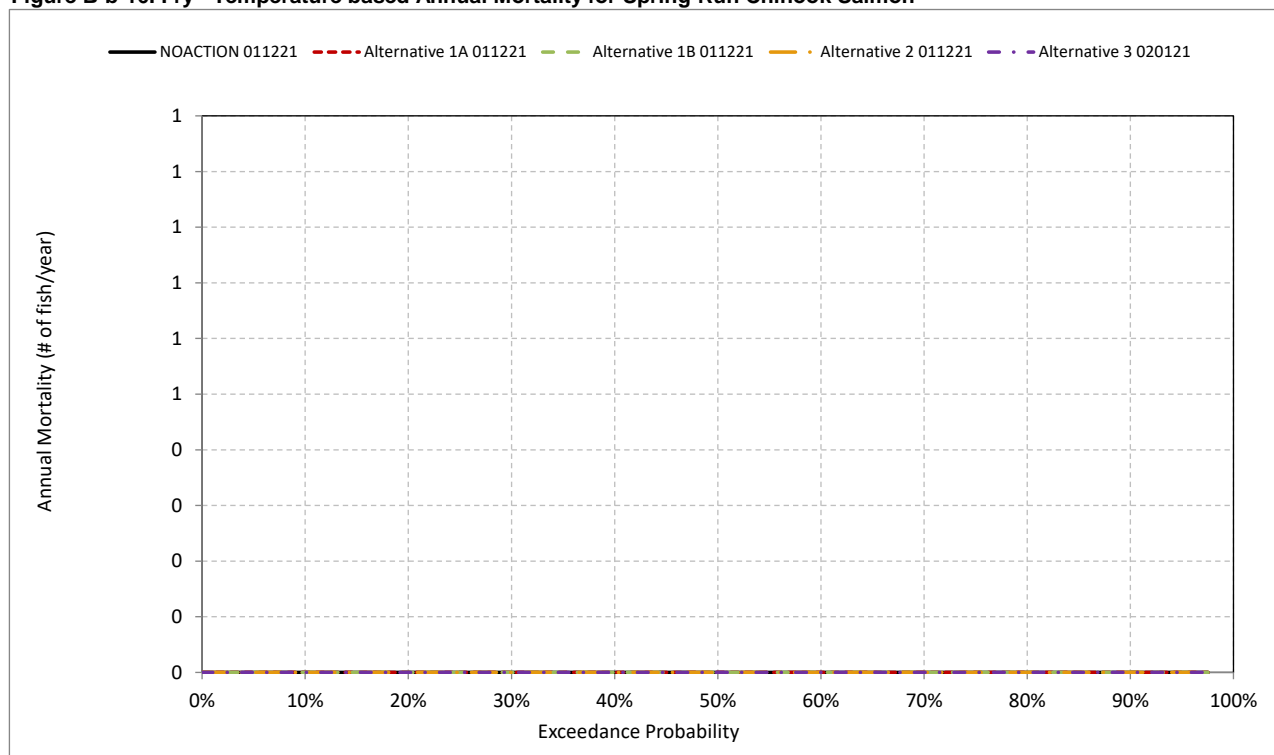


Figure B-b-17. Pre-smolt - Temperature based Annual Mortality for Spring-Run Chinook Salmon

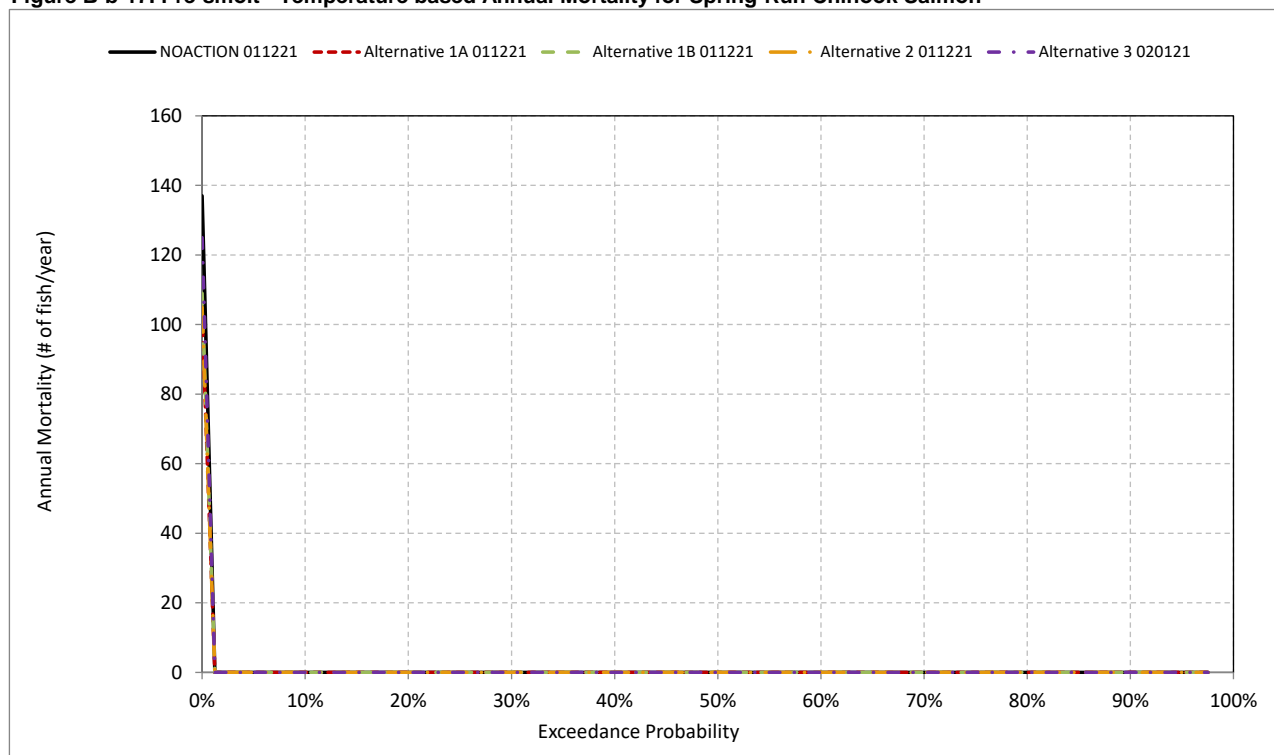


Figure B-b-18. Immature Smolt - Temperature based Annual Mortality for Spring-Run Chinook Salmon

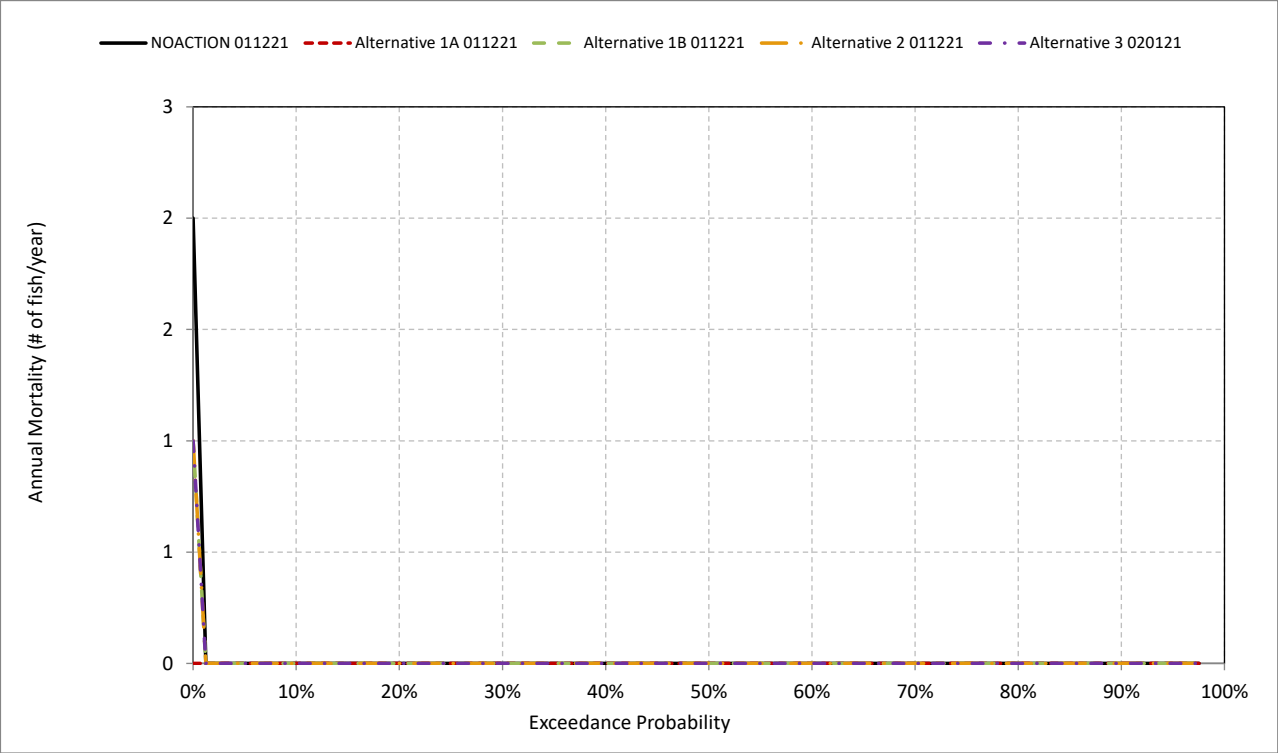


Figure B-b-19. Total Temperature based Annual Mortality for Spring-Run Chinook Salmon

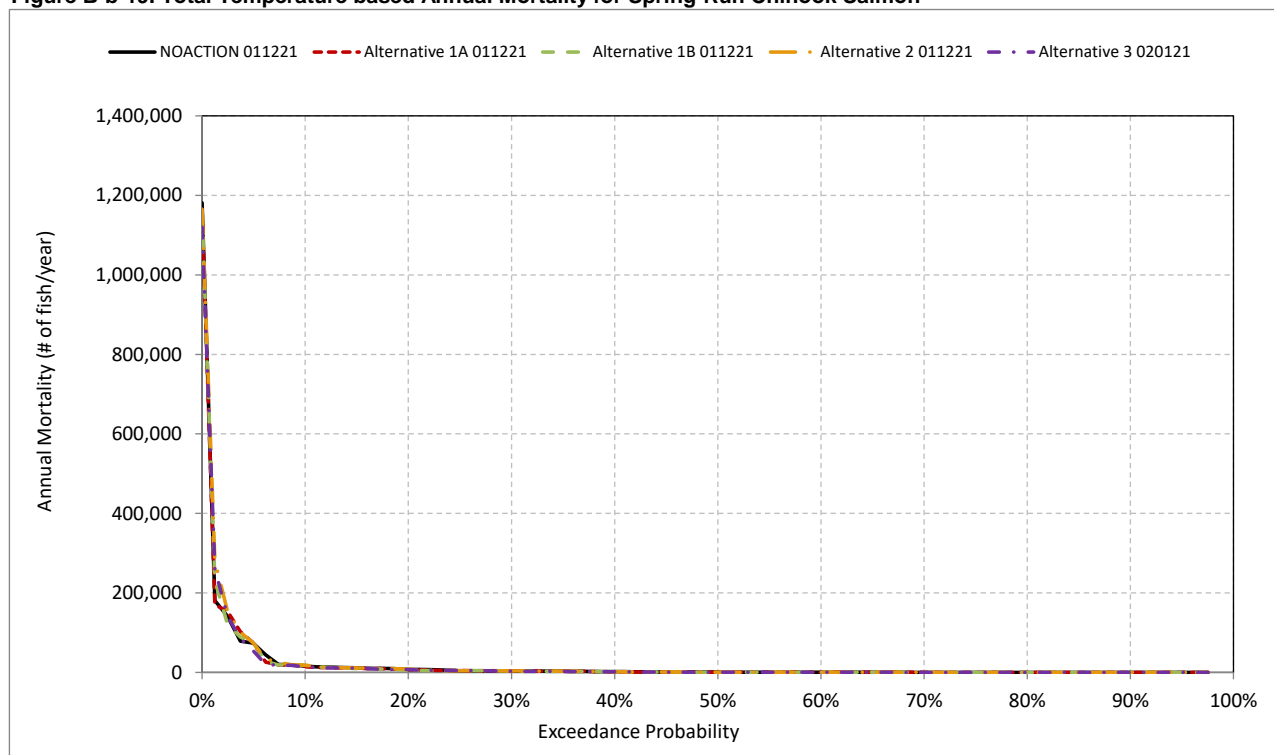
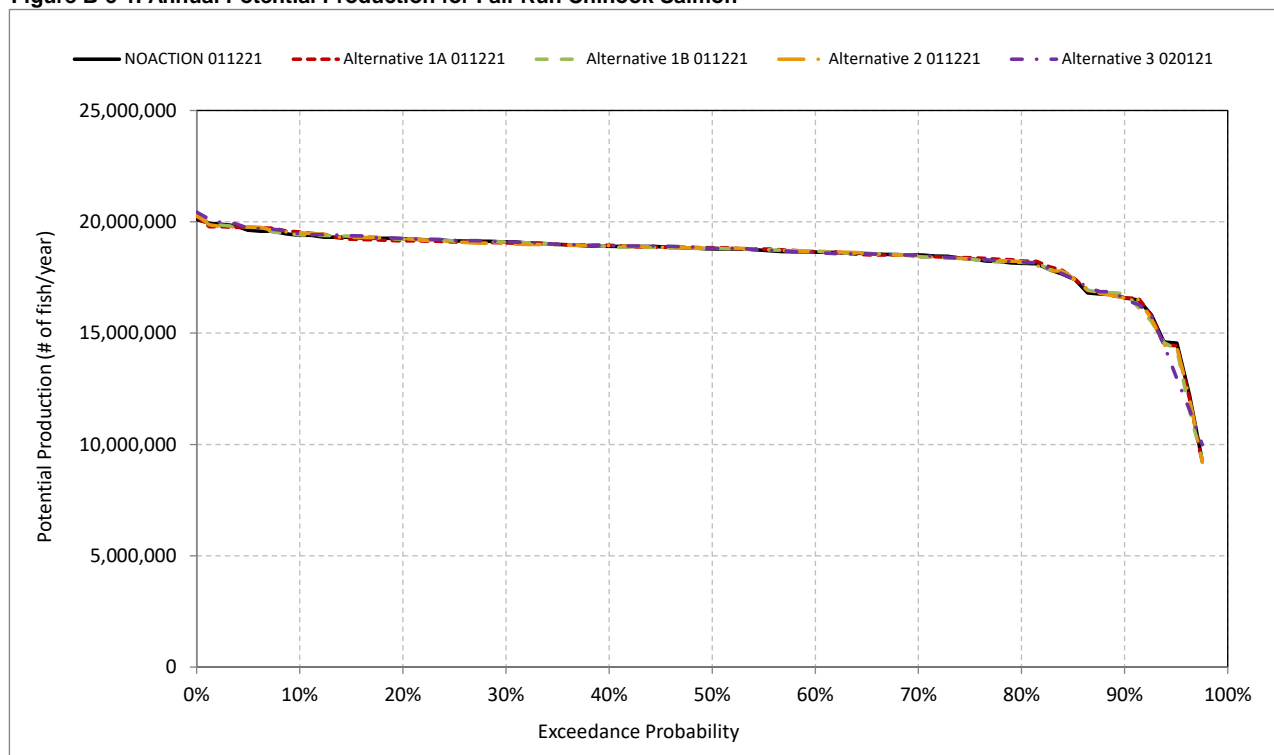


