



Photo: Yurok Tribe



Photo: CDFG



Photo: FWS

Klamath Basin Fall-Run Chinook Salmon Stock Projection and Harvest Management



Photo: CDFG



Photo: CDFG



Photo: FWS

By
Joe Polos
USFWS



Photo: Yurok Tribe



Photo: CDFG

Trinity River Adaptive Management
Working Group
December 9, 2013
Weaverville, CA



Photo: Yurok Tribe

TRRP GOAL: Restore adult anadromous fish numbers to pre-Trinity River Dam levels in order to facilitate dependent tribal, commercial, and sport fisheries full participation in the benefits of restoration via enhanced harvest opportunities

TRRP Restoration Strategy Conceptual Model for Fishery Resource Restoration



Klamath Basin Anadromous Fishery Resources

- Fall-Run Chinook Salmon – only species/race with a comprehensive harvest mgt. plan
- Spring-Run Chinook Salmon
- Steelhead
- Coho Salmon
- Green Sturgeon
- Pacific Lamprey

Klamath Basin Fall-Run Chinook Harvest Management and Allocation Guidelines

- Klamath Basin Fall Chinook Salmon— Klamath, Trinity, and all tributary populations are managed as a single stock.
- Managed by harvest rate (ocean and inriver) to allow for a 33% brood escapement rate but must provide a minimum natural spawning escapement of 40,700 adults in all years.
- Allowable harvest is split 50/50 between tribal and non-tribal fisheries (Parravano vs. Babbit).
 - Tribal fisheries – Hoopa Valley and Yurok Tribe
 - Non-tribal fisheries – inriver recreation, ocean recreation, ocean commercial.
- Agencies manage fisheries within their jurisdictions to meet harvest objectives:
 - Quota fisheries – real-time monitoring and fisheries closed when quota is met.
 - Seasonal fisheries or time/area fisheries – harvest impacts based on historical fisheries and current stock size and allocation (effectiveness assessed post-season)

Klamath Basin Fall-Run Chinook Stock Assessment – Process

- Annual monitoring of harvest (ocean and inriver), natural spawning escapement, and hatchery returns.
 - Other data collected include recovery of Coded Wire Tags from ad-clipped fish to determine hatchery origin and scales to determine age composition.
- The inriver run data are compiled by the CDFW and the Klamath River Technical Team develop the annual age-specific run-size estimate.
- The inriver run data are used to estimate the ocean stock size in the following year using cohort reconstruction and sibling regression models.
- Ocean stock size estimates are used by the Pacific Fishery Management Council to develop ocean harvest seasons.
 - Options accommodate natural spawning escapement goals (usually), tribal harvest sharing (50/50) and inriver allocation share agreed to by non-tribal fishery managers.

MEGATABL E =

Klamath River Basin Fall Chinook Salmon Spawner Escapement, In-river Harvest and Run-size Estimates

Multi-agency data collection effort throughout the Klamath-Trinity Basin and data compiled by CDFW

SPAWNER ESCAPEMENT									
	2011			2012			2013		
	Grilse	Adults	Totals	Grilse	Adults	Totals	Grilse	Adults	Totals
Hatchery Spawners:									
Iron Gate Hatchery (IGH)	9,549	8,490	18,039	1,537	38,478	40,015			
Trinity River Hatchery (TRH)	1,875	13,847	15,722	92	17,461	17,553			
Hatchery Spawner Subtotals:	11,424	22,337	33,761	1,629	55,939	57,568	0	0	0
Natural Spawners:									
Main Stem Klamath River n/ (including OCH)									
Salmon River basin	3,270	3,933	7,203	1,501	14,802	16,303			
Scott River basin	1,819	3,674	5,493	829	3,561	4,390			
Shasta River basin	2,502	3,019	5,521	1,783	7,569	9,352			
Bogus Creek basin	11,175	213	11,388	1,944	27,593	29,537			
Misc. Klamath tributaries o/ (above Yurok Reservation)	2,303	2,919	5,222	839	11,792	12,631			
Yurok Reservation tribs. (Klamath River) p/	3,259	3,072	6,331	629	3,253	3,882			
Klamath Natural Spawner Subtotals:	24,746	17,973	42,719	7,931	69,331	77,262	0	0	0
Main Stem Trinity River dd/ (including TRH)									
Misc. Trinity tributaries o/ (above Hoopa Reservation)	36,913	27,718	64,631	7,650	51,851	59,501			
Hoopa Reservation tribs. (Trinity River) p/	96	542	638	77	520	597			
Trinity Natural Spawner Subtotals:	37,103	28,790	65,893	7,774	52,687	60,461	0	0	0
Natural Spawner Subtotals:	61,849	46,763	108,612	15,705	122,018	137,723	0	0	0
Total Spawner Escapement	73,273	69,100	142,373	17,334	177,957	195,291	0	0	0
IN-RIVER HARVEST									
	2011			2012			2013		
	Grilse	Adults	Totals	Grilse	Adults	Totals	Grilse	Adults	Totals
Angler Harvest									
Klamath River (below Hwy 101 bridge)	700	624	1,324	382	2,696	3,078			
Klamath River (Hwy 101 to Weitchpec)	6,557	912	7,469	3,183	5,174	8,357			
Klamath River (Weitchpec to IGH)	1,481	1,483	2,964	237	3,967	4,204			
Trinity River basin	1,243	1,128	2,371	56	1,737	1,793			
Angler Harvest Subtotals:	9,981	4,147	14,128	3,858	13,574	17,432	0	0	0
Tribal Harvest e/									
Klamath River (below Hwy 101 bridge)	429	17,218	17,647	73	93,516	93,589			
Klamath River (Hwy 101 to Trinity mouth)	467	4,272	4,739	59	3,815	3,874			
Trinity River (Hoopa Reservation)	426	4,863	5,289	55	4,145	4,200			
Tribal Harvest Subtotals:	1,322	26,353	27,675	187	101,476	101,663	0	0	0
Total In-river Harvest	11,303	30,500	41,803	4,045	115,050	119,095	0	0	0
IN-RIVER RUN									
	2011			2012			2013		
	Grilse	Adults	Totals	Grilse	Adults	Totals	Grilse	Adults	Totals
Totals:									
In-river Harvest and Escapement	84,576	99,600	184,176	21,379	293,007	314,386	0	0	0
Angling Mortality (2.04% of harvest) f/	204	83	288	79	277	356	0	0	0
Net Mortality (8.70% of harvest) f/	115	2,292	2,407	16	8,824	8,840	0	0	0
Catch and Release Mortality gg/									
Total In-river Run	84,895	101,977	186,872	21,474	302,108	323,582	0	0	0

Area Specific Klamath
Basin Fall Chinook Salmon
Age Composition –
Klamath River Technical
Team

Table 5. Age composition of the 2012 Klamath Basin fall Chinook run.

