Adult Snake River sockeye salmon passage and conversion within and upstream of the FCRPS

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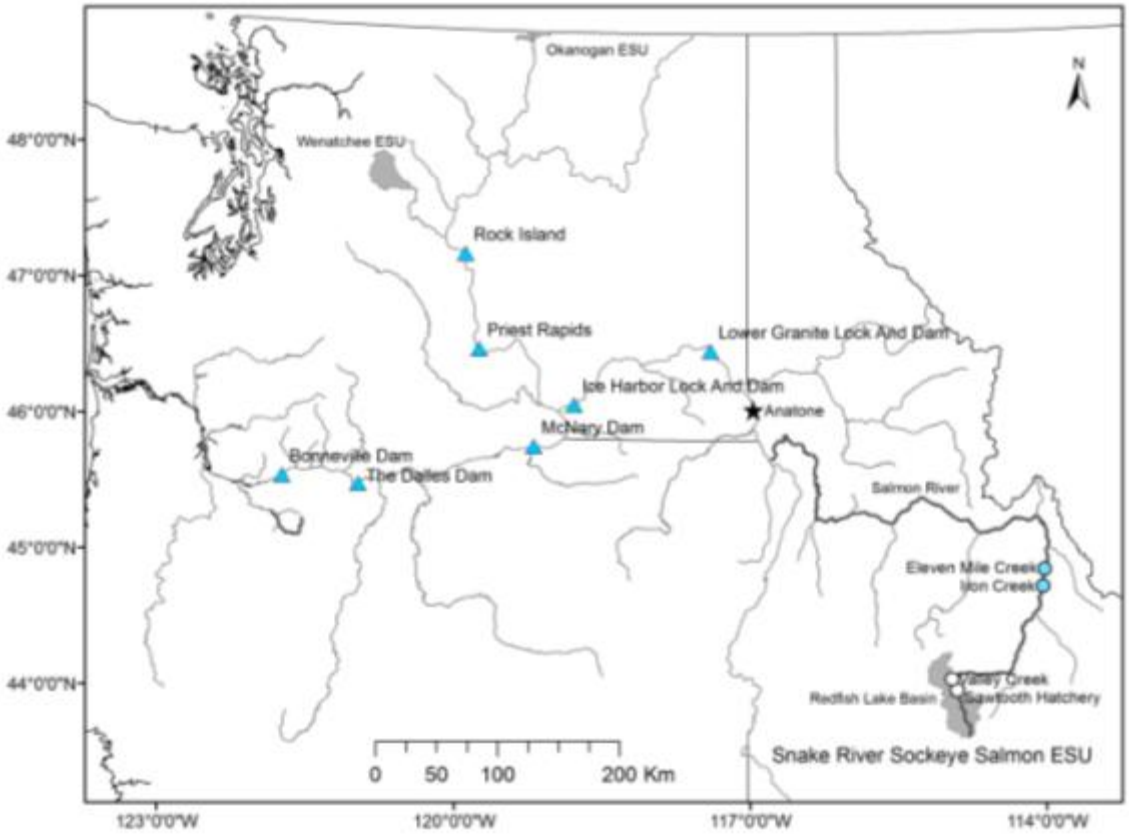
Snake River sockeye salmon



Objectives

1. 2008 2013 PIT-tag detection efficiency: Bonneville to the Sawtooth Valley

2. Annual conversion rates for each reach

3. Annual migration characteristics:
   a. Migration timing
   b. Travel times
   c. Fallback

4. Correlate migration fate with juvenile history, migration characteristics, and environmental conditions

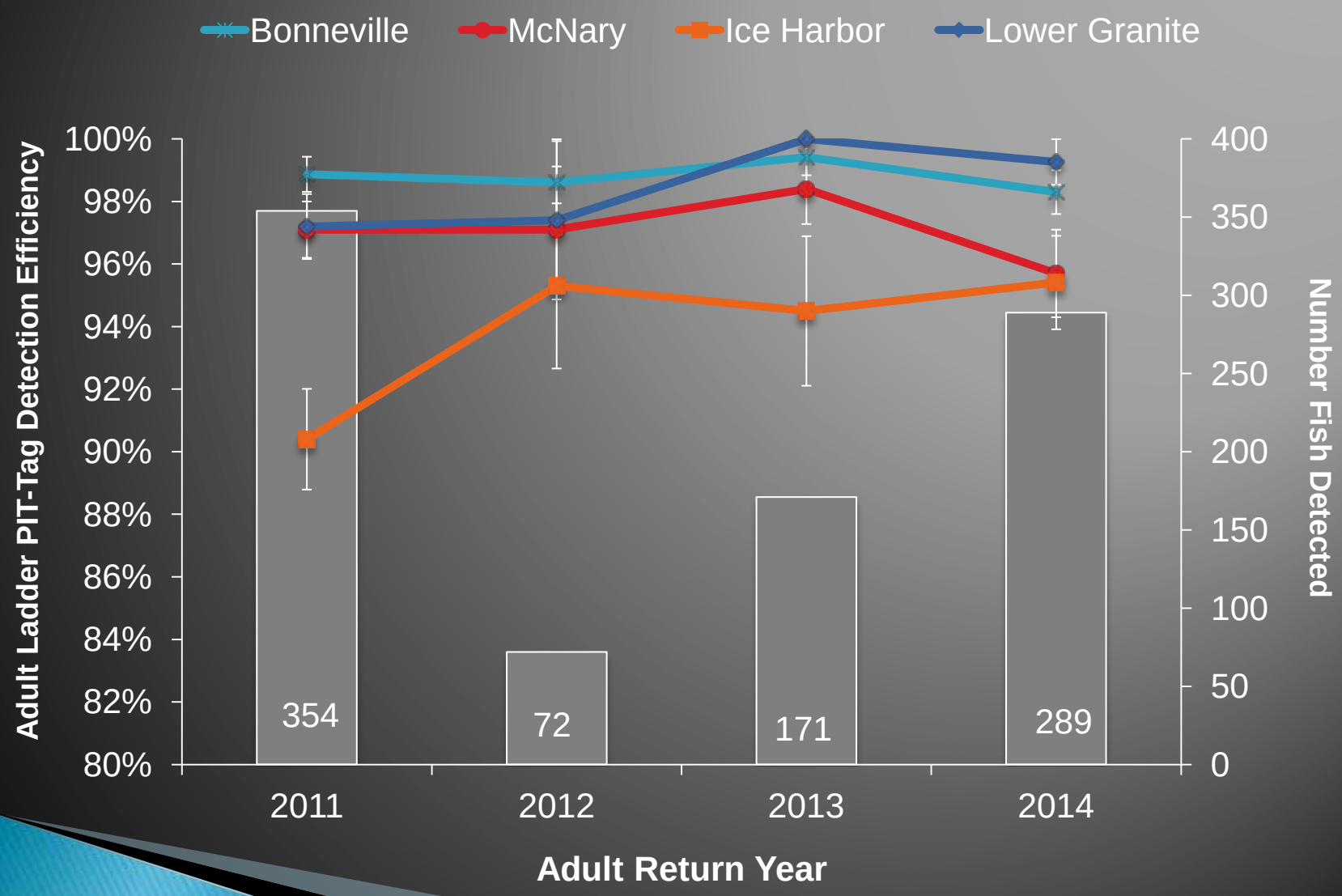
5. Identify trigger mechanisms for initiating transport of adult sockeye salmon from Lower Granite Dam to the Sawtooth Valley

Objective 1

- Detection efficiencies from 2008-2014
  - Bonneville Dam
  - McNary Dam
  - Ice Harbor Dam
  - Lower Granite Dam

Photo: Michel Larinier
Environmental issues, dams ad fish migration
http://www.fao.org/docrep/004/y2785e/y2785e03.htm

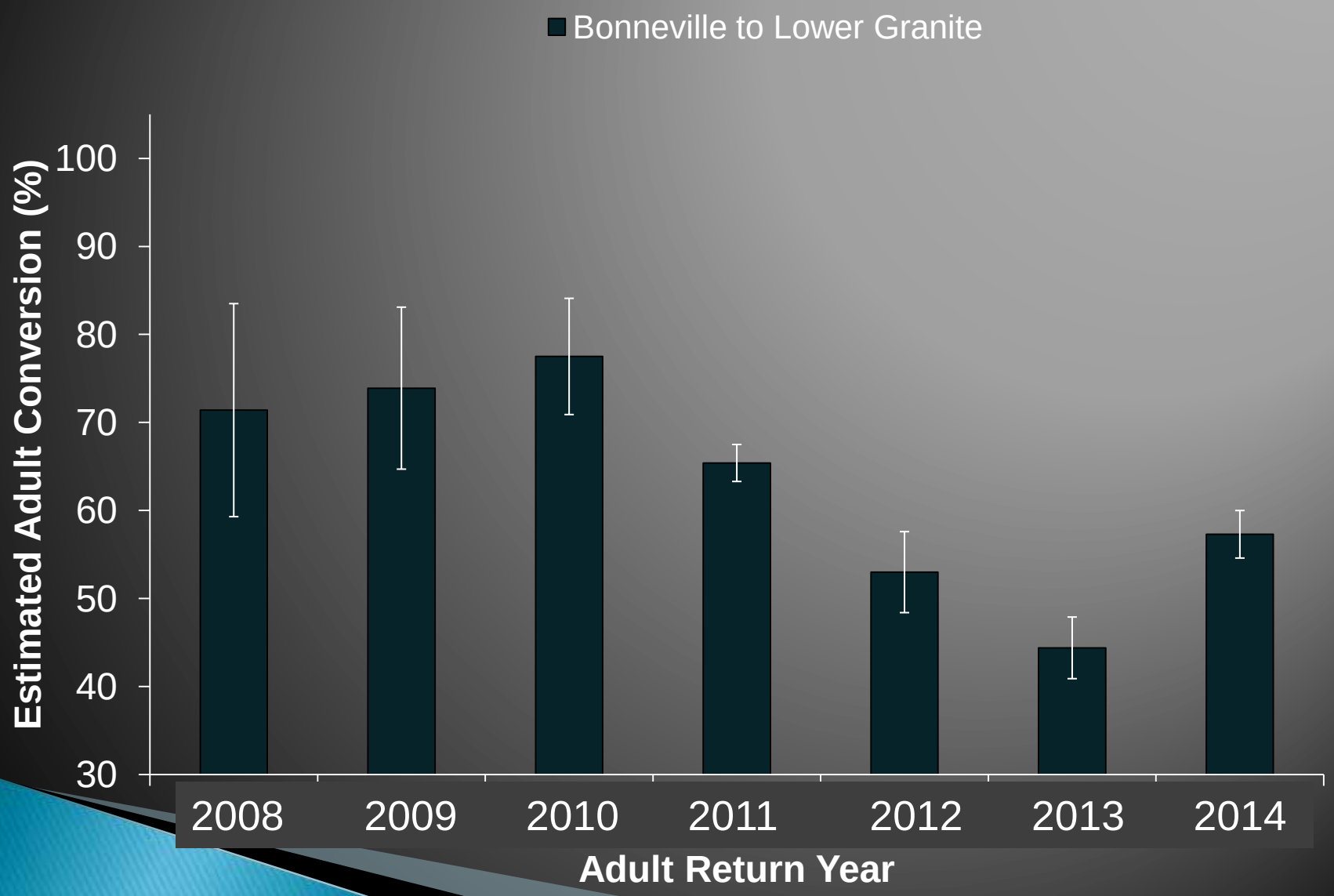
Detection efficiencies of sockeye salmon adults PIT-tagged in the Sawtooth Basin as juveniles



