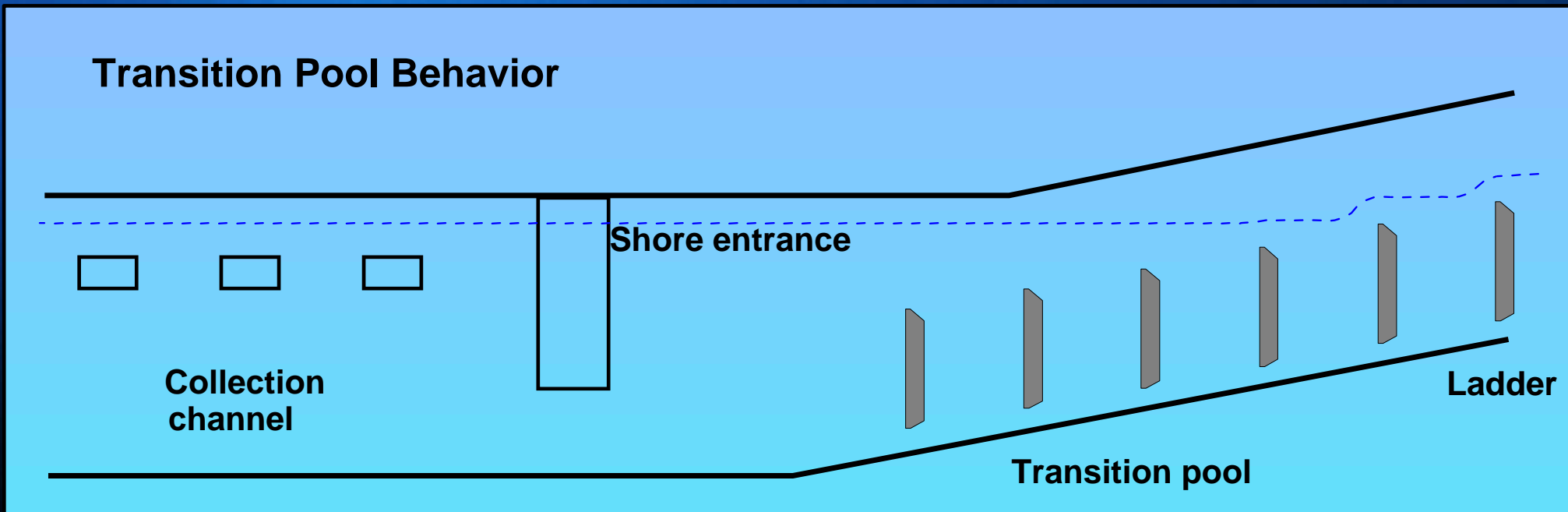


Problem

Some fish enter transition pool area, turn around, and exit the transition pool to the collection channel or tailrace

- I. Moves straight through transition pool on first attempt
- II. Moves to collection channel before moving through ladder
- III. Exits to tailrace before moving through ladder

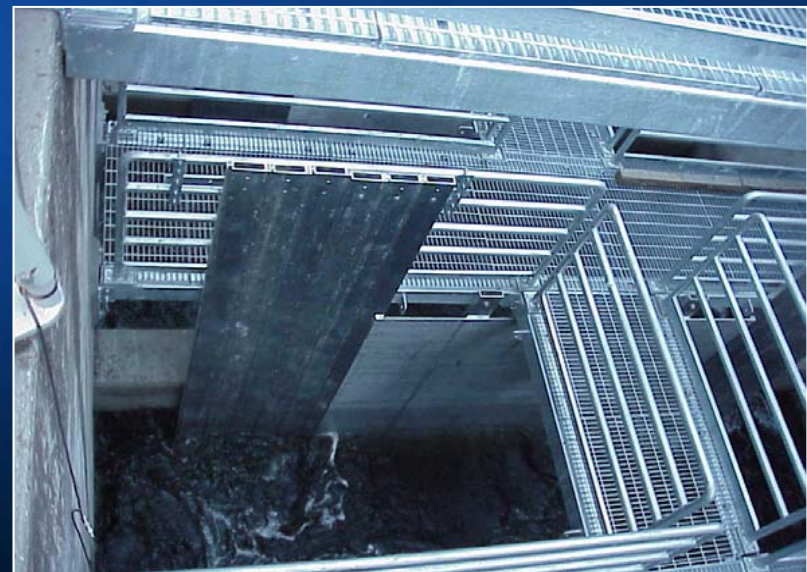


2001- 2002 Prototype Modification

- **Paired treatment blocks**
 - **Control: two panels down**
 - **Treatment: all 14 panels down on each of first 2 weirs**

Changing panels

- **After 10 fish had passed through transition pool**
- **Querying PIT tag data base or downloading radio telemetry receiver**



2001-2002 Transition Pool Passage Times

Year	Species	<u>Control</u>		<u>Treatment</u>	
		N	Median FPLP (h)	N	Median FPLP (h)
2001	SPSUCK	209	1.73	209	0.37
	FAK	18	1.60	37	1.78
	STHD	80	0.65	93	0.49
2002	SPSUCK	114	0.32	146	0.21
	FAK	12	2.02	19	0.76
	STHD	170	0.81	174	0.57

