

Post-release Attributes of Natural and Hatchery Fall Chinook Salmon Subyearlings Released into the Snake and Clearwater Rivers



Objective:

Compare selected post-release attributes between PIT tagged natural subyearlings and two PIT-tagged groups of hatchery subyearling released in 2005, 2006, and 2008.

Natural Subyearlings

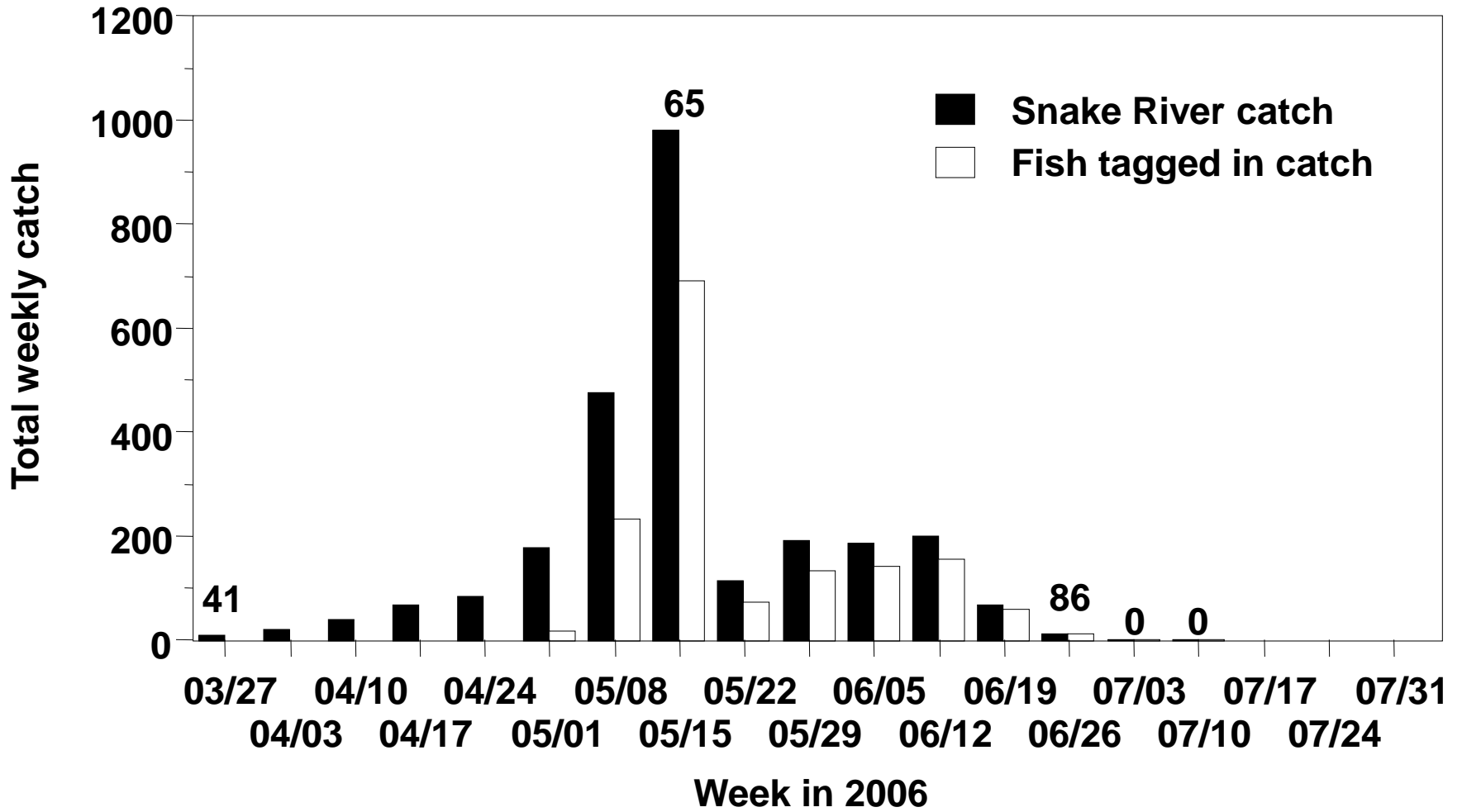
- Produced in the wild and exhibit juvenile life history diversity largely affected by temperature and characterized by protracted seaward migration and relatively low juvenile survival.