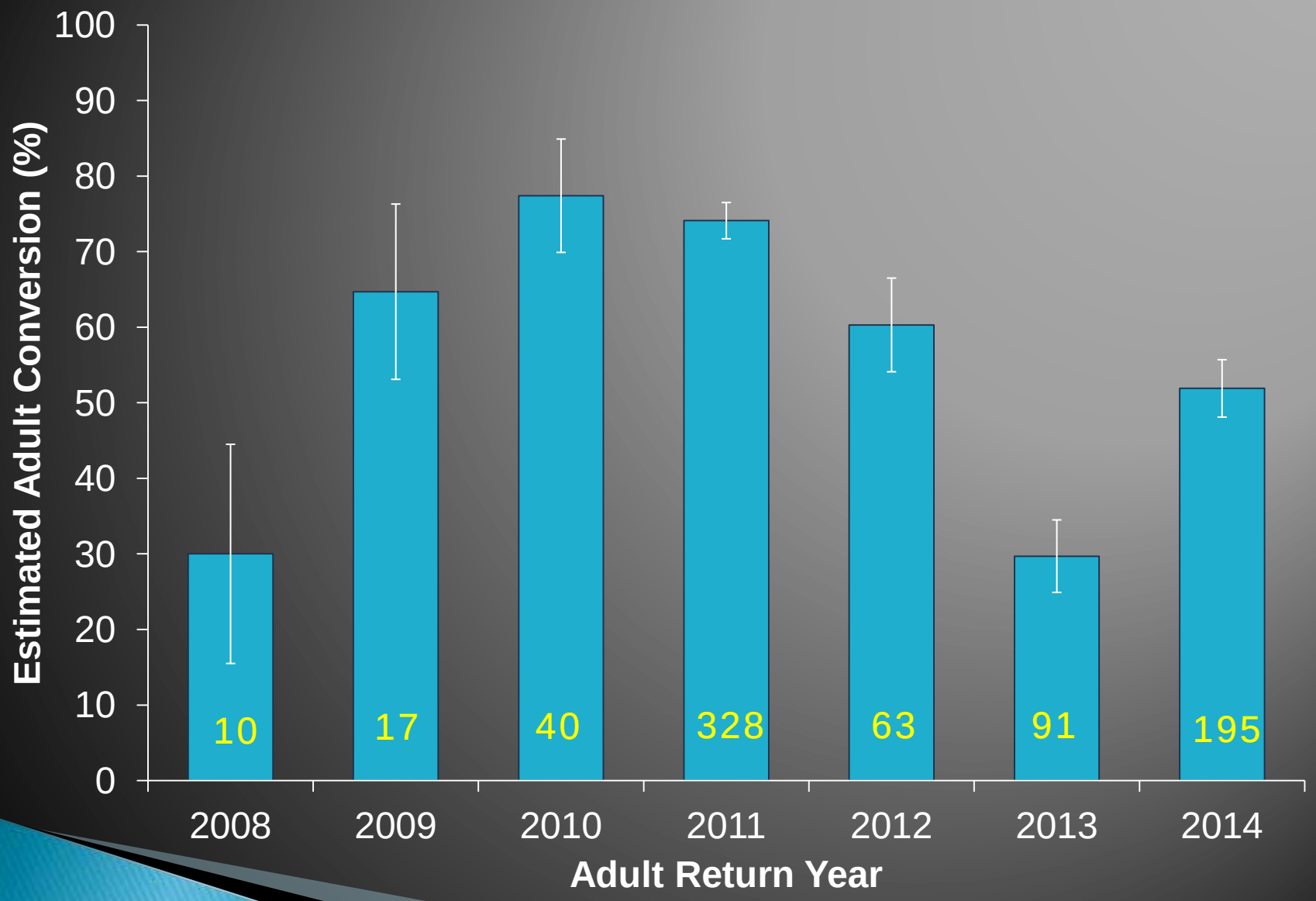
Objective 2

- Conversion rates 2008-2014
  - Bonneville to McNary
  - McNary to Ice Harbor
  - Ice Harbor to Lower Granite
  - Lower Granite to Sawtooth Valley

