Passage & Survival for Radio-tagged Yearling Chinook Salmon and Juvenile Steelhead at Lower Monumental Dam, 2007

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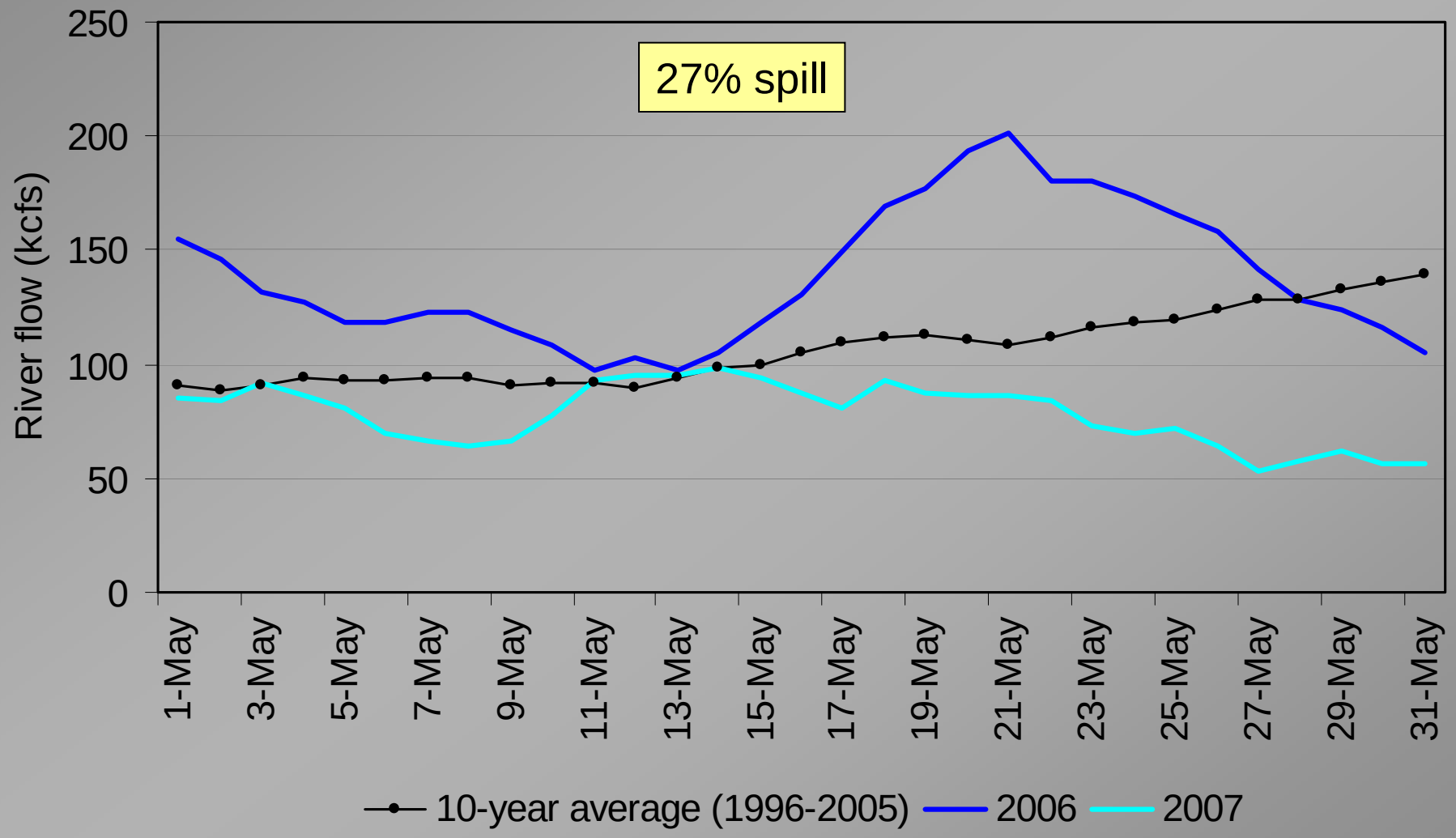
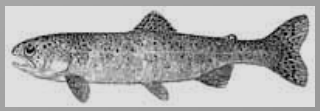
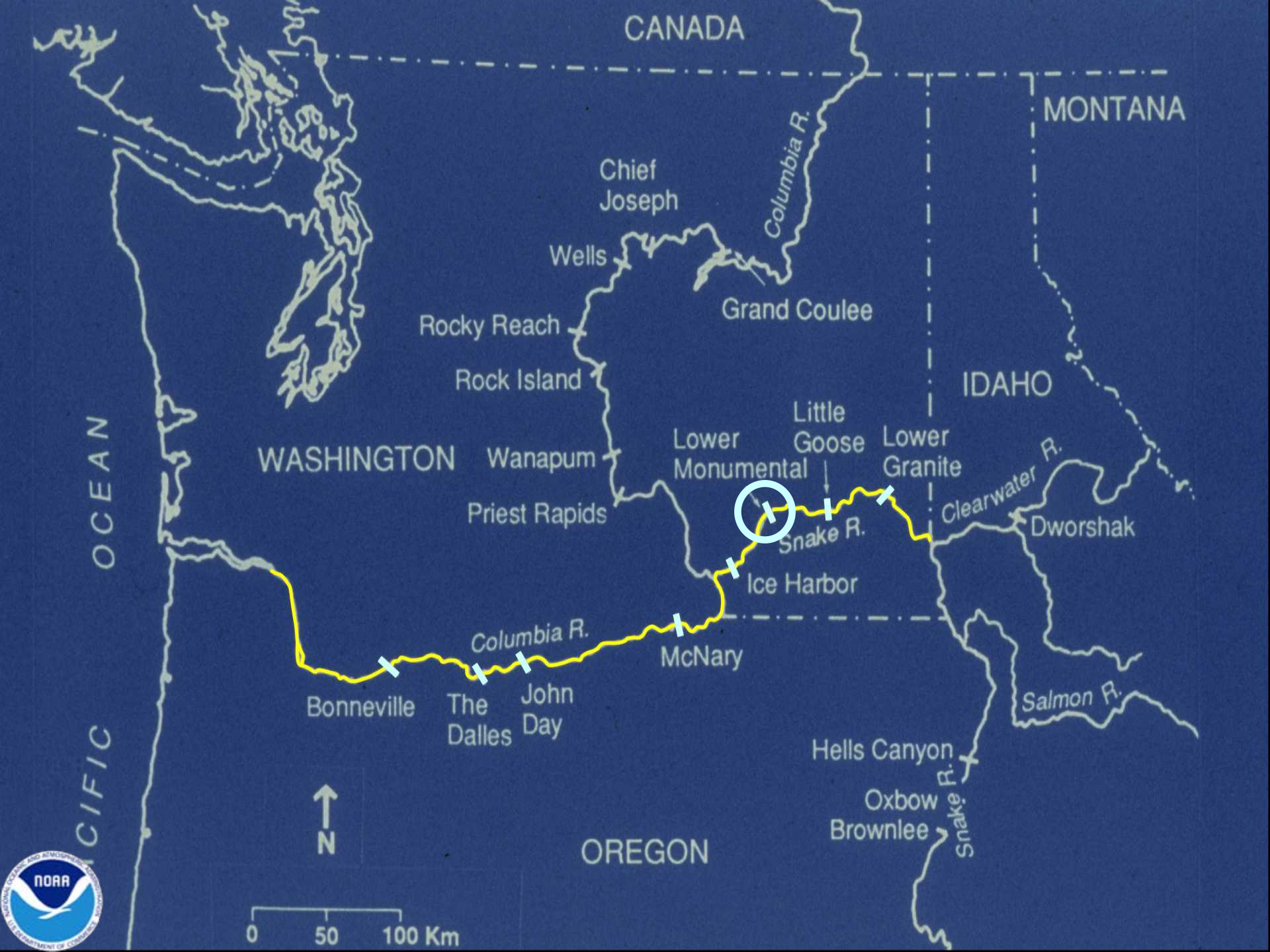
Methods – *Conditions*



Lower Monumental Dam Study Objectives

- Evaluate Passage Behavior
  - Forebay residence/delay
  - Approach distribution
  - Passage distribution
  - Tailrace egress
  - Fish Passage Metrics
- Estimate Relative Survival Using a Paired Release Design
  - Dam and concrete survival
  - Route specific survival
- yearling Chinook salmon and juvenile steelhead

