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International Council for the  
Exploration of the Sea

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*REPORT OF THE STUDY GROUP ON THE NORWEGIAN SEA AND  
FAROEES SALMON FISHERY*

Dublin, 9-11 February 1988

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## TABLE OF CONTENTS

|  | <u>Page</u> |
|--|-------------|
| 1. INTRODUCTION .....  | 1           |
| 1.1 Terms of Reference .....                                   | 1           |
| 1.2 Participants .....   | 1           |
| 2. THE FISHERY AT FAROES .....                                 | 1           |
| 2.1 Data .....   | 1           |
| 2.2 The Faroese Fishery in the 1986/1987 Season ...            | 1           |
| 2.3 Catch in Number by Area and Catch per Unit<br>Effort ..... | 2           |
| 2.4 Exploitation Rates .....                                   | 3           |
| 2.5 Origin of Salmon in the Faroese Fishery .....              | 3           |
| 2.6 Reared Salmon in the Fishery .....                         | 4           |
| 3. HOME WATER FISHERIES .....                                  | 5           |
| 4. STATUS OF SALMON STOCKS .....                               | 5           |
| 4.1 England and Wales .....                                    | 5           |
| 4.2 Northern Ireland .....                                     | 6           |
| 4.3 Scotland .....   | 6           |
| 4.4 Finland .....  | 6           |
| 4.5 Iceland .....  | 6           |
| 4.6 Norway .....   | 7           |
| 4.7 Ireland .....  | 7           |
| 5. MANAGEMENT MEASURES AT FAROES .....                         | 8           |
| 6. MANAGEMENT MEASURES IN HOME WATERS .....                    | 9           |
| 6.1 Iceland .....  | 9           |
| 6.2 Scotland .....   | 9           |
| 6.3 Finland .....  | 9           |
| 6.4 England and Wales .....                                    | 9           |
| 6.5 Northern Ireland .....                                     | 10          |
| 6.6 Norway .....   | 10          |
| 6.7 Ireland .....  | 10          |
| 7. ACOUSTIC INVESTIGATIONS OF SALMON AT SEA .....              | 11          |
| 7.1 Introduction .....   | 11          |
| 7.2 Salmon as Sonar Targets .....                              | 12          |
| 7.3 Assessment and Observation Techniques .....                | 12          |
| 7.4 Conclusions and Recommendations .....                      | 13          |
| 8. SCIENTIFICALLY-BASED APPROACHES TO MANAGEMENT .....         | 14          |
| 9. RECOMMENDATIONS .....                                       | 15          |
| REFERENCES .....   | 17          |
| Documents submitted .....                                      | 18          |
| Tables 1-14 .....  | 19          |
| Figures 1-17 .....   | 32-48       |



## 1. INTRODUCTION

### 1.1 Terms of reference:

The terms of reference were (C.res. 1987/2:3:5) as follows:

"The Study Group on the Norwegian Sea and Faroes Salmon Fishery (Chairman: Mr. H.i. Jakupsstovu) will meet in Dublin from 9-11 February 1988 to prepare the relevant data for presentation to the North Atlantic Salmon Working Group at its meeting in March 1988 (See C.Res. 1987/2:3:8)".

### 1.2 Participants:

| <u>Name</u>      | <u>Country</u>          |
|------------------|-------------------------|
| J. Browne        | Ireland                 |
| W. Crozier       | U. K. (N. Ireland)      |
| J. Dalen         | Norway                  |
| S. Forbes        | U. K. (Scotland)        |
| L.P. Hansen      | Norway                  |
| A. Isaksson      | Iceland                 |
| H.i. Jakupsstovu | Faroes                  |
| B. Joensen       | Faroes                  |
| T. McDermott     | Ireland                 |
| E. Niemela       | Finland                 |
| D. Piggins       | Ireland                 |
| E.C.E. Potter    | U. K. (England & Wales) |
| W. M. Shearer    | U. K. (Scotland)        |
| Eileen Twomey    | Ireland                 |

## 2. THE FISHERY AT FAROES

### 2.1. DATA

The material used in this report derives from the following sources: log books and landing sheets, market samples, (see table 1), returns of external tags and market screening for microtags (Anon, 1986). Further data was presented to the Study Group in submitted working documents (see attached document list) and data brought to the meeting.

### 2.2 The Faroese fishery in the 1986/87 season

The fishery in the 1986/87 season was, from the fishermen's point of view, poor from November to January, but improved in the latter part of the season. The overall catch-rate for the entire season was, in the end, the highest on record. The total nominal landings by Faroese vessels by year and season are given in Table 2. (This Table represents a corrected version of previous tables).

The fishery started in November and ended in May with the highest number caught in February, March and April. Only a very limited fishery took place in May. Some fish caught earlier were landed in June.

### 2.3 Catch in number by area and catch per unit effort

Catch in number by statistical rectangle for the whole 1986/87 season is presented in Fig. 1, and by month in Figs. 2-8. Compared to the 1985/86 season the fishery was conducted over a wider area, and some fishing, especially in March, took place outside the Faroese fishing zone. In this respect the situation was similar to the 1984/85 season.

From the market samples, length/weight category keys were established for each month from November to May. These samples were then used to raise the catch by months into numbers by weight and length category. (Tables 4-11). For one landing in June the sample from May was used.

The landing forms only gave information on numbers by weight groups for 487 tonnes of the 520 tonnes landed in the 1986/87 season.

As in previous years scale samples were collected during the market sampling programme from iced landings. In the 1986/87 season, however, all vessels except one, froze their catch at sea, and, as a result, scale samples could only be collected in December, March and April. These samples were used to estimate age/length category keys which were applied to the landings as follows:

December sample for landings in November, December and January  
March samples for landings in February and March  
April sample for landings in April, May and June

These data provide only an approximation of the age composition of the total landings but it appears that about 95% were 2sw, 5% 3sw; very few 1 and 4sw fish were caught. This is very similar to the age composition of the landings in the 1985/86 season. Further evidence that almost the entire catch derives from a single sea age group is provided by the length distribution (Fig. 9). This is based on monthly samples taken in the market sampling programme and scaled up to the total catch by weight categories.

The percentage of non-wild fish identified by scale reading in the catch samples ranged between 2.6 and 3.6%. These values compare with a mean figure of 4.2% for the 1984/85 catch and a range of 0-13% for the 1985/86 catch.

The results of the scheme, in which some vessels were asked to keep on board fish, which otherwise would have been discarded, are presented in Table 3. From this it appears that the by-catch of undersized fish in the 1986/87 season was 7.4%. All discards were assumed to be 1sw fish. This falls within the range obtained in previous years. All discards were assumed to be 1sw fish.

The catch in number per unit effort (CPUE) by statistical rectangle for the whole 1986/87 season is presented in Figure 10, and by month in Figs. 11-17. The CPUE by month and season is also presented in Table 12. From this it is appears that the average CPUE in the 1986/87 season was the highest annual figure on record. In the 1985/86 and 1986/87 season the highest catch rates were obtained in late Spring. This contrasts with earlier seasons when the highest catch rates were recorded between November and January.

#### 2.4 Exploitation rates

No new data were presented to the Study Group except for the River Drammen stock.

The first release of reared smolts of the local stock into the River Drammen was made in 1984. Preliminary analysis of tag return data indicate lower home water exploitation than estimated for the River Imsa stock (Anon. 1987b). Exploitation on the River Drammen stock at Faroese, however, seems to be similar or a little less than on the River Imsa stock.

#### 2.5 Origin of salmon in the Faroese fishery

The Study Group examined data on tag recoveries to determine the origin of salmon in the Faroese fishery.

The only new release and recovery data for external tags presented to the Study Group was from Scotland. The number of recaptures in the Faroese fishery per 1 000 smolts tagged and released in the North Esk in 1981-85 has declined from 2.5 to 0.3 (Table 13). Although the number of smolts tagged has declined, decreasing the precision of the results, these data may indicate a real decrease in the contribution which fish of North Esk origin have made to this fishery in recent years.

The numbers of micro-tags estimated to have been taken in the Faroese fishery in the 1986/87 season are presented in Table 14. The recapture rates per 1000 fish tagged are lower than those presented previously.

There is no reason to change the view expressed in the 1986 Working Group Report that the number of recoveries of Norwegian tags relative to the number released indicates that Norway is by far the largest contributor to the Faroese fishery, especially taking into account the number of smolts produced by each country. This is further substantiated by the high proportion of salmon of river age 3 or greater normally caught in the Faroese fishery.

The Study Group noted that the proportion of untagged adipose fin clipped fish caught in the Faroese fishery in the 1986/87 season was about twice that in the 1984/85 and 1985/86 seasons. While it was not felt that this need significantly effect the reliability of microtag scanning programmes, it was recognised that it made scanning more difficult and precluded the possibility of estimating the catch rates for tagged fish from fin-clip data alone. Estimates of microtag loss rates have been made in various home water fisheries and are generally less than 5%. It was therefore felt that the large number of fin-clipped fish occurring in the fishery could only be accounted for by experimental releases of juveniles, mainly in Norway but also in other European countries.

#### 2.6 Reared salmon in the fishery

The Study Group discussed the problem of distinguishing reared salmon from wild in the landings in detail at its last meeting (Anon 1987a) and identified the following methods;

1. Direct observations
2. Morphometric methods
3. Scale analysis
4. Biochemical methods

There was a general feeling that it should be possible to separate artificially propagated fish from wild stocks by using a combination of methods but some members thought that separation of farmed salmon from salmon reared for other purposes might be difficult at particular stages.

Preliminary results from Norway suggest that fish escaping during the late summer in their first sea year seem to survive less well than those escaping at the smolt stage or during their first sea winter.

#### Direct observations

No new data were presented



### Morphometric methods

Data were presented from Scotland which showed that fin measurements can be used to distinguish farmed from wild salmon, confirming the results of Hansen et al (1986) and Potter (1987). However, these methods are not sufficiently accurate to distinguish salmon escaping at the smolt stage from those released as smolts or parr.

### Scale analysis

In a paper presented by Hansen et al (1987) criteria identified by the Study Group for classifying scales were used to estimate the proportion of reared salmon in samples from two commercial salmon fisheries in Norway (Vikna and Kilgrou). The estimated proportions of reared fish were 8.9 and 13.9% respectively.

### Biochemical methods

No new data were presented. The use of canthaxanthin in fish diets was thought to be declining, but tetracyclin continues to be used and may still offer a means of discrimination. Work is underway in Norway to investigate the use, as markers, of traces of rare earth minerals in farm fish diets.

## 3. HOME WATER FISHERIES.

Available information indicates that in Iceland, Scotland, Ireland and Northern Ireland, the home-water catches in 1987 were poorer than in 1986, which was a relatively good year. From Finland, Norway and England no data were yet available.

In Iceland the catch was 30% lower in 1987 compared to 1986, and the reduction was mainly in grilse catches. The lower catch in Scotland coincided with the closure of a number of netting stations, however, there is no measure of fishing effort. In Northern Ireland the catch (mainly grilse) decreased by about 50%; this was to some extent due to a decrease in the number of fishing licenses issued.

## 4. STATUS OF SALMON STOCKS.

### 4.1 England and Wales

There are no rivers in England and Wales for which reliable annual estimates of smolt production or adult returns are available. The status of national stocks can therefore only be assessed on the basis of catch statistics and a limited amount of juvenile monitoring. These data suggest that there are one or two stocks showing signs of improving markedly in recent years and a few that have declined seriously. For the majority,

however, there is insufficient evidence to say whether they have changed significantly.

#### 4.2 Northern Ireland

Data on adult runs in the River Bush are available from 1973 to the present, but cannot be regarded as indicative of the status of Northern Ireland salmon stocks, as adult escapement was artificially regulated during the early years of the River Bush Project. Tag returns from wild and hatchery-reared smolts released from the River Bush in recent years indicate commercial exploitation both in distant water and homewater fisheries and this is assumed to apply to stocks in other Northern Ireland rivers. Although catch levels in homewater fisheries declined dramatically in 1987, there is no evidence to suggest that current levels of marine exploitation alone presents a threat to the viability of stocks in Northern Ireland rivers.

#### 4.3 Scotland

The only data available on the status of stocks in Scotland comes from the North Esk. In 1981-86 (the only years for which data are available), the number of potential spawners each year ranged between 9072 in 1981 and 6326 in 1986. Although smolt production fluctuated widely between years the underlying trend since 1964 is remarkably stable.

#### 4.4 Finland

In Finland in the Rivers Tana and Neiden the size of stocks is controlled by regulation of the fishery. All fish planting is prohibited. Since 1979 the density of juvenile salmon has increased in the River Tana but decreased in its tributaries. Grilse in the tributaries are overexploited by sea trout gill nets, with a mesh size of 40-45mm knot to knot.

During the 1980s annual catches have been lower than in the 1970s.

