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ICES Special Meeting on Measurement of Fishing Effort
Copenhagen, September 1970

Report of Session 1.

Working Group Report: "Report of the Working Group to Study Characteristics of Fishing Vessels in Terms of their Effect on Fishing Effort Measurement".(B:3).

Mr. Pope emphasized the need for continuing interchange of information between biologists, economists, technologists and fishermen as stressed in the Working Group Report and suggested that the meeting ought to consider whether it should recommend the setting up of some formal procedure for achieving this.

Mr. Parrish asked whether the effect of skipper's skill was one which would be expected to change with time or whether it was constant with time. If the latter it would not introduce any long-term bias.

Mr. Mackett reported that in the California Albacore fishery no correlation could be found between the experience of the skipper and fishing power.

Mr. Michielsen stated that a study made in Belgium between fishing power and various characteristics of skippers had indicated a negative correlation between both the number of years spent on sea and skippers' age and fishing power. Training in fishing practice appeared to have had no effect on actual ability.

Mr. Vilhjálmsson said that what might appear as skipper's skill could in fact be due to particular characteristics of the vessel such as its manœuvrability.

Paper No.13: "Relationship between fishing power and vessel characteristics of Belgian beam trawlers" by P.Hovart and K. Michielsen

No comments.

Paper No.15: "Comments on the use of brake horse power as a parameter for the fishing power" by E.J. de Boer and

Paper No.11: "On the fishing power of Dutch beam trawlers" by E.J. de Boer and J.F. de Veen

Mr. Karger asked if the method given in the paper applied to vessels of different propulsive types (e.g. steam, diesel-electric).

Mr. de Boer confirmed that when the propellar data are known the method applied to all types of propulsion.

Dr. Thurow said that he had observed that the relationship between catch per unit effort and engine horse power could vary seasonally and that this showed the possibility of fish behaviour influencing such relationships.

Mr. Saville agreed that fish behaviour could influence such relationships in herring fishing.

Mr. Zijlstra stated that he had not observed such an effect in the case of bottom trawls.

Paper No.12: "Research on the fishing power of the Polish fishing fleet", by I. Borkowska-Kwinta

No comments.

Paper No.19: "Relations entre le pouvoir de pêche et les caractéristiques des chalutiers de La Rochelle dans le pêche du merlu" by R. Guichet

No comments.

Paper No.16: "Tonnage certificate data as fishing power parameters", by F. de Beer

Mr. Pope said that this paper clearly indicated the need in all causal relation studies to be certain that the variables included in any study did in fact measure what they seemed to measure.

Mr. Parrish asked if the different methods of measuring gross tonnage had any real effect on the present tonnage classifications used by international statistical reporting agencies.

Mr. de Wit pointed out that this, of course, depended on the classifications being employed but eventually the discrepancy would disappear after the new method of measurement was internationally accepted. It would take about 12 years after the enforcement of the Convention to re-measure the existing fleets.

Paper No.23: "Remarks on the relationship between fishing power and vessel characteristics (Stern trawlers with mid-water trawls)" by W. Karger

Mr. Zijlstra asked if it was not likely that catch size would be related to the freezing capacity of the vessels studied.

Mr. Karger said that this was not the case.

Paper No. 25: "Gill net and long-line fishing of Icelandic vessels: and analysis", by J. Blöndal

Mr. Cendrero asked if the number of hooks and the dimensions of the gill nets had been taken into account.

Mr. Blöndal replied that these factors were nearly constant in this study.

Paper No.21: "Fishing Vessel Statistics (OECD Report FI/T (69)6))", by Paul Adam

No comments.

Paper No.18: "Effort measurement in the trap fisheries for Crustacea" by A.C. Simpson

No comments.

General Remarks

Mr. Dardignac said it seemed as if horse power data should be converted to propellar thrust to permit further studies to be made and asked if a method was available whereby horse power can be converted.

Report of Session 2

Paper No.2: "Fishing unit measures", by A.I. Treschev

Mr. Pope said that basically he liked Dr. Treschev's approach but there seemed to be real problems when determining volume swept in deciding what should be measured and how the measurements could be accurately obtained.

Mr. Burd pointed out that effective volume swept was important but fish behaviour was also an important factor in this connection. In certain light conditions fish might see the bridles of a trawl more readily than in others so that a day/night effect might be introduced.

Mr. Saville said that if the fishery was operating at random with respect to the fish then volume swept was a useful measure in determining abundance, but if searching techniques were employed, as in pelagic fisheries, this was not so.

Mr. de Wit said that there appeared to be inconsistencies in the measurement of swept volume between bottom trawl and pair trawl, distance between the boards being used for the former while horizontal net opening was used in the latter.

Paper No.7: "Observations sur la définition d'une unité d'effort de pêche applicable à la pêcherie de thon de l'Atlantique tropical africain", by F. Poinsard and J.C. Le Guen

No comments.

