

Can we quantify invasive catfish impacts on the ecosystem?

Corbin D. Hilling¹, Joseph D. Schmitt, Yan Jiao and Donald J. Orth

Virginia Tech Department of Fish and Wildlife Conservation

¹chilling@vt.edu



Objectives/goals

- What is the predatory effect of Blue Catfish in VA tidal rivers?
 - To species of concern (e.g. American Eel, American Shad, River Herring)
 - To commercially important species (e.g. Blue Crab)



Methods

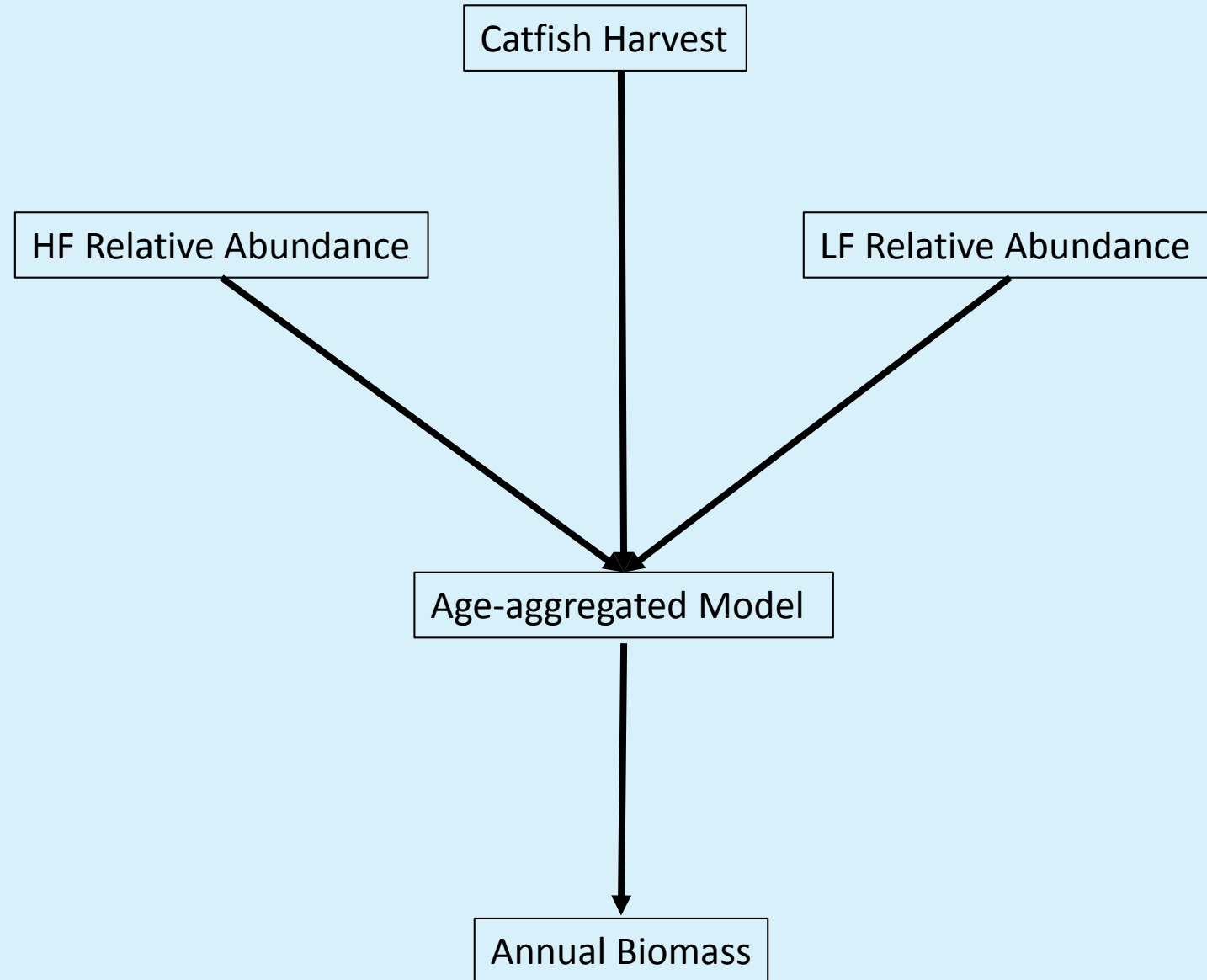
$$\text{Consumption} = \text{Biomass} \times \text{Consumption Rate} \times \text{Diet}$$

- Preliminary estimates of consumption
- Assumptions:
 - Size structure of sample(s) approximates population
 - Constant density
 - Diet (Seasonal/Spatial) represented



Biomass

- Biomass dynamic model
- Estimated by river
- Segregation of harvest
 - “Catfish, Unclassified”

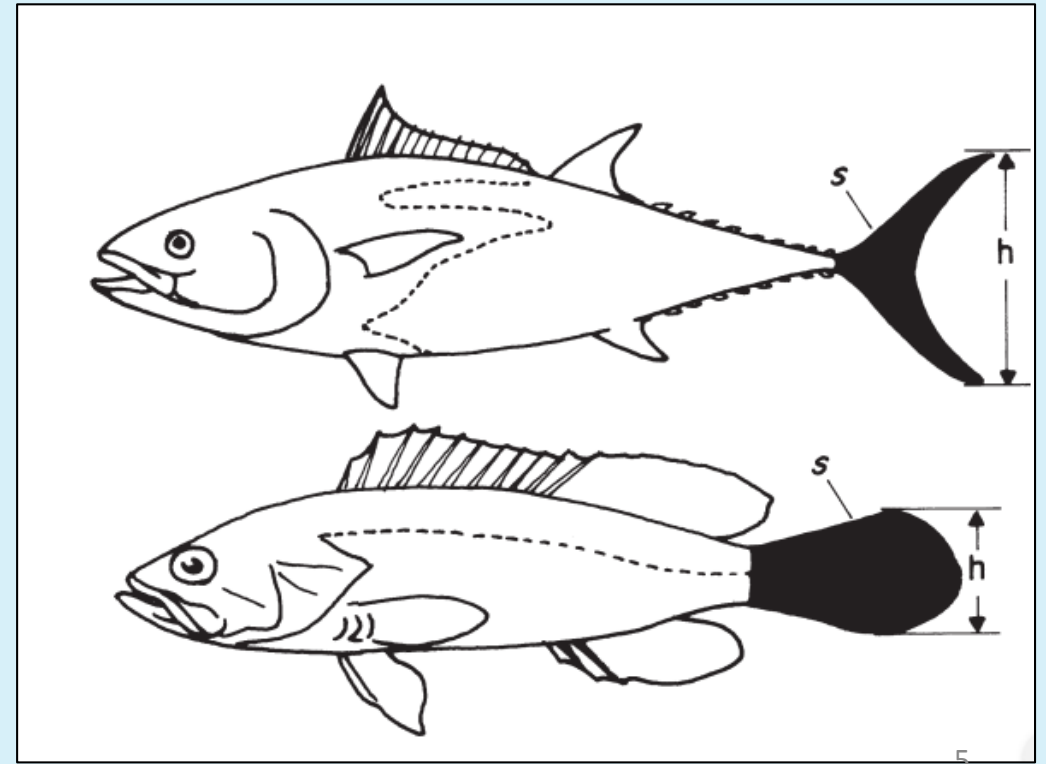


Consumption:Biomass

- Palomares and Pauly 1998¹

$$\log_{10}([Q / B]) = 7.964 - 0.204 \log_{10}(W_{\infty}) - 1.965T' + 0.083A + 0.532h + 0.398d$$

- W_{∞} = Average Max. Weight
- T' = Average Annual Temperature
- $A = h^2/s$
- h = herbivore (0 or 1)
- d = detritivore (0 or 1)



