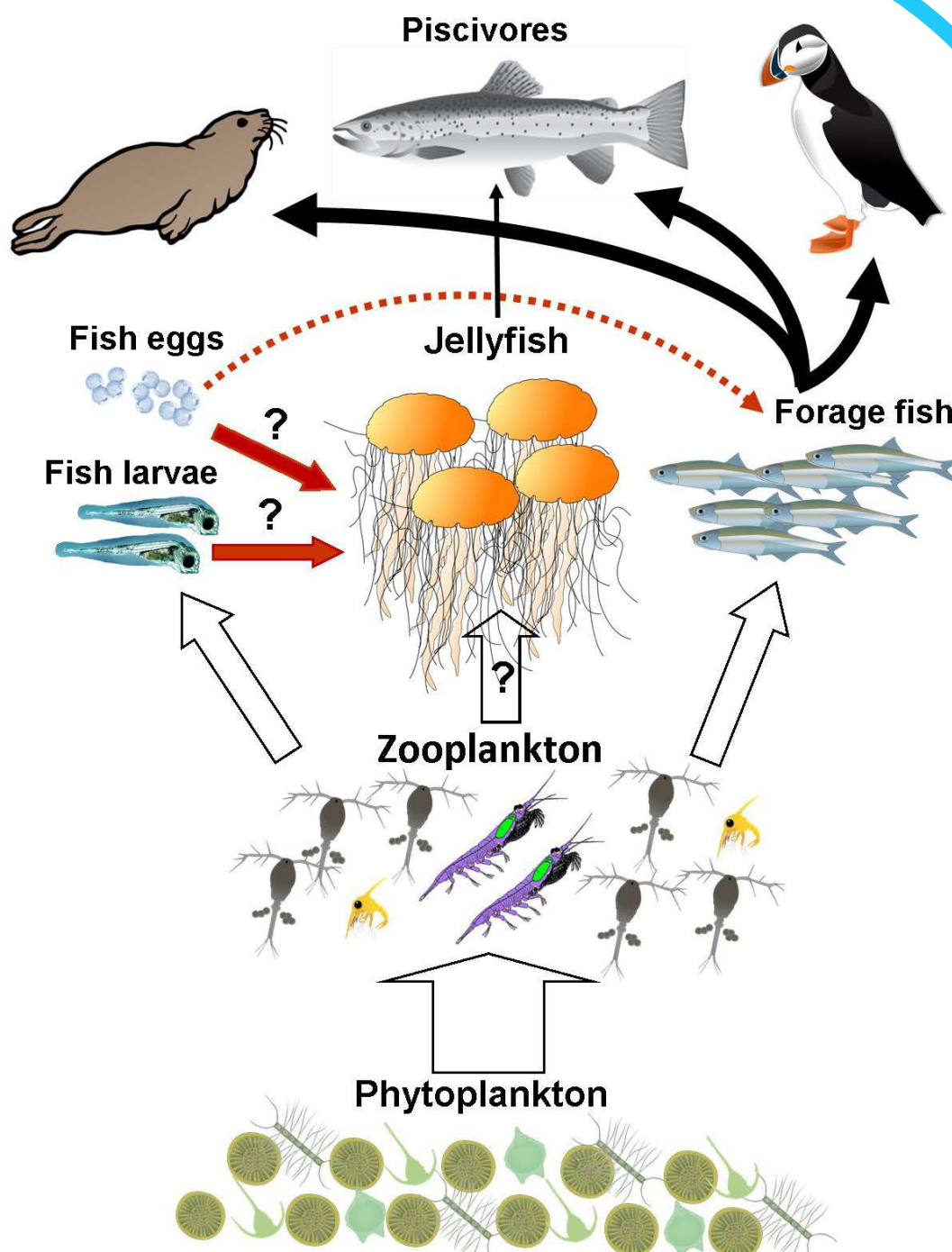


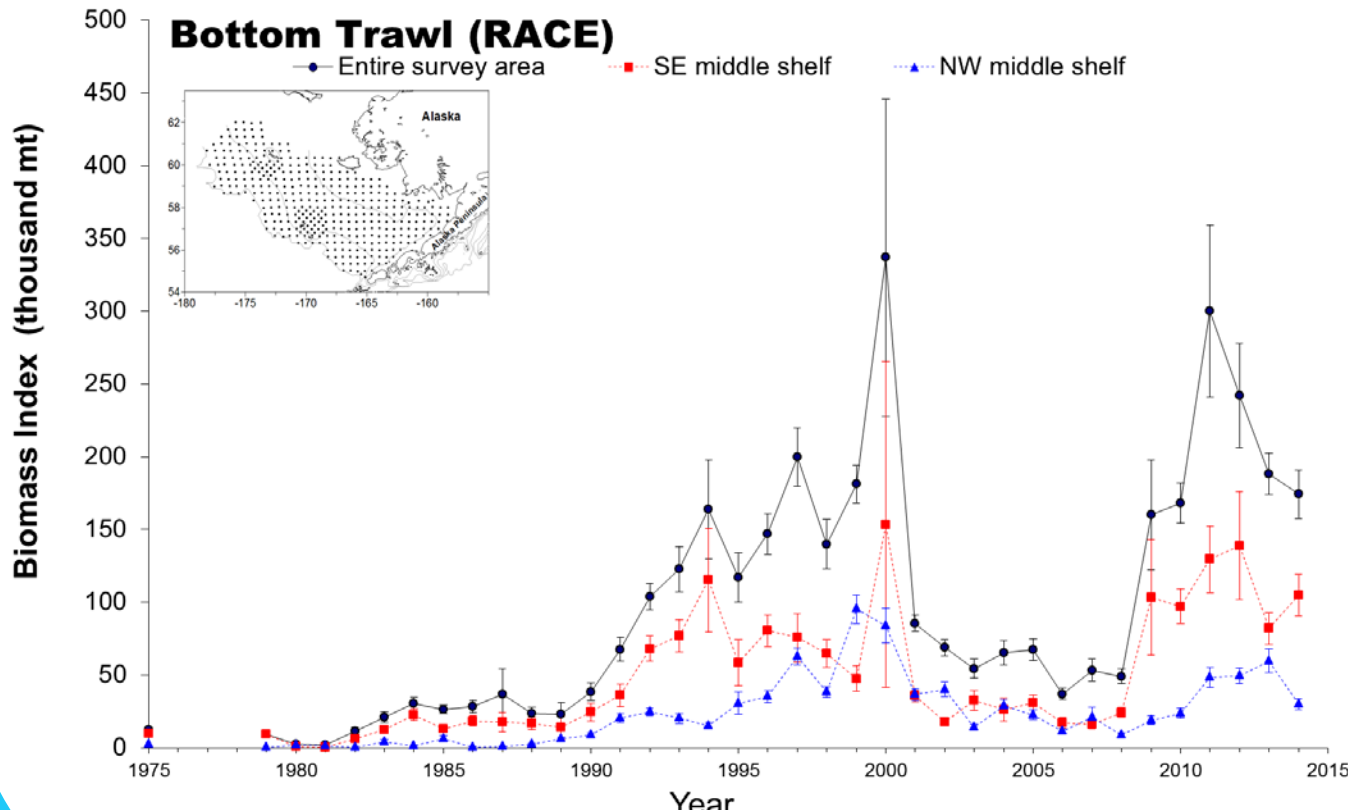
Project Objectives

- Large scyphozoan jellyfish feed on zooplankton and early life stages of fish; they are competitors and predators of fish (Fig. 1).
- Eastern Bering Sea (EBS) fishery surveys indicate that jellyfish populations have fluctuated widely over decades (Figs. 2 & 3).
- Jellyfish population changes are related to variability in climate and prey.
- An understanding of the role of jellyfish in the EBS is required for fishery and ecosystem management.
- We lack measurements of the direct and indirect impact of changes in jellyfish abundance on the ecosystem and the fish species it supports.
- We seek to estimate the scale and impact of competition between EBS forage fish and jellyfish.
- Our goal is to determine the role of jellyfish in the ecosystem as a predator and as an ecosystem structuring agent.




The diagram illustrates the energy flow in the EBS pelagic food web. At the base is Phytoplankton, which is consumed by Zooplankton. Zooplankton are eaten by Jellyfish and Forage fish. Jellyfish also consume Fish eggs and Fish larvae. Forage fish consume Jellyfish. At the top, Piscivores (like the seal) consume Forage fish, and a Puffin consumes Jellyfish. Arrows indicate the direction of energy flow, with some arrows labeled with question marks to indicate areas of uncertainty or ongoing research.

Fig. 1. Conceptual diagram of energy transfer pathways in the EBS pelagic food web.



