Acoustic Survey of Eulachon (*Thaleichthys pacificus*) Associated with Foraging Steller Sea Lions (*Eumetopias jubatus*) in Southeast Alaska

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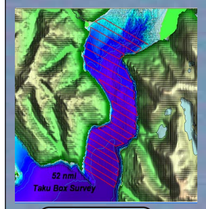
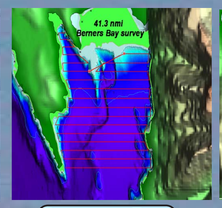
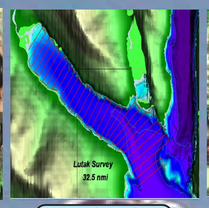


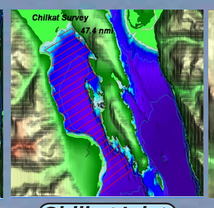
Taku Inlet survey @ 52 nmi



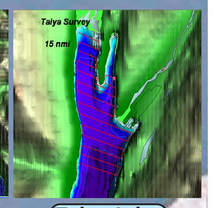
Berners Bay survey @ 41.3 nmi



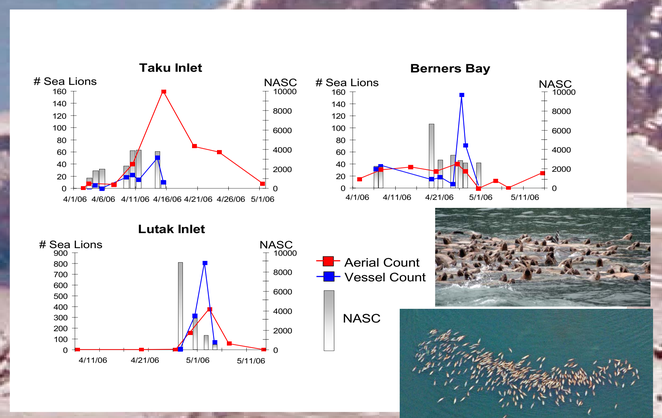
Lutak Inlet survey @ 32.5 nmi



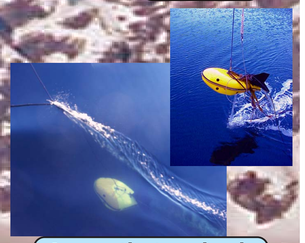
Chilkat Inlet survey @ 47.4 nmi



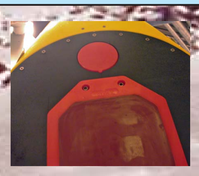
Taiya Inlet survey @ 15 nmi

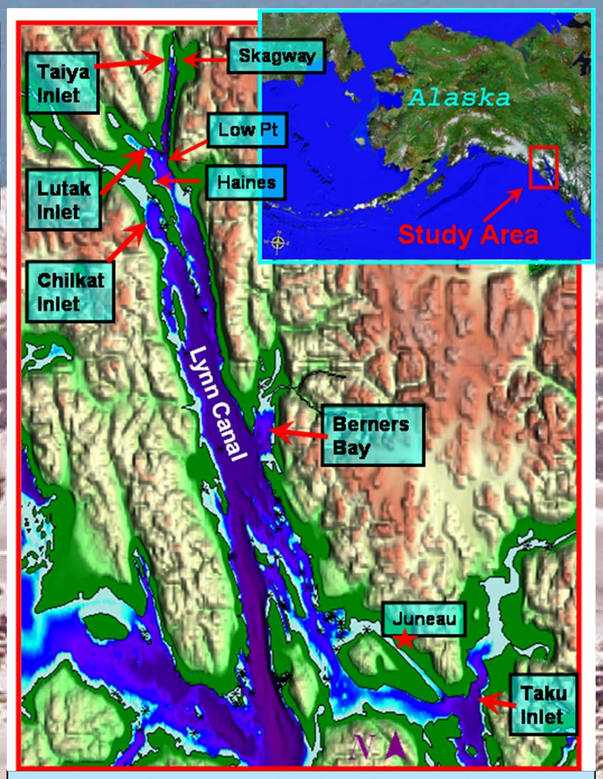


NASC (Nautical area scattering coefficent) values from 120 kHz split beam data, compared to vessel sea lion counts. Preliminary analysis shows sea lions start feeding in mass 2-3 days after peak prey concentrations.

