



CHIEF JOSEPH HATCHERY 2024 ANNUAL PROGRAM REVIEW

2023 SUMMER CHINOOK SPAWNING GROUNDS SUMMARY

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Objectives

Monitor Status and Trends:

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

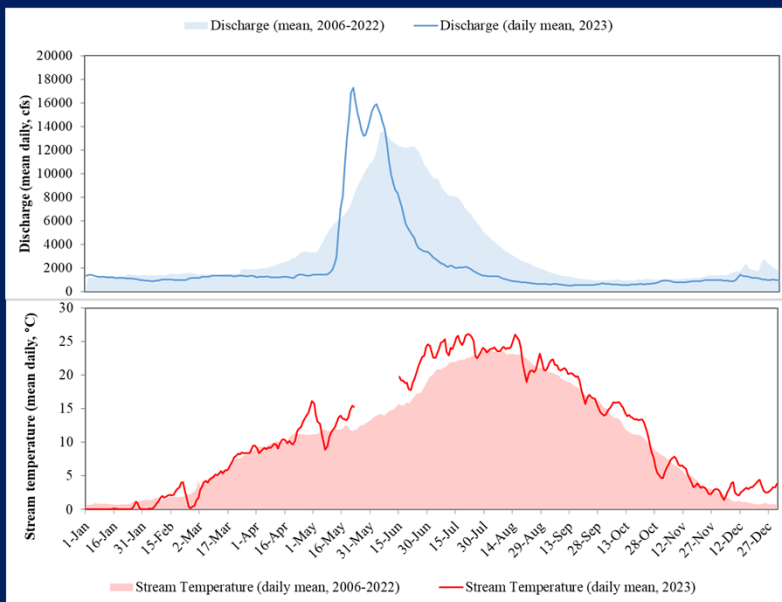
Estimate:

- Escapement
- Composition (pHOS)



