Overview, Roles, and Performance of the North East Atlantic Fisheries Commission (NEAFC)[1]

By

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Abstract

According to the 1995 United Nations Fish Stocks Agreement (UNFSA), straddling fish stocks and highly migratory fish stocks are to be managed by Regional Fisheries Management Organisations (RFMOs), consisting of coastal states and relevant Distant Water Fishing Nations (DWFNs). In the North East Atlantic there are several straddling stocks, including herring, mackerel, blue whiting, redfish and numerous deep sea stocks that are exploited both within coastal states' 200 mile Exclusive Economic Zones and on the high seas. Management of such stocks poses special management problems. In this area, the North East Atlantic Fisheries Commission (NEAFC) represents the relevant RFMO. So far the literature has devoted little attention to RFMOs in general and to NEAFC in particular. The purpose of this report is, first, to provide an overview of the organisation, structure, and objectives of NEAFC and, second, to consider its performance with regard to resource management.

[1] I have greatly benefited from very constructive comments from Professor W.E. Schrank. I would also like to thank Professor R. Hannesson for his input and Mr. N.A. Ekerhovd for assistance with the analysis of the blue whiting fishery. Miss E. Hoshino has provided expert research assistance.

0. BACKGROUND

According to the 1995 United Nations Fish Stocks Agreement (UNFSA), straddling fish stocks and highly migratory fish stocks are to be managed by Regional Fisheries Management Organisations (RFMOs) [1], consisting of coastal states and relevant Distant Water Fishing Nations (DWFNs). In the North East Atlantic there are several straddling stocks, including herring, mackerel, blue whiting, redfish and numerous deep sea stocks that are exploited both within coastal states' 200 mile Exclusive Economic Zones and on the high seas. Management of such stocks poses special management problems.

In this area, the North East Atlantic Fisheries Commission (NEAFC) represents the relevant RFMO. So far the literature has devoted little attention to RFMOs in general and to NEAFC in particular. The purpose of this report is, first, to provide an overview of the organisation, structure, and objectives of NEAFC and, second, to consider its performance with regard to resource management.

The report is organised as follows: Section 1 describes the establishment, structure and objectives of NEAFC. In Section 2, some principles of cooperative and noncooperative management of staddling fish stocks are discussed. Section 3 gives a summary of managed stocks, their status, management measures, and implementation. Section 4 gives the performance criteria recently developed by NEAFC and report the main results. A discussion of the effectiveness of NEAFC is given in Section 5.

1. BACKGROUND

The North East Atlantic Fisheries Commission (NEAFC) was established, in its current form, in 1980 by the Convention on Future Multilateral Cooperation in North-East Atlantic Fisheries, and entered into force in 1982. This Convention replaced the original North East Atlantic Fisheries Convention of 1959, which had replaced the 1946 Convention for the Regulation of Meshes and Fishing Nets and

the Size Limits of Fish. The modern rebirth of NEAFC is a result of the withdrawal of the European Community Member States as individual members of the 1963 organisation, and the general introduction in 1977 of 200 mile Exclusive Economic Zones [2].

There are currently five contracting parties: The European Union (EU), Denmark (on behalf of the Faeroe Islands and Greenland), Iceland, Norway, and the Russian Federation. All of these are coastal states[2]. Flag states that have a real interest in fisheries in the Northeast Atlantic can be accorded a Co-operating non-Contracting Party (CNCP) status. This will allow them to authorise vessels flying their flag to operate in the NEAFC area, and they agree to enforce NEAFC's measures [3] There are at present five CNCPs: Bahamas, Belize, Canada, Japan and New Zealand.

NEAFC consists of a Commission; three permanent committees: Permanent Committee on Control and Enforcement (PECCOE), Finance and Administration Committee (FAO), and Permanent Committee on Management and Science (PECMAS); four working groups: Working Group on the Future of NEAFC, Working Group on Deep-Sea Species, Working Group on Blue Whiting, Advisory Group on Data Communications; and a Secretariat based in London [4].

The main objectives of NEAFC are to provide a forum for consultation and exchange of information on the state of fisheries resources in the Northeast Atlantic and on related management policies to ensure the conservation and optimal utilisation of such resources, and to set conservation measures in waters outside national jurisdiction [5].

[2] It should be mentioned that whether a country is a coastal state or a distant water fishing nation (DWFN) may vary with the fishery. Russia is, for example, a coastal state when it comes to the Norwegian spring spawning herring fishery, but a DWFN in the blue whiting fishery, as this stock does not appear within the Russian EEZ.

NEAFC acts as a forum for consultation and exchange of information on the state of fishery resources in the Convention Area and on management policies, including examination of the overall effect of such policies on the fishery resources [6]. There is no internal scientific body since scientific advice is provided by the International Council for the Exploration of the Sea —ICES, on the basis of a Memorandum of Understanding [6]. The Advisory Committee on Fisheries Management (ACFM) of ICES, on request, supplies NEAFC with scientific advice and, on this basis, NEAFC establishes conservation and management measures. Secretariat services were formerly provided by the Ministry of Agriculture, Fisheries and Food (MAFF) in the UK, but since 1998 there has been an independent Secretariat based in London [7] (IGIFL).

The area of competence is shown in Figure 1. The Convention area is located in the Northeast Atlantic and Arctic Oceans, east of a line south of Cape Farewell (the southern tip of Greenland) at 42º W, north of a line to the southern tip of Spain at 36º N, and west of a line touching the western tip of Novya Semlya at 51º E. A subset of the Convention area, consisting of three high seas areas, represent the NEAFC Regulatory Area: the Reykjanes Ridge, extending to the Azores; the "Banana Hole" of the Norwegian Sea (between the mainland and Jan Mayen); and the Barents Sea "Loophole". NEAFC does not set quotas or any other regulations in the "Loophole" (this is done by Norway and Russia), while it does in other areas, provided the members agree. Moreover, it must be mentioned that NEAFC does not have any own powers to enforce its decisions.

2. THE MANAGEMENT OF STRADDLING FISH STOCKS[3]

According to the 1995 UN Fish Stocks Agreement (UNFSA), highly migratory fish stocks and straddling fish stocks are to be managed by Regional Fisheries Management Organisations (RFMOs), consisting of relevant coastal states and

[3] This section draws heavily on Bjørndal and Munro [1].

Distant Water Fishing Nations (DWFNs) with a "real" interest in the fishery. This Agreement has now acquired the status of international law, although in principle it is binding only for the signatories. Over time it may, however, acquire the status of international customary law and thereby become binding also for non-signatories.

Highly migratory stocks are represented by tunas and tuna like fish. Straddling fish stocks is a term for all fishery resources other than anadromous and highly migratory fish stocks, which are to be found both within the EEZ(s) and the adjacent high seas, and that are exploited by coastal states and DWFNs. According to this definition, NEAFC is concerned with the management of straddling fish stocks, but not with highly migratory fish stocks.

Non-cooperative management of resources is likely to lead to overexploitation. Based on game theoretic analysis, some basic principles of cooperative management have been derived. Given the ability of players to communicate, under the right circumstances a stable cooperative management regime may be established. At least three conditions must be met for a cooperative agreement to be preferred to competitive exploitation. First, the solution must be Pareto optimal. Thus, if one country is to gain more, it can only be at the expense of others. Second, payoff from cooperation must be at least as great as under non-cooperation, i.e., everybody must gain from cooperating. Third, the solution must be time consistent or resilient.

If side payments are introduced, the scope for bargaining increases. Side payments may be introduced with a two fold purpose: First, to enhance the scope for bargaining. Second, to enhance the flexibility and the resilience of the cooperative arrangement.

The U.N. Fish Stocks Agreement serves as a framework for cooperative management of straddling and highly migratory fish stocks. Nevertheless, its future is still uncertain.

According to the UNFSA, a RFMO is to be open to all states having a "real" interest in the fishery encompassed by the RFMO; this includes coastal states and "relevant" DWFNs. Would-be new members can only be excluded on grounds of non-cooperation.

Cooperative management of highly migratory and straddling fish stocks will likely be more difficult than cooperative management of «shared» fish stocks. The key reason for this is that members of an RFMO may change over time. Under the terms of the UN Fish Stock Agreement, would-be new members cannot be barred from a RFMO unless they refuse to abide by the RFMO management regime.

Economic analysis of the management of high seas fisheries shows that truly open RFMOs will have little chance of success and result in overexploitaton. The key problem is that of new members.[4] It is not clear how potential new entrants can be excluded from a fishery. If the only barrier prospective new members face is that they agree to abide by the RFMO management regime, it is possible that one or more initial or "charter" members of the RFMO will estimate that the net benefits of cooperation will be less than those of non-cooperation.

