

Informing Integrated Hatchery Management Using Parentage-Based Tagging (PBT)

Nell McGuan

2026 LSRCP

April 21, 2026



Washington
Department of
**FISH &
WILDLIFE**

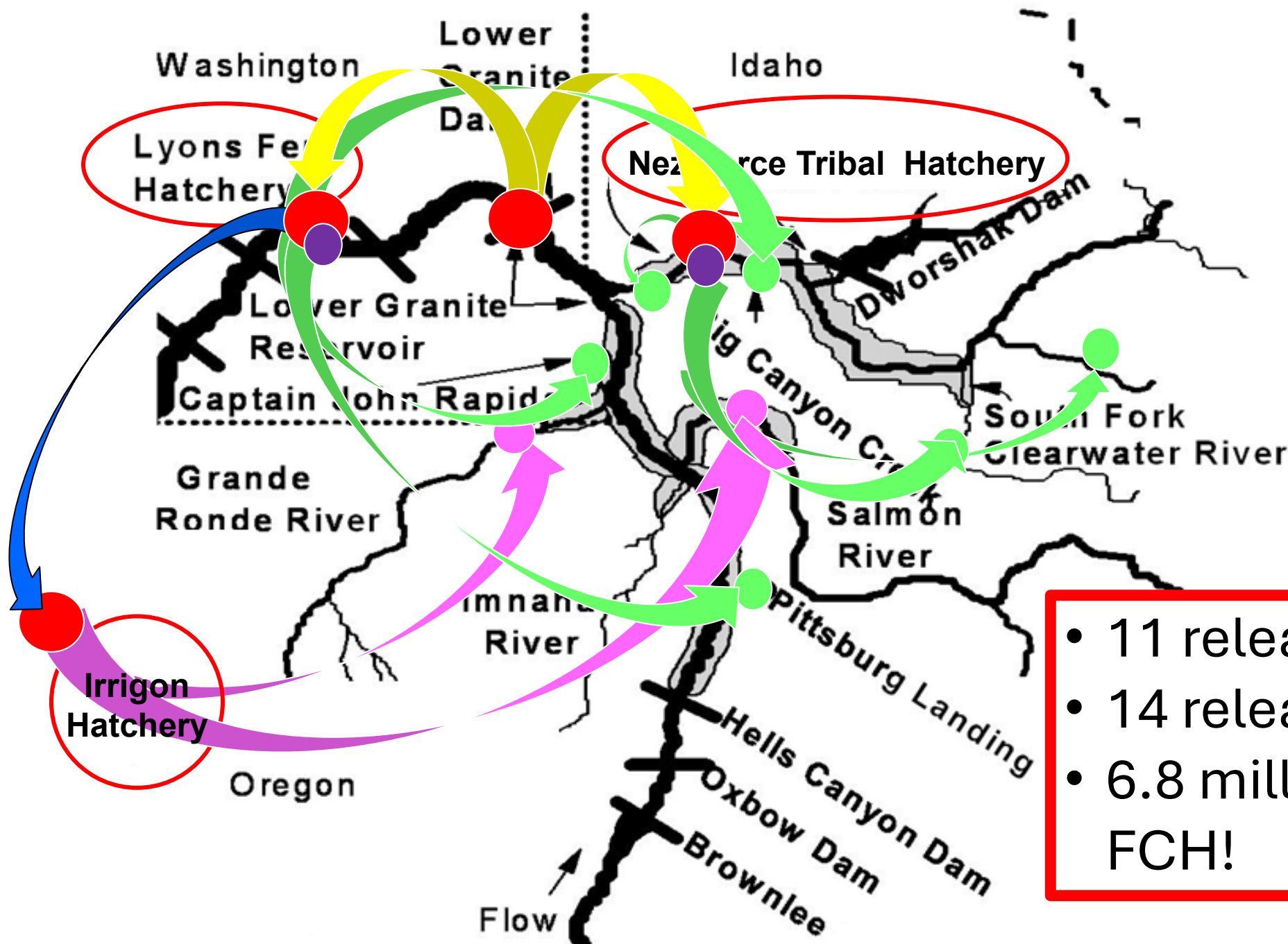
Broodstock Collection



Large-Scale Integrated Hatchery Program

2,300 females between LFH and NPTH

Collected at Lower Granite Dam



1. Brood Collected at LGR
2. Fish trucked to LFH/NPTH
3. Eyed eggs transferred
4. FCAP Releases
5. On-Station Releases
6. IFH Releases
7. NPTH AF Releases

- 11 release locations
- 14 release groups
- 6.8 million subyearling FCH!

