Lower Columbia River Hatchery Program Modifications Using Modeling Technology

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Outline of Presentation

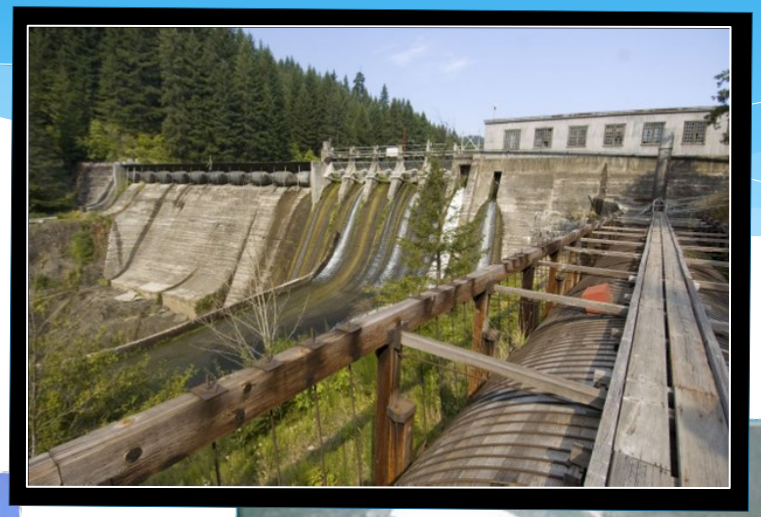
* History of Hatcheries and Role in Lower Columbia River system
* Highlight the History of the ESA Listing of LCR fish populations
* Steps to Recovery, Boards & Plans
* Scientific Review & Analysis of Hatchery Programs
* Tools Used to Modify LCR Tule fall Chinook Programs
* Current Production in LCR for Tule fall Chinook
* Projected Goals for Continued LCR Chinook Recovery

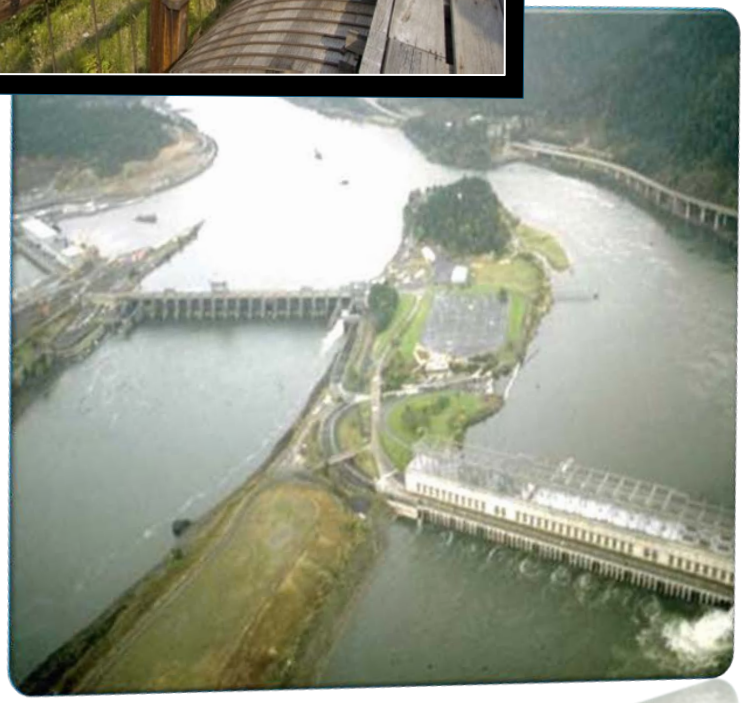
Development of Washington State Hatcheries

* Harvest demand
* Mitigation facilities started in the 1890s

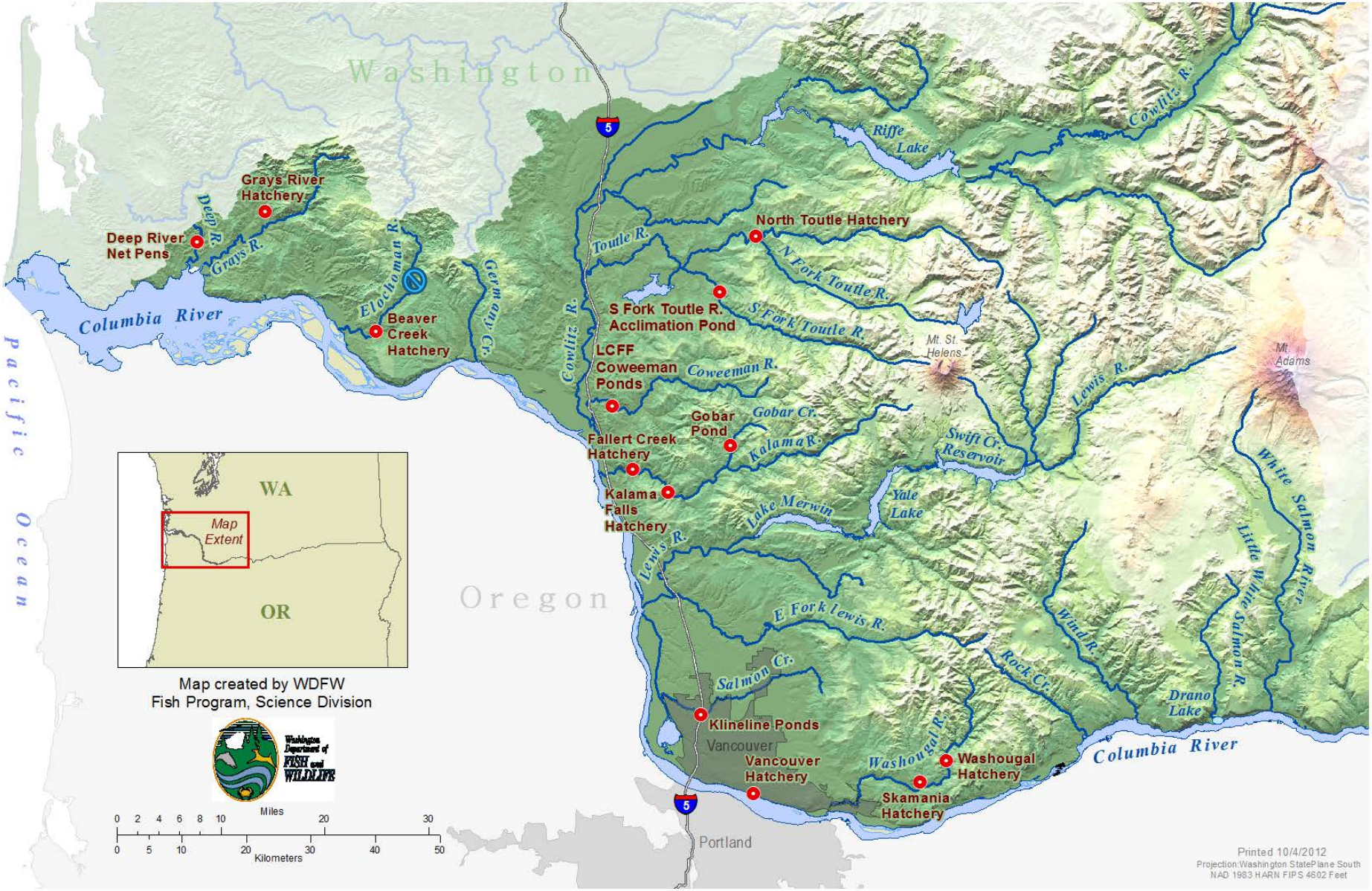
Mitigation

* Hydropower Mitigation-Mitchell Act of 1938 (Public Law 75-502)
* Northwest Power Planning Council (NPPC) established in 1980, now known as the Northwest Power and Conservation Council (NPCC)





Current Map of Mitchell Act Funded WDFW Facilities



ESA Listing of Lower Columbia River Stocks

Table 2-1. Chronology of listing decisions for lower Columbia River salmon, steelhead and trout.

Species	Action	Reference[1]
Lower Columbia River Chinook	• Listed as Threatened on 3/24/1999 (effective 5/24/1999)	64FR14308
	• Listing reaffirmed on 6/28/2005	70FR37160
	• Current critical habitat designated on 9/2/2005 (effective 1/2/2006)	70FR52630
Lower Columbia River Coho	• Identified as a candidate species on 7/25/1995	60FR38011
	• Listed as Threatened on 6/28/2005	70FR37160
	• Critical habitat designation under development	--
Columbia River Chum	• Listed as Threatened on 3/25/1999 (effective 5/24/1999)	64FR14507
	• Listing reaffirmed on 6/28/2005	70FR37160
	• Current critical habitat designated on 9/2/2005 (effective 1/2/2006)	70FR52630
Lower Columbia Steelhead	• Listed as Threatened on 3/19/1998 (effective 5/18/1998)	63FR13347
	• Listing reaffirmed on 6/28/2005	70FR37160
	• Current critical habitat designated on 9/2/2005 (effective 1/2/2006)	70FR52630
Bull trout	• Listed as Threatened on 6/10/1998 (effective 7/10/1998)	63FR31647
	• Critical habitat designated on 9/26/2005 (effective 10/26/2005)	70FR56212

[1] Federal register number

ESA Recovery Planning

Section 4(f) of the ESA requires that a recovery plan be developed and implemented for species listed as endangered or threatened under the statute. These plans must, at a minimum, contain

(1) a description of site-specific management actions necessary to achieve the plan's goal for the conservation and survival of the species;

(2) objective, measurable criteria which, when met, would result in a determination that the species be removed from the list; and

(3) estimates of the time required and cost to carry out the measures needed to achieve the plan's goal and to achieve intermediate steps toward that goal.