Escapement & Harvest	AGE				Total Adults	Total Run
	2	3	4	5		
Hatchery Spawners						
Iron Gate Hatchery (IGH)	1,537	36,485	1,992	0	38,478	40,015
Trinity River Hatchery (TRH)	92	14,965	2,494	2	17,461	17,553
Hatchery Spawner subtotal	1,629	51,450	4,486	2	55,939	57,568
Natural Spawners						
Salmon River Basin	829	2,633	925	4	3,561	4,390
Scott River Basin	1,783	5,608	1,938	23	7,569	9,352
Shasta River Basin	1,944	27,591	2	0	27,593	29,537
Bogus Creek Basin	839	11,390	403	0	11,792	12,631
Klamath River mainstem (IGH to Shasta R)	817	7,413	788	0	8,202	9,019
Klamath River mainstem (Shasta R to Indian Cr)	684	5,990	610	0	6,600	7,284
Klamath Tributaries (above Trinity River)	629	2,813	441	0	3,253	3,883
Blue Creek	406	329	393	39	761	1,167
Klamath Basin subtotal	7,931	63,767	5,500	66	69,333	77,263
Trinity River (mainstem above WCW)	7,562	38,697	12,422	134	51,253	58,815
Trinity River (mainstem below WCW)	88	452	145	2	598	686
Trinity Tributaries (above Reservation; below WCW)	77	393	126	1	520	597
Hoopa Reservation tributaries	47	239	77	1	316	363
Trinity Basin subtotal	7,774	39,781	12,770	138	52,689	60,461
Natural Spawners subtotal	15,705	103,548	18,270	204	122,022	137,724
Total Spawner Escapement	17,334	154,998	22,756	206	177,961	195,292
Recreational Harvest						
Klamath River (below Hwy 101 bridge)	382	2,132	539	25	2,696	3,078
Klamath River (Hwy 101 to Weitchpec)	3,183	4,512	633	30	5,174	8,357
Klamath River (Weitchpec to IGH)	237	3,820	147	0	3,967	4,204
Trinity River Basin (above WCW)	32	1,051	242	0	1,293	1,325
Trinity River Basin (below WCW)	24	359	85	0	444	468
Subtotals	3,858	11,874	1,646	55	13,574	17,432
Tribal Harvest						
Klamath River (below Hwy 101)	72	69,688	22,139	1,689	93,516	93,588
Klamath River (Hwy 101 to Trinity mouth)	59	2,433	1,274	108	3,815	3,874
Trinity River (Hoopa Reservation)	55	2,784	1,350	11	4,145	4,200
Subtotals	186	74,905	24,763	1,808	101,476	101,662
Total Harvest	4,044	86,779	26,409	1,863	115,050	119,094
Totals						
Harvest and Escapement	21,378	241,777	49,165	2,069	293,011	314,386
Recreational Angling Dropoff Mortality 2.04%	79	242	34	1	277	356
Tribal Net Dropoff Mortality 8.7%	16	6,513	2,153	158	8,824	8,840
Total River Run	21,473	248,532	51,352	2,225	302,109	323,582

Klamath Basin Fall Chinook Salmon Age Composition

– Klamath River Technical
Team

Klamath River Fall Chinook Salmon Age-Specific Escapement, River Harvest, and Run Size Estimates, 2012 Run

Klamath River Technical Team
27 February 2013

Summary

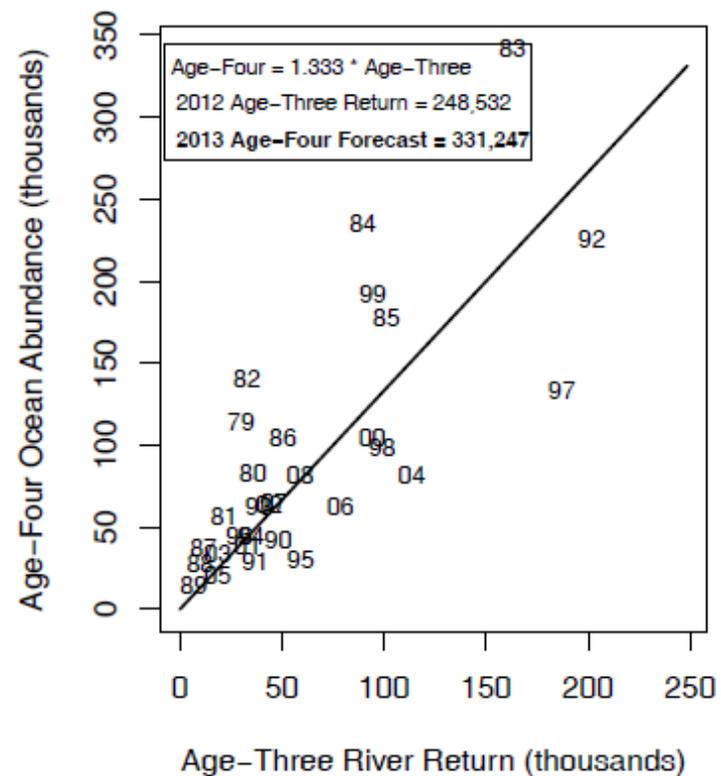
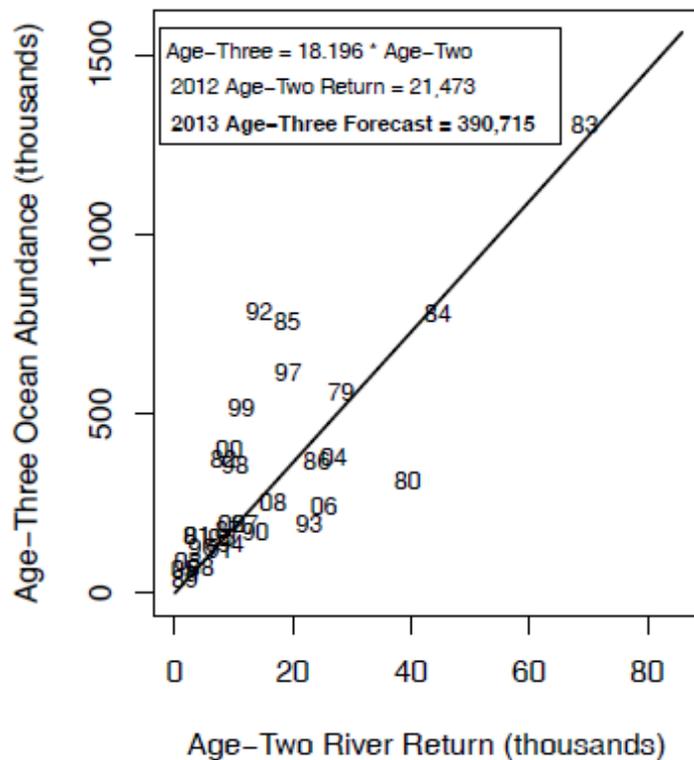
The number of Klamath River fall Chinook salmon returning to the Klamath River Basin (Basin) in 2012 was estimated to be:

Age	Run Size	
	Number	Proportion
2	21,473	0.07
3	248,532	0.77
4	51,352	0.16
5	2,225	0.01
Total	323,582	1.00

Preseason forecasts of the number of fall Chinook salmon adults returning to the Basin and the corresponding post-season estimates are:

Sector	Adults		
	Preseason Forecast	Postseason Estimate	Pre / Post
<i>Run Size</i>	381,000	302,100	1.26
<i>Fishery Mortality</i>			
Tribal Harvest	160,000	101,500	1.58
Recreational Harvest	67,600	13,600	4.97
Drop-off Mortality	15,300	9,100	1.68
	242,900	124,200	1.96
<i>Escapement</i>			
Hatchery Spawners	51,800	55,900	0.93
Natural Area Spawners	86,300	122,000	0.71
	138,100	177,900	0.78

Sibling (cohort) relationships used to estimate ocean stock size of Klamath Basin Fall-Run Chinook Salmon