Challenges

Per NOAA 30% pNOB target



Photo Credit: Nell McGuan

Challenges

Per NOAA 30% pNOB target

~50% UM/UT hatchery releases



Photo Credit: Nell McGuan

Challenges

Per NOAA 30% pNOB target

~50% UM/UT hatchery releases

5% stray rate- real-time wire reading during spawning



Photo Credit: Nell McGuan

Challenges

Per NOAA 30% pNOB target

~50% UM/UT hatchery releases

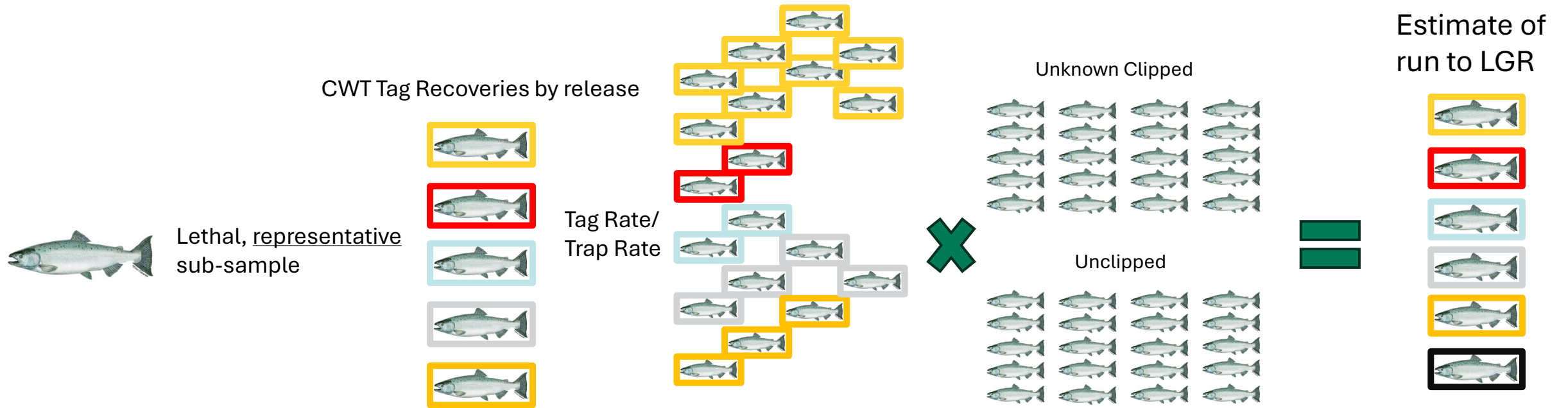
5% stray rate- real-time wire reading during spawning

