

Sustainable Management of Fish Stocks

**Reforming the
Common Fisheries Policy**

Statement

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1 Introduction

1. Fish is a valuable natural resource. It is an important source of protein for human nutrition and a key element of marine ecosystems. The realisation that fish is a renewable but not an infinite resource is not new. The phenomenon of overfishing is well described in the scientific literature, certainly since the collapse of cod stocks off Newfoundland and Labrador in the early 1990s (Hutchings and Myers 1994). Despite this realisation, it has not yet been possible to bring many fish stocks – or indeed stocks of other marine organisms – under sustainable management, where they are harvested in quantities that maintain stocks at the highest and healthiest levels while avoiding major disturbance to marine habitats. European fish stocks are a case in point. At least two-thirds of Europe’s fish stocks are harvested unsustainably and about 20 percent are in critical condition (European Commission 2011d). In addition, fishing is still one of the primary causes – in the North Sea it is the primary cause – of harm to marine habitats (OSPAR Commission 2010b).

2. The main causes of the severe problems in European fisheries are mismanagement and unsustainable fisheries management, as shown among other things by:

- Fleet overcapacity in some fisheries;
- Catch quotas set too high, often well above scientific advice;
- Use of fishing techniques that harm the environment and fish stocks;
- Excessive quantities of unwanted bycatch;
- Poor control of fishing activities;
- Illegal fishing activities.

The mismanagement of fisheries is largely a product of the Common Fisheries Policy (CFP). Except in national 12-mile zones, regulation of fisheries in European waters is entirely in EU hands. Despite initial signs of change for the better, the CFP does not meet the high standards of sustainability and environmental protection that the EU applies in many policy areas. Principles such as the precautionary approach, the polluter pays principle and the ecosystem

approach have barely any relevance to current practice. As a result, the need for a change of course in the CFP is now widely recognised.

3. A reform of the CFP is planned for 2013. On 13 July 2011, the European Commission published a proposal for reform of the Regulation on the Common Fisheries Policy (European Commission 2011f, also referred to in this statement as the Commission proposal). The reform decides whether European fisheries, today still a classic example of non-sustainable resource exploitation, can be put on a sustainable course in the next ten years. Fisheries are a clear example of how in sustainable management of a biological resource, environmental concerns must form the basis of all action. Environmental aspects gained a further boost on adoption of the Marine Strategy Framework Directive (MSFD, Directive 2008/56/EC). The CFP reform must help achieve the MSFD objective of good environmental status in Europe’s marine environment by 2020. As fishing activities continue to put heavy pressure on the marine environment, the reform is highly important.

The European Commission reform proposal marks an important first step towards putting right the identified flaws in the CFP. Although the proposal contains many positive aspects, the German Advisory Council on the Environment (SRU) considers that the reform must give greater weight to environmental sustainability and the precautionary approach. In this statement, the SRU therefore names a range of measures under the framework of the CFP that partly go beyond what the European Commission outlines in its reform proposal.

1.1 Synopsis of the overfishing problem

4. In the North-East Atlantic, according to the European Commission, 63 percent of known fish stocks are overfished, 20 percent of all stocks for which scientific advice is available are in critical condition (outside safe biological limits or at risk of collapse) and for about 64 percent the state of the stock is unknown due to poor data. For the Mediterranean and the Black Sea, 82 percent of stocks for which scientific advice is available are overfished (European Commission 2011d). The situation is especially

serious for commercially valuable demersal fish species (those living on or near the bottom) such as cod outside of the Baltic Sea.

The condition of some stocks has nonetheless improved in recent years. In the North-East Atlantic and neighbouring waters, for example, the number of stocks for which scientific advice is available that are not overfished increased from 2 to 11 between 2005 and 2010. The number of stocks 'outside safe biological limits' (but without scientific advice to stop fishing) dropped from 30 to 19 between 2003 and 2011 (European Commission 2011d).

In the North Sea including Kattegat and Skagerrak, three out of 16 of the most important fish stocks rank as being outside safe biological limits (Table 1), meaning their spawning stock biomass and/or the current rate of harvest is at a level that is unsustainable or poses a risk of collapse. This mostly relates to the two cod stocks, but few North Sea stocks have shown a positive trend of the kind seen with plaice in recent years (ICES 2010c). It is important to remember, however, that to say a stock is within safe biological limits only means it is not at risk of collapse. It does not mean the stock is sustainably managed by the criteria of maximum sustainable yield (see paragraph 16). That is the case for only two of the 16 stocks (Table 1). The condition of about half of the fish stocks in the Baltic Sea for which the International Council for the Exploration of the Sea (ICES) prepares recommendations is currently unknown because poor data make it impossible to state reference points (ICES 2011).

5. In many fish stocks, high fishing pressure has also led to a marked shift in age structure. In extreme cases such as North Sea cod the shift is towards younger and younger fish, of which very few reach spawning age. Because of this, the North Sea cod fishery mainly targets very small or very young fish below spawning age, which make up 93 percent of the catch (European Commission 2009b).

6. Problems of overfishing are very well illustrated by North Sea cod (Figure 1). Cod has long been a major food fish and cod fisheries have long been very important commercially. The chart clearly shows a steep rise in fishing pressure in the 1960s and 1970s followed by a steady fall in spawning stock biomass below both the precautionary reference point (B_{pa}) and the limit reference point (B_{lim}) (see paragraph 15). The slight recent gain is due to a single positive year for recruitment and has far more to do with natural variation in stock dynamics than with any protective measures (ICES 2010b).

7. The picture with Baltic cod is a little different, especially for the eastern Baltic cod stock. This recovered well in recent years due to very good hydrographic conditions for egg survival and larval development. The good conditions related to an influx of salty, oxygen-rich water from the North Sea in 2003. Strong recruitment made for a sharp increase in stock biomass, which is now above the precautionary reference point stated by ICES (2011).

8. Deep sea fisheries pose a special set of problems. Deep sea fish species are a resource that is coming under growing pressure as stocks of former prime target species dwindle (Norse et al. 2011). Little to no information is available on such species and their populations. One fact that is known is that many deep sea fish are very slow to mature and have low spawning rates, and high fishing pressure can very soon bring about stock collapse (OSPAR Commission 2010b). An example is the situation of the orange roughy (*Hoplostethus atlanticus*), which fisheries discovered in the early 1980s (Lack et al. 2003). Strong demand for this valuable food fish launched a veritable gold rush for the species with the result that some stocks, such as off Tasmania and in the North-East Atlantic, are now already exhausted and may well have collapsed (ICES 2010d). The latter can only be surmised from the ongoing steep drop in catch sizes.

Table 1

**State of major fish stocks of the
North Sea including Skagerrak and Kattegat**

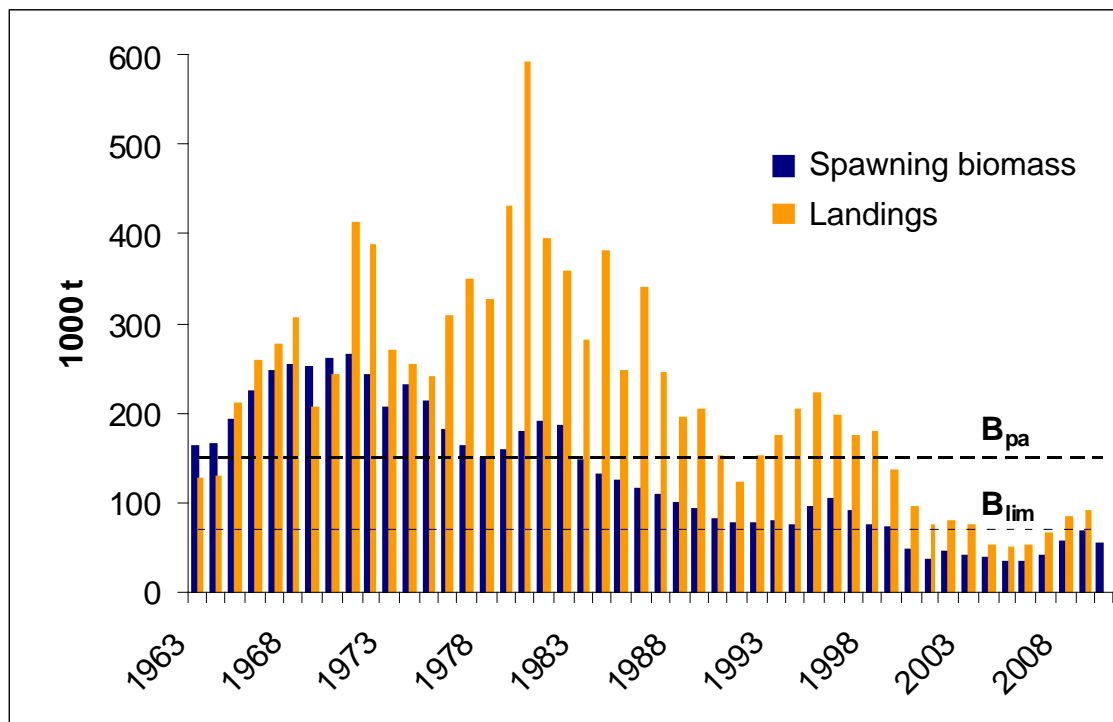
Species	Stock	Within safe biological limits		Sustainably managed**	
		Spawning biomass	Fishing pressure	Spawning biomass	Fishing pressure
Cod	North Sea, Eastern Channel, Skagerrak	–	<*	–	–
Cod	Kattegat	–	?	?	?
Haddock	North Sea, Eastern Channel, Skagerrak	+	+	+	+
Saithe	North Sea, Skagerrak, West of Scotland	+*	+*	?	?
Hake	Northern stock	+*	+*	?	?
Plaice	North Sea	+	+	–	+
Plaice	Skagerrak, Kattegat and Eastern Channel (together)	?	?	?	?
Sole	North Sea	<	+	–	–
Sole	Skagerrak, Kattegat and Belt	+	+	+	+
Sole	Eastern Channel	+	<	–	+
Herring	North Sea, Eastern Channel, Skagerrak (autumn spawners)	<	+	+	–
Herring	Skagerrak and Belt (spring spawners)	–	–	–	–
Mackerel	North-East Atlantic	+	<	–	+
Sprat	North Sea	?	?	?	?
Sprat	Skagerrak, Kattegat	?	?	?	?
Norway pout	North Sea, Skagerrak and Kattegat	+	?	?	+

– Biomass below/fishing pressure above ICES reference points or biomass/fishing pressure non-sustainable
 < Biomass/fishing pressure between ICES minimumlimit reference point and precautionary reference point
 + Biomass above/fishing pressure below ICES precautionary reference point or biomass/fishing pressure sustainable
 * Classification based on 2009/2008 advice
 ? Insufficient data and/or reference points not determined
 ** Based on ICES recommendation for maximum sustainable yield (MSY)

SRU/Statement No. 16–2011/Table 1;
Data source: ICES 2010b

Figure 1

North Sea* cod adult biomass and landings 1963 to 2010



B_{lim} Limit reference point (below which sufficient recruitment is no longer assured and stock at risk of collapse)

B_{pa} Precautionary reference point (below which stock at risk of falling to B_{lim})

* Including Eastern Channel and Western Skagerrak

SRU/Statement No. 16–2011/Fig. 1;
Data source: ICES 2010b

1.2 Other impacts on the marine environment from current fishing practices

9. Fishing not only affects harvested fish stocks, but frequently harms other species and marine ecological communities as well. In many fisheries, other species are caught as bycatch and thrown overboard as discards. This involves a wide range of organisms: undersize specimens of the target species and other commercially harvested species, fish species for which an operator has no quota, and species of no commercial interest such as whelks and brittle stars, but also sharks, rays, sea birds and marine mammals.

About 30 percent of cod and 50 percent of plaice caught in the North Sea is bycatch and is thrown overboard as discards (ICES 2010b). Most discards die – especially in the case of roundfish. But even flatfish, which tend to be less vulnerable, have a very low discard survival rate of less than 10 percent when it comes to

beam trawling (Beek et al. 1990). Discarded bycatch provides food for many opportunists such as gulls and various crab species, which populations quickly grow thanks to the new food source and displace other species (Votier et al. 2004).

Fishing bycatch can actually threaten the local survival of species, as has been shown for marine mammals (harbour porpoise in the Baltic Sea) and sea birds (Zydalis et al. 2009; OSPAR Commission 2010b). Bycatch is also an economic as well as an ecological problem because commercially useful, undersize or non-quota fish thrown overboard die on a large scale, thus depleting stocks and production. It has been calculated that bycatch accounts for a 70 percent direct loss of potential income for Danish beam trawling and 42 percent for the British round fish fishery (Cappell 2001). Landing this biomass also uses energy and labour.

10. Another way fishing affects non-target species is by upsetting the predator-prey balance. For example, the steep decline in Baltic cod went hand in hand with an increase in sprat, its main prey species (HELCOM 2010). Heavy fishing pressure on sandeel in the Northern North Sea harmed the breeding success of the black-legged kittiwake (*Rissa tridactyla*), which largely depends on sandeel for food (OSPAR Commission 2010b). Generally speaking, fish stocks are a key part of the ecosystem. Harvesting them affects stock size and dynamics, and hence the composition of ecological communities and the food web. Together with other pressures such as pollution, excess nutrients and the effects of climate change, this makes marine ecosystems more vulnerable.

11. A further major problem is the disturbance and destruction of sea floor ecosystems by bottom trawling. Heavy nets dragged along the bottom, together with their trawl boards and tickler chains, inflict mechanical damage on sea floor habitats and communities. The Southern North Sea is especially hard hit, with heavy beam trawling causing a marked fall in the biomass of benthic organisms and in the number of benthic species (OSPAR Commission 2010b; SRU 2004). While these fisheries have seen a slight fall in the number of days at sea in recent years, activity has shifted to formerly less-frequented areas. The time an ecological community needs to recover can range from a few months to 15 years (OSPAR Commission 2010b). In the Baltic Sea, beam trawling is not

allowed and most fishing is done using pelagic static nets. Bycatch is still a major problem with static nets, which marine mammals such as harbour porpoise and sea birds can become caught up in. There is little reliable data on bycatch of marine mammals in particular, hindering the assessment and adoption of suitable prevention measures.

12. Marine litter is a problem that has met with increasing debate in recent years. Fishing is probably a lesser factor here in quantity terms, although stray fishing gear and lost nets are a major environmental problem.

13. Another form of pollution is marine noise, which fishing adds to for example in the form of propeller noise. Large knowledge gaps mean there is considerable uncertainty about the impact of noise emissions on the marine environment.

2 Foundations of sustainable fisheries management

2.1 Quota management and maximum permanent yield

14. The exploitation of European fish stocks is currently regulated by setting annual catch quotas and fishing effort limits (section 3.1.1). Catch quotas are the cornerstone of fisheries management. The scientific foundations are provided by ICES based on the precautionary and the ecosystem approach (ICES 2010a).

Fisheries facts and figures

At the beginning of 2010, the German fishing fleet consisted of 1,767 vessels. Of these, nine vessels belonged to the *distant water fishing fleet*, 383 to the *cutter and coastal fishing fleet*, 1,316 to the *small-scale coastal fleet*, and 59 to the *other fishing vessels and mussel trawlers fleet*. The German fishing fleet is among the smallest in the EU.

About two-thirds of the German cutter and coastal fishing fleet specialises in shrimp and prawn fishery, which generated the highest income by species in 2010. The shrimp and prawn fishery uses beam trawls. A *beam trawl* is a net dragged along the sea bottom, with the mouth of the net held open by a beam above. When trawling for flatfish, tickler chains or lead-weighted ropes raise the target species from the sea bottom so that they enter the mouth of the net. Small-scale coastal fisheries make significant use of *passive fishing equipment* such as *traps* and *gillnets* which are static and which the fish swim into. This fishing method is notably used on the Baltic coast.

Quantitatively, the catch landed by German fishing vessels is dominated by *pelagic* species, i.e. those living in the main water column, such as herring (*Clupea harengus*, 37,036 t), sprat (*Sprattus sprattus*, 36,901 t), Atlantic horse mackerel (*Trachurus trachurus*, 21,093) and Atlantic mackerel (*Scomber scombrus*, 18,873 t) (the quantities are for the year 2010). When trawling for shoaling fish such as these it is usually possible to achieve very clean catches without very much bycatch. Another commercially important species is the cod (*Cadus morhua*). This is a demersal species that lives largely on or near the bottom. Demersal fish species are often accompanied by other species, which is why larger amounts of bycatch can be expected when fishing for them. In the North Sea, cod is mainly caught in a mixed fishery targeting cod, haddock and whiting. The German fishing fleet does not engage in *industrial fishing* solely to produce fish meal and fish oil.

Most fisheries target fish above spawning age. Sustainable management of a *fish stock* (generally a geographically distinct subpopulation of a specific species) uses a range of data. Reliable assessment of stock dynamics requires estimation of the *recruitment rate* – the rate at which young fish are added to the stock. This is affected by a variety of factors such as temperature, salinity, food availability and predation. A stock's ability to recover from high fishing pressure not only depends on recruitment, growth and morbidity, however, but also on other factors relating among other things to changes in the ecosystem due to the fishing pressure. One such factor is the extent to which ecological niches occupied by the affected species are taken over by other species over time.

The state and dynamics of a fish stock are assessed using scientific models drawing on a range of data from fisheries, fisheries monitoring and scientific catches. The latter also include sampling of juvenile fish and fish larvae.

