

CHAPTER I: DESCRIPTION OF THE AFFECTED ENVIRONMENT

The affected environment relevant to establishing the 2011 ocean salmon fishery management measures consists of the following components:

- Target Species – Chinook, coho, and pink salmon
- ESA-listed salmon stocks
- Socioeconomic aspects of coastal communities, federally recognized Tribes, and states

A description of the historical baseline for these components of the affected environment is presented in the Review of 2010 Ocean Salmon Fisheries (PFMC 2011). The current status (2011 ocean abundance forecasts) of the environmental components expected to be affected by the 2011 ocean salmon fisheries regulation alternatives (FMP salmon stocks) are described in this report (Part 1 of the 2011 salmon EA); the Review of 2010 Ocean Salmon Fisheries (STT 2011) provides an historical description of the salmon fishery-affected environment, including stock status and socioeconomic impacts, and represents the current status of the socioeconomic component of the affected environment.

Several components of the environment were determined to not be significantly affected by the proposed actions based on previous NEPA analyses and ESA consultations; they were therefore excluded from further analysis in this EA. These components included:

- Non-target species – Pacific Halibut, groundfish (NMFS 2003, PFMC 2006)
- Marine mammals – pinnipeds, killer whales (NMFS 2003, PFMC 2006, NMFS 2008)
- Seabirds (NMFS 2003, PFMC 2006)
- Ocean and coastal habitats, ESA critical habitat, and essential fish habitat (NMFS 2003, PFMC 2006)
- Biodiversity and ecosystem function (NMFS 2003, PFMC 2006)
- Unique characteristics of the geographic area (NMFS 2003, PFMC 2006)
- Cultural, scientific, or historical resources such as those eligible for listing in the National Register of Historic Places (NMFS 2003, PFMC 2006)
- Public health or safety (NMFS 2003, PFMC 2006)

The No-Action Alternative does not reflect consideration of changes in the status of salmon stocks from the previous year; therefore, over- or under- harvest of some salmon stocks would occur if this alternative was implemented, which would fail to meet the purpose and need described above. The analysis of the No-Action Alternative does, however, provide perspective that is useful in the planning process for 2011 ocean salmon fishery management measures. An understanding of stock shortfalls and surpluses under the No-Action Alternative helps managers, advisors, and constituents construct viable alternatives (previously termed “management options”) to the status-quo management measures.

The component of the affected environment that is analyzed in this document consists only of the salmon stocks identified in the FMP (Appendix A). The 2011 forecast abundance of the FMP salmon stocks represents this component of the affected environment. The surviving stock after fishery-related mortality is generally referred to as spawning escapement and the proportion of the stock that succumbs to fishing related mortality is generally referred to as the exploitation rate; these are the metrics that constitute conservation objectives for FMP stocks, and by which effects of the alternatives to this part of the affected environment are evaluated. Thus, application of management measures (alternatives) to the abundance forecasts (affected environment) results in projected exploitation rates and spawning escapements (effects).

A description of the other components of the affected environment considered for 2011 ocean salmon fishery regulation alternatives, including socioeconomic components and updated additional information on the biological components of the environment, will be presented in the Preseason Report II, to be issued after the March Council meeting.

ABUNDANCE FORECASTS

Abundance forecasts in 2011 are summarized for key Chinook and coho salmon stocks in Tables I-1 and I-2, respectively. A cursory comparison of preseason forecast and postseason abundance estimates for selected stocks is presented in Figures I-1 and I-2. More detailed analyses of this subject are covered in Chapter II (Chinook) and III (coho). Information on pink salmon abundance and forecasts, which are only significant in odd-numbered years, is contained in Chapter IV. Council Salmon Fishery Management Plan (FMP) conservation objectives are presented in Appendix A; allocation objectives are presented in Appendix B.

In addition to the key stocks with abundance forecasts listed in Tables I-1 and I-2, Council management decisions for the 2011 ocean salmon fishing seasons may be constrained by other stocks, such as those listed under the ESA or subject to the PSC agreement, which may not have abundance forecasts made, or do not have abundance forecasts available in time for inclusion in this report. These include the following Evolutionarily Significant Units (ESUs): Sacramento River Winter, Central Valley Spring, California Coastal, Lower Columbia River (LCR) natural tule, and Snake River Fall Chinook; and Central California and Southern Oregon/Northern California coho, as well as Interior Fraser (including Thompson River) coho.

