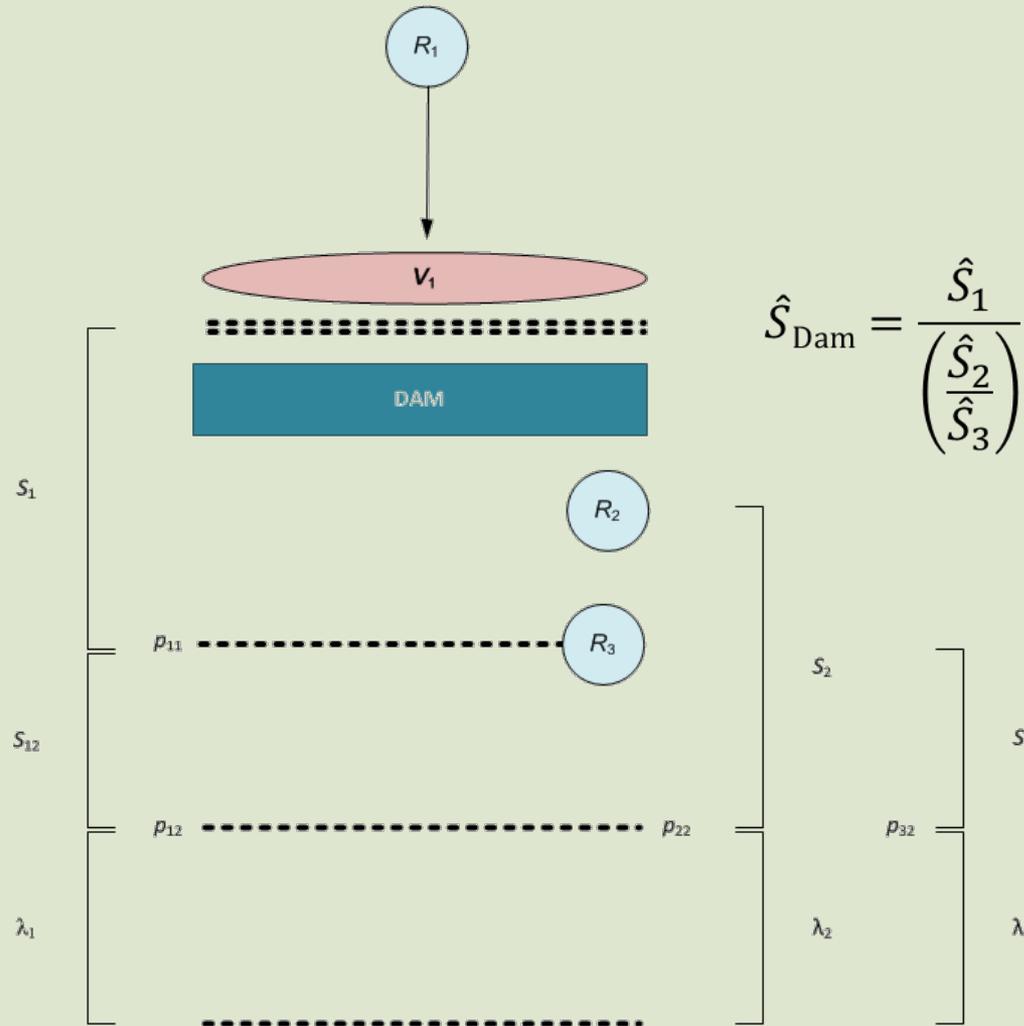


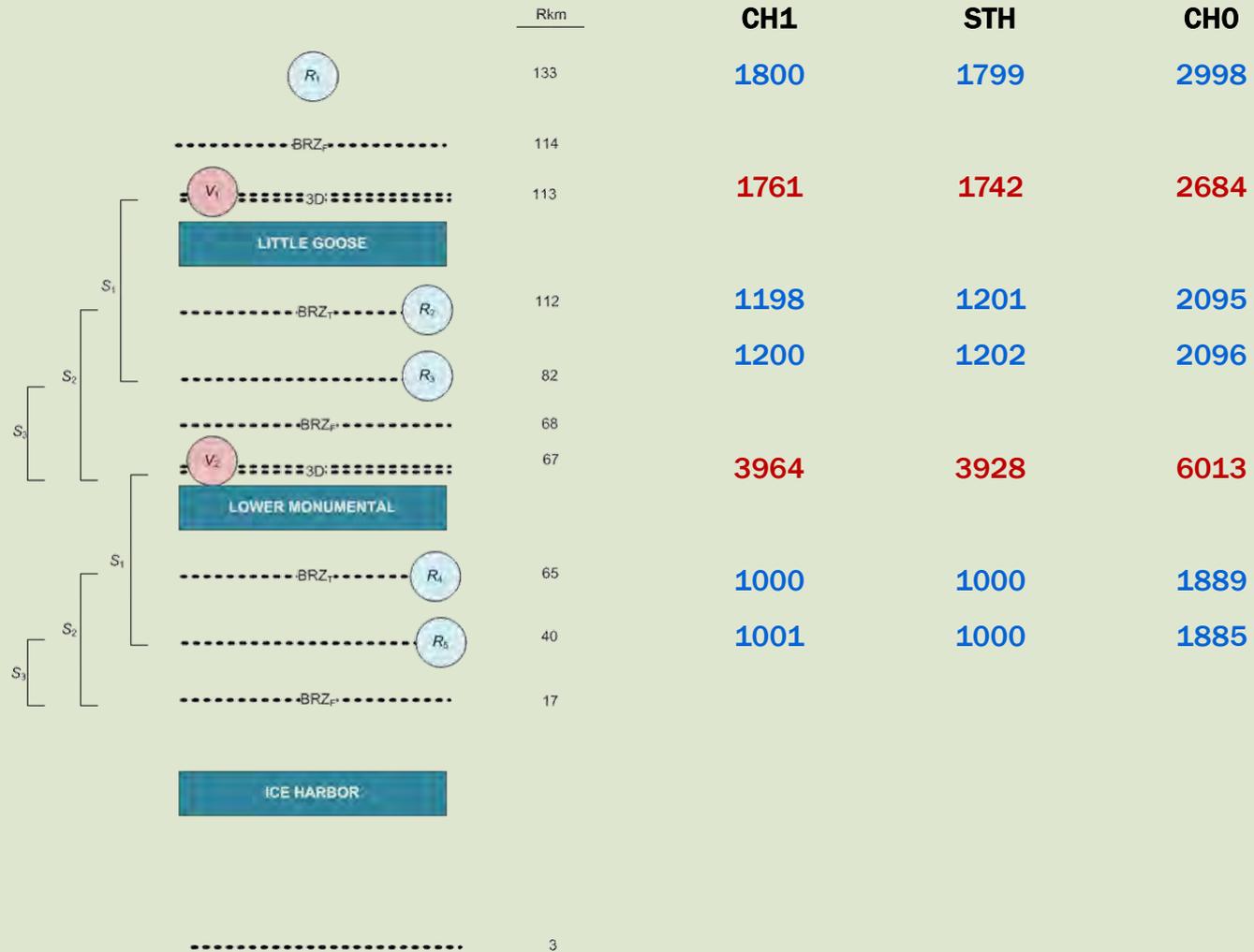
OBJECTIVES

- Perform spring and summer compliance studies at:
 - Little Goose Dam
 - Lower Monumental Dam
- 2008 BiOp:
 - Spring stocks (e.g., CH1, STH)
 $\hat{S}_{\text{Dam}} \geq 0.96$ with $\widehat{SE} \leq 0.015$
 - Summer stocks (e.g., CH0)
 $\hat{S}_{\text{Dam}} \geq 0.93$ with $\widehat{SE} \leq 0.015$

