

# 23. Fish stocks and fish landings

## Key message

- Fishing dynamics has been influenced by two main factors: fish stock and fishing quota.
- Most of the commercial fish stock is in safe biological limits.
- Cod is permanently overfished. Tunas represent about 15 to 20% of this value.
- Annual landings by major group of species have varied little for several years.
- Prices for most of fish species follow the general trend.



Photo: Evalds Urtans

## Why monitor fish stock and fish landings?

Fish is a natural resource – essential aspect not only for aquatic ecosystems, but also an important resource for fishing industry. Fishing has direct impact on aquatic ecosystems by removal of organisms from the environment, which is the sum of fish stock landed and discarded (returned). Fisheries can be 'directed' at single species but, more commonly, a variety of species are caught. In addition to target species, a particular fishery may often take a by-catch of other species, some of which may be landed. Coastal fisheries are especially affected by decreasing fish stock as they are not flexible to adapt and change. However, in many coastal areas fishing is still important source of income.

By measuring changes in fish stock it is possible to identify human pressure on aquatic environment and plan fishing intensity. The impact of fishing must be assessed against the state of the stock and its ability to recover. Stocks are 'overfished' or outside safe biological limits (SBL) when the fishing pressure (mortality), exceeds recruitment and growth. The number of stocks within SBL is expressed as a proportion of the total number of commercial stocks for which status has been assessed. Fish stock outside its SBL has become an important indicator for the fishing policy setting.

The indicator *fish stocks and fish landings* has 3 measurements: (1) state of the main fish stocks by species and sea area, (2) landings and fish mortality by species and (3) value of landings by port and species.



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Union Européenne



## What does the indicator show from European to local level?

### Percentage of commercial fish species harvested inside Safe Biological Limits

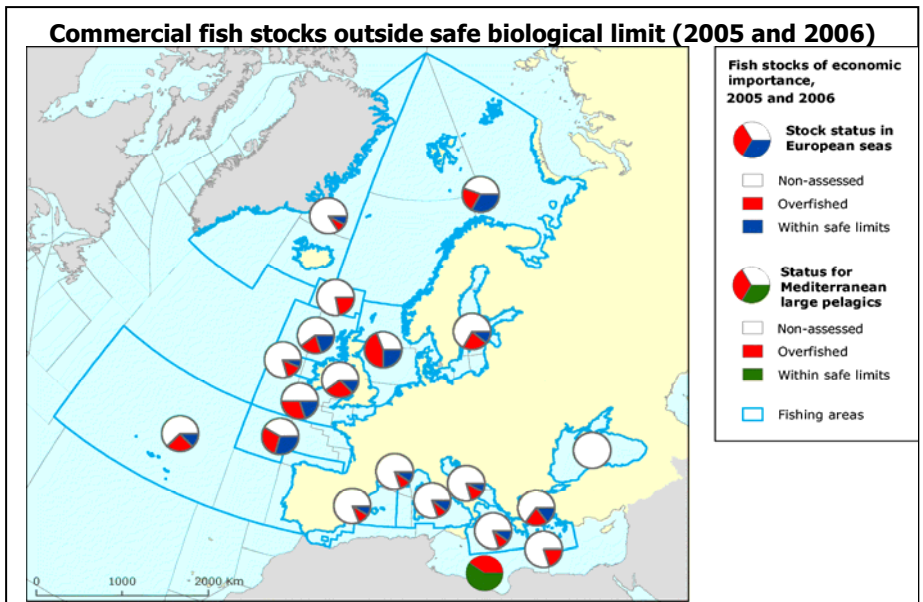
The evolution of the percentage of commercial fish stocks within SBL, reveals a discouraging situation. European Environmental Agency estimates that 33-60% of commercial stocks in the NE Atlantic are outside SBL. The Baltic and West Ireland Seas are in a better condition (with 33% of their stocks being overfished) and West of Scotland area – in the worst (with 60% of stocks being outside SBL). For the Mediterranean, the percentage of stocks outside SBL range from 10 to 20%, with the Aegean and the Cretan Sea performing the worst.

