Energetic status, diet, and size of age-0 Pacific cod during warm and cold climate states in the eastern Bering Sea

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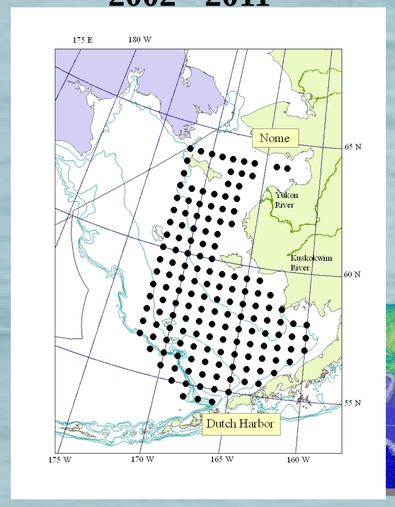
BASIS

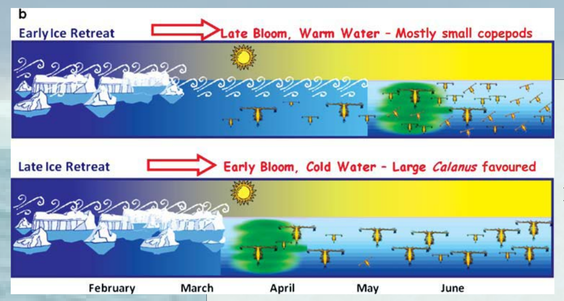
NOAA FISHERIES

Issue: Climate change and variability may impact fitness of age-0 Pacific cod

Survey Area

Stations sampled mid August to early September 2002 - 2011

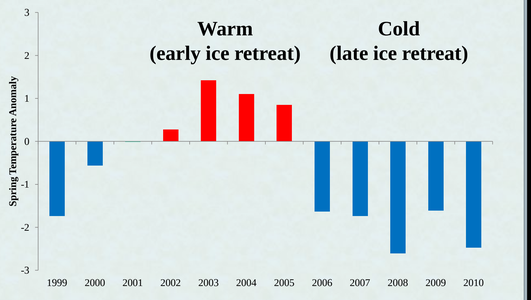




Eastern Bering Sea Shelf Productivity

Revised Oscillating Control Hypothesis; (Hunt et al. 2012)

