



TEACHERS AND RESEARCHERS
EXPLORING AND COLLABORATING

Welcome to *PolarConnect*

with Lisa Seff and the Oceanographic
Conditions of Bowhead Whale Habitat
2012 PolarTREC Expedition

Friday 7 September 2012

7:15 a.m. AKDT

(8:15 am PDT, 9:15 am MDT, 10:15 am CDT, 11:15 am EDT)

Blackboard collaborate

Slides will be shown here

Exit the presentation

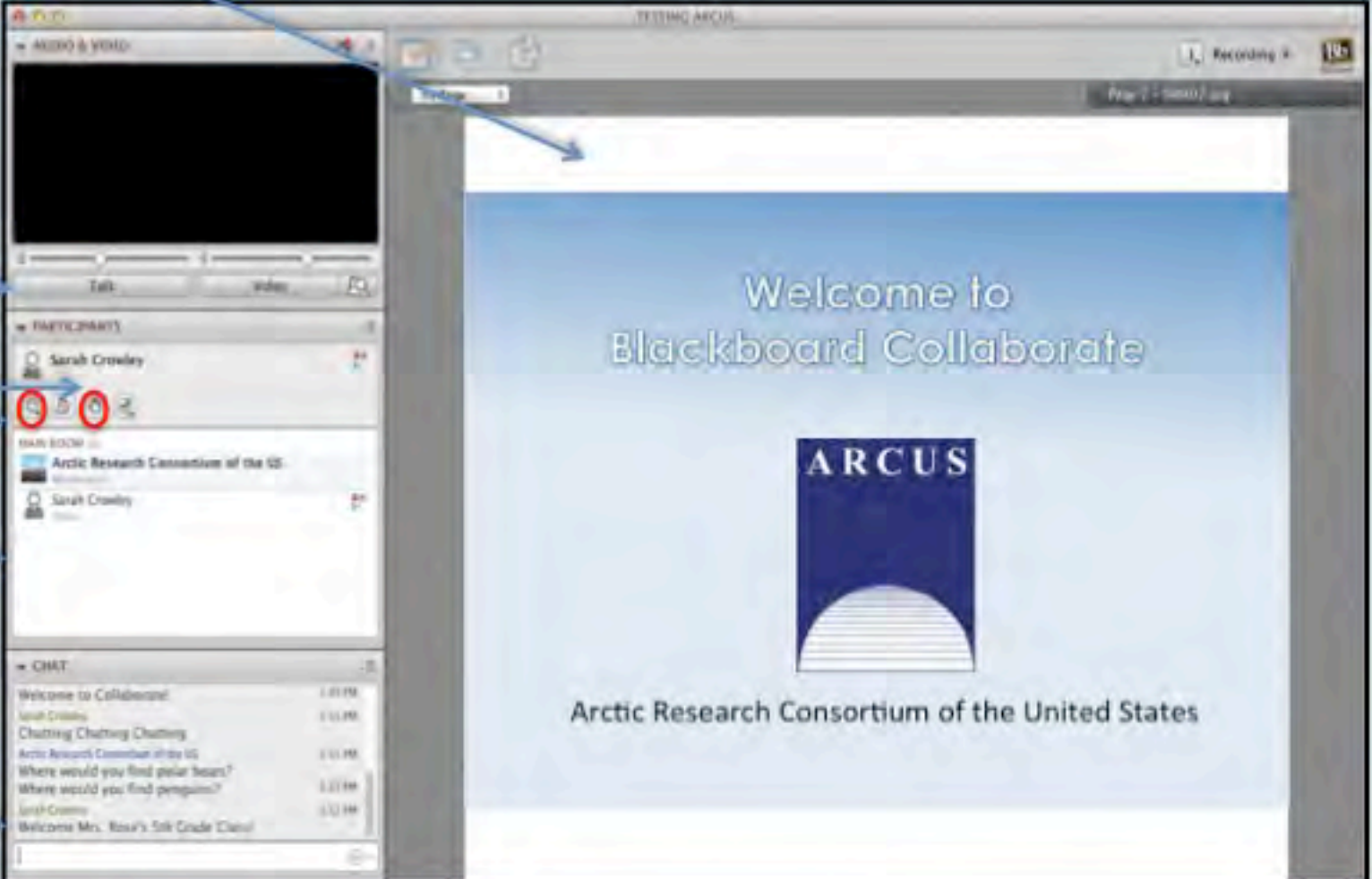
Click to Talk,
Unclick to finish talking

Raise your hand to ask a question

Share with emoticons

List of all participants

Chat with one person or the entire group



The screenshot shows the Blackboard Collaborate interface. The main area displays a presentation slide with the text "Welcome to Blackboard Collaborate" and the ARCUS logo (Arctic Research Consortium of the United States). The left sidebar contains several panels: a "TALK" panel with a microphone icon, a "PARTICIPANTS" panel listing "Sarah Crowley" with a hand icon, a "CHAT ROOM" panel with a list of messages, and a "CHAT" panel with a text input field. Arrows from the text labels on the left point to these specific interface elements.

Please Note:

- Participants using the telephone can mute/unmute by **pressing *6** on the phone.
- Today's event will be recorded and archived.



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Participant Introductions

Please type in the chat box:

- ✓ Name
- ✓ Affiliation (School, Institution, Etc.)
- ✓ The number of students and adults participating with you in the same location



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What is PolarTREC?

PolarTREC is a professional development experience in which K-12 teachers are paired with researchers for 2-6 week research experiences in the polar regions.

From 2010-2013, nearly 50 teachers from around the United States will join scientists in the Arctic and Antarctica to learn about science, the polar regions, and to share what they have learned with their students and communities.



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Questions

During the Presentation:

- Type your question in the text chat box

At the End of the Presentation:

- Raise your hand with the “hand button”.
- PolarTREC staff will call on you.
- Speak loud and clear and directly into the phone to ask your question.

Click on the Talk button to speak.

Unclick when you are done.