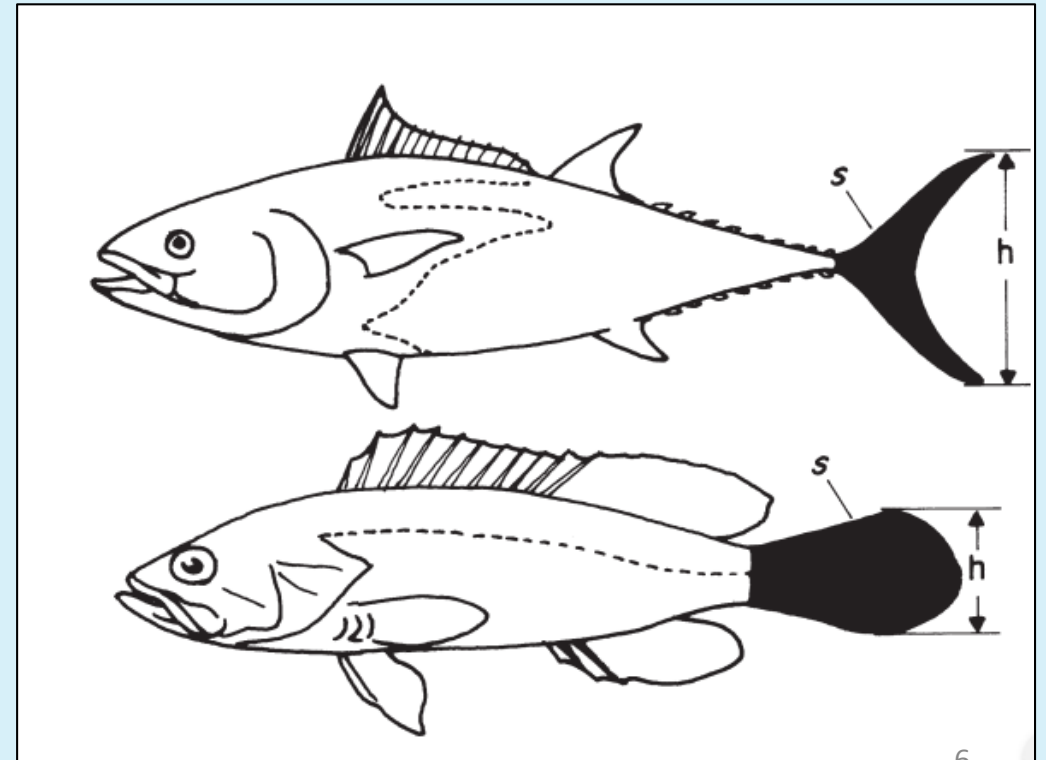
¹Palomares and Pauly. 1998. Marine and Freshwater Research 49:447–453.