Figure B-c-1. Annual Potential Production for Fall-Run Chinook Salmon





**Figure B-c-2. Annual Mortality for Fall-Run Chinook Salmon - Eggs**

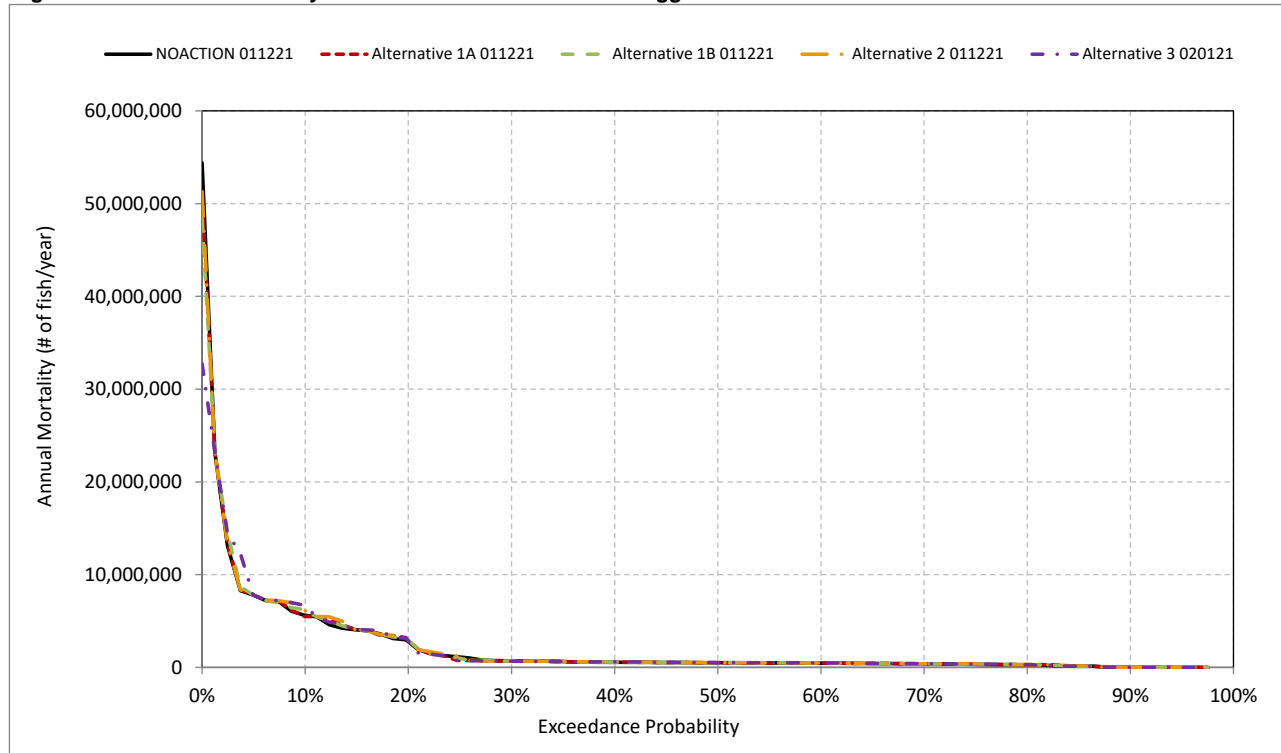


Figure B-c-3. Annual Mortality for Fall-Run Chinook Salmon - Fry

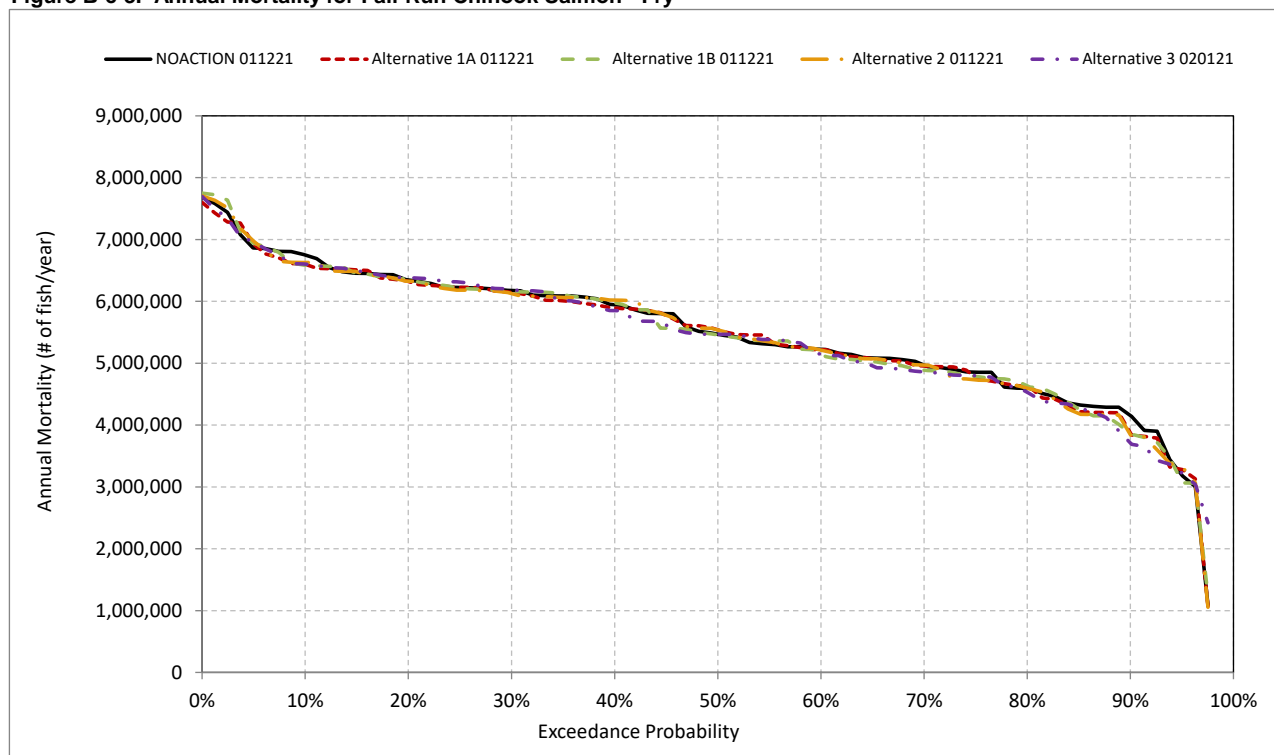


Figure B-c-4. Annual Mortality for Fall-Run Chinook Salmon - Pre-Smolt

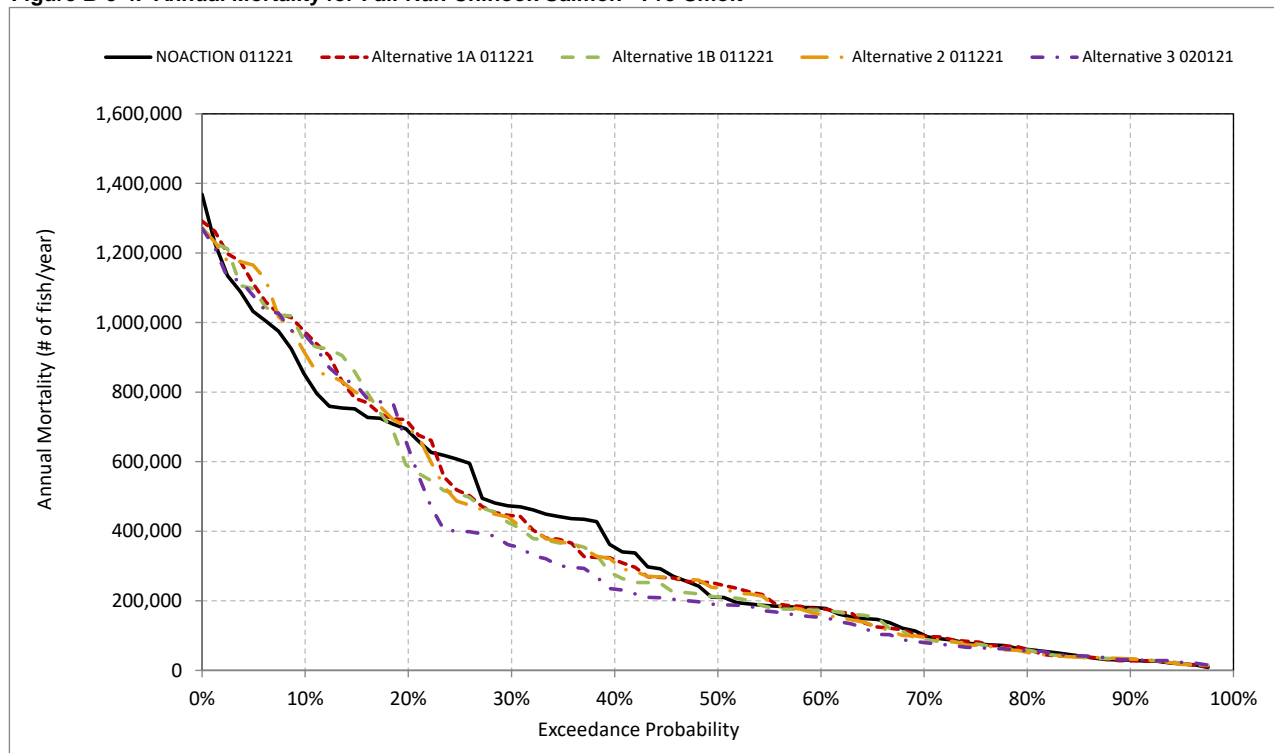


Figure B-c-5. Annual Mortality for Fall-Run Chinook Salmon - Immature Smolt

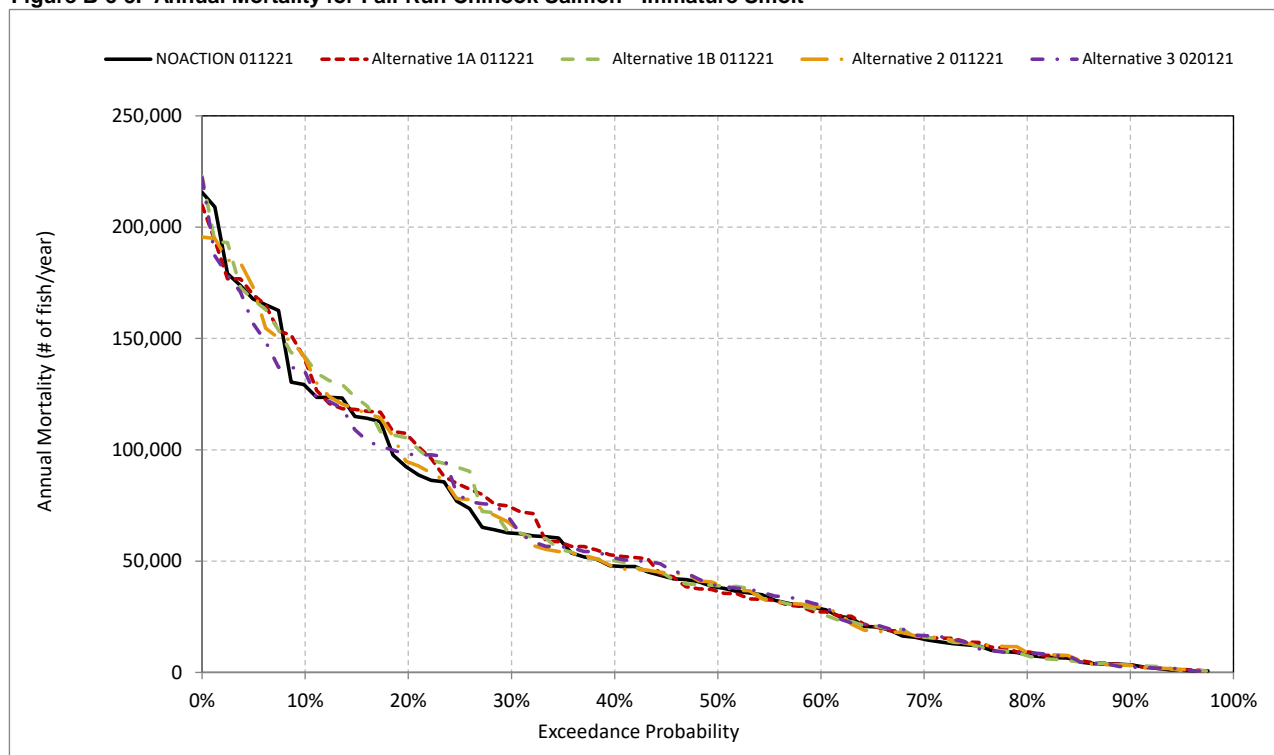


Figure B-c-6. Annual Mortality for Fall-Run Chinook Salmon - Pre- & Immature Smolts

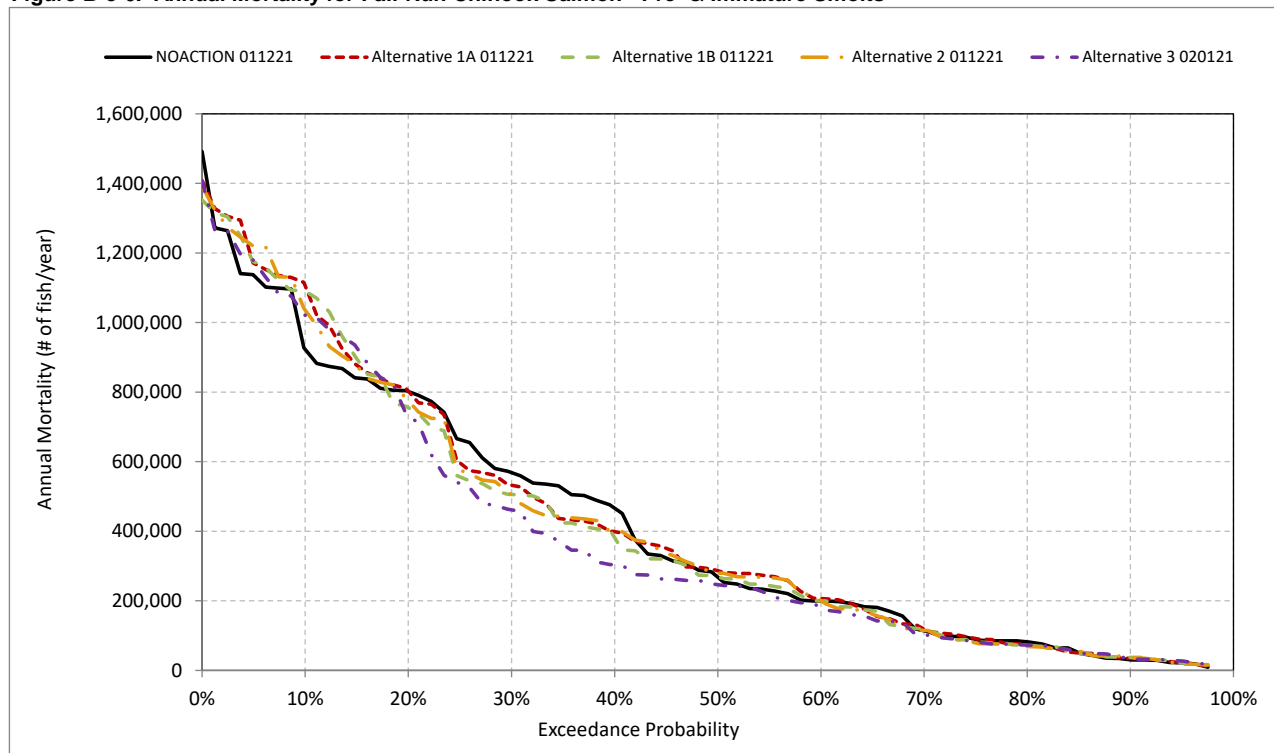


Figure B-c-7. Annual Mortality for Fall-Run Chinook Salmon - All Lifestages

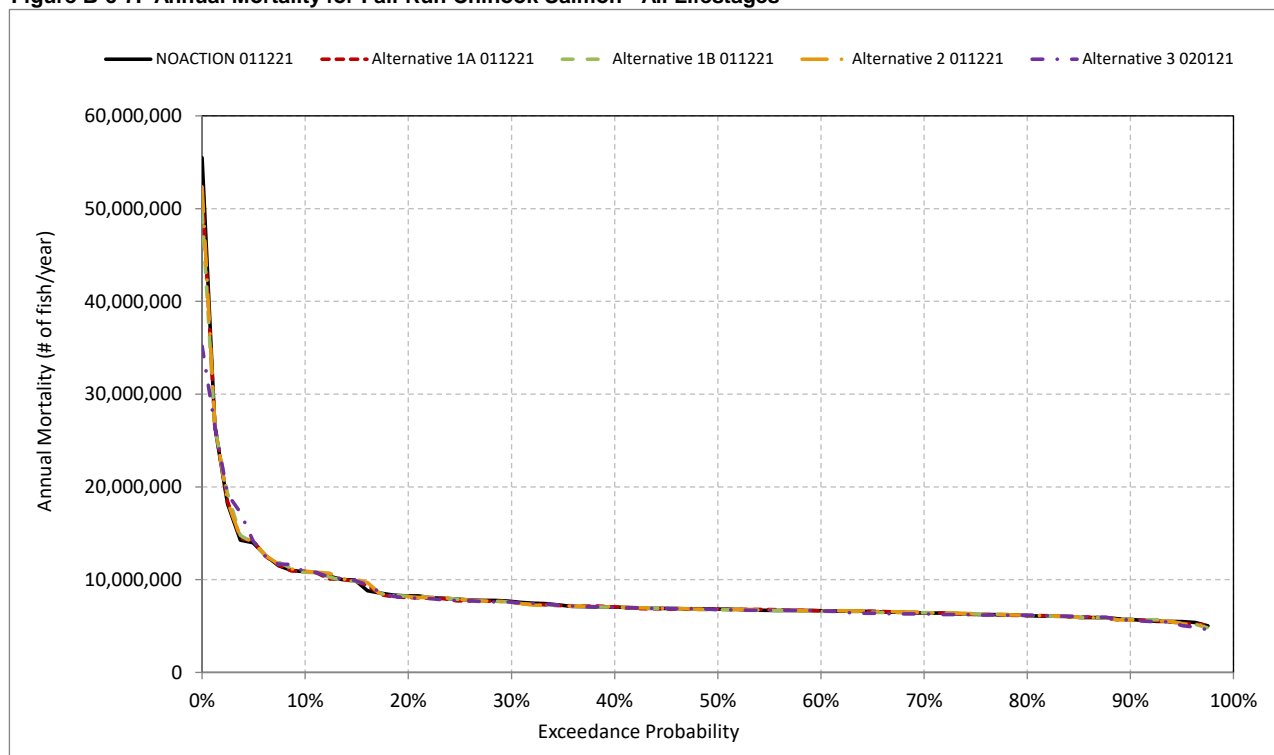


Figure B-c-8. Incubation - Habitat based Annual Mortality for Fall-Run Chinook Salmon

