



D. Killam/CDFW

Led Astray: Impacts of Drought on Fall Chinook Salmon at Coleman National Fish Hatchery

Sarah Austing
U.S. Fish and Wildlife Service
Red Bluff Fish and Wildlife Office
December 5, 2017

Outline

What are the impacts of trucking fall Chinook Salmon off-site for release during the 2014-2015 drought?

- Background
- Trucking Fall Chinook Salmon
- Coleman NFH 2017 Production
 - Partnership with Nimbus Hatchery



S. Martarano/USFWS

Introduction

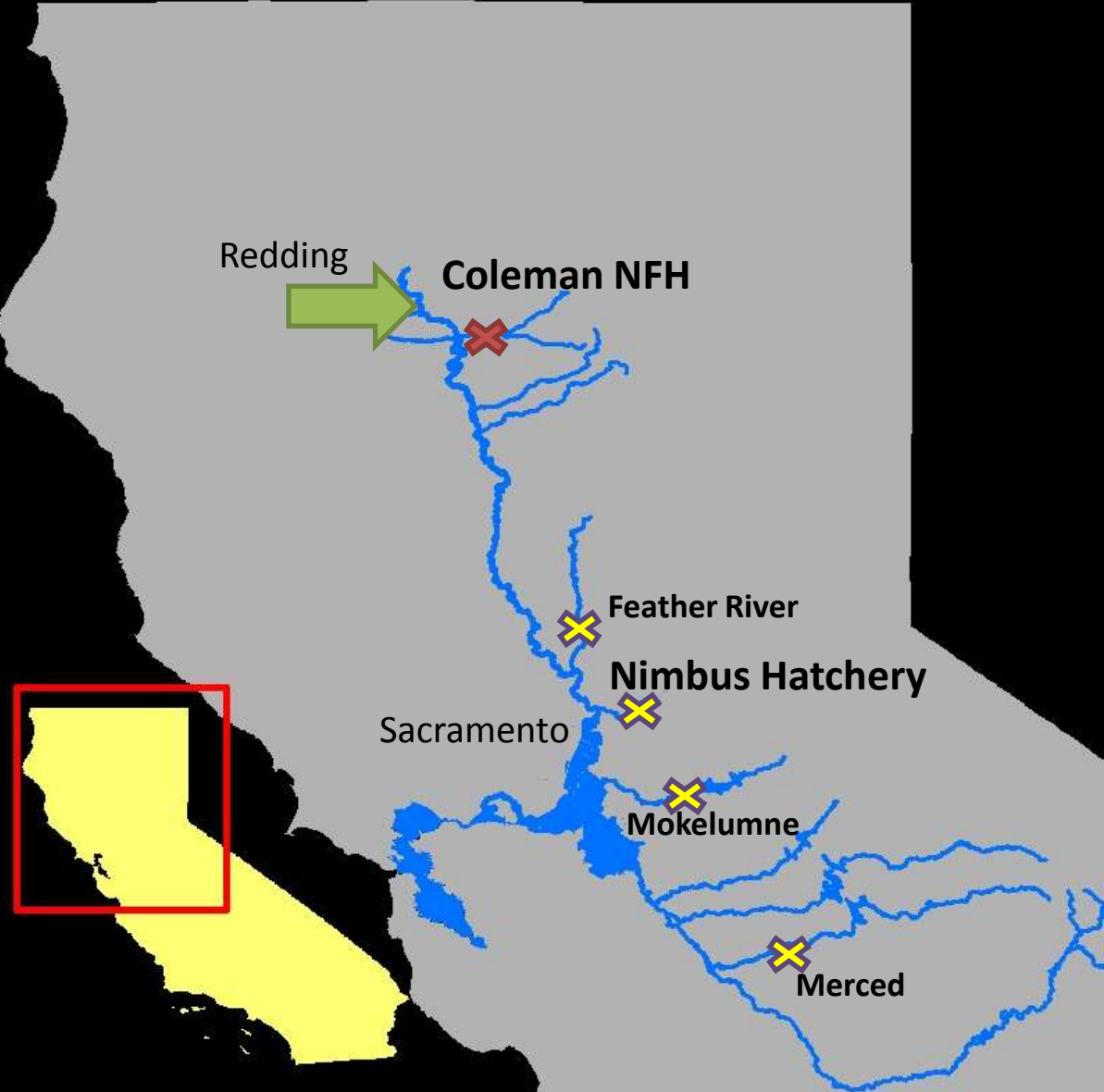
Where are we?



Introduction

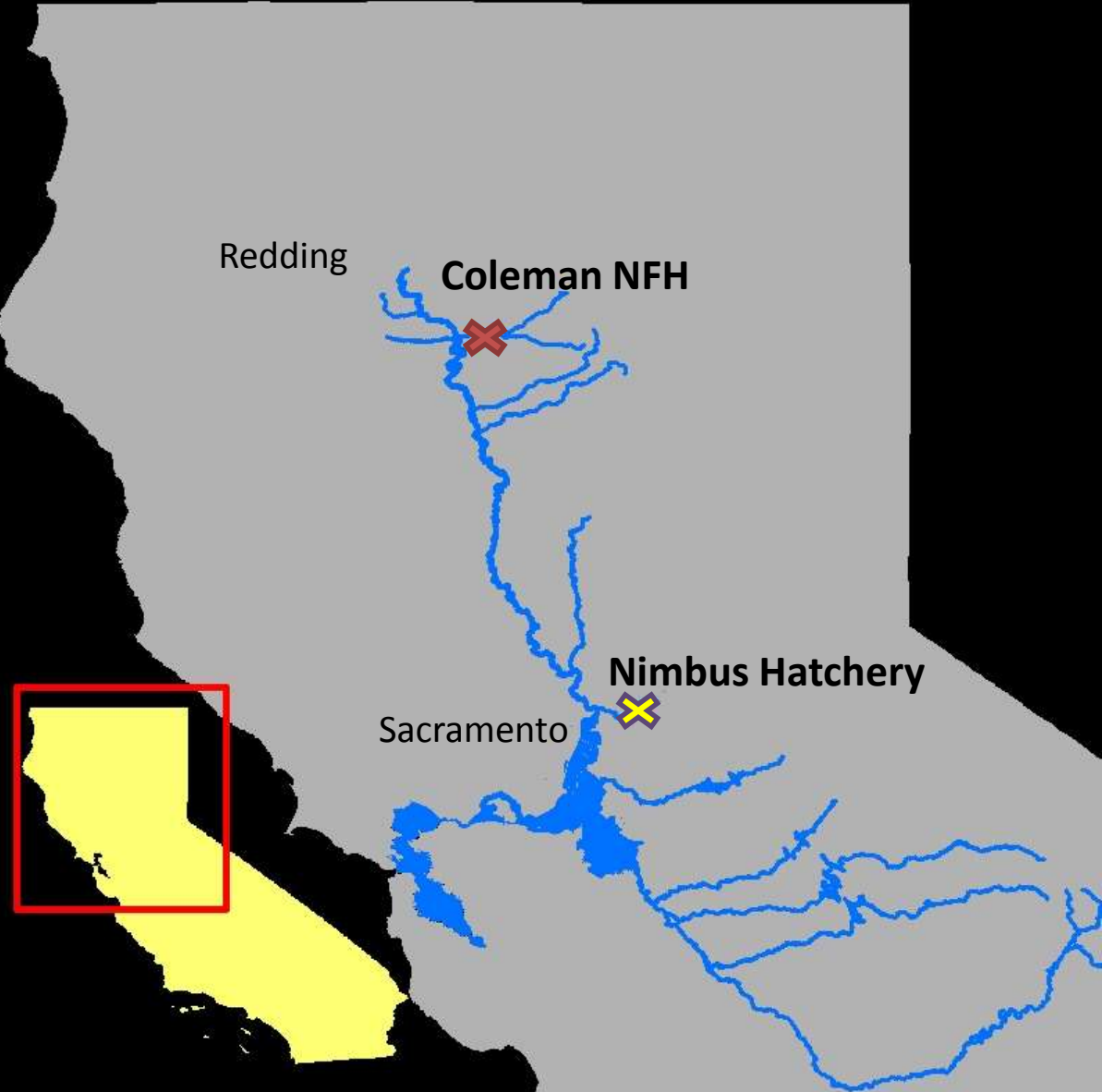
Central Valley Fall Chinook Salmon

- 5 Central Valley hatcheries
- 32 million FCS smolts
- 25% adipose fin clipped and tagged with CWT



Introduction

Central Valley Fall Chinook Salmon



Introduction

Coleman National Fish Hatchery

- 12 million fall Chinook Salmon smolts annually
- Goals
 - Ocean and freshwater fisheries
 - Broodstock for hatchery
 - Reduce impacts
- On-site release



