



**“BEST PRACTICES” FOR
FISHERIES MANAGEMENT**

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Stockholm
University

Stockholm Resilience Centre
Research for Governance of Social-Ecological Systems



Baltic Nest
Institute



BALTIC SEA 2020

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KEY MESSAGES

The performance of the Common Fisheries Policy has been poor as evidenced by:

- a much higher rate of overfishing than the worldwide average,
- many fish stocks declining to historic low levels, including iconic stocks such as the Baltic Sea cod,
- investments (in some cases subsidized) in more, larger, and more powerful fishing vessels than are needed to catch the available fish,
- widespread violations of fishery management regulations, including illegal catches,
- discarding of an unknown amount of fish,
- potentially negative impacts on habitat and biodiversity,
- deterioration in the quality of fishery dependent data used for scientific advice, often caused by illegal catches and discards,
- controversy over many fishery management actions, and a general loss of trust by stakeholders, Member States and the public in the CFP,
- poor economic performance by EU fishing fleets.

With heightened attention to the weaknesses of the CFP, comes a window of opportunity for unprecedented reform. Beginning in April 2009, the European Commission has initiated a dialogue on the CFP with a view toward reform in 2012.

Recently conducted gap analyses and this project identified serious weaknesses in the CFP in terms of:

- Objectives – They are broad and un-prioritized such that they give little guidance for choosing between options,
- Transparency – Annual decisions lack transparency. They are made by the Council of Ministers without clear linkage between objectives and/or scientific advice. The processes that deliver scientific advice are also less transparent than they should be to improve understanding and trust,

- Centralized decision making at a political level – In spite of establishing Regional Advisory Councils (RACs), decision making remains highly centralized and seemingly detached from regional and local situations. The primary fishery management decision maker is the Council of Ministers. This political body is better suited to setting high-level policies rather than making detailed tactical decisions on an annual basis.
- Fleet capacity – Fleet capacity is much larger than it should be given the available fishing opportunity. This situation has emerged as the incentive to compete for a larger share of the available fish prevails (known as the race for fish), when rights are poorly defined and cannot be transferred, and/or from subsidies. In recent years, many subsidies have been eliminated and large sums of money have been redirected to programs aimed at reducing fleet capacity, but so far overall capacity has not been reduced significantly,
- Enforcement – Enforcement depends on Member States, which are sometimes unable or unwilling to enforce regulations,
- Scientific advice – Scientific institutions are overworked, sometimes ineffective in interacting with management and stakeholders, and the advice is often not properly adhered to,
- Management workload – A centralized authority has difficulty providing the necessary capacity to connect enough with regional and local situations to meet all the needs of implementing the CFP.

When considering the reform of the CFP, it is important to address two contextual factors - subsidiarity and relative stability. Subsidiarity means that the EU may only act where Member State actions are insufficient. Some of the shortcomings of the CFP to date are related to subsidiarity. Relative stability is an agreement that Member States' historical shares in fisheries will be maintained. Trying to stabilize an inherently dynamic and evolving system is unlikely to be successful in the long term, and it is often raised as

a barrier to rights-based management. However, neither relative stability nor subsidiarity are insurmountable barriers. Rights can be applied at the national level to mitigate incentives to overinvest in fishing capacity. Today, there are various schemes that allow non-permanent trading of rights between fishing enterprises of different countries and these arrangements could be expanded. With respect to subsidiarity, if it were applied in the context of a reversal of the burden of proof and results based management, fishing opportunities of Member States could be made contingent on demonstrating they can and will fulfil the obligations that go with the opportunities.

Best practices in fisheries management are instruments that create positive incentives for participants in the fisheries system to contribute to three key elements of management:

- **Clear and trusted evidence**
Fisheries management should be evidence based. The evidence comes from assessments of the status of fish stocks, evaluation of fishing impacts on ecosystems, economic impact assessments, and social impact assessments,
- **Defensible decisions**
Fisheries management decisions should logically follow from pre-decisional analysis of options relative to objectives (i.e., thus making them defensible),
- **Compliance with decisions**
Regardless of the quality of evidence and decisions, fisheries management will fail if participants in the fishery do not comply with regulations.

A set of key characteristics of fisheries management were identified, which address the identified gaps and create the desirable positive incentives. The characteristics are:

- **Operational objectives and guidelines**
Clear prioritized objectives and guidelines for procedures and implementation are necessary to guide management.

- **Transparency**
Science and decisions need to be transparent to ensure accountability and to increase trust between participants. This also includes cooperative research where scientists and the fishing industry team up to improve data and traceability systems to improve enforcement and facilitate consumer choice.
- **Precautionary Approach and Reversal of the burden of proof**
Fisheries management should aim toward conservation and long-term sustainability rather than meeting short term economic needs. Fishing opportunities should be contingent on fulfilling the obligations that are necessary for conservation and long-term sustainability.
- **Rights with associated obligations**
Rights-based management, with appropriate transferability, is important to eliminate excess fishing capacity. Rights also create an incentive to preserve the long-term value of the right.
- **Accountability and penalties**
Positive incentives should be reinforced by penalties for failing to fulfil obligations, making decisions that are not defensible, or violating regulations.
- **Regionalization and co-management**
This includes dialogue and sharing of responsibility with stakeholders, at the appropriate geographic scale.

These are characteristics of best practices fisheries management. The table below illustrates how these characteristics create positive incentives for evidence, decisions and compliance. The revised CFP should embrace these characteristics and the regional implementation should analyze proposed actions in terms of the expected positive or negative incentives they might create.

Changing to a system with the positive incentives enabled by the best practices characteristics given above, will not happen overnight. There will be growing pains during a period of transition.

THE BALTIC SEA – AN OPPORTUNITY TO FACILITATE THE NECESSARY TRANSITION

One way to hasten and smooth the transition is to begin in advance of the 2012 revision of the CFP in a place which is arguably the most suitable for regionalization and co-management. The Baltic Sea is the place. What is needed is the leadership to create a courageous new vision for Baltic Sea fisheries. In addition to the CFP reform, the development of a Baltic Sea Strategy under the Swedish presidency could prove instrumental in achieving the necessary transition.

The Baltic Sea has been stressed by overfishing, eutrophication and other habitat alterations as well as facing the threat of severe impacts of climate change. There are examples of most of the problems (e.g., lack of compliance, misreporting of catches, and excess fishing capacity) that plague the CFP in the Baltic Sea. However, the Baltic Sea has the following advantages over other regions:

- Long tradition of multinational dialogue in the area of marine environmental protection
- A growing culture of dialogue with other stakeholders interested in the area of fisheries is developing through the Baltic Sea RAC (BSRAC),
- Numerous EU environmental directives are strengthened by demands of integration of policy areas,
- Eastern cod stock is showing signs of improvement which, with proper management, can generate a viable sustainable yield stock in a few years,
- Strong scientific capability upon which to base policy and management.
- 90% of the marine territory are within the Community. Only external partner is Russian Federation.

The process of transition toward regionalization and co-management of the Baltic Sea could be initiated by informally organizing a Baltic Sea Co-management Council to discuss how apply an ecosystem approach to management of Baltic Sea fisheries.

Applying "Best practices" successfully anywhere can however only be achieved if means of doing so are developed in close collaboration with those primarily affected. The suggestions below should thus only be regarded as ideas for further development and a starting point for a dialogue among Member States and stakeholders.

The informal council could comprise member state representatives, BSRAC representatives, other stakeholders, and a representative of the European Commission. The preparation of a plan should pursue a stepwise approach such as follows:

1. Scoping to share knowledge about the Baltic Sea, identify problems, and develop a shared vision;
2. Translation of the vision into more specific descriptors of the desirable state of the system with measurable indicators and reference levels to track progress;
3. Identification of management options to address problems and fulfil operational objectives (as specified by indicators and reference levels);
4. Incentive analysis of each of the options relative to evidence, decision making, and compliance
5. Analysis of options in terms of the biological, economic and social impacts;
6. Design of enforcement plans for each of the options to assure that there will be acceptable compliance;
7. Consultation process to assure that there is a broad opportunity for comment on the options;
8. Selection of the preferred option;
9. Implementation and monitoring.
10. Exchange of information, experiences and best practices

The process will identify, and hopefully achieve consensus on specific objectives and tangible actions. An example is given by the Baltic Sea cod, for which restoration is already an objective of the management plan developed by the BSRAC, adopted by the EC and in force since 2008 showing signs of recovery. What is needed is a more comprehensive

KEY MESSAGES

approach that will assure the long-term sustainability of the cod (by undoing the systematic problems and negative incentives that lead to overfishing, excess capacity and extensive misreporting and severe lack of compliance). The approach might involve technical measures that restrict how and where cod are fished, protection of cod habitat, and a rights-based system leading to a reduction in fishing capacity to a level that matches fishing opportunities. It may include measures aimed at preserving the cultural values of cod and the coastal communities that depend on cod. Additionally, a regional approach opens up for

tailored gear regulations and a flexible application of input (i.e. effort) and output (i.e. catch limits) control. Whatever the vision and the approach, they need to be based on broad consensus, dialogue and science in order to succeed.

The legal authority to complete the process (step 9) described above might have to wait for revision of the CFP in 2012, but if support for the plan by Baltic Sea Member States and stakeholders is strong enough, creative ways to implement important elements probably can, and should, be found prior to 2012.

Table 1. Characteristics of Best Practices Fisheries Management in Relation to Positive Incentives for Trusted and Transparent Evidence, Defensible Decisions and Compliance

	EVIDENCE	DECISIONS	COMPLIANCE
Operational objectives and guidelines: Making clear what is doable, and how to do it.	<ol style="list-style-type: none"> 1. Knowledge of the evidence that is needed to support decisions. 2. Guidance on the standards of evidence for decision making. 	<ol style="list-style-type: none"> 1. Knowledge of what is allowed, and what is not. 2. Clear priorities. 3. Rules about documentation processes. 	<ol style="list-style-type: none"> 1. Penalty schedules to create a deterrent against violations. 2. Clear expectations of reporting obligations.
Transparency: (including source of seafood products): Increasing understanding and trust.	<ol style="list-style-type: none"> 1. Scientific advice that is better understood and more trusted. 2. Pre-decisional analysis of options that are available for stakeholder comment. 3. Peer review to improve reliability of the evidence. 4. Stakeholder understanding on how they can contribute evidence, leading to cooperative projects between scientists and the fishing industry. 	<ol style="list-style-type: none"> 1. Creating the ability for decision makers to be held accountable. 2. Allowing stakeholders to know how to make their views known. 3. Making decisions more understandable, which should make fair decisions more acceptable. 4. Decisions from within the range of pre-decisional analyses so that the implications are known. 	<ol style="list-style-type: none"> 1. More trust in evidence and decisions leading to improved willingness to comply. 2. Stakeholders believing in the evidence and decisions, such that they are intolerant of others violating regulations. 3. Documentation of the source of seafood products making regulations more enforceable.
Regionalization and co-management: Instilling a sense of ownership and responsibility at geographic scale people understand.	<ol style="list-style-type: none"> 1. Regional knowledge of the type of evidence that is needed. 2. Regional knowledge of how to gather and assemble evidence. 3. Support for evidence because regional co-managers understand they need it to make decisions. 	<ol style="list-style-type: none"> 1. Regional knowledge and perspectives leading to better decisions. 2. Regionalization allowing more stakeholder participation in the process, leading to more trust in the outcome. 3. Co-managers with responsibility to find solutions rather than criticize top down decisions of others. 4. Regional co-managers sharing the overwhelming workload that now falls on the central authority. 	<ol style="list-style-type: none"> 1. Regional decision making with more stakeholder involvement improving willingness to comply. 2. More willingness to comply, leading to less tolerance for violators. 3. Regional knowledge leading to regulations that are more enforceable.
Rights: Allocated fairly and transparently, but not to everyone, thus mitigating the race for the fish" which is the root cause of wasteful excess fishing capacity.	<ol style="list-style-type: none"> 1. Incentive to protect long term value of right by getting the science right. 2. Incentive to use right in an economically efficient way, which makes the fishing industry profitable enough to invest in evidence. 	<ol style="list-style-type: none"> 1. Incentive to protect long term value of rights by advocating decisions that value long term conservation and sustainability. 2. A more profitable fishing industry which can afford to make short term sacrifices in favor of long term conservation and sustainability. 	<ol style="list-style-type: none"> 1. Incentive to protect long term value of right creating an incentive to comply will regulations. 2. An incentive for self enforcement by the fishing industry to protect the value of their rights.
Precautionary approach and reversal of burden of proof: (including results based management): Requiring that long term sustainability be given priority over short term needs, and that access to publically owned resource is contingent on fulfilling obligations (e.g., providing data).	<ol style="list-style-type: none"> 1. The incentive to provide evidence and to improve its precision because fishing opportunities are reduced by uncertainty. 2. Clear understanding that providing data is an obligation associated with the right to use a public resource. 	<ol style="list-style-type: none"> 1. Requiring decisions that favor long term conservation and sustainability over short term economics. 2. Results based decision where proponents of a decision have to demonstrate it will work. 	<ol style="list-style-type: none"> 1. Regulations designed to be enforceable even if this places an additional burden on the fishing industry. 2. Member states documenting their enforcement capability as a form of results based management.
Accountability and Penalties: The capability to identify violations of the public trust, and to penalize for violations.	<ol style="list-style-type: none"> 1. Incentive to provide fishery dependent data to avoid penalties. 2. Possibly a new code of conduct for scientists to hold them accountable. 	<ol style="list-style-type: none"> 1. Decision makers that are held accountable to public opinion. 2. Decisions that are subject to judicial review. 	<ol style="list-style-type: none"> 1. Penalties severe enough to be more than "the cost of doing business." 2. Serious or repeated violations penalized by loss of right.

INTRODUCTION, METHOD AND RATIONALE

There is currently a window of opportunity to influence the Common Fisheries Policy (CFP) in Europe, as the European Commission will initiate a reform process, beginning in April 2009 with the publication of a Green Paper. The reform will be carried out during the coming years and the revised CFP will be ready in 2012. There is substantial room for improvement to ensure long-term sustainability in fisheries management in the current CFP.

Baltic Sea 2020¹ and Stockholm Resilience Centre² have provided a team to analyse Best Practices in order to identify what measures apply in the European context and specifically the Baltic Sea. The team has been guided by two of the world’s most renowned and experienced experts on fish and fisheries management, Mike Sissenwine and David Symes.

Initially, the relevant scientific literature was reviewed, a scientific workshop hosted and a number of in depth interviews of key fisheries stakeholders (scientists, managers, the industry and NGOs) were conducted in order to identify problems with the Common Fisheries Policy as well as best practices in Europe and elsewhere. Based on the scientific exercise the team was recommended to focus on Norway, the US and Canada where extensive visits and dialogue with agencies, governments and stakeholders were carried out and documented. In addition scientific literature, national and international management publications have been reviewed. It needs to be pointed out that scientific literature is cited, but material from case studies will not be cited.

In order to ensure a comprehensive approach and to address as many issues as possible “best practice” has been defined according to three “elements” necessary for fisheries management:

- A) Best practice in the provision of science,
- B) Best practice in decision making, and
- C) Best practice for securing compliance

The results from the investigations were presented to European stakeholders to elaborate key recommendations on applying the identified “Best practices” in a European and Baltic Sea context. In addition to the guidance provided by the workshop, issues highlighted in two recent gap analyses of the Common Fisheries Policy (see p.15) provide the problem analysis. When applying ‘best practices’ to the European context, the problems are defined as examples, which create incentives for sustainability. We recognize the historical and contextual nature of fisheries management and that best practice may therefore depend on ecological, economic and social conditions of the fishery or regional sea.

The document is structured in four parts:

- Background and problem description
- Best practices? Key lessons from case studies
- Applying the key characteristics of best practice in Europe
- Management of the Baltic Sea.

It is generally recognized that fisheries management involves a number of potentially conflicting objectives, regarding social, ecological and economic aspects of the fishery. Trade-offs between biological sustainability, economic efficiency and social equity are thus often necessary in the medium term. In order to achieve any long-term goal, there is a need for policy-makers to confront these intermediate trade-offs while being aware of the outcomes of different

¹ Baltic Sea 2020 is aimed at improving the environmental quality of the Baltic Sea and fisheries is recognized as one of the major impacts. Hence, it is in the interest of the foundation to ensure that negative impacts of fisheries are minimised and that the economically valuable cod stocks improve. Project team member: Katarina Veem

² Baltic Nest Institute and Stockholm Resilience Centre advance trans-disciplinary research for governance of social-ecological systems with a special emphasis on resilience – the ability to deal with change and continue to develop. Project team members: Henrik Österblom, Martina Kadin and Tim Daw

perspectives/starting points.

In this report we do not dwell on tradeoffs. Having investigated some of the most exemplary management systems in the world, it is obvious that there are solutions. Solutions, however, are demanding and they address tradeoffs by way of including all relevant stakeholders. We are attempting to indicate characteristics that are concrete and can contribute to real sustainability for fisheries. However, in order for sustainability to be lasting, transparency and trust have to bring

stakeholders together and make joint decisions.

As the process of review and reform of the CFP is launched, the question is whether a courageous political vision of future fisheries management in the Baltic can be created as to achieve an internationally respected marine policy. Or will the process again stumble over problems of path dependence (where earlier policy decisions exert a constraining influence on future decisions) and institutional inertia, both of which are quite marked in the CFP.

BACKGROUND AND PROBLEM DESCRIPTION

Article 38 (1) of the Treaty establishing the European Economic Community (EEC) made provision for a Common Agricultural Policy (CAP) encompassing indirectly fisheries, as agricultural products, defined as "as the products . . . of fisheries and products of first-stage processing directly related to these products." It was not until 1970 that the Council of Ministers established a common market in fisheries products, and a common structural policy for the fishing industry. Although the CFP has since evolved, the underlying objectives still apply today as they are enumerated in Article 33 of the EC Treaty.

Seven years of negotiations led to the adoption of a Council Regulation 170/83 formally establishing a CFP in 1983. The 1983 Regulation organized the CFP around four components: a market policy, a structural policy, a conservation policy and a policy with respect to third States and regional fisheries management organizations (RFMOs). This access regime was set to expire in 1992. If no such decision was taken by the Council it was to continue until 2002.

The 1983 reform introduced the principle of relative stability. This principle underlies the division of the Total Allowable Catches (TACs) into quotas and their distribution among the Member States. TACs were to be distributed "in a manner which assures each Member State relative stability of fishing activities for each of the stocks considered." The principle ensures that Member States are allocated a fixed percentage of the TAC for a given fish stock. The allocation key took into account the historical fishing patterns of the Member States, the loss of fishing potential in non-EC waters following the extension of fishing limits to 200 nm by third states as well as specific needs of regions particularly dependent on fishing industries. It is up to each government to distribute its quota allocation among national fishing interests and to design systems for access to fishing opportunities and for transferability of quotas between participants. The possibilities to change quota allocations differ substantially between Member States.

A mid-term review of the CFP took place in 1992 resulting in the adoption of Council Regula-

tion 3760/92. It attempted to address the imbalance between the fishing capacity of Member States' fleets and available fishing opportunities. The reform prescribed a reduction in the size of the Community's fishing fleet, accompanied by structural measures to alleviate the socio-economic impact of such reductions. The Regulation also introduced the concept of fishing effort, which limits the time vessels are allowed to spend at sea. The greening of the CFP, which began in the early 1990s, also found its expression in the 1992 review. The 1992 basic Regulation clearly stated its aims, namely to protect and conserve the marine aquatic resources. Furthermore, it included a requirement to take account of the implications for the marine ecosystem when adopting management measures (Article 2 (1)).

The situation in European fisheries has changed dramatically during recent decades, with much more efficient fleets, higher fishing capacity and deteriorated European stocks.

CURRENT REGULATION

By late 1990s, it had become clear that the reformed CFP had failed to curb the declining status of many fish stocks within Community waters. Many were at critically low levels, and some, notably cod in the Baltic Sea, were on the brink of collapse due to intense and unsustainable fishing pressure. In turn, declining stocks seriously jeopardized the long-term viability of the fishing industry.

The European Commission's Green Paper in 2001 painted a very bleak picture of EC fish stocks stating that in the Baltic, 'the current situation does not seem sustainable'; that in the North Sea, 'it has not been possible to reverse the decline of round fish stocks'; that in the western waters, fishing mortality rates 'have far exceeded historical levels observed in the North Sea' and that in the Mediterranean, 'many important stocks have been over-fished' (COM (2001) 135).

The need to protect jobs was often given as a reason for not addressing the overcapacity problem. However, in the 1990s up to the time of the reform, it was obvious that the CFP had failed to save jobs.

BACKGROUND AND PROBLEM DESCRIPTION

In the period 1990–1997, the number of fishermen in the EU fell by 60,000 – a decline of 30%. The Commission considered that the whole of the CFP had to be reviewed. The 2002 CFP reform was much more comprehensive than legally required and it covered a much larger range of issues than previously discussed under the CFP. This led to the formulation of broader objectives and a number of significant changes. These were primarily legislative changes to conservation and structural policies. They reflected:

- a move towards a more long-term approach to fisheries management.
- a new fleet policy to limit and gradually reduce over-capacity.
- a more uniform control and sanction system throughout the EU.

In 2002, EU Ministers agreed on a second major reform of the CFP, resulting in a new basic Regulation (2371/2002) and new arrangements for Community structural aid to the fishing sector. The new basic Regulation set broader objectives for the CFP, including that the Community should take measures to protect and conserve living aquatic resources, provide for their sustainable exploitation, and minimize the impact of fishing activities on marine ecosystems. It called for the progressive implementation of an ecosystem approach to fisheries, but also stipulated that the CFP should contribute to efficient fishing activities within an economically viable and competitive fisheries and aquaculture industry, providing a decent standard of living for those who depend on fishing activities and taking into account the interests of consumers.

CURRENT INSTITUTIONS AND DECISION-MAKING

Decision-making on EU fisheries policy is a highly centralised process. In the run up to CFP reform in 2002, the Commission recognised that the system was too slow to respond to local and emergency situations and often resulted in stakeholders feeling disengaged from processes.

European Commission

The European Commission is the executive body of the EU, and is responsible for:

- Developing proposals for new EU measures;
- Implementing a number of EU policies; and
- Ensuring that EU treaties and legislation are respected.

In the case of fisheries proposals are prepared by DG Maritime Affairs and Fisheries, DG Mare. The main role of DG Mare is to initiate and define new fisheries policy and to ensure that measures which have been agreed by the Council of Ministers are put into practice by the Member States.

The Council of Ministers

The Council of Ministers is the EU's most powerful decision-making body consisting of the relevant Ministers from Member State national governments. There are nine different configurations of the Council (although it is considered a single entity) including the Agriculture and Fisheries Council and the Environment Council. The Agriculture and Fisheries Council meetings are held monthly.

The European Parliament

The Parliament gives its opinion and proposes amendments to legislative proposals after the details have been examined in one of the Parliament's 17 committees. The dedicated Committee on Fisheries was established in 1994 and examines fisheries proposals.

The Parliament plays a less significant role in the development of fisheries policy than most other areas however, including the environment. Its powers to influence the CFP are restricted by the legal basis of most fisheries policy measures. With the Lisbon treaty coming into effect, this will change as most of fisheries policy will move to co-decision, strengthening the role of the Parliament.

The Court of Justice

The European Court of Justice (ECJ) is the EU's court. Examples of the Court's role in fisheries policy

BACKGROUND AND PROBLEM DESCRIPTION

have been judgements on catch quotas, free circulation of capital, interpretation of the Habitats Directive and the EU's authority regarding relations with third countries.

CURRENT INFORMATION PROVISION AND MANAGEMENT SYSTEM

Fisheries management in the EU is based on what has sometimes been called the ‘modern fisheries management model’. Specialised institutions produce formalised knowledge, which is then used as a basis for management decisions and implementation by a centralised bureaucracy.

Data collection

Collection of fishery-dependent and fishery independent data is principally the responsibility of Member States. The systematic collection of reliable basic data on fisheries is a cornerstone of fish stock assessment and scientific advice, and consequently for the effective implementation of the CFP.

The European Union is a major funder of fisheries data collection and scientific analysis. Under Council Regulation 861/2006 establishing Community financial measures for the implementation of the Common Fisheries Policy and in the area of the Law of the Sea, up to a maximum of € 300 million has been allocated for actions in the area of data collection over the period 2007–2013. Eligible Relevant measures in national data collection programmes are eligible for EU co-financing up to 50% of the total expenditure.

In February 2008, the Council adopted Regulation 199/2008 establishing an EU framework for the collection (CFP Data Collection Regulation), management and use of data in the fisheries sector and support for scientific advice regarding the CFP.

International Council for the Exploration of the Seas (ICES)

The main source of scientific knowledge covering waters in the Baltic Sea and Atlantic Ocean is ICES (International Council for the Exploration of the Seas). In the case of the Mediterranean Sea, this knowledge

comes from the General Fisheries Commission for the Mediterranean (GFCM) and its various committees and working groups. ICES is a network of more than 1600 scientists from 200 institutes linked by an intergovernmental agreement to add value to national research efforts on fisheries and marine ecosystems. ICES uses biological data collected by the research programmes and landing records of national research institutes to assess the state of the main commercial stocks. This information is developed into unbiased, non-political advice. ICES is the prime source of scientific advice to governments and international regulatory bodies that manage the North Atlantic Ocean and adjacent seas. The Advisory Committee (ACOM) oversees the process of preparing scientific advice on fisheries and marine ecosystem issues. The Scientific Committee (SCICOM) oversees a broader research program which is a longer term investment in the capability to give scientific advice in the future.

Scientific, Technical and Economic Committee on Fisheries (STECF)

The Commission's own Scientific, Technical and Economic Committee on Fisheries (STECF) has been in place since 1979. It is the formal source of all advice given to the Commission. It consists of national experts that examine scientific advice (e.g. from ICES or commissioned studies) and issues an opinion. The most routine application of this process is the annual setting of TACs.

A number of short-term measures are also suggested, together with options for long-term institutional adjustments, to improve the reliability, transparency and timeliness of scientific advice.

The Commission supports scientific research through multi-annual framework programmes. They make funds available for fisheries and aquaculture research under the area of scientific support to policies.

Advisory Committee for Fisheries and Aquaculture

Another advisory Committee assisting the Commission in addition to the STECF is the Advisory Committee for Fisheries and Aquaculture (ACFA)³ which covers generic pan-European issues. It is composed

of representatives from European level stakeholder groups appointed by the Commission to engage stakeholders in the development and implementation of the CFP. Members include representatives of the production sector, the processing industry, trade in fishery and aquaculture products, consumers, and NGOs focusing on the environment or development. ACFA works through plenary meetings and four working groups.

Social and Economic data

Under the new Data and Control Regulation, which entered into force on January 1st 2009, social and economic data related to fisheries will be covered. However, it is too early to judge effects or results of this regulation.

Regional Advisory Councils

A decision establishing a framework for Regional Advisory Councils (RACs) was adopted by the Council in 2004 (2004/585). As the name suggests, these are advisory bodies, almost like regional equivalents to ACFA, composed of a mix of different stakeholders but with no legal decision-making powers.

To date seven RACs have been established, covering five geographical areas (Mediterranean Sea, Baltic Sea, North Sea, north western waters and south western waters) as well as pelagic stocks (blue whiting, mackerel, horse mackerel and herring) and high seas/long distance fisheries. The RACs have improved the dialogue with and between stakeholders through delivering better access to information and better understanding of EU decisions. New proposals are presented to stakeholders through the RACs which have become active players in CFP.

European Fisheries Fund and Subsidies

The European Fisheries Fund (EFF)⁴ provides

financial support aimed at enhancing the sustainable European fishing and aquaculture industry. The fund supports the industry as it adapts its fleet to make it more competitive and promote measures to protect and enhance the environment. It also helps fisheries communities to diversify their economic base. It is up to Member States to decide how they allocate funds between the different priorities of the fund. The EFF is Euro 3.7 billion for a seven year period beginning 1 January 2007. It replaces the Financial Instrument for Fisheries Guidance (FIFG) which had similar aims.

While there is no universally accepted definition of subsidies, it is widely agreed that subsidies contributed to the problem of excess capacity in Europe and worldwide. Historically, governments have encouraged the construction of larger and more powerful fishing vessels by providing financial assistance. In recent years, financial assistance has been redirected to reducing capacity and a variety of seemingly worthwhile purposes. However, unless there are well defined fishery rights such that the incentive to race for a share of the available fish is eliminated, financial assistance will tend to lead to excess capacity. For example, the EFF is available to replace fishing vessel engines to promote safety, with restrictions intended to result in a reduction in capacity.

A recent study (Sumaila and Pauly 2007) reports that EU subsidies are about 46% of the landed value of fisheries (including funds from the EFF and subsidies by member states), compared to 25% for Norway, 27% for the USA, and 25% for Canada (three countries which were the subject of case studies). New Zealand had the lowest rate of subsidies at 4%. Some subsidies are referred to as good subsidies (e.g., for research). Deducting this amount, the estimates of the remaining subsidies are for the EU – 31%, USA – 11%, Canada – 6%, Norway – 9%

³ Note that, as the name suggests, the Commission is under no obligation to follow the advice of Advisory Committees.

⁴ Council Regulation (EC) No 1198/2006

and New Zealand – 0%. It should be noted however, that estimating the rate of subsidies is difficult and involves assumptions and subjective judgments, these estimates indicate that EU is highly subsidized compared to other developed countries.

KEY ISSUES

References to the 'blunt', 'remote', 'highly bureaucratic' or 'top-down' nature of the Common Fisheries Policy (CFP) are common within literature. In the face of growing evidence of the decline of the marine environment, the EU is still viewed as ineffective in its management of the fisheries sector.

Accountability is particularly important in sectors such as fisheries where virtually the entire sector is managed by the public sector but where management and exploitation occurs largely out of public view and scrutiny. Access to information and transparency in policy are critical as means of ensuring accountability.

The importance of public participation and access to information as a means of improving the quality, effectiveness and legitimacy of decision-making is well-recognised in environmental policy at the international, European and national levels.