Lethal subsample of wire for run reconstruction

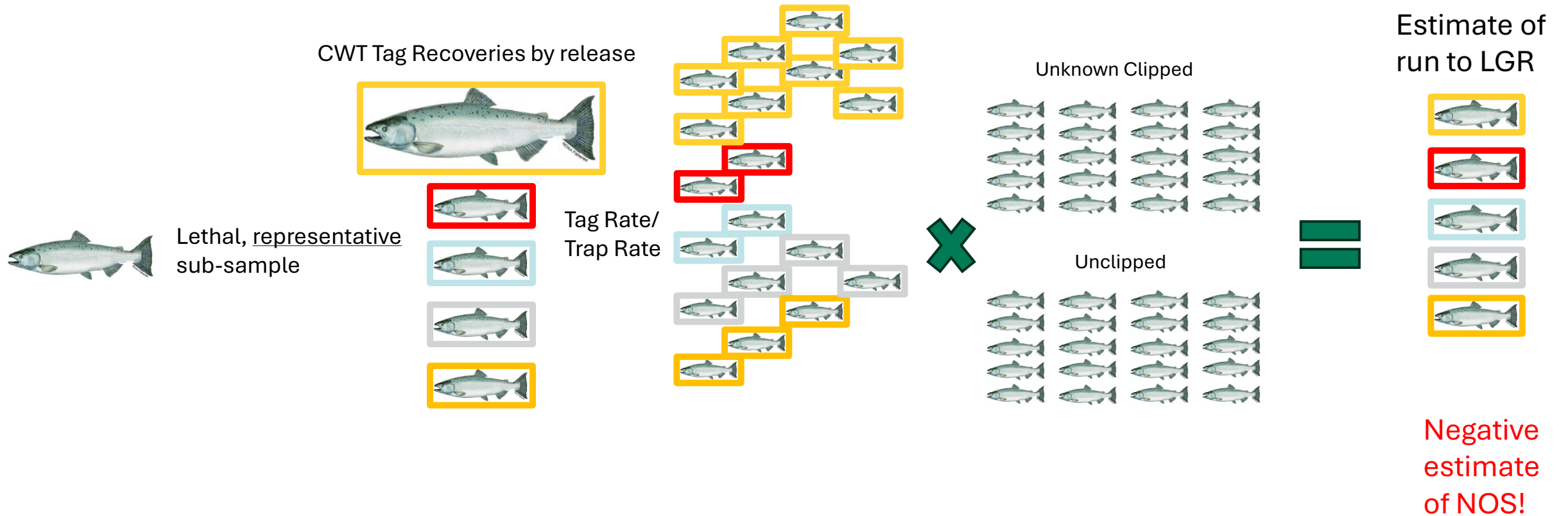


Photo Credit: Nell McGuan

CWT Run Reconstruction



CWT Run Reconstruction

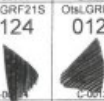
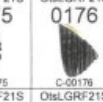
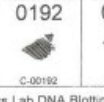
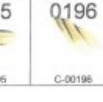


Utilizing PBT

- Parentage-based tagging
 - Non-lethal
- Started collection in 2011
 - Full representation in 2016
- Every fish at LGR gets clipped
 - RR representative subsample
 - Broodstock
- ~100% tag rate for release groups

Collecting Agency: WDFW
 Collecting Person: _____
 Location: Lower Granite Dam
 Place a piece of fin tissue, not larger than this circle  Inter of grid

Whatman Sheet #: _____
 Sample Code: OtsLGRF21S
 Target Species: Adult Fall Chinook
 Date Range: _____

	1	2	3	4	5	6	7	8	9	10
A	 0101 C-00101	 0102 C-00102	 0103 C-00103	 0104 C-00104	 0105 C-00105	 0106 C-00106	 0107 C-00107	 0108 C-00108	 0109 C-00109	 0110 C-00110
B	 0111 C-00111	 0112 C-00112	 0113 C-00113	 0114 C-00114	 0115 C-00115	 0116 C-00116	 0117 C-00117	 0118 C-00118	 0119 C-00119	 0120 C-00120
C	 0121 C-00121	 0122 C-00122	 0123 C-00123	 0124 C-00124	 0125 C-00125	 0126 C-00126	 0127 C-00127	 0128 C-00128	 0129 C-00129	 0130 C-00130
D	 0131 C-00131	 0132 C-00132	 0133 C-00133	 0134 C-00134	 0135 C-00135	 0136 C-00136	 0137 C-00137	 0138 C-00138	 0139 C-00139	 0140 C-00140
E	 0141 C-00141	 0142 C-00142	 0143 C-00143	 0144 C-00144	 0145 C-00145	 0146 C-00146	 0147 C-00147	 0148 C-00148	 0149 C-00149	 0150 C-00150
F	 0151 C-00151	 0152 C-00152	 0153 C-00153	 0154 C-00154	 0155 C-00155	 0156 C-00156	 0157 C-00157	 0158 C-00158	 0159 C-00159	 0160 C-00160
G	 0161 C-00161	 0162 C-00162	 0163 C-00163	 0164 C-00164	 0165 C-00165	 0166 C-00166	 0167 C-00167	 0168 C-00168	 0169 C-00169	 0170 C-00170
H	 0171 C-00171	 0172 C-00172	 0173 C-00173	 0174 C-00174	 0175 C-00175	 0176 C-00176	 0177 C-00177	 0178 C-00178	 0179 C-00179	 0180 C-00180
I	 0181 C-00181	 0182 C-00182	 0183 C-00183	 0184 C-00184	 0185 C-00185	 0186 C-00186	 0187 C-00187	 0188 C-00188	 0189 C-00189	 0190 C-00190
J	 0191 C-00191	 0192 C-00192	 0193 C-00193	 0194 C-00194	 0195 C-00195	 0196 C-00196	 0197 C-00197	 0198 C-00198	 0199 C-00199	 0200 C-00200

