

INTERNATIONAL COMMISSION FOR



THE NORTHWEST ATLANTIC FISHERIES

REDBOOK 1965 PART I
STANDING COMMITTEE ON RESEARCH AND STATISTICS
PROCEEDINGS FROM THE
1965
ANNUAL MEETING

Note

REDBOOK 1965 appears in 2 books. The first book contains Part I, Proceedings of the Standing Committee on Research and Statistics. The second book contains Part II, Reports on Researches in the ICNAF Area in 1964, and Part III, Selected Papers from the 1965 Annual Meeting.

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PART I. REPORT OF STANDING COMMITTEE ON RESEARCH & STATISTICS

SECTION I.
SUMMARY REPORT OF PROCEEDINGS OF RESEARCH & STATISTICS

1. INTRODUCTION

The Standing Committee on Research and Statistics (R&S) met in Halifax, Canada, with Dr W. Templeman (Canada) as Chairman and Mr B. B. Parrish as Rapporteur, from Monday to Friday, 31 May-4 June 1965, in the week preceding the 15th Annual Meeting of the Commission. The Subcommittee on Assessments met during the previous week on Friday and Saturday, 28 and 29 May, and the Subcommittee on Herring and Other Pelagic Species on Saturday, 29 May. Further meetings of R&S were held on Tuesday, Thursday and Friday, 8, 10 and 11 June.

In the course of its meetings, R&S dealt with all of the items on its agenda which is set out in Subsection 2 below. Most of the work on these items was undertaken, as in the past, by subcommittees and working groups, the approved reports and recommendations of which are given in Section II, as follows:

App. I	Herring and Other Pelagic Species
App. II	Assessments
App. III	Statistics
App. IV	Environmental Studies
App. V	Gear and Selectivity
App. VI	Tagging
App. VII	Sampling
App. VIII	Ageing Techniques
App. IX	Steering and Publications

This Section of the Report contains all of the recommendations passed at plenary meetings of R&S together with some of the most important recommendations from the reports of the subcommittees. Recommendations not contained in this Section are given in the Appendices. An annotated list of all recommendations is given in Section III.

2. AGENDA1. Introduction

- (a) Adoption of Agenda
- (b) Planning of work of R&S, its Subcommittees, and Scientific Advisers to Panels

2. Reports from: (a) ICNAF observer to ICES (Mr S. Olsen)
(b) ICNAF observer to SCOR and IOC (Mr A. Lee)
3. Age-reading (Chairman: E. Bratberg)
 - (a) Review of standard terminology for cod, redfish, and halibut otolith age readers (Rec. 16, 1964)
 - (b) Results of the 1962 cod otolith exchange program (Redbook 1961, Item 2, p. 49)
 - (c) The cod otolith photograph exchange program (Rec. 17, 1964) (R. W. Blacker is preparing a document on this matter for the 1965 annual meeting.)
 - (d) Possibilities of photographing redfish otoliths for exchange purposes (Redbook 1964, Pt. I, par. 4, p. 33)
 - (e) Validation of otolith age reading methods (Rec. 18, 1964)
 - (f) Type specimens of otoliths used in validation studies (Rec. 19, 1964)
 - (g) Other matters
4. Assessments (Chairman: J. A. Gulland)
 - (a) Review of latest statistics of catch and effort
 - (b) Consideration and revision where necessary of the Hamburg report on trends in total catch and effort
 - (c) Consideration of joint statement by Chairmen of R&S and Assessments on conservation
 - (d) Revision of past assessments in the light of latest information
 - (e) Environmental data needed in assessment work
 - (f) Future work
 - (g) Greenland catches of salmon
5. Environmental (Chairman: A. J. Lee)
 - (a) Report on the NORWESTLANT surveys: Progress with compilation and plans for publication
 - (b) Plans for further work at sea arising from the results of the NORWESTLANT surveys
 - (c) Publication of the papers given at the 1964 Environmental Symposium
 - (d) Environmental aspects of the National Research Reports
 - (e) Report on the activities of the Intergovernmental Oceanographic Commission (IOC), especially its plan for working standard sections in the North Atlantic and its Draft of a General Scientific Framework for World Ocean Study by SCOR and ACMRR
 - (f) Report on activities of the Scientific Committee for Oceanic Research (SCOR) of the International Council of Scientific Unions (ICSU)
 - (g) (i) Sea-bed drifters: Publicity
(ii) Oceanographic instruments released in Subarea 5 by the U. S. A.

5. Environmental (cont'd)

- (h) Other matters
- (i) Status of proposed FAO Symposium on Community Relationships, especially energy flow through trophic levels

6. Gear and Selectivity (Chairman: H. Bohl)

- (a) Selectivity of different codend materials with special reference to polypropylene (Redbook 1964, Pt. I, p. 40)
- (b) Tabular summaries of selectivity data (Rec. 25, 1964)
- (c) Standard reference system for net materials; to be prepared by A. v. Brandt and P. J. G. Carrothers (Redbook 1964, Pt. I, p. 41)
- (d) Length, weight and girth data (Rec. 26, 1964)
- (e) Meshing of redfish (Rec. 27, 1964)
- (f) Catch size and selectivity (Redbook 1964, Pt. I, pp. 42-43)
- (g) Developments in gear and fishing methods (Rec. 28 and 29, 1964)
 - (i) Review of the list of trade-named twines attached to the form "ICNAF Trawl and Mesh Size Sampling Summary" (circulated from the Secretariat on October 14, 1964)
 - (ii) Changes in gears, materials and mesh sizes used in the ICNAF trawl fisheries (Annual Report by the Secretariat)
- (h) Mesh measurement
- (i) Topside chafing gear (Rec. 30 and 31, 1964)
- (j) Other matters

7. Herring and other pelagic fish (Chairman: B. E. Skud)

- (a) Herring
 - (i) Review of pertinent documents
 - (ii) Review of fisheries and research by participating countries
 - (iii) Length-weight changes due to storage (Rec. 11, 1964)
 - (iv) Size and number of herring samples from Georges Bank (Rec. 13, 1964)
 - (v) Monthly data on ages and catch/effort by vessel types (USSR) (Rec. 13, 1964)
 - (vi) Identity of herring stocks in Gulf of Maine and Georges Bank (Rec. 14, 1964)
 - (vii) Interpretation of year-class changes on Georges Bank (joint with Assessments Subcommittee)
 - (a¹) Trends in catch, effort, and catch per unit effort
 - (b¹) Estimates of mortality, or apparent mortality
 - (c¹) Effect of fishing
 - (d¹) Environmental changes
 - (viii) Other matters
- (b) Tuna and swordfish catch and research

- (c) Porbeagle fishery
- (d) Other matters

8. Sampling (Chairman: S. A. Horsted)

- (a) Review of various forms and data presented in Sampling Yearbook
 - (i) The new age-length keys for cod and haddock (Rec. 20b, 1964)
 - (ii) The tabular form for reporting length and age data for cod and haddock (Rec. 20c, 1964)
 - (iii) Other data (Rec. 20a, 1964)
- (b) Possible publication in Sampling Yearbook of age-length keys for the years 1961-63 (Rec. 21, 1964)
- (c) Consideration of proposals from the Assessment Subcommittee concerning length-composition data (Rec. 22, 1964)
- (d) Review of sampling methods for discards as used by member countries (Rec. 24, 1964)
- (e) ICNAF participation in Sampling Meeting arranged by ICES (Rec. 23, 1964)
- (f) Other matters

9. Statistics (Chairman: R. C. Hennemuth)

- (a) Report on meeting of FAO/ICES/ICNAF CWP on Statistics in the North Atlantic, Rome, 9-12 March 1965
- (b) Common reporting. Review of progress and report on the use of STANA forms by ICNAF Secretariat
- (c) Review of common and scientific species names, especially invertebrates by Medcof, Canada
- (d) Consideration of collection of statistics of redfish catch and effort by depth zones. Review of submissions on ICNAF Form 5. Gulland's assessment
- (e) Review of reports on discard and industrial fish - ICNAF Forms 4a and 4b
- (f) Review of conversion factors used by member countries
- (g) Review of statistical reporting for 1964, and methods of processing and publishing statistics
- (h) Other matters
 - (i) relating 'month of landing' to 'month of catch'
 - (ii) clarification of term 'landings' in Statistical Bulletin
 - (iii) significance of changing species grouping, e. g. groundfish

10. Publications (to be considered by Steering and Publications Subcommittee)

- (a) Distribution of Publications
 - (i) mailing lists
 - (ii) free copies
 - (iii) exchange

10. Publications (cont'd)

- (iv) sales
- (v) publishers
- (b) Research Bulletin
 - (i) Review
 - (ii) Papers for No. 3
- (c) List of Fishing Vessels
 - (i) content
 - (ii) vessel classifications
- (d) Annual Proceedings
 - (i) printing of National Research Reports
- (e) Environmental Symposium
- (f) Environmental Survey
 - (i) atlas
- (g) ICNAF Handbook
- (h) FAO/ICES/ICNAF Joint Index of North Atlantic Publications
- (i) FAO translation of parts of Special Publication No. 4 (Tagging) into French and Spanish

11. Mid-Year Subcommittee meetings12. Coordination with other organizations13. Election of officers for the ensuing year14. Arrangements for the 1966 Annual Meeting15. Other matters

- (a) Tagging (Chairman: E. M. Poulsen)
 - (i) Confirmation of system for paying rewards
 - (ii) Greenland cod tagging and results (1964 Meeting Proceedings No. 2)
 - (iii) Card system of reporting taggings
 - (iv) FAO translation of ICNAF Special Publication No. 4 (Tagging)
- (b) West Greenland salmon

3. ASSESSMENTS (App. II)(a) Recent Trends in Landings and Fishing Activity in the ICNAF Area

At last year's Annual Meeting information was given on the trends in landings and fishing activity in the ICNAF Area between 1956-58, for which years the main assessments of the effects of changes in mesh size were made, and 1961. This appraisal has now been extended to include fishing activity for the years 1962-63 and the estimates of fishing activity have

been revised in the light of more refined analyses of the composition of the fisheries in each subarea. This appraisal, the results of which are given in Tables 1-6 and Fig. 1-2 of Appendix II, shows:

- (i) In the northern part of the ICNAF Area (Subareas 1, 2 and 3), fishing activity and landings increased substantially up to 1961, due to a large increase in trawl fishing in the Greenland and Labrador areas (Subareas 1 and 2) for cod and redfish, and for redfish off Newfoundland (Subarea 3). However, after 1961 the total fishing activity in this region decreased somewhat, due to a decrease in the fishing for redfish, especially in Subareas 2 and 3, and to a shift of part of the trawler fleet to fishing in the southern part of the ICNAF area. There was also a diversion from Subareas 2 and 3 to fishing for cod in Subarea 1, where landings and activity increased after 1961, due to very favourable weather conditions and good year-classes in that subarea in 1962 and 1963.
- (ii) In the southern areas (Subareas 4 and 5) groundfish landings and total fishing activity changed very little between 1957-1961, but thereafter they increased sharply. This was mainly due to the development of a large offshore trawl fishery for silver hake in Subareas 4 and 5 but the traditional fisheries for cod and haddock also increased in these years. At the same time, a major offshore fishery for adult herring also developed in Subarea 5.

In summary, therefore, the recent trends in fishing in the ICNAF Area have been towards somewhat higher exploitation in the traditional fisheries for cod and haddock, rapidly fluctuating exploitation in the redfish fisheries and, in the southern regions, the extension of fishing to species which were previously of relatively minor importance. In fact, the major increases in catches in the ICNAF Area since 1960 have come from the expansion of fishing on these, hitherto, lightly fished stocks.

(b) Review of Past Assessments in the Light of Latest Information

The assessments made last year of the relation between catch and fishing intensity in the main ICNAF fisheries have been re-examined in the light of the recent trends, outlined above. This analysis shows that:

- (i) With the possible exception of cod in Subarea 2, the fishing intensity on the main cod and haddock stocks is approaching or even beyond the level giving the maximum sustained yield. Therefore any further substantial sustained increases in fishing intensity would not be expected to result in any major increases in average catch.

- (ii) With the wide fluctuations in fishing for redfish, especially in the northern subareas, it is still not possible to assess with confidence the long-term relation between catch and fishing intensity for the main redfish fisheries. However, although the level of fishing intensity may not have exceeded that giving the maximum sustained catch, any substantial sustained increases in fishing intensity will result in decreases in catch-per-unit fishing intensity.
- (iii) Although the silver hake catches in Subareas 4 and 5 increased markedly in the period 1961-1964, the statistical and biological data are still too few for an assessment to be made of the effects of fishing in this fishery. However, the length composition data collected in 1964 from the inshore and offshore fisheries again indicate that although a mesh size of 2 inches would not cause a large immediate loss of catch, a larger mesh size would, and probably with no subsequent long-term gain.

Because of the increasing importance of silver hake in the fisheries in Subarea 5, R&S accordingly

recommends (12)

that close attention should be paid to investigating the silver hake fisheries and the changes in composition of the stocks in this subarea.

(c) Effect of Environment on Assessments

The abundance and composition of exploited fish stocks are directly changed by fishing, but also change through variations in the natural population processes - recruitment, growth and natural mortality. Inevitably, the reliability of assessments of the long-term effects of conservation measures (e. g. of mesh size or fishing intensity) is governed by the extent of knowledge of the variability of these processes and of the factors governing it. Of particular importance is their variation with changes in stock size and/or composition. At present, little is known of these relationships and the R&S accordingly

recommends (13)

that all those working on the dynamics of the stocks of fish should examine the available data of stock abundance and composition, recruitments, natural mortality and growth to determine better methods of describing their interactions and what relations may be derived.

R&S considers that research should be carried out on the early life history stages of fish with a view to a better understanding of the recruitment

process, and endorses the recommendation of the Environmental Subcommittee (App. IV) that plans be drawn up for an environmental survey of the Georges Bank area in relation to recruitment of commercial fish stocks of that area. Also of major importance are studies of fish-food relations and community dynamics in the sea. R&S therefore strongly supports the FAO Symposium on Food Chains in the Sea proposed for 1968 and

recommends (30)

- (i) that ICNAF act with FAO and ICES as a co-sponsor of a Symposium on Food Chains in the Sea and pay two-thirds of the cost of publication of the papers submitted, and
- (ii) that R&S appoint one of its members to act as the ICNAF representative in the group responsible for the organization of the Symposium.

(d) Possible Conservation Actions for the ICNAF Area

With reference to Comm. Doc. 12, R&S endorses the authors' conclusion that, apart from or in addition to mesh regulation, the most feasible system of regulation under the present terms of the Convention is by means of catch quotas. However, the estimation and setting of catch quotas pose considerable scientific problems, in particular the estimation of changes in stock abundance through fluctuations in year-class strength. To provide accurate information on such changes would require substantially increased research effort in the ICNAF Area.

R&S, recognizing the importance of economic factors in consideration of effects of fishery regulations involving changes in fishing intensity, as pointed out in Comm. Doc. 12

recommends (14)

that R&S be enabled to seek active participation by economists in its work, in the same way as statisticians, biologists and oceanographers at present take part.

(e) West Greenland Salmon Fishery

In recent years salmon catches off the west coast of Greenland have increased markedly, from 13 tons in 1959 to almost 1400 tons in 1964. Data on tag recaptures show that salmon, originating mostly as smolts from both North American and European rivers, are exploited in this fishery. Too few data are available to determine the effects, if any, of the Greenland

fishery on the salmon fisheries in home waters, but R&S endorses the recommendations of the Assessments Subcommittee (Rec. 26) regarding increased research on salmon in the West Greenland area, with special reference to catch and effort statistics, length, weight and age sampling, tagging and studies of biological stock characters.

(f) Future Work

R&S notes that the mid-term meeting of the Assessments Subcommittee, which was requested at the last Annual Meeting, has been arranged to take place at FAO in Rome on 29-30 September, immediately before the ICES meeting.

4. HERRING AND OTHER PELAGIC SPECIES (App. I)

Herring landings in the ICNAF area in 1964 were 300 thousand tons. This represented a decline from the peak landings of 344 thousand tons in 1962, but was higher than the landings of 285 thousand tons in 1963. Canadian landings increased in Subarea 4 and the USA landings in Subarea 5 declined greatly.

R&S draws attention to the fact that extensive scientific investigations of the immature, inshore and adult, offshore stocks of herring are now underway in Subarea 5 with a view to providing a better understanding of their interrelations and of the effects of fishing and other factors on their abundance and composition.

