



ERRATA TO C.M.1981/G:11 - Report of the Working Group on
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Assessment of Hake Stocks
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Pages 18 and 19, Section 2.9: in Options (3), (4) and (5) for
alternative (c) "8 000 tonnes" should be substituted
with "8 500 tonnes".

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International Council for the
Exploration of the Sea

C.M. 1981/G:11
Demersal Fish Committee

REPORT OF THE WORKING GROUP ON ASSESSMENT OF HAKE STOCKS

Copenhagen, 30 April to 7 May 1981

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REPORT OF THE WORKING GROUP ON ASSESSMENT OF HAKE STOCKS

O. INTRODUCTION

O.1 Participants

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H. Dinis	Portugal
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X. Pereiro	Spain
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O.2 Terms of Reference

At the ICES 1980 Statutory Meeting it was decided (C. Res. 1980/2:6.11) that the Working Group on the Assessment of the Stocks of Hake should meet at ICES Headquarters from 30 April to 7 May 1981 to

- (i) assess TACs for hake,
- (ii) review the exploitation patterns of hake stocks and advise on any additional measures required to improve them,
- (iii) discuss the data requirements for assessments of sea bream, monkfish and flatfish in Sub-areas VII, VIII and IX and draw up plans for collecting the requisite data.

O.3 Nominal Landing Trends

Nominal hake catches for NEAFC Regions 2 + 3 (including the stock areas considered in this report) for 1936 to 1980 appear in Table O.1. Nominal catches averaged 52 000 tonnes during the late 1930's, declined during World War II, and rose sharply to 194 000 tonnes in 1946. Thereafter, they declined to around 121 000 tonnes from 1949 to 1965, to 101 000 tonnes from 1966 to 1976 and since 1977 when 200 miles jurisdiction was adopted to 66 100 tonnes. The latter figure is believed to reflect both declining abundance and EC restrictions on Spanish effort. While the data in Table O.1 are subject to many errors, particularly in the earlier years, the Group accepted these data as being indicative of the general condition of the resource relative to earlier years.

Nominal catches of hake as reported to ICES by country and area from 1961 to 1980 are given in Table O.2. Again a downward trend is evident, although national trends differ considerably. Although reduced, partly by EC restrictions, Spain remains the major hake catching nation, France

second, Portugal third and the United Kingdom fourth.

0.4 Stock Separation

As in the two preceding Working Group reports, (Anon, 1979, 1980) two hake stocks were recognised within NEAFC Regions 2 and 3, i.e. a "northern stock" (ICES Divisions IVa and VIa, Sub-area VII and Division VIIa, b) and a "southern stock" in ICES Divisions VIIc and IXa. The French participants mentioned some work in progress on meristic characters of O-group hake which may be of some help in stock separation.

0.5 Assessment of the Data Base

The lack of adequate catch, effort, length and age composition data have in the past greatly hindered assessment of these stocks. However, encouraging reports were received as to improved sampling levels in 1980 (See Section 1.3) and still further improvement promised for 1981. France provided a substantial amount of data on the relative quantities and length composition of small hake discarded in the Nephrops fishery and further advances have been made by Spain towards reliable ageing of hake of the southern stock. (See Section 1.8).

Catch, effort, catch per unit effort and length compositions in 1980 were provided by England and Wales for Divisions IVa and VIa and Sub-area VII for all the various fleets except the small vessels working in Division VIIe. and Spanish vessels working mainly in Division VIIj which, having been re-registered in the Channel Islands, now form part of the English fleet.

France provided similar data for many components of her fleet including a new table for the cpue of hauturiers (large trawlers) based at La Rochelle for the years 1966 to 1980. Recruitment indices in Divisions VIIa and VIIb for the years 1977 to 1980 from cruises by R.V. "La Pelagia" were also provided.

Spain provided catch figures for each Sub-area and Division. These figures refer to the catches of licensed vessels in EC waters, also effort data and length compositions for those vessels.

For the southern stock Spain and Portugal provided details of their fleets, catches by country and gear, also length compositions, abundance indices of juvenile fish, sex ratios in research vessel catches and some selectivity data.

In general, the biological data available to the Working Group for 1980 was a considerable improvement on past years. However, unreported catch and effort data, especially by Spanish vessels, remain a major problem in the assessment of hake stocks.

1.0 Northern Stock (ICES Divisions IVa and VIa, Sub-area VII and Divisions VIIIA and VIIIB)

1.1 Nominal Landing Trends

Nominal catches for the Northern Stock (as reported to ICES for 1961 to 1979 by country and by sub-areas) appear in Table 1.1. Table 1.2 is similar, but includes revisions by the Hake Working Group, including unreported landings. It is to the quantities of hake shown in Table 1.2 that length measurements, etc. have been raised and all the 1980 calculations based.

It should be noted that the TAC for 1980 recommended by ACFM was 30 000 tonnes. This TAC was increased by the EC to 40 000 tonnes. The reported landings agree with this figure; however, this Working Group's estimate of the catch in 1980, including unreported landings, was 53 100 tonnes (77% above ACFM's TAC).

The general level of catch was the same as in 1979. Table 1.2 indicates that the catch in Divisions IVa and VIa increased by 400 tonnes (6%); in Sub-area VII fell by 3 200 tonnes (17%) and in Division VIIIA,b rose by 3 300 tonnes (15%).

1.2 Fleet Composition

1.2.1 England and Wales

There is now almost no directed hake fishery and individual landings of hake rarely exceed 250 kg.

Fleetwood has 10 - 12 modern vessels of 34 - 40 m, of which 6 often work as pairs, trawling for cod and haddock in Divisions IVa and VIa. The trawlers working singly get most of their hake in Division VIIa. Total catch was 96 tonnes. Milford has 6 very old trawlers working in Divisions VIIa and VIIf, in 1980 they took 25 tonnes of hake. Plymouth has 20 - 30 vessels of 16 - 20 m, some trawling and others seining, all in Division VIIe. In 1980 the trawlers took 10 tonnes of hake, the seiners 22 tonnes. Newlyn has about 30 vessels of 20 - 25 m working in Divisions VIIe, VIIf and in summer in Divisions VIIg-k. In 1980 the trawlers took 186 tonnes of hake, 4 seiners working out of port took a further 22 tonnes.

These 4 ports received 369 tonnes of hake out of an England and Wales total of 659 tonnes by vessels of over 40 ft (13 m).

In 1980 a new development took place. About 6 Spanish vessels, mainly from Pasajes, re-registered in Jersey with British skippers and Spanish crews began landing at Penryn in Cornwall. The entire catch is re-iced and exported to Spain. Hake, monk and megrim are the main species landed. Almost all the English landings from Divisions VII h, j, 111 tonnes, came from these vessels.

In addition, there is a large number of small inshore trawlers working in Divisions VIIe and VIIf, working day trips from many small ports. No reliable effort figures are available and the reported catch, 58 tonnes, is probably an underestimate. Very occasional small landings of hake occur at Grimsby and Lowestoft from Divisions IVa, b and at Whitehaven from Division VIIa. The total landings of hake in England and Wales in 1980 was 717 tonnes as against 326 tonnes in 1979.

1.2.2 Spain. For a description of the Spanish fleet see the 1978 Working Group Report (C.M. 1978/G:45).

Pasajes. This port has all the main types of trawl vessels; bous, bakas and parejas or trios. Their main grounds are in Division VIIIa,b, although

the trios and bakas also fish in Sub-areas VI and VII. Ondarroa has mainly bakas working in Division VIIIa,b. Santander has a small number of bakas and bous working only in Division VIIIa,b.

Coruña is the port from which most of the fishing done in Sub-area VII is carried out. The fleet consists mainly of bakas and some trios, and is more hake-orientated than those based at the other ports. The proportion of hake to other species landed is about 1:2.

Vigo has a fleet of about half the size of Coruña's, also working mainly in Sub-area VII, but their effort is less directed towards hake. The proportion of hake to other species landed is about 1:12, megrim and monk making up the bulk of the catches.

In all, Spain has 413 trawlers having a mean horsepower of 760. Of these, 168 were licensed to fish in EC waters in 1980. (See Figure 1.2)

1.2.3 France

The fleet composition has not drastically changed since it was described in an earlier Working Group report (C.M. 1977/G:3). Improved coverage of the sampling programme has, however, permitted further sub-division of the catches by long liners, gill netters and côtiers (small inshore trawlers) from those of the somewhat larger artisans and the hauturiers.

While the type of vessels used have not changed, the numbers of vessels have. The evolution of French effort is treated in Section 1.5.

1.3 Sampling Methods and Levels

1.3.1 England and Wales

Measurements of the hake landed at Fleetwood and Milford Haven are available since the 1950s by sub-area and division. With the drastic decrease in the landings of hake at those two ports, sampling has been started at Plymouth and Newlyn where the catches, although small, are nevertheless an important part of the total landings. Sampling of the hake landed by the Spanish vessels at Penryn should be arranged soon, and also from the many small vessels landing at the Cornish ports. The four ports where sampling is carried out received just over half the total English and Welsh landings in 1980.

The sampling level at all four ports is intended to be 1 vessel's catch sampled each month for each gear and each division fished, but hake landings

are so few and so small that this is not always achieved. Samples are raised to the vessel's catch and then quarterly to the port total, and finally summed for the year.

1.3.2 Scotland

No length compositions of hake landed in Scotland were available for 1980.

1.3.3 France

Market sampling is carried out at : Les Sables d'Olonne, 1 sample per month from artisan trawl, La Rochelle, 1 sample per week from all vessel classes, Hendaye, 2 samples per month from artisans using pelagic trawls and from long liners.

Table 1.3.1 gives the quantity of hake landed at the various French ports by the different gears and denotes which vessel classes are sampled at which port. The final line shows the percentage of the French total landings discharged at ports where sampling takes place. Where the weight of the sample is known, the numbers are raised by the ratio of landed weight/sample weight. Where the weight of the sample is not known, its weight is calculated by use of a length/weight relationship of gutted fish.

Sampling at sea on R.V. "La Pelagia" covers the grounds fished by the artisans in Division VIIIA,b, particularly those fished from the Guilvinec St Nazaire, Les Sables, La Rochelle and Arcachon. The net used is the same as that of the commercial vessels. Such cruises are carried out quarterly. Measurements are also made on artisans trawling for Nephrops in Sub-area VII. Several such trips are made each month. Sampling also takes place at sea on artisan, côtiers (small trawlers), where 18 900 measurements of hake were taken before discarding in 1980.

1.3.4 Spain

Table 1.3.2 gives the frequency of sampling at Spanish ports and the approximate number of fish measured in 1980. The frequency of sampling will be increased in 1981.

1.4 Length Compositions

The length compositions for Divisions IVa and VIa and Sub-area VII, split by countries and vessel classes, are given in Table 1.4.1 and those for Division VIIIA,b in Table 1.4.2. At the foot of the table the mean weight of individual fish in the catch is given. This immediately distinguishes

those sections of the fleet which exploit the adult fish from those which catch mainly juveniles.

Further, these two tables show clearly the greater average size of the fish taken in Divisions IVa and VIa as compared with those in Division VII which, in turn, are larger than those taken in Division VIIa,b. Where hake are taken by the same type of vessel in all three locations, as for example French hauturiers, the mean weight of the fish are 2 321, 1 444 and 1 158 g in Divisions IVa and VIa, Sub-areas VII and Division VIIa,b respectively. For French artisans, the mean weight of the fish landed are 395 g in Sub-area VII; 328 g in Division VIIa,b. Even by long line, those taken by Spanish vessels in Sub-area VII are individually over twice the weight of those taken by French vessels in Division VIIa,b. In terms of catch in numbers, Division IVa and VIa produced 2.6 million fish in 1980; Sub-area VII 21.7 million and Division VIIa,b 97.4 million. This may be taken as confirmation that the major hake nursery areas lie in Division VIIa,b.

1.5. Trends in fishing effort

Table 1.5.1 gives a number of estimates of the fishing effort exerted by England and France in Divisions IVa and VIa, Sub-area VII and Division VIIa,b for the years 1961 to 1980. No comparable data sets for Spain were available.

1.5.1 England and Wales

In Divisions IVa and VIa the effort by both motor trawlers and all trawlers (which latterly includes some pair trawlers and formerly included steam trawlers) has been declining since 1977. In Sub-area VII English effort has been relatively constant for ten years or more. There was an increase of effort in 1980 as compared with the previous year, but the 1980 value is similar to those of the 1970s. There was a suggestion that in 1980 some of the English trawlers shifted from their traditional grounds to join the French fleet on the Nephrops grounds and this is reflected in increased catches of hake (see Table 1.2).

- 1.5.2 French hauturiers in Divisions IVa and VIa increased their effort considerably during the late 60's and 70's but have reduced their effort since 1978. In Sub-area VII hauturier effort shows a decline from the peak year of 1976 and in Division VIIa,b has declined greatly since

the late 60's. Data on the distribution of French artisanal effort between Sub-area VII and Division VIIIA,b is not clear, but in the final column, where Sub-area VII and Division VIIIA,b are combined, their effort seems to have increased steadily over the 20 year period and from 1976 to 1978 has stabilised at a high level.

Over the whole area, inhabited by the Northern Stock, it seems probable that effort by the larger and more powerful units is decreasing, while effort by the smaller units, that is, French artisans and the smaller English trawlers has stabilised at a high level. Having no comparable data set for Spain means that it is impossible to decide whether the total effort on the Northern Stock has increased or decreased over the last 20 years. The Working Group was, however, of the opinion that Spanish effort was now reduced and more closely confined to the western parts of Division VIIj than previously.

1.6 Trends in Catch per Unit Effort

Table 1.6.1 gives the catches per unit effort for certain components of the fleet in Divisions IVa and VIa, Sub-area VII and Division VIIIA,b. In addition, two further data sets relating to the hauturiers and artisans landing at La Rochelle were made available and are given in Table 1.6.2. These latter are thought to be particularly useful, partly because the coverage of landings at La Rochelle is good and partly because there has been no shift of ground or change in the manner of fishing over the time period involved. (See Figures 1.6.1 and 1.6.2).

Table 1.6.1 shows the general downward trend of the cpue of the larger English trawlers and French hauturiers which tend to exploit the larger hake. This downward trend is not apparent in the Spanish data for the port of La Coruña. This data set is not complete, since in the last two years the Irish Government have forbidden Spanish vessels to fish in an area where catches were heaviest and so the figures would not be comparable.

Table 1.6.2 shows the cpue of the La Rochelle artisans to be very variable from year to year. This is to be expected where the bulk of the catch consists of a single year class. If their cpue is in fact largely determined by the success or failure of a year class, then those of 1976 to 1978 as two year olds have been more abundant than that of 1974. The cpue of the hauturiers is less variable, but if the 1974 year class was a particularly bad one, this could explain the hauturiers' low cpue in 1977.