Eagle Fish Genetics Lab DNA Blotting Sheet.
 Jesse McCane 208-939-6713 x2.6 jesse.mccane@idfg.idaho.gov
 Matt Campbell 208-939-6713 x2.1

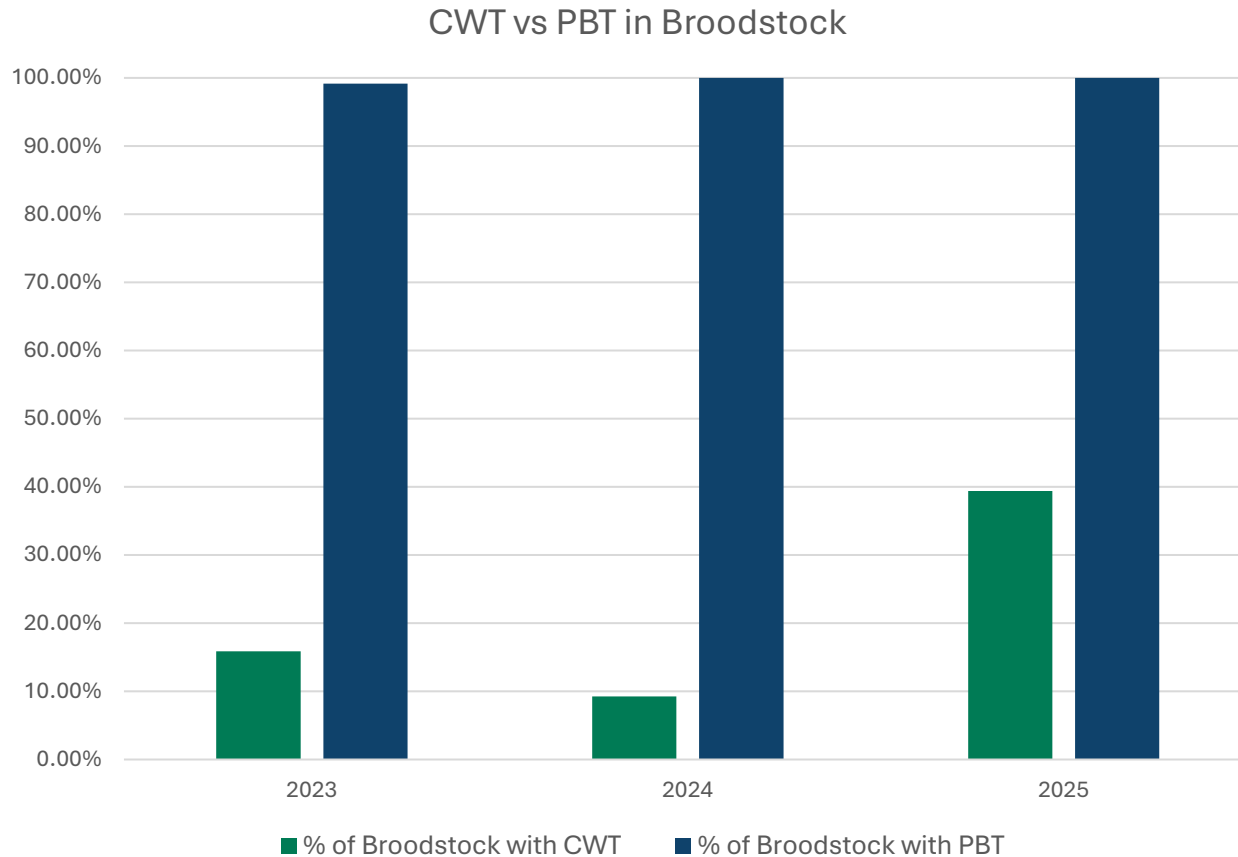
PBT in Run Reconstruction

- Simplified the process
- Better overall estimates
- No lethal wire sampling
- No negative NOS

Table 1. Fall Chinook salmon returns to Lower Granite Dam from August 18 – November 15 in 2024 by age and origin. Jacks were categorized as males less than or equal to 57 cm fork length.

