

RSW POST-CONSTRUCTION EVALUATION OF PASSAGE AND SURVIVAL FOR RADIO-TAGGED YEARLING CHINOOK SALMON AND JUVENILE STEELHEAD AT LOWER MONUMENTAL, 2008

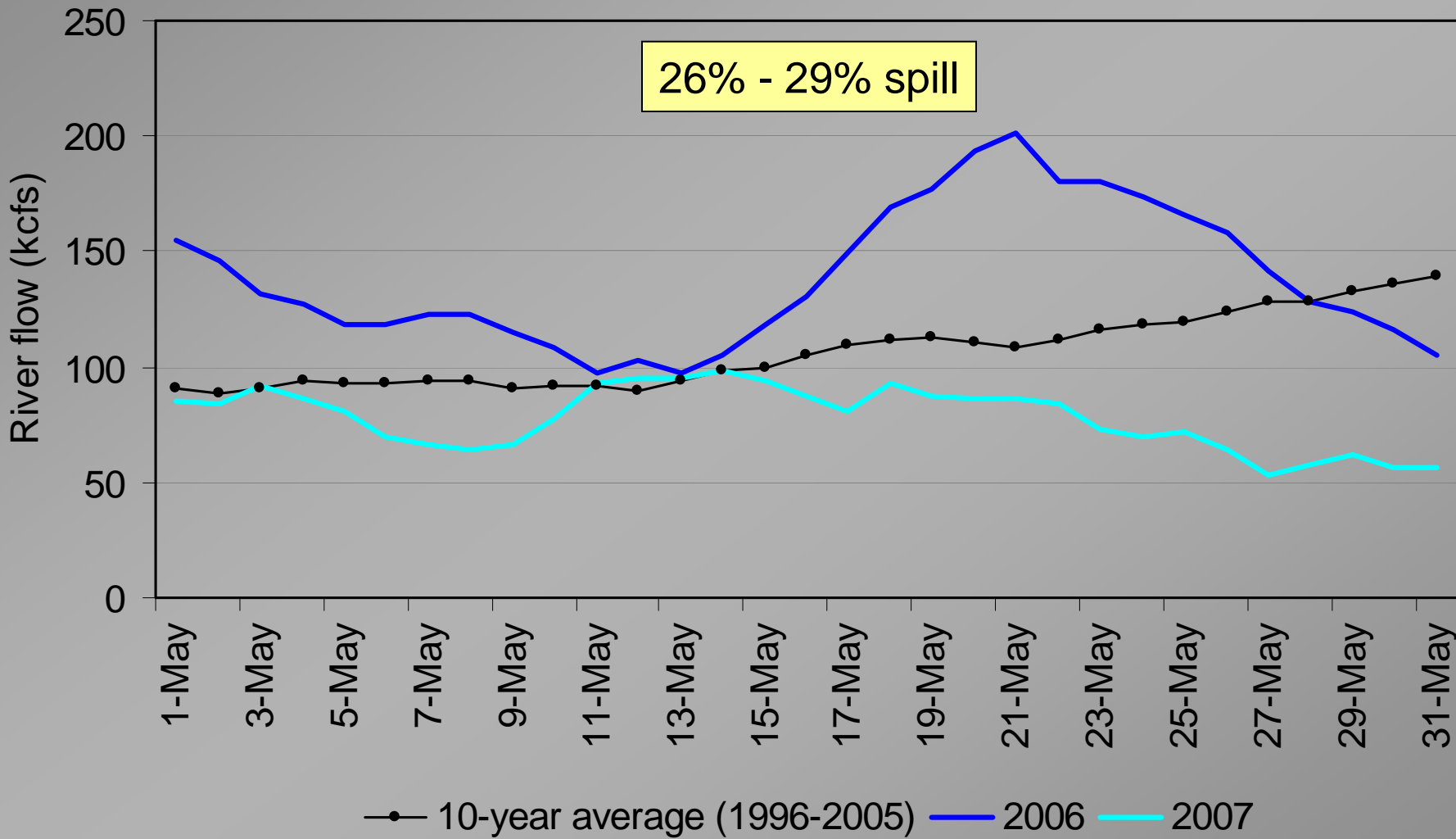


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Review - Baseline Pre-RSW Conditions (2006-2007)



Review - Baseline Pre-RSW Results (2006-2007)



Yearling Chinook salmon

Average river discharge (kcfs)	79 - 139
Median forebay delay (h)	3
Fish Passage Efficiency (FPE)	91 - 93%
Spillway Passage Efficiency (SPE)	60 - 75%
Dam Survival	92 - 93%
Concrete Survival	94 - 95%



Review - Baseline Pre-RSW Results (2006-2007)



Yearling Chinook salmon

Juvenile steelhead

Average river discharge (kcfs)	79 - 139	79 - 139
Median forebay delay (h)	3	6 - 18
Fish Passage Efficiency (FPE)	91 - 93%	96 - 98%
Spillway Passage Efficiency (SPE)	60 - 75%	49 - 67%
Dam Survival	92 - 93%	89 - 98%
Concrete Survival	94 - 95%	96 - 100%