OVERVIEW OF VIRTUAL/PAIRED-RELEASE DESIGN



RELEASE-RECAPTURE DESIGN FOR SNAKE RIVER STUDIES



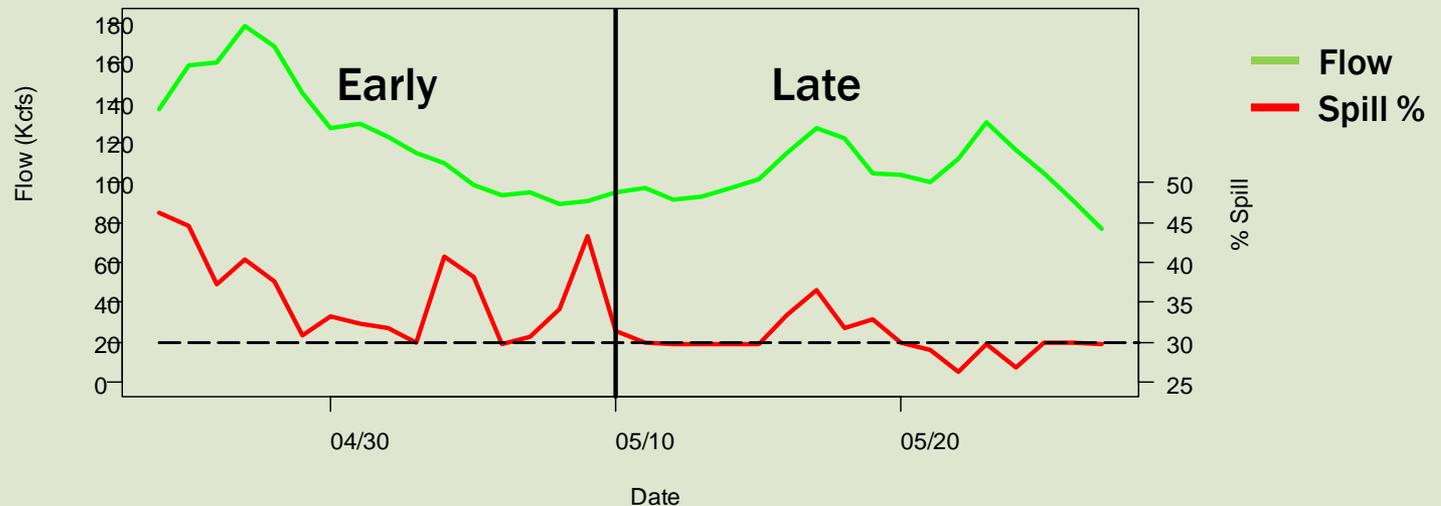
RESULTS

ASSUMPTION EVALUATIONS

- Downstream mixing – Yes
- Adequate tag life – Yes
- Balanced tagger effort – Yes
- Tagger effects – None found
- Delayed handling/tag effects – None found
- False-positive detections from dead tagged fish
 - 1/32 CHO at Little Goose Dam
 - \hat{S}_{Dam} adjusted for this rate of occurrence
- Size of tagged and ROR fish compared
- Study period vs. run timing compared

LITTLE GOOSE DAM

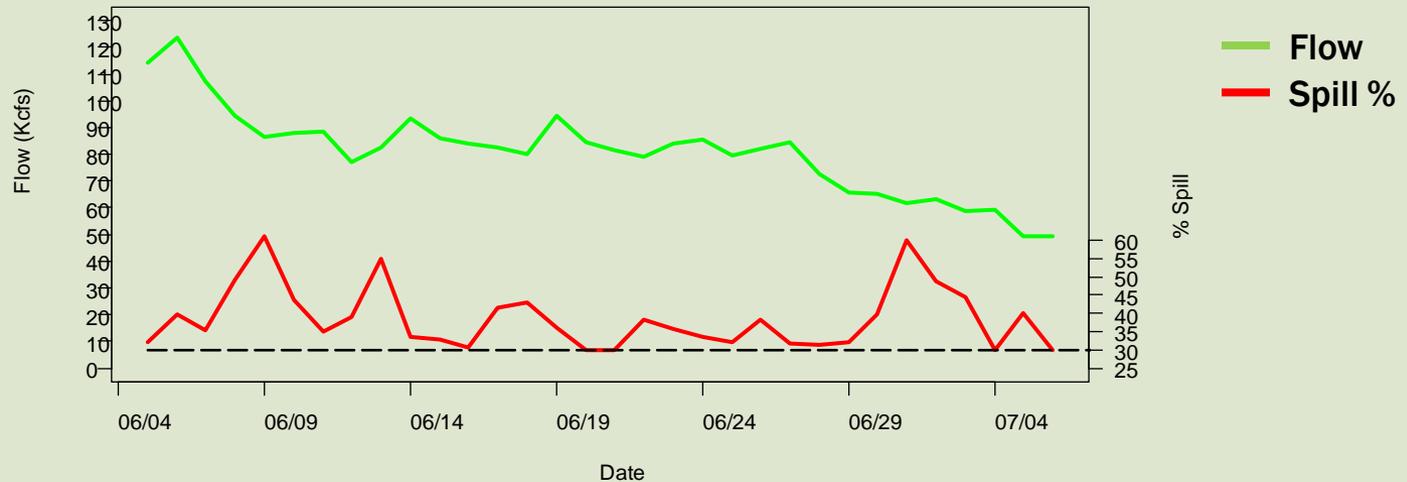
Spill Target: 30% in Spring



Stock	Early	Late	P-value
CH1	$\hat{S}_{\text{Dam}} = 0.9748(0.0126)$	$\hat{S}_{\text{Dam}} = 0.9867(0.0098)$	0.5107
STH	$\hat{S}_{\text{Dam}} = 0.9967(0.0142)$	$\hat{S}_{\text{Dam}} = 0.9932(0.0098)$	0.7631

