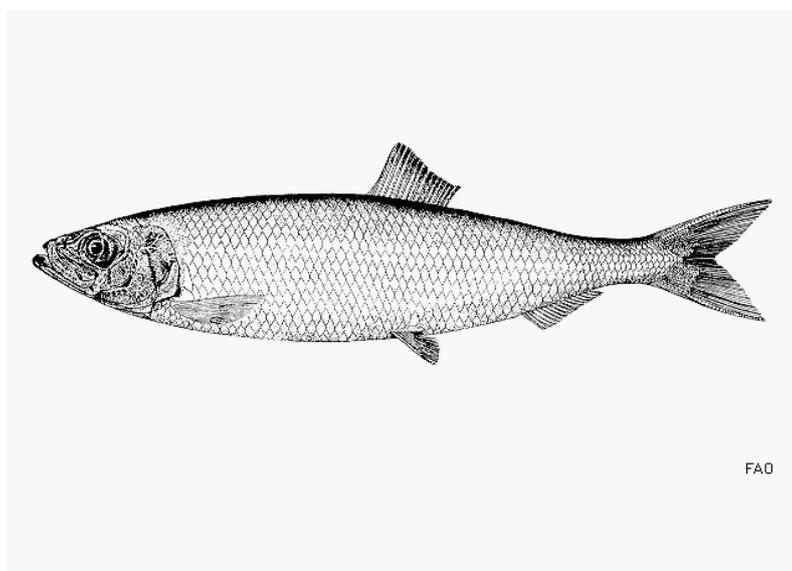


**Case studies: Towards sustainability**

# Atlantic herring

*Clupea harengus*

**Norwegian spring-spawning herring –  
Norwegian fleet**



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## Norwegian spring spawning herring – Norwegian fleet *Clupea harengus*

### Introducing the broader fishery

The Norwegian spring spawning herring (*Clupea harengus*) is a highly migratory 'straddling' stock found throughout large parts of the NE Atlantic (ICES areas Va, Vb, IIa, IIb, IVa). The herring spawns along the west coast of Norway from February to March. The larvae drift north and northeast to the Norwegian coast and the Barents Sea, where the main areas for immature fish are found. Most of the young herring leave the Barents Sea as 3-year-olds and feed off northern Norway for 2 years, before recruiting to the spawning stock as 5-year-olds.

The herring is caught throughout the year along its migration path along the Norwegian coast and in the Norwegian Sea. The fishery in general 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 Faroese, Icelandic, Jan Mayen, Svalbard, and international areas. The most intensive fisheries take place on the spawning grounds in February and in the wintering areas from September to January.

The main catches in 2007 were taken by Norway (779,000 t), Russia (162,000 t), Iceland (173,000 t), the EU (83,000 t), and the Faroe Islands (64,000 t). The Norwegian coastal fishery is mainly carried out with purse seine, while the international high seas fishery is mainly a pelagic trawl fishery. The Norwegian fleet is the focus of this case study.

### Recent fishery history

The Norwegian spring-spawning herring population collapsed to the state of commercial extinction in the late 1960s (see Tables 1 and 2), attributed to overfishing and environmental changes. The stock remained at extremely low levels for over 20 years, but has now recovered.

**Table 1: The fall and rise of Norwegian herring**

1950:	Spawning stock biomass (SSB) is at its post-war highest at 14.2 million t, but begins to decline
1966:	Increasing fishing effort and new technology leads to a peak in landings of almost 2 million t, but SSB is already close to the critical lower limit of 2.5 million t. From this time, declining landings mirror the stock decline
1972:	Stock has collapsed and SSB reaches an all time low of 16,000 t
1973:	Lowest landings are recorded at 7,020 t
1988:	Stock rises above the critical limit of 2.5 million t allowing an expansion of the fishery, almost entirely confined to Norwegian coastal waters
1995:	SSB reaches the precautionary limit of 5 million t, and the geographical extent of the fishery increases with nine nations participating and the total catch exceeding 900 000 t.
2007:	Stock is at 11.6 million t with landings at 1.27 million t.