Since 1980, the number of commercial fish stocks within SBL in the (Southern) North Sea has been maximum 2 out of the 7 (28%). Herring and Haddock fisheries were within SBL between 2002 and 2003. Plaice has been overfished except in 1983-1985 and in 1990. A similar situation is observed in the wider North-East Atlantic: 62-91% of commercial stocks are outside SBL.

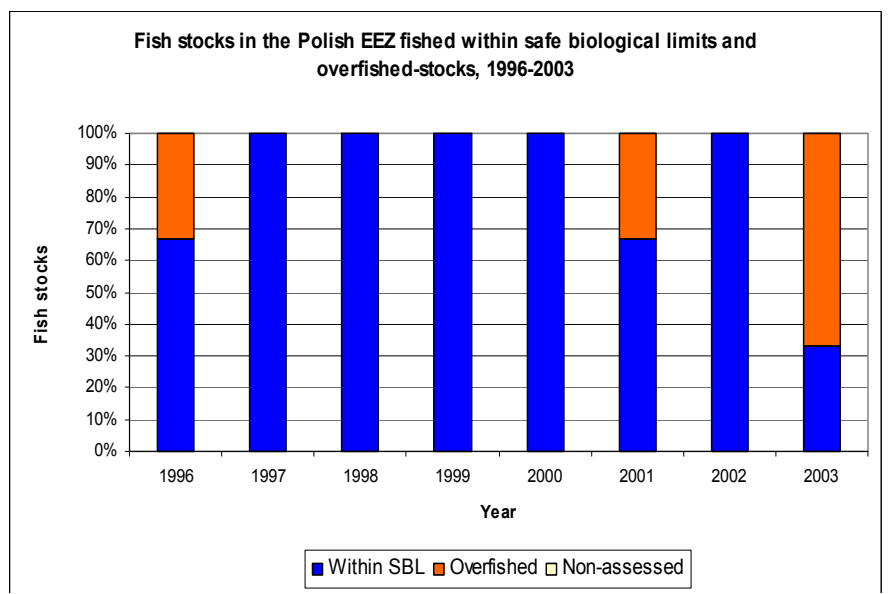
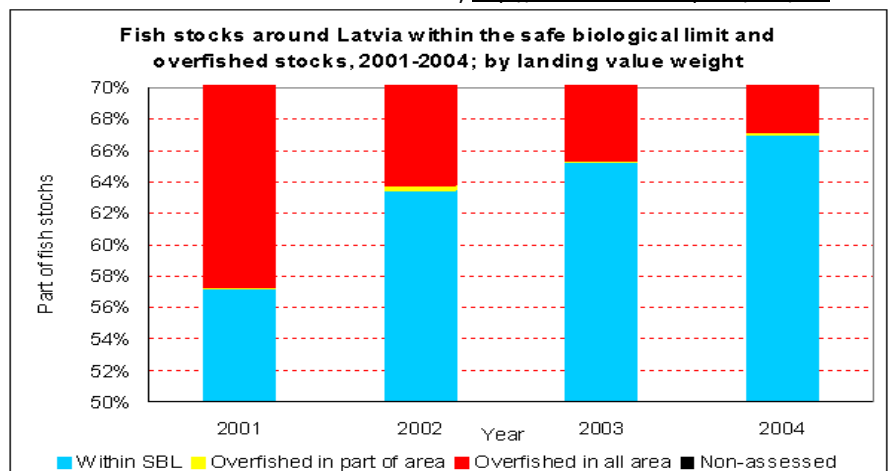
In Latvia's costal waters cod (most valuable commercial fish outside SBL in Latvia), sprat, vimba and pike are overfished, but fish stock other commercial fish (sprat, herring and smelt) is in the SBL.