Origin	Age	Females	Males	Jacks (<57 cm)	Adults	Totals
Total natural		3,279	3,464	483	6,743	7,226
Total hatchery		14,319	13,407	3,980	27,726	31,707
Totals		17,598	16,871	4,463	34,469	38,932
Natural	2	0	46	376	46	422
	3	157	1,369	84	1,525	1,610
	4	2,087	1,776	23	3,862	3,885
	5	1,035	274	0	1,309	1,309
Hatchery	2	0	606	3,478	606	4,084
	3	2,301	6,179	340	8,480	8,820
	4	8,336	4,828	16	13,164	13,180
	5	3,351	1,149	0	4,500	4,500
Stray	2	0	17	98	17	115
	3	35	335	48	370	418
	4	90	209	0	299	299
	5	207	84	0	291	291

PBT in Broodstock



- PBT used for broodstock composition since 2016
 - pNOB
 - High rate of UM/UT
- PIT tags used for efficiency
- Prioritize UM/UT fish

CWTs in 2025



Photo Credit: Nell McGuan

- 1,092 wires extracted in 2025!
- 40 wires lost
- 8 double or misplaced wires
- 9 fish numbers recorded wrong
- 23 strays without wire (AD no CWT)



Photo Credit: Nell McGuan

Data Redundancy

CWT Data

- Release Group
- Age/Brood Year
- Data from only a select number of fish
- Prone to lost or misplaced data