Almost all components of the fleet show some increase in cpue in 1980 as compared to 1979. On the evidence available, it is difficult to distinguish between the effects of :

- a) reduced effort by the EC fleet,
- b) a general reduction of Spanish effort,
- c) a somewhat stronger year class, or year classes, passing through the fishery,
- d) a gradual increase of mesh size in many components of the fleet.

1.6.1 Longer term trends in catch per unit effort and the effect of the small mesh fisheries on hake abundance

English work in progress showed that over the period 1946 to 1960 the English catch per effort fell rapidly. The decline was most rapid in Division VIIg-k, only slightly less rapid in Division VIIb,c, but occurred considerably later in Division VIa and Division IVa. Further, by the use of cpue in number for fish of less than 49 cm, as opposed to those of 50 cm and above, the decline in Divisions IVa, VIa and Sub-area VII was apparent in the smaller fish two years before the larger. In short, a partial failure of recruitment to the English fisheries was the primary cause of the collapse of the Cardiff, Swansea and Milford Haven hake fleet. This decline was very apparent in Sub-area VII as early as 1955. Since no other country has reliable effort data for that period, the total international catch of Nephrops in Sub-areas IV, VI, VII and VIII was used as an index of the growth of the small mesh fisheries. In Figure 1.6.4 the catch of Nephrops is plotted against this Working Group's revised international hake catches in the same sub-areas two years later. In Figure 1.6.5 the two data sets are seen to be roughly inversely related, apart from 3 years in the early 1970s. Since it has been abundantly shown that Nephrops and juvenile hake inhabit the same type of substrates, notably the area known as the Grande Vasière in the Bay of Biscay, to the south of the Smalls in the Celtic Sea and elsewhere, it is reasonable to conclude that the small mesh fisheries, of which the catches of Nephrops are an indicator, are largely responsible for the decrease in abundance of the 30-50 cm hake on which the English fisheries largely depended. If that is so, then clearly while an increase in mesh size in the directed hake fisheries must be beneficial, unless steps are taken to reduce the catches of very small hake further south, very large numbers of which are subsequently discarded as Table 1.4.2 shows, then the recovery of the hake stocks is unlikely. (See Figures 1.6.3, 1.6.4. and 1.6.5).

1.7 Indices of Recruitment

Two sets of data were available.

Table 1.7.1 gives the cpue of the smallest market category of hake landed at La Rochelle from Divisions VIIIA and VIIIB separately for the years 1968 to 1980. These fish are mainly of age group 2, so they can be taken to give some indication of year class strength two years before, modified by fishing mortality in those two years. The same data are shown in Figure 1.7.1. In general, abundance in Divisions VIIIA and VIIIB show similarities; both areas show peaks in 1970, 1973 and 1975 with lower values in 1969, 1971, 1972, 1974 and 1976. Since 1977 neither Division VIIIA nor Division VIIIB has yielded a high abundance. On the other hand, they would appear to be more consistently at a moderate level than hitherto.

The figure gives no indication that a particularly strong year class is soon to recruit to the adult fishery.

Table 1.7.2 gives indices of recruitment as obtained on cruises of the R.V. "La Pelagia" from 1977 to 1980 in the same divisions. In Division VIIIA, the results tend to confirm those shown in the previous table, rather steady recruitment. In Division VIIIB, however, where commercial sampling suggests that the cpue of young hake is higher than in Division VIIIA, the research vessel results suggest that they are less abundant, and in 1980 very much less abundant.

1.8 Age Determination of Hake

Preliminary work on age determination by Iglesias and Dery made it possible to construct an age/length key for hake of the Southern Stock. Some years previously, Quero and Labastie attempted to age hake from which the French participants had prior to this meeting converted numbers at length to numbers at age in the Northern Stock. The two available age/length keys were different, but as previously, a lack of age data so seriously hindered assessment, it was decided to attempt to create a data base for Virtual Population Analysis of both stocks using both age/length keys. The Working Group was unable to complete this during the meeting, but it is anticipated that VPA's will be available in the near future.

1.9 Assessments

The Working Group was of the opinion that the long-term decline in the stock had been halted; there has been some reduction in effort and some increase in cpue in some components of the fleets as compared with the previous year. However, the Working Group was concerned that the EC TAC had, as far as they could estimate, (in view of the large quantity of unreported landings) been substantially exceeded. The total catch still included a high proportion of very small hake.

The Working Group therefore considered 5 options for possible regulation of the fishery in 1982 :

- (1) To increase mesh size to 80 mm in all components of the fleet;
- (2) To increase mesh size to 60 mm in all components of the fleet;
- (3) To limit the catch to (a) 40 000 tonnes, (b) 30 000 tonnes in 1982 by the reduction of fishing effort. These totals are the EC and ACFM TACs for 1980/81.
- (4) To increase mesh size to 80 mm and also limit the catch to (a) 40 000 tonnes, (b) 30 000 tonnes in 1982.
- (5) To increase mesh size to 60 mm and limit the catch to (a) 40 000 tonnes and (b) 30 000 tonnes in 1982.

The fleet was divided into 6 categories based on the size composition of their catches.

- (a) Large mesh. This included the UK trawlers, French hauturiers and Spanish vessels in Division VIa.
- (b) Medium mesh. The French "semi-industrial" trawlers, the Spanish "bakas" in Sub-area VII, the parejas in Division VIIa,b.
- (c) Small mesh. All French artisans and Spanish bakas and bous in Division VIIa,b.
- (d) French pelagic trawlers.
- (e) French "côtiers".
- (f) Lines and gill nets.

The immediate losses for each component of the fleet were then calculated.

For an increase to 80 mm these would be :

	%							
(a)	1	these vessels take 18% of the total landings						
(b)	21	"	"	"	23%	"	"	"
(c)	31	"	"	"	42%	"	"	"
(d)	12	"	"	"	5%	"	"	"
(e)	50	"	"	"	4%	"	"	"
(f)	0	"	"	"	8%	"	"	"

Overall, the immediate loss would amount to 20% of the landings in 1980.

An increase to 60 mm would entail much lower immediate losses, viz:

(a) 0, (b) 3% (c) 9% (d) 1% (e) 15% (f) 0.

Option 3 (a) would entail cutting fishing effort by 25%, but due to the large landings in 1980, 3 (b) would entail cutting effort by 43% in order to reduce the catch in 1982 to 30 000 tonnes.

Option 4 would entail cutting the fishing effort by 6% provided that the 80 mm mesh size were introduced and by 29% to reduce the catch in 1982 to 30 000 tonnes.

Option 5 would entail a cut-back in fishing effort of 21% to achieve 40 000 tonnes and by 40% to achieve 30 000 tonnes in 1982.

The general view of the Working Group was that the fishing pattern should be changed and the fishing intensity on the juvenile fish reduced.

The fact that the catch in 1980 was well above the TAC adopted by the EC implies that some general reduction of effort would be beneficial.

It was not possible for the Group to assess the spawning biomass; nevertheless it is clearly at a low level and any measure to regulate the fishery must also benefit the spawning stock.

Therefore, the Working Group favoured the adoption of regulatory measures in the direction of an increase in the mesh size and some reduction of effort.

The Working Group therefore recommends an increase in mesh size up to 80 mm for all components of the fleet and a reduction of fishing effort by at least 6% as the most adequate regulatory measure to allow the hake stock to recover as well as the stocks of the majority of other species associated, with the possible exception of Nephrops.

The Working Group points out that the immediate losses, although moderate for the whole of the fleet, can have a serious repercussion for certain components.

Other Species

The Working Group was requested to discuss the data needed for further assessments on monkfish, sea bream and flatfish in Sub-areas VII, VIII and IX.

As can be seen in Table 1.3 of the 1980 Hake Working Group Report (C.M. 1980/G:13), sea bream (including probably different species), megrim (including two species), monkfish (including 2 species), sole, plaice and probably witch in Sub-area VII are of great importance.

Sea Bream - Some years ago, French papers were presented to ICES dealing with pink sea bream (Pagellus bogaraveo), including catch and effort, biological and tagging data. Recently, a directed fishery by pelagic trawling on grey sea bream (Spondyllosoma cantharus) has been developed in France (Division VIIIA,b); detailed and updated routine and biological information is available.

Sole - Research programmes and routine work is going on in France. For Divisions VIIa, e, f and g the data obtained have been presented to the corresponding Working Groups. In Annex I data related to Division VIIIA,b are presented.

Plaice and Witch - No investigations are carried out on these species in the Sub-areas concerned by this Working Group.

Megrim - Despite the great importance of these species, above all in Sub-area VII, no research was carried out by the countries involved. Some Spanish biological data have been published on Lepidorhombus boscii in Division VIIIC and Sub-area IX.

Monkfish - Both species are rather abundant in Sub-areas VII, VIII and IX, particularly in Sub-area VII. French biological data have been published on Lophius piscatorius and Lophius budegassa, although there are great difficulties to obtain details of commercial landings separately.

The members of the Working Group were requested to collect all the available data and to develop the corresponding research programmes in order to improve the knowledge of these species for the next Working Group meeting.

2.0 SOUTHERN STOCK (ICES Divisions IXa and VIIIc)

2.1 Nominal Landing Trends

Table 2.1 shows the annual landings during 1961 to 1980, by country and gear.

According to the data, a small increase of the 1980 catches can be observed in relation to 1979. This increase is mainly due to artisanal gears (gillnet and longline). The increase of the Spanish longline landings in 1980 is due to a better statistical information for the Cantabrica area.

It should be noted that the TAC recommended for 1980 by ACFM was 10 000 tonnes, and a total of 21 900 tonnes were landed which represents an increase of more than 100%.

2.2 Fleet Composition

2.2.1 Portugal

The only available information concerns the trawl fleet. The artisanal fleet includes gillnets and lines with a large number of small inshore boats, but no data about their number, composition and effort are available.

The trawl fleet, working in Division IXa in 1980 comprised 119 trawlers, 77 stern- and 42 side trawlers. Their GRT varies between 70 and 400, with an average GRT of 170 and an average HP of 680. The greatest part of this fleet (90%) has an average GRT of about 150 (Table 2.2.1, Figure 2.2.1). The relation between GRT and HP is given in Figure 2.2.2.

The mean mesh size of cod-end was near to 40 mm. A trawler makes an estimated 122 trips per year, 2 fishing days per trip, 3 hauls per day and 4.4 fishing hours per haul.

2.2.2 Spain

The Spanish fleet working in Divisions IXa and VIIIc comprises several types of gear :

- trawl : "Bakas", "Bous" and "Parejas"
- artisanal : "Volanta" (gillnets), "Betas" (small gillnets) and longlines.

Table 2.2.2 shows for each gear the number of vessels, their mean horse power, GRT and total catch. The total number of trawlers working in 1980 was 287, gillnetters 416, and longliners 484. The Galician fleet

contains about 60% of the total trawlers which used a mesh size between 40-60 mm. The Cantabrica trawl fleet used mesh sizes between 60-70 mm.

Figure 2.2.3 shows the Spanish trawl fleet which worked in 1980 on the Portuguese coast. The total number was 86 with an average GRT of 170 and HP of 500.

2.3 Sampling Methods

2.3.1 Portugal

A biological sampling scheme for the Portuguese commercial landings started in October 1980 for the main species. Up to that time, sampling of the trawl and artisanal landings took place at the most important ports, but with irregular frequency. The number of fish measured, as well as the percentages of the weights landed were not made available to the Working Group for 1980 samples. A description of the new sampling scheme will be presented to the next Working Group meeting.

2.3.2 Spain

Table 2.3.1 provided the frequency of sampling at Spanish ports and the approximate number of fish measured in 1980.

2.4 Length Composition

The length compositions for Divisions VIIIc and IXa and split by countries and gears are given in Table 2.4.1.

At the foot of the table the mean weight of individual fish in the catch is given. The length composition of the Spanish trawls include an estimation of 1 000 tonnes of "carioca" (smaller than 25 cm) caught by the Galician fleet.

It can be seen in Table 2.4.1 that the mean weight of fish caught in the trawl fishery was around 100g and in the artisanal one around 1 000g, except for small Spanish gillnets (136 g). 97.5% of the catches of hake less than 30 cm were caught by trawl, which represents 85.7% of its landings.

2.5 Trends in Catch per Unit Effort (Table 2.5.1)

Figure 2.5.1 gives the cpue for Portuguese and Spanish trawl fleets. It seems that there was a small increase in the 1980 catch rate in several components of the fleet when comparing with recent years.

2.6 Indices of Recruitment

2.6.1 Portuguese coast

Figure 2.6.1 shows the numbers of juveniles per trawl hour, estimated from the groundfish surveys carried out by the R.V. "Noruega" (October 80/81, March 81) in Portuguese waters. It can be seen that the areas of higher concentrations of juveniles (< 25 cm) are situated to the west of Figueira Foz in the north and off Cape Sines in the south. Other areas of less importance occur near Viana Castelo in the north and Sagres in Algarve.

It must be taken into account that on the October 80/81 surveys a trawl net with 40 mm cod-ends was used. October seems to be the most suitable month in which to estimate the recruitment.

As in Spanish waters, the juveniles are found mainly between 100 and 200 m depth, although in some cases these concentrations extend beyond 200 m.

Those surveys confirm as areas of juvenile concentrations those proposed by ICES as closed areas.

2.6.2 Spanish waters

Indices of recruitment are given in Table 2.6.2. The 1980 index is greater than in recent years, but well below the 1974 level.

The areas that give higher levels of recruitment are Prior, Sisargas and Toriñana, correspondingly the first two were recommended as closed areas by ICES in 1980.

It is important to note that these concentrations of juveniles (less than 17 cm) were found at depths of less than 200 m.

In Figure 2.6.2 the values of the index of recruitment are shown, obtained in October 1980 in "Carioca 80" and "Plataforma Cantábrica" surveys on the Galician and Cantabrica shelf. It shows a progressive decrease of recruits from Galician to Cantabrica waters.

2.7 Indices of Abundance from Portuguese Groundfish Surveys

2.7.1 Sampling scheme

During the years 1979, 1980 and 1981 the Portuguese R.V. "Noruega" made 6 surveys along the Portuguese coast. Those surveys were

carried out in June and October 1979, March 1980*, May/June 1980, October 1980 and March 1981. Each cruise was of 3 weeks duration (≈ 60 hauls). The sampling method was the stratified random one. All of the area was divided into strata, between 20 and 500 m of depth. Each strata was divided into squares of 5 x 5 miles and at least 2 squares were sampled in each depth strata. The first 5 surveys contained 15 strata and the last one 36 strata. The net used was not a commercial one. The mean mesh size of the cod-end was 40 mm. The average speed of the trawl was 3 knots, each haul was of 1 hour's duration (when possible) and all the hauls were made in daylight.

2.7.2 Results

The indices of abundance used were the catch in weight per fishing hour and the relative biomass in tonnes. The biomass was estimated from the swept area method.

