Northwest **Power** and **Conservation** Council

June 5, 2018

MEMORANDUM

TO: **Fish and Wildlife Committee Members**

FROM: **Jeff Allen, Idaho Policy Analyst**

SUBJECT: **Update on identifying and resolving survival challenges from smolts released from Springfield Hatchery.**

BACKGROUND:

Presenter: Paul Kline, Assistant Chief of Fisheries and Christine Kozfkay, Policy Coordinator, Idaho Department of Fish and Game.

Summary: Paul Kline and Christine Kozfkay, will review continued investigations regarding the smolt survival challenges from Springfield Hatchery.

Since the last update, additional physiological studies have been conducted to further test the hypothesis that water chemistry differences are impacting smolt survival post-release into Redfish Lake Creek and to develop strategies to improve survival. Two main strategies have been tested: 1) Transfer of smolts from Springfield Hatchery to Sawtooth Hatchery for an acclimation period prior to release into Redfish Lake Creek and the upper Salmon River and 2) Use of a commercial resin to soften water during transport of smolts from Springfield Hatchery to Redfish Lake Creek. Brood year 2016 smolts were just released in May. Current results, highlighting key findings from these studies and smolt survival from release to Lower Granite Dam, will be presented.

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Results indicate that differences in water chemistry (specifically water hardness) between Springfield Hatchery and Redfish Lake Creek in the Sawtooth Valley are responsible for inducing stress levels in smolts that are high enough to cause significant post-release mortality. Results also indicate that acclimating smolts at the Sawtooth Hatchery for a short period of time is an effective solution that greatly reduces post-release mortality. Results also demonstrated that in-route water softening could be an effective alternative to acclimating smolts at the Sawtooth Hatchery. Program managers need to weigh the pros and cons of each of these alternative release strategies to determine a standard operating protocol for future releases.

Update on identifying and resolving survival challenges from fish released from Springfield Hatchery

Paul Kline
Christine Kozfkay
Idaho Department of Fish and Game

Northwest Power and Conservation Council
Fish Committee Meeting – June 12, 2018
Portland, Oregon