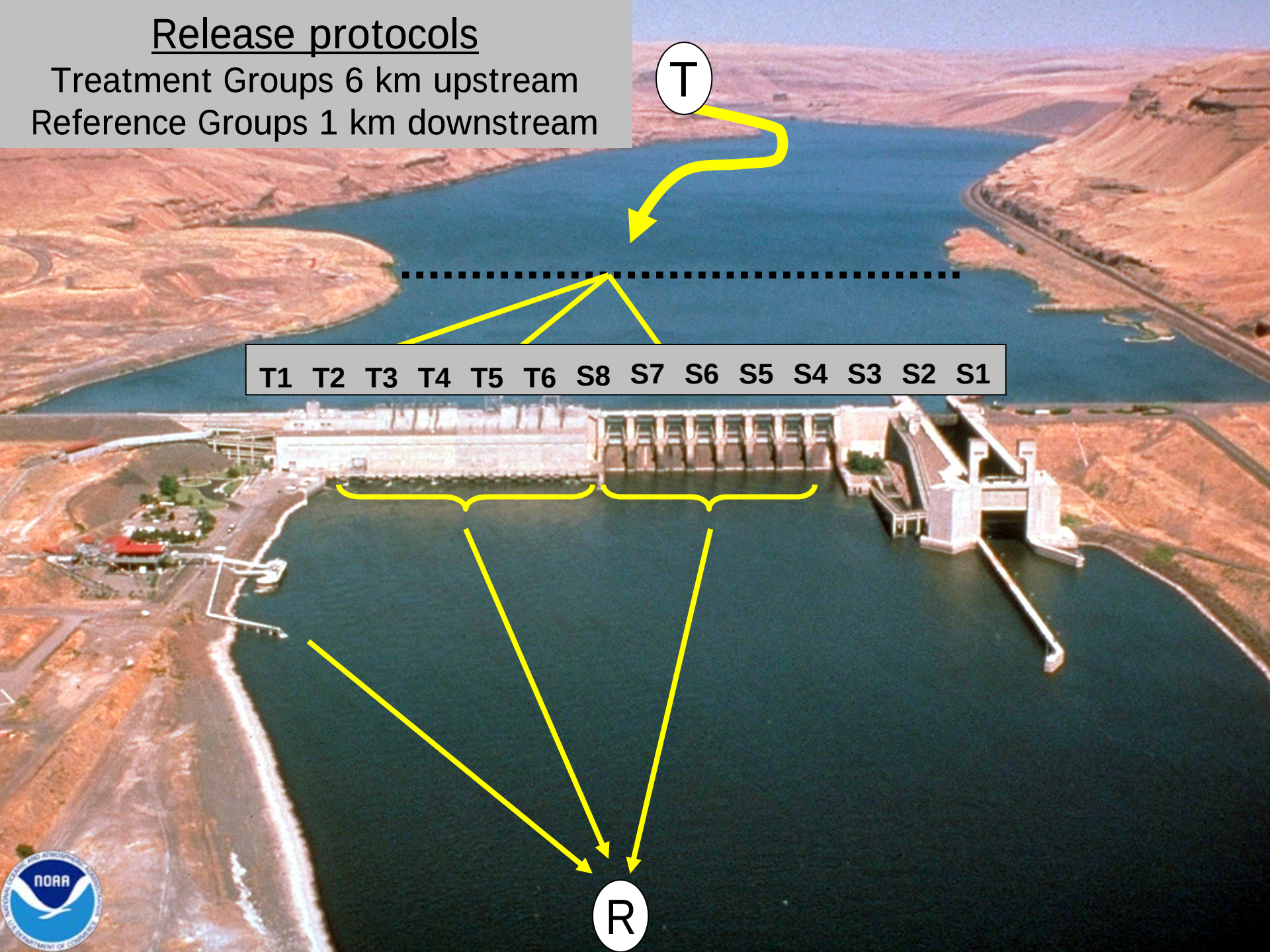



CANADA
MONTANA
IDAHO
WASHINGTON
OREGON
PACIFIC OCEAN
Columbia R.
Chief Joseph
Wells
Grand Coulee
Rocky Reach
Rock Island
Wanapum
Priest Rapids
Lower Monumental
Little Goose
Lower Granite
Snake R.
Clearwater R.
Dworshak
Ice Harbor
McNary
Columbia R.
Bonneville
The Dalles
John Day
Salmon R.
Hells Canyon
Oxbow
Brownlee
Snake R.
N
0
50
100 Km