TABLE I-1. Preseason adult Chinook salmon stock forecasts in thousands of fish. (Page 1 of 4)

Production Source and Stock or Stock Group	2003	2004	2005	2006	2007	2008	2009	2010	2011	Methodology for 2011 Prediction and Source
Sacramento Index										
Fall	-	-	-	-	-	54.6 ^{a/}	122.2	245.5	729.9	Linear regression analysis of jack escapement on SI of the following year. STT
Klamath River (Ocean Abundance)										
Fall	310.2	216.3	239.8	110.0	546.2	190.7	505.7	331.5	371.1	Linear regression analysis of age-specific ocean abundance estimates on river runs of same cohort. STT.
Oregon Coast										
North and South/Local Migrating										None.
Columbia River (Ocean Escapement)										
Upriver Spring	145.4	360.7	254.1 ^{b/}	88.4	78.5	269.3	298.9	470.0	198.4	Age-specific linear regressions of cohort returns in previous run years. WDFW staff.
Willamette Spring	109.8	109.4	116.9	46.5	52.0	34.0	37.6	62.7	104.1	Age-specific linear regressions of cohort returns in previous run years. ODFW staff.
Sandy Spring	4.8	5.2	7.4	8.2	7.9	6.8	5.2	3.7	5.5	Recent year average. ODFW staff.
Cowlitz Spring	4.9	15.9	12.7	3.0	6.4	5.2	4.1	12.5	6.6	Age-specific linear regressions of cohort returns in previous run years. WDFW.
Kalama Spring	3.6	6.0	4.5	1.5	4.0	3.7	0.9	0.9	0.6	Age-specific linear regressions of cohort returns in previous run years. WDFW.
Lewis Spring	3.1	5.4	7.6	1.8	5.9	3.5	2.2	6.0	3.4	Age-specific linear regressions of cohort returns in previous run years. WDFW.
Upriver Summer	87.6	102.8	62.4 ^{b/}	49.0	45.6	52.0	70.7	88.8	91.9	Age-specific average cohort ratios/cohort regressions. Columbia River TAC subgroup and WDFW
URB Fall	280.4	292.2	352.2	253.9	182.4	162.5	259.9	310.8	398.2	Age-specific average cohort ratios/cohort regressions. Columbia River TAC subgroup and WDFW
SCH Fall	96.9	138.0	114.1	50.0	21.8	87.2	59.3	169.0	116.4	Age-specific average cohort ratios/cohort regressions. Columbia River TAC subgroup and WDFW
LRW Fall	24.6	24.1	20.2	16.6	10.1	3.8	8.5	9.7	12.5	Age-specific average cohort ratios/cohort regressions. Columbia River TAC subgroup and WDFW
LRH Fall	115.9	77.1	74.1	55.8	54.9	59.0	88.8	90.6	133.5	Age-specific average cohort ratios/cohort regressions. Columbia River TAC subgroup and WDFW
MCB Fall	104.8	90.4	89.4	88.3	68.0	54.0	94.5	72.6	100.0	Age-specific average cohort ratios/cohort regressions. Columbia River TAC subgroup and WDFW

TABLE I-1. Preseason adult Chinook salmon stock forecasts in thousands of fish. (Page 2 of 4)

