Parliamentary Office of Science and Technology

postnote

November 2005 Number 251

SUSTAINING FISHERIES

The fishing industry is an important economic and social activity in parts of the UK; some remote communities are highly dependent upon it. Worldwide, demand for fish is rising but many fish stocks are dwindling with several important stocks threatened in the European Union (EU). A moratorium on fishing of a British favourite, the cod, has been recommended by government scientists since 2001. Several recent inquiries into the sustainability of the fishing industry have concluded that a change in management is required. This briefing outlines the main issues and recent policy developments, with a focus on whitefish stocks.

Background

Several commercial fish stocks are threatened: 36% of the stocks (by value)[1] to which the UK has access in the EU are classified as in danger or at risk. Those in the poorest state are whitefish such as cod, largely as a result of overfishing. The Royal Commission on Environmental Pollution (RCEP) reported that overfishing for top predatory species like cod is the foremost human pressure in the marine environment. Related fishing activities such as the by-catch of non-target species (discards) and habitat damage are also among the most harmful activities in our seas[2].

When 'public goods' such as fish are a limited resource and it is costly or difficult to limit access to those resources, economists predict overexploitation will result. Thus, a 'race for fish' takes place when fish stocks are limited and fishing is poorly regulated. This undermines the activities of the many fishermen committed to the long-term health of stocks. Each fisherman's urge to maximise their share of the catch is seen as the ultimate driver behind overfishing. The main factors that have allowed overfishing to happen in the EU are:

- the failure of EU and UK management frameworks to manage uncertainty such as stock size;
- perverse incentives, generated by the interaction of different policies rather than by a single problem[1].
- a lack of clear goals and objectives from fisheries administrations[1];
- low levels of compliance throughout the EU, including in the UK[1];
- rapid and uncontrolled technological advances whose spread has been facilitated by EU subsidies;
- the inherent uncertainty of scientific advice being used as a reason to delay or reject actions.

In 2004, the Prime Minister's Strategy Unit (PMSU) published a report on the sustainability of UK fisheries. It said that the current UK and EU management system was failing to deliver sustainability in a large number of stocks and warned that all UK stocks were vulnerable to future overfishing unless management was improved. A joint UK government response, 'Securing the Benefits' was published in June 2005.

Biological and technical considerations

Stock collapse

Stock collapses have occurred worldwide and many have yet to recover. The most famous example is that of the Northern Cod on the Grand Banks (Newfoundland) in 1992. Depleted populations do not always behave like healthy ones and may never recover. At the ecosystem level, the removal of key predators such as cod disturbs the food web and can then make it difficult to return to its original structure.

Technological advances

Technological advances are designed to maximise fishing yield through improvements in detection and capture and by opening up previously inaccessible areas. The increase in fishing capacity would have required the removal of 30–40% of vessels per decade to maintain fish mortality at a constant level[3]. However, this has not been done.

Climate change

Warming of the UK's coastal waters is expected to continue. There is evidence that this has affected plankton species that are critical for fish larvae survival.

A northwards shift of fish has also occurred. The long-term consequences of these changes are unknown. Many fish potentially have a long lifespan (for example, cod can live for 20 years) and produce more numerous and viable eggs as they grow older. Recent rates of fishing, however, mean relatively few cod live longer than 6 years[3]. It is believed that this reduces the species' ability to cope with climate change and local fluctuations.

Understanding of ecosystems

As outlined in Box 1, there is a growing recognition of a need to move away from traditional single stock assessments towards a more holistic ecosystem approach (see p3). This approach considers all the components of the ecosystem, their interactions and their natural fluctuations over time, as ecosystems are not static.

Box 1. Development of scientific knowledge

Stock assessments are carried out mostly by government scientists. Data from landings, observed catches and research surveys are analysed using various models to provide advice on catches, set at precautionary levels. However, such models are sensitive to data inaccuracies such as unrecorded discards and landings. While all agree that more accurate records are required to improve the science, a call to develop methods that depart from single stock assessment has also been made[2,3].

Multidisciplinary collaboration is required to understand ecosystem interactions. One initiative, the Marine Ecosystem Research Partnership (MERP)[4] aims to assist the collaboration of UK scientists in marine bio-resources. Another initiative – the Fisheries Science Partnership programme[5] – aims to use fishermen's knowledge of the sea by involving them in the co-commissioning of science.

