



# Evaluation of Juvenile Salmonid Passage and Behavior at Foster Dam Utilizing Radio Telemetry, 2016

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# Presentation Outline

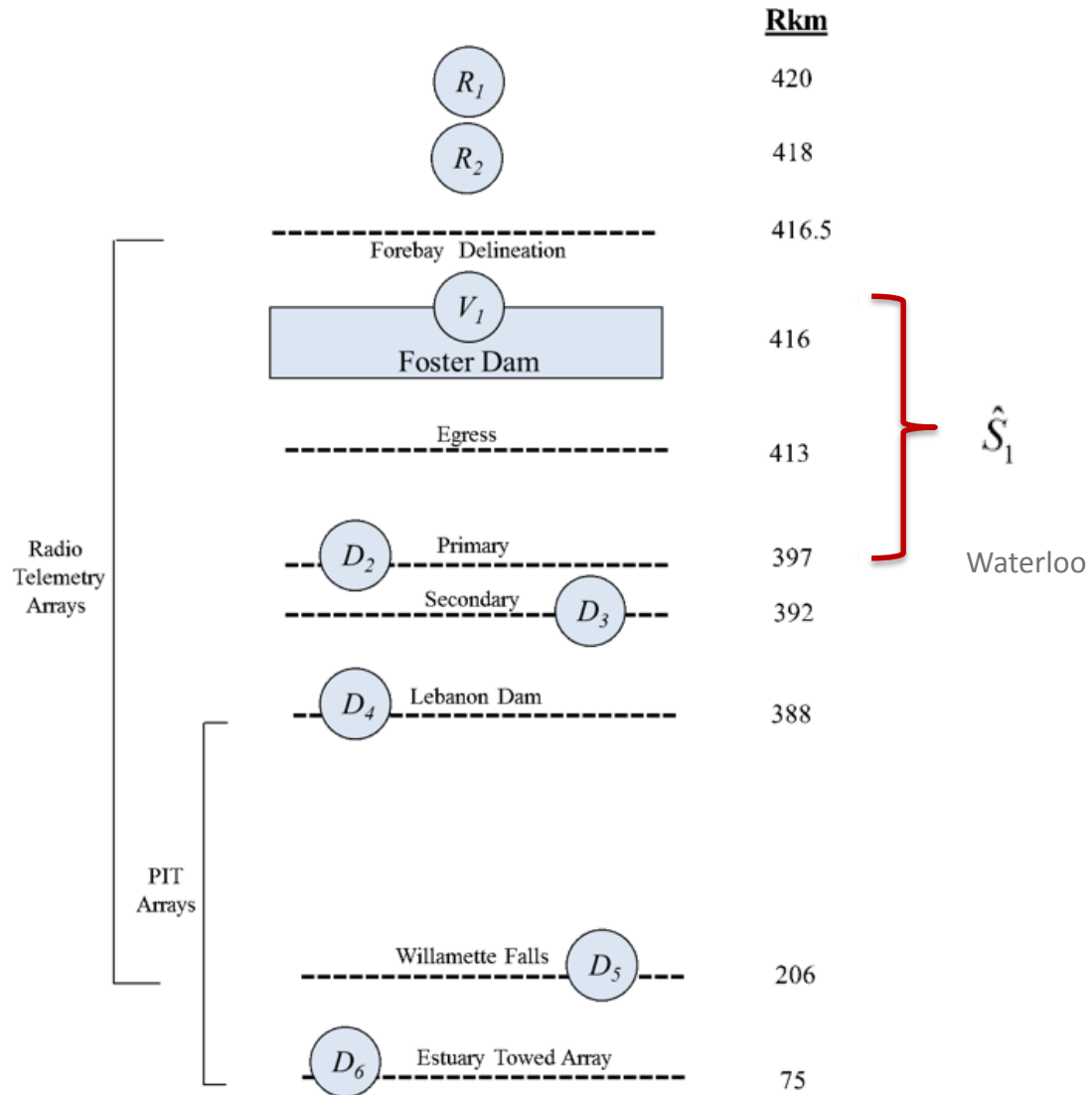
- ▶ Objectives
- ▶ Study Design
- ▶ Yearling Chinook Salmon & Steelhead (Age-2)
  - Spring – Low Pool (March – April)
    - Out-migration patterns and reservoir residence
    - Passage distributions
    - Survival
  - Spring – High Pool (May – June)
- ▶ Subyearling Chinook Salmon
  - Fall – Low Pool (October – December)
- ▶ Summary and Notable Results



- ▶ Perform a full project assessment at two reservoir elevations for passage and survival of radio-tagged juvenile Chinook salmon and steelhead
  - Estimate
    - Out-migration patterns and reservoir residence
    - Route distribution
    - Route-specific and dam passage survival
    - Entrainment in the forebay water supply, hatchery water supply and auxiliary water supply

