

Bioenergetics of juvenile Chinook salmon in Lower Columbia EMP sites

Columbia River Estuary Conference 2025



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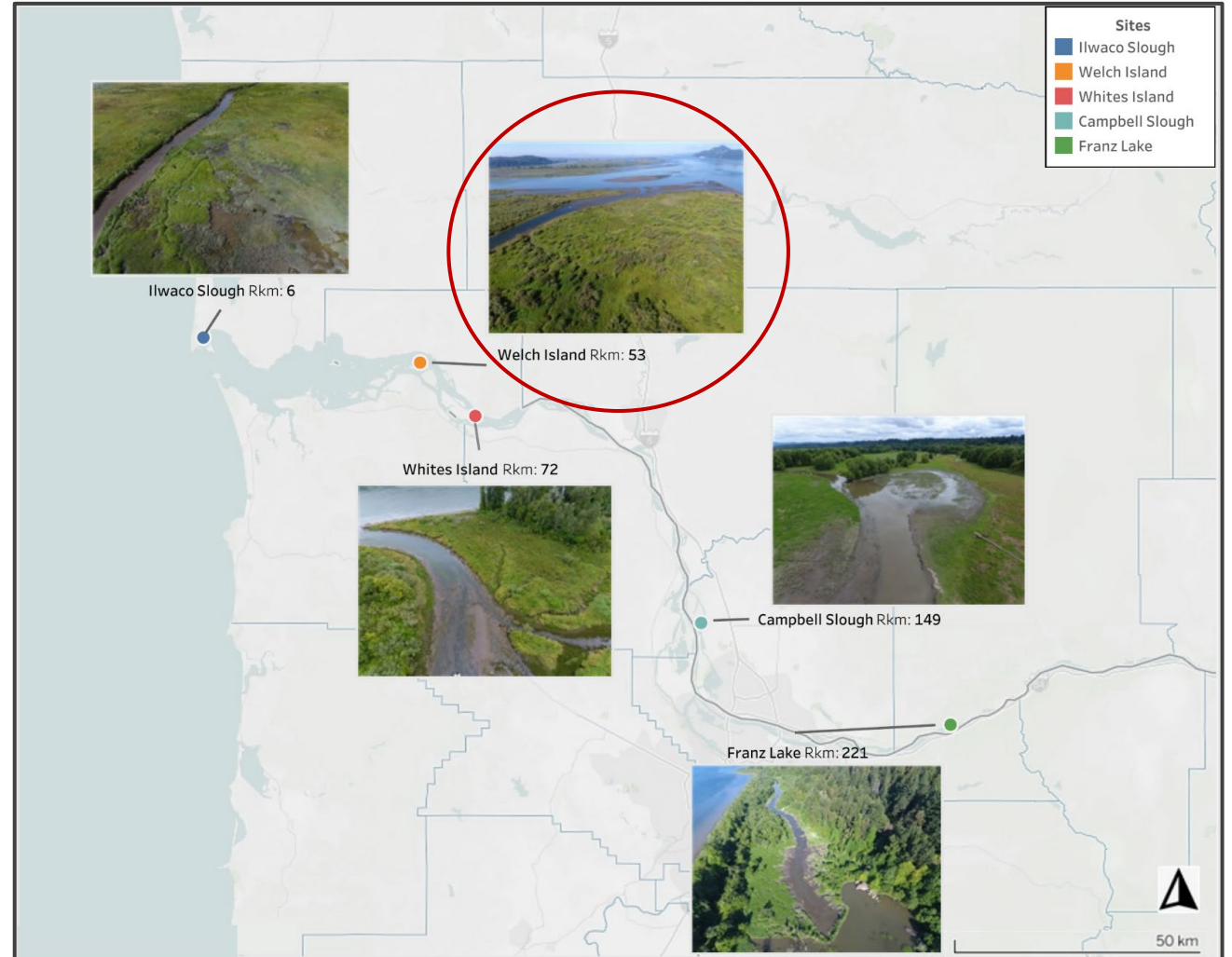
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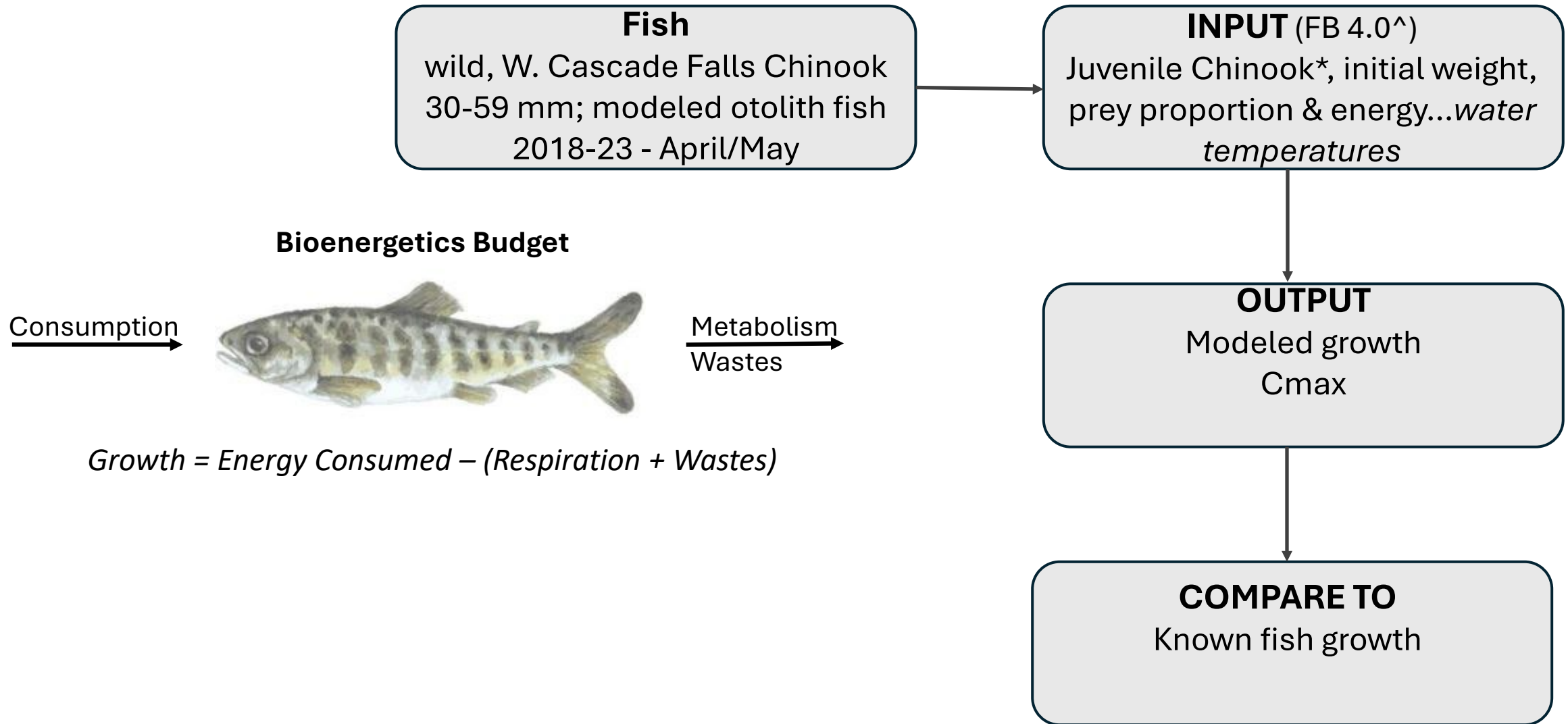
Bioenergetics Budget