5. ENVIRONMENTAL STUDIES (App. IV)

(a) Environmental Survey (NORWESTLANT 1-3)

The Report of the NORWESTLANT Environmental Survey is now in preparation. It will consist of four parts, as follows:

1. Text
2. Atlas
3. Physico-chemical oceanographic data
4. Biological data

It is hoped that the Parts 1 and 2 will be completed by the end of 1965 and a chapter, giving the main findings of the surveys, completed by January 1966. Part 3 will be issued by the Canadian Oceanographic Data Centre (CODC) for issue in March 1966. Consideration of the publication of Part 4 will be postponed until R&S meets in 1966 when it will be possible to assess the best form of the data and the costs of publication. R&S

recommends (42)

that 1300 copies of Parts 1 and 2 and 900 copies of Part 3 be printed; lacking definite information on the size and cost of publication of Part 4, it recommends its publication in principle, but is awaiting more information.

(b) Publication of Environmental Symposium

The Secretariat has completed the typing of the report and contributions to the 1964 Environmental Symposium and publication will be in September 1965. R&S appreciates the expeditious way in which the Secretariat has pursued this task.

(c) Plans for Further Work at Sea arising from the Results of the NORWESTLANT Survey

R&S strongly endorses the proposed joint international environmental survey of Georges Bank in relation to the recruitment of the commercial fish stocks in that area and

recommends (28)

that the USA and USSR (i) draw up a plan for an environmental survey of the Georges Bank area in relation to the recruitment of the commercial fish stocks of that area; (ii) indicate the resources which they have at their disposal for carrying out this survey and the additional assistance which they will need from other countries; (iii) submit the plan to the Chairman of R&S for discussion at the 1966 meeting of the Committee, the submission being made so that the plan can be circulated to members of the Committee well in advance of that meeting in order to allow them ample time to consider it and discuss it with their own countries.

6. GEAR AND SELECTIVITY (App. V)

(a) Selectivity of Codend Materials

The results of further experiments on the selectivity of polyamide (e. g. nylon, perlon) and polyethylene (e. g. courlene) fibers support the information on mesh size differentials for these materials presented to the Commission last year. New information for polypropylene (e. g. ulstron) fibers suggests that the difference in selectivity between them and manila is clearly less than 10%.

(b) Meshing of Redfish

In view of the importance of this problem in relation to any considerations of increase in mesh size in the ICNAF trawl fisheries, R&S

recommends (35)

that countries should continue to report in meeting documents on the meshing of redfish, especially those data for large-meshed codends.

(c) Developments in Gear and Fishing Methods

R&S notes the important information in Res. Doc. 52 on the twine materials and codend mesh sizes used in the trawl fisheries of member countries in the ICNAF Area. It

recommends (36)

that summary data of codend mesh size by country, subarea, main species fished, type and material of trawl and relevant information on topside chafers should be reported annually to the Secretariat on the Trawl Material and Mesh Size Sampling Summary, but that the form be altered so that mesh sizes are grouped in 5 mm intervals or the nearest equivalent in inches.

(d) Topside Chafing Gear

R&S draws the attention of the ad hoc Committee on Trawl Regulations to Res. Doc. 66, dealing with topside chafing gear experiments, made by the USSR.

(e) ICNAF Mesh Measuring Gauge

USSR scientists reported that the wording of the convention concerning the taper of the ICNAF mesh measuring gauge was ambiguous. It was ascertained that the interpretation of this wording in Canada and USA is that the gauge decreases in width by 2 cm in each 8 cm of its length. R&S draws this ambiguity to the attention of the Commission.

7. STATISTICS (App. III)

(a) Continuing Working Party on Fishery Statistics in the North Atlantic Area
(CWP)

The Executive Secretary and the Chairman of the Statistics Subcommittee of R&S represented ICNAF at the CWP meeting in Rome in March 1965, which dealt with a number of items of relevance to ICNAF's statistical program. R&S believes that the CWP provides an effective means of coordinating North Atlantic statistical activities, and that ICNAF can be best served by referring appropriate items to the CWP whenever the need arises. The next meeting of the Working Group is scheduled to take place in the first quarter of 1967.

(b) Conversion Factors

The question of the adequacy and completeness of factors for converting the statistics of fishery products landed to their round, fresh weight equivalent (nominal catch) was discussed in the light of extensive material submitted by countries. R&S considers that continued attention be given to this problem in accordance with Recommendation 4 of the Statistics Subcommittee (App. III)

(c) Statistics of Discards

Problems involved in collecting comprehensive and accurate information on the quantities of fish discarded at sea were considered. Facilities are seldom adequate for this purpose. The importance of this information is, however, stressed and R&S

recommends (20)

- (i) that discard information continue to be requested through the use of ICNAF Statistics Form 4, and that countries not now reporting or collecting discard information be urged to do so, and
- (ii) that the Secretariat be requested to make an annual summary of these data by division, species and country, beginning with the 1964 submission and circulate it as a meeting document.

(d) Definition of "Groundfish"

R&S points out that, in relation to Comm. Doc. 6 the number of species covered by the term "Groundfish" as used in the Statistical Bulletin has changed from time to time in accordance with changes in the importance of species in the ICNAF fisheries or to meet research needs. It considers that the grouping of species in the Bulletin should be related to scientific needs and should not be used for purposes of legal reference. It accordingly

recommends (24)

that the classification and grouping of ICNAF species in the Statistical Bulletin should be flexible for scientific purposes.

8. SAMPLING (App. VII)

The prospectus and plans of the ICES/ICNAF Special Meeting on Sampling, to take place in Rome on 1 and 2 October 1965, were considered. R&S again expresses its great interest in the subject matter for the meeting and strongly

recommends (39)

that member countries send representatives to the meeting and that the representatives be prepared to discuss for each relevant species alternative sampling methods and to state which proposals their laboratories would be willing to accept.

9. AGEING TECHNIQUES (App. VIII)

Otolith Exchange Program

The program of cod otolith exchange has continued, and is proving very valuable in the important task of increasing the accuracy of age interpretation of cod in the ICNAF Area. These studies on cod will be continued and consideration is being given to extending them to redfish and silver hake.

10. TAGGING (App. VI)

(a) West Greenland Cod Tagging

An appraisal has been made of the results of cod tagging experiments with special reference to the exchange of cod between West and East Greenland and Iceland. This shows that there is an emigration of mature cod from West Greenland to Iceland for spawning, mainly from the southern Divisions 1E and 1F, but the return migration is of negligible proportions. However, there is recruitment to West Greenland of larvae from the spawning at Iceland. The available data suggest that the magnitude of the emigration of cod from West Greenland to Iceland has been smaller in postwar than in prewar years.

(b) Translation of ICNAF Special Publication No. 4 (Tagging)

R&S records with pleasure that FAO has translated into French and Spanish the introduction and review sections of the ICNAF Tagging Symposium (ICNAF Spec. Pub. No. 4).

11. PUBLICATIONS (App. IX)

(a) Research Bulletin

R&S, noting that the new ICNAF Research Bulletin had been well received,

recommends (1)

that, in order to improve the quality of illustrations in the Research Bulletin, a better grade of paper stock be used at an estimated increase in cost of about \$200

and recognizing that papers for the Research Bulletin should not be limited to those presented as documents to Annual Meetings,

recommends (2)

that the Executive Secretary circulate a newsletter each year inviting papers for the Research Bulletin on subjects of importance to the Commission.

(b) Annual Proceedings

R&S reaffirmed the decision at its 1964 meeting (1964 Rec. 5) and

recommends (41)

that, if feasible, the National Research Reports be printed in the Annual Proceedings, at an estimated cost of about \$3,000, in the 1965 issue replacing the Summaries of Research by Subareas to be included in the Redbook.

(c) ICNAF Handbook

R&S noted that a revision of the former ICNAF Directory was now in press and, recognizing the need for a popular version of its more important contents for distribution to fishermen,

recommends (3)

that an ICNAF map with pertinent information on it be drafted by the USSR and the Secretariat for review at the 1966 meeting.

(d) Joint FAO/ICES/ICNAF Index of North Atlantic Publications

R&S

recommends (4)

that ICNAF participate in publication by FAO of a Joint Index of North Atlantic Publications by assuming one-third (about \$200) of the cost of preparation and printing.

12. MID-YEAR SUBCOMMITTEE MEETINGS

The Committee noted that the only subcommittee for which a mid-year meeting has been arranged this year is the Assessments Subcommittee, which will meet in Rome on Wednesday and Thursday, 29 and 30 September

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1965, immediately before the ICES meeting. In this connection, note was taken of the recommendation of Panel 1 that facilities should be provided, if required, for a meeting of an expert working group to examine the desirability of further protection for small cod at West Greenland. It was agreed that opportunities for some preliminary discussions by assessment members of this group would be afforded at the meeting of the Assessments Subcommittee in September and during the ensuing ICES meeting.

Note was also taken of the growing volume of assessments work facing the Committee, and it draws the Commission's attention to the fact that assessments of the state of an exploited stock and of the effect of any proposed fishery regulation requires detailed study, preferably by a small group of experts, of increasingly large quantities of data. Such a study normally requires more time than is available at Annual Meetings. R&S therefore

recommends (5)

that when the Commission requires a specific assessment of the state of an exploited fish stock or of the effect of a suggested regulation, facilities should, where necessary, be provided for a special meeting of a small group of experts and that funds should be provided for the attendance at it of the Chairman of R&S or of its Assessments Subcommittee.

13. CO-ORDINATION WITH OTHER ORGANIZATIONS

It was agreed that since he would probably be attending in another capacity, Mr Lee, Chairman of the Environmental Subcommittee, be asked to represent R&S at the forthcoming meetings of SCOR and IOC. It was also agreed that Mr Steinar Olsen be asked to represent R&S at the next meeting of ICES.

14. ELECTION OF OFFICERS FOR THE ENSUING YEAR

- (a) Dr W. Templeman was unanimously re-elected Chairman of R&S.
- (b) The following were nominated to serve on the Steering and Publications Subcommittee:

France, Italy, Portugal and Spain	Dr R. Monteiro
Iceland, Norway, USSR	Dr J. Jónsson
Denmark, Germany, Poland and UK	Dr F. Chrzan
Canada	Dr J. Hart
USA	Dr H. Graham

- (c) The following Subcommittee Chairmen were appointed:

Assessments	Mr J. A. Gulland
Environmental	Mr A. J. Lee
Statistics and Sampling	Dr F. McCracken
Gear and Selectivity	Dr H. Bohl
Herring and Other Pelagic Species	Mr B. Skud
Ageing Techniques	Mr E. Bratberg

15. ARRANGEMENTS FOR THE 1966 ANNUAL MEETING

The Committee

recommends (6)

- (a) that R&S should meet throughout the week preceding the 1966 Annual Meeting of the Commission;
 - (b) that the Assessments Subcommittee should meet on Friday and Saturday of the week preceding the meeting of R&S;
 - (c) that the Herring and Other Pelagic Species Subcommittee should meet during the week of the R&S meeting
- and
- (d) that the Steering and Publications Subcommittee should meet on Sunday of the week of the R&S meeting.

16. OTHER MATTERS

(a) Reporting By-Catches of Regulated Species

Reference was made to the growth in recent years of trawl fisheries for unregulated species in the ICNAF Area, especially in its southern sub-areas, in which by-catches of regulated species are taken. Data on the quantities and length and age compositions of such by-catches are of importance in assessment work. The Committee therefore

recommends (7)

that all countries with small-meshed trawl fisheries for unregulated species, in which by-catches of regulated species are taken, should report at each Annual Meeting data for each regulated species on (a) the quantities caught for each fishery, (b) the length and age composition of the catches.

(b) Effect of ICNAF Topside Chafer

The Committee noted the request by the ad hoc Committee on ICNAF trawl regulations for new information on the effect of approved ICNAF topside chafer on codend selectivity (1965 Proc. 13, section 2) and

recommended (8)

that this item should be placed on the agenda of R&S for next year's meeting, and that Dr Bohl, Chairman of its Gear and Selectivity Subcommittee be requested to prepare for the next meeting a review of the available information on this item, including, if possible, an analysis of the effects of catch size on selectivity with the chafer.

SECTION II. REPORTS OF SUBCOMMITTEES AND WORKING GROUPS

APPENDIX I

REPORT OF SUBCOMMITTEE ON HERRING AND OTHER PELAGIC SPECIES

Chairman: Mr B. E. Skud; Rapporteur: Mr S. N. Tibbo

The meeting was opened at 9:00 a. m. , 29 May, 1965. The agenda was adopted with one minor change in sequence.

1. Pertinent Documents

The Chairman listed the following Research Documents as being of interest to the Subcommittee: 5, 7, 9, 12, 16, 18, 21, 29, 33, 34, 40, 50 and 55. (Res. Doc. 37, also of interest to the Subcommittee, was not available until after the meeting.)

2. Herring

(a) Review of Fisheries Research. Mr Tibbo reported on the Canadian herring fishery and research effort (Res. Doc. 12). The total catch in 1964 amounted to approximately 141,000 metric tons of which 137,000 tons were taken in Subarea 4 and the balance in Subarea 3. The catch was 26,000 tons (23%) greater than in 1963, due almost entirely to a record catch of 84,000 tons in Div. 4X. Research efforts were concerned mainly with routine sampling for size and age composition and with tagging. A total of 138 samples involving 15,279 fish from Div. 4X were examined during the year. One and two-year-old herring dominated the "sardine" fishery in the western part of the division whereas in the eastern part, the fishery for adults was dominated by four year olds (1960 year-class). In May and June, 6,112 herring were tagged and released in Passamaquoddy Bay. Recoveries amounted to 7.3% and showed some movement eastward along the New Brunswick shore and across the Bay of Fundy to Digby. Recovery of spaghetti tags amounted to 10.6% as compared to 1.0% for opercular tags. One sample of herring (200 fish) was obtained in August from the northern slope of Georges Bank. The 1956 year-class was dominant (35.5%) in this sample and the 1957 (28.0%) and 1960 (26.0%) year-classes were well represented.

The report from Poland (Res. Doc. 16) showed a herring catch of 35 tons by Polish vessels in 1964. In 1963 the catch amounted to 251 tons. Reference was made to Res. Doc. 33 and 34 which gave results of researches on alewives, bluebacks and herring. Alewives were encountered in large numbers on the western slopes of Georges Bank and samples were examined for size, age, sex and maturity, stomach contents and fatness. Samples of herring from Grand Bank, Emerald Bank and Georges Bank were examined for size and sexual maturity. Significant size differences were noted for various parts of Georges

Bank. In general, the majority of herring examined for sexual maturity were in Stage IV (Maier's scale).

Dr Studenetsky reported on the USSR herring fishery and research (Res. Doc. 18). The catch in Subarea 5 amounted to 130,000 tons. The fishery was poor in Subarea 4. In Subarea 5 some fishing was done from January to March on the northwestern and southern slopes of Georges Bank. Intensive fishing, however, was carried on only from May to early October. Best catches were made at depths of 40-50 m on the northern slopes of Georges Bank in September and early October from pre-spawning and spawning concentrations. Catch and effort data for medium trawlers showed an average catch of 1.9 tons/hr throughout 1964 as compared to 0.79 tons/hr in 1963. Studies of age composition (31 samples of 100 specimens each) showed that in January the 1961 and 1960 year-classes dominated the catches (32.6% and 24.0% respectively). Older fish (1957 and 1956 year-classes) were encountered in March and April. From July to October the 1960 year-class was dominant. It is predicted that the 1960 and 1961 year-classes will dominate the catches in 1965 and that the stock available for commercial exploitation will increase. Studies were made of the spawning areas and the number of eggs deposited. In early October, masses of eggs were discovered over an area of about 50 km² on the northern slopes of Georges Bank. In that area herring eggs were deposited in layers 0.5 to 4 cm thick on pebble, gravel and shelly grounds. Temperatures ranged from 6° to 12°C.

In discussion, it was pointed out that (a) catch and effort data were for middle-size trawlers only (Table 1). The incidental catches of herring by large trawlers are not representative but amounted to 0.61 tons/hr in 1964 as compared to 2.15 tons/hr in 1963 (Table 2); (b) there was no drift-net fishery for herring in 1964 and (c) some dead herring eggs were observed on the spawning ground but no measure was made of this mortality.

