

# Spring Chinook Salmon Production At Dworshak National Fish Hatchery

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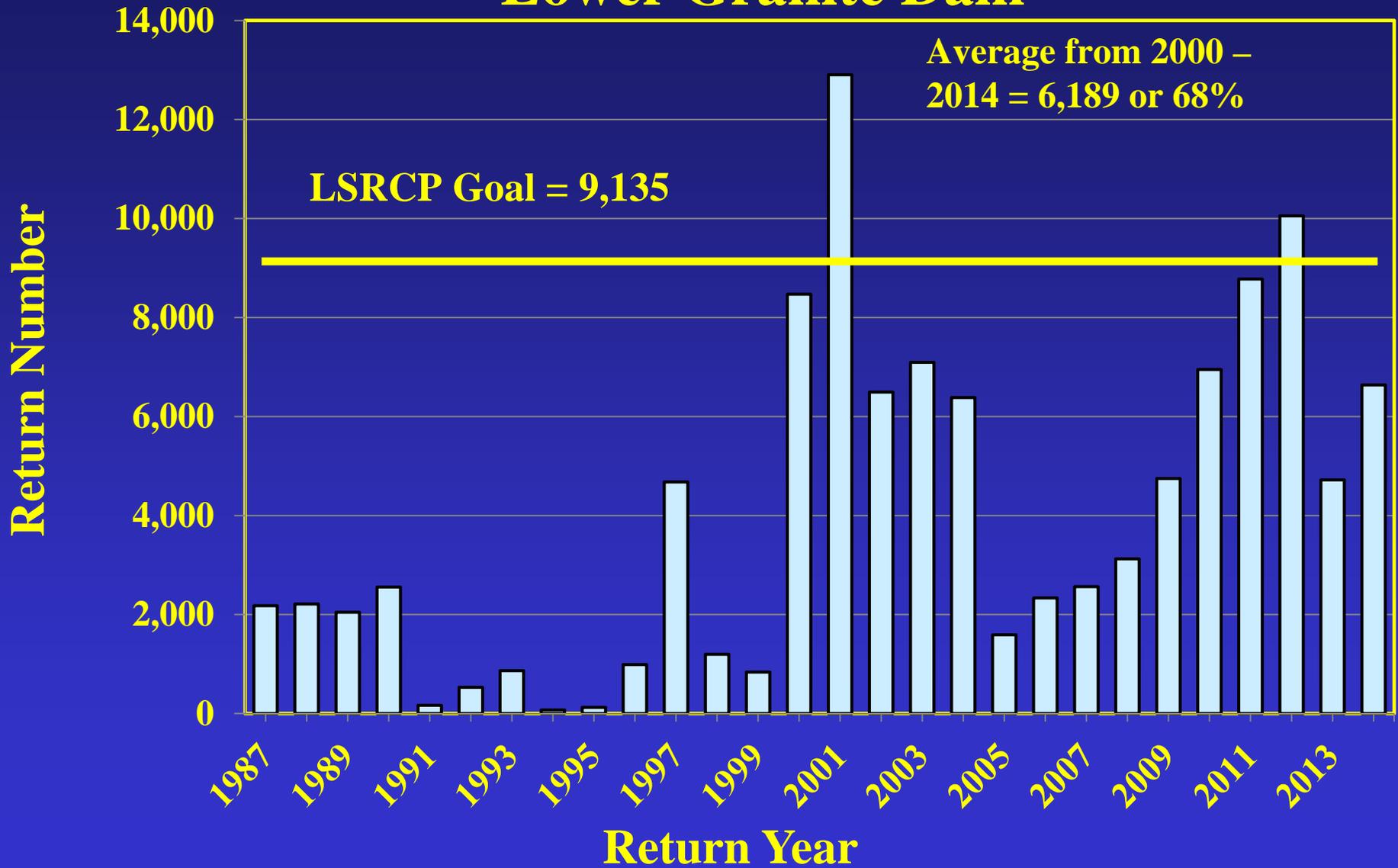
Dworshak Fisheries Complex  
U.S. Fish and Wildlife Service  
Nez Perce Tribe