Route selection behavior

Proportions (n) of spring-summer Chinook

Treatment	n	%	Straight through	Exited to Coll. chan	Exited fishway
2001 Control	209	50.1	10.1 (21)	43.1 (90)	47.9 (98)
Treatment	208	49.9	36.5 (76)	29.3 (61)	34.1 (71)
2002 Control	114	43.9	36.8 (42)	49.1 (56)	14.0 (16)
Treatment	146	56.1	53.4 (78)	37.0 (54)	9.6 (14)



2006 Weir Modification

**Junction pool walls:
reduced from 38 ft wide to 20 ft
(target velocities of 2.5-3.0 ft/s)**





2006 Weir Modification

Lower 11 weirs (634-644) modified
(target orifice jet velocity 4-5.0 ft/s)



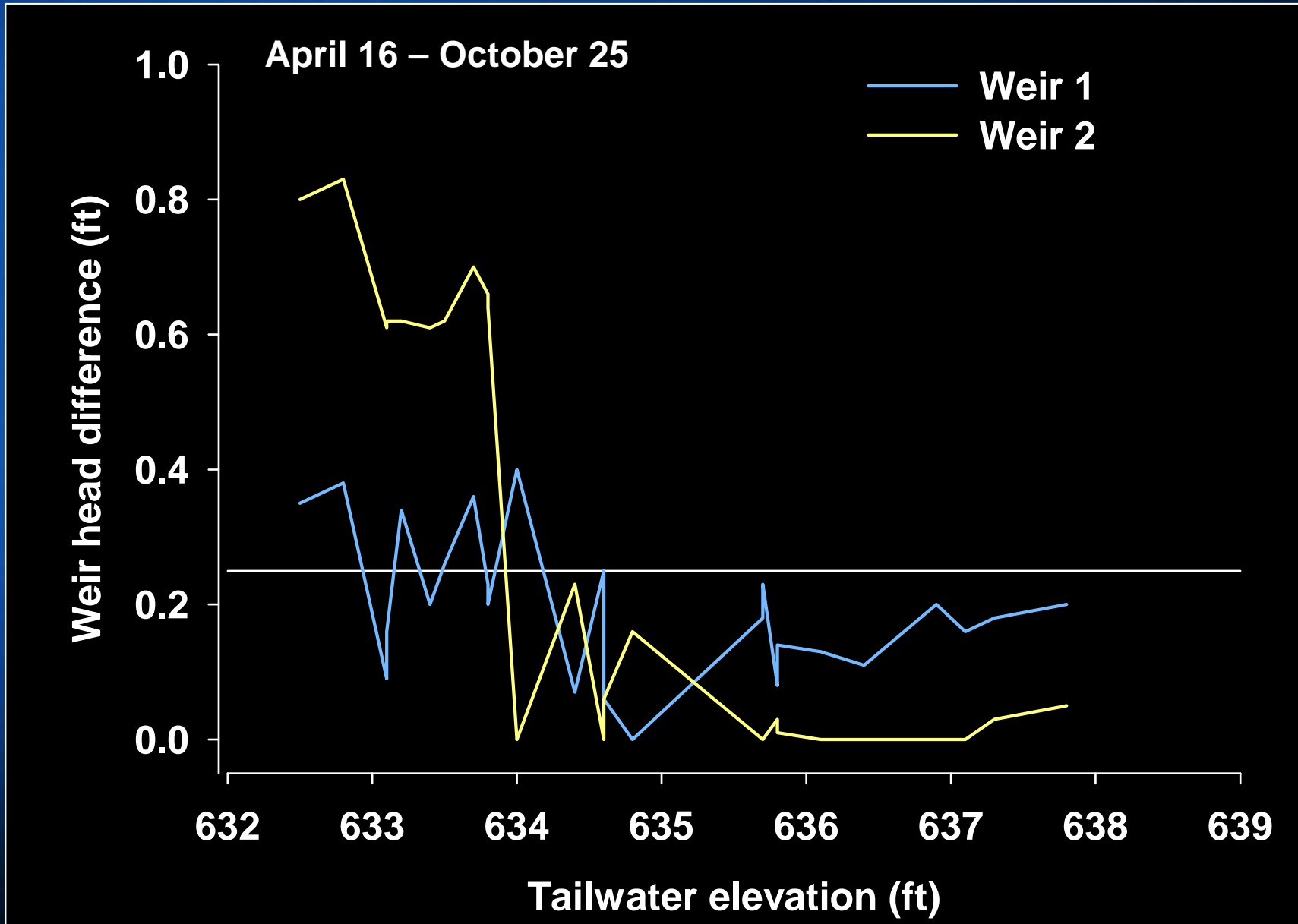
Tagging and Monitoring

Year	Species	<u>Tagging</u>		<u>LGR Trans Pool</u>	
		BON	IHR	BON	IHR
2003	SPSUCK	1184		309	
	FAK	766		27	
	STHD	641		207	
2004	SPSUCK	556	43	167	17
	FAK	606	57	38	12
	STHD	300	100	102	49
2006	SPSUCK	399	242	144	101
	FAK		284		184
	STHD		228		139
2008	SPSUCK		360		162
	FAK		275		
	STHD		300		

