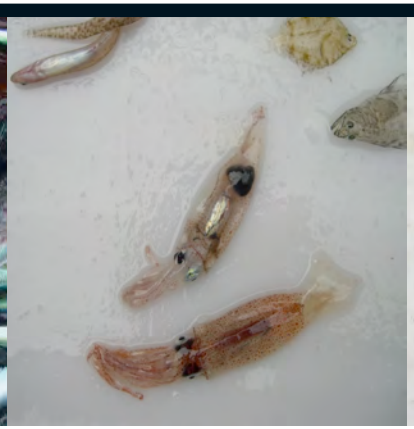
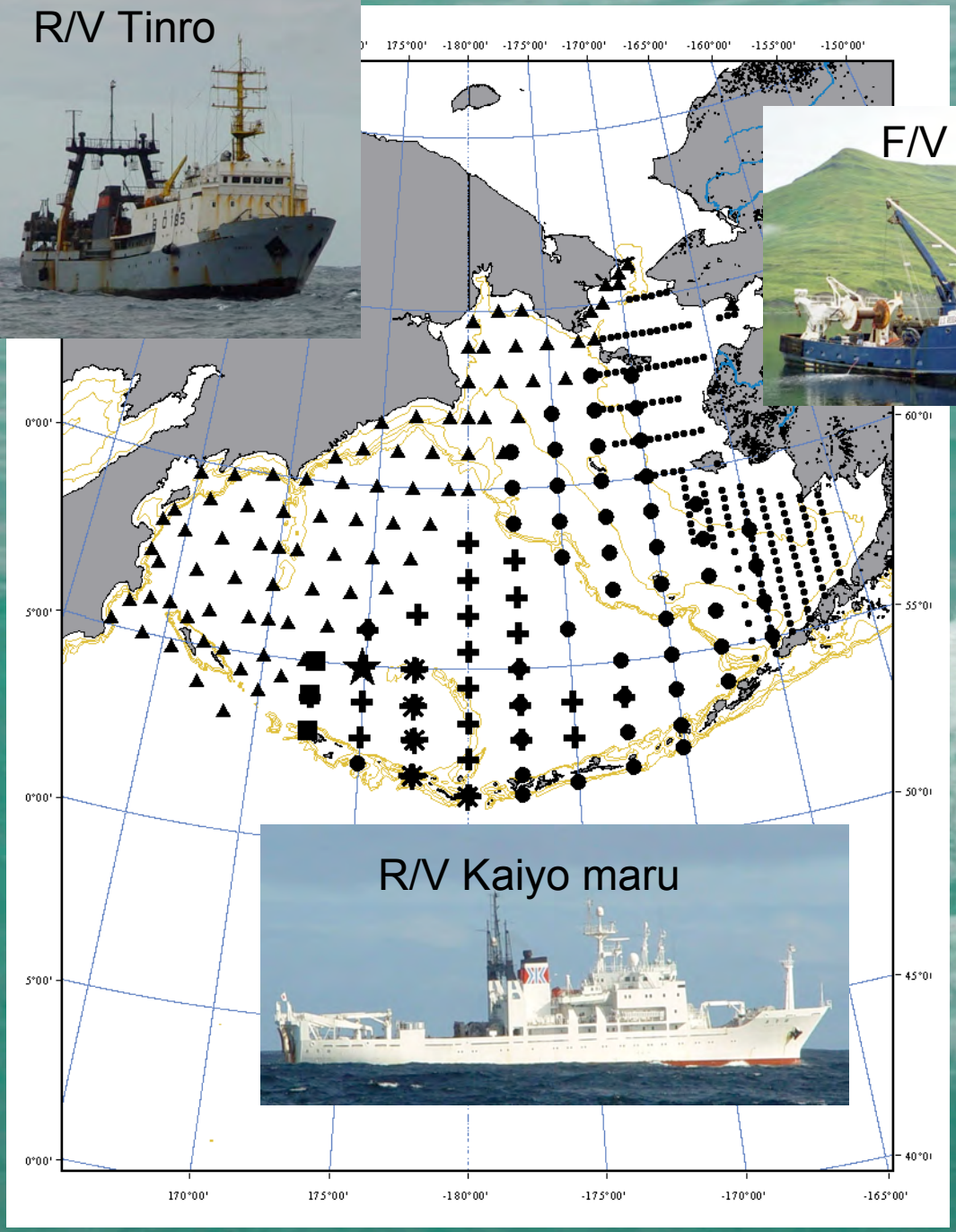
Alaska Fisheries Science Center
NATIONAL MARINE FISHERIES SERVICE