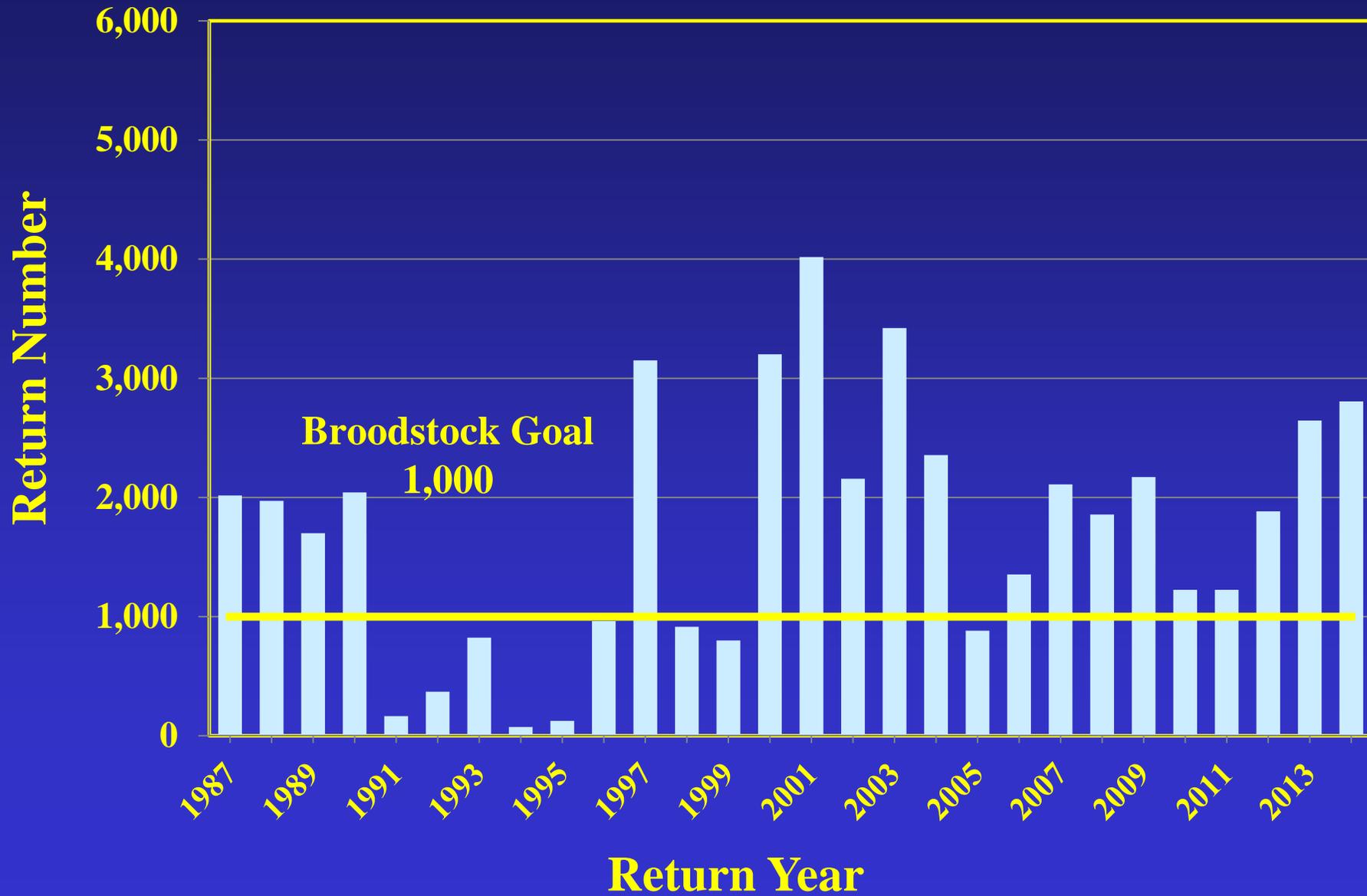
# Presentation Objectives

1. **Summarize Program Status**
2. **Report on Status of Rearing Density Evaluation**
3. **Provide the Lead-In for Discussions on Changing Directions.**

