Status of NOAA's Arctic Fish Research: the Arctic Ecosystem Integrated Survey-Ed Farley

Alaska Fisheries Science Center

Collaborators

Funding Partners

Coastal Impact Assistance Program
Loss of Sea Ice Program: Standard NOAA surveys


2010 fish assessment survey (first in 20 years)

2002 to present – Integrated Ecosystem Surveys
Arctic Ecosystem Integrated Survey

**When:** August / September 2012 & 2013

**Where:** Northern Bering Sea / Chukchi Sea

**Why:** Understand the distribution of marine fishes and shellfishes, and the plankton they depend upon for food, throughout the northern Bering Sea and Chukchi Sea

Knowledge and insights gained from these studies will help us to:

- evaluate effects of climate change on marine resources in the Alaskan Arctic
- protect marine resources in the region from potential effects of oil & gas development
Arctic Ecosystem Integrated Survey

Surface trawl (top 25 m)
Bottom trawl (fish assessment)

Physical oceanography

Biological oceanography

Acoustics (midwater)

Mammals

Birds
Physical Oceanography - 2012

Sea Surface Temperatures

Cruise 1BE12 Temperature at 5 m
7 August–24 September 2012

 Depths contoured at 30, 40, 50, 100, 200, 1000 m

E. B. Caneet, NOAA/PMEL
Physical Oceanography

Bottom Temperature and Salinity

From Ed Cokelet NOAA/PMEL
Major Forage Fish/Salmon/Invertebrate Species

- saffron cod
- Pacific herring
- capelin
- Arctic cod
- snow crab
- Chinook salmon
- chum salmon
- pink salmon
2012 Catch Summary: Surface Trawl

99% Chrysaora melanaster
Jellyfish Distribution (surface)

Chyrsaoora melanaster
Backscatter was dominated by herring in the South.
Capelin Distribution
(surface)

Photo credit: Andrews
Saffron Cod Distribution (surface)

Photo credit: Andrews

Photo credit: Pham
Arctic cod life history

- Circumpolar distribution
- On bottom or in water column, often associated with ice
- Occasionally in large schools
- Relatively short-lived: 6-7 years maximum
- Mature at age 2-6
- Spawn in nearshore waters during winter
- Eggs & larvae in water column

(40 cm max, usually < 25cm)
Arctic Cod Distribution (surface)
Backscatter was dominated by Age-0 Arctic cod in the north.
Satellite Derived SST Products
Colorado Center for Astrodynamics Research (CCAR) Altimeter Data
Physical Oceanography - 2007

Sea Surface Temperatures
2012 Catch Summary: Bottom Trawl

Invertebrates
(351 taxa)
Brittle stars

Arctic Cod
Snow Crab Distribution (Bottom Trawl)
Snow Crab Females
Snow Crab Carapace Width (Bottom Trawl)

![Graph showing proportion of catch vs. carapace width for Bering Sea and Chukchi Sea.]
Summary and Conclusions

- LOSI (Arctic Eis) will provide a more comprehensive view of the Chukchi Sea fauna from plankton to seabirds
  - Complements existing, more focused surveys
  - Opportunities for collaboration
- Diverse fish & invertebrate fauna with low densities compared to Bering Sea (N-S gradient)
- Arctic species with circumpolar distribution (i.e. Arctic cod) may serve as "bellwethers" of climate change as distribution in marginal seas contracts & expands