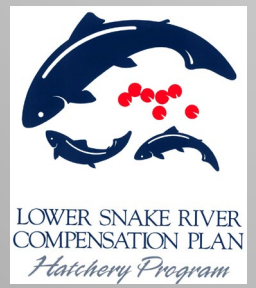
Upper Salmon River – Sawtooth Fish Hatchery

Spring Chinook Salmon Program Review



It takes a lot of people to make it happen…

Staff at Sawtooth Fish Hatchery
Harvest monitoring staff- IDFG and SBT
Fish marking Crew-PSMFC

Introduction

Hatchery

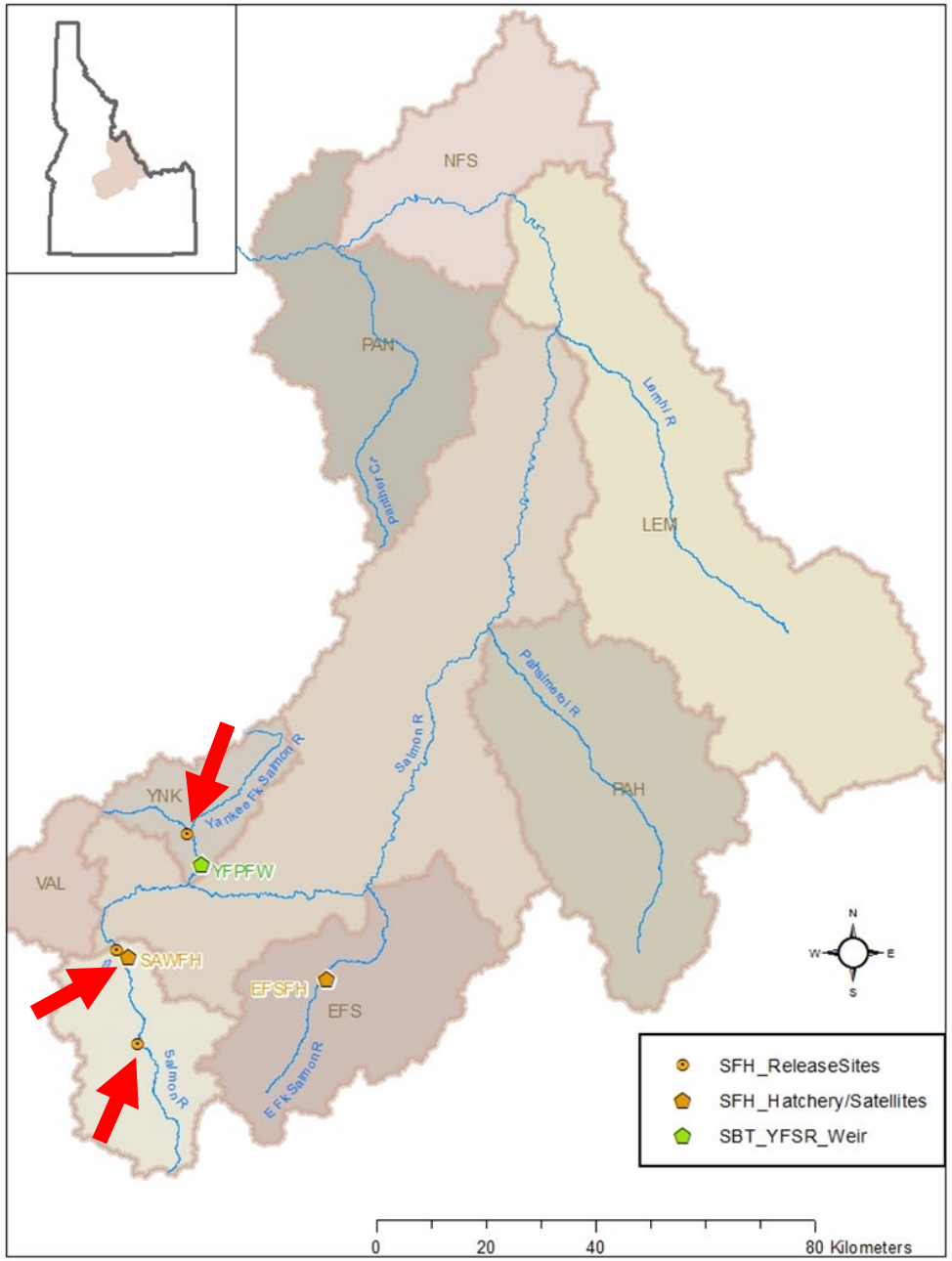
- Located on Salmon River
- Construction completed in 1985

Adult Trap and Weir

- Located on site

Juvenile Release Sites

- Sawtooth Hatchery Weir and Yankee Fork



LSRCP Mitigation Goals

Run	Project Area Adult Return Goal	Downstream of Project Area Adult Return Goal	Total Adult Return Goal
Spring	**19,445**	**77,780**	**97,225**

Juvenile Release Target: **2,000,000** yearling smolts

SAR Needed to achieve Project Area goal: **0.97%**
SAS Needed to achieve total return goal: **4.85%**

Production and Management Changes

<u>Changes since 2010</u>

- Increased production from **1.7M** to **2.0M** yearling smolts
  - Including up to **300,000** as part of SBT Yankee Fork release.
- The program has historically been managed as a segregated broodstock.
- In 2010 broodstock was changed to integrated
  - Reduce risk associated with spawning of hatchery adults downstream of weir
  - Supplementation upstream of the weir
  - Stepping-stone integration

Production and Management Changes

Integrated Broodstock Evaluation

- Due to uncertainties associated with the effectiveness of supplementation, an evaluation project was initiated in 2010.
- Funded through the BPA Fish and Wildlife Program (Project 2010-030-00)
- Evaluating
  - Weir and broodstock management objectives (pHOS, pNOB, PNI)
  - Reproductive success of hatchery and natural fish spawning naturally
  - Spatial distribution of hatchery and natural spawners

ESA Status and Consultation History

Snake River Spring Chinook ESU

(listed as threatened in 1992)

-Upper Salmon River MPG

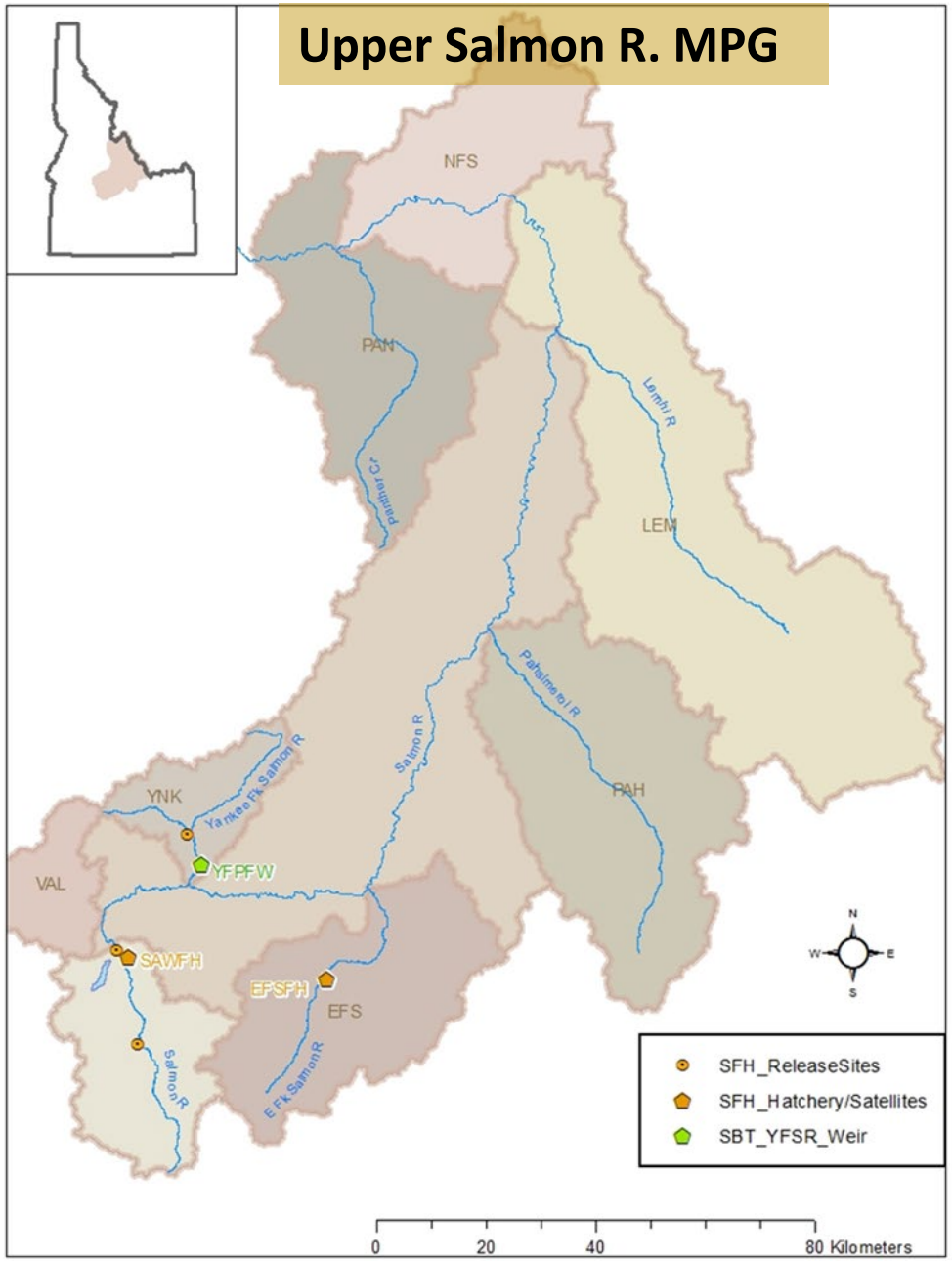
- eight extant and one extirpated population
- **Salmon River Upper Mainstem** population
  - Sawtooth Hatchery Program- hatchery fish are part of the listed ESU