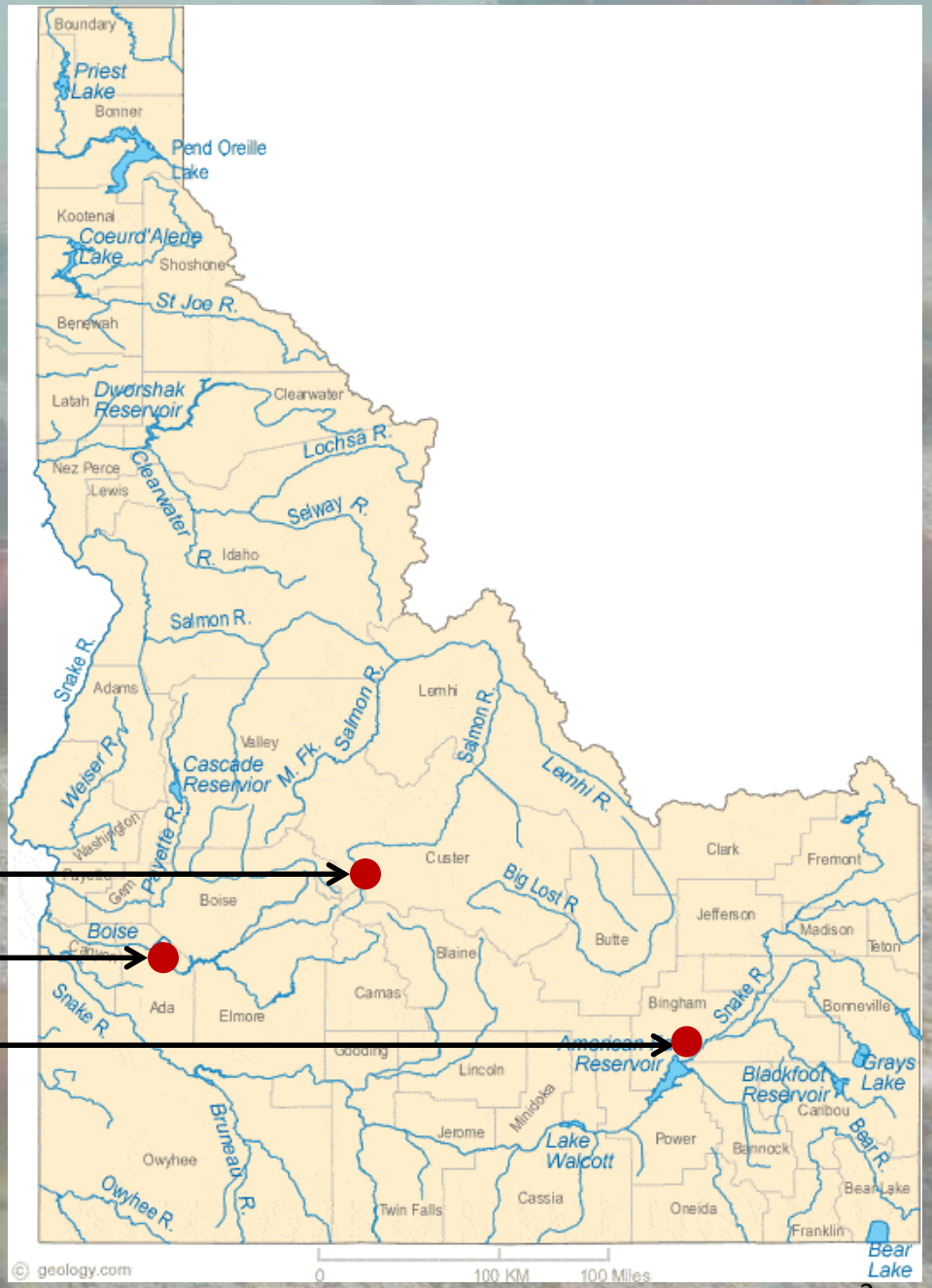
Springfield Hatchery

Background

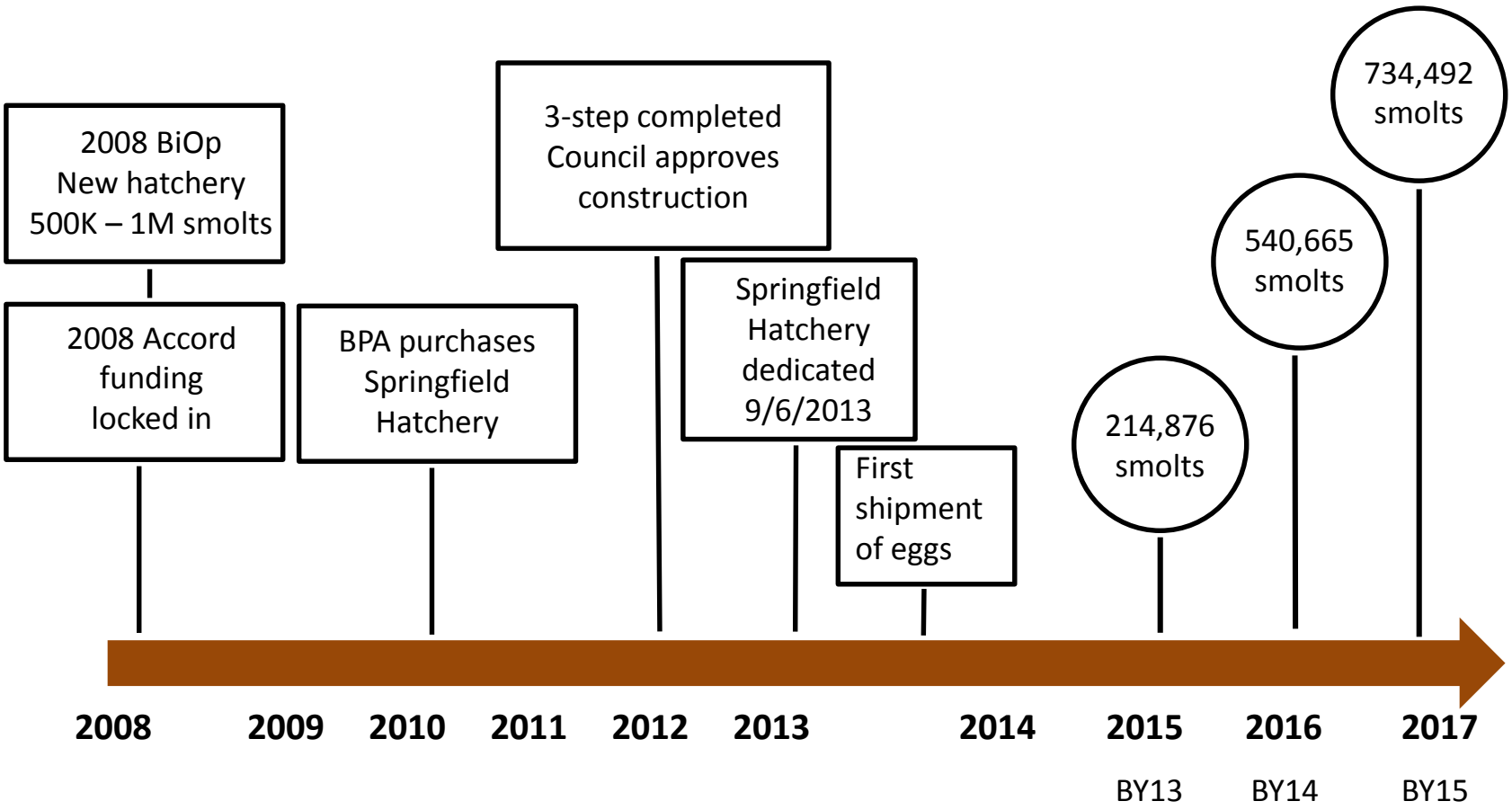
Sawtooth Hatchery

Eagle Hatchery