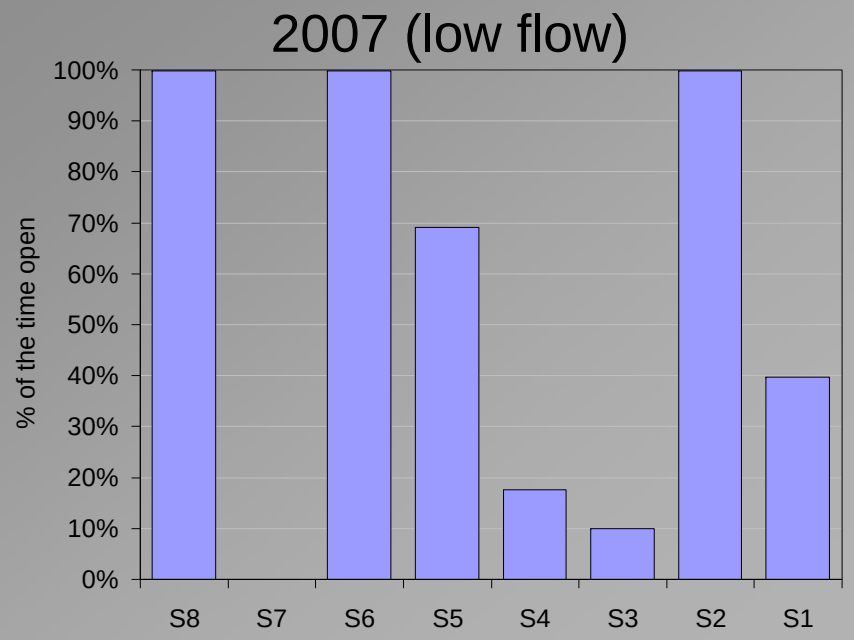
Release protocols

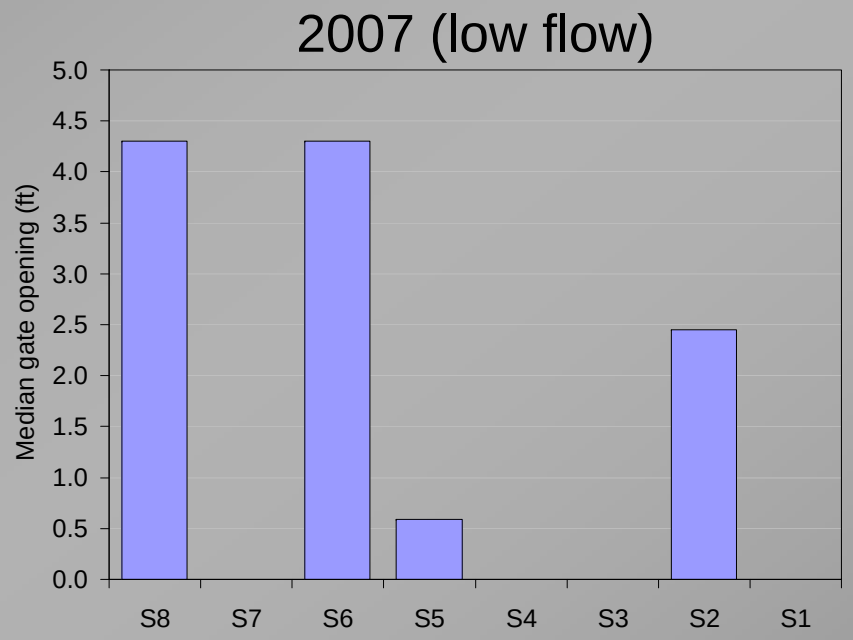
Treatment Groups 6 km upstream

Reference Groups 1 km downstream



Methods - *Spill Pattern*





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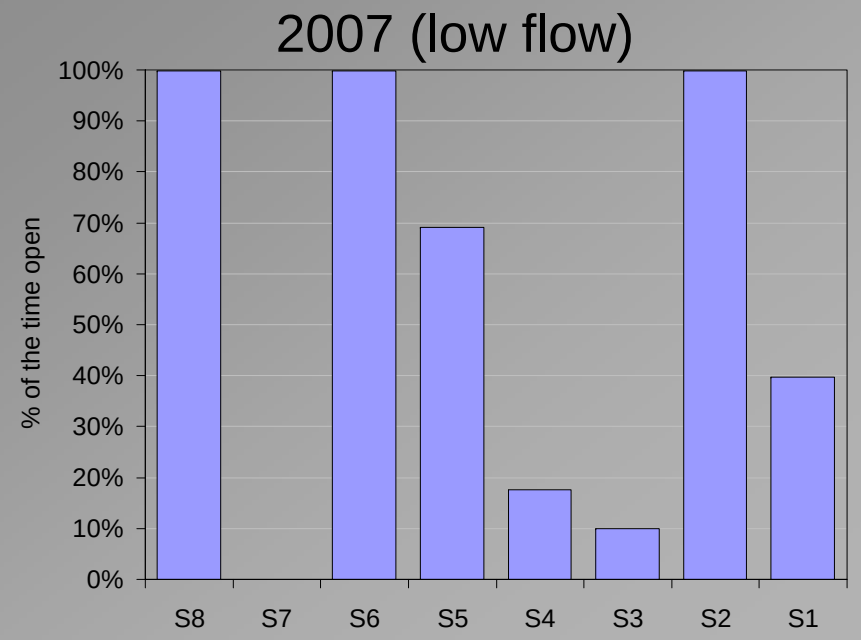
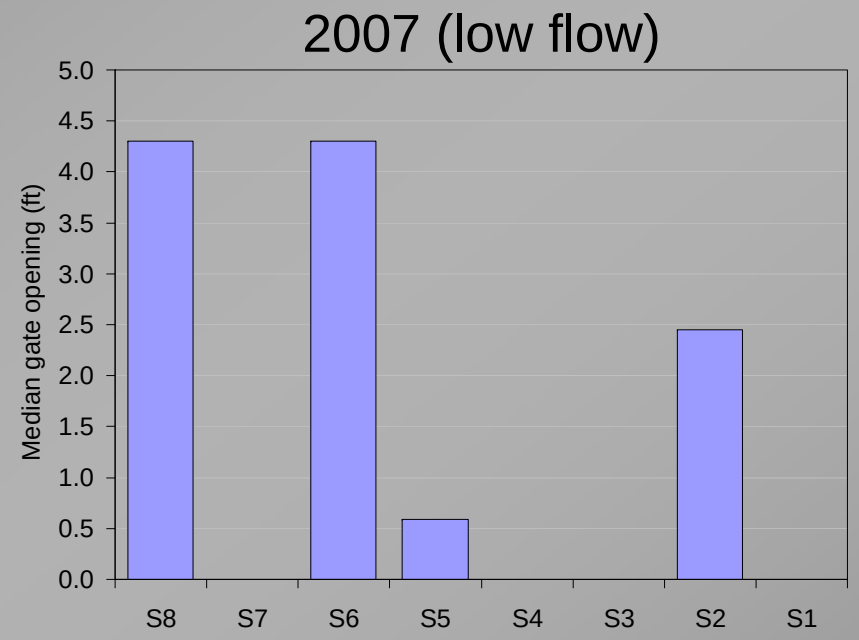
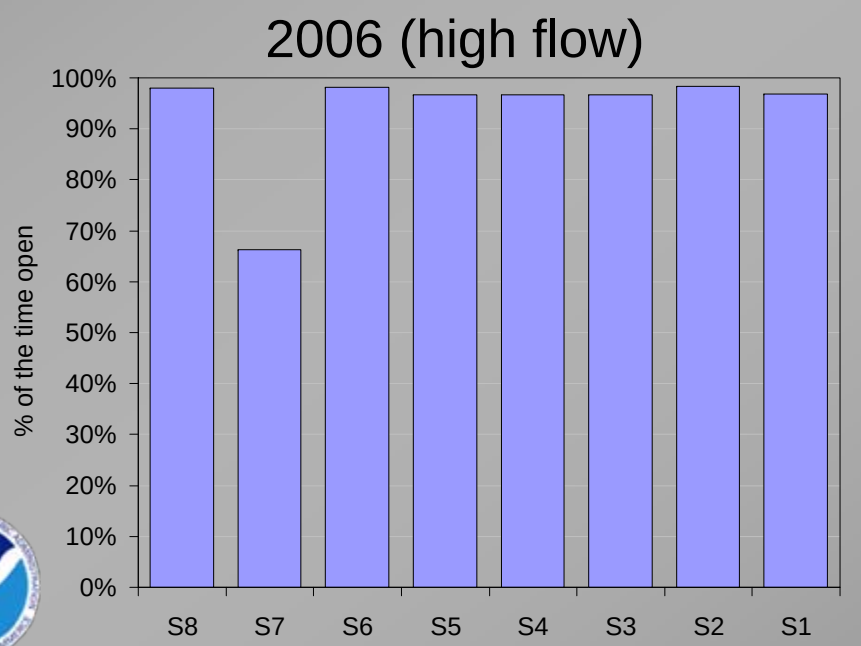
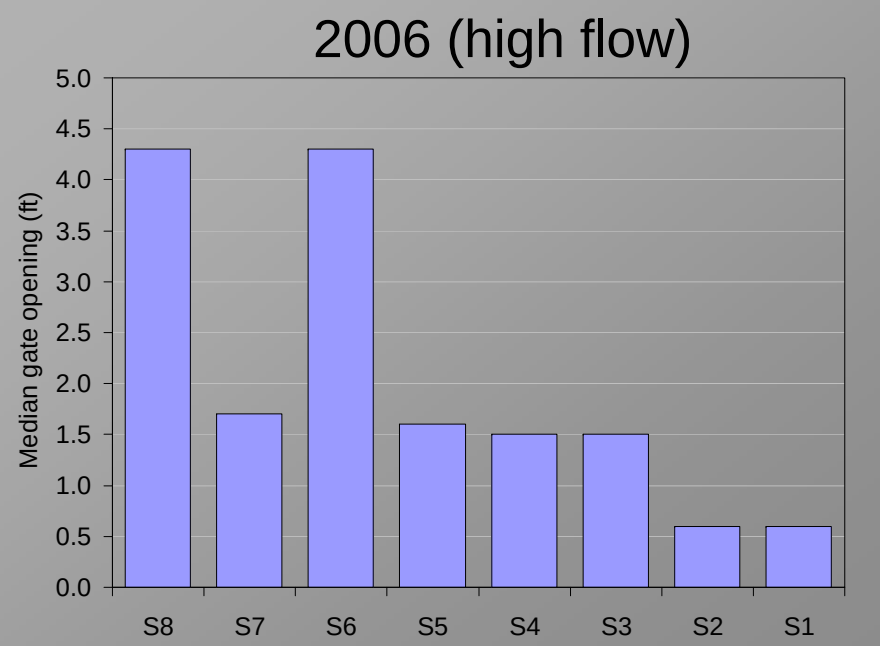


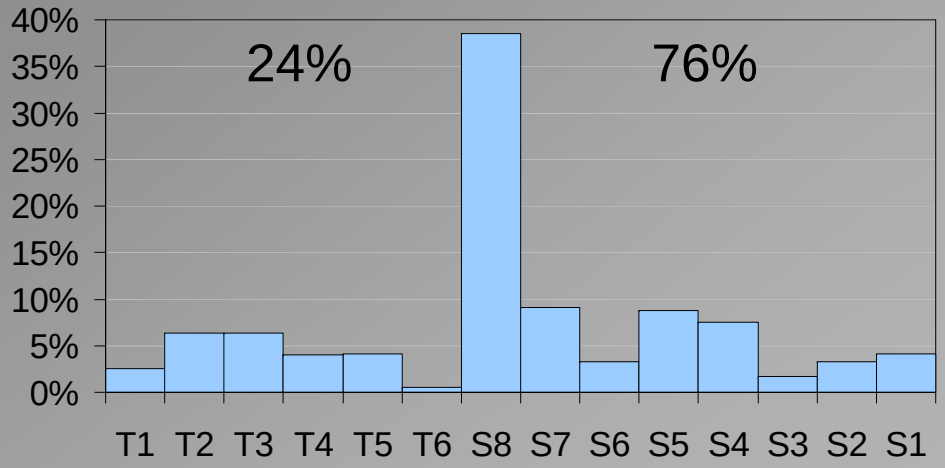






Results – *Horizontal approach distribution (5m resolution)*

2007 (low flow)



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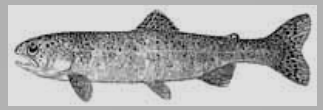