Consumption →



→ Metabolism
Wastes

$$\text{Growth} = \text{Energy Consumed} - (\text{Respiration} + \text{Wastes})$$

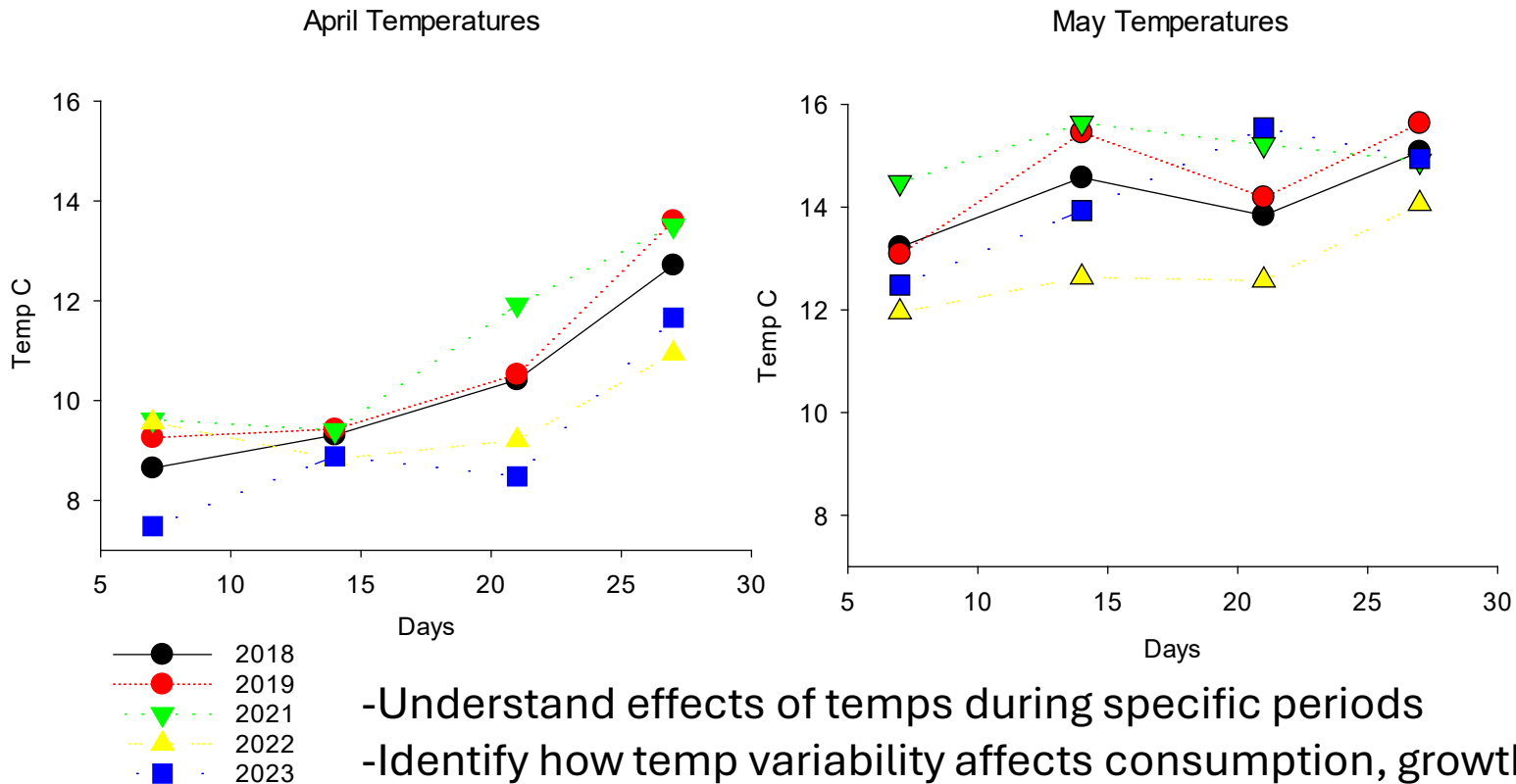


Fish
wild, W. Cascade Falls Chinook
30-59 mm; modeled otolith fish
2018-23 - April/May

INPUT (FB 4.0^)
Juvenile Chinook*, initial weight,
prey proportion & energy...*water
temperatures*