## **Sustainability of the Norwegian fleet targeting Norwegian spring-spawning herring**

### **1. Is the fishery managed from an ecosystem perspective?**

*Norway has the reputation of having some of the best managed fisheries in the world, and was recently ranked top in the world with regard to overall compliance with the UN Code of Conduct for Responsible Fisheries, and second behind the US for its implementation of ecosystem based management (EBM) for fisheries<sup>1</sup> There is, however, certainly room for improvement – Norway scored just 60% for overall compliance with the code and about 64% for EBM implementation.*

The Norwegian Marine Resources Act<sup>2</sup> has some strong goals that require “a precautionary approach, in accordance with international agreements and guidelines” and “an ecosystem approach that takes into account habitats and biodiversity.” In addition, Norway has developed clear goals set for implementing the use of a complex variety of marine protected areas (MPAs) as part of the management plan.<sup>3</sup> Area based management measures have so far been introduced to Norwegian fisheries management for the following reasons:

- competition between gears and fleets
- protection of spawning grounds
- protection of juvenile fish – permanent and real time closures
- rebuilding of depleted stocks (e.g. coastal cod, redfish, sandeel)
- management measure for stationary stocks (e.g. lobster and seaweed)
- protection of vulnerable bottom habitats (e.g. five coral reef MPAs). At present three more coral reefs are considered for protection.

### **2. Does the fishery help to protect sensitive species and habitats?**

*The type of fishery – targeted, selective, with no seabed contact – and the current health of the herring stock do ensure a minimal impact on sensitive species and habitats.*

The fishery follows the migrations of the adults through the year, so that juveniles are somewhat protected by avoidance, with additional protection provide through the minimum landing size for herring in the Norwegian fleet. The spawning grounds could also potentially be closed to fishing to further improve protective measures.

There is little information available on the impacts of the fishery on protected, endangered or threatened (PET) species, however given the nature of the fishing method and current healthy status of the fishery (see 3 below) they are not likely to be significant.

### **3. Does the fishery maintain the stocks of all target species at a healthy level?**

*The stock is regularly assessed, healthy, and recently the scientific advice has been followed.*

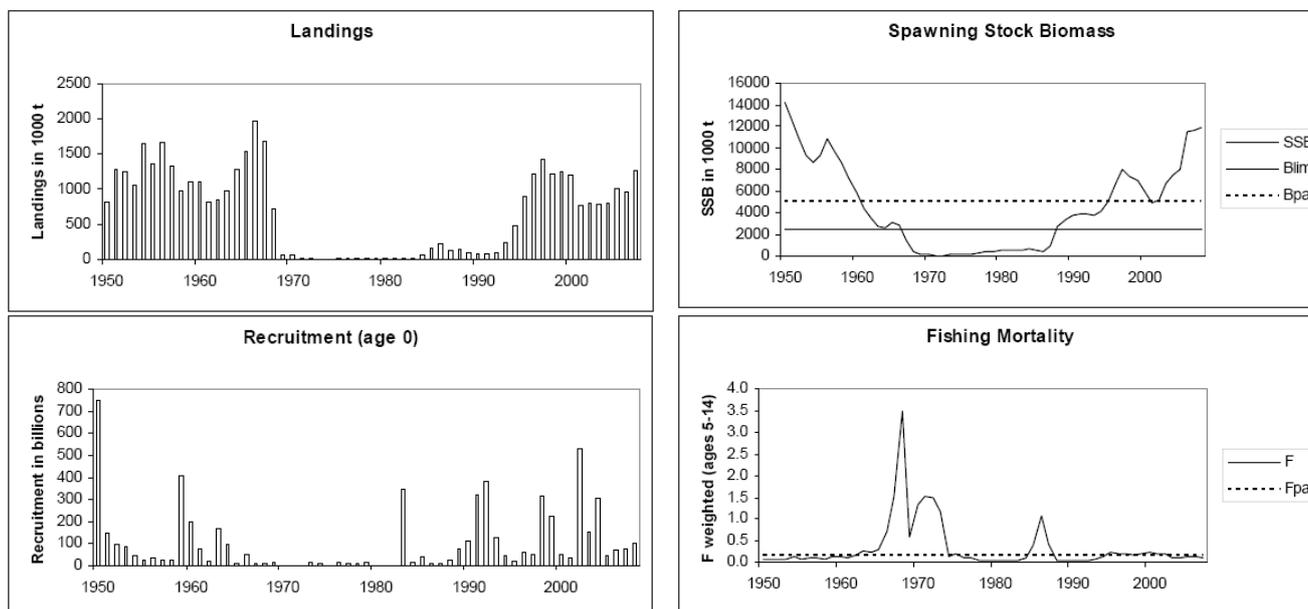
#### *Stock assessments*

Yearly stock assessments and scientific advice are provided by ICES. Assessments for this stock are somewhat uncertain due in part to changing migration and distribution, and the difficulty in predicting the appearance and impact of large year classes; however, there is agreement that the stock level is currently high and the rate of fishing is low.