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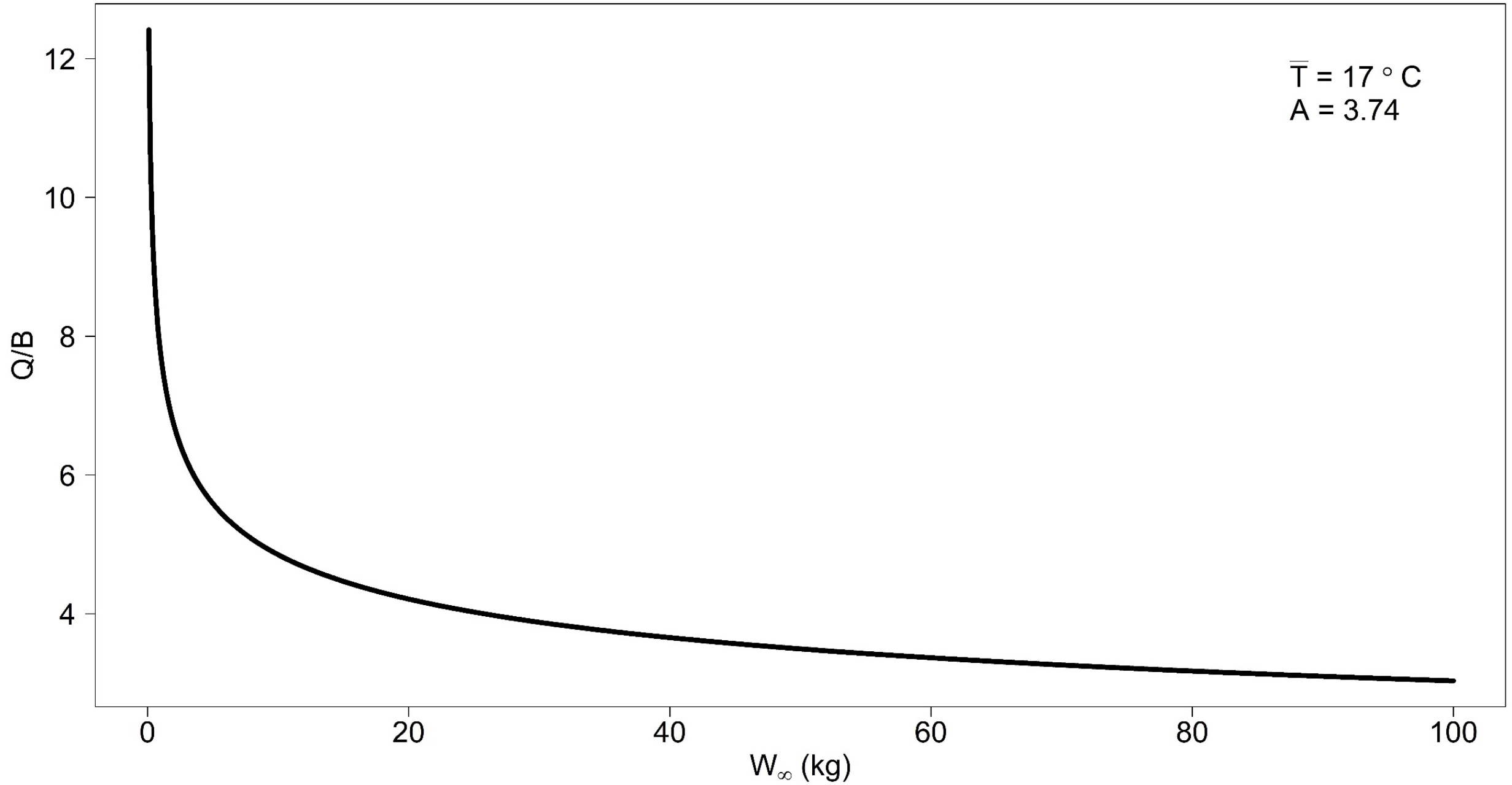
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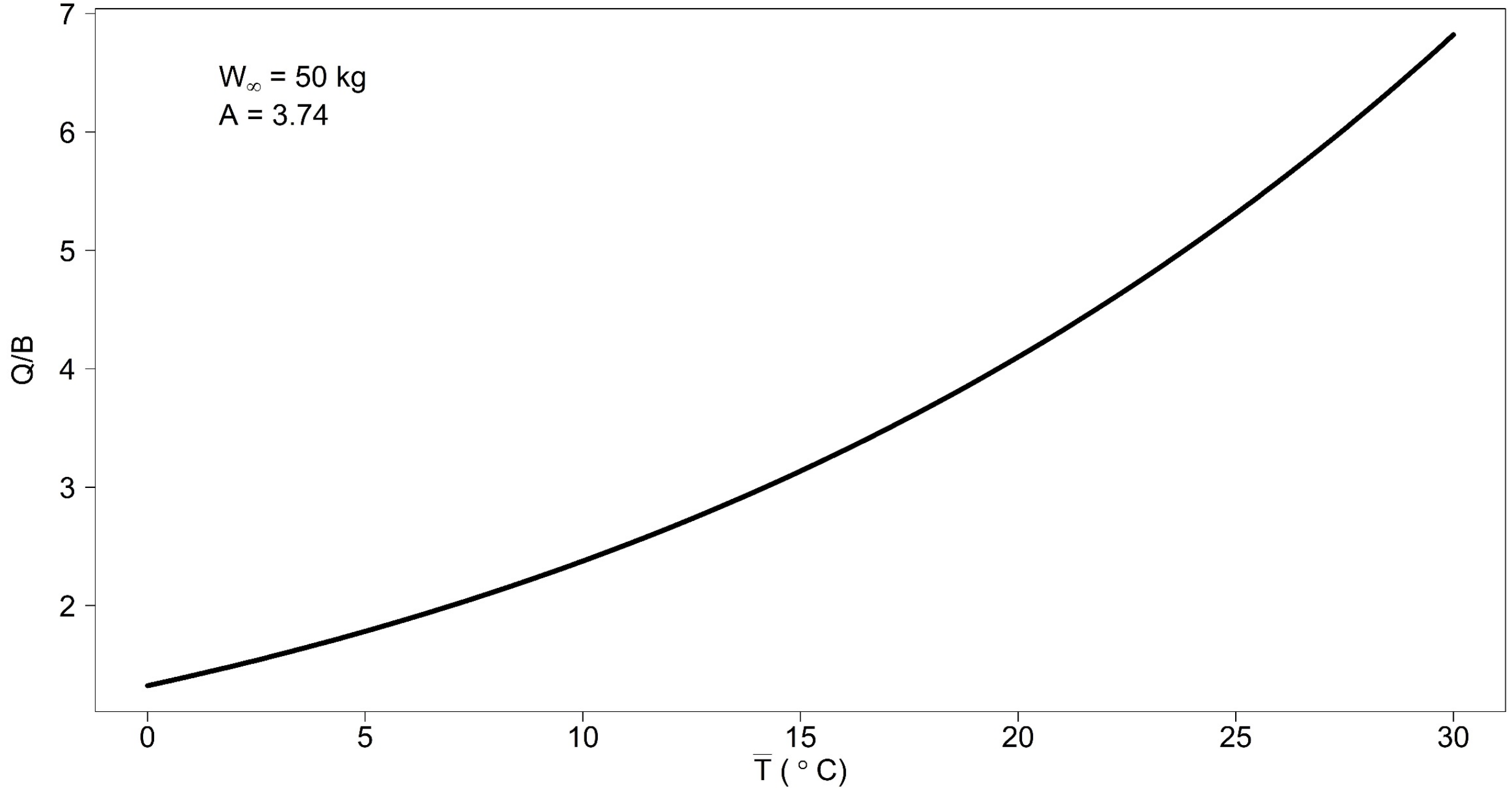
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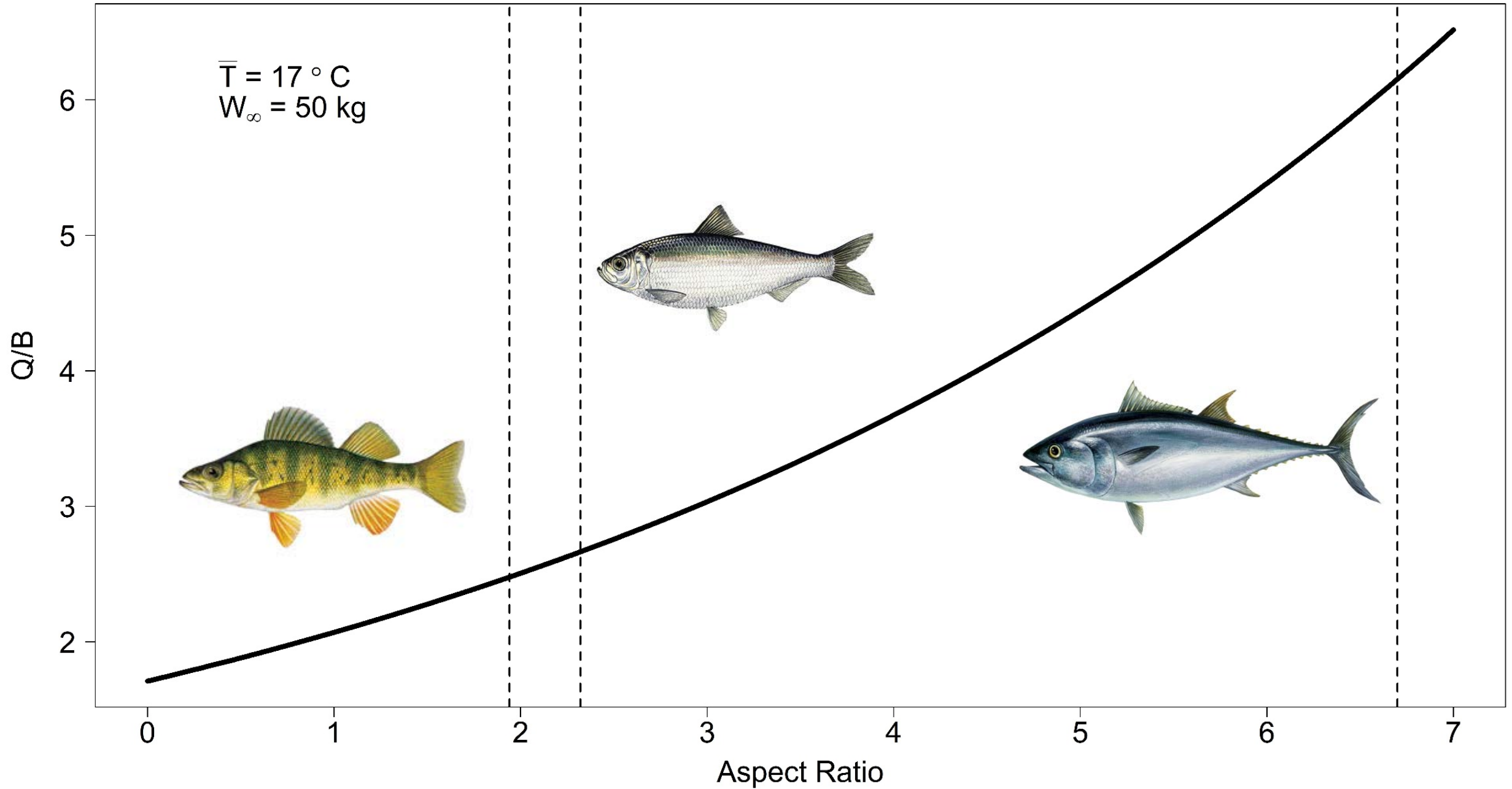


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$W_{\infty} = 50 \text{ kg}$
 $A = 3.74$

