



MIGRATION STRATEGIES AND SURVIVAL OF POST-SPAWNING ATLANTIC SALMON OF THE BRAS D'OR LAKES

Bordeleau, X.* , Hatcher, B.G., Denny, S.,
Whoriskey, F., Orr, M., Sheng, J. and Crossin,
G.T.

A collaborative effort



CAPE BRETON
UNIVERSITY



NOVA SCOTIA

Fisheries and Aquaculture



OCEAN
TRACKING NETWORK



Fisheries and Oceans
Canada

The kelt life stage



- Iteroparous
- Depleted nutritional state
- Overwinter survival in freshwater: 30-60% (Ruggles 1980; Chadwick 1981)
- Repeat spawning: <11% (Fleming 1998)
- Experienced spawners/larger
- Important reproductive contributions
- i.e. 3% repeat spawners → 8% total egg deposition (Randall 1989)
- Modelling paper
- Kelts migration behaviour and mechanisms underlying mortality remain poorly understood
- Especially in a context like the Bras d'Or Lakes, CB

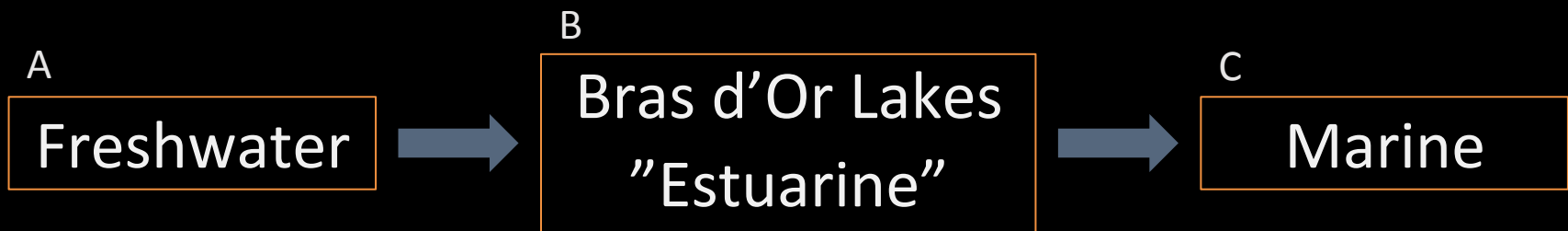
Salmon of the Bras d'Or Lakes



- Area: 1,100 km²
- Average salinity: 18-24 ppt
- Endangered (COSEWIC 2010)
- Distance to sea: 64 km
- Mi'kmaq traditional knowledge
- Local migratory strategy (?)

Objectives

1. Document habitat use and residency patterns of kelts
2. Evaluate the influence of kelt's post-spawning condition on migration behaviour and survival



Methods

Year	Middle	Baddeck	Total
Fall 2014	13	8	21
Fall 2015	33	7	40
Total	46	15	61



Leah Strople

Methods

Combining bio-sampling and telemetry

- Explain inter-individual differences in behaviour
- Link between post-spawning state and mortality



