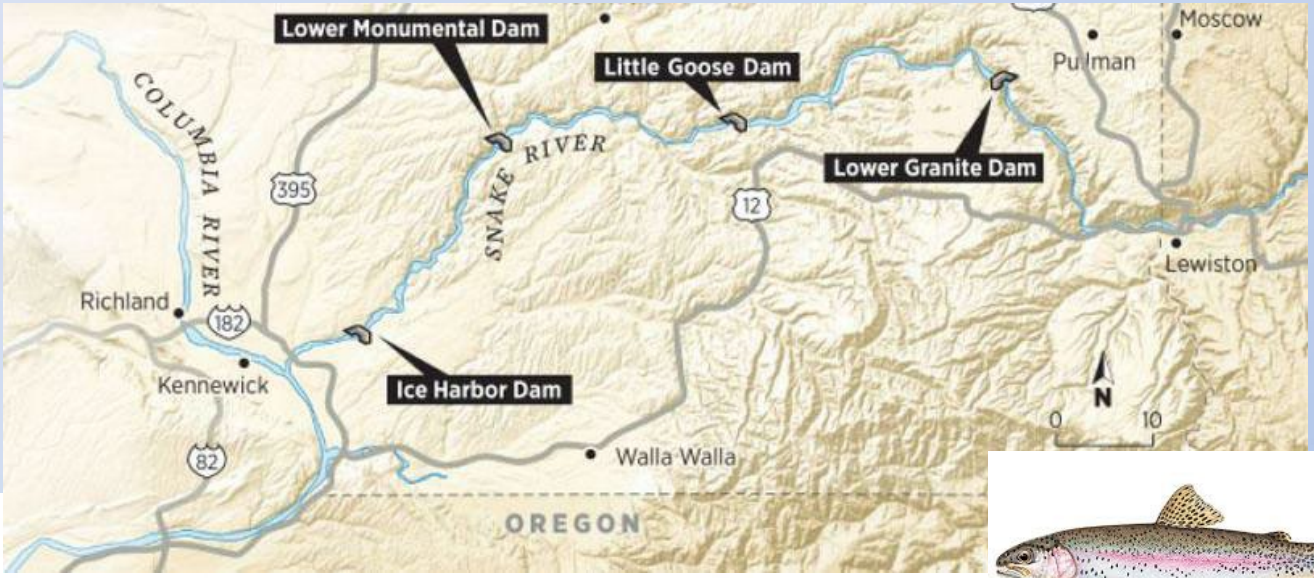
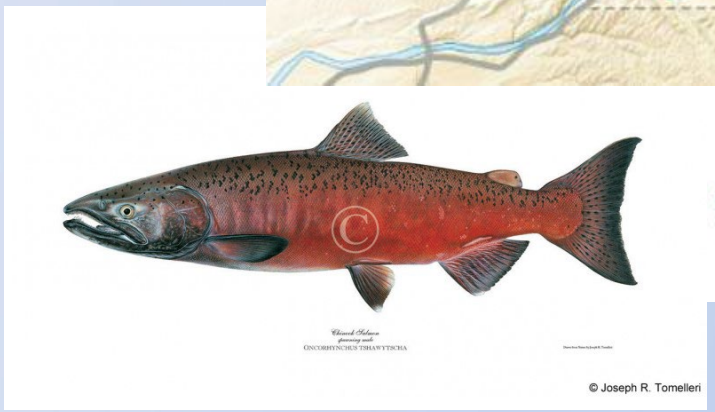
Lower Snake River Compensation Plan
Program Implementation, Execution and Performance



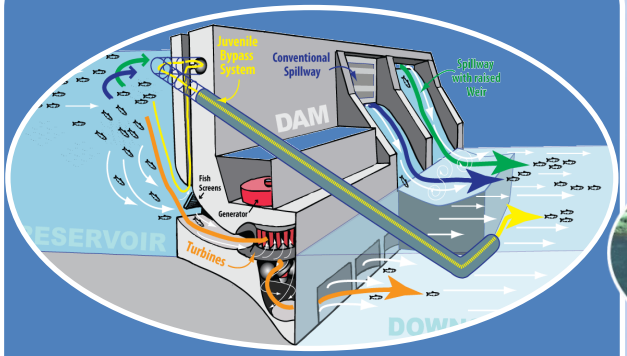


Rod Engle USFWS-LSRCP

History

Escapement

- Adult Estimates Pre-Dams
  - Sp/Su Chinook = 122,000
  - Steelhead = 114,800
  - Fall Chinook = 37,700*



Hydrosystem Loss

- Construction/Operations
- 48% loss
- Project Area goals

Harvest/Habitat Loss

- Habitat (spawning)
- Harvest
  - Varies by species
  - 2:1 Steelhead
  - 4:1 Chinook

