



for a living planet®

FISH DISH

**EXPOSING
THE UNACCEPTABLE
FACE OF SEAFOOD**



OVERFISHING



ILLEGAL FISHING



WASTEFUL FISHING



UNSELECTIVE FISHING



DESTRUCTIVE FISHING



UNFAIR FISHING

Exposing the unaccep

Introduction

This briefing provides a snapshot of the destruction and waste behind some European fisheries. We have chosen six seafood dishes eaten in Europe – cod and chips, tuna sushi, plaice fillet, swordfish steak, langoustine linguine, and seafood paella — and exposed the major problems behind them, namely:

Overfishing (taking more fish than the population can replenish)

Illegal fishing (over-quota, unlicensed, unreported, and/or unregulated fishing)

Wasteful fishing (discarding huge numbers of unwanted fish, including juvenile fish)

Unselective fishing (bycatch of non-target species)

Destructive fishing (the use of fishing gear that damages marine habitats)

Unfair fishing (in the waters of developing countries).

Although we have focused on one main problem per dish, the chosen fisheries all have multiple problems.

We have also suggested better choices for each seafood dish to illustrate that consumer-led solutions to the fisheries crisis are available, and to give consumers food for thought when they buy and eat seafood. The Marine Stewardship Council (MSC) label is the simplest way for consumers to make the best environmental choice. More information is available on page 21.

Seafood is a popular and healthy part of the European diet. The average EU citizen consumes around 22kg of seafood per year, with the Portuguese eating over 56kg per person per year – well above the global average of 20kg. Consumption rates are high in Russia, Norway, and Iceland as well: over 90kg per person per year in the case of the latter¹.

Europe's fishing industry is enormous, with a combined catch from all European countries* of around 13.4 million tonnes in 2004 – around 16% of total global catches². The industry is vitally important, providing hundreds of thousands of direct and indirect jobs across the continent, and is an important source of revenue for many countries^{3,4}. In the Mediterranean, for example, fisheries provide employment for over 100,000 EU fishers alone, on board some 40,000 vessels. In 2003, the value of fish landed in Spain was over €1.8 billion, while the value of fish

* Albania, Bulgaria, Channel Islands, Croatia, EU, Faeroe Islands, Iceland, Isle of Man, Montenegro, Norway, Romania, Russia, Serbia, Ukraine

table face of seafood

from the country's processing sector was €3.5 billion.

But European fisheries are in crisis. Most fish stocks in European waters are now overfished, from the North Sea to the Northeast Atlantic Ocean to the Mediterranean Sea^{5,6,7,8}. For many of Europe's commercial stocks, numbers of adult fish are just 10% of what they were 30 years ago⁹. Stocks are also depleted in the waters of other countries where European fleets fish.

The basic problem is that there are too many fishing boats. The EU fleet, for example, is larger than that which its waters can sustain. This situation is encouraged by EU subsidies to the tune of €500 million each year, which help keep surplus boats afloat. On top of this, current systems for fisheries management often involve more politics than science, with quotas consistently being set much higher than scientifically advised. These factors, together with illegal, unregulated, and unreported (IUU or pirate) fishing, have led to massive overfishing.

Overfishing does more than deplete valuable fish populations and put livelihoods at risk. Fishing gear, particularly bottom trawls, can be extremely damaging to fragile marine habitats. Vast quantities of unwanted juvenile fish and other marine life are hauled up by unselective nets and hooks, only to be thrown away dead or dying. This destruction and waste threatens endangered marine species,

hampers the recovery of depleted fish populations, and reverberates throughout entire marine ecosystems. Indeed, fishing and aquaculture have been ranked as the primary threat to most of Europe's marine environment¹⁰.

Despite the widespread and serious problems within Europe's fisheries, WWF believes that a sustainable industry is possible – and indeed is encouraged by progress being made in some European, and other, fisheries. However, WWF believes that much more needs to be done, and quickly. Too often, the European Commission, European governments, and the fishing industry ignore the problems and warning signs of imminent disaster. There is a pressing need to change the way we fish. If action is not taken now, fishing as we know it today could end within a generation.

Every European who buys fish – whether as a consumer, chef, retailer, processor, or restaurateur – has a huge role to play in securing the future of Europe's fish dishes and its fishing industry. By understanding the scale and urgency of the problem, and choosing the fish we buy accordingly, preferably MSC-certified fish, all Europeans can encourage better seafood.

Simon Cripps

Director, WWF Global Marine Programme



© CULINARY HAGS



Fish and chips



Once upon a time cod were large and plentiful. Published in *Through Newfoundland with the camera* / Robert E. Holloway, St. John's: Dicks and Co., Canada. 1905. The plate noted: "The larger fish measured 5 ft. 5 in., and weighed 60 lbs."

Overfished and chips

Atlantic cod

A delicate flavour and easily preserved flesh has made cod a favourite throughout Europe for centuries. But as fishers became ever-more efficient at catching this versatile fish, populations began a slow decline. Today, most stocks are at or near record lows, with several in danger of commercial extinction. If overfishing continues, Atlantic cod could be a dish of the past in less than 15 years.

Populations gone to pot

Despite being heavily fished for centuries, in 1970 cod stocks were still large enough to be sustainable. But over the past 30 years global cod catches have decreased by over 70%, with catches by the current EU countries now just 10% of the 1970 level¹⁵.

Canadian cod stocks in the Grand Banks off the coast of Newfoundland were the first to collapse from overfishing, in 1992. The Canadian government closed the fishery, but even so, the stocks have not yet recovered. Several European stocks could soon follow suit: continued overfishing in the North Sea, Irish Sea, west of Scotland, the Eastern Baltic Sea, and the Skagerrak has seen the number of breeding cod fall far below the levels needed to maintain populations. The largest-remaining populations are in the Barents Sea and around Iceland,

accounting for almost 75% of cod on the global market. But these too are to some extent overfished¹⁶, and the Barents Sea stock is threatened by widespread illegal fishing¹⁷.

Atlantic cod can live to 25, with females producing millions of eggs each year¹⁸. But these days, 72% of two-year-old cod in the North Sea do not live until sexual maturity, mainly as a result of fishing¹⁹. Vast numbers of juveniles are caught in various fisheries, including those for cod, haddock, whiting, Norway lobster, Northern shrimp, plaice, and sole – and then discarded, often dead²⁰, back to the ocean. In the North Sea, a whopping 51% of cod caught in such fisheries are discarded as they are undersize²¹. The species is now classified as Vulnerable²² – and if stocks continue to decline at the current rate, there will be no more Atlantic cod in less than 15 years²³.

ABOUT THE FISH

Scientific name: *Gadus morhua*

Local names: Atlantic cod, bacalao, cabillaud, Dorsch, kabeljau, kabeljauw, morue, skrei, treska, torsk, turska.

Main markets: Western Europe accounts for 70-80% of the world cod market¹¹, with the UK being Europe's largest importer and consumer¹². Cod, together with the similar whitefish pollock and hake, accounts for one-third of all seafood imports into the EU¹³.

Main commercial products: Fresh, chilled, or frozen whole fish; fresh, chilled, frozen, salted, dried, or smoked fillets; frozen processed fillets (e.g., fish sticks, ready made dinners); salted cheeks; liver oil; smoked or frozen roe.

Fishing grounds: Throughout the species' range in the North Atlantic Ocean.

European fleets*: **Norway, Iceland, Russia**, Faeroe Islands, Denmark, Spain, UK, Germany, Poland, Sweden, France, Portugal, Latvia, Lithuania, Belgium, Netherlands, Estonia, Ireland, Finland, Isle of Man, Channel Islands¹⁴.

Fishing methods: Primarily bottom otter trawls and midwater trawls; also handlines, cod traps, gillnets, longlines, Danish seines, purse seines, twin beam trawls, shrimp trawls, jiggers, and pound nets.



Atlantic cod, *Gadus morhua*

* in order of landings in 2004, largest to smallest; countries in bold accounted for 77% of the total catch

The British eat one-third of the world's total cod catch, mostly in fish and chips^{43,44}.

Science on the backburner

The first warnings about falling cod numbers in European waters came in the 1990s. In 2000, it was confirmed that cod stocks in the North Sea and to the west of Scotland were on the verge of collapse, and those in the Skagerrak and the eastern English Channel were in bad shape.

The International Council for the Exploration of the Sea (ICES) – the body responsible for providing advice on cod stocks to European governments – stated that fishing mortality for cod had been under-estimated, and stock size over-estimated. It drew an explicit parallel with the situation in Canada prior to the cod collapse there. Accordingly, in 2002 ICES recommended the total closure of several key cod fisheries in Europe (Skagerrak, Kattegat, North Sea, Baltic Sea, Greenland cod) as well as a rebuilding plan to increase stock sizes²⁴.

Declining cod catches in EU waters



© FAO Fishstats 2002



© WWF-CANON / MIKE R. JACKSON

ICES has continued to recommend no fishing or reduced cod catches each year since then. But EU Fisheries Ministers have consistently ignored this advice and allowed fishing to continue – even on stocks for which ICES has recommended zero catch. Contrary to ICES advice, the EU has also increased quotas for other fisheries with a high bycatch of juvenile cod, such as Norway lobster. A recovery plan was finally introduced for North Sea cod in 2004, but scientists and environmentalists fear it is too little, too late.

Pirates' platter

Overfishing for cod is not just due to quotas being too high – it's also due to illegal, over-quota catches. This is a considerable problem in several European cod fisheries, including the Baltic Sea²⁵, Barents Sea²⁶, and Celtic Sea²⁷. Unreported catches of the Northeast Arctic cod stock in the Barents Sea, for example, are estimated at 90,000–115,000 tonnes per year, or 20% of total catches²⁸. Most of these illegal catches come from Russian trawlers, whose catches are thought to be 50% higher than the legal quota²⁹. This illegally caught cod is landed in countries such as UK, the Netherlands, and Germany, and ends up for sale in European markets.

Footing the bill

Declining cod catches due to overfishing represent a huge loss of revenue. The Baltic Sea cod fishery lost €160 million in 2002 alone due to a low quota of 76,000 tonnes, instead of 165,000 tonnes which would have been possible if sustainable quotas had been in force since 1977. Similarly, the North Sea cod fishery lost €243 million in 2002³⁰. Illegal cod fishing in the Barents Sea is estimated to cost Russian and Norwegian fishermen at least €250 million each year³¹. And if Canada's cod fishery had not collapsed in 1992 but rather had been fished sustainably, it could be earning in the order of €700 million per year³².

Collapsed fisheries also bear an enormous cost to society. Some 30,000 people, including 10,000 fishermen, lost their jobs overnight when Canada's cod fishery collapsed. The country's total federal government assistance to fisheries increased 5-fold from the mid-1980s to around €500 million in the mid-1990s, largely due to this collapse³³.

SIDE DISHES

Porpoise and puffin starter

Your fish and chips could come with an unexpected side dish. Gillnet fisheries for cod catch large numbers of harbour porpoises (*Phocoena phocoena*), as well as seabirds such as fulmars (*Fulmarus glacialis*), shearwaters (*Puffinus* spp.), razorbills (*Alca torda*), murrens (*Uria aalge*), puffins (*Fratercula arctica*),

loons (*Gavia* spp.), and eiders (*Somateria mollissima*). In some cases these bycatch deaths are thought to be negatively affecting populations^{34,35,36,37}.

Seafloor fricassee

Alternatively, your fish and chips probably left a lasting impression on the seafloor. Bottom trawls, used to catch the majority of Atlantic cod, are one of the most destructive fishing gears. The heavy gear can plough the sea floor to a depth of 30 cm³⁸, resulting in changes to flora and fauna in heavily trawled areas³⁹.