Economic analysis suggests that resolution of the new member problem may call for granting "charter" members of a RFMO de facto property rights to the relevant resources. Possible solutions to the problem may be that a new country may join only if an established country leaves, a waiting period for new entrants is

[4] In some instances, interlopers, flying flags of convenience, also represent a serious problem, but this will not be discussed further here.

introduced, or fees are imposed on new entrants. Some of these issues depend critically on a legal interpretation of the UN Fish Stock Agreement.

As is well known, many of the world fish stocks are seriously depleted [8]. This applies to straddling stocks as well. Therefore, many RFMOs will be faced with the task of rebuilding stocks. To the degree this is successful, the incentives for new countries to enter the fishery increase. Pintassilgo [9] analysed the case of Atlantic bluefin tuna and found conditions under which an existing member of an RFMO would find it profitable to break away from a cooperative agreement.

If RFMOs lead to successful cooperative resource management, relevant high seas adjacent to EEZ will become high seas in name only and the stock will be managed as a shared stock.

In the following sections, we will discuss how some of these principles apply to the fishery resources managed by NEAFC.

3. RESOURCES AND MANAGEMENT MEASURES

NEAFC covers all fishery resources of the Northeast Atlantic, except marine mammals, sedentary species and, insofar as they are dealt with by other international agreements, highly migratory[5] species and anadromous stocks. The four main fisheries in the Convention Area are Norwegian spring spawning (Atlanto–Scandian) herring, mackerel, blue whiting, and pelagic redfish [10]. In 2005 about 3.3 million tonnes, or 31 %, of the total North East Atlantic catch was taken in these fisheries [10] of which about 1 million tonnes is taken in the Regulatory Area, cf. Section 1 [11].

[5] Atlantic Bluefin Tuna is managed by the ICCAT (see [12]).

The catches of the three pelagic species herring, blue whiting, and mackerel in 2005 had a landed value of approximately 9,117 million Norwegian kroner (or $ 681 million) from the Convention Area and 1,566 million Norwegian kroner (or $ 236 million) from the Regulatory Area [11]. These species are mostly fished by large mid-water trawl and purse seine vessels. Blue whiting is mainly reduced into fish meal and fish oil. Traditionally, herring and mackerel were also used for this purpose, but today they are mostly used for direct human consumption.

NEAFC is empowered to recommend a wide variety of conservation and management measures [5]. They include [7]:

(a) the regulation of fishing gear and appliances, including the size of mesh of fishing nets.
(b) the regulation of the size limits of fish that may be retained on board vessels, or landed or exposed or offered for sale.
(c) the establishment of closed seasons and of closed areas.
(d) the improvement and increase of fishery resources, which may include artificial propagation, the transplantation of organisms and the transplantation of young.
(e) the establishment of total allowable catches and their allocation to Contracting Parties.
(f) the regulation of the amount of fishing effort and its allocation to Contracting Parties.

Current (2007) measures in place include [10]:

(a) TACs for blue whiting, mackerel, herring, pelagic redfish;
(b) Mesh size restriction and maximum catch limit for pelagic redfish in the Irminger Sea;
(c) Ban on gill nets in deep water (greater than 200 m depth):
(d) Closure of areas where coldwater corals are affected by fishing activities:
(e) Effort limit for deep sea species:
(f) Prohibition of bottom trawling and use of static gear in the seamounts and other vulnerable deep sea habitats.

Enforcement

Although NEAFC became operational in 1982, it did not start to function properly until the mid-1990s when the Contracting Parties agreed to regulate the fisheries for several straddling stocks [13]. Following the 1995 U.N. Fish Stocks Agreement, NEAFC has made a number of changes to adapt to the enhanced role of Regional Fisheries Management Organisations.

In 1998, NEAFC adopted a recommendation on a Scheme of Control and Enforcement in Respect of Fishing Vessels Fishing in Areas Beyond the Limits of National Fisheries Jurisdiction in the Convention Area (hereafter called "the

Scheme"). The Scheme was entered into force on 1st July 1999, and the current Scheme was entered into force on 1st May 2007. The Scheme lays down obligations for Contracting Parties regarding the control measures, monitoring of fisheries, arrangements for inspections at sea and the follow-up of infringements, and the inspection of non-Contracting Party vessels in port [14, 15](. Contracting Parties (CPs) are required to implement a Vessel Monitoring System (VMS), and all vessels fishing outside EEZs require VMS since January 2000 [14]. Contracting Parties are also required to notify the Secretariat of vessels authorised to fish in international waters and report catches taken.

In 1999, NEAFC also implemented the Scheme to Promote Compliance by Non-Contracting Party vessels, and it was amended in 2003 in order to take actions against Non-Contracting Parties engaged in illegal, unreported, and unregulated (IUU) fishing in the Regulatory Area. Furthermore, in 2005, a new Port State control on landings and transshipment was adopted. These controls entered into force on May 1st 2007 [10].

As can be seen, NEAFC has introduced a number of schemes and controls, some of which have come into force quite recently. Nevertheless, it must be stressed that enforcement of all these regulations is the responsibility of the flag states.

Status of the key stocks and management

Pelagic Redfish

Redfish (*Sebastes mentella*) is a deep-sea species which occurs inside the EEZs of Iceland and Greenland and in the Regulatory Areas of NEAFC and the Northwest Atlantic Fisheries Organisation (NAFO). "Pelagic" redfish are bottom

dwelling at depths of several hundred metres, however, they experience a diurnal migration from bottom to top and back again. For this reason, they may be harvested with mid-water trawls as well as bottom trawls. The pelagic fishery for redfish takes place in the Irminger Sea with deep water trawl starting in April and continuing until late autumn. Fleets from all the Contracting Parties participate with large factory vessels with on-board processing facilities

The fisheries for redfish started in 1982 by Russian trawlers, and the total catches in the Irminger Sea increased from 60,600 tonnes in 1982 to 105,000 tonnes in 1986 [7] . Since 1987, the total landings decreased to a minimum of 28,000 tonnes in 1991, mainly due to effort reduction. Since 1989, the number of countries participating in the fishery gradually increased. Total catches have also increased after the 1991 minimum and reached a historical high of 180,000 t in 1996 (Table 1). In addition to the increase in the numbers of participants, the fleet started targeting redfish deeper, at 600–800 m [16]. Since 2000, the NEAFC Redfish Working Group's estimate of the catch has been between 74,000 and 161,000 tonnes, highest in 2003 (Table 1). This is probably an underestimate due to incomplete reporting of catches [17].

During the past decade, Germany, Iceland, and Russia have been the major participating nations in the fishery, and the Faeroe Islands, Norway, and Greenland have also participated for many years [16]. According to the NEAFC official catch statistics, Russia and Iceland are the two major fishing nations. Combined they accounted for almost 80 percent of total catch in 2005, with Russia accounting for 52 percent and Iceland 26 percent. The annual landing in the Convention Area and NEAFC Regulatory Area in 2004 were reported to be approximately 113,000 tonnes and 73,000 tonnes, respectively [11].

The fishery has been regulated through total allowable catches (TACs) set by NEAFC since 1996 [16] and technical measures such as minimum mesh size in

the trawls which is set at 100 mm. In 2006, NEAFC recommended that the catches in the pelagic redfish fishery in the Irminger Sea and adjacent waters in 2007 shall not exceed 46,000 tonnes.

Because scientific views about stock boundaries have changed recently, and disagreements over the different components of the stock and their exploitation have hampered agreement on management, no management objective has been agreed upon and no harvest control rules are in effect [11]. ICES had difficulties in obtaining catch estimates from the various fleets and there are indications that unreported catches are substantial [18].
Although the IUU catches have not been quantified, two studies using a satellite imagery vessel detection system (VDS) to detect fishing vessels in the NEAFC regulated redfish fishery have shown that 27 - 33 percent more vessels were found in the area than were reporting to NEAFC between June 2002 and June 2003 [17] Furthermore, landings data were missing from some ICES member countries [11].

As mentioned, NEAFC began managing this stock in 1996 but accepted ICES advice only in 2003 and 2004. Catches have exceeded TACs in a number of years (Table 2) due to IUU fishing as well as the use of the Objection Procedure within NEAFC [11]. The Objection Procedure allows Contracting Parties to object to a recommendation, which becomes non-binding on the Contracting Party that has objected. If more than three Contracting Parties have objected to a recommendation, it will become non-binding on any Contracting Party [19].

