Appendix 9D

SALMOD Analysis Documentation

This appendix provides information about the methods and assumptions used for the Remanded Biological Opinions on the Coordinated Long-Term Operation of the Central Valley Project (CVP) and State Water Project (SWP) Environmental Impact Statement (EIS) analysis using the SALMOD model. It is organized in two main sections that are briefly described below:

- Section 9D.1: SALMOD Methodology and Assumptions
  - The analysis uses the SALMOD model to quantify fall-run, late fall-run, spring-run, and winter-run Chinook Salmon survival and mortality for different life-stages within the Sacramento River, specifically from below Keswick Dam to the Red Bluff Pumping Plant (previously at Red Bluff Diversion Dam). This section briefly describes the overall analytical approach and assumptions of the SALMOD Model.
- Section 9D.2: SALMOD Model Results
  - This section presents the production (survival) and mortality by life-stages and various causes of Sacramento River fall-run, late fall-run, spring-run, and winter-run Chinook Salmon. Statistics are presented in exceedance plots and in tabular format.

9D.1 SALMOD Methodology and Assumptions

9D.1.1 SALMOD Methodology

The SALMOD model simulates the life-stage dynamics of fall-run, late fall-run, spring-run, and winter-run Chinook Salmon populations within the Sacramento River, from below Keswick Dam to the Red Bluff Diversion Dam. The model uses daily flow and temperature data from the Sacramento River HEC5Q model to simulate the annual growth, movement, and mortality of the various riverine life stages of the four Chinook Salmon populations based on an initial annual adult population that resets each biological year. The dynamics simulated are based on assumptions and relations specified in the model. The final output from SALMOD used in this analysis is annual production (number of surviving members of each life-stage) and annual mortality based on a variety of factors, including temperature and habitat (flow) based mortality. The 2008 Operations Criteria and Plan (OCAP) Biological Assessment (BA), Appendix P provides detailed description of the SALMOD model structure, assumptions, and processes (Reclamation 2008).

9D.1.2 SALMOD Analysis Scenario Assumptions

This section describes the assumptions for the SALMOD analysis for the No Action Alternative, Second Basis of Comparison, and other alternatives.

The following CalSim II model simulations were performed as the basis of evaluating the impacts of the other alternatives:

- No Action Alternative
- Second Basis of Comparison

The following model simulations of other alternatives were performed:

- Alternative 1 – for simulation purposes, considered the same as Second Basis of Comparison
- Alternative 2 – for simulation purposes, considered the same as No Action Alternative
- Alternative 3
- Alternative 4 – for simulation purposes, considered the same as Second Basis of Comparison.
- Alternative 5

Assumptions for each of these alternatives were developed with the surface water modeling tools and are described in Appendix 5A, Section B.

Alternative 1 modeling assumptions are the same as the Second Basis of Comparison, and Alternative 2 modeling assumptions are the same as the No Action Alternative; therefore, the assumptions for those alternatives are not discussed separately in this document.

Assumptions for each of these alternatives are reflected in monthly CalSim II flow data that are used in the Sacramento River HEC5Q Model to generate daily flow and temperature data that are input to the SALMOD model. For this analysis, the initial population of adult were assumed to be 23,356 for fall-run, 5,545 for late fall-run, 500 for spring-run, and 4,108 for winter-run based on geometric mean of 2003-2014 GrandTab escapement data provided by David Swank at the National Marine Fisheries Service (NMFS) in April 2015. For spring-run, the number of adults in the mainstem Sacramento River are significantly low (arithmetic mean of 69). Based on further discussion with NMFS, 500 adults were assumed as the input in SALMOD. The assumed spawning distribution by reach is shown in Table 9D.1. Assumptions of the spawning distributions were based on average 2003-2014 Redd survey data, provided by David Swank at NMFS in April 2015.

Table 9D.1 Upper Sacramento River Spawning Distributions.

River Reach	Spawning Distribution (%) Fall	Spawning Distribution (%) Late Fall	Spawning Distribution (%) Spring	Spawning Distribution (%) Winter
Keswick Dam – Anderson Cottonwood Irrigation District (ACID) Dam	19.50	71.30	12.80	45.10
ACID Dam – Highway 44 Bridge	6.60	5.20	33.90	42.10
Highway 44 Bridge – Airport Road Bridge	14.70	3.90	29.70	12.20
Airport Road Bridge – Balls Ferry	19.40	8.90	11.10	0.30
Balls Ferry – Battle Creek	12.50	5.90	7.40	0.10
Battle Creek – Jellys Ferry	15.20	3.10	1.50	0.10
Jellys Ferry – Bend Bridge	8.00	1.20	2.60	0.10
Bend Bridge – Red Bluff Pumping Plant (previously Red Bluff Diversion Dam)	4.20	0.60	0.80	0.00

9D.2 SALMOD Results

Results are provided for each of the following runs separately:

- No Action Alternative
- Second Basis of Comparison
- Alternative 1
- Alternative 3
- Alternative 5

In addition, the same statistics are provided for the following comparisons to establish changes of the alternative with respect to one of the bases of comparison:

- Alternative 1 compared to No Action Alternative
- Alternative 3 compared to No Action Alternative
- Alternative 5 compared to No Action Alternative
- No Action Alternative compared to Second Basis of Comparison
- Alternative 1 compared to Second Basis of Comparison
- Alternative 3 compared to Second Basis of Comparison
- Alternative 5 compared to Second Basis of Comparison

The first set of results is provided as probability of exceedance curves of annual production and mortality for the four Sacramento River salmonid populations. For this analysis, exceedance plots for annual production and mortality were generated based on the 82-year CalSim II time period for each of the alternatives and basis of comparison. Differences among alternatives were evaluated using the exceedance probability corresponding to varying levels of survival. The results are provided at the end of this appendix in the following subsections:

- B.1. Fall-Run Chinook Salmon
- B.2. Late Fall-Run Chinook Salmon
- B.3. Spring-Run Chinook Salmon
- B.4. Winter-Run Chinook Salmon

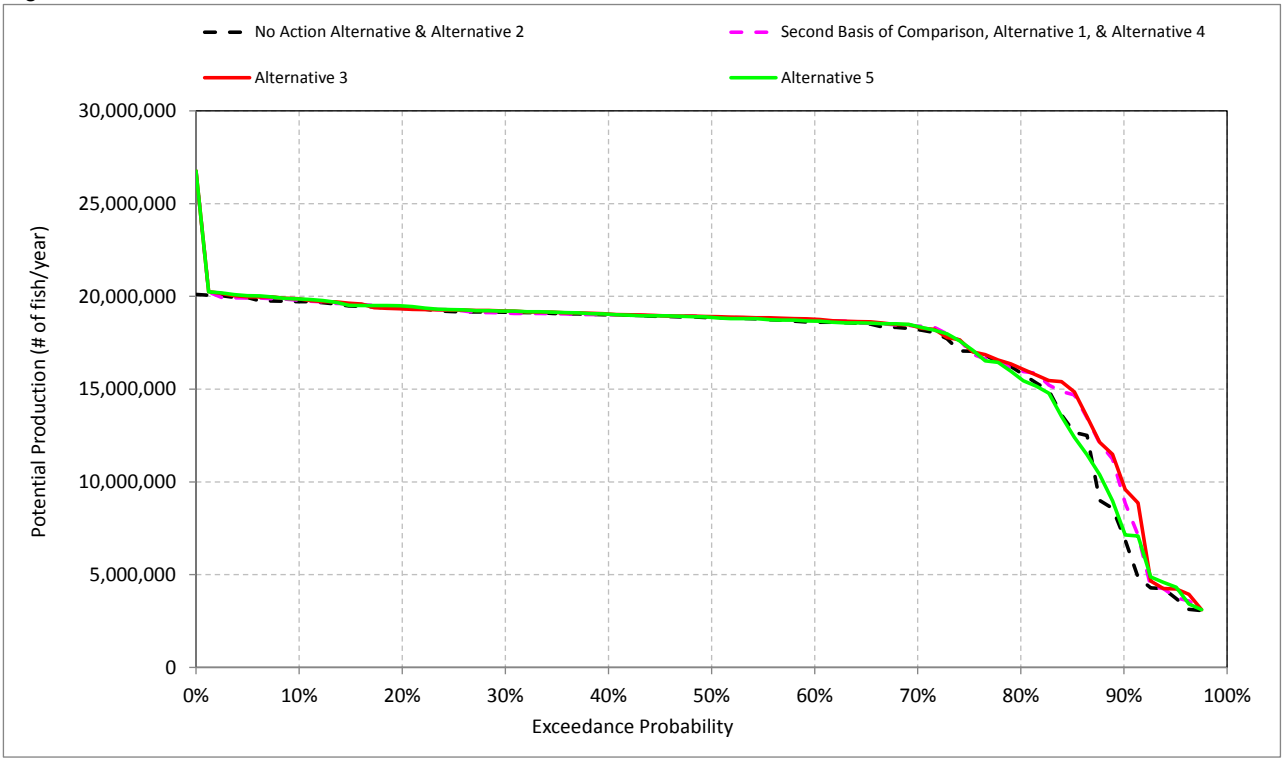
The second set of results is provided as tables summarizing the comparison between alternatives of annual production and mortality with long-term averages over the entire CalSim II simulation period. Averages are also provided by water year type.

9D.3 References

Reclamation (Bureau of Reclamation). 2008. *2008 Central Valley Project and State Water Project Operations Criteria and Plan Biological Assessment*, Appendix P SALMOD Model.

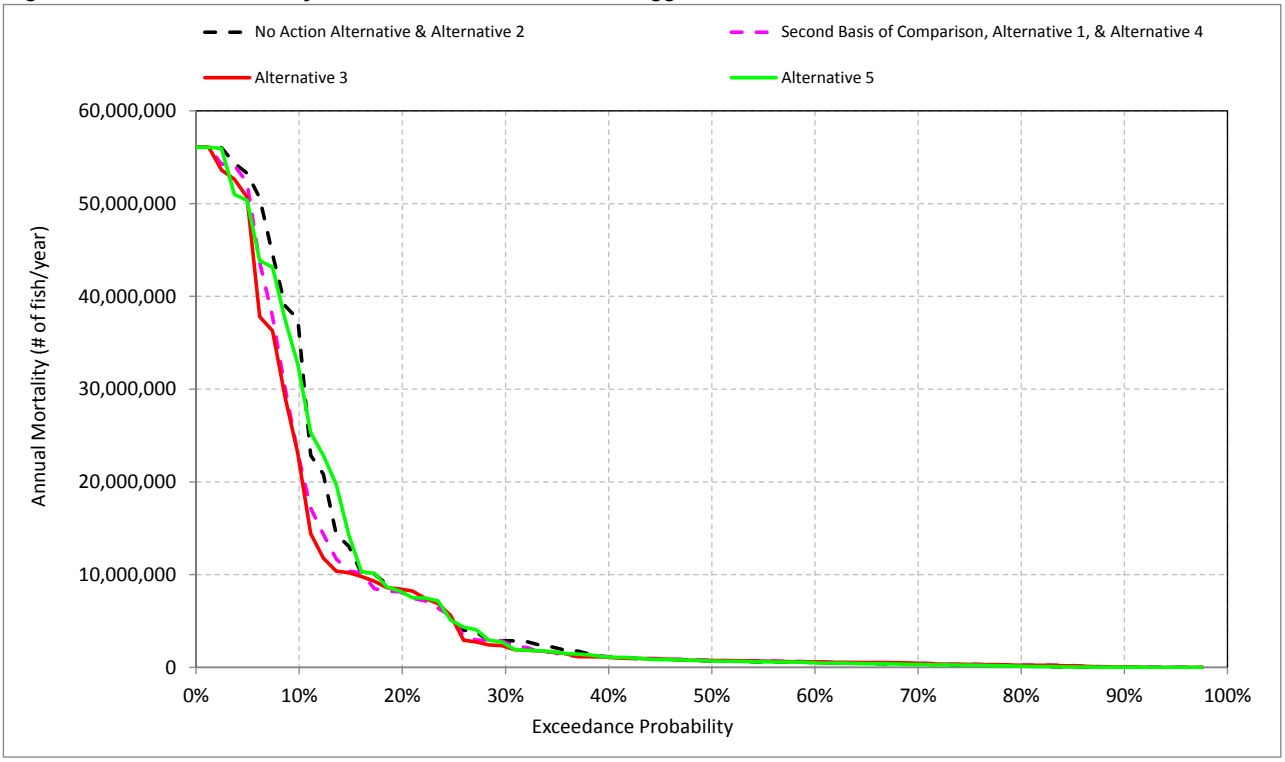
B.1. Fall-Run Chinook Salmon

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



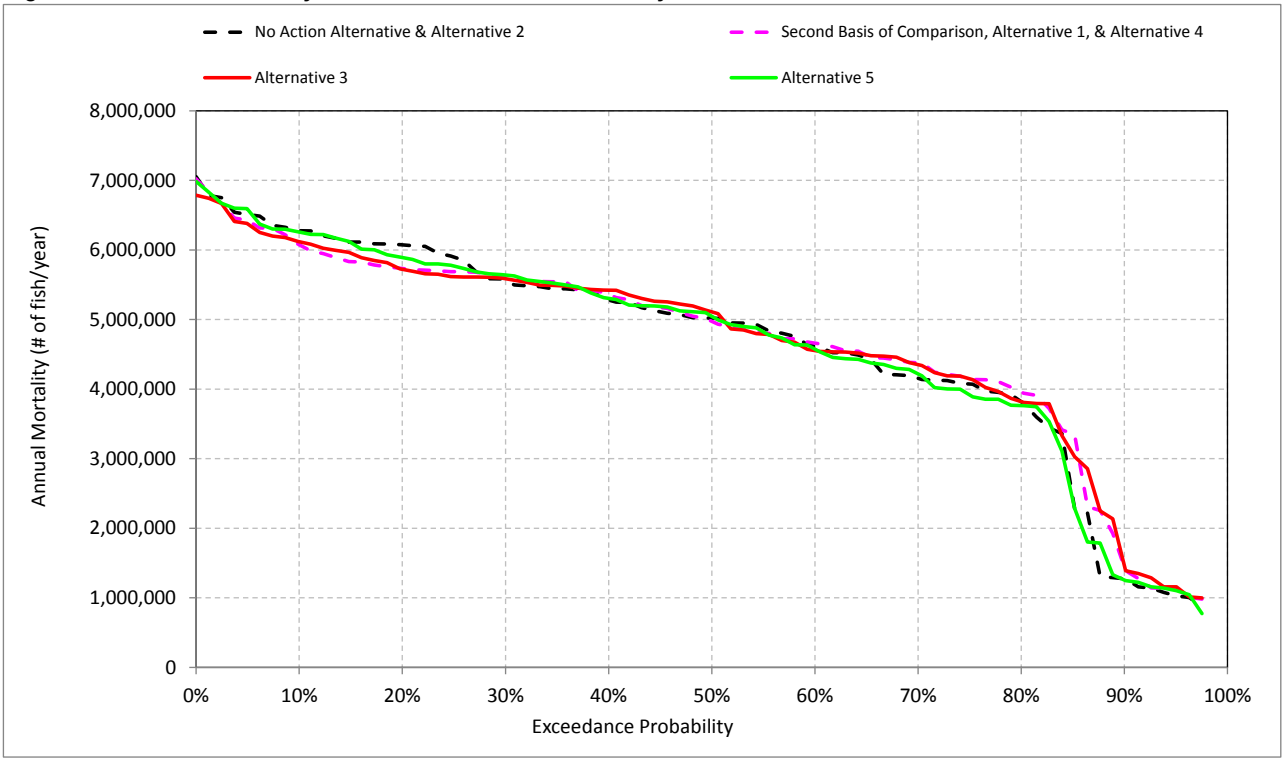
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-1-2. Annual Mortality for Fall-Run Chinook Salmon - Eggs



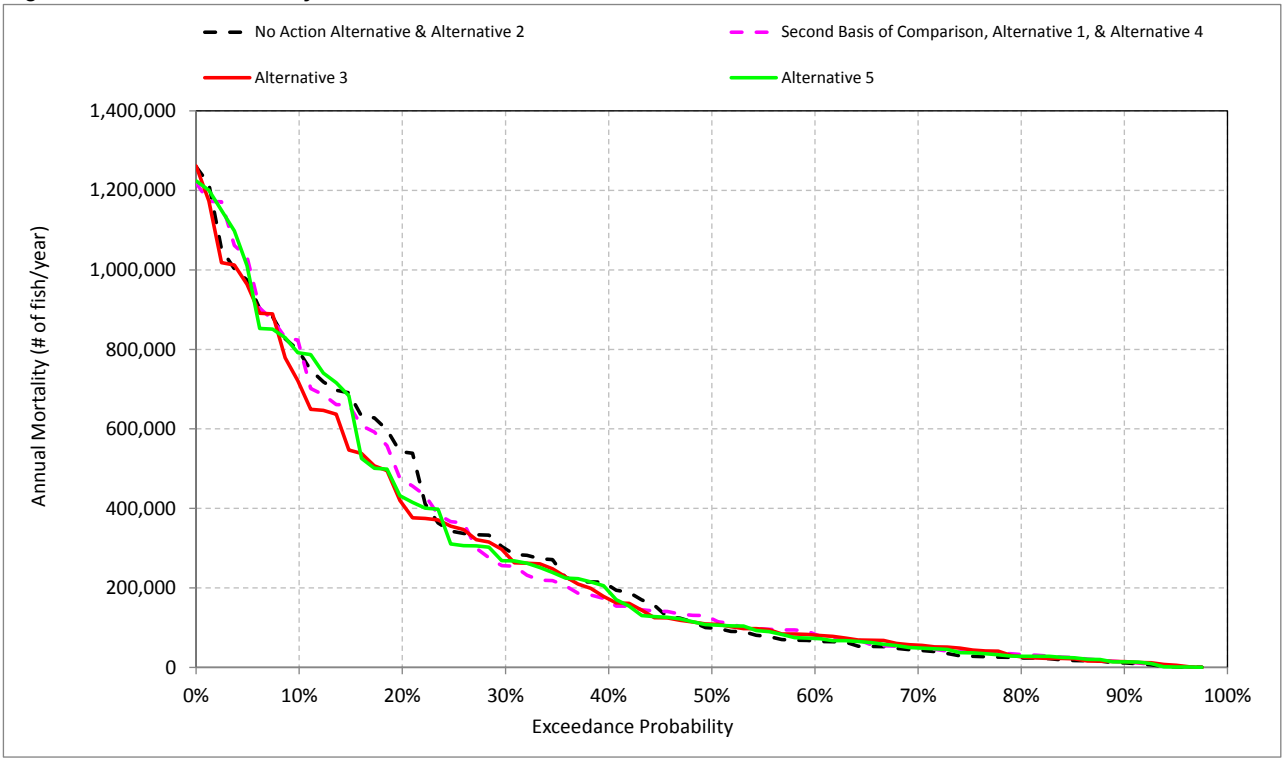
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-1-3. Annual Mortality for Fall-Run Chinook Salmon - Fry



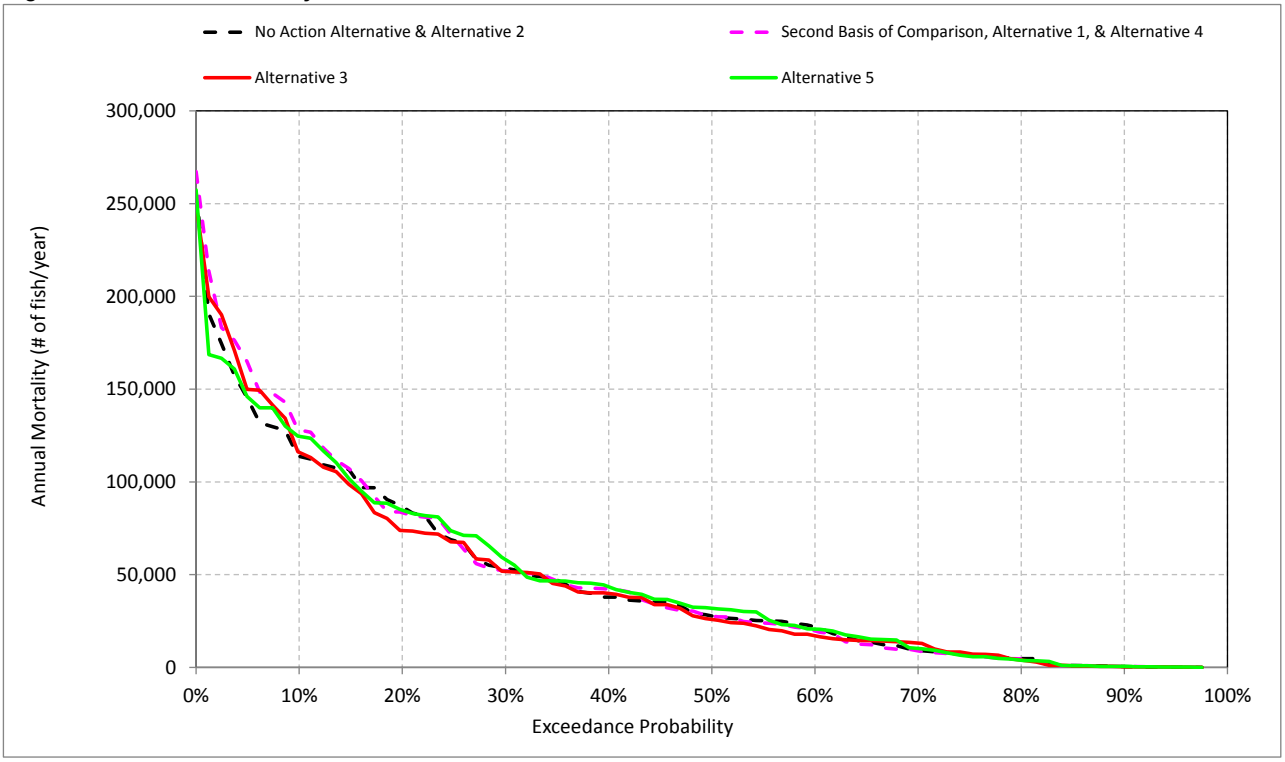
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-1-4. Annual Mortality for Fall-Run Chinook Salmon - Pre-Smolt



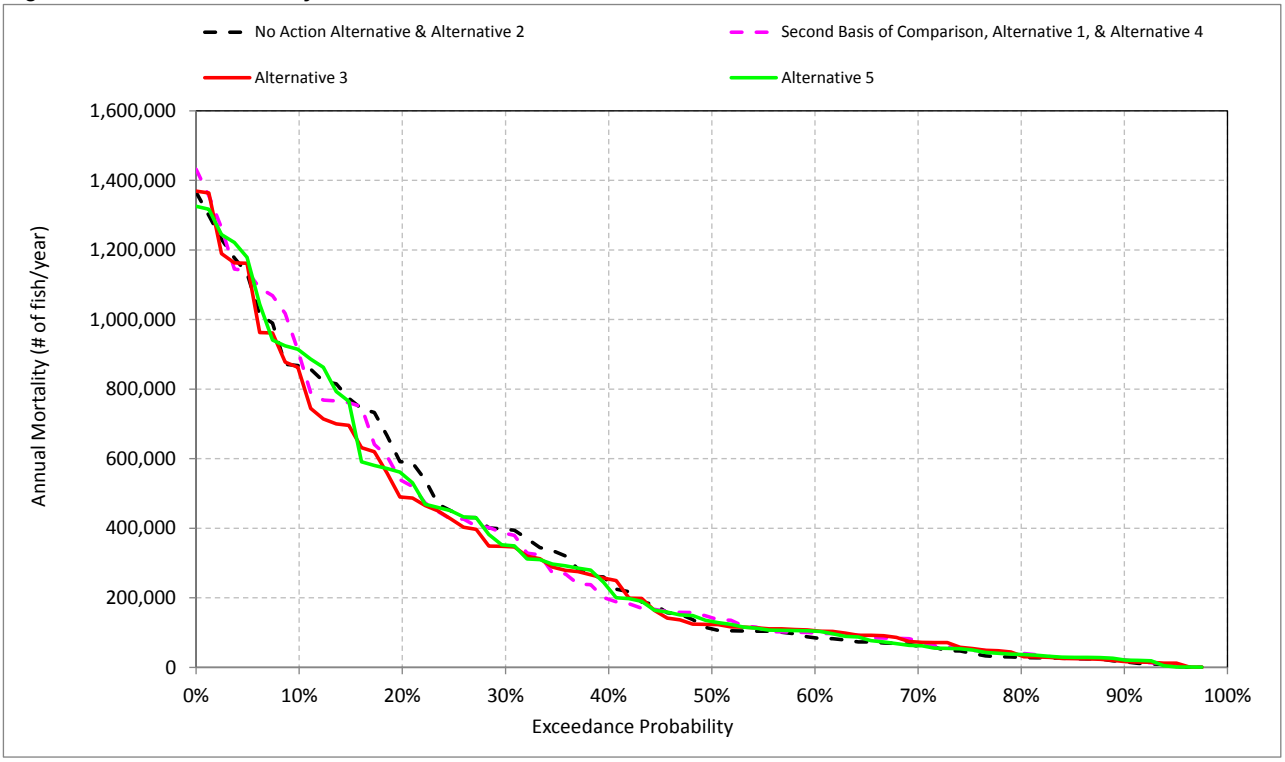
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-1-5. Annual Mortality for Fall-Run Chinook Salmon - Immature Smolt



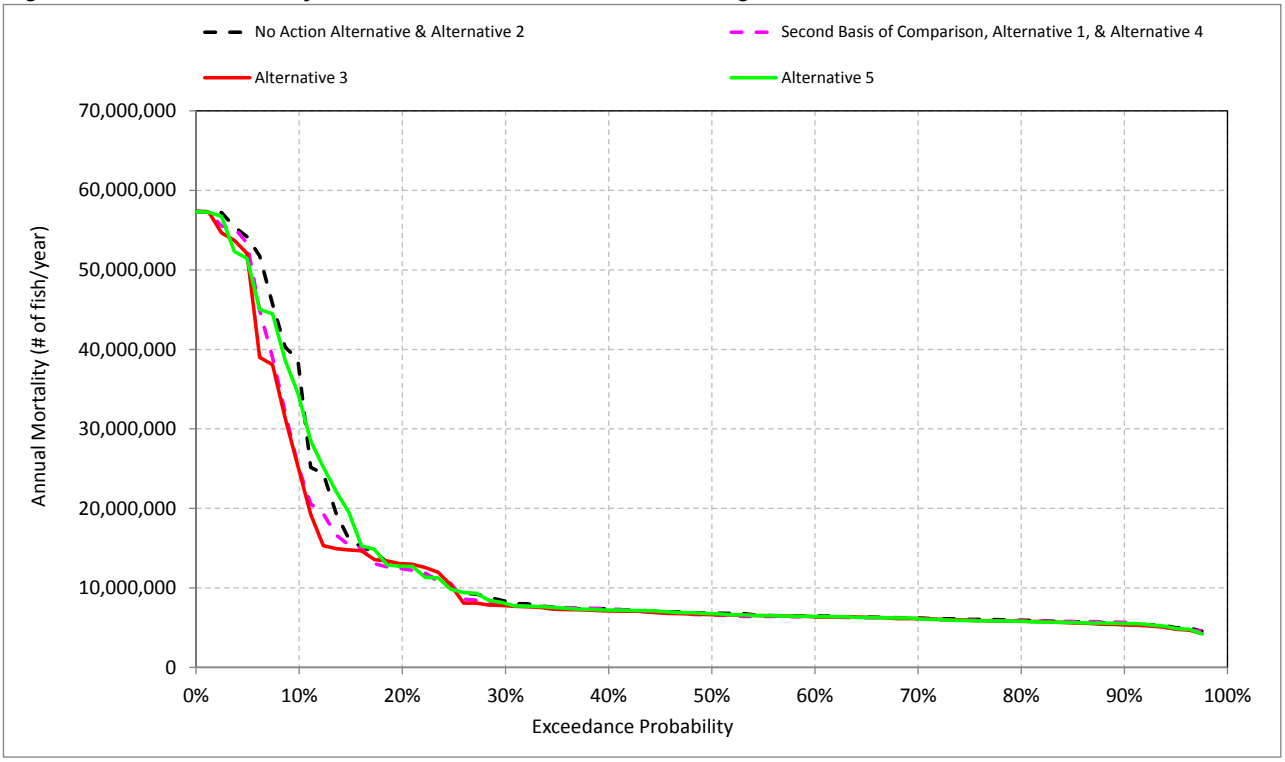
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-1-6. Annual Mortality for Fall-Run Chinook Salmon - Pre- & Immature Smolts



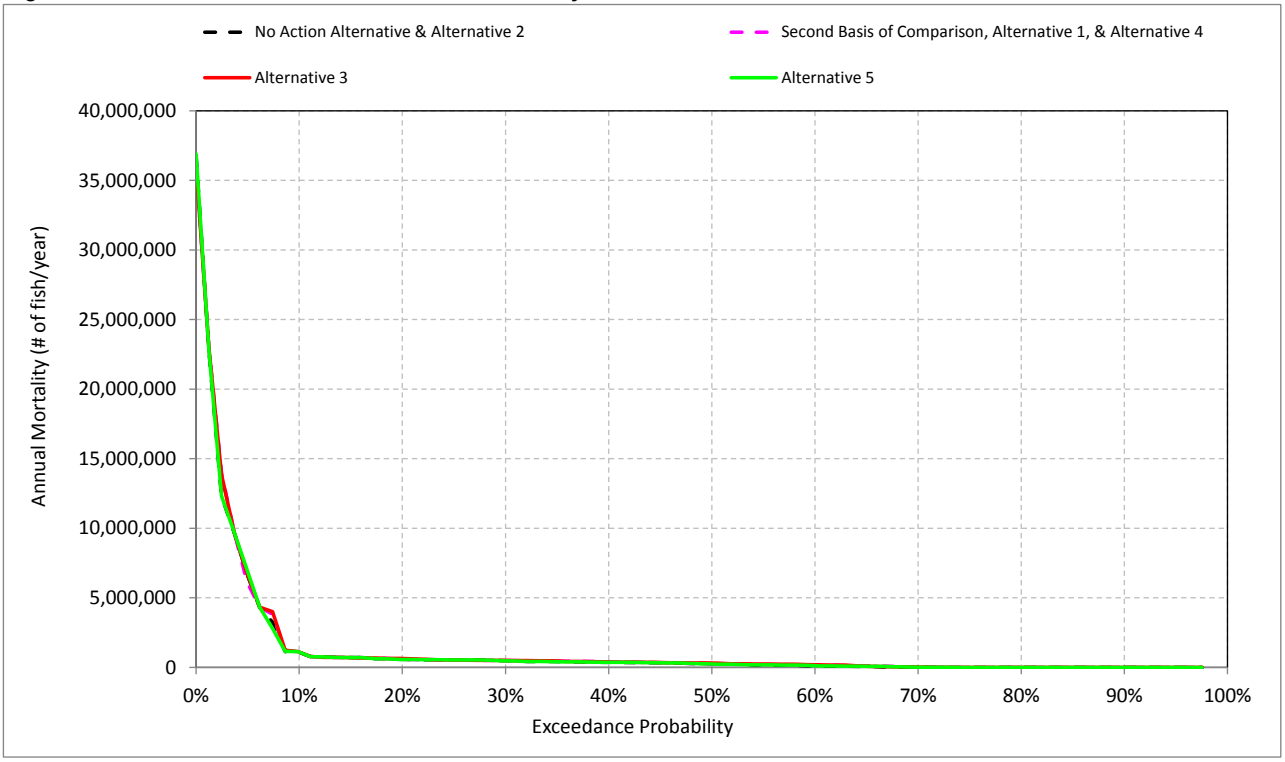
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-1-7. Annual Mortality for Fall-Run Chinook Salmon - All Lifestages



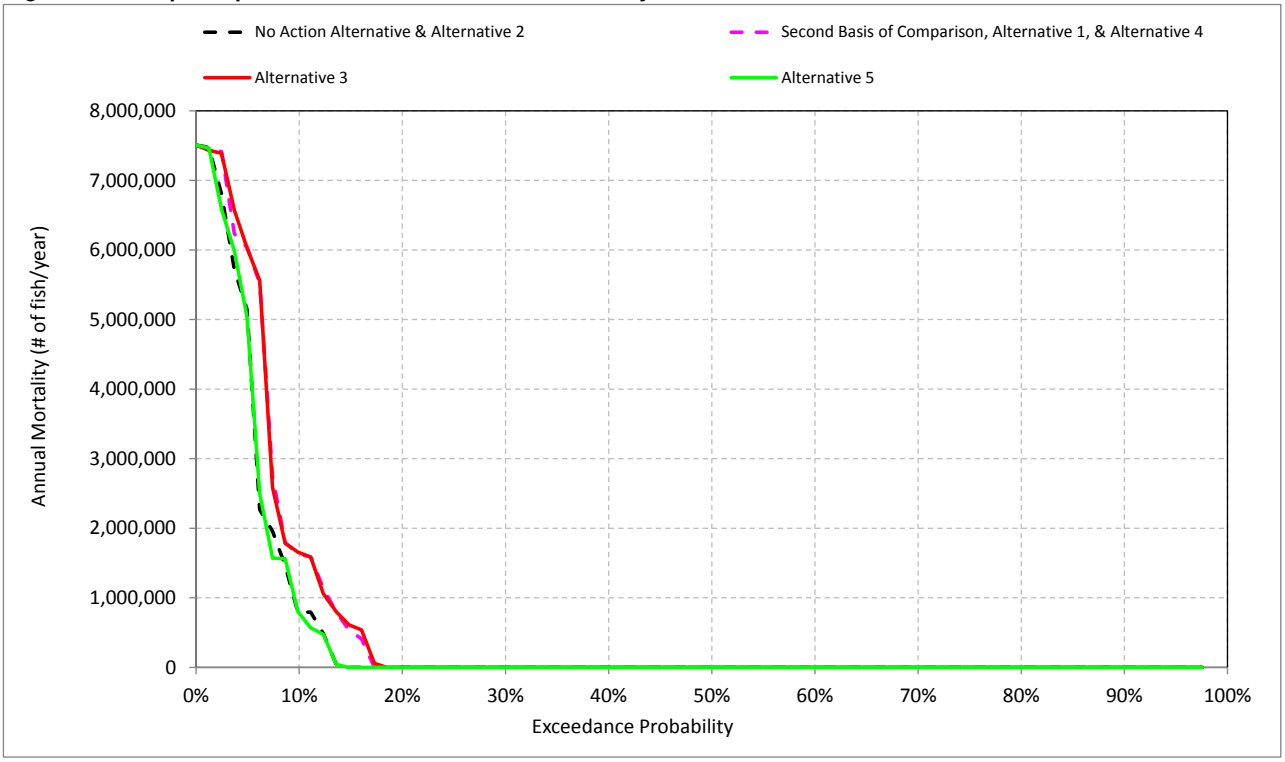
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-1-8. Incubation - Habitat based Annual Mortality for Fall-Run Chinook Salmon



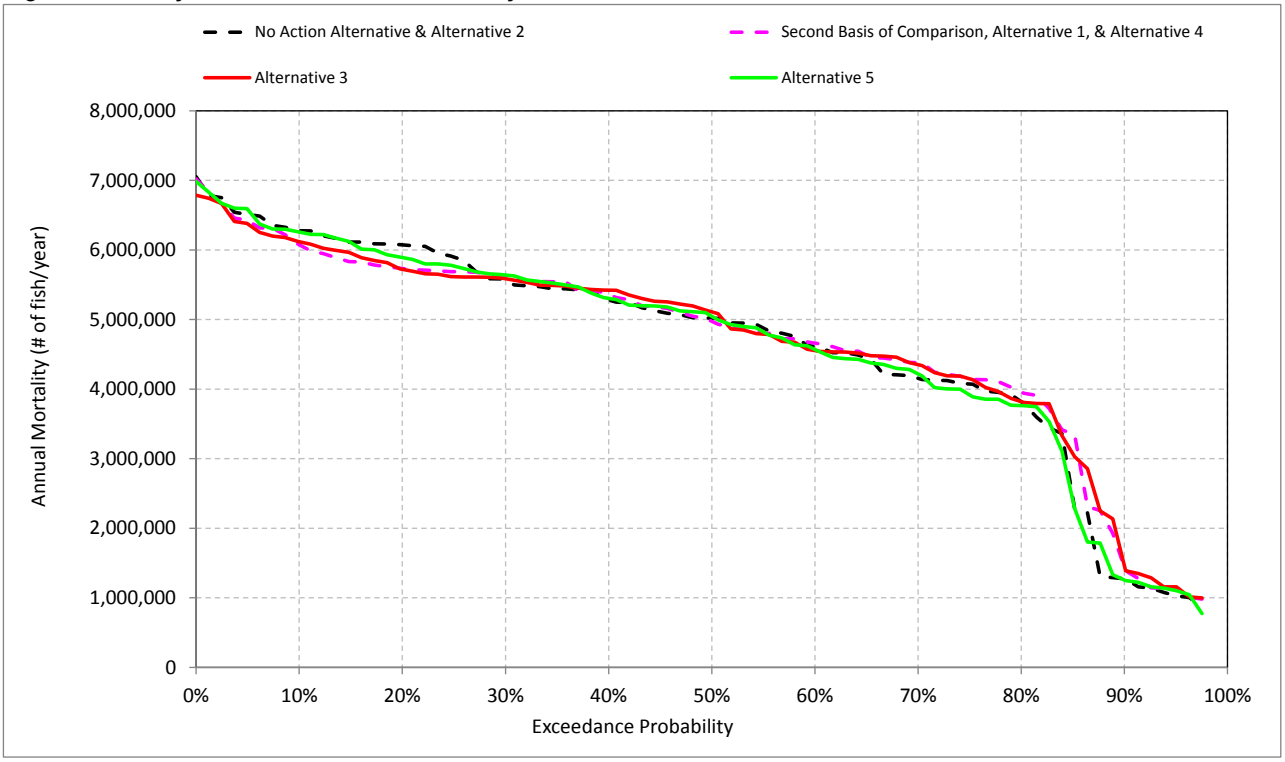
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-1-9. Super-imposition - Habitat based Annual Mortality for Fall-Run Chinook Salmon



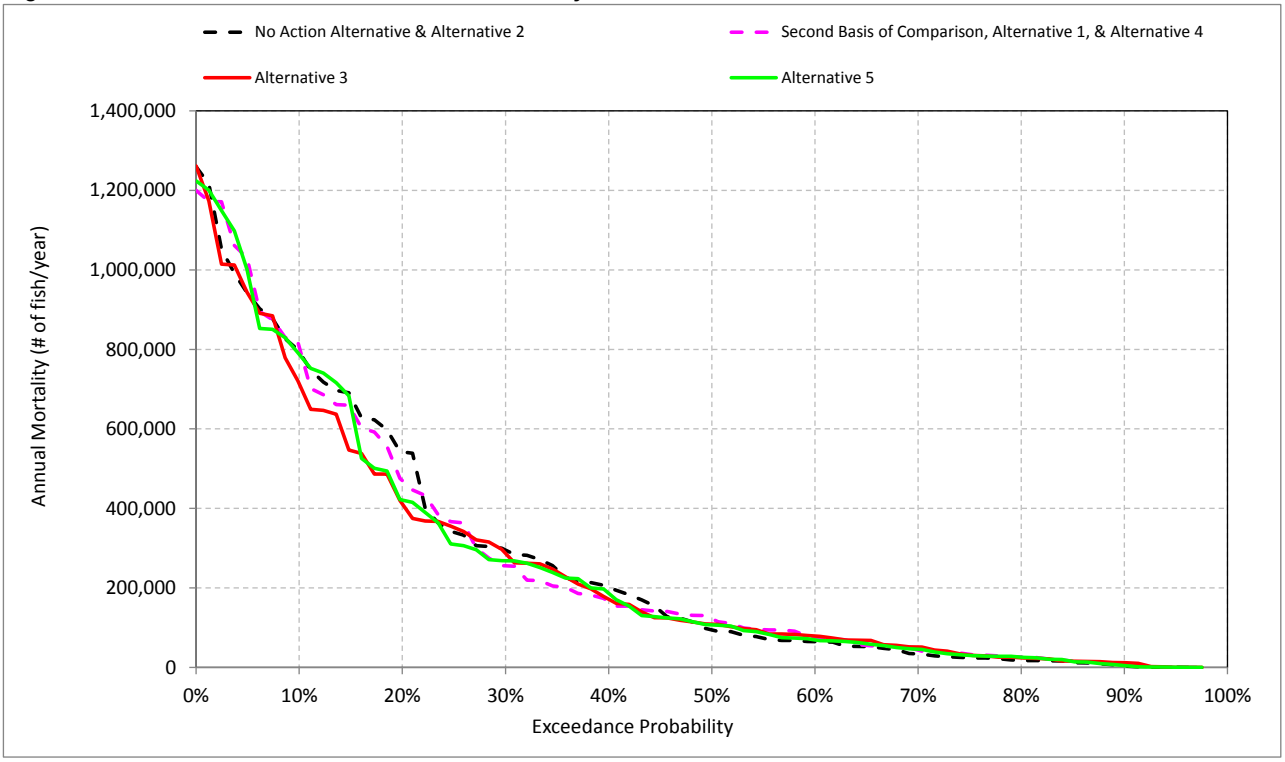
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-1-10. Fry - Habitat based Annual Mortality for Fall-Run Chinook Salmon



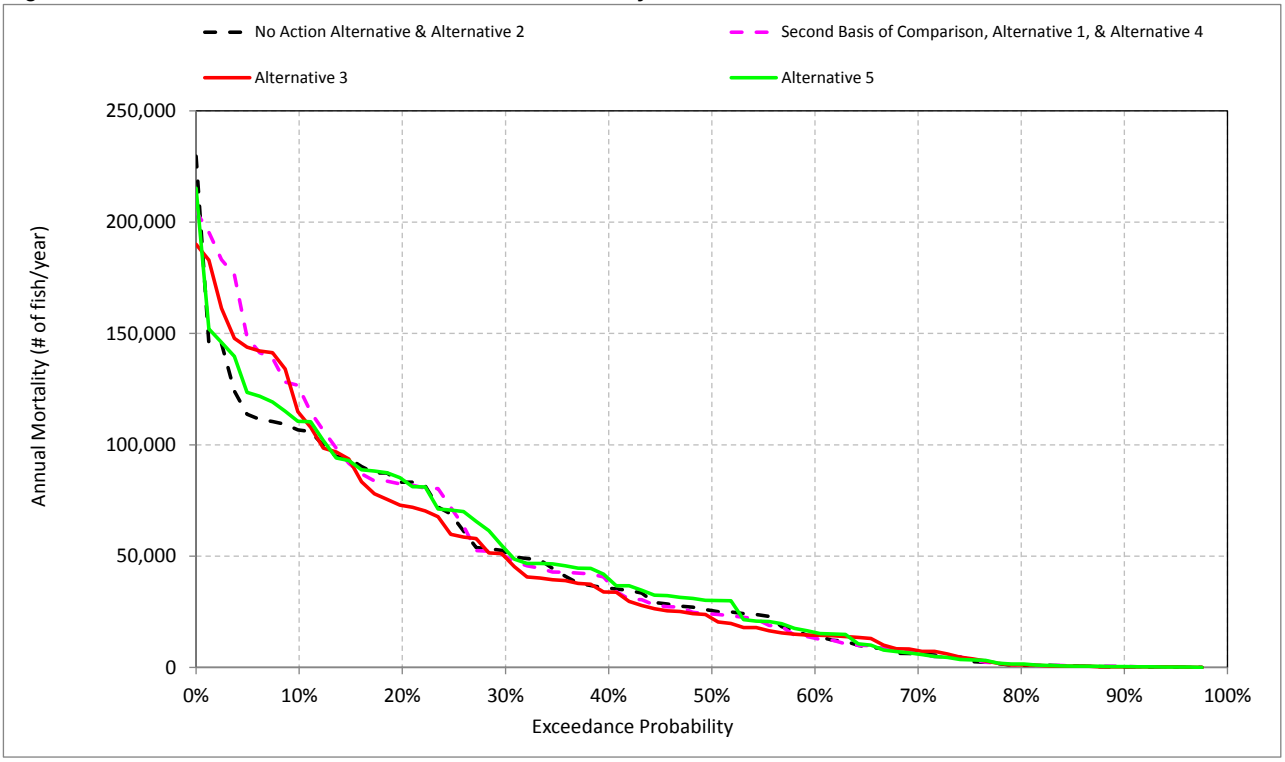
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-1-11. Pre-smolt - Habitat based Annual Mortality for Fall-Run Chinook Salmon



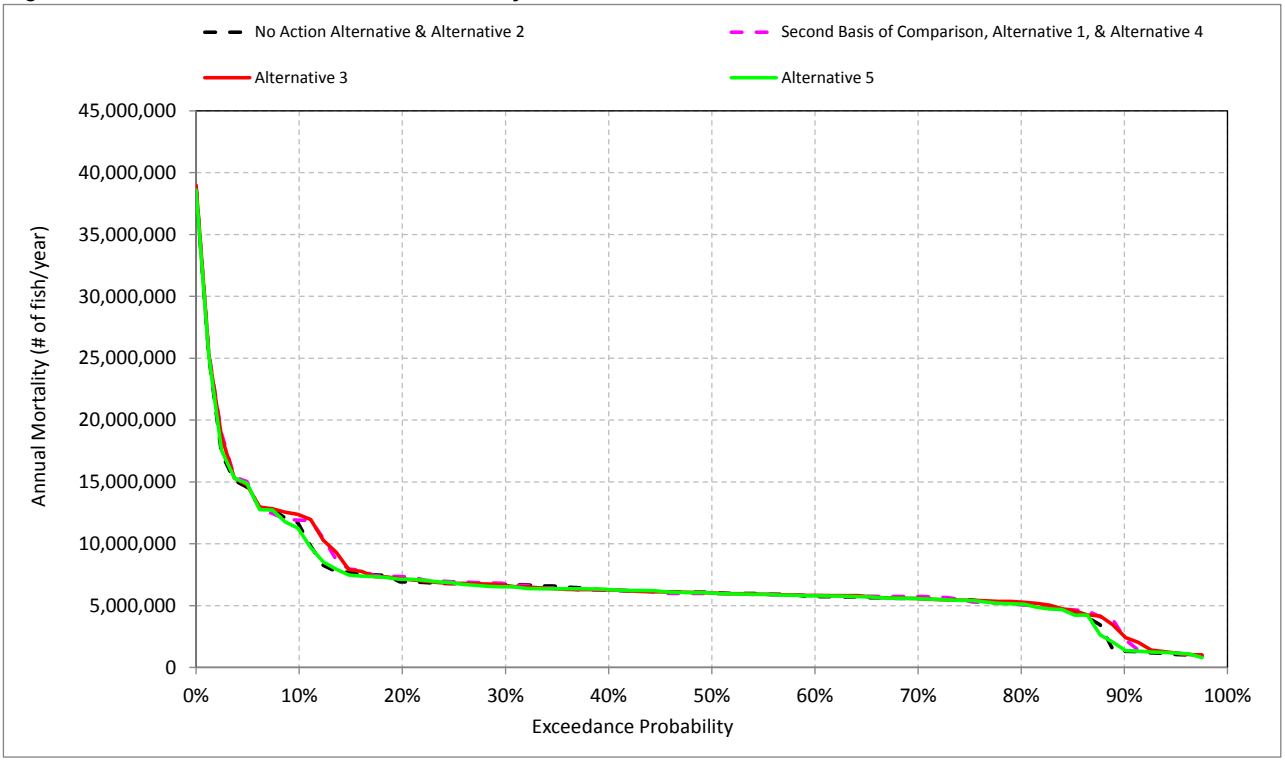
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-1-12. Immature Smolt - Habitat based Annual Mortality for Fall-Run Chinook Salmon



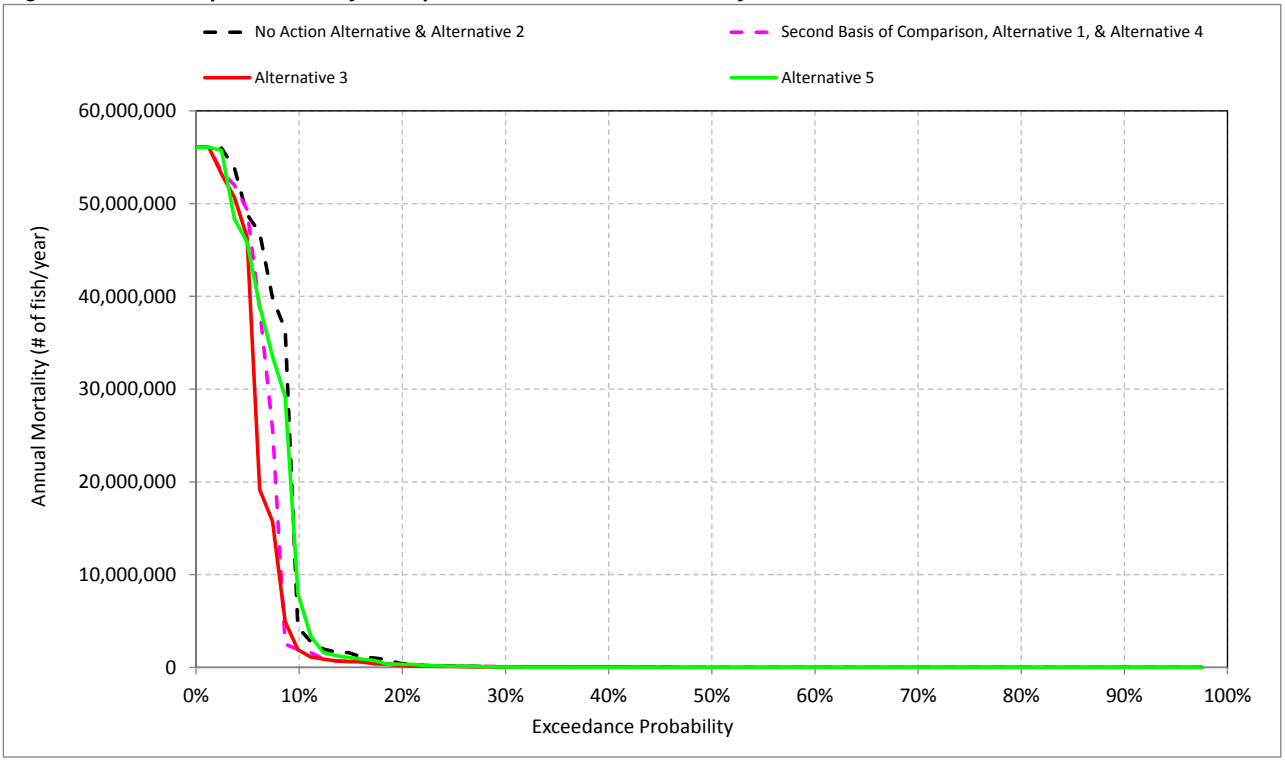
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-1-13. Total Habitat based Annual Mortality for Fall-Run Chinook Salmon



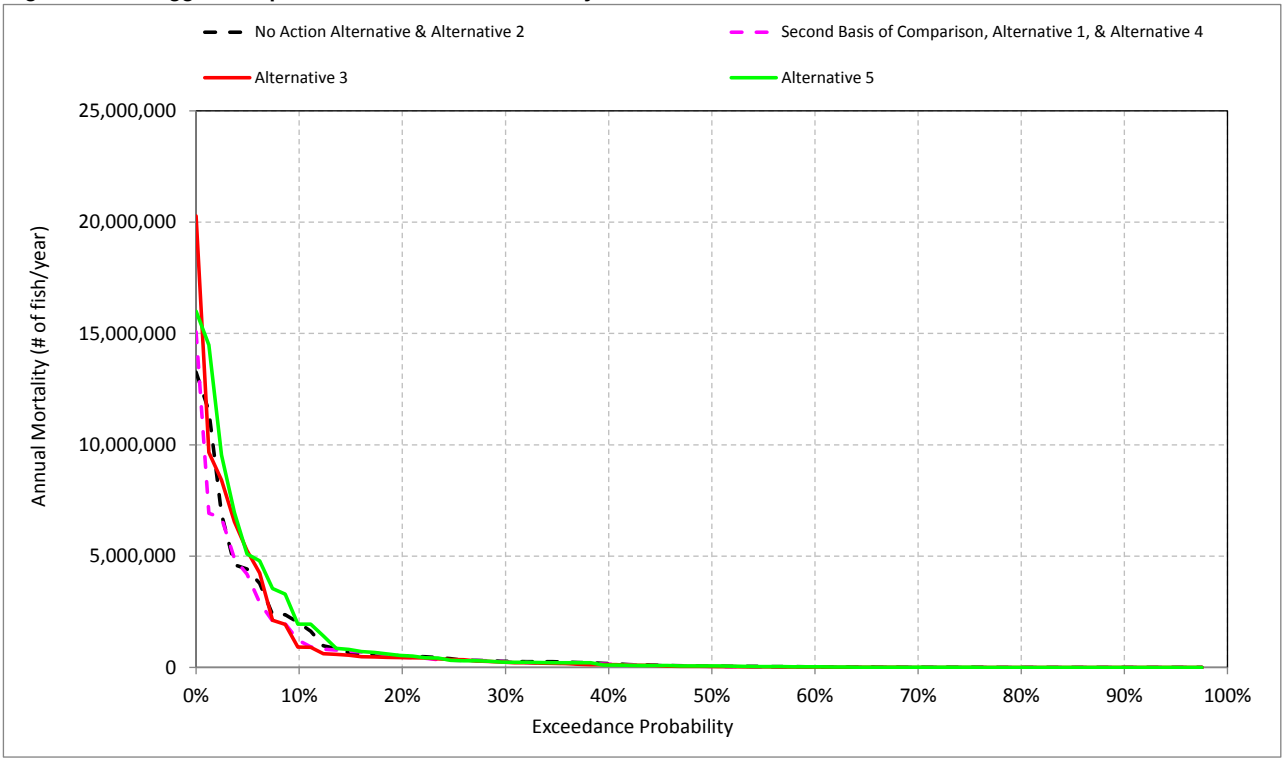
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-1-14. Pre-Spawn Mortality - Temperature based Annual Mortality for Fall-Run Chinook Salmon



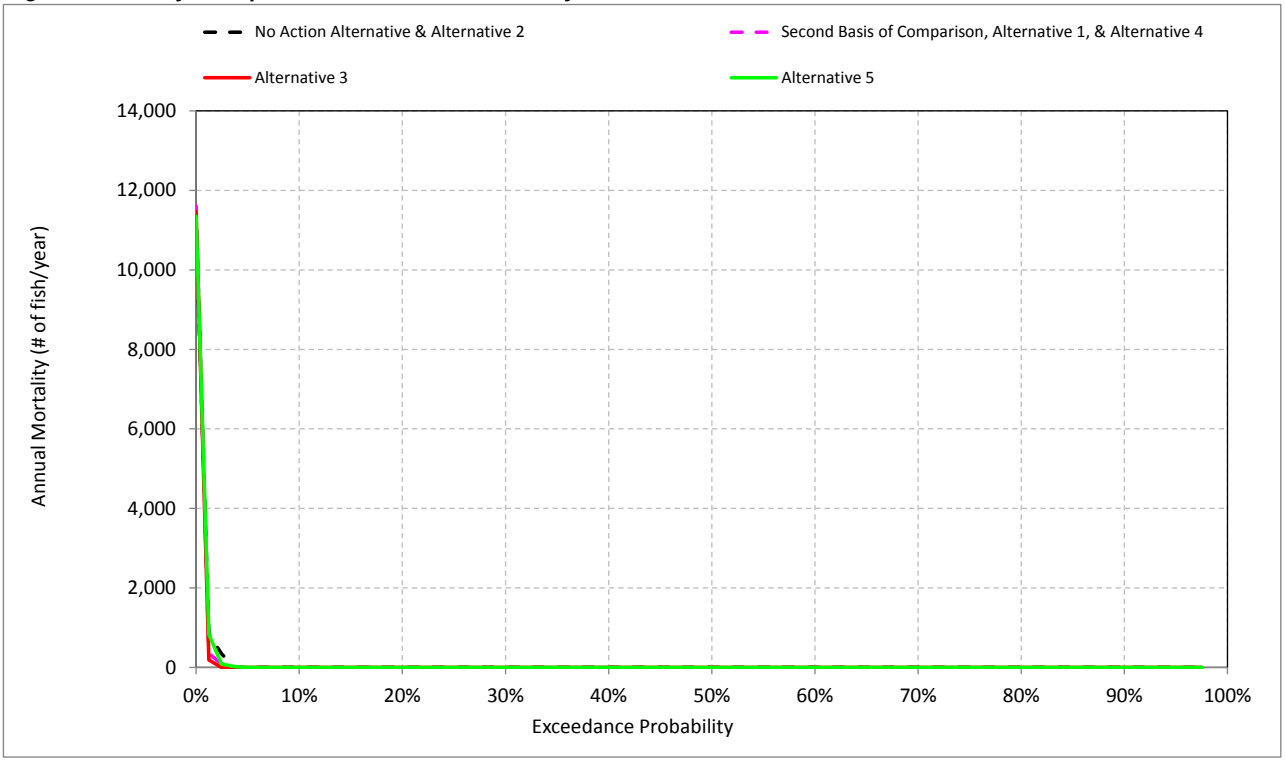
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-1-15. Eggs - Temperature based Annual Mortality for Fall-Run Chinook Salmon



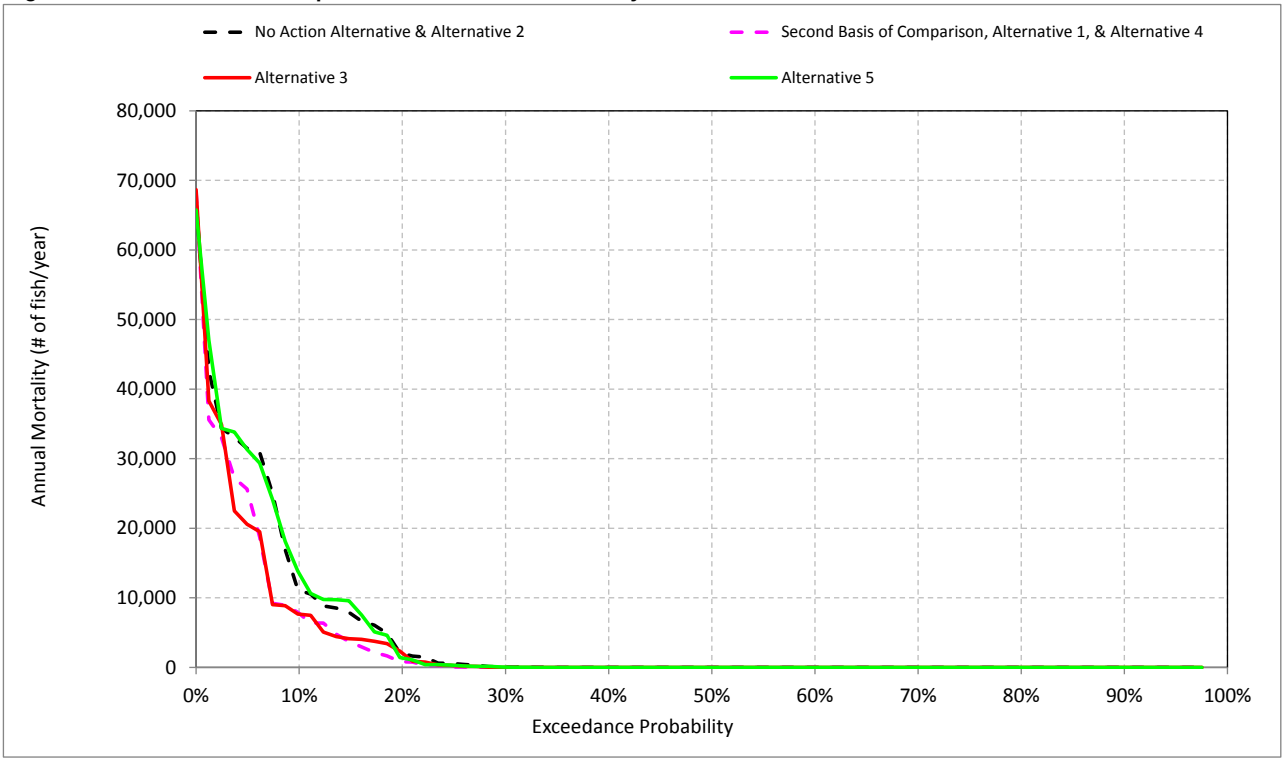
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-1-16. Fry - Temperature based Annual Mortality for Fall-Run Chinook Salmon