Oceanographic Conditions of the Bowhead Whale Habitat



Phil Alatalo



Dr. Carin Ashjian



Lisa Seff
PolarTREC Educator



Dr. Steve Okkonen



Dr. Bob Campbell



UIC-NARL Barrow Alaska

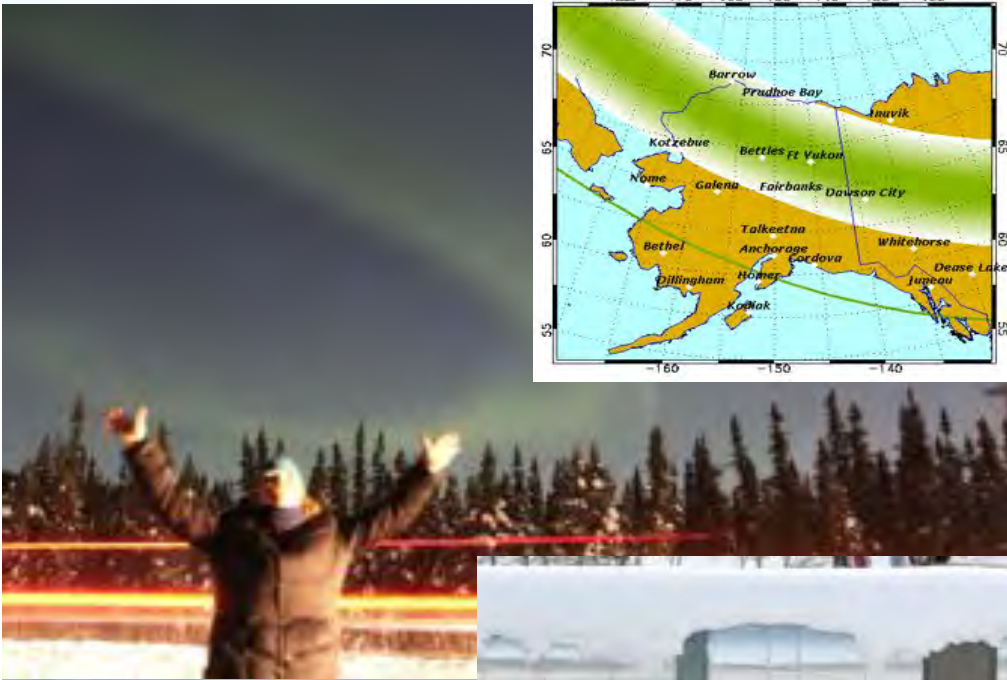
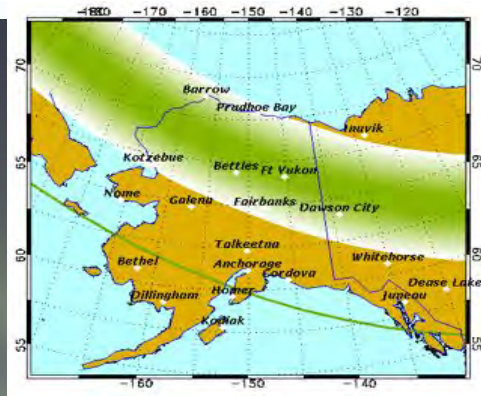


Springs School, East Hampton New York

71°17' 44" N
156°45' 59" W



40.9638° N,
72.1853° W



PolarTREC Orientation, Fairbanks





Euphausiids (Krill) are a type of zooplankton.



zooplankton=
animals that wander
freely with ocean
currents

zoo=animals and
plankton= wanderers



Arctic Ocean Ecosystem Professional Development May 2012, Barrow



BE ALERT for Polar Bears

Fall
Timing the fall hunt starts with the pack on its annual move on the North Slope of Alaska. Bears may be attracted to concentrations of walrus or bison or they may be hunting along coastal strips or river flows. These are potential family groups and include bears.

Winter
Warmer months find bears roaming long distances over the pack (up to 1000 miles). Bears may visit villages, hunting sites, or industrial areas during their travels. Daylight is diminished and bears have better the ability to hunt. Program bears being.

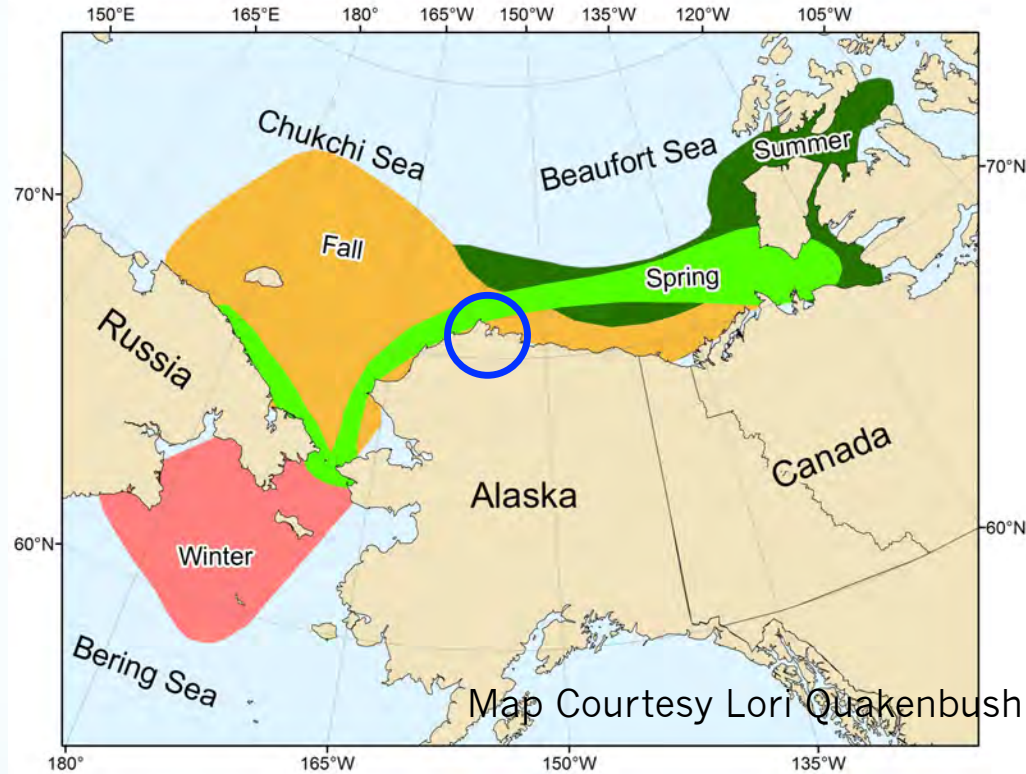
Spring
Bears begin the slow-but no-wait to season of pupping and denning. Some will even take average bear size and feed on the abundant food source. Many bear denning sites along the coast, particularly in hilly areas where bears are abundant in numbers.

