White Paper

All-H Analyzer Summaries

For

Northwest Power and Conservation Council

Amendment Process, 2008

by

The Anadromous Fish Advisory Committee

of

The Columbia Basin Fish and Wildlife Authority

The enclosed analyses were performed by the fish and wildlife managers within their individual jurisdictions and the results are not necessarily endorsed by the full CBFWA membership.

April 1, 2008

BACKGROUND MATERIAL

Need for Subbasin or Population Specific Measures

Information at the subbasin or population level provides the local scientific knowledge, policies, and priorities necessary to refine the general guidance provided by programmatic and provincial level visions, goals and objectives. Subbasin or population specific strategies and measures that address limiting factors and threats can provide this refinement. Strategies and measures are provided in subbasin plans, draft recovery plans, proposed actions, biological opinions, agency management plans, etc.; however, these planning documents and implementation plans do not effectively prioritize strategies and actions among the multiple limiting factors and threats affecting each population.

All subbasin specific measures proposed by CBFWA are taken directly from subbasin plans, draft recovery plans, or agency management plans. These plans are integral components of the Program. Our analysis merely provides a framework to help prioritize existing measures for each subbasin, within the multiple limiting factors affecting each population. This is accomplished by estimating the response of populations, in terms of abundance, to addressing limiting factors. For this analysis, potential actions addressing each limiting factor are considered suites of measures. No population response is estimated for addressing specific actions within a suite of measures.

Development of Subbasin or Population Specific Measures

We performed an analysis of action effectiveness for anadromous salmonid populations by using the All-H Analyzer (AHA), a tool that has been widely applied in the Columbia River Basin. Our objective was to assess the relative effectiveness of various suites of measures on the performance of each population or major population group. The AHA tool addresses different stages in the life cycle and thus the different limiting factors that affect anadromous salmonid population performance. The AHA tool was developed to give managers a method for examining different ways of balancing habitat restoration, hydroelectric facilities operation, harvest, and hatchery practices (Mobrand-Jones & Stokes Associates 2005).

The AHA tool uses the Beverton-Holt population parameters of productivity and capacity for habitat inputs. Inputs for the hydro portion of the tool include estimates of survival rates during juvenile outmigration, estuary/ocean residence, and adult upstream migration to obtain an overall SAR estimate. Harvest rate estimates from the ocean, the Columbia River below Bonneville Dam, the Columbia River above Bonneville Dam, and tributaries are entered separately to obtain an overall exploitation rate for each population. Hatchery inputs include, but are not limited to, actual or estimated values for numbers of smolts released, broodstock collected, and stray rates for each hatchery. See Mobrand-Jones & Stokes Associates (2005) and Carmichael and Taylor (2007) for a thorough description of the AHA tool used in our analyses.

We first utilized AHA to estimate population responses to a combination of potential management actions, beginning with the current condition. Current conditions were intended to generally reflect conditions and population performance during recent years (2002 to 2006). Outputs from the model were validated by local fish managers to ensure realistic and useful results would be achieved when comparing various alternative scenarios of proposed work. Various scenarios focused on actions aimed at improving mainstem Columbia River survival

(including the estuary), tributary habitat, harvest management, and hatchery fish management. Prospective actions are presented as scenarios in Table 1. Scenario 1 represents responses to hydro operations proposed for 2008 (draft 2008 Biological Opinion), responses over a 10-year period to specific habitat restoration actions (draft 2008 Biological Opinion), and responses to harvest and hatchery fish management defined by U.S. v Oregon agreements. Scenario 2 is similar to Scenario 1, except that habitat inputs represent potential longer-term responses to an extensive suite of habitat restoration actions considered "desirable and feasible" by managers. Scenario 3 is similar to Scenario 2, except that hydro inputs represent potential responses to "aggressive non-breach" actions proposed by salmon managers.

We then used AHA to evaluate the expected response of each population if the hydrosystem had no impact on passage survival of juveniles or adults from subbasins of origin to Bonneville Dam, but with current conditions for habitat, harvest, and hatcheries. We estimated this response using three values for current delayed mortality (none, low, and high). Results from this scenario roughly indicate mitigation for effects of passage through the hydrosystem. Finally, we used AHA to evaluate the expected response of each population if "desirable and feasible" habitat restoration actions were implemented, but with all other conditions remaining current. This roughly indicates how much of the passage mitigation can be addressed by habitat actions within each subbasin. Our analyses provide a useful and appropriate assessment of how different suites of measures may affect population performance relative to the current situation and to a benchmark defined by effects of direct passage mortality.

Display of AHA Inputs and Results

Results of the AHA analyses are presented for each population or for major population groups, organized by province. Each province section begins with tables summarizing the hydro and habitat inputs used for each scenario. Hatchery and harvest inputs can be accessed by viewing the AHA files (see Supporting Material). Subsequent figures in each province section display the expected response, in terms of equilibrium spawner abundance, for each subbasin. where multiple populations exist within a subbasin, results are combined to form a subbasin-level response.

Table 3.0-1. Actions analyzed for each population by using the AHA tool. Detailed information on derivation of and values used for inputs is provided in Volume 3.

Scenario	AHA Inputs			
	Tributary habitat	Hydrosystem	Harvest	Hatchery
Current	Current	Current	Current	Current
Scenario 1	Draft 2008 BiOp	Draft 2008 BiOp	U.S. v Oregon	U.S. v Oregon
Scenario 2	Manager Input	Draft 2008 BiOp	U.S. v Oregon	U.S. v Oregon
Scenario 3	Manager Input	Aggressive non-breach	U.S. v Oregon	U.S. v Oregon
Habitat only	Manager Plan	Current	Current	Current
No passage effect	Current	No passage effect	Current	Current

SUPPORTING MATERIAL

Carmichael, R.W., and B.J. Taylor. 2007. Conservation and recovery plan for Oregon steelhead populations in the middle Columbia River steelhead distinct population segment. November 2007 review draft. *http://www.eou.edu/~odfw/Mid-C_recoveryplan_November07reviewdraft1.doc*

CBFWA and Mobrand – Jones & Stokes Associates. All H Analyzer tool and roll up files.
H:\Work\2008ProgramAmendments\Appendix\References\Section_3\Rollup_1_8_CBFWA_V21_DW_02-15-08
H:\Work\2008ProgramAmendments\Appendix\References\Section_3\ Chinook-Provinces_02-15-08.rol
H:\Work\2008ProgramAmendments\Appendix\References\Section_3\ Steelhead-Provinces_02-15-08.rol
H:\Work\2008ProgramAmendments\Appendix\References\Section_3\CBFWA-Coho_0215081.rol

CBFWA. Unpublished data.
H:\Work\2008ProgramAmendments\Appendix\References\Section_3\NoPassageEffectSurvivalRate.xls

Framework Work Group of the NWF v NMFS Collaborative Process. 2006. Relative magnitude of human-related mortality factors affecting listed salmon and steelhead in the interior Columbia River Basin. Interim Report.
H:\Work\2008ProgramAmendments\Appendix\References\Section_3\Interim Human Mortality Report 04may06-chris1 toole@noaa govSection3AHA.pdf

Mobrand – Jones & Stokes Associates. 2005. All H Analyzer (AHA) user guide – draft. Unpublished report. Mobrand – Jones & Stokes Associates, Vashon Island, WA. *http://www.managingforsucess.us/Portals/_default/Documents?AHA%20User%20Guide.doc*

Section 3.1. Columbia River Estuary Province and Ocean

No analyses.

Section 3.2. Lower Columbia Province

No direct hydrosystem passage effects on populations that were evaluated by AHA. Effects of tributary habitat actions should be consistent with estimates from draft recovery plans. No AHA analyses presented.

Section 3.3. Columbia Gorge Province

Table 3.3.1. Juvenile out-migration survival estimates used in AHA analyses for Columbia Gorge Province Chinook salmon and steelhead.

Subbasin, population	Current	Draft 2008 Biological Opinion	Aggressive non-breach	No passage effect
Spring Chinook				
Wind River	0.906	0.906	0.969	0.997
Hood River	0.850	0.850	0.893	0.995
Klickitat River	0.906	0.906	0.969	0.989
Steelhead				
Wind River	0.838	0.838	0.922	0.959
White Salmon River	0.838	0.838	0.922	0.959
Hood River summer	0.820	0.820	0.902	0.959
Hood River winter	0.820	0.820	0.902	0.959
Klickitat River	0.838	0.838	0.922	0.959
Fifteenmile Creek	0.820	0.820	0.922	0.959

Table 3.3.2. Juvenile estuary/ocean survival estimates used in AHA analyses for Columbia Gorge Province Chinook salmon and steelhead.

Subbasin, population	Current	Draft 2008 Biological Opinion	Aggressive non-breach	No passage effect
Spring Chinook				
Wind River	0.022	0.023	0.023	0.022
Hood River	0.050	0.053	0.053	0.050
Klickitat River	0.061	0.064	0.064	0.061
Steelhead				
Wind River	0.114	0.121	0.121	0.114
White Salmon River	0.129	0.137	0.137	0.129
Hood River summer	0.053	0.056	0.056	0.053
Hood River winter	0.055	0.058	0.058	0.055
Klickitat River	0.071	0.075	0.075	0.071
Fifteenmile Creek	0.055	0.058	0.058	0.055

Table 3.3.3. Adult migration survival estimates used in AHA analyses for Columbia Gorge Province Chinook salmon and steelhead.

Subbasin, population	Current	Draft 2008 Biological Opinion	Aggressive non-breach	No passage effect
Spring Chinook				
Wind River	0.966	0.966	0.966	0.991
Hood River	0.966	0.966	0.966	0.995
Klickitat River	0.966	0.966	0.966	0.991
Steelhead				
Wind River	0.976	0.976	0.976	0.976
White Salmon River	0.976	0.976	0.976	0.976
Hood River summer	0.976	0.976	0.976	0.976
Hood River winter	0.976	0.976	0.976	0.976
Klickitat River	0.976	0.976	0.976	0.976
Fifteenmile Creek	0.976	0.976	0.976	0.976

Table 3.3.4. Productivity values used in AHA scenarios for Columbia Gorge Province Chinook.

Subbasin, population	Current	Draft 2008 Biological Opinion	Manager Input
Wind River	2.880	2.880	2.880
Hood River	1.210	1.210	1.210
Klickitat River	6.500	6.500	8.860

Table 3.3.5. Productivity values used in AHA scenarios for Columbia Gorge Province steelhead.

Subbasin, population	Current	Draft 2008 Biological Opinion	Manager Input
Wind River			
Wind River summer steelhead	4.800	4.800	6.576
Wind River winter steelhead	3.401	3.401	7.584
White Salmon River			
White Salmon River steelhead	3.924	3.924	6.789
Hood River			
Hood River summer steelhead	2.000	2.000	2.000
Hood River winter steelhead	1.110	1.110	2.919
Klickitat River			
Klickitat River steelhead	5.800	6.032	9.396
Fifteenmile Creek			
Fifteenmile Creek winter steelhead	2.230	2.230	4.326

Table 3.3.6. Habitat capacity values used in AHA scenarios for Columbia Gorge Province Chinook.

Subbasin, population	Current	Draft 2008 Biological Opinion	Manager Input
Wind River	196	196	196
Hood River	1,779	1,779	1,779
Klickitat River	1,271	1,271	1,579

Table 3.3.7. Habitat capacity values used in AHA scenarios for Columbia Gorge Province steelhead.

Subbasin, population	Current	Draft 2008 Biological Opinion	Manager Input
Wind River			
Wind River summer steelhead	1,877	1,877	2,571
Wind River winter steelhead	94	94	210
White Salmon River			
White Salmon River steelhead	25	25	43
Hood River			
Hood River summer steelhead	600	600	600
Hood River winter steelhead	2,345	2,345	4,244
Klickitat River			
Klickitat River steelhead	2,256	2,346	3,028
Fifteenmile Creek			
Fifteenmile Creek winter steelhead	1,577	1,577	2,224

Section 3.3.1 Wind River Subbasin

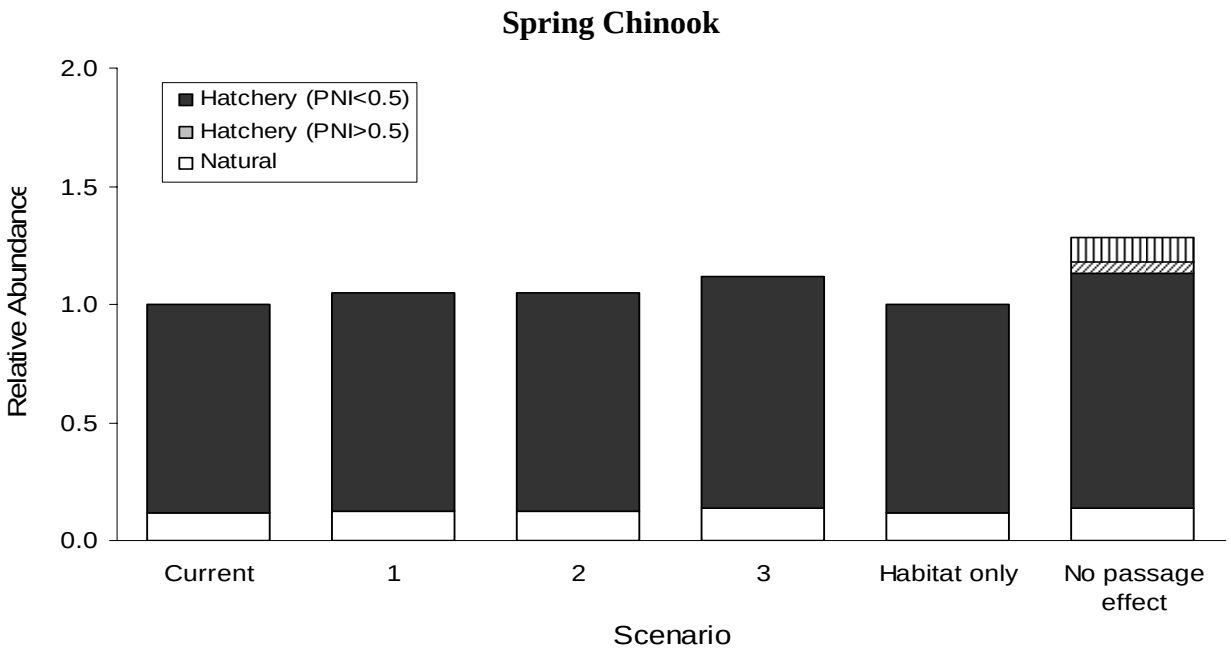

Figure 3.3.1-1. Estimates of the response of Wind River spring Chinook adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

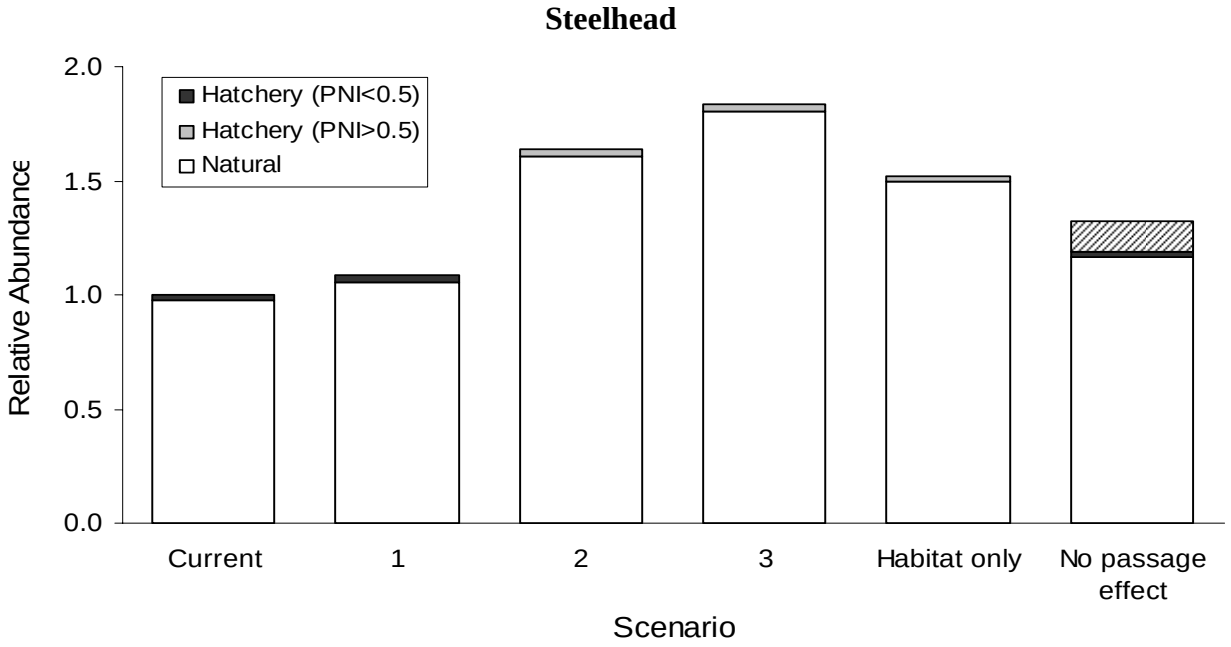

Figure 3.3.1-2. Estimates of the response of Wind River steelhead adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

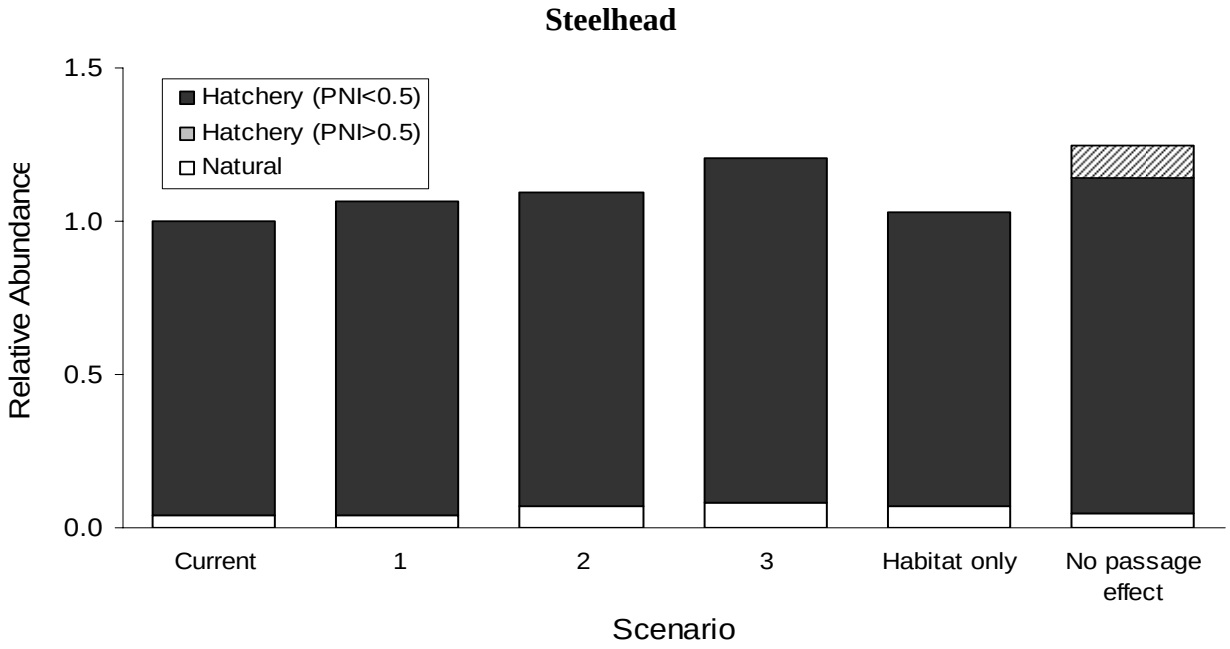

Figure 3.3.3-1. Estimates of the response of White Salmon River steelhead adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