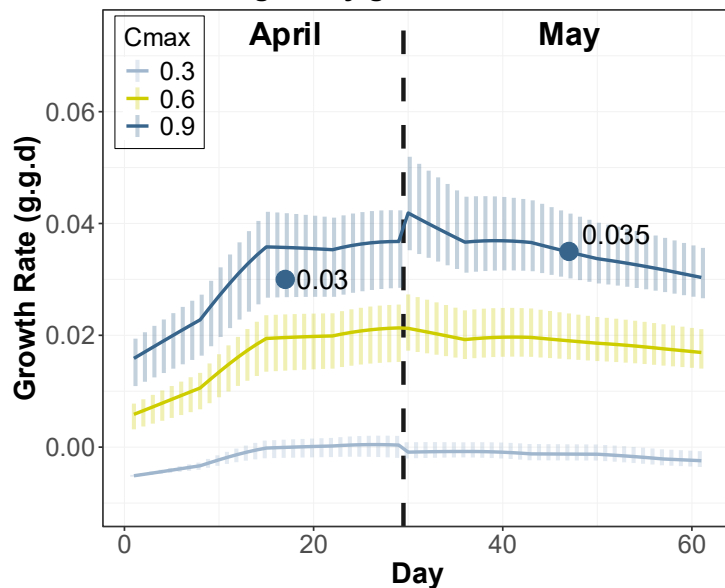
OUTPUT
Modeled growth
Cmax

COMPARE TO
Known fish growth

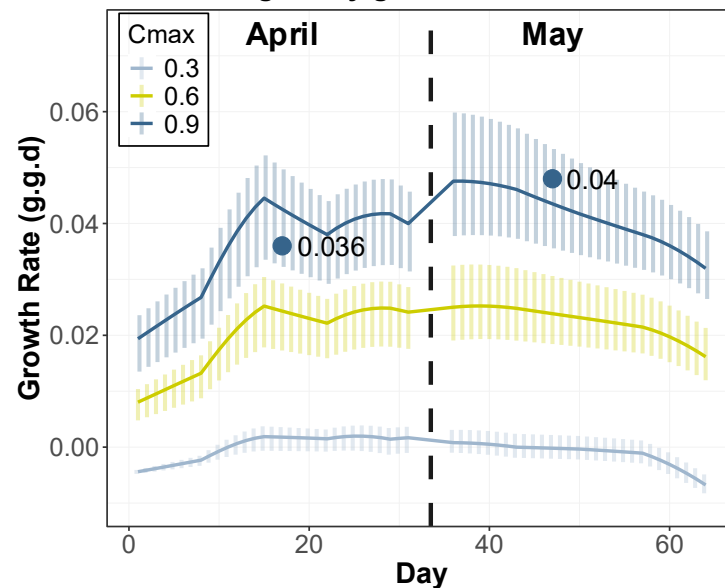


Preliminary Results

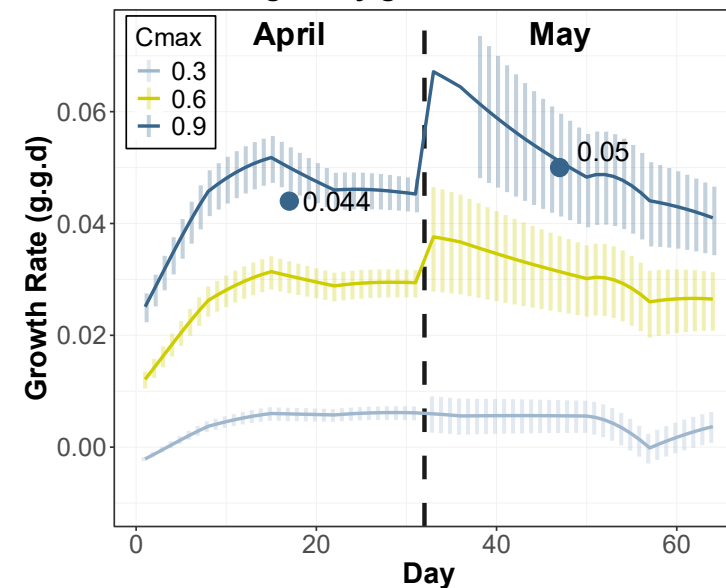
2018 Average daily growth rate



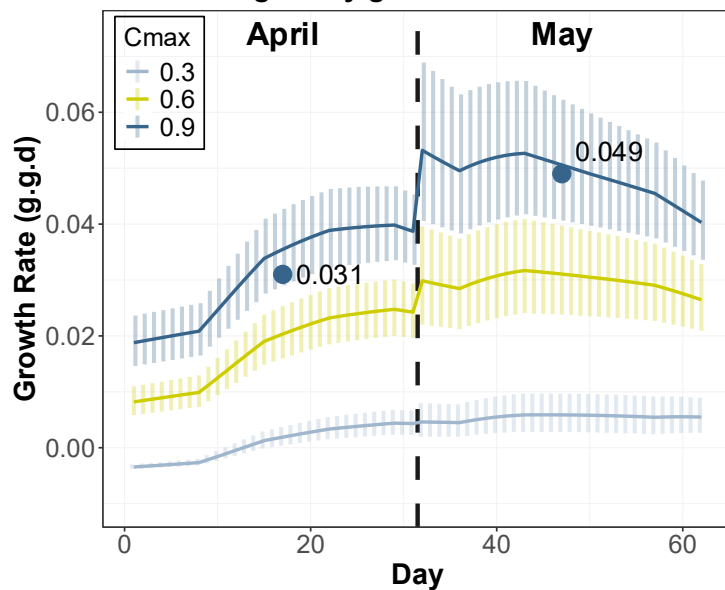
2019 Average daily growth rate



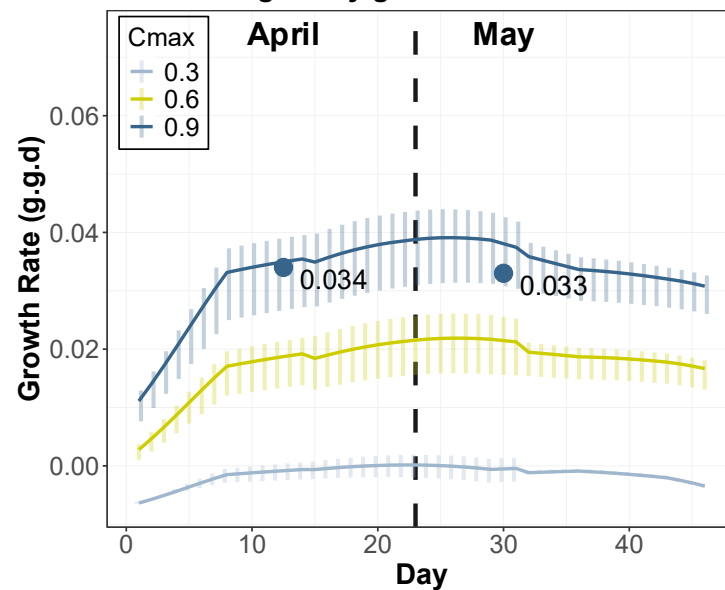
