

An ecosystem-based assessment of the Bering Sea pollock recruitment and spatial distribution

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Results of study of the Bering Sea pollock recruitment indicated that there are two large completely geographically isolated reproductive stocks in the Bering Sea: in the eastern Bering Sea and in the western Bering Sea. The spawning area of the eastern Bering Sea pollock is located from the central and eastern Aleutian Islands, across the southeastern Bering Sea shelf, to Anadyr Bay. The reproduction area of the western Bering Sea pollock is located in the Olutorskiy and Karaginskiy Bays.

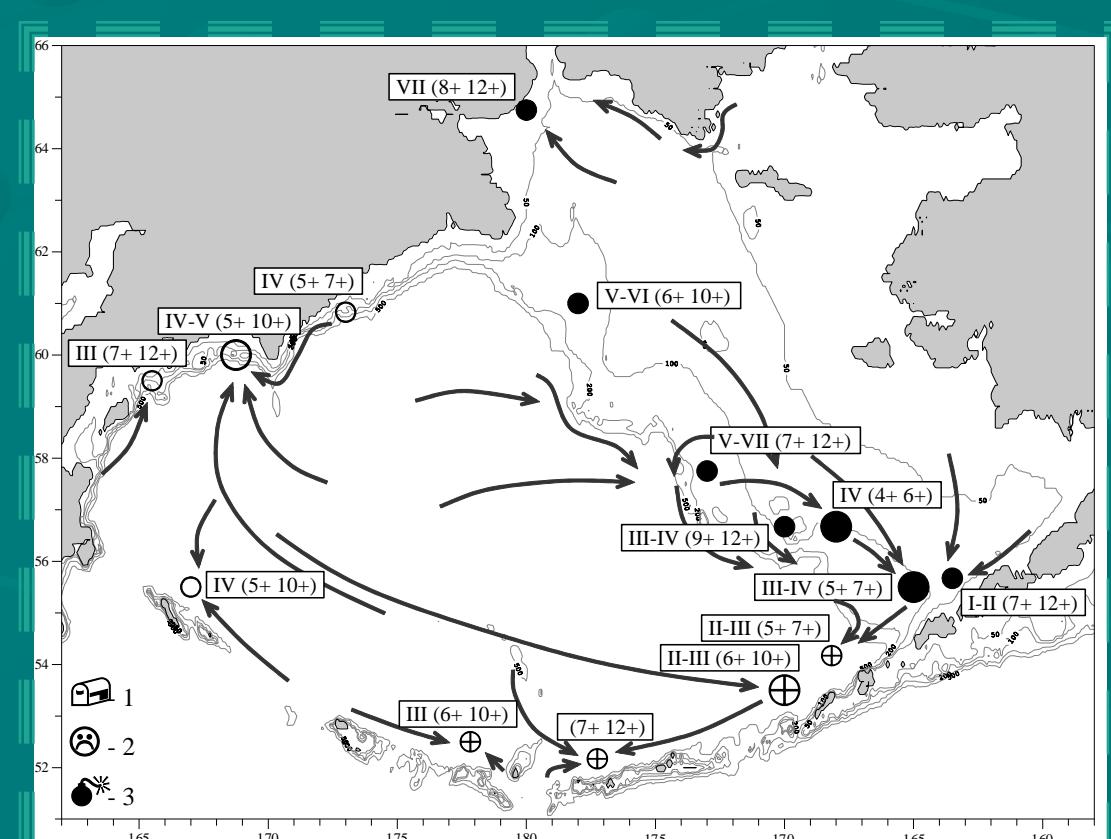


Fig. 1. Distribution of spawning concentrations and general direction prespawning migrations of the eastern Bering Sea pollock (in shelf area – 1, off Aleutian Islands – 2) and the western Bering Sea pollock (3). Months of most intensive spawning indicated by roman numbers, predominated age of spawning pollock – by regular numbers. Diameter of the cycles reflects scale of spawning concentrations.