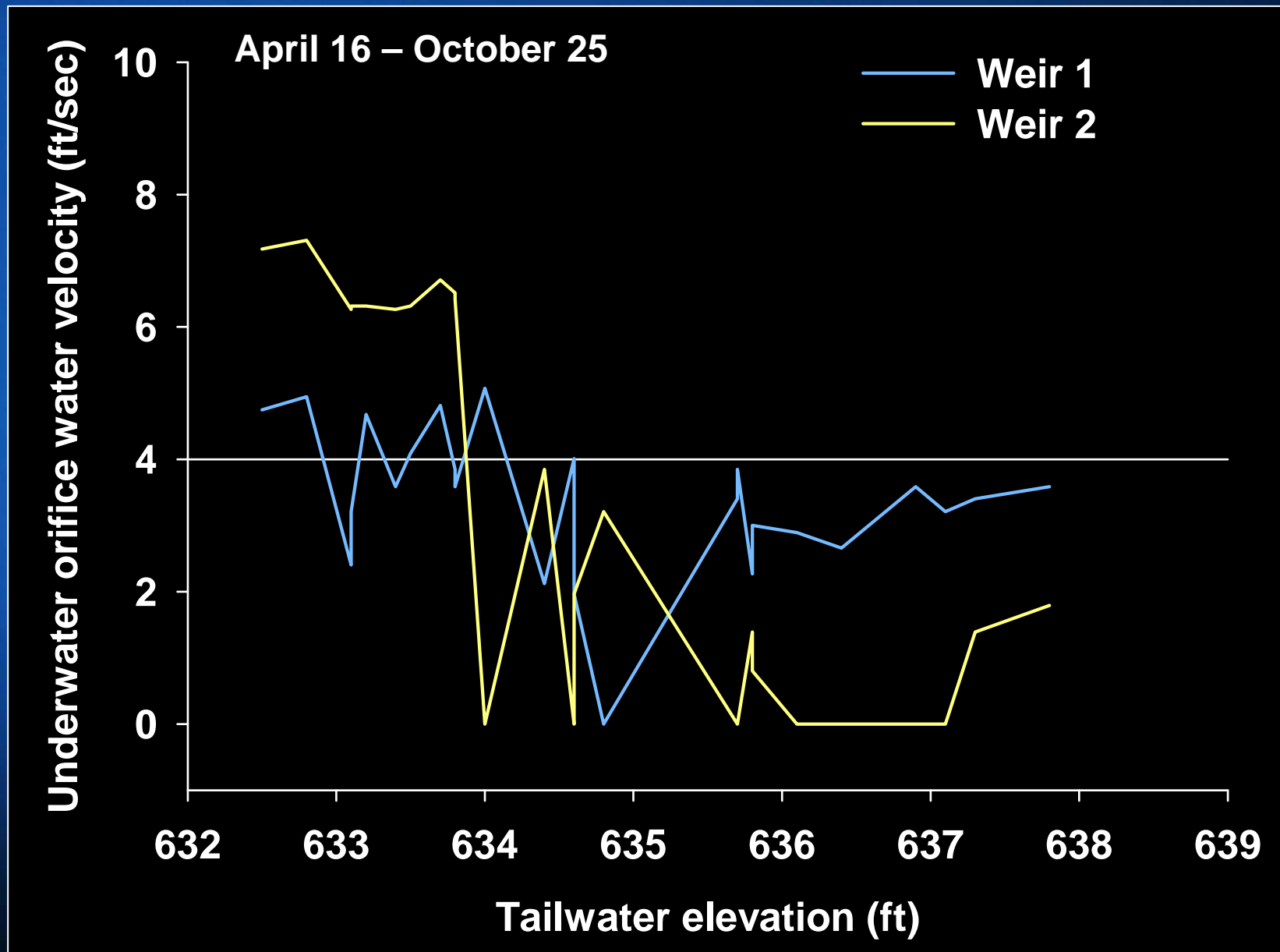
Lower Granite Dam Tailwater Elevations



Lower Granite Dam Head Differences vs. Tailwater Elevations



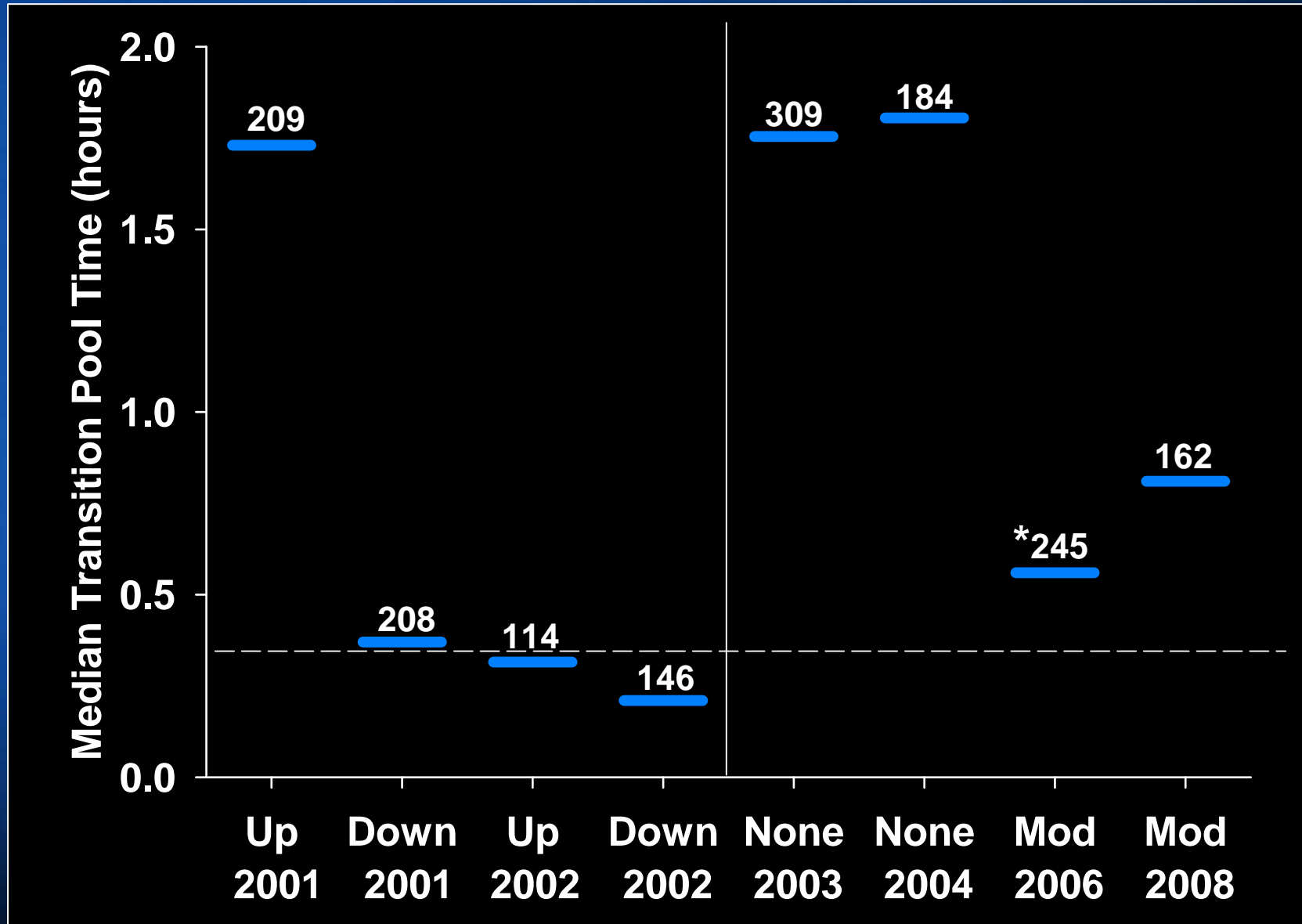
Lower Granite Dam Underwater Orifice Water Velocities vs. Tailwater Elevations