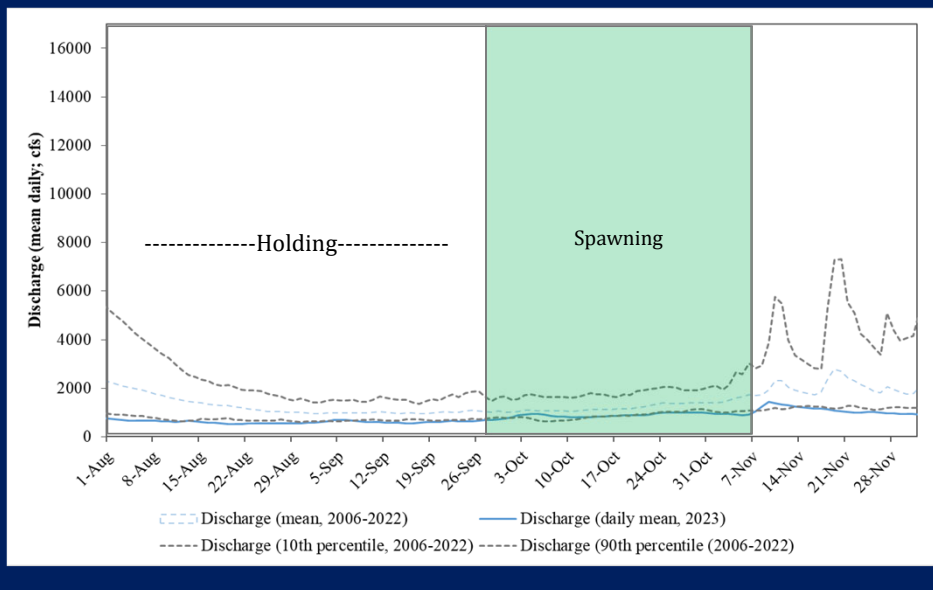
Environmental Conditions

2023 compared to previous 17 years



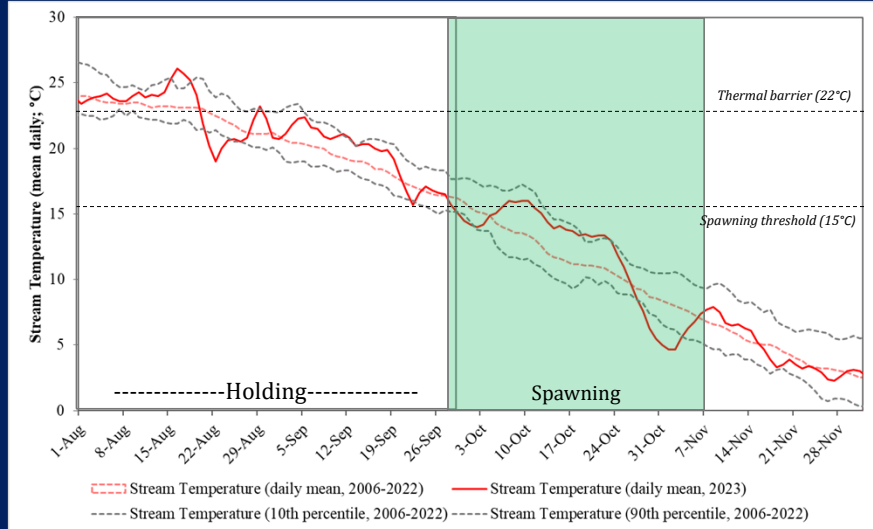
Environmental Conditions

2023 compared to previous 17 years



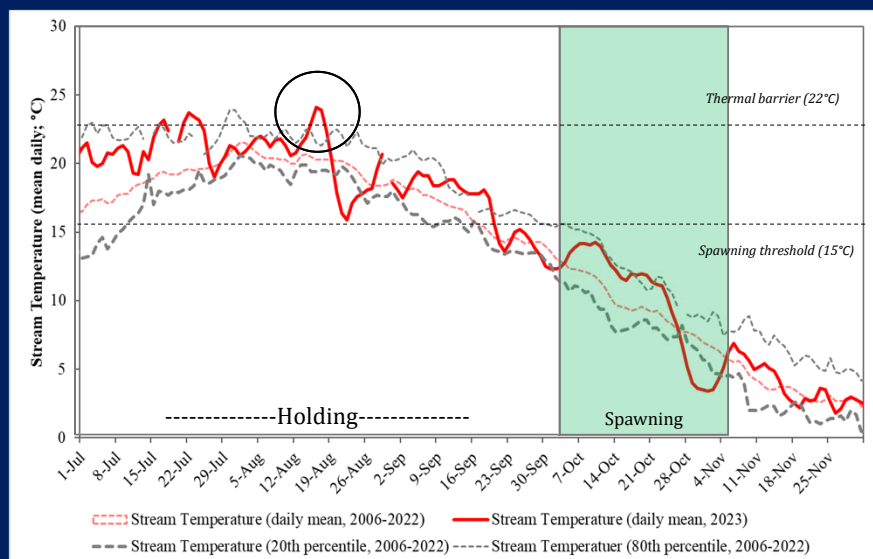
Environmental Conditions

2023 compared to previous 17 years



Environmental Conditions (Similkameen)

2023 compared to previous 17 years

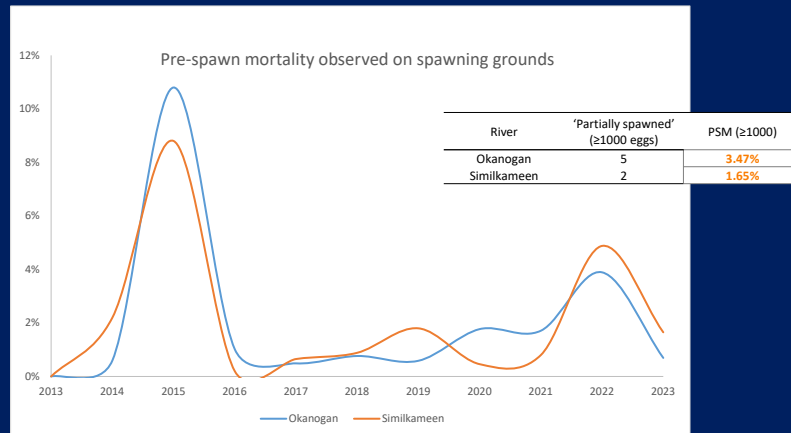


Environmental Conditions (Similkameen)

2022 compared to previous 16 years

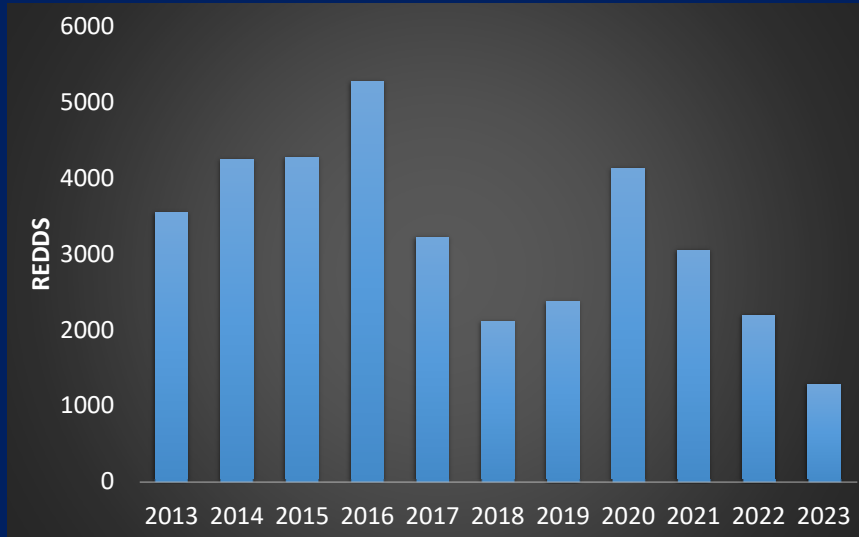
Temp in C°					Rank of each metric					Sum of	Overall
Year	July Max	Aug Max	Jul Avg	Aug Avg	Year	July Max	Aug Max	Jul Avg	Aug Avg	ranks	Rank
2014	19.5	20.6	19.62	19.62	2014	10	10	5	7	32	
2015	23.4	22.2	20.92	19.71	2015	4	9	3	5	21	5
2016	22.6	22.8	17.98	19.68	2016	5	5	8	6	24	
2017	22.6	22.6	20.63	20.51	2017	5	6	4	2	17	4
2018	22.5	22.6	19.47	18.57	2018	7	6	6	10	29	
2019	21.8	22.9	16.86	20.28	2019	8	4	9	3	24	
2020	21.6	22.3	16.86	19.52	2020	9	8	9	9	35	
2021	23.8	23.0	21.52	19.55	2021	3	3	1	8	15	3
2022	25.1	23.7	18.39	20.87	2022	1	2	7	1	11	2
2023	24.4	25.5	21.19	20.27	2023	2	1	2	4	9	1

Pre-spawn mortality (PSM)