-Upper Salmon Mainstem population is rated at high risk for A/P and low risk for S/D

-All populations are rated at high risk for A/P

-None of the populations in the MPG meet viability criteria

-Consultations with NOAA Fisheries and the USFWS were completed in 2017 that established take limitations for ESA listed species impacted by the hatchery program.



Management and Monitoring/Evaluation Objectives

- Management objectives:
  - Meet LSRCP mitigation goals
  - Restore and maintain tribal and non-tribal fisheries
  - Enhance, recover, and sustain existing natural spawning populations of Chinook salmon
  - Preserve and enhance habitat

- Monitoring and Evaluation objectives:
  - Production/productivity
  - Abundance and distribution
  - Life history
  - Evaluate alternative rearing and release strategies
  - Evaluate supplementation as a tool to increase natural population
  - Estimate contribution to fisheries
- For IDFG, natural production monitoring is funded through BPA Project # 1990-055-00
- M&E in the upper Salmon R is a cooperative effort with IDFG and the SBT

Broodstock History

Founding broodstock collected from 1981-1984 in the upper Salmon R

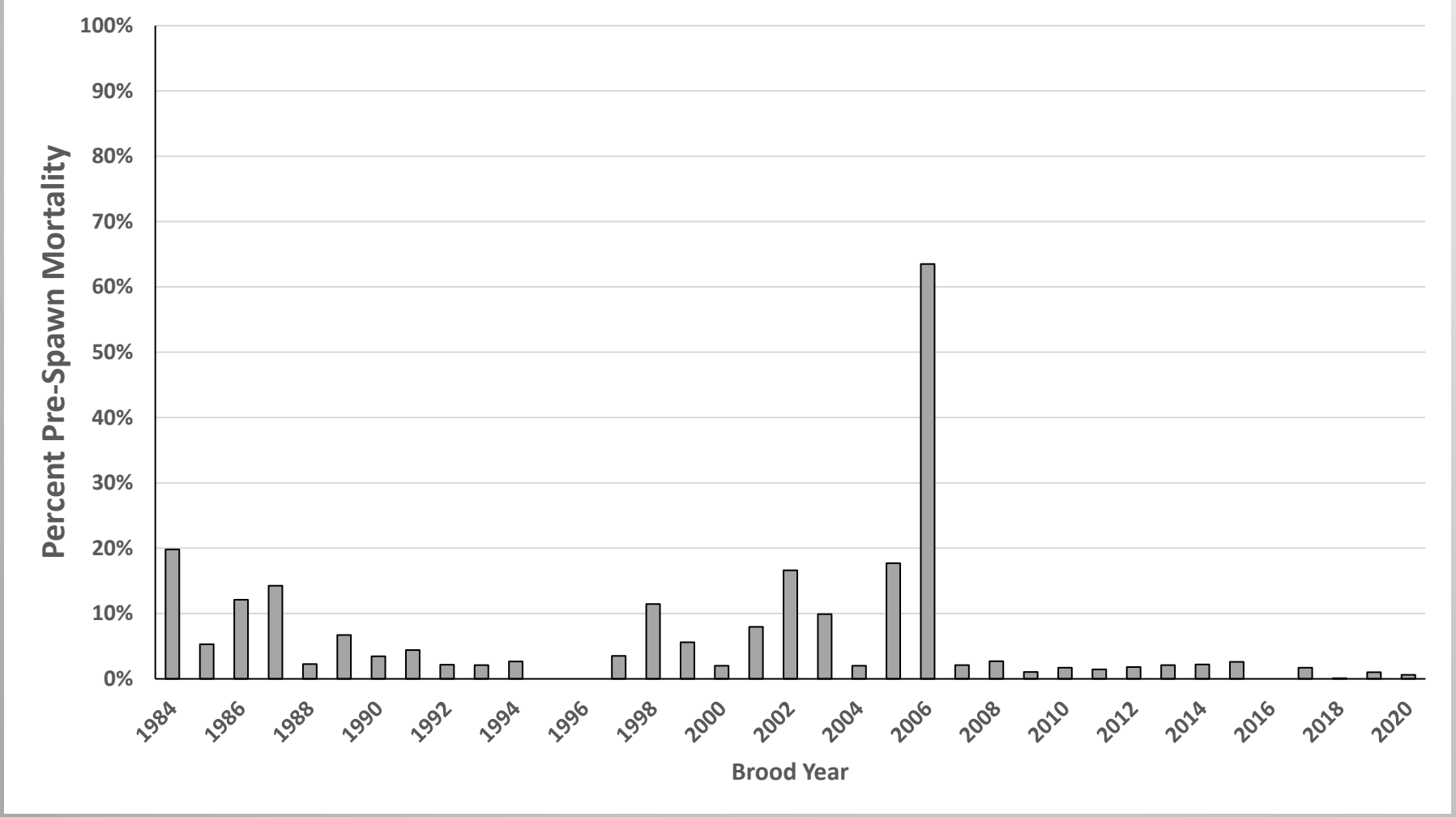
- In 1981 returns would have included some (~50%) fish of Rapid River origin from a smolt release in 1979

- Since then, all broodstock have been locally returning adults to the upper Salmon R.

- Integrated stepping-stone broodstock implemented in 2010

- Broodstock goals include 1,210 adults trapped
  - Number of natural fish held for spawning depends on natural origin abundance.