Spring Chinook Total Adults = 58,700 + (176,100 + 58,700) = 293,500

LSRCP Program Goals and Harvest Objectives

Species	Project Area Goals	Coastwide Harvest Objectives	Total Adults (Goals + Objectives)
Fall Chinook	18,300	73,200	91,500
Spring/Summer Chinook	58,700	234,800	293,500
Steelhead	55,100	110,200	165,300
Rainbow Trout	86,000 pounds stocked		

LSRCP Program Goals

Table 3. Commercial Landings and Sport Fishing Use, With and Without Compensation 1/ in Columbia River System and Pacific Ocean (Anadromous Species) and in Lower Snake River Project Area (Resident Species)

Areas and Species	Commercial Fisheries									Sport Fisheries 4/		
	With Compensation			Without Compensation			Difference					
		Landings			Landings			Landings				
	Escapement	Pounds	Value	Escapement	Pounds	Value	Escapement	Pounds	Value	W/Comp. Ang.days	WO/Comp. Ang.days	Diff. Ang.days
Columbia R. System, Ocean												
Fall chinook 2/	66,300	3,381,000	$1,893,000	31,900	1,627,000	$911,000	34,400	1,754,000	$982,000	332,000	160,000	172,000
Spring and summer chinook 2/	122,200	6,232,000	3,490,000	63,500	3,238,000	1,813,000	58,700	2,994,000	1,677,000	611,000	318,000	293,000
Steelhead 3/	114,800	692,000	208,000	59,700	360,000	108,000	55,100	332,000	100,000	763,000	397,000	366,000
Totals	303,300	10,305,000	$5,591,000	155,100	5,225,000	$2,832,000	148,200	5,080,000	$2,759,000	1,706,000	875,000	831,000
L. Snake Project Area												
Resident										250,000	205,000	45,000

1/ ~~Insofar as possible "with compensation" is intended to reflect the preproject condition.~~

2/ Calculations based on catch to escapement ratio of 4:1 (commercial catch 3:1 and sport catch 1:1) average weight per fish of 17 lbs.; and commercial value of $0.56 per pound.

3/ Calculations based on catch to escapement ratio of 2:1 (commercial catch 0.67:1 and sport catch 1.33:1); average weight per fish of 9 lbs.; and commercial value of $0.30 per pound.

4/ Angler-days for anadromous fish are based on catch to escapement ratios (footnotes 2 and 3) and an estimated 5 days of effort per fish (the value of an angler-day for anadromous fish is $6.00).
Angler-days for resident fish are based on creel studies of Washington Department of Game and the ratio of 3 reservoir angler-days to 2 stream angler-days.

NMFS and USFWS 1973 – Appendix A of COE Special Report 1975.

Table 1. Computation of Lower Snake River Compensation Measures from COE (1975) and modified from Herrig (1990) to include trout. Year, or years, of maximum counts at McNary Dam between 1954-67 are provided in parentheses. Trout mitigation was specific to the State of Washington for lost fishing opportunity due to inundation from the projects. A higher percent passage (68%) for fall Chinook salmon was observed during the passage period but was discounted by the fisheries agencies (Herrig 1990).

	Fall Chinook Salmon (1958)	Spring-Summer Chinook Salmon (1957)	Steelhead Trout (1962-63)	Trout
McNary Dam Count	97,500	222,100	172,600	
Ice Harbor Dam Maximum Percent Passage (1962-67)	33.5%	55%	66.5%	
Estimated Snake River Pre-Project Run	32,663	122,200	114,800	
Lower Snake River Compensation Goals	18,300	58,700	55,100	86,000 pounds into local waters (WA-79,800, ID-6,200).

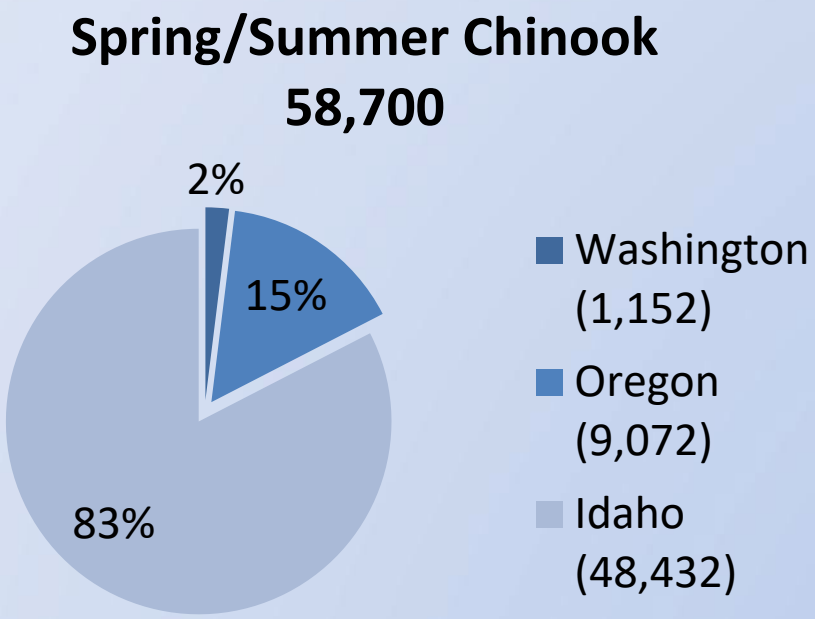
Table 2. Distribution of salmon and steelhead requiring hatchery compensation by the Columbia Basin Fisheries Technical Committee's Lower Snake Hatchery Subcommittee in 1974 (WDFW 1974). Values were derived by multiplying 48% loss rate to estimated run escapements developed within the U.S. Army COE Special Report (COE 1975) except for fall Chinook salmon. Rounding errors with the LSRCP goals were acknowledged by the subcommittee.