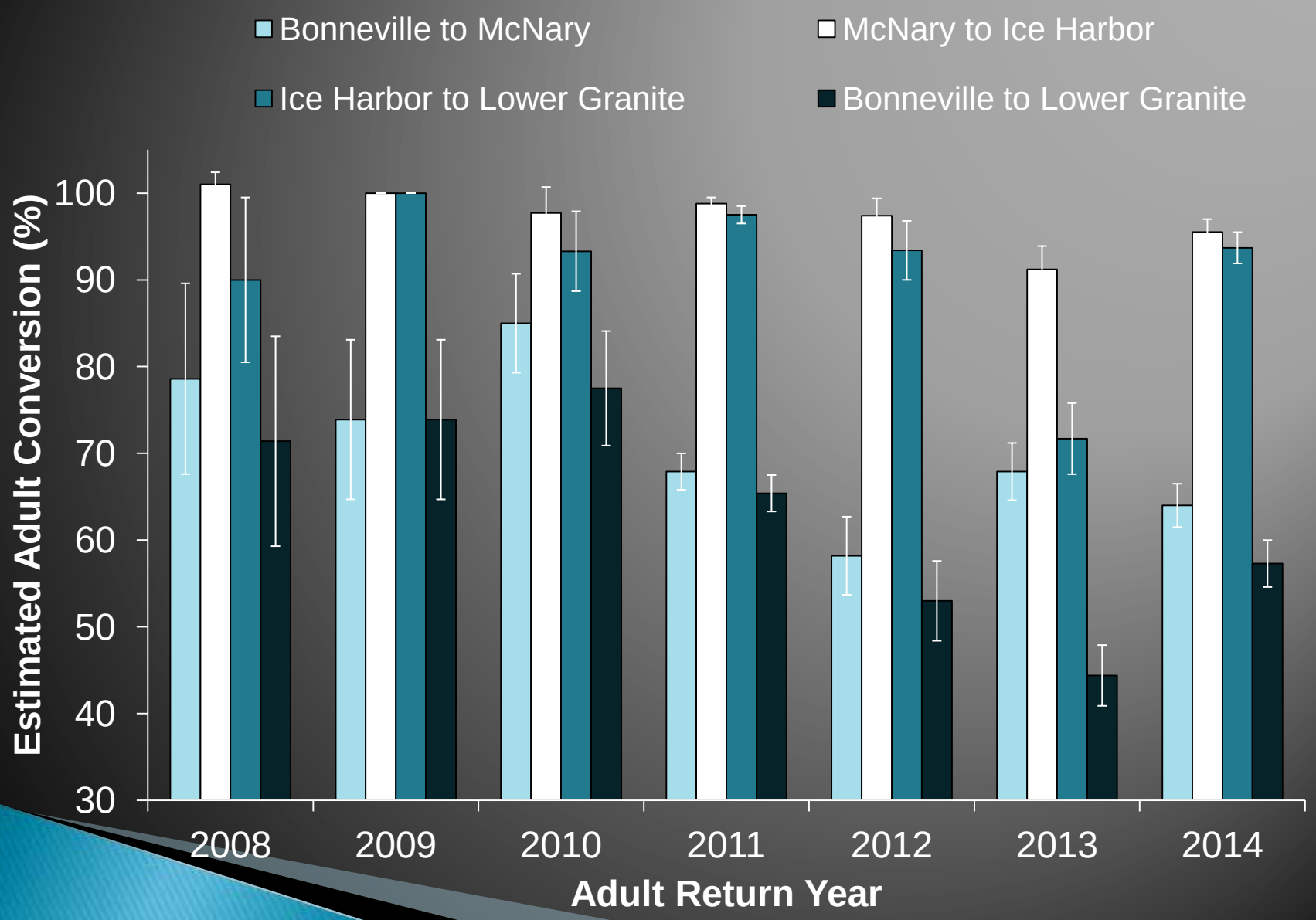
Conversion rates in FCRPS



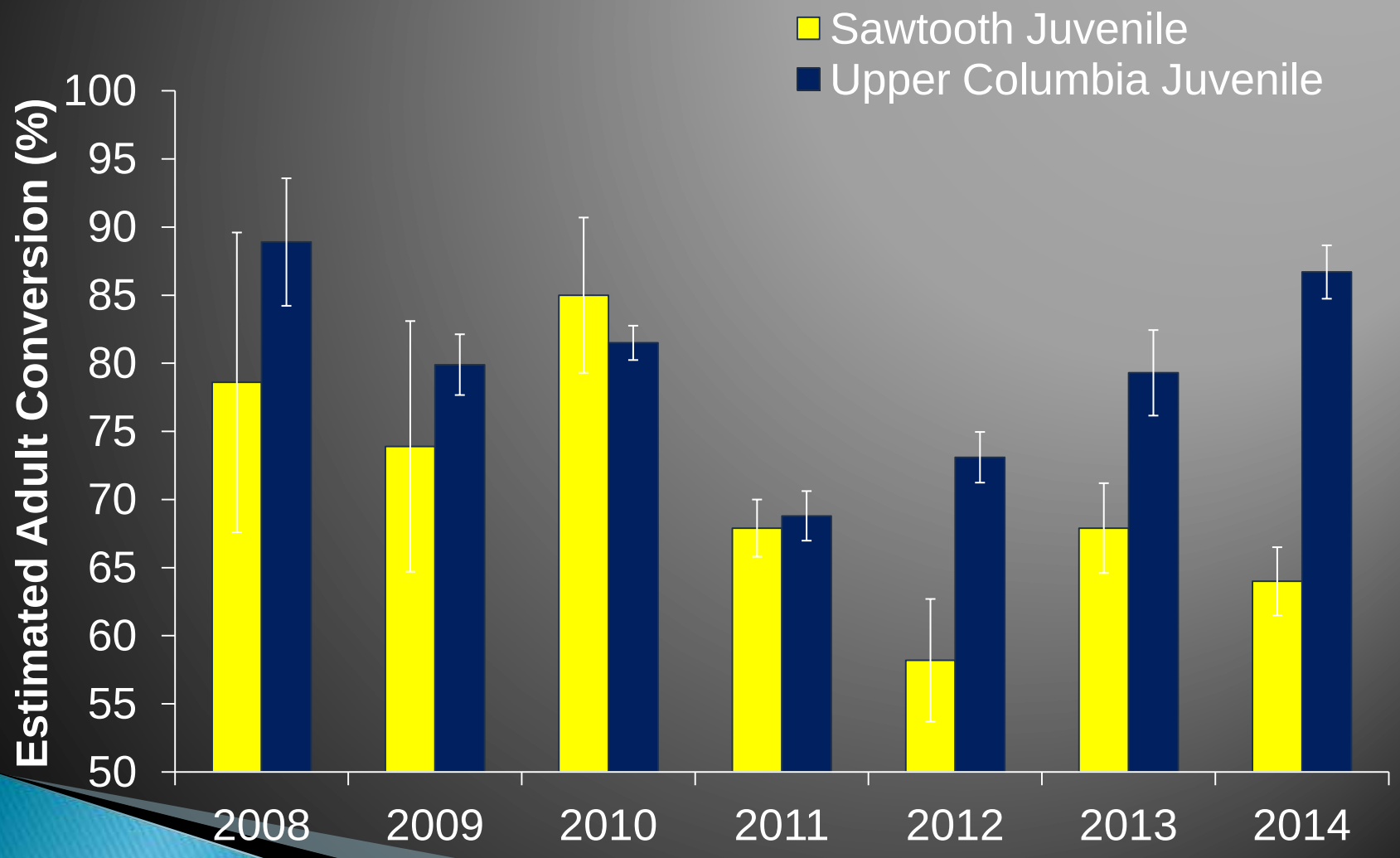
Lower Granite to Sawtooth Valley



Conversion rates in FCRPS



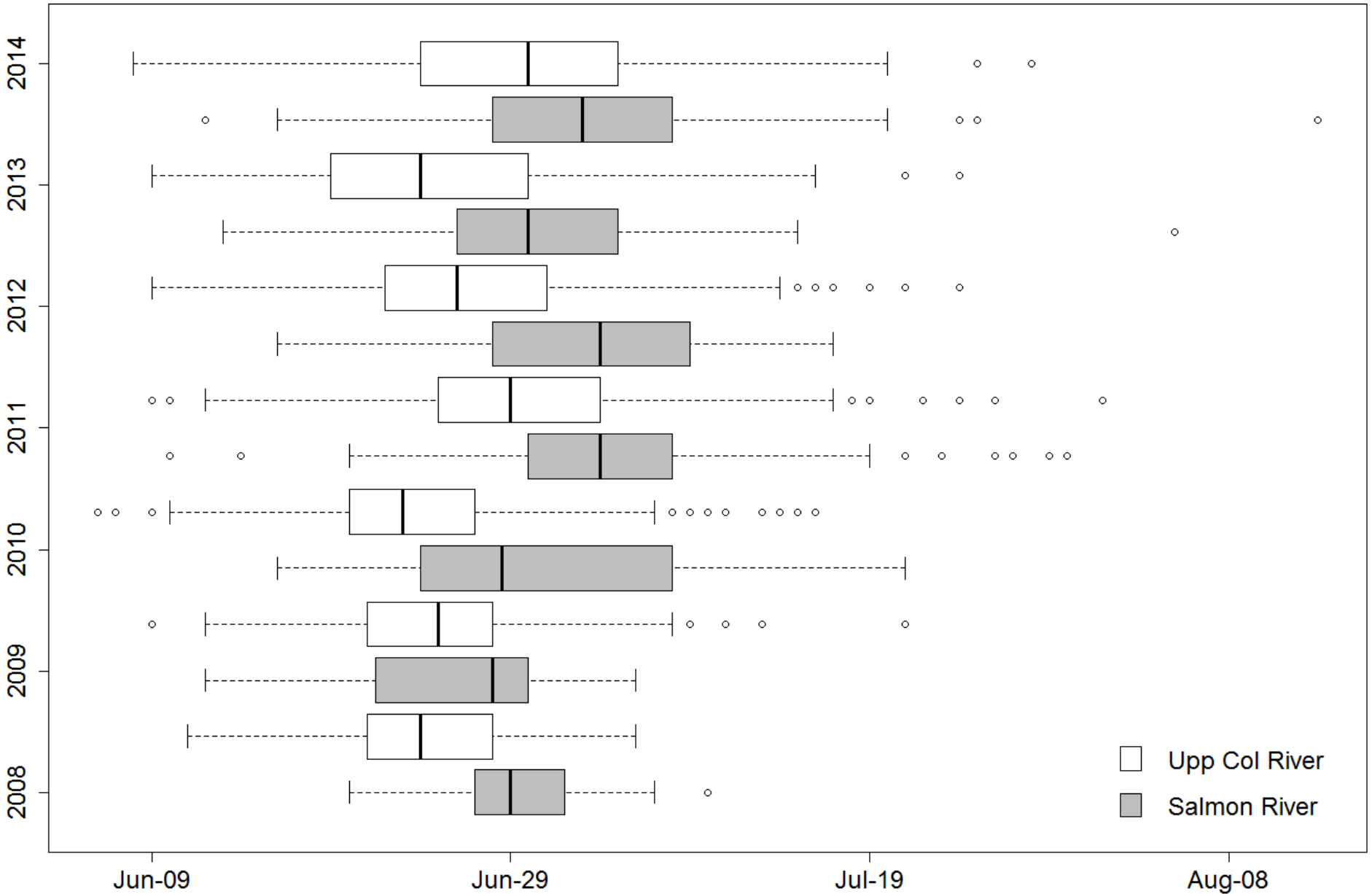
Snake River vs Upper Columbia Sockeye BON to MCN Conversion Rates



Objective 3: Migration timing

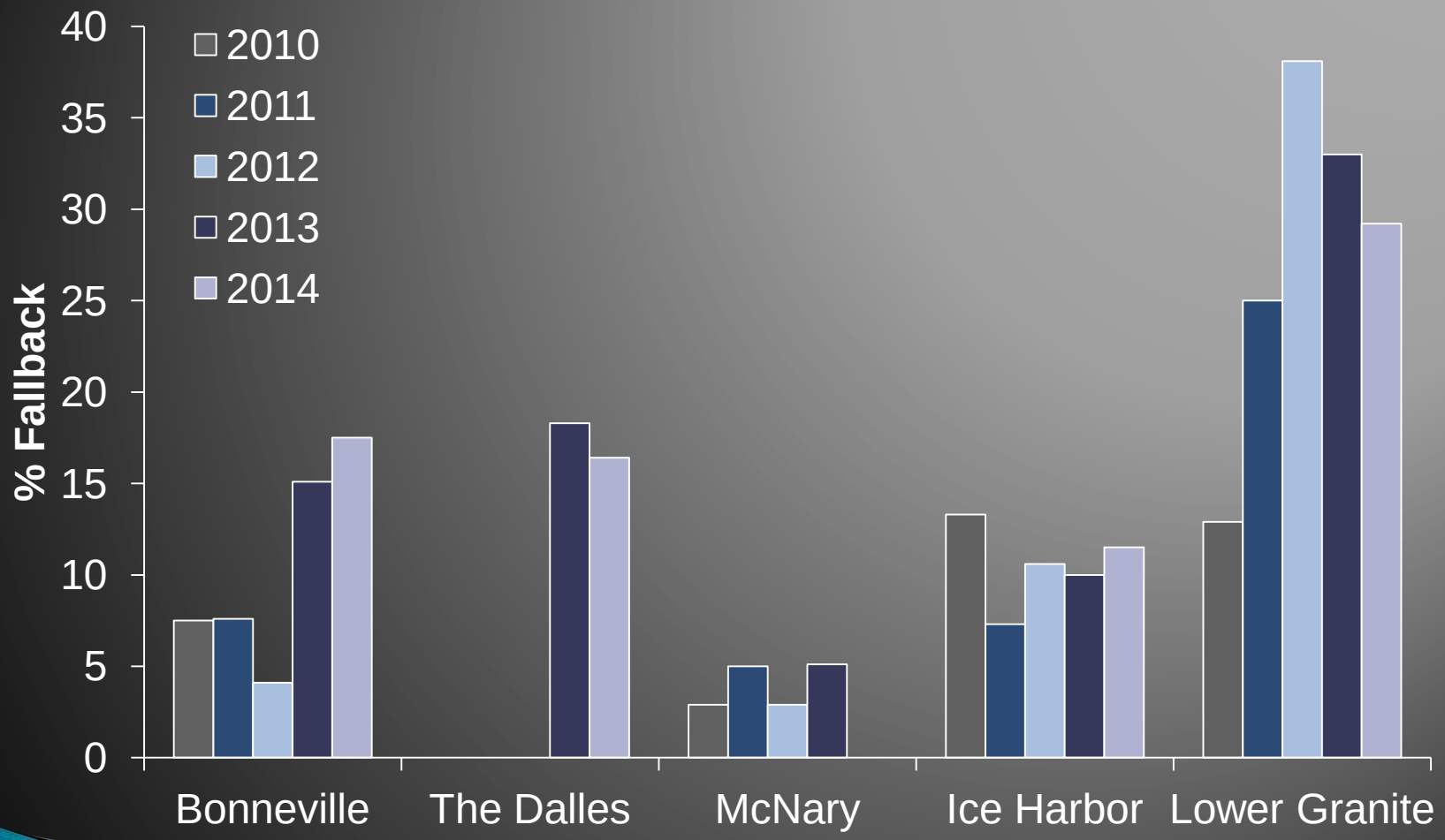
- Migration timing within the FCRPS 2008-2014
- Travel times
- Fallback