Overfishing of cod is one of the important indicators, because it is a most valuable commercial fish in many regions. Cod is overfished not only in the Baltic Sea, but also in the North Sea, Skagerrag, Irish Sea and waters West of Scotland where cod stocks are now so depleted that the chance of a collapse must be seriously considered. Cod also makes most of the profit for fishermen and limitation on cod quotas has negative reverse effects on fisheries.

There is an important lack of information on the status of stocks in the Mediterranean Sea: only 8 out of 22 most common species have been



Data source: EEA Core Set of Indicators 32, <http://themes.eea.europa.eu/IMS/CSI>

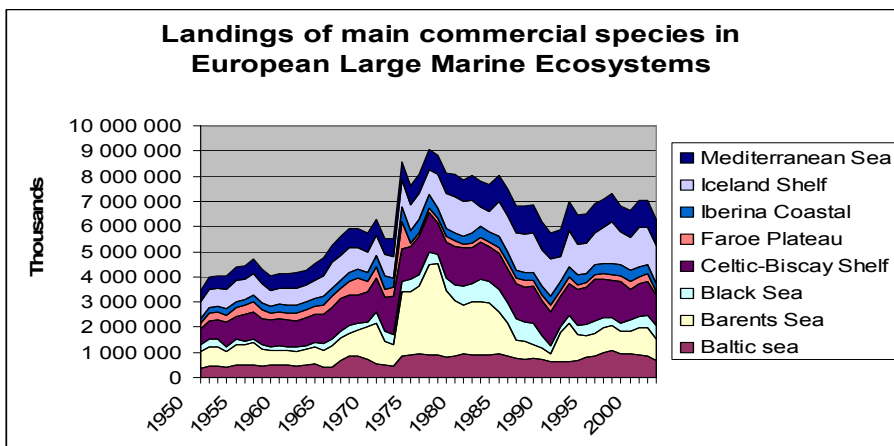


# Results and assessment

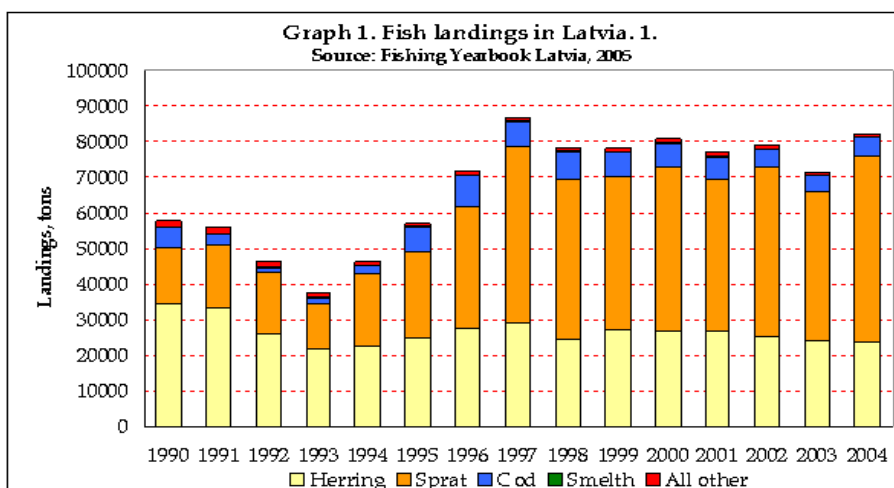
assessed between 2001 and 2005. Anchovy, red mullet, swordfish, horse and pilchard are the 5 assessed species inside safe biological limit. Bream, hake and blue fin tuna are the 3 species outside safe biological limits.

## **Total values of landed fish of commercially important species**

Overall fish landings in the European largest marine ecosystems are decreasing over the last 30 years. In the post Soviet block countries, there was a significant decrease at the beginning of 1990-ies when countries faced overall economic crises. But this followed by a steep increase in the following years. Now landing is determined by fish stock and fishing quotas.