2021 Average daily growth rate



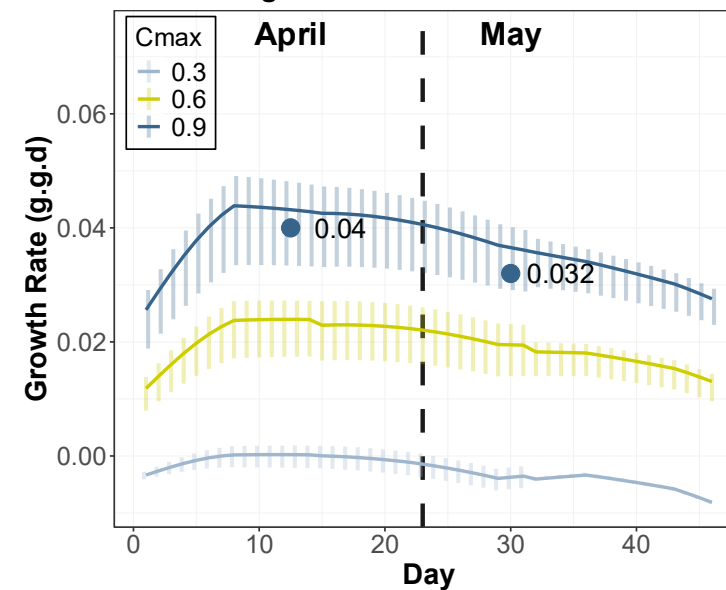
2022 Average daily growth rate



2023 Average daily growth rate

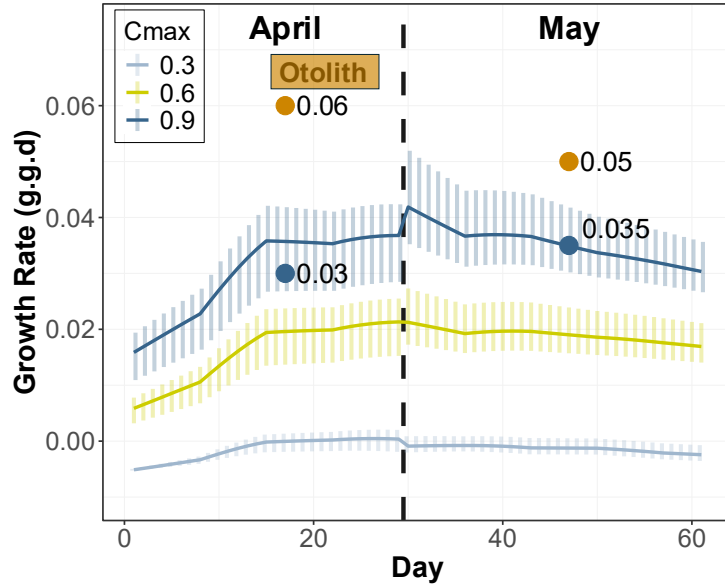


2023 +2 degrees Celsius

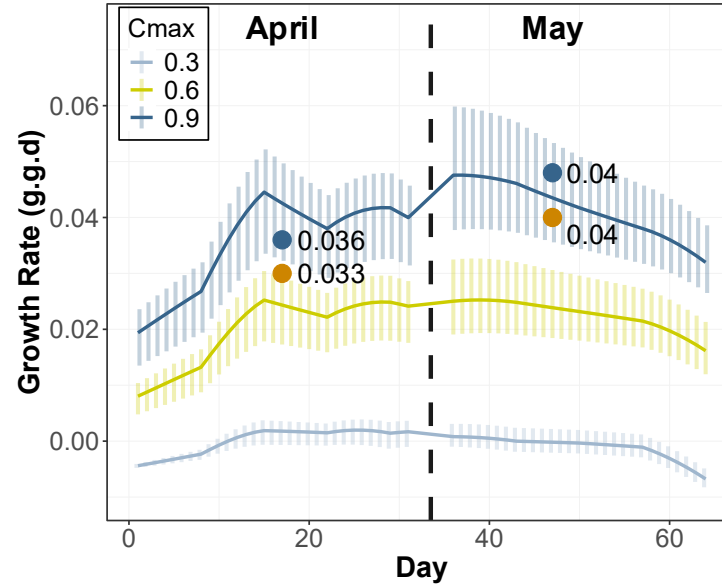


Preliminary Results

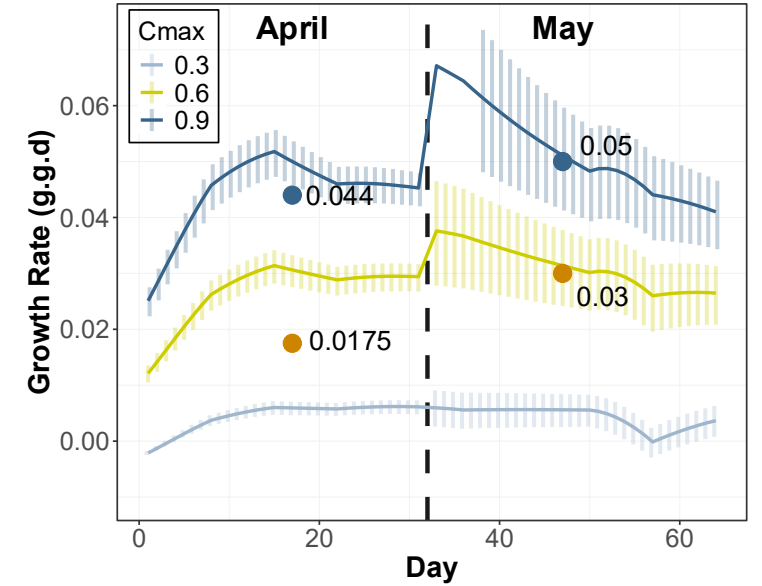
2018 Average daily growth rate