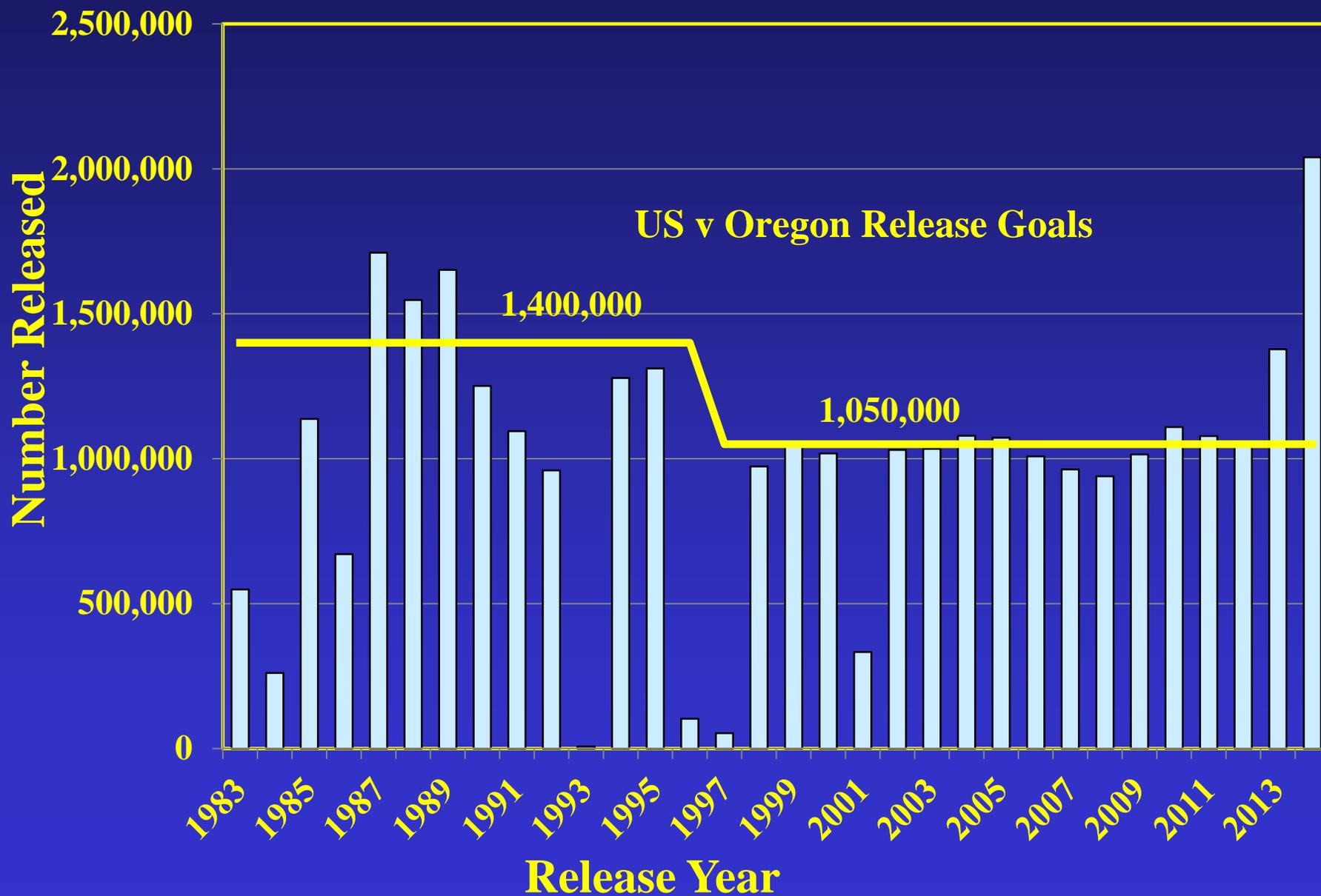
# Estimated Adult SCS Returns Above Lower Granite Dam