Processed hors d'oeuvres

The majority of cod is processed into fillets and other products. Like all food processing, this has various impacts on the environment, arising from: energy used for filleting, refrigeration, freezing, etc; generation of effluent and waste water; and generation of solid waste, including unwanted cod parts as well as packaging materials such as waxed corrugated boxes, pallets, shrink wrap, strapping ties, drums, and polystyrene⁴⁰.

Round-the-world fish sticks

Your fish may have travelled more widely than you. China has recently become an important fish processor, and is now a major supplier of cod fillets to Europe⁴¹. This means that cod caught in the North Atlantic are being shipped to China via the Suez Canal, filleted there, and then shipped back to Europe – a total distance of 44,000 km⁴².

Alternatives

The best choice is similarly flavoured whitefish that is MSC-certified including pollock, hake, hoki, Pacific cod, sablefish, and mackerel icefish. Second choice is similarly flavoured whitefish from European waters including saithe, pollock, and haddock that are more plentiful than Atlantic cod. For Atlantic cod itself the best choice is that caught legally by Iceland, Russia, or Norway, which fish the largest-remaining cod populations. However, it is virtually impossible for consumers to know whether cod has been caught legally or not. Organically farmed Atlantic cod is also available but cannot be viewed as a solution to the unsustainable management of certain wild caught fisheries.

Of the millions of eggs
each female cod
can spawn in her lifetime,
only two need survive
to adulthood for the
population to remain
stable. For the past
30 years, humans have
not even allowed this.





© DOMESTICATION OF THUNNUS THYNNUS SYMPOSIUM (DOTT) 2002, CARTEGENA, SPAIN

Pirate

Atlantic bluefin tuna

Highly prized for sushi and sashimi, bluefin tuna is the most valuable fish on the planet. But increased demand and the high prices paid have seen fishing spiral out of control — particularly for Atlantic bluefin tuna in the Mediterranean Sea, the site of most bluefin catches. Nearly one-third of all catches here come from illegal, unregulated, and unreported (IUU) fishing, most of which is carried out by EU fleets.

© LOTTA KUDOH



Sushi



Tuna slaughter in the Mediterranean

sushi

Ill-gotten gains

Since 2003, the main body responsible for regulating Atlantic bluefin tuna catches, the International Commission for the Conservation of Atlantic Tunas (ICCAT), has set an annual quota of 32,000 tonnes for the eastern stock. This quota is already 23% higher than the maximum level determined to avoid further depletion of the stock⁵⁹. But actual catch estimates are more than 40% higher than the quota – reaching at least 45,547 tonnes in 2005 and possibly being well over 50,000 tonnes⁶⁰.

These over-quota catches are illegal under ICCAT regulations as well as EU law⁶¹. Most can be traced to EU purse seine fleets (mainly French) and Libya – whose fleet includes ten former French vessels recently reflagged in Libya and still effectively under French control⁶². Fishing in Libyan waters also uses illegal tuna-spotting planes during the forbidden period of June, some of which operate from Malta and Italy. Turkey too is responsible for significant unreported catches as it has not been allocated a specific ICCAT fishing quota for bluefin tuna.

Laundering fish through farms

The EU and ICCAT have strict requirements for reporting landed bluefin tuna. However, these requirements are extremely difficult to enforce in the case of live tuna transferred to cages for fatten-

ing – meaning that these so-called tuna farms, which supply a lucrative market for cheaper bluefin tuna for sushi and sashimi, are a perfect way to launder over-quota tuna. On top of this, it's extremely difficult to keep track of how many tuna were caught where and by who due to the practice of transferring the catches at sea to tug boats, which then tow the live tuna to the farms.

Today, the majority of the Mediterranean bluefin tuna catch is caught by purse seines and transferred live to tuna farms, which are currently located off the shores of Spain, Italy, Malta, Croatia, Turkey, Cyprus, Tunisia, and Libya⁶³. As of July 2006, the farms' total capacity was 55,300 tonnes⁶⁴ – much higher than the legal annual quota, and a clear incentive for overfishing. Indeed, the rapid spread of tuna farms throughout the Mediterranean over the past decade is a major factor behind the current high level of IUU catches⁶⁵.

Spirited away

Another way that fleets avoid documentation of illegal over-quota catches is by transferring them directly to massive reefer vessels and cold containers without ever landing them at EU ports⁶⁶. These reefers then ship the tuna out of the Mediterranean. The tuna are transferred to the reefers directly from tuna farms or after being slaughtered and processed at sea.

ABOUT THE FISH

Scientific name: *Thunnus thynnus*

Local names: Atlantic bluefin tuna, atum, atun de aleta azul, giant tuna, horse mackerel, maguro, northern bluefin tuna, orkinos, roter Thun, sinievätönnikala, thon rouge, tonfisk, tonijn, tonno, tónnos, tunny.

Main commercial products:

Fresh, chilled, and frozen fish for sashimi, sushi, and steaks.

Main markets: Japan is the largest market; however, markets for both sushi and steaks are growing in Europe and the US^{45,46}.

Fishing grounds: Throughout its range in the North Atlantic Ocean, with 73% of catches coming from the Mediterranean Sea⁴⁷.

European fleets*: *France, Spain, Italy, Croatia, Greece, Malta, Portugal*⁴⁸.

Fishing methods: Predominantly purse seines (60–80% of the total Mediterranean catch); also longlines, baitboats, and traps⁴⁹.

Tuna is one of the two main fisheries that attract intense IUU fishing⁸⁶.

Current populations: Two stocks of Atlantic bluefin tuna are recognized, both of which are overfished. The smaller western stock has declined by nearly 90% since the 1970s⁵⁰ and is classified as Critically Endangered⁵¹. The larger eastern stock, which spawns in the Mediterranean Sea, is currently classified as Endangered⁵² but in fact is in danger of complete commercial and biological extinction⁵³. Fisheries in the North Sea⁵⁴ and Black Sea⁵⁵ have already disappeared; traditional fishing grounds in the Western Mediterranean are almost entirely exhausted⁵⁶; and current catches rely on the last-remaining spawning groups of tuna in the Southern and Eastern Mediterranean, for example in Libyan waters⁵⁷. In 2004, mortality due to fishing was three times higher than the overfishing threshold for this stock. The mortality on large, mature bluefin almost tripled between 2000 and 2004, pointing to a high risk of population collapse⁵⁸.

* in order of reported landings in 2004, largest to smallest; countries in bold accounted for 92% of total reported European landings and 53% of total reported global landings. Note that reported landings are far below actual catches due to significant IUU fishing and tuna farming.



Atlantic bluefin tuna, *Thunnus thynnus*

SIDE DISHES

Bait fish starter

Your plate of bluefin tuna was probably once herring, sardines, anchovies, and squid: caged tuna are fattened on a diet that includes these bait fish. But this fattening is not very efficient: 10-25 kg of bait fish are needed to produce just 1 kg of tuna⁶⁷. The huge quantities of bait fish required for the farms have exacerbated fishing pressure on some stocks in the Mediterranean, such as anchovies and sardinella⁶⁸. In addition, the massive use of imported bait fish

Nearly one bluefin tuna in every three is caught illegally in the Mediterranean.

carries the risk of introducing pathogenic species to Mediterranean fish⁶⁹. Such an event is believed to be responsible for the mass mortality of pilchards in Australia in 1995, where an exotic herpes virus was presumably introduced to local fish populations through the use of imported pilchards in the South Australia tuna farming industry.

Shark and turtle starter

Your tuna dish is likely to come with a side dish of turtle or shark. Many species of tuna, including Atlantic bluefin, are caught using longlines. These fisheries deployed an estimated 1.2 billion hooks in 2000 alone, which captured and killed a wide range of species including seabirds, marine turtles, marine mammals, sharks, and other fish⁷⁰.

Baby bluefin

The bluefin tuna on your plate could be a baby. Large numbers of small and undersized Atlantic bluefin tuna are targeted by Spanish, French, and Italian purse seiners in the Gulf of Lyon, Ligurian Sea, and Adriatic Sea⁷¹. Baby bluefin are also targeted for tuna farms, particularly in Croatia⁷². Other tuna fisheries also catch large numbers of juvenile Atlantic bluefin tuna, such as longline fleets for albacore tuna in the Mediterranean Sea⁷³ and purse-seine fisheries for yellowfin and skipjack tuna in the Atlantic Ocean. Even bluefin tuna that are caught legally are often juveniles: the minimum landing size is 10 kg in the Mediterranean and 6.4 kg elsewhere, but the tuna don't reach breeding age until they are at least 30 kg⁷⁴.

Alternatives

The best Atlantic bluefin tuna choice is that caught legally and over 30 kg in size. However, it is virtually impossible for consumers to know whether tuna has been caught legally or not, or the size of the tuna prior to filleting and processing. Given the precarious state of stocks and the rampant illegal fishing, it may be best to avoid bluefin tuna, at least until an effective and strict recovery plan for the species is implemented. Alternatives are skipjack and yellowfin tuna, whose biology (high fecundity and relatively fast growth rates) makes them better able to withstand high levels of fishing. Tuna caught using pole-and-line methods have little associated bycatch and are the best choice^{82,83}. Purse seine fisheries for skipjack and yellowfin tuna in the Atlantic also have low levels of bycatch and low interaction with marine turtles and marine mammals^{84,85}.

Value subtracted tax

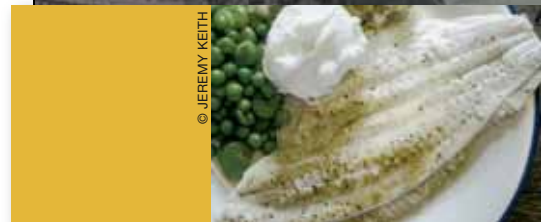
Your tax money has helped fuel the demise of Atlantic bluefin tuna⁷⁵. The French and Spanish purse seine fleets for bluefin tuna in the Mediterranean have been either modernized or completely rebuilt in the past ten years thanks to massive grants from EU public funds. On top of this, tuna farms are eligible for EU subsidies for aquaculture development – even though they are not aquaculture, as the tuna are caught from the wild. The result of these funds has been huge overcapacity of both fleets and farms, which only encourages overfishing.

Species check

Tuna woes are not just limited to Atlantic bluefin. Of the 23 commercially exploited stocks of the main tuna species (skipjack, yellowfin, bigeye, albacore, Atlantic bluefin, Pacific bluefin, and southern bluefin), at least five are fully exploited, five are overexploited, and two are depleted⁷⁶. This includes species used for canning. Other tuna fisheries also suffer from high levels of IUU fishing^{77,78} as well as bycatch^{79,80,81}.

One for yo

European plaice and sole



Sorting the catch on the deck of a beam trawler

ABOUT THE FISH

Scientific name: *Pleuronectes platessa* (plaice); *Solea solea* (sole)

Local names: Plaice: carrelet, Northern flounder, palaia anglesa, passera, plie, punakampela, rödspätta, rödspette, rödspætte, schol, Scholle, skarkoli solha, solla, spätta.

Sole: Black sole, Dover sole, glosa, lengua, lenguado, llenguado, linguata, meriantura, palaia, palai, parkgate sole, river sole, sea partridge, Seezunge, slip, søtunge, Southport sole, tong, tounge, tunga, túppiti, Zunga, sjötunga.

u, one dumped dead in the sea



Plaice fillet



© WWF-CANON / QUENTIN BATES

Fished for centuries for their delicately flavoured white flesh, plaice and sole are the most important flatfish in European fisheries. Unfortunately though, most catches come from Europe's single-most wasteful fishery – where more than half the plaice catch is thrown overboard, dead. A huge amount of other marine life hauled up in the nets is also dumped back in the sea.

A fine kettle of discarded fish

Around half of all plaice caught are discarded overboard, usually dead. The North Sea plaice and sole mixed beam trawl fishery, which accounts for the vast majority of catches, is the most wasteful of all – according to a 2000 report, up to 80% of the plaice catch is discarded in some areas⁹⁵.