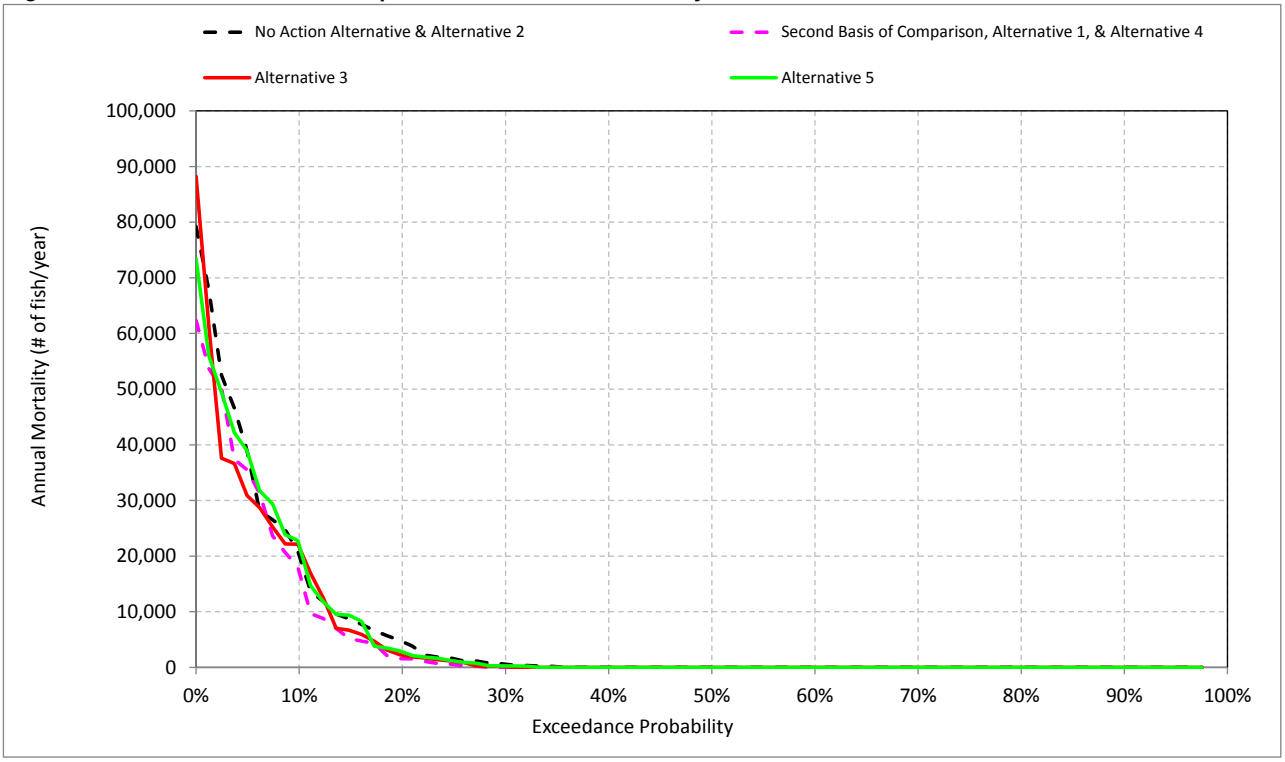
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-1-17. Pre-smolt - Temperature based Annual Mortality for Fall-Run Chinook Salmon



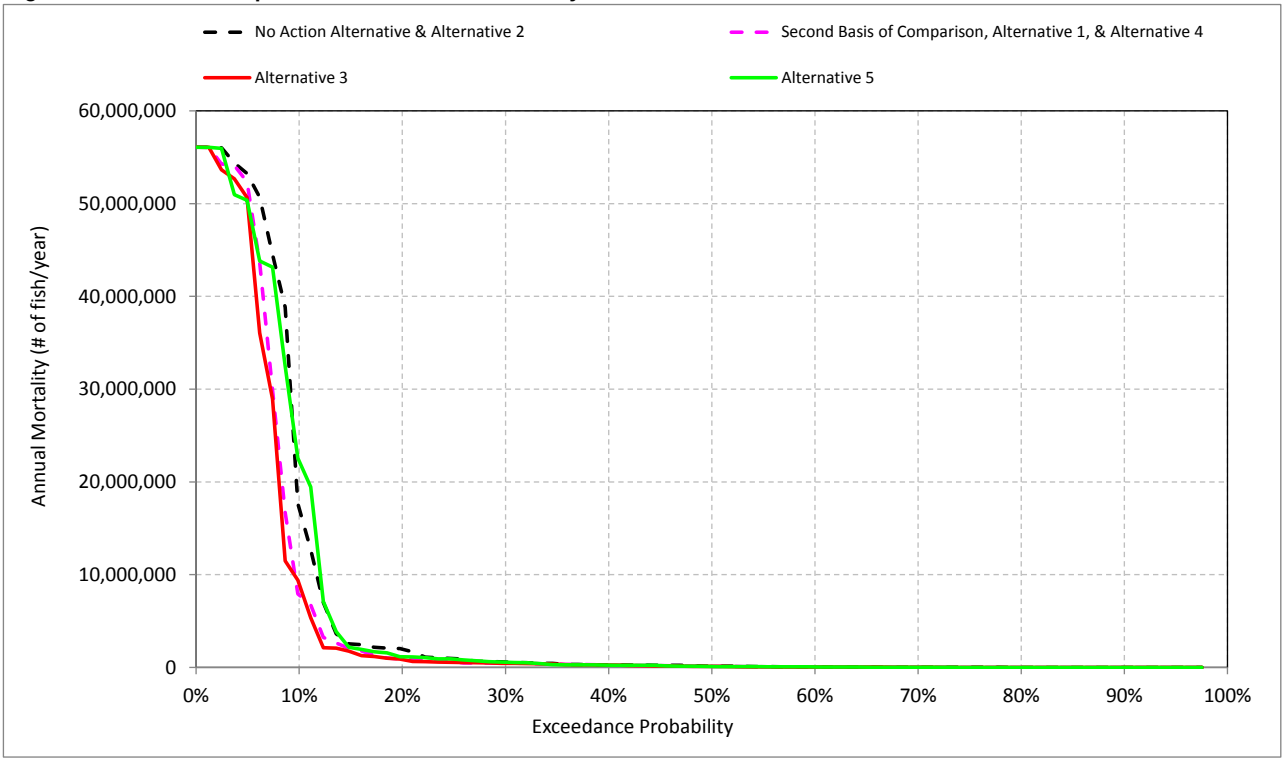
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-1-18. Immature Smolt - Temperature based Annual Mortality for Fall-Run Chinook Salmon



Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-1-19. Total Temperature based Annual Mortality for Fall-Run Chinook Salmon



Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

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

Analysis Period	Annual Potential Production (# of Fish/year)
Long-term	
Full Simulation Period[1]	
No Action Alternative	16,838,069
Alternative 1	17,037,309
Difference	199,240
Percent Difference[3]	1
Water Year Types[2]	
Wet (32.5%)	
No Action Alternative	16,537,313
Alternative 1	16,525,365
Difference	-11,948
Percent Difference	0
Above Normal (12.5%)	
No Action Alternative	15,696,855
Alternative 1	15,746,827
Difference	49,972
Percent Difference	0
Below Normal (17.5%)	
No Action Alternative	17,922,930
Alternative 1	17,847,310
Difference	-75,620
Percent Difference	0
Dry (22.5%)	
No Action Alternative	17,754,135
Alternative 1	17,934,726
Difference	180,590
Percent Difference	1
Critical (15%)	
No Action Alternative	15,800,949
Alternative 1	16,930,799
Difference	1,129,850
Percent Difference	7

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the annual average

Table B-1-2. Annual Mortality by Life Stage for Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Eggs	Fry	Pre-Smolt	Immature-Smolt	Juvenile (Pre & Immature Smolt)
Long-term					
Full Simulation Period[1]					
No Action Alternative	7,894,954	4,684,028	272,676	47,521	320,197
Alternative 1	7,110,950	4,709,109	269,215	49,405	318,621
Difference	-784,003	25,081	-3,461	1,885	-1,576
Percent Difference[3]	-10	1	-1	4	0
Water Year Types[2]					
Wet (32.5%)					
No Action Alternative	6,019,065	5,201,105	74,435	15,865	90,301
Alternative 1	6,023,551	5,129,591	71,744	16,838	88,581
Difference	4,486	-71,514	-2,692	973	-1,719
Percent Difference	0	-1	-4	6	-2
Above Normal (12.5%)					
No Action Alternative	11,831,604	5,007,353	161,828	32,005	193,834
Alternative 1	11,326,553	5,120,441	96,157	31,173	127,329
Difference	-505,051	113,088	-65,672	-833	-66,505
Percent Difference	-4	2	-41	-3	-34
Below Normal (17.5%)					
No Action Alternative	4,975,839	4,911,742	266,079	45,556	311,635
Alternative 1	4,943,736	4,895,243	284,538	50,880	335,418
Difference	-32,103	-16,499	18,459	5,324	23,783
Percent Difference	-1	0	7	12	8
Dry (22.5%)					
No Action Alternative	6,357,019	4,408,740	501,702	61,525	563,227
Alternative 1	5,846,335	4,371,799	440,615	59,727	500,342
Difference	-510,683	-36,940	-61,087	-1,798	-62,885
Percent Difference	-8	-1	-12	-3	-11
Critical (15%)					
No Action Alternative	14,391,374	3,441,525	458,729	110,322	569,051
Alternative 1	10,379,320	3,744,097	566,311	117,959	684,270
Difference	-4,012,054	302,572	107,582	7,638	115,220
Percent Difference	-28	9	23	7	20

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

5 Eggs mortality includes pre-spawn mortality

Table B-1-3. Annual Mortality by Cause for Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Temperature	Flow	Total
Long-term			
Full Simulation Period[1]			
No Action Alternative	5,949,693	6,949,486	12,899,179
Alternative 1	5,010,581	7,128,100	12,138,680
Difference	-939,112	178,614	-760,499
Percent Difference[3]	-16	3	-6
Water Year Types[2]			
Wet (32.5%)			
No Action Alternative	927,546	10,382,925	11,310,471
Alternative 1	485,103	10,756,621	11,241,723
Difference	-442,443	373,695	-68,747
Percent Difference	-48	4	-1
Above Normal (12.5%)			
No Action Alternative	11,689,545	5,343,245	17,032,790
Alternative 1	11,136,551	5,437,771	16,574,323
Difference	-552,994	94,526	-458,468
Percent Difference	-5	2	-3
Below Normal (17.5%)			
No Action Alternative	4,200,054	5,999,162	10,199,216
Alternative 1	4,155,751	6,018,646	10,174,397
Difference	-44,304	19,484	-24,819
Percent Difference	-1	0	0
Dry (22.5%)			
No Action Alternative	5,983,150	5,345,836	11,328,986
Alternative 1	5,469,925	5,248,551	10,718,477
Difference	-513,224	-97,285	-610,509
Percent Difference	-9	-2	-5
Critical (15%)			
No Action Alternative	14,038,861	4,363,089	18,401,950
Alternative 1	10,019,091	4,788,596	14,807,687
Difference	-4,019,770	425,507	-3,594,263
Percent Difference	-29	10	-20

1 Based on the 80-year simulation period.

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-1-4. Annual Mortality by Cause and Life Stage for Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Pre-Spawn Mortality	Eggs Flow	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Juvenile Temperature	Juvenile Habitat	Total
Long-term								
Full Simulation Period[1]								
No Action Alternative	5,139,812	1,955,690	799,452	154	4,683,874	10,275	309,922	12,899,179
Alternative 1	4,292,224	2,108,590	710,136	151	4,708,958	8,069	310,552	12,138,680
Difference	-847,588	152,900	-89,315	-3	25,084	-2,206	630	-760,499
Percent Difference[3]	-16	8	-11	-2	1	-21	0	-6
Water Year Types[2]								
Wet (32.5%)								
No Action Alternative	213,200	5,097,346	708,520	428	5,200,677	5,398	84,903	11,310,471
Alternative 1	76,487	5,544,710	402,355	446	5,129,145	5,816	82,766	11,241,723
Difference	-136,713	447,364	-306,165	18	-71,532	417	-2,137	-68,747
Percent Difference	-64	9	-43	4	-1	8	-3	-1
Above Normal (12.5%)								
No Action Alternative	11,397,132	146,831	287,640	34	5,007,318	4,738	189,095	17,032,790
Alternative 1	10,875,176	194,605	256,772	9	5,120,432	4,595	122,734	16,574,323
Difference	-521,956	47,774	-30,868	-26	113,113	-144	-66,361	-458,468
Percent Difference	-5	33	-11	-74	2	-3	-35	-3
Below Normal (17.5%)								
No Action Alternative	4,050,002	780,040	145,797	60	4,911,682	4,196	307,440	10,199,216
Alternative 1	4,055,314	789,925	98,496	25	4,895,218	1,915	333,503	10,174,397
Difference	5,312	9,886	-47,300	-35	-16,465	-2,280	26,064	-24,819
Percent Difference	0	1	-32	-58	0	-54	8	0
Dry (22.5%)								
No Action Alternative	5,226,978	377,492	752,548	0	4,408,740	3,623	559,604	11,328,986
Alternative 1	4,603,020	378,293	865,023	0	4,371,799	1,883	498,459	10,718,477
Difference	-623,959	801	112,475	0	-36,940	-1,740	-61,145	-610,509
Percent Difference	-12	0	15	0	-1	-48	-11	-5
Critical (15%)								
No Action Alternative	11,740,400	395,039	2,255,935	0	3,441,525	42,525	526,526	18,401,950
Alternative 1	7,750,732	392,537	2,236,052	0	3,744,097	32,307	651,963	14,807,687
Difference	-3,989,668	-2,502	-19,884	0	302,572	-10,218	125,438	-3,594,263
Percent Difference	-34	-1	-1	0	9	-24	24	-20

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-1-5. Annual Mortality by All Factors for Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Pre-Spawn Mortality	Incubation	Super-imposition	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Pre-smolt - Temperature	Pre-smolt - Habitat	Smolt - Temperature	Smolt - Habitat	Total
Long-term											
Full Simulation Period[1]											
No Action Alternative	5,139,812	1,449,851	505,839	799,452	154	4,683,874	4,419	268,257	5,856	41,665	12,899,179
Alternative 1	4,292,224	1,473,372	635,217	710,136	151	4,708,958	3,312	265,903	4,757	44,648	12,138,680
Difference	-847,588	23,521	129,379	-89,315	-3	25,084	-1,106	-2,354	-1,099	2,984	-760,499
Percent Difference[3]	-16	2	26	-11	-2	1	-25	-1	-19	7	-6
Water Year Types[2]											
Wet (32.5%)											
No Action Alternative	213,200	3,859,065	1,238,281	708,520	428	5,200,677	4,236	70,199	1,162	14,703	11,310,471
Alternative 1	76,487	3,907,496	1,637,214	402,355	446	5,129,145	4,203	67,541	1,613	15,225	11,241,723
Difference	-136,713	48,431	398,933	-306,165	18	-71,532	-33	-2,659	451	522	-68,747
Percent Difference	-64	1	32	-43	4	-1	-1	-4	39	4	-1
Above Normal (12.5%)											
No Action Alternative	11,397,132	67,263	79,569	287,640	34	5,007,318	3,300	158,529	1,438	30,567	17,032,790
Alternative 1	10,875,176	114,650	79,955	256,772	9	5,120,432	3,015	93,141	1,579	29,593	16,574,323
Difference	-521,956	47,387	386	-30,868	-26	113,113	-285	-65,387	141	-974	-458,468
Percent Difference	-5	70	0	-11	-74	2	-9	-41	10	-3	-3
Below Normal (17.5%)											
No Action Alternative	4,050,002	246,033	534,007	145,797	60	4,911,682	2,887	263,192	1,308	44,248	10,199,216
Alternative 1	4,055,314	257,762	532,163	98,496	25	4,895,218	1,115	283,424	801	50,079	10,174,397
Difference	5,312	11,729	-1,844	-47,300	-35	-16,465	-1,773	20,232	-508	5,832	-24,819
Percent Difference	0	5	0	-32	-58	0	-61	8	-39	13	0
Dry (22.5%)											
No Action Alternative	5,226,978	377,492	0	752,548	0	4,408,740	1,403	500,298	2,220	59,306	11,328,986
Alternative 1	4,603,020	378,293	0	865,023	0	4,371,799	423	440,192	1,460	58,267	10,718,477
Difference	-623,959	801	0	112,475	0	-36,940	-980	-60,107	-760	-1,038	-610,509
Percent Difference	-12	0	0	15	0	-1	-70	-12	-34	-2	-5
Critical (15%)											
No Action Alternative	11,740,400	395,039	0	2,255,935	0	3,441,525	12,058	446,671	30,467	79,854	18,401,950
Alternative 1	7,750,732	392,537	0	2,236,052	0	3,744,097	8,529	557,782	23,779	94,181	14,807,687
Difference	-3,989,668	-2,502	0	-19,884	0	302,572	-3,529	111,111	-6,689	14,327	-3,594,263
Percent Difference	-34	-1	0	-1	0	9	-29	25	-22	18	-20

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-1-6. Annual Potential Production for Fall-Run Chinook Salmon

Analysis Period	Annual Potential Production (# of Fish/year)
Long-term	
Full Simulation Period[1]	
No Action Alternative	16,838,069
Alternative 3	17,129,024
Difference	290,955
Percent Difference[3]	2
Water Year Types[2]	
Wet (32.5%)	
No Action Alternative	16,537,313
Alternative 3	16,544,696
Difference	7,383
Percent Difference	0
Above Normal (12.5%)	
No Action Alternative	15,696,855
Alternative 3	15,897,563
Difference	200,708
Percent Difference	1
Below Normal (17.5%)	
No Action Alternative	17,922,930
Alternative 3	17,877,415
Difference	-45,515
Percent Difference	0
Dry (22.5%)	
No Action Alternative	17,754,135
Alternative 3	18,382,793
Difference	628,657
Percent Difference	4
Critical (15%)	
No Action Alternative	15,800,949
Alternative 3	16,667,512
Difference	866,563
Percent Difference	5

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the annual average

Table B-1-7. Annual Mortality by Life Stage for Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Eggs	Fry	Pre-Smolt	Immature-Smolt	Juvenile (Pre & Immature Smolt)
Long-term					
Full Simulation Period[1]					
No Action Alternative	7,894,954	4,684,028	272,676	47,521	320,197
Alternative 3	6,873,719	4,709,136	258,786	47,224	306,009
Difference	-1,021,235	25,108	-13,891	-297	-14,187
Percent Difference[3]	-13	1	-5	-1	-4
Water Year Types[2]					
Wet (32.5%)					
No Action Alternative	6,019,065	5,201,105	74,435	15,865	90,301
Alternative 3	5,981,293	5,099,805	75,392	16,365	91,757
Difference	-37,772	-101,300	957	500	1,457
Percent Difference	-1	-2	1	3	2
Above Normal (12.5%)					
No Action Alternative	11,831,604	5,007,353	161,828	32,005	193,834
Alternative 3	10,983,177	5,061,047	110,803	26,403	137,207
Difference	-848,427	53,694	-51,025	-5,602	-56,627
Percent Difference	-7	1	-32	-18	-29
Below Normal (17.5%)					
No Action Alternative	4,975,839	4,911,742	266,079	45,556	311,635
Alternative 3	4,905,579	4,909,824	267,778	50,091	317,869
Difference	-70,260	-1,918	1,699	4,535	6,234
Percent Difference	-1	0	1	10	2
Dry (22.5%)					
No Action Alternative	6,357,019	4,408,740	501,702	61,525	563,227
Alternative 3	4,403,331	4,450,665	464,033	59,943	523,976
Difference	-1,953,687	41,925	-37,668	-1,583	-39,251
Percent Difference	-31	1	-8	-3	-7
Critical (15%)					
No Action Alternative	14,391,374	3,441,525	458,729	110,322	569,051
Alternative 3	11,384,504	3,723,000	461,093	109,012	570,105
Difference	-3,006,871	281,476	2,364	-1,310	1,055
Percent Difference	-21	8	1	-1	0

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

5 Eggs mortality includes pre-spawn mortality

Table B-1-8. Annual Mortality by Cause for Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Temperature	Flow	Total
Long-term			
Full Simulation Period[1]			
No Action Alternative	5,949,693	6,949,486	12,899,179
Alternative 3	4,751,566	7,137,299	11,888,865
Difference	-1,198,127	187,813	-1,010,314
Percent Difference[3]	-20	3	-8
Water Year Types[2]			
Wet (32.5%)			
No Action Alternative	927,546	10,382,925	11,310,471
Alternative 3	389,939	10,782,916	11,172,855
Difference	-537,606	399,991	-137,615
Percent Difference	-58	4	-1
Above Normal (12.5%)			
No Action Alternative	11,689,545	5,343,245	17,032,790
Alternative 3	10,788,099	5,393,332	16,181,431
Difference	-901,446	50,087	-851,359
Percent Difference	-8	1	-5
Below Normal (17.5%)			
No Action Alternative	4,200,054	5,999,162	10,199,216
Alternative 3	4,135,609	5,997,663	10,133,272
Difference	-64,445	-1,499	-65,944
Percent Difference	-2	0	-1
Dry (22.5%)			
No Action Alternative	5,983,150	5,345,836	11,328,986
Alternative 3	4,017,083	5,360,888	9,377,972
Difference	-1,966,066	15,053	-1,951,014
Percent Difference	-33	0	-17
Critical (15%)			
No Action Alternative	14,038,861	4,363,089	18,401,950
Alternative 3	10,991,653	4,685,957	15,677,609
Difference	-3,047,208	322,868	-2,724,340
Percent Difference	-22	7	-15

1 Based on the 80-year simulation period.

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-1-9. Annual Mortality by Cause and Life Stage for Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Pre-Spawn Mortality	Eggs Flow	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Juvenile Temperature	Juvenile Habitat	Total
Long-term								
Full Simulation Period[1]								
No Action Alternative	5,139,812	1,955,690	799,452	154	4,683,874	10,275	309,922	12,899,179
Alternative 3	3,882,019	2,130,887	860,812	146	4,708,991	8,589	297,421	11,888,865
Difference	-1,257,793	175,198	61,360	-8	25,116	-1,686	-12,501	-1,010,314
Percent Difference[3]	-24	9	8	-5	1	-16	-4	-8
Water Year Types[2]								
Wet (32.5%)								
No Action Alternative	213,200	5,097,346	708,520	428	5,200,677	5,398	84,903	11,310,471
Alternative 3	37,613	5,597,671	346,009	441	5,099,364	5,877	85,881	11,172,855
Difference	-175,587	500,325	-362,510	13	-101,313	478	978	-137,615
Percent Difference	-82	10	-51	3	-2	9	1	-1
Above Normal (12.5%)								
No Action Alternative	11,397,132	146,831	287,640	34	5,007,318	4,738	189,095	17,032,790
Alternative 3	10,309,394	196,462	477,321	0	5,061,047	1,384	135,823	16,181,431
Difference	-1,087,738	49,631	189,681	-34	53,729	-3,354	-53,273	-851,359
Percent Difference	-10	34	66	-100	1	-71	-28	-5
Below Normal (17.5%)								
No Action Alternative	4,050,002	780,040	145,797	60	4,911,682	4,196	307,440	10,199,216
Alternative 3	4,049,375	773,748	82,456	14	4,909,811	3,764	314,105	10,133,272
Difference	-627	-6,292	-63,341	-46	-1,871	-431	6,665	-65,944
Percent Difference	0	-1	-43	-77	0	-10	2	-1
Dry (22.5%)								
No Action Alternative	5,226,978	377,492	752,548	0	4,408,740	3,623	559,604	11,328,986
Alternative 3	3,355,934	388,784	658,614	0	4,450,665	2,536	521,440	9,377,972
Difference	-1,871,044	11,291	-93,934	0	41,925	-1,088	-38,164	-1,951,014
Percent Difference	-36	3	-12	0	1	-30	-7	-17
Critical (15%)								
No Action Alternative	11,740,400	395,039	2,255,935	0	3,441,525	42,525	526,526	18,401,950
Alternative 3	7,449,300	428,029	3,507,175	0	3,723,000	35,178	534,928	15,677,609
Difference	-4,291,101	32,990	1,251,240	0	281,475	-7,347	8,402	-2,724,340
Percent Difference	-37	8	55	0	8	-17	2	-15

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-1-10. Annual Mortality by All Factors for Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Pre-Spawn Mortality	Incubation	Super-imposition	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Pre-smolt - Temperature	Pre-smolt - Habitat	Smolt - Temperature	Smolt - Habitat	Total
Long-term											
Full Simulation Period[1]											
No Action Alternative	5,139,812	1,449,851	505,839	799,452	154	4,683,874	4,419	268,257	5,856	41,665	12,899,179
Alternative 3	3,882,019	1,491,155	639,732	860,812	146	4,708,991	3,342	255,443	5,247	41,977	11,888,865
Difference	-1,257,793	41,304	133,893	61,360	-8	25,116	-1,077	-12,814	-609	313	-1,010,314
Percent Difference[3]	-24	3	26	8	-5	1	-24	-5	-10	1	-8
Water Year Types[2]											
Wet (32.5%)											
No Action Alternative	213,200	3,859,065	1,238,281	708,520	428	5,200,677	4,236	70,199	1,162	14,703	11,310,471
Alternative 3	37,613	3,945,868	1,651,803	346,009	441	5,099,364	4,272	71,120	1,605	14,761	11,172,855
Difference	-175,587	86,803	413,522	-362,510	13	-101,313	36	921	442	58	-137,615
Percent Difference	-82	2	33	-51	3	-2	1	1	38	0	-1
Above Normal (12.5%)											
No Action Alternative	11,397,132	67,263	79,569	287,640	34	5,007,318	3,300	158,529	1,438	30,567	17,032,790
Alternative 3	10,309,394	116,493	79,969	477,321	0	5,061,047	576	110,227	808	25,595	16,181,431
Difference	-1,087,738	49,230	401	189,681	-34	53,729	-2,724	-48,301	-630	-4,972	-851,359
Percent Difference	-10	73	1	66	-100	1	-83	-30	-44	-16	-5
Below Normal (17.5%)											
No Action Alternative	4,050,002	246,033	534,007	145,797	60	4,911,682	2,887	263,192	1,308	44,248	10,199,216
Alternative 3	4,049,375	242,891	530,857	82,456	14	4,909,811	2,116	265,663	1,649	48,442	10,133,272
Difference	-627	-3,142	-3,151	-63,341	-46	-1,871	-771	2,470	340	4,195	-65,944
Percent Difference	0	-1	-1	-43	-77	0	-27	1	26	9	-1
Dry (22.5%)											
No Action Alternative	5,226,978	377,492	0	752,548	0	4,408,740	1,403	500,298	2,220	59,306	11,328,986
Alternative 3	3,355,934	388,784	0	658,614	0	4,450,665	698	463,335	1,837	58,105	9,377,972
Difference	-1,871,044	11,291	0	-93,934	0	41,925	-705	-36,963	-382	-1,200	-1,951,014
Percent Difference	-36	3	0	-12	0	1	-50	-7	-17	-2	-17
Critical (15%)											
No Action Alternative	11,740,400	395,039	0	2,255,935	0	3,441,525	12,058	446,671	30,467	79,854	18,401,950
Alternative 3	7,449,300	428,029	0	3,507,175	0	3,723,000	9,030	452,064	26,148	82,864	15,677,609
Difference	-4,291,101	32,990	0	1,251,240	0	281,475	-3,028	5,392	-4,320	3,010	-2,724,340
Percent Difference	-37	8	0	55	0	8	-25	1	-14	4	-15

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-1-11. Annual Potential Production for Fall-Run Chinook Salmon

Analysis Period	Annual Potential Production (# of Fish/year)
Long-term	
Full Simulation Period[1]	
No Action Alternative	16,838,069
Alternative 5	16,908,477
Difference	70,408
Percent Difference[3]	0
Water Year Types[2]	
Wet (32.5%)	
No Action Alternative	16,537,313
Alternative 5	16,493,092
Difference	-44,221
Percent Difference	0
Above Normal (12.5%)	
No Action Alternative	15,696,855
Alternative 5	15,891,098
Difference	194,243
Percent Difference	1
Below Normal (17.5%)	
No Action Alternative	17,922,930
Alternative 5	17,951,192
Difference	28,262
Percent Difference	0
Dry (22.5%)	
No Action Alternative	17,754,135
Alternative 5	18,003,040
Difference	248,905
Percent Difference	1
Critical (15%)	
No Action Alternative	15,800,949
Alternative 5	15,797,949
Difference	-3,000
Percent Difference	0

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the annual average

Table B-1-12. Annual Mortality by Life Stage for Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Eggs	Fry	Pre-Smolt	Immature-Smolt	Juvenile (Pre & Immature Smolt)
Long-term					
Full Simulation Period[1]					
No Action Alternative	7,894,954	4,684,028	272,676	47,521	320,197
Alternative 5	7,723,389	4,663,905	266,371	49,003	315,374
Difference	-171,565	-20,123	-6,305	1,482	-4,823
Percent Difference[3]	-2	0	-2	3	-2
Water Year Types[2]					
Wet (32.5%)					
No Action Alternative	6,019,065	5,201,105	74,435	15,865	90,301
Alternative 5	6,169,444	5,177,967	78,031	16,578	94,608
Difference	150,379	-23,138	3,595	712	4,308
Percent Difference	2	0	5	4	5
Above Normal (12.5%)					
No Action Alternative	11,831,604	5,007,353	161,828	32,005	193,834
Alternative 5	11,229,256	4,990,191	153,381	34,302	187,683
Difference	-602,348	-17,162	-8,448	2,296	-6,151
Percent Difference	-5	0	-5	7	-3
Below Normal (17.5%)					
No Action Alternative	4,975,839	4,911,742	266,079	45,556	311,635
Alternative 5	4,934,725	4,906,604	268,136	45,725	313,861
Difference	-41,114	-5,138	2,056	169	2,226
Percent Difference	-1	0	1	0	1
Dry (22.5%)					
No Action Alternative	6,357,019	4,408,740	501,702	61,525	563,227
Alternative 5	5,727,952	4,357,900	490,190	66,478	556,668
Difference	-629,067	-50,840	-11,512	4,953	-6,559
Percent Difference	-10	-1	-2	8	-1
Critical (15%)					
No Action Alternative	14,391,374	3,441,525	458,729	110,322	569,051
Alternative 5	14,415,310	3,454,056	430,811	109,120	539,931
Difference	23,936	12,531	-27,918	-1,202	-29,120
Percent Difference	0	0	-6	-1	-5

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

5 Eggs mortality includes pre-spawn mortality

Table B-1-13. Annual Mortality by Cause for Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Temperature	Flow	Total
Long-term			
Full Simulation Period[1]			
No Action Alternative	5,949,693	6,949,486	12,899,179
Alternative 5	5,781,882	6,920,785	12,702,667
Difference	-167,811	-28,701	-196,511
Percent Difference[3]	-3	0	-2
Water Year Types[2]			
Wet (32.5%)			
No Action Alternative	927,546	10,382,925	11,310,471
Alternative 5	1,088,909	10,353,111	11,442,020
Difference	161,363	-29,814	131,549
Percent Difference	17	0	1
Above Normal (12.5%)			
No Action Alternative	11,689,545	5,343,245	17,032,790
Alternative 5	11,083,720	5,323,409	16,407,129
Difference	-605,825	-19,836	-625,661
Percent Difference	-5	0	-4
Below Normal (17.5%)			
No Action Alternative	4,200,054	5,999,162	10,199,216
Alternative 5	4,169,106	5,986,084	10,155,190
Difference	-30,948	-13,078	-44,026
Percent Difference	-1	0	0
Dry (22.5%)			
No Action Alternative	5,983,150	5,345,836	11,328,986
Alternative 5	5,349,191	5,293,329	10,642,520
Difference	-633,958	-52,507	-686,466
Percent Difference	-11	-1	-6
Critical (15%)			
No Action Alternative	14,038,861	4,363,089	18,401,950
Alternative 5	14,062,400	4,346,896	18,409,296
Difference	23,539	-16,193	7,347
Percent Difference	0	0	0

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-1-14. Annual Mortality by Cause and Life Stage for Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Pre-Spawn Mortality	Eggs Flow	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Juvenile Temperature	Juvenile Habitat	Total
Long-term								
Full Simulation Period[1]								
No Action Alternative	5,139,812	1,955,690	799,452	154	4,683,874	10,275	309,922	12,899,179
Alternative 5	4,786,653	1,951,663	985,073	154	4,663,751	10,003	305,371	12,702,667
Difference	-353,159	-4,026	185,621	0	-20,123	-272	-4,551	-196,511
Percent Difference[3]	-7	0	23	0	0	-3	-1	-2
Water Year Types[2]								
Wet (32.5%)								
No Action Alternative	213,200	5,097,346	708,520	428	5,200,677	5,398	84,903	11,310,471
Alternative 5	348,257	5,086,105	735,082	436	5,177,531	5,134	89,475	11,442,020
Difference	135,058	-11,241	26,562	8	-23,146	-265	4,572	131,549
Percent Difference	63	0	4	2	0	-5	5	1
Above Normal (12.5%)								
No Action Alternative	11,397,132	146,831	287,640	34	5,007,318	4,738	189,095	17,032,790
Alternative 5	10,385,418	149,961	693,877	9	4,990,182	4,417	183,266	16,407,129
Difference	-1,011,714	3,130	406,236	-26	-17,136	-321	-5,830	-625,661
Percent Difference	-9	2	141	-75	0	-7	-3	-4
Below Normal (17.5%)								
No Action Alternative	4,050,002	780,040	145,797	60	4,911,682	4,196	307,440	10,199,216
Alternative 5	4,052,333	769,810	112,581	59	4,906,545	4,133	309,728	10,155,190
Difference	2,331	-10,229	-33,215	0	-5,137	-63	2,289	-44,026
Percent Difference	0	-1	-23	-1	0	-1	1	0
Dry (22.5%)								
No Action Alternative	5,226,978	377,492	752,548	0	4,408,740	3,623	559,604	11,328,986
Alternative 5	4,376,903	382,888	968,162	1	4,357,898	4,125	552,543	10,642,520
Difference	-850,076	5,395	215,614	1	-50,841	502	-7,061	-686,466
Percent Difference	-16	1	29	0	-1	14	-1	-6
Critical (15%)								
No Action Alternative	11,740,400	395,039	2,255,935	0	3,441,525	42,525	526,526	18,401,950
Alternative 5	11,208,869	393,784	2,812,657	0	3,454,056	40,874	499,057	18,409,296
Difference	-531,531	-1,255	556,722	0	12,531	-1,651	-27,469	7,347
Percent Difference	-5	0	25	0	0	-4	-5	0

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-1-15. Annual Mortality by All Factors for Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Pre-Spawn Mortality	Incubation	Super-imposition	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Pre-smolt - Temperature	Pre-smolt - Habitat	Smolt - Temperature	Smolt - Habitat	Total
Long-term											
Full Simulation Period[1]											
No Action Alternative	5,139,812	1,449,851	505,839	799,452	154	4,683,874	4,419	268,257	5,856	41,665	12,899,179
Alternative 5	4,786,653	1,450,386	501,277	985,073	154	4,663,751	4,489	261,882	5,514	43,488	12,702,667
Difference	-353,159	535	-4,561	185,621	0	-20,123	70	-6,375	-342	1,824	-196,511
Percent Difference[3]	-7	0	-1	23	0	0	2	-2	-6	4	-2
Water Year Types[2]											
Wet (32.5%)											
No Action Alternative	213,200	3,859,065	1,238,281	708,520	428	5,200,677	4,236	70,199	1,162	14,703	11,310,471
Alternative 5	348,257	3,861,662	1,224,443	735,082	436	5,177,531	4,005	74,026	1,129	15,449	11,442,020
Difference	135,058	2,597	-13,838	26,562	8	-23,146	-231	3,827	-33	746	131,549
Percent Difference	63	0	-1	4	2	0	-5	5	-3	5	1
Above Normal (12.5%)											
No Action Alternative	11,397,132	67,263	79,569	287,640	34	5,007,318	3,300	158,529	1,438	30,567	17,032,790
Alternative 5	10,385,418	69,983	79,978	693,877	9	4,990,182	3,244	150,137	1,173	33,128	16,407,129
Difference	-1,011,714	2,721	409	406,236	-26	-17,136	-56	-8,391	-265	2,561	-625,661
Percent Difference	-9	4	1	141	-75	0	-2	-5	-18	8	-4
Below Normal (17.5%)											
No Action Alternative	4,050,002	246,033	534,007	145,797	60	4,911,682	2,887	263,192	1,308	44,248	10,199,216
Alternative 5	4,052,333	236,463	533,348	112,581	59	4,906,545	2,782	265,353	1,350	44,375	10,155,190
Difference	2,331	-9,570	-659	-33,215	0	-5,137	-105	2,161	42	128	-44,026
Percent Difference	0	-4	0	-23	-1	0	-4	1	3	0	0
Dry (22.5%)											
No Action Alternative	5,226,978	377,492	0	752,548	0	4,408,740	1,403	500,298	2,220	59,306	11,328,986
Alternative 5	4,376,903	382,888	0	968,162	1	4,357,898	1,827	488,363	2,298	64,180	10,642,520
Difference	-850,076	5,395	0	215,614	1	-50,841	424	-11,936	79	4,874	-686,466
Percent Difference	-16	1	0	29	0	-1	30	-2	4	8	-6
Critical (15%)											
No Action Alternative	11,740,400	395,039	0	2,255,935	0	3,441,525	12,058	446,671	30,467	79,854	18,401,950
Alternative 5	11,208,869	393,784	0	2,812,657	0	3,454,056	12,558	418,253	28,316	80,804	18,409,296
Difference	-531,531	-1,255	0	556,722	0	12,531	500	-28,418	-2,151	949	7,347
Percent Difference	-5	0	0	25	0	0	4	-6	-7	1	0

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-1-16. Annual Potential Production for Fall-Run Chinook Salmon

Analysis Period	Annual Potential Production (# of Fish/year)
Long-term	
Full Simulation Period[1]	
Second Basis of Comparison	17,037,309
No Action Alternative	16,838,069
Difference	-199,240
Percent Difference[3]	-1
Water Year Types[2]	
Wet (32.5%)	
Second Basis of Comparison	16,525,365
No Action Alternative	16,537,313
Difference	11,948
Percent Difference	0
Above Normal (12.5%)	
Second Basis of Comparison	15,746,827
No Action Alternative	15,696,855
Difference	-49,972
Percent Difference	0
Below Normal (17.5%)	
Second Basis of Comparison	17,847,310
No Action Alternative	17,922,930
Difference	75,620
Percent Difference	0
Dry (22.5%)	
Second Basis of Comparison	17,934,726
No Action Alternative	17,754,135
Difference	-180,590
Percent Difference	-1
Critical (15%)	
Second Basis of Comparison	16,930,799
No Action Alternative	15,800,949
Difference	-1,129,850
Percent Difference	-7

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the annual average

Table B-1-17. Annual Mortality by Life Stage for Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Eggs	Fry	Pre-Smolt	Immature-Smolt	Juvenile (Pre & Immature Smolt)
Long-term					
Full Simulation Period[1]					
Second Basis of Comparison	7,110,950	4,709,109	269,215	49,405	318,621
No Action Alternative	7,894,954	4,684,028	272,676	47,521	320,197
Difference	784,003	-25,081	3,461	-1,885	1,576
Percent Difference[3]	11	-1	1	-4	0
Water Year Types[2]					
Wet (32.5%)					
Second Basis of Comparison	6,023,551	5,129,591	71,744	16,838	88,581
No Action Alternative	6,019,065	5,201,105	74,435	15,865	90,301
Difference	-4,486	71,514	2,692	-973	1,719
Percent Difference	0	1	4	-6	2
Above Normal (12.5%)					
Second Basis of Comparison	11,326,553	5,120,441	96,157	31,173	127,329
No Action Alternative	11,831,604	5,007,353	161,828	32,005	193,834
Difference	505,051	-113,088	65,672	833	66,505
Percent Difference	4	-2	68	3	52
Below Normal (17.5%)					
Second Basis of Comparison	4,943,736	4,895,243	284,538	50,880	335,418
No Action Alternative	4,975,839	4,911,742	266,079	45,556	311,635
Difference	32,103	16,499	-18,459	-5,324	-23,783
Percent Difference	1	0	-6	-10	-7
Dry (22.5%)					
Second Basis of Comparison	5,846,335	4,371,799	440,615	59,727	500,342
No Action Alternative	6,357,019	4,408,740	501,702	61,525	563,227
Difference	510,683	36,940	61,087	1,798	62,885
Percent Difference	9	1	14	3	13
Critical (15%)					
Second Basis of Comparison	10,379,320	3,744,097	566,311	117,959	684,270
No Action Alternative	14,391,374	3,441,525	458,729	110,322	569,051
Difference	4,012,054	-302,572	-107,582	-7,638	-115,220
Percent Difference	39	-8	-19	-6	-17

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

5 Eggs mortality includes pre-spawn mortality

Table B-1-18. Annual Mortality by Cause for Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Temperature	Flow	Total
Long-term			
Full Simulation Period[1]			
Second Basis of Comparison	5,010,581	7,128,100	12,138,680
No Action Alternative	5,949,693	6,949,486	12,899,179
Difference	939,112	-178,614	760,499
Percent Difference[3]	19	-3	6
Water Year Types[2]			
Wet (32.5%)			
Second Basis of Comparison	485,103	10,756,621	11,241,723
No Action Alternative	927,546	10,382,925	11,310,471
Difference	442,443	-373,695	68,747
Percent Difference	91	-3	1
Above Normal (12.5%)			
Second Basis of Comparison	11,136,551	5,437,771	16,574,323
No Action Alternative	11,689,545	5,343,245	17,032,790
Difference	552,994	-94,526	458,468
Percent Difference	5	-2	3
Below Normal (17.5%)			
Second Basis of Comparison	4,155,751	6,018,646	10,174,397
No Action Alternative	4,200,054	5,999,162	10,199,216
Difference	44,304	-19,484	24,819
Percent Difference	1	0	0
Dry (22.5%)			
Second Basis of Comparison	5,469,925	5,248,551	10,718,477
No Action Alternative	5,983,150	5,345,836	11,328,986
Difference	513,224	97,285	610,509
Percent Difference	9	2	6
Critical (15%)			
Second Basis of Comparison	10,019,091	4,788,596	14,807,687
No Action Alternative	14,038,861	4,363,089	18,401,950
Difference	4,019,770	-425,507	3,594,263
Percent Difference	40	-9	24

1 Based on the 80-year simulation period.

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-1-19. Annual Mortality by Cause and Life Stage for Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Pre-Spawn Mortality	Eggs Flow	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Juvenile Temperature	Juvenile Habitat	Total
Long-term								
Full Simulation Period[1]								
Second Basis of Comparison	4,292,224	2,108,590	710,136	151	4,708,958	8,069	310,552	12,138,680
No Action Alternative	5,139,812	1,955,690	799,452	154	4,683,874	10,275	309,922	12,899,179
Difference	847,588	-152,900	89,315	3	-25,084	2,206	-630	760,499
Percent Difference[3]	20	-7	13	2	-1	27	0	6
Water Year Types[2]								
Wet (32.5%)								
Second Basis of Comparison	76,487	5,544,710	402,355	446	5,129,145	5,816	82,766	11,241,723
No Action Alternative	213,200	5,097,346	708,520	428	5,200,677	5,398	84,903	11,310,471
Difference	136,713	-447,364	306,165	-18	71,532	-417	2,137	68,747
Percent Difference	179	-8	76	-4	1	-7	3	1
Above Normal (12.5%)								
Second Basis of Comparison	10,875,176	194,605	256,772	9	5,120,432	4,595	122,734	16,574,323
No Action Alternative	11,397,132	146,831	287,640	34	5,007,318	4,738	189,095	17,032,790
Difference	521,956	-47,774	30,868	26	-113,113	144	66,361	458,468
Percent Difference	5	-25	12	287	-2	3	54	3
Below Normal (17.5%)								
Second Basis of Comparison	4,055,314	789,925	98,496	25	4,895,218	1,915	333,503	10,174,397
No Action Alternative	4,050,002	780,040	145,797	60	4,911,682	4,196	307,440	10,199,216
Difference	-5,312	-9,886	47,300	35	16,465	2,280	-26,064	24,819
Percent Difference	0	-1	48	138	0	119	-8	0
Dry (22.5%)								
Second Basis of Comparison	4,603,020	378,293	865,023	0	4,371,799	1,883	498,459	10,718,477
No Action Alternative	5,226,978	377,492	752,548	0	4,408,740	3,623	559,604	11,328,986
Difference	623,959	-801	-112,475	0	36,940	1,740	61,145	610,509
Percent Difference	14	0	-13	0	1	92	12	6
Critical (15%)								
Second Basis of Comparison	7,750,732	392,537	2,236,052	0	3,744,097	32,307	651,963	14,807,687
No Action Alternative	11,740,400	395,039	2,255,935	0	3,441,525	42,525	526,526	18,401,950
Difference	3,989,668	2,502	19,884	0	-302,572	10,218	-125,438	3,594,263
Percent Difference	51	1	1	0	-8	32	-19	24

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-1-20. Annual Mortality by All Factors for Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Pre-Spawn Mortality	Incubation	Super-imposition	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Pre-smolt - Temperature	Pre-smolt - Habitat	Smolt - Temperature	Smolt - Habitat	Total
Long-term											
Full Simulation Period[1]											
Second Basis of Comparison	4,292,224	1,473,372	635,217	710,136	151	4,708,958	3,312	265,903	4,757	44,648	12,138,680
No Action Alternative	5,139,812	1,449,851	505,839	799,452	154	4,683,874	4,419	268,257	5,856	41,665	12,899,179
Difference	847,588	-23,521	-129,379	89,315	3	-25,084	1,106	2,354	1,099	-2,984	760,499
Percent Difference[3]	20	-2	-20	13	2	-1	33	1	23	-7	6
Water Year Types[2]											
Wet (32.5%)											
Second Basis of Comparison	76,487	3,907,496	1,637,214	402,355	446	5,129,145	4,203	67,541	1,613	15,225	11,241,723
No Action Alternative	213,200	3,859,065	1,238,281	708,520	428	5,200,677	4,236	70,199	1,162	14,703	11,310,471
Difference	136,713	-48,431	-398,933	306,165	-18	71,532	33	2,659	-451	-522	68,747
Percent Difference	179	-1	-24	76	-4	1	1	4	-28	-3	1
Above Normal (12.5%)											
Second Basis of Comparison	10,875,176	114,650	79,955	256,772	9	5,120,432	3,015	93,141	1,579	29,593	16,574,323
No Action Alternative	11,397,132	67,263	79,569	287,640	34	5,007,318	3,300	158,529	1,438	30,567	17,032,790
Difference	521,956	-47,387	-386	30,868	26	-113,113	285	65,387	-141	974	458,468
Percent Difference	5	-41	0	12	287	-2	9	70	-9	3	3
Below Normal (17.5%)											
Second Basis of Comparison	4,055,314	257,762	532,163	98,496	25	4,895,218	1,115	283,424	801	50,079	10,174,397
No Action Alternative	4,050,002	246,033	534,007	145,797	60	4,911,682	2,887	263,192	1,308	44,248	10,199,216
Difference	-5,312	-11,729	1,844	47,300	35	16,465	1,773	-20,232	508	-5,832	24,819
Percent Difference	0	-5	0	48	138	0	159	-7	63	-12	0
Dry (22.5%)											
Second Basis of Comparison	4,603,020	378,293	0	865,023	0	4,371,799	423	440,192	1,460	58,267	10,718,477
No Action Alternative	5,226,978	377,492	0	752,548	0	4,408,740	1,403	500,298	2,220	59,306	11,328,986
Difference	623,959	-801	0	-112,475	0	36,940	980	60,107	760	1,038	610,509
Percent Difference	14	0	0	-13	0	1	232	14	52	2	6
Critical (15%)											
Second Basis of Comparison	7,750,732	392,537	0	2,236,052	0	3,744,097	8,529	557,782	23,779	94,181	14,807,687
No Action Alternative	11,740,400	395,039	0	2,255,935	0	3,441,525	12,058	446,671	30,467	79,854	18,401,950
Difference	3,989,668	2,502	0	19,884	0	-302,572	3,529	-111,111	6,689	-14,327	3,594,263
Percent Difference	51	1	0	1	0	-8	41	-20	28	-15	24

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-1-21. Annual Potential Production for Fall-Run Chinook Salmon

Analysis Period	Annual Potential Production (# of Fish/year)
Long-term	
Full Simulation Period[1]	
Second Basis of Comparison	17,037,309
Alternative 3	17,129,024
Difference	91,715
Percent Difference[3]	1
Water Year Types[2]	
Wet (32.5%)	
Second Basis of Comparison	16,525,365
Alternative 3	16,544,696
Difference	19,331
Percent Difference	0
Above Normal (12.5%)	
Second Basis of Comparison	15,746,827
Alternative 3	15,897,563
Difference	150,736
Percent Difference	1
Below Normal (17.5%)	
Second Basis of Comparison	17,847,310
Alternative 3	17,877,415
Difference	30,105
Percent Difference	0
Dry (22.5%)	
Second Basis of Comparison	17,934,726
Alternative 3	18,382,793
Difference	448,067
Percent Difference	2
Critical (15%)	
Second Basis of Comparison	16,930,799
Alternative 3	16,667,512
Difference	-263,288
Percent Difference	-2

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the annual average

Table B-1-22. Annual Mortality by Life Stage for Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Eggs	Fry	Pre-Smolt	Immature-Smolt	Juvenile (Pre & Immature Smolt)
Long-term					
Full Simulation Period[1]					
Second Basis of Comparison	7,110,950	4,709,109	269,215	49,405	318,621
Alternative 3	6,873,719	4,709,136	258,786	47,224	306,009
Difference	-237,232	27	-10,430	-2,182	-12,611
Percent Difference[3]	-3	0	-4	-4	-4
Water Year Types[2]					
Wet (32.5%)					
Second Basis of Comparison	6,023,551	5,129,591	71,744	16,838	88,581
Alternative 3	5,981,293	5,099,805	75,392	16,365	91,757
Difference	-42,258	-29,786	3,648	-473	3,176
Percent Difference	-1	-1	5	-3	4
Above Normal (12.5%)					
Second Basis of Comparison	11,326,553	5,120,441	96,157	31,173	127,329
Alternative 3	10,983,177	5,061,047	110,803	26,403	137,207
Difference	-343,376	-59,394	14,647	-4,769	9,878
Percent Difference	-3	-1	15	-15	8
Below Normal (17.5%)					
Second Basis of Comparison	4,943,736	4,895,243	284,538	50,880	335,418
Alternative 3	4,905,579	4,909,824	267,778	50,091	317,869
Difference	-38,157	14,582	-16,760	-789	-17,549
Percent Difference	-1	0	-6	-2	-5
Dry (22.5%)					
Second Basis of Comparison	5,846,335	4,371,799	440,615	59,727	500,342
Alternative 3	4,403,331	4,450,665	464,033	59,943	523,976
Difference	-1,443,004	78,865	23,419	215	23,634
Percent Difference	-25	2	5	0	5
Critical (15%)					
Second Basis of Comparison	10,379,320	3,744,097	566,311	117,959	684,270
Alternative 3	11,384,504	3,723,000	461,093	109,012	570,105
Difference	1,005,183	-21,096	-105,218	-8,947	-114,165
Percent Difference	10	-1	-19	-8	-17

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

5 Eggs mortality includes pre-spawn mortality

Table B-1-23. Annual Mortality by Cause for Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Temperature	Flow	Total
Long-term			
Full Simulation Period[1]			
Second Basis of Comparison	5,010,581	7,128,100	12,138,680
Alternative 3	4,751,566	7,137,299	11,888,865
Difference	-259,015	9,199	-249,816
Percent Difference[3]	-5	0	-2
Water Year Types[2]			
Wet (32.5%)			
Second Basis of Comparison	485,103	10,756,621	11,241,723
Alternative 3	389,939	10,782,916	11,172,855
Difference	-95,164	26,295	-68,868
Percent Difference	-20	0	-1
Above Normal (12.5%)			
Second Basis of Comparison	11,136,551	5,437,771	16,574,323
Alternative 3	10,788,099	5,393,332	16,181,431
Difference	-348,452	-44,440	-392,892
Percent Difference	-3	-1	-2
Below Normal (17.5%)			
Second Basis of Comparison	4,155,751	6,018,646	10,174,397
Alternative 3	4,135,609	5,997,663	10,133,272
Difference	-20,141	-20,983	-41,125
Percent Difference	0	0	0
Dry (22.5%)			
Second Basis of Comparison	5,469,925	5,248,551	10,718,477
Alternative 3	4,017,083	5,360,888	9,377,972
Difference	-1,452,842	112,337	-1,340,505
Percent Difference	-27	2	-13
Critical (15%)			
Second Basis of Comparison	10,019,091	4,788,596	14,807,687
Alternative 3	10,991,653	4,685,957	15,677,609
Difference	972,562	-102,640	869,922
Percent Difference	10	-2	6

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-1-24. Annual Mortality by Cause and Life Stage for Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Pre-Spawn Mortality	Eggs Flow	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Juvenile Temperature	Juvenile Habitat	Total
Long-term								
Full Simulation Period[1]								
Second Basis of Comparison	4,292,224	2,108,590	710,136	151	4,708,958	8,069	310,552	12,138,680
Alternative 3	3,882,019	2,130,887	860,812	146	4,708,991	8,589	297,421	11,888,865
Difference	-410,205	22,298	150,676	-5	32	520	-13,131	-249,816
Percent Difference[3]	-10	1	21	-3	0	6	-4	-2
Water Year Types[2]								
Wet (32.5%)								
Second Basis of Comparison	76,487	5,544,710	402,355	446	5,129,145	5,816	82,766	11,241,723
Alternative 3	37,613	5,597,671	346,009	441	5,099,364	5,877	85,881	11,172,855
Difference	-38,874	52,961	-56,345	-5	-29,781	61	3,115	-68,868
Percent Difference	-51	1	-14	-1	-1	1	4	-1
Above Normal (12.5%)								
Second Basis of Comparison	10,875,176	194,605	256,772	9	5,120,432	4,595	122,734	16,574,323
Alternative 3	10,309,394	196,462	477,321	0	5,061,047	1,384	135,823	16,181,431
Difference	-565,781	1,857	220,549	-9	-59,385	-3,210	13,088	-392,892
Percent Difference	-5	1	86	-100	-1	-70	11	-2
Below Normal (17.5%)								
Second Basis of Comparison	4,055,314	789,925	98,496	25	4,895,218	1,915	333,503	10,174,397
Alternative 3	4,049,375	773,748	82,456	14	4,909,811	3,764	314,105	10,133,272
Difference	-5,939	-16,178	-16,041	-12	14,593	1,849	-19,399	-41,125
Percent Difference	0	-2	-16	-46	0	97	-6	0
Dry (22.5%)								
Second Basis of Comparison	4,603,020	378,293	865,023	0	4,371,799	1,883	498,459	10,718,477
Alternative 3	3,355,934	388,784	658,614	0	4,450,665	2,536	521,440	9,377,972
Difference	-1,247,086	10,491	-206,409	0	78,865	653	22,981	-1,340,505
Percent Difference	-27	3	-24	0	2	35	5	-13
Critical (15%)								
Second Basis of Comparison	7,750,732	392,537	2,236,052	0	3,744,097	32,307	651,963	14,807,687
Alternative 3	7,449,300	428,029	3,507,175	0	3,723,000	35,178	534,928	15,677,609
Difference	-301,433	35,492	1,271,124	0	-21,096	2,870	-117,035	869,922
Percent Difference	-4	9	57	0	-1	9	-18	6

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-1-25. Annual Mortality by All Factors for Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Pre-Spawn Mortality	Incubation	Super-imposition	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Pre-smolt - Temperature	Pre-smolt - Habitat	Smolt - Temperature	Smolt - Habitat	Total
Long-term											
Full Simulation Period[1]											
Second Basis of Comparison	4,292,224	1,473,372	635,217	710,136	151	4,708,958	3,312	265,903	4,757	44,648	12,138,680
Alternative 3	3,882,019	1,491,155	639,732	860,812	146	4,708,991	3,342	255,443	5,247	41,977	11,888,865
Difference	-410,205	17,783	4,515	150,676	-5	32	30	-10,460	490	-2,671	-249,816
Percent Difference[3]	-10	1	1	21	-3	0	1	-4	10	-6	-2
Water Year Types[2]											
Wet (32.5%)											
Second Basis of Comparison	76,487	3,907,496	1,637,214	402,355	446	5,129,145	4,203	67,541	1,613	15,225	11,241,723
Alternative 3	37,613	3,945,868	1,651,803	346,009	441	5,099,364	4,272	71,120	1,605	14,761	11,172,855
Difference	-38,874	38,372	14,589	-56,345	-5	-29,781	69	3,579	-8	-465	-68,868
Percent Difference	-51	1	1	-14	-1	-1	2	5	-1	-3	-1
Above Normal (12.5%)											
Second Basis of Comparison	10,875,176	114,650	79,955	256,772	9	5,120,432	3,015	93,141	1,579	29,593	16,574,323
Alternative 3	10,309,394	116,493	79,969	477,321	0	5,061,047	576	110,227	808	25,595	16,181,431
Difference	-565,781	1,843	14	220,549	-9	-59,385	-2,439	17,086	-771	-3,998	-392,892
Percent Difference	-5	2	0	86	-100	-1	-81	18	-49	-14	-2
Below Normal (17.5%)											
Second Basis of Comparison	4,055,314	257,762	532,163	98,496	25	4,895,218	1,115	283,424	801	50,079	10,174,397
Alternative 3	4,049,375	242,891	530,857	82,456	14	4,909,811	2,116	265,663	1,649	48,442	10,133,272
Difference	-5,939	-14,871	-1,307	-16,041	-12	14,593	1,001	-17,761	848	-1,637	-41,125
Percent Difference	0	-6	0	-16	-46	0	90	-6	106	-3	0
Dry (22.5%)											
Second Basis of Comparison	4,603,020	378,293	0	865,023	0	4,371,799	423	440,192	1,460	58,267	10,718,477
Alternative 3	3,355,934	388,784	0	658,614	0	4,450,665	698	463,335	1,837	58,105	9,377,972
Difference	-1,247,086	10,491	0	-206,409	0	78,865	275	23,144	378	-162	-1,340,505
Percent Difference	-27	3	0	-24	0	2	65	5	26	0	-13
Critical (15%)											
Second Basis of Comparison	7,750,732	392,537	0	2,236,052	0	3,744,097	8,529	557,782	23,779	94,181	14,807,687
Alternative 3	7,449,300	428,029	0	3,507,175	0	3,723,000	9,030	452,064	26,148	82,864	15,677,609
Difference	-301,433	35,492	0	1,271,124	0	-21,096	501	-105,719	2,369	-11,317	869,922
Percent Difference	-4	9	0	57	0	-1	6	-19	10	-12	6

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-1-26. Annual Potential Production for Fall-Run Chinook Salmon

Analysis Period	Annual Potential Production (# of Fish/year)
Long-term	
Full Simulation Period[1]	
Second Basis of Comparison	17,037,309
Alternative 5	16,908,477
Difference	-128,832
Percent Difference[3]	-1
Water Year Types[2]	
Wet (32.5%)	
Second Basis of Comparison	16,525,365
Alternative 5	16,493,092
Difference	-32,272
Percent Difference	0
Above Normal (12.5%)	
Second Basis of Comparison	15,746,827
Alternative 5	15,891,098
Difference	144,271
Percent Difference	1
Below Normal (17.5%)	
Second Basis of Comparison	17,847,310
Alternative 5	17,951,192
Difference	103,882
Percent Difference	1
Dry (22.5%)	
Second Basis of Comparison	17,934,726
Alternative 5	18,003,040
Difference	68,315
Percent Difference	0
Critical (15%)	
Second Basis of Comparison	16,930,799
Alternative 5	15,797,949
Difference	-1,132,850
Percent Difference	-7