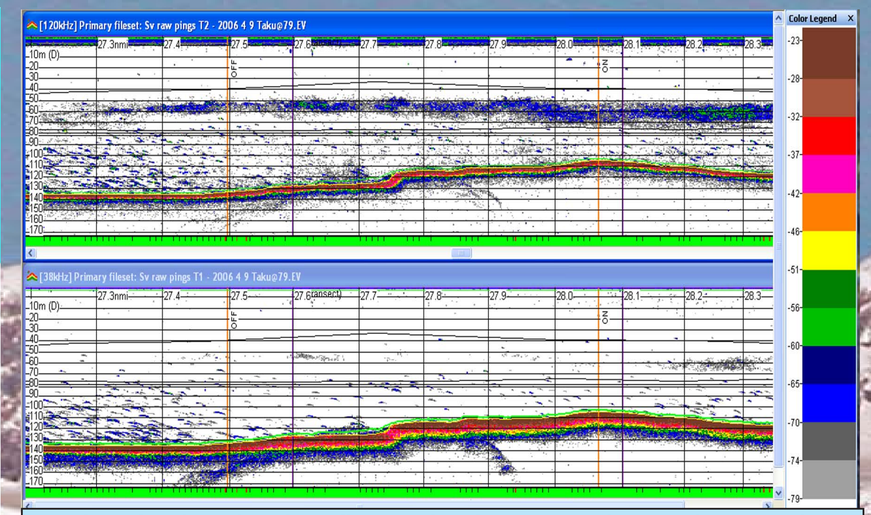


Acoustic tow body with 120 + 38 kHz frequencies towed at 6.5 to 9 knts and 2 m deep.

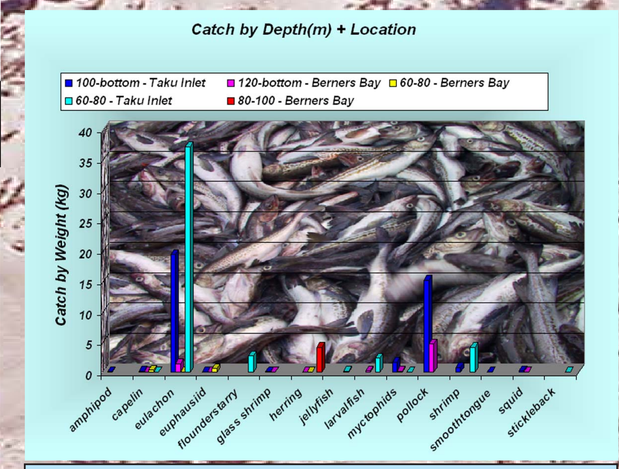




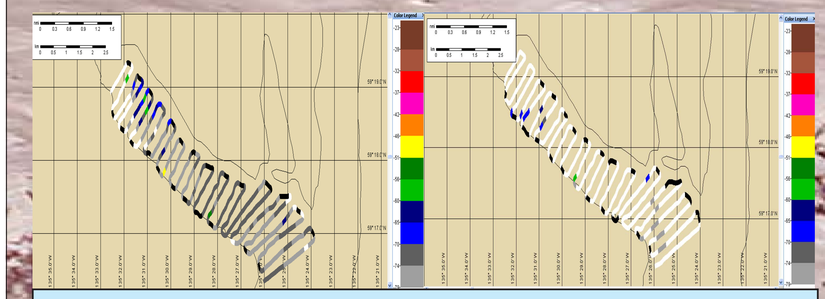
Survey area in Lynn Canal and northern Stephens Passage in the northern end of southeastern Alaska. Acoustic surveys covered 188.2 nautical miles.