#### 4.5 Iceland

In general the condition of stocks in Iceland is good. There is considerable variation in salmon abundance between years which in many cases can be related to variation in marine survival.

The actual link to sea conditions has been difficult to establish in south-western Iceland, but very good correlation has been found in northern and eastern Iceland (Scarnechia 1983). Returns to ranching stations, primarily in south-western Iceland have been useful to determine if reduced abundance of wild salmon is caused by reduced freshwater production or low sea survival.

Electric fishing has shown that natural smolt production has been normal in south-western Iceland in recent years but greater variation has been observed in northern and eastern Iceland, especially in marginal salmon streams. Year classes are occasionally missing in those streams if temperatures during hatching and first-feeding are low.

There have been theories suggesting that a surplus of spawners could have detrimental effects on the number of smolts produced. These effects are being studied in the Midfjardara system on the north coast of Iceland where the great cyclic changes in salmon abundance seem to occur.

#### 4.6 Norway

In Norway there are between 400 and 500 rivers supporting salmon. In many of these the salmon stocks are still healthy, but there are problems with several stocks. Some of them suffer from over-exploitation, and in southern-most Norway some stocks have been wiped out due to acid water and a few others are threatened.

The greatest threat to Norwegian salmon stocks at present is the fluke, Gyrodactylus salaris. This parasite was first observed in a Norwegian salmon river in 1975; there are some indications that it was introduced from the Baltic. The reproduction rate of the parasite is very fast and one single individual may increase to several thousand individuals within a few days. Most of the infested salmon parr die from skin damage.

G.salarais has been recorded in 30 salmon rivers and it was estimated that 300 tonnes of salmon was lost to Norwegian home water stocks in 1985. At present there is no satisfactory solution to the Gyrodactylus problem.

An increased proportion of reared salmon among the spawning population has been observed in many rivers. This has been most pronounced in the south-western and western parts of the country. Even though there is no direct evidence of adverse effects on natural stocks, many salmon biologists are concerned about this.

#### 4.7 Ireland

The question of stock assessment is under review in Ireland. The present system is subjective and relies heavily on catch data which is unrelated to effort.

Available data suggests that the abundance of salmon was lower in 1987 than in 1986, which was a particularly good year.

There were good returns of grilse (greater than 9%) in the Burrishoole system in 1987. Although this return rate was high, it arose from a particularly small smolt run and total numbers returning were low. This high return was not reflected in the rest of the country where tagging suggests that survival at sea was relatively poor.

#### 5. MANAGEMENT MEASURES AT FAROES.

At the Fourth Annual Meeting of NASCO in June 1987 it was agreed that the Faroes catch should be controlled in accordance with an effort limitation programme for a trial period of three years (1987-89); the total nominal catch should not exceed 1790 tonnes, and in any given year the annual catch should not exceed 5% more than the annual average (626.5 tonnes).

The following regulatory measures were also agreed:

- (1) areas with salmon below the length of 60cm will be closed for salmon fishery at short notice, following the general rules for closing areas with undersized fish already in force in the Faroese fisheries zone.
- (2) the number of boats licensed for salmon shall not exceed 26
- (3) the salmon fishing season will be limited to 15 January to 30 April, and 1 November - 15 December.
- (4) subject to the maximum annual catch the total allowable number of fishing days for the salmon fishery in the Faroe Islands zone shall be set at 1600 each year.

These agreements were reached after the majority of the 1987 catch had been taken. Catch rates in November and December 1987 were low and so the total catch for the year (510t) was less than the agreed maximum. It was not found necessary to close areas in which undersized fish were taken because the fishermen themselves avoided these areas. A total of 20 licences was issued for the 1987/88 season and the fishery was opened on 1 November 1987 and closed for the period 16 December 1987 to 14 January 1988 as agreed.

Effort data are not available for the calendar year of 1987 but in the 1986/87 seasons 868 sets were fished which is well below the annual limit of 1 600 fishing days.

## 6. MANAGEMENT MEASURES IN HOME WATERS

### 6.1 Iceland

The Icelandic management regulations were described in Anon 1987. These measures have been in force for decades and have proved very beneficial for the salmon stocks.

It is, however, now necessary to impose additional regulations concerning the interaction of wild, ranched, and farmed populations. Increased sea cage rearing of salmon as well as salmon ranching may pose a threat to wild stocks in Iceland if allowed to expand without control. It is expected that half of the salmon caught in Iceland in 1988 will be from ranching, and ranched salmon will predominate (by a large margin) in the following years. Control measures are being discussed to regulate the distances of sea cages and ranching operations from major salmon rivers.

### 6.2 Scotland

The main management provisions in the Salmon Act 1986 were described in Anon (1987). There is a proposal to increase the weekly close time for nets from 42 to 60 hours in 1988. Unfortunately it will not be possible to determine the effect of this measure in the absence of effort data. In addition, it is anticipated that the salmon dealer licensing scheme will come into operation, towards the end of 1988.

### 6.3 Finland

There will be new fishing regulations operating in the River Tana from 1988. Sea trout gill nets will be prohibited totally. During the grilse migration (15 June to 31 July) it is not permitted to use special gill nets for other fish species. The use of new methods and materials will be prohibited in the weir and gill net fisheries and distances between fishing stations will be increased. On the Finnish-Norwegian border drift and seine net fishermen will be confined to their national waters.

### 6.4 England and Wales

Management provisions operating in the salmon fisheries in England and Wales were outlined in Anon (1987b) including some new measures introduced in the Salmon Act 1986. Reports suggest that the increased controls on the use of fixed gill nets in coastal waters may have improved runs of salmon into rivers in some areas. No data are available on the effects of other measures taken to deter illegal salmon fishing. It is hoped that the 'dealer licensing scheme' will be introduced by the end of 1988. Changes and additional restrictions introduced in the north-east coast fishery will be assessed in a review to be prepared in 1989.

### 6.5 Northern Ireland

In Northern Ireland management measures comprise licensing of coastal and estuarine netting stations, together with restrictions on close periods (weekly and seasonal) and on material and mesh sizes used in nets. Most coastal netting stations are in the form of fixed bag nets for which 28 licenses were issued in 1987. One licence is issued for a commercial freshwater trapping station on the River Bann. In 1987 a total of 231 other commercial licenses were issued, the majority in the Foyle area, where 112 drift nets, 104 draft nets and one stake net were operated. Seasonal close periods in the Foyle area varied in response to adult escapements as measured by electronic counters, commercial fishing ceasing on 6th August 1987, compared to 15 September in the rest of the Northern Ireland fishery. No changes in regulations were implemented in Northern Ireland waters in 1987, and none are proposed for 1988.

### 6.6 Norway

New regulations in the Norwegian home water fishery (Anon 1987b) have been introduced to reduce the total fishing pressure on Norwegian salmon stocks and secure a larger spawning escapement. Because the license scheme for fixed nets is not yet settled, it is not possible to evaluate the effectiveness of these management measures. On the west coast of Norway there is an interceptory fishery on Swedish west coast stocks. In northern-most Norway there is also an interceptory fishery on Russian and Finnish salmon stocks. A large proportion of the salmon caught in these fisheries is taken by drift nets. A total ban of drift nets in Norway will therefore significantly reduce the catch of Swedish, Finnish and Russian salmon in Norwegian waters.

### 6.7 Ireland

To achieve effective management of the Irish salmon fishery the Salmon Review Group (Anon 1988) has made the following recommendations.

- (a) The introduction of system of dead tagging and quotas for all commercial and sport fisheries by 1989
- (b) A log book system for commercial fishermen by 1989
- (c) Close season for salmon drift netting to be extended to April 30 or even later where the runs of fish are known to occur later (eg Eastern Region).
- (d) The annual close season for estuarine fisheries should end some time earlier and begin some time later than the close season for drift net fishing.

(e) The weekend close period for drift netting should remain at 48 hours but should be reviewed periodically with a view to extending it if necessary.

(f) The maximum length of boats used in salmon fishing should not exceed 12 metres.

(g) Prohibition of drift netting for salmon outside 9 miles from baseline in 1989, outside 6 miles by 1990, and subsequently outside 3 miles.

(h) The present dealer license scheme should be extended to their agents. A licensing scheme for hotels and restaurants is also to be introduced.

(i) All boats including commercial fishing and leisure craft should be registered and marked clearly and uniquely.

(j) The ban on monofilament should be revoked provided the tags and quota system are in place and are seen to be operating. (It is assumed the tags and quota system, if properly enforced, will reduce the catch of salmon to an acceptable level.)

(k) Length and depth of drift nets should be regulated regionally allowing a maximum length of 2000 metres and depth of 45 meshes.

## 7. ACOUSTIC INVESTIGATIONS OF SALMON AT SEA

### 7.1 Introduction

Acoustic observations of fish depend on the ability firstly to detect them by sonar or echosounder, and secondly to make quantitative measurements from the data obtained. There are two principal methods of obtaining stock size estimates from sonar or echosounder data, integration of echo energy, and counting of individual fish or schools. Fish size information can be obtained by using split-beam or dual-beam sounders. Acoustic instruments can also provide information about the behaviour of fish.

## 7.2 Salmon as sonar targets

There should be no problems in detecting and recording echo signals from individual salmon. Some information on salmon target strength is available from measurements made on tethered fish (Dalen et al, 1976, Dahl, 1982). This indicates a similar relationship between target strength and length to those found for other clupeiform fish, although lower values have been found for smaller salmon compared to the clupeiformes. For fish lengths between 40 and 100cm maximum target strengths from -35 to -24 dB have been observed at both 38 and 120kHz.

## 7.3 Assessment and Observation Techniques

### 7.3.1 Echo integration and counting

Although echo integration is used where the fish are scattered in layers or in schools, it can also be applied when the fish swim as individuals at low densities as is often the case for salmon. In this case fish counting is usually a more useful technique than echo integration. One major advantage of fish counting techniques using split-beam or dual-beam systems is that fish can be sized.

With both echo integration and echo counting, a towed upward looking paravane system would be most applicable for surveying a wide area because salmon often occupy the upper layers of the sea.

A buoy-mounted sonar, scanning in the horizontal plane, also appears to have considerable potential. The system could be deployed at several locations in the fishery and data collected over several hours. This could provide useful information on speed and direction of fish movements, and an estimate of the fish density.

### 7.3.2. Problems and system capabilities

The principal problem in acoustic investigations of salmon lies in the behaviour of the fish. This relates both to the fact that salmon occupy the upper part of the water column and that they undertake large, rapid vertical migrations.

Medium to rough weather conditions can cause problems particularly in cases of observing shallow swimming fish. The proposed scanning sonar makes it feasible to use modern correlation techniques to suppress noise and this may solve some of the problems in rough weather.

All sounding systems proposed should possess capabilities partly or totally to handle these problems.



#### 7.4 Conclusions and Recommendations

Although there are some salmon target strength data at hand giving an acceptable basis for the work, more aimed target strength data should be sought.

The most appropriate methods of acoustic investigations of salmon in the Faroese waters, would be the fish counting technique using an upward looking transducer and the buoy mounted scanning sonar system. The split-beam system should be used for counting to provide size distributions.

The relevant acoustic instruments at the involved laboratories in Scotland, the Faroes and Norway are:

Simrad ES 400 split-beam echo sounder, 38 kHz  
 The Aberdeen dual-beam echo sounder, 38 kHz  
 Towed upward looking echo sounder  
 Mesotech-Simrad scanning sonar, 330 kHz  
 Digital echo integrators.

On the basis of the presentations by the acoustic experts and subsequent discussions, the Study Group accepted that the techniques being proposed could produce sufficient data to provide a basis for estimating abundance possibly linked to hooking rates in specific areas. It was further felt that additional behavioural information could be obtained which could be used, for instance, in the model proposed by Hansen (1984).

It was therefore recommended that a survey takes place in Faroese waters during 1989 and that qualified technical/acoustical personnel should be made available for that purpose. The Faroese indicated that their research vessel "Magnus Heinason", would be available for the project in early February or April 1989. She has the following relevant equipment:

Simrad ES 400 split-beam echo sounder, 38 kHz  
 Simrad EK 400 echosounders, 38,50 and 120 kHz  
 (50 kHz for a towed system)  
 Mesotech-Simrad scanning trawl sonar  
 Simrad QD echo integrator

Critical parts and functions of the buoy-mounted scanning sonar system and the data acquisition system have to be tested at sea before the survey.

Final commitments to supply acoustic personnel for this program should be reported to the Atlantic Salmon Working Group meeting in March 1988.

## 8. SCIENTIFICALLY BASED APPROACHES TO MANAGEMENT

The Study Group had preliminary discussions to stimulate ideas on scientifically based approaches to management for presentation to the Atlantic Salmon Working Group.

A model was proposed which could use existing data on a country by country basis and test whether current parameter estimates are mutually consistent.