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the annual average

Table B-1-27. Annual Mortality by Life Stage for Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Eggs	Fry	Pre-Smolt	Immature-Smolt	Juvenile (Pre & Immature Smolt)
Long-term					
Full Simulation Period[1]					
Second Basis of Comparison	7,110,950	4,709,109	269,215	49,405	318,621
Alternative 5	7,723,389	4,663,905	266,371	49,003	315,374
Difference	612,438	-45,204	-2,845	-402	-3,247
Percent Difference[3]	9	-1	-1	-1	-1
Water Year Types[2]					
Wet (32.5%)					
Second Basis of Comparison	6,023,551	5,129,591	71,744	16,838	88,581
Alternative 5	6,169,444	5,177,967	78,031	16,578	94,608
Difference	145,893	48,376	6,287	-260	6,027
Percent Difference	2	1	9	-2	7
Above Normal (12.5%)					
Second Basis of Comparison	11,326,553	5,120,441	96,157	31,173	127,329
Alternative 5	11,229,256	4,990,191	153,381	34,302	187,683
Difference	-97,297	-130,250	57,224	3,129	60,354
Percent Difference	-1	-3	60	10	47
Below Normal (17.5%)					
Second Basis of Comparison	4,943,736	4,895,243	284,538	50,880	335,418
Alternative 5	4,934,725	4,906,604	268,136	45,725	313,861
Difference	-9,011	11,362	-16,403	-5,155	-21,557
Percent Difference	0	0	-6	-10	-6
Dry (22.5%)					
Second Basis of Comparison	5,846,335	4,371,799	440,615	59,727	500,342
Alternative 5	5,727,952	4,357,900	490,190	66,478	556,668
Difference	-118,383	-13,900	49,576	6,751	56,326
Percent Difference	-2	0	11	11	11
Critical (15%)					
Second Basis of Comparison	10,379,320	3,744,097	566,311	117,959	684,270
Alternative 5	14,415,310	3,454,056	430,811	109,120	539,931
Difference	4,035,990	-290,041	-135,500	-8,839	-144,340
Percent Difference	39	-8	-24	-7	-21

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

5 Eggs mortality includes pre-spawn mortality

Table B-1-28. Annual Mortality by Cause for Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Temperature	Flow	Total
Long-term			
Full Simulation Period[1]			
Second Basis of Comparison	5,010,581	7,128,100	12,138,680
Alternative 5	5,781,882	6,920,785	12,702,667
Difference	771,302	-207,314	563,987
Percent Difference[3]	15	-3	5
Water Year Types[2]			
Wet (32.5%)			
Second Basis of Comparison	485,103	10,756,621	11,241,723
Alternative 5	1,088,909	10,353,111	11,442,020
Difference	603,806	-403,510	200,296
Percent Difference	124	-4	2
Above Normal (12.5%)			
Second Basis of Comparison	11,136,551	5,437,771	16,574,323
Alternative 5	11,083,720	5,323,409	16,407,129
Difference	-52,831	-114,362	-167,193
Percent Difference	0	-2	-1
Below Normal (17.5%)			
Second Basis of Comparison	4,155,751	6,018,646	10,174,397
Alternative 5	4,169,106	5,986,084	10,155,190
Difference	13,356	-32,563	-19,207
Percent Difference	0	-1	0
Dry (22.5%)			
Second Basis of Comparison	5,469,925	5,248,551	10,718,477
Alternative 5	5,349,191	5,293,329	10,642,520
Difference	-120,734	44,777	-75,957
Percent Difference	-2	1	-1
Critical (15%)			
Second Basis of Comparison	10,019,091	4,788,596	14,807,687
Alternative 5	14,062,400	4,346,896	18,409,296
Difference	4,043,309	-441,700	3,601,609
Percent Difference	40	-9	24

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-1-29. Annual Mortality by Cause and Life Stage for Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Pre-Spawn Mortality	Eggs Flow	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Juvenile Temperature	Juvenile Habitat	Total
Long-term								
Full Simulation Period[1]								
Second Basis of Comparison	4,292,224	2,108,590	710,136	151	4,708,958	8,069	310,552	12,138,680
Alternative 5	4,786,653	1,951,663	985,073	154	4,663,751	10,003	305,371	12,702,667
Difference	494,428	-156,926	274,936	3	-45,207	1,934	-5,181	563,987
Percent Difference[3]	12	-7	39	2	-1	24	-2	5
Water Year Types[2]								
Wet (32.5%)								
Second Basis of Comparison	76,487	5,544,710	402,355	446	5,129,145	5,816	82,766	11,241,723
Alternative 5	348,257	5,086,105	735,082	436	5,177,531	5,134	89,475	11,442,020
Difference	271,771	-458,605	332,727	-10	48,386	-682	6,709	200,296
Percent Difference	355	-8	83	-2	1	-12	8	2
Above Normal (12.5%)								
Second Basis of Comparison	10,875,176	194,605	256,772	9	5,120,432	4,595	122,734	16,574,323
Alternative 5	10,385,418	149,961	693,877	9	4,990,182	4,417	183,266	16,407,129
Difference	-489,758	-44,644	437,104	0	-130,249	-178	60,531	-167,193
Percent Difference	-5	-23	170	-4	-3	-4	49	-1
Below Normal (17.5%)								
Second Basis of Comparison	4,055,314	789,925	98,496	25	4,895,218	1,915	333,503	10,174,397
Alternative 5	4,052,333	769,810	112,581	59	4,906,545	4,133	309,728	10,155,190
Difference	-2,981	-20,115	14,085	34	11,327	2,218	-23,775	-19,207
Percent Difference	0	-3	14	137	0	116	-7	0
Dry (22.5%)								
Second Basis of Comparison	4,603,020	378,293	865,023	0	4,371,799	1,883	498,459	10,718,477
Alternative 5	4,376,903	382,888	968,162	1	4,357,898	4,125	552,543	10,642,520
Difference	-226,117	4,595	103,139	1	-13,901	2,243	54,084	-75,957
Percent Difference	-5	1	12	0	0	119	11	-1
Critical (15%)								
Second Basis of Comparison	7,750,732	392,537	2,236,052	0	3,744,097	32,307	651,963	14,807,687
Alternative 5	11,208,869	393,784	2,812,657	0	3,454,056	40,874	499,057	18,409,296
Difference	3,458,137	1,247	576,606	0	-290,041	8,567	-152,907	3,601,609
Percent Difference	45	0	26	0	-8	27	-23	24

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-1-30. Annual Mortality by All Factors for Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Pre-Spawn Mortality	Incubation	Super-imposition	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Pre-smolt - Temperature	Pre-smolt - Habitat	Smolt - Temperature	Smolt - Habitat	Total
Long-term											
Full Simulation Period[1]											
Second Basis of Comparison	4,292,224	1,473,372	635,217	710,136	151	4,708,958	3,312	265,903	4,757	44,648	12,138,680
Alternative 5	4,786,653	1,450,386	501,277	985,073	154	4,663,751	4,489	261,882	5,514	43,488	12,702,667
Difference	494,428	-22,986	-133,940	274,936	3	-45,207	1,176	-4,021	758	-1,160	563,987
Percent Difference[3]	12	-2	-21	39	2	-1	36	-2	16	-3	5
Water Year Types[2]											
Wet (32.5%)											
Second Basis of Comparison	76,487	3,907,496	1,637,214	402,355	446	5,129,145	4,203	67,541	1,613	15,225	11,241,723
Alternative 5	348,257	3,861,662	1,224,443	735,082	436	5,177,531	4,005	74,026	1,129	15,449	11,442,020
Difference	271,771	-45,835	-412,770	332,727	-10	48,386	-198	6,485	-484	224	200,296
Percent Difference	355	-1	-25	83	-2	1	-5	10	-30	1	2
Above Normal (12.5%)											
Second Basis of Comparison	10,875,176	114,650	79,955	256,772	9	5,120,432	3,015	93,141	1,579	29,593	16,574,323
Alternative 5	10,385,418	69,983	79,978	693,877	9	4,990,182	3,244	150,137	1,173	33,128	16,407,129
Difference	-489,758	-44,667	23	437,104	0	-130,249	228	56,996	-406	3,535	-167,193
Percent Difference	-5	-39	0	170	-4	-3	8	61	-26	12	-1
Below Normal (17.5%)											
Second Basis of Comparison	4,055,314	257,762	532,163	98,496	25	4,895,218	1,115	283,424	801	50,079	10,174,397
Alternative 5	4,052,333	236,463	533,348	112,581	59	4,906,545	2,782	265,353	1,350	44,375	10,155,190
Difference	-2,981	-21,299	1,184	14,085	34	11,327	1,668	-18,071	550	-5,704	-19,207
Percent Difference	0	-8	0	14	137	0	150	-6	69	-11	0
Dry (22.5%)											
Second Basis of Comparison	4,603,020	378,293	0	865,023	0	4,371,799	423	440,192	1,460	58,267	10,718,477
Alternative 5	4,376,903	382,888	0	968,162	1	4,357,898	1,827	488,363	2,298	64,180	10,642,520
Difference	-226,117	4,595	0	103,139	1	-13,901	1,404	48,171	838	5,912	-75,957
Percent Difference	-5	1	0	12	0	0	332	11	57	10	-1
Critical (15%)											
Second Basis of Comparison	7,750,732	392,537	0	2,236,052	0	3,744,097	8,529	557,782	23,779	94,181	14,807,687
Alternative 5	11,208,869	393,784	0	2,812,657	0	3,454,056	12,558	418,253	28,316	80,804	18,409,296
Difference	3,458,137	1,247	0	576,606	0	-290,041	4,029	-139,529	4,538	-13,377	3,601,609
Percent Difference	45	0	0	26	0	-8	47	-25	19	-14	24

1 Based on the 80-year simulation period

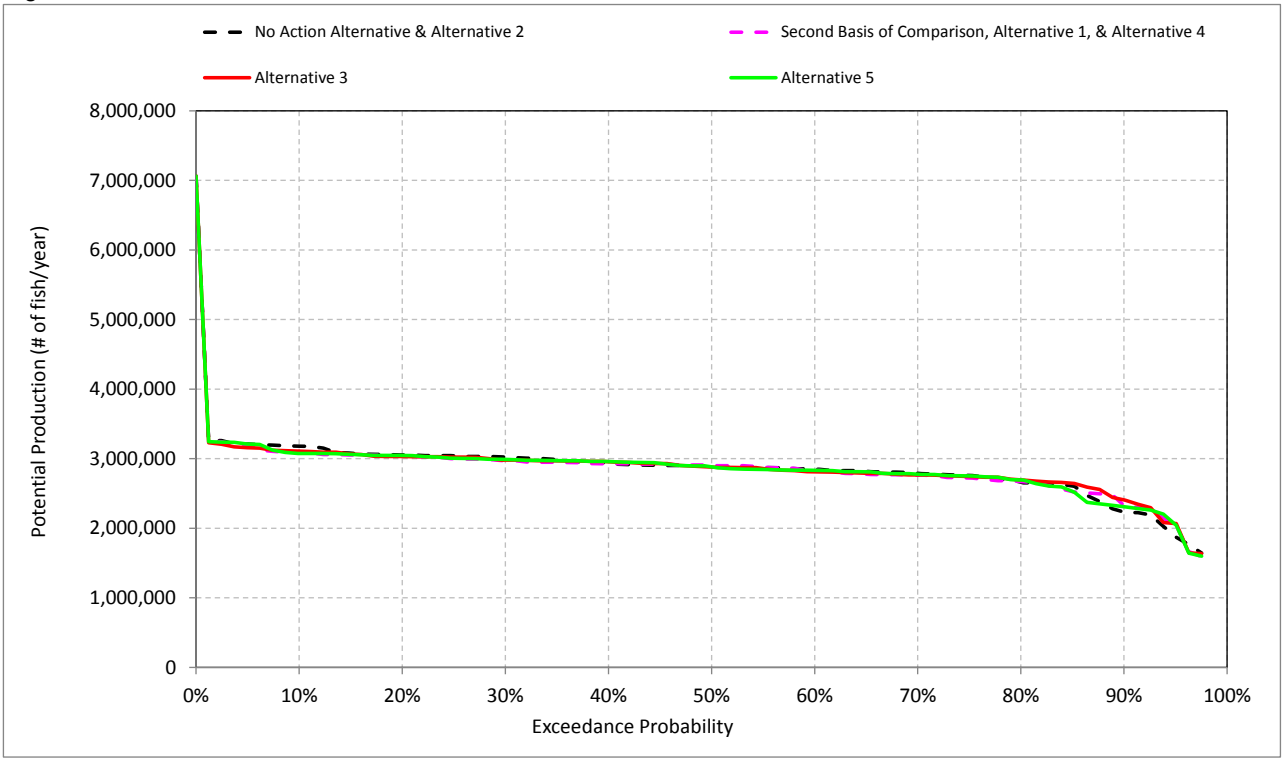
2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

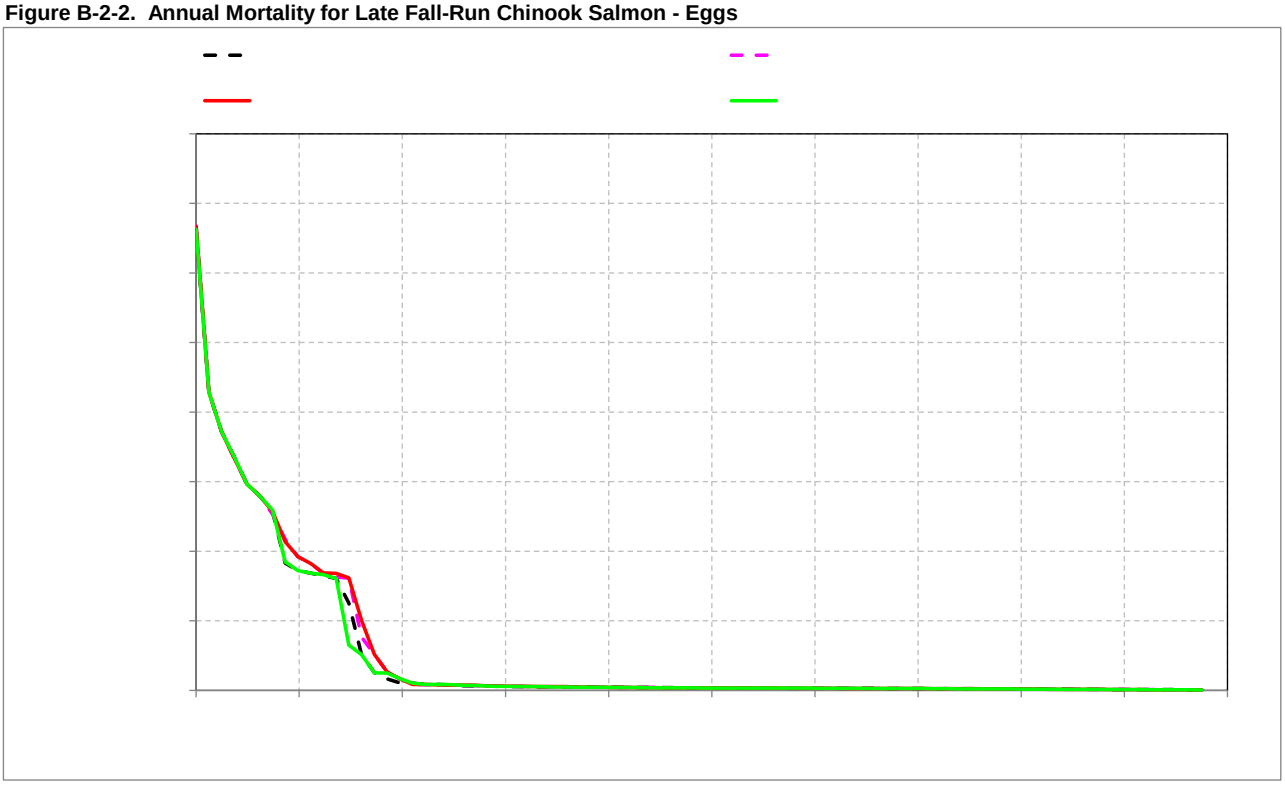
B.2. Late Fall-Run Chinook Salmon

Figure B-2-1. Annual Potential Production for Late Fall-Run Chinook Salmon



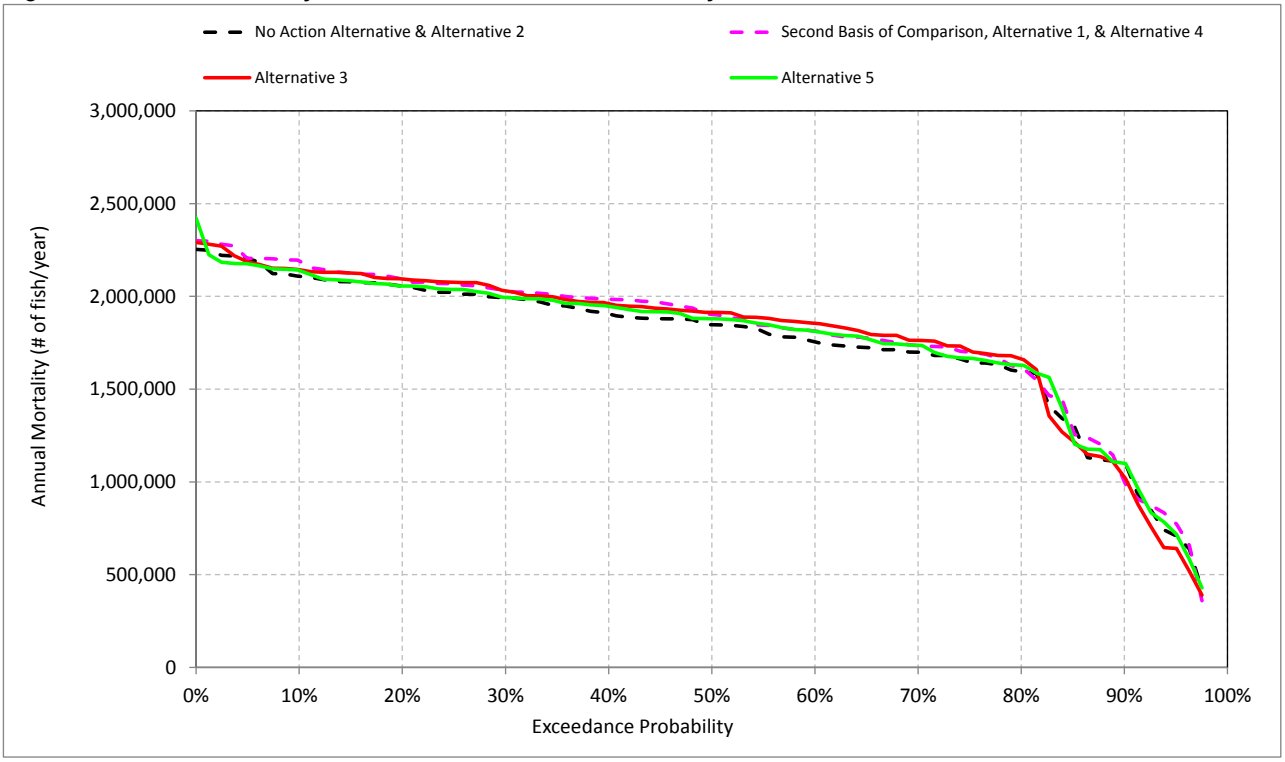
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

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



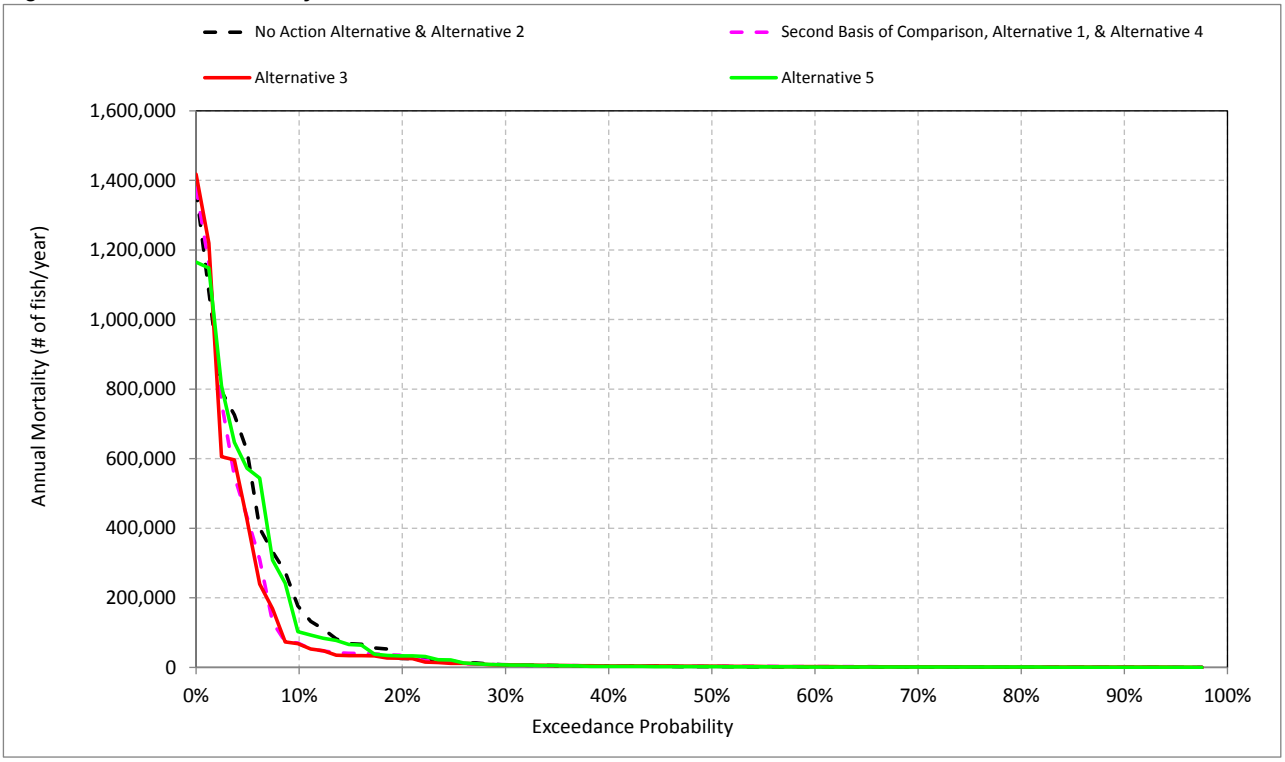
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-2-3. Annual Mortality for Late Fall-Run Chinook Salmon - Fry



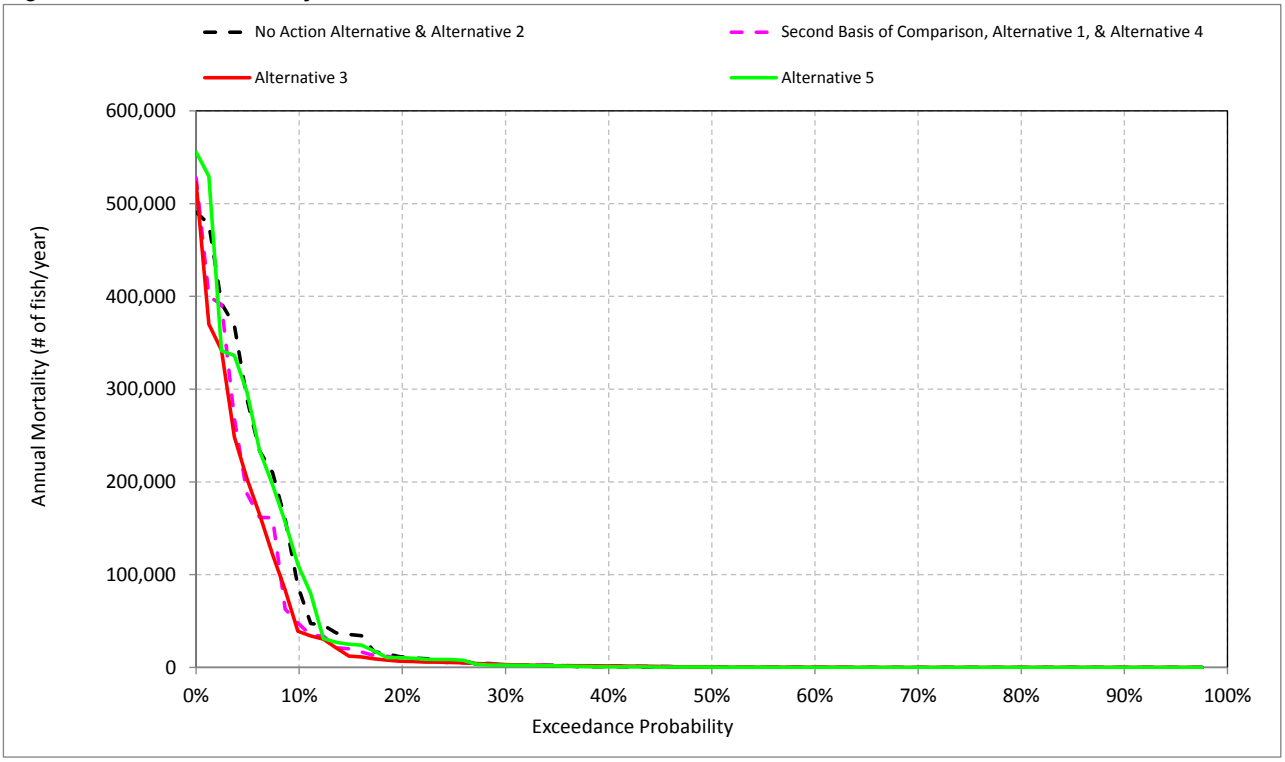
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-2-4. Annual Mortality for Late Fall-Run Chinook Salmon - Pre-Smolt



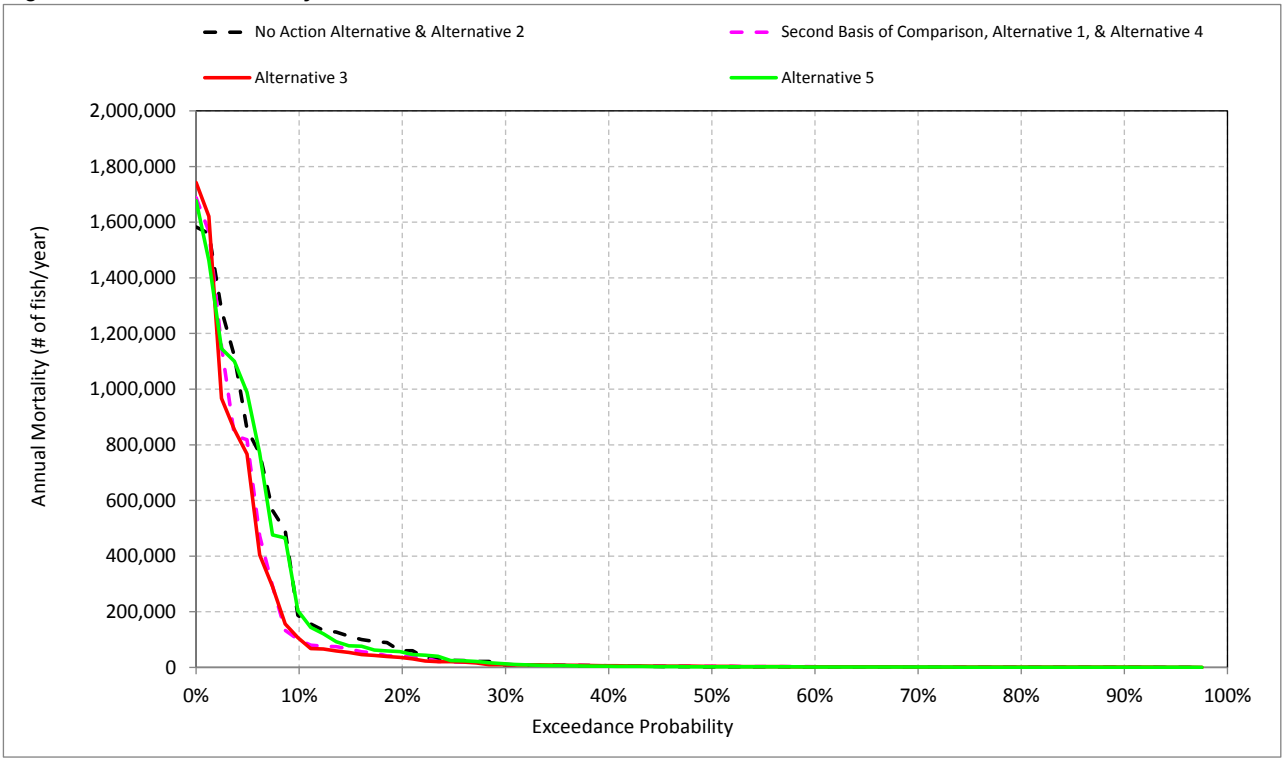
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-2-5. Annual Mortality for Late Fall-Run Chinook Salmon - Immature Smolt



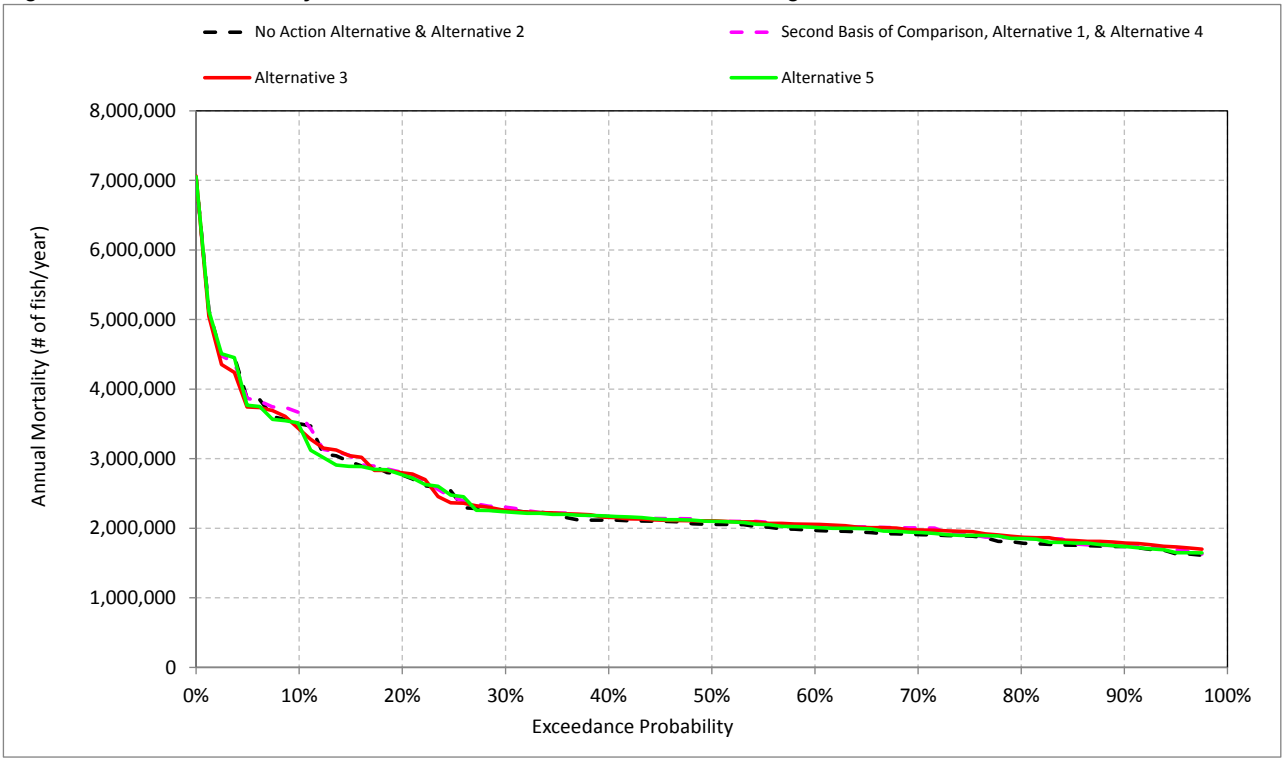
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-2-6. Annual Mortality for Late Fall-Run Chinook Salmon - Pre- & Immature Smolts



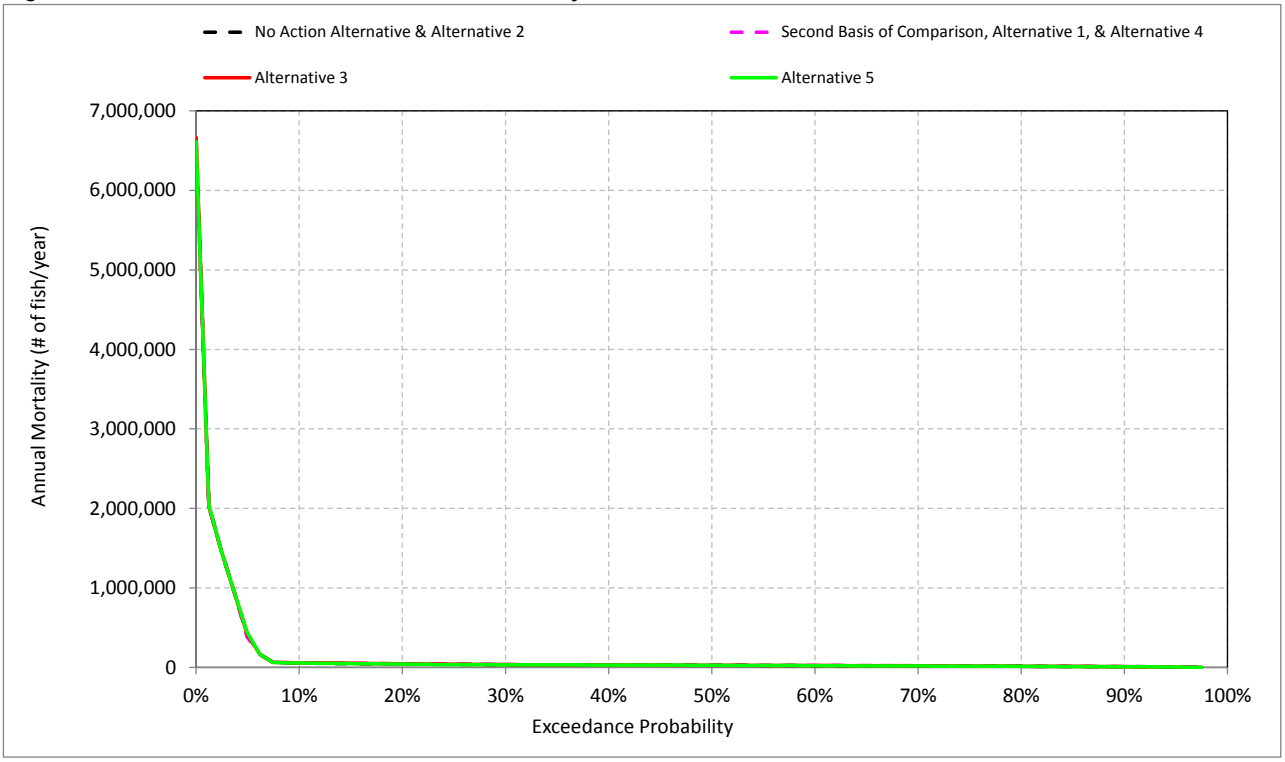
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-2-7. Annual Mortality for Late Fall-Run Chinook Salmon - All Lifestages



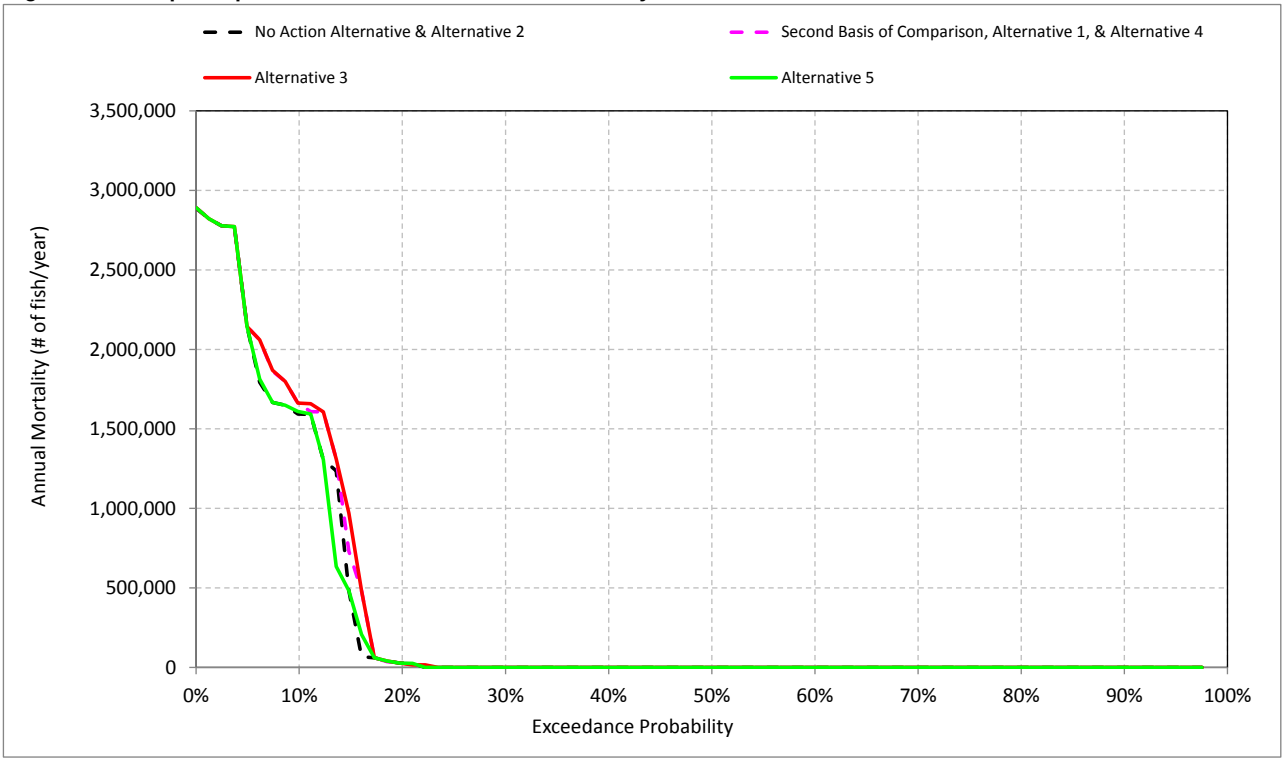
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-2-8. Incubation - Habitat based Annual Mortality for Late Fall-Run Chinook Salmon



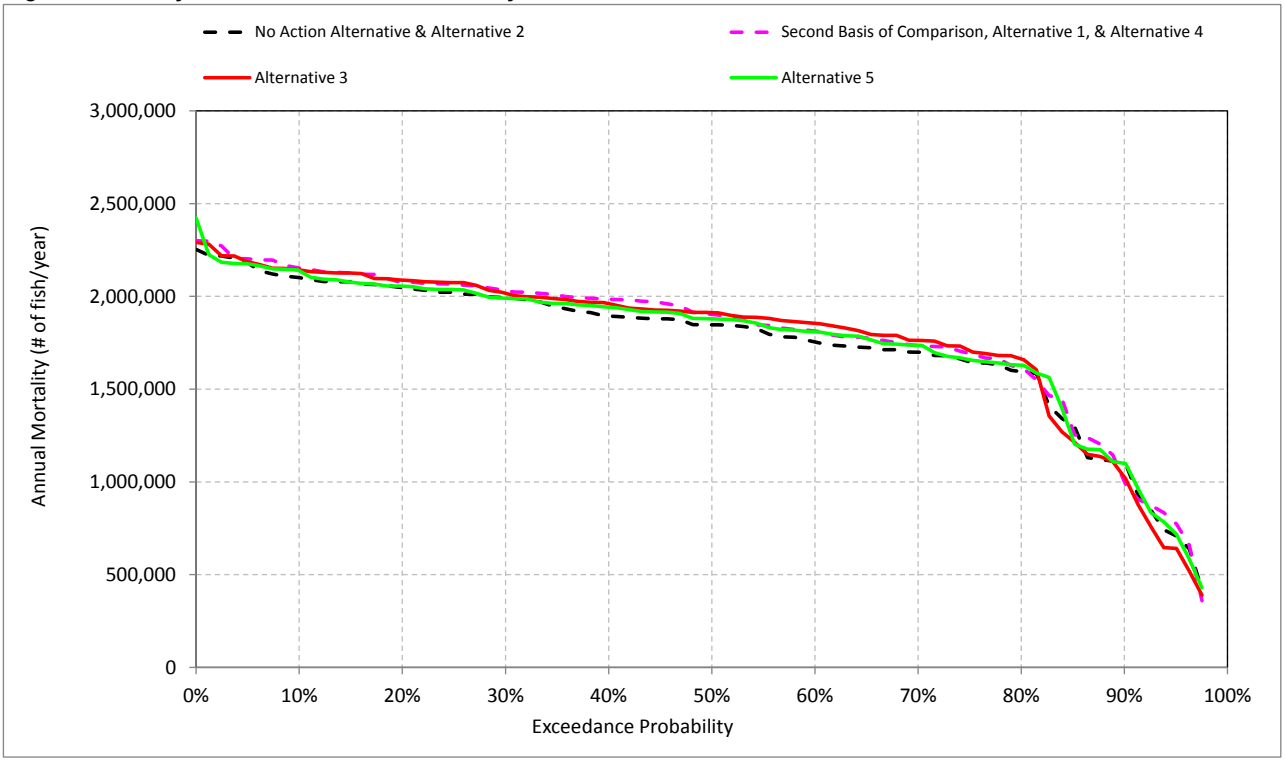
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-2-9. Super-imposition - Habitat based Annual Mortality for Late Fall-Run Chinook Salmon



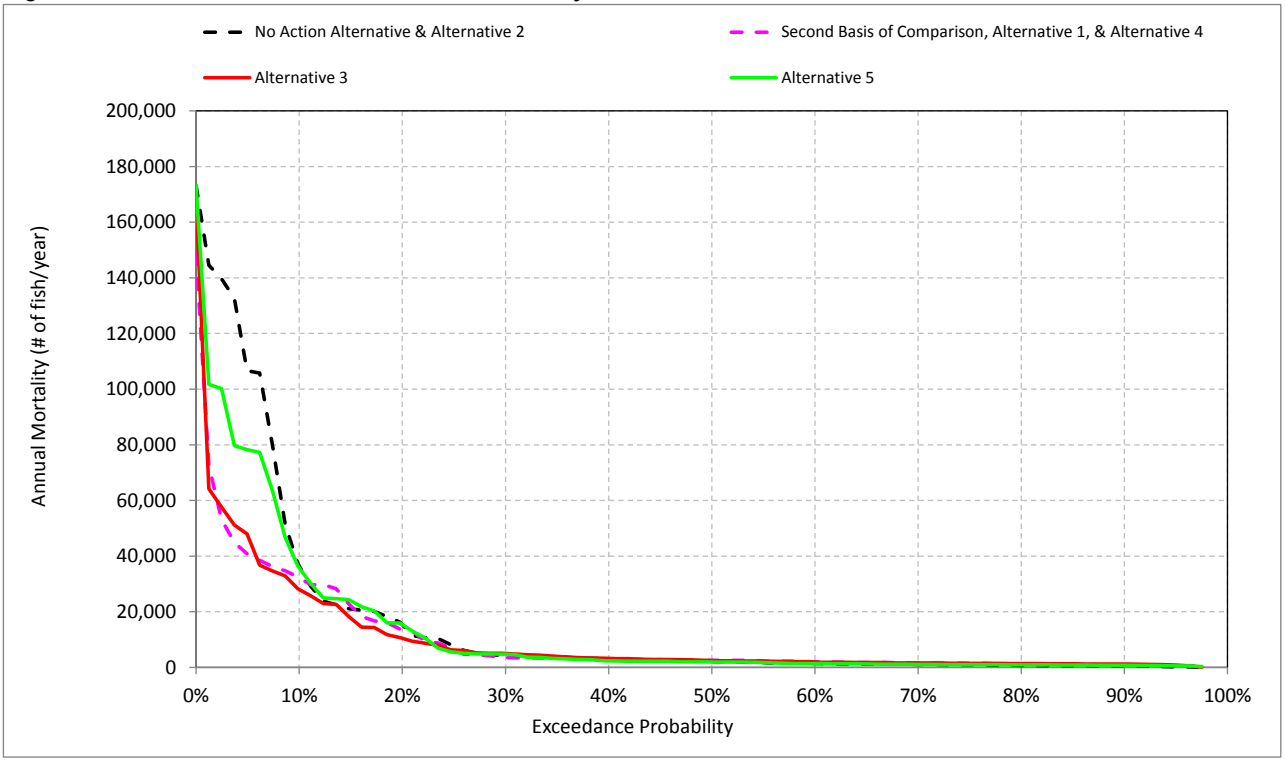
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-2-10. Fry - Habitat based Annual Mortality for Late Fall-Run Chinook Salmon



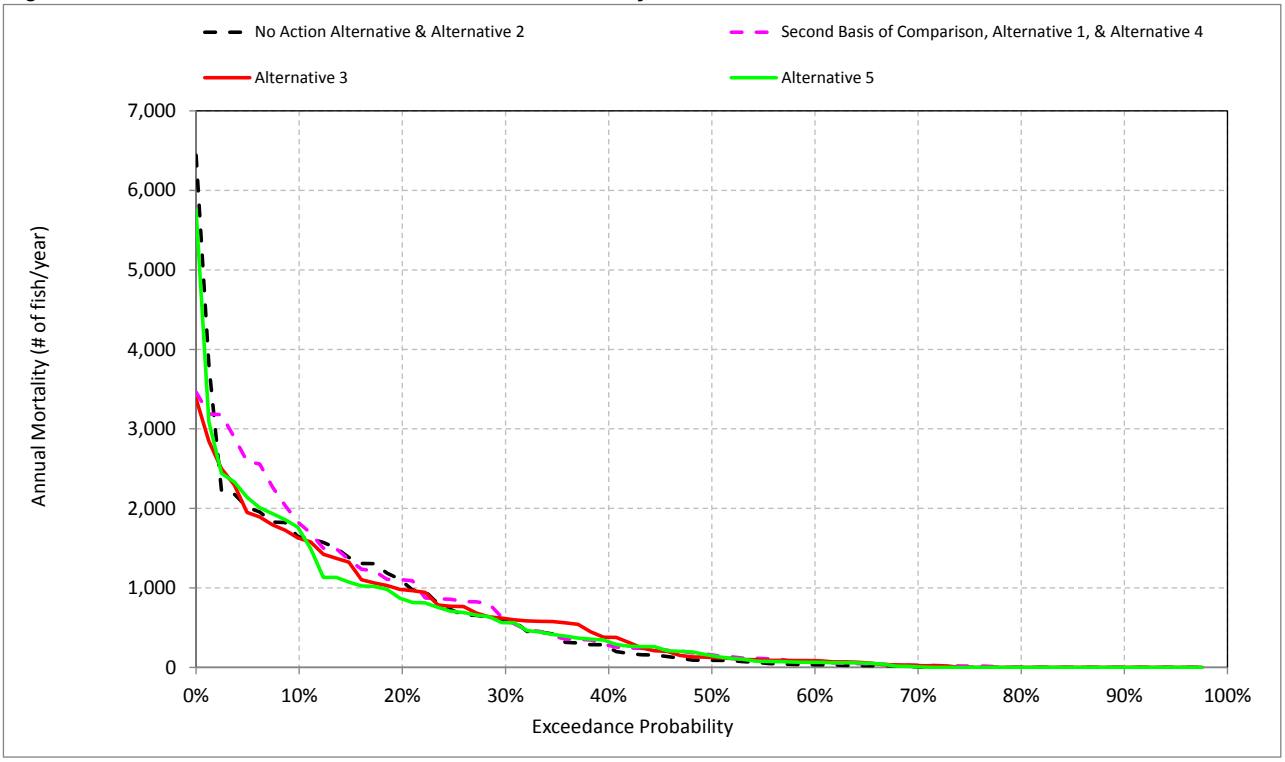
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-2-11. Pre-smolt - Habitat based Annual Mortality for Late Fall-Run Chinook Salmon



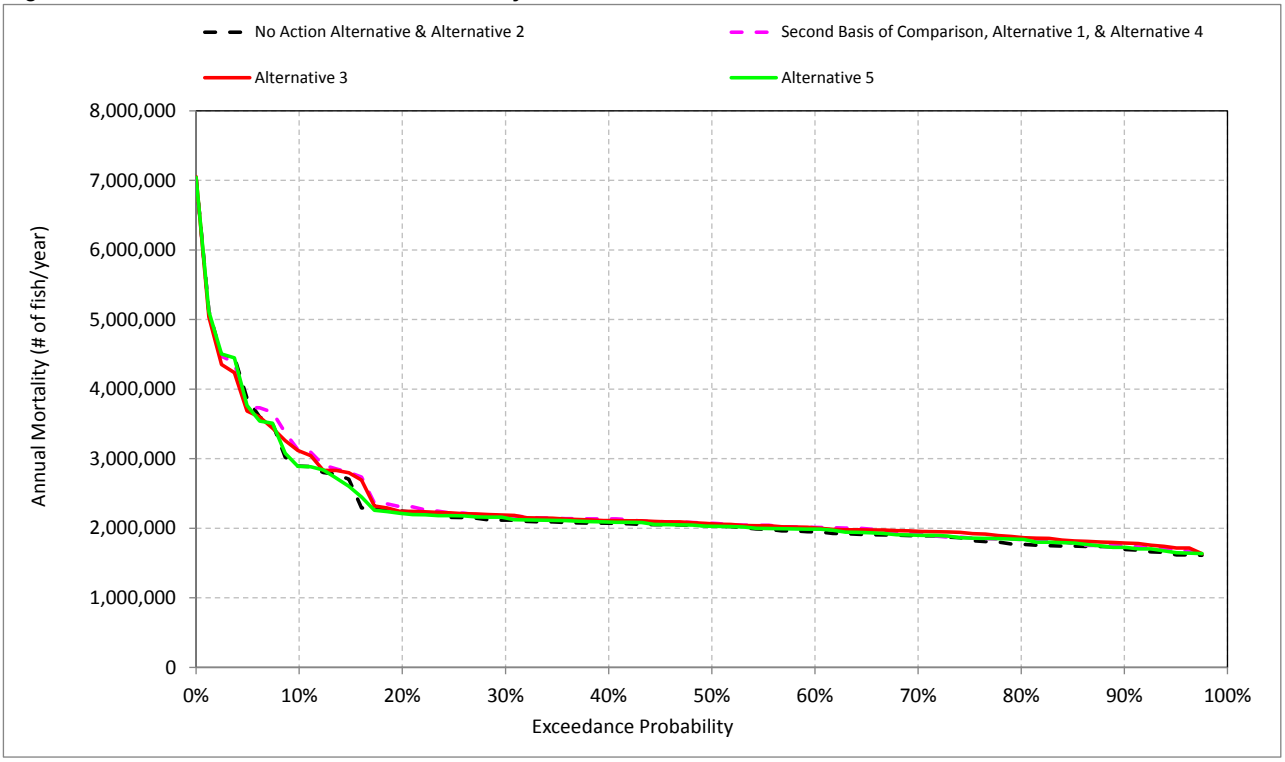
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-2-12. Immature Smolt - Habitat based Annual Mortality for Late Fall-Run Chinook Salmon



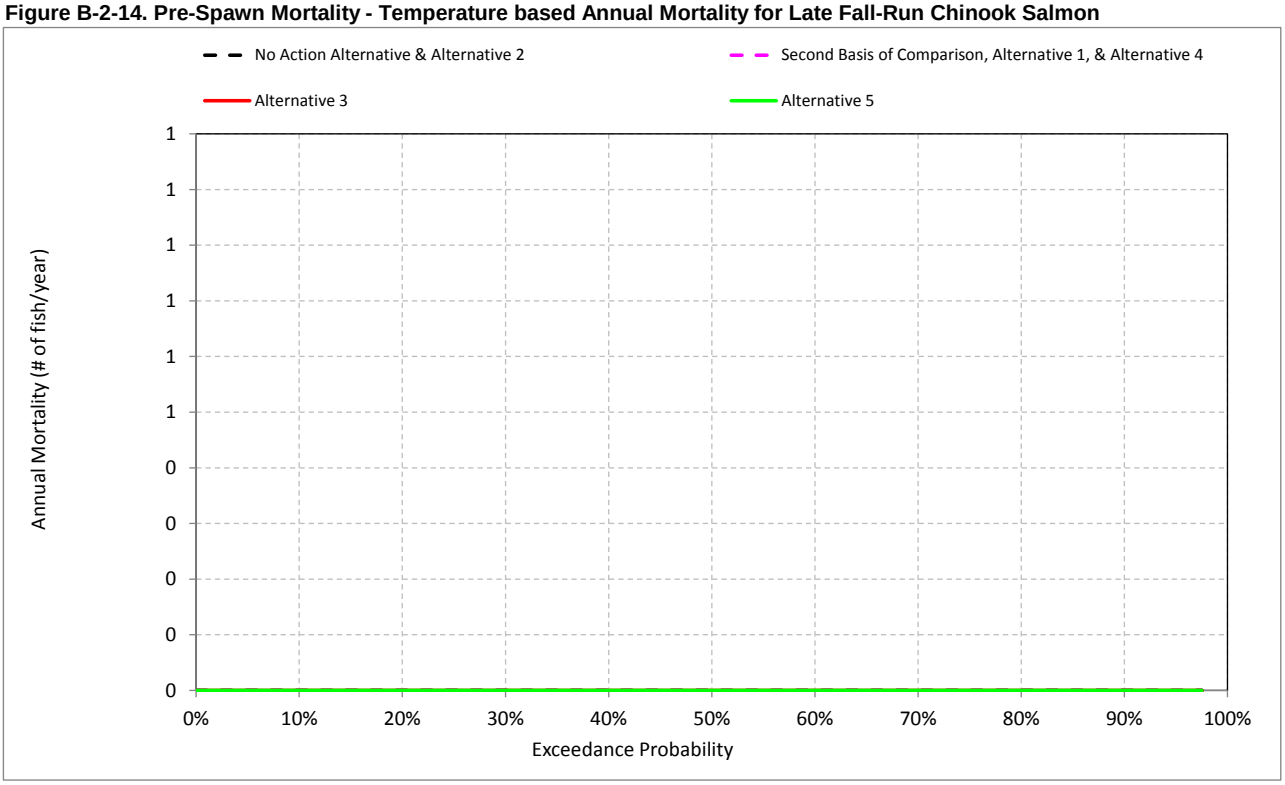
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-2-13. Total Habitat based Annual Mortality for Late Fall-Run Chinook Salmon



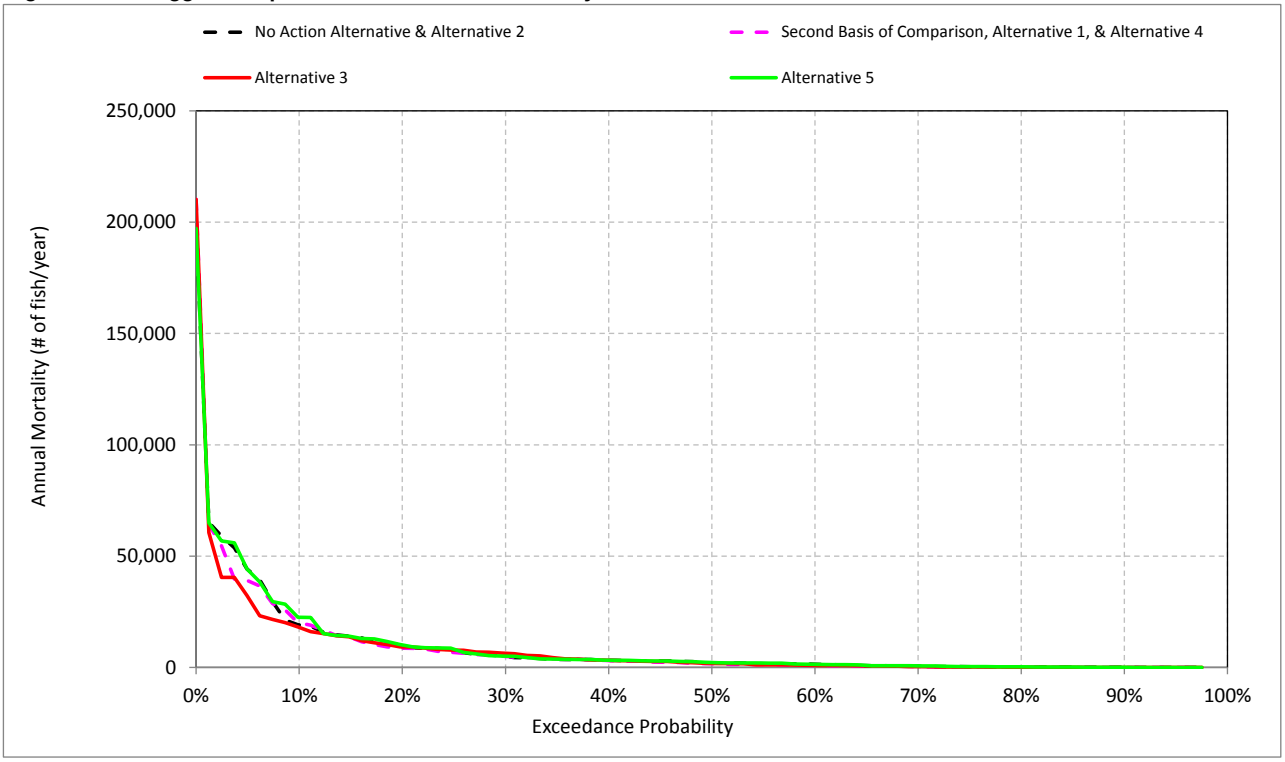
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-2-14. Pre-Spawn Mortality - Temperature based Annual Mortality for Late Fall-Run Chinook Salmon



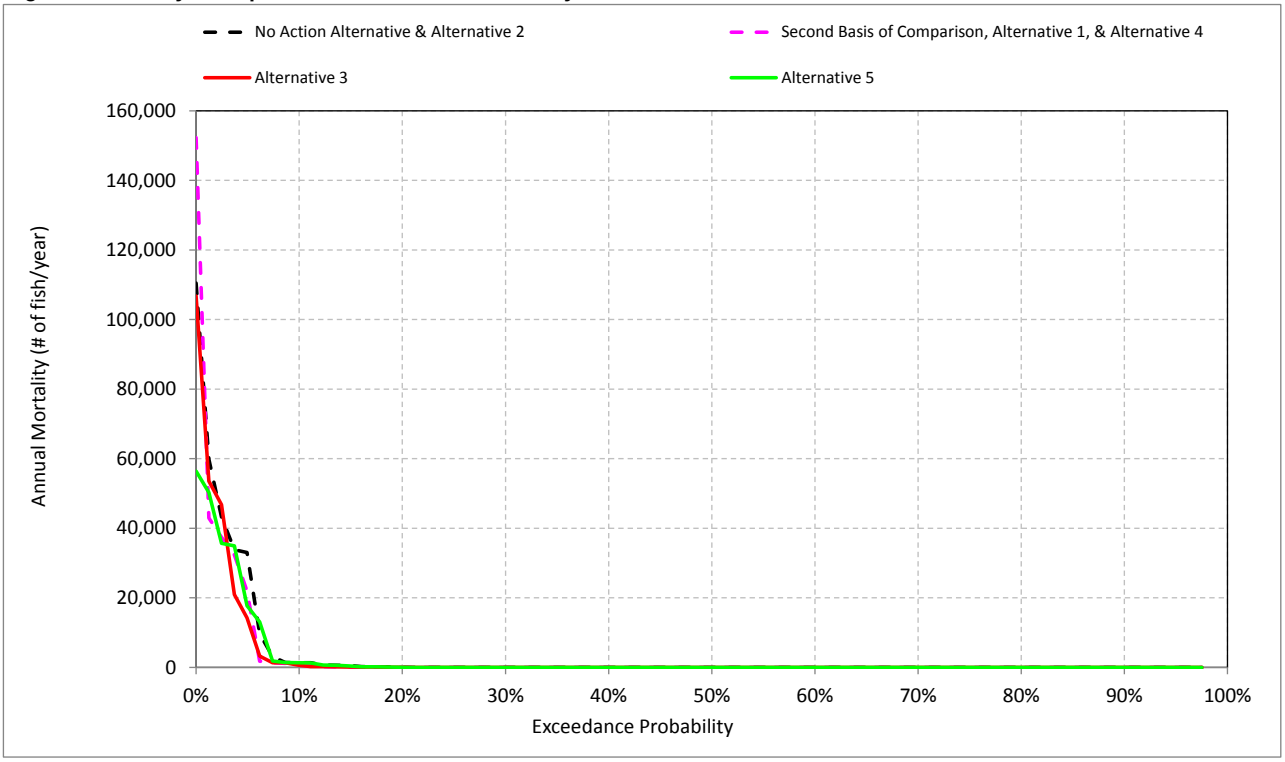
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-2-15. Eggs - Temperature based Annual Mortality for Late Fall-Run Chinook Salmon