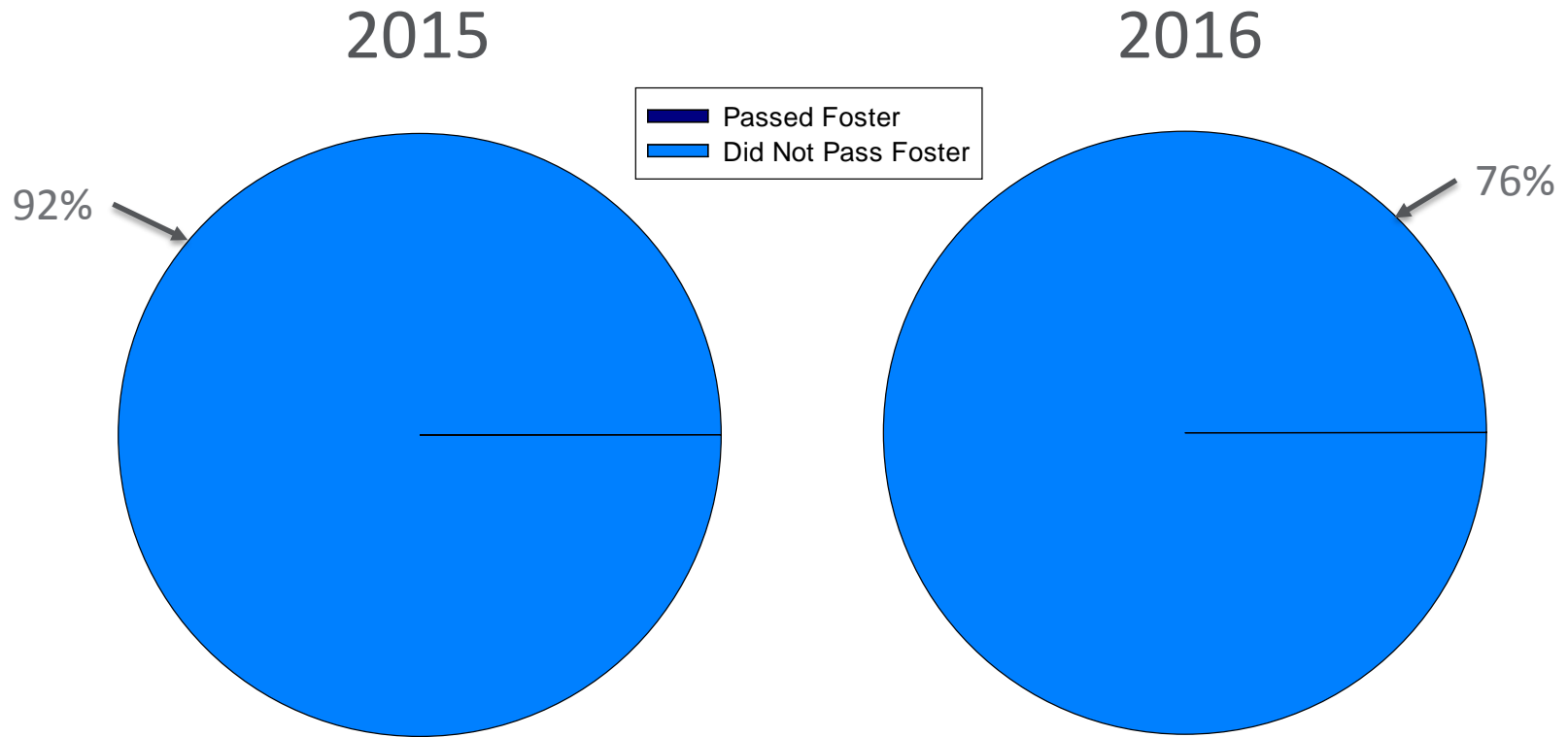


# Study Design





# Out-Migration Patterns Spring – Low Pool; Yearling Chinook Salmon



**Total # Released**

505

355

**Mean Length**

159 mm

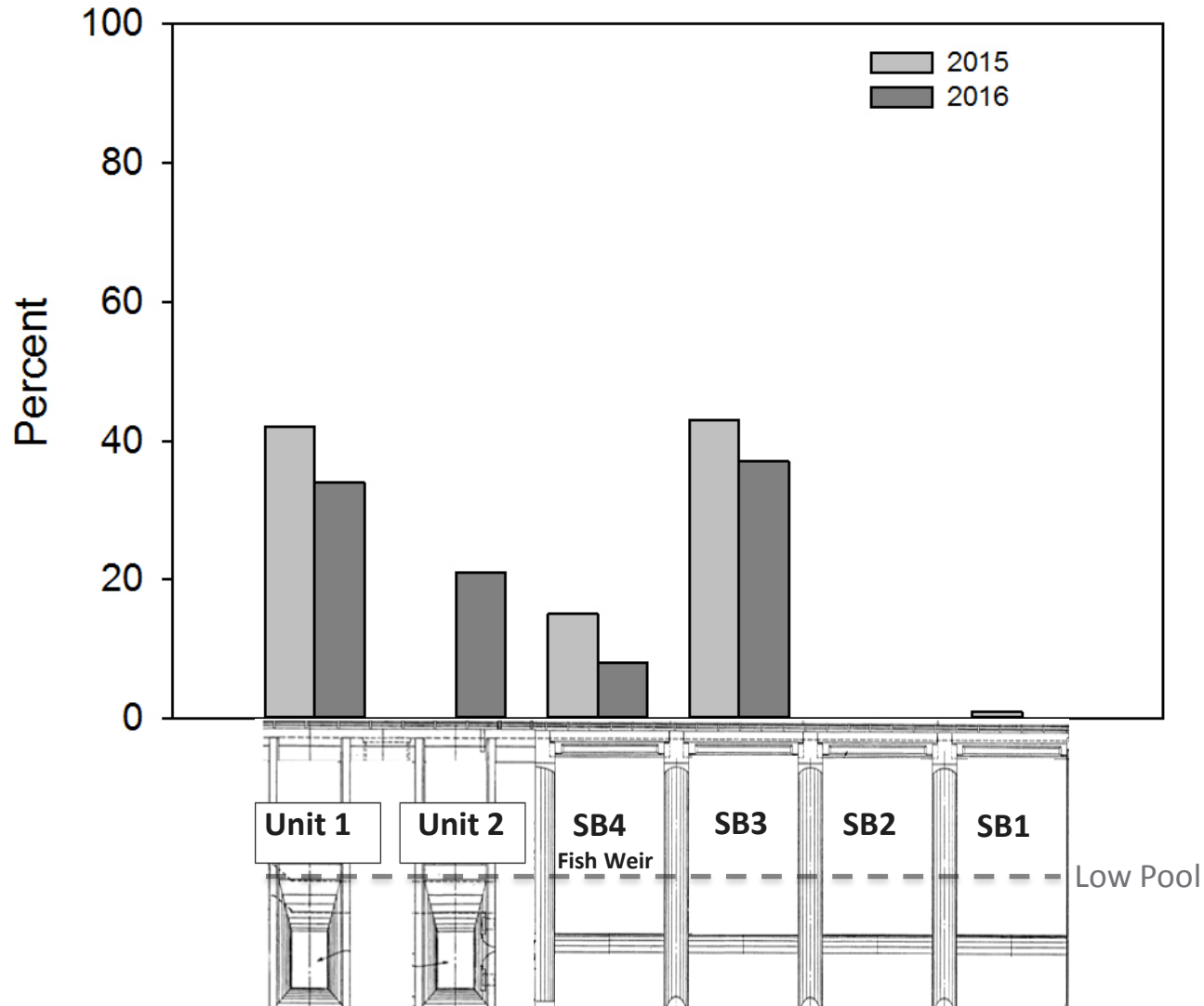
167 mm

**Mean Reservoir Residence**

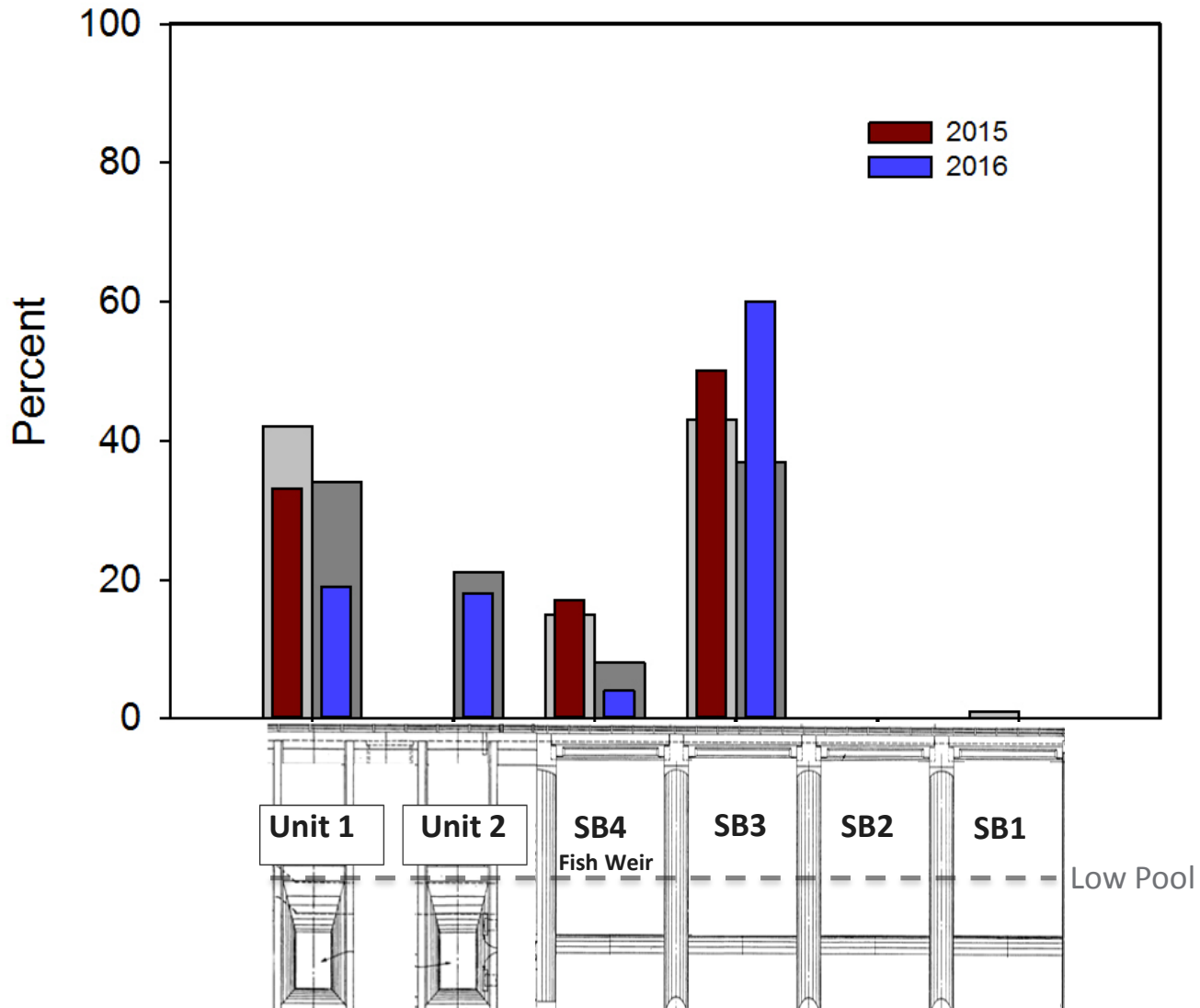
