Survey strategies for Bering Sea forage species

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ABSTRACT
Remote sensing and direct sampling technologies were used to examine distribution, species composition, and ecological role of nektonic organisms within Bering Sea nearshore, continental shelf, and slope habitats. Sampling technologies used in our integrated survey included acoustics (echosounders), optics (LIDAR, ZOOVIS), and nets (midwater trawl, MultiNet, seine). We were interested in evaluating methods for assessing distribution, abundance, and life history characteristics of forage species including myctophids, bathyplatids, Pacific sand lance, and Pacific sand fish.

EFFORT
June 8 to 22, 2005
Unalaska, Akun, and Akutan Islands

Shelf/slope
488 km of acoustics
24 sampling stations

Nearshore
18 sampling stations
Optics in all regions
23,125 km of data

OUTCOME 1
Tracking hotspots

- Hot spots were defined by high numbers of seabirds (shearwaters, fulmars, albatross, petrels, kitiwakes, gulls, alcids) and marine mammals (humpback whales, sea lions).
- Apparent northeast movement with the current throughout the day.
- Fewer predators associated with nearshore schools than offshore.

OUTCOME 2
Diet & proximate composition

- 646 fish were collected for:
  - Diet
  - Fatty Acids
  - Lipid
  - Moisture/ash
  - Protein
- Analyses are underway

OUTCOME 3
Nearshore techniques

- Please see the poster:
  “Bering Sea Forage Fish: Do They Use the Shallow Nearshore?”
  by Thedinga, Johnson, Lindeberg, and Neff

OUTCOME 4
Characterizing nektom

- Backscatter (acoustic energy) higher on shelf than slope.
- Directional trends in slope data.

- Patchy distribution in shallowest layer (6-100m).
- Middle layer (100-300m) shows hotspots at shelf break.
- Deep (300m-bottom) has highest backscatter and strong directional trends.

- Midwater trawl sampling of distinct assemblages.

NEXT STEPS
Repeated sampling of assemblages
Temporal and seasonal sampling
Patterns in assemblage behavior
Squid and jellyfish assessment
Spatial variation with repeated sampling
Species-specific migratory fluxes
Test survey design strategies

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