Lower Monumental Dam RSW

- Surface passage structure in spillbay 8

Goals

- Reduce forebay delay
- Improve juvenile survival
- Increase spillway passage



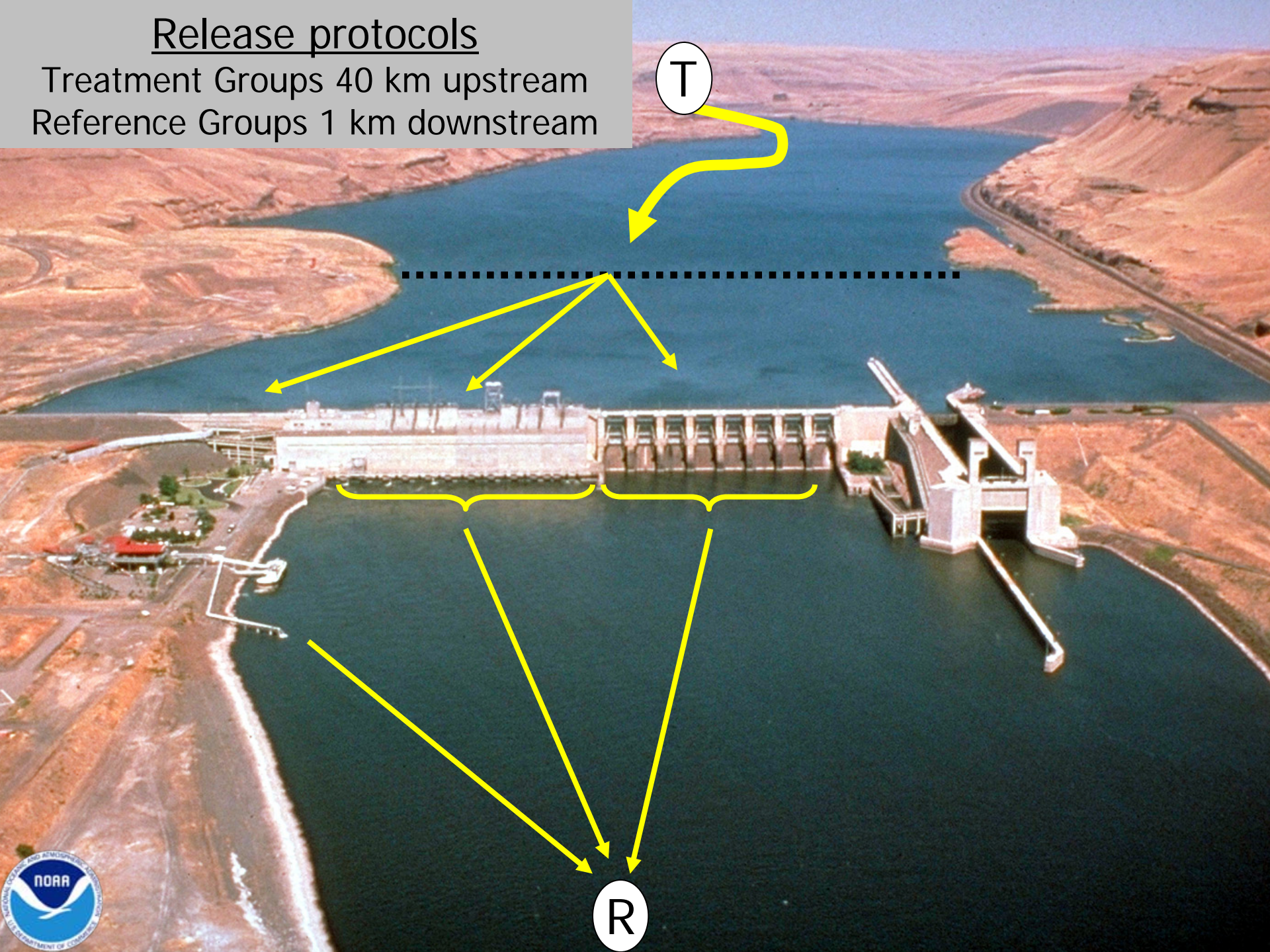
Objectives

- 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



Release protocols

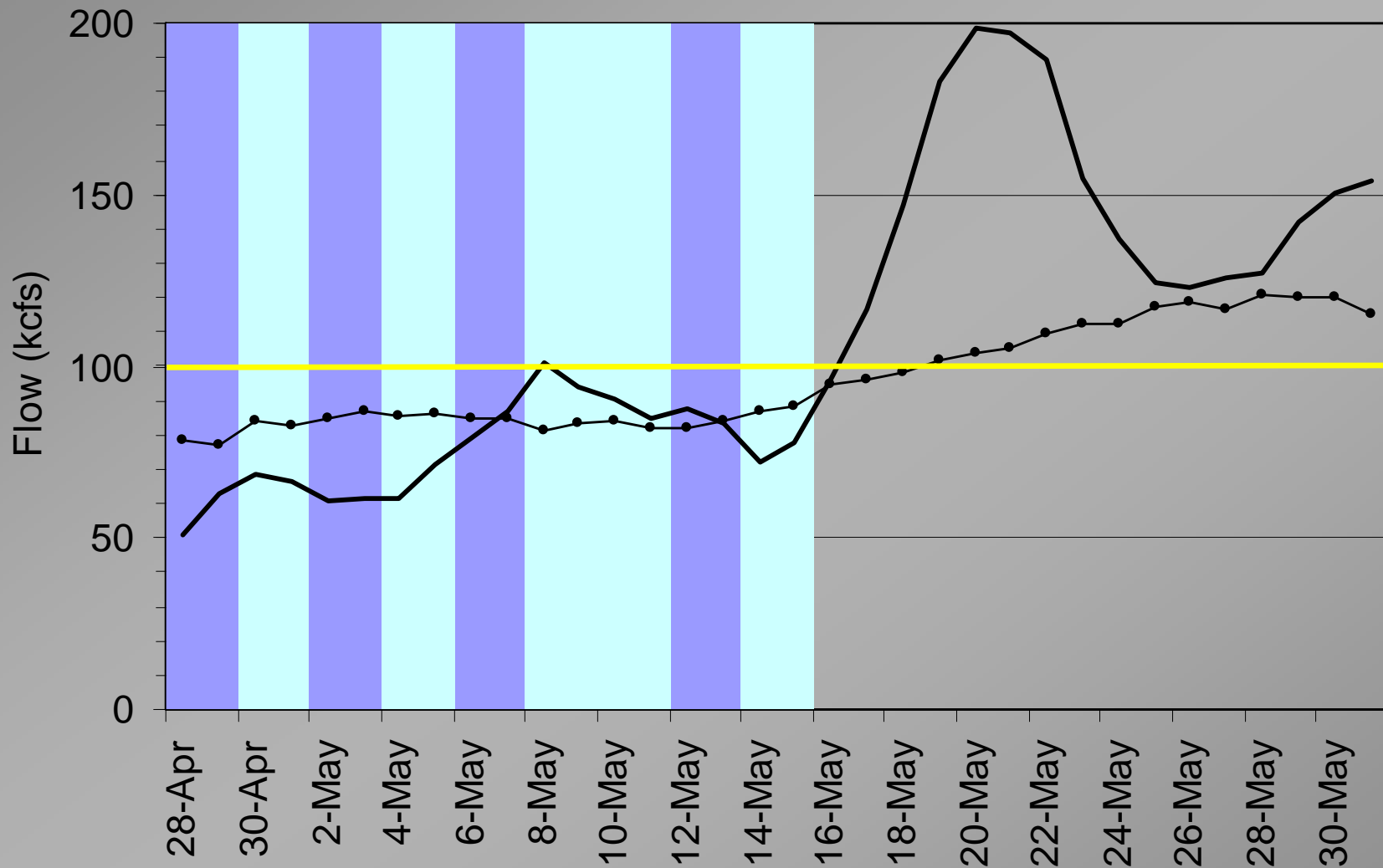
Treatment Groups 40 km upstream
Reference Groups 1 km downstream



