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General summary of Assessments Subcommittee Report
(as presented to STACREM at the Special Commission Meeting, 17 January 1973)

by

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This Commission has previously been advised that in order to achieve the MSY of each species, it is desirable whenever possible to control them by species specific regulations and acting on this advice, you have established a system of catch quotas. That advice is still valid but experience has now shown that in mixed fisheries, problems may arise owing to the interactions between fisheries for regulated species, and between fisheries for regulated and unregulated species in the same area. The bycatch tends to reduce the efficiency of the system of catch quotas and leads to difficulties in enforcement and it does not overcome the risk of rapid depletion of unregulated species where a bycatch of regulated species may also occur. Research and Statistics has, therefore, spent a week searching for adjustments to the existing system which could assist the Commission in its objectives and in relation to the US memorandum on Subarea 5 and Statistical Area 6, and the Canadian questions. My following remarks relate only to Subarea 5 and Statistical Area 6.

The catch statistics for the combined area are in Table 1 of the Report. Effort statistics expressed as standard units of US side OT 0-50 trawler days fished are in Table 2 and both tables are summarized in Table 3. I will return to the question of standardization in a moment. We next reviewed the status of the resources using two methods to estimate the total resource, irrespective of species, and one method which puts together the individual components of the resource. These are summarized in Table 4. The status of the resources has been determined in detail for 1971 because detailed figures for 1972 are not available and this status will, of course, be modified by events in 1972. From discussion of data from US overflights in 1972, Research and Statistics considers fishing has increase since 1971 considerably in excess of 10%, almost all of the increase being in the early part of the year, but there is no indication how much was directed to regulated or unregulated species. The review of status also established that there is no evidence in either research or commercial data of substantial finfish resources on the continental shelf which are not already subject to a commercial fishery.

We then went on to analyze the mixture of species in the various fisheries, estimating for each fishery directed to one species the amount of fishing mortality it causes in bycatch species and relating this to the amount of fishing on each species in standard units. The detail of the analysis is in Appendix Tables 1-2. The summary in Table 6 shows the extensive overlap between fisheries for particular groundfish species and extensive overlap between the fisheries for pelagic fish. The silver hake fishery overlaps both groups and the groundfish and pelagic species fisheries at either end of the spectrum still overlap to some extent. Research and Statistics noted that the effect of the bycatch on the fishery for the bycatch species will be accentuated if they are being taken as small fish below the optimum size of first capture.

Research and Statistics then considered what form of management might best assist the Commission to improve the efficiency of its regulations. So far as catch quotas are concerned, an extension of the present limits to include currently unregulated species would overcome one of the objections in the US memorandum but it would not overcome the bycatch problem. An overall limit on effort would have the same features. Research and Statistics considered it impractical to try to regulate effort on separate species as for catch but there remain options to regulate separately in Subarea 5 and Statistical Area 6, by groundfish or pelagic species groups, or by a combination of both. We discussed the first though it is not fully covered in our Report. In fact, most of the resources are restricted to Subarea 5 and Statistical Area 6 but the boundary between the two bears no relation to stock boundaries and so the estimation of the desirable effort in Subarea 5 or Statistical Area 6 separately is very difficult, in terms of the objectives of the Commission. Separation of pelagic and groundfish components would be difficult to enforce because many vessels can switch their type of fishing from day to day and even between hauls. The fishery in Statistical Area 6 is aimed primarily at pelagic species but a bycatch of regulated groundfish species still occurs which influences the efficiency of regulation of the groundfish species involved. Research and Statistics also noted that countries might find a regulation which

limited them to a specified amount of one species group or another, an undesirable constraint on the efficient management of their national fleet. We therefore proceeded on the lines that if the Commission should wish to control fishing effort, then an overall limit for all species in Subarea 5 and Statistical Area 6 is biologically the most meaningful.