Gap analyses

Thorough gap analyses of the Common Fisheries Policy have been performed by several researchers and managers in order to reveal where the essential improvements can and should be made. We have identified two of these as being of major importance (M. Sissenwine and D. Symes 2007, EC, Anon. 2008). For the purpose of this project we have brought these

two reports together, providing a structure for the criticism and delineated areas which need to be addressed in a coming reform of the CFP:

A. Evidence

- Strategic roles and responsibilities for science
- Sufficient scientific resources and linked activities
- Provision of ecosystem data
- Provision of economic and social data
- Reliable data from industry

B. Decision making

- Regionalisation and division of responsibility between national/ regional institutions
- Guidelines on implementing policy and prioritisation of objectives (clear articulation of objectives)
 - Guidelines for implementing ecosystem approach and links to other policy
- Transparency and clear roles for advisors in decision-making
- Avoiding politicisation of decision making and balancing between long term decisions and short term (crisis) actions
- Level of co-management

C. Compliance

- Reduction of fishing mortality
- Top-down control and micro-management
- Industry incentives to act sustainably
- Implementation and enforcement of regulations
- Removal of excess capacity
- Public and stakeholder participation and opinion
- Empowerment of local initiatives for responsible fishing

BEST PRACTICES? KEY LESSONS FROM CASE STUDIES

This section draws on scientific literature, examples from within EU and three case studies (Norway, the US and Canada) in order to illustrate how the key issues in the CFP identified in the previous section might be addressed. Norway, the US and Canada have recently been identified as the highest scoring countries in an evaluation of the level of implementation of the FAO code of conduct for responsible fisheries (Pitcher et al 2009). Norway was the overall highest scoring country and was particularly strong on regulating fleets and gear, addressing discards and bycatch as well as control and enforcement. The US scored particularly high in management objectives and consistent application of the precautionary approach. Canada in turn, received high points for responsible fishing methods and addressing compliance issues. No country was rated as 'good' at implementing ecosystem-based management in this study, but Norway, Canada and US were included in the top four (Pitcher et al. 2008). It is hoped that examining best practices from successful fisheries management regimes may provide raw material for developing new ideas for the reform of the CFP.

In this report 'best practices' are defined as examples, which create incentives that address the identified issues in ways which support long-term sustainability. We recognise the historical and contextual nature of fisheries management and that best practices may therefore depend on ecological, economic and social conditions of the fishery or regional sea. The following sections are described according to incentives directed at producing 'best practices' for:

- A) providing evidence
- B) how decisions are made
- C) achieving compliance

A. EVIDENCE

Evidence related to the structure, function and dynamics of ecological, social and economic systems is needed to inform fisheries management. Trusted and coherent evidence form the basis for sustainable decision-making and compliance within the fishing industry. Good evidence is also important for

creating incentives amongst other actors: it provides consumers with incentives to put a pressure on politicians and the industry for healthy and sustainably produced food. Transparent evidence allows stakeholders (e.g. the fishing industry, the public, NGOs and politicians) to assess decisions made, thereby providing a basis for accountability.

1. Strategic roles and responsibilities for science

In most countries, governmental fisheries institutes provide the majority of ecological data.

In Norway, the Norwegian Institute for Marine Research (IMR) is separated from the national agency, the Directorate of Fisheries, but formally owned and funded by the Ministry of Fisheries and Marine Affairs. IMR is overseen by a management board, which includes leaders from civil society, fishing industry representatives and employees from the institute. This structure is designed to provide transparent evidence independent from political interference.

IMR has recently been reorganised from an organisation composed of few hierarchical research centres, each with their own focus, to a more flat structure with many research groups collaborating on broad ecosystem-based programmes. This required a difficult change process over a period of two years and the institution is more complicated to manage. However, it facilitates interaction between previously distinct groups of researchers and engenders all research to take a more holistic and ecosystem-based perspective.

The Ministry directs the research conducted in IMR on an annual basis. However, the directions are fairly broad and are developed in close collaboration with IMR. It is purposeful to note that all Norwegian policy decisions are based on ICES advice. Considering the success of Norwegian management this is particularly interesting as the diminishing EU stocks frequently are ascribed to "lack of" or "inconclusive" data. In the US, it is the federal agency NOAA (National Oceanographic and Atmospheric Administration), and its NMFS (National Marine Fisheries Service) that are responsible for the provision of

evidence. NMFS is also the federal agency responsible for management and conservation of living marine resources. The work of NMFS is carried out in six regions, each with a regional office and one or several science centres (thirty in total). The science centres conduct the major part of US fisheries science. Stock assessments are evaluated through a peer-review process carried out by committees of independent scientists, the Scientific and Statistical Committees (SSC). There is one SSC corresponding to each of the eight regional fishery councils, established to manage the fisheries within their area of jurisdiction.

NMFS is responsible for developing fishery research programs, a work carried out in consultation with the regional councils. The main research areas are, however, outlined in the national legislation. Legislation also describes specific research programs, for example regional ecosystem research and research on deep sea corals were introduced with the amendments of the fisheries legislation in 2007.

In Canada, the main part of the research is conducted by scientists within the regional branches of the Department of Fisheries and Oceans (DFO). High-level research priorities are defined by the National Science Directors Committee of DFO after consultation within DFO and input from academia and stakeholders. Specific programs are then designed and approved at the regional level.

The provision of evidence in Canada takes place mainly at the regional level, with a set-up and focus of the research organisations varying between regions. The process starts with a request from Fisheries Management (a division of DFO) to the scientific sector for advice on status of the resource and harvest options. Science prepares at least a classic stock assessment and organises a peer review meeting, where the results are presented and discussed. The format of the meeting, including the extent of participation of different stakeholder groups, depend on region and stock.

2. Sufficient scientific resources and linked activities

There are a number of cases where the fisheries industry finances science (e.g. in Canada), but mecha-

nisms for “reversing the burden of proof”, it is more common that the industry pays for onboard observers (e.g. in the US, Australia and New Zealand) and monitoring equipment. In Norway, fisheries research is largely government funded. The industry does not directly fund research, but forfeits a ‘research quota’ from the TAC. The research quota is used in studies where fish are caught, by IMR or reference fleets (see Appendix 5), and the revenues from these catches contribute about 15% of IMR’s budget.

In the US, research also mainly relies on federal funding. The provision of evidence is done under authority of the NMFS and in the associated regional councils. Cost-recovery schemes exist in the some US fisheries where market-like instruments (Limited access privilege programs, LAPPs, see Appendix 5) have been introduced, but until now these constitute only 12 of the roughly 900 managed fisheries and such cost-recovery schemes are thus of minor importance for financing research. In Canada, however, there is a substantial industry funding of research and management through licensing fees and by industry funded observers: around 40 million Canadian dollars are collected from licence fees and the total cost of management has been estimated at 350 million Canadian dollars.

In both the US and in Canada, science is also conducted by collaborative research projects, including both researchers and fishermen - an efficient way to use resources and successfully build trust and increase mutual understanding. The projects in the US are commonly initiated jointly by science and industry, are evaluated and ranked by research steering committees (working groups within the regional councils) and compete for federal funding. These collaborations have in some instances led to dramatic changes in how the status of some fish stocks (e.g. of monkfish) are assessed (Haring and Maguire 2008, Haring, P., personal communication).

The use of commercial vessels for collaborative research contributes to building constructive relationships between industry and scientists, and generating greater legitimacy of scientific advice (McCay et al 2006). The collaborations offer several additional benefits, including:

- more cost effective data collection
- opportunities for informal exchange of fishers' experiential knowledge
- provides additional income for fishing fleets and coastal communities.

Participation of fishermen in research is relatively high in parts of North America, e.g. 30–50% of the fishermen active within the jurisdiction of the New England Fishery Management Council in the US. In Norway, a major part of the research conducted by IMR is through the use of hired commercial vessels, presently making up one third of at-sea research days by IMR.

3. Provision of ecosystem data

Fisheries management science has traditionally focused on fish stocks, however, marine ecology, ecosystem modelling and monitoring, and landscape mapping is increasingly being used in order to provide the necessary basis for integrated understanding of the marine ecosystems on which fish stocks depend (Murawski 2007, Plagányi 2007). All three countries emphasize the ecosystem approach in policy documents. Understanding marine ecosystem interactions requires enormous amounts of data and can qualitatively be addressed by the use of models. Norway, Canada and US all put substantial effort into increasing the necessary evidence.

The recent reorganisation of IMR in Norway was carried out to facilitate a more holistic ecosystem-based perspective (Misund et al. 2008). IMR has many research groups collaborating on broad ecosystem-oriented programmes. Data for ecosystem studies are provided by surveys carried out by IMR and through reference fleets (one offshore and one coastal reference fleet) of commercial vessels, representing more or less the composition of the fleet sectors in general. The reference fleet provides biological samples and information on e.g. rarely caught species, age-distribution and bycatch. Joint studies of fish and seabird distribution and abundance, carried out in cooperation between IMR and the Norwegian Institute for Nature Research, is another example of provision of valuable ecosystem data.

US and Canada also use 'reference fleets' to collect scientific data to allow monitoring of a wider range of species than possible by conventional scientific cruises. The extensive observer programs in the US and Canada provide data on bycatch and also allow the collection of other biological data.

The collection of ecosystem data in Canada varies widely between different stocks and regions. Canada is in the early stages of developing ecosystem policies, for example by integrating habitat information into management plans. Ecosystem complexity is considered to some extent. One example includes salmon on the West Coast, where a decrease in marine survival and a change in fish behaviour on temporal return to spawning rivers has been observed, related to high temperatures and low water flow in rivers. There is now a monitoring of upstream temperatures in rivers, which is increasingly being used together with weather forecasts to guide management of off-shore fishing opportunities.

4. Provision of economic and social data

Transparent social and economic data can provide an important basis for accountability in management decisions and illustrate priorities between different goals. Of the three case studies, the US has the most structured system for collecting and providing social and economic data and for their integration into fisheries management. Economic and social analyses are required for deciding management measures that have the lowest impacts. However, lack of data for more fine-tuned socioeconomic analyses is a common problem according to NMFS, which perform the analyses. Three types of impact studies are most commonly used:

- Impact on small businesses; Break-even and profitability analyses
- Cost-benefit analysis for management actions.
- Economic impact analysis; impact on the human environment and other sectors related to the fisheries sector.

In contrast, Norwegian fisheries research institutes purposely avoid conducting research on the im-

pacts of fisheries management on communities. It is perceived that this would compromise the apolitical nature of advice, which should state what is observed in the biological system, regardless of costs and opportunities for society. This means that consideration of social and economic impacts occurs during the drafting of regulations by the Directorate of Fisheries, in consultation with industry interests.

5. Reliable data from industry

Two types of information from the fishing industry can contribute to evidence provision in fisheries management: data collected by or reporting on the activities of the industry (e.g. statutory logbooks), and a more diverse range of knowledge perspectives and opinions held by fishers themselves. Most fisheries science relies in some way on the former types of data (through landings data) but recently there has been a growing interest in the importance of engaging with fishers’ knowledge (Haggan et al 2007), which has led to substantial improvements in the relationships

between scientists, fishermen and managers in all three case studies. Fishers’ knowledge, is increasingly valued in fisheries management as the fishers’ experiences and knowledge of the ecosystem can strengthen science and management and improve the legitimacy of fisheries governance.

High quality data on catches are essential for reliable scientific fisheries advice but often such data are corrupted where management instruments (e.g. individual quotas) create incentives to misreport landings or to discard fish at sea. Thus reducing or measuring discards (e.g. through bans, disincentives, or observer or camera monitoring) and tackling unreported landings by effective landing controls can improve the quality of data.

In the UK, regulations implemented in 2005 required the registration of buyers and sellers in order to reduce a long-standing problem of illegal and unreported landings. Strict penalties provided disincentives for buyers to purchase ‘black fish’, reducing the market opportunities, prices and therefore incentives

Constructive engagement with fishers’ knowledge

Approaches to engaging with fishers’ knowledge can be broadly classified into ‘extractive’, where the knowledge is collected from fishers to be used ex situ in science and decision making; and ‘participative’, in which fishers themselves become part of the process of research (Fischer 2000). Daw (2008) suggests that participative approaches may be more beneficial for enhancing science as they can provide richer, contextualized knowledge and feedback between fishers and science.

	Extractive approaches	Participative approaches
Pros	<ul style="list-style-type: none"> - Rapid to conduct - Formalises FK for incorporation with scientific knowledge - Targets specific desired FK - Can include many fishers 	<ul style="list-style-type: none"> - FK less likely to be misinterpreted - Accesses all types of FK - Allows 2-way learning and feedback - Builds personal relationships and information networks
Cons	<ul style="list-style-type: none"> - Potential misinterpretation of FK - Fishers lose power over FK 	<ul style="list-style-type: none"> - Expensive in time and resources - Dominated by few individuals

for skippers to land over-quota fish.

Technical innovations can improve data collected from the industry by providing novel information, like detailed spatial behaviour data from vessel monitoring systems (VMS) which is now being used to better understand fleet behaviour in e.g. the UK. VMS is also extensively used in the US. Currently 6 200 vessels are under surveillance by VMS, providing almost real time monitoring in 17 prioritized fisheries. However, there is a capacity for real time monitoring of up to 100 000 vessels.

Strong efforts are made in Canada to reduce IUU activities. Extensive use of observers and video-cameras onboard vessels (see further Implementation and enforcement of regulations) ensure that reliable data is collected.

There may be a tension between commercial confidentiality and provision of fisheries data. In both Norway and the US, all actors know that the dialogue is weighed in favour of data provision, and transparency is seen as paramount. All landings by vessels are reported and published. VMS data is available to scientists but is only published in aggregate form (to prevent the identification of individual vessel behaviour).

B. DECISION MAKING

1. Regionalisation and division of responsibility between national/regional institutions

The establishment of the Regional Advisory Councils was an important first step in dividing the responsibilities between the regions and the central authorities in Europe. Although the responsibility of the RACs is mainly consultative, there is a general perception that they have contributed to an improved dialogue between stakeholders and increased understanding between interest groups. The "older" RACs (i.e. regions with a longer history of cooperation between stakeholders) have generally been more successful in establishing constructive working relationships.

The extent of regionalisation varied between the

three case studies. In Norway, fisheries management decisions are basically conducted at international to national scale. This is contrasted by the US and Canada, where there is a very high diversity of fleets and fisheries and therefore responsibility is almost entirely delegated to regions.

As 90% of Norwegian stocks are shared with neighbouring countries, decisions on management plans, TACs and some technical regulations necessarily have to be made in the relevant international fisheries commission. Within Norway, although quotas are divided up regionally, there is little regional or local-level decision making on fisheries.

A detailed national policy has been deemed unsuitable for management of the very diverse US fisheries. Instead, the regional fishery councils have been established in order to manage the fisheries within their area of jurisdiction. These regional councils are decision-making bodies, which develop and recommend specific management measures (fishery management plans). These plans are subject to approval by NMFS to ensure compliance with the ten national standards and other relevant legislation. NMFS is also responsible for implementation of the management plans. The US legislation states goals and objectives, but it also defines the processes for decision-making.

In Canada, the Minister of Fisheries and Oceans is given the authority to manage the fisheries and has discretionary power to impose regulations on resource access and allocations as well as to ensure enforcement of these regulations. Generally speaking, the ministerial powers are maintained but tasks are delegated to the regional offices of DFO. There is extensive decentralization of responsibilities (albeit with large regional differences). The regional offices are responsible for developing Integrated Fisheries Management Plans (IFMPs), the principal document for guiding management.

Integrated Fisheries Management Plans are prepared with rounds of formal consultation, and sometimes with advisory groups working together with the Fisheries Management staff. These advisory groups may include a variety of combinations of Science and Policy staff from DFO, fisheries industry

people, environmental NGOs as well as community and aboriginal representatives.

Due to the discretionary powers of the Minister of Fisheries, approval of all plans is in theory up to the Minister. However, the authority to sign off IFMPs can be (and is often in practice) delegated to the Regional Director General. This is often done for fisheries that appear sustainable and profitable and no major industry or NGO lobbying taking place, which is most often the smaller fisheries. With high profile fisheries, such as the Atlantic groundfish or Pacific Salmon, the Minister keeps the authority to approve plans.

2. Guidelines on implementing policy and prioritisation of objectives (clear articulation of objectives)

Norway’s new Marine Resources Act indicates sustainability objectives of fisheries policy including the precautionary approach, the ecosystem approach and adequate control of fisheries before describing economic, social and cultural objectives, although it does not explicitly specify priorities between the latter. Supporting regulations for this law, are proposed by a

Council (which includes stakeholder representatives), drafted by the Directorate of Fisheries and then subjected to hearings before passing to the Ministry for approval. Provisions are also made for rapid creation or adjustment of regulations, for example real-time closures of areas with high densities of juvenile fish.

In the US, all fishery management plans, conservation and management measures and regulations under the fisheries legislation (Magnuson-Stevens Act) must be consistent with ten national standards. National standard 1: to prevent overfishing, has priority over the other standards, ensuring a clear prioritization between objectives.

In addition to these standards, a range of additional legislation is also considered by NMFS when they approve of the management plans suggested by the regional councils.

The fishery management plans contain information on conservation and management measures, assessment of the fisheries condition (yields relative to maximum and optimum yield, overfished status), data requirements for management, essential fish habitat, standardized bycatch reporting methodology and impacts of the fishery on participants and communi-

The ten (US) national standards

1. Prevent overfishing while achieving optimum yield.
2. Be based upon the best scientific information available.
3. Manage individual stocks as a unit throughout their range, to the extent practicable; interrelated stocks shall be managed as a unit or in close coordination.
4. Not discriminate between residents of different states; any allocation of privileges must be fair and equitable.
5. Where practicable, promote efficiency, except that no such measure shall have economic allocation as its sole purpose.
6. Take into account and allow for variations among and contingencies in fisheries, fishery resources, and catches.
7. Minimize costs and avoid duplications, where practicable.
8. Take into account the importance of fishery resources to fishing communities to provide for the sustained participation of, and minimize adverse impacts to, such communities (consistent with conservation requirements).
9. Minimize bycatch or mortality from bycatch.
10. Promote safety of human life at sea.

ties. If a stock is overfished, the fishery management plan also includes a rebuilding plan. In cases where restrictions on or reduction of harvest is necessary the fishery management plan would contain descriptions of allocations of quotas or harvest opportunities. Annual catch limits are an important part of fisheries management plans in the US and there are national guidelines for incorporating uncertainty, scientific as well as management uncertainty, in to annual catch limits. Hence, if stock assessments are uncertain, this will reduce the available catch possibilities. Given the priorities defined between the national standards, the social and economic impact assessment only have a secondary role in defining catch limits, but can be more significant when defining allocation of catch opportunities.

Canadian management emphasizes regionalisation and an adaptive approach to management. This is also evident when it comes to objectives and guidelines. A new policy framework was developed for fisheries on the Atlantic coast in 2004. The objectives clearly state that conservation of marine resources and habitat is the highest priority for fisheries management. Another objective is self-reliant fisheries and collaboration within the governance structure to promote well-being of coastal regions. However, no examples of national objectives were found. Guidelines for implementation are rarely found at the national level in Canada, except for IFMPs. There is extensive regional variation, mostly depending on historical traditions.

2.1 Guidelines for implementing Ecosystem Approach and links to other policy

The ecosystem approach (EA) to fisheries management is increasingly recognised in many fisheries despite some dispute as to how it should be implemented (Browman and Stergiou 2004). In all three case studies, the incorporation of the EA appears to be incremental rather than revolutionary as fisheries management evolves from maximising yields of target species to safeguarding long-term sustainability of stocks and marine biodiversity and ecosystem functions (Murawski 2007). The process starts with incorporation of ecosystem and environmental effects

on target species into assessments where this data is available, legislation to protect vulnerable habitats and attempts to reduce bycatches of non-target species. There are examples of fisheries management explicitly integrating with environmental management or engaging with trade-offs between different ecosystem services, or developing governance for such decisions. When considering the complexity of integrating subject matter, it frequently needs political courage and endurance.

An ecosystem approach is required to take account of 'regime shifts' in marine ecosystems, in which their dynamics are significantly altered. Best practices for decision-making tend towards long-term targets and the establishment of precautionary reference points to objectively guide short-term decisions. However, in the light of observed long-term regime shifts (de Young et al 2008) and predicted (potentially sudden) changes in response to climate change (Cheung et al. 2009) there is a need to ensure that management systems maintain the necessary adaptability to respond to changes in the underlying characteristics of an ecosystem (de Young et al 2008). The transformation of the NW Atlantic fisheries from cod to invertebrate fisheries (Parsons and Lear 2001) and the continued increase in productivity of lobster stocks provides a clear example where the system has radically and unpredictably changed and continues to evolve beyond the limits of expectations. Attempts to analyse these dynamics from an ecosystem perspective have so far only generated a limited understanding. This is a rapidly evolving perspective and field of scientific enquiry and hence, outside of concrete 'best practices' aimed at coping with such uncertainty. However, transparent, flexible, legitimate and responsive fisheries management systems, seem far more prepared to navigate such changes effectively in the future, while research institutions with an explicit ecosystem focus seem more likely to identify and provide relevant advice on regime shifts.

Some "best practices" have been identified from the case studies, primarily from the US, where significant progress has been made towards an ecosystem approach to fisheries management. There is a formal process for evaluating the impact of fisheries

on non-target species and for ensuring that fishery management plans comply with relevant legislation, such as the Endangered Species Act and the Marine Mammal Protection Act. Substantial work has also gone into defining “Essential Fish Habitat” and ecosystem modelling which is used in some regions to guide management. Annual catch limits must take account of mortality, whether it is a direct effect of fishing or bycatch. Norway applies a wider perspective on the ecosystem approach, working with marine ecosystem management. The Norwegian approach focuses on policy coherence between all sectors affecting the marine environment (shipping, oil extraction and fisheries). This is accomplished by means of e.g. performing integrated assessments across sectors.

3. Transparency and clear roles for advisors in decision-making

Availability, independence and transparency of evidence provisioning is important for trusted decision making. The existence of ICES as an external and independent source of scientific advice is vitally important for supporting transparent decision-making in Norwegian fisheries management, particularly during international negotiations to establish catching opportunities. Stakeholders have the opportunity to be observers in international negotiations. Regulatory meetings are arranged where stakeholders can give input to drafted national regulations. The fact that Norway is a small country contributes to transparent processes and organisational structure.

The regional councils in the US use the advice provided by the SSC to produce recommendations for management. Transparency is a key issue for the regional councils in the US: the meeting agendas are published prior to each meeting, the results of the voting procedure is open to the public and the meeting minutes are also publicly available. The peer review process of the stock assessments (carried out by SSC) is also partially open to the public. The US legislation ensures an open, transparent process and an opportunity for people subject to management to have a say in these processes. The decisions are judicially reviewable and the threat of lawsuits (or other legal actions) contributes toward compliance.

4. Avoiding politicisation and balancing between long term decisions and short term (crisis) actions

Pre-agreed, legally binding rules have been applied with some success in a number of fisheries (Beddington et al 2007, Caddy & Agnew 2004). All three case studies show a development towards long-term management plans that provide pre-agreed formulas for setting short term catching opportunity decisions. Norway has negotiated and agreed upon plans for most of its key stocks which include harvest control rules (HCRs), which dictate how catching opportunities will be set relative to the results of assessments (see Box p. 24). While Norwegian management plans do not tend to specify deadlines for stock improvement, in the US, RFMCs are required to produce management plans (typically lasting three years) and HCRs, which are legally required to recover stocks within set timescales. Similarly, Iceland has a harvest control rule for cod stating that only 25% of the biomass can be removed annually (ICES 2008a). Canada has five-year Integrated Fishery Management Plans for the most important fisheries. The effect of all these decision-making structures is to remove any political considerations from short-term setting of catching opportunities.

The US legislation for fisheries management provides a rather unique national framework for regional decisions, where civil servants involving stakeholders take all the decisions regarding management, based on a clear set of standards. The existing framework does not leave any room for continuous detailed political intervention. The political influence is limited to designing the overarching framework.

In contrast, crisis actions implemented as measures of last resort, such as total fishing closures, are often relatively unsuccessful. A recent review of the global experiences with recovery plans for depleted stocks during the last two decades investigated the success of 60 different cases. Caddy & Agnew (2004) illustrate that not only politically sanctioned recovery plans with legally binding decision rules are important, but that recovery is also dependent on fish species characteristics: more recoveries were observed for pelagic than for demersal species and recoveries

Bilateral Management of Northeast Arctic Cod

The Northeast Arctic (or Barents Sea) cod stock is the largest Atlantic cod stock and is mostly shared between Norway and Russia. In terms of biological sustainability, current management of the stock can be considered as successful despite various challenges. The biomass has been above precautionary reference points since 2002 and fishing mortality has declined to precautionary reference points in 2008.

The Joint Russian-Norwegian Commission on Fisheries (JRNC) was created in 1975 and meets annually to decide quotas of the main Barents Sea stocks. This arrangement has allowed for politically expedient cooperation between Norway and Russia on fisheries management and control in disputed marine territory within a military sensitive area (Stokke 2002).

JRNC request scientific advice from ICES to inform the annual setting of TACs for the stock, which is shared equally between the fleets of the two nations. According to

this pre-agreed fixed allocation key helps to avoid annual TAC negotiations becoming beset with difficult negotiations over allocations (Stokke 2002).

During the 1990s ICES advice was based on maintaining moderate fishing mortality, but in 1998 advice started to incorporate precautionary reference points. This led to advice to reduce TACs, particularly for 2000 when the advice (given to recover biomass above precautionary levels within a year) called for a four-fold cut in TAC. Following difficult negotiations during which Russian delegates broke off negotiations in response to Norwegian proposals to drastically reduce the TAC, a TAC of nearly four times that recommended by ICES was agreed. By analysing this decision in the context of the political climate of the time, Honneland (2004) suggests that it was influenced by various discourses, particularly the widespread perception within Norway of conditions of extreme hardship in Russia. Indeed, the protocol from the JRNC unusually cited "dif-

ficult conditions of the population of North-western Russia". This illustrates how the TAC was influenced by politics and the tendency for socioeconomic considerations to trump long term biological sustainability goals. It also illustrates the difficulty of management plans with strict deadlines (e.g. recover biomass to precautionary levels within a year) which may result in politically impossible advice.

From 2001 the JRNC moved away from annual TAC setting, initially setting a TAC level for 3-years and, in 2004, developing a management plan including explicit harvest control rules "with the objectives of maintaining high long-term yield, year-to-year stability, and full utilization of all available information on stock dynamics." The harvest control rule provides a transparent process for setting the quota each year, effectively making the decision a scientific calculation with a constraint on TAC changes from year to year of $\pm 10\%$ to provide stability in the yield (ICES 2008b)

occurred mostly in the centre of a species range and/or during periods of favourable conditions. The study also illustrated that stock depletions aggravated by an unfavourable climatic regime can be difficult to reverse.

5. Co-management

Decisions made through co-management structures can improve compliance and a functioning management (OECD 1997, Hauge and Wilson, in press). Case-studies (e.g. from the Shetlands; SEAC 2006) show that broad participation among stakeholders, the possibilities to make compromises between different interest groups combined with local leadership,

can result in the development of successful management systems. Management should thus be adapted to the right geographical scale (De Young et al 2008). All three case study countries have high levels of consultation with stakeholder bodies, but they differ in the extent to which the responsibility for regulations is shared between state institutions (Figure 1). In Norway there is a fairly well defined division of responsibility between the state and the industry in which decisions regarding allocation between different sectors of the industry was effectively delegated to the fishers' organisation to negotiate internally (the allocation to the different sectors has remained

constant). Similarly, as long as ecological sustainability is not compromised, the Directorate of Fisheries encourages the stakeholder Council to reach their own consensus for regulations to be implemented. The division of responsibilities between NMFS and the regional councils is specified in the US fisheries legislation. The legislation also ensures an equal and balanced representation of stakeholders in the regional councils, taking into account their relative proportion of and interests in the fisheries. The re-

gional councils are, as described in previous sections, the decision-making bodies, but their recommendations are subject to approval and implementation of NMFS. This means that their empowerment does not go beyond making decisions in alignment with the national standards and other legislation. The high level of co-management in US fisheries and large responsibility to develop the content of management plans create a very substantial work-load for council members.

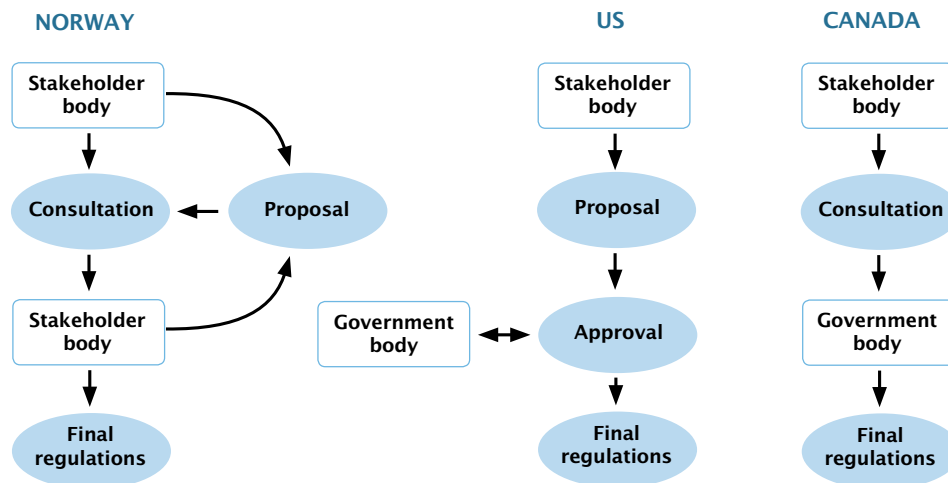


Figure 1. Simplified representation of the nature of co-management in the 3 case study countries in terms of stakeholder involvement in the creation of regulations

C. COMPLIANCE

Compliance with decisions and management actions is key for a functioning fisheries management system and can be helped by a culture of compliance in the catching and processing sectors. Compliance ensures high quality of data for stock assessment and can have a positive impact on evidence-providers and decision-makers providing them with incentives for responsible and well-informed decisions.

1. Reduction of fishing mortality

Fishing mortality needs to be controlled by limited and strongly enforced catching opportunities, as well as reducing ‘unwanted mortality’ caused by discarding at sea, high-grading, ghost fishing by lost gears and incidental mortality of fish escaping from gears.

Norwegian fisheries legislation focuses on mortality of fish rather than landings. A discard ban establishes the principle that catching (rather than

landing) of illegal fish is unlawful. Although the law in principle is difficult to enforce, the law generally has moral legitimacy with fishermen and is a clear signal that discarding is not acceptable. In addition, supplementary provisions, include real-time closures of juvenile areas, an anonymous reporting hotline and allowing whitefish skippers to retain 20% of the value of accidentally caught over-quota fish when they are landed. These regulations help to reduce incentives to discard and improve compliance with the ban. Programs are also in place to ensure constant development of gear technology and to recover lost gear to prevent 'ghost fishing'.

In the British Columbia groundfish fishery in Canada, onboard observers register all fish caught. Dumping or discarding fish is counted against quotas, which creates incentives for more selective fishing practices (Branch et al. 2006a). Currently, a trial with on-board camera monitoring is taking place in Denmark. The (voluntary) participating vessels report all catches and are in return given an increased quota according to average discard level. The aim is to prove that reliable information on catches and discards can be made available (www.fvm.dk 2008).