Area	Fall Chinook salmon	Spring-Summer Chinook salmon	Steelhead
Snake River			
Below Lewiston	5,000		
Lewiston to China Gardens	3,580		2,208
China Gardens to Pleasant Valley	1,689		
Pleasant Valley to Hells Canyon	4,459		
Hells Canyon Dam Fish Facilities	3,648	1,200	2,736
Tucannon River		1,152	1,632
Clearwater River	68	288	20,736
Asotin Creek			816
Grande Ronde River		5,856	7,632
Salmon River		46,656	16,896
Imnaha River	68	3,216	1,920
Small Tributaries		288	528
Totals	**18,512**	**58,656**	**55,104**

Table 3. Allocation of compensation (adults) by State as suggested by Columbia Basin Fisheries Technical Committee (reproduced from WDFW 1974). This allocation was not to be used as a specific indicator of release sites.

	Washington			Oregon		Idaho	
Area or Basin	Spring Chinook salmon	Fall Chinook salmon	Steelhead	Spring Chinook salmon	Steelhead	Spring-Summer Chinook	Steelhead
Snake River							
Below Lewiston		5,000					
Lewiston – Hells Canyon		9,728	2,208				
Hells Canyon Dam		3,648			1,368	1,200	1,368
Tucannon River	1,152		1,632				
Clearwater River		68				288	20,736
Asotin Creek			816				
Grande Ronde River				5,856	7,632		
Salmon River						46,656	16,896
Imnaha River		68		3,216	1,920		
Small Tributaries					264	288	264
Totals	**1,152**	**18,512**	**4,656**	**9,072**	**11,184**	**48,432**	**39,264**

"...in place, in kind..."



- Hatchery programs originally sized and implemented with a 0.87 SAR (Project Area)
  - In-kind.
- Programs placed in specific locations
  - In-place
- Meet SAR of 0.87…. meet the LSRCP goal for in-place, in-kind.

“...in place, in kind...”

In terms of achieving goals, we have two constants to consider:

- The adult goals are firm -- but do they all need to be hatchery-reared fish? What part should supplementation play in returning adults.

- We have a fixed amount of hatchery rearing space authorized for construction, how flexible can/should we be in reallocating the space among the species and runs?

Ultimately, the question is will the flexibility we do have in the program allow us to achieve our goals of replacing the lost fish and fisheries?

Herrig 1991.

LSRCP Changes to Meet Goals?

- 0.87 SAR is not the standard for every LSRCP program.
  - Performance has differed over 40 years (stock, release sites, program type).
  - Production has been added.
- 58,700 to LSRCP project area remains the primary goal… and coastwide harvest objective is secondary.
  - Slight change from last review/symposium.
- In place mitigation has evolved since program inception….

- Large shift in production from Salmon to Clearwater basin.
  - Why?
- Further refinements of programs to achieve cooperator desires, ESA.
  - Fishing, flexibility.
- Since last review (2010), approximately 2.815 M smolt production has been added to address goals.

LSRCP Programs				
Basin	Facility	Location	Current Production	Basin Adult Goal
Upper Salmon	McCall	South Fork Salmon	1,000,000	8,000
Upper Salmon	Sawtooth	Sawtooth Weir	1,700,000	19,445
Upper Salmon	Sawtooth	*Yankee Fork*	*300,000*	
		Basin Total	**3,000,000**	**27,445**
Clearwater	Clearwater	North Fork Clearwate	709,000	9,867
Clearwater	Clearwater	Clear Creek	720,000	
Clearwater	Clearwater	Lower Selway	400,000	
Clearwater	Clearwater	Red River	1,280,000	
Clearwater	Clearwater	Lochsa	640,000	2,033
Clearwater	Dworshak	North Fork Clearwate	1,650,000	9,135
Clearwater	Dworshak/NPTH	Lapwai	180,000	
		Basin Total	**5,579,000**	**21,035**
Southeast Washington	Lyons Ferry/Tucan	Tucannon	225,000	1,152
Southeast Washington	Lyons Ferry/Tucan	Touchet	250,000	
		Basin Total	**475,000**	**1,152**
Northeast Oregon	Lookingglass	Catherine	150,000	970
Northeast Oregon	Lookingglass	Lostine	250,000	1,617
Northeast Oregon	Lookingglass	Upper Grande Ronde	250,000	1,617
Northeast Oregon	Lookingglass	Lookinglass Creek	250,000	1,617
Northeast Oregon	Lookingglass	Imnaha River	490,000	3,210
		Basin Total	**1,390,000**	**9,031**
		Totals	**10,444,000**	**58,700**
				(rounded)

