



Apr 5th, 10:00 AM - 10:15 AM

## Juvenile Chinook salmon (*Oncorhynchus tshawytscha*) residency and early growth in the lower Fraser River estuary

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Chalifour, Lia; Scott, David; MacDuffee, Misty; Dower, John; and Baum, Julia, "Juvenile Chinook salmon (*Oncorhynchus tshawytscha*) residency and early growth in the lower Fraser River estuary" (2018). *Salish Sea Ecosystem Conference*. 122.

<https://cedar.wvu.edu/ssec/2018ssec/allsessions/122>

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# Characterizing juvenile Chinook salmon residency and early growth in the lower Fraser River estuary

Lia Chalifour, M. Sc. Candidate, UVic

Supervisor: Dr. Julia Baum, Uvic

Co-authors: Dave Scott, Misty MacDuffee, John Dower



# Project Partners



- Tsawwassen First Nation
- Steven Stark
- Lindsey Wilson
- Raincoast Conservation
- Baum Lab and Juanes Lab
- Tara Martin, Laura Kehoe, John Dower, Jody Spence
- Francis Juanes, Rana El-Sabaawi and Scott Hinch
- Many volunteers who helped in the field!



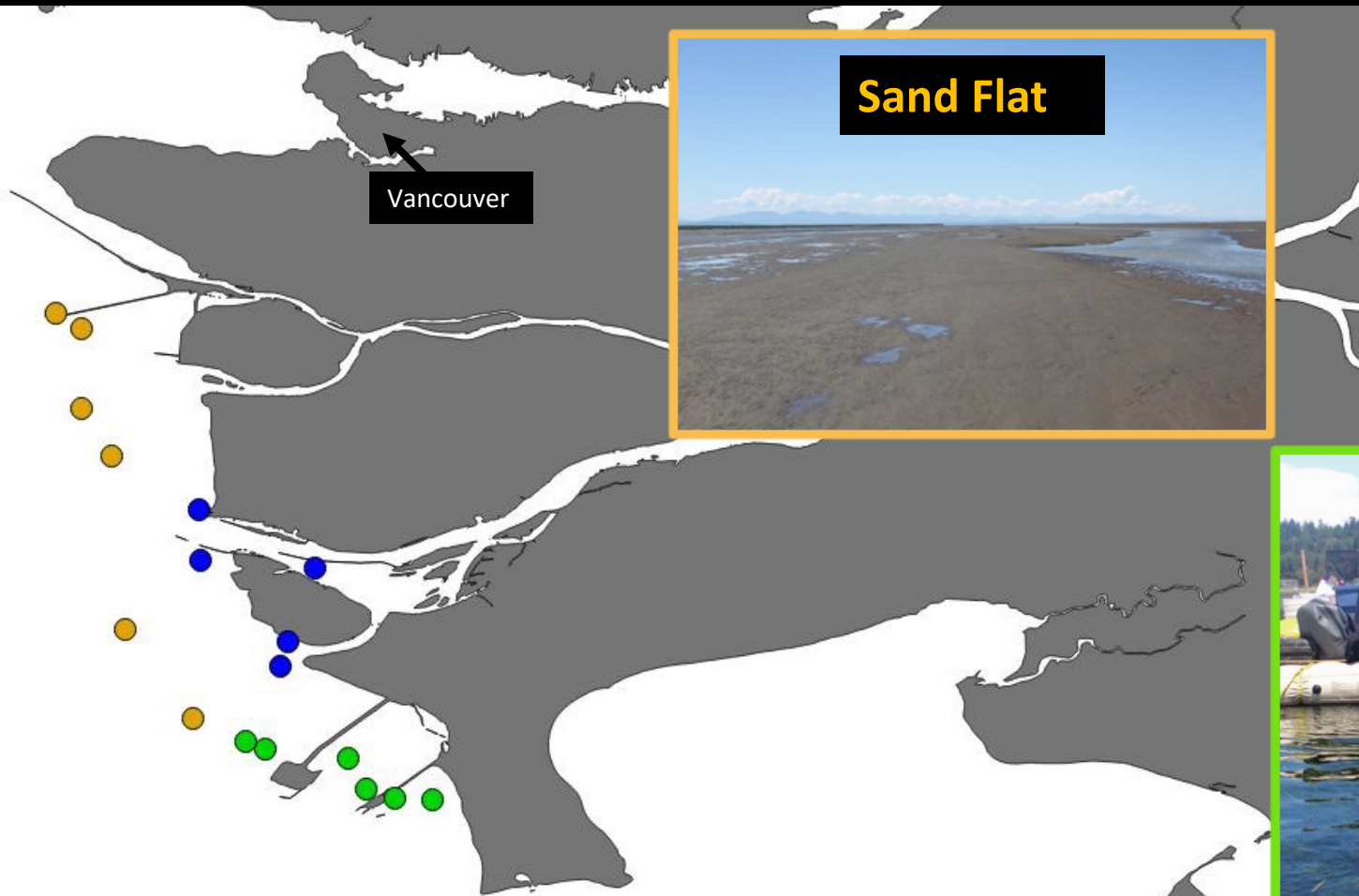
Pacific Institute  
for Climate Solutions  
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of Victoria



# Fraser River Estuary



**Sand Flat**



**Marsh**



**Eelgrass**



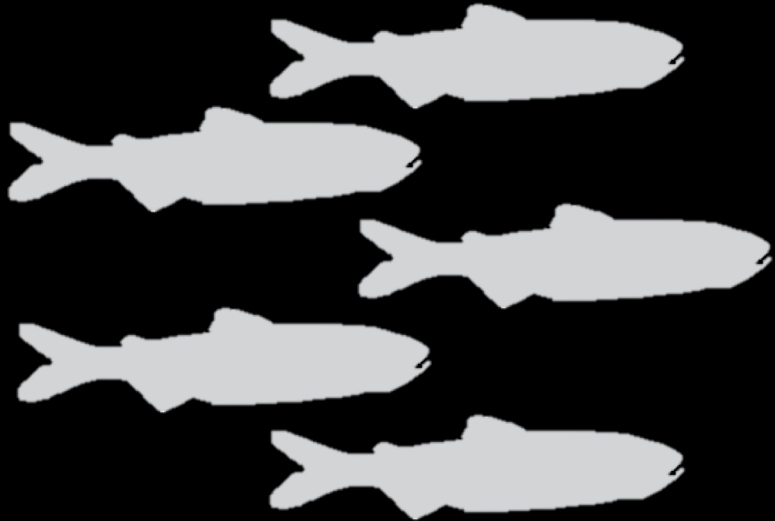
Eelgrass, marsh, or sand flat?