The results are shown in Table 2.7.2 as well as the corresponding sampling error.

2.8 Biological Data

2.8.1 Age determination of hake (see Section 1.8)

2.8.2 Selectivity

Table 2.8.2 presents some new data on hake selectivity made by Spain and Portugal. The Spanish experiments were made with 61 and 74 mm cod-end mesh sizes, in 1979 on the Atlantic shelf of the Iberian Peninsula (C.M. 1980/B:12) and in 1980 in Galician waters.

The Portuguese experiments were carried out off the Portuguese coast in November 1980 and March 1981. Two different research vessels were involved. As no detailed information concerning these experiments were available, the Working Group agreed to use the selectivity data used in 1980. (see Table 2.8.3).

*covered 9 strata

2.8.3 Weight at length

Table 2.8.4 provides 4 relationships between weight and length as well as the average weight at the mid-point of each length group.

The second relationship was used in the southern stock assessment made by this Working Group last year and was obtained from data collected in the Portuguese groundfish survey made in March 1980.

The third relationship results from the data collected on the R.V. "Noruega" in March, May/June and October 1980.

The Spanish relationship was obtained from samples caught in the Cantabrica area (Div. VIIIc) during June and September 1980.

It seems that all the relations are similar, therefore to simplify the assessments, the Working Group adopted the French one.

2.8.4 Sex ratio

The data were obtained on six surveys on the Portuguese coast, carried out in June, October 1979, March, June, October 1980 and March 1981. All the individuals above 19 cm have been examined, except in June 1979 (over 24 cm).

From a total number of 17 615 fish examined, 45% were females as is shown in Table 2.8.5. The results show a decreased number of females in the 20 to 45 cm length classes and an increased number of greater lengths.

2.9 Assessments

The Working Group was concerned that the 1980 TAC had been substantially exceeded and that the catch has a high proportion of very small hake (see Section 2.4).

The Working Group considered 5 options for possible regulation of the fishing in 1982:

- (1) to increase the mesh sizes up to 80 cm;
- (2) to increase the mesh size to 60 mm and to close the fishery during the period and in the areas of concentrations of juveniles (January-March; October-December).
- (3) to reduce the fishing effort to limit the catches to :
 - (a) 15 000 tonnes
 - (b) 10 000 tonnes (1980 TAC)
 - (c) 8 000 tonnes (1981 TAC)

(4) to increase the mesh size to 80 mm and to reduce the fishing effort to limit the catches to :

- (a) 15 000 tonnes
- (b) 10 000 tonnes
- (c) 8 000 tonnes

(5) to increase mesh size to 60 mm, to set closed areas and seasons and to reduce fishing effort to limit the catches to :

- (a) 15 000 tonnes
- (b) 10 000 tonnes
- (c) 8 000 tonnes

Option 1 - The estimated immediate losses for each component of the fleet were calculated for an increase in trawl mesh size to 80 mm.

These were :

	% of immediate losses	% of total landing
Portuguese trawl	66	11.2
Spanish trawl	41	28.5
Artisanal fleet	0	60.3
Total	19	

Option 2 - The immediate effects of option 2 were taken as similar to option 1.

Option 3 - This option would entail cutting fishing effort by :

- a) 32%
- b) 55%
- c) 61%

These reductions were considered due to the excessive landings in 1980.

Option 4 - This option would entail cutting fishing effort by :

- a) 16%
- b) 44%
- c) 52%

Option 5 - This option was taken as similar to option 4.

Therefore, the Working Group recommends as the most adequate measures to regulate this fishery to increase trawl mesh size up to 80 mm (or alternatively 60 mm and closed areas during the period of concentration of juvenile fish), and to reduce the fishing effort of all components of the fleets by about 40%.

Table 0.1 Nominal Hake catches (thousands of tonnes) for NEAFC Regions 2 and 3, 1936-1980 as reported to ICES.

YEARS	CATCH
1936 ¹	43.2
1937 ¹	52.5
1938 ¹	59.9
1939	-
1940	-
1941	-
1942	-
1943	-
1944	-
1945	-
1946	194.3
1947	179.7
1948	158.0
1949	130.6
1950	114.9
1951	128.1
1952	119.7
1953	109.8
1954	105.9
1955	143.0
1956	101.5
1957	113.3
1958	112.6
1959	110.9
1960	114.2
1961	133.8
1962	128.9
1963	133.2
1964	130.2
1965	120.6
1966	107.2
1967	107.0
1968	107.4
1969	100.6
1970	117.0
1971	62.4 ²
1972	110.0 ²
1973	109.4
1974	98.3
1975	102.9
1976	91.7
1977	66.7
1978	49.6
1979 ³	66.4
1980 ³	62.0

Mean 1936-38 = 51.8

Mean 1946-48 = 177.8

Mean 1949-65 = 120.8

Mean 1966-76 = 101.3

Mean 1974-76 = 97.6 (Before 200 miles jurisdiction)

Mean 1977-79 = 60.9

Mean 1978-80 = 59.3

¹Spanish catch assumed nil.

²Includes 17.6 thousand tonnes for Spain which were not reported by area but is assumed to have been taken in Regions 2 and 3.

³Preliminary; not reported to ICES.

Table 0.2 Nominal Hake catches (thousands of tonnes) as reported to ICES by country and area, 1961-1980.

YEARS	TOTAL	FRANCE						PORTUGAL	SPAIN					U.K.			OTHERS		
		TOTAL	IV+VI	VII	VIII	IX	IX	TOTAL	IV+VI	VII	VIII	IX	TOTAL	IV+VI	VII	TOTAL	IV+VI	VII	
1961	(133.4) ¹	35.0 ²	1.5	18.0	12.3	3.1	13.0	(72.4) ¹	.	.	40.6	31.8 ³	11.8	10.5	1.3	1.2	1.0	0.2	
1962	(128.3)	39.5 ²	0.7	19.4	14.8	3.1	6.4	(67.8)	.	.	32.0	35.8 ³	13.7	12.3	1.4	0.9	0.6	0.3	
1963	(132.5)	33.4 ²	1.5	14.9	12.4	3.2	6.9	(79.1)	.	.	39.3	39.8 ³	11.9	10.7	1.2	1.2	1.0	0.2	
1964	(129.7)	30.7 ²	3.2	11.3	13.0	2.9	9.0	(79.8)	.	.	34.0	45.8 ³	9.2	8.7	0.5	1.0	0.8	0.2	
1965	(120.0)	26.2 ²	3.7	11.7	10.7	-	10.4	(74.7)	.	21.0	7.1	46.6 ³	7.7	7.3	0.4	1.0	0.8	0.2	
1966	(106.6)	18.1	3.0	7.6	5.5	2.0	8.3	(73.2)	.	.	27.5	45.7 ³	5.9	5.3	0.6	1.1	0.9	0.2	
1967	(116.5)	25.9	2.9	9.6	11.0	2.4	7.6	(76.7)	.	.	31.6	45.1 ³	4.9	4.1	0.8	1.4	0.9	0.5	
1968	(106.4)	22.5	2.5	7.8	10.2	2.0	7.2	(69.7)	.	.	32.2	37.5 ³	5.4	4.5	0.9	1.6	1.3	0.3	
1969	(99.6)	21.3	2.9	7.9	8.8	1.7	6.6	(65.7)	.	.	27.1	38.6 ³	4.3	3.9	0.4	1.7	0.5	1.2	
1970	(116.4)	25.7	1.5	9.8	12.8	1.5	9.3	(76.1)	.	.	34.3	41.8 ³	3.2	2.7	0.5	2.1	1.9	0.2	
1971	(61.6)	23.6	0.8	9.1	13.1	0.6	8.0	(24.8)	0.9	7.8	14.0	2.1 ³	2.6	2.2	0.4	2.6	2.1	0.5	
1972	108.8 ⁴	21.8	0.4	8.8	12.6	-	8.7	73.2 ⁴	1.1	4.8	32.4	17.3	2.9	2.4	0.5	2.2	2.2	-	
1973	108.6	24.2	2.2	10.7	11.3	-	15.3	63.0	0.5	4.7	37.0	20.8	2.8	2.2	0.6	3.3	2.9	0.4	
1974	96.5	21.7	2.5	11.8	7.3	0.1	7.8	61.7	7.1	21.9	18.5	14.1	2.7	2.1	0.6	2.6	2.3	0.3	
1975	101.4	22.2	3.2	11.0	7.9	0.1	9.4	63.9	6.4	20.5	18.0	19.0	2.6	2.3	0.3	3.3	2.4	0.9	
1976	90.7	19.1	3.8	10.4	4.8	0.1	7.9	58.8	4.1	20.8	20.2	13.7	2.3	1.7	0.6	2.6	1.8	0.8	
1977	64.9	15.3	2.6	6.1	6.6	-	5.5	41.0	1.6	5.3	16.6	17.5	1.9	1.6	0.3	1.2	0.8	0.3	
1978	49.6	18.4	2.2	7.3	8.8	-	4.4	21.7	1.3	5.0	6.6	8.8	2.0	1.6	0.3	3.1	.	.	
1979	62.8	22.4	2.5	9.2	10.7	-	5.3	32.0	1.1	6.1	16.7	8.1	1.7	1.5	0.2	1.4	1.0	0.4	
1980 ⁵	62.0	24.4	2.8	5.5	13.1	-	8.3	26.4	1.1	3.3	8.4	13.6	2.3	1.8	0.5	0.6	0.4	0.2	

¹Numbers in brackets include unknown African catches for Spain (see footnote 3)

²Includes small amounts unreported by area.

³Data refer to port of landing, not area of capture (includes African catches).

⁴Includes 17.6 thousand tonnes for Spain which were not reported by area

⁵Preliminary; not reported to ICES

Table 1.1 Nominal catches (thousands of tonnes) for the Northern Hake stock (ICES Divisions IVa and VIa, Sub-area VII, and Divisions VIII a and b), as reported to ICES by country and areas, 1961-1980.

YEARS	TOTAL	FRANCE				SPAIN				U.K.			OTHERS		
		TOTAL	IVa+VIa	VII	VIII	TOTAL	IVa+VIa	VII	VIII	TOTAL	IVa+VIa	VII	TOTAL	IVa+VIa	VII
1961	85.4	31.8	1.5	18.0	12.3	40.6	.	.	40.6	11.8	10.5	1.3	1.2	1.0	0.2
1962	81.5	34.9	0.7	19.4	14.8	32.0	.	.	32.0	13.7	12.3	1.4	0.9	0.6	0.3
1963	81.2	28.8	1.5	14.9	12.4	39.3	.	.	39.3	11.9	10.7	1.2	1.2	1.0	0.2
1964	71.7	27.5	3.2	11.3	13.0	34.0	.	.	34.0	9.2	8.7	0.5	1.0	0.8	0.2
1965	62.9	26.1	3.7	11.7	10.7	28.1	.	21.0	7.1	7.7	7.3	0.4	1.0	0.8	0.2
1966	50.6	16.1	3.0	7.6	5.5	27.5	.	.	27.5	5.9	5.3	0.6	1.1	0.9	0.2
1967	61.4	23.5	2.9	9.6	11.0	31.6	.	.	31.6	4.9	4.1	0.8	1.4	0.9	0.5
1968	59.7	20.5	2.5	7.8	10.2	32.2	.	.	32.2	5.4	4.5	0.9	1.6	1.3	0.3
1969	52.7	19.6	2.9	7.9	8.8	27.1	.	.	27.1	4.3	3.9	0.4	1.7	0.5	1.2
1970	63.7	24.1	1.5	9.8	12.8	34.3	.	.	34.3	3.2	2.7	0.5	2.1	1.9	0.2
1971	50.9	23.0	0.8	9.1	13.1	22.7	0.9	7.8	14.0	2.6	2.2	0.4	2.6	2.1	0.5
1972	65.2	21.8	0.4	8.8	12.6	38.3	1.1	4.8	32.4	2.9	2.4	0.5	2.2	2.2	.
1973	72.5	24.2	2.2	10.7	11.3	42.2	0.5	4.7	37.0	2.8	2.2	0.6	3.3	2.9	0.4
1974	74.3	21.5	2.5	11.8	7.2	47.5	7.1	21.9	18.5	2.7	2.1	0.6	2.6	2.3	0.3
1975	72.9	22.1	3.2	11.0	7.9	44.9	6.4	20.5	18.0	2.6	2.3	0.3	3.3	2.4	0.9
1976	69.0	19.0	3.8	10.4	4.8	45.1	4.1	20.8	20.2	2.3	1.7	0.6	2.6	1.8	0.8
1977	41.8	15.3	2.6	6.1	6.6	23.5	1.6	5.3	16.6	1.9	1.6	0.3	1.1	0.8	0.3
1978	34.1	18.4	2.2	7.3	8.8	12.9	1.3	5.0	6.6	2.0	1.6	0.3	0.8	0.5	0.3
1979	48.7	22.4	2.5	9.2	10.7	23.9	1.1	6.1	16.7	1.7	1.5	0.2	0.7	0.3	0.4
1980 ⁺	40.1	24.4	2.8	8.5	13.1	12.8	1.1	3.3	8.4*	2.3	1.8	0.5	0.6	0.4	0.2

* VIIIIa, b only

+ not reported to ICES

Table 1.2 Revised catches (thousands of tonnes) for the Northern Hake stock (ICES Divisions IVa and VIa, Sub-area VII and Divisions VIII a and b) by country and area determined by the Hake Working Group, 1961-1980.