# SCS Rack Returns to Dworshak NFH



# Dworshak NFH SCS Smolt Releases

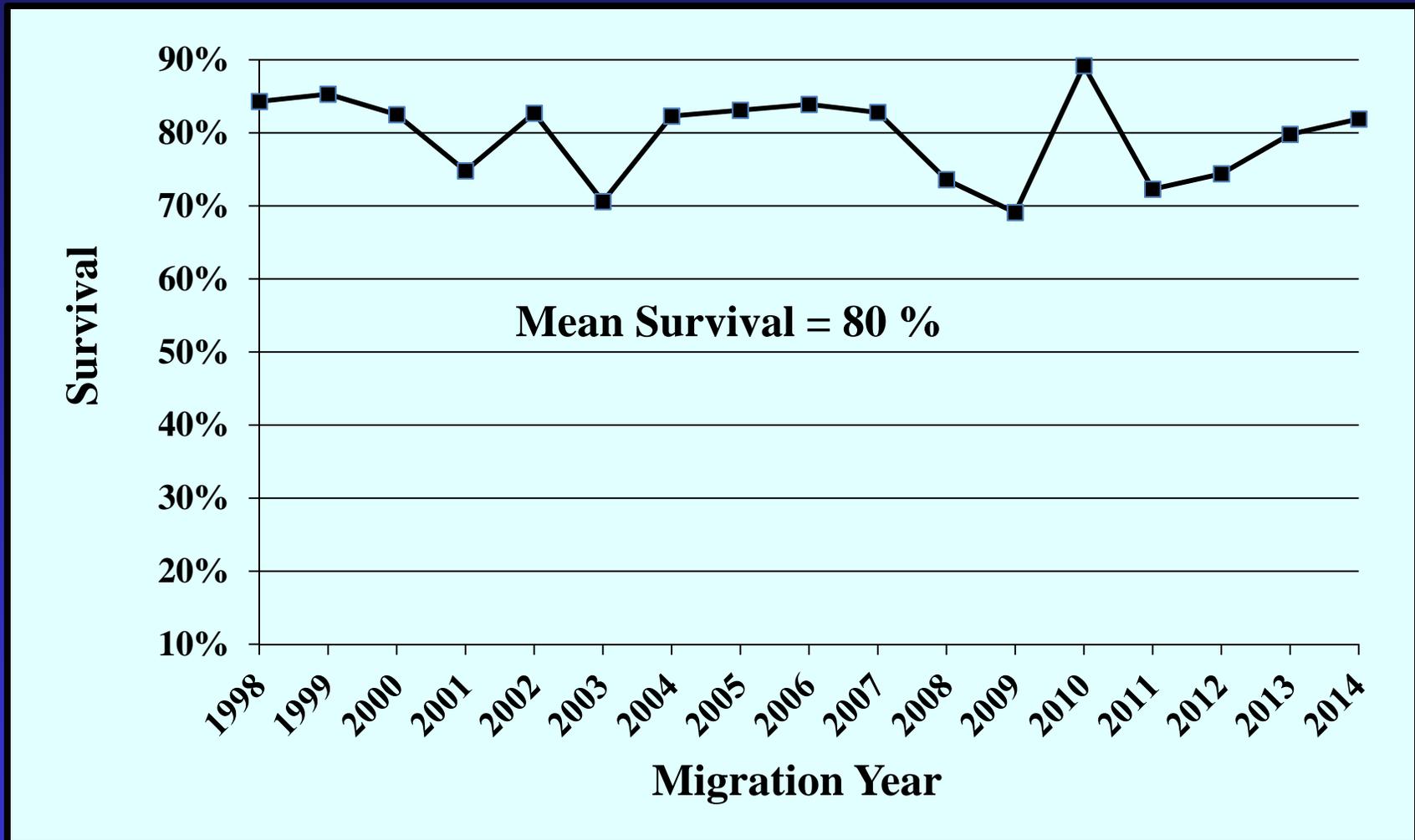


# SCS Production Efficiency

## BY2003 – BY2012

<b>Metric</b>	<b>Survival</b>
<b>Adult Holding</b>	<b>94%</b>
<b>Estimated Eye-Up</b>	<b>92%</b>
<b>Eyed Egg to Marking</b>	<b>93%</b>
<b>Marking to Release</b>	<b>98%</b>
<b>Overall Egg to Smolt</b>	<b>84%</b>