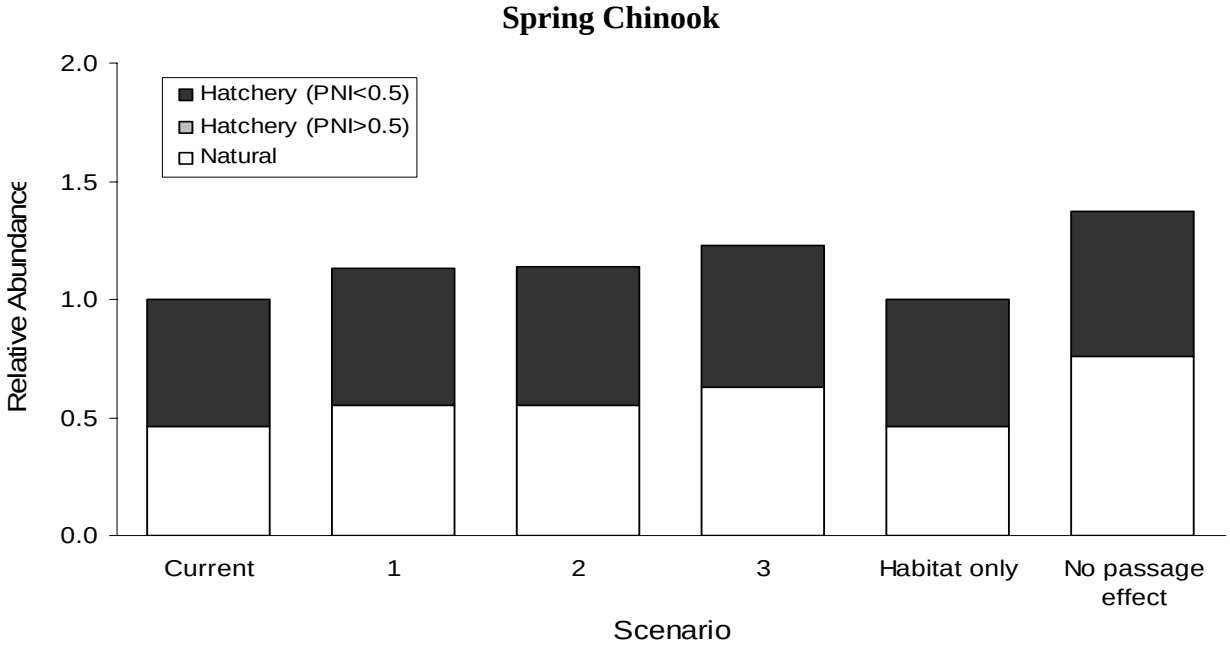

Figure 3.3.4-1. Estimates of the response of Hood River spring Chinook adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

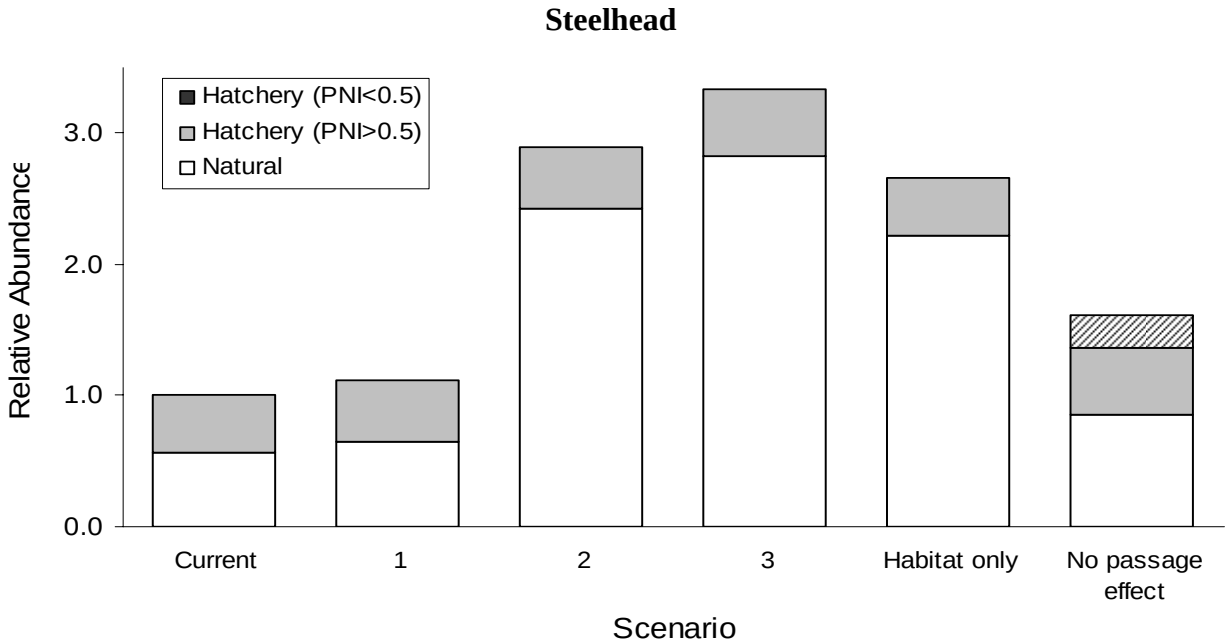

Figure 3.3.4-2. Estimates of the response of Hood River steelhead adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

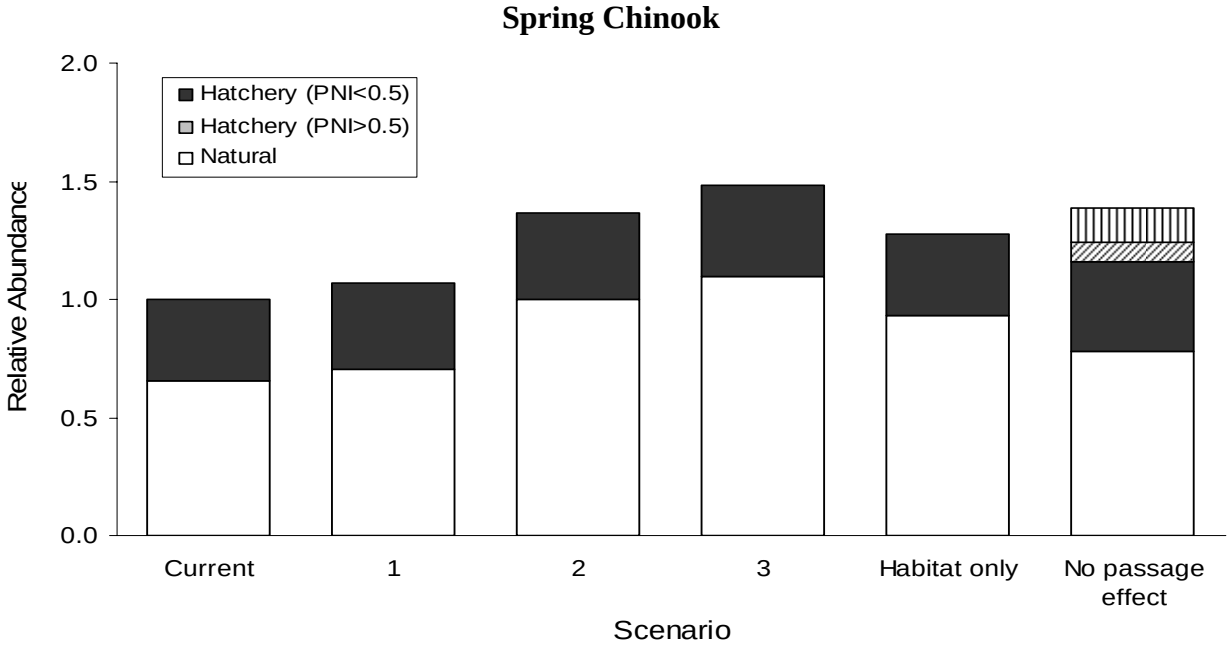

Figure 3.3.5-1. Estimates of the response of Klickitat River spring Chinook adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

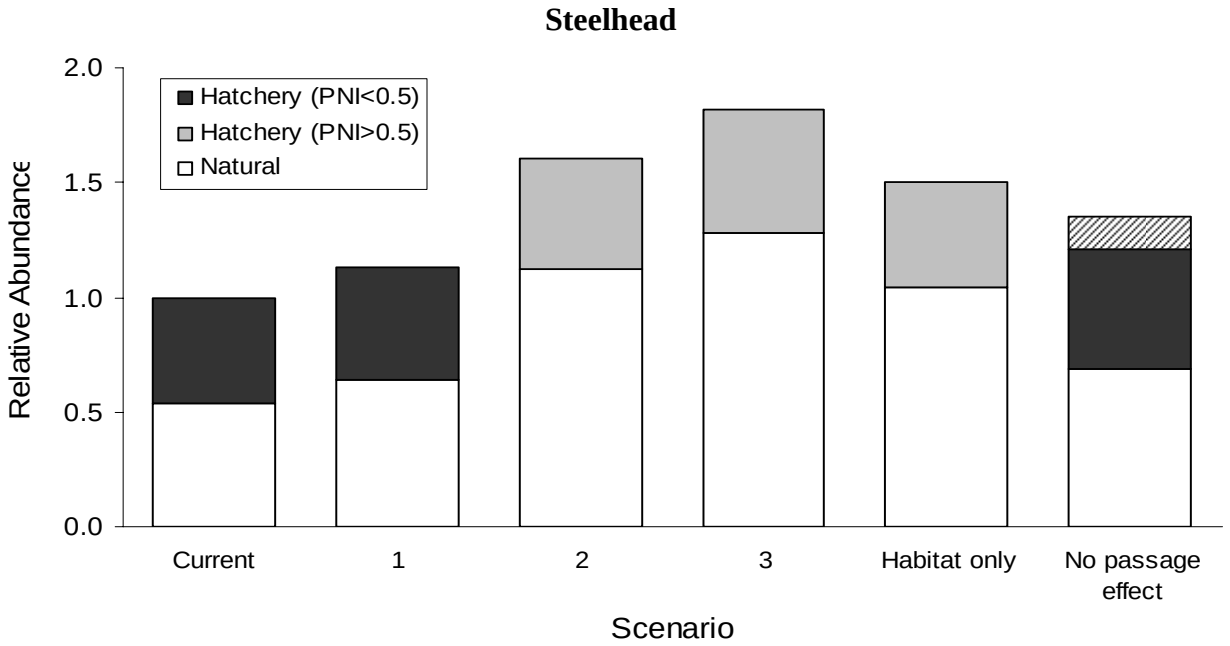

Figure 3.3.5-2. Estimates of the response of Klickitat River steelhead adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

Section 3.3.6 Fifteenmile Creek Subbasin

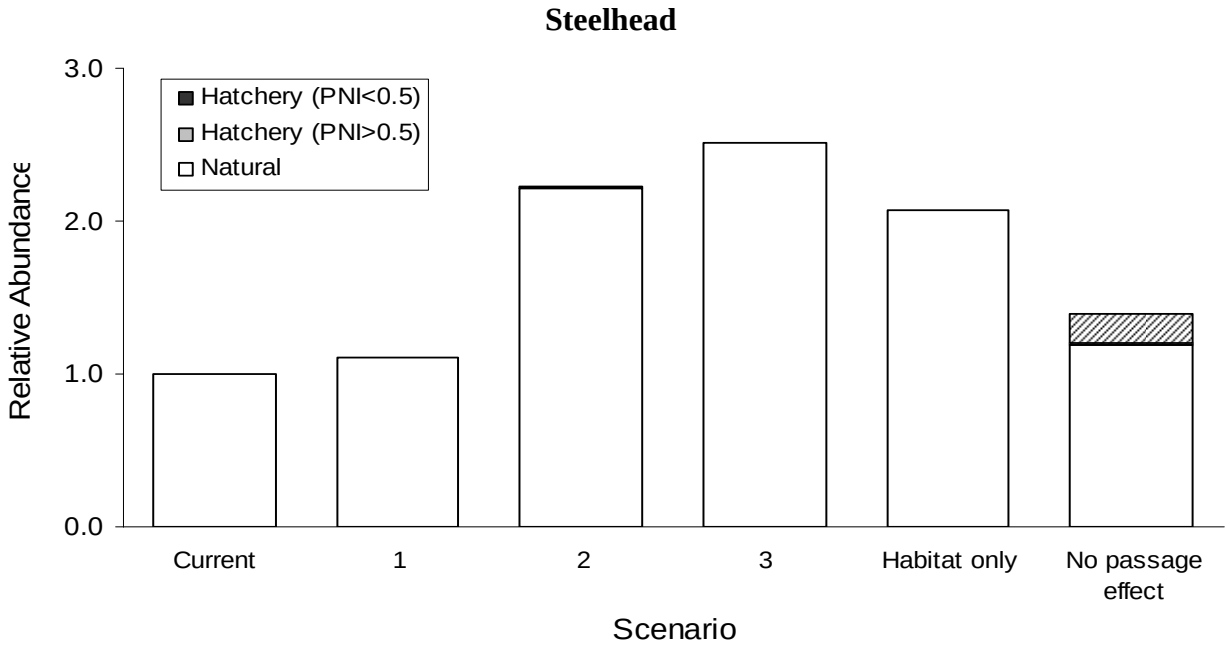

Figure 3.3.6-1. Estimates of the response of Fifteenmile Creek steelhead adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

Section 3.4. Columbia Plateau Province

Table 3.4.1. Juvenile out-migration survival estimates used in AHA analyses for Columbia Plateau Province Chinook salmon and steelhead.

	Current	Draft 2008 Biological Opinion	Aggressive non-breach	No passage effect
Spring Chinook				
Deschutes River	0.820	0.853	0.902	0.984
John Day River	0.740	0.784	0.851	0.977
UmatillaRiver	0.740	0.784	0.851	0.958
Walla Walla River	0.673	0.720	0.774	0.951
Yakima River	0.673	0.720	0.774	0.946
Tucannon River	0.608	0.657	0.699	0.931
Fall Chinook				
Umatilla River	0.522	0.559	0.600	0.676
Yakima River	0.522	0.559	0.600	0.820
Steelhead				
Deschutes River	0.770	0.809	0.886	0.923
John Day River	0.700	0.770	0.840	0.926
UmatillaRiver	0.696	0.766	0.835	0.901
Walla Walla River	0.468	0.524	0.608	0.661
Yakima River	0.470	0.531	0.611	0.691
Tucannon River	0.585	0.563	0.819	0.896

Table 3.4.2. Juvenile estuary/ocean survival estimates used in AHA analyses for Columbia Plateau Province Chinook salmon and steelhead.

	Current	Draft 2008 Biological Opinion	Aggressive non-breach	No passage effect
Spring Chinook				
Deschutes River	0.072	0.076	0.076	0.072
John Day River	0.080	0.085	0.085	0.080
UmatillaRiver	0.060	0.064	0.064	0.060
Walla Walla River	0.060	0.064	0.064	0.060
Yakima River	0.048	0.051	0.051	0.048
Tucannon River	0.060	0.064	0.064	0.060
Fall Chinook				
Umatilla River	0.017	0.019	0.019	0.017
Yakima River	0.017	0.019	0.019	0.017
Steelhead				
Deschutes River	0.053	0.056	0.056	0.053
John Day River	0.053	0.056	0.056	0.053
UmatillaRiver	0.056	0.059	0.059	0.056
Walla Walla River	0.056	0.059	0.059	0.056
Yakima River	0.061	0.065	0.065	0.061
Tucannon River	0.056	0.059	0.059	0.056

Table 3.4.3. Adult migration survival estimates used in AHA analyses for Columbia Plateau Province Chinook salmon and steelhead.

	Current	Draft 2008 Biological Opinion	Aggressive non-breach	No passage effect
Spring Chinook				
Deschutes River	0.933	0.933	0.933	0.980
John Day River	0.901	0.901	0.901	0.973
UmatillaRiver	0.930	0.930	0.930	0.974
Walla Walla River	0.907	0.907	0.907	0.965
Yakima River	0.871	0.871	0.871	0.965
Tucannon River	0.864	0.864	0.864	0.948
Fall Chinook				
Umatilla River	0.922	0.922	0.922	0.996
Yakima River	0.907	0.907	0.907	0.975
Steelhead				
Deschutes River	0.953	0.953	0.953	0.953
John Day River	0.880	0.880	0.880	0.950
UmatillaRiver	0.930	0.930	0.930	0.974
Walla Walla River	0.907	0.907	0.907	0.965
Yakima River	0.907	0.907	0.907	0.975
Tucannon River	0.864	0.864	0.864	0.948

Table 3.4.4. Productivity values used in AHA scenarios for Columbia Plateau Province Chinook salmon.

Subbasin, population	Current	Draft 2008 Biological Opinion	Manager Input
Deschutes River			
Deschutes River spring Chinook	4.000	4.000	4.880
John Day River			
Middle Fork spring Chinook	3.500	3.500	15.505
North Fork spring Chinook	5.200	5.200	10.556
Upper Mainstem spring Chinook	4.000	4.000	16.600
Umatilla River			
Umatilla River spring Chinook	2.420	2.420	3.461
Umatilla River fall Chinook	0.450	0.450	1.800
Walla Walla River			
Walla Walla River spring Chinook	4.000	4.000	5.600
Yakima River			
American spring Chinook	3.890	3.890	4.971
Naches spring Chinook	2.610	2.610	3.440
Upper Yakima spring Chinook	3.280	3.280	3.805
Yakima fall Chinook	3.290	3.290	5.201
Marion Drain fall Chinook	2.080	2.080	2.174
Tucannon River			
Tucannon River spring Chinook	2.200	2.574	2.200

Table 3.4.5. Productivity values used in AHA scenarios for Columbia Plateau Province steelhead.

Subbasin, population	Current	Draft 2008 Biological Opinion	Manager Input
Deschutes River			
Eastside tributaries summer steelhead	4.110	4.233	9.987
Westside tributaries summer steelhead	1.990	2.010	3.005
John Day River			
Lower mainstem summer steelhead	4.830	4.878	8.846
Middle Fork summer steelhead	3.890	3.929	6.808
North Fork summer steelhead	3.820	3.858	5.157
South Fork summer steelhead	3.270	3.335	4.742
Upper mainstem summer steelhead	3.400	3.434	6.528
Umatilla River			
Umatilla River summer steelhead	1.910	1.986	4.450
Walla Walla River			
Walla Walla River summer steelhead	1.840	1.914	3.128
Touchet River summer steelhead	0.750	0.780	1.748
Yakima River			
Naches summer steelhead	2.630	2.735	5.313
Satus summer steelhead	2.410	2.506	5.182
Toppenish summer steelhead	2.420	2.517	4.864
Upper Yakima summer steelhead	2.600	2.704	4.551
Tucannon River			
Tucannon River summer steelhead	1.895	1.990	1.895

Table 3.4.6. Habitat capacity values used in AHA scenarios for Columbia Plateau Province Chinook salmon.

Subbasin, population	Current	Draft 2008 Biological Opinion	Manager Input
Deschutes River			
Deschutes River spring Chinook	1,300	1,300	1,508
John Day River			
Middle Fork spring Chinook	1,500	1,500	9,300
North Fork spring Chinook	3,000	3,000	6,090
Upper mainstem spring Chinook	1,500	1,500	6,225
Umatilla River			
Umatilla River spring Chinook	942	942	1,281
Umatilla River fall Chinook	500	500	9,285
Walla Walla River			
Walla Walla River spring Chinook	443	443	620
Yakima River			
American spring Chinook	418	418	484
Naches spring Chinook	2,121	2,121	6,045
Upper Yakima spring Chinook	5,292	5,292	15,082
Yakima fall Chinook	14,989	14,989	17,042
Marion Drain fall Chinook	448	448	468
Tucannon River			
Tucannon River spring Chinook	979	1,145	979

Table 3.4.7. Habitat capacity values used in AHA scenarios for Columbia Plateau Province Steelhead.