**2. Which habitat(s) do juvenile salmon prefer?**

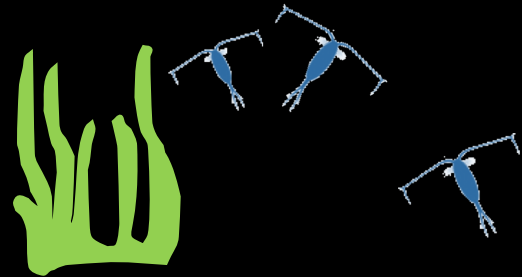


# Eelgrass, marsh, or sand flat?

## 2. Which habitat(s) do juvenile salmon prefer?

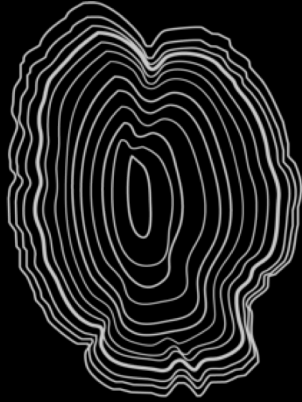


Prediction: more salmon in vegetated habitats



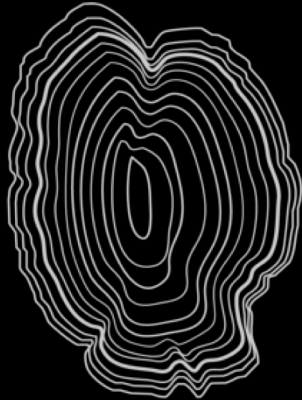
Eelgrass, marsh, or sand flat?

**3. What role does habitat play in Chinook early growth?**



# Eelgrass, marsh, or sand flat?

## 3. What role does habitat play in Chinook early growth?



Prediction: Chinook that enter estuary will eat more and grow faster → earlier = better