Objective 3: Migration timing

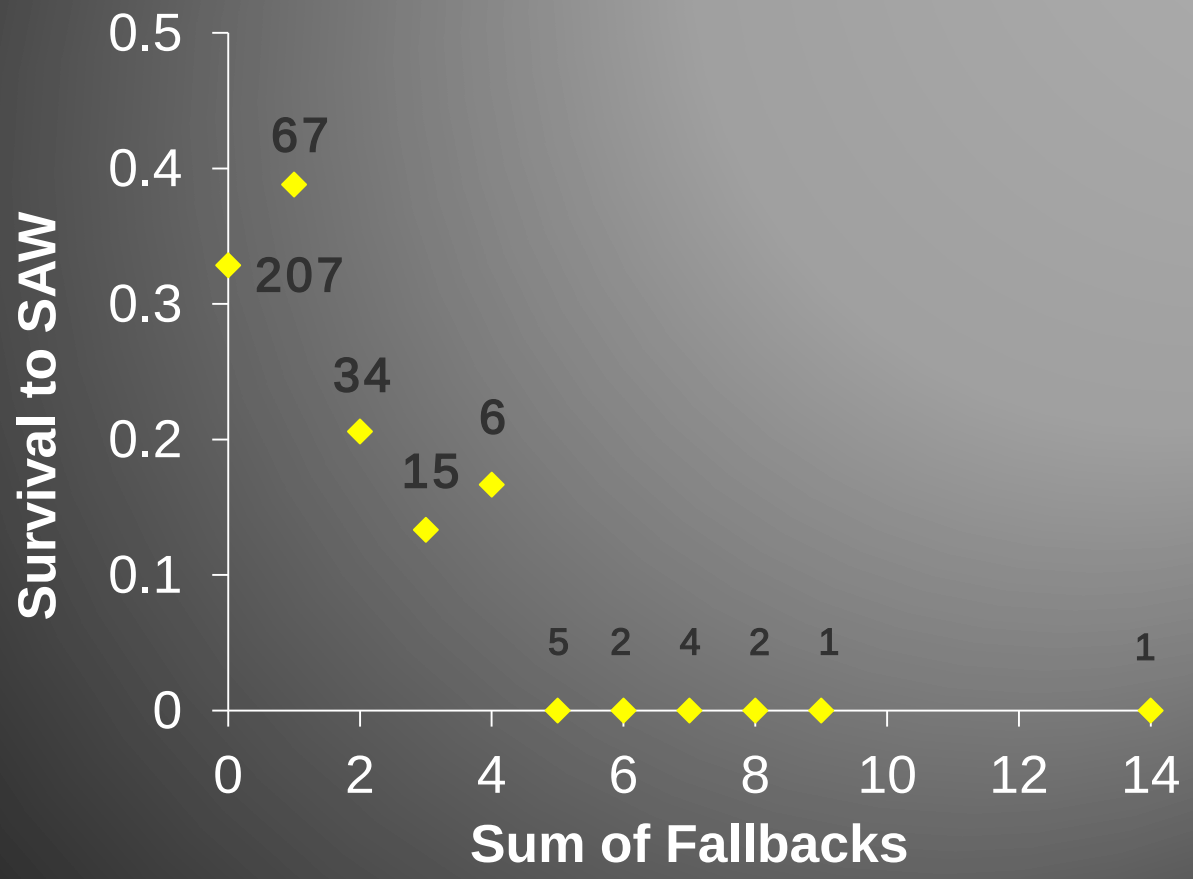


Percent Fallback

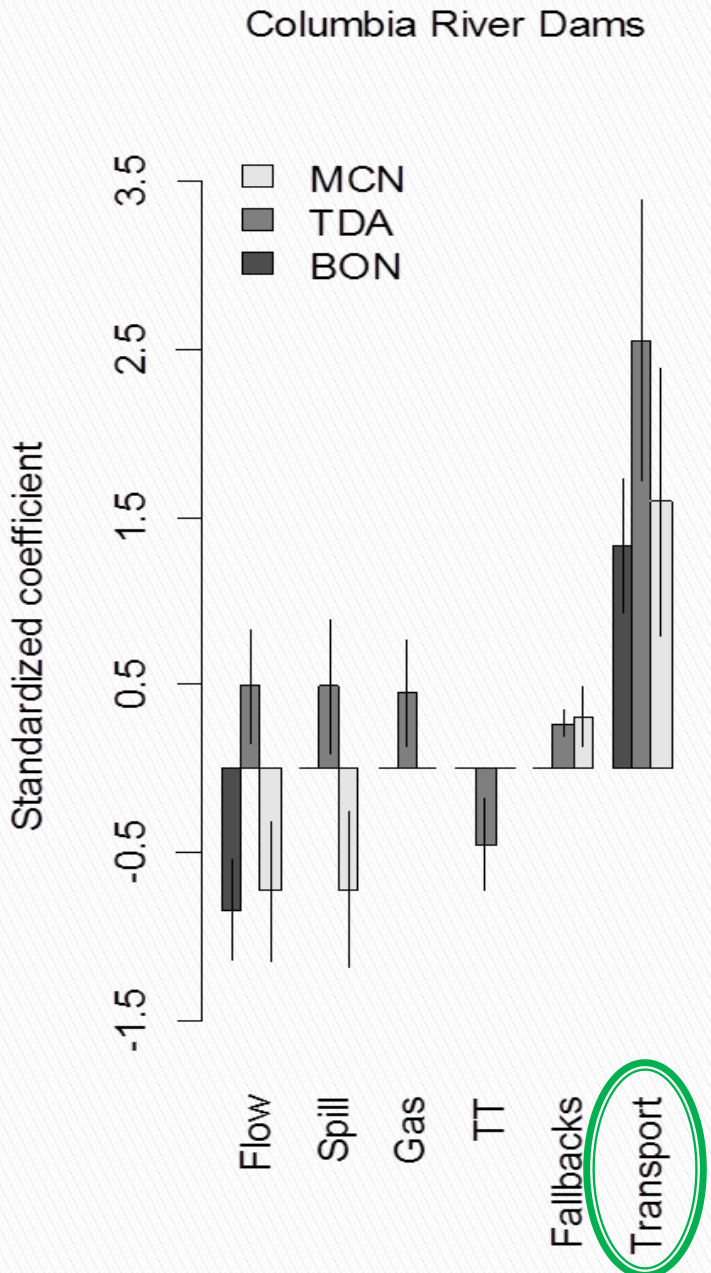
Unique fish falling back /fish passing



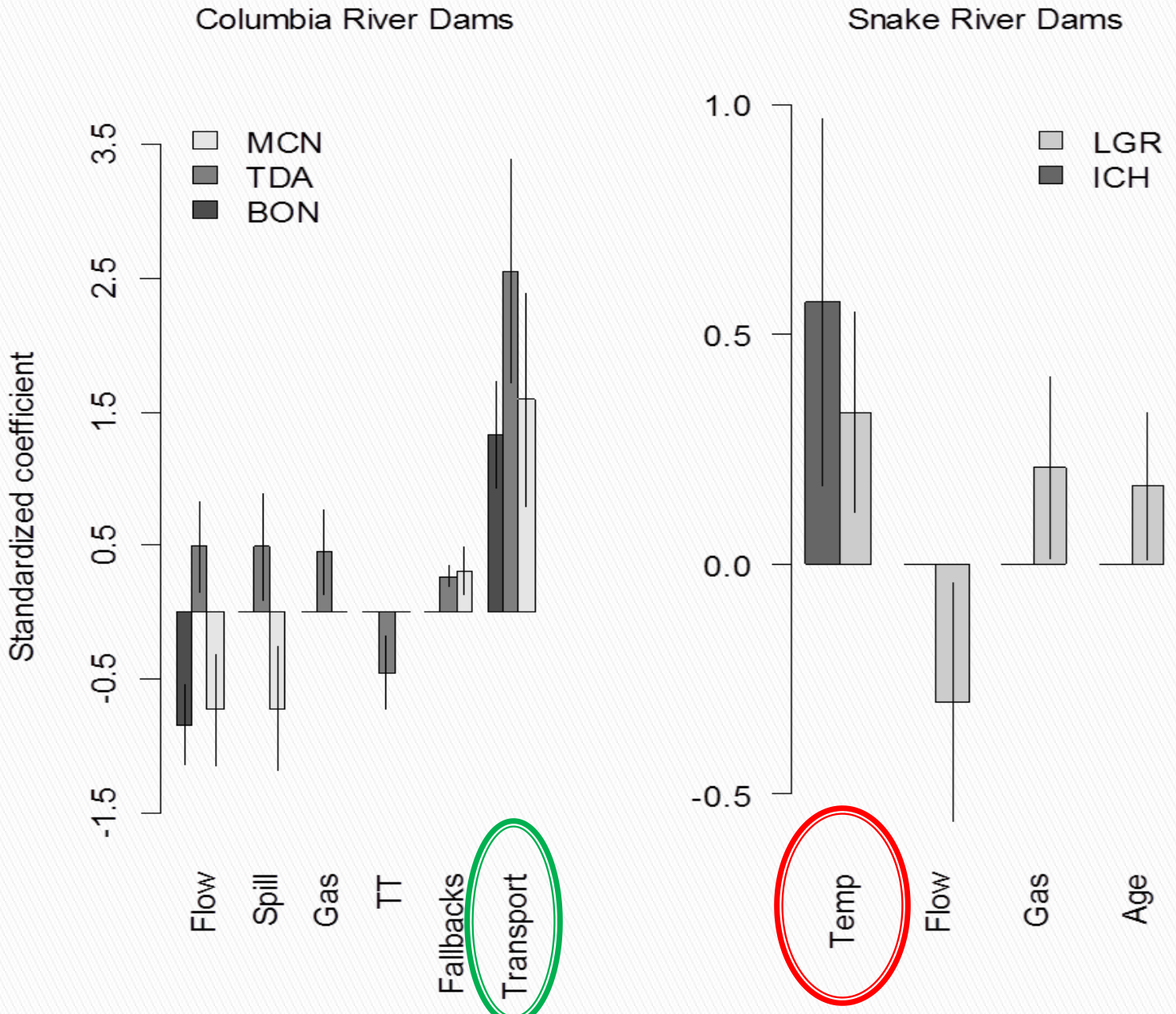
Fallbacks vs survival BO to SAW