LITTLE GOOSE DAM

Spill Target: 30% in Summer



Generally: Spill above 30% for most of summer study

LITTLE GOOSE DAM – DAM PASSAGE SURVIVAL, SEASON-WIDE

■ Yearling Chinook Salmon

$$\hat{S}_{\text{Dam}} = \frac{0.9581}{\left(\frac{0.9696}{0.9941}\right)} = \frac{0.9581}{0.9754} = 0.9822 (\widehat{\text{SE}} = 0.0076)$$

■ Steelhead

$$\hat{S}_{\text{Dam}} = \frac{0.9707}{\left(\frac{0.9620}{0.9859}\right)} = \frac{0.9707}{0.9758} = 0.9948 (\widehat{\text{SE}} = 0.0081)$$

■ Subyearling Chinook Salmon

$$\hat{S}_{\text{Dam}} = \frac{0.9267}{\left(\frac{0.9257}{0.9527}\right)} = \frac{0.9267}{0.9717} = 0.9537 (\widehat{\text{SE}} = 0.0092)$$

However, 1/32 dead tagged fish detected downriver at rkm 82.

Adjusted survival: $\hat{S}_{\text{Dam}} = 0.9508 (\widehat{\text{SE}} = 0.0097)$.

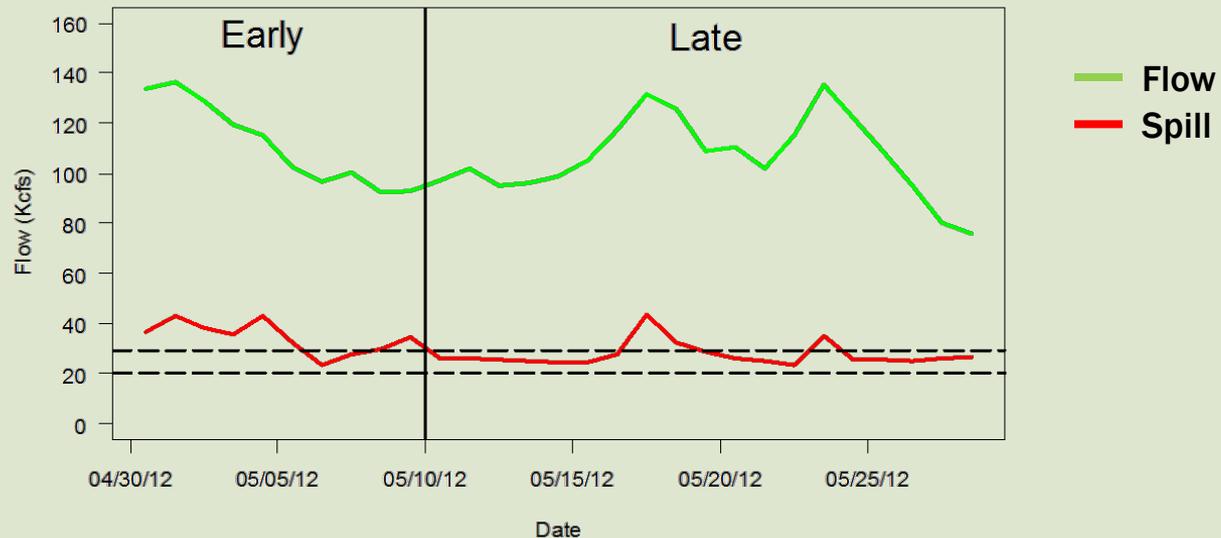
FISH ACCORDS: LITTLE GOOSE 2012 SEASON-WIDE

Performance Measure	CH1	STH	CH0
$\hat{S}_{BRZ-BRZ}$	0.9813 (0.0076)	0.9943 (0.0081)	0.9454 (0.0098)
Forebay residence time (median)	2.58 h	2.67 h	2.80 h
Tailrace egress time (median)	0.60 h	0.69 h	0.80 h
SPE*	0.653 (0.011)	0.561 (0.012)	0.725 (0.009)
FPE	0.963 (0.005)	0.980 (0.003)	0.951 (0.004)