Why? Because the plaice are either below the minimum landing size (i.e., baby fish) or less valuable than the rest of the catch. The problem stems from the fact that fisheries for these two flatfish are managed separately, despite the fact that they live – and are caught – together.

Mature sole are much smaller than mature plaice. Accordingly, beam trawlers “targeting” sole are permitted to use nets with a smaller mesh size

than those “targeting” plaice. But these finer nets also catch plaice from 17cm in length⁹⁶ – a full 10cm shorter than the minimum landing size of 27cm. Because it is illegal to land under-size fish, every plaice below 27cm is dumped overboard.

In addition, plaice and sole have separate quotas. Once the plaice quota has been filled, any extra plaice caught while “targeting” sole are also dumped overboard. And since sole are more profitable than plaice, even marketable plaice are discarded in favour of sole – indeed, the better the sole catch, the more plaice is thrown away.

Back to the seafloor

Plaice and sole live on the seafloor, often partially buried in the sediment. The most popular way to catch them is

Around half the
plaice catch
is discarded
overboard,
usually dead.



Plaice, *Pleuronectes platessa*

Main commercial products:

Fresh and frozen whole fish and fillets; frozen processed fillets (e.g., breaded fillets). Plaice is of the most commonly eaten fish in Denmark, where it is popular as an open sandwich topping, and is also often used in the UK for fish and chips⁸⁷.

Main markets: Popular throughout Europe; the UK and Denmark are the biggest consumers of plaice, followed by Sweden, France, and Spain⁸⁸.

Fishing grounds: Throughout their range in the Northeast Atlantic Ocean and Mediterranean Sea. Most catches come from the North Sea (70% for plaice, 58% for sole)⁸⁹ in mixed fisheries for both species^{90,91}.

European fleets*: *Netherlands, Denmark, UK, France, Belgium*, Iceland, Germany, Italy, Norway, Russia, Greece, Ireland, Faeroe Islands, Sweden, Spain, Portugal, Albania, Poland, Channel Islands, Romania, Slovenia, Bulgaria⁹².

Fishing methods: Predominantly beam trawls; also otter trawls, purse seines, Danish seines, and gillnets^{93,94}.

Current populations: Of the eight plaice stocks recognized by ICES, only one is considered to be harvested sustainably while three are overexploited. Data is insufficient to assess the remaining stocks; however, landings for all stocks are at or near historical lows. Of the nine sole stocks, seven are overfished with the status of the remaining two unknown.

* in order of reported landings in 2004, largest to smallest; countries in bold together accounted for 80% of the total combined plaice and sole catch. Overall, plaice landings are 2.2 times higher than sole landings. Note that the proportion of landings differs dramatically between countries, and some only land plaice while others only land sole.

to drag beam trawls across the seabed, with heavy “tickler” chains to startle the fish off the bottom^{97,98}.

But it's not just these flatfish which are caught. Sea urchins, hermit crabs, brittle stars, razor shells, starfish, shellfish ... all are picked up by the trawl net, only to be dumped back into the ocean dead or dying when the net is hauled in^{99,100}. A whopping 150,000-180,000 tonnes of such invertebrates are discarded each year in North Sea fisheries¹⁰¹. Endangered skates and rays are also caught, as well as large numbers of juvenile fish for which the flat, muddy and sandy inshore habitats of plaice and sole possibly serve as important nursery grounds¹⁰².

As much as 7 kg of marine animals are killed to produce 450g of marketable sole.

All up, as much as 7kg of marine animals are killed by beam trawlers to produce 450g of marketable sole¹⁰³. The figure is similar for plaice¹⁰⁴.

Globally, flatfish trawl fisheries discard 51.3% of their catches, the highest discard rate of all trawl fisheries, excluding shrimp. In the EU, beam trawlers targeting finfish dump 330,000 tonnes of marine life each year. Most of these discards come from the North Sea plaice and sole fisheries¹⁰⁵.

SIDE DISHES

Baby cod and sole starter

Your plate of plaice probably comes with a discarded plate of baby Atlantic cod or sole. Juveniles from these species are also caught as bycatch in plaice fisheries, and then discarded dead or dying back into the ocean.

Baby plaice

The plaice on your plate is likely to be a baby, even if it is above the minimum landing size of 27cm set by the EU: female plaice don't spawn until they reach 31cm at 2-4 years of age.

Seafloor fricassee

Your plate of plaice or sole left a lasting impression on the seafloor. A huge area of the North Sea is trawled by beam trawlers, the main boats targeting plaice and sole and one of the most destructive fishing practices. Dutch beam trawlers alone trawl some 171,000km² each year – approximately 40% of the sea's area. All other countries bordering the North Sea also operate beam trawlers, and the most heavily trawled areas may

be trawled three or four times a year¹⁰⁶. One study estimated that beam trawling in the southern and central North Sea reduces total seafloor biomass by 39%, and seafloor production by 15%, relative to the unfished state¹⁰⁷.

Fuel chaser

Trawl fisheries can use well over 2,000 litres of fuel to land every tonne of flatfish¹⁰⁸. Using an average fuel consumption of 510 litres/tonne for North Atlantic groundfish fisheries, the reported plaice and sole catch of around 124,000 tonnes in 2004 required some 63 million litres of fuel. Rising fuel prices encourage beam trawlers to fish closer to the coast, which further adds to the discard problem as most juvenile plaice are found along the coast.

Science on ice

Your plate of plaice comes with a large serving of ignored science: EU fisheries ministers have been ignoring advice on plaice stocks for over a decade, and nearly two decades in the case of North Sea plaice. Quotas have consistently been set higher than the ICES recommendations for all three currently over-exploited stocks (North Sea, Western Channel, and Irish Sea)¹⁰⁹. In 2005 for example, the agreed North Sea quota was almost double the ICES recommendation, while that for the Eastern Channel was nearly 10 times the ICES recommendation. With fishing mortality up to 2 times higher than recommended, the current fishing effort on most plaice is too high to be sustainable¹¹⁰.

Alternatives

The best plaice and sole choice is that caught from the Irish Sea, where bycatch of juvenile plaice and cod is lower than in other plaice and sole fisheries. In addition, the Irish Sea plaice fishery is currently the only one considered by ICES to be harvested sustainably. Ideally, choose plaice and sole that are line caught, and that are larger than 27cm and 24cm, respectively. If the origin of the plaice or sole is uncertain, other alternatives are a different species of flatfish such as MSC-certified halibut, or a similarly flavoured whitefish such as MSC-certified pollock, hake, hoki, Pacific cod, sablefish, or mackerel icefish.

Buy one, get two sharks free!

Swordfish

Once almost impossible to sell, swordfish is now extremely popular for grilling, barbequing, baking, and more. But with the hearty steak comes a heavy toll of other marine life caught alongside the swordfish – including endangered sharks, dolphins, and marine turtles to name a few.

Hook, line, and sinker

The vast majority of swordfish are caught using longlines – a single strand of fishing line that can be many kilometres long and which is set with thousands of baited hooks. These hooks are generally indiscriminate: any marine animal large enough to bite the bait and hook can be caught. As a result, these fisheries suffer from a high level of incidental catch, or bycatch.

A significant number of swordfish are also caught by illegal driftnet

Swordfish steak

© WWW.LAURAFRIES.COM



the fin on a longline hook

ABOUT THE FISH

Scientific name: *Xiphias gladius*

Local names: Agula, emperador, espadon, miekkakala, pesce spada, pez espada, schwertfisch, svaerdfisk, sverdfisk, swardfisk, swordfish, xiphias, zwaardvisch.

Main commercial products: Fresh, frozen, and smoked fillets and steaks.

Main markets: Western Europe, USA, Japan; demand for fresh swordfish is high and growing in most Mediterranean countries¹¹¹.

Fishing grounds: Throughout its global range. EU fleets operate in the North Atlantic, Mediterranean Sea, and Black Sea, with Spanish and Portuguese fleets also operating in the South Atlantic Ocean, the Pacific Ocean, and the Indian Ocean. Roughly one-third of Europe's catches

come from the Mediterranean Sea and overall, catches from the Mediterranean account for 14% of global catches.

European fleets*: *Spain*, Italy, Portugal, Greece, UK, Malta, France, Albania, Ireland¹¹².

Current populations: The current exploitation level of Mediterranean swordfish populations is thought to be sustainable in the short-term¹¹³. North Atlantic populations seem to be recovering from depleted levels in the 1990s¹¹⁴; however the population remains classified as Endangered¹¹⁵. Little is known about populations in the South Atlantic, Pacific, and Indian Oceans, but they are probably overfished¹¹⁶.

* in order of landings in 2004, largest to smallest; Spain alone accounted for 66% of Europe's catch and 21% of the global catch; overall, the EU accounted for 32% of global catches in 2004



Swordfish, *Xiphias gladius*

Some swordfish longliners catch over 3 tonnes of shark for every 1 tonne of swordfish.

Over a quarter of a million marine turtles are caught each year on longlines.

fisheries in the Mediterranean. Labelled “walls of death”, driftnets are also indiscriminate, catching any animal that crosses their path.

Dead in the water

The species most-affected by swordfish fisheries include:

- **Sharks:** Sharks make up a large percentage of longline catches targeting swordfish – particularly blue shark (*Prionace glauca*) and mako shark (*Isurus oxyrinchus*), both of which are classified as Near Threatened due to overfishing¹¹⁷. For example, from 1990-2000, Portuguese swordfish longliners in the North Atlantic caught around 3 tonnes of blue shark for every 1 tonne of swordfish¹¹⁸. Similarly, blue shark and mako shark made up 68% of landings by Spanish swordfish longliners in the Atlantic Ocean in 1999, while blue shark made up around 25% of landings by Spanish swordfish longliners in the Mediterranean¹¹⁹.

In addition, the illegal, large-scale Moroccan driftnet fishery targeting swordfish for the European market is currently catching one shark for every two swordfish, killing an estimated 100,000 sharks per year. Similar illegal fleets are operated by Italy, Turkey, and France¹²⁰.

- **Marine turtles:** Over 250,000 Endangered loggerhead turtles (*Caretta caretta*) and Critically Endangered leatherback turtles (*Dermochelys coriacea*) are caught annually by commercial longline fisheries for swordfish and tuna around the world¹²¹. Due to their location and timing, longlines set for swordfish are more likely to interact with marine turtles than those set for tuna¹²². Around half of all marine turtles caught on traditional longline hooks do not survive¹²³. In the Mediterranean, surface longlines and driftnet fleets are the major threats to the survival of loggerhead turtles¹²⁴.

- **Seabirds:** Longline fishing, including for swordfish, is a major cause of seabird mortality in the Mediterranean Sea¹²⁵ and South Pacific Ocean¹²⁶. As for marine turtles, longlines set for swordfish are more likely to interact with seabirds than those set for tuna¹²⁷. European species caught on longlines include gannets (*Sula bassana*), fulmars (*Fulmarus glacialis*), Manx shearwaters (*Puffinus yelkouan*), shearwaters (*Calonectris* spp.), and gulls (*Larus* spp.)¹²⁸.

- **Dolphins:** The illegal, large-scale Moroccan driftnet fishery targeting swordfish for the European market has been estimated to kill around 16,600 dolphins per year; similar illegal fleets are operated by Italy, Turkey, and France¹²⁹. Population declines due to bycatch are especially worrying for the short-beaked common dolphin (*Delphinus delphis*), whose last remnant healthy Mediterranean population is located in this sea.

- **Marlin:** 95% or more of all white marlin (*Tetrapturus albidus*) and blue marlin (*Makaira nigricans*) catches are taken as bycatch in longline fisheries targeting swordfish and tuna¹³⁰. Both these species are overfished and face extinction: in the Atlantic, the blue marlin population is currently just 20% of the pre-longlining (1960) level, while the white marlin population is only 6% of its pre-longlining abundance and declining by 3% each year¹³¹.