Factors affecting fallback



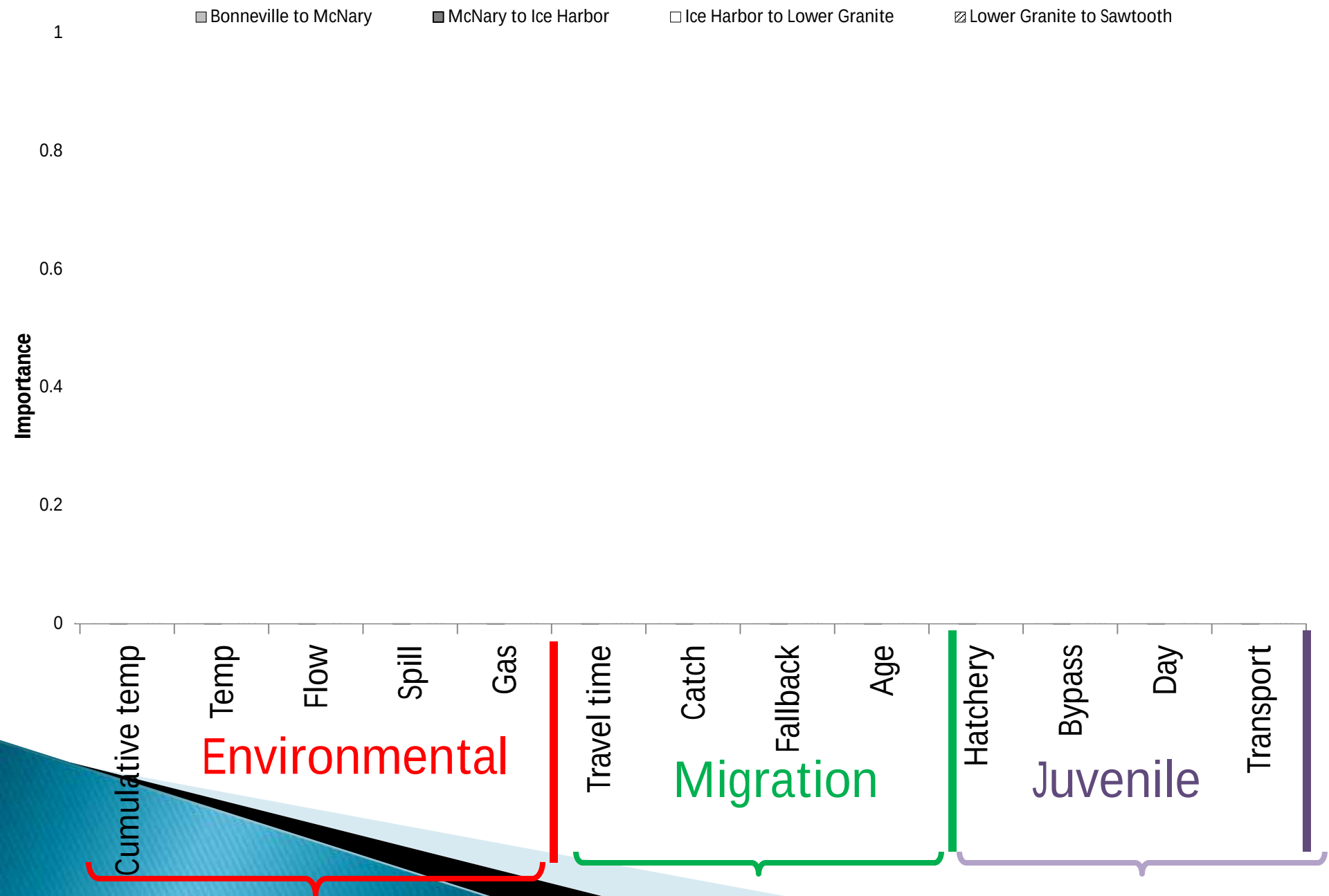
Factors affecting fallback



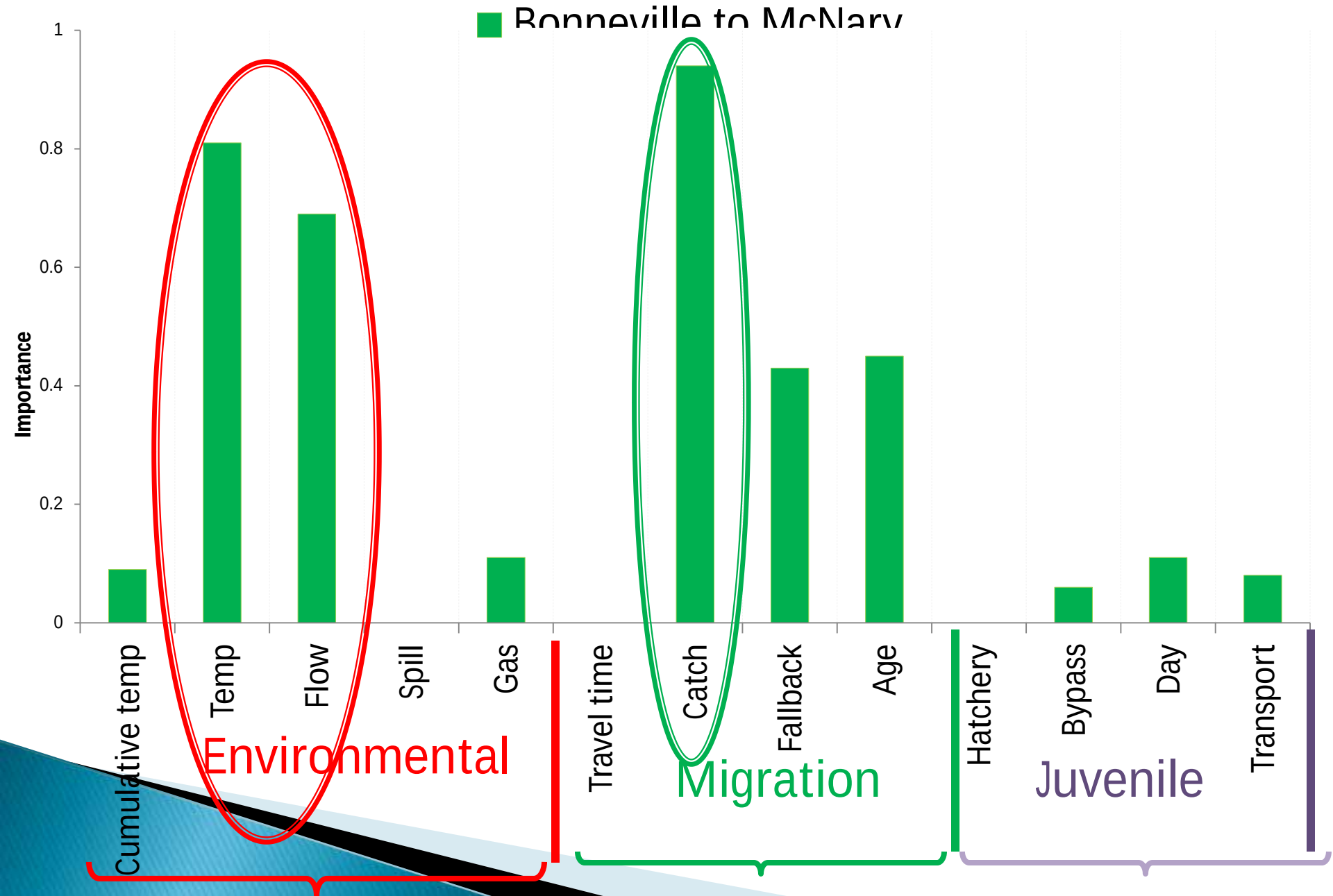
Objective 4

- Factors affecting reach survival/detection
  - Environmental factors
  - Migration characteristics
  - Juvenile history

