

Annual Variation in the Distribution of Cod (*Gadus morhua*) in the Southern Gulf of St. Lawrence*

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Abstract

Age-specific distribution of cod (*Gadus morhua*) in the southern Gulf of St. Lawrence (NAFO Div. 4T) was described with respect to depth, temperature and broad geographic region for the period 1971–90 using Poisson regression models. Effects of all three factors on distribution were highly significant for many ages and years. Extra-Poisson variation, which may reflect the degree of aggregation or clumping, was greater at younger ages and in years of higher abundance. Distribution in relation to depth was age dependent, even after accounting for indirect effects of temperature on distribution. Older cod occurred at greater depths. In contrast, distribution in relation to temperature was independent of age in most years. Annual variation in the estimated temperature of maximum catch rate was correlated among age groups and with annual variation in bottom temperature.

Abundance of cod in the southern Gulf of St. Lawrence changed dramatically during the 1971–90 period, from low levels during 1971–78 to high levels in later years. Distribution also changed between these two periods. The age–depth relationship was significantly steeper during the later period of high abundance, and broad areal changes in distribution occurred between the two periods. Cod were concentrated in the western part during the earlier period when abundance was low. Distribution shifted toward the central and northeastern parts during the later period when abundance was high. Possible causes of these changes in distribution are discussed particularly with reference to environmental quality preferences and competition.

Key words: Cod, *Gadus morhua*, depth, distribution, temperature

* The full report of this study is found in *NAFO SCR Doc.*, No. 91/104, Serial No. N1996.