Greater daily growth during estuarine residency



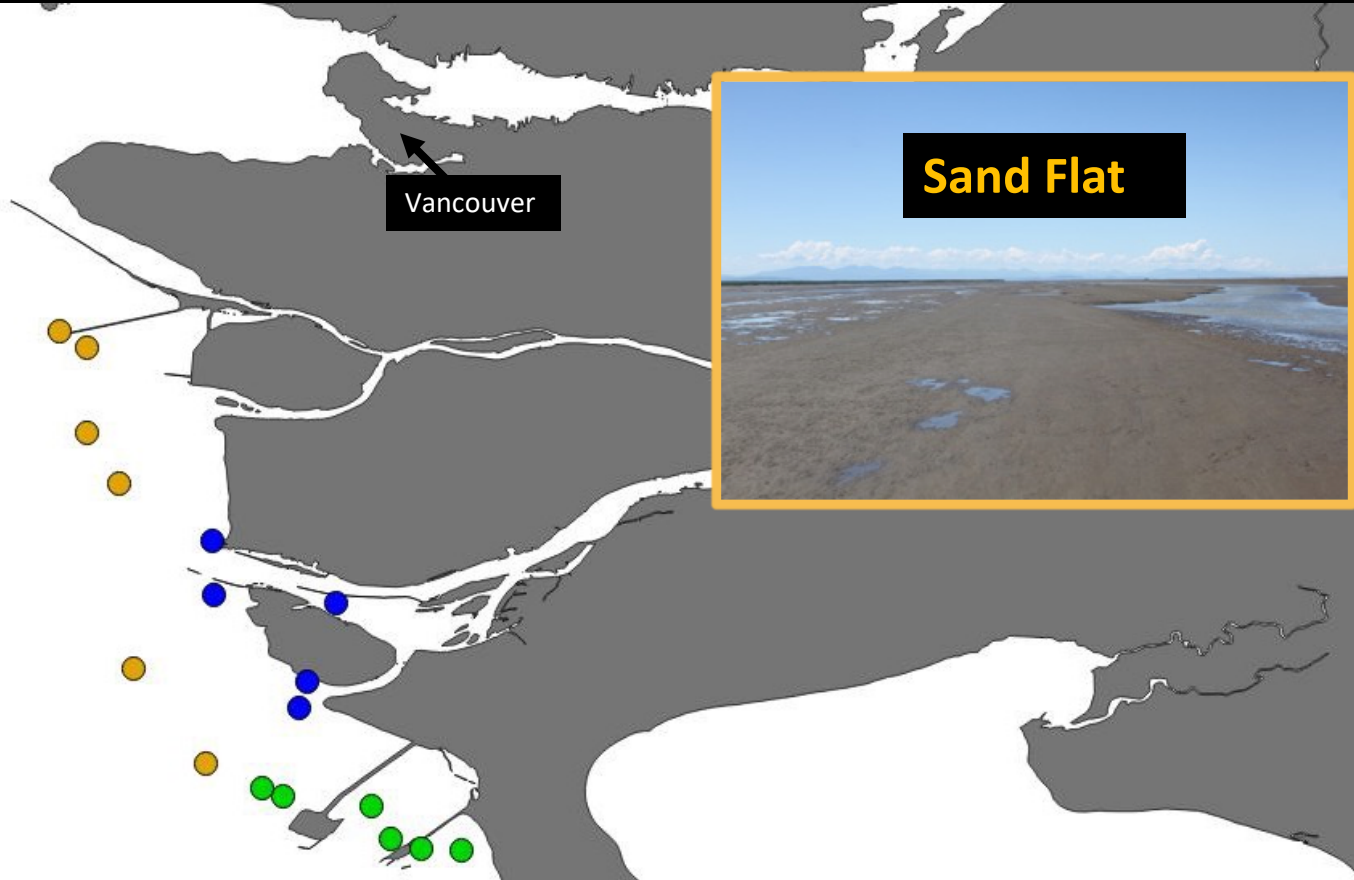
# Harrison Chinook

- Ocean type, fall run, white flesh
- Salish Sea subgroup with more variable survival (Ruff et al. 2017)



# Fraser River Estuary

- 6 Eelgrass, 6 Sand flat, 5 Marsh sites
- Biweekly sampling in spring, summer, fall



