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Report of the 1985 Meeting of Marine Environment and Ecosystems Subcommittee of CAFSAC

by

J. C. Rice

Department of Fisheries and Oceans, Fisheries Research Branch
P. O. Box 5667, St. John's, Newfoundland, Canada A1C 5X1

The 1985 meeting of the Marine Environment and Ecosystems Subcommittee of CAFSAC (MEES) included three sessions of presentations and a closing discussion session.

Session I was on the topic "Interaction of Biologists and Economists". Initially there were two objectives for the session:

1) to document and evaluate situations where socio-economic factors are believed to have influenced fishery statistics or input to assessments.
2) More generally, to consider the context in which this type of information might be made available to the assessment process.

Presentations focused on the second objective.

Papers presented in the session were:

1) A History of Bioeconomic Deliberations Within CAFSAC by R. Mahon
2) Biology and Socioeconomics: The 4VWX Herring Fisheries as a Case Study by P. Mace
3) Bioeconomic Modelling in Fisheries Management by J. McGlade

The papers and ensuing discussion did not produce specific recommendations. Rather a number of general concerns were expressed. Drawing from the final report of the meeting, the question which emerged repeatedly in the discussion was whether CAFSAC had the means to cope with the complexity and unpredictability which characterize most fisheries. The development of tools for examining longer term objectives of fishery management is in progress. As they develop, these tools will result in the

availability of new kinds of information to fishery managers. They will enable managers to explore the possible consequences of implementing various management strategies given the observed complexity and unpredictability.

The Subcommittee expressed concern that CAFSAC should begin preparing itself to be able to evaluate advice on socio-economic aspects of fisheries management as such information becomes available.

Session II addressed cod-capelin interactions. The session was to review the potential application of information on cod-capelin interactions in the provision of scientific advice on the management of both species. Two specific management problems were addressed:

1) How much capelin is required as forage by 2J+3KL and 3NO cod, and how much can be taken by a fishery?
2) What is the influence of the inshore migration of capelin on the availability of 2J+3KL cod to the inshore fishery?

Following a brief introduction, four papers were presented.

1) Cod-capelin Interactions off Labrador and Eastern Newfoundland: A Review by G. Lilly
2) An Examination of Factors Affecting Catch in the Inshore Cod Fishery of Labrador and Eastern Newfoundland by W. H. Lear, J. W. Baird, J. C. Rice, J. E. Carscadden, G. R. Lilly, and S. A. Akenhead
3) Cod Predation on Capelin in the Gulf of St. Lawrence by K. Waiwood
4) Relationship of Capelin Abundance and Condition Factor of Cod in Division 2J3K by R. Wells

A general discussion followed. Three major analysis projects worthy of immediate attention were identified, including:

i) refinement of an index or estimate of the amount of capelin available;
ii) improved resolution of the spatial and temporal overlap of cod and capelin; and
iii) analysis of cod growth rate, condition, reproductive effort and other parameters likely to depend on food supply and their relationship to capelin abundance and availability.

Five new research projects were also identified; including:

1) Studies on the thermal preferences, temperature tolerances, and metabolic responses of both cod and capelin to the range of very low temperatures that occur in Northwest Atlantic waters (i.e. ranging down to circa -1.5C).

This would relate in particular to the ability of cod to penetrate the cold Labrador Current layer in spring, and in general to the predation activity and food consumption rates of cod in cold waters.

2) Improved estimates of the abundance of cod inshore. Inshore landings are at present the only index of abundance; effort data will be required before the interannual and spatial patterns of cod abundance can be evaluated and related to the environment. Better resolution of the source of inshore landings (deep or shallow) is a component of this problem.
3) Variability in timing of the spawning migration of capelin, and its relation to the inshore migration of cod.
4) Local distribution of cod and capelin nearshore prior to and during the migration would provide information on the migration patterns and cues. This would require dedicated cruises.
5) Local information on the physical environment in the core of the Labrador Current at several inshore stations. At present, Station 27 is the only source of information on ocean climate in the Newfoundland area.

Session III addressed environmental effects on recruitment to Canadian Atlantic fish stocks. The two objectives for the session were:

1) examine potential influences of the environment on recruitment; and
2) recommend indices of environment-recruitment relationships which may be appropriate for use in setting management advice.

Eleven papers were presented:

1) The Problem of Estimating the Size of the Recruiting Year-class for Input to Catch Projections by R. Mahon
2) Difficulties of Isolating Environmental Variables to Relate to Recruitment Data by R. Loucks and R. Trites
3) A Critique of Hjort's Second Hypotehsis with Emphasis on Wind-induced Transport by R. Page and K. Frank
4) Computing the Linkage Coefficient Between Flemish Cap and the Labrador Current: Recruitment Consequences by S. Akenhead
5) Possibilities and Pitfalls of Relating Environmental Signals and Recruitment in Several North Atlantic Stocks by M. Dadswell
6) Effects of Temperature on the Timing of Spawning of Atlantic Herring in the Gulf of St. Lawrence by S. Messieh
7) The Influence of Gulf Stream Gyre Activity on Recruitment Variability in Pollock by J. McGlade

8) Sutcliffe Revisted by K. Drinkwater

9) Climate and Fish Recruitment in the Northwest Atlantic: A Reconsideration of the Influence of River Runoff by T. Koslow

10) Evaluation of a Model of Southern Gulf Cod Net Production by B. Doubleday

11) Predicting Recruitment from Stock Size Without the Mediation of a Functional Relation by J. Rice and G. Evans

These papers, or their abstracts, will be published as a Special Publication in the Canadian Fishery and Aquatic Science series. Following a discussion of the papers, the Subcommittee agreed on three recommendations:

1) A Working Group be formed, consisting of a statistician, a fisheries biologist familiar with assessment methodology, and a physicist familiar with Sutcliffe's original work. The terms of reference of the Working Group would be to identify appropriate statistical methods for analyses of the original data available to Sutcliffe, and to redo his analyses using these methods.

2) Subsequent to the results of (1), MEES should consider the use of more appropriate fishery and environmental data in these correlations, such as VPA, and use the agreed-upon statistical methods to examine their relationship with environmental parameters. Other new approaches should also be considered at this step.

3) Subsequent to the results of (2), MEES should examine the derived environment-recruitment relationships, based on the agreed statistical methodology, on a stock-by-stock basis, and determine methods to incorporate these relations into stock assessments.

The next meeting of MEES is scheduled for early November, 1986. Two sessions of presentations are currently planned. The first session will be a workshop on the tools used in bioeconomics, as they may relate to assessment methods. Emphasis will be placed on practical methods rather than abstract concepts. The other session will review the present status of studies on juvenile fish. The session will examine evidence of the age by which year-class strength is determined, the distribution of juveniles relative to adults, and problems of sampling and survey design for juveniles. Reports of Working Groups formed to address recommendations of last year's sessions will also be presented.