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Lot 4: Impact Assessment Studies related to the CFP

Environmental, Economic, Social and Governance impacts of the 2012 CFP revision

Impact Assessment Phase II

Specific Contract No. 8

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This report does not necessarily reflect the view of the European Commission and in no way anticipates the Commission's future policy in this area.

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CONTENTS

TABLES

FIGURES

Acronyms

ACFM	Advisory Committee on Fishery Management
ACP	African, Caribbean and Pacific
AER	Annual Economic Report
B	Maximum biomass
B_{msy}	Biomass of the population at which MSY is taken
B_{pa}	Target biomass set as a precautionary approach
CAP	Common Agricultural Policy
CFCA	Community Fisheries Control Agency
CFP	Common Fisheries Policy
CIF	Cost Insurance *and* Freight
DCR	Data Collection Regulation
DG MARE	Directorate-General for maritime Affairs and Fisheries
EC	European Commission
EEC	European Economic Community
EEZ	Exclusive Economic Zone
EFF	European Fishing Fund
EPA	Economic Partnership Agreements
ERDF	European Regional Development Fund
ETC/BD	European Topic Centre on Biological Diversity
EU	European Union
F	Fishing mortality
F_{msy}	F giving maximum sustainable yield
F_{max}	F where total yield is highest
$F_{0.1}$	F where slope of yield per recruit is one-tenth of its value near the origin
FIFG	Financial Instrument for Fisheries Guidance
FPAs	Fisheries Partnership Agreements
FTE	Full Time Equivalent
GCFM	General Fisheries Commission for the Mediterranean
GDP	Gross Domestic Product
GT	Gross Tonnage
GVA	Gross Value Added
HACCP	Hazard Analysis and Critical Control Point
HCR	Harvest control rule
ICES	International Council for the Exploration of the Sea
IE	Individual Non-Transferable Effort Quotas
IMF	International Monetary Fund
IQ	Individual Non-Transferable Quotas
ITE	Individual Transferable Effort Quotas
ITQ	Individual Transferable Quota
ITR	Individual Transferable Right
IUU	Illegal, Unregulated and Unreported
JDP	Joint Deployment Plan of the CFCA
LTMP	Long term management plan
MAGP	Multi-annual Guidance Programmes
MPA	Marine Protected Area
MS	Member States
MSFD	Marine Strategy Framework Directive
MSY	Maximum Sustainable Yield
NUTS	Nomenclature of Territorial Units for Statistics
OECD	Organisation for Economic Co-operation and Development
PCD	Policy Coherence for Development
PO	Producer organisations
RBM	Rights based management
ROI	Return on Investment
SAC	Special Areas of Conservation
SBL	Safe biological limits
SCI	Sites of Community Importance
SCM	Standard Cost Model

SGECA	Sub-Group on Economic Assessment
SMS	Stochastic Multi-Species Model
SPA	Special Protection Areas
SRP	Simplification Rolling Programme
SSB	Spawning Stock Biomass
STECF	Scientific, Technical and economic Committee for Fisheries
TAC	Total Allowable Catch
UNCLOS	United Nations Convention on the Law of the Sea
WTO	World Trade Organization

Country codes

BE	BEL	Belgium
CY	CYP	Cyprus
DE	DEU	Germany
DK	DNK	Denmark
ES	ESP	Spain
EE	EST	Estonia
FI	FIN	Finland
FR	FRA	France
GR	GRC	Greece
IE	IRL	Ireland
IT	ITA	Italy
LT	LTU	Lithuania
LV	LVA	Latvia
ML	MLT	Malta
NL	NLD	Netherlands
PO	POL	Poland
PT	PRT	Portugal
UK	GBR	United Kingdom
SI	SVN	Slovenia
SE	SWE	Sweden

AER Sector types

DFN	Drift nets and fixed nets	NONACTIVE	Non active vessels
DRB	Dredges	PG	Passive gears
DTS	Demersal trawl and demersal seiner	PGO	Other passive gears
FPO	Pots and traps	PGP	Polyvalent passive gears
HOK	Gears using hooks	PMP	Combining mobile & passive gears
MGO	Other mobile gears	PTS	Pelagic trawls and seiners
MGP	Polyvalent mobile gears	TBB	Beam trawl
VL0012	<12 m length vessels	VL2440	24-40 m length vessels
VL1224	12-24 m length vessels	VL40XX	>40 m length vessels

Species codes

ALB	Albacore	MAC	Atlantic mackerel
ALF	Alfonsinos nei	NEP	Norway lobster
ANE	European anchovy	NOP	Norway pout
ANF	Anglerfishes nei	ORY	Orange roughy
ARU	Greater argentine	OTH	Others
BET	Bigeye tuna	PLE	European plaice
BFT	Atlantic bluefin tuna	POK	Saithe (=Pollock)
BLI	Blue ling	POL	Pollack
BSF	Black scabbardfish	POR	Porbeagle
CAT	Wolf fishes (=Catfishes) nei	PRA	Northern prawn
COD	Atlantic cod	RED	Atlantic redfishes nei
DGS	Picked dogfish	RNG	Roundnose grenadier
DWS	Deep-water sharks nei	SAL	Atlantic salmon
FLX	Flatfishes nei	SAN	Sandeels (=Sandlances) nei
GFB	Greater forkbeard	SBR	Blackspot (=red) seabream
GHL	Greenland halibut	SOL	Common sole
HAD	Haddock	SOX	Soles nei
HAL	Atlantic halibut	SPR	European sprat
HER	Atlantic herring	SQI	Northern shortfin squid
HKE	European hake	SRX	Rays, stingrays, mantas nei
HKW	White hake	SWO	Swordfish
JAX	Jack and horse mackerels nei	USK	Tusk (=Cusk)
LEZ	Megrims nei	WHB	Blue whiting(=Poutassou)
LIN	Ling	WHG	Whiting

1. Introduction

1.1. Introduction to this document

The impact assessment of the proposals for the 2012 reform of the CFP has been conducted in two phases. Phase I, undertaken between October and December 2009, reviewed the current performance of the CFP and assessed the impact of a continuation of status quo policy, i.e. a continuation through the period 2012 to 2022 without any change in policy beyond that initiated in the 2002 reform and further elaborated into legislation since that time. The final report of this initial Phase, presented on 4 March 2010, is named here as the Status Quo report.

This present report documents the Impact Assessment conducted during Phase II and examines the impact of proposed new policy which will contribute to the 2012 reform.

Alongside these comprehensive examinations of the impact assessment of the CFP reform for the EU as a whole, four regions were selected for very specific examination. The objective of the analysis was to understand whether the general conclusions of the IA for the EU as a whole were appropriate for four regions where fishing is of very high economic and social importance; Galicia, Brittany, Sicily and Scotland. This report, presented in March 2010, is named here as the Regional Case Studies report.

The specific contract numbers for these various reports are as follows. The current report is presented in **bold**.

CFP IA Phase II (this report)	**FISH/2006/09 Specific Contract No 8**
CFP IA Phase I (Status Quo)	FISH/2006/09 Specific Contract No 4
4 Case Studies for CFP IA	FISH/2006/09 Specific Contract No 7

1.2. Guidance to this document

This document is laid out in the general approach of an impact assessment document, with four options being presented. These are the Status Quo (Option 0), for which additional details of the impact assessment are included in the Status Quo report; and the alternative Options 1, 2 and 3. The sections of the document are as follows.

1. The rest of the **introduction** gives general background on the CFP reform process, pulling in material from the Status Quo report, and then describes the methods that we have used to undertake the impact assessment.

2. Then follows Chapter 2 which **defines the problem**, providing a clear synopsis of the structural failings of the current CFP and the associated consequences on the marine environment, the European fishing industry, coastal communities and both Community and external governance.

3. Chapter 3 gives a detailed **specification of the policy options** which are considered within this impact assessment. These fall within 5 major policy areas; conservation and environment, access and fleets, subsidy, governance, markets and external policy.

4. Chapter 4 presents the formal **impact assessments** for each of the four Options. Each alternative Option is considered as a package of specific policy alternatives.

5. Chapter 5 identifies the **risks, trade-offs and synergies, public opinion, and potential enhancing measures** associated with each of the impact assessment Options.

6. Chapter 6 **compares the Options** by providing a summary which cross cuts the likely impacts and risks which come out in the four impact assessments.

7. Annexes A, B and C present the results of specific analyses conducted to support the impact assessment, the full results of the bio-economic models, and other supporting documentation

    - Annex A: External Governance Impact Assessment
    - Annex B: Result of EIAA model results
    - Annex C:
        1. Detailed specification of policy options
        2. Supporting information on ITRs
        3. Supporting information on subsidies
        4. Supporting information on stock modelling, including catch quotas
        5. Supporting information on subsidies regionalisation policy

It is important to note that the nomenclature of alternative assumptions, adopted in the SQ report, has in this report been changed to **risk factors**. This reflects better the sense in which they were investigated. Thus fuel price becomes a risk factor, rather than an alternative assumption, allowing greater clarity in the terminology used throughout the report.

1.3. General methods

The impact analysis of the policy pillars has been informed by a number of key data and information sources:

1. The submissions made by stakeholders as part of the EC consultation process
2. Views expressed by stakeholders at a seminar on subsidies organized by the Commission[1];
3. Secondary data sources available e.g. Commission data sources (e.g. FIFG and EFF expenditure, AER data), internal Commission documentation, other published reports of relevance.
4. Commission staff; and
5. The background analysis presented in the Status Quo report.

[1] Seminar titled "financial policy in the future Common Fisheries Policy" held on 13th April 2013 in Brussels, with the participation of Member States, European Institutions, Stakeholders and Experts.

The Impact assessment took account of the impact of recent policy initiatives, including the 2002 reform (Council Regulation 2371/2002), the IUU regulation, control regulation, LTMPs, discard policy and EFF. Existing Impact Assessments (IA) were used where possible.

The impact of new and existing policy, under Status Quo and Options 1-3 (see section 3), was examined through a number of mechanisms, including their likely impact on a basket of key indicators of CFP performance (originally developed in the Status Quo report and subsequently augmented) and the creation of a number of bio-economic models. This resulted in an examination of the possible impacts of pursuing the status quo and Options 1-3 over a ten-year horizon, 2012 – 2017 – 2022.

As with the Status Quo report, a number of indicators were developed, covering various aspects of performance of the CFP. These were populated using published and internally available data (Table 1).

Table 1 Key indicators of CFP performance used in this analysis

Areas	Indicators
Environmental	1) Stock situation in terms of fishing mortality in relation to MSY 2) Percentage of stocks and/or catches covered by LTMP 3) Average size (length and weight) of fish 4) Fleet evolution 6) Area covered by protection regimes (Natura 2000) or special measures EU EEZ.
Economic	7) Gross valued added 8) Economic sustainability: Ratio current revenue-Break even revenue point 9) Net profit margin 10) Economic performance: Return on investment 11) Fish prices, market orientation 12) Level of subsidies
Social	13) Employment 14) Status of fisheries dependent communities/regions/ MS/EU 15) Value added dependency levels 16) Social sustainability: Gross value added per employee 17) Attractiveness of the sector: Distribution of incomes 28) Safety
Governance	18) Departure from quotas by Council (scientific advices in decision making) 19) Management costs for the sector 20) Regions and MS having adopting RBM system 21) Data provided by MS 22) Rate of utilization of allocations (quotas) 23) Level of quotas exchanges 29) Time taken to reach a decision
Coherence	24) Level of coherence with WTO and other EC policy
Administrative burden	25) Impact for the private sector
Simplification	26) Level of implementation simplification process by MS and industry
External*	27) Governance of EC fishing activities in external waters
Aquaculture	29) Development of Aquaculture

***Note that at this time (4 May 2010) the external policy associated with the CFP revision had not been sufficiently well elaborated to include in this report**

Two models were used to assist with interpretation of the impact assessment. They are described section 4.1 below.

The overall approach taken to the impact assessment has been one based on desk study work only, and primarily using existing published data sources. Where such data have been found lacking, attempts have been made where possible, and with varying degrees of success, to contact particular administrations to obtain improved data. The study team have also been greatly assisted during this impact assessment by staff within several Units of the Commission, and we would like to acknowledge the important guidance provided on an ongoing basis during the project, and the provision of relevant data and information.

2. Problem definition

The CFP suffers from a number of structural problems, as outlined in the Green Paper[2]. These can be summarised as

- The combination of overcapacity, catches set too high and not in line with maximum sustainable yield, high levels of discards, which together results in more than 80% of EU stocks being overexploited, even those under long term management plans
- The lack of appropriate prioritisation between environmental, economic and social sustainability
- The preponderance of top-down micro-management policy, which has led to short term decision making and a confusing, complex and ineffective set of regulations which are not appropriately adjusted to regional conditions
- Low economic profitability and resilience of the capture sector, which also leads to low attractiveness for employment

The policy options assessed here are judged against four specific objectives, through the methodology outlined in Section 1; qualitative and quantitative analysis of the impact of various policy options on a wide range of indicators of CFP performance.

Environmental sustainability: indicators are presented in Table 1. The operational objectives for these indicators are

- to eliminate overfishing and reach Fmsy[3] for all stocks, if possible by 2015;
- to reduce discards significantly, and implement an ecosystem approach; and
- to improve the reliability of scientific and economic data.

Economic sustainability: indicators are presented in Table 1. The operational objectives for these indicators are

- to eliminate overcapacity;
- to improve economic profitability and robustness of the sector;
- to decrease subsidies dependency;
- to facilitate access to credits; and
- to promote an innovative and green friendly aquaculture

Social sustainability: indicators are presented in Table 1. The operational objectives for these indicators are

- to encourage viable fishing communities;
- to stabilize the level and quality of employment; and
- to increase attractiveness of employment (wages, training, safety and working conditions).

Governance sustainability: indicators are presented in Table 1. The operational objectives for these indicators are

- to put in place a decision-making system consistent with long term sustainability, able to adapt flexibly to local conditions;
- to improve responsibility and compliance on the side of industry; and
- to extend the principles of sustainable and responsible fisheries internationally

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[2] On the reform of the CFP. http://ec.europa.eu/fisheries/publications/greenpaper/greenpaper_en.pdf

[3] The fishing mortality rate at which Maximum Sustainable Yield is achieved; fishing at this level under stable recruitment and environmental conditions should result in stocks being maintained at the Spawning Stock Biomass that yields maximum sustainable yield.

