Regional Committee on Marking and Tagging
46th Meeting

April 19 & 20, 2023

PSMFC, Portland, Oregon

www.rmpc.org
205 SE Spokane Street, Suite 100
Portland, OR 97202

MS Teams Tips

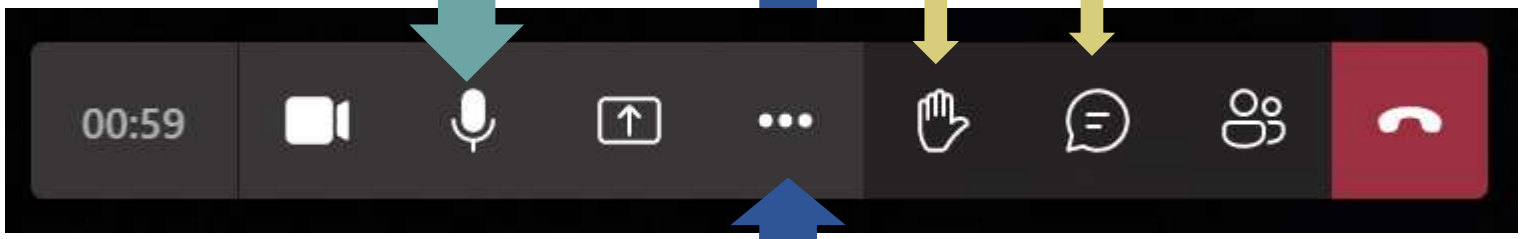
Please mute yourself when not speaking.

Use *6 to mute phone audio.

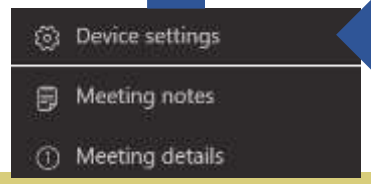
Use the microphone icon on the control bar to mute computer audio.

Desktop view

Browser view



You can use chat or raise your hand



If you are having problems with audio/video, check your device settings.

Welcome and Introductions

- Order of introductions
  - RCMT members
    - in-person
    - virtual, please keep camera on as feasible
  - Other attendees and guest presenters
    - in-person
    - virtual, please use the CHAT (name & affiliation) and leave camera off unless speaking

- In-person meeting room logistics
  - In room personal laptop use: turn off audio/volume
  - WIFI guest access
  - Refreshments

Review Agenda

Approx times (PT)

Day 1	9:00 – 4:30	Day 2	9:00 – 12:30
9:00	Welcome, introductions, and review agenda	9:00	Welcome Day 2
9:10	General RCMT Items	9:05	RCMT: Update to Regional Agreements
9:30	RMPC operations & announcements	9:45	CTUIR New Data Coordinator
10:00	Guidance for tag retrieval labs	10:00	PSC Calendar Year Exploitation Rate Work Group
10:15	All-Agency Update	11:00	Break
11:45	Lunch	11:10	Catch /Harvest Regs pilot database
1:00	Update on PSC Data Exchange Committees	11:40	Understanding Abundance & Distribution in the Ocean
1:30	Parental-Based Tagging & GSI presentations	12:10	Northwest Marine Technology
4:00	Special Marking Requests & Announcements	12:30	Adjourn
4:30	Adjourn		
	6:00 Social at Backwoods Brewing Company 231 NW 11th Ave		

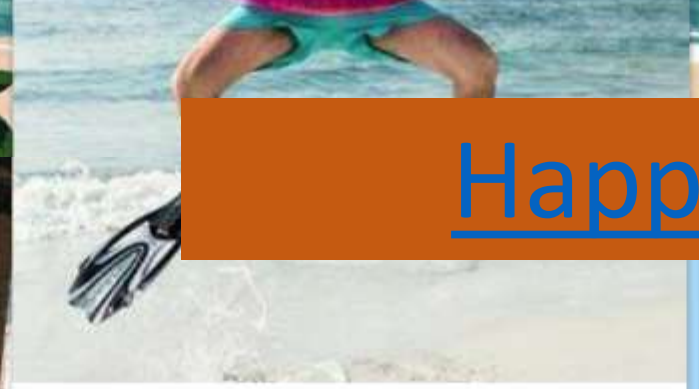
Future Meetings

- 2024 Juneau Alaska
  - 2-day meeting
  - Date options
- Future meeting logistics:
  - PSMFC handles meeting logistics?
  - Do we want to change location rotation?
  - Keep hybrid option?
- Future locations:
  - 2025 Canada
  - 2026 TBD
  - 2027 TBD

Alaska 2024: indicate dates to avoid for end of April / May 2024

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
April 22	23	24	25	26
29	30	May 1	2	3
6	7	8	9	10
13	14	15	16	17
20 Victoria Day	21	22	23	24
27 Memorial Day: United States	28	29	30	31

Happy Retirement Ron!



Congratulations on your retirement Ron! You have had a wonderful and impactful career. Thank you for always being you - super knowledgeable and willing to share your expertise, so easy to chat and laugh with, always willing to try new (and extremely spicy) foods, and just a joy to be around. Enjoy your retirement to the fullest, but don't get hurt! I look forward to seeing you (hopefully) soon to celebrate your retirement in person. Cheers to you.

From carrie cook-tabor

Somehow you beat me to it. Congratulations Ron on your retirement and outstanding career!!! It has been and honor and pleasure working with you over the years.

- Stan

From Stan Allen

From Nancy Leonard

Enjoy Retirement! It has always been great talking to you. You will be missed. Yvonne Dettlaff

From yvonne dettlaff

Congratulations on your retirement, Ron!!! May all the fish you catch in a mark-selective fishery be marked. I hope you enjoy your retirement!

-Ben Cross

Ron... Nancy had the neatest idea.. a Word Cloud for you. Here's what we came up with. Cheers!

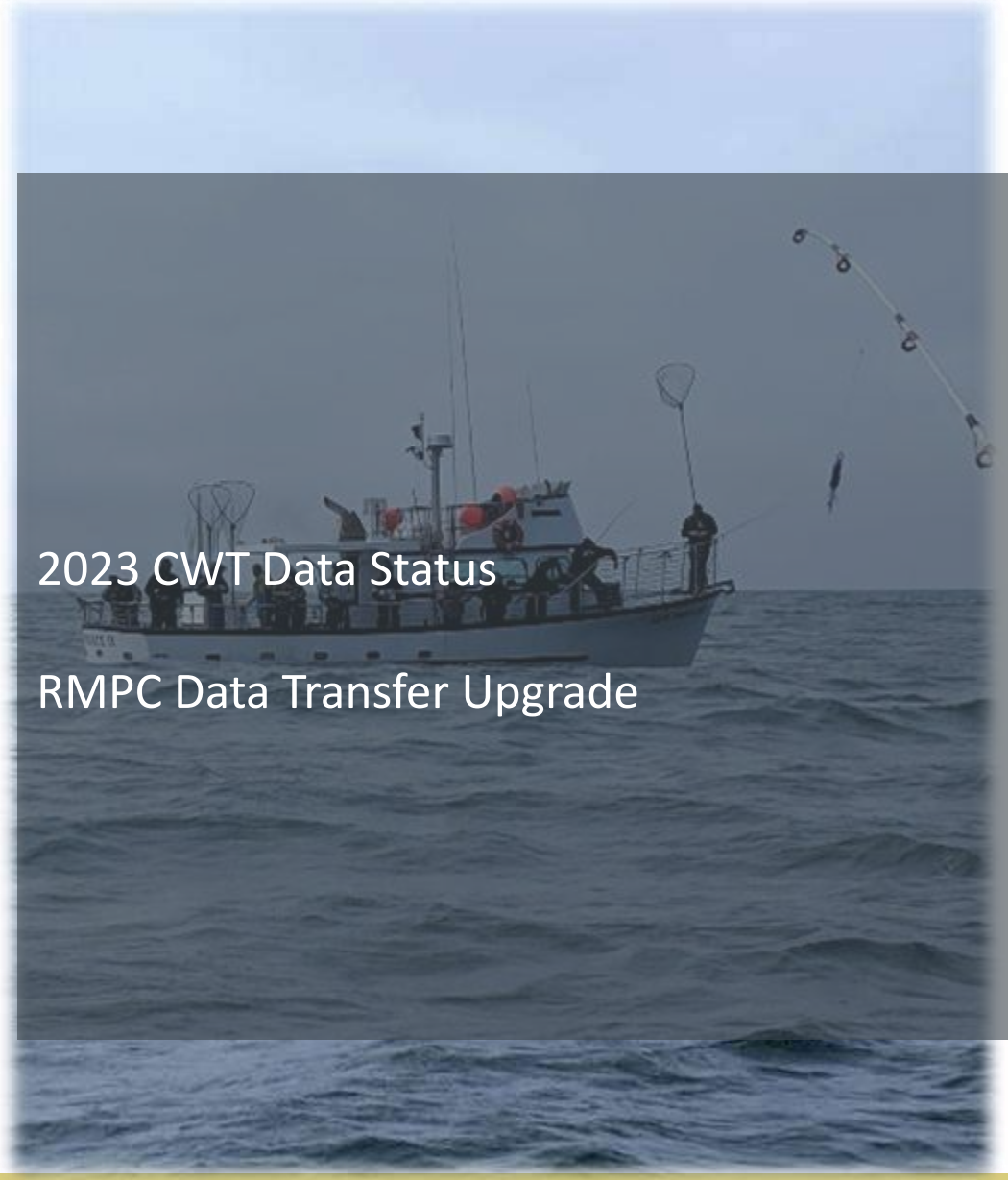
From Jim Longwill

2010 RCMT meeting in Boise, Idaho.

Shared by Stan Allen

From Nancy Leonard

Regional Mark Processing Center operations & announcements



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Dan Webb

2023 CWT Data Status

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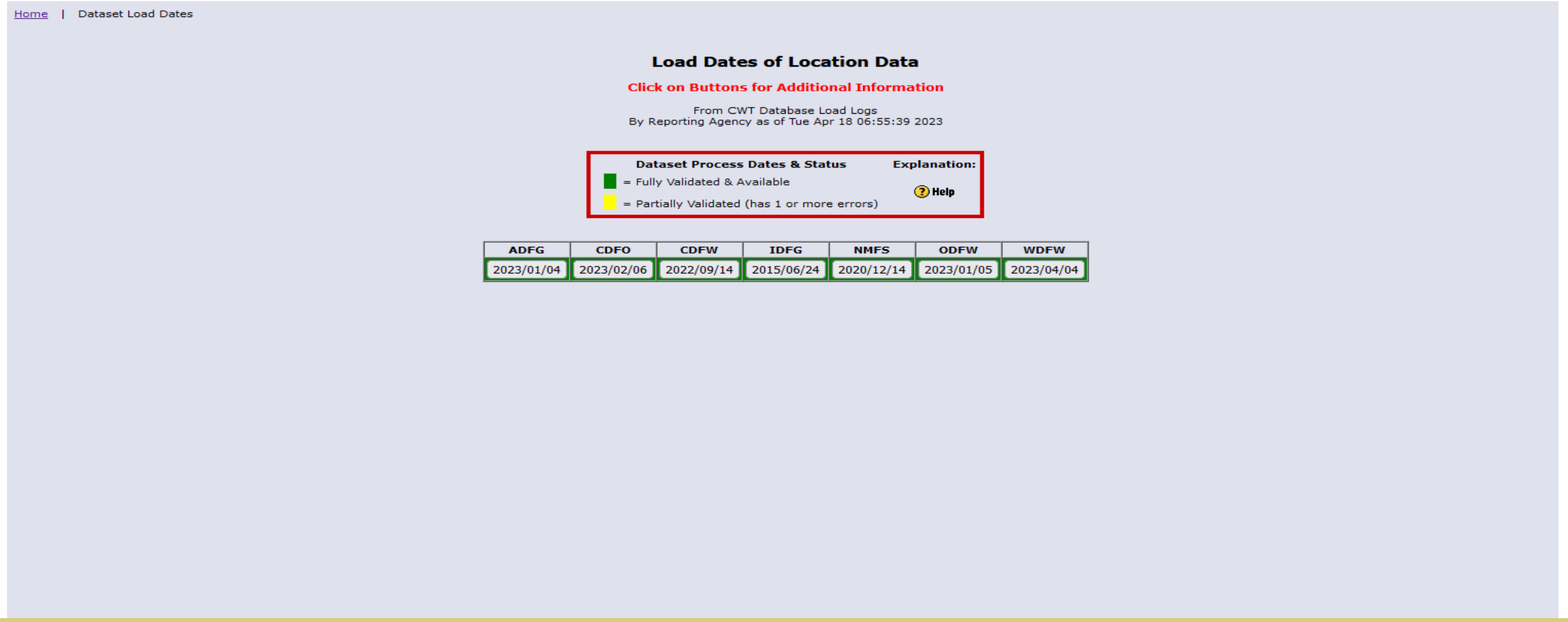
Locations


Home | Dataset Load Dates
Load Dates of Location Data
Click on Buttons for Additional Information
From CWT Database Load Logs
By Reporting Agency as of Tue Apr 18 06:55:39 2023
Dataset Process Dates & Status
= Fully Validated & Available
= Partially Validated (has 1 or more errors)
Explanation:
Help
ADFG
CDFO
CDFW
IDFG
NMFS
ODFW
WDFW
2023/01/04
2023/02/06
2022/09/14
2015/06/24
2020/12/14
2023/01/05
2023/04/04

Releases

Home | Dataset Load Dates

Load Dates of Release Data

Click on Buttons for Additional Information

From CWT Database Load Logs
By Reporting Agency as of Tue Apr 18 06:57:36 2023

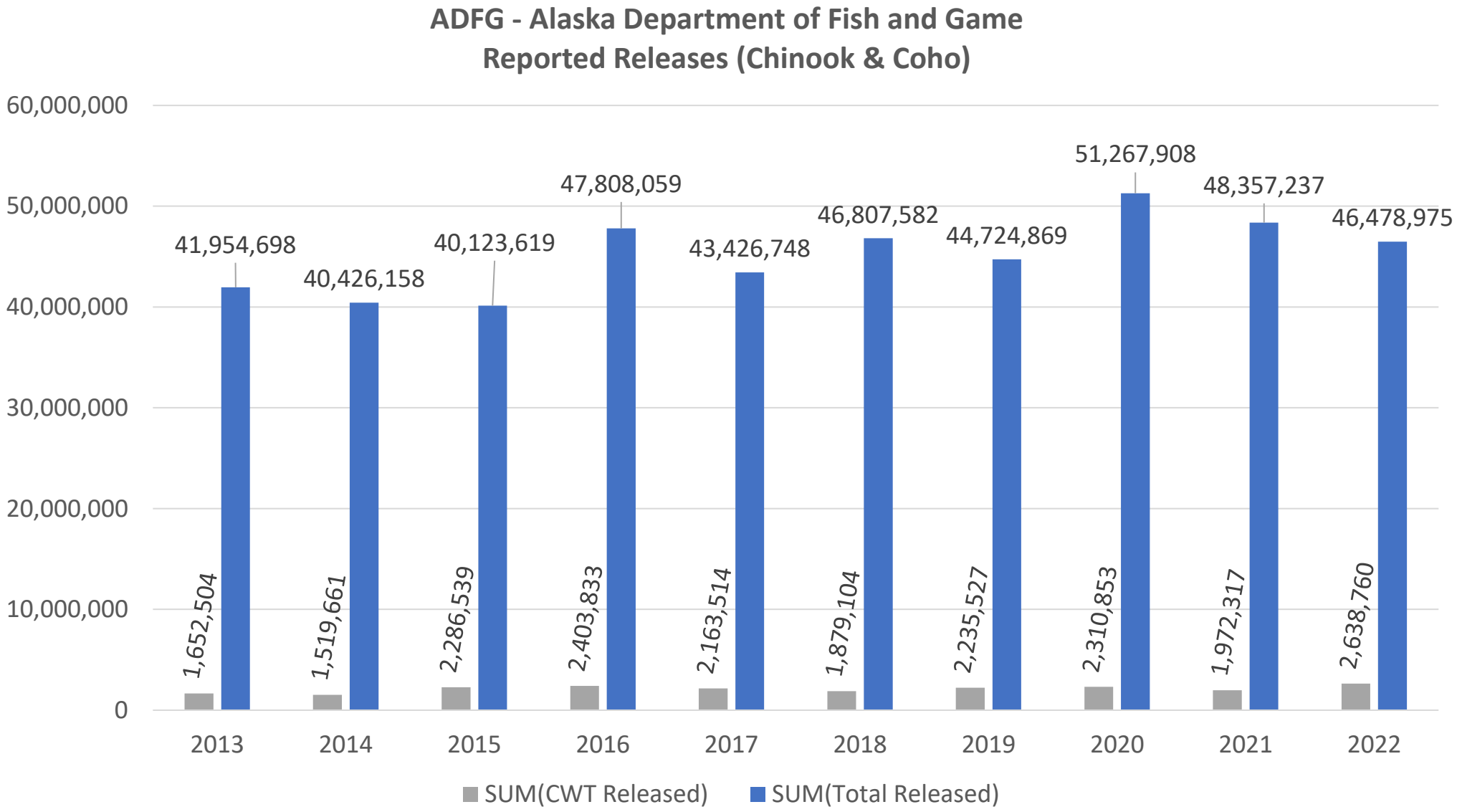
Dataset Process Dates & Status **Explanation:**

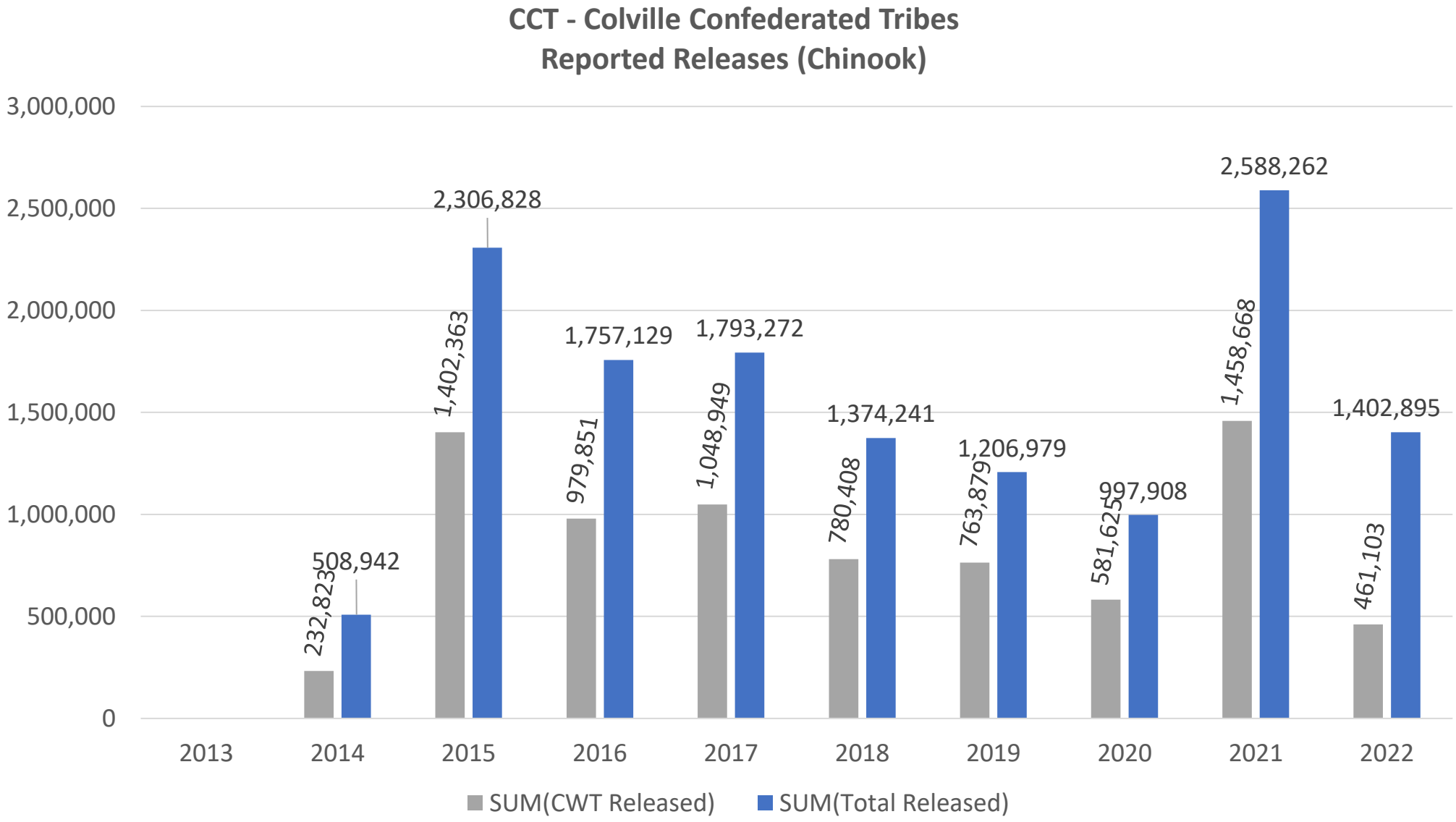
= Fully Validated & Available

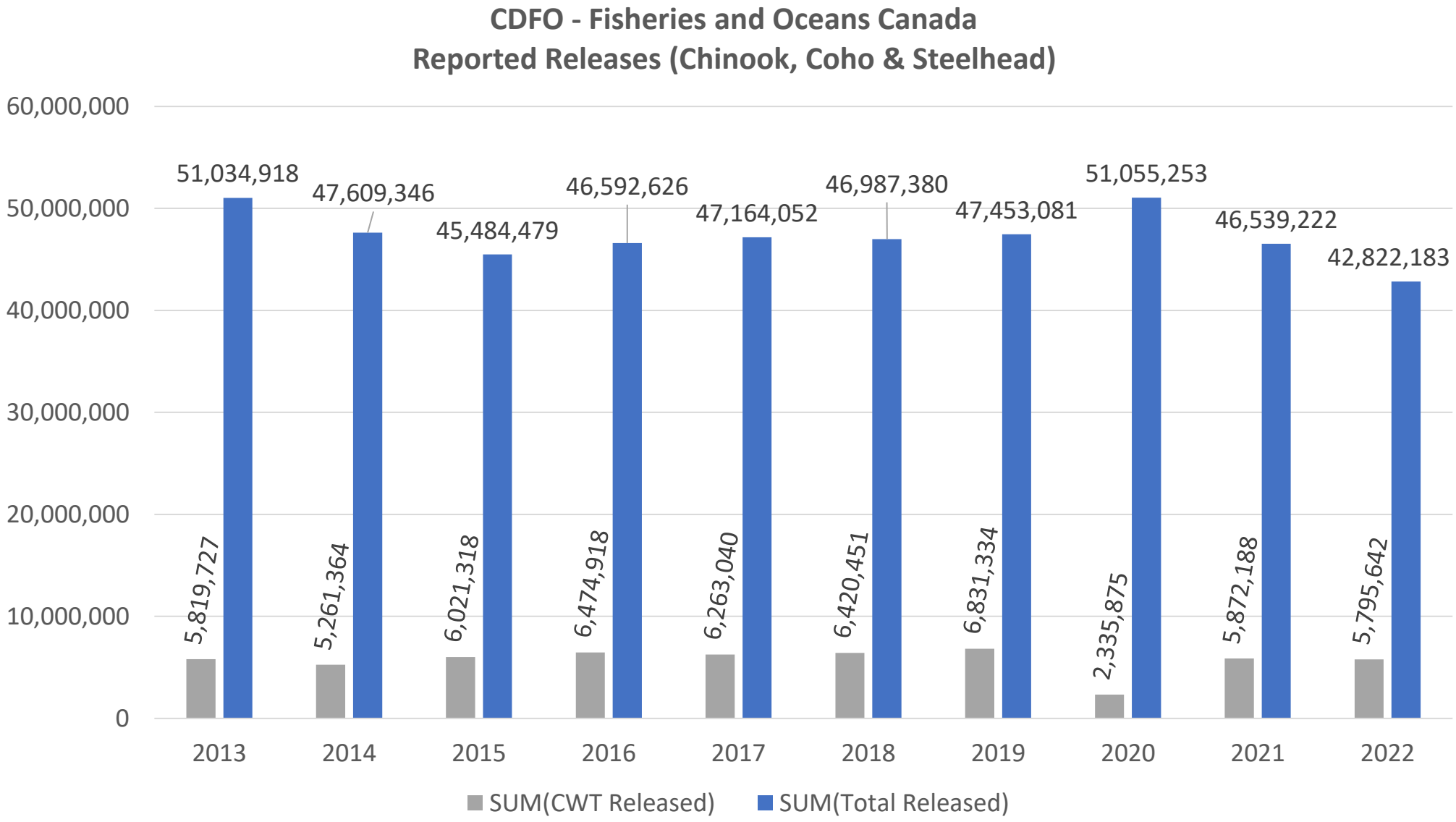
= Partially Validated (has 1 or more errors)

Help

ADFG	CDFO	CDFW	CCT	CRITFC	IDFG	NMFS	NPT	NWIFC	ODFW	QDNR	STIL	USFWS	WDFW	YAKA
2023/01/06	2023/02/02	2023/03/28	2023/01/12	2022/02/09	2022/07/25	2022/12/08	2023/02/22	2023/04/10	2023/04/17	2022/08/03	2023/02/21	2023/02/17	2023/04/17	2023/02/23


ADFG - Alaska Department of Fish and Game
Reported Releases (Chinook & Coho)
60,000,000
50,000,000
40,000,000
30,000,000
20,000,000
10,000,000
0
41,954,698
40,426,158
40,123,619
47,808,059
43,426,748
46,807,582
44,724,869
51,267,908
48,357,237
46,478,975
1,652,504
1,519,661
2,286,539
2,403,833
2,163,514
1,879,104
2,235,527
2,310,853
1,972,317
2,638,760
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
SUM(CWT Released)
SUM(Total Released)


CCT - Colville Confederated Tribes
Reported Releases (Chinook)
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
232,823
508,942
1,402,363
2,306,828
979,851
1,757,129
1,048,949
1,793,272
780,408
1,374,241
763,879
1,206,979
581,625
997,908
1,458,668
2,588,262
461,103
1,402,895
SUM(CWT Released)
SUM(Total Released)


CDFO - Fisheries and Oceans Canada
Reported Releases (Chinook, Coho & Steelhead)
60,000,000
50,000,000
40,000,000
30,000,000
20,000,000
10,000,000
0
51,034,918
47,609,346
45,484,479
46,592,626
47,164,052
46,987,380
47,453,081
51,055,253
46,539,222
42,822,183
5,819,727
5,261,364
6,021,318
6,474,918
6,263,040
6,420,451
6,831,334
2,335,875
5,872,188
5,795,642
2013
2014
2015
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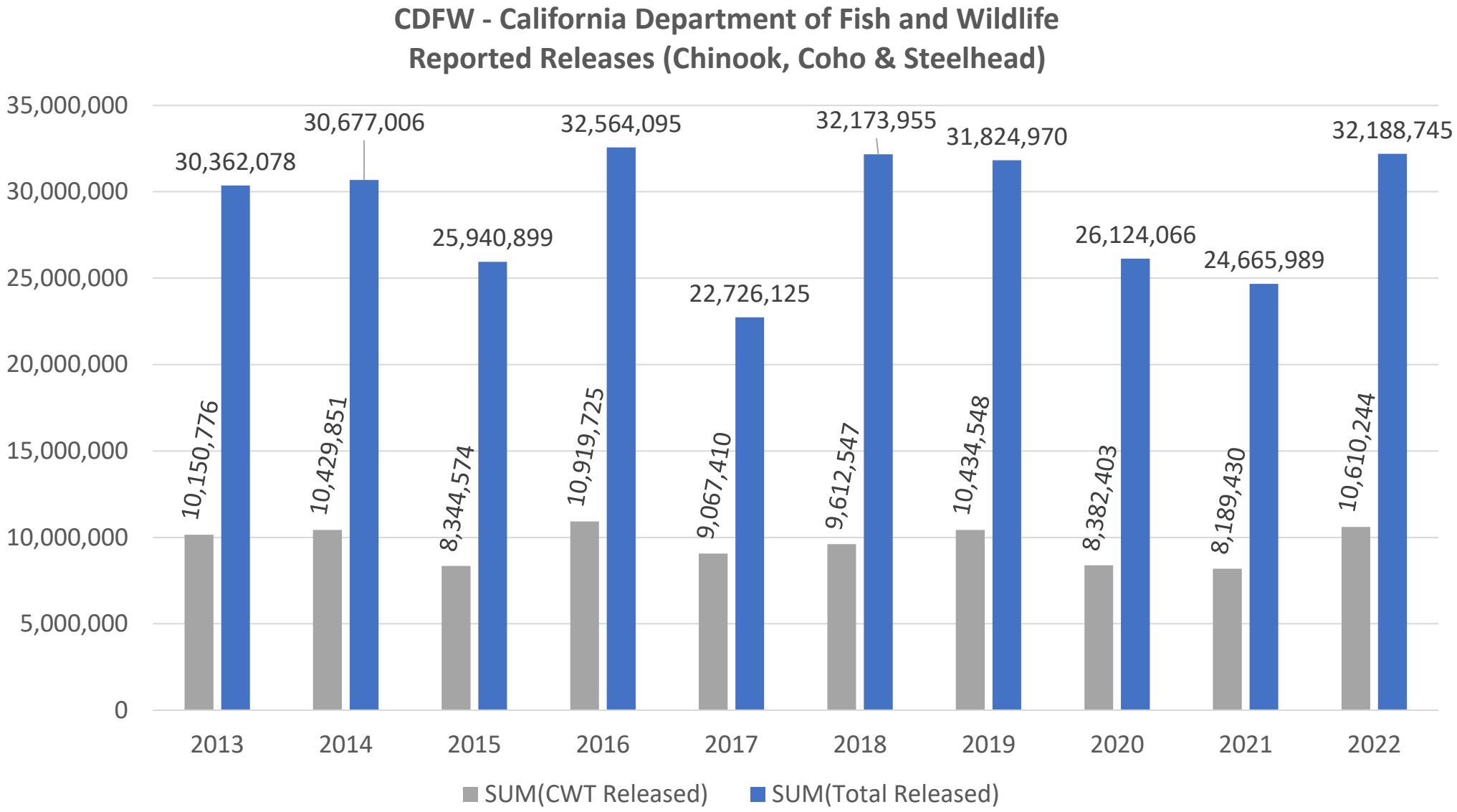
2018
2019
2020
2021
2022
SUM(CWT Released)
SUM(Total Released)


CDFW - California Department of Fish and Wildlife
Reported Releases (Chinook, Coho & Steelhead)
35,000,000
30,000,000
25,000,000
20,000,000
15,000,000
10,000,000
5,000,000
0
30,362,078
30,677,006
25,940,899
32,564,095
22,726,125
32,173,955
31,824,970
26,124,066
24,665,989
32,188,745
10,150,776
10,429,851
8,344,574
10,919,725
9,067,410
9,612,547
10,434,548
8,382,403
8,189,430
10,610,244
2013
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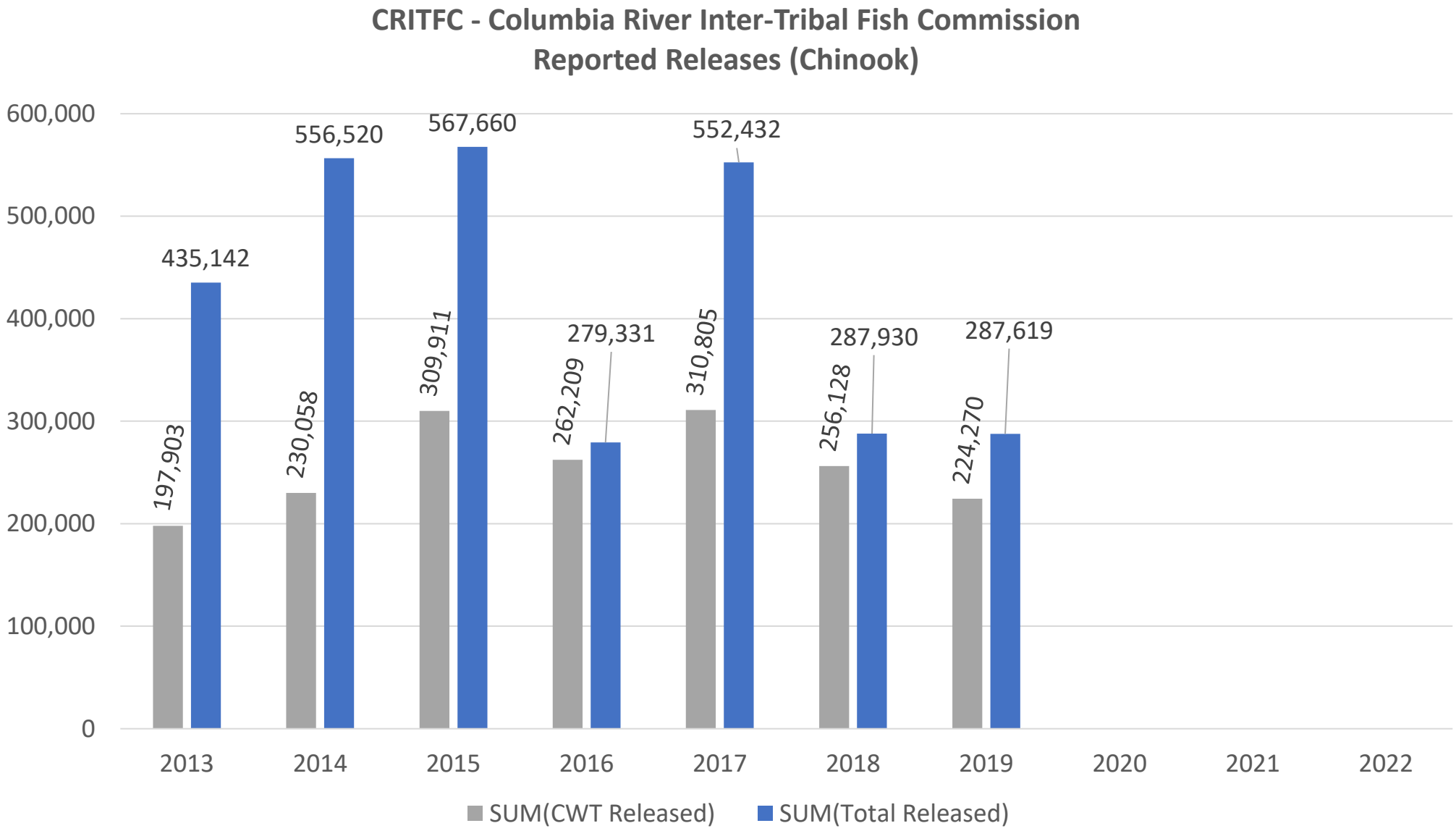
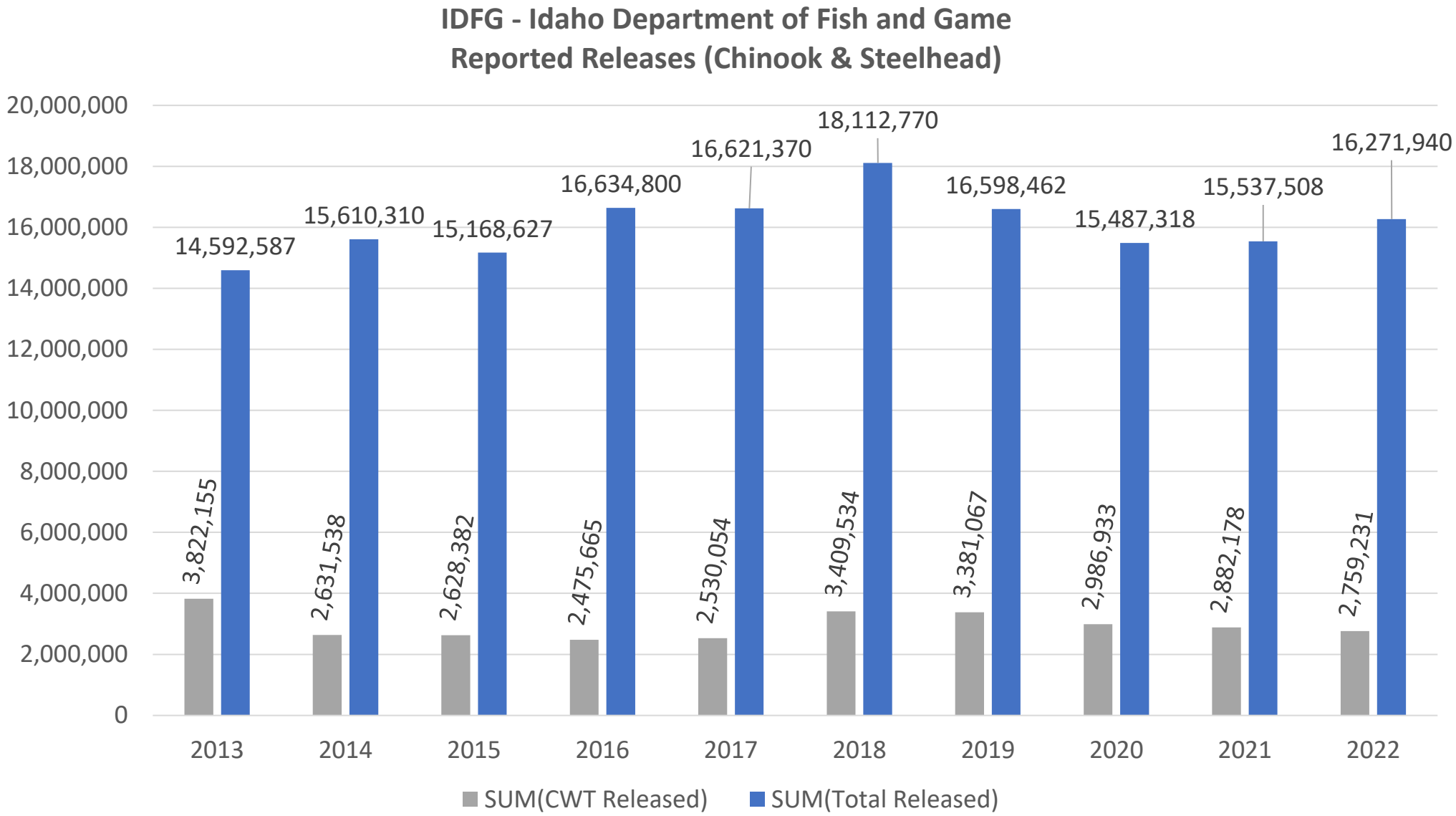
2021
2022
SUM(CWT Released)
SUM(Total Released)


CRITFC - Columbia River Inter-Tribal Fish Commission
Reported Releases (Chinook)
600,000
500,000
400,000
300,000
200,000
100,000
0
435,142
556,520
567,660
279,331
552,432
287,930
287,619
197,903
230,058
309,911
262,209
310,805
256,128
224,270
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
SUM(CWT Released)
SUM(Total Released)


