

SOUTHWEST FISHERIES SCIENCE CENTER
FIRST QUARTER REPORT-FY 2002
For the Period Oct 1 - Dec 31, 2001

Submitted By: John Hunter, Director, Fisheries Resources Division.

Title of Accomplishment or Milestone: Complete and submit a manuscript describing "An Estimate of Error for the CCAMLR 2000 Estimate of Krill Biomass," to the Special CCAMLR 2000 Issue of Deep Sea Research.

Current Status: Completed.

Background Information: During the austral summer of 1999/2000, the Antarctic Treaty Organization's Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), sponsored the third and most extensive multi-ship, multi-national acoustical survey of krill dispersion and abundance in the Antarctic Peninsular Area of the Southern Ocean (FAO statistical area 48). CCAMLR's Working Group on Environmental Monitoring and Management requires estimates of the standing stock of *Euphausia superba* and the uncertainty about that estimate, to manage the krill fishery. Traditionally, estimates of error in surveyed biomass are limited to that caused by sampling.

Purpose of Activity: The aim of this work was to estimate the total error in the CCAMLR 2000 krill biomass estimate, including both sampling and measurement errors. Potential sources of measurement bias were also explored and discussed.

Description of Accomplishment and Significant Results: Most of the components of measurement uncertainty are covariant. Consequently, the total error in the CCAMLR 2000 estimate of krill biomass was collectively estimated using a Monte Carlo simulation which assumes independent estimates of krill biomass are derived from acoustical backscatter measurements at three frequencies (38, 120, and 200 kHz). This novel method showed that the overall coefficient of variation ($10.2 \leq CV \leq 11.6\%$; 95% confidence interval) is not significantly different from the sampling variance alone ($CV = 11.4\%$).

Significance of Accomplishment: Results show that the measurement variance is negligible relative to the sampling variance due to the large number of measurements averaged to derive the ultimate biomass estimate. However, some potential sources of bias (eg. stemming from uncertainties in the *TS* model, the krill length-to-weight model, the species delineation method, bubble attenuation, signal thresholding, and survey area definition) may be more appreciable components of measurement uncertainty.

Problems: None

Contact: David Demer (858-546-5603); david.demer@noaa.gov