YEARS	TOTAL	FRANCE				SPAIN				U.K.			OTHERS		
		TOTAL	IVa+VIa	VII	VIIIa,b	TOTAL	IVa+VIa	VII	VIIIa,b	TOTAL	IVa+VIa	VII	TOTAL	IVa+VIa	VII
1961	95.6	42.0	5.3	20.7	16.0	40.6	.	.	40.6	11.8	10.5	1.3	1.2	1.0	0.2
1962	86.3	39.7	4.9	19.3	15.5	32.0	.	.	32.0	13.7	12.3	1.4	0.9	0.6	0.3
1963	86.2	33.8	4.0	16.2	13.6	39.3	.	.	39.3	11.9	10.7	1.2	1.2	1.0	0.2
1964	76.8	32.6	4.6	15.2	12.8	34.0	.	.	34.0	9.2	8.7	0.5	1.0	0.8	0.2
1965	64.7	27.9	3.3	13.0	11.6	28.1	.	21.0	7.1	7.7	7.3	0.4	1.0	0.8	0.2
1966	60.9	26.4	3.2	13.0	10.2	27.5	.	.	27.5	5.9	5.3	0.6	1.1	0.9	0.2
1967	62.1	24.2	3.2	9.9	11.1	31.6	.	.	31.6	4.9	4.1	0.8	1.4	0.9	0.5
1968	62.0	22.8	2.5	9.2	11.1	32.2	.	.	32.2	5.4	4.5	0.9	1.6	1.3	0.3
1969	54.9	21.8	3.5	10.9	7.4	27.1	.	.	27.1	4.3	3.9	0.4	1.7	0.5	1.2
1970	64.9	25.3	4.3	11.5	9.5	34.3	.	.	34.3	3.2	2.7	0.5	2.1	1.9	0.2
1971	51.3	23.4	3.3	10.7	9.4	22.7	0.9	7.8	14.0	2.6	2.2	0.4	2.6	2.1	0.5
1972	65.5	22.1	3.7	9.6	8.8	38.3	1.1	4.8	32.4	2.9	2.4	0.5	2.2	2.2	.
1973	79.5	24.0	3.2	12.3	8.5	49.4	2.4	17.9	29.1	2.8	2.2	0.6	3.3	2.9	0.4
1974	74.2	21.3	2.8	11.9	6.6	47.6	3.6	16.1	27.9	2.7	2.1	0.6	2.6	2.3	0.3
1975	74.5	22.2	3.3	12.1	6.8	46.4	4.9	15.8	25.7	2.6	2.3	0.3	3.3	2.4	0.9
1976	67.3	18.3	3.8	10.3	4.2	44.1	4.2	15.6	24.3	2.3	1.7	0.6	2.6	1.8	0.8
1977	51.2	17.2	2.8	7.6	6.8	31.0	1.6	13.0	16.4	1.9	1.6	0.3	1.1	0.8	0.3
1978	47.6	17.4	2.2	7.3	7.9	27.4	1.4	12.4	13.6	2.0	1.6	0.3	0.8	0.5	0.3
1979	52.1	20.5	2.5	7.1	10.9	29.2	2.4	11.6	15.2	1.7	1.5	0.2	0.7	0.3	0.4
1980 ²	53.1	24.4	2.8	8.5	13.1	25.6	2.2	6.6	16.8	2.3	1.8	0.5	0.8	0.3	0.5

¹⁾ Data for 1961-1972 not revised; revised figures for Sub-area VIII for 1973-1978 include data for VIIIa+b only.

²⁾ Preliminary.

Table 1.3.1 France 1980. Landings, tonnes (gutted) per port and per gear and the percentage discharged at ports where sampling takes place.

Ports	Sub-areas IV + VI	Sub-area VII					Division VIIla,b						Total
	Hauturiers	Hauturiers	Semi- industr.	Artisans bottom tr.	Pelagic trawl	Hauturiers	Semi- industr.	Artisans bottom tr.	Pelagic trawl	Gill nets	Lines	"Côtiers"	
Boulogne	152												152
Ports of the Channel		1		581									582
Douarnenez	143	199	203	15				3					563
Les Guilvinec		214		483		14		1 659		129			2 499
Concarneau	173	1 383	739	39		10		21		32		229	2 626
Lorient	1 828	332	2 219	69	32	52		29	369	185		384	5 499
Other ports of Brittany								830				128	958
Les Sables d'Olonne*			29	26			18	802*	358	734		137	2 104
Other ports of Vendée								825	90	320		33	1 268
La Rochelle*	87*	651*	14*	14*		368*	55*	288*	217*	392*		212	2 298
Marennes/ Oléron								310				308	618
Arcachon								262	338			7	607
Hendaye*									636*	60	140*	193	1 029
Total Landings (tonnes)	2 383	2 780	3 204	1 227	32	444	73	5 029	2 008	1 852	140	1 631	20 803
% landed at Sampling Ports	3.7	23.4	0.4	1.1	nil	82.9	75.3	21.7	42.5	21.2	100	sampled at sea	

*Sampling Ports.

Table 1.3.2 Spain 1980. Sampling ports and level of sampling

Ports	Sub-area VI	Sub-area VII		Division VIIIa,b		
	Trawl	Trawl	Long line		Trawl	
	(trios and parejas)	(bacas)		(bous)	(bacas)	(trios and parejas)
La Coruña		4 per month	1 per 3 months			
Santander				1 per month	1 per month	
Ondarroa	1 per month				1 per month	
Pasajes	1 per month			1 per month	1 per month	1 per month
Approx. number of fish sampled by year	2 000	10 000	600	5 000	8 000	1 000

Table 1.4.1 Length compositions (thousands of fish) for hake landings from ICES Divisions IVa + VIa and Sub-area VII by country and vessel class in 1980.

Length Classes (cm)	Divisions IVa and VIa					Sub-area VII								
	England & Wales	France Hauturier	Spain	Scot- land		England & Wales	France				Spain			
	Trawl	Trawl	Trawl		Total IVa+VIa	Seine & Trawl	Hauturier Trawl	Semi-industr. Trawl	Artisan		Artisan Pel. Trawl	Bakas Trawl	Long Line	Total VII
5-9										11				11
10-14										369				369
15-19										1 974				1 974
20-24			15.8		15.8				118	656				778
25-29			47.2		47.2	6.4	1	1 158	965		4	11.2		2 158.6
30-34	0.4	+	126.0		126.4	64.2	27	4 011	1 378		16	321.8		5 819.0
35-39	2.1	10	110.4		122.5	190.6	86	2 325	585		17	1 345.4		4 549.0
40-44	8.0	20	56.6		84.6	206.8	322	337	210		19	1 661.2		2 756.0
45-49	10.9	60	94.6		165.5	105.6	462	168	146		7	1 341.0	17.2	2 246.8
50-54	8.2	112	70.2		190.4	40.8	369	159	87		2	668.0	29.0	1 354.8
55-59	8.5	141	116.8		266.3	20.4	273	199	54		1	310.0	61.6	919.0
60-64	10.9	259	116.0		385.9	17.5	196	131	25		1	191.6	44.4	606.5
65-69	8.7	153	229.8		391.5	9.9	153	51	16			166.6	36.0	432.5
70-74	5.3	127	135.2	No Data	267.5	14.2	156	12	18		1	129.2	78.6	409.0
75-79	2.9	140	78.0		220.9	6.9	86	16	12			77.0	77.0	274.9
80-84	2.7	63	44.0		109.7	4.8	42	8	8			36.8	80.4	180.0
85-89	1.3	41	18.8		61.1	2.0	35	15	5			20.4	56.4	133.8
90-94	1.8	19	10.8		31.6	2.7	19	37	4			10.2	17.2	90.1
95-99	0.8	40	18.4		59.2	0.8	14	27	4			4.2	8.6	58.6
100-104	0.8	15			15.8	1.1	9	2	4			3.4	3.4	22.9
105+	0.4	1			1.4	0.3	3	1	1			1.4	1.8	8.5
Total N.	73.7	1 201	1 288.6		2 563.3	695.0	2 253	8 657	3 640	3 010	85	6 299	512	15 151
R.F. Tonnes	139	2 788	2 170		5 097	525	3 253	3 749	1 436		37	5 100	1 526	15 626
Calc. Tonnes	136	2 887	2 161		5 184	507	3 285	3 590	1 362	127	35	5 096	1 525	15 527
Mean Weight (g)	1 886	2 321	1 684		1 988	755	1 444	433	395	42	435	810	2 983	566

Table 1.4.2 Length compositions (thousands of fish) for hake landings from ICES Division VIIIA,b
by country and vessel class in 1980

Length Classes (cm)	Division VIIIA,b										TOTAL	
	France								Spain			
	Hauturiers	Semi-industr.	Artisans Landings	Trawl Discards	Pelagic Trawl	Artisans Côtiers Landings	Côtiers Discards	Gillnets	Lines	Parejas & Trios		Bous & Bakas
5 - 9				266			114					380
10 - 14				6 484			1 162					7 646
15 - 19				19 561			2 201			280	640	22 682
20 - 24	+	10	2 141	11 925	122	822	3 256			494	5 954	24 724
25 - 29	1	99	6 637		733	2 473		1		1 688	9 962	21 594
30 - 34	3	77	3 643		1 875	2 231		14		1 194	3 848	12 885
35 - 39	12	56	2 532		920	920		10		952	3 394	8 796
40 - 44	57	22	1 373		752	274		8	4	576	3 382	6 448
45 - 49	127	4	620		304	117		5	35	328	3 640	5 180
50 - 54	89	4	284		107	52		13	82	254	1 502	2 387
55 - 59	64	3	302		68	70		50	31	294	1 086	1 968
60 - 64	39	2	240		109	44		78	2	240	644	1 398
65 - 69	31	+	70		76	17		213	2	68	310	787
70 - 74	16	+	70		46	9		272	1	34	256	704
75 - 79	6	+	7		17			146	1	8	42	227
80 - 84	2	+	4		3			62		+	20	91
85 - 89	1	+	1		1			12			8	23
90 - 94	+	+	+		+			4			+	4
95 - 99	+		+		+			1				1
100 - 104	+		+		+							
Total Number	448	277	17 924	38 236	5 133	7 029	6 733	889	158	6 410	34 688	117 525
R.F. Weight (tonnes)	519	85	5 884	1 709	2 349	1 908	345	2 167	164	2 770	14 106	32 006
Calc. Tonnage	507	77	5 397	1 614	2 203	1 729	327	2 219	163	2 720	13 970	30 926
Mean Weight (g)	1 158	307	328	45	458	271	51	2 438	1 038	432	407	271

Table 1.5.1 Trends in fishing effort exerted on the Northern stock by country, sub-area and type of vessel

Sub-area				VII			VIII		VII and
Division	IVa and VIA							VIIIa,b	VIIIa,b
Country	Eng.+ Wales	Eng.+ Wales	France	Eng.+ Wales	Eng.+ Wales	France	France	France	France
Vessel Type	Motor	All	Hauturier	Motor	All	Hauturier	Hauturier	Hauturier	Art.
Gear	Trawl	Trawl	Trawl	Trawl	Trawl	Trawl	Trawl	Trawl	Trawl
Year	(1)	(2)	(3)	(1)	(2)	(3)	(3)	(3)	(3)
1961	41.8	145	34.3	10.7	231	103.4	100.8	71.1	173.0
1962	41.7	136	39.2	10.5	262	118.2	103.7	78.0	176.2
1963	41.4	143	40.2	14.0	243	135.7	102.9	81.5	174.6
1964	44.3	156	61.1	12.6	252	164.9	106.7	83.3	181.4
1965	43.5	149	37.4	12.5	257	209.5	116.7	83.3	188.9
1966	42.2	142	86.5	12.3	254	163.4	115.3	105.2	192.2
1967	38.2	125	58.1	12.5	249	165.2	125.1	107.9	204.2
1968	46.3	149	49.4	13.7	275	171.8	130.6	111.9	210.0
1969	36.4	119	81.7	13.4	295	164.7	142.3	61.5	202.2
1970	23.2	83.9	90.2	10.8	255.3	154.5	154.3	48.7	235.9
1971	29.4	107.2	77.5	11.2	288.8	150.3	169.8	56.7	246.0
1972	48.7	142.1	88.2	10.2	254.6	146.8	173.8	59.6	250.1
1973	41.3	122.8	99.1	14.2	272.1	185.8	183.9	49.1	272.9
1974	35.7	104.2	108.6	9.0	211.0	160.9	207.0	37.6	301.8
1975	37.5	117.9	119.3	9.8	248.4	168.0	271.2	30.4	314.9
1976	46.5	139.2	116.7	9.2	230.0	174.8	N/A	24.4	323.9
1977	55.8	184.3	170.4	8.6	206.4	154.0	N/A	12.1	328.1
1978	55.1	165.5	173.7	7.9	199.6	137.5	N/A	8.9	329.0
1979	29.1	104.5	163.3	8.2	217.0	131.8	N/A	11.5	N/A
1980	16.7	64.7	101.7	10.9	278.1	145.6	N/A	7.5	N/A
\bar{X} all years	39.7	130.0	89.8	11.11	249.0	155.3	146.9	56.5	239.2
\bar{X} 61-63	41.6	141.3	37.9	11.7	245.3	119.1	102.4	76.9	174.6
\bar{X} last 3	33.6	111.6	146.2	9.0	231.6	138.3	220.7	9.3	327.0
% change	-19	-21	+286.6	-23.1	-5.6	+13.9	+115.5	-87.9	+87.3

Units (1) Tonne hours $\times 10^{-6}$, (2) Hours $\times 10^{-3}$, (3) HP days $\times 10^{-2}$

Table 1.6.1 Trends in landings per unit effort for trawl fisheries in ICES Divisions IVa and VIa, Sub-area VII and Divisions VIIa and b by area, country and vessel class, 1961-1980.

YEAR	IVa + VIa		VII				VIIa,b	
	FRANCE ¹	U.K. ²	FRANCE ¹		U.K. ²	SPAIN ³	FRANCE ¹	
			HAUTURIERS	ARTISANS			HAUTURIERS	ARTISANS
1961	155	151	142.2	41.9	88.9	.	174.4	37.3
1962	124	162	110.8	36.7	105.3	.	159.0	31.2
1963	101	150	83.3	29.5	74.8	.	136.2	25.4
1964	74	128	65.5	25.5	33.9	.	124.8	20.6
1965	89	104	43.0	26.6	15.0	.	106.5	19.7
1966	37	61	53.2	21.9	20.0	.	75.1	20.9
1967	54	48	39.4	16.9	20.0	47.3	77.8	22.6
1968	50	41	40.7	11.7	73.7	57.4	75.1	21.6
1969	43	44	52.8	13.9	35.1	55.8	69.9	23.6
1970	48	45	60.2	17.0	25.9	76.0	78.4	40.6
1971	42	17	57.2	16.6	23.5	98.9	95.2	25.6
1972	42	9	47.0	19.5	24.7	54.0	90.6	21.1
1973	33	6	51.1	20.7	21.1	55.8	83.5	25.7
1974	26	6	57.2	19.4	34.3	51.9	82.4	18.0
1975	27	5	56.6	21.5	33.5	45.1	62.5	22.0
1976	29	4	43.1	.	29.0	53.1	63.3	.
1977	23	4	34.5	.	22.0	56.2	53.7	.
1978	17	3	41.3	.	24.6	59.4	74.7	.
1979	15	2	30.0	.	21.6	.	70.8	.
1980	21	4	46.3	.	37.2	.	66.8	.
\bar{x}_{61-63}	126.7	154.3	112.1	36.0	89.7	-	156.5	31.3
$\bar{x}_{\text{last 3 yrs. in series}}$	16.0	3.0	42.2	20.5	27.8	56.2	70.8	21.9
% change	-87	-98	-62	-43	-69	-	-55	-30

¹Catch in kg per hundred horsepower days

³Port of La Coruña only

²Catch in tonnes per million tonne hours

Table 1.6.2 Evolution of landings, effort and cpue (kg per 100 HP days) of Hauturiers and Artisans trawling in Division VIIIa,b which landed their catches at La Rochelle.