Production Source and Stock or Stock Group		2003	2004	2005	2006	2007	2008	2009	2010	2011	Methodology for 2011 Prediction and Source
Washington Coast (Ocean Escapement)											
Willapa Bay Fall	Natural	2.4	4.1	3.2	2.0	2.0	2.5	2.0	2.0	2.0	Based on average 1999-2007 returns/spawner applied to Brood Years 2005-2008. WDFW
	Hatchery	14.2	14.7	17.4	29.8	29.8	27.0	34.8	31.1	31.1	Based on average 1998-2007 returns/release applied to Brood Years 2005-2008, adjusted by model performance. WDFW
Quinalt Spring/Summer	Natural	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Quinalt Fall	Natural	2.0	2.2	3.9	8.7	7.3	3.7	6.9	7.6	NA	Return per spawner by age with a 5 year adjusted average adjusted with brood year sibling return.
	Hatchery	1.0	2.9	6.2	7.3	8.7	1.3	7.8	5.5	NA	Recent 5 year average return per spawner
Queets Spring/Summer	Natural	0.5	0.4	0.5	0.5	0.4	0.4	0.4	0.4	NA	Recent 5 year average
Queets Fall	Natural	4.5	4.4	4.3	3.5	2.6	3.5	4.5	4.1	NA	Return per spawner by age with a 5 year adjusted average adjusted with brood year sibling return.
	Hatchery	0.4	0.7	1.2	1.4	1.5	7.0	1.2	9.8	NA	Recent 5 year average return per spawner
Hoh Spring/Summer	Natural	1.9	1.5	1.5	1.4	1.6	0.9	1.1	0.8	1.0	Forecast from returns per spawner using recent 5 year mean.
Hoh Fall	Natural	3.1	4.2	3.8	4.0	2.7	2.9	2.6	3.3	2.9	Forecast from returns per spawner using recent 5 year mean.
Quillayute Spring	Hatchery	1.0	1.4	1.2	1.7	1.3	1.7	2.0	1.5	1.4	Mean return per release using most recent 4 years, 5 year adjusted means for age-5 and age-6.
Quillayute Summer/Fall	Natural	7.4	7.8	6.7	6.8	7.7	6.0	6.8	7.5	8.8	Summer: Recent 5 year mean return per spawner. Fall: Returns per spawner mean recent 5 years.
North Coast Totals											
Spring/Summer	Natural	2.4	1.9	2.0	1.9	2.0	1.3	1.5	1.2	NA	
Fall	Natural	17.0	18.6	18.7	23.0	20.3	16.1	20.8	22.5	NA	
Spring/Summer	Hatchery	1.0	1.4	1.2	1.7	1.3	1.7	2.0	1.5	1.4	
Fall	Hatchery	1.4	3.6	7.4	8.7	10.2	8.3	9.0	15.3	NA	
Puget Sound summer/fall^{d/}											
Nooksack/Samish	Hatchery	45.8	34.2	19.5	16.9	18.8	35.3	23.0	30.3	37.5	Brood release times average return/release rate (2007-2009 return years).
East Sound Bay	Hatchery	1.6	0.8	0.4	0.4	0.4	0.8	0.1	2.3	0.4	Brood release times 50% average return/release rate (2006 - 2009 return years)for Nooksack/Samish.
Skagit	Natural	13.7 ^{d/}	20.4 ^{d/}	23.4 ^{d/}	24.1 ^{d/}	15.0 ^{d/}	23.8 ^{d/}	23.4 ^{d/}	13.0 ^{d/}	14.3 ^{d/}	Adjusted age-specific average return rate per spawner.
	Hatchery	0.0 ^{d/}	0.5 ^{d/}	0.7 ^{d/}	0.6 ^{d/}	1.1 ^{d/}	0.7 ^{d/}	0.6 ^{d/}	0.9 ^{d/}	1.5 ^{d/}	Age-specific average return rate per smolt and appropriate year smolt releases.

TABLE I-1. Preseason adult Chinook salmon stock forecasts in thousands of fish. (Page 3 of 4)

Production Source and Stock or Stock Group		2003	2004	2005	2006	2007	2008	2009	2010	2011	Methodology for 2011 Prediction and Source
Stillaguamish	Natural	2.0 ^{ei}	3.3 ^{ei}	2.0 ^{ei}	1.6 ^{ei}	1.9 ^{ei}	1.1 ^{ei}	1.7 ^{ei}	1.4 ^{ei}	1.8 ^{ei}	Natural plus supplemental production from average of FRAM CWT reconstruction and an independent environmental model to link to return rates of specific age classes. FRAM CWT reconstruction uses BY 1993-2003 tagged fish survival rates for supplemental forecast, and BY 1986-1993 recruits/spawner for the natural return.
Snohomish	Natural	5.5 ^{ei}	15.7 ^{ei}	14.2 ^{ei}	8.7 ^{ei}	12.3 ^{ei}	6.5 ^{ei}	8.4 ^{ei}	9.9 ^{ei}	7.4 ^{ei}	Recent year average brood recruits/spawner applied to the 2006-2009 parent escapements. Hatchery forecasts based on average CWT survival rates (yearlings: BY 1996-97; fingerlings: BY 2000-2003) from Wallace Hatchery applied to releases .
	Hatchery	9.4 ^{ei}	10.1 ^{ei}	9.9 ^{ei}	9.6 ^{ei}	8.7 ^{ei}	8.8 ^{ei}	4.9 ^{ei}	5.6 ^{ei}	5.2 ^{ei}	Yearlings based on CWT groups for Wallace Hatchery (BYs 1987 and 1992-1996). Fingerlings based on survival estimate from Tulalip Hatchery 1998-2003.
Tulalip	Hatchery	6.0 ^{ei}	7.6 ^{ei}	9.2 ^{ei}	10.0 ^{ei}	8.1 ^{ei}	4.1 ^{ei}	4.0 ^{ei}	3.4 ^{ei}	3.5 ^{ei}	CWT survival rates (1998-2003) multiplied by release numbers for brood years 2006-2009.
South Puget Sound	Natural	19.6	17.5	17.7	21.3	17.0	21.1	17.2	12.7	8.9	Puyallup R. recent five year average return per spawner applied to brood years contributing ages 3-6. For Nisqually, recent 5 year average (2004-2009 return years) of runsizes. Green R. spawning escapement in terms of natural origin adults.
	Hatchery	86.6	86.5	83.1	85.8	92.1	101.3	93.0	97.4	118.6	Average return at age multiplied by cohort release for Green, Carr Inlet, and Area 10E. Nisqually based on return rates/release for age-3 -5.
Hood Canal	Natural	3.6 ^{di}	2.4 ^{di}	3.1 ^{di}	2.5 ^{di}	3.8 ^{di}	2.6 ^{di}	2.5 ^{di}	2.4 ^{di}	2.2 ^{di}	Natural fish based on the Hood Canal terminal run reconstruction-based relative contribution of the individual Hood Canal management units in the 2007-2010 return years.
	Hatchery	30.2 ^{di}	27.2 ^{di}	27.5 ^{di}	27.7 ^{di}	43.6 ^{di}	34.2 ^{di}	40.1 ^{di}	42.6 ^{di}	38.4 ^{di}	Brood 2007 fingerling lbs released from WDFW facilities in 2008, multiplied by the average of postseason estimated terminal area return rates (total terminal run / hatchery fingerling lbs released three years previous) for the last four return years (2007-2010).
Hoko	Natural	-	-	-	-	-	1.1 ^{ei}	1 ^{ei}	1.8 ^{ei}	0.6 ^{ei}	Sibling regressions.
Strait of Juan de Fuca Including Dungeness spring run	Natural	3.4 ^{di}	3.6 ^{di}	4.2 ^{di}	4.2 ^{di}	4.4 ^{di}	3.2 ^{di}	2.4 ^{di}	1.9 ^{di}	2.5 ^{di}	Dungeness and Elwha hatchery estimated by four-year average releases times average return rates. Dungeness wild estimated by smolts times average hatchery return rate. Elwha estimate separates hatchery and wild fish based on otolith sampling.
	Hatchery	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Hatchery production included in naturals.

