

Columbia River Chinook and Steelhead Transport Studies from McNary Dam



**National Marine
Fisheries Service**

2008 Research Objectives

Transportation vs. in-river migration vs. full-flow bypass study – yearling Chinook salmon and steelhead

- adult returns from 2005 steelhead tagging

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Transportation vs. in-river migration vs. full-flow bypass study – yearling Chinook salmon and steelhead

- adult returns from 2005 steelhead tagging
- results from three years of marking
- comparison with spring Chinook results

Hatchery Steelhead Studies

2005 Hatchery Steelhead

Juvenile tagging

- Hatcheries involved

- Winthrop	49,233
- Wells	239,513
- Chelan	34,807
- Eastbank	59,791
- Ringold*	94,875

2005 Hatchery Steelhead

Juvenile tagging

- Hatcheries involved

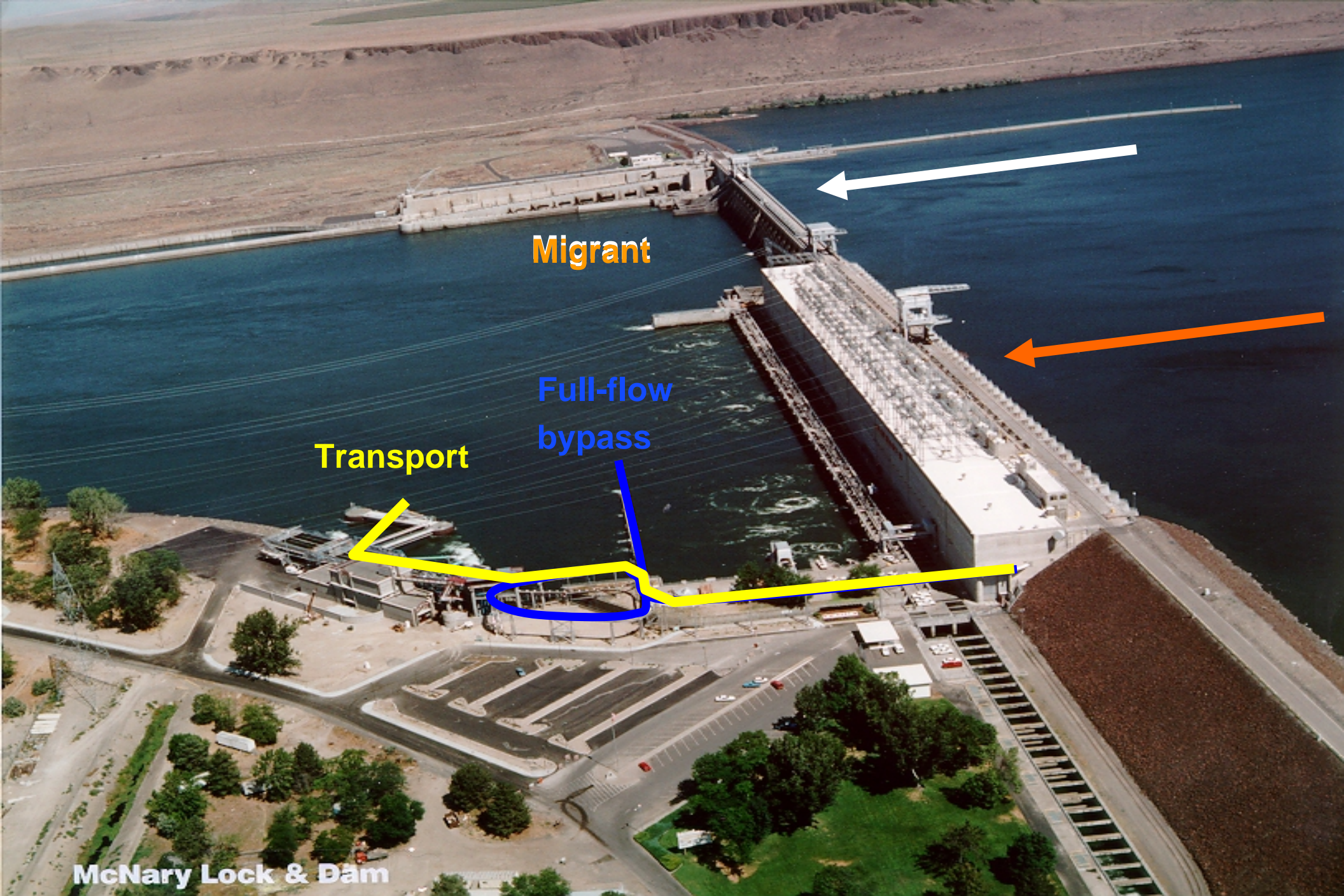
- Winthrop	49,233
- Wells	239,513
- Chelan	34,807
- Eastbank	59,791
- Ringold*	94,875