Subbasin, population	Current	Draft 2008 Biological Opinion	Manager Input
Deschutes River			
Eastside tributaries summer steelhead	6,055	6,237	16,046
Westside tributaries summer steelhead	1,766	1,784	1,554
John Day River			
Lower mainstem summer steelhead	4,294	4,337	11,723
Middle Fork summer steelhead	1,712	1,729	2,482
North Fork summer steelhead	3,925	3,964	5,103
South Fork summer steelhead	625	638	794
Upper mainstem summer steelhead	1,270	1,283	2,248
Umatilla River			
Umatilla River summer steelhead	4,230	4,399	6,218
Walla Walla River			
Walla Walla River summer steelhead	2,180	2,267	3,662
Touchet River summer steelhead	818	851	1,497
Yakima River			
Naches summer steelhead	3,192	3,320	7,660
Satus summer steelhead	1,472	1,531	3,283
Toppenish summer steelhead	860	894	2,219
Upper Yakima summer steelhead	1,809	1,881	6,449
Tucannon River			
Tucannon River summer steelhead	1,764	1,852	1,764

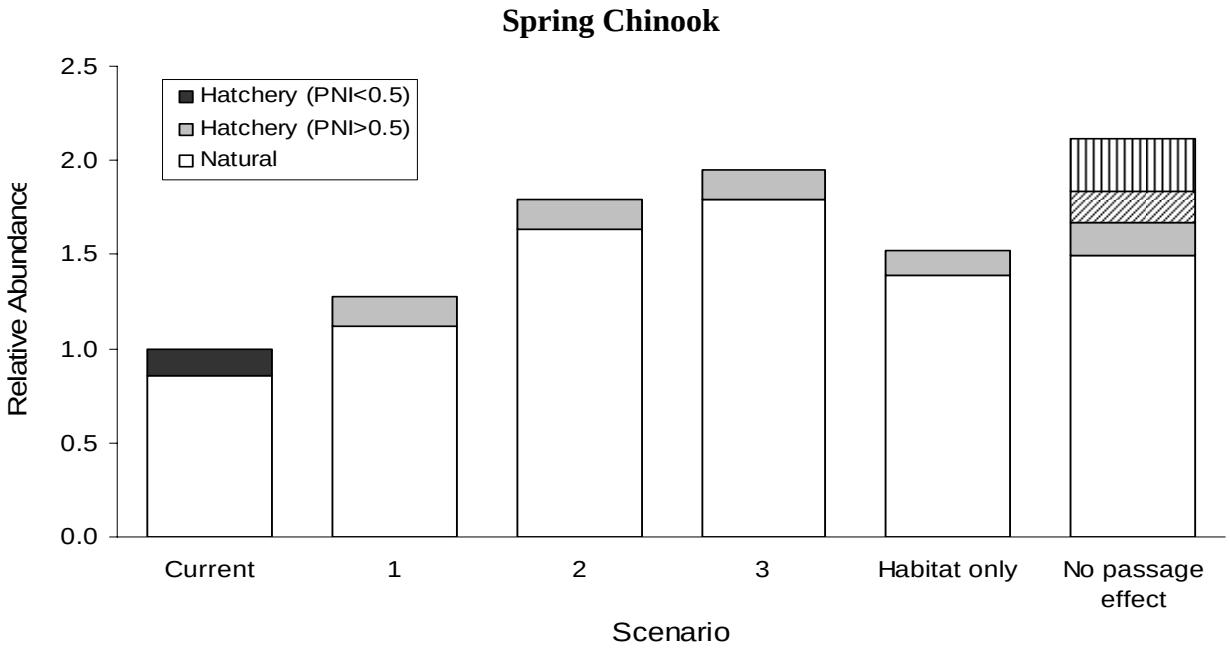

Figure 3.4.1-1. Estimates of the response of Deschutes River spring Chinook adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

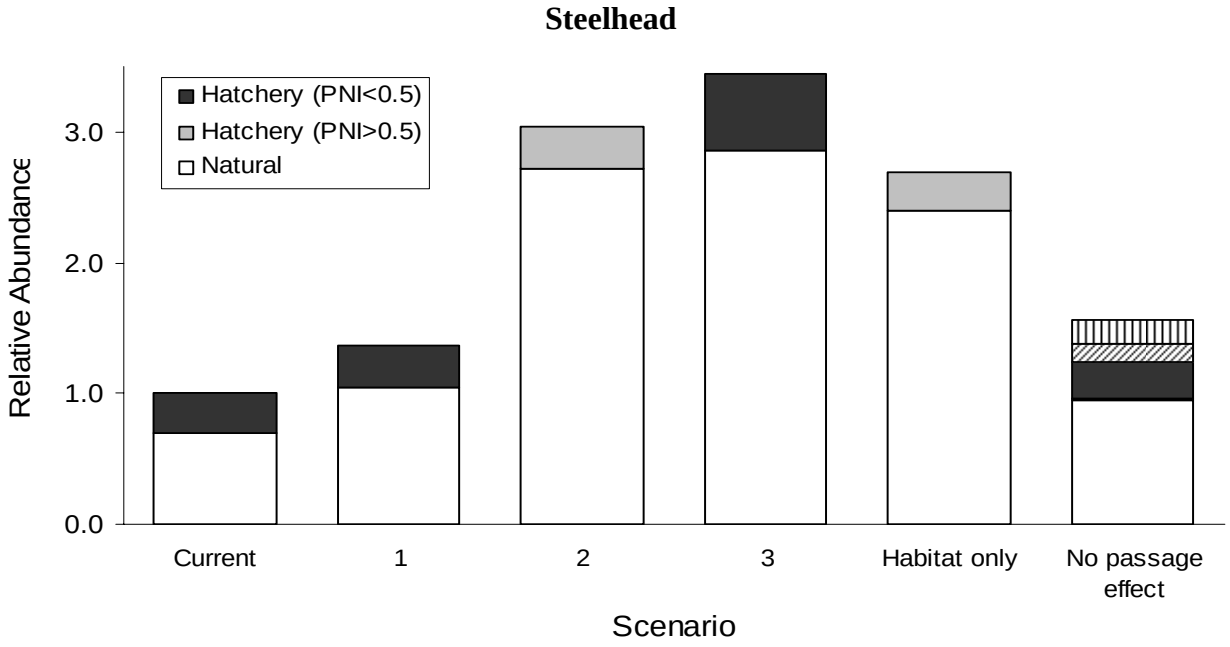

Figure 3.4.1-2. Estimates of the response of Deschutes River steelhead adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

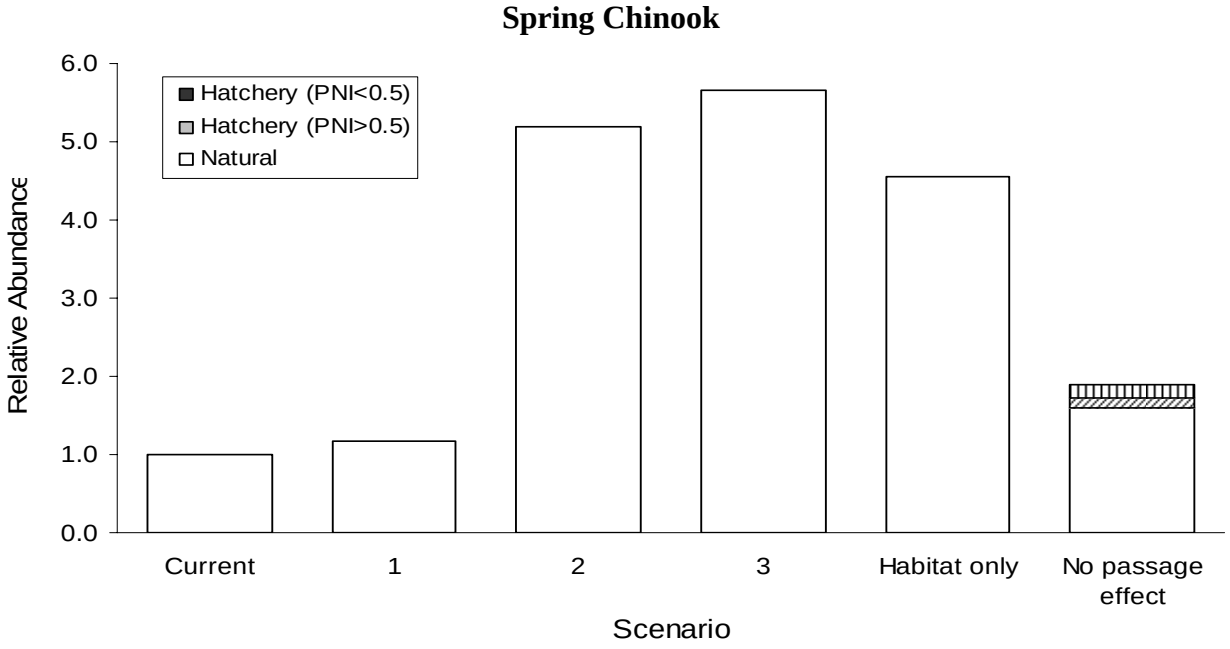

Figure 3.4.2-1. Estimates of the response of John Day River spring Chinook adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

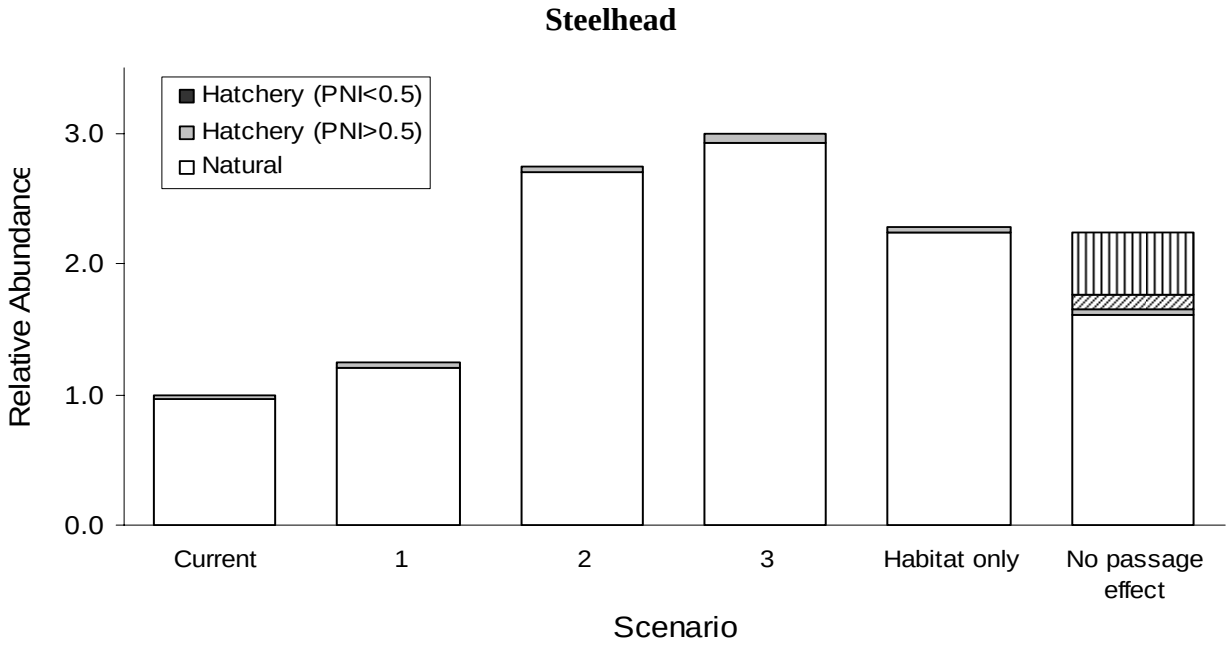

Figure 3.4.2-2. Estimates of the response of John Day River steelhead adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

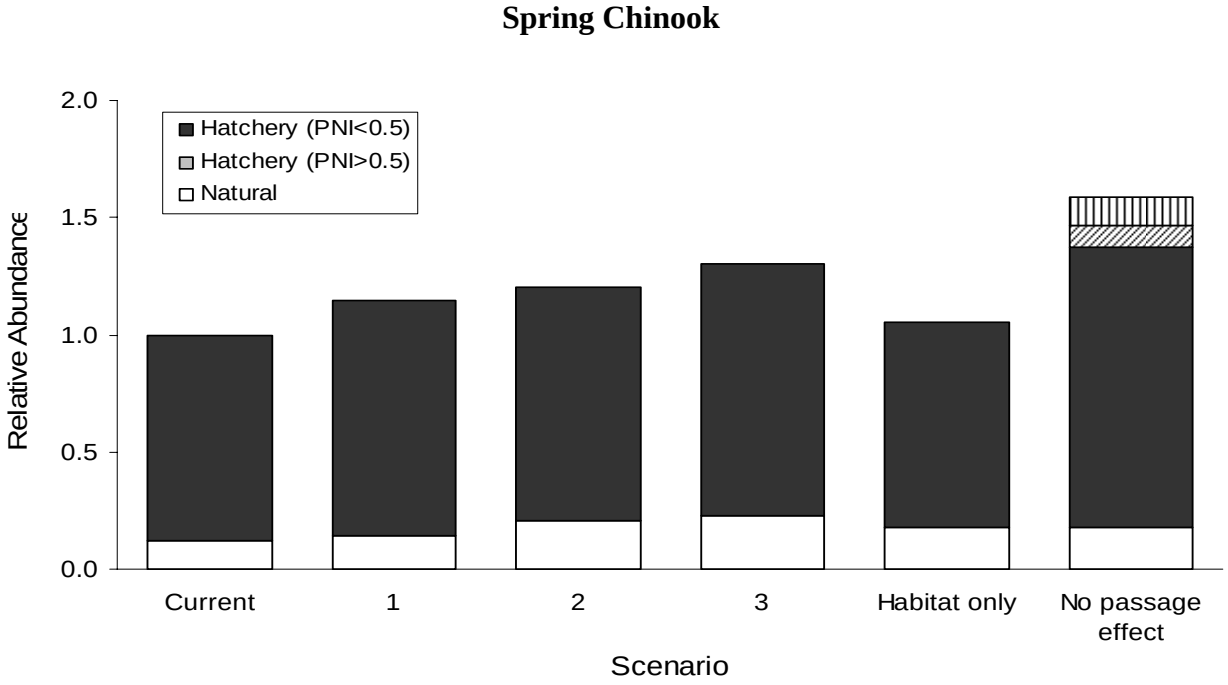

Figure 3.4.3-1. Estimates of the response of Umatilla River spring Chinook adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

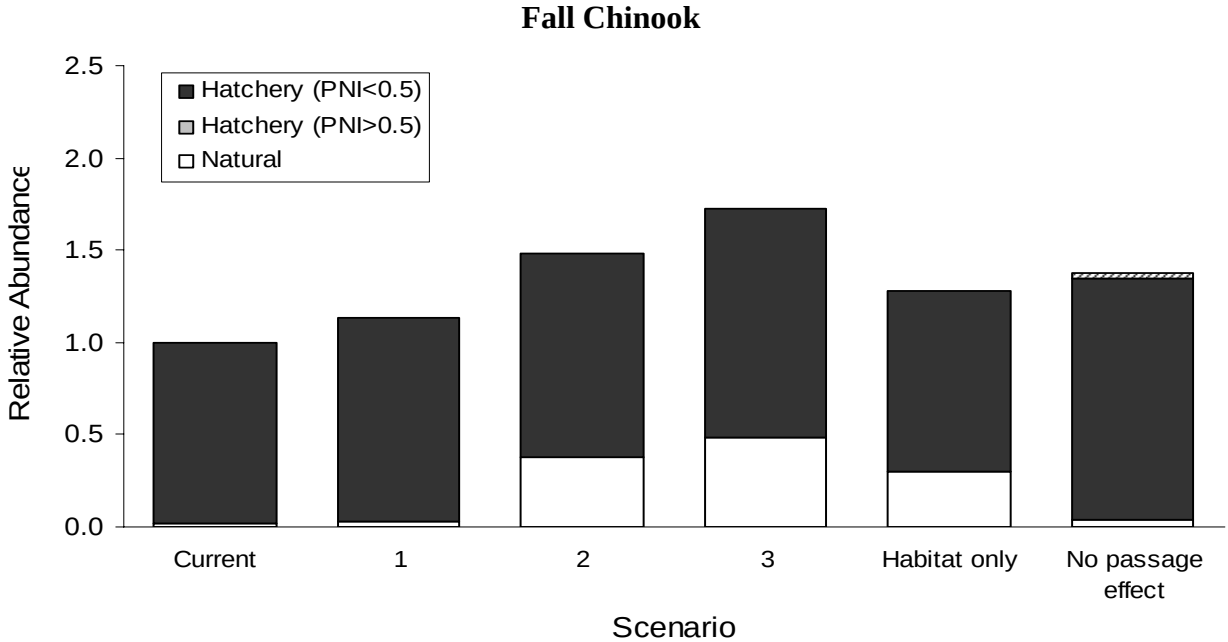

Figure 3.4.3-2. Estimates of the response of Umatilla River fall Chinook adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

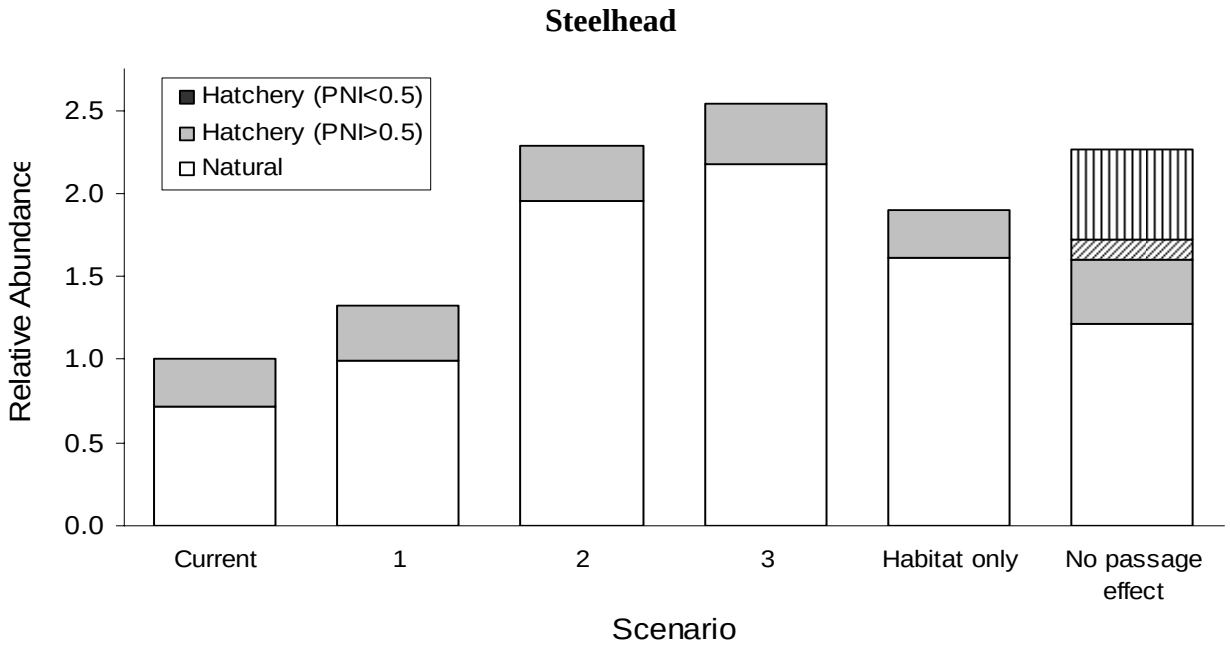

Figure 3.4.3-3. Estimates of the response of Umatilla River steelhead adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