# Smolt Survival to LGD



# Summary

- 1. Not Meeting Adult Mitigation Goal**
- 2. Current Production Program is Efficient**

# Solutions

- 1. Short-Term:** Increase Smolt Production
- 2. Long-Term:** Increase Rearing Space; Improve Program Efficiency and Smolt Quality

# **HET Assessment and Recommendations for Management 2011**

- 1. Constrained by Limited Water and Space**
- 2. Measure the Carrying Capacity of Raceways**
- 3. Re-Evaluate Rearing Density**

# Study Design Completed by HET in 2013

**65K/Raceway  
High Density**

**45K/Raceway  
Normal Density**

**6 Raceways**

**3 Replicates**

**9 Raceways**

**3 Replicates**

# Strategy

**Major Response Variable: Adult Returns  
using PBT**

**Secondary Variables: Growth, Mortality, Fish Health,  
Smolt Survival and Travel Time**

<b>Brood Year</b>	<b>Release Year</b>	<b>1-Ocean</b>	<b>2-Ocean</b>	<b>3-Ocean</b>
<b>2012</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>
<b>2013</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>
<b>2014</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>

# Progress

<b>Brood Year</b>	<b>Release Year</b>	<b>1-Ocean</b>	<b>2-Ocean</b>	<b>3-Ocean</b>
<b>2012</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>
2013	2015	2016	2017	2018
2014	2016	2017	2018	2019

# Progress

<b>Brood Year</b>	<b>Release Year</b>	<b>1-Ocean</b>	<b>2-Ocean</b>	<b>3-Ocean</b>
2012	2014	2015	2016	2017
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# Progress

<b>Brood Year</b>	<b>Release Year</b>	<b>1-Ocean</b>	<b>2-Ocean</b>	<b>3-Ocean</b>
2012	2014	2015	2016	2017
2013	2015	2016	2017	2018
<b>2014</b>	2016	2017	2018	2019

# Summary of Fish Culture for BY2012

<b>Variable</b>	<b>Mean at Release</b>		<b>Target</b>
	<b>High Density</b>	<b>Normal Density</b>	
<b>Fish/Pound</b>	<b>24</b>	<b>25</b>	<b>20</b>
<b>Flow Index</b>	<b>0.64</b>	<b>0.34</b>	<b>&lt;1.0</b>
<b>Density Index</b>	<b>0.36</b>	<b>0.23</b>	<b>0.2</b>

# Secondary Variables

BY 2012 from Oct. 2013 – Mar. 2014

Variable	Mean at Release		Statistical Significance
	High Density	Normal Density	
Fork Length (mm)	118	116	$P = 0.60$
Weight (g)	19.1	18.2	$P = 0.30$
K	1.16	1.15	$P = 0.05$
Mortality	0.025	0.028	$P = 0.06$

# Summary of Fish Health BY 2012 Pre-Release Assessment

Treatment	Date	N	<i>R. salmoninarum</i>	Virology	Bacteria	External Parasites	Mean Hematocrits
Normal	03/06/2014	30	1/15-2fp +	0/6-5fp +	0/6-5fp +	0/5 +	43.5
High	03/06/2014	30	0/15-2fp +	0/6-5fp +	0/6-5fp +	0/5 +	45.4

## Trend in Virology

1999 – 2010 – No Detections

2011 – 2014 – Detected every year

# Summary Smolt Performance

## BY 2012

Variable	Mean	
	High Density	Normal Density
Survival to LGD	0.86	0.79
Travel Time to LGD	21 DAYS	22 DAYS
Survival to Bon	0.64	0.79
Travel Time to Bon	38 DAYS	38 DAYS

# Conclusions

- 1. No Meaningful Biological Differences in the Secondary Variables**
- 2. No Meaningful Differences in Smolt Survival to LGD**
- 3. No Data for Adult Returns, the Primary Response Variable.**
- 4. Too Early to Base Management Decisions on the Study Data.**

### Dworshak NFH Spring Chinook Salmon Smolt Releases and Adults Returns to Lower Granite Dam, 1996 - 2014