IDFG - Idaho Department of Fish and Game
Reported Releases (Chinook & Steelhead)
20,000,000
18,000,000
16,000,000
14,000,000
12,000,000
10,000,000
8,000,000
6,000,000
4,000,000
2,000,000
0
14,592,587
15,610,310
15,168,627
16,634,800
16,621,370
18,112,770
16,598,462
15,487,318
15,537,508
16,271,940
3,822,155
2,631,538
2,628,382
2,475,665
2,530,054
3,409,534
3,381,067
2,986,933
2,882,178
2,759,231
2013
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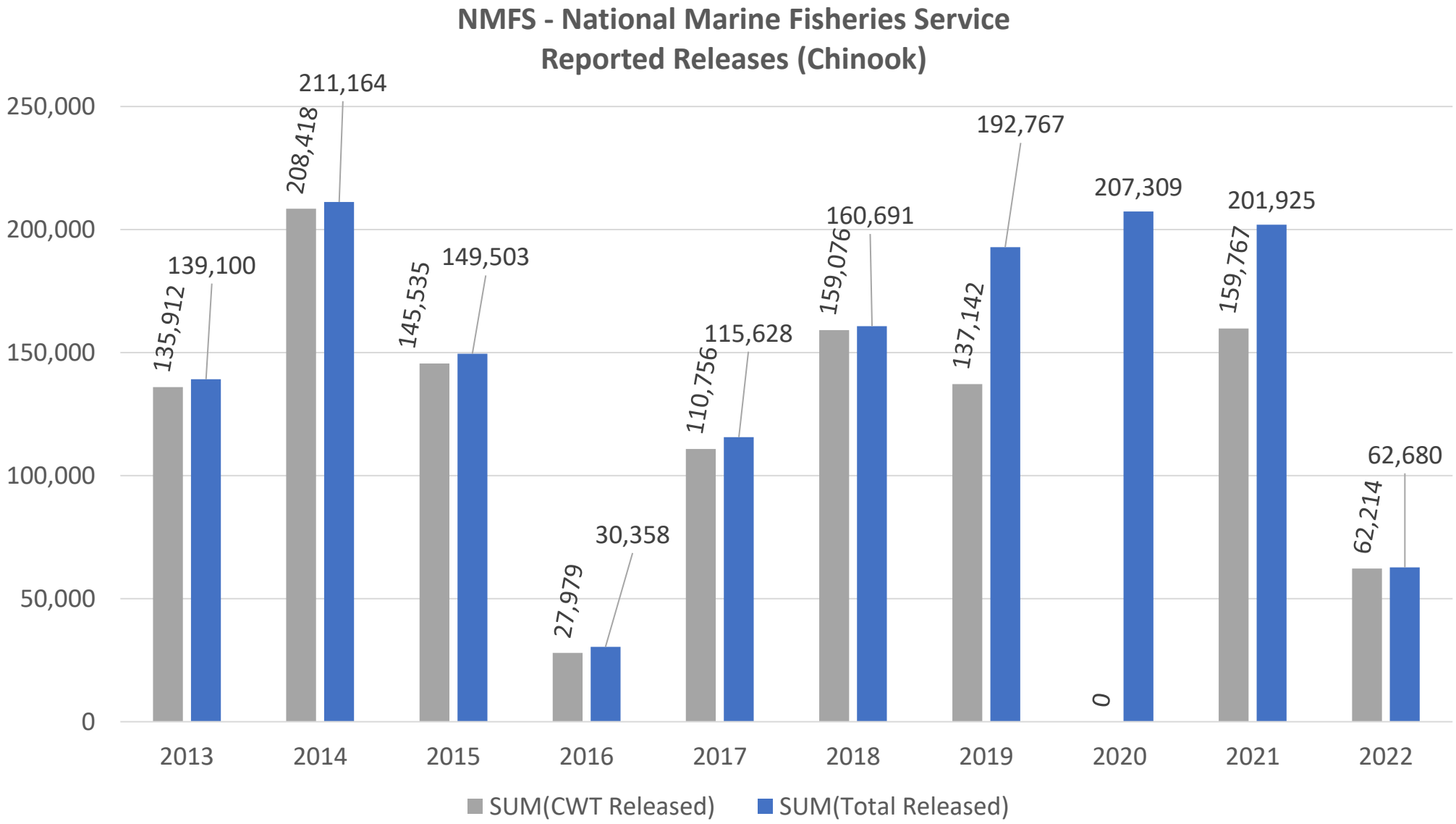
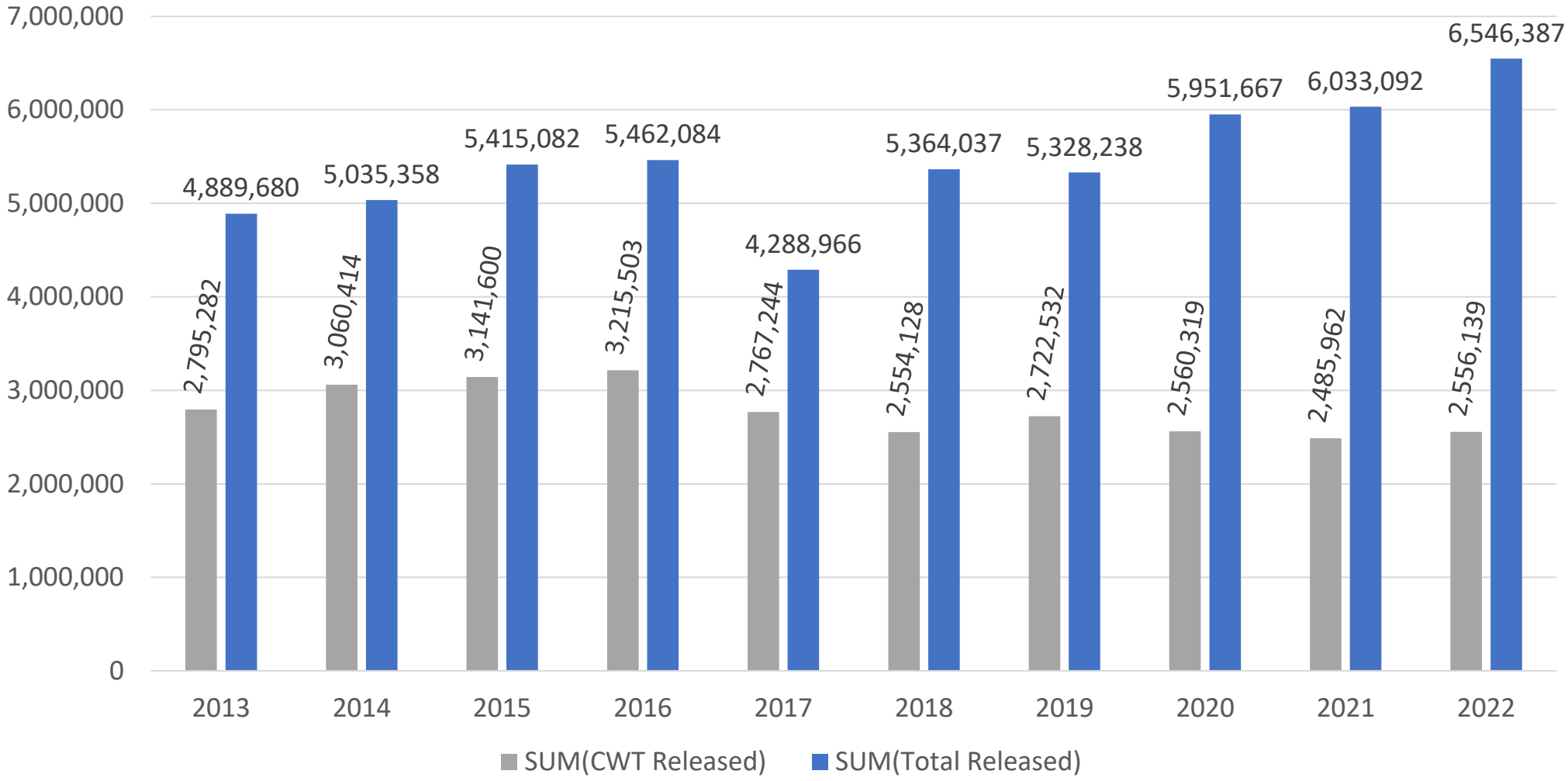
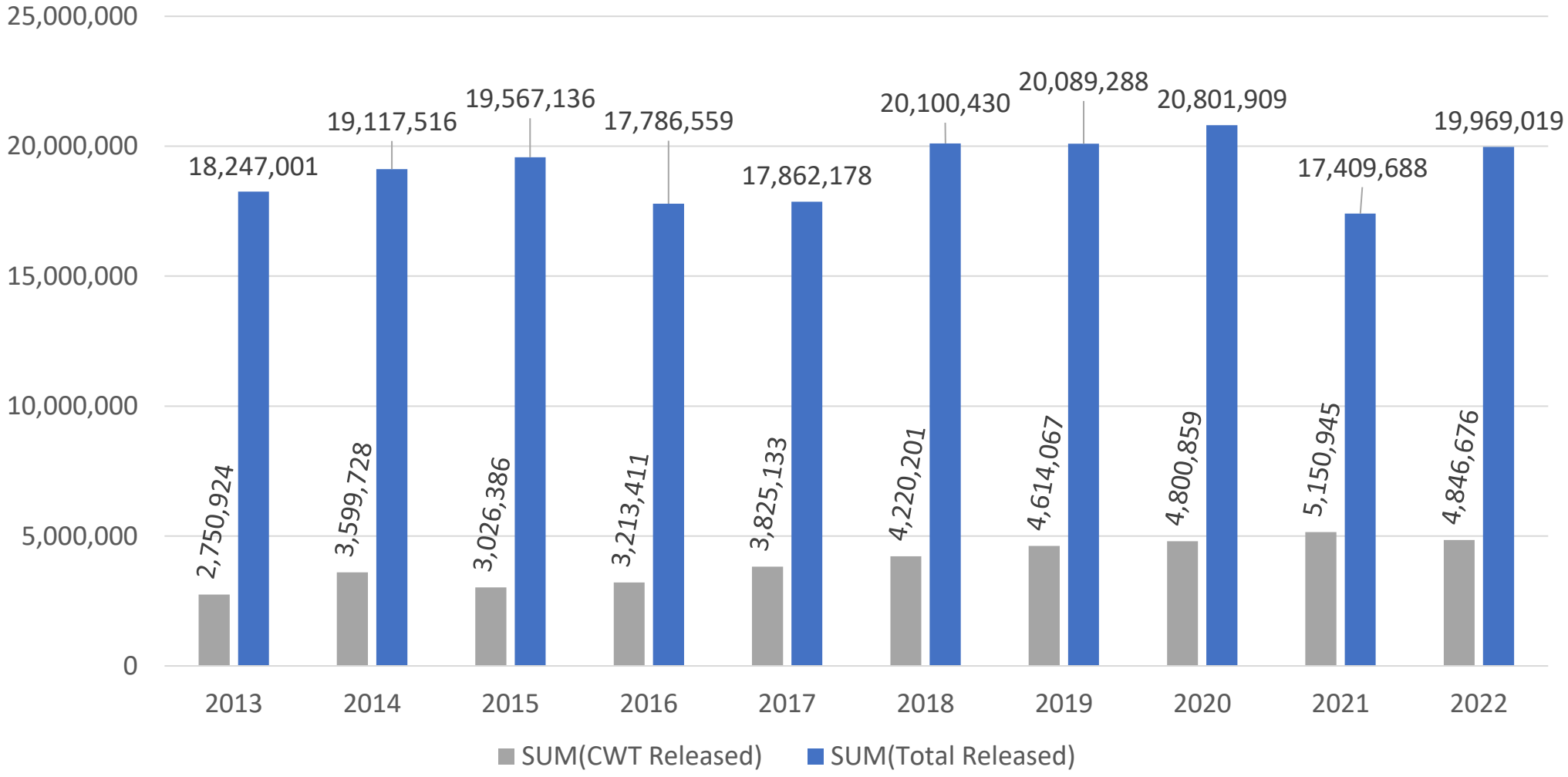
2021
2022
SUM(CWT Released)
SUM(Total Released)

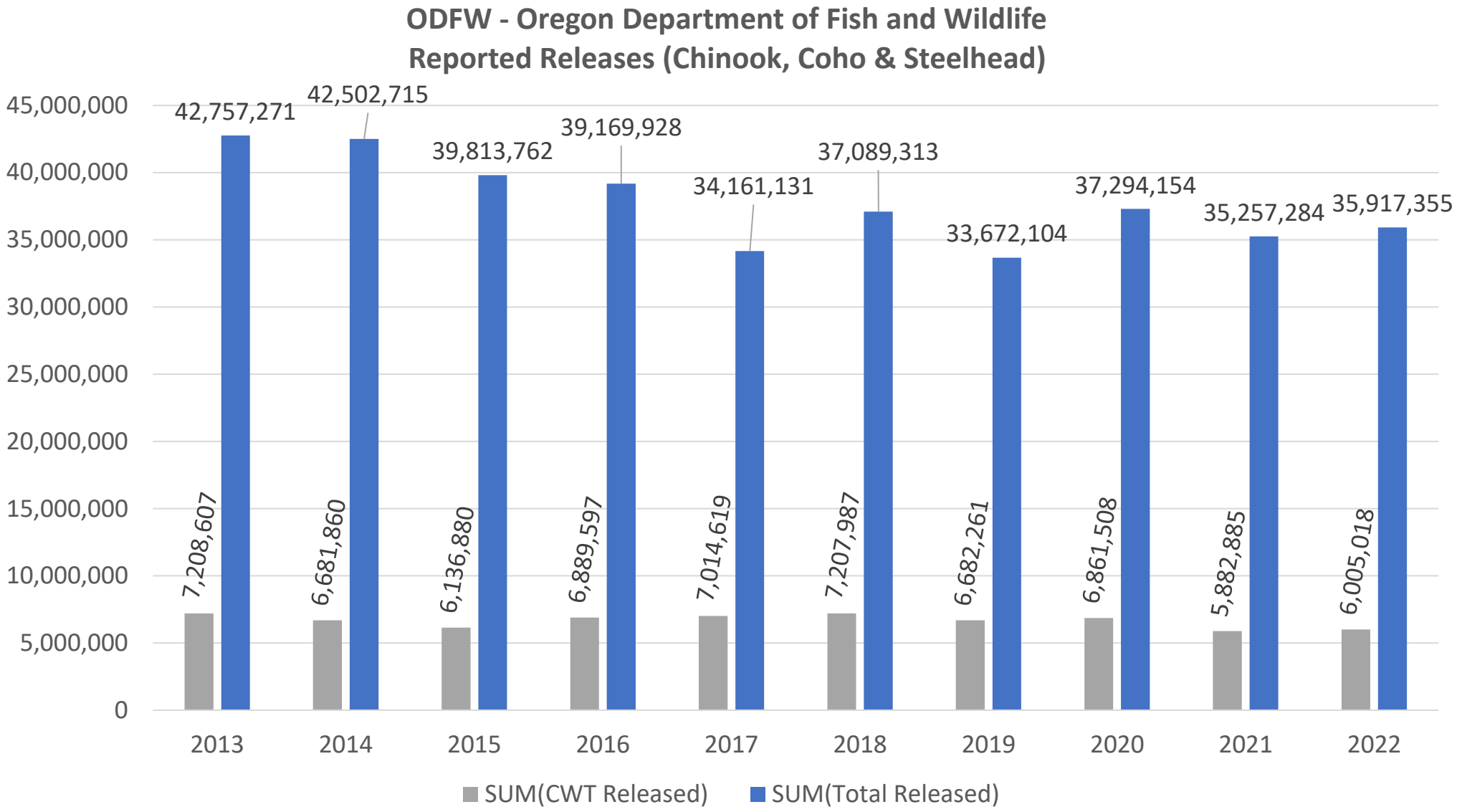

NMFS - National Marine Fisheries Service
Reported Releases (Chinook)
250,000
200,000
150,000
100,000
50,000
0
135,912
139,100
208,418
211,164
145,535
149,503
27,979
30,358
110,756
115,628
159,076
160,691
137,142
192,767
0
207,309
159,767
201,925
62,214
62,680
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
SUM(CWT Released)
SUM(Total Released)

NPT - Nez Perce Tribe
Reported Releases (Chinook & Coho)

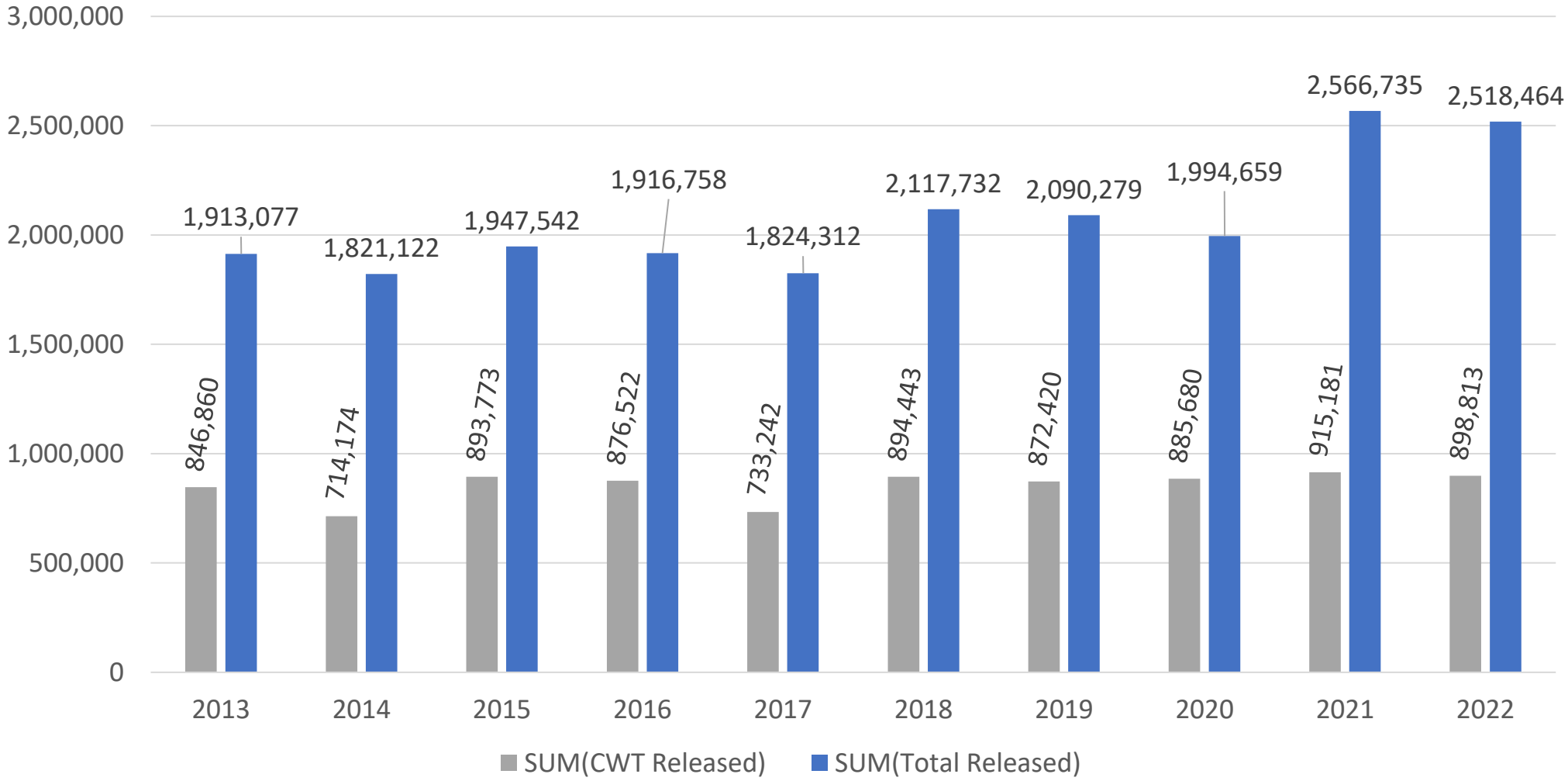


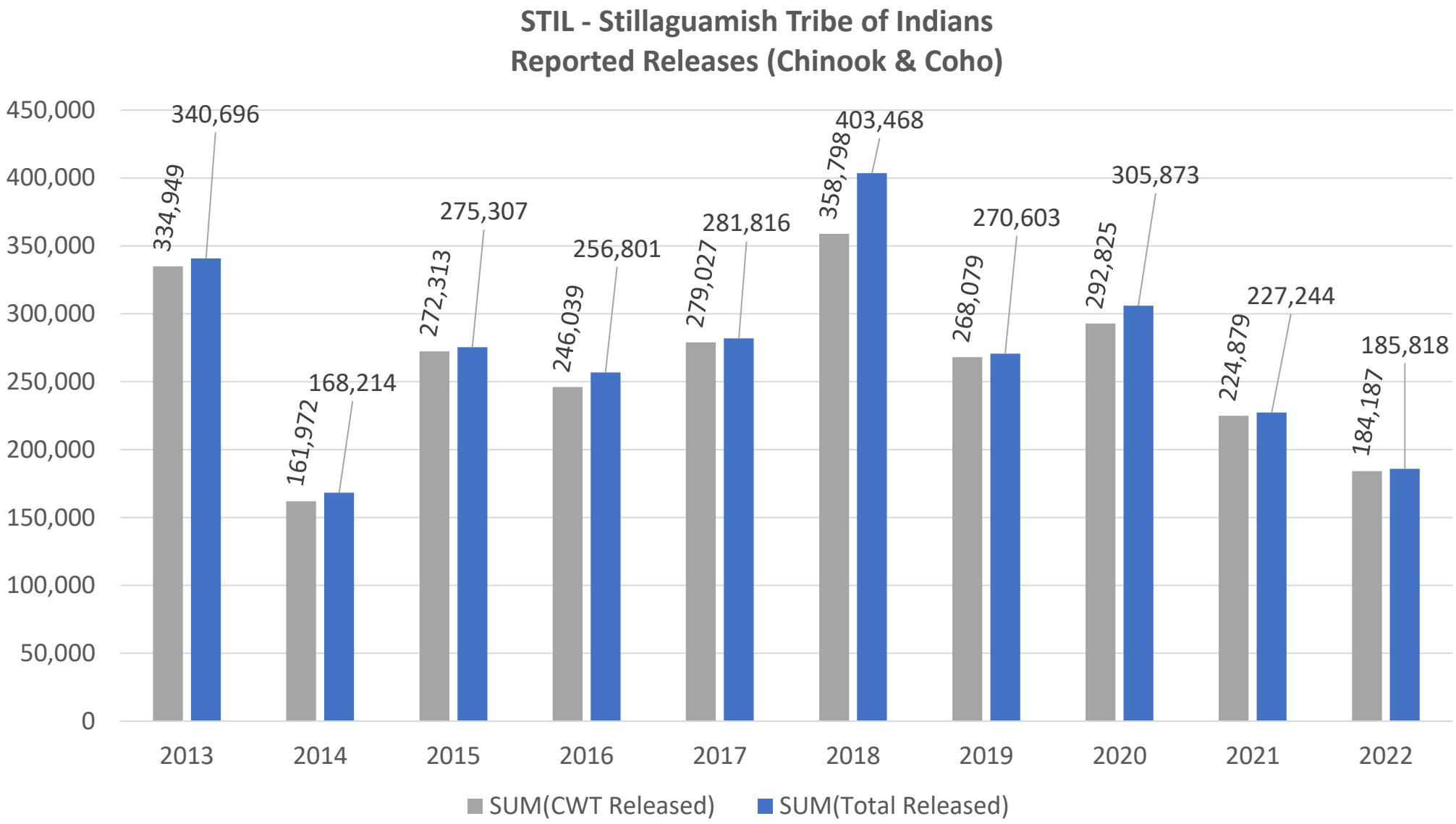
NWIFC - Northwest Indian Fisheries Commission
Reported Releases (Chinook, Coho & Steelhead)

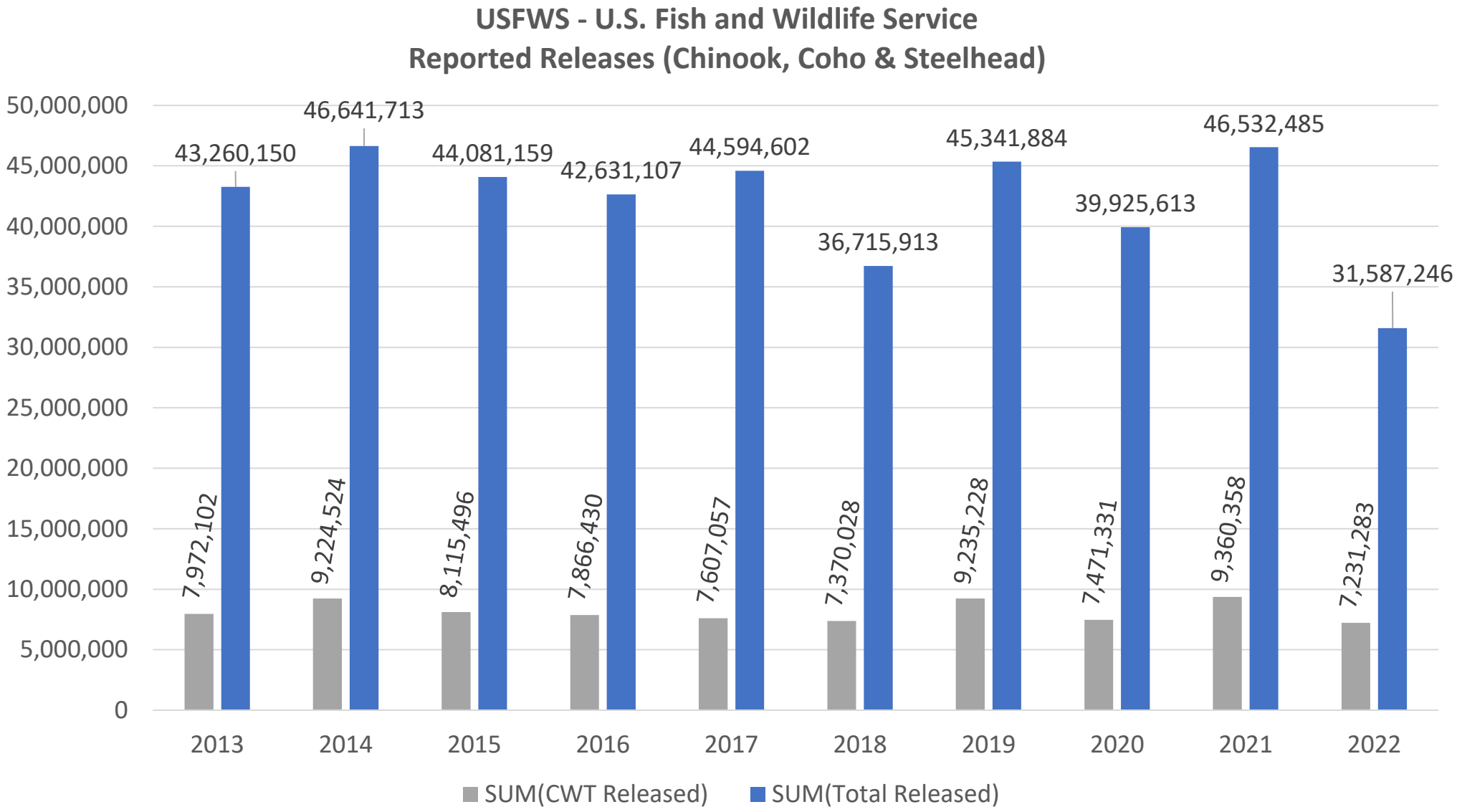


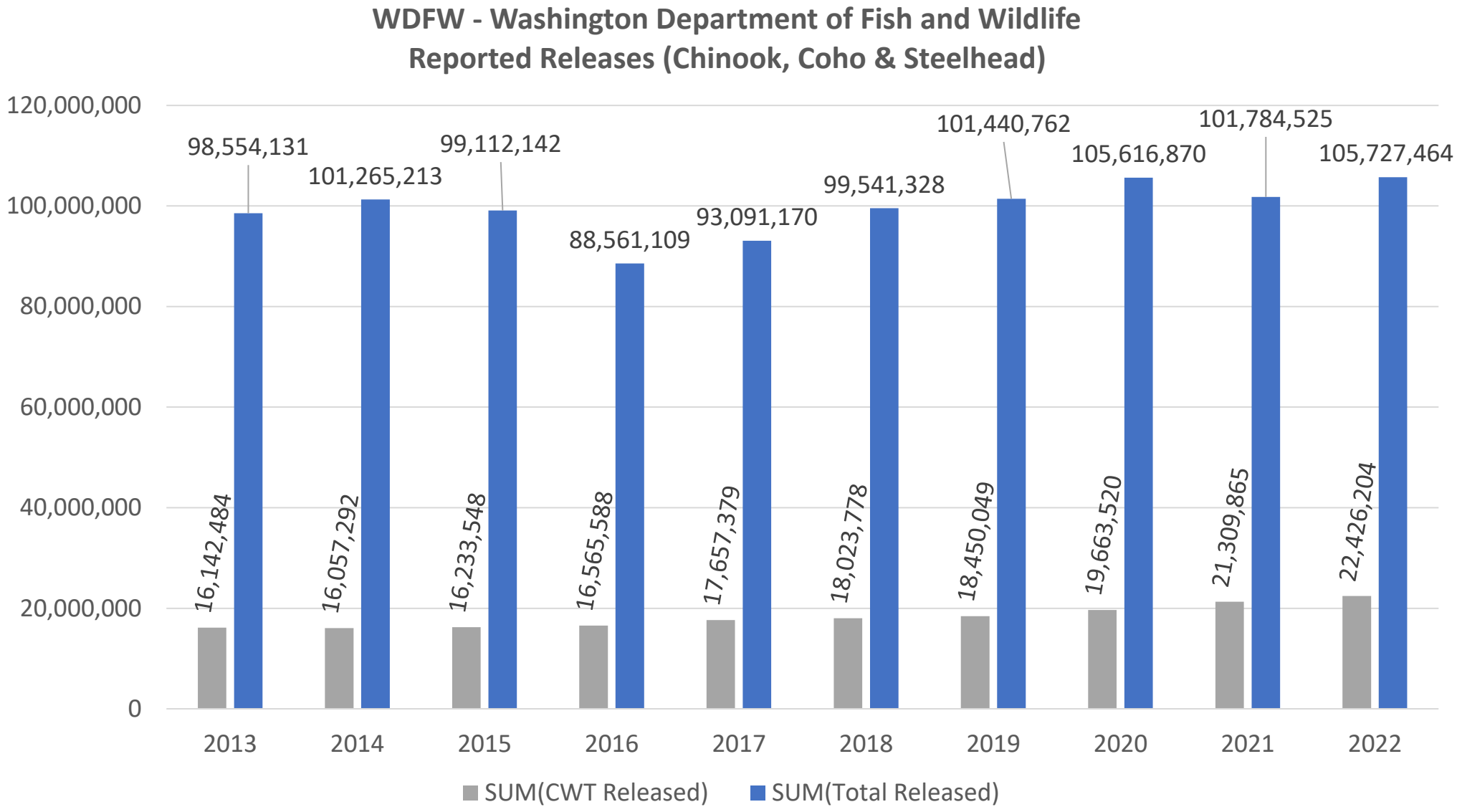

ODFW - Oregon Department of Fish and Wildlife
Reported Releases (Chinook, Coho & Steelhead)
45,000,000
40,000,000
35,000,000
30,000,000
25,000,000
20,000,000
15,000,000
10,000,000
5,000,000
0
42,757,271
42,502,715
39,813,762
39,169,928
34,161,131
37,089,313
33,672,104
37,294,154
35,257,284
35,917,355
7,208,607
6,681,860
6,136,880
6,889,597
7,014,619
7,207,987
6,682,261
6,861,508
5,882,885
6,005,018
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
SUM(CWT Released)
SUM(Total Released)

QDNR - Quinault Division of Natural Resources
Reported Releases (Chinook, Coho & Steelhead)

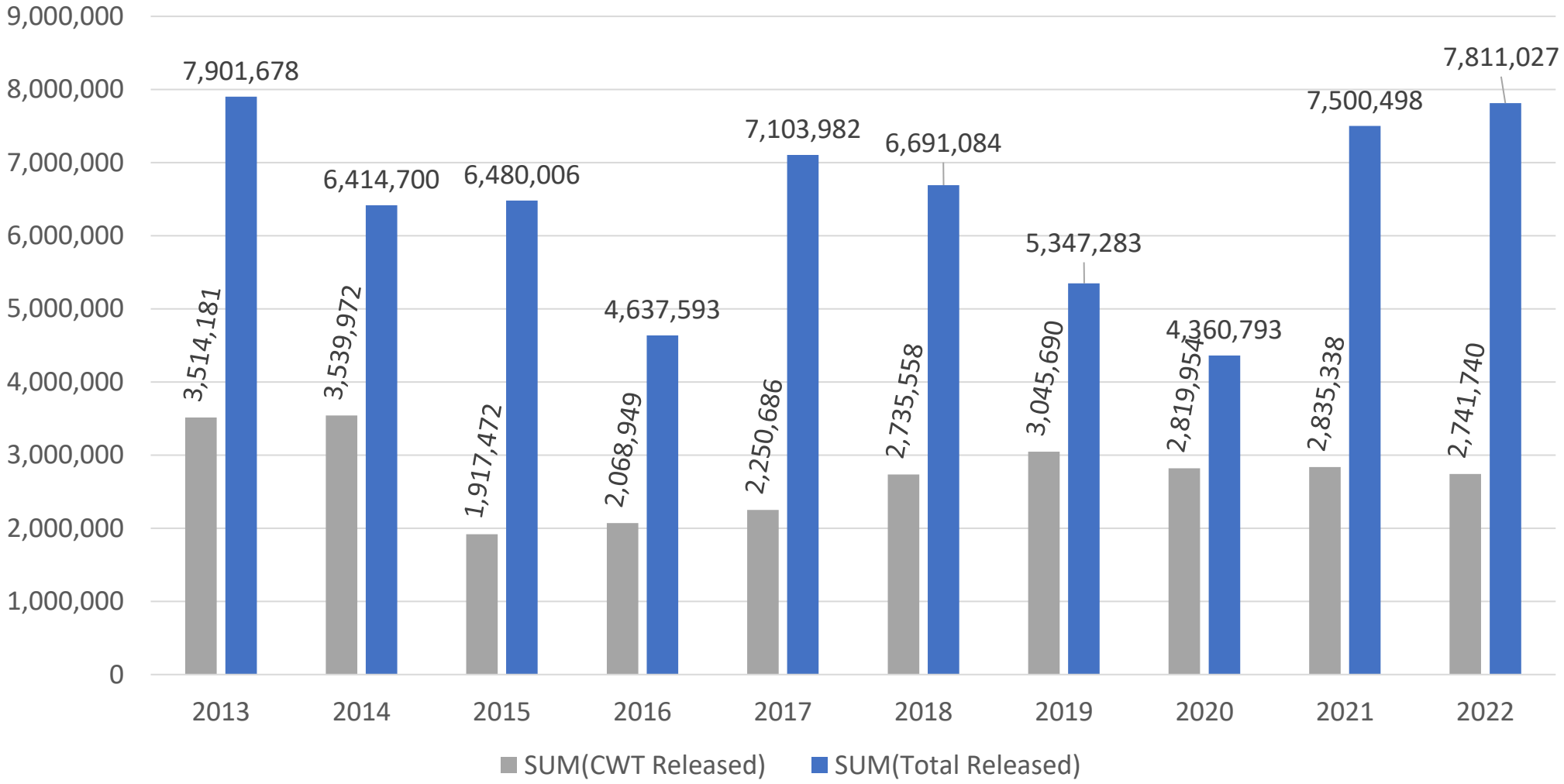



STIL - Stillaguamish Tribe of Indians
Reported Releases (Chinook & Coho)
450,000
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
334,949
340,696
161,972
168,214
272,313
275,307
246,039
256,801
279,027
281,816
358,798
403,468
268,079
270,603
292,825
305,873
224,879
227,244
184,187
185,818
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
SUM(CWT Released)
SUM(Total Released)


USFWS - U.S. Fish and Wildlife Service
Reported Releases (Chinook, Coho & Steelhead)
50,000,000
45,000,000
40,000,000
35,000,000
30,000,000
25,000,000
20,000,000
15,000,000
10,000,000
5,000,000
0
43,260,150
46,641,713
44,081,159
42,631,107
44,594,602
36,715,913
45,341,884
39,925,613
46,532,485
31,587,246
7,972,102
9,224,524
8,115,496
7,866,430
7,607,057
7,370,028
9,235,228
7,471,331
9,360,358
7,231,283
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
SUM(CWT Released)
SUM(Total Released)


WDFW - Washington Department of Fish and Wildlife
Reported Releases (Chinook, Coho & Steelhead)
120,000,000
100,000,000
80,000,000
60,000,000
40,000,000
20,000,000
0
98,554,131
101,265,213
99,112,142
88,561,109
93,091,170
99,541,328
101,440,762
105,616,870
101,784,525
105,727,464
16,142,484
16,057,292
16,233,548
16,565,588
17,657,379
18,023,778
18,450,049
19,663,520
21,309,865
22,426,204
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
SUM(CWT Released)
SUM(Total Released)

YAKA - Yakama Nation
Reported Releases (Chinook, Coho & 2012 Steelhead)



Recoveries

= Fully Validated & Available

= Partially Validated (has 1 or more errors)

From CWT Database Load Logs
By Run Year and Reporting Agency as of Tue Apr 18 07:05:34 2023

Year	ADFG	CDFO	CDFW	CDFWKT ◇	CCT	IDFG	NMFS	NMFSNWR	NPT	NWIFC ◇	ODFW	QDNR	STIL ◇	USFWS	WDFW	YAKA ◇	YTFP	Year
2022	2023/01/06	2023/02/08	2023/02/07	Not Applicable	Expected Pending	2023/01/10	2023/04/03	Expected Pending	Expected Pending	Not Applicable	2023/02/01	Expected Pending	Not Applicable	2023/03/17	2023/02/01	Not Applicable	Unknown	2022
2021	2022/01/14	2023/02/02	2023/02/07	Expected Pending	2023/02/28	2022/01/12	2023/01/19	2022/09/12	Expected Pending	2022/12/21	2022/06/10	2023/01/18	2023/02/21	2022/09/13	2023/03/29	Expected Pending	Unknown	2021
2020	2021/02/09	2023/01/24	2022/02/07	Expected Overdue	2022/05/20	2021/09/07	2022/06/14	2021/08/17	Expected Overdue	2022/04/08	2022/06/16	2023/01/18	2022/03/09	2022/05/03	2023/02/21	2021/06/23	Unknown	2020
2019	2021/02/09	2023/01/24	2021/10/13	Expected Overdue	2022/05/24	2021/01/04	2023/02/16	2020/07/29	Expected Overdue	2021/01/19	2022/07/05	2023/01/18	2021/05/18	2022/04/25	2023/04/07	2021/06/23	Unknown	2019
2018	2019/01/24	2023/01/24	2020/04/16	Expected Overdue	2019/04/09	2019/07/26	2022/03/14	2020/08/11	Expected Overdue	2020/01/07	2020/01/13	2023/01/18	2020/01/28	2021/11/03	2023/01/09	2021/06/23	Unknown	2018
2017	2019/02/28	2023/01/24	2019/07/23	Expected Overdue	2018/05/09	2019/07/26	2022/03/14	2020/09/03	Expected Overdue	2019/01/10	2020/01/06	2023/01/18	2018/11/26	2021/10/01	2022/08/04	2021/06/23	Unknown	2017
2016	2019/02/28	2023/01/24	2017/12/13	Expected Overdue	2019/05/22	2017/04/20	2022/03/14	2022/07/25	Expected Overdue	2018/12/18	2020/01/06	2023/01/11	2018/10/16	2021/09/30	2020/02/11	2022/04/08	Unknown	2016
2015	2018/09/04	2021/01/29	2017/02/07	2016/05/17	2019/05/22	2017/04/28	2022/12/09	2017/04/13	2016/03/22	2017/01/06	2020/01/07	2023/01/17	2018/11/26	2021/09/30	2018/12/17	2021/06/23	Unknown	2015
2014	2019/05/02	2020/01/24	2016/05/10	2016/05/13	2019/05/22	2017/04/28	2018/04/03	2015/10/26	2016/01/13	2016/07/22	2020/01/07	2023/01/17	2018/11/26	2021/09/16	2022/01/31	2015/03/12	Unknown	2014
2013	2017/02/01	2020/02/27	2015/11/24	2014/05/08	2019/05/22	2017/04/28	2023/03/06	2014/12/03	2016/03/28	2015/06/02	2020/01/07	2023/01/11	2018/11/26	2022/04/21	2018/12/19	2015/03/12	Unknown	2013
2012	2017/02/01	2020/01/24	2014/01/13	2014/05/08	Not Applicable	2017/04/28	2023/02/16	2014/12/05	Unknown	2013/11/06	2020/01/07	2023/01/17	2018/11/26	2015/05/11	2018/12/20	2015/03/12	Unknown	2012
2011	2017/02/01	2020/01/24	2013/01/29	Expected Overdue	Not Applicable	2017/04/28	2016/04/15	2012/11/28	Unknown	2012/11/21	2020/01/07	2013/03/15	2018/11/26	2015/05/13	2018/12/21	2015/03/12	Unknown	2011
2010	2017/01/27	2020/01/24	2012/02/10	Expected Overdue	Not Applicable	2017/04/28	2016/06/01	2012/12/05	Unknown	2019/04/15	2020/01/07	2012/02/03	Not Applicable	2015/04/15	2019/01/07	2013/05/21	Unknown	2010
2009	2017/01/27	2018/01/09	2010/12/09	Expected Overdue	Not Applicable	2017/04/28	2016/04/15	2012/11/28	Unknown	2022/04/08	2020/01/07	2011/01/03	Not Applicable	2016/06/21	2019/01/11	2013/05/21	Unknown	2009
2008	2017/01/27	2018/01/09	2009/11/19	Expected Overdue	Not Applicable	2013/03/29	2016/04/15	2012/12/04	Unknown	2019/03/28	2020/01/07	2009/09/04	Not Applicable	2016/06/21	2019/02/01	2013/05/21	Unknown	2008
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2006	2017/01/27	2018/01/09	2008/03/25	2008/08/19	Not Applicable	2007/06/26	2016/02/09	Unknown	Unknown	2019/03/07	2020/01/13	2009/08/26	Not Applicable	2016/07/07	2012/06/18	2013/05/17	2006/11/08	2006
2005	2017/01/27	2018/01/09	2008/06/06	2008/08/19	Not Applicable	2007/04/16	2016/02/08	Unknown	Unknown	2019/03/06	2011/02/28	2008/02/07	Not Applicable	2008/06/18	2013/07/25	2013/05/17	2007/08/17	2005
2004	2017/01/27	2018/01/09	2006/07/11	2008/08/19	Not Applicable	2007/04/16	2016/05/18	Unknown	Unknown	2019/02/07	2017/05/05	2006/01/17	Not Applicable	2014/04/22	2013/07/23	2013/05/17	2007/08/17	2004
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2002	2017/01/27	2018/01/09	2006/07/11	2008/08/19	Not Applicable	2006/10/19	2012/03/02	Unknown	Unknown	2019/01/29	2017/05/05	2004/01/15	Not Applicable	2007/04/12	2008/10/17	2013/05/17	2007/08/17	2002

Catch / Sample

= Fully Validated & Available

= Partially Validated (has 1 or more errors)

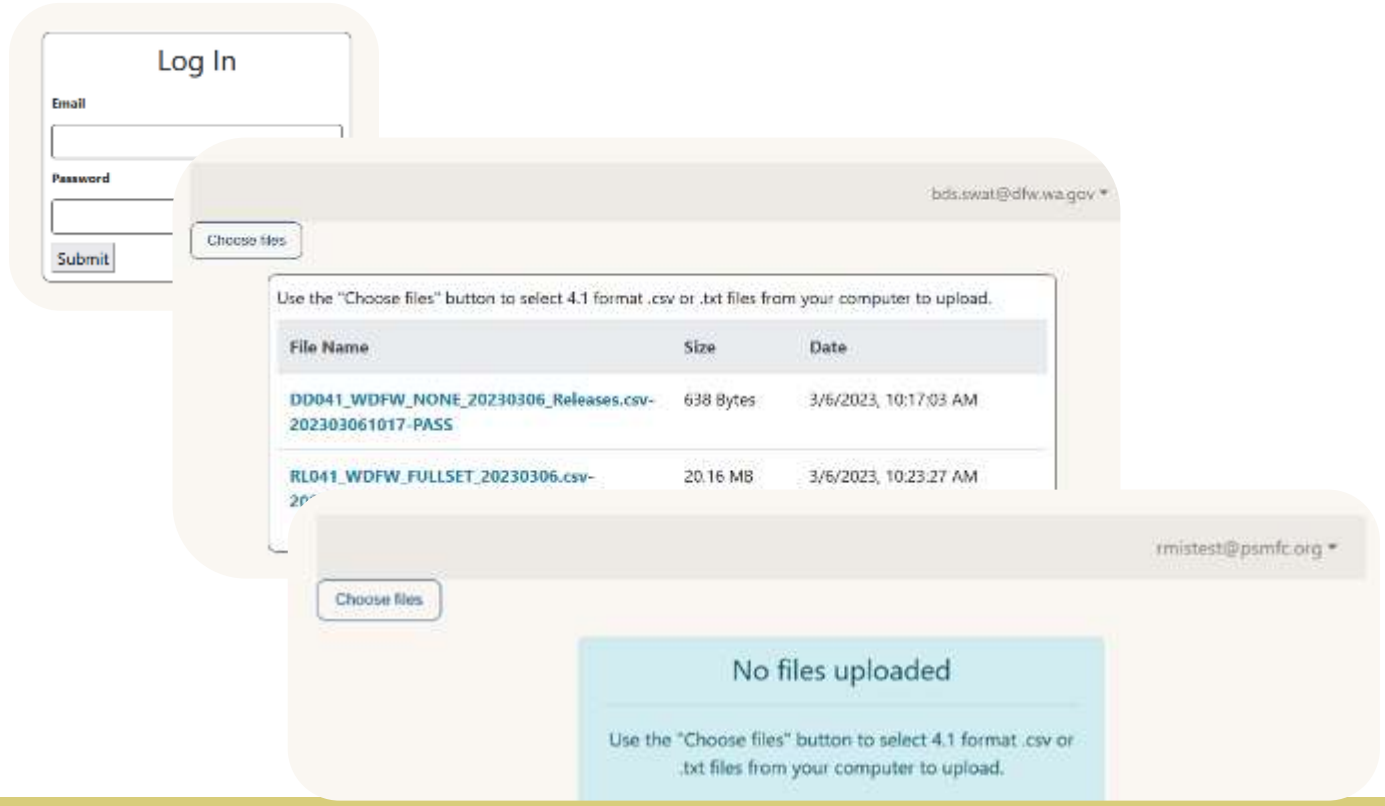
From CWT Database Load Logs
By Catch Year and Reporting Agency as of Tue Apr 18 07:14:01 2023