It is significant that there remains no consensus within ICES regarding stock structure. Currently, it is assumed that all fisheries are exploiting one population. However, the stock structure is inconclusive as the data available supports a number of different hypotheses from one stock, to different multi-stock systems.

ICES has advised that management should aim at preventing a disproportional exploitation rate of the fish in the two distinct fishing areas in order to prevent local depletion, but to date this has not been done [11].

ICES has advised that the stock is vulnerable to over-exploitation. ICES has indicated that the available information is inadequate to evaluate spawning stock biomass or fishing mortality relative to risk, so the state of the stock is unknown. The acoustic trawl survey June-July 2005 indicated that the stock size is low compared to that in the early 1990s but stock size has not shown any clear trends since 1999. The 2005 survey also indicates a substantial decrease in the abundance of fish larger than 40 cm. Table 2 shows the TACs agreed by the NEAFC, ICES advice and ACFM catch.

Commercial CPUE series were previously used to determine stock size. Because the fishery targets pelagic schooling fish and fishing technology improved over time, increasing CPUEs do not always reflect the stock status. Yet a decreasing CPUE is likely to indicate a decreasing stock. Overall CPUEs declined between 1994 and 1997 and have since fluctuated without a clear trend. However, all nations reported a decline in CPUE in 2004 (Figure 2). Nevertheless, as Schrank and Pontecorvo [20] have pointed out, although a decreasing CPUE is likely to indicate a declining stock, there are important examples where a constant or even increasing CPUE occurs in the presence of a declining stock. Thus, it is unclear what evidence is provided by the information in Figure 2.

Norwegian Spring Spawning Herring

The Norwegian spring spawning herring (*Clupea harengus*) or Atlanto-Scandian herring is a straddling stock that is distributed throughout large parts of the North-East Atlantic during its lifespan [21, 22]. The fishery is important for employment and revenue in many countries, including Norway, which records

the largest annual harvest, Iceland, Russia, Faeroe Islands, and some other member countries of the EU [23]. The fishery for Norwegian spring spawning herring follows the migration of the stock closely as it moves from the wintering and spawning grounds along the Norwegian coast to the summer feeding grounds in the Faeroese, Icelandic, Jan Mayen, Svalbard, and international areas [18].

In the 1950s and the 1960s, Norwegian spring-spawning herring was a major commercial species and the stock was subjected to heavy exploitation [23]. The annual harvest peaked at 2 million tonnes in 1966, but by this time the stock was in serious decline and by the late 1960s the mature stock was almost depleted due to overfishing [21]. A large increase in fishing effort, new technology, and environmental changes contributed to the collapse of this stock by the late 1960s [18]. Due to the moratorium that was put in place to allow an increase in the spawning stock, the stock recovered by the late 1980s/early 1990s (Figure 3).

Until 1994, the fishery was almost entirely confined to Norwegian coastal waters, but during the summer of 1994 there were also catches in the offshore areas of the Norwegian Sea for the first time in 26 years, due to the herring resuming its traditional migratory pattern [18]. In 1995, the Advisory Committee on Fishery Management (ACFM) of the ICES recommended a total allowable catch (TAC) of 513,000 tonnes, but participating countries ignored the recommendation and the collective harvest of Norway, Russia, Iceland, Faeroe Island and the EU exceeded 900,000 tonnes, almost twice the quantity recommended by ACFM [21]. The fishery expanded further the subsequent year (Figure 3).

In 1996, the EU, the Faeroe Islands, Iceland, Norway, and Russia agreed to implement a long-term management plan for Norwegian spring-spawning herring. The management plan was part of the international agreement on total quota

setting and sharing of the quota during the years 1997–2002 [22]. The Parties agreed to maintain a level of Spawning Stock Biomass (SSB) greater than the critical level (Blim) of 2 500 000 t, and to restrict their fishing on the basis of a TAC consistent with a fishing mortality rate of less than 0.125 for appropriate age groups as defined by ICES for the year 2001 and subsequent years.

In addition, there were a number of bilateral agreements between the countries involved. Fishermen from other countries were allowed to harvest part of their quota in the Norwegian EEZ and the control zone around Jan Mayen, which is under Norwegian jurisdiction, thus enabling them to harvest at a time of year when the herring contain more fat and thus are more valuable. Moreover, fishermen from other countries are allowed to land their harvests in Norway, which would tend to reduce transportation distances and thus increase the prices they would fetch. This policy would also benefit the Norwegian fish processing industry. Juvenile herring grow up in the Russian EEZ. To compensate Russia for not harvesting juvenile herring, which would imply growth overfishing, Russia is given a quota in the Norwegian EEZ.

The management plans and coastal state agreements were suspended for four years between 2003 and 2006 due to the disagreement over allocation of quotas. In this period, the bilateral agreements between Norway and other countries were also suspended, except for the one between Norway and Russia regarding juvenile herring.

In January 2007 however, the EU, the Faeroe Islands, Iceland, Norway and the Russian Federation signed an agreement on the management of this stock for 2007. The Parties agreed on a TAC for the Norwegian Spring-Spawning herring of 1.518 million tonnes in 2008. The allocation of the quotas is as follows: European Community 98,822 tonnes; Faeroe Islands 78,329 tonnes; Iceland

220,262 tonnes; Norway 925,980 tonnes, and Russian Federation 194,607 tonnes.

The agreed TAC, compared to the actual catch and ICES advice over time, are shown in Table 3. The main catches in 2004 were taken by Norway (477,000 tonnes), Russia (116,000 tonnes), Iceland (101,000 tonnes), and Faeroe Islands (43,000 tonnes) and lesser catches were taken by EU fleets (55,000 tonnes) [18]. In 2005, the total landings in the Convention Area and in the Regulatory Area were approximately 1,254,000 tonnes, and 195,000 tonnes, respectively [11].

The Norwegian spring spawning herring fishery provides a very interesting example with regard to the management of straddling fish stocks. As mentioned, when the stock was in a depressed state, it stayed fully in the Norwegian EEZ. [23] analysed cooperative and competitive management of this stock, including the question whether it might be profitable for Norway to break away from cooperation and maintain a lower stock that would remain under Norwegian control. This was not found to be profitable. The analysis showed that cooperation would give greater benefits than competition to all players, and that, under no alternative considered, would it benefit a player to break away from cooperation in the long run.

The period leading up to cooperation was interesting. In 1995, the players set TACs unilaterally, obviously on the basis that the ability to harvest higher quotas might give higher shares in a cooperative solution. Nevertheless, as catches exceeded the TAC recommended by ICES by 80%, this clearly shows the potential danger of competitive harvesting if a situation like this should persist. In 1996, Norway, Russia, Iceland and the Faeroese Islands reached an agreement, but without the involvement of the EU. The EU was fishing at full capacity, presumably with the intention of increasing its share once a full cooperative agreement was reached.

In the years 1997-2002, the partners agreed on the setting of the annual TAC and the shares for each country. The reason the agreement broke down in 2003 was because of Norwegian demands for a higher share of the TAC. These claims were based on the zonal attachment principle or the concept of ”biomass by time" within the zones (stock size within a zone multiplied with the duration of the stay, see Monstad [24]), It turned out that the herring spent more time in the Norwegian EEZ than expected when the first agreement was reached and, based on this principle, Norway laid claim to a greater share of the quota. This showed that the original cooperative agreement was not time consistent. In the end, only minor adjustments to the quota shares were made. Although Norway's quota demands were not met, Norway preferred a cooperative agreement to a non-cooperative one.

ICES classifies the current status of the stock as having full reproductive capacity and being harvested sustainably.

Blue Whiting

Blue whiting (*Micromesistius poutassou*) is a pelagic gadoid that is widely distributed in the eastern part of the North Atlantic [22]. The highest concentrations are found along the edge of the continental shelf in areas west of the British Isles and on the Rockall Bank plateau where it occurs in large schools at depths ranging between 300 and 600 metres. It is also present in almost all other management areas between the Barents Sea and the Strait of Gibraltar and west to the Irminger Sea [22].

The blue whiting fishery is the largest fishery in the North East Atlantic. Its total catch was in excess of 2 million tonnes in 2006. According to the official catch statistics of NEAFC, Norway accounted for 37 percent of the total catch in 2005,

followed by the EU (19%), Russia (17%), Iceland (13%), and Faeroe Islands (13%). Annual catches by country for 1995-2006 are given in Table 4 and have shown a very substantial increase over time. The landings of blue whiting in the Convention Area in 2004 were 2,407,000 tonnes, of which 721,000 tonnes were in the Regulatory Area, respectively[6].