One of the instruments used in the US to reduce fishing mortality are the rebuilding plans that are mandatory when a stock is assessed as overfished. The rebuilding plans should ensure a recovery of the stock to a legally-mandated target level within 10 years. In addition, all species should be managed with annual catch limits and corresponding accountability measures (see Appendix 5) are now being implemented in fishery management plans.

2. Top-down control and micro-management

A perceived reason for the difficulties in reaching goals in fisheries policy is the prevalence of perverse incentives for fishermen (Hilborn et al. 2005, Branch et al. 2006b, Grafton et al. 2006). The top-down control and micro management in EU fisheries can lead to perverse incentives for acting unsustainably.

Moving away from 'micro-management' and excessively cumbersome and detailed fisheries regulations imposed from central authorities requires

delegating responsibility for regulatory details to bodies closer to the fishery. However in Norway, the Directorate of Fisheries maintains the responsibility of top-down establishment and enforcement of regulations. Although there have been shifts towards greater industry responsibility, it is still perceived as necessary for the state to impose controls. However, technical measures are extensively trialled with fishers employed by the Directorate and consulted with the industry before they are implemented to avoid perverse incentives and 'surprise' responses from the industry. There is also a readiness to change regulations throughout the year in response to input from the industry (for example real-time closures are rapidly put in place and monitored regularly so that they can be removed if fish distribution changes).

In the US, Regional Fisheries Management Councils carry out the necessary management actions to achieve goals set at the national level. The Magnuson Stevens Act provides a detailed framework for the process of developing management plans, but these are regionally adapted and case specific (see figure p. 24). The de-centralised approach to management, and the extensive delegation of decision-making to the regional councils, makes the US an example of a country where continuous top-down control is reduced substantially compared to European fishing nations. Micromanagement may exist but it is the regional councils that design regulations.

3. Industry incentives to act sustainably

Long-term exclusive rights of access generally provide incentives for the industry as a whole to conduct sustainable fisheries for the benefit of their future business (e.g. Hilborn et al. 2005, Branch et al. 2006b, Beddington et al. 2007, Costello et al. 2008). However short-term economic pressures, high discount rates and uncertainty about future benefits can still provide incentives to overexploit (Acheson 2006).

Market-like instruments can, to a larger or smaller extent, create long-term exclusive rights. These instruments (especially individual transferable quotas - ITQs) clearly improve profitability and thereby generate private wealth as the right to fish becomes very valuable. British Columbia groundfish licences

ITQs and banking system in the British Columbia groundfish fisheries

Seven trawl fleets are managed in the Canadian West Coast groundfish fisheries. The fleets target 16 species of rockfish, flatfish, dogfish, sablefish, halibut and Pacific cod. Rockfish populations can only sustain low levels of exploitation due to their longevity (can live beyond 100 years) and late maturation. The fisheries were previously managed with limited-entry regimes and quarterly quotas. However, an average tow contained four species, which restricted efficient harvest: discards of species for which quotas were filled became a common problem (Rice 2003). Scientists and the industry jointly searched for more sustainable and profitable practices. A low number of licence holders (at most 120 trawlers) made efforts for innovative approaches easier (Rice 2003).

The fisheries are now managed with a sophisticated system of ITQs. The industry supported the introduction of the system, as they foresaw increased quality and value

of the product. At the start of the fishing year, 90% of the quotas for all species are distributed in equal proportions to each license holder and 10% is put into a “quota bank”. During a few weeks quotas are traded between license holders before being final and registered by the managing body after which the fisheries open. The fisheries have 100% observer coverage and any discards are counted against the quota. When a vessel is running out of quota on one species they can buy more quota from the bank at market value, thereby enabling continued fishing for other species. When the bank is running out of quota, quotas can be auctioned off and are sometimes sold at 3–4 times market value, since the value: the remaining quotas still make fishing profitable (Jake Rice, pers. comm.).

The money derived from “the bank” is used to finance science relevant to the fisheries and fishermen take part in proposing priorities: directed studies towards under-

standing nocturnal migration (an issue fishermen believed influenced stock assessment) resulted in a significant change in rockfish stock status.

Onboard observations (on larger vessels) and cameras (on smaller vessels) and substantial dockside monitoring secures compliance. The industry pays one third of the monitoring costs (up to CAN 2 million in total). The Department of Fisheries and Oceans covers the remaining part, but there is currently a discussion about the future funding arrangements. The full observer coverage was demanded by the industry and fishermen also developed a code of conduct. Recently the industry suggested that an additional 10% of the initial quotas should be given to the bank. These quotas would then, in the end of the year, be given to the fishermen according to their level of compliance with their own code of conduct.

for example have a value of CAN\$ 20,000 – 200,000 (Table 2 in Ecotrust Canada 2004). Such high values rely on the ability of fisheries to provide future yields and so the holders of licences or tradable quota have a clear vested interest in sustainability. However, other instruments than ITQs can also provide appropriate incentives.

Indeed, selling licences or quotas and exiting fisheries may generate substantial income for fishermen who wish to quit or retire. However, ITQ systems inevitably lead to consolidation of the industry and increasing control of licences by large businesses and investors, which may be contrary to social objectives.

Despite the wealth of literature on rights-based approaches to fisheries management and the emphasis on individual transferable quotas (e.g. Hilborn et al. 2005, Branch et al. 2006b, Beddington et al. 2007, Costello et al. 2008), these did not seem to be the main management tools in the three case studies (with the possible exception of Canada), although they appeared in all countries.

Increased consumer awareness of sustainability issues, pressure from environmental NGOs and certification schemes (most notably Marine Stewardship Council – MSC, see www.msc.org) provide additional incentives for the industry to demonstrate

responsible behaviour with regards to sustainable harvest and ecosystem effects of fishing, including bycatch and habitat damage (Beddington et al. 2007) as certification increases market value of the product and provides opportunities to sell the product at more markets. Meanwhile, professional, rationalised (as a result of structural policies) fishing industries with established rights reduce the incentives to 'free ride' as negative impacts of unsustainable behaviour are more clearly related to future profitability of the fishery and shared amongst a known limited group of actors.

In Norway structural policies have led to smaller, more professional pelagic fisheries with limited actors who have links with their counterparts in other countries. The incentives to free ride have been reduced as a result and the industry is more responsive to management concerns and is beginning to view certification as an opportunity. However, the view of the Directorate of Fisheries is that, although there is a positive trend, ensuring ecological sustainability still demand top-down enforcement by government.

In the US, several instruments are in place to encourage sustainable action by the industry. The participation of fishermen in research and data collection has shown on increased trust and credibility of science. Participation, in combination with the engagement of industry in the regional councils, have contributed to increasing acceptance for regulations and thus complying with rules. Moreover, it also increases the understanding for management actions when rules are not complied with.

Market mechanisms are being used in Norway as a tool to reduce fishing effort. Limited access privilege programs, LAPP, have been introduced in some US fisheries. They do not imply property rights, since US legislation would require compensation if a property right is taken from its holder, but instead provide privileges to participate in a fishery with limited access. The privileges may be transferable, according to principles outlined in the MSA, but the extent of transferability is determined on a fishery-to-fishery basis. Principles for initial allocation of privileges are described in the Magnuson Stevens Act, but in short the allocation should be equal, taking into account

dependence of individuals and communities on the fishery and current and historical harvest and participation in the fishery.

4. Implementation and enforcement of regulations

Effective enforcement of regulations is fundamental to the operation of a fisheries management system. Norwegian fisheries provide an example of how effective monitoring, control and enforcement systems can result from integration of various information sources. The Norwegian fishery inspection services have rights to inspect and collect information at all stages. Regulations are enforced at sea (supported at sea by a large and active coastguard including the use of helicopters for boarding and VMS tracking of all vessels over 24m), during landings (also by sales organizations) and along the supply chain through processing, transportation and marketing. At all stages documents (e.g. logbooks, sales notes) are checked against actual observations (e.g. catch onboard, amount landed) to prevent loopholes where documents declare false information. The monopoly of sales organizations to make the first sale of landed fish and the formalization of sales notes as landings records integrated with monitoring quotas allows for tight control and accountability of landings reducing incentives and opportunities for 'black landings'. Sales notes (which are largely electronic and linked to a national database of vessels and quotas) have legal status and also include information required for scientific monitoring. Enforcement against 'grey landings', in which quantities of fish landed differ from declarations, have also been addressed by incrementally increasing controls and closing loopholes through attention to such details as ensuring that conversion factors for converting product weight to live weight are realistic, and the introduction of compulsory weighing of fish boxes at sale.

Enforcement in Norway has been strengthened by increased sanctions recognising the increasingly economic nature of fisheries crimes. Cooperation between government departments (e.g. tax, customs, coast guards, police and fisheries agencies) and collaboration with enforcing laws, which lie outside their

own remit, have been instrumental. Specialised state prosecutors exist to help with conviction in complex fisheries cases and joint courses are run between the coast guard and local police fisheries inspectors.

IUU fishing has seriously disrupted attempts to manage Barents Sea cod in the past but this is improving now and Norway has international agreements addressing IUU fisheries with seventy other nations. Actions include ‘blacklisting’ of known offending vessels. The Norwegian approach implies that all blacklisted vessels irrespective of changes in ownership are perpetually prohibited from fishing in the Norwegian EEZ and will not be entitled to fly the Norwegian flag.

US fisheries management plans have to include accountability measures for non-compliance, as well as plans for onboard observers. High observer coverage in many US fisheries increases the incentives for compliance and likelihood of detection in cases of non-compliance.

In some Canadian West coast fisheries, smaller vessels are equipped with cameras, filming 100% of the catch. The national fisheries authority (DFO) monitors approximately 10% of the films taken during a fishing trip. If non-compliance is detected without proper explanation, the fisherman will be billed for all (100%) of the film taken during the relevant trip, producing a strong incentive to comply with the rules. Canada has a strong national emphasis on common training for all fisheries inspectors (at sea and in port) and work closely together with their coast guard. The consistency between regions produces capacity for coherent enforcement.

5. Removal of excess capacity

Excess fishing capacity is one important driver for unsustainable decision-making and high (legal and illegal) fishing mortality. In general, governmentally funded buy-back programs have been less effective than expected and it is not uncommon that the least efficient vessels are being bought, limiting the effect of such schemes. These schemes also do not reduce the economic incentives underlying over capacity, which tends to increase once the buybacks are completed (Beddington et al. 2007). Around

US\$ 430 million was spent on decommissioning schemes in OECD countries in 2005 (i.e. 7% of total government spending in the sector). A review of best practices in these schemes also concluded that they can only be successful under specific circumstances and that they often fail to meet their objectives both from an economic and environmental objective (see OECD 2008).

In Norway, the inevitability of consolidation of the fishing industry in order to prevent fishers becoming progressively poorer as the national economy grows is widely accepted. Since the early 1990s, the government has moved to remove subsidies which delay this trend. Structural policies to reduce capacity are seen as an economic issue to maintain the profitability of fisheries and have been designed in collaboration with the industry to be flexible, voluntary and constrained in order to meet social objectives of fisheries management. Market-like instruments have been used to reduce capacity in the offshore fleet and amongst the larger coastal vessels. Under such schemes, a fisher can buy and scrap another vessel and make use of 80–100% of its quota for the subsequent 20 years. The system includes strict limits to prevent unacceptable loss of diversity and equity. Firstly instruments only operate within vessel groups and within geographical areas, so that quotas do not accrue to large commercialised fleets or more profitable locations. Secondly, quotas are not entirely tradable, can only be owned by an active Norwegian fisher and are attached to a particular vessel. Finally, each vessel is limited in the number of quotas it can accumulate (2 or 3 depending on the fishery). For the small-scale sector, a similar scheme was operated but which was subsidised 50% by a sales tax on first sale of fish.

The introduction of Limited Access Privilege Programs (LAPP) in some US fisheries is believed to contribute to a reduction of excess capacity. NMFS view such market-like instruments as being much more effective than decommissioning schemes in solving most of the issues associated with overcapacity. In Canada there have not been decommissioning schemes, rather shifting the fishermen from one fishery to another. Although it seems that overcapacity is

recognised as contributing to overfishing, no strategic measures are currently in place to reduce this.

6. Public and stakeholder participation and opinion

The participation of fishermen in research and data collection has been shown to increase trust between fishermen and scientists improving the credibility of scientific advice and resulting management. In all three case studies, engagement with fishers' knowledge in collaborative research projects appeared to be largely participative including consultation with the industry on assessments and regulations, specific meetings between fishers and scientists, observer programs which facilitate direct contact with the industry and employment of fishers in research or management institutions. Collaborative research between fishers and scientists have been shown to allow the exchange of skills and knowledge between the groups and to start to address differences in knowledge and perceptions between fishers, scientists and managers which present problems for co-management (Hoefnagel et al. 2006; Stanley and Rice 2007).

In addition, the engagement of industry in the decision-making processes (e.g. the US regional councils) probably increases the understanding of the necessity of management action. This in turn enhances legitimacy of the process. These structures may also create positive perceptions of management in general and the regulations, which increases the will to comply with the rules.

7. Empowerment of local initiatives for responsible fishing

Local initiatives, which are relatively successful, have a tendency to spread to other regions. Local innovations in gear developments produce some clear examples of this – in the New England Fishery Management Council, local fishermen developed a new shrimp trawl which was originally met with substantial scepticism from colleagues. However, once developed the modified fishing gear proved to result in substantially reduced bycatch and increased quality of the retained catch. The cod avoidance measures proposed and implemented by Scottish fishers in

2008 also provide a good example where the industry has taken responsibility to respond to management objectives rather than rules.

Management of fisheries in the US has secured a mechanism enabling local partnerships to be developed. The cooperative research projects are one such example, and these are initiated and evaluated at the regional level. Projects may concern development of more selective or less destructive gear, identification of habitat of concern or conservation of habitat, which all can provide opportunities for more responsible fishing practices. Regional councils can also request information collection programs that NMFS should carry out (if found that there is a need for additional information). Such requests may very well concern a need for more extensive knowledge to be able to make the fishery more sustainable.

KEY CHARACTERISTICS OF BEST PRACTICES FISHERIES MANAGEMENT

The descriptions and explanations above serve to broadly explain what are the characteristics of best practices, i.e. a combination of science, social and economic insights regarding the fisheries industry and its impact on the marine environment. The best practices described can, in principle, be used to identify a package of measures for the overall reform of fisheries management in the EU, which would provide positive incentives for stakeholders to contribute directly to the overall goal of sustainable fisheries. The case studies and relevant European examples offer valuable insights into the key characteristics for creating such incentives. These characteristics are:

- Operational objectives and guidelines
- Transparency
- Precautionary approach/Reversal of the burden of proof
- Rights
- Accountability and penalties
- Regionalization and co-management

They will be used in the chapters "Applying the key characteristics of Best Practice in Europe" and "Man-

agement of the Baltic Sea” to describe the options available when reforming the CFP and for elaborating a scheme of enquiry in the Baltic Sea. But prior

to discussing what change is needed in a European and Baltic Sea context, we need to discuss mechanisms needed to ensure change.

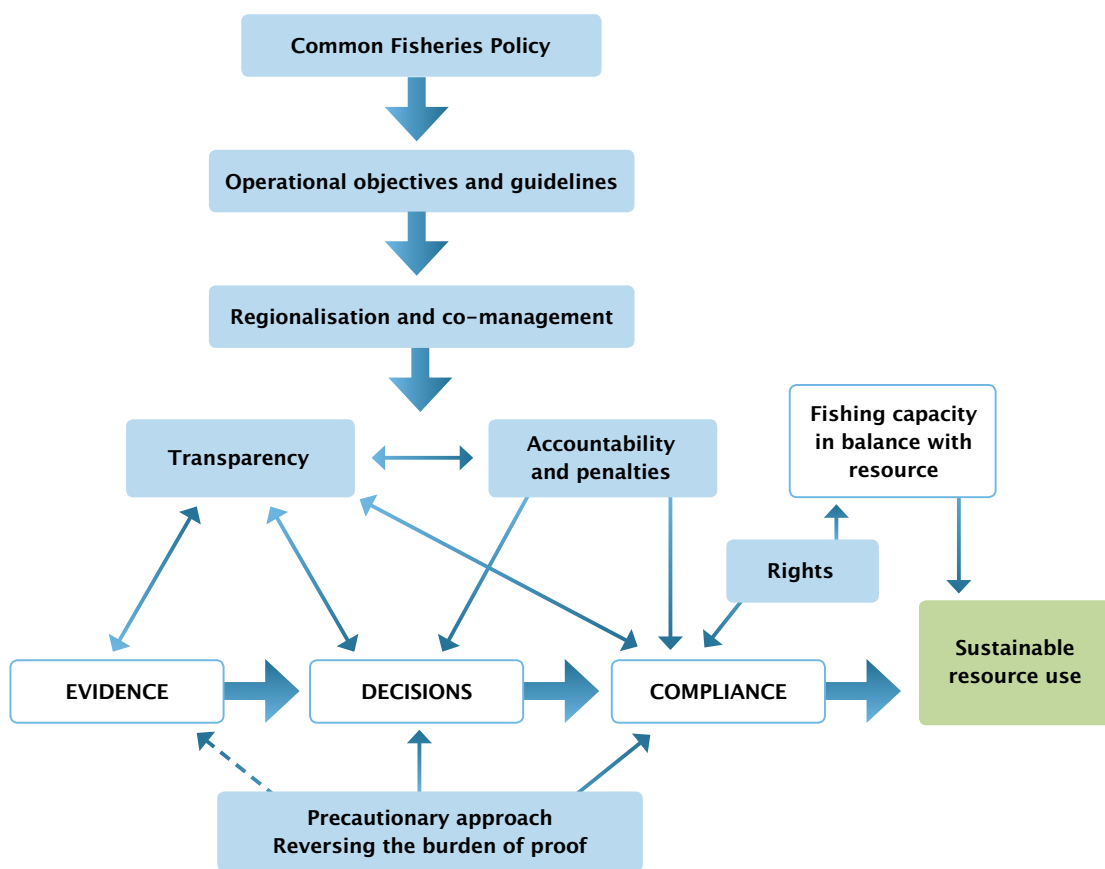


Figure 2. Conceptual model of the links between the key characteristics and elements (evidence, decisions, compliance) of best practice to reach the goal - sustainable resource use.

ACHIEVING TRANSITION IN FISHERIES MANAGEMENT

There is a widespread acceptance of the need and appetite for reform of the CFP. Successful cases of fisheries management in other parts of the world may offer ideas on how the CFP could be improved. However the transition of a complex social-ecological system, of the size, multi-scale nature, political intricacy and diverse interests of European fisheries and their associated politics is hindered by monetary, social and political costs of transition which need to be understood and equitably distributed (Swan and Gréboval 2005).

The OECD (2006) has identified a number of issues that can ease the introduction of new policy tools, including, e.g. stakeholder involvement when defining new tools, incremental implementation, avoiding the trap of using a "one-size fits all" strategy, careful design of the process to allocate rights, a pragmatic use of market forces, draw on practical experience, involving all stakeholders in the reform process, and dealing pragmatically with tradeoffs. Reform plans should include information campaigns, an open process of dialogue, and recognition of the costs and benefits that the change implies for different stakeholders.

Studies of transformations of natural resource governance systems highlight a range of factors which are proposed to facilitate transformation. This research conceptualises change as occurring due to the 'transformability' of the system as well as the existence of windows of opportunity for change. These may be crises which force change to be addressed. Studies have also illustrated the importance of leadership, trust between actors and social networks to combine sources of knowledge, recognise windows of opportunity and catalyse opinion shifts (Olsson et al. 2006, Olsson et al. 2008).

One important consideration when envisioning change in the management system is the nature of change that is required. Can new configurations of the system evolve through incremental adjustments, or is more revolutionary changes in the structures and incentives necessary to break out of existing behaviours and overcome constraints to change? The latter type of change can be conceived as 'transformation' and is distinguished from adaptation as it involves

changes in the underlying structures and feedbacks and results in a new trajectory of the system. Literature on natural resource governance and institutional and social change emphasises the prevalence of relatively sudden reorganisation (Scheffer et al 2005, Gunderson and Holling 2002) and the importance of navigating temporary windows of opportunity in response to crises. However the case studies also demonstrate more gradualist approaches to the development of fisheries management including iterative development of regulations, and incremental implementation of the ecosystem approach by the gradual inclusion of more aspects of ecosystem concerns into monitoring and management.

Addressing subsidies, overcapacity, un-sustainability and unprofitability in fisheries can be seen as a transformation as it requires a change in the usual adaptation response (increased effort, subsidies) to change the incentives of individual actors and the trajectory of the system. Choices for developing adjustment policies in the fisheries sector are limited because they often deal with regions where alternative employments are limited or non-existing. Policy makers must face three major challenges in the transition process:

- the complex and partly uncontrollable nature of ecosystems,
- managing the economic and social effects on stakeholders (OECD 2000), as well as
- being able to "sell it", i.e. getting sufficient support to act.

Changing the way fisheries are managed will thus mean addressing a number of technical, administrative and social challenges.

Such change was required in Norway to address overcapacity. Growth of the Norwegian economy and average wages from the 1960s coupled with biological limits and relatively stable fish prices led to decreasing profitability of fishing operations. The system adapted to this by providing subsidies as if dealing with a temporary problem, but this merely resulted in an industry which had zero profitability. By the early 1990s, it was apparent that this was a

poor policy and, through negotiations with fishers' organisations, subsidies were gradually removed from the system and structural policies were put in place to allow some consolidation. Since the end of subsidies in 1994 the industry as a whole has had profit margins fluctuating between 4–15%. A similar change in governance was limiting access to coastal cod fisheries, excluding thousands of vessels. Such a politically unpalatable decision was seen as the only way to respond to the situation of the resource.

Another key change in direction, illustrating the importance of leadership, was the implementation of a discard ban, which emphasised Norwegian policy to focus on fishing mortality rather than landings. Barriers to the implementation of a ban in Norway (as in other countries) included resistance from the fishing industry and general perceptions that such a ban was un-enforceable. During the 1980s, a large year class of Arctic cod following after several poor years led to problems initially of discarding undersize fish, and subsequently high-grading (discarding marketable but smaller fish to keep larger more valuable ones). The acute emergence of the issue and the widespread public concern and media coverage regarding waste of fish provided a window of opportunity for change. The fisheries minister at the time insisted on establishing a ban, in spite of advice he received, on moral grounds. Thus the change was a politically motivated decision, facilitated by general opinion, but the ban has remained in place (supported by various regulations aimed to reduce discarding), is widely respected by stakeholders and is currently being expanded to cover all commercial fish species.

Major changes in US fisheries legislation have evolved over time. The first version of the Magnuson-Stevens Act (MSA) was passed in 1976. The main purpose was to promote development of a domestic fishing fleet, phase out foreign fishing and conserve and manage the marine fishery resource. Major amendments of the MSA have been undertaken with the establishment of the Sustainable Fisheries Act in 1996 and the reauthorization of the MSA in 2007. Since the establishment of the first act the original problems had been solved whereas new ones had emerged, e.g. overcapacity of the fleet and overfished

and depleted stocks. The amendments in 1996 had the goals of achieving optimum yield in all fisheries, ending overfishing for all fisheries, rebuilding overfished stocks to the biomass that supports maximum sustainable yield (within 10 years except if impossible due to fish biology), minimize bycatch, and defining essential fish habitat (i.e. habitat necessary for fish stocks to spawn, feed and grow). The problems with overfishing in the US EEZ have persisted and therefore the most recent amendments in 2007 emphasised ending overfishing by the introduction of Annual Catch Limits, Promoting market-based approaches by using Limited Access Privilege Programs (LAPP), and enhancement of international fishery management (focussing on illegal, unreported and unregulated fishing, IUU). The development of US fisheries legislation clearly illustrates the importance of a flexible legal framework, which can take new knowledge and challenges into account. The US fisheries management system share a number of geographical (large diversity of fisheries) and institutional (federal-state relationships) similarities to the European which make the US experiences potentially relevant to the revision of the Common Fisheries policy. One main difference however is that implementation of US legislation is highly regionalized. As the legal framework is continuously evolving, regional leadership and implementation capacity significantly contributes to the relative success of US fisheries policy.

Successful fisheries reform will not be achieved if stakeholders do not identify that there is a need for change. Stakeholders in this case include politicians, fishermen as well as the general public. Thus, there is a need to build long-term support for policy reform. Increased acknowledgement of existing problems within Europe (biological sustainability and economic profitability issues) has generally increased the awareness of a need for reform (the transformability), although differences between countries and regions within the EU are apparent.

In addition to political will, there is also a need for direction; i.e. content and coherence of the reform. Structural reform in fisheries is commonly focused on reducing over-capacity or the amount of fishing activity (OECD 2007), relating only to the

first link of the fisheries production chain. The "human side" of adjustment is often treated as a secondary issue in such transition processes (OECD 2007) reflecting a general lack of engagement with social issues in fisheries management (Symes and Phillipson 2009). However, the importance of social factors in helping or hindering the process of reform is increasingly being recognized. The (common) short-term focus for fishermen needs to be replaced by a more long-term

approach which considers fisheries policy within wider economic planning (Swan and Gréboval 2005). This will increase the capacity for long-term adaptability and resilience of fisheries communities (OECD 2007). All three case studies illustrate the importance of long-term trust building processes during reform and in implementation of policy. Trust between stakeholders is necessary in order to secure capacity for change and to produce working incentives.

APPLYING THE KEY CHARACTERISTICS OF BEST PRACTICE IN EUROPE

Possible options for creating the key characteristics for EU fisheries management are briefly described in this section.

1. OPERATIONAL OBJECTIVES AND GUIDELINES

A comprehensive framework is necessary to better guide actors in the system. Actors – scientists, fishers, decision-makers, civil servants and co-managers, need to know what to do, by when, how to do it, and how to measure success.

There is a range of options for creating operational objectives for the CFP. Meeting ecological objectives is a pre-requisite for any long-term economic and social sustainability. One approach to achieve this is to define priorities between the current (often conflicting) objectives, i.e. asserting that ecological sustainability and the sustainable use of fish stocks have priority over other objectives. A likely outcome of such prioritized objectives would be to follow the scientific recommendations for catch levels (i.e. ICES advice). Such prioritization likely requires more detailed guidelines to ensure that short-term social and economic costs are minimized and that they can be counterbalanced.

One way to achieve this is to apply a concept similar to the National Standards in the US (with priority given to NS 1 which forbids overfishing and requires overfished fisheries to be rebuilt) to bound fishery management options. The national standards help in evaluating policy measures and ensure coherence between different regions. In a European context, such standards would ensure a level playing field. Objectives and guidelines for resource conservation and ecological sustainability (and their enforcement) would be set by the Commission/Council as this is part of their “exclusive competence”. However, specific objectives and guidelines for economic and social sustainability are most appropriately dealt with when considering the implementation of policy. Therefore, they are best left to the Member States to prioritise and make operational.

Guidelines for the division of responsibilities between central, regional and Member State institutions need to be established (see p. 38), as well as standards for management actions depending on stock status, coherent surveillance and enforcement of regulations. Guidelines would include a set of rules for the required response in relation to fishing mortality and biological reference points, methods for taking uncertainty into account when setting quotas, as well as describing the process of developing and amending management plans.

Methods to measure success of management need to be developed, preferably at both central and regional level. For example, the use of indices for proportions of stocks exploited sustainably, could include the level of current knowledge about how well stocks are monitored and to describe and count management measures already in place.

2. TRANSPARENCY

Transparency needs to be improved and pervade all levels of data provisioning and decision making. Science needs to be so that it is properly understood and trusted. Decisions need to be made in a transparent way so that they are understood, perceived as fair and well reasoned, and to ensure that decision makers can be held accountable. Traceability of products is needed to improve enforcement and to make consumer choices easier and increase the impact of consumer actions, reflecting the public opinion of European fisheries.

Decisions made at the European level would benefit substantially from increased transparency. This would ensure a larger degree of accountability of those making the decisions. Policy decisions should at all times adhere as closely as possible to the scientific advice. Where policy decisions depart substantially from that advice, the reasons for doing so should be clearly stated. A transparent rationale for decisions should include pre-decisional analysis of options, using social and economic impact assessments of alternative deci-

sions, and choices within the range of options that have been analyzed. Mechanisms for ensuring access to and comprehensiveness of this information should be established.

A dialogue at the regional/member state levels between scientists and fishermen, on e.g. the basis for data collection and stock assessments, increase trust and credibility of the scientific advice. Co-operative research may provide an opportunity for improvement of assessment quality as well as support mutual understanding. The scientific information forming the basis of stock assessments has become increasingly utilized in the Regional Advisory Councils, leading to increase in transparency – although much work needs to be done to further improve this process. For example, observers are not allowed at stock assessment working groups of ICES, although they can observe review groups, advice drafting groups, and the adoption of scientific advice by the ICES Advisory Committee.

Common frameworks for traceability schemes can substantially improve transparency. Producer organisations can be stimulated to take an active role in ensuring traceability. Documentation provided by producer organisations can be used to cross-check information from monitoring and catch data for use by controlling agencies. The goal would be to establish mechanisms for tracing products from sea to plate, creating possibilities for consumers to influence all stages of the production chain. This would also make management regulations more enforceable and improve the quality of fishery dependent data used in the preparation of scientific advice.

3. PRECAUTIONARY APPROACH/REVERSAL OF THE BURDEN OF PROOF

Placing the burden of proof on users of a public resource and applying the precautionary approach is a way to put long-term sustainability and the public interest first. It allows the private sector to benefit from the use of public resources with sufficient evidence that the public interest is not unduly jeopardized and certifies that obligations are fulfilled. This can be extended to results-based management where

responsibilities and benefits can be kept or even extended when the outcome of actions is the desired one. It is important, however, that national authorities retain responsibility for evaluating data, and thus deciding whether or not resources are harvested in a sustainable manner - based on best evidence/science.

The industry can carry the burden of proof in several ways. It is important to consider how the industry is to prove that they fulfil obligations and live up to the set standards. Clear objectives and a reversal of the burden of proof leaves it to the industry to prove they live up to the given standards. This type of "results based management" creates incentives for ensuring compliance with established rules. It is possible to create a system where the industry is fully responsible for providing data and bearing the cost of data collection. Such a system requires that the precautionary approach is built into the system, making clear that catches always have to be lower when there is poor data, i.e. uncertainty reduces allowable catches. The industry is then allowed to decide whether the value of the possible higher catches exceeds the cost of more intense monitoring.

Another option is to use collected resource rent or direct payments from industry to fund a part of data collection and other monitoring activities, but governments or national authorities retain the right to decide upon which activities are necessary to ensure protection of the public interest. In this case a precautionary approach is introduced through guidelines provided by the authorities.