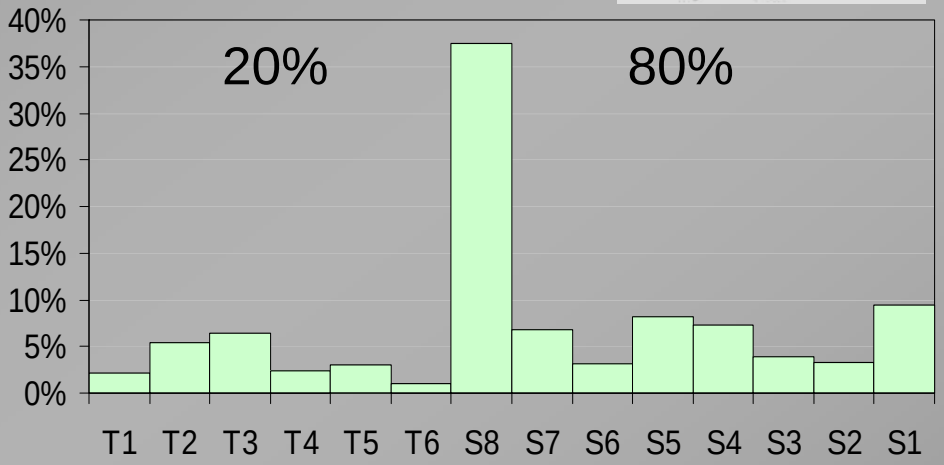

Flow ↓

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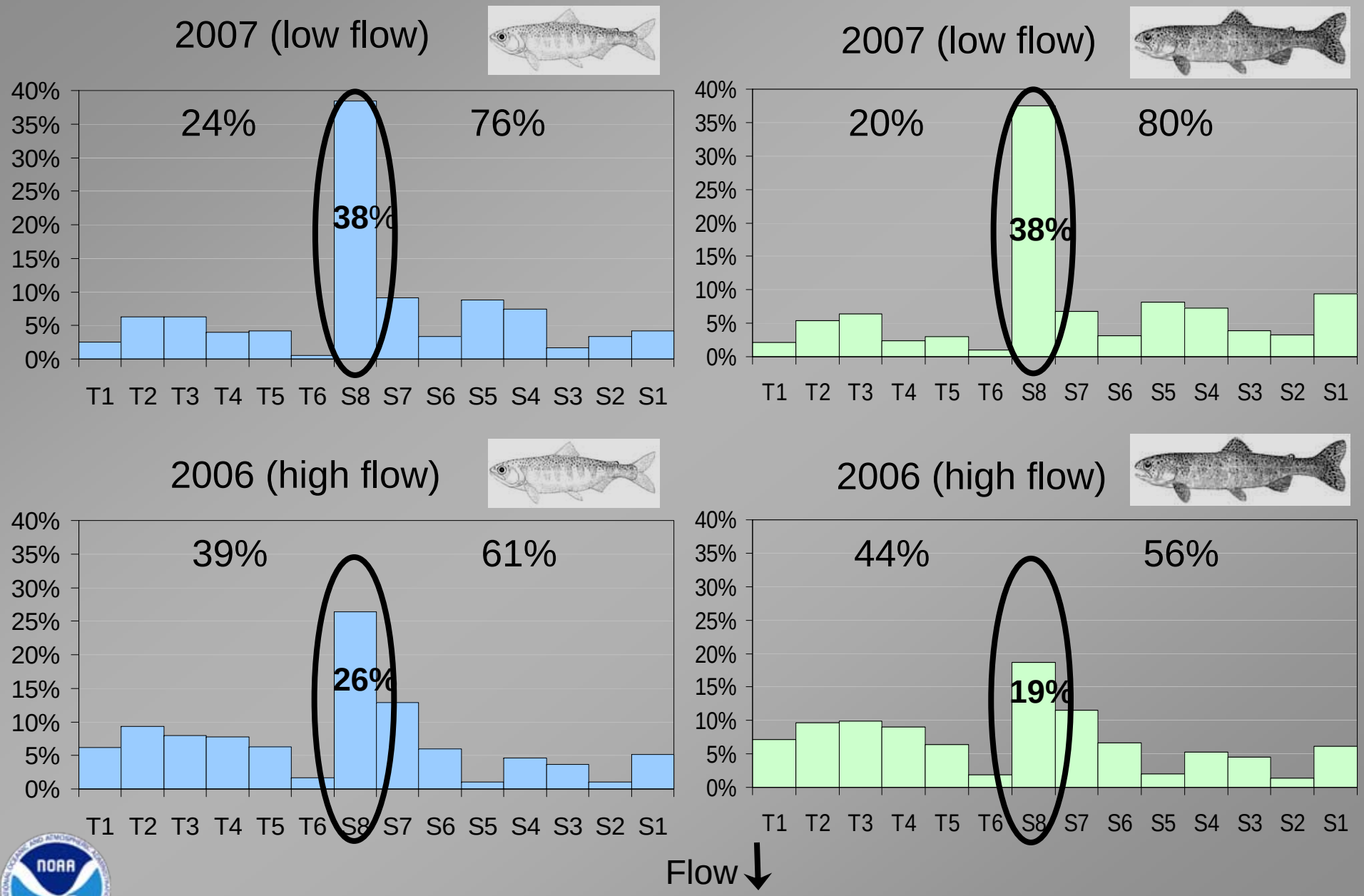
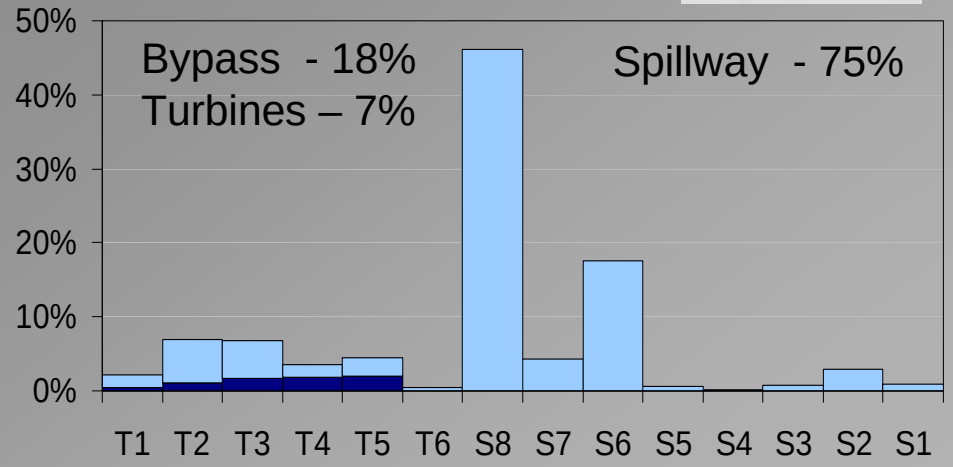
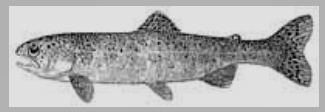


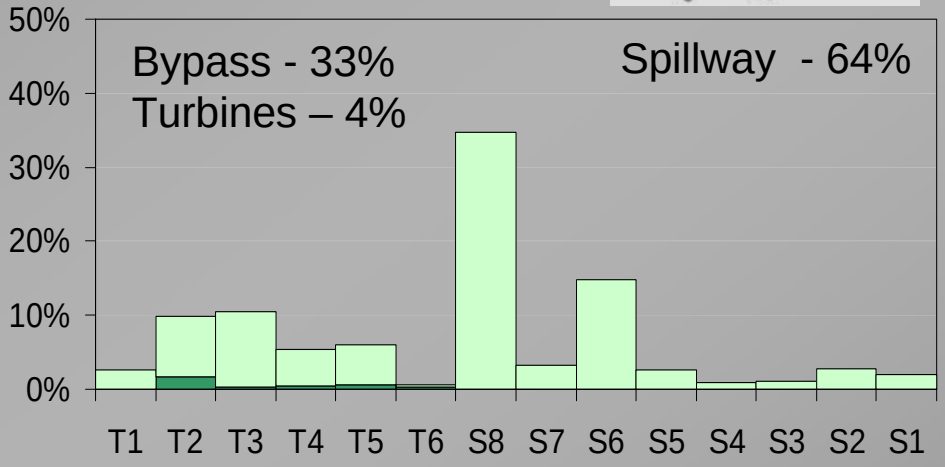
Results – *Passage distribution*

2007 (low flow)



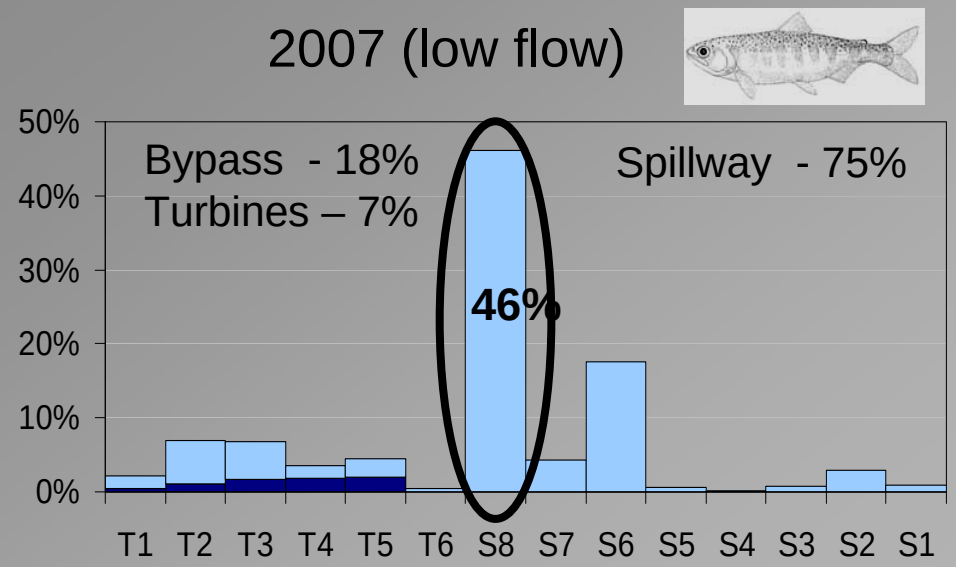
2007 (low flow)