TABLE I-1. Preseason adult Chinook salmon stock forecasts in thousands of fish. (Page 4 of 4)

- a/ Does not include the river harvest component. SI forecasts after 2008 include river harvest.
- b/ Beginning in 2005, the upriver spring/summer designation was changed, with stream type Snake Basin summer fish being combined with the spring stock.
- c/ Unless otherwise noted, forecasts are for Puget Sound run size (4B) available to U.S. net fisheries. Does not include fish caught in troll and recreational fisheries.
- d/ Terminal run forecast.
- e/ Expected spawning escapement without fishing.

TABLE I-2. Preseason adult coho salmon stock forecasts in thousands of fish. (Page 1 of 2)

Production Source and Stock or Stock Group		2003	2004	2005	2006	2007	2008	2009	2010	2011	Methodology for 2011 Prediction and Source
OPI Area (Total Abundance) (California and Oregon Coasts and Columbia River)		984.6	777.9	542.9	460.2	849.2	276.1	1,284.7	556.0	624.5	Abundance of all OPI components based on cohort reconstruction including all fishery impacts using Mixed Stock Model (MSM); prior to 2008 only fishery impacts south of Leadbetter Point were used (traditional OPI accounting). OPITT, see Chapter III for details.
OPI Public	Hatch	863.1	623.9	389.9	398.8	593.6	216.1	1,073.1	408.0	375.1	OPIH: 1969-2009 Columbia River jacks adjusted for delayed smolt releases and total OPI jacks regressed on 1970-2010 adults. Columbia/Coastal proportions based on jacks; Columbia early/late proportions based on jacks; Coastal N/S proportions based on smolts.
Columbia River Early		440.0	313.6	284.6	245.8	424.9	110.3	672.7	245.3	216.0	
Columbia River Late		377.9	274.7	78.0	113.8	139.5	86.4	369.7	144.2	146.5	
Coastal N. of Cape Blanco		29.3	16.6	11.5	8.6	7.0	1.7	7.3	4.4	3.6	
Coastal S. of Cape Blanco		15.9	19.0	15.8	30.6	22.2	17.7	23.4	14.1	9.0	
Lower Columbia River	Natura	NA	NA	NA	NA	21.5	13.4	32.7	15.1	22.7	Oregon: recent three year average; Washington: natural smolt production multiplied by 2008 brood marine survival rate. Abundance is subset of early/late hatchery abundance above.
Oregon Coast (OCN)	Natural	117.9	150.9	152.0	60.8	255.4	60.0	211.6	148.0	249.4	Rivers: Generalized additive model (GAM) relating ocean recruits to parental spawners and marine environmental variables. See text in Chapter III for details. Lakes: recent three year average return.
STEP ^{a/}	Hatch	3.6	3.1	1.0	0.6	0.2	-	-	-	-	No forecast since 2007; releases discontinued.
Washington Coast											A variety of methods were used for 2011, primarily based on smolt production and survival. See text in Chapter III for details.
Willapa	Natur	31.8	36.7	35.9	30.3	24.4	35.1	33.5	20.4	47.8	
	Hatchery	57.5	55.0	56.4	37.7	37.2	25.5	59.4	78.7	64.7	
Grays Harbor	Natura	58.0	117.9	91.1	67.3	59.4	42.7	59.2	67.9	89.1	
	Hatchery	64.0	67.8	54.4	52.4	74.0	53.1	63.5	33.3	44.0	
Quinalt	Natur	47.7	50.5	44.9	28.8	18.6	17.4	16.3	16.7	22.9	
	Hatchery	20.6	18.2	33.6	34.5	22.7	24.5	26.2	26.6	35.5	
Queets	Natur	24.0	18.5	17.1	8.3	13.6	10.2	31.4	21.8	13.3	
	Hatchery	24.9	17.1	17.4	11.9	19.1	10.3	13.5	11.9	16.3	
	Supplemental ^{b/}	1.3	2.5	2.4	-	-	-	-	-	-	
Hoh	Natur	12.5	8.1	7.6	6.4	5.4	4.3	9.5	7.6	11.6	

