



# LOWER SNAKE RIVER COMPENSATION PLAN



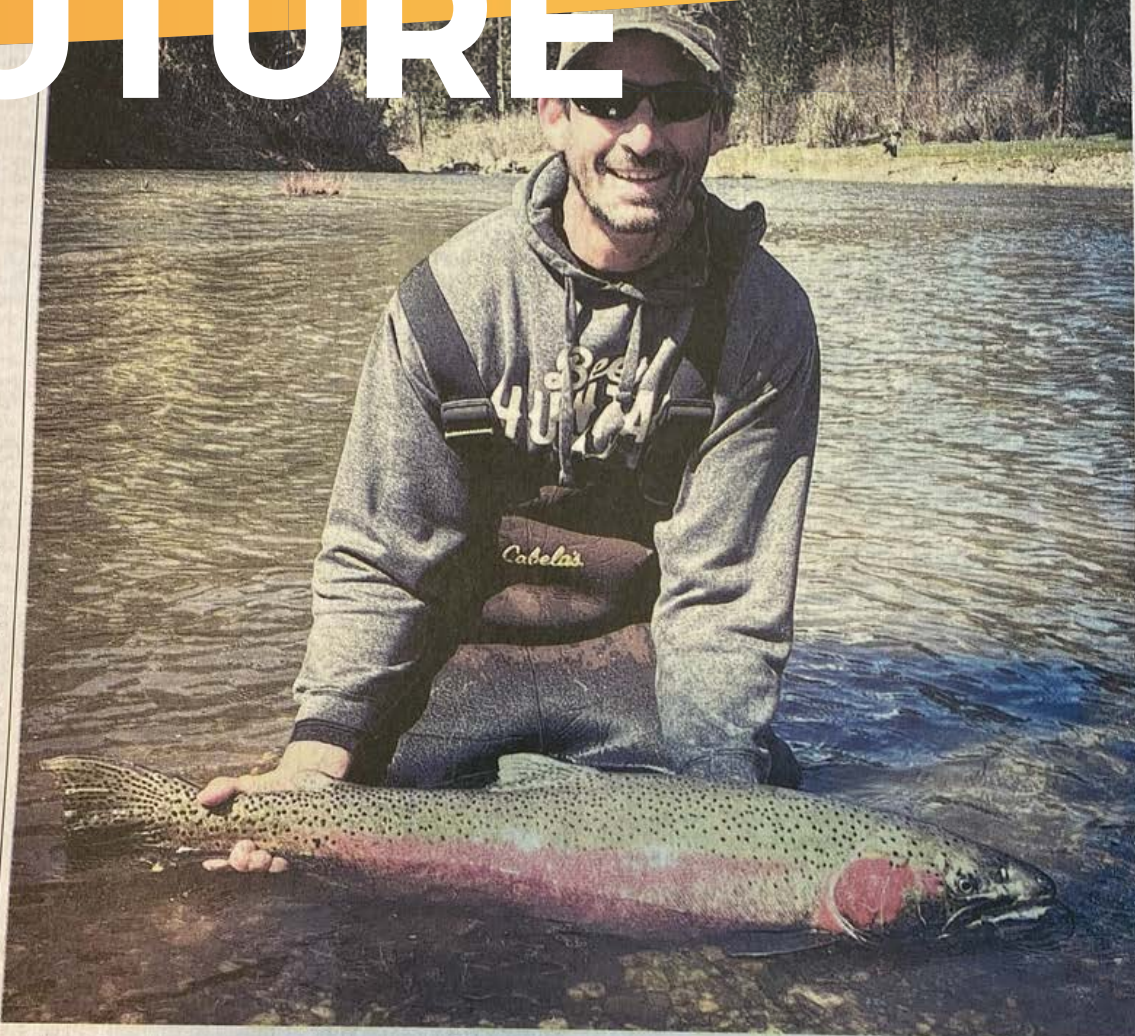
# FISH FOR THE FUTURE

MATT HOW GRAPHIC - USFWS

damage ancient rock art in Utah

BY MADDIE CAPRON

A 36-year-old climber stood in front of a nearly 1,000-foot-tall rock formation looking to create a new route up when he made a regretful mistake. Richard Gilbert, a climber from Colorado Springs, was in Moab, Utah, in March, according to the Colorado Springs Gazette. The location is a popular tourist destination near Arches and Canyonlands national parks. It's known for its scenic desert landscape and thousands of miles of open land. The area has a rich history, and some land parcels are covered in ancient rock art. When Gilbert was visiting in Moab, he created climbing routes by adding bolts to the rock face. Gilbert told The Gazette he was medically evacuated from the military after he had bolted



Boise angler Scott Turner broke the state steelhead catch-and-release record with a 39.25-inch fish caught April 11 on the South Fork Clearwater.

Scott Turner via IDFG

SCOTT TURNER ONCE OWNED THE RECORDS FOR CHANNEL AND FLATHEAD CATFISH, WHITE CRAPPIE, BROOK TROUT, CARP AND PERCH.

steelhead in an unlikely place: the Boise River in Downtown Boise. For years the Idaho Department of Fish and Game has released surplus hatchery adult steelhead in the river to give city anglers a taste of what people who live along the Snake, Clearwater and Salmon rivers enjoy. Those fish now are trapped at Hells Canyon Dam and trucked to Boise. But back in Turner's high school years, the fish sometimes came from Clearwater Drainage, which is home to big B-run bruisers. "I caught a 40-inch steelhead right here in downtown Boise," he said. When he was old enough to drive, he started making trips to Riggs and the Little Salmon River. Over the past 20 years or so, he's made regular trips to the South Fork Clearwater in southern Idaho. "I've caught a lot of big steelhead there. Most of them are from the

SOUTH FORK STEELHEAD - IDFG

WHAT'S BEEN HAPPENING IN LSRCP

APRIL 2021

just more Idaho fishing

the way back to the like a salmon. The lot bigger than the

# Lower Snake River Compensation Plan

FISH FOR THE FUTURE

## COORDINATOR'S CORNER



Nothing like a broken Idaho Catch and Release Steelhead Record for the cover shot this month. Of course, no end of controversy surrounded this catch. While some anglers applauded, others denounced fishing on "spawning" fish. If anything, it's nice to see a 39-inch fish and some good fishing activity this Spring.

I spent several weekends chasing turkeys with my 11-year old daughter in April. To make a long story short, she not only harvested her first gobbler after 3 long days of hunting, but went back two weeks later and harvested a second gobbler. This was her first hunting experience and she was proud to show up the two, thirteen-year old boys hunting with us and Dad who never did bag a bird.

Thanks to all the presenters this year at the virtual LSRCP Annual Meeting. For those of you that missed it, we've put together some of the highlights in this report. And, the presentations will be posted on the LSRCP website in the near future.

The time is now for Our Fish for the Future. I've still got a large stack of "Get out of Jail Free" cards looking for use. Keep pushing the envelope towards the next chapter of Comp Plan - we've got your back here!

Have fun out there!

- Nate

If something is important enough, you should try...Even if the probable outcome is failure.  
-Elon Musk



# STATION OF THE YEAR

2020 PHOTO OF THE YEAR - CASSIE SUNDQUIST, SAWTOOTH FISH HATCHERY



Since COVID stole the 2019 Station of the Year, we had the opportunity to announce the 2019 and 2020 LSRCP Stations in April.

## 2019 Station of the Year - Lookingglass Fish Hatchery

The Lookingglass Fish Hatchery has been a cornerstone of Spring Chinook mitigation and recovery efforts in multiple watersheds for LSRCP.

LSRCP is proud to recognize the exceptional efforts of the facility and staff. Lookingglass has routinely led Smolt to Adult return rates for LSRCP Chinook facilities along with on-station survival and performance.

## 2020 Station of the Year - WDFW Snake River Lab

The Snake River Lab consistently provides exceptional products to improve the management and operations of Washington's LSRCP facilities both internally and externally. SRCP recognizes 2020 efforts on the following reports:

- Snake River fall Chinook annual reports for both 2017 and 2018
- Steelhead Report covering 2013-2017
- Tucannon Spring Chinook 2019
- Tucannon Hatchery Bull Trout, Chinook, Steelhead Passage report for 2020

In addition, we chose a "Photo of the Year". Top honors went to Cassie Sundquist, IDFG, for her shot of the Sawtooth Weir from a few seasons back. Congratulations Lookingglass, Snake River Lab, and Cassie! Great work!



Washington  
Department of  
**FISH and  
WILDLIFE**

# MICHIGAN????

LAKE MICHIGAN

LAKE HURON

LAKE ERIE

ON TARIO

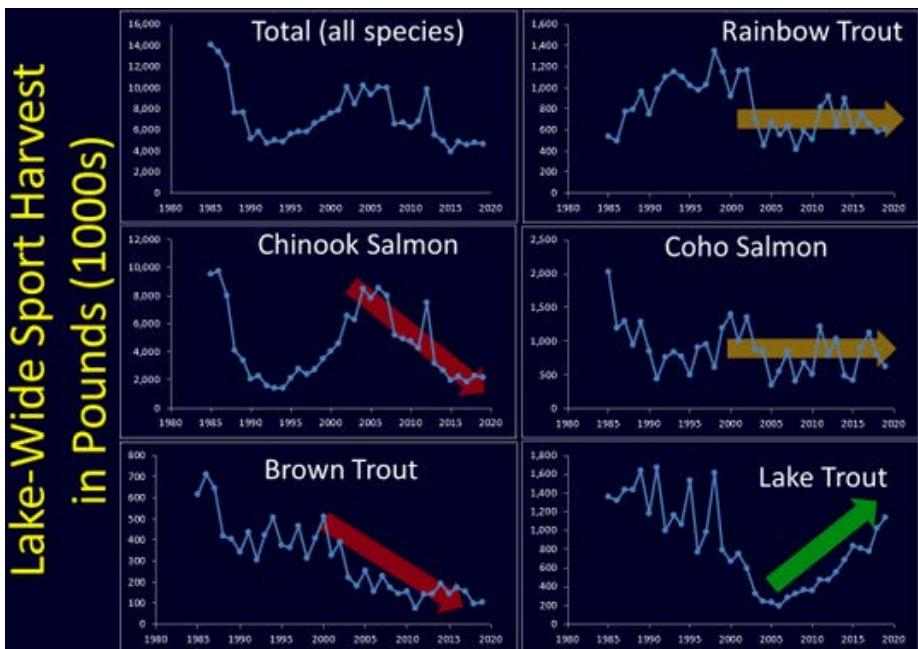


**BAFFLED RACEWAYS IN MICHIGAN**

Yes, we invited Michigan DNR to the LSRCP meeting to talk about the challenges and successes of Lake Michigan. If nothing else, it certainly identified a lot of Michigan alumni. The take-home is there have been some big changes with alewife crashes, BKD, and zebra mussels in Lake Michigan in the last 50 years since Chinook were stocked there. But, they still measure returns in millions of pounds harvested - which is exceeding 2M for Chinook and topping out at 43 lbs each.