Trucking Fall Chinook Salmon



Trucking Fall Chinook Salmon

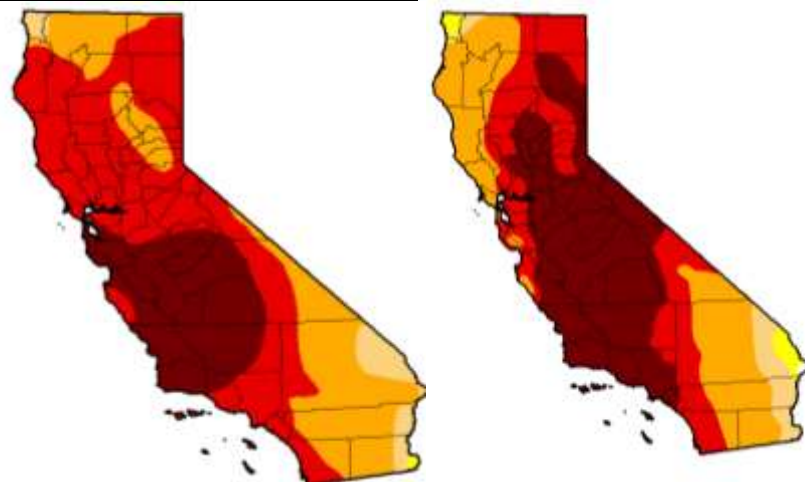
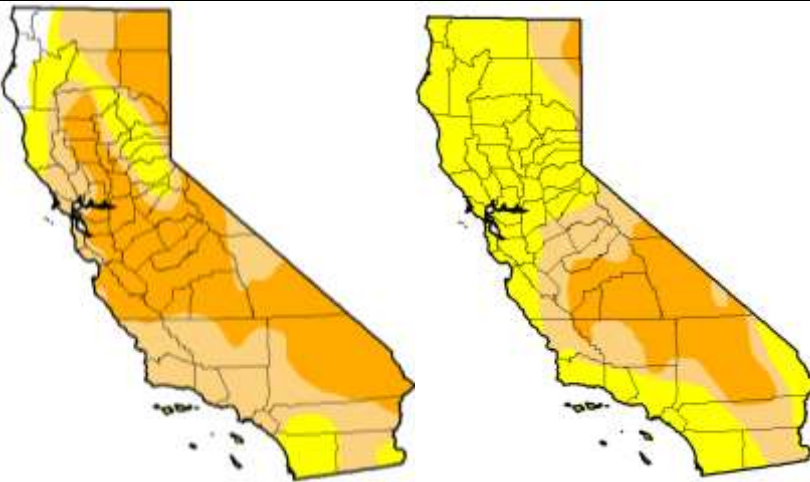
California's Drought

2012

2013

2014

2015



Legend:
Yellow: Moderate Drought
Orange: Moderate to Severe Drought
Red: Severe Drought
Dark Red: Extreme Drought

The Drought Watch focuses on broad-scale conditions. Local conditions may vary. Use accompanying text describing the forecast situation.

Author:
Lyn Combs
USDA Department of Agriculture

Logos: USDA, NWS, NOAA, etc.

<http://droughtmonitor.unl.edu/>

First week April: near target release date for fall run

Trucking Fall Chinook Salmon

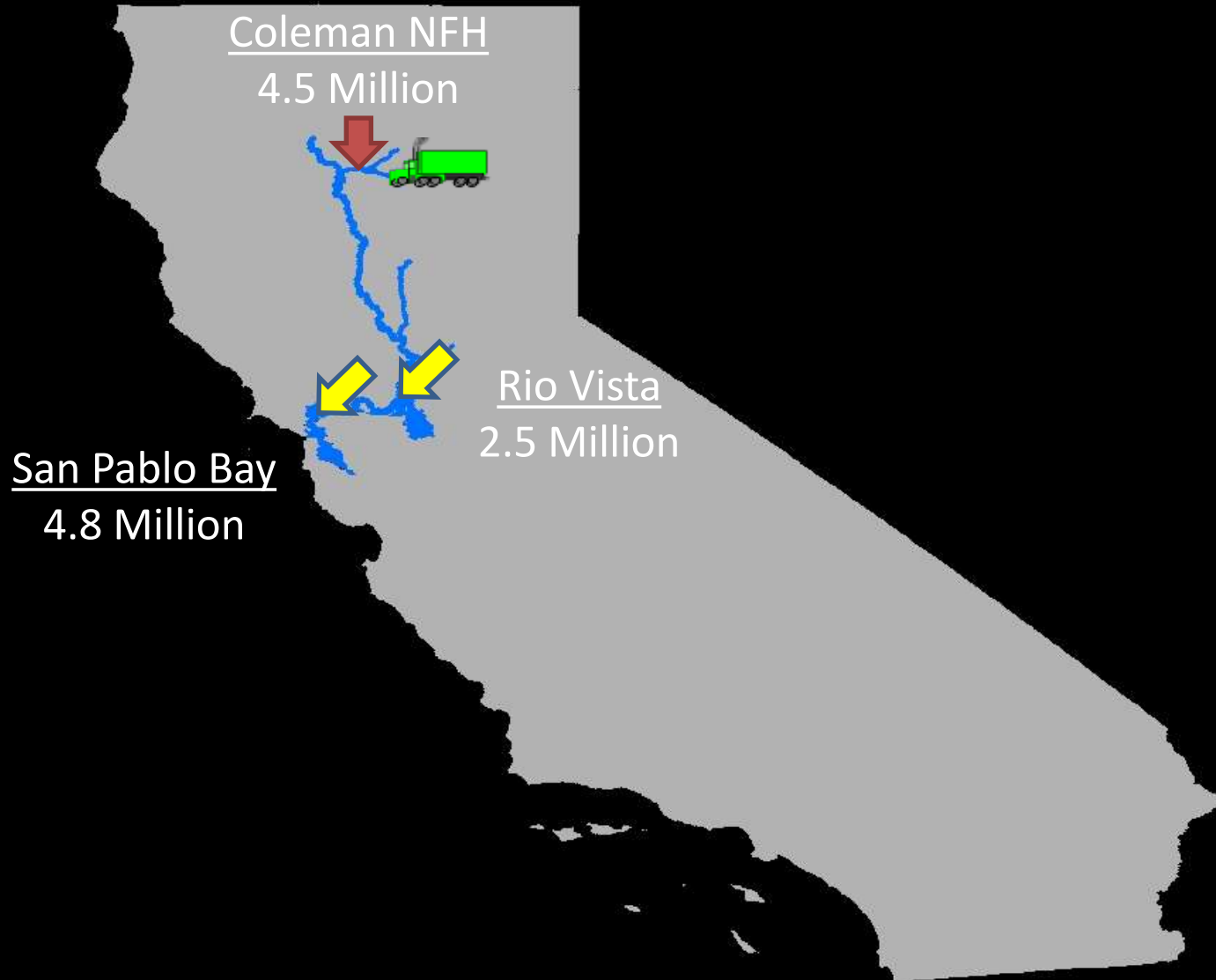
Decision to Truck



- Real-time decisions based on river conditions
- Environmental Thresholds
 - High temperature
 - Low river flows
- Delta Water Operations
- Degraded conditions through ~300 mile emigration corridor

