

Adult Fish Sampling: Preliminary Summary of Accomplishments

David Stein (NOAA/National Systematics Laboratory)

Catherine Mecklenburg (Point Stephens Research, Auke Bay, Alaska and University of California Santa Barbara)

Boris Sirenko, Zoological Institute, Russian Academy of Sciences, St. Petersburg



*Kitty
Mecklenburg,
Photo: B. Sheiko*

The project team consists of the Principal Investigator, D. Stein (NOAA/National Systematics Laboratory), and Co-Investigators C. Mecklenburg (Point Stephens Research, Auke Bay, Alaska and University of California Santa Barbara), N. Chernova, and B. Sheiko (Zoological Institute, Russian Academy of Sciences, St. Petersburg). Stein, Mecklenburg, and Sheiko participated in the cruise. The general objective was to study the effects of climate change on adult benthic fishes of the northern Bering Sea, Bering Strait, and Chukchi Sea. To accomplish this, we proposed to sample these fishes to achieve the following specific goals: 1) to provide baseline data on the species composition, distribution, and relative abundance of the fish community; 2) to try to use the distributions of “indicator species” (those with distributions related to warm and cold waters) to test the hypothesis of faunal change mediated by physical parameters related to climate; 3) to collect specimens of species of which the taxonomy is poorly known and to resolve those problems if possible; and 4) to photograph fresh specimens to record their life colors and appearance to assist in identifications.

We used the R/V *Professor Khromov* to tow a 7.1 m (21 foot) (headrope length) otter trawl with 3.7 cm (1.5”) stretch mesh to collect benthic fishes. We made 27 tows at depths from 33 to 101 m, and collected a total of 1881 individuals



*David Stein, Photo, K.
Mecklenburg*

representing at least 24 species of the approximately 97 known to occur in the sampling area. Where possible, tows were paired at each station, and fished 10-15 minutes on the bottom. All captured individuals were identified to the lowest possible taxon and their total length measured. Specimens of particular interest were preserved in formalin (and in a few cases, ethanol) for later study. These will be deposited at the United States National Museum of Natural History, the California Academy of Sciences, the Zoological Institute, and other collections as appropriate. Mecklenburg and Sheiko photographed live or recently dead individuals of all species collected during the cruise, including those from the beam trawl used by the larval/juvenile fish team. Such photos provide material for accurate

description of species and assist in identification ashore. Tissues were removed by Stein from some specimens of liparids for genetic analysis.

Results of the cruise with regard to objectives 1, 2 and 3 (as stated above) await a full analysis ashore. Objective 4 was fully accomplished, although we had hoped to collect more species.

Quantitative results of sampling will be analyzed later, but we can draw several qualitative conclusions now: first, that the Chukchi benthic community is highly diverse and patchy, and second, that both fish abundance and diversity seem lower in the Chukchi Sea than in the Bering Sea. The largest catches occurred to the south, and were usually at least one order of magnitude higher than those in the north. We will analyze the relationships of abundance, species diversity, and geographic location (e.g., substrate and benthic community) later. In addition, we believe the collections include at least several minor range extensions: a small (125 mm total length, TL) specimen of

Hippoglossoides robustus (Bering flounder) collected at Station 85 (ca. 72° 18' N) extends the northernmost record from 71° 49' N in the eastern Chukchi Sea. A *Theragra chalcogramma* (walleye pollock) of 105 mm TL collected at Station 61 represents a similar extension of known range to the north: at 71° 23' N compared to the previous record of 69° 26' N. Our collections probably include other range extensions, but these data will be analyzed after the cruise when literature and museum specimens are available for verification. Our collections also may include some individuals of rare snailfish (Liparidae) species, but the identifications of these specimens must be verified before a conclusion can be reached. Catches will be entered in an Access database to allow analysis of distributions of the species collected and subsequent analysis in relation to previous physical and biological data, as well as depiction in GIS-generated maps. We hope to be able to coordinate our analysis with the results obtained by the other participants in RUSALCA.