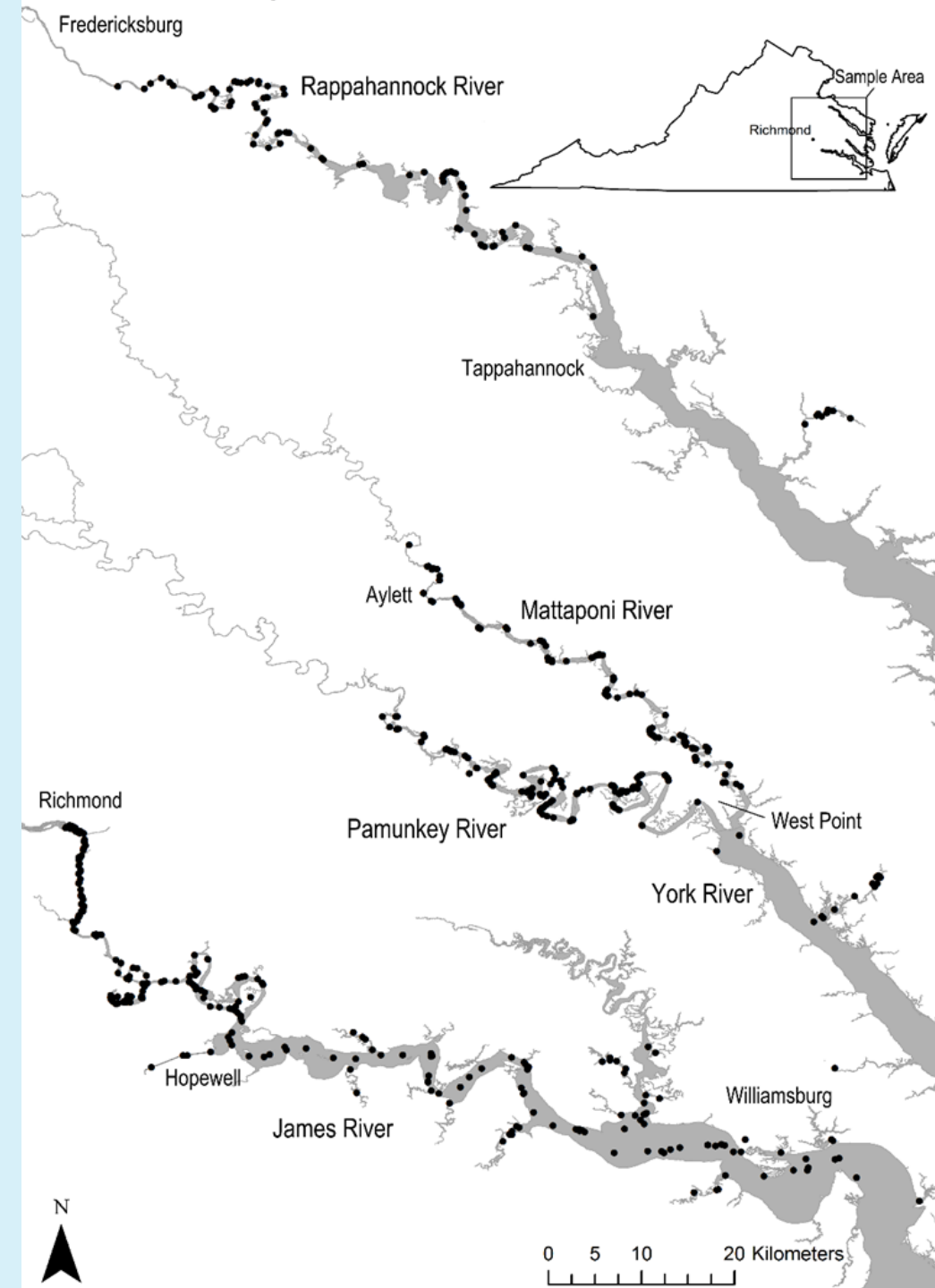


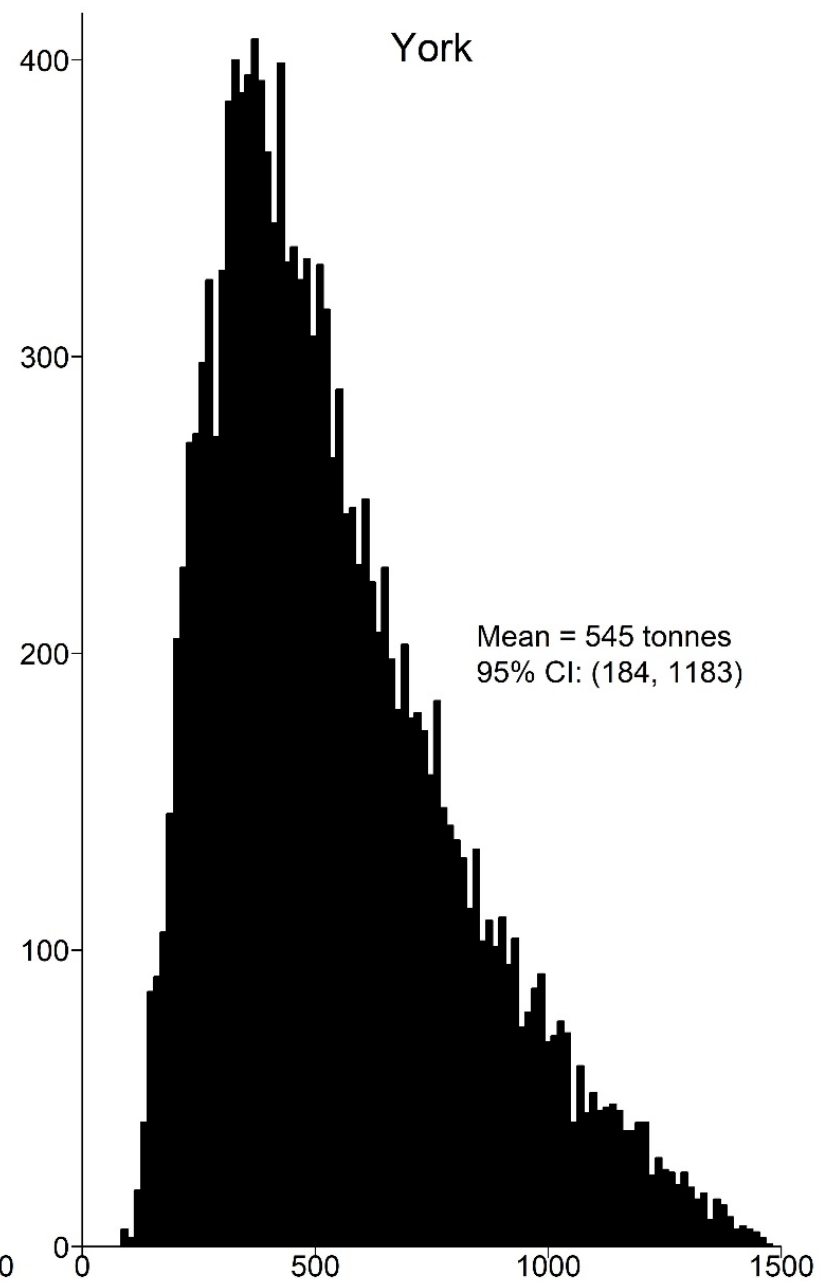
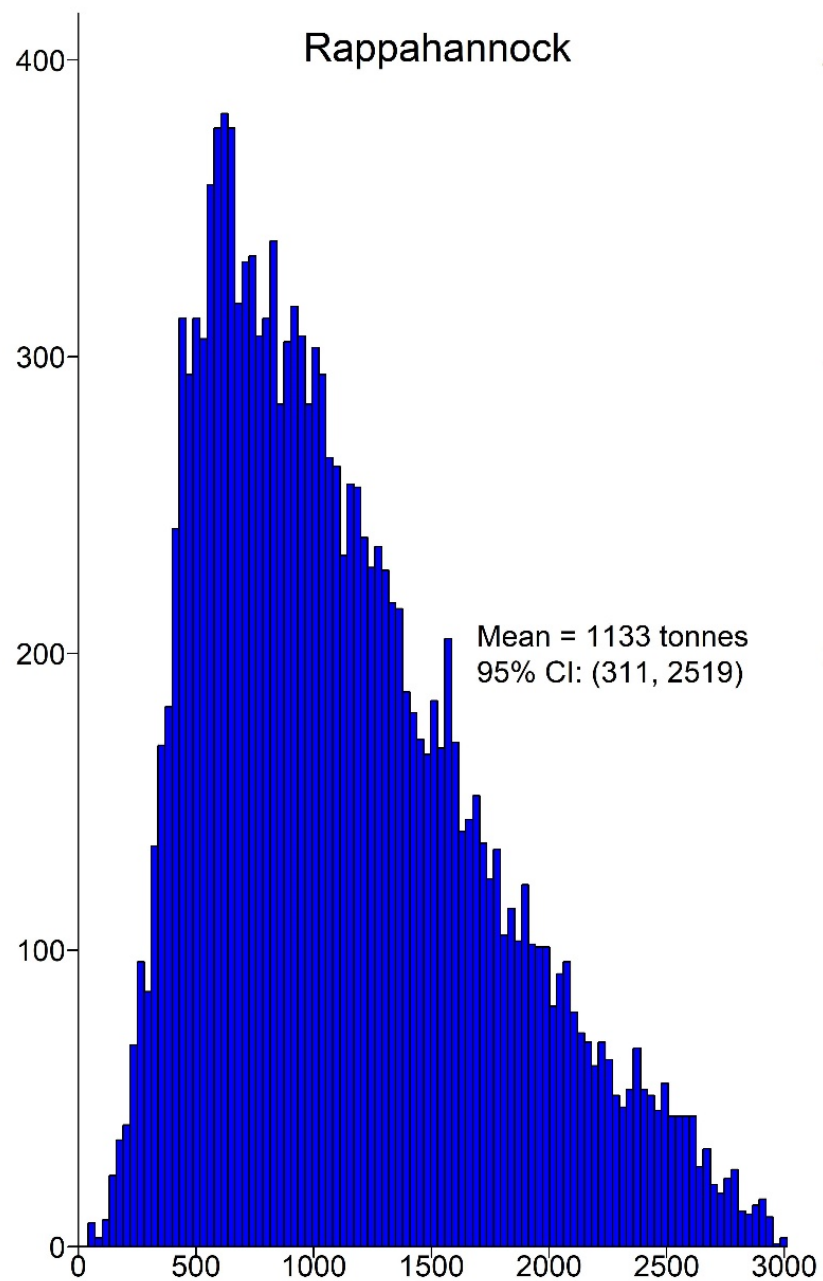
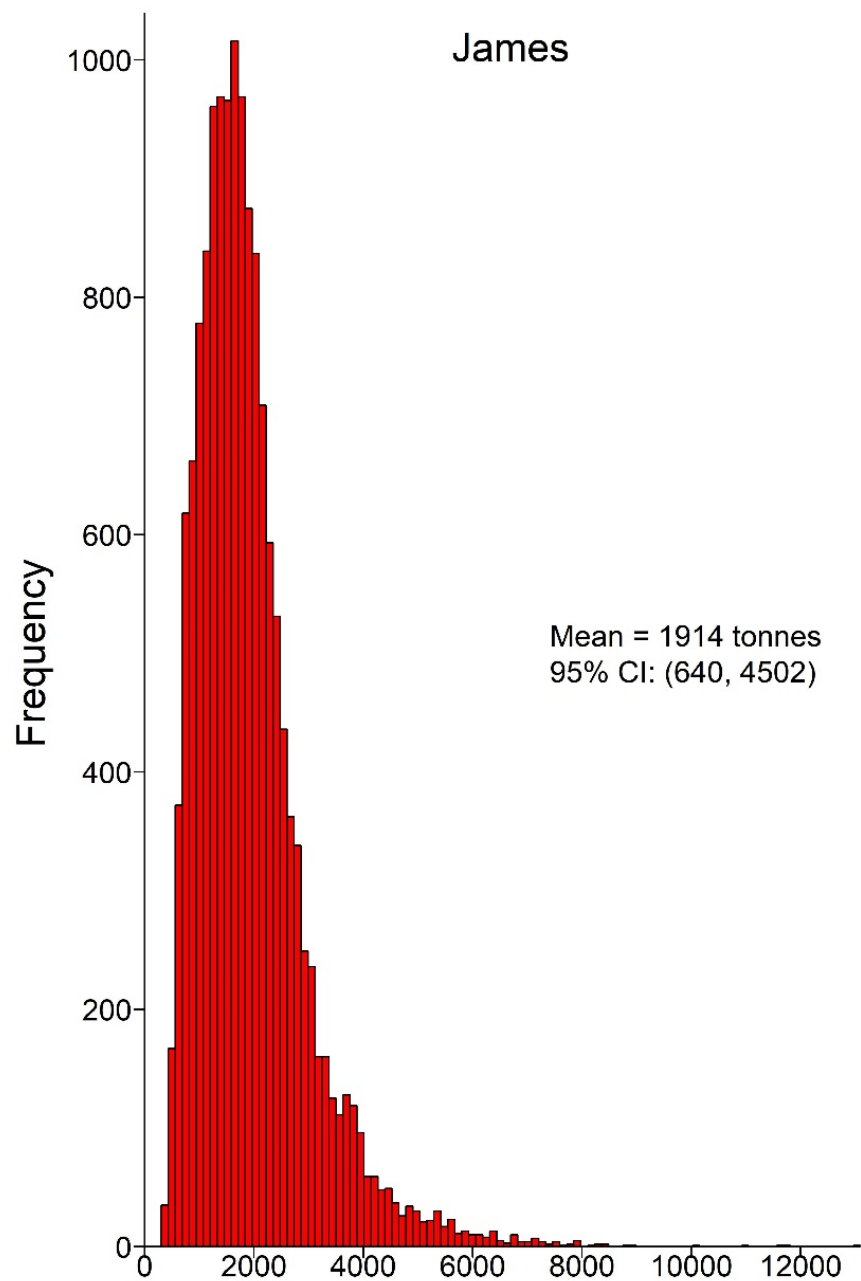
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Food Habits