Year	ADFG	CDFO	CDFW	CDFWKT ◇	CCT	IDFG	NMFS	NMFSNWR	NPT	NWIFC ◇	ODFW	QDNR	STIL ◇	USFWS	WDFW	YAKA ◇	YTFP	Year
2022	2023/01/06	2023/02/08	2023/02/07	Not Applicable	Expected Pending	Not Applicable	2023/04/03	Expected Pending	Not Applicable	Not Applicable	2023/02/01	Expected Pending	Not Applicable	2023/03/16	2023/02/01	Not Applicable	Unknown	2022
2021	2022/01/14	2023/02/02	2023/02/07	Expected Pending	2023/02/28	Not Applicable	2023/04/03	2022/09/09	Not Applicable	2022/12/20	2022/06/10	2023/01/18	2023/02/21	2023/02/16	2023/03/29	Not Applicable	Unknown	2021
2020	2021/02/09	2023/01/24	2022/02/07	Expected Overdue	2022/05/19	Not Applicable	2022/06/14	2021/08/18	Not Applicable	2022/03/03	2022/06/16	2023/01/18	2022/03/11	2023/02/16	2023/02/15	Not Applicable	Unknown	2020
2019	2021/02/09	2023/01/24	2021/10/13	Expected Overdue	2022/05/24	Not Applicable	2023/02/16	2020/07/29	Not Applicable	2021/01/19	2022/07/05	2023/01/18	2021/05/18	2023/02/16	2023/04/07	Not Applicable	Unknown	2019
2018	2019/01/24	2023/01/24	2020/04/16	Expected Overdue	2020/06/08	Not Applicable	2021/04/12	2020/08/11	Not Applicable	2020/01/06	2020/01/13	2023/01/18	2020/01/28	2023/02/16	2023/01/09	Not Applicable	Unknown	2018
2017	2019/02/28	2023/01/24	2019/07/24	Expected Overdue	2020/06/08	Not Applicable	2021/04/12	2020/09/03	Not Applicable	2019/01/10	2020/01/06	2023/01/18	2018/11/26	2021/10/01	2022/08/04	Not Applicable	Unknown	2017
2016	2019/02/28	2023/01/24	2017/12/13	Expected Overdue	2020/06/08	Not Applicable	2021/04/12	2022/07/25	Not Applicable	2018/02/01	2020/01/06	2023/01/11	2018/10/16	2021/09/30	2020/02/11	Not Applicable	Unknown	2016
2015	2018/09/04	2021/01/29	2017/02/07	2016/05/17	2020/06/08	Not Applicable	2022/12/09	2017/04/13	Not Applicable	2022/12/13	2020/01/07	2023/01/17	2018/11/26	2021/09/30	2018/12/17	Not Applicable	Unknown	2015
2014	2019/05/02	2020/01/24	2016/05/12	2016/05/13	2019/05/22	Not Applicable	2017/03/17	2015/10/26	Not Applicable	2016/07/22	2020/01/07	2023/01/17	2018/11/26	2021/09/16	2022/01/31	2015/03/12	Unknown	2014
2013	2017/02/01	2020/01/24	2015/01/29	2014/05/08	2019/05/22	Not Applicable	2017/04/06	2014/12/03	Not Applicable	2015/06/01	2020/01/07	2023/01/11	2018/11/26	2022/04/21	2018/12/19	2015/03/12	Unknown	2013
2012	2017/02/01	2020/01/24	2014/01/13	2014/05/08	Not Applicable	Not Applicable	2023/02/16	2014/12/05	Not Applicable	2013/11/06	2020/01/07	2023/01/17	2018/11/26	2015/05/11	2018/12/20	2015/03/12	Unknown	2012
2011	2017/02/01	2020/01/24	2013/01/29	Expected Overdue	Not Applicable	Not Applicable	2016/04/13	2012/12/05	Not Applicable	2012/11/20	2020/01/07	2013/03/15	2018/11/26	2015/05/13	2018/12/21	2015/03/12	Unknown	2011
2010	2017/01/27	2020/01/24	2012/02/10	Expected Overdue	Not Applicable	Not Applicable	2016/04/13	2012/12/05	Not Applicable	2019/04/15	2020/01/07	2012/02/03	Not Applicable	2015/04/15	2019/01/07	Not Applicable	Unknown	2010
2009	2017/01/27	2018/01/09	2010/12/09	Expected Overdue	Not Applicable	Not Applicable	2016/04/13	2012/12/04	Not Applicable	2019/04/15	2020/01/07	2011/01/11	Not Applicable	2016/06/21	2019/01/10	Not Applicable	Unknown	2009
2008	2017/01/27	2018/01/09	2009/11/17	Expected Overdue	Not Applicable	Not Applicable	2016/04/13	2012/12/04	Not Applicable	2019/03/28	2020/01/07	2009/09/08	Not Applicable	2016/06/21	2019/02/01	2011/03/24	Unknown	2008
2007	2017/01/27	2018/01/09	2009/03/16	2008/08/19	Not Applicable	Not Applicable	2016/02/08	Unknown	Not Applicable	2019/03/26	2020/01/07	2009/09/03	Not Applicable	2016/06/22	2012/07/27	2008/07/29	Unknown	2007
2006	2017/01/27	2018/01/09	2008/03/25	2008/08/19	Not Applicable	Not Applicable	2016/02/08	Unknown	Not Applicable	2019/03/07	2020/01/13	2009/08/26	Not Applicable	2016/07/07	2012/06/18	2007/08/16	Unknown	2006
2005	2017/01/27	2018/01/09	2008/06/06	2008/08/19	Not Applicable	Not Applicable	2016/02/08	Unknown	Not Applicable	2019/03/06	2011/02/23	2008/02/06	Not Applicable	2008/06/18	2013/07/25	Not Applicable	2007/08/17	2005
2004	2017/01/27	2018/01/09	2006/07/10	2008/08/19	Not Applicable	Not Applicable	2011/12/27	Unknown	Not Applicable	2019/02/07	2009/09/22	2006/01/17	Not Applicable	2014/04/22	2013/07/23	Not Applicable	2007/08/17	2004
2003	2017/01/27	2018/01/09	2006/07/10	2008/08/19	Not Applicable	Not Applicable	2011/12/27	Unknown	Not Applicable	2019/02/06	2009/06/12	2005/01/10	Not Applicable	2008/03/13	2008/10/21	Not Applicable	2007/08/17	2003
2002	2017/01/27	2018/01/09	2006/07/10	2008/08/19	Not Applicable	Not Applicable	2011/12/27	Unknown	Not Applicable	2019/02/06	2010/02/10	2004/01/15	Not Applicable	2008/01/28	2008/10/17	Not Applicable	2007/08/17	2002

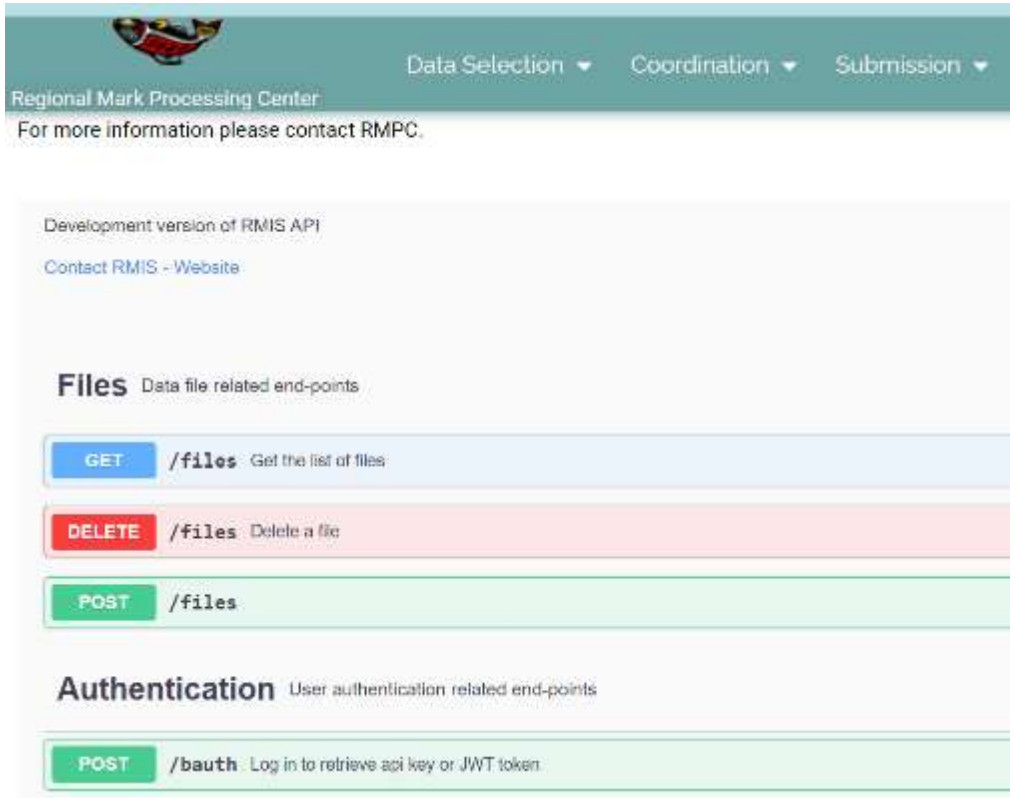
Open web-browser

Update on RMPC Data Transfer Upgrade to Webservice API

Web Form for Manual File Submittal



Machine to Machine API



All-Agency Update

Newport OR, Stan Allen

www.rmpc.org
205 SE Spokane Street, Suite 100
Portland, OR 97202

Update order

1. ADFG
2. MIC
3. NMFS (none)
4. NWIFC
5. IDFG
6. USFWS
7. WDFW
8. CRITFC
9. CDFW
10. CDFO
11. ODFW

Other reporting agencies

12. YAKA
13. NPT
14. CCT

Update Topics

Tagging Levels for 2023

Mass Marking for 2023

Mark-Selective Fishery Plans and / or Comments

Progress on recruitment and retention of tagging crews and/or operators

Lunch Break

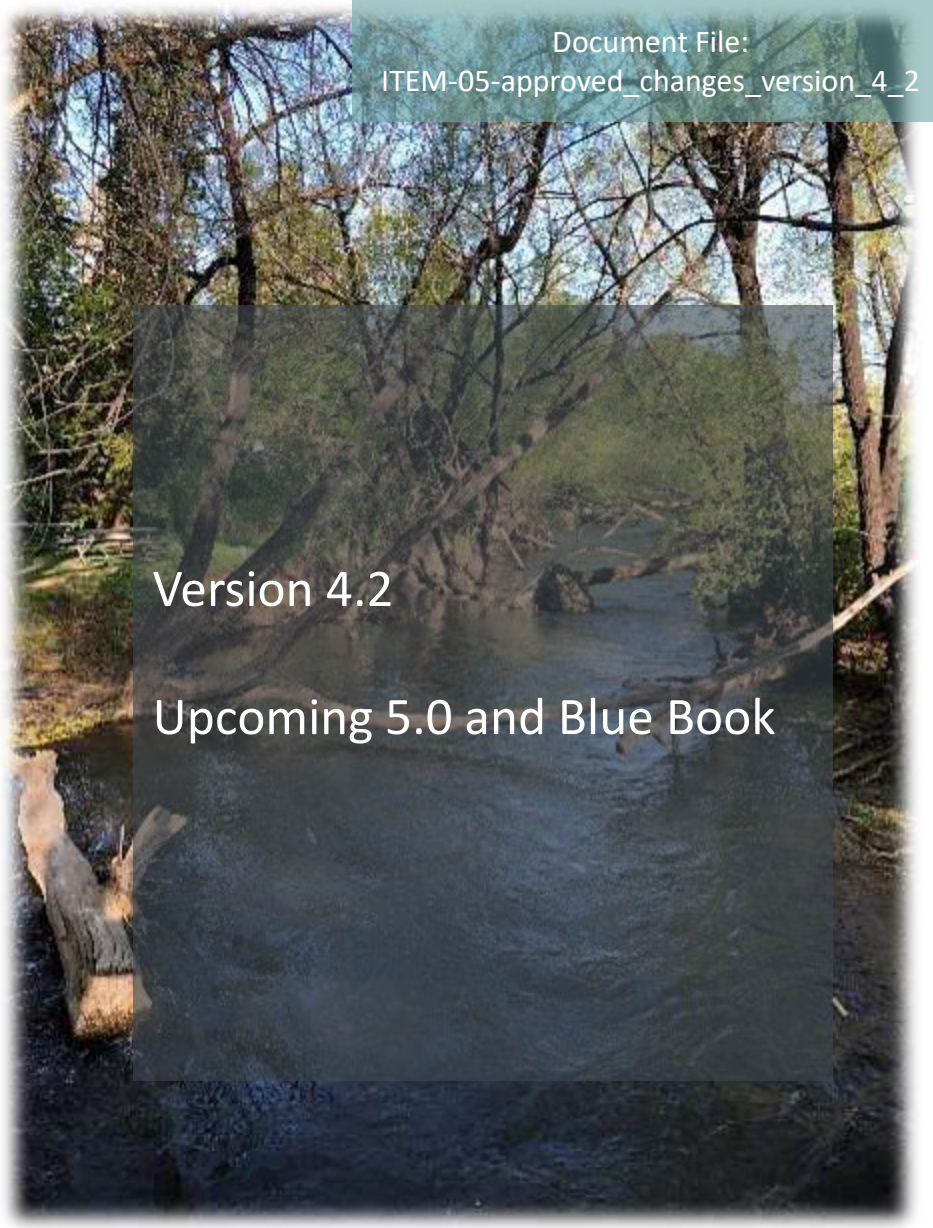
Be back by 1:00pm

Need to Develop Standard Procedures for New CWT Labs

www.rmpc.org
205 SE Spokane Street, Suite 100
Portland, OR 97202

Document File:
ITEM-05-approved_changes_version_4_2

Update on PSC Technical Committee on Data Sharing



REGIONAL MARK PROCESSING CENTER
A FISHERIES DATA PROJECT OF
THE PACIFIC STATES MARINE FISHERIES COMMISSION

www.rmpc.org
205 SE Spokane Street, Suite 100
Portland, OR 97202

Stretch Break

Be back in 10 minutes

Parental-Based Tagging & GSI

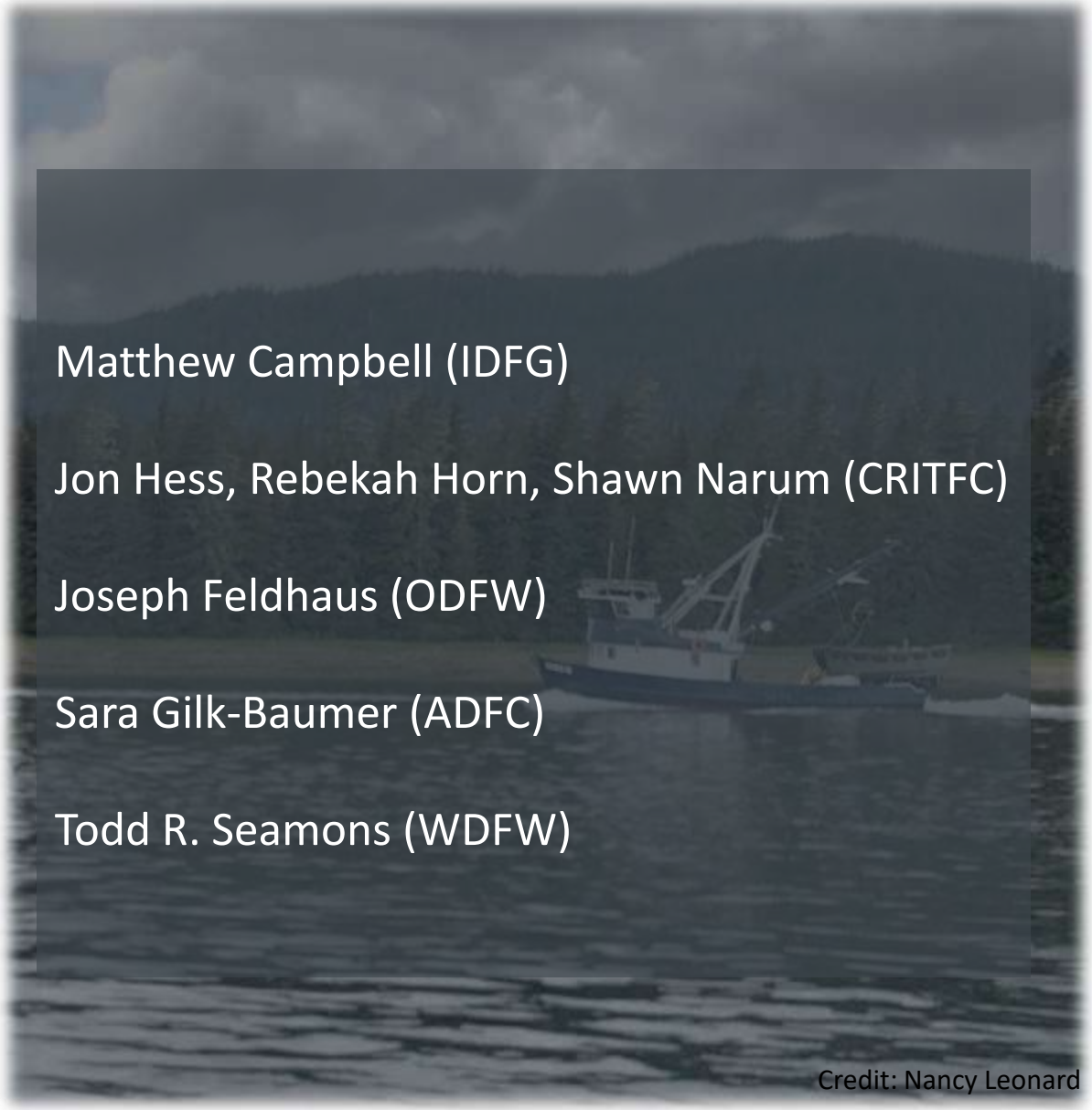
Matthew Campbell (IDFG)

Jon Hess, Rebekah Horn, Shawn Narum (CRITFC)

Joseph Feldhaus (ODFW)

Sara Gilk-Baumer (ADFC)

Todd R. Seamons (WDFW)



Credit: Nancy Leonard

The status of PBT/GSI technology in the Snake River Basin

Matthew Campbell (IDFG)
Fisheries Genetics Program Coordinator

Regional Committee on Marking & Tagging
Wednesday April 19th, 2022

Primary Collaborators: Shawn Narum, Rebekah Horn, Jon Hess
Columbia River Inter-Tribal Fish Commission

Co-collaborators:
Idaho Power Company
Lower Snake River Compensation Plan (USFWS)
Pacific States Marine Fisheries Commission
Nez Perce Tribe

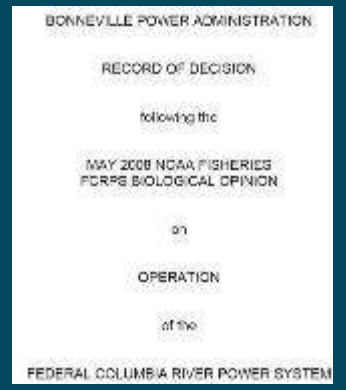
Primary Staff (EFGL PSMFC):
John Hargrove
Audrey Harris
Katharine Coykendall
Jesse McCane

IDFG Genetic Monitoring of Snake River Salmon and Steelhead stocks

- ✓ *Since 2010, the BPA has funded a project in the Snake River Basin that utilizes two genetic technologies*

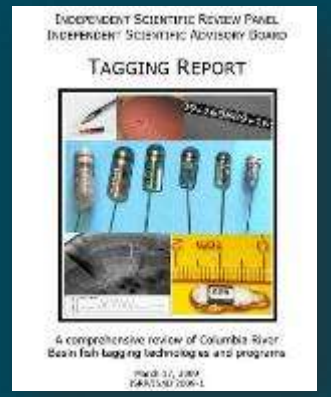
Why was this project initiated? Proof-of-concept

1. New genetic technologies were recommended as tools to address RPAs in the 2008 FCRPS BiOp



2. The "Tagging Report" requested by Council in 2008/2009, recommended the development of two specific genetic technologies:

- **Genetic Stock Identification**
- **Parentage Based Tagging**



What these genetic technologies are and how they work

Parentage-based genetic tagging - PBT (Hatchery Fish)

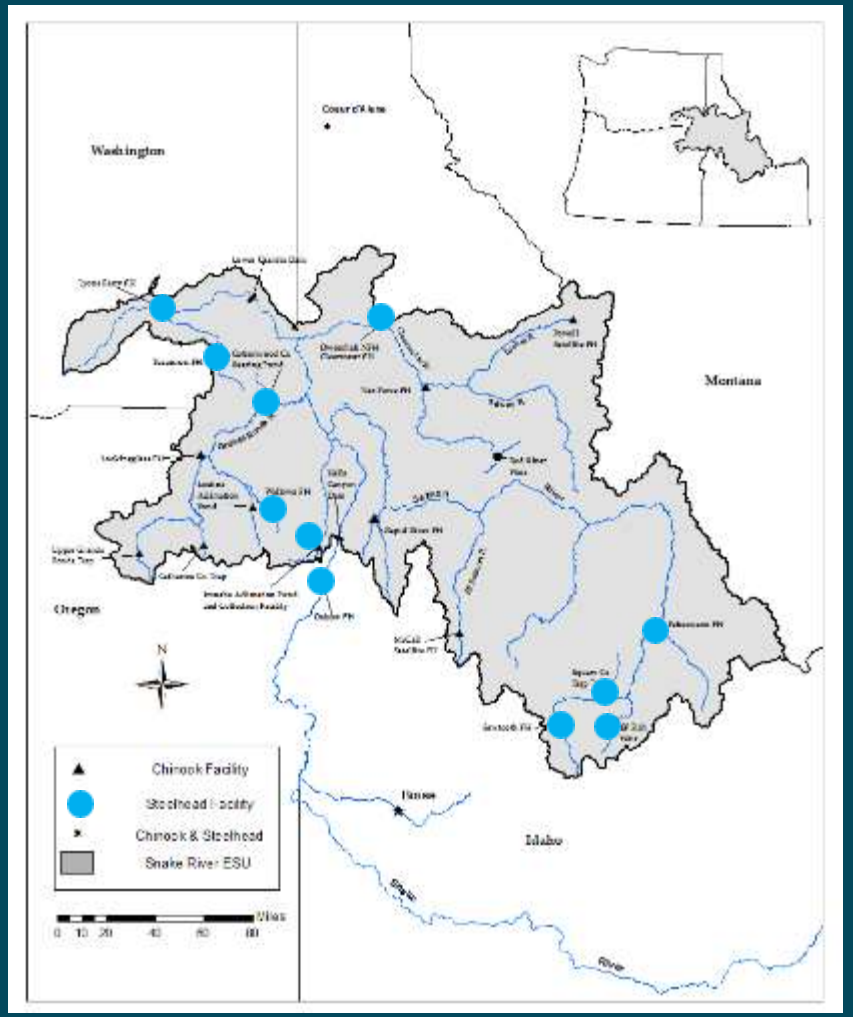
- Genetic-based fish tagging method that involves genotyping hatchery broodstock
- By genetically sampling the parents, all offspring are genetically “tagged”
- Information obtained similar to CWT, but improved tagging rate of hatchery fish (~95-100%)
- Juvenile handling not required prior to release
- ‘Tag’ recovery is non-lethal, and possible at all life stages

2 = 6,000!!!!

Snake River Steelhead

- All broodstock sampled since 2010

- ~5,000 samples/year

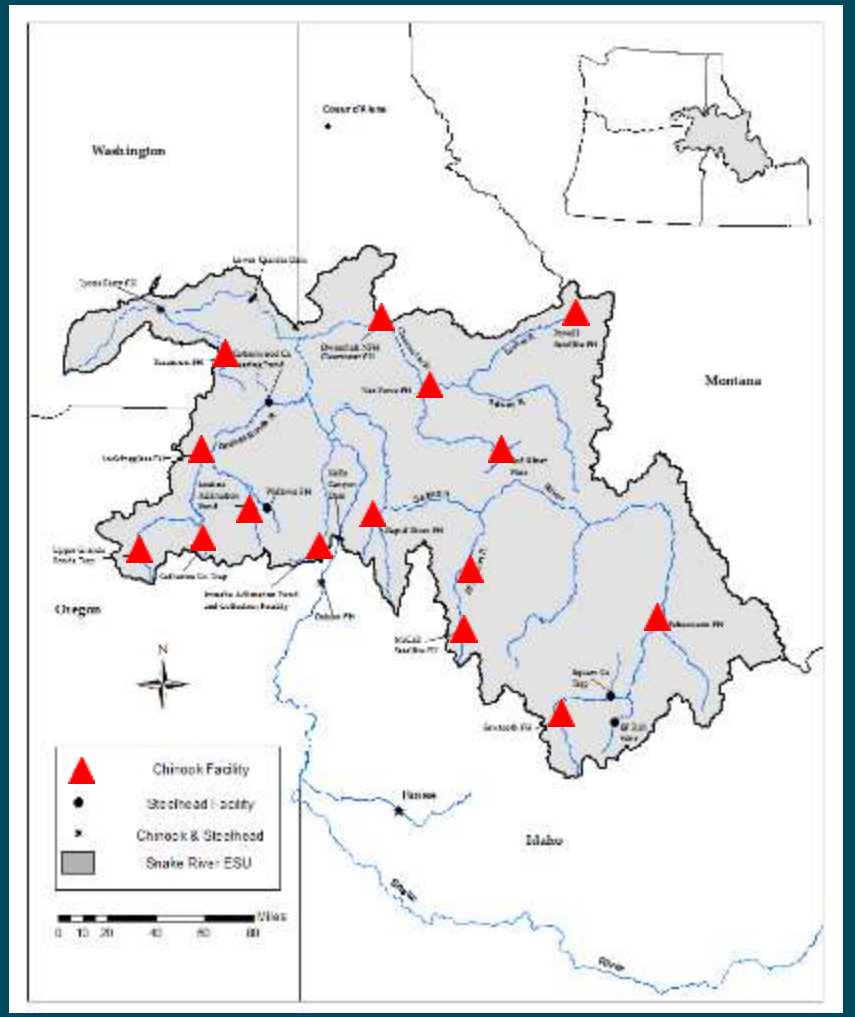


Snake River Chinook Salmon

- All Spring/Summer Chinook broodstock sampled since 2008

- All Fall Chinook broodstock sampled since 2011

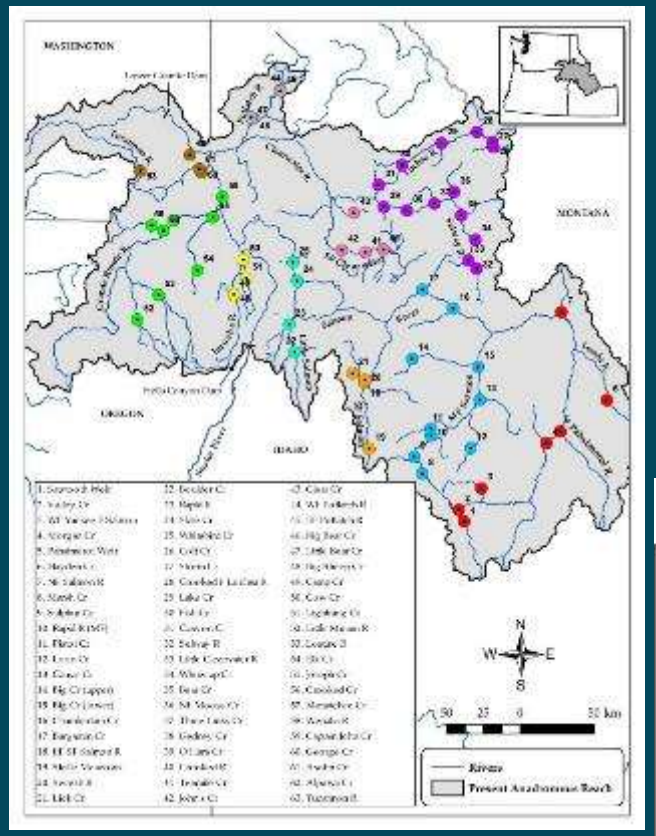
- ~12,000 samples/year

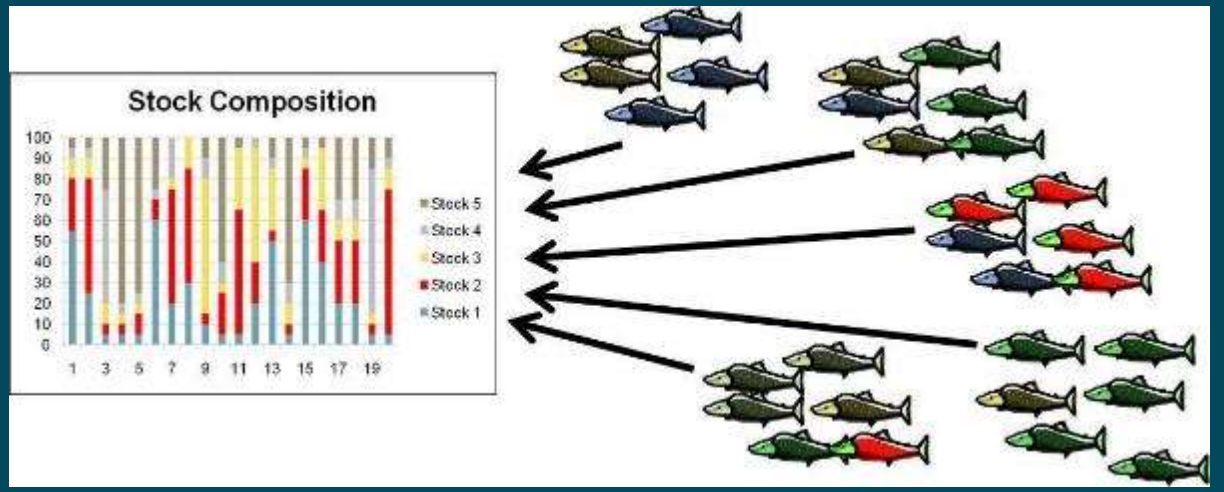


What these genetic technologies are and how they work

Genetic Stock Identification- GSI
(Wild fish)

- Uses genetic profiles from all contributing wild populations to identify the stock of origin of any unknown fish

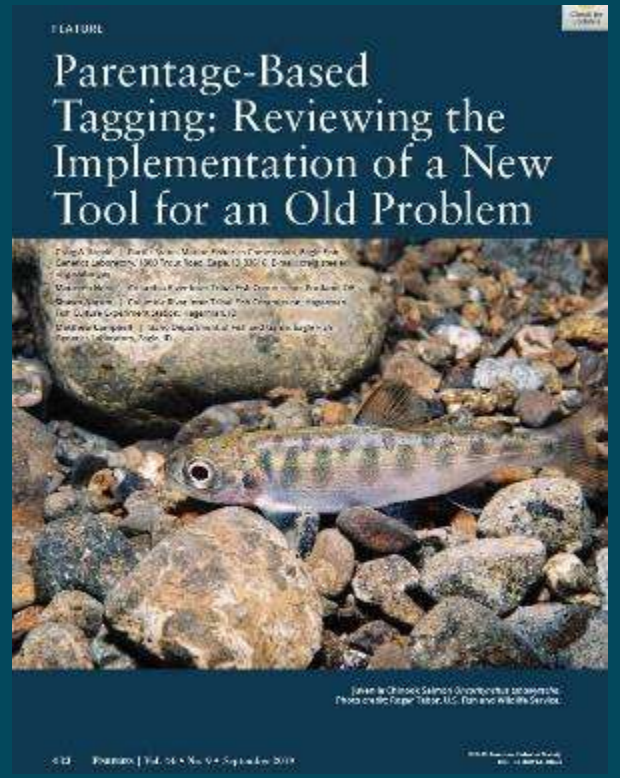




Major achievements during proof-of-concept period:

Parentage Based Tagging-

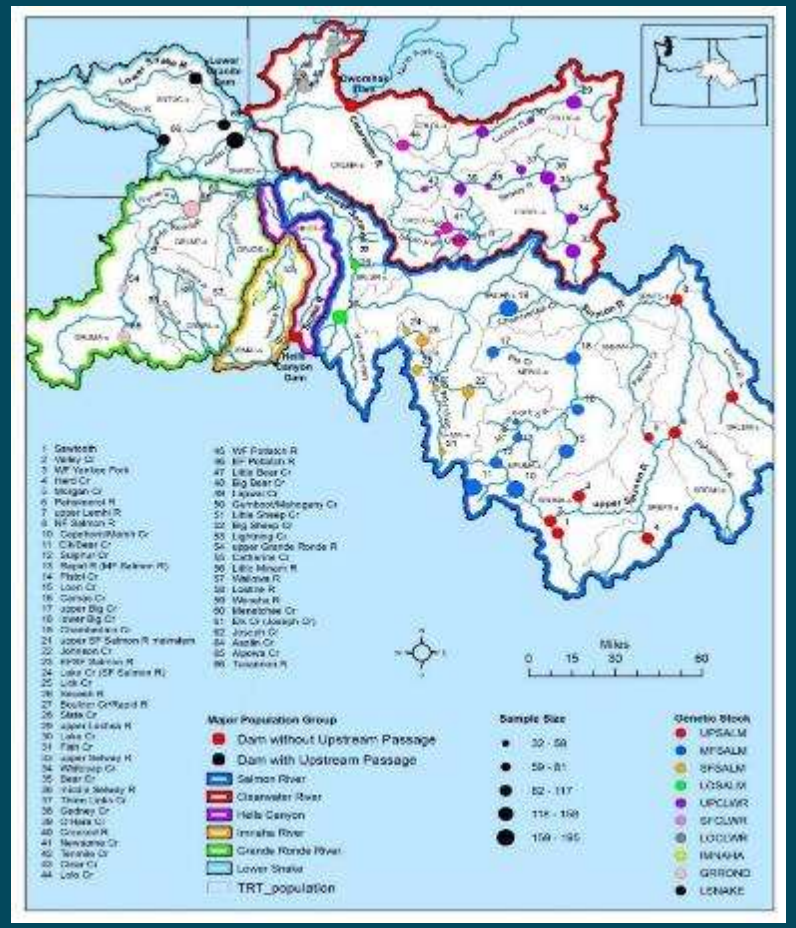
- Accuracy- PBT is accurate and matched CWT assignments (Steele et al 2013)
- Integration- Same genetic marker panel for GSI and PBT
- Tag rates- High realized tag rates 2009 - Present (>95%)
- Utility- Powerful technology to address multiple management and research questions throughout the CRB

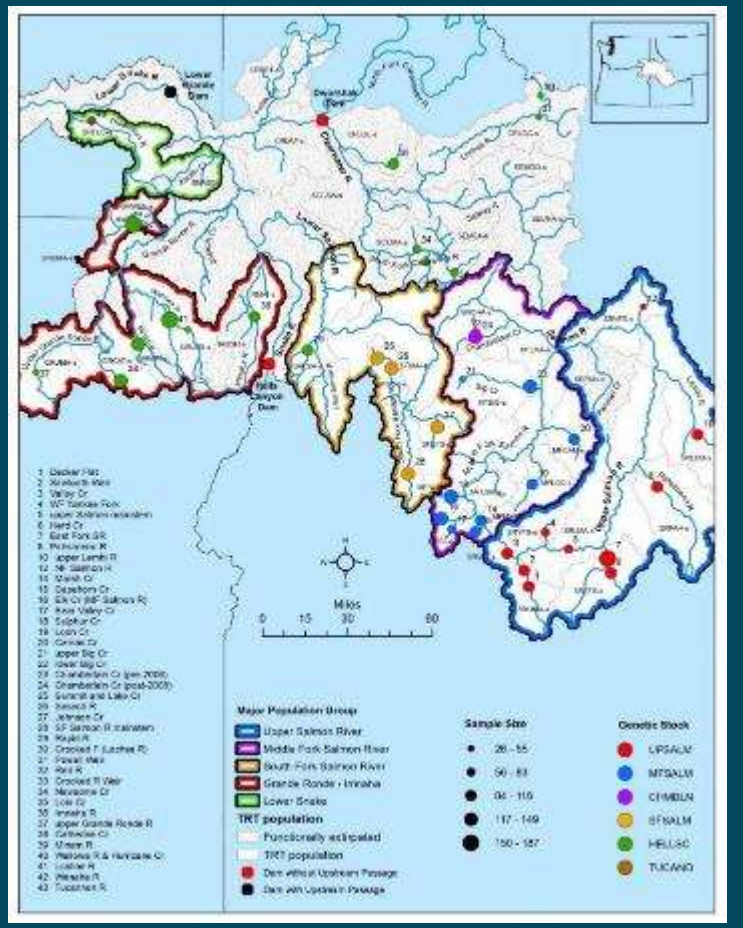


Major achievements:

Genetic Stock Identification-

- Comprehensive GSI SNP genetic baselines for both species
  - Chinook Salmon: Sample collections represent 31 TRT pops, 6 Genetic Stocks spanning 5 MPGs
  - Steelhead: Sample collections represent 23 TRT pops, 10 Genetic Stocks spanning 6 MPGs
- Baselines incorporated into Columbia River genetic baselines (CRITFC)

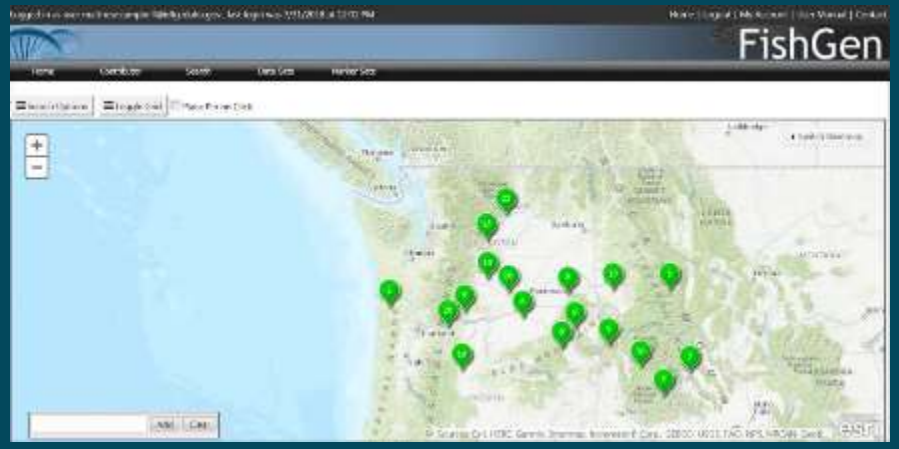


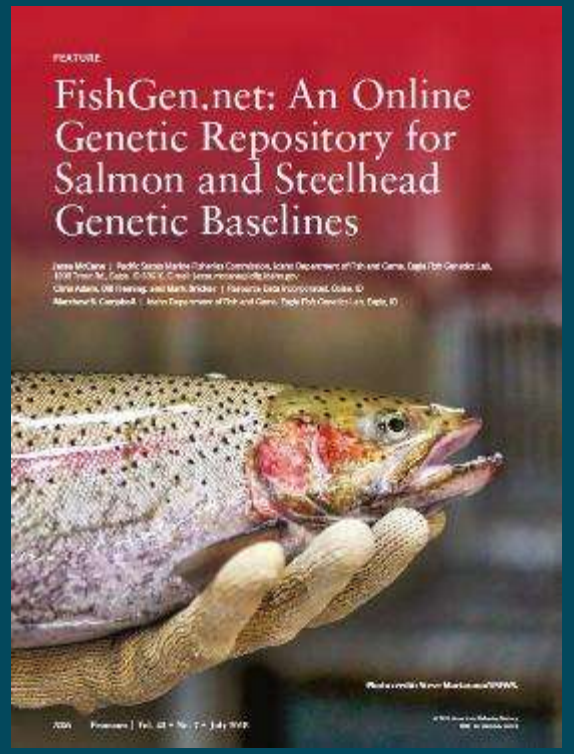


Major achievements:

Both Projects-

- FishGen Database
- Initial funding from PCSRF. Annual from BPA



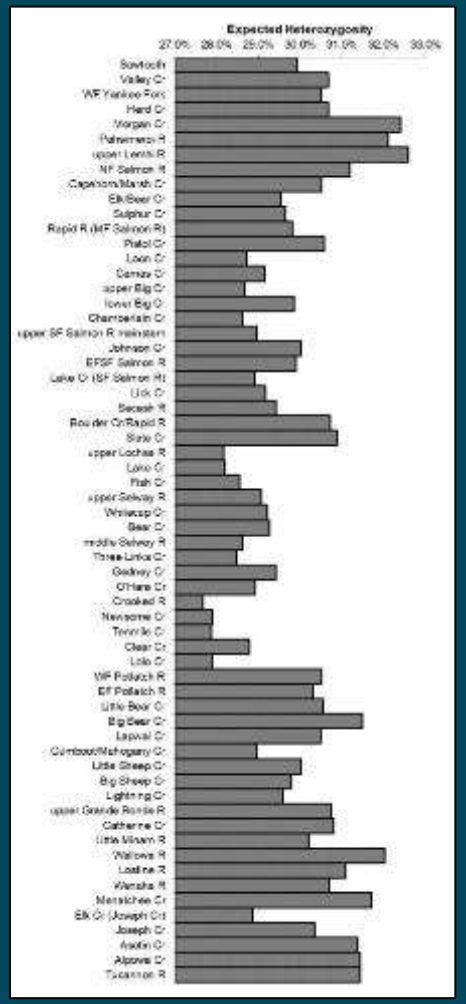


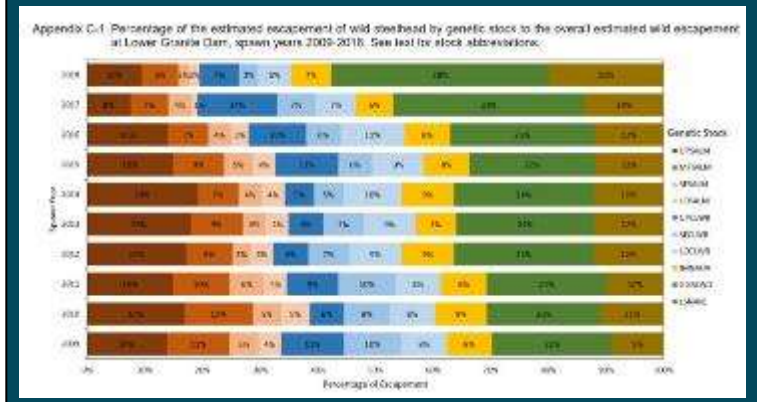
<u>All PBT/GSI baselines available on FishGen</u>

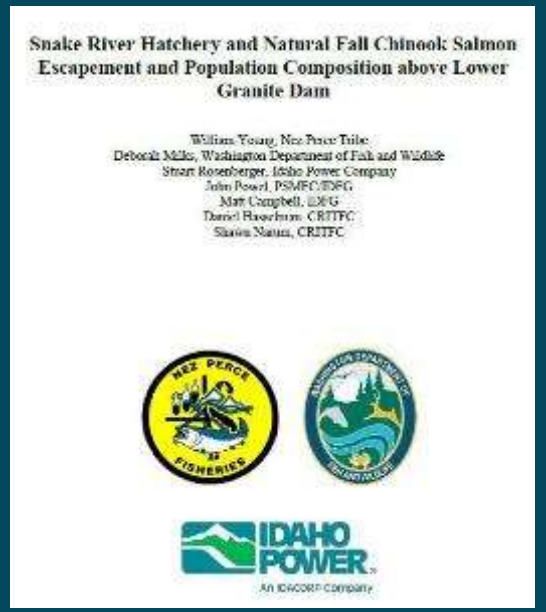
- ~500,000 Chinook Salmon
- ~150,000 Steelhead
- Standardized genetic marker panels
- Publicly available