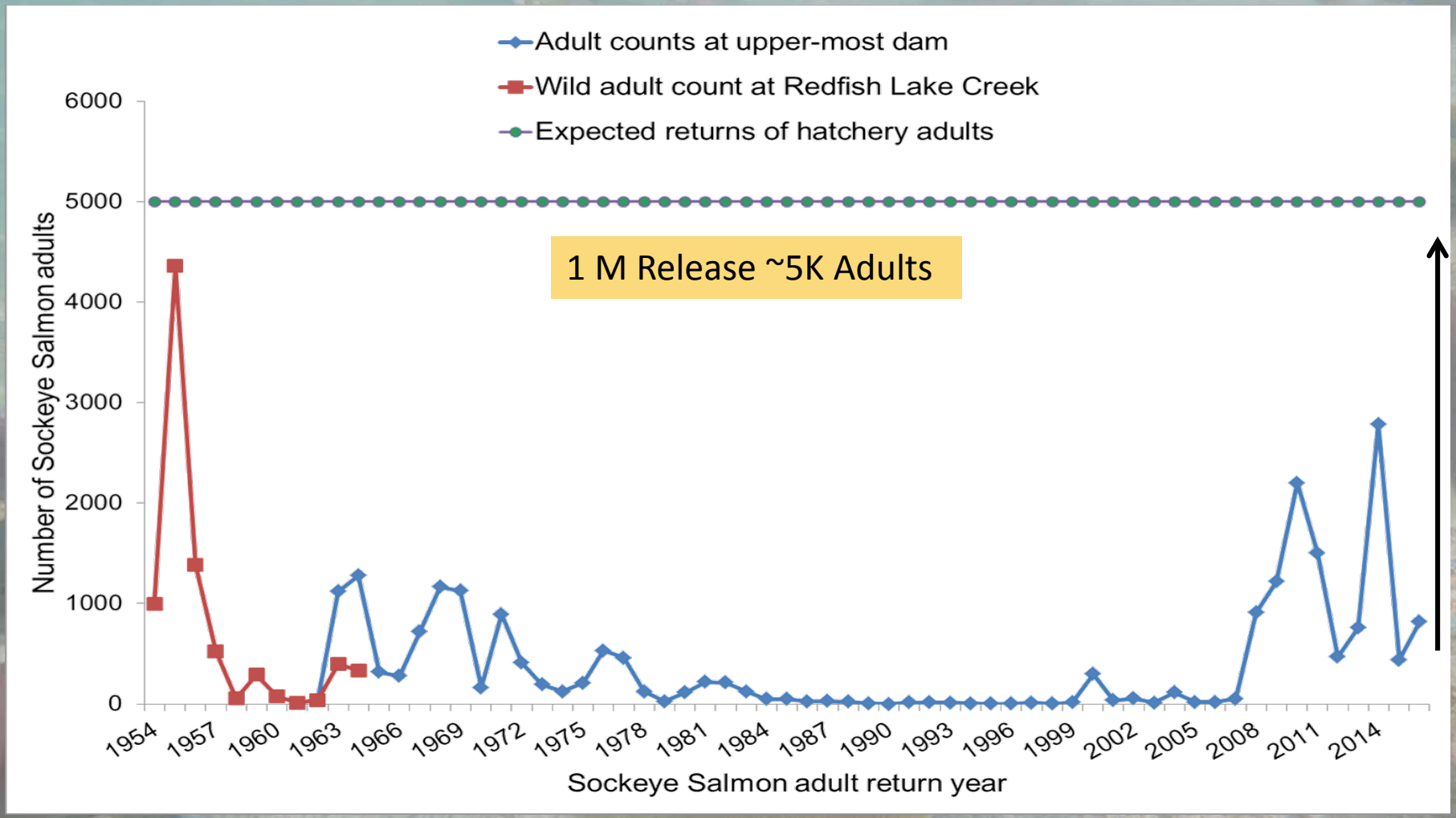
Springfield Hatchery



Program Expansion - Background

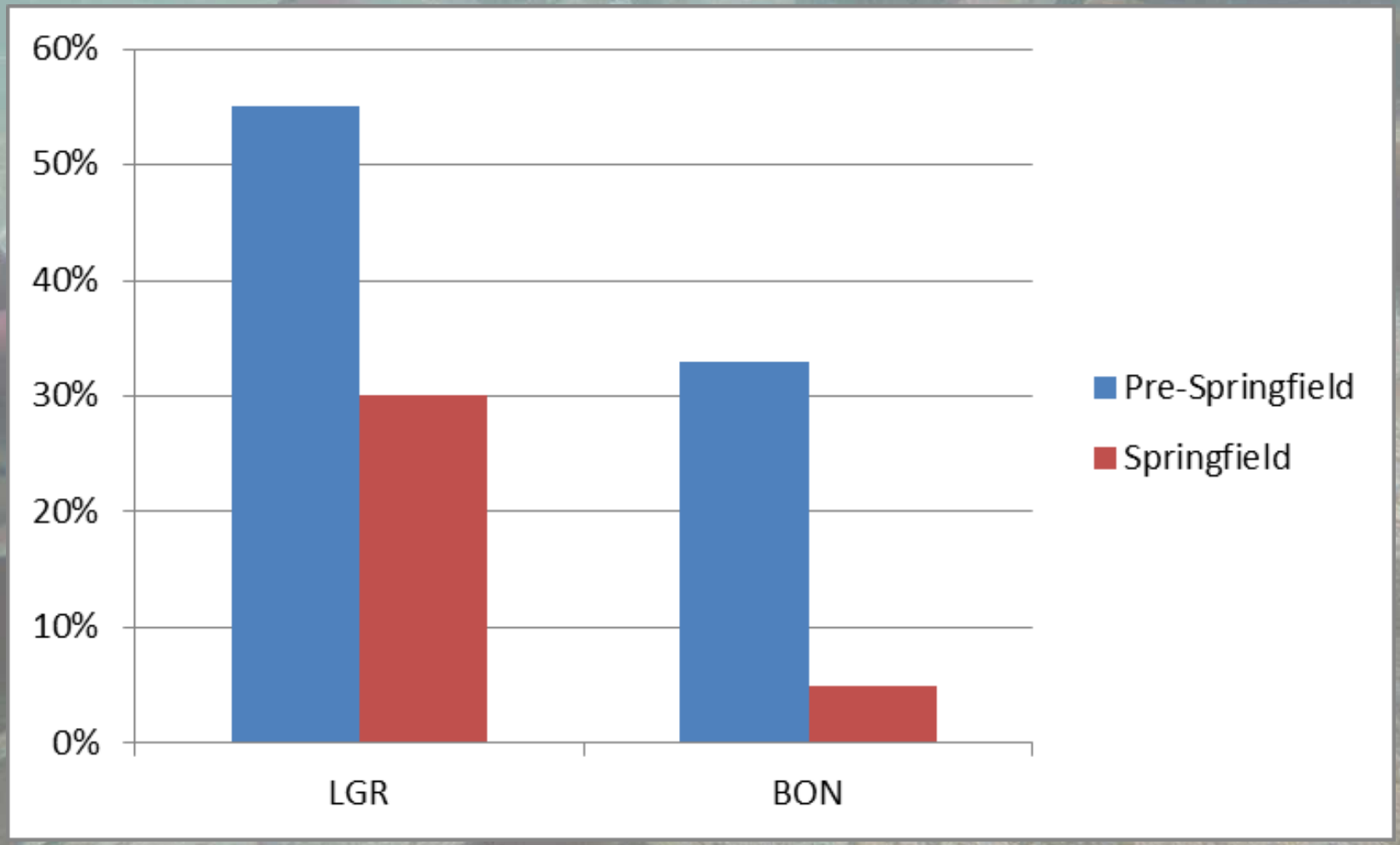


Expected Outcomes