Source: BMELV 2010a; ICES (undated); BLE 2011

Recommendations of the International Council for the Exploration of the Sea

15. The work of ICES includes preparing advice on the setting of catch quotas on a stock-by-stock basis. The most important underlying data in this context comprise fishing mortality (F), stock biomass (B) and production. Fishing mortality (F) is a relative figure stating the portion of stock biomass that can be harvested and must be converted into an absolute figure or a quota in relation to stock biomass. Stock biomass (B) is estimated from models and is subject to considerable natural variation, for which reason its estimation involves uncertainty. Production is the sum of the biomass added by recruitment and growth minus the loss from natural mortality. The production of a stock is related to stock size or spawning stock biomass (SSB), which very largely depends on F. Moreover, recruitment and hence ultimately also production are highly variable due to natural conditions such as the availability of food organisms for fish larvae. The surplus production of a stock due to fishing pressure (stocks react to increased mortality with increased production) is simultaneously the

portion of the stock that can be harvested without affecting the stock size. The relationship between F, production and stock size is called the production function. The theoretical peak of the production function is the maximum sustainable yield (MSY) at constant stock biomass (B) (see paragraph 16). F_{MSY} is defined as the fishing mortality attained at or below the peak of the production function. F_{MSY} is the portion of stock biomass that can be harvested to attain or maintain B_{MSY} .

The four main figures that – subject to sufficient data availability – ICES has determined in past years and continues to determine for the time being are as follows:

- B_{lim} : The minimum stock biomass, below which recruitment is expected to be impaired or stock dynamics unknown. The stock is at risk of collapse.
- B_{pa} : Precautionary reference point for stock biomass to prevent true biomass from falling to B_{lim} .

- F_{lim} : Fishing mortality likely to be associated with stock collapse if exceeded for a long time.
- F_{pa} : Precautionary reference point for fishing mortality to avoid stock biomass reaching B_{lim} and fishing mortality reaching F_{lim} due to natural variability and uncertainty in the assessment.

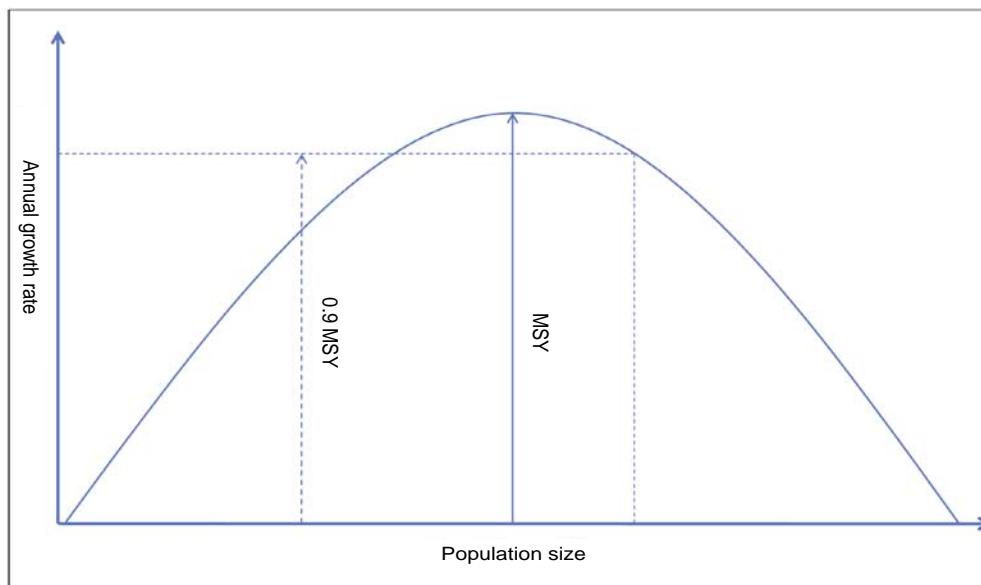
ICES also recently began determining B_{MSY} or specifically $B_{MSY-trigger}$ – a trigger value for stock biomass – and, where possible, F_{MSY} (on the difficulties see paragraph 17 ff.). The two precautionary reference points referred to above mainly serve to account for uncertainty in the data with regard to stock dynamics and the influence of natural factors (ICES 2010a). Account is only given to the ecosystem approach in the form of the ICES increasingly giving recommendations for the remainder of the ecosystem, such as for the protection of especially sensitive habitats. Overall, the past mandate for ICES advice was, in line with the precautionary approach, to maintain stocks at healthy levels so as to prevent stock collapse, but not to maximise long-term yields (Sissenwine and Symes 2007). This changed with the adoption of the concept of maximum sustainable yield (MSY).

Basic concept of MSY

16. As a yardstick for the management of fish stocks, the concept of MSY is not new (Russell 1931; Graham 1935). The basic underlying principle is no more than that of fish stocks being managed so as to enable the maximum possible harvest on an indefinite basis. This means maintaining fish stocks at just the size needed to maximise the reproduction rate. In the simplest model, this corresponds to about half the maximum stock size that would result in natural conditions without management. Below the biomass associated with maximum sustainable yield (B_{MSY}), the quantity of fish that can be harvested falls because a decrease in the number of individuals also brings about a decrease in the reproduction rate. If the stock biomass grows past B_{MSY} , stock density factors gradually reduce stock growth to zero as ecological capacity is exceeded – or the stock's scope for further growth becomes increasingly restricted as it uses up its own resources, such as food. A highly simplified illustration of these interrelationships is provided in Figure 2.

Figure 2

Schematic diagram of the MSY concept



The concept is primarily based on two assumptions. The first assumption is that harvesting a fish stock results in higher reproduction and growth rates. Under the MSY concept, it is precisely this additional growth which can be harvested each year without affecting the stock size once a stock has reached the biomass associated with maximum sustainable yield. The second assumption is that a stock does not grow without limit, because upwards of a certain number of individuals the population reaches a size at which it increasingly exhausts and is limited by the available resources.

17. The concept is criticised on various grounds, notably that it focuses on the theoretical production of the harvested species and ignores many other aspects such as size and age, including spawning maturity, of the fish harvested, complexity of stock biology, species interactions and the many and various other factors that affect stock dynamics – let alone incorporating the precautionary approach (NSRAC 2011; Froese et al. 2010; Larkin 1977; Mace 2001; Sissenwine 1978). On top of this, the theory is based on an assumed balance that is never truly attained because of variability and trends in ecosystem capacity. With the shortcomings mentioned (including instability of reference points), full exploitation of MSY would inevitably lead to overexploitation of a stock again. This would only take a single year of significantly lower recruitment due to changes in natural factors such as a lack of food for fish larvae. To reach or maintain a stock size that is stable in the long term, it is therefore necessary to fish less than MSY. It is also important that other circumstances such as stock composition, food availability – especially for fish larvae and juvenile fish – and other factors that can affect stock dynamics are monitored to enable timely response to changes by adjusting catch quotas.

18. One proposal for an alternative to MSY comes from Froese et al. (2010). For stocks that have already attained the biomass associated with MSY, the authors propose an annual harvest of 0.9 MSY. This means only 90 percent of the theoretical sustainable yield would be harvested from the stock, leaving a buffer for uncertainty in assessment and natural variation.

The objective is to reduce the risk of a stock falling below B_{MSY} . Additionally, if a stock falls below B_{MSY} , the authors propose a linear reduction in catch quotas ending at zero when stock biomass reaches half the MSY level ($0.5 B_{MSY}$). The weakness of this proposal, however, is that it is based on the single-species MSY concept and also that it is currently almost impossible to determine B_{MSY} because the necessary experience to do so is lacking (expert discussion on 27 May 2011 with the Johann Heinrich von Thünen Institute (vTI) Institute of Sea Fisheries).

In a further proposal, Holt (2007) suggests an *allowable catch and/or effort algorithm* (ACEA) for the determination of quotas. This should be advance-tested against various population models and historical data and modulated with current data so that it reflects population dynamics according to best available knowledge. Allowance must be given in its use for the fact that heavily overfished stocks often recover slower than hoped and for changes in the age and size composition of the population due to fishing.

Another approach for the management of fish stocks is optimum sustainable yield (OSY), which is based on MSY but incorporates economic, social and ecological criteria such as the ability of the ecosystem to sustain the yield in question. OSY is therefore below MSY. However, the process of determining optimum sustainable yield is substantially more complex than that of determining MSY (FAO, undated).

Summary and the ecosystem approach

19. Scientific advice was not revised to incorporate the concept of maximum sustainable yield (MSY) until 2010 (ICES 2010a). Previously, ICES was merely asked to give advice on catch quotas based on fishing mortality (F), B_{lim} and B_{pa} . B_{pa} averages about 34 percent of the biomass capable of producing MSY (Froese et al. 2010). The corresponding level of fishing mortality (F_{pa}) is significantly higher than that capable of ensuring the attainment or maintenance of B_{MSY} (referred to as F_{MSY}). The changeover to MSY therefore already represents significant progress and will result in a marked increase in fish stocks. ICES advice now also

includes figures for F_{MSY} where possible; where this is not possible, it includes a trigger of around $F_{0.1}$ (corresponding to a harvest of 10 percent). As B_{MSY} is unsuitable as a reference point for the reasons mentioned above, a trigger is used in its place ($B_{MSY-trigger}$), which generally corresponds to B_{pa} . It is nonetheless essential to make sufficient allowance for other factors that affect stock dynamics and hence for the precautionary approach when applying the MSY concept.

20. Calls for a more ecosystem-based approach to fisheries management are repeatedly made from various quarters, and with good reason. Ideas of how to put this into practice, on the other hand, are seldom put forward and are often highly elaborate (Mace 2001). Without question, the first step is to reduce fishing pressure, as doing so automatically means less harm to ecosystems. As has already been mentioned, the changeover to MSY is an important move in this direction. It is also necessary, however, to move from the management of individual stocks to multi-species management. Another need is to improve data availability, both on the condition of stocks and on the impacts of fishing on the rest of the ecosystem. A further step consists of incorporating additional factors into fisheries management – alongside fishing mortality and stock production – such as changes in the food web due to fishing activity, spawning and rearing conditions faced by fish populations, and consequences of fishing activity for sensitive parts of the ecosystem. If these conditions are fulfilled, some progress towards an ecosystem approach is already achieved. Further progress first requires the development and establishment of viable implementation ideas.

2.2 Bycatch and discards

21. As shown earlier, bycatch represents a major problem in fisheries. The share of the catch accounted for by bycatch differs among fisheries. Particularly large bycatch rates are found in North Sea beam trawling for flatfish and otter trawling for Norway lobster and bottom-living roundfish such as cod (an otter trawl is a net that is dragged along the bottom and is held open by two large metal otter boards

to the left and right of the net and by hydrodynamic pressure) (Catchpole et al. 2005). In bottom trawling for sole, for example, the bycatch rate is up to 90 percent (Groenewold and Bergman 2003). Besides the type of net – and notably the mesh size – the bycatch rate also depends on factors such as trawling speed, time and location.

22. Various regulations (notably Regulation (EC) No 199/2008 and Regulation (EC) No 812/2004) now require EU member states to collect data on bycatch and discards. Among other things, the data must allow reliable estimation of the total volume of catches per stock, including discards (Article 15 of Regulation (EC) no 199/2008). Member states must each send in a comprehensive annual report stating measures to observe bycatch and estimates of overall incidental catches of cetaceans in each of the fisheries concerned (Regulation (EC) No 812/2004). Collection of data on cetacean bycatch is a special challenge in its own right, as fishermen have little interest in this information becoming public because of the reputation impact on fisheries. ICES itself therefore regularly collects data on bycatch in the various fisheries and publishes the quantities of bycatch for each stock. Despite the obligations referred to, there are still deficits in data preparation and presentation (STECF 2008).

23. There are various ways to reduce bycatch, including technical modifications to fishing equipment to make it more selective, and geographical and temporal fishing restrictions. With static nets and pelagic fishing gear, for example, acoustic deterrent devices known as pingers are used to minimise cetacean bycatch. According to ICES summary advice on the effect of acoustic deterrents, pingers deployed on static gear are effective in reducing bycatch of harbour porpoises. There are mixed results, on the other hand, with regard to other species such as bottlenose dolphin. A reduction in bycatch of common dolphin (*Delphinus delphis*) has been observed in the UK pelagic trawl fishery for bass (*Dicentrarchus labrax*) (ICES 2010e).

In trawling, various modifications can be made to nets to help reduce bycatch, such as escape panels or ‘windows’, separating-panels, sieve

nets and changes in mesh size and net geometry. In shrimp trawling, for example, use of sieve nets reduces bycatch of undersize specimens by up to 26 percent (Revill and Holst 2004). Increasing the mesh size at the cod end and using a square instead of a diamond-shaped mesh in trawl nets allows more small fish and other benthic organisms to escape. A grid combined with an escape panel in the net can help separate oversize organisms such as dolphins out of the net. In trawling for Norway lobster (*Nephrops norvegicus*), trials with a cutaway trawl (with shortened wing length, reduced headline height, increased mesh size in the upper panels of the net and modified trawl mouth) showed an approximately 50 percent reduction in bycatch of whiting (*Merlangius merlangus*) and an approximately 60 percent reduction in bycatch of haddock (*Melanogrammus aeglefinus*) per unit Norway lobster compared with conventional trawls (Catchpole 2009).

It is thus possible to reduce bycatch by technical means. An assessment of the various methods nonetheless shows that they are unable to eliminate bycatch completely. A particularly strong incentive to reduce bycatch can be provided by a discard ban or obligation to land the whole catch (see paragraph 62 ff.), but a discard ban is only effective if suitably monitored. This makes it necessary to supervise fishing activities with on-board cameras or observers. Another, though less reliable, method is plausibility checking, where landed catches (including bycatch) and the catch data (primarily trawl location and duration) are compared with reference data or sample catches.

Alongside technical modifications, fishing bans in specific areas and at specific times can also help reduce bycatch. Such bans frequently relate to areas and times where larger quantities of juvenile fish are expected to be found (see also paragraph 34).

2.3 The role of marine protected areas in sustainable fisheries management

24. Marine protected areas (MPAs) are an important tool in protecting marine ecosystems from anthropogenic impacts. MPAs have a positive effect on ecosystems with their

characteristic ecological communities and populations, in that harmful activities are banned or restricted within MPA boundaries, and the protected areas provide safe refuge as a resting and feeding place, a breeding site and a place to rear juveniles. MPAs are particularly effective for benthic (bottom-living) communities, especially with stationary species (shellfish, corals and reef fish) (Kaiser et al. 2002). However, migratory species, too, can benefit from MPAs if aggregation, breeding and nursery areas and migration corridors are included (West et al. 2009).

Role of MPAs for fisheries

25. Marine protected areas not only serve the conservation of endangered species and habitats, but can also contribute positively towards sustainable fisheries management based on the ecosystem approach. For example, a sandbank with important ecological functions (say as a feeding habitat for migratory birds) may also be the nursery for a commercially important fish species.

Known benefits of marine protected areas include:

- Spillover and export: Rising population density and the resulting competitive pressure prompt adult fish to emigrate, thus adding to stocks in areas outside MPAs. Free-swimming larvae disperse from an MPA and help replenish stocks outside (Gell and Roberts 2003; Stelzenmüller et al. 2008; Christie et al. 2010).
- Population stability and ecosystem balance: In areas closed to fishing, populations can return to their natural composition and age structure (Agardy 1997; Sobel 1996). This also maintains biological and genetic diversity (Holland and Brazee 1996; Bohnsack 1999).

26. Whether a marine protected area has the effect of increasing stocks depends on a wide range of factors. For example:

- Size: MPAs must have a certain size in line with their conservation objectives (Sumaila 1998; Gerber et al. 2003). The strongest positive effect is expected when 20 to 40

percent of the habitat of a species is placed under protection (Gell and Roberts 2003).

- **Condition:** The condition of a fish stock (for example whether it is inside or outside safe biological limits) when an MPA is designated has a significant effect on how well the stock can recover within the MPA (Rodwell and Roberts 2004).
- **Age:** Depending on the target species, the age of an MPA can be a key factor. Especially for slow-growing species such as corals that are important as a habitat for a number of fish species, positive effects take a long time to emerge (Selig and Bruno 2010).
- **Other abiotic factors** such as rises in temperature, and also ecological characteristics of the species concerned (such as reproductive cycle, food range and adaptability), have an influence on stock characteristics and condition.

27. The European Commission recognises that there are synergies between marine protected areas and the ecosystem approach under the CFP, both for biodiversity conservation and for fisheries management (European Commission 2011f).

Marine protected areas in Europe: Legal foundations and implementation status

28. European marine protected areas have their basis in various EU directives, but are also provided for in other multilateral treaties and in international law. Human activity is restricted within a certain marine area to conserve flora and fauna along with cultural and historical resources (Kelleher 1999).

European MPAs are mostly designated as part of the Natura 2000 protected area network, with the primary aim of conserving species and habitats of Community interest listed in Annex I and Annex II of the Habitats Directive (Directive 92/43/EEC) and species protected under the Bird Directive (Directive 2009/147/EC).

The Marine Strategy Framework Directive, which entered into force in 2008, establishes a uniform European framework for marine conservation for the first time and calls on

member states to achieve or maintain 'good environmental status' throughout the European marine environment by 2020. Protected areas are identified as an important step towards fulfilling this goal. In the meantime, member states are each required to submit a progress report on the development of the marine protected area network to the European Commission by 2013.

OSPAR and HELCOM likewise call for designation of an ecologically coherent and well managed protected area network in their respective treaty areas (the North-East Atlantic for OSPAR and the Baltic Sea for HELCOM) (HELCOM and OSPAR Commission 2003; HELCOM 2007). The Natura 2000 protected areas in the North Sea and the Baltic Sea are simultaneously designated as OSPAR and HELCOM marine protected areas. The member states of the two regional marine conservation agreements have agreed to establish further MPAs and to extend the management of Natura 2000 areas to incorporate OSPAR objectives and include species and habitats as defined by OSPAR (OSPAR Commission 2003). For example, six additional marine protected areas are to be established in areas beyond national jurisdiction and administered in accordance with OSPAR recommendations (OSPAR Commission 2010a). The range of habitats protected by law is also to be expanded to include marine macrophyte populations, silty bottoms with burrowing megafauna, and species-rich gravel, coarse sand and shell layers in marine and coastal regions (Czybulka and Bosecke 2006; WWF Deutschland 2011; section 30 of the Federal Nature Conservation Act (*Bundesnaturschutzgesetz*, BNatSchG)).