Contemporary WDFW Hatchery Production Reviews

Lower Columbia Fish Recovery Board (LCFRB) established in 1998

↓

Hatchery Scientific Review Group (HSRG) LCR Reviews Finalized & Fish and Wildlife Commission Hatchery Reform Policy C-3619 Adopted in 2009

↓

Conservation &Sustainable Fisheries Plan (C&SFP) draft completed in 2010

Lower Columbia River Program Review

* Systematic science-driven approach for lower Columbia River hatcheries to determine how they can help:
  * Conserve naturally spawning populations
  * Maintain sustainable fisheries
* Achieve NMFS Technical Recovery Team recovery standards
* Implement Lower Columbia River Salmon Recovery Plan
* *Promote wild fish recovery through improved hatchery and fisheries management*

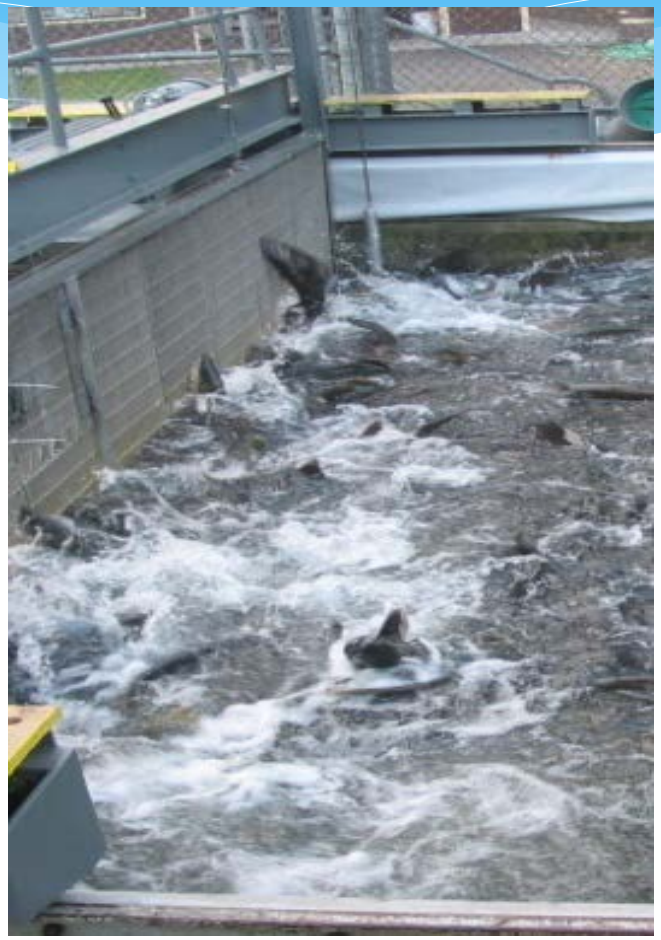
Draft Lower Columbia River C&SF Plan

* Goals
  * Achieve recovery plan improvements
  * Meet HSRG standards
  * Support sustainable fisheries
* Proposed Actions
  * Strategically redistribute hatchery releases
  * Improve brood stock management
  * Implement facility improvements
  * Implement mark-selective fisheries

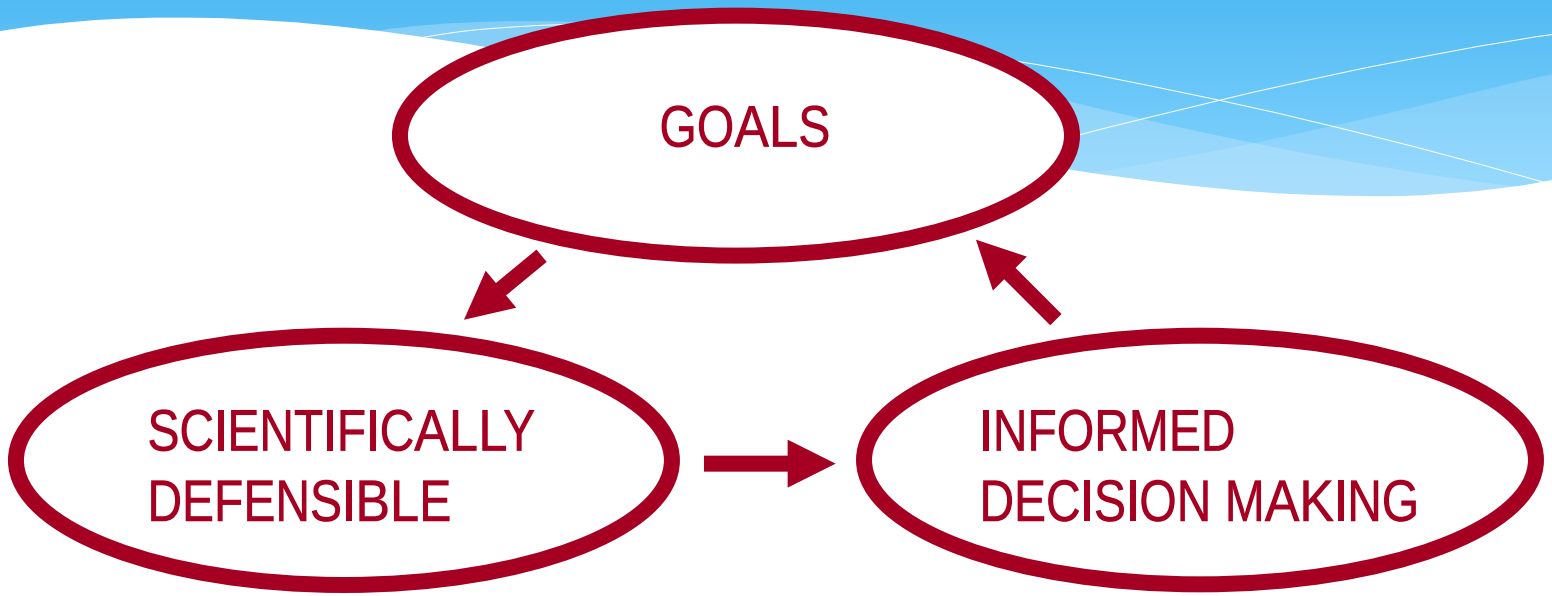
Photo of spawning fall Chinook salmon. Source: LCFRB Sub-basin Plan 2010.

Managing Hatchery Fish

* Decrease hatchery production
* Install weirs to remove hatchery fish
* Increase harvest of hatchery fish



Applying the Principles of Hatchery Reform



* Reviewed lower Columbia River Hatchery programs
* Established performance standards
* Suggestions for modifications for hatchery programs

Lower Columbia River Population Recovery Benchmarks

Table 1. Summary of population objective including fishery impact benchmarks for Washington lower Columbia River tule fall Chinook populations (LCFRB 2009). Populations are sorted by decreasing fishery impact benchmarks.

	Viability			Risk			Improve-		Fishery impact		Abundance	
Population	**Scen.[1]**	**Base[2]**	**Obj.[3]**	**10 yr[4]**	**100 yr[5]**	**Obj.[6]**	**ment[7]**	**delta[8]**	**Base.[9]**	**Bench.[10]**	**Base[11]**	**Bench[12]**
Lower Cowlitz	C	M	M+	1%	19%	15%	15%	-3%	65%	63%	3,400	4,000
Kalama	C	VL	M	6%	84%	25%	45%	-10%	65%	59%	500	650
Coweeman	P	L	H+	1%	37%	<5%	55%	-13%	65%	56%	700	1,200
Mill/Aber./Germ.	P	VL	H	6%	83%	5%	80%	-17%	65%	54%	450	950
Lewis	P	VL	H+	5%	77%	<5%	90%	-18%	65%	53%	500	1,200
Toutle	P	VL	H+	13%	99%	<5%	135%	-20%	65%	52%	1,300	4,100
Eloch./Skam.	P	VL	H	7%	95%	5%	95%	-20%	65%	52%	600	1,300
Washougal	P	VL	H+	4%	79%	<5%	90%	-19%	65%	52%	550	1,300
Grays/Chinook	C	VL	M+	41%	99%	15%	190%	-32%	65%	44%	150	650
Lower gorge	C	VL	M	--	99%	25%	>500%[11]	-50%[13]	65%	33%[13]	200	1,300
Upper gorge	C	VL	M	--	99%	25%	>500%[11]	-50%[13]	65%	33%[13]	200	1,300
White Salmon	C	VL	M	--	99%	25%	>500%[11]	-50%[13]	65%	33%[13]	200	1,300
Upper Cowlitz	S	VL	VL	--	99%	--	--	-0%	65%	--	--	--
Salmon	S	VL	VL	--	99%	--	--	-0%	65%	--	--	--

[1] *Scenario designation for population objective: Primary, Contributing, Stabilizing.*
[2] *Population viability in pre-listing baseline period (Very Low, Low, Moderate, High, Very High).*
[3] *Population viability objective.*
[4] *10 year population risk in pre-listing baseline period.*
[5] *100 year population risk in pre-listing baseline period (generally corresponds to baseline viability category).*
[6] *Risk (100 yr) consistent with scenario and viability objectives (VL: <1%, L: 1-5%, M: 6-25%, H: 26-60%, VH: >60%).*
[7] *Population improvement needed to reach objective risk target.*
[8] *Reduction in impact of each factor required to achieve population improvement.*
[9] *Fishery impact in pre-listing baseline period.*
[10] *Fishery impact benchmark at population objective assuming proportional reductions in impacts of all factors.*
[11] *Approximate average spawner abundance estimated by the model based on population parameters during the pre-listing baseline period. (Note that abundance objectives specified in the recovery plan are medians rather than averages.*
[12] *Approximate average spawner abundance projected under benchmark assumptions of equivalent reductions in impacts of all factors.*
[13] *Default values assumed for populations where viability is very low but production parameters are highly uncertain.*

Balance of Harvest and Recovery Objectives

Hatchery Production provides important economic benefits to coastal and lower river communities.