Changes Since 2010 – Idaho Basins

- Clearwater Basin
  - BY2012, +360K
    - DNFH Density study
  - BY2013,+200K
    - CFH 200K, Lochsa River Summers
  - BY2014, +780K total
    - 600K CFH – North Fork
    - 180K DNFH-Lolo Creek
  - BY2015, +180K total
    - 180K DNFH-North Fork
  - BY2019, +614K total
    - Lochsa, NF and SF changes
  - BY20, convert Selway parr to DNFH smolts (NC)
  - Total increase in Clearwater basin is ~2.135 M
  - Brood stock and releases…..
- Salmon River Basin
  - Goal increased from 1.7 M to 2.0 M for Sawtooth FH
  - Release numbers have not met target in recent years.
    - Broodstock limitations

Changes Since 2010 – OR/WA Basins

- NE Oregon
  - BY2014, 130K
    - Imnaha River release increased from 360K to 490K
    - Release numbers have met targets and collections have followed sliding scale outlined in permitting.
- SE Washington
  - Touchet Program Implementation (250K)
    - BY2018, 250K
    - First adult returns this year (2022).

2022 Spring/Summer Chinook Smolt Release Targets

LSRCP Facility	Run-Life Stage	Stock	Release Site or Location	Release Target	
McCall	Summer-Yearling	SFSR	South Fork Salmon River, Knox Bridge	1,000,000	3.0M
Sawtooth	Summer-Yearling	Sawtooth	Salmon River, Sawtooth Weir	1,700,000	
Sawtooth	Summer-Yearling	Sawtooth	Yankee Fork, Salmon River	300,000	
Clearwater	Spring-Yearling	North Fork (DWOR)	North Fork Clearwater River	709,000	5.58 M
Clearwater	Spring-Yearling	Clear Cr	Kooskia Hatchery, Clear Ck.	720,000	
Clearwater	Summer-Yearling	Powell	Lower Selway River	400,000	
Clearwater	Spring-Yearling	SF Clearwater	SF Clearwater River, Red River	1,280,000	
Clearwater	Summer-Yearling	Powell/SFSR	Powell Satellite, Lochsa River	640,000	
Dworshak	Spring-Yearling	North Fork (DWOR)	Lapwai Creek	180,000	
Dworshak	Spring-Yearling	North Fork (DWOR)	North Fork Clearwater River	1,650,000	
Lookingglass	Spring-Yearling	Catherine CK	Catherine CK	150,000	1.39M
Lookingglass	Spring-Yearling	Lostine	Lostine River	250,000	
Lookingglass	Spring-Yearling	Up Grande Ronde	Grande Ronde River	250,000	
Lookingglass	Spring-Yearling	Lookingglass	Lookingglass Ck	250,000	
Lookingglass	Summer-Yearling	Imnaha	Imnaha River (Direct)	210,000	
Lookingglass	Summer-Yearling	Imnaha	Imnaha River (Acclimated)	280,000	
Lyons Ferry	Spring-Yearling	Tucannon	Tucannon River	225,000	475 K
Lyons Ferry	Spring-Yearling	Walla Walla/Carson	Touchet River	250,000	
			Total	**10,445,000**	

With SF Salmon River Egg Box Program, Total LSRCP Production 10,745,000

Spring/Summer Chinook Example

Project Area SAR	LSRCP Total Production					
	6,000,000	**7,000,000**	**8,000,000**	**9,000,000**	**10,000,000**	**11,000,000**
1.00%	60,000	70,000	80,000	90,000	100,000	110,000
0.90%	54,000	63,000	72,000	81,000	90,000	99,000
0.80%	48,000	**0.87** 56,000	64,000	72,000	80,000	88,000
0.70%	42,000	49,000	56,000	63,000	70,000	77,000
0.60%	36,000	42,000	48,000	54,000	60,000	66,000
0.50%	30,000	35,000	40,000	45,000	50,000	55,000
0.40%	24,000	28,000	32,000	36,000	40,000	**0.42** 44,000
0.30%	18,000	21,000	24,000	27,000	30,000	33,000
0.20%	12,000	14,000	16,000	18,000	20,000	22,000
0.10%	6,000	7,000	8,000	9,000	10,000	11,000
		Where LSRCP Goal is met (58,700)				

