9.4.9 European eel

State of the stock

The available information indicates that the stock is at an historical minimum in most of the distribution area and continues to decline. Fishing mortality is thought to be high both on juvenile (glass eel) and older eel (yellow and silver eel). Recruitment to the stock is at a historically low level (Figures 9.4.9.1–2). Recent recruitment varies between areas from 1 to 10% of the recruitment observed in the 1970s, with higher values for the Atlantic area, and values less than 5% everywhere else (Figure 9.4.9.4). In the Baltic Sea, including Kattegat and Skagerrak, indices of young yellow eel recruitment have shown a sharp decline since about 1950 (Figure 9.4.9.3). Landings reported to FAO have declined to about 25% of the level of the mid-1960s (Figure 9.4.9.5).

Management objectives

A management framework for the recovery of the European eel stock was established in 2007 through an EU regulation (EU 1100/2007). The objective of this Regulation is the protection and sustainable use of the stock. To achieve the objective, member states will develop eel management plans for their river basin districts, designed to reduce anthropogenic mortalities. According to the EU regulation, eel management plans shall allow, with high probability, an escapement to sea of at least 40% of the biomass of silver eel, defined as the best estimate of the theoretical escapement if the stock had been completely free of anthropogenic influences. The EU regulation does not quantify high probability.

Reference points

As a result of the large uncertainties about eels due to their unusual biology (one single stock, spawning only once in their lifetime), ICES proposed a limit reference point of 50% for the escapement of silver eels from the continent in comparison to pristine conditions (ICES, 2003). This is higher than the escapement level of at least 40% set by the EU regulation. Precautionary reference points have not been defined. There are strong indications that recruitment might be impaired by the low spawning stock. In the 1970s, recruitment of glass eel was still at historically normal levels. This indicates that SSB was not limiting the production of recruits at that time. Therefore, an interim recovery level target could be 100% of the pre-1980 average silver eel escapement which generated higher recruitment.

Single-stock exploitation boundaries

Exploitation boundaries in relation to precautionary considerations

The recruitment of glass eels to Europe has shown a sharp and continued decline over more than 25 years to historically low levels as indicated in the section on "State of the stock." These low recruitment levels are an indication that the reproduction might be seriously impaired as a result of the stock being severely depleted. Since recruitment remains in decline and stock recovery is a long-term process for biological reasons, ICES recommends that all exploitation and other anthropogenic impacts on production and escapement of eels should be reduced to as close to zero as possible.

Management considerations

The eel stock is scattered over a multitude of inland and coastal waters with divergent characteristics. Anthropogenic pressures, such as barriers to migration (including intakes and turbines), pollution, habitat loss, etc. vary between river basins and could affect the eel stock as much as the effects of fishing. Therefore, management plans prepared under the auspices of the EU regulation should be tailored to address anthropogenic stresses that are important locally. Interim recovery levels, such as the one mentioned in the "reference points" section, should be considered in the development of management plans. Additional candidates for interim recovery levels are discussed in FAO/ICES (2008).

The EU Regulation requires a portion of glass eel catches to be made available for stocking, which often involves translocation of eels between river basins. Previous advice from ICES recommended that glass eels and other life history stages should not be translocated. Translocation and stocking of eel may involve a risk of decreased genetic variability. Movement and stocking could disrupt migration behaviour and could lead to spreading of diseases and parasites. Although there is a general consensus that the European eel stock is one panmictic homogeneous stock, there is some uncertainty about this view. There is little scientific basis for judging the potential benefits from stocking, but it is highly unlikely that the 40% recovery objective can be met primarily through stocking. Stocking should not be considered a remedy/solution for overfishing, or for ameliorating or mitigating any other anthropogenic activities adversely affecting the stock. In some cases where eels are so depleted that a river basin is at risk of no longer contributing to the spawning stock, stocking might be used as a last resort. However, large-scale stocking should not be allowed unless a scientific evaluation demonstrates that the potential escapement of silver eels will be enhanced. If

stocking occurs, procedures to prevent the introduction and spreading of parasites and diseases according to the European fish disease prevention policies should be applied.

In light of the poor state of the stock, it is important that monitoring, including time-series of recruitment, is continued and enhanced so that managers can be alerted if further declines occur, or so that progress towards recovering the stock can be measured. The quantity and quality of silver eel migrating seaward to spawn should also be monitored to help understand the factors that influence reproductive potential. Eel Management Plans should include provisions for collection of the necessary monitoring data and arrangements need to be made to make data accessible and to compile it for international analysis.