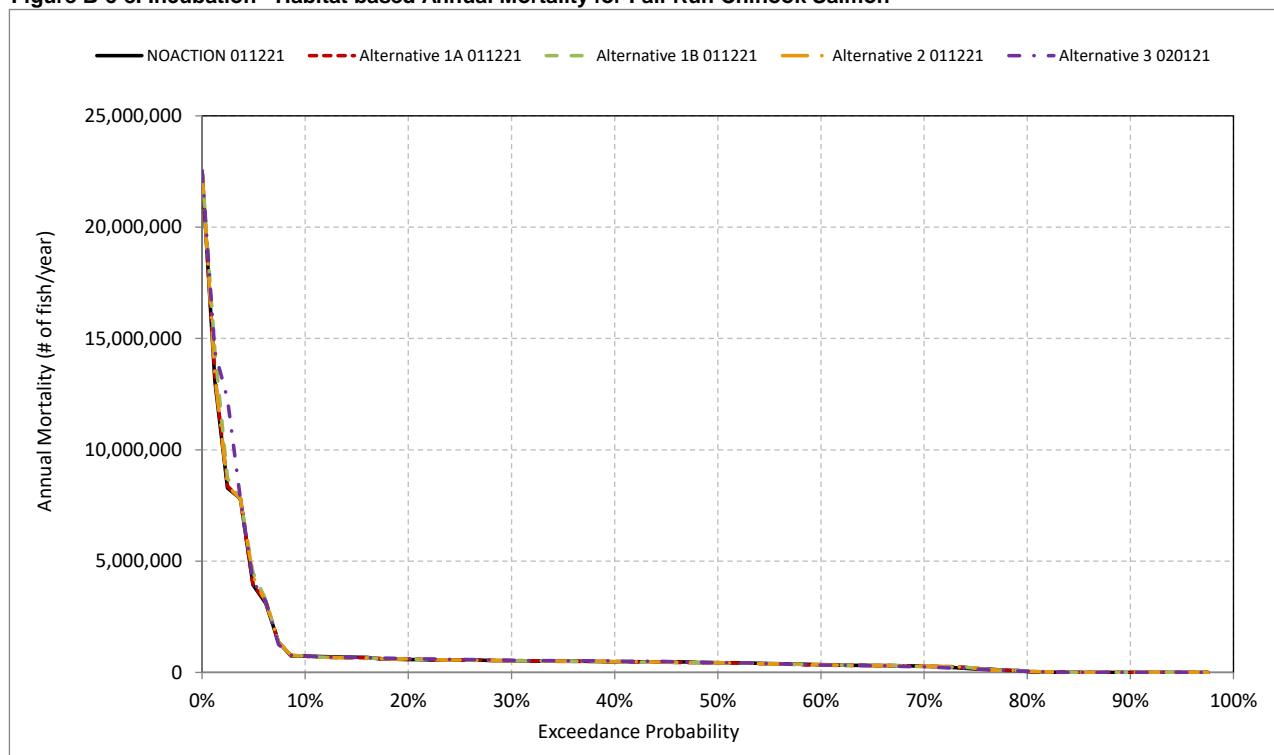


Figure B-c-9. Super-imposition - Habitat based Annual Mortality for Fall-Run Chinook Salmon

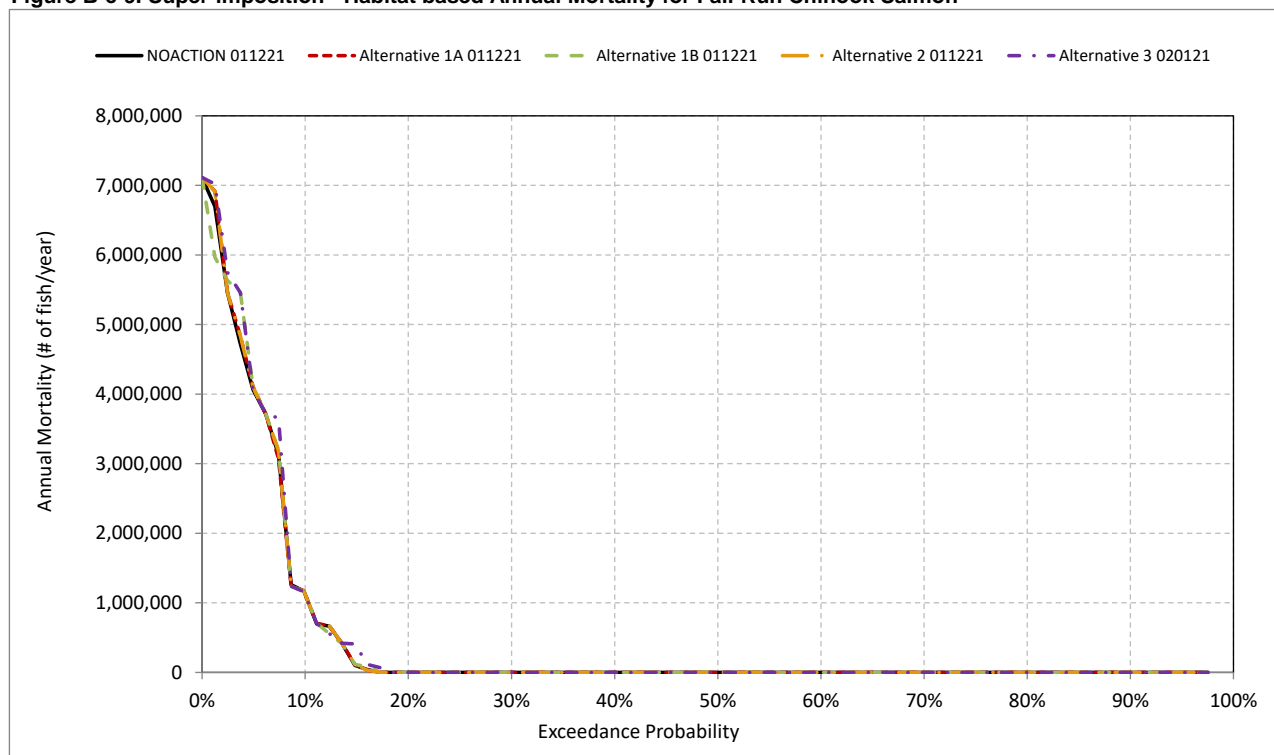




Figure B-c-10. Fry - Habitat based Annual Mortality for Fall-Run Chinook Salmon

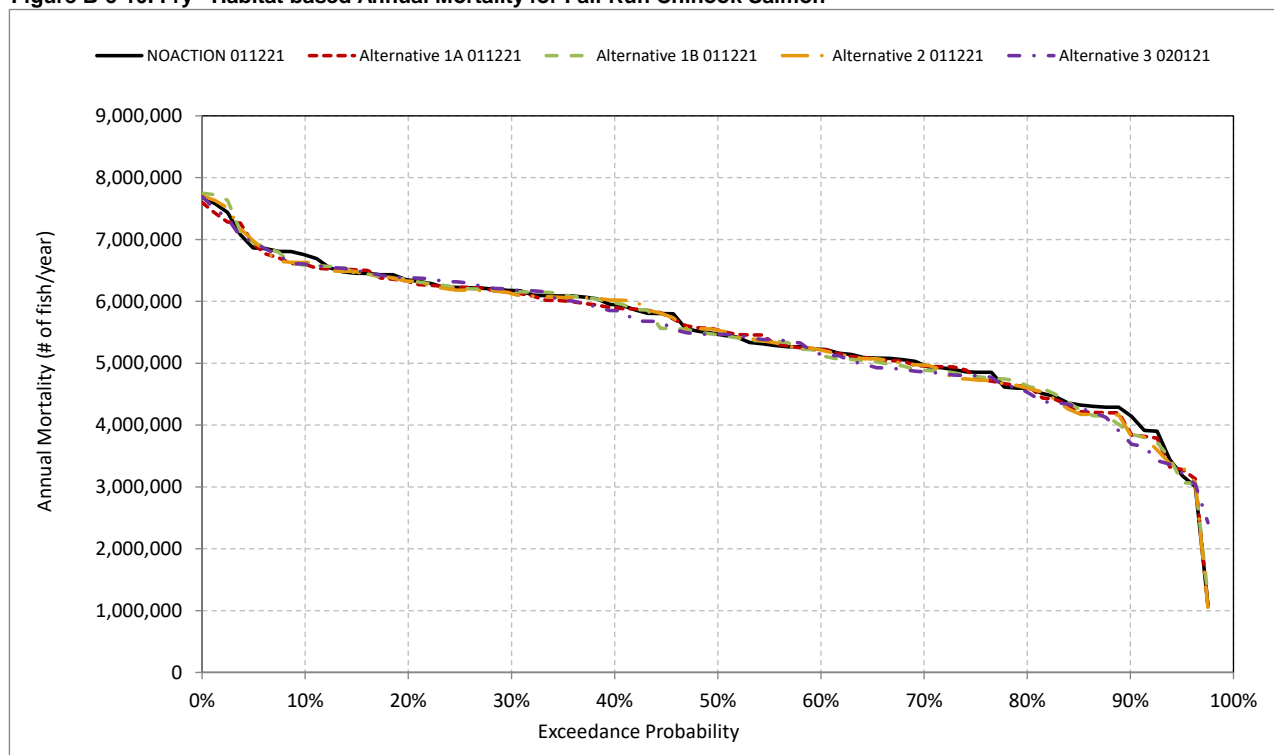


Figure B-c-11. Pre-smolt - Habitat based Annual Mortality for Fall-Run Chinook Salmon

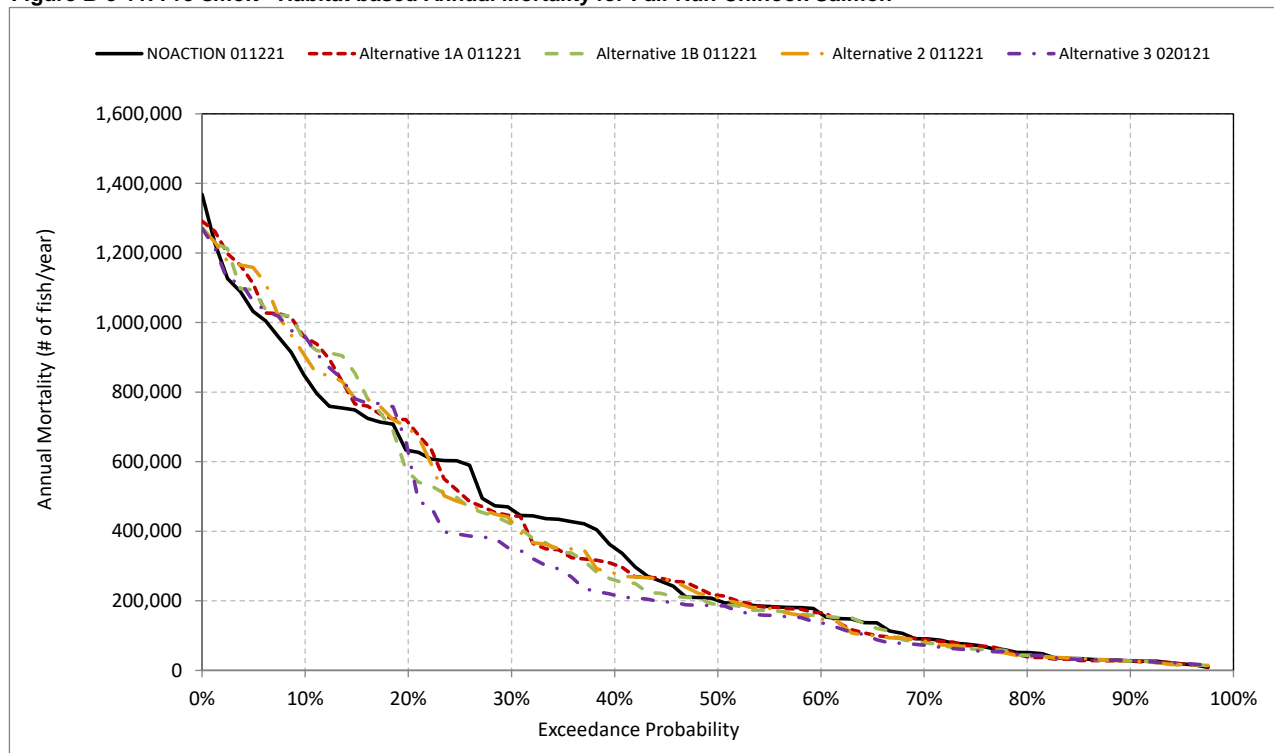


Figure B-c-12. Immature Smolt - Habitat based Annual Mortality for Fall-Run Chinook Salmon