R

T


Methods – RSW Evaluation Conditions



 Bulk spill treatment

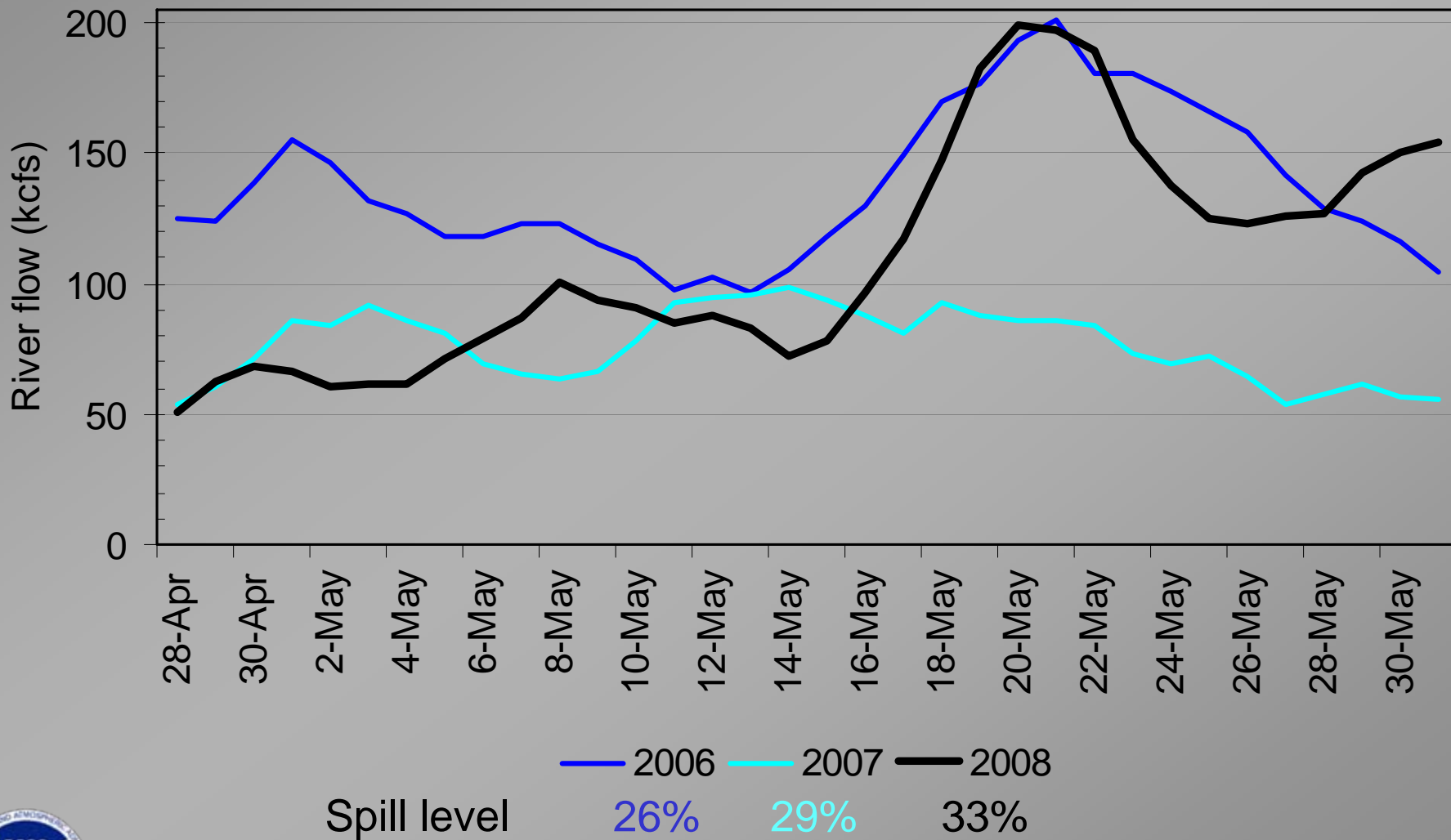
 Flat spill treatment

 2008

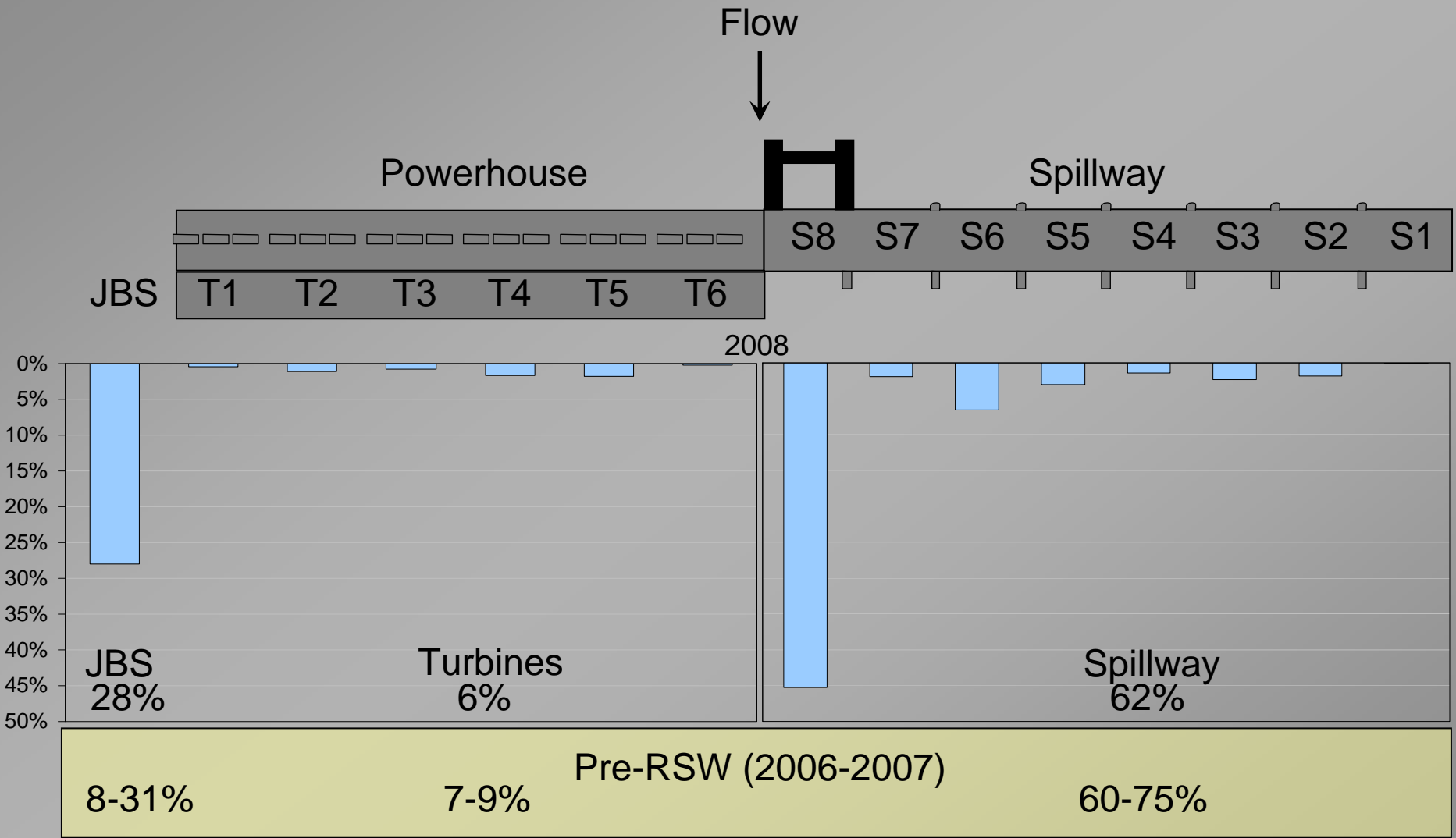
 10-year average (1998-2007)