**Sand Flat**

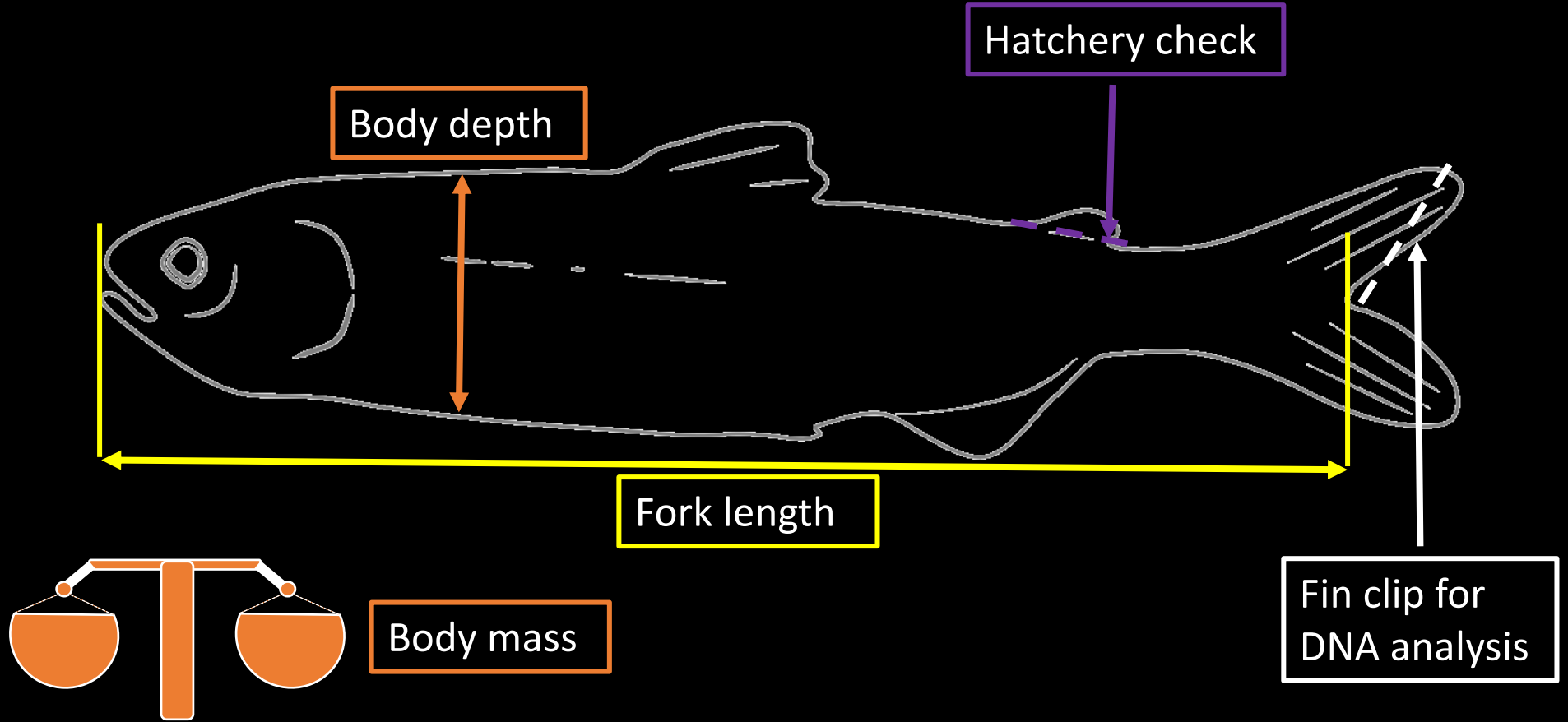


**Marsh**



**Eelgrass**

# Salmon Measurements

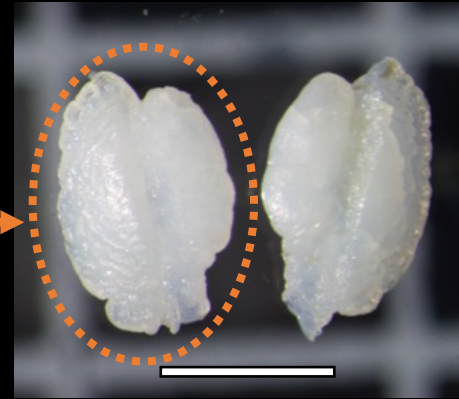


# Chinook Otolith Measurements

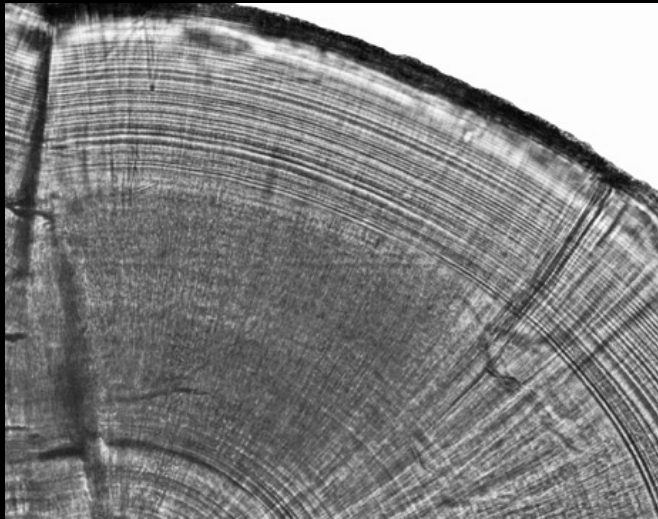


Sagittal otoliths extracted

Left  
otolith  
polished



0.5 mm



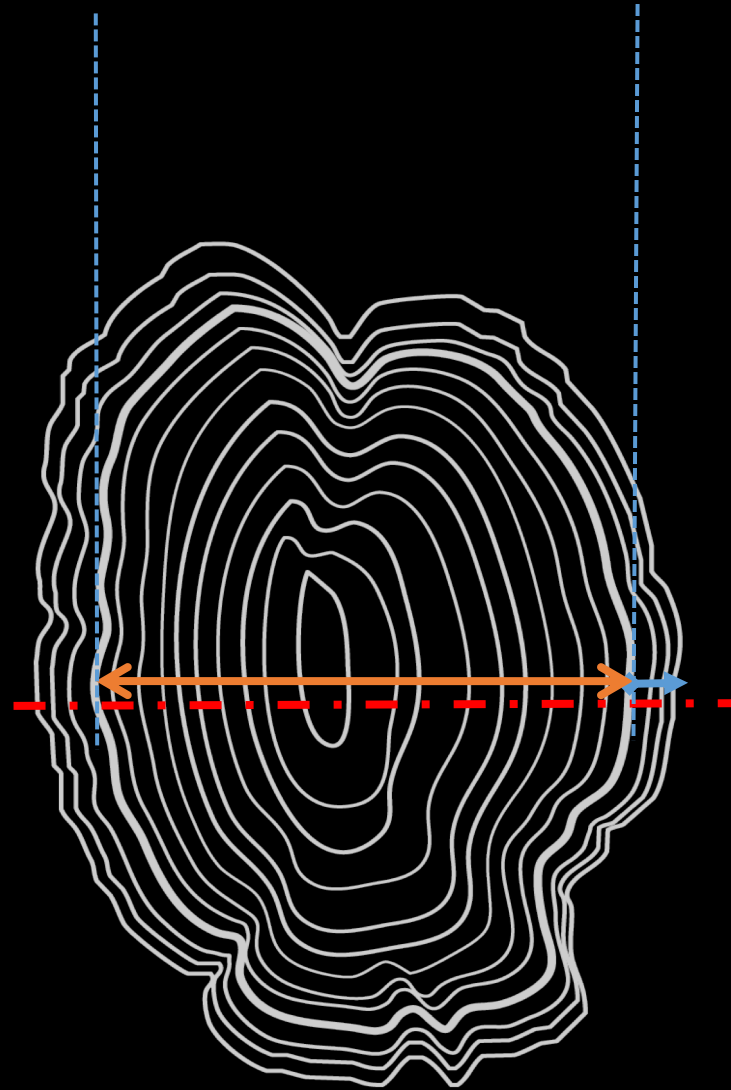
Measure growth visually and via  
Laser Ablation with Inductively  
Coupled Plasma Mass Spectrometry  
(LA-ICPMS) ...

# Chinook Otolith LA-ICPMS

Laser transect

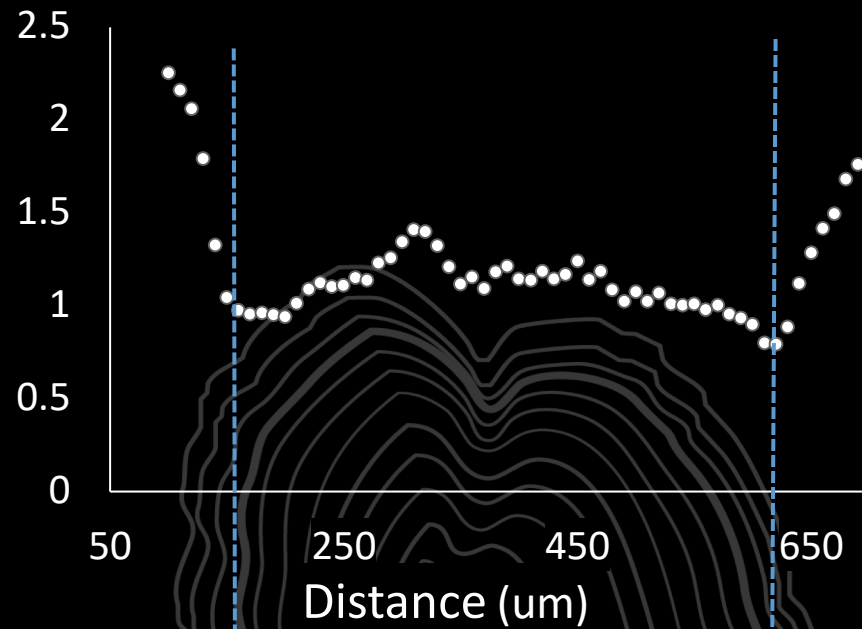
Estuarine growth

Freshwater growth



# Chinook Otolith LA-ICPMS

Sr:Ca  
(mmol / mol)