Transition to long-term status and trend monitoring programs

Following completion of proof-of-concept phase of these projects, managers throughout the Columbia River Basin incorporated GSI and PBT for long-term status and trend monitoring of steelhead and Chinook Salmon stocks



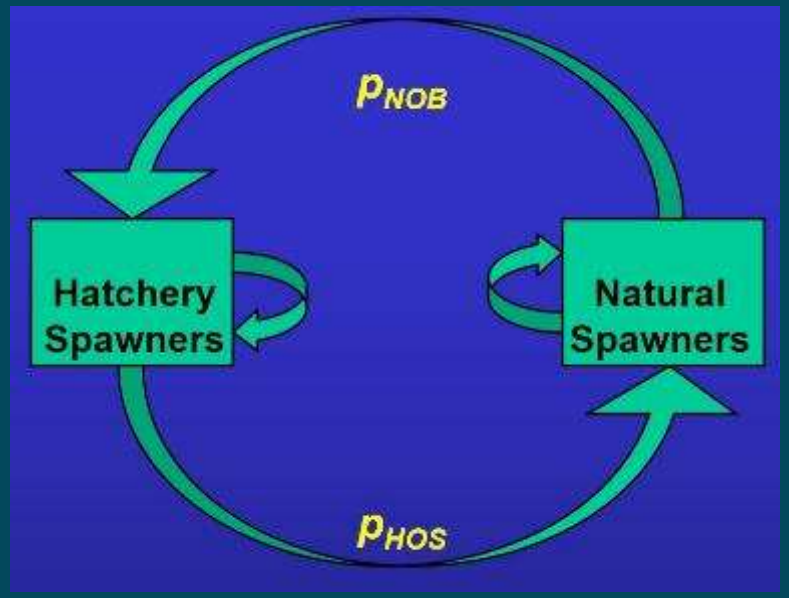




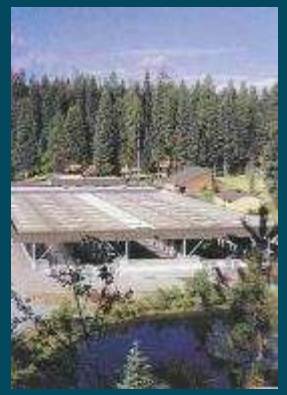
Some brief examples:

Long-term status and trend monitoring programs

- ✓ Monitoring effectiveness of integrated hatchery programs
  - Estimate PNI
  - Adult-to-adult productivity
  - Includes Snake River Fall Chinook



Calculate and report annual estimates of Proportion of Natural Influence:
PNI ≈ pNOB / (pNOB + pHOS)



McCall Fish Hatchery

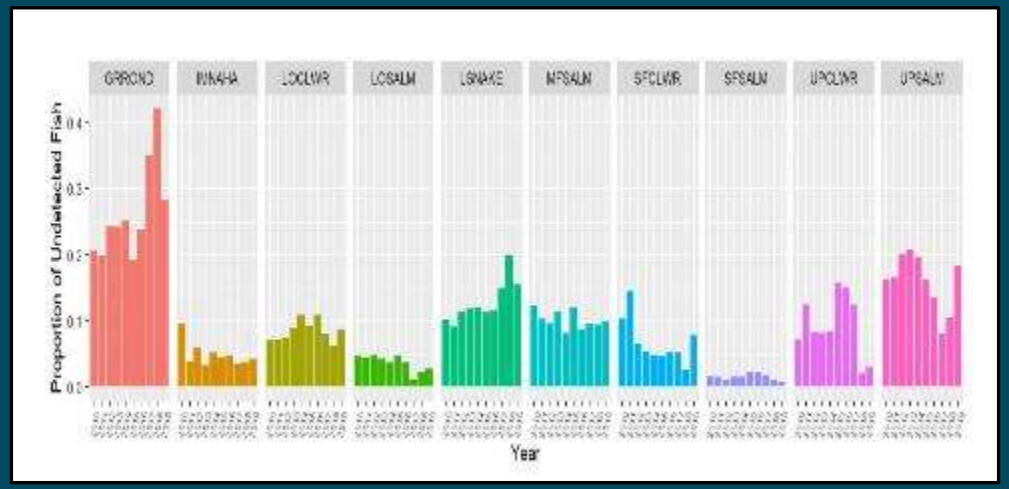
Pahsimeroi Fish Hatchery

Sawtooth Fish Hatchery

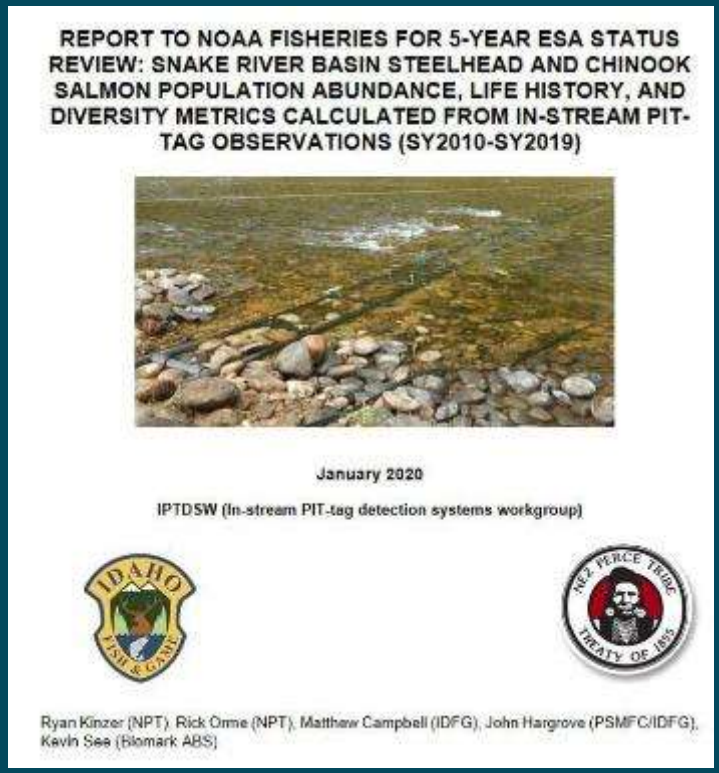
Lyons Ferry Fish Hatchery

Long-term status and trend monitoring programs

- ✓ Summarize life-history and genetic diversity of steelhead and spring/summer Chinook Salmon that are detected at instream pit tag detection systems in the Snake River basin
  - Separate wild and hatchery fish
  - Provide genetic sex and estimates of genetic diversity and structure
  - Provide GSI assignments of undetected fish



Proportions of undetected steelhead by genetic stock by year for spawn years 2010–2019


REPORT TO NOAA FISHERIES FOR 5-YEAR ESA STATUS REVIEW: SNAKE RIVER BASIN STEELHEAD AND CHINOOK SALMON POPULATION ABUNDANCE, LIFE HISTORY, AND DIVERSITY METRICS CALCULATED FROM IN-STREAM PIT-TAG OBSERVATIONS (SY2010-SY2019)

January 2020

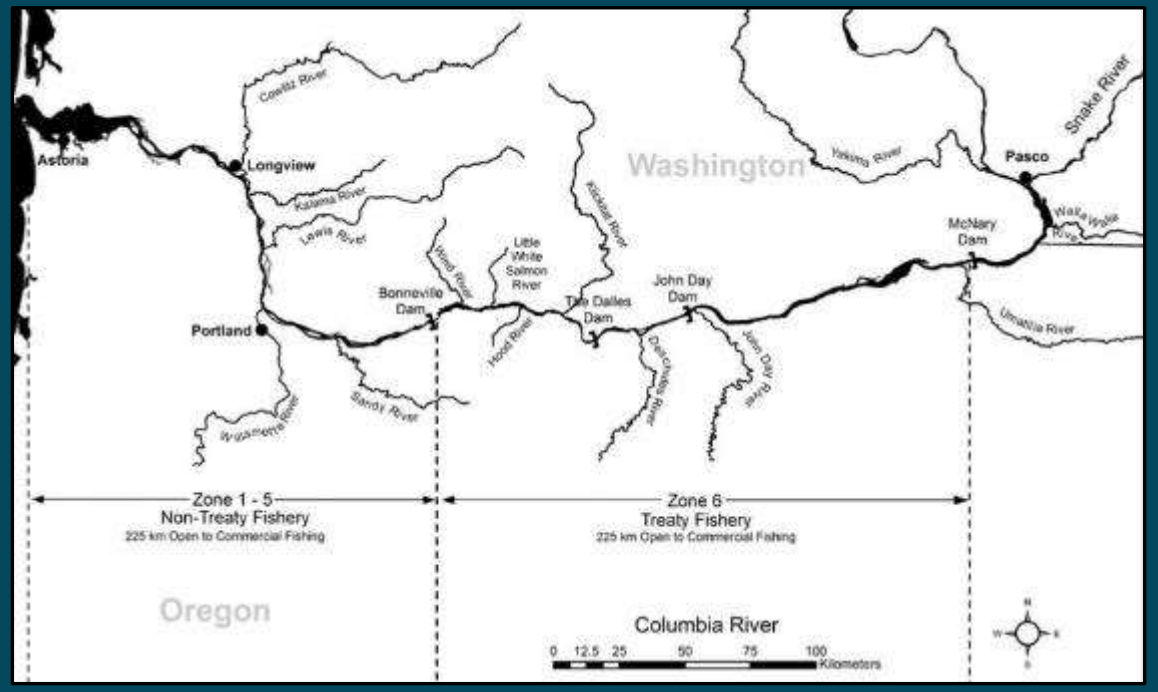
IPTDSW (In-stream PIT-tag detection systems workgroup)

Ryan Kinzer (NPT), Rick Orme (NPT), Matthew Campbell (IDFG), John Hargrove (PSMFC/IDFG), Kevin See (Blomark ABS)

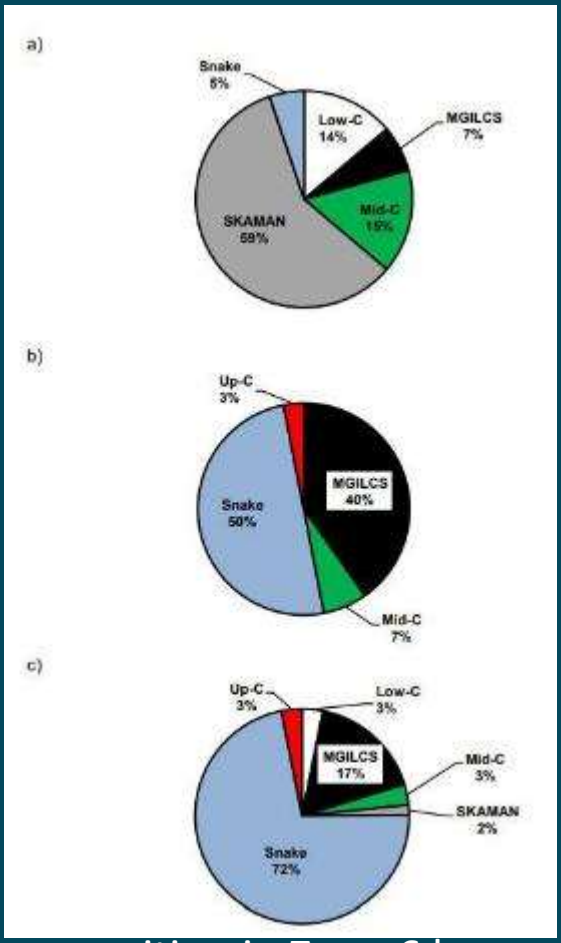
Long-term status and trend monitoring programs

Some examples of projects that are generating status and trend monitoring data:

- ✓ Estimate the wild and hatchery stock composition of adult steelhead harvested in mainstem fisheries extending from the Lower Columbia River upstream to the Snake Basins of Idaho, Oregon and Washington.



Multi-agency effort to estimate stock composition of sport and tribal harvested steelhead in the Columbia River corridor



Stock composition in Zone 6 harvest

Final example: VSP Monitoring in the Snake River Basin

VSP stands for viable salmonid population. NOAA uses four key parameters to evaluate a population's viability

- Abundance
- Population growth rate
- Spatial Structure
- Diversity

✓ These parameters can be estimated annually for the entire Snake River basin using a comprehensive sampling and genetic program at Lower Granite Dam

✓ PBT improves wild stock abundance estimates because its able to identify unmarked/untagged hatchery fish (~20% of Steelhead and ~36% of Chinook Salmon returning to the Snake River basin are unmarked/untagged and would be considered wild without PBT)

✓ PBT improves stock escapement estimation at Lower Granite Dam for hatchery stocks

Reasons to be excited about the future?

Reasons to be excited:

- Increases in the number of genetic markers and incorporating new types of genetic markers (e.g. microhaplotypes, markers under selection)
  - ✓ Provide opportunities for improving resolution and precision of GSI
  - ✓ Single Parent and Grandparentage assignments

- FINS database
  - Better tools for tracking PBT groups to release site
  - Better tools for estimating PBT tag rates

Grandparentage Testing

• Benefits of PBT technology

➢ PBT can be used to identify the origin of straying hatchery fish

ARTICLE

Maximum Likelihood Estimation of the Proportion of Hatchery-Origin Fish on Spawning Grounds Using Coded Wire Tagging and Parentage-Based Tagging

Richard A. Hinrichsen

Craig A. Steele and Michael W. Ackerman

Matthew R. Campbell

Shawn R. Narum and Maureen A. Hess

William P. Young

Barbara A. Shields

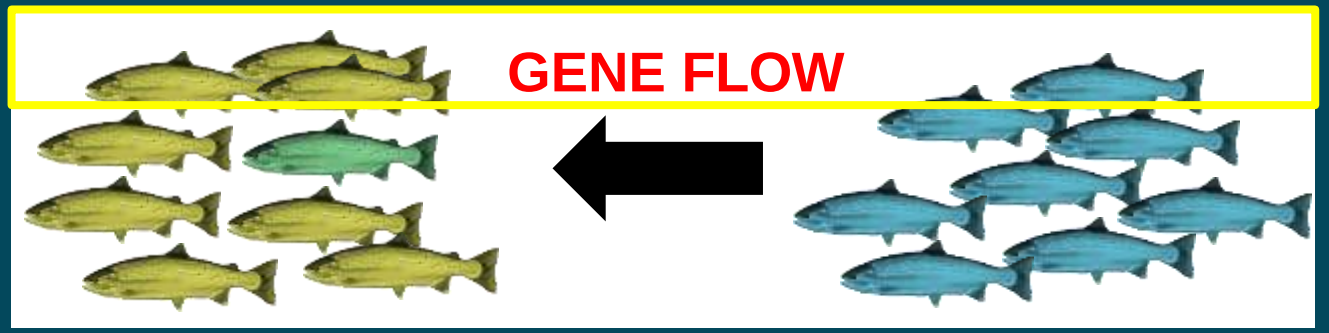
Brian L. Maschhoff

Hinrichsen et al (2016)-"*In the South Fork Salmon River application, there were 340% more PBT recoveries than CWT recoveries, leading to greater precision in release-specific values of p from maximum likelihood estimation.*"

- **NOAA wants this information**

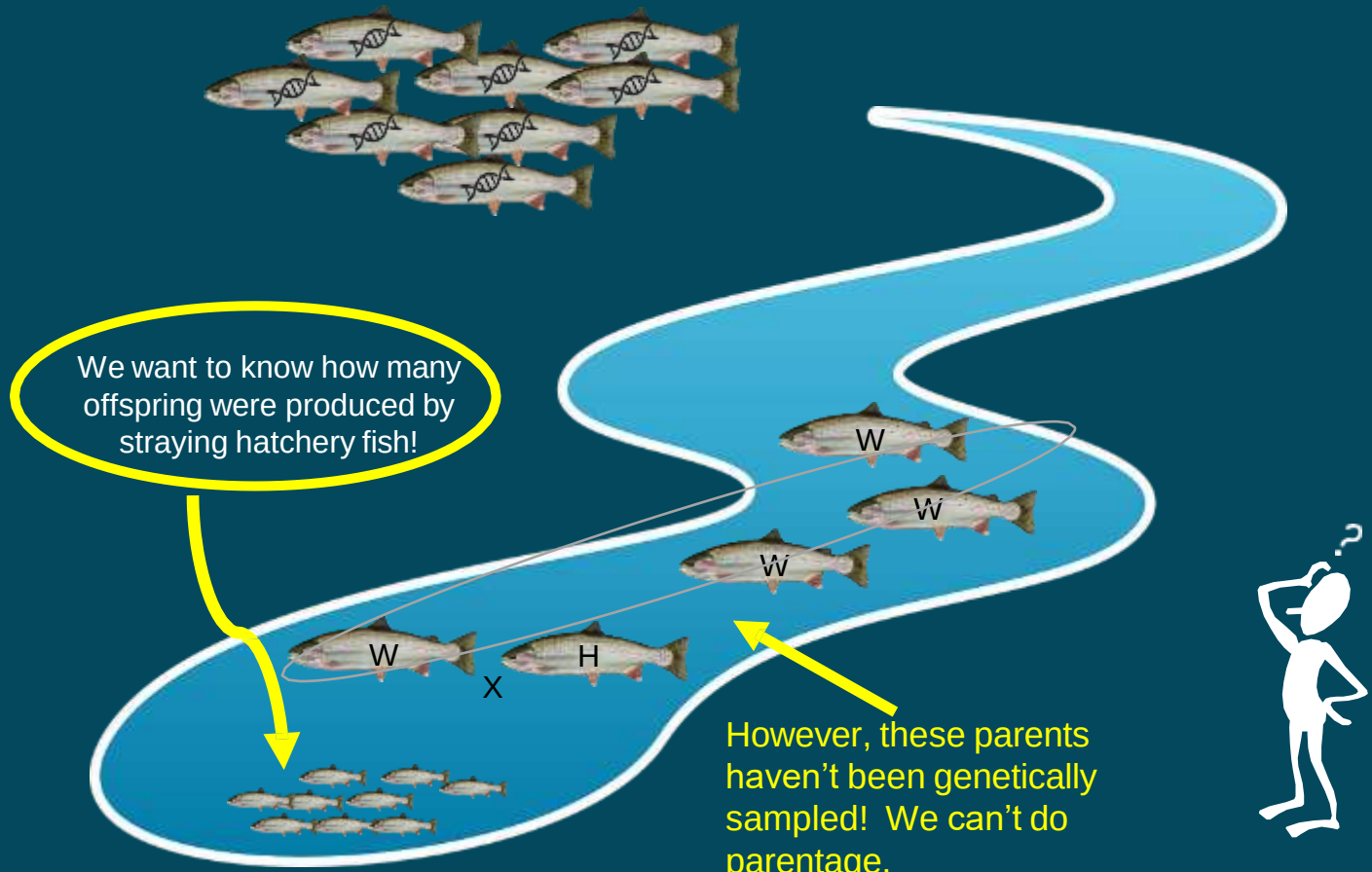
➢ Status assessments for ESA-listed salmon populations in the Snake River and Columbia River basins, require reliable estimates of the proportion of hatchery-origin spawners on the spawning grounds, or pHOS (McClure et al. 2003)

➢ However, pHOS is actually just a surrogate for what geneticists and managers would really like to monitor:

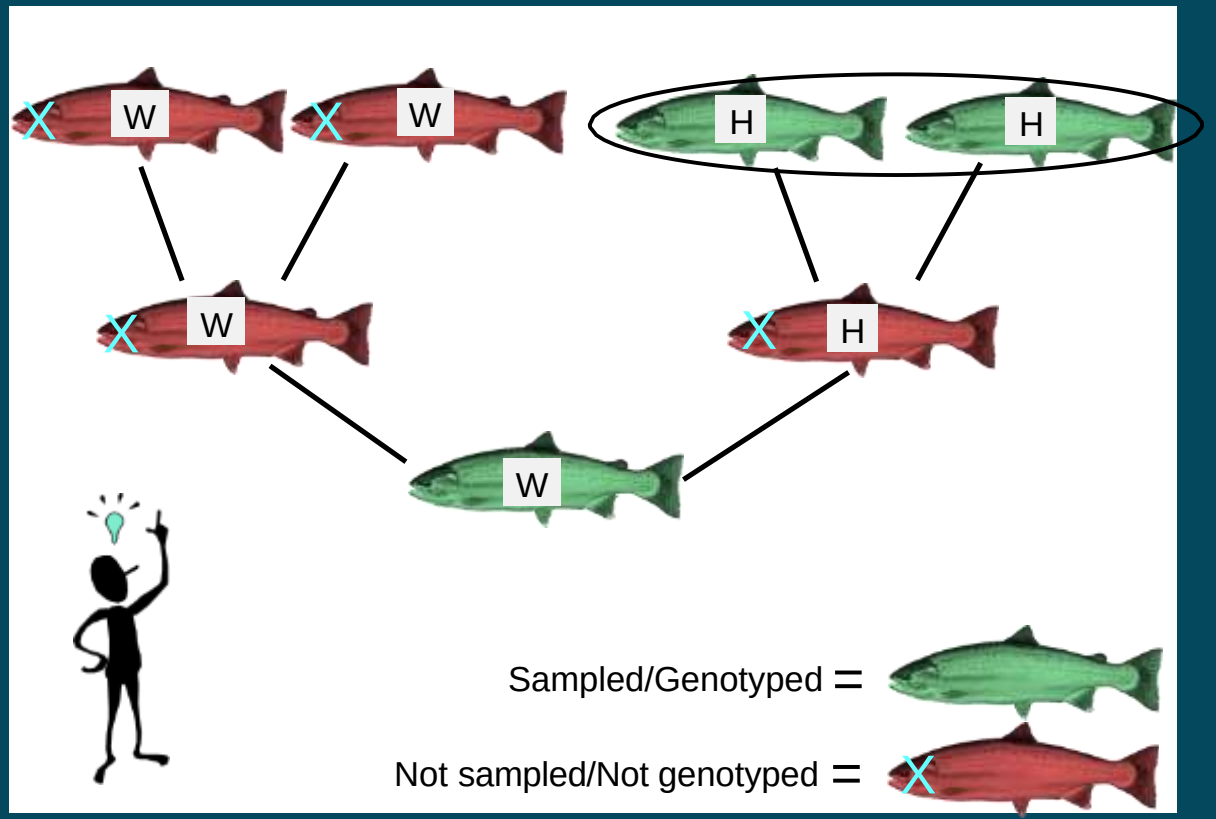


➢Gene flow only occurs if hatchery fish successfully mate with wild fish and produce offspring!

PBT Parent Baseline



- **What are we proposing?**
  - **With sufficient genetic markers we can extend PBT to identify grandparent-grandchild relationships**



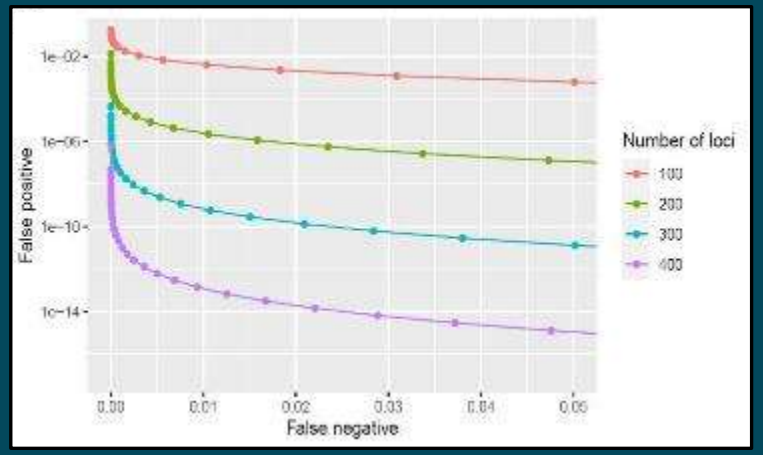
- **What are we proposing?**

✓ We have developed statistical methods for assigning grandparents and estimating error rates for a genetic panel

✓ We have implemented these methods in a package for R statistical software at https://github.com/delomast/gRandma

✓ Preliminary analysis shows that 300 – 500 genetic markers are sufficient to accurately assign grandparents basin-wide

✓ We are currently funded to complete an empirical validation and demonstration of this new technique in the Snake River Basin




North American Journal of Fisheries Management

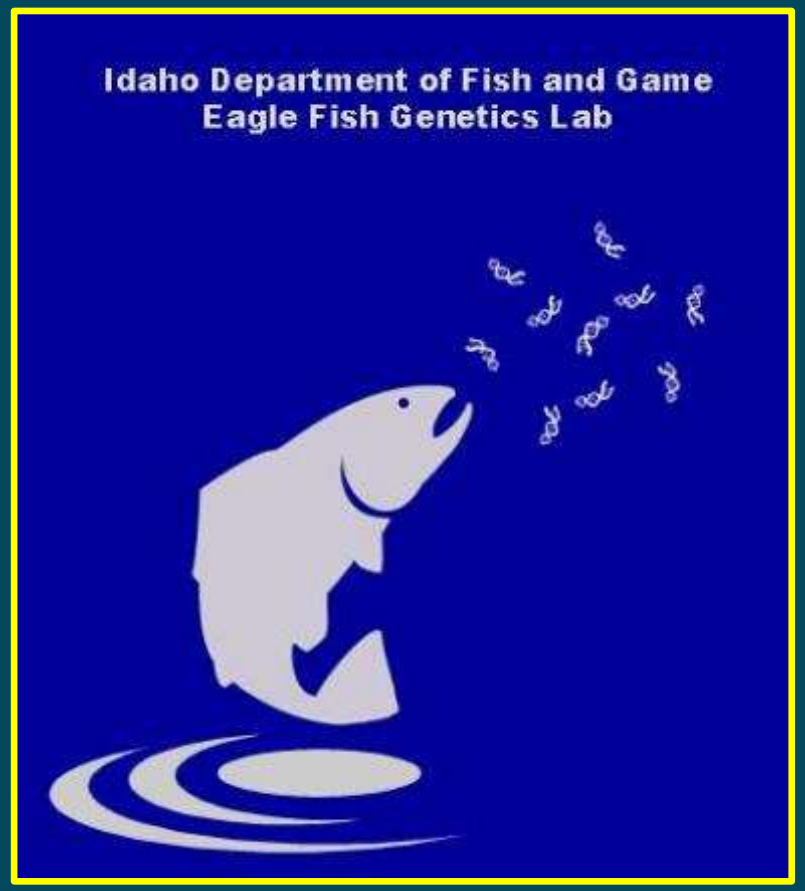
ARTICLE

Grandparent inference from genetic data: The potential for parentage-based tagging programs to identify offspring of hatchery strays

Thomas A. Delomas, Matthew Campbell

First published: 27 October 2021 | https://doi-org.libproxy.boisestate.edu/10.1002/nafm.10714

Questions???

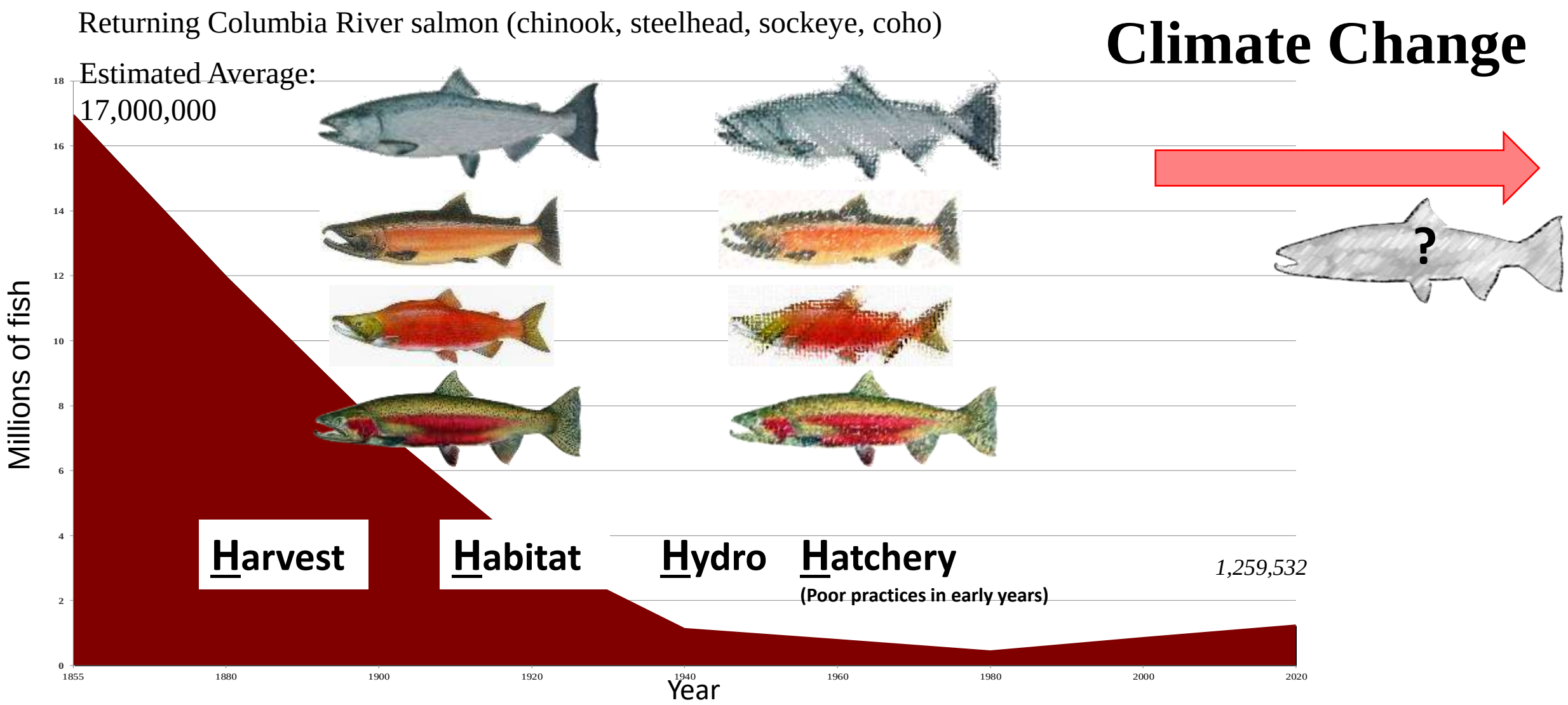


Genetic Monitoring of Salmonids in the Columbia River Basin

Jon Hess, Rebekah Horn, Shawn Narum

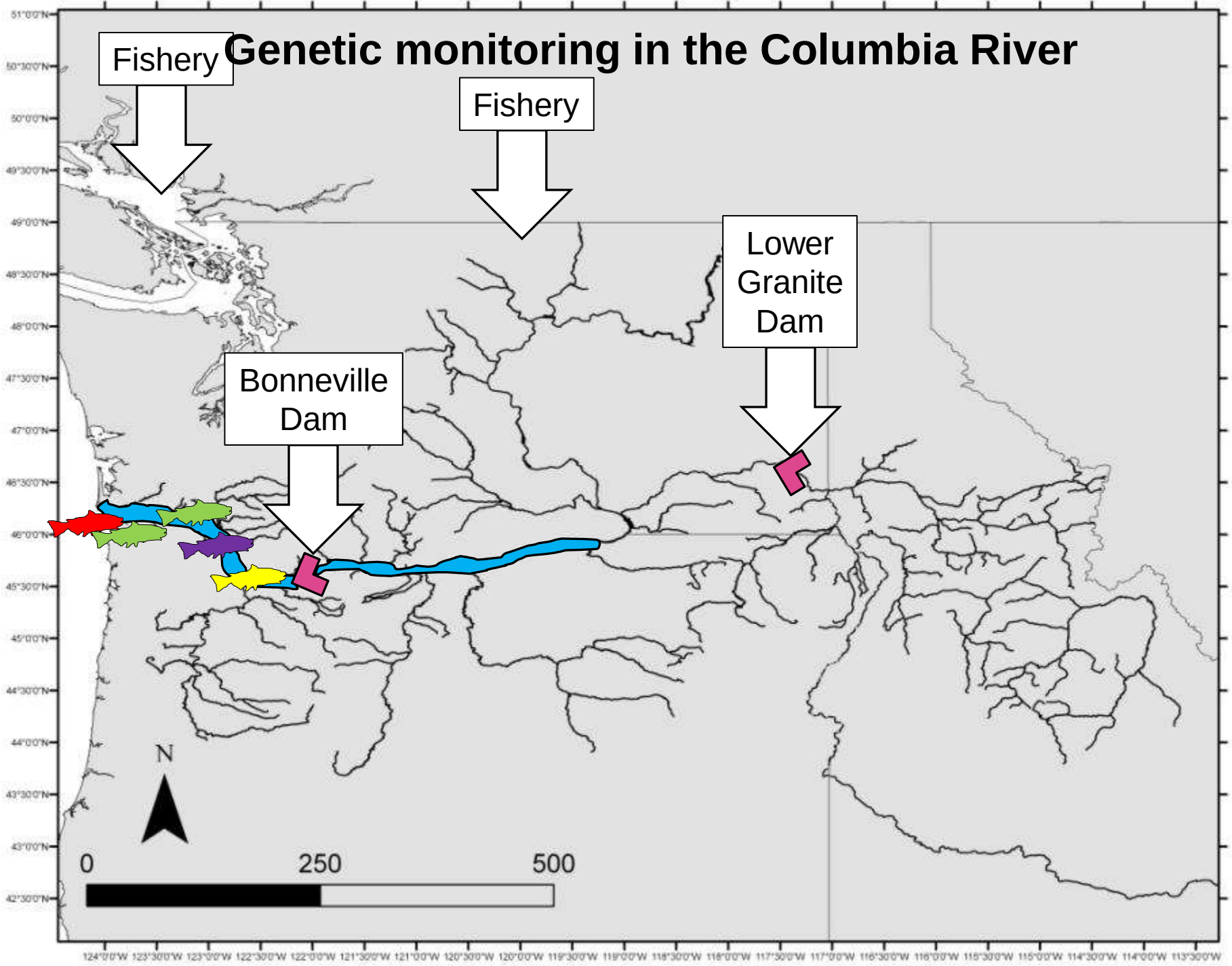
Columbia River Inter-Tribal Fish Commission (CRITFC)

Genetic Monitoring & Research to Support Recovery of Fisheries



1855: NPCC historical run extrapolation estimate; 1880-1920 data points extrapolated from Columbia River cannery output; 1940-present: dam counts and river mouth estimates

Genetic monitoring in the Columbia River



Chinook salmon

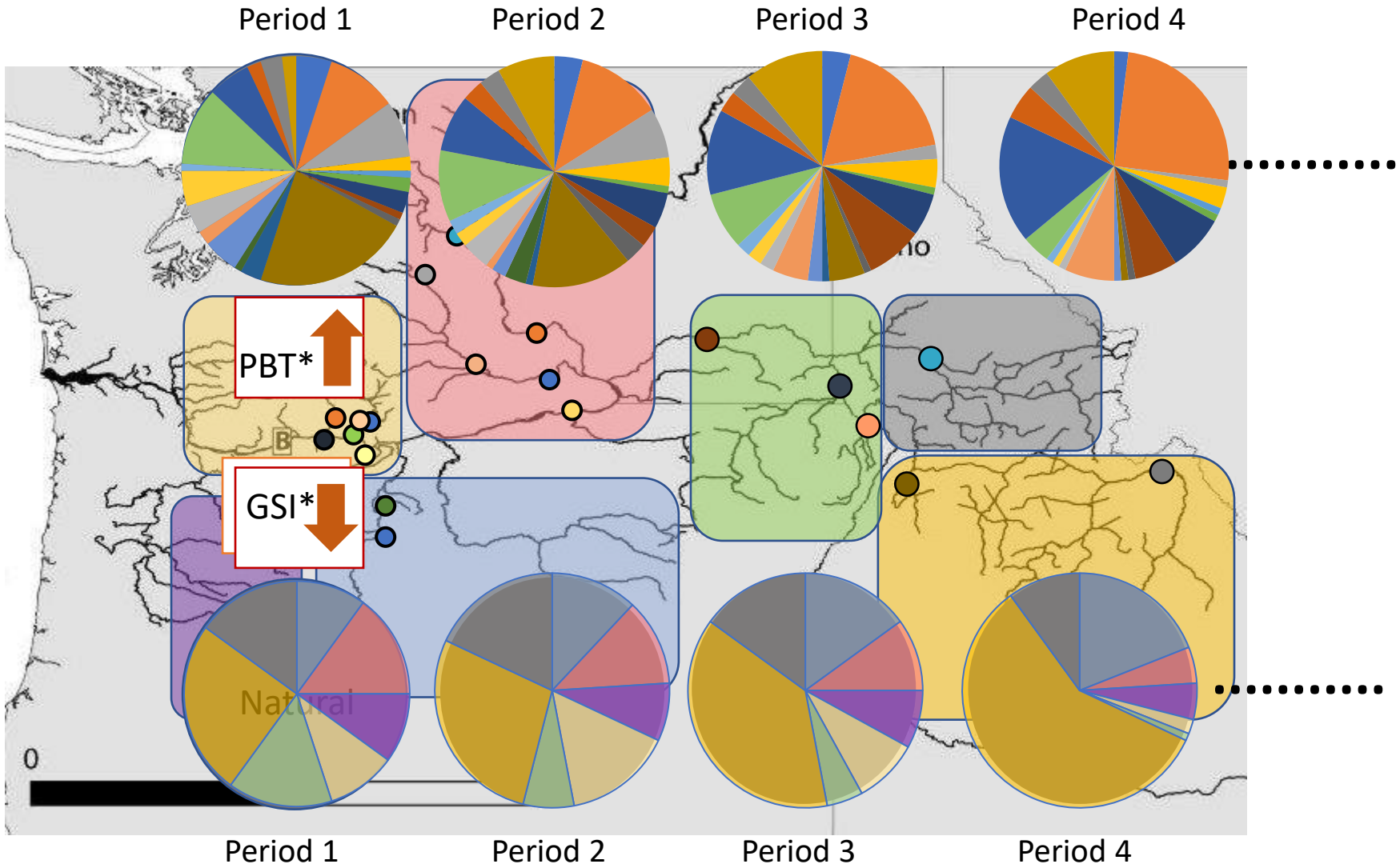
Steelhead

Sockeye salmon

Coho salmon

Bonneville Dam:

In-season estimates of abundance/timing at Bonneville Dam for specific stocks of Chinook, steelhead, sockeye; biweekly reports sent to co-managers



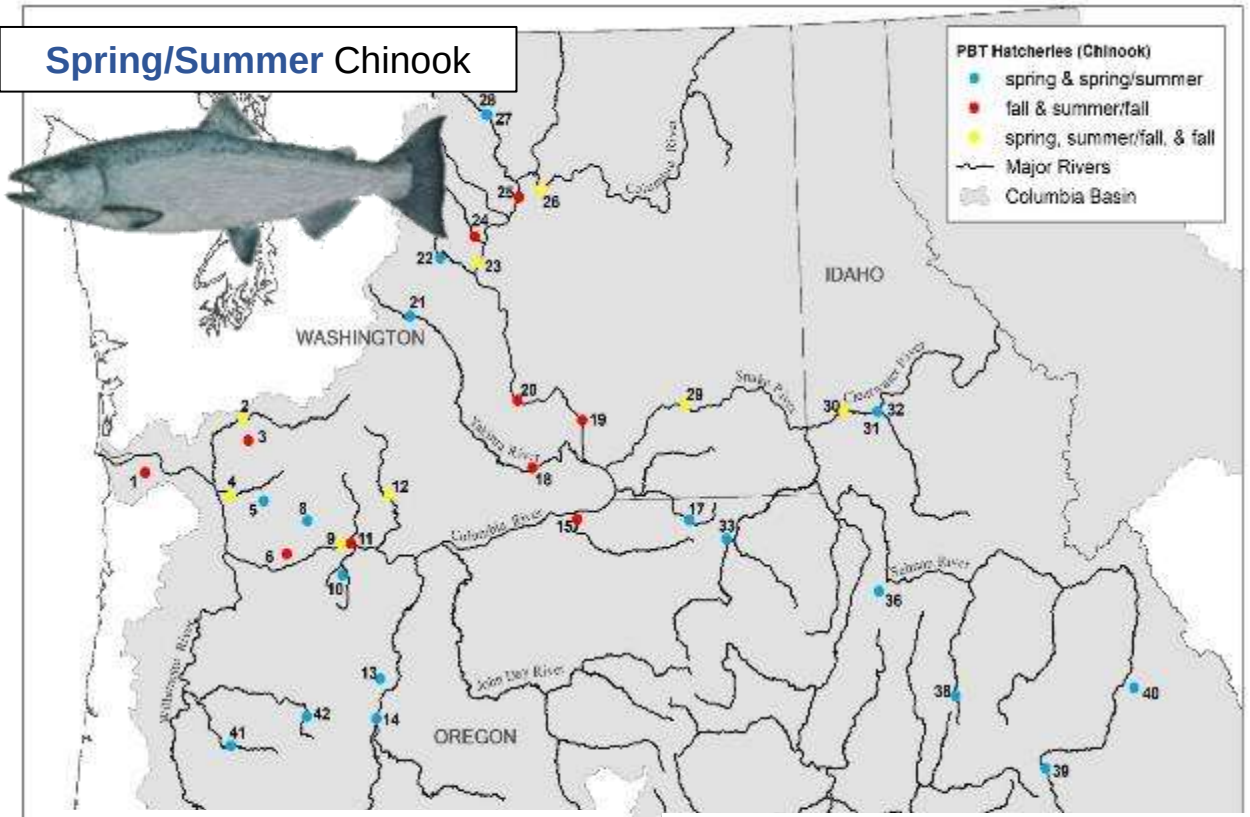
*PBT = Parentage Based Tagging

*GSI = Genetic Stock Identification

Parentage Based Tagging (PBT)
- Complete baselines above Bonneville since 2013

Chinook spawning hatcheries

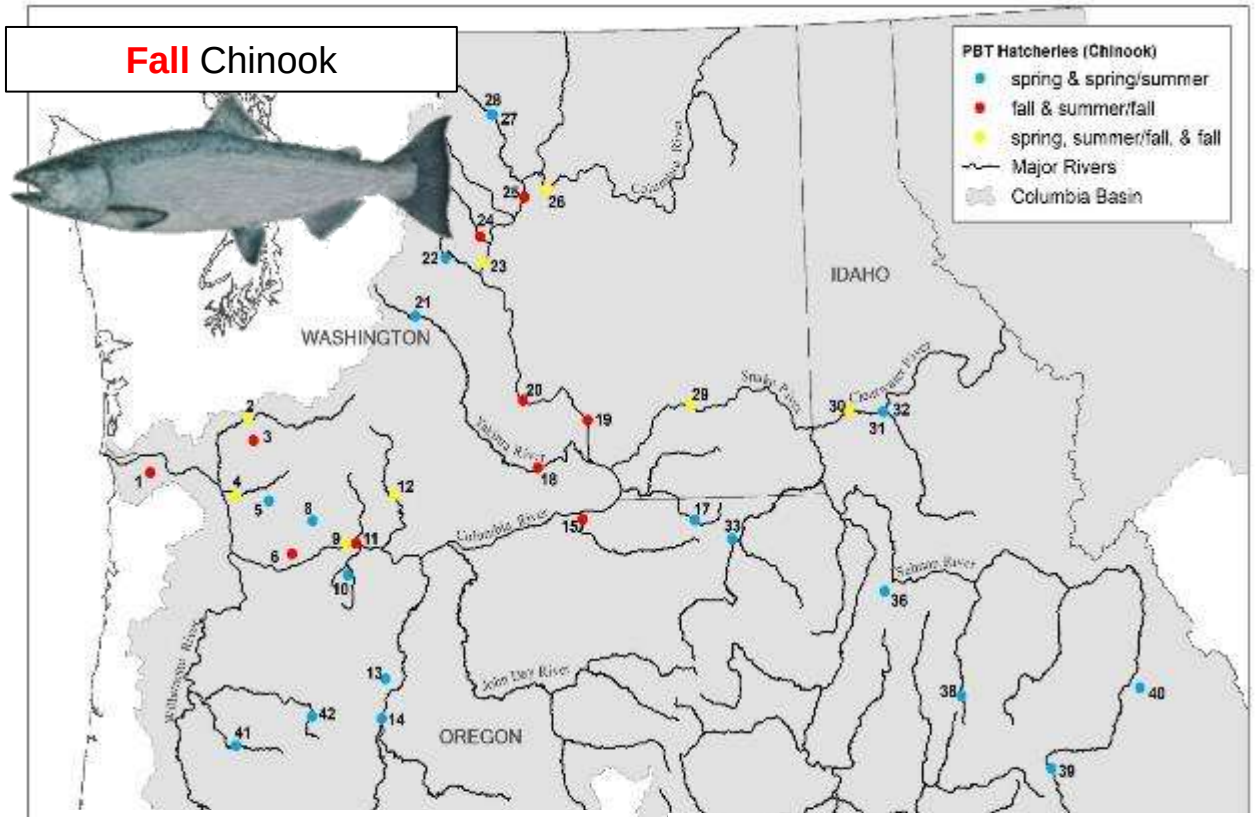
Spring/Summer Chinook



Below Bonneville Dam
- ~ 7,000 broodstock per year
- ~ 11 million juveniles released
- PBT program 'tags' ~ 31%