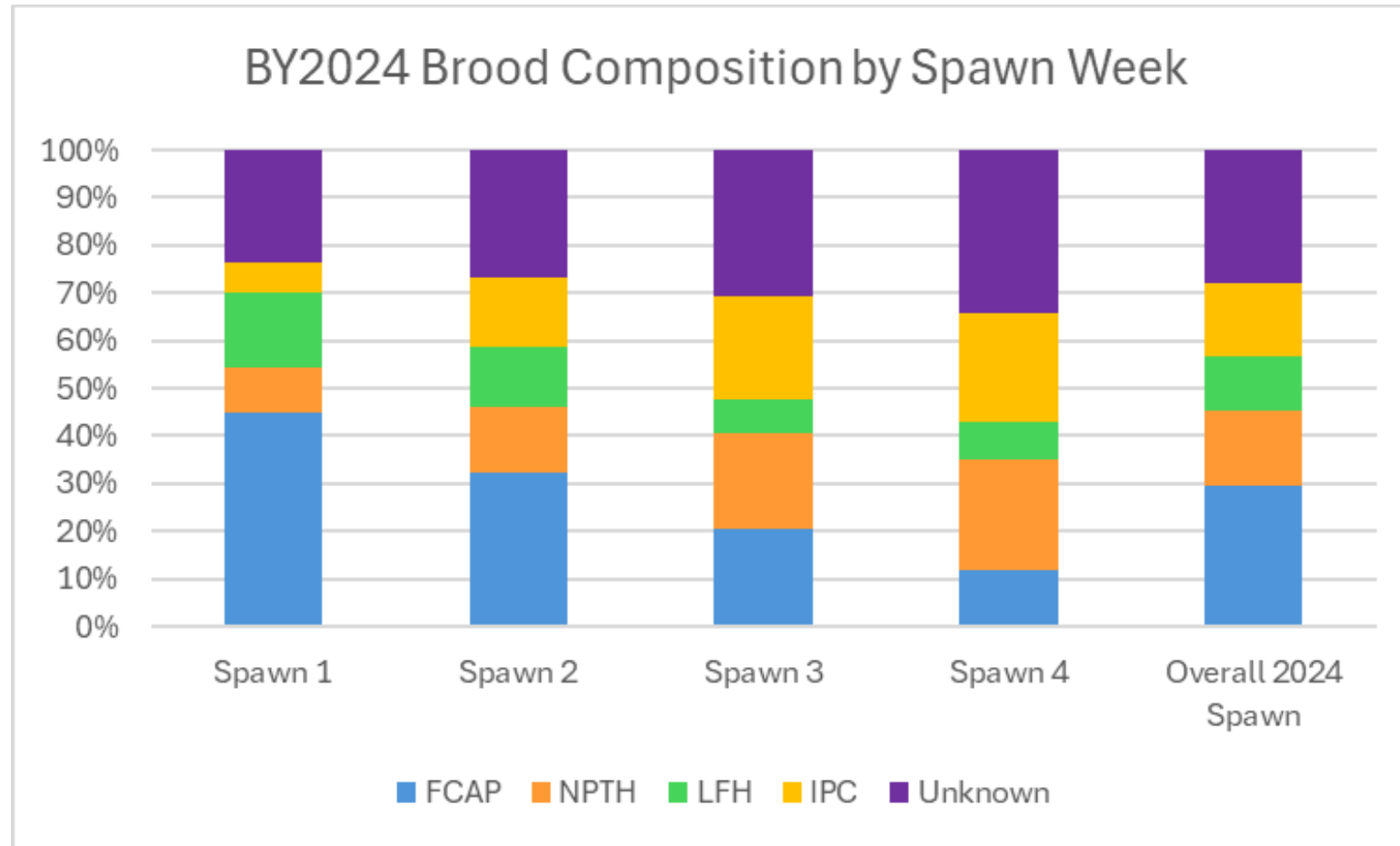


Photo Credit: Nell McGuan

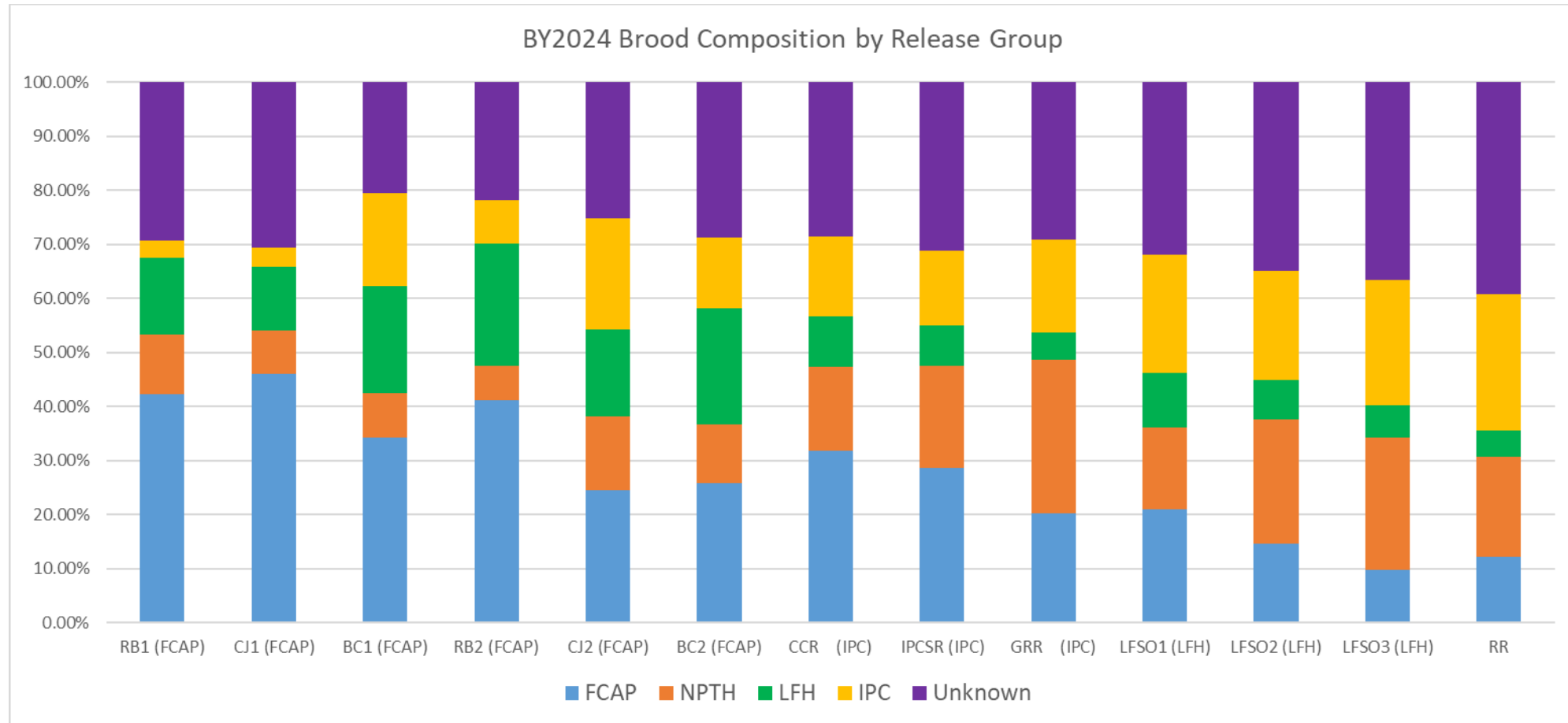
PBT Data

- Release Group
- Age/Brood Year
- Estimate for pNOB
- Data from almost every single brood fish
- Precise data flow
- Less stinky