- Number detected leaving pond	60,971
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2005 Hatchery Steelhead

Juvenile tagging

- Hatcheries involved
- Study design



Migrant

Full-flow
bypass

Transport

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2005 Hatchery Steelhead

Juvenile tagging

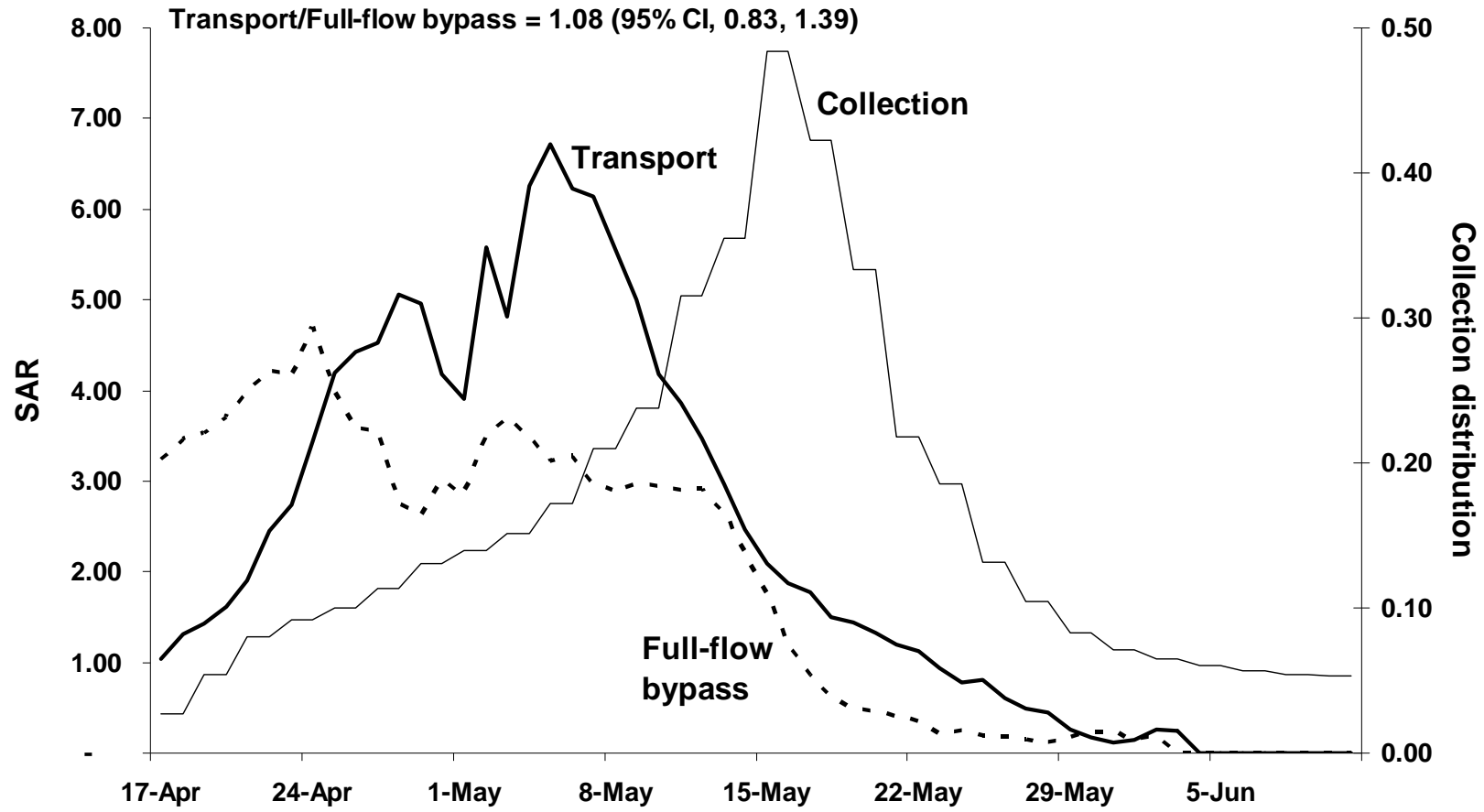
- Hatcheries involved
- Study design
- Final number of juveniles in each study group

