



# CHIEF JOSEPH HATCHERY 2022 ANNUAL PROGRAM REVIEW

## 2021 SUMMER CHINOOK SPAWNING GROUNDS SUMMARY

MATTHEW B. LARAMIE  
ECOLOGIST; USGS/COLVILLE CONFEDERATED TRIBES [MLARAMIE@USGS.GOV](mailto:MLARAMIE@USGS.GOV)

ANDREA PEARL  
FISHERIES BIOLOGIST; COLVILLE CONFEDERATED TRIBES

BRIAN DIETZ  
FISHERIES BIOLOGIST; COLVILLE CONFEDERATED TRIBES



## Objectives

### Monitor Status and Trends:

- Environmental Conditions
- Spawn timing
- Spatial distribution
- Pre-spawn mortality
- Age structure (scales, CWT)
- Stray rates
- Sex ratio
- Fish size

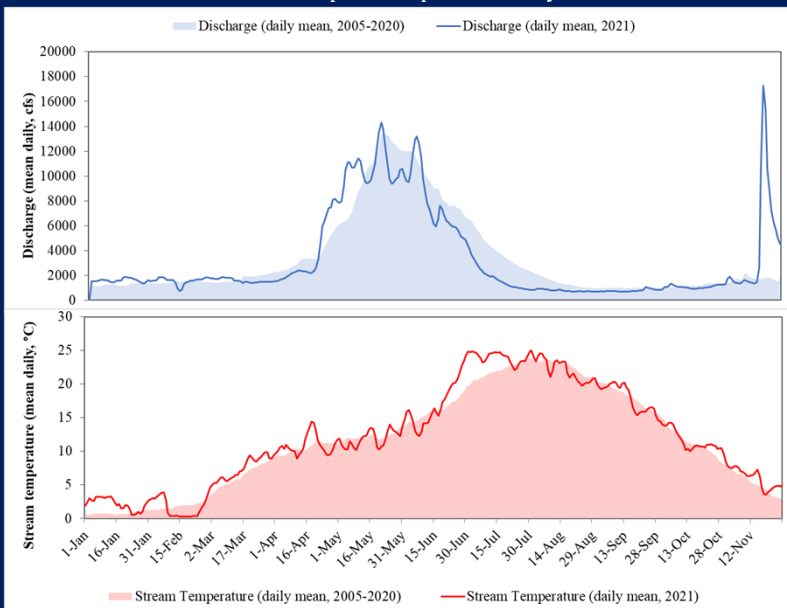
### Estimate:

- Escapement
- Composition (pHOS)