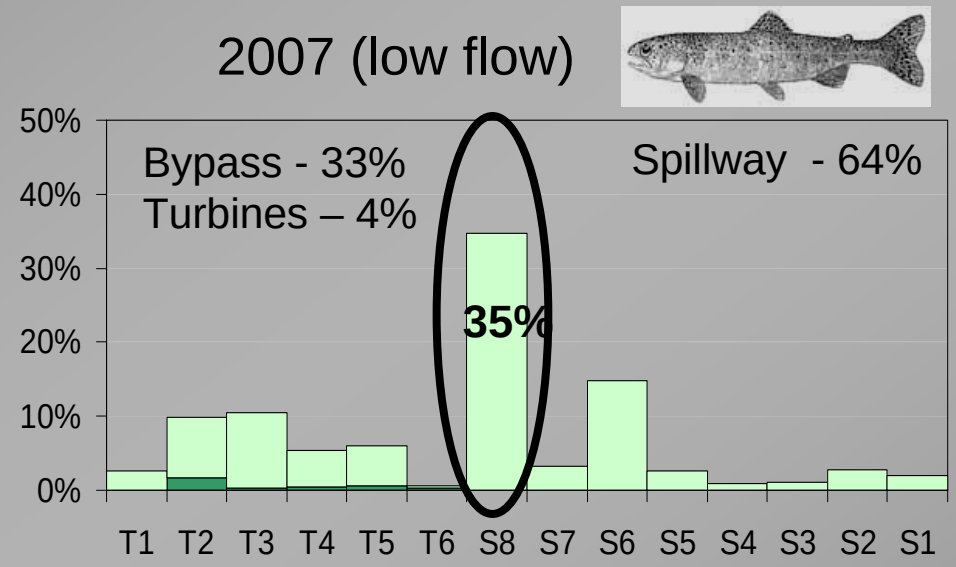


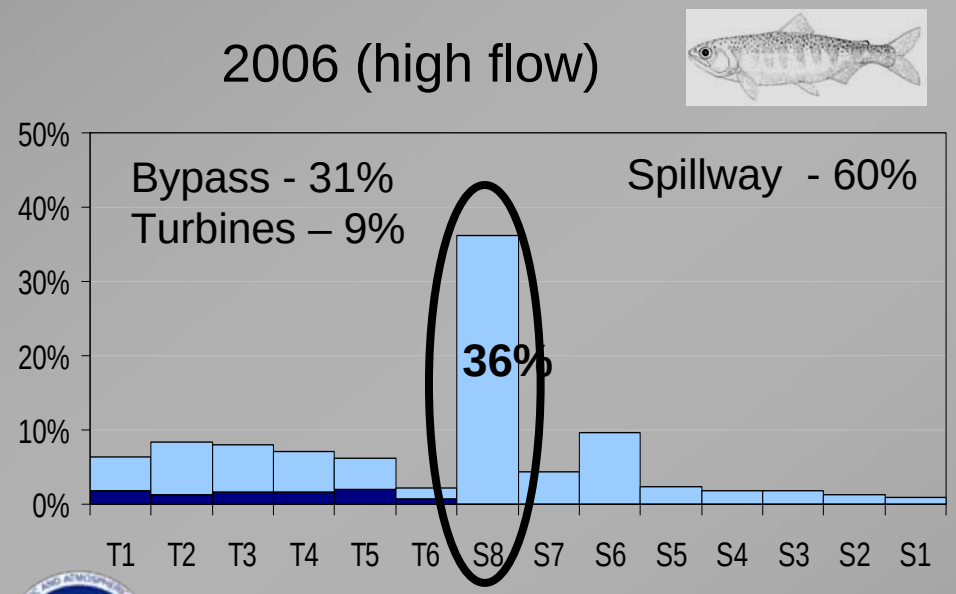


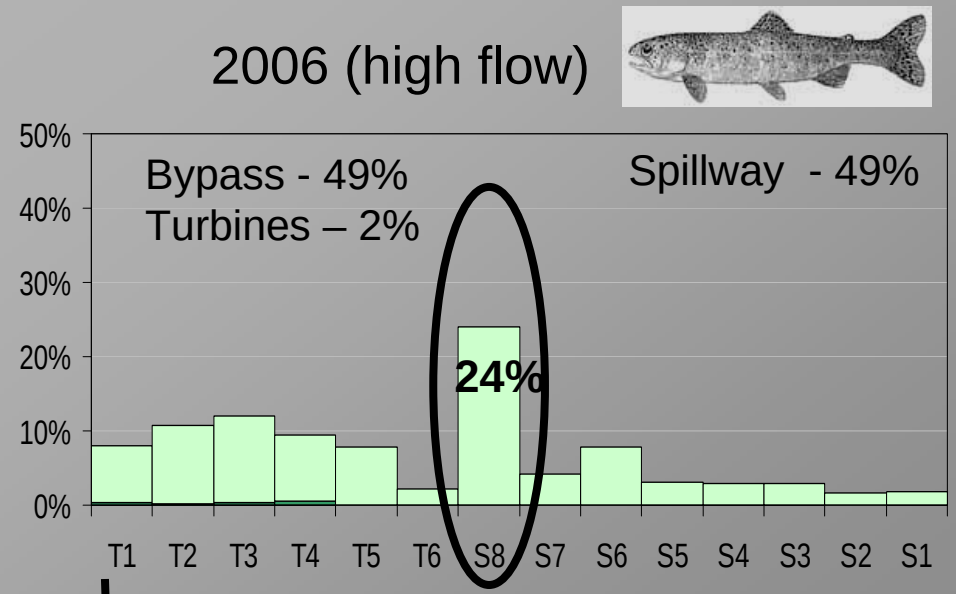
Flow ↓

Results – *Passage distribution*



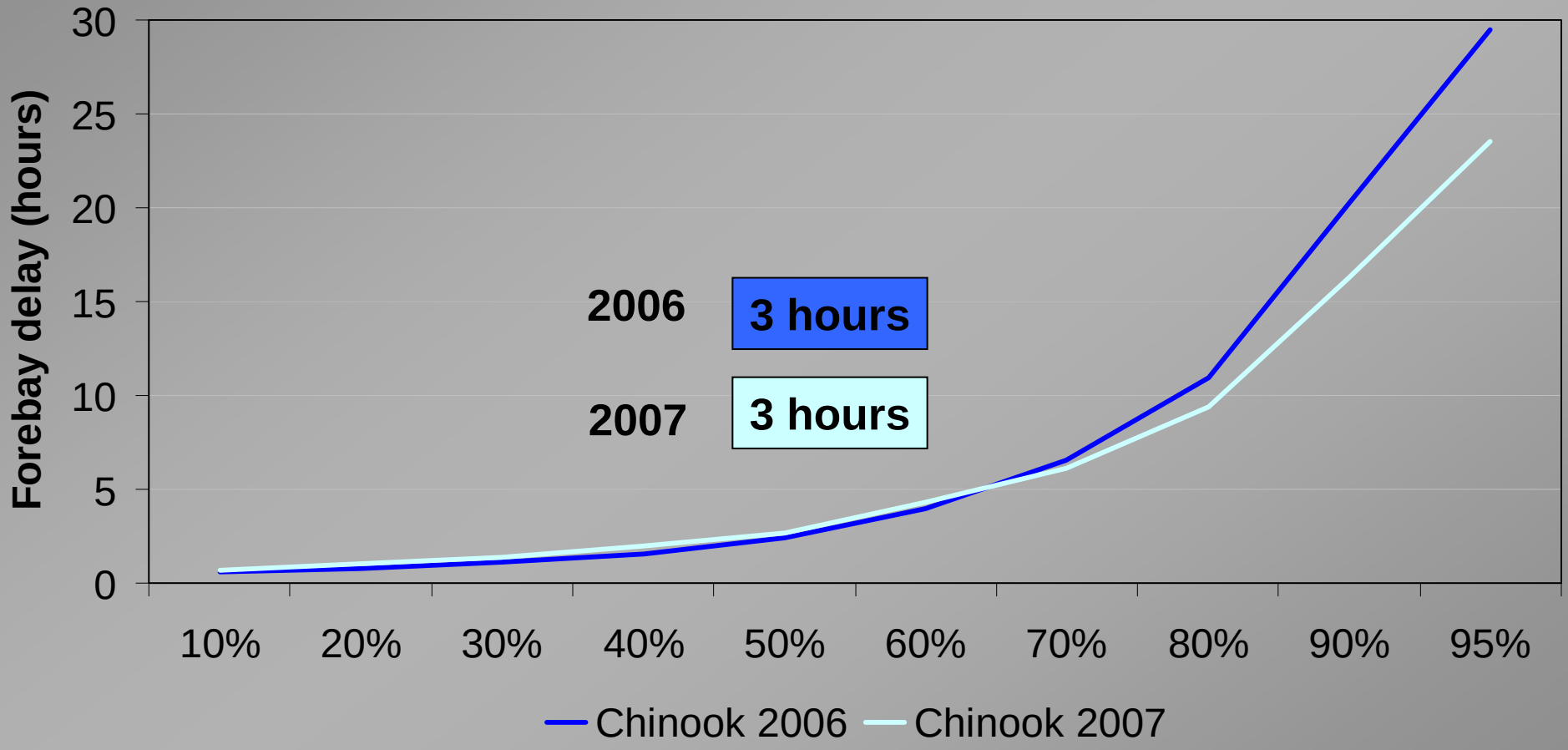




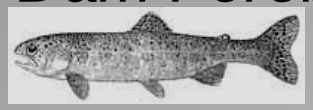


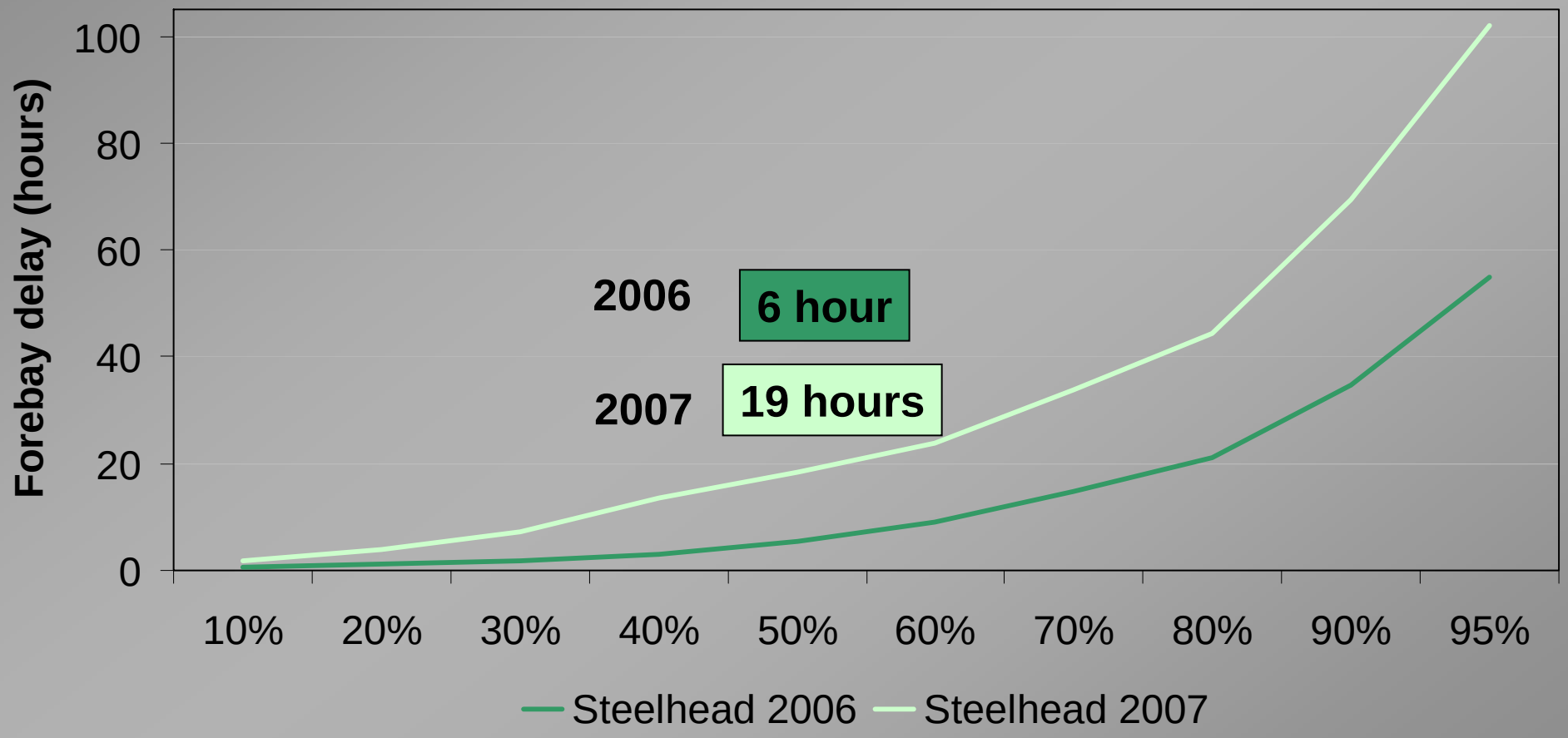
Flow ↓

Results - *Lower Monumental Dam Forebay Delay*
Yearling Chinook salmon