Section 3.4.4 Walla Walla River Subbasin

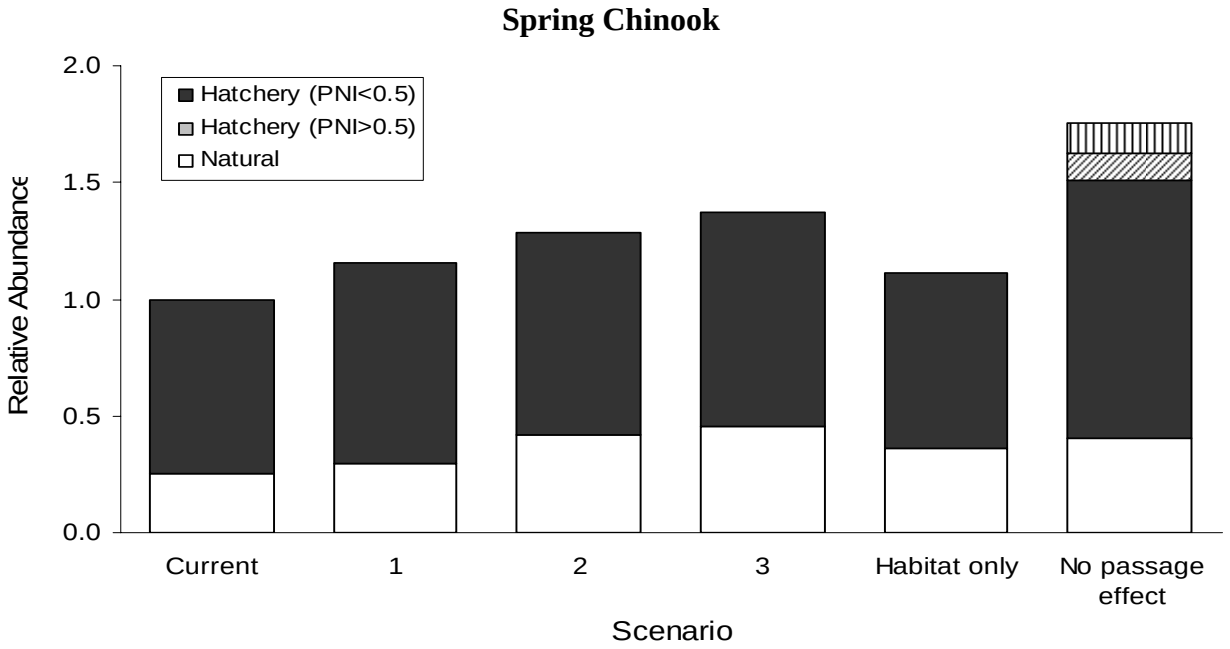

Figure 3.4.4-1. Estimates of the response of Walla Walla River spring Chinook adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

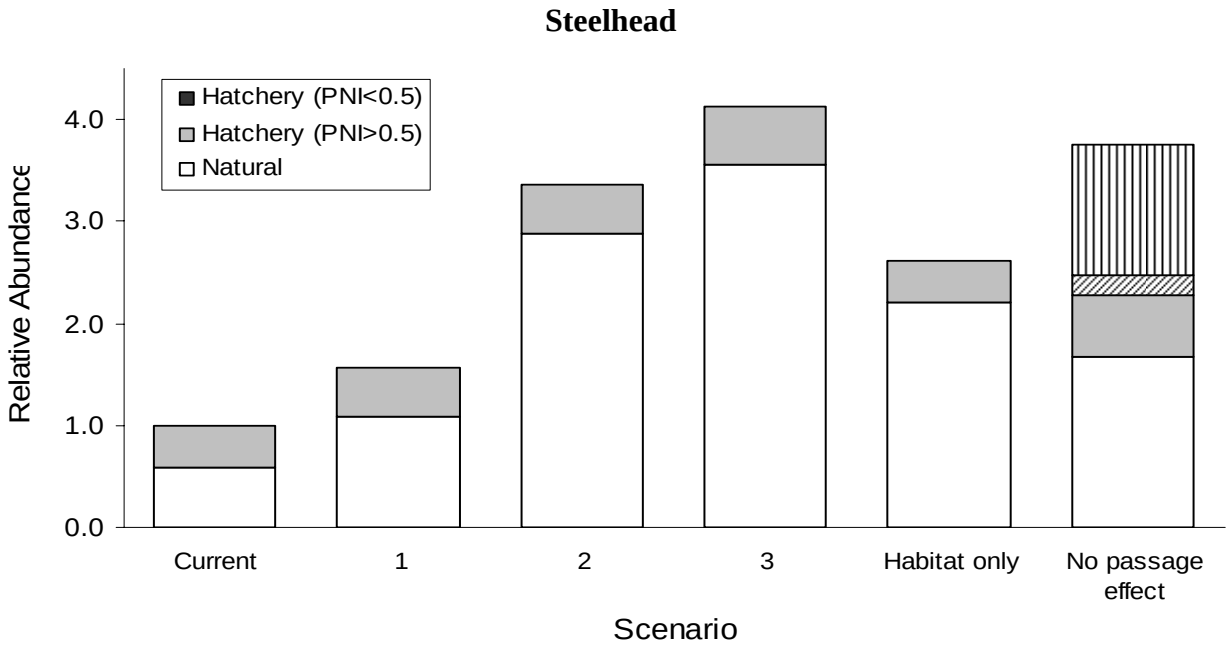

Figure 3.4.4-2. Estimates of the response of Walla Walla River steelhead adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

Section 3.4.5 Yakima River Subbasin

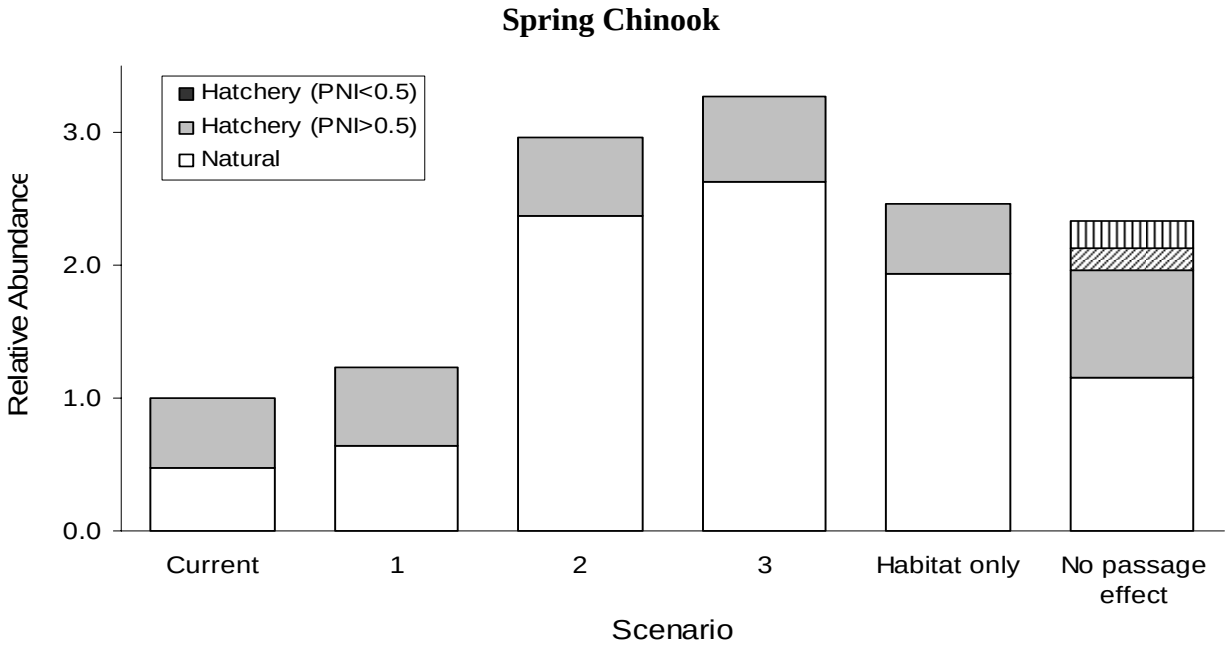

Figure 3.4.5-1. Estimates of the response of Yakima River spring Chinook adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

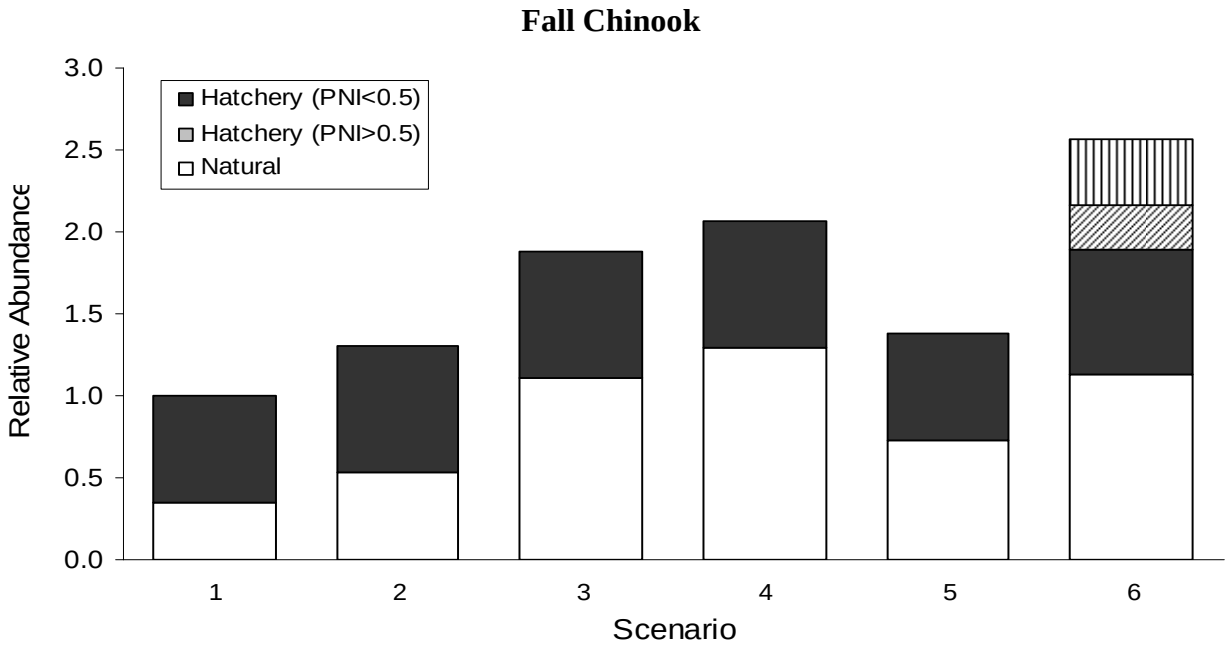

Figure 3.4.5-2. Estimates of the response of Yakima River fall Chinook adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

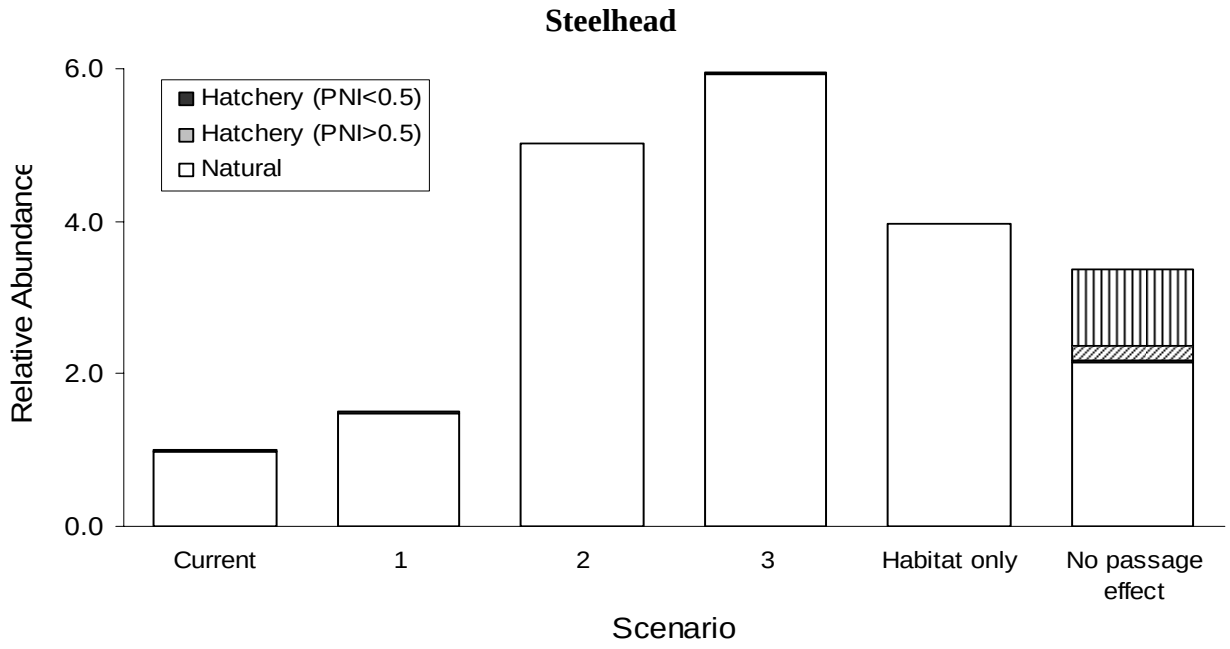

Figure 3.4.5-3. Estimates of the response of Yakima River steelhead adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

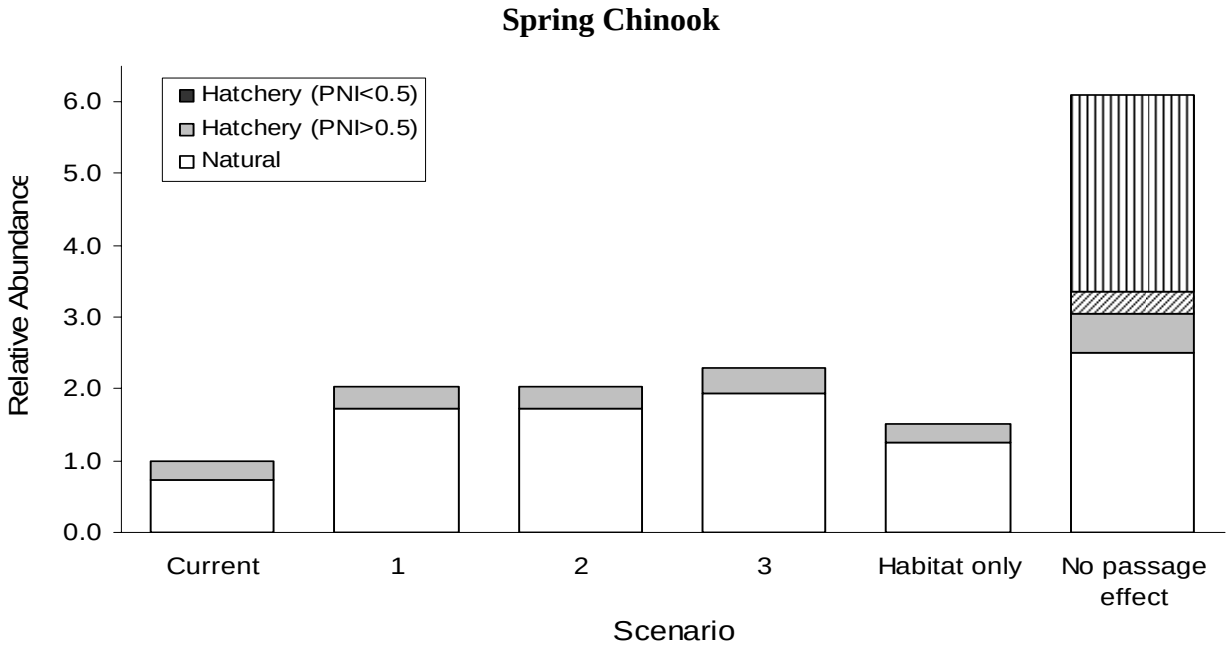

Figure 3.4.6-1. Estimates of the response of Tucannon River spring Chinook adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

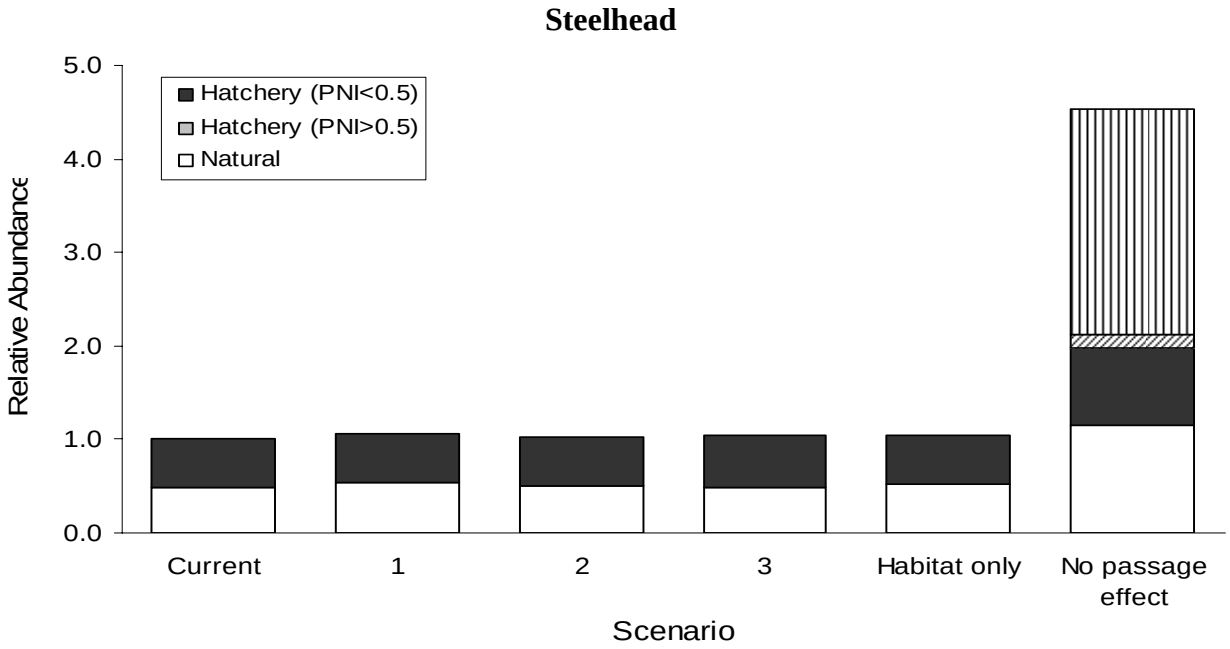

Figure 3.4.6-2. Estimates of the response of Tucannon River steelhead adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

Section 3.5 Columbia Cascade Province

Table 3.5.1. Juvenile out-migration survival estimates used in AHA analyses for Columbia Cascade Province Chinook salmon and steelhead.