Increased Performance

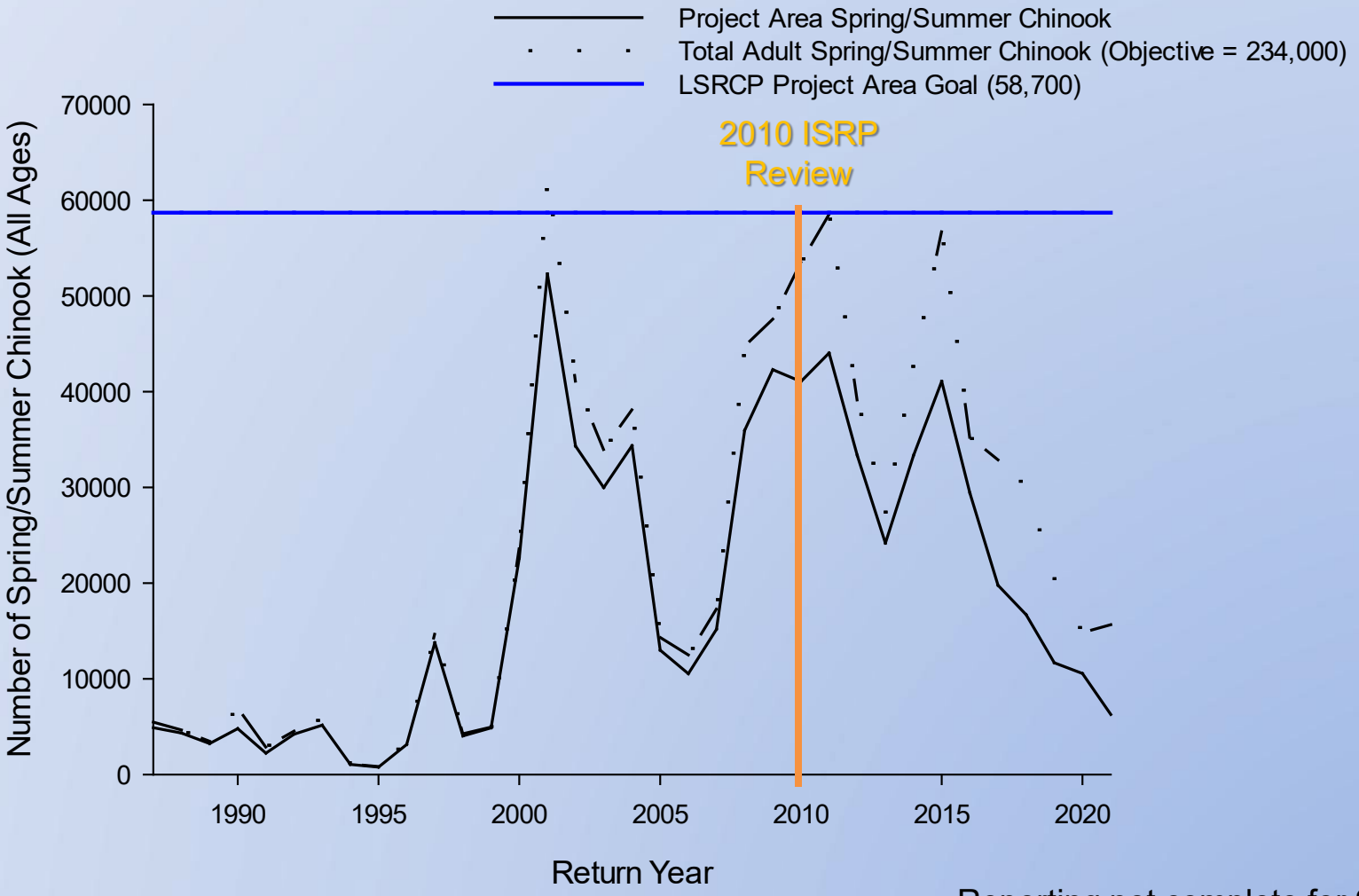
- Low Densities
- Better release sites
- Good homing
- Releases that are ready-to-migrate
- Better in-river survival, hydrosystem survival.
- Smolt programs over parr programs
- Endemic or localized stock

Increasing Costs ($)

Increased Brood Need (and Reduced Fisheries)

Started program with 6.74 M with expected survival of 0.87% = 58,700
Current program is 10.4 M with measured, mean survival of 0.42% (BY07-16) = 43,783

Project Area and Total Adult Spring/Summer Chinook
Return Years 1987-2021



Reporting not complete for 2021

Table 10. Spring-Summer Chinook salmon project area goal distributed by basin or area for the Lower Snake River Compensation Plan Program. Associated targets for smolt-to-adult recovery (SAR), coastwide harvest, total adults produced (includes jacks) and smolt-to-adult survival (SAS) are provided. Lochsa River summer Chinook salmon and Touchet River distribution of program area goals will be determined in 2020. The historical SAR of 0.87% for spring-summer Chinook salmon used to size the LSRCP program is currently unchanged in the upper Salmon, Clearwater, and Tucannon river basins (WDFW 1974).