Annual Contribution to Local Personal Income from fisheries associated with Lower Columbia River hatcheries.

Coweeman Hatchery Plants:	$33,000
Salmon River Hatchery Plants:	$100,000
S.F. Toutle Hatchery Plants:	$185,000
Grays River Hatchery Program:	$230,000
Elochoman Hatchery Program:	$1.3 million
N.F. Toutle Hatchery Program:	$1.6 million
Washougal Hatchery Program:	$1.6 million
Kalama Hatchery Program:	$3.0 million
Lewis Hatchery Program:	$6.0 million
Cowlitz Hatchery Program:	$15.3 million

Total contribution from Washington Lower River hatcheries to local personal income: $ 29.3 million

See Appendix A for full report.

Data Source: Draft Conservation and Sustainable Fisheries Plan 2010

Table 3. Criteria for hatchery influence on natural populations for each recovery designation category.

Designation Categories	Hatchery Influence Criteria
Primary	PNI greater than 0.67, or pHOS less than 5%
Contributing	PNI greater than 0.5, or pHOS less than 10%
Stabilizing	PNI no less than current, pHOS no greater than current
Other	None specified

Data Source: Draft Lower Columbia Chinook Hatchery Analysis 2007

PNI = proportionate natural influence

pHOS = proportion of effective hatchery-origin spawners

How to Identify 'Risky' Programs

* **HSRG criteria for hatchery influence on Primary populations**
  The proportion of effective hatchery-origin spawners (pHOS) should be less than 5% of the naturally spawning population, unless the hatchery population is integrated with the natural population.
  For integrated populations, the proportion of natural-origin adults in the broodstock should exceed pHOS by at least a factor of two, corresponding to a PNI (proportionate natural influence) value of 0.67 or greater and pHOS should be less than 0.30.

* **HSRG criteria for hatchery influence on Contributing populations**
  The proportion of effective hatchery-origin spawners (pHOS) should be less than 10% of the naturally spawning population, unless the hatchery population is integrated with the natural population.
  For integrated populations, the proportion of natural-origin adults in the broodstock should exceed pHOS by at least a factor of one, corresponding to a PNI value of 0.50 or greater and pHOS should be less than 0.30.

* **HSRG criteria for hatchery influence on Stabilizing populations**
  The current operating conditions are considered adequate to meet conservation goals. No criteria were developed for proportion of effective hatchery-origin spawners (pHOS) or PNI.

Source: Columbia River Hatchery Reform Project Page 1 Final Systemwide Report - Part 3.1 Chinook ESUs.

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Version 7.2.3

June 5, 2007

Activate Scenario Documentation ------->

	Current	2011	2017	2023	2029
Biological Significance:	LOW	LOW PNI: 0.08	LOW PNI: 0.77	LOW PNI: 0.74	LOW PNI: 0.79	LOW PNI: 0.75

Subregion/Subbasin	*Species/Race*	*Population Management Intent:*	Updated EDT	Weirs in Selective in Marine and tribs (sport)	25% Habitat improvments partial commercial selective	50% Habitat improvments partial commercial selective	100% Habitat improvments Full Selective fisheries
Elochoman	Fall Chinook	*Harvest&Hatchery Strategy:*					

Elochoman Fall Chinook			Historic		Current		2011		2017		2023		2029	
Hab	Productivity (Adult)	Ad. Capacity	7.81	2,118	3.80	2,112	3.80	2,112	3.98	2,212	4.16	2,313	4.52	2,513
	Min NOR Escape	% Kelt	1		1		1		1		1		1	
	Smolt Productivity	Sm. Capacity		302,628	542.9	301,714	542.86	301,714	568.57	316,000	594.29	330,429	645.71	359,000
Hydro	Ocean Surv / Baseline SAR	Vary? (Y/N)	0.007 / 0.007	y	0.007 / 0.007	Y	0.007 / 0.007	Y	0.007 / 0.007	Y	0.007 / 0.007	Y	0.007 / 0.007	Y
	Juv Passage Surv.	Adult Passage	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Adjusted Productivity	Adj. Capacity	8.23	2,233	3.80	2,112	3.80	2,112	3.98	2,212	4.16	2,313	4.52	2,513
Harv	*Active parameter documentation to see assumptions for selective and non-selective fisheries.*	Harv - Marine	NORs	HORs	0.419	0.419	0.280	0.360	0.280	0.360	0.280	0.360	0.280	0.360
		Harv - L. Mainstem	NORs	HORs	0.123	0.123	0.123	0.123	0.100	0.146	0.080	0.180	0.040	0.200
		Harv - U. Mainstem	NORs	HORs										
		Harv -Terminal	NORs	HORs	0.020	0.020	0.020	0.100	0.020	0.100	0.020	0.100	0.020	0.100
		Total Exploitation Rate	NORs	HORs	0.501	0.501	0.381	0.495	0.365	0.508	0.351	0.528	0.323	0.539
Hatch					pNOB	pHOS	pNOB	pHOS	pNOB	pHOS	100	pHOS	pNOB	pHOS
	Broodstock Composition		pNOB-Goal	pHOS-Goal	6%		10%		10%		10%		10%	
			pNOB-Realized	pHOS-Realized	6%	69%	10%	3%	10%	4%	10%	3%	10%	3%
	Purpose	Type	Cons/Harv/Both	Int/Seg/Step/None	Harv	Int	None	None	None	None	Harv	Int	Cons	Int
	Broodstock by Source		Local / Imported	Smolt Release	1100	2,072,070	500	941,850	500	941,850	600	1,130,220	800	1,506,960
	Brood Exported (from HOR Surplus)		Export Goal/Realized	Strays		231				10		1		8
	Destination for HOR Returns		% to Hatchery	% to Nat. Spawn.	70%	30%	70%	30%	70%	30%	70%	30%	70%	30%
	Productivity of Hatchery Fish		Recruits/Spawner	Fitness? [Y / N]	6.0	y	6.0	y	6.0	y	6.0	y	6.0	y

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Parameter Documentation

Select alternatives (yes/no) for parameter documentation (current condition should always be documented)

	Yes	No
Current		
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Alt 3		
Alt 4		
Alt 5		

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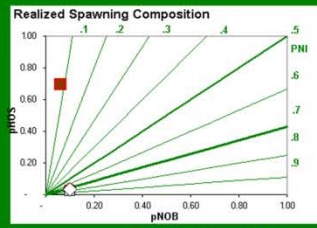

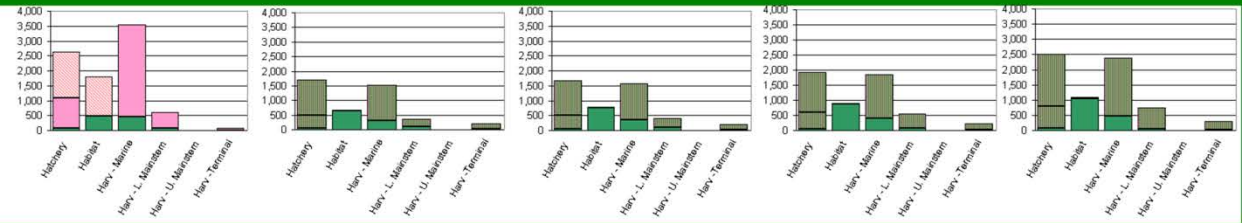

	Current	2011	2017	2023	2029
Relative Hatchery Optimum ->	80	80	80	80	80
Weir Factor ->		95%	95%	95%	95%
Relative Reproductive Success (HOS) ->	80%	80%	80%	80%	80%
Initial Fitness Factor (A)	0.81	0.81	0.81	0.81	0.81
Fitness Factor after 100 generations (B)	0.50	0.94	0.91	0.95	0.93
Average Fitness Factor (100 Generations)	0.50	0.93	0.91	0.94	0.92
Generations until average fitness is reached	16				
Minimum Hatchery Program (as % of BS Goal):					
"Fitness Floor" ->	0.5				

	Current	2011	2017	2023	2029
Calculated Hatchery SAR ->	0.32%	0.32%	0.32%	0.32%	0.32%
Calculated Natural SAR ->	0.7%	0.7%	0.7%	0.7%	0.7%

	Current Max	Current Min	Current Ave	2011 Max	2011 Min	2011 Ave	2017 Max	2017 Min	2017 Ave	2023 Max	2023 Min	2023 Ave	2029 Max	2029 Min	2029 Ave
NOR Escapement	1,608	184	471	2,339	244	649	2,711	298	750	3,194	358	875	3,825	439	1,046
HoS Total Escapement	4,072	707	1,333	77	13	25	106	18	35	89	15	29	137	24	45
HoS Effective Escapement	2,892	580	1,067	62	11	20	70	15	28	70	12	23	97	19	36
Total Natural Escapement (NoS & All HoS)	5,880	919	1,805	2,417	261	675	2,817	319	784	3,283	377	905	3,961	467	1,091
Total Harvest	13,137	2,234	4,226	6,530	1,124	2,087	6,781	1,157	2,161	8,231	1,401	2,625	10,678	1,822	3,424
Hatchery Broodstock	1,100	1,100	1,100	500	500	500	500	500	500	600	600	600	800	800	800
Surplus at Hatchery	6,827	331	1,541	4,636	433	1,216	4,503	410	1,172	5,167	451	1,329	6,703	569	1,711
Total Runsize	26,240	4,462	8,440	14,083	2,392	4,478	14,570	2,473	4,607	17,278	2,921	5,458	22,120	3,741	7,018