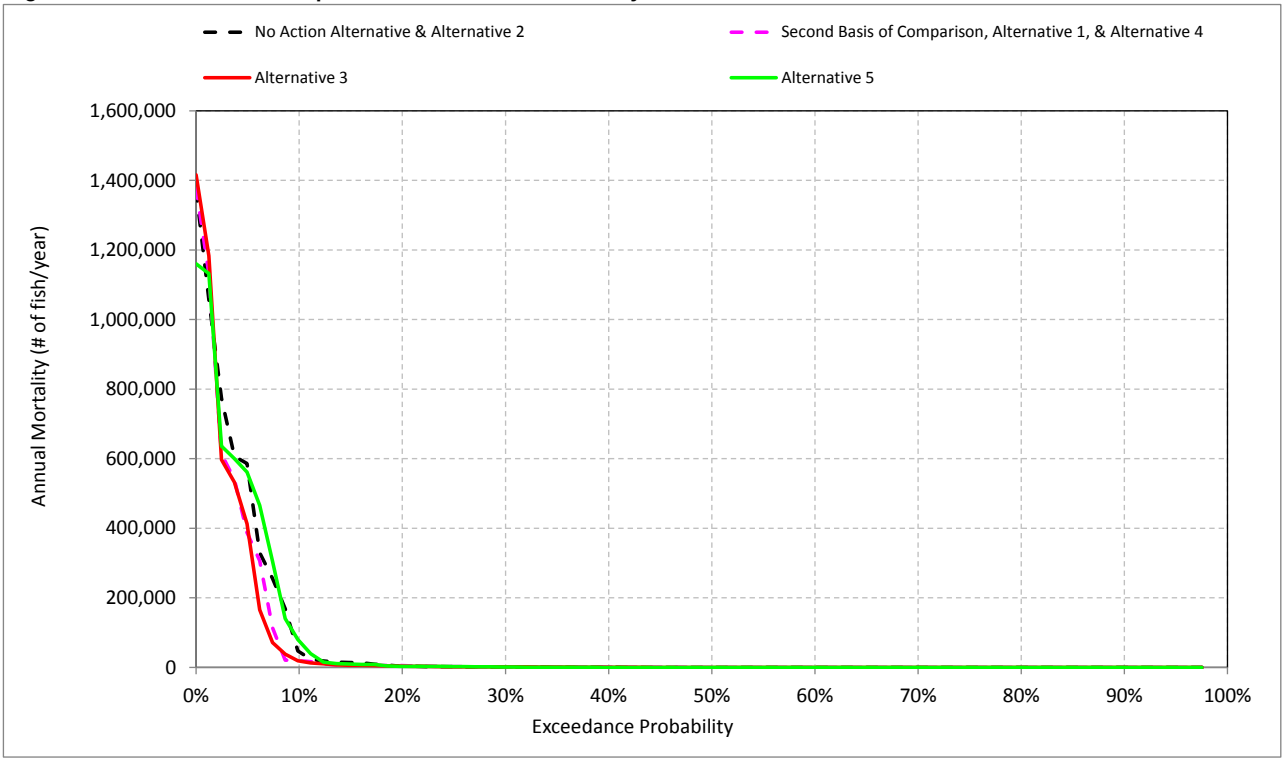
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-2-16. Fry - Temperature based Annual Mortality for Late Fall-Run Chinook Salmon



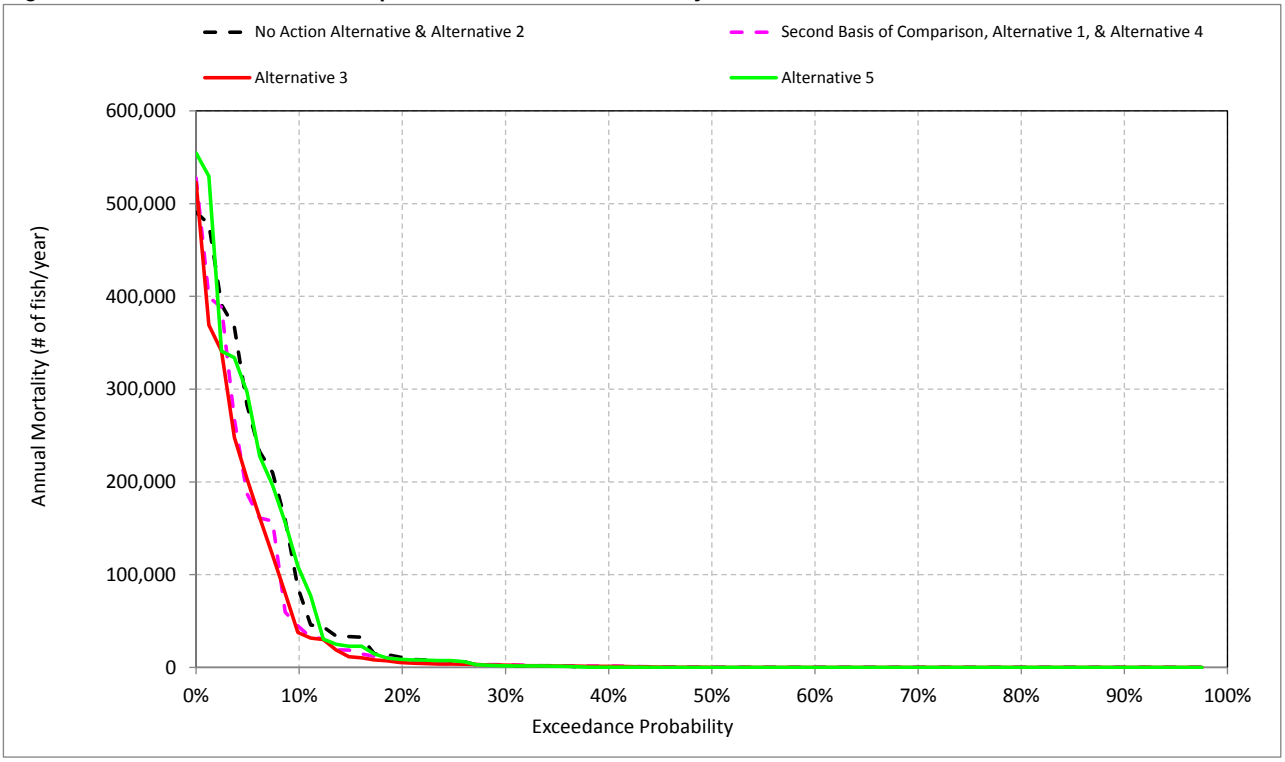
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-2-17. Pre-smolt - Temperature based Annual Mortality for Late Fall-Run Chinook Salmon



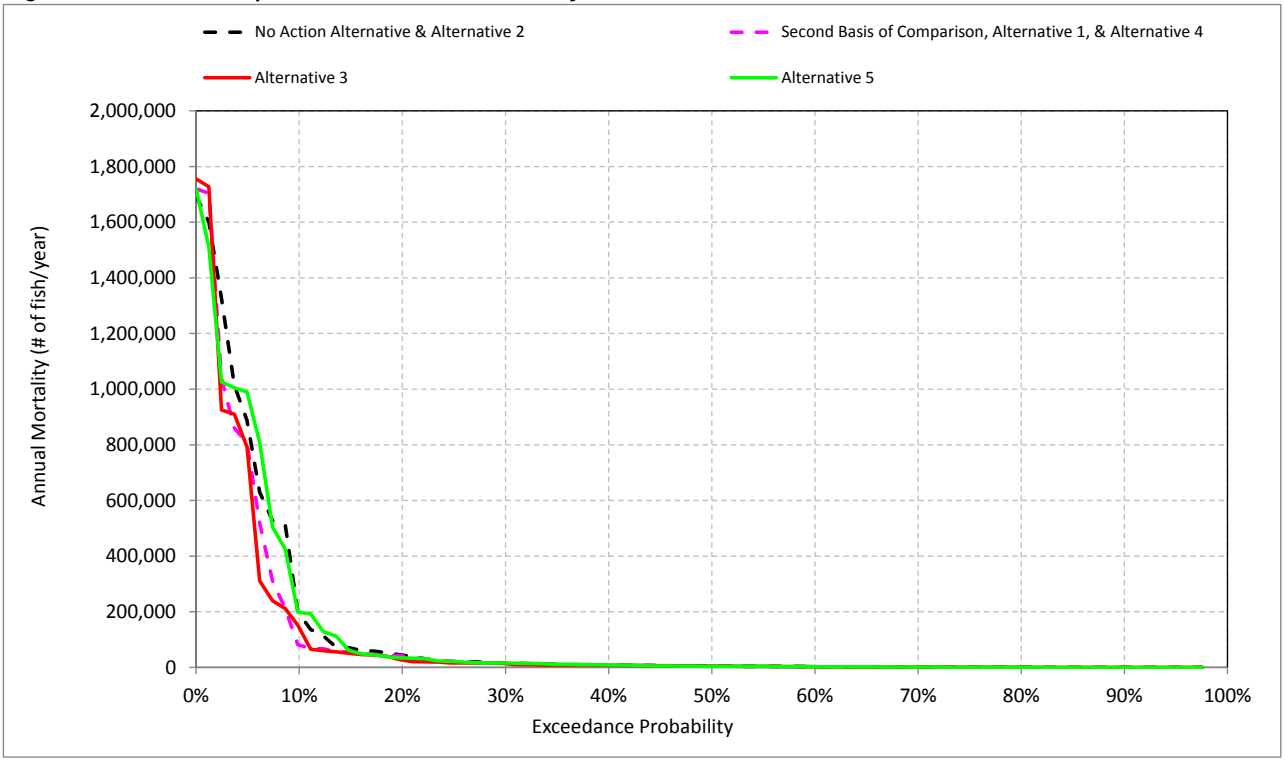
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-2-18. Immature Smolt - Temperature based Annual Mortality for Late Fall-Run Chinook Salmon



Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-2-19. Total Temperature based Annual Mortality for Late Fall-Run Chinook Salmon



Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Table B-2-1. Annual Potential Production for Late Fall-Run Chinook Salmon

Analysis Period	Annual Potential Production (# of Fish/year)
Long-term	
Full Simulation Period[1]	
No Action Alternative	2,813,219
Alternative 1	2,800,061
Difference	-13,158
Percent Difference[3]	0
Water Year Types[2]	
Wet (32.5%)	
No Action Alternative	2,692,145
Alternative 1	2,691,035
Difference	-1,111
Percent Difference	0
Above Normal (12.5%)	
No Action Alternative	2,860,264
Alternative 1	2,802,912
Difference	-57,352
Percent Difference	-2
Below Normal (17.5%)	
No Action Alternative	2,982,412
Alternative 1	2,930,472
Difference	-51,940
Percent Difference	-2
Dry (22.5%)	
No Action Alternative	3,023,892
Alternative 1	2,976,338
Difference	-47,554
Percent Difference	-2
Critical (15%)	
No Action Alternative	2,522,939
Alternative 1	2,617,343
Difference	94,404
Percent Difference	4

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the annual average

Table B-2-2. Annual Mortality by Life Stage for Late Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Eggs	Fry	Pre-Smolt	Immature-Smolt	Juvenile (Pre & Immature Smolt)
Long-term					
Full Simulation Period[1]					
No Action Alternative	492,142	1,757,035	82,787	37,844	120,631
Alternative 1	513,890	1,802,954	68,169	30,510	98,679
Difference	21,748	45,920	-14,618	-7,334	-21,952
Percent Difference[3]	4	3	-18	-19	-18
Water Year Types[2]					
Wet (32.5%)					
No Action Alternative	1,305,939	1,487,095	6,012	78	6,089
Alternative 1	1,331,500	1,479,904	4,935	609	5,544
Difference	25,561	-7,191	-1,076	531	-545
Percent Difference	2	0	-18	684	-9
Above Normal (12.5%)					
No Action Alternative	371,926	1,810,494	1,361	103	1,464
Alternative 1	482,073	1,869,446	2,387	187	2,573
Difference	110,146	58,952	1,025	84	1,109
Percent Difference	30	3	75	82	76
Below Normal (17.5%)					
No Action Alternative	38,722	1,885,067	14,022	4,588	18,610
Alternative 1	41,496	1,985,382	9,337	3,123	12,460
Difference	2,774	100,315	-4,685	-1,465	-6,150
Percent Difference	7	5	-33	-32	-33
Dry (22.5%)					
No Action Alternative	34,945	1,894,612	38,990	16,946	55,936
Alternative 1	34,962	1,979,833	29,461	15,809	45,270
Difference	17	85,221	-9,529	-1,137	-10,666
Percent Difference	0	4	-24	-7	-19
Critical (15%)					
No Action Alternative	43,879	1,941,615	462,907	221,268	684,174
Alternative 1	38,435	1,969,335	386,693	174,569	561,262
Difference	-5,445	27,720	-76,214	-46,699	-122,912
Percent Difference	-12	1	-16	-21	-18

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

5 Eggs mortality includes pre-spawn mortality

Table B-2-3. Annual Mortality by Cause for Late Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Temperature	Flow	Total
Long-term			
Full Simulation Period[1]			
No Action Alternative	117,312	2,252,495	2,369,807
Alternative 1	100,569	2,314,954	2,415,523
Difference	-16,743	62,459	45,716
Percent Difference[3]	-14	3	2
Water Year Types[2]			
Wet (32.5%)			
No Action Alternative	11,538	2,787,586	2,799,124
Alternative 1	13,087	2,803,861	2,816,949
Difference	1,549	16,276	17,825
Percent Difference	13	1	1
Above Normal (12.5%)			
No Action Alternative	9,419	2,174,466	2,183,885
Alternative 1	9,812	2,344,280	2,354,092
Difference	393	169,814	170,208
Percent Difference	4	8	8
Below Normal (17.5%)			
No Action Alternative	16,631	1,925,768	1,942,399
Alternative 1	15,158	2,024,180	2,039,338
Difference	-1,474	98,412	96,938
Percent Difference	-9	5	5
Dry (22.5%)			
No Action Alternative	44,530	1,940,964	1,985,493
Alternative 1	40,463	2,019,602	2,060,065
Difference	-4,067	78,638	74,572
Percent Difference	-9	4	4
Critical (15%)			
No Action Alternative	663,032	2,006,637	2,669,669
Alternative 1	555,549	2,013,483	2,569,032
Difference	-107,483	6,846	-100,637
Percent Difference	-16	0	-4

1 Based on the 80-year simulation period.

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-2-4. Annual Mortality by Cause and Life Stage for Late Fall-Run Chinook Salmon

Analysis Period	Pre-Spawn Mortality	Annual Mortality[4] (# of Fish/year) Eggs Flow	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Juvenile Temperature	Juvenile Habitat	Total
Long-term								
Full Simulation Period[1]								
No Action Alternative	0	482,477	9,665	3,749	1,753,285	103,897	16,733	2,369,807
Alternative 1	0	504,586	9,304	3,662	1,799,292	87,603	11,076	2,415,523
Difference	0	22,110	-361	-87	46,006	-16,294	-5,657	45,716
Percent Difference[3]	0	5	-4	-2	3	-16	-34	2
Water Year Types[2]								
Wet (32.5%)								
No Action Alternative	0	1,294,487	11,452	61	1,487,035	26	6,063	2,799,124
Alternative 1	0	1,319,517	11,983	61	1,479,843	1,043	4,501	2,816,949
Difference	0	25,030	531	0	-7,192	1,018	-1,563	17,825
Percent Difference	0	2	5	1	0	3,925	-26	1
Above Normal (12.5%)								
No Action Alternative	0	362,747	9,179	167	1,810,328	73	1,392	2,183,885
Alternative 1	0	472,813	9,259	147	1,869,299	405	2,168	2,354,092
Difference	0	110,066	80	-19	58,971	333	776	170,208
Percent Difference	0	30	1	-12	3	459	56	8
Below Normal (17.5%)								
No Action Alternative	0	28,022	10,701	143	1,884,924	5,787	12,822	1,942,399
Alternative 1	0	30,282	11,214	62	1,985,320	3,882	8,578	2,039,338
Difference	0	2,261	513	-81	100,396	-1,906	-4,244	96,938
Percent Difference	0	8	5	-57	5	-33	-33	5
Dry (22.5%)								
No Action Alternative	0	28,946	5,999	570	1,894,042	37,961	17,975	1,985,493
Alternative 1	0	30,519	4,444	1,218	1,978,615	34,802	10,468	2,060,065
Difference	0	1,573	-1,556	648	84,573	-3,159	-7,508	74,572
Percent Difference	0	5	-26	114	4	-8	-42	4
Critical (15%)								
No Action Alternative	0	33,389	10,490	23,702	1,917,913	628,839	55,335	2,669,669
Alternative 1	0	29,837	8,597	22,262	1,947,073	524,689	36,573	2,569,032
Difference	0	-3,552	-1,893	-1,440	29,160	-104,150	-18,762	-100,637
Percent Difference	0	-11	-18	-6	2	-17	-34	-4

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-2-5. Annual Mortality by All Factors for Late Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Pre-Spawn Mortality	Incubation	Super-imposition	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Pre-smolt - Temperature	Pre-smolt - Habitat	Smolt - Temperature	Smolt - Habitat	Total
Long-term											
Full Simulation Period[1]											
No Action Alternative	0	170,688	311,789	9,665	3,749	1,753,285	66,626	16,161	37,272	572	2,369,807
Alternative 1	0	171,160	333,426	9,304	3,662	1,799,292	57,690	10,479	29,913	597	2,415,523
Difference	0	472	21,637	-361	-87	46,006	-8,936	-5,682	-7,359	25	45,716
Percent Difference[3]	0	0	7	-4	-2	3	-13	-35	-20	4	2
Water Year Types[2]											
Wet (32.5%)											
No Action Alternative	0	465,305	829,182	11,452	61	1,487,035	19	5,993	7	71	2,799,124
Alternative 1	0	464,856	854,662	11,983	61	1,479,843	549	4,386	494	114	2,816,949
Difference	0	-449	25,479	531	0	-7,192	530	-1,606	488	43	17,825
Percent Difference	0	0	3	5	1	0	2,784	-27	7,082	61	1
Above Normal (12.5%)											
No Action Alternative	0	24,311	338,436	9,179	167	1,810,328	54	1,307	18	84	2,183,885
Alternative 1	0	27,524	445,289	9,259	147	1,869,299	297	2,089	108	79	2,354,092
Difference	0	3,213	106,853	80	-19	58,971	243	782	90	-6	170,208
Percent Difference	0	13	32	1	-12	3	448	60	491	-7	8
Below Normal (17.5%)											
No Action Alternative	0	28,022	0	10,701	143	1,884,924	1,766	12,256	4,022	566	1,942,399
Alternative 1	0	30,282	0	11,214	62	1,985,320	1,247	8,090	2,635	488	2,039,338
Difference	0	2,261	0	513	-81	100,396	-519	-4,166	-1,386	-79	96,938
Percent Difference	0	8	0	5	-57	5	-29	-34	-34	-14	5
Dry (22.5%)											
No Action Alternative	0	28,946	0	5,999	570	1,894,042	21,850	17,140	16,111	835	1,985,493
Alternative 1	0	30,519	0	4,444	1,218	1,978,615	19,975	9,486	14,827	982	2,060,065
Difference	0	1,573	0	-1,556	648	84,573	-1,875	-7,654	-1,284	147	74,572
Percent Difference	0	5	0	-26	114	4	-9	-45	-8	18	4
Critical (15%)											
No Action Alternative	0	33,389	0	10,490	23,702	1,917,913	409,251	53,656	219,588	1,679	2,669,669
Alternative 1	0	29,837	0	8,597	22,262	1,947,073	351,747	34,946	172,942	1,627	2,569,032
Difference	0	-3,552	0	-1,893	-1,440	29,160	-57,504	-18,710	-46,646	-52	-100,637
Percent Difference	0	-11	0	-18	-6	2	-14	-35	-21	-3	-4

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-2-6. Annual Potential Production for Late Fall-Run Chinook Salmon

Analysis Period	Annual Potential Production (# of Fish/year)
Long-term	
Full Simulation Period[1]	
No Action Alternative	2,813,219
Alternative 3	2,812,234
Difference	-985
Percent Difference[3]	0
Water Year Types[2]	
Wet (32.5%)	
No Action Alternative	2,692,145
Alternative 3	2,691,402
Difference	-743
Percent Difference	0
Above Normal (12.5%)	
No Action Alternative	2,860,264
Alternative 3	2,810,515
Difference	-49,749
Percent Difference	-2
Below Normal (17.5%)	
No Action Alternative	2,982,412
Alternative 3	2,961,353
Difference	-21,059
Percent Difference	-1
Dry (22.5%)	
No Action Alternative	3,023,892
Alternative 3	3,012,660
Difference	-11,233
Percent Difference	0
Critical (15%)	
No Action Alternative	2,522,939
Alternative 3	2,600,856
Difference	77,917
Percent Difference	3

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the annual average

Table B-2-7. Annual Mortality by Life Stage for Late Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Eggs	Fry	Pre-Smolt	Immature-Smolt	Juvenile (Pre & Immature Smolt)
Long-term					
Full Simulation Period[1]					
No Action Alternative	492,142	1,757,035	82,787	37,844	120,631
Alternative 3	517,818	1,792,455	66,941	28,700	95,641
Difference	25,677	35,421	-15,845	-9,144	-24,990
Percent Difference[3]	5	2	-19	-24	-21
Water Year Types[2]					
Wet (32.5%)					
No Action Alternative	1,305,939	1,487,095	6,012	78	6,089
Alternative 3	1,334,935	1,484,912	3,275	536	3,812
Difference	28,996	-2,184	-2,736	459	-2,278
Percent Difference	2	0	-46	590	-37
Above Normal (12.5%)					
No Action Alternative	371,926	1,810,494	1,361	103	1,464
Alternative 3	504,894	1,838,570	2,383	216	2,598
Difference	132,968	28,076	1,021	113	1,134
Percent Difference	36	2	75	110	77
Below Normal (17.5%)					
No Action Alternative	38,722	1,885,067	14,022	4,588	18,610
Alternative 3	39,609	1,946,219	10,333	2,164	12,497
Difference	887	61,152	-3,689	-2,424	-6,113
Percent Difference	2	3	-26	-53	-33
Dry (22.5%)					
No Action Alternative	34,945	1,894,612	38,990	16,946	55,936
Alternative 3	34,674	1,958,252	19,261	12,124	31,385
Difference	-271	63,640	-19,729	-4,822	-24,551
Percent Difference	-1	3	-51	-28	-44
Critical (15%)					
No Action Alternative	43,879	1,941,615	462,907	221,268	684,174
Alternative 3	40,798	1,992,284	396,247	169,277	565,524
Difference	-3,082	50,669	-66,660	-51,990	-118,650
Percent Difference	-7	3	-14	-23	-17

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

5 Eggs mortality includes pre-spawn mortality

Table B-2-8. Annual Mortality by Cause for Late Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Temperature	Flow	Total
Long-term			
Full Simulation Period[1]			
No Action Alternative	117,312	2,252,495	2,369,807
Alternative 3	96,645	2,309,269	2,405,915
Difference	-20,666	56,774	36,108
Percent Difference[3]	-18	3	2
Water Year Types[2]			
Wet (32.5%)			
No Action Alternative	11,538	2,787,586	2,799,124
Alternative 3	13,133	2,810,525	2,823,658
Difference	1,595	22,940	24,535
Percent Difference	14	1	1
Above Normal (12.5%)			
No Action Alternative	9,419	2,174,466	2,183,885
Alternative 3	6,036	2,340,026	2,346,062
Difference	-3,382	165,560	162,178
Percent Difference	-36	8	7
Below Normal (17.5%)			
No Action Alternative	16,631	1,925,768	1,942,399
Alternative 3	13,519	1,984,806	1,998,326
Difference	-3,112	59,038	55,926
Percent Difference	-19	3	3
Dry (22.5%)			
No Action Alternative	44,530	1,940,964	1,985,493
Alternative 3	27,396	1,996,915	2,024,311
Difference	-17,134	55,952	38,818
Percent Difference	-38	3	2
Critical (15%)			
No Action Alternative	663,032	2,006,637	2,669,669
Alternative 3	553,950	2,044,656	2,598,606
Difference	-109,082	38,019	-71,063
Percent Difference	-16	2	-3

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-2-9. Annual Mortality by Cause and Life Stage for Late Fall-Run Chinook Salmon

Analysis Period	Pre-Spawn Mortality	Annual Mortality[4] (# of Fish/year) Eggs Flow	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Juvenile Temperature	Juvenile Habitat	Total
Long-term								
Full Simulation Period[1]								
No Action Alternative	0	482,477	9,665	3,749	1,753,285	103,897	16,733	2,369,807
Alternative 3	0	509,000	8,818	3,126	1,789,329	84,700	10,941	2,405,915
Difference	0	26,523	-847	-623	36,043	-19,197	-5,793	36,108
Percent Difference[3]	0	5	-9	-17	2	-18	-35	2
Water Year Types[2]								
Wet (32.5%)								
No Action Alternative	0	1,294,487	11,452	61	1,487,035	26	6,063	2,799,124
Alternative 3	0	1,322,789	12,146	61	1,484,851	927	2,885	2,823,658
Difference	0	28,302	694	0	-2,184	901	-3,178	24,535
Percent Difference	0	2	6	0	0	3,475	-52	1
Above Normal (12.5%)								
No Action Alternative	0	362,747	9,179	167	1,810,328	73	1,392	2,183,885
Alternative 3	0	499,275	5,619	31	1,838,539	386	2,212	2,346,062
Difference	0	136,528	-3,560	-136	28,212	314	821	162,178
Percent Difference	0	38	-39	-82	2	433	59	7
Below Normal (17.5%)								
No Action Alternative	0	28,022	10,701	143	1,884,924	5,787	12,822	1,942,399
Alternative 3	0	28,753	10,857	75	1,946,144	2,588	9,910	1,998,326
Difference	0	731	156	-68	61,220	-3,200	-2,913	55,926
Percent Difference	0	3	1	-47	3	-55	-23	3
Dry (22.5%)								
No Action Alternative	0	28,946	5,999	570	1,894,042	37,961	17,975	1,985,493
Alternative 3	0	30,082	4,592	188	1,958,065	22,616	8,769	2,024,311
Difference	0	1,136	-1,407	-382	64,022	-15,345	-9,206	38,818
Percent Difference	0	4	-23	-67	3	-40	-51	2
Critical (15%)								
No Action Alternative	0	33,389	10,490	23,702	1,917,913	628,839	55,335	2,669,669
Alternative 3	0	32,561	8,237	20,317	1,971,967	525,396	40,128	2,598,606
Difference	0	-829	-2,253	-3,386	54,055	-103,443	-15,207	-71,063
Percent Difference	0	-2	-21	-14	3	-16	-27	-3

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-2-10. Annual Mortality by All Factors for Late Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Pre-Spawn Mortality	Incubation	Super-imposition	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Pre-smolt - Temperature	Pre-smolt - Habitat	Smolt - Temperature	Smolt - Habitat	Total
Long-term											
Full Simulation Period[1]											
No Action Alternative	0	170,688	311,789	9,665	3,749	1,753,285	66,626	16,161	37,272	572	2,369,807
Alternative 3	0	171,685	337,315	8,818	3,126	1,789,329	56,543	10,398	28,158	542	2,405,915
Difference	0	997	25,526	-847	-623	36,043	-10,083	-5,762	-9,114	-30	36,108
Percent Difference[3]	0	1	8	-9	-17	2	-15	-36	-24	-5	2
Water Year Types[2]											
Wet (32.5%)											
No Action Alternative	0	465,305	829,182	11,452	61	1,487,035	19	5,993	7	71	2,799,124
Alternative 3	0	466,004	856,785	12,146	61	1,484,851	516	2,759	411	126	2,823,658
Difference	0	699	27,603	694	0	-2,184	497	-3,233	404	55	24,535
Percent Difference	0	0	3	6	0	0	2,610	-54	5,866	77	1
Above Normal (12.5%)											
No Action Alternative	0	24,311	338,436	9,179	167	1,810,328	54	1,307	18	84	2,183,885
Alternative 3	0	28,397	470,878	5,619	31	1,838,539	296	2,087	90	125	2,346,062
Difference	0	4,086	132,442	-3,560	-136	28,212	242	779	72	41	162,178
Percent Difference	0	17	39	-39	-82	2	446	60	392	49	7
Below Normal (17.5%)											
No Action Alternative	0	28,022	0	10,701	143	1,884,924	1,766	12,256	4,022	566	1,942,399
Alternative 3	0	28,753	0	10,857	75	1,946,144	823	9,510	1,765	400	1,998,326
Difference	0	731	0	156	-68	61,220	-943	-2,746	-2,257	-167	55,926
Percent Difference	0	3	0	1	-47	3	-53	-22	-56	-29	3
Dry (22.5%)											
No Action Alternative	0	28,946	0	5,999	570	1,894,042	21,850	17,140	16,111	835	1,985,493
Alternative 3	0	30,082	0	4,592	188	1,958,065	11,401	7,860	11,215	909	2,024,311
Difference	0	1,136	0	-1,407	-382	64,022	-10,449	-9,280	-4,896	74	38,818
Percent Difference	0	4	0	-23	-67	3	-48	-54	-30	9	2
Critical (15%)											
No Action Alternative	0	33,389	0	10,490	23,702	1,917,913	409,251	53,656	219,588	1,679	2,669,669
Alternative 3	0	32,561	0	8,237	20,317	1,971,967	357,527	38,720	167,870	1,408	2,598,606
Difference	0	-829	0	-2,253	-3,386	54,055	-51,725	-14,935	-51,719	-272	-71,063
Percent Difference	0	-2	0	-21	-14	3	-13	-28	-24	-16	-3

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-2-11. Annual Potential Production for Late Fall-Run Chinook Salmon

Analysis Period	Annual Potential Production (# of Fish/year)
Long-term	
Full Simulation Period[1]	
No Action Alternative	2,813,219
Alternative 5	2,805,566
Difference	-7,653
Percent Difference[3]	0
Water Year Types[2]	
Wet (32.5%)	
No Action Alternative	2,692,145
Alternative 5	2,700,194
Difference	8,049
Percent Difference	0
Above Normal (12.5%)	
No Action Alternative	2,860,264
Alternative 5	2,829,088
Difference	-31,176
Percent Difference	-1
Below Normal (17.5%)	
No Action Alternative	2,982,412
Alternative 5	2,951,992
Difference	-30,420
Percent Difference	-1
Dry (22.5%)	
No Action Alternative	3,023,892
Alternative 5	3,004,835
Difference	-19,057
Percent Difference	-1
Critical (15%)	
No Action Alternative	2,522,939
Alternative 5	2,544,537
Difference	21,598
Percent Difference	1

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the annual average

Table B-2-12. Annual Mortality by Life Stage for Late Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Eggs	Fry	Pre-Smolt	Immature-Smolt	Juvenile (Pre & Immature Smolt)
Long-term					
Full Simulation Period[1]					
No Action Alternative	492,142	1,757,035	82,787	37,844	120,631
Alternative 5	486,679	1,779,342	78,549	38,177	116,726
Difference	-5,463	22,307	-4,237	333	-3,904
Percent Difference[3]	-1	1	-5	1	-3
Water Year Types[2]					
Wet (32.5%)					
No Action Alternative	1,305,939	1,487,095	6,012	78	6,089
Alternative 5	1,284,631	1,490,907	4,027	74	4,101
Difference	-21,308	3,812	-1,985	-4	-1,989
Percent Difference	-2	0	-33	-5	-33
Above Normal (12.5%)					
No Action Alternative	371,926	1,810,494	1,361	103	1,464
Alternative 5	385,985	1,859,656	1,357	82	1,439
Difference	14,059	49,162	-5	-21	-25
Percent Difference	4	3	0	-20	-2
Below Normal (17.5%)					
No Action Alternative	38,722	1,885,067	14,022	4,588	18,610
Alternative 5	39,141	1,943,539	13,998	4,481	18,480
Difference	419	58,471	-23	-107	-130
Percent Difference	1	3	0	-2	-1
Dry (22.5%)					
No Action Alternative	34,945	1,894,612	38,990	16,946	55,936
Alternative 5	34,298	1,930,739	31,905	14,697	46,602
Difference	-647	36,127	-7,085	-2,249	-9,334
Percent Difference	-2	2	-18	-13	-17
Critical (15%)					
No Action Alternative	43,879	1,941,615	462,907	221,268	684,174
Alternative 5	42,394	1,918,694	449,617	227,011	676,628
Difference	-1,485	-22,921	-13,290	5,743	-7,547
Percent Difference	-3	-1	-3	3	-1

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

5 Eggs mortality includes pre-spawn mortality

Table B-2-13. Annual Mortality by Cause for Late Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Temperature	Flow	Total
Long-term			
Full Simulation Period[1]			
No Action Alternative	117,312	2,252,495	2,369,807
Alternative 5	115,323	2,267,424	2,382,747
Difference	-1,989	14,929	12,940
Percent Difference[3]	-2	1	1
Water Year Types[2]			
Wet (32.5%)			
No Action Alternative	11,538	2,787,586	2,799,124
Alternative 5	11,470	2,768,169	2,779,639
Difference	-68	-19,417	-19,485
Percent Difference	-1	-1	-1
Above Normal (12.5%)			
No Action Alternative	9,419	2,174,466	2,183,885
Alternative 5	9,777	2,237,304	2,247,081
Difference	359	62,838	63,196
Percent Difference	4	3	3
Below Normal (17.5%)			
No Action Alternative	16,631	1,925,768	1,942,399
Alternative 5	16,938	1,984,222	2,001,160
Difference	307	58,454	58,760
Percent Difference	2	3	3
Dry (22.5%)			
No Action Alternative	44,530	1,940,964	1,985,493
Alternative 5	40,257	1,971,382	2,011,639
Difference	-4,273	30,419	26,146
Percent Difference	-10	2	1
Critical (15%)			
No Action Alternative	663,032	2,006,637	2,669,669
Alternative 5	655,672	1,982,044	2,637,716
Difference	-7,360	-24,593	-31,953
Percent Difference	-1	-1	-1

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-2-14. Annual Mortality by Cause and Life Stage for Late Fall-Run Chinook Salmon

Analysis Period	Pre-Spawn Mortality	Annual Mortality[4] (# of Fish/year) Eggs Flow	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Juvenile Temperature	Juvenile Habitat	Total
Long-term								
Full Simulation Period[1]								
No Action Alternative	0	482,477	9,665	3,749	1,753,285	103,897	16,733	2,369,807
Alternative 5	0	476,778	9,902	2,705	1,776,637	102,717	14,010	2,382,747
Difference	0	-5,699	236	-1,044	23,351	-1,181	-2,724	12,940
Percent Difference[3]	0	-1	2	-28	1	-1	-16	1
Water Year Types[2]								
Wet (32.5%)								
No Action Alternative	0	1,294,487	11,452	61	1,487,035	26	6,063	2,799,124
Alternative 5	0	1,273,245	11,386	61	1,490,847	24	4,077	2,779,639
Difference	0	-21,242	-66	0	3,812	-2	-1,987	-19,485
Percent Difference	0	-2	-1	0	0	-8	-33	-1
Above Normal (12.5%)								
No Action Alternative	0	362,747	9,179	167	1,810,328	73	1,392	2,183,885
Alternative 5	0	376,400	9,586	142	1,859,515	50	1,389	2,247,081
Difference	0	13,653	406	-25	49,187	-23	-2	63,196
Percent Difference	0	4	4	-15	3	-31	0	3
Below Normal (17.5%)								
No Action Alternative	0	28,022	10,701	143	1,884,924	5,787	12,822	1,942,399
Alternative 5	0	28,128	11,014	147	1,943,392	5,777	12,702	2,001,160
Difference	0	106	313	4	58,468	-10	-120	58,760
Percent Difference	0	0	3	3	3	0	-1	3
Dry (22.5%)								
No Action Alternative	0	28,946	5,999	570	1,894,042	37,961	17,975	1,985,493
Alternative 5	0	28,043	6,255	761	1,929,979	33,241	13,361	2,011,639
Difference	0	-903	256	191	35,936	-4,720	-4,614	26,146
Percent Difference	0	-3	4	34	2	-12	-26	1
Critical (15%)								
No Action Alternative	0	33,389	10,490	23,702	1,917,913	628,839	55,335	2,669,669
Alternative 5	0	31,273	11,121	16,469	1,902,225	628,081	48,546	2,637,716
Difference	0	-2,116	631	-7,233	-15,688	-758	-6,789	-31,953
Percent Difference	0	-6	6	-31	-1	0	-12	-1

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-2-15. Annual Mortality by All Factors for Late Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Pre-Spawn Mortality	Incubation	Super-imposition	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Pre-smolt - Temperature	Pre-smolt - Habitat	Smolt - Temperature	Smolt - Habitat	Total
Long-term											
Full Simulation Period[1]											
No Action Alternative	0	170,688	311,789	9,665	3,749	1,753,285	66,626	16,161	37,272	572	2,369,807
Alternative 5	0	170,227	306,551	9,902	2,705	1,776,637	65,089	13,460	37,628	549	2,382,747
Difference	0	-461	-5,238	236	-1,044	23,351	-1,537	-2,700	356	-23	12,940
Percent Difference[3]	0	0	-2	2	-28	1	-2	-17	1	-4	1
Water Year Types[2]											
Wet (32.5%)											
No Action Alternative	0	465,305	829,182	11,452	61	1,487,035	19	5,993	7	71	2,799,124
Alternative 5	0	465,569	807,677	11,386	61	1,490,847	18	4,009	6	68	2,779,639
Difference	0	264	-21,506	-66	0	3,812	-1	-1,984	-1	-3	-19,485
Percent Difference	0	0	-3	-1	0	0	-3	-33	-20	-4	-1
Above Normal (12.5%)											
No Action Alternative	0	24,311	338,436	9,179	167	1,810,328	54	1,307	18	84	2,183,885
Alternative 5	0	23,955	352,445	9,586	142	1,859,515	32	1,325	18	64	2,247,081
Difference	0	-356	14,009	406	-25	49,187	-22	18	-1	-20	63,196
Percent Difference	0	-1	4	4	-15	3	-41	1	-3	-24	3
Below Normal (17.5%)											
No Action Alternative	0	28,022	0	10,701	143	1,884,924	1,766	12,256	4,022	566	1,942,399
Alternative 5	0	28,128	0	11,014	147	1,943,392	1,852	12,147	3,925	556	2,001,160
Difference	0	106	0	313	4	58,468	86	-110	-96	-11	58,760
Percent Difference	0	0	0	3	3	3	5	-1	-2	-2	3
Dry (22.5%)											
No Action Alternative	0	28,946	0	5,999	570	1,894,042	21,850	17,140	16,111	835	1,985,493
Alternative 5	0	28,043	0	6,255	761	1,929,979	19,310	12,595	13,932	766	2,011,639
Difference	0	-903	0	256	191	35,936	-2,540	-4,545	-2,179	-70	26,146
Percent Difference	0	-3	0	4	34	2	-12	-27	-14	-8	1
Critical (15%)											
No Action Alternative	0	33,389	0	10,490	23,702	1,917,913	409,251	53,656	219,588	1,679	2,669,669
Alternative 5	0	31,273	0	11,121	16,469	1,902,225	402,734	46,883	225,348	1,663	2,637,716
Difference	0	-2,116	0	631	-7,233	-15,688	-6,517	-6,773	5,759	-16	-31,953
Percent Difference	0	-6	0	6	-31	-1	-2	-13	3	-1	-1

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table C-2-16. Annual Potential Production for Late Fall-Run Chinook Salmon

Analysis Period	Annual Potential Production (# of Fish/year)
Long-term	
Full Simulation Period[1]	
Second Basis of Comparison	2,800,061
No Action Alternative	2,813,219
Difference	13,158
Percent Difference[3]	0
Water Year Types[2]	
Wet (32.5%)	
Second Basis of Comparison	2,691,035
No Action Alternative	2,692,145
Difference	1,111
Percent Difference	0
Above Normal (12.5%)	
Second Basis of Comparison	2,802,912
No Action Alternative	2,860,264
Difference	57,352
Percent Difference	2
Below Normal (17.5%)	
Second Basis of Comparison	2,930,472
No Action Alternative	2,982,412
Difference	51,940
Percent Difference	2
Dry (22.5%)	
Second Basis of Comparison	2,976,338
No Action Alternative	3,023,892
Difference	47,554
Percent Difference	2
Critical (15%)	
Second Basis of Comparison	2,617,343
No Action Alternative	2,522,939
Difference	-94,404
Percent Difference	-4

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the annual average

Table C-2-17. Annual Mortality by Life Stage for Late Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Eggs	Fry	Pre-Smolt	Immature-Smolt	Juvenile (Pre & Immature Smolt)
Long-term					
Full Simulation Period[1]					
Second Basis of Comparison	513,890	1,802,954	68,169	30,510	98,679
No Action Alternative	492,142	1,757,035	82,787	37,844	120,631
Difference	-21,748	-45,920	14,618	7,334	21,952
Percent Difference[3]	-4	-3	21	24	22
Water Year Types[2]					
Wet (32.5%)					
Second Basis of Comparison	1,331,500	1,479,904	4,935	609	5,544
No Action Alternative	1,305,939	1,487,095	6,012	78	6,089
Difference	-25,561	7,191	1,076	-531	545
Percent Difference	-2	0	22	-87	10
Above Normal (12.5%)					
Second Basis of Comparison	482,073	1,869,446	2,387	187	2,573
No Action Alternative	371,926	1,810,494	1,361	103	1,464
Difference	-110,146	-58,952	-1,025	-84	-1,109
Percent Difference	-23	-3	-43	-45	-43
Below Normal (17.5%)					
Second Basis of Comparison	41,496	1,985,382	9,337	3,123	12,460
No Action Alternative	38,722	1,885,067	14,022	4,588	18,610
Difference	-2,774	-100,315	4,685	1,465	6,150
Percent Difference	-7	-5	50	47	49
Dry (22.5%)					
Second Basis of Comparison	34,962	1,979,833	29,461	15,809	45,270
No Action Alternative	34,945	1,894,612	38,990	16,946	55,936
Difference	-17	-85,221	9,529	1,137	10,666
Percent Difference	0	-4	32	7	24
Critical (15%)					
Second Basis of Comparison	38,435	1,969,335	386,693	174,569	561,262
No Action Alternative	43,879	1,941,615	462,907	221,268	684,174
Difference	5,445	-27,720	76,214	46,699	122,912
Percent Difference	14	-1	20	27	22

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

5 Eggs mortality includes pre-spawn mortality

Table C-2-18. Annual Mortality by Cause for Late Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Temperature	Flow	Total
Long-term			
Full Simulation Period[1]			
Second Basis of Comparison	100,569	2,314,954	2,415,523
No Action Alternative	117,312	2,252,495	2,369,807
Difference	16,743	-62,459	-45,716
Percent Difference[3]	17	-3	-2
Water Year Types[2]			
Wet (32.5%)			
Second Basis of Comparison	13,087	2,803,861	2,816,949
No Action Alternative	11,538	2,787,586	2,799,124
Difference	-1,549	-16,276	-17,825
Percent Difference	-12	-1	-1
Above Normal (12.5%)			
Second Basis of Comparison	9,812	2,344,280	2,354,092
No Action Alternative	9,419	2,174,466	2,183,885
Difference	-393	-169,814	-170,208
Percent Difference	-4	-7	-7
Below Normal (17.5%)			
Second Basis of Comparison	15,158	2,024,180	2,039,338
No Action Alternative	16,631	1,925,768	1,942,399
Difference	1,474	-98,412	-96,938
Percent Difference	10	-5	-5
Dry (22.5%)			
Second Basis of Comparison	40,463	2,019,602	2,060,065
No Action Alternative	44,530	1,940,964	1,985,493
Difference	4,067	-78,638	-74,572
Percent Difference	10	-4	-4
Critical (15%)			
Second Basis of Comparison	555,549	2,013,483	2,569,032
No Action Alternative	663,032	2,006,637	2,669,669
Difference	107,483	-6,846	100,637
Percent Difference	19	0	4

1 Based on the 80-year simulation period.

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table C-2-19. Annual Mortality by Cause and Life Stage for Late Fall-Run Chinook Salmon

Analysis Period	Pre-Spawn Mortality	Annual Mortality[4] (# of Fish/year) Eggs Flow	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Juvenile Temperature	Juvenile Habitat	Total
Long-term								
Full Simulation Period[1]								
Second Basis of Comparison	0	504,586	9,304	3,662	1,799,292	87,603	11,076	2,415,523
No Action Alternative	0	482,477	9,665	3,749	1,753,285	103,897	16,733	2,369,807
Difference	0	-22,110	361	87	-46,006	16,294	5,657	-45,716
Percent Difference[3]	0	-4	4	2	-3	19	51	-2
Water Year Types[2]								
Wet (32.5%)								
Second Basis of Comparison	0	1,319,517	11,983	61	1,479,843	1,043	4,501	2,816,949
No Action Alternative	0	1,294,487	11,452	61	1,487,035	26	6,063	2,799,124
Difference	0	-25,030	-531	0	7,192	-1,018	1,563	-17,825
Percent Difference	0	-2	-4	-1	0	-98	35	-1
Above Normal (12.5%)								
Second Basis of Comparison	0	472,813	9,259	147	1,869,299	405	2,168	2,354,092
No Action Alternative	0	362,747	9,179	167	1,810,328	73	1,392	2,183,885
Difference	0	-110,066	-80	19	-58,971	-333	-776	-170,208
Percent Difference	0	-23	-1	13	-3	-82	-36	-7
Below Normal (17.5%)								
Second Basis of Comparison	0	30,282	11,214	62	1,985,320	3,882	8,578	2,039,338
No Action Alternative	0	28,022	10,701	143	1,884,924	5,787	12,822	1,942,399
Difference	0	-2,261	-513	81	-100,396	1,906	4,244	-96,938
Percent Difference	0	-7	-5	131	-5	49	49	-5
Dry (22.5%)								
Second Basis of Comparison	0	30,519	4,444	1,218	1,978,615	34,802	10,468	2,060,065
No Action Alternative	0	28,946	5,999	570	1,894,042	37,961	17,975	1,985,493
Difference	0	-1,573	1,556	-648	-84,573	3,159	7,508	-74,572
Percent Difference	0	-5	35	-53	-4	9	72	-4
Critical (15%)								
Second Basis of Comparison	0	29,837	8,597	22,262	1,947,073	524,689	36,573	2,569,032
No Action Alternative	0	33,389	10,490	23,702	1,917,913	628,839	55,335	2,669,669
Difference	0	3,552	1,893	1,440	-29,160	104,150	18,762	100,637
Percent Difference	0	12	22	6	-1	20	51	4

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table C-2-20. Annual Mortality by All Factors for Late Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Pre-Spawn Mortality	Incubation	Super-imposition	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Pre-smolt - Temperature	Pre-smolt - Habitat	Smolt - Temperature	Smolt - Habitat	Total
Long-term											
Full Simulation Period[1]											
Second Basis of Comparison	0	171,160	333,426	9,304	3,662	1,799,292	57,690	10,479	29,913	597	2,415,523
No Action Alternative	0	170,688	311,789	9,665	3,749	1,753,285	66,626	16,161	37,272	572	2,369,807
Difference	0	-472	-21,637	361	87	-46,006	8,936	5,682	7,359	-25	-45,716
Percent Difference[3]	0	0	-6	4	2	-3	15	54	25	-4	-2
Water Year Types[2]											
Wet (32.5%)											
Second Basis of Comparison	0	464,856	854,662	11,983	61	1,479,843	549	4,386	494	114	2,816,949
No Action Alternative	0	465,305	829,182	11,452	61	1,487,035	19	5,993	7	71	2,799,124
Difference	0	449	-25,479	-531	0	7,192	-530	1,606	-488	-43	-17,825
Percent Difference	0	0	-3	-4	-1	0	-97	37	-99	-38	-1
Above Normal (12.5%)											
Second Basis of Comparison	0	27,524	445,289	9,259	147	1,869,299	297	2,089	108	79	2,354,092
No Action Alternative	0	24,311	338,436	9,179	167	1,810,328	54	1,307	18	84	2,183,885
Difference	0	-3,213	-106,853	-80	19	-58,971	-243	-782	-90	6	-170,208
Percent Difference	0	-12	-24	-1	13	-3	-82	-37	-83	7	-7
Below Normal (17.5%)											
Second Basis of Comparison	0	30,282	0	11,214	62	1,985,320	1,247	8,090	2,635	488	2,039,338
No Action Alternative	0	28,022	0	10,701	143	1,884,924	1,766	12,256	4,022	566	1,942,399
Difference	0	-2,261	0	-513	81	-100,396	519	4,166	1,386	79	-96,938
Percent Difference	0	-7	0	-5	131	-5	42	51	53	16	-5
Dry (22.5%)											
Second Basis of Comparison	0	30,519	0	4,444	1,218	1,978,615	19,975	9,486	14,827	982	2,060,065
No Action Alternative	0	28,946	0	5,999	570	1,894,042	21,850	17,140	16,111	835	1,985,493
Difference	0	-1,573	0	1,556	-648	-84,573	1,875	7,654	1,284	-147	-74,572
Percent Difference	0	-5	0	35	-53	-4	9	81	9	-15	-4
Critical (15%)											
Second Basis of Comparison	0	29,837	0	8,597	22,262	1,947,073	351,747	34,946	172,942	1,627	2,569,032
No Action Alternative	0	33,389	0	10,490	23,702	1,917,913	409,251	53,656	219,588	1,679	2,669,669
Difference	0	3,552	0	1,893	1,440	-29,160	57,504	18,710	46,646	52	100,637
Percent Difference	0	12	0	22	6	-1	16	54	27	3	4

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-2-21. Annual Potential Production for Late Fall-Run Chinook Salmon

Analysis Period	Annual Potential Production (# of Fish/year)
Long-term	
Full Simulation Period[1]	
Second Basis of Comparison	2,800,061
Alternative 3	2,812,234
Difference	12,173
Percent Difference[3]	0
Water Year Types[2]	
Wet (32.5%)	
Second Basis of Comparison	2,691,035
Alternative 3	2,691,402
Difference	367
Percent Difference	0
Above Normal (12.5%)	
Second Basis of Comparison	2,802,912
Alternative 3	2,810,515
Difference	7,603
Percent Difference	0
Below Normal (17.5%)	
Second Basis of Comparison	2,930,472
Alternative 3	2,961,353
Difference	30,881
Percent Difference	1
Dry (22.5%)	
Second Basis of Comparison	2,976,338
Alternative 3	3,012,660
Difference	36,322
Percent Difference	1
Critical (15%)	
Second Basis of Comparison	2,617,343
Alternative 3	2,600,856
Difference	-16,487
Percent Difference	-1

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the annual average

Table B-2-22. Annual Mortality by Life Stage for Late Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Eggs	Fry	Pre-Smolt	Immature-Smolt	Juvenile (Pre & Immature Smolt)
Long-term					
Full Simulation Period[1]					
Second Basis of Comparison	513,890	1,802,954	68,169	30,510	98,679
Alternative 3	517,818	1,792,455	66,941	28,700	95,641
Difference	3,928	-10,499	-1,228	-1,811	-3,038
Percent Difference[3]	1	-1	-2	-6	-3
Water Year Types[2]					
Wet (32.5%)					
Second Basis of Comparison	1,331,500	1,479,904	4,935	609	5,544
Alternative 3	1,334,935	1,484,912	3,275	536	3,812
Difference	3,434	5,008	-1,660	-72	-1,732
Percent Difference	0	0	-34	-12	-31
Above Normal (12.5%)					
Second Basis of Comparison	482,073	1,869,446	2,387	187	2,573
Alternative 3	504,894	1,838,570	2,383	216	2,598
Difference	22,822	-30,877	-4	29	25
Percent Difference	5	-2	0	15	1
Below Normal (17.5%)					
Second Basis of Comparison	41,496	1,985,382	9,337	3,123	12,460
Alternative 3	39,609	1,946,219	10,333	2,164	12,497
Difference	-1,887	-39,163	996	-959	37
Percent Difference	-5	-2	11	-31	0
Dry (22.5%)					
Second Basis of Comparison	34,962	1,979,833	29,461	15,809	45,270
Alternative 3	34,674	1,958,252	19,261	12,124	31,385
Difference	-288	-21,580	-10,200	-3,685	-13,885
Percent Difference	-1	-1	-35	-23	-31
Critical (15%)					
Second Basis of Comparison	38,435	1,969,335	386,693	174,569	561,262
Alternative 3	40,798	1,992,284	396,247	169,277	565,524
Difference	2,363	22,949	9,554	-5,292	4,262
Percent Difference	6	1	2	-3	1

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

5 Eggs mortality includes pre-spawn mortality

Table B-2-23. Annual Mortality by Cause for Late Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Temperature	Flow	Total
Long-term			
Full Simulation Period[1]			
Second Basis of Comparison	100,569	2,314,954	2,415,523
Alternative 3	96,645	2,309,269	2,405,915
Difference	-3,924	-5,685	-9,609
Percent Difference[3]	-4	0	0
Water Year Types[2]			
Wet (32.5%)			
Second Basis of Comparison	13,087	2,803,861	2,816,949
Alternative 3	13,133	2,810,525	2,823,658
Difference	45	6,664	6,710
Percent Difference	0	0	0
Above Normal (12.5%)			
Second Basis of Comparison	9,812	2,344,280	2,354,092
Alternative 3	6,036	2,340,026	2,346,062
Difference	-3,776	-4,254	-8,030
Percent Difference	-38	0	0
Below Normal (17.5%)			
Second Basis of Comparison	15,158	2,024,180	2,039,338
Alternative 3	13,519	1,984,806	1,998,326
Difference	-1,638	-39,374	-41,012
Percent Difference	-11	-2	-2
Dry (22.5%)			
Second Basis of Comparison	40,463	2,019,602	2,060,065
Alternative 3	27,396	1,996,915	2,024,311
Difference	-13,067	-22,686	-35,754
Percent Difference	-32	-1	-2
Critical (15%)			
Second Basis of Comparison	555,549	2,013,483	2,569,032
Alternative 3	553,950	2,044,656	2,598,606
Difference	-1,599	31,172	29,574
Percent Difference	0	2	1

1 Based on the 80-year simulation period.

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-2-24. Annual Mortality by Cause and Life Stage for Late Fall-Run Chinook Salmon

Analysis Period	Pre-Spawn Mortality	Annual Mortality[4] (# of Fish/year) Eggs Flow	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Juvenile Temperature	Juvenile Habitat	Total
Long-term								
Full Simulation Period[1]								
Second Basis of Comparison	0	504,586	9,304	3,662	1,799,292	87,603	11,076	2,415,523
Alternative 3	0	509,000	8,818	3,126	1,789,329	84,700	10,941	2,405,915
Difference	0	4,414	-485	-536	-9,963	-2,903	-136	-9,609
Percent Difference[3]	0	1	-5	-15	-1	-3	-1	0
Water Year Types[2]								
Wet (32.5%)								
Second Basis of Comparison	0	1,319,517	11,983	61	1,479,843	1,043	4,501	2,816,949
Alternative 3	0	1,322,789	12,146	61	1,484,851	927	2,885	2,823,658
Difference	0	3,272	162	0	5,008	-117	-1,616	6,710
Percent Difference	0	0	1	0	0	-11	-36	0
Above Normal (12.5%)								
Second Basis of Comparison	0	472,813	9,259	147	1,869,299	405	2,168	2,354,092
Alternative 3	0	499,275	5,619	31	1,838,539	386	2,212	2,346,062
Difference	0	26,462	-3,640	-117	-30,760	-19	44	-8,030
Percent Difference	0	6	-39	-79	-2	-5	2	0
Below Normal (17.5%)								
Second Basis of Comparison	0	30,282	11,214	62	1,985,320	3,882	8,578	2,039,338
Alternative 3	0	28,753	10,857	75	1,946,144	2,588	9,910	1,998,326
Difference	0	-1,530	-357	13	-39,176	-1,294	1,332	-41,012
Percent Difference	0	-5	-3	21	-2	-33	16	-2
Dry (22.5%)								
Second Basis of Comparison	0	30,519	4,444	1,218	1,978,615	34,802	10,468	2,060,065
Alternative 3	0	30,082	4,592	188	1,958,065	22,616	8,769	2,024,311
Difference	0	-437	149	-1,030	-20,551	-12,186	-1,699	-35,754
Percent Difference	0	-1	3	-85	-1	-35	-16	-2
Critical (15%)								
Second Basis of Comparison	0	29,837	8,597	22,262	1,947,073	524,689	36,573	2,569,032
Alternative 3	0	32,561	8,237	20,317	1,971,967	525,396	40,128	2,598,606
Difference	0	2,723	-360	-1,946	24,894	707	3,555	29,574
Percent Difference	0	9	-4	-9	1	0	10	1

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-2-25. Annual Mortality by All Factors for Late Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Pre-Spawn Mortality	Incubation	Super-imposition	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Pre-smolt - Temperature	Pre-smolt - Habitat	Smolt - Temperature	Smolt - Habitat	Total
Long-term											
Full Simulation Period[1]											
Second Basis of Comparison	0	171,160	333,426	9,304	3,662	1,799,292	57,690	10,479	29,913	597	2,415,523
Alternative 3	0	171,685	337,315	8,818	3,126	1,789,329	56,543	10,398	28,158	542	2,405,915
Difference	0	525	3,889	-485	-536	-9,963	-1,147	-80	-1,755	-55	-9,609
Percent Difference[3]	0	0	1	-5	-15	-1	-2	-1	-6	-9	0
Water Year Types[2]											
Wet (32.5%)											
Second Basis of Comparison	0	464,856	854,662	11,983	61	1,479,843	549	4,386	494	114	2,816,949
Alternative 3	0	466,004	856,785	12,146	61	1,484,851	516	2,759	411	126	2,823,658
Difference	0	1,149	2,123	162	0	5,008	-33	-1,627	-84	11	6,710
Percent Difference	0	0	0	1	0	0	-6	-37	-17	10	0
Above Normal (12.5%)											
Second Basis of Comparison	0	27,524	445,289	9,259	147	1,869,299	297	2,089	108	79	2,354,092
Alternative 3	0	28,397	470,878	5,619	31	1,838,539	296	2,087	90	125	2,346,062
Difference	0	873	25,589	-3,640	-117	-30,760	-1	-3	-18	47	-8,030
Percent Difference	0	3	6	-39	-79	-2	0	0	-17	60	0
Below Normal (17.5%)											
Second Basis of Comparison	0	30,282	0	11,214	62	1,985,320	1,247	8,090	2,635	488	2,039,338
Alternative 3	0	28,753	0	10,857	75	1,946,144	823	9,510	1,765	400	1,998,326
Difference	0	-1,530	0	-357	13	-39,176	-424	1,420	-871	-88	-41,012
Percent Difference	0	-5	0	-3	21	-2	-34	18	-33	-18	-2
Dry (22.5%)											
Second Basis of Comparison	0	30,519	0	4,444	1,218	1,978,615	19,975	9,486	14,827	982	2,060,065
Alternative 3	0	30,082	0	4,592	188	1,958,065	11,401	7,860	11,215	909	2,024,311
Difference	0	-437	0	149	-1,030	-20,551	-8,574	-1,626	-3,612	-73	-35,754
Percent Difference	0	-1	0	3	-85	-1	-43	-17	-24	-7	-2
Critical (15%)											
Second Basis of Comparison	0	29,837	0	8,597	22,262	1,947,073	351,747	34,946	172,942	1,627	2,569,032
Alternative 3	0	32,561	0	8,237	20,317	1,971,967	357,527	38,720	167,870	1,408	2,598,606
Difference	0	2,723	0	-360	-1,946	24,894	5,780	3,774	-5,072	-219	29,574
Percent Difference	0	9	0	-4	-9	1	2	11	-3	-13	1

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-2-26. Annual Potential Production for Late Fall-Run Chinook Salmon

Analysis Period	Annual Potential Production (# of Fish/year)
Long-term	
Full Simulation Period[1]	
Second Basis of Comparison	2,800,061
Alternative 5	2,805,566
Difference	5,506
Percent Difference[3]	0
Water Year Types[2]	
Wet (32.5%)	
Second Basis of Comparison	2,691,035
Alternative 5	2,700,194
Difference	9,159
Percent Difference	0
Above Normal (12.5%)	
Second Basis of Comparison	2,802,912
Alternative 5	2,829,088
Difference	26,176
Percent Difference	1
Below Normal (17.5%)	
Second Basis of Comparison	2,930,472
Alternative 5	2,951,992
Difference	21,520
Percent Difference	1
Dry (22.5%)	
Second Basis of Comparison	2,976,338
Alternative 5	3,004,835
Difference	28,497
Percent Difference	1
Critical (15%)	
Second Basis of Comparison	2,617,343
Alternative 5	2,544,537
Difference	-72,807
Percent Difference	-3

