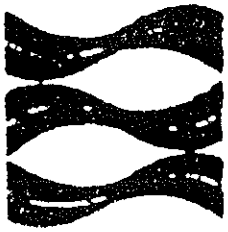

ROINN NA MARA

THE CLOSURE OF HERRING SPAWNING GROUNDS IN THE CELTIC SEA AND DIV VIIJ.

by

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The development of the demand for roe from the Celtic Sea has resulted in an intensification of the fishery for herring while the shoals are on the spawning beds. Stocks at this time are at their most vulnerable and uncontrolled fishing could lead to a repetition of the disaster of the 1970s. At the same time, no effort must be spared in maximising the profit from such a lucrative fishery.

The problems arise from the fact that the type of herring required by the Japanese market is very specific and large quantities of unsuitable fish may be caught and discarded. Furthermore, because fishing takes place in the breeding area, there is an obvious risk of seriously disrupting all spawning.

This paper presents some of the aspects that must be considered so that on the one hand maximum catches may be obtained and on the other the long-term survival of the fishery may be guaranteed. In particular, the reasons for the closure of selected spawning areas are explained.

In recent years the herring fishery off the south coast of Ireland has undergone considerable change. The total catch which can legally be taken each year is now regulated by a combination of seasonal and boat quotas. In addition the market for herring has changed from one which provided frozen and salted herring for European customers to one which is now almost totally dependent on the Japanese demand for "roe" herring. Roe herring are those mature herring in which the ovaries are just on the point of spawning. Only the ovaries are used by the Japanese market; the remainder of the fish must be processed in some other form.

It has become evident that in recent years the demand for herring has decreased considerably and it is now difficult to dispose of any herring other than those in good condition. Under these circumstances it is becoming increasingly important to ensure that as much as possible of the total catch is taken at a time when it is in peak condition and provides maximum benefit to fishermen and processors.

The need for the present regulations and management of this fishery is clearly evident because of the collapse of the stock in the late seventies and the subsequent closure of the fishery from 1977-1982. The main objectives of the regulations are

(1) to contain the total annual catch within the scientifically advised range;

(2) to ensure a degree of protection for herrings during the time that they are actually spawning;

(3) to distribute the catch in such a way that procesors have a continuous supply during the season;

(4) to distribute the total catch equally among the boats participating in the fishery.

The first two of these could be considered as biological objectives in managing a roe fishery. It has become clear from other roe fisheries - particularly those on the Pacific coasts of the United States and of Canada - that the management of a roe fishery presents two conflicting objectives. These can be defined as

1) the necessity to afford protection to herring shoals during spawning;

2) the necessity of conducting the fishery at a time when the financial returns to the industry are at a maximum.

The conflict arises because the financial returns to the industry are at a maximum at the same time as the herrings are commencing to spawn. It seems clear that the future

management of Celtic Sea/VIIj fishery will continue to be based on the closure of certain spawning areas and on regulating the catches according to the condition of the fish - whether they are ripe (spawning) or hard (non spawning). Spawning areas may therefore be closed on a long term basis to provide protection for the spawning population or for short periods to ensure that only fish suitable for processing are landed. Short term closures may be introduced in the course of the season for two reasons:

1) Herring in certain areas may not be ripe and consequently not suitable for the Japanese market. In this case catches may be discarded at sea or else graded ashore, where unsuitable fish are rejected.

2) Herring in certain areas may contain large amounts of small fish which have not yet spawned and catches are again discarded.

This paper deals mainly with the implications which arise from the introduction of closures introduced to provide adequate protection of the spawning stock. Closures introduced because herrings are unsuitable for processing (because of their size or their condition) are not considered further.

Closed Spawning Areas

Because of the development of roe fisheries in recent years in areas other than in the Celtic Sea and Div. VIIj (eg in the English Channel and in the Irish Sea) the 1989 Herring Assessment Working Group of the International Council for the Exploration of the Sea (ICES) discussed the closure of spawning grounds in general (Anon. 1989).

Spawning ground closures have been common for some time in the management of herring fisheries and are currently in operation in four main herring fisheries: - the Celtic Sea/Div VIIj; off Kilkeel and on the Douglas Bank in the Irish Sea; off the Yorkshire and Northumberland coasts in the North Sea and off the Scottish coast in Div. VIa.