Year	Hauturiers			Artisans		
	Landings (tonnes)	Effort 100 HP days	cpue	Landings (tonnes)	Effort 100 HP days	cpue
1966	2 932	42 132	69.6	N/A	N/A	N/A
1967	2 926	35 929	81.5	N/A	N/A	N/A
1968	2 313	28 129	82.2	N/A	N/A	N/A
1969	1 601	22 779	70.3	N/A	N/A	N/A
1970	1 417	18 075	78.4	N/A	N/A	N/A
1971	2 227	21 495	103.6	268	21 538	12.5
1972	2 052	20 790	98.7	251	16 917	14.8
1973	1 734	18 703	92.7	399	17 540	22.7
1974	838	10 692	78.4	226	19 095	11.8
1975	791	10 004	79.0	404	19 938	20.2
1976	654	10 084	64.9	130	18 659	7.0
1977	349	7 423	47.0	397	22 604	17.5
1978	459	5 542	82.9	363	15 521	23.4
1979	543	6 829	79.5	263	10 780	24.4
1980	368	4 752	77.4	288	12 399	23.2

Table 1.7.1 Catch/effort of the smallest market category (22 - 26 - 35 cm) at La Rochelle as an index of recruitment in Divisions VIIIA and VIIIB

Year	Year Class	Landings per Unit Effort	
		Div. VIIIA	Div. VIIIB
1968	1966	12.7	23.9
1969	1967	7.1	15.0
1970	1968	23.5	23.4
1971	1969	6.4	9.1
1972	1970	2.9	9.0
1973	1971	14.2	16.0
1974	1972	2.5	5.3
1975	1973	18.3	11.8
1976	1974	3.6	3.1
1977	1975	9.4	9.1
1978	1976	9.8	11.5
1979	1977	8.4	11.5
1980	1978	6.0	11.8
		8.4	11.0 \bar{x} 1977-80

Table 1.7.2 Recruitment indices in the Bay of Biscay (R.V. "La Pelagia") Numbers per square mile

Year	Div. VIIIA	Div. VIIIB
1977	233 \pm 73	
1978	227 \pm 58	256 \pm 56
1979	328 \pm 146	257 \pm 54
1980	258 \pm 75	53 \pm 20
	261	189 \bar{x} 1977-80

Table 2.1 Revised catches (thousand of tonnes) for the Southern hake stock (ICES Divisions VIIIC and IXa) by country and area adopted by the Working Group

Year	Total	Portugal (IXa)			Spain (IXa + VIIIC)			France (Divs. VIIIC and IXa)
		Total	Trawl	Artisanal*	Total	Trawl	Artisanal*	
1961	**	7.5	4.6	2.9	**	**	**	0.7
1962	**	7.5	5.1	2.4	**	**	**	0.7
1963	**	8.1	5.5	2.6	**	**	**	0.6
1964	**	10.5	6.4	4.1	**	**	**	0.7
1965	**	12.1	7.9	4.2	**	**	**	0.8
1966	**	9.6	5.4	4.2	**	**	**	0.6
1967	**	7.8	4.0	3.8	**	**	**	0.6
1968	**	8.0	3.8	4.2	**	**	**	0.4
1969	**	7.1	2.8	4.3	**	**	**	0.5
1970	**	9.9	5.8	4.1	**	**	**	0.2
1971	**	9.5	4.9	4.6	**	**	**	0.1
1972	26.7	9.4	4.4	5.0	17.3	10.2	7.1	0.0
1973	35.6	14.6	7.7	6.9	20.8	12.3	8.5	0.2
1974	23.4	9.2	3.8	5.4	14.1	**	**	0.1
1975	31.9	11.0	4.6	6.4	20.8	**	**	0.1
1976	26.1	9.6	3.3	6.3	16.4	**	**	0.1
1977	15.8	6.4	1.7	4.7	9.2	**	**	0.2
1978	14.8	5.2	1.5	3.7	9.5	5.9	3.6	0.1
1979	17.5	6.2	2.0	4.2	11.3	7.2	4.1	0.0
1980	21.9	8.3	2.4	5.9	13.6	6.3	7.3	0.0

* Gillnets and longlines

** Unknown

Table 2.2.1 Portuguese trawl fleet composition fishing
in 1980 (Division IXa)

GRT Group	Number of Boats	$\overline{\text{HP}}$
70 -	2	305.0
80 -	3	370.0
90 -	4	334.8
100 -	6	340.2
110 -	5	384.2
120 -	10	503.0
130 -	7	480.6
140 -	3	603.3
150 -	6	665.8
160 -	4	625.0
170 -	13	685.0
180 -	21	744.8
190 -	23	925.2
200 -	6	1 176.7
280 -	1	800.0
350 -	1	550.0
380 -	2	770.0
400 -	2	837.5
Total	119	{ 77 Stern 42 Otter

Table 2.2.2 Spanish fleet composition and catches
(Divisions IXa and VIIIc)

Cantabrica

	Trawl			Artisanal		
	Bakas	Bous	Parejas	Gillnets	Longlines	Others
Catches(t)	464	702	109	700	2 308	*
Number	29	16	8 x 2	36	314 ²⁾	215
HP	724	1 007	503 x 2	83	135	176
GRT	209	254	182 x 2	12	26	31

North Galicia

	Trawl		Artisanal			Others
	Bakas	Parejas	Volantas	Betas	Longlines	
Catches(t)	1 070 ¹	225	551	81	1 640	**
Number	60	6 x 2	42	118	80	
HP	465	493 x 2	164	24	235	
GRT	180	200 x 2	37	5	55	

South Galicia

	Trawl	Artisanal			
	Bakas and Bous	Volantas	Betas	Longlines	Others
Catches(t)	2 149 ¹	928	158	1 019	**
Number	104	40	180	90	
HP	454	284	50	115	
GRT	150	74	6	20	

South Atlantic Coast

	Bakas	Others
Catches(t)	538	**
Number	50	
HP	436	
GRT	129	

* are included in longline and gillnet
 ** not known
²⁾ 81 of those boats work 85% in EC waters and 15% in the southern stock.

¹⁾ Includes an estimate of 1 000 tonnes of illegal Galician catches (<25 cm).

Table 2.3.1 Sampling frequency at Spanish ports in 1980 and the approximate number of fish measured in 1980

Southern Stock (VIIIc and IXa)

	Trawl	Longline	Gillnet	Small Gillnet
Marin	3 per month	1 per 3 months	1 per 3 months	2 per month seasonal
Riveira	2 per month			
Aguino				
Muros				
Finisterre		1 per 3 months	1 per 3 months	1 per 3 months seasonal
La Coruna	3 per month			
Cedeira				
Cariño				
Santander	1 per month	1 per month		
Ondarroa	1 per month			
Pasajes	1 per month			
Fuenterrabia				
Approximate number of fish sampled by year	12 000	1 500	500	3 000

Table 2.4.1 Length composition of the catches (Number $\times 10^3$)
by fishing gear in 1980 (Divisions IXa and VIIIC)

Length classes (cm)	Portugal		Spain				Total
	Trawl	Artisanal	Trawl*	Small Gillnet	Gillnet	Longline	
5 -	1		859				860
10 -	947		17 630				18 577
15 -	6 343		11 071	118			17 532
20 -	7 149	34	8 662	707			16 553
25 -	4 851	213	7 720	579	4		13 367
30 -	1 610	417	3 233	258	21		5 539
35 -	693	627	2 284	66	20	26	3 716
40 -	233	884	1 273	22	40	370	2 822
45 -	123	1 153	811	3	126	845	3 060
50 -	23	881	267	2	298	1 094	2 565
55 -	16	744	121	-	427	1 034	2 342
60 -	16	531	81	1	361	497	1 487
65 -	6	266	56		132	178	638
70 -	2	99	28		58	54	241
75 -	2	51	1		17	32	102
≥ 80 -		49	2		3	10	64
Total	22 015	5 949	54 099	1 756	1 506	4 141	89 465
Nominal Weight (t)	2 453	5 859	6 258	239	2 179	4 967	21 955
Current Mesh Size (mm)	40	-	40-60	-	-	-	
\bar{w}	111	985	116	136	1 446	1 199	245

*) Includes an estimation of 1 000 tonnes of illegal catches (≤ 25 cm).

Table 2.5.1 Cpue for trawl fishermen in Divisions IXa and VIIIc by countries during the period 1961 - 1980

Year	France	Spain			Portugal
		La Coruña	Muros	Riveira	
1961	174	-	-	-	24.3
1962	151	-	-	-	23.8
1963	123	-	-	-	31.2
1964	102	-	-	-	34.7
1965	107	-	-	-	42.9
1966	78	-	-	-	31.0
1967	63	-	-	-	19.7
1968	54	-	-	-	17.3
1969	69	-	-	-	11.9
1970	67	-	-	-	22.4
1971	87	-	-	-	16.7
1972	53	-	-	-	15.6
1973	108	-	-	-	20.9
1974	102	-	-	-	11.0*
1975	93	36.0	-	-	13.2*
1976	67	30.3	-	-	9.8*
1977		34.3	-	26.8	4.5*
1978		25.2	22.1	20.6	4.3*
1979		34.9	26.8	28.2	5.3*
1980		31.7	31.5	31.8	6.5*

*) estimated

cpue France : $\text{kg} \times 10^{-2} \times (\text{HP} \times \text{day})^{-1}$

cpue Spain : - La Coruña: $\text{kg} \times 10^{-2} \times (\text{HP} \times \text{day})^{-1}$

Muros, Riveira : kg/day

cpue Portugal : kg/hour

Table 2.6.2 Indices of hake recruitment (number of hake < 17cm per trawl hour)

Year	1974	1975	1976	1977	1979	1980
Average index	1 152	198	254	96	158	487
Maximum value	4 552	1 027	1 094	662	326	1 807

Indices of hake recruitment by area and year
(Divisions VIIIc and IXa)

Year	1974	1975	1976	1977	1979	1980
<u>Area</u>						
Estaca-Ribadeo	1 217	150				339
Prior	1 582	444			157	1 315
Sisargas	1 389	508	58	32		398
Toriñana	1 934	288	234	11		248
Finisterre-Corrubedo	170	17	74	41		292

Table 2.7.2 Indices of abundance of hake estimated from the Portuguese surveys (R.V. "Noruega")
(Division IXa)

Surveys	\bar{y} (kg/hr)	$S\bar{y}$	B (tonnes)	S_B
June 1979	11.75	1.88	4 142.1	663.4
October 1979	9.38	1.33	3 433.7	488
March 1980	12.22	2.61	2 781.8	593.1
May-June 1980	15.64	2.8	6 157.3	1 102.4
October 1980	12.44	1.85	4 900.1	728.4
March 1981	12.74	1.99	4 005.5	670.1

Table 2.8.2 Selectivity of hake (nylon codend)

Country	Mesh Size (mm)	Unweighted logistic fit			Weighted logistic fit			Graphical method		
		SF	L_{50}	25-75	SF	L_{50}	25-75	SF	L_{50}	25-75
Spain	42.65	4.09	17.45	4.46						
	61.0	4.04	24.6	7.8	4.11	25.1	8.7			
	74.0	4.69	34.7	13.5	4.85	35.9	15.4			
Portugal	35.2				4.9	17.2	4.95	4.8	17.0	4.5
	38.6				4.03	15.5	6.65	4.2	16.0	7.0

SF = Selection factor

L_{50} = 50% Selection length

25-75 = 25% - 75% Selection range

Table 2.8.3 Selectivity adopted with respect to retention

	(1)	(2)	(3)
Length class	42.5 mm	61 mm	80 mm
5 -	.041	.010	.001
10 -	.198	.036	.005
15 -	.587	.122	.018
20 -	.891	.337	.063
25 -	.979	.651	.197
30 -	.996	.873	.474
35 -	.999	.962	.768
40 -	1.000	.989	.924
45 -		.997	.978
50 -		.999	.994
55 -		1.000	.998
60 -			1.000
l_{25}	13.75	21.0	28.66
l_{75}	19.82	29.41	37.11
SF	3.9	4.1	4.1
L_{50}	16.5	25.1	32.9
a	-5.84	-6.46	-8.55
b	0.35	0.26	0.26*

(1) Cruise of the "Roselys" 1976

(2) Cruise of the "Cigala" 1979

(3) Derived from (2)

(*) Derived from mesh of 61mm

Table 2.8.4 Length/weight relationship. Hake

Length classes (cm)	Average weight (kg)			
	France (1)	Portugal (2)	Portugal (3)	Spain (4)
5-9	.002	.003	.003	.002
10-14	.012	.012	.013	.011
15-19	.034	.035	.035	.032
20-24	.073	.078	.077	.072
25-29	.136	.146	.142	.135
30-34	.227	.246	.237	.230
35-39	.352	.384	.368	.362
40-44	.517	.569	.540	.539
45-49	.727	.805	.759	.767
50-54	.989	1.101	1.033	1.054
55-59	1.309	1.464	1.365	1.406
60-64	1.691	1.900	1.764	1.832
65-69	2.142	2.417	2.234	2.339
70-74	2.668	3.022	2.781	2.935
75-79	3.276	3.724	3.481	3.626
80-84	3.993	4.528	4.138	4.422
85-89	4.785	5.443	4.958	5.330
90-94	5.676	6.476	5.880	6.358
95-99	6.673	7.636	6.911	7.514
100-104	7.782	8.929	8.058	8.807
105-109	9.009	10.363	9.327	10.244

(1) $W = .00513 L^{3.074}$ Hake Working Group 1979 (May, 1979)

(2) $W = .00458 L^{3.12819}$ Hake Working Group 1980 (Portuguese R.V. "Noruega" in March 1980)

(3) $W = .00541 L^{3.07006}$ Portuguese R.V. "Noruega" in March, May/June and October 1980

(4) $W = .00366 L^{3.17365}$ Santander 1980 (June and September)

Table 2.8.5 Hake sex ratio (% females)

Southern Stock

Length classes (cm)	♀♀	♂♂ ♀♀	% ♀♀
20 -	3 302	1 068	45.3
25 -	2 205	4 907	44.9
30 -	1 205	2 801	43.0
35 -	706	1 651	42.8
40 -	289	722	40.0
45 -	78	241	32.4
50 -	63	126	50.0
55 -	43	58	74.1
60 -	23	25	92.0
65 -	8	8	100.0
70 -	6	6	100.0
75 -	1	2	50.0
Total	7 929	17 615	45.0