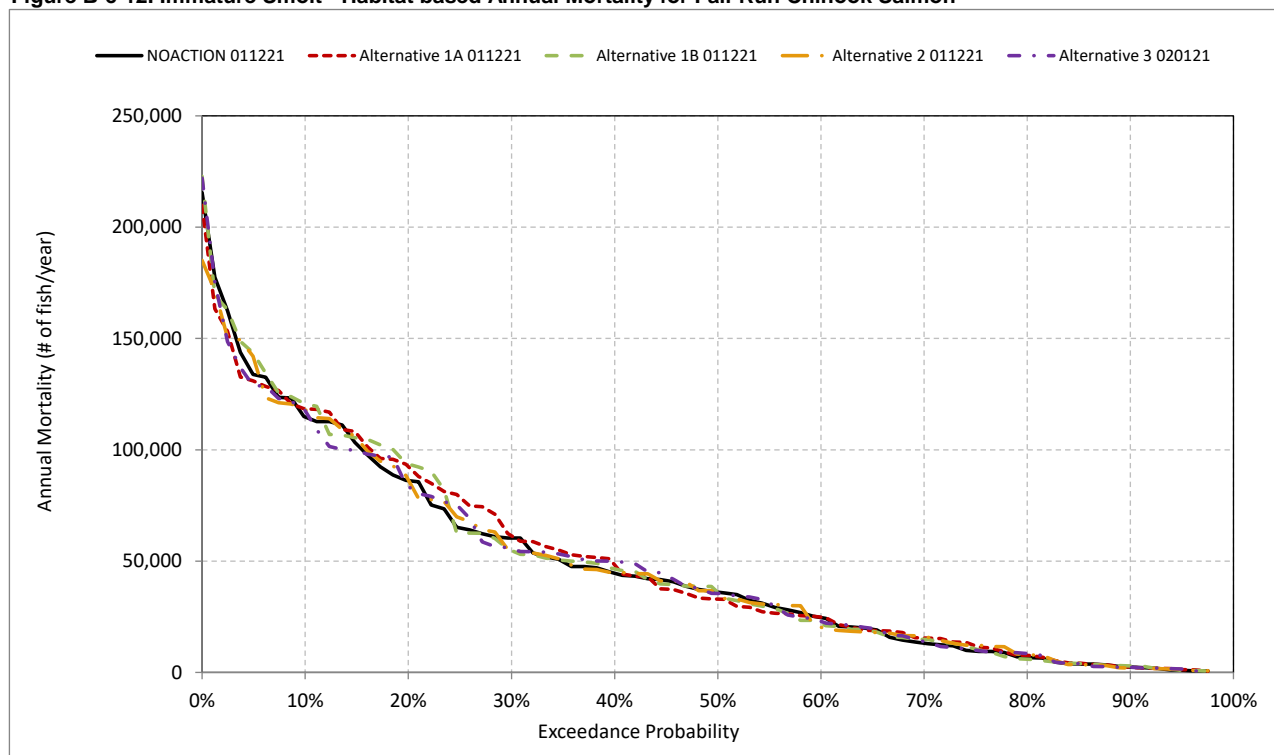


Figure B-c-13. Total Habitat based Annual Mortality for Fall-Run Chinook Salmon

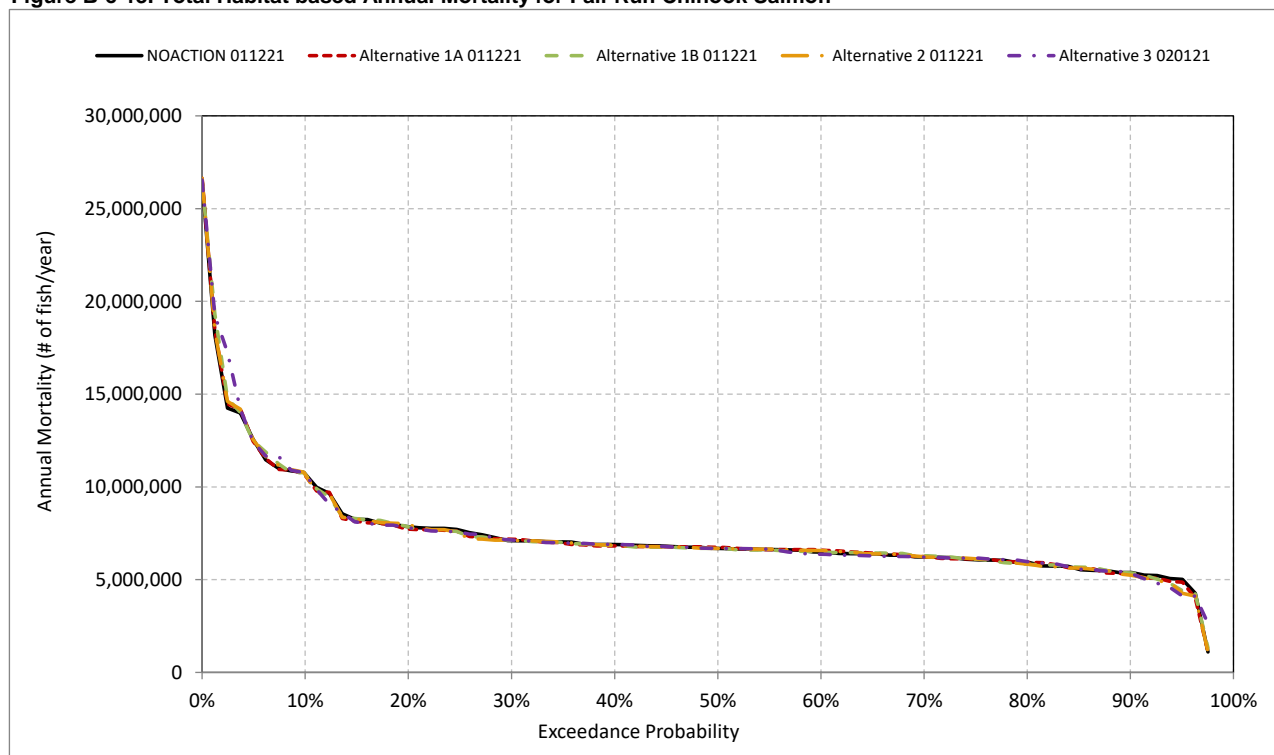


Figure B-c-14. Pre-Spawn Mortality - Temperature based Annual Mortality for Fall-Run Chinook Salmon

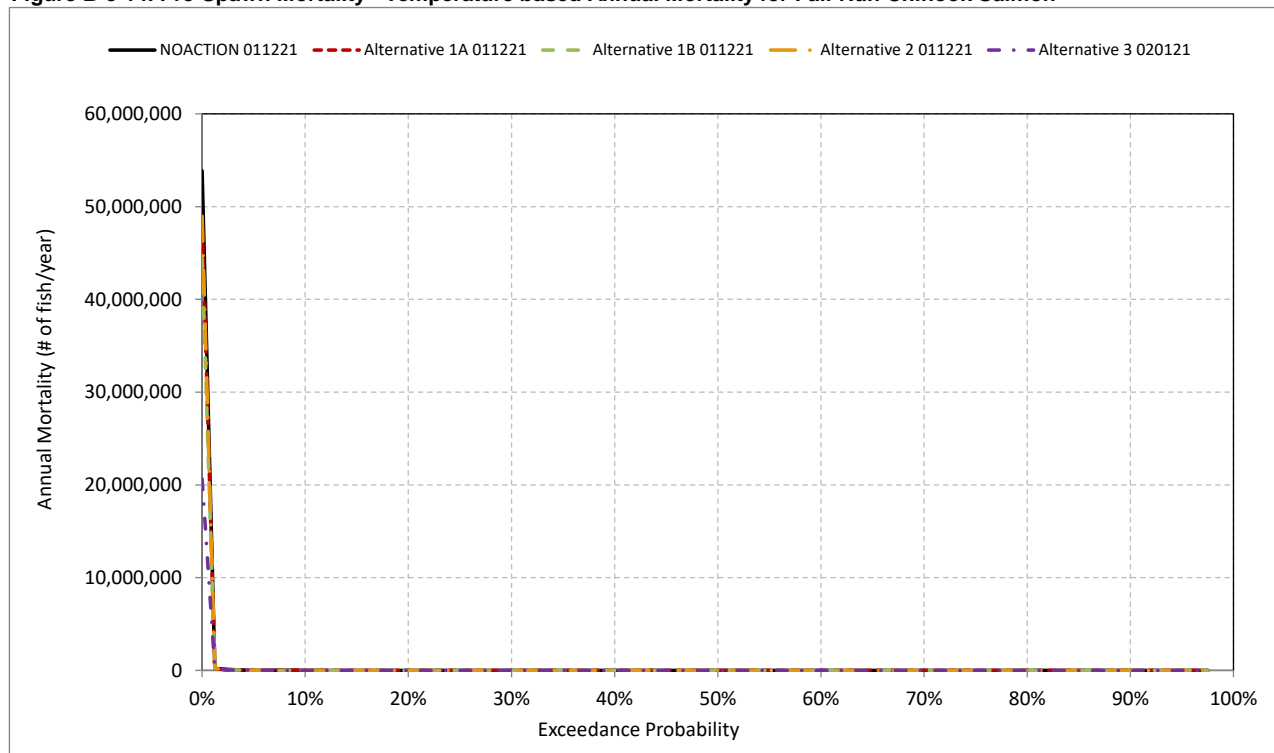


Figure B-c-15. Eggs - Temperature based Annual Mortality for Fall-Run Chinook Salmon

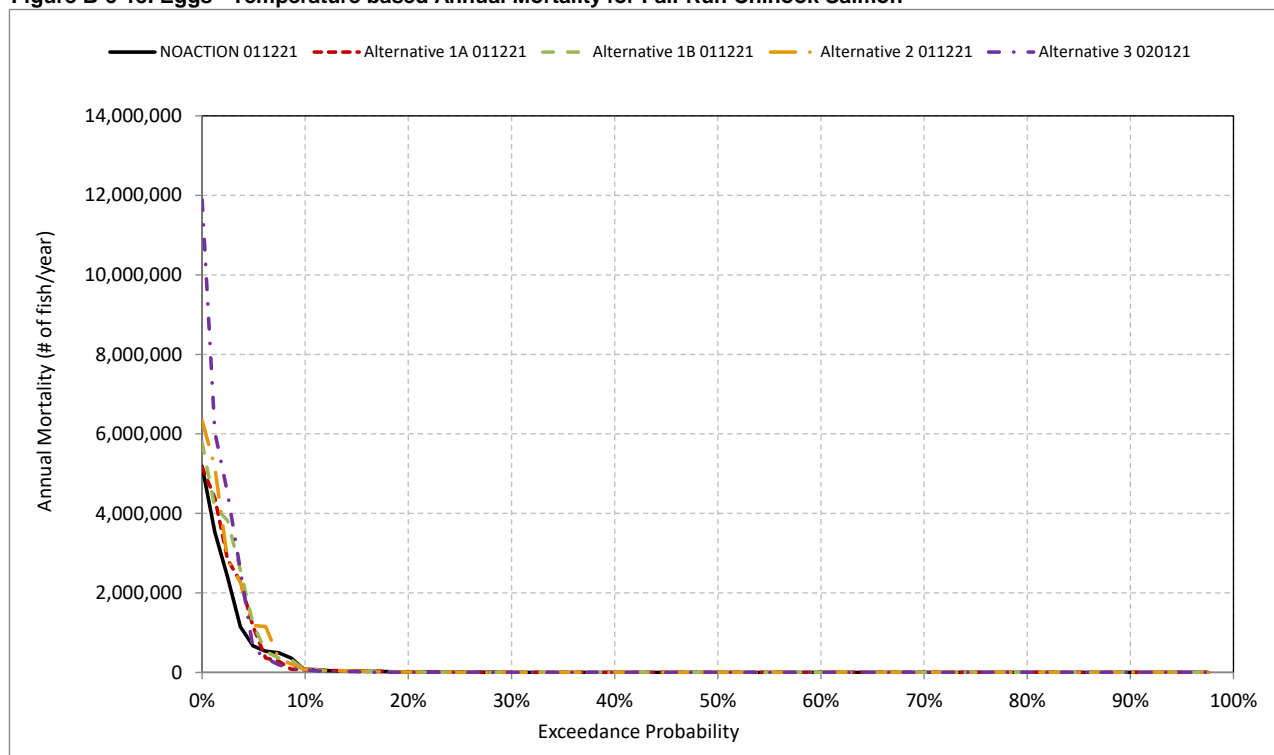


Figure B-c-16. Fry - Temperature based Annual Mortality for Fall-Run Chinook Salmon

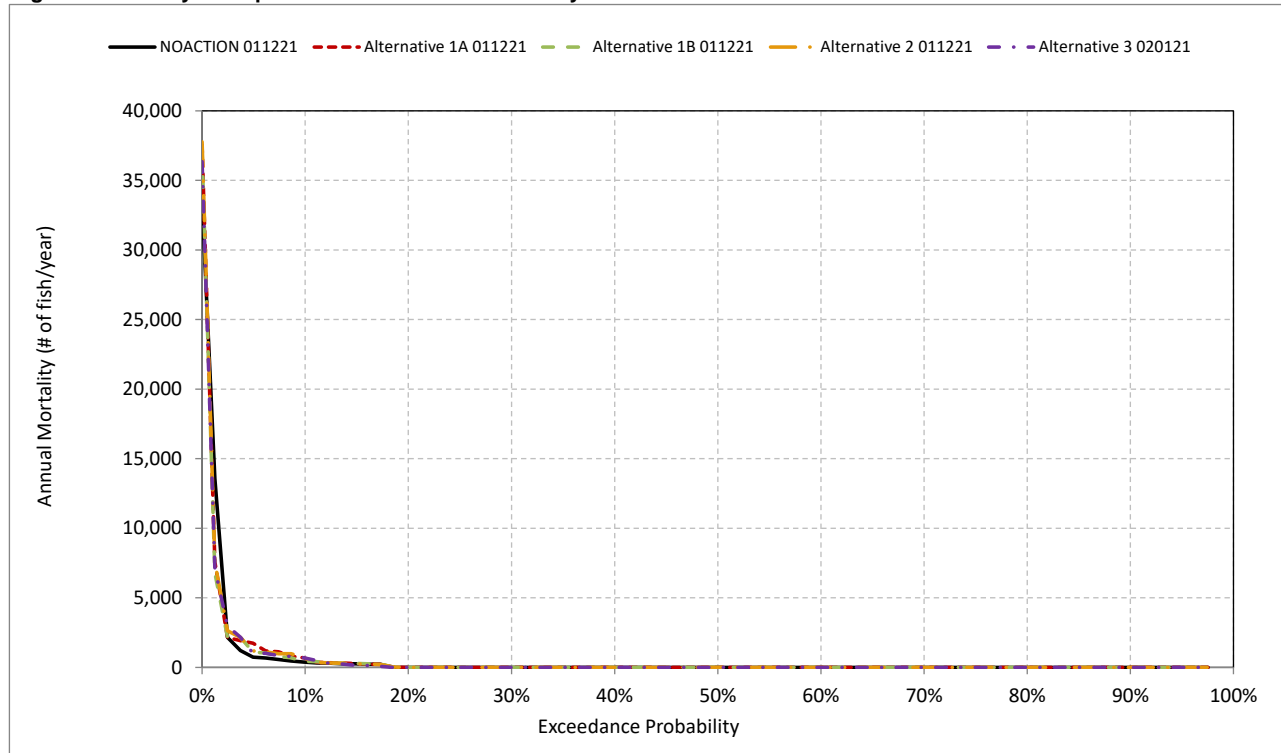


Figure B-c-17. Pre-smolt - Temperature based Annual Mortality for Fall-Run Chinook Salmon

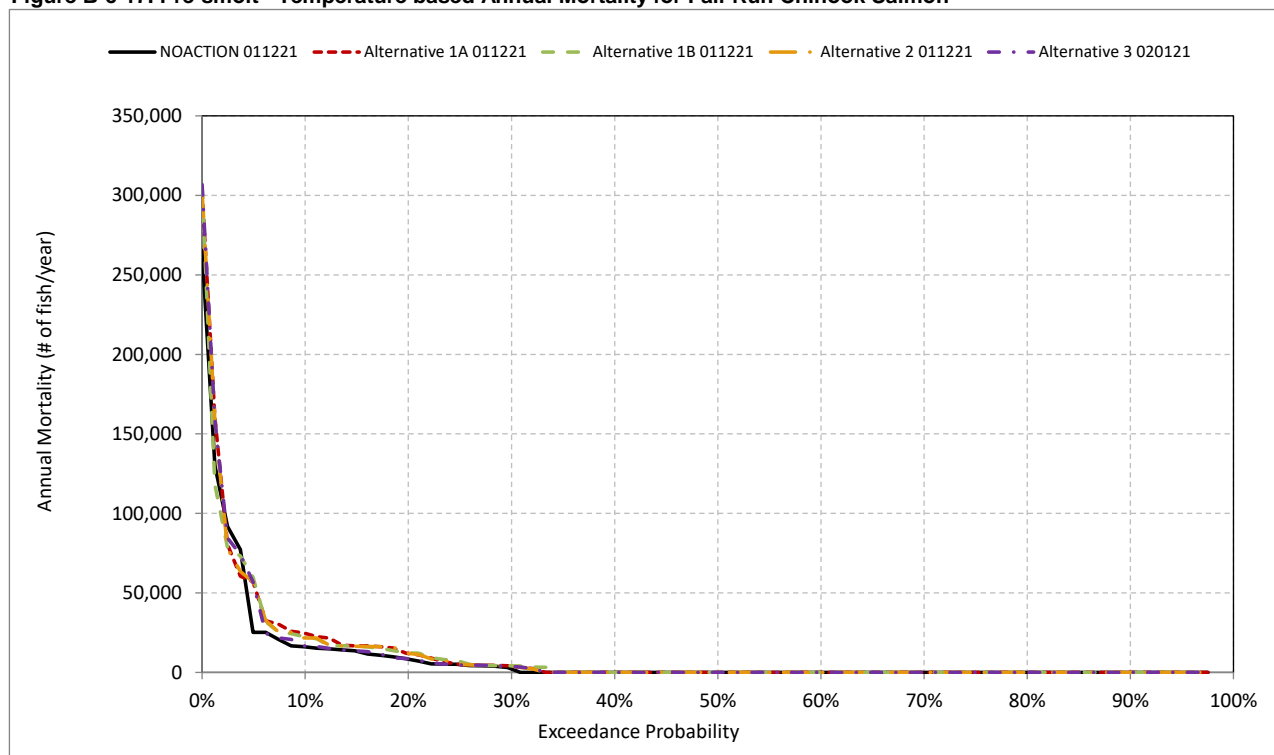




Figure B-c-18. Immature Smolt - Temperature based Annual Mortality for Fall-Run Chinook Salmon