TABLE I-2. Preseason adult coho salmon stock forecasts in thousands of fish. (Page 2 of 2)

Production Source and Stock or Stock Group		2003	2004	2005	2006	2007	2008	2009	2010	2011	Methodology for 2011 Prediction and Source	
Quillayute Fall	Natural	24.9	21.2	18.6	14.6	10.8	10.5	19.3	22.0	28.2	A variety of methods were used for 2011, primarily based on smolt production and survival. See text in Chapter III and Joint WDFW and tribal annual reports on Puget Sound Coho Salmon Forecast Methodology for details.	
	Hatchery	15.2	20.9	22.1	10.4	18.1	13.0	39.5	17.7	31.0		
Quillayute Summer	Natural	1.8	1.1	0.8	1.1	1.0	1.1	2.2	2.8	2.8		
	Hatchery	5.4	6.1	6.1	4.0	6.4	4.2	12.9	3.2	5.4		
North Coast Independent Tributaries	Natural	14.8	12.7	8.5	8.1	3.2	3.2	11.1	4.2	21.6		
	Hatchery	11.0	4.3	5.6	3.2	4.1	5.0	14.1	5.7	11.8		
WA Coast Total	Natural	215.5	266.7	224.5	164.9	136.4	124.5	182.5	163.4	237.3		
	Hatchery	199.9	191.9	198.0	154.1	181.6	135.7	229.1	177.1	208.7		
Puget Sound												
Strait of Juan de Fuca	Natural	20.1	35.7	20.7	26.1	29.9	24.1	20.5	8.5	12.3		
	Hatchery	24.0 ^{b/}	28.7 ^{b/}	26.5 ^{b/}	20.5	18.4	9.5	7.0	7.8	15.2		
Nooksack-Samish	Natural	16.4	27.5	17.0	18.3	5.2	14.8	7.0	9.6	29.5		
	Hatchery	66.2	75.5	89.5	81.1	53.1	47.1	25.5	36.0	45.7		
Skagit	Natural	116.6	155.8	61.8	106.6	26.8	61.4	33.4	95.9	138.1		
	Hatchery	10.4	22.8	9.1	22.5	8.9	18.3	11.7	9.5	16.7		
Stillaguamish	Natural	37.8	38.0	56.7	45.0	69.2	31.0	13.4	25.9	66.6		
	Hatchery	1.3	0.5	0.2	1.2	0.0	0.1	0.0	5.4	0.6		
Snohomish	Natural	203.0	192.1	241.6	139.5	98.9	92.0	67.0	99.4	180.0		
	Hatchery	35.4	48.3	59.1	96.4	25.7	53.5	53.6	24.5	8.4		
South Sound	Natural	103.6	61.3	45.7	45.3	18.2	27.3	53.6	25.3	98.9		
	Hatchery	315.6	288.4	222.2	256.1	181.7	170.0	188.8	186.4	173.3		
Hood Canal	Natural	32.4	98.7	98.4	59.4	42.4	30.4	48.6	33.2	74.7		
	Hatchery	48.0 ^{b/}	43.1 ^{b/}	60.6 ^{b/}	57.9	54.8	35.0	52.0	51.2	74.9		
Puget Sound Total	Natural	529.9	609.2	541.9	440.2	290.6	281.0	243.5	297.8	600.1		
	Hatchery	501.0	507.3	465.2	535.7	342.6	333.5	338.6	320.8	334.8		

a/ Program ended in 2005.

b/ Strait of Juan de Fuca and Hood Canal Hatchery numbers in 2002-2005 include natural coho from secondary (hatchery) management zones.