Basin/Area	Spring-Summer Chinook	Distribution of Project Area Goal	SAR (%)	Coastwide Harvest Objective (4:1)	Total Adults Produced	SAS (%)
Salmon (Idaho, Sawtooth Hatchery)	Summer	19,445	0.87	77,780	97,225	4.35
Salmon (Idaho, McCall Fish Hatchery)	Summer	8,000	0.80	32,000	40,000	4.00
Clearwater (Idaho, Clearwater Hatchery)	Spring	11,900	0.87	47,600	59,500	4.35
Lochsa River (Idaho, Clearwater Hatchery)	Summer	TBD				
Clearwater (Idaho, Dworshak)	Spring	9,135	0.87	36,540	45,675	4.35
SE Washington - Tucannon	Spring	1,152	0.87	2,608	3260	4.35
SW Washington - Touchet	Spring	TBD				
Imnaha River (Oregon)	Summer	3,210	0.65	12,840	16,050	3.25
Grande Ronde (Oregon, upper basin)	Spring	1,617	0.65	6,468	8,085	3.25
Catherine Creek (Oregon)	Spring	970	0.65	3,880	4,850	3.25
Lookingglass (Oregon)	Spring	1,617	0.65	6,468	8,085	3.25
Lostine (Oregon)	Spring	1,654	0.65	6,616	8,270	3.25
Totals		**58,700**		**234,800**	**293,500**	

LSRCP Performance Table Data

- Provided with agenda (BY07-16)
  - "Report Card"
  - Two new, separated programs
    - Clearwater Summer Chinook (2,033 adults)
    - Touchet Spring Chinook (TBD)
  - Revised SAR/SAS
  - Lowest DI
    - Tucannon (0.16), NE Oregon programs (0.15-0.19)
  - Project Area Goals Achieved
    - Lostine 6/11 and Imnaha 5/11