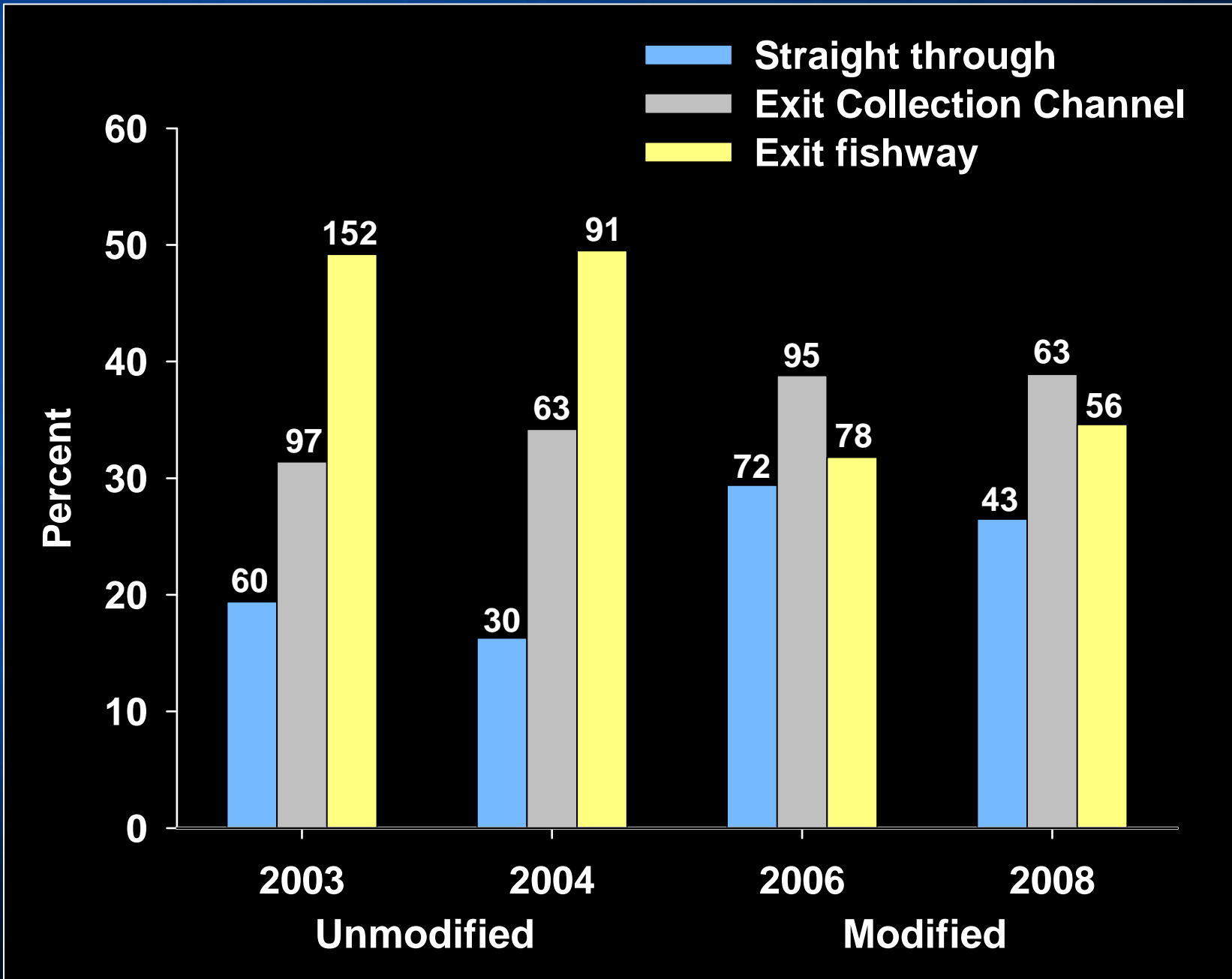
Objectives

- **Compare transition pool times and behavior of unmodified years (2003-2004) to modified years (2006 & 2008)**
- **Compare transition pool passage times among individual fish between LGO and LGR between the unmodified and modified years.