

# Bioenergetics Approach to Estimating Green Sturgeon Consumption



WASHINGTON STATE DEPARTMENT OF  
**Natural Resources**



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## Threatened Green Sturgeon in Willapa Bay

- Wide-ranging anadromous species that enters coastal estuaries during summer months
- In 2015, 700 of 2000 tagged individuals were detected in Willapa Bay
- Subsist largely on burrowing shrimp
- Aquaculture apply pesticides on tide flats to kill burrowing shrimp

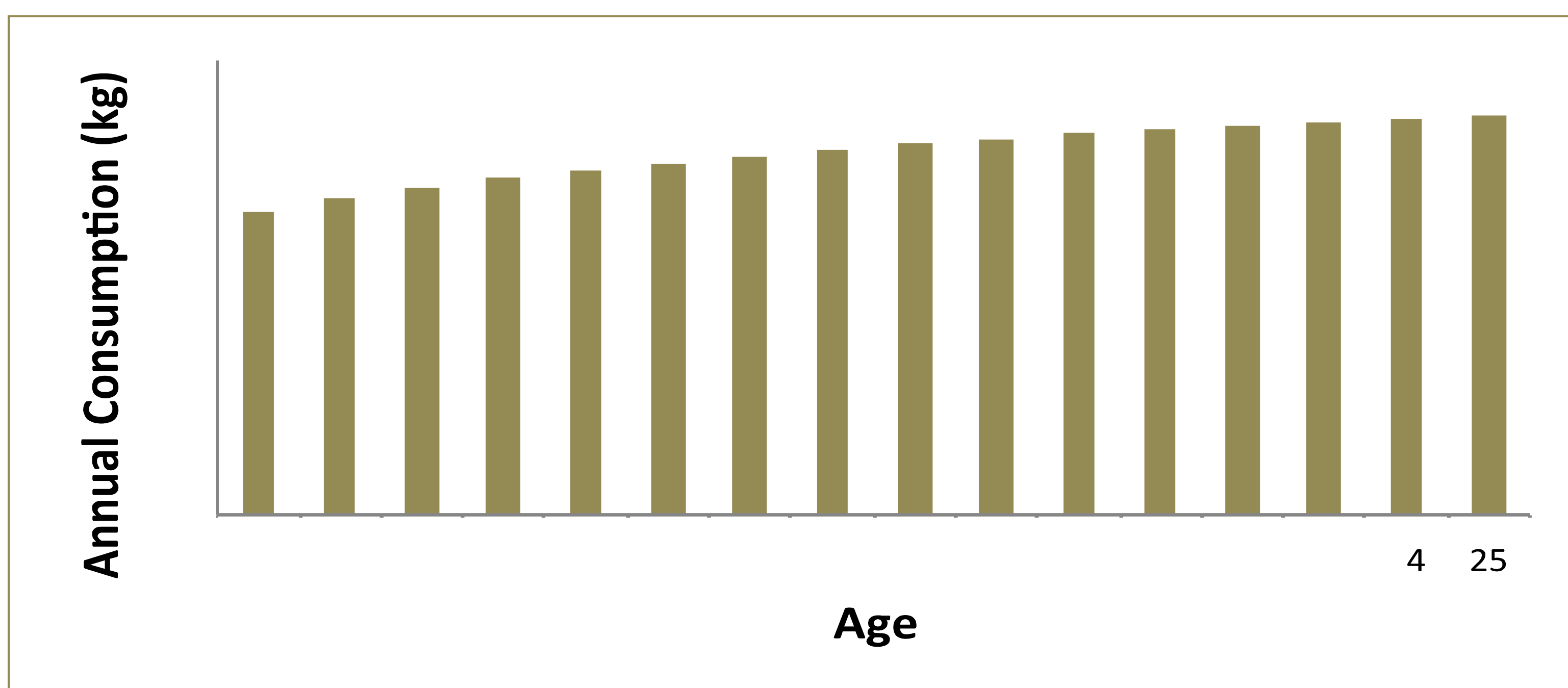


## What is Willapa Bay's Carrying Capacity?

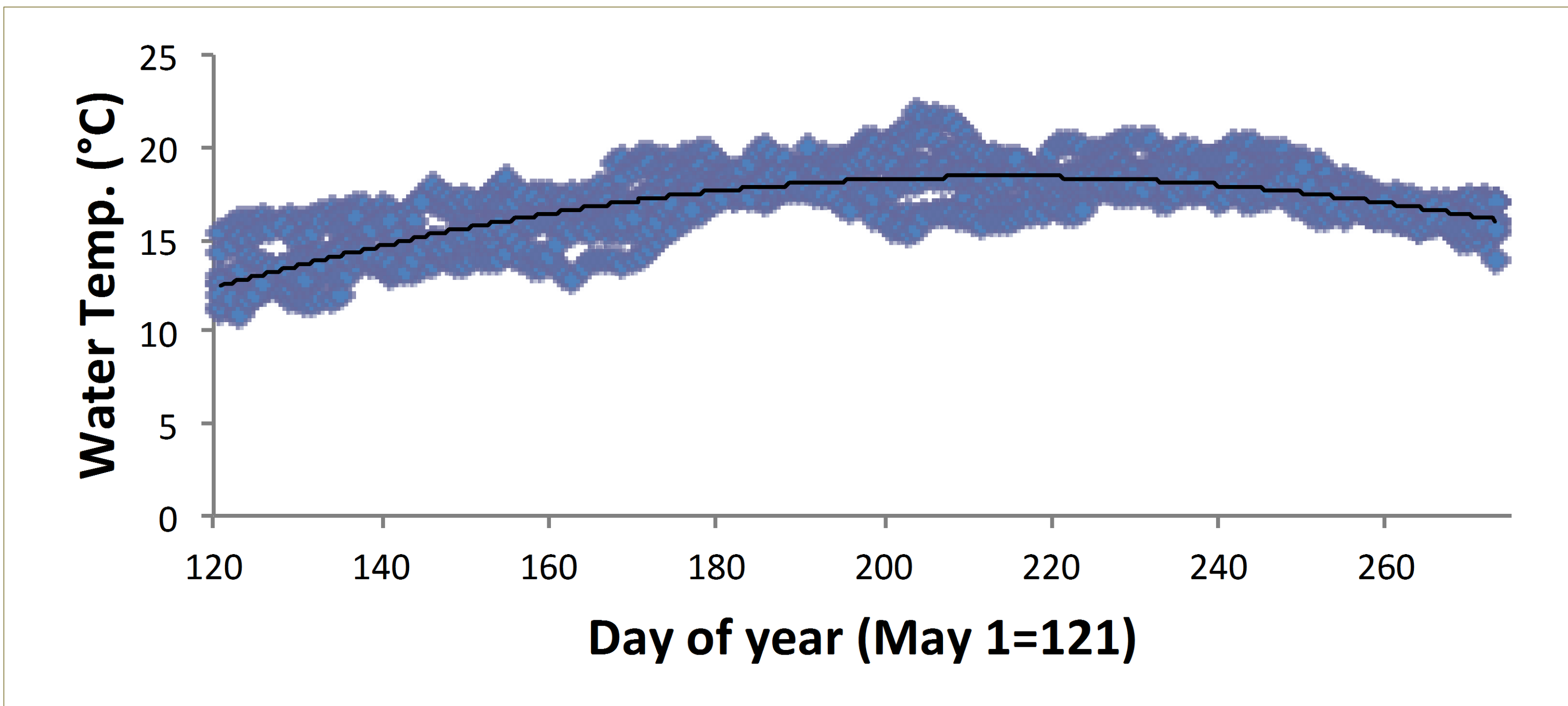
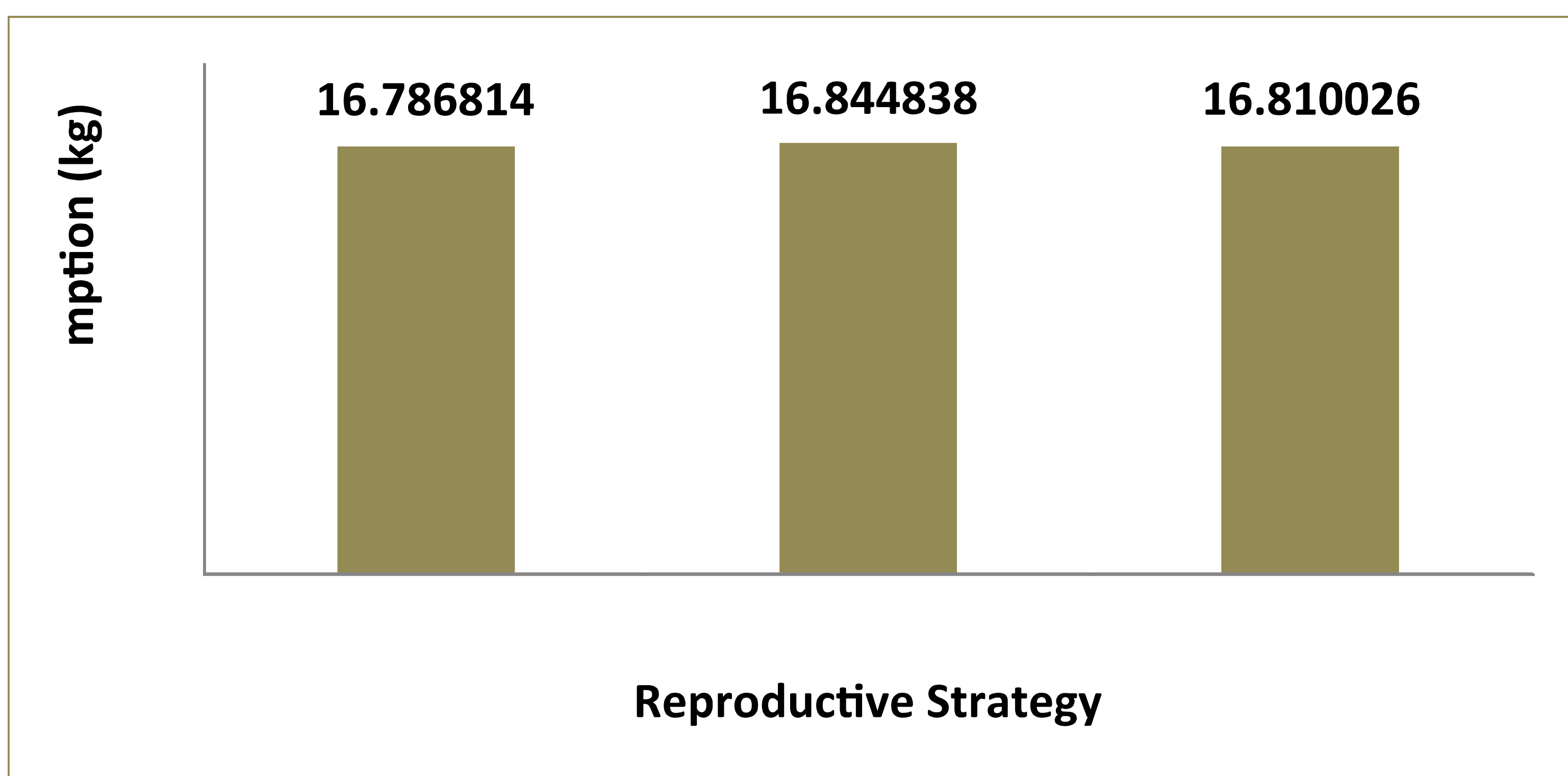
We estimated how many burrowing shrimp a sturgeon eats