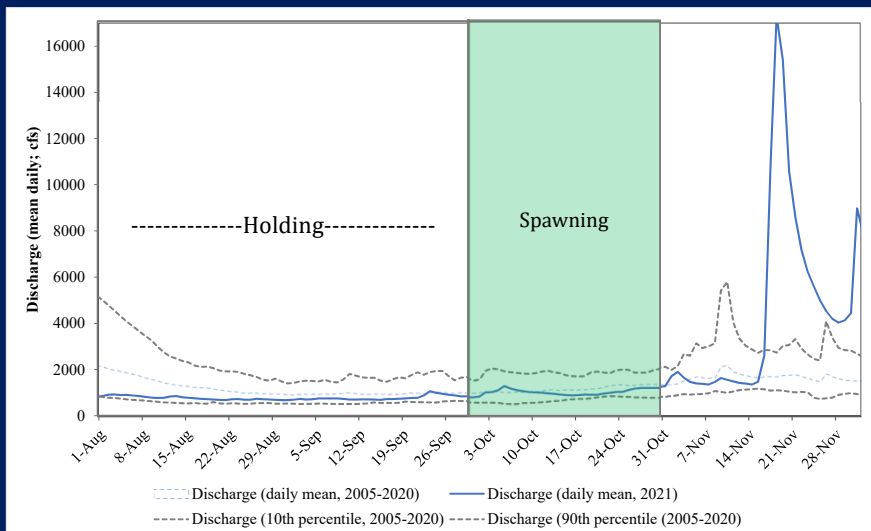
# Environmental Conditions

2021 compared to previous 16 years



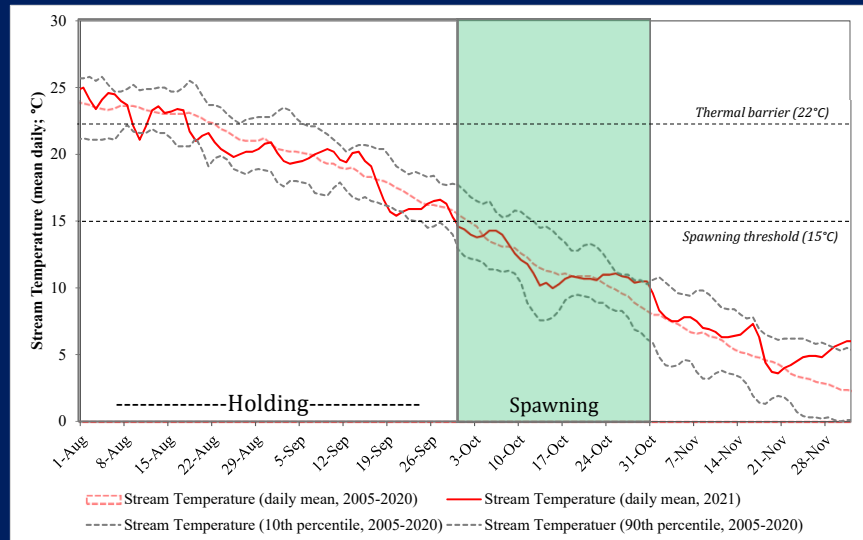
# Environmental Conditions

2020 compared to previous 15 years

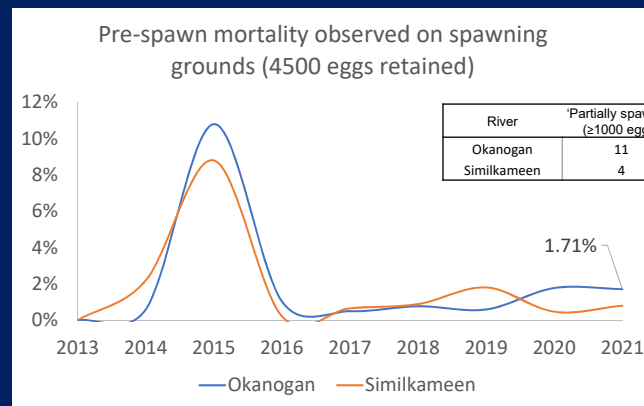


# Environmental Conditions

2020 compared to previous 15 years



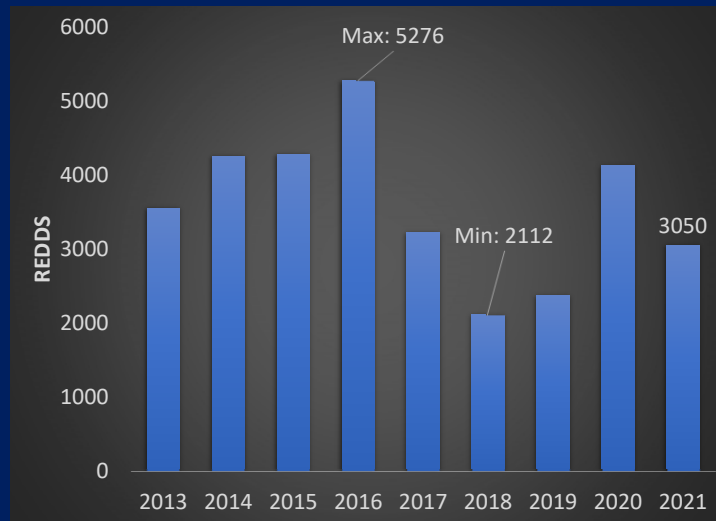
# Pre-spawn mortality (PSM)



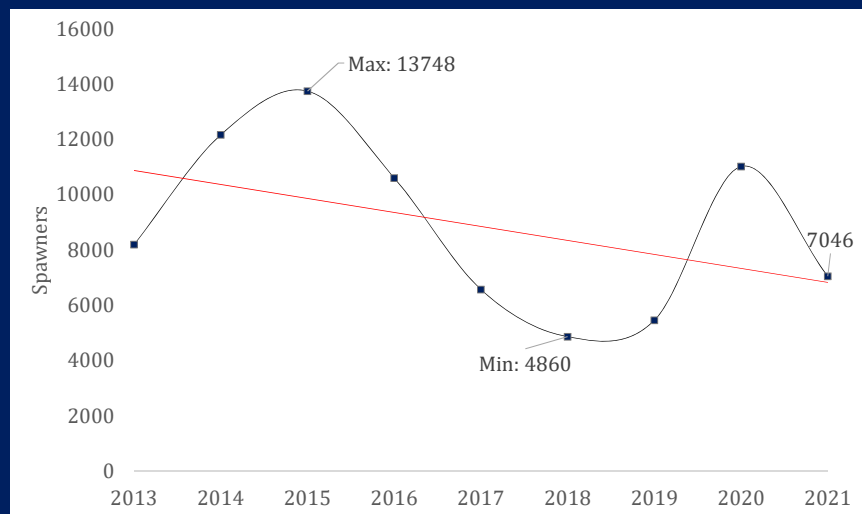
Count of recovered female carcasses (i.e., sample size)

River	2013	2014	2015	2016	2017	2018	2019	2020	2021
Okanogan	314	621	398	786	412	261	170	734	469
Similkameen	249	681	923	1018	309	113	111	655	251
Total	563	1302	1321	1804	721	374	281	1389	720

