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Problems of Fishery Management: Precautionary Approach and Some Others

by

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Abstract

The comments are presented concerning some results of NAFO Scientific Council Working Group Meeting in June 1997 devoted to development of strategy for precautionary approach to commercial fish populations management. The doubt is expressed concerning possibility of scientifically substantiated assessment of some reference points. Considerations relevant to general principles of fishery management for fishes with approach abundance fluctuations and relatively constant recruitment are presented.

Introduction

Results of NAFO Scientific Council Working Group Meeting in June 1997 devoted to development of strategy for precautionary approach to fishery management evidence significant progress in the above problem. However, it seems not useful to consider the above said approach as the sole possible management strategy at present. Definition of some reference points items (criteria), proposed by the Working Group and approved by the Scientific Council are doubtful. Therefore, significant uncertainty still exists in the problem considered, which will be commented below.

Approaches to Management and Discussion

First of all, it seems useful to clear up the difference between "the precautionary approach" (PA) and strategy of optimal fishery management. The idea of the latter may be generally defined as the maintenance of equilibrium between stock size and fishery mortality rate, while the main feature of the former is a slope towards predominance of the measures to restrict exploitation rate and, hence, the total allowable catch (TAC). In principle such approach is reasonable in conditions of current frequently extremely intensive fishery, and is commonly applied in NAFO area at present. Several examples are presented below:

Silver hake Div. 4VWX

As a rule, only values resulted in the lower estimates of the stock and TAC (average weight-at-age, recruitment abundance, terminal F are selected from several input parameters values, utilizing in the analytical model.

Capelin Div. 3NO

Exploitation rate (even for good condition of the stock) is estimated at the level of 5-10%, which is significantly below the optimal F value due to high natural mortality of the species.

Redfish Div. 3LN

Since no convincing evidences of the fact that the same stock distributed in zones Div. 3LN and 3O, and at present the bulk of it lives in zone Div. 3O are presented, moratorium for redfish fishery in Div. 3LN was enforced in 1998. The ban of the target fishery for several stock units of cod and flat fishes in Subareas 2 and 3 is still applied which may be considered as the highest stage of precautionary approach. The lack of clear criteria required to determine scientifically substantiated strategy of fishery.

management should by considered as the weak point of careful measures. Certainly, definition and evaluation of the above said criteria is uneasy task. In June 1997 the Scientific Council made an attempt to solve the first half of the task by means of proposing 3 reference points for biomass and 3 for fishing mortality (Serchuk *et al.*, 1997). The following remarks refer to the first group of criteria (for biomass) which constitute the basis for development of other criteria (for fishing mortality).

B_{lim} - is determined as the level of spawning stock biomass that the stock should not be allowed to fall below.

The wording itself is doubtful. Whether such biomass level is available in the nature which may guarantee the stock non-decrease. Information on many fish populations abundance dynamics evidence that actually any spawning biomass may associate with total stock abundance fluctuation. Certainly it frequently occurs in short-life-cycle fishes with pronounced abundance fluctuations, caused mainly by environmental factors variability. The above wording is hardly related with the interpretation of Riker's curve "stock-recruitment". Indeed, how shall we interpret B_{lim} in the light of the fact, that spawning biomass when exceeding some specific level, starts to affect negatively the reproduction process. Therefore, exceeding of specific level of biomass may cause subsequent decrease of the stock. It is probable that the above said means the necessity to fix both lower and upper limits of B_{lim}.

B_{buf} - is estimated as a level of spawning stock biomass, above B_{buf}, that acts as a buffer to ensure a high probability of B_{buf} not reached.

Evidently, the above criterion is useful only if the previous one is available which value is known for the unit stock considered, However, as is shown above, precise estimation of B_{lim} is rather problematic. If it is so, discussion of B_{buf} estimation is useless. B_{tr} - is the target recovery level. For overfished stocks this is the total stock biomass level which would produce maximum sustainable yield (MSY).

We may agree with the above definition, however, from the point of view of scientific background, the other one seems to be more attractive, namely, "the level of (optimal) spawning stock biomass which provides the most probable successfully annual reproduction".

Concerning the methods of precautionary points definition, proposed by the Scientific Council, the task seems to be realistic, if no purpose to obtain biologically backgrounded estimates is implemented. However, there should be no any illusions concerning the estimates obtained, which are conditional to significant extent. Certainly, in the latter case the principle of precautionary approach also will be observed. The problem is to what extent the limiting criteria will correspond to the actual dynamics of stocks and promote favorable conditions to maintain long-term and relatively sustained fishery of the object considered.

In conclusion, I would like to specify some considerations concerning principles of fishery management without any details (Rikter, 1970; 1977; 1981).

1. Fish species with sharp fluctuations of abundance.

   Strategy of fishery management, based on maintenance (as far as possible) of the spawning biomass at the optimal level, assumes unavoidable sharp (however controllable) fluctuations of fishing effort in compliance with the spawning biomass variability. Evidently, transfer from one fishery regime to another should be carried out in due time. In particular group of species is concerned; we should not rely upon the long-term stability. We may speak only about short-term relative stability of the stock.

2. Fish species with relatively stable recruitment.

   Besides natural catastrophes, fishery is the major reason of the above said species abundance decrease, which determines the management strategy, aimed at providing the stable and economically profitable exploitation. For that purpose it is required only to keep fishing mortality at the fixed optimal level from the very beginning.

Thus, possibility of strategy selection to maintain the stable exploitation rate without sharp fluctuations of fishing effort constitutes the principle difference of the above group of species fishery management unlike the previous one.

The above said evidence that the pattern of appropriate populations abundance dynamics should be considered in development fishery management strategy.