

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

G. A. Rose, L. Fahrig¹, and S. Narayanan
Department of Fisheries and Oceans, Science Branch, P. O. Box 5667
St. John's, Newfoundland, Canada A1C 5X1

B. DeYoung
Department of Physics, Memorial University
St. John's, Newfoundland, Canada A1B 3X7

and

C. Walters
Ecology Group, University of British Columbia
Vancouver, B.C. V6T 1W5

Abstract

This biophysical spatial model was developed to analyze the migration patterns of Atlantic cod (*Gadus morhua*), and simulate availability to the fisheries, on the Northeast 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 Ocean Production Enhancement Network (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° to 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 were described.

Key words: Cod, *Gadus morhua*, currents, distribution, east coast of Canada, feeding/food

¹ Present address: Carleton University, Dept. of Biology, Ottawa, Ontario

* The full report of this study is found in *NAFO SCR Doc.*, No. 91/119, Serial No. N2012.

Blank