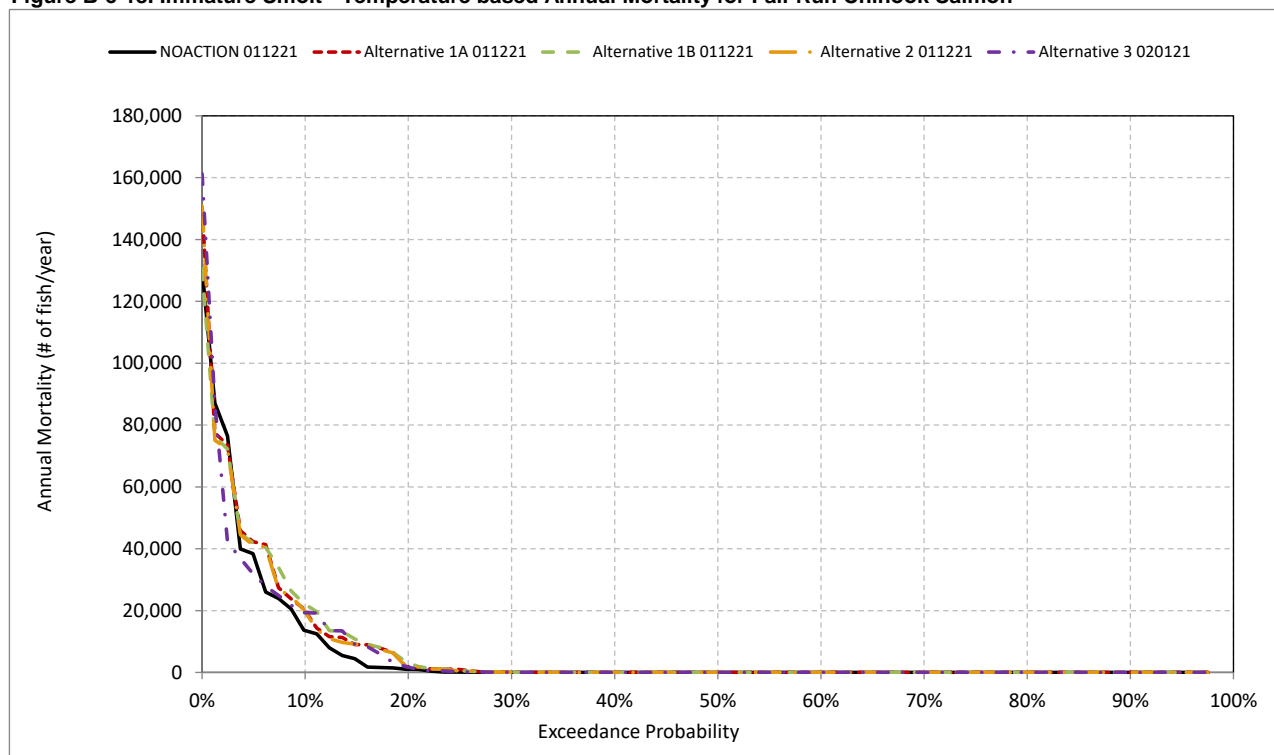


Figure B-c-19. Total Temperature based Annual Mortality for Fall-Run Chinook Salmon