Klamath Fall-
Run Chinook
Salmon
Allocation and
Management

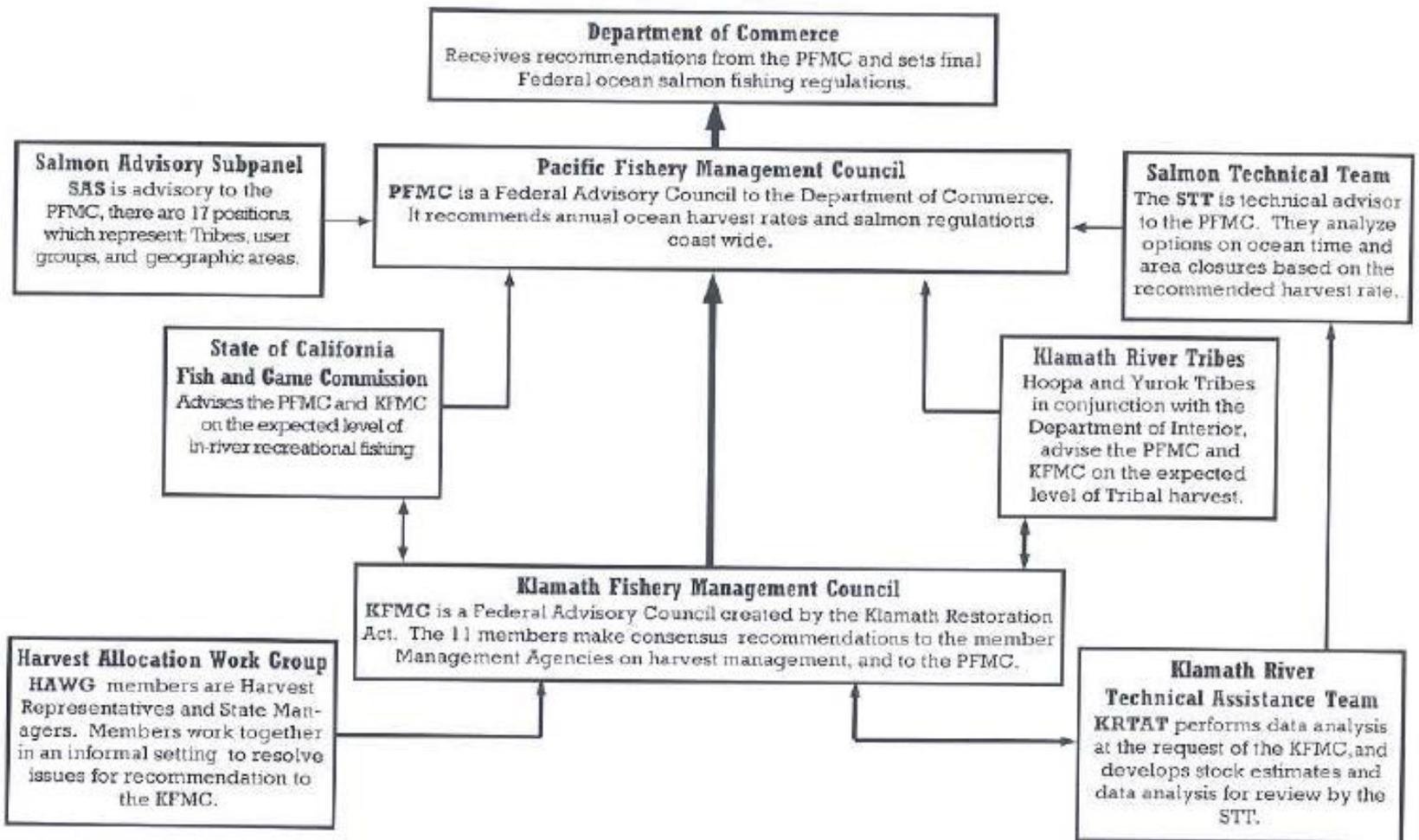
Klamath Salmon:

understanding allocation

Background, policy
of the procedures of the
harvest allocation process
for Klamath River Fall Chinook Salmon

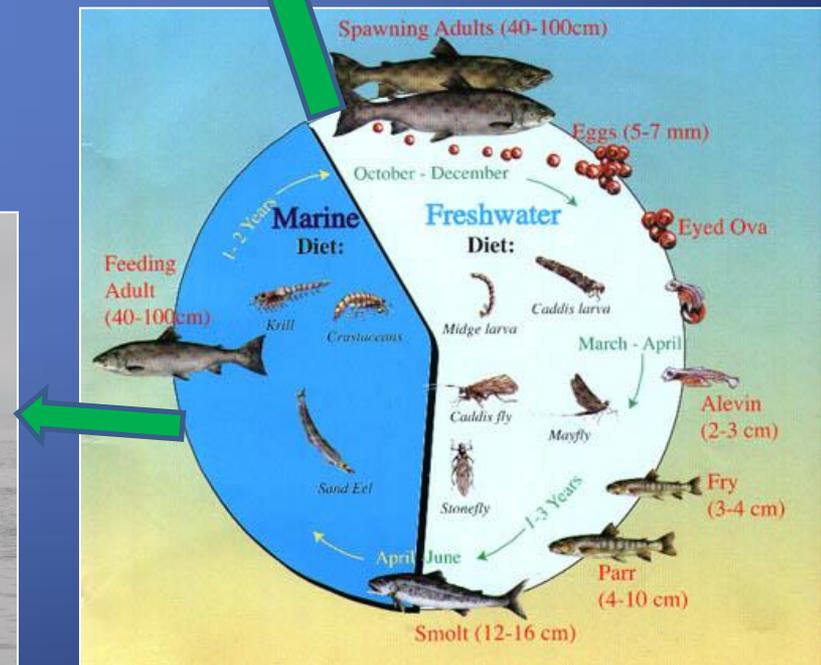
February 1998

OCEAN SALMON MANAGEMENT AND THE FEDERAL REGULATORY PROCESS

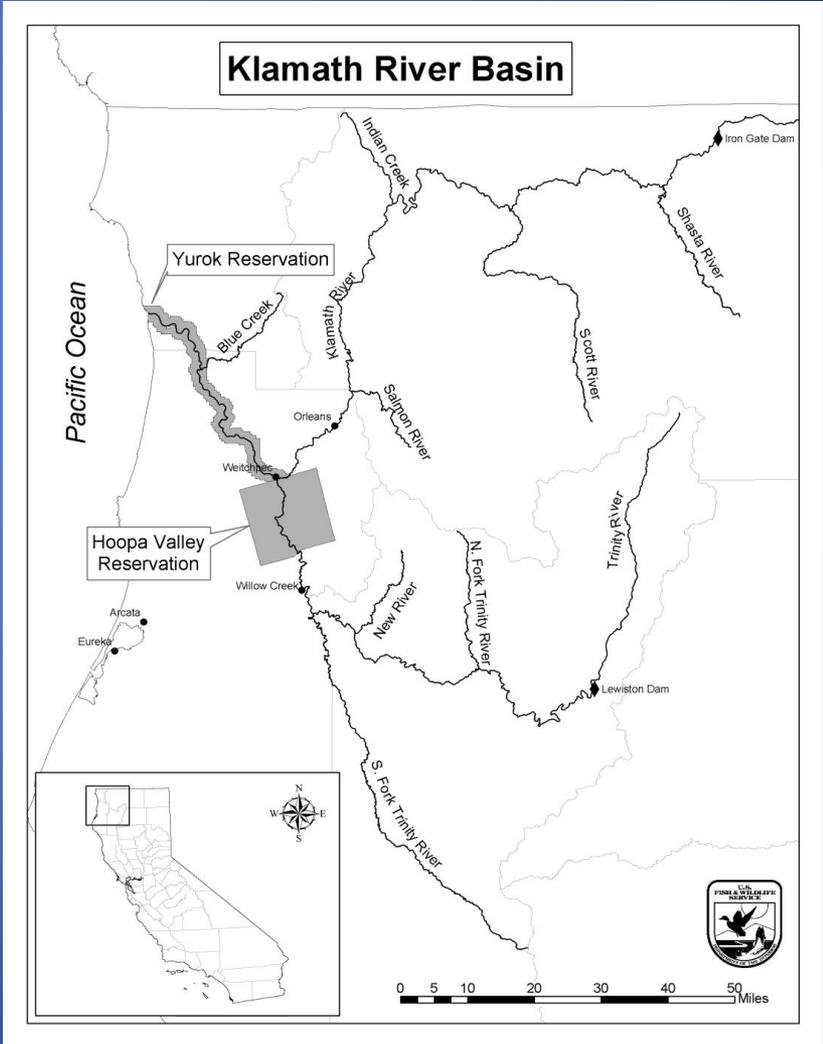
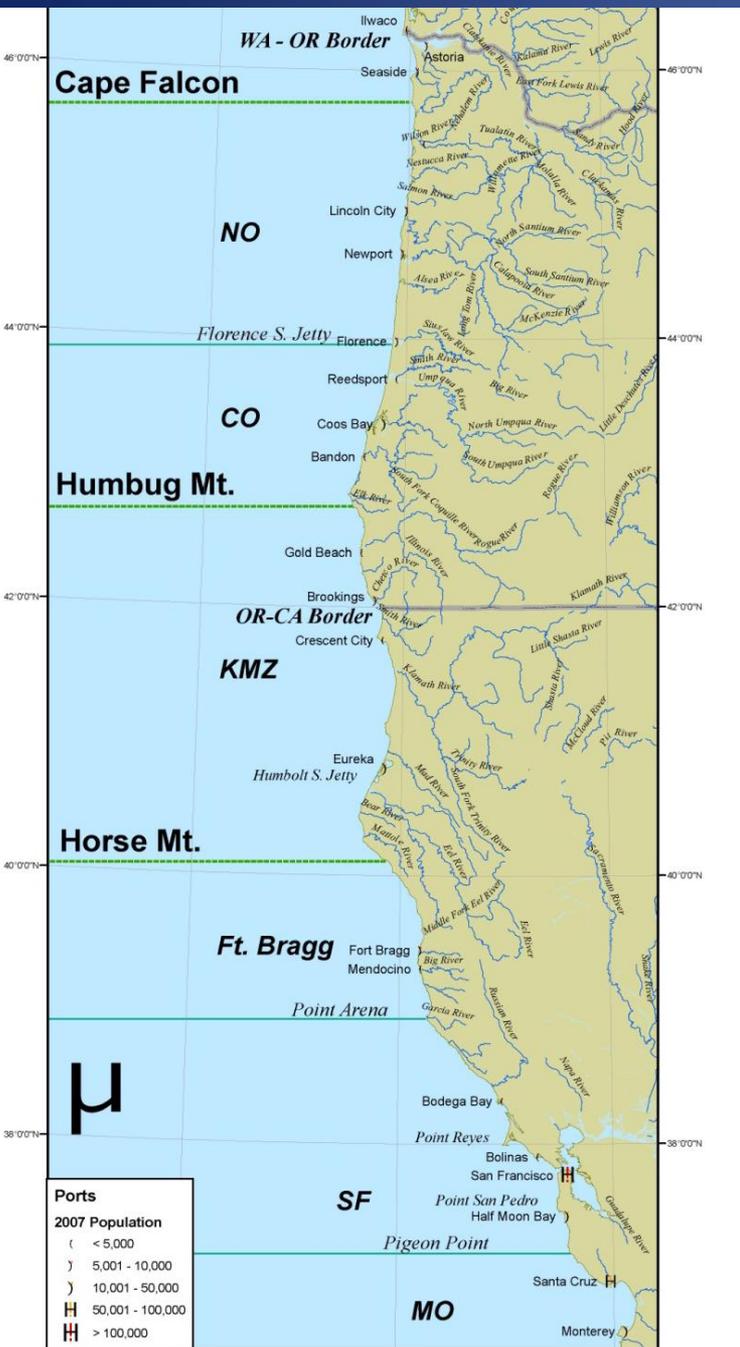