Ocean Carrying Capacity Program
Auke Bay Laboratory

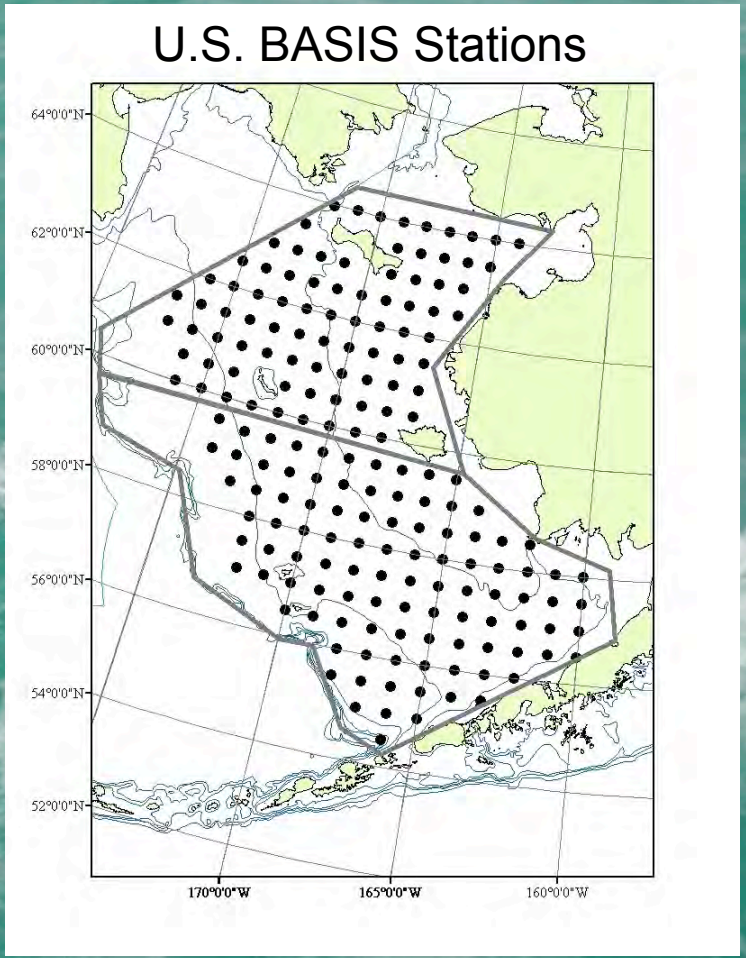


BASIS 2002 - 2004



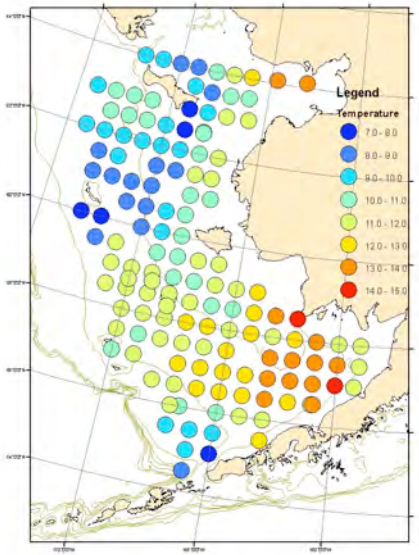
Pelagic Ecosystem Research

- U.S. BASIS August – October research cruise (60 days)
- Distribution in relation to ocean conditions
- Critical Size and early marine survival
- Climate Change, distribution, and survival
- Spatially Explicit Habitat Quality
- Trophic Interactions
- Physical/Biological Oceanography