Around 16,000 dolphins are killed each year in Morocco's illegal driftnets set for swordfish.

SIDE DISHES

Baby swordfish

There's a good chance swordfish on your plate comes from a baby that has never spawned. ICCAT – the principal body for managing tunas and tuna-like species in the Atlantic and adjacent seas – estimates that juveniles make up 25% of the total Atlantic swordfish catch¹³². ICCAT has not established a minimum landing size for swordfish in the Mediterranean, where individuals less than three years old make up a massive 50-70% of total catches¹³³.

Alternatives

Some longline fisheries in the Mediterranean are trialling different hook designs, such as circle hooks, to minimize bycatch. WWF supports swordfish caught using these modified hooks but at present it is not possible for consumers to identify such swordfish. Be wary of swordfish from Morocco, Italy, and Turkey, which may well have come from an illegal driftnet fishery.



© MAYU SHIMIZU



Norway lobster caught in nets, showing bycatch of other species

Stirring up the seafloor

Norway lobster

Once thrown away as unwanted bycatch, Norway lobster is now a highly valuable catch – particularly in the UK, where it is now the country's most-valuable fishery. But the soft muddy seafloor in which Norway lobster live is particularly sensitive to bottom trawling, one of the most damaging fishing practices.

Scraping the bottom

Norway lobster live in burrows dug into soft, muddy sediments on the seafloor. Although there is much more to learn about these muddy habitats, a diverse group of creatures are known to live here, including other burrowing crustaceans, burrowing worms and fish, seapens, starfish, brittlestars, and shellfish¹⁴¹.

These muddy habitats form in areas where the seafloor is relatively undisturbed by waves and other external factors. This makes them particularly sensitive to bottom trawling^{142,143}, the main method used to catch Norway lobster¹⁴⁴.

The heavy otter and beam trawls scrape and plough into the mud, to a depth of 30cm or more. The trawls can leave deep, lasting furrows up to 6m wide; flatten out natural contours; and compact sediments^{145,146,147}. In addition to the marine life caught by the net, animals living on the seafloor are crushed or buried as the trawl passes, while those living in the sediment can become exposed¹⁴⁸.

The trawls also resuspend large quantities of mud into the water – around 112kg of particles per second¹⁴⁹. This sediment can smother filter feeders such as seapens, which are related to corals¹⁵⁰. It can also reduce the light available for photosynthetic organisms and have negative effects on animals' feeding and metabolic rates¹⁵¹.

Small wonder that bottom trawling has been described as one of the most



Norway lobster, *Nephrops norvegicus*

destructive fishing practices, comparable to forest clear cutting and agricultural ploughing on land¹⁵². And the damage occurs over vast areas. The entire area of Irish Sea has been intensively bottom trawled for Norway lobster¹⁵³, as well as for other species such as plaice, sole, cod, haddock, whiting, saithe, and monkfish. The North Sea is also intensively bottom trawled for these species, with some areas being trawled three or four times a year¹⁵⁴. And nowadays fishermen use not one trawl, but four or six per vessel.

Changed communities and reduced biomass

The effects of a bottom trawl are immediate. Significant decreases in the number of species, biomass, species richness, and diversity have been documented 24 hours after otter trawling for Norway lobster in the Irish Sea¹⁵⁵.

Long-term effects are more difficult to assess – mainly because there are very few untrawled areas left for comparison in the two areas most studied, the Irish Sea and the North Sea¹⁵⁶. One study of the Irish Sea, however, concluded that there are significantly fewer individuals and reduced biomass in areas trawled for Norway lobster than in areas around nearby shipwrecks that have not been trawled¹⁵⁷. Populations of burrowing urchins and mudshrimp have also been shown to be severely impacted by these trawls^{158,159}. By disrupting burrowing animals, bottom trawling can also alter the complexity and oxygenation of muddy sediments on the seafloor, leading to further impacts on seafloor communities^{160,161,162}.

Langoustine
linguine

Bottom trawling has been described as the most destructive of all fishing practices, comparable to forest clear cutting and agricultural ploughing on land.

In general, stronger, mobile, and/or fast-growing animals are believed to recover from bottom trawling more quickly than fragile, non-mobile, and/or slow-growing ones^{163,164}. There is speculation that bottom trawling also leads to a reduced body size for organisms living in intensely trawled areas^{165,166}. In addition, the large numbers of dead and dying animals on the seafloor – due to both the trawl passing as well as the unwanted bycatch discarded overboard – may also alter seafloor communities by, for example, attracting increased populations of “scavenger” species that feed opportunistically on the dead animals^{167,168,169}.

Overall, seafloor communities may never recover to their original condition while trawling continues¹⁷⁰. Trawling on muddy habitats is likely to be the most serious threat to these unique, fragile communities – where species are vanishing faster than they are being discovered¹⁷¹.

SIDE DISHES

Lobster on the side

Your plate of Norway lobster comes with another plate that was discarded.

ABOUT THE FISH

Scientific name: *Nephrops norvegicus*

Local names: Jomfruhummer, Buchstabenkrebs, cigala, Dublin Bay prawn, havskräfta, Kaisergranat, Kaiserhummer, keisarihummeri, karavida, langoustine, Nephrops, Noorse kreeft, Norway lobster, Norway prawn, Norwegischer Hummer, scampi, sjøkreps.

Main commercial products: Live specimens; fresh and frozen whole specimens and tails; canned peeled tails; canned soup (bisque de langoustines).

Main markets: Sold throughout Europe as a highly esteemed food¹³⁴, particularly in the UK, Spain, France, and Italy.

Fishing grounds: Throughout almost its entire range, from Iceland to the Mediterranean Sea; most catches come from the North Sea, the waters around the UK and Ireland, and the Bay of Biscay¹³⁵.

European fleets*: **UK, Ireland, France, Denmark**, Italy, Iceland, Spain, Netherlands, Sweden, Portugal, Greece, Belgium, Norway, Croatia, Germany, Faeroe Islands, Isle of Man, Serbia and Montenegro, Albania¹³⁶.

Fishing methods: Beam trawls, otter trawls, seine nets, baited traps (creels).

Current populations: The status of stocks in most areas is unknown, but many appear to be exploited at a sustainable level and in some cases abundance appears to be increasing, perhaps due to decreased predation by depleted species such as cod and hake^{138, 139}. However, stocks are depleted in West Galicia and North Portugal, while sharp reductions in stock biomass have been recorded in North Galicia and the Cantabrian Sea¹⁴⁰.

* in order of reported landings in 2004, largest to smallest. The UK alone accounted for 53% of the total catch; countries in bold together accounted for around 85% of the total catch; Norway lobster is currently the UK's most valuable fishery¹³⁷

Large numbers of Norway lobster are thrown overboard, either because they are smaller than the minimum landing size or because the market prefers larger individuals¹⁷². In the North Sea, 30% of caught individuals are discarded¹⁷³, while in the Bay of Biscay the figure rises to 50-60%¹⁷⁴. Norway lobster caught by trawls suffer frequent and often severe damage, and the vast majority of discarded individuals do not survive^{175,176}.

Baby fish on the side

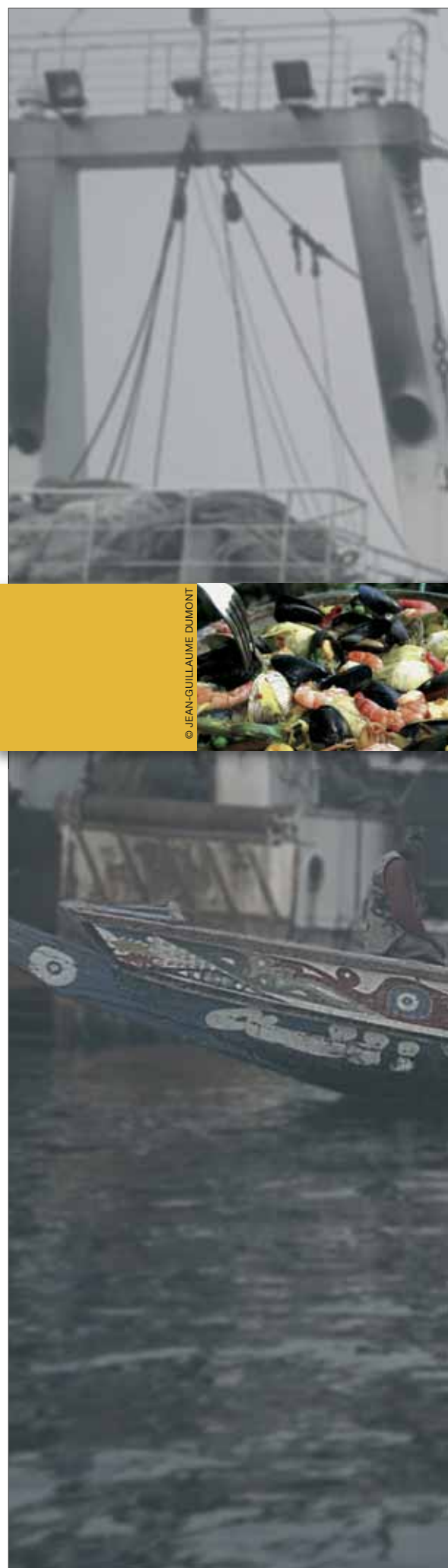
Your plate of Norway lobster also comes with a plate of discarded baby fish – including commercial species such as cod, sole, plaice, haddock, whiting, and hake^{177,178}. The small mesh size of Norway lobster trawl fisheries means that considerable numbers of fish are caught as bycatch, up to 70% of which are discarded as the fish are below the minimum landing size¹⁷⁹. In the Skagerrak, for example, 61% of the total cod catch by Norway lobster trawls was discarded between 1995 and 2000¹⁸⁰. In some cases, the amount of discarded fish is greater than the Norway lobster catch¹⁸¹. A significant proportion of discarded fish do not survive¹⁸². Even young fish that escape through the net can die from the injuries they sustain¹⁸³. The high level of juvenile fish mortality caused by most Norway lobster fisheries has led to concerns about the potential impact of these fisheries on the recovery of cod populations, as well as the sustainability of whiting and haddock populations.

Starfish and shellfish on the side

The waste doesn't stop with edible seafood: huge amounts of invertebrate species (such as worms, starfish, and shellfish) are also discarded from bottom trawl nets. In North Sea fisheries alone, 150,000-180,000 tonnes of invertebrates are discarded each year¹⁸⁴.

Alternatives

Norway lobster caught using creels (a kind of trap) are currently a good choice, as traditional creel fisheries generally have minimal impact on the marine environment, suffer from much lower rates of bycatch than trawl fisheries, and return unwanted catch back to the sea unharmed. At the moment there is only one such creel fishery with MSC certification, in Scotland, but other creel and trawler fisheries are investigating the potential for certification. The Clyde Fisheries Development Project in Scotland is also looking at ways of improving the sustainability of the Norway lobster fishery off Scotland's west coast. Other Norway lobster fisheries, in Sweden for example, are using nets with sorting grids, larger mesh sizes, or escape panels to allow juvenile fish to escape and reduce bycatch of non-target species.



European trawlers sometimes collide with artisanal pirogues with

Poverty platter

West African shrimp, squid and fish

The Northwest African coast was once a rich source of seafood for local people. But once commercial fishing fleets arrived from Europe and other distant countries, the region's marine resources began to decline. These waters are now as depleted as those of the North Atlantic – leading to real fears of food shortages and social disaster.

Dishing up African fish in Europe

Europe's demand for seafood outstrips supply in its own waters. To meet demand, the EU and Russia in particular have increasingly looked for fishing opportunities in foreign waters.