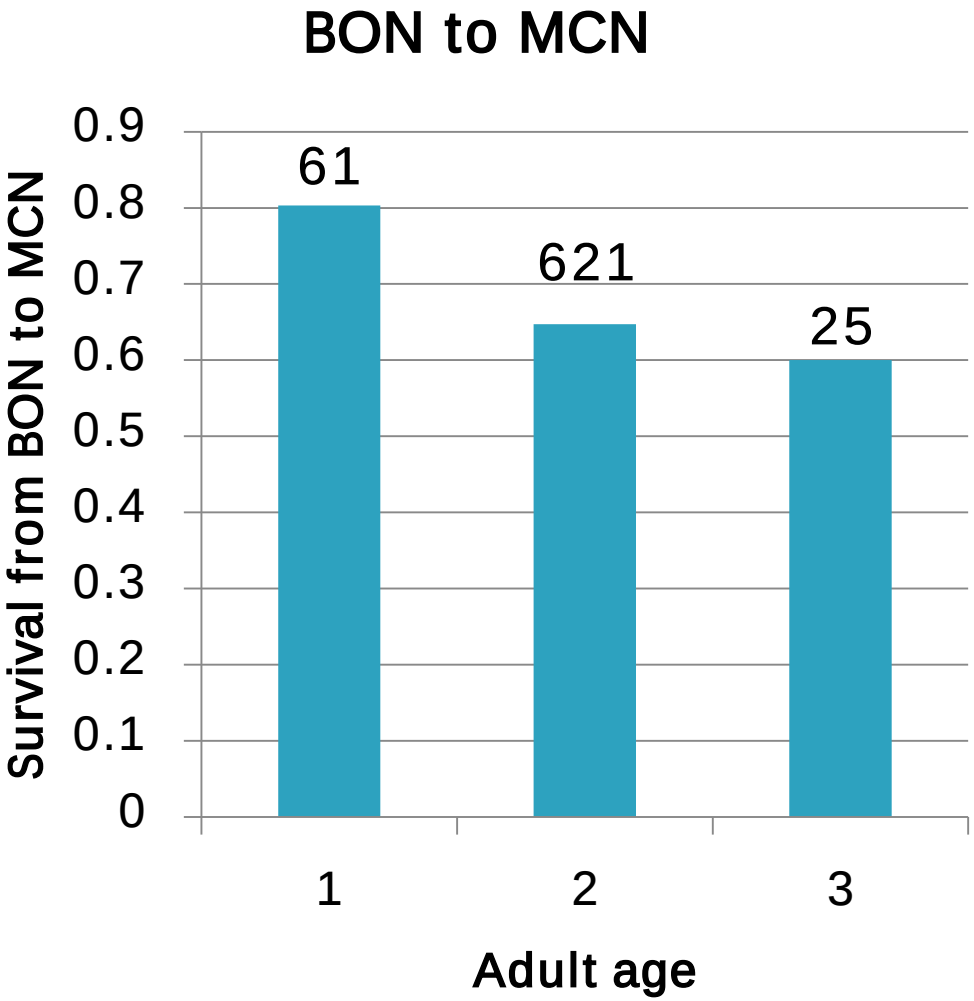
Factors affecting survival



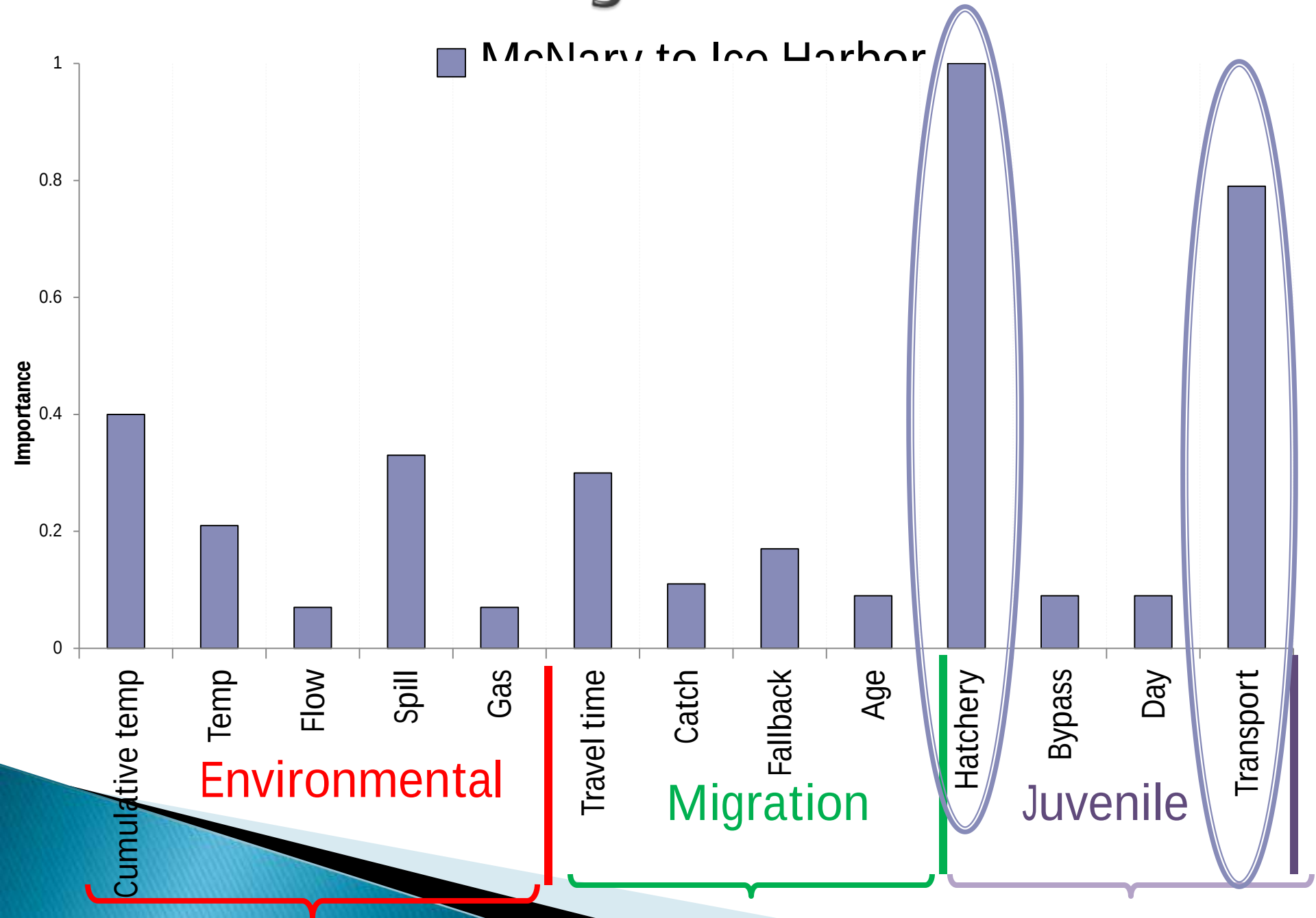
Factors affecting survival



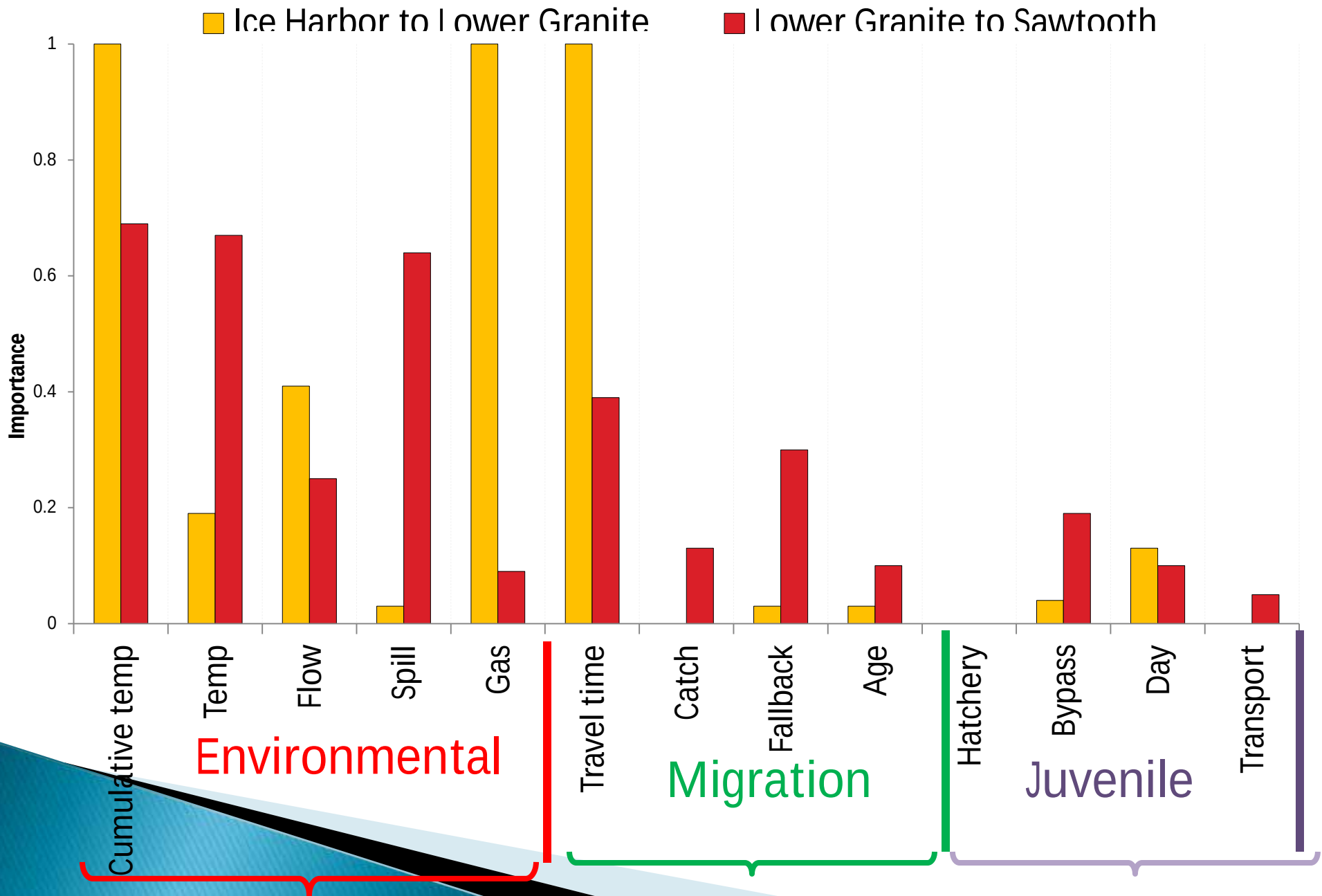
Adult age


BON to MCN
Survival from BON to MCN
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
61
621
25
1
2
3
Adult age