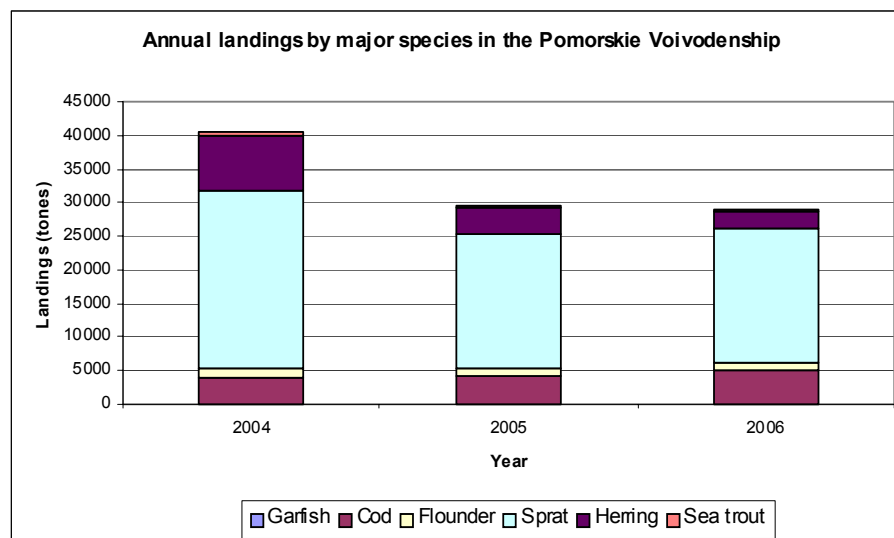
In Latvia, most important landed fish species are those from the pelagic group. There are also landings of demersal and diadromous fish, but their share in the total values is less than 1%. Landing increases mostly due to rise in sprat catch. Landing of other species slowly decreases.



In Latvia, cod landing declines lately due to constant cut down of the catch quotas. In addition, in years 2002 and 2003 they were not fulfilled. In 2004, increase in values was determined by rise of the price as well as by increase in landing, slightly overrunning the allowed quota of 5000 tons. Decrease in landing values of other fish species is determined mainly by decline of landing itself, while prices for some species have increased significantly.

There are some geographical differences in the catch. For example, sprat catch dominates in the Baltic Sea, while the main species caught in the Gulf of Riga is Baltic herring. Proportion between fish landing values in the Gulf of Riga and the Baltic Sea tends to grow slightly, in favour of the Gulf values.

In Poland, strongest decrease in total landings was observed in 2005 (with the highest decrease in sprat and herring landings), the main reasons could be the decrease in fish prices together with the rise of fuel costs, the more restricted fishing quotas, the prolongation of protection periods (cod), the reduction of fishing fleet after the accession to EU. However, this followed by increase of the total value of landings by ports in the Gulf of Gdansk area in 2006 (no significant differences in 2004-2005), with Wladyslawowo as the economically most important fishing port. The second most important port is Hel,