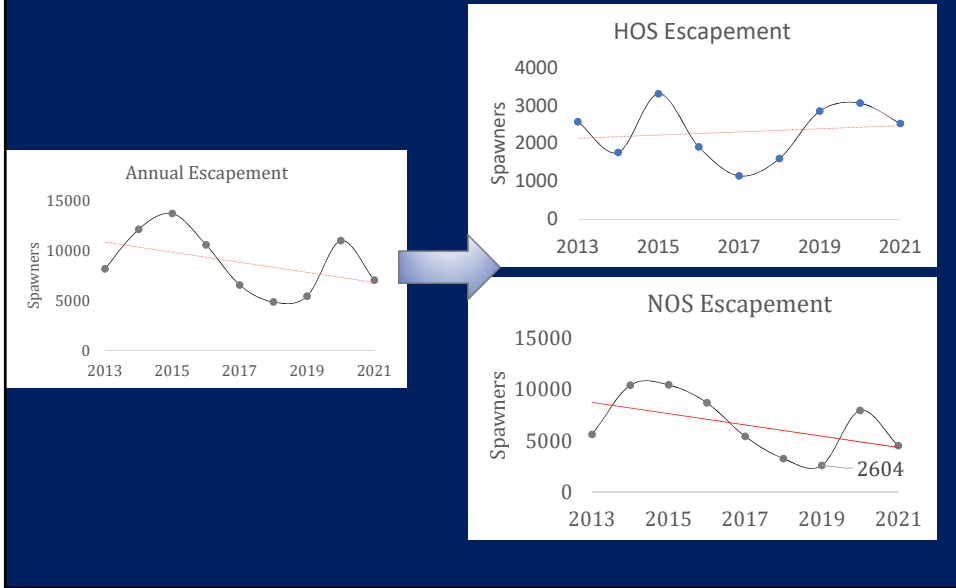
## Annual Redd Counts



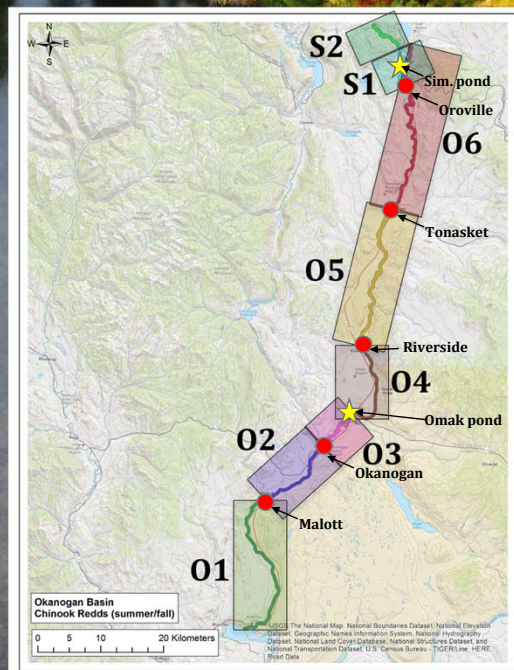
## Annual Escapement

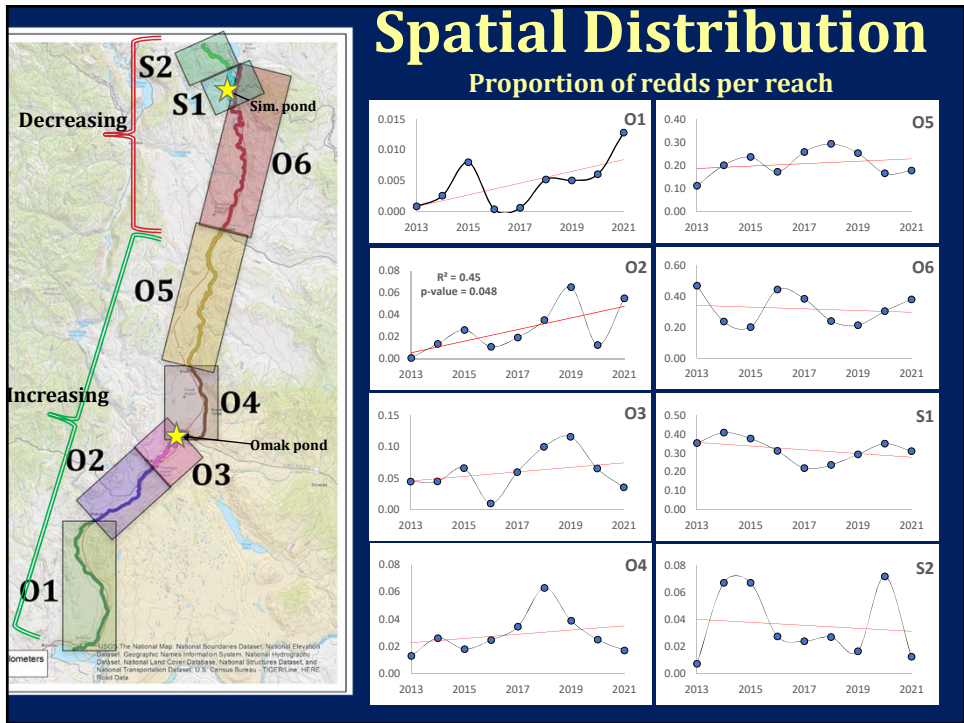
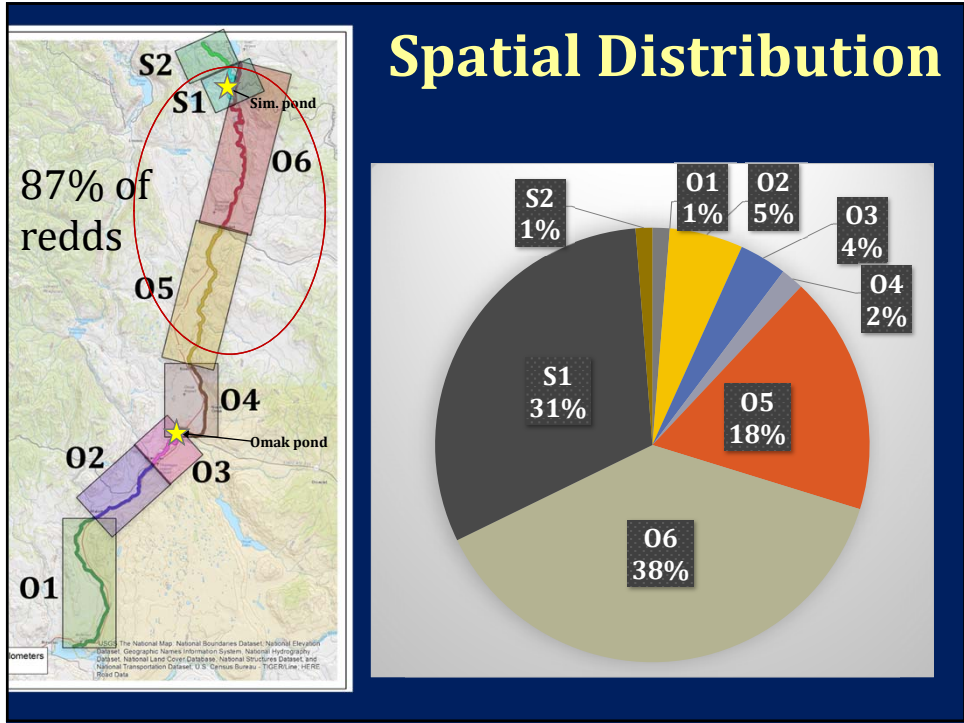