The Northwest African coast has long been popular, with European fleets fishing in the area since the 1960s¹⁹¹. Since 1979, the EU alone has paid millions of Euros to various countries for the right to fish in their waters. Most of these fishing access agreements (now called Fisheries Partnership Agreements) are in Africa, with the largest in the waters of Mauritania, Senegal, and Guinea-Bissau¹⁹². In 1999, such agreements provided around 25% of all fish consumed in the EU¹⁹³ and in 2001, 11% of all EU catches came from the Eastern Central Atlantic Ocean off the coast of West Africa¹⁹⁴.

ABOUT THE FISH

Main species: Various fish (mainly bigeye, skipjack, and yellowfin tuna, anchovies, sardines, and mackerel), crustaceans (mainly shrimp), and cephalopods (mainly octopus and squid)¹⁸⁵.

Main commercial products:

Fresh, chilled, frozen fillets, shrimp, fish, squid, and octopus; canned tuna and other fish.

Fishing grounds: Along the West African coast from Mauritania to North Angola, primarily in the north.

European fleets*: *Russia, Netherlands, Lithuania, Spain*, France, Ukraine, Latvia, Ireland, Portugal, Italy, Greece, Germany¹⁸⁶.

European imports: Europe imports a significant amount of seafood from the region.

Fishing methods: Surface, midwater, and bottom trawls; purse seines¹⁸⁷.

Current populations: Detailed scientific data for West African stocks is not available; however, there is evidence of a huge decline in biomass and depleted fish populations in the region, and of current fishing levels being unsustainable^{188,189,190}.

* in order of reported landings in 2004, largest to smallest; countries in bold together accounted for 73% of the total European catch, and 16% of the global catch, in the Eastern Central Atlantic Ocean (marine fish, crustaceans, and molluscs)

Paella



Common octopus, *octopus vulgaris*

Over the same time period, imports of seafood to the EU have increased. Today the EU is the largest world market for imported seafood¹⁹⁵, with Africa the single-largest supplier¹⁹⁶. Such exports are extremely valuable for the countries concerned: Senegal's seafood exports make up a third of the country's export earnings, with 60% of these exports ending up in the EU¹⁹⁷.

But a series of studies have shown that both the fishing agreements and the increased trade dependence on Europe have been disastrous – both environmentally and socially^{198,199,200}.

Overfishing exported

The huge increase in the number of EU, Russian, and to a lesser extent Asian, boats along the Northwest African coast since the 1960s has driven a huge increase in fishing effort²⁰¹. The EU fleet – which numbered nearly 800 boats in 2001 – has essentially been able to take whatever it can catch^{202,203}.

60% of seafood on EU dinner plates comes from non-EU waters²⁴², particularly African waters.

Most fishing agreements do not include maximum catch quotas or effort limits, and in any case, the African countries have a limited capacity, and sometimes limited will, to control the activities of foreign fleets. Under- and misreporting of catches is rife. On top of this, EU subsidies have allowed EU vessels continue to fish in the region even after fish stocks became too depleted for fishing to be profitable²⁰⁴.

A recent example is the 2006 fisheries partnership agreement between the EU and Mauritania. Worth some €108 million each year for six years, it is one of the most significant agreements ever in terms of fishing opportunities for the EU. The agreement allows around 200 EU vessels to fish various species in Mauritanian waters, including squid and octopus – yet there is already some 30% overfishing on these cephalopods.

Local fishers have also contributed to the overfishing, but often as a direct result of Europe's demand: many have switched their attention from supplying the domestic market to supplying the export market²⁰⁵.

Unsurprisingly, the region's marine biomass has massively decreased, to just 25% of the 1950 level. The fish resources and ecosystems of Northwest Africa are now as depleted as those of the North Atlantic, and the fisheries are not sustainable^{206,207,208}.

Pirates

Pirate fishing by foreign vessels, primarily for shrimp, is also a problem. Guinea, for example, loses over 34,000 tonnes of seafood every year to pirates – 64% over and above the country's legal, recorded catch. The EU is a major market for the illegal catches, and EU companies are behind many of the pirate operations^{209,210,211}. In addition to contributing to overfishing, the pirate's illegal bottom trawling activities often destroy vital fish habitats and nursery grounds²¹².

European consumers are buying fish and shrimp stolen from some of the world's poorest people²⁴³.

Throwing away good food

Foreign fleets are only interested in high-value species – and do not hesitate to throw away what they don't want²¹³. The amount they throw away is huge. The estimated discard rate for licensed fleets in Guinea, for example, is 25% for midwater fish trawlers, 27% for the octopus fishery, and 33% for the shrimp fishery. The discard rate for pirate trawlers, most of which target shrimp for the European market, is likely to be much higher, since they use illegal nets with smaller mesh sizes, and fish illegally in shallow coastal waters that serve as nurseries for many fish species. As most discarded fish do not survive²¹⁴, this is a massive amount of food lost for a country where over a quarter of the population is undernourished²¹⁵.

Less fish for the locals

Fish is a vital source of food in West African countries, supplying a major part of the population's animal protein intake – 75% in the case of Senegal^{216,217}. Clearly, the collapse of fish stocks here would be a humanitarian disaster²¹⁸.

By depleting marine resources, EU and other foreign fleets are already threatening food security in the region. Guinea, for example, already has a problem feeding its people. The country has a specific objective to improve food security by increasing the fish consumption of the population. But the main obstacle preventing this is IUU

fishing, primarily shrimp trawling for European markets^{219,220}.

In Guinea-Bissau, the government requested that instead of throwing away locally consumed species caught as bycatch, EU fleets instead land the fish for local consumption. The EU rejected the request as to do so would take too much time²²¹.

In Senegal, depleted fish stocks caused by foreign fleets and foreign demand have had a serious impact on local food supplies^{222,223}. According to one Senegalese NGO, it now takes local fishermen a month to catch the same amount of fish that could once be caught in just four days²²⁴. The preference for high-value "noble" fish in European markets has reduced the quality of fish reaching domestic markets^{225,226}, with the markets furthest from the coast receiving less fish and of poorer quality²²⁷. Exports have also raised domestic fish prices²²⁸. The country's national dish of fish and rice, thiebou dienne, has become a luxury for many²²⁹, and is now more often made with sardines than the once almost-universal grouper²³⁰.

Social timebomb

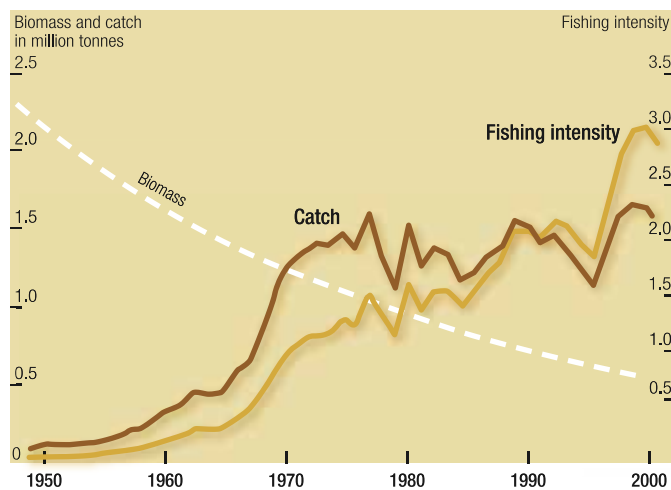
Fishing provides more than just food to West Africans – it also provides livelihoods. In Senegal, for example, the fishing industry directly and indirectly employs over 15% of the working population²³¹. The industry is especially important for women, who process and sell fish. If there are no fish, these women cannot make a living and so cannot afford to feed or educate their children²³².

As mentioned above, fishing also provides valuable export earnings to West African countries. On top of this, the fees paid by the EU and other countries fishing access agreements represent considerable revenue. In the case of Mauritania and Guinea-Bissau, these fees account for an estimated 15% and 30%, respectively, of the national budget²³³.

Clearly, the collapse of fish stocks in the region would be an economic and social disaster. But already, fishing for foreign markets has a high cost.

For example, the 34,000 tonnes of fish taken by pirates each year in Guinean waters is worth an estimated US\$110 million²³⁴ – money the country, one of the world's poorest, can ill afford to lose. On top of this, the fees paid by the EU for fishing access agreements do not reflect the true value of the resources being taken by EU fleets²³⁵.

Declining biomass and increased fishing effort in Northwest Africa



In addition, local people are missing out. Not only do the highly subsidized, technically advanced EU boats represent unfair competition with small-scale, local fishers, but the fishing agreements have in general ignored the interests of coastal communities, provided few jobs, and provided little support for research and development of local fishing sectors^{236,237}. And now local jobs are threatened by depleted fish stocks²³⁸.

SIDE DISHES

Death on the side

Your plate of African seafood may come with a nasty shock. There are reports of local West African fishers being injured, or even killed, when their small pirogues have collided with large foreign trawlers^{239,240}.

Value subtracted tax

Your tax money is contributing to the plight of the West African poor. EU-funds led to fishing overcapacity in the first place, and are now subsidizing EU fleets in West African, and other developing countries', waters. There is also evidence that EU boat owners have received EU funds to transfer their vessels to other countries – with these vessels then undertaking illegal fishing activities in West African waters²⁴¹.

Alternatives

Traditional Valencia paella is made with chicken and rabbit, not fish. The best choice for the more modern 'paella de marisco' (seafood paella) – which can contain shrimp, Norway lobster, clams, squid, and different kinds of fish – is that made using seafood caught locally in the Mediterranean. Be aware that cheaper dishes may contain shellfish and fish from West Africa. Fishing agreements generate much needed revenue for developing countries but until agreements are genuinely equitable and sustainable, providing a fair deal for all involved, consuming West African fish could be supporting short-term benefits at long-term cost. There is usually no way for consumers to distinguish where shellfish and fish come from but you could try asking the chef.



Sourced from a fishery certified
to the Marine Stewardship
Council Standard

www.msc.org



**Fresh
Cornish
Whole
Mackerel**

£4.29

kg

£1.95 lb

Caught in the
North East Atlantic

Sustainable seafood



The easiest way for consumers to identify the best environmental choice in seafood is through the Marine Stewardship Council (MSC) label. Products with this label have been independently assessed as meeting the rigorous MSC standard – the only internationally recognized set of environmental principles to assess whether a fishery is well-managed and sustainable. The standard is based on the best scientific data and the latest knowledge about the marine environment.

choices

To date, 21 fisheries, both small- and large-scale, have been certified around the world. A further 30-40 fisheries are undergoing assessment, and together these represent over 4% of edible, global wild fisheries production. Over 100 major seafood buyers have pledged to purchase MSC-certified seafood products, including large supermarket chains in France, Germany, Switzerland, and the UK. Overall, there are currently around 400 MSC-certified fish products on sale in 26 countries — ranging from fresh, frozen, smoked, and canned fish to fish oil dietary supplements. Consumer access to sustainable seafood products is a reality and the availability of MSC-labelled fish is increasing throughout Europe.