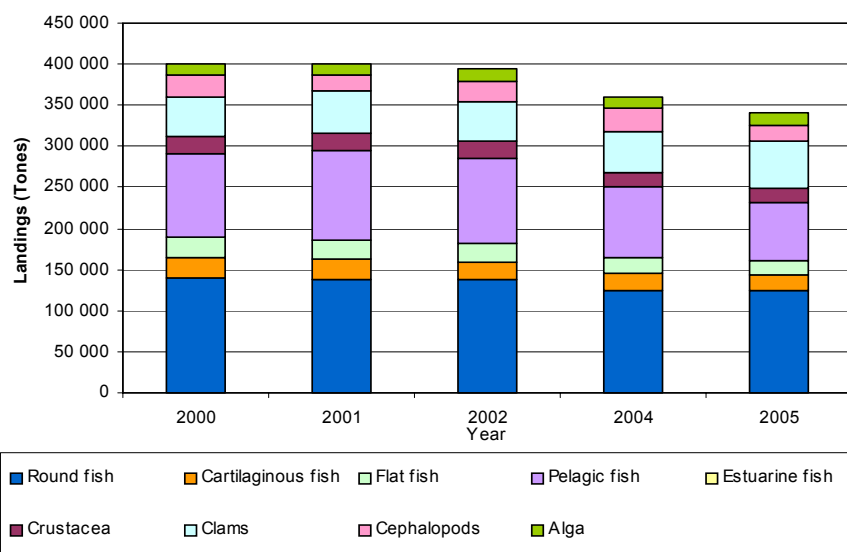
# Results and assessment

which year after year gains higher values of landings. Other ports are below the level of 1000 EUR (x1000). In bigger ports (with open sea fleet), sprat and herring landings dominate, in smaller ports with coastal type of boats - flounder and cod. In the inner waters of the Gulf of Gdansk (Kuznica, Swarzewo, Puck), garfish plays quite a significant role, even if fished only seasonally.

The annual value by species shows the strong increase of cod price. This constant growth in the landings' value is probably caused by the regular increase in the cod value in 2006 (resulting probably from a lower level of catch caused mainly by the overfishing, reduction of the fleet and more strict fishing regulations). Continuous monitoring is needed to allow estimation of the long term trend in regional fisheries.

In France, the total value of landings varies little since 2000. It is about 1100 millions of EUR. Value of landings differs significantly from one coastal region to other. In France, tuna is most important landed fish species with 160 000 t per year. Other important species are herring, sardine, scallop and mackerel. Landings of these species are between 20 000 and 40 000 t each year.

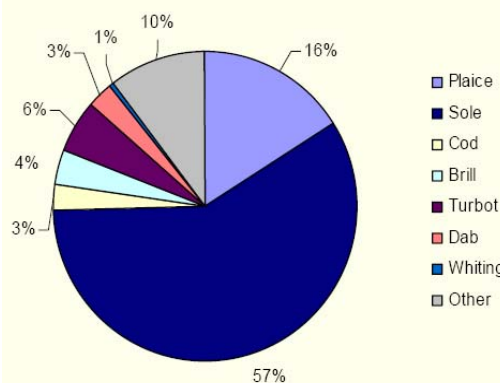
Annual landings by major group of species in France (only wet fish)



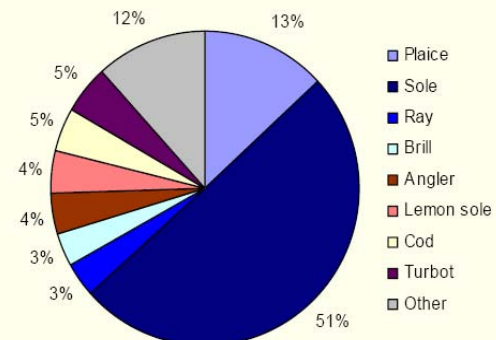
Each region in the Southern North Sea has one outstanding port in terms of fish landings value. The most important port concerning fish landings in West-Vlaanderen is Zeebrugge (about 45 million EUR per year) and Vlissingen (about 50 million EUR per year) – in Zeeland. In the regions of Essex and Kent, Leigh-On-Sea has the most valued landings (about 3 million EUR per year) over the period measured (2000-2003). In Nord-Pas de Calais, the port with the highest values of landed fish is Boulogne-sur-mer (about 90 million EUR per year). The same conclusions can be drawn about the major groups of species too: demersal fish dominate in West-Vlaanderen and Nord-Pas de Calais. In Essex, the share of molluscs dominates, but this is only the case in Leigh-On-Sea with a high value of 3,6 million EUR in 2003. In Zeeland, the mussel has the highest value of landings among all species (about 35 million EUR per year).

Sole landings provided the biggest share of income for most of the fishing areas in Belgium. Sole, plaice, cod and shrimp are the most important commercial catches in Belgium. Sixty-five percent of the total income in 2003 was provided by sole. In Breskens 45% of the annual turnover comes from the sole fishery and 30% from shrimp. But nearly 50% of the value of sales in Belgium is derived from the landings of squid, sole and plaice. Increase in sprat and herring landing values in general, is determined by rise of prices and the latter is affected by the overall economic processes in the country, mainly - inflation. Fluctuations around the mean tendency are attributed to changes in landing values.