# Annual Escapement



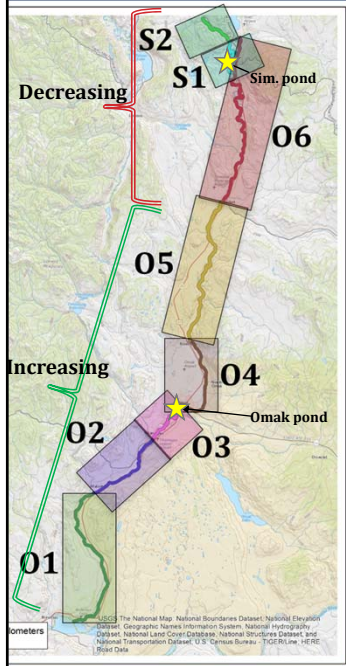
# Spatial Distribution - Spawning





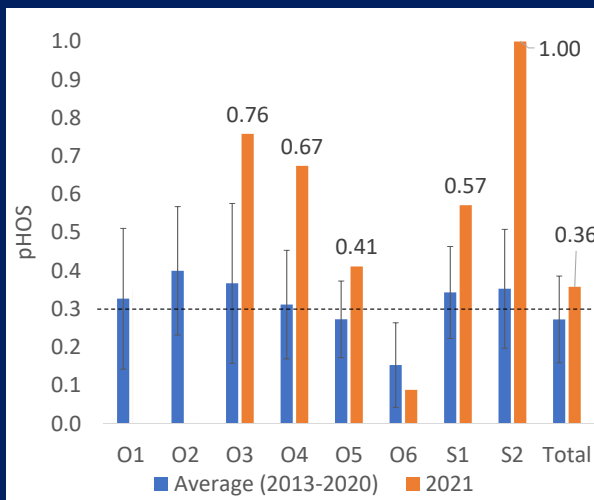
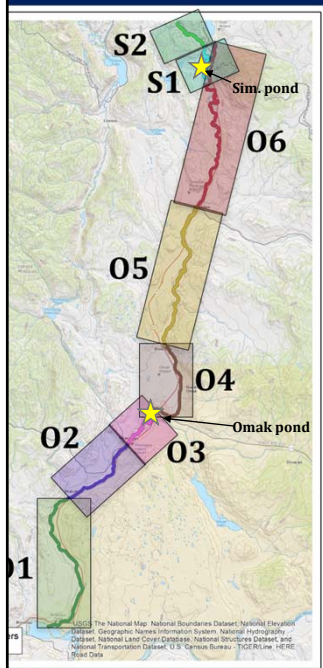
# Spatial Distribution