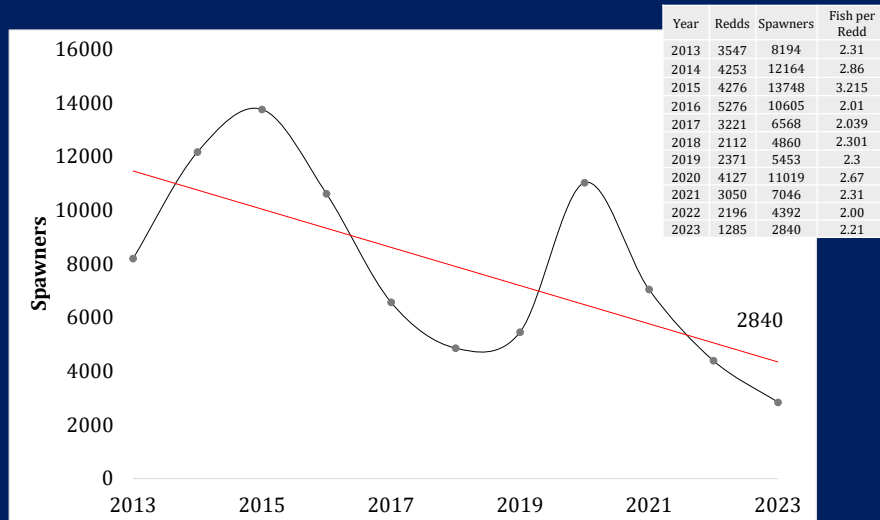


Count of Recovered Female Carcasses (i.e., sample size)											
Basin	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Okanogan	314	621	398	786	412	261	170	734	469	385	144
Similkameen	249	681	923	1018	309	113	111	655	251	246	121
Total	563	1302	1321	1804	721	374	281	1389	720	631	265

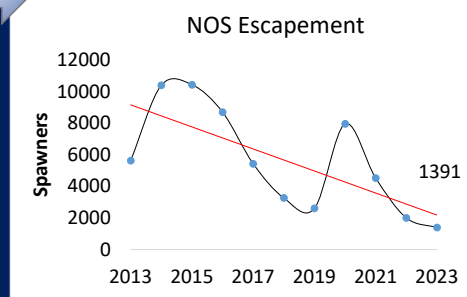
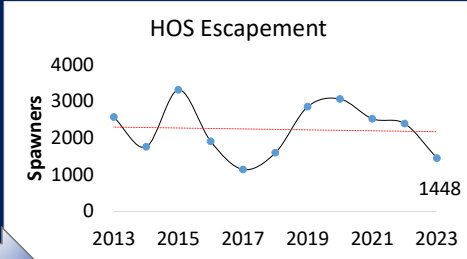
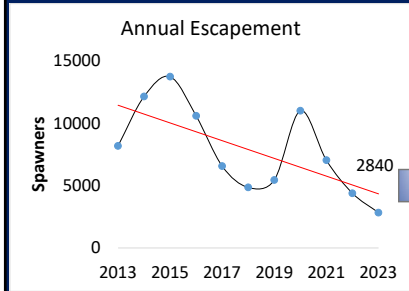
Annual Redd Counts