2.3 days

2.4 days

# Discharge Spring – Low Pool; Yearling Chinook Salmon

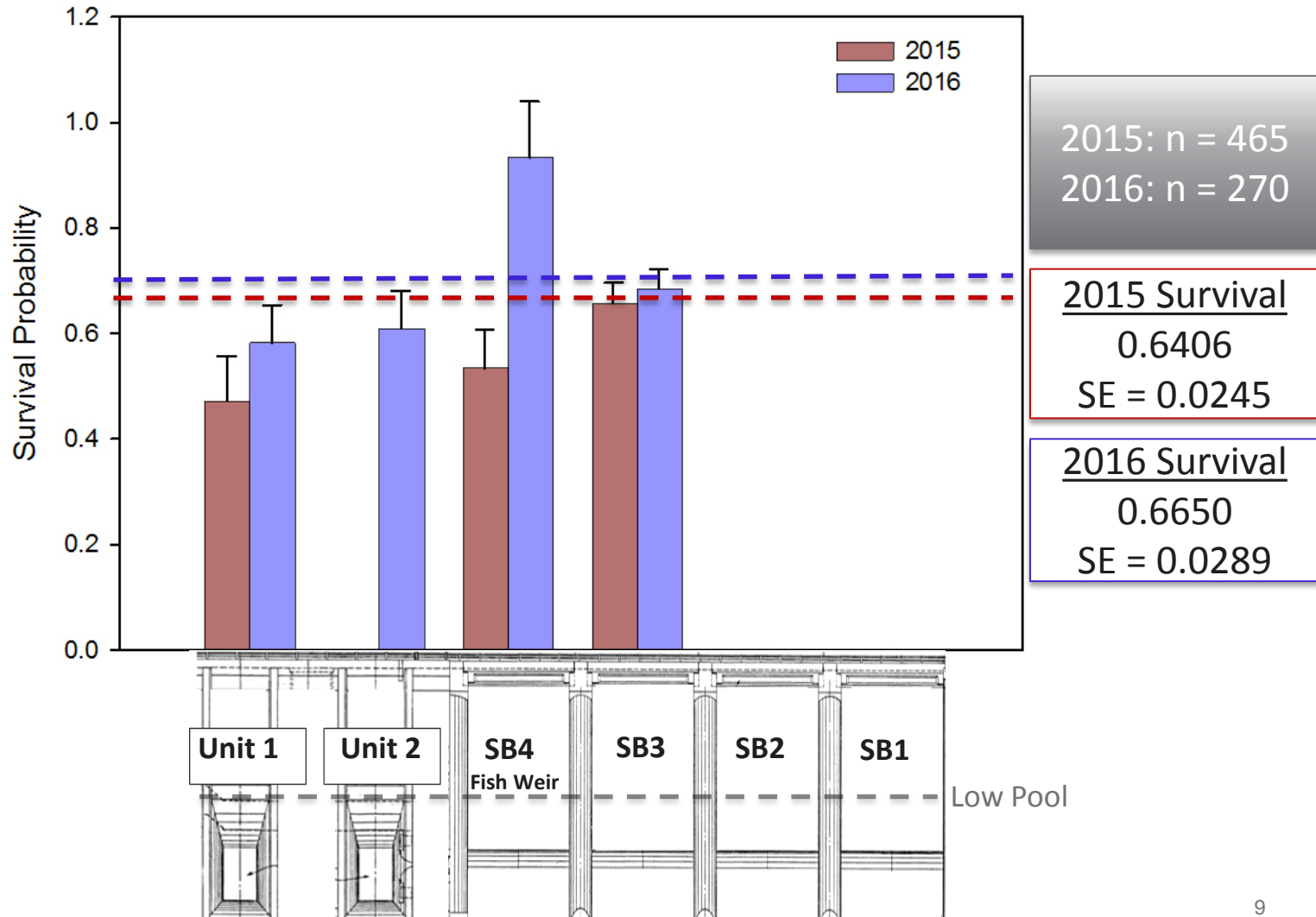


# Passage Distributions Spring – Low Pool; Yearling Chinook Salmon



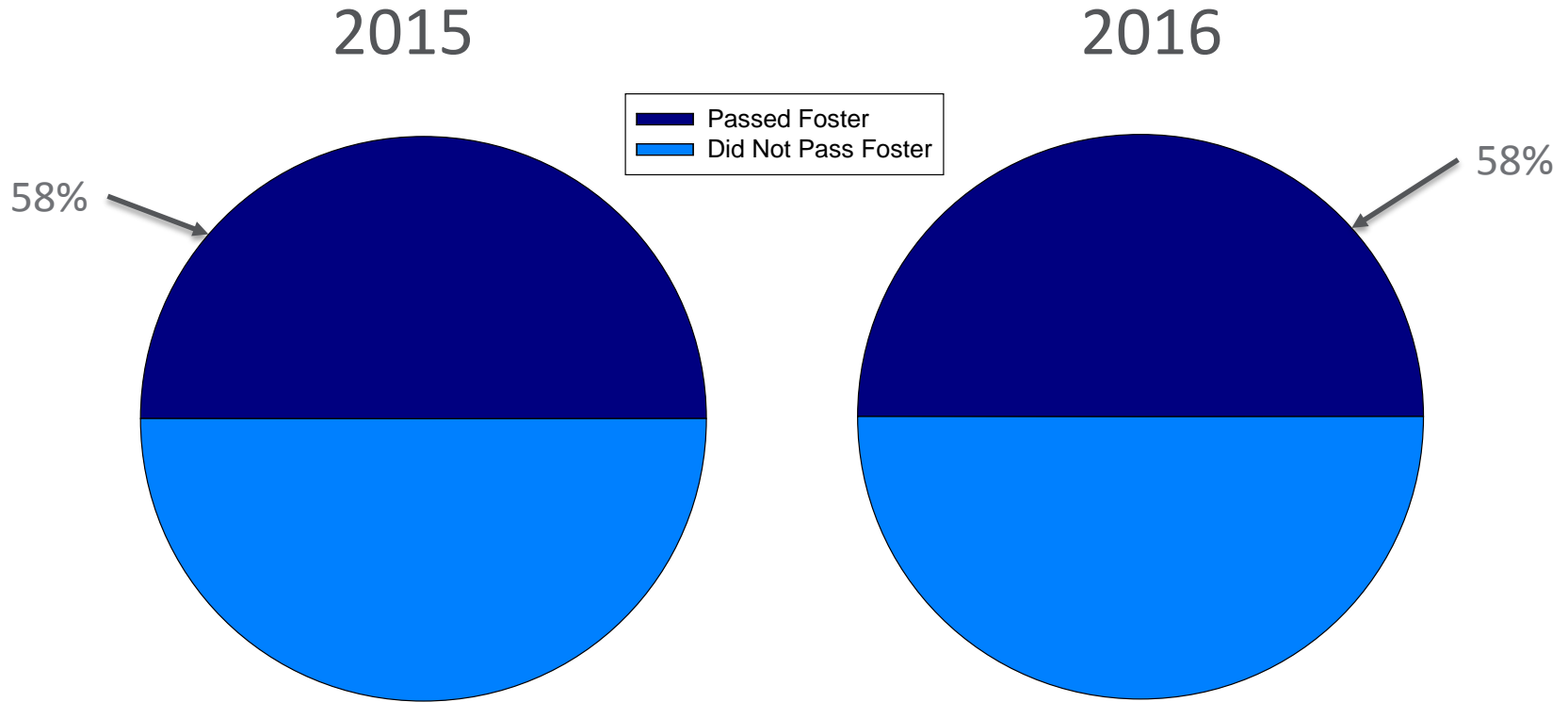