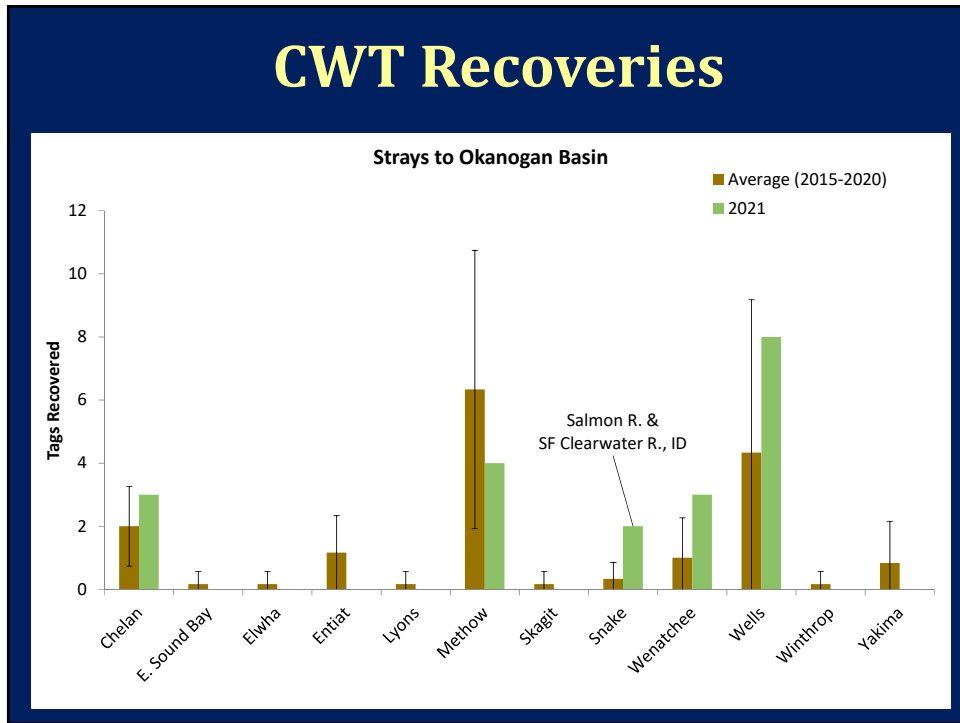
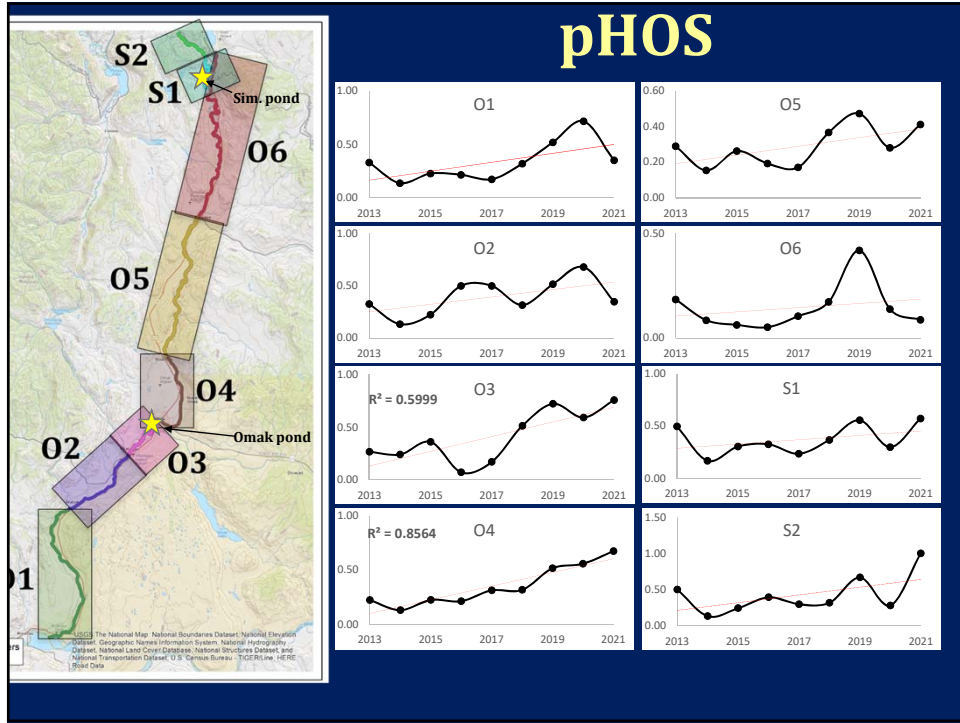
Proportion of redds per reach



Reach	Pre-CJH	CJH-Era	$\Delta$	p-value
O1	0.00	0.01	0.00	0.07
O2	0.02	0.04	0.03	<b>0.03</b>
O3	0.05	0.08	0.03	0.11
O4	0.02	0.04	0.01	0.20
O5	0.20	0.22	0.02	0.51
O6	0.34	0.28	-0.05	0.44
S1	0.34	0.30	-0.04	0.35
S2	0.04	0.03	-0.01	0.58

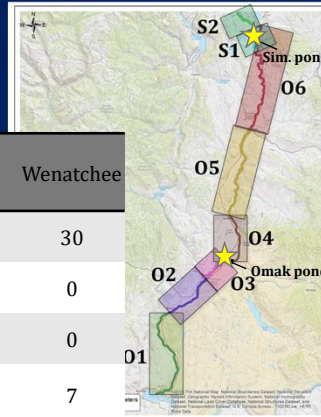
# Spawner composition







## Stray rate-into basin (CWT-expansions)



Reach	Chelan	Methow	Salmon R.	SF Clearwater R.	Wells	Wenatchee
O2	30	0	0	0	0	30
O3	0	4	4	0	32	0
O4	3	0	0	0	6	0
O5	14	7	0	7	7	7
O6	0	0	0	0	6	0
S1	0	29	0	0	0	7
S2	0	0	0	0	0	0
Total	47	24	4	7	52	44
Percent of spawning population	0.7%	0.3%	0.1%	0.1%	0.7%	0.6%