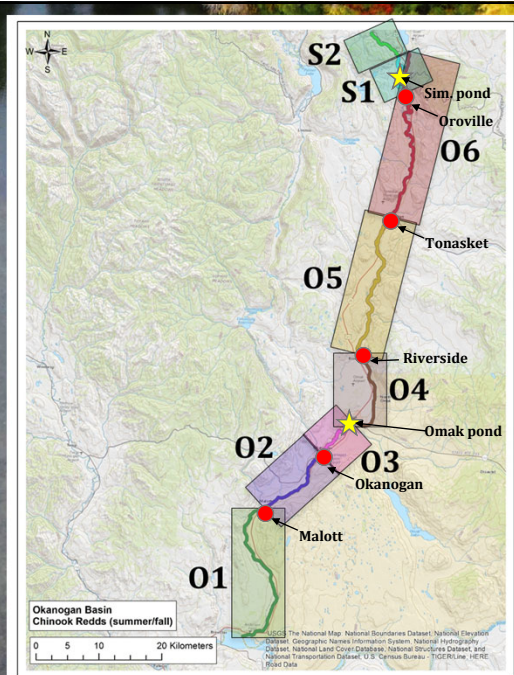
Annual Escapement

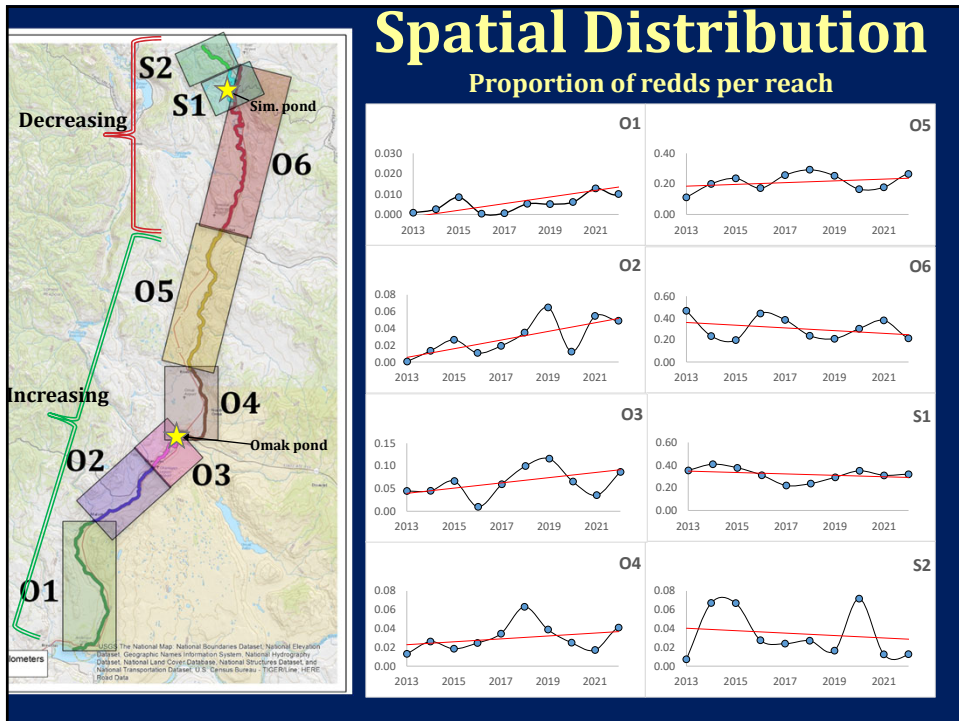
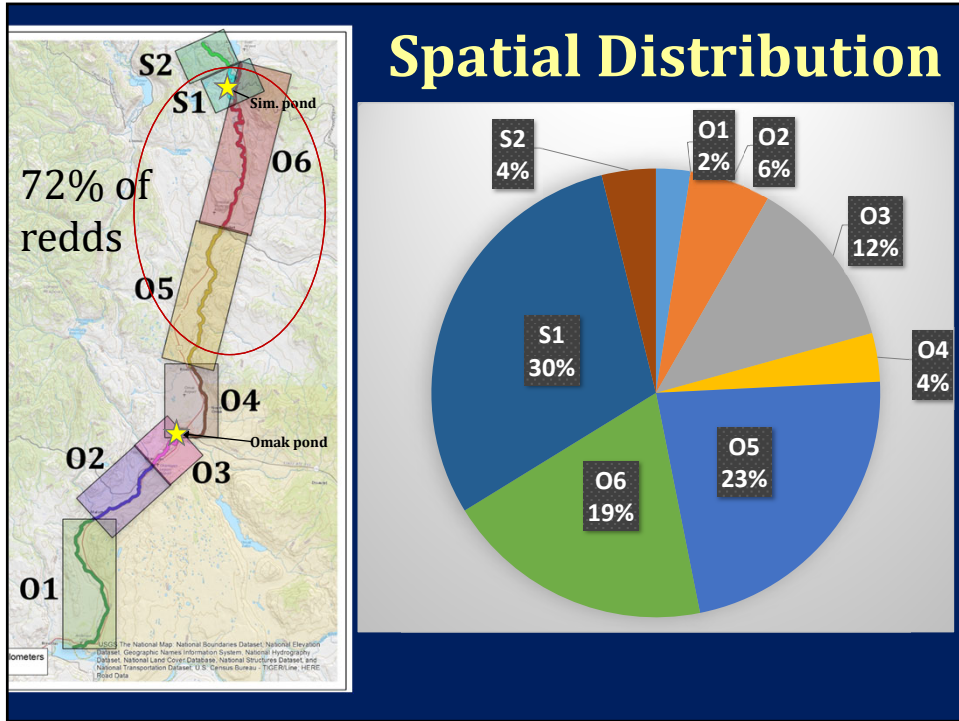


Annual Escapement



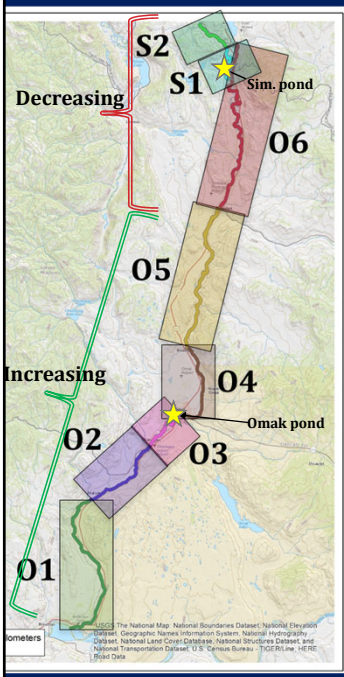
Spatial Distribution - Spawning





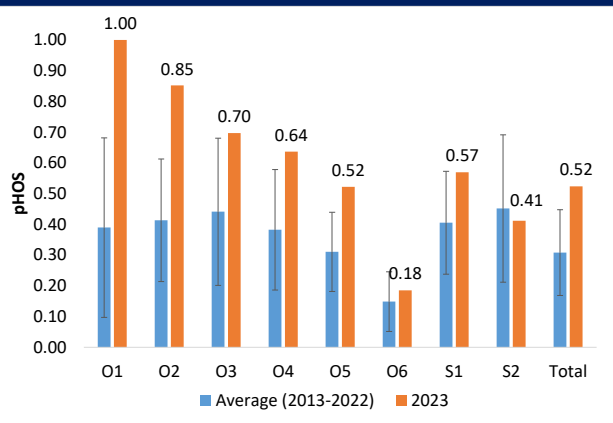
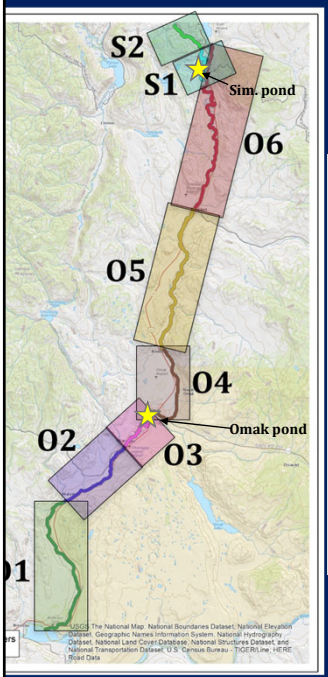
Spatial Distribution