Multi-national fishing for blue whiting started at the end of the 1970s, with participation mainly from the former Soviet Union (Russia) and Norway (Standal, 2006). In most of the 1980s and 1990s, the catches were rather stable, however, the catches increased rapidly since 1998 (Figure 4), and a new catch record was set almost every year, with catches over 2 million tonnes in 2003-2006.

The fishery has been regulated by a TAC system since 1994. NEAFC agreed to follow the advice from Advisory Committee for Fisheries Management (ACFM) regarding an annual total catch quota, but for many years the coastal nations set their own quota, the sum of which far exceeded the recommendation from ICES [35]. In 2003, for instance, catches of blue whiting reached a record high of almost 2.4 million tonnes (Figure 4), whereas advised catch limit from ICES was around 600,000 tonnes [25].

There is a Coastal State management plan in place that is applied by NEAFC, however, ICES has not yet evaluated this plan in relation to the precautionary approach [11]. The exceptional recruitment and concurrent underestimations of stock size by ICES, and uncertainty regarding the status of the stock, have resulted in coastal states being unwilling to reach agreements on management [11] or, at any rate, to follow recommendations by fisheries biologists who for a number of years underestimated the stock.

[6] These data are taken from [11]. There is a discrepancy between the catch figure of 2,407,000 tonnes and that of 2,419,000 tonnes in Table 4, with FAO Fishstat as source. It has been impossible to ascertain the reason for this discrepancy.

Based on the most recent estimates of SSB and fishing mortality, ICES classifies the stock as having full reproductive capacity, but being harvested unsustainably. ICES has advised that immediate management action should be taken, as the current fishing effort is much above what the stock can sustain if it returns to a lower recruitment regime. ICES recommends that biomass, according to the precautionary principle (B_{pa}) is set at 2.250 million tonnes and that the corresponding fishing mortality (F_{pa}) is set at 0.32 [25, 26].

The history leading up to the 2005 agreement is most interesting. Apart from the Russian Federation and Norway, which developed the fishery, the blue whiting was mainly fished by vessels from the Faeroe Islands and countries from the European Union. Only minor fishing was carried out by Icelandic vessels until the mid-1990s (Table 4), when a new Icelandic fishery was initiated by a fleet of powerful vessels [28]. As a consequence, the Icelandic catches of blue whiting increased rapidly, reaching 501,000 tonnes in 2003.

As the landings of blue whiting grew to significant quantities, it became clear that an international agreement was needed on how to share this resource among the nations involved and to avoid overexploitation. NEAFC organised a series of meetings to this end, including workshops, discussions and negotiations. However, after two years of such meetings in the early 1990s, when the matter was thoroughly dealt with, no agreement was reached on how to share the Total Allowable Catch, i.e., the quota recommended by NEAFC on the basis of advice from the International Council for the Exploration of the Seas (ICES) [24].

The process was put aside until 1998, when NEAFC set up a Working Group to deal with the matter and present suggestions for a solution. The Working Group consisted of representatives from the coastal states, i.e., states that have the blue whiting stock occurring within their Exclusive Economic Zones (EEZ). These

are the EU, Norway, Iceland, Faeroe Islands and Greenland (formally represented by Denmark). The Russian Federation is also included, although not regarded as a coastal state by the others, but it is a major participant in the blue whiting fisheries.

A great amount of effort was devoted to this process. All the available relevant data were analysed and used as a basis for discussion and negotiations. In spite of this and the urgent need for management measures to regulate the blue whiting fisheries, an agreement was not reached until late 2005.

The various countries involved have presented alternative ways to show the biological zonal attachment of blue whiting. Some countries use the zonal attachment principle or the concept of ”biomass by time" within the zones (stock size within a zone multiplied with the duration of the stay), while others exclusively employ the catch statistics from the zone as the basic concept. A combination of these two methods is also used, and in some cases other factors such as economic dependency on the fishery were also considered. The relevant parties presented demands for their own quota share along with what they thought the others' shares should be, and the sum of each nation's claim amounted to almost 200 % of a possible TAC.

To allow for fishing blue whiting in the waters of other countries, the states have negotiated bilateral quotas within the various zones. Due to the lack of agreed sharing of the quota, the negotiations did not consider the recommended TAC. In addition, each country allowed for unlimited landings from its own as well as from international waters. As a result of this the actual harvest was in fact in some years almost three times more than recommended by ICES.

A multilateral agreement included an agreement to reduce fishing mortality to sustainable levels within three years. The Contracting Parties established an

allowable catch limitation of 1.25 million tonnes [29] of blue whiting for 2008. TAC allocations are as follows: European Community 350,000 tonnes; Faero Islands 300,000 tonnes; Norway 296,000 tonnes, and Iceland 202,000 tonnes.

In 16th December 2005, after six years of negotiatons, the coastal states of the EU, Faeroe Islands, Iceland, and Norway signed an agreement. The agreement, starting in 2006, includes a long run management strategy that implies annual reductions in the landings until the management goals are reached [30]. This arrangement provided for catches in 2006 of 2 million tonnes [31] allocated as follows: EU 30.5 %, Faeroe Islands 26.125 %, Norway 25.745 % and Iceland 17.63 %. Russia will be accommodated by transfers from some of the coastal states and additional catches in the NEAFC area [32]. In 2006, Russian catches represented 16.3 % of total catches (Table 4).

For a lucid and up to date game theoretic analysis of the blue whiting fishery, see Ekerhovd [33].

An interesting aspect of this agreement is how the coastal states' fishermen's organisations were instrumental in preparing the ground for the agreement. During the summer of 2005, prior to the coastal state agreement, various fishermen's organisations from the European Union, Iceland, and Norway negotiated and signed an agreement, similar to the one signed by officials from the coastal states later that year [34].

The virtually unregulated blue whiting fishery prior to 2006 appears to have been a very attractive strategy for further economic expansion for agents who otherwise fish for herring and mackerel within a system where the harvest quantity is strongly quota regulated and access to the resources is strictly limited [35]. There has been a dramatic development in the pelagic fishing fleets from the late 1970s when vessels and equipment were not suitable for the blue

whiting fishery. During the past 10-12 years, there has been a considerable modernisation of the fleet of combined purse seiners/blue whiting trawlers with high financial investments and, therefore, a great need for increased catch income. Vessels that were licensed to fish blue whiting faced few restrictions in this fishery, both with respect to quantity and time [33], and were able to gain maximum use of their catch capacity. Within the framework of licensed-regulated fishing where only a limited numbers of participants can take part in the otherwise unregulated blue whiting fishery, we see that modern technology has a prominent position where development is accelerated by financial motives for largest possible profit.

For many years the coastal states were not able to reach an agreement on the management of the blue whiting stock. One possible reason for this is pressure from the national fishermen organisations. Then, suddenly, when the fishermen agree, the coastal states follow. There are probably several reasons for this change in mode. One is that that the fishermen knew that the stock could not sustain such a high fishing mortality much longer without collapsing. Secondly, the catches were already decreasing compared to just a couple of years earlier, and this encouraged the vessel owners to find a solution as to how a TAC should be divided while there still was something to share. Another factor that was instrumental for the Norwegian vessel owners' willingness to negotiate was that the extraordinary blue whiting fishery in Norwegian waters during summer and autumn had not been the success they had hoped it to be, and therefore did not back up Norway's claim to 37% of TAC.

Northeast Atlantic Mackerel

ICES currently uses the term "North East Atlantic Mackerel" to define the mackerel present in the area extending from ICES Division IXa in the south to Division IIa in the north, including mackerel in the North Sea and Division IIIa.

The stock is historically divided into three components, with the North Sea component considered to be over-fished since the late 1970s, and the western component contributing the vast majority of biomass and catch to the stock [36]. For management purposes, they are treated as one stock because the stocks mix at times when they are jointly harvested [37]. Therefore, fishing effort is in the main not directed at any one of the three separate components, but at a single combined stock. It has not been possible to calculate the total catch taken from the North Sea stock component separately because of the low stock size and low catches taken from Divisions IVbc, but it has been assumed to be 10,000 tonnes for a number of years [36].

Total catches peaked in 1979 at 843,000 tonnes, and more recently in 1993 and 1994 around 820 000 tonnes (Figure 5). They have remained at about 650,000 tonnes since 1995, but catches declined to around 433,000 tonnes in 2005 (Figure 5). According to the official catch statistics, in 2005 about 60 percent of the catches were taken by member countries of EU, followed by Norway (28%), Russia (9%), Faeroe Islands (2%), and Iceland (less than 0.1%). The landings of the mackerel *Scomber scombrus* in the Convention Area and in the Regulatory Area in 2004 were reported to be 527,000 tonnes, and 41,000 tonnes, respectively [11].