Above Bonneville Dam
- ~ 22,000 broodstock per year
- ~ 26 million juveniles released
- PBT program 'tags' ~ 100%

Fall Chinook

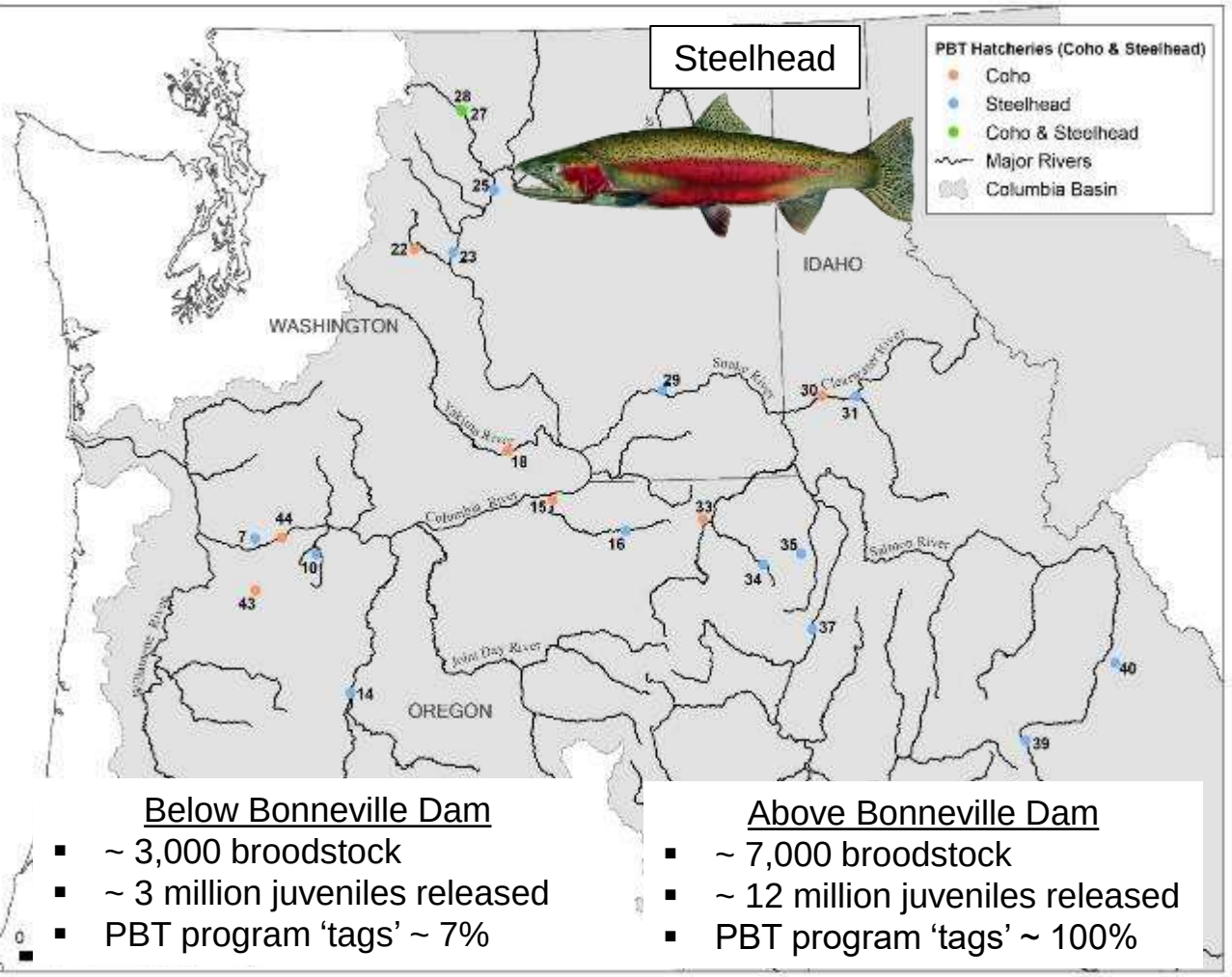


Below Bonneville Dam
- ~ 14,000 broodstock per year
- ~ 28 million juveniles released
- PBT program 'tags' ~ 86%

Above Bonneville Dam
- ~ 21,000 broodstock per year
- ~ 41 million juveniles released
- PBT program 'tags' ~ 100%

Parentage Based Tagging (PBT)
- Complete baselines above Bonneville since 2013

Steelhead spawning hatcheries



Below Bonneville Dam
- ~ 3,000 broodstock
- ~ 3 million juveniles released
- PBT program ‘tags’ ~ 7%

Above Bonneville Dam
- ~ 7,000 broodstock
- ~ 12 million juveniles released
- PBT program ‘tags’ ~ 100%

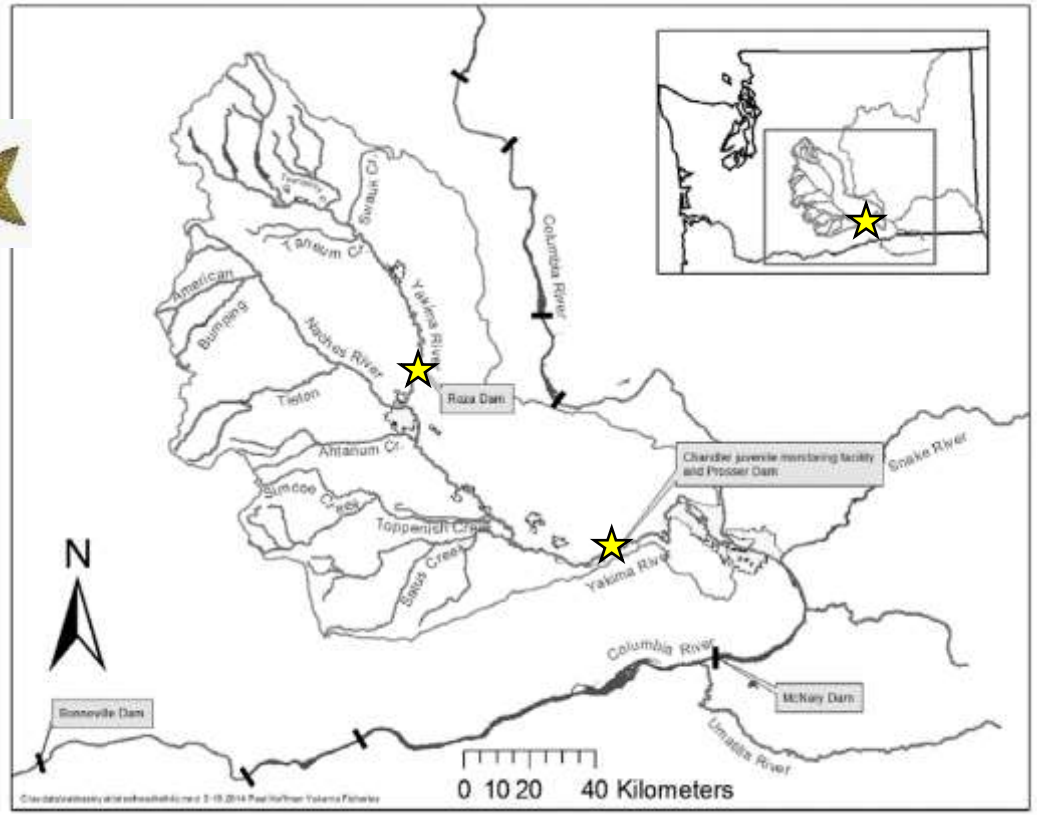
Sockeye spawning programs

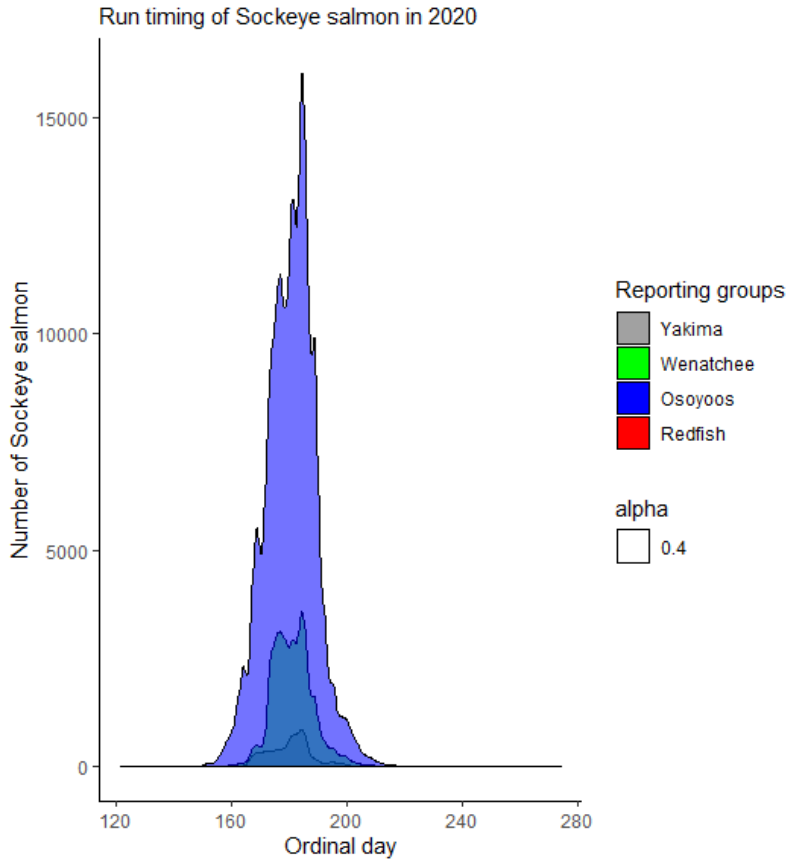
Primary sockeye stocks
-Okanogan R.
-Cle Elum reintroduction

Parentage Based Tagging (PBT)
- Complete baselines above Bonneville since 2013

Sockeye reintroduction

Sockeye





Above Bonneville Dam

- ~ 10,000 adult transplants per year
- PBT program ‘tags’ ~ 50%

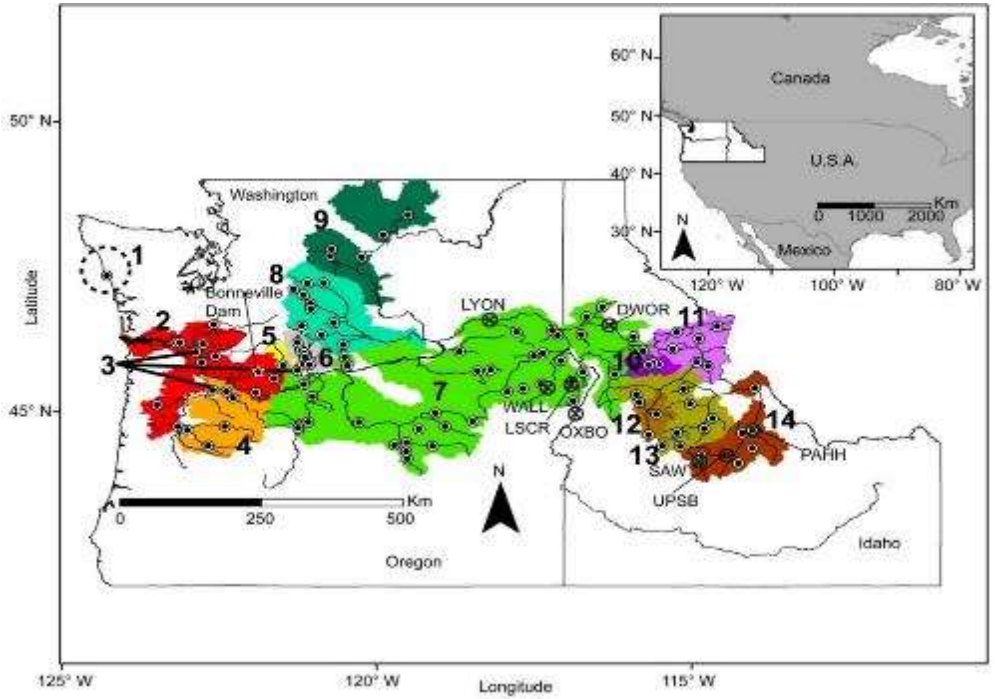
GENETIC STOCK ID BASELINES

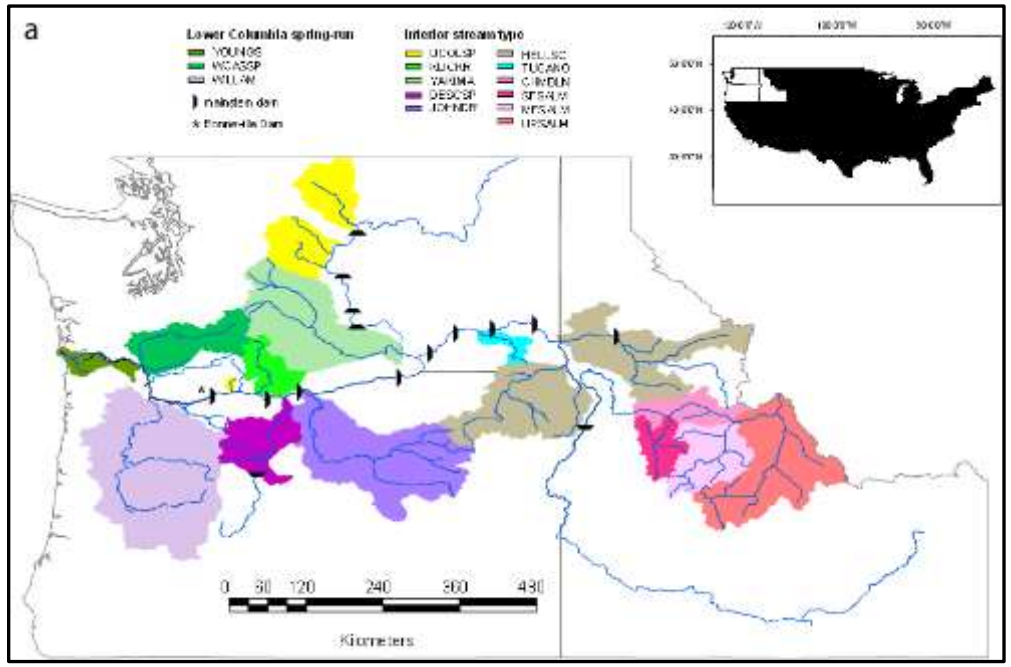
Utility to assign <u>natural origin</u> fish

Genetic Stock Identification (GSI)

Steelhead

Chinook salmon





<u>Primary sockeye stocks</u>
-Wenatchee R.
-Okanogan R.
-Snake R.
-several kokanee stocks