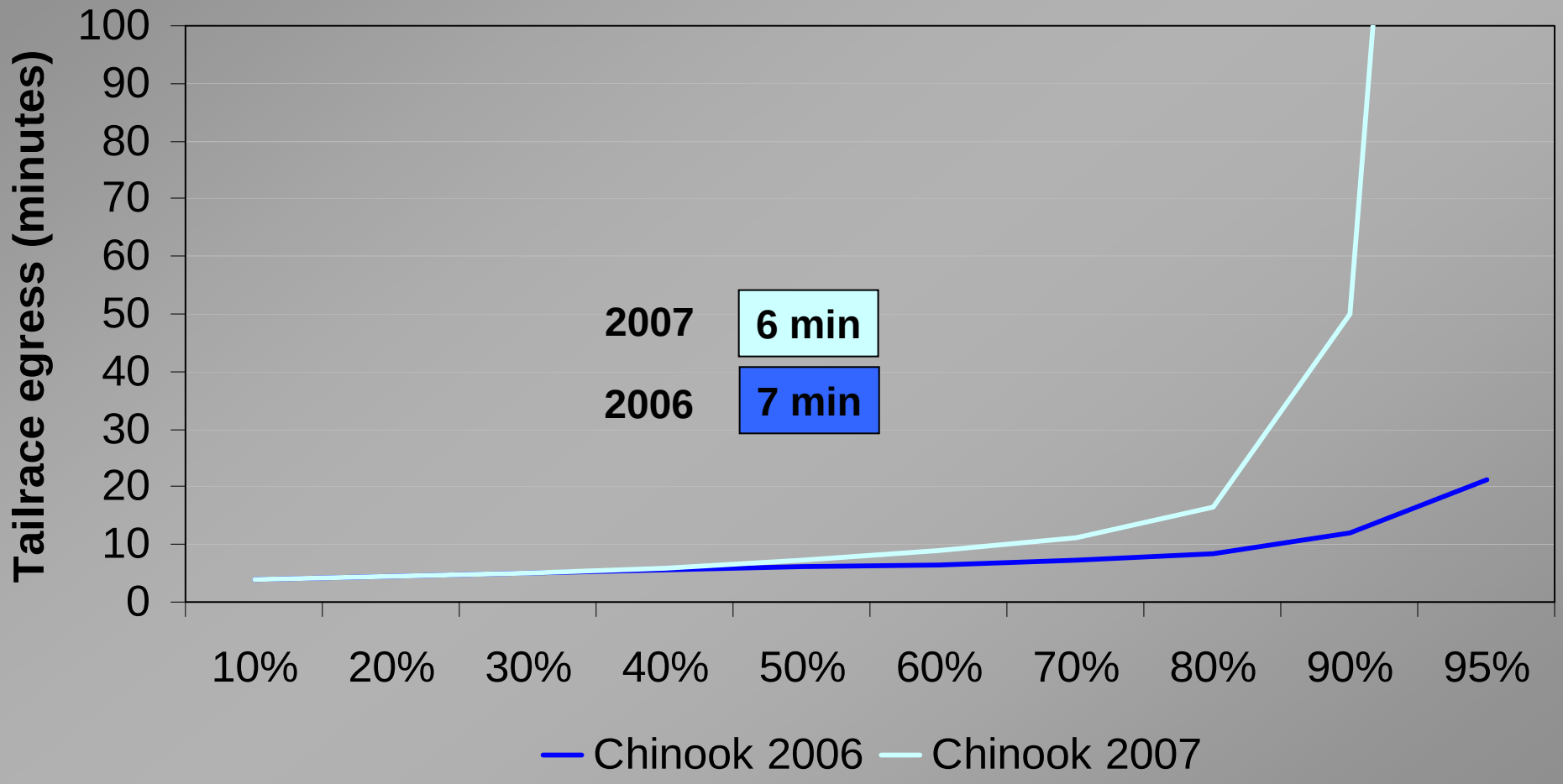


Results - *Lower Monumental Dam Forebay Delay juvenile Steelhead*

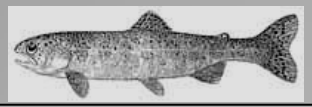


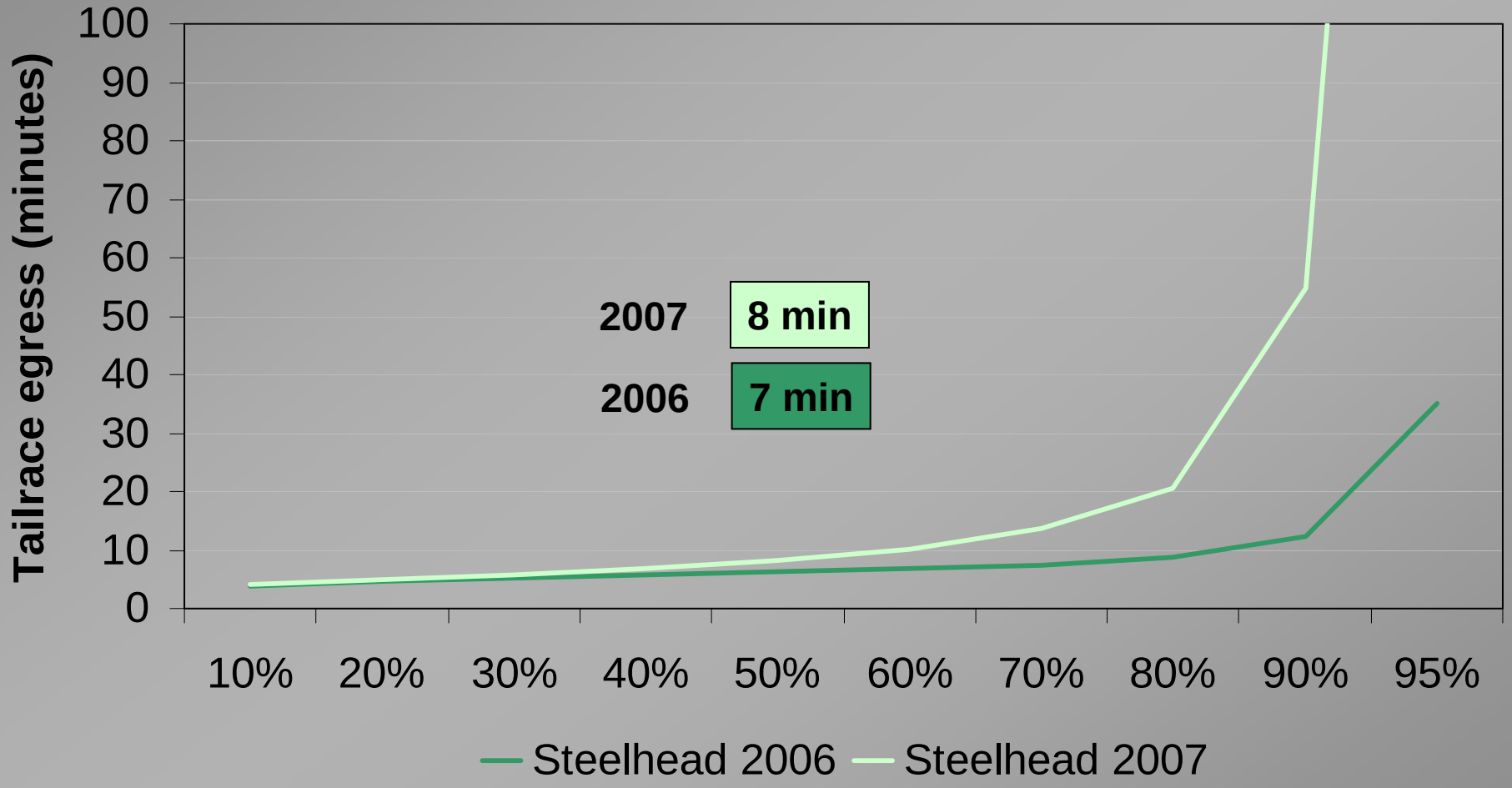


Results - *Lower Monumental Dam Tailrace Egress yearling Chinook salmon*



Results - *Lower Monumental Dam Tailrace Egress juvenile Steelhead*

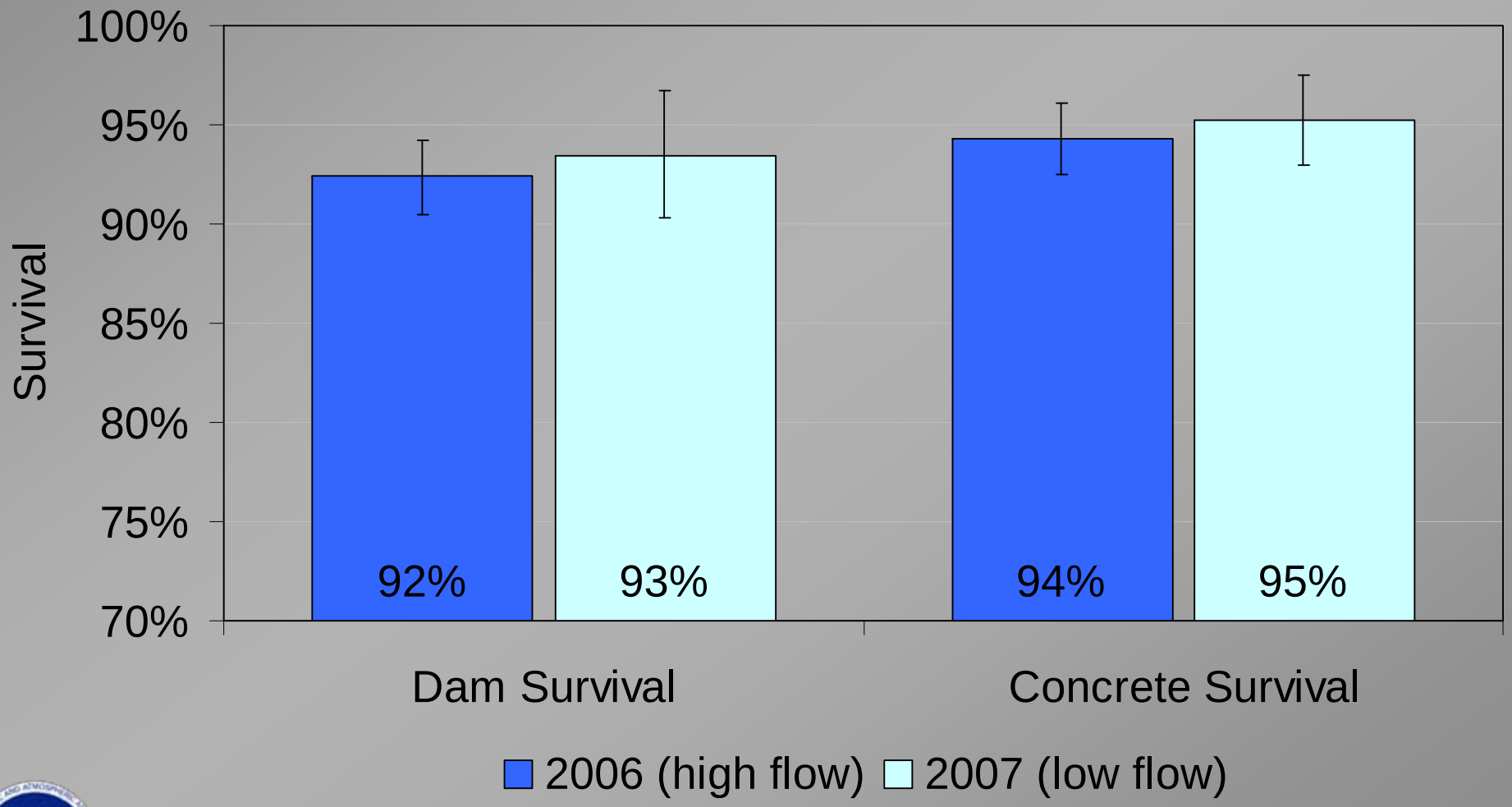