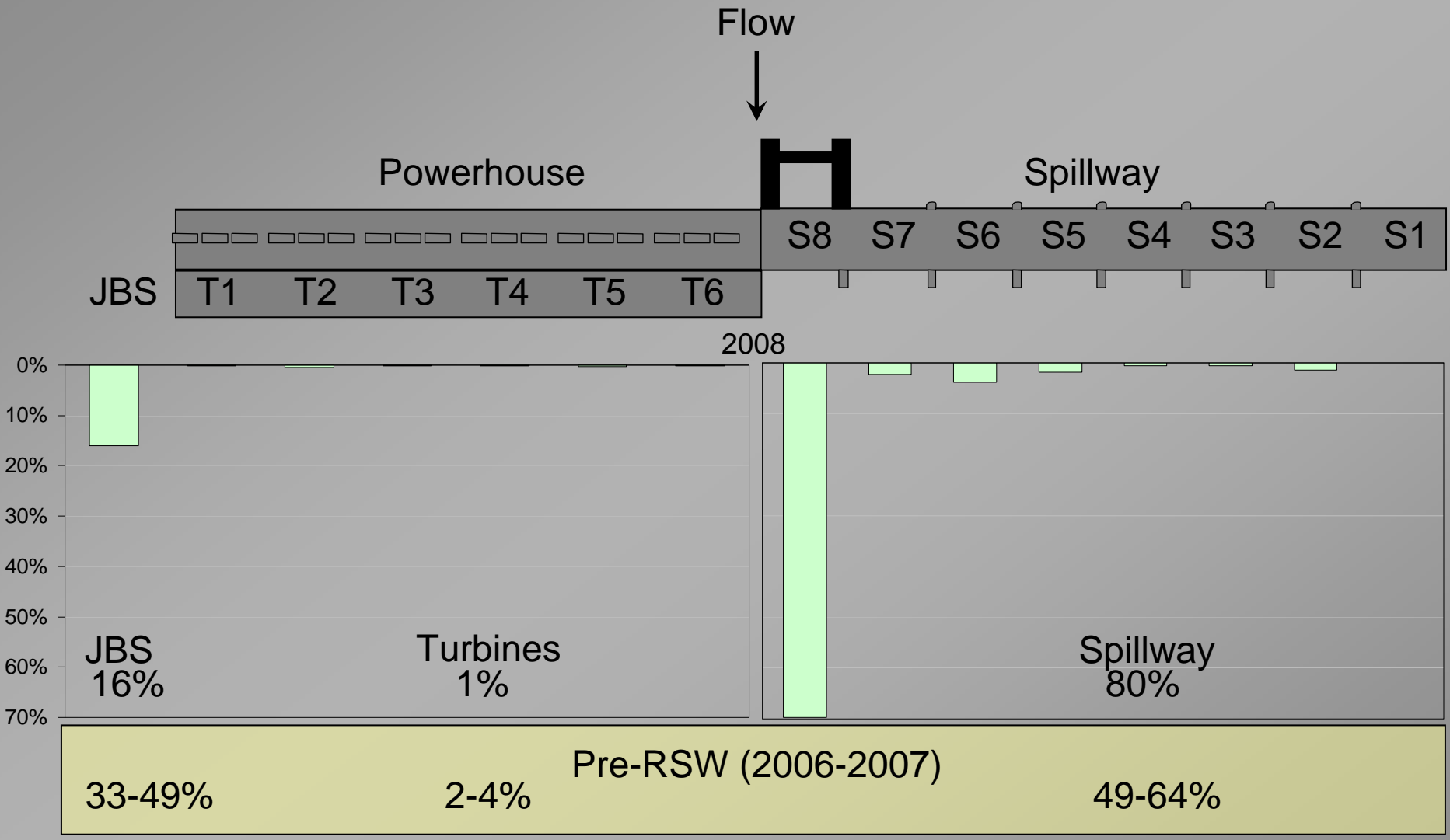
Results – *Pre-RSW and RSW Conditions*



Results – Passage distribution yearling Chinook salmon



Results – *Passage distribution juvenile steelhead*



Results – *Fish Passage Metrics yearling Chinook salmon*



	Pre-RSW 2006-2007	RSW 2008
Median forebay delay (h)	3	2



Results – *Fish Passage Metrics yearling Chinook salmon*



	Pre-RSW 2006-2007	RSW 2008
Median forebay delay (h)	3	2
Median tailrace egress (m)	6 - 7	7



Results – *Fish Passage Metrics yearling Chinook salmon*



	Pre-RSW 2006-2007	RSW 2008
Median forebay delay (h)	3	2
Median tailrace egress (m)	6 - 7	7
Fish Passage Efficiency (FPE)	91 - 93%	94%



Results – *Fish Passage Metrics yearling Chinook salmon*



	Pre-RSW 2006-2007	RSW 2008
Median forebay delay (h)	3	2
Median tailrace egress (m)	6 - 7	7
Fish Passage Efficiency (FPE)	91 - 93%	94%
Spill Efficiency	60 - 75%	65%



Results – *Fish Passage Metrics yearling Chinook salmon*



	Pre-RSW 2006-2007	RSW 2008
Median forebay delay (h)	3	2
Median tailrace egress (m)	6 - 7	7
Fish Passage Efficiency (FPE)	91 - 93%	94%
Spill Efficiency	60 - 75%	65%
Spill Effectiveness (26-33% of the river)	2.3 – 2.9	2.0



Results – *Fish Passage Metrics yearling Chinook salmon*



	Pre-RSW 2006-2007	RSW 2008
Median forebay delay (h)	3	2
Median tailrace egress (m)	6 - 7	7
Fish Passage Efficiency (FPE)	91 - 93%	94%
Spill Efficiency	60 - 75%	65%
Spill Effectiveness (26-33% of the river)	2.3 – 2.9	2.0
RSW Efficiency		47%



Results – *Fish Passage Metrics yearling Chinook salmon*



	Pre-RSW 2006-2007	RSW 2008
Median forebay delay (h)	3	2
Median tailrace egress (m)	6 - 7	7
Fish Passage Efficiency (FPE)	91 - 93%	94%
Spill Efficiency	60 - 75%	65%
Spill Effectiveness (26-33% of the river)	2.3 – 2.9	2.0
RSW Efficiency		47%
RSW Effectiveness (7% of the river)		6.8



Results – *Fish Passage Metrics juvenile steelhead*



	Pre-RSW 2006-2007	RSW 2008
Median forebay delay (h)	6 – 18	2



Results – *Fish Passage Metrics juvenile steelhead*



	Pre-RSW 2006-2007	RSW 2008
Median forebay delay (h)	6 – 18	2
Median tailrace egress (m)	6 - 8	5



Results – *Fish Passage Metrics juvenile steelhead*



	Pre-RSW 2006-2007	RSW 2008
Median forebay delay (h)	6 – 18	2
Median tailrace egress (m)	6 - 8	5
Fish Passage Efficiency (FPE)	96 - 98%	99%



Results – *Fish Passage Metrics juvenile steelhead*



	Pre-RSW 2006-2007	RSW 2008
Median forebay delay (h)	6 – 18	2
Median tailrace egress (m)	6 - 8	5
Fish Passage Efficiency (FPE)	96 - 98%	99%
Spill Efficiency	49 - 64%	82%



Results – *Fish Passage Metrics juvenile steelhead*



	Pre-RSW 2006-2007	RSW 2008
Median forebay delay (h)	6 – 18	2
Median tailrace egress (m)	6 - 8	5
Fish Passage Efficiency (FPE)	96 - 98%	99%
Spill Efficiency	49 - 64%	82%
Spill Effectiveness (26-33% of the river)	1.9 – 2.4	2.5