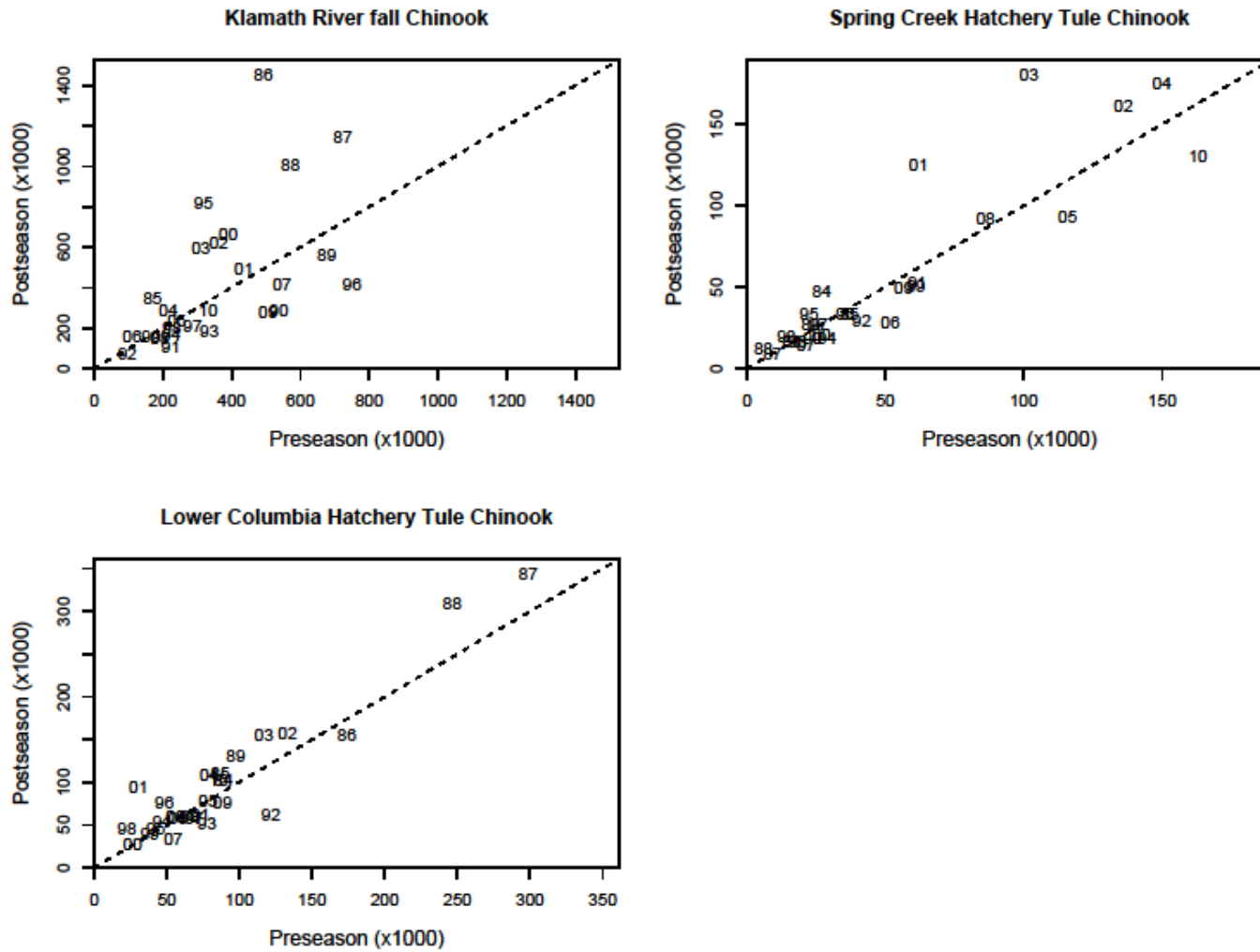


FIGURE I-1. Selected preseason vs. postseason forecasts for Chinook stocks with significant contribution to Council area fisheries.