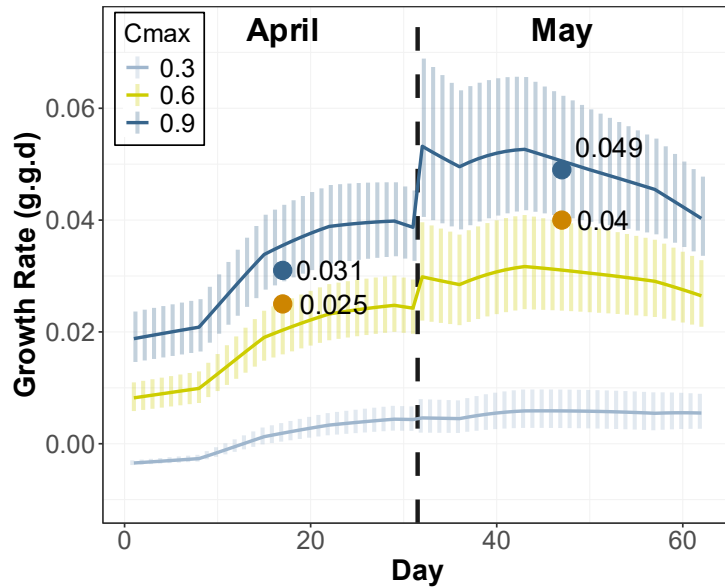
2019 Average daily growth rate



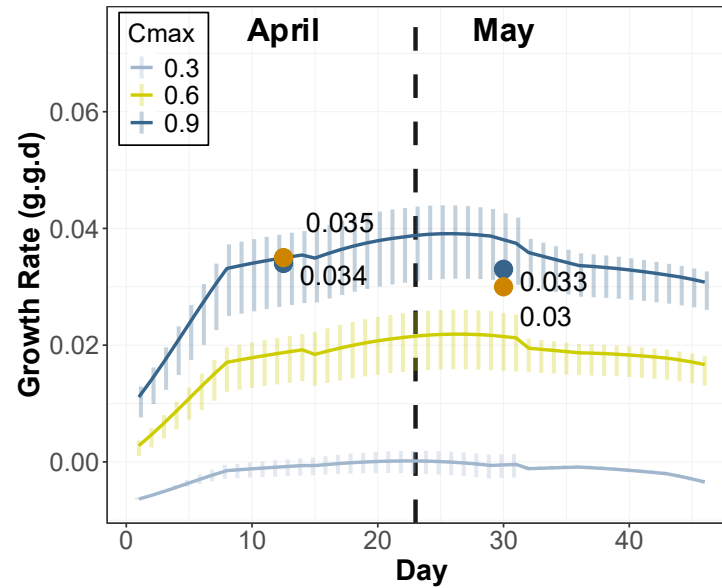
2021 Average daily growth rate



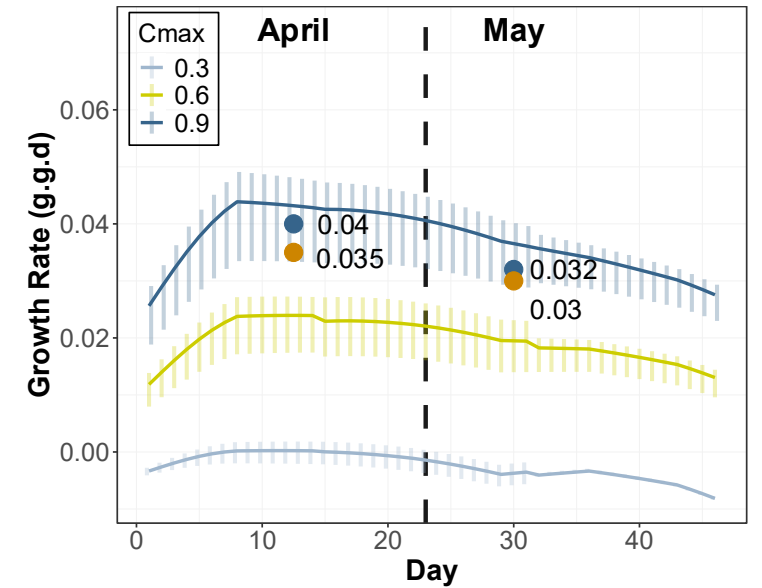
2022 Average daily growth rate



2023 Average daily growth rate



2023 +2 degrees Celsius



Summary & Next Steps for Bioenergetics Modeling with EMP Data

SUMMARY

- Developing bioenergetics models to understand subyearling growth; incorporate other EMP data

NEXT STEPS

- Expand modeling by adding:
 - Chinook > 60mm
 - More months, years, sites, stocks
 - Link to flow, N & P, habitat, prey, adult returns
 - Estimate climate change effects (temps/prey)



Thank you!

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