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the annual average

Table B-2-27. Annual Mortality by Life Stage for Late Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Eggs	Fry	Pre-Smolt	Immature-Smolt	Juvenile (Pre & Immature Smolt)
Long-term					
Full Simulation Period[1]					
Second Basis of Comparison	513,890	1,802,954	68,169	30,510	98,679
Alternative 5	486,679	1,779,342	78,549	38,177	116,726
Difference	-27,211	-23,612	10,380	7,667	18,047
Percent Difference[3]	-5	-1	15	25	18
Water Year Types[2]					
Wet (32.5%)					
Second Basis of Comparison	1,331,500	1,479,904	4,935	609	5,544
Alternative 5	1,284,631	1,490,907	4,027	74	4,101
Difference	-46,869	11,003	-909	-535	-1,443
Percent Difference	-4	1	-18	-88	-26
Above Normal (12.5%)					
Second Basis of Comparison	482,073	1,869,446	2,387	187	2,573
Alternative 5	385,985	1,859,656	1,357	82	1,439
Difference	-96,087	-9,790	-1,030	-105	-1,134
Percent Difference	-20	-1	-43	-56	-44
Below Normal (17.5%)					
Second Basis of Comparison	41,496	1,985,382	9,337	3,123	12,460
Alternative 5	39,141	1,943,539	13,998	4,481	18,480
Difference	-2,355	-41,843	4,662	1,358	6,020
Percent Difference	-6	-2	50	43	48
Dry (22.5%)					
Second Basis of Comparison	34,962	1,979,833	29,461	15,809	45,270
Alternative 5	34,298	1,930,739	31,905	14,697	46,602
Difference	-664	-49,093	2,444	-1,112	1,332
Percent Difference	-2	-2	8	-7	3
Critical (15%)					
Second Basis of Comparison	38,435	1,969,335	386,693	174,569	561,262
Alternative 5	42,394	1,918,694	449,617	227,011	676,628
Difference	3,960	-50,641	62,924	52,442	115,365
Percent Difference	10	-3	16	30	21

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

5 Eggs mortality includes pre-spawn mortality

Table B-2-28. Annual Mortality by Cause for Late Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Temperature	Flow	Total
Long-term			
Full Simulation Period[1]			
Second Basis of Comparison	100,569	2,314,954	2,415,523
Alternative 5	115,323	2,267,424	2,382,747
Difference	14,754	-47,530	-32,776
Percent Difference[3]	15	-2	-1
Water Year Types[2]			
Wet (32.5%)			
Second Basis of Comparison	13,087	2,803,861	2,816,949
Alternative 5	11,470	2,768,169	2,779,639
Difference	-1,617	-35,692	-37,310
Percent Difference	-12	-1	-1
Above Normal (12.5%)			
Second Basis of Comparison	9,812	2,344,280	2,354,092
Alternative 5	9,777	2,237,304	2,247,081
Difference	-35	-106,977	-107,012
Percent Difference	0	-5	-5
Below Normal (17.5%)			
Second Basis of Comparison	15,158	2,024,180	2,039,338
Alternative 5	16,938	1,984,222	2,001,160
Difference	1,780	-39,958	-38,178
Percent Difference	12	-2	-2
Dry (22.5%)			
Second Basis of Comparison	40,463	2,019,602	2,060,065
Alternative 5	40,257	1,971,382	2,011,639
Difference	-206	-48,219	-48,426
Percent Difference	-1	-2	-2
Critical (15%)			
Second Basis of Comparison	555,549	2,013,483	2,569,032
Alternative 5	655,672	1,982,044	2,637,716
Difference	100,123	-31,439	68,684
Percent Difference	18	-2	3

1 Based on the 80-year simulation period.

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-2-29. Annual Mortality by Cause and Life Stage for Late Fall-Run Chinook Salmon

Analysis Period	Pre-Spawn Mortality	Annual Mortality[4] (# of Fish/year) Eggs Flow	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Juvenile Temperature	Juvenile Habitat	Total
Long-term								
Full Simulation Period[1]								
Second Basis of Comparison	0	504,586	9,304	3,662	1,799,292	87,603	11,076	2,415,523
Alternative 5	0	476,778	9,902	2,705	1,776,637	102,717	14,010	2,382,747
Difference	0	-27,809	598	-958	-22,655	15,114	2,934	-32,776
Percent Difference[3]	0	-6	6	-26	-1	17	26	-1
Water Year Types[2]								
Wet (32.5%)								
Second Basis of Comparison	0	1,319,517	11,983	61	1,479,843	1,043	4,501	2,816,949
Alternative 5	0	1,273,245	11,386	61	1,490,847	24	4,077	2,779,639
Difference	0	-46,272	-597	0	11,003	-1,020	-424	-37,310
Percent Difference	0	-4	-5	-1	1	-98	-9	-1
Above Normal (12.5%)								
Second Basis of Comparison	0	472,813	9,259	147	1,869,299	405	2,168	2,354,092
Alternative 5	0	376,400	9,586	142	1,859,515	50	1,389	2,247,081
Difference	0	-96,413	326	-6	-9,784	-355	-779	-107,012
Percent Difference	0	-20	4	-4	-1	-88	-36	-5
Below Normal (17.5%)								
Second Basis of Comparison	0	30,282	11,214	62	1,985,320	3,882	8,578	2,039,338
Alternative 5	0	28,128	11,014	147	1,943,392	5,777	12,702	2,001,160
Difference	0	-2,155	-200	85	-41,928	1,896	4,124	-38,178
Percent Difference	0	-7	-2	137	-2	49	48	-2
Dry (22.5%)								
Second Basis of Comparison	0	30,519	4,444	1,218	1,978,615	34,802	10,468	2,060,065
Alternative 5	0	28,043	6,255	761	1,929,979	33,241	13,361	2,011,639
Difference	0	-2,476	1,812	-457	-48,637	-1,561	2,893	-48,426
Percent Difference	0	-8	41	-38	-2	-4	28	-2
Critical (15%)								
Second Basis of Comparison	0	29,837	8,597	22,262	1,947,073	524,689	36,573	2,569,032
Alternative 5	0	31,273	11,121	16,469	1,902,225	628,081	48,546	2,637,716
Difference	0	1,436	2,524	-5,793	-44,848	103,392	11,973	68,684
Percent Difference	0	5	29	-26	-2	20	33	3

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-2-30. Annual Mortality by All Factors for Late Fall-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Pre-Spawn Mortality	Incubation	Super-imposition	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Pre-smolt - Temperature	Pre-smolt - Habitat	Smolt - Temperature	Smolt - Habitat	Total
Long-term											
Full Simulation Period[1]											
Second Basis of Comparison	0	171,160	333,426	9,304	3,662	1,799,292	57,690	10,479	29,913	597	2,415,523
Alternative 5	0	170,227	306,551	9,902	2,705	1,776,637	65,089	13,460	37,628	549	2,382,747
Difference	0	-933	-26,876	598	-958	-22,655	7,399	2,982	7,715	-48	-32,776
Percent Difference[3]	0	-1	-8	6	-26	-1	13	28	26	-8	-1
Water Year Types[2]											
Wet (32.5%)											
Second Basis of Comparison	0	464,856	854,662	11,983	61	1,479,843	549	4,386	494	114	2,816,949
Alternative 5	0	465,569	807,677	11,386	61	1,490,847	18	4,009	6	68	2,779,639
Difference	0	713	-46,985	-597	0	11,003	-531	-378	-489	-46	-37,310
Percent Difference	0	0	-5	-5	-1	1	-97	-9	-99	-40	-1
Above Normal (12.5%)											
Second Basis of Comparison	0	27,524	445,289	9,259	147	1,869,299	297	2,089	108	79	2,354,092
Alternative 5	0	23,955	352,445	9,586	142	1,859,515	32	1,325	18	64	2,247,081
Difference	0	-3,569	-92,844	326	-6	-9,784	-265	-765	-90	-14	-107,012
Percent Difference	0	-13	-21	4	-4	-1	-89	-37	-84	-18	-5
Below Normal (17.5%)											
Second Basis of Comparison	0	30,282	0	11,214	62	1,985,320	1,247	8,090	2,635	488	2,039,338
Alternative 5	0	28,128	0	11,014	147	1,943,392	1,852	12,147	3,925	556	2,001,160
Difference	0	-2,155	0	-200	85	-41,928	605	4,056	1,290	68	-38,178
Percent Difference	0	-7	0	-2	137	-2	49	50	49	14	-2
Dry (22.5%)											
Second Basis of Comparison	0	30,519	0	4,444	1,218	1,978,615	19,975	9,486	14,827	982	2,060,065
Alternative 5	0	28,043	0	6,255	761	1,929,979	19,310	12,595	13,932	766	2,011,639
Difference	0	-2,476	0	1,812	-457	-48,637	-665	3,109	-896	-216	-48,426
Percent Difference	0	-8	0	41	-38	-2	-3	33	-6	-22	-2
Critical (15%)											
Second Basis of Comparison	0	29,837	0	8,597	22,262	1,947,073	351,747	34,946	172,942	1,627	2,569,032
Alternative 5	0	31,273	0	11,121	16,469	1,902,225	402,734	46,883	225,348	1,663	2,637,716
Difference	0	1,436	0	2,524	-5,793	-44,848	50,987	11,937	52,405	36	68,684
Percent Difference	0	5	0	29	-26	-2	14	34	30	2	3

1 Based on the 80-year simulation period

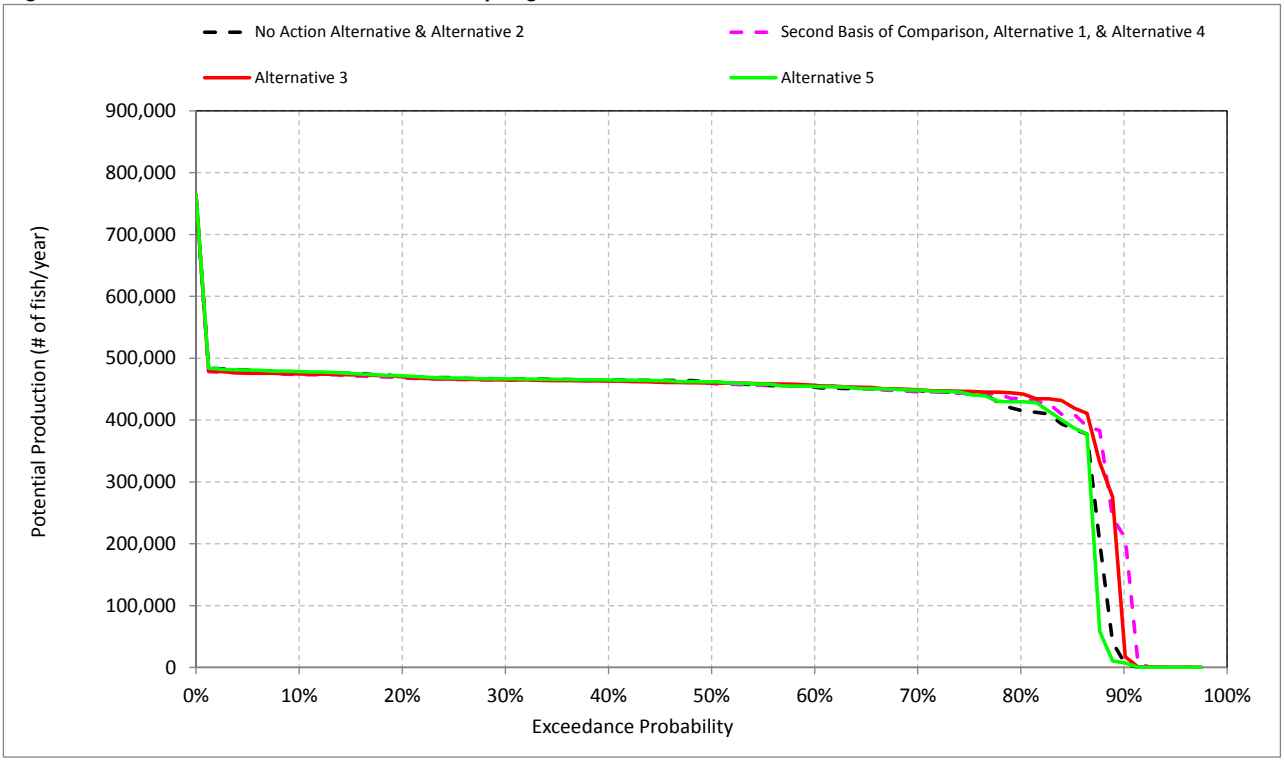
2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

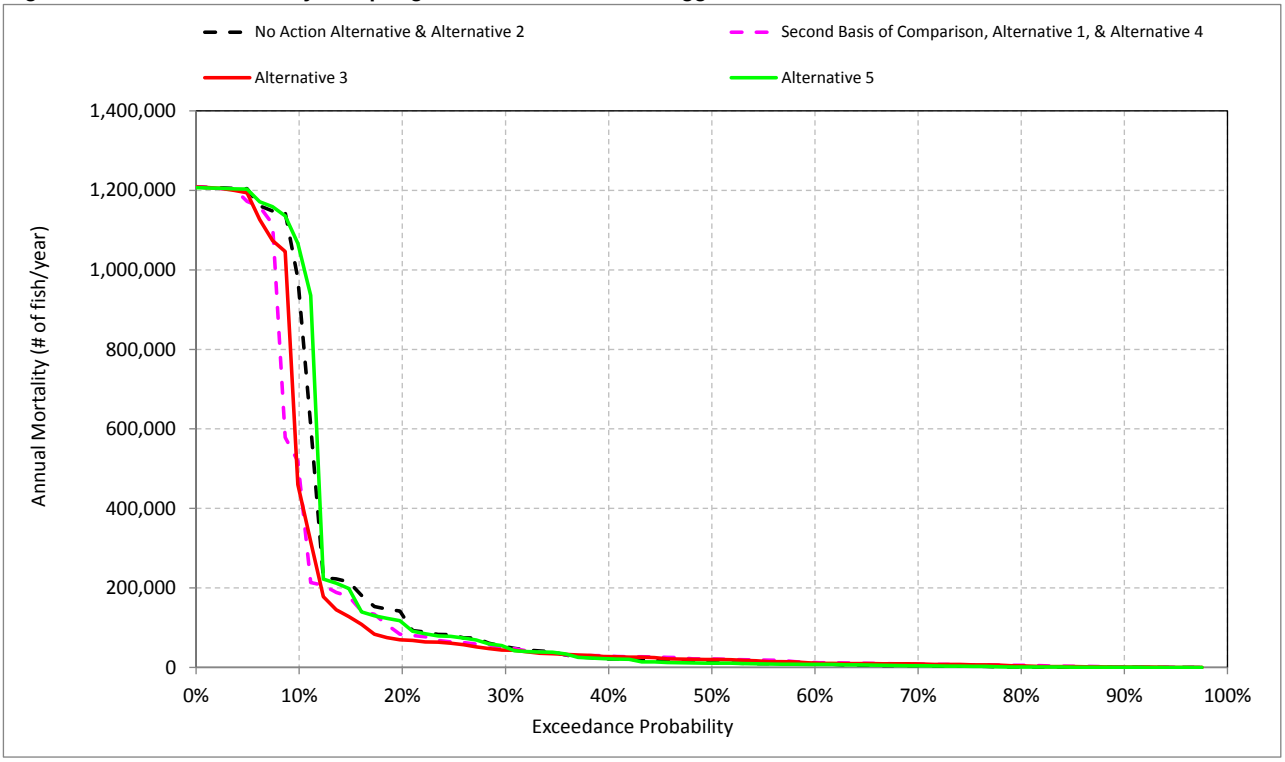
B.3. Spring-Run Chinook Salmon

Figure B-3-1. Annual Potential Production for Spring-Run Chinook Salmon



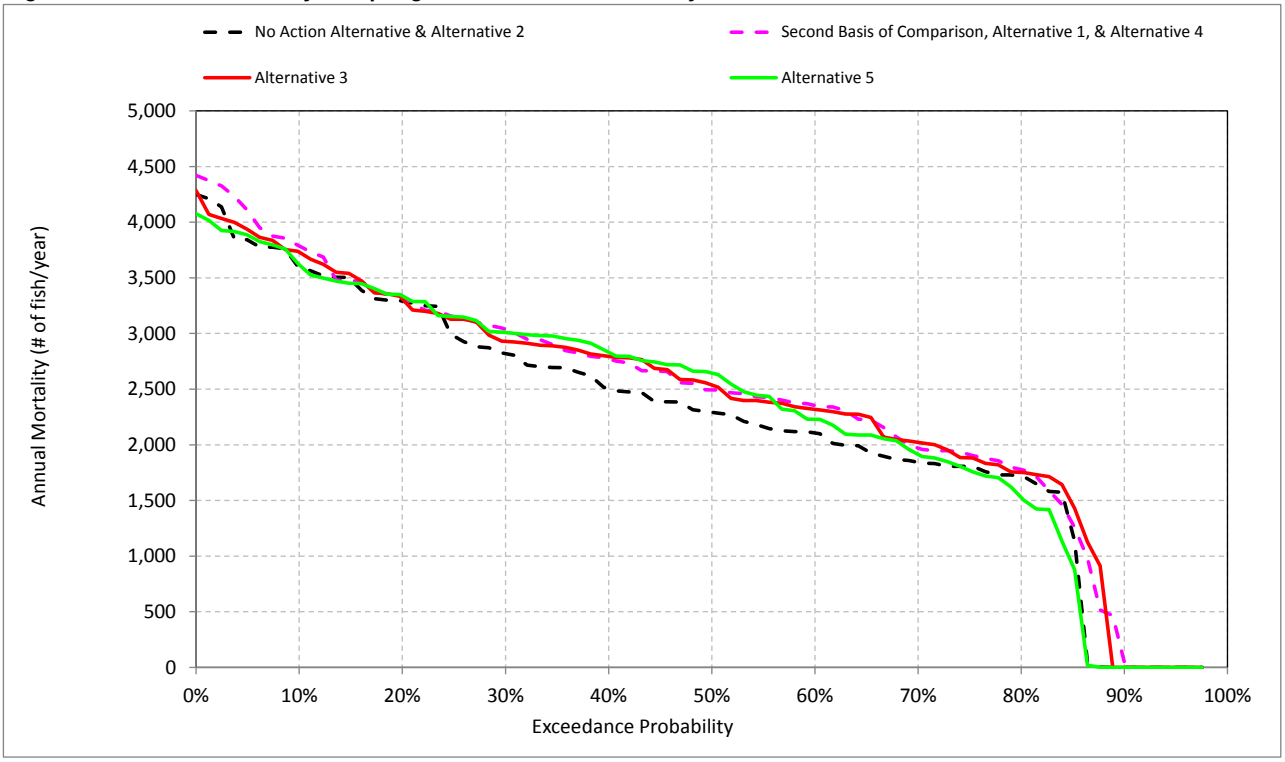
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-3-2. Annual Mortality for Spring-Run Chinook Salmon - Eggs



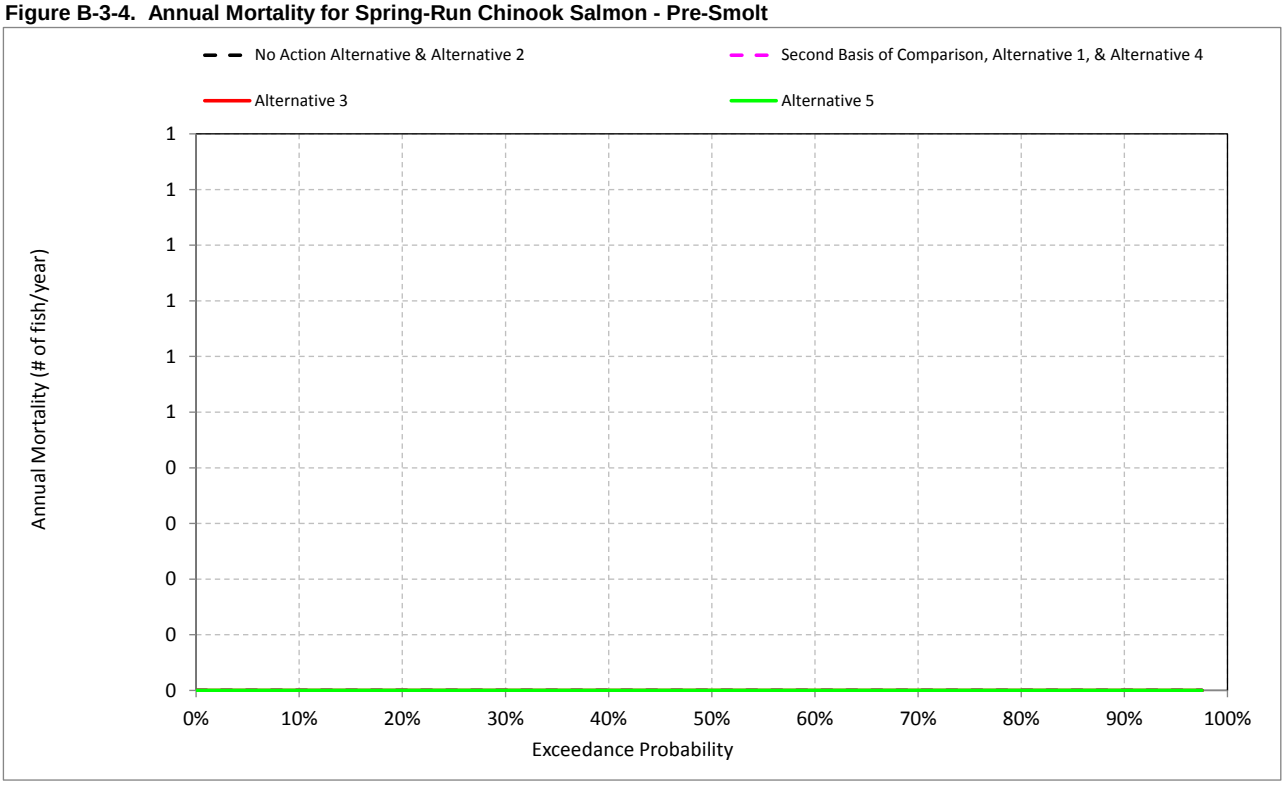
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

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



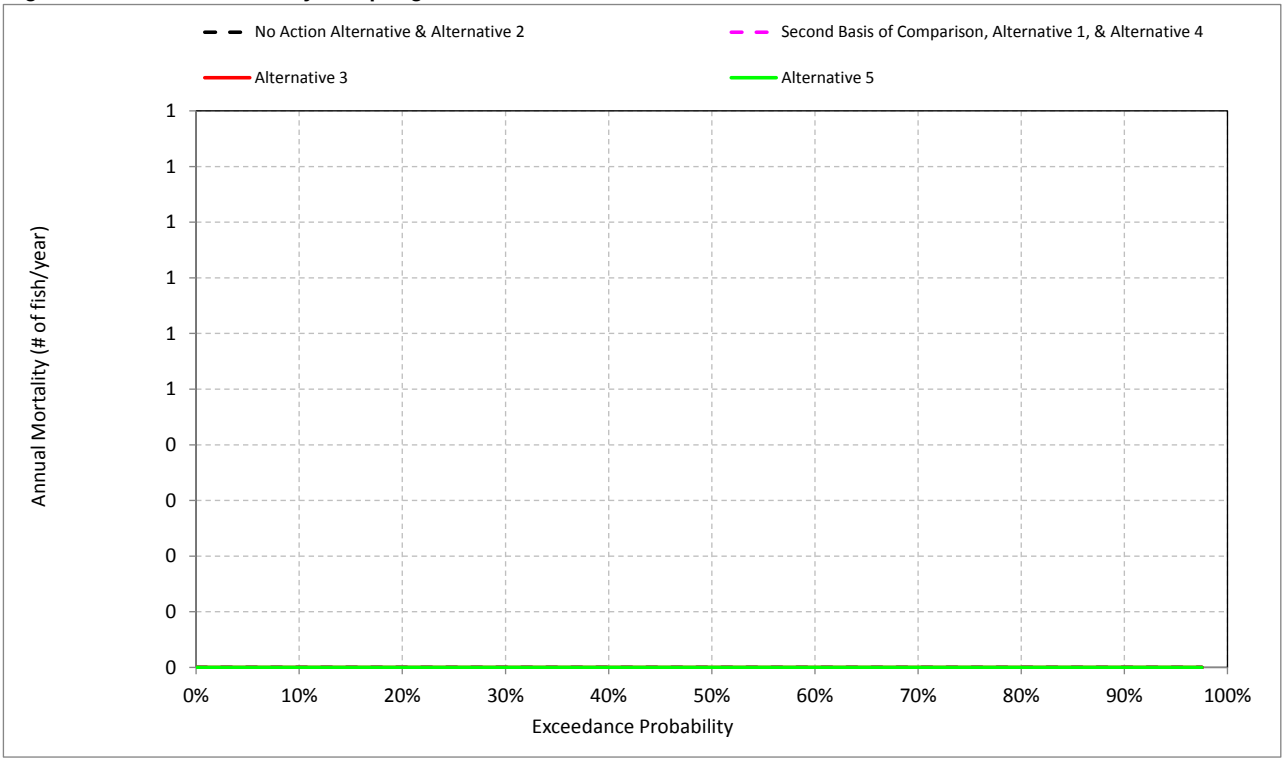
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-3-4. Annual Mortality for Spring-Run Chinook Salmon - Pre-Smolt



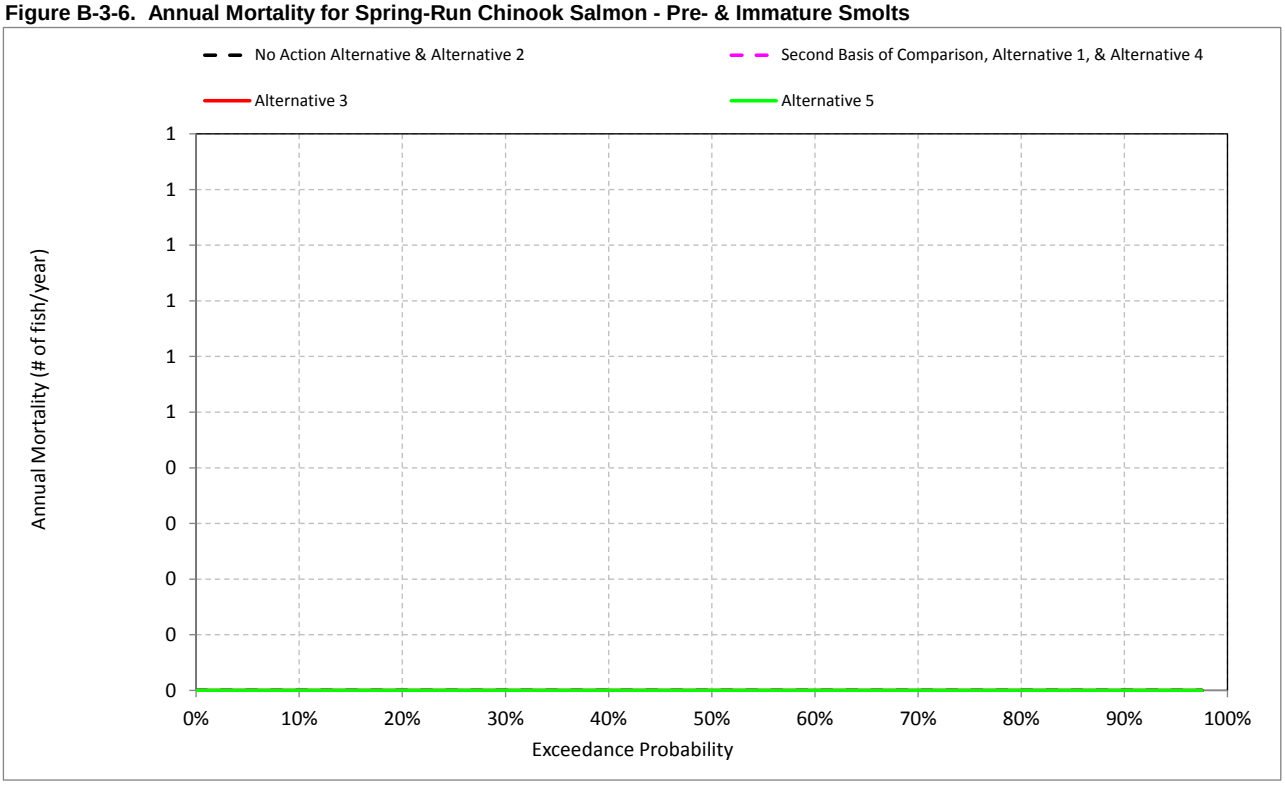
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-3-5. Annual Mortality for Spring-Run Chinook Salmon - Immature Smolt



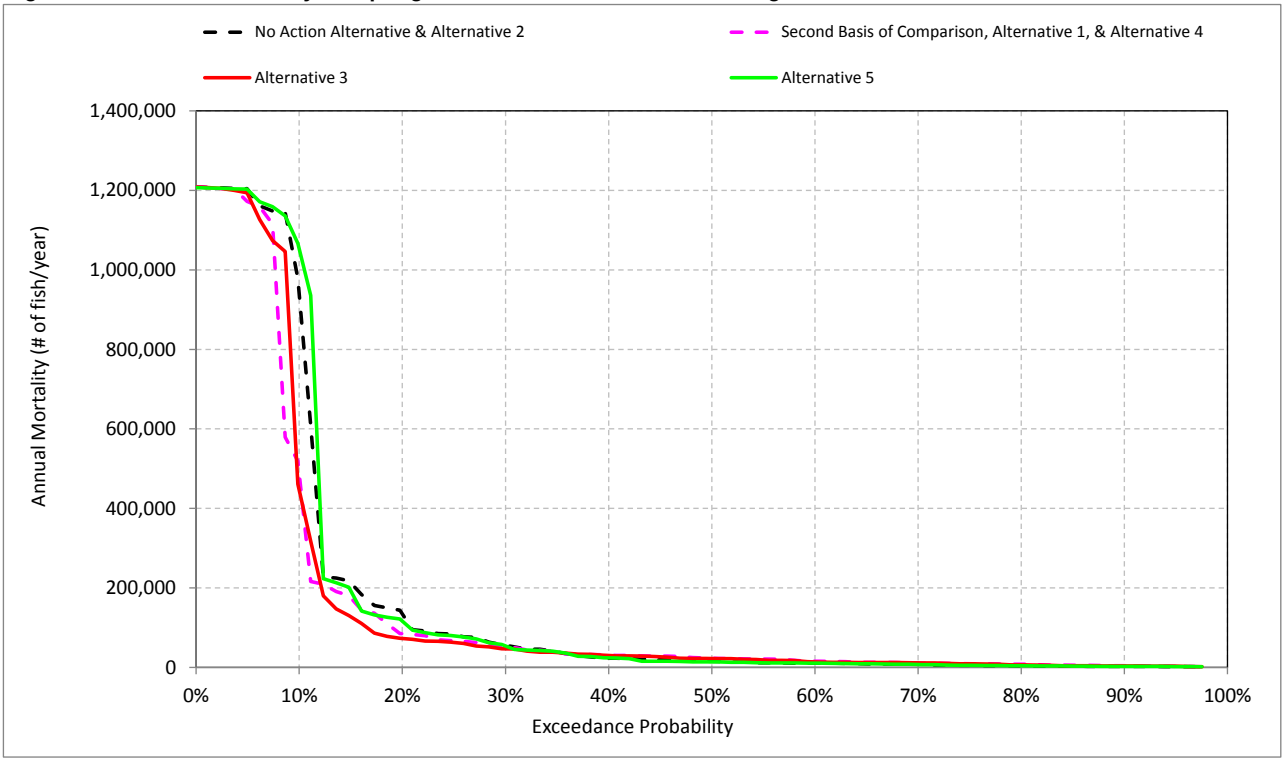
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-3-6. Annual Mortality for Spring-Run Chinook Salmon - Pre- & Immature Smolts



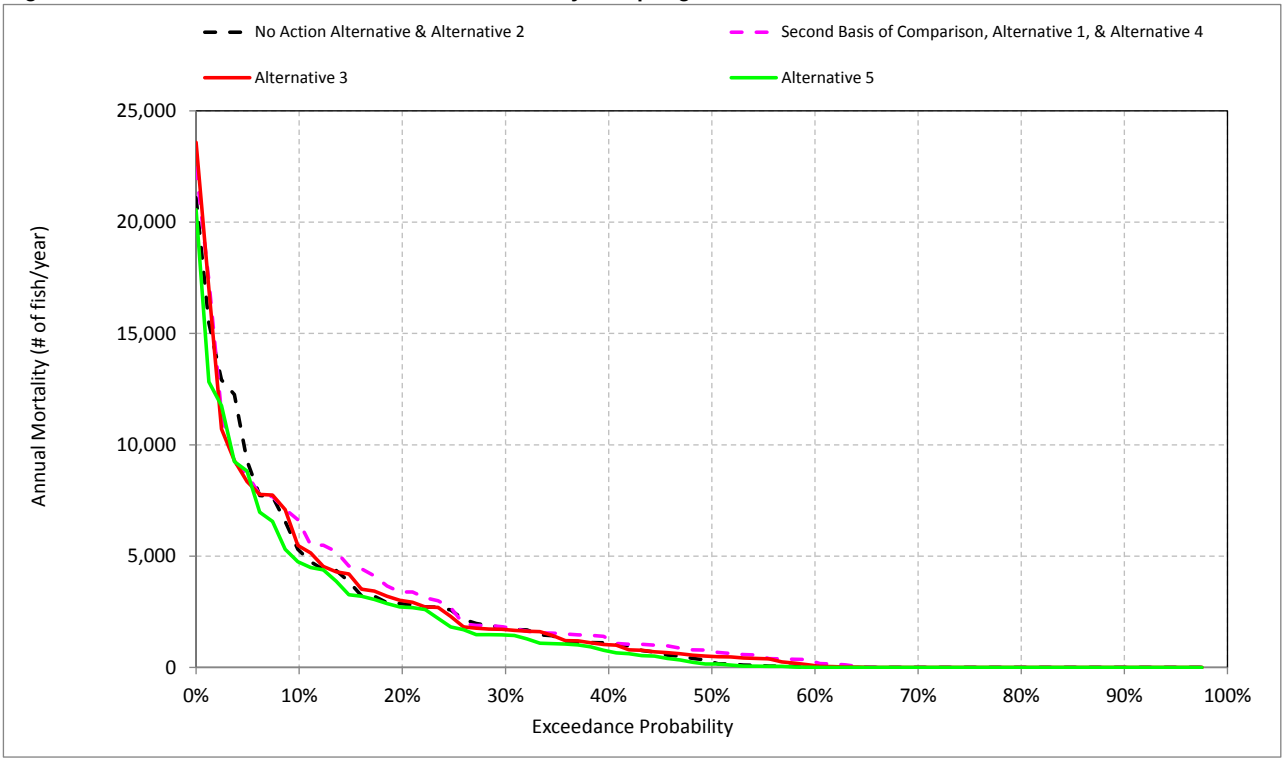
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-3-7. Annual Mortality for Spring-Run Chinook Salmon - All Lifestages



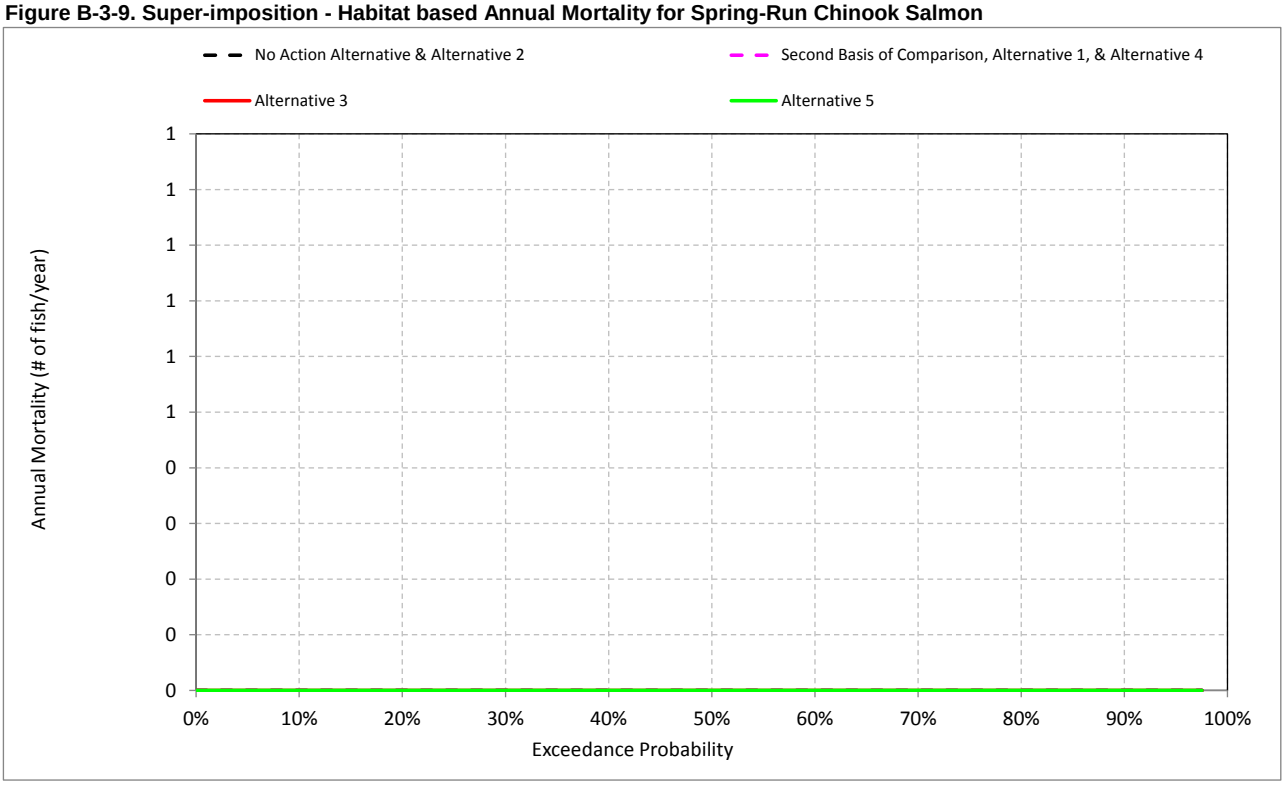
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-3-8. Incubation - Habitat based Annual Mortality for Spring-Run Chinook Salmon



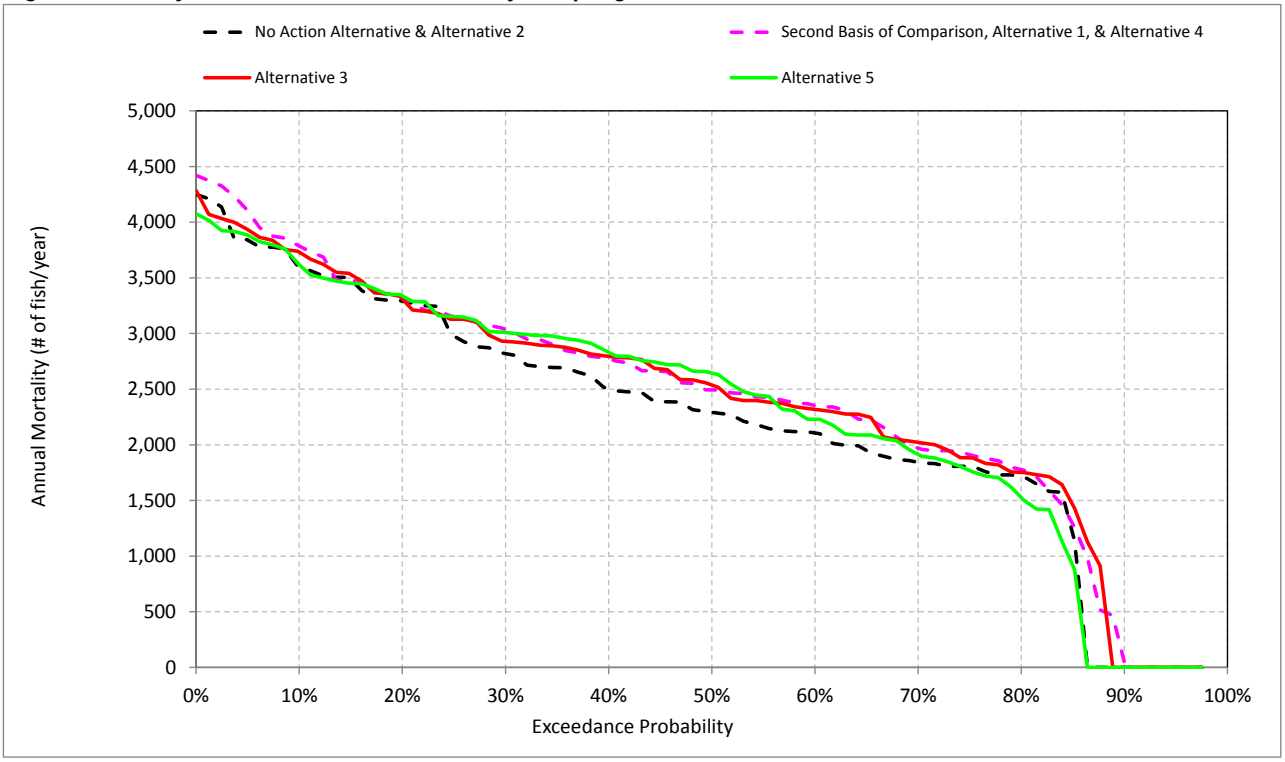
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-3-9. Super-imposition - Habitat based Annual Mortality for Spring-Run Chinook Salmon



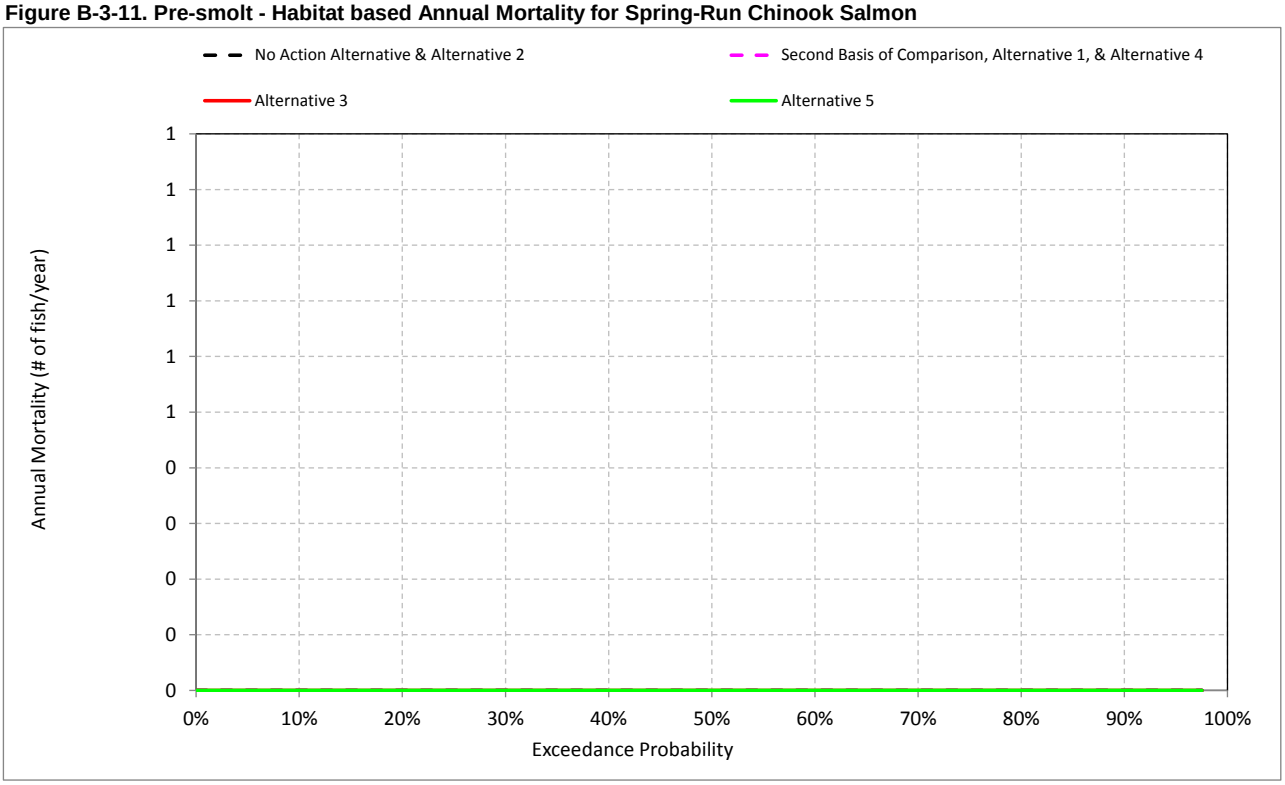
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-3-10. Fry - Habitat based Annual Mortality for Spring-Run Chinook Salmon



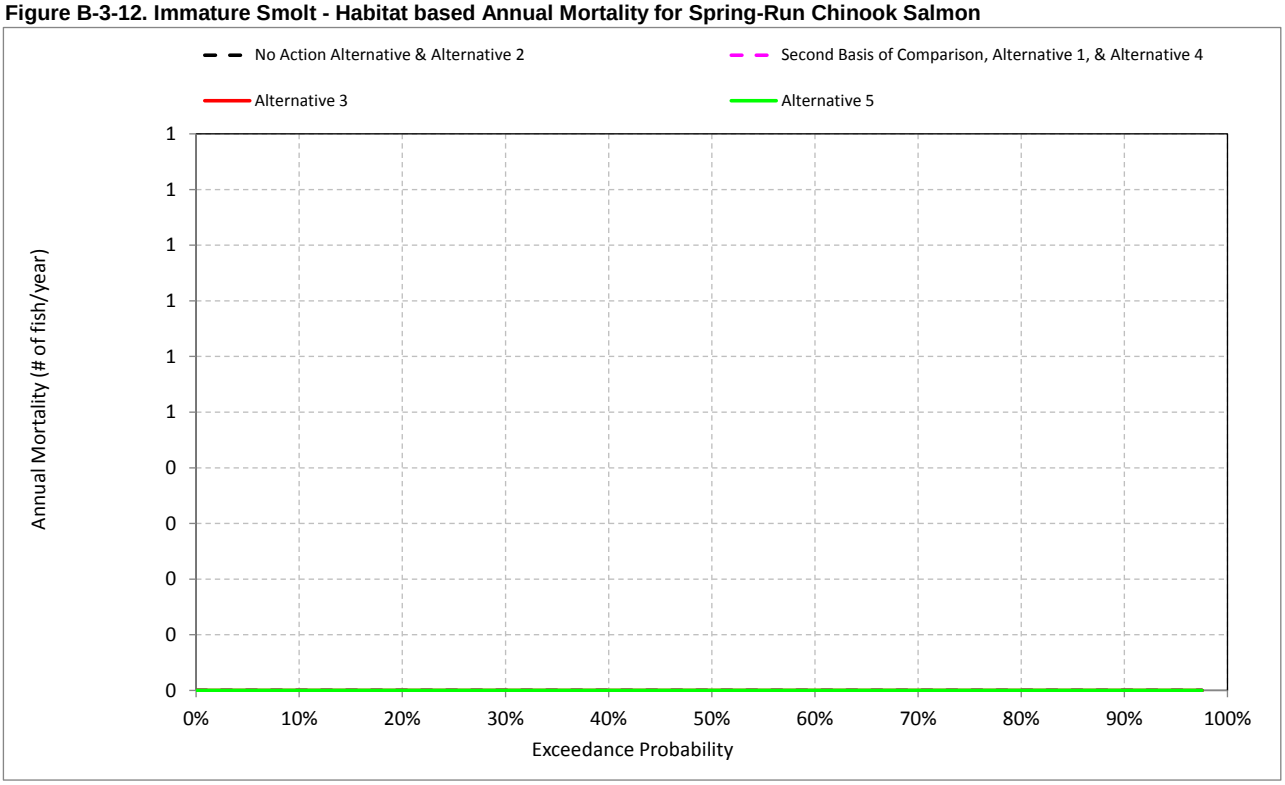
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-3-11. Pre-smolt - Habitat based Annual Mortality for Spring-Run Chinook Salmon



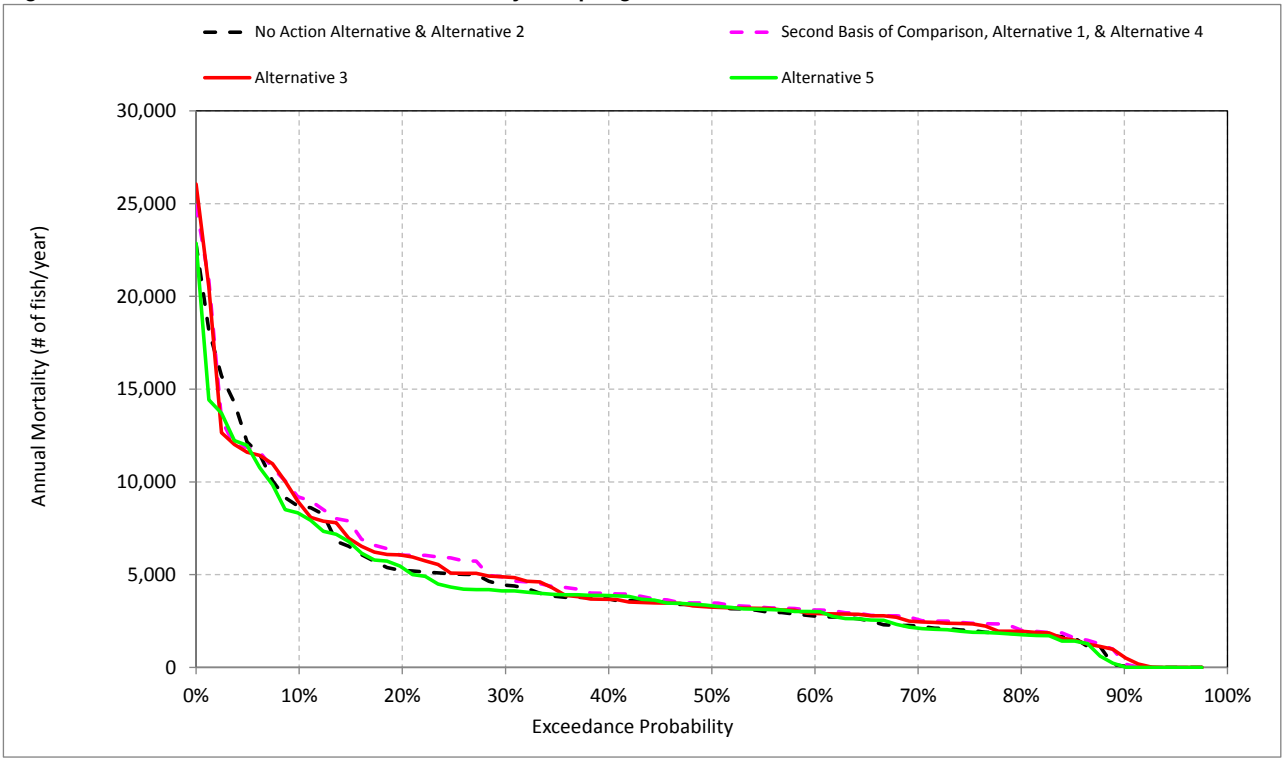
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-3-12. Immature Smolt - Habitat based Annual Mortality for Spring-Run Chinook Salmon



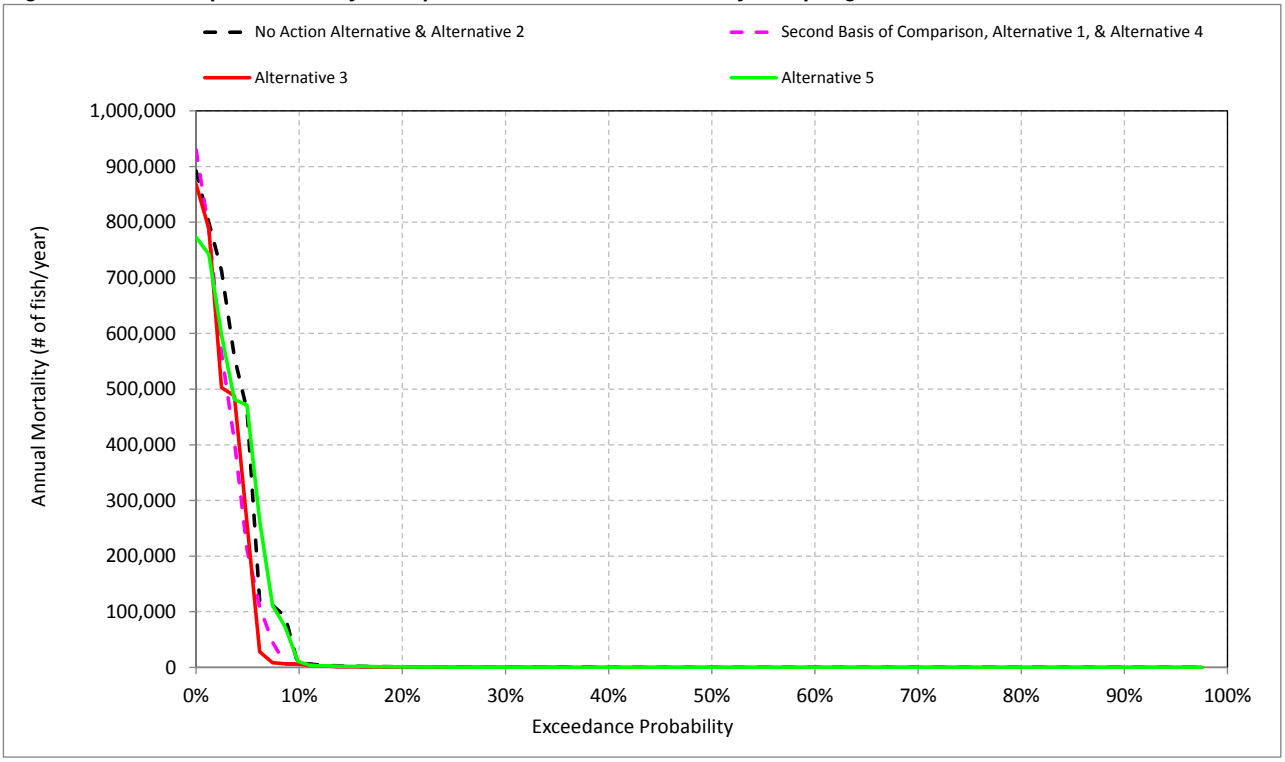
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-3-13. Total Habitat based Annual Mortality for Spring-Run Chinook Salmon



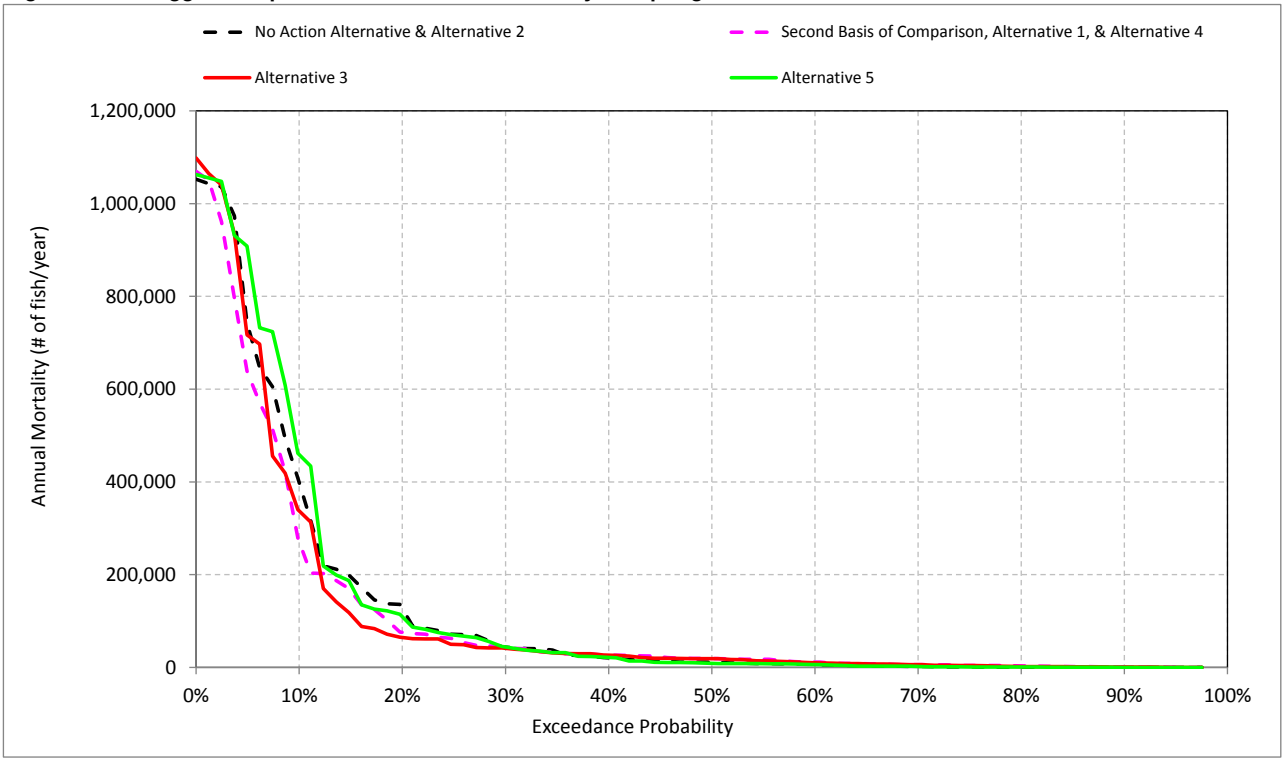
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-3-14. Pre-Spawn Mortality - Temperature based Annual Mortality for Spring-Run Chinook Salmon



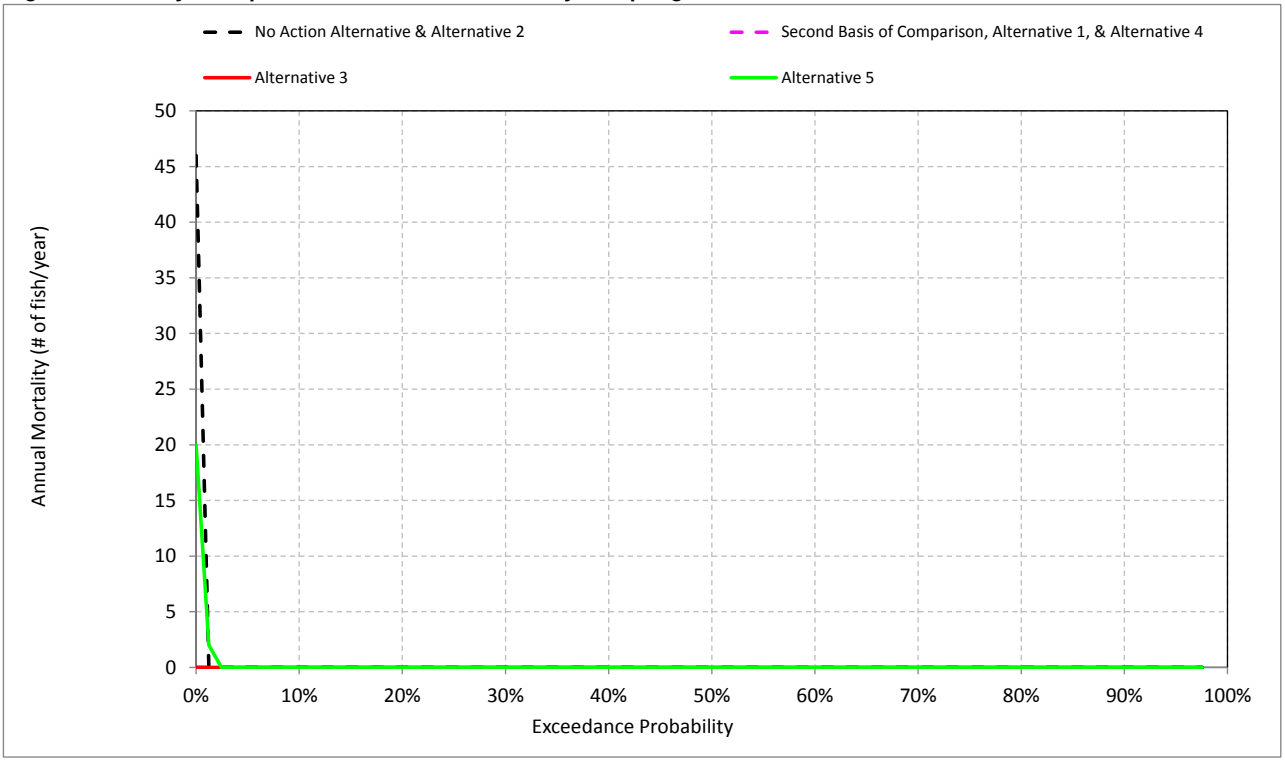
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-3-15. Eggs - Temperature based Annual Mortality for Spring-Run Chinook Salmon