### Proposed model

|   |                   |
|---|-------------------|
| Smolt production                                      | P in year N       |
| Catch in high seas                                    | X numbers         |
| Loss to home water fisheries                          | L times X numbers |
| Nominal home water catch                              | Y numbers         |
| Non catch fishing mortality -<br>home water fisheries | Z numbers         |
| <hr/>   |                   |
| Total removed from spawning stock                     | (L X)+Y+Z numbers |
| Spawning escapement                                   | W numbers         |

This involves obtaining estimates nationally of total smolt production and relating the numbers of smolts being produced to the figures available for natural mortality, exploitation rates, catches in home waters by sea age, unreported catches etc.

It was agreed that countries which had suitable data for individual rivers would test the model and present their results for discussion by the North Atlantic Salmon Working Group if appropriate.

## 9. RECOMMENDATIONS

The Study Group endorsed the list of research requirements identified by the Working Group (Anon 1987b) and recognised that further recommendations might arise from the discussion of the scientifically based framework for management of salmon stocks. The following recommendations were made, however, for work to be carried out specifically in relation to the assessment of the Faroes fishery:

### a. Sampling and screening the landings at Faroes

The Study Group considered the current effort put into sampling and screening landings at Faroes to be adequate and recommend it be continued at a similar level. In view of the problems of collecting sufficient scale samples, however, it was recommended that historic data sets be examined to assess the possibility of using length distributions to estimate sea age composition of catches.

### b. Country of origin by river age analysis

The Study Group recommended that scale samples collected in previous years be analysed to assess the possibilities of using characteristics, including river age, to estimate the composition of the catch by country of origin.

### c. Analysis of tagging data

It is recommended that tagging data should be presented in uniform fashion broken down by parr, reared smolt, wild smolt and special group releases. These data should also be presented as wild smolt equivalents by year of migration. The numbers of untagged finclipped fish being released should also be reported as wild smolt equivalents.

### d. Salmon of wild and reared origin

It was recommended that further work be carried out to test methods for distinguishing fish farm escapees from wild and ranched salmon and specifically that a report on the use of rare earth minerals as food additives be presented to the next meeting. Information on the incidence and estimated extent of escapees from fish farms should be compiled by each country and brought to the next meeting of the Study Group.

e. Acoustic survey

It was recommended that acoustic methods should be tested for estimating numbers of salmon in the Faroese area. This feasibility study should be carried out some time in January or April 1989 (see section 6.7).

f. Next meeting

It was recommended that the Study Group should meet for at least 3 days in the spring of 1989 and that this meeting should be scheduled at a time allowing the report to be finalised before the following meeting of the North Atlantic Salmon Working Group. An invitation was received to hold the next meeting of the Study Group in Finland.

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Table 1. Faroese salmon fishery market sampling data 1986/87.

| Date   | Place    | vessel        | Numbers |      |        |       |       |              |            |
|--------|----------|---------------|---------|------|--------|-------|-------|--------------|------------|
|        |          |               | Catch   | Obs. | Scaled | Meas. | Finc. | Micro tagged | Ext tagged |
| 861126 | Norðepli | Jøkul         | 335     | 220  | 0      | 220   | 1     | 0            | 0          |
| 861208 | Klaksvík | Turid         | 1343    | 912  | 0      | 0     | 11    | 1            | 0          |
| 861208 | Klaksvík | Dragasund 2   | 588     | 588  | 0      | 0     | 13    | 0            | 0          |
| 861215 | Tórshavn | Lómurin 3     | 1528    | 1528 | 0      | 0     | 12    | 8            | 7          |
| 861216 | Tórshavn | Norðfarið     | 219     | 219  | 219    | 0     | 2     | 0            | 3          |
| 861218 | Norðepli | Jónrit        | 1823    | 840  | 0      | 123   | 0     | 0            | 3          |
| 861222 | Gøtu     | Gáshólmur     | 3875    | 2650 | 0      | 113   | 4     | 5            | 24         |
| 870113 | Tórshavn | Breiðanes     | 630     | 630  | 0      | 0     | 8     | 3            | 0          |
| 870114 | Glyvrrar | Hvítiklettur  | 801     | 650  | 0      | 264   | 4     | 0            | 3          |
| 870116 | Norðepli | Rivkollur     | 397     | 210  | 0      | 0     | 4     | 0            | 0          |
| 870116 | Norðepli | Sundaenni     | 607     | 607  | 0      | 0     | 5     | 0            | 0          |
| 870116 | Norðepli | Norðfarið     | 211     | 211  | 0      | 0     | 3     | 0            | 0          |
| 870129 | Norðepli | Jøkul         | 900     | 900  | 0      | 0     | 13    | 2            | 1          |
| 870204 | Gøtu     | Gáshólmur     | 2171    | 850  | 0      | 0     | 12    | 2            | 15         |
| 870210 | Tórshavn | Lómurin 3     | 783     | 783  | 0      | 225   | 7     | 1            | 11         |
| 870219 | Norðepli | Rivkollur     | 384     | 384  | 0      | 0     | 5     | 1            | 0          |
| 870223 | Norðepli | Sundaenni     | 2884    | 2200 | 0      | 0     | 21    | 0            | 2          |
| 870223 | Norðepli | Jónrit        | 3168    | 3168 | 0      | 0     | 36    | 3            | 1          |
| 870302 | Norðepli | Norðfarið     | 444     | 138  | 138    | 0     | 1     | 0            | 1          |
| 870309 | Norðepli | Jøkul         | 787     | 787  | 0      | 0     | 5     | 0            | 0          |
| 870311 | Leirvík  | Petur á Regni | 3749    | 3520 | 0      | 0     | 28    | 1            | 3          |
| 870318 | Tórshavn | Boðanes       | 1830    | 1795 | 0      | 0     | 24    | 2            | 0          |
| 870323 | Tórshavn | Lómurin 3     | 2581    | 2581 | 0      | 266   | 52    | 0            | 1          |
| 870325 | Norðepli | Norðfarið     | 971     | 570  | 228    | 0     | 5     | 2            | 3          |
| 870331 | Glyvrrar | Hvítiklettur  | 6690    | 5950 | 0      | 0     | 54    | 1            | 2          |
| 870407 | Glyvrrar | Jónrit        | 3162    | 1518 | 0      | 0     | 15    | 2            | 2          |
| 870413 | Norðepli | Norðfarið     | 1758    | 1420 | 252    | 0     | 16    | 1            | 1          |
| 870422 | Tórshavn | Lómurin 3     | 1637    | 234  | 0      | 234   | 0     | 1            | 0          |
| 870427 | Glyvrrar | Petur á Regni | 5323    | 2461 | 0      | 0     | 30    | 0            | 0          |
| 870429 | Glyvrrar | Norðfarið     | 2036    | 610  | 0      | 0     | 3     | 0            | 0          |
| 870504 | Tórshavn | Boðanes       | 6426    | 6426 | 0      | 0     | 75    | 0            | 1          |
| 870505 | Tórshavn | Lómurin 3     | 382     | 382  | 0      | 382   | 2     | 0            | 1          |
| 870506 | Sørvág   | Drangur       | 3300    | 1405 | 0      | 0     | 9     | 0            | 0          |

Table 2. Nominal catches in the Faroese long-line fishery 1968-1987<sup>a</sup> officially reported (Tonnes round fresh weight).

| Year              | Catch | Season | Catch |
|-------------------|-------|--------|-------|
| 1968              | 5     |        |       |
| 1969              | 7     |        |       |
| 1970              | 12    |        |       |
| 1971              | 0     |        |       |
| 1972              | 9     |        |       |
| 1973              | 28    |        |       |
| 1974              | 20    |        |       |
| 1975              | 28    |        |       |
| 1976              | 40    |        |       |
| 1977              | 40    |        |       |
| 1978              | 37    |        |       |
| 1979              | 106   |        |       |
| 1980              | 553   |        |       |
| 1981              | 1025  |        |       |
| 1982              | 865   | 81/82  | 796   |
| 1983              | 678   | 82/83  | 625   |
| 1984              | 628   | 83/84  | 651   |
| 1985              | 566   | 84/85  | 598   |
| 1986              | 530   | 85/86  | 545   |
| 1987 <sup>b</sup> | 510   | 86/87  | 520   |

<sup>a</sup>In some years part of the catch taken outside the EEZ of Faroes.

<sup>b</sup>Preliminary.



Table 3. Total catch in number of legalised and undersized fish from vessels asked to keep the latter in the 1986/87 season. See the text for further explanation.

| Date    | Place    | vessel        | Total<br>Catch | No's | Discards |       | Micro<br>tagged |
|---------|----------|---------------|----------------|------|----------|-------|-----------------|
|         |          |               |                |      | Meas.    | Finc. |                 |
| 861222  | Gøtu     | Gáshólmur     | 3875           | 332  | 332      | 10    | 6               |
| 870114  | Glyvrar  | Hvítiklettur  | 801            | 80   | 0        | 2     | 0               |
| 870204  | Gøtu     | Gáshólmur     | 2176           | 1551 | 1551     | 15    | 7               |
| 870210  | Hósvík   | Hvítiklettur  | 1874           | 306  | 0        | 6     | 2               |
| 870210* | Tórshavn | Lómurin 3     | 783            | 15   | 0        | 2     | 0               |
| 870213  | Tórshavn | Boðanes       | 879            | 274  | 0        | 11    | 3               |
| 870323  | Tórshavn | Lómurin 3     | 2581           | 0    | 0        | 0     | 0               |
| 870331  | Hósvík   | Hvítiklettur  | 6690           | 160  | 0        | 2     | 0               |
| 870422  | Tórshavn | Lómurin 3     | 2581           | 30   | 0        | 3     | 0               |
| 870427  | Glyvrar  | Petur á Regni | 5323           | 0    | 0        | 0     | 0               |
| 870504  | Tórshavn | Boðanes       | 6426           | 66   | 0        | 3     | 0               |
| 870505  | Tórshavn | Lómurin 3     | 382            | 0    | 0        | 0     | 0               |
| 870512  | Hósvík   | Hvítiklettur  | 5387           | 35   | 0        | 1     | 0               |

\* In addition 1 external tag

Table 4. Gutted weight/fork length and sea age/fork length relationships for landings at Faroes in November 1986

| NOVEMBER 1986 |      | GUTTED WEIGHT - FORK LENGTH |           |           |           |           |     |       |
|---------------|------|-----------------------------|-----------|-----------|-----------|-----------|-----|-------|
| CM/KG         | <2.5 | >=2.5<br><3                 | >=3<br><4 | >=4<br><5 | >=5<br><7 | >=7<br><9 | >=9 | TOTAL |
| <50           | 0    | 0                           | 0         | 0         | 0         | 0         | 0   | 0     |
| 50 to 54      | 37   | 0                           | 0         | 0         | 0         | 0         | 0   | 37    |
| 55 to 59      | 197  | 36                          | 7         | 0         | 0         | 0         | 0   | 240   |
| 60 to 64      | 73   | 262                         | 137       | 0         | 0         | 0         | 0   | 472   |
| 65 to 69      | 0    | 48                          | 448       | 104       | 0         | 0         | 0   | 600   |
| 70 to 74      | 0    | 0                           | 99        | 133       | 29        | 0         | 0   | 261   |
| 75 to 79      | 0    | 0                           | 0         | 22        | 35        | 0         | 0   | 57    |
| 80 to 84      | 0    | 0                           | 0         | 0         | 6         | 7         | 0   | 13    |
| 85 to 89      | 0    | 0                           | 0         | 0         | 6         | 20        | 0   | 26    |
| 90 to 94      | 0    | 0                           | 0         | 0         | 0         | 20        | 15  | 35    |
| 95 to 99      | 0    | 0                           | 0         | 0         | 0         | 7         | 15  | 22    |
| 100 to 104    | 0    | 0                           | 0         | 0         | 0         | 0         | 0   | 0     |
| 105 to 109    | 0    | 0                           | 0         | 0         | 0         | 0         | 0   | 0     |
| >=110         | 0    | 0                           | 0         | 0         | 0         | 0         | 0   | 0     |
| Total         | 307  | 346                         | 691       | 259       | 76        | 54        | 30  | 1763  |

| NOVEMBER 1986 |   | SEA AGE - FORK LENGTH |    |   |   |   |       |
|---------------|---|-----------------------|----|---|---|---|-------|
| CM/AGE        | 1 | 2                     | 3  | 4 | 5 | 6 | TOTAL |
| <50           | 0 | 0                     | 0  | 0 | 0 | 0 | 0     |
| 50 to 54      | 0 | 37                    | 0  | 0 | 0 | 0 | 37    |
| 55 to 59      | 0 | 241                   | 0  | 0 | 0 | 0 | 241   |
| 60 to 64      | 0 | 472                   | 0  | 0 | 0 | 0 | 472   |
| 65 to 69      | 0 | 599                   | 0  | 0 | 0 | 0 | 599   |
| 70 to 74      | 0 | 261                   | 0  | 0 | 0 | 0 | 261   |
| 75 to 79      | 0 | 57                    | 0  | 0 | 0 | 0 | 57    |
| 80 to 84      | 0 | 11                    | 1  | 0 | 0 | 0 | 12    |
| 85 to 89      | 0 | 5                     | 21 | 0 | 0 | 0 | 26    |
| 90 to 94      | 0 | 0                     | 35 | 0 | 0 | 0 | 35    |
| 95 to 99      | 0 | 0                     | 22 | 0 | 0 | 0 | 22    |
| 100 to 104    | 0 | 0                     | 0  | 0 | 0 | 0 | 0     |
| 105 to 109    | 0 | 0                     | 0  | 0 | 0 | 0 | 0     |
| >=110         | 0 | 0                     | 0  | 0 | 0 | 0 | 0     |
| TOTAL         | 0 | 1683                  | 79 | 0 | 0 | 0 | 1762  |