	Current	Draft 2008 Biological Opinion	Aggressive non-breach	No passage effect
Spring Chinook				
Wenatchee River	0.500	0.545	0.575	0.909
Entiat River	0.453	0.503	0.521	0.905
Methow River	0.410	0.455	0.472	0.894
Okanogan River	0.410	0.455	0.472	0.892
Summer/Fall Chinook				
Wenatchee River	0.065	0.071	0.075	0.143
Entiat River	0.066	0.073	0.076	0.161
Methow River	0.047	0.052	0.054	0.128
Okanogan River	0.047	0.052	0.054	0.128
Steelhead				
Wenatchee River	0.265	0.334	0.344	0.547
Entiat River	0.219	0.276	0.285	0.496
Methow River	0.181	0.228	0.235	0.448
Okanogan River	0.181	0.228	0.235	0.447

Table 3.5.2. Juvenile estuary/ocean survival estimates used in AHA analyses for Columbia Cascade Province Chinook salmon and steelhead.

	Current	Draft 2008 Biological Opinion	Aggressive non-breach	No passage effect
Spring Chinook				
Wenatchee River	0.055	0.058	0.058	0.055
Entiat River	0.055	0.058	0.058	0.055
Methow River	0.055	0.058	0.058	0.055
Okanogan River	0.055	0.058	0.058	0.055
Summer/Fall Chinook				
Wenatchee River	0.096	0.105	0.105	0.096
Entiat River	0.096	0.102	0.102	0.096
Methow River	0.096	0.102	0.102	0.096
Okanogan River	0.096	0.102	0.102	0.096
Steelhead				
Wenatchee River	0.111	0.118	0.118	0.111
Entiat River	0.111	0.118	0.118	0.111
Methow River	0.111	0.118	0.118	0.111
Okanogan river	0.111	0.118	0.118	0.111

Table 3.5.3. Adult migration survival estimates used in AHA analyses for Columbia Cascade Province Chinook salmon and steelhead.

	Current	Draft 2008 Biological Opinion	Aggressive non-breach	No passage effect
Spring Chinook				
Wenatchee River	0.785	0.785	0.785	0.940
Entiat River	0.758	0.758	0.758	0.932
Methow River	0.733	0.733	0.733	0.924
Okanogan river	0.733	0.733	0.733	0.924
Summer/Fall Chinook				
Wenatchee River	0.785	0.785	0.785	0.940
Entiat River	0.758	0.758	0.758	0.932
Methow River	0.733	0.733	0.733	0.924
Okanogan River	0.733	0.733	0.733	0.924
Steelhead				
Wenatchee River	0.611	0.611	0.611	0.907
Entiat River	0.569	0.569	0.569	0.899
Methow River	0.531	0.531	0.531	0.891
Okanogan River	0.531	0.531	0.531	0.891

Table 3.5.4. Productivity values used in AHA scenarios for Columbia Cascade Province salmon and steelhead.

	Current	Draft 2008 Biological Opinion	Manager input
Spring Chinook			
Wenatchee River	4.260	4.388	4.942
Entiat River	1.970	2.403	2.403
Methow River	1.920	2.035	2.938
Okanogan River	0.900	1.026	1.233
Summer/Fall Chinook			
Wenatchee River	4.250	4.250	4.675
Entiat River	1.690	1.690	1.859
Methow River	1.760	1.760	1.936
Okanogan River	6.000	6.000	6.600
Steelhead			
Wenatchee River	2.250	2.340	2.520
Entiat River	0.900	0.972	1.287
Methow River	1.250	1.300	1.875
Okanogan River	1.650	1.881	2.772

Table 3.5.5. Habitat capacity values used in AHA scenarios for Columbia Cascade Province salmon and steelhead.

	Current	Draft 2008 Biological Opinion	Manager input
Spring Chinook			
Wenatchee River	2,091	2,154	3,404
Entiat River	344	420	534
Methow River	1,116	1,183	1,821
Okanogan River	253	288	347
Summer/Fall Chinook			
Wenatchee River	1,336	1,336	1,723
Entiat River	300	300	387
Methow River	1,531	1,531	1,975
Okanogan River	10,000	10,000	12,900
Steelhead			
Wenatchee River	765	796	1,446
Entiat River	170	184	184
Methow River	1,962	2,040	2,629
Okanogan River	126	144	418

Section 3.5.1 Wenatchee River Subbasin

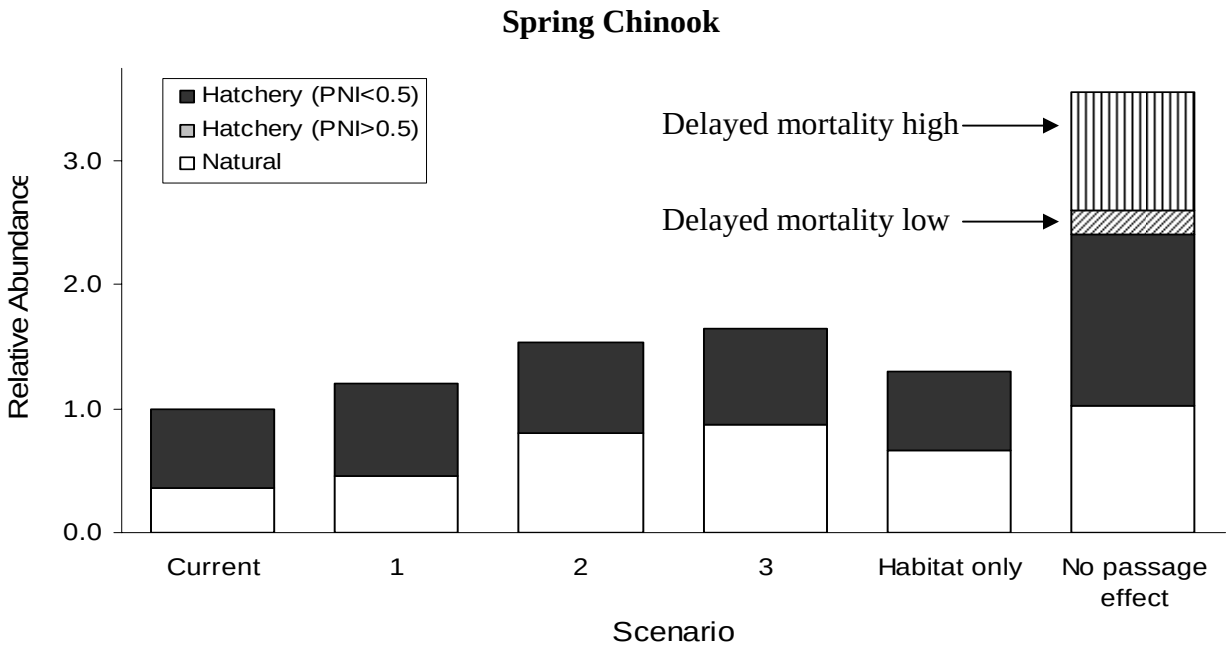

Figure 3.5.1-1. Estimates of the response of Wenatchee River spring Chinook adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

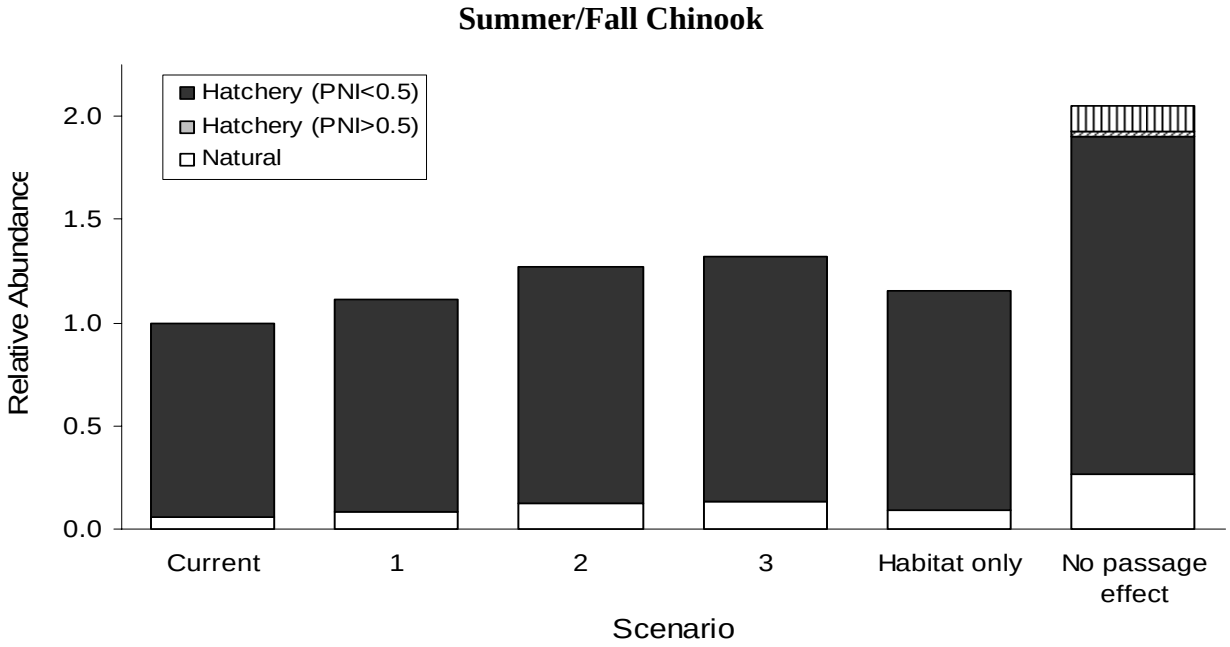

Figure 3.5.1-2. Estimates of the response of Wenatchee River summer/fall Chinook adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

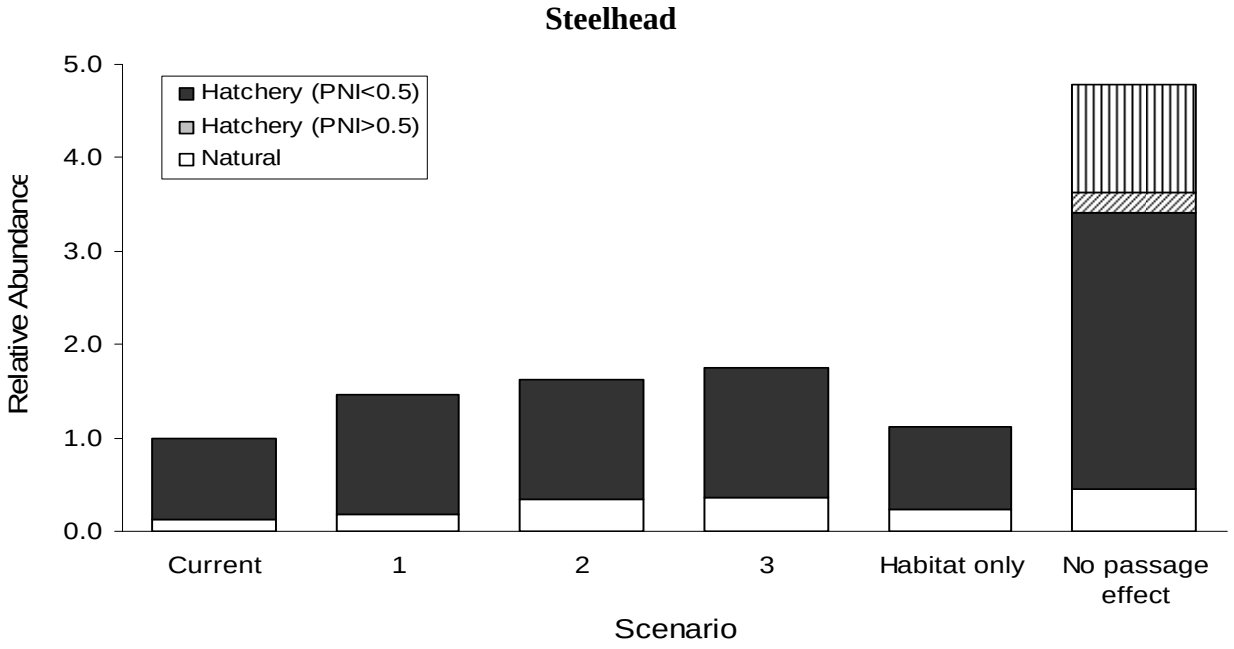

Figure 3.5.1-3. Estimates of the response of Wenatchee River steelhead adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

Section 3.5.2 Entiat River Subbasin

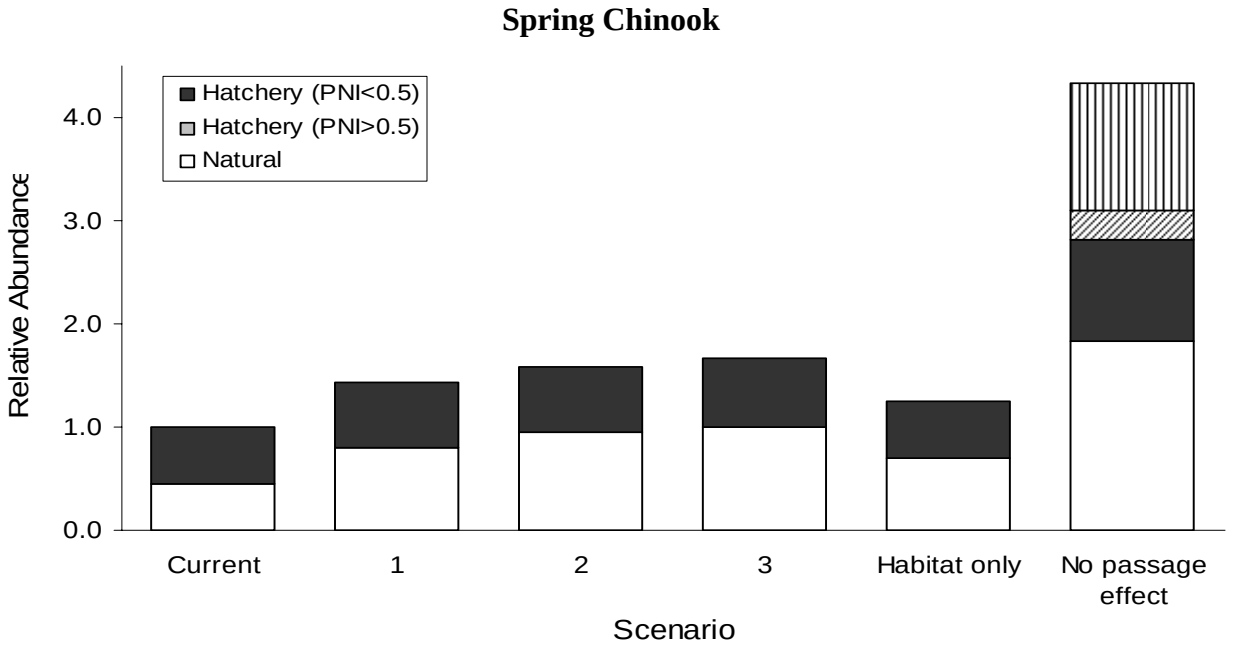

Figure 3.5.2-1. Estimates of the response of Entiat River spring Chinook adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

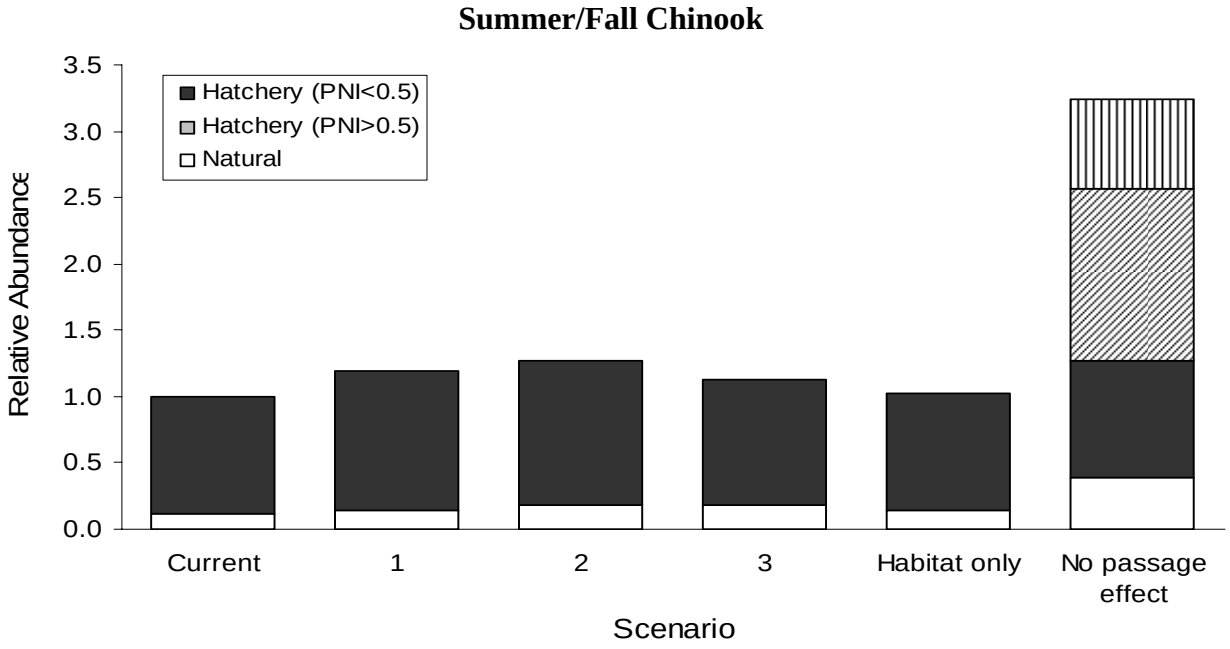

Figure 3.5.2-2. Estimates of the response of Entiat River summer/fall Chinook adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

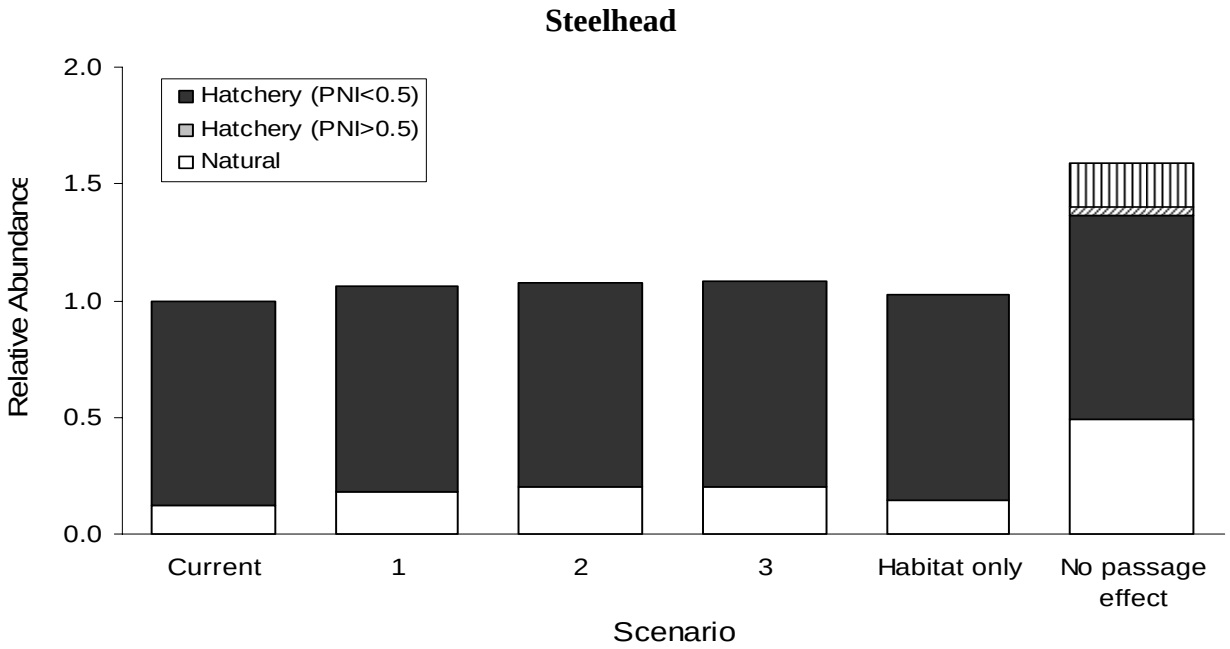

Figure 3.5.2-3. Estimates of the response of Entiat River steelhead adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