3. Specification of the policy options

There are 7 key pillars (policy areas) in the Common Fisheries Policy: Conservation and environment; Control and Enforcement; Structural measures; Market policy; External relations; Aquaculture and processing; and Governance. The policy options proposed for the 2012 CFP reform fall within these 7 pillars.

- One major policy change is proposed for Conservation policy, the introduction of F_{MSY} as a target;
- Significant new policy was developed in 2009 on control and enforcement, and therefore no new policy is proposed under the 2012 reform;
- Two major policy changes are proposed for Structural measures, the first regarding access rights (the introduction of Individual Transferable Rights) and the second regarding subsidies to the fishing industry;
- Significant changes to market policy are proposed under the reform of the Common Market Organisation, whose impact will be examined in a parallel IA to this current study;
- Changes to External policy have not yet been established.
- No major changes to Aquaculture policy are proposed;
- Under Governance, the introduction of regional management bodies is proposed.

In addition to the Status Quo option, four alternative options are proposed under each of these policy initiatives. Alternative Option 1 comprises each of the Option 1 policies presented below under the 6 policy areas, acting together, and the likely impacts of Alternative Option 1 are assessed in Section 4 in this light. Alternative Options 2, 3 and 4 are likewise comprised of each of the Option 2 and Option 3 policies presented below, acting together.

The policy options are presented in Annex C Appendix 1.

3.1. Option 0 Status Quo

This option involves a continuation of the current CFP policies, including the 2002 regulation (2371/2002) and the newer regulations developed under it, including the various LTMPs, the Control Regulation and the IUU Regulation.

These policies were assessed in the first report.

Concerning conservation policy, the status quo option included the continuation of current LTMPs for specific stocks, and the development of a few additional LTMPs over the course of the 10 years from 2012.

Concerning fleet policy, currently quotas are distributed to MS according to the Relative Stability key. According to the subsidiarity principle, MS are free to manage their quota allocation as they wish and as such can develop and implement ITR systems for individual fleets and fisheries. However, rights cannot be transferred between vessels from different MS; transferability is usually only permitted among vessels in a particular sector within a MS.

A patchwork of different types of rights mechanisms have developed across the EU for the management of quota stocks. A relatively small number include transferability. Similarly, other rights systems (transferable and non-transferable) have developed to manage non-quota stocks (e.g. transferable effort systems, territorial use rights). In the status quo option this patchwork of rights would continue. To date, some MS have indicated that they will be moving to ITQs (Sweden, Poland) and it was assumed, in the SQ report,that this would continue.

Concerning subsidy policy, the assumption of the Status Quo was that at the expiry of the EFF in 2013, and allowing for a continuation of funding under the EFF for 2 years, that a replacement EFF would be introduced to run for the 7 years 2014-2020.

Concerning markets, the assumption in the status quo option is that the current CMO policies will continue.

Concerning governance, the assumption in the status quo option is that the only regional bodies will be the RACs.

3.2. Option 1

This option includes a range of modified policies

Conservation policy

With environmental objectives at the forefront of the 2012 reform of the CFP, the environmental policy under Option 1 would aim to achieve maximum sustainable yield for all assessed fish stocks. This would be achieved by the following mechanisms.

The principle of a harvest control rule for all stocks with an objective of Fmsy would be established in the basic regulation. Continued fishing at Fmsy will be assumed to deliver a stock status of Bmsy, and to ensure this the harvest control rule would reduce fishing mortality under conditions of uncertainty or when the stock is outside biological limits, in a way similar to that outlined in the Commission's communication of 12 May 2009[4]

All current LTMPs would have to be changed to accept this reduction in target, and it is further assumed that some interannual TAC variation would still need to be allowed, at the 25% level included in the Commission's communication of May 2009.

For stocks that are not included in LTMPs, the HCR would be applied despite their non-inclusion in LTMPs, so long as assessments were possible. For all currently assessed stocks, including those in LTMPs, the objective would be to reduce their fishing mortality to Fmsy within 4 years (i.e. by 2016), except where the 25% interannual TAC variation rule applies. For stocks for which assessments are not current possible, assessments and the application of the agreed HCR would take place over a period of 8 years after the new CFP came into effect, so that all these stocks were brought into the Fmsy management regime in three batches, each with a 4 year reduction in Fmsy.

For stocks in multispecies fisheries, decisions will be taken, advised by the RegBods (see below), that would allow for Fmsy to be met only for the most valuable stocks, emphasising socio-economic considerations.

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[4] COMMUNICATION FROM THE COMMISSION ; Consultation on Fishing Opportunities for 2010 Brussels, 12 May 2009, COM(2009) 224

No particular discard policy is identified under the reforms. Nevertheless, some impact on discarding is likely to result from some of the other policies.

Access rights policy

Individual transferable rights are proposed as the main tool to deal with overcapacity throughout all Options considered within this IA, and the access rights policy proposals would trigger a significant movement towards rights-based management throughout EU fleets.

Under Option 1 the move to ITR would be mandatory for the large scale fleet, providing secure long-term rights with 10-year fixed validity, but for the small scale fleet the move to ITR would be optional. This market-based system would both allow rights to be leased in the short term (i.e. annual fishing authorisations), or to be sold or transferred to a new owner in the long term.

The initial allocation of rights to MS would be according to Relative Stability, and thereafter MS would allocate rights between sectors as they saw fit. Transfers would be limited to within-MS, and relative stability would be maintained. Examples of possible safeguards include:

- Ceilings on the concentration of rights which would limit the accumulation of fishing rights to three times the current quota holding;
- Ring fencing of fishing rights which would ensure no transfer of quota from the small-scale to the large scale fleet.

Because of the 4 year implementation period, it is anticipated that most of the fleets moving to ITRs would do so after the end of the current EFF. There would be no further subsidies for the fleet (scrapping or modernisation – see below) and any reduction in capacity would therefore be achieved through trading of rights under the ITR system rather than through publically-funded scrapping schemes.

MS are not involved in the sale or leasing of tradable rights for those fleets under ITR, which instead will be done by industry. For those small-scale fleets which choose not to move to ITR, the MS will continue to orchestrate quota swaps with other MS.

Subsidies

Specification of future policy options are based on potential changes to, and reorganization of, items eligible for current EFF funding. Instead of the current five main axes of EFF, Option 1 will include two newly defined axes as follows:

Axis 1 – 'Smart green fisheries'. This axis would cover items such as innovation, environment and knowledge, and measures to support sustainability. The type of actions to be supported would include: innovation in capacity building; innovation in technologies, processes, marketing and products – which do not increase fishing capacity or effort; incentives for selectivity, reducing environmental impacts, establishment of MPAs; safety; collective actions (industry, regional); and financial engineering (e.g. SME access to finance).

Axis 2 – Inclusive territorial development. This axis would support socio-economic viability of coastal communities and would replace the current axis 4, becoming more important than under the current EFF.

Up to 5% of the overall allocation would also be available under Option 1 for technical assistance i.e. continuation of the current Axis 5.

Total future expenditure would be the subject of negotiation between the Commission and Member States. However, the expectation is that the total size of EFF-2 support to the private sector would be significantly reduced to 70% of current EFF planned expenditure (i.e. 70% of 4.3 billion Euro = 3 billion Euro). Under Option 1 the expectation is that the funds for Axis 1 and Axis 2 would be equal. The expected differences in funding allocations under different policy Options would therefore be as follows:

Table 2 Option 1 Comparisons of expected current EFF allocations with those under

Status Quo	Option 1
Euro 4.3 billion	Euro 3 billion
Axis 1: 1.2 bn (22%)	Smart green axis: 1.35 bn (47.5%)
Axis 2: 1.3 bn (29%)	Territorial development axis: 1.35bn (47.5%)
Axis 3: 1.1 bn (27%)	Technical assistance: 150 mn (5%)
Axis 4: 567 mn (13%)	
Axis 5: 159 mn (3.69%)	

The territorial development axis would benefit mostly small-scale fisheries through its focus on fishing dependent communities. For the axis on smart green fisheries two scenarios are assessed. Firstly a principal scenario under which 2/3 of its allocation goes to small-scale fisheries. And a second scenario where the amounts for small-scale fisheries are not ring fenced.

State aid rules would continue to apply, including maintenance of *de minimis* rules, and tax exemption for fuel and social security derogations would in principle remain.

Option 1 does not include proposals for addressing any other forms of subsidies that may be in use within the EU to support the fisheries sector e.g. management costs, social security systems, other investment support, etc.

A comparison of the eligible measures/actions under the status quo, with a future EFF-2 under Option 1 is provided below, with some brief rationale for the changes.

EFF 2007-2013	Future EFF
Axis 1: Fleet adaptation	This is the most criticised element, creating permanent dependency and contributing to overcapacity, so significant changes would take place to current Axis 1 as presented below.
• Permanent cessation of fishing activities (scrapping)	• Stop; due to conflicts with a transition to ITR
• Temporary cessation of fishing activities	• Stop; huge costs which do not imply any structural change; expected to be banned by WTO
• Investments on board vessels and selectivity a) safety on board, working conditions, hygiene, product quality b) fuel efficiency	• Re-define and re-focus under new axis 1 because general modernisation measures increase fishing capacity a) Small scale only, without increasing capacity. Safety, living and working conditions, product quality/hygiene. b) Stop engine replacement. Allow putting a

EFF 2007-2013	Future EFF
c) gear selectivity and change of gear	sail, recycle waste oil. c) Allow, if in line with any new technical measures and new objectives of smart green fisheries axis (without increasing capacity to fish)
d) engine replacement	d) Stop; due to perceived impacts on increases in fishing effort.
• Small scale coastal fishing premiums a) improve management and access control b) promote the organisation of the production, processing and marketing c) encourage voluntary steps to reduce fishing effort for the conservation of resources d) encourage the use of technical innovations (more selective fishing techniques going beyond Community obligations) e) safety and training	• Re-define. Currently no conditionality attached and unclear scope, and as a result little effect or application a) Collective action under axis 1 (or could be part of transitional support, moving to better management and ITR under emergency funds in Option 3 - see later text on Option 3); b) collective actions under axis 1 (the 'approche filière') and axis 2 (current axis 4) c) redefine, concrete criteria d) Reinforce. New "smart green fisheries" axis 1 e) Under new Axis 2 or done by POs under collective actions in smart green fisheries axis. European Social Fund.
• Socio-economic measures a) diversification, b) training (new skills for fishers) c) retraining (new skills for fishers leaving the sector), d) early departure from the fishing sector e) premiums to young fishers	a) axis 2 (or emergency funds under Option 3 – see later text) b) training (knowledge transfer) axis 1 c) axis 2 d) high costs and limited effects so probable exclusion although could be supported in axis 2 (or emergency funds under Option 3 – see later text) e) Purchase of new vessel: stop. Other type of support under axis 2
Axis 2: Aquaculture, inland fishing, processing and marketing of fishery and aquaculture products.	
Productive investments in aquaculture	No investment aid, only innovation angle, including applied research (with focus on environment, demonstration, pilot projects, etc)
Aqua-environmental measures	New "smart green fisheries" axis 1
Public health measures	Very complicated to apply, better to be addressed by state aid. If necessary into special emergency reserve under Option 3 – see later text
Animal health measures	Very complicated to apply, better to be addressed by state aid. If necessary into special emergency reserve under Option 3 – see later text
Inland fishing	Stop temporary cessation and on board investment; investment in fishing facilities under new Axis 2
Processing and Marketing	Only in the framework of an approche filière

EFF 2007-2013	Future EFF
	under axis 2, otherwise covered by regional policy
Axis 3: Measures of common interest	
Collective actions	To be reinforced. New "smart green fisheries" axis 1, and could also include support for setting up new ITR Approaches by regional bodies/PO.
Protection and development of aquatic fauna and flora	New "smart green fisheries" axis 1
Fishing ports, shelters and landing sites	New Axis 2
Development of new markets and promotion campaigns	Part of CMO or new transnational element of EFF for transnational campaigns, national and regional campaigns under axis 1.
Pilot projects (new technical knowledge)	New "smart green fisheries" axis 1
Modification for reassignment of fishing vessels (for training or research purposes)	New Axis 2
Axis 4: Sustainable development of fisheries areas	
Basically all measures allowed providing that actions are taken in eligible areas (low population density or fishing in decline or small fisheries communities), based on local partnership and approved development strategy.	Strengthened, explicit focus on SSF dependent areas which are most affected by fisheries management decisions. Under axis 2
Axis 5: Technical assistance	Retained

As can be seen from the table above, Option 1 retains many of the currently eligible items, but with re-organisation into newly titled priority axes, a much stronger focus on environment and innovation, and with eligibility based on more conditionality and tighter definitions to ensure better focus of support so as to achieve objectives. Key differences with the status quo option relate to the abolition of a number of measures/actions under the current EFF Axis 1.

Still to be decided is the issue of the integration of other financial instruments into the EFF (e.g. CMO, control and data collection), but the amounts are small and should not make any material difference in terms of the impact assessment.

Markets and trade

A separate impact assessment exercise is being undertaken regarding the CMO reform, and therefore is not described in detail here. Some assumptions are made about the likely impact of this reform on prices in section 4.1.

This impact assessment of CMO policy does not analyse the CMO as a whole but reviews separately the 6 CMO tools (marketing standards, consumer information, organisation of the profession, intervention, prices, trade policy). For every tool 3 or 4 scenarios are analysed: status quo, intermediate (1 or 2 options), abolition. Individual options analysed are shown in Table 3.

Table 3 policy options being assessed under the CMO reform Impact Assessment.