From: Pierce, R. 1998. Klamath Salmon: understanding allocation. Background, policy of the procedures of the harvest allocation process for Klamath River Fall Chinook Salmon.

Klamath Basin Fall-Run Chinook Salmon are harvested in the ocean and in the river



Areas Where Klamath Basin Fall Run Chinook Salmon are Harvested



Annual Fishery Allocation

Harvestable Surplus – number of fish above those needed to meet harvest rate management and minimum natural spawning escapement

Tribal and Non-Tribal Fishery Sharing – 50/50 sharing of harvestable surplus

Tribal Fisheries

Yurok Tribe

Hoop Valley Tribe

Lower Klamath below Weitchpec

Lower Trinity

Non-Tribal Fisheries

Ocean Recreational

Ocean Commercial

Inriver Recreational

Klamath Management Zone

California

Oregon

Trinity

Lower Klamath – below Weitchpec

Upper Klamath – Above Weitchpec

PFMC Salmon Management Documents – Review of previous years fisheries, stock abundance for current year

REVIEW OF 2012 OCEAN SALMON FISHERIES

Stock Assessment and Fishery Evaluation Document
for the Pacific Coast Salmon Fishery Management Plan



Pacific Fishery Management Council
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Portland, OR 97220-1384
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www.pcouncil.org

FEBRUARY 2013

PRESEASON REPORT I STOCK ABUNDANCE ANALYSIS AND ENVIRONMENTAL ASSESSMENT PART 1 FOR 2013 OCEAN SALMON FISHERY REGULATIONS

REGULATION IDENTIFIER NUMBER 0648-XC438



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FEBRUARY 2013

PFMC Salmon Management Documents – Proposed Alternatives and Adopted Season for current year

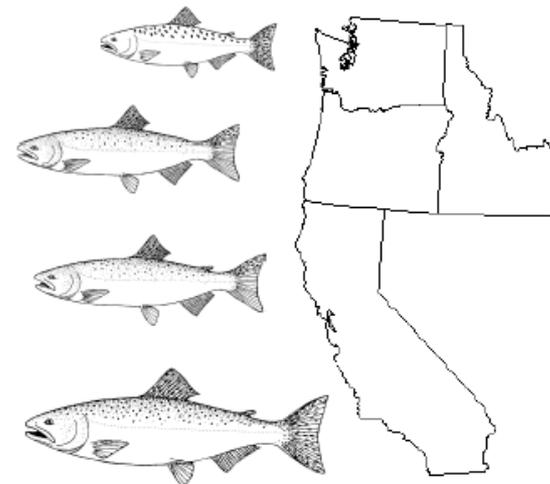
PRESEASON REPORT II PROPOSED ALTERNATIVES AND ENVIRONMENTAL ASSESSMENT PART 2 FOR 2013 OCEAN SALMON FISHERY REGULATIONS REGULATION IDENTIFIER NUMBER 0648-XC438



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www.pcouncil.org

MARCH 2013

PRESEASON REPORT III COUNCIL ADOPTED MANAGEMENT MEASURES AND ENVIRONMENTAL ASSESSMENT PART 3 FOR 2013 OCEAN SALMON FISHERY REGULATIONS REGULATION IDENTIFIER NUMBER 0648-XC438