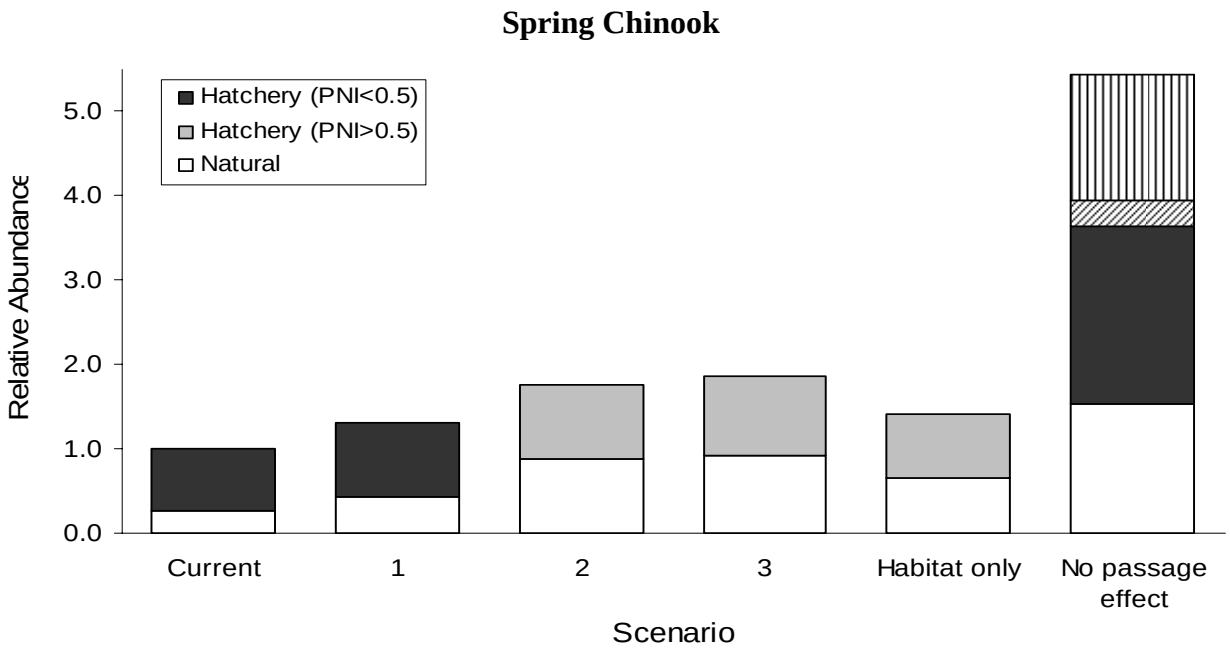

Figure 3.5.3-1. Estimates of the response of Methow River spring Chinook adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

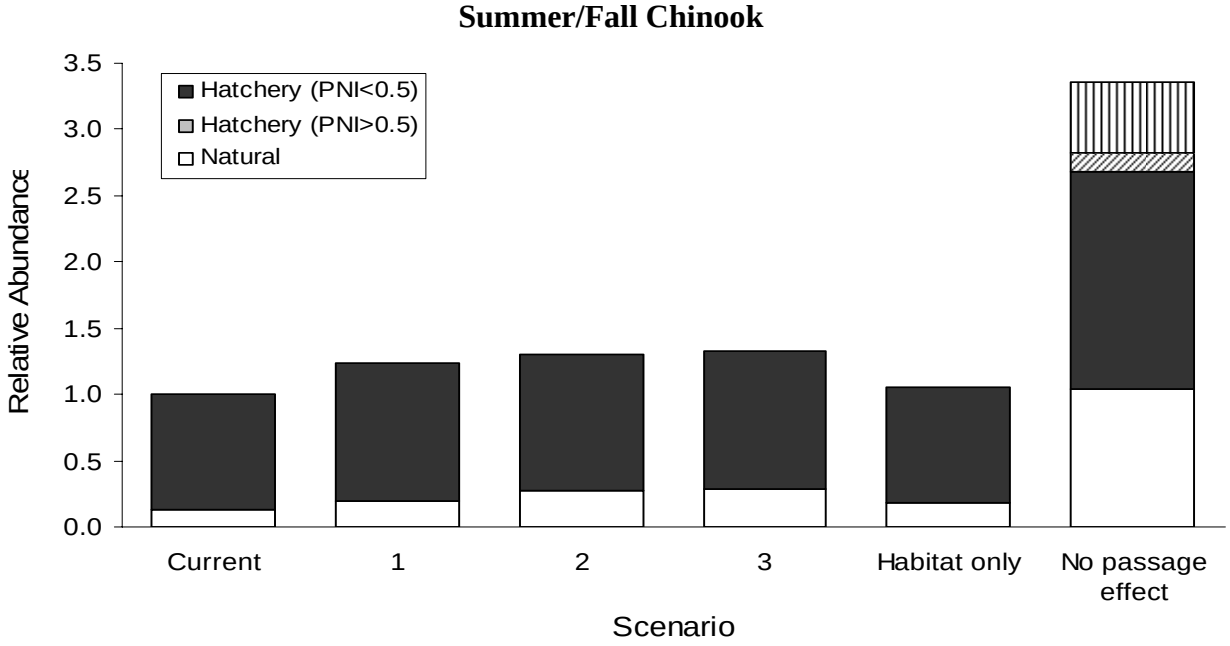

Figure 3.5.3-2. Estimates of the response of Methow River summer/fall Chinook adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

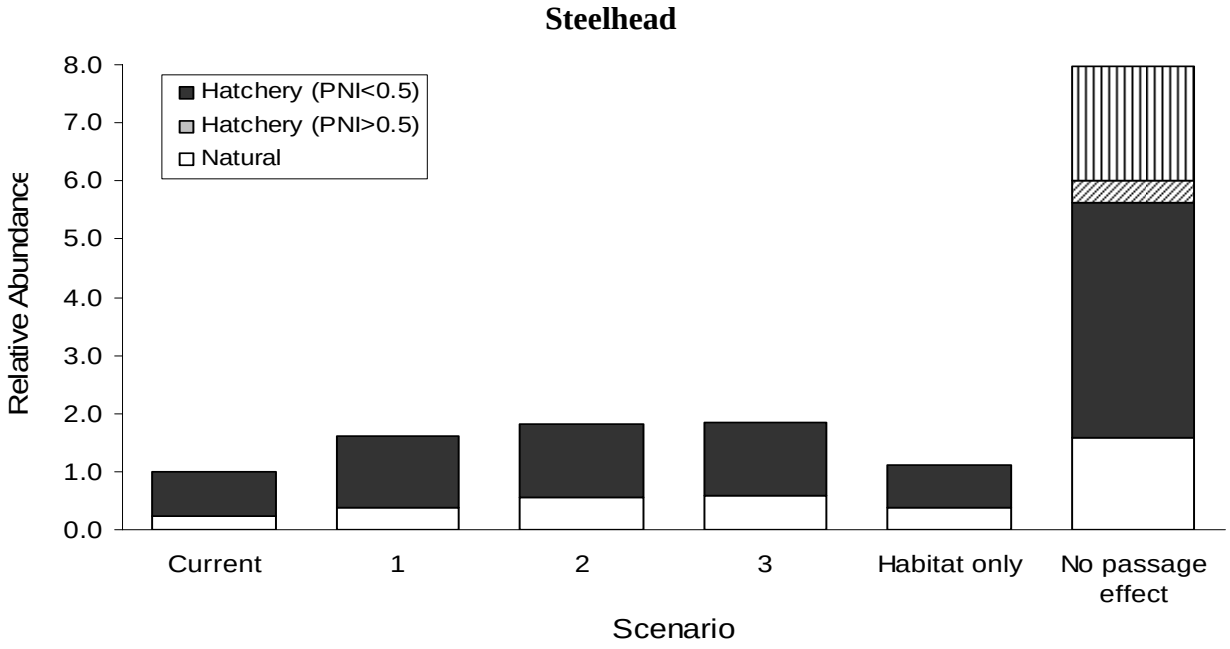

Figure 3.5.3-3. Estimates of the response of Methow River steelhead adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

Section 3.5.4 Okanogan River Subbasin

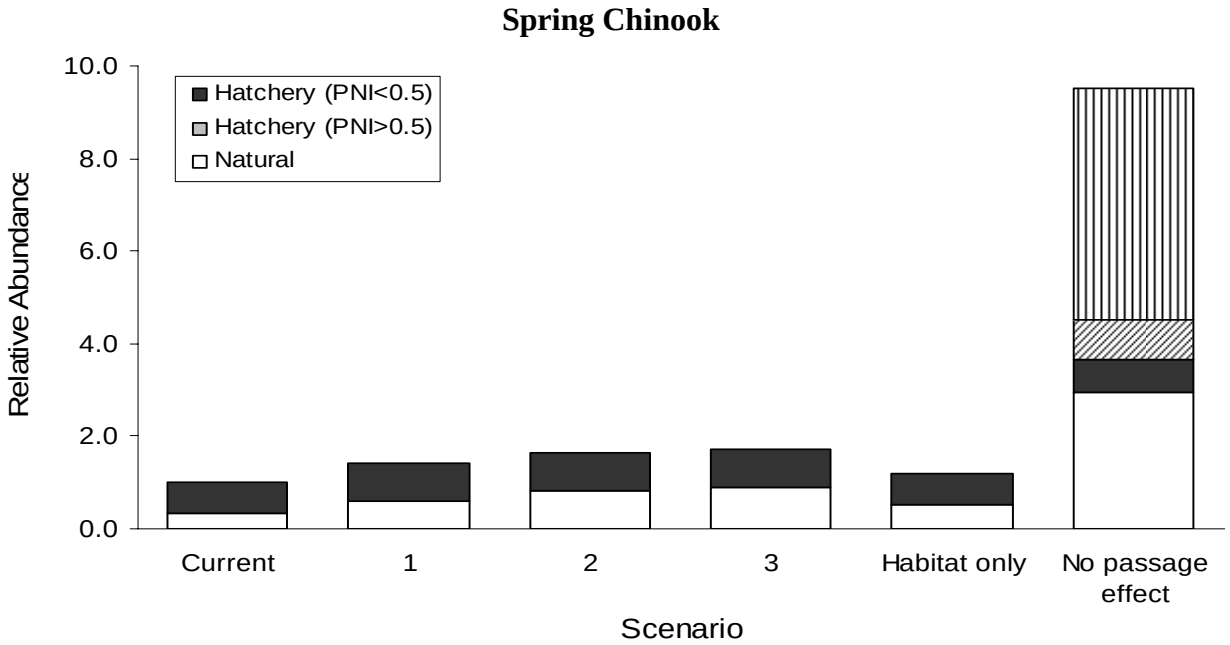

Figure 3.5.4-1. Estimates of the response of Okanogan River spring Chinook adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

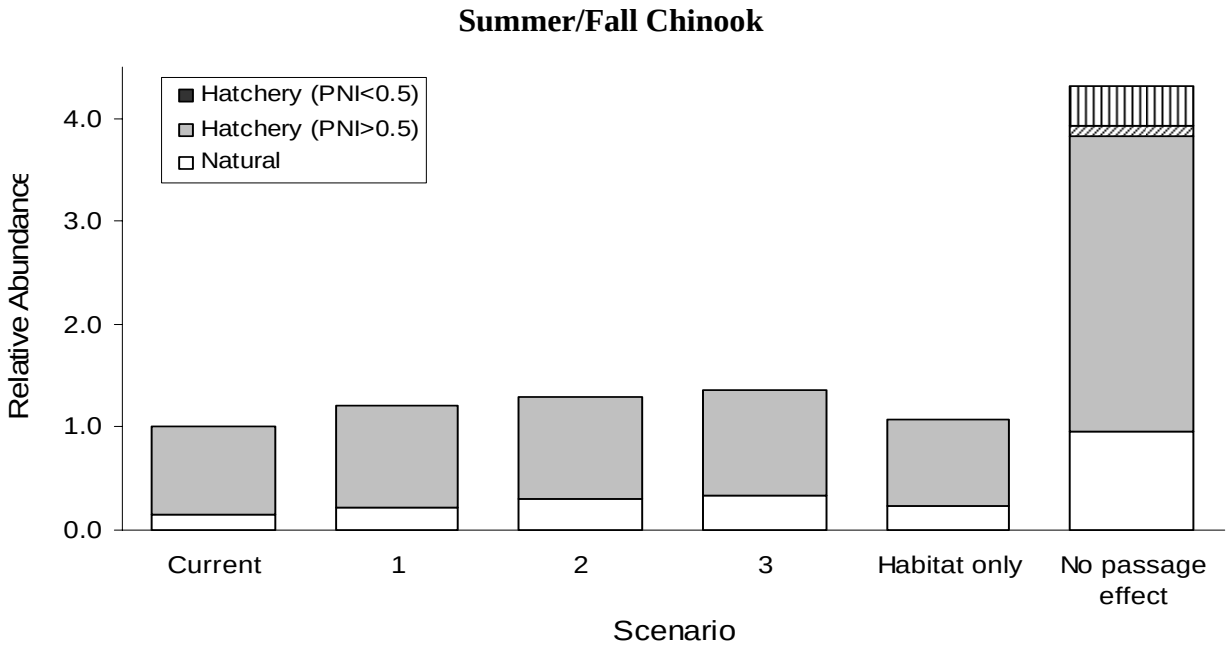

Figure 3.5.4-2. Estimates of the response of Okanogan River summer/fall Chinook adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

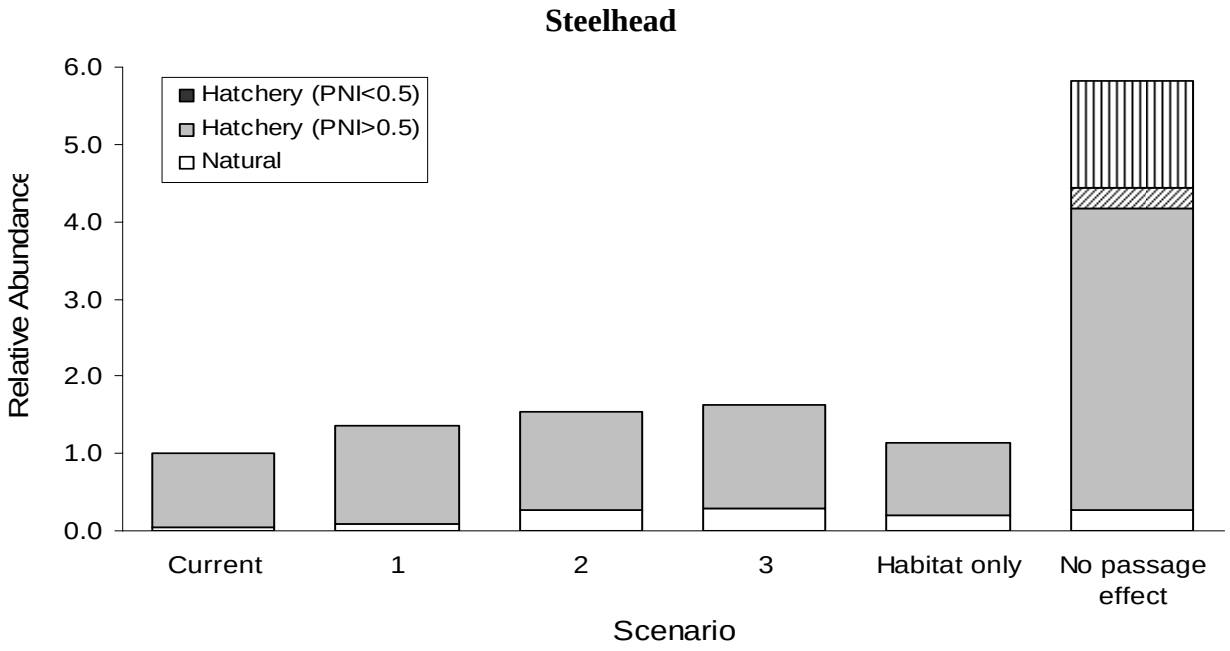

Figure 3.5.4-3. Estimates of the response of Okanogan River steelhead adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

Section 3.6 Blue Mountain Province

Table 3.6.1. Juvenile out-migration survival estimates used in AHA analyses for Blue Mountain Province Chinook salmon and steelhead.

	Current	Draft 2008 Biological Opinion	Aggressive non-breach	No passage effect
Spring/Summer Chinook				
Grande Ronde River	0.548	0.592	0.631	0.902
Imnaha River	0.548	0.592	0.631	0.896
Steelhead				
Asotin Creek	0.489	0.471	0.734	0.908
Grande Ronde River	0.489	0.471	0.734	0.905
Imnaha River	0.489	0.471	0.734	0.896

Table 3.6.2. Juvenile estuary/ocean survival estimates used in AHA analyses for Blue Mountain Province Chinook salmon and steelhead.

	Current	Draft 2008 Biological Opinion	Aggressive non-breach	No passage effect
Spring/Summer Chinook				
Grande Ronde River	0.029	0.031	0.031	0.029
Imnaha River	0.029	0.031	0.031	0.029
Steelhead				
Asotin Creek	0.056	0.059	0.059	0.056
Grande Ronde River	0.056	0.059	0.059	0.056
Imnaha River	0.056	0.059	0.059	0.056

Table 3.6.3. Adult migration survival estimates used in AHA analyses for Blue Mountain Province Chinook salmon and steelhead.

	Current	Draft 2008 Biological Opinion	Aggressive non-breach	No passage effect
Spring/Summer Chinook				
Grande Ronde River	0.820	0.820	0.820	0.932
Imnaha River	0.820	0.820	0.820	0.932
Steelhead				
Asotin Creek	0.823	0.823	0.823	0.932
Grande Ronde River	0.823	0.823	0.823	0.932
Imnaha River	0.823	0.823	0.823	0.932

Table 3.6.4. Productivity values used in AHA scenarios for Blue Mountain Province Chinook salmon.

Subbasin, population	Current	Draft 2008 Biological Opinion	Manager Input
Grande Ronde River			
Wenaha spring Chinook	5.200	5.200	5.200
Lostine spring Chinook	3.650	3.723	3.906
Catherine Creek spring Chinook	2.500	3.075	3.150
Lookingglass Creek spring Chinook	3.000	3.000	3.000
Minam spring Chinook	5.700	5.700	5.700
Upper Grande Ronde spring Chinook	1.000	1.230	1.280
Imnaha River			
Imnaha River spring-summer Chinook	2.000	2.020	2.060

Table 3.6.5. Productivity values used in AHA scenarios for Blue Mountain Province steelhead.

Subbasin, population	Current	Draft 2008 Biological Opinion	Manager Input
Asotin Creek			
Asotin Creek summer steelhead	1.993	2.073	1.993
Grande Ronde River			
Wallowa summer steelhead	2.887	2.916	3.493
Lower Grande Ronde summer steelhead	1.800	1.872	2.412
Upper Grande Ronde summer steelhead	3.900	3.939	4.056
Joseph summer steelhead	3.000	3.120	3.570
Imnaha River			
Imnaha summer steelhead	3.000	3.000	3.450

Table 3.6.6. Habitat capacity values used in AHA scenarios for Blue Mountain Province Chinook salmon and steelhead.