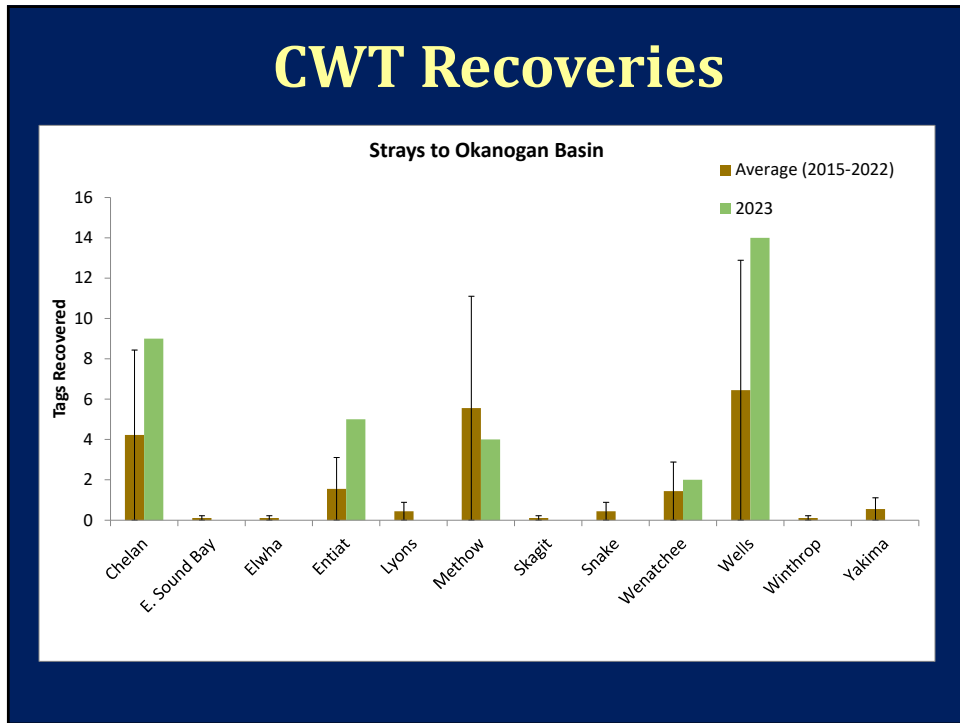
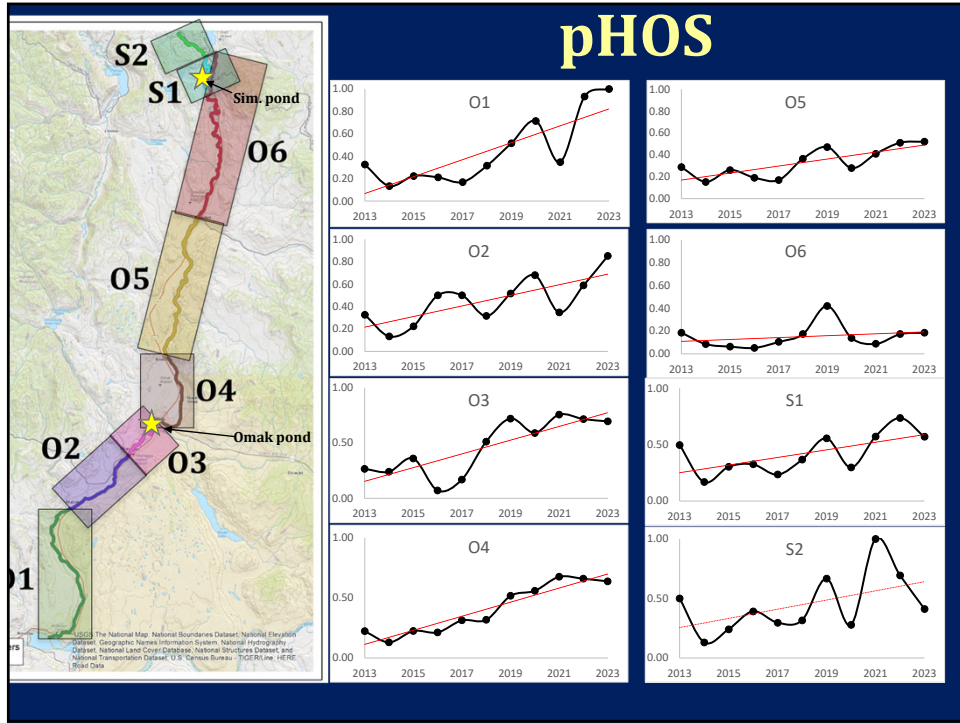
Proportion of redds per reach



Reach	Pre-CJH	CJH-Era	Δ	p-value
O1	0.00	0.01	0.01	0.04
O2	0.02	0.05	0.03	0.01
O3	0.05	0.09	0.04	0.03
O4	0.02	0.04	0.01	0.10
O5	0.20	0.23	0.03	0.29
O6	0.34	0.26	-0.08	0.17
S1	0.34	0.30	-0.03	0.29
S2	0.04	0.03	-0.01	0.42