Strays  
comprise  
**2.5%** of  
spawning  
population

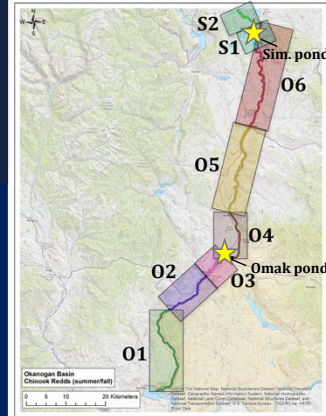
## CJHP strays to out-of-basin

Year	Escapement	Chelan	Cowlitz	Methow	Okanogan	Similkameen	Homing	Straying
2014	241	0	0	0	121	120	100.0%	0.0%
2015	1789	4	0	0	687	1097	99.8%	0.2%
2016	2391	4	0	4	328	2005	99.7%	0.3%
2017	576	11	3	0	370	192	97.5%	2.5%
2018	191	4	0	4	116	68	95.6%	4.4%
2019	1460	12	0	0	846	602	99.2%	0.8%
2020	836	0	0	29	686	121	96.5%	3.5%

\*RMIS query data from 16 March 2021

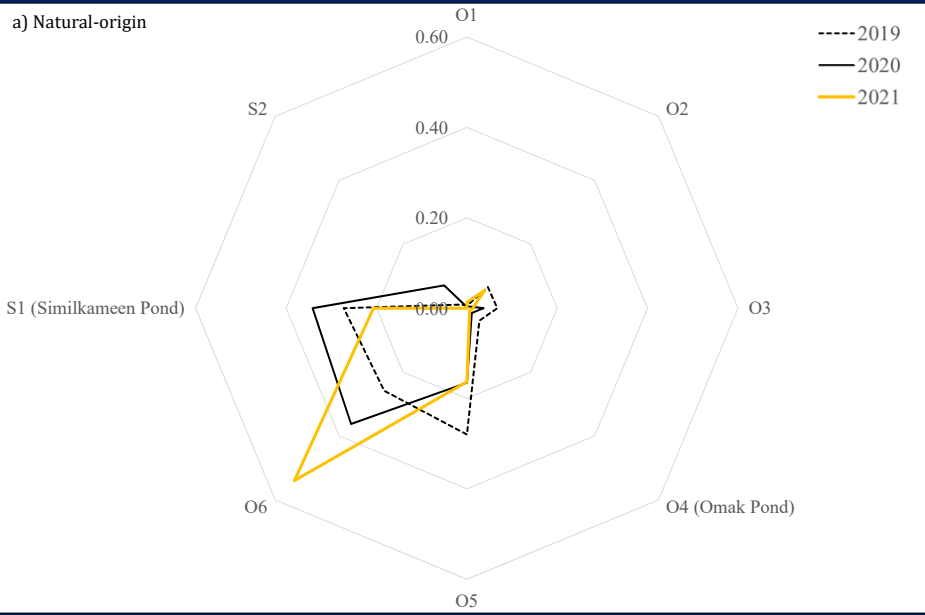
## CJHP-origin returns to the Okanogan spawning grounds (CWT expansions)

Reach	CJH (seg)	Omak Pond (CJH Int.)	Similkameen Pond (CJH Int.)
O2	75	0	0
O3	31	85	31
O4	19	46	6
O5	19	218	236
O6	14	41	174
S1	169	42	1001
S2	0	23	65
Total	328	455	1513
Percent of spawning population	4.7%	6.5%	21.5%