Summer
Most denning with the increasing pack size (up to 1000) in summer. Each and every denning site is at risk for the increasing number of bears on land. Increased bears may threaten to feed on different prey species, including fish, as they compete for limited resources. Bears are more likely to include garbage in the diet.

Wildlife Report
Polar bears are a protected species under the Endangered Species Act. It is illegal to kill, harm, or harass a polar bear. If you see a polar bear, please report it to the Alaska Department of Fish and Game. For more information, visit www.adfg.state.ak.us.



Bowhead Whale Migration



- Bowhead whales spend the winter in the Bering Sea and the summer in the Canadian Arctic and migrate between the two regions during spring and fall
- During their migrations, bowhead whales pass by and often linger near coastal Alaskan villages
- These villages rely on subsistence hunting of the whales for food and have done so for centuries
- Whaling is an important part of Iñupiat culture

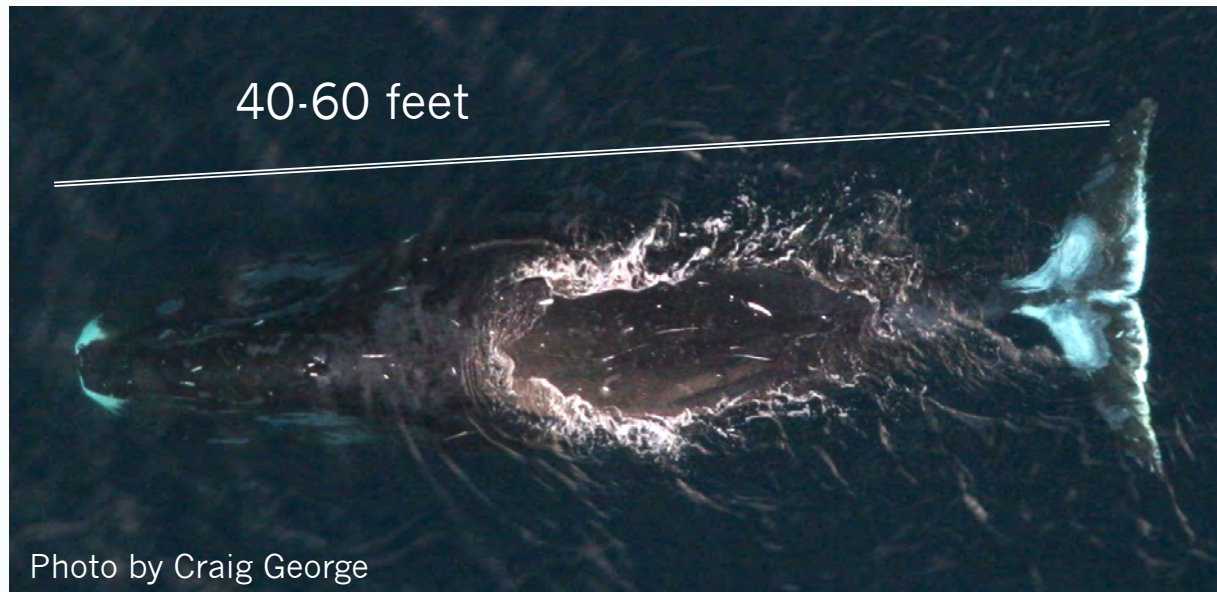
We have been working in Barrow since 2005. This is our eighth year of fieldwork.

Research Goals

- Why do bowhead whales stop at Barrow during their migrations?
 - Hypothesis: Bowhead whales stop at Barrow in fall because of dense patches of their prey that form there, such as krill.
- What oceanographic conditions form these patches?
- How do the ocean conditions, and amount of whale prey, vary inter-annually?
- How might climate variability change this?

What do whales eat?

Bowhead Whale



Bowhead Prey

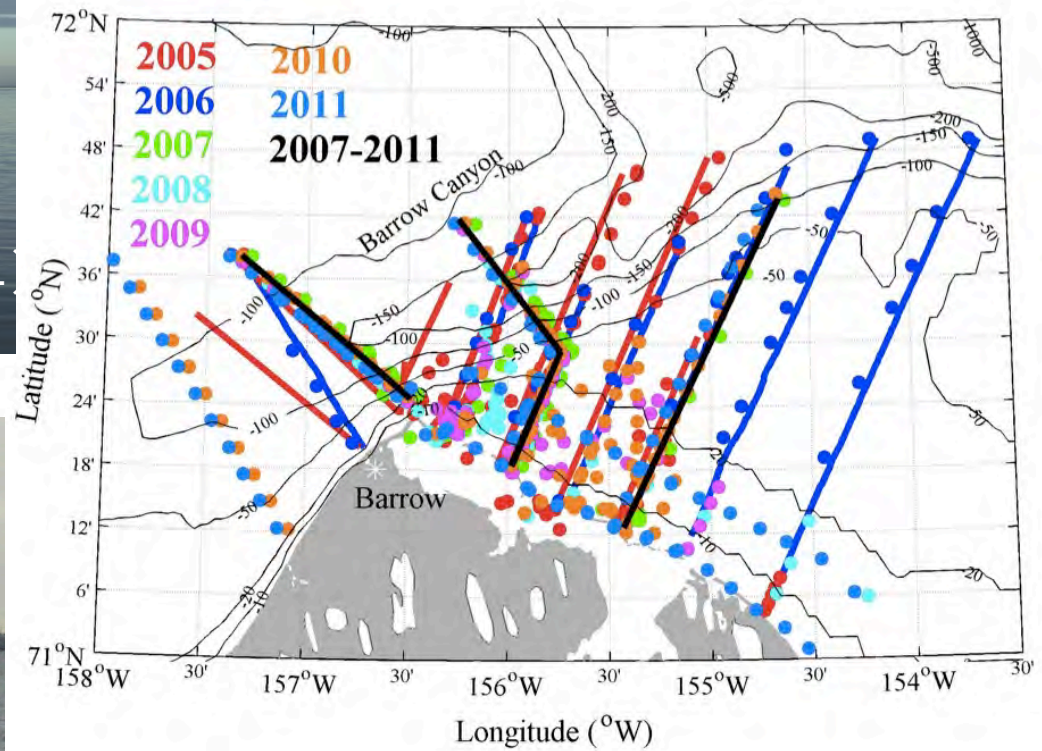


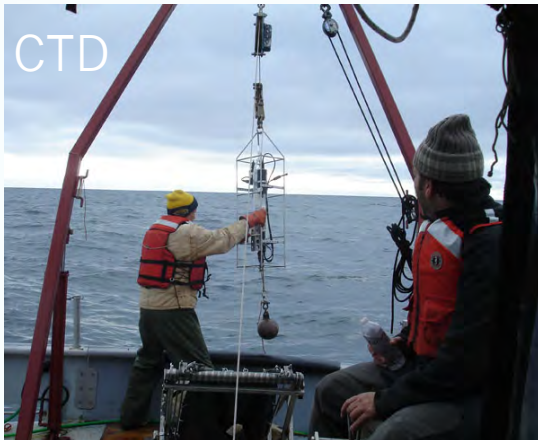
Euphausiids or Krill



Copepods

How are we doing this?