Results – *Fish Passage Metrics juvenile steelhead*



	Pre-RSW 2006-2007	RSW 2008
Median forebay delay (h)	6 – 18	2
Median tailrace egress (m)	6 - 8	5
Fish Passage Efficiency (FPE)	96 - 98%	99%
Spill Efficiency	49 - 64%	82%
Spill Effectiveness (26-33% of the river)	1.9 – 2.4	2.5
RSW Efficiency		71%



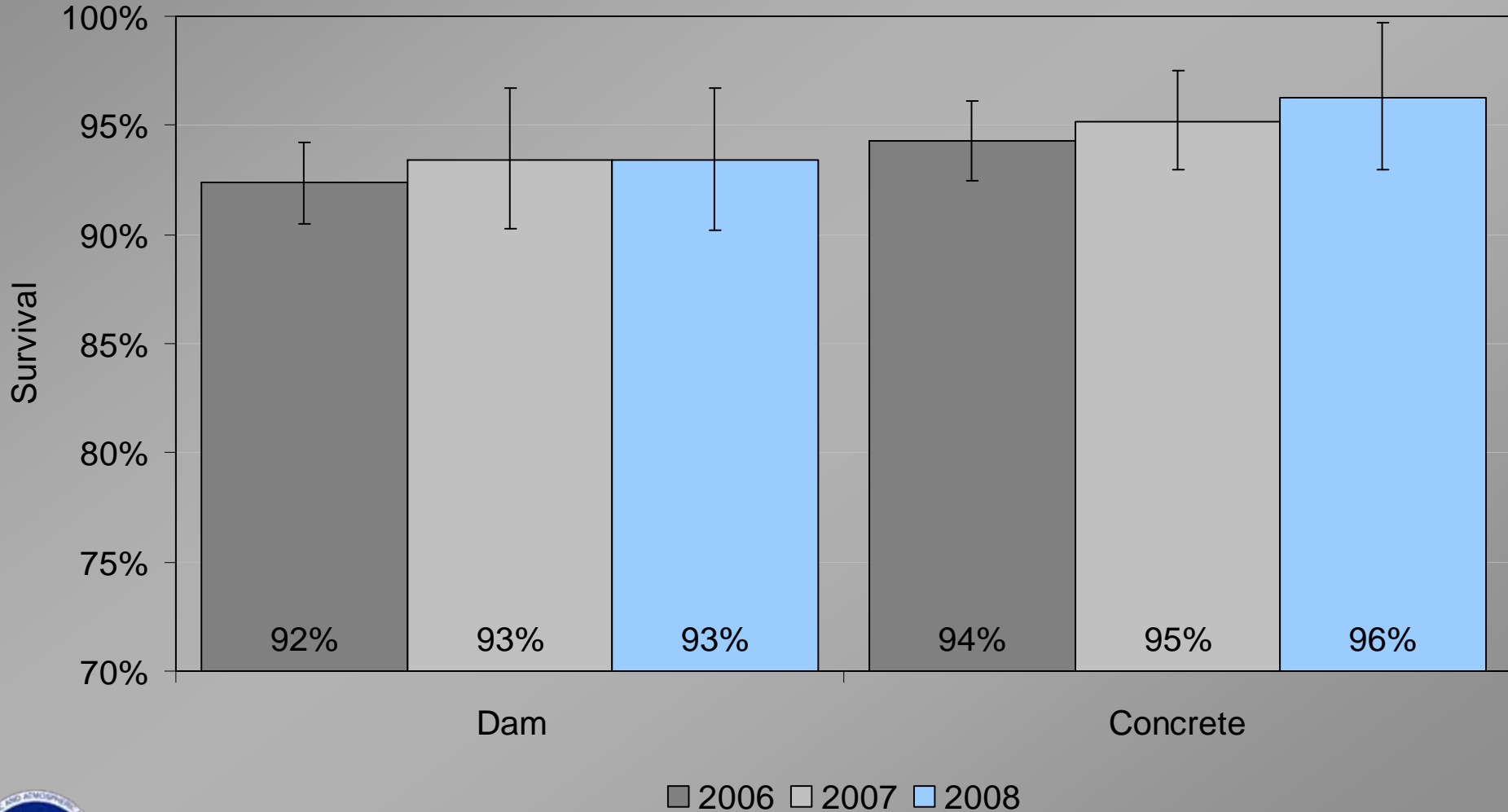
Results – *Fish Passage Metrics juvenile steelhead*