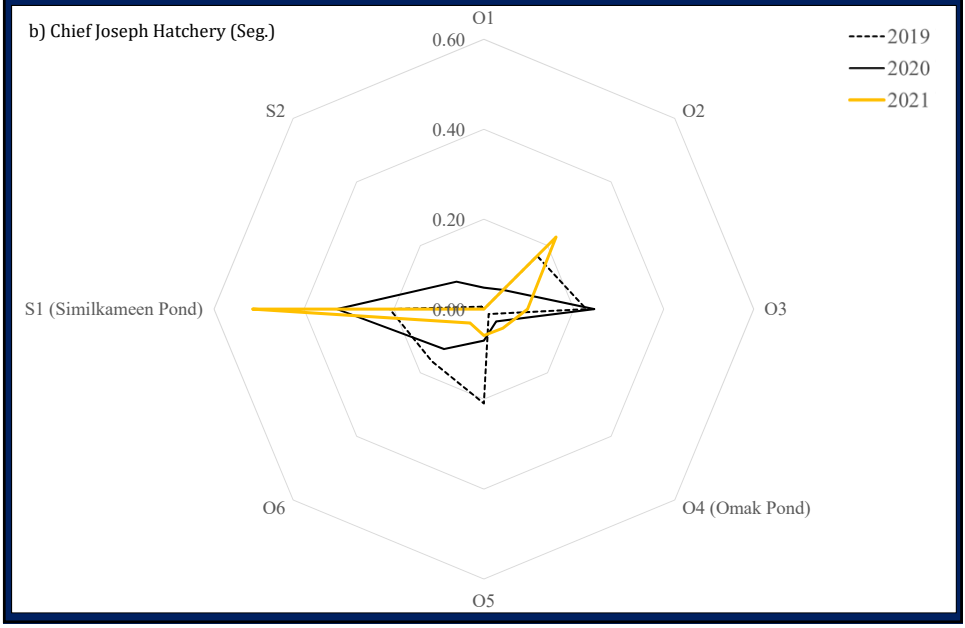


**CJH-origin fish comprise 32.6% of spawning population**

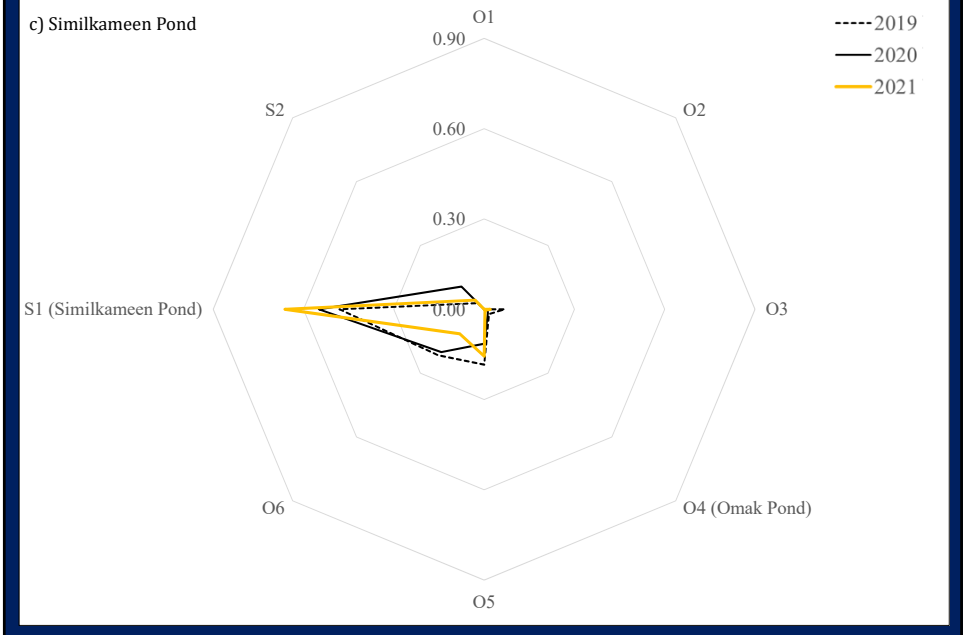
## Spawner distribution



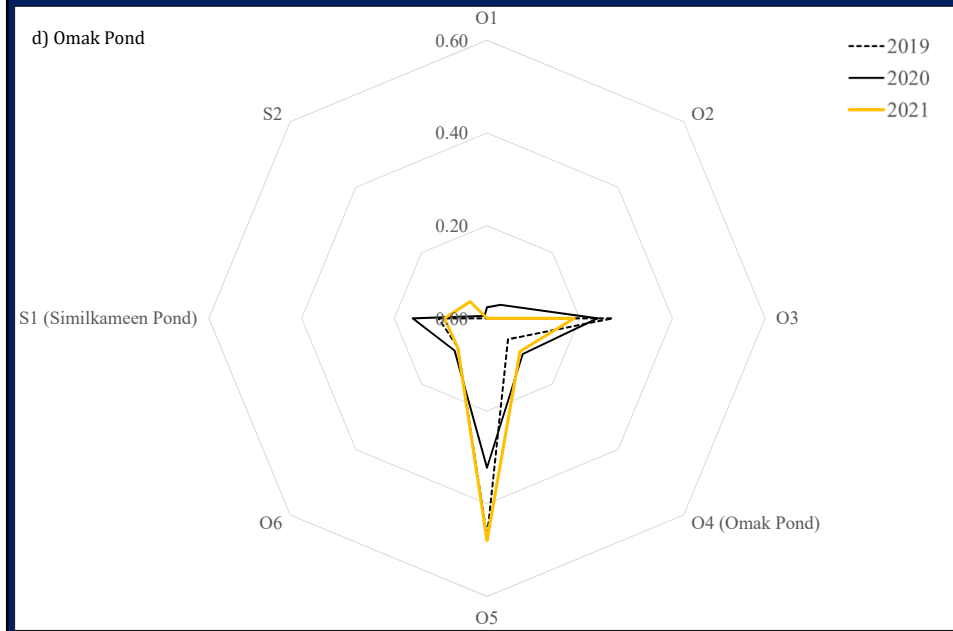
# Spawner distribution



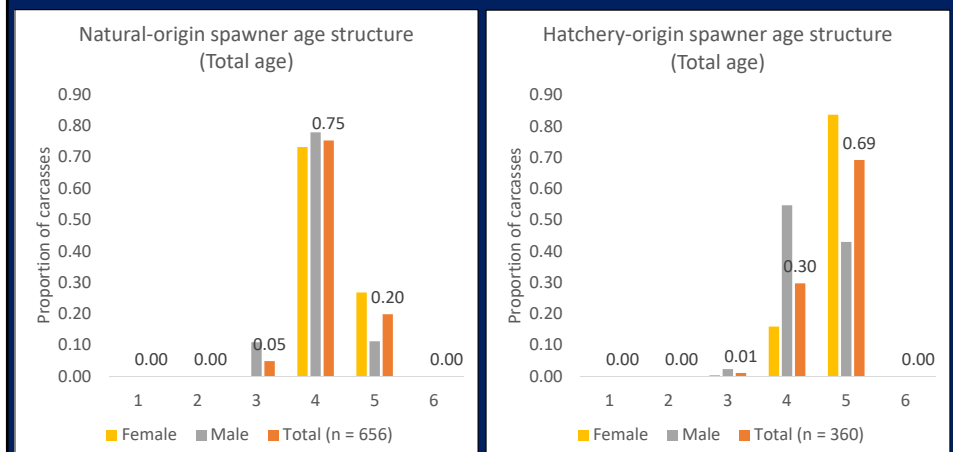
# Spawner distribution



# Spawner distribution



# Age Structure

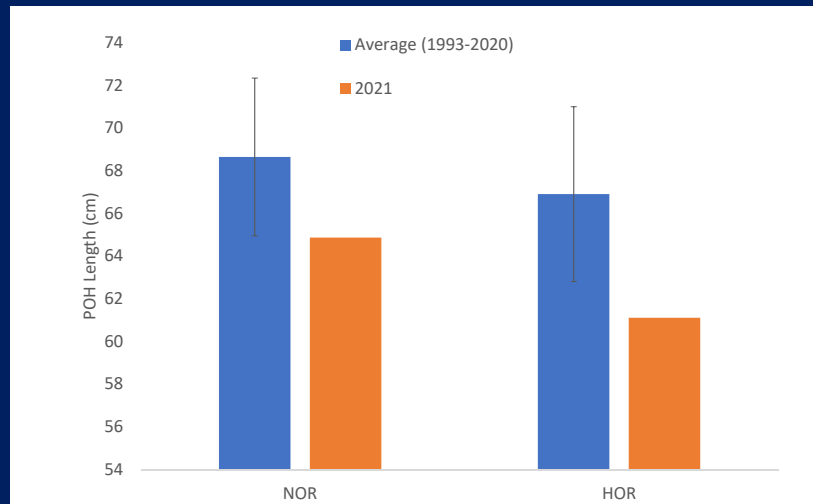


## 2021 Jacks

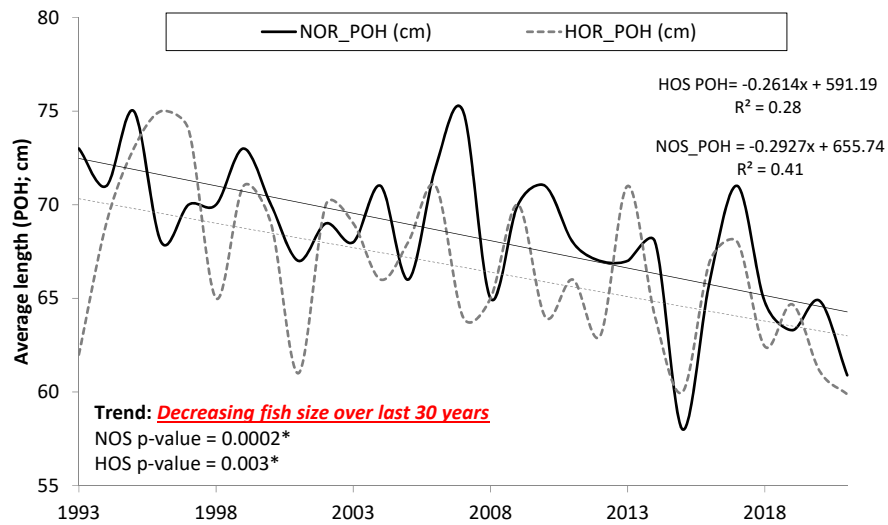
	Jacks	Adults	Total	Jack Rate