# Survival Spring – Low Pool; Yearling Chinook Salmon



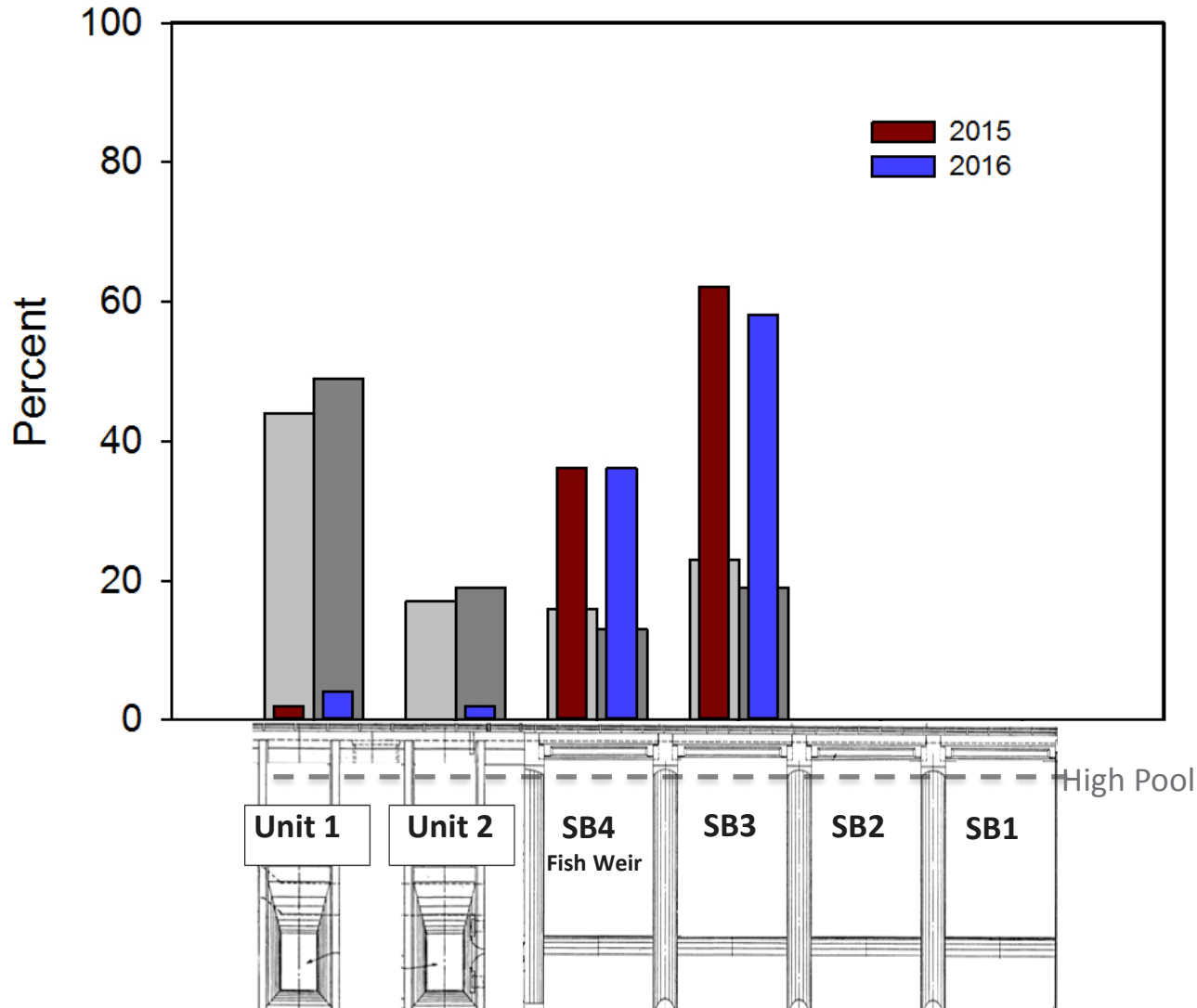
# Out-Migration Patterns

## Spring – High Pool; Yearling Chinook Salmon



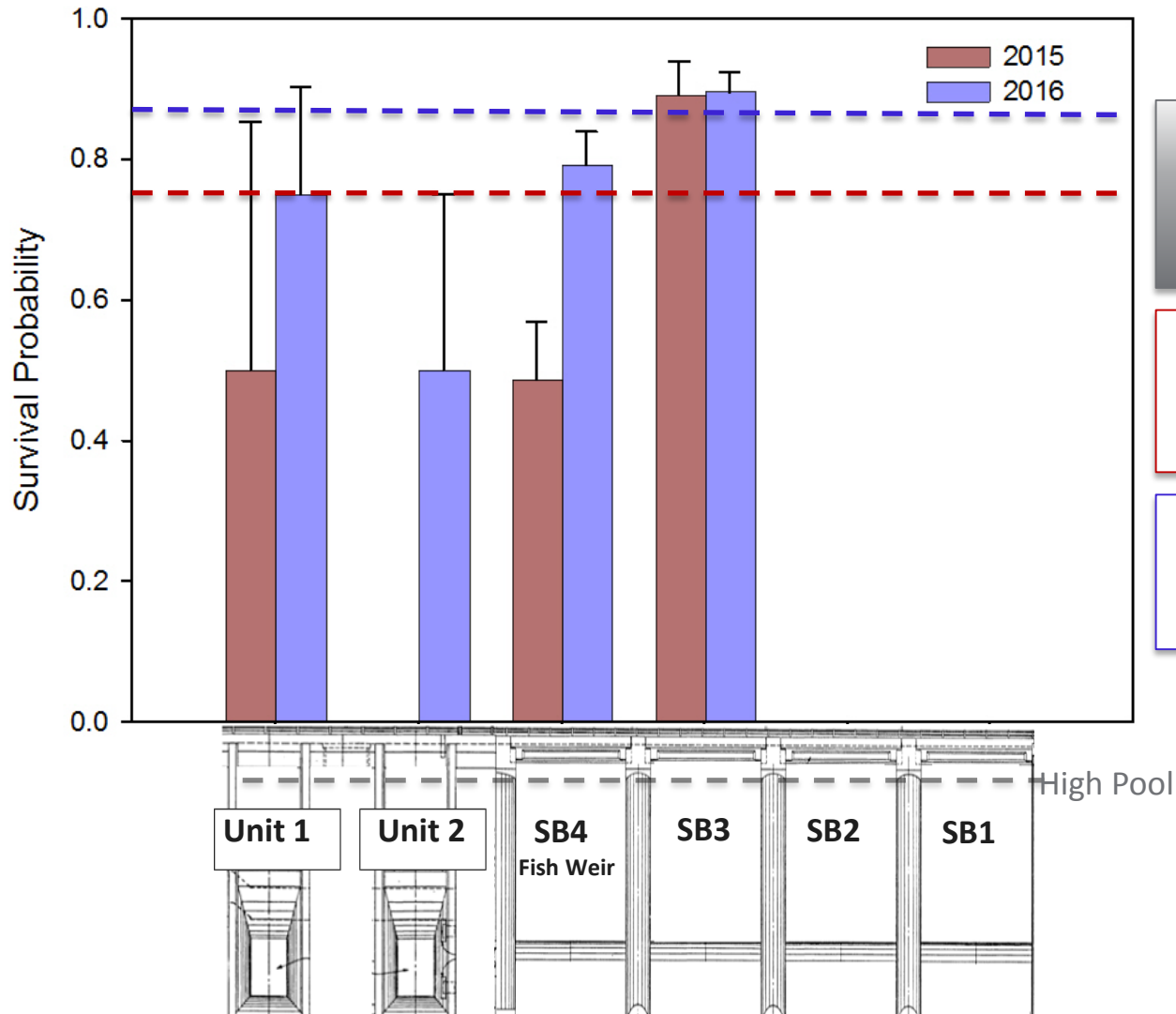
<b>Total # Released</b>	189	369
<b>Mean Length</b>	178 mm	187 mm
<b>Mean Reservoir Residence</b>	9.0 days	11.5 days