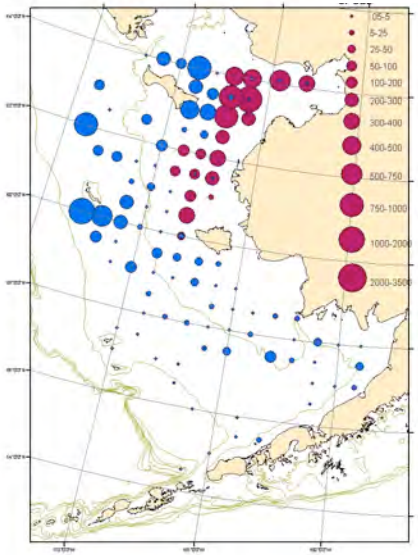


Distribution in relation to Ocean Conditions 2004

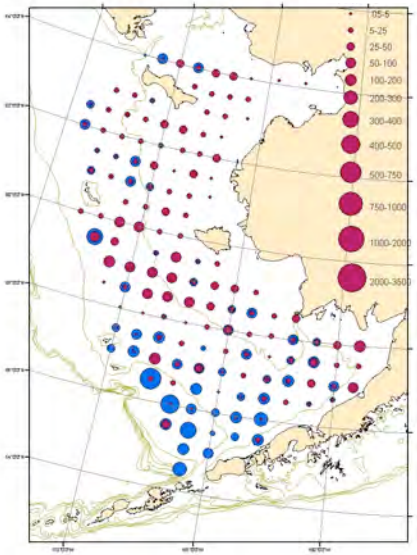
SST



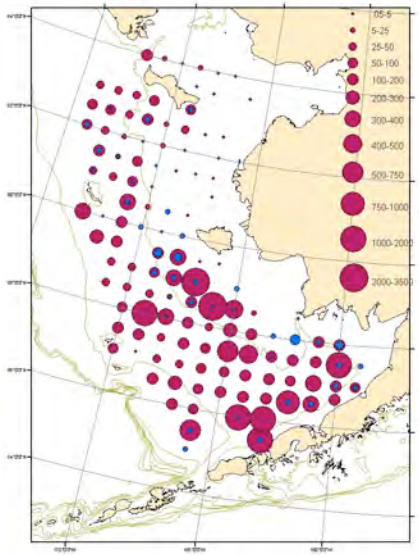
Herring



Salmon



Pollock



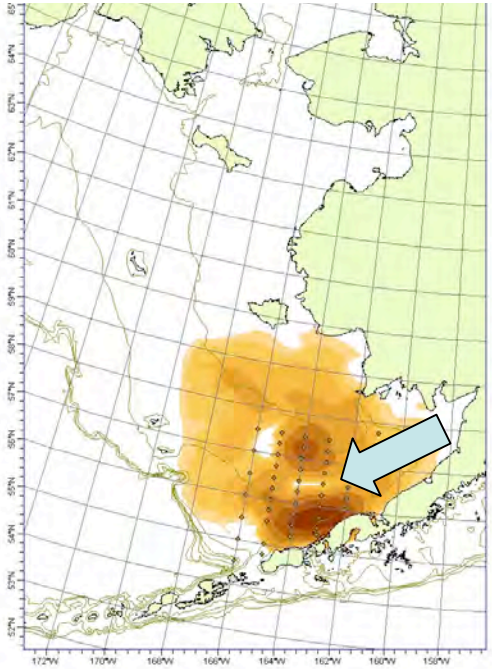
Blue = Adult

Red = Juvenile

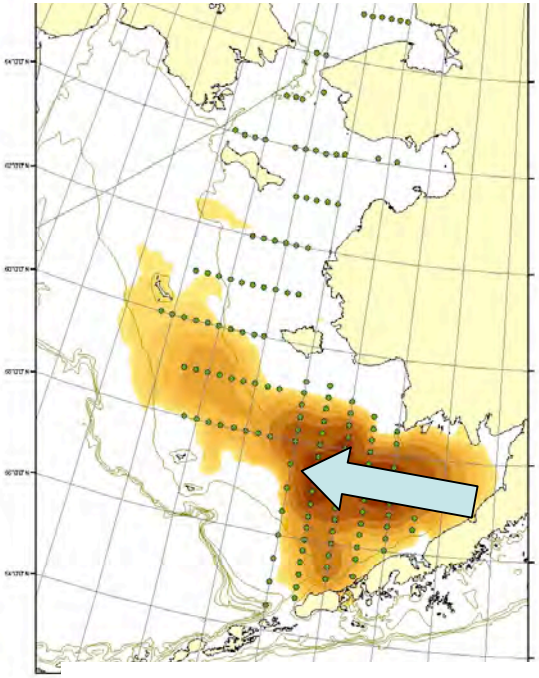
Critical Size in Relation to Distribution