Hess et al. 2022; BPA Report

COUNTING FISHES FOR MANAGEMENT

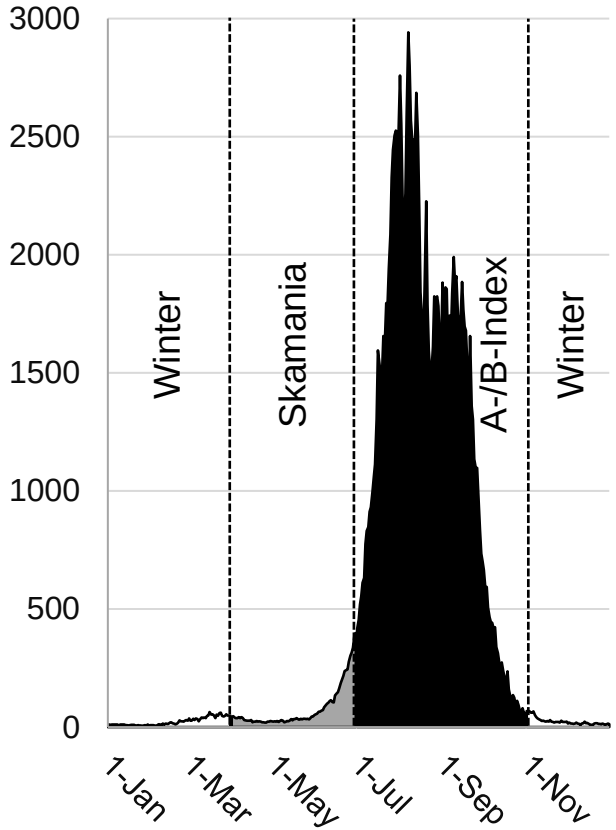
Season

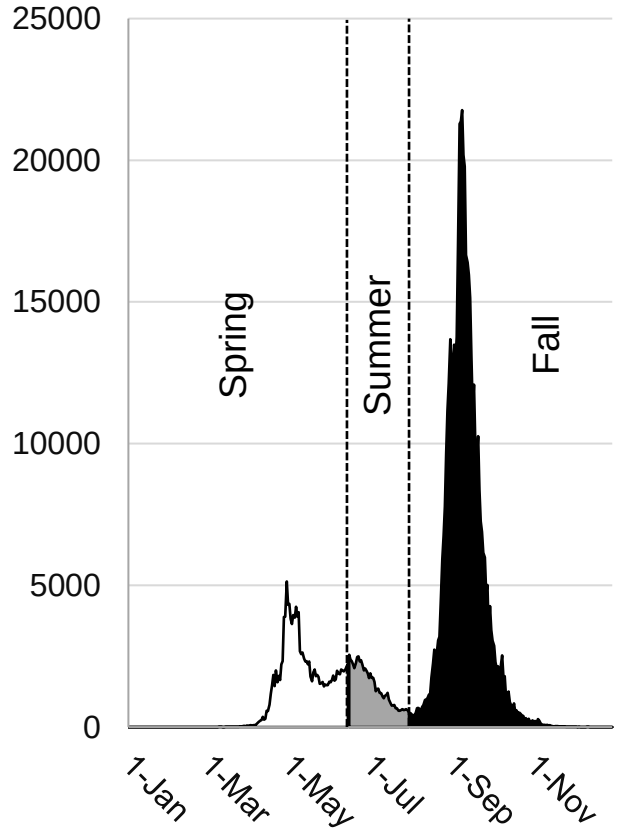
Steelhead

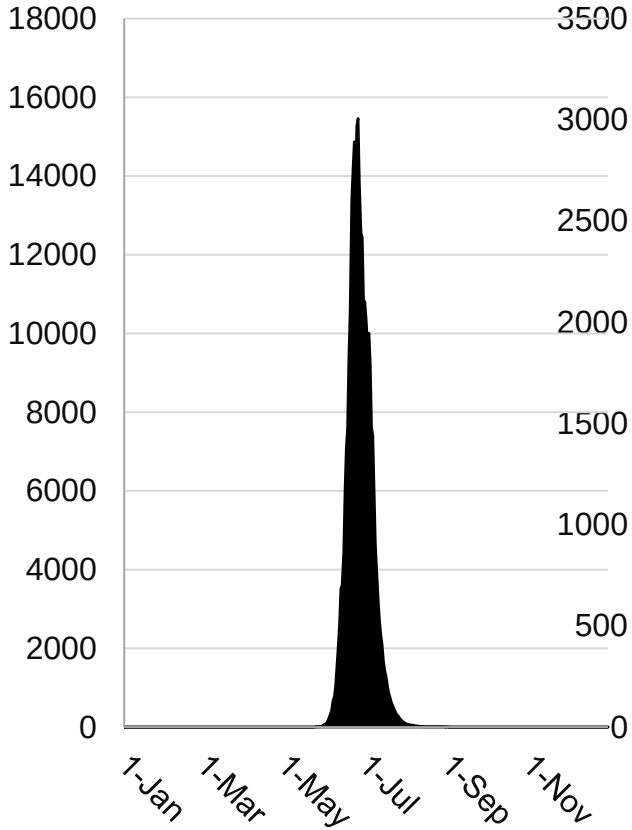
Chinook

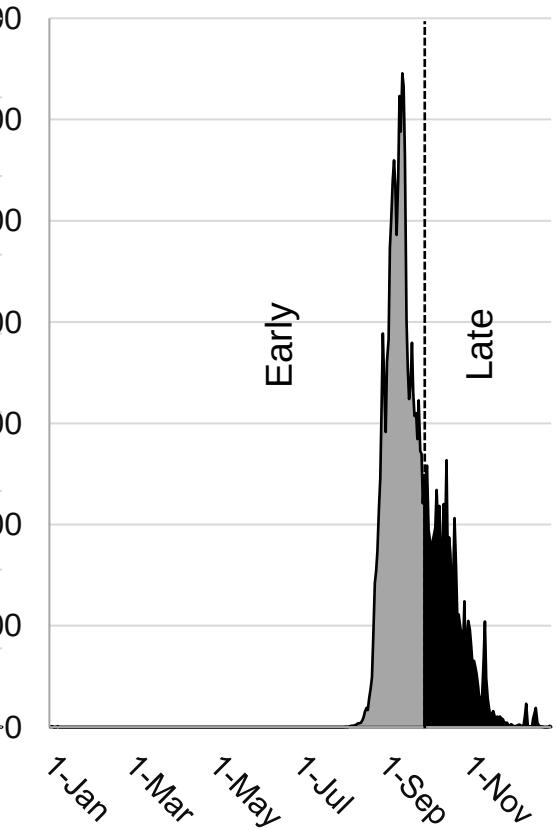
Sockeye

Coho

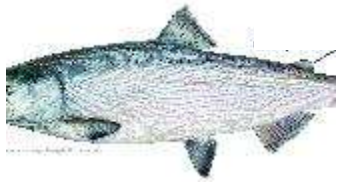






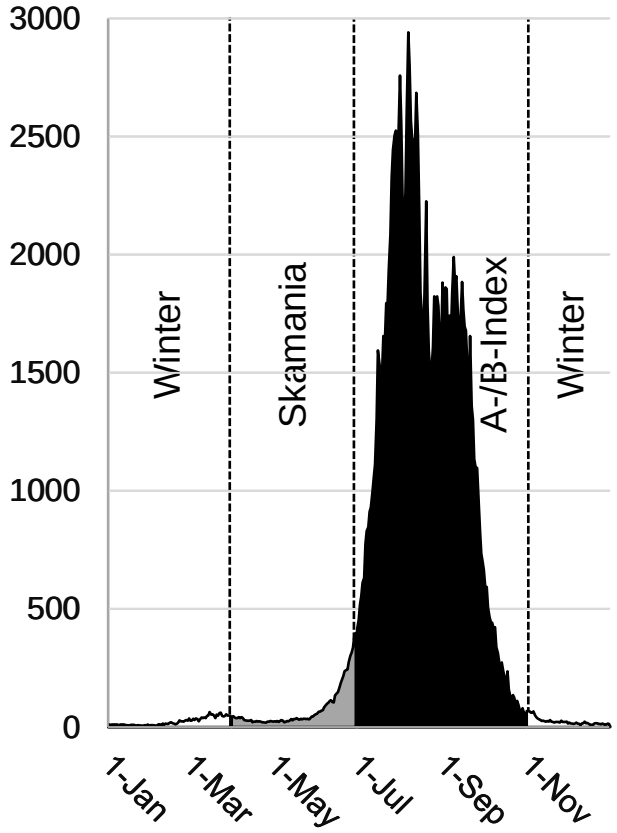


COUNTING FISHES FOR MANAGEMENT

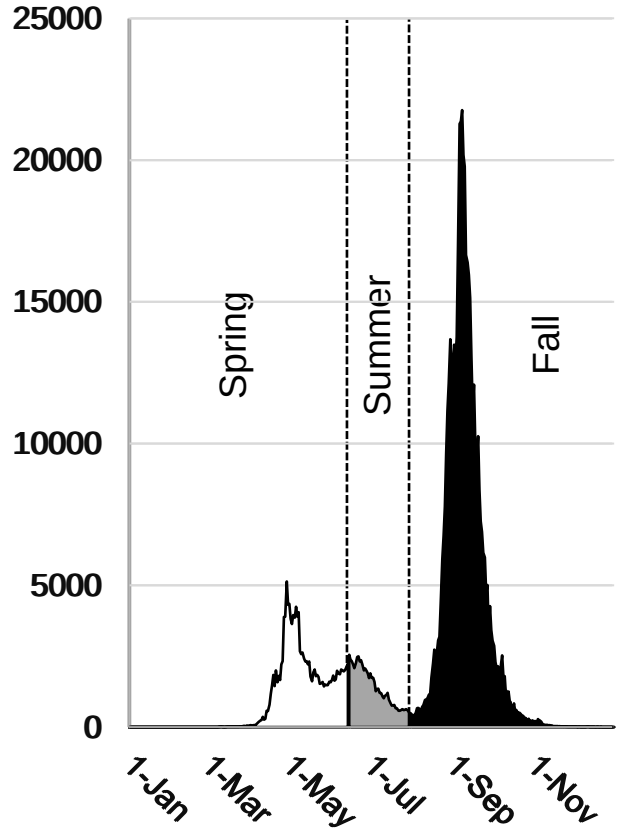


Adipose Unclipped

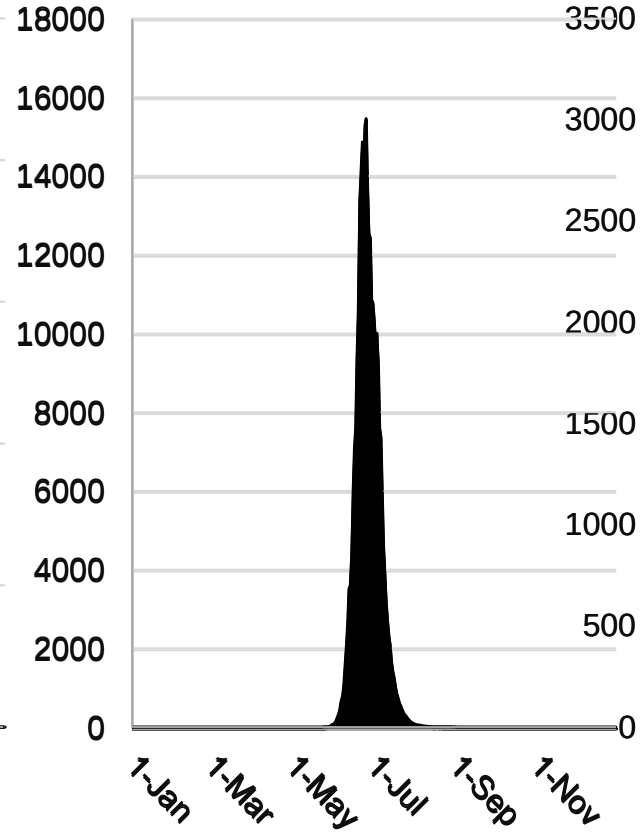
Steelhead



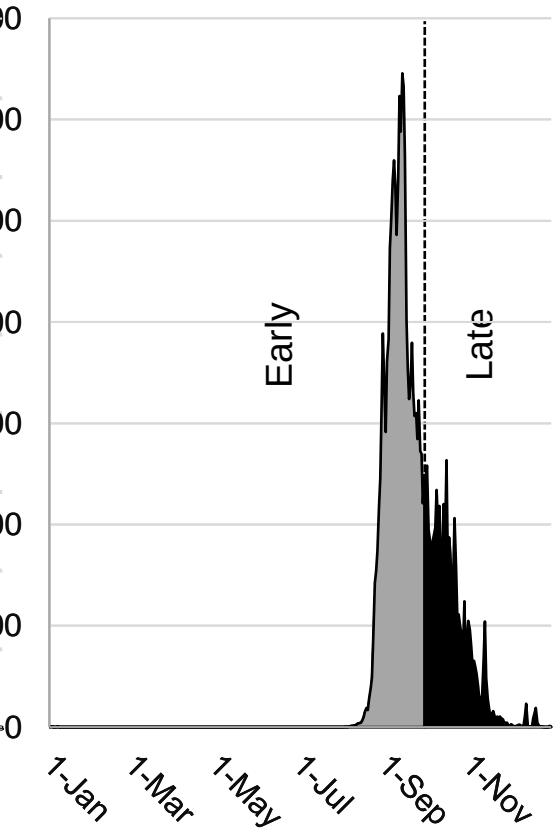
Chinook ★



Sockeye ★



Coho ★



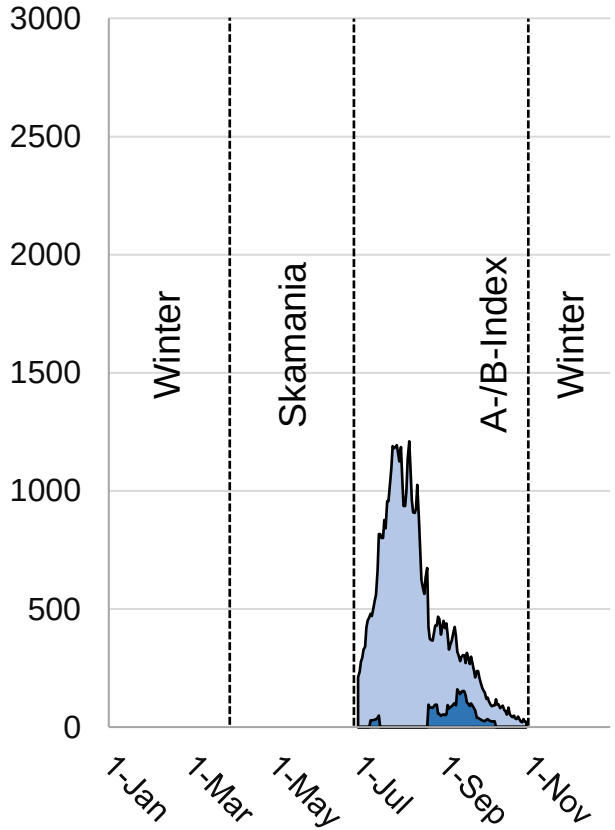
COUNTING FISHES FOR MANAGEMENT

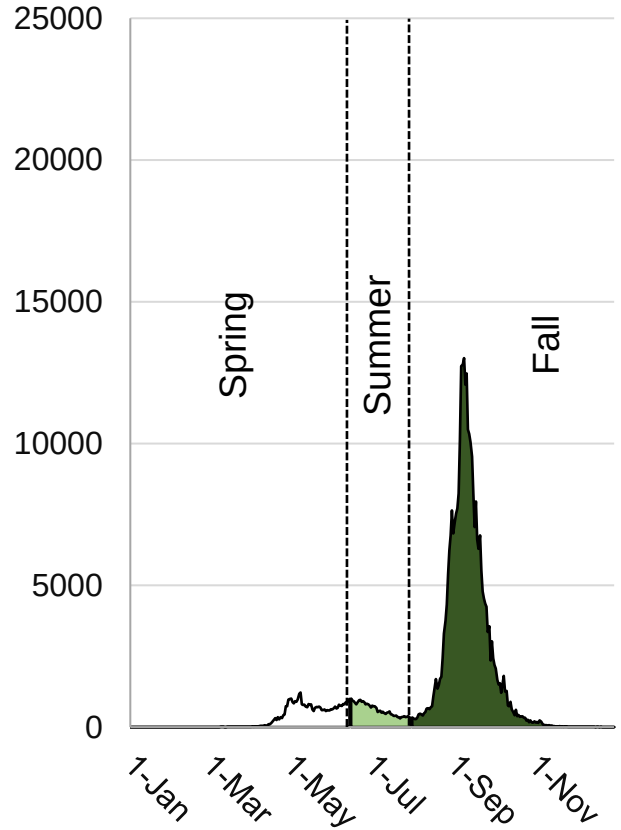
A-/B-Index Steelhead

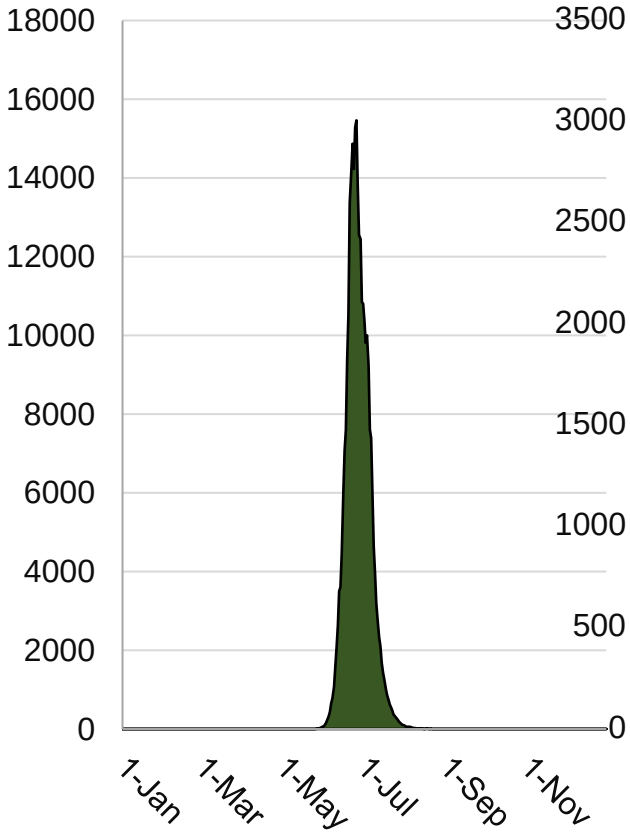
Chinook

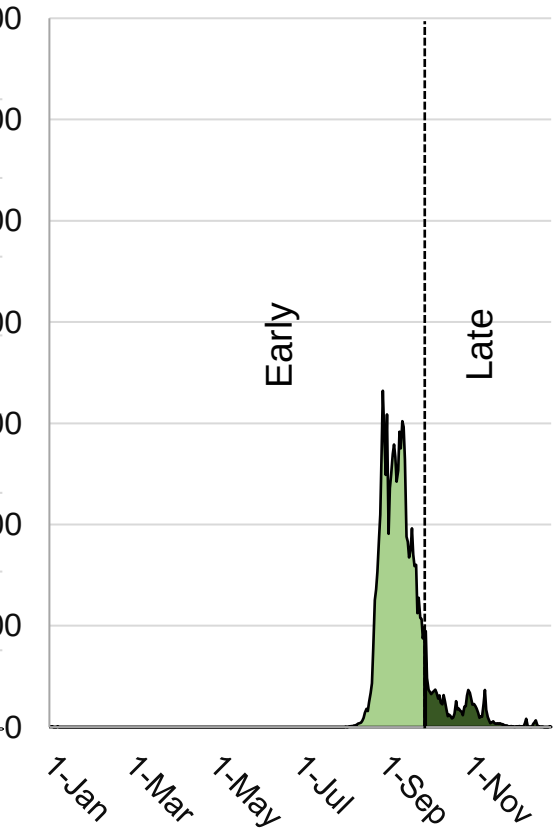
Sockeye

Coho

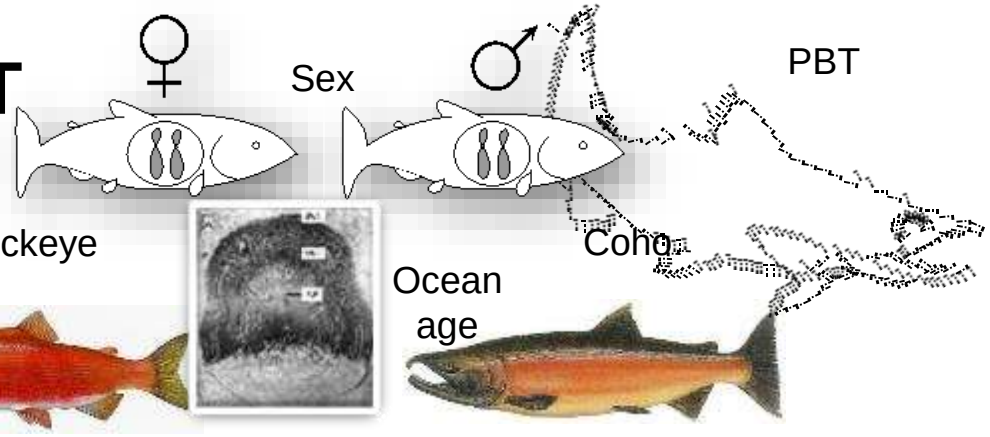


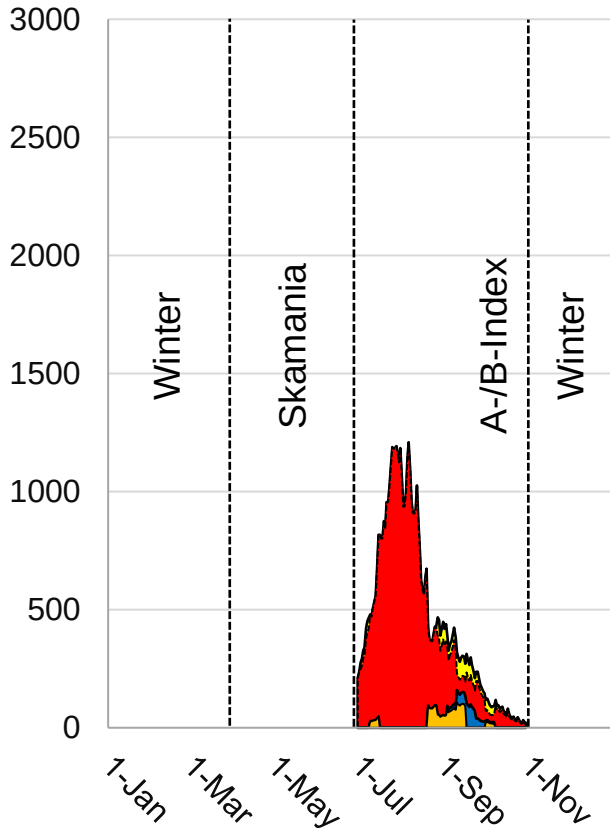


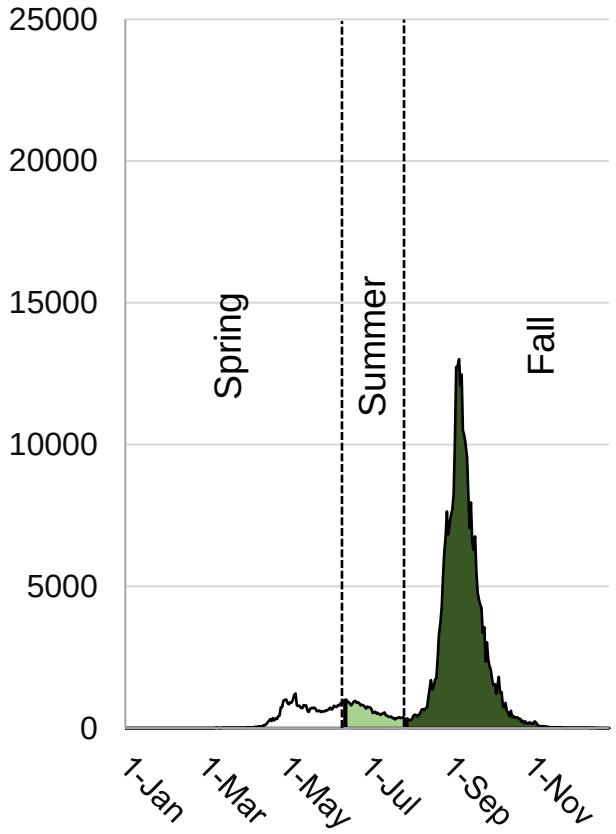


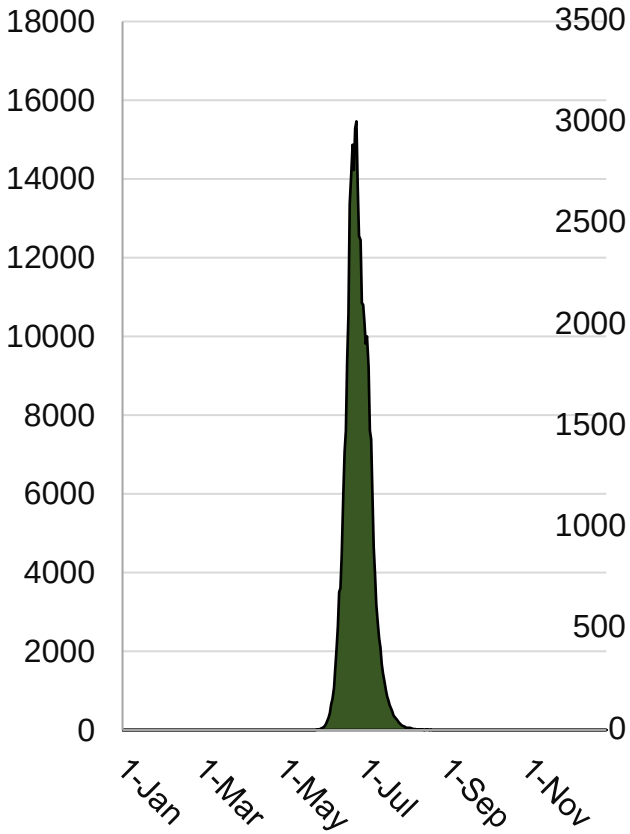


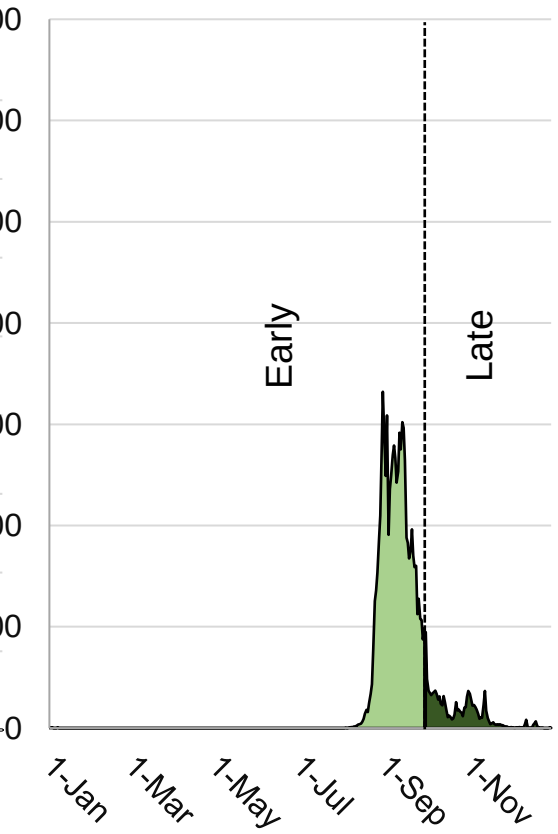
COUNTING FISHES FOR MANAGEMENT



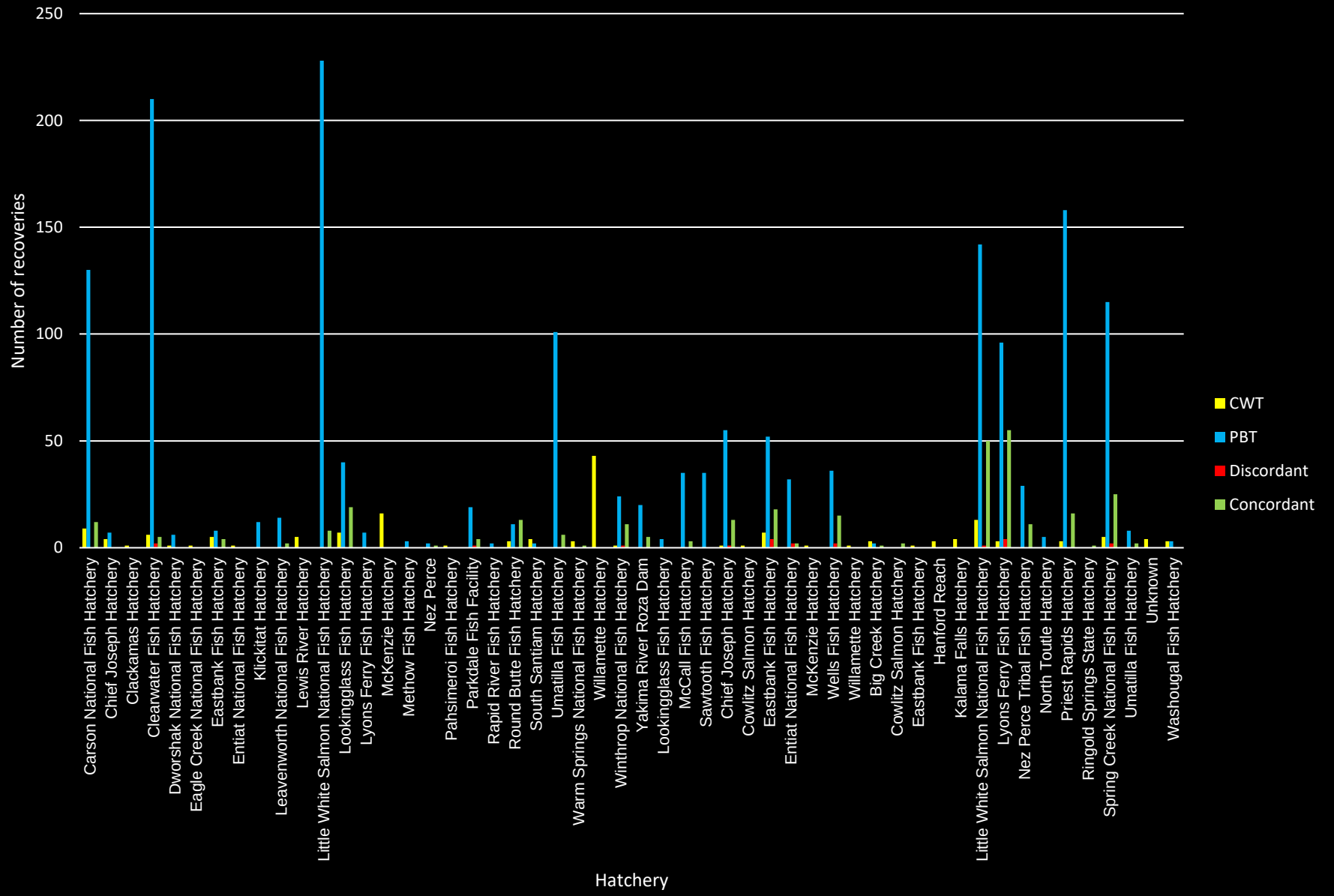


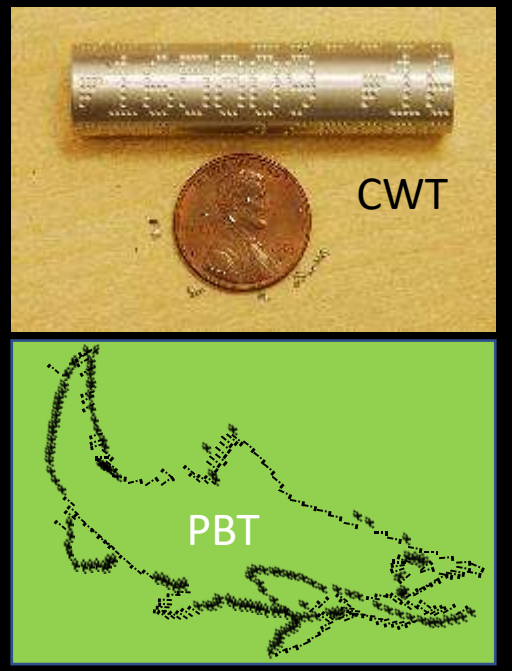




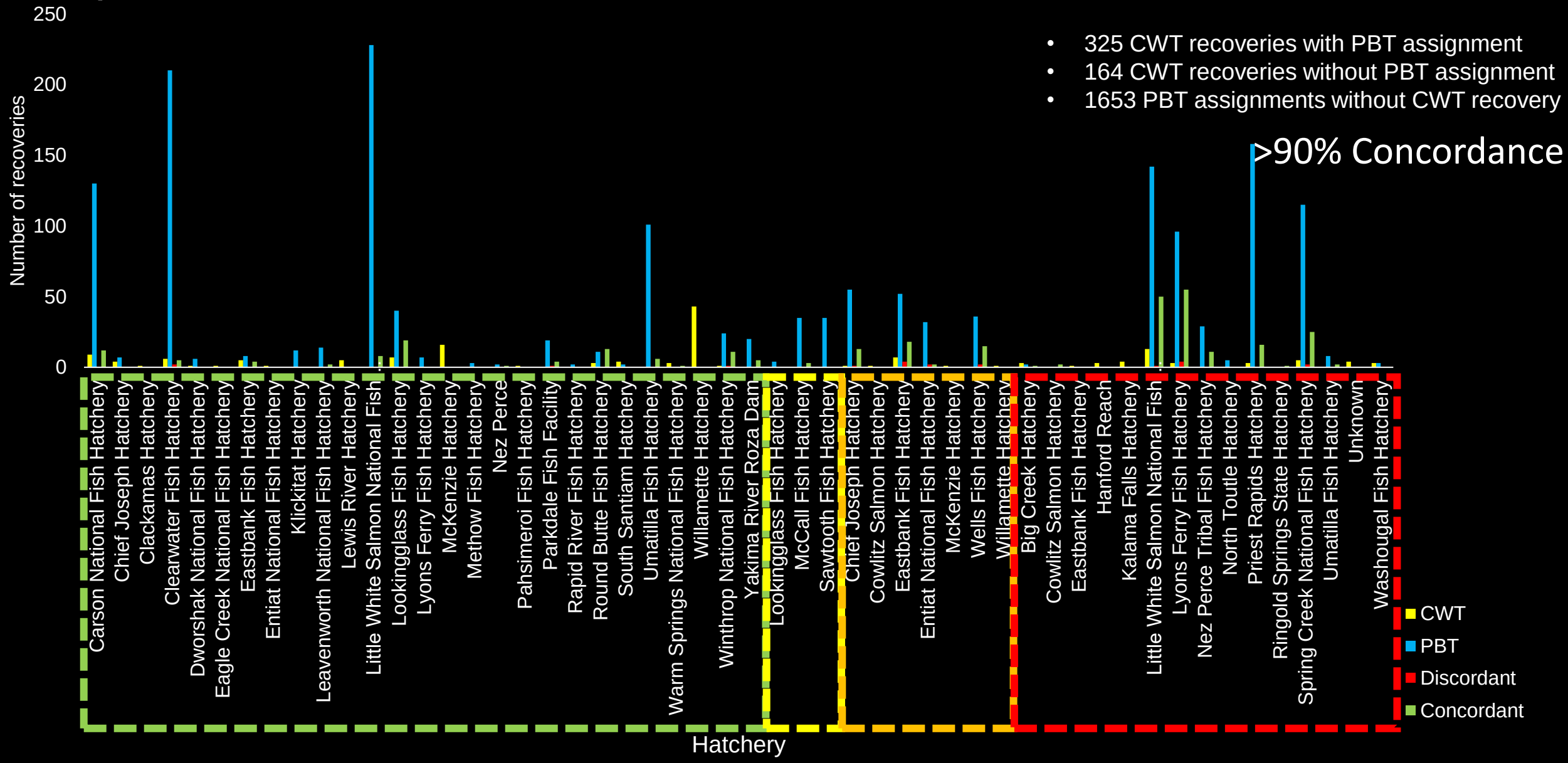


Coded Wire Tag and Parentage-Based Tag Comparisons of recoveries in the chinook fisheries of 2018





Coded Wire Tag and Parentage-Based Tag Comparisons of recoveries in the chinook fisheries of 2018

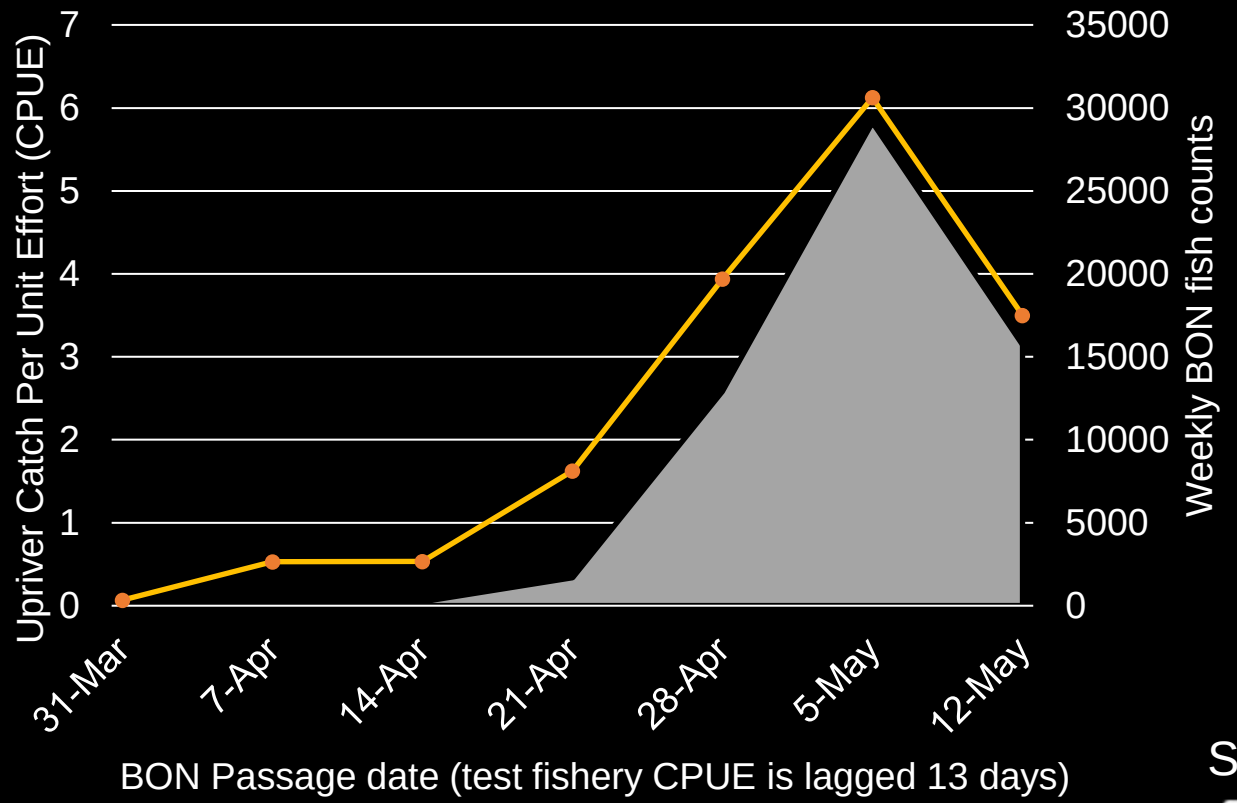


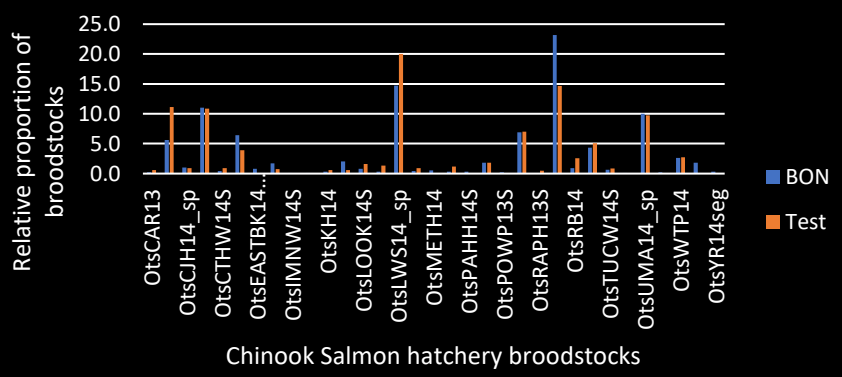
- 325 CWT recoveries with PBT assignment
- 164 CWT recoveries without PBT assignment
- 1653 PBT assignments without CWT recovery

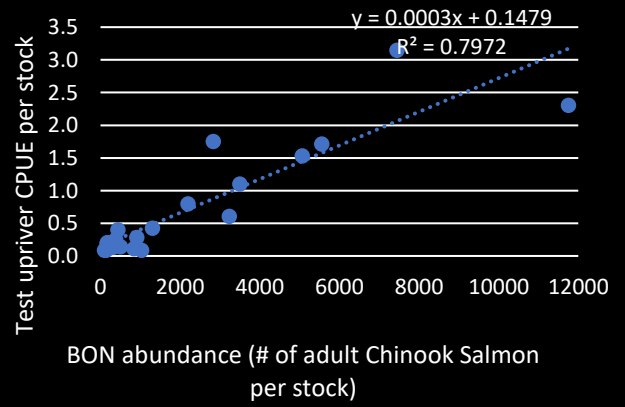
>90% Concordance

GENETIC APPLICATIONS IN FISHERIES MANAGEMENT

Spring Chinook Test Fishery



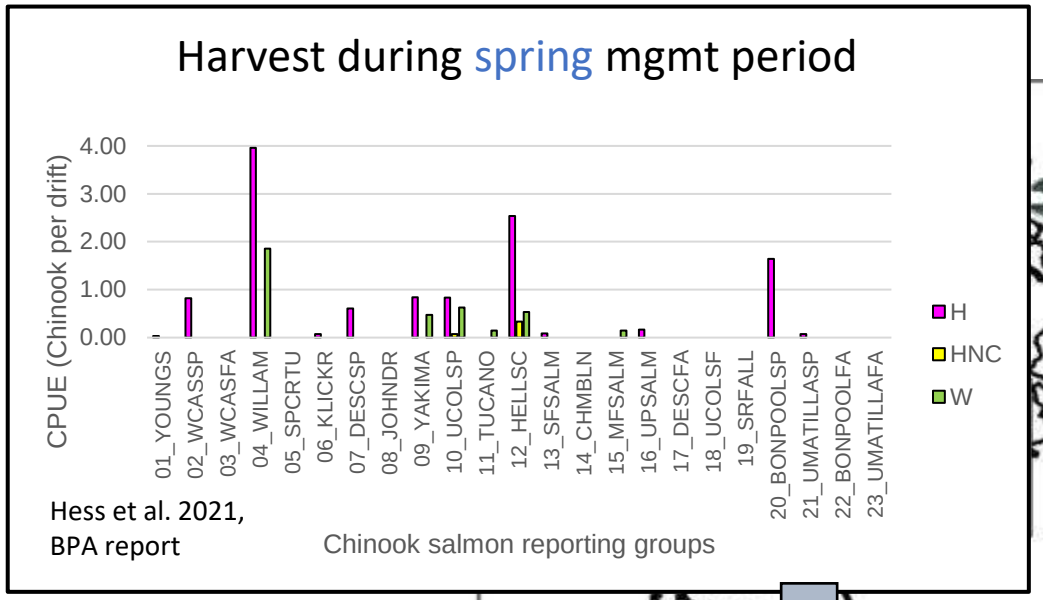


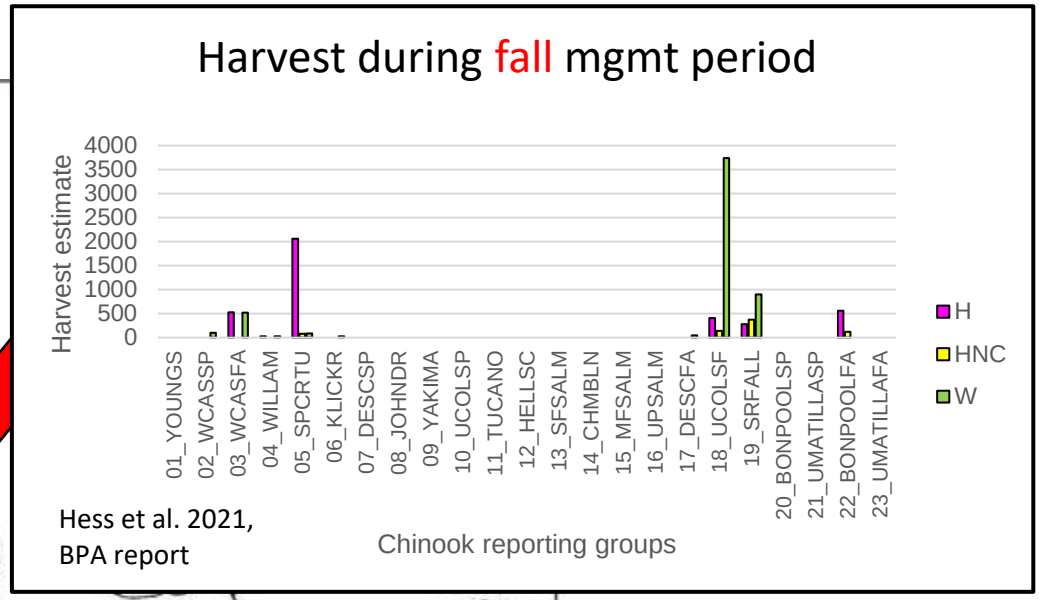


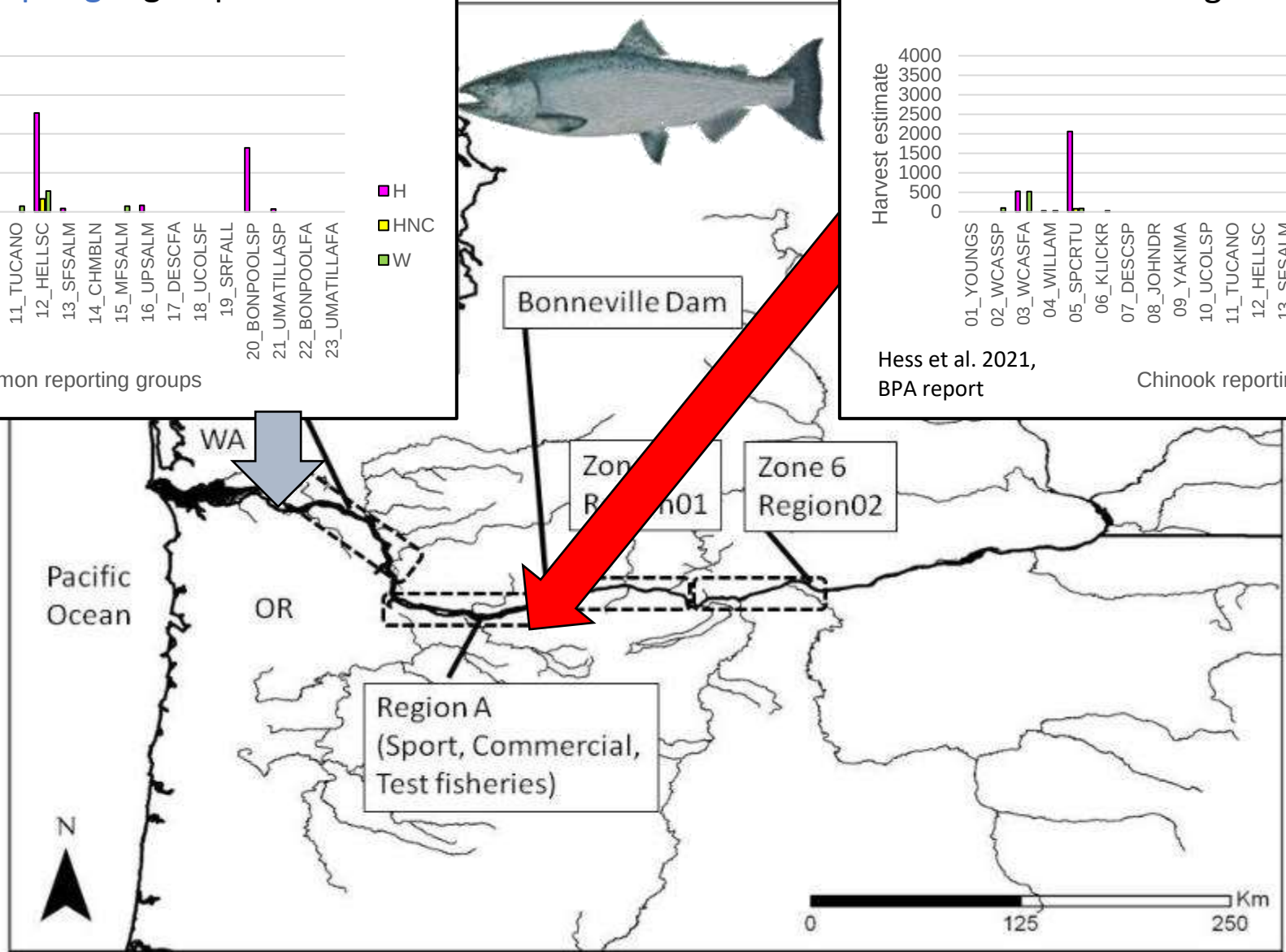
Spring Chinook Test Fishery

STOCK ID OF MAINSTEM HARVEST
Stock specific harvest annually since 2009

Chinook salmon







- Hatchery clipped
- Hatchery unclipped
- W; Natural origin

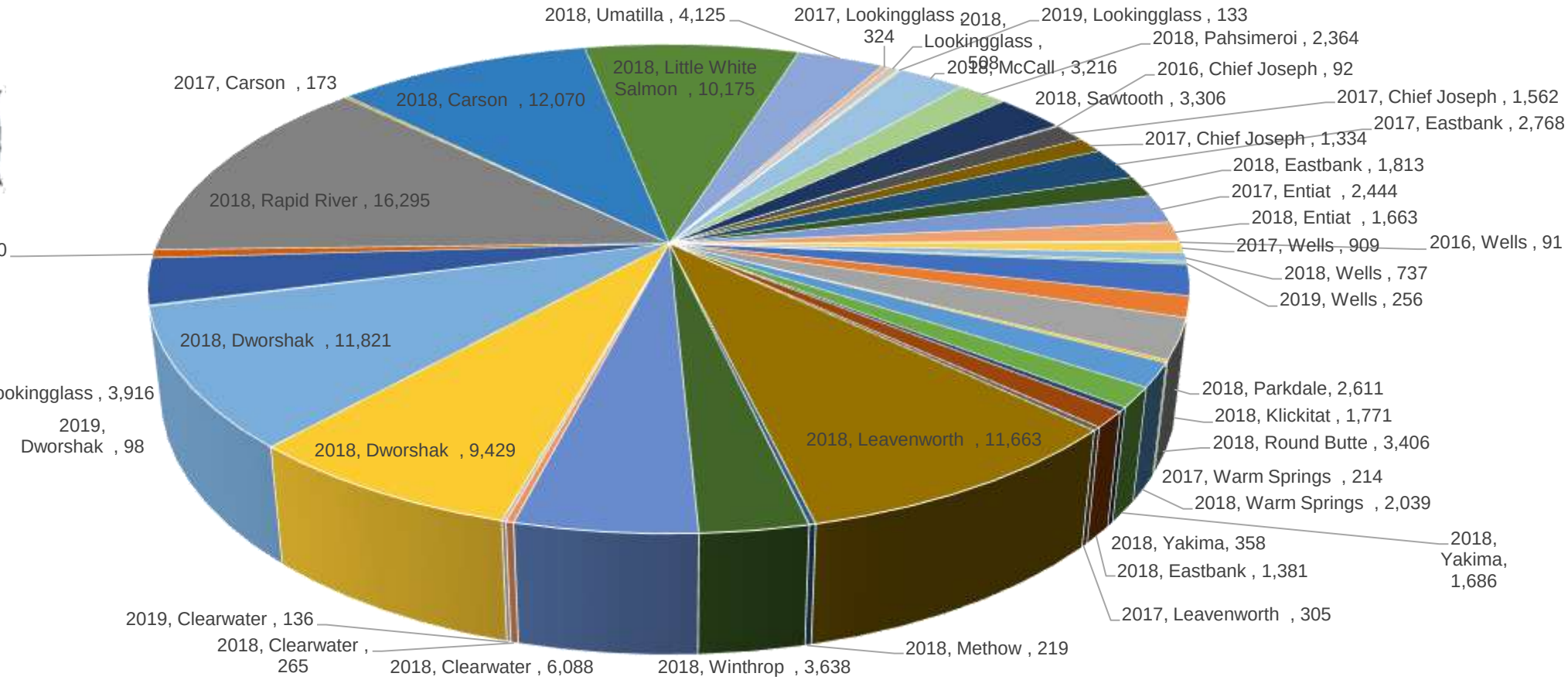
In-season analyses of stocks (since 2017)

Results provided at two-week intervals throughout run

Spring Chinook

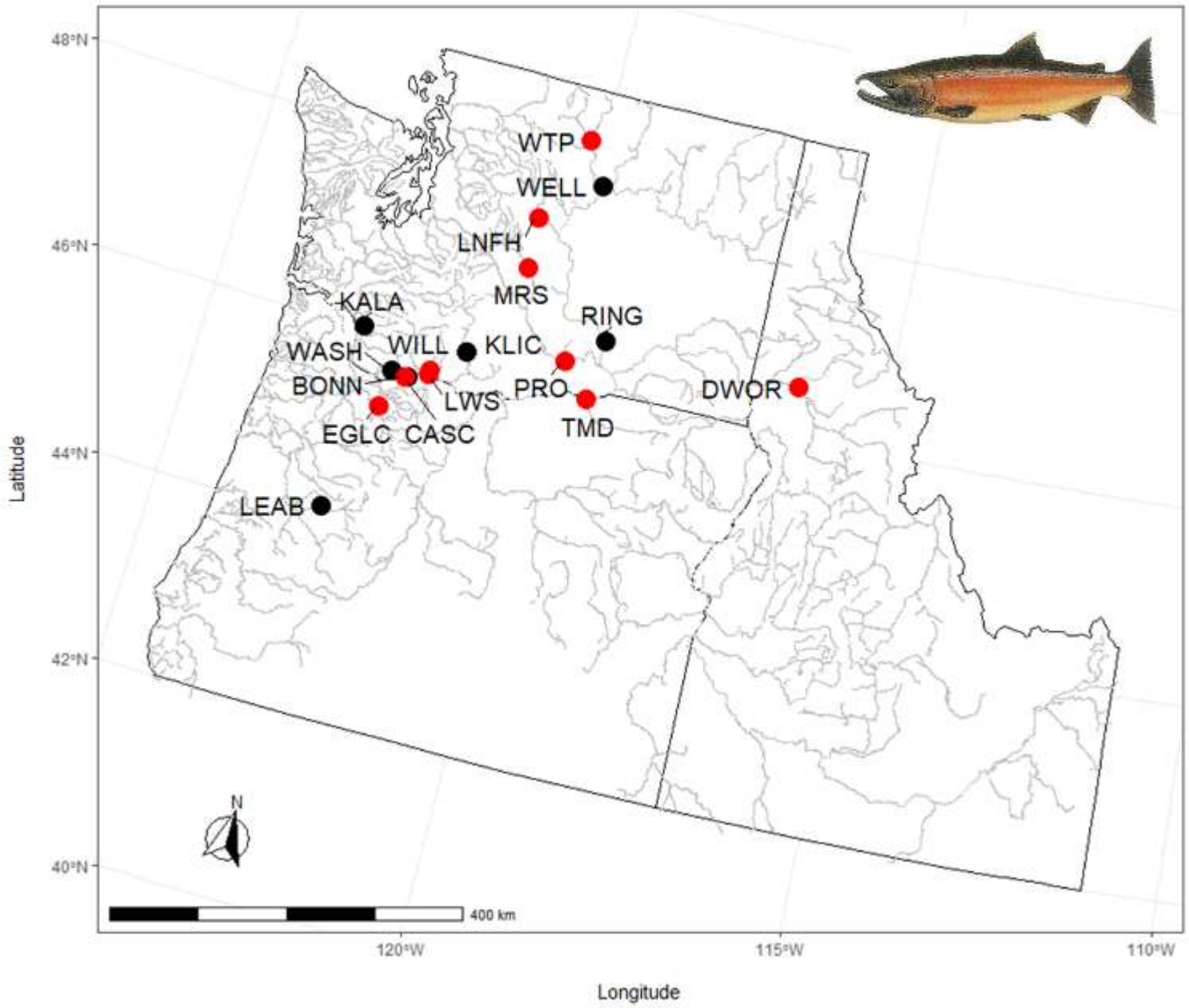
Sockeye

Steelhead



Hatchery clipped adult-sized Chinook salmon passing Bonneville Dam through June 15, 2022.

Hatcheries that release Coho above Bonneville



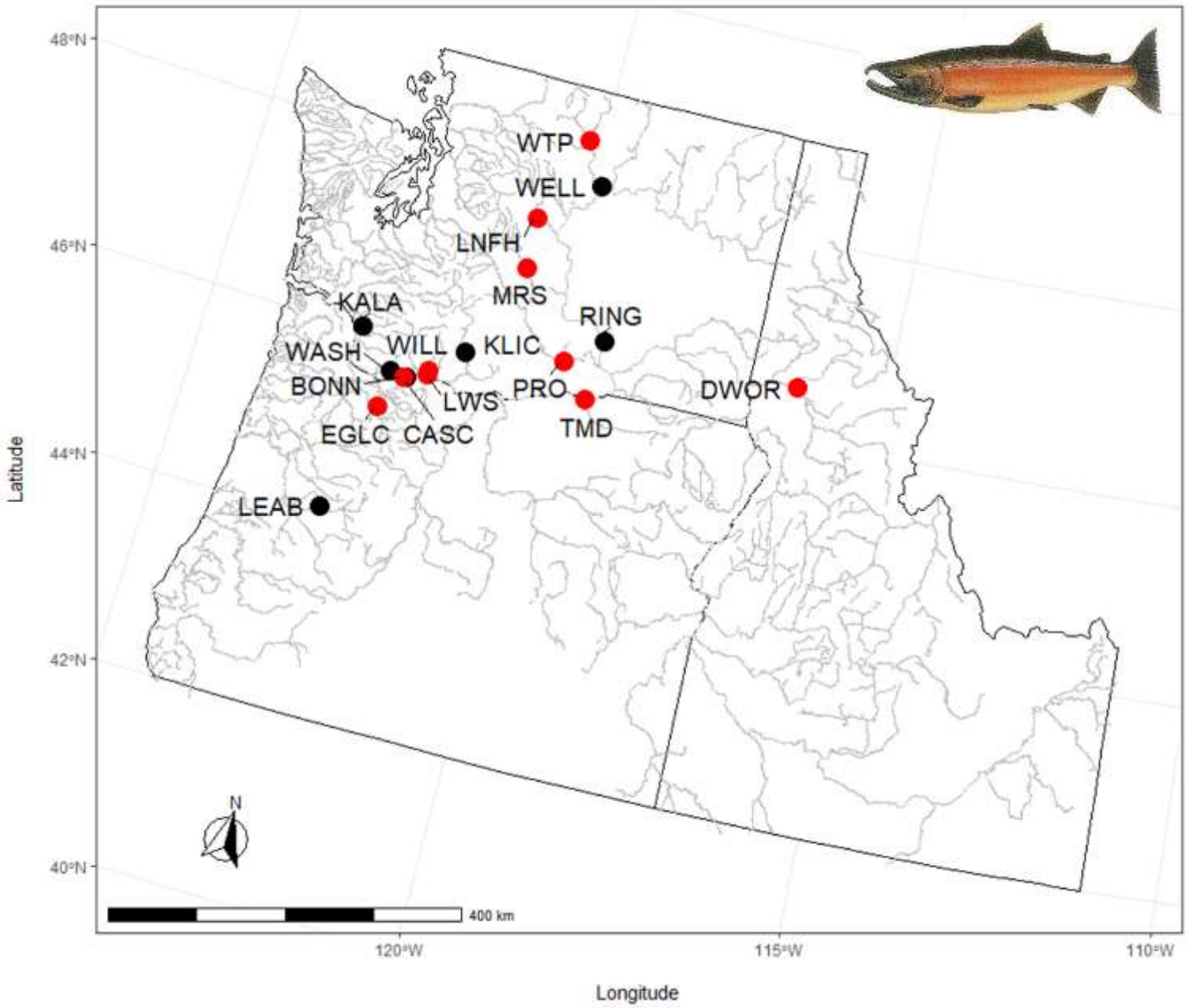
Coho PBT Hatcheries

BONN – Bonneville Hatchery
EGLC – Eagle Creek NFH
LWS – Little White Salmon NFH
WILL – Willard NFH
TMD – Three Mile Dam Hatchery
MRS – Mel R Sampson Hatchery
PRO – Prosser Hatchery
LNFH – Leavenworth NFH
WTP – Winthrop NFH
DWOR – Dworshak NFH

Other Coho Hatcheries

KALA – Kalama Hatchery
WASH – Washougal Hatchery
LEAB – Leaburg Hatchery
CASC – Cascade Hatchery
KLIC – Klickitat Hatchery
RING – Ringold Springs Hatchery
WELL – Wells Hatchery

Hatcheries that release Coho above Bonneville



Above Bonneville Dam

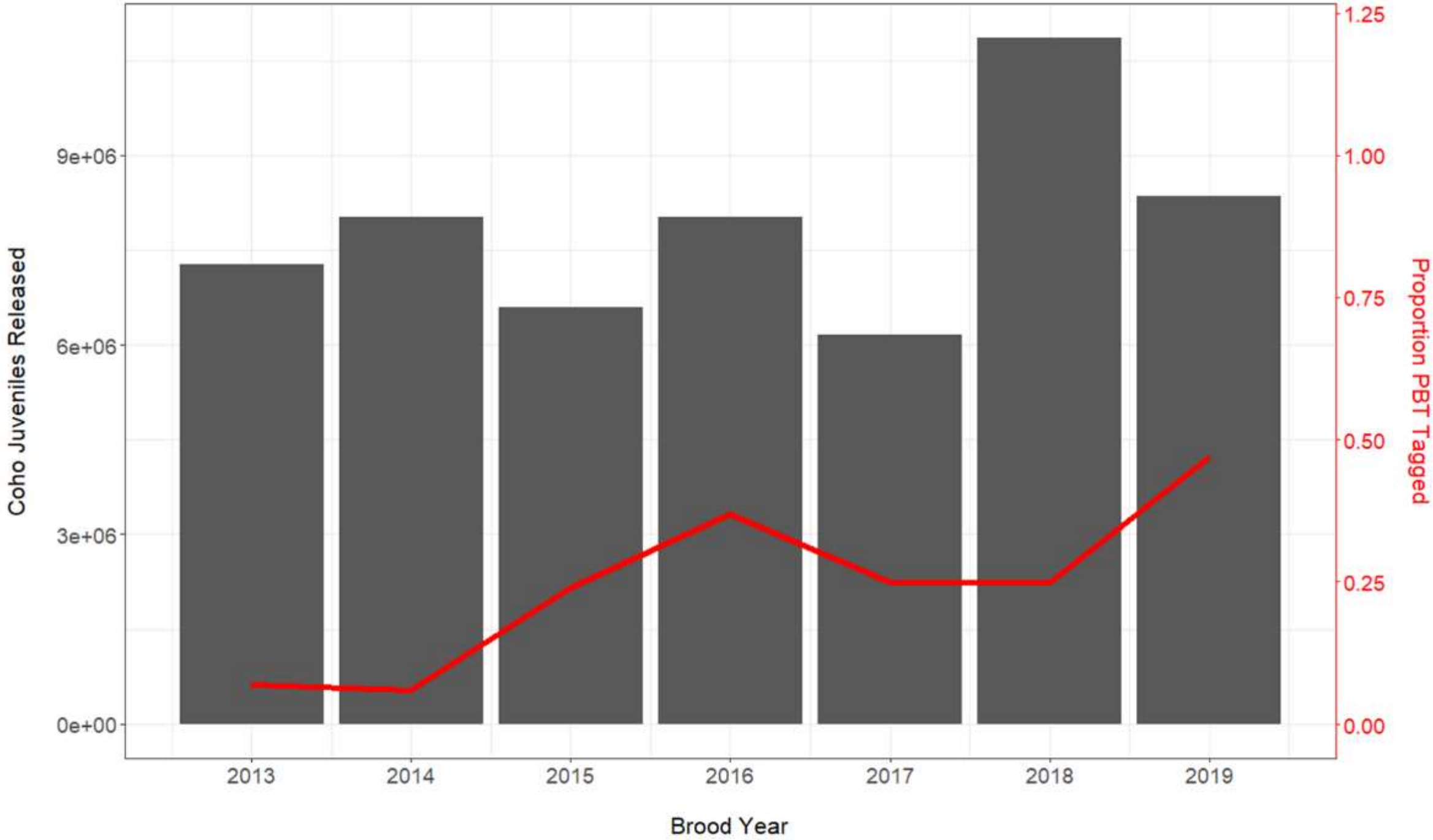
~ 8 million juveniles released

PBT program ‘tags’ < 50%

Below Bonneville Dam

~ 12 million juveniles released

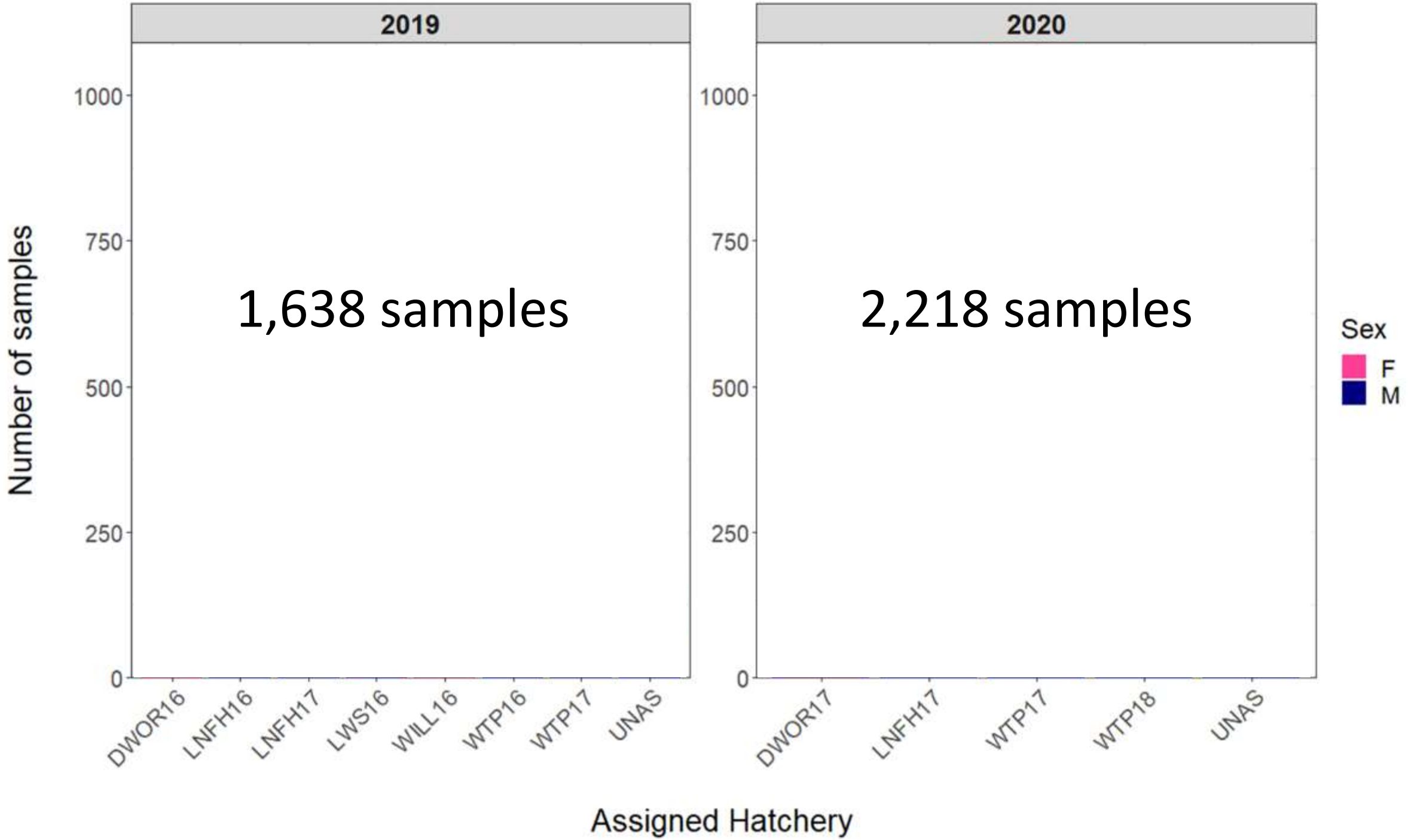
PBT program ‘tags’ ~ 4%

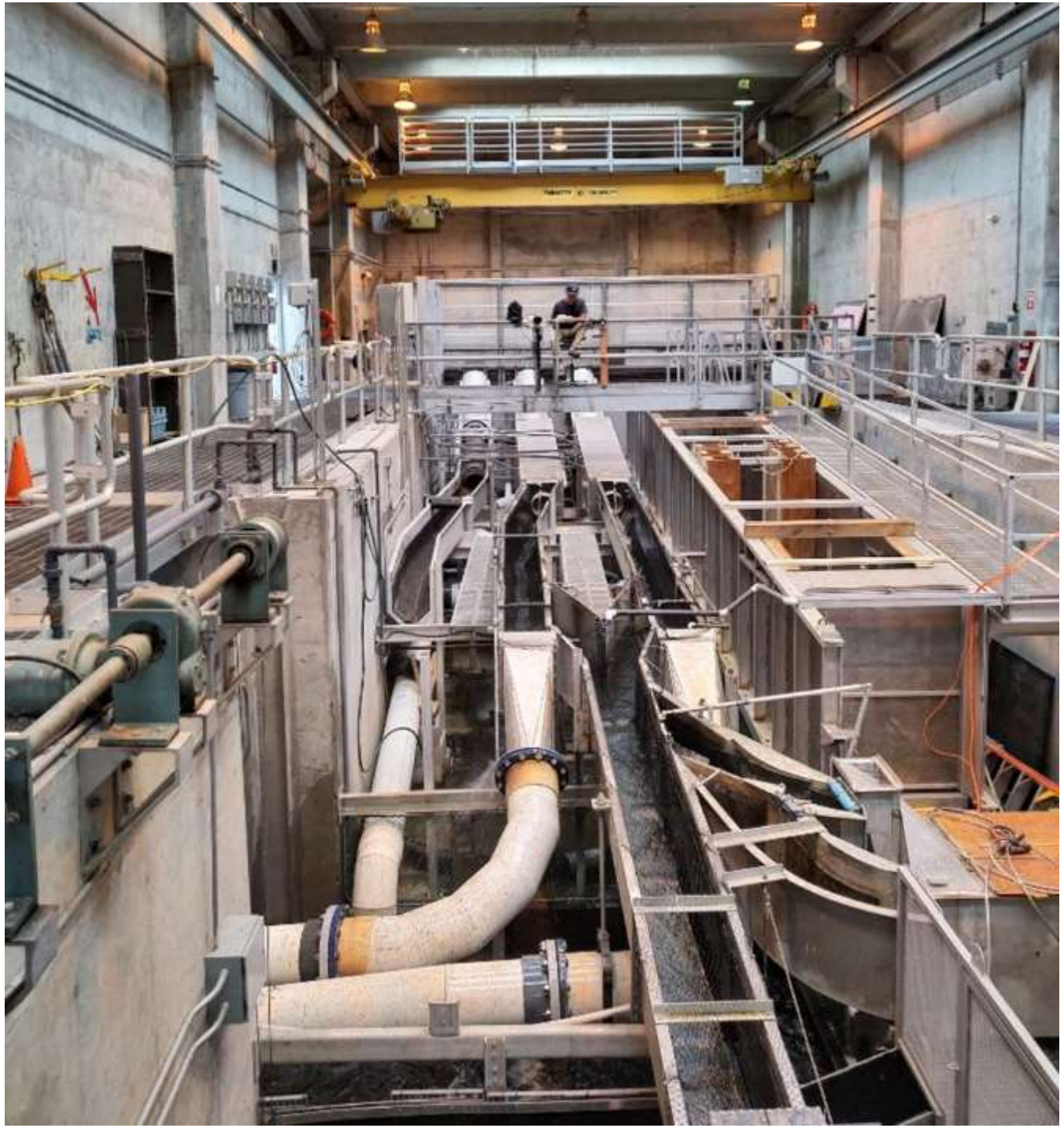

Coho Juveniles Released
9e+06
6e+06
3e+06
0e+00
1.25
1.00
0.75
0.50
0.25
0.00
Proportion PBT Tagged
2013
2014
2015
2016
2017
2018
2019
Brood Year