Transport	17,733
Full-flow bypass	24,479
Migrant	147,832

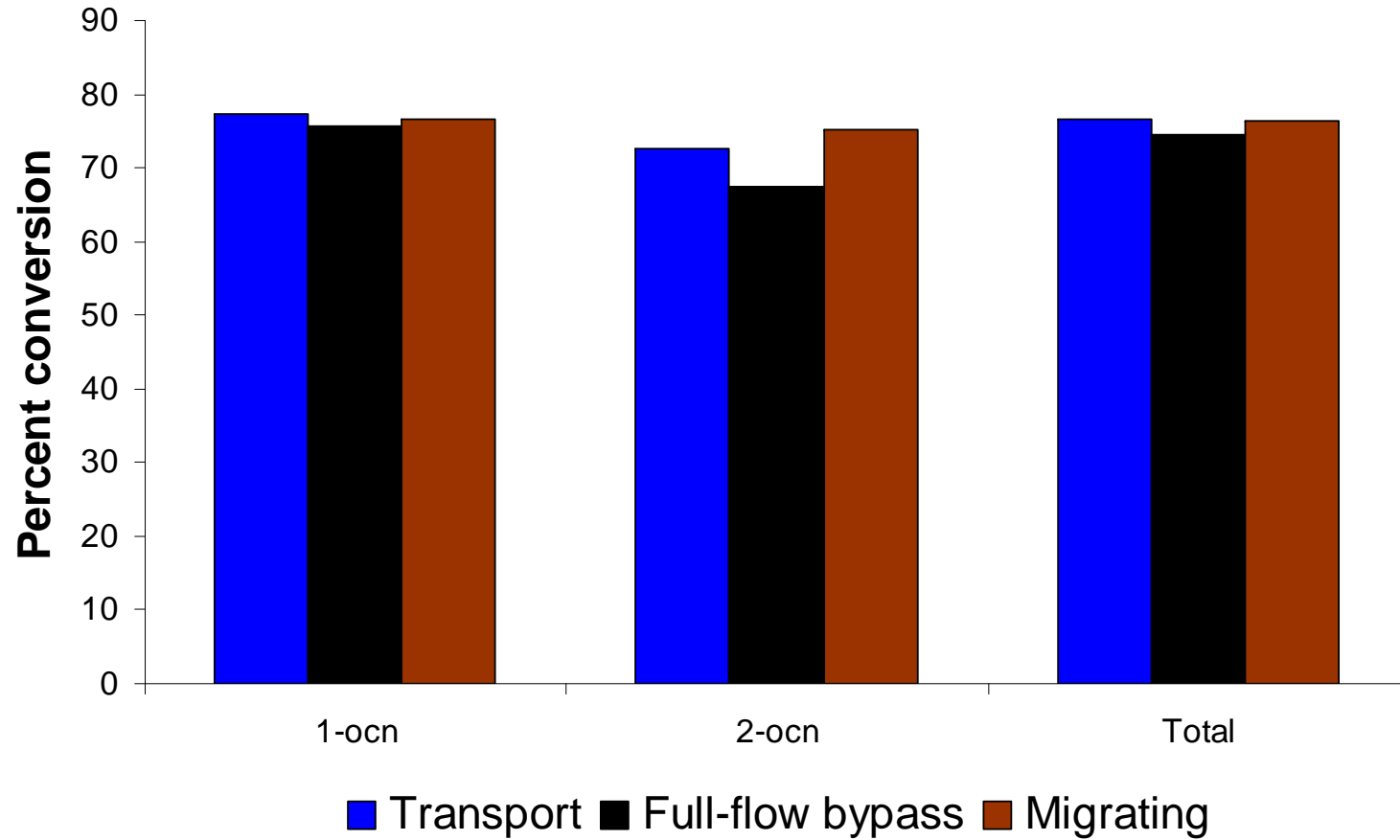
2005 Hatchery Steelhead

	Juvenile numbers	<u>Returns by Age-class</u>		SAR	T/I B/I
		1-ocn	2-ocn		
Transport	17,733	327	52	2.14	1.09 (0.95,1.26)
Full-Flow bypass	24,479	425	60	1.98	1.01 (0.88,1.16)
Migrant	147,832	2,420	468	1.95	

