

Beaufort Sea Marine Fish Survey August 2008

A marine fish survey is planned for August 2008 in a portion of the Beaufort Sea (Figure 1). The survey meets a major goal of Loss of Sea Ice research by the Alaska Fisheries Science Center (AFSC) of periodically monitoring marine fish and mammals of seasonal sea ice areas of the Beaufort Sea, Chukchi Sea and southeast Bering Sea. Three major institutions conducting marine research in Alaska are collaborating on this study: Alaska Fisheries Science Center; Institute of Marine Science, University of Alaska Fairbanks; and School of Aquatic and Fishery Sciences, University of Washington. The Minerals Management Service is funding this study. The distribution and abundance of fish will be assessed by bottom trawl and acoustic surveys. The distribution of zooplankton will be sampled with bongo nets and oceanographic properties will be measured with conductivity-temperature-depth probes.

This study has 3 principal objectives:

- 1) Quantify the distribution and abundance of benthic and pelagic fish;
- 2) Quantify the characteristics of the marine habitats occupied by benthic and pelagic fish;
- 3) Recommend methods for future monitoring.

Bottom trawl survey: The distribution and abundance of adult and juvenile demersal fish and their dominant benthic invertebrate prey in offshore habitats (20 m to the shelf break) will be assessed with a 83-112 eastern otter trawl, the standard for AFSC bottom trawl surveys of the Bering Sea shelf. AFSC standard survey methods will be followed including maintaining a constant vessel speed and tow duration; and monitoring of vertical and horizontal net openings with net sounders. A plumb staff beam trawl also may be deployed. A stratified sampling plan will be employed with survey effort distributed among three strata defined by water depth: 20 – 50 m, 50 – 100 m, and 100 m – 500 m, which correspond to documented changes in water masses in the Beaufort Sea that are likely to affect the distribution of fish and their prey.

Acoustic survey: The distribution and abundance of pelagic fish will be assessed using acoustic methods but limited to times and areas that will not conflict with subsistence whaling operations. Adult and juvenile fish will be surveyed with echo integration trawl (EIT) survey methods similar to those used during other routine AFSC acoustic surveys. 5 parallel transects oriented inshore to offshore from the 20m to the 500m isobath will be surveyed. The transects will be 30 nmi long and spaced 15 nmi apart. Midwater trawl hauls will be conducted when and where significant amounts of fish are detected by the acoustic system to determine the species composition and to collect other biological information from the sound reflecting layers (a.k.a. “backscattering”).

Oceanography: Concurrent physical, chemical and biological data will be collected to assess water column properties and the food fields upon which the fish depend. The water column properties include the distribution of water mass types defined by temperature, salinity and density profiles, and the flow fields setting the boundaries and distribution of the water masses. The physical information will be provided by CTD (conductivity – temperature – depth) measurements. Plankton tows completed in conjunction with the CTD measurements will collect the samples needed to quantify the species composition, abundance and biomass of the zooplankton available to the fish. The food fields available to the benthic fish will be assessed by sampling the invertebrates taken during the bottom trawls. The shipboard physical oceanographic sampling and zooplankton sampling will take place along 3 of the 10 cross-shelf acoustic transects described above.

Biological sampling: Researchers will collect and process archival biological samples. Fish otoliths and stomachs will be collected and stored for later laboratory analysis at AFSC, pending the availability of future funding. Fish and benthic invertebrate samples may also be collected and provided to collaborating scientists from other programs for analyses such as proximate composition, fatty acid composition, contaminants, and genetics.

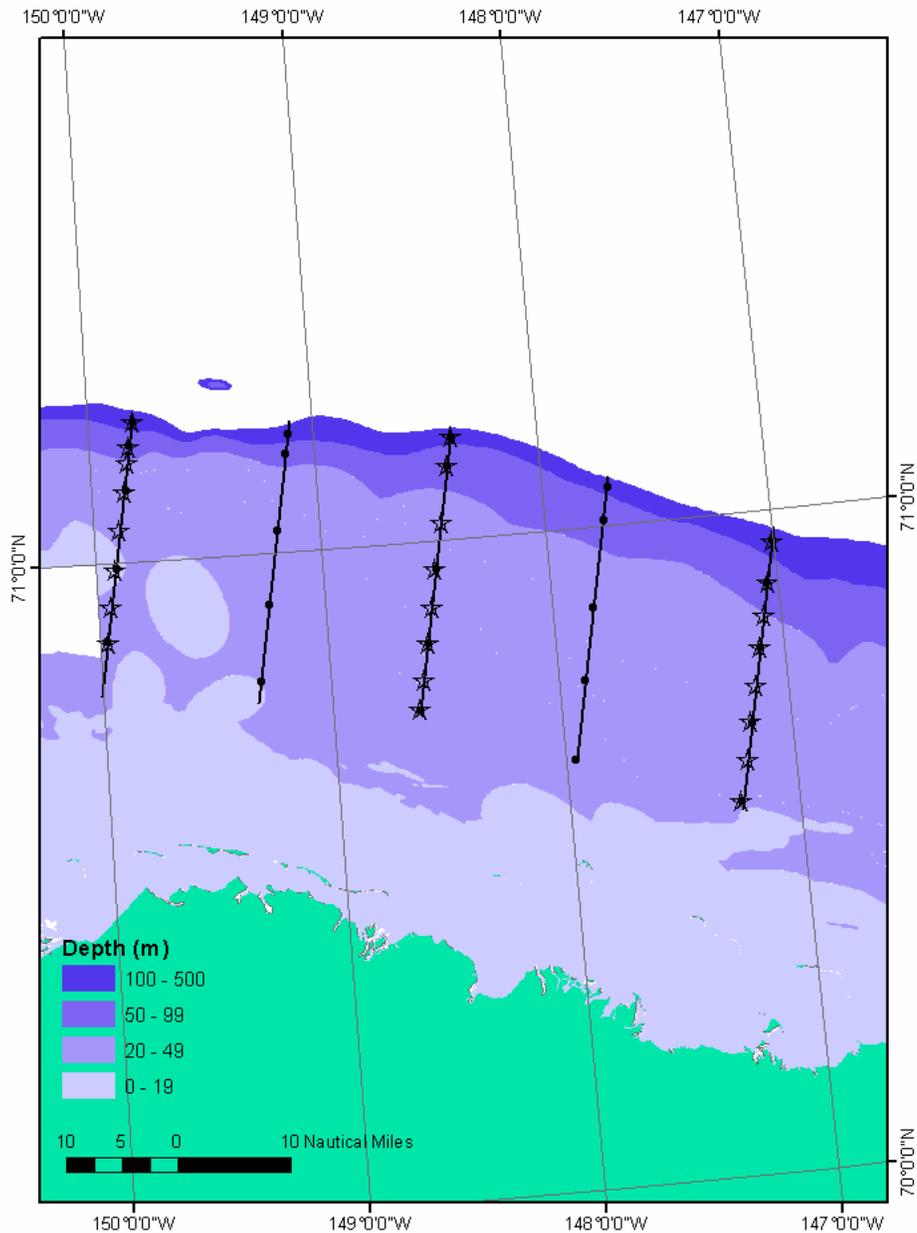


Figure 1. Design for a Charter Vessel (TBD) survey. The three darker blue areas show the three depth-defined strata (20 – 50 m, 50 – 100 m, and 100 m – 500 m). The black lines are the acoustic transects, the solid circles are bottom trawl stations and the stars are CTD and zooplankton tow stations.