**

Spring/summer Chinook - Transition Pool Passage Times



Spring/summer Chinook - Transition Pool Behavior



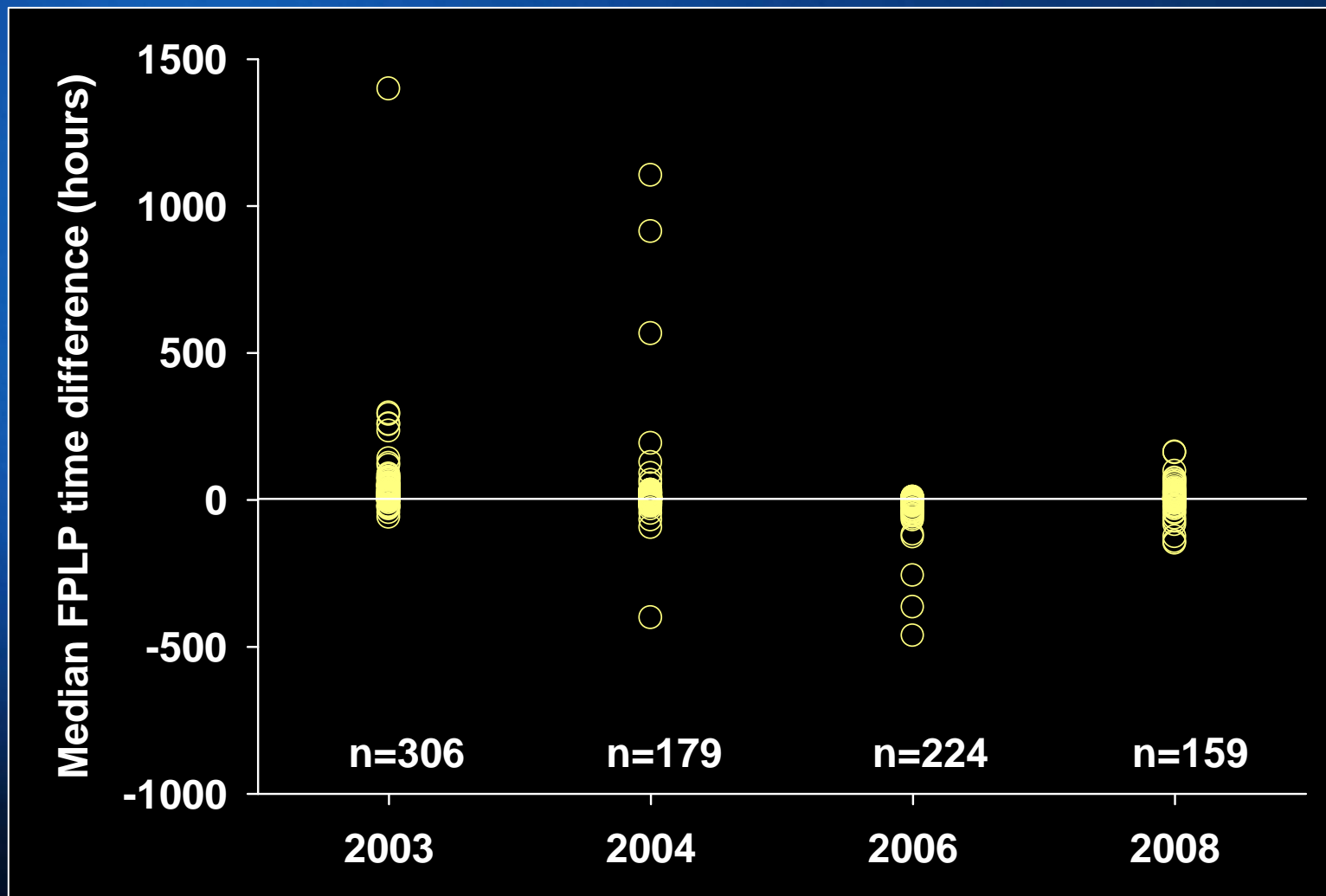
Transition Pool Passage at Little Goose and Lower Granite Dams