In the past there has not been a particularly keen demand for spawning fish, because of their poor condition and low fat content. Closures of spawning grounds could therefore be introduced relatively easily as an auxiliary management measure. However the development of a roe market and the decrease in consumption of herring fillets has meant that spawning fish have become extremely valuable, and thus there has been an increasing interest in the exploitation of herring on the spawning grounds. A closure of a spawning ground therefore prevents fishermen from taking herring at the time when they are most valuable. If such closures are to be maintained, or if new closures are to be introduced there must be strong justification for doing so. The reasons generally advocated for spawning ground closures have been:

1) There has been a heavy concentration of fishing effort on a spawning ground which has led to an increased vulnerability of the shoals. It has been found that where there was more than one spawning unit within a management area there could be a very heavy fishing effort on one particular spawning ground - which has led to very high fishing mortality.

2) In addition to increased fishing on the spawning grounds the actual process of spawning can be disrupted by continual interference of the shoals and by damage to the eggs which have already been deposited on the spawning beds.

3) Excessive mortality may be caused when fishing dense concentrations of herring because a) catches in excess of boat quotas has lead to discarding and b) catches have been so heavy that nets have been burst.

Herring scientists have generally been reluctant to recommend closures of spawning areas on the basis that if the fishery is properly managed and the TAC adequately enforced then the spawning stock should be adequately protected. However there are a number of specific situations in which the disadvantages of fishing on spawning grounds are so great that a closure of the spawning grounds is justified. These include:

a. A management unit controlled by an overall TAC, composed of several discrete spawning stocks. In this situation the spawning grounds of some stocks are more vulnerable than others. Therefore closure of the more vulnerable spawning grounds will prevent an uneven distribution of fishing effort and possible extinction of some of the more vulnerable stocks.

b. A stock managed by a precautionary TAC which is above the recommended level. In this situation it is wise to introduce a closed spawning season as an extra precaution. This will prevent the stock from being decimated if an unexpected drop in recruitment occurs and the TAC is found to have been too high.

c. Where excessive discarding is known to occur in the spawning fishery. Closure here is a precautionary measure to ensure that some spawning takes place in spite of the loss of large numbers of potential breeding fish.

d. A fishery managed by quotas where enforcement is found to be inadequate and where the total catch tends to exceed the TAC. In this case, a closure of spawning grounds is required as a back up measure, to ensure that a certain proportion of the stock gets a chance to spawn.

For the Celtic Sea/VIIj area the 1987 ICES Herring Assessment Working Group (Anon. 1987) suggested that fishing should be prohibited on one of the main spawning grounds each season. This suggestion was made because of concern about the cessation of surveys and because of the intense fisheries on the main spawning area. Although weekend closures of larval abundance had been introduced for a number of years as a voluntary measure by the Irish fleet, it was felt that this was not in itself adequate to ensure protection because of the development of the roe fishery.

A system of spawning ground closures was introduced on a rotational basis in 1988. The limits of the closed zones were identified by the larval surveys carried out by the MFV Stelimar in 1983 and 1984 which indicated the main spawning areas and times of peak spawning in those years. The closed seasons and areas which were introduced and which will operate until 1991 were defined as follows and are shown in Fig. 1.

Season	Prohibition Date	Area
1988/89	15 October - 31 October	Bounded by 09° 00'W. Long; 51° 15' N. Lat; 11° W. Long. 52°30' N.Lat. and by the Irish coast
1989/90	1 Nov - 16 Nov	Bounded by 09° 00'W. Long; 51° 15'N, Lat; 08° W. Long; 51° 15'N. Lat. and the Irish coast
1990/91	15 Jan - 31 Jan	Bounded by 52° 30'N. Lat; 06° 00'W. Long; 52° N. Lat. and the Irish coast.

The closures have been introduced on a trial basis, and their effectiveness will be reviewed each year. It is possible that the selected times may turn out not to be fully appropriate because of changes which may occur in the spawning times of herring in various areas. In addition the intensity of spawning may also vary from area to area. For example heavy concentrations of herring were found in the area off Cork Harbour in January 1989 and appeared to be spawning. This area had not been fished for spawning herring in the previous few seasons and it is possible that shoals had not been using it as a spawning area in recent years. The duration of the spawning closures (approximately 14 days) may not therefore be sufficiently long if herring shoals change their spawning times.

CONCLUSIONS

As already stated the overall aim of these spawning closures is to reduce the total fishing mortality by restricting fishing at a time when shoals are particularly vulnerable. This obviously cannot be achieved if the fishing activity is merely transferred from one area to another. If this happened fishing effort could, in fact, increase if suitable shoals were located in adjacent areas. [This may have been the case when the fishery developed off Cobh in January 1989 when the area off Dunmore East was closed]. However the times selected for closures were intended to ensure as far as possible that fish would not be simultaneously spawning in an adjacent area.