- Adapted from white sturgeon model  
 $C = G + R + F + U$
- Bomb calorimetry to get prey energy densities
- Simulated range of ages, reproductive strategies, and residency strategies
- Assumed diet entirely burrowing shrimp and entire annual growth in Willapa Bay

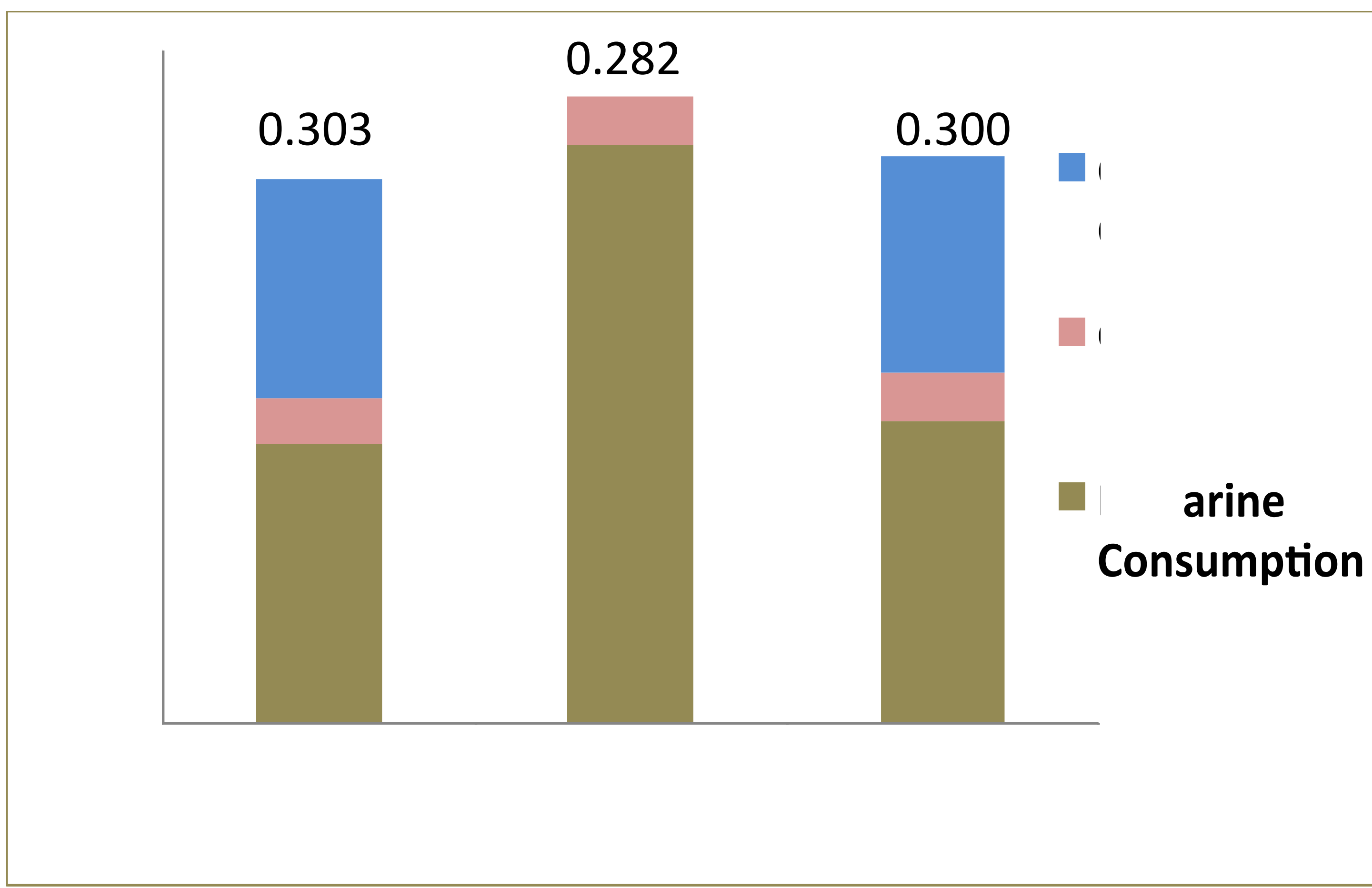
## Sturgeon eat more as they grow



## Consumption is not sensitive to differing reproductive strategies



## Consumption is sensitive to environmental temperature



- Energetically costly to occupy estuaries for long intervals
- Feeding well below maximum consumption to achieve growth
- Efficient to occupy estuaries for short intervals with more intense feeding
- \*Does not factor in prey availability and predation

**Ongoing Research:**  
Exploring likely residency strategies by comparing simulations to real detections!