Spawner composition

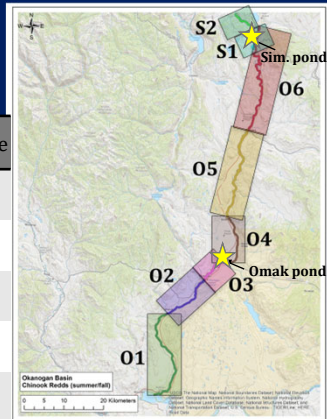




Stray rate-into basin

(CWT-expansions)

Reach	Chelan	Methow	Entiat	Wells	Wenatchee
01	24	0	0	24	0
02	43	0	7	7	0
03	18	6	31	37	12
04	5	5	0	6	0
05	21	10	0	41	0
06	0	5	0	5	0
S1	0	0	0	4	0
S2	0	0	0	0	0
Total	111	26	46	124	12
Percent of spawning population	3.9%	0.9%	1.6%	4.4%	0.4%



Strays comprise **11.2%** of spawning population

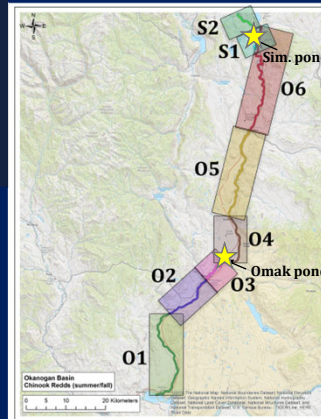
CJHP strays to out-of-basin

Year	Escapement	Chelan	Wenatchee	Methow	Okanogan	Similkameen	Homing	Straying
2014	1026	0	0	4	374	648	99.61%	0.39%
2015	2470	4	4	5	939	1518	99.47%	0.53%
2016	2585	4	0	4	365	2212	99.69%	0.31%
2017	857	11	0	0	510	336	98.72%	1.28%
2018	193	4	0	4	116	69	95.85%	4.15%
2019	1460	12	0	0	846	602	99.18%	0.82%
2020	2035	0	0	33	1083	919	98.38%	1.62%
2021	1688	4	4	15	713	952	98.64%	1.36%
2022	282	0	0	12	202	68	95.74%	4.26%

*RMIS query data from February 2024

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

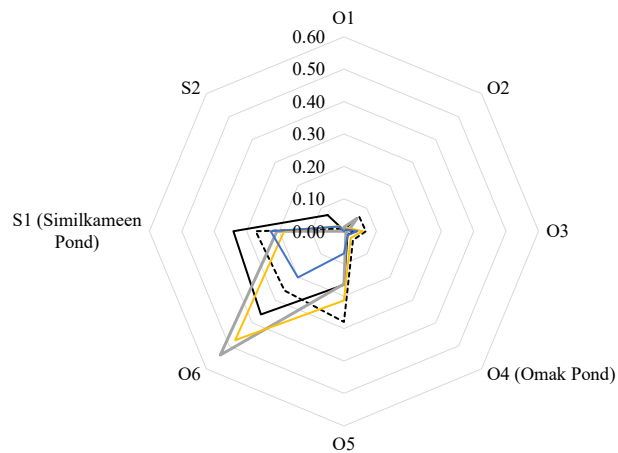
Reach	CJH (seg)	Omak Pond (CJH Int.)	Similkameen Pond (CJH Int.)
01	23	0	0
02	48	29	7
03	75	64	0
04	12	10	26
05	126	54	83
06	21	11	58
S1	90	112	278
S2	0	23	15
Total	396	304	467
Percent of spawning population	14.0%	10.7%	16.5%