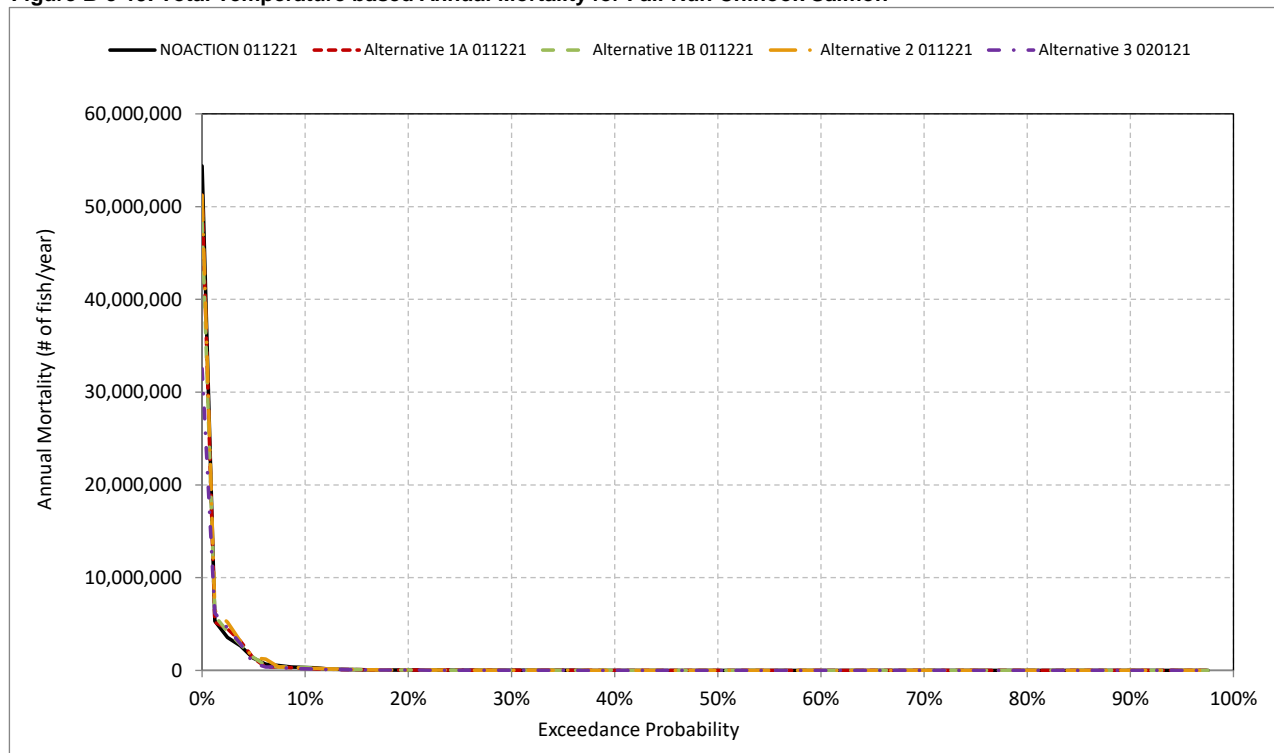


Figure B-d-1. Annual Potential Production for Late Fall-Run Chinook Salmon

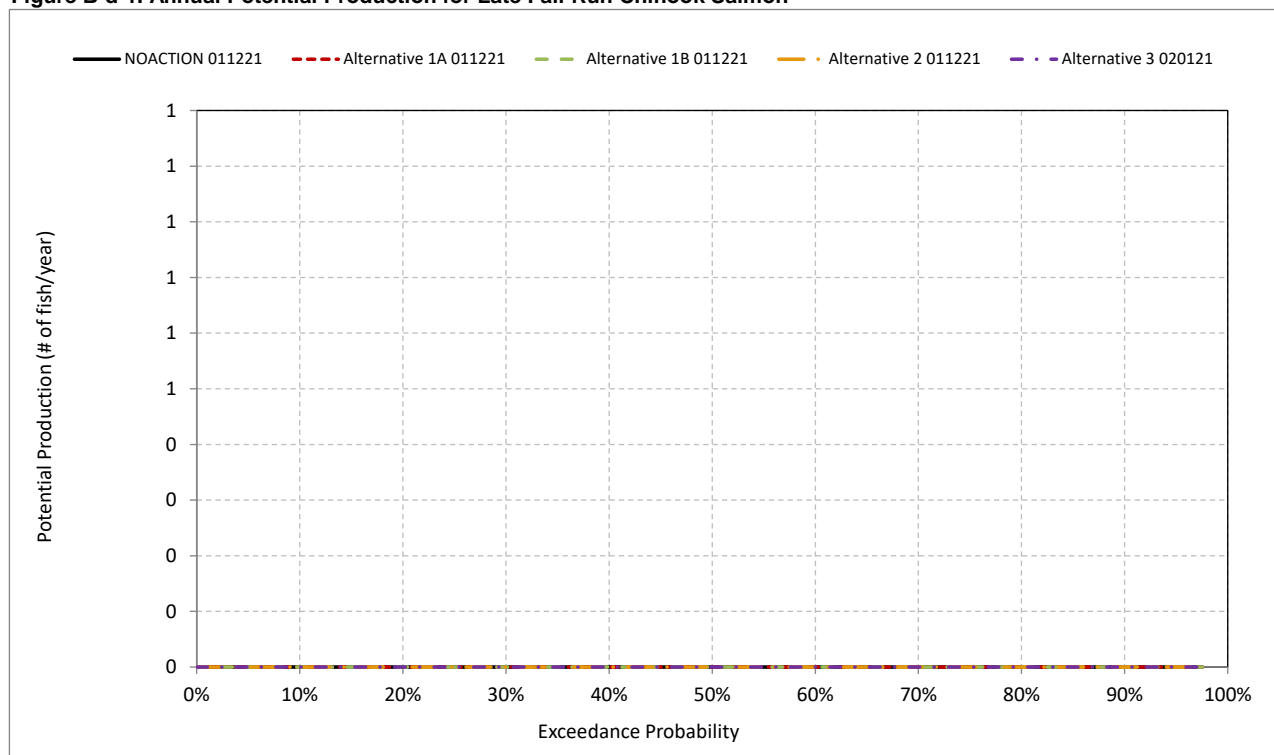


Figure B-d-2. Annual Mortality for Late Fall-Run Chinook Salmon - Eggs

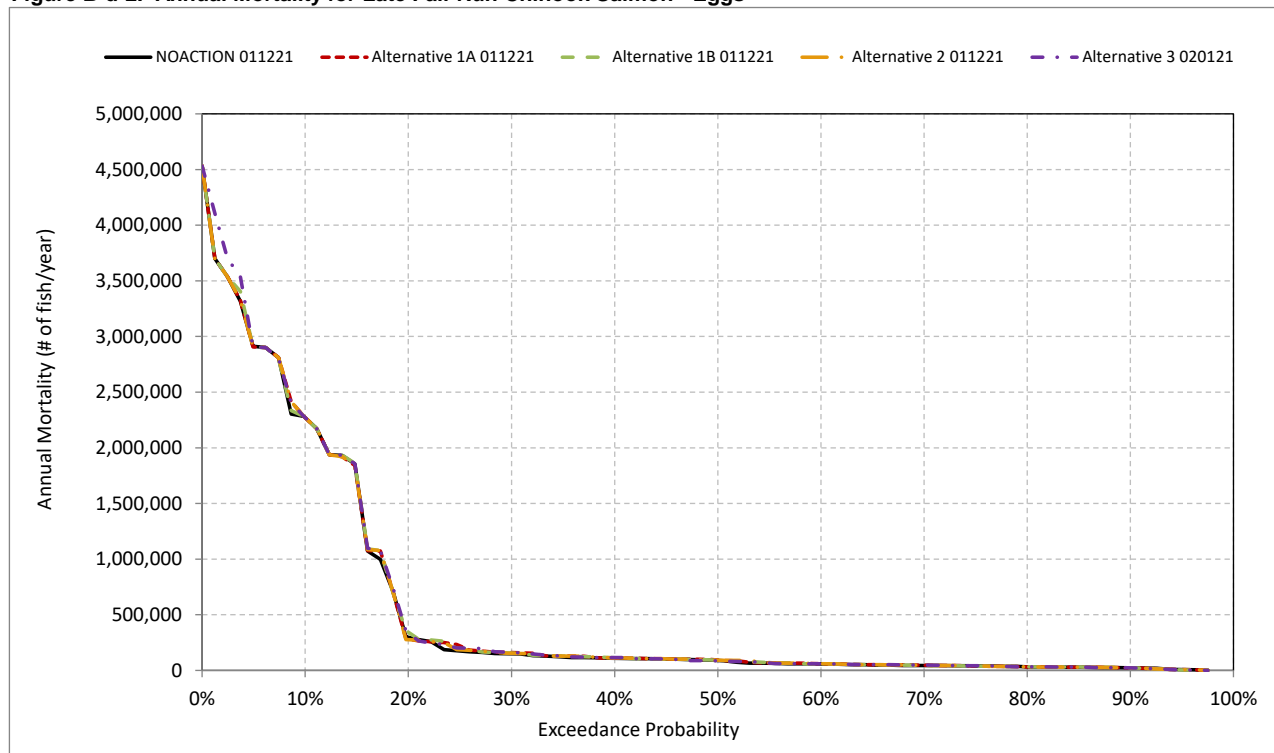


Figure B-d-3. Annual Mortality for Late Fall-Run Chinook Salmon - Fry

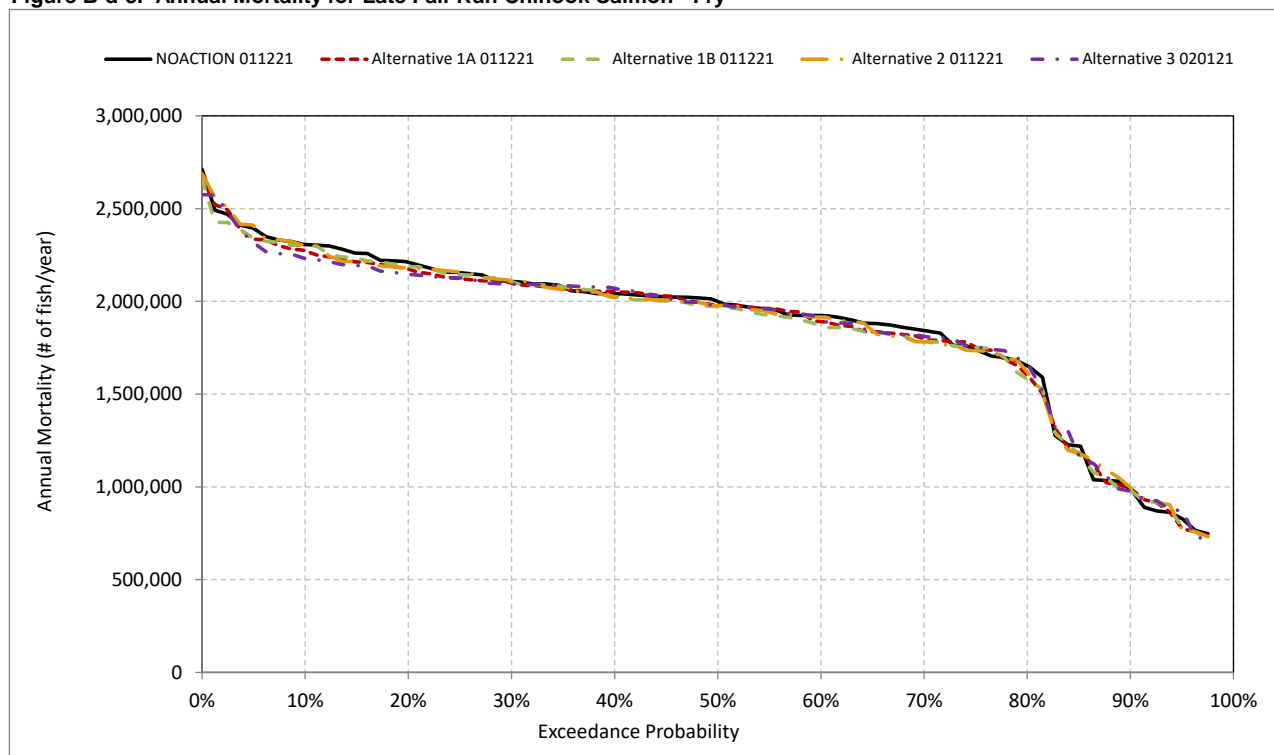


Figure B-d-4. Annual Mortality for Late Fall-Run Chinook Salmon - Pre-Smolt

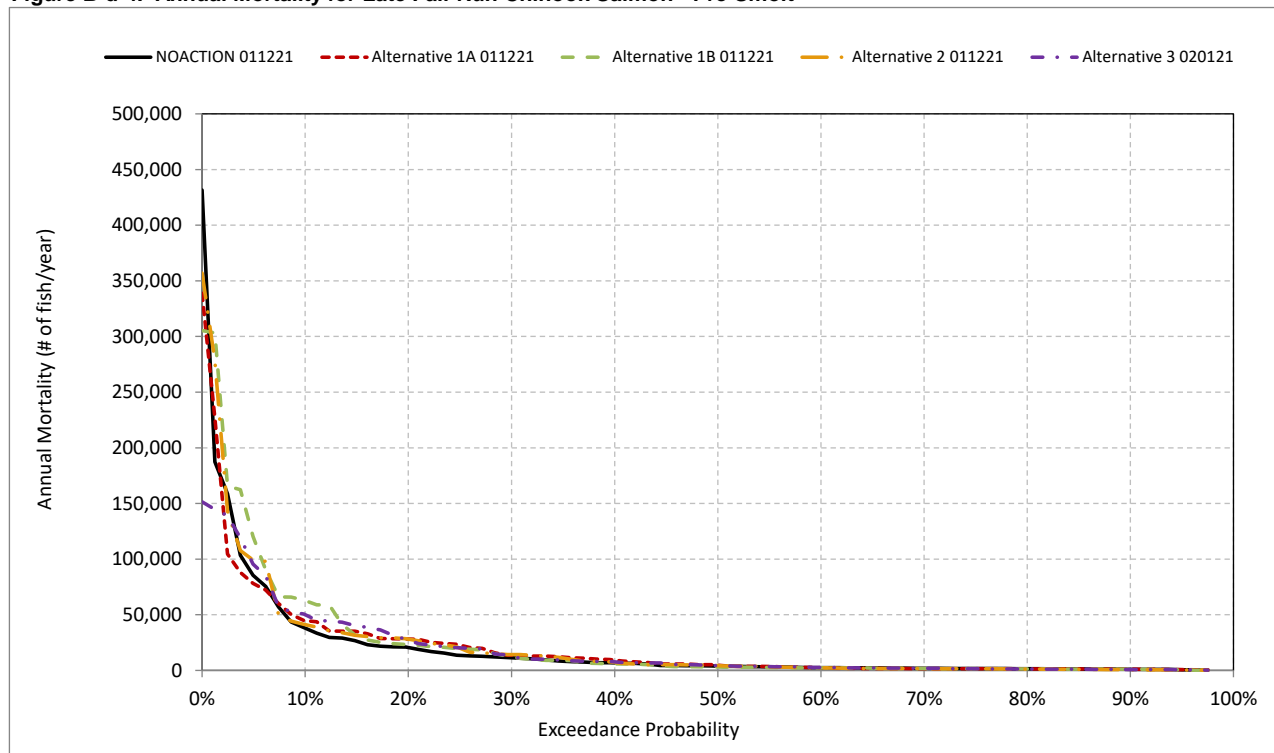


Figure B-d-5. Annual Mortality for Late Fall-Run Chinook Salmon - Immature Smolt

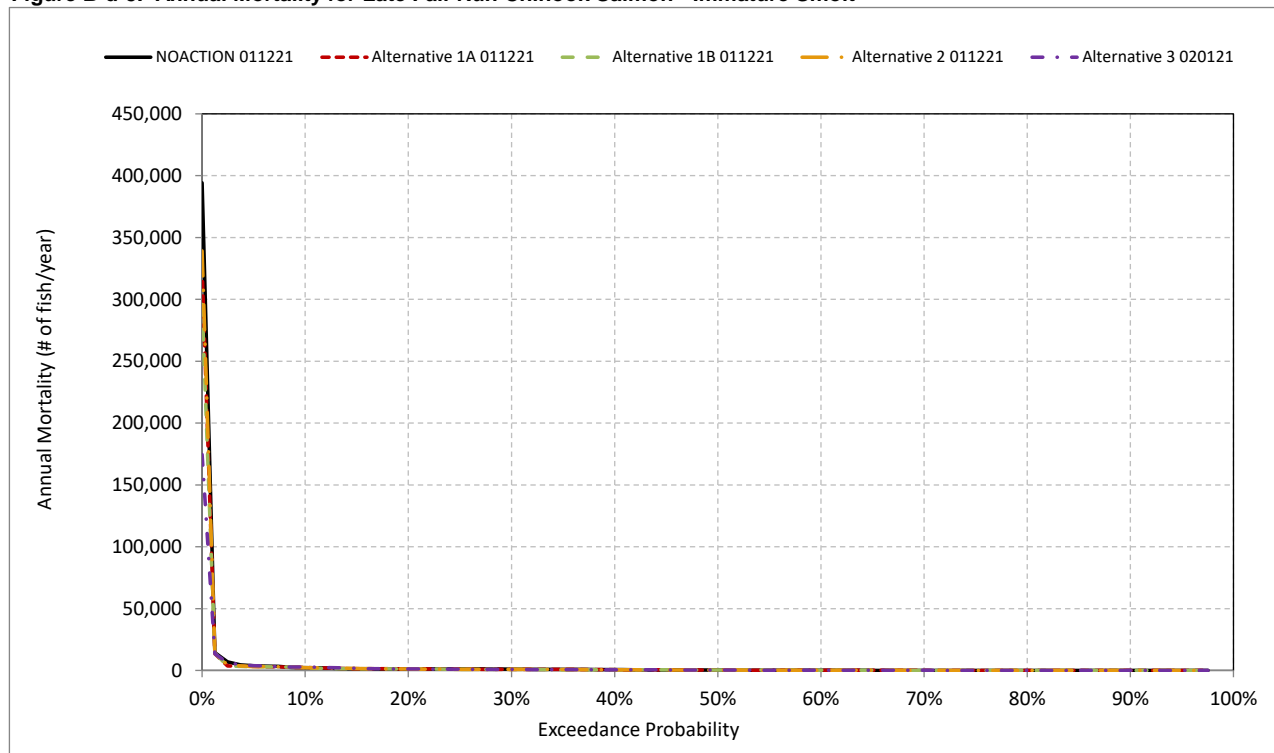


Figure B-d-6. Annual Mortality for Late Fall-Run Chinook Salmon - Pre- & Immature Smolts

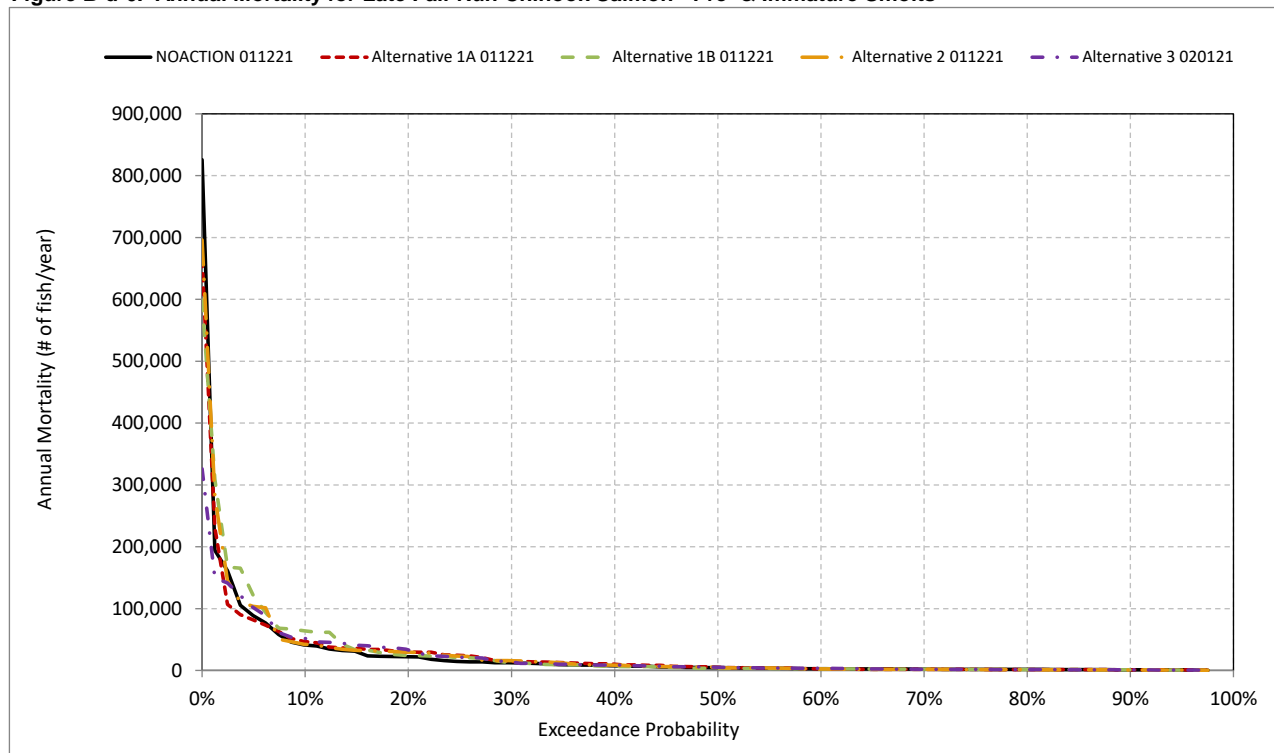




Figure B-d-7. Annual Mortality for Late Fall-Run Chinook Salmon - All Lifestages

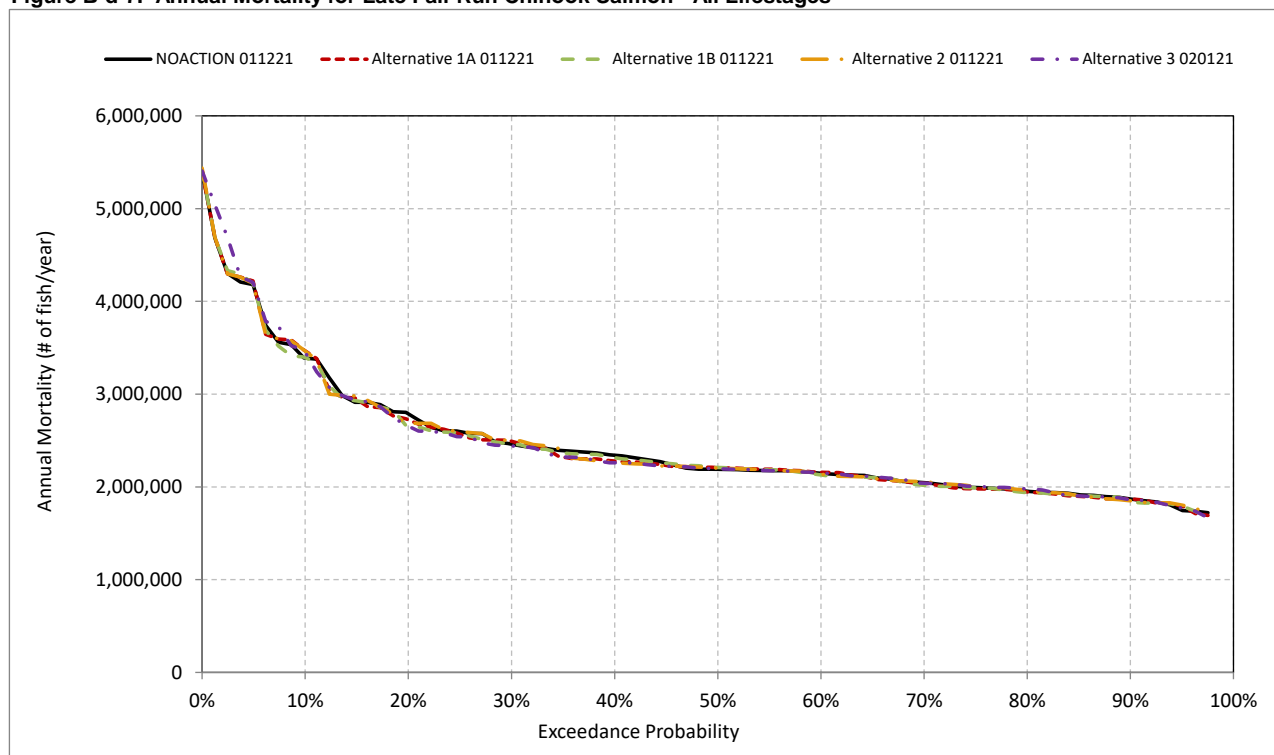


Figure B-d-8. Incubation - Habitat based Annual Mortality for Late Fall-Run Chinook Salmon

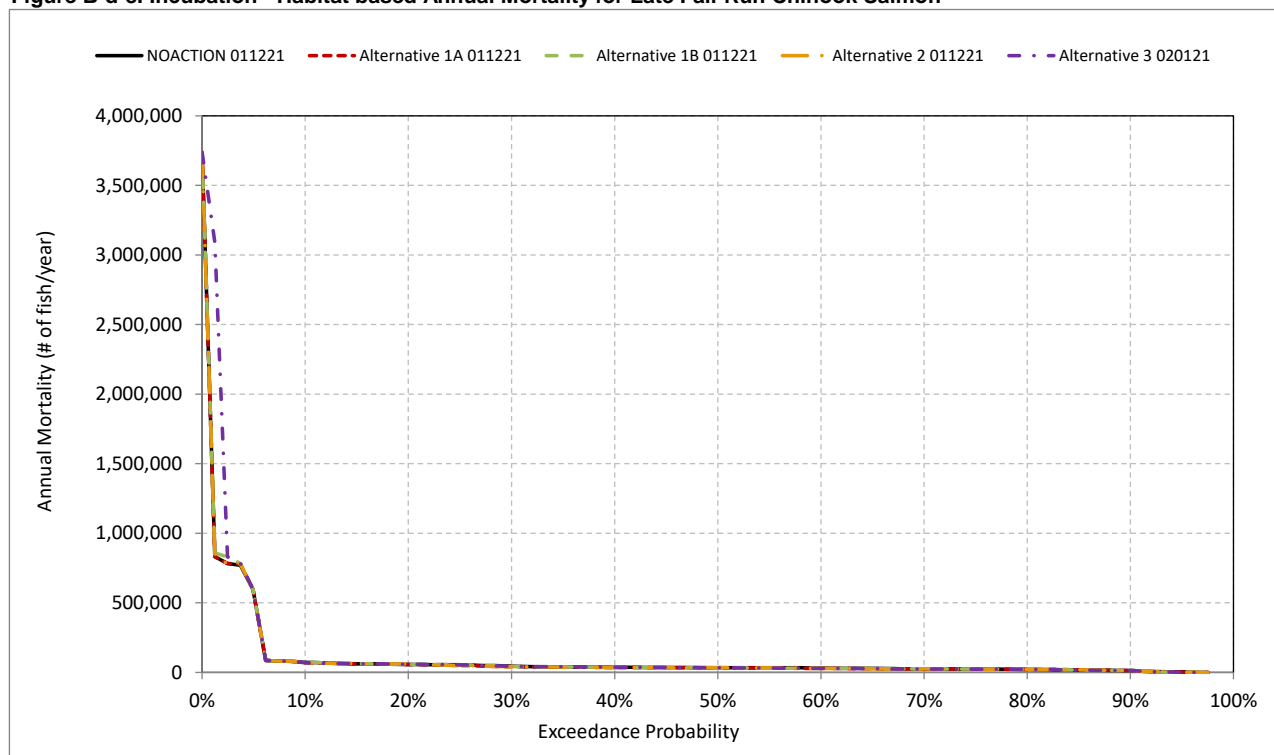


Figure B-d-9. Super-imposition - Habitat based Annual Mortality for Late Fall-Run Chinook Salmon