All Michigan hatchery facilities used for Pacific Salmon employ similar strategies: 65 kg/m<sup>3</sup> (relatively high at around 0.5 DI or 4lbs/ft<sup>3</sup>) and 2.5 water exchanges per hour. Raceways are baffled, most have LHO's (Low-Head Oxygenator), and all have overhead roof cover.

**LAKE MICHIGAN SPORT HARVEST FROM 1980 TO 2020**



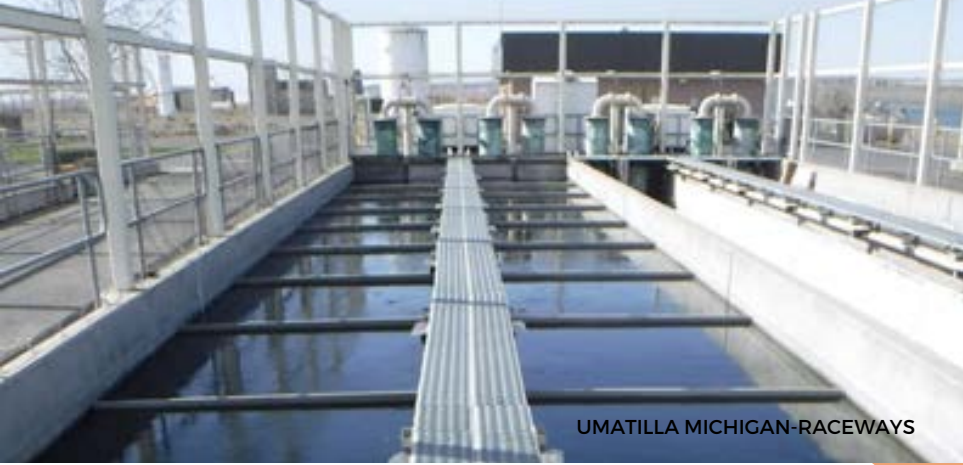
(notes: Y axis scales are not the same for each graph; data to 1985-2019)



Thanks Jay Wesley and Aaron Switzer for the presentations! Jay and Aaron contact info:

[wesleyj@michigan.gov](mailto:wesleyj@michigan.gov)

[switzerA1@michigan.gov](mailto:switzerA1@michigan.gov)



UMATILLA MICHIGAN-RACEWAYS

# BAFFLED?

Expanding on the Michigan discussions, the next series of presentations discussed the use of baffles at Umatilla, Clearwater, and Little White Salmon Hatcheries. At Umatilla, research showed that Michigan-Raceways (baffled and LHO's) produced more adults per raceway than standard raceways:

<https://afspubs.onlinelibrary.wiley.com/doi/10.1577/A08-067.1>

At Little White Salmon National Fish Hatchery, Bob Turik reported baffles removing solids effectively and reducing staff cleaning time substantially. However, they also require more work for end of year pressure washing and must be removed for fish marking operations and in some cases for transfer (if not direct release).

At Clearwater Hatchery, baffles are being used to bring swimming speeds up to 2.5 body lengths per second under the baffles for exercise training along with solids removal.

Matt Belnap reported good on-station results, but so far, no significant differences in Smolt to Adult Rates (SAR's) between baffled and un-baffled raceways.

So, overall, baffles and LHO's are another tool in the box for Hatchery managers to consider.



CLEARWATER FISH HATCHERY  
SPRING CHINOOK UNDER A BAFFLE

Thanks Keenan Schmidt, Bob Turik, and Matt Belnap for the presentations:

[keenan.schmidt@odfw.oregon.gov](mailto:keenan.schmidt@odfw.oregon.gov)

[bob\\_turik@fws.gov](mailto:bob_turik@fws.gov)

[matt.belnap@idfg.idaho.gov](mailto:matt.belnap@idfg.idaho.gov)



LITTLE WHITE SALMON BAFFLED CHINOOK RACEWAYS

# ALASKA RAS

## William Jack Hernandez Sport Fish Hatchery

Greg Carpenter ([greg.carpenter@alaska.gov](mailto:greg.carpenter@alaska.gov)) presented on the newest Recirculating Aquaculture System (RAS) hatchery in Alaska. Total construction cost of the facility was \$96M in 2011, but it now annually produces 4.5 million salmonids on less than 3000 gallons per minute (gpm) of water at 95% re-use.

With full RAS, the system employs gas conditions, biofilters, ozone disinfection, and dual-drain circular tanks. The Hatchery supports thousands of anglers annually in the urban Anchorage fishery.



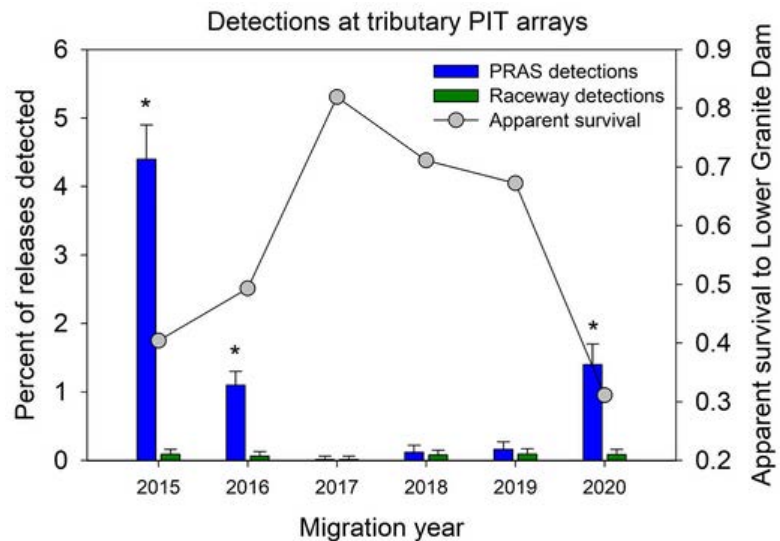
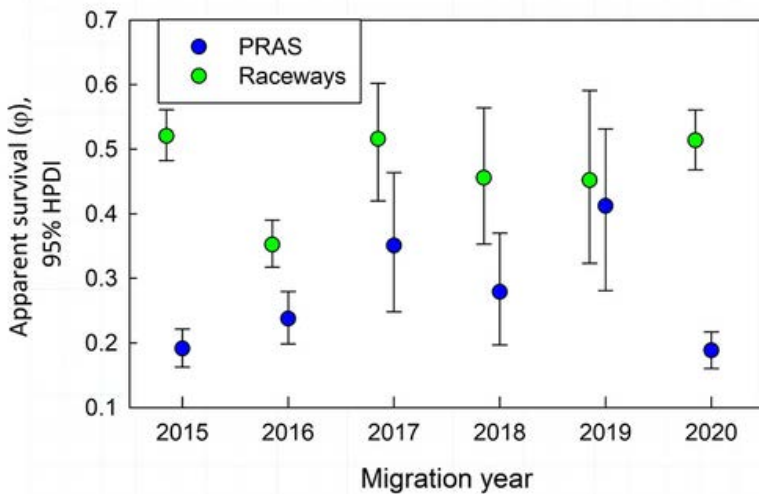
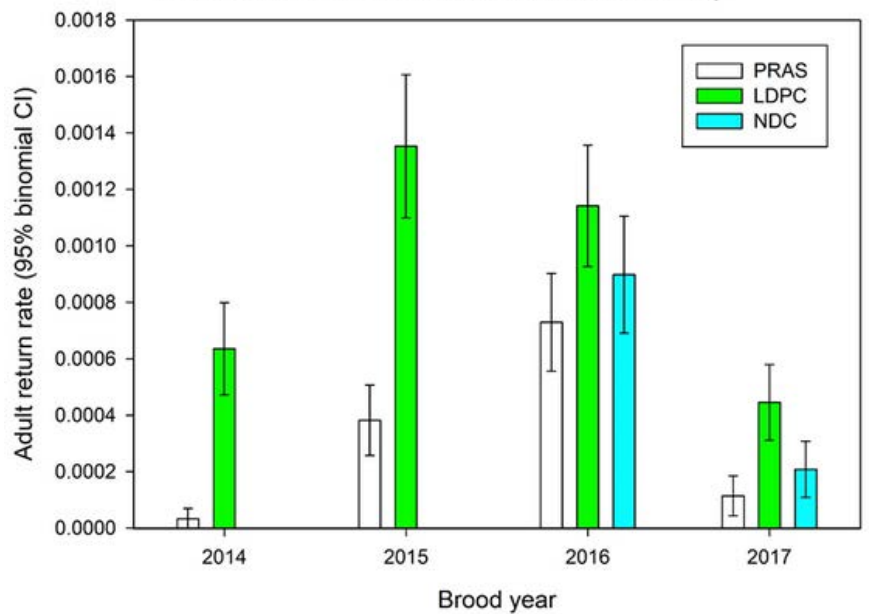


# HAGERMAN PRAS

Doug Peterson (doug\_peterson@fws.gov) and Rod Engle (rod\_engle@fws.gov) presented Hagerman Partial Recirculating Aquaculture System (PRAS) datasets. Overall, steelhead reared in PRAS systems are not outmigrating at the rates of raceway-reared steelhead.