29. Finally, European parties to the Convention on Biological Diversity (CBD) are committed to the CBD objectives. The objective of establishing a network of marine protected areas was added at the 2002 World Summit in Johannesburg. The Convention objectives were affirmed at the most recent Conference of the Parties (CBD/COP10) in Nagoya, Japan, in October 2010, which adopted a target of establishing protected areas to comprise ten percent of marine areas by 2020.

30. Marine protected areas account for nearly 20 percent (198,760 km²) of the entire European Natura 2000 network (as of June 2011). Major gaps remain, however, in offshore areas or EEZs (EEA 2010). By law, fishing in Natura 2000 areas is subject to the requirement that deterioration of habitats shall be avoided. Member states must prepare management plans to ensure this by 2013 (Fock 2011).

31. Alongside the MPAs backed up by European directives and regional agreements, there are further marine protected areas at national level, such as national parks and nature parks.

Germany's share of the European marine protected area network

32. Germany takes a leading role in Europe with regard to the establishment of marine protected areas. Approximately 77 percent of German coastal waters in the North Sea and 50 percent in the Baltic sea are designated as Natura 2000 areas. To these are added ten marine protected areas in the German EEZ (some 28 percent of the North Sea EEZ and 55 percent of the Baltic Sea EEZ) (Krause et al. 2011). All Natura 2000 areas in the EEZ are also registered as OSPAR or HELCOM protected areas. Germany and the Netherlands are the only EU member states to have developed a complete Natura 2000 coastal and marine protected area network (loc. cit.).

Assessment of the importance of MPAs for sustainable fisheries management in Europe

33. It has often been called into question whether marine protected areas are an adequate tool for fisheries management. In the following, examples are used to look at two different types of MPA in greater depth together with their importance for sustainable fisheries management:

- Areas where the focus is on recovery of fish stocks through selective closure and fishing restrictions;
- Areas where the focus is on conservation of endangered species and habitats.

Goal attainment critically depends on clear goal setting as to what designation as an MPA aims

to achieve (Jennings and Rice 2009). That is, the definition of a marine protected area and with it the level of exploitation (general fishing ban or targeted harvesting) must be clarified in advance along with the form of implementation (bottom-up or top-down) (Toropova et al. 2010).

Selective area closures and fishing restrictions for recovery of fish stocks

34. Temporary area closures can be imposed to protect specific species, life cycle stages (such as larvae) and habitats (such as nurseries) and can target specific fishing techniques, vessel sizes or fisheries. The European Commission Scientific, Technical and Economic Committee for Fisheries (STECF) Subgroup on Management of Stocks (SGMOS) has investigated several temporary area closures (European Commission 2007a). A recurrent problem proved to be the frequent failure to clearly specify goals, making it impossible to identify positive or negative change with certainty. Area closures were accompanied in some cases with other packages of measures such as fleet reductions, which meant that outcomes could not be clearly attributed. Some areas were too small and others would have to be modified in order to attain their objectives. Despite this, it was argued that in most cases, repealing area closures would have a negative impact and it was recommended that the closures should be maintained (European Commission 2007a).

An example of a successful selective area closure (ICES 2003; European Commission 2007a) is the establishment of the mackerel box in 1980 to protect juvenile mackerel off the south-west coast of the UK. Permanent closure of the area to the mackerel fishery significantly reduced the percentage of undersize, juvenile fish in the total catch (based on samples) (European Commission 2007a). In contrast, establishment of a plaice box north of the Dutch and German Wadden Sea islands and west of the Danish coast to protect young, undersize plaice by selective closure to beam trawlers with an engine power greater than 300 hp did not produce the expected increase in the quantity of undersize plaice in the habitat. The reasons were hotly debated. Fishermen argued that closure to large beam trawlers meant less sediment was churned up and fewer shells cracked open, with

the result that juvenile plaice found no food and migrated elsewhere. On the other hand, the plaice box remains one of the most important fishing grounds for beam trawlers with less than 300 hp. The increase in fishing effort by beam trawlers with less than 300 hp was three times as big as the decrease in fishing effort by beam trawlers with more than 300 hp. In particular, the mixed flatfish fisheries and the shrimp fishery generated more than 70 percent of their earnings in the plaice box. This can hardly have helped protect juvenile plaice. While juvenile plaice were indeed shown to migrate out of the plaice box, the reasons could scarcely have anything to do with a reduction in fishing effort (Beare et al. 2010).

Marine protected areas for conservation of endangered species and habitats

35. Marine protected areas where there is no fishing at all (no-take zones) have the greatest success with regard to natural stock dynamics and conserving marine biodiversity (Roberts et al. 2005; Toropova et al. 2010; WWF Deutschland 2011). European waters come under heavy pressure of use from various maritime sectors, however, and this makes no-take zones less easy to designate. The level of exploitation within existing MPAs must nonetheless ensure that they attain their conservation objectives.

36. A project launched by the German Federal Agency for Nature Conservation (BfN) and carried out by ICES, Environmentally Sound Fisheries Management in Marine Protected Areas, proposes fisheries management measures in accordance with Natura 2000 for all MPAs in the German North Sea and Baltic EEZ. The use of mobile fishing techniques with bottom contact is to be avoided, particularly on sandbanks and reefs. Experimental closures will be imposed (such as for Dogger Bank, Sylt Outer Reef and Borkum Reef Ground) and monitoring carried out to close knowledge gaps. A ban on gillnets and entangling nets or conversion to alternatives is recommended to protect sea birds and harbour porpoise (Pusch and Pedersen 2010). Seasonal and in some cases all-year closures are recommended for sub-areas such as the Eastern German Bight. Year-round use of acoustic deterrents (pingers) on all static nets regardless of vessel size is a hotly debated

proposal for MPAs (Sell et al. 2011). One way of minimising marine mammals' exposure to pinger noise and hence of avoiding the habituation effect would be to use interactive pingers that only sound when animals come near. The World Wide Fund For Nature (WWF) recommends that MPA management should use hierarchical zoning centred around a no-take, no-use zone. In the remainder of an MPA, harmful fishing practices should then be restricted by time or area and the remaining fishing techniques made as environment-friendly as possible (WWF Deutschland 2011). In a report to UK parliament, the Royal Commission on Environmental Pollution (RECP) recommended that 30 percent of the British EEZ should be designated a no-take zone for comprehensive recovery of the North Sea ecosystem (RCEP 2004).

It is noted that conservation objectives for mobile species in particular, such as harbour porpoise, are impossible to attain if measures to achieve them are exclusively restricted to Natura 2000 areas. Having said that, measures taken within MPAs affect surrounding areas, for example by raising fishing pressure on stocks outside MPAs (Pusch and Pedersen 2010; Sell et al. 2011).

In its reform proposal, the European Commission does not stipulate any specific requirements or prohibitions and merely provides that "fishing activities shall be conducted by Member States in such a way so as to alleviate the impact from fishing activities in such special areas of conservation" (Article 12 (1)). This requirement is regrettably vague and lacks targets. It is to be welcomed, on the other hand, that the Commission has a self-imposed obligation to enact requirements for such areas if member states fail to fulfil their duties under EU environmental law (see Article 12 (2)).

2.4 Impacts of climate change on fisheries

37. The impacts of climate change vary from region to region (IPCC 2007). This applies just as much to the European marine environment as it does elsewhere. Northerly regions will be most heavily affected by atmospheric warming and glacier melt (Hassol 2004), while less pronounced warming is expected in southerly

regions (Rijnsdorp et al. 2010). Sea temperatures will not increase quite as strongly as atmospheric temperatures. There is a key difference in this regard between deep ocean and continental shelf/coastal regions, with temperatures changing far more slowly in the former than in the latter (Walther et al. 2002; Lehodey et al. 2006). The average surface water temperature in the North Sea off Heligoland, for example, has increased by 1.6 °C in the last 50 years (Figure 3).

38. Another notable expected change besides water temperature relates to precipitation. Precipitation in general and heavy rain events in particular are expected to increase in winter. This will lead to increased precipitation runoff and reduced water availability (Rijnsdorp et al. 2010). A change in salinity due to greater precipitation is solely expected for the Baltic Sea.

39. Other factors include changes in wind conditions (strength and direction), fewer cold winters and more hot summers (Frei et al. 2006). This mainly affects the temperature niche of native species, but also has implications for invasive alien species.

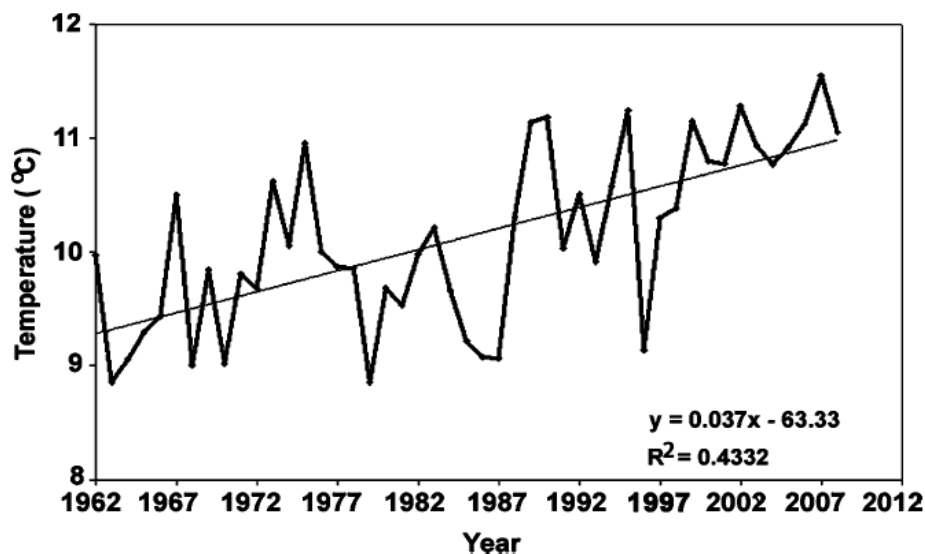
40. Fish have complex life cycles with various development stages (egg, larva, juvenile and adult). Each stage is adapted to a specific

habitat and changes in each habitat affect optimum living conditions. Because of this, fish, like other marine species, are especially sensitive to climate change. They can, however, respond to change in many different ways (Rijnsdorp et al. 2009; 2010; Link et al. 2010). ICES (Rijnsdorp et al. 2010) names five different, largely interlocking mechanisms by which climate change can have an impact on fish and fish stocks. These include:

- Physiological changes in response to changed environmental parameters (such as temperature, CO₂ concentration and pH value);
- Behavioural changes (such as emigration) to avoid unsuitable surroundings;
- Changes at population and stock level such as broader or more restricted distribution as a result of local extinction events and colonisation prompted by changes in the natural balance (for example in mortality rate, growth and reproduction);
- Changes at ecosystem level (such as trophic webs);
- Fishing pressure adding to adverse effects on species abundance (the number of individuals per unit area or volume) and resilience (Ottersen et al. 2006).

Figure 3

Mean yearly trend in surface water temperature off Heligoland, 1962 to 2010



41. The main factors of importance for the fisheries sector are distribution shifts and the success of stock replenishment. There are already many examples of distribution shifts (Rose et al. 2000; Rose 2005; Drinkwater 2002; Walther et al. 2002; Brander et al. 2003; Brander 2007; Perry et al. 2005; Spencer 2008; Nye et al. 2009). Stocks at the outer limit of their natural distribution prove to be more heavily affected than those in the middle of their range. Southern species will increase at their northern distribution limit and northern species will decline at their southern distribution limit. There are also shifts in species to deeper and colder waters (Perry et al. 2005; Drinkwater 2005; van Keeken et al. 2007; Dulvy et al. 2008). Specialists, K-strategists (species with low reproduction rates) and species from continental shelf and coastal regions will show a more pronounced response to climate change than generalists, R-strategists (species with high reproduction rates) and deep sea species (Rindorf and Lewy 2006). Climate change also has a decisive influence on larval survival rates and development. Unlike the larvae of tropical species, those of most temperate species are poor ‘swimmers’ (Rijnsdorp et al. 2009). If a temperature rise alters plankton assemblages in the larval habitat, larvae may lack an important component of their alimentation (Richardson and Schoeman 2004; Platt et al. 2003; Temming et al. 2007). This has been seen in cod in the North Sea (Durant et al. 2005). The rapidly decreasing number of cold winter days also increases the threat of invasive species from more southerly latitudes (Goren and Galil 2005; Karlson et al. 2007). Last but not least, distribution shifts induced by climate change also have an impact on the effectiveness of MPAs, as species may migrate out of protected areas.

The subject of climate change and its impacts is not addressed in the European Commission reform proposal (European Commission 2011f).

3 Spotlight on the Common Fisheries Policy

3.1 The European Commission proposal for reform of the Common Fisheries Policy

42. Following on from green and blue papers in 2009 and 2010, the European Commission published its Proposal for a Regulation on the Common Fisheries Policy in July 2011 (European Commission 2009b; 2010a; 2011f). The SRU generally welcomes the Commission proposal and considers that it gives important impetus towards reforming European fisheries policy in a direction that permits long-term and environmentally compatible management of European fish stocks.

In its proposal, the European Commission states the central objective of the CFP as being to ensure fishing and aquaculture activities that provide long-term sustainable environmental conditions as a requirement for economic and social sustainability in the sector. This brings environmental conditions to the forefront of fisheries policy action – a highly welcome development. Another aim of the proposal is to better integrate the precautionary and ecosystem approach into the CFP. The European Commission proposes a wide range of measures to ensure sustainable management of fish stocks in future and help attain good environmental status in marine ecosystems. Notable among these measures are the following:

- Enshrinement in law of the aim of restoring and maintaining populations at a level that can produce maximum sustainable yield (Article 2) (paragraph 49 ff.);
- A discard ban for important harvested stocks (Article 3; 15) (paragraph 62 ff.);
- Implementation of multiannual plans based on the ecosystem approach (Articles 9 to 11) (paragraph 52);
- Technical measures frameworks for the protection of stocks and marine ecosystems (Article 14; 21 to 26) (paragraph 60);
- Establishment of a system of transferable fishing concessions (Article 27 to 28) (paragraph 96);
- Fishing capacity ceilings for member states (Article 35) (paragraph 88).

These measures principally go in the right direction. They are an important step towards removing the shortcomings in the current CFP.

The discard ban and the enshrinement in law of the aim of ensuring a population size that can produce maximum sustainable yield deserve special emphasis. However, the Commission proposal still has marked weaknesses, in particular when it comes to giving measures and targets binding force and expressing them in precise terms. This imprecision in wording poses a risk that positive moves towards reform may come to nothing. Additionally, the solutions proposed for some problems are inadequate. This is particularly the case with the failure to take into account regional circumstances in decision making processes and the ineffective obligations to reduce fleet overcapacity. It is also to be feared that it will remain impossible to prevent the problems of overfishing from being transferred to non-EU states. The following sections go into the proposed measures in detail.

3.2 Basic structure of the Common Fisheries Policy and current developments

43. The European Union regulates fishing activity in all Community waters through the CFP, which covers the following policy areas:

- Conservation and management of fisheries resources;
- Common organisation of the market in fishery products;
- Structuring of the fleet through common structural policy;
- Control and inspection of fishing activities;
- Management of fishing activities outside of the European Union

3.2.1 Conservation and management of fisheries resources

44. For the conservation of fisheries resources, the currently applicable Regulation (EC) No 2371/2002 on the conservation and sustainable exploitation of fisheries resources under the Common Fisheries Policy (referred to in the following as the CFP Framework Regulation) lays down a legal framework for quantitative restrictions on catches (quotas), for restrictions on the intensity of fishing (fishing effort limits), and for technical measures such as

closed zones and periods and measures regarding fishing gear and methods.

3.2.1.1 Catch restrictions

Current practice

45. To allocate fish resources in Community waters among member states, total allowable catches (TACs) are revised annually for the entire EU. From these are derived the total allowable catch for each member state, whose share of the EU TAC is held constant over time (the relative stability principle). The Fisheries Council sets TACs separately for each fish species and fishery based on recommendations from the European Commission Scientific, Technical and Economic Committee for Fisheries (STECF), which draws in turn on scientific advice from ICES. The result until the last CFP reform in 2002 was the regular setting of TACs that on a long-term average exceeded ICES advice by 30 percent (Frid et al. 2003, p. 40) – and at that time, as mentioned earlier, ICES advice was merely geared to avoiding a collapse in fisheries and not to ensuring maximum sustainable yield.

46. Since 2002, TACs are required to be laid down on the basis of long-term management plans for individual fish stocks. Firstly, ‘recovery plans’ aim to ensure that stocks outside of safe biological limits recover to within safe biological limits (Article 5 (2) of Regulation (EC) No 2371/2002). Secondly, Article 6 (1) requires ‘management plans’ to be adopted ‘as far as necessary’ to maintain stocks within safe biological limits for fisheries exploiting stocks at/or within safe biological limits.