All H Analyzer (AHA)

Version 7.2.3

June 5, 2007

Activate Scenario Documentation ——>

	Current	2011	2017	2023	2029
Biological Significance:	LOW	LOW PNI: 0.06	LOW PNI: 0.80	LOW PNI: 0.80	LOW PNI: 0.82	LOW PNI: 0.80
Population Management Intent:	Harvest	Weir on Green	25% Habitat	50% Habitat	100% Habitat
Harvest&Hatchery Strategy:	Segregated program	Selective in Marine and Tribs.	Partial selective commercial	More Partial selective in commerical	Full Selective Fisheries

Subregion/Subbasin: Cowlitz — *Species/Race*: Fall Chinook

Cowlitz_Toutle Fall Chinook

			Historic		Current		2011		2017		2023		2029	
Hab	Productivity (Adult)	Ad. Capacity	11.20	2,181	3.10	6,748	3.10	6,748	3.23	7,035	3.36	7,322	3.63	7,895
	Min NOR Escape	% Kelt	1		1		1		1		1		1	
	Smolt Productivity	Sm. Capacity		151,961	216.0	470,244	216.03	470,244	225.09	490,244	234.15	510,244	252.96	550,174
Hydro	Ocean Surv (Baseline SAR)	Vary? (Y/N)	0.014 0.014	n	0.014 0.014	y	0.014 0.014	y	0.014 0.014	y	0.014 0.014	y	0.014 0.014	y
	Juv Passage Surv.	Adult Passage	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Adjusted Productivity	Adj. Capacity			3.10	6,748	3.10	6,748	3.23	7,035	3.36	7,322	3.63	7,895
Harv	*Active parameter documentation to see assumptions for selective and non-selective fisheries.*	Harv - Marine	NORs	HORs	0.419	0.419	0.280	0.360	0.280	0.360	0.280	0.360	0.280	0.360
		Harv - L. Mainstem	NORs	HORs										
		Harv - U. Mainstem	NORs	HORs	0.123	0.123	0.123	0.123	0.100	0.146	0.080	0.180	0.123	0.123
		Harv - Terminal	NORs	HORs	0.020	0.020	0.020	0.100	0.020	0.100	0.020	0.100	0.020	0.100
		Total Exploitation Rate	NORs	HORs	0.501	0.501	0.381	0.495	0.365	0.508	0.351	0.528	0.381	0.495
Hatch					pNOB	pHOS	pNOB	pHOS	pNOB	pHOS	100	pHOS	pNOB	pHOS
	Broodstock Composition		pNOB-Goal	pHOS-Goal	3%		25%	10%	25%	10%	25%	10%	25%	10%
			pNOB-Realized	pHOS-Realized	3%	47%	25%	6%	25%	6%	25%	5%	25%	6%
	Purpose	Type	Cons/Harv/Both	Int/Seg/Step/None	Harvest	Seg		None	Harv	Int	Harv	Int	Harv	Int
	Broodstock by Source		Local / Imported	Smolt Release	1121	2,498,166	650	1,449,828	800	1,784,404	900	2,007,455	1000	2,230,505
	Brood Exported (from HOR Surplus)		Export Goal/Realized	Strays										
	Destination for HOR Returns		% to Hatchery	% to Nat. Spawn.	80%	20%	95%	5%	95%	5%	95%	5%	95%	5%
	Productivity of Hatchery Fish		Recruits/Spawner	Fitness? [Y / N]	6.0	y	6.0	y	6.0	y	6.0	y	6.0	y

Open AHA Dataset:

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Parameter Documentation

Select alternatives (yes/no) for parameter documentation (current condition should always be documented)

	Yes	No
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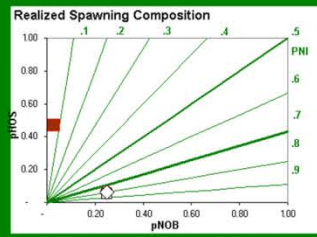
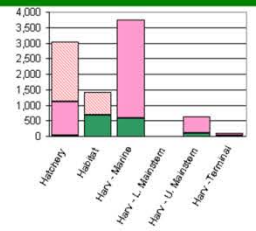
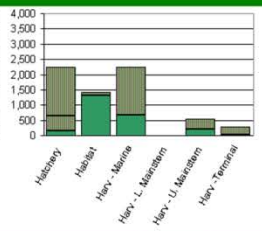
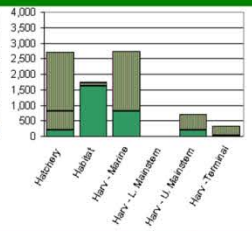
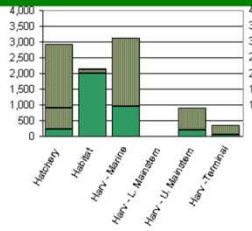
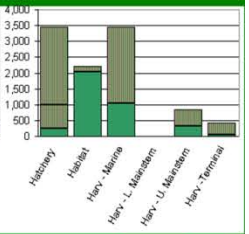












	Current	2011	2017	2023	2029
Relative Hatchery Optimum ->	80	80	80	80	80
Weir Factor ->					
Relative Reproductive Success (HOS) ->	80%	80%	80%	80%	80%
Initial Fitness Factor (A)	0.81	0.81	0.81	0.81	0.81
Fitness Factor after 100 generations (B)	0.50	0.93	0.93	0.95	0.93
Average Fitness Factor (100 Generations)	0.50	0.90	0.91	0.93	0.91
Generations until average fitness is reached	18				

Minimum Hatchery Program (as % of BS Goal):

"Fitness Floor" -> 0.5

	Current	2011	2017	2023	2029
Calculated Hatchery SAR ->	0.27%	0.27%	0.27%	0.27%	0.27%
Calculated Natural SAR ->	1.4%	1.4%	1.4%	1.4%	1.4%

	Current Max	Current Min	Current Ave	2011 Max	2011 Min	2011 Ave	2017 Max	2017 Min	2017 Ave	2023 Max	2023 Min	2023 Ave	2029 Max	2029 Min	2029 Ave
NOR Escapement	2,542	225	672	4,685	259	1,311	5,633	370	1,610	7,212	555	1,996	7,438	564	2,040
HoS Total Escapement	2,286	397	748	335	58	109	402	69	131	434	75	142	516	89	169
HoS Effective Escapement	1,829	318	599	268	46	88	322	55	105	347	60	113	413	71	135
Total Natural Escapement (NoS & All HoS)	4,828	657	1,421	4,985	332	1,420	5,993	458	1,741	7,646	650	2,138	7,954	677	2,209
Total Harvest	14,045	2,346	4,462	9,330	1,529	3,061	11,630	1,923	3,761	13,728	2,269	4,380	14,852	2,434	4,724
Hatchery Broodstock	1,120	1,120	1,120	650	650	650	800	800	800	900	900	900	1,000	1,000	1,000
Surplus at Hatchery	8,061	502	1,910	5,890	620	1,601	7,043	728	1,903	7,581	759	2,029	9,061	955	2,463
Total Runsize	28,054	4,686	8,912	20,513	3,257	6,733	25,453	4,083	8,206	29,855	4,751	9,447	32,867	5,258	10,396

All H Analyzer (AHA)

Version 7.2.3

June 5, 2007

Activate Scenario Documentation -------->

	Current	No Hatchery	Best Seg	Best Int	~User Def (HSRG Rec)
Biological Significance:	LOW	LOW PNI: 0.06	LOW PNI: 0.06	LOW PNI: 0.06	LOW PNI: 0.07
Population Management Intent:	Harvest	Selective in marine and tribs	25% Habitat Improvments	50% Habitat Improvments	100% Habitat Improvments
Harvest&Hatchery Strategy:	Segregated hatchery		Partial Selective Commercial	More Partia selective commercial	Full Selective Fisheries

Subregion/Subbasin: Kalama — *Species/Race*: Fall Chinook

Kalama Fall Chinook			Historic		Current		2011		2017		2023		2029	
Hab	Productivity (Adult)	Ad. Capacity	8.69	3,263	3.90	2,102	3.30	2,370	3.95	2,128	4.00	2,155	4.10	2,207
	Min NOR Escape	% Kelt	1		1		1		1		1		1	
	Smolt Productivity	Sm. Capacity		227,387	557.1	300,286	471.43	338,571	564.29	304,000	571.43	307,857	585.71	315,286
Hydro	Ocean Surv / Baseline SAR	Vary? (Y/N)	0.007 / 0.014	y	0.007 / 0.007	Y	0.007 / 0.007	Y	0.007 / 0.007	Y	0.007 / 0.007	Y	0.007 / 0.007	Y
	Juv Passage Surv.	Adult Passage	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Adjusted Productivity	Adj. Capacity	4.24	1,592	3.90	2,102	3.30	2,370	3.95	2,128	4.00	2,155	4.10	2,207
Harv	*Active parameter documentation to see assumptions for selective and non-selective fisheries.*	Harv - Marine	NORs	HORs	0.419	0.419	0.280	0.360	0.280	0.360	0.280	0.360	0.280	0.360
		Harv - L. Mainstem	NORs	HORs	0.123	0.123	0.123	0.123	0.100	0.143	0.080	0.180	0.040	0.200
		Harv - U. Mainstem	NORs	HORs										
		Harv -Terminal	NORs	HORs	0.020	0.020	0.020	0.100	0.020	0.100	0.020	0.100	0.020	0.100
		Total Exploitation Rate	NORs	HORs	0.501	0.501	0.381	0.495	0.365	0.506	0.351	0.528	0.323	0.539
Hatch					pNOB	pHOS	pNOB	pHOS	pNOB	pHOS	100	pHOS	pNOB	pHOS
	Broodstock Composition		pNOB-Goal	pHOS-Goal	5%		5%		5%		5%		5%	
			pNOB-Realized	pHOS-Realized	5%	80%	5%	75%	5%	74%	5%	73%	5%	71%
	Purpose	Type	Cons/Harv/Both	Int/Seg/Step/None	None	None	None	None	Harv	Seg	Harv	Int	Harv	Int
	Broodstock by Source		Local / Imported	Smolt Release	2200	5,040,035	2200	5,040,035	2200	5,040,035	2200	5,040,035	2200	5,040,035
	Brood Exported (from HOR Surplus)		Export Goal/Realized	Strays		566		566		566		566		566
	Destination for HOR Returns		% to Hatchery	% to Nat. Spawn.	80%	20%	80%	20%	80%	20%	80%	20%	80%	20%
	Productivity of Hatchery Fish		Recruits/Spawner	Fitness? [Y / N]	7.5	y	7.5	y	7.5	y	7.5	y	7.5	y