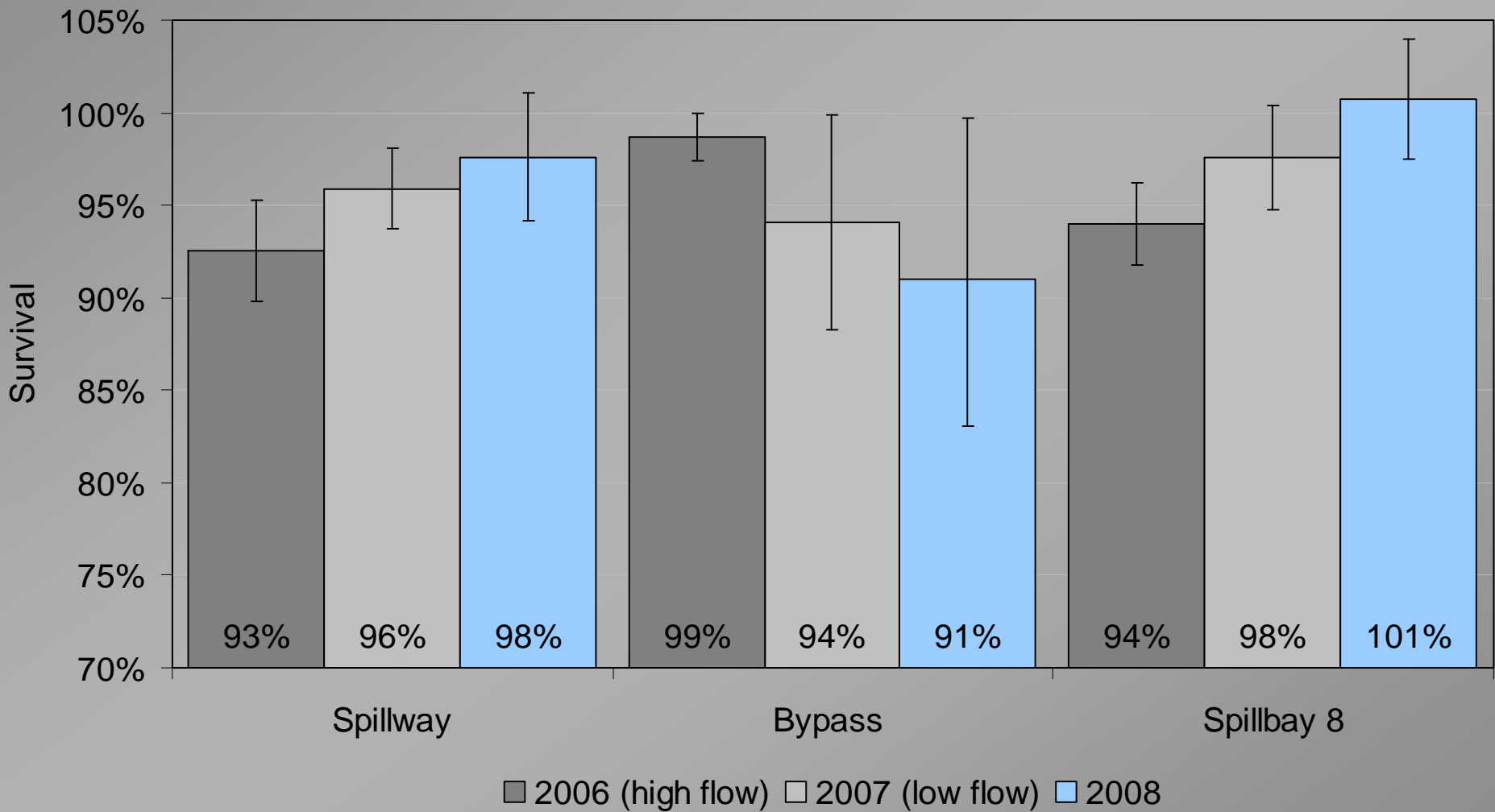
	Pre-RSW 2006-2007	RSW 2008
Median forebay delay (h)	6 – 18	2
Median tailrace egress (m)	6 - 8	5
Fish Passage Efficiency (FPE)	96 - 98%	99%
Spill Efficiency	49 - 64%	82%
Spill Effectiveness (26-33% of the river)	1.9 – 2.4	2.5