The CFP Framework Regulation explicitly stipulates that the plans must be drawn up on the basis of the precautionary approach and take account of limit reference points recommended by relevant scientific bodies (Article 5 (3); Article 6 (3)). Despite this, in many cases, quota setting did not conform to the scientific advice from ICES (WWF 2007; Sissenwine and Symes 2007; Lutchman et al. 2009). In 2003, for example, North Sea quotas were merely reduced for cod, haddock and whiting, while ICES advice was for a fishing ban in mixed fisheries for these species. Similar advice in 2005 for a

fishing ban on cod in the North Sea including the Eastern Channel and Skagerrak and on the northern stock of hake was likewise ignored, as were recommended fishing bans on cod in 2006, 2007 and 2009. Not until 2010 were quotas for cod set in line with the scientific advice (Ingerowski and Salomon 2006, p. 11; WWF 2004; 2007, p. 14; vTI 2010; Federal Research Centre for Fisheries press release No. 366 of 28 October 2002). Table 2 shows the percentage of each stock for which the TACs exceeded the recommended sustainable catch according to

scientific advice in recent years. It also shows the situation to have improved somewhat most recently. In 2010, for example, the scientific advice was exceeded for ‘only’ 34 percent of stocks, compared with 48 percent in 2009. It should be borne in mind, however, that ICES advice in the past was not geared to the standards of sustainable fisheries (measured against the attainment of B_{MSY}), hence stocks identified shown to be sustainably harvested in the table do not fully meet the criteria of sustainability (see paragraph 19).

Table 2

Difference between scientific advice and quota setting for fisheries

Year	2003	2004	2005	2006	2007	2008	2009	2010
Percentage of stocks for which TAC greater than sustainable catch	46	49	59	47	45	51	48	34
* Sustainable catch: catch corresponding to ICES and STECF advice based on the precautionary approach								
Source: European Commission 2010c								

47. Multiannual plans have been drawn up so far for the following stocks: Northern and southern hake, Norway lobster in the Cantabrian Sea and Western Iberian peninsula, sole in the Bay of Biscay, in the western Channel and in the North Sea, plaice in the North Sea, herring to the west of Scotland, cod in the Kattegat, North Sea, Skagerrak, eastern Channel, to the west of Scotland and in the Irish Sea, and bluefin tuna in the eastern Atlantic and Mediterranean (see Regulation (EU) No 57/2011). According to the European Commission, all important commercially exploited stocks and 30 percent of fish taken by EU fishermen is thus covered for 2011. Adding the various stocks jointly managed with Norway for which multiannual management arrangements are also in place, over 80 percent (by weight) of the fish taken by EU fishermen is subject to multiannual management (“Fisheries: Commission proposes science-based, sustainable fishing opportunities for 2011”, European Commission Press Release dated 11 November 2010). Specific management plans have attracted criticism, however. For cod in the North Sea, for example, the combination of the catch quota, fishing effort,

and the fact that the species is harvested in a mixed fishery where the catch for the remaining species has not been brought in line with the multiannual plan for protection of the cod stock, has resulted in a sharp rise in discards to more than 50 percent of the total catch today (STECF 2010). This is compounded by the poor status of most stocks, as mentioned earlier (see paragraph 4). Some important stocks, however, such as southern and northern hake and sole from the Bay of Biscay, show clear improvements associated with the multiannual management plans (“Fisheries: Commission proposes science-based, sustainable fishing opportunities for 2011”, European Commission Press Release dated 11 November 2010).

48. Overall, the condition of some stocks has begun to improve most recently (paragraph 4). This slight positive trend is likely to be maintained in the current year after ministers, for the first time, only marginally exceeded the Commission proposal when setting quotas for 2011, putting the TACs “for 2011 in line with scientific advice and long-term management plans for the stocks of special importance to

European fisheries” (Deutscher Bundestag 2011, p. 6). In light of past experience and the major unsolved problems including a reduction in surplus fleet capacity, however, it may well be too early to interpret this trend as a reversal in the direction of sustainable fisheries management.

Initiatives targeting maximum sustainable yield

49. Maximum sustainable yield (MSY) has been stipulated as the overriding goal for the management of fish stocks since as early as 1982, when it was incorporated into the United Nations Convention on the Law of the Sea (UNCLOS). At the Johannesburg World Summit on Sustainable Development in 2002, states pledged to maintain or restore fish stocks to a level that can produce maximum sustainable yield by no later than 2015. The European Commission is committed to this target and recognises it as a fundamental goal of sustainable European fisheries policy (European Commission 2006a; 2011f).

50. The European Commission thus published a communication entitled “Implementing sustainability in EU fisheries through maximum sustainable yield” in 2006, and has incorporated the objective of maintaining or restoring stocks to MSY levels into its CFP reform proposal (European Commission 2006b; 2011f). The Commission expects that implementing MSY-based fisheries management would help reverse the current poor state of many – and in particular demersal – fish stocks, allowing them to regain sizes that allow substantially more fish to be harvested, and at lower cost, than is currently the case. This would also improve fishery profitability and competitiveness. It would additionally reduce by-catch of juvenile fish and non-target species. The Commission states that attaining the objective of MSY would require temporary restrictions on catches so stocks can recover. However, neither the Commission Communication nor the current reform proposal discusses whether it is actually possible to restore all harvested stocks to MSY levels. Precisely this is doubted by experts, among other things because of interdependencies among stocks, such as predator-prey relationships (Agnew et al. 2009;

Mackinson et al. 2009). The size of the Baltic cod stock, for example, inevitably affects the size of the sprat stock because sprat are the main food organism of cod.

An objective of attaining a stock biomass that can produce maximum sustainable yield (B_{MSY}) is to be generally welcomed (paragraph 19). It is not suitable as the sole goal of sustainable fisheries, however, because of the difficulty of determining B_{MSY} for fish stocks and the uncertainty about whether all stocks can be restored to this level. Preferably, therefore, a level of fishing mortality should be set as a precautionary reference point below the level that produces maximum sustainable yield (F_{MSY}). A target of this kind is the only way to sustain stock biomass above B_{MSY} in the long term. For reasons mentioned in section 2.1, fisheries should be stopped short of harvesting MSY.

Recommendations for quota management

51. ICES advice in the past did not have the objective of maintaining or restoring stocks to a size that could produce MSY. Instead, the prime aim was to prevent stock collapse. ICES advice has now been modified to incorporate MSY (paragraph 19). However, data availability is still inadequate to the task of issuing advice on all important commercial fish stocks. This deficit should be eliminated by improving research conditions, including funding. An incentive to conduct such research could consist of significant restrictions on fishing for stocks where data availability is insufficient (paragraph 52). The European Commission proposes specific obligations for member states with regard to data collection and management, for example by adopting multiannual programmes for data collection (Article 37 of the Commission proposal). It remains unclear, however, to what extent members are to be required to make available adequate data for stock management. On the other hand, the Commission reserves the right to stipulate requirements for the multiannual programmes.

52. The SRU considers that the coming CFP reform should include an obligation to establish long-term management plans at least for all stocks that are not currently sustainably

harvested, i.e. that are under the B_{MSY} (or $B_{MSYtrigger}$) reference point, or whose fishing mortality is above F_{MSY} , or for which reference points cannot be determined due to data availability. The European Commission's proposal for CFP reform makes the establishment of such plans a priority but not an obligation (Article 9 to 11 of the Commission proposal). As envisaged by the Commission, multiannual plans should be drawn up not only for individual stocks, but also for mixed fisheries, where management has to be coordinated between stocks.

In the SRU's opinion, therefore, it is necessary to incorporate a blanket obligation to prepare multiannual plans into the CFP Framework Regulation (Article 9 of the Commission proposal). The management plans must be exclusively geared to restoring stocks over an appropriate length of time above levels that can produce maximum sustainable yield (B_{MSY}) (Article 2 of the Commission proposal). Until B_{MSY} can be determined, the objective should be to maintain fishing mortality below F_{MSY} and biomass above B_{pa} while ensuring stock growth, based on ICES advice. Target attainment should be reviewed annually and both quotas and targets adjusted in line with new scientific knowledge. Social and economic concerns must not be allowed to compromise this objective in any way. If it is determined that quotas for endangered stocks do not permit any growth, the quotas must be further reduced immediately.

Whenever there is a lack of adequate data for stock management, the precautionary approach must come into play. Quotas must then, as already proposed by the Commission, be set at 25 percent below the ICES advice on fishing mortality targeting B_{MSY} , in the hope that this safety margin is big enough to account for the prevailing uncertainty. If there are no data for management of a stock, harvesting of that stock should be prohibited on precautionary grounds.

A large number of management plans have now been adopted by the Fisheries Council (paragraph 47). An important factor in their success is that the objectives set in them represent clearly formulated guidance for attainment of maximum sustainable yield and that quotas are

exclusively adopted that serve attainment of the objectives in the plans.

53. To ensure that fisheries are equipped for the impacts of climate change and already weakened stocks are not taken even closer to their biological limits, it is important to take account of climate impacts in management plans where possible.

54. The success of management plans should be measured against the target of maintaining or restoring biomass to levels that can produce maximum sustainable yield by 2015, even if this is clearly unattainable for many endangered stocks in such a short time. It is essential to prevent quota setting from being dominated by short-term political interests as has been common in the past. To this end, the reform must set clear limits to action by the Fisheries Council while leaving scope to decide quotas on a sustainable and precautionary basis. The adopted management plans are not enough to achieve this on their own. Instead, appropriate, unambiguous, science-based guidelines must be incorporated into the CFP Framework Regulation (Markus 2010). The SRU therefore considers it vital to prohibit fishing mortality and hence quotas (including expected bycatch) higher than the precautionary reference point (F_{pa}), because this would go against both the precautionary principle and sustainable fisheries management. B_{MSY} should similarly be given binding force as a target, as the Commission proposes (Article 2 of the Commission proposal). Harvesting in excess of F_{MSY} should not be allowed except in clearly specified circumstances and for a limited time. Harvesting cannot be defined as being sustainable and in conformity with the precautionary principle unless fishing mortality is below F_{MSY} (European Commission 2010b). As it is probably not possible to maintain or restore all fish stocks to a biomass that can produce MSY, it is all the more important to include F_{MSY} as a reference parameter in the CFP Framework Regulation. For the future, the aim should be to draw up common management plans for stocks that display interdependencies.

55. If the reform does not succeed at restoring fish stocks, the SRU sees a vital need to reassign powers for the management of fish

stocks in Europe, for example by transferring more such powers to the Commission, even if this might require changes to the Treaty on the Functioning of the European Union (TFEU).

56. The SRU regards it as necessary for the following basic steps towards sustainable fisheries management to be addressed at high level in the coming CFP reform:

- Long-term management plans should be adopted for all harvested stocks. For mixed fisheries, stock management plans must be coordinated. The long-term goal should be multi-species management plans.
- As targets or reference points, the management plans should stipulate the biomass and fishing mortality required for maximum sustainable yield (B_{MSY} and F_{MSY}).
- From no later than 2015, quotas should be set to maintain fishing mortality below F_{MSY} .
- In the long term, quotas should be agreed that correspond to 90 percent of the maximum sustainable yield ($0.9 F_{MSY}$).
- In consequence, in ideal conditions and for some stocks, this allows stock biomass to settle above B_{MSY} , the quantity that can produce maximum sustainable yield. Quotas should be cut automatically the moment stock biomass falls short of this level.
- A fishing ban should be imposed at half the stock biomass that can produce maximum sustainable yield or at the current precautionary reference point (B_{pa}).
- Management plans should be revised annually based on comprehensive fisheries monitoring that also includes non-fisheries factors affecting stock dynamics.

More flexible quotas

57. It is also to be recommended that quotas be made more flexible, in particular with a view to the special features of mixed fisheries (see also paragraph 96). This makes it necessary to give fishermen who reach their quota a means of increasing it by exchange or purchase, without this altering the total quota for the fish stock. How much use is made of this option will

largely depend on how well the quotas assigned to fishermen in the first place correspond to the quantities actually caught in the mixed fishery, including bycatch. Notably, a discard ban of the kind proposed by the European Commission and welcomed by SRU (paragraph 65) would make it illegal for fishermen to throw part of their catch overboard, hence making quotas more flexible in the way described means fishermen would not have to stop altogether on reaching the quota for a single species. Making quotas more flexible can thus help improve efficiency and reduce overcapacity.

3.2.1.2 Fishing effort limits

58. Fishing effort, as targeted by fishing effort limits, is the product of time spent at sea and the number, size and engine power of vessels operating in a given area. It was decided in 2007 to set fishing effort limits in kilowatt-days (kW-days) to prevent fishing time restrictions from being offset by higher capacity.

Fishing effort limits are currently an obligatory feature of recovery plans, but they are also provided for as a general measure in the CFP to limit fishing effort in specific fisheries, as under the regulations on deep sea fisheries (Regulation (EC) No 2347/2002) and on management of fishing effort (Regulation (EC) No 1954/2003). The Commission proposal likewise explicitly provides for the use of fishing effort limits as a management tool in the absence of management plans (21st recital of the Commission proposal) and does not rule out their use within management plans.

In the past, fishing effort limits notably served to cushion the effects of the excessively high quotas resulting from lack of political consensus on quota reductions and failure to reduce overcapacity. Experience shows that fishing effort limits are politically easier to push through (Sissenwine and Symes 2007, p. 43).

An advantage of fishing effort limits is the relative ease of monitoring compared with a quota system, especially when effort is measured in days at sea and fleet capacity (Khalilian et al. 2010, p. 1180). Determining what level of fishing effort is suitable, on the other hand, requires as much if not more data than a quota

system, as it is very hard to associate fishing fleet effort with a specific rate of fishing mortality. Setting fishing effort limits in kW-days rather than days at sea as recently decided by the Commission brings the additional difficulty of correctly registering vessel engine power (Markus 2010, p. 139). The engine power of a vessel is easy to manipulate with modern technology but takes a lot of effort to verify (BMELV 2010b, p. 7).

A key drawback of fishing effort limits is that they channel technological progress in a direction that results in greater harm to ecosystems: Fishermen use fishing methods enabling them to catch more fish in less time, minimising kW-days expended. The pressure to fish as efficiently as possible is also counterproductive with regard to bycatch reduction measures, because using larger mesh nets or other selective fishing equipment and targeting fishing grounds with low juvenile fish abundance tends to increase fishing effort as measured in kW-days (BMELV 2010b, p. 6).

Fishing effort limits also have to be revised in line with technical progress, which is economically inefficient. A quota system, in contrast, is unaffected by technical progress (Khalilian et al. 2010, p. 1180).

Mixed systems of quotas and fishing effort limits as currently used in the CFP are also demanding to administer, and the German Federal Ministry of Food, Agriculture and Consumer Protection (BMELV) comes to the assessment that the additional cost of fishing effort limits is not cancelled out by a corresponding additional benefit (BMELV 2010c, p. 14).

On balance, the drawbacks of fishing effort limits thus outweigh the benefits, whether used on their own or alongside quotas. In the SRU's opinion they should therefore no longer normally be used as a stock management tool in future management plans. Instead, quotas should be set in line with scientific advice. This removes the need for fishing effort limits for stock management, cutting administration costs. Fishing effort restrictions remain useful only in limited circumstances – for example if it is not possible to set quotas, or when ecosystems temporarily need greater protection, e.g. due to

an abundance of juvenile fish – and should then be used accordingly (Neudecker 2002).

3.2.1.3 Preventing bycatch/discards and protecting ecosystems

Technical requirements and fisheries protection zones

59. The main aim of technical measures is to protect juvenile fish, non-target species and marine ecosystems. A number of regulations enacted in the past primarily relate to the types and designs of nets to be used. An important requirement is the minimum mesh size, which mostly serves to protect undersize fish.

The main regulations in this regard are as follows:

- Regulation (EC) No 894/97 laying down certain technical measures for the conservation of fishery resources;
- Regulation (EC) No 850/98 for the conservation of fishery resources through technical measures for the protection of juveniles of marine organisms;
- Regulation (EC) No 2187/2005 for the conservation of fishery resources through technical measures in the Baltic Sea, the Belts and the Sound.

The above regulations have been amended many times for reasons such as technical progress. Regulation (EC) No 850/1998 alone had undergone 95 amendments by 2006 (Marcus 2009a).

60. The provisions on fishing techniques attract wide-ranging criticism. A number of examples are picked out in the following. Generally speaking, the technical requirements are found to be too complex and detailed, and in many cases drafted without consulting the affected fishermen. A move to address this last deficit was made in 2002 with the introduction of regional advisory councils (advisory councils for specific marine regions, composed of industry representatives and other interest groups and serving to advise the European Commission) (Article 31 of Regulation (EC) No 2371/2002; paragraph 73 ff.). The European Commission also proposes a shift away from

highly detailed technical requirements by means of more strongly target-driven fisheries management linked to corresponding reporting obligations (European Commission 2009b).

An important point of criticism relates to mesh sizes. The 120 mm mesh size for the North Sea cod fishery, for example, is considered by various parties to be too small (in the past it was even smaller, at 110 mm). Most of the cod caught with this mesh size are juvenile or below spawning age (Catchpole et al. 2005). At the same time, intense fishing pressure has altered the composition of the stock so that it is heavily dominated by juvenile fish. Older and thus larger individuals have become very rare. The reason given for the small mesh size is that cod are harvested in a mixed fishery that includes target species such as whiting (*Merlangius merlangus*), which are far smaller on reaching adulthood. A general shortcoming of mesh size requirements is that they are easy to sidestep, for example by reducing the trawl speed, which causes mesh openings to narrow.

Other criticism relates to the legality of fishing techniques that are particularly harmful to the environment, such as heavy bottom trawling with otter trawls and beam trawls (WWF Deutschland 2008; Løkkeborg 2005). The use of such equipment inflicts great harm on benthic communities (paragraph 11). Beam trawling has already been widely restricted and is completely banned for example in the Baltic Sea, but it continues to be practised in the North Sea. Alternatives such as replacing the heavy tickler chains on trawl nets with electric ticklers (electric pulse trawls) have been available for some time, but such use as they have received so far has been restricted to individual fishermen and testing (BMELV 2011a).

A further problem is the requirement under Regulation (EC) No 850/1998 for undersize fish to be returned immediately to the sea. As over 90 percent of discarded fish die in any case, this serves no purpose ecologically and only worsens the problems of bycatch (Ingerowski and Salomon 2006).