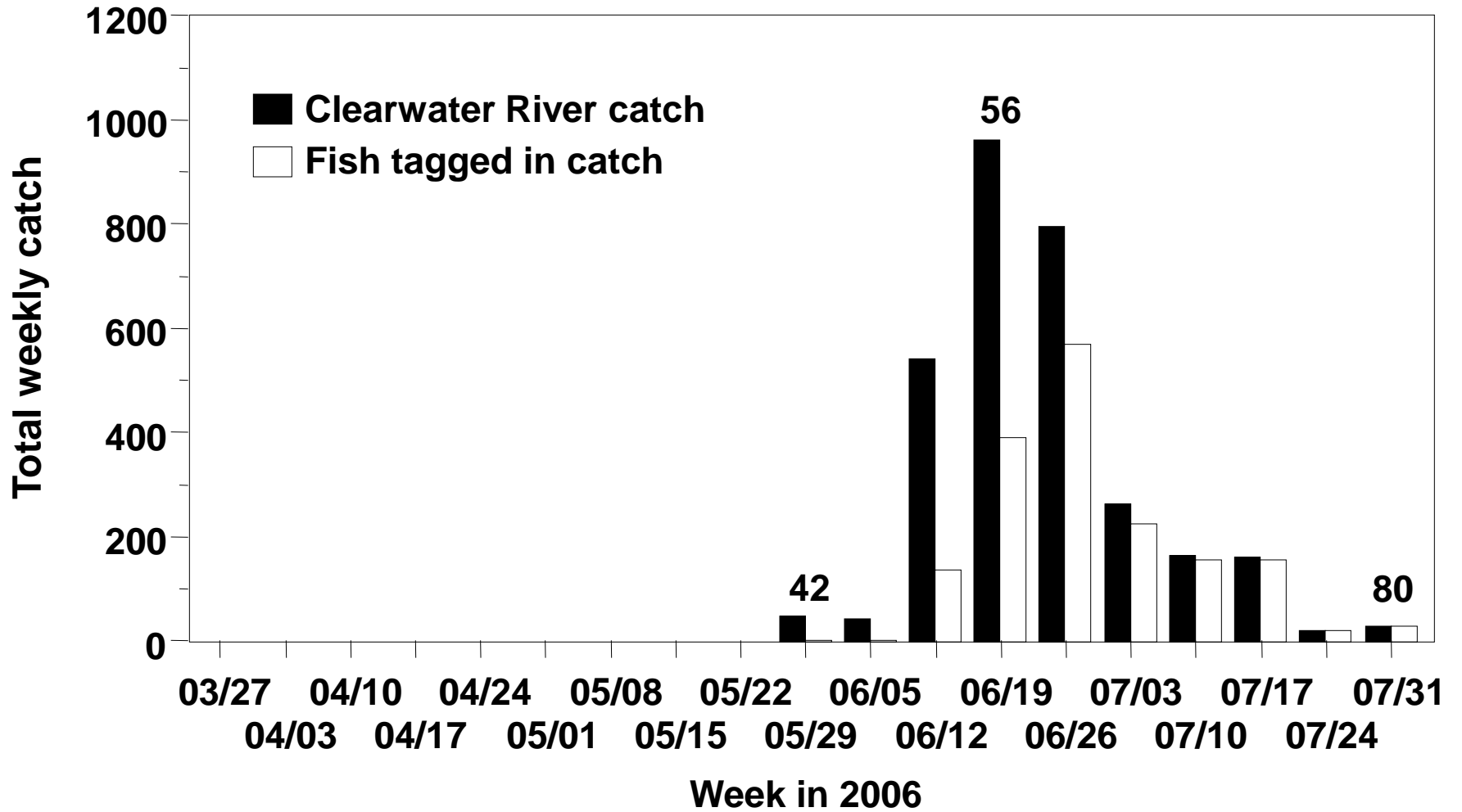
Surrogate Subyearlings

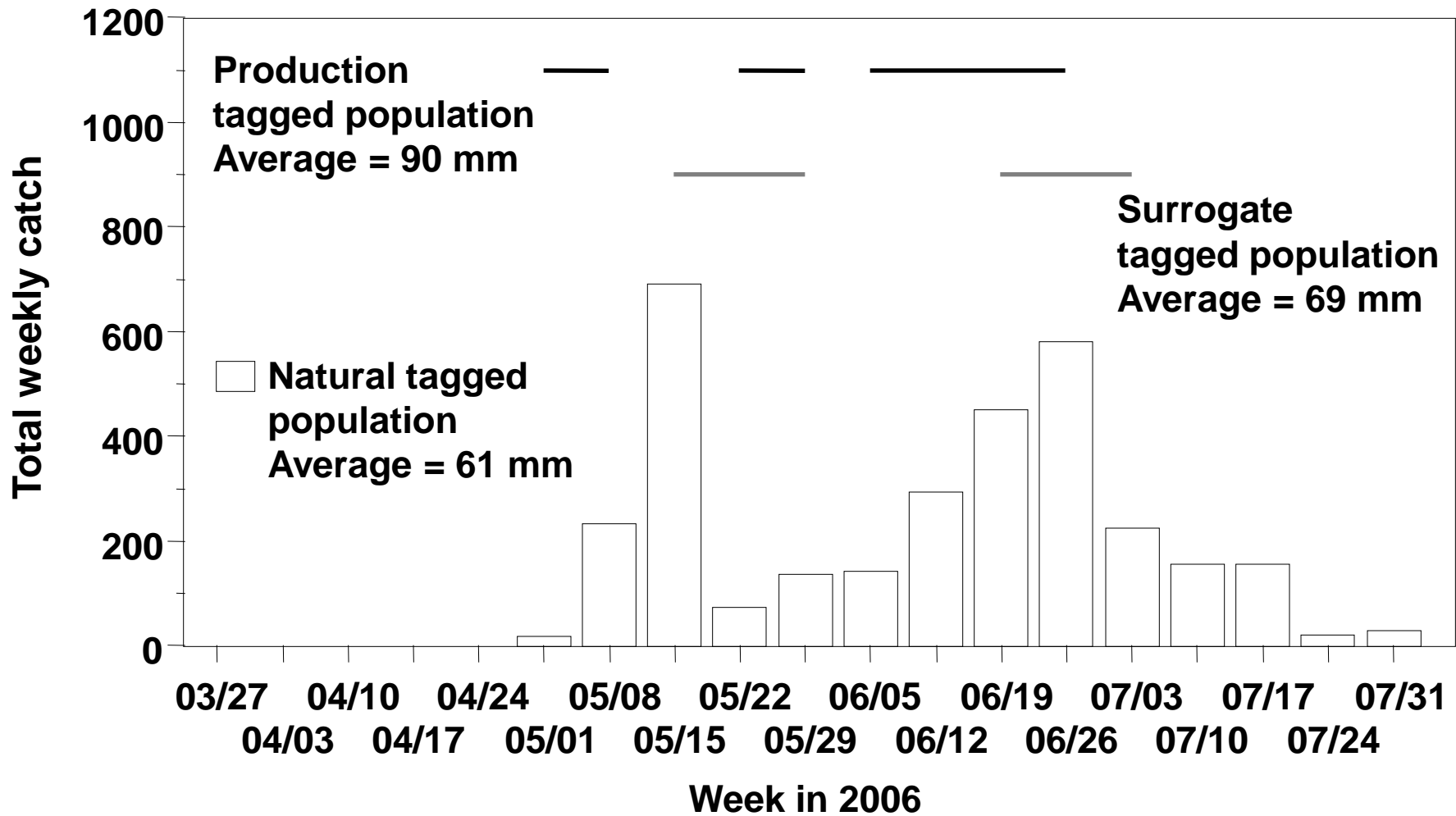
- Cultured at hatcheries to provide research releases of subyearlings that approximate the protracted migration and relatively low juvenile survival of natural subyearlings.