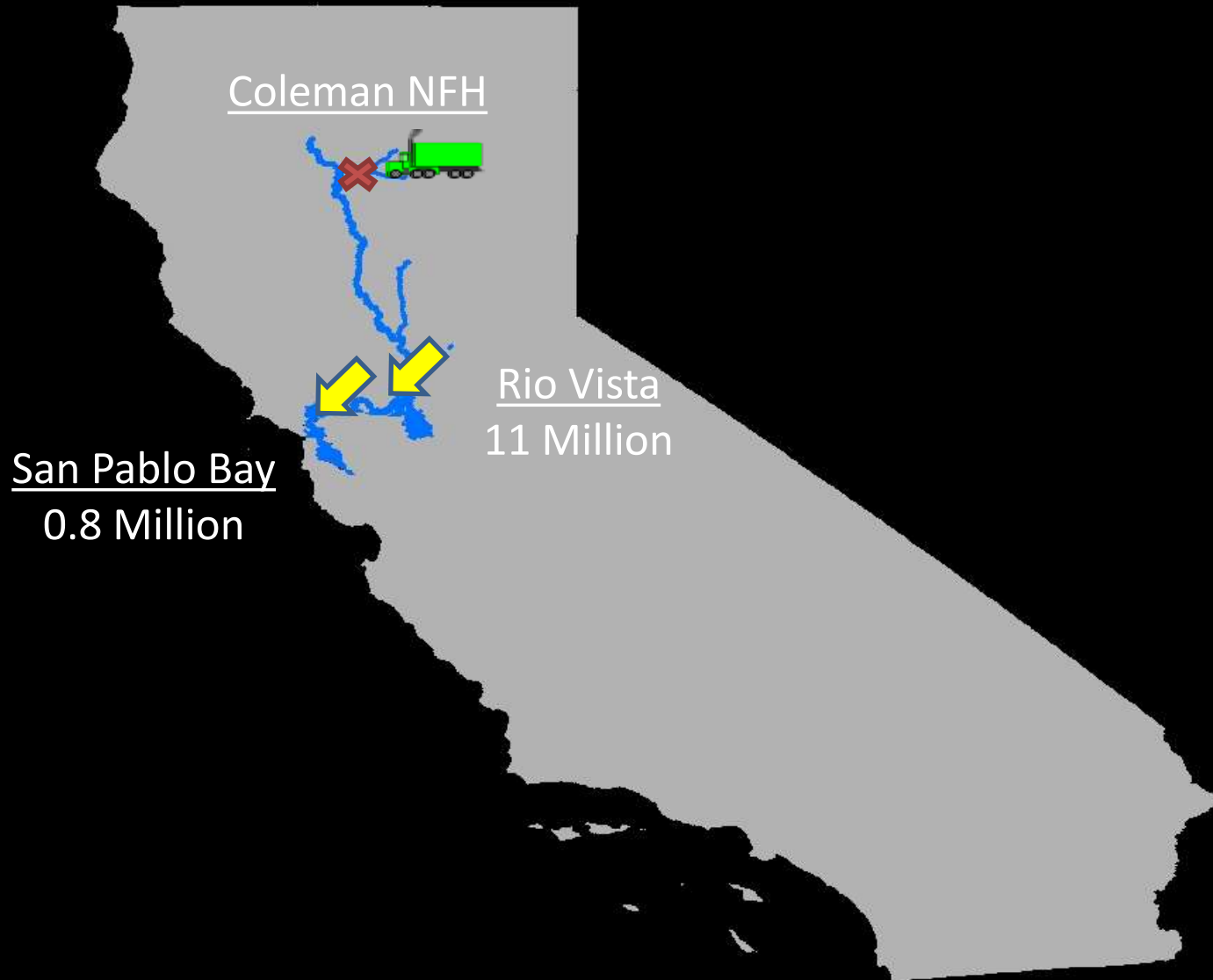
Trucking Fall Chinook Salmon

BY 2013 Releases



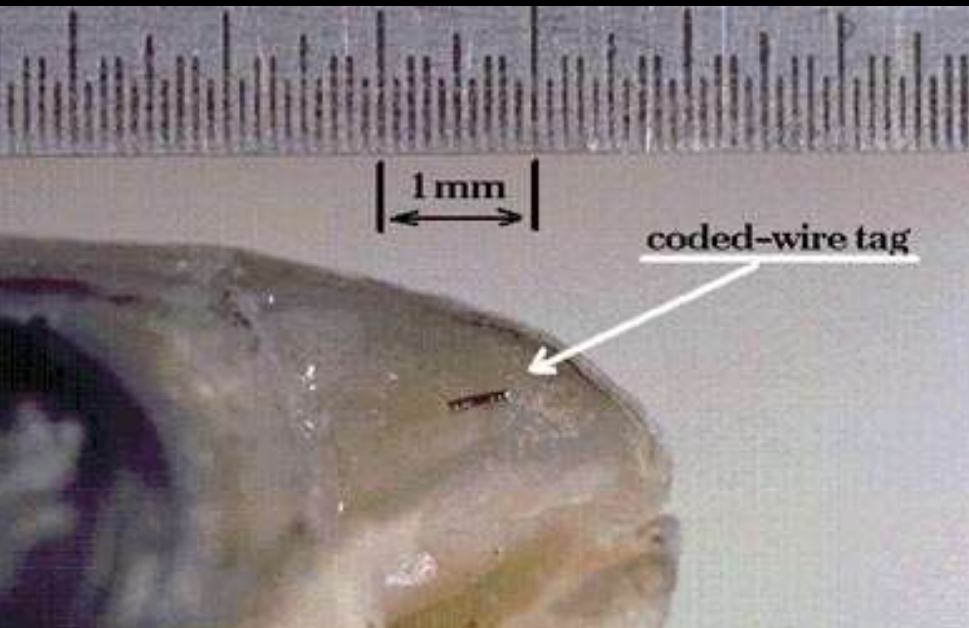
Trucking Fall Chinook Salmon

BY 2014 Releases



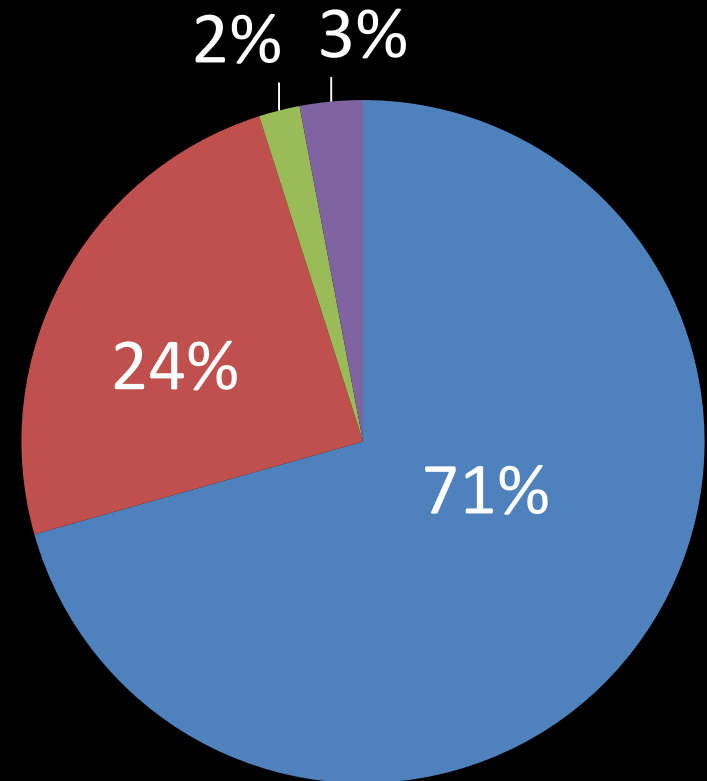
Trucking Fall Chinook Salmon

CWT Recoveries



Trucking Fall Chinook Salmon

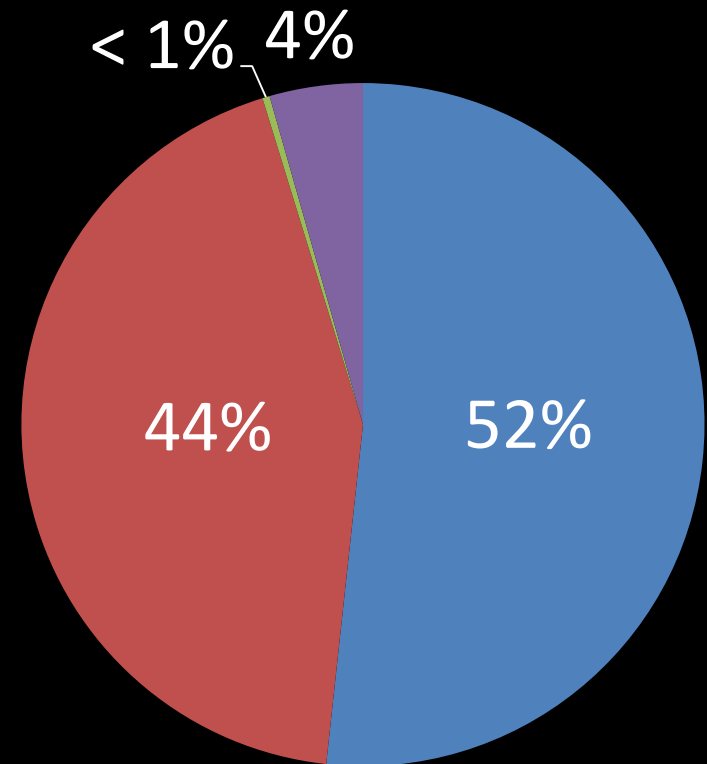
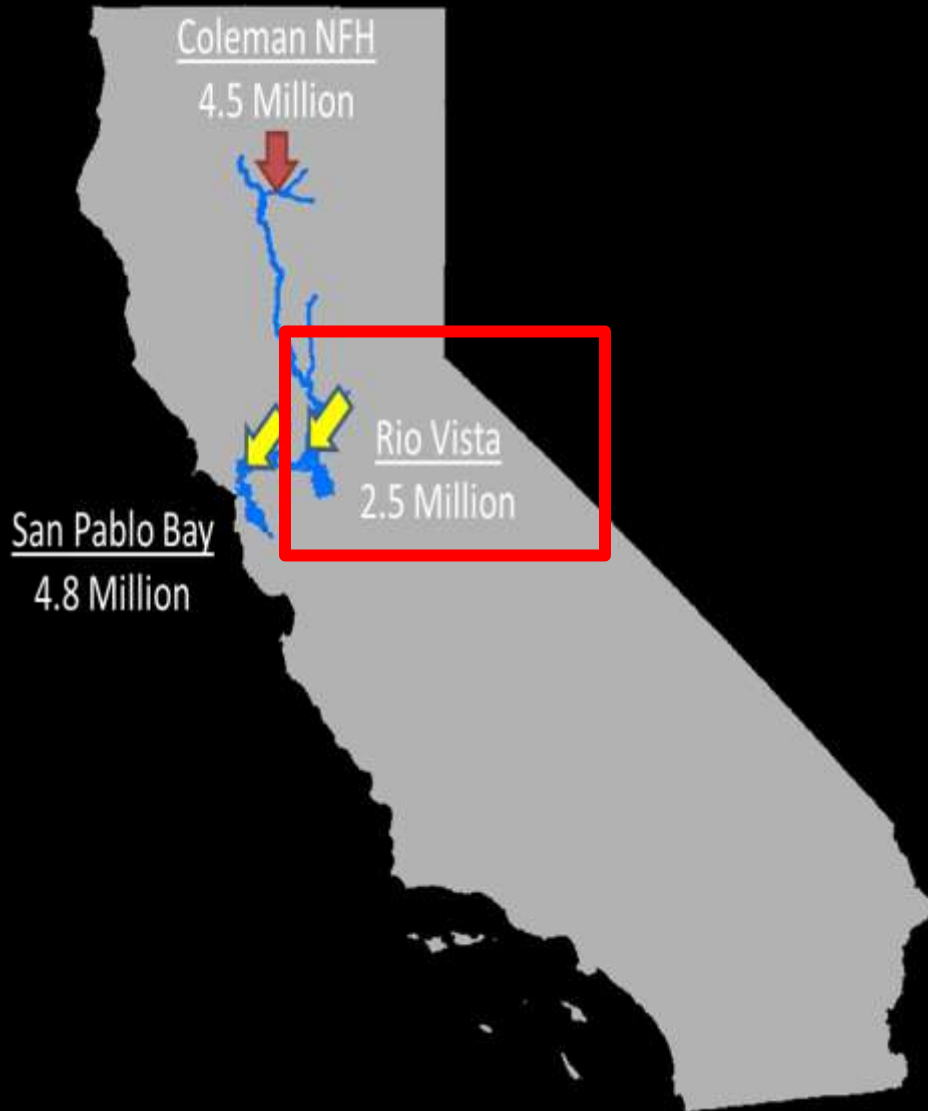
BY 2013 CWT Recovery