TABLE 1. CATCHES OF ALL SPECIES AND HERRING TAKEN BY MIDDLE-SIZED TRAWLERS (TONS/HR TRAWLED) ON GEORGES BANK, 1962-64

YEAR	CATCH/HR TRAWLED	MONTHS												AVERAGE
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
1962	ALL SPECIES	-	-	0.25	0.39	0.65	0.71	1.14	1.27	3.65	1.53	-	-	1.38
	HERRING	-	-	0.11	0.10	0.62	0.65	0.56	1.06	3.48	1.47	-	-	1.16
1963	ALL SPECIES	-	-	-	-	-	1.80	0.72	1.05	5.73	4.20	-	-	1.28
	HERRING	-	-	-	-	-	1.2	0.51	0.95	5.35	1.95	-	-	0.79
1964	ALL SPECIES	-	-	-	1.09	0.99	0.82	1.06	1.29	7.2	12.3	-	-	2.21
	HERRING	-	-	-	0.55	0.69	0.68	0.97	1.25	7.1	12.3*	-	-	1.94

* RELATES TO ONE VESSEL ONLY

TABLE 2. CATCHES OF ALL SPECIES AND HERRING TAKEN BY SOVIET BIG REFRIGERATOR STERN TRAWLERS (TONS/HR TRAWLED) ON GEORGES BANK, 1961-64.

YEAR	CATCH/HR TRAWLED	MONTHS												AVERAGE
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
1961	ALL SPECIES	-	-	-	-	-	-	1.81	3.09	2.87	1.51	-	0.23	2.41
	HERRING	-	-	-	-	-	-	1.81	3.09	2.87	1.51	-	0.23	2.41
1962	ALL SPECIES	0.79	1.45	0.83	4.15	4.18	4.81	3.15	2.35	6.34	1.73	1.13	2.35	2.65
	HERRING	0.79	1.44	0.72	2.64	2.31	2.39	2.85	2.46	6.73	1.7	0.96	1.86	2.41
1963	ALL SPECIES	0.22	0.85	0.41	2.94	2.66	5.42	3.03	2.31	6.84	4.57	1.66	1.82	2.84
	HERRING	0.22	0.85	0.41	0.22	0.26	0.09	0.77	1.88	5.92	3.62	-	-	2.15
1964	ALL SPECIES	3.3	3.5	4.0	4.7	2.6	2.8	2.7	2.2	6.0	2.8	1.2	2.9	3.1
	HERRING	0.24	0.62	0.06	0.005	0.018	0.06	0.13	0.62	3.5	1.2	0.39	0.29	0.61

Mr Skud reported that the Maine fishery landed 26,244 tons of herring, slightly more than the poor catch of 24,154 tons in 1961. Catches in 1962 and 1963 were 67,000 tons and 69,000, respectively. Effort decreases from 1963 to 1964 were 141 to 108 stop seines, and 74 to 64 weirs. The effort of purse seines increased slightly.

The age composition for the 1964 fishery indicates that 72% of the herring caught were of the 1962 year-class, and 12.4% of the 1963 year-class. Contributions of the other year-classes were: 6.4% for 1961; 8.5% for 1960. In 1962, the 1960 year-class provided 96% of the total catch. In 1963, the 1960 year-class provided 37% of the total catch, the largest contribution of 3-year-olds since the coast-wide sampling began in 1960. The 1960 year-class was dominant in the offshore fishery during 1963 and 1964. In offshore waters, 35 samples (2,549 fish) were obtained from Georges Bank and 46 samples (3,565 fish) from the coastal Gulf of Maine. The 1960 year-class was dominant in both areas.

Oceanographic observations were continued along the US, Gulf of Maine coast from Cape Ann to Grand Manan Channel. Temperature, salinity and water clarity were measured seasonally within the 90-m isobath at 32 stations along the coast. Zooplankton sampling continued along the inner periphery of the Gulf of Maine from inshore to the 90-m isobath. Zooplankton volumes in 1964 followed the pattern of areal variation found in 1963, with highest mean-annual volumes occurring in the western region, moderate volumes in the central area, and low volumes in the eastern sector of the coast.

Herring larval studies were conducted in the offshore waters of Georges Bank and in the Gulf of Maine during the September, October and November research cruises. The seasonal progression of larval abundance along the coast was continued. Catches with high-speed trawls provided samples of larvae through the winter and spring seasons. To supplement the catches of other gear, buoyed half-meter nets were designed to fish the inshore tidal flow. Thirty over-night sets of buoy nets during the fall and early winter averaged

from 39 to 245 herring larvae per 100 m³ of water strained during the tidal cycle (12 hrs). During the fall the size of larvae ranged from 7 to 34 mm total length and in early winter from 15 to 43 mm total length.

Behaviour studies are being carried out to learn some of the responses of herring to variations in environmental conditions. An example is supersaturation of oxygen in water, which occurred at several localities along the coast in the spring and summer of 1964. Laboratory experiments are designed to test the responses of the fish to certain conditions which can be controlled and measured; and have been essentially tests of "preference" or "avoidance" by the fish.

Analysis of maturity stages indicated that fall spawning occurred from early September to late November. The peak of spawning occurred earlier in coastal Gulf of Maine (September) than on Georges Bank (October). There was no evidence of spring spawning on Georges, but spring spawning was recorded from the western waters of the Gulf of Maine. In the spring, adult herring were found dispersed over Georges Bank, while in the fall they were found congregating on the northern portion. Immature herring on Georges Bank were found only at Cultivator Shoals, in depths of 20 fathoms or less.

In the discussion that followed, it was pointed out that the purse seine vessels operating inshore were very small and unable to carry any of their own catches. Other items of discussion were the size of larvae at metamorphosis and the causes of the supersaturation of gases in sea water. Mr Parrish noted that dominant year-classes in the Northwest Atlantic were also strong in the North Sea. The Chairman summarized catches (in tons) of herring in the Convention Area during the past 3 years:

	1962	1963	1964
Canada	111,649	114,222	141,000
Poland	277	256	35
USSR	160,404	100,036	133,195
USA	71,779	70,111	26,244
Total	344,109	284,625	300,474

(b) Length-weight Changes due to Storage (Rec. 11, 1964). Experiments were carried out by Canada (Res. Doc. 55) and USA (Res. Doc. 50) to determine changes in the length and weight of herring due to storage. Mr Tibbo reported length losses of 1.0-3.2% and weight losses of 11.7-59.3% for herring kept in refrigerated storage for 183 days. For herring preserved in 5% formalin, length losses were 0.5-2.2% and weight losses 4.2-7.8%. Mr Skud reported that length losses for frozen herring (12-21 cm total length) varied from 2.4-4.1% and weight losses from 0.13-5.97%. Samples thawed in water showed a smaller loss than samples thawed in air, because of the absorption of water. Relative changes in length and weight measurements were greater in samples

of small fish. Changes in fish held in brine storage were comparable to changes due to freezing. Losses in length did not increase markedly when storage included brining and freezing, but losses in weight were substantially higher when this combined storage was utilized. Brine strengths in these tests included higher salt concentrations than are used by the industry to establish extreme values of losses in length and weight. Regression lines and confidence intervals for the changes due to each storage method are presented in Res. Doc. 50 for comparison with data from similar experiments.

(c) Size and Number of Herring Samples from Offshore Areas (Rec. 13, 1964).

The size and number of samples taken by each country was summarized. Canada obtained one sample of 200 fish; Poland took 7 samples, ranging from 247 to 1,359 fish; USSR took 165 samples of 300 to 400 fish each for size measurement and 31 samples of 100 fish each for age determinations (from scales); USA obtained 81 samples of 100 fish each for length and weight measurements, age determination (from otoliths), and counts of vertebrae, fin rays, and number of eggs per female.

(d) Identity of Herring Stocks in the Gulf of Maine and Georges Bank (Rec. 14, 1964).

The Chairman reported on three aspects of the serological and biochemical studies on herring at the Boothbay Harbour laboratory. These involved (i) the development of better methods for preserving blood to allow more extensive testing; (ii) testing the blood samples with many new blood typing reagents, especially antisera developed in rainbow trout and (iii) expanded studies on serum protein differences by starch gel electrophoresis and immunodiffusion.

The development of a more suitable anticoagulant and preservative solution has allowed blood samples to be tested for at least a week when previously they could be used for only two or three days. A method of preserving herring erythrocytes by freezing in liquid nitrogen has been developed which allows the storage of samples for indefinite periods before testing. Preliminary analysis of the blood typing data obtained from repetitive samples taken on Georges Bank has not indicated that more than a single population of herring was sampled. Analysis of the data obtained from inshore samples has been complicated by the discovery that herring cells change in their agglutinability. Many of the herring sampled in the western Gulf of Maine had blood cells which could not be agglutinated by any reagent. Experiments on herring held in the laboratory indicate that the lack of agglutinability of herring red cells is not an inherent characteristic of individual herring, but can be induced by exposure to moderately high temperatures. Herring whose red cells are inagglutinable were found to have significantly higher frequencies of immature and abnormal erythrocytes. Apparently, environmental conditions occur in the western Gulf of Maine during the summer which induce this change in the blood of a significant proportion of the herring population.

(e) Interpretation of Year-class Changes on Georges Bank (considered jointly with Assessment Subcommittee). The Chairman reviewed the discussion of last year's joint meeting with the Assessment Subcommittee. Of particular interest was the seasonal change in year-class contributions during the 1963 fishery. The specific question was whether this change resulted from fishing or from other causes. The USSR had agreed to provide monthly data on age composition by vessel types and the Chairman requested a report on this information. Dr Studenetsky presented the monthly data which are given below in Table 3.

TABLE 3. PERCENT AGE COMPOSITION OF HERRING IN SAMPLES TAKEN BY USSR VESSELS ON GEORGES BANK, 1961-64

YEARS	MONTHS	AGE								No. OF FISH
		2	3	4	5	6	7	8	9	
1961	MAY	-	5.0	13.0	59.0	20.0	3.0	-	-	176
	JUN	-	5.0	11.0	56.0	19.0	7.0	2.0	-	165
	JUL	-	3.0	18.0	50.0	24.0	3.0	2.0	-	188
	SEP	-	9.5	28.1	50.9	10.3	1.2	-	-	156
	NOV	0.6	0.6	19.5	39.5	28.3	7.9	3.6	-	155
1962	MAY	-	4.0	14.0	16.2	50.2	13.7	1.7	0.2	144
	JUN	-	-	6.8	15.5	50.4	21.1	5.2	1.0	306
	JUL	-	-	4.9	12.0	33.1	35.5	11.4	3.1	194
	AUG	-	-	4.1	25.0	55.2	13.6	2.1	-	146
	NOV	5.6	6.8	43.7	37.1	6.8	-	-	-	394
	DEC	1.4	1.0	38.8	45.2	13.0	0.6	-	-	294
1963	MAR	-	-	10.6	57.7	31.7	-	-	-	75
	APR	-	16.7	11.3	37.7	32.3	2.0	-	-	785
	MAY	-	25.2	29.7	28.8	15.7	0.6	-	-	282
	JUN	-	10.4	6.6	49.5	20.6	12.9	-	-	382
	JUL	-	21.6	7.2	31.3	27.4	8.9	3.6	-	590
	AUG	-	47.6	15.7	28.7	8.0	-	-	-	400
	SEP	-	47.2	17.5	29.3	5.9	0.1	-	-	888
	OCT	66.7	29.6	2.3	1.4	-	-	-	-	420
	NOV	25.0	52.0	8.0	15.0	-	-	-	-	100
1964	JAN	15.6	32.6	24.1	10.2	7.1	7.3	3.0	0.1	100
	MAR	-	-	-	0.4	6.8	53.0	37.3	2.5	197
	APR	-	-	8.2	5.7	20.8	34.2	30.0	1.1	286
	JUN	2.1	4.9	12.2	23.8	32.5	24.5	-	-	296
	JUL	3.9	30.0	47.9	11.4	6.7	0.1	+	-	706
	AUG	4.4	29.9	46.0	13.4	4.9	1.4	+	-	600
	SEP	1.2	33.6	34.3	18.4	12.3	0.2	-	-	400
	OCT	0.9	16.2	34.7	30.3	17.9	-	-	-	200

In discussion of sampling methods, it was pointed out that (a) samples were obtained from research vessels in the early part of the year and from commercial vessels later on; (b) multiple samples were taken from several catches rather than a single catch; (c) there was little variation between samples taken in the same month and (d) ages were overestimated by one year (i. e. throughout 1964 four year olds equal 1960 year-class). Mr Hennemuth noted that the increase in catch per effort resulted from recruitment of the 1960 year-class.

In reply to a question regarding the locations of samples on Georges Bank, it was reported that samples came from various parts of the Bank except during the June to October period when fishing was concentrated on the northern slopes. The Chairman cited the results of Polish research (Res. Doc. 34) to show the need for more specific geographic reference of the age-length samples. Appreciating the need for additional information on sampling locations, the Subcommittee

recommends (9)

that, in reporting data from Georges Bank, the region from which the samples were taken be defined as precisely as possible, e. g. northern edge, western slope, etc.

(f) Other Matters

(i) The Chairman called attention to the announcement (Res. Doc. 21) that ICES would hold a symposium on the "Biology of the Early Stages of Herring and on the Recruitment Mechanism". Mr Parrish discussed the planned emphasis of the symposium and explained that the Herring Committee of ICES would meet in the autumn to determine whether to hold the symposium in 1967 or later. Recognizing the importance of such a symposium, the Subcommittee

recommends (10)

that the Research and Statistics Committee express to ICES its keen interest in this symposium and request that ICNAF be kept informed of the developments in its plans.

(ii) The Chairman mentioned the Bibliography on Herring of the Northwest Atlantic (1964 Meeting Doc. 4) and the need to add recent titles. Dr Hart suggested the preparation of a supplement, and the Subcommittee

recommends (11)

that member countries submit complete references to papers published in 1964 and to Mr Skud, Boothbay Harbour, Maine (USA) for compilation as a supplement to the ICNAF Herring Bibliography.

3. Tuna and Swordfish Catch and Research

(a) Tuna. Reference was made to Res. Doc. 7 and 12 for information on the 1964 tuna fishery.

The total Canadian tuna catch in 1964 amounted to 1,315 tons, 323 tons from Subarea 4 and the remainder from Subarea 5 and to the south. In Subarea 4, the landings are mainly bluefin, whereas in Subarea 5 the catch was a mixture of bluefin and skipjack in the ratio of approximately 3:2. Research efforts were concerned with size and age composition and tagging.

US landings (in tons) of tuna in 1964 were reported as follows:

	<u>Subarea 5</u>	<u>Total catch (including landings at Puerto Rico)</u>
Bluefin	400	4,500
Skipjack	352	4,000
Bonito	7	
Total	<u>759</u>	<u>8,500</u>

Research efforts by USA in the ICNAF Area were limited to explorations for various species, but an extensive tuna program is being conducted in the South Atlantic. Studies of tuna migrations were carried out by the Woods Hole Oceanographic Institution.

(b) Swordfish. The Canadian swordfish catch in 1964 amounted to 7,994 tons, about 500 tons (7%) less than in 1963. The decrease was due to smaller landings from Div. 4V and 4W. Shore sampling involved 8,000 specimens for studies of size composition. Dressed weights varied from 7 to 486 lbs (14-1069 kg) with an overall average for the season of 142 lbs (312 kg). This is in sharp contrast to an average size of 200 lbs (440 kg) obtained when the fishery was exclusively by harpoons. Food studies showed silver hake, redfish, barracudinas, lanternfish and cephalapods to be the most common items in the diet. The ratio of males to females was approximately 1:3. Twenty-eight swordfish were tagged and released during the year.

US swordfish landings in 1964 amounted to 344 tons, which showed a sharp decrease from the 934 tons taken in 1963.

4. Porbeagle Fishery

Statistics of the Norwegian porbeagle fishery were mailed to the Chairman by Per L. Mietle, Chief of the Statistics Department, Directorate of Fisheries, Norway. The data are summarized below:

	<u>1962</u>	<u>1963</u>	<u>1964</u>
No. of vessels	9	19	28
No. of trips	-	44	43
Average gross tonnage	189	191	195
Total landings, frozen fish ¹⁾ (tons)	1,327	4,433	6,200
Total catch, round, fresh weight ¹⁾ (tons)	2,216	5,763	8,060

¹⁾ catches landed in foreign ports (approx. 500 tons in both 1963 and 1964) are not included

Canadian landings for porbeagles in 1964 amounted to 17 tons, all from Subarea 4.