RSW Efficiency		71%
RSW Effectiveness (7% of the river)		10.3



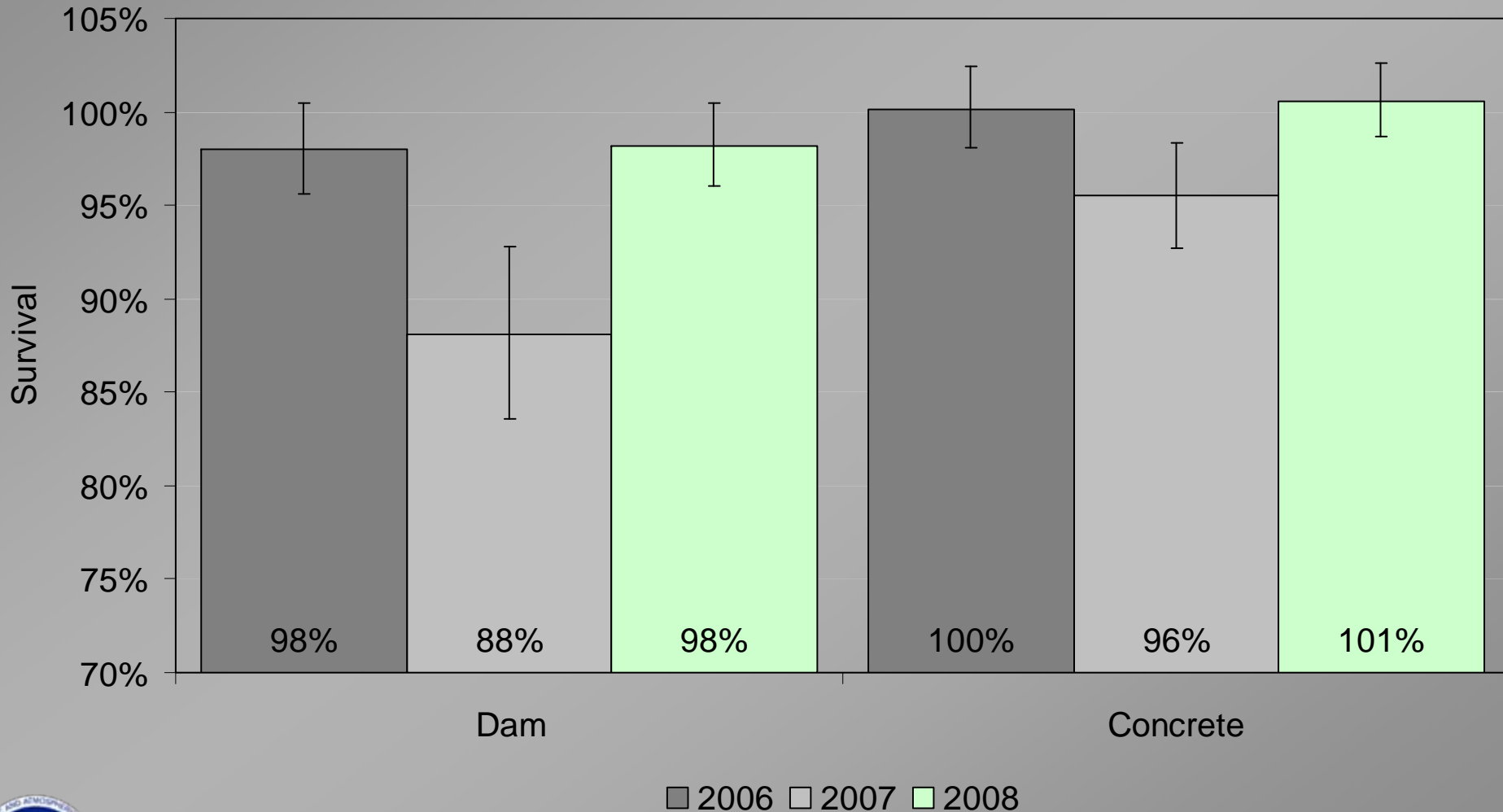
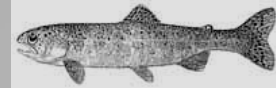
Results – *Dam and Concrete Survival* *yearling Chinook salmon*