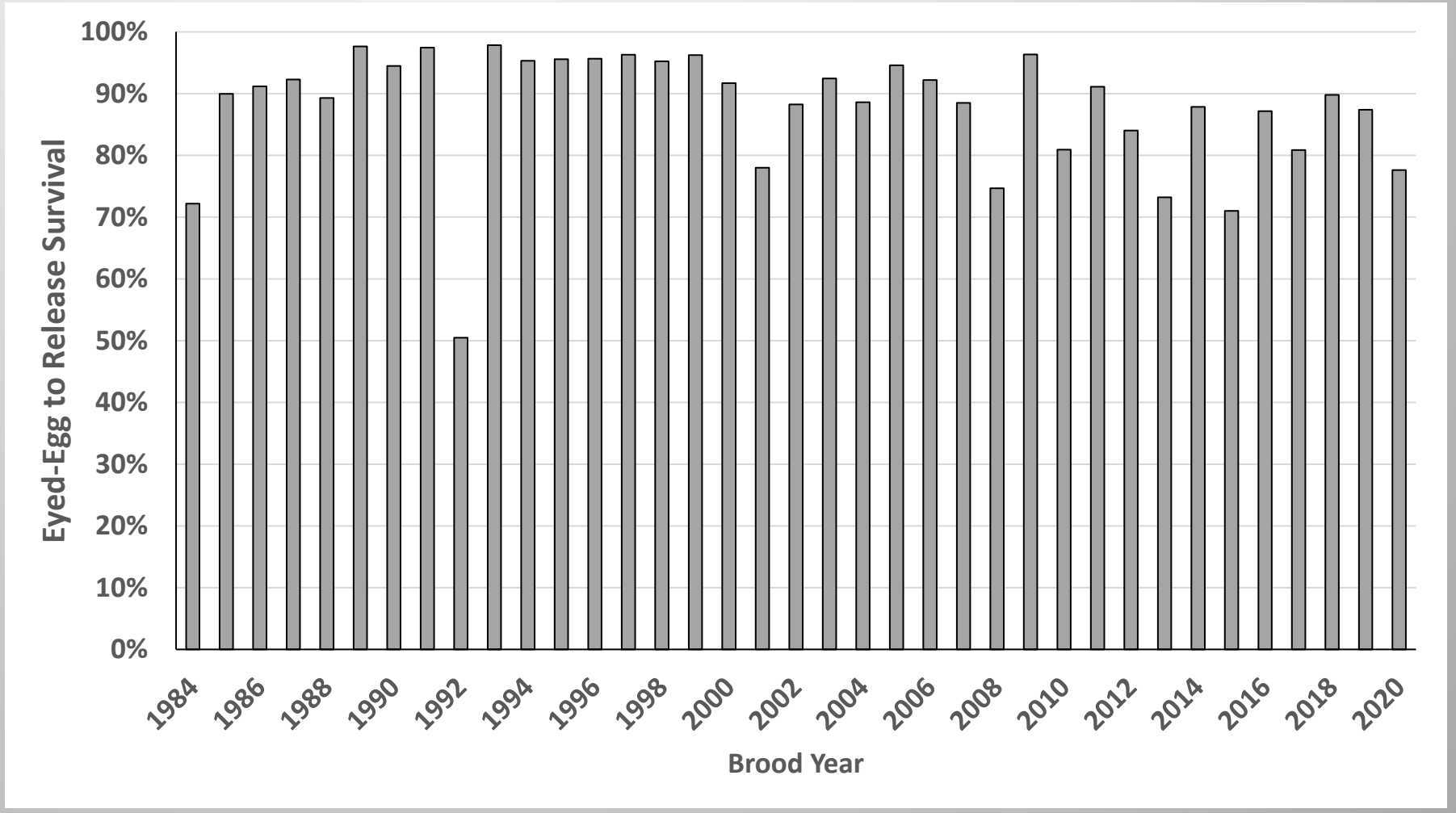
Pre-spawn Mortality



- BY1984 – BY2020 Mean: **6%**
- BY2006: **64%** *Ichthyophthirius multifilis* outbreak
- BY2007-BY2020 Mean: **2%**

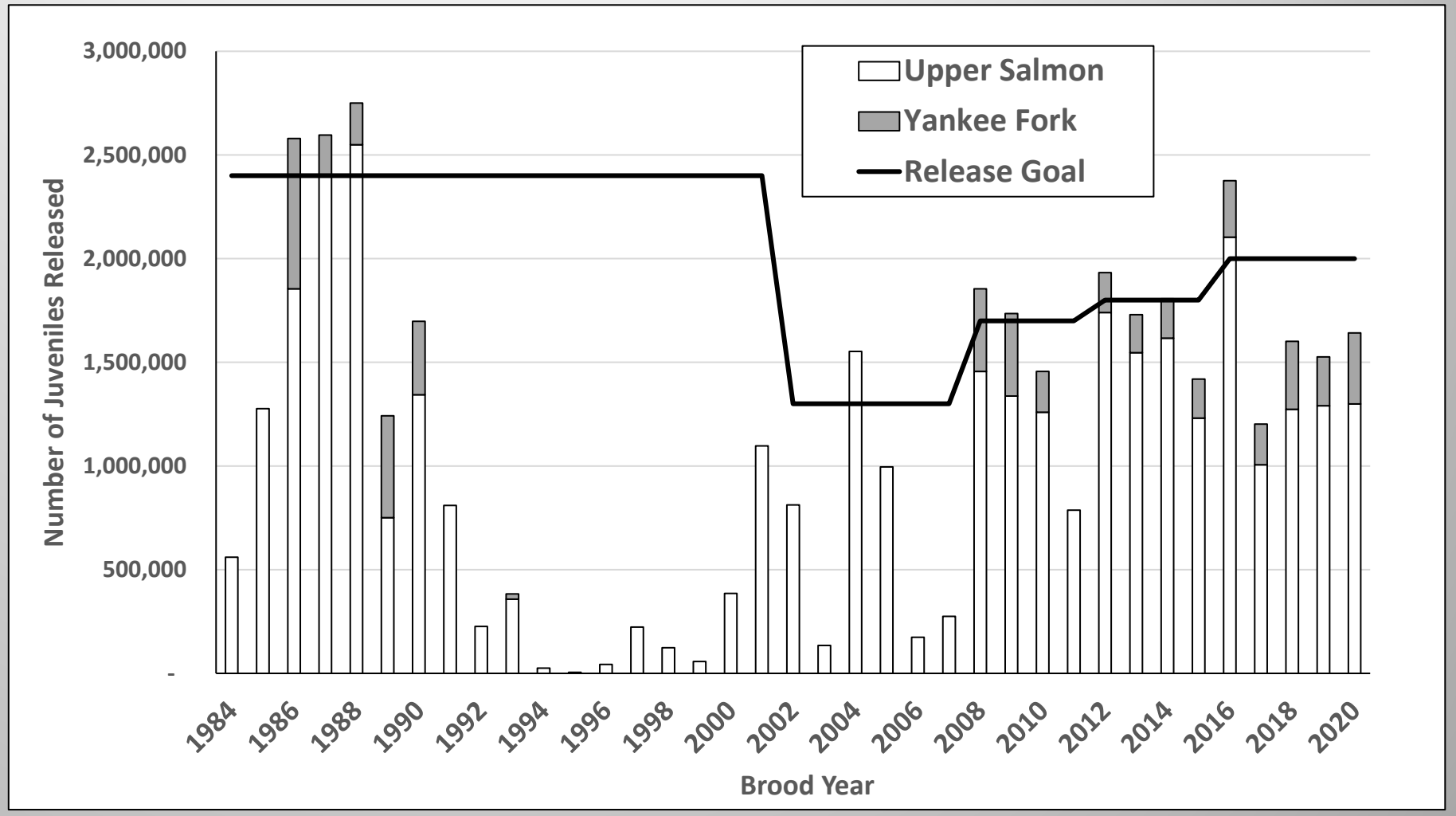
Eyed-egg to Release Survival

- BY1984 – BY2020 Mean: **88%**
- BY1992: **50%** survival due to fungal epizootic
- BY2011-BY2020 Mean: **83%**