Nutritional status

Plasma glucose (Buelow and Moffit 2014)
Body Condition Index

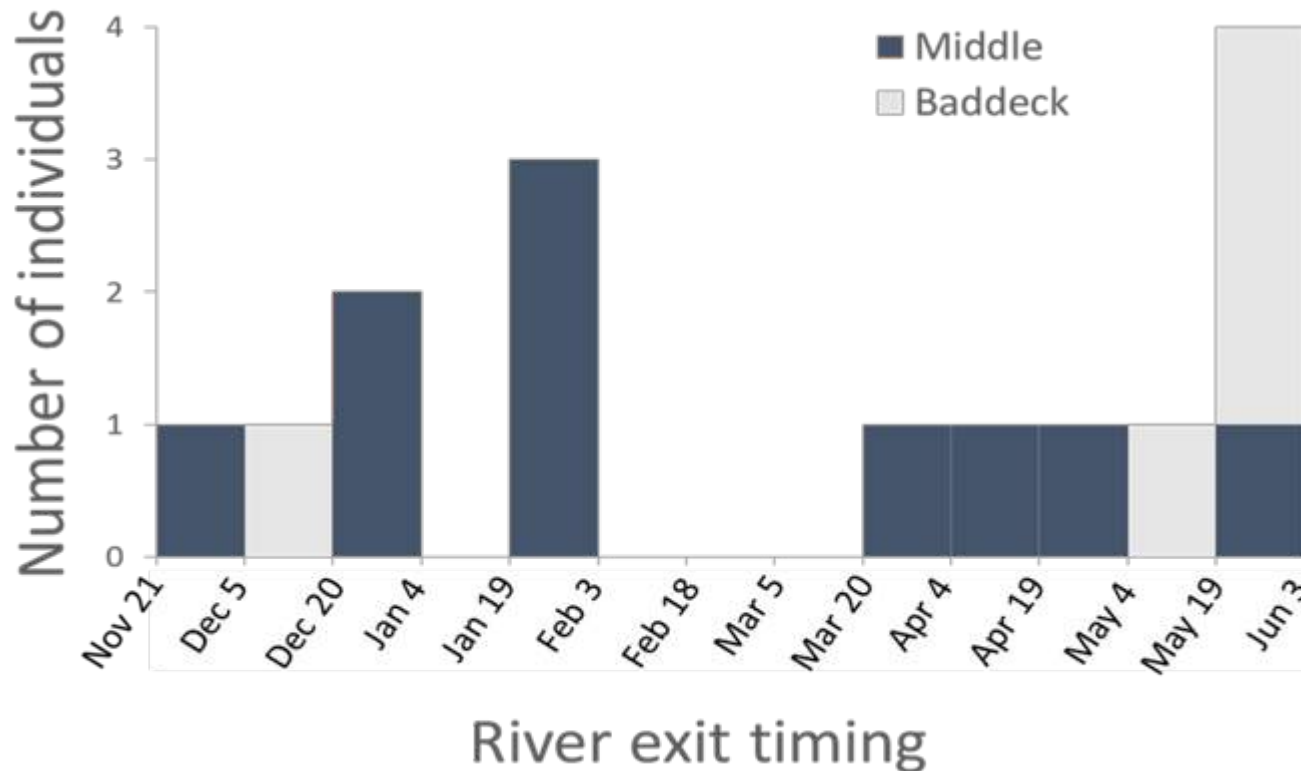
Baseline stress level

Cortisol
Metabolites (ions, glucose)

A

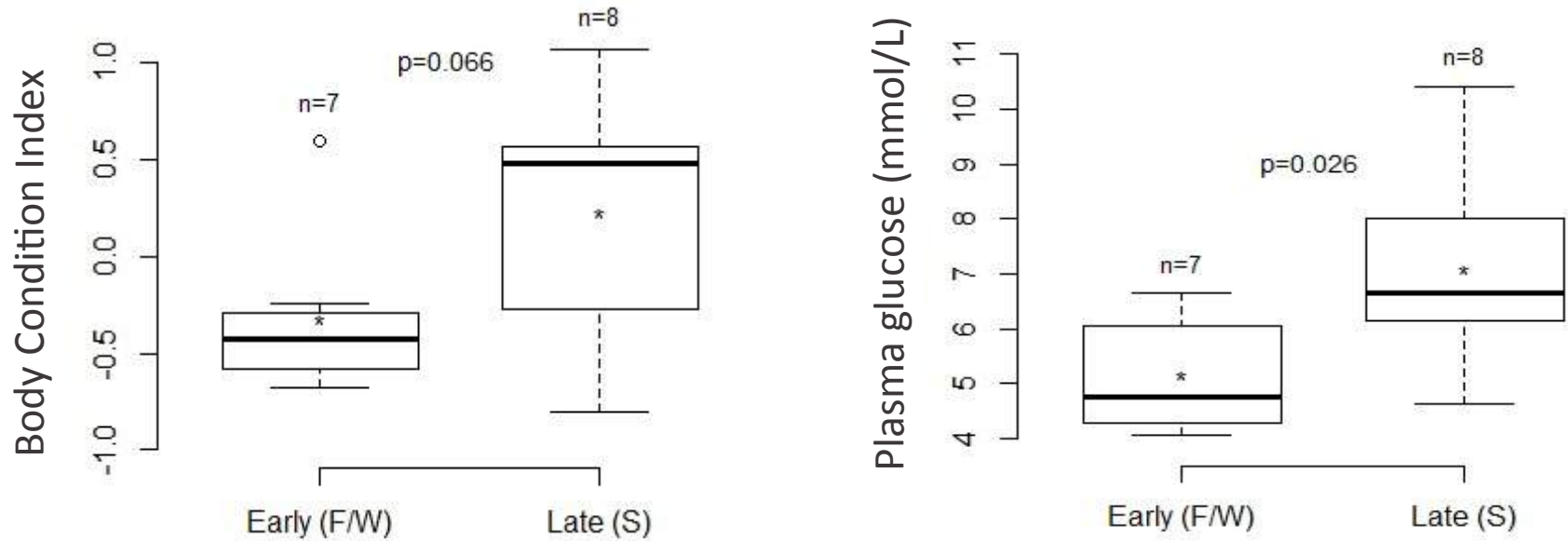
Freshwater stay and exit timing

- Freshwater survival of 71% (15/21)
- From 1 to 189 days in river
- Early and late migrants