Instrument	Option 1	Option 2	Option 3
	Status quo	Intermediate	Abolition

Instrument	Option 1 Status quo	Option 2 Intermediate	Option 3 Abolition
Marketing standards	Upholding of provisions in force - standards apply to first sale of fresh products, - standards exist for canned tuna and canned sardines, - frozen products and farmed fish not covered	Option 2.1 : upholding of provisions in force, with : - extension to frozen fish, all canned fish and farmed fish, - more detailed standards (freshness, size, …) Option 2.2 : Other prescriptive frameworks (related to standardisation of food products)	Abolition of all marketing standards
Consumer information and promotion	Upholding of provisions in force - information compulsory for products of chapter 3 of CN, - obligations linked to traceability, - no other promotion actions than those foreseen in EFF	Option 2.1 : upholding of provisions in force, with : - mention of nationality of vessel, - extension to products of chapter 16 of CN (preserves and preparations), - extension to HORECA, - setting up of Community tools to support promotion operations Option 2.2 : abolition and transfer of existing rules to other instruments (e.g. food labelling instruments)	Abolition of all compulsory information
Interventions	Upholding of provisions in force - withdrawal aid, carry-over aid, private storage aid, compensatory allowance for tuna	Option 2.1 : upholding of carry-over aid and abolition of all other mechanisms Option 2.2 : reinforced intervention (increase of financial compensations and extension to aquaculture)	Abolition of all provisions

Instrument	Option 1 Status quo	Option 2 Intermediate	Option 3 Abolition
Organisation of the profession	Upholding of provisions in force - creation and support of POs and IBOs	Upholding of provisions in force, with - strengthening of role and mandate of POs and IBOs : access to resource, marketing, - taking into account of specificities of aquaculture, - IBOs : organization of the supply chain, joint marketing actions, creation of transnational organizations, - introduction of a direct aid scheme for professional organizations in connection with the achievement of goals (conservation, quality)	Abolition of organisation of the profession
Prices	Upholding of provisions in force - creation and support of POs and IBOs	Option 2.1 : upholding of autonomous prices and abolition of community guide prices Option 2.2 : Reinforcement of price control (fixing of first sale prices and limitation of gross margins beyond first sale)	Abolition of community guide prices and autonomous prices
Trade policy	Upholding of provisions in force - policy based on customs duties, rules of origin and taking into account concessions made in the framework of bilateral and multilateral trade agreements - adaptation to the needs of the processing industry (suspension of tariff duties, tariff quotas)	Upholding of provisions in force with - reduction of tariff duties by suspension - differentiation of duties by destination (raw material/final consumption)	Full liberalization : no suspensions, no quotas, no reference prices

The translation of these different options into options under the CFP is not straightforward, but reflects broadly the impact they would have on prices.

Under Option 1 there would be a large reform of the Common Markets Organisation (CMO). The reform process would review the role of both Producer and Interbranch Organisations, in particular the management and control of fishing activities, as well as placing and marketing of fisheries products (i.e. quality, tractability, market analysis, etc). Trade policy would be re-enforced in view of adequate supply of the EU market and of ensuring a better,

level playing-field. There would also be a revision of information provided to customers (i.e. the scope and contents of mandatory and voluntary product labelling).

Small scale fleet

A differentiated regime for the small-scale fleet (SSF) would be introduced, which would have a bearing on subsidies and ITRs. The current definition of the SSF, which currently assumes all vessels less than 12m, would shift to include:

- vessels using passive gears which are less than 12m and less than 15 GT;
- vessels using pots, lines, nets, pole and line (except under recovery plans) and undecked vessels under 24 m and under 100 GT;
- derogations for vessels under 24m and 100GT fishing within 12 nautical miles or less than 24 hours (except for trawlers and dredgers);
- Regional Bodies would be allowed to propose additional derogations.

Under the new regime, EFF subsidy would lean more towards small-scale fisheries in terms of aid intensity and the increased weight of the new territorial development Axis (Axis 2), which focuses on fishing dependent communities.

As stated under the access rights policy, the move to ITR in the SSF would be voluntary, and various safeguards will be put in place to restrict the pressures of market forces on the SSF.

Regionalisation policy

Regional Bodies (RegBods) will be created, which, sitting as an intermediate structure above Regional Advisory Councils (RACs), will provide a forum of dialogue between stakeholder groups and the Commission, with key responsibilities for developing proposals and measures. The overall responsibility of the sector will be increased as it becomes tied in with RegBods.

These new bodies will hold proposal ability, with proposition to the Commission on conservation and technical measures (including TACs and LTMPs) based on the analysis of information and through the scientific assessment of stocks.

Limits on the power of RegBods in terms of decision-making, will be limited under the Lisbon Treaty, and the Commission will keep its initiative, with the RegBods in effect being close to a Commission agency.

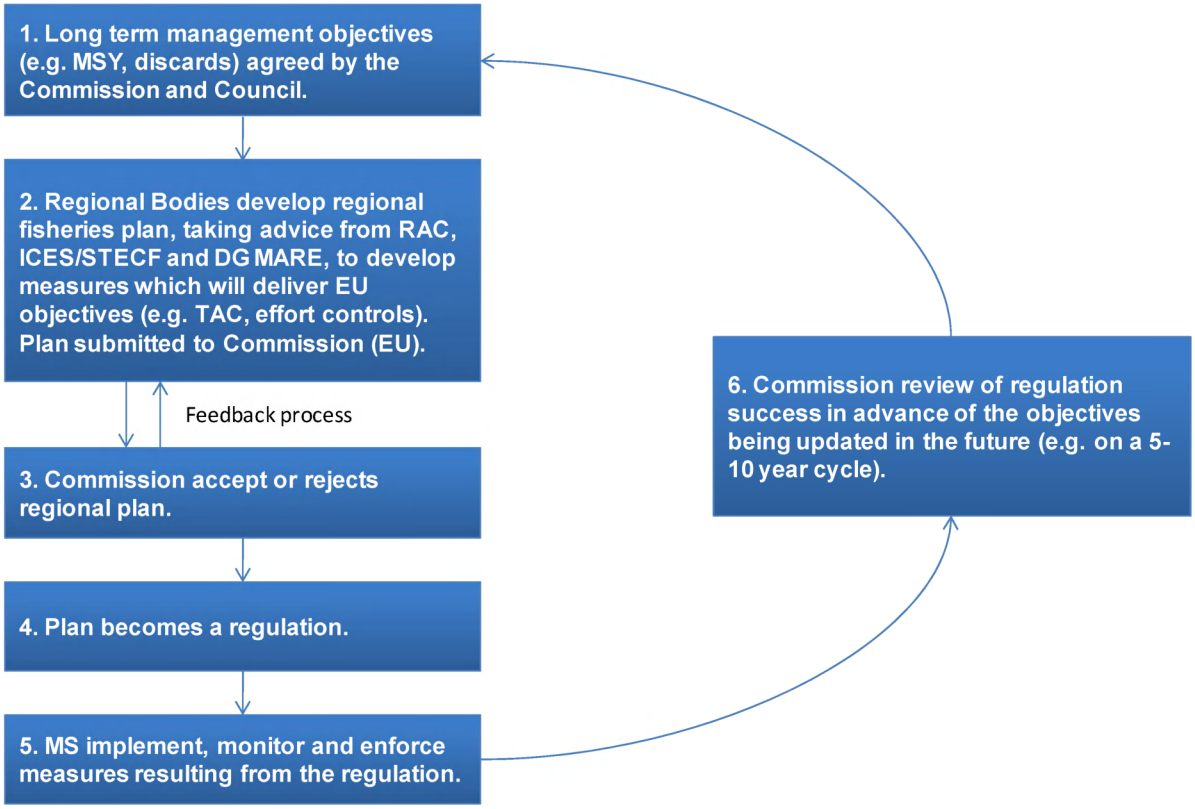

Figure 1 A conceptual model of how RegBods might possibly fit into the regulation and policy definition process (modified from UK response to the CFP Reform Green Paper).

3.3. Option 2

This option includes a range of modified policies.

Conservation policy

Under option 2 no deviation from the 4 year implementation of Fmsy policy would be allowed, whether for assessed or unassessed stocks. This would mean that the assessment of these stocks would have to take place much earlier than is anticipated by current research and science delivery plans, incurring additional costs. No deviation from the 4 year reduction in fishing mortality would be allowed, even where the TAC variation was greater than 25%.

In multispecies fisheries, option 2 would require that all species were managed at Fmsy or below, i.e. the fishing effort would be dictated by the most sensitive stock.

Access rights policy

As with Option 1 ITRs would become mandatory for the large scale fleet and remain optional for the small scale fleet.

In Option 2 transfer of rights would be possible across the EU, between Member States and individual enterprises regardless of nationality. Such transfers would be introduced on a management unit basis during a short phasing-in period, 4 years. During this period the practical issues faced by individual management units regarding the adoption of an ITR system would be addressed, and the development of common standards for safeguards etc would be developed.

There would be a number of safeguards introduced, including

- ceilings on the concentration of rights which would limit the accumulation of fishing rights to three times the current quota holding;
- ring fencing of fishing rights which would ensure no transfer of quota from the small-scale to the large scale fleet.
- Additional safeguards can be proposed at the regional level, which might, for instance, limit the transfer into and out of specific regions

Our interpretation of these safeguards is that they would apply at all times.

The initial allocation of rights to MS would be according to Relative Stability, but would be adjusted to take into account MS-MS quota swaps. Once the validity of rights expires, the rights would accumulate to the MS of the rights holder, and consequently the concept of Relative Stability would become irrelevant. Therefore, sale of rights between owners of different nationalities would affect the geographical distribution of rights and the current restrictive access regime to the territorial sea of Member States (derogation from the Treaty principles).

Subsidies

Under Option 2, there would be a complete cessation of EFF funding, and CFP objectives would be addressed through other funds e.g. social objectives through the European Social Fund, and current Axis 4 measures through regional policy and related funding.

Markets and trade

Under Option 2 there would be no CMO.

As a consequence of this, there would be no market intervention, no subsidies for marketing and processing of relevant organisations and no market standards (i.e. quality, minimum size, etc).

Most importantly, Option 2 envisages removal of current tariffs, and full liberalisation of trace policy. This is likely to have a more significant impact on prices than the removal of the CMO.

Small scale fleet

The small scale fleet policy under Option 2 is identical to Option 1 in terms of a new definition of small-scale fisheries.

Regionalisation policy

Under Option 3, the current decision-making structure would remain the same re would be no creation of Regional Bodies. The current basic decision making process would be maintained, although RACs would be reinforced by increasing the representation of stakeholders within them, and also by improving the scientific capacity of RAC working groups though increased funding.

3.4. Option 3

This option includes a range of modified policies.

Conservation policy

Conservation policy under Option 3 is similar to Option 1, but with the single change of allowing for smaller annual reductions in TACs as fishing mortalities are reduced. Thus the objective would be to reach Fmsy in 4 years, as with Option 1, but allowing for a 15% interannual TAC variation, rather than 25%.

The most significant policy change under option 2 would be a move to catch quotas rather than landing quotas, which although targeted at reducing discarding would have many other impacts.

Access rights policy

Option 3 is identical to Option 1.

Subsidies

Subsidies policy under Option 3 would be similar to Option 1, with the two new axes and a small 5% of total funds allocated for technical assistance. However, in addition, under Option 3, there would be an emergency reserve released in emergency situations because the risk of stock collapse is greatest under Option 3 because the route to environmental objectives is longer than under Option 1.

As with Option 1, the expectation for Option 3 is that the total size of EFF-2 support to the private sector would be significantly reduced to 70% of current EFF planned expenditure (i.e. 70% of 4.3 billion Euros = 3 billion Euros). Under Option 3 it is expected that 10% of the Eur 3 bn would be allocated to the emergency reserve, and the remaining funds, less the 5% for technical assistance, divided evenly between Axis 1 and Axis 2 i.e. 42.5% to each. The expected differences in funding allocations under different policy Options would therefore be as follows:

Table 4 Option 3 Comparisons of expected current EFF allocations with those

Status Quo	Option 3
Euro 4.3 billion	Euro 3 billion
Axis 1: 1.2 bn (22%)	Smart green axis: 1.275 bn (42.5%)
Axis 2: 1.3 bn (29%)	Territorial development axis: 1.275bn (42.5%)
Axis 3: 1.1 bn (27%)	Emergency reserve 0.3bn (10%)
Axis 4: 567 mn (13%)	Technical assistance 150 mn (5%)
Axis 5: 159 mn (3.69%)	

Markets and trade

Under Option 3, there would be a renewal of the current CMO.

Market interventions would remain, and organisation of the sector and normative structure would remain unchanged. The main change would come through better implementation and control within the market, including traceability.

Small scale fleet

The small scale fleet policy under Option 3 is identical to Option 1 in terms of a new definition of small-scale fisheries.

Regionalisation policy

Under Option 3, there would be no creation of Regional Bodies. The current basic decision making process would be maintained, although RACs would be reinforced by increasing the representation of stakeholders within them, and also by improving the scientific capacity of RAC working groups though increased funding.

3.5. Option 4

This option includes a range of modified policies.

Conservation policy

Under Option 4 conservation policy would be the same as under Option 1, that is an achievement of Fmsy within 4 years, subject to the constraint of a maximum of 25% interannual TAC variability, and a multispecies policy that maximises socio-economic value from the fishery. However, with the removal of Axis 1 subsidies (in particular decommissioning), the fleet will remain significantly overcapacity even in the middle of the time period, which can be expected to reduce compliance slightly, which may reduce the ability of the management system to achieve a 25% interannual TAC variation.

Access rights policy

Under Option 4 ITR would not be compulsory. Although use of ITR in the EU (and ITQ in particular) is growing, our Status Quo assumption is that only Denmark, Netherlands, Sweden, Poland and Estonia have committed to and will have ITQ systems operational within an unchanged CFP. Other MS would be at liberty to develop ITR systems internally, but there would be no system for inter-EU transferability, nor would there be any attempt to define a single set of ITR standards through which, at some point in the future, ITRs could become transferable.

Subsidies

Under Option 4 subsidies would follow the Option 1 trajectory. The current EFF would continue to fund activities in all 4 axes until 2015, including decommissioning. After that time EFF-2 would have only two axes, “smart green fisheries” and “inclusive territorial development”. No funds would be available for decommissioning.

Markets and trade

Under Option 4 markets and trade policy would follow directly Option 1.

Small scale fleet

Under Option 4 small scale policy would follow directly Option 1, except that there would no longer be any need for protection of the small scale fleet within the EU ITR system, given that there is no EU ITR system. Member States would be free, when considering the development of their own ITR systems, to provide any safeguards that they saw fit, to the small scale or any other fleet sectors.

Regionalisation policy

Under Option 4 regionalisation policy would follow directly Option 1.

3.6. Summary of the options

The options described above include a mix of policies. To best understand them, and the differences between them, it is worth presenting a summary table.