Monitoring marine health using bio-indicators is an important feature of the new approach. These are ecosystem indicators akin to toxicological testing for pollution. They could potentially assist management by providing timely, ongoing, information on the state of the ecosystem. Their development is at an early stage.

Policy

The Common Fisheries Policy (CFP)

The CFP provides a means of allocating diverse fisheries opportunities between Member States (MS). Quota allocation is based on the existing fisheries of each MS on joining. To prevent overfishing, a maximum amount of fish to be removed is calculated: the Total Allowable Catches (TACs) (see Box 2). Most TACs are set on an annual basis and are the result of a cycle of events that ends with the December meeting of the Council of Ministers. The Council decides the final TACs for the following year. The whitefish (such as cod, haddock, plaice), pelagic (mackerel, herring) and *Nephrops* (Norway lobster) stocks are managed though the CFP.

In its early stages, the CFP comprised structural measures that aimed to help modernise the catching sector and, later, to allocate fishing opportunities (quotas). In 1992, a review aimed at protecting fishing communities made funding available for a range of activities including aid for new boats, while trying to eliminate overcapacity. The failure to protect stocks led to the 2002 CFP reform, which has sustainability of resources at its heart (see below). The CFP is also negotiating access by EU vessels to foreign fishing grounds; 83% of these agreements are with developing countries. Many, including the Department for International Development (DFID) are concerned about access to stocks that are already recognised as overfished. Overexploitation can drive local small scale fishermen into greater poverty. There are also concerns that some countries are failing to realise a fair share of the large sums of money accrued by the EU from these agreements. Subsidies are also seen as an issue. DFID is working with the European Commission and other MS on how to address the issues raised by these agreements.

Institutional framework in the UK

While EU fisheries policies are agreed centrally, individual MS are responsible for their implementation. They are also responsible for enforcement over their flagged ships, all vessels in their waters and ports and for the overall fleet structure. In the UK, enforcement, licensing and quota administration are devolved. Quota management currently rests mainly with organisations that represent the catching sector although a quota management reform programme is underway[6]. A planned Marine Bill aims to establish an integrated system for the streamlined planning, management and protection of marine resources. Many hope it will provide wide-ranging new legislation that integrates fisheries activities.

Box 2. MSY and TACs

Maximum Sustainable Yield (MSY) is the level at which maximum biological productivity is generated by the stock. Fishing at rates over the MSY is overfishing. A commitment to MSY targets was made at the World Summit on Sustainable Development. At present, fishing mortality rates are set at rates higher than the MSY target. Adhesion to MSY would decrease fishing mortality, resulting in increased stock size. This is in line with the 'large stocks' strategy recommended by the PMSU, which is to leave a large population in the sea. Large stocks are expected to fluctuate less and avoid 'boom and bust' periods, resulting in greater economic stability.

Total Allowable Catches (TACs) allow for allocation of fishing opportunities among EU MS. TACs are estimated by government scientists who come together within the International Council for the Exploration of the Sea (ICES) to advise the European Commission. TACs may not be the most efficient means of managing mixed fisheries and scientists have suggested a stronger role for management of fishing effort such as 'days at sea'. TACs have often been criticised for being set too high either by the Council of Ministers or on the recommendation of scientists.

From overexploitation to sustainability

The new CFP aims to ensure a long term approach to securing sustainable fisheries and integrating biodiversity concerns. The CFP is to move towards an ecosystem approach and apply the precautionary principle (see p3). In addition to coherence in policy making and transparency, the CFP adopted key principles underpinning good governance that include:

- **participation** of stakeholders and decentralisation;
- **effectiveness** in evaluation, control and enforcement;
- **openness and accountability**.

Measures derived from these principles are described below. Measures in respect of the fishing overcapacity are, however, long standing (Box 3).

Box 3. Fishing overcapacity and quota reduction
Fishing overcapacity has essentially been managed through decommissioning schemes. These took place over more than a decade but had limited effect on the actual fishing capacity in EU waters. For example, some of the decommissioned vessels were obsolete anyway. In 2003, the last decommissioning round did reduce the fleet in the UK. Fishing capacity is, however, difficult to assess and a thorough assessment of current UK capacity was recommended following the widely criticised 13% fleet reduction that was suggested by the PMSU. After the 2003 decommissioning, the UK fishing industry considers that the UK should first ensure that a similar reduction is achieved in the rest of the EU before considering further cuts.
Quota reduction affects profitability, leaving many whitefish fishermen struggling, especially as they can have large capital repayments on their equipment. Before the December 2004 Council of Ministers meeting that agreed quotas for the following year, many EU fishermen demonstrated in favour of larger quotas. The impact of reduced quotas on the livelihood of fishermen pressurises politicians to secure the best deal possible at Council meetings, sometimes departing from scientific advice. It also creates a strong incentive for illegal fishing, which then increases the need for better enforcement.