The fishery is regulated by an internationally agreed TAC. Moreover a number of management measures are in place to protect the North Sea component of the stock that is considered depleted, and to protect juvenile mackerel. The total TAC set for 2008 is 385,366 tonnes [38]. Despite the attempts to control allowable catches, the landings have exceeded the annual TACs in most years (see Table 6), sometimes by a considerable amount.

ICES classifies the stock as being harvested unsustainably. Spawning stock biomass (SSB) has declined since 1992 but has shown an increasing trend in

recent years (Figure 5). Misreporting of catches is also a serious problem. The ICES Working Group on the Assessment of Mackerel, Horse Mackerel, Sardine and Anchovy (WGMHSA) has found substantial levels of unaccounted mortality, and these unaccounted removals have been estimated to be more than 60% of the reported catch [36]. The Coastal States, the EU, the Faeroe Islands and Norway, have adopted a series of control measures regarding the weighing and inspection of landings for mackerel that should help to resolve this problem.

As of early September 2008, Icelandic pelagic fishing companies have caught 108,000 tonnes of mackerel this year, which is a substantial increase from 2007 when a little over 36,000 tonnes were caught [39] This appears to be due to changes in the distribution pattern of mackerel which now partly migrate into the Icelandic EEZ. While Iceland had no quota and hardly any catches in the past, this is likely to change in the future. It also means that the mackerel "game" has changed, with essentially the appearance of a new coastal state. All that can be said at this point is that it is uncertain what impact this development may have on the management of mackerel.

Deep Sea Species

ICES uses the term deepwater (or deep sea) fisheries at depths greater than 400 m. The deep water in the ICES area covers the deep parts of ICES Subareas I, II, III, V-X, XII, and XIV. In some parts of the northeast Atlantic where the continental shelf is narrow, such as off Portugal, there have been traditional fisheries for many years, for example for black scabbardfish (*Aphanopus carbo*) and red (or blackspot) seabream (*Pagellus bogaraveo*) [18] Other traditional species are ling, blue ling, and tusk. Before the 1980s, with the exception of a fishery for species such as roundnose grenadier (*Coryphaenoides rupestris*), there was little interest from the fishing industry in exploiting stocks in international waters, but since the 1980s dwindling resources on the continental

shelves of the North Atlantic have encouraged the development of fisheries in deeper waters [18].

Fisheries for species such as anglerfish and Greenland halibut have extended into deeper waters, and new fisheries have developed to target the new deepwater species. Species such as the argentine or greater silver smelt (*Argentina silus*) and roundnose grenadier (*Coryphaenoides rupestris*), which were previously bycatch species, have been targeted within the ICES area for the last two decades. Orange roughy (*Hoplostethus atlanticus*) has been a target species since the early 1990s.

Expansion of the deep-sea fisheries has been rapid, and at a greater pace than scientific information has become available. It is believed that most species and stocks are not being fished sustainably, and ICES has recommended immediate reductions in the fisheries unless they can be shown to be sustainable. It is also believed that within the ICES area some species/stocks have been depleted before appropriate management measures have been implemented.

The Contracting Parties agreed to freeze effort in 2003 and 2004, and then reduce it by 30% for 2005 and 2006. There are no long term management objectives, nor are there any long term management plans in place. Questions as to appropriate management remain.

4. THE PERFORMANCE OF NEAFC

The need for strengthening the roles of Regional Fisheries Organisations (RFMOs) has been highlighted in recent years at international meetings such as the Committee on Fisheries of the Food and Agriculture Organisation of the United Nations (FAO/COFI). In November 2005 NEAFC decided to undertake its

own performance review. The purpose of the review was to provide for a systematic check of the performance of the organisation and its consistency with the NEAFC Convention, the United Nations Fish Stock Agreement (UNFSA) and other relevant international agreements and instruments [11].

A six member mixed review Panel was appointed, of which three members of the Panel were selected with guidance from the international institutions and three were selected from inside NEAFC. The Panel's task was to identify achievements and highlight areas where improvement could still be made [11].

According to best practise for external reviews, all members of the panel should be external. Why NEAFC deviated from this, and included three members from inside the organisation, is unknown.

The Panel based its work on the obligations set out in relevant international instruments, in particular UNFSA, and the generally agreed approaches for effective fisheries management as outlined in the FAO Code of Conduct for Responsible Fishing, the supporting guidelines, as well as other relevant technical reports. This involved looking for evidence of robust systems as well as effective processes and governance when evaluating each of the review criteria.

Review criteria are given in Table 7. They assessed the performance of NEAFC against the objectives set out in the Article 4 of the 1982 Convention. The review criteria are divided into five categories (the left column), and they are further subdivided into 17 groups (middle column). The right column describes the detailed criteria for each group.

The results of the Review Panel were detailed in its 2006 Report, and the key issues addressed by the Panel are summarised below.

Although the review report does not provide a clear cut answer to overall performance of the NEAFC as it lacks quantitative evaluation results, overall the Panel acknowledged progress in a number of areas, e.g. conservation measures already taken by NEAFC. Nonetheless, it must be pointed out that although conservation measures may have been taken, what really matters is how effective they are. The really critical questions are, how are regulations enforced, and how effectively? The Panel does not address these issues in a satisfactory way.

The Panel also identifies some areas where improvement can be made. These include:

- Knowledge regarding pelagic redfish as well as deep-sea species is lacking. Sustainable management of pelagic redfish continues to be problematic and resolution is seen as a high priority for NEAFC and its Contracting Parties;
- The lack of focus and information available on economic and social benefits;
- Regarding monitoring and control, more attention could be paid to quality control, e.g. entry and exit messages could be cross-checked and messages concerning transhipments should be systematically checked to verify that there is a match between donor and receiver vessels' reports. Moreover, there is scope for improvement in the coordination of the allocation and deployment of inspection resources;
- The measures on Port State control must be clarified and reinforced;
- The effectiveness of the measures to combat IUU fishing could be strengthened through the reciprocal recognition of IUU lists between NAFO and NEAFC which are scheduled to come into effect from 2007;
- While NEAFC has a decision-making role in terms of the management of resources, in practice decisions on a number of stocks are made outside

NEAFC. This leaves NEAFC with a limited residual role in decision-making in respect of the management of stocks.

While some of these points are technical and fairly easy to rectify, the implications of others are uncertain. The Panel points out that lack of information about economic variables is an issue (a situation that can be rectified, with relative ease). It fails, however, to say how the recommendations of NEAFC might change if this information were available.

Similarly, the Panel notes that NEAFC has "a limited residual role in decision making of (some) stocks", but fails to suggest or identify properly what this role should be.

The 27th session of the FAO COFI meeting which took place in March 2007 also acknowledged that although the evidence of strong performance in specific areas of operation such as the monitoring and enforcement schemes was observed, the status of the main fish stocks in the Convention area is at a critical point and unless effective action is taken promptly, there is a strong possibility that their future sustainable use will be compromised [40].

Since the NEAFC Performance Review was completed in October 2006, there have been a number of important developments in NEAFC which have addressed most of the major concerns identified by the Panel [41]. These include:

- NEAFC has adopted new Port State Control measures as a part of the existing NEAFC Control and Enforcement Scheme. The new measures entered into force on 1 May 2007. This new Scheme will effectively close Contracting Party ports to landings of frozen fish which have not been certified by the Flag State of the vessel intending to land.
- NEAFC has joined forces with NAFO to create a pan-North Atlantic list of IUU vessels. The two RFMOs have decided that vessels on their respective

lists of IUU vessels are transferred from the list of one organisation to the list of the other. Depending on the transgression, measures against IUU vessels include denial of port facilities and fishing rights in the EEZs of the Contracting Parties.

- In November 2006 NEAFC agreed that bottom trawling and fishing with static gear shall be prohibited in three more areas in the Regulatory Area to protect vulnerable marine ecosystems, in addition to the five areas closed since 2005.
- Criteria and objectives for using closed areas as a tool to minimise the ecological impacts of fisheries on marine habitats and biodiversity will be more closely examined in NEAFC's Permanent Committee on Management and Science**.**

Nevertheless, although these measures may be important in certain regards, it is uncertain what impact they will have on improved management and enforcement.

5. DISCUSSION

Since the UNFSA was concluded in 1995, NEAFC has made a number of positive changes, in particular, in combating IUU fishing and improving monitoring and enforcement through the adoption of the Scheme of Control and Enforcement, the Scheme to Promote Compliance by Non-Contracting Party vessels, and a port State control on landings and transshipment.