	Policy	Status Quo	Option 1	Option 2	Option 3	Option 4
Environmental sustainability	MSY policy	Current LTMPs, which do not implement Fmsy consistently, remain	Move to Fmsy for all stocks over a period of 8 years	Move to Fmsy for all stocks over a period of 4 years	As Option 1	As Option 1
	Fleet policy	Capacity reduction through EFF and an anticipated EFF-2	No EFF-2 scrapping fund. ITR on LSF compulsory. ITR on SSF voluntary. Transfers limited to within-MS.	No EFF-2 scrapping fund. ITR on LSF compulsory. ITR on SSF voluntary. Transfers throughout the EU with safeguards	As Option 1	No EFF-2 scrapping fund. ITR remains a MS issue, as in the SQ without inter-EU transferability .
	Discards	No discard reduction policy	As Status Quo	Move to catch quotas	As Status Quo	As Option 1
Economic sustainability	Subsidies	Continuation of EFF-2	No fleet subsidies (scrapping, modernisation), smart green subsidies and territorial development axes only.	No subsidies	As Option 1, with a small reserve for crisis response (eg in case of collapsed fishery)	As Option 1
	Markets	Renewal of current CMO	Large reform of the CMO	No CMO and removal of tariffs	As Status Quo	As Option 1

	Policy	Status Quo	Option 1	Option 2	Option 3	Option 4
Social Sustainability	SSF Regime	No differentiated safeguard policy	EFF with some preferences for SSF. Axis 4 focus on heavily fishing dependent communities. Protection from over exposure to market forces for SSF on ITRS.	No special regime	EFF with some preferences for SSF. Axis 4 focus on heavily fishing dependent communities. Protection from over exposure to market forces for SSF on ITRS.	As Option 1
	Improved Safety	No CFP safety policy	Improve safety legislation (largely beyond scope of CFP)	Improve safety legislation (largely beyond scope of CFP)	Improve safety legislation (largely beyond scope of CFP)	As Option 1
Governance	Regionalisation	RAC structure continues	Regional Bodies constructed with Executive of MS and Commission, advised by RACs	As Option 1 with some additional independence from Commission	RACs reinforced	As Option 1
	Other policies (IUU, data collection)	No change	As Status Quo	As Status Quo	As Status Quo	As Option 1
External	EU bilateral fishing agreements	No change	Cost of access borne by EU ship owners	No bilateral fishing agreements	As Status Quo with fewer EU vessels concerned	As Option 1
	EU involvement in RMOs	No change (RFMOs are however in a review process)	Enhanced participation including financial contribution of EU ship owners	EU leadership in RFMO with increased funding	As Status Quo	As Option 1

4. Impact Assessment

4.1. Modelling methods and assumptions

Two bioeconomic models (FLR-EIAA and BIRDMOD) were developed to assist with some aspects of the Impact Assessment. The full impact assessment, described in the following sections, makes use of model outputs and additional analyses, both qualitative and quantitative, to understand what the combined impacts of the various policy options is likely to be.

These models are described in the following sections.

4.2. FLR-EIAA

Stock dynamic assumptions

The FLR-EIAA model was a combined bioeconomic model created specifically for this project using established FLR (Fisheries Library in R; Kell et al., 2007[5]) code and the most recent version of the EIAA model (Economic Interpretation of ACFM Advice; Frost et al, 2009[6]). This model is described in detail in Annex B, and in outline below.

Twenty-one stocks covering were explicitly modelled in FLR. Stocks were projected from the most recent ICES assessment (2009, which provided their 2008 stock status) through 2022 with standard assumptions about recruitment (a geometric mean of the last 10 years) and other stock dynamic parameters, and relevant harvest control rules (HCRs). Projections were aligned with current regulations, such that calculated TACs in 2009 corresponded to the actual TACs set for 2009. These stocks are:

Baltic herring 22-24	Cod 25-30	North Sea Plaice
Baltic sprat	Cod northeast Arctic	North Sea Saithe
Bay of Biscay sole VIIIab	Eastern channel sole VIId	North Sea Sole
Blue whiting	Irish Sea sole VIIa	Northern hake
Celtic Sea sole VIIfg	North Sea Cod	Southern hake
Central Baltic herring	North Sea haddock	North East Atlantic mackerel
Cod 22-24	North Sea Herring	Western horse mackerel

For the **Status Quo** model, we incorporated assumptions about discard mortality, the level of unreported fishing (compliance with regulations) and an allowance for relatively poor governance through a lag in implementation of regulations. These three issues reflect the situation as currently seen with LTMP stocks. The Status Quo assumptions were

- Discarding is reduced, in LTMPs under the Status Quo, by only 5% of its current level, because of a lack of discard policy
- Unreported catches are reduced, in LTMPs under the Status Quo, by 65% of their current level as the Control Regulation becomes effective, particularly combined with the JDPs now demonstrating an impact in particular fisheries.
- If a management plan is in place, with no significant overcatch, changes in the catch were assumed to lag behind reductions in the TAC by two years. There was no lag in implementation if the TAC was increased.

For stocks that are of key importance to fleets, but for which explicit age-structured assessments and models do not exist, future trends were either assumed to be constant (i.e.

[5] Kell, L. T., I. Mosqueira, P. Grosjean, J-M. Fromentin, D. Garcia, R. Hillary, E. Jardim, S. Mardle, M. A. Pastoors, J. J. Poos, F. Scott, and R. D. Scott. 2007. FLR: an open-source framework for the evaluation and development of management strategies. *ICES J. Mar. Sci.* 64 (4):640-646.

[6] Frost H, Andersen J.L, Hoff A and Thøgersen The EIAA model, methodology definitions and model outline, Institute of Food and Resource Economics, Report No, 200, 2009

at 2009 TACs and stock size) or, in the case of Nephrops and anglerfish, some extrapolation of current trends in stock size and biomass were made. These stocks are:

Anglers IV	Nephrops IIa, IV (EU zone)	Nephrops Vb, VI
Anglers VIIb-k and VIII a, b, d (2 species)	Nephrops IIIa, IIIbcd	Nephrops VII

For **Options 1-4** we assumed that significant benefits to compliance and discarding would occur from the combination of new Fmsy policy, the RegBods and for Options 1-3 from the capacity reduction arising from the implementation of ITRs. Consequently we made the following changes

- increase the level of discard reduction to 50% in all options, resulting from better discard practice under RegBod or strengthened RAC governance and ITRs, which is likely to result in a decline in over-quota catches and highgrading.
    - Note that the large decline in discarding that would be associated with a move to a catch quota system (new mesh sizes, changes in regulations on landing size, requirements for observation on vessels) is explored separately in the impact assessment for Option 2. Due to the difficulty of predicting the responses of individual stocks within multispecies complexes this example was not extrapolated to the whole of the EIAA model.
- change the level of unreported catches to experience a 95% reduction on previous levels arising from changes to governance and ITRs
- eliminate the lag period between decision and implementation, again as a result of improved governance

The biggest challenge with the new Options is the requirement that all stocks move to Fmsy. The majority of EU stocks are currently unassessed, and therefore moving them to Fmsy harvest control rules is problematic. We have approached this by assuming that these stocks have a similar current state (Fcurrent/Fmsy) to similar assessed stocks, and will take similar trajectories as Fmsy policy is implemented. The assessed stocks currently have an $F_{current}/F_{msy}$ ratio of 1-4, with low ratios generally being seen with pelagic stocks and high ratios with high value whitefish such as cod. Thus in this method we would assign an unassessed cod stock a high ratio of $F_{current}/F_{msy}$, and allow catches and biomass of the unassessed stock to follow the average future trajectory that we obtained from assessed stocks with this ratio of $F_{current}/F_{msy}$.

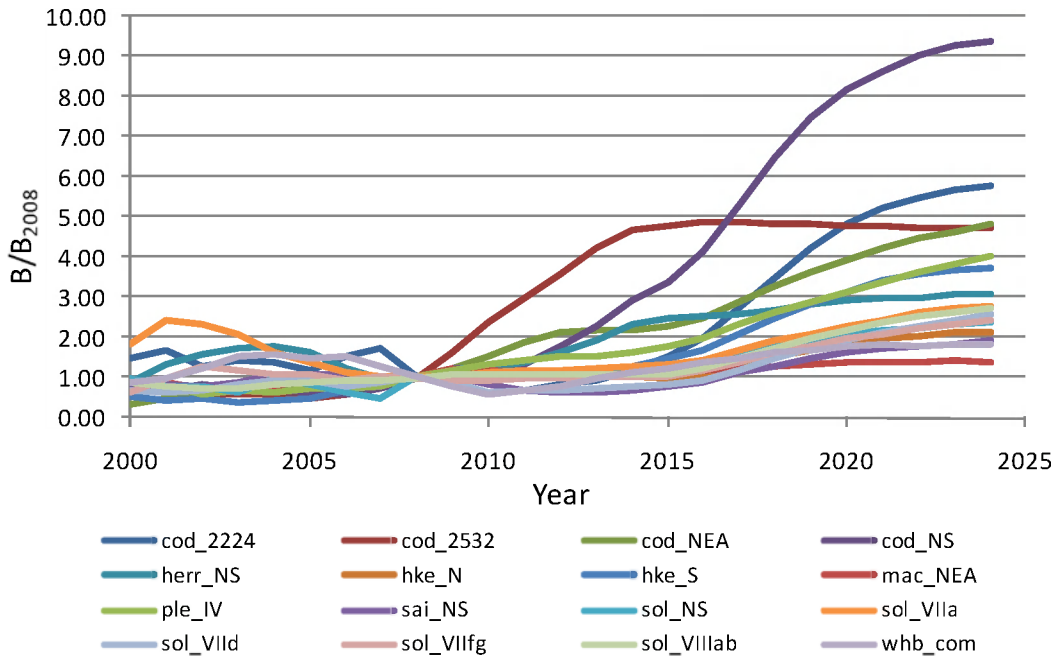

Figure 2 Trajectory of biomass in modelled stocks with the implementation of Fmsy policy in 2013 under Option 1.

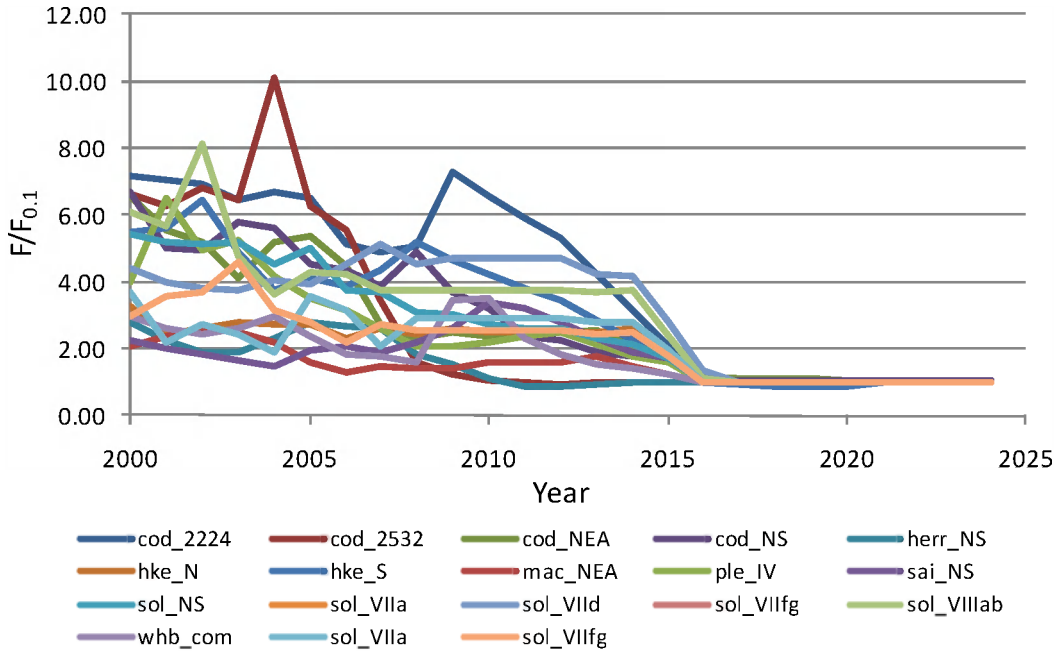

Figure 3 Trajectory of fishing mortality (F) in modelled stocks with the implementation of Fmsy policy in 2013 under Option 1.

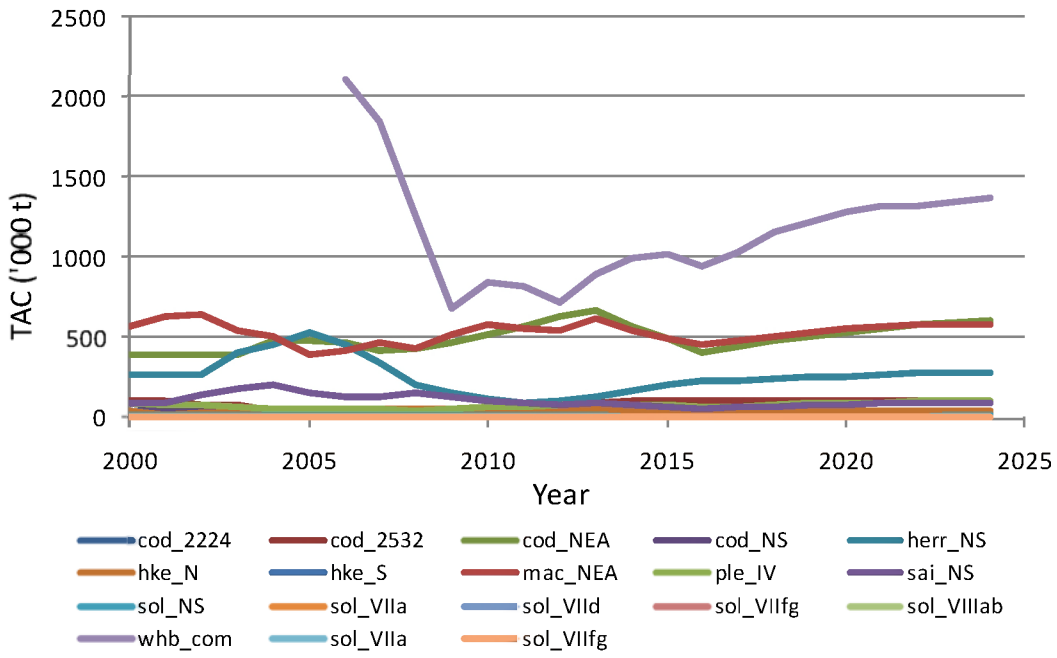

Figure 4 Trajectory of TAC in modelled stocks with the implementation of Fmsy policy in 2013 under Option 1.

There is a difference in the timing of implementation of conservation policy between Options 1-4. Under Option 1 we assume that all assessed stocks move to Fmsy over a 4 year period, unless limited by the 25% interannual TAC variation rule, and 30% of unassessed stocks have science developed and reach Fmsy in each of the years 2016, 2018 and 2020. Under Option 2 we assume that all stocks reach Fmsy in 2016. Under Option 3 we assume the same as Option 1, except for the 15% interannual TAC variation rule.