Paper No.9: "A two-way AOV model for estimating standardized fishing effort applied to the U.S. haddock fleet" by H. Stern

No comments.

Paper No.10: "An automatic fishing time electronic recorder ("AFTER")" by R.B. Mitson and M.J. Holden and

Paper No.20:"Remarks on the measurement of the fishing effort from the economic standpoint", by Paul Adam

No comments.

Paper No.2a: "Classification of fishing gear", by A.I. Treschev and

Paper No.8: "Classification, definition and codification of fishing gear statistics", by A. von Brandt and L.P.D. Gertenbach

Mr. Parrish stressed the value of fishing gear classifications and in the present instance both systems reported appeared very satisfactory. It was necessary that a single system should be adopted and he suggested that the one given in Paper No.8 should be chosen.

Mr. Gertenbach pointed out that the classification given in Paper No.8 was a draft only and that it might profitably be revised after a fuller study had been made of the classification given by Dr. Treschev.

Report of Session 3

Paper No. 14: "Gross section production functions for North Atlantic Groundfish and Tropical Tuna Seine Fisheries - Measures of Fishing Power and their Use in the Measurement of Fishing Effort" by E.W. Carlson

Mr Adam pointed out that for the economist "time at sea" of the vessel was more useful, whereas biologists relied more on time spent fishing. However, it was felt necessary to combine both these concepts, so as to arrive at a common denominator, not the least due to the fact that usually more than one stock of fish was being utilised.

Mr Sokoloski pointed out that we need to know how much time the vessel actually used for fishing and how much time is spent searching for fish.

Mr Hildebrandt said that economists would assist biologists more if they also worked in terms of quantity, but they would then need time series of stock abundance indices.

Mr Sokoloski said that this was true to a certain extent. However, economists had to use the parameters more advantageous for their analysis of particular problems. The value terms could be translated into quantity.

Mr Dickie mentioned the behaviour or intentions of the fishermen as to the selection of fishing grounds and species, due to the influence of the market. It was felt that it was of value for the biologist to be acquainted with this factor.

Mr Sokoloski: In this respect one had to distinguish between a "regulated" and an "unregulated" fishery.

Mr Elísson referred to the groundfish operations of several Northern European countries, where prices are fixed.

Mr Adam: Regulation of a fishery under circumstances of fixed prices is difficult. Biological reasoning could lead to an untenable economic situation.

Paper No. 17: "A fishery-economist's problems with fishing effort" by A. Hildebrandt

Mr Boddeke asked whether exact information on percentage of the total landings of soles could be obtained, taking into account that by-catches would have to be eliminated.

Mr de Boer mentioned that when plaice prices are low, the fish is discarded and thus biological information is lost.

Mr Hildebrandt argued that the number of samples was possibly too small and said that it was questionable to take samples of the auction because of the motives of the fishermen when fishing for a certain market.

Mr Treschev pointed out that the biological optimum in Mr Hildebrandt's model was different from the economical optimum.

Mr Hildebrandt said that his paper pictured a static situation, but of course it was possible to describe the dynamics, but that would involve a great deal of work.

Paper No. 20: "Remarks on the measurement of the fishing effort from the economic standpoint" by Paul Adam

Mr Sokoloski mentioned the hypothetical concepts and the technical problems which the economists face and said that economists and biologists would have to intensify their collaboration in an order to create a sound scientific basis for management of fisheries, which otherwise would be based on purely political decisions.

Mr Elísson: Paul Adam in his paper criticises the biologists for not being able to submit sufficiently reliable data on the herring stocks which make forecasts possible. This is undoubtedly an important point. However, the criticism should be qualified somewhat due to

1) great difficulties in measuring the effort in the purse-seine fishery;
2) rapid improvement in fishing technique (these have made forecasting difficult).

Mr Adam: When biologists make forecasts they assume that the fishing effort will remain the same. Understandably, they cannot allow for the consequences of changes in techniques. Here economists and technologists could help.

Mr Letaconnoux: Is the economist able to foresee changes in demand and prices ?

Mr Sokoloski pointed to the work of FAO in this respect, as well as to studies made by individual countries.

Mr Adam: Evaluating the market is the economist's job. Consumers' habits do not usually change over night. In order to be able to assess the market, the economists need data from the biologists.

Mr Elísson: Economic forecasting should combine the fishery and the market.

Paper No. 22: " The concept of fishing effort as a tool of management" by P.H. Hughes

Mr Adam said that it was difficult to compare the catch/effort tables produced in the paper.

Mr Burd said that the species caught by the two countries and the operations of the fishermen were different.

Mr Bannister stated that when looking at the English ports as a whole, one would find a similar situation, for instance Fleetwood versus Hull and Grimsby.