Datasets are showing a large number of tributary detections of PRAS reared steelhead especially on years with low Lower Granite Dam detections. It appears those fish are not migrating but rather nosing into tributaries looking for a new home.

Adult steelhead returns to Sawtooth Hatchery



# WALLA WALLA HATCHERY

NEW WALA WALLA FISH HATCHERY



30-FT CIRCULARS

Jon Lovrak (jonlovrek@ctuir.org) presented on construction of the new Walla Walla Hatchery. The facility will produce a total of 500,000 Spring Chinook smolts for release in the Touchet and Walla Walla drainages.

Despite a large flood in February 2020, the project is on track for completion in June 2021. If everything falls in place, the first fish will be spawned in August/September 2021.

Constructing this facility was first proposed in 1987 and will go a long way to meeting: the CTUIR Fisheries Program Mission:

*To provide sustainable harvest opportunities for aquatic species of the first food order by protecting, conserving, and restoring native aquatic populations and their habitats.*

Ultimately, the program will return 5,000-5,500 spring Chinook to the Walla Walla River mouth to reestablish natural production and fisheries.



EARLY REARING AREA





MCCALL HATCHERY

# SHADE COVERS

Chris Starr led discussion on Hatchery shade covers at McCall, Niagara, Hagerman and Sawtooth Fish Hatcheries. McCall has had the longest experience with shade covers and consistently has some of the highest SAR rates of Spring/Summer Chinook. Niagara Springs just completed its first full rearing cycle under the new shade structure and had one of the first years that the Oxbox stock steelhead achieved the target release size (they are usually small by 20%). That change was attributed to better feeding response, less cleaning activity, and less salt use for algae.

Hatchery managers also discussed spawning operations during the COVID pandemic. Overall, managers reduced volunteers on spawning floors and streamlined operations with new tools that may be helpful even in non-COVID years.



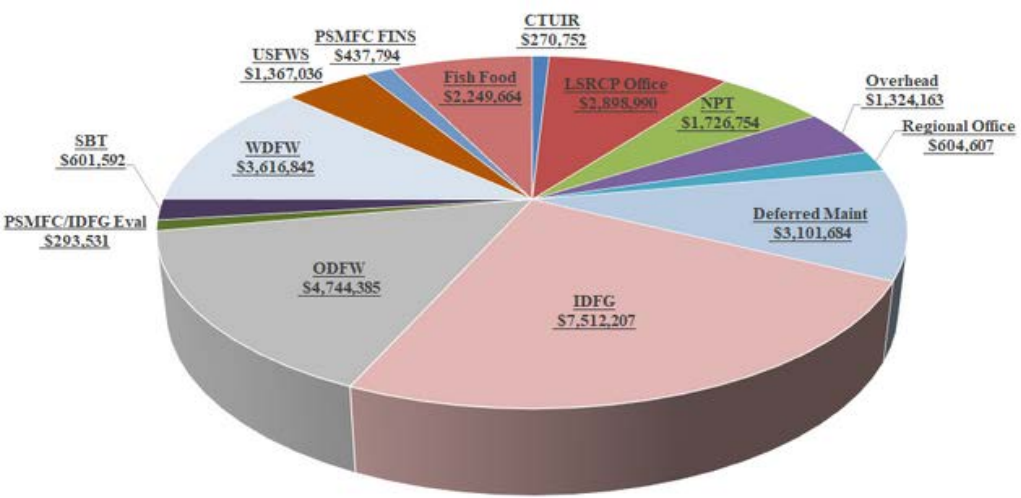
NIAGARA SHADE STRUCTURE

DWORSHAK'S MILT MASTER 3000



SAWTOOTH SHADE COVER CONSTRUCTION

# BUDGETS



Brian Devlin discussed overall LSRCP budgets and spending patterns. Crystal Ball, Bonneville Power Administration (BPA) gave an overall picture of business side of BPA and mission to strengthen financial health, modernize assets, provide competitive power products and services, and meet transmission customer needs. The overall Fish and Wildlife Budget of BPA declined 10% from 2018 to 2020 and is flat through 2026.

Nathan Wiese asked the program to continue to challenge itself to spend resources wisely and completely by the end of Fiscal Years. In addition, he asked to find innovative solutions that continue to move the needle towards meeting adult return targets and increasing program efficiencies. These are certainly challenging budgetary times for the program and we'll need everyone seeking ways to make operations more efficient.

**O&M (24 cents)**  
Operation and maintenance costs at the hydro projects and Columbia Generating Station.

**Debt (24 cents)**  
Principal and interest on federal and nonfederal debt.

**Fish & Wildlife (17 cents, plus the impact of lost power generation)**  
Principal and interest on debt, expense and people costs total 17 cents. But the full impact is 24 cents due to the cost of lost power generation that results from spill and other operational requirements to support fish and wildlife.

**Residential Exchange (9 cents)**  
Payments to consumers served by higher-cost investor- and consumer-owned utilities.

**Conservation (7 cents)**  
Principal and interest on debt, expense costs, people and Energy Efficiency Incentive.



**BPA people (5 cents)**  
Salaries, benefits and supplies for power and corporate employees not supporting conservation and fish and wildlife.

**Power purchases (5 cents)**  
System augmentation, balancing purchases, renewable purchases, long-term contracts and risk mitigation.

**Transmission (4 cents)**  
Resource integration costs and cost to deliver secondary energy to customers.

**Transfer (3 cents)**  
Cost to deliver power to customers not directly connected to BPA's transmission system.

**Rate discounts (2 cents)**  
Discount provided to customers with low system densities and to customers with eligible irrigation load.

# FISH INVENTORY SYSTEM



# FINS

Tara Garrison reported on the Fishery Information Needs System. FINS is currently being used for a wide variety of data needs across the program:

- Hatchery Management
- Data Requests
- Simplify Reporting
- Connect data to other Databases
- Single place to Track all data points from Trap to Release

The FINS steering committee has been wrestling with the Application Programming Interface (API) implications to mining the FINS database. API is producing data for websites like these - giving snapshots of the data entered into the FINS system:

<https://idfg.idaho.gov/fish/chinook/returns>

<https://nptfisheries.shinyapps.io/kus-data/>

TRANSFER SHIPPING SUMMARY					
Location: Sawtooth Fish Hatchery			Stock: Pahsimeroi		
Species: Chinook			Run: Summer		
Date Range of Available Data: 9/4/2018 - 10/10/2018			Brood Year: BY 2018		
SHIPPED/TRANSFERRED EGGS					
Move From Facility	Stock	Transfer Date	Move To Location	Eyed	Total
Sawtooth Fish Hatchery	Pahsimeroi	10/9/2018	Shoshone-Bannock Tribes Inbox	46674	46674
		10/10/2018	Shoshone-Bannock Tribes Inbox	108565	108565
Subtotal				155239	155239

### Hatchery Spawning Summary

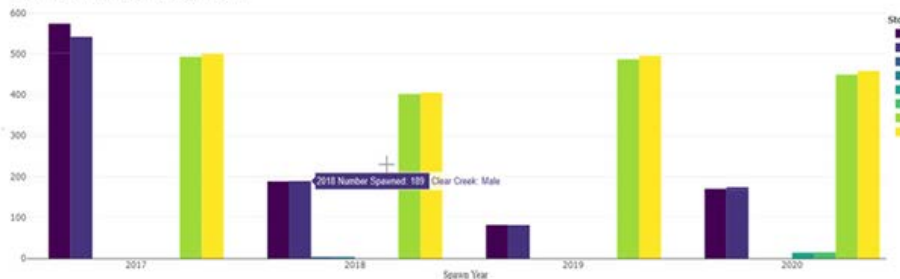
Choose Species:

Choose Facility:

#### Rapid River Fish Hatchery Yearly Spawns Counts



#### Clearwater Fish Hatchery Yearly Spawns Counts



## Hatchery Returns

This page summarizes the number of adipose-clipped steelhead are updated every evening.

### Clearwater Fish Hatchery

Date	Count
04/13/2021	0 No returns r

### Dworshak National Fish Hatchery

Dworshak National Fish Hatchery Ladder Trap

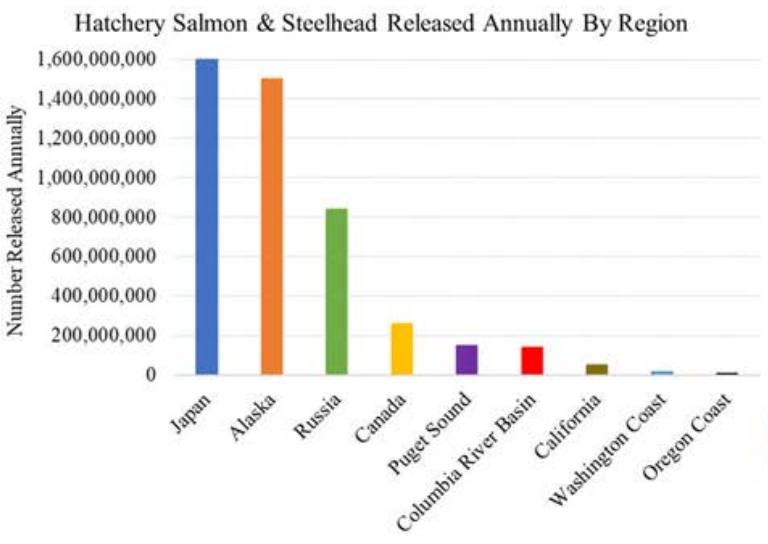
Date	Count
3/30/2021	200
3/23/2021	177
3/16/2021	244
3/2/2021	242
2/23/2021	236
2/9/2021	333

1,432 total returns.