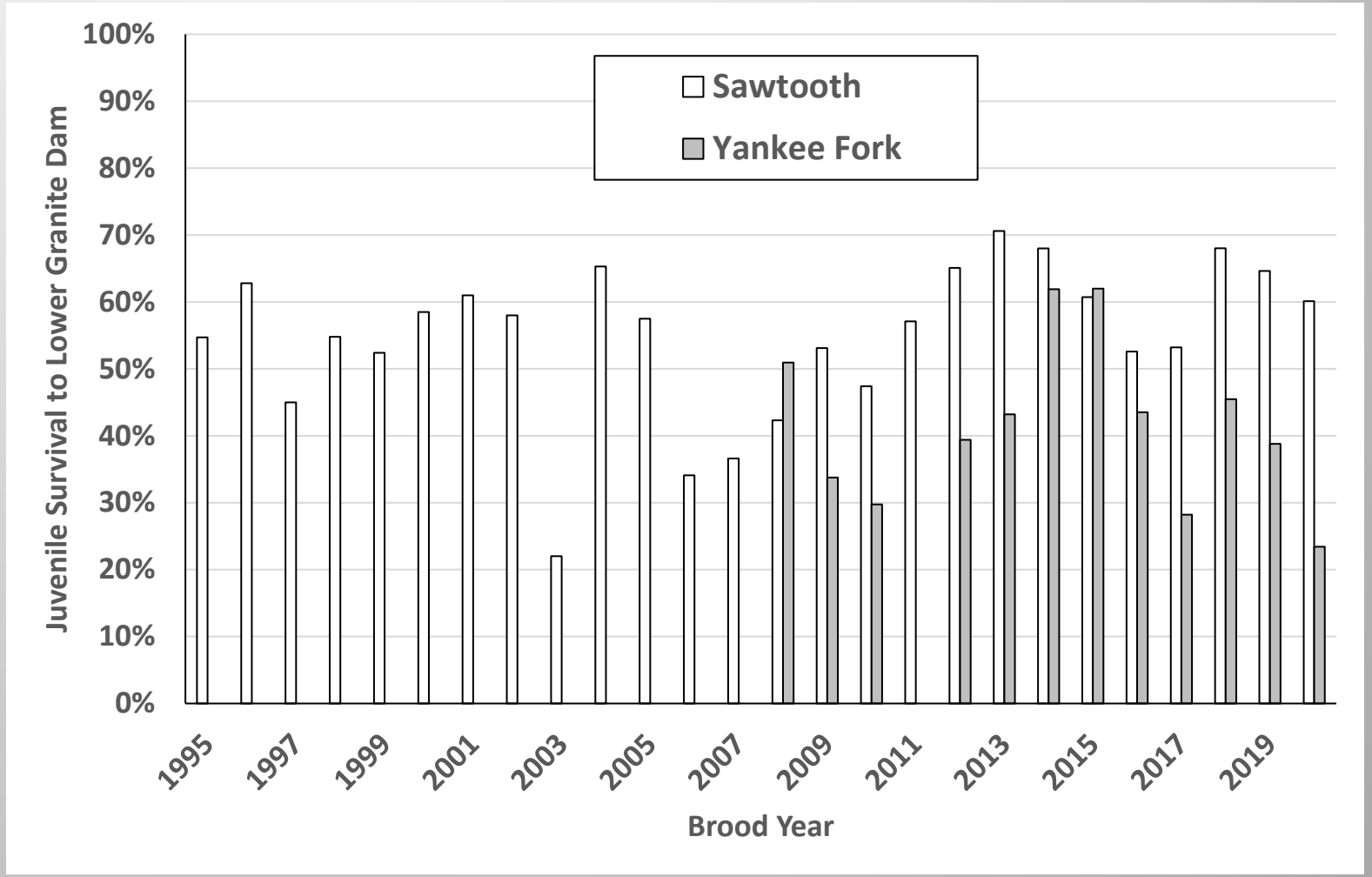
Juvenile Releases

- Current Release Goal: **2.0M** yearling smolt
  - Sub-yearling releases ended in BY1993
- Up to **300,000** released into the Yankee Fork

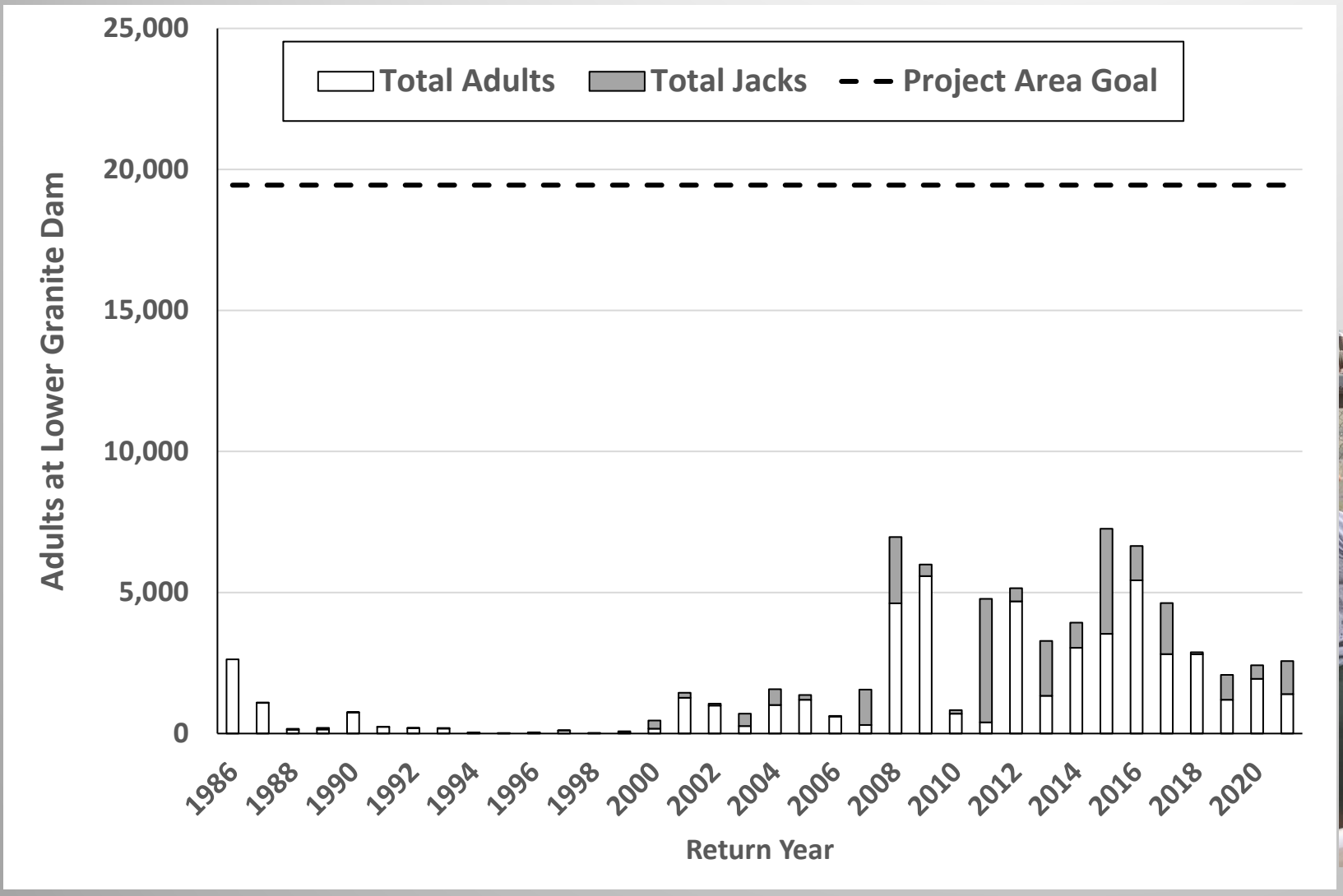


Juvenile Survival to Lower Granite Dam

- BY2011-BY2020 Mean: **55%**
- BY1995-BY2010 Mean: **46%**
- BY2008-2020
  - Sawtooth Mean: **59%**
  - Yankee Fork Mean: **42%**