How and what are we sampling

- CTD- Temperature, salinity, pressure, fluorescence (chlorophyll)
- Niskin Bottles - water for chlorophyll, nutrient, and microzooplankton samples
- Acoustic Doppler current profiler - Velocity and acoustic backscatter (not shown)
- Tucker Trawl – Zooplankton (whale prey)
- Ring Net – Zooplankton (whale prey)



Niskin Bottle

Processing Plankton Sample



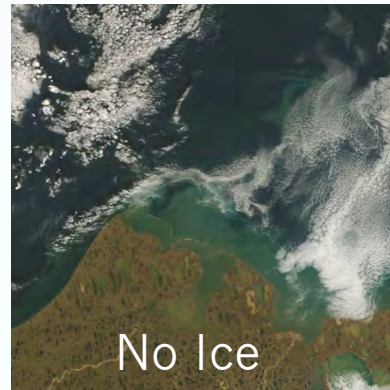
August 14, 2005



August 23, 2006



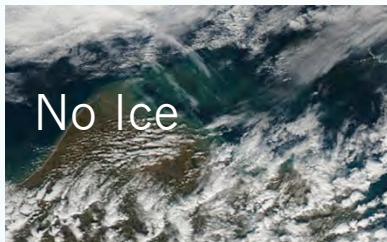
August 23, 2007



August 23, 2008



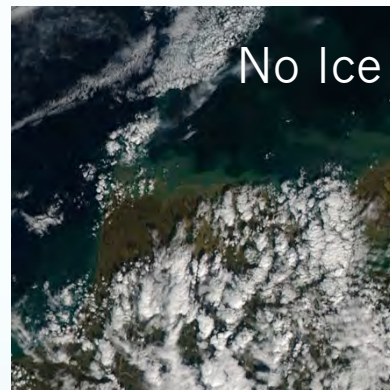
August 19, 2009



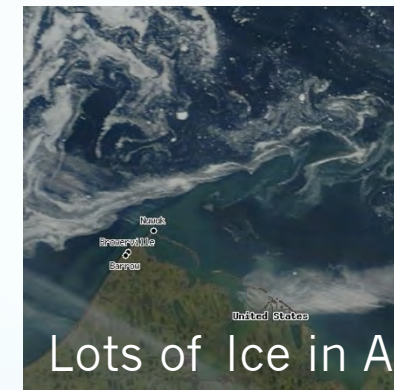
August 24, 2010



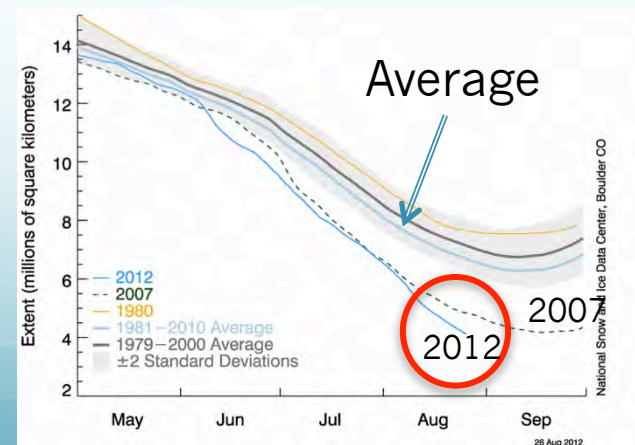
August 6, 2011



August 12, 2012



Example of Interannual Differences- Ice Cover



Prudhoe Bay, Alaska!

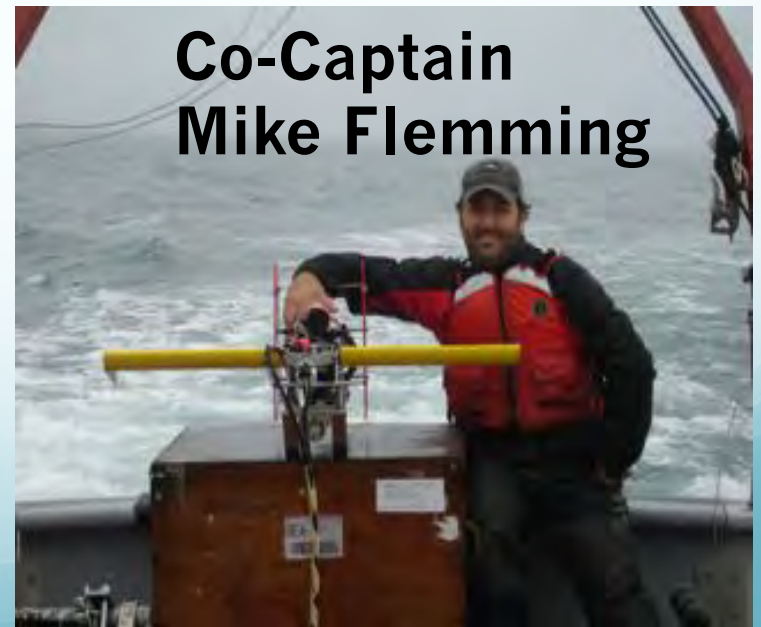


Trans-Alaskan Pipeline



**Captain Bill
Kopplin**

The R/V Ukpik!