### Kooskia National Fish Hatchery

Date	Count	Comment
04/13/2021	0	No returns recorded for this hatchery.

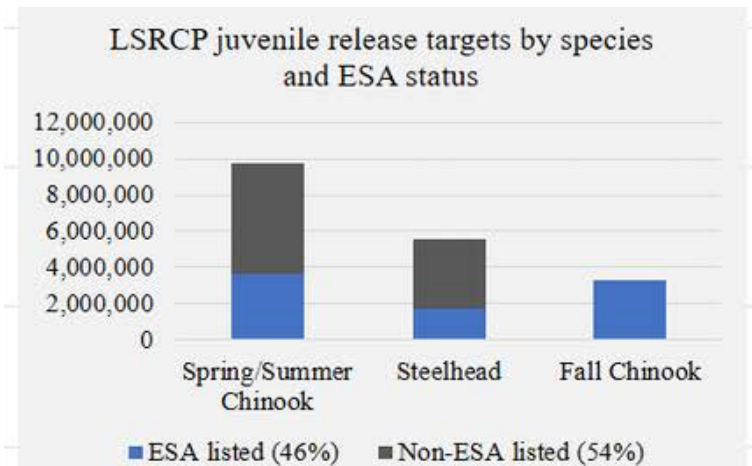
# SALMON THEN AND NOW

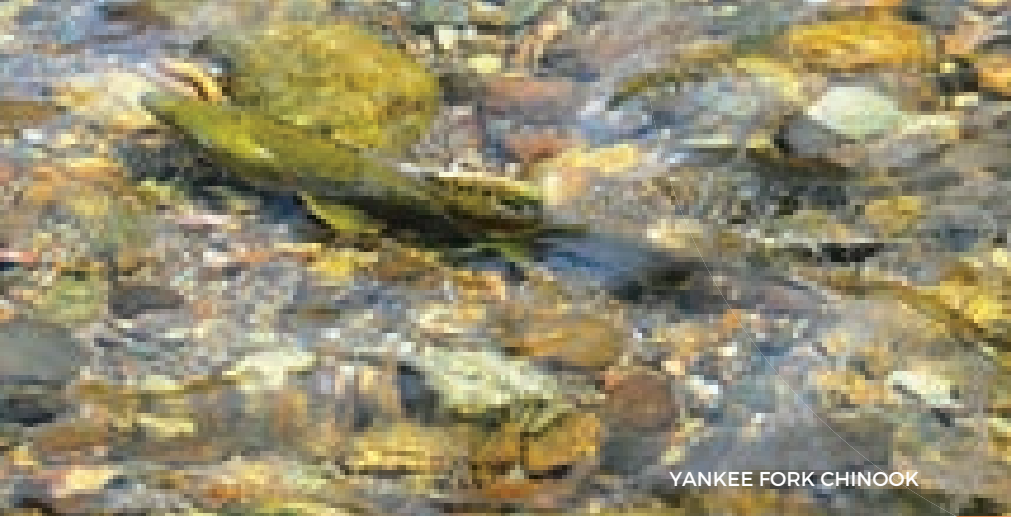


Maureen Hess presented an overview of Columbia River salmon management and hatchery production. Prior to 1850, adult salmon and steelhead returns were between 10 to 16 million to the Columbia River. Current returns are around 1.8 million.

Dam construction has blocked about 55% of available habitat and fish hatcheries have been used to mitigate the losses from those projects. Overall, 140 million smolts are released in the Columbia River and 33 million of those are in the Snake Basin.

When the Columbia is compared to other Pacific mitigation/hatchery programs, the 140 million is relatively small compared to Alaska or Japanese programs. However, most of those programs are Pink and Chum production for offshore fisheries.





YANKEE FORK CHINOOK

# YANKEE FORK

Lytle Denny discussed the Yankee Fork challenges over the past decade and the overall objectives of the program.

**·Fishery Objective**

- provide traditional harvest opportunities for salmon and steelhead in historical fishery areas

**·Cultural Objective**

- provide opportunities for connection with and protection of cultural and social values and rights

**·Population Restoration Objective**

- restore a productive, self-sustaining population of salmon and steelhead

**·Species Recovery Objective**

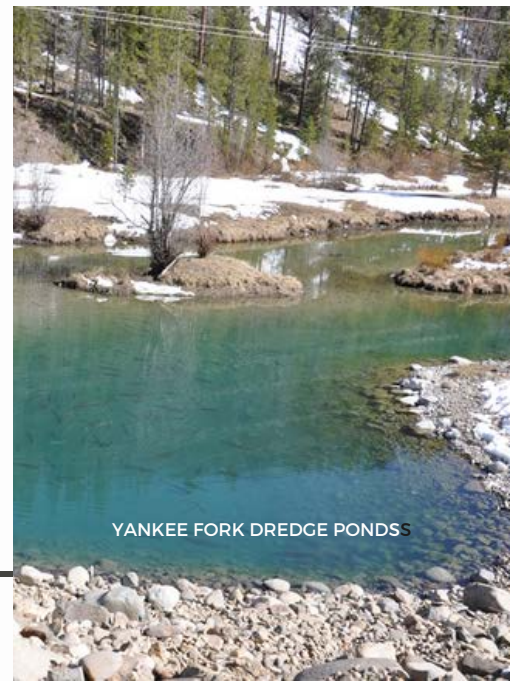
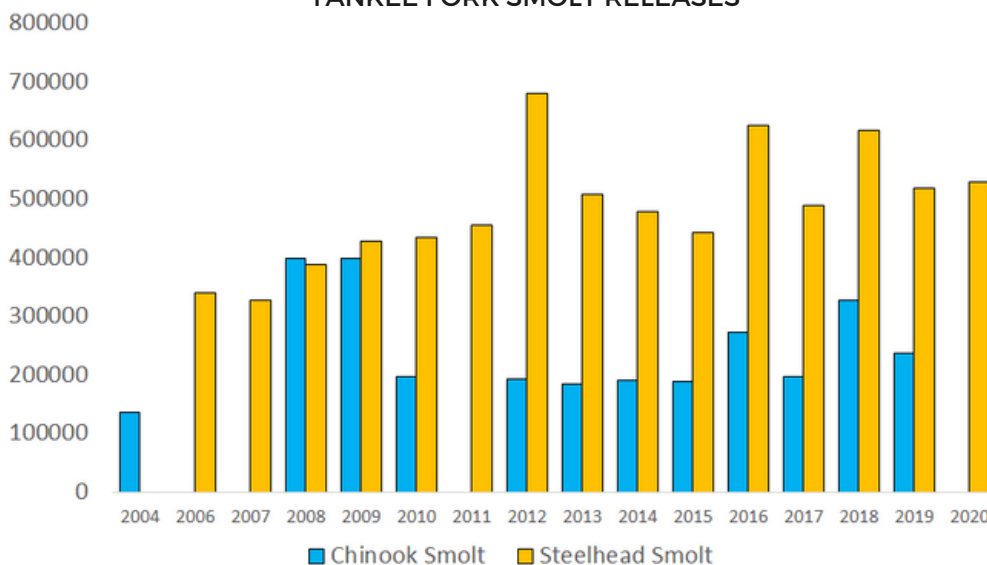
- avoid jeopardizing recovery of other salmon and steelhead populations within the sub-basin



YANKEE FORK

The Hatchery component of the Yankee Fork program seeks to return 2000 steelhead and 2000 Chinook for harvest opportunities. Unfortunately, an average of only 35 Hatchery-origin Chinook have returned annually from 2008-2020 (0 to 170). Many of the Chinook destined for Yankee Fork are intercepted at the Sawtooth Weir where they were reared prior to acclimation. Current strategies are examining opportunities for additional acclimation to hopefully increase adult returns to the target area.

YANKEE FORK SMOLT RELEASES



YANKEE FORK DREDGE PONDS

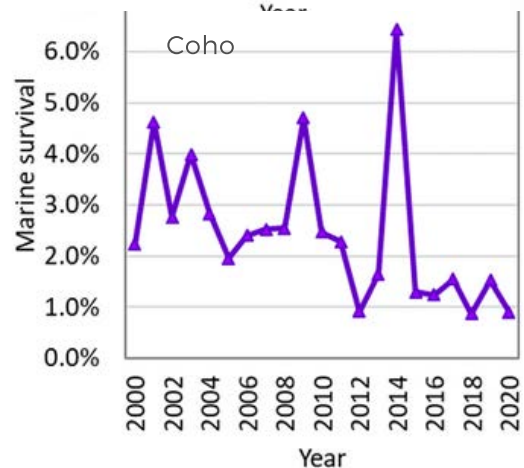
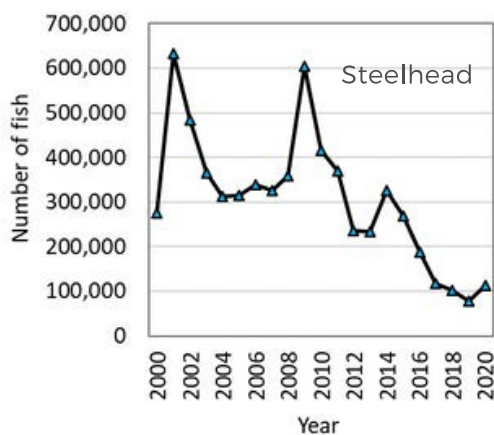
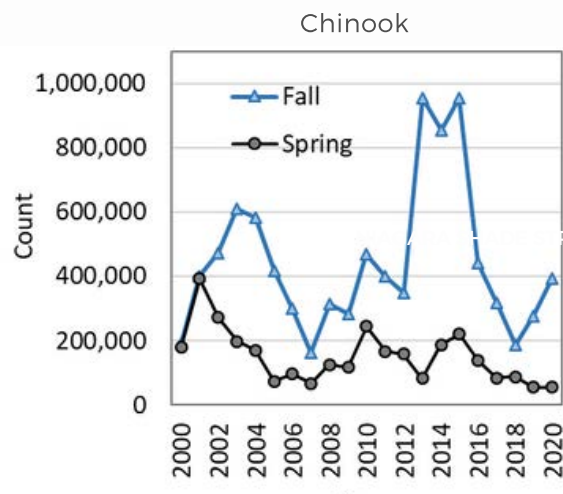
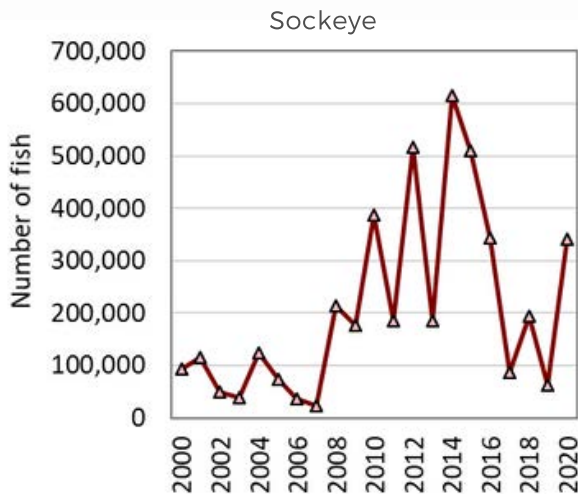