APPENDIX II - REPORT OF THE SUBCOMMITTEE ON ASSESSMENTS

Chairman: Mr J. A. Gulland; Rapporteur: Mr B. B. Parrish

The Subcommittee met on 28 and 29 May and at intervals during the following week. The following items were discussed:

1. Recent trends in landings and fishing activity in the ICNAF Area.
2. Revision of past assessments in the light of latest information.
3. Environmental data needed in assessment work.
4. Review of possible conservation actions for the ICNAF Area.
5. Grouping of length composition data in Sampling Yearbook.
6. West Greenland salmon fishery.
7. Future work.

1. Recent Trends in Landings and Fishing Activity in the ICNAF Area

At last year's meeting of the subcommittee an appraisal was made of the main trends in landings and fishing activity in the ICNAF Area since the period (1956-58) for which the main assessments of the effects of changes in mesh size were made. This appraisal, in which a crude measure of fishing activity, based on the number of days fishing by all classes of fishing vessel, was used, showed that in the period 1957-1961 the fishing activity in the northern part (Subareas 1, 2 and 3) of the ICNAF Area increased markedly and at a substantially faster rate than landings (Redbook 1964, Table 1 and Fig. 1 and 2, p. 71-74). This appraisal has now been extended to include fishing activity data for the years 1962 and 1963, and the estimates of fishing activity in the series of years since 1956 have been revised in the light of more refined analyses of the composition of the fisheries in each subarea. These data are summarized in Tables 1 to 6 and Fig. 1 and 2. Tables 1 to 5 give the landings of the principal species and estimated total fishing activity for each subarea, and Table 6 and Fig. 1 and 2 give combined total groundfish landings and fishing activity for the fisheries in the northern (Subareas 1, 2 and 3) and southern (Subareas 4 and 5) parts of the ICNAF Area respectively.

The estimates of fishing activity, being based simply on the numbers of days fishing do not take into account changes in the power or efficiency of the vessels. For instance, the modern German stern trawlers achieve some 30% more fishing (as measured by time with the trawl being towed) in a day than did the traditional side-trawler. The figures of fishing activity may therefore underestimate, possibly substantially, the increases in the actual amount of fishing.

These results indicate the following main trends in the ICNAF fisheries during the period of years 1957-1963:

- (a) In the northern areas (Subareas 1, 2 and 3) fishing activity and landings increased substantially up to 1961. This was due principally to a large increase in trawl fishing in the Greenland and Labrador areas (Subareas 1 and 2) for cod and redfish, and for redfish off Newfoundland (Subarea 3). During this time the fishing activity increased at a faster rate than landings. However, after 1961 total fishing activity and total landings fell somewhat. This was mainly due to a decrease in fishing for redfish (especially in Subareas 2 and 3) and to a shift of part of the trawler fleet to fishing in the southern part of the ICNAF Area. There was also a diversion from Subareas 2 and 3 to fishing for cod in Subarea 1, where landings and activity increased after 1961, due to very favourable conditions in that Subarea in 1962 and 63.
- (b) In the southern areas (Subareas 4 and 5) groundfish landings and total fishing activity underwent relatively small changes between 1957-1961, but thereafter they both increased sharply. This was mainly due to the development of a large offshore trawl fishery for silver hake in Subareas 4 and 5, but the traditional fisheries for cod and haddock also increased in these years.

At the same time a major fishery for adult herring also developed in Subarea 5.

In summary, therefore, the recent trends in fishing in the ICNAF Area have been towards somewhat higher exploitation in the traditional fisheries for cod and haddock, rapidly fluctuating exploitation in the redfish fisheries and in the southern part of the area, the extension of intensive fishing to species which were previously of relatively minor importance.

2. Revision of Past Assessments in the Light of Latest Information

The Subcommittee re-examined past assessments for the major ICNAF fisheries, with special reference to their position on the equilibrium yield curve, and the following conclusions were drawn:

- (a) Cod. The most recent data support the earlier assessments that, with the possible exception of the fishery in Subarea 2, the fishing intensity in all of the major cod fisheries in the ICNAF area is approaching or even beyond that level giving the maximum sustained yield. In all of them the fishing intensity has remained high, and in Subarea 5 there has been a substantial percentage increase in recent years.
- (b) Haddock. As with the cod fisheries, the most recent data for haddock support the earlier assessments that the fishing intensity is approaching or even beyond that level giving the maximum sustained yield.

- Again a substantial increase in the fishing intensity on haddock in Subarea 5 has taken place in recent years. The fishing effort on haddock in Subarea 3 has decreased greatly since 1962, because an absence of good year-classes has resulted in a very small stock
- (c) Redfish. It is still not possible to assess with confidence the position of the major redfish fisheries on the yield curve. In the northern fishing areas (Subareas 1, 2 and 3), the intensity of fishing on redfish has fluctuated widely, and since 1961 has tended to decrease substantially, while in the southern areas (Subareas 4 and 5) it has remained steadier, although in these too, effort has tended to decrease in recent years. However, the latest statistical and sampling data on the redfish fisheries provide no grounds for amending the conclusions reached last year. The transitory, large catches in the northern areas since 1957 were in many cases taken from an accumulated stock, and do not reflect the level of the sustainable catch. Also any substantial sustained increases in fishing intensity on redfish in the ICNAF fisheries will give rise to marked decreases in catch-per-unit fishing intensity, though the effort has not necessarily exceeded the level giving the greatest sustained catch.
- (d) Silver hake. In 1964 there was a further increase in the USSR and US catches of silver hake in Subarea 5. Catch sampling gave the same general picture as in 1963 (Redbook 1964, Part I, p 62), the catches being composed principally of the younger, mature age-groups (3-5 year olds), with a mean size of 30 cm, and the mortality rates estimated from USSR data being high ($Z = \text{ca. } 1.5$). In the US silver hake "food" fishery, catch-per-unit fishing intensity showed a further decrease. With the data at present available, it is not possible to make a detailed assessment of the effects of fishing on the silver hake stocks in this subarea, or to ascertain the magnitudes of fishing and natural mortality rates, although it seems likely that the natural mortality rate is relatively high. The length composition data collected in 1964 from both the offshore and inshore fisheries again indicate that, while a mesh size of 2" would not cause a large immediate loss, larger mesh sizes would do so and probably with no subsequent long-term gains. In view of the increasing importance of the silver hake in the fisheries in Subarea 5, the Subcommittee

recommends (12)

that close attention should continue to be paid to the silver hake fishery and the changes in composition of the stocks in Subarea 5.

There is no past history of any substantial fishery for silver hake in Subarea 4 so that it is even more difficult to assess the state of the

stock in this subarea. However, it should be noted that the decrease in catch in 1964 has been attributed to environmental factors.

The conclusion in this section concerning the state of the major individual ICNAF stocks, where for most, further increase in fishing effort will give little or no increase in catch, is in apparent contrast to the trends in catch and activity described in the first section. It must, however, be emphasized again that the major increases in catch have come from expansion of fishing on hitherto lightly exploited stocks. Also the index of fishing activity takes no account of the increased size and efficiency of the individual vessels.

3. The Effect of the Environment

It is a truism that the size and composition of an exploited stock, and hence future catches, are dependent on many factors other than fishing but a truism with many important implications in assessing the yields of fisheries. Thus it is impossible to predict that, for example, by using a larger mesh, the catch in 1972 will be, say, 5% greater than the catch taken in 1962 with a small mesh. All that can be estimated is that, under the 1962 conditions, the sustained catch with a larger mesh will be 5% greater than the sustained catch with a small mesh. It is implicitly assumed that this would still be true under 1972 conditions. However, some environmental changes could invalidate this assumption. Because the necessary calculations are usually made in terms of the average catch from a fish reaching a fishable size, the assessments are often given in terms of catch per recruit, but the conclusions are equally applicable to total catch if the average recruitment does not change.

In addition to environmental effects, the population processes may also be influenced indirectly by the fishing through its effect on stock size. Increased fishing will decrease the abundance of stock, and change its composition. This may cause changes in growth, natural mortality or recruitment (Res.Doc.25). Some of the possible changes (e.g. increased growth or reduced natural mortality) tend to damp (reduce) the changes in the stock; such changes therefore leave the qualitative assessments unaltered, but tend to reduce the magnitude of the calculated effects on yield. More important are the possible changes (e.g. decreased recruitment) which tend to exaggerate any changes in stock magnitude.

At present there is very little evidence one way or the other of how the average recruitment, natural mortality and growth patterns change with the size of the stock. The Subcommittee therefore

recommends (13)

that all those working on the dynamics of the stocks of fish should examine the available data of stock abundance and composition, recruitment, mortality and growth to determine better methods of describing their interactions and what relations may be derived.

The Subcommittee further considers that better information of the early life-history of the fish, and especially, estimates of the mortality and growth rates of eggs, larvae and young fish, are likely to be helpful in understanding recruitment. The Subcommittee noted with approval the Environmental Subcommittee recommendation concerning an intensive study of the early stages of commercial fishes on Georges Bank.

If fishing is very intense it may, as described in Res. Doc. 25, cause substantial changes in the natural community, e. g. by removing most of the predators. There is at present little knowledge about fish community organizations, and the Subcommittee therefore reaffirms its interest, expressed at the 1964 meeting, in studies on the fish and fish-food aspects of production, and especially in the proposed joint symposium on food chains.

4. Review of Possible Conservation Actions for the ICNAF Area

The Subcommittee took note of this review (Comm. Doc. 12) and agreed that it constituted an excellent account of the types of considerations which have formed the basis for the past advice to the Commission on conservation problems. It noted that the review concluded that catch quotas are likely to be the most feasible system of regulation possible under the present terms of the ICNAF convention. However, the setting of catch quotas involving total yield from fisheries poses considerable scientific problems. As described in the previous section, the absolute amount of the catch in any future year is difficult to predict even when it can be estimated that a certain level of fishing mortality will give the optimum yield in the absence of drastic changes in the composition of the fish stocks due to the environment.

Given constant conditions, this estimate of mortality will be proportional to the fishing effort provided there are no substantial changes in the general fishing efficiency of the fleets in relation to the abundance changes. If a catch quota were considered to be the most effective administrative device for achieving a given fishing mortality, a concerted effort would be required to estimate the actual stock abundance and to predict the abundance of incoming year-classes. Present research efforts in the ICNAF Area need to be substantially increased in order to provide accurate information on these factors.

The Subcommittee also agreed with the statement in the review concerning the importance of economic factors both in considering fisheries on several species of different market value in the same area, and particularly in considering changes in fishing effort. The Subcommittee therefore

recommends (14)

that R&S be enabled to seek active participation by economists in the same way as statisticians, biologists and oceanographers at present take part.

5. Grouping of Length Composition Data in Sampling Yearbook

The Subcommittee considered the request of the Subcommittee on Sampling at the 1964 Annual Meeting (Redbook 1964, Part I, Rec.22, p.37), for advice as to the grouping of length composition data in the Sampling Yearbook. It was agreed that no specific time interval can be prescribed to cover all fisheries and fish stocks. Whereas for some fisheries, in which the size composition is not changing significantly within seasons, large grouping intervals (e. g. quarters or even years) are appropriate, for others, in which large changes take place, shorter intervals (e. g. months) should be used. The Subcommittee therefore cannot at this stage recommend a change from the existing system of grouping length composition data by month.

Consideration was also given to the most appropriate form in which the length composition data should be published in the Sampling Yearbook, whether on a per mille basis, as in the past, or as the total numbers of each length in the landings. It was agreed that, while the latter form is the one in which the data are usually needed for assessment purposes, in few instances is sampling sufficiently intensive and the sampling system sufficiently comprehensive to justify the general adoption of this form of presentation in the Sampling Yearbook. The Subcommittee emphasizes, however, the importance of all supporting information.

6. West Greenland Salmon Fishery

A joint meeting of the Assessment Subcommittee with the Working Group on Tagging was held to discuss the information available on the salmon fishery off the west coast of Greenland and the recaptures in this fishery of salmon tagged in North American and European rivers.

Information in Res. Doc. 69 showed that the production in West Greenland of salmon for export, since 1959 was as follows:

1959	13 tons
1960	55 "
1961	115 "
1962	220 "
1963	420 "
1964	1,386 "

This fishery takes place in autumn, between August and November, in all divisions of the subarea (but mostly Div. 1B-1E) and the catches consist of medium-sized fish, between 1.0 and 4.5 kg in weight.

Data on tag recaptures show that salmon originating from both North American (Canada and USA) and European (England, Ireland, Scotland, Sweden) rivers are exploited in this fishery. The majority of the recaptures have been of fish tagged as smolts in the native rivers and have therefore spent one winter in the sea. In most tagging experiments from which West Greenland recaptures have been obtained, the numbers of fish recaptured at Greenland have been much smaller than the recaptures in the home waters.

Consideration was given to the data and research needed to follow the course of the West Greenland fishery and elucidate the biology of the exploited stock and the effects of the fishery. Present data are insufficient to determine what effect, if any, the Greenland fishery is having on the fisheries in home waters. The important factors are the potential growth, and the natural losses, between the two fisheries. The Subcommittee accordingly

recommends (15)

that active attention be paid to the following Atlantic salmon research items and that the results be reported in meeting documents to future Annual Meetings of the Research and Statistics Committee:

- (i) Catch and effort statistics. Complete catch data should be collected for the Greenland fishery, by ICNAF division and month, and in each North American and European country, preferably by river of origin, subdivided into types of fish (grilse and salmon). Where possible appropriate data for estimating abundance should also be collected.
- (ii) Length, weight and age composition. Sampling of catches for length, weight and age in the West Greenland area and home rivers should be conducted throughout the respective fisheries.
- (iii) Tagging. Tagging of salmon should be carried out as intensively as possible throughout the duration of the West Greenland fishery, and in as many North American and European rivers as possible. The Subcommittee noted with approval that Danish and Scottish scientists plan to make joint tagging experiments at West Greenland in 1965.
- (iv) Identities of salmon in the West Greenland area. The possible value of the following biological characters for identifying the North American and European components of the exploited salmon stock at West Greenland should be explored: - growth characteristics; scale types; parasites; serological and biochemical characters.

7. Future work

The Subcommittee noted that the mid-term meeting requested at the 1964 meeting has been arranged to take place in Rome on Wednesday and Thursday, 29 and 30 September immediately before the ICES meeting. This meeting will give an opportunity to discuss in greater detail some of the theoretical problems outlined in previous sections of this report.

The Subcommittee also emphasized that regular re-assessments of the state of the various stocks are required using more detail of catch, effort and mortality than has been possible at this meeting. At any one time it will probably only be possible to review a small number of stocks, and the stocks to be reviewed should be chosen in view of data available and known changes in catch or fishing activity. Mid-term meetings are the most suitable occasions to carry out these detailed re-assessments.

TABLE I. SUBAREA I.

	1957	1958	1959	1960	1961	1962	1963	1964
ALL GEARS								
LANDINGS (THOUSAND TONS)								
COD	269	320	294	243	345	451	406	335
REDFISH	28	18	33	44	54	60	47	27
TOTAL (ALL SPECIES)	304	345	273	295	414	526	474	382
OTTER TRAWLERS								
LANDINGS (THOUSAND TONS)	140	173	110	101	171	247	244	
DAYS ON GROUNDS	169	192	143	147	236	318	306	
LANDINGS PER DAY (ALL SPECIES) (TONS)	7,614	9,781	8,864	8,286	12,618	14,165	15,519	
	19.6	19.6	16.1	17.7	18.7	22.4	19.7	
LINERS (EXCL. GREENLAND)								
LANDINGS (THOUSAND TONS)	30	53	48	56	74	87	77	
DAYS ON GROUNDS	5,147	9,707	16,679	11,691	16,087	14,625	12,728	
LANDINGS PER DAY (TONS)	5.8	5.4	2.9	4.8	4.6	6.0	6.0	
DORY VESSELS								
LANDINGS (THOUSAND TONS)	75	69	50	59	66	81	62	52
DAYS ON GROUNDS	3,215	4,257	3,395	3,017	3,461	3,553	3,700	
LANDINGS PER DAY (TONS)	23.2	16.2	14.7	19.5	19.0	22.7	16.7	
TOTAL DAYS ON GROUNDS	15,976	23,745	28,938	22,994	32,166	32,343	31,947	

LANDINGS INCLUDE ALL SPECIES EXCEPT SHELLFISH. CATCHES OF LINERS AND DORY VESSELS ARE ALMOST EXCLUSIVELY COD.