There are no figures for the biomass producing the Maximum Sustainable Yield (MSY) or estimates of the unfished stock (Bvirgin), so it is difficult to compare the fishery to others using MSY-based-management. However, the spawning stock biomass (SSB) is close to the highest level recorded (1950) and has been above the precautionary limit (Bpa) for 20 years.<sup>4</sup>

The current SSB (Table 2) is more than double the Bpa and more than four times the negative limit (Blim). In addition, the stock relies on the irregular occurrence of very strong year classes (see Table 2), which have been appearing more often in recent years.

The fishing rate (or fishing mortality,  $F$ ) has been maintained at a low level since the stock collapse (see Table 2). The target rate is below the precautionary level ( $F_{pa}$ ) and the actual fishing rate has been below the precautionary level since 2003.



**Table 2: Fishery and stock data for the Norwegian spring-spawning herring fishery, 1950–2007**

#### Stock management

The EU, Faroe Islands, Iceland, Norway, and Russia agreed in 1999 on a long-term management plan for the stock. It includes a recovery plan in the case of a decline of the stock below  $B_{pa}$  to ensure a safe and rapid recovery of the SSB to a level above  $B_{pa}$ . ICES describes the plan as precautionary and the target defined in the management plan as being consistent with high long-term yield and with a low risk of depleting the stock's production potential.<sup>5</sup>

Countries exploiting the stock have generally followed scientific advice in recent years. In 2006, there was disagreement regarding the allocation of the quota and no total allowable catch (TAC) was agreed. Despite this, the sum of the coastal states quotas did not lead to  $F_{pa}$  being exceeded. For 2007 and 2008 the TAC was agreed in accordance with the Management Plan and agreement was made on the allocation of the quota.

Norway has adopted various measures to avoid overshooting of quotas in their pelagic fisheries. Unintentional overshooting can be due to underestimating the size of the last catch, bycatch in other fisheries, and the ban on discarding. The main measure used by Norway to avoid quota overshooting in pelagic fisheries is the so-called 'under-regulation' of the different group-quotas – the sum of the vessel quotas is set lower than the overall group quota. This is estimated on the basis of earlier overfishing at the vessel level.

#### 4. Does the fishery use selective fishing methods?

*The broader fishery is a pelagic fishery composed of single and pair trawls and purse seines. The Norwegian sector mainly operates purse seines. These methods do not impact the sea bed and tend to be selective, especially when targeting schooling fish.*

There is little quantitative information on the bycatch in the fisheries for herring, but bycatch is thought to be small. The known bycatch in the Norwegian purse seine fishery consists of a small amount of large saithe that chase the herring migrations. The Norwegian fisheries inspection services can close areas if the intermixture of saithe is too high.<sup>6</sup>

In recent years, increasing amounts of mackerel have been caught in other parts of the herring fishery in some feeding areas (such as the Faeroes). However, fisheries tend to try to avoid the mackerel due to the low market value of mackerel in summer months when its flesh is too soft.<sup>7</sup>

In the Norwegian fishery there are also regulations aiming at protecting immature fish with a minimum catch size at 25 cm.<sup>8</sup>

A ban on discarding fish that are dead or dying was introduced in Norwegian fisheries legislation in 1988.<sup>9</sup>

Bycatch data for non-commercial species is not currently collected. With regard to cetacean bycatch, one study<sup>10</sup> considered directed pelagic trawling and purse seining for herring as among the fisheries where cetacean bycatch is known or suspected to occur; however, there is little data on this, and it does not appear to be a major concern for this fishery. Seabird bycatch is not thought to be significant. Collection of non-commercial bycatch data could become mandatory under Norway's Marine Resources Act:

Chapter 4, section 15: "The Ministry may by regulations lay down a duty to land bycatches of other marine organisms, including plants, marine mammals and seabirds, or a duty to provide reports on such bycatches."<sup>11</sup>

#### **5. Does the fishery maintain the biodiversity associated with the fishery?**

*There is little information available on the impacts of the fishery on the ecosystem however ICES states that the "unintended effects of the fishery on the ecosystem are probably small," given the nature of the fishing method and current healthy status of the fishery.<sup>12</sup>*

The Norwegian Sea and Barents Sea ecosystems are relatively simple and fairly well understood – ICES provides a detailed overview of these ecosystems.<sup>13</sup> Marine mammals (at least 24 species including small and large cetaceans and seals) are important components of the Barents Sea – the amount of fish that marine mammals need to eat is about 1.5 times the amount of fish caught by the all the Barents Sea fisheries. The Barents Sea also holds one of the largest concentrations of seabirds in the world – about 20 million seabirds harvest approximately 1.2 million tonnes of biomass annually from the area.