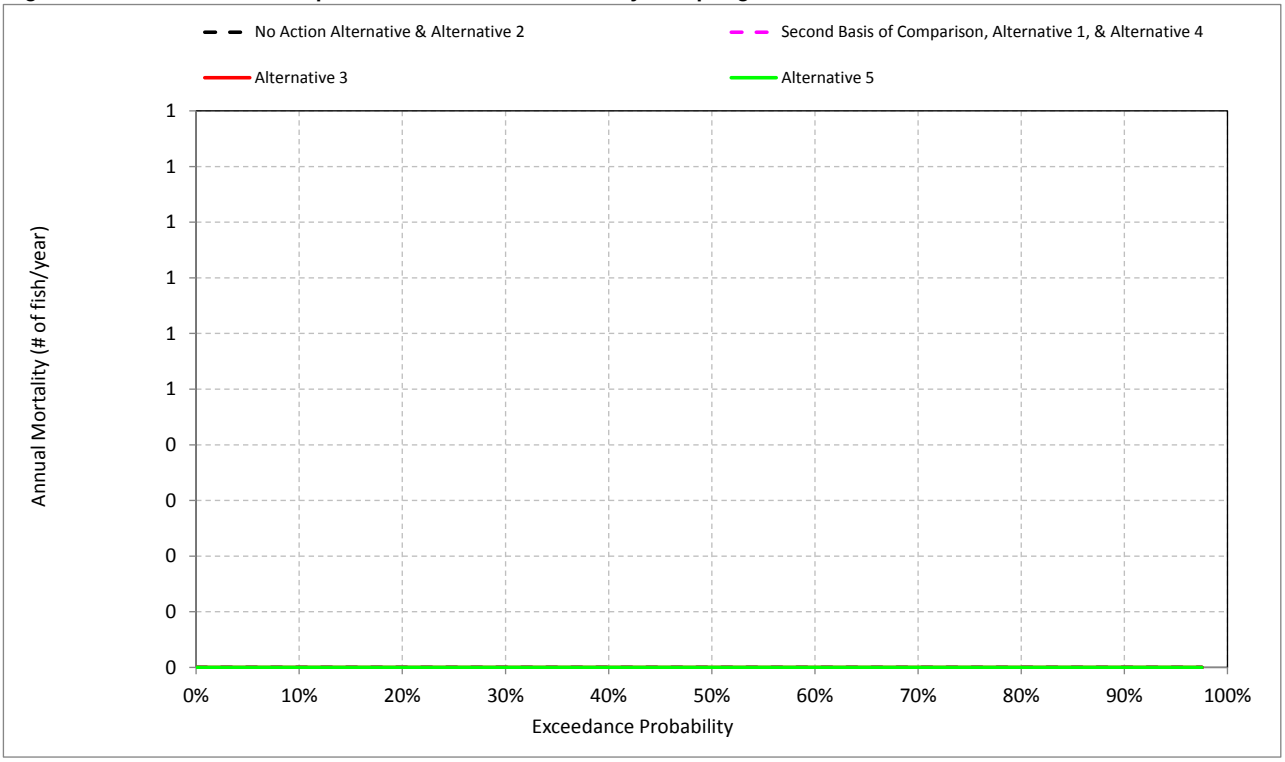
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-3-16. Fry - Temperature based Annual Mortality for Spring-Run Chinook Salmon



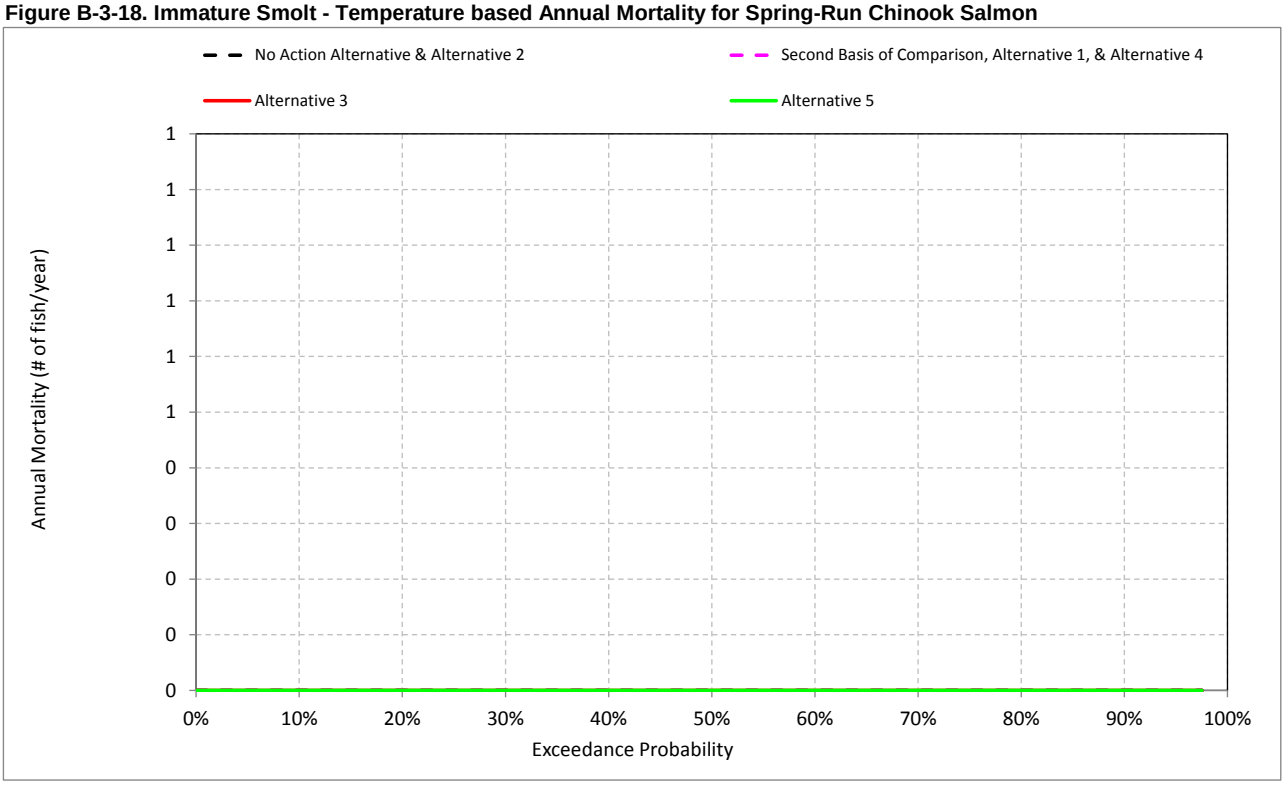
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-3-17. Pre-smolt - Temperature based Annual Mortality for Spring-Run Chinook Salmon



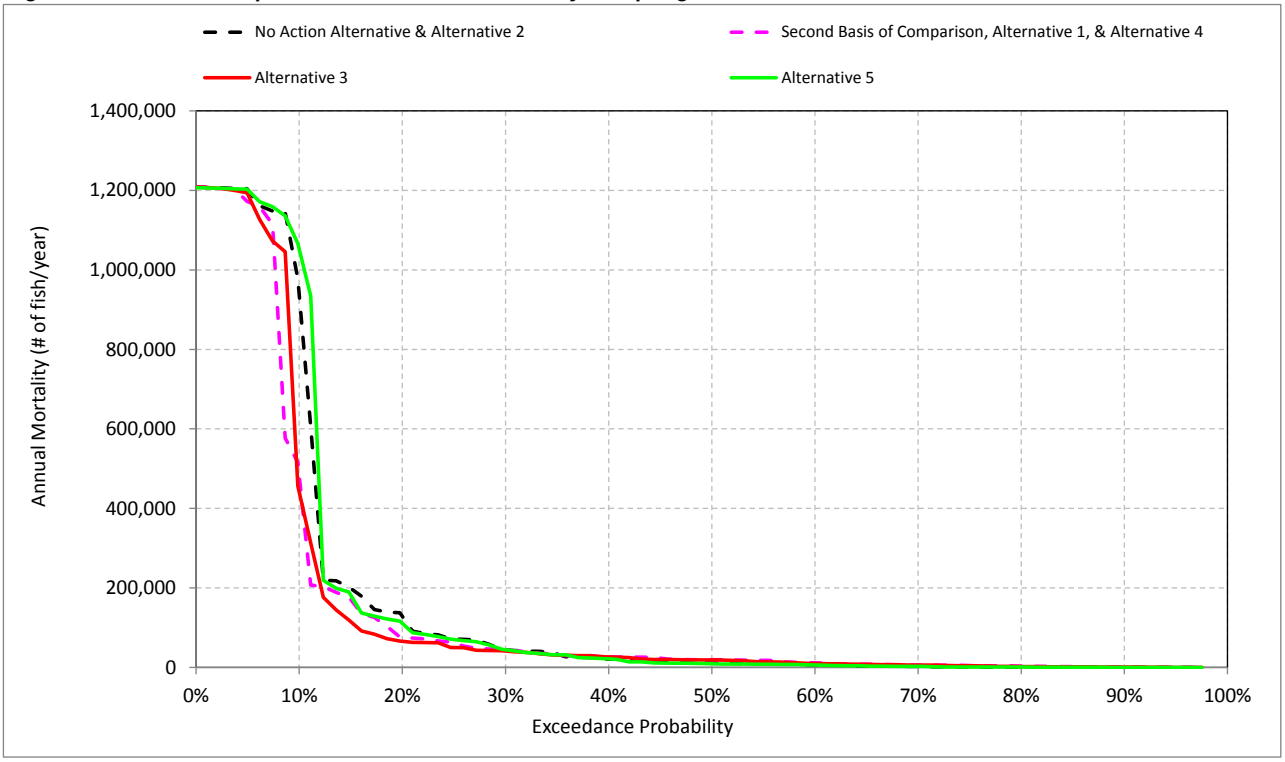
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-3-18. Immature Smolt - Temperature based Annual Mortality for Spring-Run Chinook Salmon



Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-3-19. Total Temperature based Annual Mortality for Spring-Run Chinook Salmon



Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Table B-3-1. Annual Potential Production for Spring-Run Chinook Salmon

Analysis Period	Annual Potential Production (# of Fish/year)
Long-term	
Full Simulation Period[1]	
No Action Alternative	402,980
Alternative 1	410,722
Difference	7,742
Percent Difference[3]	2
Water Year Types[2]	
Wet (32.5%)	
No Action Alternative	442,676
Alternative 1	449,832
Difference	7,156
Percent Difference	2
Above Normal (12.5%)	
No Action Alternative	362,537
Alternative 1	367,591
Difference	5,054
Percent Difference	1
Below Normal (17.5%)	
No Action Alternative	428,569
Alternative 1	426,491
Difference	-2,078
Percent Difference	0
Dry (22.5%)	
No Action Alternative	405,967
Alternative 1	403,012
Difference	-2,955
Percent Difference	-1
Critical (15%)	
No Action Alternative	316,344
Alternative 1	355,097
Difference	38,753
Percent Difference	12

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the annual average

Table B-3-2. Annual Mortality by Life Stage for Spring-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Eggs	Fry	Pre-Smolt	Immature-Smolt	Juvenile (Pre & Immature Smolt)
Long-term					
Full Simulation Period[1]					
No Action Alternative	169,230	2,282	0	0	0
Alternative 1	149,155	2,453	0	0	0
Difference	-20,075	171	0	0	0
Percent Difference[3]	-12	7	0	0	0
Water Year Types[2]					
Wet (32.5%)					
No Action Alternative	54,929	2,217	0	0	0
Alternative 1	38,874	2,303	0	0	0
Difference	-16,055	86	0	0	0
Percent Difference	-29	4	0	0	0
Above Normal (12.5%)					
No Action Alternative	275,059	1,955	0	0	0
Alternative 1	256,999	2,360	0	0	0
Difference	-18,059	406	0	0	0
Percent Difference	-7	21	0	0	0
Below Normal (17.5%)					
No Action Alternative	108,811	2,619	0	0	0
Alternative 1	110,617	2,763	0	0	0
Difference	1,806	144	0	0	0
Percent Difference	2	5	0	0	0
Dry (22.5%)					
No Action Alternative	170,290	2,608	0	0	0
Alternative 1	175,971	2,682	0	0	0
Difference	5,681	73	0	0	0
Percent Difference	3	3	0	0	0
Critical (15%)					
No Action Alternative	397,589	1,814	0	0	0
Alternative 1	302,962	2,151	0	0	0
Difference	-94,627	337	0	0	0
Percent Difference	-24	19	0	0	0

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

5 Eggs mortality includes pre-spawn mortality

Table B-3-3. Annual Mortality by Cause for Spring-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Temperature	Flow	Total
Long-term			
Full Simulation Period[1]			
No Action Alternative	167,192	4,321	171,512
Alternative 1	146,922	4,686	151,608
Difference	-20,270	366	-19,904
Percent Difference[3]	-12	8	-12
Water Year Types[2]			
Wet (32.5%)			
No Action Alternative	53,038	4,108	57,146
Alternative 1	36,709	4,468	41,178
Difference	-16,329	360	-15,969
Percent Difference	-31	9	-28
Above Normal (12.5%)			
No Action Alternative	274,408	2,606	277,013
Alternative 1	256,534	2,826	259,360
Difference	-17,874	221	-17,653
Percent Difference	-7	8	-6
Below Normal (17.5%)			
No Action Alternative	107,177	4,253	111,431
Alternative 1	108,800	4,580	113,380
Difference	1,623	327	1,949
Percent Difference	2	8	2
Dry (22.5%)			
No Action Alternative	167,873	5,025	172,898
Alternative 1	173,420	5,232	178,652
Difference	5,547	207	5,754
Percent Difference	3	4	3
Critical (15%)			
No Action Alternative	394,171	5,232	399,403
Alternative 1	299,101	6,012	305,113
Difference	-95,070	780	-94,290
Percent Difference	-24	15	-24

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-3-4. Annual Mortality by Cause and Life Stage for Spring-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Pre-Spawn Mortality	Eggs Flow	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Juvenile Temperature	Juvenile Habitat	Total
Long-term								
Full Simulation Period[1]								
No Action Alternative	47,267	2,039	119,924	1	2,282	0	0	171,512
Alternative 1	38,621	2,233	108,301	0	2,453	0	0	151,608
Difference	-8,646	194	-11,623	-1	172	0	0	-19,904
Percent Difference[3]	-18	10	-10	-100	8	0	0	-12
Water Year Types[2]								
Wet (32.5%)								
No Action Alternative	340	1,893	52,697	2	2,215	0	0	57,146
Alternative 1	260	2,165	36,450	0	2,303	0	0	41,178
Difference	-80	272	-16,247	-2	88	0	0	-15,969
Percent Difference	-24	14	-31	-100	4	0	0	-28
Above Normal (12.5%)								
No Action Alternative	151,449	651	122,959	0	1,955	0	0	277,013
Alternative 1	99,868	466	156,666	0	2,360	0	0	259,360
Difference	-51,581	-185	33,707	0	406	0	0	-17,653
Percent Difference	-34	-28	27	0	21	0	0	-6
Below Normal (17.5%)								
No Action Alternative	63,840	1,634	43,337	0	2,619	0	0	111,431
Alternative 1	66,585	1,818	42,215	0	2,763	0	0	113,380
Difference	2,744	183	-1,122	0	144	0	0	1,949
Percent Difference	4	11	-3	0	5	0	0	2
Dry (22.5%)								
No Action Alternative	37,718	2,417	130,155	0	2,608	0	0	172,898
Alternative 1	34,417	2,551	139,003	0	2,682	0	0	178,652
Difference	-3,301	134	8,847	0	73	0	0	5,754
Percent Difference	-9	6	7	0	3	0	0	3
Critical (15%)								
No Action Alternative	57,112	3,419	337,059	0	1,814	0	0	399,403
Alternative 1	44,378	3,862	254,723	0	2,151	0	0	305,113
Difference	-12,734	443	-82,336	0	337	0	0	-94,290
Percent Difference	-22	13	-24	0	19	0	0	-24

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-3-5. Annual Mortality by All Factors for Spring-Run Chinook Salmon

Analysis Period	Pre-Spawn Mortality	Incubation	Super-imposition	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Pre-smolt - Temperature	Pre-smolt - Habitat	Smolt - Temperature	Smolt - Habitat	Total
					Annual Mortality[4] (# of Fish/year)						
					Long-term						
Full Simulation Period[1]											
No Action Alternative	47,267	2,039	0	119,924	1	2,282	0	0	0	0	171,512
Alternative 1	38,621	2,233	0	108,301	0	2,453	0	0	0	0	151,608
Difference	-8,646	194	0	-11,623	-1	172	0	0	0	0	-19,904
Percent Difference[3]	-18	10	0	-10	-100	8	0	0	0	0	-12
					Water Year Types[2]						
Wet (32.5%)											
No Action Alternative	340	1,893	0	52,697	2	2,215	0	0	0	0	57,146
Alternative 1	260	2,165	0	36,450	0	2,303	0	0	0	0	41,178
Difference	-80	272	0	-16,247	-2	88	0	0	0	0	-15,969
Percent Difference	-24	14	0	-31	-100	4	0	0	0	0	-28
Above Normal (12.5%)											
No Action Alternative	151,449	651	0	122,959	0	1,955	0	0	0	0	277,013
Alternative 1	99,868	466	0	156,666	0	2,360	0	0	0	0	259,360
Difference	-51,581	-185	0	33,707	0	406	0	0	0	0	-17,653
Percent Difference	-34	-28	0	27	0	21	0	0	0	0	-6
Below Normal (17.5%)											
No Action Alternative	63,840	1,634	0	43,337	0	2,619	0	0	0	0	111,431
Alternative 1	66,585	1,818	0	42,215	0	2,763	0	0	0	0	113,380
Difference	2,744	183	0	-1,122	0	144	0	0	0	0	1,949
Percent Difference	4	11	0	-3	0	5	0	0	0	0	2
Dry (22.5%)											
No Action Alternative	37,718	2,417	0	130,155	0	2,608	0	0	0	0	172,898
Alternative 1	34,417	2,551	0	139,003	0	2,682	0	0	0	0	178,652
Difference	-3,301	134	0	8,847	0	73	0	0	0	0	5,754
Percent Difference	-9	6	0	7	0	3	0	0	0	0	3
Critical (15%)											
No Action Alternative	57,112	3,419	0	337,059	0	1,814	0	0	0	0	399,403
Alternative 1	44,378	3,862	0	254,723	0	2,151	0	0	0	0	305,113
Difference	-12,734	443	0	-82,336	0	337	0	0	0	0	-94,290
Percent Difference	-22	13	0	-24	0	19	0	0	0	0	-24

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-3-6. Annual Potential Production for Spring-Run Chinook Salmon

Analysis Period	Annual Potential Production (# of Fish/year)
Long-term	
Full Simulation Period[1]	
No Action Alternative	402,980
Alternative 3	409,813
Difference	6,832
Percent Difference[3]	2
Water Year Types[2]	
Wet (32.5%)	
No Action Alternative	442,676
Alternative 3	453,743
Difference	11,067
Percent Difference	2
Above Normal (12.5%)	
No Action Alternative	362,537
Alternative 3	368,403
Difference	5,866
Percent Difference	2
Below Normal (17.5%)	
No Action Alternative	428,569
Alternative 3	427,631
Difference	-938
Percent Difference	0
Dry (22.5%)	
No Action Alternative	405,967
Alternative 3	410,542
Difference	4,575
Percent Difference	1
Critical (15%)	
No Action Alternative	316,344
Alternative 3	327,260
Difference	10,915
Percent Difference	3

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the annual average

Table B-3-7. Annual Mortality by Life Stage for Spring-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Eggs	Fry	Pre-Smolt	Immature-Smolt	Juvenile (Pre & Immature Smolt)
Long-term					
Full Simulation Period[1]					
No Action Alternative	169,230	2,282	0	0	0
Alternative 3	150,290	2,435	0	0	0
Difference	-18,940	153	0	0	0
Percent Difference[3]	-11	7	0	0	0
Water Year Types[2]					
Wet (32.5%)					
No Action Alternative	54,929	2,217	0	0	0
Alternative 3	29,787	2,271	0	0	0
Difference	-25,142	54	0	0	0
Percent Difference	-46	2	0	0	0
Above Normal (12.5%)					
No Action Alternative	275,059	1,955	0	0	0
Alternative 3	257,573	2,190	0	0	0
Difference	-17,485	236	0	0	0
Percent Difference	-6	12	0	0	0
Below Normal (17.5%)					
No Action Alternative	108,811	2,619	0	0	0
Alternative 3	107,671	2,858	0	0	0
Difference	-1,140	239	0	0	0
Percent Difference	-1	9	0	0	0
Dry (22.5%)					
No Action Alternative	170,290	2,608	0	0	0
Alternative 3	156,331	2,731	0	0	0
Difference	-13,959	123	0	0	0
Percent Difference	-8	5	0	0	0
Critical (15%)					
No Action Alternative	397,589	1,814	0	0	0
Alternative 3	362,639	2,060	0	0	0
Difference	-34,950	247	0	0	0
Percent Difference	-9	14	0	0	0

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

5 Eggs mortality includes pre-spawn mortality

Table B-3-8. Annual Mortality by Cause for Spring-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Temperature	Flow	Total
Long-term			
Full Simulation Period[1]			
No Action Alternative	167,192	4,321	171,512
Alternative 3	148,223	4,502	152,726
Difference	-18,968	182	-18,786
Percent Difference[3]	-11	4	-11
Water Year Types[2]			
Wet (32.5%)			
No Action Alternative	53,038	4,108	57,146
Alternative 3	27,591	4,467	32,057
Difference	-25,448	359	-25,089
Percent Difference	-48	9	-44
Above Normal (12.5%)			
No Action Alternative	274,408	2,606	277,013
Alternative 3	257,166	2,597	259,763
Difference	-17,242	-8	-17,250
Percent Difference	-6	0	-6
Below Normal (17.5%)			
No Action Alternative	107,177	4,253	111,431
Alternative 3	105,832	4,697	110,529
Difference	-1,345	444	-901
Percent Difference	-1	10	-1
Dry (22.5%)			
No Action Alternative	167,873	5,025	172,898
Alternative 3	154,048	5,014	159,062
Difference	-13,825	-11	-13,836
Percent Difference	-8	0	-8
Critical (15%)			
No Action Alternative	394,171	5,232	399,403
Alternative 3	359,528	5,172	364,700
Difference	-34,643	-60	-34,703
Percent Difference	-9	-1	-9

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-3-9. Annual Mortality by Cause and Life Stage for Spring-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Pre-Spawn Mortality	Eggs Flow	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Juvenile Temperature	Juvenile Habitat	Total
Long-term								
Full Simulation Period[1]								
No Action Alternative	47,267	2,039	119,924	1	2,282	0	0	171,512
Alternative 3	37,164	2,067	111,060	0	2,435	0	0	152,726
Difference	-10,103	28	-8,864	-1	154	0	0	-18,786
Percent Difference[3]	-21	1	-7	-100	7	0	0	-11
Water Year Types[2]								
Wet (32.5%)								
No Action Alternative	340	1,893	52,697	2	2,215	0	0	57,146
Alternative 3	189	2,196	27,402	0	2,271	0	0	32,057
Difference	-151	303	-25,295	-2	56	0	0	-25,089
Percent Difference	-44	16	-48	-100	3	0	0	-44
Above Normal (12.5%)								
No Action Alternative	151,449	651	122,959	0	1,955	0	0	277,013
Alternative 3	104,829	407	152,337	0	2,190	0	0	259,763
Difference	-46,620	-244	29,379	0	236	0	0	-17,250
Percent Difference	-31	-37	24	0	12	0	0	-6
Below Normal (17.5%)								
No Action Alternative	63,840	1,634	43,337	0	2,619	0	0	111,431
Alternative 3	62,085	1,839	43,747	0	2,858	0	0	110,529
Difference	-1,755	205	410	0	239	0	0	-901
Percent Difference	-3	13	1	0	9	0	0	-1
Dry (22.5%)								
No Action Alternative	37,718	2,417	130,155	0	2,608	0	0	172,898
Alternative 3	28,700	2,282	125,348	0	2,731	0	0	159,062
Difference	-9,018	-134	-4,807	0	123	0	0	-13,836
Percent Difference	-24	-6	-4	0	5	0	0	-8
Critical (15%)								
No Action Alternative	57,112	3,419	337,059	0	1,814	0	0	399,403
Alternative 3	44,510	3,112	315,018	0	2,060	0	0	364,700
Difference	-12,602	-307	-22,041	0	247	0	0	-34,703
Percent Difference	-22	-9	-7	0	14	0	0	-9

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-3-10. Annual Mortality by All Factors for Spring-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Pre-Spawn Mortality	Incubation	Super-imposition	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Pre-smolt - Temperature	Pre-smolt - Habitat	Smolt - Temperature	Smolt - Habitat	Total
Long-term											
Full Simulation Period[1]											
No Action Alternative	47,267	2,039	0	119,924	1	2,282	0	0	0	0	171,512
Alternative 3	37,164	2,067	0	111,060	0	2,435	0	0	0	0	152,726
Difference	-10,103	28	0	-8,864	-1	154	0	0	0	0	-18,786
Percent Difference[3]	-21	1	0	-7	-100	7	0	0	0	0	-11
Water Year Types[2]											
Wet (32.5%)											
No Action Alternative	340	1,893	0	52,697	2	2,215	0	0	0	0	57,146
Alternative 3	189	2,196	0	27,402	0	2,271	0	0	0	0	32,057
Difference	-151	303	0	-25,295	-2	56	0	0	0	0	-25,089
Percent Difference	-44	16	0	-48	-100	3	0	0	0	0	-44
Above Normal (12.5%)											
No Action Alternative	151,449	651	0	122,959	0	1,955	0	0	0	0	277,013
Alternative 3	104,829	407	0	152,337	0	2,190	0	0	0	0	259,763
Difference	-46,620	-244	0	29,379	0	236	0	0	0	0	-17,250
Percent Difference	-31	-37	0	24	0	12	0	0	0	0	-6
Below Normal (17.5%)											
No Action Alternative	63,840	1,634	0	43,337	0	2,619	0	0	0	0	111,431
Alternative 3	62,085	1,839	0	43,747	0	2,858	0	0	0	0	110,529
Difference	-1,755	205	0	410	0	239	0	0	0	0	-901
Percent Difference	-3	13	0	1	0	9	0	0	0	0	-1
Dry (22.5%)											
No Action Alternative	37,718	2,417	0	130,155	0	2,608	0	0	0	0	172,898
Alternative 3	28,700	2,282	0	125,348	0	2,731	0	0	0	0	159,062
Difference	-9,018	-134	0	-4,807	0	123	0	0	0	0	-13,836
Percent Difference	-24	-6	0	-4	0	5	0	0	0	0	-8
Critical (15%)											
No Action Alternative	57,112	3,419	0	337,059	0	1,814	0	0	0	0	399,403
Alternative 3	44,510	3,112	0	315,018	0	2,060	0	0	0	0	364,700
Difference	-12,602	-307	0	-22,041	0	247	0	0	0	0	-34,703
Percent Difference	-22	-9	0	-7	0	14	0	0	0	0	-9

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-3-11. Annual Potential Production for Spring-Run Chinook Salmon

Analysis Period	Annual Potential Production (# of Fish/year)
Long-term	
Full Simulation Period[1]	
No Action Alternative	402,980
Alternative 5	401,678
Difference	-1,302
Percent Difference[3]	0
Water Year Types[2]	
Wet (32.5%)	
No Action Alternative	442,676
Alternative 5	441,971
Difference	-705
Percent Difference	0
Above Normal (12.5%)	
No Action Alternative	362,537
Alternative 5	363,460
Difference	923
Percent Difference	0
Below Normal (17.5%)	
No Action Alternative	428,569
Alternative 5	428,206
Difference	-363
Percent Difference	0
Dry (22.5%)	
No Action Alternative	405,967
Alternative 5	407,290
Difference	1,323
Percent Difference	0
Critical (15%)	
No Action Alternative	316,344
Alternative 5	306,861
Difference	-9,484
Percent Difference	-3

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the annual average

Table B-3-12. Annual Mortality by Life Stage for Spring-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Eggs	Fry	Pre-Smolt	Immature-Smolt	Juvenile (Pre & Immature Smolt)
Long-term					
Full Simulation Period[1]					
No Action Alternative	169,230	2,282	0	0	0
Alternative 5	171,978	2,371	0	0	0
Difference	2,748	89	0	0	0
Percent Difference[3]	2	4	0	0	0
Water Year Types[2]					
Wet (32.5%)					
No Action Alternative	54,929	2,217	0	0	0
Alternative 5	57,192	2,203	0	0	0
Difference	2,263	-14	0	0	0
Percent Difference	4	-1	0	0	0
Above Normal (12.5%)					
No Action Alternative	275,059	1,955	0	0	0
Alternative 5	271,916	1,980	0	0	0
Difference	-3,143	26	0	0	0
Percent Difference	-1	1	0	0	0
Below Normal (17.5%)					
No Action Alternative	108,811	2,619	0	0	0
Alternative 5	108,195	2,925	0	0	0
Difference	-616	306	0	0	0
Percent Difference	-1	12	0	0	0
Dry (22.5%)					
No Action Alternative	170,290	2,608	0	0	0
Alternative 5	166,496	2,666	0	0	0
Difference	-3,794	57	0	0	0
Percent Difference	-2	2	0	0	0
Critical (15%)					
No Action Alternative	397,589	1,814	0	0	0
Alternative 5	420,039	1,972	0	0	0
Difference	22,449	159	0	0	0
Percent Difference	6	9	0	0	0

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

5 Eggs mortality includes pre-spawn mortality

Table B-3-13. Annual Mortality by Cause for Spring-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Temperature	Flow	Total
Long-term			
Full Simulation Period[1]			
No Action Alternative	167,192	4,321	171,512
Alternative 5	170,196	4,153	174,349
Difference	3,004	-167	2,837
Percent Difference[3]	2	-4	2
Water Year Types[2]			
Wet (32.5%)			
No Action Alternative	53,038	4,108	57,146
Alternative 5	55,390	4,005	59,395
Difference	2,351	-103	2,249
Percent Difference	4	-2	4
Above Normal (12.5%)			
No Action Alternative	274,408	2,606	277,013
Alternative 5	271,280	2,616	273,896
Difference	-3,128	11	-3,117
Percent Difference	-1	0	-1
Below Normal (17.5%)			
No Action Alternative	107,177	4,253	111,431
Alternative 5	106,681	4,439	111,120
Difference	-496	186	-310
Percent Difference	0	4	0
Dry (22.5%)			
No Action Alternative	167,873	5,025	172,898
Alternative 5	164,607	4,554	169,161
Difference	-3,266	-471	-3,737
Percent Difference	-2	-9	-2
Critical (15%)			
No Action Alternative	394,171	5,232	399,403
Alternative 5	417,191	4,820	422,011
Difference	23,020	-412	22,608
Percent Difference	6	-8	6

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-3-14. Annual Mortality by Cause and Life Stage for Spring-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Pre-Spawn Mortality	Eggs Flow	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Juvenile Temperature	Juvenile Habitat	Total
Long-term								
Full Simulation Period[1]								
No Action Alternative	47,267	2,039	119,924	1	2,282	0	0	171,512
Alternative 5	44,327	1,783	125,868	0	2,371	0	0	174,349
Difference	-2,940	-256	5,944	0	89	0	0	2,837
Percent Difference[3]	-6	-13	5	-52	4	0	0	2
Water Year Types[2]								
Wet (32.5%)								
No Action Alternative	340	1,893	52,697	2	2,215	0	0	57,146
Alternative 5	608	1,803	54,781	1	2,203	0	0	59,395
Difference	268	-90	2,084	-1	-13	0	0	2,249
Percent Difference	79	-5	4	-57	-1	0	0	4
Above Normal (12.5%)								
No Action Alternative	151,449	651	122,959	0	1,955	0	0	277,013
Alternative 5	125,685	636	145,595	0	1,980	0	0	273,896
Difference	-25,764	-15	22,636	0	26	0	0	-3,117
Percent Difference	-17	-2	18	0	1	0	0	-1
Below Normal (17.5%)								
No Action Alternative	63,840	1,634	43,337	0	2,619	0	0	111,431
Alternative 5	53,122	1,514	53,559	0	2,925	0	0	111,120
Difference	-10,718	-120	10,222	0	306	0	0	-310
Percent Difference	-17	-7	24	0	12	0	0	0
Dry (22.5%)								
No Action Alternative	37,718	2,417	130,155	0	2,608	0	0	172,898
Alternative 5	37,450	1,889	127,157	0	2,666	0	0	169,161
Difference	-268	-528	-2,998	0	57	0	0	-3,737
Percent Difference	-1	-22	-2	0	2	0	0	-2
Critical (15%)								
No Action Alternative	57,112	3,419	337,059	0	1,814	0	0	399,403
Alternative 5	71,310	2,848	345,881	0	1,972	0	0	422,011
Difference	14,198	-571	8,822	0	158	0	0	22,608
Percent Difference	25	-17	3	0	9	0	0	6

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-3-15. Annual Mortality by All Factors for Spring-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Pre-Spawn Mortality	Incubation	Super-imposition	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Pre-smolt - Temperature	Pre-smolt - Habitat	Smolt - Temperature	Smolt - Habitat	Total
Long-term											
Full Simulation Period[1]											
No Action Alternative	47,267	2,039	0	119,924	1	2,282	0	0	0	0	171,512
Alternative 5	44,327	1,783	0	125,868	0	2,371	0	0	0	0	174,349
Difference	-2,940	-256	0	5,944	0	89	0	0	0	0	2,837
Percent Difference[3]	-6	-13	0	5	-52	4	0	0	0	0	2
Water Year Types[2]											
Wet (32.5%)											
No Action Alternative	340	1,893	0	52,697	2	2,215	0	0	0	0	57,146
Alternative 5	608	1,803	0	54,781	1	2,203	0	0	0	0	59,395
Difference	268	-90	0	2,084	-1	-13	0	0	0	0	2,249
Percent Difference	79	-5	0	4	-57	-1	0	0	0	0	4
Above Normal (12.5%)											
No Action Alternative	151,449	651	0	122,959	0	1,955	0	0	0	0	277,013
Alternative 5	125,685	636	0	145,595	0	1,980	0	0	0	0	273,896
Difference	-25,764	-15	0	22,636	0	26	0	0	0	0	-3,117
Percent Difference	-17	-2	0	18	0	1	0	0	0	0	-1
Below Normal (17.5%)											
No Action Alternative	63,840	1,634	0	43,337	0	2,619	0	0	0	0	111,431
Alternative 5	53,122	1,514	0	53,559	0	2,925	0	0	0	0	111,120
Difference	-10,718	-120	0	10,222	0	306	0	0	0	0	-310
Percent Difference	-17	-7	0	24	0	12	0	0	0	0	0
Dry (22.5%)											
No Action Alternative	37,718	2,417	0	130,155	0	2,608	0	0	0	0	172,898
Alternative 5	37,450	1,889	0	127,157	0	2,666	0	0	0	0	169,161
Difference	-268	-528	0	-2,998	0	57	0	0	0	0	-3,737
Percent Difference	-1	-22	0	-2	0	2	0	0	0	0	-2
Critical (15%)											
No Action Alternative	57,112	3,419	0	337,059	0	1,814	0	0	0	0	399,403
Alternative 5	71,310	2,848	0	345,881	0	1,972	0	0	0	0	422,011
Difference	14,198	-571	0	8,822	0	158	0	0	0	0	22,608
Percent Difference	25	-17	0	3	0	9	0	0	0	0	6

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-3-16. Annual Potential Production for Spring-Run Chinook Salmon

Analysis Period	Annual Potential Production (# of Fish/year)
Long-term	
Full Simulation Period[1]	
Second Basis of Comparison	410,722
No Action Alternative	402,980
Difference	-7,742
Percent Difference[3]	-2
Water Year Types[2]	
Wet (32.5%)	
Second Basis of Comparison	449,832
No Action Alternative	442,676
Difference	-7,156
Percent Difference	-2
Above Normal (12.5%)	
Second Basis of Comparison	367,591
No Action Alternative	362,537
Difference	-5,054
Percent Difference	-1
Below Normal (17.5%)	
Second Basis of Comparison	426,491
No Action Alternative	428,569
Difference	2,078
Percent Difference	0
Dry (22.5%)	
Second Basis of Comparison	403,012
No Action Alternative	405,967
Difference	2,955
Percent Difference	1
Critical (15%)	
Second Basis of Comparison	355,097
No Action Alternative	316,344
Difference	-38,753
Percent Difference	-11

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the annual average

Table B-3-17. Annual Mortality by Life Stage for Spring-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Eggs	Fry	Pre-Smolt	Immature-Smolt	Juvenile (Pre & Immature Smolt)
Long-term					
Full Simulation Period[1]					
Second Basis of Comparison	149,155	2,453	0	0	0
No Action Alternative	169,230	2,282	0	0	0
Difference	20,075	-171	0	0	0
Percent Difference[3]	13	-7	0	0	0
Water Year Types[2]					
Wet (32.5%)					
Second Basis of Comparison	38,874	2,303	0	0	0
No Action Alternative	54,929	2,217	0	0	0
Difference	16,055	-86	0	0	0
Percent Difference	41	-4	0	0	0
Above Normal (12.5%)					
Second Basis of Comparison	256,999	2,360	0	0	0
No Action Alternative	275,059	1,955	0	0	0
Difference	18,059	-406	0	0	0
Percent Difference	7	-17	0	0	0
Below Normal (17.5%)					
Second Basis of Comparison	110,617	2,763	0	0	0
No Action Alternative	108,811	2,619	0	0	0
Difference	-1,806	-144	0	0	0
Percent Difference	-2	-5	0	0	0
Dry (22.5%)					
Second Basis of Comparison	175,971	2,682	0	0	0
No Action Alternative	170,290	2,608	0	0	0
Difference	-5,681	-73	0	0	0
Percent Difference	-3	-3	0	0	0
Critical (15%)					
Second Basis of Comparison	302,962	2,151	0	0	0
No Action Alternative	397,589	1,814	0	0	0
Difference	94,627	-337	0	0	0
Percent Difference	31	-16	0	0	0

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

5 Eggs mortality includes pre-spawn mortality

Table B-3-18. Annual Mortality by Cause for Spring-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Temperature	Flow	Total
Long-term			
Full Simulation Period[1]			
Second Basis of Comparison	146,922	4,686	151,608
No Action Alternative	167,192	4,321	171,512
Difference	20,270	-366	19,904
Percent Difference[3]	14	-8	13
Water Year Types[2]			
Wet (32.5%)			
Second Basis of Comparison	36,709	4,468	41,178
No Action Alternative	53,038	4,108	57,146
Difference	16,329	-360	15,969
Percent Difference	44	-8	39
Above Normal (12.5%)			
Second Basis of Comparison	256,534	2,826	259,360
No Action Alternative	274,408	2,606	277,013
Difference	17,874	-221	17,653
Percent Difference	7	-8	7
Below Normal (17.5%)			
Second Basis of Comparison	108,800	4,580	113,380
No Action Alternative	107,177	4,253	111,431
Difference	-1,623	-327	-1,949
Percent Difference	-1	-7	-2
Dry (22.5%)			
Second Basis of Comparison	173,420	5,232	178,652
No Action Alternative	167,873	5,025	172,898
Difference	-5,547	-207	-5,754
Percent Difference	-3	-4	-3
Critical (15%)			
Second Basis of Comparison	299,101	6,012	305,113
No Action Alternative	394,171	5,232	399,403
Difference	95,070	-780	94,290
Percent Difference	32	-13	31

1 Based on the 80-year simulation period.

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-3-19. Annual Mortality by Cause and Life Stage for Spring-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Pre-Spawn Mortality	Eggs Flow	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Juvenile Temperature	Juvenile Habitat	Total
Long-term								
Full Simulation Period[1]								
Second Basis of Comparison	38,621	2,233	108,301	0	2,453	0	0	151,608
No Action Alternative	47,267	2,039	119,924	1	2,282	0	0	171,512
Difference	8,646	-194	11,623	1	-172	0	0	19,904
Percent Difference[3]	22	-9	11	0	-7	0	0	13
Water Year Types[2]								
Wet (32.5%)								
Second Basis of Comparison	260	2,165	36,450	0	2,303	0	0	41,178
No Action Alternative	340	1,893	52,697	2	2,215	0	0	57,146
Difference	80	-272	16,247	2	-88	0	0	15,969
Percent Difference	31	-13	45	0	-4	0	0	39
Above Normal (12.5%)								
Second Basis of Comparison	99,868	466	156,666	0	2,360	0	0	259,360
No Action Alternative	151,449	651	122,959	0	1,955	0	0	277,013
Difference	51,581	185	-33,707	0	-406	0	0	17,653
Percent Difference	52	40	-22	0	-17	0	0	7
Below Normal (17.5%)								
Second Basis of Comparison	66,585	1,818	42,215	0	2,763	0	0	113,380
No Action Alternative	63,840	1,634	43,337	0	2,619	0	0	111,431
Difference	-2,744	-183	1,122	0	-144	0	0	-1,949
Percent Difference	-4	-10	3	0	-5	0	0	-2
Dry (22.5%)								
Second Basis of Comparison	34,417	2,551	139,003	0	2,682	0	0	178,652
No Action Alternative	37,718	2,417	130,155	0	2,608	0	0	172,898
Difference	3,301	-134	-8,847	0	-73	0	0	-5,754
Percent Difference	10	-5	-6	0	-3	0	0	-3
Critical (15%)								
Second Basis of Comparison	44,378	3,862	254,723	0	2,151	0	0	305,113
No Action Alternative	57,112	3,419	337,059	0	1,814	0	0	399,403
Difference	12,734	-443	82,336	0	-337	0	0	94,290
Percent Difference	29	-11	32	0	-16	0	0	31

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-3-20. Annual Mortality by All Factors for Spring-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Pre-Spawn Mortality	Incubation	Super-imposition	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Pre-smolt - Temperature	Pre-smolt - Habitat	Smolt - Temperature	Smolt - Habitat	Total
Long-term											
Full Simulation Period[1]											
Second Basis of Comparison	38,621	2,233	0	108,301	0	2,453	0	0	0	0	151,608
No Action Alternative	47,267	2,039	0	119,924	1	2,282	0	0	0	0	171,512
Difference	8,646	-194	0	11,623	1	-172	0	0	0	0	19,904
Percent Difference[3]	22	-9	0	11	0	-7	0	0	0	0	13
Water Year Types[2]											
Wet (32.5%)											
Second Basis of Comparison	260	2,165	0	36,450	0	2,303	0	0	0	0	41,178
No Action Alternative	340	1,893	0	52,697	2	2,215	0	0	0	0	57,146
Difference	80	-272	0	16,247	2	-88	0	0	0	0	15,969
Percent Difference	31	-13	0	45	0	-4	0	0	0	0	39
Above Normal (12.5%)											
Second Basis of Comparison	99,868	466	0	156,666	0	2,360	0	0	0	0	259,360
No Action Alternative	151,449	651	0	122,959	0	1,955	0	0	0	0	277,013
Difference	51,581	185	0	-33,707	0	-406	0	0	0	0	17,653
Percent Difference	52	40	0	-22	0	-17	0	0	0	0	7
Below Normal (17.5%)											
Second Basis of Comparison	66,585	1,818	0	42,215	0	2,763	0	0	0	0	113,380
No Action Alternative	63,840	1,634	0	43,337	0	2,619	0	0	0	0	111,431
Difference	-2,744	-183	0	1,122	0	-144	0	0	0	0	-1,949
Percent Difference	-4	-10	0	3	0	-5	0	0	0	0	-2
Dry (22.5%)											
Second Basis of Comparison	34,417	2,551	0	139,003	0	2,682	0	0	0	0	178,652
No Action Alternative	37,718	2,417	0	130,155	0	2,608	0	0	0	0	172,898
Difference	3,301	-134	0	-8,847	0	-73	0	0	0	0	-5,754
Percent Difference	10	-5	0	-6	0	-3	0	0	0	0	-3
Critical (15%)											
Second Basis of Comparison	44,378	3,862	0	254,723	0	2,151	0	0	0	0	305,113
No Action Alternative	57,112	3,419	0	337,059	0	1,814	0	0	0	0	399,403
Difference	12,734	-443	0	82,336	0	-337	0	0	0	0	94,290
Percent Difference	29	-11	0	32	0	-16	0	0	0	0	31

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-3-21. Annual Potential Production for Spring-Run Chinook Salmon

Analysis Period	Annual Potential Production (# of Fish/year)
Long-term	
Full Simulation Period[1]	
Second Basis of Comparison	410,722
Alternative 3	409,813
Difference	-909
Percent Difference[3]	0
Water Year Types[2]	
Wet (32.5%)	
Second Basis of Comparison	449,832
Alternative 3	453,743
Difference	3,911
Percent Difference	1
Above Normal (12.5%)	
Second Basis of Comparison	367,591
Alternative 3	368,403
Difference	812
Percent Difference	0
Below Normal (17.5%)	
Second Basis of Comparison	426,491
Alternative 3	427,631
Difference	1,140
Percent Difference	0
Dry (22.5%)	
Second Basis of Comparison	403,012
Alternative 3	410,542
Difference	7,530
Percent Difference	2
Critical (15%)	
Second Basis of Comparison	355,097
Alternative 3	327,260
Difference	-27,838
Percent Difference	-8

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the annual average

Table B-3-22. Annual Mortality by Life Stage for Spring-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Eggs	Fry	Pre-Smolt	Immature-Smolt	Juvenile (Pre & Immature Smolt)
Long-term					
Full Simulation Period[1]					
Second Basis of Comparison	149,155	2,453	0	0	0
Alternative 3	150,290	2,435	0	0	0
Difference	1,135	-18	0	0	0
Percent Difference[3]	1	-1	0	0	0
Water Year Types[2]					
Wet (32.5%)					
Second Basis of Comparison	38,874	2,303	0	0	0
Alternative 3	29,787	2,271	0	0	0
Difference	-9,087	-33	0	0	0
Percent Difference	-23	-1	0	0	0
Above Normal (12.5%)					
Second Basis of Comparison	256,999	2,360	0	0	0
Alternative 3	257,573	2,190	0	0	0
Difference	574	-170	0	0	0
Percent Difference	0	-7	0	0	0
Below Normal (17.5%)					
Second Basis of Comparison	110,617	2,763	0	0	0
Alternative 3	107,671	2,858	0	0	0
Difference	-2,946	95	0	0	0
Percent Difference	-3	3	0	0	0
Dry (22.5%)					
Second Basis of Comparison	175,971	2,682	0	0	0
Alternative 3	156,331	2,731	0	0	0
Difference	-19,640	50	0	0	0
Percent Difference	-11	2	0	0	0
Critical (15%)					
Second Basis of Comparison	302,962	2,151	0	0	0
Alternative 3	362,639	2,060	0	0	0
Difference	59,677	-90	0	0	0
Percent Difference	20	-4	0	0	0

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

5 Eggs mortality includes pre-spawn mortality

Table B-3-23. Annual Mortality by Cause for Spring-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Temperature	Flow	Total
Long-term			
Full Simulation Period[1]			
Second Basis of Comparison	146,922	4,686	151,608
Alternative 3	148,223	4,502	152,726
Difference	1,302	-184	1,118
Percent Difference[3]	1	-4	1
Water Year Types[2]			
Wet (32.5%)			
Second Basis of Comparison	36,709	4,468	41,178
Alternative 3	27,591	4,467	32,057
Difference	-9,119	-1	-9,120
Percent Difference	-25	0	-22
Above Normal (12.5%)			
Second Basis of Comparison	256,534	2,826	259,360
Alternative 3	257,166	2,597	259,763
Difference	632	-229	404
Percent Difference	0	-8	0
Below Normal (17.5%)			
Second Basis of Comparison	108,800	4,580	113,380
Alternative 3	105,832	4,697	110,529
Difference	-2,968	117	-2,851
Percent Difference	-3	3	-3
Dry (22.5%)			
Second Basis of Comparison	173,420	5,232	178,652
Alternative 3	154,048	5,014	159,062
Difference	-19,372	-219	-19,590
Percent Difference	-11	-4	-11
Critical (15%)			
Second Basis of Comparison	299,101	6,012	305,113
Alternative 3	359,528	5,172	364,700
Difference	60,427	-840	59,587
Percent Difference	20	-14	20

1 Based on the 80-year simulation period.
2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.
3 Relative difference of the Annual average
4 Mortality values do not include base mortality

Table B-3-24. Annual Mortality by Cause and Life Stage for Spring-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Pre-Spawn Mortality	Eggs Flow	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Juvenile Temperature	Juvenile Habitat	Total
Long-term								
Full Simulation Period[1]								
Second Basis of Comparison	38,621	2,233	108,301	0	2,453	0	0	151,608
Alternative 3	37,164	2,067	111,060	0	2,435	0	0	152,726
Difference	-1,457	-166	2,759	0	-18	0	0	1,118
Percent Difference[3]	-4	-7	3	0	-1	0	0	1
Water Year Types[2]								
Wet (32.5%)								
Second Basis of Comparison	260	2,165	36,450	0	2,303	0	0	41,178
Alternative 3	189	2,196	27,402	0	2,271	0	0	32,057
Difference	-71	31	-9,047	0	-33	0	0	-9,120
Percent Difference	-27	1	-25	0	-1	0	0	-22
Above Normal (12.5%)								
Second Basis of Comparison	99,868	466	156,666	0	2,360	0	0	259,360
Alternative 3	104,829	407	152,337	0	2,190	0	0	259,763
Difference	4,961	-59	-4,329	0	-170	0	0	404
Percent Difference	5	-13	-3	0	-7	0	0	0
Below Normal (17.5%)								
Second Basis of Comparison	66,585	1,818	42,215	0	2,763	0	0	113,380
Alternative 3	62,085	1,839	43,747	0	2,858	0	0	110,529
Difference	-4,500	22	1,532	0	95	0	0	-2,851
Percent Difference	-7	1	4	0	3	0	0	-3
Dry (22.5%)								
Second Basis of Comparison	34,417	2,551	139,003	0	2,682	0	0	178,652
Alternative 3	28,700	2,282	125,348	0	2,731	0	0	159,062
Difference	-5,717	-269	-13,654	0	50	0	0	-19,590
Percent Difference	-17	-11	-10	0	2	0	0	-11
Critical (15%)								
Second Basis of Comparison	44,378	3,862	254,723	0	2,151	0	0	305,113
Alternative 3	44,510	3,112	315,018	0	2,060	0	0	364,700
Difference	132	-750	60,295	0	-90	0	0	59,587
Percent Difference	0	-19	24	0	-4	0	0	20

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-3-25. Annual Mortality by All Factors for Spring-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Pre-Spawn Mortality	Incubation	Super-imposition	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Pre-smolt - Temperature	Pre-smolt - Habitat	Smolt - Temperature	Smolt - Habitat	Total
Long-term											
Full Simulation Period[1]											
Second Basis of Comparison	38,621	2,233	0	108,301	0	2,453	0	0	0	0	151,608
Alternative 3	37,164	2,067	0	111,060	0	2,435	0	0	0	0	152,726
Difference	-1,457	-166	0	2,759	0	-18	0	0	0	0	1,118
Percent Difference[3]	-4	-7	0	3	0	-1	0	0	0	0	1
Water Year Types[2]											
Wet (32.5%)											
Second Basis of Comparison	260	2,165	0	36,450	0	2,303	0	0	0	0	41,178
Alternative 3	189	2,196	0	27,402	0	2,271	0	0	0	0	32,057
Difference	-71	31	0	-9,047	0	-33	0	0	0	0	-9,120
Percent Difference	-27	1	0	-25	0	-1	0	0	0	0	-22
Above Normal (12.5%)											
Second Basis of Comparison	99,868	466	0	156,666	0	2,360	0	0	0	0	259,360
Alternative 3	104,829	407	0	152,337	0	2,190	0	0	0	0	259,763
Difference	4,961	-59	0	-4,329	0	-170	0	0	0	0	404
Percent Difference	5	-13	0	-3	0	-7	0	0	0	0	0
Below Normal (17.5%)											
Second Basis of Comparison	66,585	1,818	0	42,215	0	2,763	0	0	0	0	113,380
Alternative 3	62,085	1,839	0	43,747	0	2,858	0	0	0	0	110,529
Difference	-4,500	22	0	1,532	0	95	0	0	0	0	-2,851
Percent Difference	-7	1	0	4	0	3	0	0	0	0	-3
Dry (22.5%)											
Second Basis of Comparison	34,417	2,551	0	139,003	0	2,682	0	0	0	0	178,652
Alternative 3	28,700	2,282	0	125,348	0	2,731	0	0	0	0	159,062
Difference	-5,717	-269	0	-13,654	0	50	0	0	0	0	-19,590
Percent Difference	-17	-11	0	-10	0	2	0	0	0	0	-11
Critical (15%)											
Second Basis of Comparison	44,378	3,862	0	254,723	0	2,151	0	0	0	0	305,113
Alternative 3	44,510	3,112	0	315,018	0	2,060	0	0	0	0	364,700
Difference	132	-750	0	60,295	0	-90	0	0	0	0	59,587
Percent Difference	0	-19	0	24	0	-4	0	0	0	0	20

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-3-26. Annual Potential Production for Spring-Run Chinook Salmon

Analysis Period	Annual Potential Production (# of Fish/year)
Long-term	
Full Simulation Period[1]	
Second Basis of Comparison	410,722
Alternative 5	401,678
Difference	-9,044
Percent Difference[3]	-2
Water Year Types[2]	
Wet (32.5%)	
Second Basis of Comparison	449,832
Alternative 5	441,971
Difference	-7,862
Percent Difference	-2
Above Normal (12.5%)	
Second Basis of Comparison	367,591
Alternative 5	363,460
Difference	-4,131
Percent Difference	-1
Below Normal (17.5%)	
Second Basis of Comparison	426,491
Alternative 5	428,206
Difference	1,716
Percent Difference	0
Dry (22.5%)	
Second Basis of Comparison	403,012
Alternative 5	407,290
Difference	4,278
Percent Difference	1
Critical (15%)	
Second Basis of Comparison	355,097
Alternative 5	306,861
Difference	-48,237
Percent Difference	-14

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the annual average

Table B-3-27. Annual Mortality by Life Stage for Spring-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Eggs	Fry	Pre-Smolt	Immature-Smolt	Juvenile (Pre & Immature Smolt)
Long-term					
Full Simulation Period[1]					
Second Basis of Comparison	149,155	2,453	0	0	0
Alternative 5	171,978	2,371	0	0	0
Difference	22,823	-82	0	0	0
Percent Difference[3]	15	-3	0	0	0
Water Year Types[2]					
Wet (32.5%)					
Second Basis of Comparison	38,874	2,303	0	0	0
Alternative 5	57,192	2,203	0	0	0
Difference	18,318	-100	0	0	0
Percent Difference	47	-4	0	0	0
Above Normal (12.5%)					
Second Basis of Comparison	256,999	2,360	0	0	0
Alternative 5	271,916	1,980	0	0	0
Difference	14,917	-380	0	0	0
Percent Difference	6	-16	0	0	0
Below Normal (17.5%)					
Second Basis of Comparison	110,617	2,763	0	0	0
Alternative 5	108,195	2,925	0	0	0
Difference	-2,422	163	0	0	0
Percent Difference	-2	6	0	0	0
Dry (22.5%)					
Second Basis of Comparison	175,971	2,682	0	0	0
Alternative 5	166,496	2,666	0	0	0
Difference	-9,475	-16	0	0	0
Percent Difference	-5	-1	0	0	0
Critical (15%)					
Second Basis of Comparison	302,962	2,151	0	0	0
Alternative 5	420,039	1,972	0	0	0
Difference	117,076	-179	0	0	0
Percent Difference	39	-8	0	0	0

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

5 Eggs mortality includes pre-spawn mortality

Table B-3-28. Annual Mortality by Cause for Spring-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Temperature	Flow	Total
Long-term			
Full Simulation Period[1]			
Second Basis of Comparison	146,922	4,686	151,608
Alternative 5	170,196	4,153	174,349
Difference	23,274	-533	22,742
Percent Difference[3]	16	-11	15
Water Year Types[2]			
Wet (32.5%)			
Second Basis of Comparison	36,709	4,468	41,178
Alternative 5	55,390	4,005	59,395
Difference	18,680	-463	18,217
Percent Difference	51	-10	44
Above Normal (12.5%)			
Second Basis of Comparison	256,534	2,826	259,360
Alternative 5	271,280	2,616	273,896
Difference	14,746	-210	14,536
Percent Difference	6	-7	6
Below Normal (17.5%)			
Second Basis of Comparison	108,800	4,580	113,380
Alternative 5	106,681	4,439	111,120
Difference	-2,119	-141	-2,260
Percent Difference	-2	-3	-2
Dry (22.5%)			
Second Basis of Comparison	173,420	5,232	178,652
Alternative 5	164,607	4,554	169,161
Difference	-8,813	-678	-9,491
Percent Difference	-5	-13	-5
Critical (15%)			
Second Basis of Comparison	299,101	6,012	305,113
Alternative 5	417,191	4,820	422,011
Difference	118,090	-1,192	116,898
Percent Difference	39	-20	38

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-3-29. Annual Mortality by Cause and Life Stage for Spring-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Pre-Spawn Mortality	Eggs Flow	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Juvenile Temperature	Juvenile Habitat	Total
Long-term								
Full Simulation Period[1]								
Second Basis of Comparison	38,621	2,233	108,301	0	2,453	0	0	151,608
Alternative 5	44,327	1,783	125,868	0	2,371	0	0	174,349
Difference	5,706	-450	17,567	0	-82	0	0	22,742
Percent Difference[3]	15	-20	16	0	-3	0	0	15
Water Year Types[2]								
Wet (32.5%)								
Second Basis of Comparison	260	2,165	36,450	0	2,303	0	0	41,178
Alternative 5	608	1,803	54,781	1	2,203	0	0	59,395
Difference	348	-362	18,331	1	-101	0	0	18,217
Percent Difference	134	-17	50	0	-4	0	0	44
Above Normal (12.5%)								
Second Basis of Comparison	99,868	466	156,666	0	2,360	0	0	259,360
Alternative 5	125,685	636	145,595	0	1,980	0	0	273,896
Difference	25,817	171	-11,071	0	-380	0	0	14,536
Percent Difference	26	37	-7	0	-16	0	0	6
Below Normal (17.5%)								
Second Basis of Comparison	66,585	1,818	42,215	0	2,763	0	0	113,380
Alternative 5	53,122	1,514	53,559	0	2,925	0	0	111,120
Difference	-13,463	-303	11,344	0	163	0	0	-2,260
Percent Difference	-20	-17	27	0	6	0	0	-2
Dry (22.5%)								
Second Basis of Comparison	34,417	2,551	139,003	0	2,682	0	0	178,652
Alternative 5	37,450	1,889	127,157	0	2,666	0	0	169,161
Difference	3,033	-662	-11,845	0	-16	0	0	-9,491
Percent Difference	9	-26	-9	0	-1	0	0	-5
Critical (15%)								
Second Basis of Comparison	44,378	3,862	254,723	0	2,151	0	0	305,113
Alternative 5	71,310	2,848	345,881	0	1,972	0	0	422,011
Difference	26,932	-1,013	91,158	0	-179	0	0	116,898
Percent Difference	61	-26	36	0	-8	0	0	38

