



# THE ROLE OF COD IN THE BALTIC SEA

SUMMARY

*It is hardly news that the cod stocks in the Baltic Sea are in a poor condition. Similar to many commercially important fish stocks around the world, cod has decreased substantially during recent decades. Stocks that play an important role for the commercial fishermen are commonly also important for sustaining functioning ecosystems. The Baltic Sea region has well-established democratic institutions that can base their decisions on qualified scientific assessments. The prerequisites for a sustainable fisheries management should thus be relatively good. If we are unable to manage the Baltic cod stocks in a sustainable matter, where will we be able to reverse the negative trend observed for many of the worlds' fish stocks?*

## Cod and the ecosystem

The Baltic is a productive sea. When the cod stocks reached its historical record, during the 1980s, roughly 22 per cent of global cod catches were landed from this tiny sea! Catches today are far more modest. Cod is a bottom-dwelling, cold-water species, originating from the sea, where salinities are far higher than in the Baltic. The Baltic cod is specially adapted – reproduction can only be successful if oxygen and salinity levels (affected by rainfall and inflows of oxygenated, saline North Sea water) are sufficiently high. Large cod stocks are thus in part regulated by natural variation.

But human influence on the Baltic Sea also affects cod reproduction and survival. Eutrophication has contributed to increased oxygen consumption at larger depths, which decrease the potential for cod eggs to survive. In a historical context, however, eutrophication has contributed to the large production of cod. In the early 1900s, the Baltic Sea was a nutrient poor sea with a large seal population (which partly eat cod). Seals were hunted during a few decades and decreased substantially. Agricultural production, and thus leakage of nutrients to the sea, increased during the same time period. Decreasing seal populations early in the century appears to have contributed to a rapid increase in cod during the 1930s. When eutrophication accelerated in the 1970s, there was again a substantial increase of cod. Both increases coincided with favourable hydrological conditions (high salt and oxygen levels), but without the decrease of seals early in the century

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and the increased nutrients added to the system leading to increased production in the system, the cod catches during the 1980s appear highly unlikely. Seals are currently not a threat to the cod population, but eutrophication remains both a problem and a prerequisite for a large cod stock. Measures taken within the context of the fisheries policy can produce a large and productive cod stock again.

Loss of predators such as seals or cod in an ecosystem can lead to chain reactions. Knowledge about these “cascading effects” is leading to an increased understanding of the complexity of biological systems. The decline of cod in the Baltic may have led to increased symptoms of eutrophication and may also have contributed to a decrease of pike and perch along the Swedish coast! There are several indications suggesting these inter-linkages in the ecosystem. Predators such as cod are thus not only food, but also

important components of the ecosystems. The EU common fisheries policy underlines the ecosystem approach, i.e. that all components of the ecosystems should be managed sustainably. Examples from other seas illustrate that substantially altered ecosystems can lead to “regime shifts”, where ecosystem becomes “locked in” an alternate stable state, prohibiting depleted species from recovery. The cod stocks outside the coast of Newfoundland represent a well known example, where the stocks has not recovered despite more than a decade of fishing bans. Presumably, other species has “taken the ecological niches” previously occupied by cod. There is potential for alternate stable states also in the Baltic Sea but there are clear indications that these mechanisms are not sufficiently strong to hinder a recovery of the cod stock. It is the intensive fishing pressure that is keeping the stock at a low level.

### Cod fisheries in the Baltic Sea

Cod is the most valuable fish in the Baltic Sea, and a large proportion of the fishermen in the region are dependent on viable cod stocks. There are two separate stocks in the region, the “western stock” and the Baltic Sea cod – the “eastern stock”. The geographical border between these two is by the island of Bornholm. The two stocks are distinctly genetically separated and the eastern stock is uniquely adapted to the brackish waters of the Baltic and can thus not be “replenished” by migration from the western stock. The majority of the catches taken from the eastern stock, mainly in Hanö Bay and around Bornholm. Commercial fisheries for cod have previously taken place all the way up to the Bothnian Bay in the northern parts of the Baltic. A large stock would lead to a larger geographical distribution and thereby larger opportunities to fish for cod also in other parts of the Baltic.