Figure 1.2 Northern Stock, Spanish fleet composition 1980

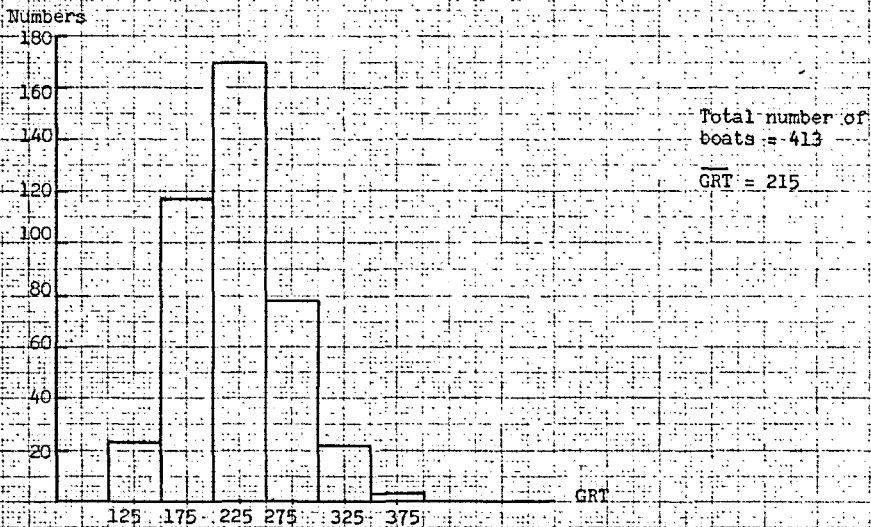
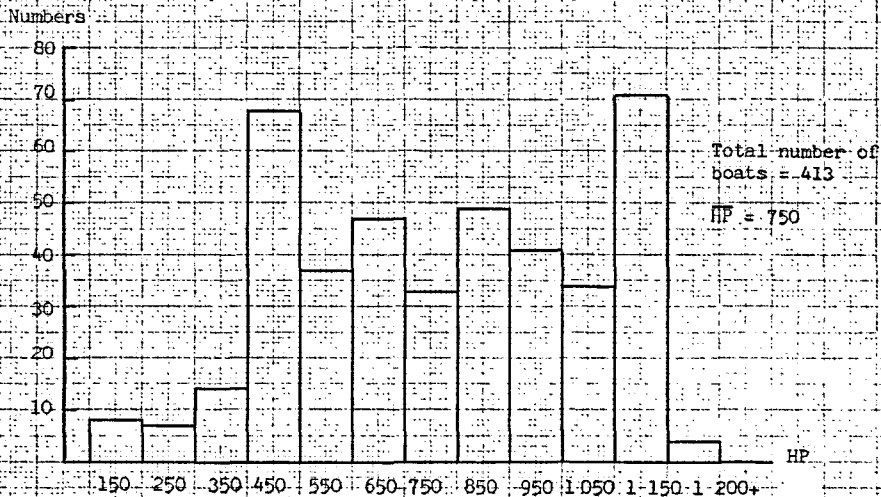
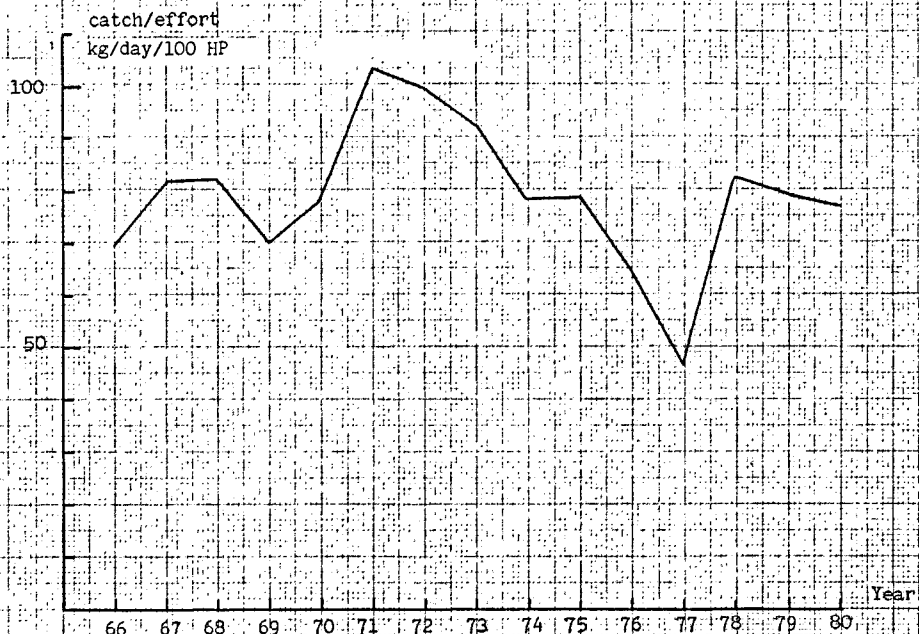


Figure 1.6.1 Catch/effort of the "hauturiers" trawlers of La Rochelle in Div. VIIa, b.



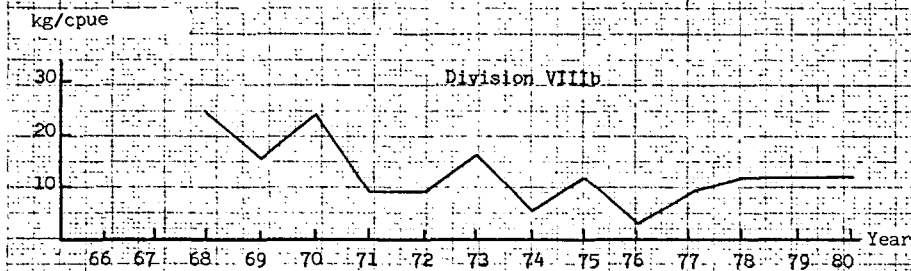
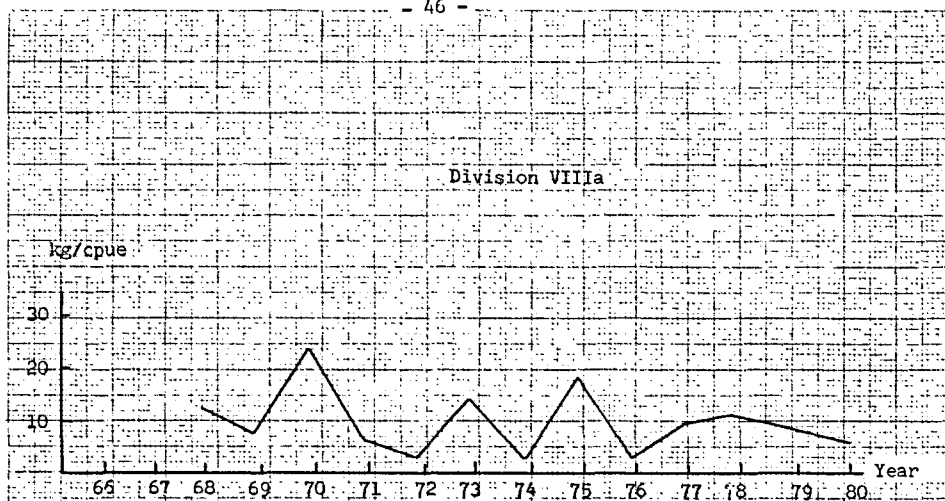


Figure 1.6.2 Cpu of smallest category (22 - 26-35 cm) at La Rochelle

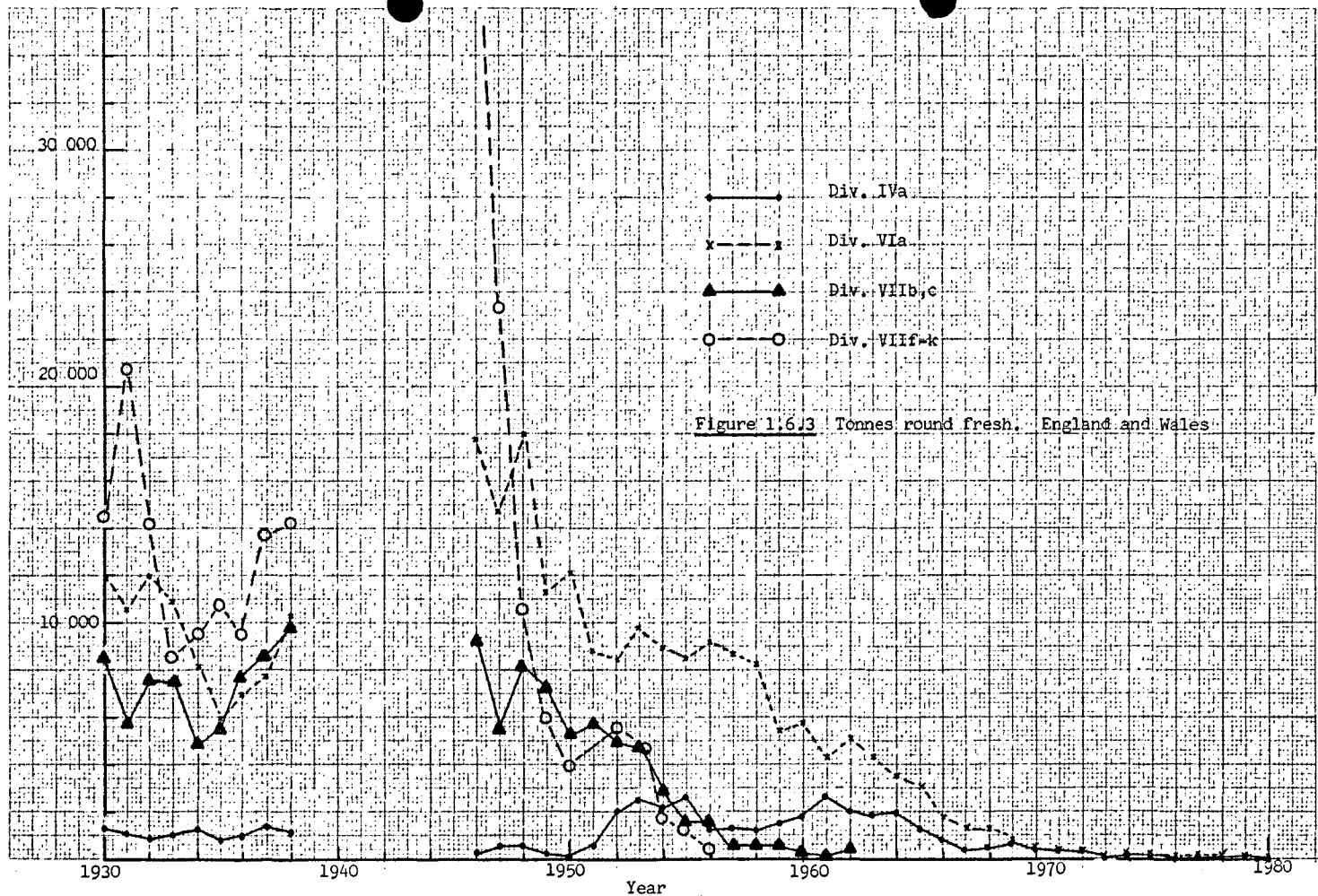
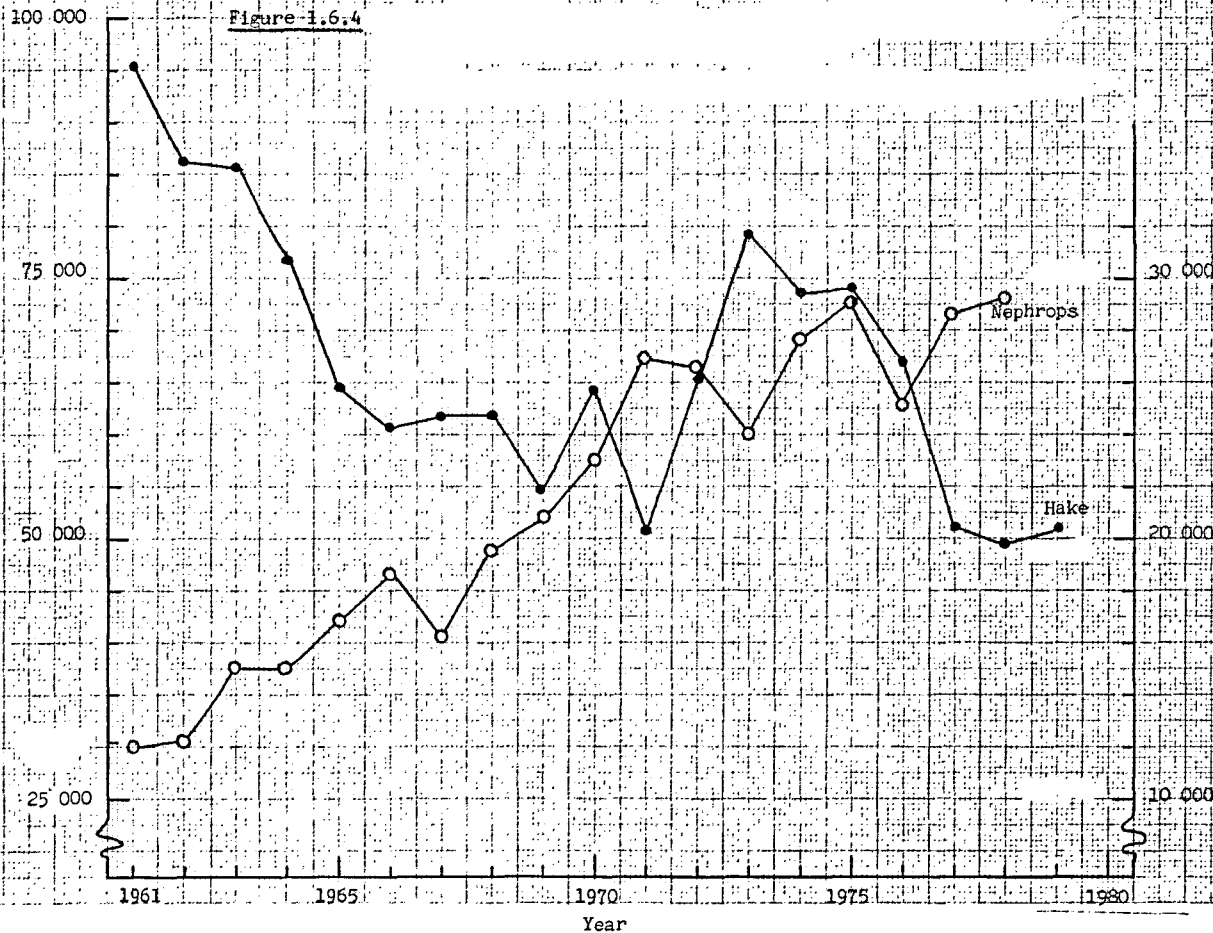


Figure 1.6.3 Tonnes round fresh. England and Wales

Figure 1.6.4

Hake: Tonnes from ICES Divisions IVa, VIa, VIIa and VIIIa
(Table 1.2 1980 Working Group Report)