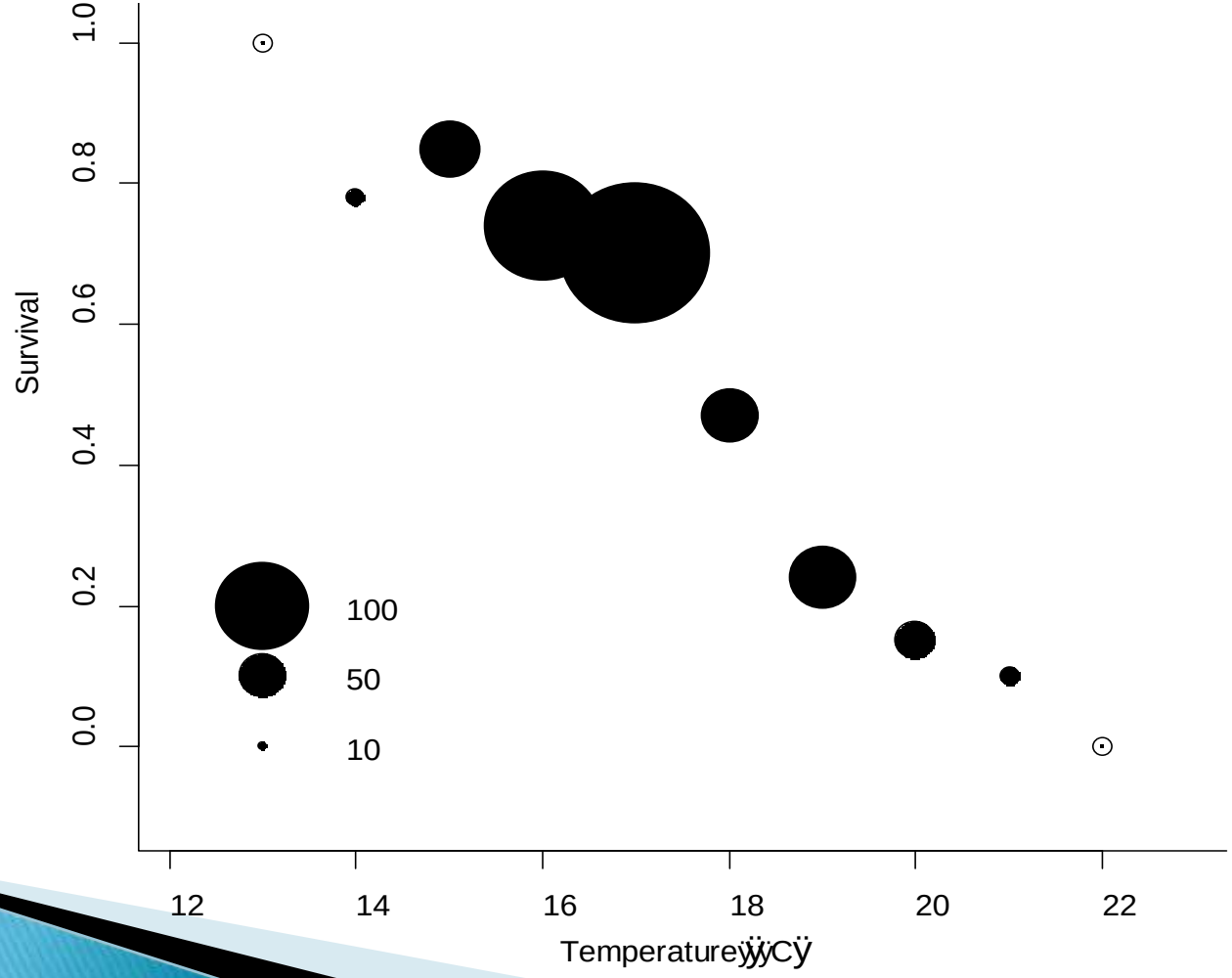
Factors affecting survival



Factors affecting survival

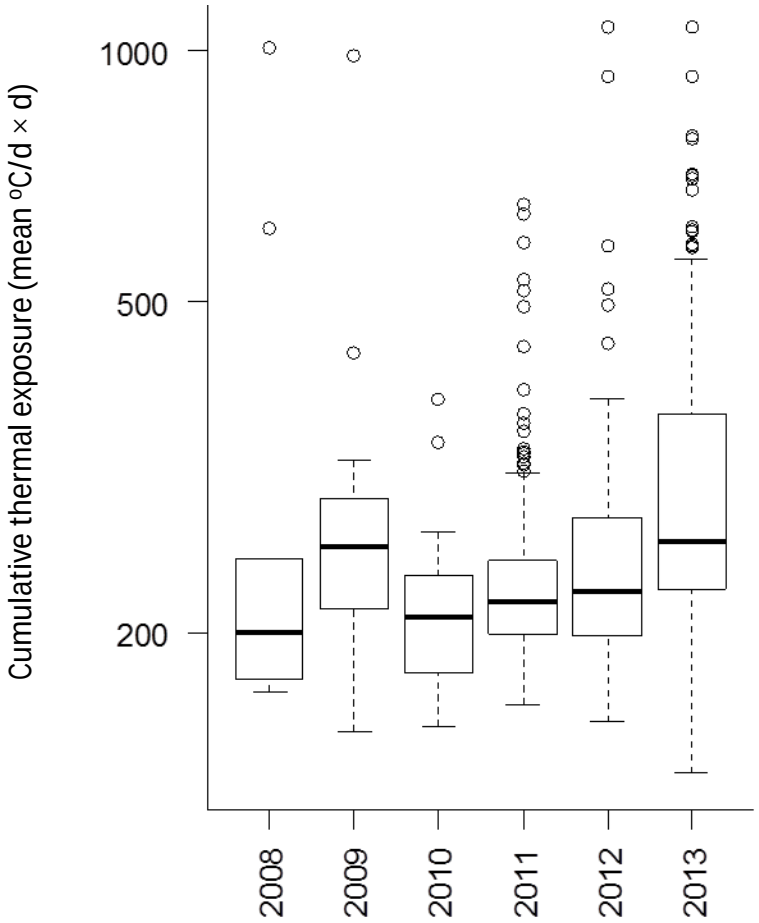


Survival
from Ice Harbor to the Sawtooth vs temperature (at Ice Harbor Dam)