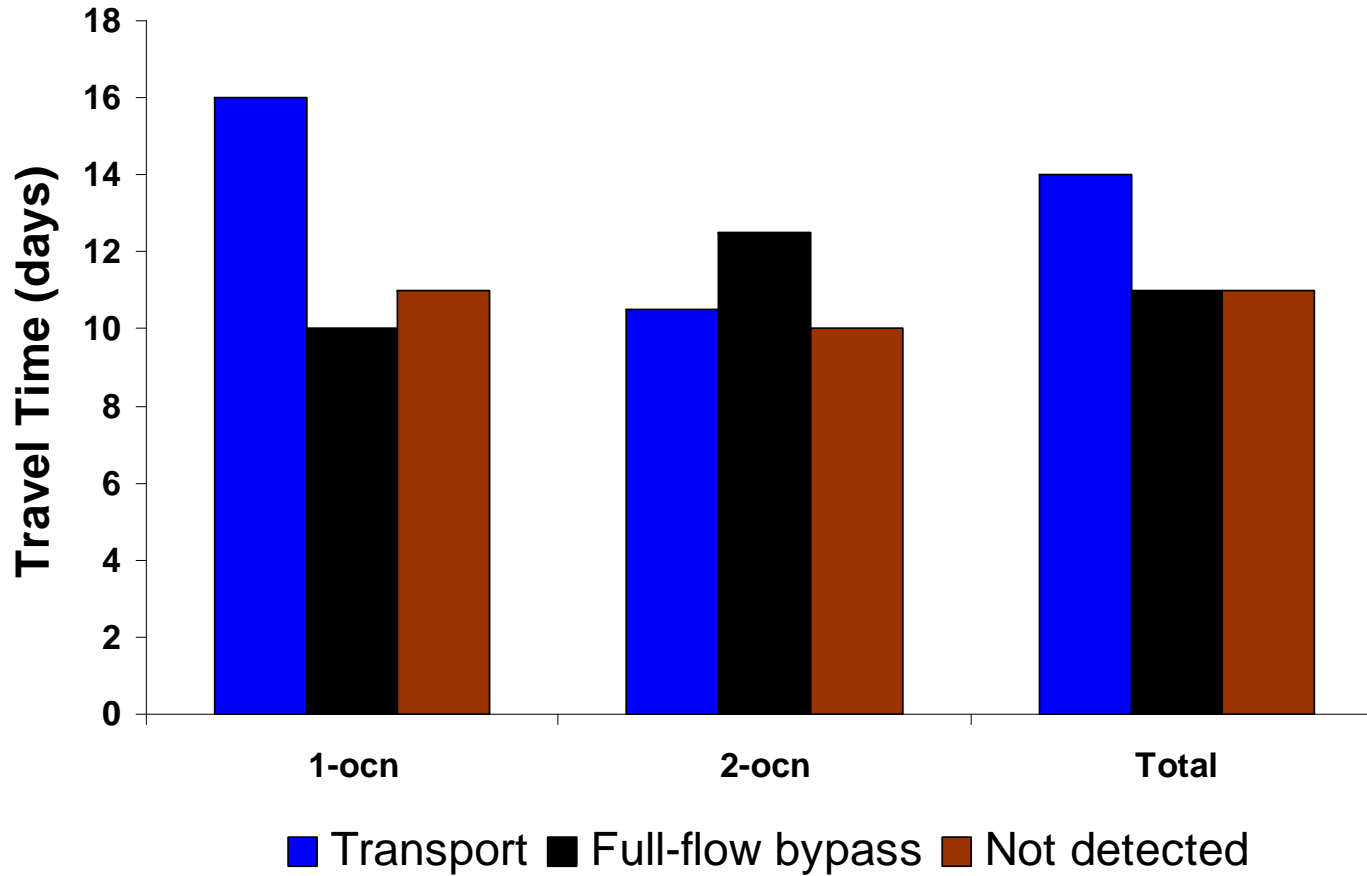
2005 Hatchery Steelhead



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2005 Hatchery Steelhead

Conclusions:

- Transport fish returned at slightly higher rates than both bypass and migrant fish

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Conclusions:

- Transport fish returned at higher rates than both bypass and migrant fish
- Migrant and bypass fish returned at similar rates
- Adult conversion rates from BON to MCN were similar for all three groups