Production Subyearlings

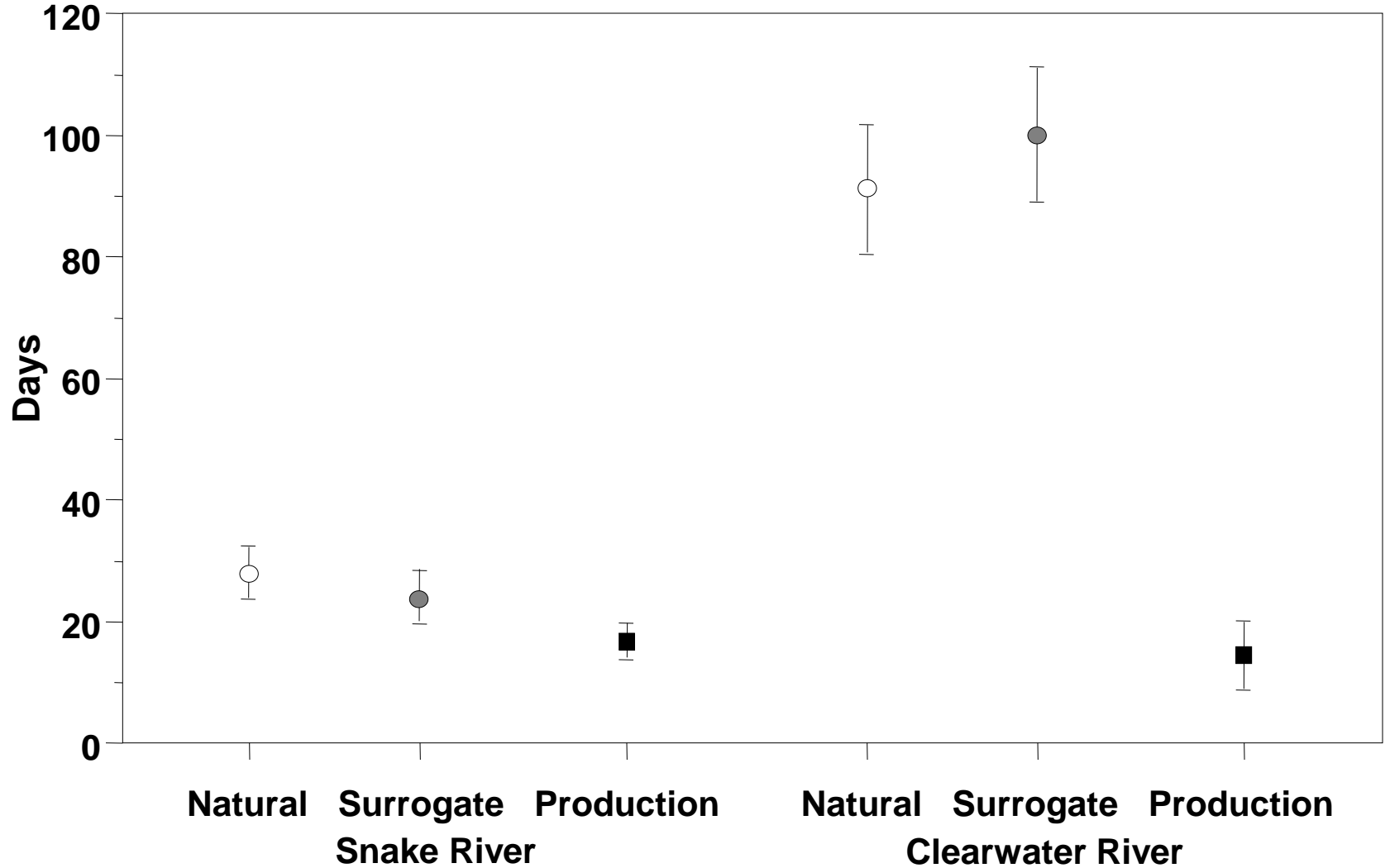
- Cultured at hatcheries to provide supplementation releases of large smolts that migrate faster, migrate earlier, and survive at higher rates as juveniles than natural subyearlings because of accelerated juvenile development.