# MARINE CONDITIONS

Laurie Weitkamp, NOAA, presented on Ocean Conditions in regards to salmon and steelhead stocks. As the climate warms, the Oceans have become the global heat sink and biological responses are occurring. Barracuda have shown up in British Columbia and Striped marlin off the coast of Oregon during recent heat waves of 2015-2016, 2019 and 2020. Juvenile rockfish and mackerel number are increasing while Pacific cod is decreasing. On the invertebrate side, commercial harvest of California market squid is now occurring off the Pacific Northwest, water Jellyfish are increasing and Sea nettle jellyfish are decreasing. Huge abundances of unusual species like Colonial pelagic tunicate, are occurring.

These changes are occurring Columbia River salmonids as well. Sockeye and Fall Chinook are showing uptrends in populations while Spring Chinook and Steelhead are in a multi-year decline. Coho are down overall, but more stable in the last 6 years.

Laurie's advice to the LSRCP program: Keep trying multiple strategies as conditions keep changing.

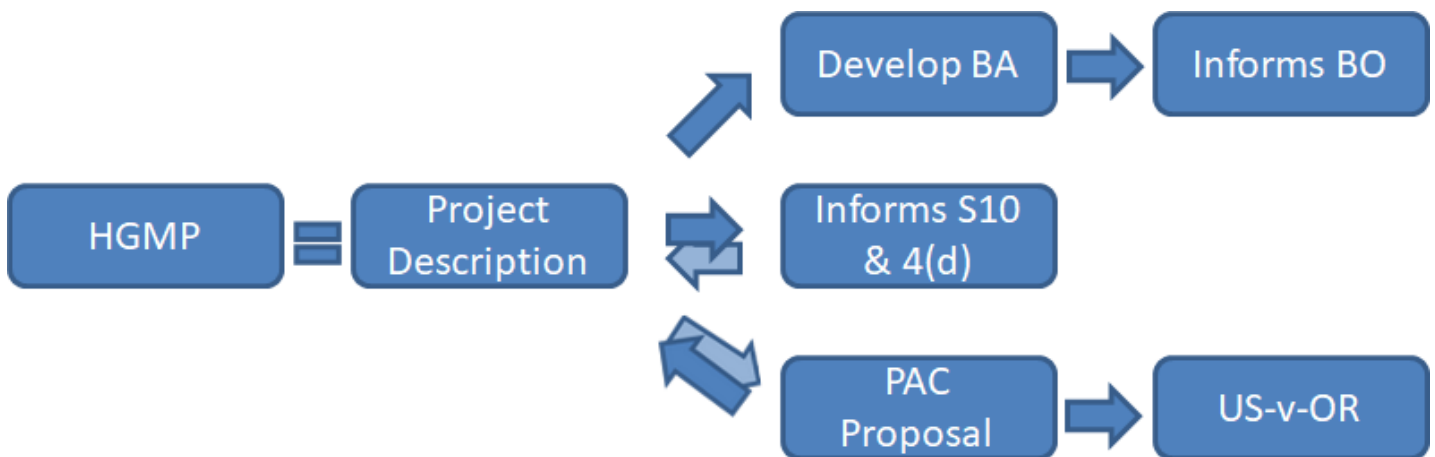


# PROGRAM CHANGES



Mark Robertson ran through the processes guiding moving ideas to implementation within the LSRCP program. For a brand new program, an idea starts with a Hatchery Genetic Management Plan (HGMP) development. It then proceeds to US v OR consideration via the Production Advisory Council (PAC). Then, Endangered Species Act (ESA) consultation begins when LSRCP or partners submit a Biological Assessment (BA) and a Section 10 Permits or Section 4 (d) Rules for listed species take. The National Marine Fisheries Service (NMFS) then issues a Biological Opinion (BO) for Anadromous Species and the US Fish and Wildlife Service (USFWS) issues a BO for resident species (Bull trout, etc.).

A program change needs to examine if changes are needed in the HGMP, ESA, and US-v-OR interest. Communication among all parties can ensure that these bases are all checked. Document communication and records so that the change can be followed if future review is necessary in the future.

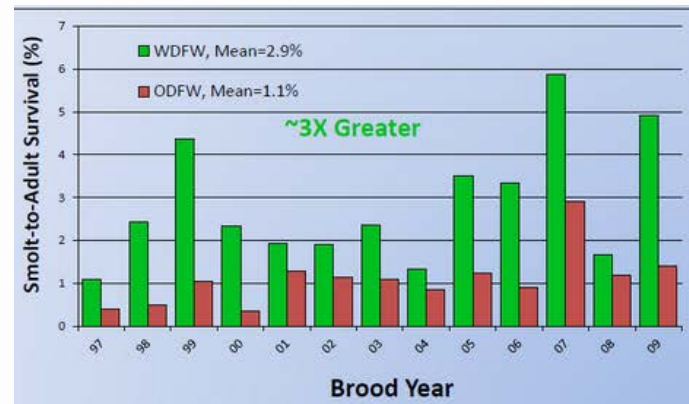




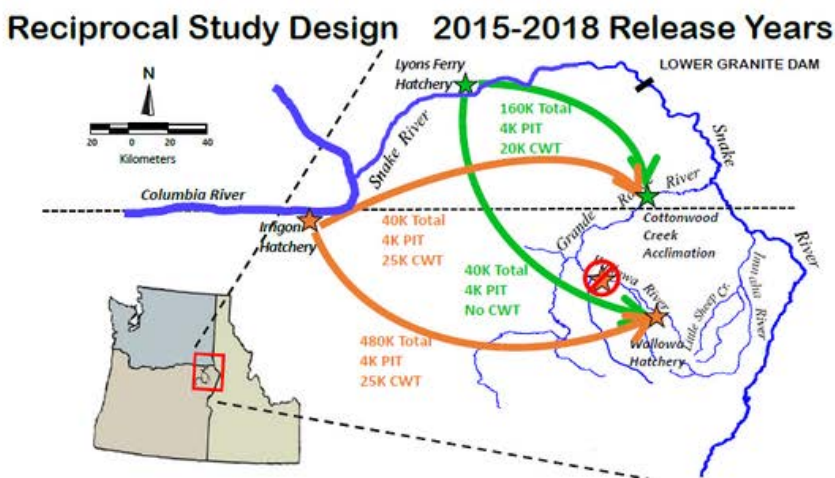
# RECIPROCAL STUDY

Rod Engle discussed the Reciprocal Study implementation between Irrigon and Lyons Ferry Fish Hatcheries. Basically, the reciprocal study moved steelhead from Lyons Ferry and Irrigon to multiple shared release sites to examine rearing differences between extremely low (DI=0.01) lake rearing to raceway rearing densities (DI=0.15). The results showed an approximately 2:1 Smolt to Adult survival advantage to extremely low rearing densities. LSRCP will consider these priorities as we put together options discussed on how this study may benefit the overall program:

- Cost efficiencies to address current and future budget climate
- Where possible, address spring Chinook mitigation goals
- Ensure consideration of ESA, U.S. v. Oregon, scientific defensibility.
- Maintain and/or enhance in-kind/in-place LSRCP mitigation obligations.
- Policy considerations



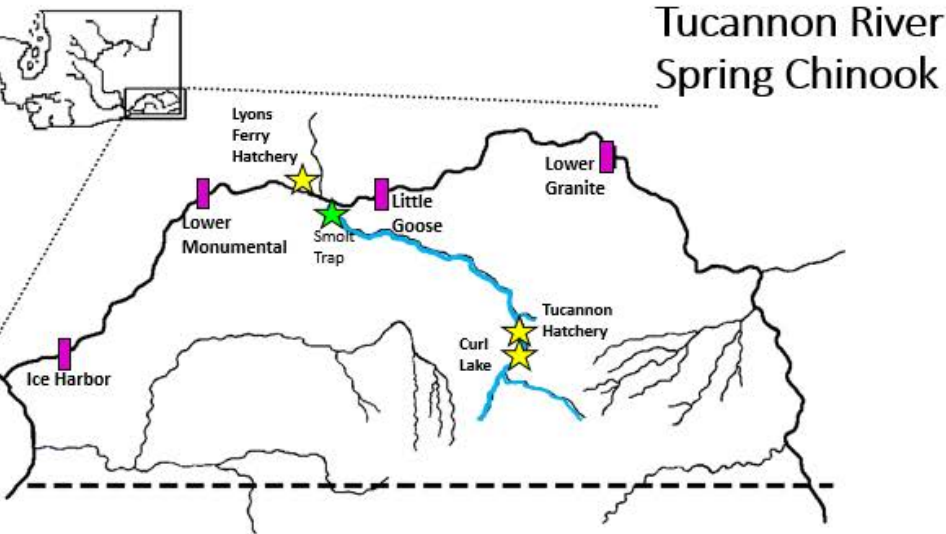
Over 22 ideas have been identified so far that have potential benefits to steelhead, Fall Chinook, and Spring Chinook within LSRCP.