Nephrops: Tonnes from Sub-areas IV, VI, VII and VIII 2 years before

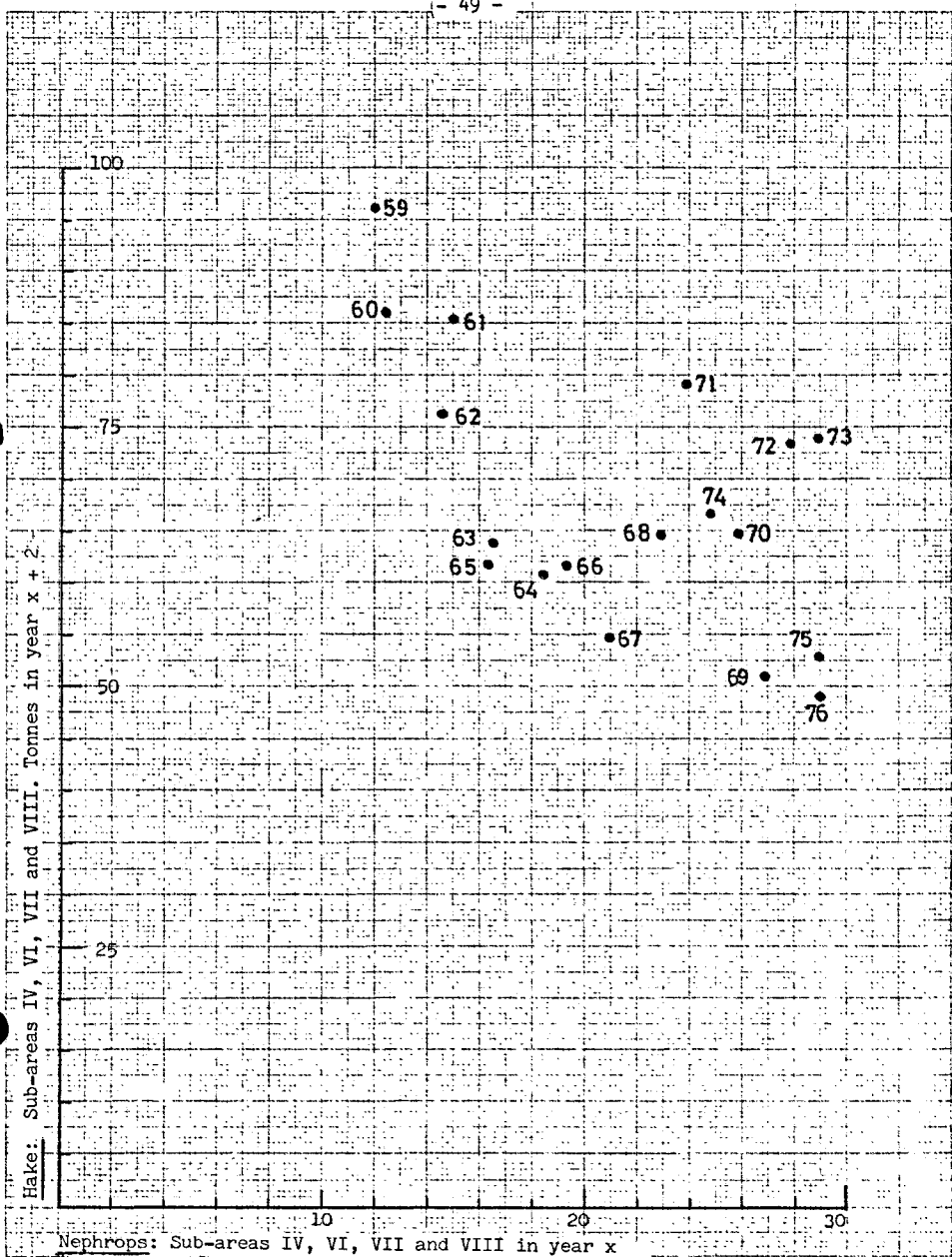


Figure 1.6.5

No. of Vessels

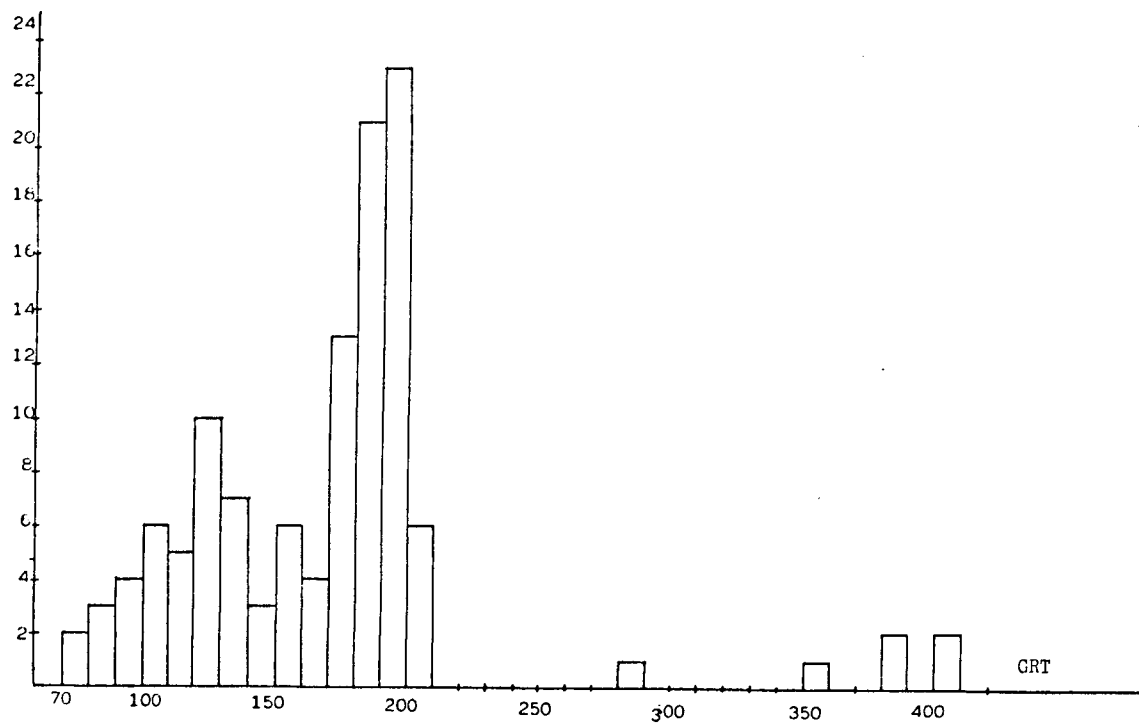


Figure 2.2.1 Composition of the Portuguese fishing fleet operating in ICES Division IXa during 1980.

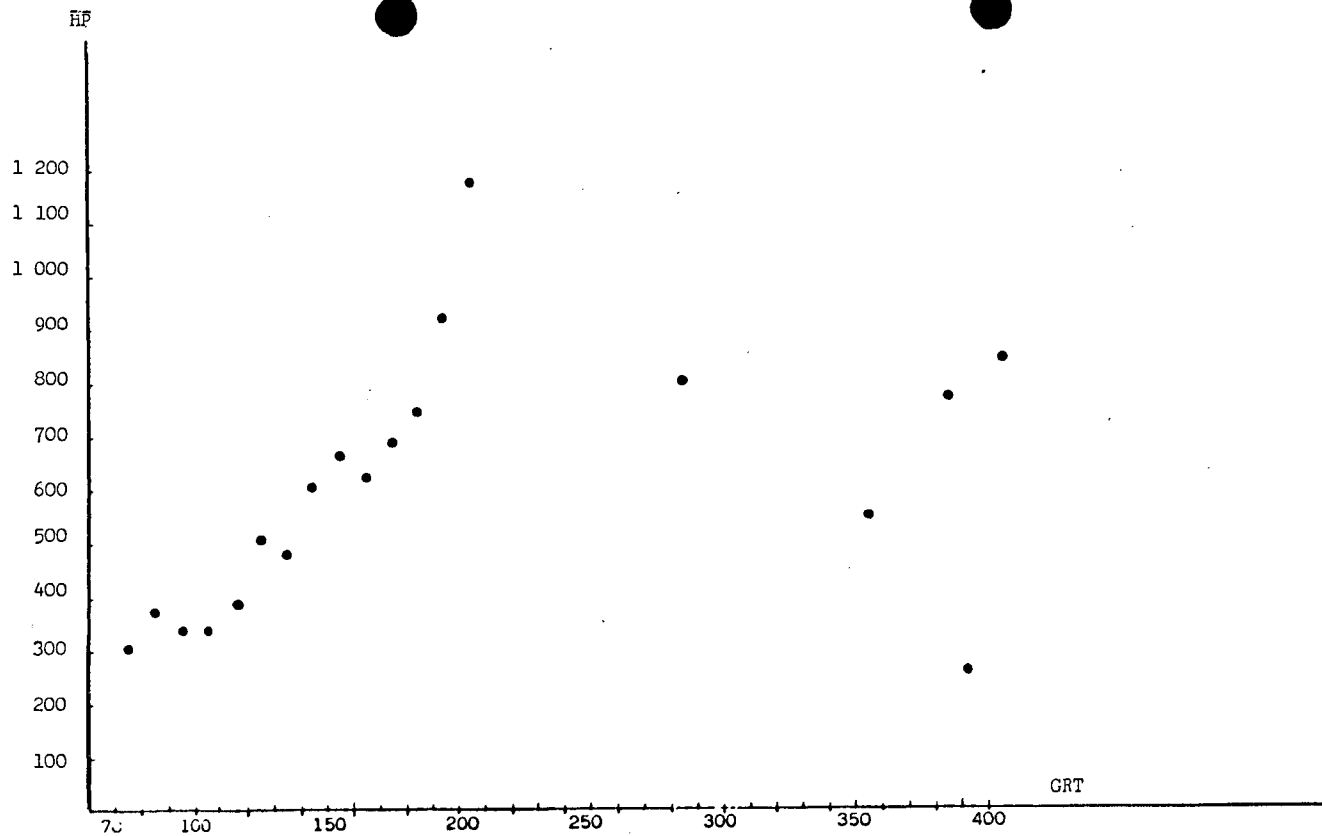
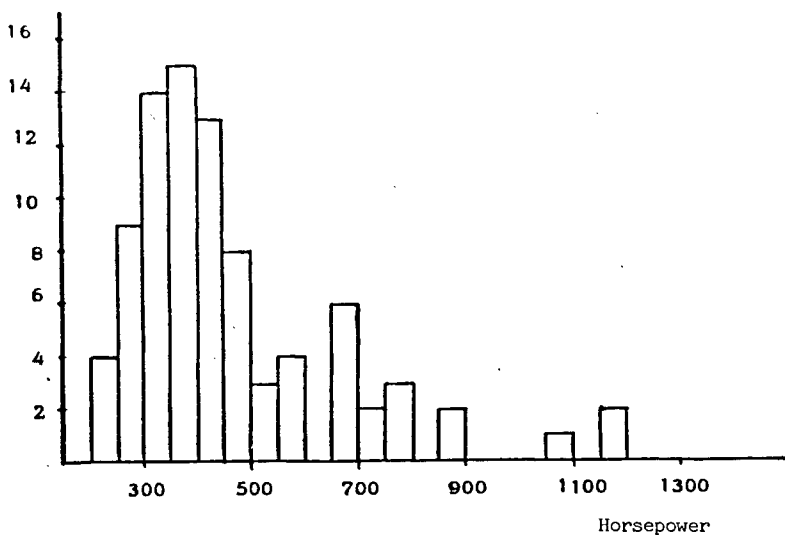


Figure 2.2.2 Relationship between HP and GRT of the Portuguese fishing fleet operating in ICES Division IXa in 1980

No. of vessels



No. of vessels

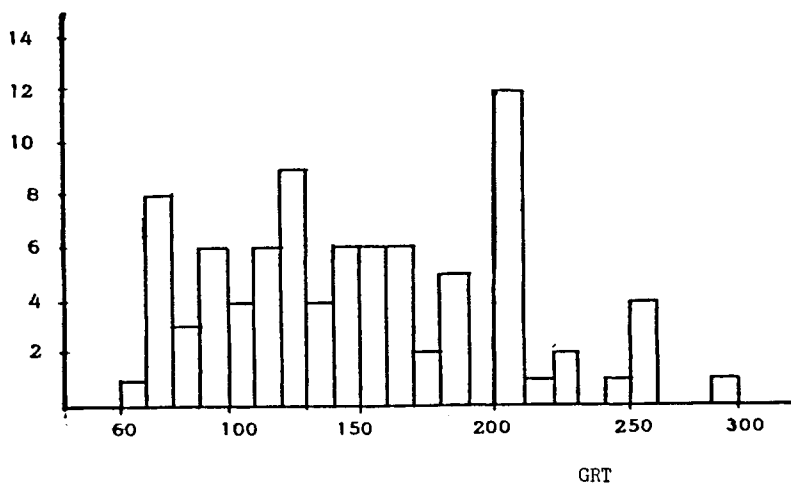


Figure 2.2.3 Spanish fishing fleet composition working in ICES Division IXa in Portuguese waters in 1980