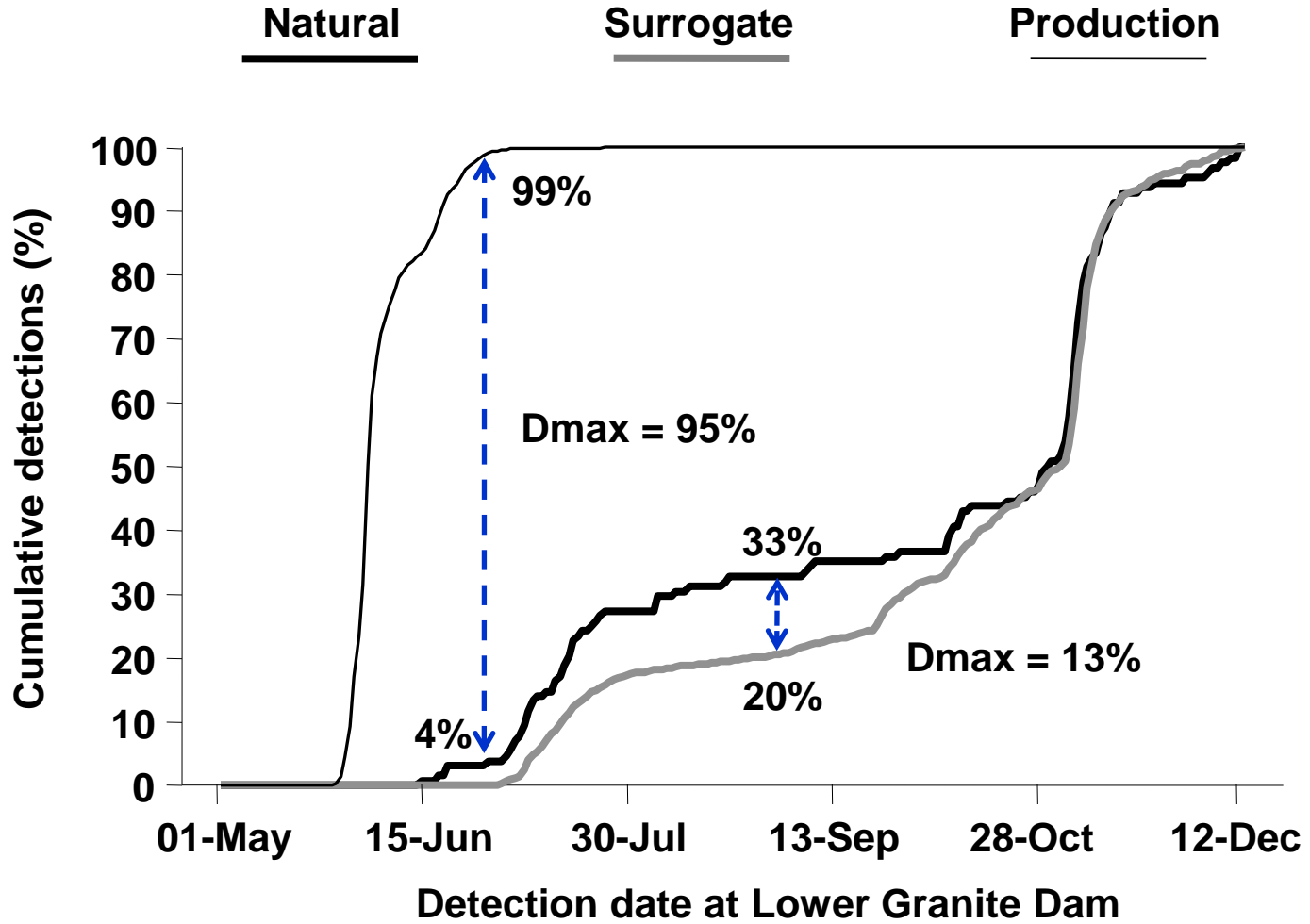




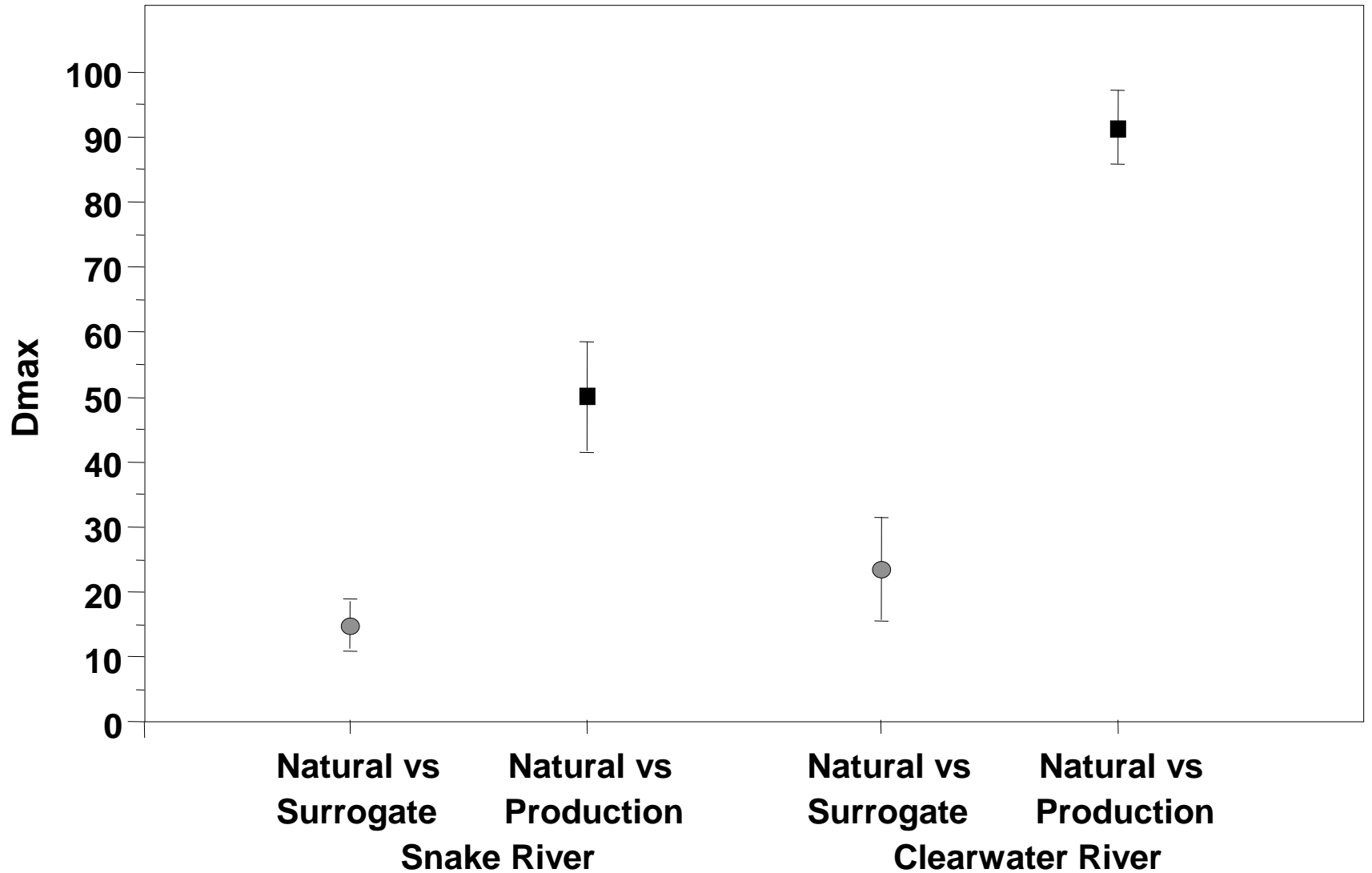
Inter-annual mean travel time to Lower Granite Dam (\pm SE; $n = 3$ years)