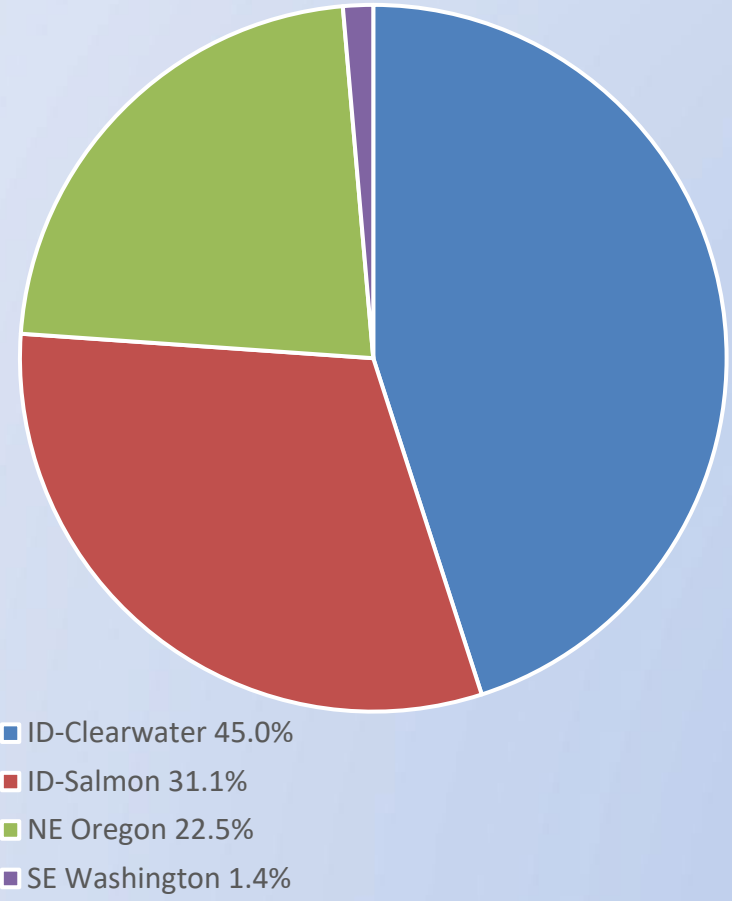
Performance

e

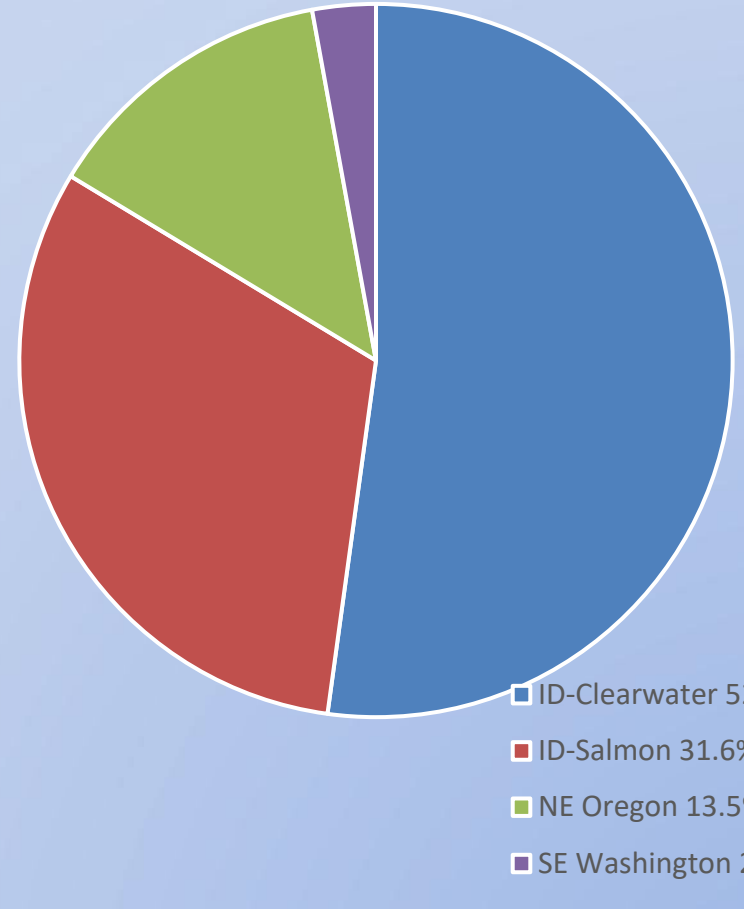
Facility	Location	Current Production	Basin Adult Goal	BY07-16 Mean SAR
McCall	South Fork Salmon	1,000,000	8,000	0.50%
Sawtooth	Sawtooth Weir	1,700,000	19,445	0.30%
Sawtooth	*Yankee Fork*	*300,000*		
	Basin Total	**3,000,000**	**27,445**	**0.91%**

Performance

Adults BY07-16 = 261,020



Juvenile Production = 84,957,258



Options

Example - Options to consider for achieving unmet mitigation balance	**15,000**
Add production (easy)	3,578,126
Only in Clearwater (no in-place or in-kind considerations, ESA easy)	3,732,656
Only in SF Salmon River (in-place in-kind, ESA concerns, brood concerns)	3,000,000
Only in Upper Salmon (in-place in-kind, ESA concerns, brood limited, fisheries concerns)	5,000,000
Lostine only (in place in kind concerns, ESA concerns, brood limited, fisheries concerns)	1,744,186
SF Salmon, Upper Salmon, Lostine (thirds)	2,710,843
Increased performance, additional production, in-river survival increases	?

Options

Challenges and considerations with changing the programs.

- LSRCP in-place, in-kind goals
- Performance (potential or actual)
- Type of program
- Space/Infrastructure/Logistics
- Funding
- Policy considerations, U.S. v. Oregon (consensus)
- ESA
- Scientific Recommendations
- Shifting baselines (Climate, Ocean, etc.)

Specific tagging currently used by the States of Washington, Oregon and Idaho to determine and report the Lower Snake River Compensation Plan (LSRCP) goals for the project area (PA) and for coastwide harvest objectives (CW). Depending on cooperator, individual project area harvest monitoring may also be used in combination of PBT and coded wire tag (CWT)/Adult recoveries to help determine LSRCP performance. Parental-based tagging (PBT) sampling occurs at Lower Granite Dam and in some harvest monitoring both downstream and within the project area of the LSRCP. Passive integrated transponders (PIT) tags are commonly used in LSRCP releases for a number of purposes.

	Spring-Summer Chinook Salmon		
Program Location	PBT	PIT Tags and/or Conversion	CWT/Adult Recoveries
Washington		CW-PA	CW-PA
Oregon			CW-PA
Idaho	PA	CW	CW

Summary

- LSRCP added production since 2010 but are still not meeting the LSRCP goal of 58,700 annually.
- Performance matters, now and into the future.
- Acknowledged difficulties and complexities with any changes in LSRCP.

Questions?

Seven Questions to Knowing Your Audience

1. **What are they like?**

   Energetic, knowledgeable, inquisitive, not informed on details of LSRCP or administrative minutuae. Highly interested in the presentation

2. **Why are they here?**

   To learn about LSRCP issues and programs from their funding source, objectively understand and provide critical feedback on the science around the program.

   To work on parallel issues/projects with LSRCP cooperators in Fish and Wildlife program and connect the broader level understanding of how LSRCP fits into their other reviewed programs and BPA's FWP funding regarding salmon recovery.