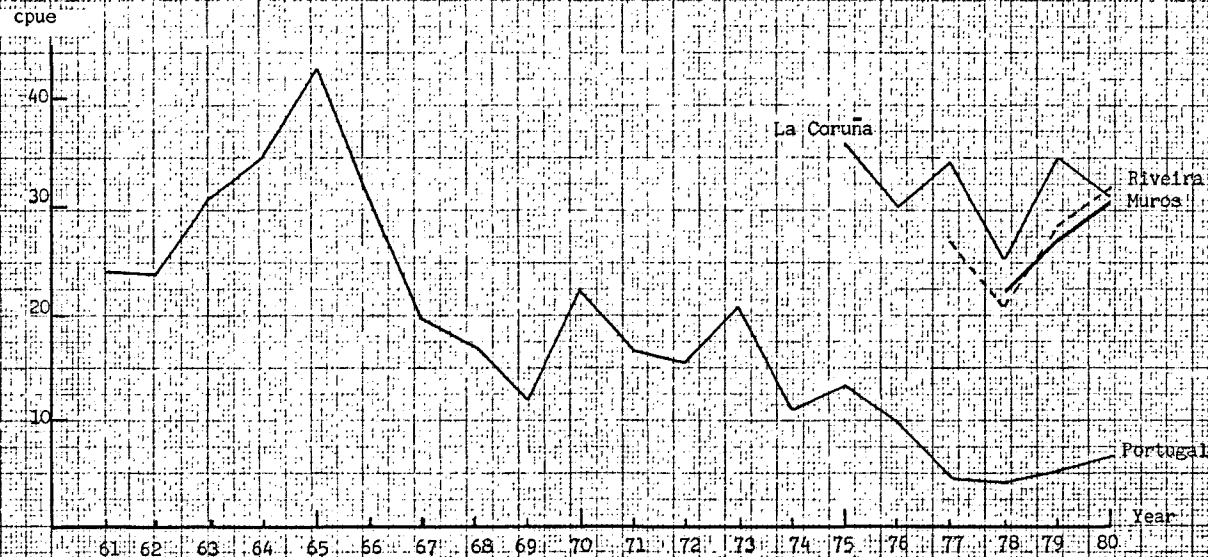


Figure 2.5.1 Hake Southern Stock (Divisions IXa and VIIIc) Cpu for trawl fishery

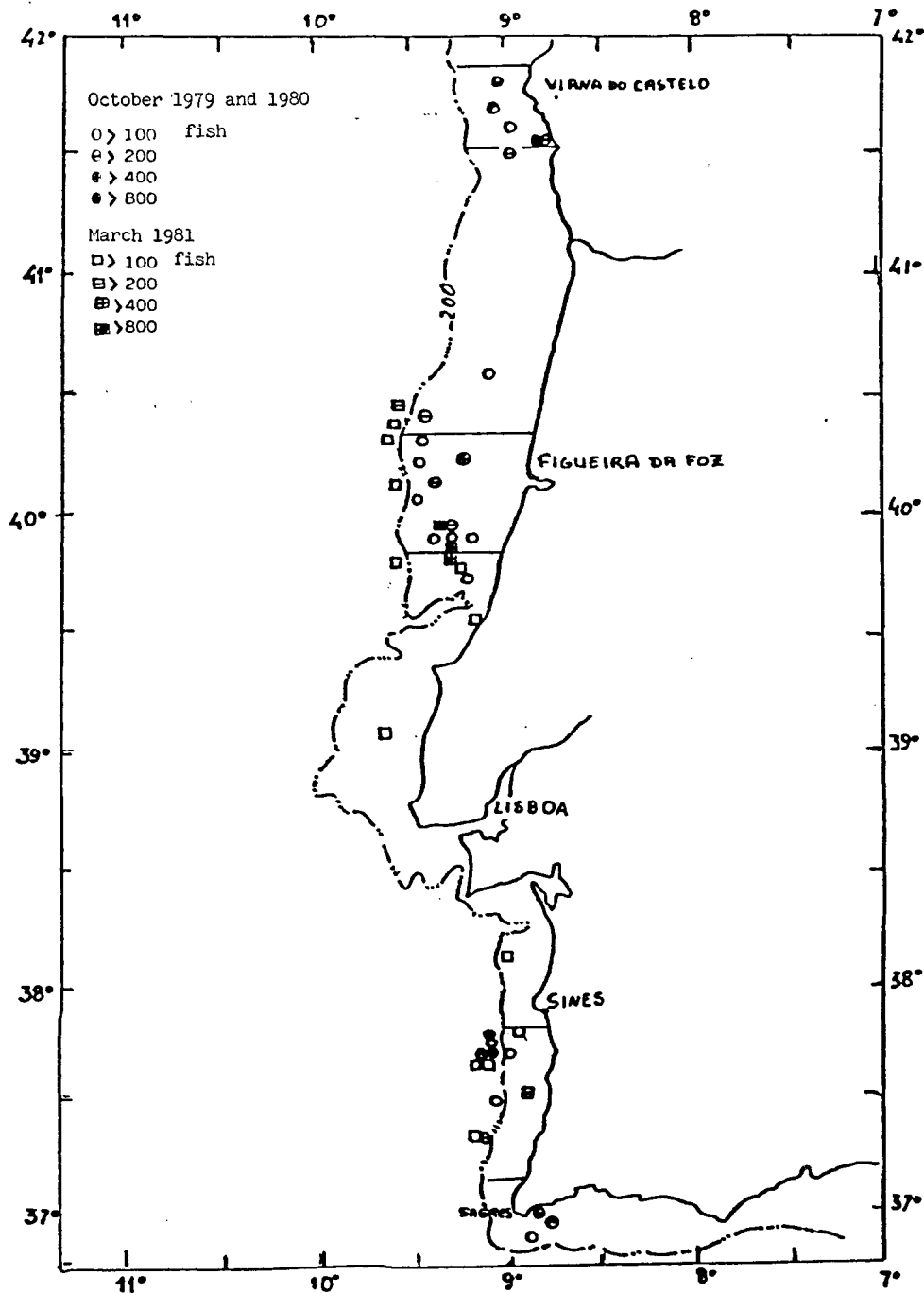


Figure 2.6.1 Number of juveniles (less than 25 cm) per trawl hour (October 1979, October 1980 and March 1981).

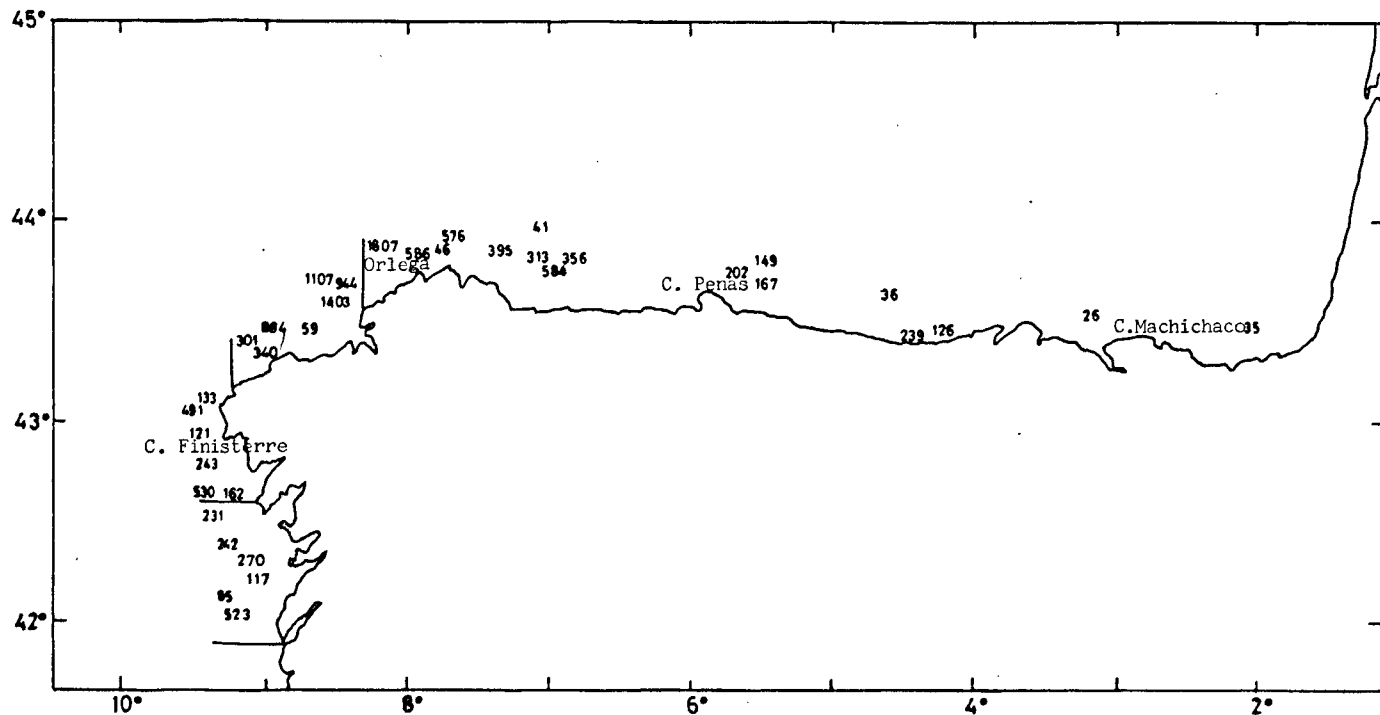


Figure 2.6.2 Cruises "Carioca 80" and "Plataforma Cantabrica" (October-November 1980). Number of O-group hake (less than 17 cm) per hour fishing. The two zones proposed for closure between October and March are shown.

ANNEX

FRANCE

Sole

Sole is yet the object of research programmes and routine work in France. For Divisions VIId and e the data are presented to the North Sea Flatfish Working Group and for Divisions VIIa - VIIg to the Irish Sea and Bristol Channel Working Group. What follows only concerns the Bay of Biscay and has not been, until now, regularly reported to any ICES Working Group.

Catches

For the ports of the Atlantic coast from Le Guilvinec to Bayonne and during the period 1966-1980 the landings have been as follows :

Year	Landings (tonnes)
1966	1 330
1967	1 454
1968	1 435
1969	1 449
1970	1 982
1971	2 412
1972	2 177
1973	2 182
1974	2 486
1975	2 416
1976	2 655
1977	2 663
1978	2 167
1979	2 158
1980	2 254

On the whole, four types of boats participate in this fishery :

- the "artisans" trawlers (10 - 50 GRT)
- the "côtiers" trawlers (<10 GRT)
- the shrimp trawlers (<10 GRT)
- the small gillnets (<10 GRT)

In 1980 and for the Atlantic ports from Auray to Bayonne (totalling 1 900 tonnes of the 2 254 tonnes mentioned above, their landings were respectively :

Artisan trawlers	1 339 tonnes
Côtiers trawlers	425 tonnes
Shrimp trawlers	75 tonnes
Gillnets	61 tonnes

The quality of these statistics differs according to the ports and the gears. The landings of the three last types of boats that often sell their fish outside the market are underestimated.

Fishing Effort

Effort data have been compiled since 1961 for the trawlers, but the same observations as in the previous paragraph must be formulated concerning their quality.

Sampling (see Annex, Figure 1)

The catches of artisan trawlers are sampled since 1970 in La Rochelle and since 1979 at Les Sables d'Olonne (these two ports contribute by about 45% to the total French Atlantic production).

In 1980, this sampling has been carried out at sea on board some côtiers trawlers of La Rochelle and shrimp trawlers from the Ile d'Oléron. Moreover, the quarterly-based cruises of the R.V. "La Pelagia" give the catch composition (before discarding) on the fishing grounds of the artisan trawlers of the main ports. During the same year, the following age-readings have been achieved :

Artisan trawlers	1 077
Côtiers trawlers	75
Shrimp trawlers	114

The age composition of these three types of boats is given in Annex Figure 1.

Selectivity

Selectivity of the trawls used by the artisans has been studied by R. Guichet (C.M.1979/B:13). Selection factors of 3.6 and 3.7 have been calculated.

Biology

Reproduction. The spawning season extends from January to May in the whole area of the Bay of Biscay. The spawning grounds are in the depths of 30 - 100 m and the eggs have been mainly caught over the depths of 50 - 70 m.

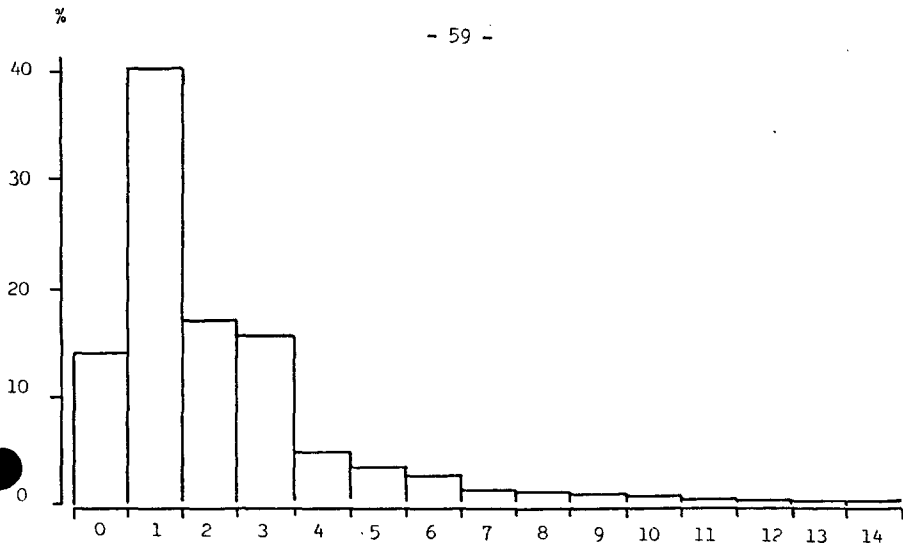
Nursery grounds. Their identification has started in 1976. They are limited to the littoral areas. The following have mainly been identified as nurseries (from north southwards): the Bay of Vilaine, the Estuary of the Loire, the Bay of Bourgneuf, the "Pertuis Charentais" (region between the Ile de Ré, Ile d'Oléron and the coast) and the Estuary of the Gironde.

Migrations. Tagging experiments have been carried out on the nursery grounds (age group II mainly) :

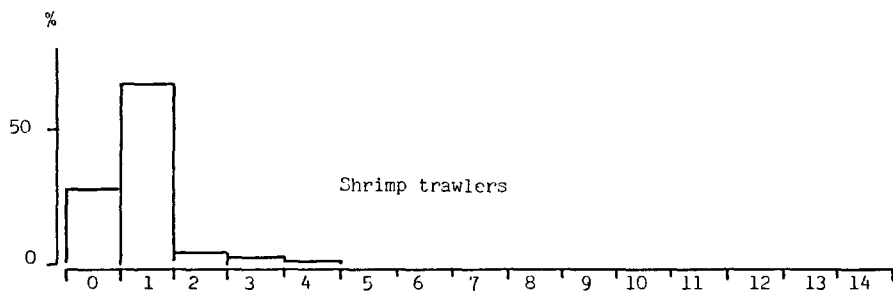
1978	193 individuals
1979	1 000 individuals
1980	3 000 individuals

Concluding Remarks

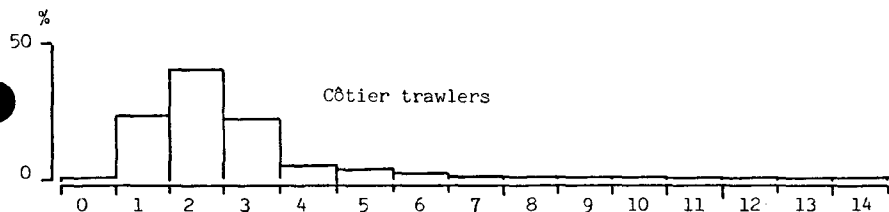
A first trial of the Jones' method seems to show that the conclusions are strongly dependent on the catch estimates of the shrimp and côtier trawlers, as well as on the length composition of their catches. An improvement in the coverage of their landings and in sampling of the catch must be recommended.



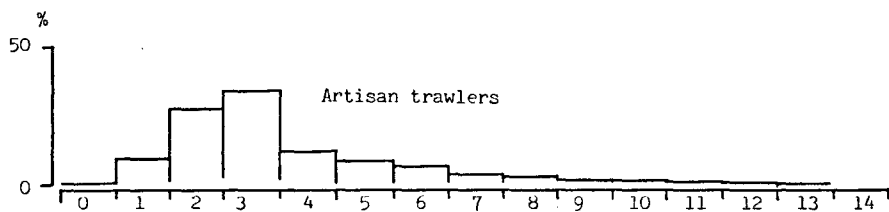
Annex Figure 1 Age composition of the sole catches in the Bay of Biscay (1980)



Shrimp trawlers



Côtier trawlers



Artisan trawlers

Annex Figure 2 Age composition of the sole catches by gear in the Bay of Biscay (1980)