Table 5. Gutted weight/fork length and sea age/fork length relationships for landings at Faroes in December 1986.

| DECEMBER 1986 |      | GUTTED WEIGHT - FORK LENGTH |           |           |           |           |     |       |
|---------------|------|-----------------------------|-----------|-----------|-----------|-----------|-----|-------|
| CM/KG         | <2.5 | >=2.5<br><3                 | >=3<br><4 | >=4<br><5 | >=5<br><7 | >=7<br><9 | >=9 | TOTAL |
| <50           | 0    | 0                           | 0         | 0         | 0         | 0         | 0   | 0     |
| 50 to 54      | 319  | 0                           | 0         | 0         | 0         | 0         | 0   | 319   |
| 55 to 59      | 2169 | 491                         | 36        | 0         | 0         | 0         | 0   | 2696  |
| 60 to 64      | 1021 | 2892                        | 1601      | 68        | 0         | 0         | 37  | 5619  |
| 65 to 69      | 0    | 491                         | 4767      | 576       | 0         | 0         | 0   | 5834  |
| 70 to 74      | 0    | 0                           | 676       | 1830      | 296       | 48        | 0   | 2850  |
| 75 to 79      | 0    | 0                           | 0         | 136       | 419       | 0         | 0   | 555   |
| 80 to 84      | 0    | 0                           | 0         | 0         | 49        | 121       | 0   | 170   |
| 85 to 89      | 0    | 0                           | 0         | 0         | 0         | 194       | 0   | 194   |
| 90 to 94      | 0    | 0                           | 0         | 0         | 0         | 24        | 110 | 134   |
| 95 to 99      | 0    | 0                           | 0         | 0         | 0         | 0         | 37  | 37    |
| 100 to 104    | 0    | 0                           | 0         | 0         | 0         | 0         | 37  | 37    |
| 105 to 109    | 0    | 0                           | 0         | 0         | 0         | 0         | 0   | 0     |
| >=110         | 0    | 0                           | 0         | 0         | 0         | 0         | 0   | 0     |
| Total         | 3509 | 3874                        | 7080      | 2610      | 764       | 387       | 221 | 18445 |

| DECEMBER 1986 |   | SEA AGE - FORK LENGTH |     |   |   |   |       |
|---------------|---|-----------------------|-----|---|---|---|-------|
| CM/AGE        | 1 | 2                     | 3   | 4 | 5 | 6 | TOTAL |
| <50           | 0 | 0                     | 0   | 0 | 0 | 0 | 0     |
| 50 to 54      | 0 | 319                   | 0   | 0 | 0 | 0 | 319   |
| 55 to 59      | 0 | 2695                  | 0   | 0 | 0 | 0 | 2695  |
| 60 to 64      | 0 | 5618                  | 0   | 0 | 0 | 0 | 5618  |
| 65 to 69      | 0 | 5834                  | 0   | 0 | 0 | 0 | 5834  |
| 70 to 74      | 0 | 2850                  | 0   | 0 | 0 | 0 | 2850  |
| 75 to 79      | 0 | 555                   | 0   | 0 | 0 | 0 | 555   |
| 80 to 84      | 0 | 153                   | 17  | 0 | 0 | 0 | 170   |
| 85 to 89      | 0 | 39                    | 155 | 0 | 0 | 0 | 194   |
| 90 to 94      | 0 | 0                     | 134 | 0 | 0 | 0 | 134   |
| 95 to 99      | 0 | 0                     | 37  | 0 | 0 | 0 | 37    |
| 100 to 104    | 0 | 0                     | 37  | 0 | 0 | 0 | 37    |
| 105 to 109    | 0 | 0                     | 0   | 0 | 0 | 0 | 0     |
| >=110         | 0 | 0                     | 0   | 0 | 0 | 0 | 0     |
| TOTAL         | 0 | 18063                 | 380 | 0 | 0 | 0 | 18443 |

Table 6. Gutted weight/fork length and sea age/fork length relationships for landings at Faroes in January 1987

| CM/KG      | GUTTED WEIGHT - FORK LENGTH |             |           |           |           |           |     | TOTAL |
|------------|-----------------------------|-------------|-----------|-----------|-----------|-----------|-----|-------|
|            | <2.5                        | >=2.5<br><3 | >=3<br><4 | >=4<br><5 | >=5<br><7 | >=7<br><9 | >=9 |       |
| <50        | 0                           | 0           | 0         | 0         | 0         | 0         | 0   | 0     |
| 50 to 54   | 34                          | 0           | 0         | 0         | 0         | 0         | 0   | 34    |
| 55 to 59   | 276                         | 0           | 0         | 0         | 0         | 0         | 0   | 276   |
| 60 to 64   | 517                         | 943         | 58        | 0         | 0         | 0         | 0   | 1518  |
| 65 to 69   | 69                          | 265         | 1595      | 140       | 0         | 0         | 0   | 2069  |
| 70 to 74   | 0                           | 0           | 404       | 456       | 80        | 0         | 0   | 940   |
| 75 to 79   | 0                           | 0           | 0         | 152       | 161       | 0         | 0   | 313   |
| 80 to 84   | 0                           | 0           | 0         | 0         | 27        | 87        | 0   | 114   |
| 85 to 89   | 0                           | 0           | 0         | 0         | 0         | 58        | 15  | 73    |
| 90 to 94   | 0                           | 0           | 0         | 0         | 0         | 87        | 77  | 164   |
| 95 to 99   | 0                           | 0           | 0         | 0         | 0         | 0         | 15  | 15    |
| 100 to 104 | 0                           | 0           | 0         | 0         | 0         | 0         | 0   | 0     |
| 105 to 109 | 0                           | 0           | 0         | 0         | 0         | 0         | 0   | 0     |
| >=110      | 0                           | 0           | 0         | 0         | 0         | 0         | 15  | 15    |
| Total      | 896                         | 1208        | 2057      | 748       | 268       | 232       | 122 | 5531  |

| CM/AGE     | SEA AGE - FORK LENGTH |      |     |    |   |   | TOTAL |
|------------|-----------------------|------|-----|----|---|---|-------|
|            | 1                     | 2    | 3   | 4  | 5 | 6 |       |
| <50        | 0                     | 0    | 0   | 0  | 0 | 0 | 0     |
| 50 to 54   | 0                     | 34   | 0   | 0  | 0 | 0 | 34    |
| 55 to 59   | 0                     | 276  | 0   | 0  | 0 | 0 | 276   |
| 60 to 64   | 0                     | 1517 | 0   | 0  | 0 | 0 | 1517  |
| 65 to 69   | 0                     | 2069 | 0   | 0  | 0 | 0 | 2069  |
| 70 to 74   | 0                     | 940  | 0   | 0  | 0 | 0 | 940   |
| 75 to 79   | 0                     | 313  | 0   | 0  | 0 | 0 | 313   |
| 80 to 84   | 0                     | 103  | 11  | 0  | 0 | 0 | 114   |
| 85 to 89   | 0                     | 15   | 58  | 0  | 0 | 0 | 73    |
| 90 to 94   | 0                     | 0    | 164 | 0  | 0 | 0 | 164   |
| 95 to 99   | 0                     | 0    | 15  | 0  | 0 | 0 | 15    |
| 100 to 104 | 0                     | 0    | 0   | 0  | 0 | 0 | 0     |
| 105 to 109 | 0                     | 0    | 0   | 0  | 0 | 0 | 0     |
| >=110      | 0                     | 0    | 0   | 15 | 0 | 0 | 15    |
| TOTAL      | 0                     | 5267 | 248 | 15 | 0 | 0 | 5530  |

Table 7. Gutted weight/fork length and sea age/fork length relationships for landings at Faroes in February 1987

| FEBRUARY 1987 |      | GUTTED WEIGHT - FORK LENGTH |           |           |           |           |     |       |
|---------------|------|-----------------------------|-----------|-----------|-----------|-----------|-----|-------|
| CM/KG         | <2.5 | >=2.5<br><3                 | >=3<br><4 | >=4<br><5 | >=5<br><7 | >=7<br><9 | >=9 | TOTAL |
| <50           | 71   | 0                           | 0         | 0         | 0         | 0         | 0   | 71    |
| 50 to 54      | 143  | 0                           | 0         | 0         | 0         | 0         | 0   | 143   |
| 55 to 59      | 926  | 69                          | 0         | 0         | 0         | 0         | 0   | 995   |
| 60 to 64      | 998  | 1454                        | 202       | 0         | 0         | 0         | 0   | 2654  |
| 65 to 69      | 71   | 1593                        | 2934      | 116       | 0         | 0         | 0   | 4714  |
| 70 to 74      | 0    | 69                          | 1720      | 1159      | 185       | 0         | 0   | 3133  |
| 75 to 79      | 0    | 0                           | 152       | 637       | 370       | 0         | 0   | 1159  |
| 80 to 84      | 0    | 0                           | 0         | 58        | 278       | 112       | 0   | 448   |
| 85 to 89      | 0    | 0                           | 0         | 0         | 0         | 392       | 55  | 447   |
| 90 to 94      | 0    | 0                           | 0         | 0         | 0         | 168       | 55  | 223   |
| 95 to 99      | 0    | 0                           | 0         | 0         | 0         | 0         | 55  | 55    |
| 100 to 104    | 0    | 0                           | 0         | 0         | 0         | 0         | 55  | 55    |
| 105 to 109    | 0    | 0                           | 0         | 0         | 0         | 0         | 55  | 55    |
| >=110         | 0    | 0                           | 0         | 0         | 0         | 0         | 0   | 0     |
| Total         | 2209 | 3185                        | 5008      | 1970      | 833       | 672       | 275 | 14152 |

| FEBRUARY 1987 |    | SEA AGE - FORK LENGTH |     |    |   |   |       |
|---------------|----|-----------------------|-----|----|---|---|-------|
| CM/AGE        | 1  | 2                     | 3   | 4  | 5 | 6 | TOTAL |
| <50           | 71 | 0                     | 0   | 0  | 0 | 0 | 71    |
| 50 to 54      | 0  | 143                   | 0   | 0  | 0 | 0 | 143   |
| 55 to 59      | 0  | 996                   | 0   | 0  | 0 | 0 | 996   |
| 60 to 64      | 0  | 2654                  | 0   | 0  | 0 | 0 | 2654  |
| 65 to 69      | 0  | 4714                  | 0   | 0  | 0 | 0 | 4714  |
| 70 to 74      | 0  | 3133                  | 0   | 0  | 0 | 0 | 3133  |
| 75 to 79      | 0  | 1136                  | 23  | 0  | 0 | 0 | 1159  |
| 80 to 84      | 0  | 336                   | 112 | 0  | 0 | 0 | 448   |
| 85 to 89      | 0  | 27                    | 420 | 0  | 0 | 0 | 447   |
| 90 to 94      | 0  | 0                     | 223 | 0  | 0 | 0 | 223   |
| 95 to 99      | 0  | 0                     | 55  | 0  | 0 | 0 | 55    |
| 100 to 104    | 0  | 0                     | 44  | 11 | 0 | 0 | 55    |
| 105 to 109    | 0  | 0                     | 37  | 18 | 0 | 0 | 55    |
| >=110         | 0  | 0                     | 0   | 0  | 0 | 0 | 0     |
| TOTAL         | 71 | 13139                 | 914 | 29 | 0 | 0 | 14153 |