Develop better escapement estimates

- Combine PIT tags and PBT data

Genetically identify sex


2019
2020
1,638 samples
2,218 samples
Number of samples
1000
750
500
250
0
DWOR16
LNFH16
LNFH17
LWS16
WILL16
WTP16
WTP17
UNAS
DWOR17
LNFH17
WTP17
WTP18
UNAS
Assigned Hatchery
Sex
F
M

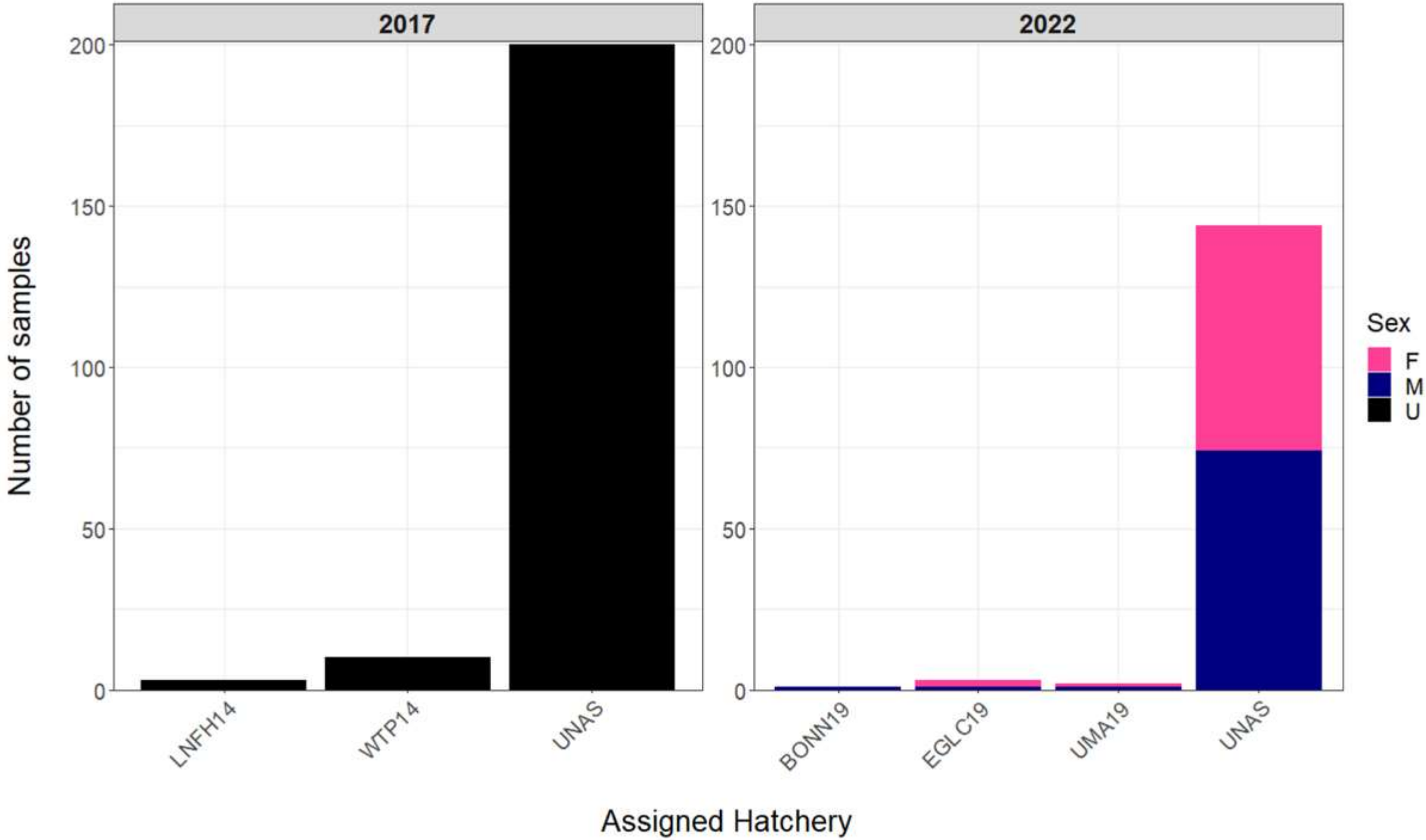


Bonneville Dam Adult Fish Facility

Use PBT to characterize stock abundance & run-timing

- Chinook salmon
- Sockeye salmon
- Steelhead

Coho sampled in 2017 (n=213) & 2022 (n=150)


2017
2022
Number of samples
200
150
100
50
0
LNFH14
WTP14
UNAS
BONN19
EGLC19
UMA19
UNAS
Assigned Hatchery
Sex
F
M
U

Future Directions For Coho PBT

Can PBT be used to help manage lower river natural-origin Coho stocks?

PBT could be used to estimate proportion of natural-origin if the PBT baseline can be expanded to hatcheries below Bonneville Dam

PBT tagged <50% of hatchery releases above Bonneville

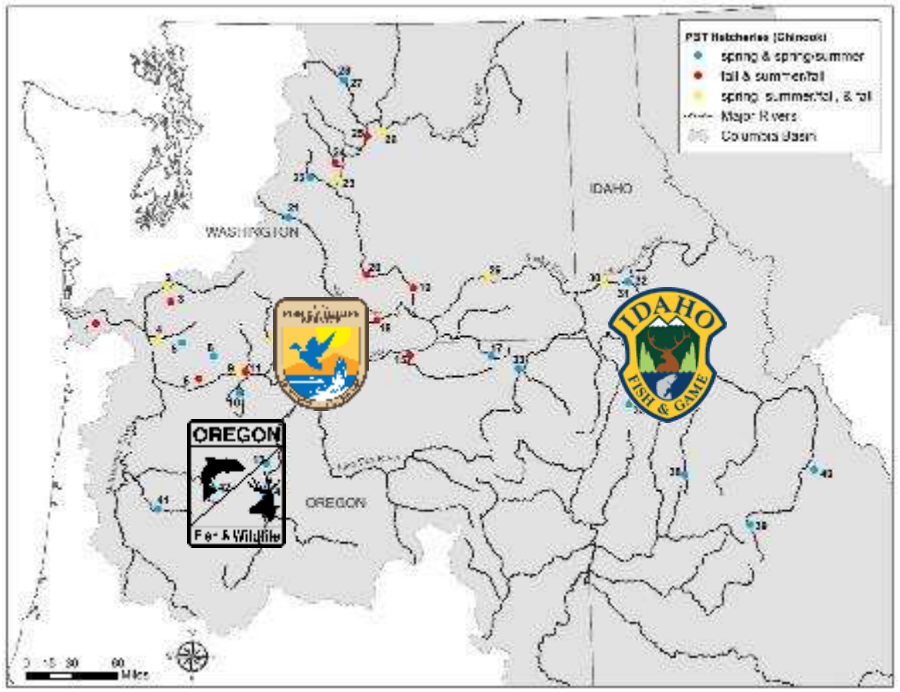
Future Directions For Coho PBT

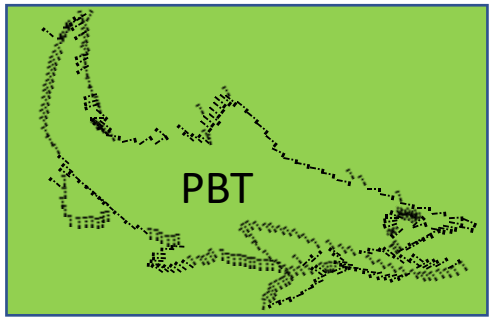
Can PBT be used to help manage lower river natural-origin Coho stocks?

What is the level of Coho exploitation in the ocean?

- Ocean harvest samples could be used to test assumptions of the Fishery Regulation Assessment Model

Data Accessibility





FISHGEN Database

Genetic data is uploaded to FISHGEN

PBT/GSI baselines can be downloaded from FishGen

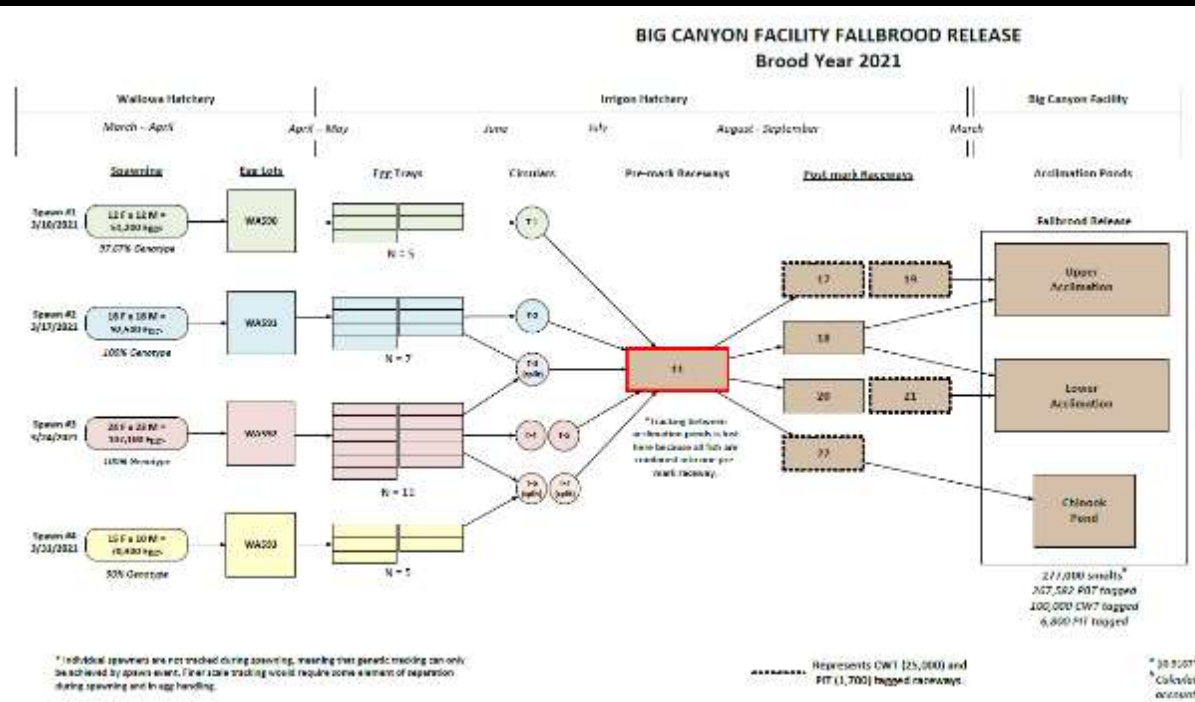
Individual PBT/GSI assignments not present

Consistency among databases in terminology

Juvenile releases -> spawn hatchery

Questions?

Tagging salmon in NE Oregon: the who, what, when, and how we use the data



100% tracking
96.6% Genotype
96.6% PBT Tagging

Joseph Feldhaus
Fisheries Research Biologist
Oregon Department of Fish and Wildlife
203 Badgley Hall
Eastern Oregon University
La Grande, OR 97850

This project was funded by the United States Fish and Wildlife Service under the Lower Snake River Compensation Plan

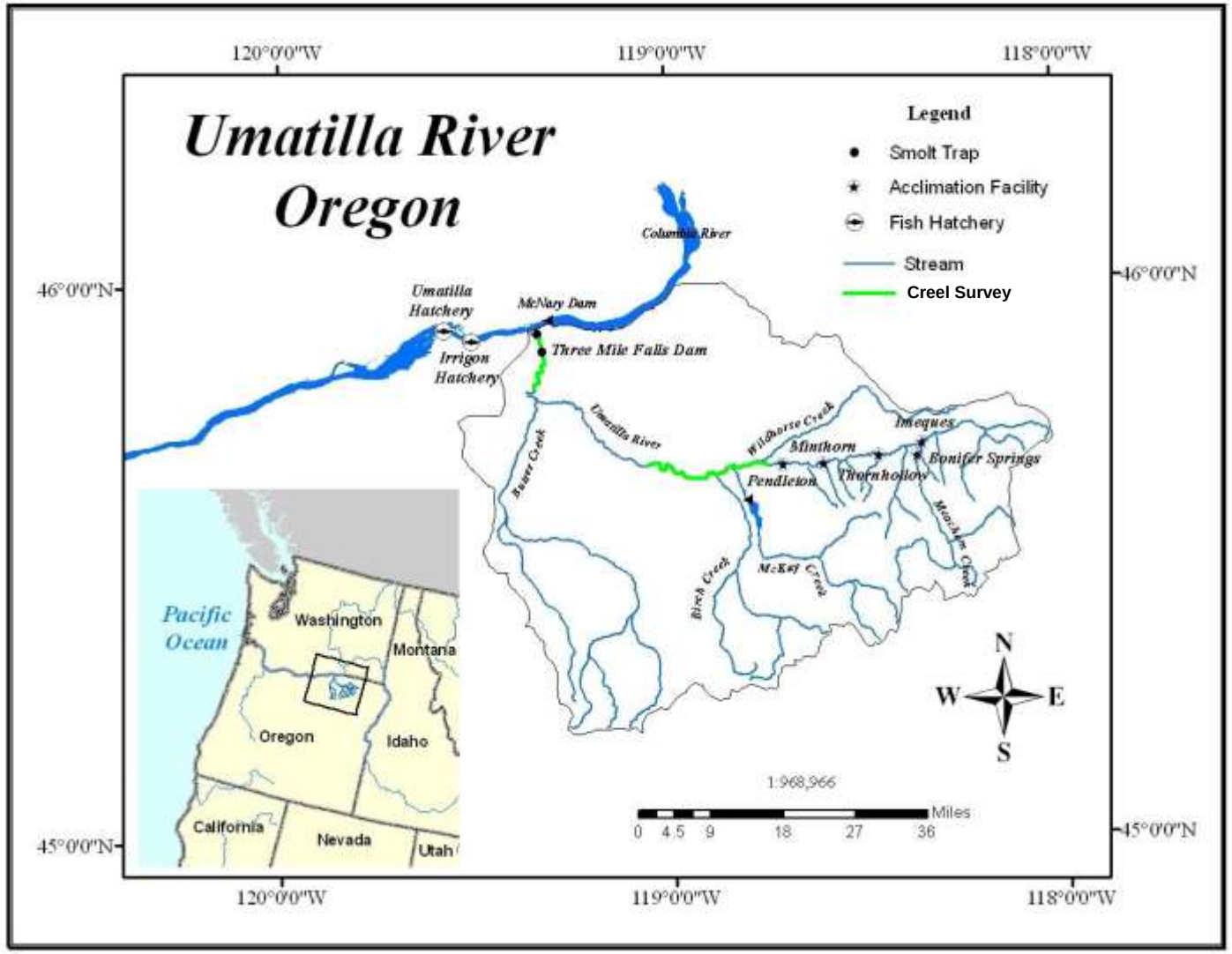
Do we need RMIS for PBT?

- Can Parentage Based Tagging (PBT) data replace Coded-wire-tags (CWTs)?
- The need for a centralized publicly available database for parentage based tagging data?

To date, all published hatchery M&E studies for our programs rely on CWT data.

Coded Wire Tags = The “gold standard” for determining SAS and SAR rates for NE Oregon programs.

Umatilla River Basin- Release Goals & CWT numbers



CWT costs (discount >1 million tags)

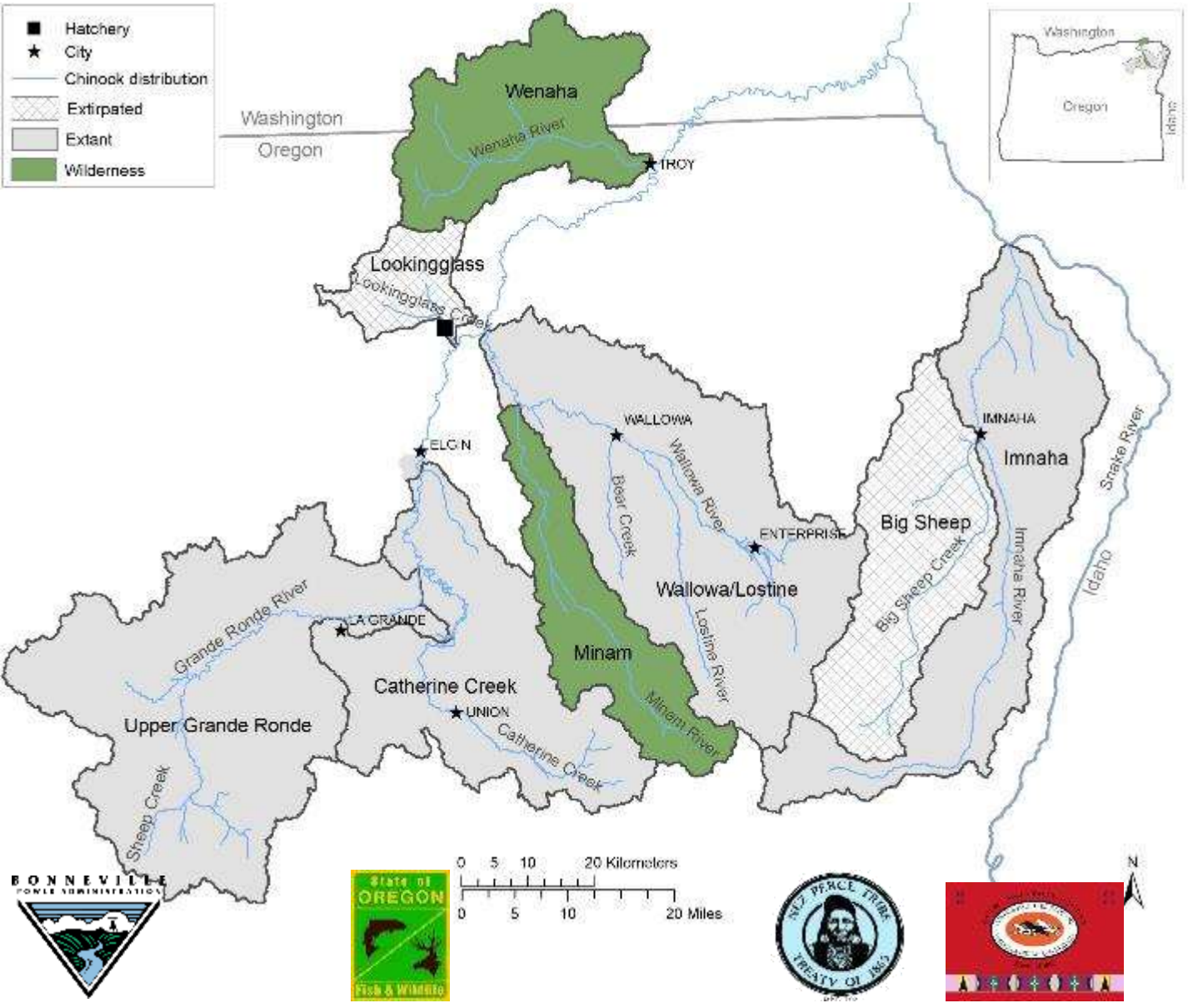
Total Quantity Ordered	Standard Delivery (min 90 days)	Expedited Delivery (min 30 days)
3,000 – 9,000*	$ 163	$ 187
10,000 – 99,000	$ 112	$ 130
100,000 – 999,000	$ 102	$ 120
1,000,000+	$ 97	$ 112

Salmon Species	Funding	Release Goals	# CWT's	% of release
Summer Steelhead	BPA	150,000	64,000	43%
Spring Chinook	PST	810,000	241,000	30%
Fall Chinook sub-yearlings	BPA PST	600,000 120,000 720,000	270,000	33%
Fall Chinook Yearlings	COE/JDM	900,000	250,000	27%
Coho	Mitchel Act	500,00	100,000	20%
Total		~ 3.1 Million	925,000	

5 Chinook hatchery programs, 2 hatchery summer steelhead programs + 2 wilderness streams

=

LOWER SNAKE RIVER COMPENSATION PLAN
Hatchery Program



PBT collections started in 2008 for both species

Spring Chinook Goals

5 Stocks

- Total smolts = **1,390,000**
- Ad clipped = 91%
  - ✓ Upper Grande Ronde = 50% ADCWT; 50%CWT
- Total **CWTs = 841,000 (60.5%)**
- Total **ADCWT = 716,000 (51.5%)**
- PIT tags = 55,000

Summer Steelhead Goals

2 Stocks (Wallowa & Imnaha)

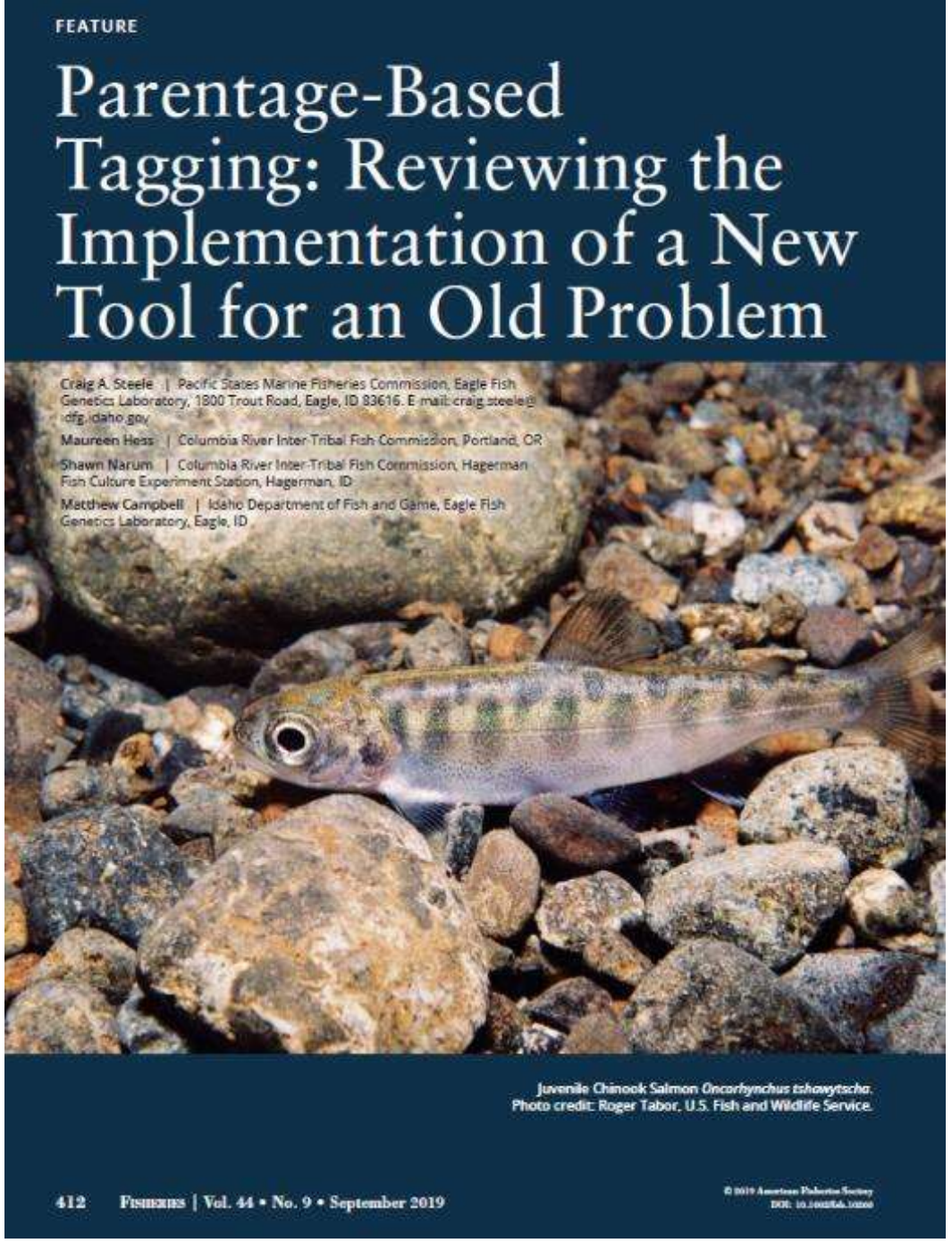
- 1,015,000 smolts
- 100% Ad clipped + mix of RV and LV clips
- **ADCWT = 275,000 (27%)**
- PIT tags = 32,600

PBT highlights

Using PBT to estimate abundance from a sampled population is fundamentally the same as with other tagging technologies

- **However, with PBT:**
  - Tag rates are very high (minimal assumption of tag representation)
  - Tags are inherited so none of the typical “tag effects” to worry about (i.e. tag loss, diff. mortality, tag detection, behavior etc.)
  - Non-lethal sampling (e.g. adults at Lower Granite Dam)
  - Each fish has a has unique Tag ID

Slide borrowed from Brian Leth (IDFG)



Comparing PBT & CWT tagging rates

PBT Tagging Rate = Genotyping rate X Tracking Rate

% of successfully genotyped parents for the group of interest

X

% of offspring that can be tracked to the release group of interest

What is the ideal study unit?

CWT Tagging Rate

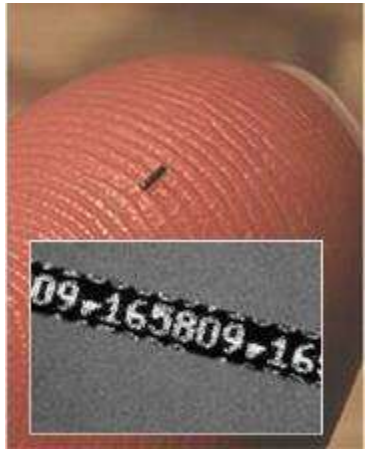
$$= \frac{CWT\ marked\ smolts}{Total\ Smolts}$$

Raceway = "ideal" study unit

✓ **Unique CWT code/raceway**

Tissue for PBT

All parents sampled @ spawning



A portion of the offspring are CWT marked & fin clipped

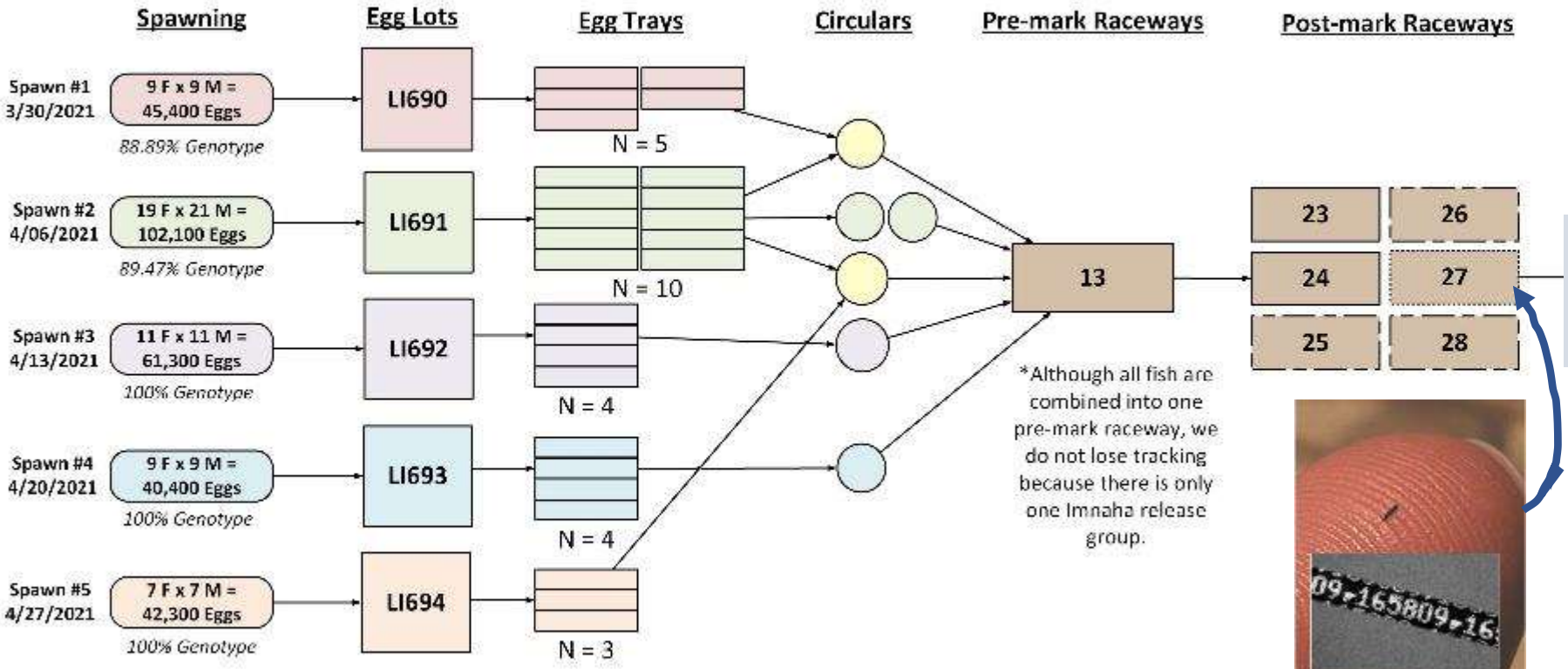
"Marking" occurs at a different stage in the hatchery rearing process

Spawning → Incubation & Rearing → Release

PBT Tagging Rate = Genotyping rate X Tracking Rate

IMNAHA STOCK LITTLE SHEEP STEELHEAD RELEASE
Brood Year 2021

Little Sheep Facility	Wallowa Hatchery	Irrigon Hatchery			Little Sheep Facility
March – April	*April – May*	*June*	*July*	*August - September*	*February*



*Although all fish are combined into one pre-mark raceway, we do not lose tracking because there is only one Imnaha release group.

Little Sheep Release

Acclimation Pond = 247,500 smolts
- 231,907 PBT (94%)
- 25,000 CWT (12%)

PBT Math
- Tracking = 100%
- Genotyping = 93.7%

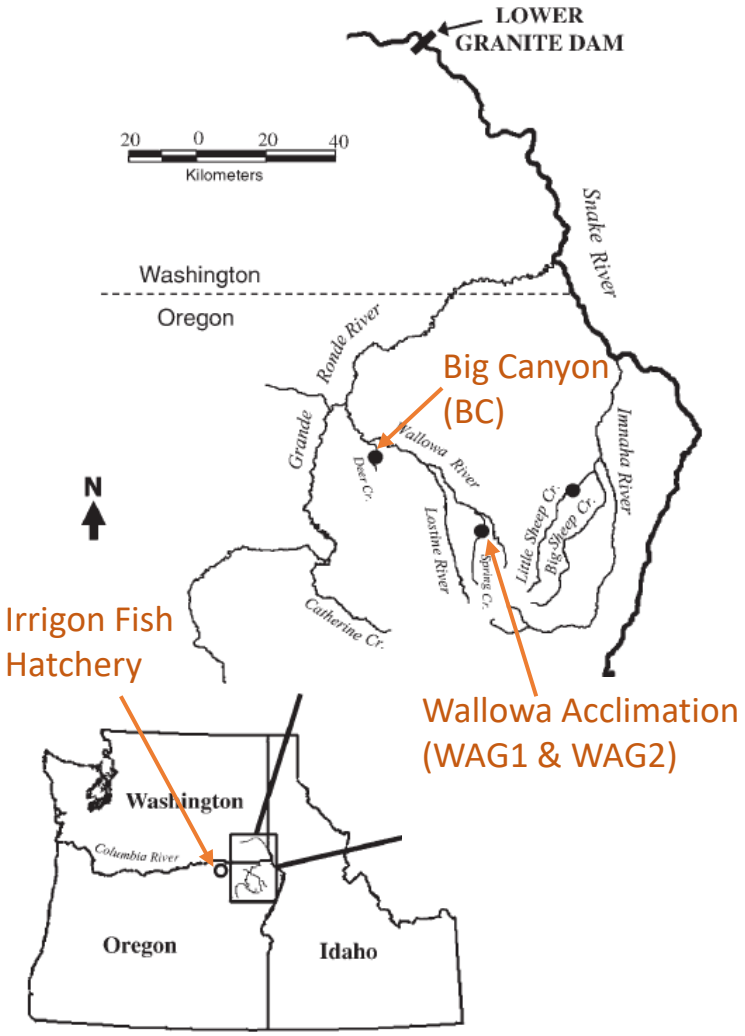
PBT Tagging: 100% X 93.7% = 93.7%

* Individual spawners are not tracked during spawning, meaning that genetic tracking can only be achieved by spawn event. Finer scale tracking would require some element of separation during spawning and in egg handling.

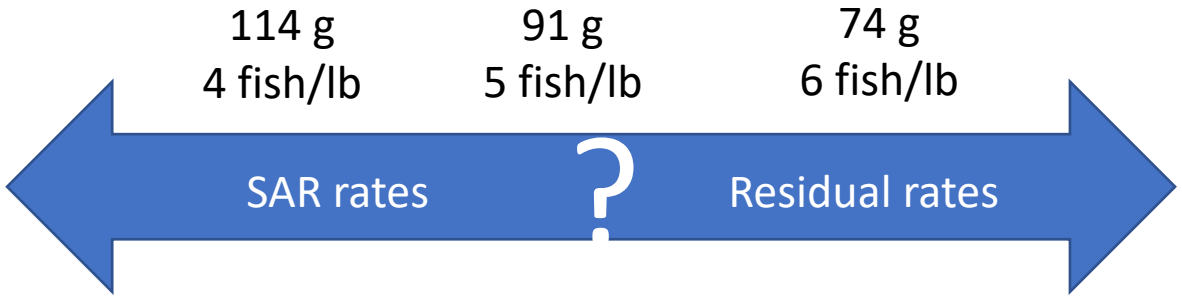
..... Represents CWT (25,000) and PIT (3,800) tagged raceways.
— – – Represents PIT (3,700 – 3,800) tagged raceways.

[a] ((0.889*45,400)+(0.8947*100,000)+(1*40,000)+(1*40,000)+(1*22,100)) / 247,500
[b] *Calculations do not take mortality or program excess into account, as final release numbers have yet to be determined.*

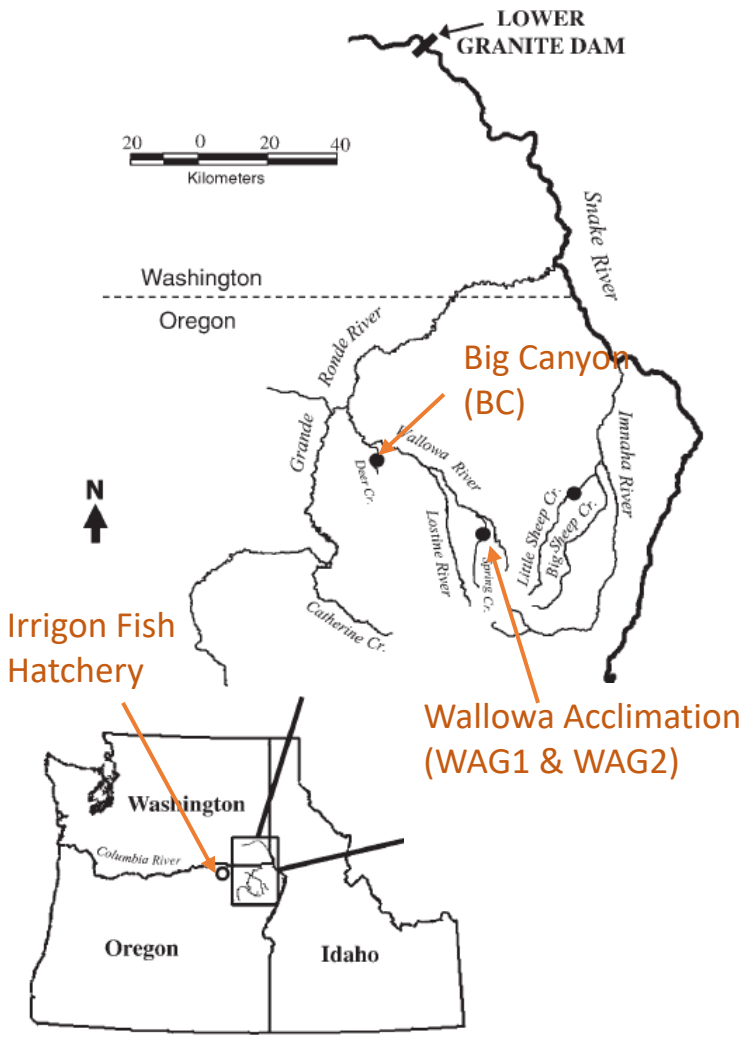
Case Study: can we use PBT to examine resdualism in a hatchery production Summer Steelhead program?