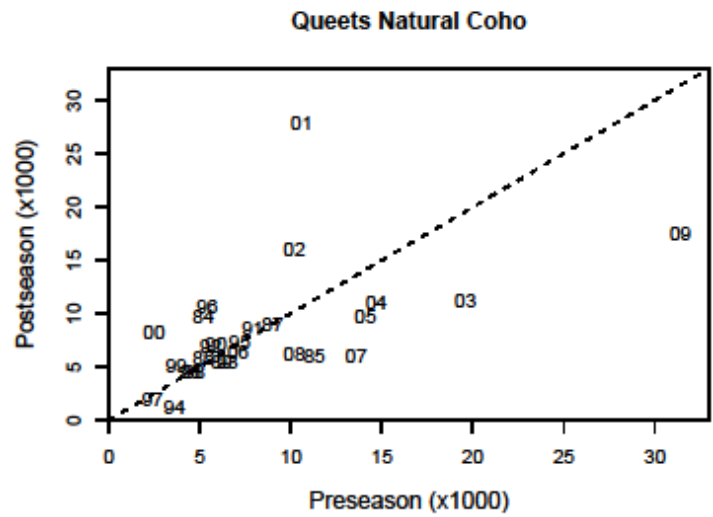
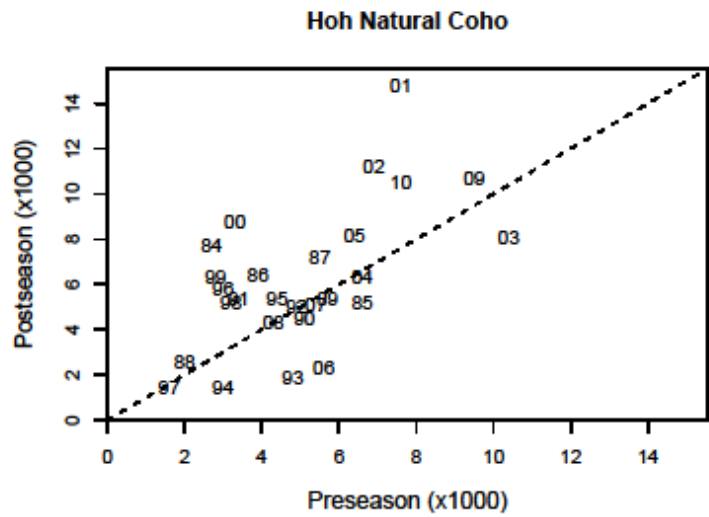
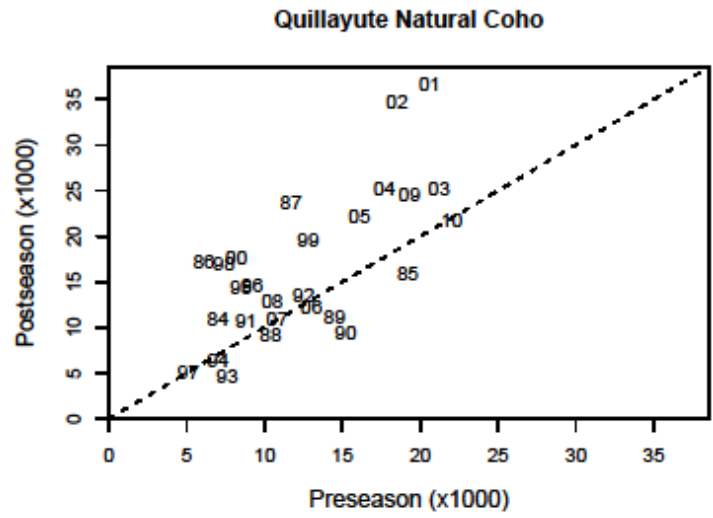
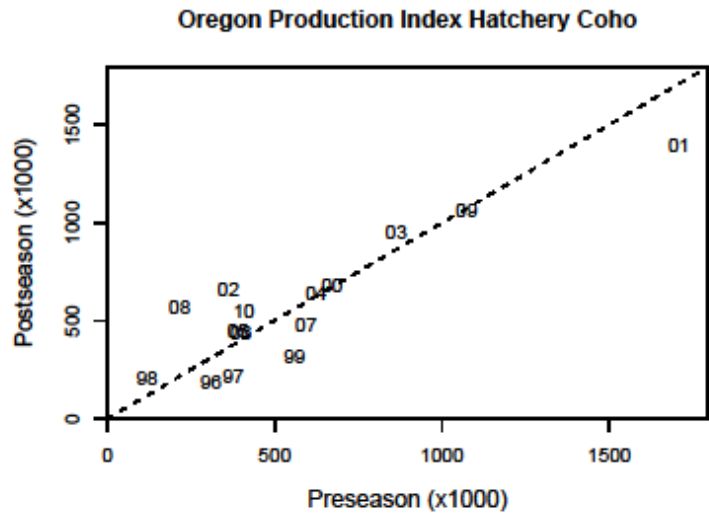


FIGURE I-2a. Selected preseason vs. postseason forecasts for coho stocks with significant contribution to Council area fisheries.