Table 8. Gutted weight/fork length and sea age/fork length relationships for landings at Faroes in March 1987

| MARCH 1987 |      | GUTTED WEIGHT - FORK LENGTH |           |           |           |           |     |       |
|------------|------|-----------------------------|-----------|-----------|-----------|-----------|-----|-------|
| CM/KG      | <2.5 | >=2.5<br><3                 | >=3<br><4 | >=4<br><5 | >=5<br><7 | >=7<br><9 | >=9 | TOTAL |
| <50        | 0    | 0                           | 0         | 0         | 0         | 0         | 0   | 0     |
| 50 to 54   | 320  | 55                          | 0         | 0         | 0         | 0         | 0   | 375   |
| 55 to 59   | 2562 | 221                         | 0         | 0         | 0         | 0         | 0   | 2783  |
| 60 to 64   | 4355 | 4694                        | 917       | 0         | 0         | 0         | 0   | 9966  |
| 65 to 69   | 64   | 3369                        | 5729      | 357       | 0         | 0         | 0   | 9519  |
| 70 to 74   | 0    | 55                          | 3208      | 1846      | 87        | 0         | 0   | 5196  |
| 75 to 79   | 0    | 0                           | 183       | 774       | 654       | 47        | 0   | 1658  |
| 80 to 84   | 0    | 0                           | 0         | 0         | 742       | 284       | 0   | 1026  |
| 85 to 89   | 0    | 0                           | 0         | 0         | 175       | 1088      | 0   | 1263  |
| 90 to 94   | 0    | 55                          | 0         | 0         | 0         | 284       | 449 | 788   |
| 95 to 99   | 0    | 0                           | 0         | 0         | 0         | 142       | 163 | 305   |
| 100 to 104 | 0    | 0                           | 0         | 0         | 0         | 0         | 123 | 123   |
| 105 to 109 | 0    | 0                           | 0         | 0         | 0         | 0         | 0   | 0     |
| >=110      | 0    | 0                           | 0         | 0         | 0         | 0         | 0   | 0     |
| Total      | 7301 | 8449                        | 10037     | 2977      | 1658      | 1845      | 735 | 33002 |

| MARCH 1987 |   | SEA AGE - FORK LENGTH |      |    |   |   |       |
|------------|---|-----------------------|------|----|---|---|-------|
| CM/AGE     | 1 | 2                     | 3    | 4  | 5 | 6 | TOTAL |
| <50        | 0 | 0                     | 0    | 0  | 0 | 0 | 0     |
| 50 to 54   | 0 | 375                   | 0    | 0  | 0 | 0 | 375   |
| 55 to 59   | 0 | 2783                  | 0    | 0  | 0 | 0 | 2783  |
| 60 to 64   | 0 | 9966                  | 0    | 0  | 0 | 0 | 9966  |
| 65 to 69   | 0 | 9519                  | 0    | 0  | 0 | 0 | 9519  |
| 70 to 74   | 0 | 5196                  | 0    | 0  | 0 | 0 | 5196  |
| 75 to 79   | 0 | 1634                  | 25   | 0  | 0 | 0 | 1659  |
| 80 to 84   | 0 | 769                   | 257  | 0  | 0 | 0 | 1026  |
| 85 to 89   | 0 | 79                    | 1184 | 0  | 0 | 0 | 1263  |
| 90 to 94   | 0 | 0                     | 788  | 0  | 0 | 0 | 788   |
| 95 to 99   | 0 | 0                     | 305  | 0  | 0 | 0 | 305   |
| 100 to 104 | 0 | 0                     | 92   | 31 | 0 | 0 | 123   |
| 105 to 109 | 0 | 0                     | 0    | 0  | 0 | 0 | 0     |
| >=110      | 0 | 0                     | 0    | 0  | 0 | 0 | 0     |
| TOTAL      | 0 | 30321                 | 2651 | 31 | 0 | 0 | 33003 |

Table 9. Gutted weight/fork length and sea age/fork length relationships for landings at Faroes in April 1987

| APRIL 1987 |      | GUTTED WEIGHT - FORK LENGTH |           |           |           |           |     |       |  |
|------------|------|-----------------------------|-----------|-----------|-----------|-----------|-----|-------|--|
| CM/KG      | <2.5 | >=2.5<br><3                 | >=3<br><4 | >=4<br><5 | >=5<br><7 | >=7<br><9 | >=9 | TOTAL |  |
| <50        | 0    | 0                           | 0         | 0         | 0         | 0         | 0   | 0     |  |
| 50 to 54   | 206  | 0                           | 0         | 0         | 0         | 0         | 0   | 206   |  |
| 55 to 59   | 2331 | 153                         | 35        | 0         | 0         | 0         | 0   | 2519  |  |
| 60 to 64   | 3702 | 2296                        | 242       | 0         | 0         | 18        | 0   | 6258  |  |
| 65 to 69   | 617  | 3572                        | 2105      | 19        | 19        | 0         | 0   | 6332  |  |
| 70 to 74   | 0    | 408                         | 2657      | 403       | 39        | 0         | 0   | 3507  |  |
| 75 to 79   | 0    | 0                           | 311       | 441       | 174       | 0         | 0   | 926   |  |
| 80 to 84   | 0    | 0                           | 0         | 19        | 213       | 54        | 0   | 286   |  |
| 85 to 89   | 0    | 0                           | 0         | 0         | 39        | 288       | 13  | 340   |  |
| 90 to 94   | 0    | 0                           | 0         | 0         | 0         | 54        | 66  | 120   |  |
| 95 to 99   | 0    | 0                           | 0         | 0         | 0         | 0         | 40  | 40    |  |
| 100 to 104 | 0    | 0                           | 0         | 0         | 0         | 0         | 27  | 27    |  |
| 105 to 109 | 0    | 0                           | 0         | 0         | 0         | 0         | 0   | 0     |  |
| >=110      | 0    | 0                           | 0         | 0         | 0         | 0         | 0   | 0     |  |
| Total      | 6856 | 6429                        | 5350      | 882       | 484       | 414       | 146 | 20561 |  |

| APRIL 1987 |   | SEA AGE - FORK LENGTH |     |   |   |   |       |  |
|------------|---|-----------------------|-----|---|---|---|-------|--|
| CM/AGE     | 1 | 2                     | 3   | 4 | 5 | 6 | TOTAL |  |
| <50        | 0 | 0                     | 0   | 0 | 0 | 0 | 0     |  |
| 50 to 54   | 0 | 206                   | 0   | 0 | 0 | 0 | 206   |  |
| 55 to 59   | 0 | 2519                  | 0   | 0 | 0 | 0 | 2519  |  |
| 60 to 64   | 0 | 6258                  | 0   | 0 | 0 | 0 | 6258  |  |
| 65 to 69   | 0 | 6332                  | 0   | 0 | 0 | 0 | 6332  |  |
| 70 to 74   | 0 | 3406                  | 100 | 0 | 0 | 0 | 3506  |  |
| 75 to 79   | 0 | 907                   | 18  | 0 | 0 | 0 | 925   |  |
| 80 to 84   | 0 | 257                   | 29  | 0 | 0 | 0 | 286   |  |
| 85 to 89   | 0 | 155                   | 185 | 0 | 0 | 0 | 340   |  |
| 90 to 94   | 0 | 0                     | 120 | 0 | 0 | 0 | 120   |  |
| 95 to 99   | 0 | 0                     | 40  | 0 | 0 | 0 | 40    |  |
| 100 to 104 | 0 | 0                     | 27  | 0 | 0 | 0 | 27    |  |
| 105 to 109 | 0 | 0                     | 0   | 0 | 0 | 0 | 0     |  |
| >=110      | 0 | 0                     | 0   | 0 | 0 | 0 | 0     |  |
| TOTAL      | 0 | 20040                 | 519 | 0 | 0 | 0 | 20559 |  |

Table 10. Gutted weight/fork length and sea age/fork length relationships for landings at Faroes in May 1987

| MAY 1987   |       | GUTTED WEIGHT - FORK LENGTH |           |           |           |           |     |       |  |
|------------|-------|-----------------------------|-----------|-----------|-----------|-----------|-----|-------|--|
| CM/KG      | <2.5  | >=2.5<br><3                 | >=3<br><4 | >=4<br><5 | >=5<br><7 | >=7<br><9 | >=9 | TOTAL |  |
| <50        | 0     | 0                           | 0         | 0         | 0         | 0         | 0   | 0     |  |
| 50 to 54   | 0     | 0                           | 0         | 0         | 0         | 0         | 0   | 0     |  |
| 55 to 59   | 1586  | 0                           | 0         | 0         | 0         | 0         | 0   | 1586  |  |
| 60 to 64   | 5683  | 1161                        | 82        | 0         | 0         | 0         | 0   | 6926  |  |
| 65 to 69   | 3039  | 7935                        | 2460      | 0         | 0         | 0         | 0   | 13434 |  |
| 70 to 74   | 132   | 1935                        | 5657      | 814       | 0         | 0         | 0   | 8538  |  |
| 75 to 79   | 0     | 0                           | 1886      | 1119      | 338       | 0         | 0   | 3343  |  |
| 80 to 84   | 0     | 0                           | 0         | 509       | 541       | 72        | 0   | 1122  |  |
| 85 to 89   | 0     | 0                           | 0         | 0         | 405       | 434       | 0   | 839   |  |
| 90 to 94   | 0     | 0                           | 0         | 0         | 0         | 362       | 45  | 407   |  |
| 95 to 99   | 0     | 0                           | 0         | 0         | 0         | 72        | 312 | 384   |  |
| 100 to 104 | 0     | 0                           | 0         | 0         | 0         | 0         | 89  | 89    |  |
| 105 to 109 | 0     | 0                           | 0         | 0         | 0         | 0         | 0   | 0     |  |
| >=110      | 0     | 0                           | 0         | 0         | 0         | 0         | 0   | 0     |  |
| Total      | 10440 | 11031                       | 10085     | 2442      | 1284      | 940       | 446 | 36668 |  |

| MAY 1987   |   | SEA AGE - FORK LENGTH |      |   |   |   |       |  |
|------------|---|-----------------------|------|---|---|---|-------|--|
| CM/AGE     | 1 | 2                     | 3    | 4 | 5 | 6 | TOTAL |  |
| <50        | 0 | 0                     | 0    | 0 | 0 | 0 | 0     |  |
| 50 to 54   | 0 | 0                     | 0    | 0 | 0 | 0 | 0     |  |
| 55 to 59   | 0 | 1586                  | 0    | 0 | 0 | 0 | 1586  |  |
| 60 to 64   | 0 | 6926                  | 0    | 0 | 0 | 0 | 6926  |  |
| 65 to 69   | 0 | 13434                 | 0    | 0 | 0 | 0 | 13434 |  |
| 70 to 74   | 0 | 8282                  | 256  | 0 | 0 | 0 | 8538  |  |
| 75 to 79   | 0 | 3275                  | 67   | 0 | 0 | 0 | 3342  |  |
| 80 to 84   | 0 | 1010                  | 112  | 0 | 0 | 0 | 1122  |  |
| 85 to 89   | 0 | 378                   | 462  | 0 | 0 | 0 | 840   |  |
| 90 to 94   | 0 | 0                     | 406  | 0 | 0 | 0 | 406   |  |
| 95 to 99   | 0 | 0                     | 384  | 0 | 0 | 0 | 384   |  |
| 100 to 104 | 0 | 0                     | 89   | 0 | 0 | 0 | 89    |  |
| 105 to 109 | 0 | 0                     | 0    | 0 | 0 | 0 | 0     |  |
| >=110      | 0 | 0                     | 0    | 0 | 0 | 0 | 0     |  |
| TOTAL      | 0 | 34891                 | 1776 | 0 | 0 | 0 | 36667 |  |