Juvenile salmon abundance and size selective mortality

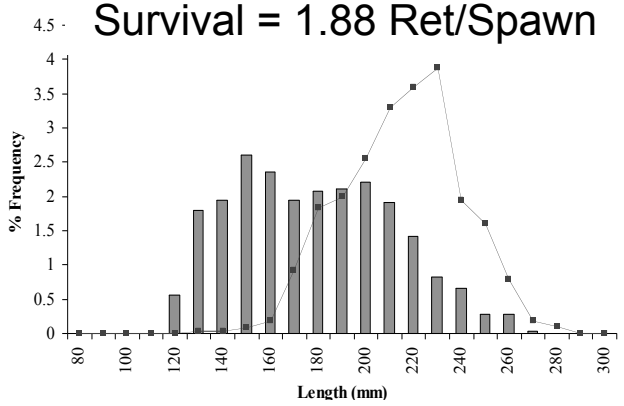
2001 Juvenile Sockeye



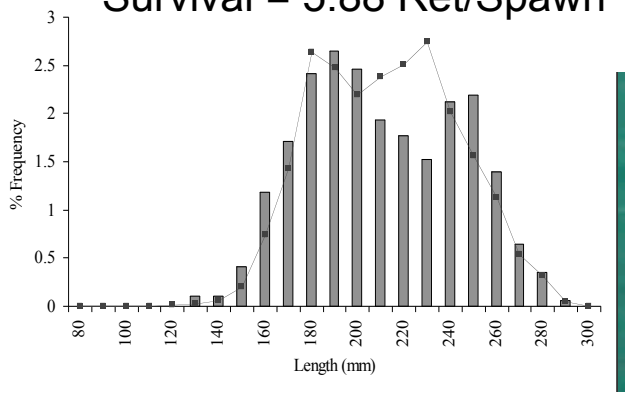
2002 Juvenile Sockeye



Survival = 1.88 Ret/Spawn



Survival = 5.88 Ret/Spawn

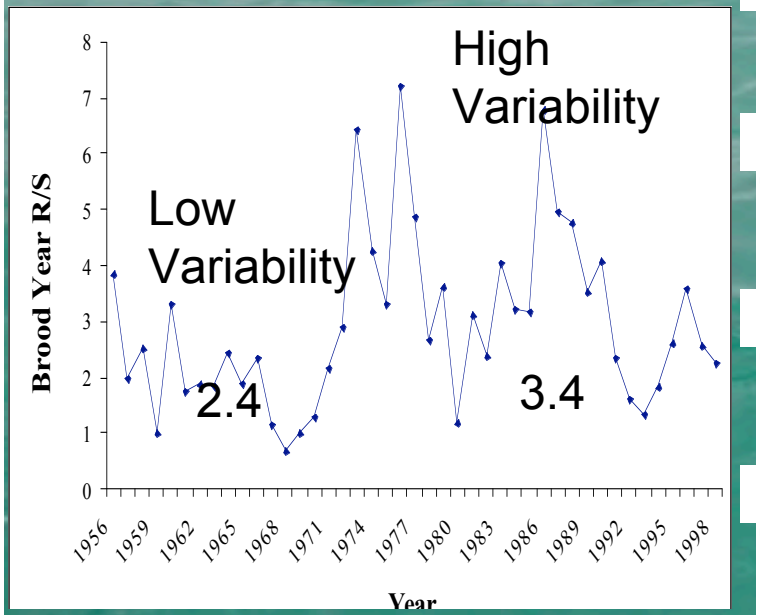


Line –Critical Size Distribution

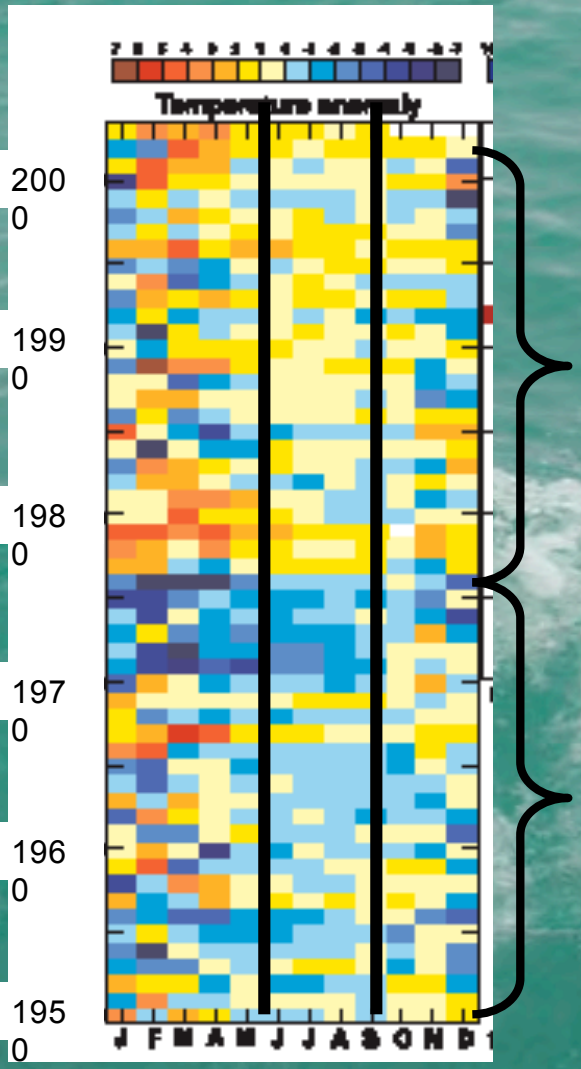
Bar -Juvenile Salmon Size

Climate Change in Relation to Distribution and Survival