REFERENCES

- 1 European Commission (2006) Facts and figures on the CFP: Basic data on the Common Fisheries Policy; http://ec.europa.eu/comm/fisheries/doc_et_public/liste_public/facts/pcp06_en.pdf
- 2 FAO Fisheries Global Information System Global Capture Production 1950-2004; http://www.fao.org/figis/servlet/TabLandArea?tb_ds=Capture&tb_mode=TABLE&tb_act=SELECT&tb_grp=COUNTRY
- 3 European Commission (2006) Op. cit. 1
- 4 Richartz, S. and Corcoran, E. (2004) The state of Europe's regional seas – Are we meeting conservation targets? In: Sustainable EU Fisheries: Facing the Environmental Challenges Conference Report (2004); <http://www.ieep.org.uk/publications/pdfs/2005/conferencereport.pdf>
- 5 FAO (2004) State of World Fisheries and Aquaculture (SOFIA) 2004; <http://www.fao.org/docrep/007/y5600e/y5600e05.htm#TopOfPage>
- 6 Richartz, S. and Corcoran, E. (2004) Op. cit. 4
- 7 European Commission (2006) Commission launches consultation on fishing less for better returns; <http://europa.eu.int/rapid/pressReleasesAction.do?reference=IP/06/931&type=HTML&aged=0&language=EN&guiLanguage=en>
- 8 OSPAR Commission (2000) Quality Status Report 2000 for the North-East Atlantic; <http://www.ospar.org/eng/html/gsr2000/qec3.htm#3.5>
- 9 European Commission (2001) Green Paper: The future of the common fisheries policy; http://ec.europa.eu/comm/fisheries/greenpaper/green/volume1_en.pdf
- 10 Richartz, S. and Corcoran, E. (2004) Op. cit. 4
- 11 FISH INFOnetwork Market Report (2003) Cod December 2003; <http://www.eurofish.dk>
- 12 FISH INFOnetwork Market Report (2005) Cod May 2005; <http://www.eurofish.dk>
- 13 FISH INFOnetwork Market Report (2003) Op. cit. 11
- 14 FAO Fisheries Global Information System Op. cit. 2
- 15 FAO Fisheries Global Information System Op. cit. 2
- 16 ICES Advisory Committee on Fishery Management. ICES advice for cod stocks; <http://www.ices.dk/iceswork/acfm.asp>
- 17 WWF-Norway (2004) The Barents Sea cod – The last of the large cod stocks; http://assets.panda.org/downloads/wwf_codreport_2004.pdf
- 18 MarineBio.org Gadus morhua, Atlantic Cod. Retrieved 26 April 2006; <http://marinebio.org/species.asp?id=206>.
- 19 Richartz, S. and Corcoran, E. (2004) Op. cit. 4
- 20 Hopkins, C.C.E (2003) The dangers of bottom trawling in the Baltic Sea; http://www.ccb.se/downloads/bottom_trawling.pdf
- 21 OSPAR Commission (2000) Op. cit. 8
- 22 IUCN (2006) 2006 IUCN Red List of Threatened Species. Accessed 11 May 2006; <http://www.iucnredlist.org>
- 23 WWF-Norway (2004) Op. cit. 17
- 24 WWF-UK (2000) Choose or Lose: A recovery plan for fish stocks and the UK fishing industry; http://www.wwf.dk/db/files/choose_or_loose.pdf
- 25 Rejwan, C., Booth, S., and Zeller, D. (2001) Unreported catches in the Barents Sea and adjacent waters for periods from 1950 to 1998. In: Fisheries Impacts on North Atlantic Ecosystems: Catch, Effort and National/Regional Data Sets. Zeller, D., R. Watson, and D. Pauly (eds.), Fisheries Centre Research Reports 9(3):254; http://www.searounds.org/report/datasets/Norway_Rejwan1.pdf
- 26 ICES (2005) Report of the ICES Advisory Committee on Fishery Management, Advisory Committee on the Marine Environment and Advisory Committee on Ecosystems, 2005. ICES Advice, Volume 3; <http://www.ices.dk/products/AnnualRep/2005/ICES%20Advice%202005%20Volume%203.pdf>
- 27 ICES (2005) Report of the ICES Advisory Committee on Fishery Management, Advisory Committee on the Marine Environment and Advisory Committee on Ecosystems, 2005. ICES Advice, Volume 5; <http://www.ices.dk/products/AnnualRep/2005/ICES%20Advice%202005%20Volume%205.pdf>
- 28 ICES (2005) Op. cit. 26
- 29 Norwegian Directorate Of Fisheries (2006) Status report for 2005 – “Russian cod and haddock fishing / transshipment at sea”; [http://www.illegal-fishing.info/uploads/Norwegian_report_russian_codfishing_2005\[1\].pdf](http://www.illegal-fishing.info/uploads/Norwegian_report_russian_codfishing_2005[1].pdf)
- 30 WWF-Germany (2002) The economics of a tragedy at sea: Costs of overfishing of cod from the North Sea and the Baltic <http://assets.panda.org/downloads/tragedyatsea.pdf>
- 31 Landing price of illegally fished cod calculated by the Norwegian Directorate of Fisheries
- 32 WWF-UK (2001) Now or never: The cost of Canada's cod collapse and disturbing parallels with the UK; http://www.wwf.dk/db/files/now_or_never.pdf
- 33 Twenty-Fifth Report of the Select Committee on the European Union - House Lords (2003) Progress of reform of the Common Fisheries Policy; <http://www.publications.parliament.uk/pa/ld200203/dselect/lducom/109/109.pdf>
- 34 CAFF (1998) Incidental take of seabirds in commercial fisheries in the Arctic Countries: Important incidental takes in the Arctic; <http://www.caff.is/sidur/uploads/incidentalpart3.htm>
- 35 Holy, N. (2004) Tangled in the food web. Earth Island Journal, 19(1); http://www.earthisland.org/EIJOURNAL/new_articles.cfm?articleID=866&journalID=77
- 36 IFAW Harbour porpoises – dying in a tangle of nets; http://www.eupolitix.com/NR/rdonlyres/21DE9412-9459-4AE2-A234-01D32D8D90E5/0/net_tangle.doc
- 37 IFAW (2002) Harbour porpoises in the Baltic Sea... heading for extinction?; http://www.ifaw.org/ifaw/dfiles/file_110.pdf
- 38 Oceana (2004) European trawlers are destroying the oceans; http://www.oceana.org/fileadmin/oceana/uploads/europe/reports/european_trawlers_destroying_oceans.pdf
- 39 Hopkins, C.C.E (2003) Op. cit. 20
- 40 Brown, J and Tyedmers, P. (2004) Production of fish. In: Sustainable EU Fisheries: Facing the Environmental Challenges Conference Report; <http://www.ieep.org.uk/publications/pdfs/2005/conferencereport.pdf>
- 41 FISH INFOnetwork Market Report (2006) Cod January 2006; <http://www.eurofish.dk>
- 42 Aftonbladet (2006) Fiskpinnen reser över 4 400 mil. Sweden; <http://www.aftonbladet.se/vss/matovin/story/0,2789,800878,00.html>
- 43 The Observer (2001) Cod almighty; <http://observer.guardian.co.uk/foodmonthly/story/0,488334,00.html>
- 44 FISH INFOnetwork Market Report (2003) Op. cit. 11
- 45 Oceanic Development, Poseidon Aquatic Resource Management Ltd, and MegaPesca Lda (2005) The European tuna sector; http://ec.europa.eu/comm/fisheries/doc_et_public/liste_public/studies/tuna_2005_en.pdf
- 46 WWF (2006) The plunder of bluefin tuna in the Mediterranean and East Atlantic in 2004 and 2005; http://assets.panda.org/downloads/wwfbtreportfinalediti onreducido_final.pdf
- 47 FAO Fisheries Global Information System Op. cit. 2
- 48 FAO Fisheries Global Information System Op. cit. 2
- 49 ICCAT (2005) SCRS Report for biennial period, 2004-05 PART I (2004), Volume 2; http://www.iccat.es/Documents/BienRep/REP_EN_04-05_1_2.pdf
- 50 ICCAT (2006) SCRS Report for biennial period, 2004-05 PART II (2005), Volume 2; http://www.iccat.es/Documents/BienRep/REP_EN_04-05_1_2.pdf
- 51 Safina, C. (1996) Thunnus thynnus (Western Atlantic stock). In: IUCN (2006). 2006 IUCN Red List of Threatened Species. Accessed 10 July 2006; <http://www.iucnredlist.org>
- 52 Safina, C. (1996) Thunnus thynnus (Eastern Atlantic stock). In: IUCN 2006. 2006 IUCN Red List of Threatened Species. Accessed 10 July 2006; <http://www.iucnredlist.org>
- 53 WWF (2006) Op. cit. 46
- 54 Buck, E. (1995) Atlantic bluefin tuna: International management of a shared resource; <http://ncseonline.org/NLE/CRSreports/Marine/mar-5.cfm>
- 55 Mareblucamogli.com Mediterranean bluefin tuna: An ancient fishery copes with modern demands; http://www.mareblucamogli.com/mediterranean_bluefin_tuna.htm
- 56 WWF (2006) Op. cit. 46
- 57 WWF (2006) Op. cit. 46
- 58 ICCAT (2006) Op. cit. 50
- 59 WWF Mediterranean (2004) Tuna farming in the Mediterranean: The bluefin tuna stock at stake; <http://assets.panda.org/downloads/tunafarming2004.pdf>
- 60 WWF (2006) Op. cit. 46
- 61 WWF (2006) Op. cit. 46
- 62 WWF (2006) Op. cit. 46
- 63 WWF Mediterranean (2004) Op. cit. 59
- 64 ICCAT (2006) ICCAT Record of Farming Facilities for Bluefin Tuna. Accessed 25 July 2006; <http://www.iccat.es/ffb.asp>
- 65 WWF (2006) Op. cit. 46
- 66 WWF (2006) Op. cit. 46
- 67 WWF Mediterranean (2004) Op. cit. 59
- 68 WWF Mediterranean (2004) Op. cit. 59
- 69 WWF Mediterranean (2005) Risk on local fish populations and ecosystems posed by the use of imported feed fish by the tuna farming industry in the Mediterranean; <http://assets.panda.org/downloads/wwfonenvironmental riskoftunafarming.doc>
- 70 Blueocean.org Yellowfin tuna, longline-caught. Accessed 10 July 2006; <http://blueocean.org/seafood/species/43.html>
- 71 Mareblucamogli.com Op. cit. 55
- 72 ICCAT (2006) Op. cit. 50
- 73 Tudela, S. (2004) Ecosystem effects of fishing in the Mediterranean: an analysis of the major threats of fishing gear and practices to biodiversity and marine habitats; http://www.fao.org/documents/show_cdr.asp?url_file=/docrep/007/y5594e/y5594e05.htm
- 74 Fromentin, J.-M. and Powers, J.E. (2005) Atlantic bluefin tuna: population dynamics, ecology, fisheries and management. Fish and Fisheries 6(4): 281-306; <http://www.ifremer.fr/doc/elec/doc/2005/publication-797.pdf>
- 75 WWF (2006) Op. cit. 46
- 76 FAO Fisheries Technical Papers (2005a) Review of the state of world marine fishery resources; <http://ftp.fao.org/docrep/tao/007/y5852e/y5852e00.pdf>
- 77 Blueocean.org Albacore tuna, longline-caught. Accessed 10 July 2006; <http://blueocean.org/seafood/species/48.html>
- 78 EJFoundation.org ICCAT's fight against the tuna pirates. Accessed 11 July 2006; <http://www.ejfoundation.org/page268.html>
- 79 Blueocean.org Yellowfin tuna, longline-caught Op. cit. 70
- 80 Blueocean.org Skipjack tuna, purse-seine-caught. Accessed 10 July 2006; <http://blueocean.org/seafood/species/54.html>
- 81 Oceanic Development, Poseidon Aquatic Resource Management Ltd, and MegaPesca Lda (2005) Op. cit. 45
- 82 Blueocean.org Skipjack tuna, pole-and-line-caught. Accessed 10 July 2006; <http://blueocean.org/seafood/species/105.html>
- 83 Blueocean.org Yellowfin tuna, pole-and-line-caught. Accessed 10 July 2006; <http://blueocean.org/seafood/species/44.html>
- 84 Blueocean.org Skipjack tuna, purse-seine-caught Op. cit. 80
- 85 Blueocean.org Yellowfin tuna, purse-seine-caught. Accessed 10 July 2006; <http://blueocean.org/seafood/species/70.html>
- 86 Oceanic Development, Poseidon Aquatic Resource Management Ltd, and MegaPesca Lda (2005) Op. cit. 45
- 87 Wikipedia.org European plaice. Retrieved 16 July 2006; http://en.wikipedia.org/wiki/European_plaice
- 88 Eat the Seasons (2004-2006) Plaice; <http://eattheseasons.co.uk/Archive/plaice.htm>
- 89 ICES Advisory Committee on Fishery Management. ICES advice for plaice and sole stocks; <http://www.ices.dk/iceswork/acfm.asp>
- 90 ICES-FishMap Plaice; <http://www.ices.dk/marineworld/fishmap/ices/pdf/plaice.pdf>
- 91 ICES-FishMap Sole; <http://www.ices.dk/marineworld/fishmap/ices/pdf/sole.pdf>
- 92 FAO Fisheries Global Information System Op. cit. 2
- 93 ICES-FishMap Plaice Op. cit. 90
- 94 ICES-FishMap Sole Op. cit. 91
- 95 OSPAR Commission (2000) Op. cit. 8
- 96 ICES Advisory Committee on Fishery Management. ICES advice for plaice in the North Sea; <http://www.ices.dk/committe/acfm/comwork/report/2005/oct/ple-nsea.pdf>
- 97 ICES-FishMap Plaice Op. cit. 90
- 98 ICES-FishMap Sole Op. cit. 91
- 99 Glover, C. (2004) The end of the line: How overfishing is changing the world and what we eat. Ebury Press, London.
- 100 FAO Fisheries Technical Papers (2005b) Discards in the world's marine fisheries. An update; http://www.fao.org/documents/show_cdr.asp?url_file=/docrep/008/y5936e/y5936e0a.htm
- 101 Bergmann, M. (2004) The ecological disturbance of fishing in demersal fish and benthic invertebrate communities; <http://www.mafcons.org/documents/Deliverable03.pdf>
- 102 FAO Fisheries Technical Papers (2005b) Op. cit. 100
- 103 Glover, C. (2004) Op. cit. 99
- 104 Greenpeace (2004) Greenpeace activists defend the proposed Dogger Bank Marine Reserve from destructive fishing methods; <http://www.greenpeace.org.uk/contentlookup.cfm?CFID=1437354&CFTOKEN=8&cidparam=20040812150114>
- 105 FAO Fisheries Technical Papers (2005b) Op. cit. 100
- 106 Greenpeace.org.uk The North and Baltic Seas are under threat from destructive and unsustainable fishing. Accessed 17 June 2006; <http://www.greenpeace.org.uk/oceans/marinereserves/gillnets.cfm>
- 107 ICES North Sea; <http://www.ices.dk/committe/acfm/comwork/report/2005/oct/North%20Sea.pdf>
- 108 Brown, J and Tyedmers, P. (2004) Op. cit. 40
- 109 ICES Advisory Committee on Fishery Management. ICES advice for plaice stocks <http://www.ices.dk/iceswork/acfm.asp>
- 110 ICES-FishMap Plaice Op. cit. 90
- 111 ICCAT (2003) Report of the 2002 Atlantic swordfish stock assessment session. Col. Vol. Sci. Pap. ICCAT, 55(4): 1289-1415; <http://www.iccat.es/Documents/SCRS/ExecSum/SWOMED%20EN.pdf>
- 112 FAO Fisheries Global Information System Op. cit. 2
- 113 ICCAT (2003) Op. cit. 111
- 114 ICCAT (2003) Op. cit. 111
- 115 IUCN (2006) 2006 IUCN Red List of Threatened Species. Accessed 11 May 2006; <http://www.iucnredlist.org>
- 116 WCS North Atlantic swordfish stocks nearly recovered; <http://www.wcs.org/353624/193387>
- 117 IUCN (2006) 2006 IUCN Red List of Threatened Species. Retrieved 11 May 2006; <http://www.iucnredlist.org>
- 118 Neves dos Santos, N., Garcia, A., and Pereira, J.G. (2002) A historical review of the by-catch from the Portuguese surface long-line swordfish fishery: observations on blue shark (Prionace glauca) and short-fin mako (Isurus oxyrinchus). Col. Vol. Sci. Pap. ICCAT, 54(4): 1333-1340; http://www.iccat.int/Documents/CVSP/CV054_2002/no_4/CV054041333.pdf?zoom_highlight=swordfish
- 119 TRAFFIC (1999) Slipping the net: Spain's compliance with ICCAT recommendations for swordfish and bluefin tuna; <http://www.traffic.org/news/ICCATreport.pdf>
- 120 WWF Mediterranean (2003) Biodiversity impact of the Moroccan driftnet fleet operating in the Alboran Sea (SW Mediterranean). A case study of the harmful effects inflicted by current IUU large-scale driftnet fleets in the Mediterranean on protected and vulnerable species; <http://assets.panda.org/downloads/briefingonwwfreport onmorocccantriftnets.pdf>
- 121 Duke News (2004) Measuring sea turtle casualties by longline fishing; http://www.dukeneews.duke.edu/2004/03/seaturtle_0304.html