A

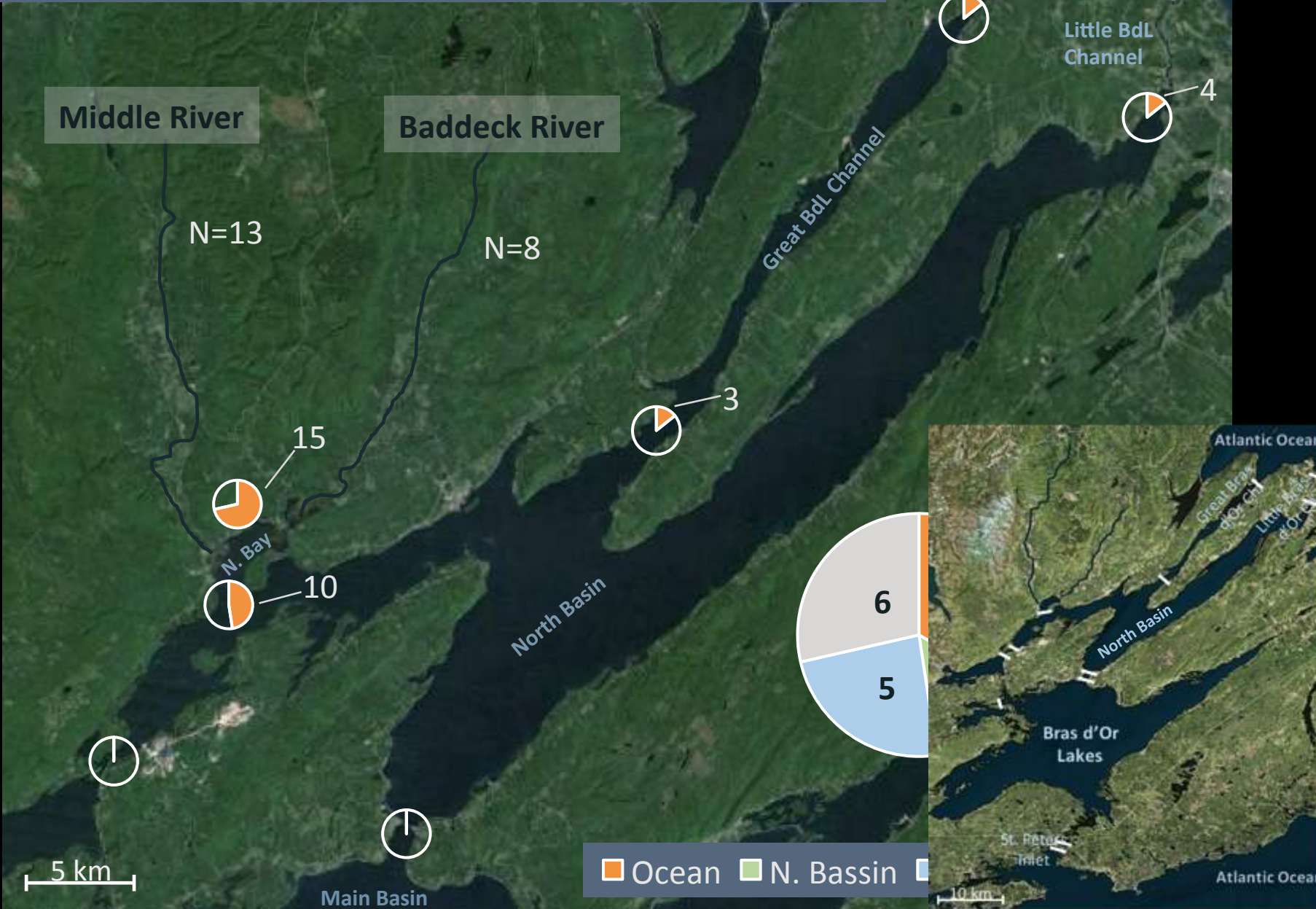
Correlates of freshwater exit timing



- Early migrants in poorer condition
- Condition dependant migration (Halttunen et al. 2013)
- Trade-off between foraging opportunity and security