It is extremely important therefore that spawning activity and distribution should be monitored closely during the whole season - particularly during the closed periods. For this purpose information will be necessary about the maturity distribution of catches on a weekly basis and it will be necessary to carry out trial fishing and larval surveys in the closed areas during the closed season. This will give an indication of the extent of spawning that is taking place and how effective the closures are. This type of information will be collected during the 1989/90 and 1990/91 seasons and will be evaluated in the stock assessments in 1990 and 1991.

These investigations will provide more comprehensive information on how the spawning stock is reacting to the present fishing intensity and how effective these conservation measures are proving. It may then be necessary to extend them or to alter the areas or duration of the closures.

REFERENCES

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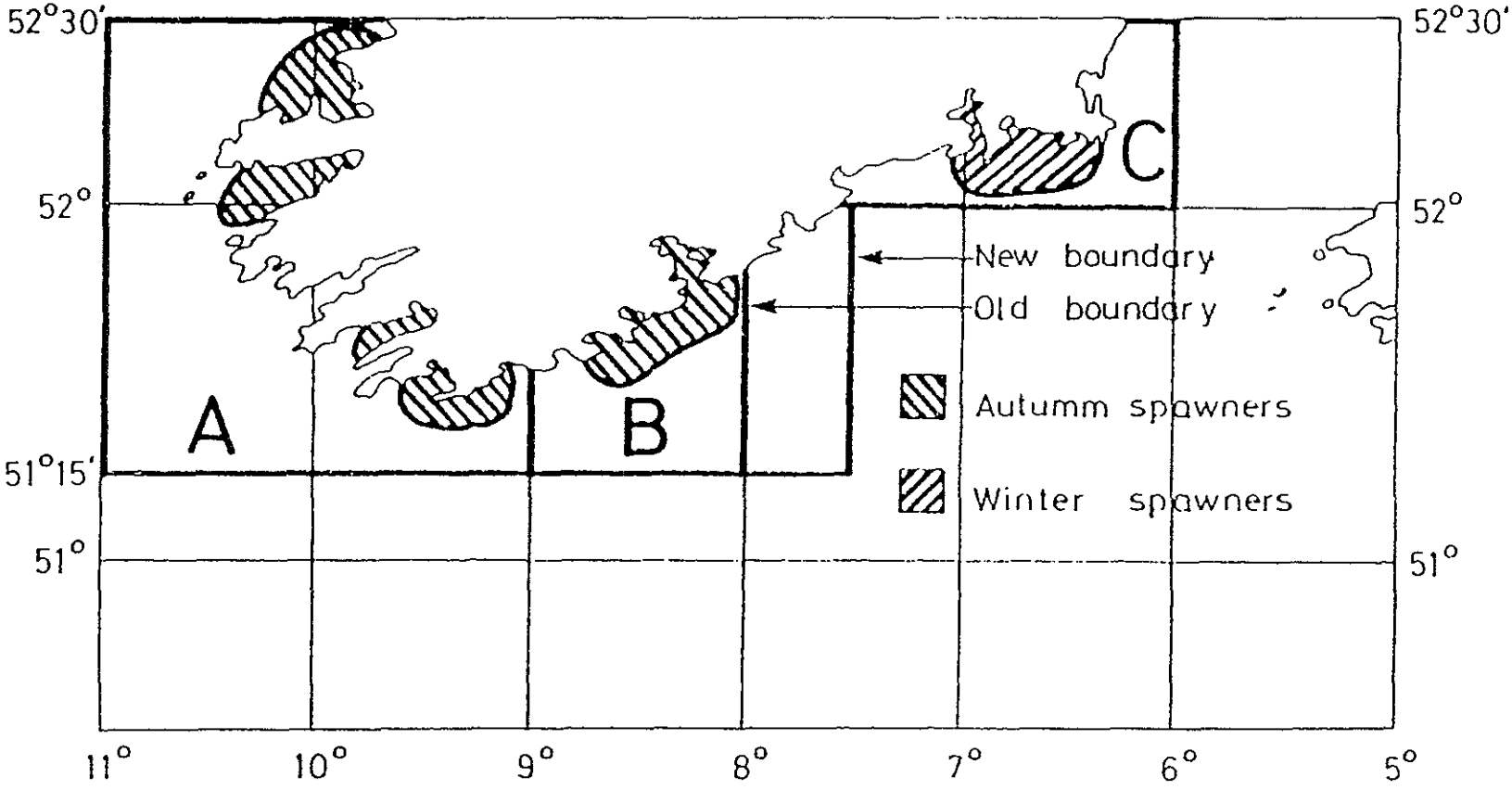

Figure 1. Recommended seasonal closures of herring spawning grounds in the Celtic Sea and Division VIIj herring stock.