- ¹²² Ward, P. (2000) Swordfish fisheries and management today. Pelagic Fisheries and Research Program, 5(4); <http://www.soest.hawaii.edu/PFRP/newsletters/Oct-Dec2000.pdf>
- ¹²³ Monterey Bay Aquarium (2004) Atlantic bluefin tuna. Seafood Watch - Seafood Report; Tunas, Volume II; http://www.mbayaq.org/cr/cr_seafoodwatch/content/media/MBA_SeafoodWatch_AtlanticBluefinTunaReport.pdf
- ¹²⁴ Tudela, S. (2004) Op. cit. 73
- ¹²⁵ Tudela, S. (2004) Op. cit. 73
- ¹²⁶ Seabird Technical Working Group FAO consultation on reduction of incidental catch of seabirds in longline fisheries; <http://www.fws.gov/migratorybirds/conserv/torpubl.html>
- ¹²⁷ Ward, P. (2000) Op. cit. 122
- ¹²⁸ Joint Nature Conservation Committee Seabird bycatch; <http://www.jncc.gov.uk/page-1565>
- ¹²⁹ WWF Mediterranean (2003) Op. cit. 120
- ¹³⁰ National Geographic News (2002) North Atlantic swordfish on track to strong recovery. http://news.nationalgeographic.com/news/2002/11/1101_021101_Swordfish_2.html
- ¹³¹ BigMarineFish.com Blue marlin - white marlin; <http://www.bigmarinefish.com/marlin.html>
- ¹³² ICCAT (2003) Op. cit. 111
- ¹³³ ICCAT (2004) 2003 ICCAT Mediterranean swordfish stock assessment session. Col. Vol. Sci. Pap. ICCAT, 56(3): 789-837; <http://www.iccat.es/Documents/SCRS/ExecSum/SWOMED%20EN.pdf>
- ¹³⁴ FAO Fisheries Global Information System Species fact sheet: Nephrops norvegicus; <http://www.fao.org/figis/servlet/FiRefServlet?ds=species&fid=2647>
- ¹³⁵ ICES Advisory Committee on Fishery Management. ICES advice for Nephrops stocks; <http://www.ices.dk/iceswork/acfm.asp>
- ¹³⁶ FAO Fisheries Global Information System Op. cit. 2
- ¹³⁷ Smith, P. (2003) Norway lobster creel fisheries; http://www.gla.ac.uk/centres/marinestation/research/nn-creel_frame.html
- ¹³⁸ ICES Advisory Committee on Fishery Management. ICES advice for Nephrops stocks Op. cit. 135
- ¹³⁹ The Independent (2002) Cod fishermen find hope in langoustine as Scotland's biggest catch; <http://www.eurocbc.org/page836.html>
- ¹⁴⁰ ICES Advisory Committee on Fishery Management. ICES advice for Nephrops stocks Op. cit. 135
- ¹⁴¹ WWF-Germany (2003) North-East Atlantic and Baltic Sea health check; <http://assets.panda.org/downloads/neabaltichealthcheck.pdf>
- ¹⁴² Johnson, K. (2002) A review of national and international literature on the effects of fishing on benthic habitats; <http://www.nmfs.noaa.gov/habitat/habitatprotection/pdf/efh/literature/KJohnson.pdf>
- ¹⁴³ Tudela, S. (2004) Ecosystem effects of fishing in the Mediterranean: an analysis of the major threats of fishing gear and practices to biodiversity and marine habitats; <http://www.fao.org/docrep/007/y5594e/y5594e04.htm#bm4>
- ¹⁴⁴ WWF-Germany (2003) Op. cit. 141
- ¹⁴⁵ Johnson, K. (2002) Op. cit. 142
- ¹⁴⁶ FAO Fisheries Technical Papers (2005c) Impact of trawling and scallop dredging on benthic habitats and communities; <http://www.fao.org/docrep/008/y7135e/y7135e06.htm#bm06>
- ¹⁴⁷ Oceana (2004) Op. cit. 38
- ¹⁴⁸ Johnson, K. (2002) Op. cit. 142
- ¹⁴⁹ Oceana (2004) Op. cit. 38
- ¹⁵⁰ WWF-Germany (2003) Op. cit. 141
- ¹⁵¹ Johnson, K. (2002) Op. cit. 142
- ¹⁵² Hopkins, C.C.E (2003) Op. cit. 20
- ¹⁵³ FAO Fisheries Technical Papers (2005c) Impact of trawling and scallop dredging on benthic habitats and communities; <http://www.fao.org/docrep/008/y7135e/y7135e07.htm#TopOfPage>
- ¹⁵⁴ Greenpeace.org.uk Op. cit. 106
- ¹⁵⁵ FAO Fisheries Technical Papers (2005c) Op. cit. 153
- ¹⁵⁶ FAO Fisheries Technical Papers (2005c) Op. cit. 153
- ¹⁵⁷ Ball, B.J., Fox, G. & Munday, B.W.(2000) Long- and short-term consequences of a Nephrops trawl fishery on the benthos and environment of the Irish Sea. ICES Journal of Marine Science, 57: 1315-1320.
- ¹⁵⁸ Joint Nature Conservation Committee Irish Sea <http://www.jncc.gov.uk/page-2530>
- ¹⁵⁹ UK Biodiversity Action Plan Mud habitats in deep water; <http://www.ukbap.org.uk/UKPlans.aspx?ID=41>
- ¹⁶⁰ WWF-Germany (2003) Op. cit. 141
- ¹⁶¹ Joint Nature Conservation Committee Op. cit. 158
- ¹⁶² UK Biodiversity Action Plan Op. cit. 159
- ¹⁶³ Johnson, K. (2002) Op. cit. 142
- ¹⁶⁴ Bergmann, M. (2004) Op. cit. 101
- ¹⁶⁵ Bergmann, M. (2004) Op. cit. 101
- ¹⁶⁶ Johnson, K. (2002) Op. cit. 142
- ¹⁶⁷ Bergmann, M. (2004) Op. cit. 101
- ¹⁶⁸ Johnson, K. (2002) Op. cit. 142
- ¹⁶⁹ Oceana (2004) Op. cit. 38
- ¹⁷⁰ Johnson, K. (2002) Op. cit. 142
- ¹⁷¹ WWF-Germany (2003) Op. cit. 141
- ¹⁷² ICES Advisory Committee on Fishery Management. ICES advice for Nephrops stocks Op. cit. 135
- ¹⁷³ ICES Advisory Committee on Fishery Management. ICES advice for Nephrops stocks in Division IVa; [http://www.ices.dk/committe/acfm/comwork/report/2005/oct/Nep-IVa\(F-9-10\).pdf](http://www.ices.dk/committe/acfm/comwork/report/2005/oct/Nep-IVa(F-9-10).pdf)
- ¹⁷⁴ ICES Advisory Committee on Fishery Management. ICES advice for Nephrops stocks in Divisions Villa,b; [http://www.ices.dk/committe/acfm/comwork/report/2005/oct/nep-8ab%20N\(23-24\).pdf](http://www.ices.dk/committe/acfm/comwork/report/2005/oct/nep-8ab%20N(23-24).pdf)
- ¹⁷⁵ Harris, R. R., Andrews, M. B., Sangster, G. I., Ulmestrand, M., Valentinsson, D., Lowry, N., Soldal, A.V. (1997) Damage and physiological stress in Nephrops norvegicus cod-end escapees and discards. In Proceedings and abstracts of the fourth International Crustacean Congress, Amsterdam, 20 to 24 July 1998; <http://www.fish.washington.edu/people/nlowry/publications/publicat.html#har2>
- ¹⁷⁶ Ulmestrand, M., Valentinsson, D., Sangster, G.I., Bova, D.J., Kynoch, R., Breen, M., Graham, G. N., Soldal, A.V., Cruikshank, O., Moth-Poulsen, T., Lowry, N. (1998) Nephrops survival after escape from commercial fishing gear or discard from the deck. Paper presented to the ICES Fishing Technology and Fish Behaviour (FTFB) working group meeting in La Coruna, Spain, 20-23 April 1998; <http://www.fish.washington.edu/people/nlowry/publications/mats1.html>
- ¹⁷⁷ ICES Advisory Committee on Fishery Management. ICES advice for Nephrops stocks Op. cit. 135
- ¹⁷⁸ FAO Fisheries Technical Papers (2005b) Op. cit. 100
- ¹⁷⁹ Stratoudakis, Y., Fryer, R.J., Cook, R.M., Pierce, G.J., and Coull, K.A. (2001) Fish bycatch and discarding in Nephrops trawlers in the Firth of Clyde (West of Scotland). Aquatic Living Resources 14(5): 283-291; <http://www.edpsciences.org/articles/alr/pdf/2001/05/alr1116.pdf?access=ok>
- ¹⁸⁰ ICES (2002) Report of the study group on discard and by-catch information; <http://www.ices.dk/reports/acfm/2002/sqdbi/sqdbi02.pdf>
- ¹⁸¹ Bergmann, M. (2004) Op. cit. 101
- ¹⁸² FAO Fisheries Technical Papers (2005d) Mortality of fish escaping trawl gears; <http://www.fao.org/docrep/008/y6981e/y6981e06.htm>
- ¹⁸³ Oceana (2004) Op. cit. 38
- ¹⁸⁴ Bergmann, M. (2004) Op. cit. 101
- ¹⁸⁵ FAO Fisheries Global Information System Op. cit. 2
- ¹⁸⁶ FAO Fisheries Global Information System Op. cit. 2
- ¹⁸⁷ European Commission Directorate General Fisheries (2001) European distant water fishing fleet; http://ec.europa.eu/comm/fisheries/doc_et_pub/liste_public/facts/peche_en.pdf
- ¹⁸⁸ Sea Around Us Project, University of British Columbia, Vancouver, Canada, and WWF International (2002) State of the Northwest African marine fisheries resources, Press briefing to accompany the International Symposium on Marine fisheries, ecosystems and societies in West Africa: half a century of change held in Dakar, Senegal, June 24-28 2002 <http://www.seaaroundus.org/Dakar/pressReleases/WWFPresent.ppt>
- ¹⁸⁹ United Nations Environment Programme (2002) Fisheries subsidies and marine resources management: Lessons learned from studies in Argentina and Senegal; <http://www.unep.ch/etb/publications/fishierSubsidiesEnvironment/FEvol2.pdf>
- ¹⁹⁰ United Nations Development Programme (2005) Policy incoherence: EU fisheries policy in Senegal; http://hdr.undp.org/docs/publications/background_papers/2005/HDR2005_Oil_Brown_29.pdf
- ¹⁹¹ Sea Around Us Project, University of British Columbia, Vancouver, Canada, and WWF International (2002) Op. cit. 188
- ¹⁹² European Commission Directorate General Fisheries (2001) Op. cit. 187
- ¹⁹³ United Nations Development Programme (2005) Op. cit. 190
- ¹⁹⁴ Brown, J and Tyedmers, P. (2004) Op. cit. 40
- ¹⁹⁵ FAO Globefish (2004) Fish Trade Issues in WTO and ACP-EU Negotiations; <http://www.globefish.org/index.php?id=2251>
- ¹⁹⁶ FAO (2004) State of World Fisheries and Aquaculture (SOFIA) 2004; http://www.fao.org/docrep/007/y5600e/y5600e05.htm#P1337_92005
- ¹⁹⁷ United Nations Development Programme (2005) Op. cit. 190
- ¹⁹⁸ Sea Around Us Project, University of British Columbia, Vancouver, Canada, and WWF International (2002) Op. cit. 188
- ¹⁹⁹ United Nations Environment Programme (2002) Op. cit. 189
- ²⁰⁰ Alder, J. and Sumaila, U.R. (2004). Western Africa: a fish basket of Europe past and present. Journal of Environment and Development, 13(2), 156-178.
- ²⁰¹ Sea Around Us Project, University of British Columbia, Vancouver, Canada, and WWF International (2002) Op. cit. 188
- ²⁰² Kaczynski, V.M. and Fluharty, D.L. (2002) European policies in West Africa: Who benefits from fisheries agreements? Marine Policy 26: 75-93; <http://www.seaaroundus.org/Dakar/pressReleases/KaczynskiFluharty.pdf>
- ²⁰³ United Nations Development Programme (2005) Op. cit. 190
- ²⁰⁴ United Nations Development Programme (2005) Op. cit. 190
- ²⁰⁵ United Nations Environment Programme (2002) Op. cit. 189
- ²⁰⁶ Sea Around Us Project, University of British Columbia, Vancouver, Canada, and WWF International (2002) Op. cit. 188
- ²⁰⁷ United Nations Environment Programme (2002) Op. cit. 189
- ²⁰⁸ United Nations Development Programme (2005) Op. cit. 190
- ²⁰⁹ EJFoundation.org Pirate fishing - The scourge of West Africa. Accessed 17 July 2006; <http://www.ejfoundation.org/page275.html>
- ²¹⁰ Environmental Justice Foundation (2005) Party to the plunder - Illegal fishing in Guinea and its links to the EU; http://www.ejfoundation.org/pdf/party_to_the_plunder.pdf
- ²¹¹ Greenpeace (2001) Pirate vessels fish out African resources for the European market; http://www.seaaroundus.org/Dakar/pressReleases/GRP_2001-10_EN.pdf
- ²¹² United Nations Environment Programme (2002) Op. cit. 189
- ²¹³ United Nations Environment Programme (2002) Op. cit. 189
- ²¹⁴ FAO Fisheries Technical Papers (2005d) Op. cit. 182
- ²¹⁵ Environmental Justice Foundation (2005) Op. cit. 210
- ²¹⁶ Environmental Justice Foundation (2005) Op. cit. 210
- ²¹⁷ FAO Fisheries Reports (2003) Report of the Expert Consultation on International Fish Trade and Food Security. Casablanca, Morocco, 27-30 January 2003; <http://www.fao.org/DOCREP/006/Y4961E/Y4961E0i.htm>
- ²¹⁸ Environmental Justice Foundation (2005) Op. cit. 210
- ²¹⁹ Environmental Justice Foundation (2005) Op. cit. 210
- ²²⁰ Greenpeace (2001) Op. cit. 211
- ²²¹ Kaczynski, V.M. and Fluharty, D.L. (2002) Op. cit. 202
- ²²² United Nations Environment Programme (2002) Op. cit. 189
- ²²³ United Nations Environment Programme (2001) A tale of two countries links developed world fishing subsidies with environmental and social impacts; <http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=227&ArticleID=2991>
- ²²⁴ BBC (2001) The battle for West Africa's fish; http://www.seaaroundus.org/Dakar/pressReleases/BBC_2001-08_EN.pdf
- ²²⁵ United Nations Environment Programme (2002) Op. cit. 189
- ²²⁶ WWF (2003) Senegalese artisanal fishers weep over loss of noble fish; http://www.panda.org/about_wwf/what_we_do/marine/news/stories/index.cfm?uNewsID=7213
- ²²⁷ United Nations Development Programme (2005) Op. cit. 190
- ²²⁸ United Nations Development Programme (2005) Op. cit. 190
- ²²⁹ TVE News A fish too far; <http://www.tve.org/earthreport/archive/doc.cfm?aid=799>
- ²³⁰ Newsweek Bulletin (2002) Africa's lost fish; <http://www.eurocbc.org/page806.html>
- ²³¹ United Nations Development Programme (2005) Op. cit. 190
- ²³² Environmental Justice Foundation (2005) Op. cit. 210
- ²³³ Mutume, G. (2002) Africa seeks to safeguard its fisheries. Africa Recovery, 16(1):12; <http://www.un.org/ecosocdev/geninfo/afrec/vol16no1/161fish.htm>
- ²³⁴ Environmental Justice Foundation (2005) Op. cit. 210
- ²³⁵ Kaczynski, V.M. and Fluharty, D.L. (2002) Op. cit. 202
- ²³⁶ United Nations Development Programme (2005) Op. cit. 190
- ²³⁷ Kaczynski, V.M. and Fluharty, D.L. (2002) Op. cit. 202
- ²³⁸ United Nations Development Programme (2005) Op. cit. 190
- ²³⁹ Environmental Justice Foundation (2005) Op. cit. 210
- ²⁴⁰ WWF (2003) Op. cit. 226
- ²⁴¹ Environmental Justice Foundation (2005) Op. cit. 210
- ²⁴² WWF (2003) Fisheries Partnership Agreements - Rebranding or a real step towards sustainability? http://www.wwf.dk/db/files/parliament_magazine_june_2003_fina.pdf
- ²⁴³ EJFoundation.org Op. cit. 209