Bristol Bay
Sockeye Salmon Survival

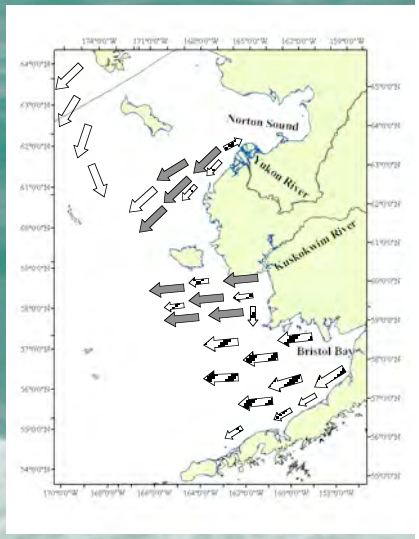


Air Temperature
Pribilof Islands



Overland and
Stabeno 2004

Slightly higher
survival with
much higher
variability



Lower survival with
lower variability

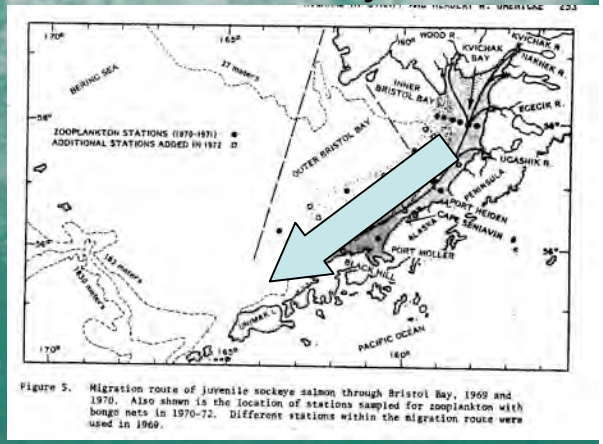
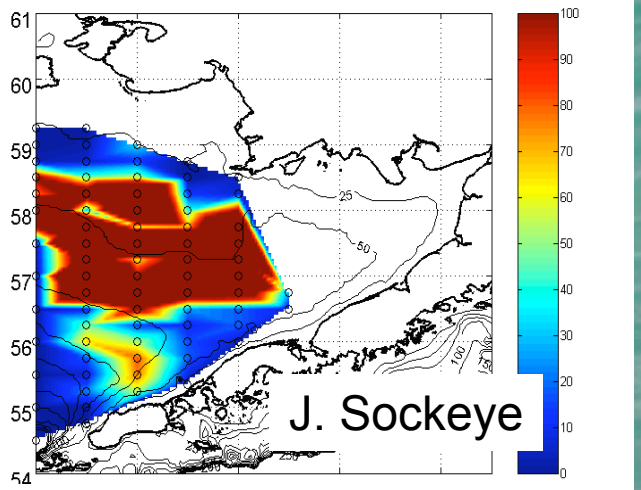
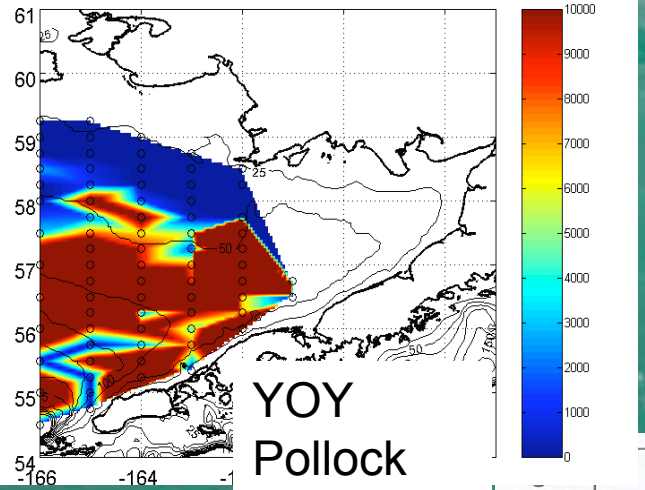
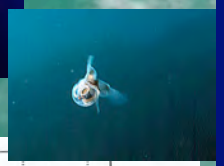