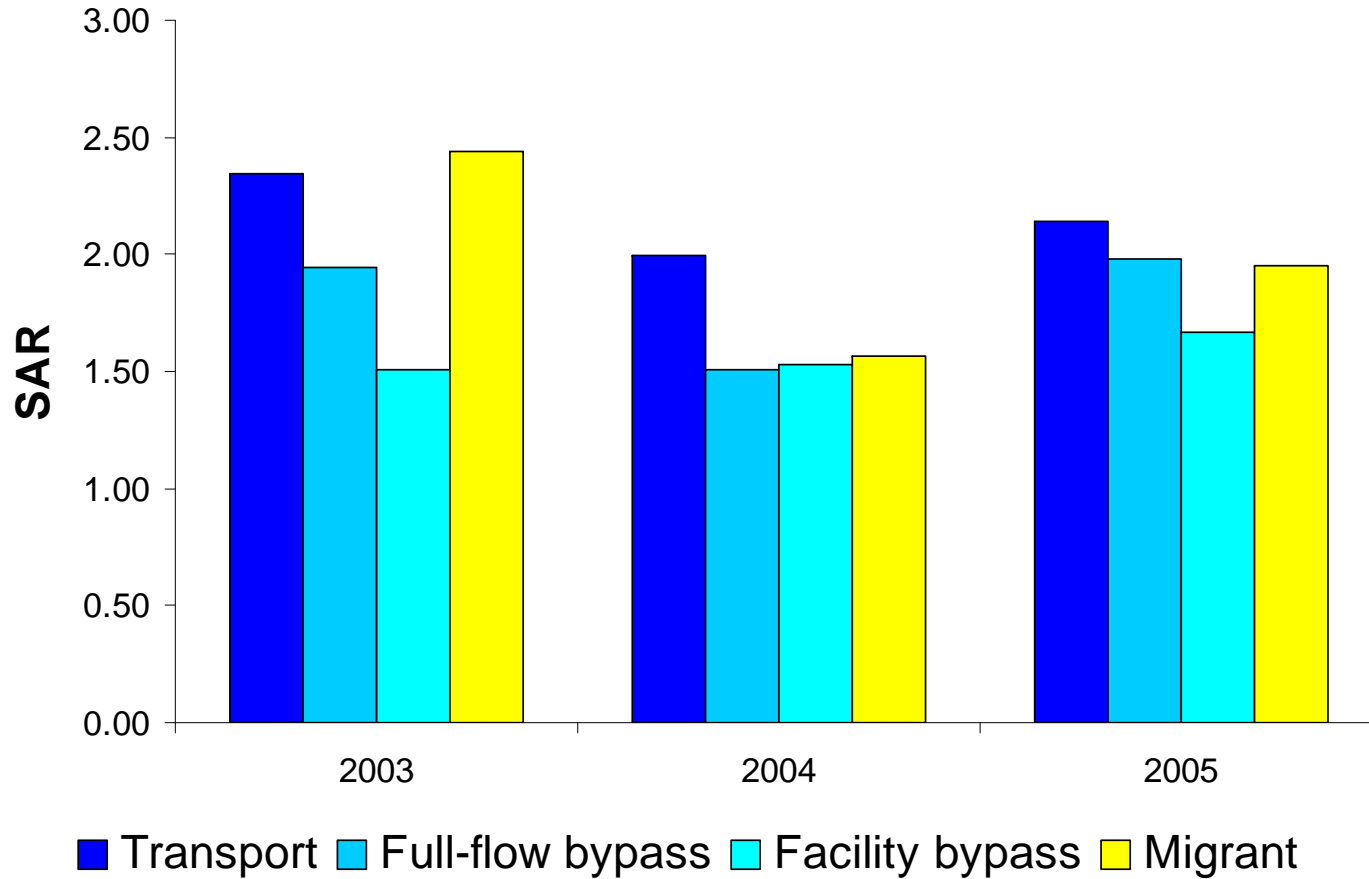
2005 Hatchery Steelhead

Conclusions:

- Transport fish returned at higher rates than both bypass and migrant fish
- Migrant and bypass fish returned at similar rates
- Adult conversion rates from BON to MCN were similar for all three groups
- Transport adults had the slowest median travel times from BON to MCN, while migrant and bypass adults showed similar travel times

