

Northwest Atlantic



Fisheries Organization

Serial No. N2012

NAFO SCR Doc. 91/119

SCIENTIFIC COUNCIL MEETING - SEPTEMBER 1991

The Migration Pathways of Atlantic Cod (*Gadus morhua*) on the NE Newfoundland Shelf: a Model Based on Oceanography and Fish Behaviour

by

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We have developed a biophysical spatial model to analyze the migration patterns of Atlantic cod (*Gadus morhua*), and simulate availability to the fisheries, on the NE Newfoundland Shelf. The model generates predictions of cod distribution at large and small scales based on inputs and assumptions derived from theory from fisheries oceanography, ecology, behaviour, and physiology. Specific predictions are being tested with physical oceanographic, fisheries acoustics, trawling and tagging data collected through monitoring programs being conducted under the OPEN and Northern Cod Science Programs. Some initial predictions to be tested are: 1) that cod undertake post-spawning "feeding" migrations in large aggregations from the outer Shelf area to the inshore; 2) that they do so with the prevailing currents and within waters having favourable (e.g. 0-4°C) temperatures; 3) that in keeping with 1) and 2), there exist only a few likely "pathways" within which the migration takes place; 4) that the pathway taken depends on the point of origin (the spawning areas) and on thermal variations at relatively large spatial and temporal scales; and 5) that the rate of migration and fragmentation of the aggregations as they approach shore is regulated simultaneously by physical factors and by the distribution and abundance of prey encountered (especially capelin, *Mallotus villosus*). In this presentation, our methods and some preliminary results are described.

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