- Ocean
- Freshwater Stray
- Battle Creek
- Sac River Sport

Trucking Fall Chinook Salmon

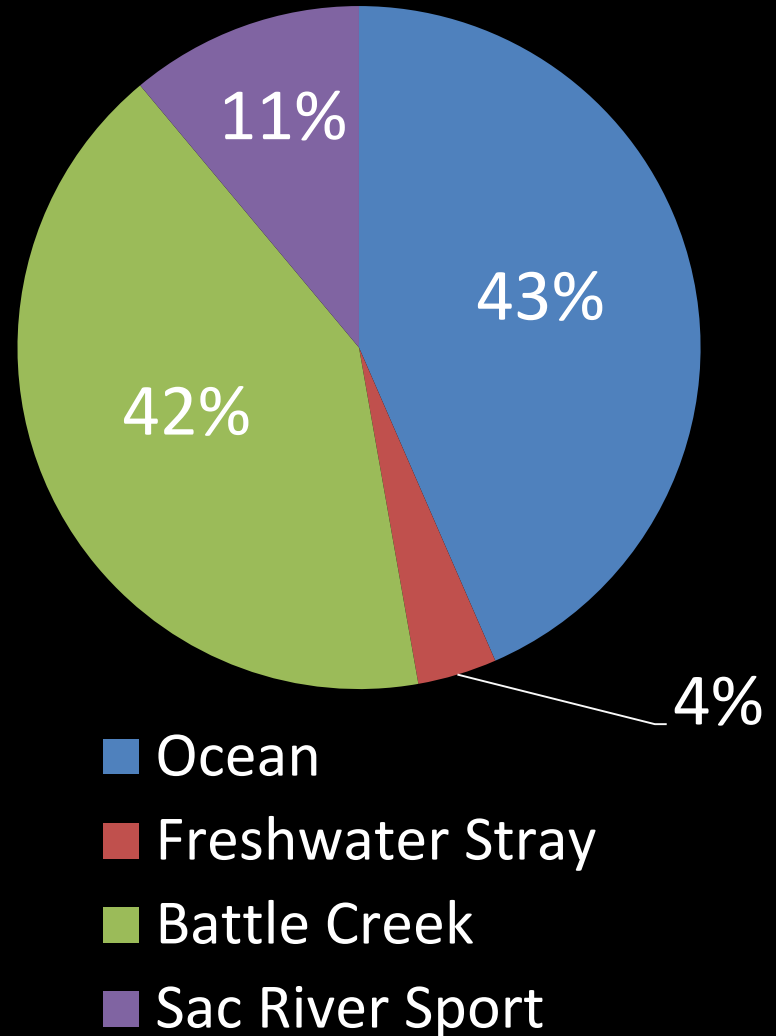
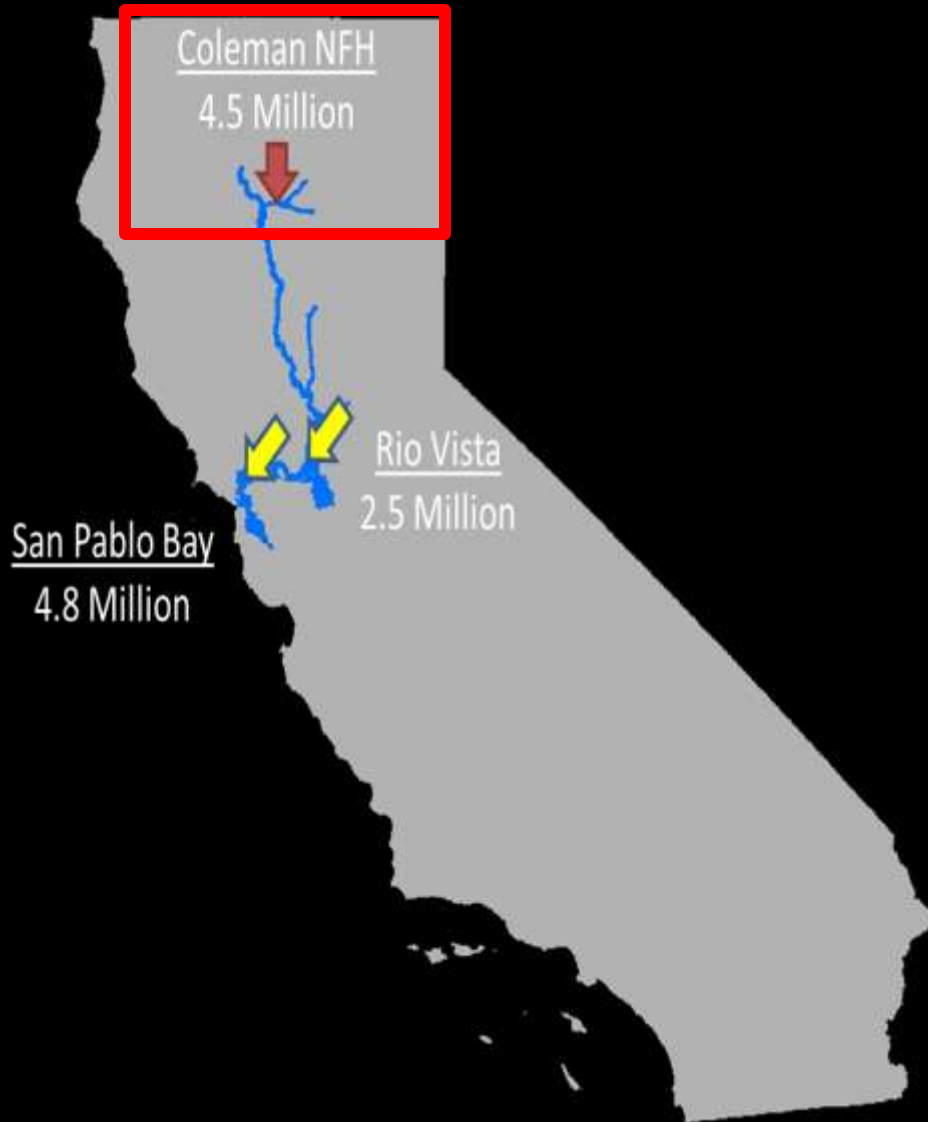
BY 2013 CWT Recovery