DAYS ON GROUNDS ARE BASED ON DATA REPORTED IN STATISTICAL BULLETIN, INCREASED BY THE RATIO OF TOTAL CATCH BY THE GEAR, TO CATCH BY VESSELS REPORTING DAYS ON GROUNDS. THESE ARE MOST OF THE TRAWLERS, ONE HALF TO A QUARTER OF THE LINERS, AND ALL THE DORY VESSELS.

TABLE 2. SUBAREA 2.

	1957	1958	1959	1960	1961	1962	1963	1964
LANDINGS (THOUSAND TONS)								
COD								
0. TRAWL	20.4	29.1	41.1	171.5	246.4	230.6	191.0	-
INSHORE	11.7	11.1	18.9	16.7	18.6	24.6	24.7	-
TOTAL	32.1	40.2	60.0	188.2	265.0	255.2	215.7	204.2
REDFISH	=	77.6	52.8	82.9	25.6	7.3	6.1	17.1
HADDOCK	=	=	=	=	+	0.1	0.1	+
FLOUNDER	=	=	0.1	1.5	1.1	0.4	0.3	1.3
TOTAL (ALL GROUND FISH SPECIES)	32.1	118.6	113.7	279.3	296.1	265.9	223.5	227.0
LANDINGS PER DAY (TONS) (ALL SPECIES)								
0.T. > 1800 TONS	=	32.1	21.7	39.3	36.6	36.0	44.6	
0.T. 901-1800 TONS	16.4	10.3	12.7	25.4	23.4	29.0	29.4	
0.T. 501-900 TONS	=	38.7	43.0	36.4	29.2	(46.4)	(22.0)	
ALL 0.T. OVER 500 TONS	(16.4)	22.6	31.7	30.0	28.0	30.5	30.8	
FISHING ACTIVITY								
ESTIMATED DAYS FISHED IN TERMS OF TRAWLERS OVER 500 GRT	1,960	5,247	3,585	9,311	10,575	8,719	7,255	

TABLE 3. SUBAREA 3.

LANDINGS (THOUSAND TONS)	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964
COD	471.6	429.0	389.7	448.8	293.6	425.3	470.0	460.6	389.0	466.4	564.7
HADDOCK	55.3	104.5	84.2	68.1	44.4	35.0	67.1	79.7	35.1	14.4	12.2
RED FISH	37.2	17.6	29.8	57.7	158.7	246.1	99.3	89.9	61.3	68.7	75.1
HALIBUT	1.3	0.9	1.4	2.2	2.1	2.4	2.8	2.4	1.8	1.3	3.2
FLOUNDERS	11.4	19.4	17.6	26.3	24.5	25.1	35.1	30.0	27.2	34.4	47.8
OTHER GROUND FISH	9.6	9.4	8.6	8.1	8.8	19.1	17.1	10.9	7.9	7.1	8.2
TOTAL GROUND FISH	586.4	580.8	522.5	611.2	532.1	753.0	691.4	673.5	522.3	592.3	711.2
HERRING	7.7	5.2	4.2	7.6	10.8	4.5	5.4	4.1	5.2	5.8	
*OTHERS	15.9	15.3	14.5	7.7	9.3	5.4	6.4	6.0	5.0	6.3	
HERRING AND OTHERS	23.6	20.5	18.7	15.3	20.1	9.9	11.8	10.1	10.2	12.1	(10)
**GRAND TOTAL	610.5	601.8	541.7	627.0	552.0	763.6	704.3	684.0	533.3	605.3	
LANDINGS BY TRAWLERS PER DAY FISHED	17.1	18.2	18.6	18.9	17.5	19.3	18.0	18.7	16.1	17.9	
ESTIMATED FISHING) ACTIVITY FOR TRAWL) GROUND FISH)	34.3	31.9	28.1	32.3	30.4	39.0	38.4	36.0	32.4	33.1	

* OTHERS INCLUDES CAPELIN AND PELAGIC FISH OTHER THAN HERRING.

** TOTAL INCLUDES ALL FISH EXCEPT SHELLFISH; SHARKS, DOGFISH, SALMON, ETC. ARE INCLUDED

LANDINGS PER DAY AND ACTIVITY ARE BASED ON THE TOTALS FOR TRAWLERS EXCEPT THAT (A) THE DAYS FISHED BY THE SMALLER USSR TRAWLERS (150-575 G. TONS) WERE ESTIMATED IN TERMS OF EQUIVALENT DAYS BY LARGER (OVER 1800 TONS) USSR TRAWLERS, AND (B) HOURS FISHING BY UK TRAWLERS WERE CONVERTED TO DAYS FISHING USING THE RATIO HOURS:DAYS OBSERVED FOR OTHER TRAWLERS.

TABLE 4. SUBAREA 4.

LANDINGS (THOUSAND TONS)	1957	1958	1959	1960	1961	1962	1963	1964*
COD	187.8	213.3	213.5	218.5	212.0	218.8	218.5	231
HADDOCK	47.7	48.9	53.4	46.3	46.9	44.0	51.3	60
REDFISH	54.8	54.9	42.3	49.7	41.9	43.2	58.6	52.4
HALIBUT	2.8	2.6	2.5	2.7	2.4	2.3	2.1	2.2
FLOUNDERS	16.3	17.0	19.6	26.1	27.0	25.3	30.5	32.2
SILVER HAKE	-	-	-	-	-	8.8	123.0	81.1
*TOTAL	368.2	403.2	395.2	405.5	376.2	422.6	585.9	(550)
HERRING	91.4	92.5	101.5	105.0	81.1	115.6	111.4	
**CATCH PER DAY (TONS)	14	15	14	13	13	12	13	
ESTIMATED FISHING ACTIVITY (DAYS FISHED)	26,400	27,100	27,900	31,000	28,800	35,200	45,000	

* INCLUDES ALL SPECIES REPORTED IN TABLE 3 OF STATISTICAL BULLETIN EXCEPT SHELLFISH AND HERRING

** BASED ON CATCH PER DAY OF ALL OTTER TRAWLERS OVER 50 GROSS TONS AND ALL PAIR TRAWLERS. CATCHES OF HERRING ARE EXCLUDED FROM THE ESTIMATES OF ACTIVITY AND CATCH PER DAY

TABLE 5. SUBAREA 5.

LANDINGS (THOUSAND TONS)	1957	1958	1959	1960	1961	1962	1963	1964
COD	13	16	16	14	18	27	30	28
HADDOCK	55	45	41	46	52	59	60	70
REDFISH	18	16	16	11	14	14	10	8
FLOUNDERS	23	26	25	27	29	38	48	50
SILVER HAKE	57	48	50	47	42	86	147	220
*TOTAL	310	262	276	221	228	300	391	421
HERRING								
OFFSHORE	-	-	-	-	68	151	97	131
INSHORE	23	81	48	69	27	71	70	28
**LANDINGS (TONS) PER UNIT EFFORT								
GROUND FISH (TONS/DAY)	-	7.3	7.0	6.5	7.3	8.2	7.9	7.5
HERRING OFFSHORE (TONS/HR)	-	-	-	-	-	1.2	0.8	1.9
**ESTIMATED TOTAL FISHING ACTIVITY								
GROUND FISH (DAYS X 10 ⁻³)	-	36	39	34	31	36	50	56
HERRING OFFSHORE (HR X 10 ⁻³)	-	-	-	-	-	130	123	67

* TOTAL INCLUDES ALL SPECIES EXCEPT SHELLFISH AND HERRING

** ACTIVITY FOR GROUND FISH IS BASED ON US TRAWLERS OF 51-150 GROSS TONS. THE ACTIVITY IN THE TWO DIVISIONS (5Y AND 5Z) WAS CALCULATED SEPARATELY AND ADDED TO GIVE THE ESTIMATE FOR THE SUBAREA. ACTIVITY FOR OFFSHORE HERRING IS BASED ON USSR TRAWLERS.

TABLE 6. TOTAL GROUND FISH LANDINGS (THOUSAND TONS)

SUBAREA	1957	1958	1959	1960	1961	1962	1963	1964
1	304	347	274	296	417	528	478	362
2	32	119	114	279	296	266	224	227
3	611	532	753	674	663	522	592	711
1+2+3	947	999	1,141	1,249	1,376	1,316	1,294	1,300
4	368	403	395	405	374	423	586	(550)
5	310	262	276	221	228	300	391	421
4+5	678	665	671	626	602	723	977	(971)

ACTIVITY ('000's DAYS FISHING)

SUBAREA	1957	1958	1959	1960	1961	1962	1963	1964
1	16.0	23.7	28.9	23.0	32.2	32.3	31.9	
2	2.0	5.2	3.6	9.3	10.6	8.7	7.3	
3	32.3	30.4	39.0	38.4	36.4	32.4	33.1	
1+2+3	50.3	59.3	71.5	69.8	88.3	73.4	72.3	
4	26.4	27.1	27.9	31.0	28.8	35.2	45.0	
5	38	36	39	34	31	36	50	56
4+5	64	63	67	65	60	71	95	

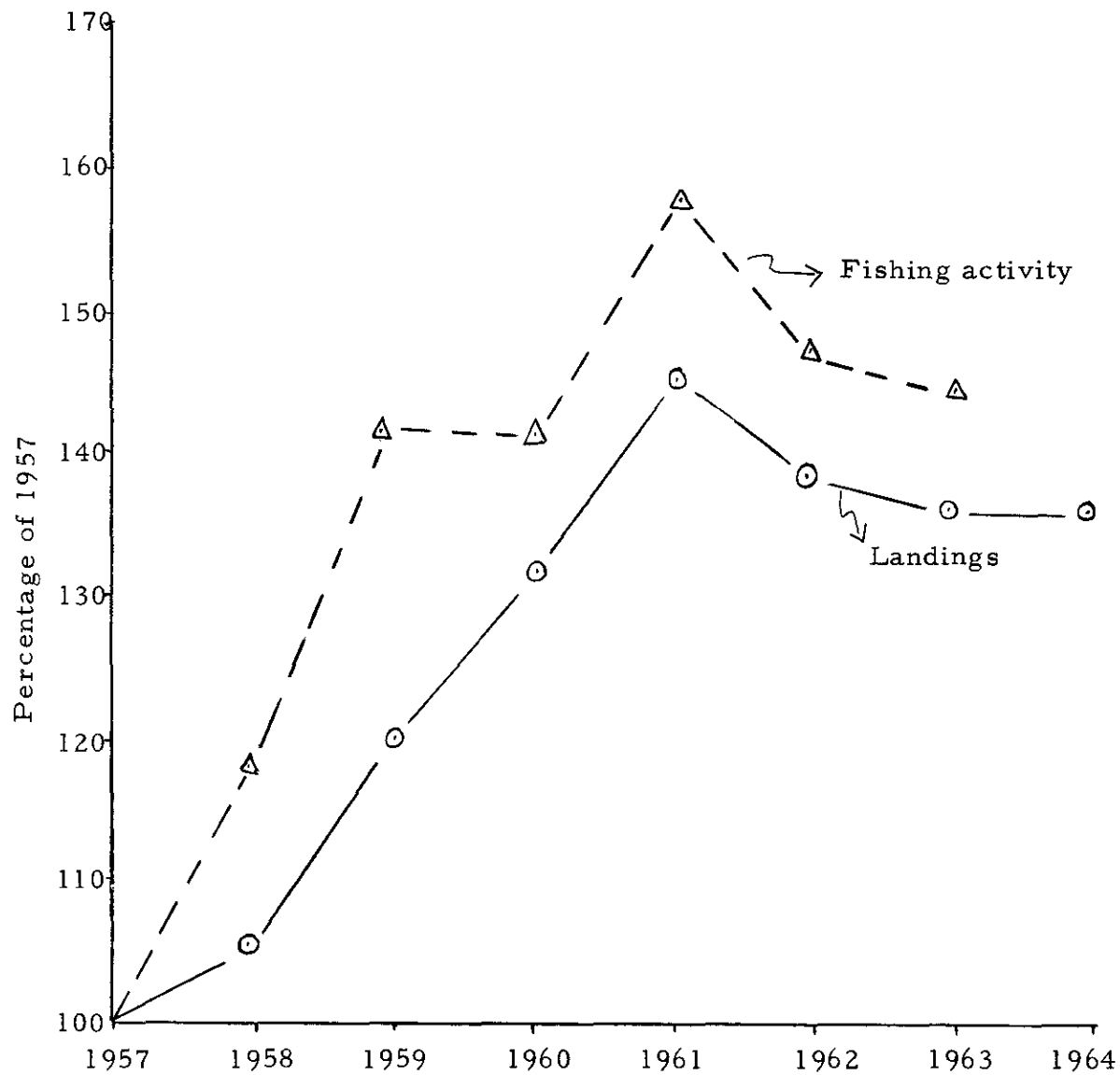


Fig. 1. Groundfish landings and fishing activity relative to 1957 for Subareas 1, 2 and 3 combined.

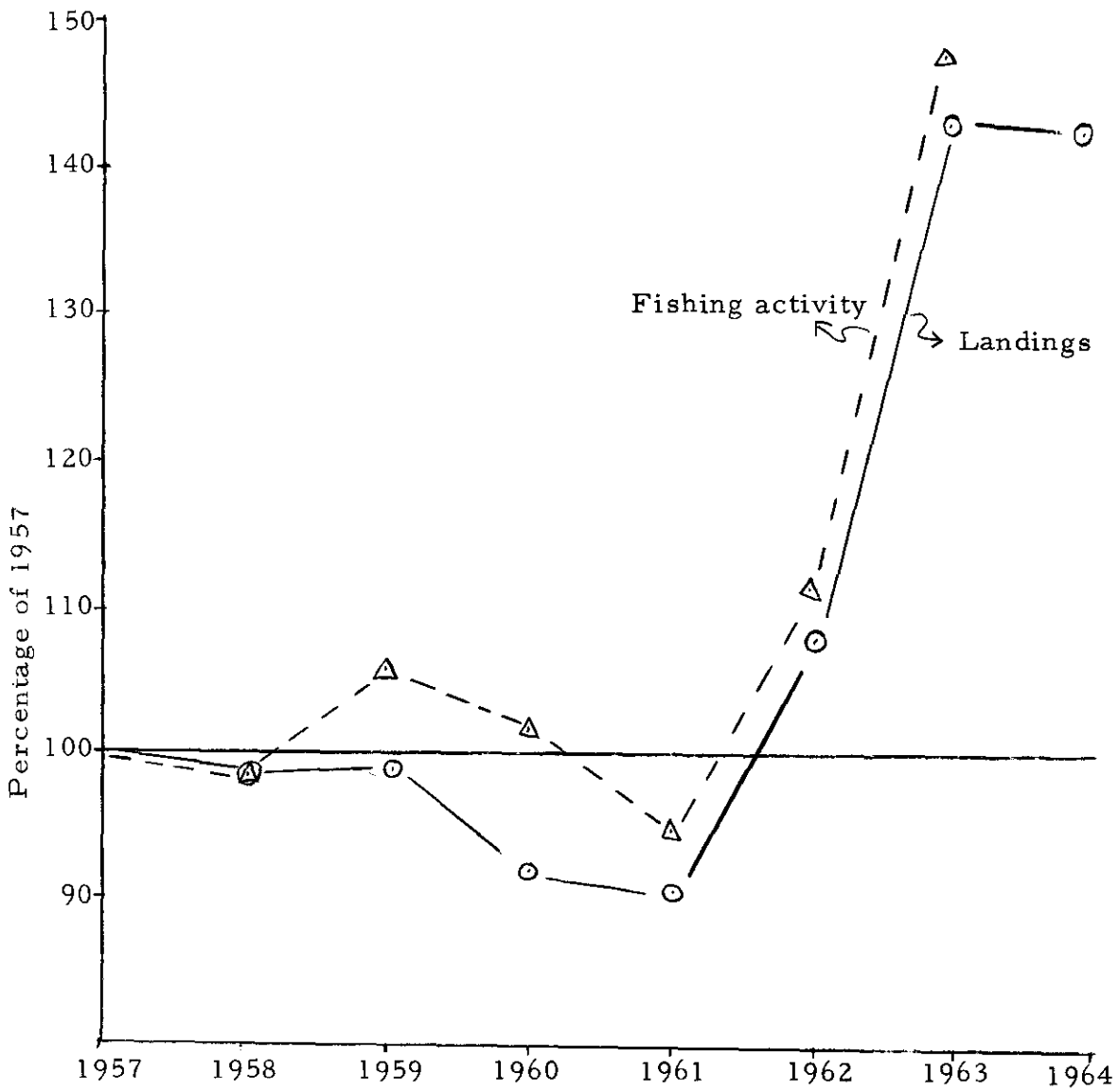


Fig. 2. Groundfish landings and fishing activity relative to 1957 for Subarea 4 and 5 combined.