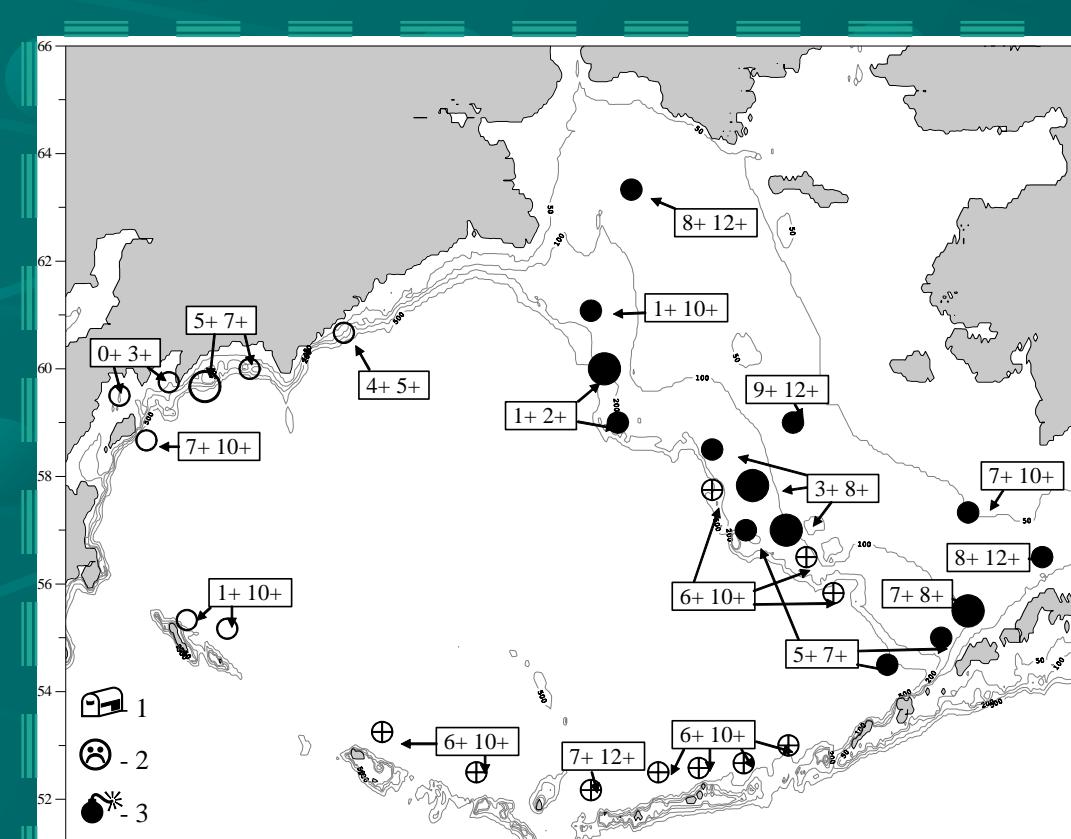


Fig. 2. Locations of winter concentrations of the eastern Bering Sea pollock in shelf area (1), off Aleutian Islands (2) and of western Bering Sea pollock (3). Indicated predominant pollock age in winter concentrations. Diameter of cycles reflects scale of winter concentrations.

The time series of surveys suggested that in the eastern Bering Sea there are two distinctly different stable spawning grounds: one on the shelf area and one in the deep water adjacent to the eastern and central Aleutian Islands. Spawning pollock behavior in the eastern Bering Sea supported the hypothesis that shelf and deepwater spawning pollock are completely independent reproductive stocks.