Share of economic importance of fish landings by species-Vlissingen (2004)



Share of economic importance of fish landings by species-Belgian fishing ports (2003)

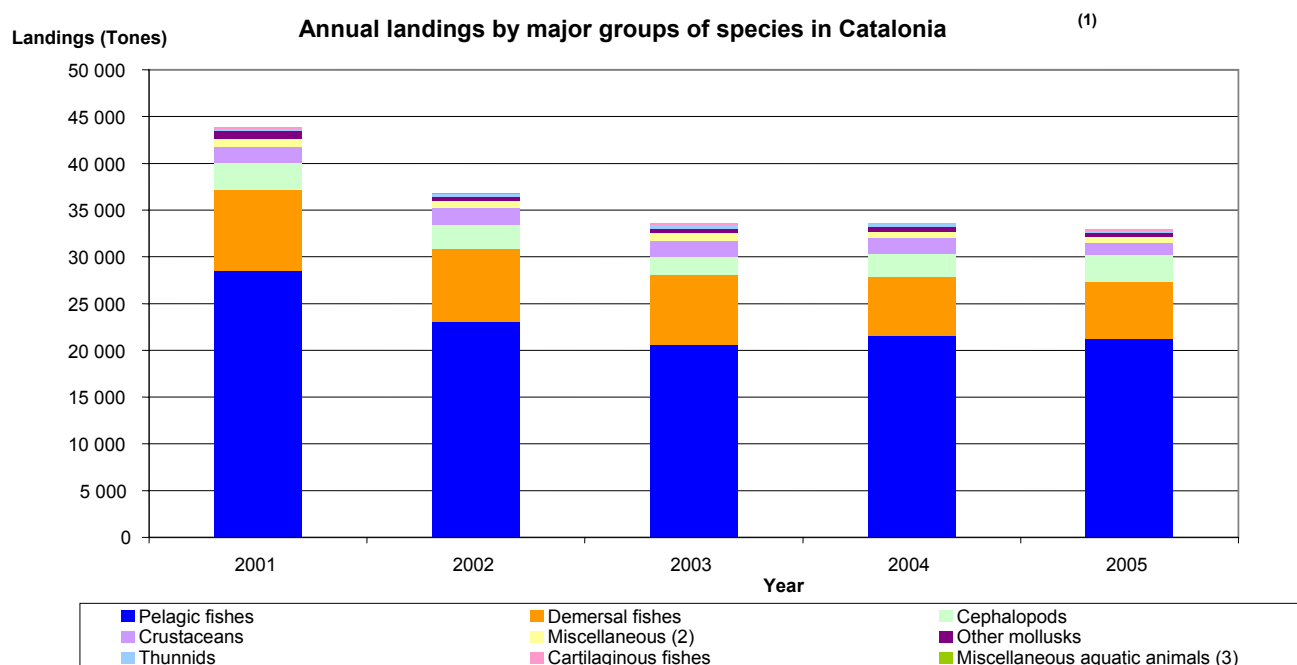


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The landing of marine species in Catalonia, Spain has stabilized since 2003 in 33 million Kg per year. In a long-term assessment, we can see that the volume of the last three years is the lowest one since 1993 (max. of 60 M Kg in 1994) but it is higher than landings between 1990 and 1992 (around 26 M Kg)/year). The most landed

# Results and assessment

groups of species have experienced a continued decrease during the last decade. The diminution has been recorded for all marine fishes (demersal, pelagic and thunnids), and also molluscs (cephalopods) and crustaceans. The European pilchard is the most landed species in Catalonia and it is also the species with the most important drop of landings during the last 5 years. The main landed group of species are fishes, featuring 84% of all landing volume (64% for pelagic and 19 % for demersal), cephalopods - 9% and crustaceans - 4%.



Note: Data on landings by major groups of species available that can be classified according to FAO.