APPENDIX III - REPORT OF THE SUBCOMMITTEE ON STATISTICS

Chairman: Mr R. Hennemuth; Rapporteur: Dr F. D. McCracken

The Subcommittee met on 31 May and 2 June.

The Subcommittee expressed its appreciation for the rapid processing and distribution of the preliminary summary of statistics for 1964 contained in FAO Fisheries Circulars 38 and 32 and reproduced jointly for this meeting as ICNAF Res. Doc. 7. The Subcommittee asked Mr Gertenbach (FAO) to provide, if necessary, the same services on the current year's statistics for the 1966 ICNAF Annual Meeting. Mr Gertenbach consented to do this and stressed again the necessity for submission of statistical summaries, at least, by 15 April in order to accomplish this task.

The Chairman brought to the attention of the members the fact that the ICNAF Statistical Bulletin Vol. 13 for 1963 was available for distribution. The Subcommittee commended the Secretariat for improvement in timeliness of statistical processing and printing.

1. Review of the 1965 CWP Meeting

Mr Gertenbach (FAO), Secretary of the Continuing Working Party on Fisheries Statistics in the North Atlantic (CWP), reviewed the Report of the Fourth Session of the CWP (Res. Doc. 1), held in Rome, from 9-12 March 1965, stressing those items of particular significance to ICNAF. Mr L. R. Day, (Executive Secretary) and Mr R. C. Hennemuth (Chairman, Subcommittee on Statistics) represented ICNAF, in addition to the representatives from ICES, FAO, and country members observers from the statistical office of the European communities and from the Organization of Economic Co-operation and Development (OECD) also attended. It was also noted that the CWP reviewed the ICNAF statistical program, the ICNAF Statistical Bulletin, and the statistical programs of ICES and FAO and made several recommendations which had a direct bearing on the activities of the Statistical Subcommittee. These recommendations are covered by items on the agenda of the subcommittee and are reported below.

The Subcommittee supports the recommendation of the CWP that, pending the further development of a special Atlantic Tuna Statistics collecting and reporting system, the tuna catches in the ICNAF Area continue to be reported as at present.

The Subcommittee called attention to the FAO Bulletin of Fishery Statistics No. 6 - "Catches in the North Atlantic" (Res. Doc. 5), agreed the Bulletin presents a useful compilation which does not exist elsewhere, and expressed the hope that FAO would continue with its publication.

Mr Gertenbach reported that the CWP had recommended to FAO the desirability to make available as one of its "Bulletins of Fishery Statistics" a tabulation of the scientific, and English, Spanish and French common names of species of North Atlantic commercial fish, crustaceans, molluscs, etc., appearing in the tables issued by ICNAF, ICES and FAO. The Subcommittee endorses this proposal and expresses the hope that this publication might be available for distribution before the 1966 ICNAF meeting. It also concurs with the CWP's proposal that a review of this proposed FAO Bulletin together with the OECD's "Nomenclature" take place at its Fifth Meeting in 1967.

The CWP urged FAO to consider developing an automatic data processing (ADP) system and, when undertaking a feasibility study, to take into account also the needs of ICNAF and ICES, in view of the very close links now being maintained between the statistical programs of these three agencies. The CWP stressed the urgent need for a numerical coding of all aquatic animals and plants for automatic statistical processing purposes.

The CWP recommended that, should FAO decide to proceed with a program of world-wide fisheries census, detailed proposals be placed before ICNAF and ICES in order that these two bodies could suggest any additional items to be included.

The CWP, in considering its future program, took into account the recommendations made by the 1963 ICNAF meeting. The pertinent paragraph from the CWP report is as follows:

"The Continuing Working Party recognized that its own activities, so far, had been confined mostly to catch/effort statistics in the North Atlantic area, but felt that these activities had revealed the growing need to extend such inter-agency expert consultation to provide on a world-wide basis advice concerning all aspects of fishery statistics, including, for example, economic statistics. Such arrangements should ensure the effective co-ordination of discussions and decisions concerning the fishery statistics required by administrators, biologists, economists and technologists at the national, regional and international levels. In this connection, the Continuing Working Party noted that the scope and organization of FAO's fishery activities were at present under review and expressed the hope that the above considerations would be taken into account and adequately reflected in FAO's future program of work in the field of fishery statistics. Meanwhile the Continuing Working Party recommends that the Secretary in consultation with other interested countries and agencies explore ways and means of increasing the effectiveness of the Continuing Working Party's activities in the North Atlantic."

The CWP Secretary announced that it was expected that its Fifth Session would be held during the first quarter of 1967, possibly in Reykjavik, Aberdeen or Hamburg, after two ICES and two ICNAF annual meetings and one biennial FAO Conference have been held.

The Subcommittee again expressed the view that the CWP provides an effective means of coordination of North Atlantic statistical activities, and that ICNAF could best assure continued benefits by referring appropriate items to it whenever the need arises.

2. Notes for completion of Forms STANA 1W and 2, and the Contents of Form STANA 1W

The ICNAF Subcommittee reviewed the draft notes for the completion of forms STANA 1W and 2 (Res. Doc. 8) and the proofs of the proposed final version of the form STANA 1W. It noted that these include the revisions already recommended by the CWP and by the ICNAF Secretariat, based on past experience in their use.

The Subcommittee

recommends (16)

(i) that the following changes be incorporated in form STANA 1W:

- (1) the insertion of "silver hake" in line 30;
- (2) the change from "pelagic fish" to "other pelagic fish" on line 75; this change is required to indicate that line 75 refers to pelagic species other than "herring" (line 53);
- (3) the line numbers (under column A) and the species entries (under column C) on the following lines should be printed in bold black characters: 8, 18, 19, 28, 29, 30, 38, 53, 74, 75, 76, 77.

(ii) that the following changes be made in the notes for the completion of the forms STANA 1W and 2 by the CWP Secretary in consultation with the ICNAF Secretariat for use with the 1965 Statistical Subcommittee:

- (1) The notes stress that all countries should report annually only the changes in conversion factors, if any, and if none, confirm that their basic lists are to be left unrevised (see Section 2.12, first sentence of the STANA 2 notes and Section 5.12, first sentence of the STANA 1W notes).
- (2) The insertion of new sections to stress that all the live equivalent (nominal catches) of landings of products from so-called "industrial" fish are to be included in the STANA 1W and 2 forms. Countries should ensure that such products, when manufactured from viscera, livers, etc. of fish for human food, should not be

included in these calculations - these raw materials would already be included in the live weight equivalent of the food fish landings.

- (3) The insertion of new sections stressing that all countries should report the data on forms STANA 1W and 2 according to the "calendar year of capture" and not the "calendar year of landing".
- (4) The lists of species given in Sections 6 and 7 of the notes of STANA 1W should be revised to include the following:
 - (a) transfer of "silver hake (Merluccius bilinearis)" from the category "Other Groundfish" to "Groundfish";
 - (b) insertion of "argentinnes (silver smelt) (Argentina spp)" under "Other Fish";
 - (c) various other changes which may result from changes made in the list in Res. Doc. 26.

3. Matters relating to Format of Statistical Bulletin Tables

As the result of recommendations from the CWP and discussions among the participants, the Subcommittee

recommends (17)

- (i) that columns for listing "Other Groundfish" and "Other Pelagic fish" be added to Table 5 so that it will be a full summary of Table 4;
- (ii) that the term "Landings" be changed to "Nominal Catch" in all tables and references;
- (iii) that time units "month" and "year" be specifically defined as "month and year of capture";
- (iv) that the term "Others" in Tables 4 and 5 be changed to "Other Fish and Shellfish";

4. Classification of Silver Hake as a Main Species

It was noted that silver hake ranked third in the landings in 1963, and that the importance of studies of this fishery was discussed in the Assessment Subcommittee.

The Subcommittee therefore

recommends (18)

that the statistics of catch and effort for silver hake be included separately in Tables 2, 4 and 5 of the Statistical Bulletin, beginning with the year 1965, and that the species be listed separately on STANA 1W forms.

5. Conversion Factors

The question of the adequacy and completeness of factors for converting "landed weights" to "nominal catch (round, fresh or live weight)" was considered. Current factors and bases for them were submitted by most countries and tabulated in Res. Doc. 51.

The Subcommittee

recommends (19)

- (i) that the list of conversion factors published in the next Statistical Bulletin be brought up to date by reference to Res. Doc. 51, and the Secretariat contact countries not covered therein in order to obtain a complete list;
- (ii) that the Secretariat request through correspondence that countries submit each year only any new or revised factors so the list may be kept current and accurate;
- (iii) that the Secretary of the CWP revise the notes for completion of STANA 1W and 2 to reflect this change;
- (iv) that the subject of validity and methods of estimating conversion factors be referred to the next session of the CWP;
- (v) that the countries continue with experiments to improve conversion factors and report in meeting documents the results of such experiments.

6. Discards and Industrial Fish

(a) Discards. It was agreed that the simplified form, devised at the 1964 meeting, for reporting discards was satisfactory. The Subcommittee discussed some of the problems and effort involved in collecting information on discards. The value of this type of information, even though incomplete, was recognized and the Subcommittee

recommends (20)

- (i) that discard information continue to be requested through the use of ICNAF Statistics Form 4 (formerly 4a) and that countries not now reporting or collecting discard information be urged to do so;
- (ii) that the Secretariat be requested to make an annual summary of these data by division, species and country, beginning with the 1964 submissions, and circulate it as a meeting document.

(b) Industrial Catches. The Subcommittee considered the use of ICNAF Statistics Form 4b for reporting species composition and quantities of industrial fish taken incidentally while fleets were fishing primarily for food. It was agreed that in compiling STANA Forms 1W and 2, the quantities reported should include only those species of fish which go wholly into meal. Fish meal derived from offal would normally be included in the conversion to nominal catch (round, fresh) and should not be included in the category whole fish used for industrial purposes. Accordingly the Subcommittee

recommends (21)

that ICNAF Statistics Form 4b be discontinued, with the same information being obtained through use of STANA Forms 1W and 2; and that the notes for compilation of these forms be redrafted to take care of this problem.

7. Redfish Statistics by Depth Zones

As requested by this Subcommittee at the 1964 Annual Meeting, Mr Gulland had reviewed some available data on redfish statistics of catch and effort and length frequencies by depth zones (Res.Doc. 28). He concluded that depth zone information on both catches and length samples of landings could provide better estimates of changes in the fishery. However, countries producing a major share of the redfish landings are unable as yet to provide such information. Accordingly, the Subcommittee

recommends (22)

that the request for collection of redfish statistics of catch and effort by depth zones (ICNAF Statistics Form 5) be terminated.

8. List of Species

The Subcommittee considered the revision by ICNAF experts of the common and scientific names of fish and invertebrates, made during the past two years and compiled in Res. Doc. 26. It was pointed out that the ling, Molva

molva (L.), was only noted on one occasion to have been caught in the ICNAF Area.

The Subcommittee

recommends (23)

- (i) that the scientific name "Molva molva (L.)", "ling", be dropped from the list;
- (ii) that the name "argentines (silver smelts), Argentina spp." be added to the list;
- (iii) that the silver hake be changed from the group "Other Groundfish" to "Groundfish";
- (iv) that the list in the next Statistical Bulletin be revised where necessary to conform to the listing in Res. Doc. 26, and changes above;
- (v) that the Secretary of the CWP make appropriate changes in the list in "Notes for Completion" to conform to the above list.

9. Definitions of Groundfish

The question of the interpretation of the word "groundfish" in relation to ICNAF regulations, as outlined in Comm. Doc. 6, was discussed. Certain regulations refer to groupings as listed in specific issues of the Statistical Bulletin, but these groupings have changed from time to time as biological studies or the development of new fisheries have so required. The Subcommittee felt that the groupings in the Statistical Bulletin were related more to scientific needs and should not be used for purposes of legal reference.

The Subcommittee therefore

recommends (24)

that the classification and grouping of ICNAF species in the Statistical Bulletin should be flexible for scientific purposes.

10. Communications with ICES

The Chairman of the Statistical Committee of ICES referred to the exchange of reports of the Statistical Committees of ICES and ICNAF and expressed the value of this procedure and the appreciation of ICES for it.

No matters were referred by ICES (Res. Doc. 6) specifically to ICNAF for consideration, but it was noted that ICES is considering the matter of an inventory of fishing vessels, such as the ICNAF List of Fishing Vessels. The possibility of a joint list for the North Atlantic region was discussed and the Subcommittee

recommends (25)

that ICES be advised of ICNAF's opinion that such a combined list of vessels would be desirable.

11. ICNAF List of Fishing Vessels for 1965

The Secretariat must circulate requests for information for inclusion in the next issue of the list during 1965. The Subcommittee considered the value of items for which information has been requested previously. Several items of information were considered superfluous or extremely difficult to obtain. One item was added. A list of items and definitions to be included is appended and the Subcommittee

recommends (26)

that the Secretariat, utilizing the appended list of items for the List of Vessels, prepare and circulate appropriate forms for obtaining information from member countries. These data should be reviewed next year.

Furthermore, a previous recommendation exists for including in the List of Vessels information on number of ships, number of trips, days absent and average gross tonnage by subarea and country, gear and tonnage class. These data are reported on ICNAF Statistics Form 3. Since the previous information is so incomplete as to preclude making a useful summary, the Subcommittee

recommends (27)

that the Secretariat make an extra effort to obtain complete information on fishing effort for 1965 on ICNAF Statistics Form 3, and, if successful, publish only the 1965 summaries in the 1965 List of Vessels.

Subcommittee on Statistics

Annex 1. Items for the List of Vessels over 50 gross tons fishing in the ICNAF Area in 1965.

<u>Item</u>	<u>Definition</u>
1. Name of vessel	-
2. Date built	-
3. Gear	
(a) Type and name	see 1964 list, page 1
(b) Size of gear	" " " " "
4. Gross tonnage	" " " " "
5. Overall length	" " " " "
6. Register number and home port	" " " " "
7. Engine	Indicate steam or motor
8. Power	see 1964 list, page 1
(a) Brake H. P.	
(b) Propellor R. P. M.	
9. Crew	see 1964 list, page 1
10. Controllable pitch propellor	" " " " "
11. Radio	" " " " "
12. Radar	" " " " "
13. Sonar	Ranging device for locating fish
14. Echo sounder	see 1962 list, page 1
15. Loran	" " " " "
16. Automatic navigator	" " " " "
17. Automatic pilot	" " " " "
18. Radio direction finder	" " " " "
19. Subareas fished	" " " " "
20. Remarks	" " " " "

APPENDIX IV

REPORT OF THE SUBCOMMITTEE ON ENVIRONMENTAL STUDIES

Chairman: Mr A. J. Lee

The Subcommittee met on the mornings of 31 May and 1 June.

1. Report on the NORWESTLANT Surveys

The Chairman outlined the progress made with the writing of this Report over the last year and the arrangements which the Steering and Publications Subcommittee had made for its publication. A considerable part of the Report has been completed, the main work outstanding being the completion of the texts on physical oceanography, various eggs and larvae, and on scattering layers. The Report will consist of four parts as follows: -

1. Text
2. Atlas
3. Physico-chemical oceanographic data
4. Biological data

It was agreed that every effort should be made to complete the text of the Report and the Atlas by the end of 1965 and that a chapter giving the main findings of the NORWESTLANT Surveys should be written and added during January 1966. This should be written by the Chairman in the first instance and then submitted to the authors of the various sections of the Report for their comments. The physico-chemical oceanographic data will be issued by the Canadian Oceanographic Data Centre (CODC) during that body's present fiscal year. To allow that to be done, it was agreed that all the material which was to be issued should reach CODC by 1 September so that printing could start on 1 December and issue take place in March 1966. Mr Sauer, head of CODC, gave an account of the form which the data books will take and of the arrangements that had been made to machine process the data, including the bathythermograph data. He also outlined the material which was required by CODC but which was not yet to hand. It was agreed that Mr Sauer should write to those participants in the NORWESTLANT Surveys who had not yet sent in all their material and say exactly what he required from them by 1 September. It was agreed that consideration of the publication of the biological data (Part 4) should be postponed until the Research and Statistics Committee's meeting in 1966 when the Report will have been completed and it will be possible to assess exactly the work necessary to get the data in a form suitable for publication and the costs involved in publication.