3. **What keeps them up at night?**

   Bad science, poor connection to broader issues (other H's of Habitat and Hydro in particular but also Harvest), lack of understanding about the programs.

4. **How can you solve their problem?**

   Identify how the in-kind, in place goals are measured and met for the LSRCP program and how the individual programs in the four basins are performing as a collective program. Set up presentations and reviews with their report (past and future) in mind. Performance table helps that, PNI and understanding of the LSRCP role and purpose should be conveyed.

5. **What do you want them to do?**

   Understand that their feedback will be and to highlight and implement better methods or scientific rigor in parts of the program that need it.

6. **How can you best reach them?**

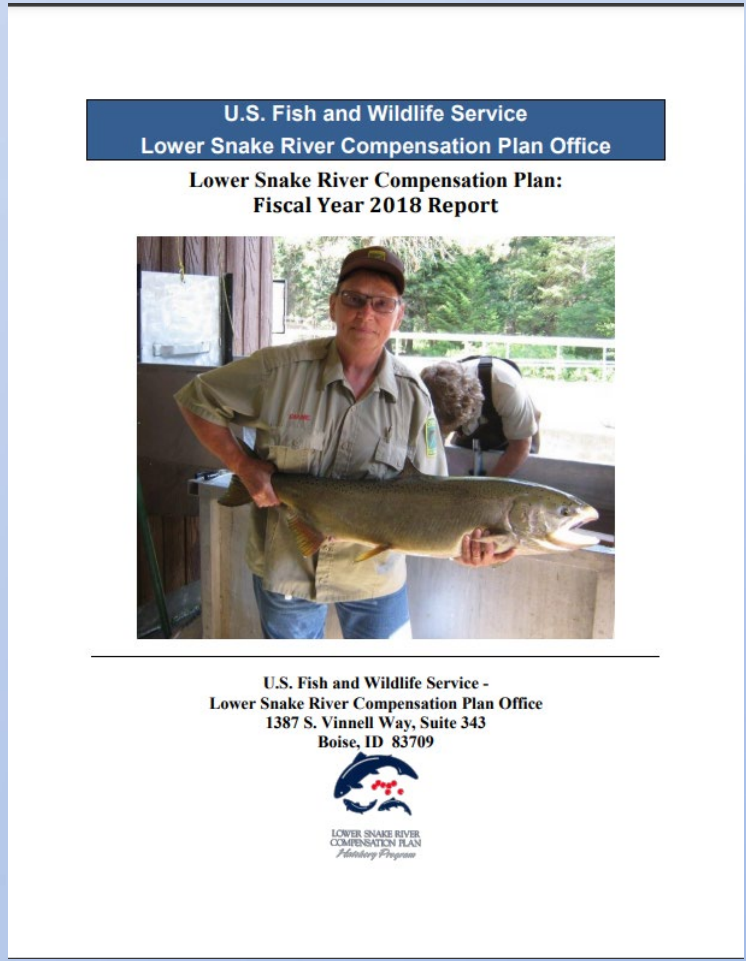
   Simplicity, tell a story. Identify both production and return, performance broadly. Not confuse them about how the program is implemented.

7. **How might they resist?**

   Poorly understood points, seeing others/presentations as not accountable toward objectives of science within or informing the program, poor connection to other F&W pieces.

Presentation Outline

a. Program Implementation and distribution of the LSRCP Adult Goal of 58,700
   i. SE Washington (1,152)
      1. Tucannon/Touchet
   ii. NE Oregon (9,072)
      1. Lookingglass
   iii. Idaho Clearwater and Idaho Salmon Basins (48,432)
   iv. Implementation differences in the in-place and in-kind
b. Current juvenile production releases by program/life stage
   i. Production changes since last program review
      1. Clearwater/DNFH spring/summer Chinook programs
      2. Imnaha Summer Chinook
      3. Touchet Spring Chinook.
c. Program Performance toward 58,700
   i. How are the goals measured by cooperator?
   ii. Adult goal performance in-place, in-kind.
      1. Individual program performance averages by SAR/SAS.
   iii. Future Program Considerations
      1. Prioritizing performance into the future
      2. Conservation and Mitigation examples within the LSRCP
         a. Upper Grande Ronde/Catherine Creek
         b. Tucannon Program
      3. Program execution impacts
         a. Climate Change examples
         b. Brood stock management


U.S. Fish and Wildlife Service
Lower Snake River Compensation Plan Office

Lower Snake River Compensation Plan:
Fiscal Year 2018 Report

U.S. Fish and Wildlife Service -
Lower Snake River Compensation Plan Office
1387 S. Vinnell Way, Suite 343
Boise, ID 83709

LOWER SNAKE RIVER COMPENSATION PLAN
Mitchell Act Program