CJH-origin fish comprise 41.1% of spawning population

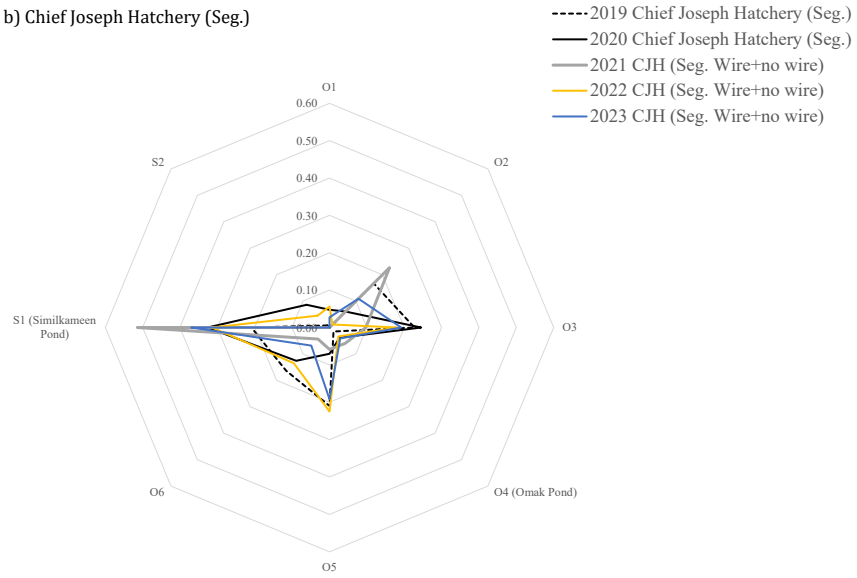
Spawner distribution

a) Natural-origin



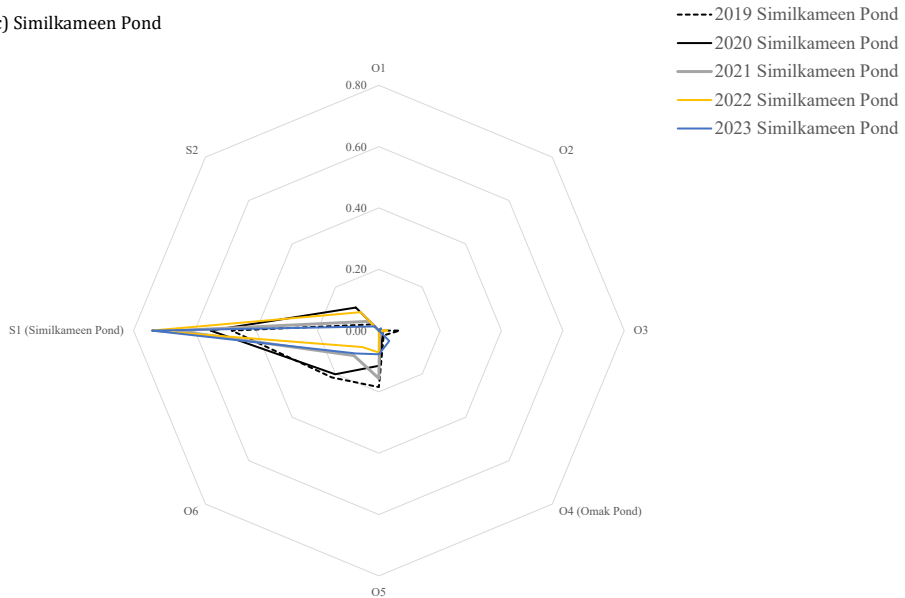
Spawner distribution

b) Chief Joseph Hatchery (Seg.)



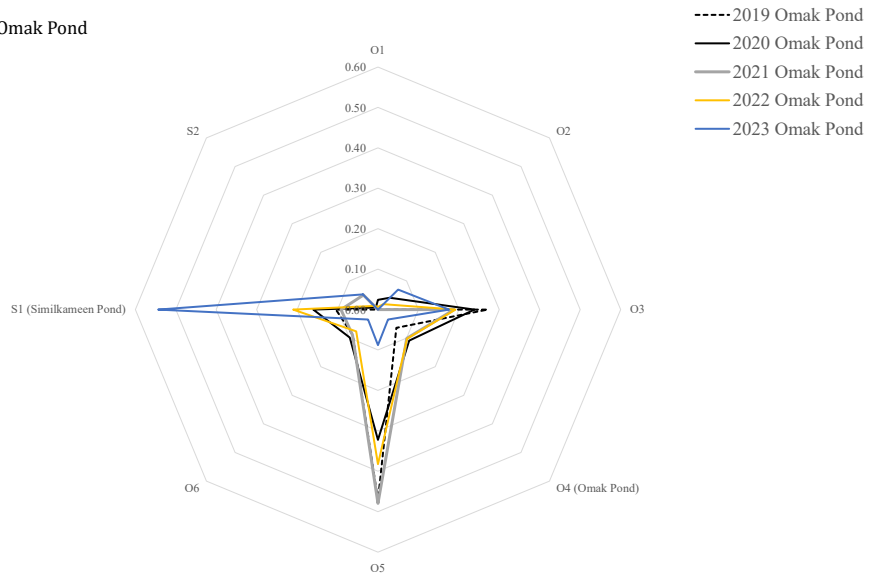
Spawner distribution

c) Similkameen Pond



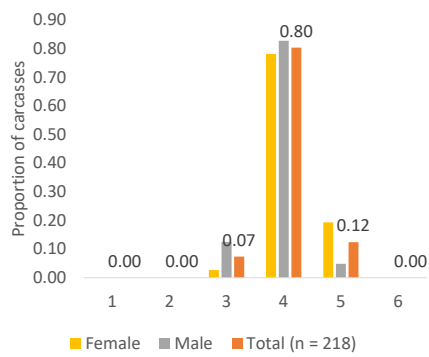
Spawner distribution

d) Omak Pond

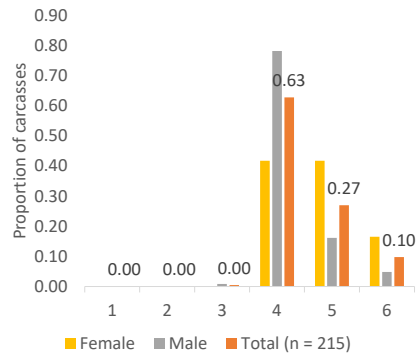


Age Structure

Natural-origin spawner age structure (Total age)



Hatchery-origin spawner age structure (Total age)