# Passage Distributions Spring – High Pool; Yearling Chinook Salmon



# Survival

## Spring – High Pool; Yearling Chinook Salmon



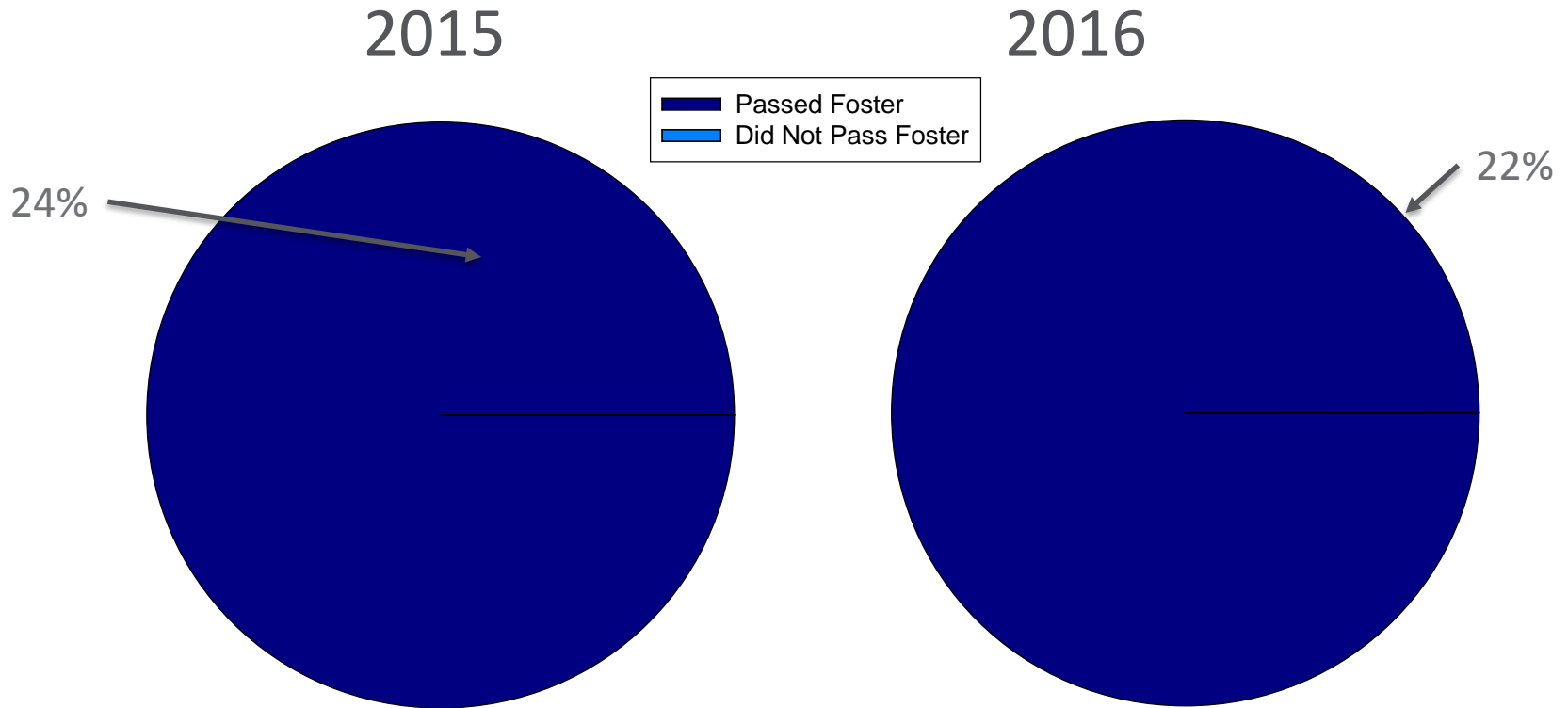
2015: n = 110  
2016: n = 215

2015 Survival  
0.7598  
SE = 0.0414

2016 Survival  
0.8560  
SE = 0.0240

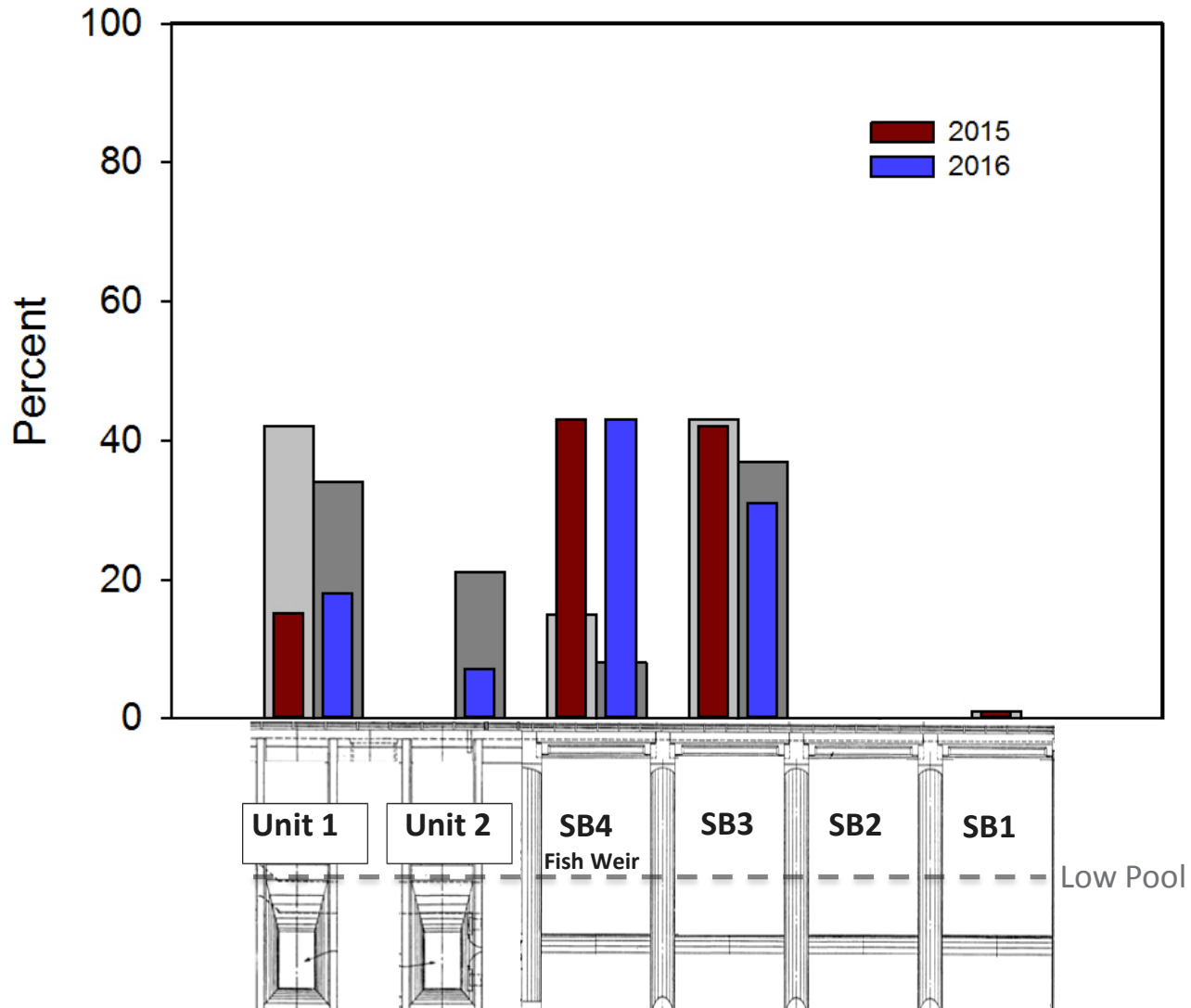
# Out-Migration Patterns

## Spring – Low Pool; Steelhead (Age-2)

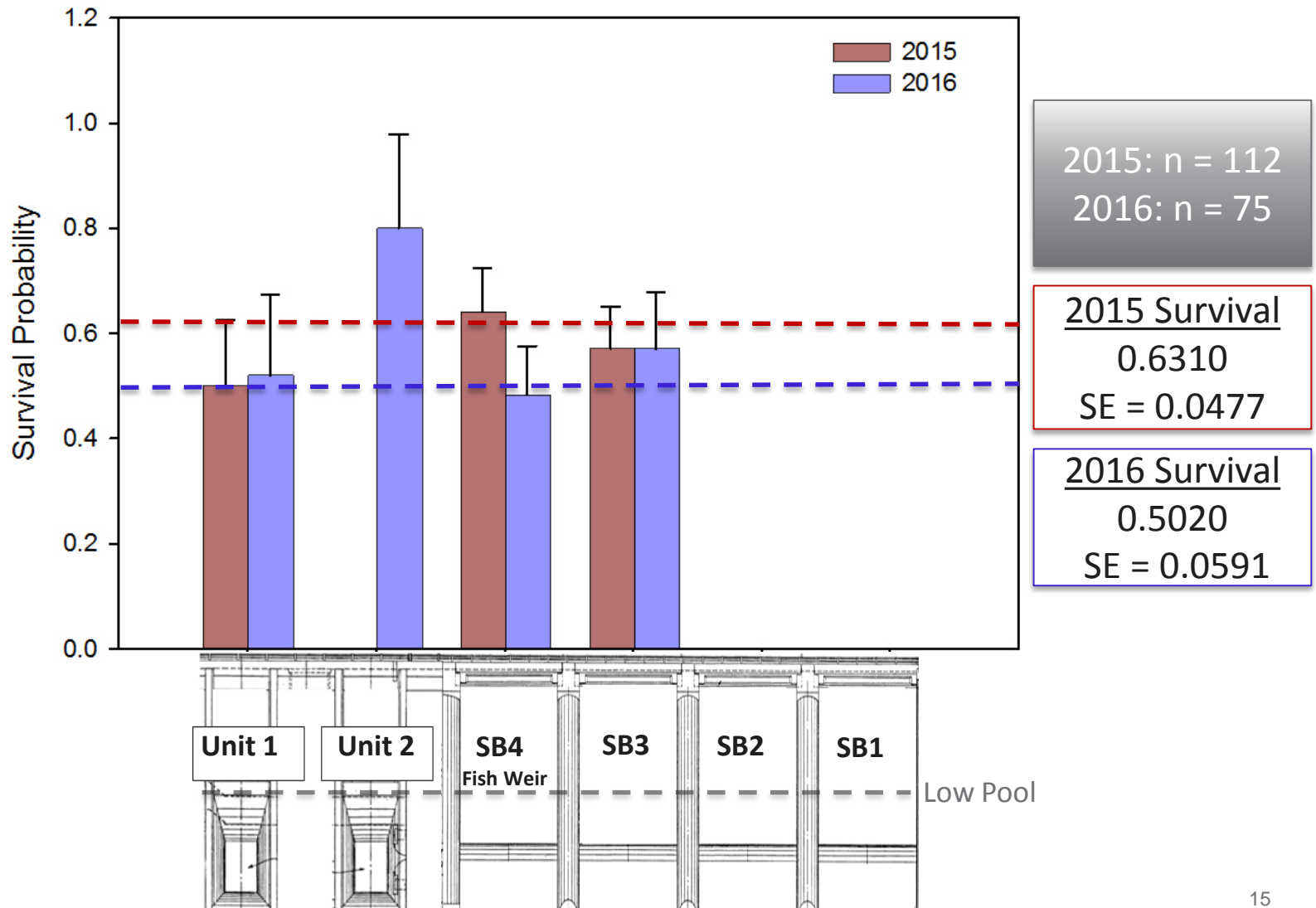


<b>Total # Released</b>	465	341
<b>Mean Length</b>	169 mm	163 mm
<b>Mean Reservoir Residence</b>	6.6 days	4.2 days