Participation

There are many potential stakeholders in marine ecosystems, including the public at large.

Regional Advisory Councils (RACs)
RACs were created within the CFP to decentralise management advice and to involve stakeholders, especially the fishing industry (which has two thirds of the seats, recreational anglers not being part of this proportion) in the provision of management advice to the European Commission. RACs are divided into ecologically defined areas of management, which transcend national boundaries. These create a communication platform that includes fishermen from all nations concerned. The North Sea RAC was the first fully established RAC. To date its advice has been well received. It provides a strong regional voice at EU level and in advice to Ministers. National funds have recently been extended for scientific and technical support to strengthen the RACs' advisory capability[6].

Consumers
Consumers can influence the debate on fisheries through their purchasing choices. However, current labelling does not provide clear and simple information about stocks' sustainability status. At present, consumers cannot be certain that their fish has been caught within quotas. More transparent measures, including traceability of fish sold to the first buyer, have just been introduced[6]. Consumers' interest is not confined to environmental issues. Long-term supply of healthy fish is also a concern. The Marine Stewardship Council (MSC) certifies fisheries that are sustainable and well managed. Recently a cod fishery from the Pacific has become the first in the world to seek MSC certification. Consumer-recognised certification might become a valuable driver of more sustainable fishing practices among fishermen. For example, Unilever, a large fish buyer concerned about long term fish supply, is committed to buying from sustainable sources. National funds are available to support the MSC certification scheme[6].

Effective enforcement

Sustainability can be threatened by illegal fishing (see Box 3), which was identified as a critical component in addressing management problems[1]. Measures that are more easily enforced are likely to be more effective. For example, it is easier to enforce 'days at sea' and area limitations by making effective use of technology such as global positioning systems. A tamper-proof tracking device is being introduced in the UK[6]. On the other hand, it is hard to enforce the use of specific gear. Quotas are not easy to enforce at sea. Detection of infringements is low and the court fines small (averaging 1.7 times the value of the infringement in 2000–2001). With high value stocks (*Nephrops*) or large pelagic operations (mackerel or herring), illegal fishing can command millions of pounds, posing specific enforcement issues.

Accountability

The European Commission is increasingly taking steps to ensure MS' compliance and accountability. In 2003, it opened a number of infringement procedures, the majority involving overfishing. Denmark, Spain, the UK and France were among the highest offenders. On the other hand in 2005, the UK was graded 19.5 out of 20 on the current implementation of the cod recovery programme, which aims to preserve these stocks. France was recently fined a record €20 million for enforcement shortcomings, and a further €57 million payable every six months until compliance is achieved. A Community Fisheries Control Agency is being set up in Spain. A degree of flexibility in implementation by MS is expected to continue but it is hoped that uniformity, coherence and cooperation will improve.

Ecosystem approach

The CFP is committed to implementing an Ecosystem Approach to Fisheries Management (EAFM). The EAFM's overarching aim is to cater both for ecosystems and for human wellbeing, including social and economic aspects. This approach starts with the ecosystem's wellbeing rather than that of the target species. There is still, however, a great deal of uncertainty about how to put effective ecosystem management into practice. Implementation of the EAFM requires regionalised and adaptive management ('learning though doing') and the reconciliation of different interests[7]. Many, including English Nature include Marine Protected Areas (MPAs), impact assessments and stakeholder participation as integral parts of an EAFM. In the past, one potential barrier that has prevented implementation of some conservation measures has been uncertainty about their effectiveness. Data and information will never be complete, so an important part of the Ecosystem Approach is adaptive management combined with the

precautionary approach[7]. This states that "where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measure to prevent environmental degradation"[8].