This approach of reversing the burden of proof creates positive incentives to contribute to increased knowledge and better data. A positive feedback can be generated which further increases these incentives.

The burden of proof and results-based management can also be applied to management itself. Co-management responsibility and accountability for outcome of management plans at the regional level represent a "reversal of the burden of proof" where the actors demonstrate that they fulfil the obligations they are put under and that the fishing activities do not interfere with the public's interest in current and

future use of ecosystem services provided by the sea. Another example includes application of results-based management to enforcement and compliance, whereby Member States would produce compliance plans for objective and transparent review by professionals. If plans do not have a reasonable chance of producing results, they would be rejected and actions would be triggered to correct the problem, or some fishing opportunities might be withheld.

4. RIGHTS WITH ASSOCIATED OBLIGATIONS

Transferable rights or privileges should be more widely used to eliminate excess capacity and to create a positive incentive to rationalize investment decisions. This will lower the effective discount rate of fishermen, i.e. assure a stake in the future, which should also motivate cooperation with and investment in science, as well as promoting self-enforcement and compliance.

The excess capacity can be substantially reduced by the introduction of market-like instruments, broadly defined as rights or privileges to fish in a system with limited access to the resource - in addition to substantial reductions in subsidies. Such instruments assure a long-term stake in the fishery and a more predictable future regarding catching opportunities. Market-like instruments come in many forms and they range from very flexible transferable property rights to strictly regulated limited access privileges. Permits to operate, in a fishery managed by market-like instruments, may be issued yearly, for a fixed time, e.g. 10 years, or for unlimited time. The permits can be given out for free, being paid for or auctioned off in order to collect a part of the wealth for public good or to recover a part of the management cost. Longer term access to fisheries, in combination with strong mechanisms for enforcement, is likely to stimulate compliance by the development and maintenance of a "culture of compliance" and self-enforcement.

Market-like instruments for incentives for sustainable fishing are often discussed and applied in the form of ITQs. ITQs place an emphasis on rationalis-

ing the fleets for the purpose of improving efficiency, profitability and competitiveness for the catching sector as a whole and for individual enterprises. An important by-product of the market process is an industry-funded reduction in catching capacity towards a point where capacity and harvesting opportunities are in balance. Among the social disadvantages of such schemes, however, is the tendency for structural and geographical concentration of the catching sector. Moreover, quota prices tend to reach levels well in excess of the affordability of new entrants to the industry. Although some of the negative side effects of ITQs can be addressed through regulation of the market, the effect of such intervention will be to limit the effectiveness of ITQs as a means of reducing fishing capacity. The design of the instrument is thus important, as that will set the trade-off between social and economic goals.

The principles of relative stability and subsidiarity, are often discussed in relation to rights-based management under the CFP. Relative stability is often raised as a barrier to rights-based management. However, rights are already applied at the national level and there are, today, various schemes that allow non-permanent trading of rights between fishing enterprises of different countries and these arrangements could be expanded. The element of transferability is not as widespread, however.

To ensure the desired effects of transferable rights, a system with European guidelines, Member States decisions and European approval could be a way forward. In this case, Member States develop plans for review by EC before qualifying for funds from the European Fisheries Fund. The review should be transparent and conducted by objective professionals insulated from political influence. The design of rights and their implementation is up to the Member States, but the independent reviews ensure that they effectively end overcapacity.

Community based allocation of rights

There may well be circumstances where an ITQ system is inappropriate and where other forms of resource allocation can offer similar incentives to reduce fishing pressure and achieve compliance.

Such circumstances might include artisanal inshore fisheries and vulnerable fishing areas often located in more remote or marginal rural areas where alternative forms of livelihood are scarce. Here the concept of 'community quotas' may offer a viable alternative to ITQs. Clearly defined groups of fisheries (e.g. member of a cooperative or Producer Organisation) are allocated shares of the TAC which they manage for the benefit of the collective membership, deciding on the internal allocation of shares in the quota, rules for the sub-leasing of quota, establishing a reserve pool of quota for distribution to new entrants etc. Given the promise of long-term security of community quotas, collective decisions will tend to favour sustainable fishing as a means of protecting the value of the fishing rights.

Community quotas can form the centrepiece of a more comprehensive system of support for and management of the local fishing industry, which exploits the positive attributes of fishers (skill, experience and local ecological knowledge) and builds on the collective strengths of local and regional networks of fishing communities with a highly developed sense of self-reliance and will to survive. The range of actions is potentially quite extensive from the design of local fishing plans and voluntary codes of conduct, through schemes to improve marketing and processing so as to increase the value added to locally landed catches, to the provision of loans, grants and training schemes to assist the social renewal of the local industry. All such schemes can deliver benefits to the fisheries as well as to the economic and social sustainability of local fishing related industries and fishing dependent areas. Their impact is likely to be that much stronger when developed within the framework of a local or regional management plan for the fishery, as in the case of the Shetland Islands.

5. ACCOUNTABILITY AND PENALTIES

Positive incentives are the desired way forward, but they should be backed up by knowledge that there is a price to be paid for abuse.

- Authorisation of devolved management respons-

ibilities should be withdrawn where there is evidence that those responsibilities are being seriously abused

- **Decision makers should be subject to judicial review and public opinion**
- **Industry should face stiff penalties for illegal or unethical activity, including loss of fishing rights.**

Coherent European enforcement policies are needed, which has a capacity to detect, prosecute and punish fisheries offences in a manner that produce sufficient incentives for actors to refrain from illegal activities. These "negative" incentives should include the potential to withdraw the rights to fish and (for devolved management bodies) the rights to co-manage the resource. The Commission has recently highlighted that the allocation of responsibilities between the Member States, the Commission and the Common Fisheries Control Agency should be further clarified and confirm that control of compliance with the CFP rules should be first and foremost the responsibility of the Member States. Notably in the proposed new control regulation the Commission inspectors would have more powers.

Contrary to the regionalisation of decision-making, it would not pose problems from a Community legal perspective. A regionalised control regime implying enhanced cooperation and standards would strengthen compliance and enforcement. It must be explored to what extent the role and tasks of the Community Fisheries Control Agency (CFCA) can be regionalised and require a certain transfer of competences to the EU level.

6. REGIONALIZATION AND CO-MANAGEMENT

A regionalized approach, establishing a regional management organisation (RMO) would allow flexibility so that management can better fit to regional differences, without threatening the "common" policy. Co-management incorporating stakeholders will ideally instil a sense of ownership and responsibility and the regional level implies that it will take

place at a geographical scale that is more meaningful to most people and thus adhere more concretely to the subsidiarity principle.

Properly implemented, regionalization can:

- (i) assist in the transfer of detailed management tasks from the centre to a more appropriate scale, bringing responsibility for tactical decision making closer to the areas directly affected and so help to remove the burden of micro-management from the Commission;
- (ii) facilitate the implementation and development of the ecosystem based approach to fisheries management as the regional seas are more comparable to large scale ecosystems;
- (iii) create the opportunity to develop regional fisheries management plans for the delivery of core objectives and targets in relation to conservation policy;
- (iv) devolve co-management responsibility and secure accountability for outcome of management plans at the regional level. This represents a “reversal of the burden of proof” where the actors demonstrate that they fulfil the obligations they are put under and that the fishing activities don’t interfere with the public’s interest in current and future use of ecosystem services provided by the sea;
- (v) make possible the coordination of implementation policies concerning control, enforcement, monitoring and evaluation; and
- (vi) enable effective coordination of the EU’s marine strategy, maritime management strategy and fisheries policy.

The institutional arrangements required for regionalization will depend on a range of issues, in particular whether the regional management is to have advisory or executive functions. Assuming that the intention is, over time, to devolve certain management responsibilities to the region, then important issues are likely to concern:

- (i) legal competence – whether this is vested in the EU, MS or the RMO (ii) constitution and composition – whether the RMO is made up of MS administrators, stakeholders (broader than the fishing industries) or, preferably, a mix of the two elements;
- (ii) avoidance of the re-politicisation of the CFP at the regional level;
- (iii) funding – the RMO is likely to be an added cost for EU fisheries management, though there should be some marginal savings for both MS and DG Mare;
- (iv) the interactions of the RMO with the science community (ICES, MS laboratories etc)
- (v) the future of the RACs – one option is to extend the powers and responsibilities of the RACs rather than create a new RMO body. Another option is that the RACs continue to function as expert advisory bodies serving the new regional authorities. A third option is that the RACs are subsumed into the new RMO
- (vi) the most appropriate geographical scale - the present division of the common pond into 5 regional seas provides an appropriate starting point for the regionalisation of the CFP. Additional regions may be necessary although that may risk fragmenting the CFP and endanger the sense of ‘a common policy applied across a level playing field’. It is also necessary to consider how the RMO would interact with the Pelagic RAC.

Regionalization can be a means of delivering key areas of reform. Reform of the CFP is not necessarily dependent on a commitment to devolving areas of responsibility for fisheries management to the ‘regions’ over the period 2012 – 2022, but could be greatly assisted by such a process. Regionalization should help to improve the implementation of the CFP because decision making will focus on developing good, practical working relationships between neighbouring coastal Member States (and fishing industries) that share an interest in a common fishery and its future

sustainability without the distractions of broader political issues. A co-management approach with regard to the principle of subsidiarity would be less about empowering the Member States over the European institutions than finding the appropriate level of governance where managers and policy makers are best able to work closely with the fishing industry. However, for this to be feasible Member States have to demonstrate a willingness and determination to implement and enforce the agreed policies in full.

The basic division of responsibility for fisheries management within the EU is between the European institutions (Commission, Council, European Parliament) concerned with the formulation of policy, where the 'exclusive competence' of the Commission with regard to conservation of living marine resources is a key feature; and the Member States, concerned with the implementation of policy (control, enforcement) which allows Member States considerable freedom to develop their own distinctive management systems in relation to quota management, inshore fisheries, fleet restructuring etc leading to a proliferation of different styles, non-standardized means of control and uneven standards of enforcement across the EU. In conformity with the EC Treaty, the leading role of the Commission and the Council of Ministers in adopting conservation measures would have to be maintained, but in a more strategic and overarching manner. They should be setting operational objectives such as "fish stocks above biological limits" or "environmental impacts minimised" which, in turn, are elaborated in the regions with region-specific objectives (see p.46). The current CFP already includes large elements of regional variation, particularly the RACs, which could be strengthened and used more effectively with respect to stock conservation, the support of fishing dependent communities and the direct involvement of the various interested parties in regional fisheries.

There are several legal considerations that need appropriate attention but increased regionalization appears to be possible within the current framework (see Appendix 1). Regional co-management systems (i.e. where stakeholders are not merely consulted but rather share management responsibility) can help to

improve the relevance, legitimacy of – and compliance with – management decisions, and it is likely that opportunities for developing co-management would be enhanced through regionalization.

Potential funding for a regionalisation process

The CFP has an overall budget of € 6.7 billion for the period 2007 –2013. € 4.3 billion of this is earmarked for the European Fisheries Fund (EFF), the support instrument for structural actions for fisheries and aquaculture for that period. At present, the EFF is not suited for financing the costs incurred for supporting and developing a regionalisation of the CFP. Although under priority axis 4, support may be granted for the promotion of inter-regional and trans-national co-operation among groups in fisheries areas, mainly through networking and disseminating best practice. Financial support can also contribute to the running costs of the groups, i.e. those representing public and private partners from the various local relevant socio economic sectors. Under Priority axis 3, the EFF may support measures of common interest which are implemented with the active support of operators themselves or by organisations acting on behalf of producers or other organisations recognised by the Member State and which aim, inter alia, to contribute sustainably to better management or conservation of resources. The scope of the EFF should be amended in order to make financial support available to all having management responsibilities within a regionalised CFP post 2013 when the current financing period expires.

The Community contributes part of the operating costs of the RACs. In 2007 it was decided that the Community financial contribution towards the cost incurred by the RACs would become permanent. The grant allocated by the Community to each RAC for its operating costs could not exceed 90% of the operating budget of the RAC. In the following years, the financial contribution was to be fixed in an "operating grant agreement". The enhanced roles of the RAC in a regionalized CFP should be recognized post 2012, by enhancing and broadening the financial support.

MANAGEMENT OF THE BALTIC SEA

As the process of review and reform of the CFP is launched, the question is whether a courageous political vision in the Baltic can be created in order to achieve an internationally respected marine policy approach.

Path dependence is embedded in so much of community business, from exclusive competence to the investment of political capital by Member States in ensuring that earlier policy decisions will benefit their own fishing industries. Most commonly, policy development is likely to proceed by incremental changes that broadly continue the original trajectory. However, the extent of the difficulties that the CFP currently faces might be enough to create a window of opportunity for more radical reform in 2012. Assimilating experience from around the world, and more specifically from the case studies of progressive fisheries management regimes, the highlighted best practices could lead to sustainable management of European fisheries. In this chapter we outline how best practice characteristics can be applied to the Baltic Sea context and provide a concrete example. It should, however, be stressed that:

- discussions and decisions regarding Baltic Sea fish stocks and fisheries, related resources and environmental issues need to be preceded by intensive dialogue with stakeholders from the various sectors, and
- recognizing the importance of the historical and contextual nature of fisheries management, best

practices depend on ecological, economic and social conditions at local, national and regional scales.

Applying "Best practices" successfully anywhere can only be achieved if means of doing so is developed in close collaboration with those primarily affected. The suggestions below should only be regarded as ideas for further development and a starting point for a dialogue among the relevant Member States and stakeholders.

A TRADITION OF DIALOGUE AND COLLABORATION

Simply in terms of the distressed natural environment and depleted ecosystem, the Baltic Sea represents a stern challenge to those with responsibility for its management. In this area, HELCOM⁵ (Helsinki Convention for the protection of the marine environment in the Baltic Sea) and IBSFC⁶ (International Baltic Sea Fisheries Council), ICES (described above, section "Background and problem description") and more recently the Baltic Sea RAC have worked side by side since the 1970s. HELCOM has since it was established made it possible for stakeholders and organizations to participate as observers. IBSFC, on the other hand, was a notoriously closed community, forced to open only by interdisciplinary initiatives generated by sustainable development and the development of an Agenda 21 for the Baltic Sea

⁵ HELCOM is the governing body of the "Convention on the Protection of the Marine Environment of the Baltic Sea Area" - also known as the Helsinki Convention and was established in 1974. In the light of political changes, a new convention was signed in 1992 by all the states bordering the Baltic Sea, and the European Community. The Convention covers the whole of the Baltic Sea area, including inland waters as well as the waters of the sea and the seabed. Measures are also taken in the whole catchment area of the Baltic Sea to reduce land-based pollution and have focused on: eutrophication, hazardous substances, pollution from land and maritime transportation, environmental impacts of fisheries and conservation of marine and coastal biodiversity.

⁶ IBSFC The Convention on Fishing and Conservation of the Living Resources in the Baltic Sea and the Belts (the Gdansk Convention) established the International Baltic Sea Fishery Commission and was signed 1973 by Finland, Denmark, East and West Germany, Poland, Sweden and the Soviet Union. In 1992, Estonia, Latvia and Lithuania acceded to the Convention. The IBSFC set TACs and distributed quotas. Scientific advice on TACs came from ICES. The negotiations regarding the TACs were highly political and most frequently resulted in TACs well over the scientific advice. With accession of the Baltic states and Poland, IBSFC ceased to exist in 2006 and is replaced by a bilateral agreement between Russia and the EC.

Characteristics of the Baltic Sea

Characteristics of the Baltic Sea
The Baltic Sea is a large and almost entirely enclosed marine region, located in Northern Europe. It is a brackish sea with both salt and fresh water. Baltic Sea water flows northwards through the sounds and along the Swedish west coast in the Baltic Current. Periodic extensive inflows of salt water fill the deep areas further north with oxygenated water. This occurrence has been irregular in recent years. Complete water exchange of the sea occurs approximately within one human generation. This means that pollutants which are released into the water remain there for a long time.

There are strong vertical and horizontal gradients in temperature, salinity and oxygen due to the limited hydrographical exchange with the North Sea. From approximately 25 ppm in Kattegatt salinity decreases to 8 ppm in the southern Baltic proper, and is down to only 2 ppm in the northern Gulf of Bothnia and in the innermost parts of the Gulf of Finland. The salinity levels significantly influence marine life. Species diversity is low as few species can live under such stressful conditions. The numbers of marine species decrease from more than 1,000 in Kattegatt to

only 50 in the Gulf of Bothnia and in the Gulf of Finland, where fresh water species begin to dominate.

The most abundant commercial fish species are presently sprat, herring and cod. All three species have experienced major fluctuations since the 1960s and cod is presently at historically low abundance according to scientific assessments although there have been signs of improvement in the Eastern stock. Fishing mortality is high. Production in all three species is believed to be influenced by both climatic conditions and species interactions (predation, competition). A fourth important species in the Baltic Sea is salmon. Research on these species is a national responsibility, but there is international coordination, and scientific advice is prepared by the International Council for the Sea (ICES).

Three major changes to the Baltic ecosystem have occurred during the 20th century: intensification of fishing activity, eutrophication and eradication of most marine mammals. Other changes such as species invasions and introductions, pollution by persistent contaminants (heavy metals, PCBs etc.), disappearing wetlands and

river runoff regulation due to hydroelectric power dams have also impacted the marine ecosystem.

In addition, climate change and fishery induced changes in the food web of the Baltic Sea may shift the ecosystem between regimes that at times favour pelagic species and at other times favour demersal species. The mechanisms behind these so called regime shifts, the relative importance of natural and human causal factors, and the duration and reversibility of regimes are being investigated, but there are no conclusive answers. Nevertheless, this type of ecosystem dynamics needs to be taken into account in an ecosystem based fishery management plan for the Baltic Sea.

85 million people inhabit the drainage area of the Baltic Sea. Most live in the southern half, and approximately half reside in Poland. The area is intensely industrialized with forestry operations dominating in the north and agriculture in the south. Significant efforts have been made to address the largest point sources. Today's emissions are dominated by many small, diffuse, sources which collectively constitute a significant impact on the Baltic Sea.

Region. The scientific program of ICES is open to all, and its advisory program is increasingly open to stakeholders. HELCOM has in recent years struggled to redefine its identity as the legal instrument for marine protection where all but one Contracting Parties have become Member States in the European Union. It should be noted that Member States have so far supported maintaining the regional forum for

marine environmental policy, even though the mandatory regulations today are elaborated by Directives. It cannot be denied that the regional administrative framework has strengthened effective and regular dialogue in this area.

Baltic Sea Regional Advisory Council

The Baltic Sea Regional Advisory Council (BS RAC)

was set up in March 2006. The main aim of the BS RAC is to prepare and provide advice on the management of Baltic Sea fisheries to the European Commission. However, there is a separation of demersal (cod) and pelagic fisheries (for herring and sprat). This is an impediment to an ecosystem approach to fisheries management for the Baltic Sea. The BS RAC consists of representatives from the fishing sector and other interest groups affected by the Common Fisheries Policy. These include fisheries’ associations, producer organisations, processors, market organisations, environmental NGOs, aquaculture producers, consumers, women’s networks and recreational and sports fishermen.

The four significant institutions dealing with marine and fisheries issue have occupied the Baltic Sea regional arena during the past 40 years. The list of their successes and failures is long. In many different ways the Baltic Sea region could provide the most suitable case for testing the concept of regionalized fisheries management in practice. The fact that there has been, in the past and at present, an ongoing multi-national dialogue with regard to environment and fisheries issues with several existing forums for discussion is a great advantage when striving for success.

CRITICAL ISSUES AND OPPORTUNITIES IN THE BALTIC SEA

Numerous negative trends regarding fisheries management in the Baltic Sea need to be halted to ensure sustainable fisheries for future generations in the region. Some of the most critical issues are that:

- ICES advice on Baltic Sea stocks has more frequently been politicized and disregarded than adhered to in the past 20 years

- More than 80% (4 out of 5) of the assessed major commercial stocks in the Baltic Sea are overfished,⁷
- Transparency and trust is still an issue between engaged stakeholders (industry and others) as well as between civil servants and stakeholders
- Capacity is not in balance with the resource
- High degree of unreported and unregulated fishing activity
- Possible regime shift due to fishing induced changes in the food web, climate change, and other human caused stresses.
- Diverse views on the economic, social and cultural value of various species and the role of fisheries among Member States around the Baltic.

Despite negative trends there are also numerous opportunities to build on both historical as well as current management and policy instruments:

- Long tradition of multinational dialogue in the area of marine environment protection
- A growing culture of dialogue with other stakeholders interested in the area of fisheries is developing through the Baltic Sea RAC
- Numerous EU environmental directives are strengthened by demands for integration of policy areas
- Eastern cod stock is showing signs of improvement which, with proper management, can generate a viable optimal yield stock in a few years
- Strong scientific capability upon which to base policy and management
- 90% of the marine territory are within the Community. Only external partner is the Russian Federation.

⁷ Fishing mortality in relation to high long-term yield. ICES includes 16 stocks in their advice for the Baltic Sea, however the state of most stocks is unknown (ICES 2008c)

APPLYING THE KEY CHARACTERISTICS OF BEST PRACTICE IN THE BALTIC SEA

The key characteristics of best practice, as identified through the case studies and described more generally regarding options for applying them in Europe, will in this section be made more concrete in order to stimulate a discussion on possible ways forward. The text will follow the logic of the chapter "Applying the key characteristics of best practice in Europe", with one exception. Important features and considerations for regionalization and co-management will be described first, since regional application is the basis for future discussion.

REGIONAL GOVERNANCE

In order to address the regional needs and unique conditions effectively, while making use of existing advantages, establishing a regional co-management organisation for the Baltic Sea could be a way forward. Co-management needs to function horizontally with Member States sharing responsibility with stakeholders, and vertically with the European Commission sharing responsibilities and empowering a regional management entity to operate with pan European policies and guidelines. This is by no means a quick or easy fix. In order to be successful there needs to be a firm commitment and engagement by national governments and the EC as well as stakeholders⁸.

The Baltic Sea RAC could become an important building block for a broad co-management approach. Such is the distressed state of the Baltic Sea ecosystem and so serious are the implications for fisheries that there is a case to be made for a regional management body that addresses environmental and fisheries management together. As suggested above a regional management body would be strengthened and ad-

ressing the complexity facing marine environment and fisheries management in the region. That would mean that representation should be broader and be representative of the wider policy context of marine issues and the ecosystem of which fish are components.

Recognizing that numerous issues need to be ironed out in order to ensure and describe appropriate representation a sketch will be provided, focusing on fisheries governance since it is a community competence issue⁹. In order for a regional body to have the appropriate decision making power it needs to be clearly established that the Member State governments will collaborate together through an enhanced cooperation mechanism between Member States where they request the delegation of competence to the Baltic Sea Member States. Considering the political geography of the Baltic Sea region the council could consist of:

- government representatives from the Baltic Sea Member States,
- industry and recreational stakeholders as well as
- stakeholders from environmental and other interest groups.

A step-by-step process

The work of a future Baltic Sea regional body will have to fulfil several purposes. The Baltic Sea is the management unit, or encompasses the management units, in several other policy initiatives (e.g. Marine Strategy Directive, Maritime Strategy, Baltic Sea Strategy, HELCOM Baltic Sea Action Plan and in coastal waters the Water Framework Directive). Currently the Baltic Sea Strategy could prove to be the most effective tool to ensure integration between fisheries and environment. In order to effectively address integration between policy areas, as well as the

⁸ Stakeholder participation will be context-dependant. Recreational fisheries are of major importance in some regions, whereas of minor in other areas. For example, more than 100 000 anglers fish off the German Baltic coast yearly, removing 1,9-5,0 million cod annually, or 1900-5100 t biomass. This compares to 30-50% of the catch of German commercial fisheries.

⁹ Legal constraints and opportunities have been elaborated in the previous chapter and in Appendix 1.

various regional differences and interests, development of a comprehensive management approach to Baltic Sea fisheries needs to evolve through a series of steps including:

1. Scoping to share knowledge about the Baltic Sea, identify problems, and developing a shared vision;
2. Translation of the vision into more specific descriptors of the desirable state of the system with measurable indicators and reference levels to track progress;
3. Identification of management options to address problems and fulfil operational objectives (as specified by indicators and reference levels);
4. Incentive analysis of each of the options relative to evidence, decision making, and compliance
5. Analysis of options in terms of the biological, economic and social impacts;
6. Design of enforcement plans for each of the options to assure that there will be acceptable compliance;
7. Consultation process to assure that there is a broad opportunity for comment on the options;
8. Selection of the preferred options;
9. Implementation and monitoring.

These steps are intended to be illustrative rather than prescriptive and a discussion about the most feasible method for the Baltic Sea region should be encouraged.

Subcommittees and working groups

Despite the Baltic being a well-defined region, the biogeochemical gradients in the system make some issues more properly dealt with on a sub-basin scale. Further, more specific topics can be handled by the most engaged stakeholders and experts in the field, rather than treated by the entire regional body. Demersal and pelagic fisheries should, for example, be handled differently, recognizing their interaction to a greater extent. A number of subcommittees could be established to properly consider issues such as:

- By-catch and fishery interactions with marine mammals and seabirds,

- Ecosystem considerations including multispecies interactions and ecosystem status indicators,
- Sub-regional groups, e.g., Bay of Bothnia, Baltic Proper, Kattegat etc.
- Cooperative research including gear development, fish biology and ecology,
- Control measures,
- Enforcement.

Stakeholders and science

Availability, independence and transparency of evidence provision are important to ensure trusted decision making. The existence of ICES as an external and independent source of scientific advice is important, especially in a multilateral international context. In the Baltic Sea transparency and trust between science and stakeholders will be of decisive importance in moving things forward. Currently observers can participate in ICES review groups, advice drafting groups and the ICES Advisory Committee where the scientific advice is adopted. However, broader mechanisms to ensure input from stakeholders are desirable. Data collection and stock assessment programs where the industry and scientists work together has proven in other areas to provide valuable information and greatly improve transparency. Similarly, the establishment of collaborative research projects allow fishermen and scientists to work together as equal partners, each using their unique knowledge and experience to better understand the marine environment, fisheries, marine communities and fish capture systems, and to promote effective and equal use of marine resources.

Collaborative research fosters a culture of partnership, increasing the dialogue between stakeholders of fishery resources and developing future participation. It is targeted outreach aimed at drawing fishermen into research and into participation in proposal writing by integrating their knowledge with scientific methods.

The research can be broad or specific and elaborated within the RMO. It can be thematic and contribute to illuminating contested or unknown issues as well as affirming or verifying known issues.

National co-ordination

Moreover, national governments will need to formalize, improve and strengthen their dialogue with the various national stakeholders. On the one hand, the aim is simply to foster trust and openness which is needed in the entire process. On the other hand, dialogue and trust are necessary when discussing administrative and regulatory frameworks regarding data and elaborating scientific advice, enforcement, socio-economic objectives, administering fleet etc. Finally, it is imperative that the subsidiarity principle be applied to ensure that decisions are taken as close to the citizen as possible. A first step is to delegate decision power from the EU to the level where action is most likely to have an impact, be it at the national, regional or local level. This applies equally well in the Baltic Sea as in other waters within the EU.

Orientation program

In order to improve dialogue and integration an orientation program for the future RMO would be appropriate. To ensure that there is the same information base for the whole group of members in the management body the course could cover a number of relevant topics, such as fishery science and basic stock assessment methods, fishery management techniques, environmental quality issues and monitoring, data needs and decision-making procedures, social science and fishery economics, development of management plans – the list of possible topics is potentially quite long. The orientation should be available to both staff and council members and be mandatory.

Funding opportunities

There are possible ways to finance the process of developing and maintaining a regional management organisation for the Baltic Sea. The Community contributes part of the operating costs of the RACs. In 2007 it was decided that the Community financial contribution towards the cost incurred by the RACs would become permanent. The grant allocated by the Community to each RAC for its operating costs could not exceed 90% of the operating budget of the RAC. In the following years, the financial

contribution was to be fixed in an “operating grant agreement”. The enhanced roles of the RAC in a regionalized CFP should be recognized post 2012, by enhancing and broadening the financial support.

OPERATIONAL OBJECTIVES AND GUIDELINES

The different experiences and contexts in Europe implies a need for overarching, general policy aims, which could remain much as they are today, although they need to be prioritized (see p.36). Such aims could be:

- Fish stocks above safe biological limits
- Environmental impacts minimized
- Prosperous fishing industry
- Vibrant local fishing communities.

In order to have relevance on a regional scale, however, the objectives need to be brought closer to the users and managers of the Baltic Sea region and to be further specified, while remaining consistent with the Community level objectives.

Regional objectives should be defined through a comprehensive process involving politicians, manager and stakeholders as well as input from the public, such as the step-by-step-process outlined above.

Notwithstanding the importance of broad participation in the scoping process, one can foresee several important issues to be addressed regionally, such as:

- Ending overfishing and rebuilding overfished stocks,
- Taking account of food web interactions, particularly between pelagic and demersal species,
- Taking account of apparent regime shifts on reference levels for fish stocks,
- Harmonizing fishing capacity with fishing opportunities,
- Addressing the impacts of habitat degradation on productivity of fishery resources;
- Reducing wasteful and harmful interactions between fisheries, marine mammals and sea birds,
- Reconciling different views and values when it comes to trade-offs between pelagic and demersal

fisheries, and small-scale coastal and industrial fisheries.

Operational guidelines for management, following the developed objectives, should also be developed by the step-by-step process. One example could be the formulation of mandatory (legally-binding) multiannual rebuilding plans, a useful instrument when a stock is assessed as overfished. The rebuilding plans should ensure a recovery of the stock to a pre-defined target level within biologically realistic time frame (usually about the generation time of the species being rebuilt). The recently adopted (2007) Multiannual plan for Baltic cod provides one such example, where council decisions in 2008 were in line with the agreed plan. A strong legal framework (i.e. the operational guidelines) for these plans is however still necessary to ensure compliance with the agreed plan – and avoiding the risk of politicization of annual quota decisions.

Incorporating an ecosystem approach to management

A regional approach to the Baltic Sea, taking in to account the above issues will enable the often called for, but rarely (in a European context) applied, ecosystem approach. The Common Fisheries Policy and the Marine Strategy Directive both underline the importance of this approach and the HELCOM countries have, in the discussions following the adoption of the Baltic Sea Action Plan, emphasized the potential in making the Baltic Sea a European Pilot area for this approach.

There is a need to provide sufficient management response to the ecosystem approach, not only in the area of fisheries but also in marine environment issues. The complexity of marine ecosystems and incomplete understanding of how they function is not a reason to fear or delay an ecosystem approach. Fisheries management needs to progress through an evolutionary process towards an ecosystem approach.