Spring/Summer Chinook Salmon

Year	Little Goose Median FPLP (h)	Lower Granite Median FPLP (h)
2003	0.20	1.75
2004	0.36	1.80
2006	0.27	0.56
2008	0.20	0.81

Spring/summer Chinook - Transition Pool Behavior Between Little Goose and Lower Granite Dams

	2003	2004	2006*	2008*
Median difference FPLP	0.98 h	0.59 h	0.10 h	0.33 h



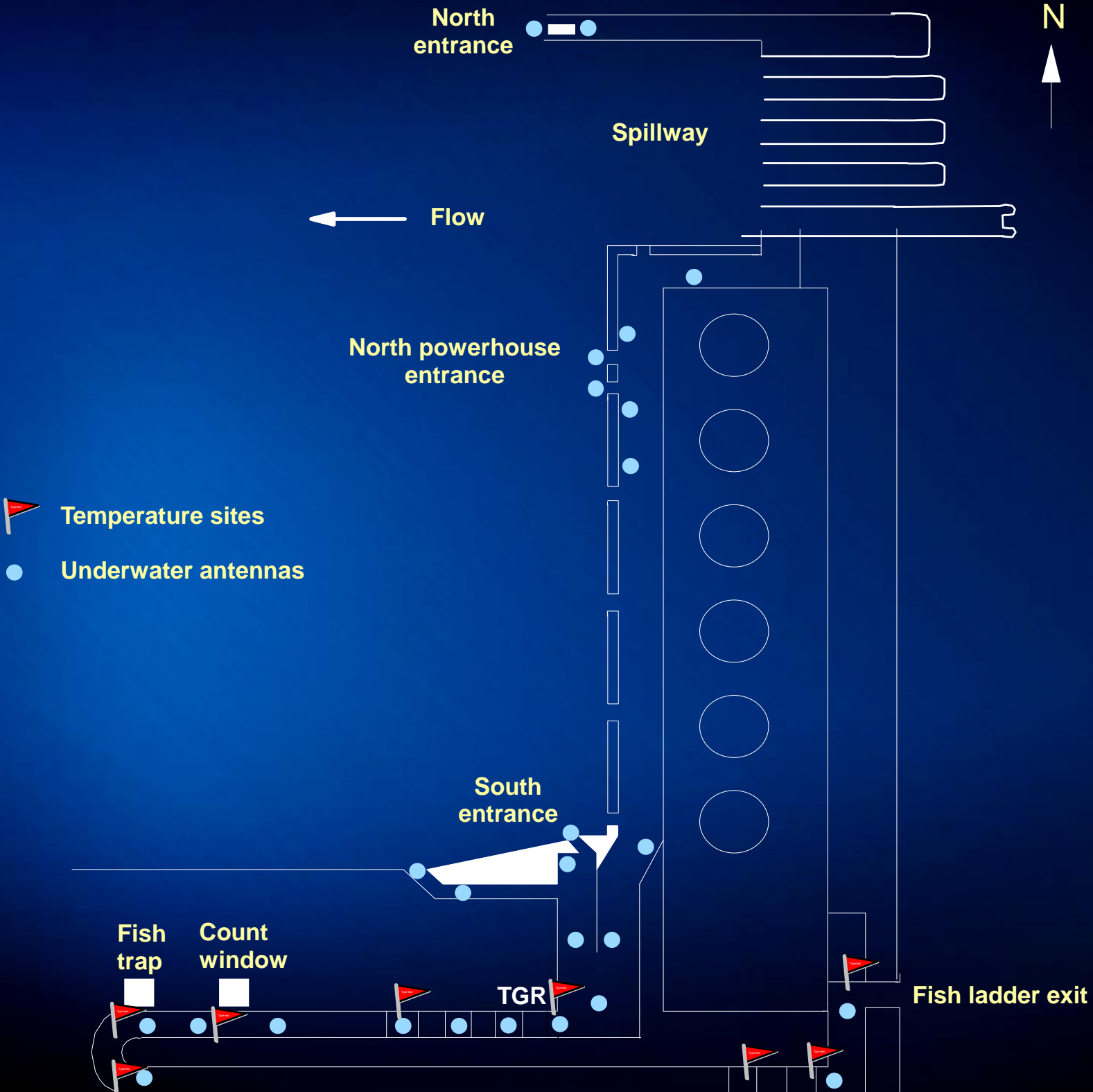
Preliminary Conclusions

- **Target velocities achieved at lower tailwater elevations**