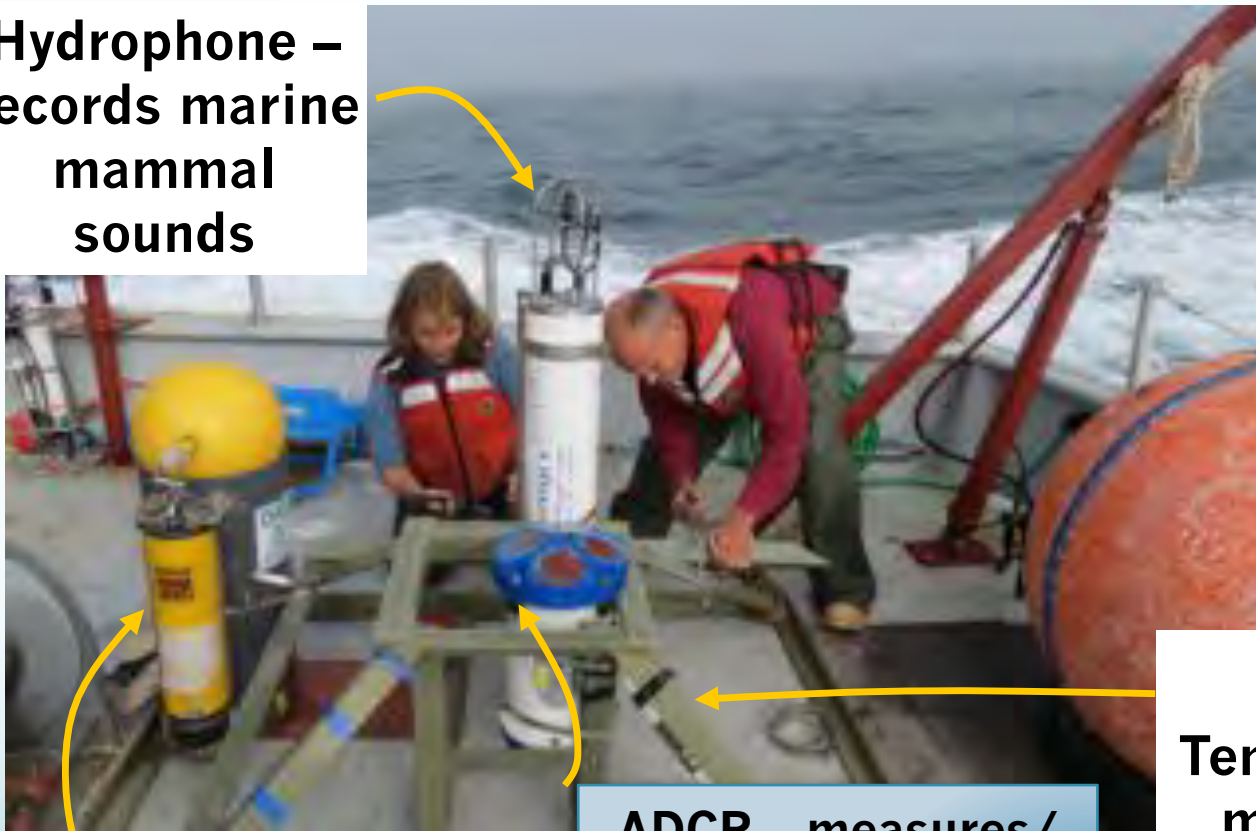
**Co-Captain
Mike Flemming**



On the cruise from Prudhoe Bay to Barrow we deployed a shallow- water, short-term mooring.

Oceanographic moorings measure and record ‘weather’ in the ocean

**Hydrophone –
records marine
mammal
sounds**



**Acoustic release and
buoy – mooring
recovery equipment**

**ADCP – measures/
records ocean
current speed and
direction**

**Conductivity
Temperature sensor –
measures/records
ocean salinity and
temperature**

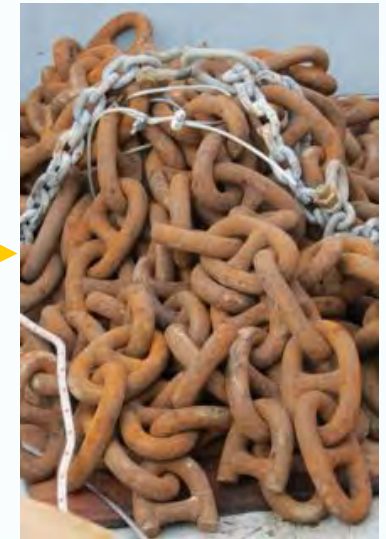
Saturday September 3rd we deployed a deep-water, year-round mooring