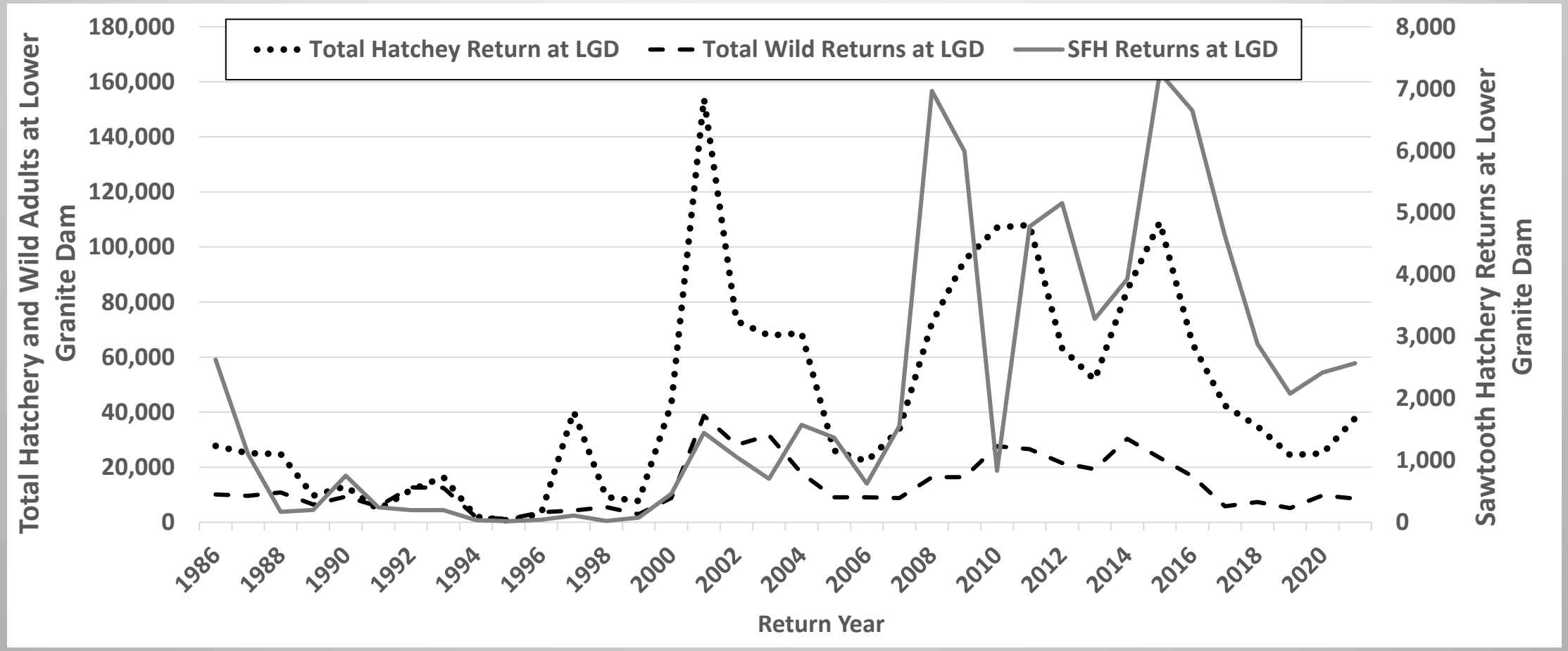


Adult Return to Project Area

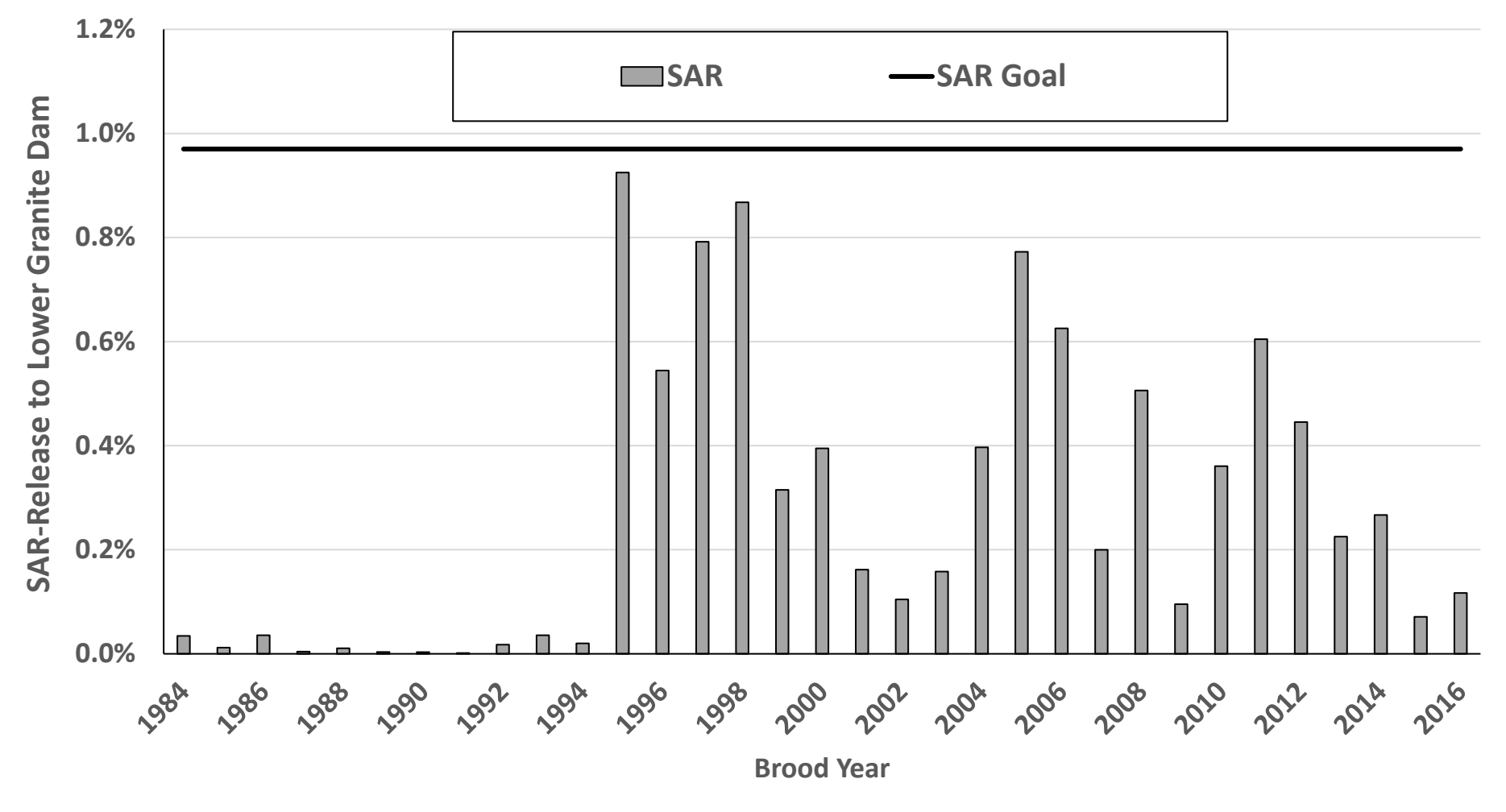


- Project Area Goal (**19,445**) has not been met
- 1986-2011 Mean: **1,274**
- 2012-2021 Mean: **4,084**

Adult Return to Project Area

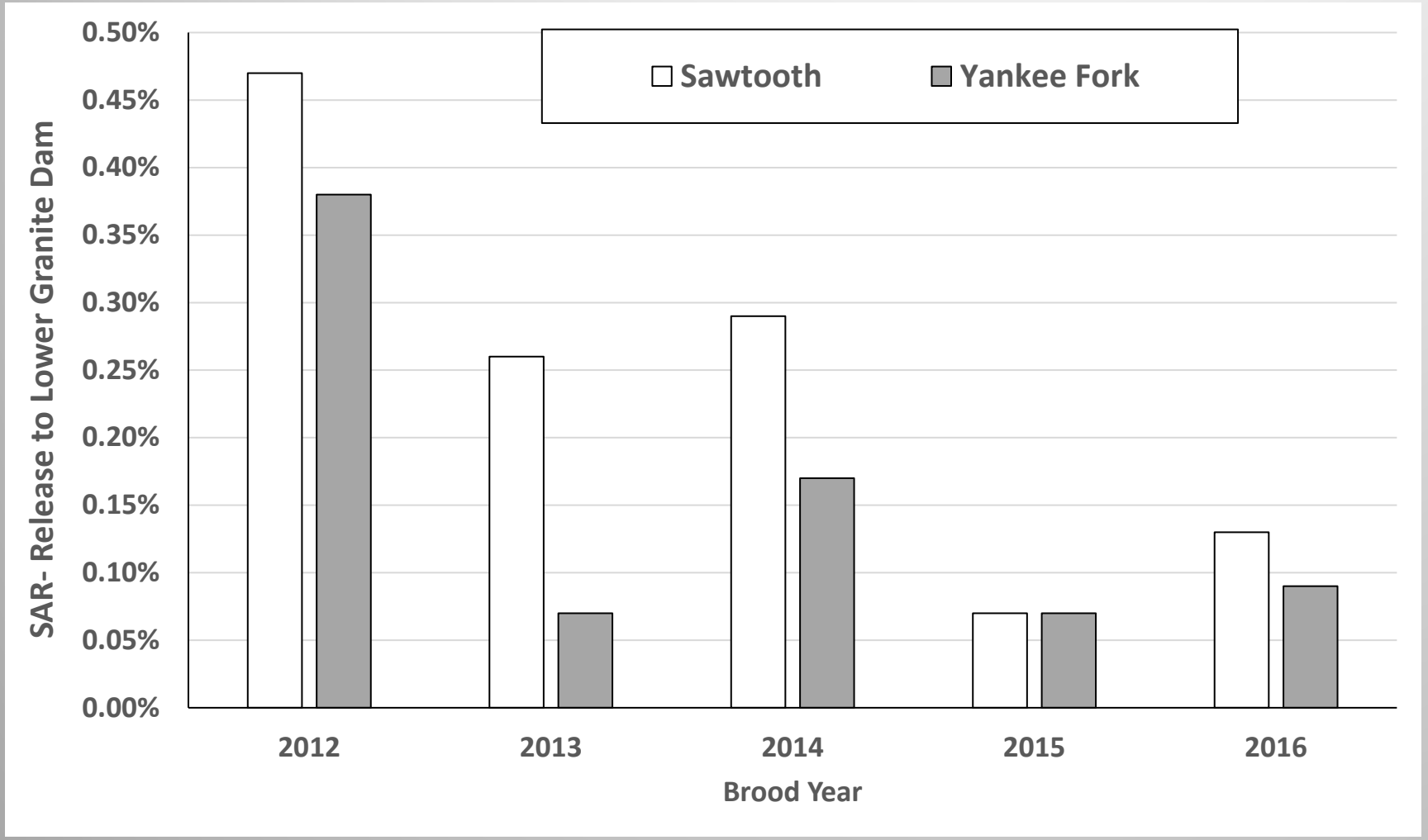


Smolt to Adult Return (SAR)