Cod fisheries in the region are dominated by Poland, Denmark and Sweden, but also Germany, Latvia, Lithuania and Russia land substantial catches. Since cod fisheries have such a fundamental role, the size of the quota thus determines the profitability for many of the commercial fishermen operating in the region. Increasing fuel costs is also contributing to decreasing profitability. An economic assessment of the commercial fisheries in the Baltic Sea illustrate that the profitability has decreased during several years and

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that fisheries is playing a decreasing role in providing local and regional income. The contribution from fisheries to Danish, Swedish and Polish economies is modest and

only constitutes 0.5, 0.2 and 0.005 per cent of GDP respectively, but is regionally and important source of employment. About 3 200 fishermen are active from Denmark, fishing in the Baltic and North Seas, and other seas. In 2004, Poland had 3 800 fishermen active in the Baltic. Sweden has 2 200 active fishermen. It is unclear how many of these are employed full time as fishermen. The processing industry employs additional people and Poland has emerged during recent years as an important middle hand in the processing and trade of Baltic cod. The total value of cod for Swedish fishermen was 164.8 million Swedish kronor in 2005. Recreational fishing for cod is a well-established

activity in Germany, Denmark and along parts of the Swedish West coast. The absence of large cod stocks thus affects other sectors than the commercial fisheries.

Trawl, gillnets (set on the bottom) and hook (long-line) are the common fishing methods. Gillnet and long-line fisheries is mainly conducted by small vessels fishing close to their home port, thus generally using less fuel than trawlers. Gillnet fisheries are more selective (catches less juvenile cod) than trawl-fisheries, although more selective trawls has been developed (BACOMA-trawl). Gillnet fisheries benefit from a large cod stock consisting of adult individuals, but has decreased in recent years. In the 1980s, total catches consisted of less than 20 per cent juvenile cod. In 2003 however, juvenile cod (that newer had the chance to reproduce) made up almost 40 per cent of catches. No wonder the stock is having problems recovering! Even if gillnets is more size selective, they also catch seabirds and seals, and substantial problems with seals damaging fishing gear and catches is making this fisheries difficult. In a resource and environmental perspective there are thus both problems and potential with gillnet- and trawl fisheries respectively. The economic benefits are most readily found in the small-scale gillnet fisheries, according to the Swedish Board of Fisheries. If the fishery were conducted by a small number of larger vessels however, the fleet would be much easier to monitor.

Substantial funds have previously (1995-1999) been invested in reducing fleet capacity, simultaneous to large funds being allocated to modernising existing boats, thus increasing capacity. Larger and more effective vessels in part replaced small ineffective boats. Fishing capacity also increased in Poland and Lithuania during the time period, in part as a result of exported fishing capacity from member states. Substantial scrapping of fishing capacity was conducted during 2000-2006, mainly in Poland and Lithuania. Support for modernisation has become more restrictive. Despite a decrease in fishing capacity, there is no change in the political pressure to maintaining unsustainable cod quotas.

### ICES advice and the political decisions

ICES, the International Council for the Exploration of the Seas, is coordinating fisheries research and producing advice on what fishing pressure the stocks can take. ICES defines a lower limit for the amount of adult fish needed (160 000 tonnes for the eastern stock) to reduce the risks of collapse and generally recommend fishing ban if the stock falls below this level. The stock has been below the critical level during most of the 1990s and during the 2000s. There risk for collapse is thus very real, but despite this fact, 60 per cent of all adult cod has been taken from the Baltic annually.

We should not give up the eastern stock despite these facts. A reduced fishing pressure could have a rapid effect on the stock. According to preliminary calculations, the stock could reach twice the present size after only one year of fishing ban, thus almost reaching the critical level of 160 000 tonnes. Additional years of fishing bans would lead

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to additional increases. Four years with a zero quota could lead to a stock exceeding 450 000 tonnes, compared to current 80 000 tonnes. A larger

stock would mean much larger catches at a lower cost and for a higher profit, without the present risk of collapse. Responsible management of cod between 1983 and 2007 could have generated substantial additional catches and annual profits exceeding additional 1-2 billion Swedish kronor. These numbers are far from the political reality.

The EU council of ministers decision on annual cod quotas has consistently been higher than the ICES recommendations. One explanation for this is that the council also take account of social and economical factors. A recent review of the common fisheries policy concluded

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that the rationale behind the council decision was hard to evaluate as there are conflicting goals and limited documentation.

It is a well-known fact that the decisions in-

volve horse trading and that the ministers are exposed to lobbying from commercial fishermen and local constituency interests. The ministers thus base their decision influenced by an outspoken interest group on the one hand and a large, but unorganized public on the other hand. The result is decisions that are not favouring long-term sustainability of either fish stocks or commercial fisheries. The quotas are further exceeded due to substantial illegal and unreported fishing.

Sustainable use of the cod stock would increase the profitability of the commercial fisheries and is likely to have a number of positive effects on the Baltic Sea ecosystem. These long-term gains are likely to be far greater than the short-term losses from a reduced fishery.