B

Bras d'Or use and detections

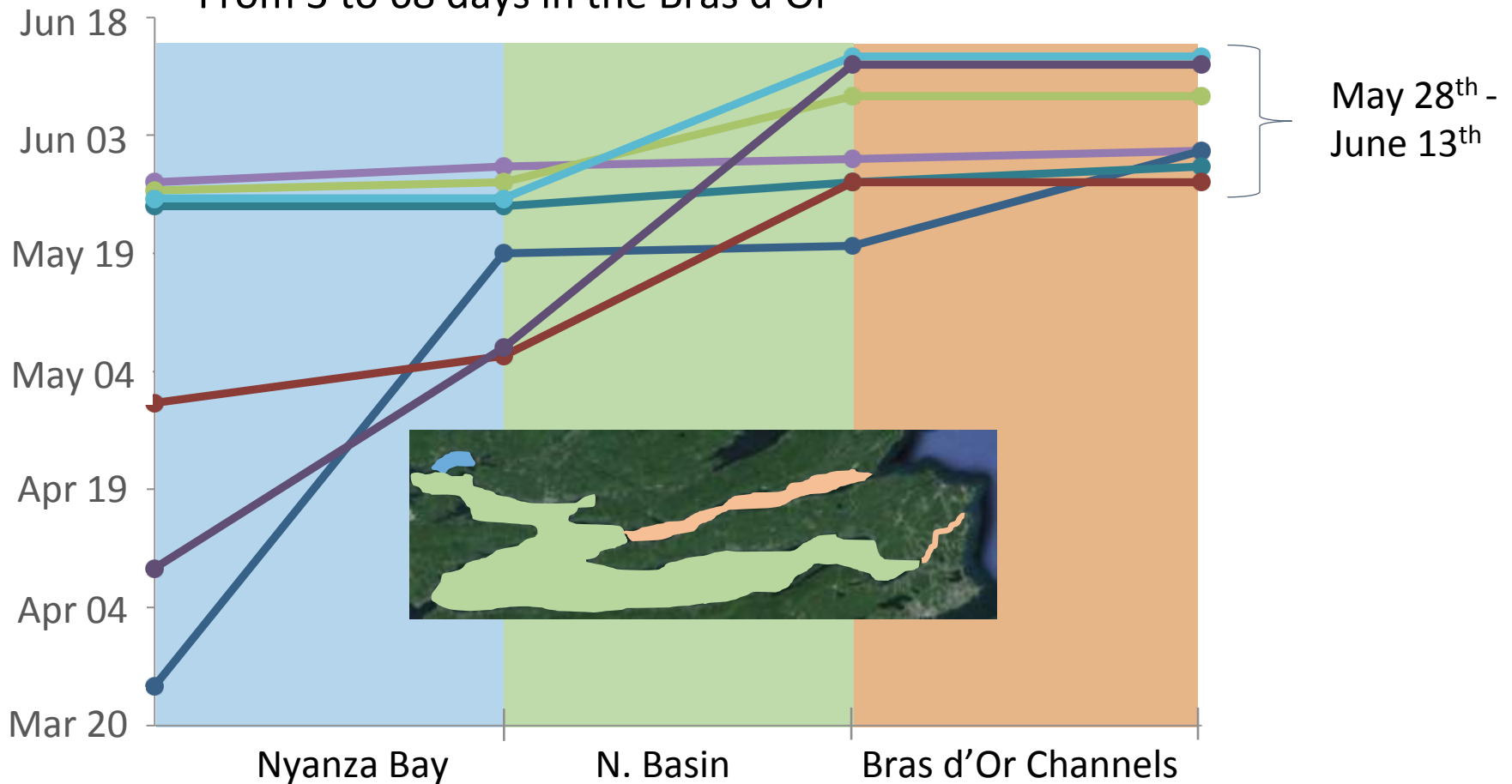


B

Bras d'Or migration timing

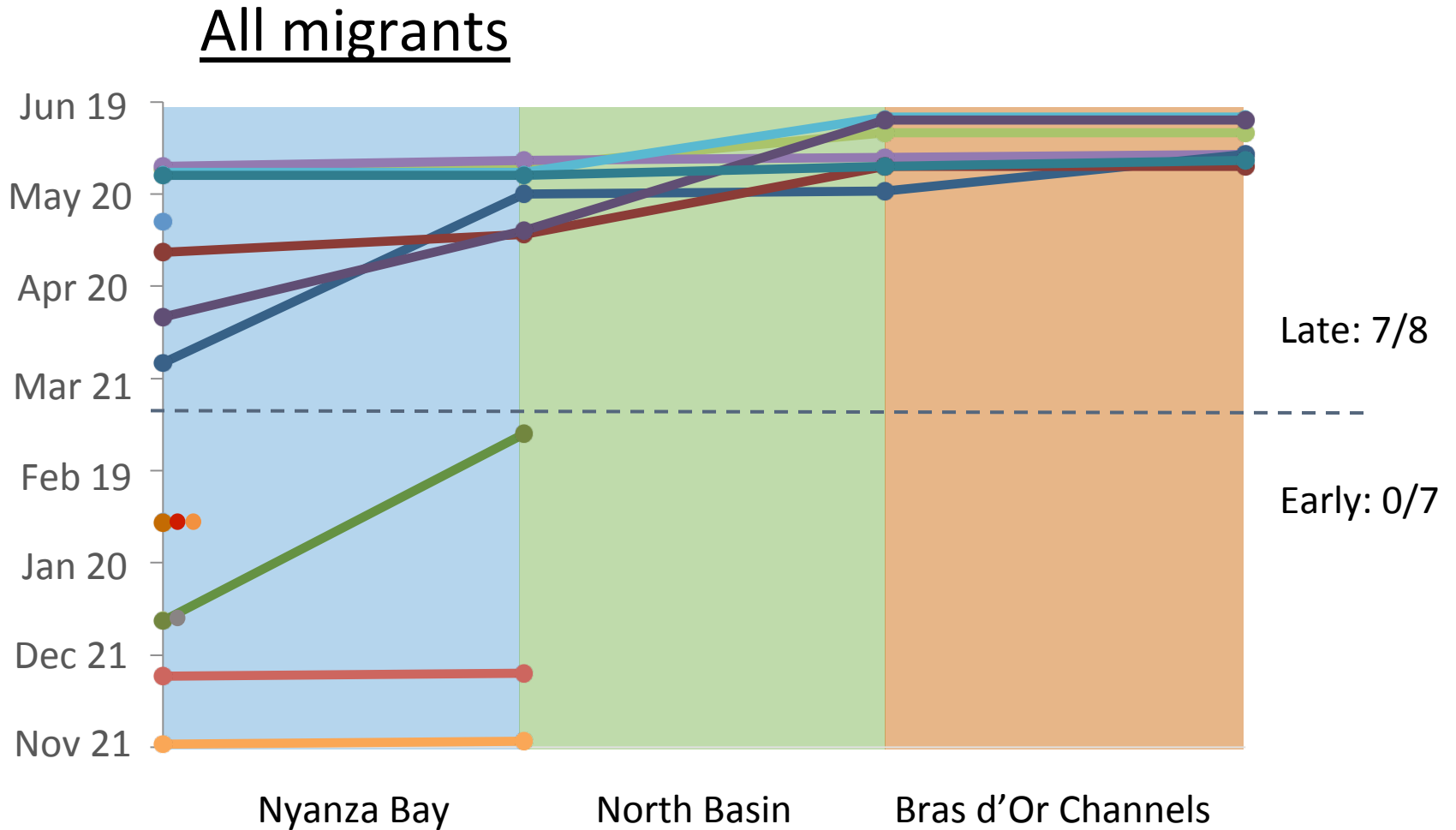
Successful ocean migrants

From 3 to 68 days in the Bras d'Or



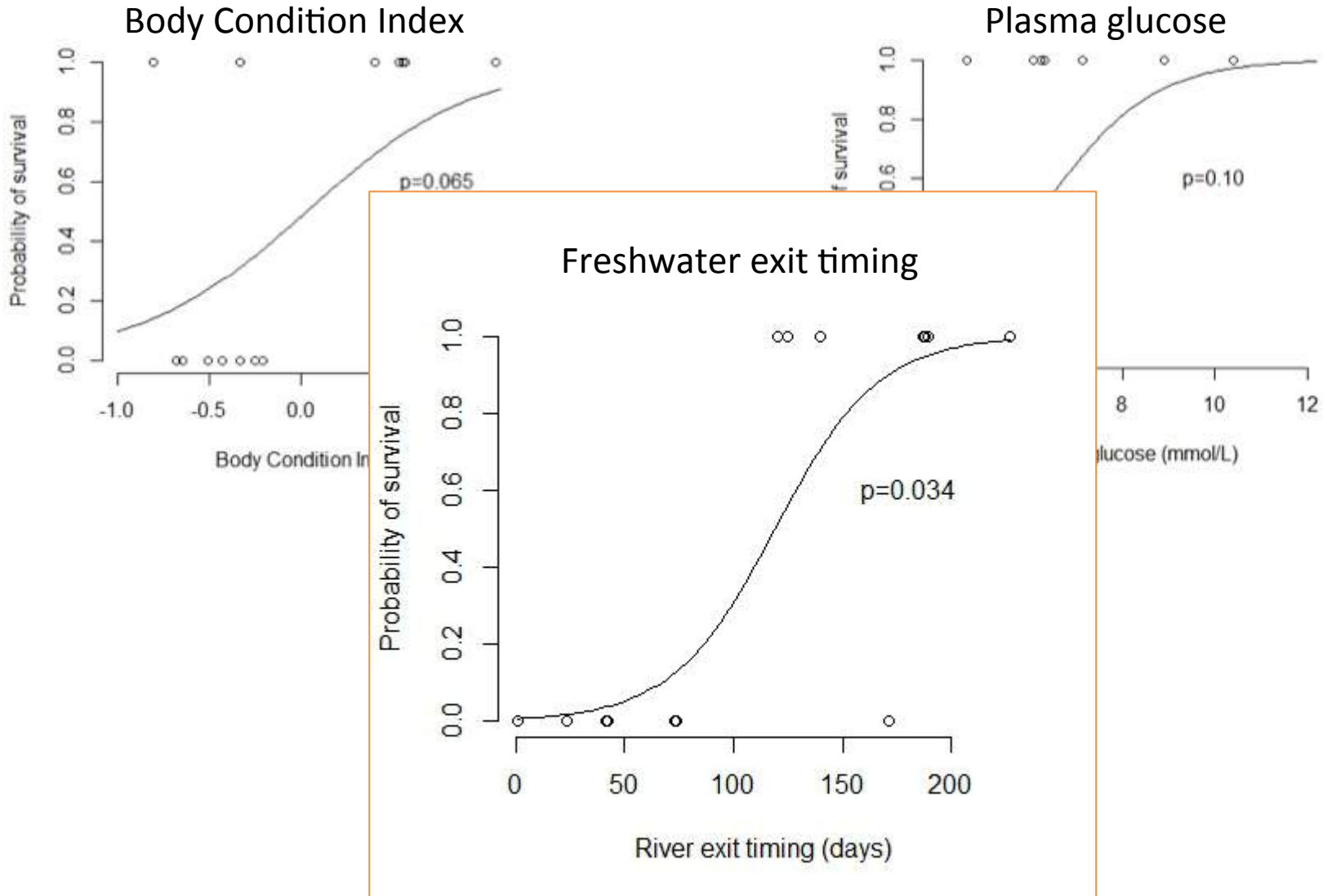
B

Bras d'Or migration timing



B

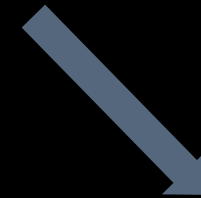
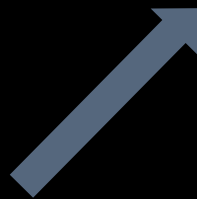
Correlates of Bras d'Or survival



Summary

Out-river migration timing

- Kelts in poor condition leaving earlier



Nutritional state

- Body Condition Index
- Plasma glucose



Estuarine survival

- 0% of early migrants survived
- 88% of late migrants survived

Future work

- Still uncertain about Bras d'Or residency
 - 3 potential resident
 - Additional receivers deployment
- More data
 - Marine detections
 - Repeat spawners
 - Recently tagged fish (+40)
 - Including covariates in models



Future work

Aboriginal Fund for Species at Risk
www.recovery.gc.ca/afsar-faep/



- Smolts / kelts co-migration
 - 50 smolts (May 2016) and ~15 kelts (Dec 2015)



Question?

Email: xavier.bordeleau@dal.ca