Results from the Three Year Hatchery Steelhead Study

2003-5 Hatchery Steelhead

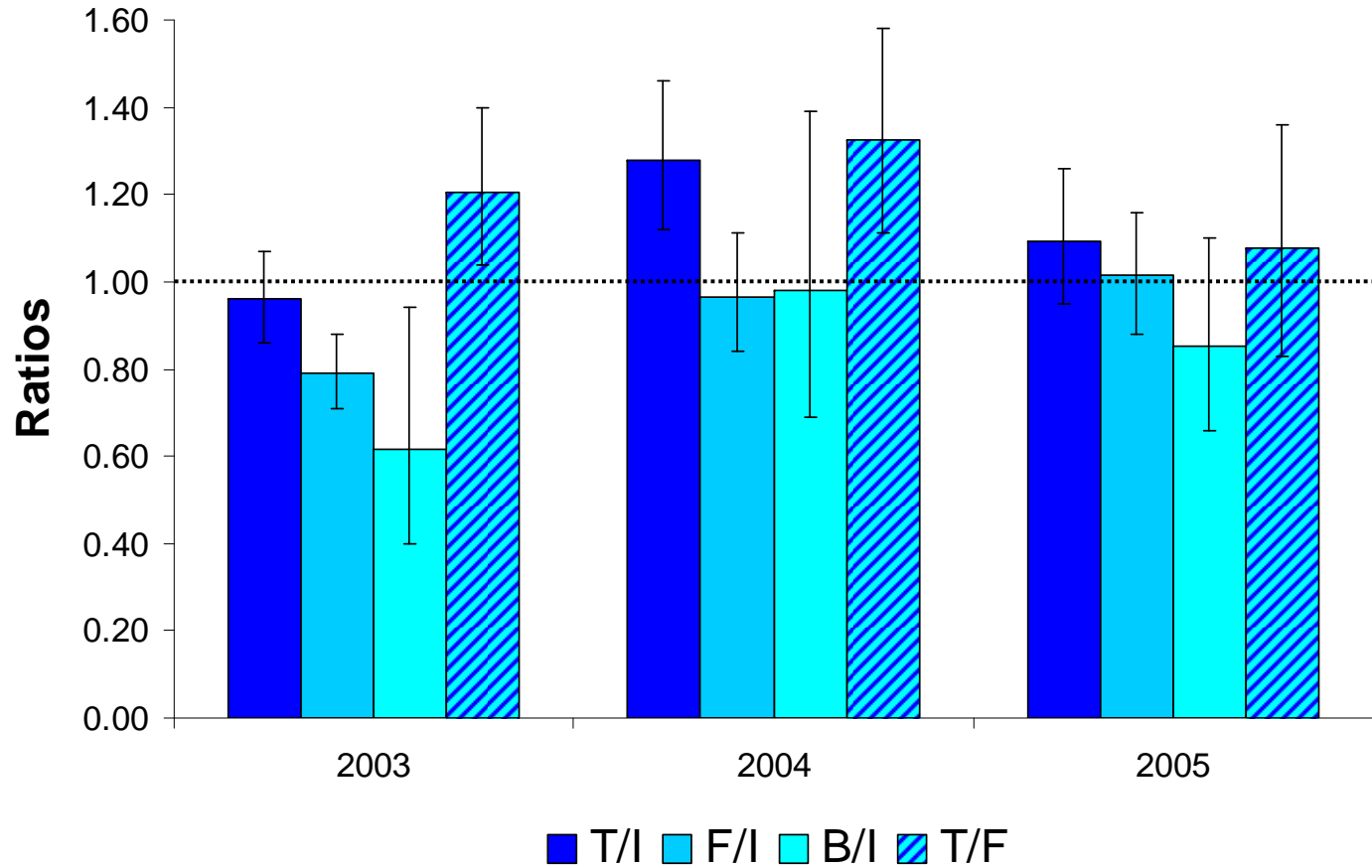


2003-5 Hatchery Steelhead

3 Year Study Conclusions :

- SARs for the three years ranged from 1.5-2.4%

2003-5 Hatchery Steelhead



2003-5 Hatchery Steelhead