Under Option 4 we assume that although the objective is to achieve Fmsy within the same time frame as Option 1, in reality there is likely to be a slight reduction in compliance in the medium term, as a result of the much fewer fleets entering ITR-stimulated reductions (see text below) in capacity in 2016, even though in the short term (2012-2015) capacity reduction is supported by EFF Axis 1. Thus in the medium term it is unlikely that TAC reductions of 25% will be achieved for assessed stocks. We therefore use the same assumptions for stock trajectories as under Option 3 (i.e. a maximum 15% interannual TAC variation).

Options 1-4 contain two different approaches to multispecies fisheries: adoption of a socio-economic optimum (managing the fishery to ensure Fmsy for the most valuable species); or adoption of a conservation optimum (managing the fishery ensure Fmsy for the most vulnerable/sensitive species). Undertaking such modelling for all available multispecies fisheries in the EU would be beyond the scope of this project, because it is not simply a biological problem, but also clearly a socio-economic one requiring full analysis of the behaviour of individual metiers of the fleet. However, analysis of this problem suggested that in the socio-economic optimum, roughly equal numbers of species would be under- and over- exploited. Thus for Options 1, 3 and 4 the analytical result obtained above by managing to Fmsy for all stocks was retained. For Option 2, analysis suggested that about 2/3 (66%) of stocks in multispecies fisheries would be underexploited by at least 20%. Accordingly, in the EIAA model, the catch of 2/3 of the stocks judged to be in multispecies

fisheries were reduced by 20% in 2017 and 2022 to reflect their underexploitation in this state.

Economic considerations

The results of these projections – stock size, exploitation rate, catches, quotas, and average age in the stock over the period 2007 – 2022 – were used to drive a modified EIAA model.

The EIAA model takes as its inputs variables for each vessel segment: gross vessel earnings as determined by annual volume of catches per species and price of those species, fuel costs, other variable costs (which vary as a function of gross sales or effort), crew share, fixed costs (constant costs such as maintenance, insurance and administration), depreciation and catch data (weight and value) for the top 5 species. Other variables include employment, capital costs and vessel characteristics (GT, kW and effort).

As described in the Status Quo report, 57 fleets were included in the model, with between two and eight fleets per country depending on the relative size of GVA and employment in each Member State (MS). These fleets represent on average more than 80% of the value-added for MSs (58%-100%) and on average more than 70% of employment for MSs. Fleets proposed represent a good balance of vessel sizes (14 of 0-12m, 15 of 12-24m, 16 of 24-40m, and 12 of 40+m).

The linkages between the FLR and EIAA models were stock size (Spawning Stock Size) and TAC (Figure 5).

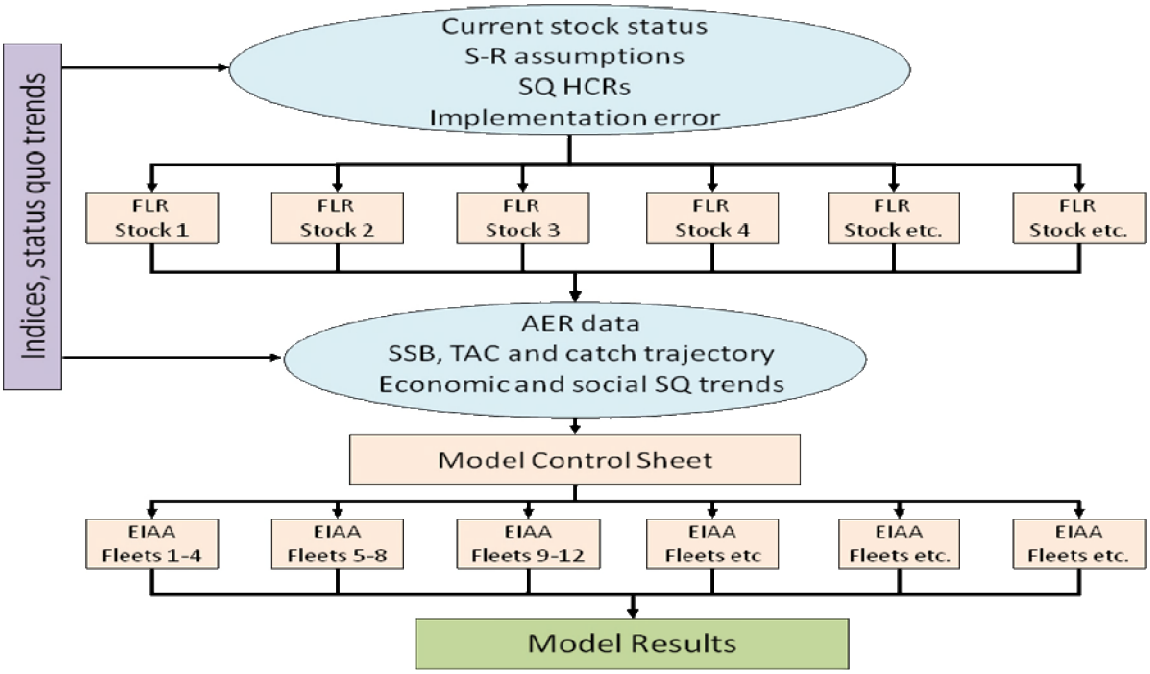

Figure 5 Schematic diagram of the linkages between components of the FLR-EIAA model

We estimate upstream and downstream multipliers as part of the modelling exercise in Section 4, with a methodology described in section 4.2.1. Downstream processing multipliers (GVA and employment) were assumed to respond to changes in the income from catches, and upstream ancillary multipliers to respond to the size of the fleet.

The EIAA model had the following features:

(a) Calculations of the expected changes in effort required for each sector in each of the years 2012, 2017 and 2022 arising from increasing quotas and stock sizes, based on their catch composition in the reference period 2007-2009. The standard stock flexibilities for different species were used, as estimated by STECF (0.8 for demersal species, 0.1 for pelagic species), and the uptake ratios calculated from the reference period were maintained.

(b) Fish prices were calculated individually by species and sector. Price flexibilities (the relationship between supply volume and price) were assumed to be 0.2 for all species unless other values could be derived from the literature.

Species	Flexibility	Species	Flexibility	Species	Flexibility
Herring	0.3	Norway lobster	0.2	Turbot	0.3
Anchovy	0.6	Northern prawn	0.2	Lemon Sole	0.2
Cod	0.35	Plaice	0.25	Dab	0.2
Megrim	0.2	Pollack	0.2	Skates and rays	0.2
Anglerfish	0.2	Saithe	0.2	Norway pout	0.2
Haddock	0.4	Mackerel	0.4	Sandeel	0.2
Whiting	0.3	Common sole	0.5	Atlantic salmon	0.2
Hake	0.4	Sprat	0.2	Other	0.2
Blue whiting	0.2	Horse mackerel	0.2		

(c) All prices, costs and values are expressed in real terms (i.e. with no inflationary component) relative to the reference period (2005-2007). In some sensitivity scenarios fish and fuel prices were raised/lowered.

(d) Variable costs were adjusted in proportion to fleet size, whereas fuel costs were adjusted in proportion to effort.

(e) Crew share was defined as a percentage of the gross revenue less variable costs (fuel and running costs). This covers payments to crew members, including the skipper. The percentage relevant to a particular sector was derived from historic crew share calculations. Note that the default EIAA model calculates future wages by maintaining the ratio of average wage to turnover in the reference period. This calculation differs to the standard share remuneration system, and does not allow for the independent performance of the various components of costs to be modelled effectively.

(f) In addition to crew share, the following were calculated: Gross value added, net profit, return on investment.

Fleet trend assumptions

In the Status Quo report, fleet size from 2007 to 2015 (the final date allowed for fleet reductions under the EFF) was modified according to current trends and MS declared objectives for fleet reductions (informed by use of the fuel package by some MS for Fleet Adaptation Schemes[7]) except where ITRs were implemented in a few fleets. At the end of this period, and for fleets where MS had not explicitly defined fleet decommissioning

[7]An emergency package of measures to tackle the fuel crisis in the fisheries sector. An ad hoc special, temporary regime which will derogate from some provisions of the European Fisheries Fund (EFF) regulation for a limited period (up to the end of 2010).

schemes in their EFF plans, an average 2% per year decline was assumed. Increases in technological development ("effort creep") were introduced through assuming a 1% per year increase in vessel capacity. Reference levels of fleet size, number of days fishing per vessel per year, and employment (FTE) were calculated.

In some cases increasing catches and declining fleet size led to an increase in the number of days fishing that each vessel would have to undertake in a year. Examination of AER data indicated that the maximum number of days that vessels should be able to fish was 190 days for vessels in the 00-12m class, 220 days for vessels 12-24m, 250 days for 24-40m and 290 days for 40m+ vessels. When average days at sea per vessel reached these levels, vessel numbers were increased. This is further described in the Status Quo report.

Experience obtained in various European ITR systems (ITQ and ITE) appears to suggest that they are accompanied by a rapid reduction in fleet size at the time that they are implemented, but that this may last for only 3 years, at rates of about 10% of vessels per year. This is higher than the normal rate of fleet reduction under MAGP and Entry / Exit regime (2%) both supported by structural aid for leaving the fleet register (decommissioning, support to joint-venture until 2004).

- Spain ITQ: 7.5% p.a. reduction over 5 years up to 1997, then 1.2% reduction after this[8]
- Estonia ITQ and ITE: 8% p.a. reduction over 5 years up to 2001, then slower[9][10]
- Denmark demersal ITQ: 15% reduction over one year, with further 30% reduction in active capacity[11][12]
- Norway[13]:
  - pre-ITQ 1990-2001, reduction in vessel numbers and employment 3.5% p.a.
  - initial ITQ period: 2001-2005 (with ITQ) reduction in vessel numbers 10.1% p.a., capacity 1.7%, employment 6.1%
  - later ITQ period: 2005-7 vessels 3.9%, capacity 0.9%, employment 3.6%

Experience has also shown that where fleets undergo restructuring, the least efficient vessels are removed and the most efficient vessels retained, so leading to an increase in efficiency across the fleet as a whole. This has been demonstrated by the Norwegian cod trawl fleet, in which a decrease in horse power lagged behind the reduction in vessel numbers following implementation of the Structural Quota Scheme (SQS). In this case, the eventual declining trend in total horsepower was delayed by around three years[14].

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[8] OECD (2004) *Further Exmination [sic] of Economic Aspects Relating to the Transition to Sustainable Fisheries – A Case Study of Spain*, France, OECD.
[9] Ulmas, H. (2003) *The Cost of Fisheries Management in Estonia*. Tokyo, The United Nations University.
[10] European Commission (2009) *Facts and Figures on the EU Fishing Fleet – Estonia* (internet). Available at URL: http://ec.europa.eu/fisheries/fleetstatistics/index.cfm?ctyCode=EST (accessed: 19/03/2010).
[11] Ministry of Food Agriculture and Fisheries (2009) *Annual Report on Fishing Fleet Capacity 2008 – Denmark*. Denmark, Ministry of Food Agriculture and Fisheries.
[12] MRAG Consortium (2007) *An Analysis of Existing Rights Based Management (RBM) Instruments in Member States and on Setting up Best Practices in the EU: Part 2.* London, EC – MRAG.
[13] Directorate of Fisheries: Norway (2010) *Norwegian Fishing Vessels, Fisherman and Licenses* (internet). Available at URL: http://www.fiskeridir.no/english/statistics/norwegian-fisheries/norwegian-fishing-vessels-fishermen-and-licenses
[14] Danielsen, J F. (2010) *Introduction of RBM in Norway* [workshop presentation]. Brussels, DG MARE.

Furthermore, ITQ/E-induced restructuring appears to be most likely where sectors of the fleets are unprofitable or where they are fishing for relatively few of their available days (for instance if a fleet is fishing for only 100 days of the year per vessel when it would normally be able to fish for 250 days of the year, weather permitting). These are indicators of overcapacity.

We have translated this experience into the following assumptions about the relationship of ITRs to capacity.

- All fleets undergo current planned EFF reductions, or 2% per year if the EFF plans are not specified, up to 2015.

- In the Status Quo and Option 4, only certain nominated fleets enter ITR (Poland, Estonia, Sweden – Denmark and the Netherlands already have ITR systems – and some other potential exceptions – see below). In Options 1-3 all LSF enter ITR, and some of the small scale fleet depending on their choice. For Options 1-3, any fleet entering ITR will experience an immediate reduction in size by 10% per year over 3 years if the sector is unprofitable (defined as <10% profitability, at which point it is statistically probable that at least some vessels in the fleet are working unprofitably) **or** is operating at less than 70% of its potential fishing days, in 2012. The start point for this decline will be after the end of the EFF decommissioning schemes, for which the last year will be 2015, i.e. 2016, and lasting for 3 years (2016-2018). Following this time the reductions will follow the status quo assumption of continuing decline at 2% per year.

- Under Fmsy policy there will be heterogeneity in the rate of recovery for different stocks, which will lead to a variation in the timescale of changes in economic performance across fleet segments. It is reasonable to assume therefore that some segments will remain unprofitable for longer, depending on which stock(s) they target, and this lagging profitability could still trigger a second round of ITR uptake, albeit a modest one, even once all stocks are expected to have reached MSY.

- In Option 4 it is assumed that the Status Quo situation pertains for most fleets, with the following exceptions:

    - For all the fleets, there will be no fleet decommissioning or modernisation support after 2015, although there would be some support for innovative green technology developments under the “smart green fisheries” axis. The status quo assumption of continued 2% per year reductions in fleet size, and 1% per year increases in technological capacity, are unlikely to apply when Axis 1 subsidies are removed. Instead, we assume for any fleet not subject to ITR that there will be no reduction in fleet size and a small (0.5% per year – see below for rationale) increase in vessel fishing capacity.

    - For Option 4 it is assumed that some other fleets might enter ITR on a MS basis, following the example of Denmark, Sweden, Estonia, Poland and the Netherlands, but that they will choose to do this later than if there was an EU policy for compulsory ITRs. From the review of MS responses to the Green Paper consultation, and from their current close relationships with those MS listed above which have implemented ITRs, it would appear that perhaps some fleet segments in Spain and Germany would be favourably disposed to ITRs even in the absence of an EU-wide mandatory application for the large scale fleet.

  - Thus, for option 4 we assume that the large scale fleet in Spain and Germany will enter ITR, but will make this decision based on their profitability or operating capacity (defined as <10% profitability or <70% of potential fishing days) considering the situation in 2017, rather than 2012 as in options 1-3. These fleet would follow the same trajectory as for the Status Quo and Options 1-3 ITR fleets, i.e. an immediate reduction in fleet size by 10% per year over a 3 year period starting in 2018.