The European Commission (2011f) proposes the establishment of technical measures frameworks. These can authorise member states to adopt measures of their own to protect stocks

and marine ecosystems. Member states must ensure that such measures are compatible with the following objectives (Article 14 and 21 of the Commission proposal):

- Maintain or restore fish stocks above B_{MSY} ;
- Reduce bycatch of juvenile fish and non-target species;
- Mitigate the impact of fishing gear on ecosystems.

Under the Commission proposal, if member states fail to notify measures to the Commission within three months of a technical measures framework entering into force or if such measures fail to meet specific criteria, the Commission will be empowered to adopt delegated acts to specify technical measures covered by the framework. The criteria are that measures must be compatible with the objectives set out in the technical measures framework and must meet those objectives effectively (Article 24 of the Commission proposal).

The SRU welcomes this proposal and also considers it helpful for consultation to take place between member states on the technical measures to be adopted for a given marine region, with stakeholders involved in the process (paragraph 71 ff). This would scarcely be achievable in a three-month timeframe, however. The Commission merely provides that member states must notify relevant advisory councils (Article 22 of the Commission proposal).

61. Alongside requirements on fishing techniques, the current CFP Framework Regulation also permits the Council to adopt zones and periods in which fishing activities are prohibited or restricted (Article 4 (2) (g) (ii) of Regulation (EC) No 2371/2002). Based on ICES advice, for example, a zone protecting habitats from bottom trawling was agreed for the Darwin Mounds in 2004 and another for the waters around the Azores, Madeira and the Canary Islands in 2005 (Lutchman et al. 2008, p. 60).

If there is evidence of a serious threat to fish stocks or ecosystems resulting from fishing activities, the Commission, at the substantiated request of a member state or on its own

initiative, may adopt emergency measures having immediate effect and lasting not more than six months, including fishing effort limits, area closures and technical measures to make fishing techniques more selective. If there is such a threat to waters under the sovereignty or jurisdiction of a member state, the member state can itself take emergency measures lasting not more than three months “where any undue delay would result in damage that would be difficult to repair” (Article 8 of Regulation (EC) No 2371/2002). Commission emergency measures have often been used ahead of recovery plans and became necessary because of past quotas in excess of scientific advice. The recovery plans for hake and Baltic cod, for example, were preceded by emergency measures (Lutchman et al. 2008, p. 24).

European Commission initiative to ban discards

62. The past approach of attempting to master the problems of bycatch merely by imposing requirements on fishing techniques and restrictions on fishing in specific zones and at specific times has failed without question (SRU 2004). One reason for this is highly likely to be lack of acceptance among the affected fishermen. The measures taken evidently also related to only a small fraction of fisheries. In some fisheries, there is additionally considerable economic pressure to maximise the value of the catch. Fishermen aim to fill their stores with high-value fish. This encourages ‘high grading’, where fish of low market value on account of their species, size or condition are thrown back overboard (European Commission 2007b). Some fisheries rules, such as those permitting far too small mesh sizes in mixed fisheries, have also countered efforts to reduce discards. Finally, in mixed fisheries, the quota management system can lead to one fish species being thrown back overboard when fishermen use up their quotas for that species but not for others.

63. The European Commission published a proposal for a ban on discards as early as 2007 and has taken this further in its reform proposal on the CFP (European Commission 2007b; 2011f). The latter provides for a discard ban on all fisheries, although the ban does not apply

immediately for all harvested stocks but is to be phased in gradually for discards of specific species. Discards of pelagic species such as mackerel, horse mackerel, herring, anchovy (*Engraulis encrasicolus*), blue whiting (*Merluccius merluccius*), sardinella (*Sardinella spec.*), boarfish (Caproidae), argentine (Argentinidae), capelin (*Mallotus villosus*) and various tuna species are thus to be banned from 2014, discards of cod, hake and sole from 2015, and discards of other, mostly demersal commercial fish species from 2016. Undersize fish is to be sold for reduction to fish meal or pet food only.

The reasons given for the phased species-by-species approach are the need for fisheries to adapt to the new situation and the desire to promote continuous improvement in fishing techniques. The Commission stresses the great importance of enforcement and especially monitoring for successful introduction of the discard ban. Requirements for monitoring according to the Commission are as follows:

- Thorough records of landings by each fishing vessel;
- Electronic logbook systems permitting real-time reports on catch composition;
- Monitoring and control of fishing gear;
- Surveillance of fishing activities by inspectors;
- Stakeholder involvement and enhanced cooperation and consultation with fisheries in implementation.

The European Commission’s proposal is broadly to be welcomed. It is nonetheless hard to understand why different time periods should apply for species caught together in mixed fisheries, such as cod, whiting and haddock. The desire to phase in a discard ban gradually is generally understandable given the different levels of effort and expense needed for technical modifications. The phasing should be by fisheries, however, rather than by species. A discard ban that only relates to specific species can only be monitored at very high cost if at all. For example, infringements would be difficult to detect using surveillance cameras.

It is to be welcomed, on the other hand, that the Commission proposal provides for a relatively

short timescale for ceasing this practice and the harm it causes to stocks and ecosystems.

Problems are raised by the approach of only banning discards of commercially important species. An obligation to land all catches of less important commercial species and non-commercial species would be helpful so that bycatch of such species can be better monitored and measures established to reduce it. It is therefore necessary to impose a general discard ban for all fish species. Only if specific fisheries can demonstrate that their bycatch has strong chances of survival might it be possible to exclude those fisheries from the obligation.

64. Proper monitoring of a discard ban requires either cameras or inspectors on board ship, because compliance is likely to be low without adequate control given the large economic burden of landing bycatch. A blanket discard ban or landing obligation is quite capable of being monitored. For small-scale fisheries, camera and observer surveillance is likely to be too expensive. A possible alternative here consists of plausibility checks, where landed catches are compared with catch data and the fishing gear used. The Commission only plans to oblige member states to ensure that all fishing vessels flying under their flag are equipped for full documentation of fishing activities. It does not propose technical means for implementing this requirement (Article 15 of the Commission proposal).

Recommendations to protect ecosystems

65. To bring the bycatch problem under control, the SRU advocates a discard ban/landing obligation for all fish species (SRU 2009; 2004); this should be included in the CFP Framework Regulation – as the Commission has already done, although only for specific species (Article 15 of the Commission proposal). A discard ban can be introduced on a phased basis for different fisheries but should be made binding on all fisheries within a few years. Among other things, this makes it necessary to repeal the requirement in Regulation (EC) No 850/1998 for undersize fish to be returned immediately to the sea. A discard ban is without question the strongest incentive for fishermen to reduce bycatch and adopt innovations improv-

ing the selectivity of fishing nets. As set out in section 2.2, there are many ways of reducing bycatch through technical modifications to nets. Only a few such modifications have so far been adopted, however, largely because of opposition from the fishing industry, which fears that more selective fishing techniques will reduce catches (Catchpole et al. 2005). Modified nets are also more expensive and involve more complex handling with greater risk. A discard ban raises the hope of overcoming this resistance.

A discard ban also makes it possible to register the entire catch and so include bycatch in quotas. In this way, technical requirements can be reduced and responsibility for solving the bycatch problem placed more firmly in the hands of fisheries themselves. This can be supported by making quotas more flexible.

66. A discard ban can generally be expected to cause financial losses for fisheries, especially in the initial period after its introduction. For one thing, loading capacity on fishing vessels will be filled with unprofitable or unmarketable bycatch biomass. For another, more selective nets, which are probably also less effective at catching the target species, are costlier to use in terms of time, labour, fuel and hence money. Protection of juvenile fish would have to be ensured in parallel with minimum mesh sizes and marketing rules. For example, the Commission proposes that juvenile fish should be sold for reduction to fish meal or pet food only. In the long term, however, adaptation to a discard ban would take the form of improvements in fishing gear, thus reducing the extra cost. Commercially uninteresting bycatch could also be sold as fish meal and fish oil, again reducing the financial losses. In the long term, fisheries will profit from the recovery of stocks as a result of a discard ban.

67. For coastal fisheries, other solutions and exceptions could be considered, where appropriate, to ensure that fisheries remain economic. One potential candidate in this regard is the small-scale flatfish fishery. Such an exception should only be contemplated, however, if bycatch does not represent an acute threat to fished stocks. Even if parts of coastal fisheries are exempted from the discard ban, it is still necessary to reduce bycatch in those fisheries.

In the SRU's opinion, cooperation-based approaches should be applied here. As experience shows, technical requirements will not be enough to achieve the objective. Acceptance of the measures can also be improved at the same time. Whether increasing the powers of regional advisory councils suffices for this purpose is something that needs appraisal and depends among other things on how well coastal fisheries are represented in the councils.

68. Technical requirements remain necessary in order to introduce environment-friendly fishing techniques for further protection of marine ecosystems, as a discard ban does not provide any incentive in this regard. The framework proposed by the European Commission is an important step in the right direction. Regional advisory councils (RACs) should be involved as early as possible to improve acceptance for and the meaningfulness of the measures adopted (see paragraph 72 ff.). The position of RACs should be strengthened in this regard. In concrete terms, work should be stepped up to develop alternatives and modifications in bottom trawling and RACs called upon to take part in developing ideas to this end.

69. Alongside the measures already mentioned, other factors important to fisheries management based on the ecosystem approach include stipulating closed periods for specific areas, selective area closures and marine protected areas (MPAs). As set out in section 2.3, MPAs are designated for the conservation of sensitive ecosystems and species and can additionally have a positive impact on fisheries. To further restrict biodiversity loss and address knowledge gaps regarding basic functional relationships within marine ecosystems and the stock dynamics of specific species, the SRU considers that greater effort is required to safeguard existing MPAs from adverse impacts and that there is an urgent need to place further sensitive areas under protection.

More protected areas should be designated in the European EEZ taking into account the species, ecological communities and habitats classified by OSPAR as endangered (OSPAR Commission 2003). There is also no ecological argument in favour of exploitation of marine Natura 2000 areas in the way that there is for

terrestrial areas, where for example abandonment of farming can cause the loss of important species communities. The SRU therefore advocates the designation of no-take zones covering large contiguous regions (e.g. 50 percent of the areas concerned). This would create a zone of representative reference areas that give key points of departure for determining what constitutes good environmental status, as required for example by the Marine Strategy Framework Directive (paragraph 28). Any fishing inside an MPA but outside the no-take zone must be replaced with environment-friendly fishing techniques. Particularly harmful fishing techniques should be prohibited or replaced immediately (WWF Deutschland 2011; Sell et al. 2011). In this connection, the SRU sees a decisive opportunity to adopt strong protective measures in the implementation of management plans for Natura 2000 areas. In this way, the CFP could make a major contribution towards attaining the objectives of the MSFD.

In general, MPAs and their objectives should be subjected to regular monitoring for effectiveness. It is essential for all forms of MPAs serving as a management tool for the fisheries sector to be accompanied by other measures to prevent a shift in fishing effort outside of MPAs (paragraph 34).

70. MPAs can cushion impacts of climate change – such as temperature changes, distribution shifts and changes in food availability – because they represent areas where fish stocks are not also subject to fishing pressure. One possibility for responding to climate-induced distribution shifts and outward migrations would be to give MPAs a flexible buffer zone that can be geographically varied as needed.

3.2.1.4 Regionalisation and participation

71. As discussed earlier, competence for fisheries in Community waters lies with the EU (exclusive competence under Article 3 (1) (d) TFEU for the conservation of marine biological resources under the common fisheries policy). Competence for other aspects of fisheries is shared between the EU and member states (Article 4 (2) (d) TFEU).

Decisions on the management of European fish stocks are taken – right down to technical details – exclusively at European level, by the Fisheries Council on proposal from the Commission. The latter generally draws on scientific advice, for example from ICES or the STECF. Governance of the CFP thus follows a centralised, top-down policy approach. An important point of criticism about the CFP is that too little provision is made for regional circumstances and for stakeholder involvement (Marine Conservation Society and ClientEarth 2010; Markus 2009a; O'Mahony 2008).

72. The framework described clearly limits the scope for greater devolution of decision making on fisheries management to regional level and for stakeholder involvement (Long 2010). There are already initial moves in this direction, however, and further proposals have been put forward. An Advisory Committee on Fisheries and Aquaculture (ACFA) composed of industry representatives and other European non-governmental organisations has already been established, as have regional advisory councils. The purpose of these bodies is on the one hand to benefit from their practical experience and on the other to better involve fishermen in decision making so as to give them a greater share of responsibility and overcome enforcement difficulties.

Functioning and implementation of regional advisory councils

73. The establishment of regional advisory councils (RACs) marked a first step towards giving greater allowance in decision making to differences between marine regions. Their creation is often cited as the most innovative step in the last CFP reform. Based on Article 31 of the CFP Framework Regulation (Regulation (EC) No 2371/2002), the Fisheries Council laid the foundations for establishing RACs in 2004 (Council Decision 2004/585/EC) for the following seven regions: Baltic Sea, Mediterranean Sea, North Sea, north-western waters, south-western waters, pelagic stocks, and high seas/long distance fleet. The actual initiative to establish an RAC must come from the fisheries sector. The objective of establishing RACs was to promote the participation of fisheries in decision making and dialogue between fisheries

representatives and environmental organisations (27th recital of Regulation (EC) No 2371/2002).

74. The main task of RACs is to advise the European Commission on matters of fisheries management in specific sea areas or fishing zones (Article 31 (1) of Regulation (EC) No 2371/2002). This can be achieved either by the European Commission or a member state consulting them or by RACs submitting recommendations and suggestions of their own on problems in the implementation of rules on fisheries. The RACs are encouraged to reach consensus in their recommendations but can also submit dissenting opinions. Besides this mandated task, RACs are also called upon to promote dialogue among the various fisheries stakeholders and between fisheries and scientists and other institutions. No other specific obligations are placed on RACs, nor is the Commission required to consult them when drafting proposals on fisheries policy (Long 2010). Although the European Commission advocates giving greater powers to the RACs, their powers have not been modified in the Commission proposal (Article 52 to 54 of the Commission proposal).

75. Each RAC has a general assembly and an executive committee and is composed of representatives from the fisheries sector and other interest groups affected by the CFP (Article 5 (1) of Council Decision 2004/585/EC). Representatives from the fisheries sector comprise persons from the catching sub-sector such as fishermen, processors and market organisations (Article 1 (2) of the Council Decision). Other interest groups can include environmental and consumer organisations and recreational or sport fishermen (Article 1 (3) of the Council Decision). There is no provision for membership by scientists but they may participate without voting. The fisheries sector clearly dominates in the composition of RACs in the form of a two-thirds membership majority in general assemblies and executive committees alike.

76. The RACs now receive permanent funding for their work from the European Union to cover 90 percent of their operating costs. Despite this, the European Parliament Fisheries Committee considers that funding of the RACs

remains inadequate for the work they perform and should be improved (European Parliament 2009).

Example: The North Sea Regional Advisory Council

77. The North Sea Regional Advisory Council (NSRAC) is the oldest of the seven RACs in existence so far. Its Executive Com-

mittee currently has 22 members representing 20 different organisations from all member states in the North Sea region whose fisheries interests are affected (see Table 3). The fisheries sector visibly dominates, as mentioned above for RACs in general. Environmental and conservation interests are represented by three organisations. Consumer interests are not represented.

Table 3

Member organisations of the North Sea Regional Advisory Council Executive Committee

Fisheries representatives	French National Committee of Maritime Fisheries and Marine Fish Farming (CNP MEM)
	Danish Fishermen's Association (two seats)
	UK National Federation of Fishermen's Organisations (NFFO)
	Scottish Fishermen's Federation (SFF)
	Netherlands Fishermen's Federation (Stichting van de Nederslandse Visserij) (two seats)
	German Fishermen's Association (Deutscher Fischerei-Verband)
	Swedish Fishermen's Federation
Union representatives	European Transport Workers' Federation
Processing industry, shipowners and ports	European Fish Processors Association (AIPCE)
	North Atlantic Producer Association
	European Association of Fishing Ports and Auctions (EAFPA)
	Belgian fishing vessel owners' association (Redercentrale CV)
	Union of French fishing vessel owners (UAPF)
Environmental organisations	Birdlife International
	Seas at Risk
	WWF
Other interests	Coastal & Marine Union (EUCC)
	North Sea Women's Network
	European Bureau for Conservation and Development (EBCD)
	European Anglers Alliance (EEA)
Source: NSRAC 2009	

The objective of the NSRAC is to prepare and provide advice on management of North Sea fisheries, taking into account a sustainable

management of fish stocks, incorporating an ecosystem-based approach and based on the precautionary principle. Its work involves

regular meetings with European Commission representatives and exchange with experts from other institutions such as OSPAR, ICES and the Directorate-General for Maritime Affairs and Fisheries.

Since 2005, the NSRAC has published advice and opinions between two and seven times a year. Examples include position papers on cod discards, on fishing opportunities and TACs for 2008, and on a proposal for a Council Regulation amending Regulation (EC) No 423/2004 as regards the recovery of cod stocks and amending Regulation (EEC) No 2847/93, and a letter to Commission on ICES advice for 2007 on North Sea plaice and sole. The RACs are regarded as a source of highly competent advice especially with regard to technical measures.

Evaluation of the work of regional advisory councils

78. The European Commission published a review of the functioning of the Regional Advisory Councils in 2008 (European Commission 2008). The RACs' geographical coverage was found to be satisfactory. With regard to composition, the Commission acknowledged the poor representation of specific interest groups such as consumers. It also criticised the fact that some groups representing fisheries interests are listed as 'other interests', worsening the existing imbalance between fisheries and other interest groups. The importance of informing the public and of transparency for the work of the RACs was once again highlighted. The Commission recognised that RACs are not always satisfied with the extent to which their advice is followed. It notes, however, that when their advice is not followed it is with good reason – for example with reference to obligations towards third countries or the sustainable development of fisheries, both of which must be taken into account independently of RAC advice. Overall, the Commission concludes that the RACs contribute positively to the CFP, promote dialogue with and among interest groups, and help address reservations against the CFP. It also acknowledges, however, that the division of responsibilities between RACs and ACFA is not yet clear.