J. Bumgarner - WDFW





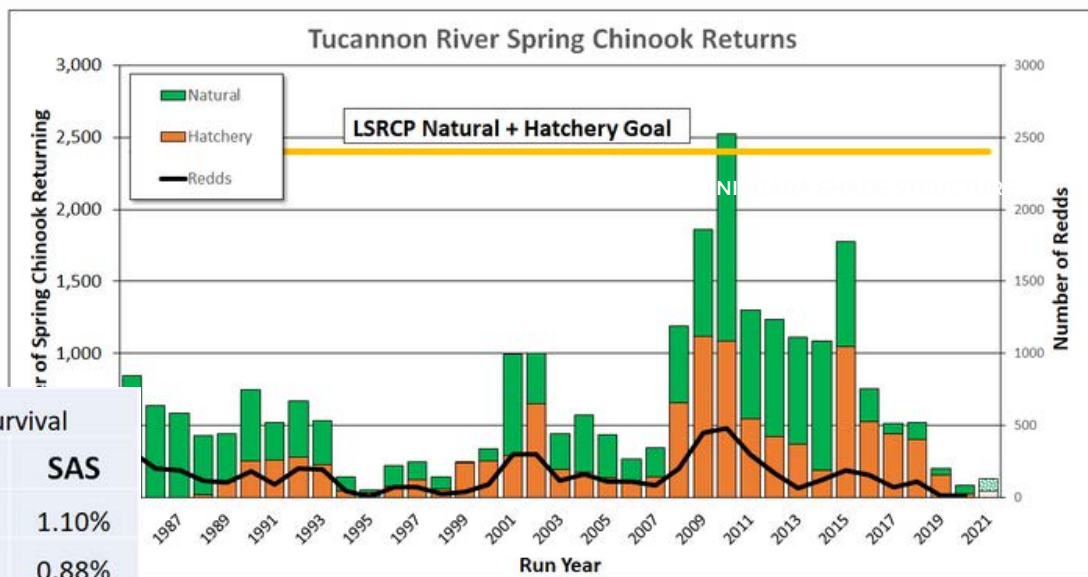


# TUCCANON SPRING CHINOOK

Joe Bumgarner, WDFW, discussed the Tucannon Spring Chinook program challenges. In 2019 and 2020, redds in the Tucannon dropped to levels not witnessed since the mid-1990's. Basically, only 11 redds were observed in 2019 and 14 in 2020. The current program is 225,000 smolts released at 12 fpp. However, 2021 and 2022 smolt releases are expected to be below 100,000 because of low adult return numbers. And, in general, Tucannon hatchery spring Chinook have very low SAR rates (0.19%), but have maintained recruits/spawner above adult replacement unlike the wild recruits/spawner.

To address low outmigration success, WDFW plans to try three release groups: On-station Tucannon Fish Hatchery release, Tucannon River mouth release, and a Directly loaded barge group from Lyons Ferry. All fish will be over wintered/acclimated at Tucannon Fish Hatchery from November to April.

Exploring options for an Eggbank program at a downriver hatchery below Bonneville and possibly exploring Captive Brood Programs again.

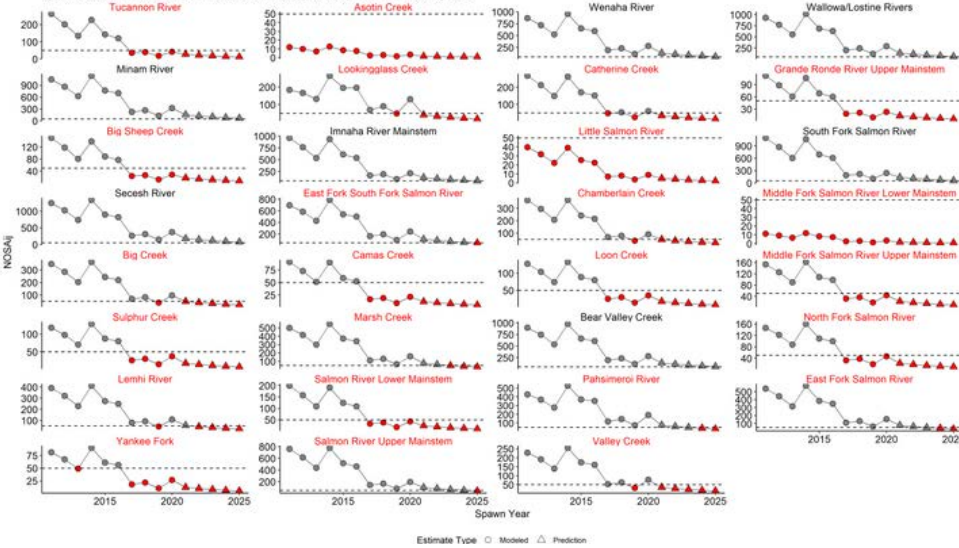


Brood Years - 2000-2013 AVG Survival

Location	Release Site	SAS
Abv LGR	Imnaha	1.10%
Abv LGR	McCall	0.88%
Abv LGR	Grande Ronde	0.80%
Abv LGR	Dworshak	0.58%
Abv LGR	Sawtooth	0.34%
Abv LGR	Clearwater	0.33%
<b>Blw LGR</b>	<b>Tucannon</b>	<b>0.19%</b>

From LSRCP Annual Report 2020

**Spring-summer Chinook Salmon**  
 Future predictions of natural-origin spawner abundance (NOSA) for Snake River Basin show 24 populations (77%) will start to drop below the quasi-extinction threshold (QET, dashed line, 50 spawners) within the next 5 years.

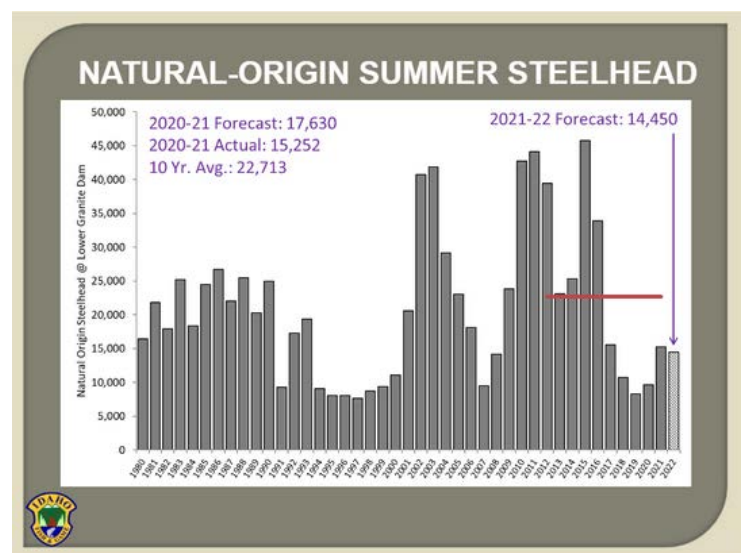
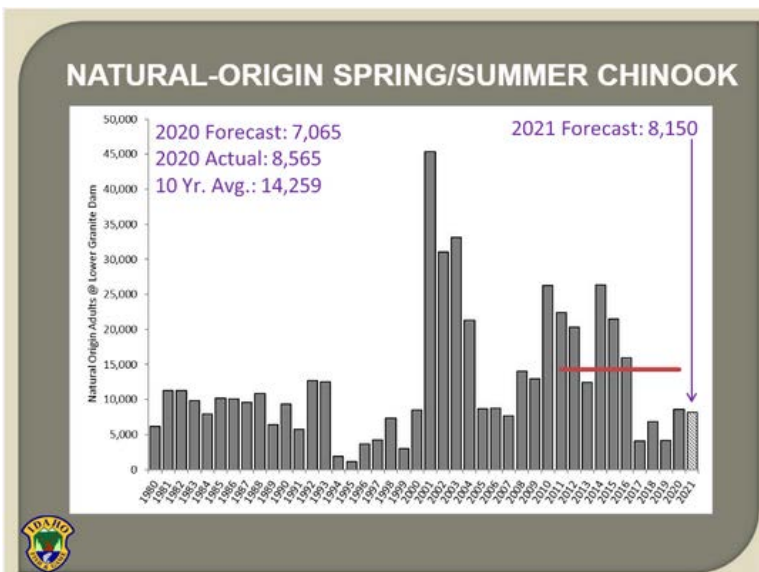


# CALL TO ACTION

Jay Hesse, Nez Perce Tribe, presented a "Call to Action" on the alarming extinction trend in wild spring/summer Chinook and steelhead. Modeling data suggest that Snake River populations will dip below critical Endangered Species Act levels within five years.

Possible action items include additional hatchery refugia, cryo-preservation, habitat work, and listing status.