The ecosystem approach can be viewed as contributing to integration of fisheries with marine environment policy and delivering on demands put forth by other current policy developments and an opportu-

nity to improve knowledge and data.

The ecosystem approach is increasingly recognized globally and the case studies represent some of the leading nations in its implementation. The incorporation of the approach has been incremental in all case studies, contributing to safeguarding long-term sustainability of stocks and considering marine biodiversity and ecosystem functions. As 'regime shifts' are increasingly being considered when addressing environmental quality issues in the Baltic Sea it seems appropriate that management systems maintain the adaptability to respond to changes in the underlying characteristics of an ecosystem. The ecosystem approach should be incorporated in management, reflected in the objectives and influencing design of data collection and science structure. The step-by-step process suggested above can be used to identify these elements of the ecosystem approach, ensuring a shared view, and to guide the process of decisions and implementation.

Conservation Measures

At the European level, the primary conservation measure is the Total Allowable Catch (usually on landings, not catch). Effort limits are used to back up TACs and to encourage capacity reductions. A regional co-management approach will allow more flexibility to apply measures that fit the regional situation. This might include more use of closed areas (or MPAs), larger mesh sizes and minimum fish sizes, discard ban and accompanying measures to discourage illegal discarding, replacing TACs with effort limits.

TRANSPARENCY

A new regional organisation for the Baltic Sea needs to ensure transparency at all levels, from evidence provision to decision-making and enforcement actions. Traceability is another aspect of transparency as it is the window for the public as consumers to influence fisheries. Further, traceability is a mechanism for providing better evidence and can facilitate effective enforcement.

Thorough analysis of options before decisions are

made, using best available science (ensured by developed guidelines) is an important tool. The analysis should include assessments of ecological, social and economic impacts to guide the selection of an option within the range of the analysed options. This is a prerequisite for transparent decisions in line with agreed objectives.

Transparent social and economic data can provide an important basis for accountability in management decisions and illustrate different options for economic and social trade-offs. Thorough economic and social analyses are required for deciding lowest impact of management measures, such as analysis of break-even points and profitability for small businesses; cost-benefit analysis for management actions as well as more general economic impact analysis - impacts on the human environment and other sectors related to the fisheries operations. However, in this context it is important to stress the need for decisions with a long-term focus. Short-term social or economic costs, as revealed by impact assessments, can never be allowed to change the focus from long-term sustainability and precautionary decisions. The impact analysis should instead be used to guide decisions on e.g. how to allocate quotas or the design of fishing rights, as that will reflect the trade-offs between goals that can be met to various extents when ecological sustainability is secured.

For the Baltic Sea, a necessary first step would be to develop standardised methodologies for collection of relevant data. Standardised collection of biological data has been co-ordinated by HELCOM and ICES, together with national laboratories for decades, making it possible to conduct integrated biological assessment of the biological parameters of the Baltic Sea. A similar database is needed also for social and economic parameters. A consistent approach to these issues is a major challenge for a regional management body considering the large differences in the region regarding local and national dependence on fisheries.

Traceability of fisheries products

Traceability ensures that a fish can be traced from being harvested through the stages of distribution and processing to the sales counter. Traceability

systems may, in a similar way as certification (such as the Marine Stewardship Council – MSC), increase market value of the product and provide opportunities to sell the product on more markets. Consumer awareness of sustainability issues, often in combination with pressure from environmental NGOs (e.g. Swedish consumer boycott of Baltic cod), have potential to ensure or keep an eye on sustainability issues in fisheries if facilitated by traceability systems. With traceability, consumer choice can impact the whole chain from sea to plate, thus improving sustainability of every step. Thus, traceability provides increased additional incentives for the industry to demonstrate responsible behaviour with regards to sustainable harvest and ecosystem effects of fishing. Traceability is also an important component of effective and coherent enforcement.

PRECAUTIONARY APPROACH/REVERSAL OF THE BURDEN OF PROOF

The dynamics of the Baltic Sea and the strong influence of hydrographical variation on species distribution and abundance underline the importance of a precautionary approach. Large unknowns in relation to the dynamic interplay between species and the potential impacts of climate change on e.g. Baltic cod reproduction (e.g. MacKenzie et al. 2007, Österblom et al. 2007) also stress the importance of following scientific advice, taking into account the uncertainties related to a possible regime shift influencing the reproductive potential for commercial stocks. The low profitability of the fishing industry and the potential gains from a rebuilt cod stock is an additional argument for ensuring long term compliance with agreed precautionary decisions on catch quotas. The potential gains, and the fact that the industry uses a public resource, are pervasive reasons why the industry should contribute to facilitating this process, i.e. providing evidence on the sustainability of fishing activities and to show that these do not have a negative influence on the public goods, the resource. Potential mechanisms to ensure such reversal of the burden of proof are described under the section on EU applications of Best practices.

Results-based management can also be applied to the Baltic Sea regional management itself. The industry should be required to demonstrate that it can fulfil the obligations they are put under or risk losing the mandate to manage the resource, i.e. a mechanism to withdraw authority from the regional body should be established.

RIGHTS WITH ASSOCIATED OBLIGATIONS

Long-term exclusive rights of access generally provide incentives for the industry to conduct sustainable fisheries for the benefit of their future business. Market-like instruments can, to varying degrees, create such long term exclusive rights. Individually transferable quotas – ITQs, could contribute to reducing over-capacity and improve profitability for Baltic Sea fisheries – but there is a variety of long-term exclusive rights that could provide similar incentives.

Transferability of individual quotas is important for adapting fishing capacity to catch opportunity. ITQs have proven to be efficient in this respect. Success of any rights depends on tradition in the given fishery, on the acceptance of biological advice and on legitimacy of rules. It also depends on the number of rights owners, economic conditions and fluctuations in market forces. If adherence to rules is low, control is weak and market drivers for high-grading are high the “fishing opportunities” easily risk exceeding the TAC’s. Under such circumstances ITQs and other rights will not prevent illegal catches, high-grading and other forms of discards. Other possible negative aspects of ITQs can be capital concentration and the impoverishment of coastal fisheries. These are likely effects of an entirely unregulated ITQ system. In most market economies, as in the Baltic Sea region, such consequences can be regulated by public policy measures.

Several governments in the Baltic Sea region have embarked on establishing various ITQ systems, and it seems appropriate to build on ongoing initiatives as long as caution and regulations are shared. ITQ management can be designed to serve societal policies in relation to: structural development of the fleet, restriction of capital- or owner concentration, defining

fleet segments with no cross-border transferability, allocation priorities, premiums for coastal fisheries or geographical regions, facilitating new entry e.g. young fishermen’s entry.

The design of rights has to be left to Member States, but a management plan for the Baltic Sea can provide a platform for testing rights in a regional perspective. This could include establishing international rights for selected offshore segments of some fisheries while maintaining national jurisdiction for coastal fleets. Increased regional cooperation will also enable exchange of national experiences with different systems of rights.

Associated obligations

Although rights provide incentives for sustainable actions, there is a need for additional regulations to control fishing mortality. Rights-holders should comply with regulations for reducing ‘unwanted mortality’ caused by discarding at sea and high-grading. Another possible tool in this context is real-time closures of areas with high concentrations of juvenile fish. This would be an additional measure for ensuring that fish caught have spawned, it would maximise possible output by only targeting the age-classes giving the highest yield per recruit and reduce incentives to discard (due to catch of undersized fish).

Further possible obligations associated with obtaining rights include contributing to reduce ghost fishing (i.e. recovering lost gears), as well as developing and improving fishing gear, which reduce negative impacts of the fishery. Additionally, the right to fish should come with some form of obligation to assist in collecting the data necessary for management, including information needed to ensure compliance with other ecosystem objectives.

Subsidies

While well-defined right that eliminate the incentive to race for the fish is the most important action to harmonize fishing capacity with fishing opportunities, eliminating subsidies is as significant. A regional approach for the Baltic should address financial assistance programs of member states around the Baltic Sea (including their strategies for distribution

of European Fisheries Funds), so that there are agreed strategies and guidelines so that these funds serve overall goals, and do not exacerbate the problems of excess capacity and overfishing. Moreover, if certain funding is made available, rigorous cross compliance needs to be ensured making all funding subject to compliance with regulations. If there is a breach, the funding is removed.

ACCOUNTABILITY AND PENALTIES

From trials conducted in Denmark, a switch to catch quota as opposed to landing quotas required by EU regulations, would be expected to increase accountability and thereby limit fishing mortality. At present TAC/quotas are managed on basis of registered landings, as registration of catches is considered unreliable and uncontrollable. To avoid an unacceptable discrepancy between catches and landings EU has introduced a vast number of regulations and controls without apparent success. Total catches are not known, but the overcapacity in fleets show, that highgrading and misreporting is an important economic activity.

One concrete option is to set quotas as "catch quotas" instead of the current "landing quotas". Catch quotas can be fixed at a higher level since they contain the quantities which, within the current landing quota system, are not registered. Moreover, it provides an efficient manner with which to address the discard which hampers proper assessment of fishing mortality. Most importantly, however, is that precise data for the biological advice is obtained and that the incentive mechanism will change from an incentive to upgrade to an incentive to get the most out of the total catch i.e. choosing a selective fishing strategy as part of the planning of the individual fishery. However, the approach requires the capability to monitor or estimate discards. In addition to encouraging all of the catch to be landed by allowing a percentage of the landed value to be retained (an approach that could minimize the amount of discarding), there are three approaches to monitoring or estimating the amount discarded:

1. Logbook self reporting- Unfortunately this approach is often unreliable,
2. Observers- Trained observers provide high quality data, but they are expensive, and there may be an observer effect (changed behaviour in the presence of observers) which will bias estimates of discards,
3. Camera monitoring systems that automatically document discarding- Such systems are being tested, in particular by Denmark although it correlates to similar, successful, applications in Canada. If the technology is proven successful, it could be widely applied in Baltic Sea context.

Enforcement

Effective enforcement of regulations is fundamental to the operation of a fisheries management system. Norwegian fisheries provide a useful example of how effective monitoring, control and enforcement systems can result from integration of various information sources.

HELCOM has a well-designed system able to respond to marine pollution incidents. The Baltic Sea countries are working together in a coordinated effort with extensive aerial surveillance, 45 sea-going vessels and 30 emergency tugs. In 2007 the Baltic-wide Joint Inspection and Surveillance Scheme (JISS) deployed resources pooled by Member States. As JISS builds greatly on the existing network established within HELCOM activities it could contribute effectively to further collaboration and development of surveillance and control of fisheries in the Baltic Sea.

Sufficient and equal penalties

A unified approach to penalties is important to strengthen a culture of compliance in the Baltic Sea. Although decisions need to be made at the national level, a discussion leading to a coherent approach would be desirable. Unlawful activities should be harmonised and hence have equal penalties no matter the nationality of the fisherman or where the offense occurred. Further, penalties need to be severe enough, even include the loss of fishing rights, to have a sufficient deterring effect. Increasingly severe penalties should be the result of repeated violations.

Reform of the control regulations and of the CFP

In its simplest terms, the aim of a regionalized approach to fisheries management is to escape the imposition of a one size fits all straightjacket of centralized policies, by allowing for differentiation and diversification of the way in which the living

resources of the sea are managed. The elaboration and application of the current control regulation is not in sync with the reform of the CFP. In order to comprehensively address weaknesses of current regulations related to fisheries management it is crucial that the elaboration of a control and enforcement regime occurs simultaneously.

Cod fisheries in the Baltic Sea – prospects enhanced by regionalization

Cod fishing in the Baltic Sea illustrates many of the challenges faced by a potential regional organization for the Baltic Sea. The fishery is characterized by:

- Substantial overcapacity in the fishing fleet
- Low profitability for fishermen
- A race to fish
- Large problems with unregulated and unreported fishing
- Problems with discards of undersized fish
- Conflicts with conservation concerns (bycatches of seabirds and endangered harbour porpoises, conflicts between fisheries and seals and effects of bottom-trawling)

Politically decided quotas have consistently exceeded the scientific advice and the amount of trust between stakeholders is low, albeit improving as a result of constructive processes in the Baltic Sea RAC. Recently, however, there has been a somewhat unexpected increase in the eastern cod stock, leading to enhanced catch opportunities and renewed political pressure to increase catch quotas exceeding the existing 3 year management plan.

To concretely illustrate how best practice characteristics could be purposefully applied on the Baltic Sea cod fishery we conclude that:

- A regionalized approach with clear objectives could facilitate more sustainable decisions on catch quotas based on the precautionary approach and taking uncertainty into account.
- An introduction of catch quotas rather than landing quotas in order to ensure that the total mortality of Baltic cod is taken in to account.
- Targeted efforts to reduce illegal catches through regional enforcement collaboration and the use of modern surveillance equipment
- Further work on integrating the ecosystem approach should be stimulated, e.g. by using multi-species models to guide the setting of quotas for potentially competing (or at least interacting) species (i.e. sprat predation on cod eggs and competing with sprat larvae for zooplankton).
- Transparency and trust between scientists and stakeholders increase the potential for decisions based on best available science.

- Through dialogue with stakeholders on a regional level a comprehensive discussion on how a sustainable cod stock could be achieved and maintained should set agreed upon targets and aims.
- When setting shared targets and aims, some issues crucial for sustainability are:
 - Socio- economic aims and effects
 - How large the cod stock should be to sustain ecosystem function in the face of climate change as well as securing long-term industry profitability, e.g. by modeling fisheries economy and cod ecology will assist in setting long-term regional goals.
- Co-operative research programs to enhance and stimulate much needed trust building exercises.
- Over capacity can be addressed by the potential use of rights (e.g. ITQs) in cod fisheries.

It is premature to suggest how these issues should be addressed in each specific case but could present the basis for the anticipated work by a Baltic Sea regional management body.

CONCLUSIONS

The Baltic Sea is well suited to demonstrate best practices because of the strong cooperative spirit of the Member States around the Baltic Sea, a good scientific basis for fisheries management, and a relatively simple system (essentially self contained sea area with a few dominant species). Regionalized co-management should be applied to the Baltic Sea as a concrete example serving as a starting point for a dialogue among Member States and stakeholders. This dialogue could evolve into a more formal

process to apply an ecosystem approach to prepare a fishery management plan for the Baltic Sea fisheries. Planning and preparation of the plan need not wait for the completion of the reform process. This is a pivotal opportunity to strengthen transdisciplinary coordination and a multitude of policy synergies. Yet it needs to be underlined that discussions and decisions regarding the marine environment need to be preceded by intensive dialogue with stakeholders from the various sectors.

OVERCOMING BARRIERS TO CHANGE

As described above, political courage and leadership are the most important aspects to enable change. Many systems-change processes involve substantial inertia, which in the case of fisheries policy has been proven to have serious implications (e.g. failure to take scientific advice into account prior to dramatically reduced stocks).

EU fisheries management is embedded in one of the most complex and highly structured political systems. Implementing change will have to negotiate certain principles – equal access, relative stability and exclusive competence – already deeply entrenched within the CFP. None of these appear insurmountable hurdles to accommodating best practice. Within the EU, however, fisheries policy is high on the agenda for only a small number of countries where fishing is of major significance to the national economy. Fishing communities are by definition peripheral coastal communities, which are unimportant for the great majority, but very important for a small minority. Overall, fisheries issues have attracted little public attention in the EU and this in turn may have fed into the persistence of some of the CFP’s failings. Fisheries policy has generally been conducted away from the glare of political and media attention and analysis; it has tended to be the prisoner of minorities and without the corrective mechanisms that media attention can sometimes induce and indeed from the attention paid by prime ministers and leaders of the opposition when political priority questions arise. This situation may well be changing with some issues, especially those associated with ecosystem degradation and with illegal fishing activity, moving towards centre stage.

In recent years, however, the poor status of many commercial fish stocks, in combination with increased attention to illegal, unreported and unregulated fishing, as well as the environmental dimension of fishing have attracted attention in a series of scientific reports, with the result that the political rationality of fishing is changing. This increased crisis preparedness and understanding of the reasons for the current crisis provide fertile ground for the politicians who dare challenge the remaining barriers.

Implementing best practice is unlikely to prove

a simple, straightforward task. All forms of change engender a degree of caution, bordering on resistance, on the part of those directly affected whether they are politicians, managers or stakeholders. Each needs to be convinced of the need for change and persuaded that the new systems will succeed where others have failed. It is not always easy to give that assurance. Incremental change that builds on earlier decisions will be more readily accepted. Transformational change, on the other hand, is disruptive: it implies an alteration to the direction of policy and thus a change of behavior for those caught up in the process. It will often be seen to involve greater risk and uncertainty and to incur monetary or social costs. For fishermen there will be anxiety as to how the changes will affect their livelihoods, earnings and status and a particular concern over scenarios that seem to imply substantial sacrifice in the short term in the anticipation of benefits to be gained at some future date.

The more radical the change, the greater the need for evidence of improved outcomes. There is perhaps little in the proposals set out in this report that constitutes a truly radical transformation of the management system. Many examples of best practice build upon earlier initiatives or reflect changes occurring in some Member States though not in others. And many of those examples target the very circumstances that feed anxiety and suspicion about change – the absence of clear objectives, lack of transparency in decision making, remoteness of decision makers and weak engagement with the fishing industry in the policy process.

To overcome the barriers to implementing change that may eventually bring about sustainable fisheries in the EU calls for three things:

- first, the full and willing consent of the principal stakeholders, the fishermen;
- second, the courage, leadership and will of EU and Member State politicians; and
- third, a well informed public opinion to maintain pressure on both the fishing industry and the politicians to see the process through to a successful conclusion.

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Appendix 1. EUROPEAN FISHERIES GOVERNANCE

Article 38 (1) of the Treaty establishing the European Economic Community (EEC) made provision for a Common Agricultural Policy (CAP) encompassing indirectly fisheries, as agricultural products were defined as "as the products . . . of fisheries and products of first-stage processing directly related to these products." It was not until 1970 that the Council of Ministers established a common market in fisheries products, and a common structural policy for the fishing industry. The latter established the principle of "equal access" for EEC vessels to the Member States' waters, with the exception of a three nautical mile (nm) coastal zone reserved to the local fishermen of the coastal region concerned. This exception was set to expire beginning 1976.

The EEC Treaty in its Article 39 established a number of founding objectives for a CAP, with the following aims in mind:

- increase agricultural productivity by promoting technical progress and by ensuring the rational development of agricultural production and the optimum utilisation of the factors of production, in particular labour;
- ensure a fair standard of living for the agricultural community, in particular by increasing the individual earnings of persons engaged in agriculture;
- stabilise markets;
- assure availability of supplies; and
- ensure that supplies reach consumers at reasonable prices.

Although the CFP has since evolved, these underlying objectives still apply today as they are enumerated in Article 33 of the EC Treaty.

The accession of Denmark, Ireland and the United Kingdom - whose catches represented more than twice those of the six founding Member States - prompted a review of the principle of equal access. Pursuant to their 1972 Act of Accession, the three nm exclusive zone was extended to six nm and to twelve nm in certain coastal areas of Denmark, France, Ireland and the United Kingdom. Within the outer belt, the fishing rights of other Member States

were guaranteed.

Following a 1976 Council Resolution adopted in anticipation of the entry into force of the 1982 United Nations Convention on the Law of the Sea, the Member States began to claim Exclusive Economic/Fisheries Zones (EFZs/EEZs) extending up to 200 nm from their baselines. It was at this juncture that the EEC assumed responsibility for the development of a common fisheries policy (CFP) throughout the Member States' waters and on the high seas. Seven years of negotiations led to the adoption of a Council Regulation 170/83 formally establishing a CFP in 1983. The 1983 Regulation organized the CFP around four components: a market policy, a structural policy, a conservation policy and a policy with respect to third States and regional fisheries management organizations (RFMOs). At the time conservation policy was to allow for balanced exploitation of fishery resources, including the setting of annual allowable catches (TAC) for specific stocks or group of stocks.

The 12 nm exclusive coastal regime was generalized towards all Member States, subject to the limited and well defined historical rights enjoyed by other States. This access regime was set to expire in 1992. If no such decision was taken by the Council it was to continue until 2002. The 1983 reform introduced another cornerstone of the CFP: the principle of relative stability. This principle underlies the division of the TAC into quotas and their distribution among the Member States. TAC's were to be distributed "in a manner which assures each Member State relative stability of fishing activities for each of the stocks considered." The principle ensures that Member States are allocated a fixed percentage – not a fixed share - of the TAC for a given fish stock. The allocation key took into account the traditional (historical) fishing patterns of the Member States and the loss of fishing potential in non-EC waters following the extension of fishing limits by third States. The specific needs of regions particularly dependent on fishing and its allied industries were also taken into account. Only two Member States, the United Kingdom and Ireland benefited from the latter criterion also known

as the Hague preferences.

It is up to each Member State to distribute its quota allocation among national fishing interests as it sees fit. Different approaches prevail in different Member States, for example with regard to whether quotas are allocated to individual fishermen, producers' organizations or cooperatives, and whether fishermen can hire or purchase quota from other fishermen. The sectoral setup influences the way a Member State will decide to distribute its quotas at the national level. The possibilities to change quota allocations differ substantially between Member States. An intra-Member State rights based management regime can be adopted at Member State level.

The situation in European fisheries has changed dramatically during recent decades, with much more efficient fleets, higher fishing capacity and deteriorated conditions of European stocks. The principle of relative stability influences the potential to use alternative/complementary management tools, such as an inter-Member State rights based management regime. Firstly because the fishing opportunities are generally fixed between Member States, and secondly because its abolition would compromise the legality of many - not necessarily quota related - aspects of the CFP as it is the concept relied upon by the legislator and the European judicial institutions to justify many of the derogations from the equal access principle. The concept of relative stability is thus somewhat limiting the sector potential to adapt to these changes, but at the same time allows for a regionalized CFP and has allowed to keep the fishing armada of certain Member States outside other parts of the Community waters.

A mid-term review of the CFP took place in 1992 resulting in the adoption of Council Regulation 3760/92. It attempted to address the imbalance between the fishing capacity of Member States' fleets and available fishing opportunities. The reform prescribed a reduction in the size of the Community's fishing fleet, accompanied by structural measures to alleviate the socio-economic impact of such reductions. The Regulation also introduced the concept of fishing effort, which limits the time vessels are allowed to spend at sea. It also obliged Member States to operate national licensing regimes designed to

regulate access to fisheries. The greening of the CFP, which began in the early 1990s, also found its expression in the 1992 review. The 1992 basic Regulation clearly stated its aims, namely to protect and conserve the marine aquatic resources. Furthermore, it included a requirement to take account of the implications on the marine ecosystem when adopting management measures (Article 2 (1)).

Current regulation

By late 1990s, it had become clear that the reformed CFP had failed to curb the declining status of many fish stocks within Community waters. Many were at critically low levels, and some, notably cod, were on the brink of collapse due to intense and unsustainable fishing pressure. In turn, declining stocks seriously jeopardized the long-term viability of the fishing industry.

A 1999 scientific review carried out by the Scientific, Technical and Economic Committee for Fisheries (STECF) on the status of EC fish stocks, concluded that 67% were overfished, 40% were 'depleted' and 37% of species were both depleted and overfished (COM (2000) 272). Furthermore, a 1999 survey in the North East Atlantic confirmed that 40 out of the 60 main commercial fish stocks were outside safe biological limits. The most severely depleted species was cod. In the EC, the average landings for the period 1995–1999 were down 65% compared to 1978–1982 with a major decline in the numbers of larger, mature fish by 73% in the same period (COM (2001) 135). The European Commission's Green Paper in 2001 painted a very bleak picture of EC fish stocks stating that in the Baltic, 'the current situation does not seem sustainable'; that in the North Sea, 'it has not been possible to reverse the decline of round fish stocks'; that in the western waters, fishing mortality rates 'have far exceeded historical levels observed in the North Sea' and that in the Mediterranean, 'many important stocks have been over-fished' (COM (2001) 135).

The need to protect jobs was often given as a reason for not addressing the overcapacity problem. However, in the 1990's up to the time of the reform, it was obvious that the CFP had failed to save jobs.

In the period 1990 –1997, the number of fishermen in the EU fell by 60,000 – a decline of 30% - but the decline in catches and landings was progressively worsening with negative impacts on the industry (COM (2001) 135). For the period 1960 –1999, total fish landings in the United Kingdom, for example, declined from 900,000 to 400,000 tonnes, with the value of the catch falling from a peak of £880 million to just less than £200 million in 1999 (WWF, 2007).

All the factors, as discussed above, led to the general consensus that the CFP was failing to achieve its objectives of conserving fish stocks, protecting the marine environment, ensuring the economic viability of the European fleets and providing good quality food to consumers. The Commission therefore considered that the whole of the CFP had to be reviewed, although legally only three components had to be reviewed during the 2002 reform: the rules of access to the 12 nm limit, to the Shetland Box and to the North Sea¹⁰. The 2002 CFP reform covered a much larger range of issues than previously discussed under the CFP. This led to the formulation of broader objectives and a number of significant changes. These were primarily legislative changes to conservation and structural policies. They reflected:

- a move towards a **more long-term approach to fisheries management**. The revised CFP should lead to a shift away from annual decision-making on TACs, to multi-annual planning as well as the use of recovery plans for restoring overfishing and depleted fish stock;
- a new fleet policy to limit and **gradually reduce over-capacity**. Member States are given more responsibility to match capacity with fishing possibilities, while vessels renewal and modernization subsidies are phased out;
- a better application of the rules. This is to be

achieved through an increased co-operation between national authorities and a more uniform **control and sanction** system throughout the EU; and

- improved governance. The aim is to involve stakeholders more closely into the policy making process. This is to be achieved through the **setting up of Regional Advisory Councils (RACs)**.

The new Regulation 2371/02 concerning the conservation and sustainable exploitation of fisheries resources now contains more specific and progressive objectives and provisions (see Appendix 1) with 36 articles laid out in seven chapters replacing Regulation 3760/92. The new Regulation, which on paper aims for sustainable exploitation, provides the legal basis to adopt measures to reduce negative impacts on the environment.

The new basic Regulation set broader objectives for the CFP, including that the Community should take measures to protect and conserve living aquatic resources, provide for their sustainable exploitation, and minimize the impact of fishing activities on marine ecosystems. It called for the progressive implementation of an ecosystem approach to fisheries, but also stipulated that the CFP should contribute to efficient fishing activities within an economically viable and competitive fisheries and aquaculture industry, providing a decent standard of living for those who depend on fishing activities and taking into account the interests of consumers.

The regulation has sought to promote a long-term approach to fisheries management by introducing the possibility of adopting multi-annual management and recovery plans for stocks outside of safe biological limits. However, it has not yet been established that existing moves to long-term management plans are sufficient to de-politicize short-term decisions.

¹⁰ Regulation 3760/92, Article 14 (2); 1985 and 1994 Acts of Accession. Regulation 3760/1992 did not rule out an all encompassing review, as it was stipulated that the Council was to decide - on the basis of a report on the fisheries situation in the Community and, in particular, on the economic and social situation of the coastal regions, on the state of the resources and their expected development, and on the implementation of Regulation 3760/1992 - on any necessary adjustments to be made.

The regulation also provides for a greater degree of co-ordination and co-operation among Member States with regard to enforcement activities. A Community Fisheries Control Agency (CFCA) was established and charged with co-coordinating Member States' control and inspection activities under the CFP and organizing the deployment of pooled national control and inspection resources, with the aim of improving the effectiveness and uniformity of enforcement.

Another innovation was the establishment of RAC. These bodies are intended to secure greater stakeholder involvement in the CFP, by offering interest groups a channel through which to provide advice to the European Commission and Member States on fisheries management in a given area. Seven RAC have become operational: the Mediterranean Sea, the North Sea, Baltic Sea, North Western Waters, South Western Waters, Pelagic stocks across all areas, and Distant Water fisheries.

The principle of relative stability has been retained. Annual negotiations among Member States are thus not over how fishing opportunities are to be shared between countries (national quotas), but about the total number of fish to be caught (the overall TAC for a given species). The equal access principle still underlies the CFP, subject to some derogations of which the preferential 12 nm coastal access regime constitutes the most important. By 31 December 2011 the Commission must present to the European Parliament and the Council a report on the 12 nm arrangements. The Council must decide before 31 December 2012 on the provisions which will follow. A More broad reform as in 2002 is possible.

Current Institutions and Decision-making

Decision-making on EC fisheries policy is a highly centralised process. In the run up to CFP reform in 2002, the Commission recognised that the system was too slow to respond to local and emergency situations and often resulted in stakeholders feeling disengaged from processes (CEC, 2001a). The Commission noted that decision-making procedures have exacerbated the complexity of the current rules and that in legal and political terms, measures have been

placed at a higher level than strictly necessary (CEC, 2004a). While reforms such as the development of Regional Advisory Councils (RACs) have taken place, and continue to evolve, the core EC fisheries policy decision-making system remains essentially the same as that before the 2002 reform.

The role of each of the EC's institutions in developing items of legislation depends upon the Treaty article on which they are based. The so-called consultation procedure applies to nearly all fisheries legislation. Co-decision is the main legislative procedure in the EC but it has limited application to fisheries policy, applying only to Fisheries Partnership Agreements (FPA) and setting the European Fisheries Fund (EFF) budget. However, this will change if the Lisbon Treaty enters into force. The decision-making process and respective roles of the institutions is described in this section.

European Commission

The European Commission is the executive body of the EC, and is responsible for:

- Developing proposals for new legislation;
- Implementing a number of EC policies; and
- Ensuring that EU treaties and legislation are respected.

The work of the Commission is intended to be completely independent of Member States and the European Parliament. It has the ultimate responsibility for overseeing implementation and compliance with the Treaties and secondary legislation. The Commission also has limited powers to adopt implementing legislation, where the Council expressly delegates these. Importantly, the Commission has the sole right to initiate legislation. The Commission can also withdraw proposals at any time, although this is not frequently done.

Commission initiatives, whether in the form of general Communications (non-legislative policy documents) or more specific proposals for Regulations, Decisions or Directives, are prepared by the relevant technical Directorate General (DG). In the case of fisheries, this is DG Maritime Affairs and

Fisheries, DG Mare. The main role of DG Mare is to initiate and define new fisheries policy and to ensure that measures which have been agreed to are put into practice by the Member States. The DG manages the EFF. It also represents the EC in the relevant international and regional fisheries organisations, in negotiating and managing fisheries agreements with third countries.

Prepared initiatives, such as the reform of the CFP, are discussed with other relevant Commission DGs (e.g. DG Environment; DG Trade) and amended if necessary in a process known as interservice consultation. Proposals for legislation are then checked by the Legal Service. Once the proposal is fully ready, it will be put on the agenda of a forthcoming Commission College meeting by the Secretariat General, the DG that oversees and directs the whole of the Commission's procedures and reports directly to the President of the Commission. If there is agreement, the College of Commissioners will adopt the proposal and send it to Council and the European Parliament for their consideration.