Open AHA Dataset:

E:\Col River HSRG\Draft HSRG and Reco Plan aha\aa-HSRG-KalamaFallChinook_011607_E110207.aha

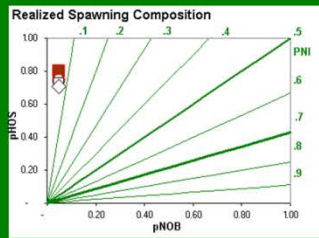
OPEN SAVE

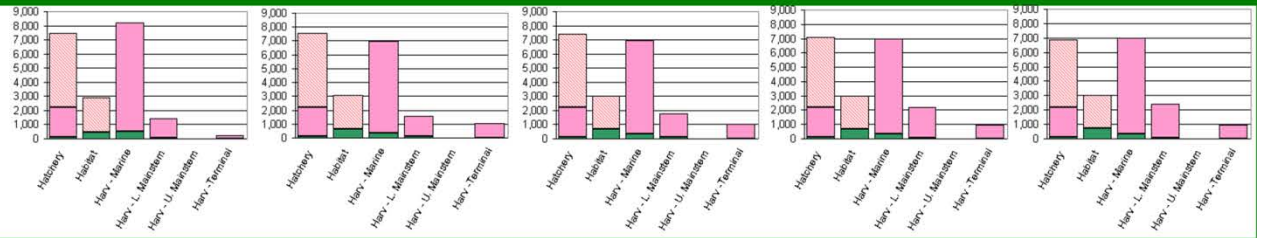
Parameter Documentation

Select alternatives (yes/no) for parameter documentation (current condition should always be documented)

	Yes	No
Current		●
Alt 2		●
Alt 3		●
Alt 4		●
Alt 5		●

Parameter Documentation Inactive for All Alternatives





	Current	No Hatchery	Best Seg	Best Int	~User Def (HSRG Rec)
Relative Hatchery Optimum ->	80	80	80	80	80
Weir Factor ->					
Relative Reproductive Success (HOS) ->	80%	80%	80%	80%	80%
Initial Fitness Factor (A)	0.81	0.81	0.81	0.81	0.81
Fitness Factor after 100 generations (B)	0.50	0.50	0.50	0.50	0.50
Average Fitness Factor (100 Generations)	0.50	0.50	0.50	0.50	0.50
Generations until average fitness is reached	15				

Minimum Hatchery Program (as % of BS Goal):

"Fitness Floor" -> 0.5

	Current	No Hatchery	Best Seg	Best Int	~User Def (HSRG Rec)
Calculated Hatchery SAR ->	0.33%	0.33%	0.33%	0.33%	0.33%
Calculated Natural SAR ->	0.7%	0.7%	0.7%	0.7%	0.7%

	Current Max	Current Min	Current Ave	No Hatchery Max	No Hatchery Min	No Hatchery Ave	Best Seg Max	Best Seg Min	Best Seg Ave	Best Int Max	Best Int Min	Best Int Ave	~User Def Max	~User Def Min	~User Def Ave
NOR Escapement	1,873	181	480	2,515	263	662	2,470	273	662	2,553	285	686	2,740	313	742
HoS Total Escapement	7,340	1,275	2,403	7,405	1,286	2,425	7,276	1,264	2,382	7,036	1,222	2,304	6,906	1,199	2,262
HoS Effective Escapement	5,014	1,054	1,923	5,065	1,063	1,940	4,963	1,045	1,907	4,775	1,011	1,844	4,674	993	1,810
Total Natural Escapement (NoS & All HoS)	9,213	1,474	2,884	9,920	1,578	3,086	9,746	1,558	3,044	9,590	1,529	2,990	9,646	1,535	3,004
Total Harvest	30,133	5,198	9,809	29,436	5,080	9,586	29,949	5,177	9,766	31,104	5,378	10,145	31,670	5,478	10,333
Hatchery Broodstock	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,200	2,200
Surplus at Hatchery	20,368	1,811	5,265	20,629	1,857	5,351	20,110	1,766	5,181	19,152	1,600	4,867	18,635	1,511	4,697
Total Runsize	60,188	10,383	19,593	60,458	10,415	19,658	60,279	10,401	19,626	60,320	10,407	19,637	60,425	10,424	19,669

All H Analyzer (AHA)

Version 7.2.3

June 5, 2007

Activate Scenario Documentation ——>

	Current	No Hatchery	Best Seg	Best Int	~User Def (HSRG Rec)
Biological Significance:	LOW	LOW PNI: 0.04	LOW PNI: 0.69	LOW PNI: 0.69	LOW PNI: 0.67	LOW PNI: 0.68
Subregion/Subbasin	Washougal				
Species/Race	Fall Chinook				
Population Management Intent:		New EDT data	Weir and selective fishing in Marine and Tribs	25% habitat Improvments Partial selelctive in commercial	50% Habitat improvments More partial selelctive in commercial	100% habitat improvements Full Selective Fisheries
Harvest&Hatchery Strategy:					

Washougal Fall Chinook			Historic		Current		2011		2017		2023		2029	
Hab	Productivity (Adult)	Ad. Capacity	10.05	2,777	3.80	2,378	3.80	2,378	3.97	2,485	4.14	2,592	4.48	2,806
	Min NOR Escape	% Kelt	1		1		1		1		1		1	
	Smolt Productivity	Sm. Capacity		58,091	577.5	361,398	577.51	361,398	603.34	377,660	629.18	393,921	680.85	426,444
Hydro	Ocean Surv / Baseline SAR	Vary? (Y/N)	0.007 / 0.048		0.007 / 0.007	Y	0.007 / 0.007	Y	0.007 / 0.007	Y	0.007 / 0.007	Y	0.007 / 0.007	Y
	Juv Passage Surv.	Adult Passage	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Adjusted Productivity	Adj. Capacity	1.38	382	3.81	2,385	3.81	2,385	3.98	2,493	4.15	2,600	4.49	2,815
Harv	*Active parameter documentation to see assumptions for selective and non-selective fisheries.*	Harv - Marine	NORs	HORs	0.419	0.419	0.280	0.360	0.280	0.360	0.280	0.360	0.280	0.360
		Harv - L. Mainstem	NORs	HORs	0.123	0.123	0.123	0.123	0.100	0.146	0.080	0.180	0.040	0.200
		Harv - U. Mainstem	NORs	HORs										
		Harv -Terminal	NORs	HORs	0.020	0.020	0.020	0.100	0.020	0.100	0.020	0.100	0.020	0.100
		Total Exploitation Rate	NORs	HORs	0.501	0.501	0.381	0.495	0.365	0.508	0.351	0.528	0.323	0.539
Hatch		Broodstock Composition	pNOB-Goal	pHOS-Goal	pNOB 3%	pHOS	pNOB 10%	pHOS	pNOB 10%	pHOS	100 10%	pHOS 20%	pNOB 10%	pHOS 30%
			pNOB-Realized	pHOS-Realized	3%	81%	10%	5%	10%	5%	10%	5%	10%	5%
	Purpose	Type	Cons/Harv/Both	Int/Seg/Step/None	None	None	None	None	None	None	Harv	Int	Harv	Int
		Broodstock by Source	Local / Imported	Smolt Release	2000	4,084,250	450	918,956	550	1,123,169	700	1,429,488	900	1,837,913
		Brood Exported (from HOR Surplus)	Export Goal/Realized	Strays		890	900 / 900	12	900 / 900	12	900 / 900	12	900 / 900	12
		Destination for HOR Returns	% to Hatchery	% to Nat. Spawn.	80%	20%	80%	20%	80%	20%	80%	20%	80%	20%
		Productivity of Hatchery Fish	Recruits/Spawner	Fitness? [Y / N]	9.5	y	9.5	y	9.5	y	9.5	y	9.5	y

Open AHA Dataset:

E:\Col River HSRG\Draft HSRG and Reco Plan aha\aa-HSRG-WashougalFallChinook(Natural)_E110107.aha