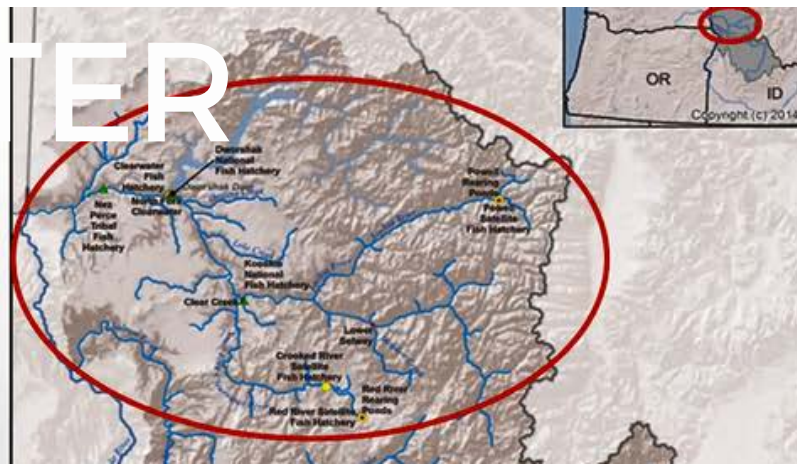
	Chinook	Steelhead
Desired	179,000	137,480
Delisting	30,000	21,500
Critical	1,900	1,250



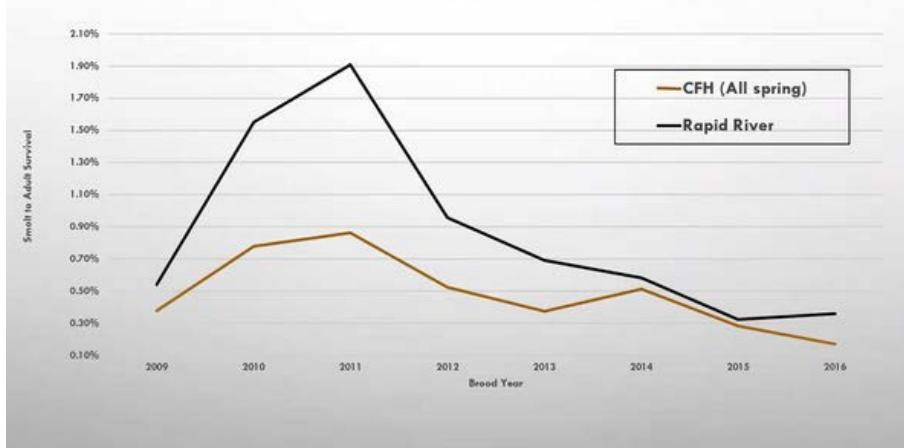
**“We are the circle. That’s what life is all about. We take care of one another. So when we have someone in trouble, that’s when the rest of us have to step in.”**

**-Elmer Crow, Nez Perce**

# CLEARWATER CHINOOK PROGRAM



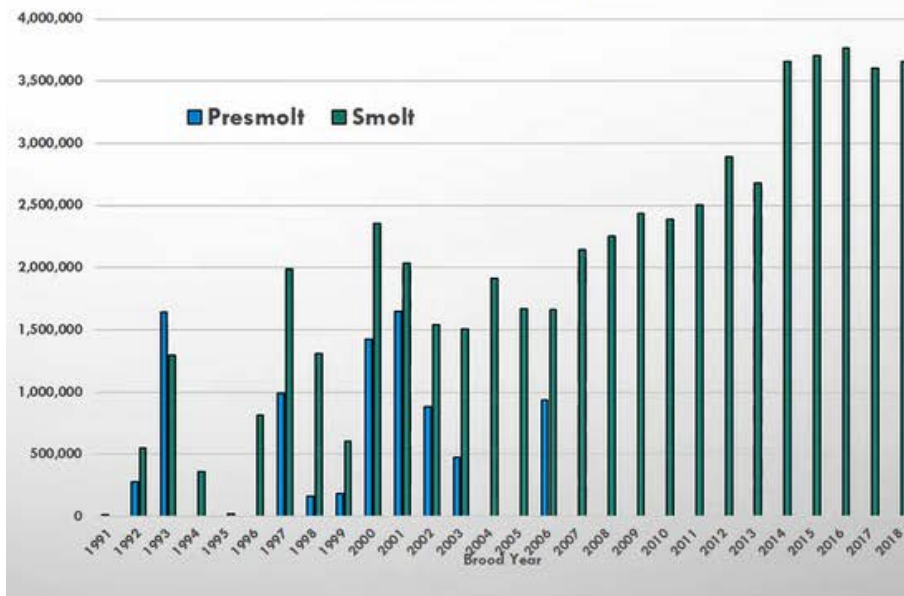
## SMOLT TO ADULT SURVIVAL OF RAPID RIVER AND CLEARWATER HATCHERY SPRING CHINOOK



Brian Leth, IDFG, presented data from the Clearwater Chinook program. The Clearwater program was founded on Rapid River stock and has a similar downstream migration distance as Rapid River, but has lower Smolt to Adult return rates. Over the years, the Clearwater facilities have moved away from premolt production, developed summer run programs, examined baffles, and rearing density towards increasing adult returns. Currently, staff are examining juvenile migration timing as another option that could increase outmigration survival and resulting SAR rates.

And if you missed it, Brian had a good roast of Nate Wiese "dumpster diving" data behind the Nampa Research station.

## Juvenile Spring Chinook Released from Clearwater Fish Hatchery for Brood Years 1991-2018



### Production Program- Yearling Smolts Funded by LSRCP

- Clearwater FH – 3.75 M (36%)
- Dworshak NFH – 1.65 M (16%)
- NezPerce FH- 0.18 M (2%)
- **5.58 M (54%)**

The combined production in the Clearwater represents approximately 54% of LSRCP funded production



# FISH PASSAGE CENTER

The Fish Passage Center was established in 1982 and has a staff of 11 people in Portland, Oregon. The objective of the Fish Passage Center is to provide data analyses and technical assistance regarding upstream and downstream salmon and steelhead passage.

Smolt Monitoring Program (SMP) - long term juvenile fish migration from 1983-2020 and includes Gas Bubble Trauma Monitoring Program

Comparative Smolt Survival Study (CSS) - began in 1995 to answer "can transportation.....compensate for the effect of the hydro-system?"

·www.fpc.org

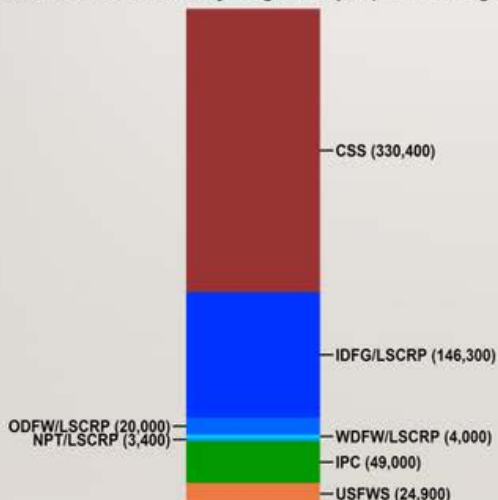
Thanks Michele Dehart for the presentation

Hatchery	Species	Total PIT Tags
Rapid River	Sp. Chinook	52,000
McCall	Su. Chinook	52,000
Clearwater	Sp. & Su. Chinook	86,600
Kooskia	Sp. Chinook	8,000
Pahsimeroi	Su. Chinook	22,400
Sawtooth	Sp. Chinook	22,400
Magic Valley	Steelhead	34,800
Hagerman	Steelhead	17,200
Niagara Springs	Steelhead	22,700
Clearwater	Steelhead	21,500
Lookingglass (Imnaha AP)	Sp. Chinook	21,000
Lookingglass (Catherine Creek)	Sp. Chinook	21,000
Irrigon (Grande Ronde, Imnaha)	Steelhead	34,000
Dworshak	Sp. Chinook	42,000
Dworshak	Steelhead	32,900
Lyons Ferry (Cottonwood AP)	Steelhead	6,000
Springfield	Sockeye	50,000
Lyons Ferry (Captain Johns/ Pittsburg Landing)	Fa. Chinook	27,000
Lyons Ferry (Big Canyon Creek)	Fa. Chinook	4,500
<b>Grand Total</b>		<b>578,000</b>

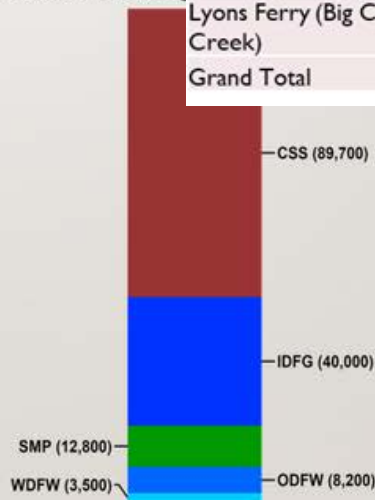
- CSS data and analyses are derived from PIT tags (~1 million in 2020)**

- Tagged cooperatively and preassigned for use in CSS

Snake River Hatchery Tag Groups (~578 K tags)



Snake River Wild Tag





# HYDRO AND HATCHERIES

Jay Hesse, Nez Perce Tribe, reported on Hydrosystem operations. Key Hydrosystem Impacts to Fish:

- Prolonged Juvenile Travel Time
- Increased In-river Mortality
- Cumulative Stress (Delayed Mortality)
- Delayed Adult Passage
- Increased Predation Risk
- Degraded Water Quality

## In River Survival

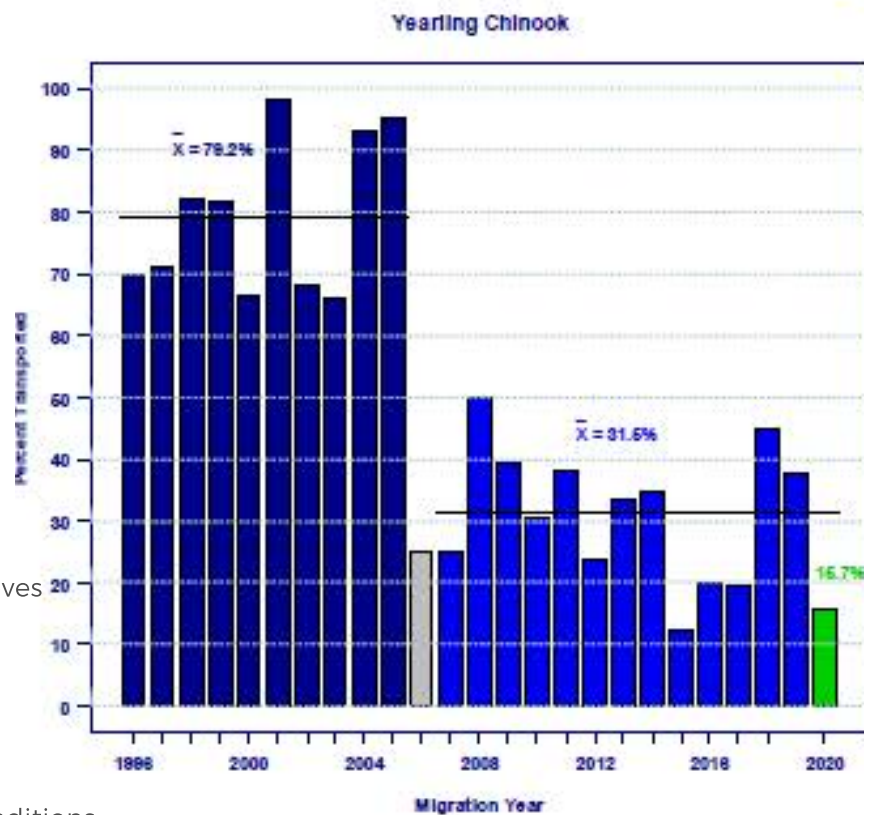
- Spillway > Juvenile Bypass > Turbine
- Increased turbines = Decreased SAR
- Faster travel = Higher survival
- SAR's are higher earlier