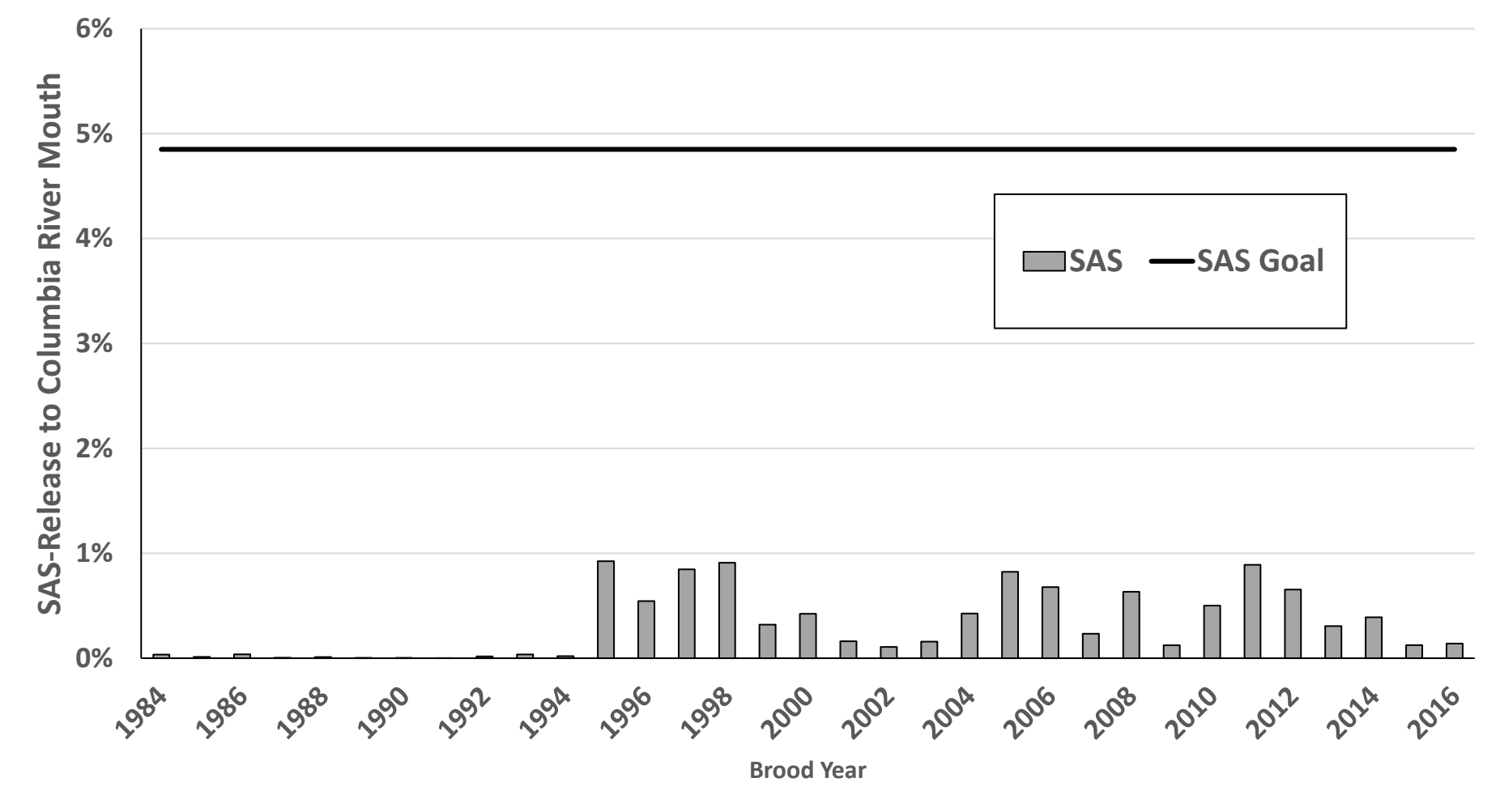
- BY1984 – BY2016 Mean: **0.28%**
- BY2007-2016 Mean: **0.30%**
- SAR needed to meet Project Area Goal (**0.97%**)

Smolt to Adult Return (SAR)



- BY2012 – BY2016
  - Sawtooth Hatchery Mean: **0.24%**
  - Yankee Fork Mean: **0.16%**

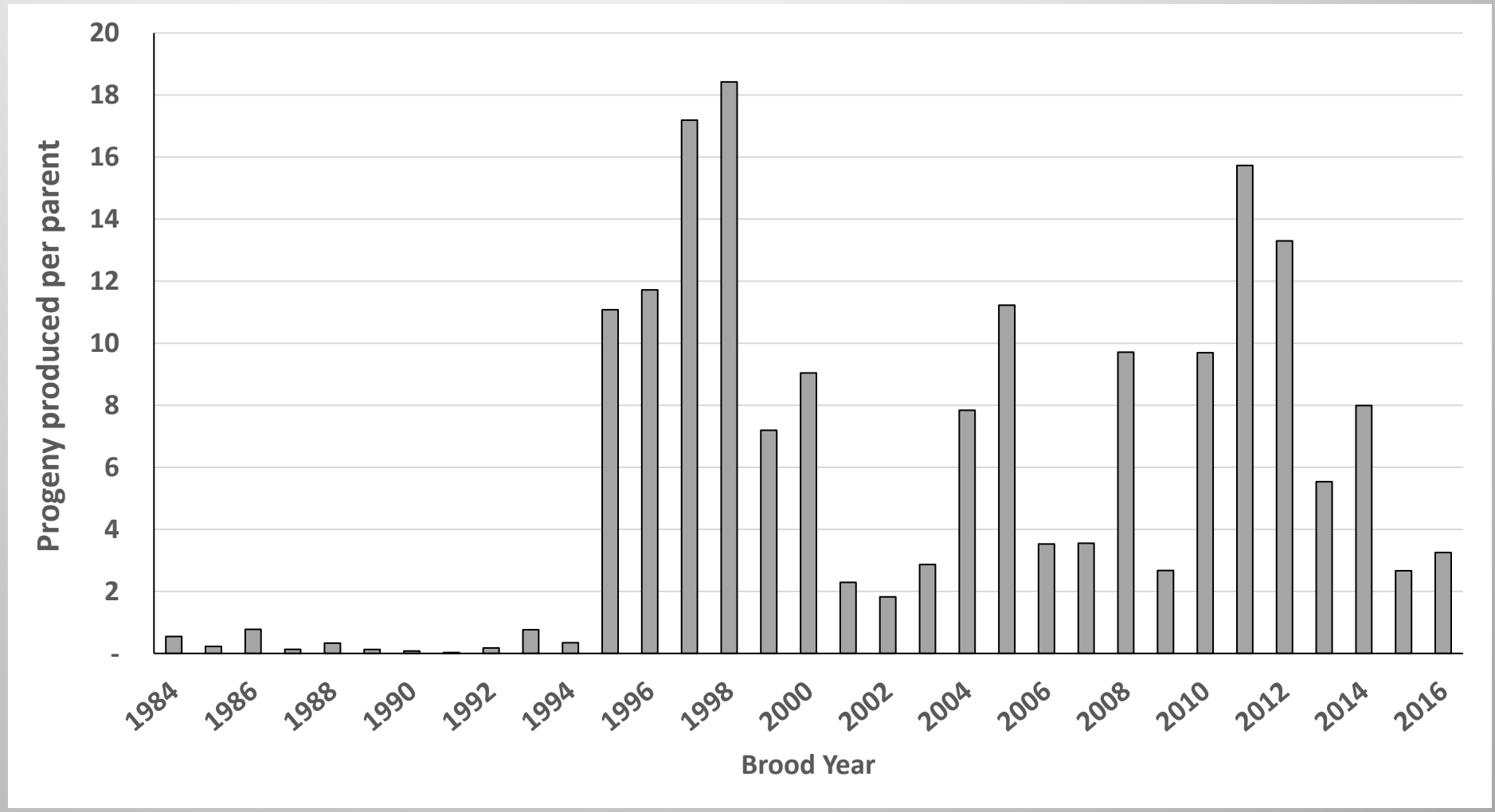
Smolt to Adult Survival (SAS)



- BY1984-2016 Mean: **0.32%**
- BY2007-BY2016 Mean: **0.40%**
- SAS needed to meet total adult goal: **4.85%**