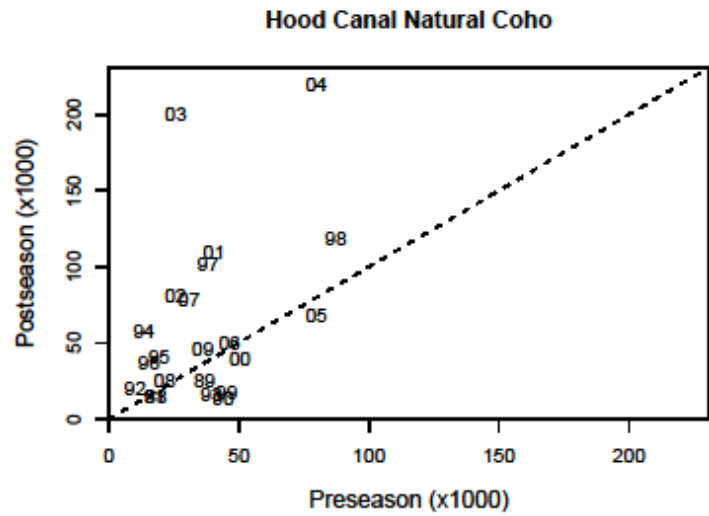
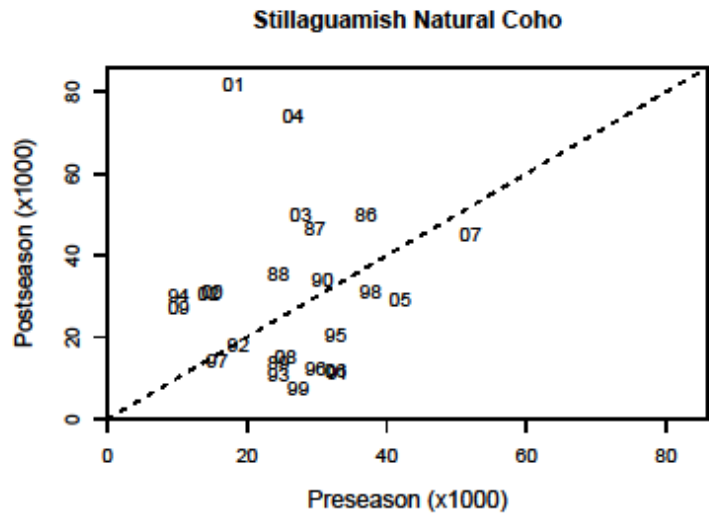
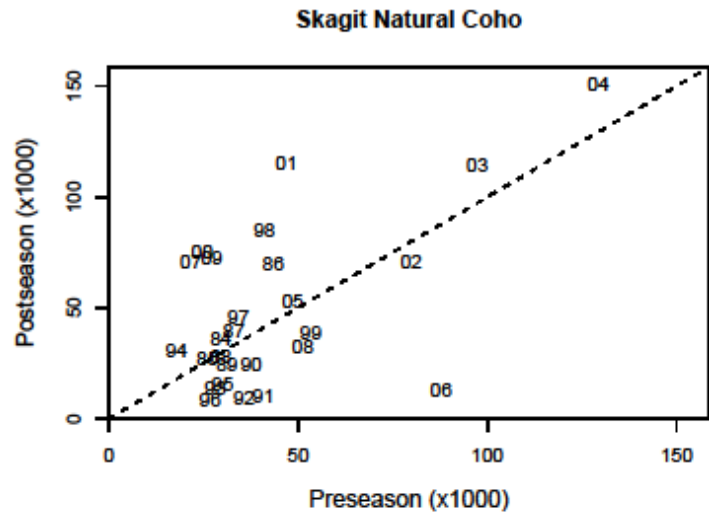
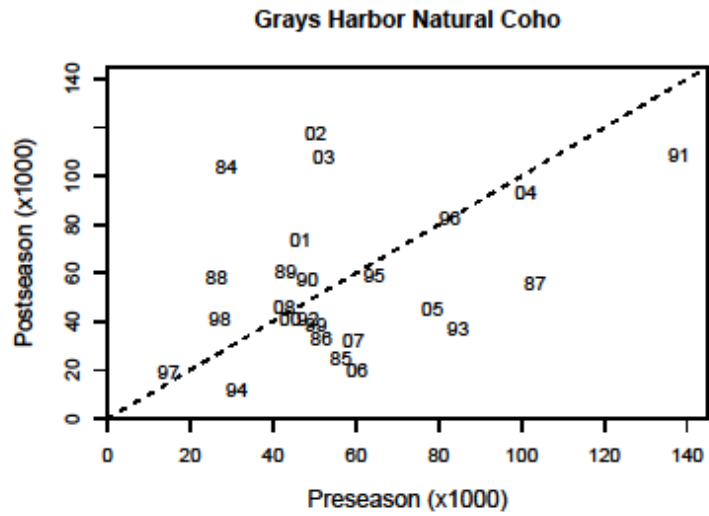


FIGURE I-2b. Selected preseason vs. postseason forecasts for coho stocks with significant contribution to Council area fisheries.