- Ocean
- Freshwater Stray
- Battle Creek
- Sac River Sport

Trucking Fall Chinook Salmon

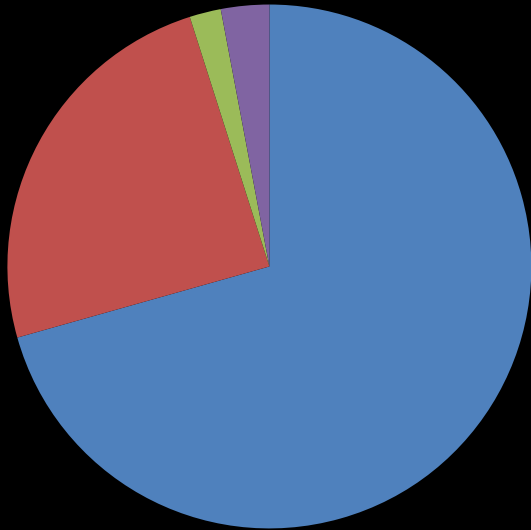
BY 2013 CWT Recovery



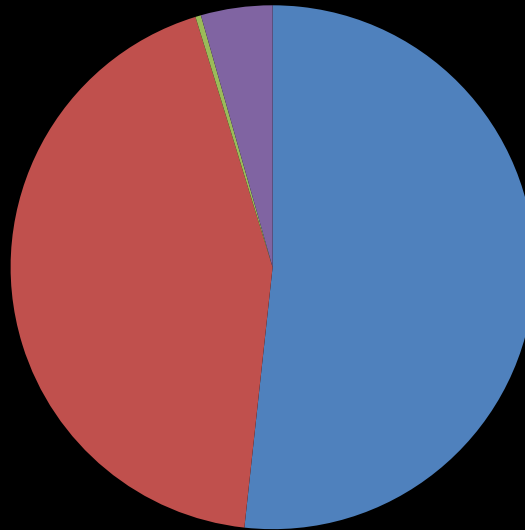
Trucking Fall Chinook Salmon

BY 2013 CWT Recovery

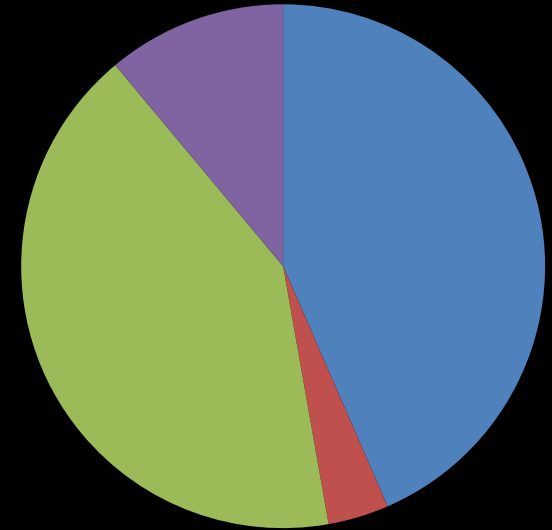
San Pablo Bay



Rio Vista



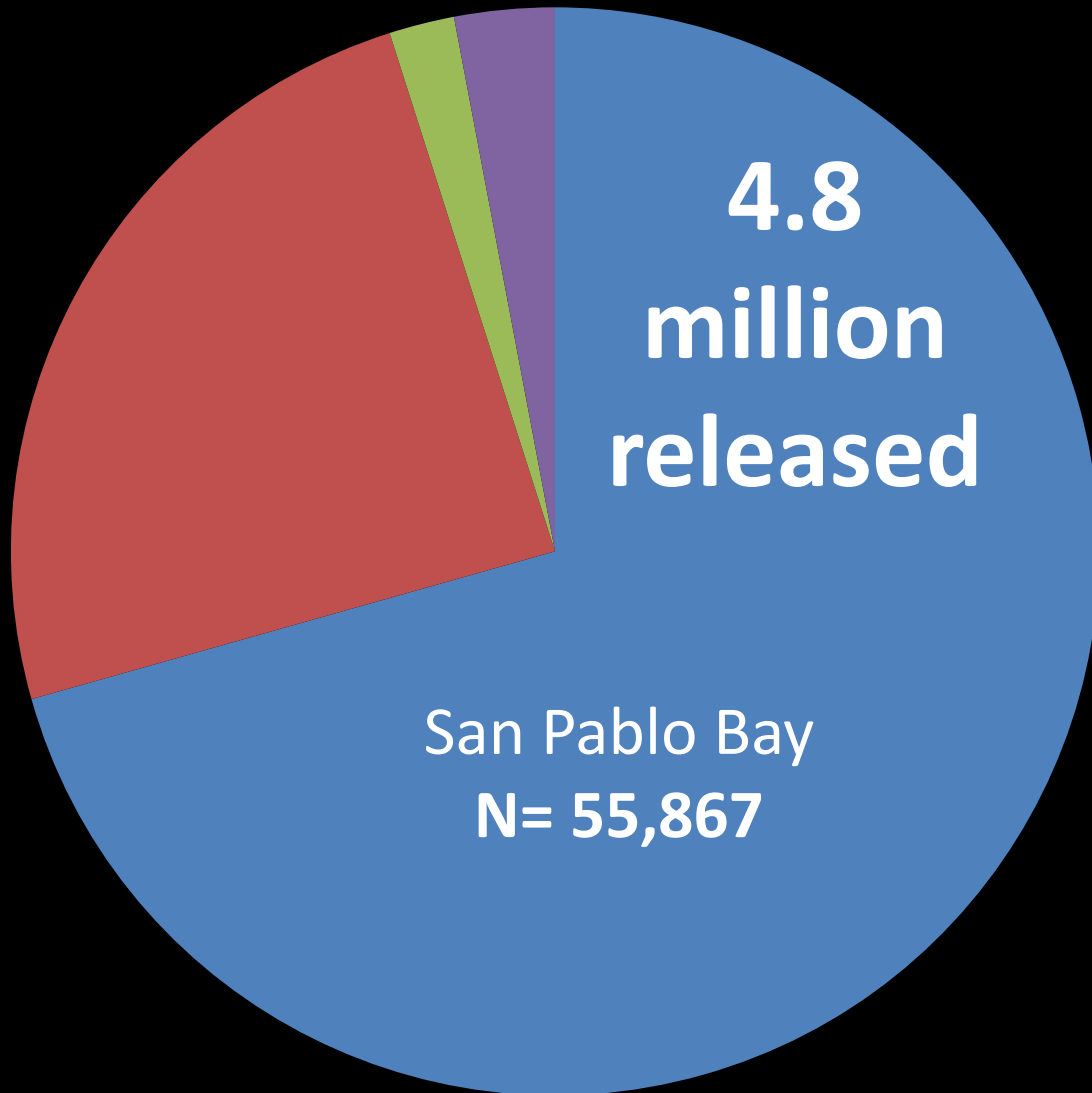
Coleman NFH



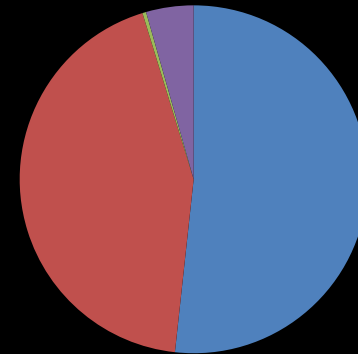
- Ocean
- Freshwater Stray
- Battle Creek
- Sac River Sport