Pre-release Fish Condition

Post Release Smolt Survival 2015, 2016, 2017



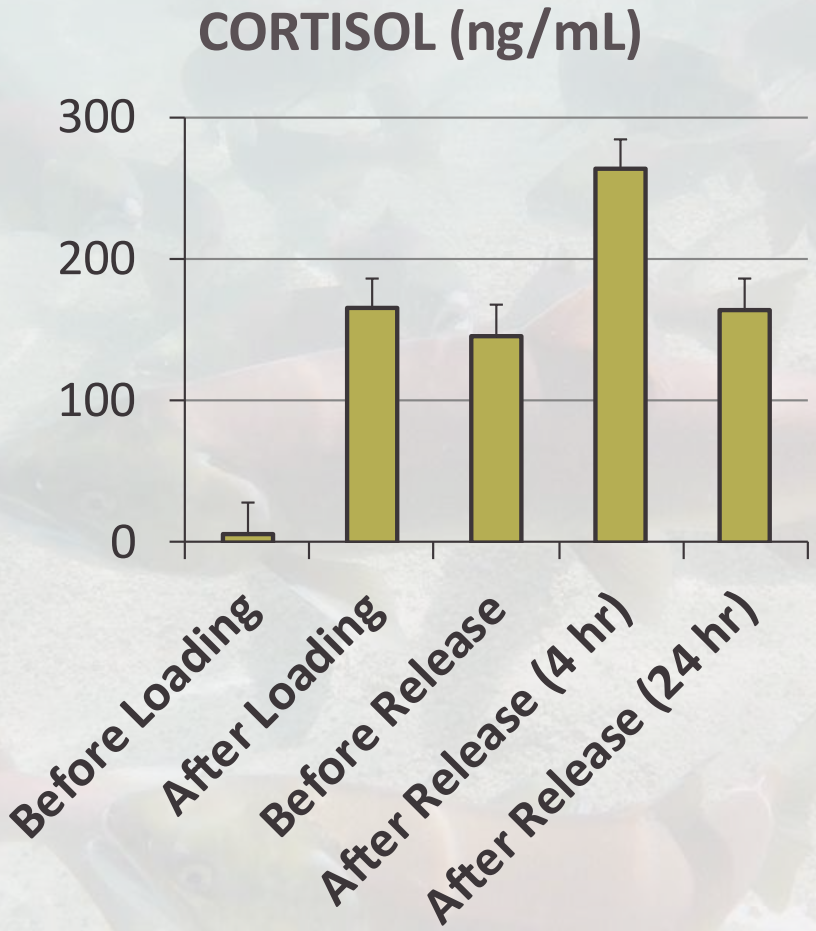
Challenges – Why such Low Survival?