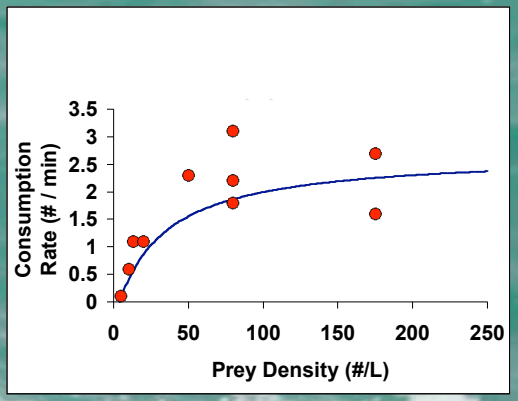
Figure 5. Migration route of juvenile sockeye salmon through Bristol Bay, 1969 and 1970. Also shown is the location of stations sampled for zooplankton with bongo nets in 1970-72. Different stations within the migration route were used in 1969.

Habitat Quality – Bioenergetics Models to Link Ocean Productivity to Fish Growth Rate Potential

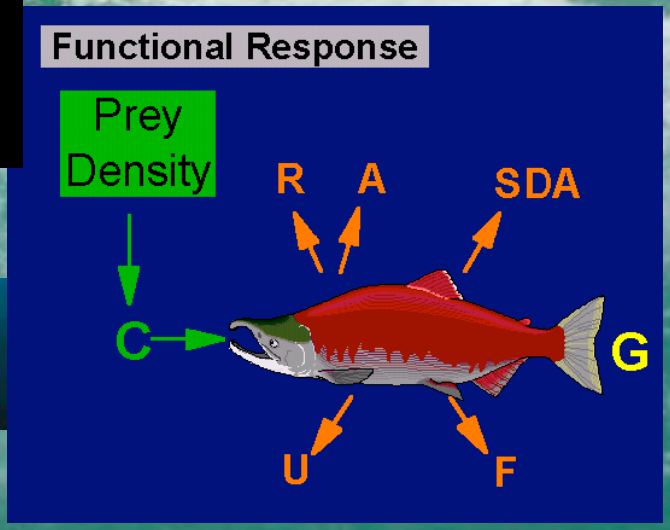


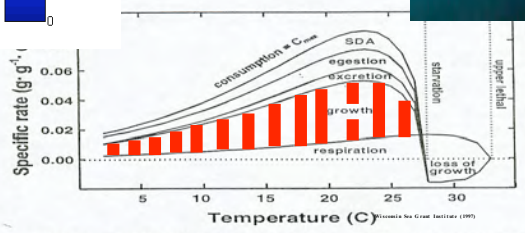






Foraging Rate Models

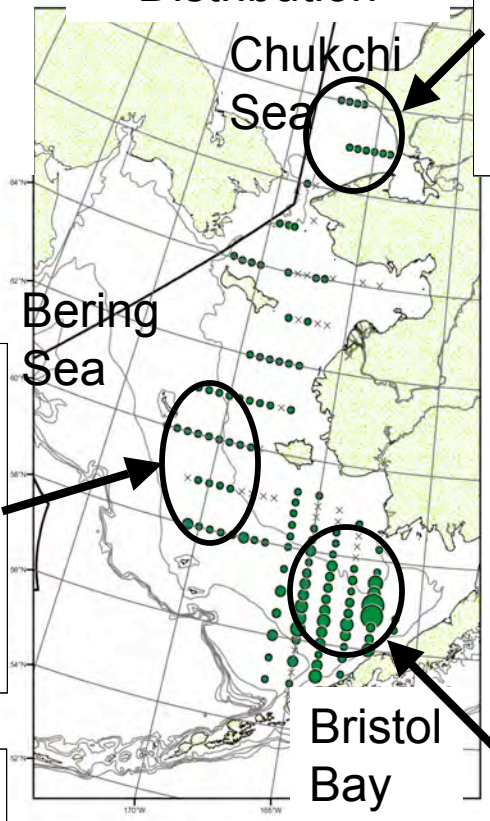


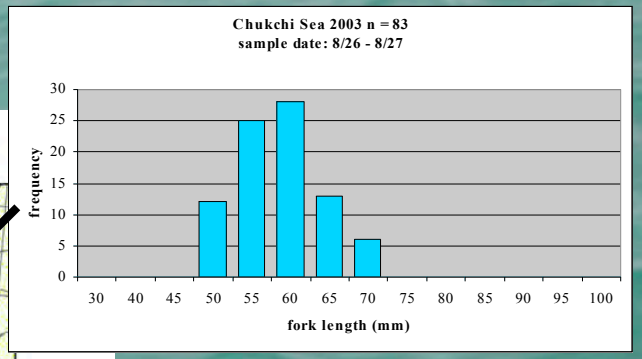


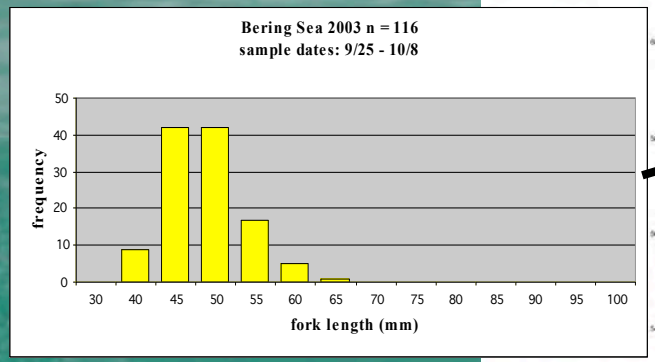
Spatially-Explicit Models of Growth Potential

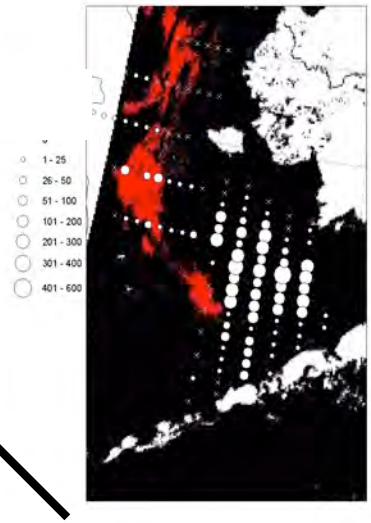
Forage Fish as an Indicator of Ocean Conditions