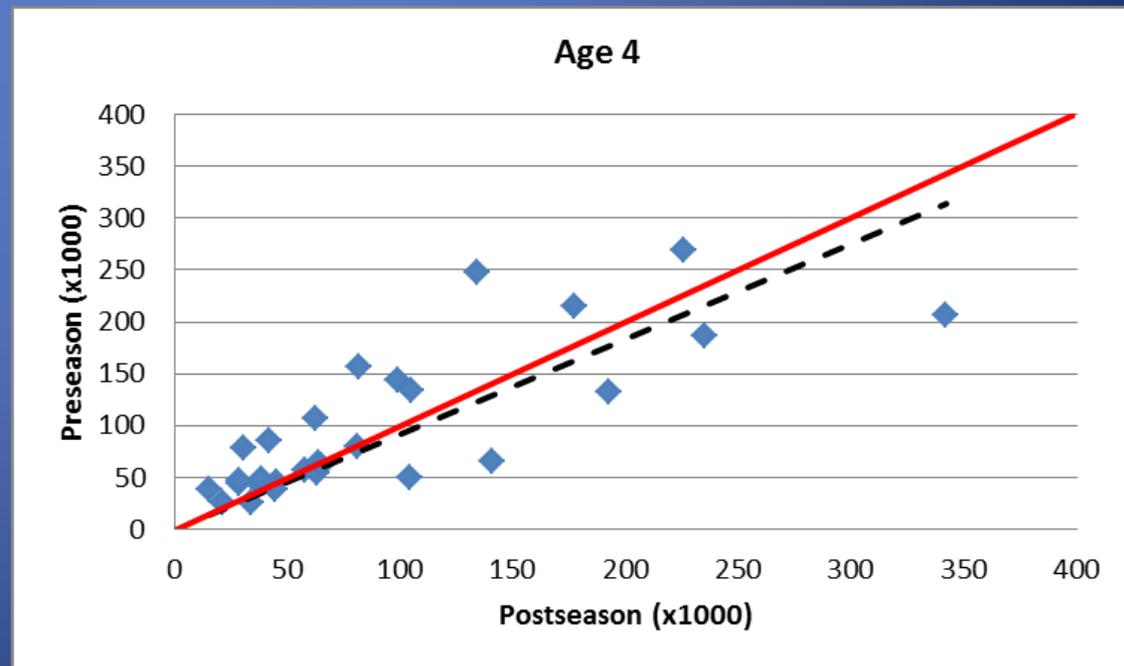
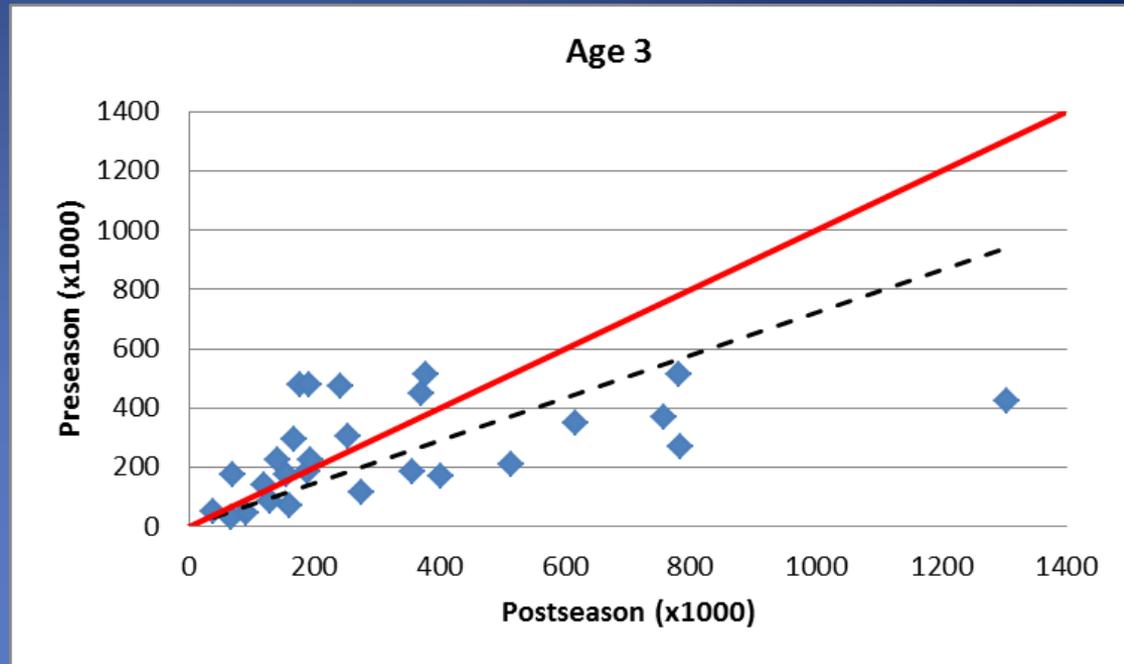
Pacific Fishery Management Council
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Portland, OR 97220-1384
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APRIL 2013

Management Entities

- Agencies with harvest management and law enforcement responsibilities for Klamath Basin Fall Chinook Salmon (as well as other harvest).
- Ocean:
 - National Marine Fisheries Service - Federal Waters (3-200 miles) -
 - Oregon and California Fish and Wildlife/Game Agencies - State Waters (0-3 miles)
- Inriver:
 - California Fish and Game Commission and CDFW - Inriver Recreational
 - Hoopa Valley Tribe
 - Yurok Tribe

Preseason Projection vs. Postseason Estimate for Age 3 and Age 4 Klamath Basin Fall-Run Chinook Salmon in the Ocean



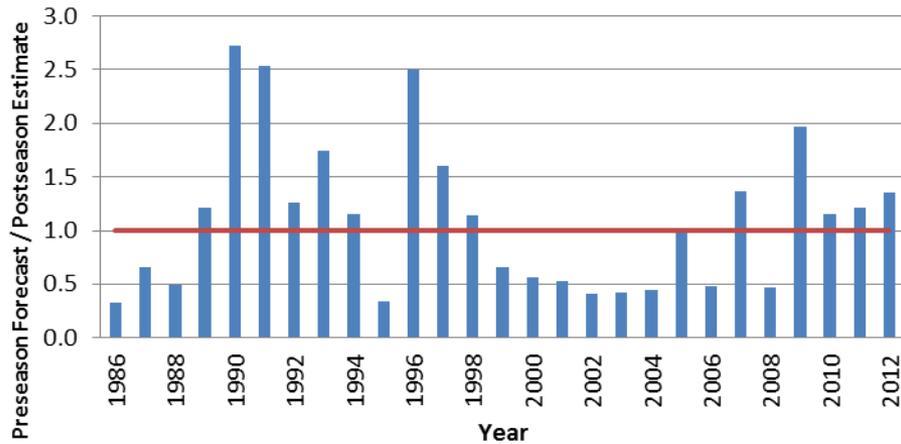
Dashed line is regression relationship

Solid red line is 1-1 relationship.

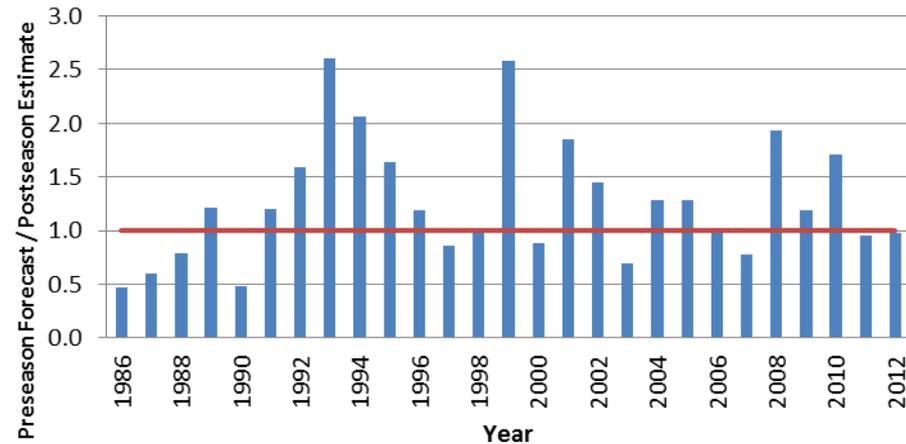
Data from 1985-2011.

Preseason Projection/Postseason Estimate for Age 3 and Age 4 Klamath Basin Fall-Run Chinook Salmon in the Ocean