The Council of Ministers

The Council of Ministers is the EC's most powerful decision-making body consisting of the relevant Ministers from Member State national governments. There are nine different configurations of the Council (although it is considered a single entity) including the Agriculture and Fisheries Council and the Environment Council. The Ministers attending a Council session will depend on the subject matter under discussion. The Agriculture and Fisheries Council meetings are generally held each month. On fisheries issues, the Council can take decisions by qualified majority vote (QMV). Under QMV Member States' votes are weighted so as to give larger Member States greater voting power, though the weighting is not directly proportional to the size of each Member State's population. Any decision, for instance, may be blocked by three large Member States, plus at least one smaller one. Clearly then, the joining of new Member States can have significant implications for the direction of legislation if they are large or numerous enough, such as the joining of the ten new

Member States in 2004.

If the Lisbon Treaty enters into force, the decision-making within the Council will change. The Treaty will introduce a double majority voting system, requiring the assent of 55% of Member States accounting for 65% of the EC population. However, double majority voting will only be applied from 2014, with a transition period from 2014 to 2017. This would replace the QMV system currently used to decide the Council position in the co-decision procedure.

The European Parliament

The Parliament gives its opinion and proposes amendments to legislative proposals after the details have been examined in one of the Parliament's 17 committees. The dedicated Committee on Fisheries was established in 1994 and examines fisheries proposals.

The Parliament plays a less significant role in the development of fisheries policy than most other areas however, including the environment. Its powers to influence the CFP are restricted by the legal basis of most fisheries policy measures. Under Article 37 of the EC Treaty the Parliament need only be consulted as part of the legislative process – this will change once the Lisbon Treaty enters into force. All external trade related matters falling within the 'common commercial policy' (including both the CAP and the CFP) have Article 133 as their legal base, which requires no consultation with the Parliament at all. Despite this, the Parliament has increasingly shown an interest in aspects of fisheries policy and flexed its muscles in what areas of power it has. A new Mediterranean Regulation proposed by the Commission in 2003 (CEC, 2003c), for example, was rejected by the Parliament, forcing the Commission to redraft the Regulation.

The Court of Justice

The European Court of Justice (ECJ) is the EC's court. It is made up of judges appointed jointly by the Member States. Although the ECJ has no direct and visible role in policy development, it has the final say over the interpretation of Community law and its

rulings have a far from insignificant influence on the development of the CFP. It rules on cases brought before it concerning the interpretation, application and validity of Community legislation. Although some cases are referred to the Court from national courts, the Commission brings most cases because Member States have failed to transpose and/or implement EC legislation correctly. Individuals have very limited ability to bring cases directly to the Court, but must rely instead on complaining to the Commission or bringing cases at the national level. Examples of the Court's role in fisheries policy have been judgements on catch quotas, free circulation of capital, interpretation of the Habitats Directive and the EU's authority regarding relations with third countries.

Current Information Provision and Management System

Fisheries management in the EC is based on what has sometimes been called the 'modern fisheries management model'. Specialised institutions produce formalised knowledge, which is then used as a basis for management decisions and implementation by a centralised bureaucracy.

Data collection

Collection of fishery-dependent and fishery independent data is principally the responsibility of Member States. However, the Community has gradually been taking greater responsibility itself. Programmes are increasingly being developed to enhance operation and coordination of data collection with standardized procedures and criteria. The systematic collection of reliable basic data on fisheries is a cornerstone of fish stock assessment and scientific advice, and consequently for the effective implementation of the CFP.

The most formalised such system is established by the Data Collection Regulation (1543/2000), which sets out minimum data requirements and an 'extended programme' of non-compulsory data, collected by the Member States with EC co-funding. This Regulation has been reviewed and the current Regulation better reflects inter alia the ecosystem based approach to fisheries management required under the new CFP.

The European Union is a major funder of fisheries data collection and scientific analysis. Under Council Regulation 861/2006 establishing Community financial measures for the implementation of the Common Fisheries Policy and in the area of the Law of the Sea, up to a maximum of € 300 million has been allocated for actions in the area of data collection over the period 2007 –2013. Eligible measures in national data collection programmes are eligible for EC co-financing up to 50% of the total expenditure.

In February 2008, the Council adopted Regulation 199/2008 establishing an EC framework for the collection (CFP Data Collection Regulation), management and use of data in the fisheries sector and support for scientific advice regarding the CFP. This regulation builds on the Data Collection Regulation, but also introduces provisions to meet the new developments following the 2002 Reform of the CFP. In particular the move towards fisheries- or fleet-based management as opposed to managing individual stocks, the integration of environmental data, and the shift towards an ecosystem-based approach. The Commission will shortly introduce a proposal for detailed implementing rules.

The new CFP data collection system covers the entire process, from the collection of data in ports or at sea, to its use by the scientific community and advisory bodies. There are new rules for access and use of the data collected, as well as rules to protect the interests of data providers. As well as supporting the move towards fleet- and fishery-based management, and towards an ecosystem-based approach, the new framework also places more emphasis on social and economic data so as to provide a basis for impact assessment of new legislation and to allow monitoring of the performance of the European fleet. The regulation covers the collection of data by scientists for scientific purposes, and is independent of the systems used to control quota uptake in the Member States for the purposes of implementing the CFP.

The regulation also aims to fill gaps in the existing system, and to improve the quality of data wherever possible. Quality control and validation have been reinforced, and EC financial support is conditional on compliance with agreed quality standards. EC

financial assistance is made available not only to the scientific bodies which advise the Commission on fisheries policy, but to all stakeholders interested in fisheries management. The new regulation also includes access to and use of detailed data.

International Council for the Exploration of the Seas (ICES)

The main source of scientific knowledge covering waters in the Baltic Sea and Atlantic Ocean is ICES (International Council for the Exploration of the Seas). In the case of the Mediterranean Sea, this knowledge comes from the General Fisheries Commission for the Mediterranean (GFCM) and its various committees and working groups. ICES uses biological data collected by national research institutes from their research programmes and landing records to assess the state of the main commercial stocks (i.e. those stocks targeted by fishermen). The Consultative Committee oversees the production of scientific information and sets priorities for the work of the eight Science Committees (Oceanography, Marine Habitat, Living Marine Resources, Resource Management Fisheries Technology, Mariculture, Diadromous Fish, and the Baltic). The results of the assessment of the stocks in the northeast Atlantic are then examined by the Advisory Committee (ACOM), which is made up of representatives from each country. Its findings represent the scientific advice of ICES. ACOM assigns advisory tasks to working groups and advice drafting groups on behalf of the Council, ICES’ ultimate governing body.

ICES has also seen a number of changes since its establishment more than 100 years ago. When discussing the reformation of the CFP it might also be appropriate to discuss if the current structure of ICES provides a sufficiently holistic perspective. In the broader scope this means addressing how sufficient ecosystem data can be supplied to make implementation of an ecosystem approach possible. Moreover, it could contribute to coping with regime-shifts and predicted effects of climate change and on how to make reference points flexible while maintaining their use and avoiding ‘shifting baseline’.

Scientific, Technical and Economic Committee on Fisheries (STECF)

The Commission’s own Scientific, Technical and Economic Committee on Fisheries (STECF) has been in place since 1979. It is made up of national experts that examine scientific advice (e.g. from ICES or commissioned studies) and issues an opinion. The most routine application of this process is the annual setting of TACs. The framework for its original operation was replaced by the Commission in 2005 to take account of a shift in focus and emphasis in CFP objectives since CFP reform and EU enlargement. The expertise of members was more explicitly defined and broadened so as to reflect the importance of aquaculture and an ecosystem based approach to fisheries. The STECF annual report is now also to include broader economic factors affecting fisheries, reflecting the heightened emphasis on economic issues in policy making. The STECF is now able to take more initiative in providing opinions to the Commission, rather than having to be purely responsive.

In this context it can be useful to consider some of the weaknesses which the Commission considered when over viewing the science and advisory systems in 2003. A number of weaknesses were identified in the provision of both operational or short-term advice, as well as strategic or long-term guidance. The Commission intends to improve current insufficiencies in the advisory process by:

1. improving the efficiency and coordination of advisory activities; and
2. strengthening and supplementing existing capacity for scientific advice.

A number of short-term measures are suggested, together with options for long-term institutional adjustments, to improve the reliability, transparency and timeliness of scientific advice.

The Communication sets out the Commission’s thinking on an improved Community information framework in general terms, rather than identifying specific remedial measures. The Communication does not however differentiate between the symptoms and causes of shortcomings in advisory systems. Despite

acknowledging that it is questionable whether additional Community resources, if and when provided, would increase the actual resource base the general approach of the Commission appears to be focused on pouring more resources into the advisory system.

The Commission supports scientific research through multi-annual framework programmes. The 6th Framework programme covers the period from 2002 to 2006 and the 7th Framework programme the period from 2007 to 2013. It makes funds available for fisheries and aquaculture research under the area of scientific support to policies. The policy relevance of research is to be met by targeted calls, where detailed task descriptions explain the objectives and the resulting deliverables. In addition to this, the Commission has funds available for research of direct relevance to the CFP. Most of these are being used to support the collection of basic data for the assessment of EC fisheries.

Advisory Committee for Fisheries and Aquaculture

Another advisory Committee assisting the Commission in addition to the STECF is the Advisory Committee for Fisheries and Aquaculture (ACFA)¹¹. It is composed of representatives from European level stakeholder groups appointed by the Commission to engage stakeholders in the development and implementation of the CFP. Members include representatives of the production sector, the processing industry, trade in fishery and aquaculture products, consumers, the environment and development. ACFA works through plenary meetings and four working groups:

- Group 1: Access to fisheries resources and management of fishing activities;
- Group 2: Aquaculture: fish, shellfish and molluscs;
- Group 3: Markets and Trade Policy; and

- Group 4: General questions: economics and sector analysis.

ACFA was established in 1970 as the Advisory Committee on Fisheries (ACFA). It was reformed in 2000 to improve industry participation and broaden its membership to include wider interest groups. This was part of a broader Action Plan to improve stakeholder dialogue, in which the Commission recognised that 'relations between the Commission and the fishing industry, especially in the framework of the ACF, are no longer satisfactory to either party' (DG XIV, 1999).

Social and Economic data

Currently the social and economic data related to fisheries are at the discretion and elaboration of the Member States. Various stakeholder groups have requested broadening the scope of data collection of social and economic data related to fisheries to be specifically community wide. Currently, however this has not been done.

Regional Advisory Councils

A decision establishing a framework for Regional Advisory Councils (RACs) was adopted by the Council in 2004 (2004/585). As the name suggests, these are advisory bodies, almost like regional equivalents to ACFA, composed of a mix of different stakeholders but with no legal decision-making powers.

To date seven RACs have been established, covering five geographical areas (Mediterranean Sea, Baltic Sea, North Sea, north western waters and south western waters) as well as pelagic stocks (blue whiting, mackerel, horse mackerel and herring) and high seas/long distance fisheries. While the name 'RAC' suggests that they are all regional, this is not strictly the case; the high seas/long distance fisheries and the pelagic stocks RACs cover a number of fisheries that may or may not overlap geographically.

¹¹ Note that, as the name suggests, the Commission is under no obligation to follow the advice of Advisory Committees.

RACs consist of a general assembly and an executive committee of 24 members. As a rule general assembly and executive committee meetings are public. However, the executive committee may decide by majority to meet in private ‘in exceptional circumstances’. The industry makes up two thirds of both the general assembly and the executive committee, with the remaining third made up of ‘other interest groups’. These may include environmental interests, recreational fishermen or consumer representatives.

The RACs have improved the dialogue with and between stakeholders through delivering better access to information and better understanding of EC decisions. New proposals are presented to stakeholders through the RACs which have become active players in CFP. The number of recommendations

to the Commission has increased significantly and RACs often organise events and workshops to discuss major CFP issues. The RACs are represented on the advisory board of the EC Fishery Control Agency and are involved in its work. However, the RACs still face difficulties in their functioning as they are still in a learning process and as some face(d) serious capacity development challenges (CEC, 2008). Although the RACs are still evolving, it is only appropriate to consider if they currently operate in the desired or most optimal scale? Moreover, since the RACs are a for a stakeholder dialogue, it would be useful to investigate what incentives there are to increase stakeholder engagement in cross-sectoral initiatives, such as data provision or scientific initiatives and how such could be elaborated.

LEGAL CONSIDERATIONS OF REGIONALIZATION

There are a number of legal constraints to the exercise of prescriptive powers on a regional basis, since a key aspect of the CFP lies within the exclusive competence of the Commission. The purpose of regionalization is not to usurp the Commission’s reserved powers in regard to legislative proposals but to improve the efficacy of implementation. Co-management can potentially be a means to facilitate implementation. The constraints concern mainly the principle of subsidiarity and the EC Treaty provisions on enhanced co-operation between Member States. The principle of subsidiarity (Article 3b (5) EC Treaty) states that: in areas which do not fall within its exclusive competence, the Community shall take action, in accordance with the principle of subsidiarity, only if and in so far as the objectives of the proposes action cannot be sufficiently achieved by the Member States and can therefore, by reason of the scale or effects of the pro-

posed action, be better achieved by the Community.

Thus, the principle of subsidiarity does not apply to an area of exclusive Community competence. Consequently, *prima facie* legislation can only be adopted at EU level. Apart from the provisions with respect to ‘enhanced co-operation’, no provisions allow for the exercise of legislative powers on a regional basis.

Enhanced cooperation between Member States

Member States concerned can move forward at different speeds and/or towards different goals. Enhanced cooperation does not allow extension of the powers as laid down by the Treaties and it can only be used when the Council has established that the objectives of such cooperation cannot be attained within a reasonable period by applying the relevant provisions

of the Treaties. In principle, at least eight States must be involved in enhanced cooperation. Enhanced cooperation must also further the Treaty objectives and respect the whole of the *acquis communautaire* and the powers of the various parties. It may not apply to an area that falls within the exclusive competence of the Community.

Delegation of competence

The shortcomings with respect to the principle of subsidiarity can be overcome by delegating competences to the Member States. It is necessary to emphasize the distinction between a delegation of powers and a direction to a Member State to exercise its own powers in a particular way. The latter is very common and one form of Community act, the directive, was designed for this purpose. Delegation of powers, so far, is comparatively rare. The reason is that it is not generally necessary for powers to be transferred to Member States as they normally pos-

sess sufficient powers in their own right. If, however, Member States have given up their powers in a particular area in favour of the Community, it will be possible for powers to be transferred back to them by means of a delegation.

The EC has since 1979 enjoyed exclusive legislative jurisdiction in certain areas of fisheries policy. This means that in this field Member States' legislative powers have been rescinded. Member States cannot validly intervene unless treaties or secondary provisions explicitly delegate the powers to do so.

The Lisbon Treaty

Article 3 of the Lisbon Treaty establishes that the Union shall have exclusive competence in the conservation of marine biological resources under the common fisheries policy. Its Article 4 provides that shared competence between the Union and the Member States applies in "agriculture and fisheries, excluding the conservation of marine biological resources".

Appendix 2. PARTICIPANTS IN THE SCIENTIFIC WORKSHOP, STOCKHOLM, JANUARY 10–11, 2009.

Name	Institution / organization	Country
Claire Armstrong	University of Tromso	Norway
Ragnar Arnason	University of Iceland	Iceland
Thorsten Blenckner	Baltic Nest Institute, Stockholm Resilience Centre	Sweden
Sally Clink	Baltic Sea Regional Advisory Council	Denmark
Poul Degnbol	DG MARE	Belgium
Lovisa Hagberg	Lund University	Sweden
Stellan Hamrin	Ministry of the environment	Sweden
Sture Hansson	Stockholm University	Sweden
Joakim Hjelm	National Board of Fisheries	Sweden
Martina Kadin	Baltic Nest Institute, Stockholm Resilience Centre	Sweden
Steve Karnicki	Sea Fisheries Institute in Gdynia	Poland
Markus Knigge	PEW Environment Group	Belgium
Tristram Lewis	Oak Foundation	Switzerland
Bonnie McCay	Rutgers University	US
Marmar Nekoro	Baltic Nest Institute, Stockholm Resilience Centre	Sweden
Olof Olsson	Stockholm Resilience Centre	Sweden
Henrik Österblom	Baltic Nest Institute, Stockholm Resilience Centre	Sweden
Carl-Christian Schmidt	OECD	France
Stefanie Schmidt	DG MARE	Belgium
Mike Sissenwine	Woods Hole Oceanographic Institution	US
Matilda Thyresson	Stockholm University	Sweden
Katarina Veem	Baltic Sea 2020	Sweden
Doug Wilson	Innovative Fisheries Management, Aalborg University	Denmark
Fredrik Wulff	Baltic Nest Institute / Stockholm University	Sweden

Appendix 3.

PARTICIPANTS IN MANAGEMENT WORKSHOP, COPENHAGEN, MARCH 12–13, 2009.

Name	Institution / organization	Country
Anne Mette Baek Jespersen	Ministry of Food, Agriculture and Fisheries	Denmark
Alfonasas Bargaila	Lithuanian Fisheries Producers' Association	Lithuania
Hansen Black	Shetland Fishermen's Association	UK
Jenny Brough	Scottish Government Marine Directorate	UK
Sally Clink	Baltic Sea Regional Advisory Council	Denmark
Radek Gawlik	Dolnoślaska Fundacja Ekorozwoju	Poland
David Goethel	North East Atlantic Fisheries Management Council	US
Peter Gullestad	Directorate of Fisheries	Norway
Kjellrun Hiis Hauge	Institute of Marine Research	Norway
Reine Johansson	Baltic Sea Regional Advisory Council	Sweden
Martina Kadin	Stockholm Resilience Centre	Sweden
Markus Knigge	PEW Environment Group	Belgium
Markku Lahtinen	Helsinki Commission	Finland
Lennart Nyman	Man and Water AB	Sweden
Mike Park	Scottish Fishermen's Federation	UK
Martin Pastoors	Wageningen IMARES	Belgium
Laura Piriz	Swedish Board of Fisheries	Sweden
Vaida Sakaite	Lithuanian Fisheries Producers' Association	Lithuania
Stefanie Schmidt	European Commission	Belgium
Mogens Schou	Ministry of Food, Agriculture and Fisheries	Denmark
Mike Sissenwine	Woods Hole Oceanographic Institution	US
David Symes	University of Hull	UK
Katarina Veem	Baltic Sea 2020	Sweden
Simon West	Dep. for Environment Food and Rural Affairs	UK
Isabelle Viallon	European Commission	Belgium
Marcus Öhman	Swedish Ministry of Agriculture	Sweden
Henrik Österblom	Stockholm Resilience Centre	Sweden

Appendix 4. INTERVIEW KEY INFORMANTS

Norway

Ministry of Fisheries & Coastal Affairs, Oslo

Geir Ervik – Senior Advisor

Kjersti Pauline Vartdal – Advisor

Institute for Marine Research, Bergen

Ole Arve Misund – Research Director

Kjellrun Hiis Hauge – Researcher

Directorate of Fisheries, Bergen

Peter Gullestad – Specialist director. Former Director

General of Directorate of Fisheries

Snorri Palmason – Adviser

Thord Monsen – Legal advisor

US

Committee on Natural Resources, House of Representatives, Washington

Julia Hathaway – Legislative Staff, Subcommittee on Insular Affairs, Oceans and Wildlife

Committee on Commerce, Science and Transportation, U.S. Senate, Washington

Michael Conathan – Subcommittee on Oceans,

Atmosphere, Fisheries and Coast Guard

Kristine Lynch – Subcommittee on Oceans, Atmosphere, Fisheries and Coast Guard

Amanda Hallberg – Subcommittee on Oceans, Atmosphere, Fisheries and Coast Guard

National Marine Fisheries Service (NMFS), NOAA, Silver Spring

James Balsiger – Acting Assistant Administrator

Dale Jones – Director, Office for Law Enforcement

Mark Holliday – Director, Office of Policy

Rebecka Lent – Director, Office of International Affairs

Steven Murawski – Director of Scientific Programs and Chief Science Advisor

Ned Cyr – Chief, Marine Ecosystems Division, Acting Director of Office of Science and Technology

Rita Curtis – Chief, Economic & Social Analysis

Division, Office of Science and Technology

Richard Methot – Researcher, Assessment and Monitoring Division, Office of science and technology

Samuel Rauch – Deputy Assistant Administrator for

Regulatory Programs

Jim Lecky – Director, Office of Protected Resources

Thomas Bigford – Chief, Habitat Protection Division, Office of Habitat Conservation

Galen Tromble – Chief, Domestic Fisheries Division, Office of Sustainable Fisheries

New England Fishery Management Council (NE-FMC), Newburyport

Chris Kellogg – Deputy Executive Director

David Goethel – Council member and full-time fisherman

Philip Haring – Senior Fishery Analyst

Pew Environment Group, Pew Charitable Trust, Washington

Lee Crockett – Director, Federal Fisheries Policy Reform Project

Canada

Fisheries and Oceans Canada, Ottawa

Adam Burns – Manager, Access And Allocation, Fisheries and Aquaculture Management

Andrea Carew – Manager, Engagement Strategies, Fisheries and Aquaculture Management

Derek Eby – Senior Policy Advisor, Fisheries and Aquaculture Management

Brett Gilchrist – Resource Management Officer, Resource Management Branch - Licensing Policy and Special Projects

Heather James – Chief, Pacific Operations, Resource Management Branch - Operations

Brent Napier – Staff Officer, International Fisheries Enforcement, Conservation and Protection Directorate

Lisa Randall – Officer, Resource Management – National

Jake Rice – Senior National Advisor, Ecosystem Sciences

Bernard Vezina – Senior Resource Management Officer, Resource Management - National

University of Ottawa

Sandra Clark – ORMN Program coordinator, C-FOAM Research Cluster

Howard Powles – Researcher, C-FOAM Research Cluster

Scott Parsons – Researcher, C-FOAM Research Cluster. Former president of ICES.

Dan Lane – Chair, C-FOAM Research Cluster

Appendix 5. CASE STUDY SUMMARIES

FISHERIES MANAGEMENT IN NORWAY

INTRODUCTION

This report summarizes aspects of Norwegian fisheries management which shed light on identified issues with fisheries management in the Common Fisheries Policy of the EU. Norway provides an appropriate case for this 'best practice' study because, biophysically, Norwegian fisheries are roughly analogous to many EU fisheries, being based on North Atlantic stocks and involving a wide range of vessel and gear types. Most of Norway's fish stocks are (like the EU's) shared with neighboring nations (including the EU itself) and they also rely on the scientific stock assessments of the International Council for the Exploration of the Seas (ICES) where Norwegian fishery scientists make assessments and recommendations jointly analyzing the collected stock data in annual working groups with the scientists of the other ICES member countries. After ICES has given its quota recommendations, the negotiations on management issues between Norway and other states take place. The domestic regulation process for quota allocation begins after the international negotiations are finalized. The Directorate of Fisheries (DoF) then makes the final proposals. In addition to the EU Norway also shares stocks with Russia, and the management issues between those two countries (in the Barents Sea) are handled within a joint commission. Norwegian fisheries are thus a highly regulated industry with quotas and licensing requirements. With some 90% of the commercial stocks shared with other countries good governance also requires close cooperation with those countries, which means that the number of fish that can be taken from a given fish stock is based on international agreement which in turn determines the domestic decision-making process.

Norway is generally regarded as having a successful fisheries policy, particularly with regard to issues of rule enforcement and reducing discards. Supporting this perception, Pitcher et al. (2009) identified

Norway as having implemented the FAO Code of Conduct for Responsible fisheries more successfully than any other nation. Norway was particularly strong on regulating fleets and gear, addressing discards and by-catch as well as control and enforcement (Pitcher et al. 2008).

The material in this document is based on documents detailing Norwegian fisheries management and information provided and opinions expressed during interviews with key informants at the Ministry of Fisheries and Coastal Affairs ('the Ministry'), the Institute for Marine Research (IMR) and the Directorate of Fisheries. The document is organized in three themes (Evidence provision, Decision Making and Compliance) corresponding to those identified from gap analysis of the CFP and during an expert workshop held in Stockholm in January 2009.

Overview of Norwegian Fisheries

Norway is the biggest fishing nation in Europe, and presently (2006, FAO) number 11 by volume in the world. In export value (combining the values of catches and aquaculture) Norway ranks second after China. The value of the Norwegian seafood exports is divided almost equally between fish caught at sea and those farmed in aquaculture (2007).

Although Norway is among the highest ranking fish producing countries in the world its economical importance nationally is only some one percent of the total GDP. The number of fishers is decreasing rapidly as is also the number of fishing vessels, the latter of which has dropped from some 30,000 in 1971 to about 7,000 in 2007. There is, however, a general increase in catch per fisher. In contrast, employment in the aquaculture sector has increased substantially both as full-time and part-time employment. In the northern part of Norway, however, the fishing sector is very important, both economically and from an employment standpoint. Here the fishing industry plays an important role in many coastal

areas, where a considerable number of people rely on the industry for employment. Apart from the fishing activities, employment is also generated indirectly through shipbuilding, gear manufacturing, packaging and transport of fish products.

The largest landing of a single species is herring, but highest in terms of value is groundfish which include species of the cod family (cod, haddock, coalfish, blue whiting, and pollock). Other important species are Greenland halibut, mackerel, capelin, sprat, Norwegian lobster, and shrimp.

Recreational fisheries mainly target salmonid fish in fresh water – Atlantic salmon, trout and Arctic char. Some species of the cod family and halibut are important target species in the marine environment. Recreational fishing is conducted by rod, hand-lines or nets, but it is also possible to buy licenses for long-lines, traps and pots, provided you are a Norwegian citizen. Otherwise you may only use hand-held gear, and you are not allowed to sell your catch.

Development of fisheries management in Norway

The Ministry of Fisheries and Coastal Affairs is the central administrative body responsible for adoption and implementation of legislation and regulations. The Ministry is further responsible for the fisheries and aquaculture industry, seafood safety and fish health, and ports, infrastructure for maritime transport and preparedness against acute pollution. The Directorate of Fisheries is the Ministry’s advisory and executive body on matters pertaining to fishing and aquaculture. The Directorate was founded already in 1900, and its goal is to promote profitable economic development through sustainable and user-oriented management of marine resources and the marine environment.

The Directorate’s role is to provide professional input to the fisheries sector by statistics, analyses, and advice but also on legislature and the regulation planning development. Further, the Directorate should be an efficient manager by implementing political decisions, processing applications and appeals and to conduct resource monitoring and control. The Directorate is also a partner in co-operation with trade and

industry, public services, the general public, and the scientific community.

The Directorate now operates seven offices spread along the long Norwegian coast, from Egersund in the far south to Vadsö in the far north.

The Institute of Marine Research (IMR) in Bergen is the second largest marine research institution in Europe, with a staff totaling some 700 people. The Institute is the main scientific adviser to the Ministry and the Directorate on fisheries, marine ecosystems and aquaculture issues.

Presently, fisheries management in Norway is based on two sets of measures:

1. Maintaining fish stock productivity through technical measures and output control (TACs)
2. Adjusting catch capacity to stock renewal through access control (allocation) and reducing fleet through license aggregation programs

Regulatory instruments coupled with strict control measures are used to ensure sustainability while economic instruments are used to enhance efficiency and achieve structural policy targets of consolidation within sectors.

National fisheries status trends

The herring stock collapsed around 1970. This led to the introduction of a license limitation system for the fleet fishing for the meal and oil industry. Strict quota controls were enforced. The capelin fisheries are also regulated by licensing, determining the overall catch quota for each vessel depending on its size. The herring stocks have partly recovered but a ban was placed on the capelin fishery (2004) to protect its low spawning stock biomass. Some cod stocks have also recovered, especially the Barents Sea stock, and most pelagic and demersal fish stocks are now in good shape, apart from those of the Greenland halibut and redfish.

There is great concern over escapees from the salmon aquaculture industry. Escaping fish are vectors for spreading parasites and diseases, but they also “pollute” the local gene pool of naturally spawning salmon stocks, hence causing genetic erosion of lo-

cally adapted salmon populations. Aquaculture units thus need to be constructed so as to provide minimal risk of fish escaping, and the aquaculture industry is also required to carry out routine monitoring around their facilities. The government has established criteria for environmental testing of pharmaceuticals to improve the "environmental health" around fish farms. These measures are carried out to minimize harmful effects of aquaculture on the environment and indigenous wild fish populations.

EVIDENCE PROVISION

Strategic roles and responsibilities for science

Norwegian management of living marine resources is based on best scientific advice available. Scientific advice on sustainability and fish stocks within Norway is available from IMR, the second largest research institute in Europe, which was separated from the Directorate of fisheries in 1989 to ensure the independence of scientific advice. Fisheries research conducted by IMR contributes to scientific stock assessments by ICES. As stated earlier, ICES plays a key role in providing internationally refereed advice on which to base management decisions. For non-fisheries issues relating to the marine environment, IMR provides advice directly to the relevant ministry. The independence of IMR's scientific advice is illustrated by recent controversial advice given by IMR on oil exploration near the Lofoten islands and the development of cod aquaculture.

IMR is owned, and approximately half funded by the Ministry. To separate the activities of IMR from political considerations of the Ministry, they are overseen by an independent board, including prominent citizens, and representatives of universities, the fishing industry and IMR staff. The Ministry sets the research agenda annually, by a broad letter of intent, although this is written in collaboration with IMR staff and provides scope for IMR to develop specific foci. After direct Ministry funding the most important source of funds is external grants and projects, while 10–15% of funds comes from the sale

of 'research quotas'. Research quotas are a proportion of TACs allocated for research work and training. They are somewhat contentious as they represent lost catching opportunities for the industry, they mean that IMR is a financial benefactor of fishing opportunities, and as a source of funding they are vulnerable to fluctuations in stocks, quotas and prices. As a result they are frequently discussed at IMR board meetings but are likely to remain in the future and are generally accepted by the fishing industry.

In response to calls for a move to the ecosystem approach (EA), in 2002 IMR began a major restructuring process to try to engender an ecosystem perspective in research and advice. This two year process resulted in abandoning the previous structure of 3–4 large disciplinary research centers in favor of 19 research groups served by a shared department of research support who collaborate on four programs (Barents Sea, Norwegian Sea, Norwegian coastal zone, Aquaculture). The aim is to allow greater interaction across the institution and thereby engender a holistic, ecosystem perspective on research and advice (Misund et al 2008).