Table 11. Gutted weight/fork length and sea age/fork length relationships for landings at Faroes in June 1987

| JUNE 1987  |      | GUTTED WEIGHT - FORK LENGTH |           |           |           |           |     |       |
|------------|------|-----------------------------|-----------|-----------|-----------|-----------|-----|-------|
| CM/KG      | <2.5 | >=2.5<br><3                 | >=3<br><4 | >=4<br><5 | >=5<br><7 | >=7<br><9 | >=9 | TOTAL |
| <50        | 0    | 0                           | 0         | 0         | 0         | 0         | 0   | 0     |
| 50 to 54   | 0    | 0                           | 0         | 0         | 0         | 0         | 0   | 0     |
| 55 to 59   | 82   | 0                           | 0         | 0         | 0         | 0         | 0   | 82    |
| 60 to 64   | 293  | 33                          | 2         | 0         | 0         | 0         | 0   | 328   |
| 65 to 69   | 157  | 227                         | 67        | 0         | 0         | 0         | 0   | 451   |
| 70 to 74   | 7    | 55                          | 155       | 24        | 0         | 0         | 0   | 241   |
| 75 to 79   | 0    | 0                           | 52        | 33        | 9         | 0         | 0   | 94    |
| 80 to 84   | 0    | 0                           | 0         | 15        | 14        | 2         | 0   | 31    |
| 85 to 89   | 0    | 0                           | 0         | 0         | 10        | 11        | 0   | 21    |
| 90 to 94   | 0    | 0                           | 0         | 0         | 0         | 9         | 2   | 11    |
| 95 to 99   | 0    | 0                           | 0         | 0         | 0         | 2         | 13  | 15    |
| 100 to 104 | 0    | 0                           | 0         | 0         | 0         | 0         | 4   | 4     |
| 105 to 109 | 0    | 0                           | 0         | 0         | 0         | 0         | 0   | 0     |
| >=110      | 0    | 0                           | 0         | 0         | 0         | 0         | 0   | 0     |
| Total      | 539  | 315                         | 276       | 72        | 33        | 24        | 19  | 1278  |

| JUNE 1987  |   | SEA AGE - FORK LENGTH |    |   |   |   |       |
|------------|---|-----------------------|----|---|---|---|-------|
| CM/AGE     | 1 | 2                     | 3  | 4 | 5 | 6 | TOTAL |
| <50        | 0 | 0                     | 0  | 0 | 0 | 0 | 0     |
| 50 to 54   | 0 | 0                     | 0  | 0 | 0 | 0 | 0     |
| 55 to 59   | 0 | 82                    | 0  | 0 | 0 | 0 | 82    |
| 60 to 64   | 0 | 329                   | 0  | 0 | 0 | 0 | 329   |
| 65 to 69   | 0 | 451                   | 0  | 0 | 0 | 0 | 451   |
| 70 to 74   | 0 | 234                   | 7  | 0 | 0 | 0 | 241   |
| 75 to 79   | 0 | 91                    | 2  | 0 | 0 | 0 | 93    |
| 80 to 84   | 0 | 28                    | 3  | 0 | 0 | 0 | 31    |
| 85 to 89   | 0 | 9                     | 12 | 0 | 0 | 0 | 21    |
| 90 to 94   | 0 | 0                     | 11 | 0 | 0 | 0 | 11    |
| 95 to 99   | 0 | 0                     | 15 | 0 | 0 | 0 | 15    |
| 100 to 104 | 0 | 0                     | 4  | 0 | 0 | 0 | 4     |
| 105 to 109 | 0 | 0                     | 0  | 0 | 0 | 0 | 0     |
| >=110      | 0 | 0                     | 0  | 0 | 0 | 0 | 0     |
| TOTAL      | 0 | 1224                  | 54 | 0 | 0 | 0 | 1278  |

Table 12. Catch in number per unit effort (1000 hooks) by month in the Faroese longline fishery for salmon in the seasons 1982/83-1986/87.

| Season | Nov. | Dec.  | Jan. | Feb. | Mar. | Apr.  | Mai. | Whole Season |
|--------|------|-------|------|------|------|-------|------|--------------|
| 82/83  | 83.9 | 133.7 | 73.2 | 48.5 | 46.0 | 39.1  | 34.1 | 46.9         |
| 83/84  | 75.1 | 81.0  | 78.6 | 52.5 | 38.9 | 23.1  | 31.5 | 51.3         |
| 84/85  | 41.7 | 34.6  | 30.7 | 35.0 | 37.4 | 41.5  | 37.0 | 35.8         |
| 85/86  | 54.7 | 57.2  | 65.0 | 45.3 | 63.1 | 73.0  | 95.6 | 58.4         |
| 86/87  | 36.9 | 44.2  | 33.3 | 62.2 | 83.5 | 101.2 | 74.2 | 63.9         |

Table 13 Numbers of tagged wild smolts released in North Esk in 1981-87 and numbers of recaptures in the Faroes salmon fishery

| Year released | No. tagged | 1983 | Year of recovery |      |      |      | Total no. of recaptures | Recaptures /1000 smolts tagged |
|---------------|------------|------|------------------|------|------|------|-------------------------|--------------------------------|
|               |            |      | 1984             | 1985 | 1986 | 1987 |                         |                                |
| 1981          | 10 367     | 18   | 4                | 1    |      |      | 23                      | 2.2                            |
| 1982          | 11 848     | 7    | 22               | 1    |      |      | 30                      | 2.5                            |
| 1983          | 1 456      |      |                  | 1    |      |      | 1                       | 0.7                            |
| 1984          | 6 527      |      |                  |      | 2    | 0    | 2                       | 0.3                            |
| 1985          | 6 210      |      |                  |      | 1    | 3    | 4                       | 0.6                            |
| 1986          | 1 124      |      |                  |      |      |      |                         |                                |
| 1987          | 4 976      |      |                  |      |      |      |                         |                                |

Table 14 Recoveries of microtagged fish at Faroes - the 1986-87 season.

| Country                | No. tags | Age | Raising factor | Estimated Nos. in fishery | Number of tagged smolts | Number recovered per 1 000 tagged |
|------------------------|----------|-----|----------------|---------------------------|-------------------------|-----------------------------------|
| <b>1 Port sampling</b> |          |     |                |                           |                         |                                   |
| Ireland                | 2        | 2sw |                | 5                         | 220 000                 | 0.02                              |
| Faroes                 | 29       | 2sw | 2.3            | 67                        | 25 637                  | 2.6                               |
| England & Wales        | 3        | 2sw |                | 7                         | 25 000(E)               | 0.28                              |
| Iceland                | 0        |     | -              | 0                         | 77 690                  | 0                                 |
| <b>2. Discards</b>     |          |     |                |                           |                         |                                   |
| Ireland                | 7        | 1sw |                | 20                        | 143 866                 | 0.14                              |
| N. Ireland             | 4        | 1sw | 2.9            | 12                        | 21 847                  | 0.50                              |
| England & Wales        | 3        | 1sw |                | 9                         | 25 000(E)               | 0.36                              |
| Iceland                |          |     |                |                           |                         |                                   |

E = Estimates

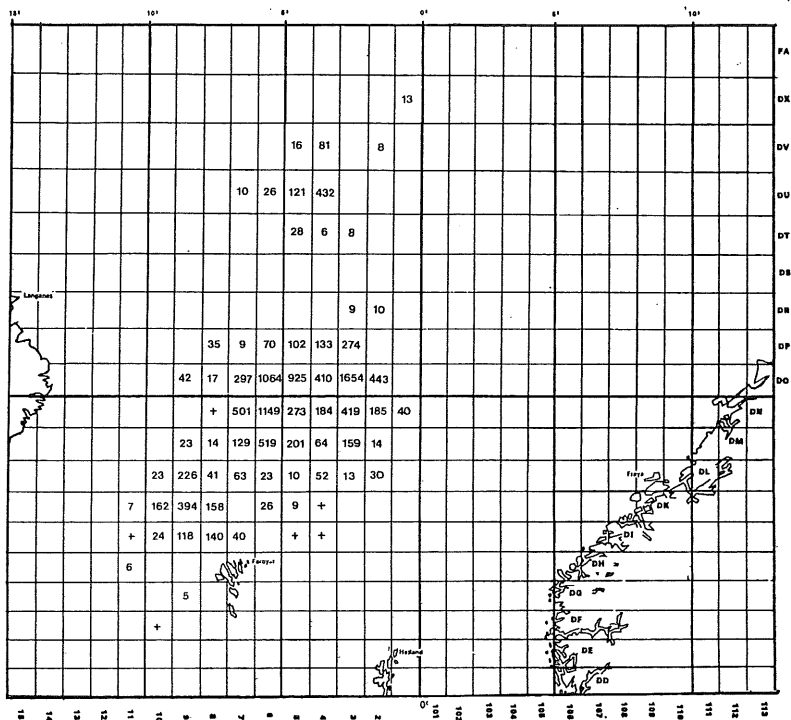


Figure 1. Catch in number\*10<sup>-1</sup> by statistical rectangle from logbooks, 1986/87 season.

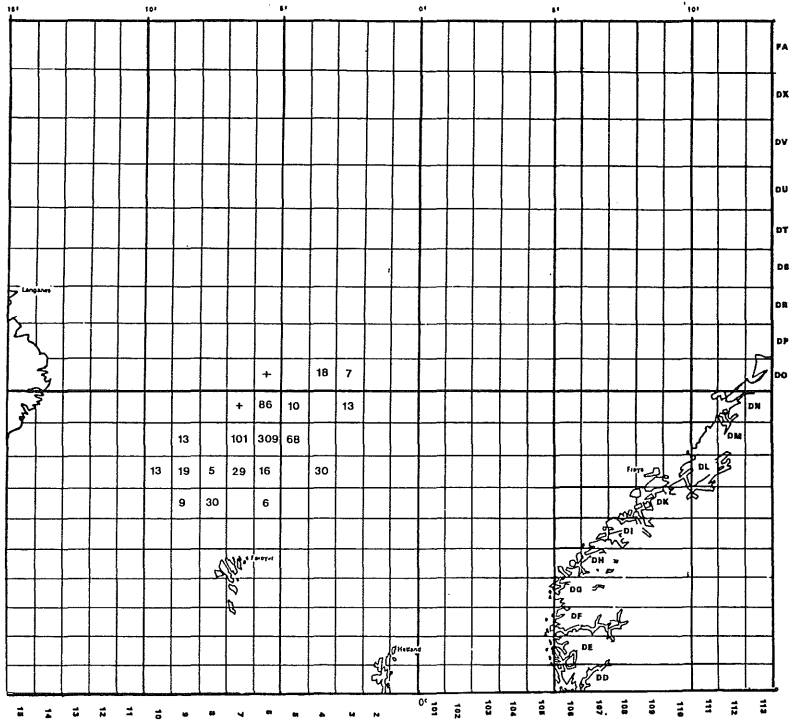


Figure 2. Catch in number\*10<sup>-1</sup> by statistical rectangle from logbooks, November 1986.



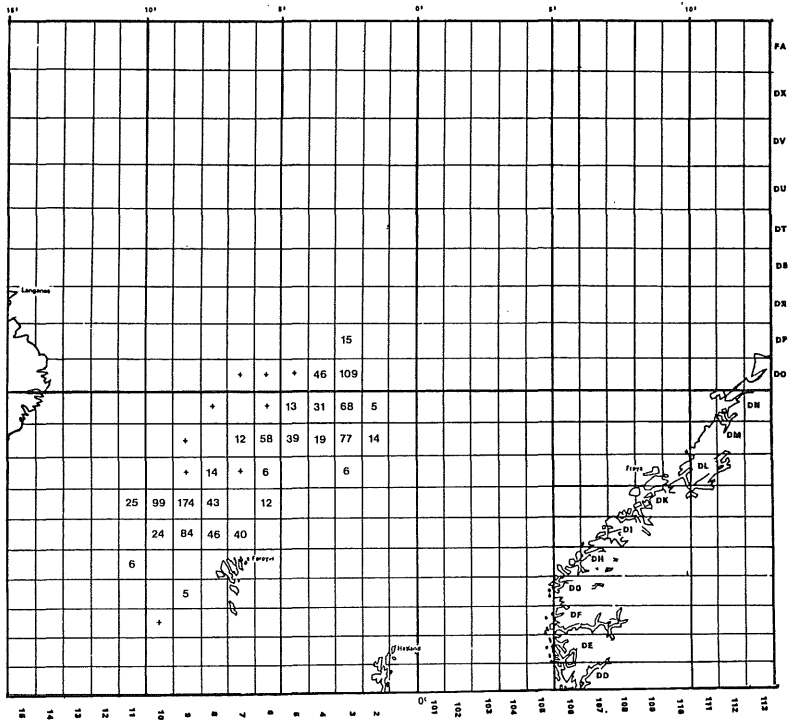


Figure 4. Catch in number\*10<sup>-1</sup> by statistical rectangle from logbooks, January 1987.

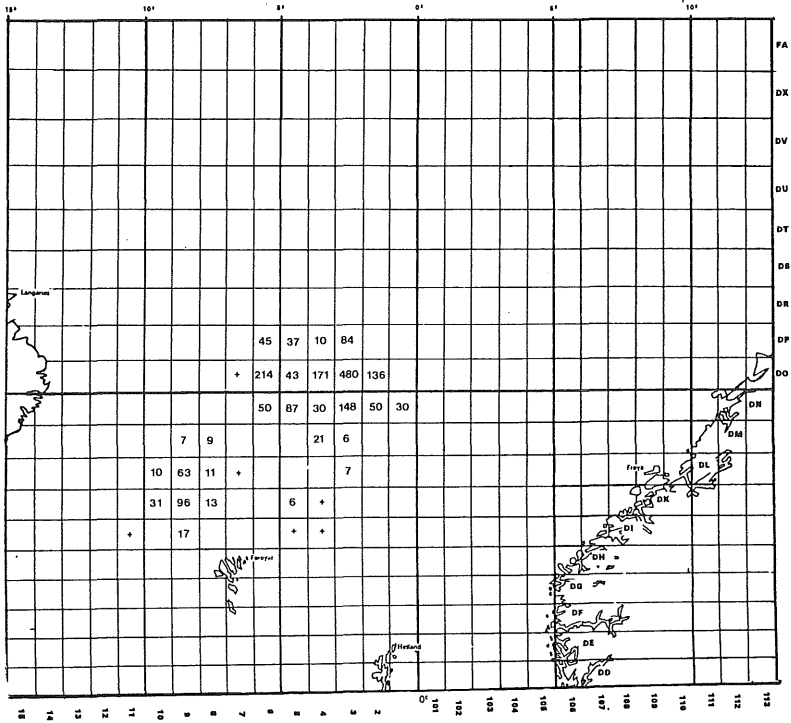


Figure 5. Catch in number\*10<sup>-1</sup> by statistical rectangle from logbooks, February 1987.