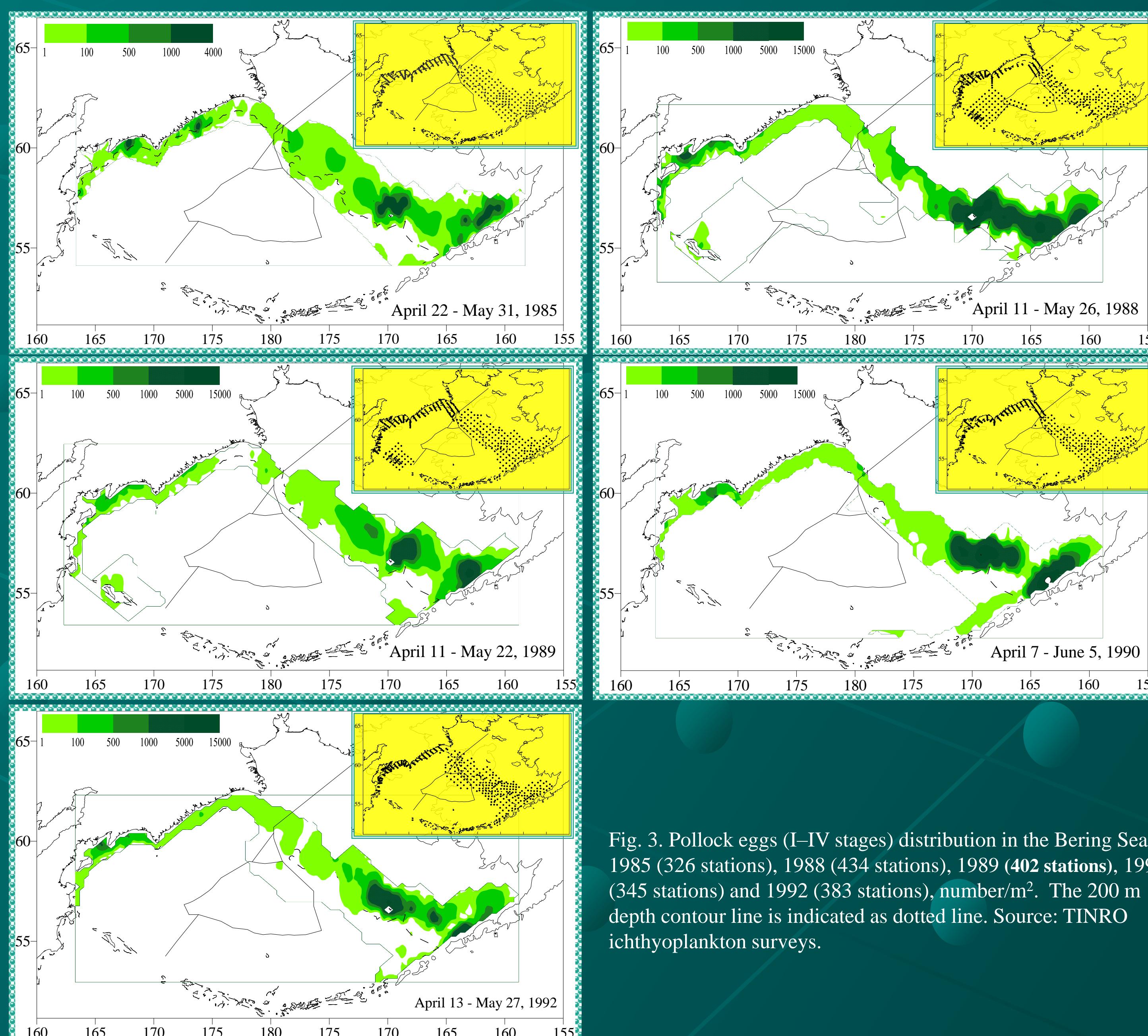


Fig. 3. Pollock eggs (I-IV stages) distribution in the Bering Sea in 1985 (326 stations), 1988 (434 stations), 1989 (402 stations), 1990 (345 stations) and 1992 (383 stations), number/m². The 200 m depth contour line is indicated as dotted line. Source: TINRO ichthyoplankton surveys.

The annual variation in the spatial distribution of eastern Bering Sea pollock during summer-autumn depended on the abundance and distribution of large zooplankton, water temperature, total biomass of pollock, and its age composition. The annual changes in physical oceanographic conditions, productivity, and species composition of the zooplankton community were associated with significant differences in pollock seasonal migrations and distribution, reproduction, survival of recruits at early stages of development, and ultimately the abundance of year classes and total biomass of pollock.