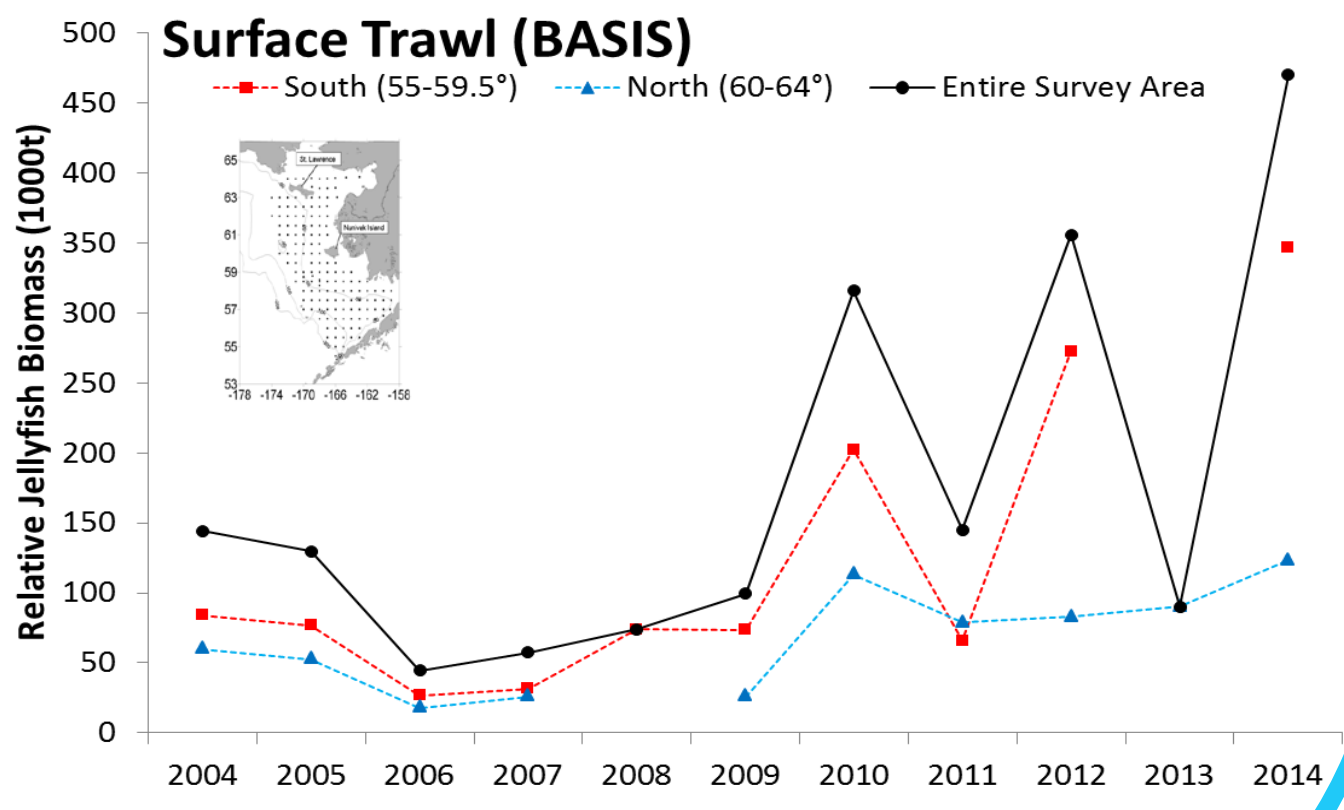
The graph shows the biomass index (thousand mt) of large jellyfish from 1975 to 2015. Three data series are plotted: Entire survey area (black diamonds), SE middle shelf (red squares), and NW middle shelf (blue triangles). The biomass shows significant fluctuations, with major peaks around 1980, 1990, 2000, and 2010. An inset map shows the survey area in the Eastern Bering Sea.

Fig. 2. Time series of large jellyfish collected during the EBS Bottom Trawl survey.



A photograph showing several large jellyfish, likely Rhinomedusa, collected in a surface trawl net. Two researchers in orange gear are visible in the background, handling the catch on a ship's deck.

Jellyfish collected with Surface Trawl



The graph shows the relative jellyfish biomass (1000t) from 2004 to 2014. Three data series are plotted: South (55-59.5°N, red squares), North (60-64°N, blue triangles), and Entire Survey Area (black diamonds). The biomass shows significant fluctuations, with major peaks around 2004, 2010, and 2014. An inset map shows the survey area in the Eastern Bering Sea.

Fig. 3. Time series of large jellyfish collected during the EBS Surface Trawl survey.

Fig. 7. Centers of gravity & variation Surface Trawl, 2004-2012

[illegible]