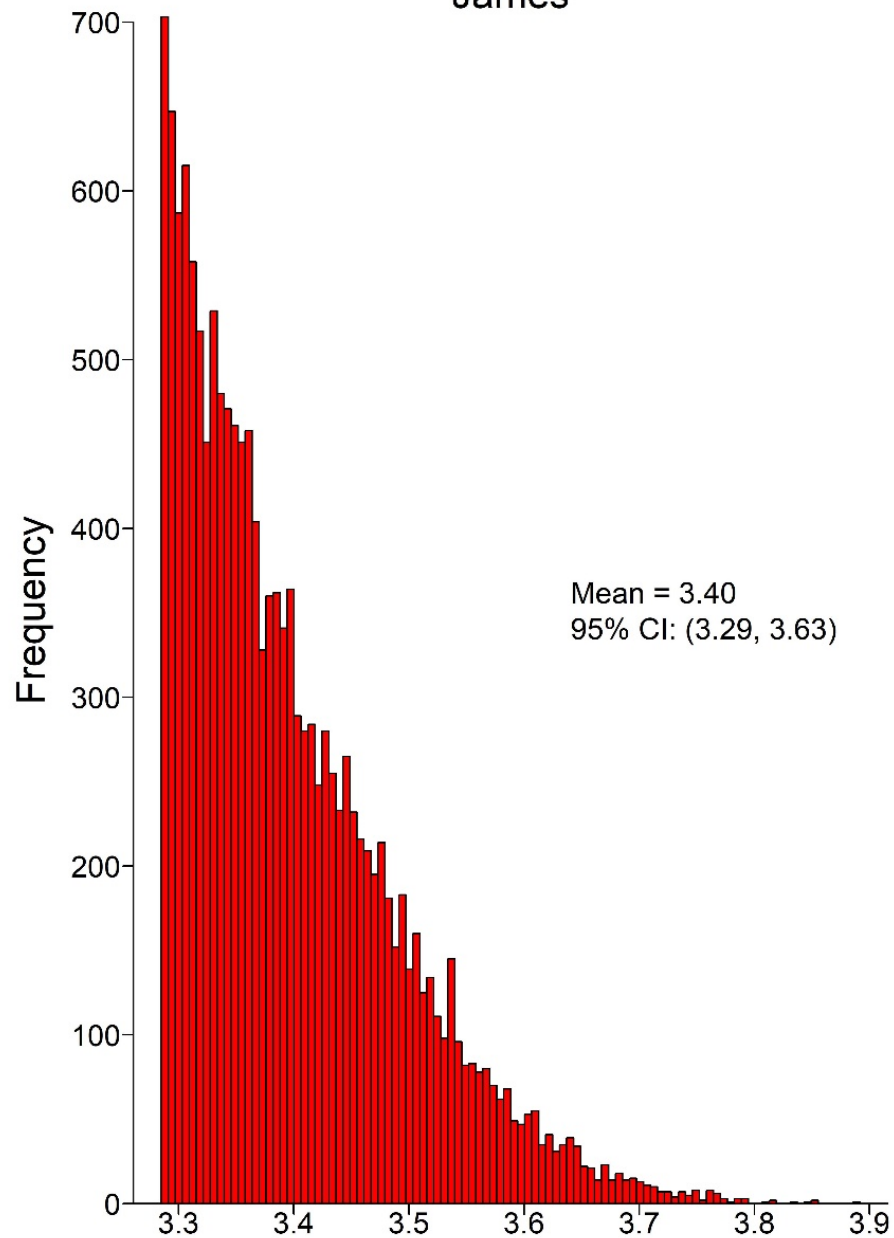
- Boat electrofishing
- Stratified random sampling
- Tidal freshwater – mesohaline
- %W
- Seasonal %W equally weighted
 - James: Every Month
 - Rappahannock: March – October
 - York: March – December
- Generated data from mean and SD