Building the mooring



buoy

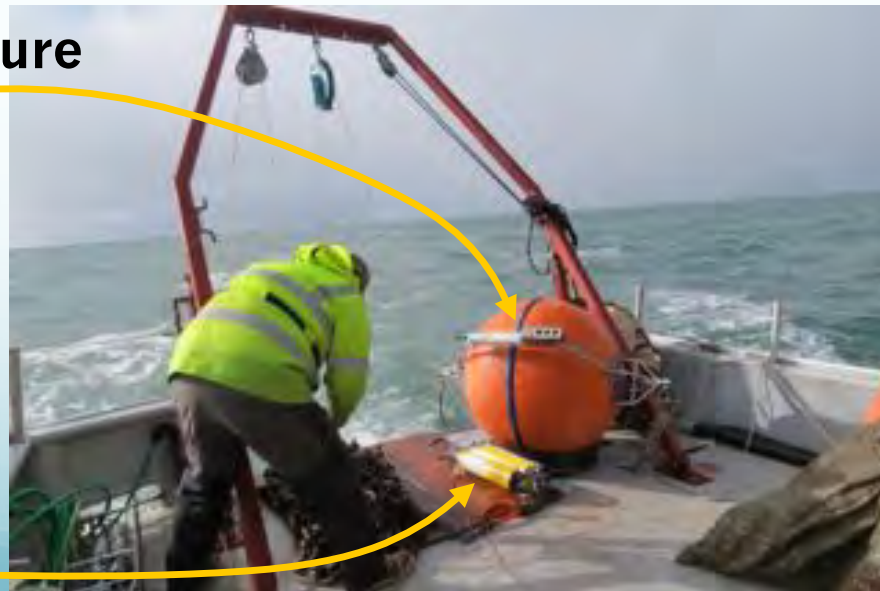
ADCP



Chain anchor

Conductivity temperature sensor

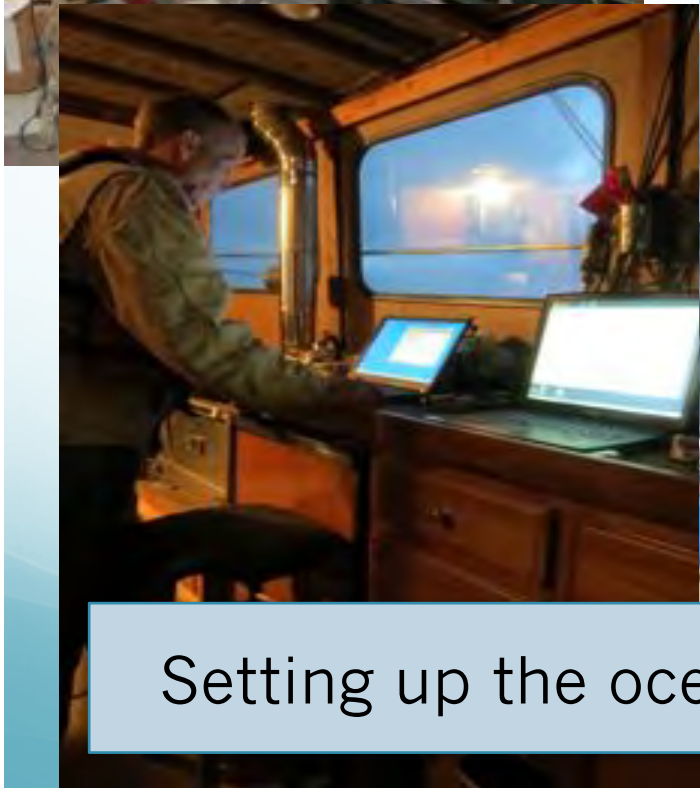
Acoustic release



The mooring is ready to deploy



Home sweet home! Welcome to UIC-NARL.



Setting up the oceanographic equipment.



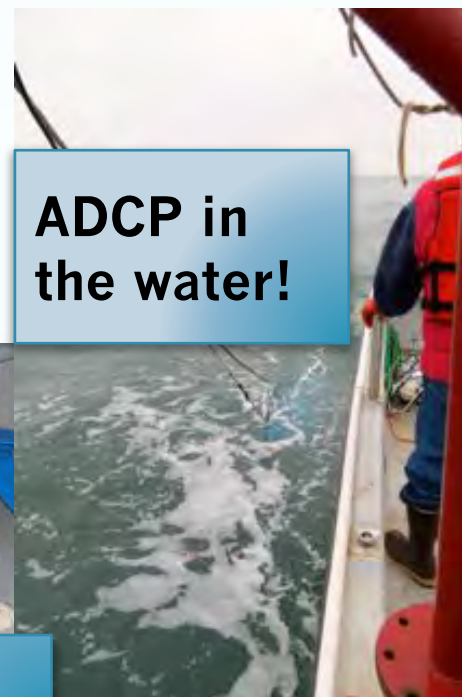
When the weather's good we plan first, then head out to sea.

Every time an instrument enters the water, is seen on the surface and leaves the water the date and time are noted in both the science sample log and ships log by Dr. Ashjian and Captain Kopplin.

ADCP in the water!



ADCP on deck!



Niskin Bottle back on deck!



Niskin bottle readings are taken at 1, 10 & 40 meters

CTD on deck!



Plankton Ring Net stop fishing!



As I check and concentrate the ring net sample taken from the cod end of the net, Dr. Campbell and Dr. Okkonen prepare and launch the Tucker trawl while Dr. Ashjian works on the Niskin water for chlorophyll, nutrient, and microzooplankton samples.

Tucker Trawl going in the water!



Wire angle indicator!



Waiting for the messenger to strike the double trip mechanism.



Some organisms brought aboard are noted and released.

Brittle starfish, sea cucumbers and other critters... it's a benthic Stew!

Basket starfish

Cyanea (jellyfish)



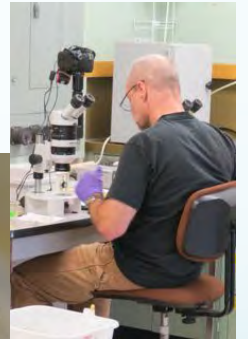
Tucker trawl on deck



Samples removed from the cod ends are concentrated for preservation and then



... placed in labeled containers for laboratory analysis.



Euphausiids (Krill)

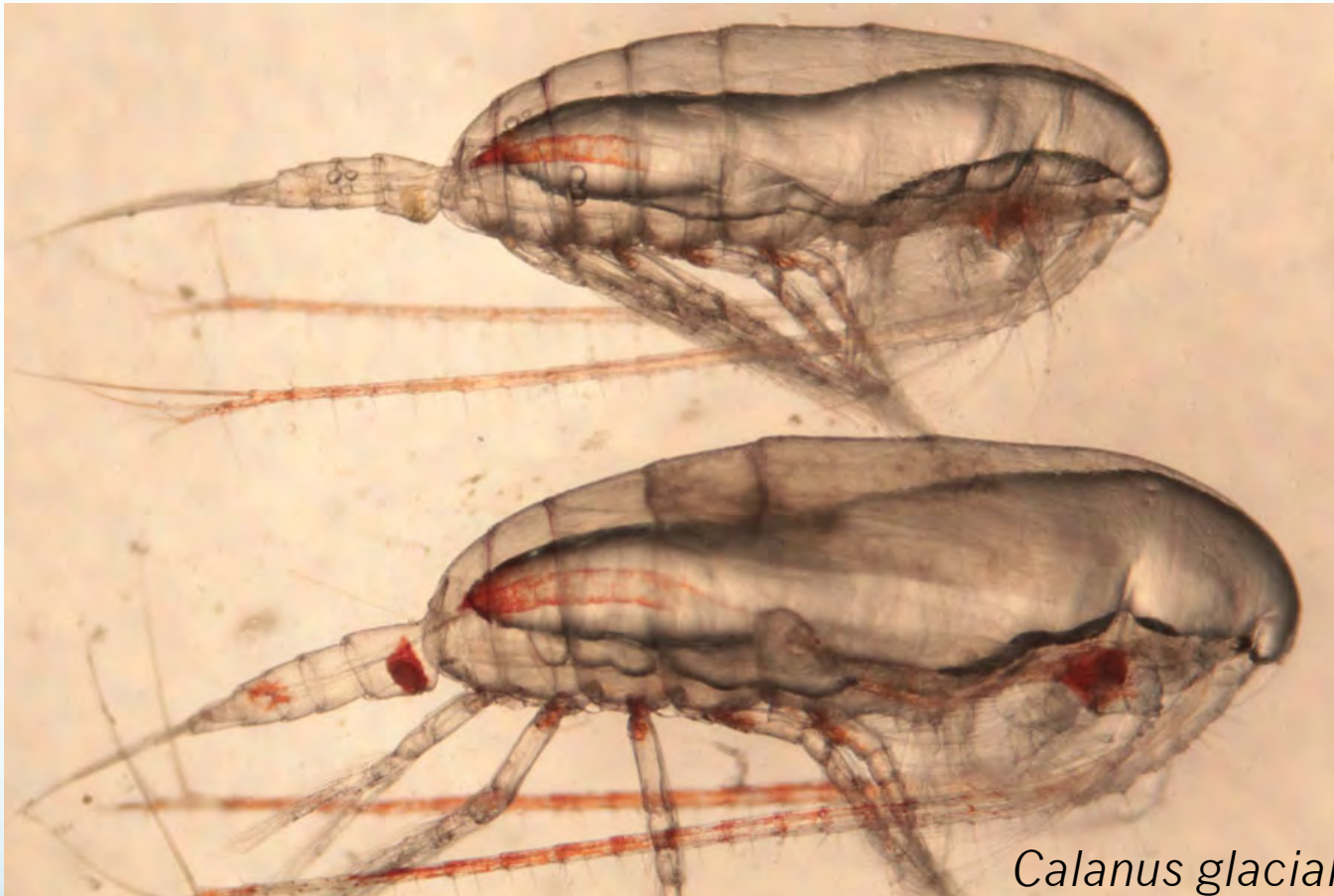
Euphausiids (Krill) are the most important item in the diet of the bowhead whale in the fall near Barrow, AK