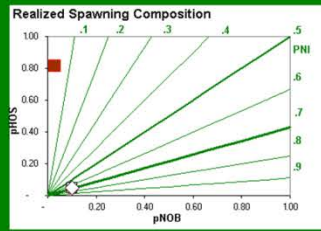
OPEN SAVE

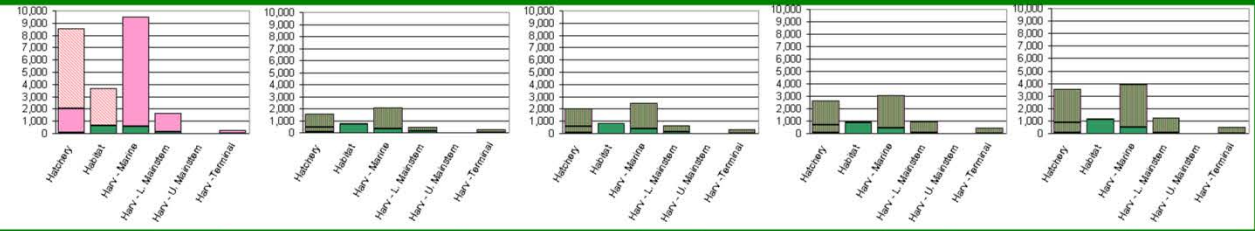
Parameter Documentation

Select alternatives (yes/no) for parameter documentation (current condition should always be documented)

	Yes	No
Current		●
Alt 2		●
Alt 3		●
Alt 4		●
Alt 5		●

Parameter Documentation Inactive for All Alternatives





	Current	No Hatchery	Best Seg	Best Int	~User Def (HSRG Rec)
Relative Hatchery Optimum ->	80	80	80	80	80
Weir Factor ->		95%	95%	95%	95%
Relative Reproductive Success (HOS) ->	100%	100%	100%	100%	100%
Initial Fitness Factor (A)	0.81	0.81	0.81	0.81	0.81
Fitness Factor after 100 generations (B)	0.50	0.87	0.88	0.87	0.88
Average Fitness Factor (100 Generations)	0.50	0.88	0.88	0.87	0.88
Generations until average fitness is reached	14				
Minimum Hatchery Program (as % of BS Goal):					
"Fitness Floor" ->	0.5				

	Current	No Hatchery	Best Seg	Best Int	~User Def (HSRG Rec)
Calculated Hatchery SAR ->	0.47%	0.47%	0.47%	0.47%	0.47%
Calculated Natural SAR ->	0.7%	0.7%	0.7%	0.7%	0.7%

	Current Max	Current Min	Current Ave	No Hatchery Max	No Hatchery Min	No Hatchery Ave	Best Seg Max	Best Seg Min	Best Seg Ave	Best Int Max	Best Int Min	Best Int Ave	~User Def Max	~User Def Min	~User Def Ave
NOR Escapement	2,265	299	646	2,509	272	706	2,900	316	806	3,189	343	878	4,002	448	1,094
HoS Total Escapement	9,177	1,593	3,005	110	19	36	124	22	41	144	25	47	171	30	56
HoS Effective Escapement	7,297	1,553	2,828	85	19	34	99	21	38	118	24	45	145	29	54
Total Natural Escapement (NoS & All HoS)	11,442	1,904	3,652	2,619	295	742	3,025	342	847	3,332	372	925	4,173	483	1,150
Total Harvest	34,740	6,001	11,322	8,781	1,512	2,823	10,744	1,846	3,457	13,717	2,360	4,428	17,657	3,035	5,708
Hatchery Broodstock	2,000	2,000	2,000	450	450	450	550	550	550	700	700	700	900	900	900
Surplus at Hatchery	23,921	2,553	6,529	5,979	-	1,081	7,275	111	1,444	9,065	310	1,940	11,580	598	2,642
Total Runsize	69,389	11,987	22,614	18,693	3,213	5,984	22,457	3,845	7,186	27,678	4,743	8,880	35,173	6,011	11,289

Fishery Benefit Analysis

Elochoman Chinook Broodyears 1996-97,99-00 (CWT recoveries)			
SAR	Total CWT Reld	Total Recovered	Smolt to Adult Survival
	525912	1913	0.36%
Adults			
Agency	Fishery	# CWT Recovered	**% Adult Survival As:**
ADFG	All	47.51	**2.48**
CDFO	All	400.84	**20.95**
NMFS	All	6.81	**0.36**
ODFW	Fishery		
ODFW	10- Ocean Troll	66.22	**3.46**
ODFW	21- Columbia R. Gillnet	73.55	**3.84**
ODFW	40- Ocean Sport	10.54	**0.55**
ODFW	44- Columbia R. Sport	7.35	**0.38**
ODFW	45- Esturine Sport-(bouy 10)	29.68	**1.55**
ODFW	50- Hatchery Escapement	19.17	**1.00**
ODFW	54- Spawning Ground	7	**0.37**
WDFW	Fishery		
WDFW	10- Ocean Troll	79.63	**4.16**
WDFW	15- Treaty Troll	82.31	**4.30**
WDFW	23- PS Net	1.82	**0.10**
WDFW	41- Ocean Sport- Charter	31.43	**1.64**
WDFW	42- Ocean Sport - Private	56.94	**2.98**
WDFW	45- PS Sport	10.04	**0.52**
WDFW	50- Hatchery Escapement	243.47	**12.73**
WDFW	54- Spawning Ground	738.21	**38.59**
	Total	1912.52	**99.97**
jacks			
Agency	Fishery	# CWT Recovered	**% Total Survival As:**
WDFW	50- Hatchery Escapement	1	**0.05**
WDFW	54- Spawning Ground	5.06	**0.26**
UFWS	50- Hatchery Escapement	1	**0.05**
	Total	7.06	**0.37**

N. Toutle Fall Chinook Broodyears 1996-00 (CWT recoveries)			
SAR	Total CWT Reld	Total Recovered	Smolt to Adult Survival
	418401	1190	0.28%
Adults			
Agency	Fishery	# CWT Recovered	**% Adult Survival As:**
ADFG	All	116.73	**9.84**
CDFO	All	141.57	**11.93**
NMFS	All	11.7	**0.99**
ODFW	Fishery		
ODFW	10- Ocean Troll	43.76	**3.69**
ODFW	21- Columbia R. Gillnet	51.75	**4.36**
ODFW	40- Ocean Sport	5.5	**0.46**
ODFW	44- Columbia R. Sport	5.03	**0.42**
ODFW	45- Esturine Sport (bouy 10)	21.41	**1.80**
WDFW	Fishery		
WDFW	10- Ocean Troll	13.2	**1.11**
WDFW	15- Treaty Troll	25.63	**2.16**
WDFW	23- PS Net	7.67	**0.65**
WDFW	41-Ocean Sport- Charter	21.04	**1.77**
WDFW	42- Ocean Sport- Private	29.62	**2.50**
WDFW	46- Freshwater Sport (CR tribs)	31.44	**2.65**
WDFW	50- Hatchery Escapement	321.56	**27.10**
WDFW	54- Spawning Ground	338.81	**28.56**
	Total	1186.42	**100.00**
jacks			
Agency	Fishery	# CWT recovered	**% Total Survival As:**
WDFW	50- Hatchery Escapement	4.05	**0.34**

Kalama Fall Chinook Broodyears 1996-00 (CWT recoveries)			
SAR	Total CWT Reld	Total Recovered	Smolt to Adult Survival
	460264	2040	0.44%
Adults			
Agency	Fishery	# CWT Recovered	**% Adult Survival As:**
ADFG	All	131.23	**6.46**
CDFO	All	530.58	**26.12**
ODFW	Fishery		
ODFW	10- Ocean Troll	54.13	**2.66**
ODFW	21- Columbia R. Gillnet	106.01	**5.22**
ODFW	40- Ocean Sport	12.6	**0.62**
ODFW	44- Columbia R. Sport	30.78	**1.52**
ODFW	45- Esturine Sport-(bouy 10)	16.84	**0.83**
WDFW	Fishery		
WDFW	10- Ocean Troll	93.51	**4.60**
WDFW	15- Treaty Troll	39.69	**1.95**
WDFW	23- PS Net	1.45	**0.07**
WDFW	41- Ocean Sport- Charter	55.62	**2.74**
WDFW	42- Ocean Sport- Private	47.94	**2.36**
WDFW	45- PS Sport	5.4	**0.27**
WDFW	50- Hatchery Escapement	348.59	**17.16**
WDFW	54- Spawning Ground	557.3	**27.43**
		2031.67	**100.00**
jacks			
Agency	fishery	# CWT Recovered	**% Total Survival As:**
WDFW	50- Hatchery Escapement	5.44	**0.27**
WDFW	54- Spawning Ground	2.43	**0.12**
		7.87	**0.39**