*Includes spill and spillway weir

LOWER MONUMENTAL

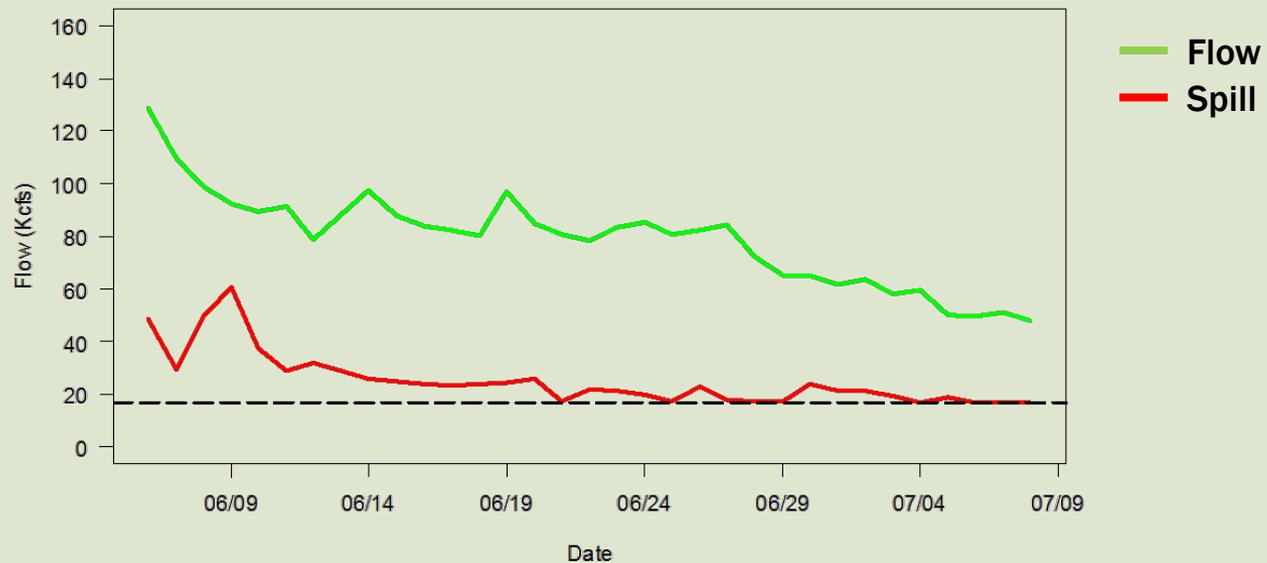
Spill Target: 20-29 kcfs in Spring to Gas Cap



Stock	Early	Late	P-value
CH1	$\hat{S}_{\text{Dam}} = 0.9692(0.0175)$	$\hat{S}_{\text{Dam}} = 0.9939(0.0105)$	0.2262
STH	$\hat{S}_{\text{Dam}} = 0.9802(0.0040)$	$\hat{S}_{\text{Dam}} = 0.9741(0.0155)$	0.7032

LOWER MONUMENTAL

Spill Target: 17kcfs in Summer



Summer spill operations began June 21

LOWER MONUMENTAL DAM – DAM PASSAGE SURVIVAL, SEASON-WIDE

■ Yearling Chinook Salmon

$$\hat{S}_{\text{Dam}} = \frac{0.9709}{\left(\frac{0.9580}{0.9737}\right)} = \frac{0.9709}{0.9839} = 0.9868 (\widehat{\text{SE}} = 0.0090)$$

■ Steelhead

$$\hat{S}_{\text{Dam}} = \frac{0.9826}{\left(\frac{0.9319}{0.9317}\right)} = \frac{0.9826}{1.0002} \text{ set } 0.9826 (\widehat{\text{SE}} = 0.0021)$$

■ Subyearling Chinook Salmon

$$\hat{S}_{\text{Dam}} = \frac{0.9424}{\left(\frac{0.9344}{0.9706}\right)} = \frac{0.9424}{0.9627} = 0.9789 (\widehat{\text{SE}} = 0.0079)$$

FISH ACCORDS: LOWER MONUMENTAL 2012 SEASON-WIDE

Performance Measure	CH1	STH	CH0
$\hat{S}_{BRZ-BRZ}$	0.9859 (0.0090)	0.9815 (0.0022)	0.9721 (0.0079)
Forebay residence time (median)	2.35 h	2.17 h	2.60 h
Tailrace egress time (median)	0.40 h	0.40 h	0.53 h
SPE*	0.789 (0.007)	0.659 (0.008)	0.836 (0.005)
FPE	0.948 (0.004)	0.965 (0.003)	0.924 (0.003)

*Includes spill and spillway weir

CONCLUSIONS

- Six survival studies performed
 - All 6 achieved survival standard
 - All 6 achieved precision level
- Assumptions satisfied
- Spill targets were difficult to achieve
 - \hat{S}_{Dam} is not different in high and low spring spills

	CH1	STH	CHO
LGO	×	×	×
LMO	×	×	×