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-3-30. Annual Mortality by All Factors for Spring-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Pre-Spawn Mortality	Incubation	Super-imposition	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Pre-smolt - Temperature	Pre-smolt - Habitat	Smolt - Temperature	Smolt - Habitat	Total
Long-term											
Full Simulation Period[1]											
Second Basis of Comparison	38,621	2,233	0	108,301	0	2,453	0	0	0	0	151,608
Alternative 5	44,327	1,783	0	125,868	0	2,371	0	0	0	0	174,349
Difference	5,706	-450	0	17,567	0	-82	0	0	0	0	22,742
Percent Difference[3]	15	-20	0	16	0	-3	0	0	0	0	15
Water Year Types[2]											
Wet (32.5%)											
Second Basis of Comparison	260	2,165	0	36,450	0	2,303	0	0	0	0	41,178
Alternative 5	608	1,803	0	54,781	1	2,203	0	0	0	0	59,395
Difference	348	-362	0	18,331	1	-101	0	0	0	0	18,217
Percent Difference	134	-17	0	50	0	-4	0	0	0	0	44
Above Normal (12.5%)											
Second Basis of Comparison	99,868	466	0	156,666	0	2,360	0	0	0	0	259,360
Alternative 5	125,685	636	0	145,595	0	1,980	0	0	0	0	273,896
Difference	25,817	171	0	-11,071	0	-380	0	0	0	0	14,536
Percent Difference	26	37	0	-7	0	-16	0	0	0	0	6
Below Normal (17.5%)											
Second Basis of Comparison	66,585	1,818	0	42,215	0	2,763	0	0	0	0	113,380
Alternative 5	53,122	1,514	0	53,559	0	2,925	0	0	0	0	111,120
Difference	-13,463	-303	0	11,344	0	163	0	0	0	0	-2,260
Percent Difference	-20	-17	0	27	0	6	0	0	0	0	-2
Dry (22.5%)											
Second Basis of Comparison	34,417	2,551	0	139,003	0	2,682	0	0	0	0	178,652
Alternative 5	37,450	1,889	0	127,157	0	2,666	0	0	0	0	169,161
Difference	3,033	-662	0	-11,845	0	-16	0	0	0	0	-9,491
Percent Difference	9	-26	0	-9	0	-1	0	0	0	0	-5
Critical (15%)											
Second Basis of Comparison	44,378	3,862	0	254,723	0	2,151	0	0	0	0	305,113
Alternative 5	71,310	2,848	0	345,881	0	1,972	0	0	0	0	422,011
Difference	26,932	-1,013	0	91,158	0	-179	0	0	0	0	116,898
Percent Difference	61	-26	0	36	0	-8	0	0	0	0	38

1 Based on the 80-year simulation period

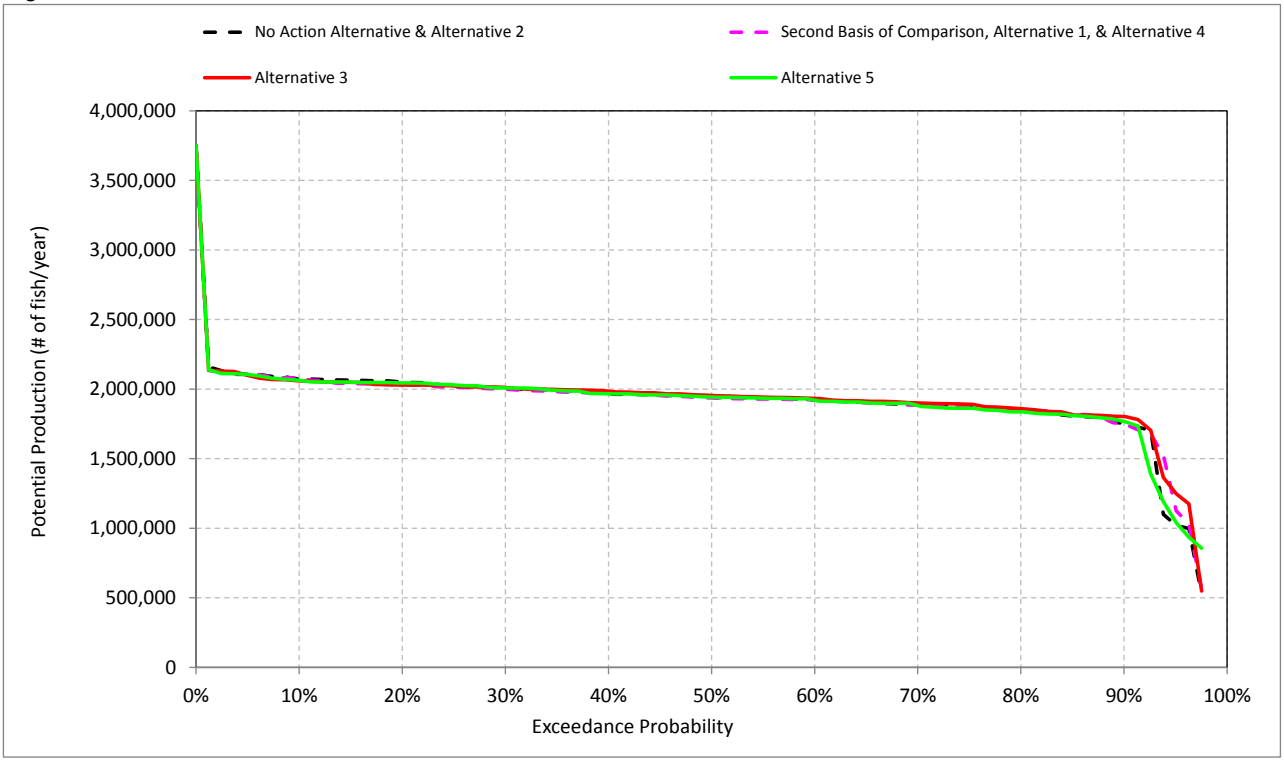
2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

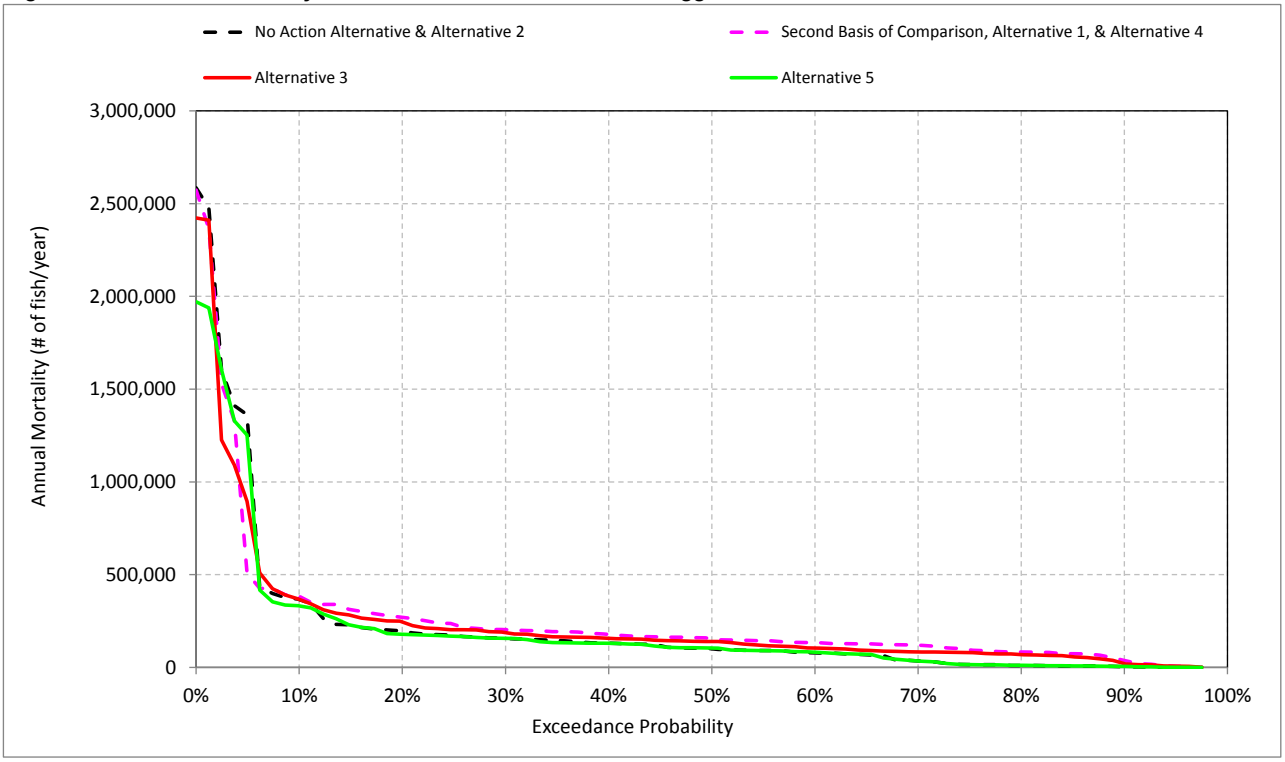
B.4. Winter-Run Chinook Salmon

Figure B-4-1. Annual Potential Production for Winter-Run Chinook Salmon



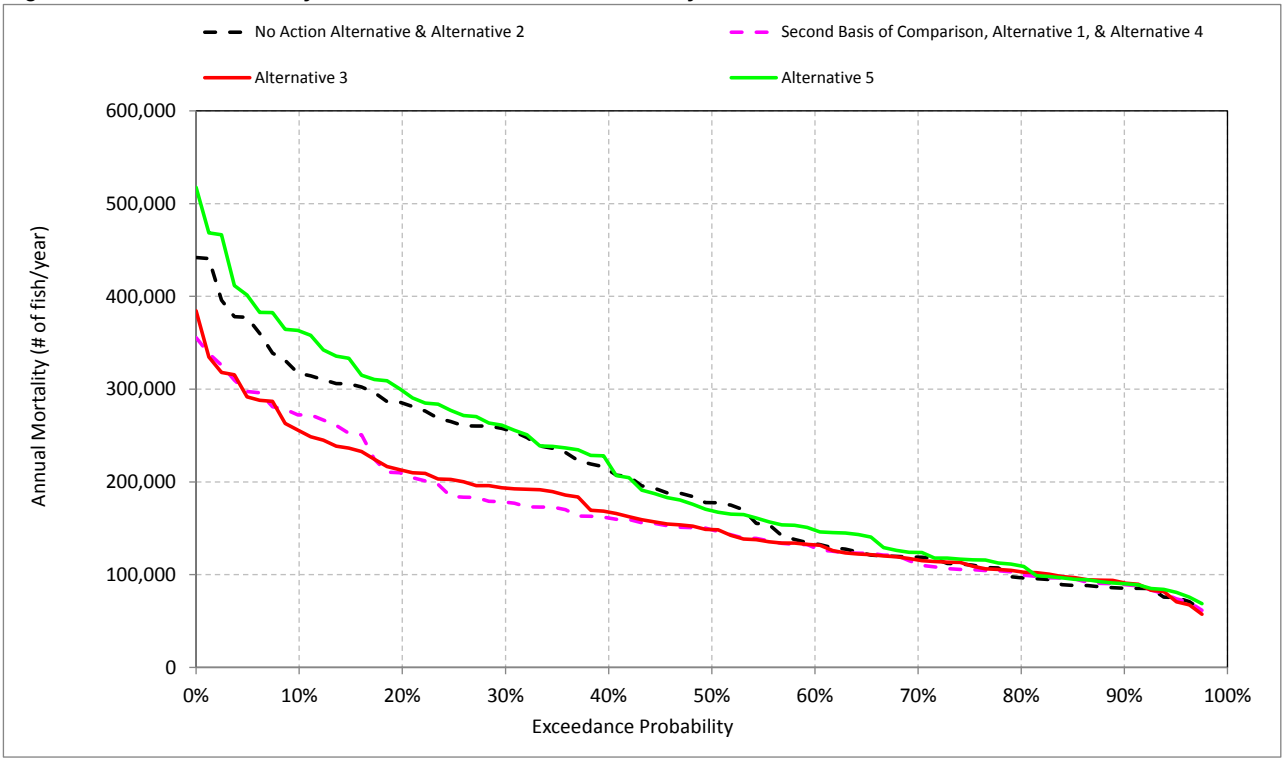
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-4-2. Annual Mortality for Winter-Run Chinook Salmon - Eggs



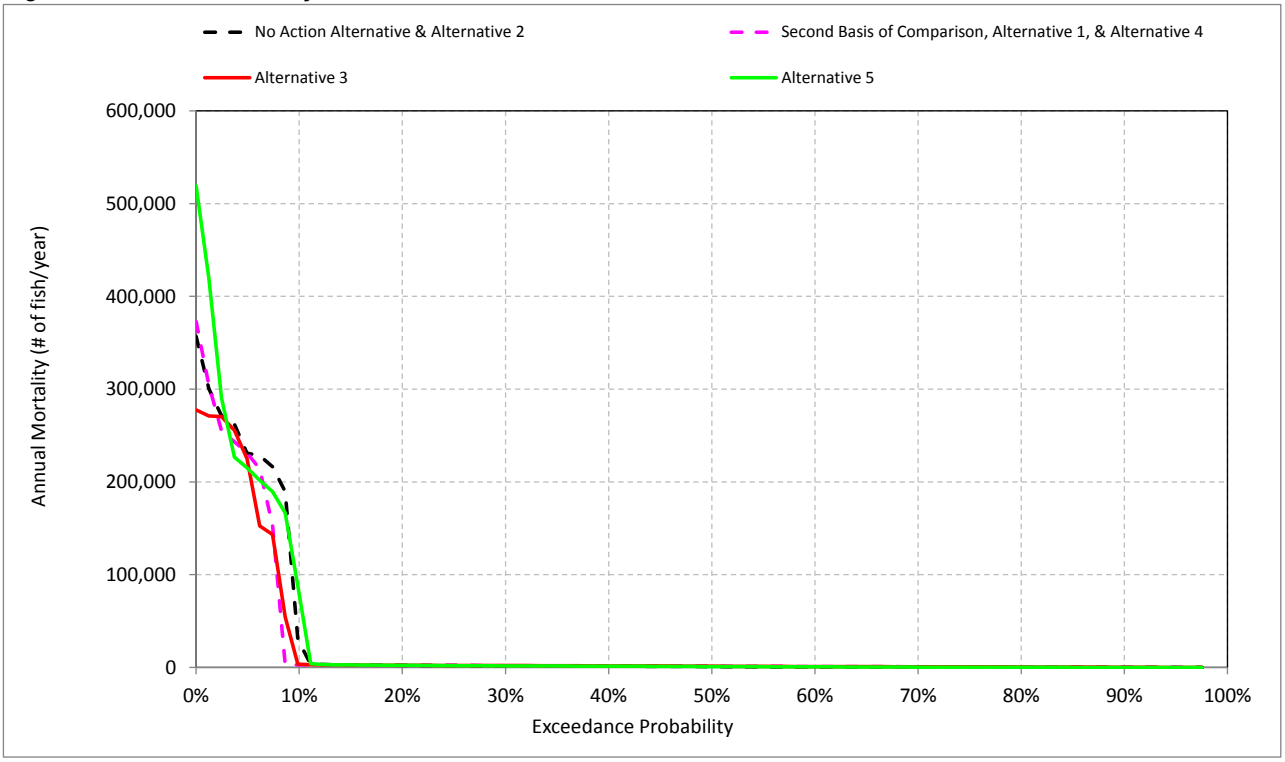
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-4-3. Annual Mortality for Winter-Run Chinook Salmon - Fry



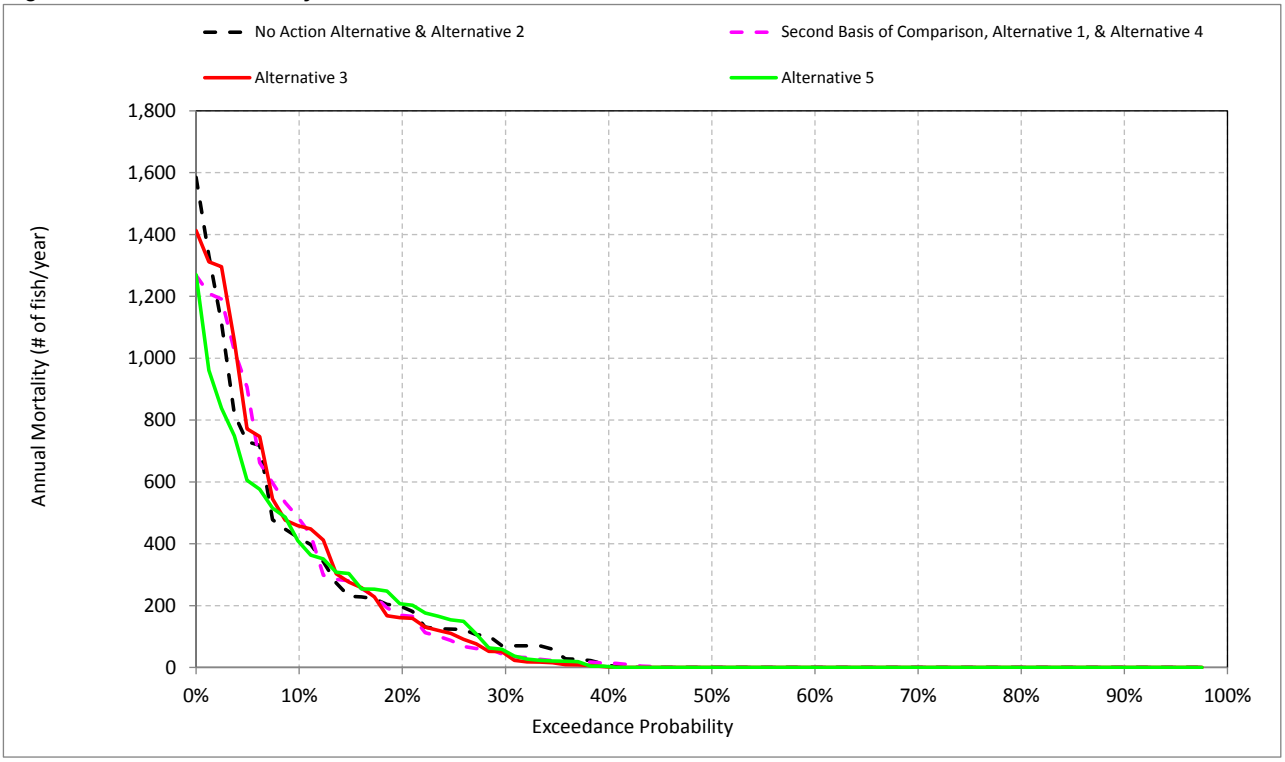
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

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



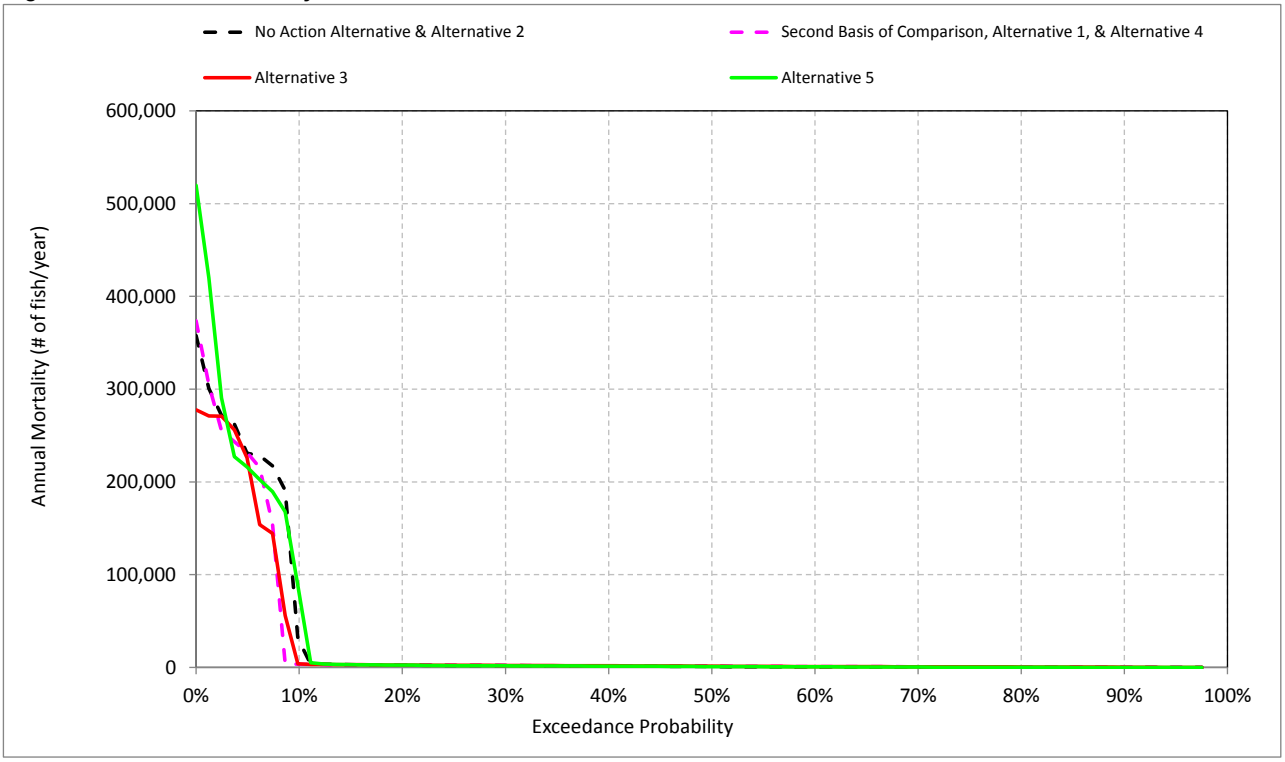
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-4-5. Annual Mortality for Winter-Run Chinook Salmon - Immature Smolt



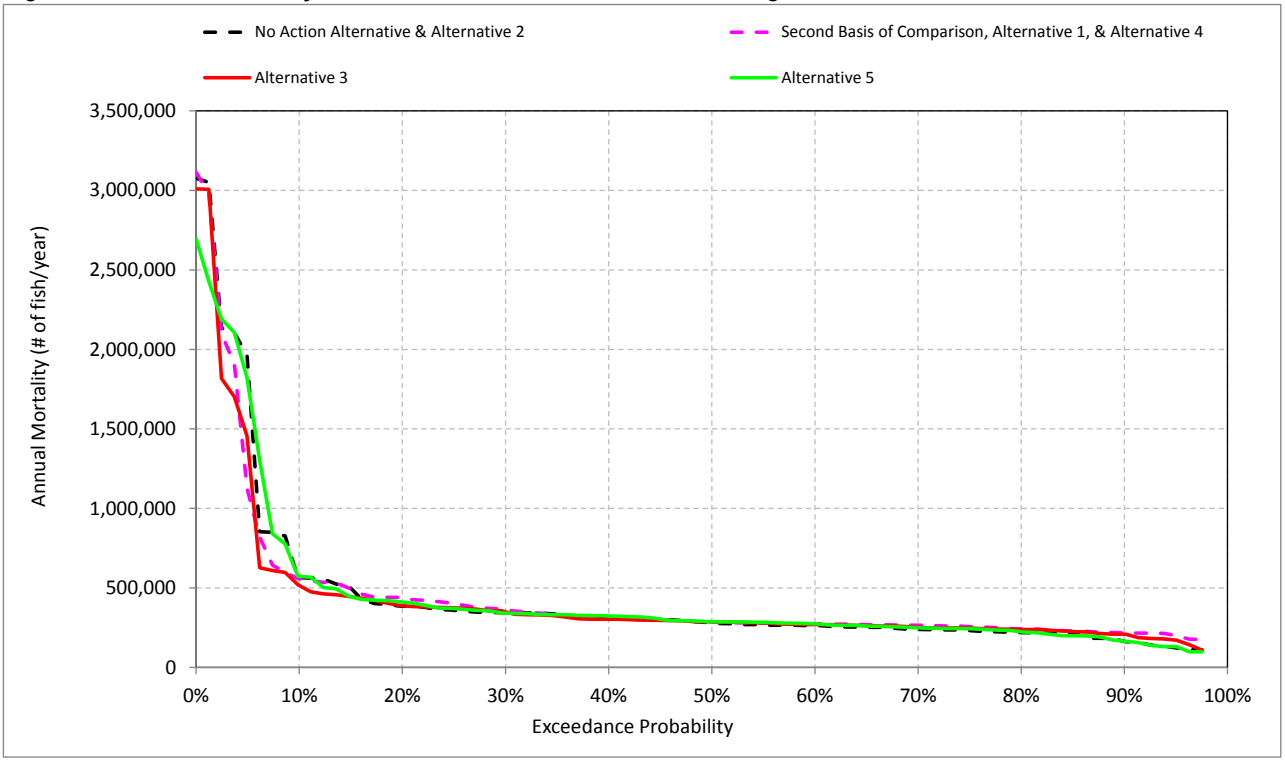
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-4-6. Annual Mortality for Winter-Run Chinook Salmon - Pre- & Immature Smolts



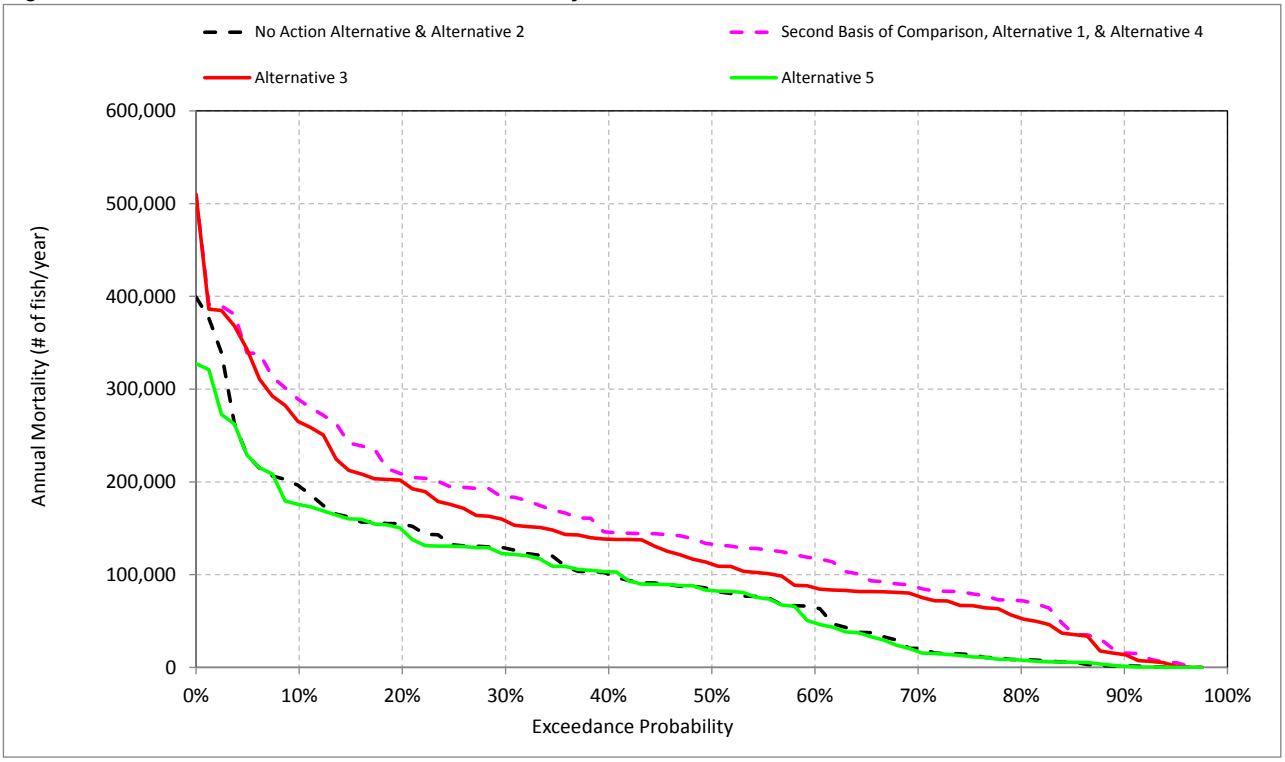
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-4-7. Annual Mortality for Winter-Run Chinook Salmon - All Lifestages



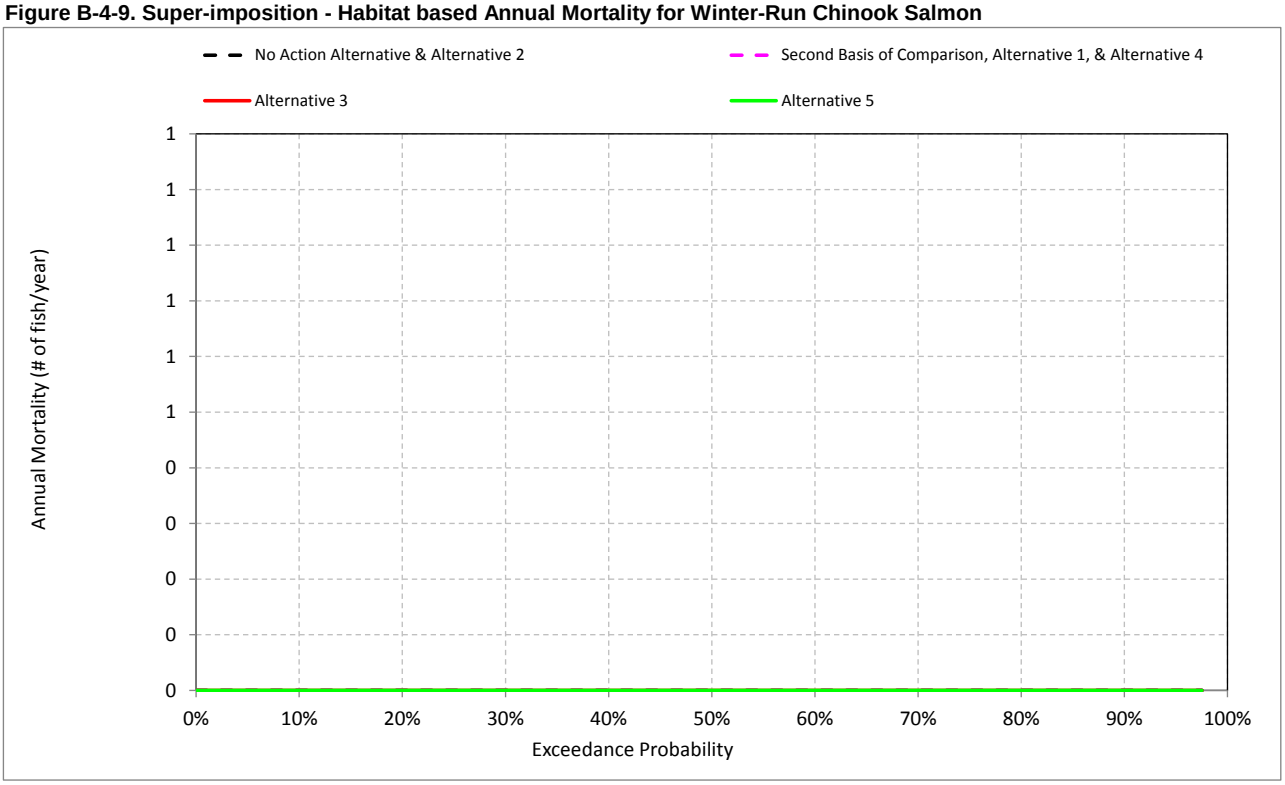
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-4-8. Incubation - Habitat based Annual Mortality for Winter-Run Chinook Salmon



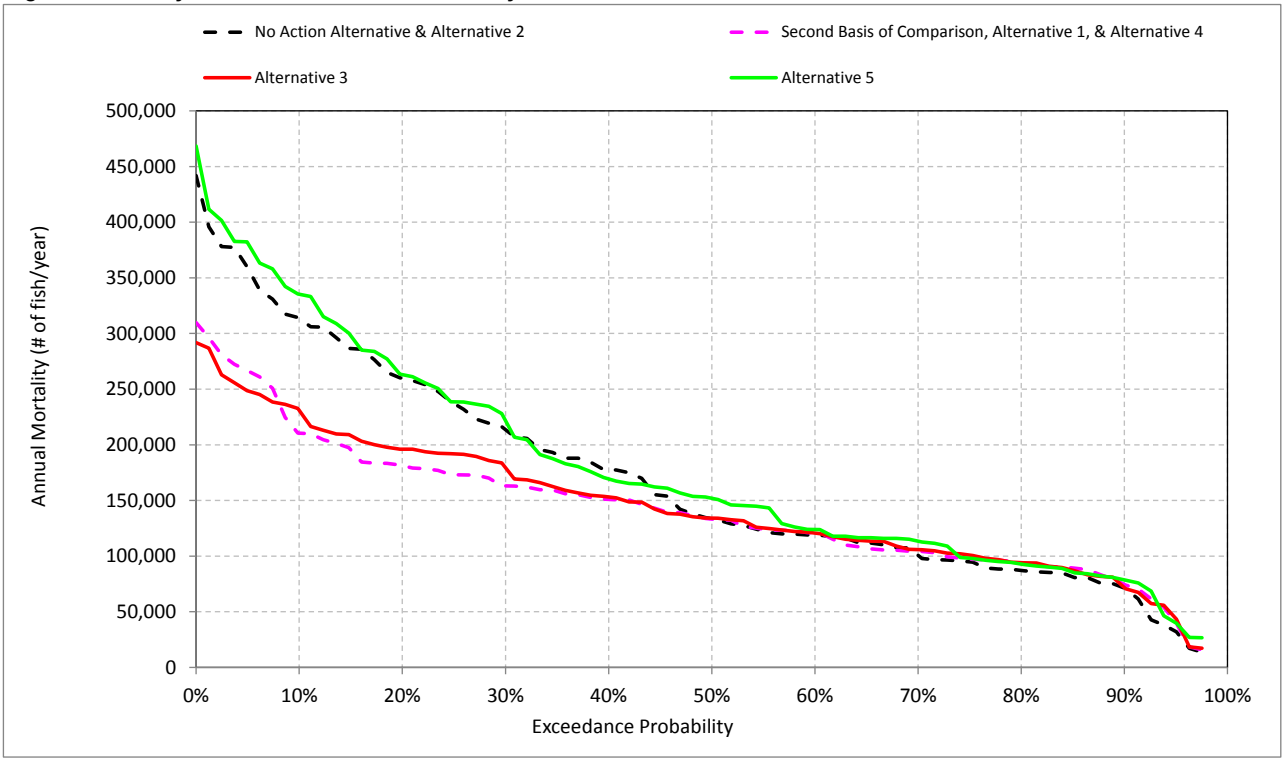
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-4-9. Super-imposition - Habitat based Annual Mortality for Winter-Run Chinook Salmon



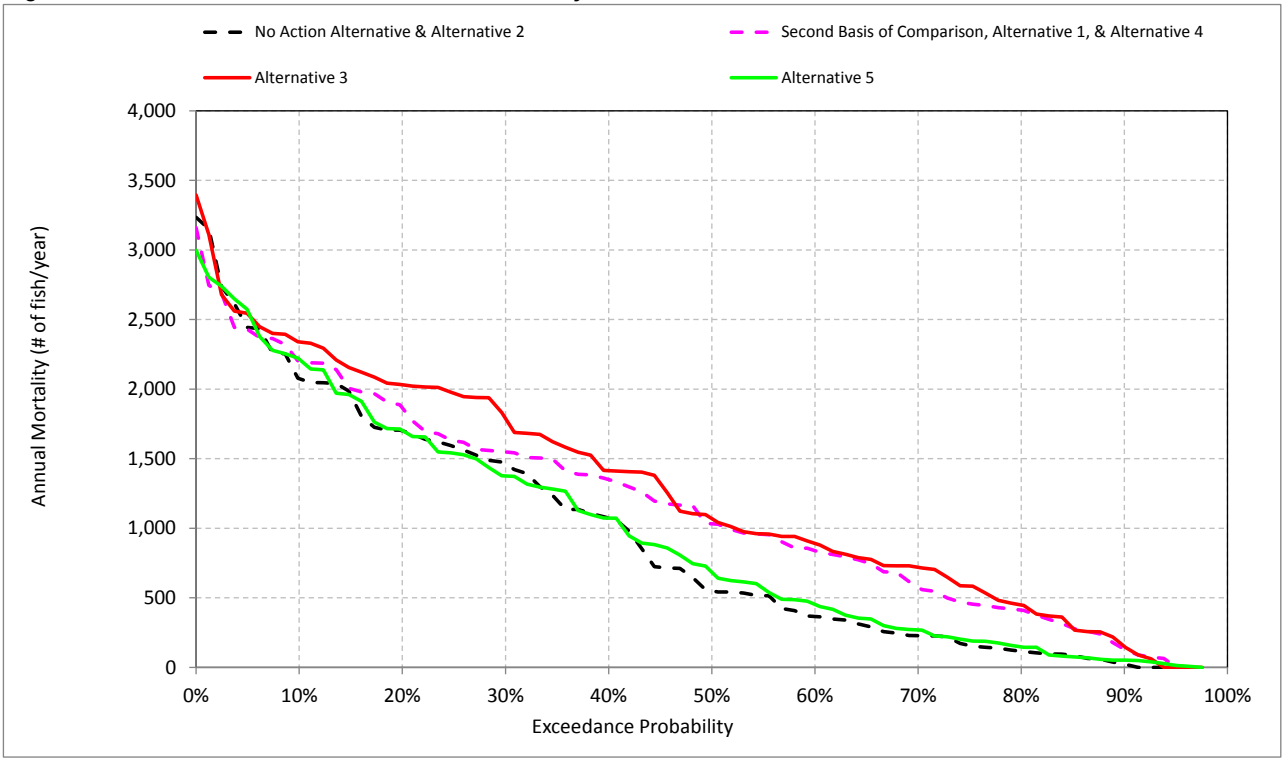
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-4-10. Fry - Habitat based Annual Mortality for Winter-Run Chinook Salmon



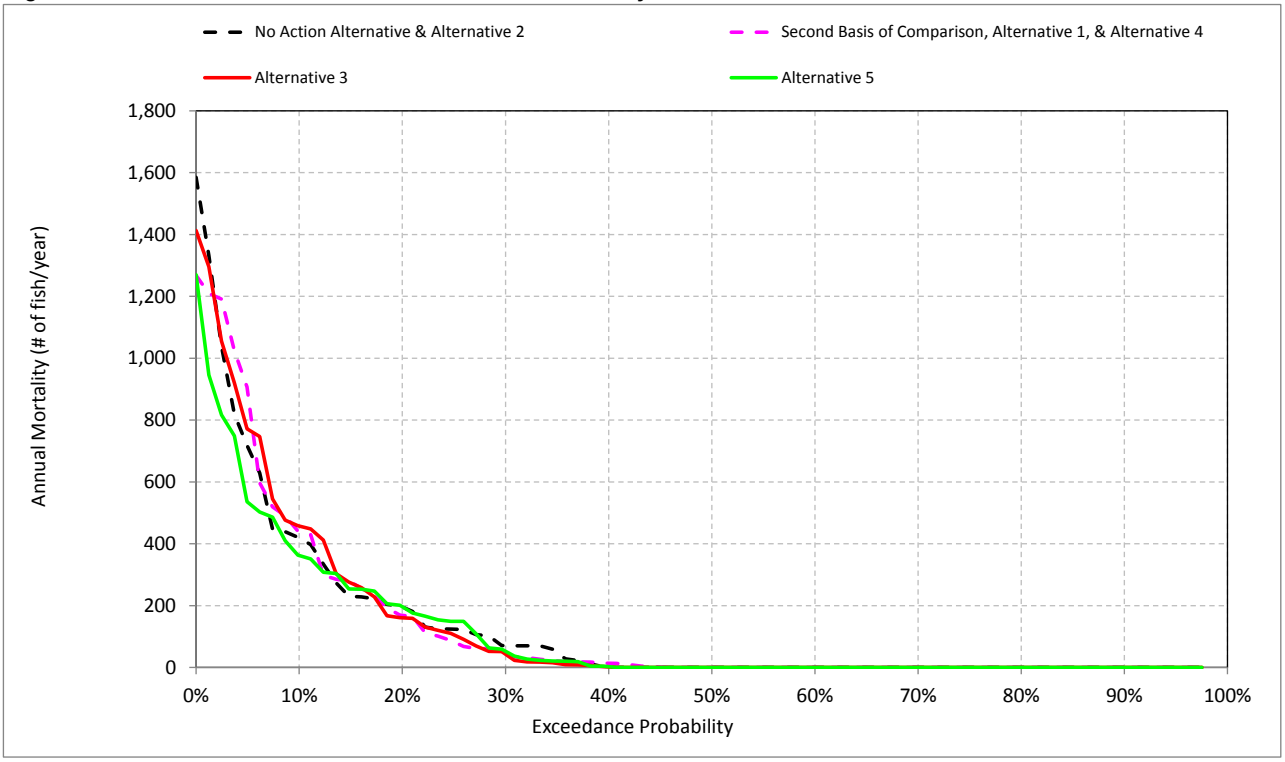
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-4-11. Pre-smolt - Habitat based Annual Mortality for Winter-Run Chinook Salmon



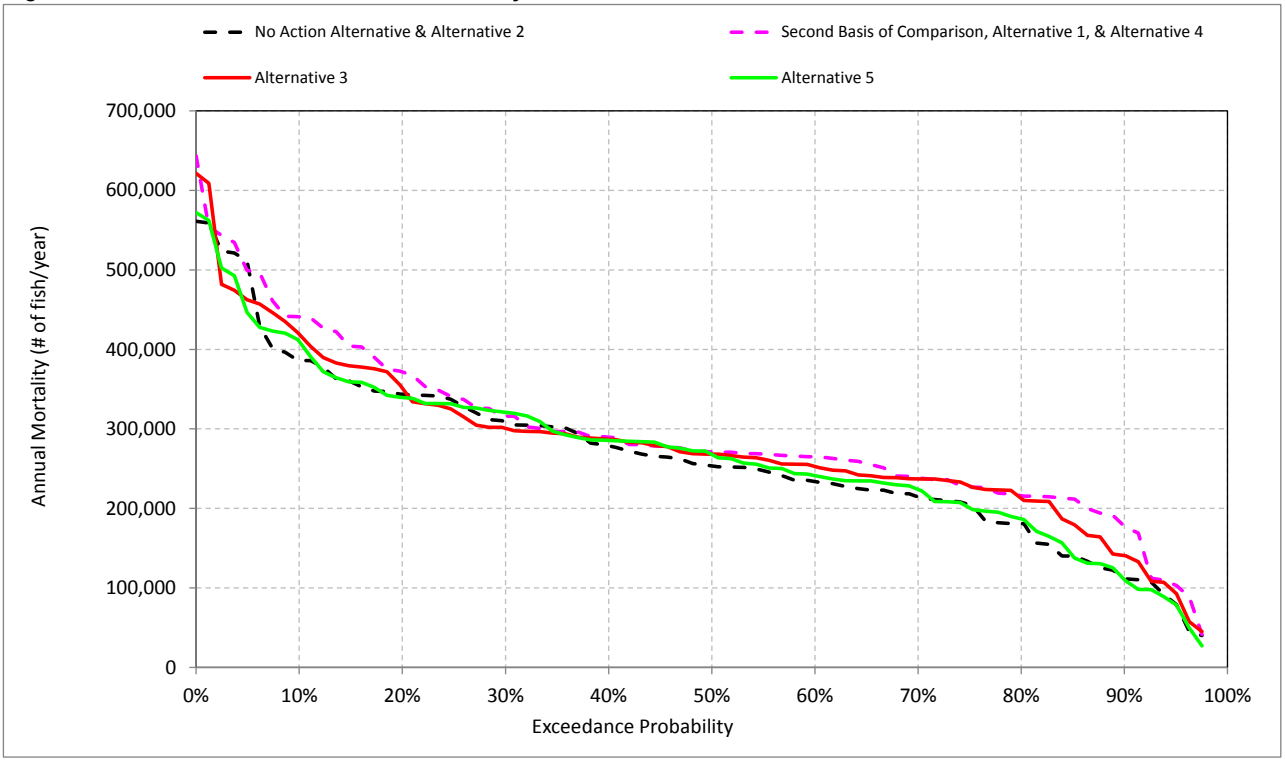
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-4-12. Immature Smolt - Habitat based Annual Mortality for Winter-Run Chinook Salmon



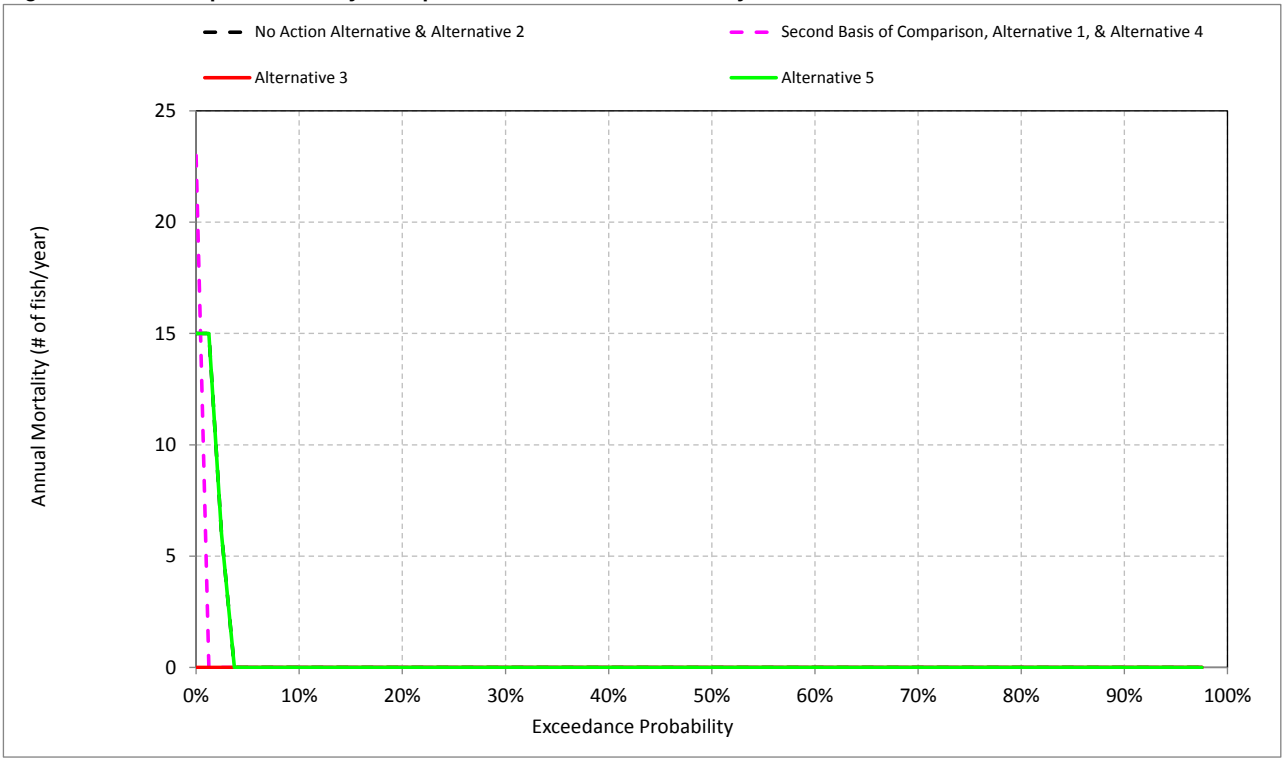
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-4-13. Total Habitat based Annual Mortality for Winter-Run Chinook Salmon



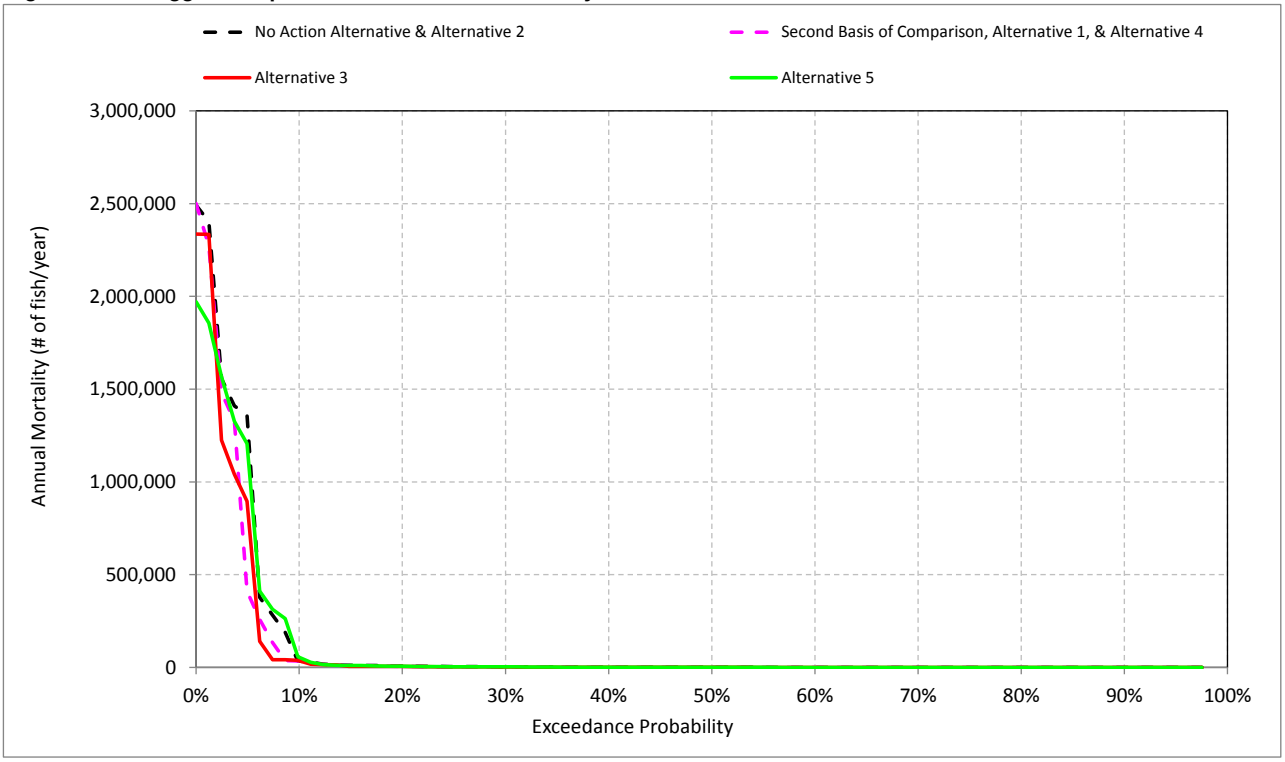
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-4-14. Pre-Spawn Mortality - Temperature based Annual Mortality for Winter-Run Chinook Salmon



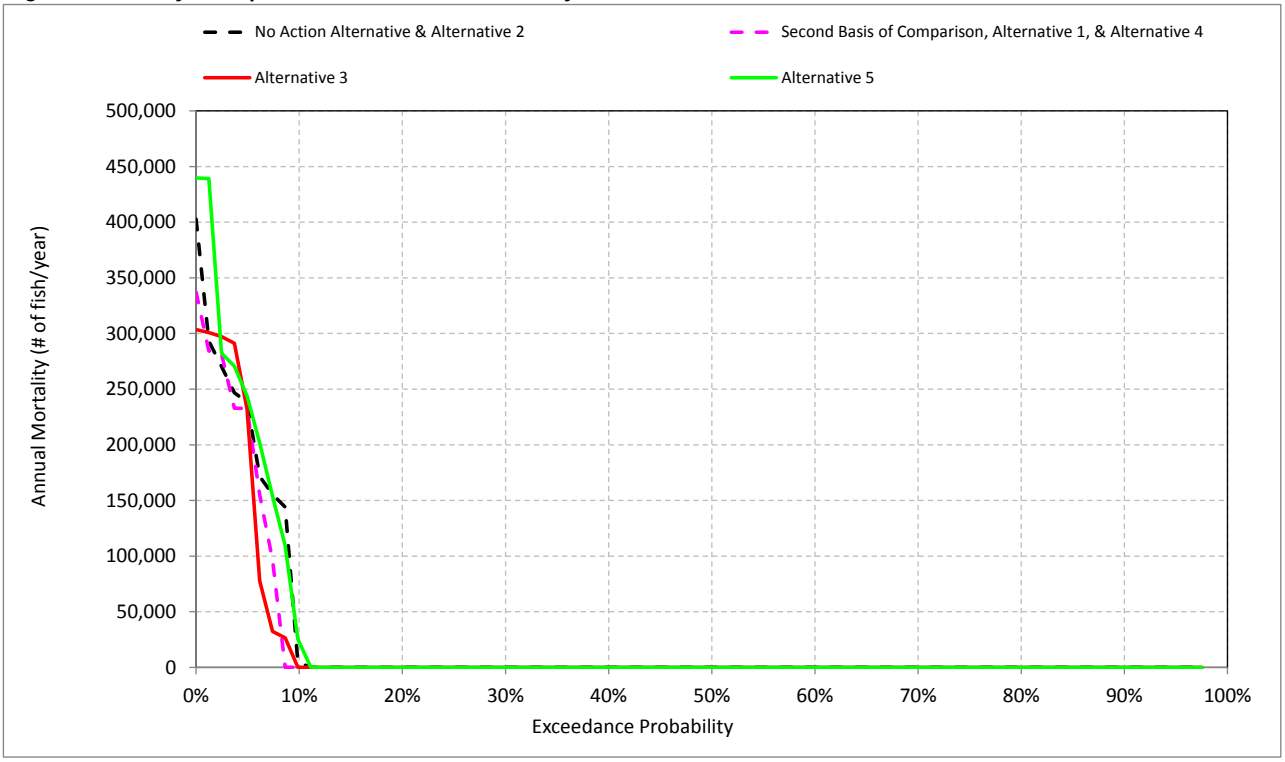
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-4-15. Eggs - Temperature based Annual Mortality for Winter-Run Chinook Salmon



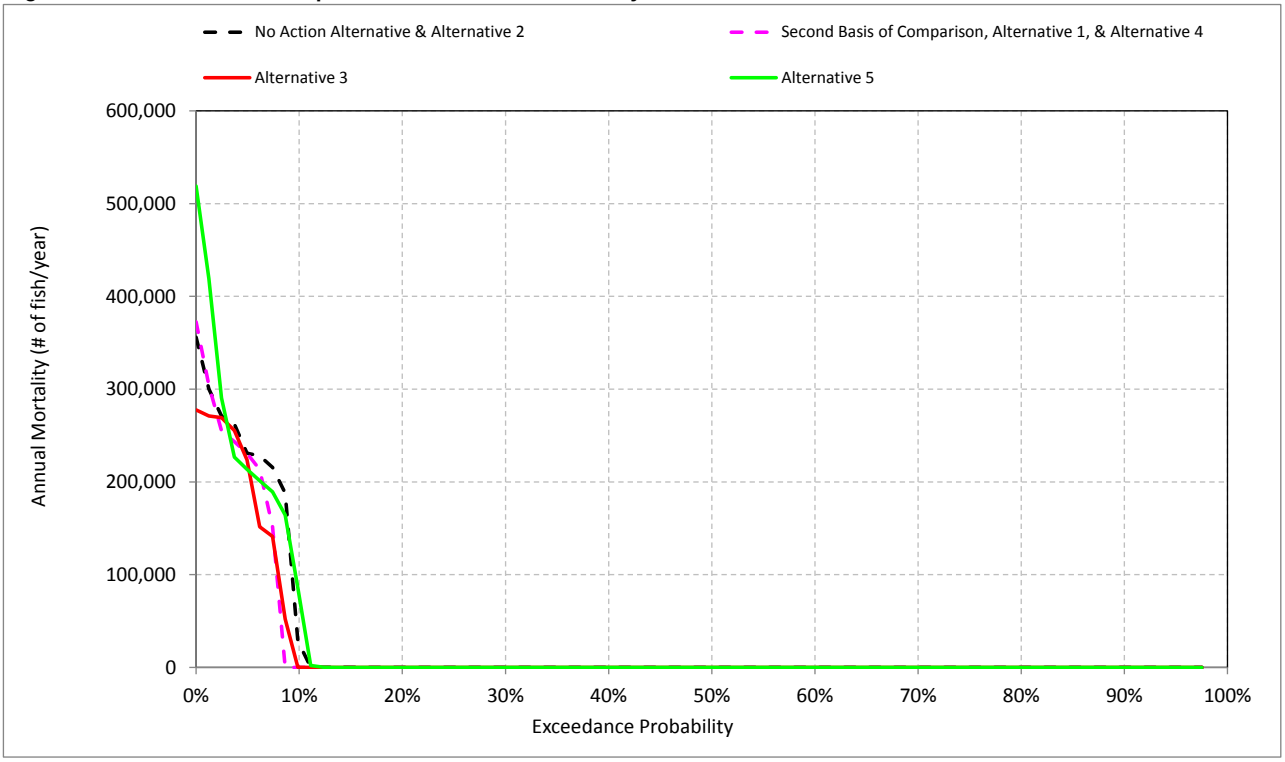
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-4-16. Fry - Temperature based Annual Mortality for Winter-Run Chinook Salmon



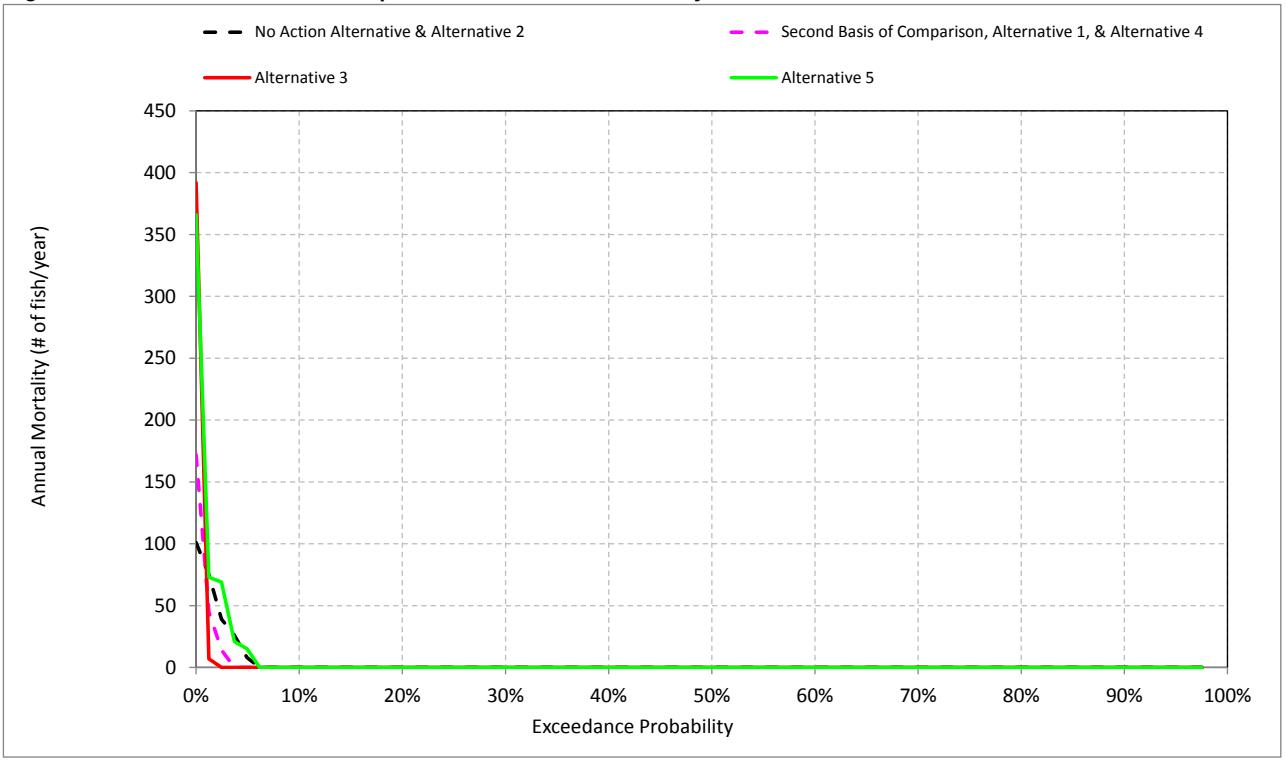
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-4-17. Pre-smolt - Temperature based Annual Mortality for Winter-Run Chinook Salmon



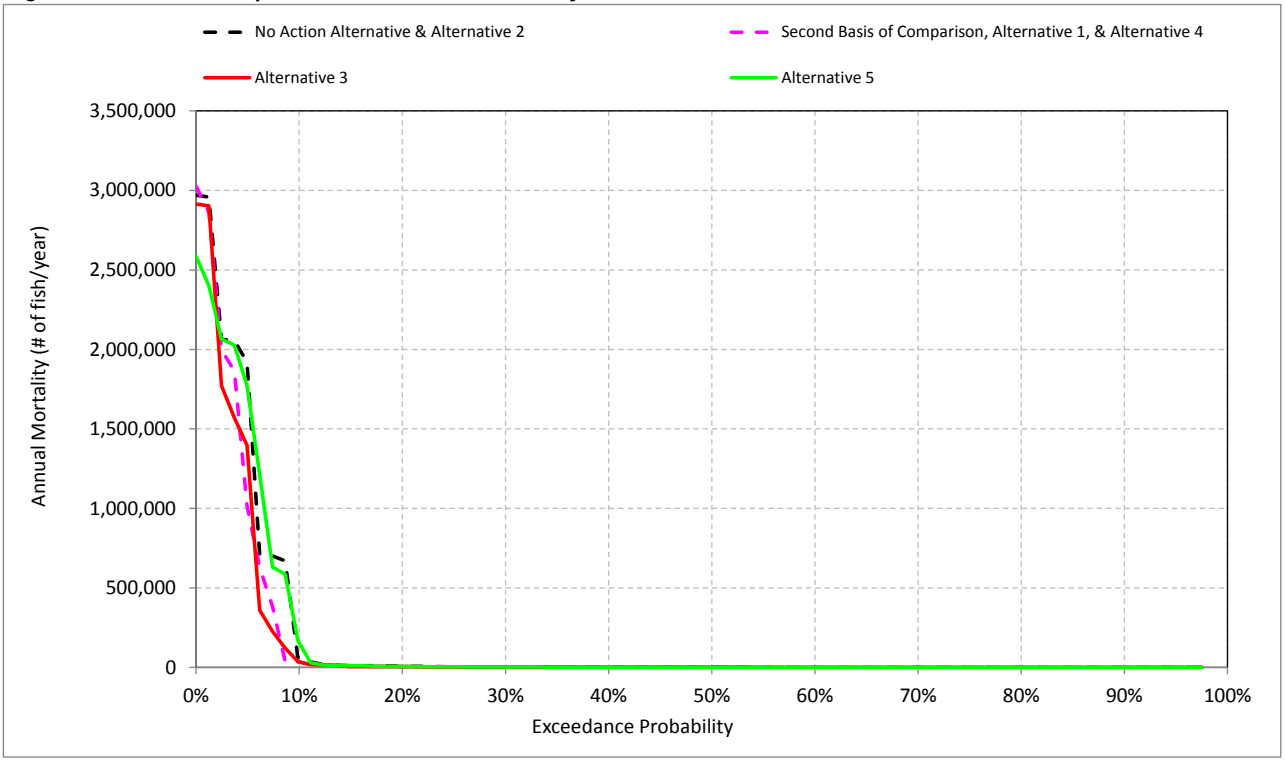
Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-4-18. Immature Smolt - Temperature based Annual Mortality for Winter-Run Chinook Salmon



Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Figure B-4-19. Total Temperature based Annual Mortality for Winter-Run Chinook Salmon



Notes: 1) Exceedance probability is defined as the probability a given value will be exceeded in any one year. 2) All alternatives are simulated with projected hydrology and sea level at Year 2030 conditions. 3) Model results for Alternatives 1, 4, and Second Basis of Comparison are the same, therefore Alternatives 1 and 4 results are not presented. Qualitative differences, if applicable, are discussed in the text. 4) Model results for Alternative 2 and No Action Alternative are the same, therefore Alternative 2 results are not presented. Qualitative differences, if applicable, are discussed in the text.