The Chairman explained how he had received a proposal from Dr M. Dunbar that all the zooplankton collected during the NORWESTLANT Surveys

should be housed in one institution and how he had obtained the reaction to this proposal of the plankton experts who had been concerned with the NOR WEST-LANT Surveys. About half favoured it and half did not. He particularly stressed the views of Mr Glover and Dr Vagn Hansen who had also been concerned with the International Indian Ocean Expedition's collection of plankton. They pointed out that despite the heavy curatorial work necessary to run such a collection, it was seldom used by experts. It was agreed that a decision on the proposal by Dr Dunbar should be deferred until the Report as a whole had been completed and it was possible to assess the scientific value of the NOR WESTLANT zooplankton material more accurately.

2. Plans for Further Work at Sea arising from the Results of the NORWESTLANT Surveys

Dr Graham outlined a proposal that an environmental survey be carried out in the Georges Bank area in order to study the effects of the environment on the recruitment of haddock. The study would require surveys of haddock eggs and larvae, zooplankton and hydrography carried out at a high frequency over a period of at least four months and these surveys would have to be repeated for about three years. Dr Bogdanov said that the USSR would be pleased to participate in such a study which was in line with similar Soviet investigations in the Caspian and Barents Seas; he would like to see it extended to include herring, cod and silver hake. Dr Graham pointed out that this would increase the survey area somewhat and would extend the survey over a much longer period of time each year. Dr Cole supported the proposal and pointed out that similar work was now being done by the UK in the North and Irish Seas: he stressed that careful planning and standardization of gear and methods would be essential. Dr Campbell thought that the hydrographic studies would necessitate investigations outside the Georges Bank and Gulf of Maine to as far as the Gulf Stream. Dr Hart doubted whether useful answers could be obtained if the surveys only lasted three years. The Chairman pointed out that the Chairman of the Assessments Subcommittee had indicated to him that his group were getting very interested in the type of study proposed by Dr Graham.

The Subcommittee

recommends (28)

that the USA and USSR (i) draw up a plan for an environmental survey of the Georges Bank area in relation to the recruitment of the commercial fish stocks of that area, (ii) indicate the resources which they have at their disposal for carrying out this survey and the additional assistance which they will need from other countries, (iii) submit the plan to the Chairman of R&S for discussion at the 1966 meeting of the Committee, the submission being made so that the plan can be circulated to members of the Committee well in advance of that meeting in order to

allow them ample time to consider it and discuss it within their own countries.

The Subcommittee took note that various countries intend to continue their environmental studies in Subarea 1; Norway is continuing cod egg surveys, USSR and Germany are continuing to do hydrography, and Denmark is continuing cod larvae surveys and hydrography.

3. Publication of 1964 Environmental Symposium

The Chairman reported that the Secretariat had completed the typing of the Report of and contributions to the 1964 Environmental Symposium. The typescript amounts to 815 pages and it is now being corrected. Publication will be in September 1965.

4. Environmental Aspects of the National Research Reports

Res. Doc. 9-20, 29, 37, 41 and 47 were considered. From a number of these, it was seen that 1964 was a cold year along the American side of the ICNAF Area and at its beginning along the Greenland side too, but that from May onwards the Irminger component in the Greenland area was abnormally warm giving rise to temperatures above 7°C in November, a level not observed hitherto. Dr Templeman said that it would be of interest to see if this anomalous condition was transferred to the Labrador area later. Dr Hansen said that ice conditions were heavy at West Greenland in 1964, but that in 1965 they have been light, the heavy ice being to the east of Greenland. Dr Jonsson reported that 1965 had seen the worst ice conditions at Iceland this century.

Dr Cole drew attention to the increasing amount of plankton work being done in the ICNAF Area by (a) the Oceanographic Laboratory, Edinburgh, using continuous plankton recorders and (b) USSR vessels. He hoped that the USSR would be able to publish its material at an early date so that it could be compared with the UK material.

Dr Graham drew attention to the continuing US benthos studies and reported that a considerable number of samples along the whole of the Atlantic shelf had been obtained as a result of a geological survey being carried out in that area by the US Geological Survey and the Woods Hole Oceanographic Institution.

Dr Bogdanov reported on the USSR studies on the use of sonar to evaluate the abundance of fish (Res. Doc. 37). He hoped that this would stimulate other countries to start this type of investigation in the ICNAF Area.

The Chairman noted that some of the Res. Doc. (10, 18, 41, 47 and 67) contain material of use to the scientists who are writing the NORWESTLANT Report and he hoped that they would draw upon it. This material, amongst

other things, allowed a comparison of the environmental conditions and of the egg and larval abundance during NORWESTLANT 1-3 with those in 1964.

5. Report on the Activities of the Intergovernmental Oceanographic Commission (IOC)

The Chairman described the progress made by SCOR and ACMRR in preparing a General Scientific Framework for World Ocean Study for IOC. The Subcommittee had no comments to make on the Draft circulated by IOC and noted that Chapter 8 on "Fisheries Aspects of the General Scientific Framework for World Ocean Study" had been prepared by ACMRR and would now be published as a separate document. It hoped that FAO would ensure that this had as wide a circulation as possible.

The Chairman described the scheme for working standard oceanographic sections in the North Atlantic prepared by the USSR and submitted to IOC. He reported that as a result of subsequent discussions between USSR, US and Canadian oceanographers IOC intended to establish a working group which would (a) carry out a study of the results obtained by working standard sections in the past (b) organize an intensive study of one particular section which would probably be in the Norwegian Sea and which would be sampled with high frequency over one year. The Subcommittee noted that the map of standard sections in the North Atlantic prepared for IOC did not include a number of sections worked by ICNAF countries over a period of years, and that the data collected on them might help the IOC working group.

The Subcommittee therefore

recommends (29)

- (i) that the Chairman of the Environmental Subcommittee prepare a list of the standard hydrographic sections worked in the ICNAF Area and that the Executive Secretary forward this to the IOC;
- (ii) that the Chairman of R&S ask a suitable member of the IOC Working Group on Variability in the Ocean to act as an observer on behalf of ICNAF, his expenses being met by the member country of IOC which he represents.

6. Report on the Activities of the Scientific Committee on Oceanic Research (SCOR)

Reports on the last two meetings of SCOR had been prepared by the Chairman and circulated by the Executive Secretary on 17 August and 31 December 1964 respectively. They were taken as read.

7. Sea-bed Drifters: Publicity

The Chairman reported that the Executive Secretary had circulated to liaison officers the paper by Lee, Bumpus and Lauzier on the Sea-Bed Drifter (1964 Meeting Doc. 35). This had been translated and published in French, Norwegian and Canadian journals. Dr Lauzier reported that Canadian sea-bed drifter releases had been publicized on radio and television and that Canada was now getting recaptures by vessels of other countries. The paper by Lee, Bumpus and Lauzier will be published in ICNAF Research Bulletin No. 2.

8. Sea-bed Thermographs

Dr Posgay reported upon a US scheme to lay long-period thermographs on the sea-bed and await their recapture by fishermen. An experiment with 10 dummy cases had resulted in 3 recaptures so far. Further progress depended on the development of a cheap and reliable thermograph.

9. FAO Symposium on Food Chains in the Sea

This symposium was formerly called a Symposium on Community Relationships and Energy Flow through Trophic Levels. The Chairman reported that FAO had informed the Executive Secretary that it was prepared to act as a co-sponsor with ICES and ICNAF on the following bases:

- (1) The symposium should be held in autumn, 1968, in Copenhagen at the time of the ICES meeting;
- (2) ICES should provide the meeting accommodation and one-third of the cost of publishing the papers given;
- (3) ICNAF should bear two-thirds of the publication costs;
- (4) FAO should bear the cost of a three language interpretation system and the expenses of the ACMRR Working Group on Trophic Levels;
- (5) UNESCO should pay for the attendance of scientists from countries outside ICNAF and ICES who contributed papers;
- (6) The organizers of the marine section of the International Biological Programme (IBP) should assist in arranging the symposium;

The Subcommittee noted the interest of the Assessments Subcommittee in this symposium. Dr Cole said that ICES would be prepared to act as host and to pay its share of the costs provided that ICNAF would collaborate to the extent indicated above.

The Subcommittee

recommends (30)

- (i) that ICNAF act with FAO and ICES as a co-sponsor of a Symposium on Food Chains in the Sea and pay two-thirds of the cost of publication of the papers submitted; and
- (ii) that R&S appoint one of its members to act as the ICNAF representative in the group responsible for the organization of the symposium.

APPENDIX V - REPORT OF SUBCOMMITTEE ON GEAR AND SELECTIVITY

Chairman: Dr H. Bohl; Rapporteur: Dr F.D. McCracken

The Subcommittee met on Tuesday, June 1.

The Chairman reviewed the agenda based on the 1964 recommendations and it was adopted.

1. Selectivity of Codend Materials

The selective properties of polypropylene and polyamide fibers reported in Res. Doc. 31 and 10 were discussed. The latter document also included information about manila and polyethylene fibers. The Chairman informed the Subcommittee that six papers giving information on the selective properties of polypropylene fibers were submitted to the 1964 meeting of ICES. All the new data support the information on mesh size differentials for polyethylene (e. g. courlene) and polyamide (e. g. nylon, perlon) and polyester (e. g. terylene) given to the Commission at the 1964 meeting.

The new information suggests that the difference in selectivity between manila and polypropylene is clearly less than 10%.

Res. Doc. 61, giving information on selectivity for silver hake and red hake, was also presented and discussed.

2. Tabular Summaries of Selectivity Data

Discussion on this item centred on details of the tabular form to be used and on the ICES Guide to the Presentation of Selectivity Data (Report of the ICES Comparative Fishing Committee, 1964) (Annex 1).

(a) Tabular Form. The need for minor alterations to the ICNAF mesh selection summary (Redbook 1963, Part I, Appendix III) was noted and the Subcommittee

recommends (31)

- (i) that "range of depths" be added to column 2 under "locality";
- (ii) that "through water" be added to column 5 under "speed of tow";
- (iii) that the heading of column 6 be changed to read "codend material";
- (iv) that the word "R tex" be added to column 7;

- (v) that for column 14 the heading be changed to read "Total number of fish within selection range (species studied)";
- (vi) that column 15 be divided vertically so that the first section of the column refers to experimental species and the second section to all species taken.

(b) ICES Guide to the Presentation of Selectivity Data. The Subcommittee recognized that this guide would be most useful to ICNAF scientists submitting data on selectivity and

recommends (32)

that the ICES Guide to the Presentation of Selectivity Data be annexed to this report and published in the Redbook for 1965 but that for ICNAF use there should be one alteration as follows - between items 16 and 17 of the guide, insert an item requesting the total number of fish of the species studied in codend and cover separately.

3. Standard Reference System for Net Materials

Res. Doc. 63 was prepared at the request of this Subcommittee which expressed its appreciation to the authors. After a brief review, the Subcommittee

recommended (33)

that workers reporting to ICNAF should use the Resultant tex number to characterize netting twines.

For the time being, the runnage may be stated also to enable workers not familiar with R tex numbering to relate to current twine designations.

The Secretariat is asked to make sure that Res. Doc. 63 is given wide circulation.

4. Length, Weight and Girth Data

Res. Doc. 22, reporting on length-girth relationships for cod from 3L and 3N, was discussed. Res. Doc. 48, presenting information about Georges Bank scallop weight-length ratios, was noted.

The Subcommittee agreed to repeat Rec. 26 of 1964 (Redbook 1964, Pt. I, p. 41) and that part of Rec. 24 of 1963 (Redbook 1963, Pt. I, p. 50) dealing with the detail of girth measurements and

recommends (34)

that the collection of girth, weight and length data, especially in the northern subareas, be continued. The results should be submitted to the Secretariat or presented as meeting documents. Measurements of girth should be as stated in Rec. 24, Redbook 1963, Part I.

5. Meshing of Redfish

There were no papers specifically dealing with this item. The probability that this matter could be of increased importance if mesh size should be increased was recognized and the Subcommittee again

recommends (35)

that countries should continue to report in meeting documents on the meshing of redfish, especially those data for large meshed codends.

6. Selectivity and Catch Size

The importance of catch size on selectivity was recognized and is illustrated again in a paper by Hodder and May in ICNAF Research Bulletin No. 1. Further information for redfish is needed.

7. Developments in Gear and Fishing Methods

(a) List of trade-named twines. The revised list in Appendix II of Res. Doc. 52 was reviewed and some corrections were made. The Subcommittee was unable to make a complete review and agreed that the Chairman of the Gear and Selectivity Committee should ask Mr Carrothers (Canada) and Dr Klust (Germany) to review the list and submit the results to the 1966 meeting. They will be asked to consider only fibers that are used in marine fishing gears.

(b) Report of trawl material and mesh size sampling, 1964. Both the members of this Subcommittee and the Chairman of the Assessments Subcommittee reaffirmed the importance of the material summarized in Res. Doc. 52. Certain ambiguities in reporting by different countries were cleared. The Subcommittee again

recommends (36)

that summary data of codend mesh size by country, subarea, main species fished, type and material of trawl and relevant information on topside chafers should be reported annually to the Secretariat on the ICNAF Trawl Material and Mesh Size Sampling Summary form, but that the form be altered so that mesh sizes are grouped in 5 mm intervals

(i. e. 90-94, 95-99, etc) or the nearest equivalent in inches.

The Subcommittee agreed that preparing and publishing the material should follow Rec. 28 in Redbook 1964, Pt. I.

8. Topside Chafing Gear

Res. Doc. 66, dealing with topside chafing gear experiments by the USSR, was not available. A verbal account was presented. The Subcommittee wishes to draw the attention of the ad hoc Committee on Trawl Regulations to the contents of this document.

9. ICNAF Mesh Gauge Description

Delegates from the USSR drew to the attention of the Subcommittee the ambiguity in wording describing the taper of the ICNAF mesh measuring gauge in regulations proposed at the 1955 Annual Meeting of the Commission. The Subcommittee

recommends (37)

that the ambiguity in the wording of the description of the taper of the ICNAF mesh measuring gauge be drawn to the attention of the Commission and points out that an agreed interpretation is needed.

The Subcommittee noted that the US and Canadian interpretation of the wording is that the ICNAF gauge decreases in width by 2 cm in each 8 cm of its length.

Subcommittee on Gear and Selectivity

Annex 1. ICES Guide to the Presentation of Selectivity Data
(Appendix I of Report of Comparative Fishing Committee, ICES Procès Verbaux 1964, p.83-84)

As a guide to authors when reporting the results of mesh selection experiments, it is recommended that the information set out below should be provided in tabular form. This list is based on that suggested by the Mesh Selection Working Group (see Cooperative Research Report No.2, p.151), with some amendments and additions proposed at the present meeting of the Comparative Fishing Committee.

As it stands, the following list is intended to meet the case in which data from several hauls are combined to give a single selection result. The most appropriate way of grouping hauls for this purpose must be left to the discretion of the author, but in addition to the obvious criteria such as type of material and mesh size of the codend, it is suggested that locality, time (day or night) and catch size may also be relevant.

This list is neither obligatory nor exhaustive, and it is expected that any special circumstances applying to the tests, or supplementary information such as girth measurements, would be mentioned by the author. If results for individual hauls are to be given, the presentation can be adapted accordingly.