HOS	4	356	360	1.1%
NOS	32	624	656	4.9%

*HOS Age Sample Rate 5.1%*  
*NOS Age Sample Rate 9.3%*

## Fish size



## Length trend



## Spawner Abundance (USA portion of basin only)

2021	Redds	Spawners	HOS	NOS	pHOS
Okanogan	2067	4775	1186	3589	0.25
Similkameen	983	2271	1335	936	0.59
U.S. Total	3050	7046	2521	4525	0.36

# Chinook escapement to Canada

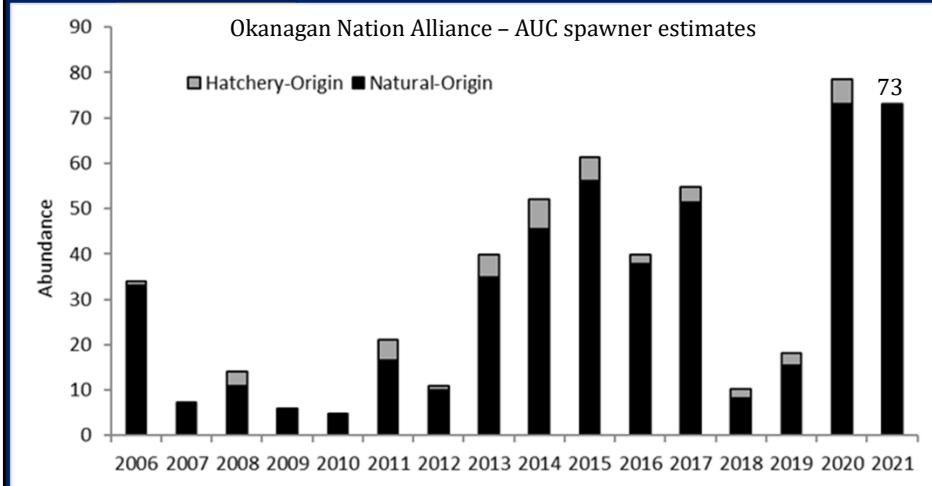


Figure courtesy of Elinor McGrath, ONA

# U.S. pHOS