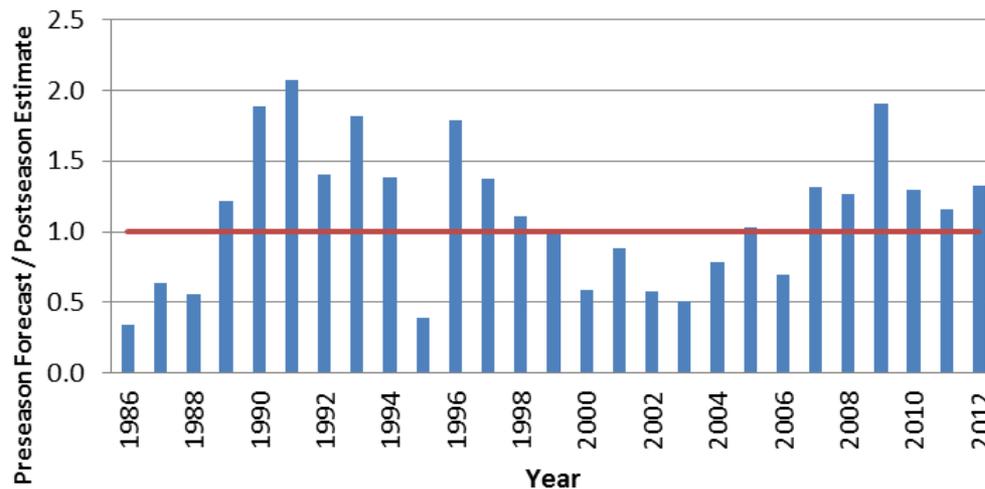
Age 3 in Ocean



Age 4 in Ocean

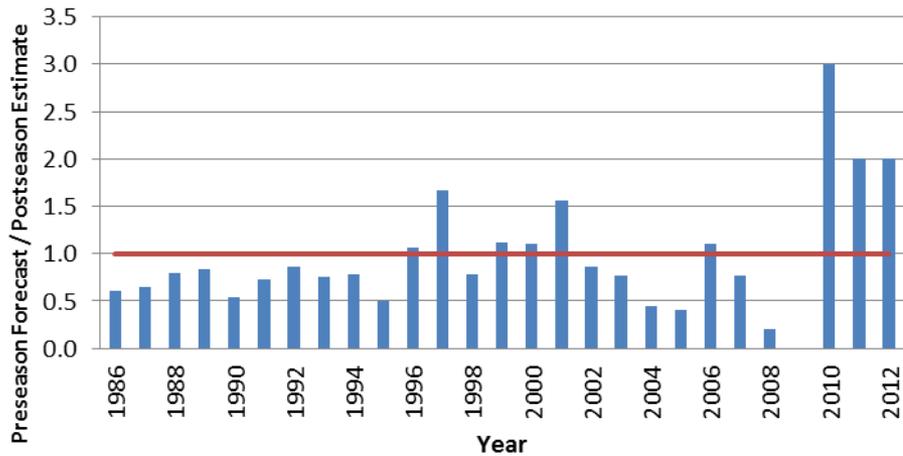


Age 3+4 in Ocean

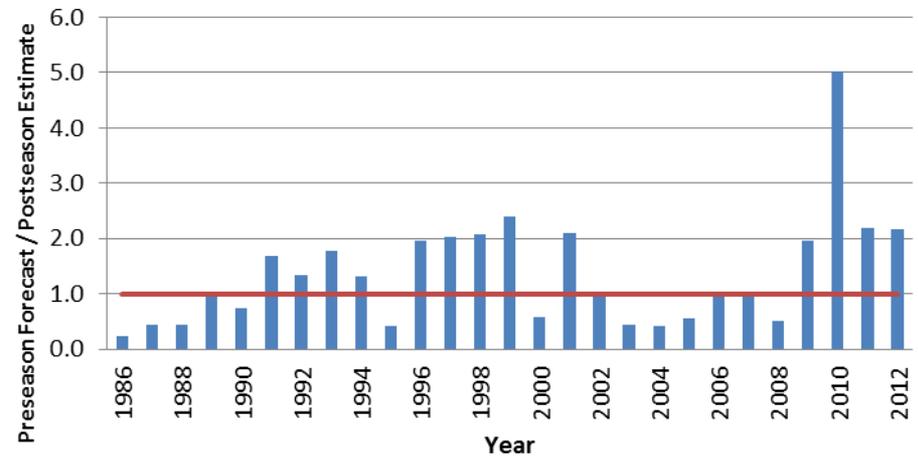


Preseason Projection/Postseason Estimate for Age 4 Ocean Harvest Rate and Ocean Harvest of Klamath Basin Fall-Run Chinook Salmon

Ocean Harvest Rate

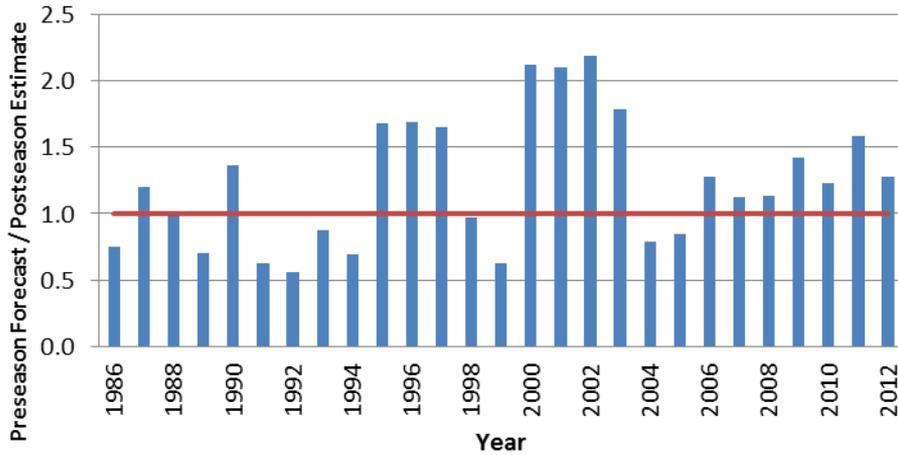


Ocean Harvest

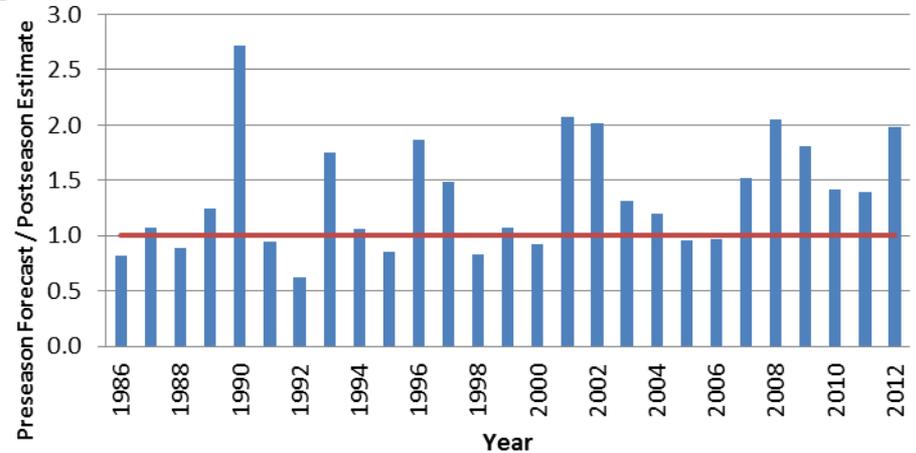


Preseason Projection/Postseason Estimate for Age 4 Inriver Harvest Rate and Inriver Adult Harvest of Klamath Basin Fall-Run Chinook Salmon