Trucking Fall Chinook Salmon

BY 2013 CWT Recovery

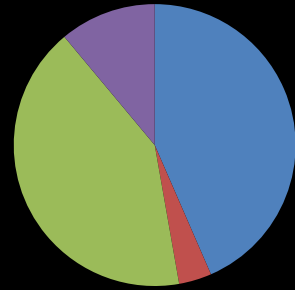


2.5
million
released



Rio Vista
N= 18,838

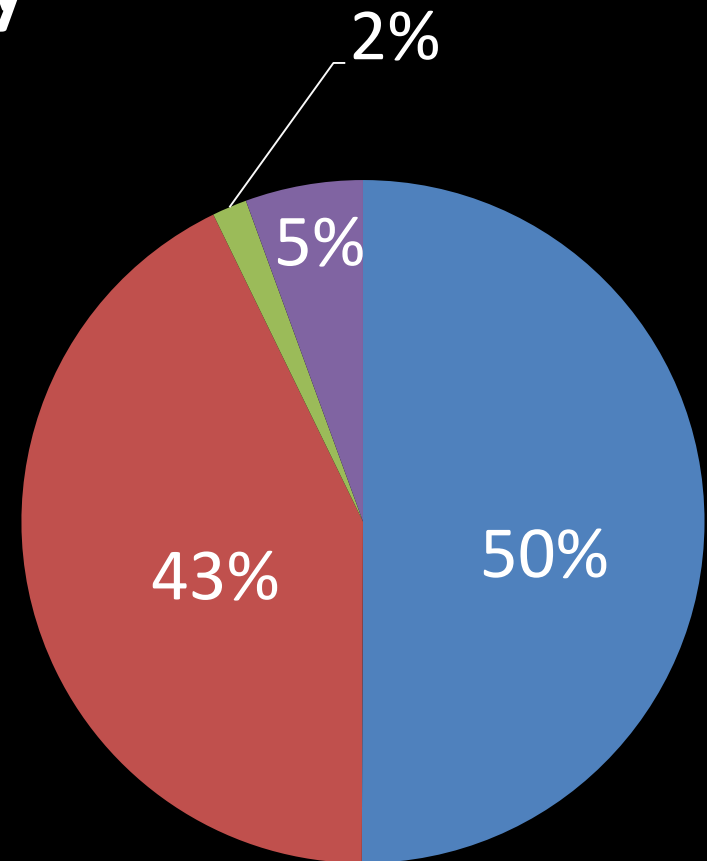
4.5
million
released



Coleman NFH
N= 13,992

Trucking Fall Chinook Salmon

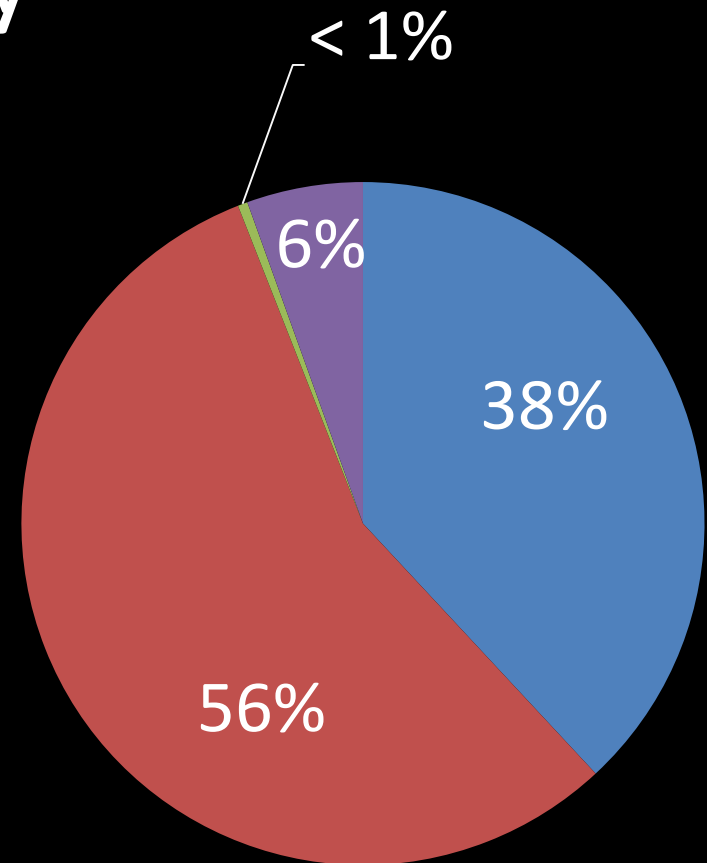
BY 2014 CWT Recovery



- Ocean
- Freshwater Stray
- Battle Creek
- Sac River Sport

Trucking Fall Chinook Salmon

BY 2014 CWT Recovery

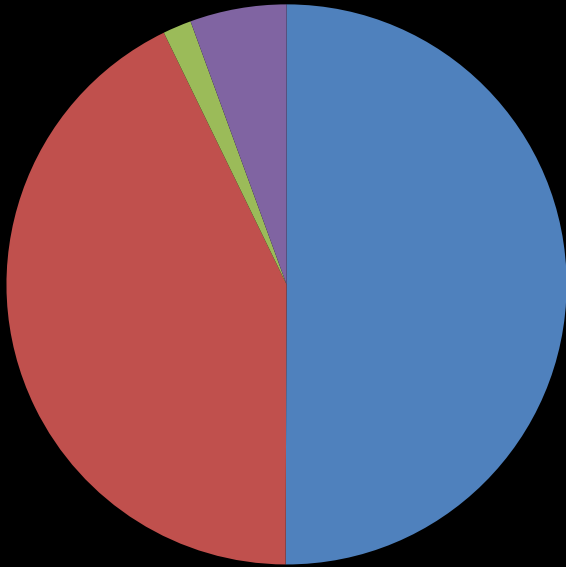


- Ocean
- Freshwater Stray
- Battle Creek
- Sac River Sport

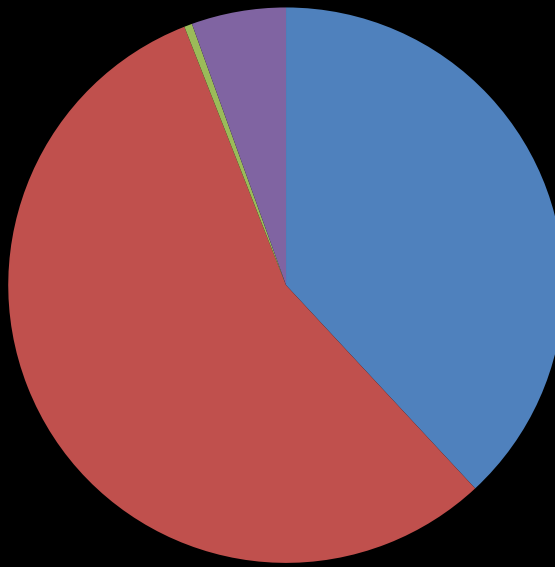
Trucking Fall Chinook Salmon

BY 2014 CWT Recovery

San Pablo Bay



Rio Vista



Coleman NFH



- Ocean
- Freshwater Stray
- Battle Creek
- Sac River Sport

Trucking Fall Chinook Salmon

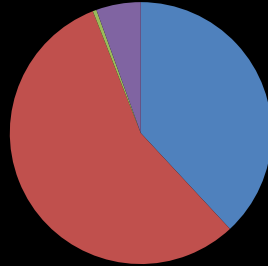
BY 2014 CWT Recovery

**11 million
released**

0.8 million
released

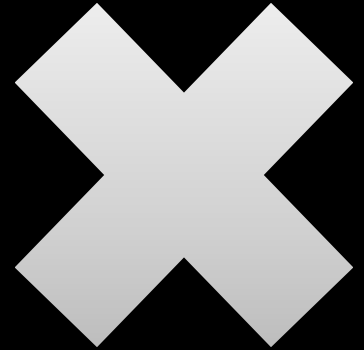


San Pablo Bay
N= 4,719



Rio Vista
N= 11,851

**0
released**



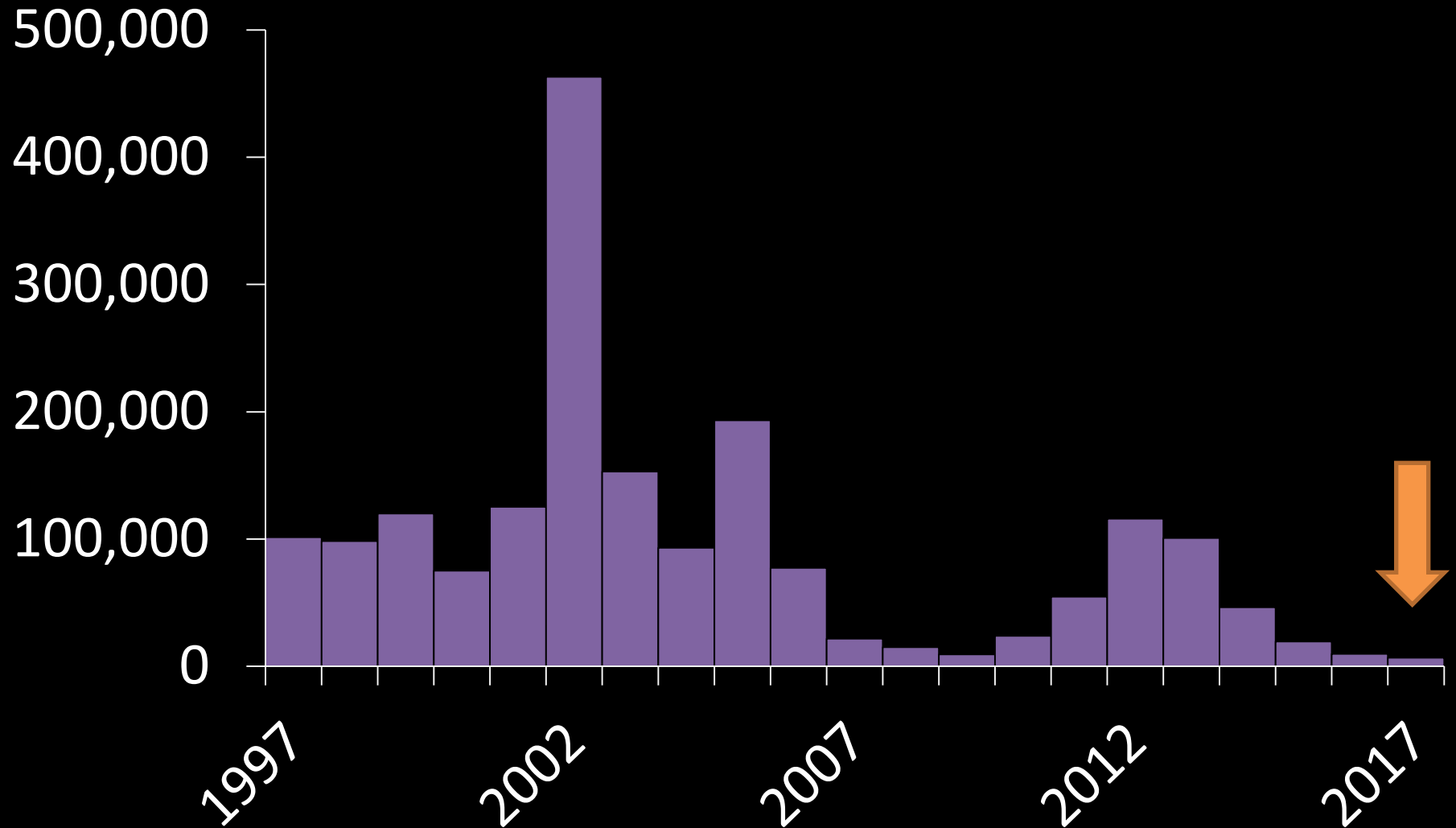
Coleman NFH
N= 0

2017 Coleman NFH Production