# Passage Distributions Spring – Low Pool; Steelhead (Age-2)

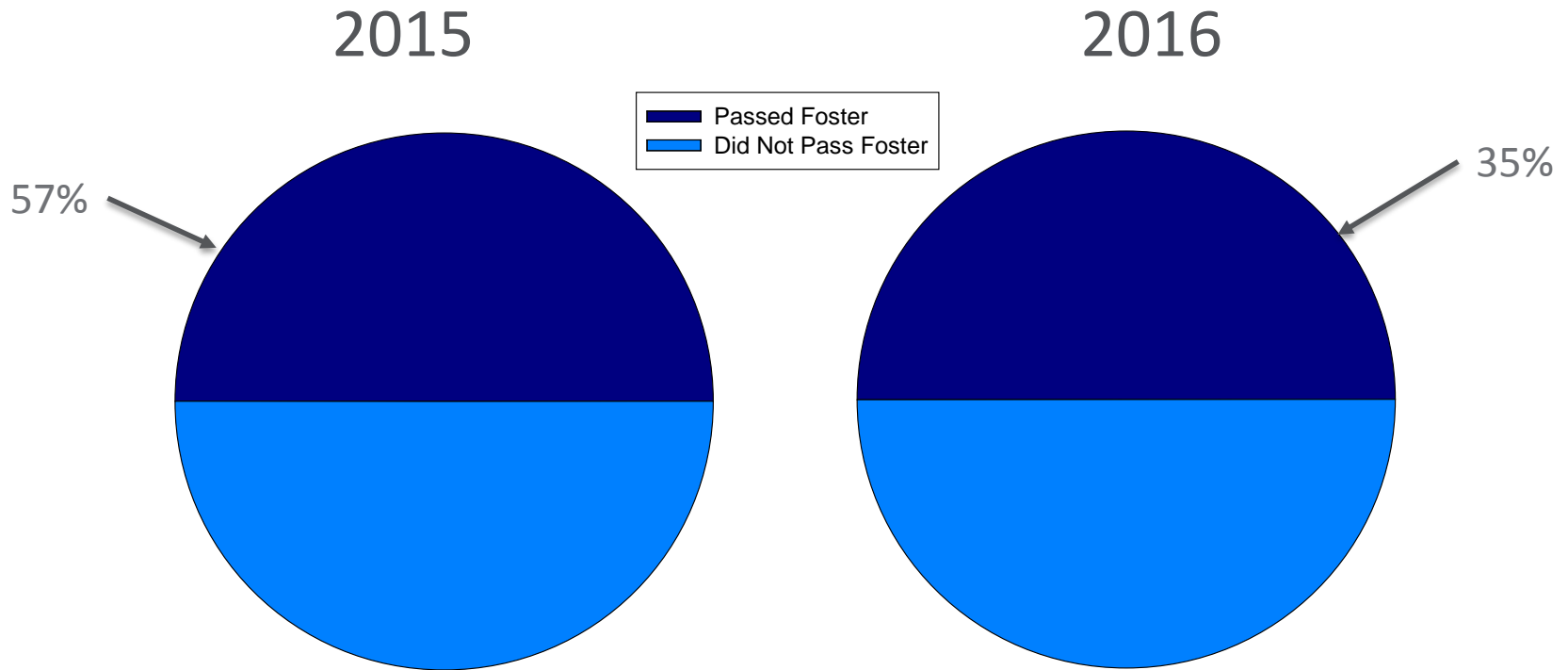


# Survival Spring – Low Pool; Steelhead (Age-2)



# Out-Migration Patterns

## Spring – High Pool; Steelhead (Age-2)



**Total # Released**

306

437

**Mean Length**

194 mm

181 mm

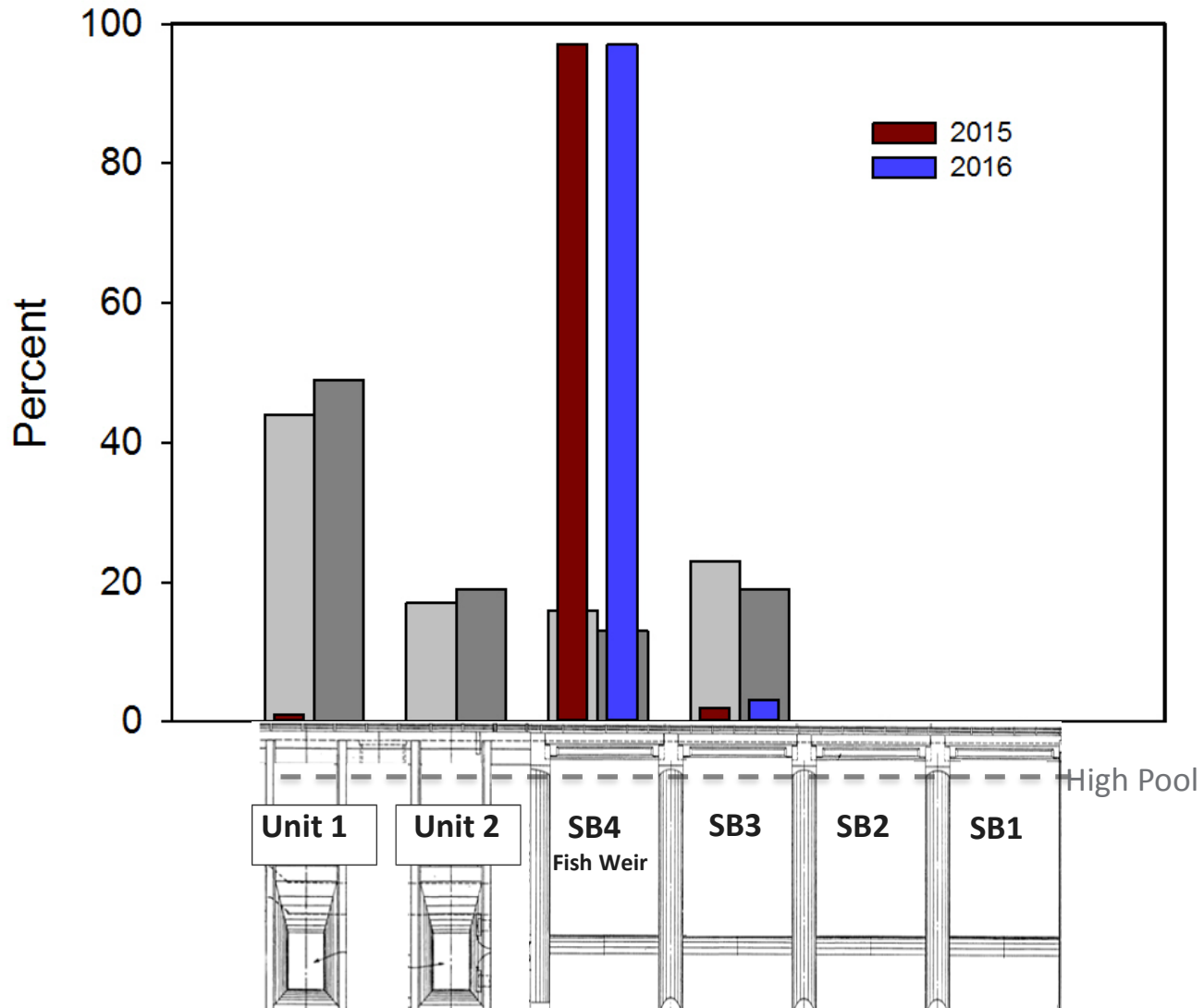
**Mean Reservoir Residence**

25.3 days

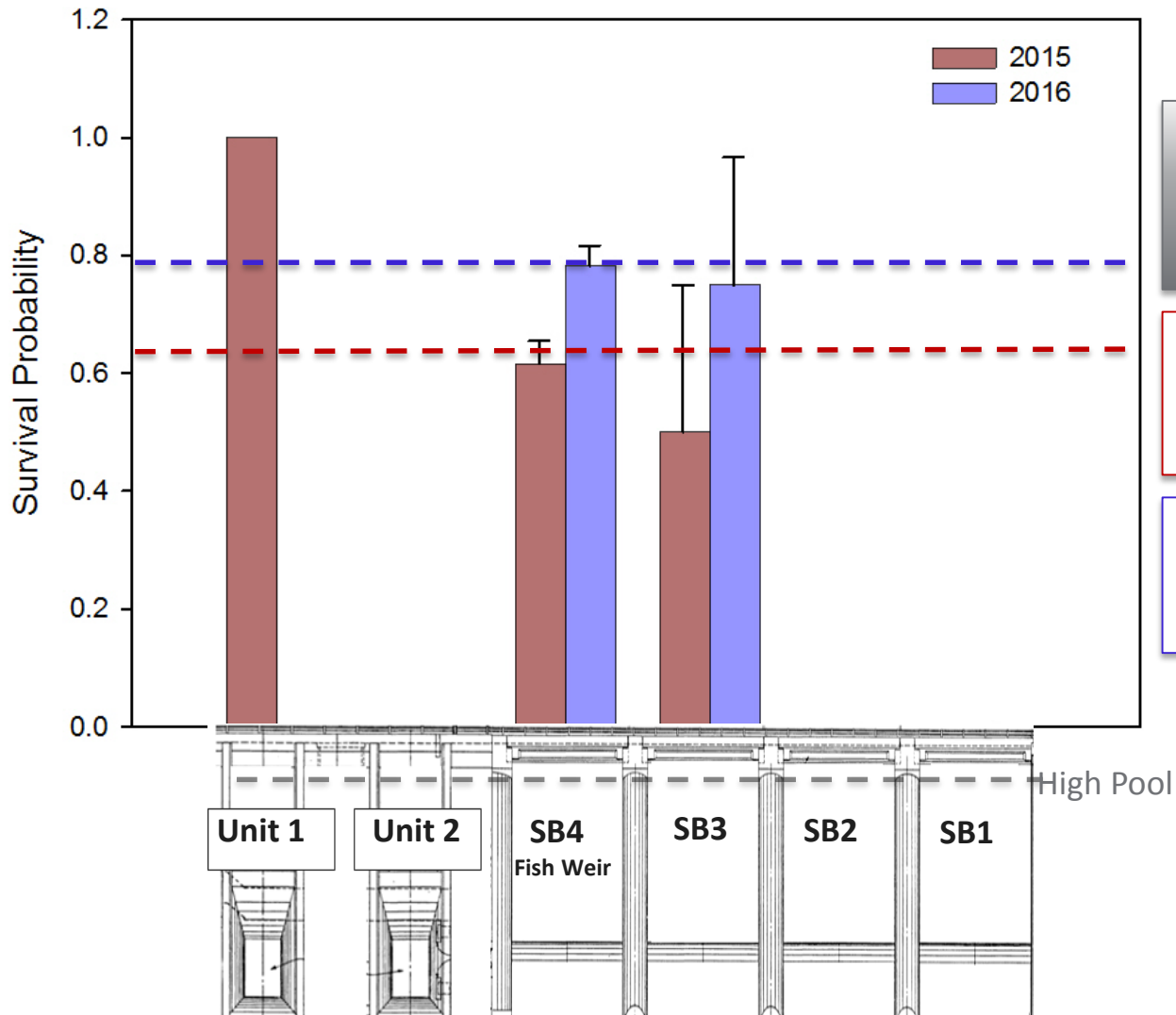
17.3 days



# Passage Distributions Spring – High Pool; Steelhead (Age-2)

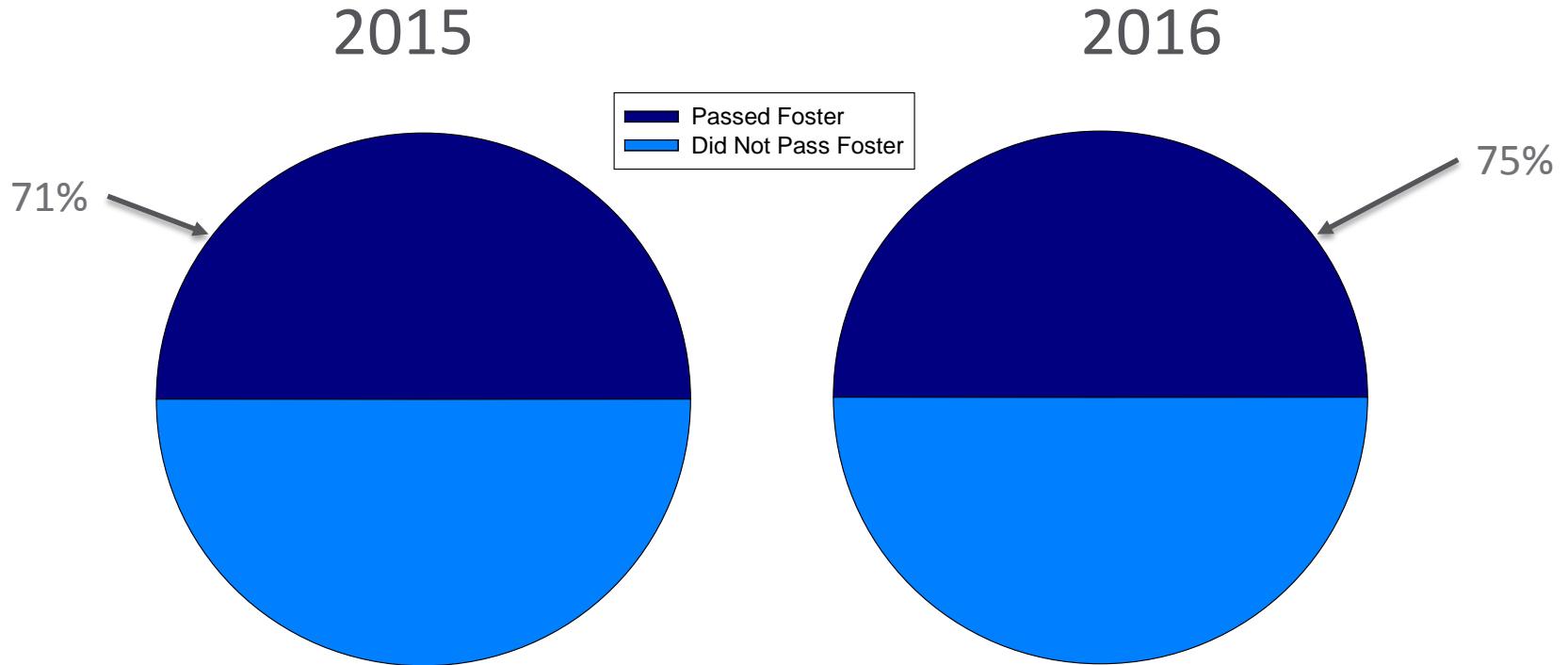


# Survival Spring – High Pool; Steelhead (Age-2)



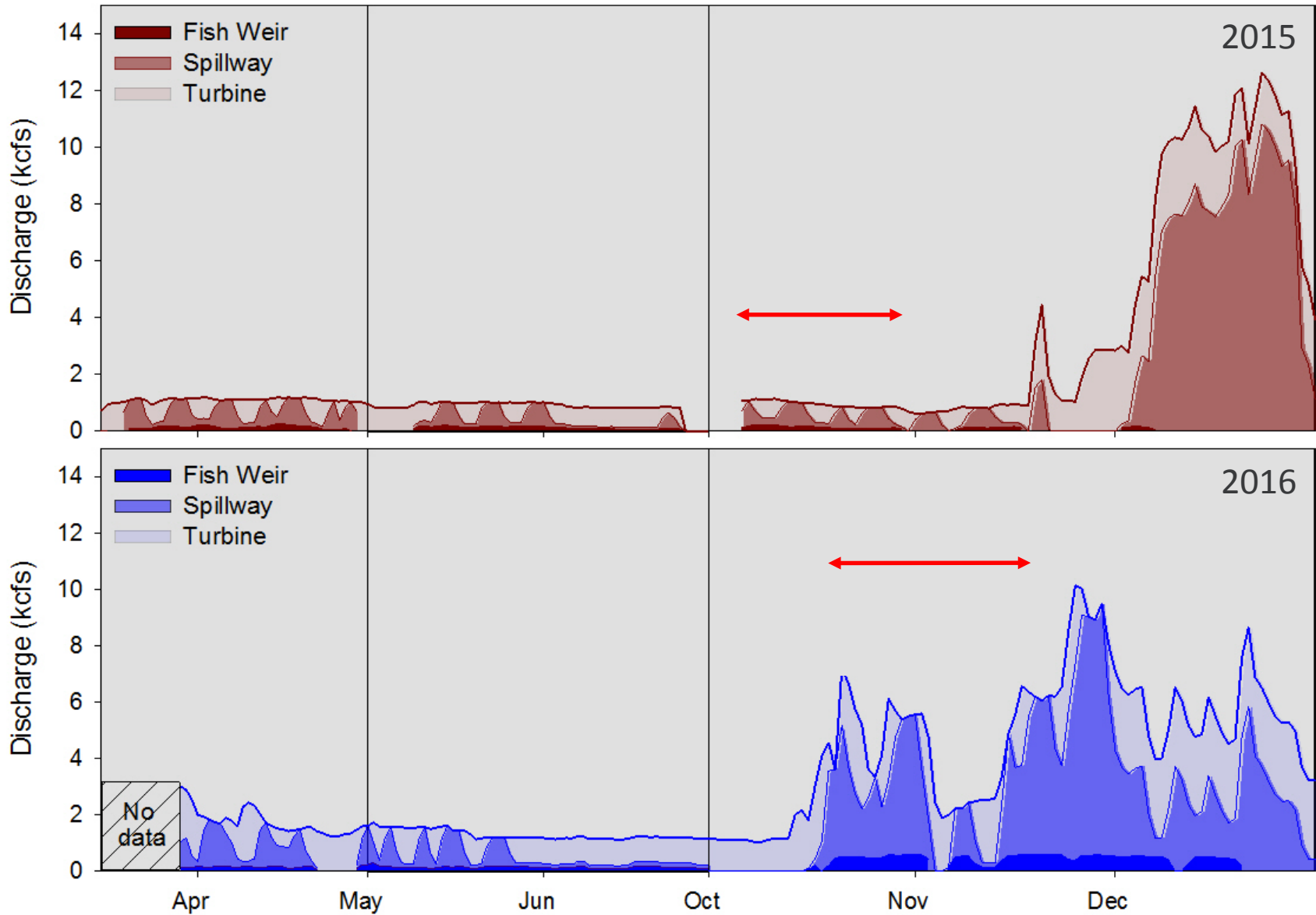
# Our-Migration Patterns

## Fall – Low Pool; Subyearling Chinook Salmon



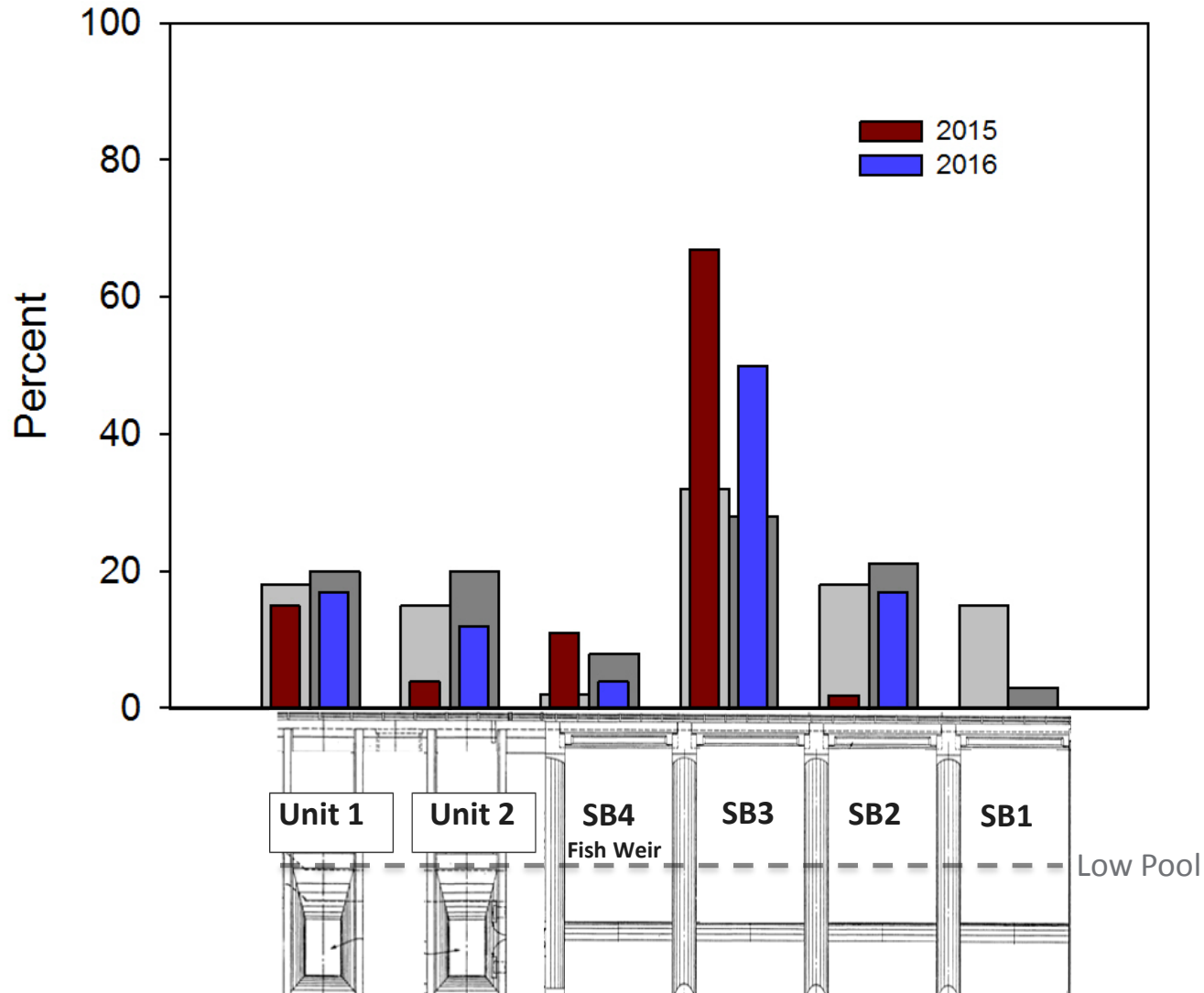
<b>Total # Released</b>	1222	1352