#### **6. Does the fishery minimise energy use, chemical use, and waste production in all its operations?**

*Data for this aspect of the fishery is lacking. It is not a requirement of management.*

#### **7. Does the fishery operate in a socially, and economically, fair and responsible manner?**

*IUU is not a major issue in this fleet, and the fishermen's sales associations ensure fair prices. However, the fishing rights of Norway's indigenous people, the Sami, have not yet been dealt with adequately by fisheries management.*

IUU has not been reported as a major issue in this fleet or in the broader herring fishery, and monitoring, control and surveillance (MCS) in Norwegian waters is strong (see 8 below).

All fish in Norway is sold through sales associations (six in total) that are owned by the fishermen.<sup>14</sup> These organisations provide full transparency with regard to the fishery, from the details of individual vessel quotas through to the final prices and buyers details (see 8 below) – all of which help to ensure a fair deal for both fishermen and buyers.

#### *Indigenous peoples rights<sup>15</sup>*

In recent decades, Norway has adopted a supportive policy for the indigenous Arctic people, the Sami, and has been promoting indigenous rights at the international level. The Sami Parliament

was established in 1989. Norway was the first country to ratify the 1990 International Labour Organization (ILO) Convention 169, on the rights of indigenous peoples. Unfortunately, this new policy has had little effect in the area of fisheries management.

Coastal Sami have struggled to safeguard their traditional and customary fishing practices from the impacts of industrial fishing, and from failure of fisheries management's to recognize the link between small-scale fisheries and indigenous rights. When authorities established a new quota system in 1989–90, many small scale fishermen, mainly the coastal Sami, were systematically excluded from obtaining vessel quotas. Instead they were transferred to a competitive quota system, under which they were unable to make an adequate living. In addition, consideration was not given to Sami customary law.

Small-scale fisheries faced similar issues when the commercial fishery for king crab was developed in 2002. This invasive Pacific species (introduced from Russia) has spread along the coast and into the fjords of northern Norway. The criteria for obtaining a crab fishing licence meant that smaller boats, unable to fish cod any more due to the overwhelming presence of king crabs, were denied the right to catch crab, until laws were changed in 2008.

In 2008 the Coastal Fisheries Committee for Finnmark, the northern-most county of Norway, formulated a proposal for an indigenous and regional rights approach to small-scale fisheries, with the hope that the main elements of the proposal will be formalized by an Act adopted by the Norwegian Parliament.

#### **8. Does the fishery provide full traceability of all its fish from the point of capture to the market?**

*Monitoring, control and surveillance (MCS) and data collection for fisheries in Norway is strong and fully transparent.*

MCS covers the entire production chain in Norway, from the point of catch to storage and export.<sup>16</sup> The Coast Guard annually performs more than 1,800 inspections of Norwegian and foreign vessels operating in Norwegian waters. Vessels over 24 metres (15 metres for EU vessels) must carry satellite transponders that allow their activities to be tracked at all times, all year round. Once catches have been landed, the landing data are cross-checked against the fishing rights of the vessel. This task is performed by the fishermen's own sales associations and the Directorate of Fisheries.

The sales associations, such as Norges Sildesalgslags<sup>17</sup> for pelagic fish such as herring, are responsible for collecting statistics for the catch and the first-hand sale of fish. This information is passed on to the Directorate of Fisheries, and forms the basis for quota control and fisheries statistics. Sales associations also perform some dockside inspections.

The associations provide full transparency with regard to all data collected. All catches are reported while vessels are still at sea, and the vessel quotas and total catches for each vessel are all traceable on the associations' public websites. For pelagic fish like herring, the website even shows how much of the catch is sold for human consumption, and how much goes to into fishmeal. Data such as bycatch can be provided on request.

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