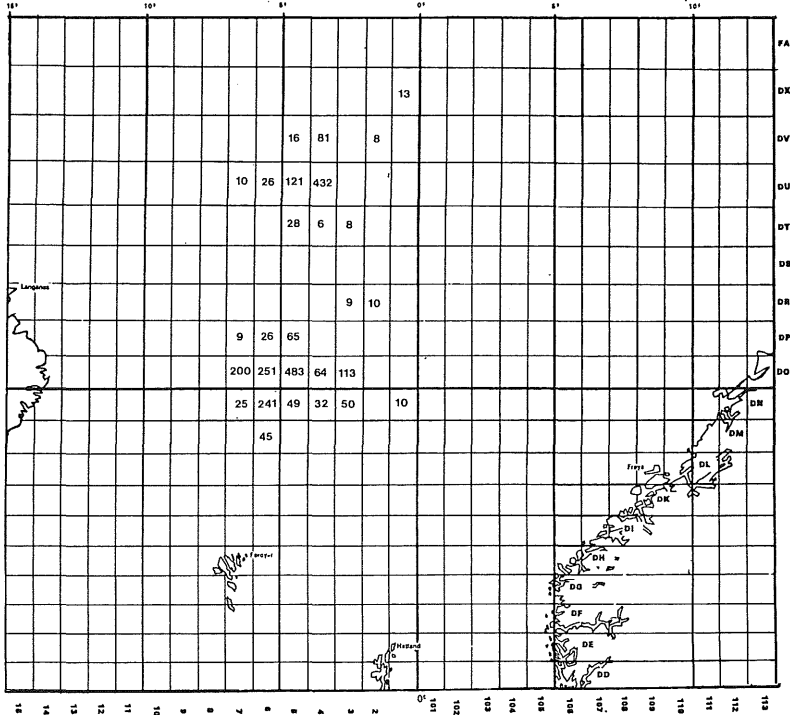


Figure 6. Catch in number\*10<sup>-1</sup> by statistical rectangle from logbooks, March 1987.

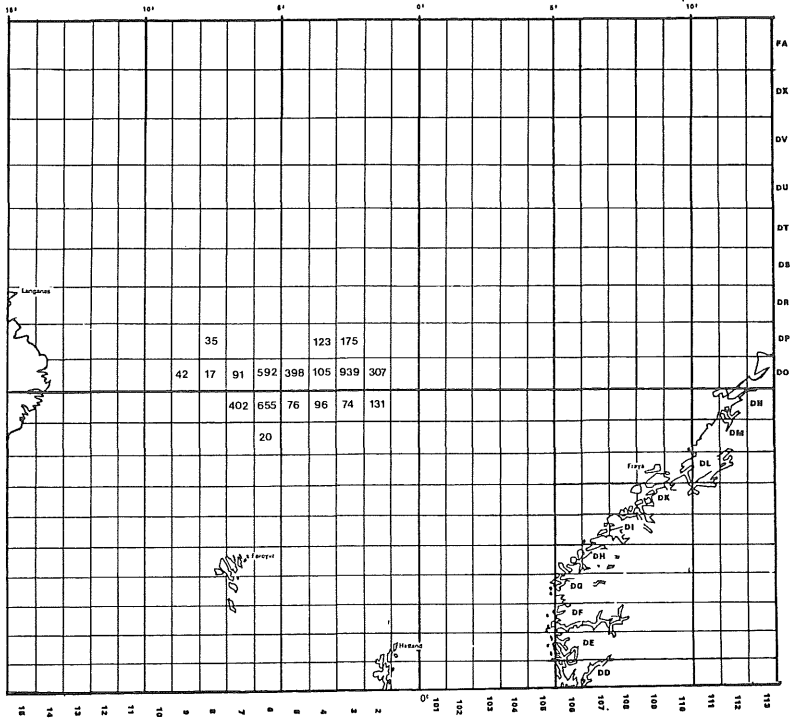


Figure 7. Catch in number\*10<sup>-1</sup> by statistical rectangle from logbooks, April 1987.

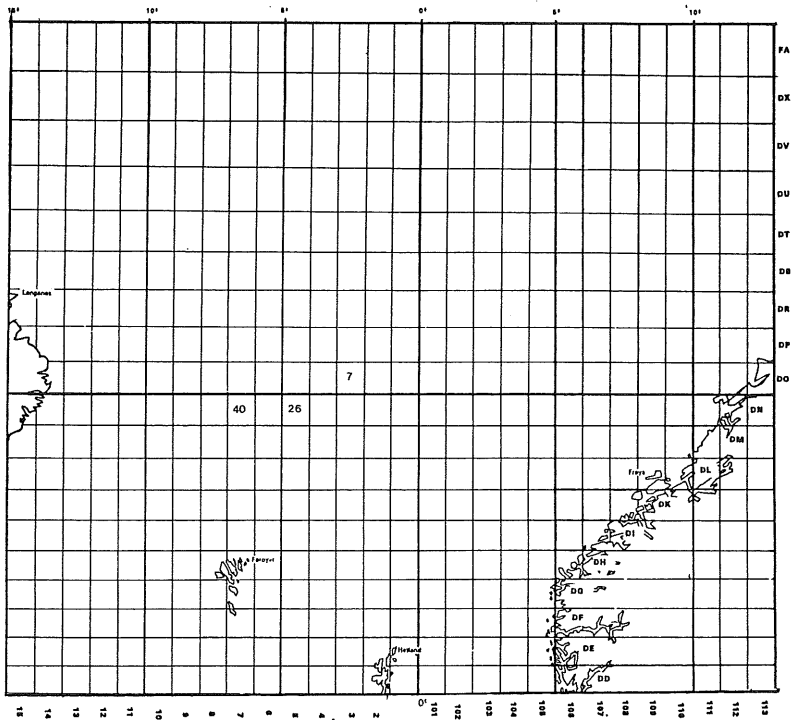
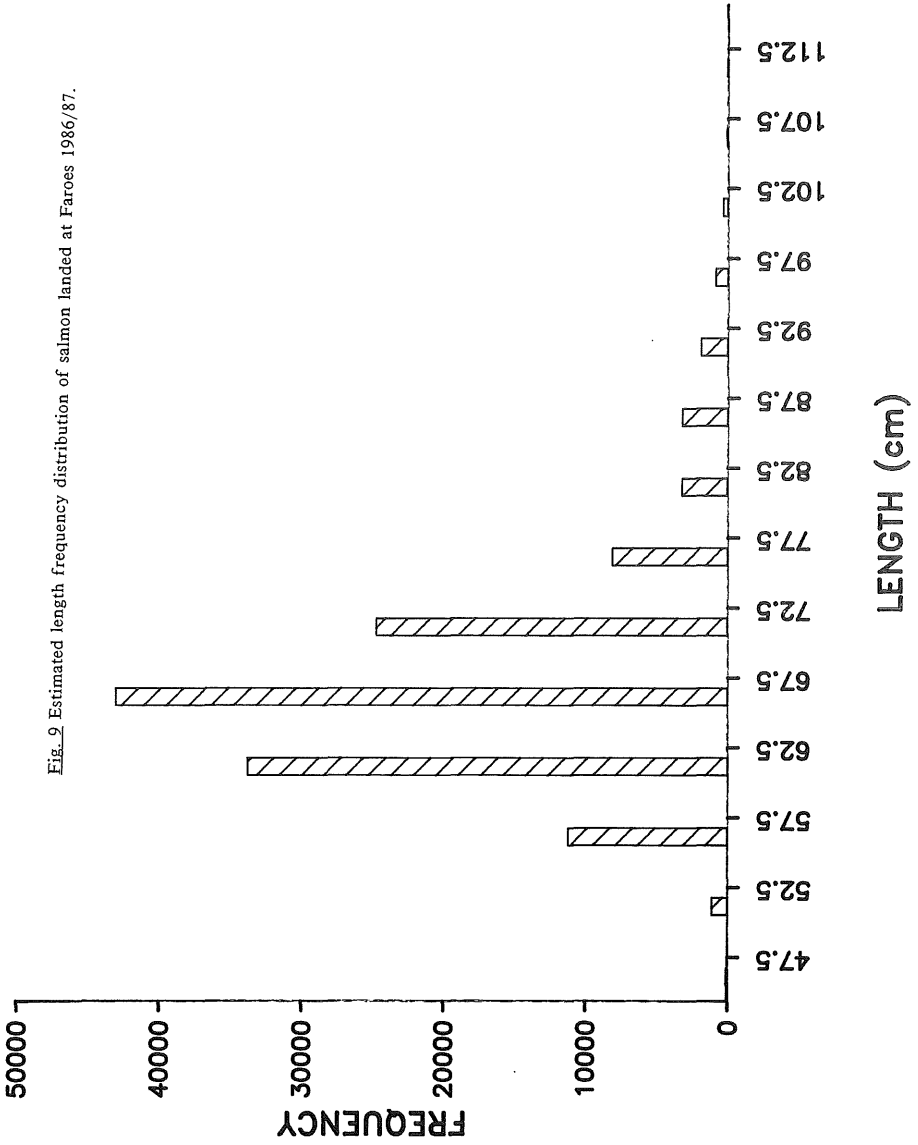


Figure 8. Catch in number\* $10^{-1}$  by statistical rectangle from logbooks, Mai 1987.

Fig. 9 Estimated length frequency distribution of salmon landed at Faroes 1986/87.



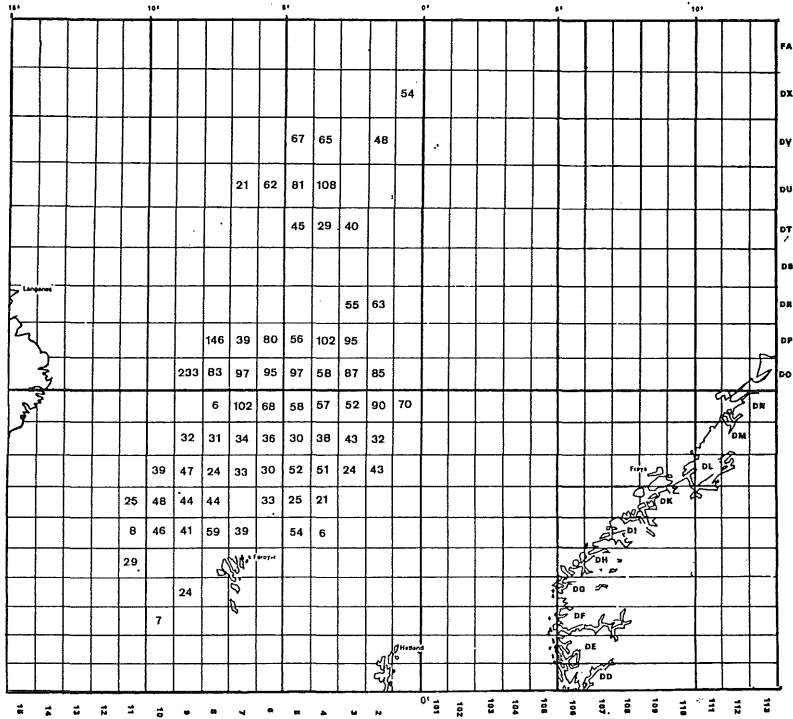


Figure 10. Catch in number per unit effort (1000 hooks) by statistical rectangle from logbooks, 1986/87 season.