Bering Sea Spring Temperature Anomaly

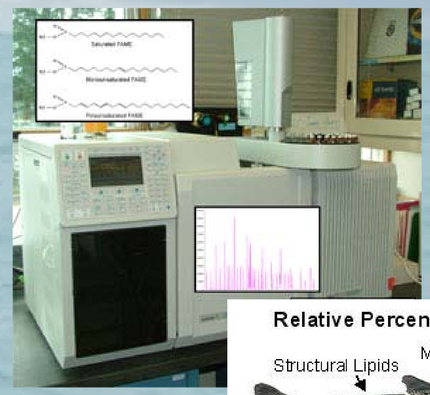


Methods

Fish

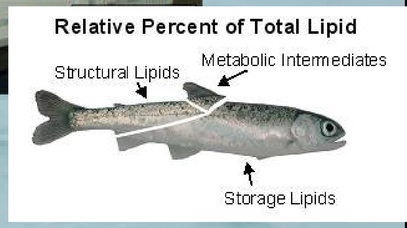
Diet

Laboratory Analyses/Energetics

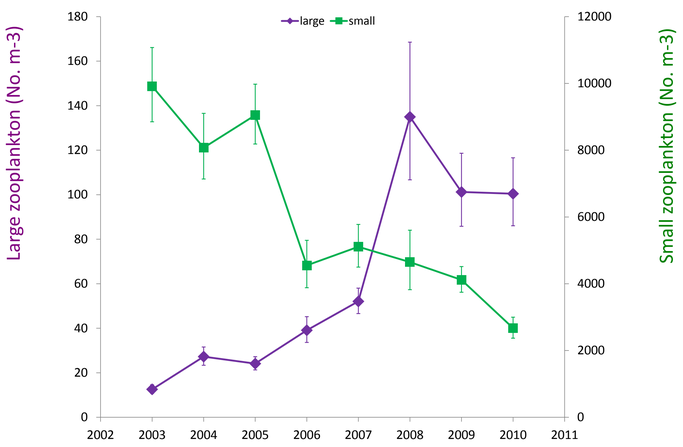


Oceanography

Zooplankton



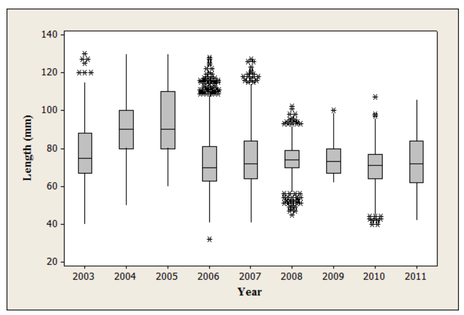
Ecosystem Response

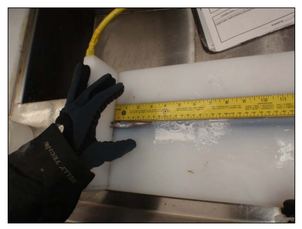


Abundance of large zooplankton increased from 2006 to 2008, while abundance of small zooplankton decreased.

Fish Response

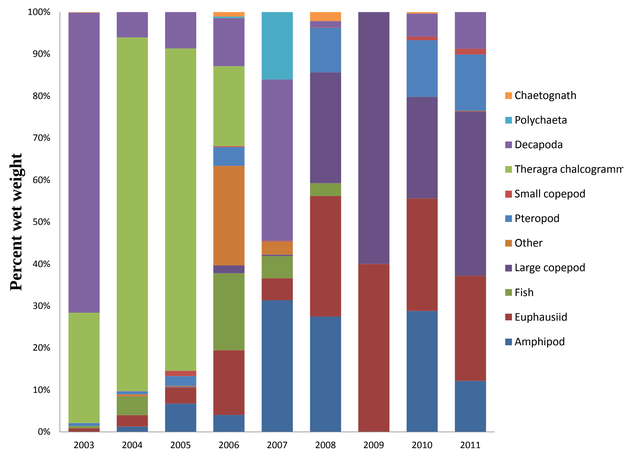
Size





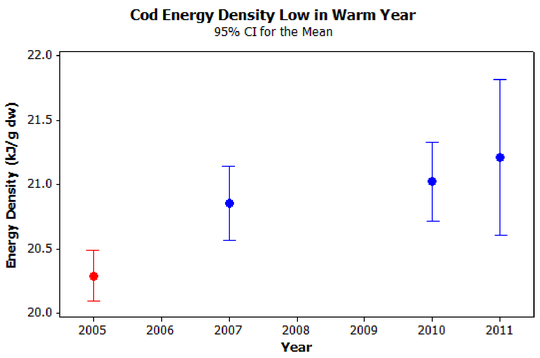
Fish tended to be larger during years with warmer sea temperatures.

Diet



- Age-0 walleye pollock dominated the diets during warm years.
- Gradual shift to large copepods and euphausiids follows similar pattern to Ecosystem Response.

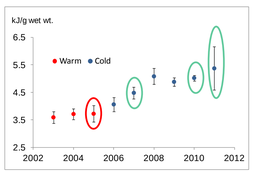
Energy

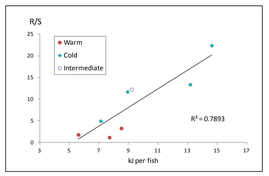


Increase in larger prey is associated with increase in energy for age-0 Pacific cod

The pattern in P. cod energy is similar to age-0 walleye pollock. Also, pollock and P. cod recruitment are correlated.

Note strong relationship between energy and age-1 recruitment for pollock.





Age-0 walleye pollock

Conclusion: Energy content increased with ecosystem shift to large copepods and cooler sea temperatures.

Future: Is energetic status of age-0 Pacific cod related to recruitment?