Water quality parameters measured and compared

	Springfield Hatchery	Redfish Lake Creek	Salmon River
Alkalinity	194-202 mg/L	1-8 mg/L	66 mg/L
Hardness	234-248 mg/L	11-12 mg/L	68 mg/L
pH	7.70-7.75	7.41-7.72	7.94

Researching – Low Survival

2017 Results



RESULTS SUGGEST STRESS FACTOR(S) REMAINS POST-RELEASE

2018 Release Plan – What We Changed

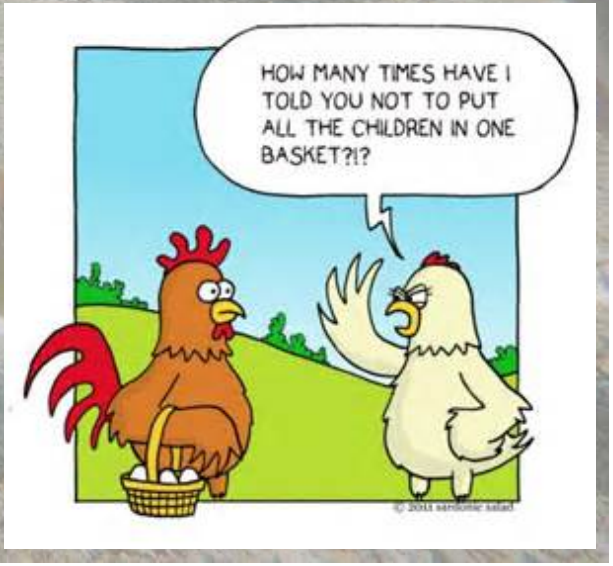
Release Strategies Used

~240K pre-smolts acclimated at Sawtooth H and released to Redfish Lake in October, 2017

~700K smolts acclimated at Sawtooth H
½ released in Redfish Lake Creek
½ released in the Salmon River

~3K smolts directly released to Redfish Lake Creek after water softening

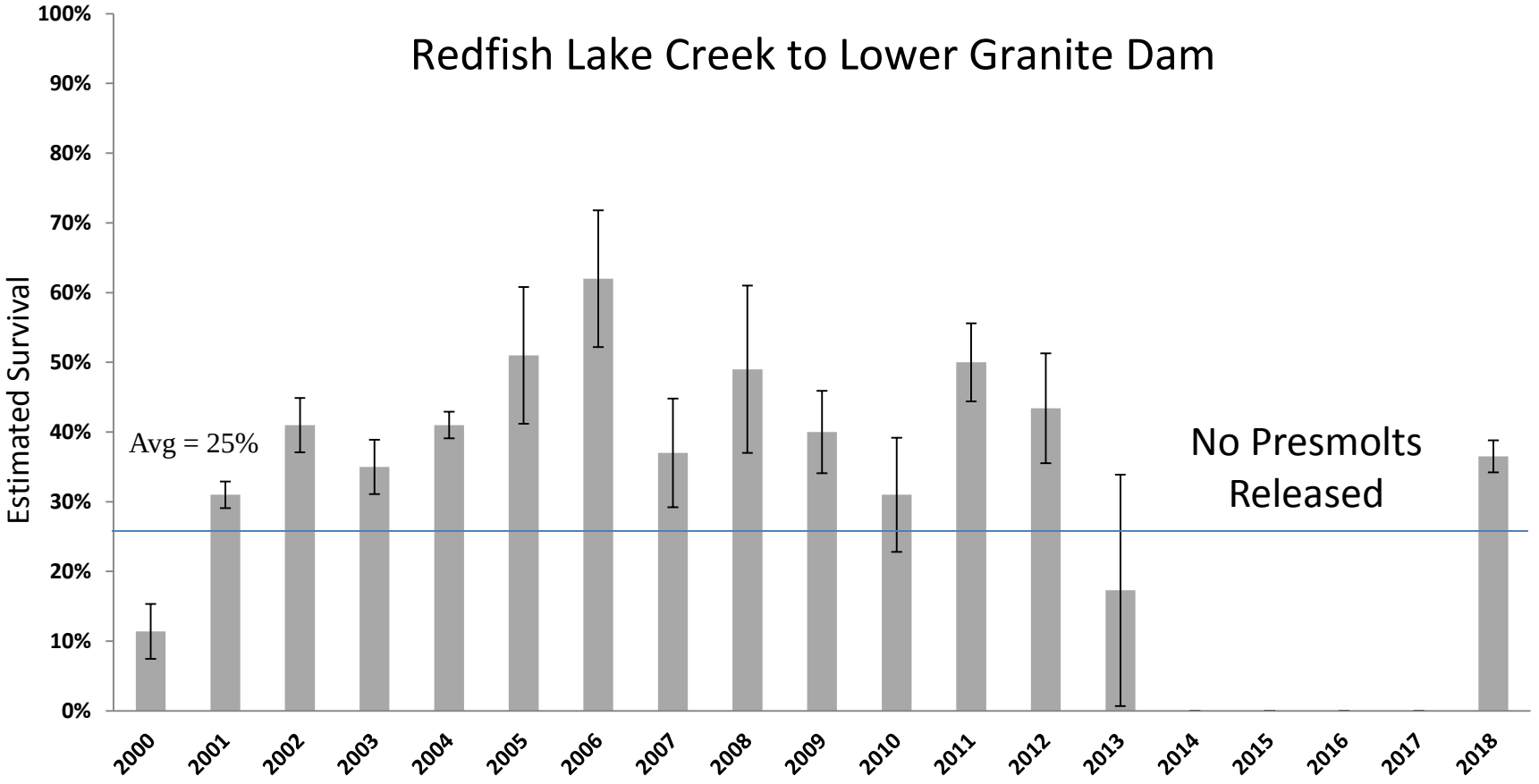
~45K smolts directly released to Redfish Lake Creek as control



2018 Pre-smolt Over-winter Survival

- ~ 106,580 emigrated from release
- 45% Over-winter survival
- pre-smolt over-winter survival 11-29% (previous yrs).