<b>Mean Length</b>	173 mm	162 mm
<b>Mean Reservoir Residence</b>	10.1 days	1.6 days

# Discharge by Route - Revisited



# Passage Distributions

## Fall – Low Pool; Subyearling Chinook Salmon



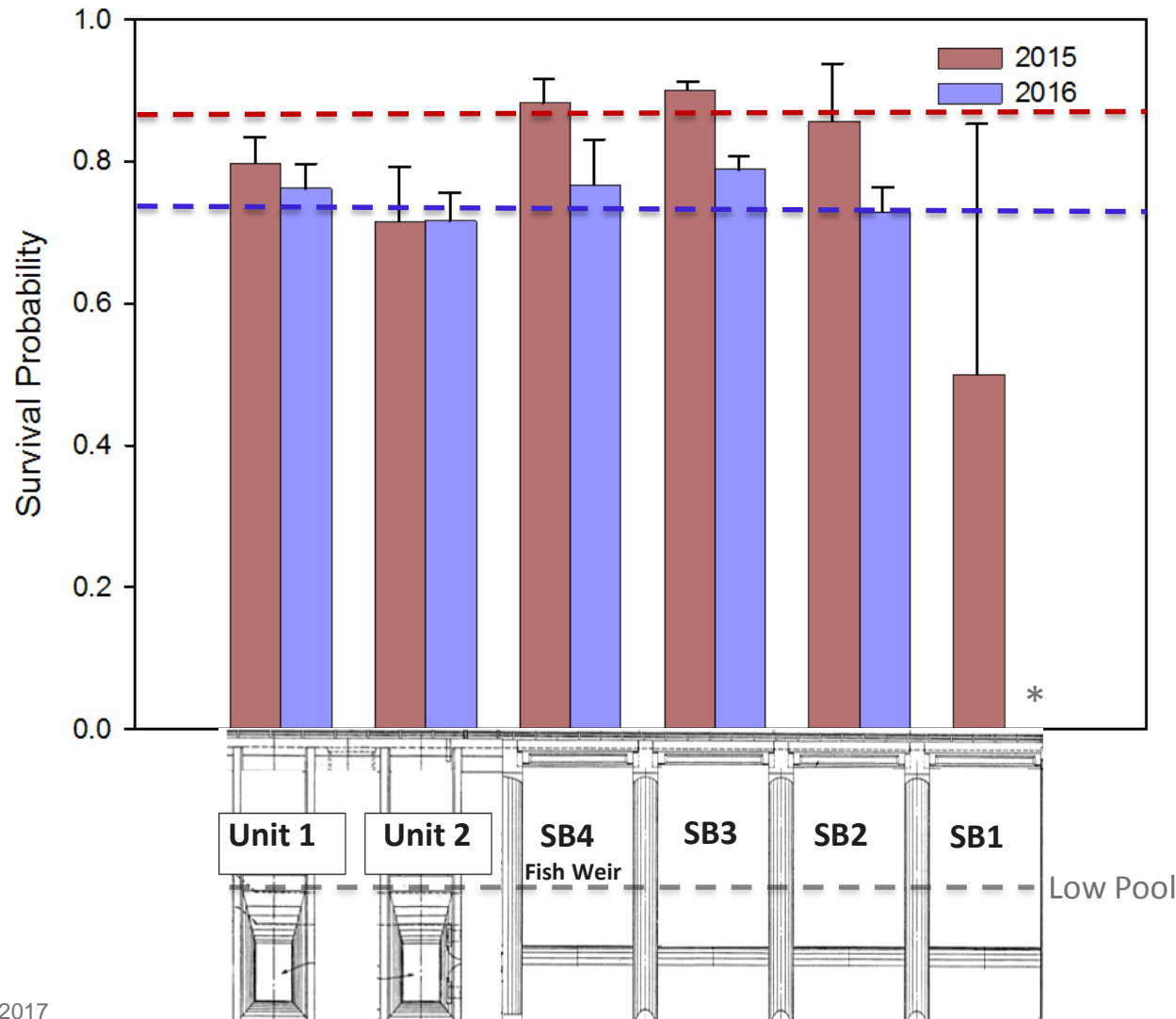
# Survival

## Fall – Low Pool; Subyearling Chinook Salmon



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2015: n = 871  
2016: n = 1014

2015 Survival  
0.8760  
SE = 0.0112

2016 Survival  
0.7603  
SE = 0.0130

# Summary and Notable Results

- ▶ Preferred route of passage
  - Yearling Chinook Salmon – Spillway (SB3)
  - Steelhead (Age-2) – Fish Weir (SB4)
  - Subyearling Chinook Salmon – Spillway (SB3)
  
- ▶ For both the 2015 and 2016 study years, only one age-2 steelhead was detected in the Auxiliary Water Supply in spring 2015 at low pool.
  
- ▶ Tagged age-1 steelhead in fall 2015 and 2016
  - 2015; n=94, 4% passed Foster
  - 2016; n=145, 7% passed Foster

# Acknowledgments

## ▶ Army Corps of Engineers

- Fenton Khan
- Steve Gardner
- Thomas Voldbaek
- Greg Taylor
- Chad Helms
- Doug Garletts
- Foster control room operators,  
Engineering and structural staff

## ▶ Cramer Fish Sciences

- Peter Stevens
- Mark Morasch

## ▶ Lotek Wireless Inc.

- Larry Egan
- Matt Knoff

## ▶ PNNL

- Kate Deters
- John Stephenson
- Ethan Green
- Erika Cutsforth
- Kristin Engbrecht
- Alison Colotelo

## ▶ OSU

- Karen Cogliati
- Rob Chitwood
- Staff of the fish surrogate  
program

## ▶ ODFW

- Fred Monzyk
- Brett Boyd
- Cameron Sharpe
- Jeremy Romer