However, as pointed out by the FAO COFI meeting and by its review Panel, major stocks are overfished or fished unsustainably and there is a need to improve resource management. Out of five major fisheries, only the Norwegian spring spawning herring stock is considered sustainable. The herring stock appears to be robust despite the fact that the coastal state agreement broke down for several years with the consequence that harvest exceeded the recommended TAC for some years. Attempts to reach an international

agreement on exploitation of blue whiting have also failed a number of years, and the landings of Northeast Atlantic mackerel have exceeded the annual TACs for many years. For the pelagic redfish fishery, no management objective has been agreed on due to the disagreements over the structure of stock components. Whether this is a substantial argument or a nebulous one is probably difficult to tell.

These observations indicate that there is a clear need to strengthen the roles of NEAFC in terms of decision-making, and to reduce catches to the level recommended by ICES. For this to happen, it must be seen to be in the interest of the members of the organisation. Nevertheless, it must be kept in mind that the stock situation for redfish is uncertain, while ICES on several occasions have been grossly mistaken in its advice regarding blue whiting.

Moreover, due to the lack of information on economic and social benefits, the review Panel was unable to make an assessment of the performance of NEAFC in terms of meeting the Convention's objective of optimal utilisation [11]. The Panel considers it unlikely that such benefits are being optimised given that many of the fisheries in the Convention Area are industrial level fisheries being fished, in practice, under open access conditions, and consequently a portion of the economic rents available from these fisheries is most probably being dissipated at the expense of optimal economic or social outcomes [11]. It must be pointed out, however, that this situation can be changed if it is seen to be in the interest of the countries involved to do so.

There is some evidence of rent dissipation. For instance, Kennedy estimated that optimal harvest levels of Northeast Atlantic Mackerel, where joint rent between participating countries is maximised, to be about the half of the current level [37]. On the other hand, substantial – albeit not maximum – rents are made in the Norwegian spring spawning herring fishery [42].

The time consistency or resilience of agreements also appears to be an important consideration, as climate change can impact on the distribution pattern for several stocks in question. The breakdown of the coastal agreement for Norwegian spring spawning herring due to changes in distribution was discussed in Section 3; see also Hannesson, Herrick and Barange [43]. Possible consequences of climate change for the blue whiting agreement are analysed in a recent paper by Ekerhovd [44]. Whether climate change is the cause of migration of mackerel to the Icelandic EEZ is not yet known.

Although the Panel suggested that NEAFC take steps to develop an annual fisheries status report which encompasses not just biological factors for the fish stocks concerned but social, environmental and economic assessments as well [11], there have not been any actions taken as of today. RMFOs, including NEAFC could improve their negotiating power by addressing socio-economic benefits from optimal management of fisheries resources, and provide incentives for coalition formation. How this could or should happen, is left unexplained.

Some of the conditions underlying cooperative management of a fishery resource were discussed in Section 2. In the final instance it is the interests of the agents in the fishery, acting on their own or in coalition with others, that will determine how a fishery is managed and how management is enforced. Underlying the management regime, however, is the setting of suitable TACs and their distribution among the participants in the fishery. This places a formidable responsibility on the Contracting Parties to achieve sustainable harvesting of very valuable fish stocks in the North Atlantic. Based on recent history, there is considerable scope for improvement.

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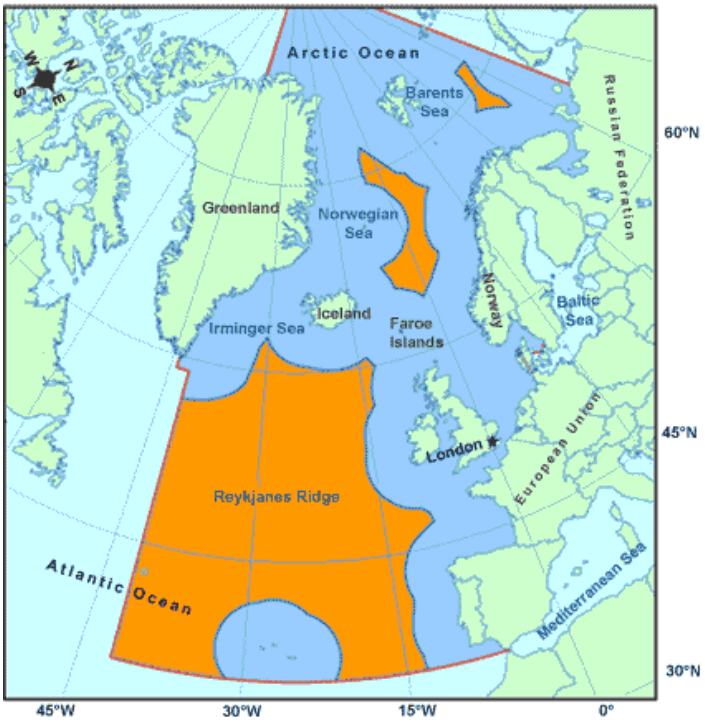

Figure 1: The NEAFC Regulatory and Convention Area.
Source: NEAFC website [10].

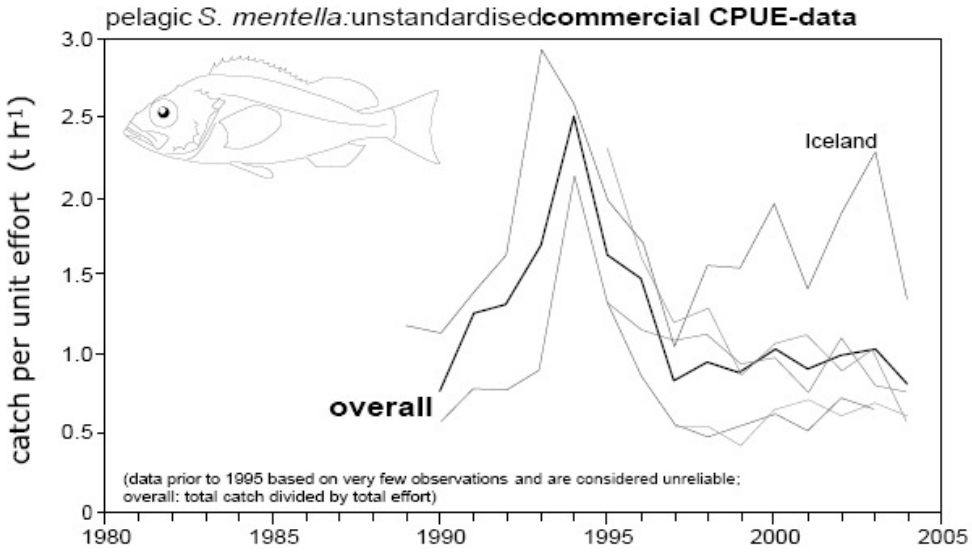

Figure 2: CPUE for the Pelagic *S. Mentella* Fishery.
Source: Taken from [18].

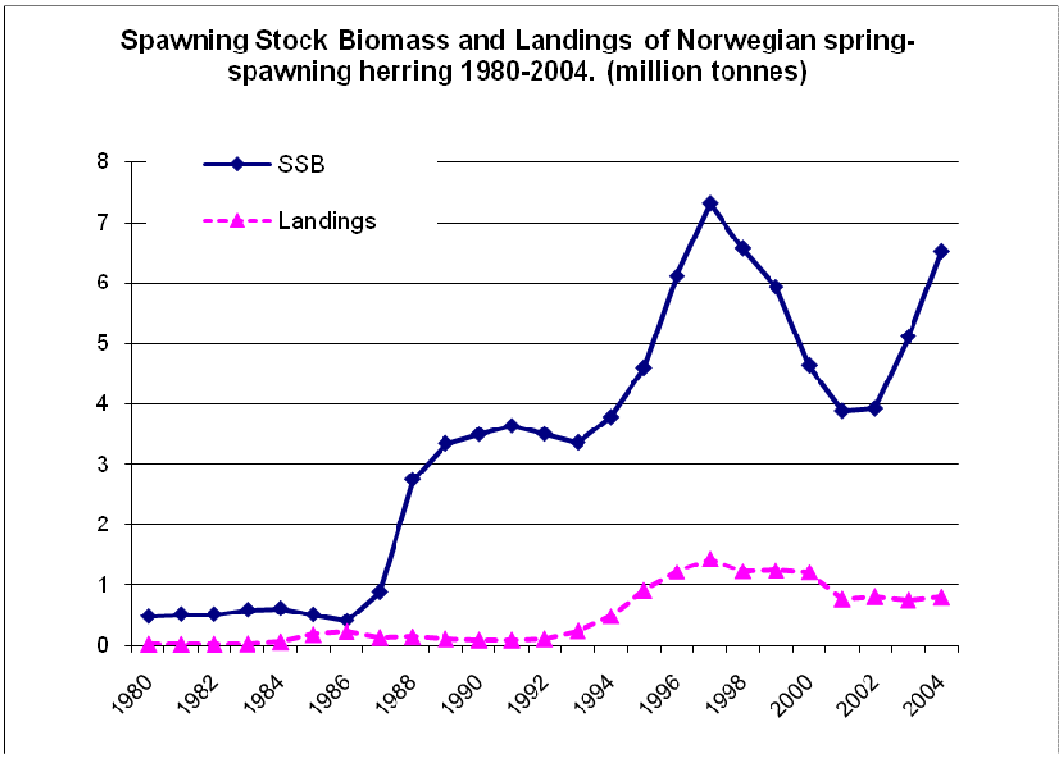

Figure 3: Spawning Stock Biomass (SSB) and Landings of Norwegian Spring-spawning Herring. 1980-2004.