2018 Pre-smolt Survival Results to LGR

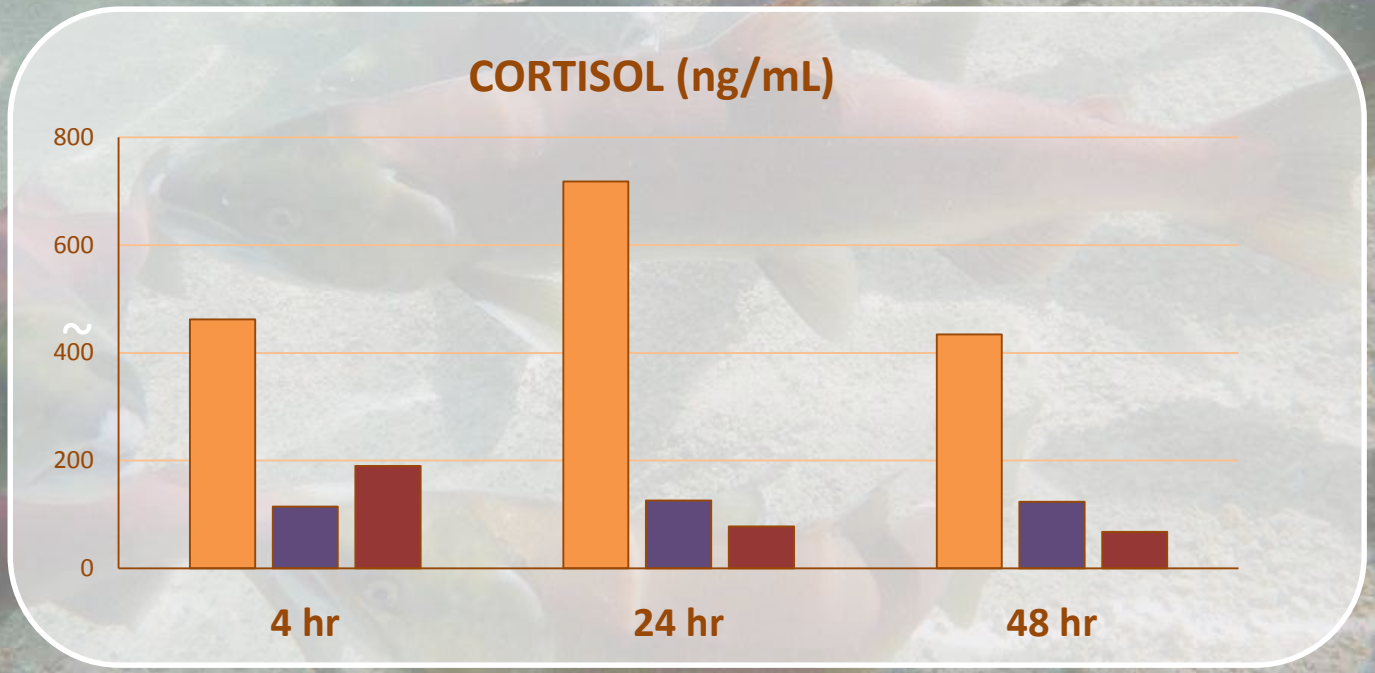


2018 Smolt Physiology Results

DIRECT RELEASE SPRINGFIELD TO RFLC

RELEASE TO RFLC AFTER SAWTOOTH ACCLIMATION

RELEASE TO SALMON RIVER AFTER SAWTOOTH ACCLIMATION



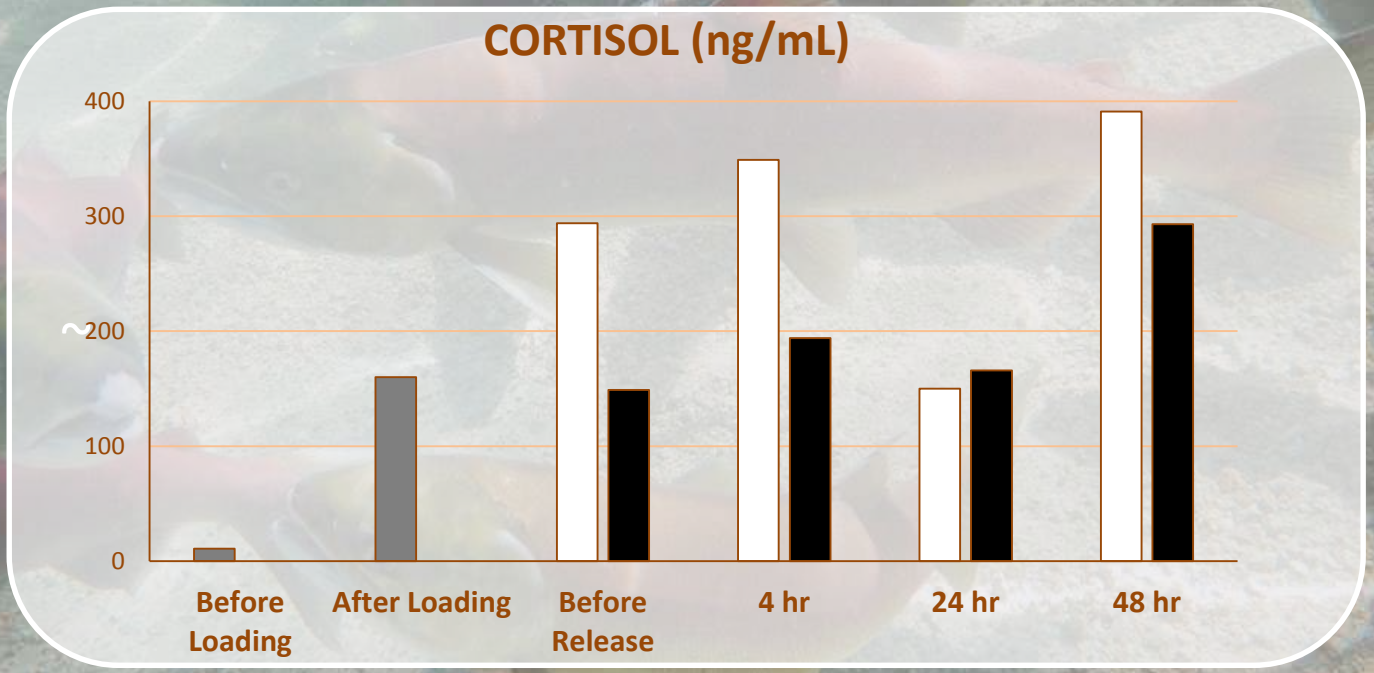
>17% MORTALITY IN SPRINGFIELD TO RFLC DIRECT RELEASE GROUP AT 24-48 HR, NO MORTALITY AMONG SAWTOOTH ACCLIMATED FISH