In 2007, eel was included in CITES Appendix II that deals with species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilization incompatible with their survival (see http://www.cites.org/eng/disc/how.shtml). The listing will be made effective in March 2009.

Ecosystem considerations

Habitat alteration, including barriers to eel passage and deterioration in water quality, contribute to the anthropogenic stress on eels. Eel Management Plans should address these stresses.

Factors affecting the fisheries and the stock

Regulations and their effects

Following the implementation of eel management plans from July 2009, the first post-evaluation of the regulation is expected in mid-2012.

The environment

Recent research indicated that pollution, diseases, and parasites might seriously impair the quality and reduce the fat content of silver eel escaping from the continent. On a pan-European scale, large differences in eel quality occur between areas. The quality of spawners also varies with biological characteristics such as fat content. None of these quality parameters are currently included in the assessment of the status of the stock or in setting management targets. However, these quality parameters could have impacts on the fitness and behaviour of eels and may have influence on the reproductive success. In addition, in some regions eels are contaminated to such an extent that they exceed either National or EU human consumption limits and could represent a threat to consumers.

Scientific basis

Data and methods

The advice is based on recruitment indices both from surveys and from commercial cpue. Landings data are incomplete, but show a decline in yield. Current monitoring is based on national programmes. The implementation of the EU Regulation has the potential to improve future data, and this should be an important consideration in the development of management plans. However, several long time-series may be jeopardised in the near future due to changes in the local eel fisheries under the Eel Management Plans (EMPs). In light of the poor state of the stock and continuing anthropogenic stresses, it is importance that time-series of recruitment are continued and supplemented. For fisheries that continue, effort and yield will need to be monitored. Current data collection programmes (EMPs, DCR, WFD, etc.) will need to be extended, coordinated, and integrated to support eel assessment and management.

Uncertainties

There are very few quantitative estimates of pristine silver eel production, which makes evaluation of progress toward the 40% recovery level called for in the EU regulation uncertain. It also adds uncertainty to comparisons between areas. Lack of data at the level of pristine production is another reason for considering interim targets based on observed population levels (see section on “reference points” and FAO/ICES, 2008). It is known that some eels inhabit estuarine and coastal waters without visiting freshwater rivers, but it is unknown if they are a significant portion of the population or if the proportion has changed during the period of declining abundance in rivers. This is a source of uncertainty to the state of the stock.

Comparison with previous assessment and advice

There is no change in the perception of the status of the stock. The advice remains that urgent actions are needed to avoid further depletion of the eel stock and to bring about a recovery.

Sources of information

EC. 2007. Council regulation (EC) N° 1100/2007 of 18 September 2007 establishing measures for the recovery of the stock of European eel.

FAO/ICES. 2007. Report of the EIFAC/ICES Working Group on Eels, Bordeaux (France), 3–7 September 2007. ICES CM 2007/ACFM:23.

FAO/ICES 2008. Report of the EIFAC/ICES Working Group on Eels, Leuven (Belgium), 3–9 September 2008.

ICES. 1999. Report of the ICES Advisory Committee on Fisheries Management, 1998. ICES Cooperative Research Report, No. 229. Pp. 393–405.

ICES. 2001. Report of the ICES Advisory Committee on Fishery Management, 2001. ICES Cooperative Research Report No. 246. Pp. 819–828.

ICES. 2003. Report of the ICES Advisory Committee on Fishery Management 2002. ICES Cooperative Research Report No. 255. Pp. 938–947.

ICES. 2005. Report of the ICES Advisory Committees, 2005. ICES Advice 2005, Vol. 9.

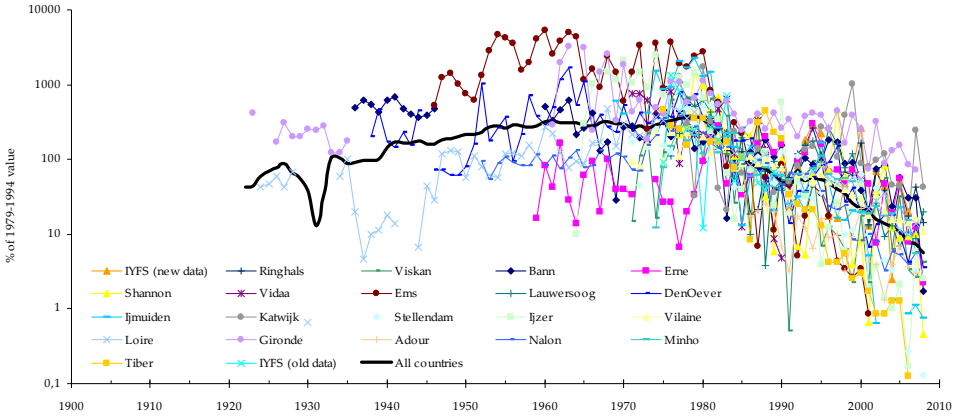

Figure 9.4.9.1 Time-series of **glass eel** monitoring in Europe. Each series has been scaled to the 1979–1994 average. Note the logarithmic scale on the y-axis.