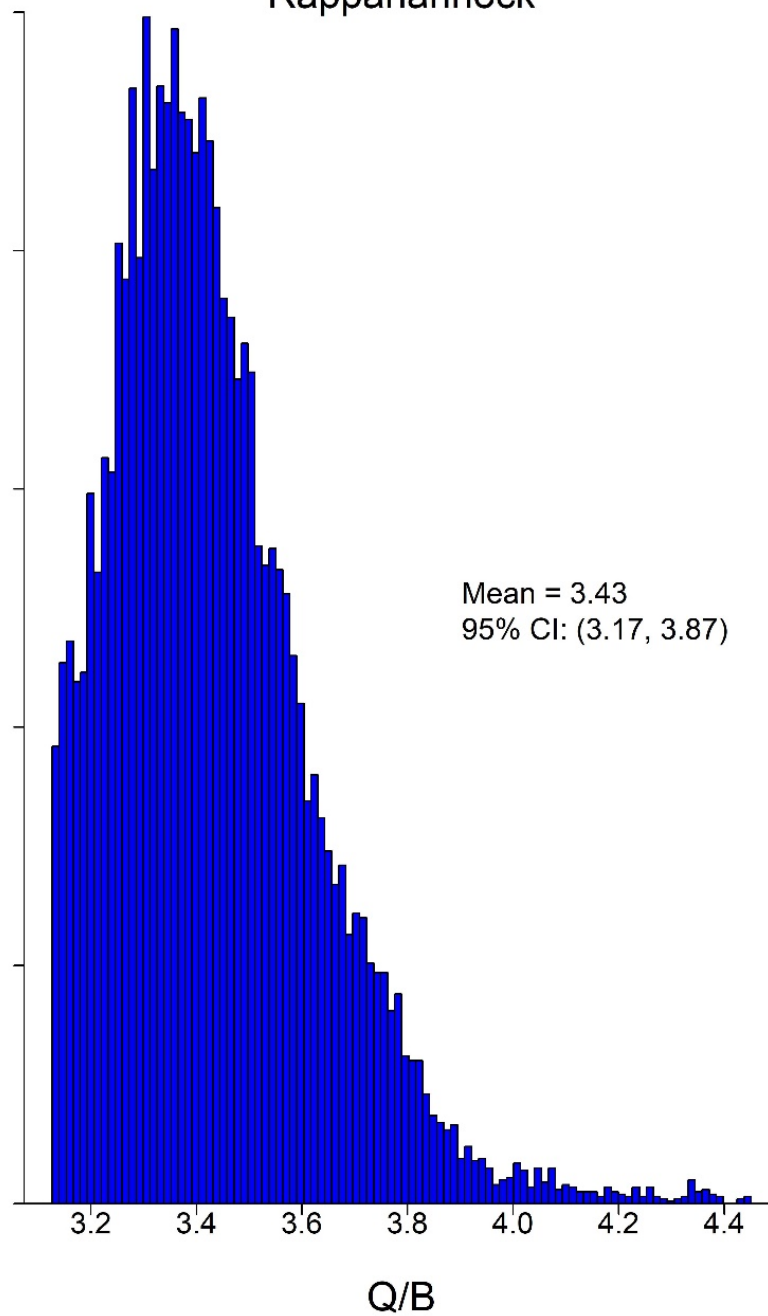


Biomass (tonnes)