Marine Protected Areas (MPAs)

These are areas in which human activities are restricted. While there is a consensus that biodiversity and marine health benefit from large well-designed MPAs[9], there is little evidence of their benefits for migratory fish stocks, since there are almost no MPAs for such species. It is therefore unclear how well these would work and fishermen's federations are mostly opposed to them. Others are concerned with the appropriateness of their potential location and size. Environmentalists believe that MPAs are a vital management tool. The RCEP recommended that fishing be banned in 30% of all seas to protect the environment and make fish populations sustainable in the long run[2]. The PMSU recommended a trial of MPAs and criteria for their selection are being developed with stakeholders[10]. The UK is committed to establishing a coherent network of habitats covering 10% of the North East Atlantic by 2010[9]. The seas are used by many industries in potentially conflicting ways. A call has been made to develop a Marine Spatial Plan that would regulate and integrate all sea users. This could help towards MPA design and facilitate their management.

Impact assessments

The fishing industry, unlike all the other marine industries, is not subject to any form of impact assessment despite being the most destructive activity in the seas. The PMSU recommended the use of environmental and other impact assessments for fisheries policies both at the EU level, such as in funding policy, and at the operational level. The latter has been suggested for new fisheries and for new gear in particular. It is hard to know when modified gear represents a shift for the fishing industry, as such modifications are incremental. Options are being studied to overcome difficulties[6].

Discarding policy

Whitefish and *Nephrops* fisheries catch a large amount of non-target species (up to 80%) in the trawling process. These are then discarded at sea; most are dead. Discarding is not illegal, but landing of the entire catch has been recommended[2,3] for many reasons including accuracy of catch data. The studying of effort management was recommended[1] for these mixed fisheries and it is acknowledged that discarding issues need to be addressed at EU level[6].

Ownership of the sea

Economists' main solution to the 'race for fish' behaviour that occurs for such shared resources is to convert them into private property. This is done by effectively giving property rights in a share of the stock to fishermen, giving them a stake that depends on the long term health of the stock. It is also said to reduce overcapitalisation because their gross revenue is more or less fixed by their quota holding. At present, quota arrangements can be transferred, traded or leased between fishermen under complex transfer rights that have evolved over the years. The PMSU said that the current system did not, however, have "clarity of ownership"[1] and therefore did not confer the long term benefits of property rights. For example, the Government insists that licence holders have no title to the quota units currently attached to the licence[1]. The PMSU has recommended the introduction of Individual Transferable Quotas (ITQs). This quota system can come in a variety of forms but in principle ITQs provide their owner with a durable and exclusive fishing right. ITQs have been seen to bring many benefits in fisheries that have adopted them such as in Iceland and New Zealand. This PMSU recommendation led to much controversy and varying interpretations of the nature of ITQs. The main disadvantage of ITQs is the concentration of ownership of fishing rights, possibly abroad. A feasibility study aiming to harness the benefits of ITQs while protecting vulnerable and dependent communities has been announced in 'Securing the Benefits'[6].

Overview

Over recent years, the state of fish stocks and the scale of fishing's impact on the environment has prompted a number of actions. The PMSU carried out an inquiry into UK fisheries and many of its recommendations are currently being investigated. Many require changes to EU fisheries regulations. The planned Marine Bill intends to improve the current framework for managing and protecting all marine resources. Many strategic decisions remain to be taken to achieve the joint government goal of "a fishing sector that is sustainable and profitable and supports strong local communities… ". This is a challenging task: no fishery in the world can claim to have achieved this all-encompassing goal. A proactive, collaborative approach to fisheries management based on sound science has been widely recognised as the starting point to policy development, together with the management of fish stock as a complete ecosystem.

Endnotes

1 *Net Benefits*, Prime Minister's Strategy Unit, March 2004.
2 *Turning the Tide*, The Royal Commission on Environmental Pollution, November 2004.
3 *Enquiry into the Future of the Scottish Fishing Industry*, Royal Society of Edinburgh, March 2004.
4 www.nerc.ac.uk/funding/marinebio/scoping_study_final_report.pdf
5 www.cefas.co.uk/FSP/default.html.
6 *Securing the Benefits. The joint government response to the Prime Minister's Strategy Unit Net Benefits*, June 2005
7 *The Ecosystem Approach: Coherent actions for marine and coastal environments*, English Nature 2004.
8 Principle 15,of the Rio Declaration Earth Summit 1992.
9 POSTnote 234 and www.nceas.ucsb.edu/consensus
10 *Charting a New Course*, Defra, October 2005

POST is an office of both Houses of Parliament, charged with providing independent and balanced analysis of public policy issues that have a basis in science and technology. POST is grateful to Karina Drif for preparing this briefing and to NERC for providing funding.

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