3 Year Study Conclusions :

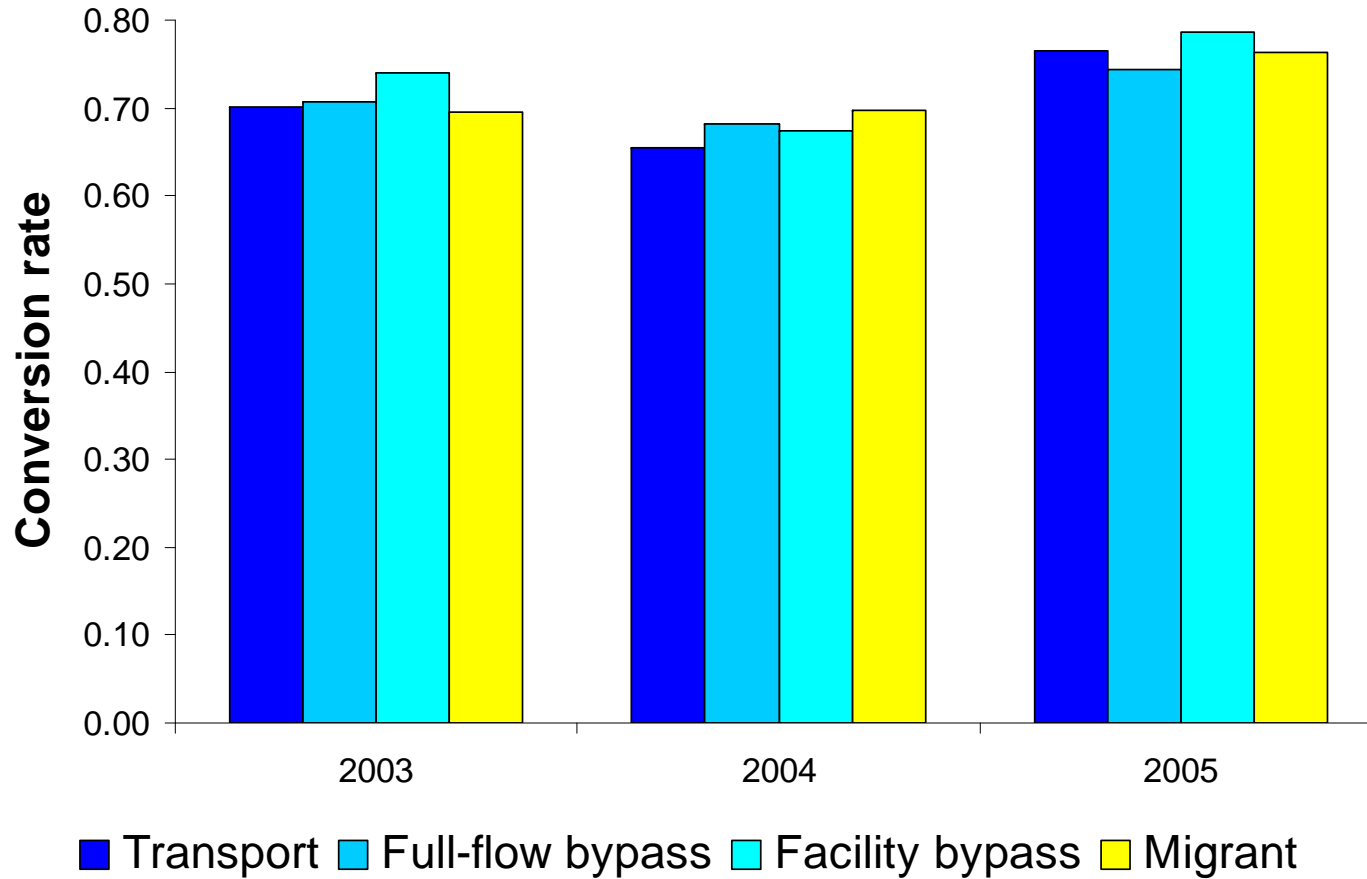
- SARs for the three years ranged from 1.5-2.4%
- T/Is ranged from 0.97 to 1.28; F/Is ranged from 0.80 to 1.02; B/I < 1.0 in all years

2003-5 Hatchery Steelhead

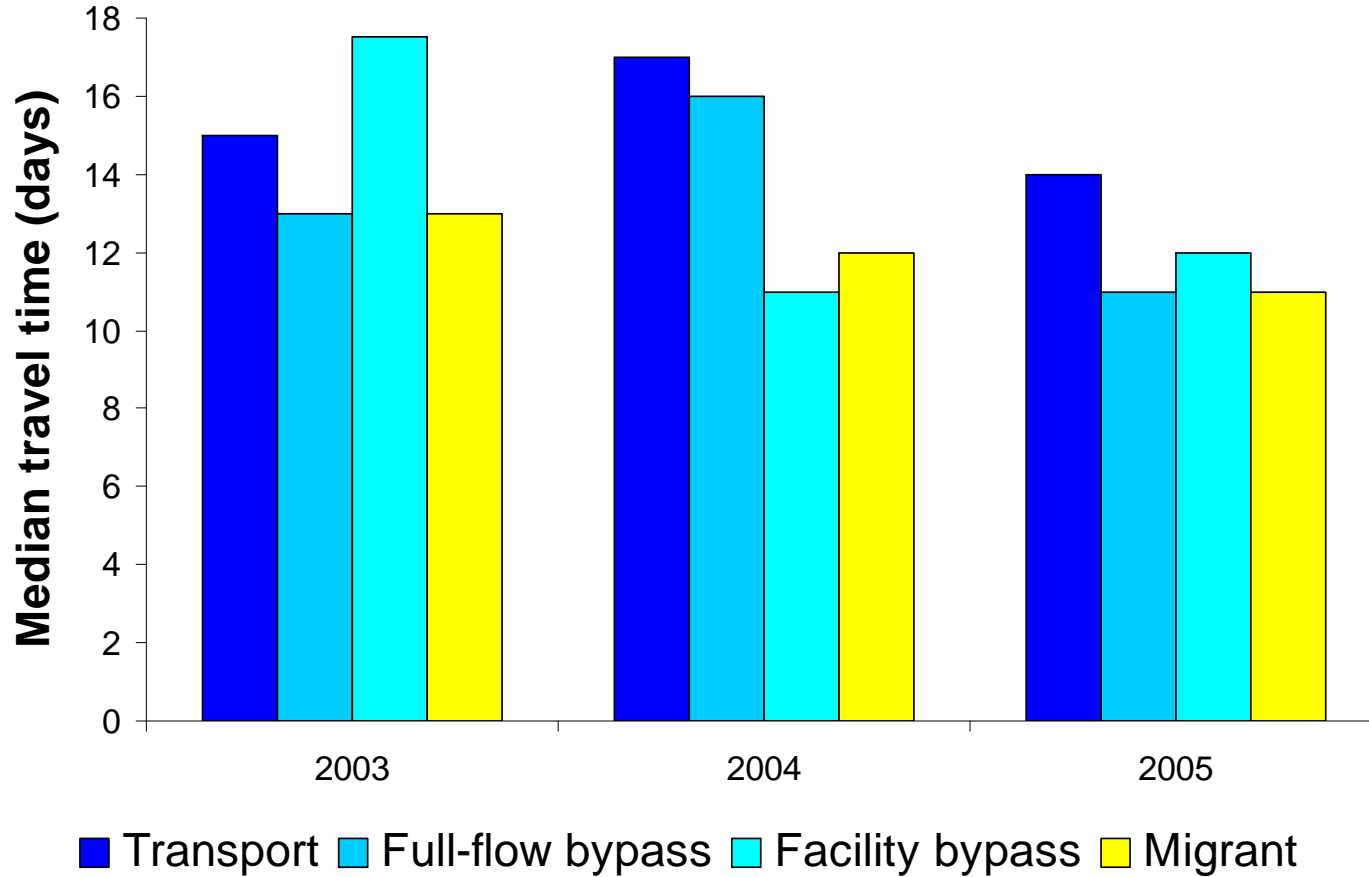
3 Year Study Conclusions :