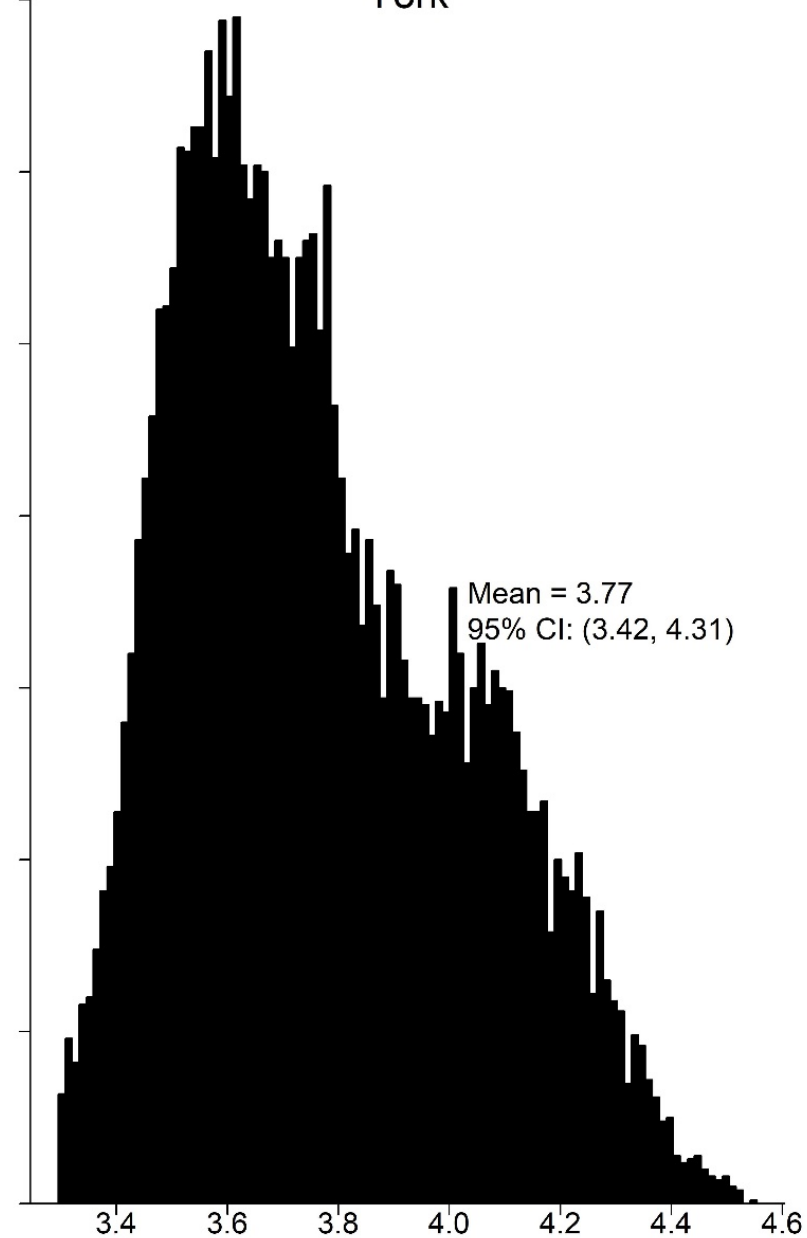
James

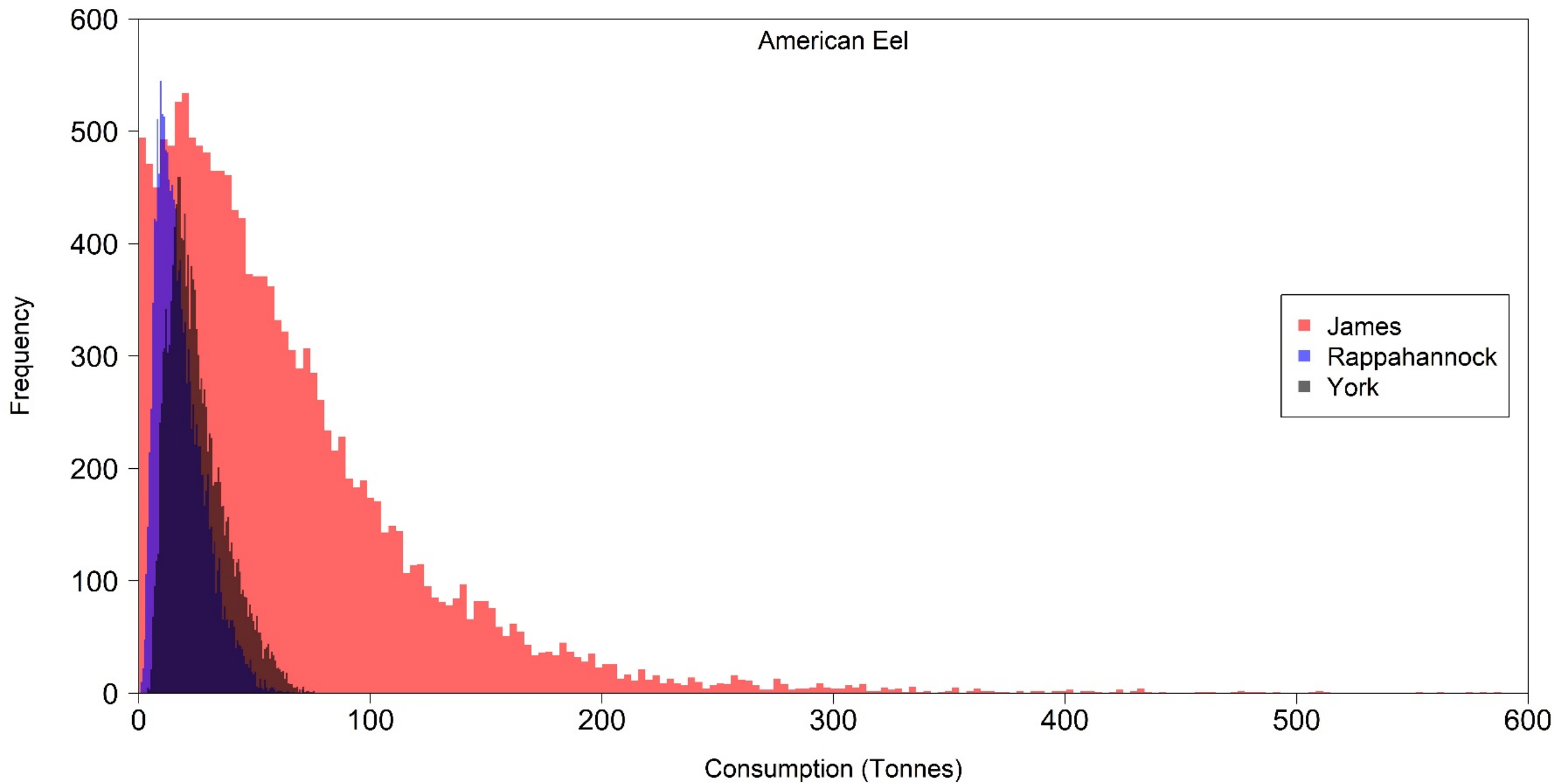


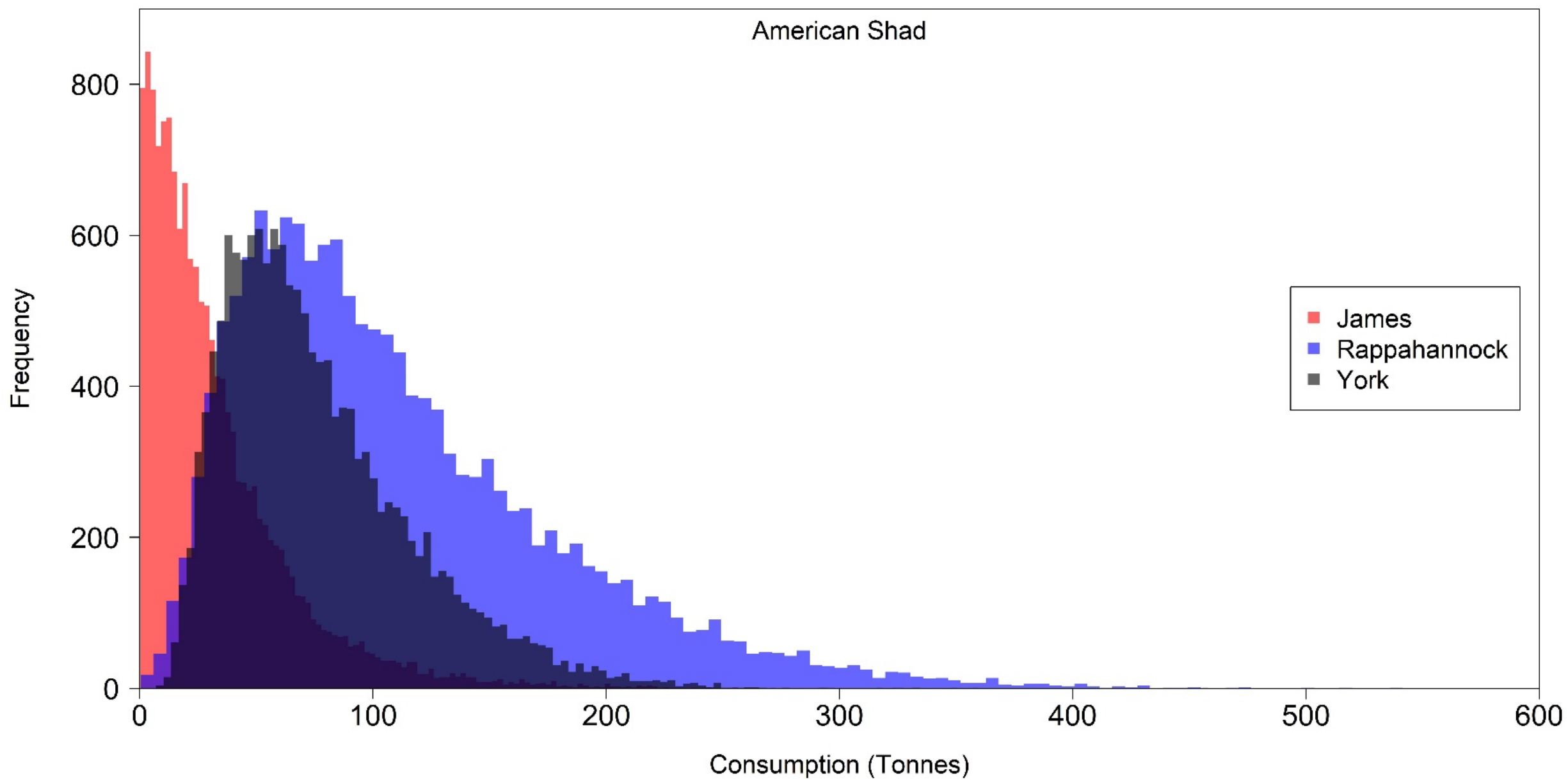
Rappahannock

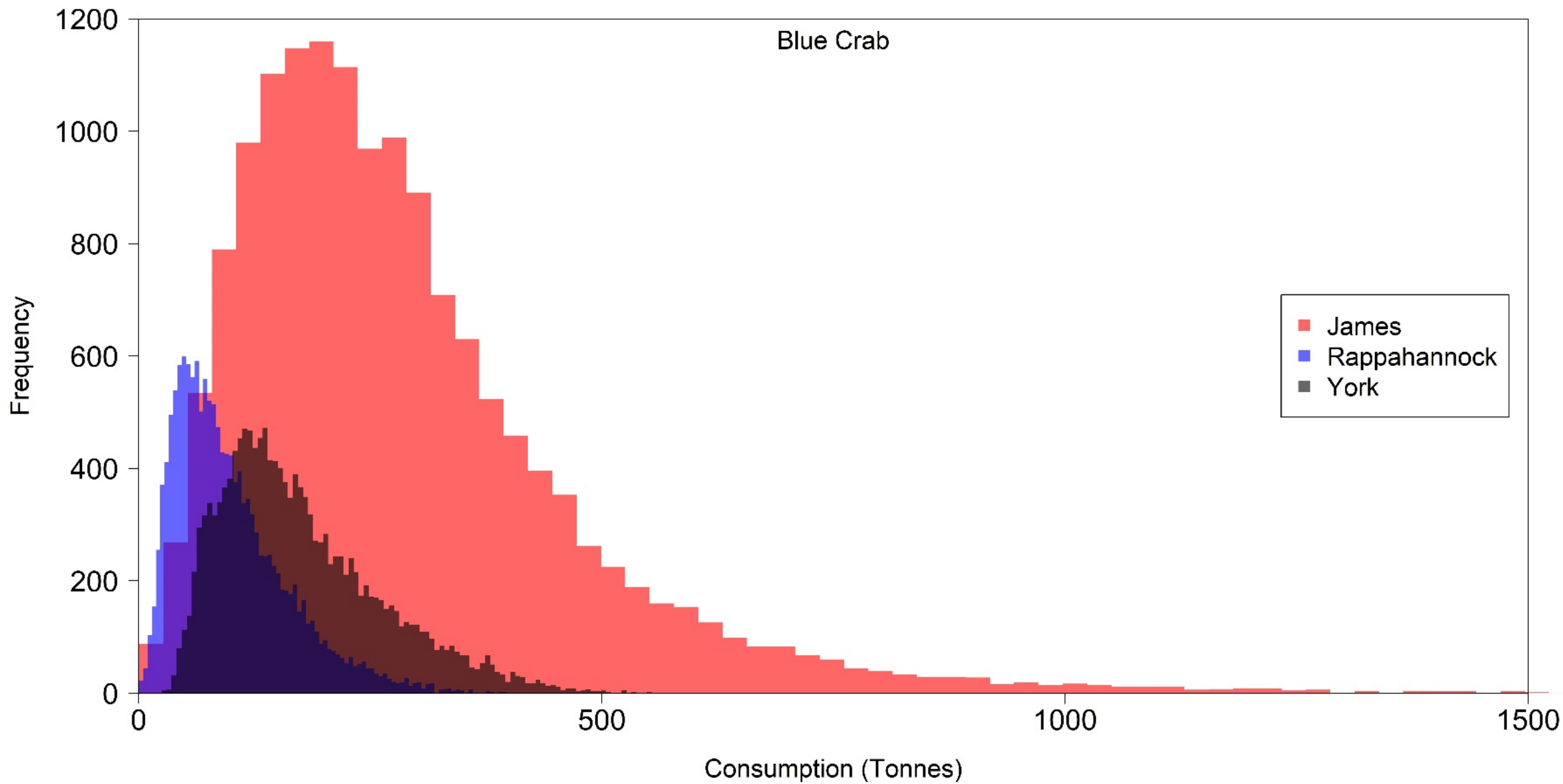


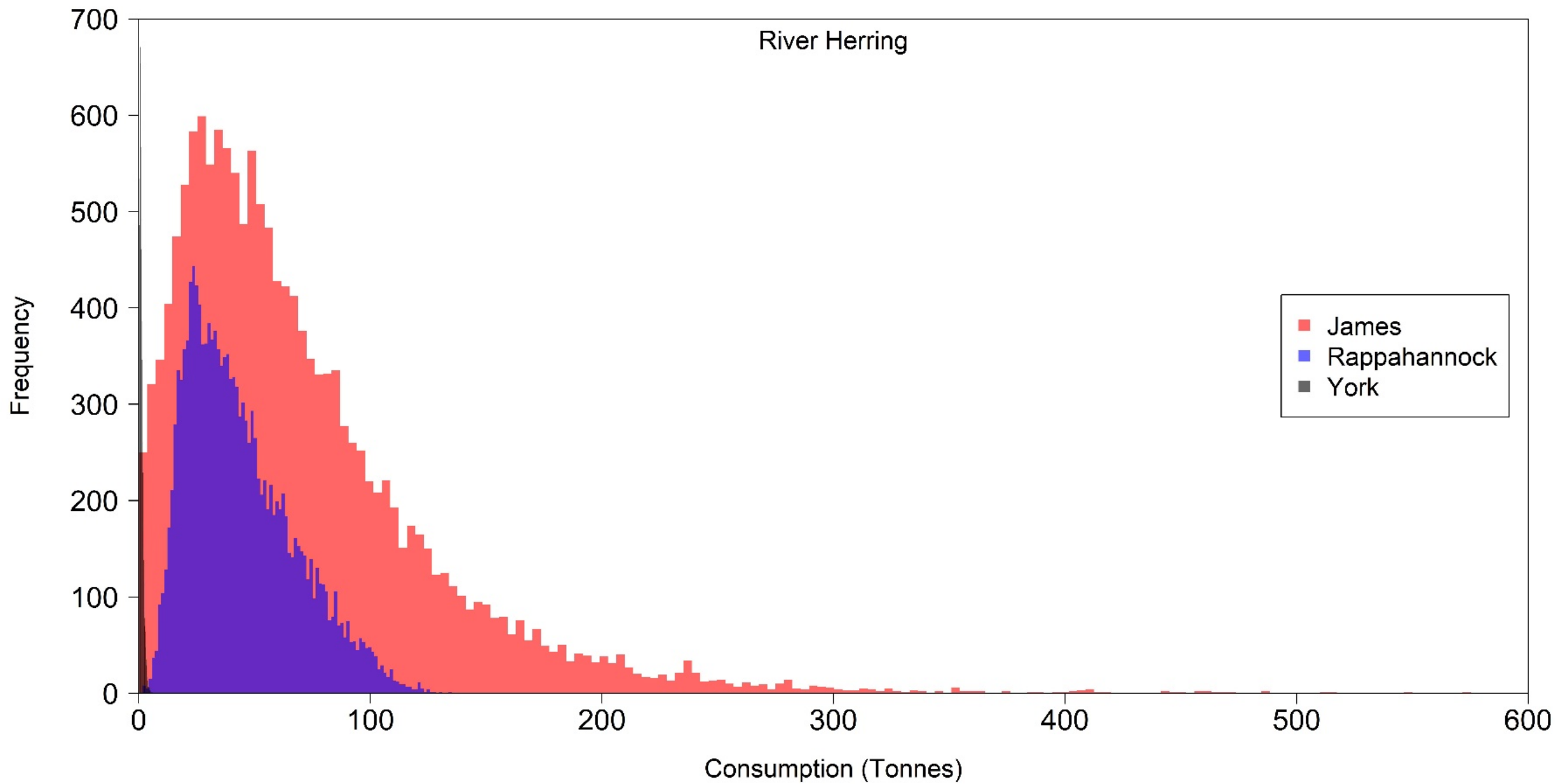
York











Discussion

- Estimates of population-level consumption
- Natural morality for stock assessment
- \uparrow Large Catfish = \uparrow Consumption of at-risk fishes
- Data gaps
 - Winter diets
 - Evaluation of assumptions
- Next steps
 - Expand to additional species
 - Size-structured population model
 - Structured consumption model