- Any fleet not undergoing 10% decline per year under an ITR scheme will revert to 2% per year (i.e. the assumption is that even an ITR fleet will hold this general level of decline after its initial rapid decline, and in any case all fleets not in ITR will conform to this reduction).

- Accounting for technological improvements. The result of decommissioning and ITR removals of vessels, and technological advancements through investments by more profitable vessels, will mean that for any ITR fleet, individual vessel capacity will increase, at a rate that is modelled as 1% per year under normal circumstances and 2% per year under conditions of rapid buy-out associated with the 3 years of ITR fleet reductions. The continuation of EFF Axis 1 funding assumed under the Status Quo mean that the same 1% increase in capacity would apply to non-ITR fleets under the Status Quo option. However, non-ITR fleets in Option 4 would not experience the same level of improvement (see above: our assumption of 0.5% improvement).

- In Options 1-3 the small scale fleet also has the option of entering ITR. We assume that under Option 4 none of the small scale fleets will enter ITR. The experience of the Danish small scale fleet suggests that 30% of vessels in this sector may choose to enter ITR. This is modelled by assuming that 30% of the vessels in small scale fleets meeting the capacity triggers in the first bullet experience the same trends in vessel numbers and capacity as the large scale fleets.

Price assumptions

The status quo assumption for fish prices is that they stay the same, in real terms, as the baseline period 2005-07.

There are two aspects of the reform that are expected to deliver increased prices. The first is the direct impacts from the use of market policy, and the other is the indirect impacts associated with increasing environmental stability.

Gains to prices are expected to be strongest with the re-direction of CMO policy in Option 1, but also positive with its retention in Option 3. A decline in prices is anticipated in Option 2 with the removal of tariffs and the CMO.

Gains to real prices can be expected from environmental policy in several ways. Firstly, the size of fish in the stock, and in the catch, will increase as stocks recover, delivering slightly increased prices. Increased prices can be expected as the image of fishermen as custodians of the sea improves, particularly resulting from increasing stocks but also, in Options 1 and 2, arising from lower rates of discarding with the increased uptake of ITRs and activities of strengthened regional bodies. There are also likely to be differences in the times at which these increases are seen, associated with the differences in timing of stock recovery.

Taken overall, the changes in fish price in real terms is assumed, in the model, to be 20% in Option 1 (10% in 2012, with the introduction of the new CMO direction, and 10% in 2016 as stocks recover), and 10% in Options 2, 3 and 4.

Fuel prices are almost certain to return to the levels seen in 2008 by 2012, and perhaps to greater levels. An analysis of the 2008 AER data shows that although fuel price increased by 40% in 2008 compared to 2005-2007, the increase in fuel costs experienced by vessels was 35%. This difference is due to the tendency of vessels to change their fishing patterns and behaviour as fuel prices increase, with strategies designed to minimise fuel use (e.g. fishing closer to home ports or landing closer to fishing grounds, switching to use of other gears like from trawl to Danish seine).

There are already signs that fuel price is increasing once again, and we anticipate that it will reach the peak experienced in 2008 by 2012. This peak was a 50% increase on 2005-2007 levels. Taking into account the experience in 2008, we assumed that in 2012 and afterwards, that the fleet would experience fuel prices are 45% above the level in the baseline years 2005-07.

Timing of events

The timing of events is shown schematically in the following figures.

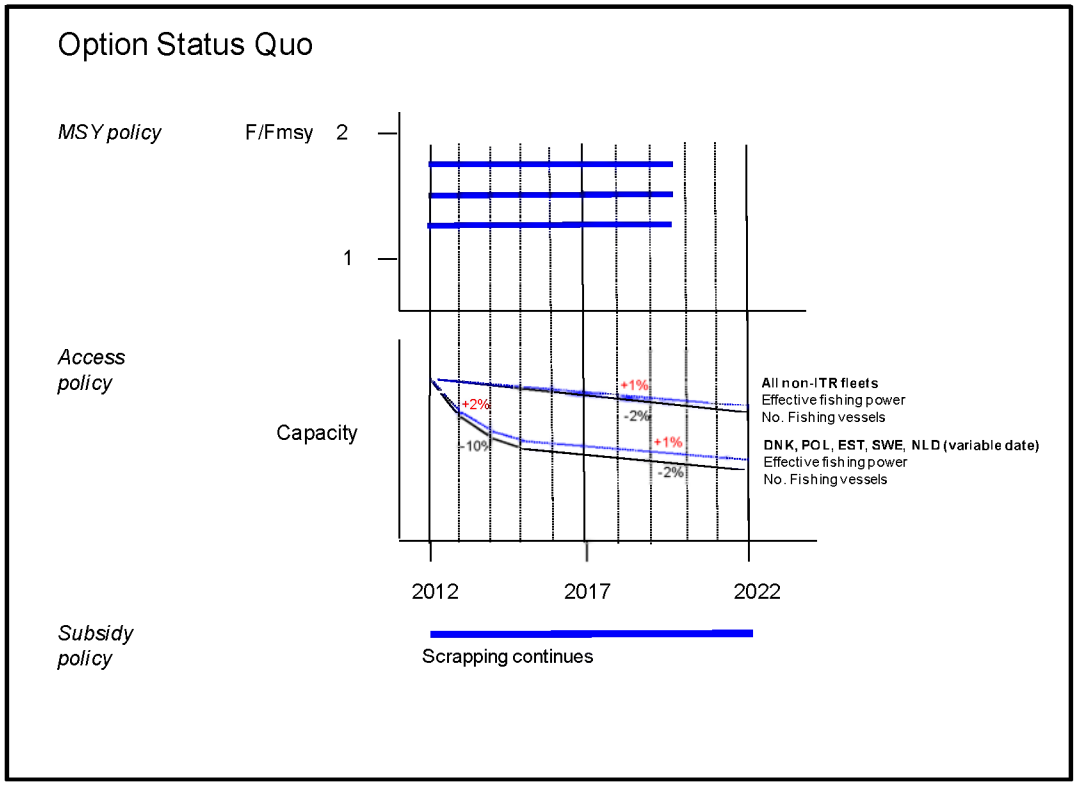

Figure 6: Schematic diagram of trends in Fishing mortality, capacity and subsidies to the fleet under Status Quo. The top figure shows the anticipated continuation of current management strategies. The lower figure shows, figuratively, the trend expected in vessel numbers for fleets a) indicated to be in ITR/ITQ systems (Denmark, Poland, Estonia, Sweden and the Netherlands), with implementation depending on their individual decisions (for Denmark and the Netherlands this is prior to 2012), and b) for all other fleets under the decommissioning schemes currently presented by MS under the EFF (up to 2015) and an anticipation that these schemes will continue in EFF-2 under the Status Quo to deliver a 2% per year reduction in fleet size (black percentage figures), and a 1% increase in effective fishing power each year (red percentage figures).

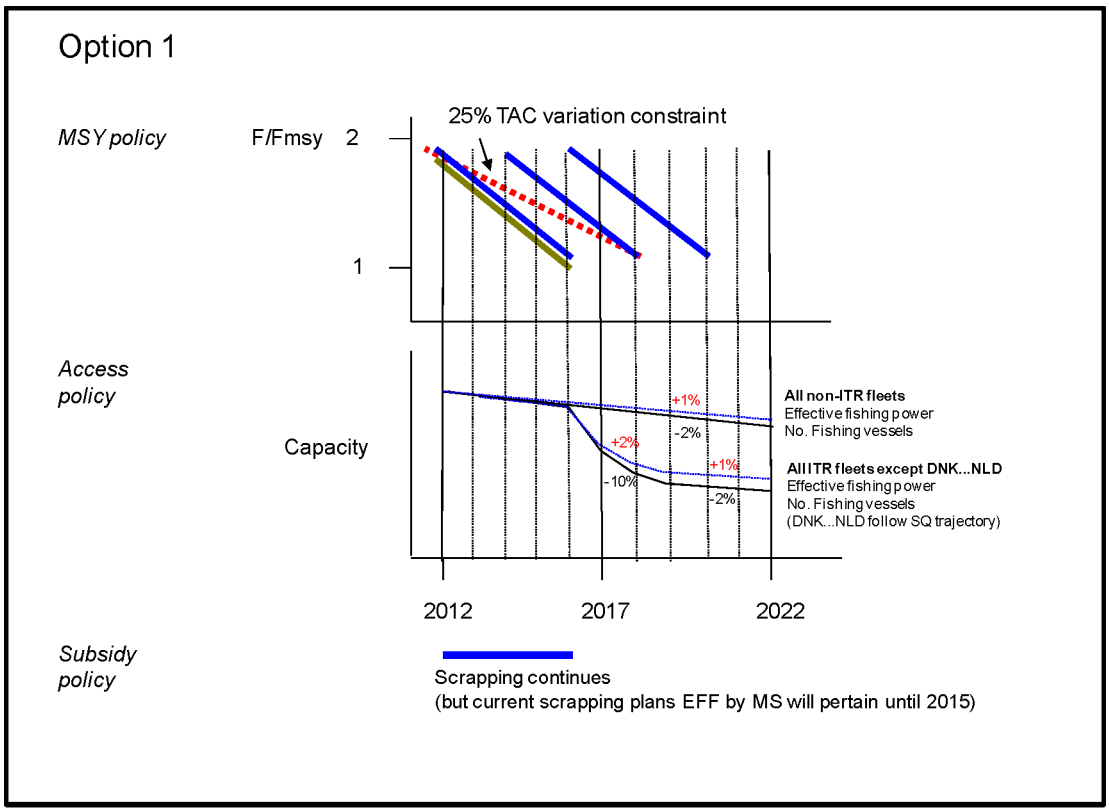

Figure 7: Schematic diagram of trends in Fishing mortality, capacity and subsidies to the fleet under Option 1. The top figure shows the anticipated 4 year decline in fishing mortality to Fmsy for all assessed stocks (green) except where the decline would create an interannual TAC variation of greater than 25%, and the blue lines show the trends expected for the unassessed stocks as they move in three separate time periods along the 4-year Fmsy pathway. These time periods reflect the time taken to develop assessments and management advice for the stocks. The lower figure shows, figuratively, the trend expected in vessel numbers for a) fleets not entering ITRs and b) unprofitable ITR fleets or ITR fleets operating at fewer than 70% of their available days which are expected to undergo a reduction in fleet size. The dotted line shows the trend in capacity/fishing power that accompanies the reduction in vessel numbers, with legend as in the previous figure. Trends up to 2016 follow MS operational plans under the current EFF, or to have entered ITRs already in the case of DNK, SWE, EST, POL and NLD (these latter trajectories are not shown on this figure)

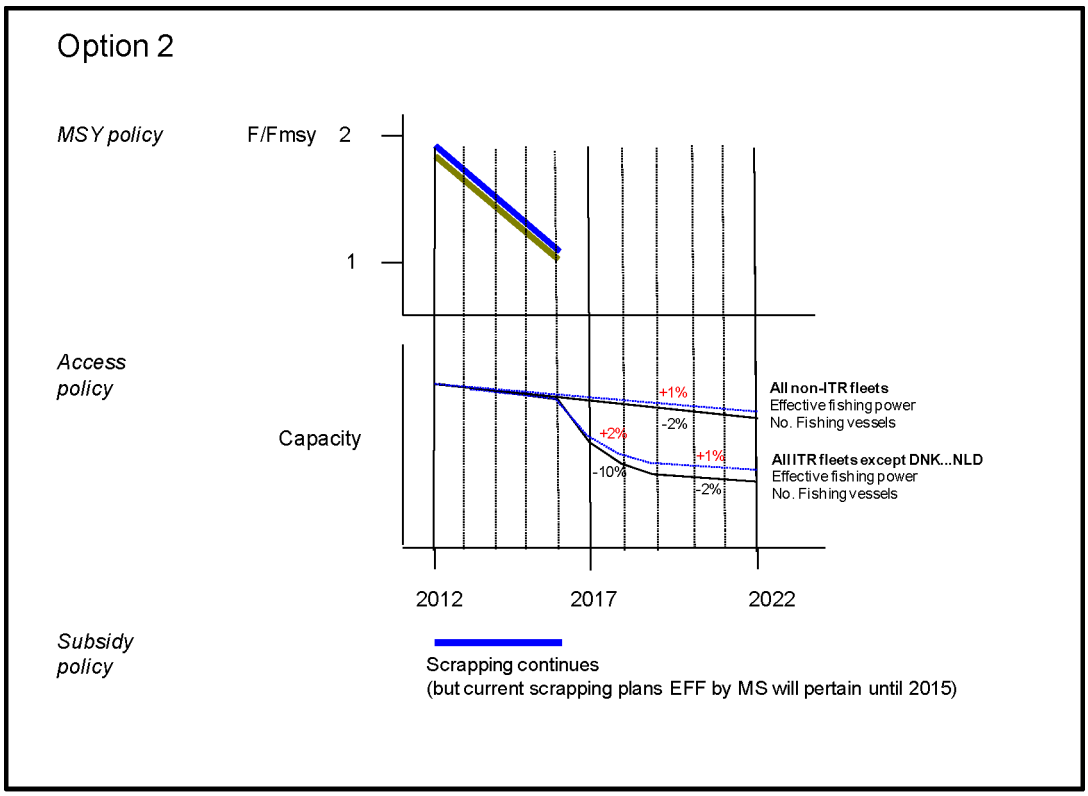

Figure 8: Schematic diagram of trends in Fishing mortality, capacity and subsidies to the fleet under Option 2. Legend as with Figure 6.