Subbasin, population	Current	Draft 2008 Biological Opinion	Manager Input
Grande Ronde River			
Wenaha spring Chinook	488	488	488
Lostine spring Chinook	500	510	535
Catherine Creek spring Chinook	200	246	252
Lookingglass Creek spring Chinook	200	200	200
Minam spring Chinook	338	338	338
Upper Grande Ronde spring Chinook	100	123	128
Imnaha River			
Imnaha River spring-summer Chinook	700	707	721

Table 3.6.7. Habitat capacity values used in AHA scenarios for Blue Mountain Province steelhead.

Subbasin, population	Current	Draft 2008 Biological Opinion	Manager Input
Asotin Creek			
Asotin Creek summer steelhead	505	525	505
Grande Ronde River			
Wallowa summer steelhead	2,060	1,734	2,078
Lower Grande Ronde summer steelhead	4,765	3,812	4,911
Upper Grande Ronde summer steelhead	2,010	1,971	2,029
Joseph summer steelhead	2,829	2,558	2,927
Imnaha River			
Imnaha summer steelhead	2,000	2,000	2,300

Section 3.6.1 Asotin Creek Subbasin

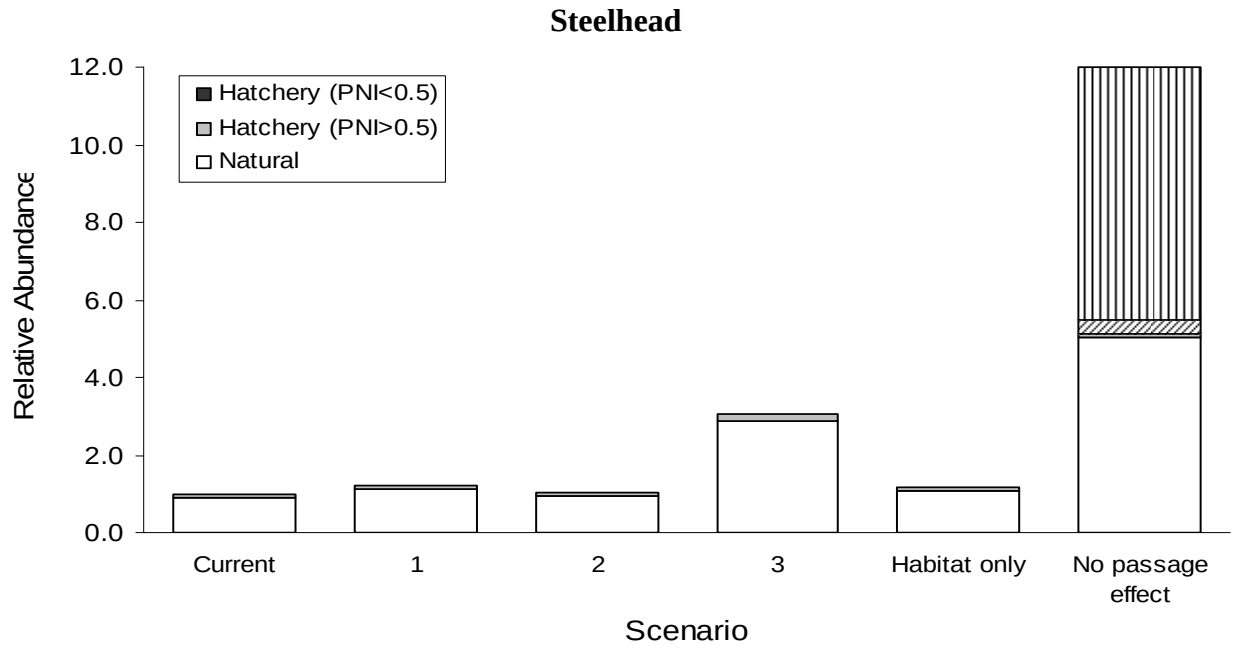

Figure 3.6.1-1. Estimates of the response of Asotin Creek steelhead adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

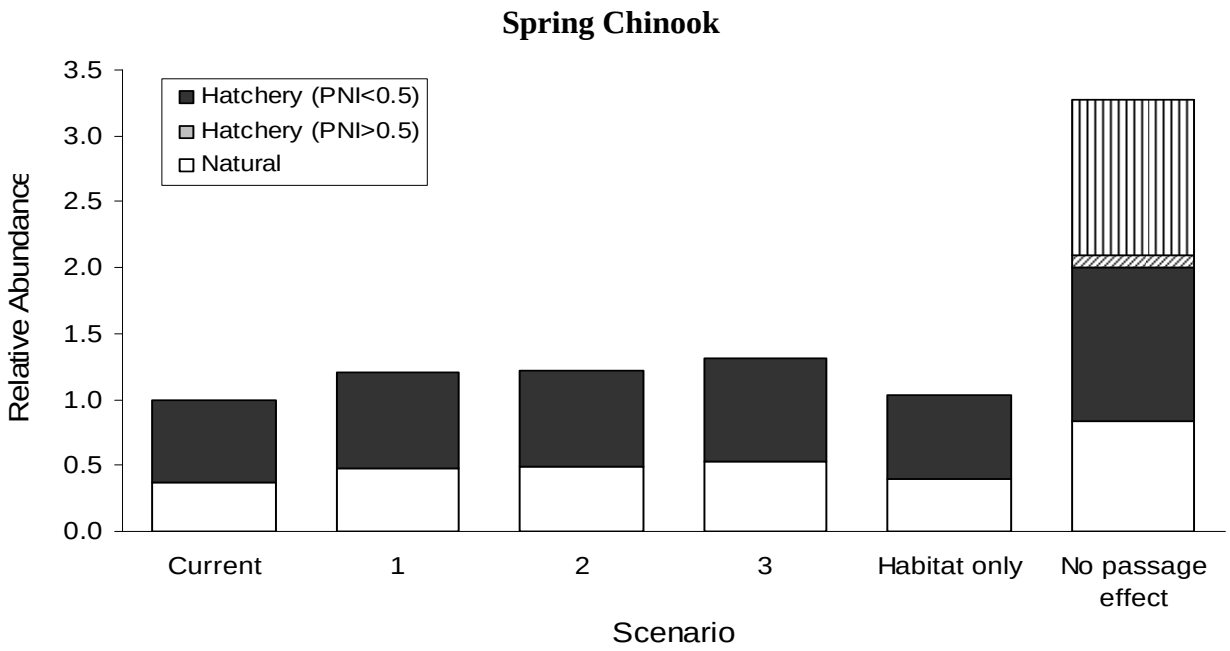

Figure 3.6.2-1. Estimates of the response of Grande Ronde River spring Chinook adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

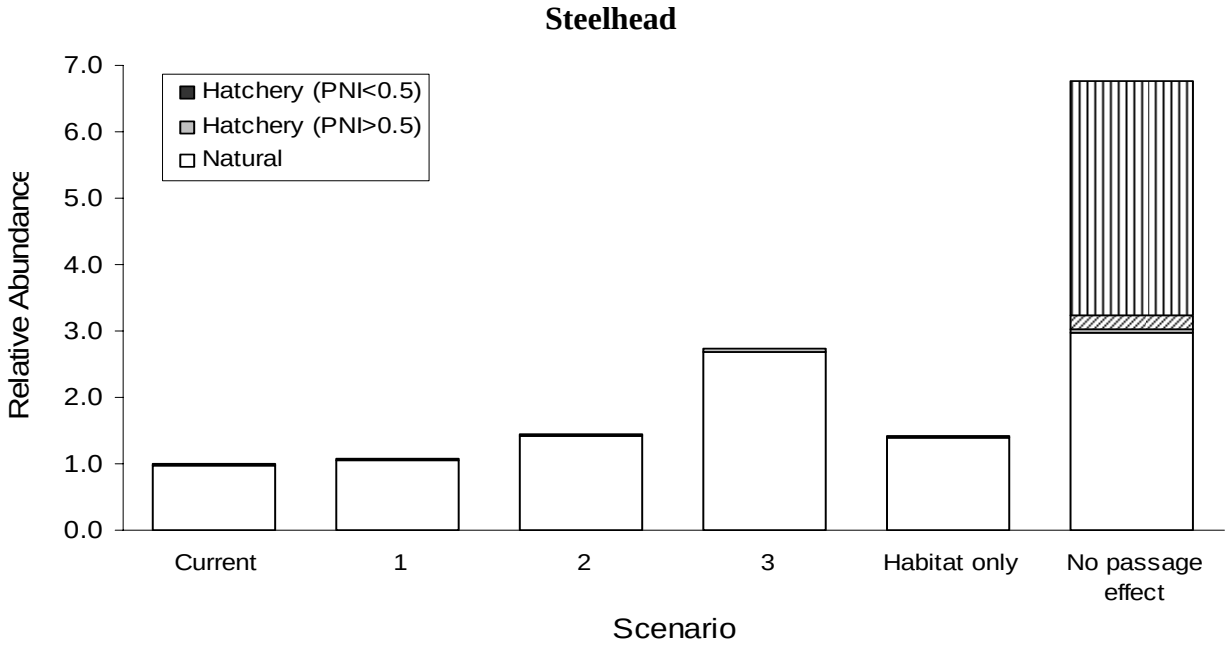

Figure 3.6.2-2. Estimates of the response of Grande Ronde River steelhead adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

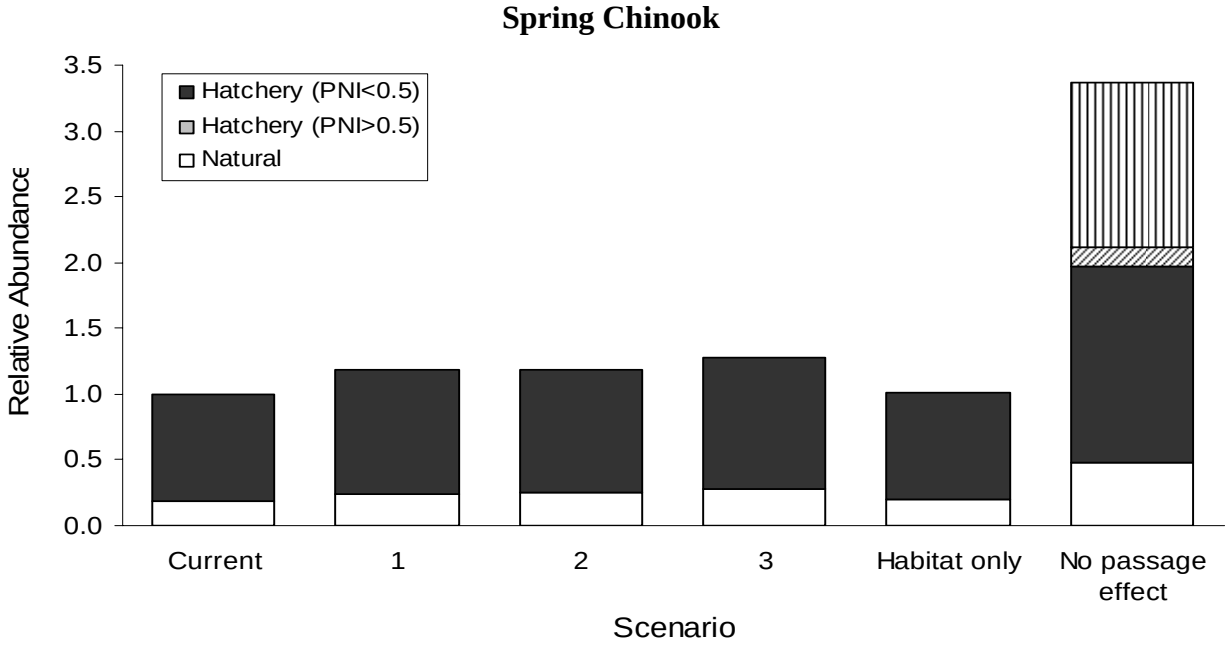

Figure 3.6.3-1. Estimates of the response of Imnaha River spring Chinook adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

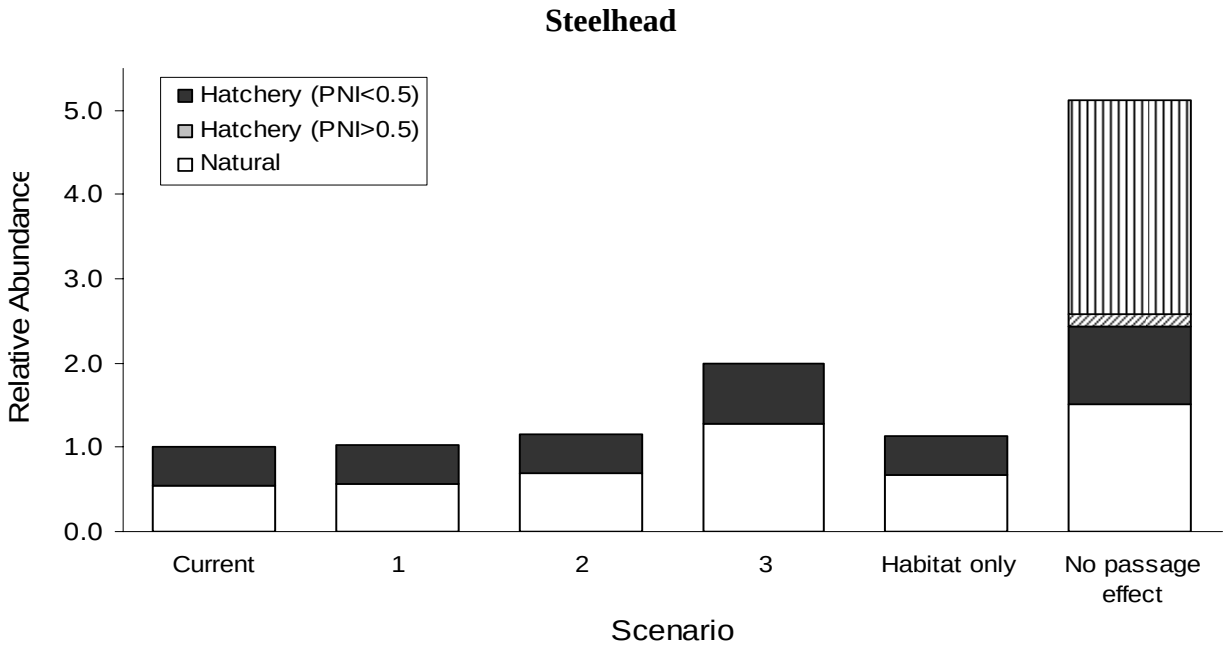

Figure 3.6.3-2. Estimates of the response of Imnaha River steelhead adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

Section 3.7 Mountain Snake Province

Table 3.7.1. Juvenile out-migration survival estimates used in AHA analyses for Mountain Snake Province Chinook salmon and steelhead.

	Current	Draft 2008 Biological Opinion	Aggressive non-breach	No passage effect
Spring/Summer Chinook				
Clearwater River	0.548	0.592	0.630	0.910
Salmon River	0.548	0.592	0.630	0.910
Steelhead				
Clearwater River	0.489	0.471	0.734	0.813
Salmon River	0.489	0.471	0.734	0.813

Table 3.7.2. Juvenile estuary/ocean survival estimates used in AHA analyses for Mountain Snake Province Chinook salmon and steelhead.

	Current	Draft 2008 Biological Opinion	Aggressive non-breach	No passage effect
Spring/Summer Chinook				
Clearwater River	0.029	0.031	0.031	0.029
Salmon River	0.029	0.031	0.031	0.029
Steelhead				
All A-Run	0.053	0.056	0.056	0.053
All B-Run	0.048	0.051	0.051	0.048

Table 3.7.3. Adult migration survival estimates used in AHA analyses for Mountain Snake Province Chinook salmon and steelhead.

	Current	Draft 2008 Biological Opinion	Aggressive non-breach	No passage effect
Spring/Summer Chinook				
Clearwater River	0.820	0.820	0.820	0.932
Salmon River	0.820	0.820	0.820	0.932
Steelhead				
Clearwater River	0.823	0.823	0.823	0.932
Salmon River	0.823	0.823	0.823	0.932

Table 3.7.4. Productivity values used in AHA scenarios for Mountain Snake Province spring/summer Chinook salmon.

Subbasin, population	Current	Draft 2008 Biological Opinion	Manager Input
Clearwater River			
Lochsa Spring Chinook	1.300	1.508	1.716
Lower Selway Meadow Creek Spring Chinook	1.300	1.300	1.456
Upper Selway Spring Chinook	1.300	1.300	1.456
Newsome Creek Spring Chinook	1.300	1.300	1.950
SF Clearwater Spring Chinook	1.300	1.300	1.950
Lolo Spring Chinook	1.300	1.456	1.794
Lower Clearwater Tribs Spring Chinook	1.300	1.456	1.690
Salmon River			
Little Salmon Spring-Summer Chinook	1.300	1.300	1.534
SF Salmon Summer Chinook	3.000	3.030	5.040
Secesh Spring-Summer Chinook	1.600	1.616	2.080
EF-SF Johnson Creek Summer Chinook	1.500	1.500	1.770
Chamberlain Spring Chinook	1.500	1.500	1.500
Big Creek Spring-Summer Chinook	3.310	3.343	3.608
Lower Middle Fork Spring-Summer Chinook	1.500	1.500	1.500
Camas Creek Spring Chinook	1.300	1.300	1.300
Loon Creek Spring-Summer Chinook	1.120	1.120	1.120
Upper Middle Fork Spring Chinook	1.500	1.500	1.500
Sulphur Creek Spring Chinook	1.670	1.670	1.670
Bear Valley Spring Chinook	3.030	3.030	3.030
Marsh Creek Spring Chinook	3.030	3.030	3.030
NF Salmon Spring Chinook	1.500	1.500	2.490
Lemhi River Spring Chinook	1.250	1.338	2.188
Pahsimeroi Summer Chinook	1.250	1.760	2.740
Below Redfish Spring-Summer Chinook	1.500	1.515	2.265
East Fork Salmon Spring Chinook	1.500	1.515	1.620
Yankee Fork Spring Chinook	1.200	1.560	1.944
Valley Spring Chinook	1.300	1.313	1.521
Above Redfish Spring Chinook	1.500	1.710	2.295
Panther Creek Spring Chinook (Extirpated)	0.100	0.100	0.100

Table 3.7.5. Productivity values used in AHA scenarios for Mountain Snake Province steelhead.

Subbasin, population	Current	Draft 2008 Biological Opinion	Manager Input
Clearwater River			
Lochsa Summer Steelhead (B-Run)	3.000	3.480	3.960
Selway Summer Steelhead (B-Run)	3.000	3.030	3.360
SF Clearwater Summer Steelhead (B-Run)	1.500	1.710	2.250
Lolo Summer Steelhead (A+B-Run)	1.300	1.456	1.794
Lower Clearwater Summer Steelhead (A-Run)	5.210	5.210	6.773
Salmon River			
Little Salmon Summer Steelhead (A-Run)	5.210	5.210	5.992
South Fork Summer Steelhead (B-Run)	1.300	1.313	1.859
Secesh Summer Steelhead (B-Run)	1.300	1.378	1.443
Chamberlain Summer Steelhead (A-Run)	5.210	5.210	5.210
Lower Middle Fork Salmon Summer Steelhead (B-Run)	1.300	1.326	1.352
Upper Middle Fork Salmon Summer Steelhead (B-Run)	1.300	1.300	1.300
Panther Creek Summer Steelhead (A-Run)	5.210	5.210	5.210
North Fork Salmon Summer Steelhead (A-Run)	5.210	5.210	7.138
Lemhi Summer Steelhead (A-Run)	5.210	5.366	11.514
Pahsimeroi Summer Steelhead (A-Run)	5.210	5.679	9.170
Salmon_East Fork Salmon Summer Steelhead	5.210	5.314	6.929
Salmon_Upper Salmon Summer Steelhead (A-Run)	5.210	5.523	8.076

Table 3.7.6. Habitat capacity values used in AHA scenarios for Mountain Snake Province spring/summer Chinook salmon.