TABLE 3

Contribution to Local Personal Income from 2020 Hatchery Plan

Hatchery Production Region: **LOWER COLUMBIA RIVER**

	COMMERCIAL FISHERIES					SPORT FISHERIES				
Watershed	**Ocean Troll**	**Columbia River Net Catch**	**Coastal Net**	**Puget Sound Marine and FW Net**	**Total Commercial**	**Columbia River Mainstem**	**Ocean**	**Puget Sound Marine**	**Freshwater**	**Total Sport**
Grays River										
steelhead	$0	$0	$0	$0	$0	$117,518	$0	$0	$0	$117,518
chinook	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
coho	$899	$12,726	$345	$30	$14,000	$0	$40,542	$0	$59,282	$99,824
subtotal	$899	$12,726	$345	$30	$14,000	$117,518	$40,542	$0	$59,282	$217,342
Elochoman River										
steelhead	$0	$0	$0	$0	$0	$546,188	$0	$0	$0	$546,188
chinook	$60,719	$16,023	$0	$694	$77,436	$9,313	$29,517	$3,468	$36,106	$78,404
coho	$3,626	$88,534	$0	$0	$92,160	$4,147	$193,957	$6,023	$272,258	$476,385
subtotal	$64,345	$104,557	$0	$694	$169,596	$559,648	$223,474	$9,491	$308,364	$1,100,977
Cowlitz River										
steelhead	$0	$0	$0	$0	$0	$8,586,776	$0	$0	$0	$8,586,776
chinook	$115,105	$43,433	$0	$198	$158,736	$67,532	$113,457	$2,920	$1,097,081	$1,280,990
coho	$10,480	$289,190	$2,365	$181	$302,216	$0	$885,535	$24,931	$4,045,561	$4,956,027
subtotal	$125,585	$332,623	$2,365	$379	$460,952	$8,654,308	$998,992	$27,851	$5,142,642	$14,823,793
North Fork Toutle River										
steelhead	$0	$0	$0	$0	$0	$205,761	$0	$0	$0	$205,761
chinook	$22,382	$17,739	$0	$4,561	$44,682	$9,980	$27,243	$0	$349,836	$387,059
coho	$322	$34,920	$0	$0	$35,242	$64,893	$169,317	$548	$712,602	$947,360
subtotal	$22,704	$52,659	$0	$4,561	$79,924	$280,634	$196,560	$548	$1,062,438	$1,540,180
South Fork Toutle River										
steelhead	$0	$0	$0	$0	$0	$185,269	$0	$0	$0	$185,269
chinook	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
coho	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
subtotal	$0	$0	$0	$0	$0	$185,269	$0	$0	$0	$185,269
Coweeman River										
steelhead	$0	$0	$0	$0	$0	$32,621	$0	$0	$0	$32,621
chinook	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
coho	$0	$0		$0	$0	$0	$0	$0	$0	$0
subtotal	$0	$0	$0	$0	$0	$32,621	$0	$0	$0	$32,621
Kalama River										
steelhead	$0	$0	$0	$0	$0	$1,161,799	$0	$0	$0	$1,161,799
chinook	$157,226	$62,946	$0	$991	$221,163	$249,170	$97,995	$5,384	$503,530	$856,079
coho	$1,463	$28,783	$0	$0	$30,246	$14,394	$100,879	$1,643	$627,949	$744,865
subtotal	$158,689	$91,729	$0	$991	$251,409	$1,425,363	$198,874	$7,027	$1,131,479	$2,762,743
Lewis River										
steelhead	$0	$0	$0	$0	$0	$2,267,976	$0	$0	$0	$2,267,976
chinook	$5,770	$15,222	$0	$0	$20,992	$41,584	$3,265	$0	$522,559	$567,408
coho	$10,470	$199,338	$764	$60	$210,632	$41,717	$904,498	$22,256	$1,915,805	$2,884,276
subtotal	$16,240	$214,560	$764	$60	$231,624	$2,351,277	$907,763	$22,256	$2,438,364	$5,719,660
Salmon Creek										
steelhead	$0	$0	$0	$0	$0	$102,044	$0	$0	$0	$102,044
chinook	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
coho	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
subtotal	$0	$0	$0	$0	$0	$102,044	$0	$0	$0	$102,044
Washougal River										
steelhead	$0	$0	$0	$0	$0	$496,002	$0	$0	$0	$496,002
chinook	$80,634	$80,858	$0	$1,586	$163,078	$104,459	$71,826	$5,293	$281,528	$463,106
coho	$3,602	$84,204	$641	$76	$88,523	$159,793	$179,600	$1,278	$79,286	$419,957
subtotal	$84,236	$165,062	$641	$1,662	$251,601	$760,254	$251,426	$6,571	$360,814	$1,379,065
ALL WATERSHEDS										
steelhead	$0	$0	$0	$0	$0	$13,701,954	$0	$0	$0	$13,701,954
chinook	$441,836	$236,221	$0	$8,030	$686,087	$482,038	$343,303	$17,065	$2,790,640	$3,633,046
coho	$30,862	$737,695	$4,115	$347	$773,019	$284,944	$2,474,328	$56,679	$7,712,743	$10,528,694
TOTAL	$472,698	$973,916	$4,115	$8,377	$1,459,106	$14,468,936	$2,817,631	$73,744	$10,503,383	$27,863,694

Table Source: Wegge Technical Memo 2009

C&SFP Proposed Production Changes in 2009 By Facility

				2009 Current Production		Conservation & Fisheries		
Facility	Species	Stock	Recovery Contribution	Release Location	Number of Smolts	Release Location	Number of Smolts	Difference (Cur-Prop)
WDFW Facilites	Fall Chin (Tule Stock)				18,500,000		17,400,000	-1,100,000
	Type S Coho				3,048,000		1,930,000	-1,118,000
	Type N Coho				7,538,254		7,076,254	-462,000
	Win. Sthd				1,220,000		1,150,000	-70,000
	Sum. Sthd				1,239,000		1,194,000	-45,000
	Spring Chinook				3,217,000		3,517,000	300,000
	Chum				395,000		395,000	0
	All Species Combined				35,157,254		32,662,254	-2,495,000
ODFW Facilities	Fall Chin (Tule Stock)				5,700,000		5,700,000	0
	Type S Coho				5,845,000		5,845,000	0
	Win. Sthd				400,000		400,000	0
	Sum. Sthd				215,000		215,000	0
	Spring Chinook				361,120		361,120	0
	Sockeye				55,000		55,000	0
	All Species Combined				12,576,120		12,576,120	0
USFWS Facilities	Fall Chin (Tule Stock)				6,493,000		6,493,000	0
	Fall Chin (URB Stock)				8,200,000		8,200,000	0
	Type S Coho				2,900,000		2,900,000	0
	Win. Sthd				150,000		100,000	-50,000
	Spring Chinook				2,420,000		2,420,000	0
	All Species Combined				20,163,000		20,113,000	-50,000
YN Facilities	Fall Chin (URB Stock)				4,000,000		4,000,000	0
	Type S Coho				1,000,000		1,000,000	0
	Spring Chinook				600,000		600,000	0
	All Species Combined				5,600,000		5,600,000	0
All Facilities	Fall Chin (Tule Stock)				30,693,000		29,593,000	-1,100,000
	Fall Chin (URB Stock)				12,200,000		12,200,000	0
	Type S Coho				12,793,000		11,675,000	-1,118,000
	Type N Coho				7,538,254		7,076,254	-462,000
	Win. Sthd				1,770,000		1,650,000	-120,000
	Sum. Sthd				1,454,000		1,409,000	-45,000
	Spring Chinook				6,598,120		6,898,120	300,000
	Chum				395,000		395,000	0
	Sockeye				55,000		55,000	0
	All Species Combined				73,496,374		70,951,374	-2,545,000

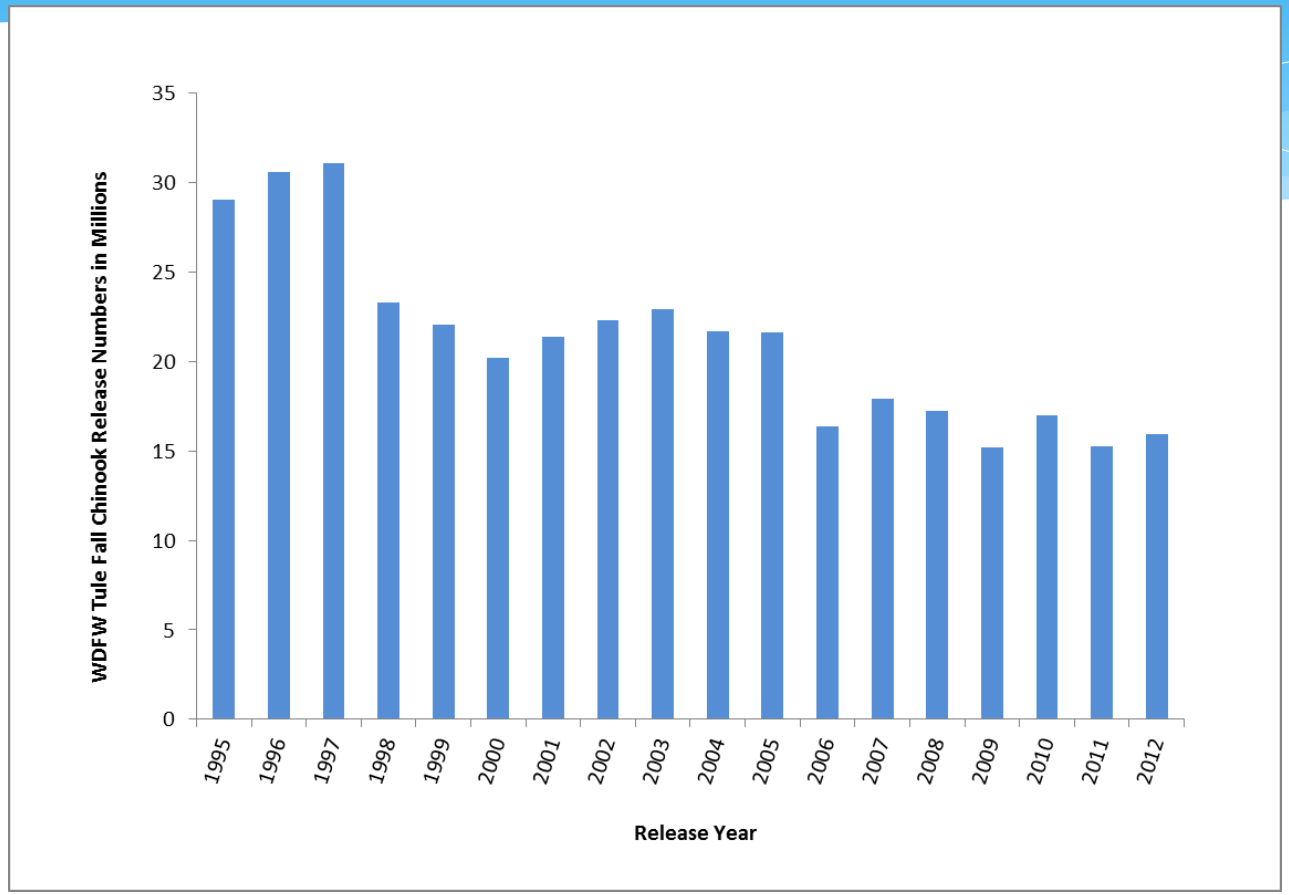
Source: Draft C&SFP 2010

2009 Proposed Production Shifts at all State Operated Hatchery Facilities in the Lower Columbia River for Tule Fall Chinook