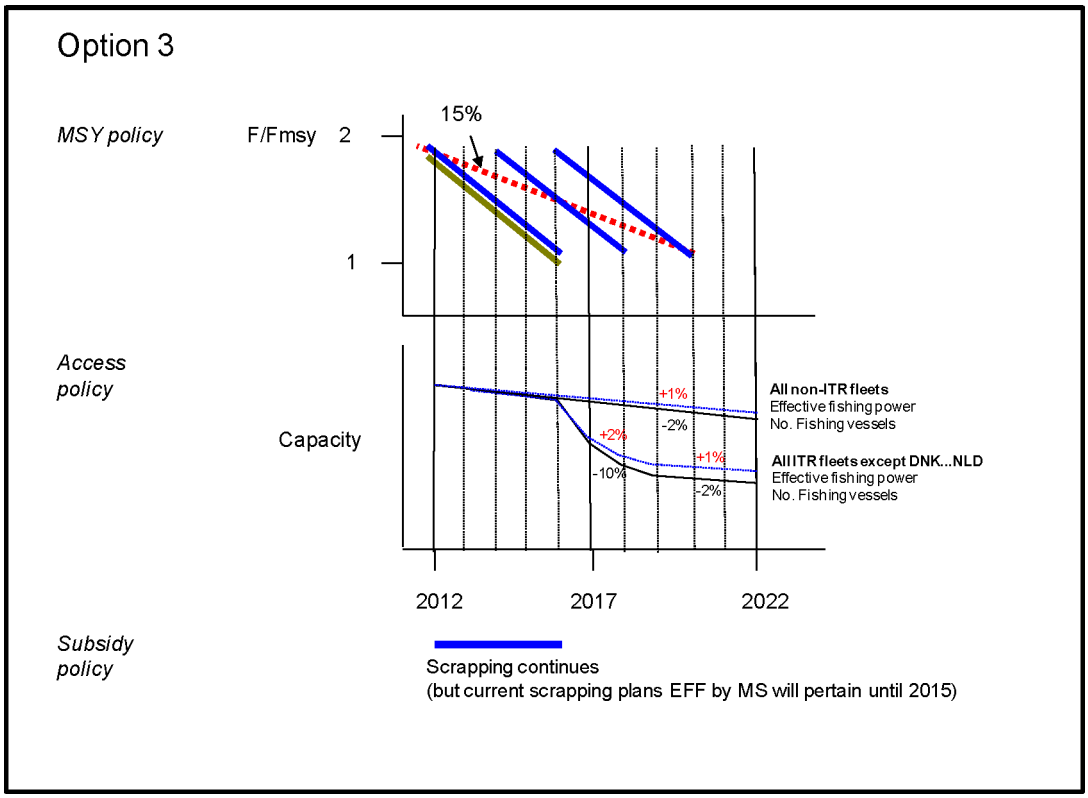

Figure 9: Schematic diagram of trends in Fishing mortality, capacity and subsidies to the fleet under Option 3. Legend as with Figure 6.

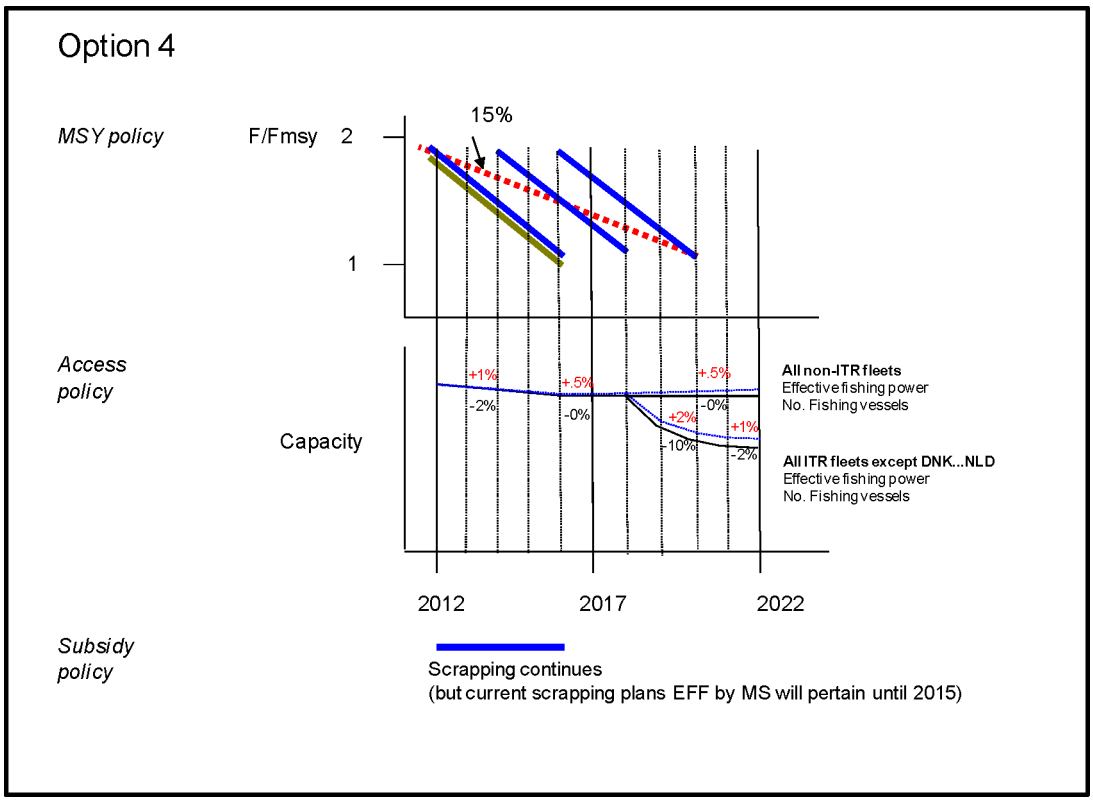

Figure 10: Schematic diagram of trends in Fishing mortality, capacity and subsidies to the fleet under Option 4, where after 2016, in the absence of decommissioning through EFF-2, fleets are expected to continue at present sizes unless they decide, on a MS basis, to enter ITRs which we assume to be at a later stage than in Option 1. Other aspects of legend as with Figure 6.

4.3. HDA-BIRDMOD

BIRDMOD lends itself ideally to the exploration of multispecies fishery issues. A BIRDMOD model for Sicily and GSA 17, two of the most important fishing areas in the Mediterranean, was implemented. The model covers two management areas (GSA-10 and GSA-16), 8 Italian fleets and 10 species for Sicily, while 10 Italian fleets and 10 species are covered under GSA 17.

BIRDMOD[15] was implemented without the age structured Aladyn model described in Prellezo et al (2009)[16]. Instead a biomass-dynamic production model was implemented, fitted to the latest stock assessments available from SG-MED[17] (based on data from MEDITS and GRUND Programmes). A few adjustments have also been applied to the economic module for estimating additional indicators specifically requested for this study. The new version of BIRDMOD, named the HDA model, was implemented to cover

[15] IREPA. – 2005. A working proposal for the economic and biological data collection of the small scale fisheries. Workshop on Small Scale Fisheries. Kavala, Greece 12th-16th September 2005. Accadia, P. and M. Spagnolo. – 2006. A bio-economic simulation model for the Italian fisheries. 13th IIFET Conference: "Rebuilding Fisheries in an Uncertain Environment", Portsmouth, UK, 11-14 July 2006.
[16] Prellezo, R., Accadia, P., Andersen J. L, Little, A., Nielsen R., Andersen, B.S., Röckmann C., Powell J. and Buisman, E. (2009) Survey of existing bioeconomic models: Final report. Sukarrieta: AZTI-Tecnalia. 283 pages.
[17] Report of the SGMED-09-02 Working Group on the Mediterranean Part I. 8-12 JUNE 2009, Villasimius, Sardinia, ITALY

- 6 fleets operating in GSA 16 and 8 fleets (2 of them located outside Sicily but exploiting the same stocks) operating in GSA 10 (south and north of Sicily, respectively) (purse seine 12-24m, longline 12-24m, small fishery <12m, demersal trawlers 12-24m and 24-40m, passive polyvalent 12-24m, polyvalent 12-24m). These fleets operate within a variety of mixed fisheries, targeting both demersal and pelagic stocks. The demersal species included in the model for simulating landings and revenues are European hake, nephrops, striped mullet, red mullet, deepwater rose shrimp, giant red shrimp, and blue and red shrimp. Pelagic species are European anchovy, European pilchard, swordfish and bluefin tuna. With the exception of the fisheries for swordfish and tuna, all other fisheries are regulated by effort control and mesh size, the latter being determined by the Mediterranean Regulation (Council Regulation (EC) No 1967/2006).

- 10 fleet segments operating in GSA 17: demersal trawlers <12, demersal trawlers 12-24m and 24-40m, beam trawlers 12-24m and 24-40m, pelagic trawlers and seiners 12-24m and 24-40m, polyvalent passive <12, vessels using hooks 12-24m and dredges 12-24m. These fleets operate within a variety of mixed fisheries, targeting both demersal and pelagic stocks. The demersal species included in the model for simulating landings and revenues are European hake, striped mullet, Norway lobster, common cuttlefish, common sole and musky octopus. Pelagic species are European anchovy, European pilchard, bluefin tuna and swordfish. With the exception of the fisheries for swordfish and tuna, all other fisheries are regulated by effort control and mesh size, the latter being determined by the Mediterranean Regulation (Council Regulation (EC) No 1967/2006).

Future scenarios were generated principally through reductions in effort associated with the planned reduction in Italian fleet size indicated by the Italian Operational Programme under the EFF, and by reductions in the catch of smaller fish and shrimps likely to be affected by the move to the required 40mm mesh size under regulation 1967/2006. This methodology was adequate for simulating changes in stock status as a response to changing fishing effort. For the quota stocks, tuna and swordfish, catches were pro-rated according to the likely prognosis of the stocks and catches anticipated by ICCAT and SG-MED.

Similar assumptions about fuel and fish prices (described above) were introduced into the BIRDMOD model. Stock responses were modelled by adjusting demersal trawl fleet sizes according to the fleet size rules described above, with the introduction of ITRs for the large scale fleet.

4.4. Sensitivity

4.4.1. Fuel price

Fuel price is an extremely important cost to vessels. The results will be sensitive to assumptions about fuel price. Currently, the status quo, and all options, assumes that fuel prices from 2012 to 2022 will be 45% higher than the average price experienced in 2005-07.

Two sensitivities were run to explore issues with fuel price.

1. It is not clear at this stage whether the removal of subsidies would include the removal of the favourable tax status for marine diesel/gasoil that exists in most MS, at varying levels. The Commission estimates that over the whole of the EU this tax status is an effective subsidy of 40% on the real price of fuel. This sensitivity therefore included an increase in fuel price by 40% from 2017. Because this is likely to take effect only if subsidies were significantly removed, we have applied this

sensitivity only to Option 2. This 40% price increase in 2017 is applied along with the additional 45% increase in fuel price explained below in 2.

2. World fuel prices may continue to increase at the rate that they are assumed to take between 2005-7 and 2012. The second sensitivity therefore examined the impact that an additional 45% increase in fuel price in 2017 (maintained at this rate to 2022) would have on fleet performance.

4.4.2. Fish prices

A sensitivity was run assuming that the increases in fish price assumed under PRICES **did not occur**, whether through failure of CMO and other policies or through external influences

4.4.3. Assessment status

Option 2 calls for a rapid introduction of Fmsy management for all stocks by 2016. We consider that for some of the very poorly understood stocks, acquisition of relevant data, achievement of analytical assessments, and development of harvest control rules that will deliver Fmsy in 2016, may be almost impossible in this very short time frame, even if sufficient money and scientific expertise were available.

In a sensitivity for Option 2, we implemented the Option 1 type staged development of Fmsy management for all currently unassessed stocks. The trajectories for the currently assessed stocks retained the more rapid application of Fmsy policy assumed in Option 2.

4.5. Status Quo (Option 0)

The likely impacts under a Status Quo option are described in the following table. These are taken directly from the Status Quo report.

Table 5 Option 0 Assessment of likely impacts on indicators under Status Quo

Indicator	Performance target (ideal state)	Status quo scenario results	Overall performance of the status quo scenario	Risks and threats to the status quo results
1. Stock at MSY	All stocks at MSY	Only about 40% of the stocks modelled were fished sustainably by 2022, an increase from 20% in 2012. Total catches of modelled stocks increase by 21%. The major concerns remain – • LTMPs continue to set targets that are higher than MSY • Continued discarding • Unassessed stocks and Mediterranean stocks not at MSY. • Negative impact on non-LTMP stocks as effort is directed away from LTMP stocks	Performance target **not met** although there is some improvement. • Undermined by setting targets higher than MSY, discarding and unassessed stocks	There is a risk that the Control Regulation will not be as effective as assumed in the status quo calculations. This impacts the state of the stocks concerned but does not significantly impact the modelled proportion of stocks at MSY. There is a significant risk that the Commission will not have the resources, or that sufficient political will will not be generated, to agree all the proposed LTMPs. This will significantly impact the ability to meet MSY management.
2. LTMP	All stocks with LTMP	Some 75% of catch volume will come from stocks with LTMP. However, significant numbers of unassessed stocks (66%) will remain without LTMP.	Performance target **not met** although there is some improvement • undermined by unassessed stocks	There is a significant risk that the Commission will not have the resources, or that sufficient political will will not be generated, to agree all the proposed LTMPs. This will significantly impact this indicator and lead to a reduction in management and governance ability.