IMR purposely does not include social scientists (although they do take part in some multidisciplinary research projects) and the DoF does not recommend that social scientists studying the impact of fisheries decisions be part of ICES. Social science as a research tool to better understand the behavior of fisheries (e.g. studies on fishers' behavior) are thought to have a place in marine research advisory bodies but the feeling is that explicitly studying the impacts of fisheries management decisions on society should not be mixed up with the provision of impartial advice on the status of stocks. Economic data is collected and monitored by DoF who annually publish a profitability study for the fishing fleet (see www.fiskeridir.no). The assessment of social impact of management decisions is accounted for during the more political phase of setting objectives and during consultation with stakeholders who will give objections to measures that are unfeasible. In addition to fishers the consultation process includes processing industry, regional government, the Sami Parliament as well as environmental NGOs.

Information used by scientists to produce advice is collected through typical channels of catch data collection as well as close links with the industry.

Landings data is collected by integrating catch marketing with data collection. In Norway six sales organizations have a monopoly for the first hand sale of fish. The sales note between fisher and buyer monitored by the sales organization, is a legally binding document which also includes relevant scientific information such as gear type and fishing zone. Most of these are electronic, facilitating efficient collection and data flow from fisher/buyer through sales organizations to DoF. The presence of a discard ban for most commercial species (and since the 2008 Act comprising nearly all species) ensures that incidental catches should also be landed and recorded (a source of great uncertainty in other fisheries). The quality of scientific data on catches is also improved by strong control and enforcement.

Close co-operation between the scientific community and the fishing industry

The Gullestad Commission in 1996, conducted at a time of great tension between the industry and scientists over TAC recommendations, recommended greater use of data from the industry. In response the Norwegian scientists may have improved the relationship to the industry compared to the situation in many countries. This serves two purposes, to increase the quantity and scope of data available for science, and to improve cooperation and respect between scientists and the industry. The main example is the reference fleet which is made up of about 40 vessels which are recruited for a period of 4 years to collect data during their fishing operations. This scheme started with larger vessels and has recently been expanded to include inshore vessels. Fishers in the reference fleet receive specific training and compensation which is funded by the research quota. The initiative is popular amongst the industry: membership of the reference fleet is regarded in high esteem and competitively allocated every 4 years, some captains have even modified their vessels to facilitate scientific work. Within the scientific community the reference fleet is recognized as having positive impacts

on industry-science relationships but there is some debate as to the scientific usefulness of the exercise and whether training fishers to become scientists is the best way to engage with fishers' knowledge.

Information from the fishing industry is also communicated to scientists in various forums including presentations of ICES advice by IMR to the industry and the Reference Group for Marine Science, an annual 2 day meeting between scientists and fishers to improve dialogue between the groups.

Provision of ecosystem data

The ecosystem approach was proposed in a 2002 White Paper. This approach has been applied in practice by development of National Ecosystem Management Plans. Fisheries management is being developed along a trajectory from single species to incorporating more ecosystem concerns, including species interactions, impacts on habitats, non-commercial by-catch and pollution. Thus the approach is iterative, gradually incorporating more ecosystem concerns.

Examples of ecosystem considerations in management include the establishment of protected areas around cold-water coral reefs and the consideration of cod predation on capelin when setting quotas for capelin in the Barents Sea. This is due to predation by cod occurring after surveys are made to assess capelin biomass but before the capelin fishery starts. The fishing season for capelin has also been restricted to the winter to first allow cod to forage on capelin.

In order to strengthen the protection and sustainable utilization of living marine resources a new legal framework (the Marine Resources Law) came into effect in 2009.

DECISION-MAKING

Division of responsibility and transparency of governance

By virtue of the fact that 90% of Norway's stocks are shared, much decision-making (over management plans and TACs) occurs at the international level in negotiation with other states (primarily Russia and the EU). Norway and Russia share stocks of cod,

haddock and capelin in the Barents Sea. The main part of Norwegian cod exports comes from this area. The formal co-operation with Russia on these shared resources takes place within the Joint Norwegian-Russian Fisheries Commission. This commission has a 30-year history of developing management strategies and setting TAC quotas. The co-operation with the EU concerns a much greater number of species and stocks than the Russian-Norwegian situation. The TACs set for the joint stocks are also intended to ensure a national harvesting pattern and stable catch levels. The EU and Norway have also agreed on long-term management plans for cod, haddock, coalfish and herring.

A master plan for Norwegian fisheries development was adopted by the Government in 1998. It contained responsible management of natural renewable resources, increased marketing efforts and product development, and better utilization of secondary products, like heads and guts. The White Paper produced by the Government in 2002 stated the need for sustainable development to be integrated into management plans. The White Paper also emphasized implementation of ecosystem based management and the precautionary approach. It was further stressed that a balance be achieved between commercial inter-

est and the need to protect the marine environment and its biological diversity. Another important realization was the plan to reduce the fishing fleet even further so as to allow for harvesting of fish stocks in a sustainable way.

Norway's fisheries policy now has 4 objectives:

- commercial viability of the industry
- sustainable management of the resources
- stable employment and settlement in coastal areas
- economic sustainability through market orientation

Thus, as with the CFP policy the Norwegian policy is aimed to consider environmental, economic and social objectives. There is no clearly mandated priority between these in legislation but it has gradually been generally accepted that sustainable management of the living marine resources is 'pre-conditional' for all other objectives.

A new legal framework on wild living marine resources (Havressurslova – the Marine Resources Law) was passed in 2008 and came into effect in 2009. This sets out seven objectives for fisheries management and emphasizes sustainability, the first three of which relate to sustainability, the ecosystem approach

Section 7 of the new Marine Resources Law on management principles and basic considerations (translation to English by the authors of this report):

The Ministry should consider what kind of management is necessary to ensure sustainable management of wild marine resources.

The administration of the wild marine resources and associated genetic material shall put emphasis on:

- a) a precautionary approach in line with international agreements and guidelines
- b) an ecosystem-based approach that takes into account the distribution of the population and biological diversity
- c) an effective control of harvest and other exploitation of resources
- d) a purposeful distribution of resources, which can help to ensure employment and settlement in coastal communities
- e) an optimal exploitation of resources which is adapted to marine added value, markets and industry
- f) that gear and harvest methods take into account the need to reduce possible negative impacts on living marine resources
- g) that management actions contribute to ensuring the material basis for Sami culture.

and controls on fishing. Other objectives related to economic, social and cultural objectives.

The law is put into practice by the drafting of, consultation on and passing into law of regulations. For example the new law outlawed nearly all discarding but the actual wording of the regulations is currently being deliberated so that it does not make unreasonable demands on fishers to land large quantities of certain non-commercial marine organisms, for example jellyfish.

"Internal transparency" is achieved by the incorporation of industry representatives in negotiations. Transparency of the advice and decision-making process is also thought to be enhanced by structures and processes to enforce transparency (e.g. the board of IMR), the general transparency of governance in Norway and the small size of the country and population.

Decisions taken in international negotiations are greatly assisted by the existence of pre-agreed management plans, harvest control rules, independent advice from ICES and pre-agreed allocations between nations (for example Norway and Russia have a 50% each share of Barents Sea cod). Agreed allocations of catches (similar to the 'relative stability' of the CFP) appear to actually assist the negotiation process and the following of ICES advice. For example in 2002, in the absence of pre-agreed allocations of blue whiting, a zero catch recommendation by scientists was seen by many as poor, politicized scientific advice. Since 2005, when national allocations for this species were agreed, and ICES is giving its normal type of advice, it has become easier for negotiations to start by accepting ICES advice and move on to negotiate the TAC and management measures.

Management plans and harvest control rules are seen as useful tools in moving from short term decision making and depoliticizing decisions since 1998 when the North Sea Herring Management plan was agreed. More and more fisheries have established long-term management plans. So far these have, to a very large extent, been single species plans but they are expected to develop to include ecosystem aspects in future.

Deadlines for particular outcomes (e.g. recover a

stock to Bpa within 5 years) are not favored. Rather the approach is to monitor signals from the fishery and enhance the stringency of controls until signals are better. An example of this adaptive approach is with coastal cod stocks. There are no stock assessments (only abundance indices) and the DoF has been gradually increasing controls in collaboration with the industry in response to declining abundances. Now that there appears to be a positive change in trends, controls have not been further tightened.

Trying to avoid political hegemony over scientific advice

On occasions however, ICES advice is not followed. For example Barents Sea cod TACs were set over three times higher than scientific advice in 2000, because to follow the advice (which advised a quartering of the 1999 TAC) would have crippled the industry. This situation of 'unrealistic' advice is due to the way in which advice had been requested from ICES. Advice for TACs were requested that would recover biomass to precautionary reference points within one year. This illustrates the difficulty of management plans with strict deadlines which may result in politically impossible advice.

In an analysis of the political context of this decision, Honneland (2004) suggests that the decision was hotly disputed between the two countries, with Norway adhering to a 'sustainability discourse' and proposing following ICES advice more closely, while Russian negotiators refused to accept sudden cuts in quotas, breaking off negotiations for several days. The final protocol from the negotiations acknowledges the TAC as 'alarmingly high' but justifies its acceptance based on the "difficult conditions of the population of North-western Russia" (Honneland 2004). Thus the suggestion is that the TAC setting negotiations were also prone to the political interference and the precedence of social and economic management objectives over biological sustainability. At this time quotas were being set annually.

The experiences from setting the TAC for the years up to and including 2000, led Norway and Russia to develop a long term management strategy for cod with an associated harvest control rule. These

measures which were adopted in 2003 have successfully reduced the influence of the very short term vested interest on decision making.

Stakeholder co-management

Where decisions are to be made which do not concern ecological sustainability, there is a preference for stakeholders to negotiate their own decisions, which will then be implemented by the DoF/Ministry. For example, the allocation of quota between different fleet sectors was eventually decided based on lengthy and difficult negotiations within the Norwegian Fishermen's Association. In theory, the Ministry has the authority to alter these allocations each year but they will normally follow the agreement established between the industry sectors.

Stakeholders input into fisheries regulations occurs at the stage of drafting regulations and also during hearing processes before regulations are past to the Cabinet and parliament for voting. A council of industry and NGO members used to provide proposals and input into regulations. This had to be abandoned because of Norwegian gender laws and is now replaced by an open meeting which is also open to the press. This is more democratic and is apparently 'functioning' but it is more prone to single-issue agendas than the council was. The strategy of the DoF for non-sustainability issues was to try to encourage the Council to achieve their own consensus so that it could be directly implemented rather than DoF having to draft regulations themselves in the absence of stakeholder consensus. This created an incentive for stakeholders to achieve a consensus position rather than lose their direct influence on the content of regulations.

COMPLIANCE

Reduction of fishing mortality

There are two approaches to the reduction of fishing mortality. TACs and strict enforcement of landings limit intentional fishing mortality.

At the same time there is a ban on discarding all commercial (and with the new Act, many non com-

mercial) species. In contrast to the EU, in Norway it is forbidden to catch illegal fish, rather than only to land them. Combating illegal, unreported and unregulated fishing (IUU) is to care for all marine resources. Fighting this crime, which is a threat to legal harvest and ecosystems alike, is actually the highest priority of Norwegian fisheries management. Norway has thus instituted a number of measures to combat IUU fishing. Norway has implemented comprehensive measures aimed at strengthening control of fishing activities at sea and the landing of fish. Both Norwegian and foreign vessels are subject to stringent controls in all Norwegian waters. The key factor of success in this process is the efficient co-operation between the Norwegian Coast Guard at sea and the DoF and the sales organizations on land. IUU fishing is a transnational problem and an extensive network of international measures has evolved to help control fishing on shared stocks among affected states.

Thus the point of regulations is to put pressure on fishers to avoid unwanted mortality of fish. It is recognized that the discard ban is difficult to enforce. It serves as 'a flag' while other technical measures designed to supplement the ban by reducing incentives to cause unwanted mortality include:

- net mesh limits
- minimum size regulations
- temporary or permanent closures of fishing ground
- real-time closures
- selective gear technology
- by-catch regulations

Addressing top-down control

Norway operates a top-down regulatory system in which the state regulates and enforces regulations on the industry. Consolidation of the industry and increasing interest in eco-labeling (like the Marine Stewardship Council, MSC) etc are changing the behavior and incentives of industry actors to take a more proactive role in responsible fishing. However for the time being, the DoF still has a somewhat parental responsibility to regulate the industry including specifying fine details of regulations. Such regula-

tions, however, are subject to extensive trials by fishers employed by DoF and consultation with the industry before implementation. A flexible approach is maintained and regulations can be revisited to accommodate the practicalities of fishing and needs of the industry as long as sustainability goals are being met.

Enforcement of regulations

Enforcement of fisheries regulations requires attention along the entire value chain, and the Norwegian fishery inspection services have rights to inspect and collect information at all stages. Regulations are enforced at sea, during landings (also by Sales Organizations) and along the supply chain through processing, transportation and marketing. At all stages, documents (e.g. logbooks, sales notes) are checked against actual observations (e.g. catch onboard, amount landed) to prevent loopholes where documents declare false information.

At sea, the existence of a large and active coastguard, including helicopters, has been necessary to enforce legal fishing amongst high-powered vessels that could outpace fishery protection vessels. Vessel Monitoring Systems for all vessels over 24m allow the enforcement of closed areas and the collection of detailed data on fleet behavior. The monopoly of sales organizations to make the first sale of landed fish and the formalization of sales notes as landing records integrated with monitoring quotas allows for tight control and accountability of landings and reduction of possibilities for ‘black landings’. The value of over-quota fish is automatically deducted from any sales revenue (although a 20% payment is made in order to maintain incentives to land rather than discard over-quota fish). Individual vessel groups are ‘under-regulated’ or ‘over-regulated’ to try to avoid quota overshoot. If quota overshoot is expected the total of the individual vessel quotas will be less than the TAC for that vessel group to allow for predicted vessel overshoot. DoF officials emphasized the importance of an incremental, iterative process of improving basic aspects of control to reduce ‘grey landings’, for example by using realistic conversion factors to convert product weight to live weight, and the introduction of compulsory weighing of fish boxes at sale, to

ensure the quantities of fish recorded in sales notes accurately reflect the quantities actually landed.

Further checks are made later in the value chain, when post-sales audits of producers are checked to see that the amount of product purchased matches with the amount of fish recorded as sold.

Enforcement in Norway has been strengthened by increased sanctions to recognize the increasingly economic nature of fisheries crimes and through cooperation between government departments (e.g. tax, customs, coastguard, police and fisheries agencies) to assist each other enforcing laws which lie outside their own remit. To help with conviction in complex fisheries cases two specialized state prosecutors are employed and joint courses are run between the coastguard and local police fisheries inspectors. IUU fishing has seriously disrupted attempts to manage Barents Sea cod in the past. This is improving now and Norway has international agreements addressing IUU fisheries with 17 other nations, including relevant EU nations (but not Spain yet).

Removal of excess capacity

Economic analysis of Norwegian fisheries and the wider economy highlights the inevitable need for consolidation of the fishing industry to prevent it becoming unprofitable and to prevent fishers becoming progressively poorer. Thus the need for a structural policy to maintain the economic viability of the sector is widely accepted. From the perspective of the Ministry, structural policy is an economic issue necessary to maintain profitability; however the DoF tends to see overcapacity in wider terms as the root of many fisheries management problems. Consolidation of the industry to an appropriate size reduces short-term pressure to increase catching opportunities beyond sustainable levels and creates a smaller, more professional fleet with fewer incentives to free-ride and more incentives to behave responsibly and support sustainable policies.

Several market-like instruments have been implemented with the following features:

- Voluntary
- Flexible

- User pays – user gains
- Restrictions embedded to prevent uncontrolled consolidation and maintain social objectives of a diverse fleet supporting coastal livelihoods and communities.
 - Maximum quota size for any individual vessel
 - Quotas can only be associated with a licensed fishing vessel owned by an active Norwegian fisher
 - Quotas can only be consolidated within geographical regions and within established vessel groups (i.e. large commercial sector cannot access quota belonging to the small-scale sector)
 - Requirement that the boat originally associated with the quota is scrapped

Different instruments have been applied to different portions of the fleet reflecting the specifics of each vessel group.

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FISHERIES MANAGEMENT IN UNITED STATES

A case study summary produced for the Baltic2020 foundation project 'Best Practices in Fisheries Management' based on documentation and meetings with federal and regional civil servants and scientists as well as stakeholders (an NGO and a fishermen representative).

INTRODUCTION

This report summarises aspects of fisheries management in the US, which shed light on identified issues with fisheries management in the Common Fisheries Policy of the EU. US provides an appropriate case for this 'best practice' study since their fisheries are very diverse, spanning from arctic to tropical systems and involve a wide range of vessel and gear types, a situation similar to that in EU. The total catch of US and European fisheries are similar. For both the US and EU, fisheries are minor in terms of economics, but they are culturally and politically important. The governance structure of US natural resources can be viewed as analogous to the EU with central authorities (congress, Secretary of Commerce and National Oceanic and Atmospheric Administration (NOAA) in US and European parliament, Council of Ministers and European Commission (COM) in EU) and states being somewhat analogous to member states in EU. In addition, US are generally regarded as having a successful fisheries policy, particularly with regards to issues of clear objectives, transparency, division of decision-making power and standards for evaluating proposals and performance. Supporting this perception, Pitcher et al. (2009) identified US as the second best nation in implementation of the FAO Code of Conduct for Responsible fisheries. In that study, US scored particularly high, relative to other countries, for management objectives and precautionary approach (Pitcher et al. 2008). The rate of overfishing of US fisheries is about 20–25%, which is slightly better than the global average, and much better than

the European Union.

The material in this document is based on documents detailing US fisheries management and information provided and opinions expressed during interviews with key informants at the House of Representatives' Committee on Natural Resources; at the Senate Committee on Commerce, Science, and Transportation; at NOAA's National Marine Fisheries Service (NMFS); the New England Fishery Management Council (NEFMS) and the Pew Environment Group (Pew). The document is organised in three themes (Evidence provision, Decision-making and Compliance) corresponding to those identified from gap analyses of the CFP and during a scientific workshop held in Stockholm in January 2009.

Overview of US Fisheries

The catch in US fisheries constitute 3.7% of global catches, making it the fifth largest fishing nation (figures from 2006, NOAA 2008). Fisheries have relatively low economical importance nationally, constituting less than one percent of GDP. However, fisheries are of significant value in some regions both economically and as a source of employment.

The most important species by volume is pollock, constituting about a third of the catch. Second is menhaden, followed by salmon and cod. Total catches were 4.2 million tons in 2007 (NOAA 2008). Crabs, scallops, lobster, salmon and shrimp are the most significant in landed value. Pollock is in sixth place in terms of value. The value of landings was \$4.1 billion in 2007 (NOAA 2008).

US recreational fisheries are also very important. The number of recreational anglers is conservatively estimated at 17 million, and there spending on recreational fishing far exceeds the landed value from commercial fisheries.¹² Recreational fisheries for some species in some regions catch more than commercial fisheries. Recreational fisheries are subject to the same regulatory framework at commercial fisheries in the US.

¹² Note this is not a fair basis for comparing the economic importance of recreational and commercial fisheries, but it does indicate that recreational fisheries are important to many US citizens and they are important economically.

US fisheries are diverse ranging from arctic and subarctic regions (i.e. Alaska) to tropical waters and coral reefs (e.g. Hawaii, Puerto Rico and Virgin Islands) and take place both in the Atlantic and the Pacific. Sentinal, industrial and recreational fisheries are substantial in most regions and the fleets include virtually all gear and vessel types, with trawling and purse seining being the most common fishing methods.

Development of fisheries management in the US

The main legislation for fisheries management is the Magnuson-Stevens Act (MSA). The first version of the act was passed in 1976 after establishment of the US exclusive economic zone (EEZ). The Act established eight Regional Fisheries Management Councils (FMCs) with responsibility for the preparation of Fishery Management Plans. Plans that comply with the Act's National Standards (there were eight initially, but two more have been added) and other applicable laws and regulations are implemented by the Federal government. Thus, the US has more than 30 years of experience with regionalized co-management of fisheries.

Fisheries beyond 3 nautical miles out to the 200 miles border of the EEZ are under federal jurisdiction and managed under the MSA, whereas freshwater fisheries and fisheries within three miles from the shore are managed by the states. For species that are fished primarily in federal waters, but also in state waters, federal regulations apply up to the shoreline.¹³ The purpose of the 1976 act was mainly to promote development of a domestic fishing fleet, phase out foreign fishing and conserve and manage the marine fishery resource.

Major amendments of the MSA have been undertaken with the evolution of the act toward stronger conservation and greater accountability. The 1996

amendment, known as the Sustainable Fisheries Act:

- Eliminated provisions of the Act that had allowed fishing in excess of MSY to be justified based on vague economic, social and ecological considerations,
- Required overfished fisheries to be rebuilt to the MSY level in 10 years unless the biology of the species and condition of the stock makes rebuilding in 10 years impossible,
- Required bycatch to be minimized to the extent practicable,
- Established essential fish habitat and provisions to protect it from adverse effects of fishing and to advocate protecting it from the activities of other industry sectors.

The 2007 reauthorization of the MSA:

- Added provisions to increase accountability by requiring accountability measures that are triggered when the Annual Catch Limit (ACL) is exceeded,
- Strengthened the role of Scientific and Statistical Committees that advice on acceptable catch levels and other scientific aspects of fisheries management,
- Promoted market-based approaches by using Limited Access Privilege Programs (LAPP)
- Enhanced international fishery management, especially targeted to address illegal, unreported and unregulated fishing (IUU)

National guidelines and approval and regional management

NMFS is the federal agency responsible for management and conservation of living marine resources under the MSA, the Marine Mammal Protection Act and the Endangered Species Act. The work of NMFS

¹³ The legal formalities of the arrangements between states and the federal government are complicated and in the early years of the MSA they were polarized with the loophole of misreporting federal catch from unregulated state waters threatening to undermine fisheries. However, such loopholes have now been closed in almost all cases, such that in practice, management in state and federal waters is harmonized.

is carried out in six regions, which each has a regional office and a Science Center with one or several laboratories. There are about thirty NMFS science laboratories with about 1500 scientists. This science enterprise in support of fisheries management is comparable in size and capability to the EUs fisheries science enterprise. One important difference is that the US laboratories integrate social and natural sciences, which is only the case in a few European countries.

Since US fisheries are so diverse in biological, economical and sociological characteristics, a national detailed plan would be unsuitable for management. In stead, the eight regional fishery councils prepare management plans for the fisheries within their area of jurisdiction. The regional fishery management councils are decision-making bodies, which develop and recommend specific management measures. While the plans developed by FMCs are technically only recommendations, they are the first step in the decision process that constitutes a co-management arrangement between the FMCs and the federal government. The fishery management plans are subject to review by NMFS and approval by the Secretariat of Commerce (analogous to the EC Commissioner for Fisheries) to ensure compliance with the national standards and other relevant legislation. The Federal government only has the authority to implement its own plan under limited circumstances, such as when a plan submitted by a FMC violates the National Standards. NMFS is also responsible for implementation of the management plans.

EVIDENCE PROVISION

Strategic roles and responsibilities for science

NMFS is responsible for developing fishery research programs, a work carried out in consultation with the regional councils. The main research areas are however outlined in the MSA. The Act also describes specific research programs, (e.g. regional ecosystem research and research on deep sea corals were introduced with the recent amendments), but these are a minor element of the overall science program.

The science centers are regionalized, but they are separate from the regionalized management structure. They produce stock assessments for most of the 900 fisheries that are managed under federal jurisdiction. Stock assessments are done in different ways. The most complete and hence also most data demanding is age-structured models. Other, more or less sophisticated, models are also used. For stocks for which less data is available an index of abundance is used.

The stock assessments are evaluated through a peer-review process carried out by committees of independent scientists, and the Scientific and Statistical Committees (SSC) of regional FMCs. SSCs are required by the MSA. SSC members are appointed by the FMC they serve. The SSC ensures that best available scientific information is used in the stock assessments and shall

‘provide its Council ongoing scientific advice for fishery management decisions, including recommendations for acceptable biological catch, preventing overfishing, maximum sustainable yield, and achieving rebuilding targets, and reports on stock status and health, bycatch, habitat status, social and economic impacts of management measures, and sustainability of fishing practices.’

The evaluation process includes a public meeting and the SSC should try to hold its meeting in conjunction with council meetings to facilitate attendance of council members. However, it is described by the New England Fishery Management Council (NE-FMC) that participation is often intimidating to the fishermen as the process is rather technical. Stock assessments are updated every one to three years, although less frequently in some cases.

Sufficient resources and linked activities

The provision of evidence, under authority of NMFS and regional councils, rely on federal funding. Cost-recovery schemes exist in fisheries where market-like instruments (Limited access privilege programs, LAPP) have been introduced, but hitherto (February 2009) these cover 12 of the roughly 900 managed stocks whereby cost-recovery must be considered to

be of minor importance for financing research. The general view expressed by the Senate professional staff, is that the contribution from fisheries to the overall economy is really important and that it is more important than recovering the cost for research and management. This reflects the political importance of fisheries.

Science is also conducted by cooperative projects, including both researchers and fishermen. They are described by NEFMC as an efficient way to use resources and successful in building trust and increase mutual understanding. The cooperative research projects are initiated jointly by science and industry, which create research proposals that are evaluated and ranked by research steering committees (working groups within the regional councils). The approved projects are funded federally.

Provision of ecosystem data

Fishermen provide data on catches through the use of mandatory log books. These are matched against dealer logs on first sale of fish. In addition, US have extensive observer programs to provide data on bycatch (which in US is defined as discards, including incidentally caught mammals, endangered species and/or birds) and data on retained catch. The observer programs also allow collection of biological data and information that is used to define essential fish habitat (EFH). All of the NMFS regions conduct ecosystem research, including the collection of environmental, plankton, fish, marine mammal, trophic interaction and other types of data, and development of multispecies and ecosystem models.

NMFS put effort into applying an ecosystem approach to management, but find that lack of data (despite their extensive collection of data) and appropriate models often hinders i.e. multi-species models. The data provisioned by the observer programs is very valuable for ecosystem-oriented approaches, as exemplified by Alaska, the region where the major part of US fisheries take place and extensive observer programs are established. In Alaska data on fish larvae is collected and NMFS have recently been able to construct food-web models for the Berings Sea and the Gulf of Alaska. The food-webs are big spider webs

with many species, but it was found that four species had most of the energy flow going through them of which three are of major importance in commercial fisheries (e.g. pollock, cod, salmon).

There are also study fleets in which participating fishermen collect information on catches and discards. The study fleet uses equipment to make data collection as automated as possible, e.g. sensors, measurement equipment and a computer on the boat where the fisherman enter in the size and species of catch and discards. The work is described as demanding, but the fishermen receive compensation for participating in the study fleet. The data provisioned by the study fleet is intended to be used in stock assessments, as well as ecosystem-approaches to management. Such programs are relatively new, but they have already reach the point were there are some successes.

A large number of the fishermen are involved in research projects and study fleets. For example, in area managed by NEFMC 30–50% of fishermen are participating, although the effort input by fishermen varies.

Provision of economic and social data

The primary focus of the data collection methods described above is data on or for fish abundance and catches. There is also collection of socioeconomic data through the observer programs. The agency also issues academic grants to collect social and economic data and to research priority topics. For social data, the national census is an important source of data. Economic and social analyses are required for management measures to guide which measures have the lowest impacts. NMFS has placed a priority on building a social sciences research program in its Science Centers (there are about a 100 professional social scientists in the Agency). However, lack of data for more fine-tuned socioeconomic analyses is a common problem according to NMFS which perform the analyses. Three types of impact studies are most commonly used:

- Impacts on small businesses; Break-even analysis and profitability analysis

- Cost-benefit analysis for the management action.
- Economic impact analysis; impact on the human environment and other sectors related to the fisheries sector.

Reliable of fishery dependent data

As everywhere there are some problems with IUU, but misreporting is not perceived as a wide spread problem. In part this is because of aggressive enforcement and severe penalties and a high level of observer coverage. There is also a sampling program for recreational catches, although it is imprecise and probably inadequate for some species.

DECISION-MAKING

Division of responsibility and guidelines for prioritization and implementation

The regional council uses the advice provided by the SSC to produce recommendations for management. The main part of the recommendations are in the form of fishery management plans, which the council must develop for virtually all fisheries. Plans are amended as needed. The fishery management plans contains information on e.g. conservation and management measures, assessment of the fisheries condition (maximum sustainable yield, MSY; optimum yield, OY; overfished status), data requirements for management, essential fish habitat, standardized bycatch reporting methodology (a description on how bycatch is measured and accounted for) and impacts of the fishery on participants and communities. If the stock is considered to be overfished, the fishery management plan shall also contain a rebuilding plan. In cases where restrictions on or reduction of harvest is necessary the fishery management plan should contain descriptions of allocations of quotas or harvest opportunities.

All fishery management plans, conservation and management measures and regulations under the MSA shall be consistent with ten national standards. These standards include:

1. Prevent overfishing while achieving optimum yield.

2. Be based upon the best scientific information available.
3. Manage individual stocks as a unit throughout their range, to the extent practicable; interrelated stocks shall be managed as a unit or in close coordination.
4. Not discriminate between residents of different states; any allocation of privileges must be fair and equitable.
5. Where practicable, promote efficiency, except that no such measure shall have economic allocation as its sole purpose.
6. Take into account and allow for variations among and contingencies in fisheries, fishery resources, and catches.
7. Minimize costs and avoid duplications, where practicable.
8. Take into account the importance of fishery resources to fishing communities to provide for the sustained participation of, and minimize adverse impacts to, such communities (consistent with conservation requirements).
9. Minimize bycatch or mortality from bycatch.
10. Promote safety of human life at sea.

Recommendations issued by the regional council are checked by NMFS to ensure compliance with the national standards and other legislations, after which they are approved.

National standard 1, to prevent overfishing, has the highest priority when trade-offs are necessary. Thus US must be said to have clear objectives and a prioritization between them. Importantly, there are national standard guidelines that translate the general policies of the national standards to more specifics what how the agency interprets the standards and what's expect in FMPs. The National Standard guidelines for NS 1 on overfishing are particularly important in this regard.

The legislation states goals and objectives, but in addition it defines the processes for decision-making to ensure an open, transparent process and an opportunity for people subject to management (affected or benefitted) to have a say in these processes. The

decisions are juridically reviewable, and this threat of lawsuits ensures compliance assure accountability under the law.

The regional council has to set annual catch limits for each of its managed fisheries that does not exceed the recommended fishing level, as advised by the SSC or the peer review process of stock assessments. National standard guidelines for annual catch limits state that catch limit has to take all kinds of mortality into account, both directed and bycatch, and that limits has to incorporate uncertainty (scientific as well as management uncertainty, depending e.g. on what kind of controls are used, i.e. input or output control, and how exactly these can reach the management target) by reducing the allowable biological catch with the uncertainty.