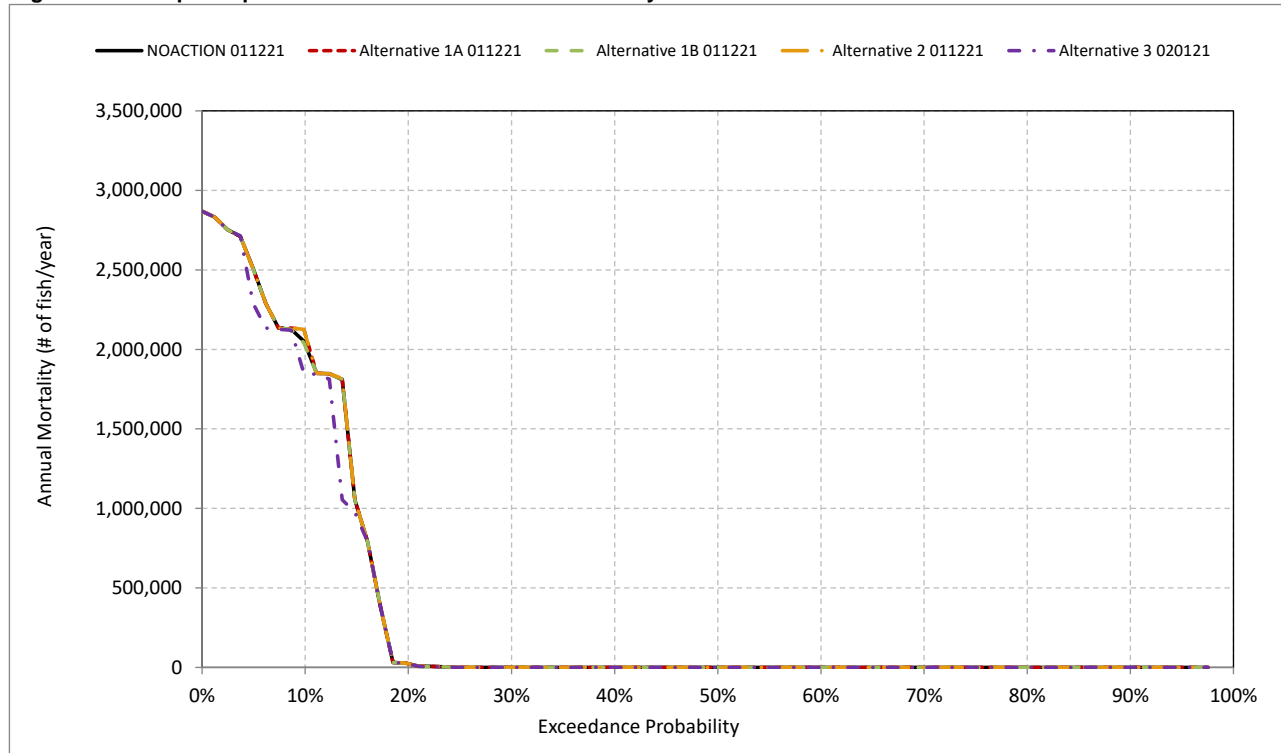


Figure B-d-10. Fry - Habitat based Annual Mortality for Late Fall-Run Chinook Salmon

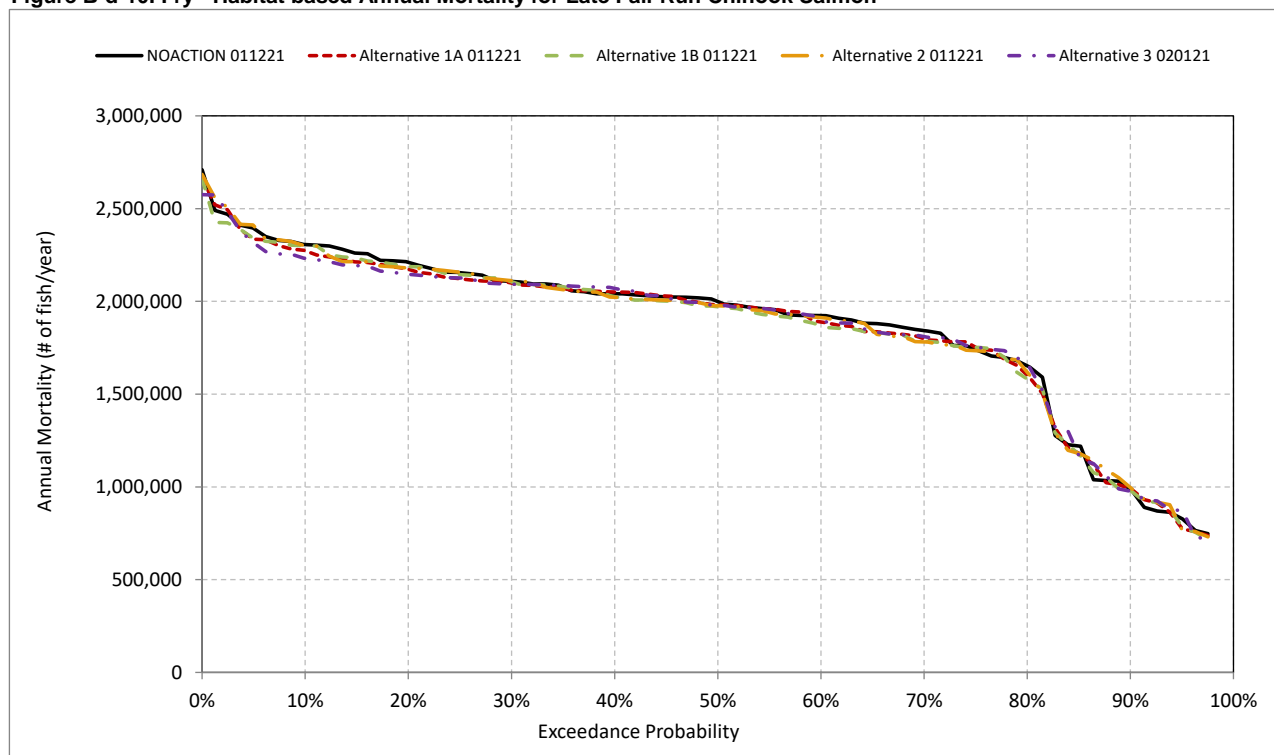


Figure B-d-11. Pre-smolt - Habitat based Annual Mortality for Late Fall-Run Chinook Salmon

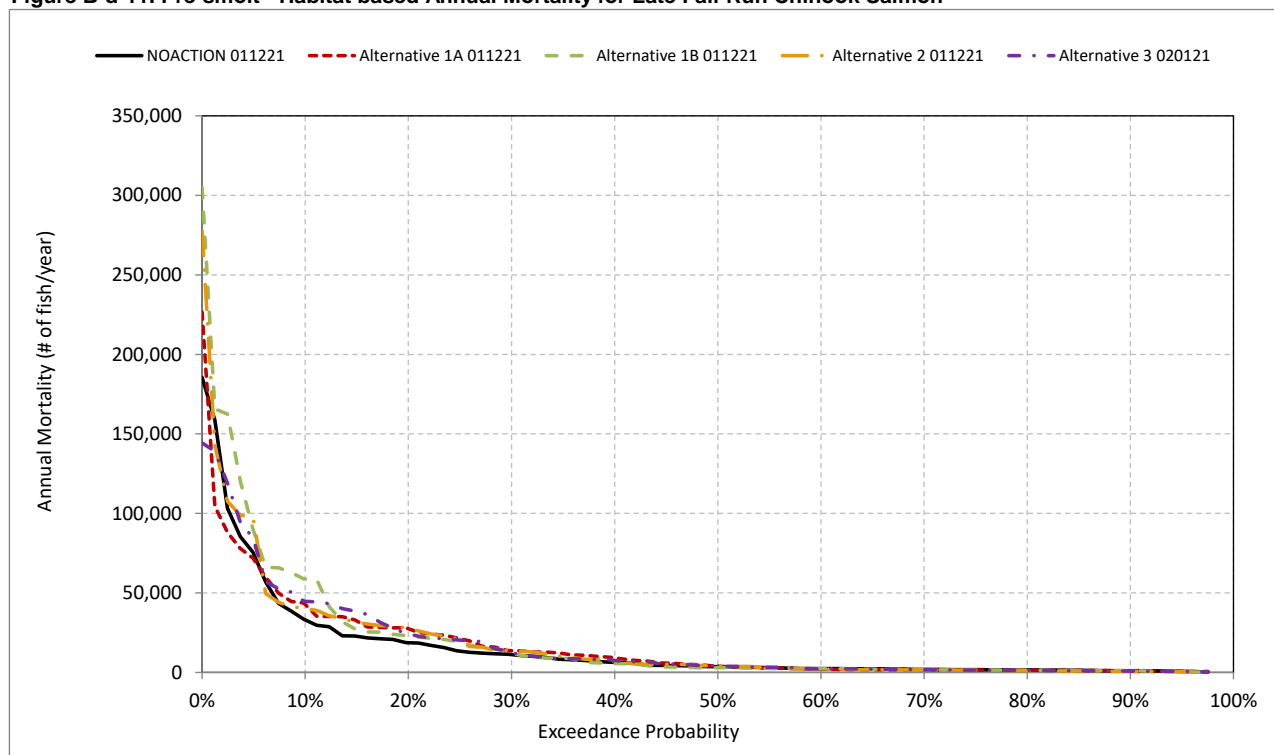


Figure B-d-12. Immature Smolt - Habitat based Annual Mortality for Late Fall-Run Chinook Salmon

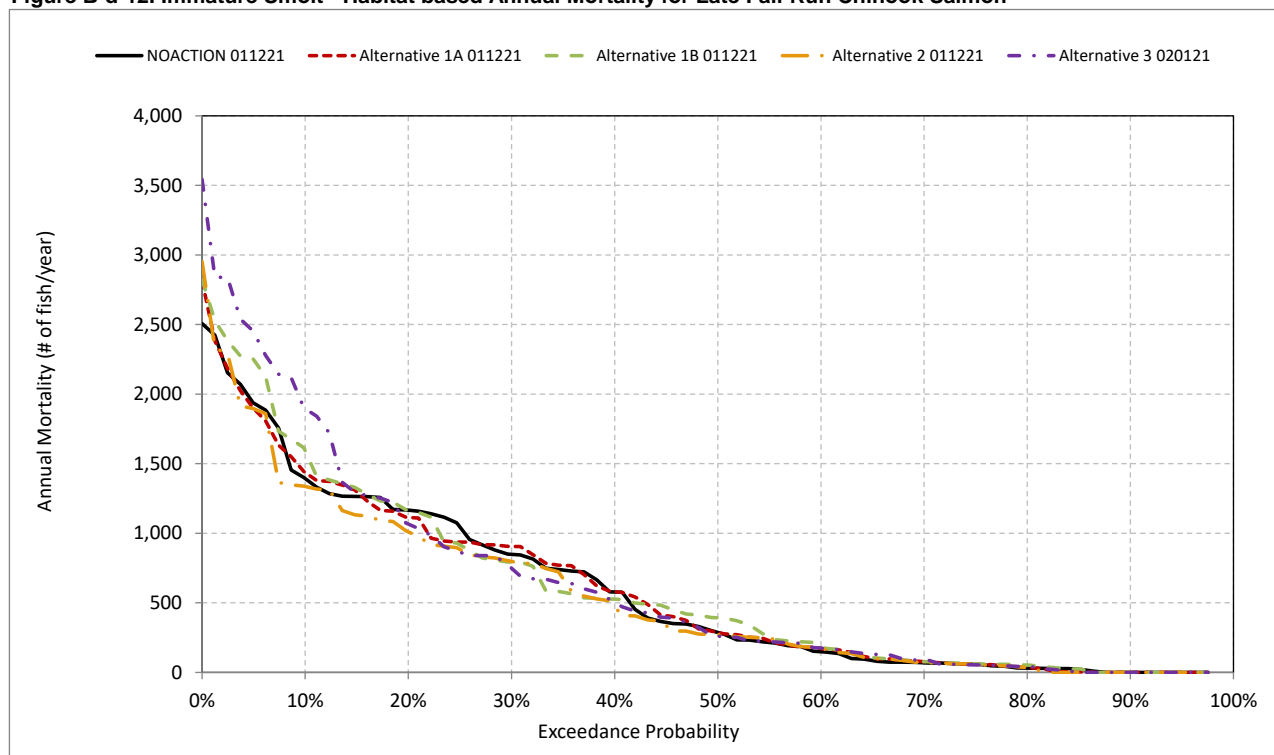


Figure B-d-13. Total Habitat based Annual Mortality for Late Fall-Run Chinook Salmon

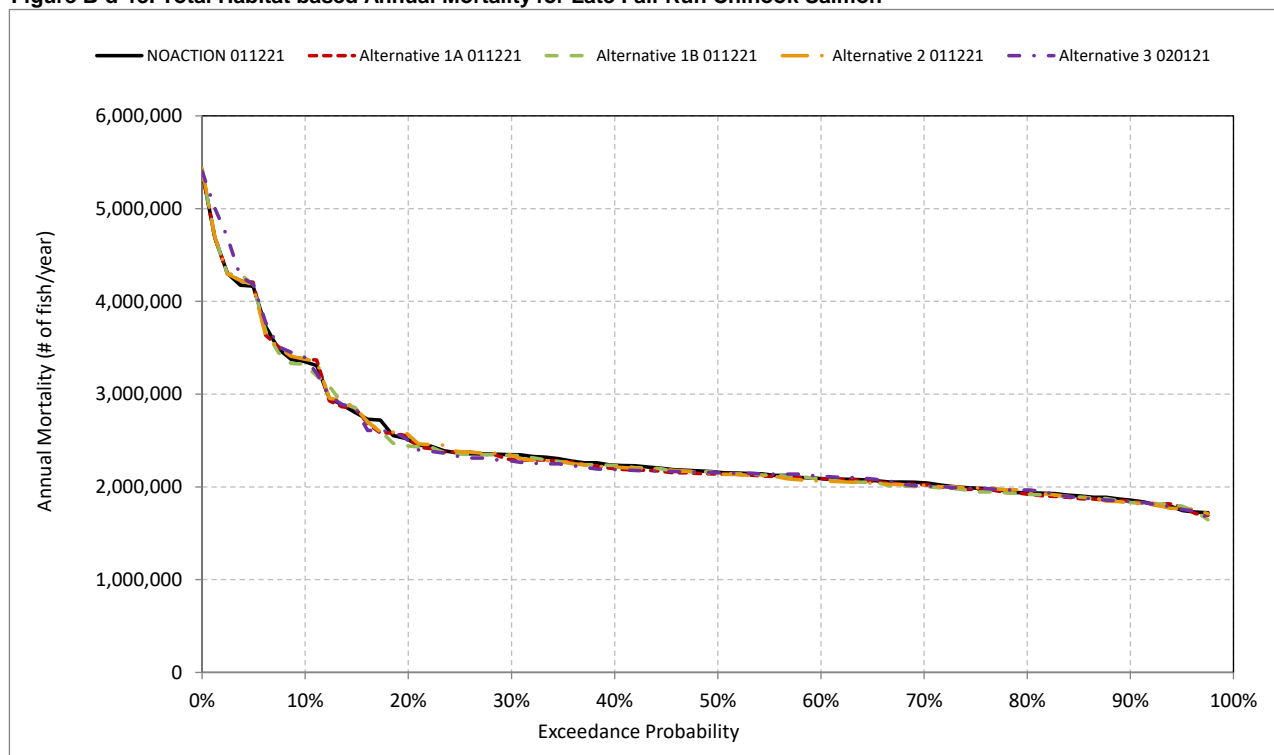


Figure B-d-14. Pre-Spawn Mortality - Temperature based Annual Mortality for Late Fall-Run Chinook Salmon