120 kHz (top) and 38 kHz (bottom) echograms; these 2 frequencies greatly enhance species delineation between weak and strong backscatterers. Weak scatters (i.e. eulachon and euphausids) show up better with 120 kHz and strong scatterers (i.e. pollock, herring and capelin) show up better on 38 kHz.



A midwater trawl was used in Taku Inlet and Berners Bay, gillnets and USFS fish traps were used Berners Bay, a gillnet and dipnets were used in Chilkat, Lutak and Taiya Inlets to collect specimens for analysis and echo integration.



Survey track lines showing mean volume backscatter (Sv) of a high concentration of eulachon on the left and no eulachon on the right. Color legend at the right of each graph shows the dB range from -23 to -79 from 120 kHz split beam data. Shades of gray and purple are eulachon which are weak (Rayleigh) scatterers, all other colors are usually strong (Geometric) scatterers, black is bad data or off transect and are not included in the analysis and white means no data.

OBJECTIVES

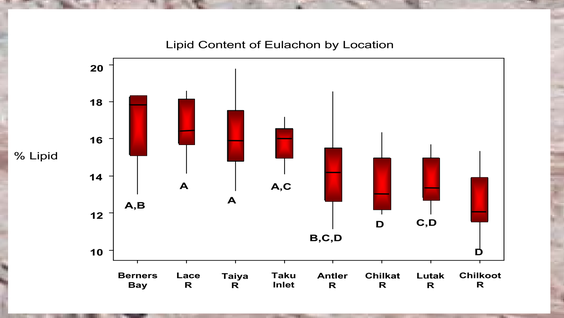
Eulachon are high-lipid, energy-rich, spring spawners that are likely vital energy sources for many marine mammals, birds and fish. Our goal in this study is to estimate the energy available to marine predators from aggregations of eulachon in southeastern Alaska. Our objectives are to characterize 5 spawning runs of eulachon by 1) estimating the biomass of aggregations, 2) measuring the energy content, 3) enumerating the response of Steller sea lions, 4) characterizing the population structure using genetics, and 5) characterizing eulachon movement.

METHODS

Acoustic surveys were conducted from April 3 – May 6, 2006 to estimate fish biomass and behavior. Mid-water trawl, gillnet, dipnet and fish traps were used to sample fish to identify species in acoustic data, collect morphological measurements, and for nutritional and genetic analyses. Aerial surveys were used to enumerate sea lions and to provide guidance for locating acoustic surveys for sea lion forage.

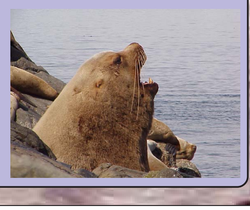
RESULTS

Preliminary analysis indicates that Berners Bay eulachon were very low in 2006. Sea lions were less abundant then past years. Taku and Chilkat Inlets are large river systems with potentially large eulachon runs, yet sea lions appear to be less able to efficiently feed at these locations. Eulachon appear to move quickly to freshwater, schooling little if at all in saltwater. Nutritional content of eulachon varied amongst sites. Variation in nutritional content does not correlate with sea lion attendance to the runs, however, suggesting other factors such as fish density are greater influence on sea lion foraging.



Nutritional content (lipid and energy contents) of eulachon varied by drainage, with the Lace and Antler Rivers draining into Berners Bay.

Funding provided by Alaska Seals and Steller Sea Lions from National Marine Mammal Lab, under NMML's Steller sea lion permit # 782-1768-00 and ABL's fish resource permit # CF-06-010.
Contributing parties include:
1) Auke Bay Lab
A) Marine Ecology and Stock Assessment
B) Nutritional Ecology Lab
C) Stock Identification Lab
2) National Marine Mammal Lab
3) United States Forest Service



Acknowledgements: Ron Heintz, NOAA R/V John N. Cobb and crew, F/V Sea View captain John Ethridge, F/V Nanesse captain Mark Saldi , USFS Berners Bay Eulachon fishtrap team, Tom Dress, and Elizabeth Calvert.