In addition, the council has to develop accountability measures to correct for cases where the annual catch limits are exceeded. For example, the accountability measure may require the excess catch to be repaid the next year. The requirement for accountability measures was introduced with the 2007 amendments of the MSA and will be mandatory by 2010 for stocks subject to overfishing or by 2011 for others stocks. This can be viewed as another element of the precautionary approach because accountability measures are a hedge against uncertainty.

The ecosystem approach and links between fisheries policy and other policies

The US is moving towards an ecosystem approach to fisheries management. The process is described by NMFS as an incremental, step-by-step-process, which is rather loosely defined. Work has started towards incorporating effects of one species on another in stock assessments and, if the effects are understood, environmental variability can influence parameters in an assessment model. There is also ongoing research on climate change and increased climate variability, to investigate the effects on fish and possibly incorporate such effects in assessments.

The impact of fisheries on non-target species are evaluated by NMFS to ensure that fishery management plans comply with the relevant legislation, such as the Endangered Species Act and the Marine Mam-

mal Protection Act.

Anthropogenic activities are being checked for effects on fish ecosystems as other agencies, e.g. issuing construction permits, are asking NMFS for advice on how activities may affect essential fish habitat. Thus, the work on defining essential fish habitat, following the 1996 Sustainable Fisheries Act, has been successful in enhancing the importance of such considerations.

Transparency and clear roles in decision-making

Open and transparent decision-making processes are described as a key principle by the NMFS.

The regional councils have 4 –8 full meetings a year. In addition, there are numerous meetings of subordinate groups (committees, panels). All agendas are published before meeting, the voting procedure is open to public and the meeting minutes are available for the public, in order to ensure transparency. The procedure for selecting council members is a complicated political process, but there are provisions for public input into the selection.

During the peer review process of stock assessments, there is a meeting open to the public.

The division of responsibilities between NMFS and the regional councils is described in the MSA, which clearly states their respective roles in management and the decision-making procedure. The separation of population assessments and allocation decisions is important, as it further make a clear distinction between the functions of the different bodies involved in management.

Avoiding politicisation of decision-making

The US legislation for fisheries management provides a national framework for regional decisions. Civil servants involving stakeholders take all the decisions regarding management. The framework does not include a formal role for the members of congress in the review of plans or in day-to-day fisheries management. There intended role is limited to designing the overarching framework, i.e. development and amendments of the fisheries act. However, politicians often attempt to influence the process on behalf of their constituency. Transparency, National Standard

Guidelines, and judicial review all counteract political influences.

Balance between long term decisions and short term actions

The fishery management plans are multiannual (they last until amended). Most Plans establish the rules for annual adjustment of management measures. Annual catch limits are defined within the fishery management plans, but the accountability measures may come in to play to reduce next years catch if the limit of the previous year was not met. The fishery management plan shall however be amended when necessary and the MSA specifically states that this should be carried out promptly when changes in management and conservation in another fishery affects the fishery in question.

Level of co-management

Co-management of fisheries takes place mainly in the regional councils. The MSA specify the number of members (ranging from 7 to 17 voting members) and their composition of each council. In addition to one NMFS representative in each council there are also one representative from each of the states within the area of the regional council. The other members are appointed by the Secretary of Commerce choosing from lists submitted by the Governors of the relevant states. These members should be knowledgeable regarding conservation and management fisheries. They are mostly representing the fishing sector (commercial harvesters and processes, and recreational interests, depending on the relative importance of the two types of fishing by region), but there are also environmentalists and scientists. A process outlined in the MSA ensures an equal and balanced representation of interests in fisheries under authority of the council, taking into account their relative proportion of and interests in the fisheries.

The regional councils are, as described in previous sections, the decision-making bodies, but their recommendations are subject to approval and implementation of NMFS. This means that their empowerment do not go beyond making decisions in alignment with the national standards and other legislation.

COMPLIANCE

Reduction of fishing mortality

Problems with overfishing have been one major reason for the amendments of the MSA in 1996 and 2007. These problems are not yet solved but there is a trend in the direction of more sustainable fishing practices. NOAA/NMFS have developed a Fishery Stock Sustainability Index, where the major stocks gets a score depending on available information and its status. During the last eight years there has been a steady increase of the index, indicating that an improved sustainability of fisheries.

One of the instruments used to reduce fishing mortality is the rebuilding plans that are mandatory when a stock is assessed as overfished. The rebuilding plans should ensure a recovery of the stock to a legally mandated target level within 10 years.

Accountability measures are now being implemented in fishery management plans. This implies that all fisheries will be under output control, which hopefully will increase the possibilities to maintain, or if needed reduce, fishing mortality to a sustainable level.

Addressing top-down control and micro-management

The de-centralised approach to management and the extensive delegation decision-making to the regional council make US an example of a country where top-down control is reduced substantially compared to the situation in the EU. Micromanagement may exist but as it is the regional councils that design regulations, it is likely that complicated rules have had more input from the fishing people that have to live with the rules.

Industry incentives to act sustainably

In US fisheries management several instruments are in place to encourage sustainable action by the industry. An increasing number of American fisheries are certified under the Marine Stewardship Council. The certification requirements imply sustainable practices and the MSC certification is a positive incentive – it increases market value of the product and provides

opportunities to sell the product at more markets.

Limited access privilege programs, LAPP, have been introduced in US fisheries management and are currently used in 12 fisheries. Their purpose is to improve economical situation and sustainability of fisheries and to promote safety at sea. NMFS support the programs but they should be initiated by the regional councils. LAPP do not imply property rights, since US legislation would require compensation if a property right is taken from its holder, but instead provides privileges to participate in a fishery with limited access. The privileges may be transferable, according to principles outlined in the MSA, but to what extent is determined on a fishery-to-fishery basis. Principles for initial allocation of privileges are described in the MSA, but in short the allocation should be equal, taking into account dependence of individuals and communities on the fishery and current and historical harvest and participation in the fishery. LAPP are likely to reduce the race to fish between fishermen and thereby create positive incentives for more sustainable actions.

The high observer coverage in many US fisheries increases the likelihood of detection of non-compliance. This provides incentives to comply with the regulations and thereby contribute to intended sustainable practices.

Enforcement of regulations

Observer programs are one way to enforce regulations, but as many fishing trips still are conducted without observers onboard other measures are necessary. The US coast guard carries out the major part of the controls at sea. The controls are however sporadic since the coast guard, in relation to the very large EEZ of the US is relatively small. Additional assignments to the coast guard following the terrorist attacks in 2001 have resulted in a situation where the coast guard is described as overloaded by both NMFS and regional FMCs. The large number of coast guard missions has also the effect that violations of fisheries regulations most often are discovered during operations with other purposes and relatively few missions targeted directly towards fisheries are carried out. In some areas however, like New England and Alaska,

coast guard does more fisheries-targeted missions due to the importance of the industry in these areas.

After the coast guard discovers violations, the vast majority of the cases are then transferred to the special agents at NMFS' Office of Law and Enforcement. The special agents take over at landings or at shore and are trained to investigate cases concerning violations of fisheries regulations. Investigations of violations by other methods, e.g. matching log books with landings data, other forms of forensic accounting, are also carried out by the special agents.

US have developed an extensive system for monitoring of vessels by VMS. Currently 6200 vessels are under surveillance by VMS and VMS equipment is required in 17 fisheries. The reasons for using VMS differs between fisheries, examples include ensuring non-disturbance of Stellar's sea lions haul-outs and rookeries in Alaska and compliance with different fishing seasons in New England. However, the system has capacity for monitoring of 100 000 vessels and can thus be extended to more fisheries.

The US is a leader in terms of the international policies to combat IUU. It has very few high seas fishing vessels, but they are held accountable to all international agreements that are applicable to them. In addition, The US is very active in promoting measures within Regional Fisheries Organizations (e.g., ICCAT) to counteract IUU.

Removal of excess capacity

The introduction of Limited Access Privilege Programs in some fisheries is believed to contribute to a reduction of excess capacity. NMFS view market-like instruments as much more effective in solving most of the issue associated with overcapacity than decommissioning schemes.

However, several decommission schemes have been employed in the US. There is under normal circumstances no funding for buying out boats, but occasionally the legislations have created funds for decommissioning schemes. Federally funded buy-back programs funded by congress have cost tens of millions of dollars. In a few cases they may have had a significant positive effect on reducing capacity, but overall they have had a minor impact. There have also

been industry-funded initiatives to decommission boats. These programs might be supported by the NMFS through loan guarantee programs available to the fishing industry. NMFS regard scrapping requirements as an important feature of a successful decommissioning scheme. If this is not possible, then the fishing permit should be taken from the boat-owner.

Fishing capacity in many US fisheries has been sharply reduced in recent years. The most significant reasons for reduction in fleet capacity have been more conservation oriented management that has meant many boats are no longer economically viable, and rights based management in many forms (including stakeable fishing effort units) which have given a incentive for fleet consolidation.

Public and stakeholder participation and opinion

The participation of fishermen in research and data collection is likely to increase trust between fishermen and scientists as well as managers. Credibility of science will then be higher. In addition, the engagement of industry in the regional councils probably increases the understanding of the necessity of management action. This in turn enhances legitimacy of the process. These structures may also create positive perceptions of management in general and the regulations, which increases the will to comply with the rules.

Encouragement of local initiatives for responsible fishing

The cooperative research projects are proposed and evaluated at regional level. These projects may for example concern development of more selective or less destructive gear, identification of habitat of concern or conservation of habitat, which all must be said to provide opportunities for more responsible fishing practices. Regional councils can in addition request information collection programs that NMFS should carry out if the needs are legitimate.

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FISHERIES MANAGEMENT IN CANADA

INTRODUCTION

This report summarises aspects of fisheries management in Canada, potentially relevant to the EU Common Fisheries Policy. Canadian fisheries are very diverse, ranging from arctic and subarctic regions to temperate waters. Most take place in the Atlantic or the Pacific Oceans, but commercial fisheries are extending into the Arctic Ocean as well. Commercial and recreational fisheries are substantial in most regions and involve a wide range of vessel and gear types, a situation similar to that in EU. For both Canada and EU, fisheries are minor in terms of economics, but they are culturally and politically important, and in some rural coastal parts of Canada. Social dependency on fisheries can be very high. Governance of Canadian natural resources share similarities with the EU with a division of responsibilities between central and regional level, having central authorities and implementation agencies (the Minister of Fisheries and Oceans and Department of Fisheries and Oceans (DFO) in Canada and Council of Ministers and European Commission (COM) in EU) as well as geographically with large regional diversity. Canada is generally regarded as having a successful fisheries policy, particularly with regards to issues of surveillance and control, reducing harmful gear and fishing practices as well as stakeholder participation in management. Supporting this perception, Pitcher et al. (2009) identified Canada as the third best nation implementing the FAO Code of Conduct for Responsible fisheries. In that study, Canada received high points for responsible fishing methods and addressing compliance issues (Pitcher et al. 2008).

The material in this document is based on documents detailing Canadian fisheries management and information provided and opinions expressed during interviews with key informants at the University of Ottawa and at the Department of Fisheries and Oceans (DFO, sometimes referred to as Fisheries and Oceans Canada). The document is organised in three elements (Evidence provision, Decision-making and Compliance) corresponding to the structure of issues identified from gap analyses of the CFP and during a scientific workshop held in Stockholm in January 2009.

Overview of Fisheries in Canada

Canadian catches constituted 0.7% of global catches in 2006, excluding Canada from the list of the 20 largest fishing nations (DFO 2008, NOAA 2008). Fisheries have relatively low economical importance nationally, constituting less than one percent of GDP. However, fisheries are of significant value in some coastal regions both economically and as a source of employment. Total employment in fisheries industries was 86,000 people in 2005, of which 52,800 were commercial fishermen and crew members (DFO 2007).

Lobster, snow crab and shrimp are the most significant species measured in landed value. The value of landings was CAN 1.9 billion in 2007 (DFO 2008). The major species by volume are herring and shrimp, each accounting for 15% of the catches (figures from 2005, DFO 2007), followed by snow crab and North Pacific hake. Total quantity caught in 2007 was slightly more than 1 million tonnes (DFO 2008).

General characteristics of fisheries management in Canada

The Section 91 in the Constitution Act of 1867 regulates the division of responsibilities for fisheries management between the federal government and provinces. It states that provinces have authority to legislate on civil or property right issues in provincial fisheries, whereas conservation of the resource is under federal jurisdiction. With the Fisheries Act, the main legislation for fisheries management and first established in 1868, the Minister of Fisheries and Oceans is given the authority to manage the fisheries including provisioning of regulations under the act. In addition, the Oceans Act (from 1996) and the Species at Risk Act (from 2002) give the Minister further power and responsibilities.

The Minister has discretionary authority to impose regulations on resource access and allocation of access, on gear, on amount, size and species of fish caught as well as to ensure enforcement of these regulations. Additionally, the Minister is responsible under the Oceans Act for conducting the research necessary for management of fisheries, habitat and

aquaculture. The Department of Fisheries and Oceans (DFO) carry out this work on behalf of the Government of Canada.

The Canadian management system has been described as a command-and-control system, although there have been efforts since the 1990s to increase co-management and stewardship arrangements. This is particularly the case in Aboriginal Fisheries, where Bands have significant legal rights to participate in management of resources they exploit. The regions (where a major part of the work by DFO is carried out) use different measures for management, also often with variations between fisheries, and there are also differences in how processes for provisioning of evidence and for decision-making are designed.

EVIDENCE

Strategic roles and responsibilities for science

In Canada, the main part of the research is conducted by scientists within the regional branches of DFO. Research priorities are defined by the National Science Directors Committee (NSDC) through a quite complex process. The process includes consultation with the other parts of DFO (Fisheries Management, Oceans and Habitat Management, Policy) to identify their needs as well as periodic work by national working groups of Science experts, looking into particular high-level science themes with regard to "far-horizon" issues. The process also allows for annual input from academia and stakeholders through the Assistant Deputy Minister of Science's External Advisory Board. The result from these consultation processes is handed over to NSDC, which makes the final decisions on priorities. In some cases the government as a whole provides direct guidance on research priorities, through allocations in the federal budget targeted at a specific issue. However in all cases, at the scale of the Science sector priorities are quite high-level, and it is at the regional level that specific programs are designed and approved.

The set-up and focus of the research organisations varies between regions. Also at this level there is room

for (informal) input from stakeholders through stakeholder meetings during annual work planning, which almost every Regional Director of Science hosts to get input on priorities.

The provision of evidence takes place mainly at the regional level. In fisheries, it starts with a request from Fisheries Management (a division of DFO) to the scientific sector for advice on status of the resource and harvest options. Science prepares at least a classic stock assessment and organises a peer review meeting, where the results are presented and discussed. The forms of the meeting, including the extent of participation of different stakeholder groups, depend on region, stock, and the nature of the request.

Sufficient scientific resources and linked activities

The provision of evidence under the authority of DFO and their regional offices rely mainly on federal funding. However, licence fees play a substantial role in funding management, including science. Annually around CAN 40 million are collected from licence fees and the total cost of management has been estimated to CAN 350 million.

There is also considerable industry funding of surveillance schemes such as extensive onboard observer coverage and cameras mounted on vessels. In some fisheries, mainly those targeting high-value-species, the industry initiates and funds research projects. In addition, there are also collaborative research projects, including both scientists and fishermen, which are described as an efficient way to use resources and further, successfully build trust and increase mutual understanding.

Provision of ecosystem data

The collection of ecosystem data in Canada varies widely between different stocks and regions. The extensive observer programs (implemented in many fisheries, particularly those managed under ITQs; see also the box on British Columbia groundfish) provide data on bycatch and also allow the collection of other biological data. Canada makes use of 'reference fleets' to collect scientific data and to allow monitoring of a

wider range of species than possible by conventional scientific cruises.

Canada is in the early stages of developing ecosystem policies, e.g. by more generally integrating habitat information into management plans. Within the existing system, ecosystem complexity is considered to some extent. One example includes salmon on the West Coast, where there has been observations of a decrease in marine survival and a change in fish behaviour on temporal return to spawning rivers, related to high temperatures and low waterflow in rivers in recent decades. There is now a monitoring of upstream temperatures in rivers, which is increasingly being used together with weather forecasts to guide management of offshore fishing opportunities to ensure that fishing does not jeopardize salmon reproduction.

Provision of economic and social data

Economic and social data are collected through sentinel research programs, although this appears limited and subject to regional variation. In addition, socioeconomic data may be linked to employment policies and activities, thus being rather arbitrary from a fisheries management perspective.

Reliable data from industry

Strong efforts are made in Canada to reduce IUU activities and to ensure data provided by the industry are reliable. Examples include extensive use of on-board observers and video-cameras onboard vessels. There is also industry-initiated research, such as in the British Columbia groundfish fishery.

DECISION-MAKING

Regionalisation and division of responsibility between national/ regional institutions

In Canada, there is extensive decentralization of responsibilities, with a lot of variation between regions on procedures and formal structures. There is also a variation regarding management of different stocks. Generally speaking, the ministerial powers are

maintained but tasks are delegated to the regional offices of DFO. The regional offices are responsible for developing Integrated Fisheries Management Plans (IFMP), the principal document for management. IFMPs serve two functions: identification of the issues, objectives and management measures designed to ensure an orderly, economically viable, socially/culturally beneficial and sustainable fishery, as well as to communicate the basic information on a fishery and its management. It should be viewed as an explanation and document of record of how the fishery is managed. IFMPs may last one year or be multi-annual, although multi-annual plans are encouraged.

Integrated Fisheries Management Plans are prepared with rounds of formal consultation, and sometimes with advisory groups working together with the Fisheries Management staff. These advisory groups may include a variety of combinations of Science and Policy staff from DFO, fisheries industry people, environmental NGOs as well as community and aboriginal representatives. There is no preferred model, but the design is up to the regional office.

Due to the discretionary powers of the Minister of Fisheries, approval of all plans is in theory up to the Minister. However, the authority to sign off IFMPs can be (and is often in practice) delegated to the Regional Director General. This is often done for fisheries that appear sustainable and profitable and no major industry or NGO lobbying taking place, thus this more often concerns the smaller fisheries. With high profile fisheries, such as the Atlantic groundfish or Pacific Salmon, the Minister keeps the authority to approve plans. In this context it is important to bear in mind that IFMPs are not legally-binding, but can be altered by the Minister at any time.

Guidelines on implementing policy and prioritisation of objectives

Canadian management emphasizes regionalisation and an adaptive approach to management. This is also evident when it comes to objectives and guidelines. A new policy framework was developed for fisheries on the Atlantic coast in 2004. The objectives clearly state that conservation of marine resources and habitat is the highest priority of fisheries man-

agement. Another objective is self-reliant fisheries and collaboration within the governance structure to promote well-being of coastal regions. However, we found no examples of any national objectives although it may be viewed as likely that the objectives of the emerging Pacific policy will be somewhat similar.

Guidelines for implementation are rarely found at the national level. There is extensive regional variation, mostly depending on historical traditions, that makes systematic comparison of implementation across regions, and sometimes even among different fisheries within a region, difficult. One exception is however the IFMPs for which documents exist to provide guidance for preparation.

Guidelines for implementing ecosystem approach and links to other policy

DFO has commenced work towards implementing an ecosystem approach. Individual fisheries have been considering habitat issues for a long time (regarding e.g. corals) but DFO is now getting into a process of implementing this on a more general level. Ecosystem considerations (e.g. impacts on upper and lower trophic levels, including bycatch) form one part of the new IFMP framework that is expected to be fully implemented in 2010/11.

Sustainability checklists have been developed and are used increasingly with the aim bringing ecosystem and sustainability considerations into each major fishery. The checklist contains 106 questions and can be viewed as a snapshot in time on how sustainable the fishery is. However, there is no standard for sustainability, so there is no direct impact resulting from how a fishery scores on the checklist. The checklists are intended to serve two functions, as an internal reporting tool and there are also plans to use these as an index of how successful DFO is when reporting to the parliament.

The Oceans Act has led to a positive and necessary overlap between the Oceans Act and the Fisheries Act. This has contributed to important changes and a more ecosystem-oriented view. The act is changing processes by the increasingly formalised links of ecosystem issues to the Fisheries Act and new

policies are being developed, for example regarding dependent species (i.e. issues regarding forage fish) and bycatch issues. There is also a process for renewing the fisheries sector of DFO, which is expected to result in e.g. better collaboration between managers under the two acts. For example, when fisheries closures and marine protected areas are established a common communication plan (to the industry and the public) is used to show that it was done by the authorities together.

Transparency and clear roles for advisors in decision-making

For stocks with full analytical assessments, if the stock is estimated to be above the conservation reference point then scientific advice on harvest is provided as a probability plot of likelihood of increase in spawning population as a function of increasing harvest. If the stock is below the conservation reference point, the advice is that within a precautionary approach framework there is no surplus to harvest, and a plot is provided of the risk of further stock decline if there were to be any harvests, including bycatches in other fisheries. After advice is given and reviewed the regional fisheries management office runs the process of decision-making. The processes are regionally coloured and case-specific and this decentralization makes it difficult to get overview. Mechanisms to ensure transparency are however in place.

The scientific peer-review and advisory process is run by regional Secretariats at arm's length from directly departmental influence, and includes external participants at all meetings. The results of meetings are published on the web quickly thereafter, and there is no opportunity for anyone within DFO to delay or alter the science advisory reports. The inclusive meetings and rapid publication allow the public access to the scientific advice that went to DFO and the Minister prior to a decision.

However, ministerial decisions on quotas and allocations are generally less transparent, although there are opportunities for the public and stakeholders to get access to information regarding decisions through the Access to Information Act. The Act is very strong and ensures access for the public to all let-

ters, correspondence, meeting notes etc on a specified subject. Getting access to this information can take a while because the requests have to be worded carefully to get exactly what might be needed, and formal Cabinet business is exempted from the regulations in the Act. In general, fisheries decisions are sooner or later considered to not be protected by Cabinet secrets provisions and are therefore being made available.

Avoiding politicisation of decision-making

Ministerial Discretion is enshrined in the Fisheries Act and therefore politicization of decisions is a reality. There are formal Ministerial Advisory Boards for many issues (e.g. fisheries, coastal zone planning, oil and gas). How transparently these groups operate is variable, but transparency is increasing in all cases. In reality, notwithstanding the Ministerial Advisory Boards, lobbying directly to the Minister's Office take place when important issues are decided. This is described as the normal procedure and is not considered inappropriate.

The decision-making structures described in the sections above are, in combination with the increasingly common multi-annual Integrated Fishery Management Plans for the most important fisheries, designed to remove any political considerations from short-term setting of catching opportunities.

Balance between long term decisions and short term (crisis) actions

The development of multi-annual IFMPs for all important species gears decisions towards more long-term planning and currently 175 IFMPs are in place. Allocation schemes are increasingly ensuring longer-term rights and there are several permanent licensing schemes in place.

Level of co-management

Stakeholders participate in many aspects of management in Canada, such as at peer-review meetings of stock assessments described in previous sections. There is also extensive involvement in the development of IFMPs. There is a large variation between regions and stocks, where different stakeholder groups are given access to participate and the representation

is described as "ad hoc". However, aside from the special Constitutional status of Aboriginal peoples that affects their rights in using fish resources, stakeholders are involved in consultation processes, not in decision-making, whereby true co-management can not be said to exist in Canada.

COMPLIANCE

Reduction of fishing mortality

Several measures to reduce fishing mortality are applied in Canada, but also in this case there is large regional variation of which measures that are applied. Bycatch reductions measures are however included in IFMPs. There are also measures linked to quotas, such as in the British Columbia groundfish fisheries, where onboard observers or cameras register all fish caught. Dumping of fish is counted against individual quotas, thus creating incentives for more selective fishing practices.

Top-down control and micro-management

There are initiatives to reduce top-down control and micro-management, but progress has been spotty. Rather top-down control and micro-management tends to be enhanced by the Canadian management structure. However, there is extensive participation 'on the ground' in designing management measures and plans although coherent frameworks or standards for participation are missing. The regulations are applied regionally and adapted to context, whereby micromanagement may be more relevant.

Industry incentives to act sustainably

The industry is given incentives to act sustainably in several ways. One example includes the British Columbia groundfish fisheries described in the box below.

There is a desire among fishermen to qualify for Marine Stewardship Council (MSC) certification, since European and US consumers demand MSC-labelling and the Canadian industry wants to access these markets. Sustainable fishing practices are necessary to live up to the MSC standards and there is now

a process, driven by the industry, to introduce the required measures in several Canadian fisheries.

Enforcement of regulations

Canada puts strong emphasis on enforcement of regulations. There is a large capacity within DFO

to carry out the work, which is done in cooperation with the Coast Guard who provides logistical support. There is a program to ensure common training for all fisheries inspectors (at sea and in port) and national standards for enforcement activities. The consistency between regions produces capacity for

ITQs and banking system in the British Columbia groundfish fisheries

The Canadian West Coast groundfish stocks are exploited primarily by a trawl fishery. This fishery targets a complex of over 15 species of rockfish, flatfish, dogfish, sablefish, and Pacific cod. Rockfish populations can only sustain low levels of exploitation due to their longevity (can live beyond 100 years) and late maturation. The fisheries were previously managed with limited-entry regimes and quarterly quotas. However, as a typical tow contained four or more species, efficient harvest was restricted: discards or misreporting of species for which quotas were filled became a common problem (Rice 2003). Scientists and the industry jointly searched for more sustainable and profitable practices. A low number of license holders (around 120 active trawlers) made efforts for innovative approaches easier (Rice 2003).

The fisheries are now managed with a sophisticated system of ITQs and a fleet approximately one third smaller. The industry supported the introduction of the system, as they agreed that the system of competitive quotas could not be made sustainable ecologically or economically, and some foresaw increased quality and value of the product. At the start of the fishing year, approximately 90% of the quotas

for all species are distributed in equal proportions to each license holder and with the remainder put into a “quota bank”. During a few weeks quotas are traded between license holders before being final and registered by the managing body after which the fisheries open. The fisheries have 100% observer coverage and any discards are counted against the quota. When a vessel is running out of quota on one species they can buy more quota from the bank at market value, thereby enabling continued fishing for other species. When the bank is running out of quota, quotas can be auctioned out and are sometimes sold substantially above market value, since the value of the remaining quotas still make fishing profitable (Jake Rice, pers. comm.).

The money derived from “the bank” is used to finance science and improved management relevant to the fisheries and fishermen take part in proposing priorities and selecting specific projects. For example, the industry proposed a directed study of day-night vertical migration in a few rockfish species, an issue fishermen believed was making the stock assessments inaccurate. The study supported the hypothesis of the fishermen and resulted in a significant change

in the perception of the status of these stocks.

Onboard observers (on larger vessels) and cameras (on smaller vessels) and substantial dockside monitoring secures compliance. The industry pays one third of the monitoring costs (up to CAN 2 million in total). The Department of Fisheries and Oceans covers the remaining part, but there is currently a discussion about the future funding arrangements. The full observer coverage was demanded by the industry and fishermen also developed a code of conduct. Recently the industry suggested that an additional 10% of the initial quotas should be reserved from the initial allocation. This reserved quota would reallocated to the fishermen before the fishery opened, according to their compliance with their own code of conduct during the previous fishing year.

Recently questions have been posed about the legality of these arrangements relative to government budgetary rules. However, the fact that the program was developed and implemented collaboratively between the government and the industry, and led to improved resource status and greater economic viability for the industry for over a decade illustrates the progress that can be made

coherent enforcement.

All fishermen are required to use electronic logs and in some fisheries VMS is mandatory. There is also sophisticated system making use of technology to ensure compliance. In the B C groundfish fisheries, smaller vessels are equipped with cameras, filming 100% of the catch. DFO monitor 10% of the films from each fishing trip and if non-compliance is detected without proper explanation, the fisherman is charged for observation of the entire 100% of the relevant film, producing a strong incentive to comply with the rules.

Removal of excess capacity

Efforts to reduce fishing capacity have mainly been in the form of buyback programs and introduction of limited licence schemes and longer-term rights. About 60% of the landed value is from fisheries currently managed by IQs or ITQs. The main exception from the individual quota systems are the Atlantic lobster fishery, which is the main driver in value on the Atlantic coast, and the Pacific salmon fishery, where there has been a large decrease in value due to decreased resource abundance.

There have been a significant number of license buyback schemes for Pacific fisheries. Buyback programs started already in the 60's and there were further buybacks in the 90's. The outcome is described as a semi-success in the British Columbia fisheries. Problems with overcapacity still remain in Canada however, especially on the Atlantic coast.

After the collapse of the Newfoundland cod stocks in 1991 a CAN 4.3 billion 5-year-program was employed to improve the situation. There was a sophisticated system of sentinel fisheries to provide data on the cod stock, but no legal catch. Fishermen received unemployment compensation, but they were also provided with incentives to learn new skills, as they would receive more money from the program. The skills taught were generic, but at the same time they made the participants better fishermen since they learned e.g. navigation and computer skills. Navigation systems (GPS and the forerunners to that), introduced to improve safety at sea, also allow

fishing in foggy days (about one third of the days in a year) and skills to use them thus increase fishing capacity. When program ended the cod catching capacity was estimated to be 140% of what it was before the program, despite the number of vessels being reduced substantially.

Atlantic fisheries have been prosperous since the mid-90's, when looking at value, due to the increase in abundance of high-value invertebrate stocks. There were two key differences, however. First groundfish fishing required onland processing, providing additional employment opportunities, whereas invertebrate fishing don't, so that part of the sector is lost. Second, in the 1990s licences for many of the invertebrate fisheries, including snow crab, scallop, and shrimp were much more restricted than for groundfish. As the duration of the groundfish collapse continued the Atlantic lobster fishery did not allow new entrants. However the crab and shrimp fisheries had to allow new entrants due to pressure on politicians to allow the former groundfishers to participate. Participation was first limited to temporary licences but later on a series of decisions have made these licences permanent. Over-capacity problems in these fisheries, particular some snow crab stocks, is now serious .

Public and stakeholder participation and opinion

Stakeholder participation is extensive in most advisory and policy-developing processes in Canada. However, the forms for participation are very variable and in most cases it is individuals rather than organisation representatives that participate. The selection of participants has not been described, but appear rather ad-hoc. One issue brought up during the interviews was the risk of participation burnout. There are so many consultative processes in some regions that virtually all fishermen (among those interested anyway) participate in several processes and this implies a rather heavy workload, whereby finding stakeholders willing to participate in new processes/consultations is difficult.

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Lilla Frescativägen 4B • Box 50005 • S-104 05 Stockholm, Sweden
phone: +46 (0)8 673 97 64 • fax: +46 (0)8 673 97 60 • e-mail: info@balticsea2020.org
www.balticsea2020.org