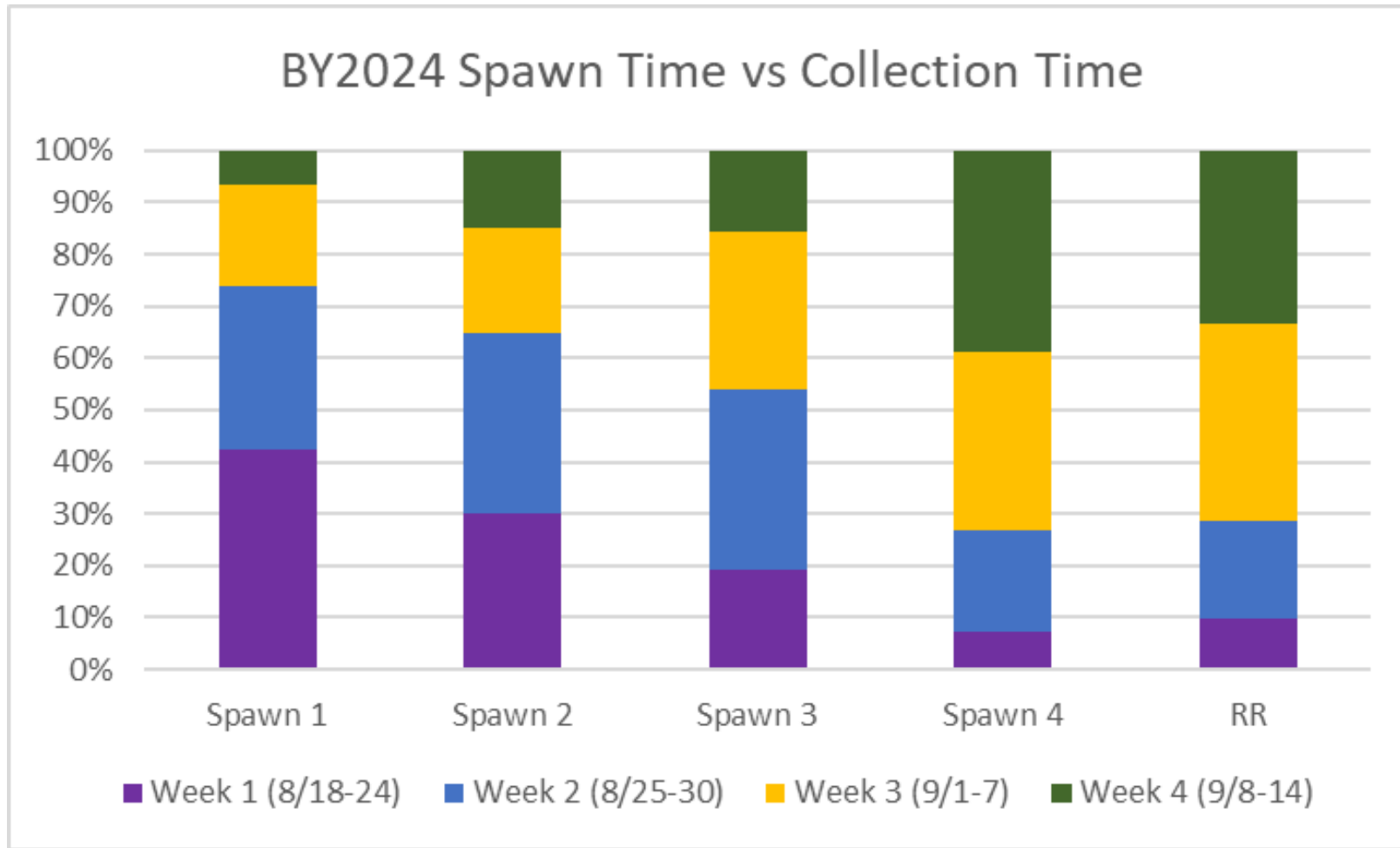
Broodstock Composition



Broodstock Composition



Broodstock Composition



What's Next?

- No more wire retrieval?!
- Scale back wire tagging?
 - Ocean/downstream harvest



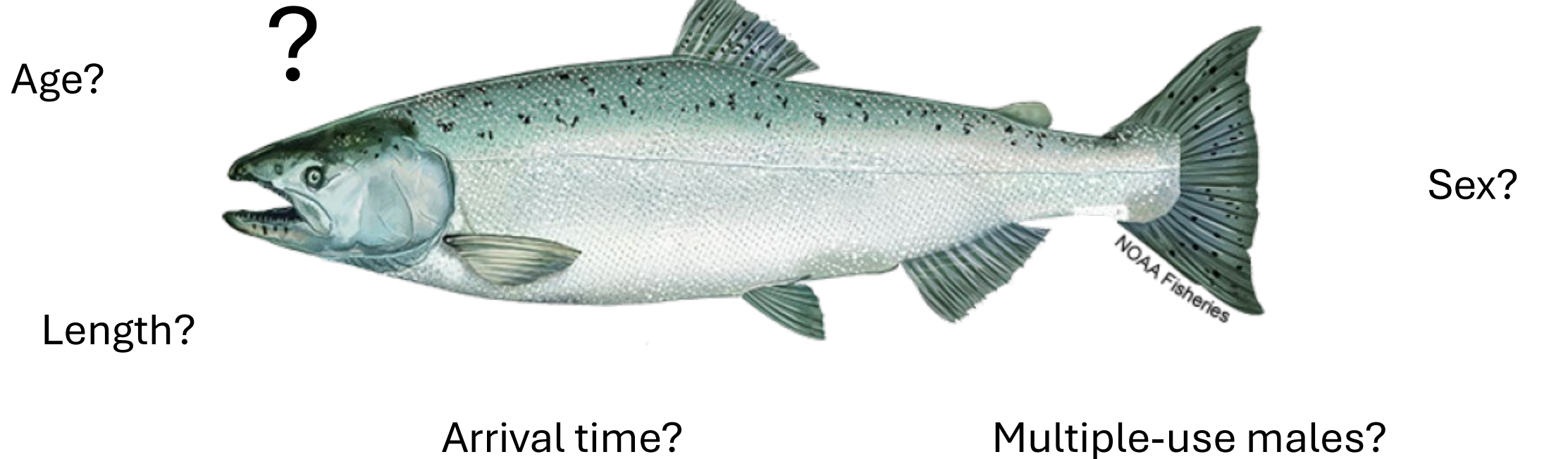
Photo Credit: Nell McGuan



Photo Credit: Nell McGuan

What's Next?

- Reproductive Success Study



What's Next?

- Updated management decisions and spawning protocols
 - Specific crosses
 - Multiple-use males
 - Collection/Spawn Timing



Photo Credit: Nell McGuan



Photo Credit: Nell McGuan



Questions?

nell.mcguan@dfw.wa.gov



Request this information in an alternative format or language at wdfw.wa.gov/accessibility/requests-accommodation, 833-885-1012, TTY (711), or CivilRightsTeam@dfw.wa.gov.