- **Spring/summer Chinook salmon transition pool passage times in 2008 similar to 2006, and lower than 2003-2004**
- **A higher percentage of fish passed straight through the transition pool in 2006 and 2008 than in 2003 and 2004.**
- **Have observed a decrease in median transition pool passage time differences among individual fish between Little Goose and Lower Granite dams between unmodified and modified years.**

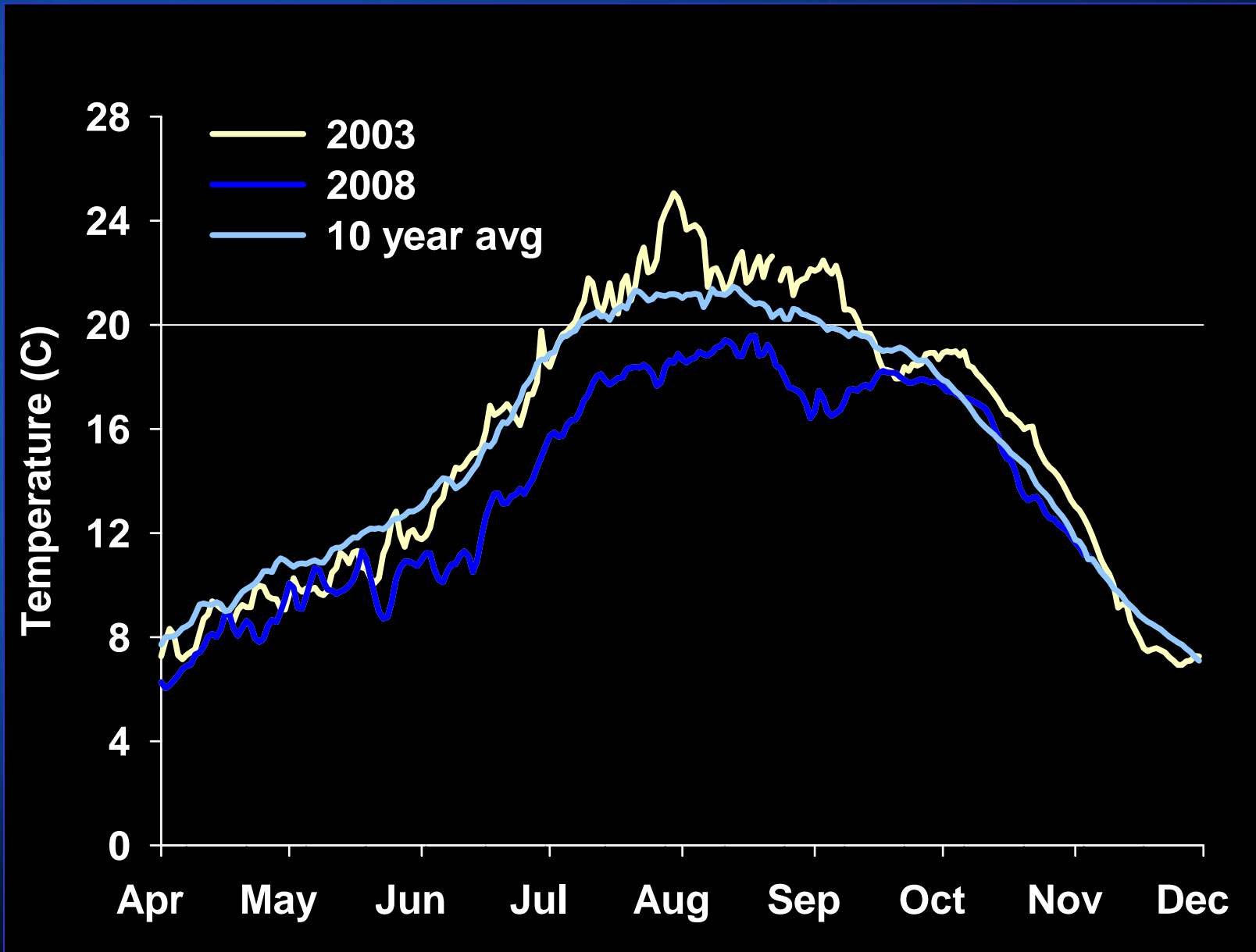
Lower Granite Dam Ladder Temperatures

Objective:

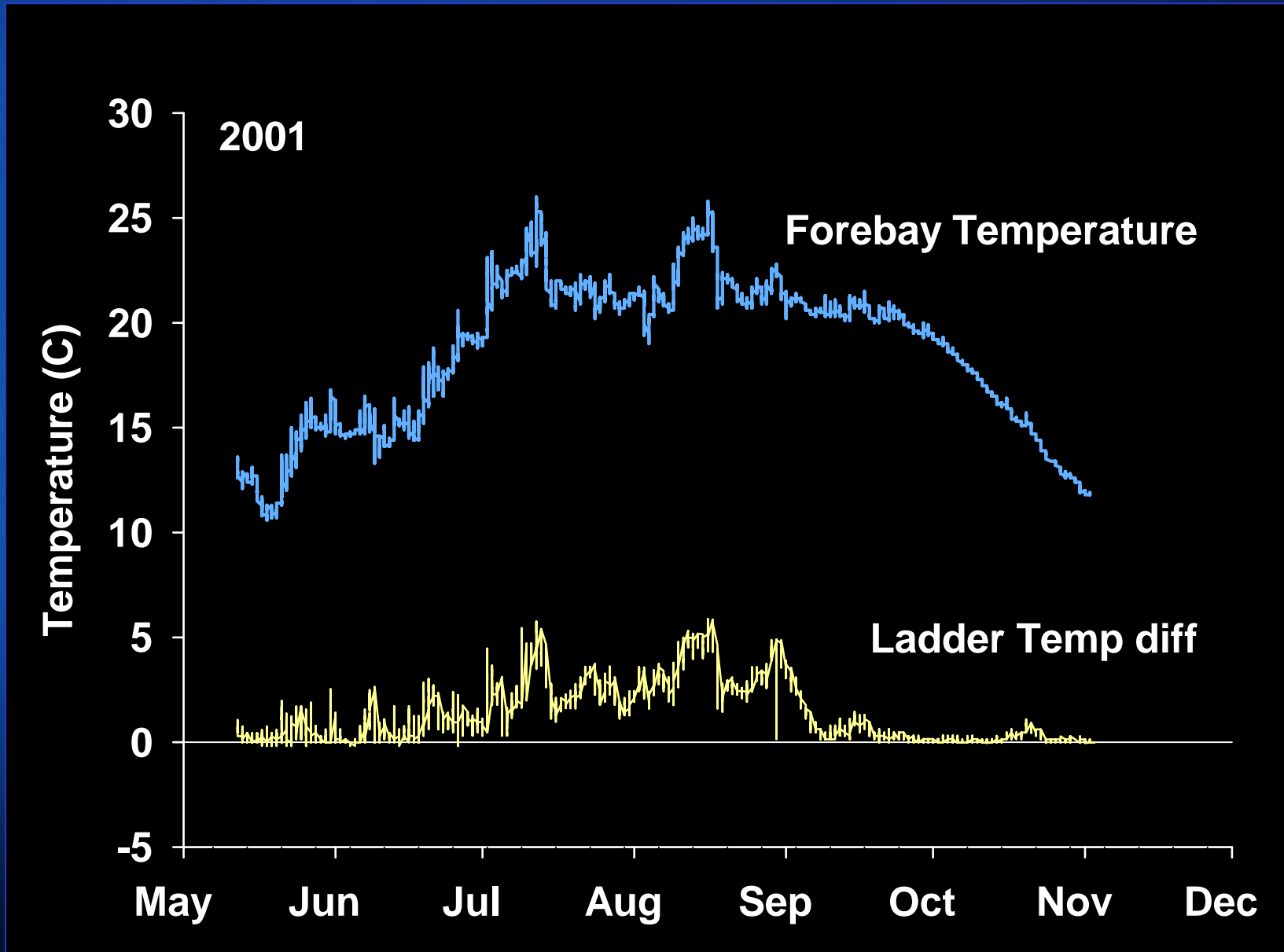
- **Determine influence of water temperature in the fishway on adult passage and behavior**
 - A. Ladder Temperature Differences**
 - B. Ladder Exits**
 - C. Overnighting**
 - D. Passage Times**



Lower Granite Dam Forebay Temperatures



Lower Granite Dam Ladder Temperatures - 2001



Lower Granite Dam Passage at Temperature Differentials

Spring/Summer Chinook

Year	N	> 1 °C
2000 - 2003	830	27.3%
2008	162	7.4%

Lower Granite Dam Ladder Behavior

When ladder temperatures were $>18^{\circ}\text{C}$ did more fish exit ?

Spring/Summer Chinook

	$<18^{\circ}\text{C}$	$>18^{\circ}\text{C}$
Did not exit	71.5	43.6
Exited	28.5	56.4
N	123	39

Lower Granite Dam Overnighting

Spring/Summer Chinook

Overnight	n	Mean temp difference (C)	Range of temp difference (C)	Median FPLP (h)	Median F1LT (d)
Yes	24	0.51	0.01 – 1.53	45.7	3.0
No	138	0.27	-0.40 – 1.53	0.6	0.8

Preliminary Conclusions

- 2008 ladder temperatures were relatively cool
- Few fish experienced ladder temperatures differences $> 1^{\circ}\text{C}$
- Warm temperatures appear to be associated slower passage