

ICES/PICS 6ZPS 2016/Special session: 1. Application of optical and acoustical methods in zooplankton studies

Title:

What we're learning from acoustic surveys of euphausiids in the Bering Sea, the Barents Sea, and the Gulf of Alaska (a tale of the once and future ping)

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Abstract:

Over the last 10 years, acoustic-trawl survey methods for euphausiids ('krill', principally *Thysanoessa* spp.) have been developed and applied in several high-latitude ecosystems, including the Bering Sea, the Barents Sea, and the Gulf of Alaska. The basic approach is to use 1) multifrequency acoustic backscatter data collected during acoustic-trawl surveys of midwater fish and targeted macrozooplankton trawls to classify euphausiid backscatter, 2) trawl catch to estimate euphausiid size and species composition, 3) a physics-based scattering model to estimate euphausiid target strength, and 4) optical methods when feasible to provide additional 'sea-truth' information. Our results suggest that euphausiids are found in identifiable layers and patches during the daytime, that euphausiids dominate backscatter from similar zooplankton targets in these systems, and that these surveys provide valuable information on the abundance and distribution of this important taxon. We've used these data to better understand top-down and bottom-up effects on euphausiid abundance, to model predator and prey distribution, to inform ecosystem-based fisheries management, and to attempt quantitative comparisons among nets, acoustics, and ecosystem models. Remaining methodological challenges include reconciling acoustic and net capture estimates of abundance, evaluating the effects of TS uncertainty and net avoidance, improving the use of optical methods to provide additional sea-truth and observe euphausiid orientation in situ, and further developing the use of euphausiid survey data in ecosystem based fishery management.

Keywords:

Acoustics, euphausiids, zooplankton, biomass, abundance, consumption, monitoring, Bering Sea, Barents Sea, Gulf of Alaska, ecosystem based fishery management

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