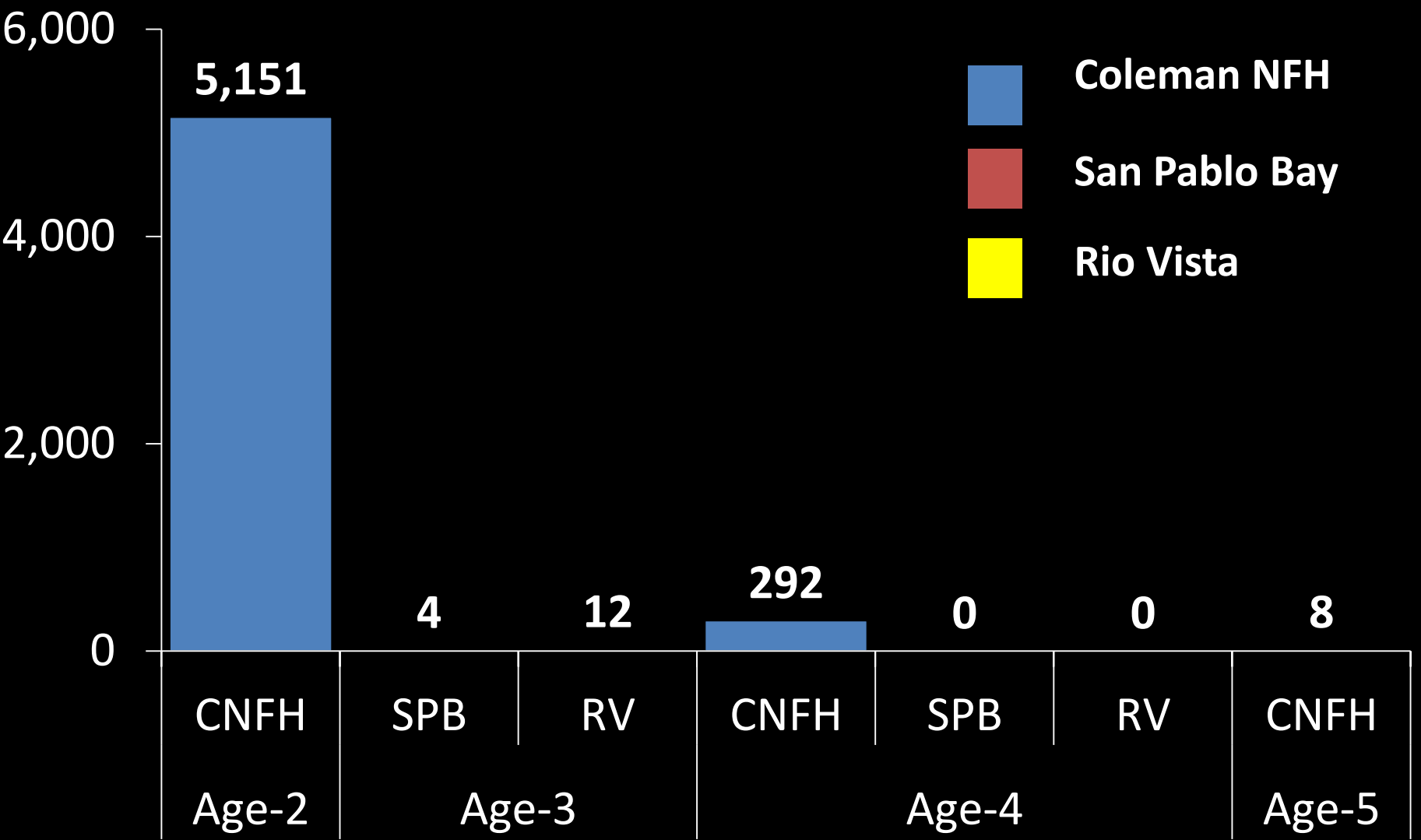


2017 Coleman NFH Production

Battle Creek Run Size

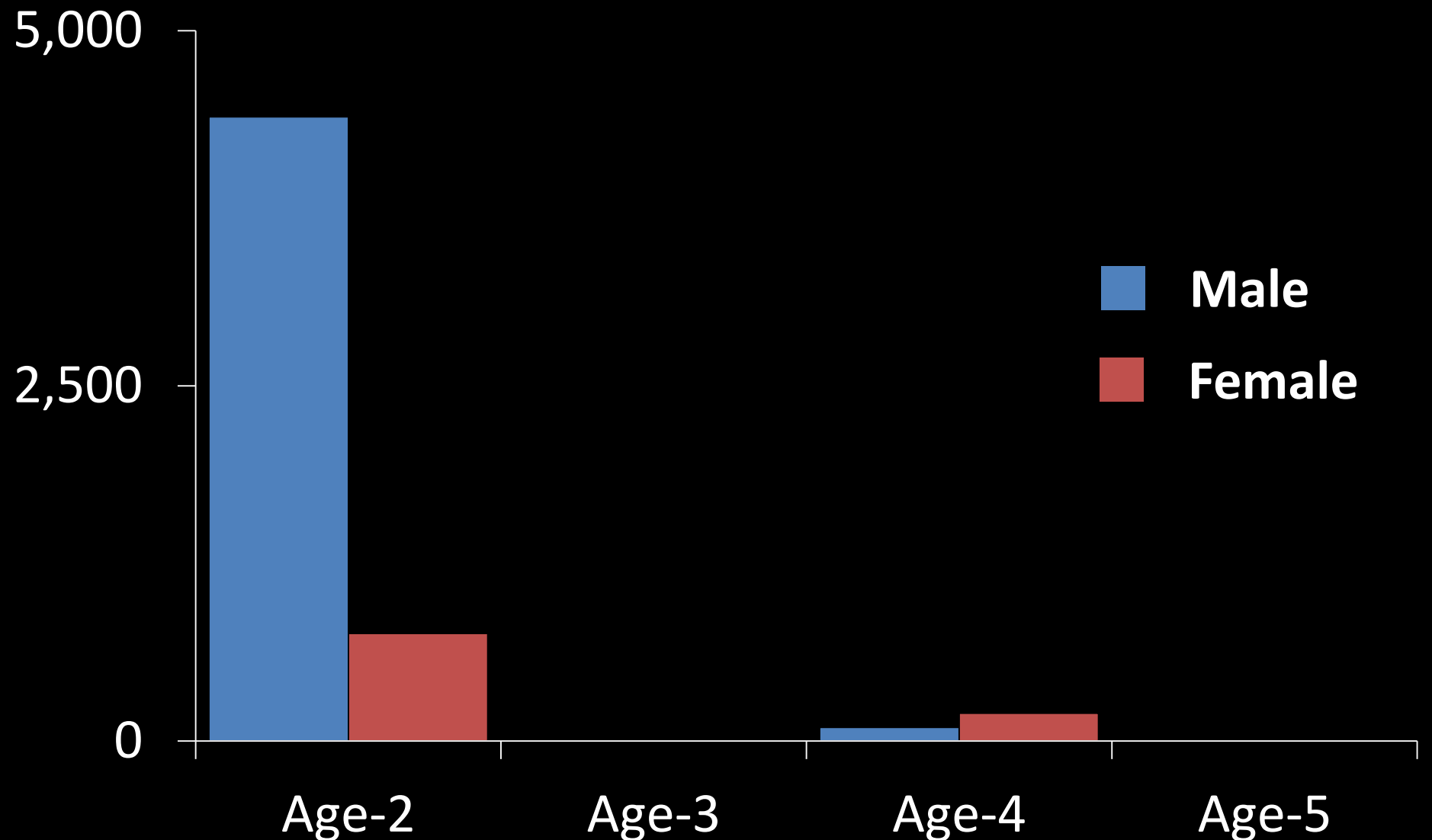


Run Composition: Origin & Age



2017 Coleman NFH Production

Run Composition: Age & Sex

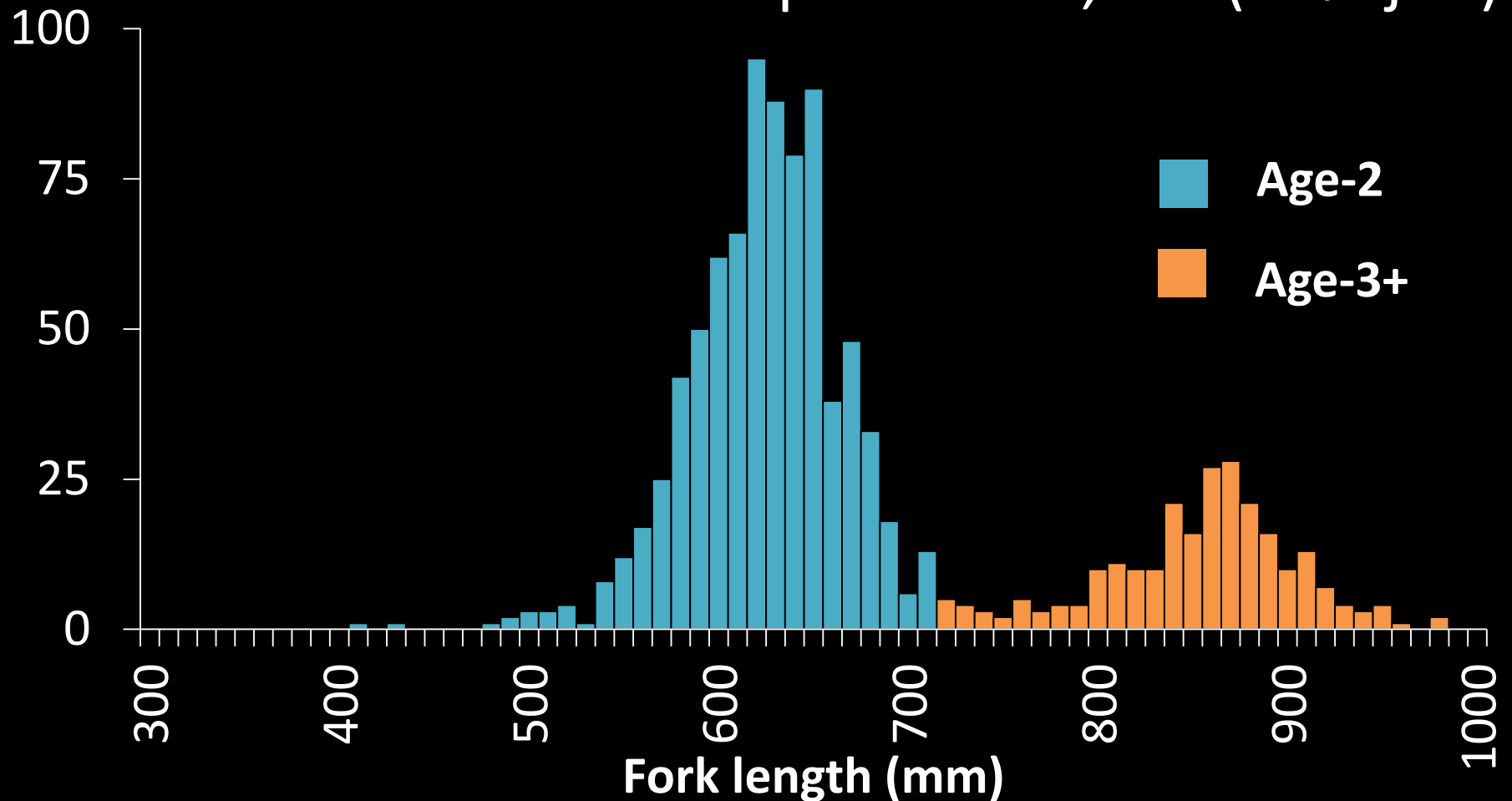


2017 Coleman NFH Production

Females Spawned

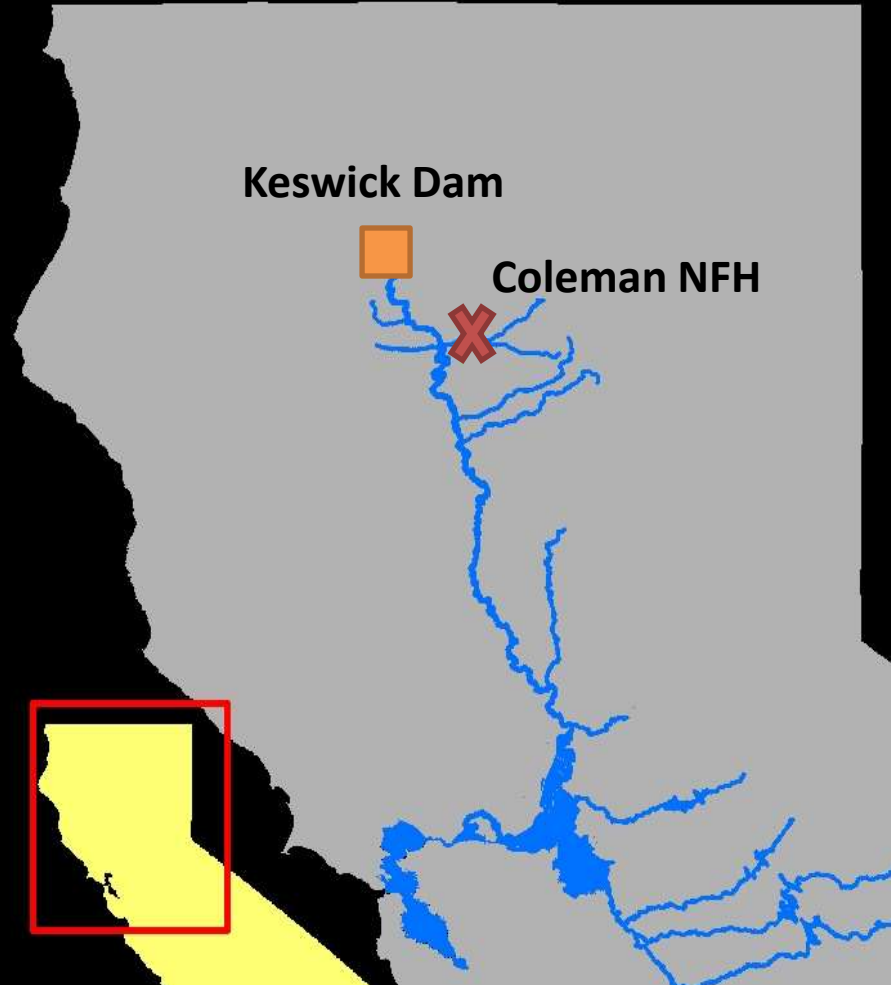
Minimum Requirements: 2,600 females

Spawned: 1,050 (75% jills)



2017 Coleman NFH Production

Keswick Dam Fish Trap



2017 Coleman NFH Production

Keswick Dam Fish Trap



Keswick Trap

- 16 times
- 92 salmon spawned
- 350,000 eyed eggs

2017 Coleman NFH Production

2017 Coleman NFH Totals

- 4.2 million eyed eggs
- 30% Egg goal



2017 Coleman NFH Production

Nimbus State Hatchery Spawning

- Collaborative effort between agencies
- Real-time CWT reading
 - Target CNFH:CNFH crosses
- Keep unmarked fish eggs if 75% of CWTs from CNFH



S. Martarano/USFWS

2017 Coleman NFH Production

Nimbus State Hatchery Spawning

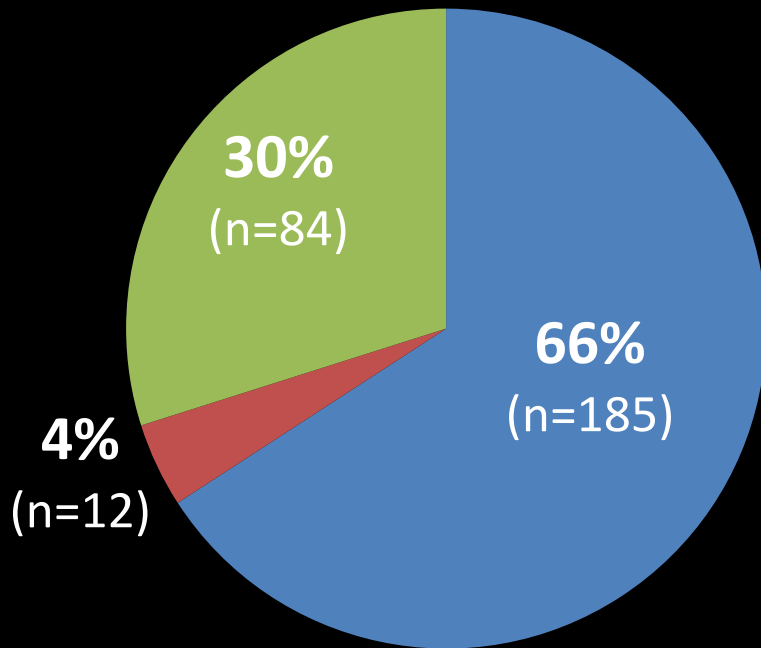
Why Nimbus?

- Run time difference