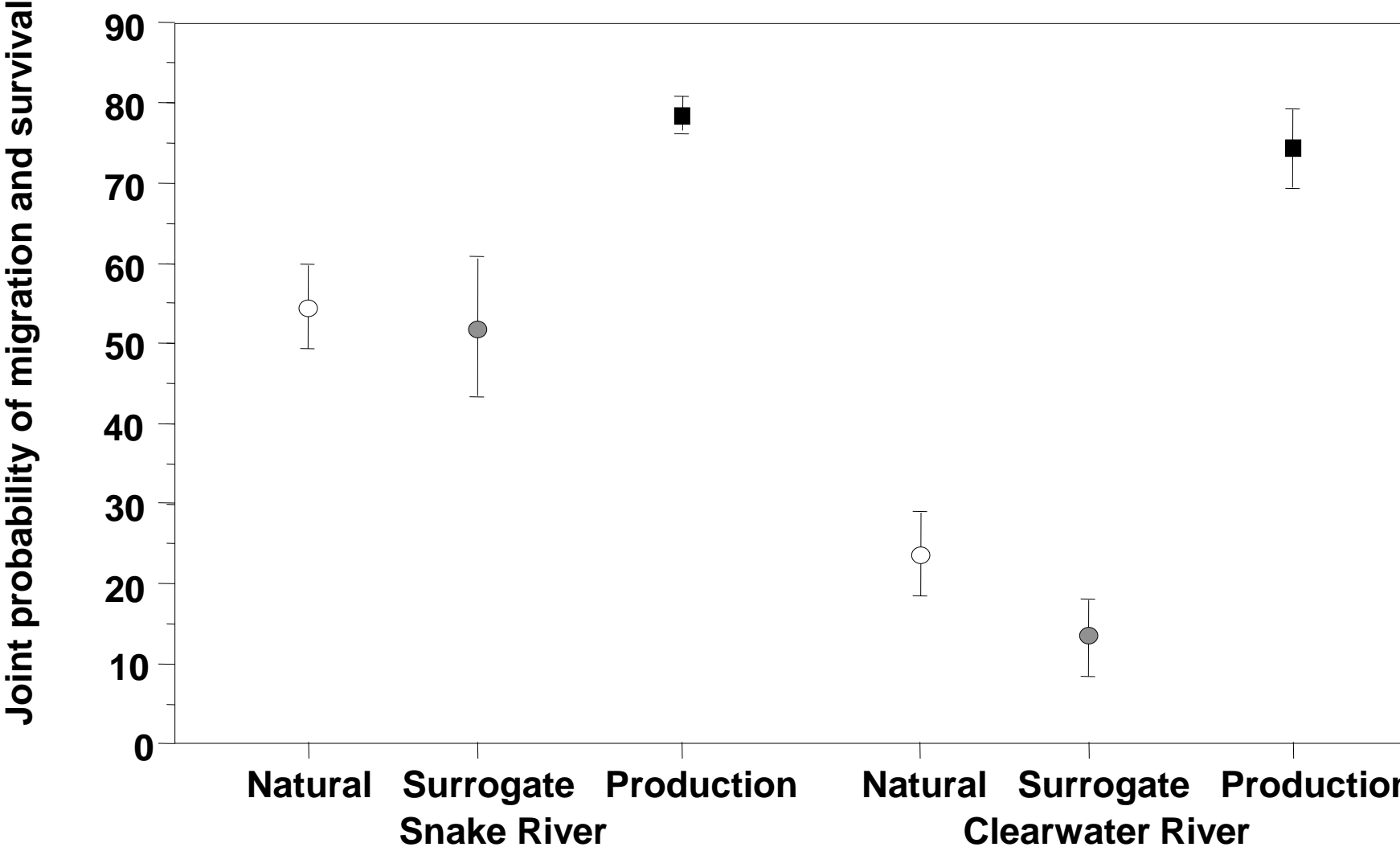
Maximum differences in cumulative detection