Thysanoessa raschii

- Large – up to 25 mm in length
- Form dense schools or aggregations

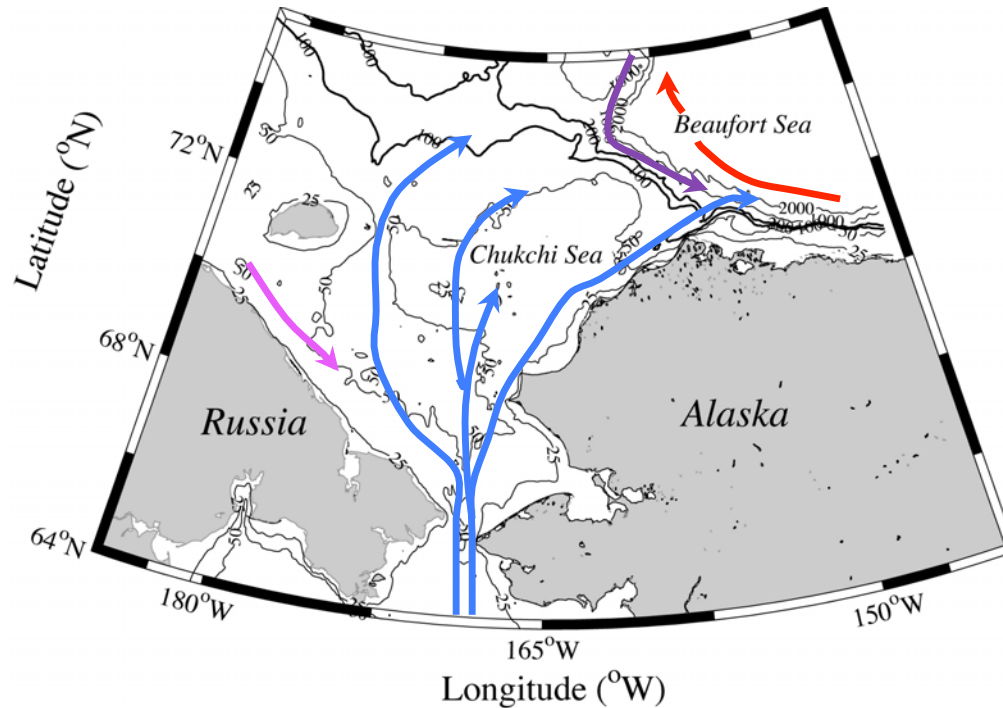
Large copepods in the genus *Calanus* may also be an important food source for bowheads



Calanus glacialis

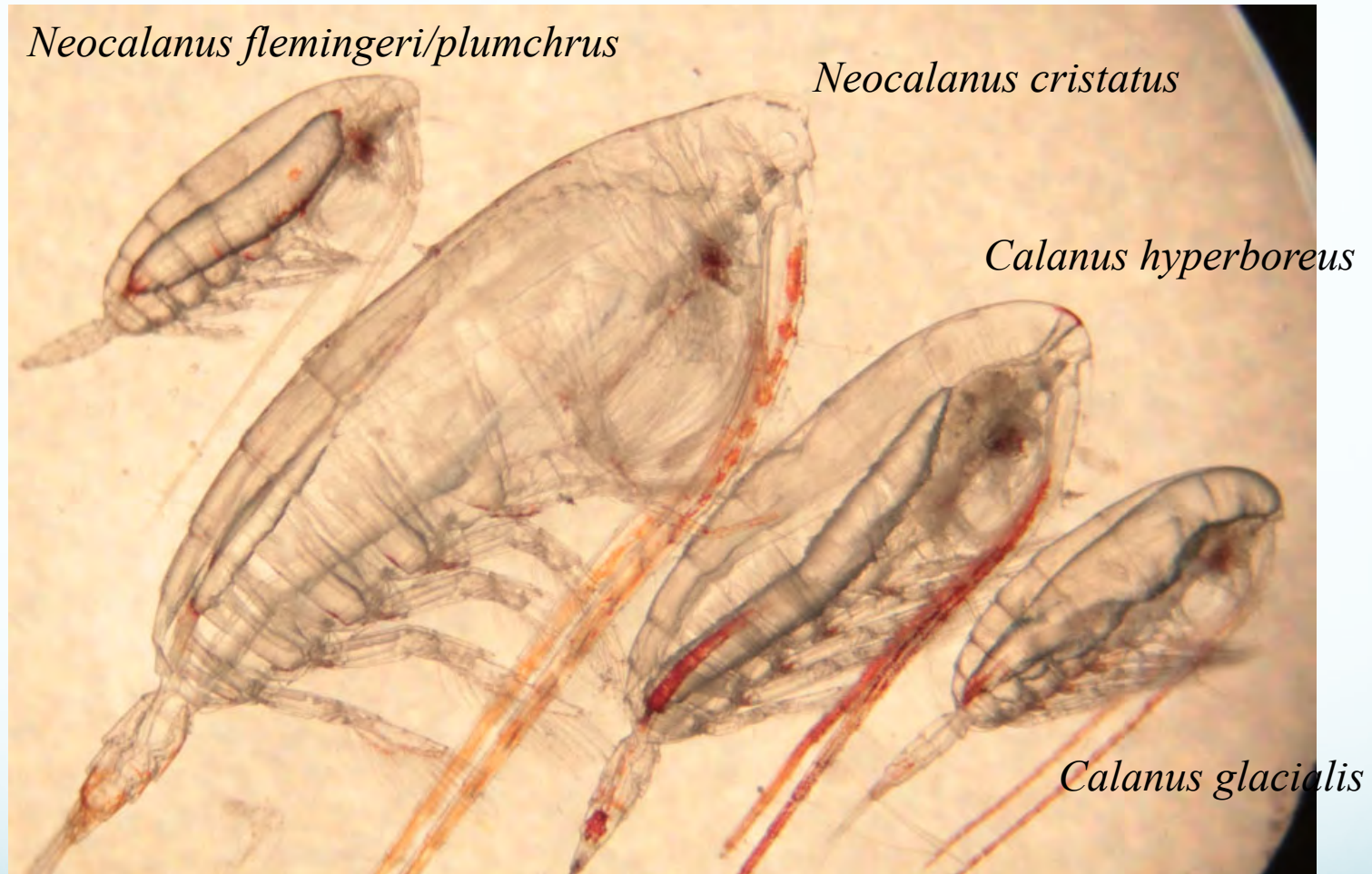
- Smaller than Krill, up to 8 mm in length, but they have a much higher fat content
- Form dense aggregations