Mr Sokoloski: In U.S.A. the strategy is to land the catch in the right port. This results in higher prices.

Mr Bannister: This raises the question of using value rather than quantity.

Mr Mackett: This indicates the necessity of cooperation between biologists and economists.

Mr Dickie stated that seasonal concentrations of fish would tend to regulate prices over a longer period.

Report of Fourth Session of Special Meeting on Measurement of Fishing Effort

The fourth session was devoted entirely to a general discussion of all topics raised in the first three sessions and also on the conclusions which could be drawn from the meeting.

The meeting itemised those factors which were recognised as contribution to the variability of catch per unit effort statistics. These were taken to be

a) fishing unit characteristics (vessel and gear)

b) methods of gear operation (tactics)

c) fish abundance

d) fish availability

e) economic desirability

f) "error"

The latter factor was interpreted as a "portmanteau" term including, in particular, the skill or talent of the skipper and crew. These factors were recognised as being inter-related in many ways and hence the effects of each could not always be separately studied. The meeting noted the results of the many studies aimed at measuring the degree of association between fishing success and vessel characteristics, a number of which were presented in the papers to the meeting.

The meeting felt that from both a biological and economic viewpoint the classes of data currently collected and published for certain methods of fishing were broadly satisfactory for the understanding and interpretation of effort statistics but that there could be important sources of error in some of these, particularly statistics of gross registered tonnage. The meeting noted a need for a uniform classification system of fishing vessels. The meeting also stressed the need, in this field, for continued close collaboration between biologists, economists and technologists. For fisheries in which aimed trawling formed a major component of effort there was at present no satisfactory measure of fishing effort and the meeting agreed the need for information on searching time. The meeting also noted the need for continued studies on how to relate different types of effort to one another. The meeting agreed that hope of abundance estimation free from the shortcomings of commercial fishery statistics lay, in the future, in the increased use of alternative methods. Methods which hold out promise in this way include various survey techniques such as research vessels, submersibles, acoustic devices underwater television and resource sattelites. Recent encouraging progress in the use of acoustic techniques in population estimation was noted.

The meeting was aware of a possible increase in the use of quota controls as a method of fishery regulation and recognised that this called for accurate methods of short-term forecasting of both stock abundance and fishing effort. Analyses presented to the meeting by economists indicated that the total production and total value in some mixed fisheries which have been studies are capable of a high degree of explanation in terms of fishing power and fishing time statistics. This implies that in making predictions for quota regulations biologists may have to adopt the economists method of taking a mixed fishery as a unit system. That is, aggregate data may offer a greater possibility for reliable short-term prediction of productivity level than do data for individual species.

This still leaves the problem of quota allocations for individual species and reinforces the need for independent measures of stock abundance.

Given an independent measure of abundance, the allocation of quotas may be the only feasible method of achieving a desired level of fishing mortality. In such a case, knowledge of relative fishing power of different gears is essential for individual countries in apportioning their share of the mortality among fishing units. To obtain and interpret this information requires the close collaboration of biologists, economists and technologists.

The meeting discussed the problems which are likely to arise in the allocation of fishing mortality among various species and gears. Of particular importance to individual nations will be adequate information on the diversity of catches in relation to fishing tactics. This will require more extensive sampling of commercial catches for species size and age; composition by gear, location and season.

Main Conclusions and Recommendations

1. The value of fishing gear classifications was recognised as important to the interpretation of both biological and economic statistics. The meeting had for consideration two proposed classifications (Doc.No.2a and No.8). It was recommended that the Secretary of the CWP undertake a study of both systems in consultation with appropriate experts with a view to presenting a proposed single classification for consideration by national and international statistical agencies.

2. The meeting noted the desirability of attempting to introduce a uniform classification of fishing units for the reporting of catch and effort statistics. It was agreed that a draft classification be drawn up by the CWP and be submitted to ICNAF, ICES and other International Agencies in 1971.

3. The meeting had before it a recommendation from ICNAF R&S Sub-Committee on Statistics and Sampling that the usefulness of the effort measure "days on ground" be considered. The meeting was informed that the reporting of "days on ground" was redundant as it is given also either as "days absent" or "days fished". The meeting accordingly recommended that the item "days on ground" be deleted from both STATLANT 1W and 1E.

4. The meeting recognised the importance for measuring the element of searching time fishing effort. It noted that the present effort report "number of days fished" includes both fishing time and searching time. It is important to maintain this series unaltered. The meeting requested that the Secretary of the CWP to contact national agencies in order to ascertain the possibility of reporting "searching time" as an additional statistic.

5. The meeting recognised the common interest of biologists, technologists and economists in the catch and effort statistics reported to national and international agencies. The importance of close collaboration among them, in the interpretation and analysis of these statistics, was clearly borne out by the papers submitted to the meeting. The meeting recommended that international agencies continue to foster and support such collaboration.