(1)- Discards and recreational fishing catches not registered.

(2)- Varied bony fishes

(3)- Marine invertebrates.

Sources: Government of Catalonia. Department of Agriculture, Livestock Farming and Fishing, 2006.

FAO, International Standard Statistical Classification of Aquatic Animals and Plants (ISSCAAP), 2006.

Although there are oscillations of values since 1997, there is a clear descendant trend since 2001. The reduction of landings in economic terms does not have considerable impacts on the global coastal economy because the value of fish landing is very low in relation to the whole coastal economy. However, this fact can affect firstly, fishermen's families and professions involved in fish food industry or trade, and secondly, small marine towns with an important fisheries activity. Fishing activities take place along the entire coast - there are fishing ports distributed regularly along the Catalan coast.

The most valued groups of species in Catalonia are all marine fishes (mainly, pelagic and demersal), but also molluscs (cephalopods), and crustaceans. From evolution of the most valued target species during 2001-2005 it is possible to conclude that the most affected by the loss of economic value are demersal and pelagic fishes (European hake, European pilchard, Angler), crustaceans (Blue and red shrimp, Norwegian lobster), and cephalopods (Octopuses).

European anchovy, European hake and shrimp have the highest value of landings by species. Prices of species vary a lot. In the case of shrimp resources there is a considerable contradiction between their high economic value and scarcity and overexploitation of resources.

## What are the implications for planning and managing the coastal zone?

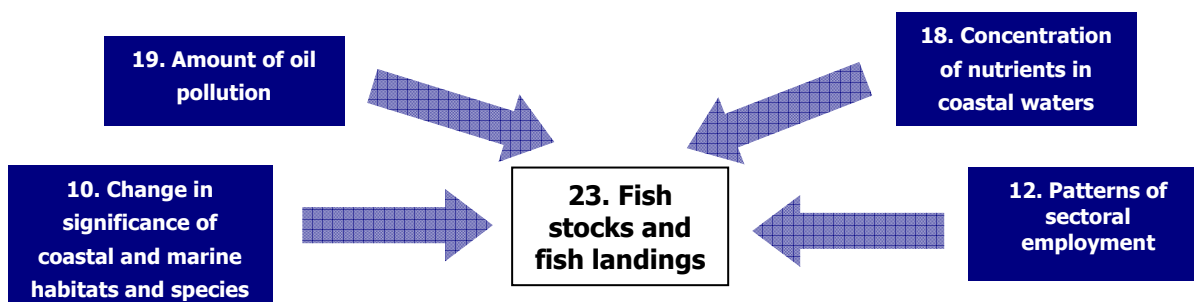
Fishing is not only an important sector in the regional economy; it also has a major impact on marine ecosystems. The European Common Fisheries Policy (CFP) (1983) aims to implement management mechanisms for sustainable fisheries while offering stable economic and social conditions. However, the CFP has recognized the need to achieve sustainable fishing while safeguarding vulnerable marine wildlife and habitats as required by European legislation (such as the Habitats Directive).

Sustainable fishing requires balancing of natural growth in fish stocks with the total number of fish annually removed by fishing activity. This balance, known as the "maximum sustainable yield", aims to maximise earnings in fisheries while conserving fish stocks for the future. Regulatory arrangements, identifying harvesting levels based on the CFP, the precautionary principle and multi annual fisheries plans, were set through the Cardiff European Council (COM (2000) 803). Total Allowable Catches (TAC) and quotas for the stocks in the north-East Atlantic and the Baltic Sea are set annually by the Fisheries Council. In the Mediterranean Sea, where no TAC have been set except for the highly migratory tuna and swordfish, fisheries management is achieved by means of closed areas and seasons to keep fishing effort under control and make exploitation patterns more rational. The General Fisheries Council for the Mediterranean (GFCM) attempts to harmonise the process. Compliance is ensured by monitoring landings from fishing vessels, and taking into account the discards.