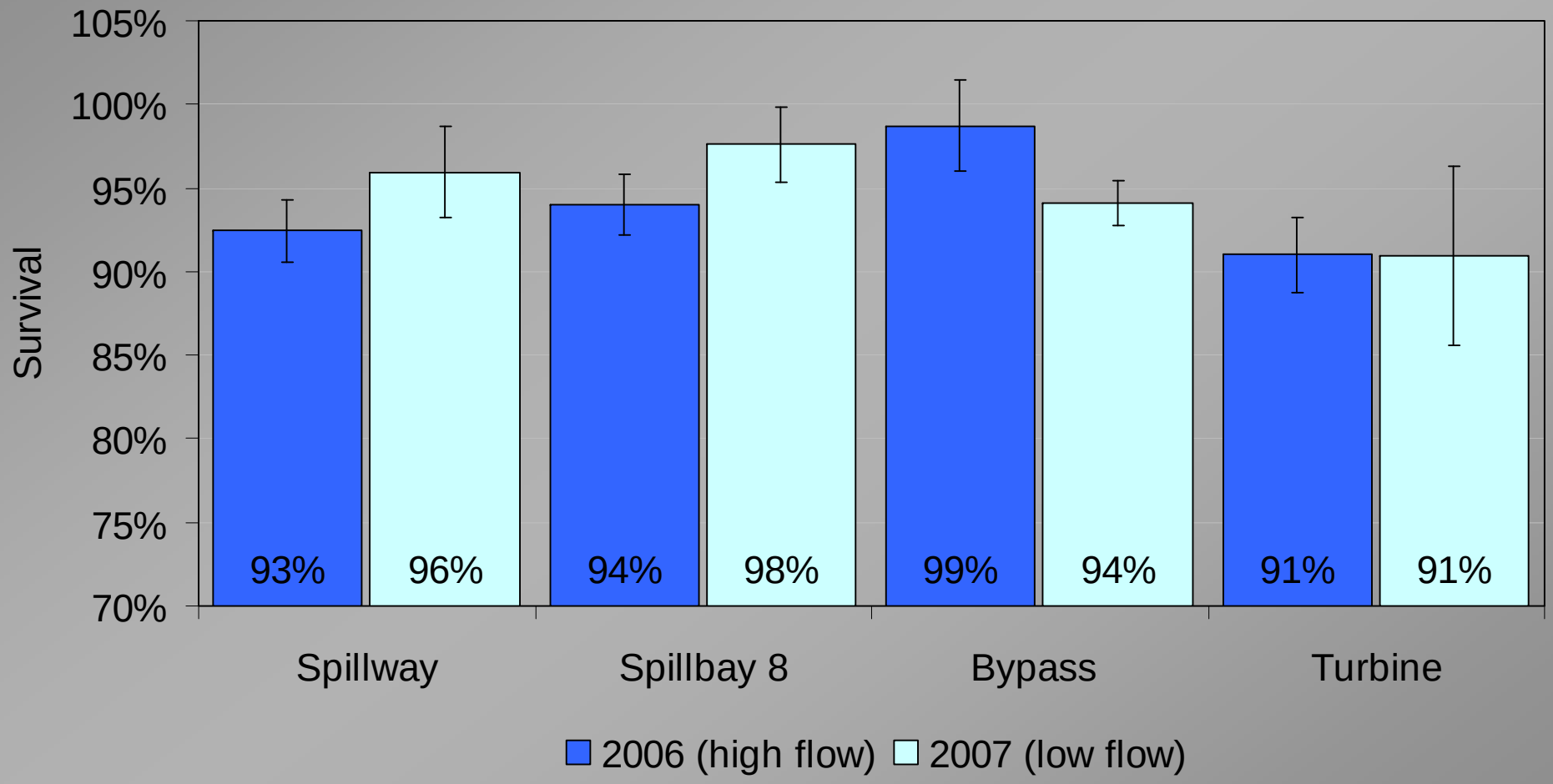
Results – *Fish Passage Metrics*

	Yearling Chinook salmon		Juvenile steelhead	
	2006 (high flow)	2007 (low flow)	2006 (high flow)	2007 (low flow)
Fish Guidance Efficiency (FGE)	77%	71%	96%	90%
Fish Passage Efficiency (FPE)	91%	93%	98%	96%
Spill Efficiency	60%	75%	49%	64%
Spill Effectiveness	2.3	2.9	1.9	2.4