The work of the RACs is also viewed positively in other quarters. They played an important part in compilation of management plans for herring in the Celtic Sea and Mackerel west of Scotland, where communication between scientists and interest groups worked exceptionally well. In another example, the acceptance by fishermen of MPA designations in the Dogger Bank is substantially a result of work by the North Sea RAC (Agnew et al. 2009, p. 41).

There are, however, clear points of criticism regarding the work of RACs. For example, cooperation among interest groups is not always as smooth as the Commission describes. Thus the Baltic Sea RAC was unable in the past to reach consensus on quota advice (Linke et al. 2011). Marked differences of opinion emerged between fisheries representatives and environmental organisations, the latter generally calling for lower quotas than the fisheries representatives. The fishermen for their part showed distinct mistrust of scientific advice and demanded higher quotas than ICES recommended. This almost historical conflict in the Baltic Sea RAC proved impossible to resolve. It is regrettable in this connection that the RACs have contributed little to promote dialogue between fisheries representatives and scientists and are also not geared towards doing so.

Some representatives of other interest groups in the RACs are unhappy with the marked dominance of fisheries representatives (Fourgon et al. 2009). There are also problems in cooperation and communication between the European Commission and the RACs. For example, the time allowed for preparing European Commission opinions is too short, resulting in RAC complaints that they are not consulted in all important discussions. The RACs also consider themselves overworked (European Commission 2008; NSRAC 2010; BS RAC et al. 2009).

Evaluation of the current consultation process

79. The moves towards enhancing stakeholder involvement mentioned earlier are to be welcomed but still show major weaknesses. For example, such involvement remains exclusively restricted to the Commission consulting ACFA and the RACs, and advice from them is not always followed up, with the result that their

influence on decision making stays small. Another critical point is the heavy dominance of the fisheries industry – and especially offshore fisheries – in both ACFA and the RACs, and overlapping responsibilities between them (Markus 2009b; European Commission Directorate-General for Maritime Affairs and Fisheries 2008).

There are various proposals on how to take this process further. These include a system of decentralised regional management, creating a central authority and transferring to it the management of EU fishing rights in consultation with scientists and the industry, and a system of regional advisory committees (European Commission 2009b). Under the latter proposal, the European Commission envisages committees covering individual marine regions such as the North Sea and specific fisheries such as the tuna fishery, and composed of member state officials, fisheries industry representatives, non-governmental organisations, fisheries biologists, and economists from member states with a real interest in the fisheries concerned. The committees would have to be consulted ahead of any measures proposed by the Commission. How the existing regional advisory councils fit in is not explained. One possibility would be to expand their role into that of regional committees. Regional advisory committees are without question the simplest and legally the most straightforward way of addressing the need for greater participation and regionalisation in decision making. They would not conflict with the current division of responsibilities in fisheries policy and would only take minimal change to existing structures. There is a general risk with such committees, however, of them playing more of token role rather than truly furthering stakeholder involvement.

Another option is the creation of a central authority or European fisheries management agency (Long 2010). This could be mainly restricted to laying down technical requirements for the fishing of specific stocks in the various marine regions. The agency would have its justification in the technical expertise and the sophisticated understanding of ecosystems that this requires. Its responsibilities would include

involving stakeholders and coordinating scientific advice and member state activities. This could relieve the workload for the Commission, the Fisheries Council and in future also the European Parliament. Arguments against such an agency include the continually growing number of European institutions and agencies and the associated increase in bureaucratisation. It would also mean decision making being partly placed in the hands of experts, which is considered to be antidemocratic and to entail a loss in transparency.

The European Commission mentions a further option for shifting decision making (European Commission 2009b; 2010a). It raises the idea of placing fisheries management more firmly in the hands of the European Commission in cooperation with member states. Member states are thus to be authorised to adopt conservation measures and technical measures on the basis of established multiannual plans (European Commission 2011f). The Commission is required to examine such measures and if appropriate adopt measures of its own (paragraph 60). As in the remainder of the European Commission's proposal for CFP reform, this does not enhance the role of RACs. These retain their advisory function – although now also towards member states – and may (but do not have to) be consulted on decisions (Article 53 of the Commission proposal).

Summary recommendations

80. Without question, there is a need to give greater consideration to regional concerns and further enhance stakeholder involvement in fisheries management. Experience with the regional advisory councils has shown that transferring more responsibility to fisheries and promoting dialogue among stakeholders has a favourable effect on the decision making process and the implementation of measures.

Putting micromanagement more firmly in regional hands makes it necessary to have at least a coordinating institution. Existing institutions can be used for this purpose. Decisions should be made in close cooperation with scientists and regional advisory councils, giving special consideration to regional circumstances. Fundamental decisions should

continue to be taken by the EU Fisheries Council and Parliament. The task of the responsible institutions will then include combining expertise from fisheries and scientists and promoting dialogue between representatives of the two sectors. The long-term aim should be more target-driven management.

The SRU also sees a need, however, for greater involvement in this process for other interest groups not closely connected with fisheries. Consideration should be given, for example, to how consumer groups can be motivated to participate on a long-term basis in the work of RACs. A common barrier to such participation is lack of resources, most of all in terms of working time. Thought should be given in general here to what level of contribution and expertise stakeholder representatives can be expected to provide. This is not clearly taken into account in all RAC member organisations.

3.2.2 Common organisation of the market

81. The common organisation of the markets in fishery and aquaculture products encompasses quality and marketing standards together with compliance monitoring and requirements on consumer information. It includes intervention mechanisms to protect fishermen from large downward price fluctuations and lays down rules on the recognition of producer organisations, industry associations and their activities.

Under the current market organisation, producer organisations are given the right to fix a withdrawal price below which no produce is sold, and members are paid financial compensation for quantities withdrawn from market. If this price is based on the Community withdrawal price, compensation for limited quantities is partly funded by the EU. For each fish species, the Council each year fixes a guide price (as the average of past prices) from which the lower Community withdrawal price is calculated (Regulation (EC) No 104/2000 on the common organisation of the markets in fishery and aquaculture products). This withdrawal system is to be abolished under the Commission proposal. Options for market stabilisation then still remain, however, in the form of storage and by producers and their organisations adjusting

the level of marketing to demand (European Commission 2011g).

Currently, when the market price falls below the withdrawal price, producer organisations can put quantities in storage, which are then placed on the market at a later date, with the EU refunding preservation and storage costs for limited quantities. Financial support is also provided for private storage. Compensation is paid for tuna when it falls below a fixed price if it is sold for industrial processing (Articles 17 to 27 of Regulation (EC) No 104/2000). Under the Commission proposal, producer organisations will still be allowed to put surplus produce in storage, but unlike under the current arrangement, no special financial support is provided for the purpose (European Commission 2011g).

The Commission's proposed abolition of an intervention arrangement under which fish is disposed of at public expense is logical and correct with a view to the CFP principles of sustainable management of fish stocks. The artificially high prices from such intervention unnecessarily promote overfishing and so are incompatible with the principles of sustainable management.

- As the EU has barely used this form of publicly funded price support together with the associated compensation mechanisms in recent years (BMELV 2010c, p. 11), abolishing it would have very limited impact on producer incomes, despite a number of recent intervention purchases as a result of stock recovery. The recovery of Baltic cod stocks and the resulting increased market supply caused the price of cod to fall below €/kg for a time in June 2011 and that of Baltic cod even to drop below €0.70/kg (Agra-Europe country report 24/2011 of 14 June 2011). The North Sea coastal plaice fishery similarly had to contend with low prices in 2011. The price of plaice fell below €/kg for a time as plaice stocks and catches reached all-time records (*loc. cit.*).
- Under Article 32 of the Commission's proposed regulation on the common organisation of the market, activities of producer organisations (POs) will continue to be monitored by the Commission in that each

PO is required to submit a production and marketing plan at the beginning of each year (European Commission 2011g). These plans must be approved by the Commission.

- One of the main aims of the reform of the market organisation is to empower producer organisations (European Commission 2011g, p. 3). This is to be achieved by explicitly allowing multiple POs to form groups – although this is already permitted under the current market organisation – and also by proposing that member states should be allowed to make rules agreed within a PO binding on non-members throughout the region where the PO is representative. The Commission proposal no longer provides for financial support for POs, however.

82. The market organisation also stipulates that fishery products placed on the common market must comply with certain marketing standards relating to quality, size and weight classes, packaging, presentation and labelling, with compliance monitored by member states. Consumer labelling must indicate at least the commercial designation of the species, the production method (caught in the wild or farmed) and the catch area (Article 2 to 4 of Regulation (EC) No 104/2000). Under Article 42 of the Commission proposal for reform of the market organisation, this mandatory information is to be supplemented with the date of catch or harvest, and whether the product is fresh or has been defrosted (European Commission 2011g).

Minimum requirements for the information on packaging are to be welcomed in the interests of transparency for consumers. Greater effort should be made, however, to enable greater use of local branding and quality marks for fishery and aquaculture products with the aim of establishing higher standards – particularly environmental standards – within the market (European Commission 1999, p. 8). This could be achieved by introducing uniform minimum EU requirements and guidelines on eco-labelling or a single EU eco-labelling scheme for fishery products similar to the EU organic label (European Commission 2005). Unlike other labelling systems such as organic labelling, there is no consensus on what eco-labelling

would actually mean in the fisheries sector, and some companies could be tempted to make exaggerated and unjustifiable claims for their products (European Commission 2005, p. 6 f.). Minimum requirements could ensure that products are only certified if they show clear environmental benefit. As has been seen with the Marine Stewardship Council (MSC) label, higher producer prices can be obtained using eco-labels that consumers trust (Roheim 2003, p. 99).

Imports of fishery products from non-EU countries are subject to customs duties. Precautionary and anti-dumping measures can also be adopted if imports of fishery products seriously disturb the market. 1 January 2010 marked the entry into force of the Regulation establishing a Community system to prevent, deter and eliminate illegal, unreported and unregulated fishing (Regulation (EC) No 1005/2008). This stipulates that fishery products can only be imported into the EU if their legality can be substantiated by catch certificates in a system ensuring full traceability. This possibility is to be welcomed, especially since a large proportion of catches enter the market with inaccurate declarations of origin (Jacquet and Pauly 2008; Stiles et al. 2011, p. 8 ff.; Miller and Mariani 2010).

3.2.3 Common structural policy

83. Structural policy primarily relates to the adjustment of fleet sizes and fishing capacity. On European Commission calculations, the European fishing fleet was 40 percent over capacity in 1995 (SRU 2004, p. 118). Multiannual guidance programmes (MAGPs) were adopted to reduce the overcapacity. These included targets for reductions in tonnage and engine power across the entire fleet, to be attained by the end of the programme. Under MAGP III (1991 to 1995), the EU fleet was reduced by 15 percent in tonnage and some 9.5 percent in engine power. The target under MAGP IV (1997 to 2001) was a five percent overall reduction in engine power and was exceeded as early as the beginning of 2000 (with reductions of 17 percent in tonnage and six percent in engine power) (European Commission 2001b Volume 2, section 3.1,

fourth paragraph). This reduction in capacity was more than offset by efficiency gains, however.

84. In the 2002 reform of the CFP Framework Regulation, the Commission opted to replace MAGPs with a stipulation on entries and exits in national fishing fleets and to give member states the main responsibility for cutting capacity. Under these provisions, any new entry to a member state fleet made with public aid must be compensated by a previous withdrawal, without public aid, of at least the same gross tonnage as the entry if the entry is up to 100 GT and at least 1.35 times the capacity of the entry if larger. Any entry to a fleet made without public aid must be compensated by a previous withdrawal, likewise without public aid, of at least the same capacity as the entry (Article 13 (1) of Regulation (EC) No 2371/2002).

No member state fleet is allowed to grow larger than its gross tonnage as of 1 January 2003 (or for countries that joined the EU after that, their accession date). Between 2003 and 2004, each member state also had to reduce its overall fleet capacity by three percent relative to the MAGP IV targets (Article 13 (2) of Regulation (EC) No 2371/2002). Member states additionally had to establish management plans and submit regular progress reports on reductions in overcapacity.

To enable monitoring of adjustment measures, member states were required to maintain national fishing fleet registers (Article 15 of Regulation (EC) No 2371/2002).

Public aid can only be granted for trawler modernisation if a vessel is at least five years old and the aid is granted solely to improve safety or product quality or to add selective fishing or satellite monitoring equipment, provided that the changes do not increase fishing capacity (Article 11 (5) of Regulation (EC) 2371/2002).

85. Alongside such aid, a *de minimis* rule allows member states to grant large sums in direct income support out of national funds without any additional conditions attached. The fisheries sector is subject to a relatively high *de minimis* ceiling of “€30,000 per beneficiary over any three-year period ... where the total amount

of such aid granted to all undertakings in the fisheries sector over three years is below a ceiling of around 2.5% of the annual fisheries output” (Commission Regulation (EC) No 875/2007 on the application of Articles 87 and 88 of the EC Treaty to *de minimis* aid in the fisheries sector).

86. The European Union set up the European Fisheries Fund (EFF) in 2007 to provide funding to the fishing industry and coastal communities to help them adapt to changing conditions in the sector. The EFF has a budget of €4.3 billion for 2007-2013. Projects are funded on the basis of strategic plans and operational programmes drawn up by national authorities. There are five priority areas (axes) for EFF funding:

- “Adjustment of the fleet (e.g. to support scrapping of fishing vessels);
- Aquaculture, processing and marketing, and inland fishing (e.g. to support the shift to more environmentally friendly production methods);
- Measures of common interest (e.g. to improve product traceability or labelling);
- Sustainable development of fisheries areas (e.g. to support diversification of the local economy);
- Technical assistance to finance the administration of the fund” (European Commission 2011a).

On top of direct aid from the EFF and similar national aid schemes, the fisheries industry in member states benefits from a wide range of indirect subsidies, the most important of which is the blanket exemption from fuel taxes (European Commission 2009b, p. 8).

Although the figures vary widely by marine region and fleet, fleets have been reduced overall by an average of only 2 percent a year since the last CFP reform in 2002. This has been more than offset by gains in fishing efficiency (estimated at two to three percent a year). The imbalance between fleet size and available fish stocks has not been redressed to this day (European Commission 2009b, p. 7).

87. One reason for this is adherence to public aid for fishing vessels, even if this is subject to fixed constraints: Although each grant requires a capacity withdrawal at least equal in size, this does not alter the fact that the sector is supported with public money and the process of adjusting to the limits determined by markets and natural resources is retarded. The situation is similar for the vessel modernisation grants that are still allowed: Capital-neutral aid rules restrict such grants to areas that do not affect capacity, but the grants still reduce the capital outlay and this leaves other resources free for capacity expansion (SRU 2004, paragraph 249). Experience also shows that permanent support for scrapping serves as an indirect subsidy for operators, who simply factor the scrapping premium into future investment decisions (European Commission 2009b, p. 8).

The Commission aims to prevent this in future by stipulating in its proposal for a new CFP Framework Regulation that any fishing capacity withdrawn from the fleet with public aid cannot be replaced (Article 34 (2) of the Commission proposal).

Given the considerable overcapacity, all aid (Community and national) for building new vessels must cease. This includes indirect subsidies for overcapacity such as the exemption from fuel tax. The European Commission has already adopted a goal of abolishing all environmentally harmful subsidies, and that goal must also be made to apply to this sector (European Commission 2011c). Aid should only be provided for socioeconomic measures needed to reduce the size of the sector (SRU 2004, paragraph 266). A critical point in this regard is the very high *de minimis* ceiling for direct income support to fishermen. This needs to be reduced urgently.

88. It is particularly important to adapt fleet capacity to national quotas, as not all fisheries have the same level of overcapacity. The European Commission should identify and specify how far member states must cut overcapacity in each fishery.

The Commission does lay down in its proposal for reform of the CFP Framework Regulation that capacity must not exceed the fishing capacity ceilings listed in Annex II of the

proposal. Clear national-level stipulations of this kind are to be welcomed in principle. To attain the goal of aligning fleet capacities to fishing opportunities in line with the sustainability principle, member states must each be required to observe capacity ceilings matching their respective fishing opportunities. The capacity ceilings listed in Annex II, however, once again only match the status quo and will in no way bring about the urgently needed capacity reductions. Member states can also request an exemption from the ceilings for fleets that are subject to a system of transferable fishing concessions to be established under the proposal, i.e. offshore fleets and the larger cutter fleets (see paragraph 96) (Article 35 (2) of the Commission proposal). This will further diminish the capacity-reducing effect of the requirement.

The size of European fishing fleets should nonetheless be adjusted as soon as possible to the available resources requiring sustainable management.

3.2.4 Control and inspection

89. It is generally up to member states to ensure effective control of fisheries in their waters and of their fishing vessels operating outside of Community waters, together with enforcement of CFP rules (Article 23 (1) and (2) of Regulation (EC) No 2371/2002). However, member state control activities can be verified and fisheries inspections carried out by EU fisheries inspectors (Article 27 of Regulation (EC) No 2371/2002). Member states are also authorised to inspect vessels flying the flag of other member states in Community and international waters (Article 28 of Regulation (EC) No 2371/2002).