Where do the krill and copepods that we see in Barrow come from?



- Are they from local populations that are native to the Arctic or are they from far away, transported in the currents from the Pacific Ocean?
- How do we answer this question?

Where did I come from?

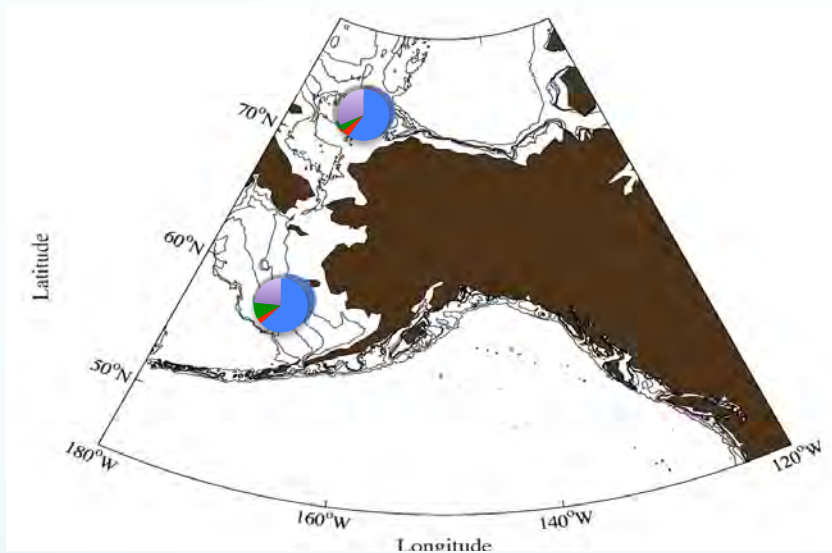


- *Neocalanus* copepods are from the Pacific Ocean
- *Calanus hyperboreus* is from the Arctic Ocean
- *Calanus glacialis* is found in the Pacific and the Arctic Oceans

Using Genetics to Understand Populations

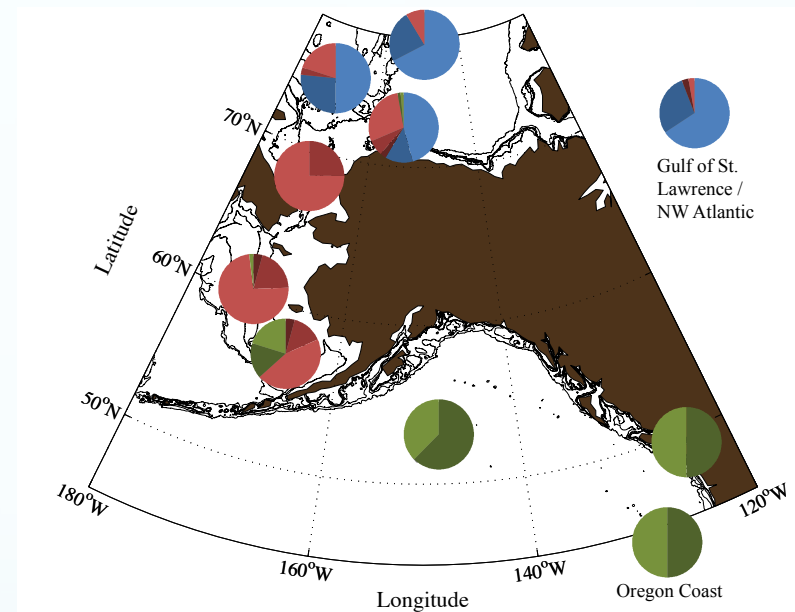
Krill

Thysanoessa raschii



Copepods

Calanus glacialis/marshallae



- How will climate change affect zooplankton populations and ultimately the Arctic marine ecosystem?
 - Will krill colonize the Arctic?
 - Will the smaller copepods from Pacific populations replace the larger Arctic populations?

At the end of the day the all important question is.....
What's for dinner?

Healthy choices.



...not so healthy choices







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Teachers: Join PolarTREC!

www.polartrec.com/about/join

Every teacher can participate in different ways:

- **Following Expeditions**
- **Participate in PolarConnect Events**
- **Join the Polar Education Email List**
- **Take Online Professional Development Courses**
- **Become a PolarTREC Teacher!**



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Upcoming Events

Watch for and register for upcoming events at [www.polartrec.com!](http://www.polartrec.com)



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Thank You!

An archive of the event will be available shortly.
<http://www.polartrec.com/polar-connect/archive>