Table B-4-1. Annual Potential Production for Winter-Run Chinook Salmon

Analysis Period	Annual Potential Production (# of Fish/year)
Long-term	
Full Simulation Period[1]	
No Action Alternative	1,883,893
Alternative 1	1,885,400
Difference	1,507
Percent Difference[3]	0
Water Year Types[2]	
Wet (32.5%)	
No Action Alternative	1,952,705
Alternative 1	1,930,740
Difference	-21,965
Percent Difference	-1
Above Normal (12.5%)	
No Action Alternative	1,707,717
Alternative 1	1,746,928
Difference	39,211
Percent Difference	2
Below Normal (17.5%)	
No Action Alternative	1,863,415
Alternative 1	1,847,619
Difference	-15,795
Percent Difference	-1
Dry (22.5%)	
No Action Alternative	1,883,395
Alternative 1	1,894,107
Difference	10,712
Percent Difference	1
Critical (15%)	
No Action Alternative	1,906,250
Alternative 1	1,933,573
Difference	27,323
Percent Difference	1

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the annual average

Table B-4-2. Annual Mortality by Life Stage for Winter-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Eggs	Fry	Pre-Smolt	Immature-Smolt	Juvenile (Pre & Immature Smolt)
Long-term					
Full Simulation Period[1]					
No Action Alternative	222,517	196,405	26,961	138	27,099
Alternative 1	259,052	162,983	23,312	137	23,449
Difference	36,535	-33,421	-3,649	-2	-3,650
Percent Difference[3]	16	-17	-14	-1	-13
Water Year Types[2]					
Wet (32.5%)					
No Action Alternative	90,910	197,835	1,943	54	1,997
Alternative 1	155,104	176,315	1,060	47	1,107
Difference	64,194	-21,520	-883	-7	-890
Percent Difference	71	-11	-45	-13	-45
Above Normal (12.5%)					
No Action Alternative	469,585	220,960	53,686	94	53,779
Alternative 1	438,691	167,899	63,706	103	63,808
Difference	-30,894	-53,061	10,020	9	10,029
Percent Difference	-7	-24	19	9	19
Below Normal (17.5%)					
No Action Alternative	275,022	176,292	19,822	61	19,884
Alternative 1	337,945	142,925	18,481	41	18,522
Difference	62,922	-33,367	-1,341	-21	-1,362
Percent Difference	23	-19	-7	-34	-7
Dry (22.5%)					
No Action Alternative	209,708	215,896	24,076	139	24,215
Alternative 1	240,069	172,393	22,611	143	22,755
Difference	30,361	-43,503	-1,465	4	-1,460
Percent Difference	14	-20	-6	3	-6
Critical (15%)					
No Action Alternative	259,734	167,072	71,553	447	72,000
Alternative 1	271,006	139,289	44,553	461	45,014
Difference	11,272	-27,783	-27,000	14	-26,985
Percent Difference	4	-17	-38	3	-37

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

5 Eggs mortality includes pre-spawn mortality

Table B-4-3. Annual Mortality by Cause for Winter-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Temperature	Flow	Total
Long-term			
Full Simulation Period[1]			
No Action Alternative	178,654	267,367	446,021
Alternative 1	149,945	295,539	445,484
Difference	-28,708	28,172	-537
Percent Difference[3]	-16	11	0
Water Year Types[2]			
Wet (32.5%)			
No Action Alternative	3,522	287,219	290,741
Alternative 1	1,273	331,252	332,525
Difference	-2,249	44,034	41,785
Percent Difference	-64	15	14
Above Normal (12.5%)			
No Action Alternative	504,624	239,700	744,324
Alternative 1	388,548	281,850	670,398
Difference	-116,076	42,150	-73,926
Percent Difference	-23	18	-10
Below Normal (17.5%)			
No Action Alternative	212,903	258,295	471,198
Alternative 1	218,115	281,277	499,391
Difference	5,212	22,981	28,193
Percent Difference	2	9	6
Dry (22.5%)			
No Action Alternative	155,797	294,022	449,819
Alternative 1	134,348	300,869	435,217
Difference	-21,449	6,847	-14,602
Percent Difference	-14	2	-3
Critical (15%)			
No Action Alternative	280,793	218,012	498,805
Alternative 1	217,099	238,210	455,309
Difference	-63,694	20,198	-43,496
Percent Difference	-23	9	-9

1 Based on the 80-year simulation period.

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-4-4. Annual Mortality by Cause and Life Stage for Winter-Run Chinook Salmon

Analysis Period	Pre-Spawn Mortality	Annual Mortality[4] (# of Fish/year) Eggs Flow	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Juvenile Temperature	Juvenile Habitat	Total
Long-term								
Full Simulation Period[1]								
No Action Alternative	0	93,980	128,537	24,093	172,312	26,023	1,076	446,021
Alternative 1	0	151,512	107,540	20,257	142,726	22,149	1,300	445,484
Difference	0	57,532	-20,997	-3,836	-29,585	-3,875	225	-537
Percent Difference[3]	-36	61	-16	-16	-17	-15	21	0
Water Year Types[2]								
Wet (32.5%)								
No Action Alternative	0	88,673	2,236	182	197,652	1,103	893	290,741
Alternative 1	0	153,836	1,268	3	176,312	3	1,104	332,525
Difference	0	65,163	-969	-180	-21,340	-1,101	211	41,784
Percent Difference	0	73	-43	-98	-11	-100	24	14
Above Normal (12.5%)								
No Action Alternative	0	83,031	386,554	64,945	156,015	53,125	654	744,324
Alternative 1	0	169,913	268,778	56,974	110,925	62,797	1,012	670,398
Difference	0	86,882	-117,776	-7,972	-45,090	9,671	358	-73,926
Percent Difference	0	105	-30	-12	-29	18	55	-10
Below Normal (17.5%)								
No Action Alternative	0	101,792	173,231	20,940	155,352	18,732	1,152	471,198
Alternative 1	0	157,331	180,614	20,113	122,812	17,388	1,134	499,391
Difference	0	55,539	7,383	-827	-32,540	-1,344	-18	28,193
Percent Difference	0	55	4	-4	-21	-7	-2	6
Dry (22.5%)								
No Action Alternative	2	100,064	109,642	23,024	192,872	23,129	1,086	449,819
Alternative 1	1	148,149	91,919	21,162	151,231	21,266	1,488	435,217
Difference	0	48,085	-17,723	-1,862	-41,641	-1,863	402	-14,602
Percent Difference	-23	48	-16	-8	-22	-8	37	-3
Critical (15%)								
No Action Alternative	1	96,360	163,373	47,138	119,933	70,281	1,719	498,805
Alternative 1	0	129,397	141,609	32,354	106,935	43,136	1,878	455,309
Difference	-1	33,037	-21,764	-14,784	-12,999	-27,145	160	-43,496
Percent Difference	-100	34	-13	-31	-11	-39	9	-9

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-4-5. Annual Mortality by All Factors for Winter-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Pre-Spawn Mortality	Incubation	Super-imposition	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Pre-smolt - Temperature	Pre-smolt - Habitat	Smolt - Temperature	Smolt - Habitat	Total
Long-term											
Full Simulation Period[1]											
No Action Alternative	0	93,980	0	128,537	24,093	172,312	26,020	941	3	135	446,021
Alternative 1	0	151,512	0	107,540	20,257	142,726	22,146	1,167	3	134	445,484
Difference	0	57,532	0	-20,997	-3,836	-29,585	-3,875	226	0	-1	-537
Percent Difference[3]	-36	61	0	-16	-16	-17	-15	24	-7	-1	0
Water Year Types[2]											
Wet (32.5%)											
No Action Alternative	0	88,673	0	2,236	182	197,652	1,101	842	3	51	290,741
Alternative 1	0	153,836	0	1,268	3	176,312	3	1,057	0	47	332,525
Difference	0	65,163	0	-969	-180	-21,340	-1,098	215	-3	-4	41,784
Percent Difference	0	73	0	-43	-98	-11	-100	26	-100	-8	14
Above Normal (12.5%)											
No Action Alternative	0	83,031	0	386,554	64,945	156,015	53,122	564	3	90	744,324
Alternative 1	0	169,913	0	268,778	56,974	110,925	62,779	926	17	85	670,398
Difference	0	86,882	0	-117,776	-7,972	-45,090	9,658	363	14	-5	-73,926
Percent Difference	0	105	0	-30	-12	-29	18	64	406	-6	-10
Below Normal (17.5%)											
No Action Alternative	0	101,792	0	173,231	20,940	155,352	18,732	1,091	0	61	471,198
Alternative 1	0	157,331	0	180,614	20,113	122,812	17,388	1,093	0	41	499,391
Difference	0	55,539	0	7,383	-827	-32,540	-1,344	3	0	-21	28,193
Percent Difference	0	55	0	4	-4	-21	-7	0	0	-34	6
Dry (22.5%)											
No Action Alternative	2	100,064	0	109,642	23,024	192,872	23,129	947	0	139	449,819
Alternative 1	1	148,149	0	91,919	21,162	151,231	21,264	1,348	3	141	435,217
Difference	0	48,085	0	-17,723	-1,862	-41,641	-1,865	401	3	2	-14,602
Percent Difference	-23	48	0	-16	-8	-22	-8	42	0	1	-3
Critical (15%)											
No Action Alternative	1	96,360	0	163,373	47,138	119,933	70,269	1,283	12	435	498,805
Alternative 1	0	129,397	0	141,609	32,354	106,935	43,135	1,418	1	460	455,309
Difference	-1	33,037	0	-21,764	-14,784	-12,999	-27,135	135	-11	25	-43,496
Percent Difference	-100	34	0	-13	-31	-11	-39	11	-90	6	-9

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-4-6. Annual Potential Production for Winter-Run Chinook Salmon

Analysis Period	Annual Potential Production (# of Fish/year)
Long-term	
Full Simulation Period[1]	
No Action Alternative	1,883,893
Alternative 3	1,897,120
Difference	13,227
Percent Difference[3]	1
Water Year Types[2]	
Wet (32.5%)	
No Action Alternative	1,952,705
Alternative 3	1,944,614
Difference	-8,091
Percent Difference	0
Above Normal (12.5%)	
No Action Alternative	1,707,717
Alternative 3	1,752,903
Difference	45,186
Percent Difference	3
Below Normal (17.5%)	
No Action Alternative	1,863,415
Alternative 3	1,840,343
Difference	-23,072
Percent Difference	-1
Dry (22.5%)	
No Action Alternative	1,883,395
Alternative 3	1,919,466
Difference	36,071
Percent Difference	2
Critical (15%)	
No Action Alternative	1,906,250
Alternative 3	1,947,116
Difference	40,866
Percent Difference	2

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the annual average

Table B-4-7. Annual Mortality by Life Stage for Winter-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Eggs	Fry	Pre-Smolt	Immature-Smolt	Juvenile (Pre & Immature Smolt)
Long-term					
Full Simulation Period[1]					
No Action Alternative	222,517	196,405	26,961	138	27,099
Alternative 3	237,813	165,266	21,803	140	21,943
Difference	15,296	-31,139	-5,158	2	-5,156
Percent Difference[3]	7	-16	-19	1	-19
Water Year Types[2]					
Wet (32.5%)					
No Action Alternative	90,910	197,835	1,943	54	1,997
Alternative 3	131,631	174,265	1,188	34	1,222
Difference	40,721	-23,569	-755	-20	-774
Percent Difference	45	-12	-39	-37	-39
Above Normal (12.5%)					
No Action Alternative	469,585	220,960	53,686	94	53,779
Alternative 3	443,487	166,295	54,841	70	54,912
Difference	-26,098	-54,664	1,156	-23	1,133
Percent Difference	-6	-25	2	-25	2
Below Normal (17.5%)					
No Action Alternative	275,022	176,292	19,822	61	19,884
Alternative 3	324,721	159,309	20,994	55	21,049
Difference	49,699	-16,983	1,172	-6	1,166
Percent Difference	18	-10	6	-10	6
Dry (22.5%)					
No Action Alternative	209,708	215,896	24,076	139	24,215
Alternative 3	207,993	170,244	16,866	166	17,032
Difference	-1,715	-45,653	-7,210	27	-7,183
Percent Difference	-1	-21	-30	19	-30
Critical (15%)					
No Action Alternative	259,734	167,072	71,553	447	72,000
Alternative 3	239,816	144,393	47,286	490	47,776
Difference	-19,918	-22,679	-24,267	43	-24,224
Percent Difference	-8	-14	-34	10	-34

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

5 Eggs mortality includes pre-spawn mortality

Table B-4-8. Annual Mortality by Cause for Winter-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Temperature	Flow	Total
Long-term			
Full Simulation Period[1]			
No Action Alternative	178,654	267,367	446,021
Alternative 3	142,827	282,195	425,022
Difference	-35,827	14,828	-20,999
Percent Difference[3]	-20	6	-5
Water Year Types[2]			
Wet (32.5%)			
No Action Alternative	3,522	287,219	290,741
Alternative 3	1,126	305,992	307,118
Difference	-2,396	18,773	16,377
Percent Difference	-68	7	6
Above Normal (12.5%)			
No Action Alternative	504,624	239,700	744,324
Alternative 3	430,489	234,205	664,694
Difference	-74,135	-5,495	-79,630
Percent Difference	-15	-2	-11
Below Normal (17.5%)			
No Action Alternative	212,903	258,295	471,198
Alternative 3	210,138	294,942	505,080
Difference	-2,765	36,647	33,882
Percent Difference	-1	14	7
Dry (22.5%)			
No Action Alternative	155,797	294,022	449,819
Alternative 3	95,635	299,633	395,268
Difference	-60,162	5,611	-54,551
Percent Difference	-39	2	-12
Critical (15%)			
No Action Alternative	280,793	218,012	498,805
Alternative 3	202,386	229,599	431,984
Difference	-78,407	11,587	-66,821
Percent Difference	-28	5	-13

1 Based on the 80-year simulation period.

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-4-9. Annual Mortality by Cause and Life Stage for Winter-Run Chinook Salmon

Analysis Period	Pre-Spawn Mortality	Eggs Flow	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Juvenile Temperature	Juvenile Habitat	Total
			Annual Mortality[4] (# of Fish/year)					
Long-term								
Full Simulation Period[1]								
No Action Alternative	0	93,980	128,537	24,093	172,312	26,023	1,076	446,021
Alternative 3	0	135,049	102,763	19,523	145,743	20,541	1,402	425,022
Difference	0	41,070	-25,774	-4,571	-26,568	-5,482	326	-20,999
Percent Difference[3]	-100	44	-20	-19	-15	-21	30	-5
Water Year Types[2]								
Wet (32.5%)								
No Action Alternative	0	88,673	2,236	182	197,652	1,103	893	290,741
Alternative 3	0	130,505	1,126	1	174,265	0	1,222	307,118
Difference	0	41,832	-1,111	-181	-23,388	-1,103	329	16,377
Percent Difference	0	47	-50	-100	-12	-100	37	6
Above Normal (12.5%)								
No Action Alternative	0	83,031	386,554	64,945	156,015	53,125	654	744,324
Alternative 3	0	119,969	323,517	52,929	113,366	54,043	869	664,694
Difference	0	36,938	-63,037	-12,016	-42,648	917	215	-79,630
Percent Difference	0	44	-16	-19	-27	2	33	-11
Below Normal (17.5%)								
No Action Alternative	0	101,792	173,231	20,940	155,352	18,732	1,152	471,198
Alternative 3	0	155,899	168,822	21,483	137,826	19,833	1,217	505,080
Difference	0	54,108	-4,409	542	-17,525	1,101	65	33,882
Percent Difference	0	53	-3	3	-11	6	6	7
Dry (22.5%)								
No Action Alternative	2	100,064	109,642	23,024	192,872	23,129	1,086	449,819
Alternative 3	0	146,046	61,947	18,345	151,898	15,343	1,689	395,268
Difference	-2	45,982	-47,695	-4,679	-40,974	-7,786	603	-54,551
Percent Difference	-100	46	-44	-20	-21	-34	55	-12
Critical (15%)								
No Action Alternative	1	96,360	163,373	47,138	119,933	70,281	1,719	498,805
Alternative 3	0	116,643	123,172	33,460	110,932	45,753	2,023	431,984
Difference	-1	20,283	-40,201	-13,678	-9,001	-24,528	305	-66,821
Percent Difference	-100	21	-25	-29	-8	-35	18	-13

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-4-10. Annual Mortality by All Factors for Winter-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Pre-Spawn Mortality	Incubation	Super-imposition	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Pre-smolt - Temperature	Pre-smolt - Habitat	Smolt - Temperature	Smolt - Habitat	Total
Long-term											
Full Simulation Period[1]											
No Action Alternative	0	93,980	0	128,537	24,093	172,312	26,020	941	3	135	446,021
Alternative 3	0	135,049	0	102,763	19,523	145,743	20,536	1,267	5	135	425,022
Difference	0	41,070	0	-25,774	-4,571	-26,568	-5,484	326	2	0	-20,999
Percent Difference[3]	-100	44	0	-20	-19	-15	-21	35	60	0	-5
Water Year Types[2]											
Wet (32.5%)											
No Action Alternative	0	88,673	0	2,236	182	197,652	1,101	842	3	51	290,741
Alternative 3	0	130,505	0	1,126	1	174,265	0	1,188	0	34	307,118
Difference	0	41,832	0	-1,111	-181	-23,388	-1,101	346	-3	-17	16,377
Percent Difference	0	47	0	-50	-100	-12	-100	41	-100	-33	6
Above Normal (12.5%)											
No Action Alternative	0	83,031	0	386,554	64,945	156,015	53,122	564	3	90	744,324
Alternative 3	0	119,969	0	323,517	52,929	113,366	54,043	799	0	70	664,694
Difference	0	36,938	0	-63,037	-12,016	-42,648	921	235	-3	-20	-79,630
Percent Difference	0	44	0	-16	-19	-27	2	42	-100	-22	-11
Below Normal (17.5%)											
No Action Alternative	0	101,792	0	173,231	20,940	155,352	18,732	1,091	0	61	471,198
Alternative 3	0	155,899	0	168,822	21,483	137,826	19,832	1,162	1	54	505,080
Difference	0	54,108	0	-4,409	542	-17,525	1,100	72	1	-7	33,882
Percent Difference	0	53	0	-3	3	-11	6	7	0	-11	7
Dry (22.5%)											
No Action Alternative	2	100,064	0	109,642	23,024	192,872	23,129	947	0	139	449,819
Alternative 3	0	146,046	0	61,947	18,345	151,898	15,343	1,523	0	166	395,268
Difference	-2	45,982	0	-47,695	-4,679	-40,974	-7,786	576	0	27	-54,551
Percent Difference	-100	46	0	-44	-20	-21	-34	61	0	19	-12
Critical (15%)											
No Action Alternative	1	96,360	0	163,373	47,138	119,933	70,269	1,283	12	435	498,805
Alternative 3	0	116,643	0	123,172	33,460	110,932	45,720	1,566	33	457	431,984
Difference	-1	20,283	0	-40,201	-13,678	-9,001	-24,549	283	21	22	-66,821
Percent Difference	-100	21	0	-25	-29	-8	-35	22	180	5	-13

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-4-11. Annual Potential Production for Winter-Run Chinook Salmon

Analysis Period	Annual Potential Production (# of Fish/year)
Long-term	
Full Simulation Period[1]	
No Action Alternative	1,883,893
Alternative 5	1,883,178
Difference	-715
Percent Difference[3]	0
Water Year Types[2]	
Wet (32.5%)	
No Action Alternative	1,952,705
Alternative 5	1,943,241
Difference	-9,464
Percent Difference	0
Above Normal (12.5%)	
No Action Alternative	1,707,717
Alternative 5	1,698,809
Difference	-8,908
Percent Difference	-1
Below Normal (17.5%)	
No Action Alternative	1,863,415
Alternative 5	1,898,667
Difference	35,252
Percent Difference	2
Dry (22.5%)	
No Action Alternative	1,883,395
Alternative 5	1,876,977
Difference	-6,419
Percent Difference	0
Critical (15%)	
No Action Alternative	1,906,250
Alternative 5	1,897,912
Difference	-8,338
Percent Difference	0

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the annual average

Table B-4-12. Annual Mortality by Life Stage for Winter-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Eggs	Fry	Pre-Smolt	Immature-Smolt	Juvenile (Pre & Immature Smolt)
Long-term					
Full Simulation Period[1]					
No Action Alternative	222,517	196,405	26,961	138	27,099
Alternative 5	203,248	207,870	29,865	124	29,989
Difference	-19,269	11,465	2,904	-14	2,890
Percent Difference[3]	-9	6	11	-10	11
Water Year Types[2]					
Wet (32.5%)					
No Action Alternative	90,910	197,835	1,943	54	1,997
Alternative 5	87,970	210,570	4,085	28	4,113
Difference	-2,939	12,735	2,142	-26	2,117
Percent Difference	-3	6	110	-48	106
Above Normal (12.5%)					
No Action Alternative	469,585	220,960	53,686	94	53,779
Alternative 5	464,585	236,533	52,336	89	52,425
Difference	-5,000	15,573	-1,349	-5	-1,354
Percent Difference	-1	7	-3	-5	-3
Below Normal (17.5%)					
No Action Alternative	275,022	176,292	19,822	61	19,884
Alternative 5	191,541	178,323	31,052	108	31,160
Difference	-83,481	2,031	11,229	47	11,276
Percent Difference	-30	1	57	76	57
Dry (22.5%)					
No Action Alternative	209,708	215,896	24,076	139	24,215
Alternative 5	200,255	234,855	20,690	134	20,824
Difference	-9,453	18,959	-3,386	-5	-3,391
Percent Difference	-5	9	-14	-3	-14
Critical (15%)					
No Action Alternative	259,734	167,072	71,553	447	72,000
Alternative 5	253,379	172,126	79,375	365	79,740
Difference	-6,354	5,055	7,822	-82	7,740
Percent Difference	-2	3	11	-18	11

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

5 Eggs mortality includes pre-spawn mortality

Table B-4-13. Annual Mortality by Cause for Winter-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Temperature	Flow	Total
Long-term			
Full Simulation Period[1]			
No Action Alternative	178,654	267,367	446,021
Alternative 5	170,139	270,968	441,107
Difference	-8,515	3,601	-4,914
Percent Difference[3]	-5	1	-1
Water Year Types[2]			
Wet (32.5%)			
No Action Alternative	3,522	287,219	290,741
Alternative 5	7,569	295,085	302,654
Difference	4,047	7,866	11,913
Percent Difference	115	3	4
Above Normal (12.5%)			
No Action Alternative	504,624	239,700	744,324
Alternative 5	499,928	253,615	753,543
Difference	-4,696	13,915	9,219
Percent Difference	-1	6	1
Below Normal (17.5%)			
No Action Alternative	212,903	258,295	471,198
Alternative 5	149,215	251,809	401,024
Difference	-63,688	-6,486	-70,174
Percent Difference	-30	-3	-15
Dry (22.5%)			
No Action Alternative	155,797	294,022	449,819
Alternative 5	146,764	309,170	455,934
Difference	-9,033	15,148	6,115
Percent Difference	-6	5	1
Critical (15%)			
No Action Alternative	280,793	218,012	498,805
Alternative 5	307,023	198,222	505,246
Difference	26,230	-19,790	6,441
Percent Difference	9	-9	1

1 Based on the 80-year simulation period

not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-4-14. Annual Mortality by Cause and Life Stage for Winter-Run Chinook Salmon

Analysis Period	Pre-Spawn Mortality	Annual Mortality[4] (# of Fish/year) Eggs Flow	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Juvenile Temperature	Juvenile Habitat	Total
Long-term								
Full Simulation Period[1]								
No Action Alternative	0	93,980	128,537	24,093	172,312	26,023	1,076	446,021
Alternative 5	0	89,100	114,147	27,082	180,788	28,909	1,080	441,107
Difference	0	-4,880	-14,389	2,989	8,476	2,886	5	-4,914
Percent Difference[3]	0	-5	-11	12	5	11	0	-1
Water Year Types[2]								
Wet (32.5%)								
No Action Alternative	0	88,673	2,236	182	197,652	1,103	893	290,741
Alternative 5	0	84,683	3,288	977	209,593	3,304	809	302,654
Difference	0	-3,991	1,051	795	11,941	2,201	-84	11,913
Percent Difference	0	-5	47	436	6	199	-9	4
Above Normal (12.5%)								
No Action Alternative	0	83,031	386,554	64,945	156,015	53,125	654	744,324
Alternative 5	0	80,569	384,016	64,143	172,390	51,769	656	753,543
Difference	0	-2,463	-2,538	-802	16,375	-1,356	2	9,219
Percent Difference	0	-3	-1	-1	10	-3	0	1
Below Normal (17.5%)								
No Action Alternative	0	101,792	173,231	20,940	155,352	18,732	1,152	471,198
Alternative 5	0	103,637	87,904	31,368	146,956	29,943	1,216	401,024
Difference	0	1,845	-85,326	10,427	-8,396	11,212	64	-70,174
Percent Difference	0	2	-49	50	-5	60	6	-15
Dry (22.5%)								
No Action Alternative	2	100,064	109,642	23,024	192,872	23,129	1,086	449,819
Alternative 5	2	94,247	106,007	21,110	213,744	19,645	1,179	455,934
Difference	0	-5,817	-3,635	-1,914	20,873	-3,484	93	6,115
Percent Difference	0	-6	-3	-8	11	-15	9	1
Critical (15%)								
No Action Alternative	1	96,360	163,373	47,138	119,933	70,281	1,719	498,805
Alternative 5	1	81,098	172,281	56,716	115,410	78,025	1,715	505,246
Difference	0	-15,262	8,908	9,578	-4,524	7,744	-4	6,441
Percent Difference	0	-16	5	20	-4	11	0	1

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-4-15. Annual Mortality by All Factors for Winter-Run Chinook Salmon

Analysis Period	Pre-Spawn Mortality	Incubation	Super-imposition	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Pre-smolt - Temperature	Pre-smolt - Habitat	Smolt - Temperature	Smolt - Habitat	Total
					Annual Mortality[4] (# of Fish/year)						
					Long-term						
Full Simulation Period[1]											
No Action Alternative	0	93,980	0	128,537	24,093	172,312	26,020	941	3	135	446,021
Alternative 5	0	89,100	0	114,147	27,082	180,788	28,902	963	7	117	441,107
Difference	0	-4,880	0	-14,389	2,989	8,476	2,882	22	4	-18	-4,914
Percent Difference[3]	0	-5	0	-11	12	5	11	2	118	-13	-1
					Water Year Types[2]						
Wet (32.5%)											
No Action Alternative	0	88,673	0	2,236	182	197,652	1,101	842	3	51	290,741
Alternative 5	0	84,683	0	3,288	977	209,593	3,302	784	3	26	302,654
Difference	0	-3,991	0	1,051	795	11,941	2,201	-59	0	-25	11,913
Percent Difference	0	-5	0	47	436	6	200	-7	-8	-50	4
Above Normal (12.5%)											
No Action Alternative	0	83,031	0	386,554	64,945	156,015	53,122	564	3	90	744,324
Alternative 5	0	80,569	0	384,016	64,143	172,390	51,732	604	37	52	753,543
Difference	0	-2,463	0	-2,538	-802	16,375	-1,389	40	33	-38	9,219
Percent Difference	0	-3	0	-1	-1	10	-3	7	976	-42	1
Below Normal (17.5%)											
No Action Alternative	0	101,792	0	173,231	20,940	155,352	18,732	1,091	0	61	471,198
Alternative 5	0	103,637	0	87,904	31,368	146,956	29,943	1,108	0	108	401,024
Difference	0	1,845	0	-85,326	10,427	-8,396	11,212	18	0	47	-70,174
Percent Difference	0	2	0	-49	50	-5	60	2	0	76	-15
Dry (22.5%)											
No Action Alternative	2	100,064	0	109,642	23,024	192,872	23,129	947	0	139	449,819
Alternative 5	2	94,247	0	106,007	21,110	213,744	19,645	1,045	0	134	455,934
Difference	0	-5,817	0	-3,635	-1,914	20,873	-3,484	98	0	-5	6,115
Percent Difference	0	-6	0	-3	-8	11	-15	10	0	-3	1
Critical (15%)											
No Action Alternative	1	96,360	0	163,373	47,138	119,933	70,269	1,283	12	435	498,805
Alternative 5	1	81,098	0	172,281	56,716	115,410	78,016	1,359	9	356	505,246
Difference	0	-15,262	0	8,908	9,578	-4,524	7,747	75	-3	-79	6,441
Percent Difference	0	-16	0	5	20	-4	11	6	-22	-18	1

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-4-16. Annual Potential Production for Winter-Run Chinook Salmon

Analysis Period	Annual Potential Production (# of Fish/year)
Long-term	
Full Simulation Period[1]	
Second Basis of Comparison	1,885,400
No Action Alternative	1,883,893
Difference	-1,507
Percent Difference[3]	0
Water Year Types[2]	
Wet (32.5%)	
Second Basis of Comparison	1,930,740
No Action Alternative	1,952,705
Difference	21,965
Percent Difference	1
Above Normal (12.5%)	
Second Basis of Comparison	1,746,928
No Action Alternative	1,707,717
Difference	-39,211
Percent Difference	-2
Below Normal (17.5%)	
Second Basis of Comparison	1,847,619
No Action Alternative	1,863,415
Difference	15,795
Percent Difference	1
Dry (22.5%)	
Second Basis of Comparison	1,894,107
No Action Alternative	1,883,395
Difference	-10,712
Percent Difference	-1
Critical (15%)	
Second Basis of Comparison	1,933,573
No Action Alternative	1,906,250
Difference	-27,323
Percent Difference	-1

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the annual average

Table B-4-17. Annual Mortality by Life Stage for Winter-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Eggs	Fry	Pre-Smolt	Immature-Smolt	Juvenile (Pre & Immature Smolt)
Long-term					
Full Simulation Period[1]					
Second Basis of Comparison	259,052	162,983	23,312	137	23,449
No Action Alternative	222,517	196,405	26,961	138	27,099
Difference	-36,535	33,421	3,649	2	3,650
Percent Difference[3]	-14	21	16	1	16
Water Year Types[2]					
Wet (32.5%)					
Second Basis of Comparison	155,104	176,315	1,060	47	1,107
No Action Alternative	90,910	197,835	1,943	54	1,997
Difference	-64,194	21,520	883	7	890
Percent Difference	-41	12	83	15	80
Above Normal (12.5%)					
Second Basis of Comparison	438,691	167,899	63,706	103	63,808
No Action Alternative	469,585	220,960	53,686	94	53,779
Difference	30,894	53,061	-10,020	-9	-10,029
Percent Difference	7	32	-16	-8	-16
Below Normal (17.5%)					
Second Basis of Comparison	337,945	142,925	18,481	41	18,522
No Action Alternative	275,022	176,292	19,822	61	19,884
Difference	-62,922	33,367	1,341	21	1,362
Percent Difference	-19	23	7	50	7
Dry (22.5%)					
Second Basis of Comparison	240,069	172,393	22,611	143	22,755
No Action Alternative	209,708	215,896	24,076	139	24,215
Difference	-30,361	43,503	1,465	-4	1,460
Percent Difference	-13	25	6	-3	6
Critical (15%)					
Second Basis of Comparison	271,006	139,289	44,553	461	45,014
No Action Alternative	259,734	167,072	71,553	447	72,000
Difference	-11,272	27,783	27,000	-14	26,985
Percent Difference	-4	20	61	-3	60

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

5 Eggs mortality includes pre-spawn mortality

Table B-4-18. Annual Mortality by Cause for Winter-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Temperature	Flow	Total
Long-term			
Full Simulation Period[1]			
Second Basis of Comparison	149,945	295,539	445,484
No Action Alternative	178,654	267,367	446,021
Difference	28,708	-28,172	537
Percent Difference[3]	19	-10	0
Water Year Types[2]			
Wet (32.5%)			
Second Basis of Comparison	1,273	331,252	332,525
No Action Alternative	3,522	287,219	290,741
Difference	2,249	-44,034	-41,785
Percent Difference	177	-13	-13
Above Normal (12.5%)			
Second Basis of Comparison	388,548	281,850	670,398
No Action Alternative	504,624	239,700	744,324
Difference	116,076	-42,150	73,926
Percent Difference	30	-15	11
Below Normal (17.5%)			
Second Basis of Comparison	218,115	281,277	499,391
No Action Alternative	212,903	258,295	471,198
Difference	-5,212	-22,981	-28,193
Percent Difference	-2	-8	-6
Dry (22.5%)			
Second Basis of Comparison	134,348	300,869	435,217
No Action Alternative	155,797	294,022	449,819
Difference	21,449	-6,847	14,602
Percent Difference	16	-2	3
Critical (15%)			
Second Basis of Comparison	217,099	238,210	455,309
No Action Alternative	280,793	218,012	498,805
Difference	63,694	-20,198	43,496
Percent Difference	29	-8	10

1 Based on the 80-year simulation period.

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-4-19. Annual Mortality by Cause and Life Stage for Winter-Run Chinook Salmon

Analysis Period	Pre-Spawn Mortality	Annual Mortality[4] (# of Fish/year) Eggs Flow	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Juvenile Temperature	Juvenile Habitat	Total
Long-term								
Full Simulation Period[1]								
Second Basis of Comparison	0	151,512	107,540	20,257	142,726	22,149	1,300	445,484
No Action Alternative	0	93,980	128,537	24,093	172,312	26,023	1,076	446,021
Difference	0	-57,532	20,997	3,836	29,585	3,875	-225	537
Percent Difference[3]	57	-38	20	19	21	17	-17	0
Water Year Types[2]								
Wet (32.5%)								
Second Basis of Comparison	0	153,836	1,268	3	176,312	3	1,104	332,525
No Action Alternative	0	88,673	2,236	182	197,652	1,103	893	290,741
Difference	0	-65,163	969	180	21,340	1,101	-211	-41,784
Percent Difference	0	-42	76	6,482	12	44,038	-19	-13
Above Normal (12.5%)								
Second Basis of Comparison	0	169,913	268,778	56,974	110,925	62,797	1,012	670,398
No Action Alternative	0	83,031	386,554	64,945	156,015	53,125	654	744,324
Difference	0	-86,882	117,776	7,972	45,090	-9,671	-358	73,926
Percent Difference	0	-51	44	14	41	-15	-35	11
Below Normal (17.5%)								
Second Basis of Comparison	0	157,331	180,614	20,113	122,812	17,388	1,134	499,391
No Action Alternative	0	101,792	173,231	20,940	155,352	18,732	1,152	471,198
Difference	0	-55,539	-7,383	827	32,540	1,344	18	-28,193
Percent Difference	0	-35	-4	4	26	8	2	-6
Dry (22.5%)								
Second Basis of Comparison	1	148,149	91,919	21,162	151,231	21,266	1,488	435,217
No Action Alternative	2	100,064	109,642	23,024	192,872	23,129	1,086	449,819
Difference	0	-48,085	17,723	1,862	41,641	1,863	-402	14,602
Percent Difference	30	-32	19	9	28	9	-27	3
Critical (15%)								
Second Basis of Comparison	0	129,397	141,609	32,354	106,935	43,136	1,878	455,309
No Action Alternative	1	96,360	163,373	47,138	119,933	70,281	1,719	498,805
Difference	1	-33,037	21,764	14,784	12,999	27,145	-160	43,496
Percent Difference	0	-26	15	46	12	63	-9	10

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-4-20. Annual Mortality by All Factors for Winter-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Pre-Spawn Mortality	Incubation	Super-imposition	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Pre-smolt - Temperature	Pre-smolt - Habitat	Smolt - Temperature	Smolt - Habitat	Total
Long-term											
Full Simulation Period[1]											
Second Basis of Comparison	0	151,512	0	107,540	20,257	142,726	22,146	1,167	3	134	445,484
No Action Alternative	0	93,980	0	128,537	24,093	172,312	26,020	941	3	135	446,021
Difference	0	-57,532	0	20,997	3,836	29,585	3,875	-226	0	1	537
Percent Difference[3]	57	-38	0	20	19	21	17	-19	8	1	0
Water Year Types[2]											
Wet (32.5%)											
Second Basis of Comparison	0	153,836	0	1,268	3	176,312	3	1,057	0	47	332,525
No Action Alternative	0	88,673	0	2,236	182	197,652	1,101	842	3	51	290,741
Difference	0	-65,163	0	969	180	21,340	1,098	-215	3	4	-41,784
Percent Difference	0	-42	0	76	6,482	12	43,923	-20	0	9	-13
Above Normal (12.5%)											
Second Basis of Comparison	0	169,913	0	268,778	56,974	110,925	62,779	926	17	85	670,398
No Action Alternative	0	83,031	0	386,554	64,945	156,015	53,122	564	3	90	744,324
Difference	0	-86,882	0	117,776	7,972	45,090	-9,658	-363	-14	5	73,926
Percent Difference	0	-51	0	44	14	41	-15	-39	-80	6	11
Below Normal (17.5%)											
Second Basis of Comparison	0	157,331	0	180,614	20,113	122,812	17,388	1,093	0	41	499,391
No Action Alternative	0	101,792	0	173,231	20,940	155,352	18,732	1,091	0	61	471,198
Difference	0	-55,539	0	-7,383	827	32,540	1,344	-3	0	21	-28,193
Percent Difference	0	-35	0	-4	4	26	8	0	0	50	-6
Dry (22.5%)											
Second Basis of Comparison	1	148,149	0	91,919	21,162	151,231	21,264	1,348	3	141	435,217
No Action Alternative	2	100,064	0	109,642	23,024	192,872	23,129	947	0	139	449,819
Difference	0	-48,085	0	17,723	1,862	41,641	1,865	-401	-3	-2	14,602
Percent Difference	30	-32	0	19	9	28	9	-30	-100	-1	3
Critical (15%)											
Second Basis of Comparison	0	129,397	0	141,609	32,354	106,935	43,135	1,418	1	460	455,309
No Action Alternative	1	96,360	0	163,373	47,138	119,933	70,269	1,283	12	435	498,805
Difference	1	-33,037	0	21,764	14,784	12,999	27,135	-135	11	-25	43,496
Percent Difference	0	-26	0	15	46	12	63	-10	900	-5	10

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-4-21. Annual Potential Production for Winter-Run Chinook Salmon

Analysis Period	Annual Potential Production (# of Fish/year)
Long-term	
Full Simulation Period[1]	
Second Basis of Comparison	1,885,400
Alternative 3	1,897,120
Difference	11,720
Percent Difference[3]	1
Water Year Types[2]	
Wet (32.5%)	
Second Basis of Comparison	1,930,740
Alternative 3	1,944,614
Difference	13,874
Percent Difference	1
Above Normal (12.5%)	
Second Basis of Comparison	1,746,928
Alternative 3	1,752,903
Difference	5,975
Percent Difference	0
Below Normal (17.5%)	
Second Basis of Comparison	1,847,619
Alternative 3	1,840,343
Difference	-7,277
Percent Difference	0
Dry (22.5%)	
Second Basis of Comparison	1,894,107
Alternative 3	1,919,466
Difference	25,359
Percent Difference	1
Critical (15%)	
Second Basis of Comparison	1,933,573
Alternative 3	1,947,116
Difference	13,543
Percent Difference	1

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the annual average

Table B-4-22. Annual Mortality by Life Stage for Winter-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Eggs	Fry	Pre-Smolt	Immature-Smolt	Juvenile (Pre & Immature Smolt)
Long-term					
Full Simulation Period[1]					
Second Basis of Comparison	259,052	162,983	23,312	137	23,449
Alternative 3	237,813	165,266	21,803	140	21,943
Difference	-21,239	2,283	-1,509	4	-1,506
Percent Difference[3]	-8	1	-6	3	-6
Water Year Types[2]					
Wet (32.5%)					
Second Basis of Comparison	155,104	176,315	1,060	47	1,107
Alternative 3	131,631	174,265	1,188	34	1,222
Difference	-23,473	-2,050	128	-13	116
Percent Difference	-15	-1	12	-28	10
Above Normal (12.5%)					
Second Basis of Comparison	438,691	167,899	63,706	103	63,808
Alternative 3	443,487	166,295	54,841	70	54,912
Difference	4,795	-1,603	-8,864	-32	-8,897
Percent Difference	1	-1	-14	-31	-14
Below Normal (17.5%)					
Second Basis of Comparison	337,945	142,925	18,481	41	18,522
Alternative 3	324,721	159,309	20,994	55	21,049
Difference	-13,223	16,384	2,513	14	2,527
Percent Difference	-4	11	14	35	14
Dry (22.5%)					
Second Basis of Comparison	240,069	172,393	22,611	143	22,755
Alternative 3	207,993	170,244	16,866	166	17,032
Difference	-32,076	-2,150	-5,745	22	-5,723
Percent Difference	-13	-1	-25	16	-25
Critical (15%)					
Second Basis of Comparison	271,006	139,289	44,553	461	45,014
Alternative 3	239,816	144,393	47,286	490	47,776
Difference	-31,190	5,104	2,733	29	2,762
Percent Difference	-12	4	6	6	6

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

5 Eggs mortality includes pre-spawn mortality

Table B-4-23. Annual Mortality by Cause for Winter-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Temperature	Flow	Total
Long-term			
Full Simulation Period[1]			
Second Basis of Comparison	149,945	295,539	445,484
Alternative 3	142,827	282,195	425,022
Difference	-7,118	-13,344	-20,462
Percent Difference[3]	-5	-5	-5
Water Year Types[2]			
Wet (32.5%)			
Second Basis of Comparison	1,273	331,252	332,525
Alternative 3	1,126	305,992	307,118
Difference	-147	-25,261	-25,407
Percent Difference	-12	-8	-8
Above Normal (12.5%)			
Second Basis of Comparison	388,548	281,850	670,398
Alternative 3	430,489	234,205	664,694
Difference	41,941	-47,645	-5,704
Percent Difference	11	-17	-1
Below Normal (17.5%)			
Second Basis of Comparison	218,115	281,277	499,391
Alternative 3	210,138	294,942	505,080
Difference	-7,977	13,666	5,688
Percent Difference	-4	5	1
Dry (22.5%)			
Second Basis of Comparison	134,348	300,869	435,217
Alternative 3	95,635	299,633	395,268
Difference	-38,713	-1,236	-39,949
Percent Difference	-29	0	-9
Critical (15%)			
Second Basis of Comparison	217,099	238,210	455,309
Alternative 3	202,386	229,599	431,984
Difference	-14,713	-8,612	-23,325
Percent Difference	-7	-4	-5

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-4-24. Annual Mortality by Cause and Life Stage for Winter-Run Chinook Salmon

Analysis Period	Pre-Spawn Mortality	Eggs Flow	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Juvenile Temperature	Juvenile Habitat	Total
			Annual Mortality[4] (# of Fish/year)					
Long-term								
Full Simulation Period[1]								
Second Basis of Comparison	0	151,512	107,540	20,257	142,726	22,149	1,300	445,484
Alternative 3	0	135,049	102,763	19,523	145,743	20,541	1,402	425,022
Difference	0	-16,462	-4,776	-734	3,017	-1,607	102	-20,462
Percent Difference[3]	-100	-11	-4	-4	2	-7	8	-5
Water Year Types[2]								
Wet (32.5%)								
Second Basis of Comparison	0	153,836	1,268	3	176,312	3	1,104	332,525
Alternative 3	0	130,505	1,126	1	174,265	0	1,222	307,118
Difference	0	-23,331	-142	-2	-2,048	-3	118	-25,407
Percent Difference	0	-15	-11	-69	-1	-100	11	-8
Above Normal (12.5%)								
Second Basis of Comparison	0	169,913	268,778	56,974	110,925	62,797	1,012	670,398
Alternative 3	0	119,969	323,517	52,929	113,366	54,043	869	664,694
Difference	0	-49,944	54,739	-4,045	2,441	-8,754	-143	-5,704
Percent Difference	0	-29	20	-7	2	-14	-14	-1
Below Normal (17.5%)								
Second Basis of Comparison	0	157,331	180,614	20,113	122,812	17,388	1,134	499,391
Alternative 3	0	155,899	168,822	21,483	137,826	19,833	1,217	505,080
Difference	0	-1,432	-11,792	1,370	15,015	2,445	83	5,688
Percent Difference	0	-1	-7	7	12	14	7	1
Dry (22.5%)								
Second Basis of Comparison	1	148,149	91,919	21,162	151,231	21,266	1,488	435,217
Alternative 3	0	146,046	61,947	18,345	151,898	15,343	1,689	395,268
Difference	-1	-2,103	-29,972	-2,817	667	-5,923	200	-39,949
Percent Difference	-100	-1	-33	-13	0	-28	13	-9
Critical (15%)								
Second Basis of Comparison	0	129,397	141,609	32,354	106,935	43,136	1,878	455,309
Alternative 3	0	116,643	123,172	33,460	110,932	45,753	2,023	431,984
Difference	0	-12,754	-18,436	1,107	3,997	2,617	145	-23,325
Percent Difference	0	-10	-13	3	4	6	8	-5

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-4-25. Annual Mortality by All Factors for Winter-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Pre-Spawn Mortality	Incubation	Super-imposition	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Pre-smolt - Temperature	Pre-smolt - Habitat	Smolt - Temperature	Smolt - Habitat	Total
Long-term											
Full Simulation Period[1]											
Second Basis of Comparison	0	151,512	0	107,540	20,257	142,726	22,146	1,167	3	134	445,484
Alternative 3	0	135,049	0	102,763	19,523	145,743	20,536	1,267	5	135	425,022
Difference	0	-16,462	0	-4,776	-734	3,017	-1,609	100	2	2	-20,462
Percent Difference[3]	-100	-11	0	-4	-4	2	-7	9	73	1	-5
Water Year Types[2]											
Wet (32.5%)											
Second Basis of Comparison	0	153,836	0	1,268	3	176,312	3	1,057	0	47	332,525
Alternative 3	0	130,505	0	1,126	1	174,265	0	1,188	0	34	307,118
Difference	0	-23,331	0	-142	-2	-2,048	-3	131	0	-13	-25,407
Percent Difference	0	-15	0	-11	-69	-1	-100	12	0	-28	-8
Above Normal (12.5%)											
Second Basis of Comparison	0	169,913	0	268,778	56,974	110,925	62,779	926	17	85	670,398
Alternative 3	0	119,969	0	323,517	52,929	113,366	54,043	799	0	70	664,694
Difference	0	-49,944	0	54,739	-4,045	2,441	-8,737	-128	-17	-15	-5,704
Percent Difference	0	-29	0	20	-7	2	-14	-14	-100	-17	-1
Below Normal (17.5%)											
Second Basis of Comparison	0	157,331	0	180,614	20,113	122,812	17,388	1,093	0	41	499,391
Alternative 3	0	155,899	0	168,822	21,483	137,826	19,832	1,162	1	54	505,080
Difference	0	-1,432	0	-11,792	1,370	15,015	2,444	69	1	14	5,688
Percent Difference	0	-1	0	-7	7	12	14	6	0	34	1
Dry (22.5%)											
Second Basis of Comparison	1	148,149	0	91,919	21,162	151,231	21,264	1,348	3	141	435,217
Alternative 3	0	146,046	0	61,947	18,345	151,898	15,343	1,523	0	166	395,268
Difference	-1	-2,103	0	-29,972	-2,817	667	-5,921	176	-3	25	-39,949
Percent Difference	-100	-1	0	-33	-13	0	-28	13	-100	18	-9
Critical (15%)											
Second Basis of Comparison	0	129,397	0	141,609	32,354	106,935	43,135	1,418	1	460	455,309
Alternative 3	0	116,643	0	123,172	33,460	110,932	45,720	1,566	33	457	431,984
Difference	0	-12,754	0	-18,436	1,107	3,997	2,585	148	32	-3	-23,325
Percent Difference	0	-10	0	-13	3	4	6	10	2,700	-1	-5

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-4-26. Annual Potential Production for Winter-Run Chinook Salmon

Analysis Period	Annual Potential Production (# of Fish/year)
Long-term	
Full Simulation Period[1]	
Second Basis of Comparison	1,885,400
Alternative 5	1,883,178
Difference	-2,222
Percent Difference[3]	0
Water Year Types[2]	
Wet (32.5%)	
Second Basis of Comparison	1,930,740
Alternative 5	1,943,241
Difference	12,501
Percent Difference	1
Above Normal (12.5%)	
Second Basis of Comparison	1,746,928
Alternative 5	1,698,809
Difference	-48,120
Percent Difference	-3
Below Normal (17.5%)	
Second Basis of Comparison	1,847,619
Alternative 5	1,898,667
Difference	51,047
Percent Difference	3
Dry (22.5%)	
Second Basis of Comparison	1,894,107
Alternative 5	1,876,977
Difference	-17,130
Percent Difference	-1
Critical (15%)	
Second Basis of Comparison	1,933,573
Alternative 5	1,897,912
Difference	-35,661
Percent Difference	-2

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the annual average

Table B-4-27. Annual Mortality by Life Stage for Winter-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Eggs	Fry	Pre-Smolt	Immature-Smolt	Juvenile (Pre & Immature Smolt)
Long-term					
Full Simulation Period[1]					
Second Basis of Comparison	259,052	162,983	23,312	137	23,449
Alternative 5	203,248	207,870	29,865	124	29,989
Difference	-55,804	44,886	6,553	-12	6,540
Percent Difference[3]	-22	28	28	-9	28
Water Year Types[2]					
Wet (32.5%)					
Second Basis of Comparison	155,104	176,315	1,060	47	1,107
Alternative 5	87,970	210,570	4,085	28	4,113
Difference	-67,133	34,255	3,025	-19	3,007
Percent Difference	-43	19	285	-40	272
Above Normal (12.5%)					
Second Basis of Comparison	438,691	167,899	63,706	103	63,808
Alternative 5	464,585	236,533	52,336	89	52,425
Difference	25,893	68,634	-11,369	-14	-11,383
Percent Difference	6	41	-18	-13	-18
Below Normal (17.5%)					
Second Basis of Comparison	337,945	142,925	18,481	41	18,522
Alternative 5	191,541	178,323	31,052	108	31,160
Difference	-146,403	35,399	12,571	67	12,638
Percent Difference	-43	25	68	165	68
Dry (22.5%)					
Second Basis of Comparison	240,069	172,393	22,611	143	22,755
Alternative 5	200,255	234,855	20,690	134	20,824
Difference	-39,814	62,462	-1,921	-9	-1,931
Percent Difference	-17	36	-8	-6	-8
Critical (15%)					
Second Basis of Comparison	271,006	139,289	44,553	461	45,014
Alternative 5	253,379	172,126	79,375	365	79,740
Difference	-17,627	32,838	34,822	-96	34,726
Percent Difference	-7	24	78	-21	77

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

5 Eggs mortality includes pre-spawn mortality

Table B-4-28. Annual Mortality by Cause for Winter-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Temperature	Flow	Total
Long-term			
Full Simulation Period[1]			
Second Basis of Comparison	149,945	295,539	445,484
Alternative 5	170,139	270,968	441,107
Difference	20,193	-24,571	-4,378
Percent Difference[3]	13	-8	-1
Water Year Types[2]			
Wet (32.5%)			
Second Basis of Comparison	1,273	331,252	332,525
Alternative 5	7,569	295,085	302,654
Difference	6,296	-36,168	-29,872
Percent Difference	495	-11	-9
Above Normal (12.5%)			
Second Basis of Comparison	388,548	281,850	670,398
Alternative 5	499,928	253,615	753,543
Difference	111,380	-28,235	83,145
Percent Difference	29	-10	12
Below Normal (17.5%)			
Second Basis of Comparison	218,115	281,277	499,391
Alternative 5	149,215	251,809	401,024
Difference	-68,900	-29,468	-98,367
Percent Difference	-32	-10	-20
Dry (22.5%)			
Second Basis of Comparison	134,348	300,869	435,217
Alternative 5	146,764	309,170	455,934
Difference	12,416	8,302	20,717
Percent Difference	9	3	5
Critical (15%)			
Second Basis of Comparison	217,099	238,210	455,309
Alternative 5	307,023	198,222	505,246
Difference	89,925	-39,988	49,937
Percent Difference	41	-17	11

1 Based on the 80-year simulation period.

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-4-29. Annual Mortality by Cause and Life Stage for Winter-Run Chinook Salmon

Analysis Period	Pre-Spawn Mortality	Eggs Flow	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Juvenile Temperature	Juvenile Habitat	Total
				Annual Mortality[4] (# of Fish/year)				
				Long-term				
Full Simulation Period[1]								
Second Basis of Comparison	0	151,512	107,540	20,257	142,726	22,149	1,300	445,484
Alternative 5	0	89,100	114,147	27,082	180,788	28,909	1,080	441,107
Difference	0	-62,412	6,608	6,825	38,061	6,761	-220	-4,378
Percent Difference[3]	57	-41	6	34	27	31	-17	-1
				Water Year Types[2]				
Wet (32.5%)								
Second Basis of Comparison	0	153,836	1,268	3	176,312	3	1,104	332,525
Alternative 5	0	84,683	3,288	977	209,593	3,304	809	302,654
Difference	0	-69,153	2,020	974	33,281	3,302	-295	-29,872
Percent Difference	0	-45	159	35,183	19	132,074	-27	-9
Above Normal (12.5%)								
Second Basis of Comparison	0	169,913	268,778	56,974	110,925	62,797	1,012	670,398
Alternative 5	0	80,569	384,016	64,143	172,390	51,769	656	753,543
Difference	0	-89,345	115,238	7,169	61,465	-11,028	-355	83,145
Percent Difference	0	-53	43	13	55	-18	-35	12
Below Normal (17.5%)								
Second Basis of Comparison	0	157,331	180,614	20,113	122,812	17,388	1,134	499,391
Alternative 5	0	103,637	87,904	31,368	146,956	29,943	1,216	401,024
Difference	0	-53,694	-92,710	11,254	24,144	12,556	82	-98,367
Percent Difference	0	-34	-51	56	20	72	7	-20
Dry (22.5%)								
Second Basis of Comparison	1	148,149	91,919	21,162	151,231	21,266	1,488	435,217
Alternative 5	2	94,247	106,007	21,110	213,744	19,645	1,179	455,934
Difference	0	-53,902	14,088	-52	62,514	-1,621	-309	20,717
Percent Difference	30	-36	15	0	41	-8	-21	5
Critical (15%)								
Second Basis of Comparison	0	129,397	141,609	32,354	106,935	43,136	1,878	455,309
Alternative 5	1	81,098	172,281	56,716	115,410	78,025	1,715	505,246
Difference	1	-48,299	30,672	24,363	8,475	34,889	-164	49,937
Percent Difference	0	-37	22	75	8	81	-9	11

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality

Table B-4-30. Annual Mortality by All Factors for Winter-Run Chinook Salmon

Analysis Period	Annual Mortality[4] (# of Fish/year) Pre-Spawn Mortality	Incubation	Super-imposition	Eggs - Temperature	Fry - Temperature	Fry - Habitat	Pre-smolt - Temperature	Pre-smolt - Habitat	Smolt - Temperature	Smolt - Habitat	Total
Long-term											
Full Simulation Period[1]											
Second Basis of Comparison	0	151,512	0	107,540	20,257	142,726	22,146	1,167	3	134	445,484
Alternative 5	0	89,100	0	114,147	27,082	180,788	28,902	963	7	117	441,107
Difference	0	-62,412	0	6,608	6,825	38,061	6,757	-204	4	-16	-4,378
Percent Difference[3]	57	-41	0	6	34	27	31	-17	135	-12	-1
Water Year Types[2]											
Wet (32.5%)											
Second Basis of Comparison	0	153,836	0	1,268	3	176,312	3	1,057	0	47	332,525
Alternative 5	0	84,683	0	3,288	977	209,593	3,302	784	3	26	302,654
Difference	0	-69,153	0	2,020	974	33,281	3,299	-274	3	-21	-29,872
Percent Difference	0	-45	0	159	35,183	19	131,968	-26	0	-45	-9
Above Normal (12.5%)											
Second Basis of Comparison	0	169,913	0	268,778	56,974	110,925	62,779	926	17	85	670,398
Alternative 5	0	80,569	0	384,016	64,143	172,390	51,732	604	37	52	753,543
Difference	0	-89,345	0	115,238	7,169	61,465	-11,047	-322	19	-33	83,145
Percent Difference	0	-53	0	43	13	55	-18	-35	113	-39	12
Below Normal (17.5%)											
Second Basis of Comparison	0	157,331	0	180,614	20,113	122,812	17,388	1,093	0	41	499,391
Alternative 5	0	103,637	0	87,904	31,368	146,956	29,943	1,108	0	108	401,024
Difference	0	-53,694	0	-92,710	11,254	24,144	12,556	15	0	67	-98,367
Percent Difference	0	-34	0	-51	56	20	72	1	0	165	-20
Dry (22.5%)											
Second Basis of Comparison	1	148,149	0	91,919	21,162	151,231	21,264	1,348	3	141	435,217
Alternative 5	2	94,247	0	106,007	21,110	213,744	19,645	1,045	0	134	455,934
Difference	0	-53,902	0	14,088	-52	62,514	-1,619	-303	-3	-7	20,717
Percent Difference	30	-36	0	15	0	41	-8	-22	-100	-5	5
Critical (15%)											
Second Basis of Comparison	0	129,397	0	141,609	32,354	106,935	43,135	1,418	1	460	455,309
Alternative 5	1	81,098	0	172,281	56,716	115,410	78,016	1,359	9	356	505,246
Difference	1	-48,299	0	30,672	24,363	8,475	34,881	-60	8	-104	49,937
Percent Difference	0	-37	0	22	75	8	81	-4	679	-23	11

1 Based on the 80-year simulation period

2 As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB 1995). Water years may not correspond to the biological years in SALMOD.

3 Relative difference of the Annual average

4 Mortality values do not include base mortality