90. To improve the control of fishing activities, the European Fisheries Control Agency was established in 2005 with the aim of pooling national and Community control and inspection resources. The Agency's stated objective is to coordinate fisheries control activities by member states and "to assist them to cooperate so as to comply with the rules of the Common Fisheries Policy in order to ensure its effective and uniform application" (Article 1 of Regulation (EC) No 768/2005). The Agency

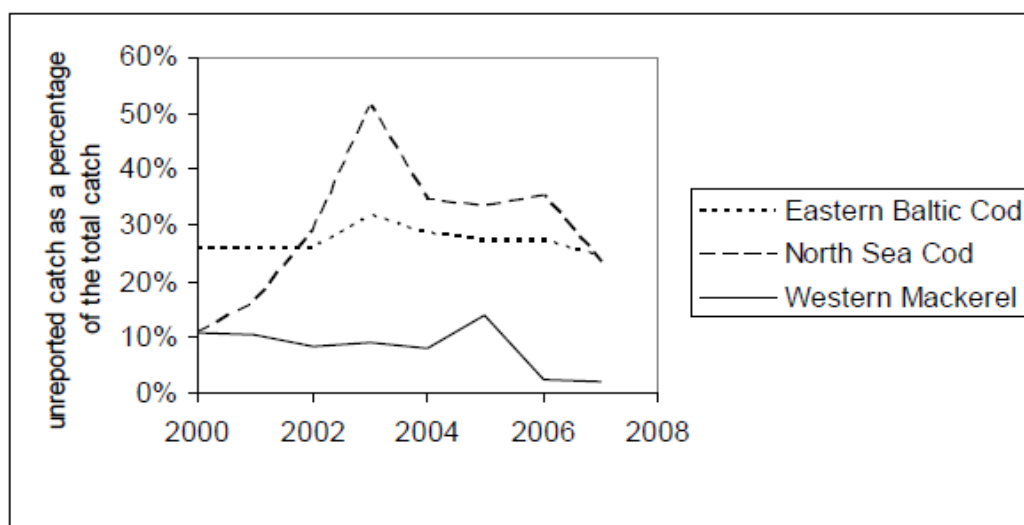
began work in 2007. Since then, inspections have been stepped up and a number of additional cases of illegal fishing discovered (Agnew et al. 2009, p. 27). Overall, however, it remains to be seen whether control has significantly improved as a result.

The Commission currently has various mechanisms at its disposal for ensuring that member states comply with their obligations under the CFP. If it discovers a breach of CFP rules or deficiencies in a control system, the Commission can at least partially suspend aid from the EFF. If states breach the CFP requirements on stock conservation, it can reduce their fishing quotas or close the affected fishery if the stock is covered by a multiannual plan. Quotas are also reduced if a member state fishing fleet has exceeded its allocated quotas in the previous year (Damanaki 2011, p. 7).

The sanctions that member states can impose on fishermen who exceed their allocated quotas have not had much of a deterrent effect in the past. In 2007, the Commission found that the amount paid by industry in fines averaged roughly two thousandths of the landing value of the illegal catch. This potential cost of being caught landing an illegal catch was treated by industry as part of normal running costs. The sanctions thus did not act as an incentive for compliance (European Court of Auditors 2007, p. 17).

Figure 4

Estimated unreported catch of two cod stocks and one mackerel stock



Source: Agnew et al. 2009, p. 25

Ineffective sanctions and evidently insufficient inspections in the past kept illegal catches at high levels (see Figure 4).

91. To change this, a reform of fisheries control policy was set in motion in 2008 and was completed by the adoption in April 2011 of Commission Implementing Regulation (EU) No 404/2011. The new system is based on three pillars ('Fisheries: The EU "zero tolerance" campaign against illegal fishing gets tougher', European Commission Press Release dated 12 April 2011).

- The core Control Regulation (Regulation (EC) No 1224/2009), which creates a new legal framework for control and enforcement of the CFP.
- A regulation against illegal fishing (Regulation (EC) No 1005/2008 together with an implementing regulation, Regulation (EC) No 1010/2009), to ensure that all fishery products traded to and from the EU are in full compliance with all relevant conservation and management measures. These stipulate that products imported to and exported from the EU require a catch certificate.
- A regulation on fishing authorisations (Regulation (EC) No 1006/2008) providing a framework through which EU operators can be licensed to fish outside EU waters and foreign operators to fish in EU waters.

The Control Regulation aims to ensure uniform and effective sanctions by requiring member states to calculate the overall level of sanctions and accompanying sanctions “in such way as to make sure that they effectively deprive those responsible of the economic benefit derived from their infringement. Those sanctions shall also be capable of producing results proportionate to the seriousness of such infringements, thereby effectively discouraging further offences of the same kind.” (Article 89 (2) of Regulation (EC) No 1224/2009). National administrative action and criminal proceedings are not ruled out. Commission audits verify that imposed sanctions are adequate to the Regulation’s requirements. The EU is also in the process of introducing a points system similar to that used in many countries for road traffic offences (European Commission 2011e).

92. The new requirements on sanctions are supplemented by further improvements with regard to the control of fishing activities. The Control Regulation requires all EU fishing vessels to have a valid fishing licence in order to fish commercially. For certain fishing activities in areas where fishing is restricted by CFP rules (such as fishing effort regimes and multiannual plans), vessels must additionally have a fishing authorisation permitting the activities concerned. The Regulation forces member states to install a satellite-based vessel monitoring system (VMS) that regularly collects position, course and speed data on all fishing vessels longer than 15 m (12 m from 1 January 2012). Similarly sized vessels from non-EU countries must have a working satellite location device on board in order to enter Community waters. A requirement for larger vessels to be fitted with an automatic identification system is being introduced in several phases. Logbooks must be kept, recording all fishing operations and separately listing the quantity of each species caught and retained on board and all discards.

For better control of landings, large quantities must be landed at designated ports, for which vessels must obtain specific authorisation. The Control Regulation also seeks to ensure that fishery products are traceable throughout the processing chain, ‘from net to table’. It therefore stipulates inspections at every processing stage

where proof must be presented of the legality of consignments (Regulation (EC) No 1224/2009).

93. Besides retaining the existing control and inspection activities, the Commission proposal for reform of the CFP also makes provision for the Commission and member states to carry out pilot projects on new control technologies and systems for data management (Article 47 of the Commission proposal).

94. To what extent the new legal framework created by the new fisheries control policy will ensure more effective control and sanctioning and hence greater compliance is yet to be seen, as the last of the implementation regulations only went into force in April this year, with the result that the EU system for the control of fisheries with its detailed rules on inspections throughout the supply chain is only now up and running (‘Fisheries: The EU “zero tolerance” campaign against illegal fishing gets tougher’, European Commission Press Release dated 12 April 2011). However, it appears to be a decisive step in the right direction.

3.2.5 The external dimension

95. While demand for fishery products in the EU continues to rise, landings in the EU-27 are falling. As a result, imports are steadily rising (see Figure 5) and European vessels are increasingly active outside of European waters. More than a quarter of the fish caught by the European fleet comes from waters outside the EU (European Commission 2001a). The EU consumes 24 percent of world fishery resources in terms of value (European Commission 2011b, p. 3). According to the Food and Agriculture Organization of the United Nations (FAO), fish consumption in Europe will continue to increase (FAO 2007), and with it fishing pressure in international and third country waters. The associated shift in fishing effort from industrialised countries to developing countries is regarded as the key problem of global fisheries (Worm et al. 2009, p. 584). Almost all fish caught by foreign fleets in African waters is consumed in industrialised countries and so is unavailable as a source of protein for African countries. This can endanger the security of regional food supplies. Overfishing also threatens biodiversity (loc. cit.).

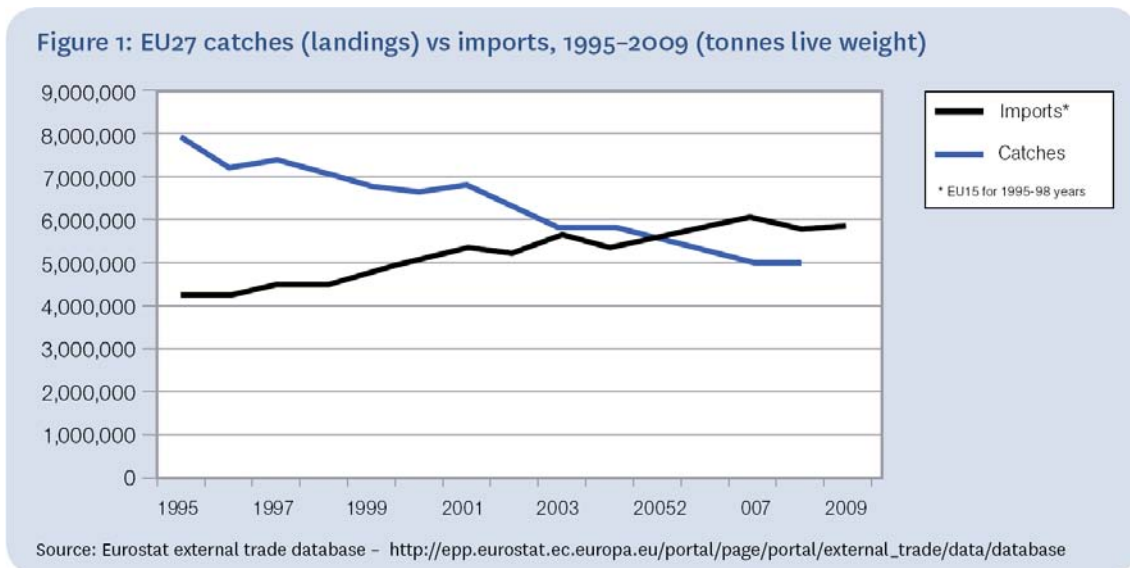
The EU has had bilateral and multilateral fisheries agreements with third countries since the mid-1970s, securing continued access for the EU fleet to the fishing areas of non-European states after most of the world's coastal states adopted exclusive economic zones (EEZs) during that decade (IFREMER 1999). The agreements fall into two groups, the first of which is made up of 'northern agreements' signed with Norway, Iceland and the Faeroe Islands and based on shared management of fisheries. The most important agreement, with Norway, relates to quotas worth over €2 billion.

The second group consists of partnership agreements ('southern agreements') signed with countries in Africa and the Pacific. As of mid-2011, 15 such agreements are in existence, and

there are a further five for which no protocol is in force (European Commission 2011b, p. 16). Alongside the 11 tuna agreements in force, various agreements cover multiple fish species (loc. cit.). In the last ten years, the EU has extended its fishing activities beyond the existing fishing grounds off West Africa to include East Africa (Mozambique, Madagascar and the Comoros) and the South Pacific (Kiribati, the Solomon Islands and Micronesia). The fisheries agreements are based on Article 62 (2) of the United Nations Convention on the Law of the Sea (UNCLOS), which lays down that a coastal state may give other states access to the surplus allowable catch in its EEZ that it does not have the capacity to harvest itself.

Figure 5

EU27 catches (landings) vs. imports



Source: OCEAN2012 2011

Since the last CFP reform, the southern agreements have been referred to as Fisheries Partnership Agreements (FPAs) to underscore that the EU pays a financial contribution for access to fishing grounds and promotes the development of local fisheries sectors. The Commission stipulated as early as 2002 in its Communication on an Integrated Framework for Fisheries Partnership Agreements with Third Countries that the EU long distance fleet should exploit fisheries resources outside Community waters sustainably (European Commission 2002). For coherence with European develop-

ment policy goals (Article 208 (1), second subparagraph, second sentence, TFEU), a specific objective is to build the capacity of developing country signatories to exploit their marine resources (European Commission 2002, p. 5). The 2002 Communication therefore makes provision for the EU's financial contribution to be divided into two parts: the portion of the financial contribution given in exchange for fishing possibilities for European vessels, largely to be met by the private sector, and the portion devoted to fisheries partnership activities such as stock assessments, control,

monitoring and surveillance (European Commission 2002, p. 8).

In response to sustained criticism of the partnership agreements following their introduction, the European Commission revisits the subject of how third country agreements are implemented in its CFP reform proposal. The European Commission itself points to substantial shortcomings in the partnership agreements in a recent communication on the external dimension of the CFP:

- Scientific knowledge regarding certain stocks in foreign waters is insufficient to establish the overall size of the surplus;
- The terms and conditions of fishing agreements concluded by partner countries with other (non-EU) countries are usually not known to the EU;
- Coastal states can make only limited use of the funds allocated to support their fishing sectors (European Commission 2011b, p. 10).

The European Commission therefore considers that a number of additional requirements should be taken into account when entering into bilateral fisheries agreements, proposing that the EU should:

- Base the agreements on the best available scientific advice and information on cumulative fishing effort;
- Conduct scientific audits on multi-species ('mixed') agreements;
- Make respect of human rights an essential condition for concluding fisheries agreements;
- Move towards an increased contribution of shipowners to the cost of access rights;
- Ensure that fisheries agreements support better governance of the fisheries sector in partner countries, notably in terms of surveillance, inspection and administrative and scientific capacity;
- Ensure sound and efficient financial management of sectoral support funds and provide for suspension of payments if re-

sults are not obtained (European Commission 2011b, p. 4).

The agreements are in future to be designated 'sustainable fisheries agreements' (Article 41 to 42 of the Commission proposal).

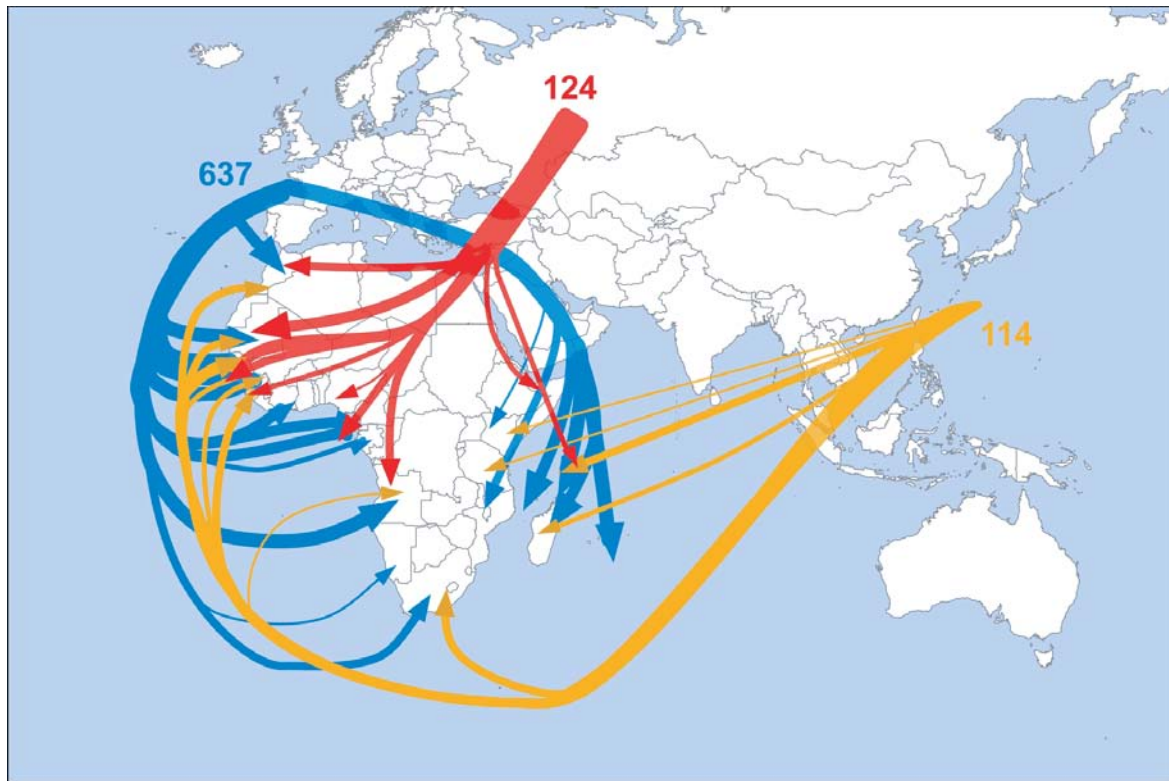
Parts of the EU fishing industry – in particular the tuna sector – express a strong interest in concluding fisheries agreements with adjacent states in order to better cover the trail of migratory species they target in neighbouring EEZs (European Commission 2009b, p. 23).

Fisheries agreements have also long attracted criticism with regard to their economic benefits to the EU. The ex-post evaluation of the fisheries agreement and protocol between the EU and Guinea-Bissau, for example, determined that the annual payments of €7 million to Guinea-Bissau subsidised jobs at sea for just 470 EU citizens (the average annual catch was worth €32.1 million) (Oceanic Developpement 2010). The European Commission has accordingly proposed increasing shipowner contributions towards the payments to coastal states (European Commission 2011b, p. 12). At the same time, the EU payments provide an annual average of 7.3 percent of the state budget of Guinea-Bissau, demonstrating their huge importance to the countries involved (Oceanic Developpement 2010).

Partnership agreements are accused of primarily serving to sustain the oversized EU fleet. For most affected West African developing countries, industrial fishing by foreign countries, under fisheries agreements or otherwise, has predominantly negative impacts (on the situation of individual states see Mari 2010). The shifting of fishing pressure to West and East African waters is well documented. A rough impression of the scope of the agreements can be gained by looking at how many years of access rights the various economic areas have had themselves granted by the countries of East and West Africa (Figure 6). Almost all fish caught there is consumed in industrialised countries. Illegal and unregistered catches also account for a particularly large share of the total in West and East Africa (Worm et al. 2009, p. 584).

Figure 6

The shift in fishing pressure to Africa in the 1990s



The figures correspond to cumulative years of access rights granted in total under all long-distance fisheries agreements

Source: Worm et al. 2009, based on Alder and Sumaila 2004

The European Commission dismisses the criticism levelled at the fisheries agreements, particularly with West African states, and also concerning the fishing practices of the EU fleet, saying that EU fleets accounts for less than 20 percent of fishing pressure and are not therefore responsible for the overfishing of specific areas and species (European Commission 2009a, p. 25). The Commission does acknowledge, however, that fisheries agreements should better address the needs of developing countries and their legitimate interest in developing their own fisheries sector. There are justified concerns whether the partner countries have the capacity to monitor the catches of foreign fleets (Swartz et al. 2010, p. 1367). For this reason, it became possible in 2008 to exclude vessels that are on an IUU list or have committed infringements from acquiring a fishing authorisation for third country waters (Regulation (EC) No 1006/2008).