Turning now to the question of standardization of fishing effort, this principle is a fundamental necessity in order to judge the relative importance of each fishery in the context of the total amount of fishing in the area. Research and Statistics adopted the 0-50-ton US side otter trawler as standard using an average value of comparability between this standard and each country to trace the development of the fishery in the last decade. It was chosen because it is the unit most consistently available over the years. This involved the use of a learning factor for some years when a new entrant joined the fishery. The choice of learning factor influences the amount and rate of increase in fishing effort since 1961. Research and Statistics also found that because of variability of the estimates for each country from year to year, it is not possible to define the contribution of each country to the total fishery in each year in sufficiently precise terms to define their participation in historic terms. We concluded, however, that the vessel comparisons are sufficiently consistent that the choice of another standard would have given similar results. However, the answers to the Canadian questions depend only on the situation in 1971 and although the rate of increase led up to the 1971 situation, scientifically it is not relevant to any changes that might be necessary from the 1971 situation to achieve Commission objectives. So far as the exact situation in 1971 is concerned, the choice of standard is not relevant either. That computation has been based on the comparisons of catch per day fished of each country in 1971 to give their relative performance. These relativities in Table 7 indicate that the largest trawlers catch about 8 times as much per day as the standard vessel. As we have used these values we have assumed each vessel fishes across the same kind of resources. This is not strictly true but we felt that to assume the largest trawler would only catch 8 times the amount the standard trawler did when fishing on the same resources would tend to under- rather than over-emphasize the relationships involved. Not only do the vessel comparisons remain the same whatever standard is chosen, but the adjustments that may be required from the 1971 level are independent too, being judged from the separate estimation of fishing mortality.

Research and Statistics, therefore, concluded the choice of vessel standard has no bearing on the scientific estimates provided in answer to the Canadian questions. The summary of estimates of both resources status and standard effort on them is given in Tables 9 and 10. Research and Statistics then went on to answer the Canadian questions. The three qualifications in the preamble to that part of the Report are important. Our approach has necessarily meant some simplification; the answers given do relate to 1971 and may be modified in the light of events in 1972 and, so far as the total fishery is concerned, the precision is limited by lack of information about mackerel which claimed the largest single share of fishing effort. With herring and silver hake, it heavily outweighs the amount of fishing on other species.

That said, the answers to the Canadian questions are as summarized in the Research and Statistics Report. I should perhaps say a word or two about the relation between the various percentages given. Explanation of the MSY given as 70-80% of the 1971 level is based on data in Table 4 and the estimates of derived fishing mortality with its associated fishing effort weighted by the size of each fishery as indicated in Table 10. The reduction of 80-100% to achieve the 1973 catch has wide limits because we await your conclusions regarding herring but also, because although we had one tentative estimate of effort to give the MSY of mackerel, we had no data to establish the amount of fishing necessary to give the estimated catch of mackerel in 1973. We worked on the principle of not encouraging the depletion of the resource until we know more about it and estimated the amount of fishing for mackerel to remain at the 1971 level. That level was higher than our tentative estimates of effort at the MSY for mackerel, so the level of reduction in effort to achieve the total catches in 1973 is less than the reduction to achieve the MSY of all species.

The level of effort needed to harvest species to be regulated in 1973 has been obtained by ignoring the mackerel fishery altogether. It gives the lowest figure because in taking out the mackerel fishery we also had to take out the fishing effort on species taken as bycatch with it. Strictly, if mackerel could be exploited independently, the reduction would be close to the MSY level.

The advice I have summarized is consistent with our advice in earlier years. It is obviously desirable to provide for the continued exploitation of recently developed fisheries but Research and Statistics could find no way which would allow complete freedom of fishing for mackerel and at the same time adequately conserve other regulated resources according to the Commission's current objectives. If the mackerel fishery itself were to be regulated by a catch quota, then all finfish resources known to attract a substantial commercial fishery would be under catch regulation. But the bycatch problem will remain under both an overall effort or catch regulation, and there is no clear-cut advantage to one approach or the other on scientific grounds. However, because the bycatch does tend to generate over-exploitation, if either is adopted, it would need to be set at a lower level than that defined by adding together the requirements for each resource component as if they could be fished completely independently of each other.