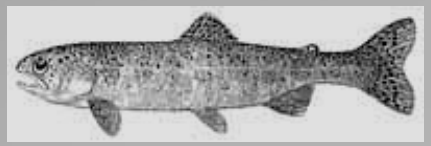
Results – *Dam and Concrete Survival yearling Chinook salmon*

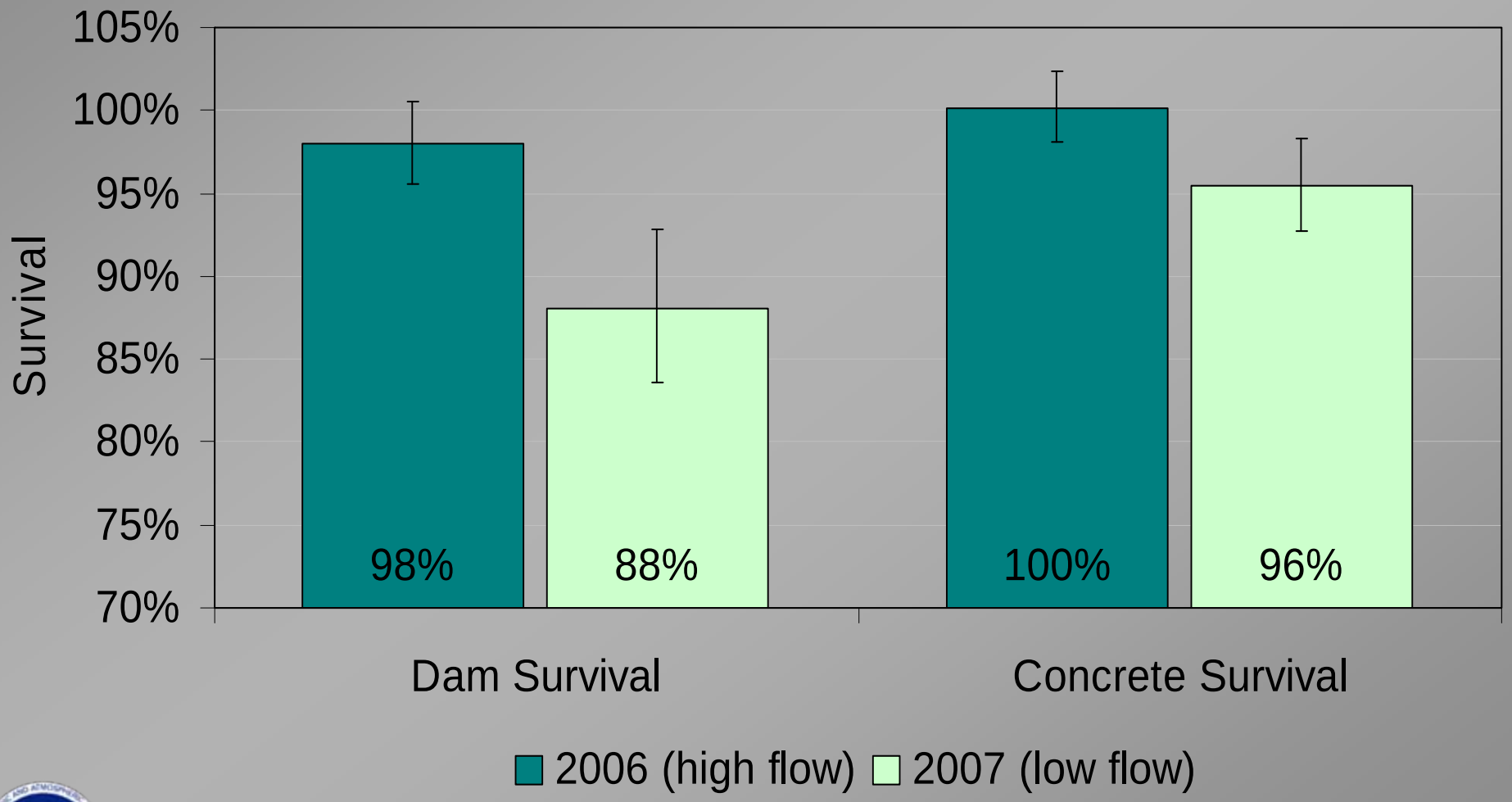


Results – *Route specific Survival yearling Chinook salmon*

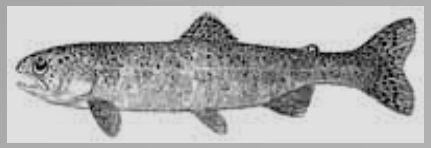


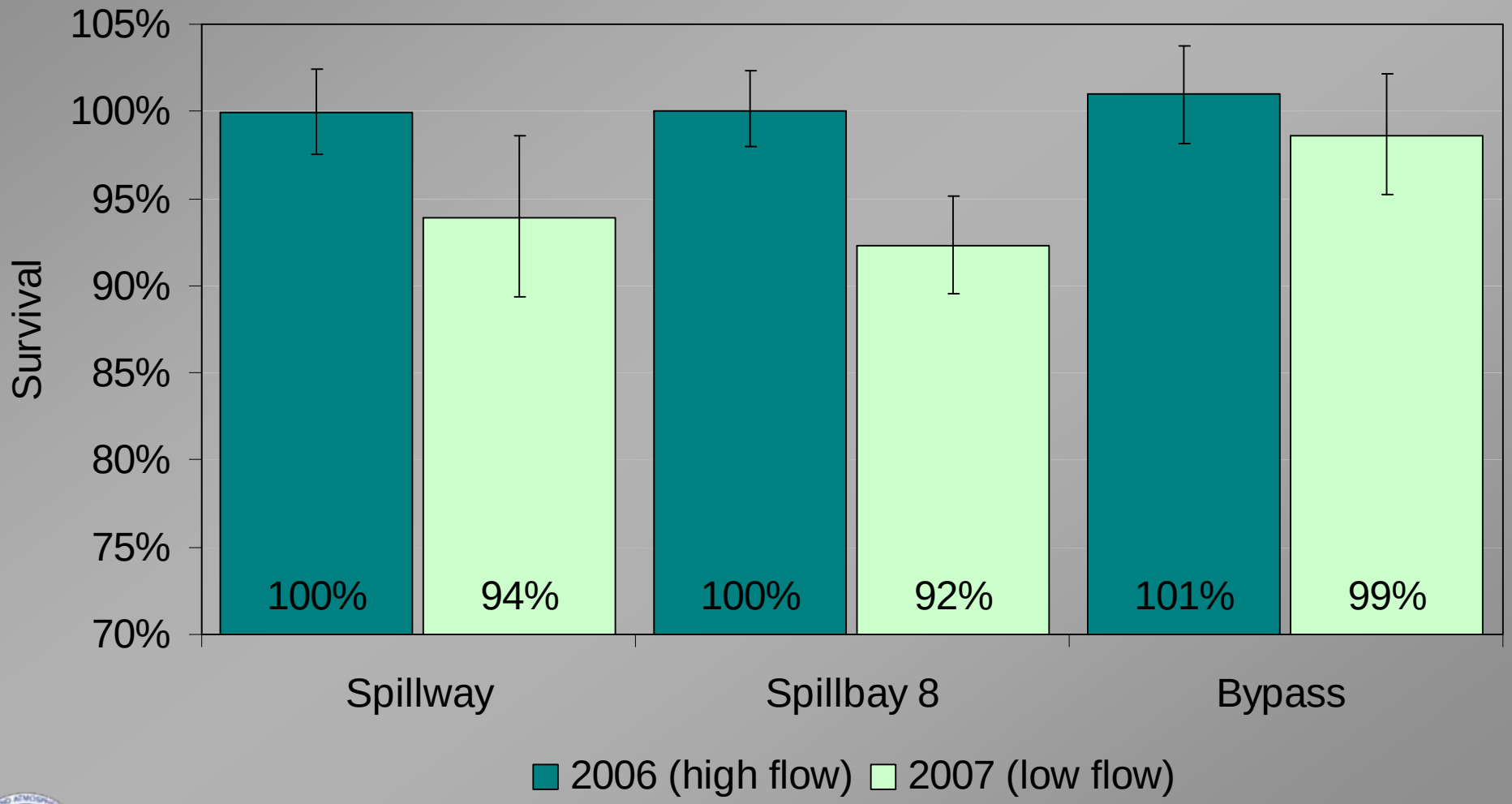
Results –*Dam and Concrete Survival juvenile Steelhead*





Results – *Route Specific Survival juvenile Steelhead*





Summary and Conclusions

- The highest proportion of fish approach and pass at spillbay 8
- More fish approach and pass through the spillway with lower river flows and the same proportion of spill
- Tailrace egress similar among species and flow conditions
- Higher spill efficiency and effectiveness during low flow conditions
- Yearling Chinook salmon similar forebay delay and survival between high and low flow conditions
- Steelhead longer forebay delay and lower survival during lower flows

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