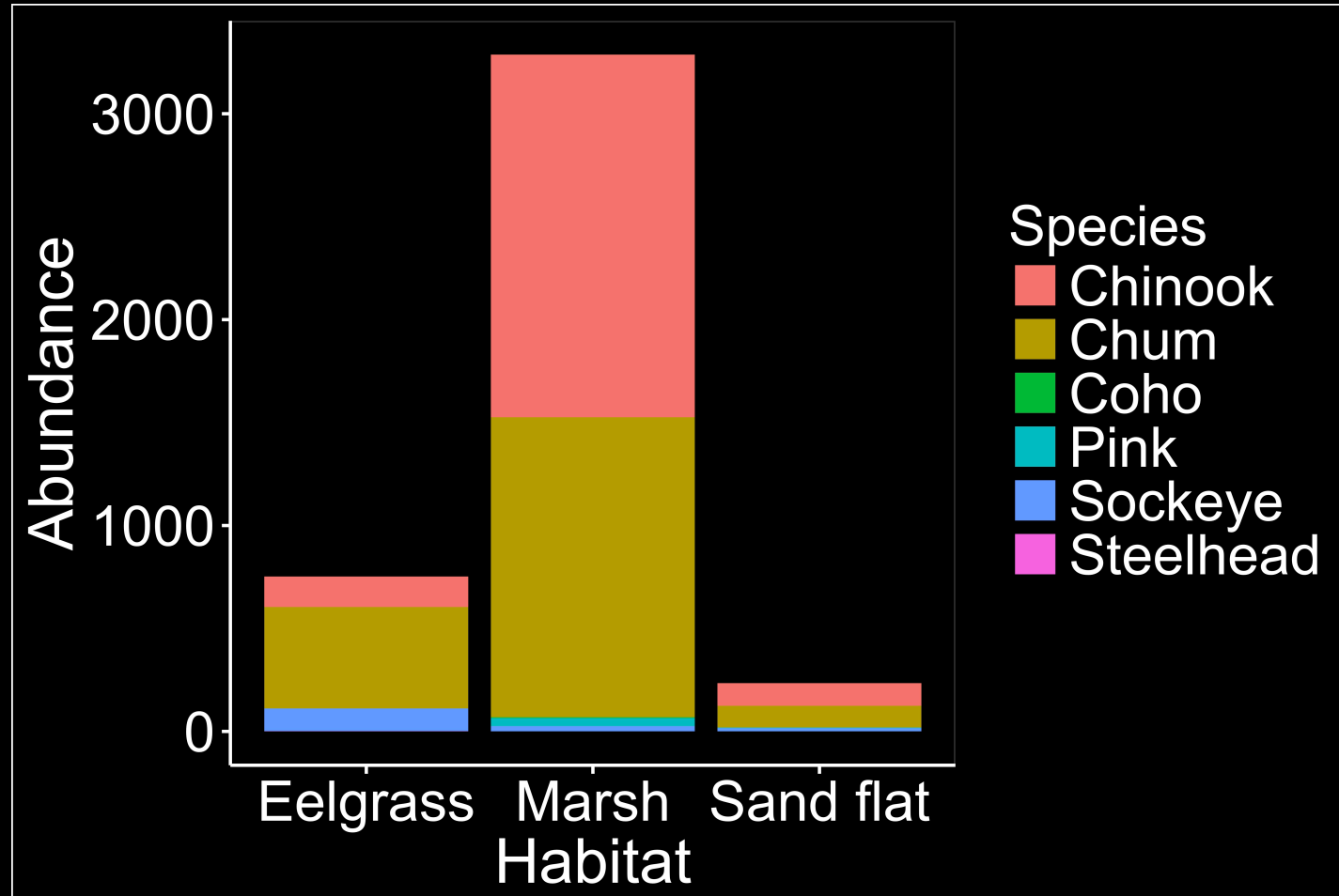


Laser transect

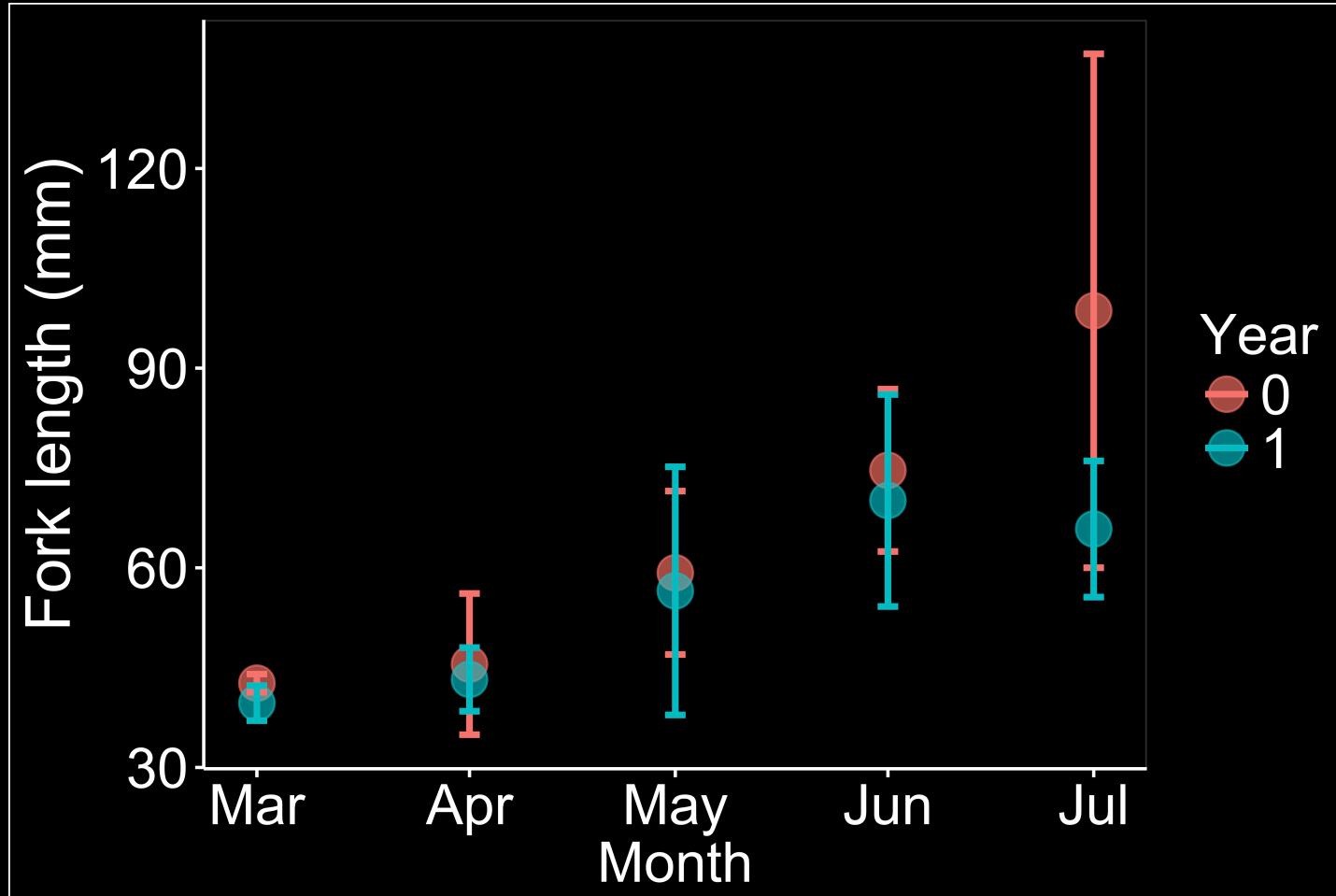
Estuarine growth

Freshwater growth

# Results: habitat density

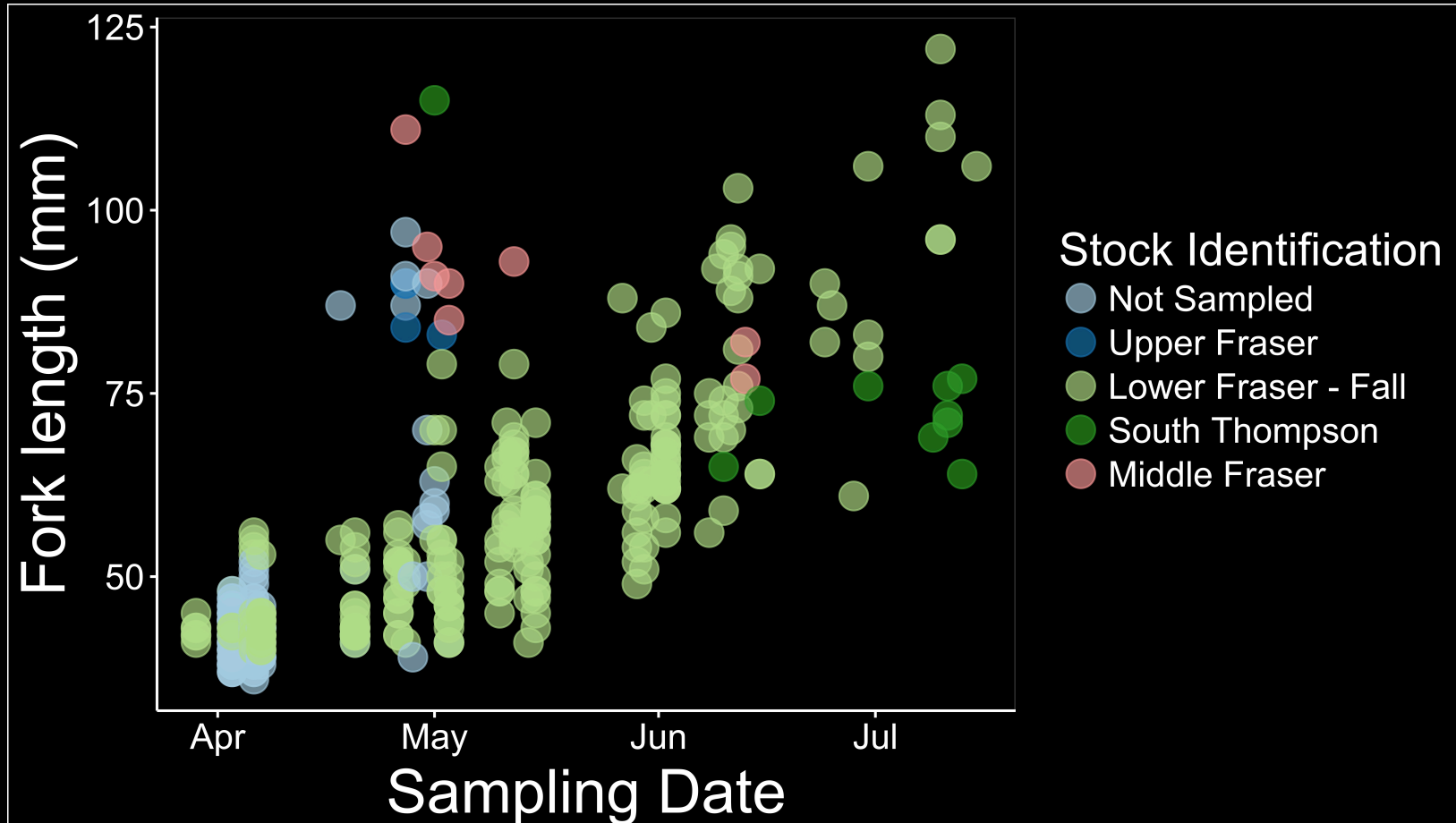


# Chinook size and timing

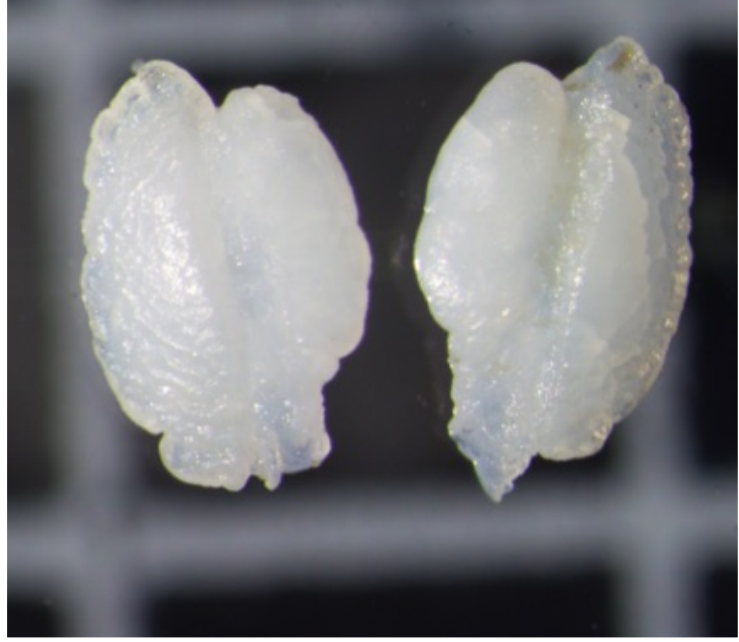




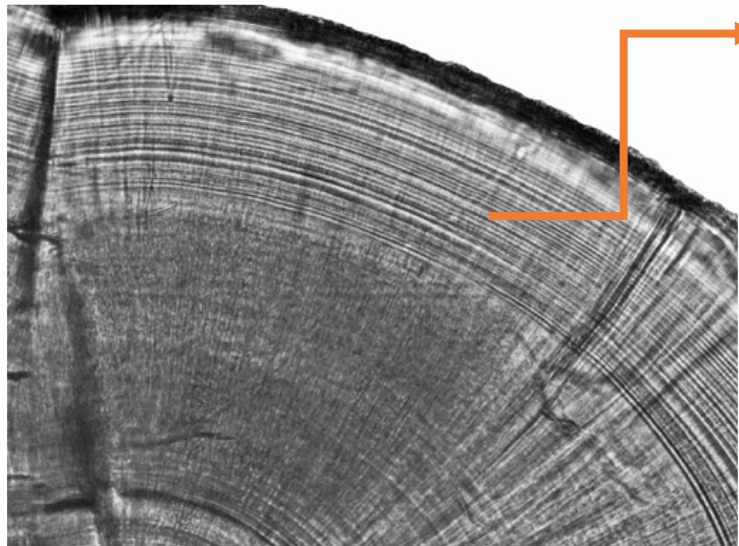
# Stock-specific entry timing



# Otolith analyses

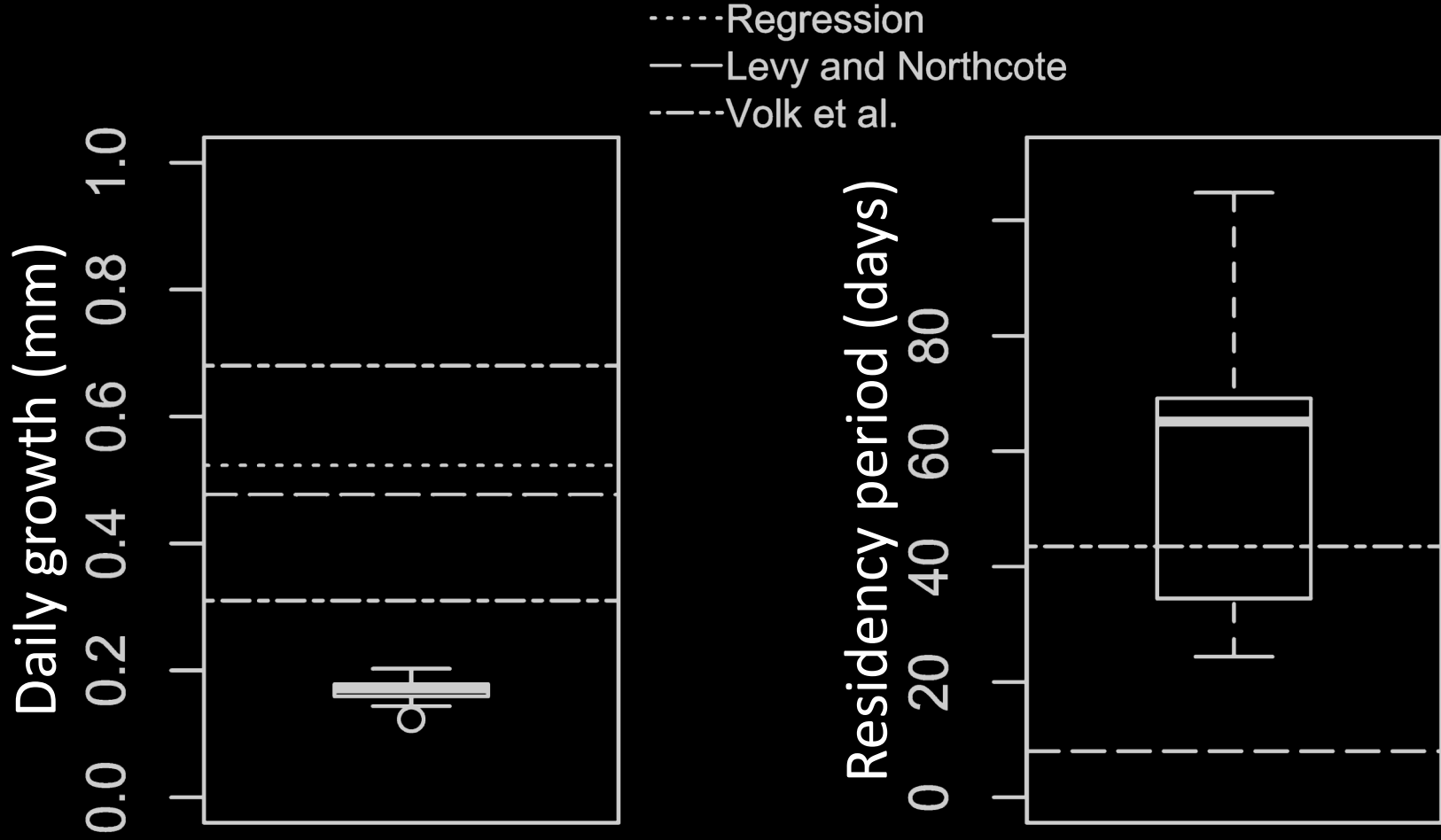