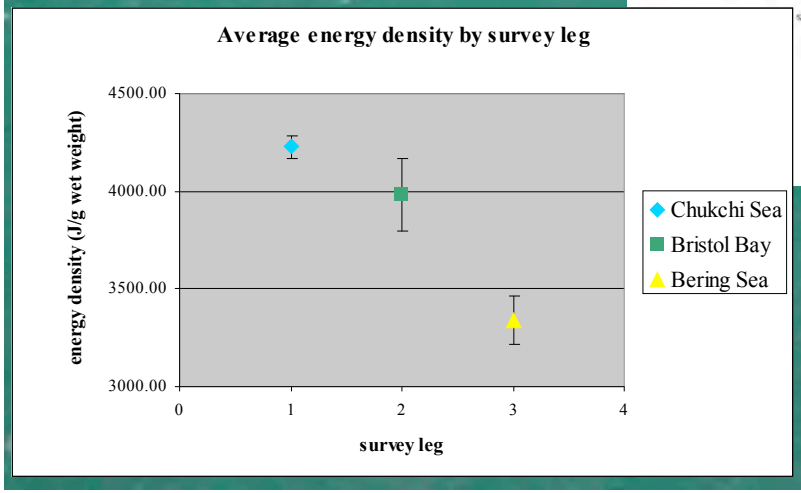
Age 0 Pollock Distribution

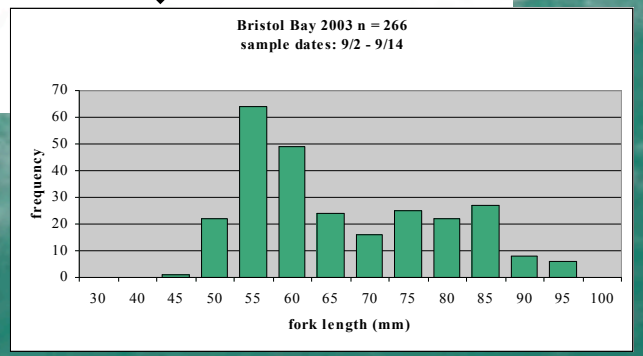






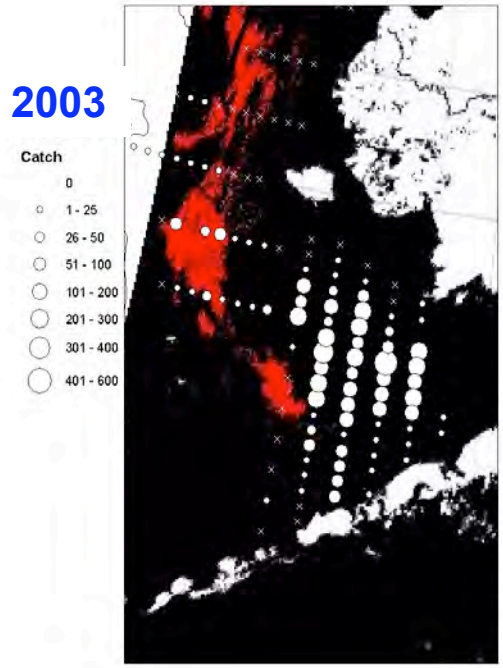




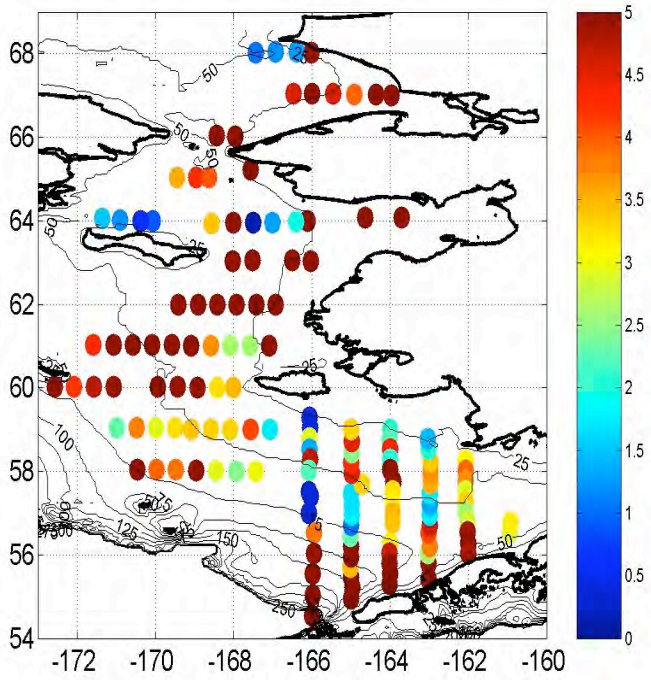


Oceanography

SeaWiFS coccolithophore mask images with J. sockeye

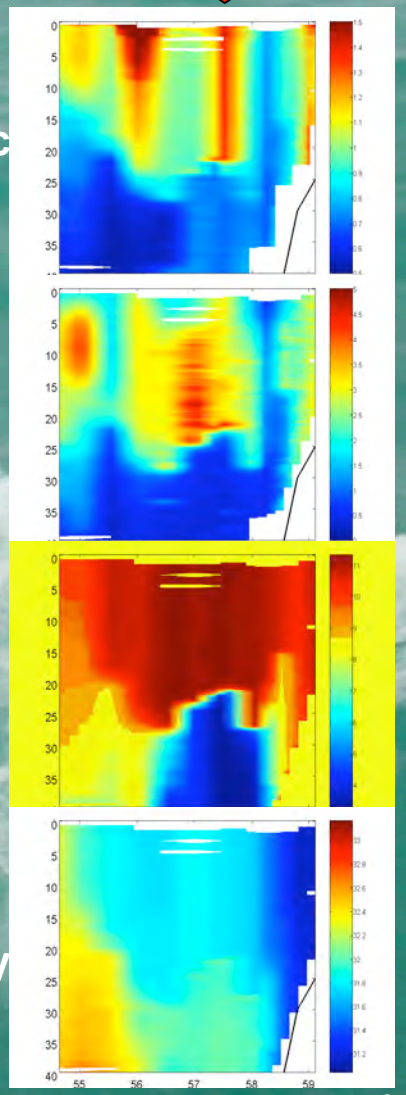


Silicate at 5m (Range 0-5 µM-Si)



2003 Location of aqua color water

166°W top 40m



Beam c (trans)

Chl a (fluor)

Temp

Salinity

south north

19-Sept-03, Saitoh and Iida (unpubl.)

Key Issues

- **Bering Sea Salmon and Forage Fish** – changes in productivity related to ocean conditions
- **Climate Change in the Bering Sea** – reduction in sea ice, increases in sea and air temperatures
- **Bycatch** – warming sea surface temperatures in relation to expanding salmon distribution