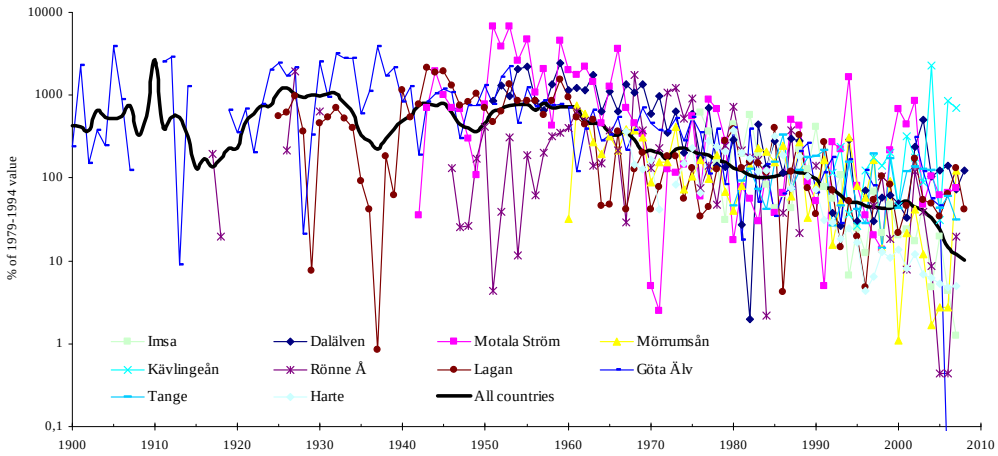

Figure 9.4.9.2 Time-series of monitoring **yellow eel** recruitment (older than one year) in European rivers. Each series has been scaled to the 1979–1994 average**.** Note the logarithmic scale on the y-axis**.**