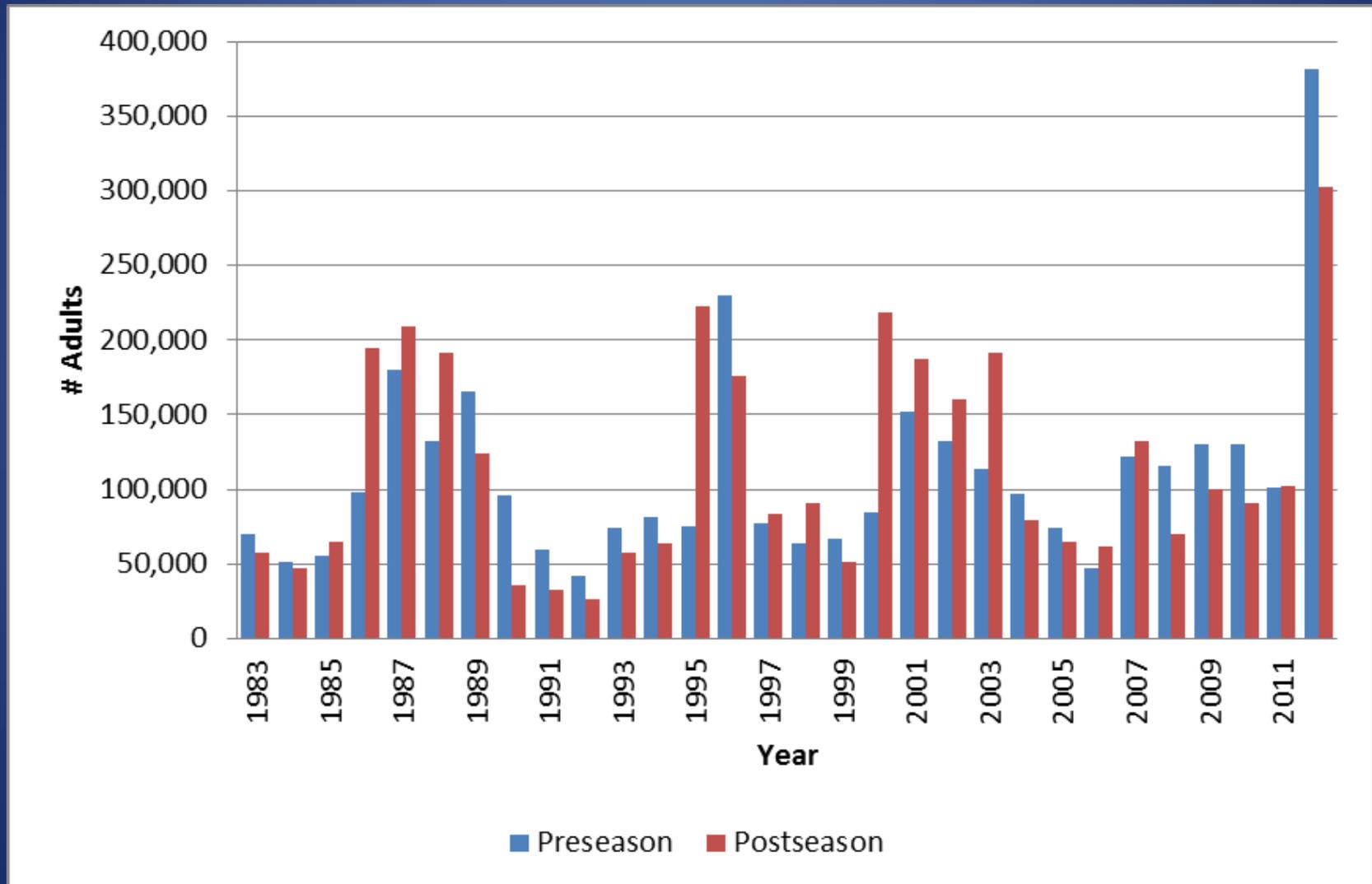
River Harvest Rate



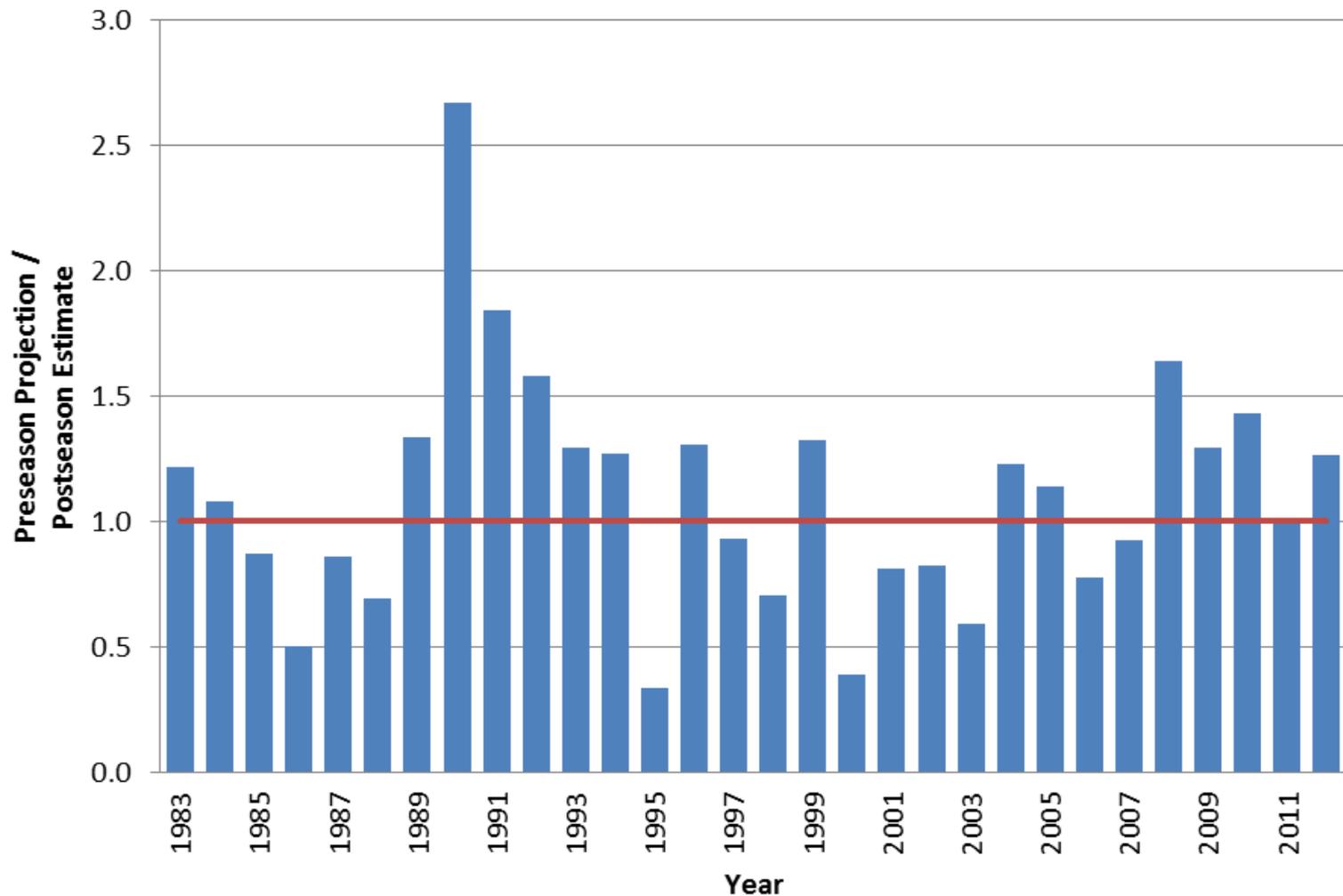
River Harvest



Klamath Basin Adult Fall-Run Chinook Salmon Preseason Projection and Postseason Estimate, 1983-2012



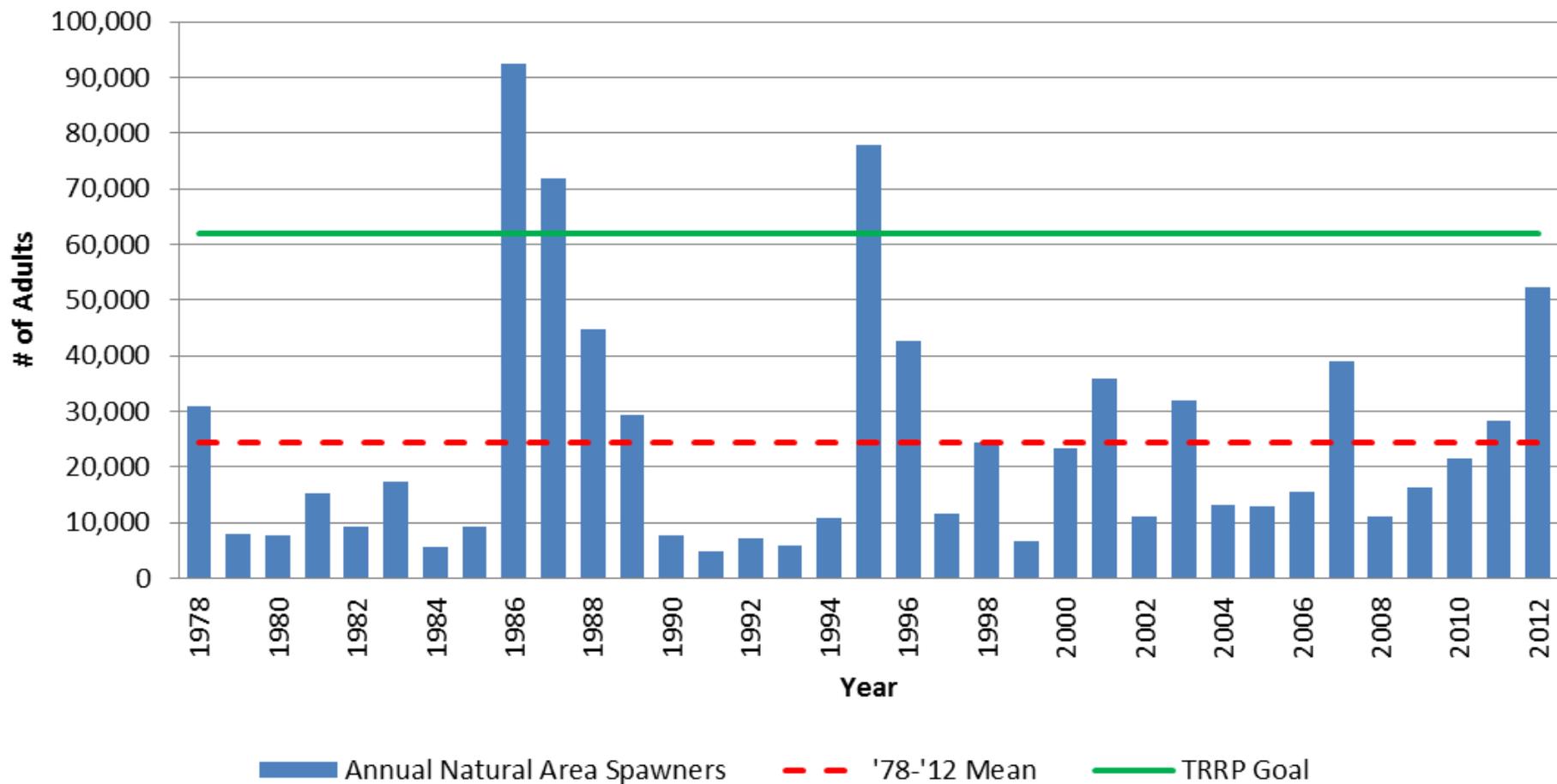
Klamath Basin Adult Fall-Run Chinook Salmon Preseason Projection / Postseason Estimate, 1983-2012