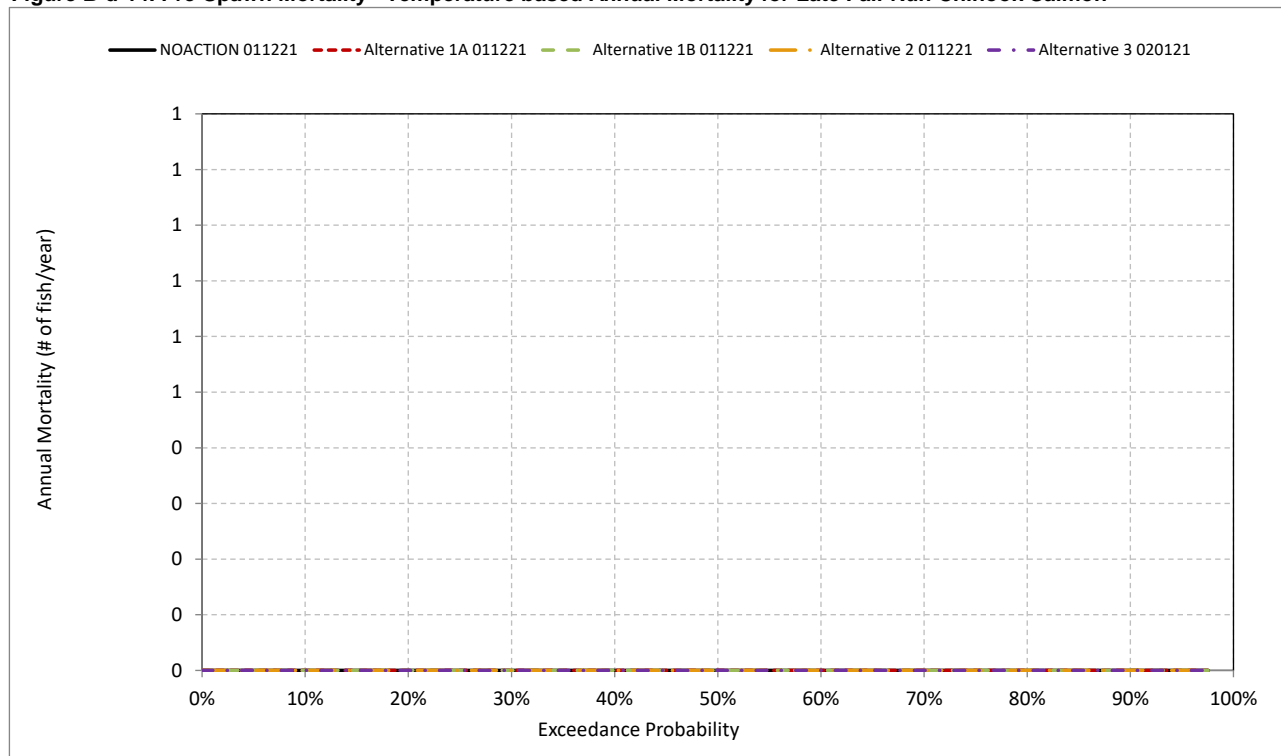




Figure B-d-15. Eggs - Temperature based Annual Mortality for Late Fall-Run Chinook Salmon

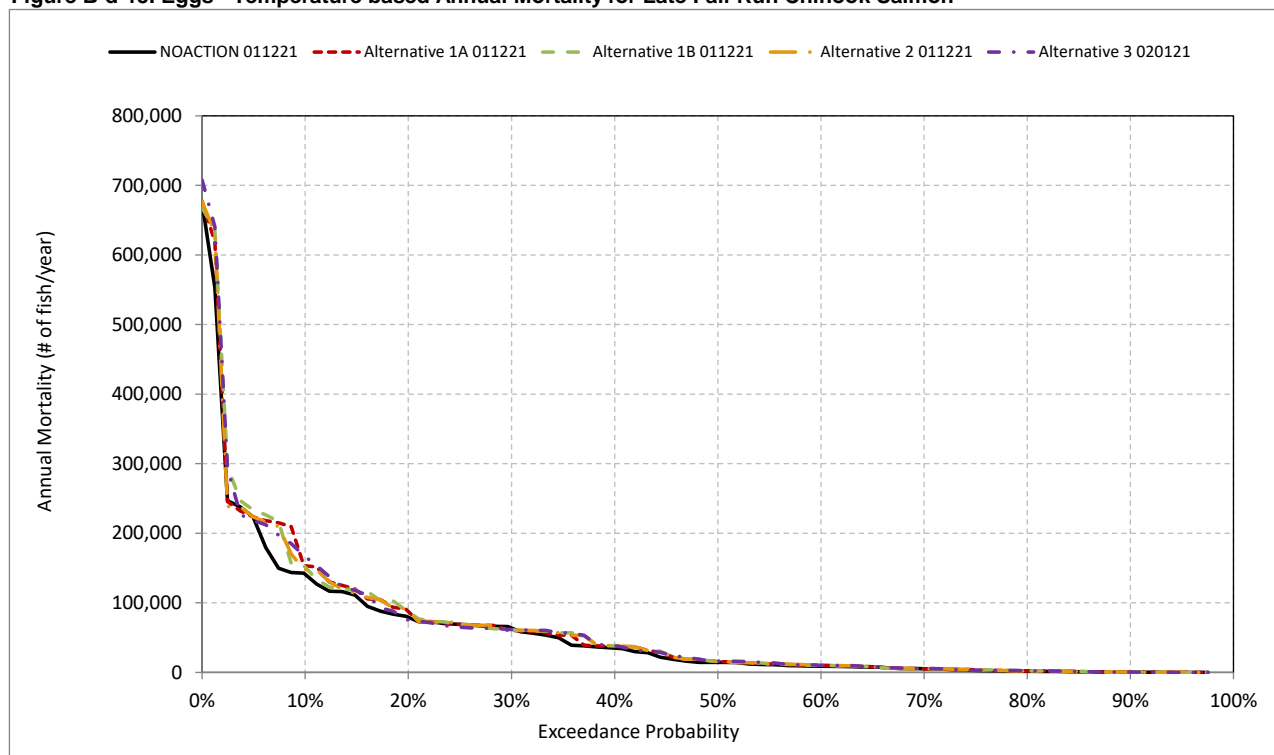


Figure B-d-16. Fry - Temperature based Annual Mortality for Late Fall-Run Chinook Salmon

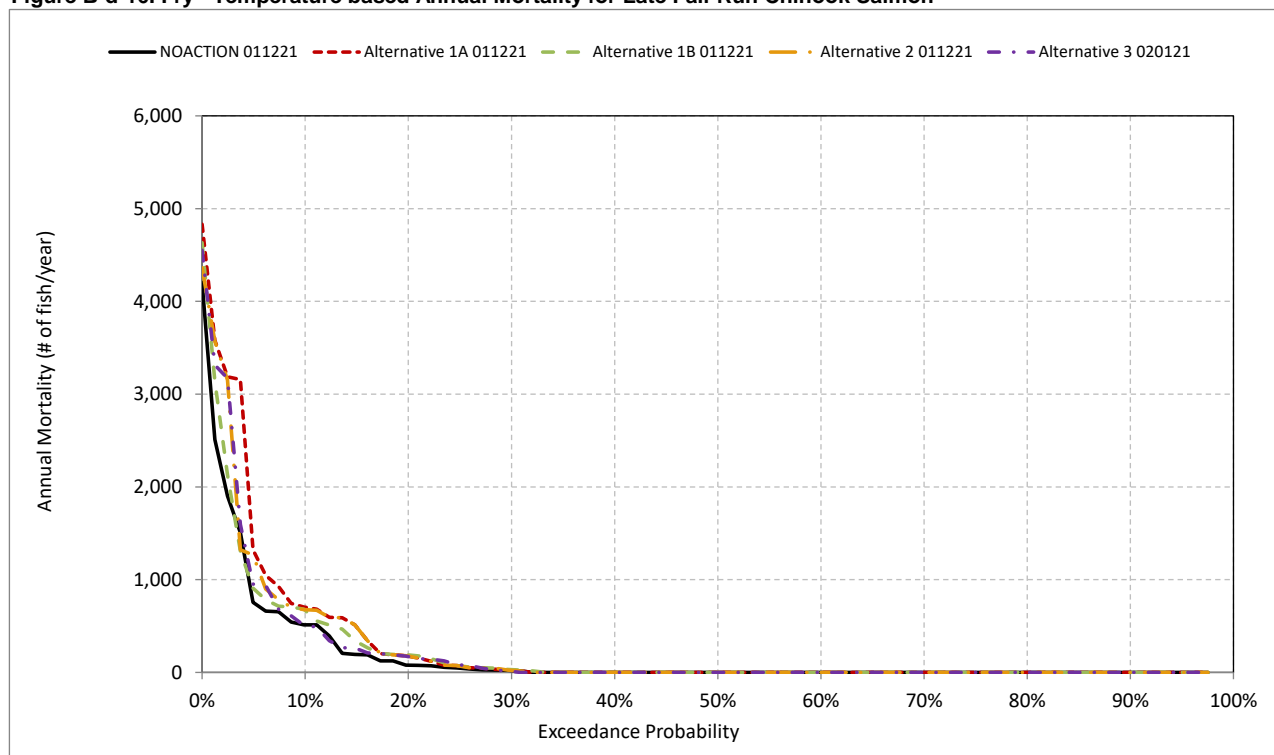


Figure B-d-17. Pre-smolt - Temperature based Annual Mortality for Late Fall-Run Chinook Salmon

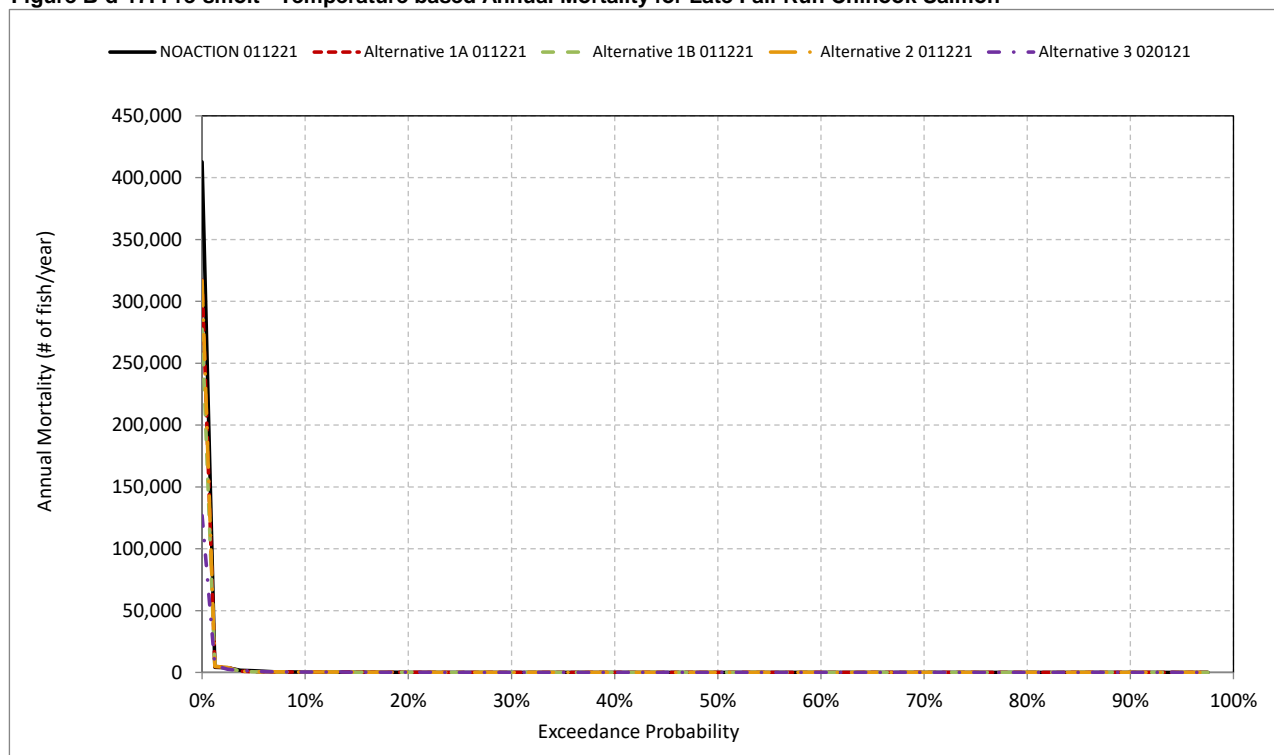


Figure B-d-18. Immature Smolt - Temperature based Annual Mortality for Late Fall-Run Chinook Salmon

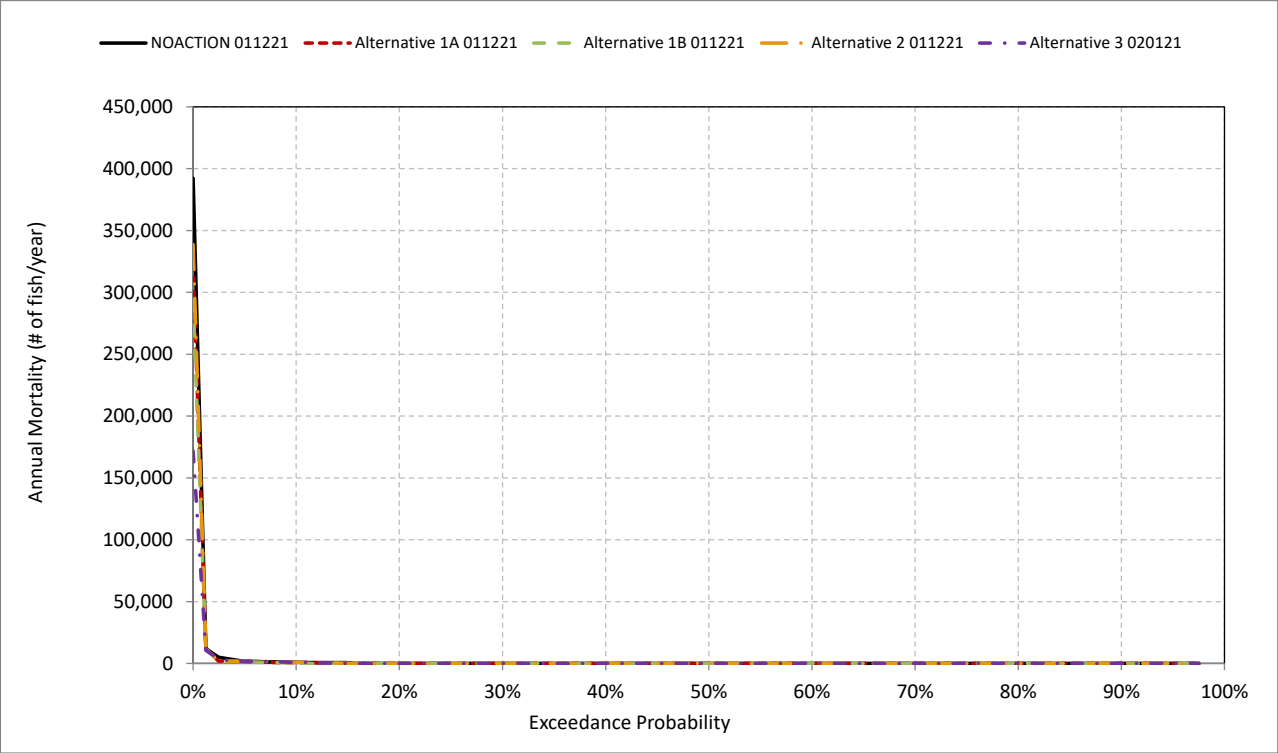


Figure B-d-19. Total Temperature based Annual Mortality for Late Fall-Run Chinook Salmon