Cumulative thermal exposure

BON - LGR



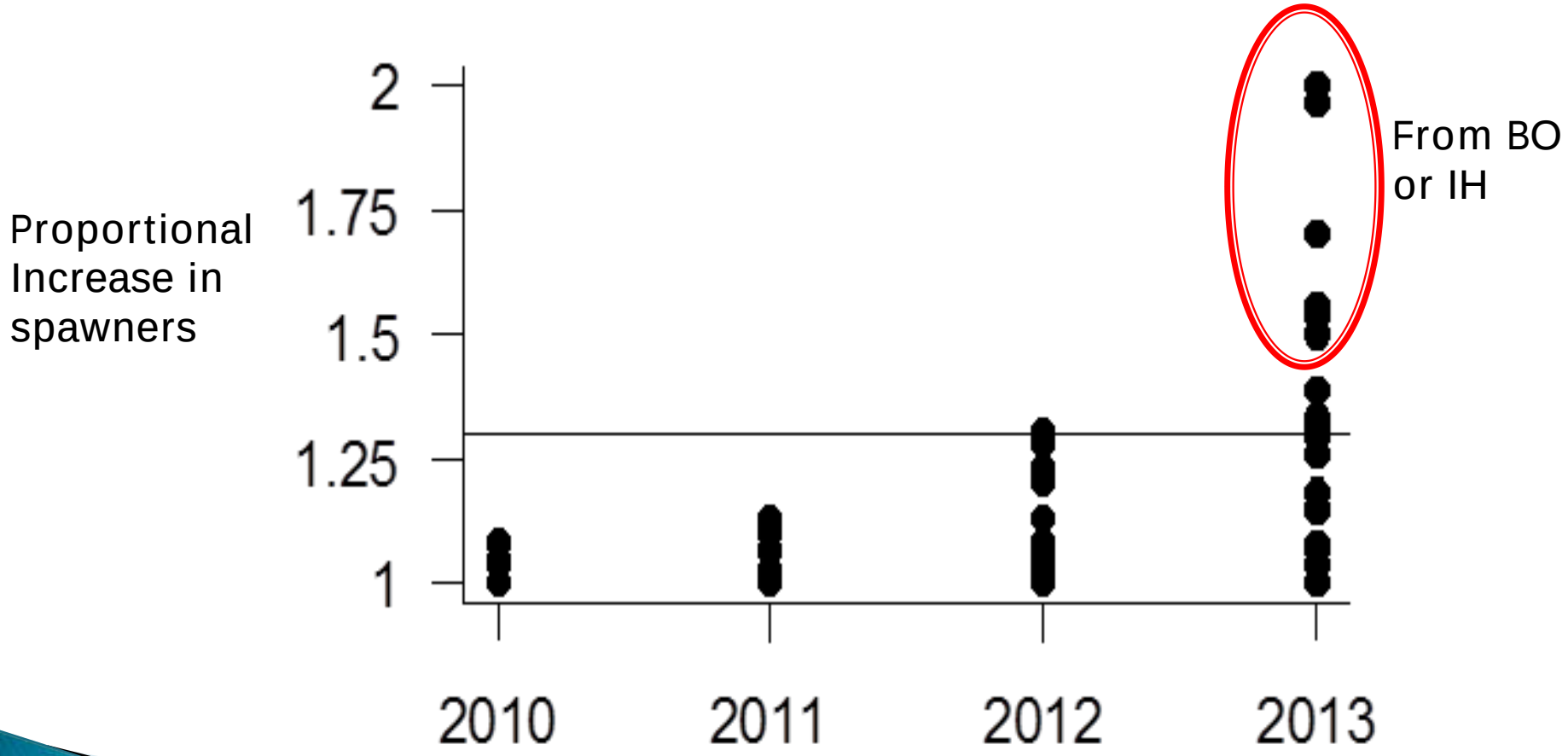
Objective 5

- Adult transportation scenarios

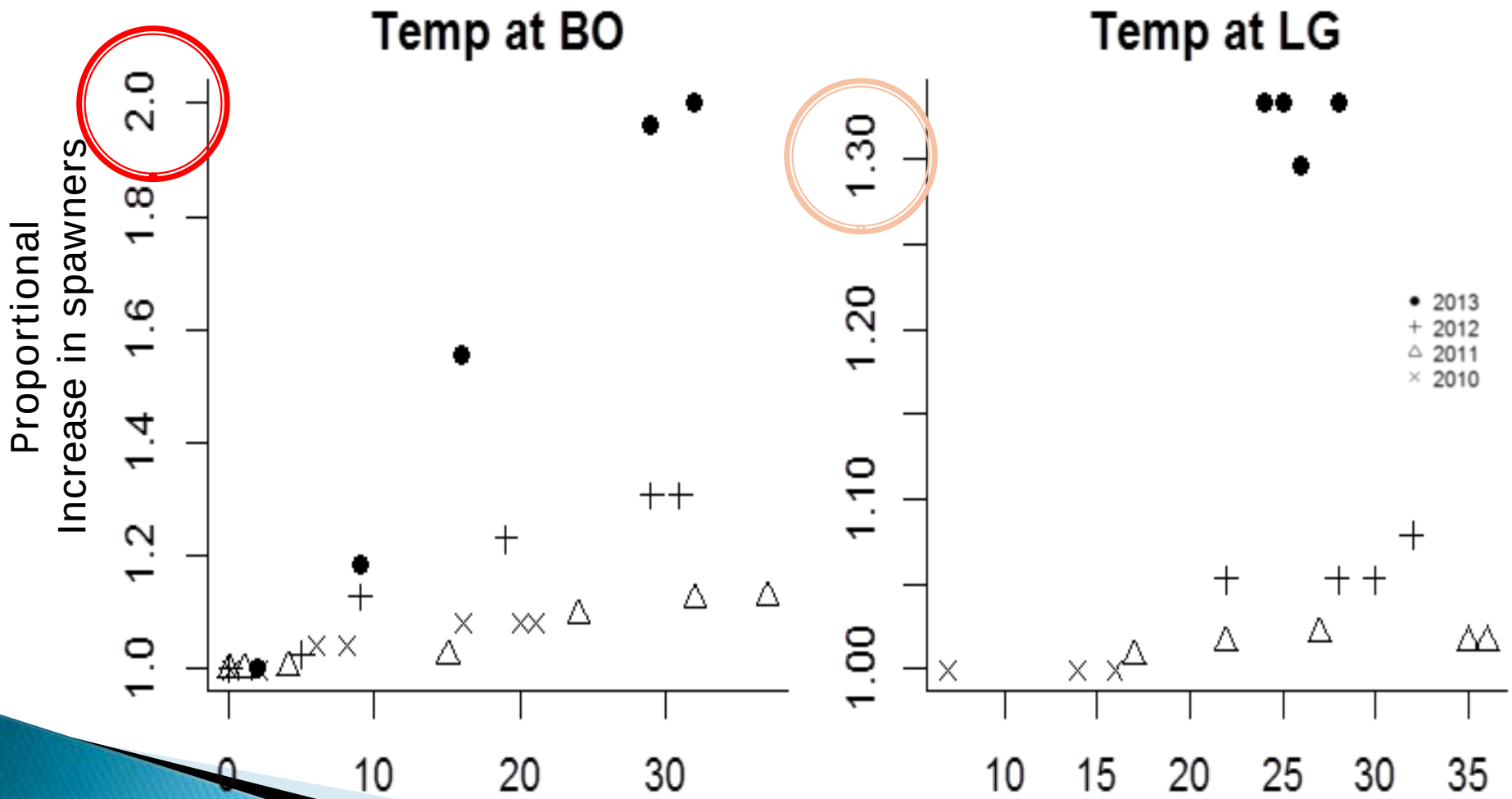
Adult transportation scenarios

- Adults collected at BO, IH, or LG
- On any day that exceeds a scenario-defined threshold (e.g., temperature or date)
- 20% of fish passing on that day transported
- Transported fish had 80% survival
- Result: proportional change in spawners

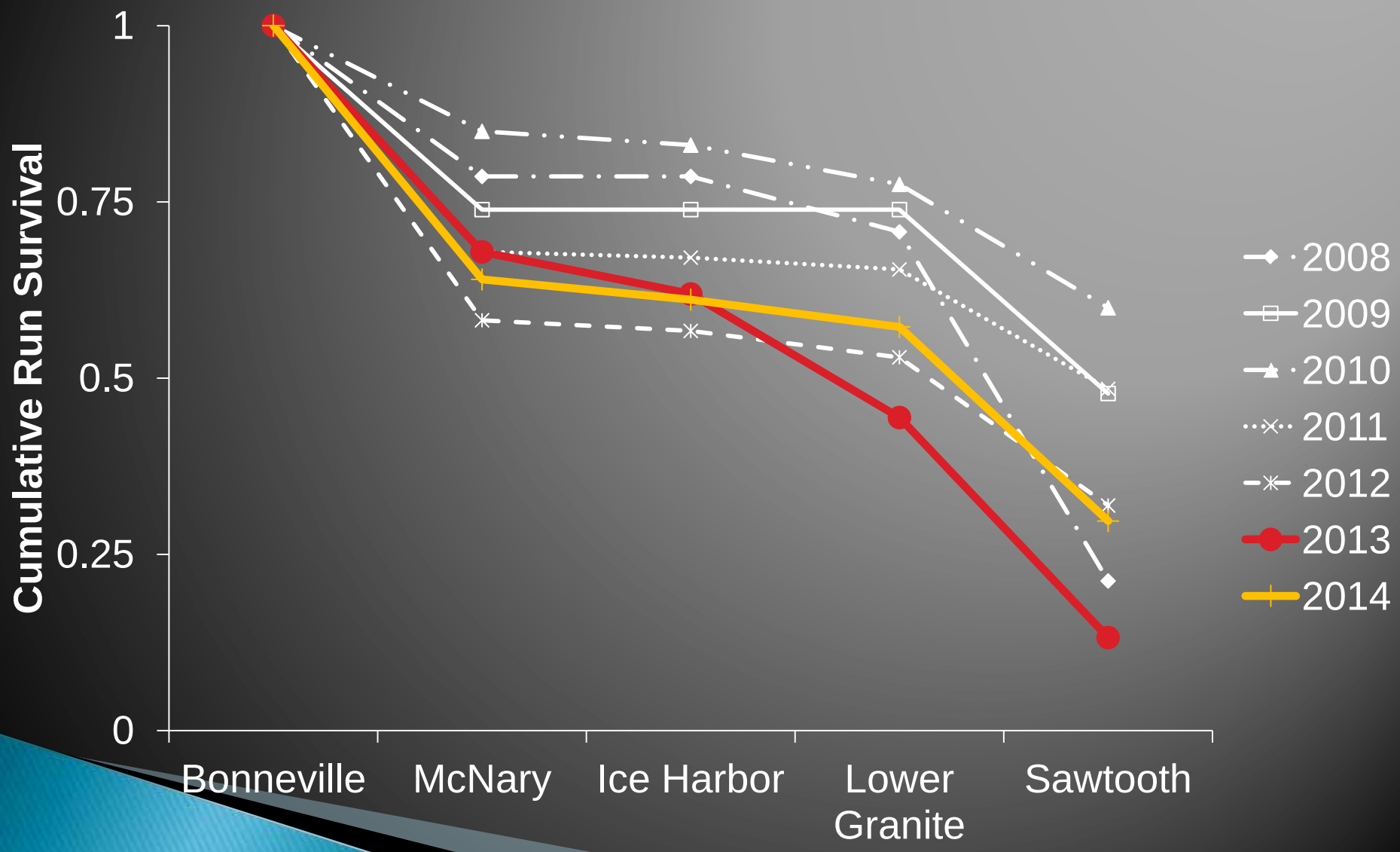
Most benefit in 2013



Most benefit in 2013, from BO



Cumulative run survival



Summary

- Hydrosystem survival
  - Most mortality in BO to MN reach
    - Catch + Temp + Flow
    - Snake River sockeye survival lower than UC sockeye
  - 2013 high temperatures in Snake River
- Lower Granite to Sawtooth
  - Sensitive to environmental factors, e.g. temp @ IH
- Transportation
  - Most benefit in 2013, ~15-30%

Acknowledgments

Eric Hockersmith (COE)
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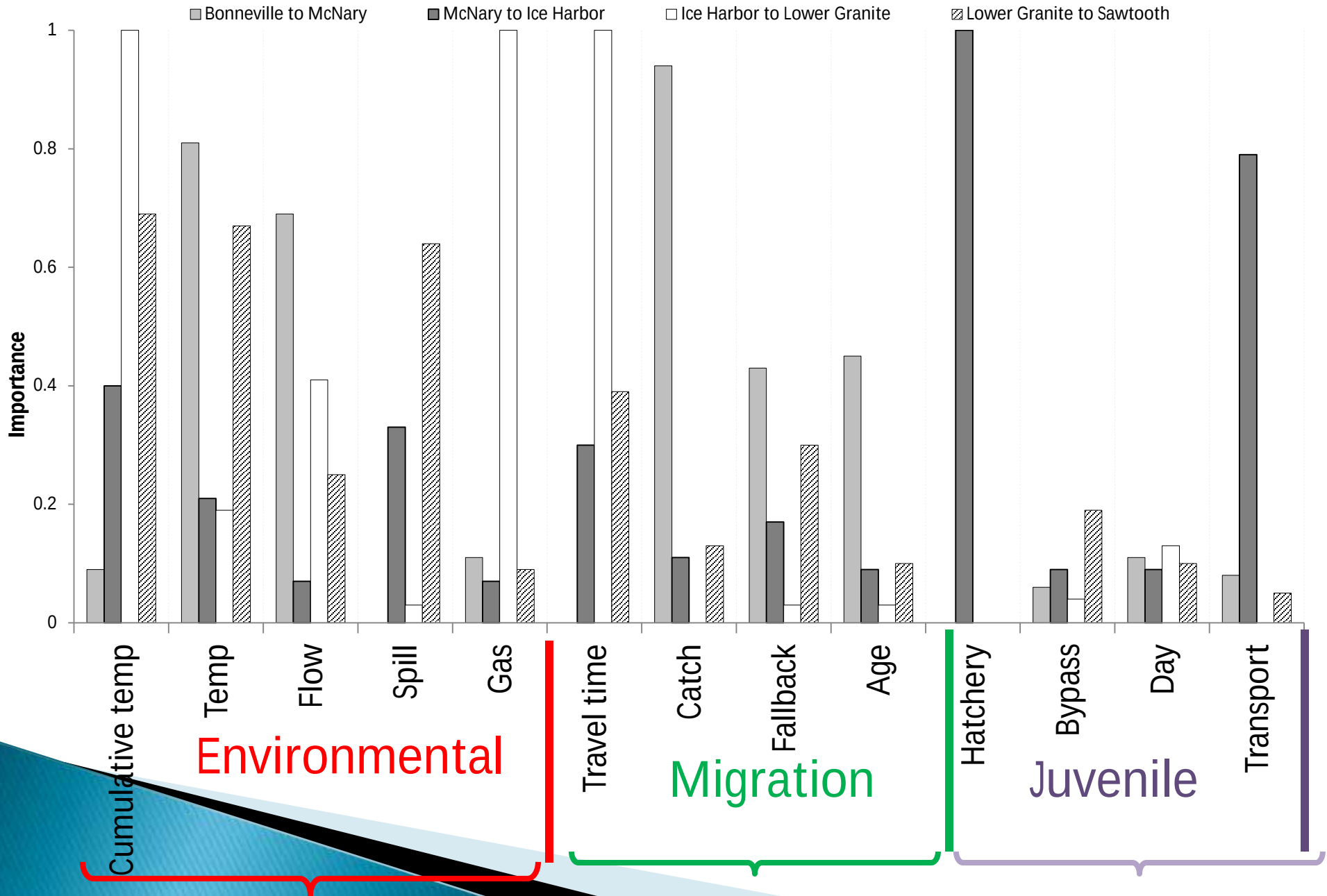
Stuart Ellis (CRITFC)

Factors affecting survival