2018 Smolt Physiology Results

PRE-RELEASE

DIRECT RELEASE SPRINGFIELD TO RFLC

SPRINGFIELD TO RFLC WITH 5 hr. WATER SOFTENING



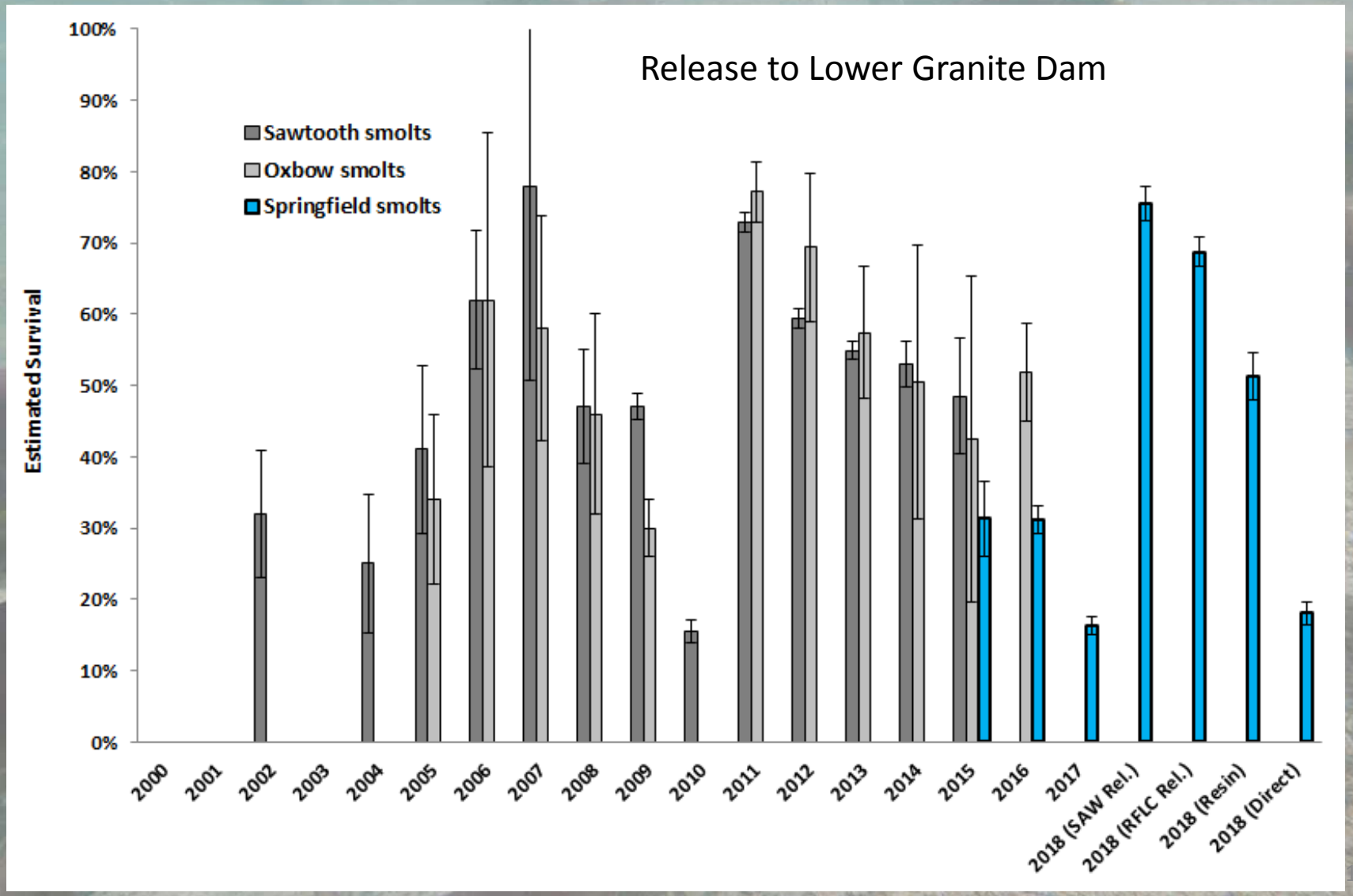
RESPONSE DELAYED OR SLIGHTLY ATTENUATED IN WATER SOFTENING GROUP?