Source: Taken from [18].

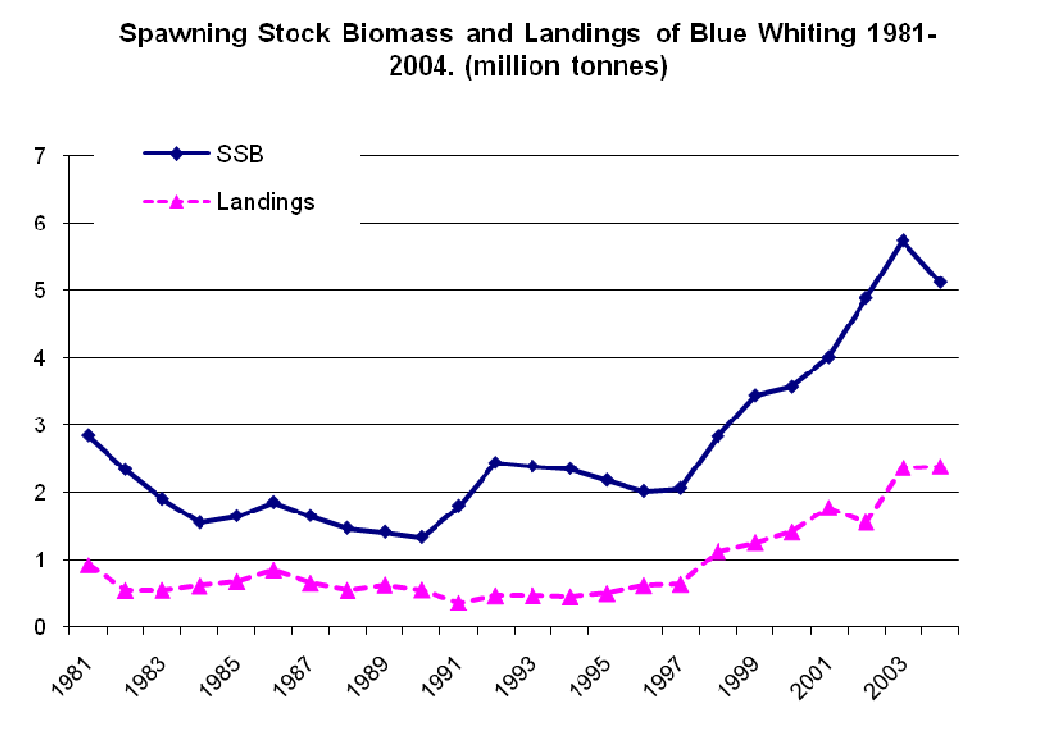

Figure 4: Spawning Stock Biomass (SSB) and Landings of Blue whiting 1981-2004. Million Tonnes.
Source: Taken from [18].

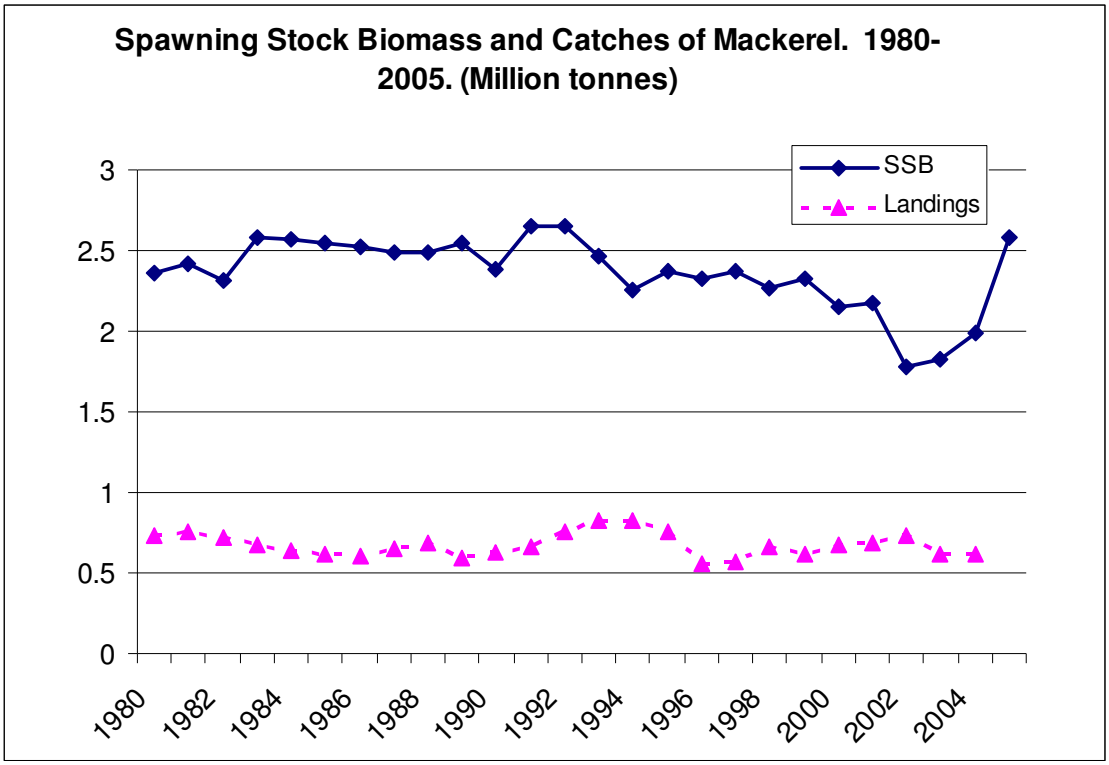

Figure 5: Spawning Stock Biomass (SSB) and Catches (including discards) of Northeast Atlantic Mackerel 1980-2005. Million tonnes
Source: Taken from [18].

Table 1: Catches of Pelagic Redfish in the Irminger Sea and Adjacent Waters. 1990-2006. Tonnes [a]

Year	Total catches
1990	31,901
1991	27,608
1992	65,962
1993	115,835
1994	148,689
1995	175,842
1996	180,322
1997	122,825
1998	116,968
1999	109,665
2000	126,313
2001	128,818
2002	146,334
2003	160,984
2004	125,905
2005	73,715
2006	82,910

[a] Due to the lack of area reporting for some countries, the share in Subareas XII and XIV is only approximate in the most recent years.
Source: Sata from [45].

Table 2: Agreed TAC vs. Catch of Pelagic Redfish *S. Mentalla*. '000 tonnes.

Year	ICES Advice	Agreed TAC [a,b]	ACFM Catch
1987	No assessment		91
1988	No assessment		91
1989	TAC		39
1990	TAC		32
1991	TAC		27
1992	Preference for no major expansion of the fishery		66
1993	TAC		116
1994	TAC		149
1995	TAC		176
1996	No specific advice	153	180
1997	No specific advice	153-158	123
1998	TAC not over recent (1993-1996) levels of 150 000 t	153	117
1999	TAC to be reduced from recent (1993-1996) levels of 150 000 t	153	110
2000	TAC set lower than recent (1997-1998) catches of 120 000 t	120	126
2001	TAC less than 75% of catch 1997-1999	95	129
2002	TAC less than 75% of catch 1997-1999 Revised to be below current catch levels	Not agreed NEAFC	135
2003	TAC not exceed current catch levels	proposal (95)	151
2004	TAC not exceed current catch levels	119	124
2005	Limit catch to 41 kt	120	
2006	Catch less than 41 kt	80	

a) Set by NEAFC. b) Preliminary.

Source: data from [18].