## Transport

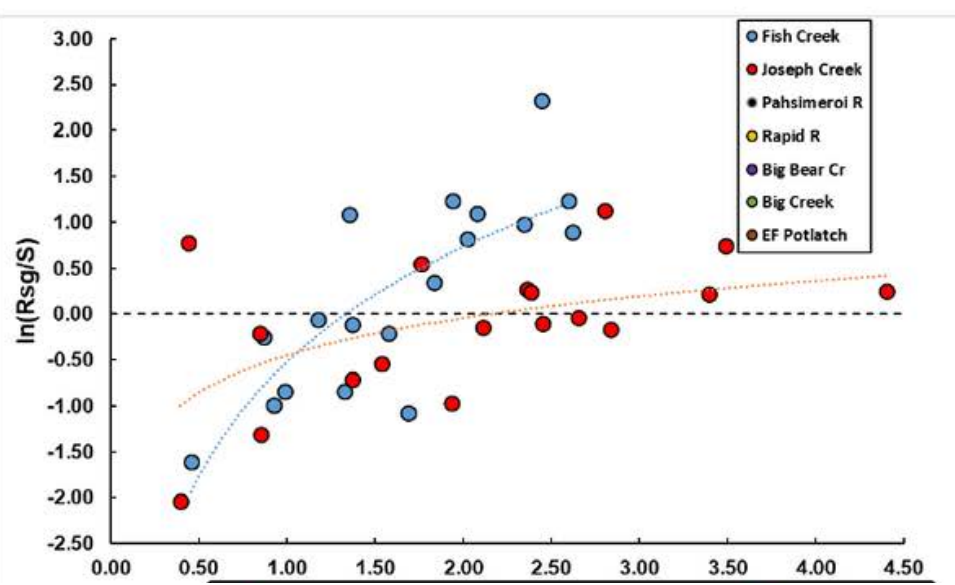
- Greater benefit for hatchery production
- Increasing benefit through season
- Greater benefit for steelhead than Chinook
- Decreasing benefit as in-river survival improves
- Higher strays than in-river

## Flow

- Higher flow decreases travel time
- Higher spill decreases travel time
- Spillway weirs decrease travel time
- PITPH lowest under low flow - high spill conditions



# SAR MUSINGS



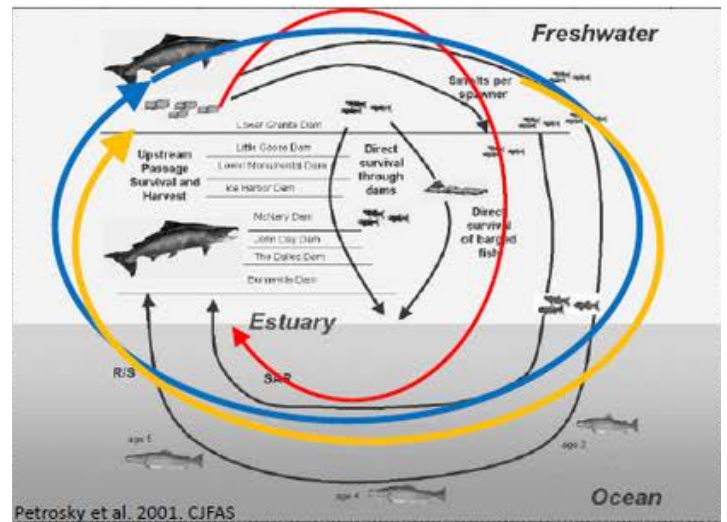
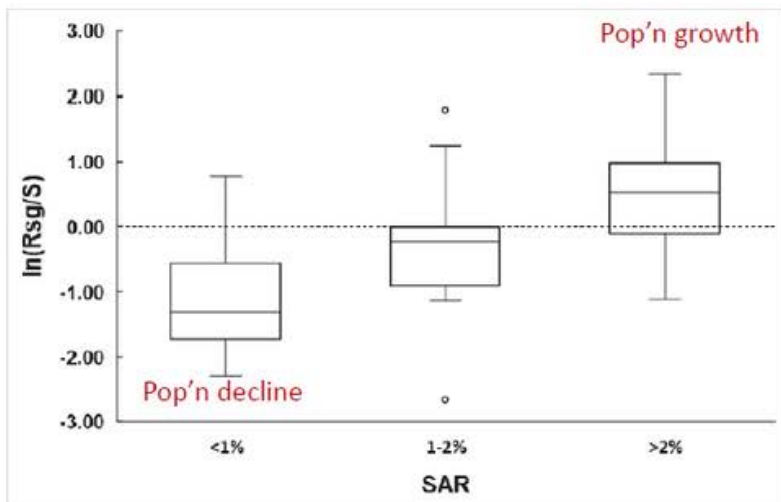
Jonathan Ebel, Idaho Department of Fish and Game, presented "SAR as an indicator for wild and hatchery fish performance" and summed that as Musing on SARs.

## SAR Smolt to Adult survival Rate

- Northwest Power and Conservation Council (NPCC) adopted 2-6% SAR as goal
- CSS estimates start point and Lower Granite Dam and end point of Lower Granite Dam
- SAR of 2% is sufficient for population growth of spring/summer Chinook and steelhead

## Musings

- Do not apply NPCC SAR goals to Hatchery stocks
- Framework can be used to refine LSRCP SAR reality vs. goal
- Report detailed methods of how a program estimates a SAR
- If you use someone else's data make sure you know the details



# LSRCP Performance



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		

SCS Performance – 2004-2017			
Facility	Releases (smolt)	Total Adults Produced	SAS (%)
Clearwater	27,583,855	84,492	0.31
Dworshak	14,696,726	75,502	0.51
Lookingglass	12,422,482	112,423	0.91
McCall	12,804,588	105,379	0.82
Sawtooth	14,681,584	48,513	0.33
Tucannon	2,438,332	5,336	0.21
<b>TOTAL</b>	<b>84,627,567</b>	<b>431,645</b>	<b>0.51</b>

Rod Engle, LSRCP, presented on spring/summer Chinook LSRCP performance since 2004. During that timeframe, the program has averaged just shy of 50% of its project area goals in spring/summer chinook. Average Smolt to Adult Survival (SAS) has been 0.51%, below the 0.65- 0.87% Project Area goals and well below the 3.25-4.35% Total Adult objective goals.

### Take-Aways

- More smolts hasn't equaled more adults spring/summer chinook
- Enhance performance of existing programs

### Program Performance Work

- Reciprocal study implementation (steelhead, fall Chinook, spring Chinook)
- Salmon River and Clearwater River Basins Performance
- Release Sites, Release Strategies, Stock performance, Rearing Performance.

# FISH FOR THE FUTURE

The Lower Snake River Compensation Plan is critical to the future of salmon and steelhead in the Pacific Northwest. We've had successes. Fall Chinook are doing well. 1990's predictions of complete extinction have been staved off. Some salmon harvest mitigation is still happening.

However, 40 years after we've begun, there is still work to do. We're only half way to the adult spring/summer Chinook targets. Steelhead are currently struggling. Ocean conditions are changing quickly and the migration corridor continues to demise of the majority of LSRCF smolts.

Keep challenging our assumptions. Dream big and take risks. We are a large, talented, and diverse group of people and fish with a common goal: Fish for the Future. If we continue experimenting and adapting, we will find success points to replicate and move the needle towards consistent returns above the mitigation goals.

Thanks for everything you do out there!

***We are Fish for the Future!***

- Nate

Project	Smolts Affected	Survival To LGR	Current SAS Rate	New SAS Rate	Net Adult Benefit	Cost/Adult
Direct Barge Dworshak FH	368,000	77%	0.00%	0.35%	1,288	\$ -
Direct Barge Clearwater FH	1,275,000	66%	0.00%	0.52%	6,630	\$ -
Direct Barge Sawtooth FH	1,020,000	51%	0.00%	0.51%	5,202	\$ -
Lyons Ferry Reciprocal to SCS	750,000		0.00%	0.87%	6,525	\$ 15
Operate Sawtooth at 2M	500,000		0.00%	0.51%	2,550	\$ 25
Hagerman PRAS to Age 0 SCS	300,000		0.00%	0.50%	1,500	\$ 26
Dworshak Burrows Ponds	1,000,000		0.00%	0.58%	5,800	\$ 78
<b>SubTotal</b>					<b>29,495</b>	
Cover Dworshak Raceways	1,150,000		0.34%	0.80%	3,590	\$ 738
Lyons Ferry Expansion	1,000,000		0.00%	0.80%	8,000	\$ 766
McCall or Lookingglass Expansion	1,000,000		0.00%	0.80%	8,000	\$ 766
NPTH Expansion	1,000,000		0.00%	0.80%	8,000	\$ 766
					<b>57,085</b>	