2018 Overall Survival Results

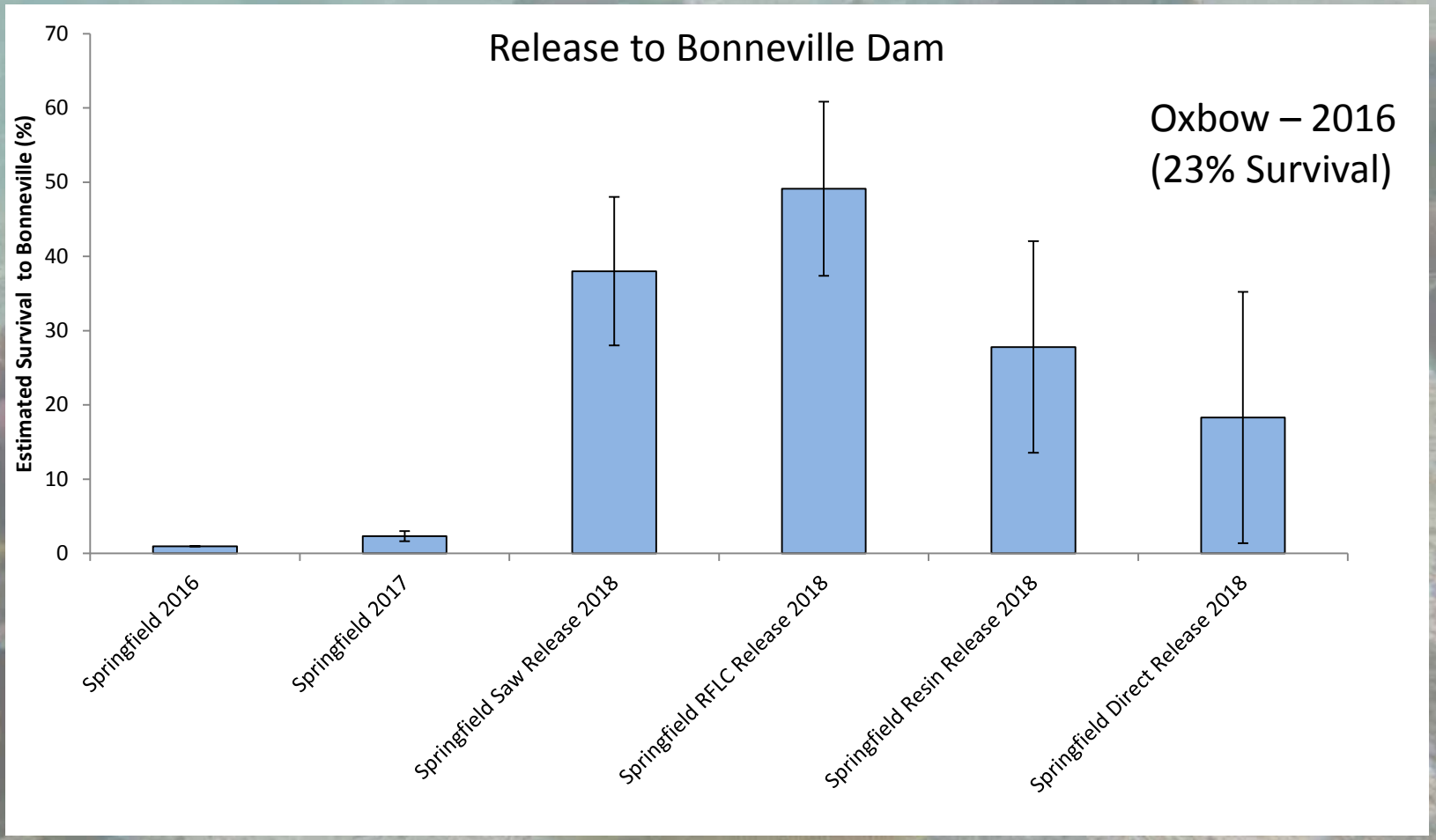
Release	Number Fish Released	Survival to Array in RFLC*	Median Passage Time to Array	Survival to LGR	Median Passage Time to LGR
Springfield to upper Salmon w/ acclimation	339,900	N/A	N/A	75%	7.5 days
Springfield to RFLC w/ acclimation	275,356	91%	15 hours	69%	8.2 days
Springfield to RFLC w/ water softening	2,879	92%	36 hours	53%	9.3 days
Springfield to RFLC -direct	40,598	72%	56 hours	18%	9.1 days

*Assuming array detects 75% of the tags

Survival Results



Survival Results



Summary

- Smolts face a number of stressors during transport and after release
- Water chemistry differences - significant stressor
- Acclimation seems to be the most effective strategy
- Continue to identify other successful strategies (e.g., in-route water softening)

Next Steps

- Need to finalize release strategies for 2019
  - 610K reared @ Springfield H
  - 340K reared @ Sawtooth H
  - Acclimation will be needed for Springfield fish

- Believe that outmigration conditions/survival from 2018 are positive

Time for questions?