Factors that Contribute to Errors in Inriver Runsize and Spawning Estimates

- Variability in regression relationship
 - Natural variability in survival, maturity, and recruitment
 - Errors of estimation – statistical error
- Errors in fishery impact estimates
- Combination of projection errors and fishery impact errors.
- Others???

Trinity River Basin Adult Fall-run Chinook Salmon Natural Area Spawning Escapement



Very Preliminary Snapshots of Klamath and Trinity Chinook Salmon Inriver Run Data for 2013

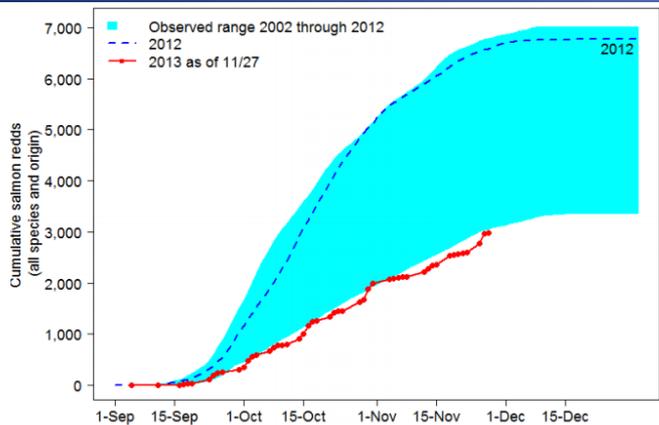
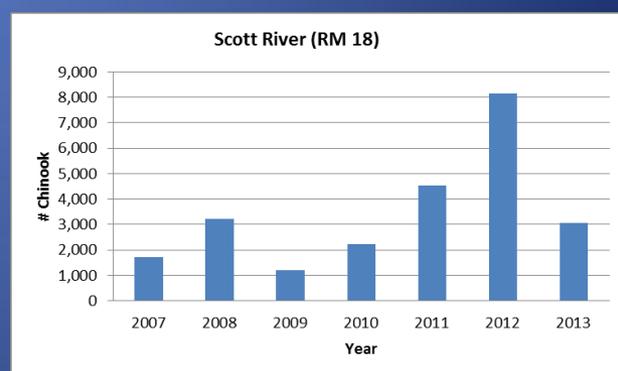
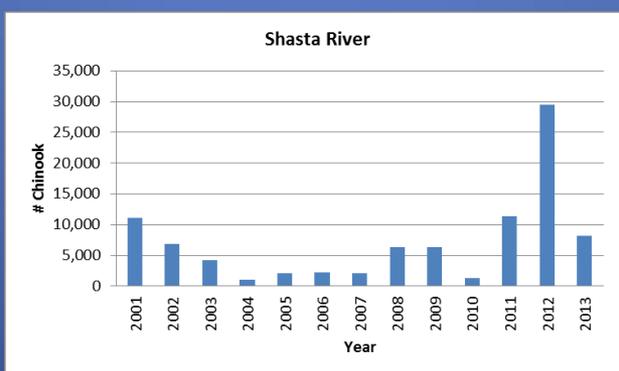
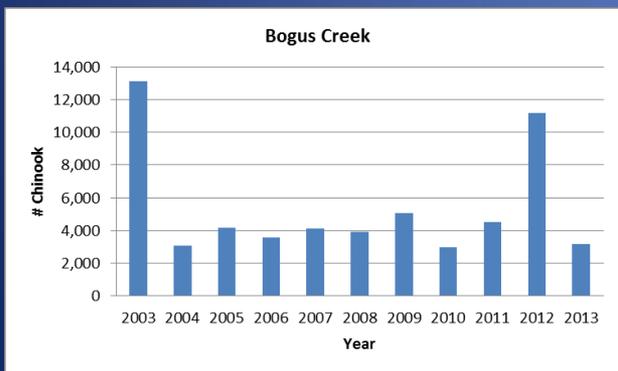
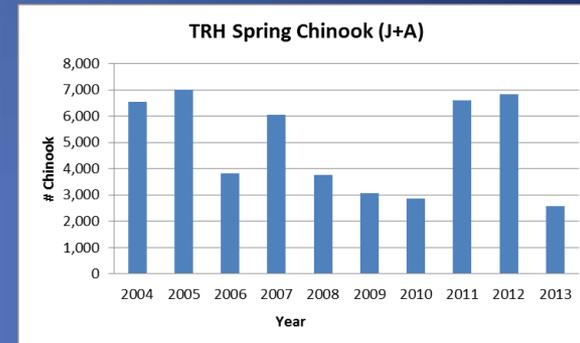
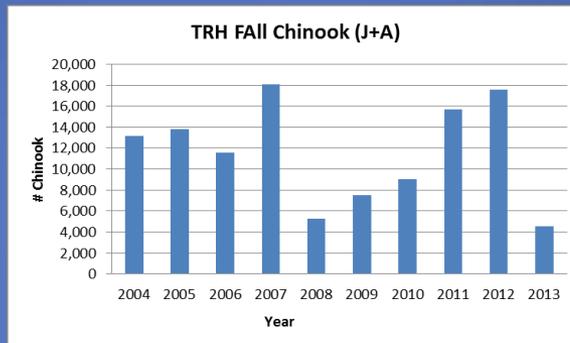


Figure 2. Comparison of fall 2013 cumulative Trinity River mainstem redd counts reaches 1 to 10 as of 11/27/2013 to counts in 2012 and the range of years 2002-2012 (reach 8 excluded).



Management Entities

- Agencies with harvest management and law enforcement responsibilities for Klamath Basin Fall Chinook Salmon (as well as other harvest).
- Ocean:
 - National Marine Fisheries Service - Federal Waters (3-200 miles) -
 - Oregon and California Fish and Wildlife/Game Agencies - State Waters (0-3 miles)
- Inriver:
 - California Fish and Game Commission and CDFW - Inriver Recreational
 - Hoopa Valley Tribe
 - Yurok Tribe



Some fishermen casting for Chinook salmon at Klamath River mouth



QUESTIONS??



The Sportsmen's Catch, Aug. 31, 1942 at Klamath River Mouth was 250 Chinook Salmon, as shown - 2190-1985

~ 32 pounder.

Being packed at Paul's Sportsmen's Cannery, Klamath, Calif.