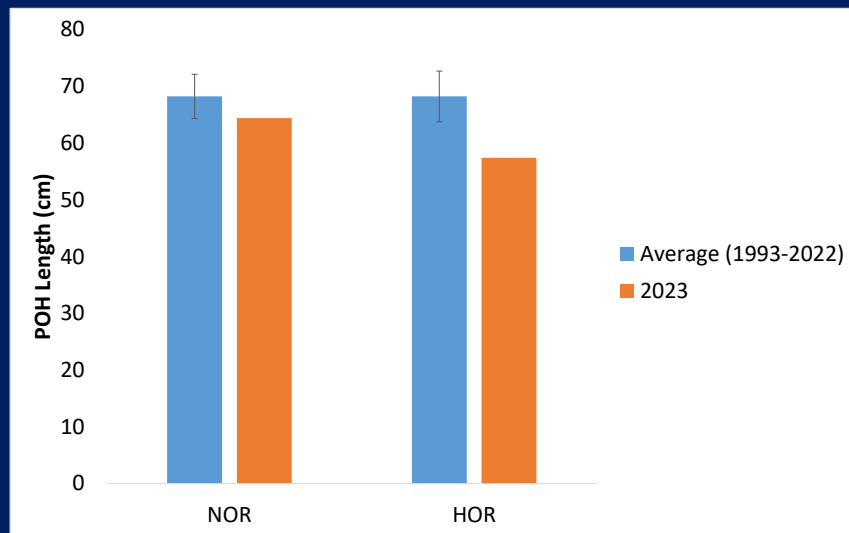


2023 Jacks

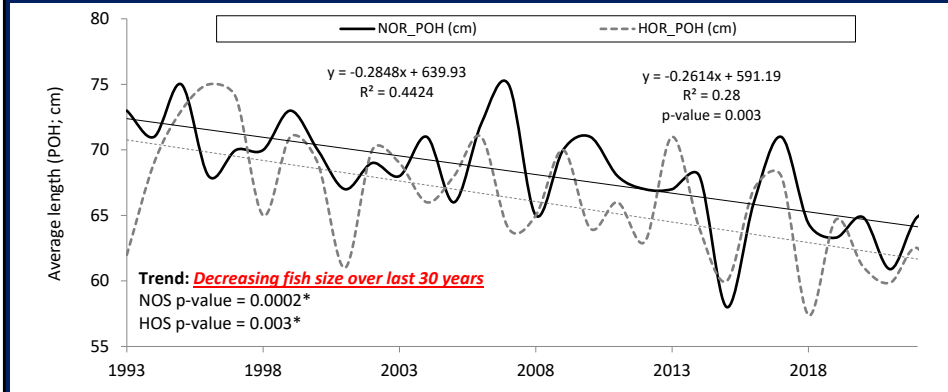
	Jacks	Adults	Total	Jack Rate
HOS	1	214	215	0.5%
NOS	16	202	218	7.3%

HOS Age Sample Rate 7.6%
NOS Age Sample Rate 7.7%

Fish size



Length trend

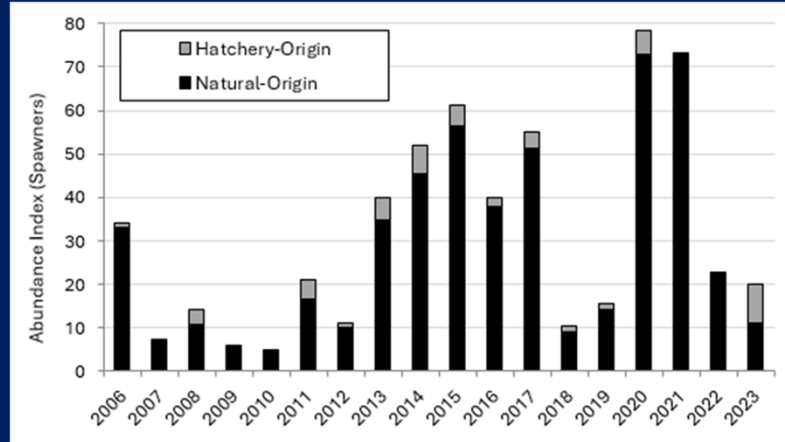


Spawner Abundance (USA portion of basin only)

2023	Redds	Spawners	HOS	NOS	pHOS
Okanogan	851	1881	957	923	0.51
Similkameen	434	959	529	431	0.55
U.S. Total	1285	2840	1486	1354	0.52

Chinook escapement to Canada

Okanagan Nation Alliance – AUC spawner estimates

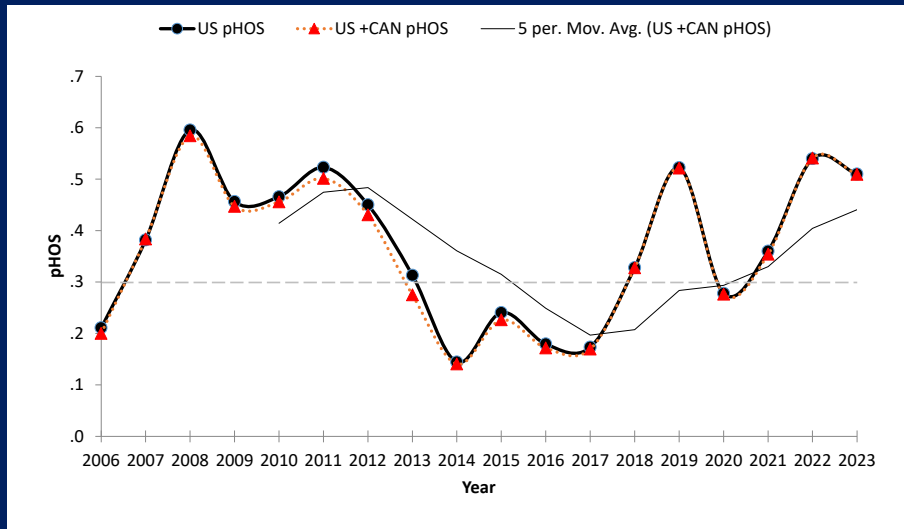


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Figure courtesy of Elinor McGrath, ONA

U.S. pHOS



2023 Effective pHOS 0.47
5-yr Ave Effective pHOS 0.38