- SARs for the three years ranged from 1.5-2.4%
- T/Is ranged from 0.97 to 1.28; F/Is ranged from 0.80 to 1.02; B/I < 1.0 in all years
- T/F > 1.0 for all years; F/Bs ranged from 0.98 to 1.29; T/B > 1.0 for all years

2003-5 Hatchery Steelhead



2003-5 Hatchery Steelhead



2003-5 Hatchery Steelhead

3 Year Study Conclusions :

- SARs for the three years ranged from 1.5-2.4%
- T/Is ranged from 0.97 to 1.28; F/Is ranged from 0.80 to 1.02; B/I < 1.0 in all years
- T/F > 1.0 for all years; F/Bs ranged from 0.98 to 1.29; T/B > 1.0 for all years
- Transport provided a benefit over in-river migration in only one of three years; if collected, it was better to transport than bypass back to the river

Comparison of Hatchery Steelhead and Hatchery Yearling Chinook Salmon Studies

Steelhead and Yearling Chinook Salmon comparisons

SARs

- Yearling Chinook Salmon
 - poor returns for all three years (0.19-0.43%)
 - temporal SAR patterns for each year were different
- Steelhead
 - good returns for all three years (1.5-2.4%)
 - temporal SAR patterns for both transport and bypass fish showed that earlier outmigrating fish performed better

Steelhead and Yearling Chinook Salmon comparisons

T/Is

- Yearling Chinook Salmon
 - ranged from 0.74 to 0.95
 - no benefit from transportation
- Steelhead
 - ranged from 0.97 to 1.28
 - one year showed a benefit from transportation

Steelhead and Yearling Chinook Salmon comparisons

T/Fs and T/Bs

- Yearling Chinook Salmon
 - T/Fs were always greater than 1.0
 - T/Bs were 1.0 or less
- Steelhead
 - T/Fs and T/Bs were always greater than 1.0

Steelhead and Yearling Chinook Salmon comparisons

Other observations

- Yearling Chinook Salmon

- adult return from separator not an issue

- Steelhead

- adult return from separator may be an issue, although numbers of juveniles using this route were low (2.11-2.58% of fish entering separator)

Steelhead and Yearling Chinook Salmon comparisons

Conclusions

1. Little to no benefit from transportation over in-river migration for both species

Steelhead and Yearling Chinook Salmon comparisons

Conclusions

1. Little to no benefit from transportation over in-river migration for both species
2. Transportation was better than full-flow bypass for both species

Steelhead and Yearling Chinook Salmon comparisons

Conclusions

1. Little to no benefit from transportation over in-river migration for both species
2. Transportation was better than full-flow bypass for both species; however, facility bypass may be better than, or at least as good as, transportation for Chinook salmon



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