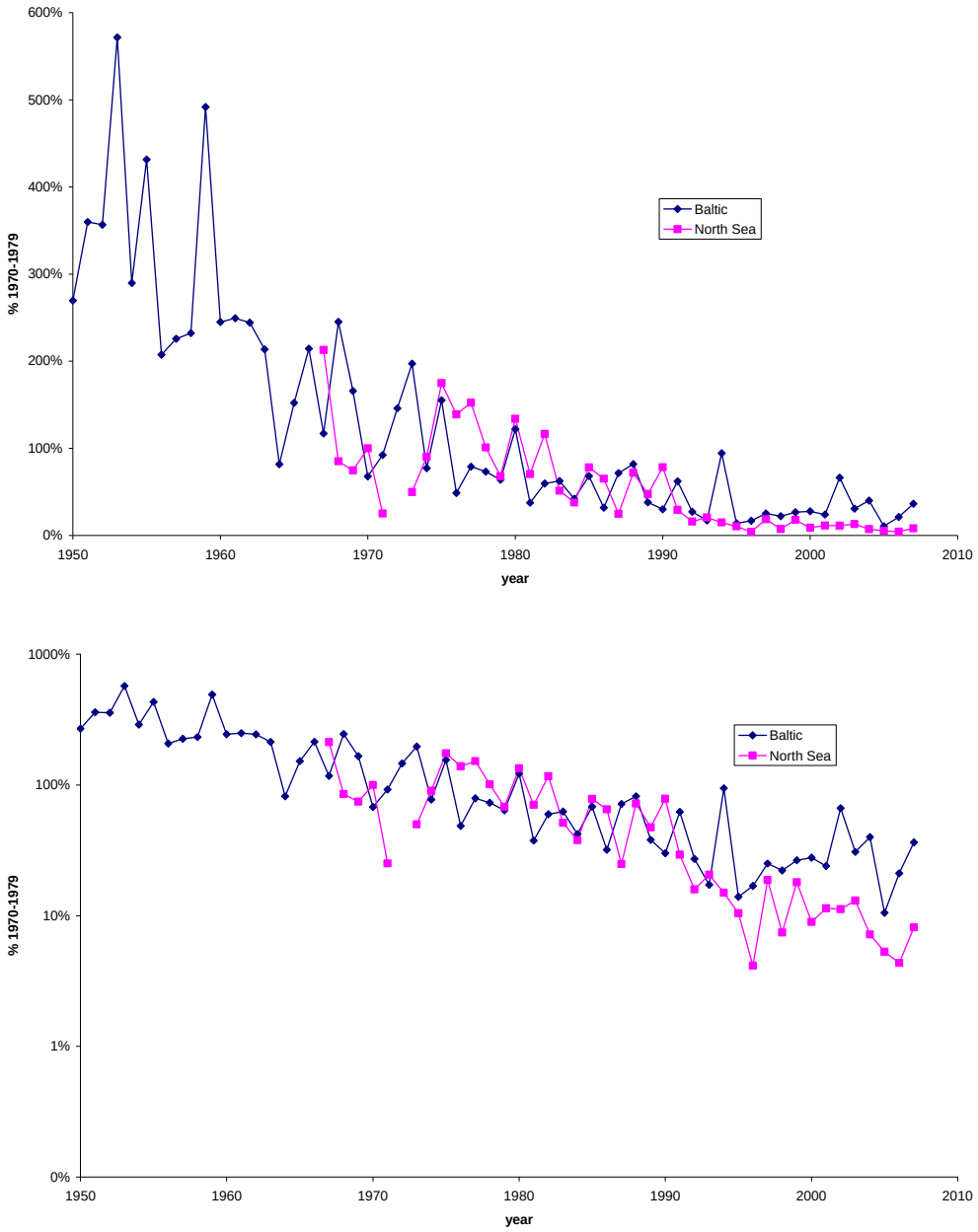

Figure 9.4.9.3 Young **yellow eel** older than 1 year index per area in regular (upper panel) and in logarithmic scale (lower panel). Each series has been scaled to the 1970–1979 average.