**Inter-annual mean maximum difference in cumulative detection at Lower Granite Dam
(percentage points \pm SE; n = 3)**



Inter-annual mean joint probability of migration and survival to the tailrace of Lower Granite Dam ($\% \pm \text{SE}; n = 3$)



Example of calculating similarity indices (SI: higher value divided by lower value of the attribute) for comparing releases of PIT-tagged natural subyearlings to surrogate and production subyearlings.

Attribute	Attribute values			Attribute values		
	Natural	Surrogates	SI	Natural	Production	SI
Lower Granite Dam						
Cumulative detection	36.8	48.2	1.3	18.4	54.0	2.9
Peak monthly detection	71.1	71.8	1.0	71.1	48.7	1.5
Summer spill detection	47.8	41.1	1.2	47.8	27.4	1.7
Travel time	24	22	1.1	24	14	1.7
2006 detection	100.0	100.0	1.0	100.0	100.0	1.0
Migrant size	94	91	1.0	94	103	1.1
Migration/survival	See Table A1		1.1	See Table A1		1.4
Little Goose Dam						
Cumulative detection	35.4	45.4	1.3	12.3	69.6	5.7
Peak monthly detection	56.3	63.0	1.1	56.3	35.9	1.6
Summer spill detection	73.9	65.8	1.1	73.9	23.9	3.1
Travel time	33	31	1.1	33	18	1.8
2006 detection	100.0	100.0	1.0	100.0	100.0	1.0
Lower Monumental Dam						
Cumulative detection	11.7	6.0	1.9	14.9	85.2	5.7
Peak monthly detection	60.6	64.5	1.1	60.6	36.3	1.7
Summer spill detection	47.9	48.9	1.0	47.9	7.8	6.1
Travel time	34	31	1.1	34	21	1.6
2006 detection	100.0	100.0	1.0	100.0	100.0	1.0

Inter-annual mean similarity indices across dams (\pm SE)

River	Groups	<i>n</i>	Similarity index
Snake	Natural and surrogates	9	1.26 \pm 0.09
	Natural and production	9	4.01 \pm 0.82
Clearwater	Natural and surrogates	5	1.68 \pm 0.16
	Natural and production	5	65.36 \pm 30.8

In Closing:

- We knew when developing the consensus proposal that it would not be possible during this study to PIT-tag the sample size of natural subyearlings required for precise SARs.
- The method of surrogate releases provides an approach to obtain precise SARs for a group of subyearlings that exhibit the protracted migration and relatively low survival of PIT-tagged natural subyearlings.
- As intended when the production program was developed, the population of production subyearlings does not share the protracted migration and relatively low juvenile survival of PIT-tagged natural subyearlings.
- The similarity is greater between natural and surrogate subyearlings than between natural and production subyearlings.