What we know	Unknown
Some portion of 800,000 annual steelhead smolt releases residualize	**Residual abundance?**
Broadly distributed in the Grande Ronde and Wallowa Basin	Have distributions changed since evaluation in 1993-1996?
Larger smolts have higher smolt-to-adult return rates	**Does the novel release strategy decrease SAR by increasing residualization?**



Case Study: can we use PBT to examine resdualism in a hatchery Summer Steelhead program (starting with Brood Year 2020)

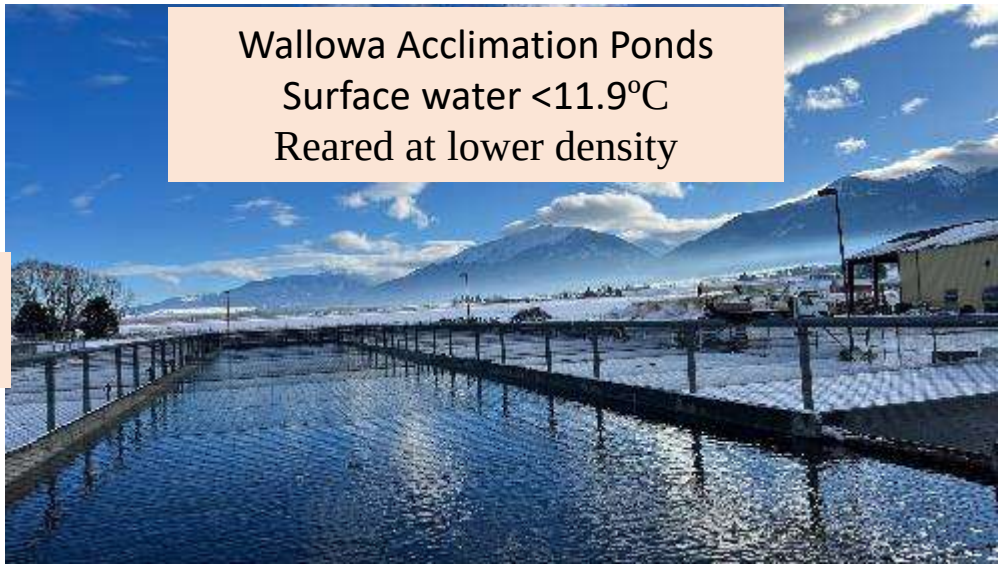


Typical = Rear until transfer to acclimation ponds

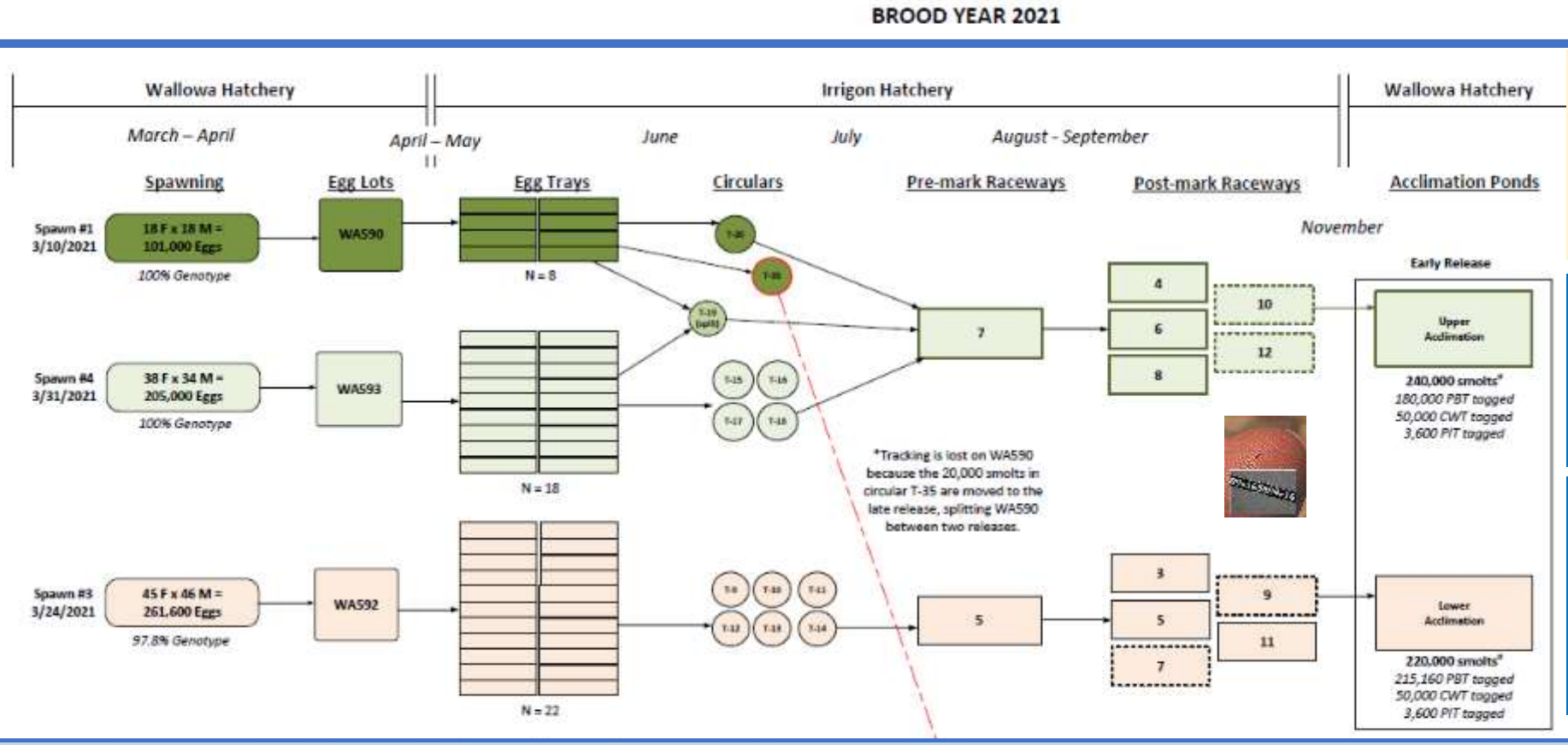
Irrigon Fish Hatchery
Well Water 10.5 to 13.9 ºC

Novel = Over winter rearing in acclimation ponds

Wallowa Acclimation Ponds
Surface water <11.9ºC
Reared at lower density



Can we use PBT data to compare two different release groups?



WAG 1

- Transfer = November
- Release = Early April
- 4.5 months at 0-11.9 ˚C

- Tracking = 75%
- Genotyping = 100%

PBT Tagging: 75% X 100% = 75%

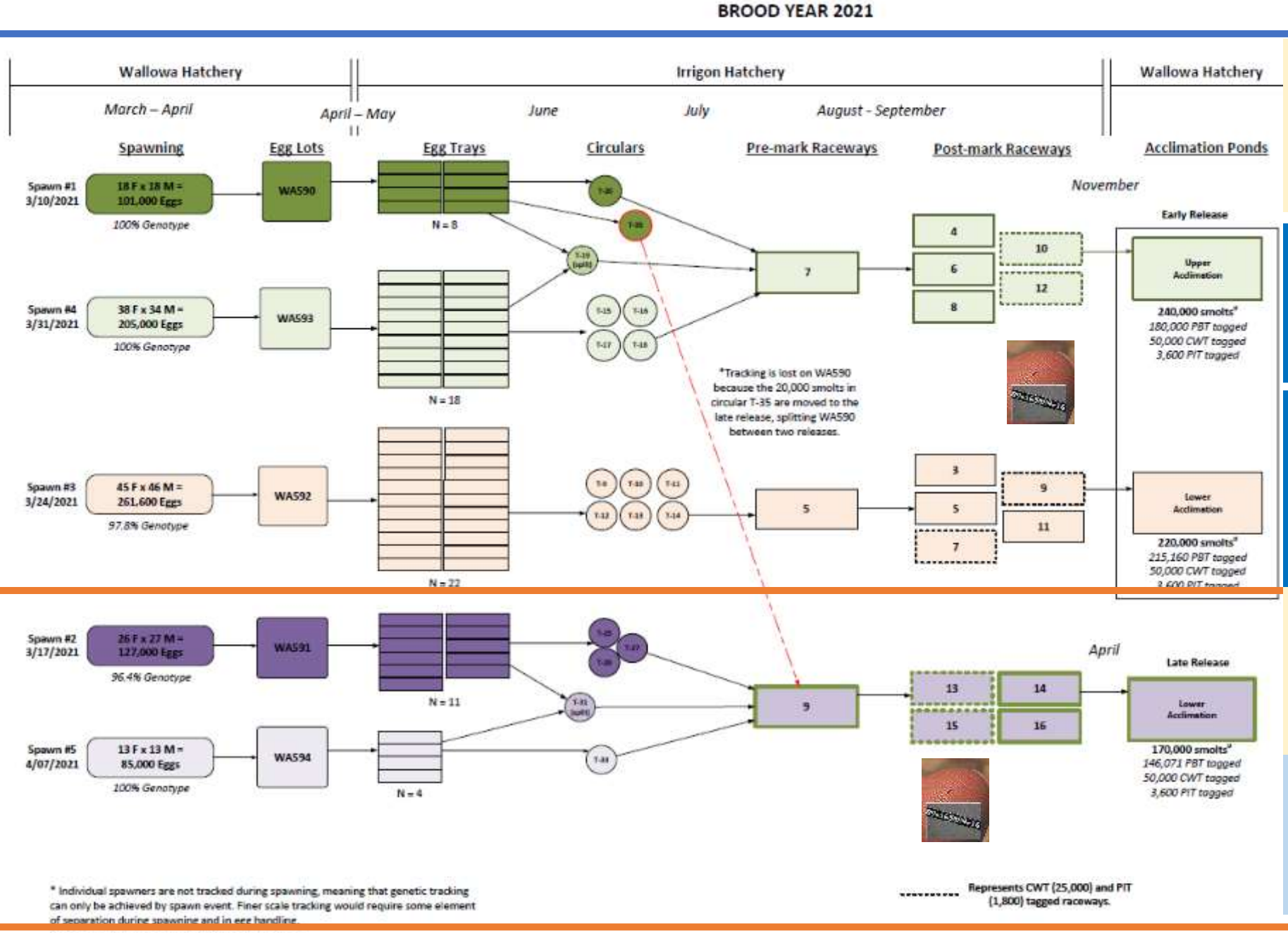
✓ 2 Unique CWT codes = 21%

- Tracking = 100%
- Genotyping = 97.8%

PBT Tagging: 100% X 97.8% = 97.8%

✓ 2 Unique CWT codes = 23%

Can we use PBT data to compare two different release groups?



WAG 1

- Transfer = November
- Release = Early April
- 4.5 months at 0-11.9 ˚C

- Tracking = 75%
- Genotyping = 100%

PBT Tagging: 75% X 100% = 75%

✓ 2 Unique CWT codes = 21%

- Tracking = 100%
- Genotyping = 97.8%

PBT Tagging: 100% X 97.8% = 97.8%

✓ 2 Unique CWT codes = 23%

WAG 2

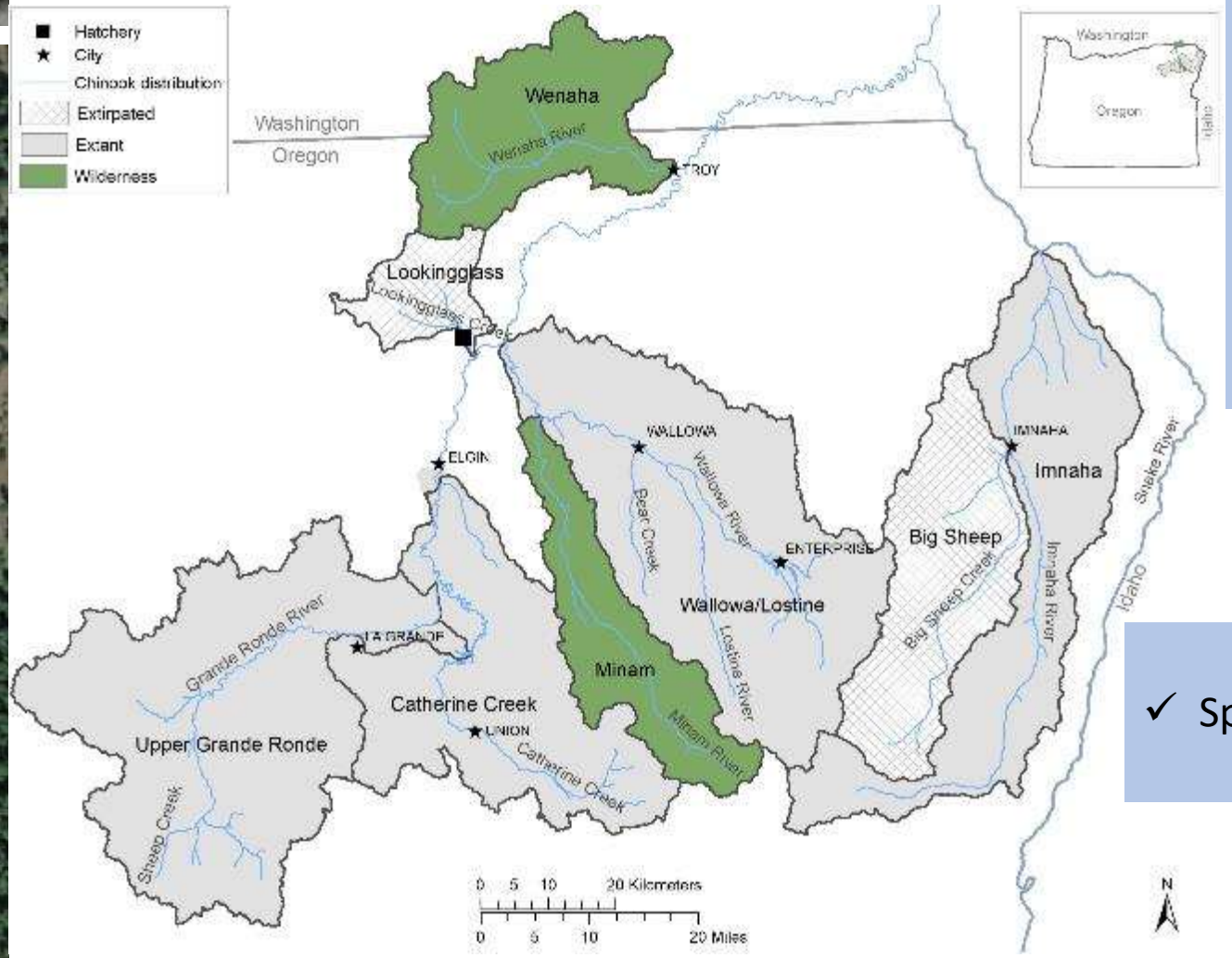
- Transfer = Early April
- Release = Mid April
- 2-3 weeks at 0-11.9 ˚C

- Tracking = 88%
- Genotyping = 97.4%

PBT Tagging: 88% X 97.4% = 85.7%

✓ 2 Unique CWT codes = 29.4%

Another Case Study: Lookingglass Fish Hatchery
Who are you?



5 Spring/Summer Chinook Programs

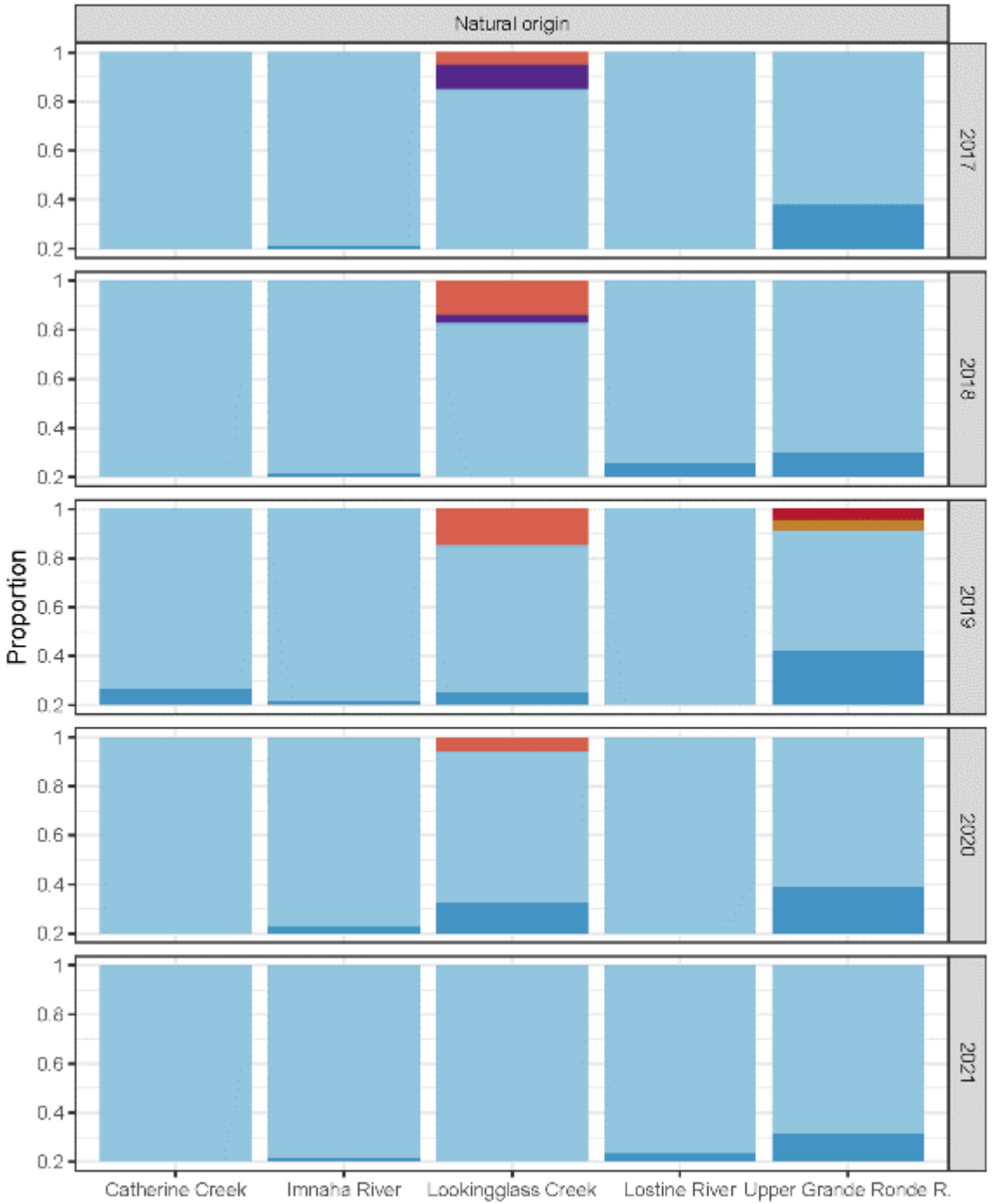
- ✓ Catherine Creek
- ✓ Upper Grande Ronde
- ✓ Lookingglass
- ✓ Lostine River
- ✓ Imnaha River

Integrated broodstock

- ✓ Spawn = Hatchery X Natural

Parentage-based tagging data

Some hatchery fish masquerade as natural origin



Light blue = not in PBT baseline = "natural origin"
Dark blue = hatchery fish from same stock

Key takeaways

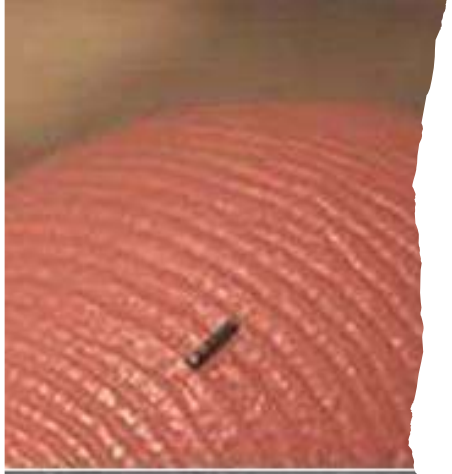
- Under-estimating hatchery fish
  - ✓ In the Hatchery Broodstock
  - ✓ In-Nature?

Upper Grande Ronde

- 100% CWT
  - ✓ 50% Ad + 50% unclipped

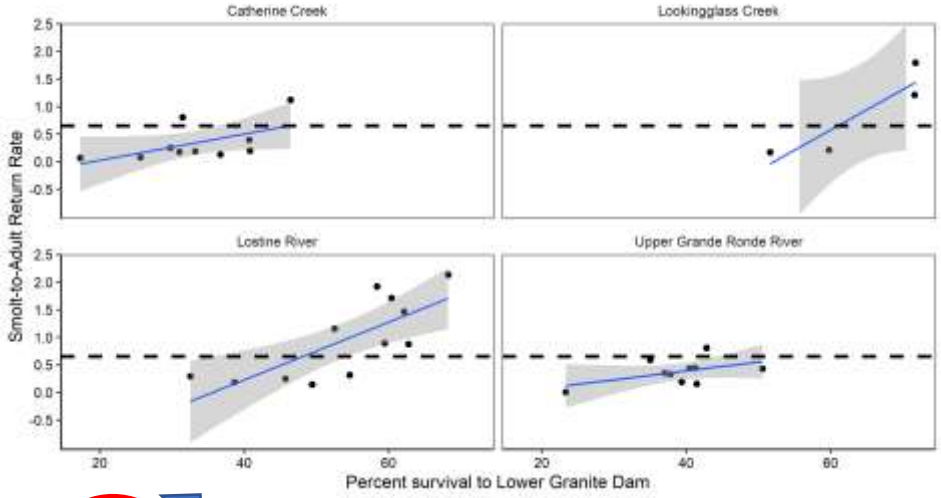
How do I capture this nuance in Coordinated Assessments?

Mari, Kasey…we have a problem….

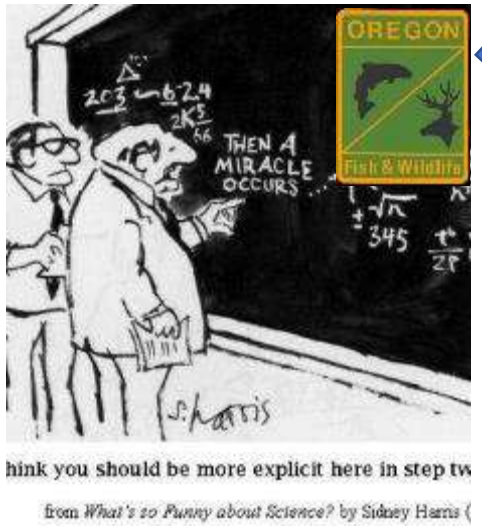


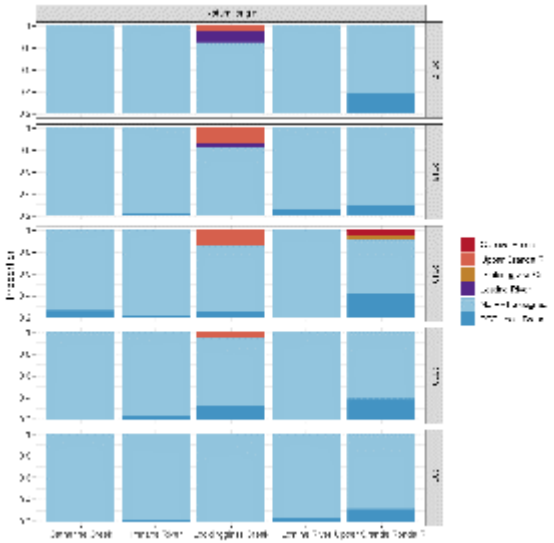
Do we need RMIS for PBT?

- Can Parentage Based Tagging (PBT) data replace Coded-wire-tags (CWTs)?
- The need for a centralized publicly available database for parentage based tagging data?

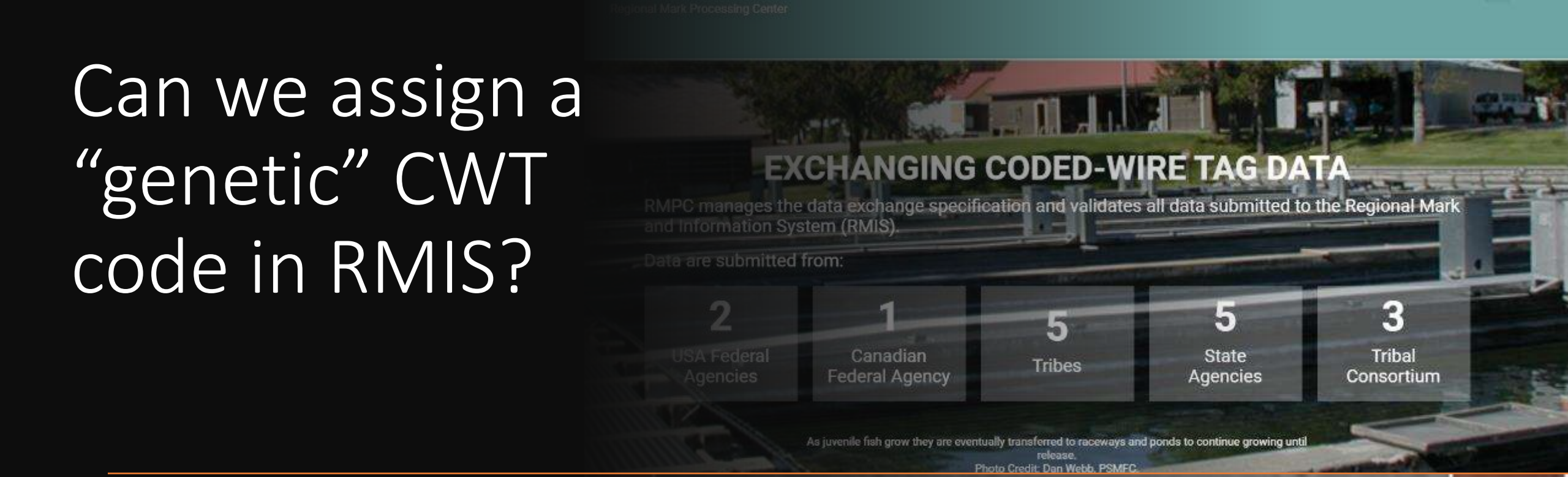


Collections started in 2008 at Lookingglass & Wallowa





Can we assign a “genetic” CWT code in RMIS?



Identify the hatchery: GS-09-2020LKG

Hatchery + Raceway: GS-09-2020LKG_RW2

- GS = Genetic Sample
- 09= Release in Oregon
- 2020 = Brood Year
- LKG = Hatchery Identification Code
- RW = Raceway or release code

Questions?

Acknowledgements

Data Collection/Reporting: Field Staff and Biologists

Data Provided By:

Data Repository:

Funding Provided By:

ADF&G Gene Conservation Laboratory (GCL)

Sara Gilk-Baumer

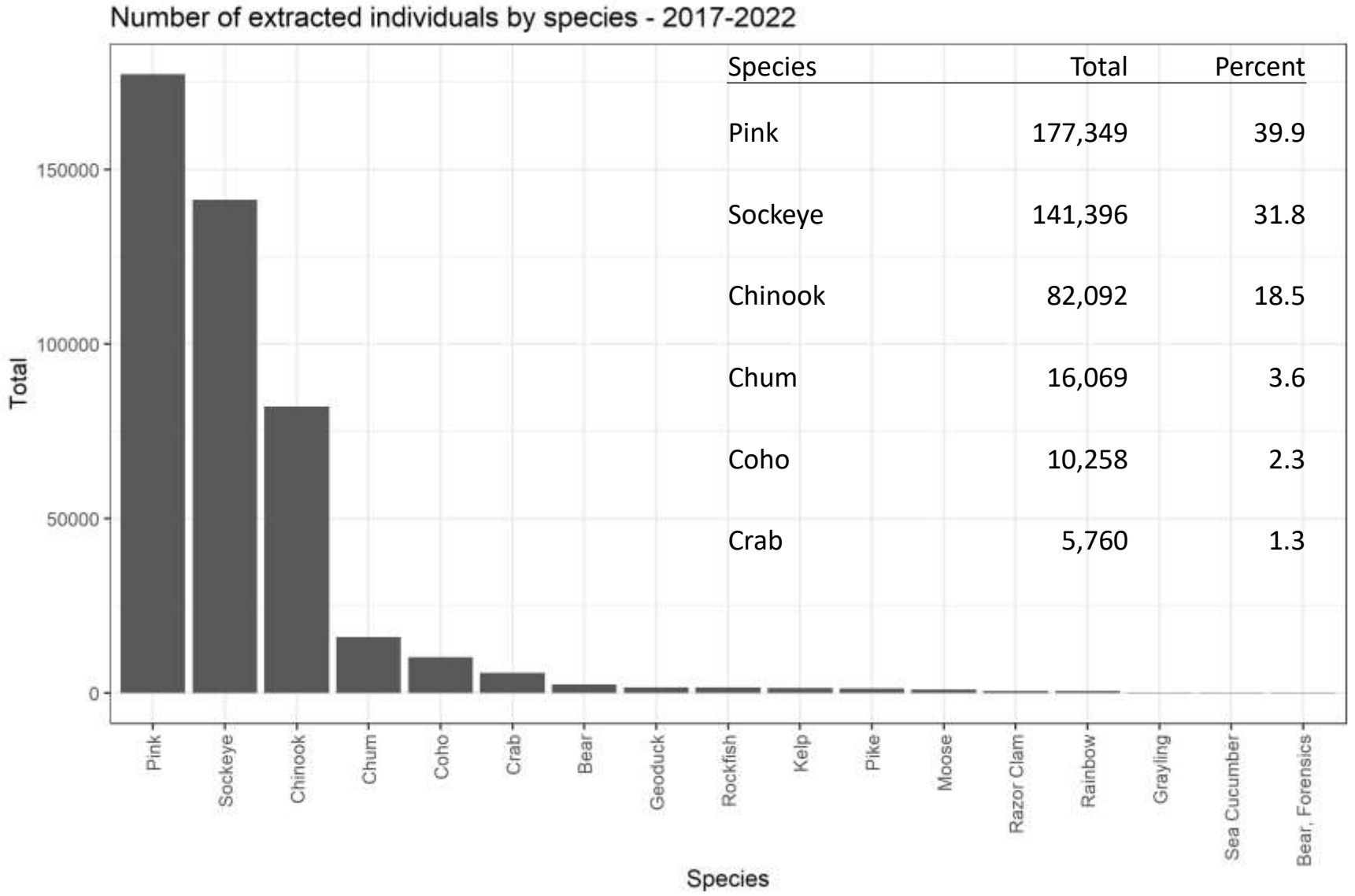
RCMT Meeting

19 April 2023

GCL: Who we are

- Statewide lab
- ~3 million samples archived
  - ~1.5 million samples genotyped
    - 200,000+ samples collected each year
      - ~75,000 samples genotyped each year
- Salmonids, marine fish, seaweeds, invertebrates, and some mammals

Total extractions among species



Species	Total	Percent
Pink	177,349	39.9
Sockeye	141,396	31.8
Chinook	82,092	18.5
Chum	16,069	3.6
Coho	10,258	2.3
Crab	5,760	1.3

GCL: Who we are

Mission: *To **protect genetic resources** and **provide genetic information and advice** to department staff, policy makers, and the public to support **management** of resources consistent with the mission of Alaska Department of Fish and Game.*

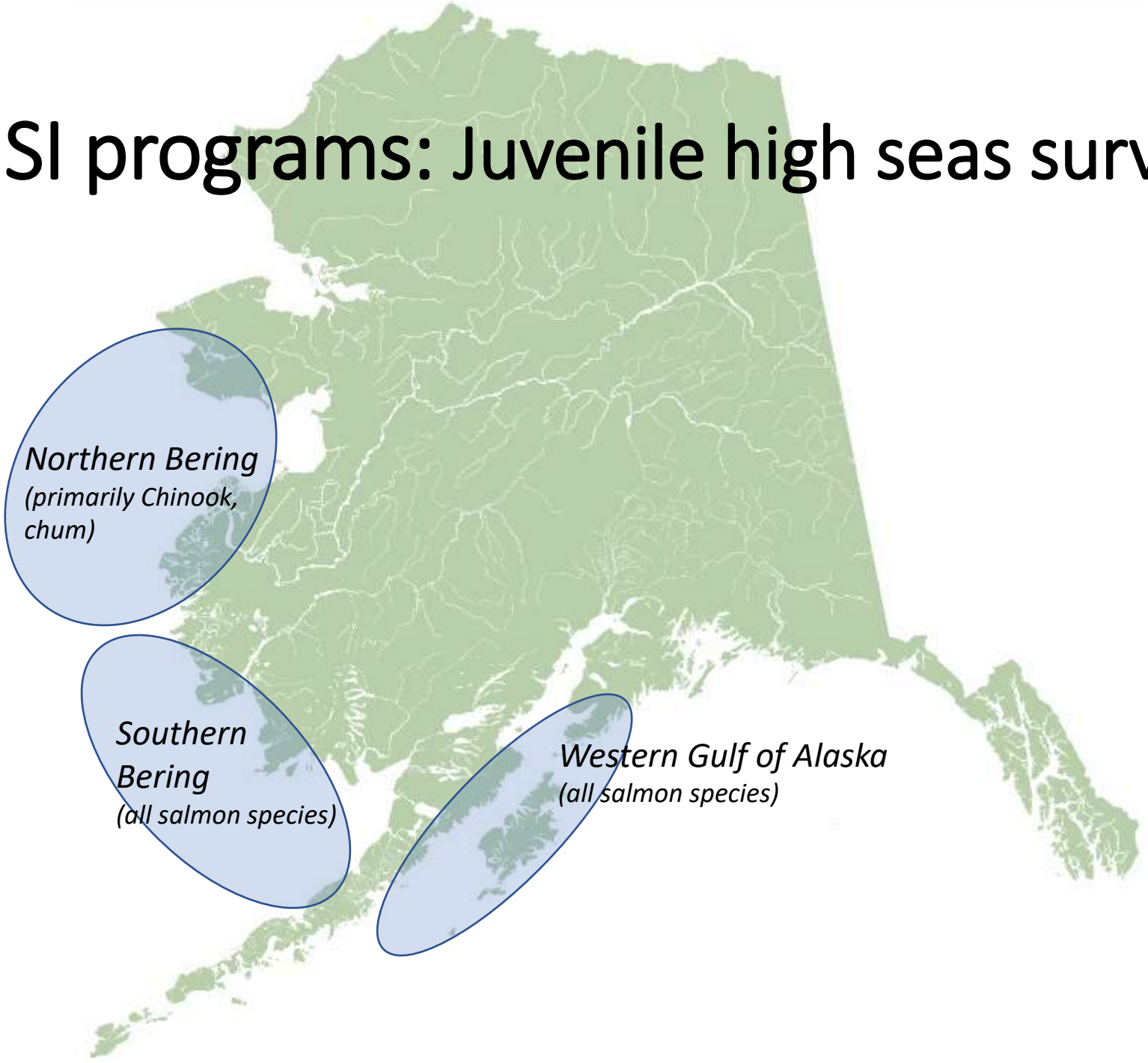
GCL: Who we are

- Genotyping capabilities using several platforms, including sequencing
- Ability to explore new techniques and technologies
- Centralized archiving system, Oracle database *LOKI*
- Direct support and interaction between GCL staff and management biologists

GSI programs: Standard post season

GSI programs: Inseason

GSI programs: Juvenile high seas surveys



Other projects/programs (not exhaustive)

- Alaska Hatchery Research Program
- Kelp research
- tGMR and GMR
- Rockfish pop structure
- Northern Pike sex determination markers
- Baseline development
- Marker panel development
- MSA method development
- Mammal forensics
- Species identification
- Driver Stock method
- Collaborative projects

Other projects/programs (not exhaustive)

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- **Collaborative projects**

Alaska Hatchery Research Program

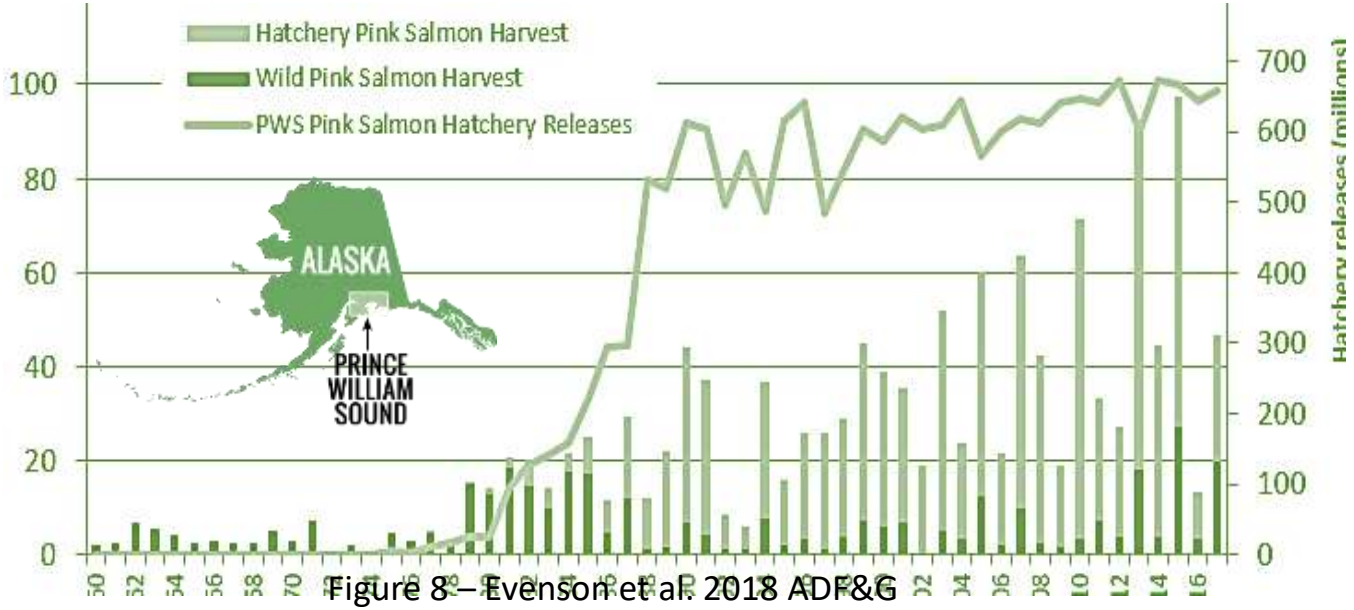
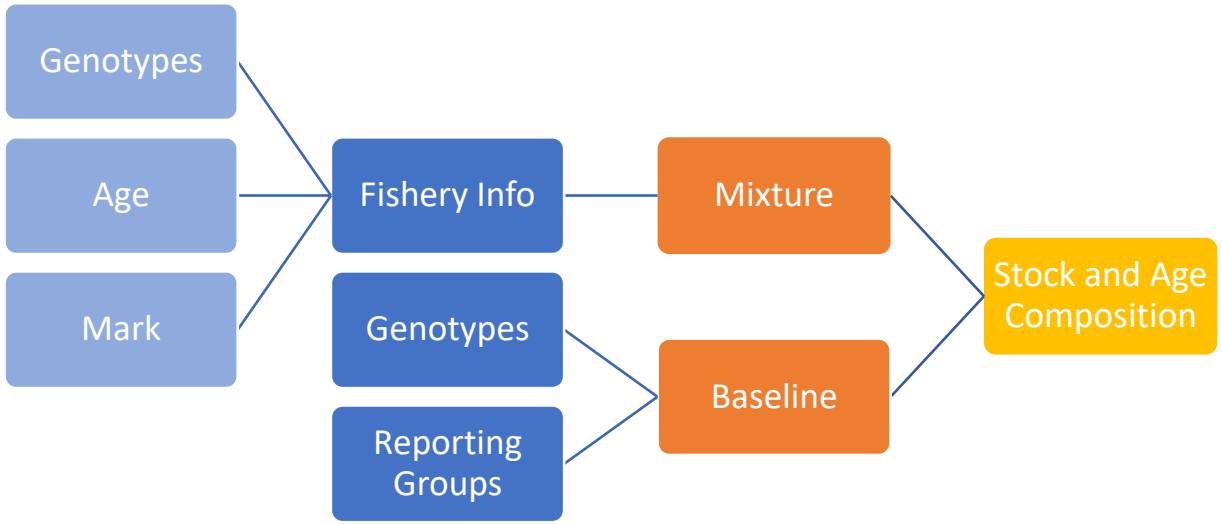


Figure 8 – Evenson et al. 2018 ADF&G

1. What is the genetic structure of pink and chum salmon in PWS and SEAK?
2. What is the extent and annual variability of straying?
3. What is the impact on fitness (productivity) of natural pink and chum stocks due to straying hatchery pink and chum salmon?

Method development

- MAGMA: Mark- and age-enhanced genetic mixture analysis
  - Estimate stock and age composition in one model

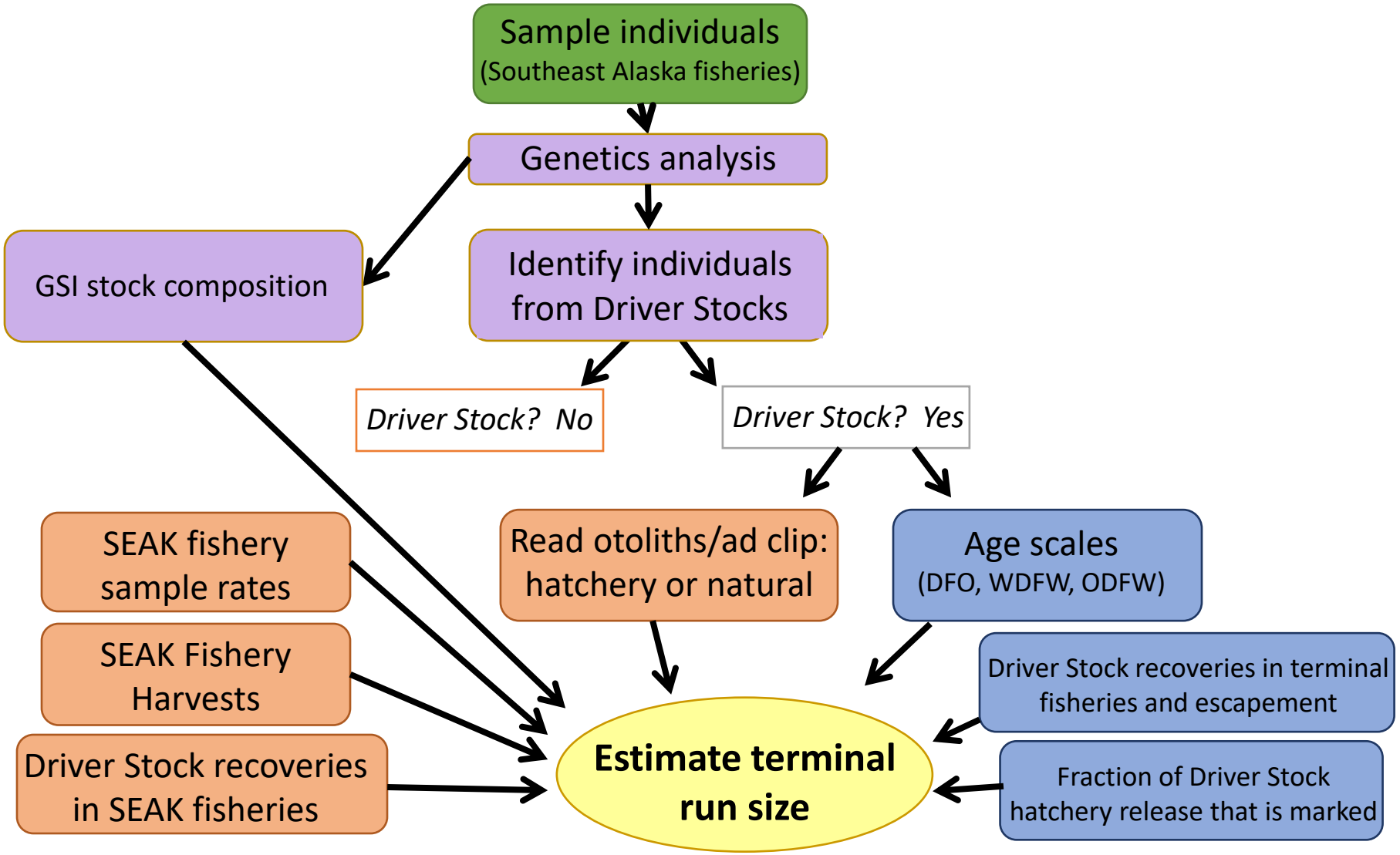


- Multi-stage GSI
  - Allow use of disparate baselines in single integrated process

Driver Stock

- Goal: Estimate terminal run sizes of aggregate stocks of natural and hatchery origin Chinook salmon from PSC stocks for interest

Driver Stock



Example Collaborative projects

- *Ichthyophonus* prevalence by stock (ADF&G, USFWS)
  - Can infection rates help explain high pre-spawn mortality rates in upper Yukon River Chinook?
- Otolith microchemistry (ADF&G, UW, others)
  - Can strontium isotopes and genetic markers together help differentiate chum and Chinook populations in Western Alaska?
- Juvenile growth, condition factor, habitat use (ADF&G, UW, UAF)
  - How do rearing conditions affect growth and survival?
  - How do growth rates and body condition differ among stocks?
  - How has stock-specific smolt size and migration timing changed?
- IYS
  - What is the winter ecology of salmon in the North Pacific?

Questions?

Adjourn Day 1

- See you tomorrow 9am (PT)

- For those in Portland
  - 6pm Social: banquet room at Backwoods Brewing Co. 231 NW 11th Ave.