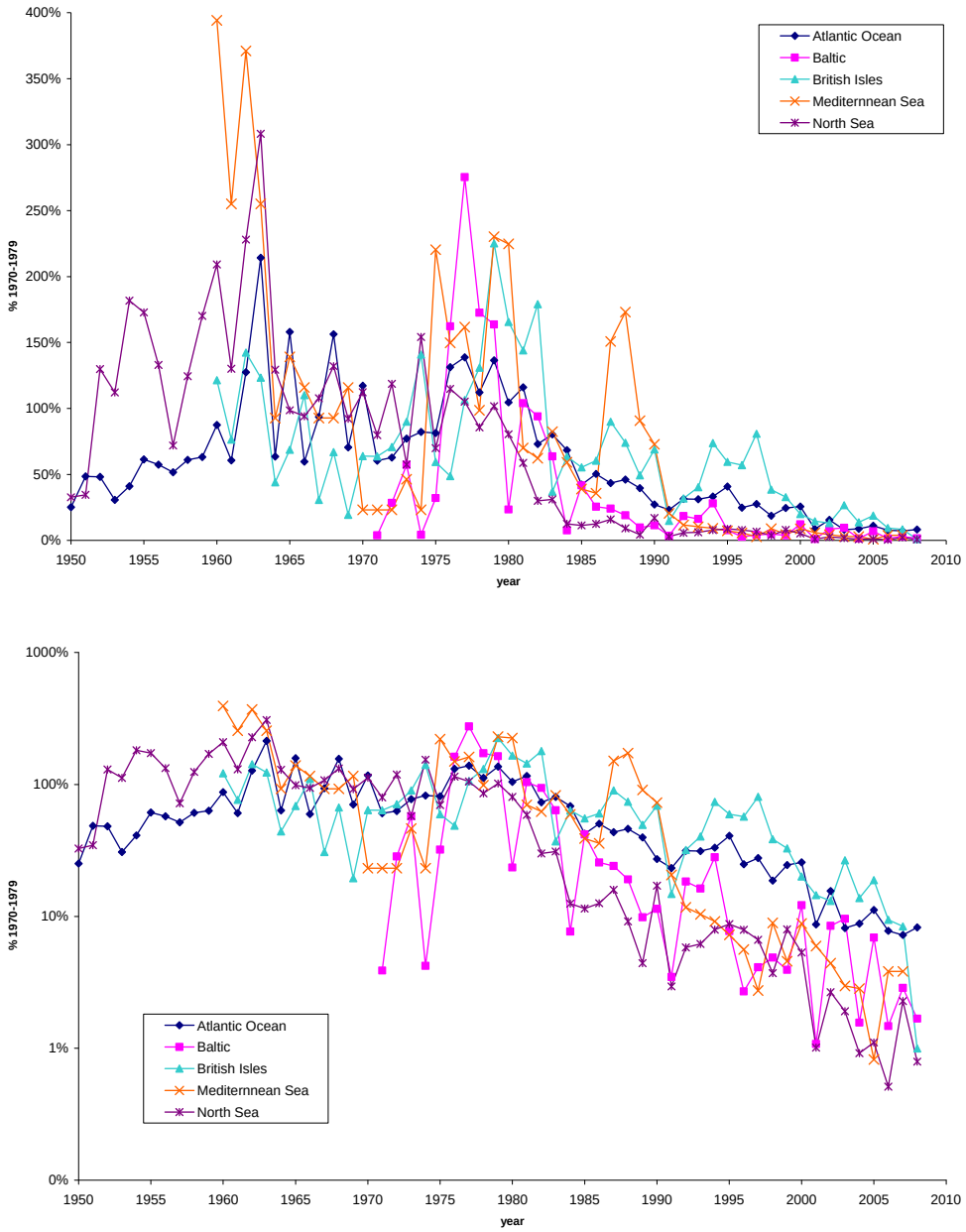

Figure 9.4.9.4 Recruitment (**glass eel** and **young of the year**) index per area in regular (upper panel) and in logarithmic scale (lower panel). Each series has been scaled to 1970–1979 average.

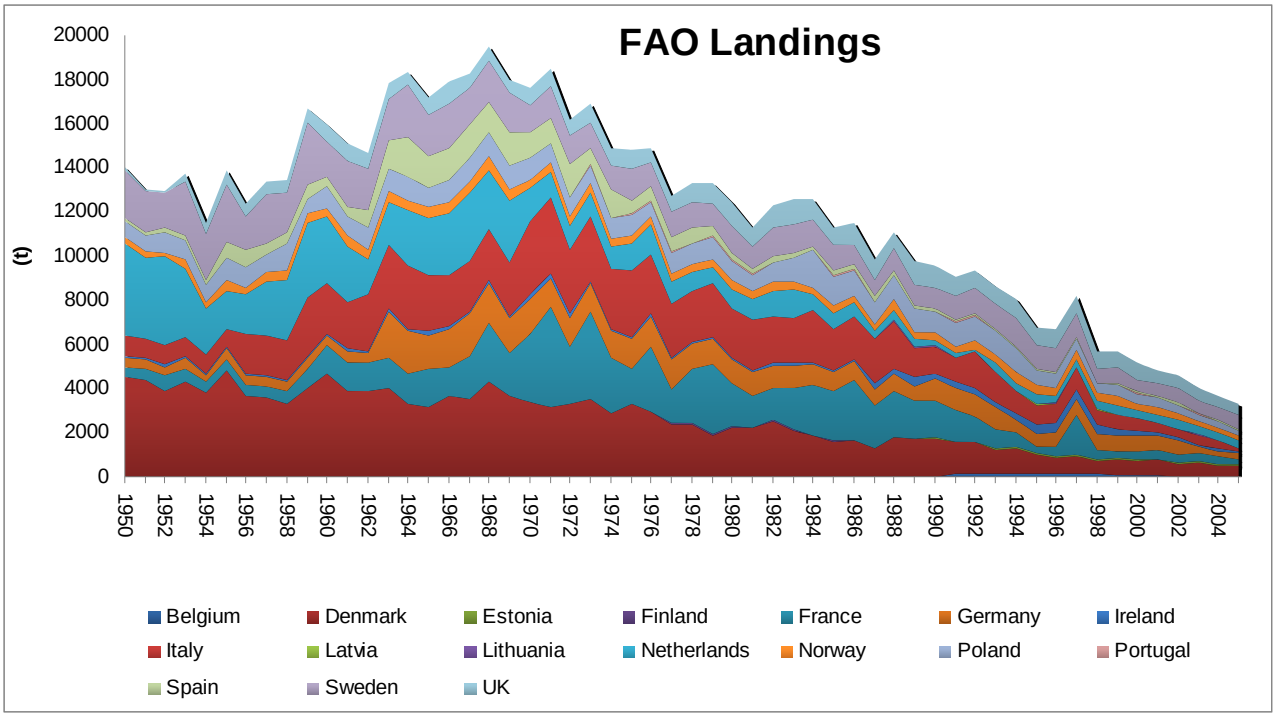

Figure 9.4.9.5 European eel landings (tonnes) in Europe. Source: FAO.