Table 3: Agreed TAC vs. Catch of Norwegian Spring-spawning Herring. '000 tonnes.

Year	ICES Advice	Agreed TAC	ACFM Catch
1987	TAC	115	127
1988	TAC	120	135
1989	TAC	100	104
1990	TAC	80	86
1991	No fishing from a biological point of view	76	85
1992	No fishing from a biological point of view	98	104
1993	No increase in F	200	232
1994	Gradual increase in F towards F0.1; TAC suggested	450	479
1995	No increase in F	None[a]	906
1996	Keep SSB above 2.5 million t	None[b]	1 217
1997	Keep SSB above 2.5 million t	1 500	1 420
1998	Do not exceed the harvest control rule	1 300	1 223
1999	Do not exceed the harvest control rule	1 300	1 235
2000	Do not exceed the harvest control rule	1 250	1 207
2001	Do not exceed the harvest control rule	850	770
2002	Do not exceed the harvest control rule	850	809
2003	Do not exceed the harvest control rule	711[c)]	773
2004	Do not exceed the harvest control rule	825[c)]	794
2005	Do not exceed the harvest control rule	1.000[c)]	
2006	Do not exceed the harvest control rule		

Source: data from [18].

a Autonomous TACs totaling 900 000 t.

b Autonomous TACs totaling 1 425 000 t were set by April 1996.

c There was no agreement on the TAC, the number is the sum of autonomous quotas from the individual Parties.

Table 4. Catches of Blue Whiting by Country in the Northeast Atlantic, 1995-2006. Tonnes.

Country	1995a	1996	1997	1998	1999	2000
Norway	261,362	356,054	348,268	570,665	534,570	553,478
Russian Federation	93,824	87,310	118,656	130,042	182,637	241,905
Faeroe Islands	25,936	21,483	28,773	71,217	105,106	152,687
Iceland	369	513	10,480	68,514	160,424	259,157
EU	143,762	147,946	185,068	312,238	314,927	238,561
Total	526,380	613,306	691,246	1,152,677	1,297,665	1,445,788
	2001	**2002**	**2003**	**2004**	**2005**	**2006**
Norway	573,686	557,684	851,396	958,768	738,599	642,453
Russian Federation	315,586	298,367	360,160	346,762	332,240	329,400
Faeroe Islands	258,334	204,524	326,593	316,868	267,447	320,592
Iceland	365,101	286,381	501,494	422,078	265,889	314,755
EU	281,247	210,732	333,485	374,815	455,394	410,050
Total	1,793,954	1,557,688	2,373,128	2,419,291	2,059,569	2,017,250

a Japanese catch of 1,127 tonnes are included in 1995 total.
Source: Data from [46].

Table 5. ICES's Management Advice on TAC for Blue Whiting: the Expected Landings (Based on the Recommendations), TAC Agreed upon by the NEAFC Members, and Actual landings. '000 Tonnes.

Year	ICES recommendations	Expected landings	TAC	Actual landings
1994	Precautionary TAC (northern component); no recommendations on the southern component of the stock	485	650a	459
1995	Precautionary TAC for combined stock	518	650a	579
1996	Precautionary TAC for combined stock	500	650a	646
1997	Precautionary TAC for combined stock	540	650a	672
1998	Precautionary TAC for combined stock	650	650	1,125
1999	Landings > 650,000 t may not be sustainable in the long run	650	650	1,256
2000	F should not exceed the proposed $\mathbf{F}_{pa}$	800	650	1,412
2001	F should not exceed the proposed $\mathbf{F}_{pa}$	628	650	1,780
2002	Rebuilding plan	0		1,560
2003	F should not exceed the proposed $\mathbf{F}_{pa}$	600		2,321
2004	Achieve 50% probability that F will be less than Fpa	925		2,378
2005	Achieve 50% probability that F will be less than Fpa	1,075		
2006	F = F management plan	1,500		
2007			1,700	

Source: Report of the Northern Pelagic and Blue Whiting Fisheries Working Group, 25 August 1 September 2005 (ICES CM 2006/ACFM:05). Cited in: [18]. TAC for 2007 was taken from [22].
[a] NEAFC proposal for NEAFC regions 1 and 2.

Table 6: Agreed TAC vs. catch of Northeast Atlantic Mackerel. '000 tonnes.

Year	ICES Advice	Total Agreed TAC [c]	Official landings	Discards and Slipping[a]	ACFM catch[b,d]
1987	Given by stock component	442	589	11	655
1988	Given by stock component	610	621	36	680
1989	Given by stock component	532	507	7	590
1990	Given by stock component	562	574	16	628
1991	Given by stock component	612	599	31	668
1992	Given by stock component	707	723	25	760
1993	Given by stock component	767	778	18	825
1994	Given by stock component	837	792	5	821
1995	Given by stock component	645	660	8	756
1996	Significant reduction in F	452	493	11	564
1997	Significant reduction in F	470	434	19	570
1998	F between 0.15 and 0.2	549	647	8	667
1999	F of 0.15 consistent with PA	562	595	n/a	616
2000	F=0.17: Fpa	612	579	2	675
2001	F=0.17: Fpa	670	620	1	687
2002	F=0.17: Fpa	683	688	24	727
2003	F=0.17: Fpa	583	580	9	617
2004	F=0.17: Fpa	532	559	11	611
2005	F=0.15 to 0.20	422			
2006	F=0.15 to 0.20				

Source: data from [18].

[a] Data on discards and slipping from ony two fleets.

[b] Landings and discards from IIa, IIIa, IV, Vb, VI, VII, VIII, and IXa.

[c] All areas except some catches in international waters in II.

[d] Catches updated in 2003 with revisions from SGDRAMA in 2002.

n/a=not available. Tonnes.

Table 7. Performance Review Criteria

1. Conservation and management of fisheries resources	Knowledge about the status of marine living resources	Status of major fish stocks in relation to maximum sustainable yield and other relevant biological standards. Trends in status of stocks. Status of species belonging to the same ecosystems as, or associated with, or dependent upon, the major target stocks
	Quality and provision of scientific advice	Extent to which NEAFC receives advice in accordance with Article 14 of the NEAFC Convention and the Memorandum of Understanding between ICES and NEAFC
	Data collection and sharing	Extent to which Contracting Parties, individually or through NEAFC, collect and share, in a timely manner, complete and accurate data concerning fishing activities
	Adoption of conservation and management measures, including measures adopted at Coastal State level	Extent to which NEAFC has adopted measures based on the best scientific evidence available and used strategies designed to ensure the promotion of the long-term conservation and optimum utilisation of fishery resources Extent to which NEAFC provides sustainable economic, environmental and social benefits Extent to which NEAFC has taken due account of the need to conserve marine biological diversity and minimise harmful impacts of fisheries on living marine resources and marine ecosystems
	Compatibility of management measures	Extent to which measures have been adopted as set out in Article 7 of UNFSA
	Fishing allocations	Extent to which NEAFC successfully allocates fishing
2. Monitoring, control and	Flag States duties	Extent to which Contracting Parties are fulfilling the duties as Flag States under the NEAFC Scheme (UNFSA Article 18

enforcement		and the 1993 FAO Compliance Agreement)
	Monitoring, surveillance and control activities	Extent to which Contracting Parties implement the relevant parts of the NEAFC Scheme of Control and Enforcement and the non-Contracting Party Scheme
	Port State measures	Extent to which Contracting Parties implement port State obligations under the non-Contracting Parties Scheme and UNFSA Article 23
	Other enforcement-related issues, including follow up on infringements	Extent to which Contracting Parties are following up infringements to both Schemes. Management measures by which they are bound
3. Decision making and dispute settlement procedures		Extent to which NEAFC has established adequate decision making procedures and mechanisms for solving possible disputes
4. Co-operation	Transparency	Extent to which NEAFC is operating in accordance with the transparency provisions of Article 12 of UNFA
	Participatory rights of newcomers	Extent to which NEAFC is determining participatory rights of new members in accordance with Article 11 of UNFA
	Relationship to cooperating non-Contracting Parties	Extent to which NEAFC grants cooperative non-Contracting Party status in accordance with the non-Contracting Party Scheme
	Relationship to other non-Contracting Parties	Extent of fishing activity by vessels of non-Contracting Parties, that are not cooperating with NEAFC and measures to deter such activity
5. NEAFC in a regional and international context	Co-operation with other RFMO/As	Including co-operation in the network of Regional Fishery Body Secretariats

	Co-operation with other regional organisations	Including the OSPAR Commission for the Protection of the Marine Environment in the North East Atlantic

Source: Data from [11].