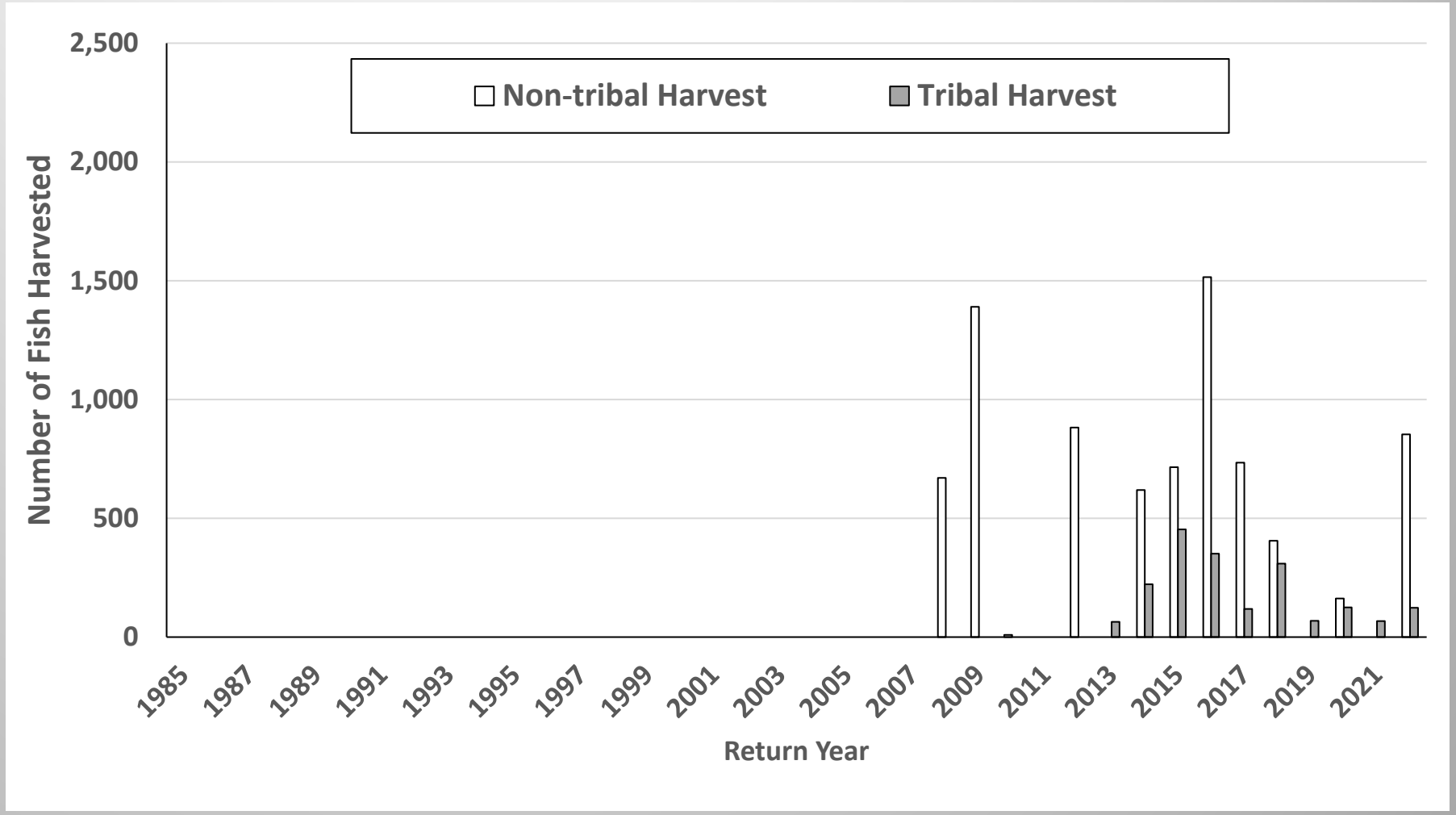
Recruits per Spawner

- BY1984-BY2016 Mean: **5.5**
- BY2007-2016 Mean: **7.4**



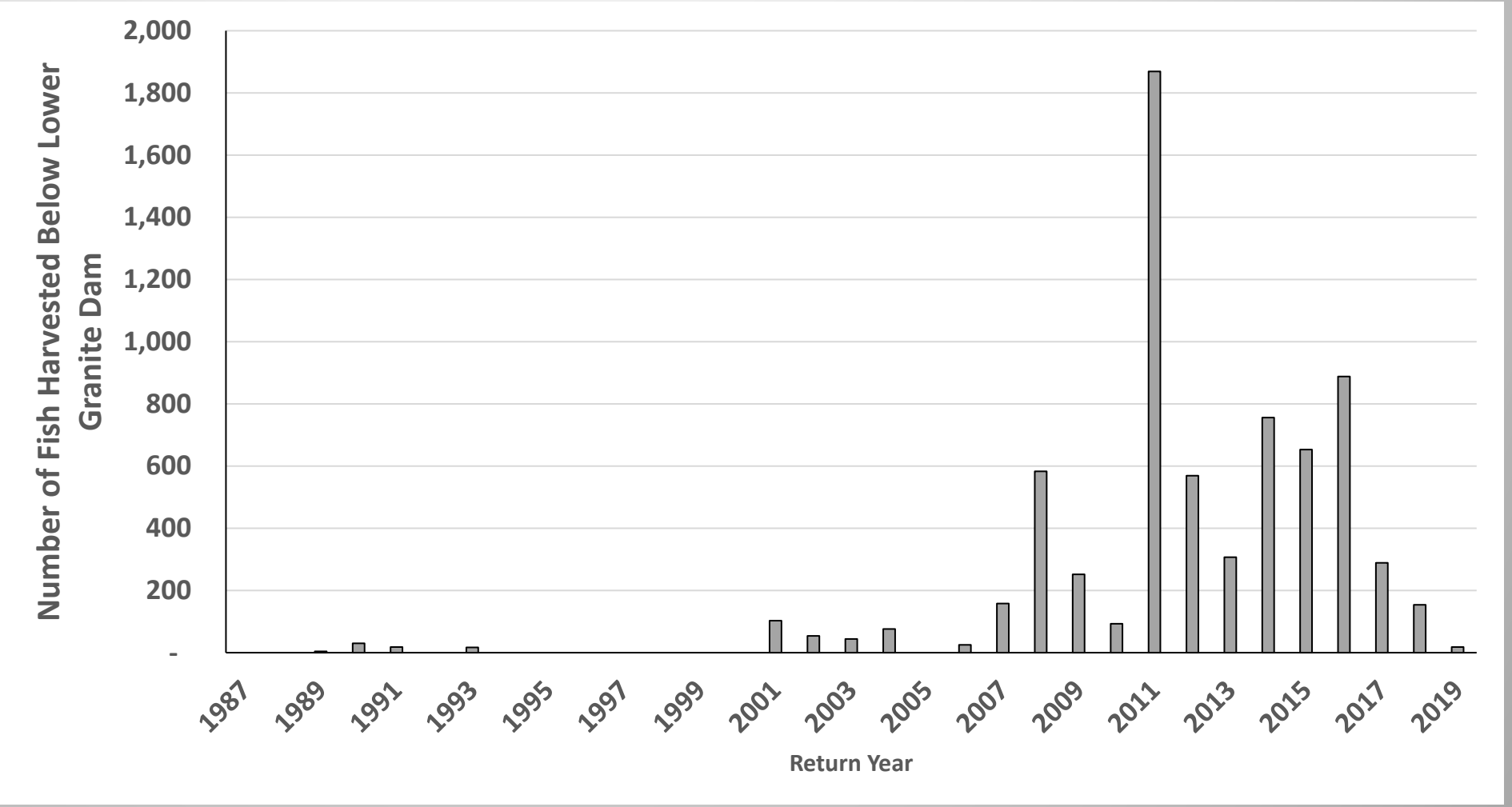
Harvest – Idaho Fisheries

- Mean Harvest:
  - Non-tribal – **723**
  - Tribal- **190**
- Mean Effort: **17,900** angler hours
- 2008 was first non-tribal fishery since 1978
- No Non-Tribal fisheries in **2011, 2013, 2019, 2021**
- Tribal harvest prior to 2013 not presented