How long are estuarine residency periods?

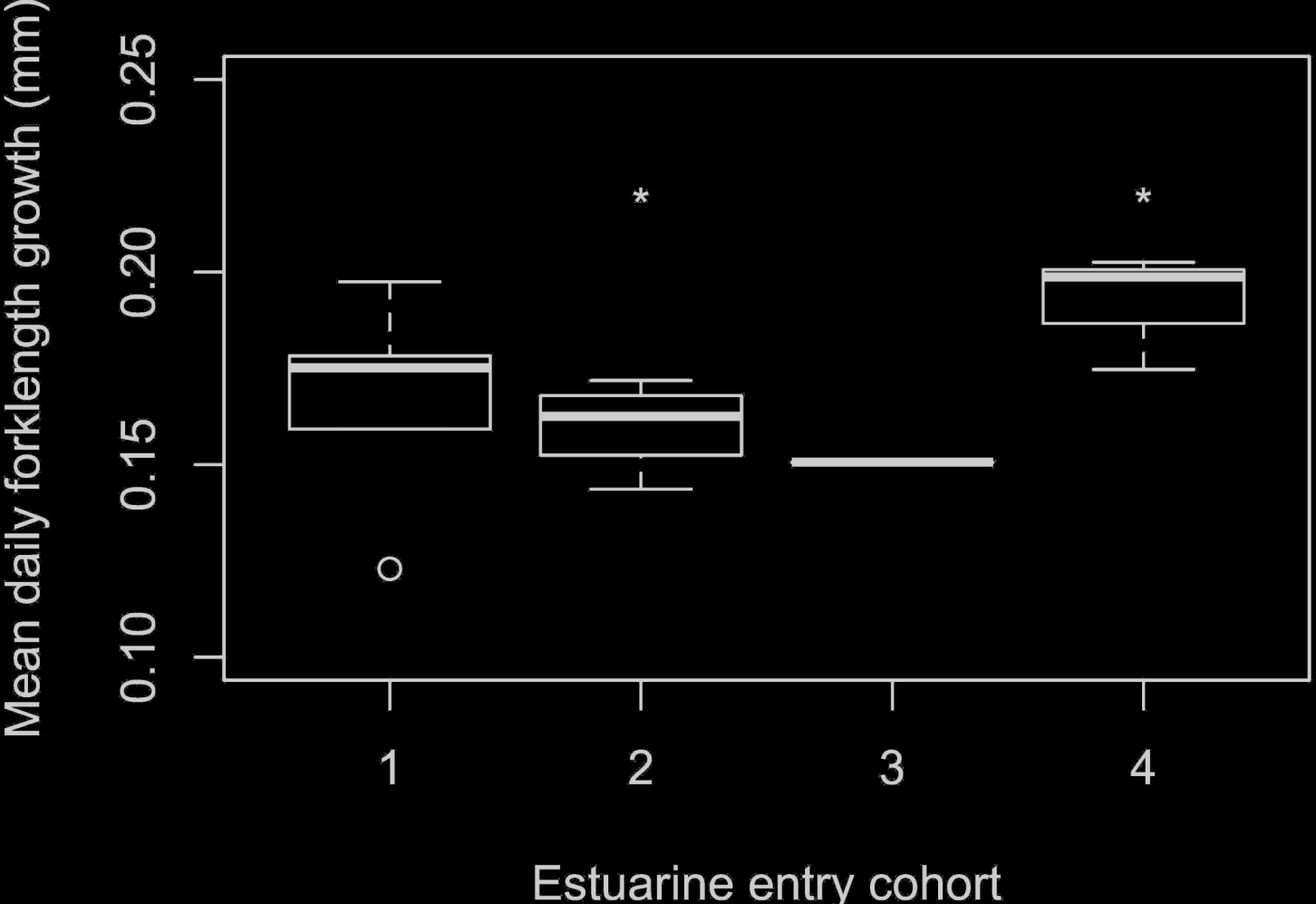


How does estuarine growth compare to other salmon?

# Harrison estuarine growth



# Optimal estuarine entry time





# Summary

- Habitat:
  - Highest catch in marsh
  - Consistent catch in marsh for Harrison Chinook
- Entry Timing:
  - Harrison enter earliest in March, grow best in May





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  - 59.3 days (SD 23.4 days)





# Summary

- Habitat:

- Highest catch in marsh
- Consistent catch in marsh for Harrison Chinook

- Entry Timing:

- Harrison enter earliest in March, grow best in May

- Estuarine residency:

- 59.3 days (SD 23.4 days)

- Daily growth:

0.17 mm (SD 0.023 mm)





# Next Steps

- Otoliths:

- Finish growth measurements
- Continue to test cohorts – optimal timing?







# Next Steps

- Otoliths:

- Finish growth measurements
- Continue to test cohorts – optimal timing?

- Habitat:

- Raincoast to implement marsh restoration & continue sampling: David Scott's talk tomorrow!
- Friday 11:15 room 603