ABBREVIATIONS

EU European Union

ICCAT International Commission for the Conservation of Atlantic Tunas

ICES International Council for the Exploration of the Sea

IUU Illegal, Unregulated and Unreported

MSC Marine Stewardship Council



ATLANTIC COD



ATLANTIC BLUEFIN TUNA



PLAICE AND SOLE



SWORDFISH



NORWAY LOBSTER



SHRIMP, SQUID AND FISH

Every European has a huge role to play in securing the future of Europe's fish dishes and its fishing industry.

By understanding the scale and urgency of the problem, and choosing the fish we buy accordingly, preferably MSC-certified fish, all Europeans can encourage sustainable seafood.

WWF is one of the world's largest and most experienced independent conservation organizations, with almost 5 million supporters and a global network active in more than 100 countries.

WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature, by:

- conserving the world's biological diversity
- ensuring that the use of renewable natural resources is sustainable
- promoting the reduction of pollution and wasteful consumption.

PHOTO CREDITS

Cover: Domestication of Thunnus Thynnus Symposium (DOTT) 2002, Cartagena, Spain (main picture);
 PANL.VA 21-18/Holloway [ca.1900];
 WWF-Canon/Quentin Bates; Domestication of Thunnus Thynnus Symposium (DOTT) 2002, Cartagena, Spain;
 WWF-Canon/Quentin Bates; Cat Holloway;
 Jim Greenfield/imagequestmarine.com

Back cover: Culinary Hags; Lotta Kudoh;
 Jeremy Keith; www.laurafries.com;
 Mayu Shimizu; Jean-Guillaume Dumont

© WWF International 2006

This report was prepared and edited by Emma Duncan and Justin Woolford
 Layout: Wassmer Graphic Design, Nyon
 Printed on FSC-certified Aconda paper

For further information contact:

Global Marine Programme
WWF International
 Avenue du Mont-Blanc
 1196 Gland
 Switzerland

Tel +41 22 364 9111

Fax +41 22 364 0526

Email sbladen@wwfint.org

www.panda.org/marine



for a living planet®