Harvest – Downriver Fisheries

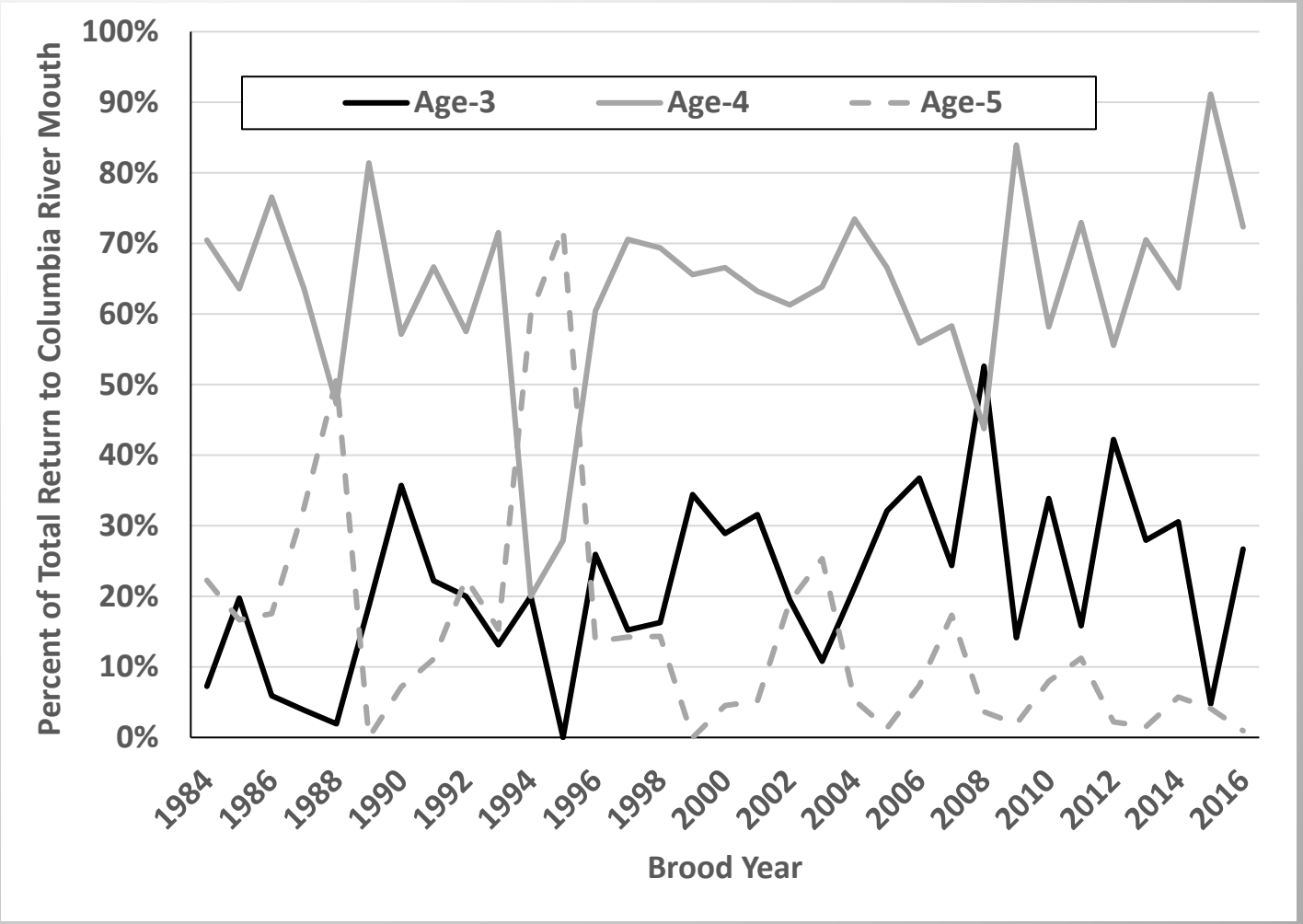
- 1987-2019 Mean Harvest: **211**
- 2010-2019 Mean Harvest: **560**



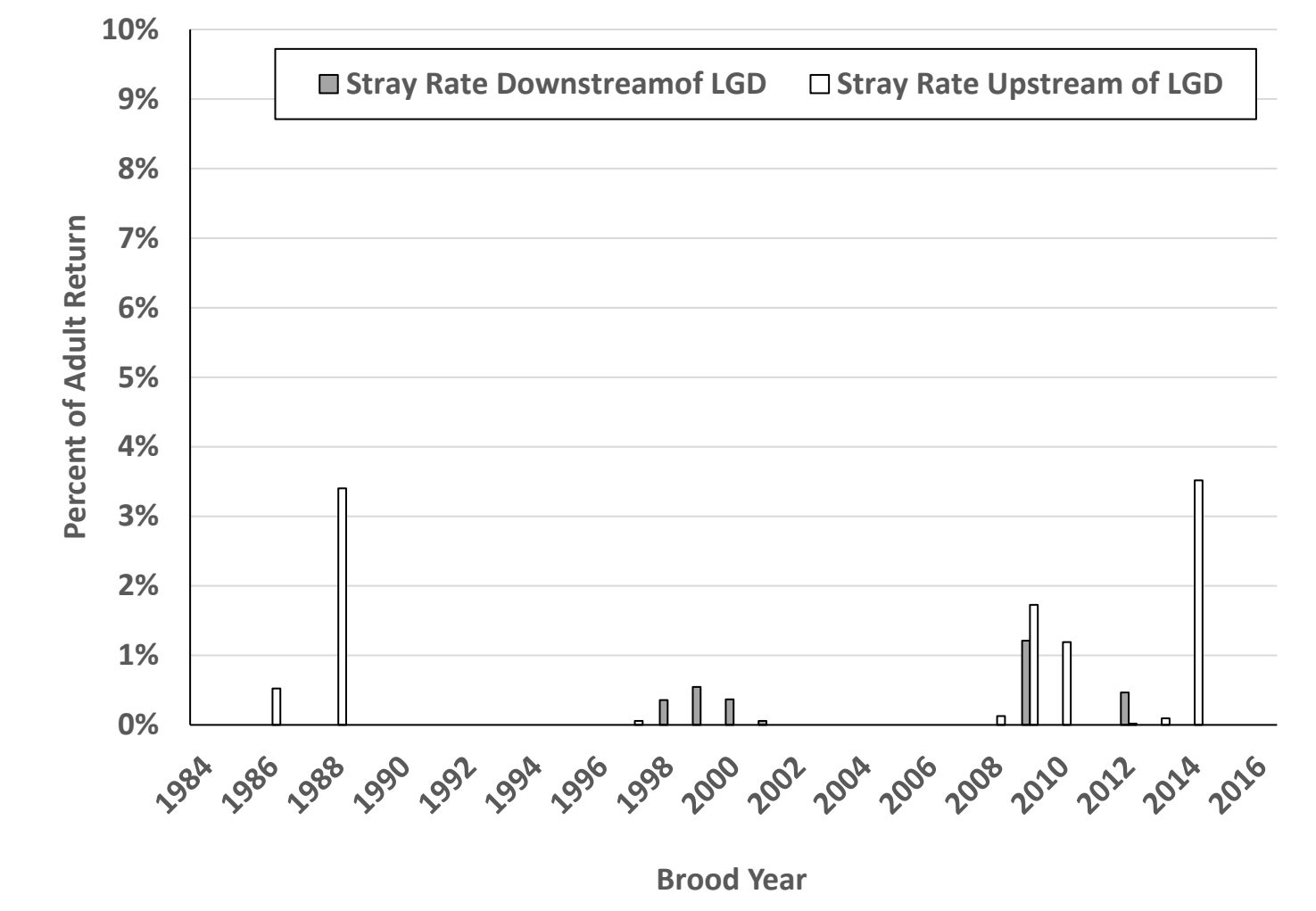
Age Composition

BY84 – BY06 Mean Age: **4.0** years

BY07 – BY16 Mean Age: **3.8** years



Straying Rates



Downstream of LGD

- BY84 – BY16 Mean: **0.1%**
- BY07 – BY16 Mean: **0.2%**

Upstream of LGD

- BY84 – BY16 Mean: **0.3%**
- BY07 – BY16 Mean: **0.7%**

Integrated Broodstock

Spawn Year	Observed pNOB	Observed pHOS	PNI
2014	0.28	0.43	0.39
2015	0.6	0.69	0.47
2016	0.53	0.8	0.4
2017	0.2	0.91	0.18
2018	0.26	0.81	0.25
2019	0.33	0.13	0.72
2020	0.71	0.15	0.83
2021	0.55	0.24	0.7

First integrated adults returned in 2014

- Target pNOB: **100%**
- Target PNI: **0.50 - 0.67**
- **Moving Forward**
  - Evaluate R/S for hatchery and natural adults spawning naturally
  - Can supplementation increase the abundance of naturally produced adults?

Summary and Outlook

- Consistent high in-hatchery survival and highly variable post release survival
- Have never met project area goal.
- More consistent adults return in the last 10 years compared to early years.
  - Recent 10 years – average of 4,084 adults to project area
  - Previous 26 years – average of 1,274 adults to project area
- First non-tribal fishery in upper Salmon R. since 1978 occurred in 2008
  - Since then, fisheries have occurred in all but four years.
  - Average annual harvest in non-tribal fishery is 723
- Initiated integrated program in 2010
  - Early in evaluation
  - Returns from future broods will guide supplementation efforts.
- Exploring alternative rearing practices to increase adult returns
- Sawtooth is far from reaching Project Area mitigation and unlikely to reach goal without increasing the number of smolts released.

Photo by Sylvia Hamilton