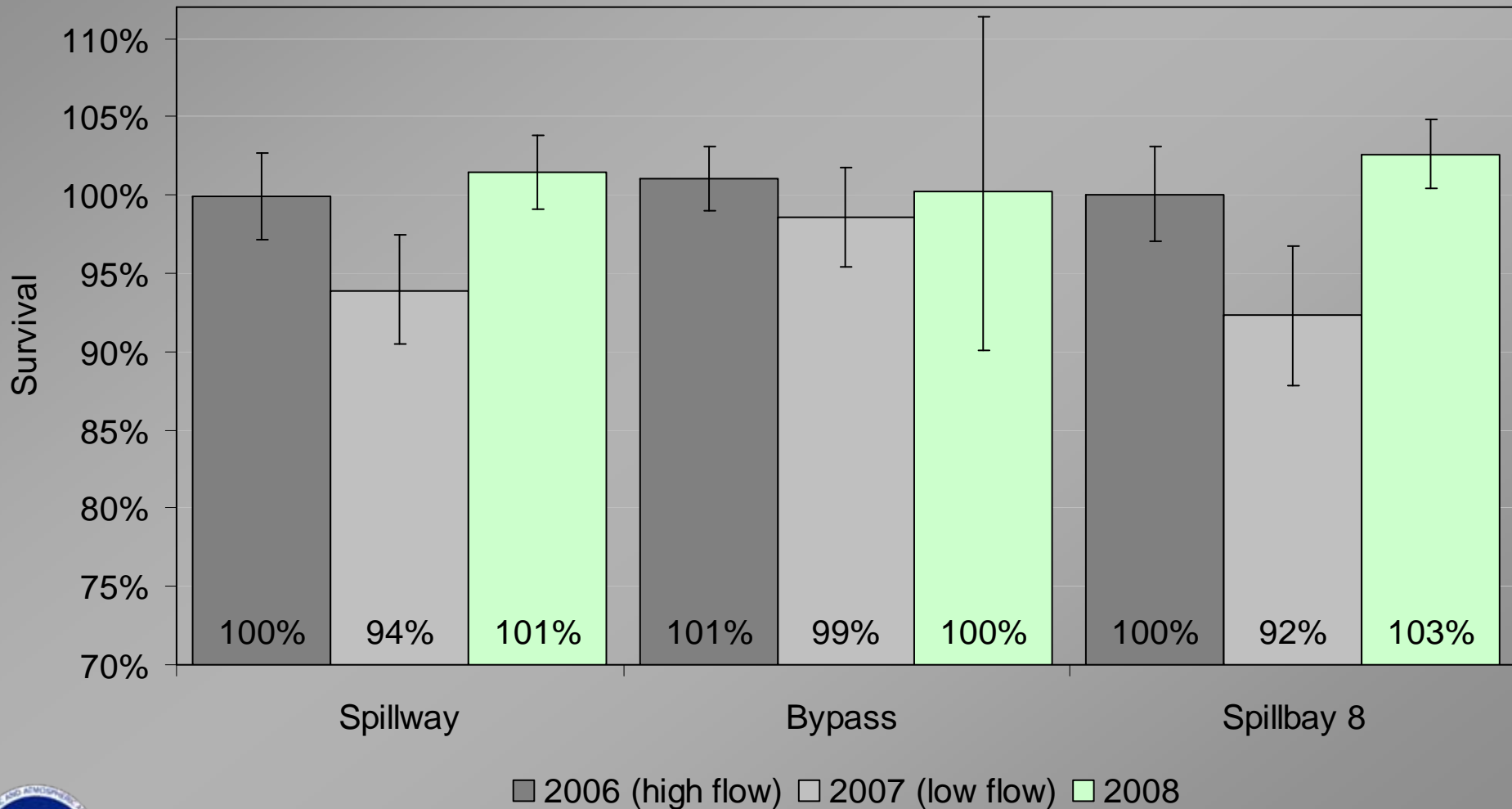
Results – *Route specific Survival* *yearling Chinook salmon*



Results – Dam and Concrete Survival juvenile Steelhead



Results – *Route Specific Survival* *juvenile Steelhead*



Summary and Conclusions

- 2008 was a mixed flow year in the Snake River.
 - Late April-mid May 10% < 10-year average
 - mid-May-early June 35% > 10-year average

Pre-RSW vs. RSW

- yearling Chinook salmon no differences
 - Approach
 - Passage distribution
 - Fish passage metrics
 - Survival

- juvenile steelhead
 - ↑ – Spillway approach
 - Spillway passage
 - Survival
 - ↓ – Forebay delay



Future Considerations

- RSW PIT-tag detection development.
- In 2008 73% of the yearling Chinook salmon and 86% of the juvenile steelhead passed Lower Monumental Dam through either the JBS or RSW.



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Thank you