			LCFRB Sub Plan	Current Production		Conservation & Fisheries			
Facility	Species	Stock	Recovery Contribution	Release Location	# of Smolts	Release Location	# of Smolts	Difference (Cur-Prop)	Comments
SAFE	Fall Chin	Tule	na	na	0	Oregon SAFE	2,100,000	2,100,000	Recieve from Washougal Hatchery to SAFE location at 140 per pound for final rearing and release
Deep RNP	Fall Chin	Tule	na	na	0	SAFE	1,000,000	1,000,000	Receive fish from Beaver Creek Hatchery at 140 fish per pound for final rearing and release
Klaskanine	Fall Chin	Tule	Stabilizing	na	0	Na	0	0	
Big Creek	Fall Chin	Tule	Contributing	On-Site	5,700,000	On-Site	5,700,000	0	no change
Elochoman	Fall Chin	Tule	Primary	On-Site	2,000,000	na	0	-2,000,000	Close Hatchery
Beaver Creek	Fall Chin	Tule	na	na	0	SAFE	1,000,000	1,000,000	Transfer to Deep River net pens at 140 per pound for final rearing and release-see above
Kalama Falls	Fall Chin	Tule	Contributing	On-Site	2,500,000	On-Site	3,000,000	500,000	
	Fall Chin	Tule	Contributing	na	0	SAFE	500,000	500,000	Early release in May at 80-100 per pound
Fallert Creek	Fall Chin	Tule	Contributing	On-Site	2,500,000	On-Site	3,000,000	500,000	
	Fall Chin	Tule	Contributing	na	0	On-Site	500,000	500,000	Early release in May at 80-100 per pound
Cowlitz	Fall Chin	Tule	Contibuting	On-Site	5,000,000	On-Site	5,000,000	0	Contributing in lower river and stablilizing in upper river
NF Toutle	Fall Chin	Tule	Primary	On-Site	2,500,000	On-Site	1,400,000	-1,100,000	
Lewis	Fall Chin	Tule	Primary	na	0	na	0	0	
Washougal	Fall Chin	Tule	Primary	On-Site	4,000,000	On-Site	900,000	-3,100,000	Establish weir in lower river
	Fall Chin	Tule	na	na	0	Or. SAFE	2,100,000	2,100,000	Transfer to SAFE location at 140 per pound-see above
Bonneville	Fall Chin	Spring Cr (Tule)	Contributing	na	0	Bonneville	0	0	Production changes to be determined through Spring Creek Repogramming discussions
Spring Creek	Fall Chin	Spring Cr (Tule)	Contributing	Spring Creek	6,493,000	Spring Creek	6,493,000	0	Production changes to be determined through Spring Creek Repogramming discussions
				Total Production	**30,693,000**		**29,593,000**		

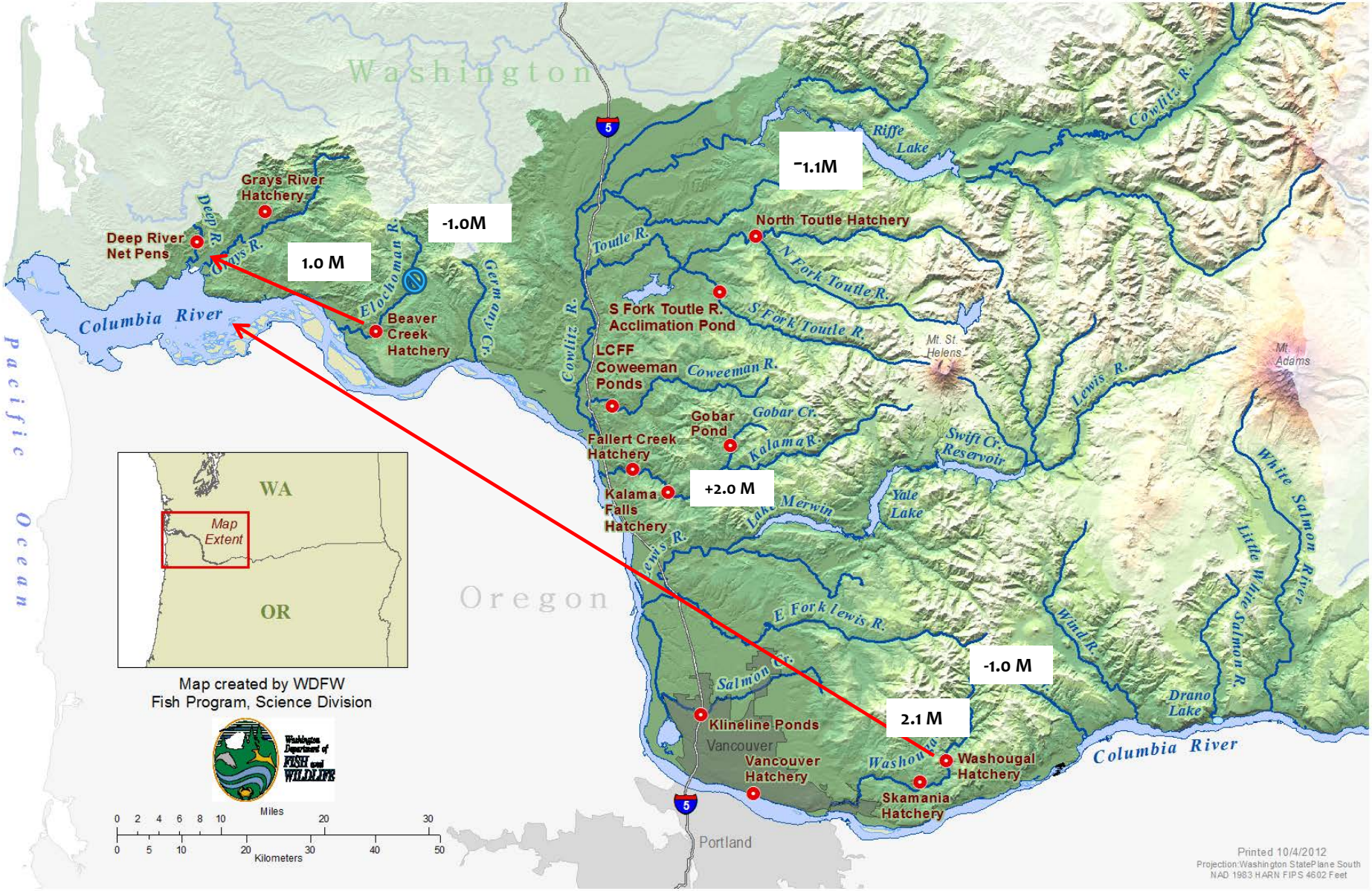
Table Source: WDFW Draft C&SFP 2010.

WDFW Fall Chinook Releases for the Lower Columbia Mitchell Act Facilities from 1995 - 2012



Data Source: WDFW FishBooks 2012.

2009 Proposed WDFW Tule Fall Chinook Production Modifications



Short Term Program Goals Were

2009 to 2013 (5 years)

- Reconfigure and reform hatchery programs for Fall Chinook consistent with responsibilities identified in the Lower Columbia Fish Recovery Plan and standards established by the HSRG.
- Mark hatchery fall Chinook in priority watersheds to promote fishery utilization, facilitate the utilization of natural-origin fish in integrated programs, and enumerate hatchery fish in natural spawning areas.
- Continue to produce, in a manner consistent with other recovery strategies and measures, sufficient numbers of hatchery fall Chinook to sustain significant fishery opportunities until harvestable naturally-spawning populations are restored.

Long Term Program Goals Are

By 2015 & Beyond

- Establish wild fish refuges for fall Chinook in selected watersheds by eliminating or limiting release and escapement of hatchery-origin fish into natural spawning areas.
- Implement hatchery reforms for fall Chinook in phases in order to limit demographic risks of the reduction in hatchery supplementation of natural abundance in the interim until natural habitat and population productivity is sufficient to sustain local populations.
- Use local brood stock and integrated production strategies in fall Chinook hatchery programs in order to promote local adaptation and natural productivity.
- Use fall Chinook juvenile release strategies to minimize ecosystem effects and ecological interactions.
- Monitor long term effects of hatchery reductions and fishery benefits

Final Recap: What We Hope to Continue to Accomplish

* Meet WDFW's responsibilities as outlined in the **Lower Columbia River Salmon Recovery Plan**
* Address the **HSRG** suggested solutions by using production modifications to structure our programs to achieve HRSG standards for primary, contributing and stabilizing populations in recovery
* **Support sustainable** sport and commercial **fisheries,** including increased levels of selective fisheries
* See improved fitness of naturally produced salmon and steelhead over time

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