The SRU takes a critical view of the third country agreements, among other things because it doubts that it is realistic for third

countries to adequately monitor the fishing activity and comply with strict sustainability criteria, even if the EU supports the development of control systems as part of its sectoral policy. Generally, a practice where the EU exploits resources needed to feed the population in partner countries is to be called into question. This cannot be justified with financial compensation paid for the fishing rights, firstly because the compensation is far smaller than the profit generated by the industry, and secondly because developing countries could be assisted in the development of capacity in their fisheries sector independently of whether they make over fish resources to the EU.

Additionally, fishing vessels taken out of service in capacity withdrawal programmes should be prevented from fishing in other regions so that public funds are not used to 'export' overcapacity to third countries. Using DNA analysis, it has been shown that about a third of imported fish in the EU is placed on the market with a false declaration of origin (Miller and Mariani 2010). This mainly involves 'relabelling'

economically less valuable fish from African waters as more valuable fish from other catch areas. This shows that the EU must significantly improve monitoring of its long-distance fishing fleet to stop IUU fishing by that fleet.

3.3 Establishment of systems of transferable fishing concessions

96. National quotas for fish stocks in water covered by the CFP are allocated to member states. Under the current CFP Framework Regulation, member states decide for themselves how the national quotas are passed on to fishing enterprises, i.e. how the quotas for individual stocks are allocated among fishermen. In many cases, a fishery will be closed when the national quota is used up (Döring et al. 2008, p. 169). In other words, fishing enterprises do not have individual rights to fish stocks or a portion of the quota. This system encourages overexploitation: If a fisherman has no guarantee that he will be allowed to catch fish tomorrow, he will catch all he can today. If there is always a danger of a fishery soon being closed because allocated quotas have been used up, fishermen will invest to boost capacity and quickly harvest the largest possible share of the overall quota. Capacity planning focused on short-term profit maximisation in this way inevitably results in overcapacity. At the same time, it is also rational for an individual fisherman to use fishing equipment that promises a good catch even if this means a high rate of juvenile bycatch and therefore restricts future stock growth (Döring et al. 2008, p. 169 f.; SRU 2004, paragraph 273).

A solution that is frequently put forward, and also practised in some member states such as the Netherlands, Spain and the United Kingdom, is to allocate national quotas to individual fishermen or groups such as producer organisations and to make the allocations tradable as individual transferable quotas (ITQs) (SRU 2004, paragraph 271). A fixed portion, usually a percentage, of the overall quota gives fishermen an incentive to harvest the quantity concerned at lowest cost. Fishermen with high operating costs can sell or lease their quotas to users who can fish at lower cost. In Germany, too, a significant proportion of quotas are assigned to

shipowners (offshore fishing) and producer organisations (cutters). These quotas are not, however, transferable in the sense of fishermen being able to sell or lease them among themselves.

It is assumed that under an ITQ scheme all fishermen remaining in the fishery will want to increase their total catch. At a constant percentage this is only possible if the stock grows so that individual fishermen can land a larger catch. Users are therefore expected to reach an arrangement to act as a group and manage 'their' stocks (Döring et al. 2008, p. 172). Adopting ITQs in the New Zealand fisheries, for example, has already led to local cooperation and voluntary controls that go beyond government regulation (Kerr et al. 2003, p. 17).

The ability to sell quotas also allows uneconomic operators to exit, thus reducing fishing fleet overcapacity (see paragraph 83) overall (SRU 2004, paragraph 273).

Recognising the incentive effect of individual transferable rights, the Commission suggests in its proposal for a new CFP Framework Regulation that member states should be required to establish a system of transferable fishing concessions and to allocate individual fishing opportunities. Under this suggestion, each member state is to set up a system of transferable fishing concessions for all fishing vessels over 12 m length and also for all vessels under 12 m length fishing with towed gear (Article 27 of the Commission proposal). "Transferable fishing concessions' means revocable user entitlements to a specific part of fishing opportunities allocated to a Member State or established in management plans adopted by a Member State" (Article 5 of the Commission proposal). Accordingly, member states shall allocate fishing opportunities in tonnes per year to holders of transferable fishing concessions (Article 29 of the Commission proposal). When allocating transferable fishing concessions for mixed fisheries, member states are required to take account of the likely catch composition in the fisheries concerned (Article 28 of the Commission proposal).

Under the proposal, member states ensure that fishing concessions are fully or partially transferable within a member state among

eligible concession holders (Article 31 of the Commission proposal). With regard to fishing opportunities, the proposal requires that these must be able to be leased (Article 32 of the Commission proposal). The conditions governing the transfer of fishing concessions may be decided by member states themselves (Article 31 of the Commission proposal). For example, a member state might rule that concessions are only transferable within specific fleet segments.

Uneconomic enterprises are thus able to sell their fishing concessions and as described above have an incentive to exit. Such a system nonetheless still needs controls, if only for ongoing stock estimation. With properly working group arrangements, however, control and rule enforcement costs would be far lower than today because there is not only less incentive to harvest the biggest catch in the shortest time, but also less incentive to use fishing methods that yield large quantities of juvenile bycatch (SRU 2004, paragraph 273). It may then be possible to replace some state regulation with self-regulation because the groups of fishermen has an own interest that each member do not act in a way that would reduce future income.

Critics of such a system fear factors such as a trend towards industry concentration, as smaller fishing operators take the now more attractive option of exit and sell their fishing rights to more economic, generally larger operations, with the result that small and medium-scale fishing enterprises are crowded out of the market (BMELV 2011b). Concentration of this kind could thus have a negative impact on the small-scale coastal fishing sector without reducing the overall take, as the quotas of fishermen leaving the trade persist and are harvested by someone else. Concentration has actually been observed in ITQ schemes. In UK, Netherlands, Iceland and the inshore fishery in New Zealand, for example, there was clear evidence of increases in the concentration of quota holdings after the introduction of ITQs (European Parliament Directorate General for Research 2003, p. v). The Commission attempts in its proposal to counter the 'extinction' of coastal fisheries by limiting the system of transferable fishing concessions to vessels of 12

m length and vessels fishing with towed gear (Article 27 of the Commission proposal). With regard to small cutters, however, the Commission instead proposes to address the urgent need for capacity cuts by imposing capacity ceilings, but these are set too high in the current proposal to make a noticeable difference (see paragraph 88). Undesirable concentration levels can also be averted by limiting transferability, for example with a maximum number of quotas per fishing enterprise as practised in Iceland (OECD 2005, p. 14).

The kind of structural change that is accelerated by an ITQ system or indeed by the model proposed by the Commission at least favours sustainable management of stocks in member states with high levels of overcapacity, as cutting overcapacity reduces the pressure on fishermen and hence on fish stocks. The social impact of this process can be mitigated by retraining and employment schemes (SRU 2004, paragraph 273).

Tradable quotas increase fishermen's variable costs, however. Each fish landed incurs an extra cost (or lost profit on potential sale of quota) equal to the corresponding quota value. This adds to the incentive for 'high grading' – throwing undersize and juvenile fish back overboard so as to land larger and thus more valuable specimens. Because of this, an ITQ scheme should only be introduced together with a discard ban, as provided for in the Commission proposal (see paragraph 63).

In mixed fisheries, ITQ schemes, including the model proposed by the Commission, mean operators can adjust their quota holdings to fit their catch by buying or leasing fishing rights retroactively. This can help prevent discards of species for which operators have no quota or have used up their allocation.

A negative incentive can arise if a discard ban leads to a shortage of quotas for unavoidable but commercially unattractive bycatch, creating a strong incentive to discard such species. This underscores the need for a discard ban for all species in each fishery (see paragraph 63), for suitable monitoring of the ban and for effective sanctions in case of infringement. Incentives to engage in unlawful practices can be reduced by allowing some seasonal flexibility with TACs

within safe biological limits, or by keeping a limited quantity of fishing rights in reserve to ensure a liquid market and further reduce the risk of low-value portions of the catch being discarded (Hatcher et al. 2002, p. 67).

Price levels for quotas under ITQ schemes in general and for transferable fishing concessions under the Commission model in particular also provide important information both for enterprises in the fishing industry and for regulators aiming to conserve fishing resources: The larger a fish stock and the more stable the ecosystem needed to support it, the higher the market value of individual fishing rights, which represent the current and future catch in securitised form. This information facilitates business investment decisions and for regulators constitutes a reliable indicator of the development of fish stocks and the economic situation of the fisheries sector (SRU 2004, paragraph 273). That is how the price mechanism operates for target species. A sharp rise in the price of quotas for bycatch, on the other hand, would be evidence of stocks being decimated; the price increase would be a result of constant demand for the bycatch quota (to continue fishing the target species) combined with a fall in supply of the target species. This information, too, could be used by regulators.

Overall, ITQ schemes in general and the specific implementation regarding quota allocation among member states in the Commission proposal would appear an effective way of creating incentives for more sustainable management of fish stocks, and in particular – together with a discard ban – of reducing the problem of high levels of discards in mixed fisheries.

4 Summary

97. The coming reform of the CFP must create a framework for fisheries management that allows long-term harvesting of widely healthy fish stocks. At the same time, the CFP is expected to help protect and conserve Europe's seas. As fishing remains one of the main sources of impacts to marine ecosystems, the objective of good environmental status in the marine environment laid down in the Marine Strategy Framework Directive will not be attained

without suitable changes to the CFP. The Commission proposal on reform of the CFP contains a number of welcome improvements to this end. The measures put forward by the SRU, however, go beyond the Commission proposal in many respects.

The SRU's approach is based on two pillars. The first pillar consists of modifying the incentives created by the CFP. This includes a binding definition of sustainable stock management. Secondly, this correction to incentives is an essential precondition for placing micromanagement more firmly in the hands of regions and fisheries so as to foster self-responsibility among fishermen and give greater consideration to regional circumstances. Fisheries will be required to document that they are capable of meeting their environmental responsibilities in the harvesting of fish stocks.

The SRU considers the following changes to the CFP to be urgently necessary for the protection and conservation of the seas and of marine biological resources:

Sustainable stock management

- 1) The CFP Framework Regulation should be supplemented with a binding, science-based definition of sustainable stock management consistent with the precautionary approach. This includes fishing mortality below F_{MSY} or corresponding to $0.9 F_{MSY}$ and a target of stock biomass above the level capable of producing maximum sustainable yield (to be inserted in Article 2 of the Commission proposal).
- 2) The CFP Framework Regulation should also incorporate an obligation to establish multiannual management plans for all harvested stocks. Common management plans should be established for all stocks that are harvested in mixed fisheries or that display interdependencies (to be inserted in Article 9 to 11 of the Commission proposal).

Discard ban and technical measures

- 3) A discard ban or landing obligation should be laid down for all fish species (by modifying Article 15 of the Commission proposal accordingly). Fisheries should only be exempted if they can demonstrate that bycatch

has strong chances of survival. The discard ban can be introduced on a phased basis for different fisheries, but the process should be completed as soon as possible. Adequate monitoring of the discard ban by member states should be assured. The European Commission should formulate technical requirements for this purpose (to be added to Article 15 of the Commission proposal). This requires observers and/or cameras on board. Plausibility checks should only be allowed as an alternative for small-scale coastal fisheries. Technical requirements must also be developed and implemented for environment-friendly fishing techniques. The framework proposed by the Commission for this purpose is an important step in the right direction (Article 14 and 21 to 26 of the Commission proposal).

Common organisation of the market

- 4) The Commission's proposed abolition of an intervention arrangement under which fish is disposed of at public expense is logical and correct with a view to the CFP principles of sustainable management of fish stocks. The current artificially high prices deriving from such intervention unnecessarily promote overfishing and are thus incompatible with the principles of sustainable management.

Reducing overcapacity

- 5) Given the considerable overcapacity, all aid for building new vessels must cease. Aid should only be provided for socioeconomic measures needed to reduce the size of the sector. It is also particularly important to adapt fleet capacity to national quotas. The European Commission should specify – as provided for in Article 35 of the Commission proposal – how far member states must cut overcapacity in each fishery. The capacity ceilings listed in Annex II, however, only match the status quo and will in no way bring about the urgently needed capacity reductions. It is thus urgently necessary to lower these ceilings.

Control and inspection

- 6) Ineffective sanctions and evidently insufficient inspections in the past kept illegal catches at high levels. To what extent the

new legal framework created by the new fisheries control policy will ensure more effective control and sanctioning and hence greater compliance is yet to be seen. However, it appears to be a decisive step in the right direction.

Regionalisation and participation

- 7) Micromanagement and the stipulation of technical measures for sustainable management of fish stocks should be placed more firmly in the hands of fisheries and the regions. Consideration should be given in this context to establishing an agency or institution to coordinate regional cooperation and for other tasks, or to using existing institutions for the purpose. Regional advisory councils (RACs) should be involved to a greater extent, for example in the compilation of proposals of measures. This includes a requirement for the Commission to consult RACs in advance when drafting proposals on fisheries policy (this should be added in Article 53 of the Commission proposal). Within RACs, an increased role should be given to other stakeholders, including consumers.

Selective area closures and marine protected areas

- 8) Selective area closures and closed periods, as provided for in Article 8 of the Commission proposal, should be retained as temporary measures for recovery and protection of fish stocks. Long-term measures such as marine protected areas (MPAs; in this instance primarily Natura 2000 areas) should, as mentioned in Article 12, be backed with management plans. Large, contiguous no-take zones should be established inside MPAs to create representative reference areas for purposes such as determining what constitutes good environmental status within the meaning of the MSFD. Any fishing inside MPAs must be replaced with environment-friendly fishing techniques, or be banned where fishing activities run contrary to MPA conservation objectives. MPAs and their objectives should be subjected to regular monitoring for effectiveness. The use of area closures as a management tool for the fisheries sector should be accompanied by

other measures in order to prevent a major shift in fishing effort to other areas.

Bilateral sustainable fisheries agreements

- 9) Bilateral fisheries agreements should be made sustainable in the long term. To this end, it is important that agreements are based on the best available scientific information on cumulative fishing effort. The agreements must also support third countries in their legitimate interest of developing their own fisheries sectors. Fishing vessels taken out of service in capacity withdrawal programmes should be prohibited from fishing in other regions to prevent overcapacity from being 'exported' to third countries.

Establishment of systems of transferable fishing concessions

- 10) The SRU welcomes the provision in Article 27 of the Commission proposal requiring member states to establish a system of transferable fishing concessions. A system of this kind creates incentives for more sustainable

management of fish stocks and provides a way – together with a discard ban – of reducing the problem of high levels of discards in mixed fisheries.

Overall, the Commission proposal for reform of the CFP already contains positive steps towards achieving sustainable management of fishing stocks but does not go far enough in some areas and loses effectiveness in non-binding wording. Any future CFP must have the objective of sustainable management of fish stocks with strong priority given to environmental goals. The fisheries sector clearly shows how failure to take adequate account of environmental concerns also has severe impacts on social and economic sustainability. All now depends on whether changes to the Commission proposal are geared towards this guiding principle. Consistent implementation of a sustainable CFP is the only way to achieve positive effects in the medium term both for fish as a resource and marine habitats as well as for fisheries and consumers.

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Abbreviations

ACEA	Allowable Catch and/or Effort Algorithm
ACFA	Advisory Committee on Fisheries and Aquaculture
B	Stock biomass
BfN	Bundesamt für Naturschutz (Federal Agency for Nature Conservation)
B_{lim}	Minimum stock biomass, below which recruitment is expected to be impaired, or stock dynamics unknown. The stock is at risk of collapse.
BMELV	Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz (Federal Ministry of Food, Agriculture and Consumer Protection)
B_{pa}	Precautionary reference point for stock biomass to prevent true biomass from falling to B_{lim} .
CBD	Convention on Biological Diversity
CFP	Common Fisheries Policy
CO ₂	Carbon dioxide
DNA	Deoxyribonucleic acid
EEZ	Exclusive Economic Zone
EFF	European Fisheries Fund
F	Fishing mortality
FAO	Food and Agriculture Organization of the United Nations
F_{lim}	Fishing mortality likely to be associated with stock collapse if exceeded for a long time.
F_{pa}	Precautionary reference point for fishing mortality to avoid fishing mortality reaching F_{lim} .
GT	Gross tonnage
HELCOM	Helsinki Commission (governing body of the Convention on the Protection of the Marine Environment of the Baltic Sea Area, 1992)
ICES	International Council for the Exploration of the Sea
ITQs	Individual transferable quotas
IUU	Illegal, unreported and unregulated
K-strategists	Species with low reproduction rate
kW-days	kilowatt-days
MAGP	Multiannual guidance programme
MPA	marine protected area
MSC	Marine Stewardship Council
MSFD	Marine Strategy Framework Directive
MSY	maximum sustainable yield
NSRAC	North Sea Regional Advisory Council

OSPAR Convention	Convention for the Protection of the marine Environment of the North-East Atlantic
OSY	Optimum sustainable yield
PO	Producer organisation
RACs	Regional advisory councils
RECP	Royal Commission for Environmental Pollution
R-strategists	Species with high reproduction rate
SGMOS	Subgroup on Management of Stocks
SRU	Sachverständigenrat für Umweltfragen (German Advisory Council on the Environment)
SSB	Spawning stock biomass
STECF	Scientific, Technical and Economic Committee for Fisheries
TAC	Total allowable catch
TFEU	Treaty on the Functioning of the European Union
UNCLOS	United Nations Convention on the Law of the Sea
VMS	Vessel monitoring system
WWF	World Wide Fund For Nature

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