Vessels and countries that do not adhere to their agreed quota may suffer economic sanctions and a reduced quota the following year. Two approaches are used to address unsustainable practices in fisheries: direct restrictions in fishing effort through e.g. the reduction in number of ships or fishing days, and indirect restrictions in terms of the output or catches. The second approach (e.g. catch quota such as the TAC) has shown to be less efficient, in particular in mixed fisheries with more than one target species. The beam-trawler fisheries on plaice and sole commercially valuable catch have to be discarded when TAC for one species has been completed while for the other species it has not.

Priorities in the CFP are the introduction of the precautionary approach in setting annual TACs, adjusting catch effort and the size of the fleet to the carrying capacity of the stocks, and introducing environmentally friendly fishing tools and methods.

### Related indicators:



## Further work needed

In order to specify loads on the coast more precisely, it would be appropriate to define tendencies in different types of coastal NUT5 areas: major cities and small towns, rural areas etc.

Base data to determine the state of stocks in the future should be also based on commercial catches and landings along with scientific surveys in a comprehensive way, both spatially and temporally. The same approach should be applied to fisheries in different regional seas (ex. NE Atlantic and the Mediterranean), and the same precautionary reference limits set to cover wider areas and more species in data series.

Overfished resources in the diagram should be described in two subcategories: "overfished in all area" and "overfished in one particular area", if information is collected separately for the several water territories.

A new parameter that combines landings and capacity of fishery (for instance the number of boats or fishermen) would provide useful information for assessment of overexploitation.

"Weight" coefficient, which equals the share of the cache value in total cache, should be introduced for the assessed fish species (measure 23.3).

Fish prices applied in calculations should be adjusted by inflation index.

The discards should be estimated to make the picture more reliable.

The classification of the Eurostat's ISSCAAP should be used to have more comparability with international standards.

## Data sources

### Government of the Generalitat of Catalonia

Source: European Environment Agency, General Fisheries Council for the Mediterranean (GFCM), International Commission for the Conservation of Atlantic Tunas (ICCAT). Directorate General of Fishing and Marine Affairs, Department of Agriculture, Livestock Farming and Fishing of the Government of Catalonia (DARP). Spanish Institute of Statistics (INE).

### Institut français de l'Environnement

Source: Ministry for agriculture and fishery, Ofimer.

### Maritime Institute in Gdańsk

Source: Fisheries Monitoring Centre in Gdynia, EUROSTAT.

### University of Latvia

Source: Yearbook of Fisheries in Latvia, Fish Fund of Latvia, 2005 (Latvijas zivsaimniecības gadagrāmata, 2005); Fish agency of Latvia (Latvijas Zivsaimniecības aģentūra).

### Province of West-Flanders

Source: International Council for the Exploration of the Sea (ICES), ILVO (Sea Fisheries Department), Dienst voor Zeevisserij-DVZ (Belgium), Office National Interprofessionnel des Produits de la Mer et de l'Aquaculture-OFIMER (F), Department for Environment Food and Rural Affairs (UK), and Centraal Bureau voor de Statistiek (CBS) and individual Fish markets in Zeeland (The Netherlands).

## Reliability of the indicator

Although the same principle is applied in determining the state of fish stocks in each European fishing area, there is a degree of uncertainty with the criteria to set the safety margins (%) of fish stocks. Data sets in many cases are fragmented both temporally and spatially. Considerable part of monitoring activities is based on scientific surveys rather than commercial catches. Different approaches have been used in different European fishing areas to determine whether a stock is outside safe biological limits. Stock assessments should also be extended to other commercially important stocks, in order to obtain a broader view on the status of fish stocks. In the future, data on recruitment, spawning stock biomass and fish mortality should also be based on commercial catches and landings along with scientific surveys. Long time data series of landings provide a good indication of changes in landings patterns. Landings however do not include information related to discards. The ICES recognizes that discard data are variable in accuracy and availability and by-catch data for many species (such as marine mammals) is often based on anecdotal and voluntarily collected evidence.