Subbasin, population	Current	Draft 2008 Biological Opinion	Manager Input
Clearwater River			
Lochsa Spring Chinook	940	1,090	1,241
Lower Selway Meadow Creek Spring Chinook	400	400	448
Upper Selway Spring Chinook	600	600	672
Newsome Creek Spring Chinook	500	500	750
SF Clearwater Spring Chinook	2,500	2,500	3,750
Lolo Spring Chinook	1,500	1,680	2,070
Lower Clearwater Tribs Spring Chinook	500	560	650
Salmon River			
Little Salmon Spring-Summer Chinook	500	500	590
SF Salmon Summer Chinook	3,000	3,030	5,040
Secesh Spring-Summer Chinook	1,240	1,252	1,612
EF-SF Johnson Creek Summer Chinook	2,000	2,000	2,360
Chamberlain Spring Chinook	500	500	500
Big Creek Spring-Summer Chinook	500	505	545
Lower Middle Fork Spring-Summer Chinook	100	100	100
Camas Creek Spring Chinook	500	500	500
Loon Creek Spring-Summer Chinook	931	931	931
Upper Middle Fork Spring Chinook	100	100	100
Sulphur Creek Spring Chinook	160	160	160
Bear Valley Spring Chinook	1,000	1,000	1,000
Marsh Creek Spring Chinook	500	500	500
NF Salmon Spring Chinook	100	100	166
Lemhi River Spring Chinook	1,613	1,726	2,823
Pahsimeroi Summer Chinook	10,000	14,100	21,900
Below Redfish Spring-Summer Chinook	500	505	755
East Fork Salmon Spring Chinook	500	505	540
Yankee Fork Spring Chinook	500	650	810
Valley Spring Chinook	500	505	585
Above Redfish Spring Chinook	500	570	765
Panther Creek Spring Chinook (Extirpated)	100	100	100

Table 3.7.7. Habitat capacity values used in AHA scenarios for Mountain Snake Province Steelhead.

Subbasin, population	Current	Draft 2008 Biological Opinion	Manager Input
Clearwater River			
Lochsa Summer Steelhead (B-Run)	2,000	2,320	2,640
Selway Summer Steelhead (B-Run)	2,500	2,425	2,800
SF Clearwater Summer Steelhead (B-Run)	750	855	1,125
Lolo Summer Steelhead (A+B-Run)	200	224	276
Lower Clearwater Summer Steelhead (A-Run)	1,430	1,430	1,859
Salmon River			
Little Salmon Summer Steelhead (A-Run)	1,139	1,139	1,310
South Fork Summer Steelhead (B-Run)	1,115	1,126	1,594
Secesh Summer Steelhead (B-Run)	342	363	380
Chamberlain Summer Steelhead (A-Run)	399	399	399
Lower Middle Fork Salmon Summer Steelhead (B-Run)	1,587	1,619	1,650
Upper Middle Fork Salmon Summer Steelhead (B-Run)	1,667	1,667	1,667
Panther Creek Summer Steelhead (A-Run)	428	428	428
North Fork Salmon Summer Steelhead (A-Run)	226	226	310
Lemhi Summer Steelhead (A-Run)	1,139	1,173	2,517
Pahsimeroi Summer Steelhead (A-Run)	1,029	1,122	1,811
East Fork Salmon Summer Steelhead	1,048	1,069	1,394
Upper Salmon Summer Steelhead (A-Run)	1,283	1,360	1,989

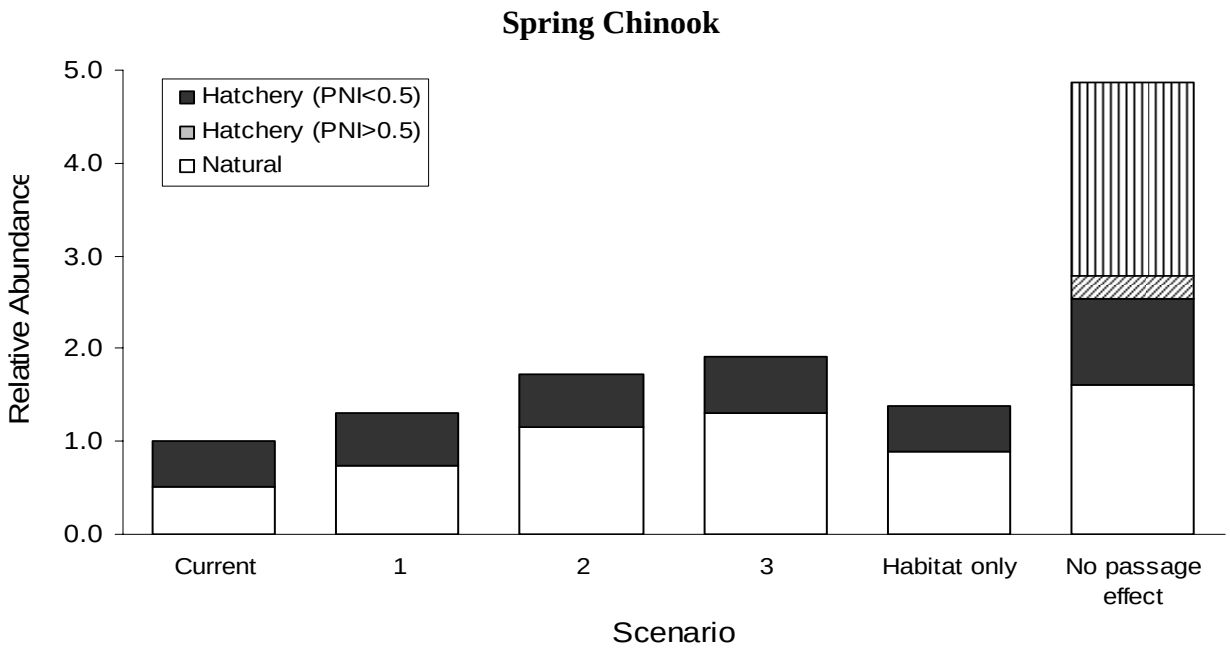

Figure 3.7.1-1. Estimates of the response of Clearwater River spring Chinook adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

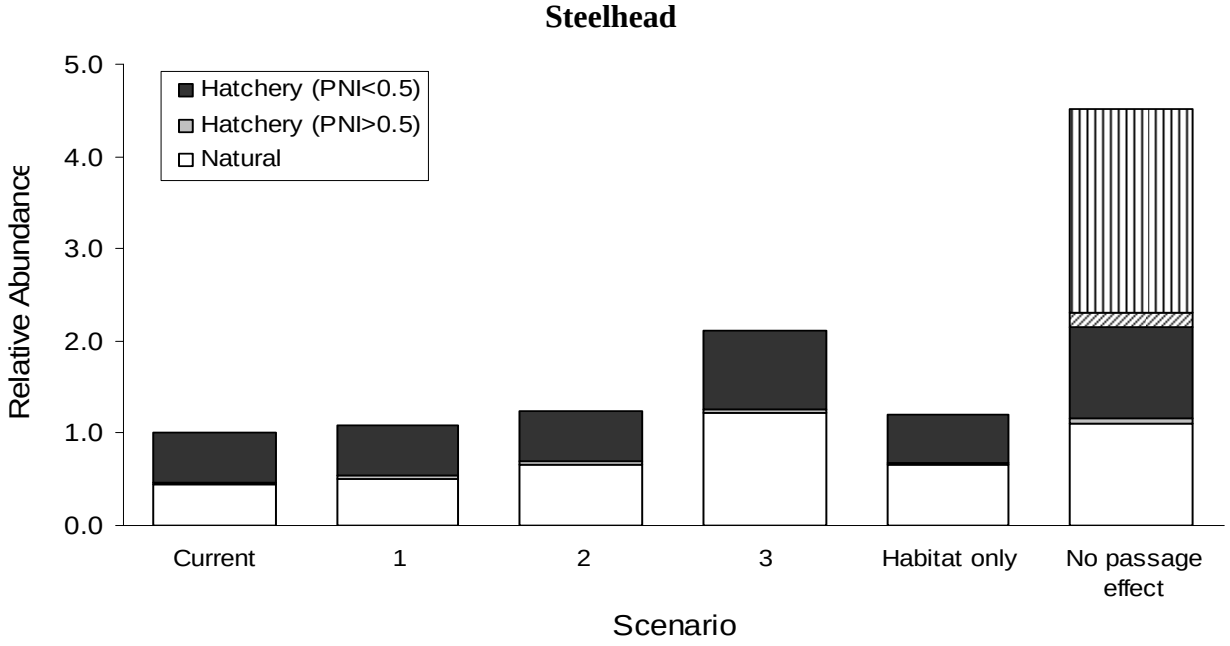

Figure 3.7.1-1. Estimates of the response of Clearwater River steelhead adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

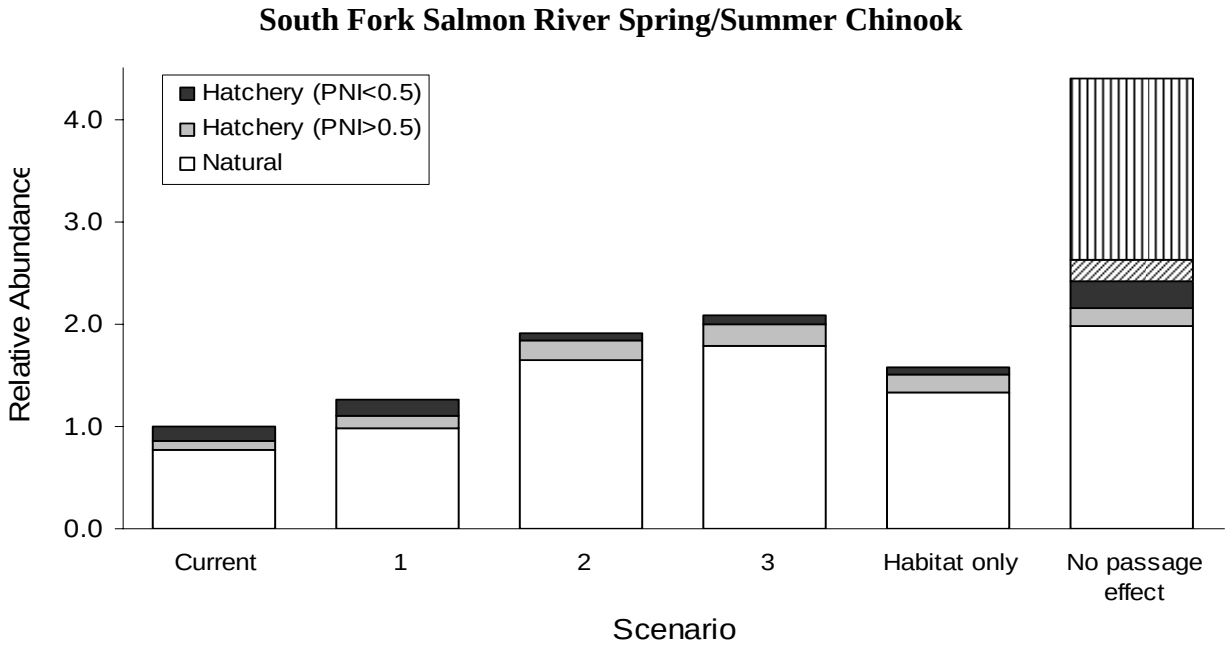

Figure 3.7.2-1. Estimates of the response of South Fork Salmon River spring/summer Chinook adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

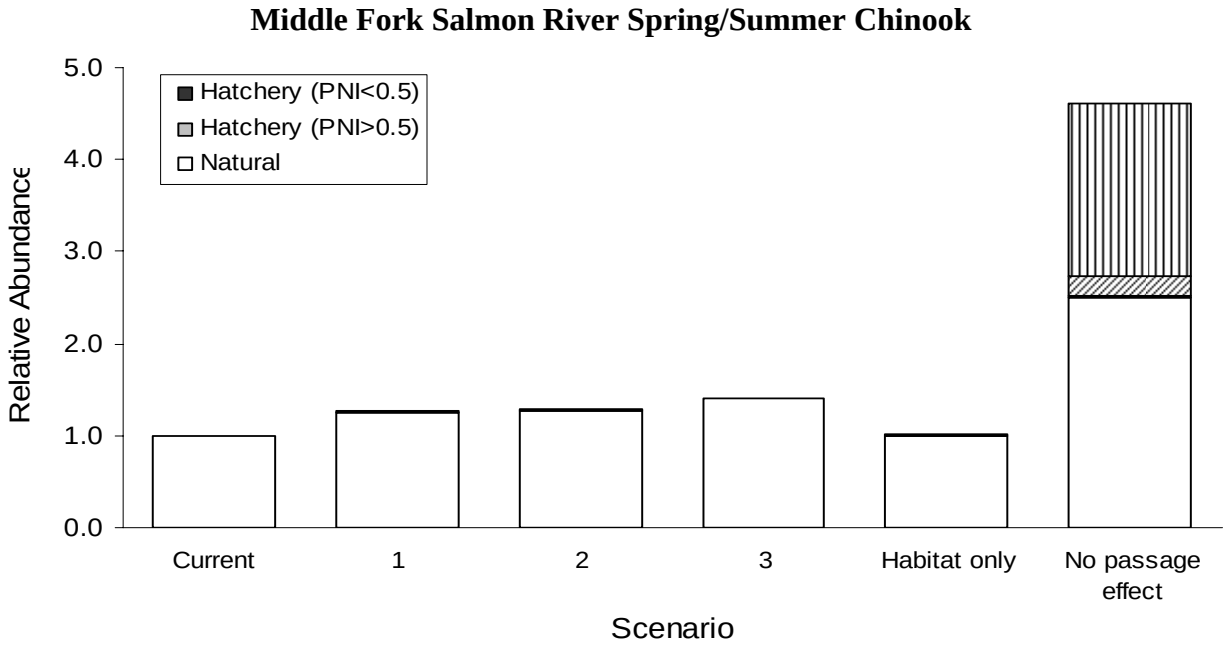

Figure 3.7.2-2. Estimates of the response of Middle Fork Salmon River spring/summer Chinook adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

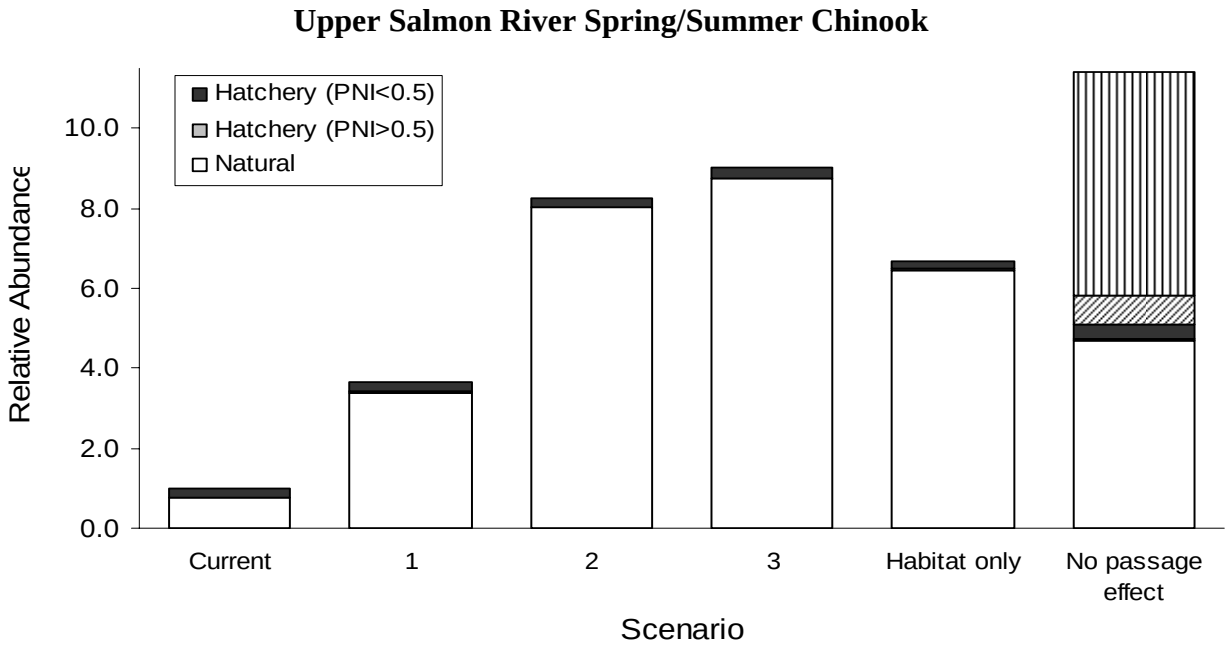

Figure 3.7.2-3. Estimates of the response of Upper Salmon River spring/summer Chinook adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.

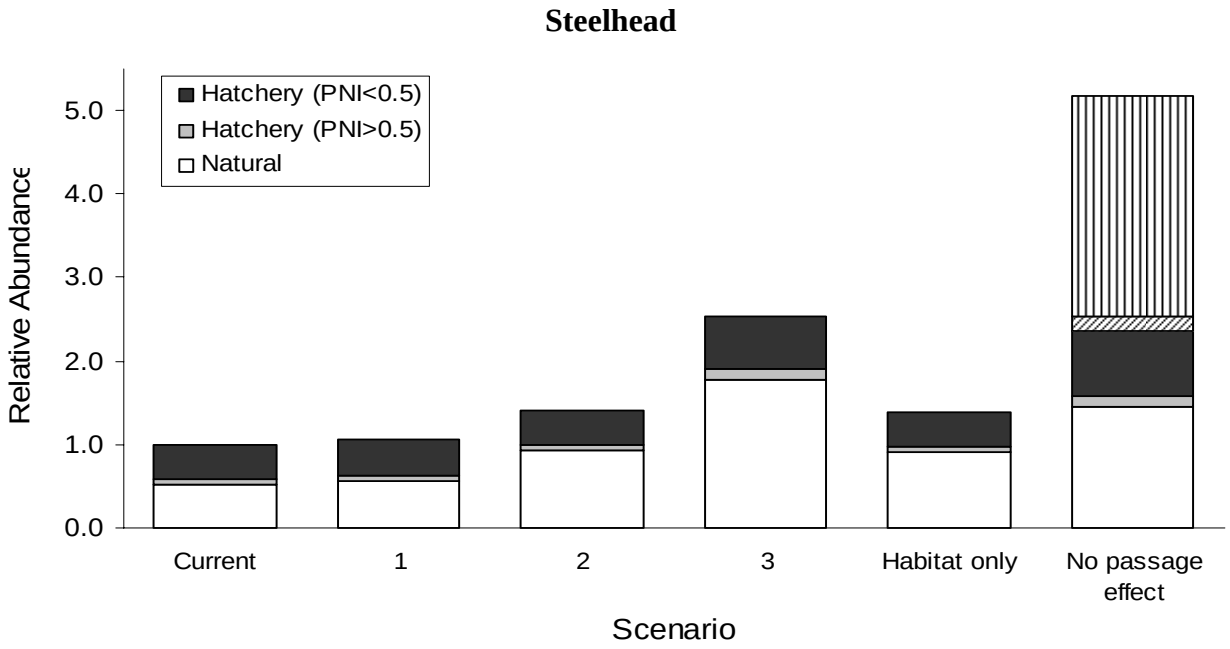

Figure 3.7.2-4. Estimates of the response of Salmon River steelhead adult abundance to potential scenarios, relative to the current situation. Scenarios are described in Table 3.0-1. PNI = proportion natural influence. Lined portions of the "no passage effect" bar indicate increases in response relative to the current situation if delayed mortality (low and high estimates) is eliminated.