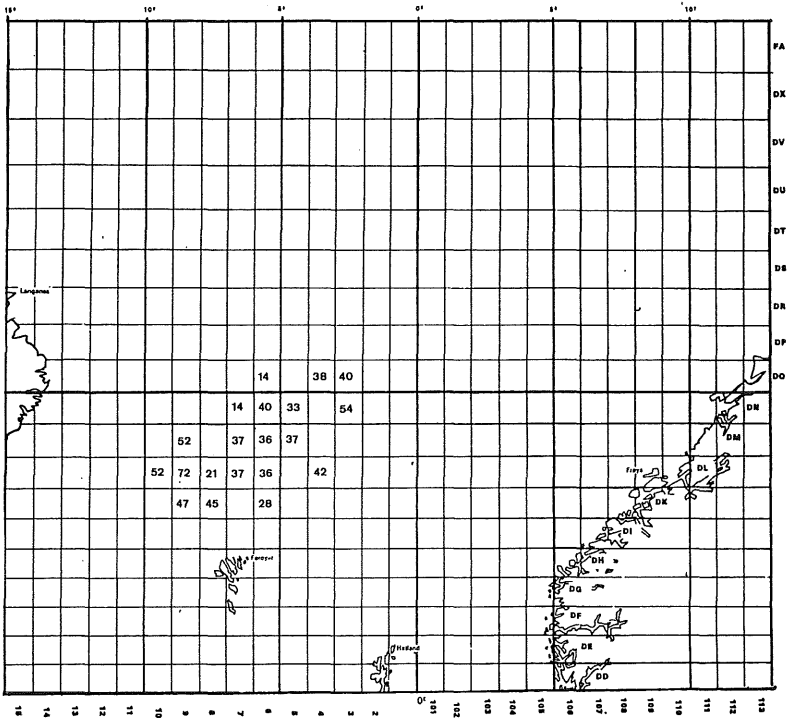


Figure 11. Catch in number per unit effort (1000 hooks) by statistical rectangle from logbooks, November 1986.

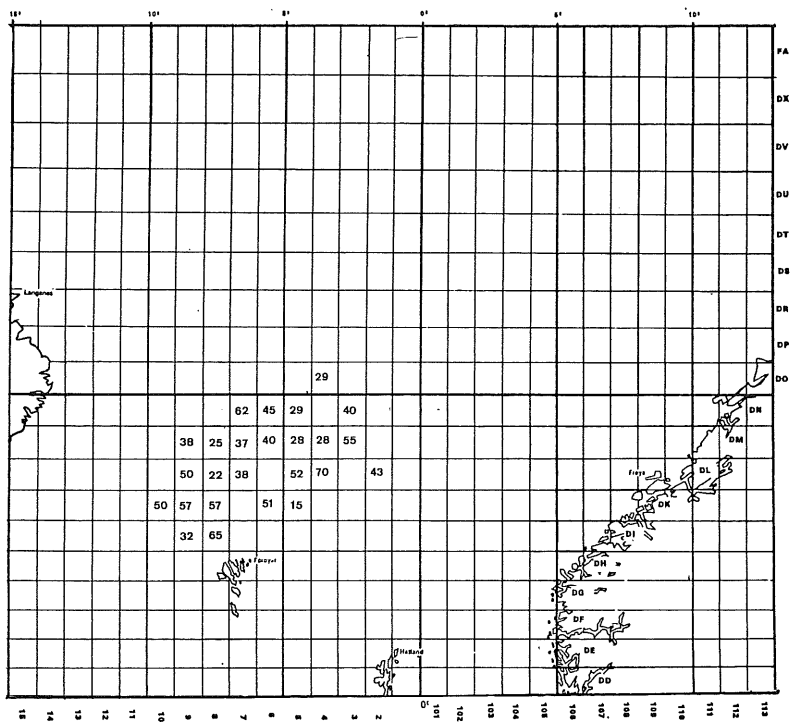


Figure 12. Catch in number per unit effort (1000 hooks) by statistical rectangle from logbooks, December 1986.

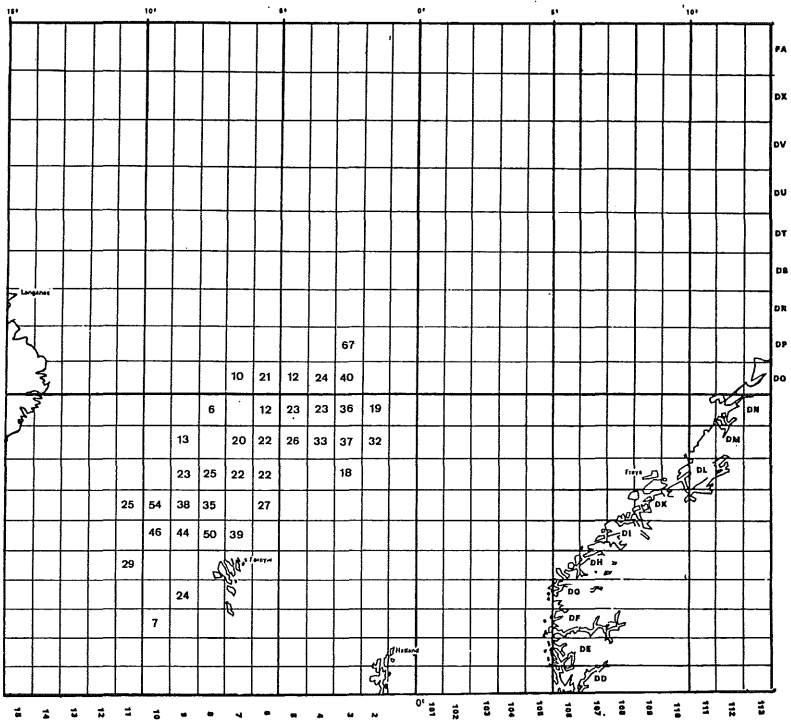


Figure 13. Catch in number per unit effort (1000 hooks) by statistical rectangle from logbooks, January 1987.



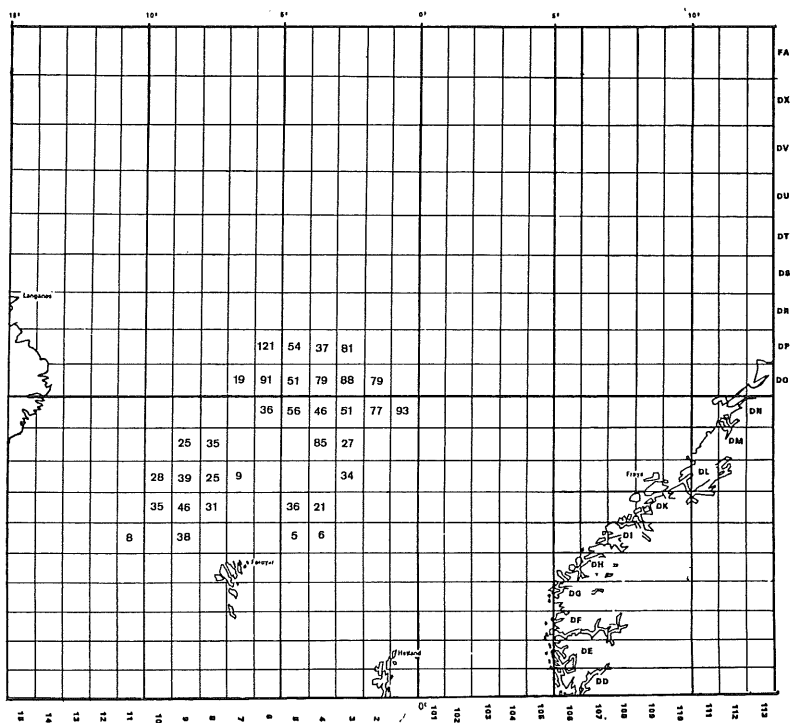


Figure 14. Catch in number per unit effort (1000 hooks) by statistical rectangle from logbooks, February 1987.

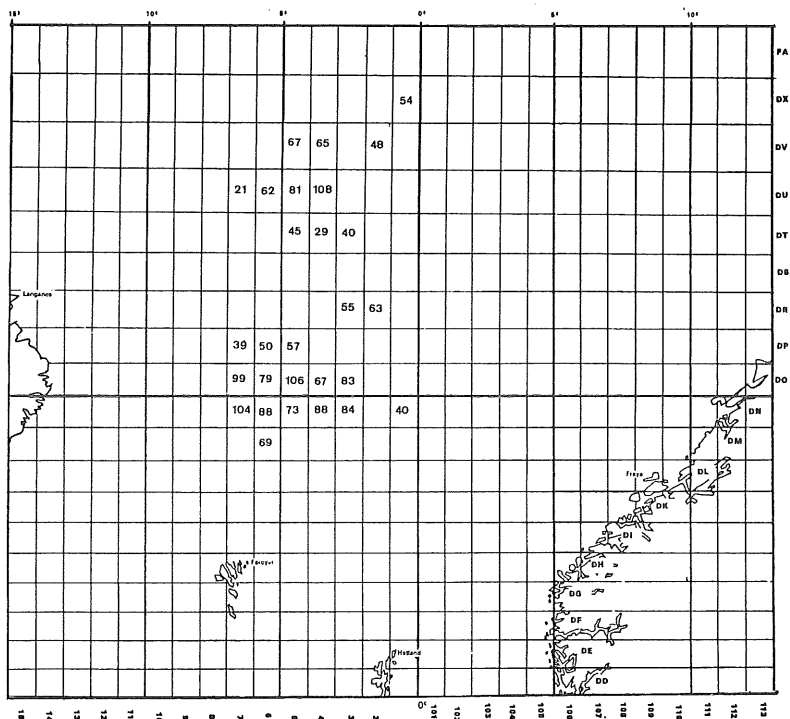


Figure 15. Catch in number per unit effort (1000 hooks) by statistical rectangle from logbooks, March 1987.

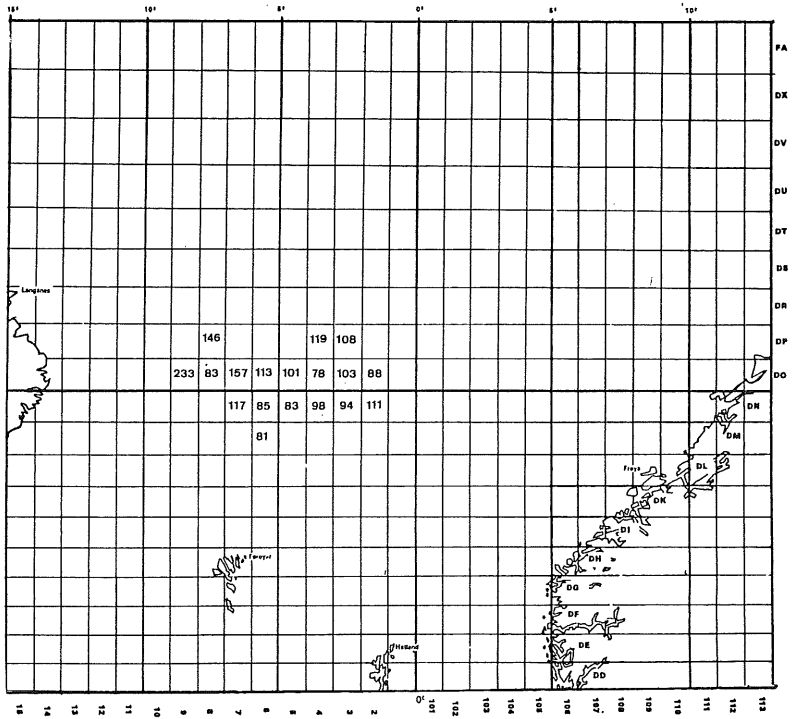


Figure 16. Catch in number per unit effort (1000 hooks) by statistical rectangle from logbooks, April 1987.

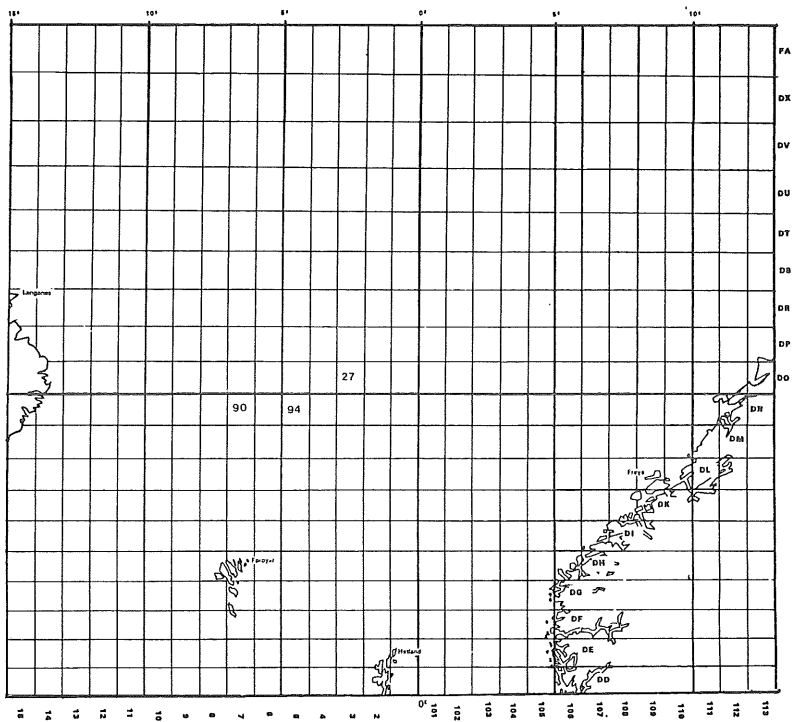


Figure 17. Catch in number per unit effort (1000 hooks) by statistical rectangle from logbooks, Mai 1987.