- High % Coleman strays seen in 2016
- Low impact on Nimbus broodstock collection

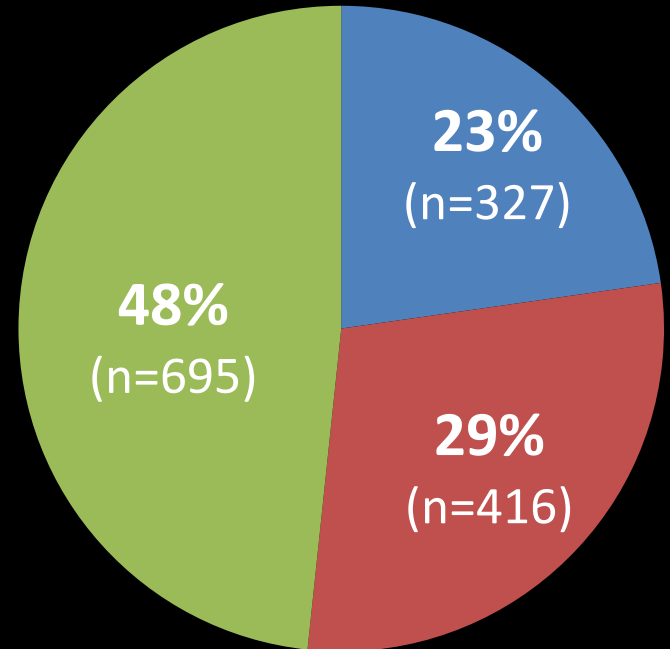


Nimbus State Hatchery CWT Totals

October



November



■ Coleman NFH ■ Nimbus Fish Hatchery ■ Other Hatcheries

Nimbus State Hatchery Spawning

- 1.9 million eggs collected
- Reared to eyed egg stage
- Transferred to CNFH



2017 Totals

- 6.1 million eyed eggs
 - 1.9 mil Nimbus + 4.2 mil CNFH
- ~ 50% Production goal



Next Steps

Better Next Year?



Experimental Early Release

- Fish out smaller/earlier
- Flow event
- Bypass bad in-river conditions
- Adaptive management

Next Steps

Better Next Year?



First year results

- 2 year old returns
- Fish from all groups came back
- Stay tuned

Summary



S. Martarano/USFWS

- High stray rates with off-site releases during drought
- Low returns to Coleman NFH
- Egg collection at Nimbus Hatchery
- ~ ½ of production goal
- More information to come

Questions?

Thank you!

Acknowledgements

- Special thanks to CDFW staff for all their help at Nimbus Hatchery!!
- USFWS Staff at Coleman NFH and RBFWO