<u>Item</u>	<u>Units (metric)</u>
1. Ship (including length and horsepower)	
2. Gear (design and material)	
3. Date	
4. Time	
5. Locality	
6. Depth range	
7. Codend material (including runnage, braiding, treatment, Tex. No.)	
8. Type of mesh gauge (including operating pressure)	
9. Mesh size	Mean: to nearest mm Range: in mm S. E. of Mean: to nearest 0.1 mm No. of measurements
10. Experimental method (covered codend or alternate hauls)	
11. Dimensions, material and mesh size of cover	
12. Species	
13. 50% retention length.....	to nearest mm

14. Selection factor..... S.F. to 1 dec. place
(S.E. of S.F. to 2 dec. places)
15. 25-75% selection range to nearest mm
16. Number of fish of the species studied in selection range, in codend and cover separately.
17. Average weight per haul of all fish species (including that studied) in codend and cover separately kg
18. Quantity and composition of other catch (including weed, sponge, crustacea etc.)...kg
19. Number of hauls
20. Average duration of haul..... hours and minutes
21. Towing speed (speed through water)..... knots

Notes to Items

- re 4. In view of the substantial differences of selectivity in daylight and darkness which have been reported in certain instances, authors may wish to group hauls accordingly. If light measurements are made, these should also be reported.
- re 8. In accordance with an earlier decision of the Comparative Fishing Committee, the recommended gauge is the ICES gauge used as specified in the published Prospectus (i. e. at a pressure of 4 kg, reading at the second "squeeze"). If another type of gauge is used, it should be described, and its operating pressure stated.
- re 9. Mesh size. If a gauge other than the ICES gauge is used, measurements should where possible be converted to ICES gauge equivalents, and the conversion factor stated.
- re 11. A recommended design and mesh size of cover will be found on p. 140 of the Cooperative Research Report No. 2. If this type of cover is used, it is sufficient to enter "ICES specification" and mesh size.
- re 14. It is intended that the S. E. of the mean selection factor should be calculated from selection factors obtained from individual hauls. If the data are insufficient, the S. E. cannot be given.
- re 17. If there are marked variations in the catch composition of the hauls being summarized, it is advised that the main composition of each haul be stated separately.

APPENDIX VI - REPORT OF WORKING GROUP ON TAGGING

Chairman: Dr E. M. Poulsen; Rapporteur: Mr Sv. Aa. Horsted

The Group met at 4:00 p. m. on 31 May and at 2:30 p. m. on 2 June, with representatives from most member countries and observers from Japan in attendance.

The Working Group considered the four subjects listed on the R&S agenda under Item 15a. The matter of the Greenland salmon stock referred to the Group was dealt with in a joint meeting with the Assessments Subcommittee, and this item is reported by that Subcommittee.

1. Payment of Rewards

After consideration, it was agreed that the existing system for paying rewards for reports of recaptures be confirmed, viz. that the country first receiving tags and data pays the reward without any refund from the tagging country.

2. Greenland Tagging and Results

At last year's meeting, Panel 1 recommended that the interchange between cod stocks at Greenland and Iceland be studied at the 1965 meeting. This was referred to a small working group consisting of Bratberg, Hansen, Horsted (Chairman), Jónsson and Meyer.

Reports on tagging experiments in Greenland waters were presented by Denmark (Res. Doc. 36 and 56), Germany (Res. Doc. 23) and USSR (Res. Doc. 73). The Working Group also had reports by Dr Biester. Iceland submitted valuable tables on cod tagging in Iceland waters (Res. Doc. 75) and Norway (Bratberg) reported verbally. The Working Group compared and combined these reports.

Although a study of interchange needs more specified data (especially of age and maturity of cod when tagged and of the varying fishing intensity and returning rate), the Working Group came to the following conclusions:

- (a) The interchange of cod between West Greenland and Iceland consists of a spawning migration from West Greenland to Iceland (and East Greenland). Cod having migrated to Iceland seem to stay in Iceland waters and the migration of adult cod from Iceland to West Greenland seems to be negligible. However, the NORWESTLANT Survey has confirmed the earlier findings that cod fry from Iceland and East Greenland contribute to the recruitment of the West Greenland stock.

- (b) The magnitude of the spawning migration from West Greenland to Iceland varies between divisions. Tagging experiments in Div. 1A-1D have given less than 1% recaptures at Iceland while experiments in 1E and especially 1F have given higher recapture percentages (in some years between 3% and 4%) at Iceland.
- (c) The migration of cod from East Greenland to Iceland is of a much larger scale than that from West Greenland to Iceland. It is debatable whether migration of adult cod from Iceland to East Greenland takes place, but tagging experiments have not shown any migration.
- (d) The recapture percentage of cod tagged (and caught) in Iceland waters indicate that the chance of a tagged cod to be recaptured and reported in Iceland waters has been about doubled in the last ten years. If the magnitude of the interchange is steady, this also ought to have doubled the recapture percentage of cod tagged at West Greenland and caught at Iceland. This percentage, however, seems to have been rather steady in the last ten years. It must, however, also be taken into account that the fishing intensity in Greenland waters has been increased (roughly doubled) in this period. This means that more tagged cod are caught at Greenland and that less cod remain for migration to Iceland. These two trends working contrarily to one another make it difficult to judge whether the interchange between Iceland and Greenland stocks has changed during the postwar period, but the Working Group considers it to have remained steady.
- (e) Icelandic tagging experiments at West Iceland give roughly 15-20% recaptures in recent years. Danish tagging experiments in Div. 1F give about 3% recaptures at Iceland in the same years. These figures, however, are not a measure of the magnitude of the interchange because the proportion of tagged cod to non-tagged cod in the tagging area is unknown.
- (f) The postwar interchange seems to be of rather smaller magnitude than the prewar interchange, but the heavily increased fishing intensity at Greenland taking many tagged cod before they become mature makes direct comparison very difficult.

3. Card System of Reporting Taggings

The existing card system for reporting taggings was considered. It was noted that from the point of view of the Secretariat the system was working well. Canada (in part) found the system not absolutely necessary and in cases somewhat difficult to work with. The Executive Secretary offered to consider

the last point. However, it was the general consensus of the Working Group that the card system served a useful purpose and that it should be continued. It was stressed that the reporting to the Secretariat should be as soon after tagging as possible.

4. Translation of ICNAF Special Publication No. 4 (Tagging)

The Executive Secretary and the FAO observer, Mr Boerema, informed the Committee that FAO had made translations into French and Spanish of the introductory parts of the ICNAF Spec. Publ. No. 4 (Tagging) for publication together with a FAO paper on tagging.

APPENDIX VII- REPORT OF THE SUBCOMMITTEE ON SAMPLING

Chairman: Mr Sv. Aa. Horsted; Rapporteur: Dr Erik M. Poulsen

The Subcommittee met on Wednesday, 2 June at 10:30 a.m. Representatives from most member countries and observers from Japan and FAO attended the session.

The Subcommittee considered Items 8(a) to (f) of the agenda of R&S.

1. Forms and Data in Sampling Yearbook

The Subcommittee reviewed the forms and the data presented in the completed forms for the new age-length tables for cod and haddock and the forms for age and length frequencies. It was the consensus of the Subcommittee that no changes were needed in these forms. It was, however, noted that special stress should be laid upon the completion of the bottom part of the tables including information on landings.

It was agreed that, although the reporting of redfish catches by depth zones in the Statistical Bulletin had been abolished, the reporting by depth zones should be continued for the Sampling Yearbook.

2. Age-length Keys for Sampling Yearbook

The Subcommittee considered the problem of making the age-length keys information filed with the Secretariat available in published form.

Problems of summarizing and using this information arise from (a) the differences in assignment of ages to various fish lengths by different age-readers or laboratories and (b) the actual differences in the growth rates of the exploited fish. Should the first problem be resolved, it would then be possible to summarize and publish the data in a much reduced and usable form.

The Subcommittee therefore

recommends (38)

(i) that publication in the Sampling Yearbook of the age-length key data for 1961; 1962 and 1963 be deferred

and

(ii) that within the next two years the Statistician of the ICNAF Secretariat make arrangements for transferring this age-length information to data-processing cards, and in association with ICNAF

scientists carry out a study of the heterogeneity of the material with a view to preparing summary tables for study and eventual publication.

3. Proposals from the Assessments Subcommittee

It was noted that the Assessments Subcommittee had not made any proposals for changes in the present sampling forms.

4. Sampling Methods for Discards

Almost all countries had submitted papers on their methods of sampling and estimating discards and catches of industrial fish. The findings noted in these papers are summarized for each country in Res. Doc. 54. The document was reviewed and it was agreed that no further action could be taken at the present time.

5. Joint ICES/ICNAF Special Meeting on Sampling

The plans and prospectus for the Joint ICES/ICNAF Sampling Meeting to take place in Rome, 1 and 2 October 1965, were reviewed by Mr B. Parrish.

The Subcommittee

recommended (39)

that member countries send representatives to the Joint ICES/ICNAF Sampling Meeting in 1965, and that the representatives be prepared to discuss for each relevant species alternative sampling methods, and to state which proposals their laboratories would be willing to accept.

Attention was drawn to the ICNAF circular letter of 6 April 1965, including an annex, with questions to be answered before 15 July 1965 by member countries.

6. Other Matters

The Subcommittee is of the opinion that due to the Joint ICES/ICNAF Sampling Meeting, the Subcommittee should continue in existence but that consideration should be given by the Steering and Publications Subcommittee to a possible eventual merging of the Sampling and the Statistical Subcommittees.

APPENDIX VIII - REPORT OF THE SUBCOMMITTEE ON AGEING TECHNIQUES

Chairman: Mr E. Bratberg; Rapporteur: Dr P.M. Powles

1. Standard Terminology for Cod, Redfish and Halibut Age Readers

Following Rec.16 (Redbook 1964, Pt. I), it was reported that Mr Jensen had incorporated the proposed changes and modifications in his "Standard Terminology and Notation for Otolith Age Readers", so that it may now be adopted for halibut and redfish. The revised article will be published in ICNAF Research Bulletin No. 2.

2. Cod Otolith Exchange Program

The Subcommittee then considered Serial No. 1429 by Mr DeBaie and Res. Doc.2 by Mr Hennemuth. Statistical analysis indicated some rather serious discrepancies in age reading of cod otoliths among the countries involved, mainly in the youngest age groups.

Res. Doc.42, prepared by Mr Blacker, was examined in detail. The group expressed both approval of and appreciation for the continuation and coordination of this otolith photograph exchange. It was agreed that Mr Blacker's photographs clearly showed the major sources of difficulty in age interpretation of cod, which mainly occurred in the early growth stages. It was suggested that in some cases high magnification of small otoliths might exaggerate checks, thereby influencing age determination. A statement or standardization of the magnification used for each photograph would alleviate this situation. The cod otolith photograph exchange program was felt to be very valuable and its continuation highly desirable.

It was noted that there was only one change in the list of ageing experts (Redbook 1964, Pt. I, p. 35). Correspondence concerning otolith photograph exchange with the USA should be sent to the Director, US Bureau of Commercial Fisheries, Woods Hole, Mass.

3. Redfish Otolith Exchange Program

It was agreed that Mr Blacker and Dr Messtorff should be asked to investigate the possibility of carrying out a redfish otolith exchange program, as some countries showed definite interest.

4. Validation of Otolith Age Reading Methods

Res. Doc. 53 was presented and considered. Pertinent discussion evolved around different methods of otolith age validation and the importance of continuing such studies was reiterated. The Subcommittee accordingly

recommends (40)

- (i) that each member country should compile an inventory of its previous, published and unpublished validation studies and forward this to the Secretariat in time for it to produce a combined document for the 1966 Annual Meeting;
- (ii) that validation studies be continued in member countries for all species and areas, especially those where known disagreements in age interpretation occurs;
- (iii) that upon completion of validity studies for a particular area and species, the experts involved distribute photographs of type otoliths to all member countries, or deposit them with the Secretariat. The particular characteristics of the otoliths should be properly described or annotated.

These could then be used as guides by member countries not directly familiar with the particular areas.

5. Silver Hake Otolith Photography and Exchange Program

It was decided that Mr Blacker be asked to investigate the possibilities of photographing otoliths of silver hake. If such photographs were successful, silver hake could then be included in the exchange program. The US agreed to take the initiative in advancing this project and in contacting the interested member countries.

APPENDIX IX - REPORT OF STEERING AND PUBLICATIONS SUBCOMMITTEE

The Subcommittee met on 30 May and 3 June under the Chairmanship of Dr Templeman (Canada), Chairman of R&S, with Dr H. W. Graham (USA) as Rapporteur, to consider R&S Agenda Item 10 Publications and other matters. Present were: H. W. Graham (USA) representing USA; A. S. Bogdanov (USSR) representing Iceland, Norway and USSR; F. Chrzan (Poland) representing Denmark, Germany, Poland and UK, replacing C. E. Lucas (UK); J. L. Hart (Canada) representing Canada; R. Monteiro (Portugal) representing France, Portugal, Spain and Italy; and L. R. Day, Executive Secretary of the Commission.

Under R&S Item 10(a), Distribution of Publications, the Executive Secretary explained that he was sending a mailing list to each member country for review. The list would show the present addresses for each category of Commission publication, including meeting documents and circular letters. The list will be accompanied with a request for review and additions or deletions.

Regarding free copies of Commission publications, the Executive Secretary explained that present policy was that each member country was entitled to 100 free copies of each Commission publication. Authors were entitled to 50 free reprints of their papers published in Commission publications. No recommendations were made for change in the present policy.

Regarding exchange of publications, since it was not considered necessary for the Secretariat to build up a large research library, the Subcommittee agreed that establishing exchanges for Commission publications was not desirable.

In considering the sale of Commission publications, it was pointed out that sales in past years had provided a considerable amount in miscellaneous income to the Commission. The Executive Secretary agreed to explore the possibility of sales being handled by a sales agency, thus cutting down on the time consumed in correspondence regarding sales. Also it was agreed that the Executive Secretary will look into the feasibility of having a publisher distribute Commission publications to the Commission's mailing lists.

Under R&S Item 10(b), Research Bulletin, the Executive Secretary reported that No. 2 is in press and will be distributed in about 2 months. Better paper stock will be used at an increased cost of about \$200 in order to improve the quality of illustrations. In discussing papers for No. 3, it was agreed that the Executive Secretary should circulate a newsletter each year inviting submission of papers for the Research Bulletin on subjects of importance to the Commission. Papers for the Research Bulletin should not be limited to those presented as meeting documents.

Under R&S Item 10(c), List of Fishing Vessels, it was agreed that the Assessments and Statistical Subcommittees should be asked to review the current number and submit any modifications in the list of vessel characteristics to be included in the 1965 List. It was assumed that vessel classification was reviewed by the Statistical Subcommittee.

Under R&S Item 10(d), Annual Proceedings, the Subcommittee reaffirmed the decision of R&S in 1964 and

recommended (41)

that the National Research Reports be printed in the Annual Proceedings, if possible, in the 1965 issue.

Under R&S Item 10(e), Environmental Symposium, the Executive Secretary reported that the Symposium, composed of about 850 pages, was ready to go to press as ICNAF Special Publication No. 6. The Secretariat was complimented on its expeditious preparation of the publication.

Under R&S Item 10(f), Environmental Survey (NORWESTLANT 1-3), it was proposed that the Survey be published as ICNAF Special Publication No. 7 in four parts: Part I as Text; Part II as Figures; Part III as Basic Oceanographic Data; and Part IV as Basic Biological Data. Parts I and II will be published by the Commission. Part III will be published by the Canadian Oceanographic Data Centre (CODC). It was decided that Part IV should be considered for decision when there was more information on size and cost of the volume. The Subcommittee

recommended (42)

that 1300 copies of Parts I and II and 900 copies of Parts III and possibly Part IV should be printed and that reprints of Parts I and II should be provided to authors and institutions in accordance with policy established for the Special Publications.

Under R&S Item 10(g), ICNAF Handbook, the Subcommittee approved the new Handbook prepared by the Secretariat and now in press. In this respect, it was considered desirable that an ICNAF map, with pertinent information, be prepared for distribution to fishermen. The USSR and Secretariat offered to prepare drafts of such a map for review next year.

Under R&S Item 10(h), FAO/ICES/ICNAF Joint Index of North Atlantic Publications, the Subcommittee recommended approval of participation in the publication of this index at a cost of about \$200 to the Commission.

Under R&S Item 10(i), Other Matters, the Subcommittee agreed that

chairmen of subcommittees should be asked to consider the need for continuation of their subcommittees.

The Subcommittee reviewed the 1965 Research Documents and

recommended (43)

that the Executive Secretary refer Res. Doc. 2, 23, 25, 28, 29, 36, 41, 48, 50, 55 and 69 to authors and laboratories for possible inclusion in Redbook 1965, Part III, and Res. Doc. 31, 33, 35, 37, 43, 44, 46, 47, 53, 61 and 68 for possible submission, with modifications, for publication in the ICNAF Research Bulletin No. 3.

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