Indicator	Performance target (ideal state)	Status quo scenario results	Overall performance of the status quo scenario	Risks and threats to the status quo results
3. Fish size	Increase in mean size for all stocks	62% of modelled stocks show an increase in mean size under LTMPs, although there is no increase for some already-healthy stocks. Improvements in LTMP stocks are however overshadowed by continued discarding and lack of improvement in non-LTMP stocks.	Performance target is **met** for LTMP stocks, but **not met** for other stocks. • Level of improvement reduced by continued discarding	The level of improvement is less than it should be for some stocks because of continued discarding. If stock size increases are not realised, through continued unreported catches or significant ecosystem impacts the mean size of fish in impacted stocks will not increase. There is a significant risk that the Commission will not have the resources, or that sufficient political will will not be generated, to agree all the proposed LTMPs. This will significantly impact this indicator for the stocks for which proposed LTMPs are not implemented.
4. Fleet size	Decrease in fleet size to balance stock size, of at least 30% of 2007 levels by 2017 and 40% by 2022	Decrease in fleets anticipated, but generally only at the existing rate reduction of 2% p.a. to 15% by 2017 and 23% by 2022. A balance with opportunities is only likely for RBM fleets.	Performance target **not met** although there is some improvement • Undermined by large number of non-RBM fleets	Technological improvement at high rates will undermine the balancing of fleet size with catching opportunities except where RBM fleets are operating. The current financial situation may lead to MS being unable to provide sufficient matched funding under Axis 1 of the EFF reduce fleet size through decommissioning.
6. Protected areas	Increase in protected areas to a maximum of 30% of fishable area	Increase in protected areas close to 30% of fishable area within continental EU waters, but not with MPA status.	Performance target **not met** although there is likely to be significant improvement.	
7. GVA	Increase	GVA increases for most segments, with overall GVA increasing from 1.9 mln in 2012 to 2.3 mln in 2022.	Performance target **not met** although there is some improvement • Undermined by significant number of poorly performing fleets	Vulnerability to prices of inputs (e.g. fuel) and outputs (e.g. fish prices) and success of recovery plans (themselves consequent on the performance of the Control Regulation)

Indicator	Performance target (ideal state)	Status quo scenario results	Overall performance of the status quo scenario	Risks and threats to the status quo results
8. Revenue to breakeven revenue	All fleets have a ratio of >1	Small increases due to stock increases and declines in vessel numbers, but some fleet segments continue to perform poorly. Only 86% of modelled segments have a ratio >1 in 2022, compared with 82% in 2012.	Performance target **not met** although there is some improvement • Undermined by significant number of poorly performing, over-capacity fleets	Decreasing fish prices, lack of significant stock recovery, and increasing fuel price will reduce ratio.
9. Net profit margin	All fleets have NPM of >5%)	Small increases due to stock increases and declines in vessel numbers, but some fleet segments continue to perform poorly. Only 70% of the modelled segments have a ratio >5% in 2022, compared with 49% in 2012.	Performance target **not met** although there is some improvement • Undermined by significant number of poorly performing, over-capacity fleets	Decreasing fish price, lack of significant stock recovery, and increasing fuel price will reduce NPM.
10. Return on investment	All catching segments have RoI >15%; and all processing sectors have RoI >10%	Small increases due to stock increases and declines in vessel numbers, but some fleet segments continue to perform poorly. Only 24 (42%) of the modelled catching segments are operating with RoI >15% in 2022, compared with 26% in 2012. Probably fewer than 50% of MS will have processing sectors with RoI >10%.	Performance target **not met** although there is some improvement • Undermined by significant number of poorly performing, over-capacity fleets	Decreasing fish price, lack of significant stock recovery, and increasing fuel price will reduce return on investment.
11. Fish prices and market orientation	Fish prices remain stable	The best estimate under status quo is that fish prices will remain constant in real terms.	Performance target **met**	Fish prices might increase with increasing quality and size; increasing demand; decreasing supply of imported product. However, it is perhaps more likely that increasing supply of imported product eased by relaxation of trade rules and increased access to technology in third countries as well as competition with aquaculture will exert downwards pressure on prices.

Indicator	Performance target (ideal state)	Status quo scenario results	Overall performance of the status quo scenario	Risks and threats to the status quo results
30. Fuel Prices	N/A	As a proportion of vessel costs, fuel price does not change as a linear relationship to fuel price increases or decreases. That is with an average 33% increase in fuel prices between 2005-2008, there was only a 25% increase in fuel price/vessel costs.	N/A	Fuel prices may increase by greater than 33% requiring further changes to activity.
12. Subsidies	Reduced and more targeted 'good' subsidies	Subsidies remaining as a significant proportion of the value of landings, albeit declining slightly. Some improved targeting of subsidies	Performance target **not met**	Role of WTO agreement could be critical in determining type of subsidies post 2013
13. Employment	Reversal of declining trends	Catching sector employment decreases with decreasing number of vessels from 2012 – 2022, with ancillary employment following this trend. Processing employment increases slightly with the increase in landings.	Performance targets **not met**	Effort creep and the failure of the Control Regulation would erode the improvements in employment, with decreases in FTE required to catch fish. Increased employment of cheaper third country labour detrimental to employment of EC Nationals
14. Status of fisheries dependent communities	Reversal of declining importance of fishing	No major changes anticipated in some regions, but others where significant stock recoveries are anticipated (e.g. Scotland) will experience an increase in employment and income	Performance target **met** for some regions**, not met** for others	Failure of the Control Regulation and non-recovery of stocks, increases in fuel prices, decreasing fish prices, could significantly impact highly fishery dependent regions
15. Regional dependency	Reversal of declining trends in employment	Following (14)	Performance target **met** for some regions**, not met** for others	Following (14)
16. Social sustainability	Increase in GVA per employee	Small increases following increases in GVA per employee	Performance target **met**	Vulnerability to decreasing prices of fish and success of recovery plans (themselves consequent on the performance of the Control Regulation). However, with effort creep the effort required to catch fish will decrease, and the resulting decline in employment will boost social sustainability

Indicator	Performance target (ideal state)	Status quo scenario results	Overall performance of the status quo scenario	Risks and threats to the status quo results
17. Attractiveness of the sector	Income at least 100% of national average	Unlikely to change significantly, because although there are increases in real terms these are likely to only keep pace with national income increases	Performance target **not met** • Undermined by likely trends in national average salary	Vulnerability to decreasing prices of fish and success of recovery plans (themselves consequent on the performance of the Control Regulation). However, with effort creep the effort required to catch fish will decrease, and the resulting decline in employment will boost social sustainability
18. Departure from scientific advice	Deviation from advice should decline to zero.	Deviation should decrease where catches are high (stocks have recovered) and LTMPs effective. However there are no indications of this reversing the current situation where quotas are set 40% higher than scientific advice. The number of stocks for which scientific advice is zero TAC where the Council sets a positive TAC has increased significantly since 2003.	Performance target **not met** • there are no indications that deviation of TACs from scientific advice is declining	If fleet capacity continues to be higher than opportunities, pressure for continued deviation may continue.
19. Management costs	Management costs should decline	Management costs are unlikely to be reduced in the short term, but in the medium term national enforcement budgets are expected to be 42% and 35% of 2012 baseline in 2017 and 2022 respectively. Management costs will also slightly decrease with declining fleet sizes.	Performance target **met**	If the Control Regulation is not effective, additional management costs may be incurred to control the problem.
20. Regions and MS having RBM systems	RBM systems uptake should increase to more than 50%	Adoption of additional RBM systems is likely, but will stay at a low level within the EU, about 20% of the modelled fleet.	Performance target **not met** although some improvement • Indications are that relatively few additional fleets are considering implementing RBMs	
21. Data provided by MS	Full compliance by all MS with reporting obligations	Number of infringements expected to decline as the Control Regulation takes effect, and the DCF will significantly improve data reporting	Performance target **met**	

Indicator	Performance target (ideal state)	Status quo scenario results	Overall performance of the status quo scenario	Risks and threats to the status quo results
22. Rate of utilisation of quotas	Optimum utilisation at 70%	Likely to continue to decline unless fleets as stocks increase	Performance target **not met** • Trends indicate continuing decline in utilisation	
23. Level of quota swaps	NA[18]	Likely to remain stable, at about 6% overall, or to continue to decline for most species as stocks recover. A high level of swaps will continue for certain stocks, most particularly redfish, horse mackerel and blue whiting.	NA	The development of highly specialised fleets, particularly for deepwater species, may increase the demand for swaps of those species.
29. Time to Taken to Reach a Decition	Time = low	Most frequent result in time taken was between 181 – 240 days (6 – 8 months). This is based on older systems and under new Lisbon Treaty, effective 2010, new results are anticipated.	NA	Lisbon Treaty does not positively impact time taken and current status quo trends, time taken reaches 18 months.
28. Safety[19]	The accident rate (accidents per FTE) should decrease to zero	The current trend would suggest that the non-fatal accident rate will reduce to near zero by 2022. This trend should be expected to be re-inforced as more safety regulations are introduced by the EU, more RBM systems are introduced, and as profitability and GVA/vessel increases. There is no indication that the fatal accident rate is declining.	Performance target **met** for non-fatal accidents, but **not met** for fatal accidents	Safety at sea could be compromised by utilisation of old fishing vessels (low investment capacity of the industry, low availability of public support for modernisation)
24. Coherence with WTO	All policies coherent with the EU's WTO obligations	Likely to remain coherent with current policy except on subsidies if agreement is reached at WTO	Performance target **may not be met** • Undermined if WTO decisions on subsidies include those being provided in the EU	

[18] Although it is possible to track this indicator, it is difficult to assess an ideal state for it. A reduction in swaps implies efficiency of the quota allocation system and decreasing administrative burden. An increase in swaps implies individual fleet specialisation and economic efficiency, and full utilisation of quota opportunities by the fleet.

[19] Although safety is indicator 28, should be grouped with social indicators

Indicator	Performance target (ideal state)	Status quo scenario results	Overall performance of the status quo scenario	Risks and threats to the status quo results
25 Administrative burden	Administrative cost and burden should decrease	Decrease, linked to improvement in compliance, reduction in swaps, and reduced fleet sizes using RBM more frequently.	Performance target **met**	Increasing control, in the Control Regulation and through tracking of swap/transfer arrangements under RBM, may increase administrative burden
26 Simplification	Simplification of implementation should increase	Increase in simplification, linked to improvement in electronic reporting.	Performance target **met**	
27 External fleet	100% of the Coastal States EEZ and International waters in which EC vessels have obtained fishing possibilities have good Governance frameworks	Governance will continue to be satisfactory overall, but poor in some agreements. Currently 39% of EU vessels operating in distant waters are operating under poor governance systems.	Performance target **not met** • EC vessels to continue to make private agreements with poorly performing states	
31. Aquaculture	NA	Until 2007, ratio of fisheries capture over aquaculture was decreasing due to both declining catches and increasing aquaculture production. Between 2007 and 2008 this ratio is stabilised.	NA	Aquaculture production may begin to increase and lack of stocks under LTMP may negatively impact fisheries capture.

To enable easy comparison with later sections of the report, the results of the EIAA and BIRDMOD models for Economic and Social indicators under the Status Quo are presented here.

Table 6 Status Quo economic results of the EIAA model by member state

	2012					2017					2022				
Indicator	Income (mln)	GVA (mln)	Revenue/ Break Even Revenue	Net Profit Margin	Return On Investment	Income (mln)	GVA (mln)	Revenue/ Break Even Revenue	Net Profit Margin	Return On Investment	Income (mln)	GVA (mln)	Revenue/ Break Even Revenue	Net Profit Margin	Return On Investment
		7	8	9	10		7	8	9	10		7	8	9	10
BEL	83	16	0.93	-13%	-17%	82	24	0.93	-12%	-17%	83	30	0.94	-11%	-18%
DEU	145	105	1.51	30%	172%	152	117	1.57	33%	223%	151	117	1.59	34%	252%
DNK	300	179	1.30	4%	3%	310	194	1.33	6%	4%	313	202	1.35	10%	7%
EST	26	7	1.22	12%	16%	26	8	1.27	16%	26%	26	10	1.33	20%	35%
ESP	1415	445	1.02	-2%	-1%	1399	464	1.03	-1%	0%	1414	535	1.05	1%	1%
FIN	14	2	0.92	-41%	-47%	14	3	0.95	-35%	-43%	13	3	0.98	-31%	-40%
FRA	948	472	1.18	6%	6%	946	496	1.21	8%	8%	947	521	1.23	10%	11%
GBR	648	262	1.20	9%	4%	680	320	1.25	13%	6%	686	346	1.29	16%	8%
IRL	215	112	1.31	16%	12%	216	118	1.35	19%	16%	217	125	1.39	22%	20%
LTU	5	4	1.25	18%	42%	5	4	1.28	20%	54%	6	4	1.30	22%	66%
LVA	12	5	1.36	25%	64%	13	6	1.47	30%	91%	13	6	1.55	34%	113%
NLD	342	124	1.16	1%	1%	353	158	1.23	7%	13%	358	176	1.27	11%	22%
POL	34	19	1.44	24%	12%	35	20	1.48	27%	17%	35	21	1.50	29%	20%
PRT	250	138	1.33	16%	12%	251	143	1.33	16%	12%	247	144	1.31	16%	13%
SWE	62	26	1.46	21%	11%	63	29	1.51	25%	15%	63	31	1.56	28%	19%
TOTAL	**4499**	**1916**	**1.15**	**5%**	**3%**	**4545**	**2105**	**1.18**	**8%**	**5%**	**4572**	**2270**	**1.20**	**10%**	**7%**
Increase over 2012						1%	10%	2%	3%	2%	2%	19%	4%	5%	4%

Table 7 Status Quo social results of the EIAA model by member state

	2012					2017					2022				
	Fleet size (no)	Employment (FTE)	Employment (FTE) per vessel	Value added per employee (€)	Crew wage (€) per FTE	Fleet size (no)	Employment (FTE)	Employment (FTE) per vessel	Value added per employee (€)	Crew wage (€) per FTE	Fleet size (no)	Employment (FTE)	Employment (FTE) per vessel	Value added per employee (€)	Crew wage (€) per FTE
Indicator	a2	13	13a	16	17	a2	13	13a	16	17	a2	13	13a	16	17
BEL	82	459	6	35249	49302	73	398	5	61342	76580	66	362	5	82451	98288
DEU	317	721	2	146229	78821	286	653	2	178864	94136	259	635	2	184045	96194
DNK	400	1312	3	136588	83222	400	1239	3	156488	94951	362	1200	3	168303	100324
EST	800	2475	3	2918	1039	723	2395	3	3545	1197	653	2278	3	4241	1379
ESP	10974	26452	2	16815	15667	10377	25526	2	18165	16433	9406	24088	3	22195	19362
FIN	1224	1641	1	1443	2161	1105	1537	1	1880	2321	999	1452	1	2306	2517
FRA	2564	8649	3	54518	37430	2404	8109	3	61229	41345	2252	7664	3	68010	45230
GBR	2954	5040	2	51995	30390	2840	4664	2	68657	39133	2567	4434	2	77988	43014
IRL	1372	2451	2	45540	24588	1240	2335	2	50586	26616	1121	2223	2	56412	29036
LTU	19	61	3	59638	42301	17	60	3	65421	45318	16	58	4	69585	47386
LVA	737	1229	2	4112	1419	666	1204	2	4900	1453	602	1151	2	5509	1473
NLD	279	1479	5	84015	52549	241	1340	6	117834	68661	217	1263	6	139002	78599
POL	637	1510	2	12332	5564	563	1478	3	13848	6180	509	1426	3	14893	6606
PRT	2247	8485	4	16245	8885	2116	8091	4	17720	10052	1916	7712	4	18674	11118
SWE	793	1086	1	23955	6195	680	1029	2	27807	7254	615	991	2	30830	8037
TOTAL	**25398**	**63050**	**2**	**30387**	**20920**	**23731**	**60057**	**3**	**35053**	**23474**	**21559**	**56935**	**3**	**39878**	**26328**
Increase over 2012						-7%	-5%	2%	15%	12%	-15%	-10%	6%	31%	26%

Table 8 Status Quo economic results of the EIAA model by fleet segment

	2012					2017					2022				
	Income (mln)	GVA (mln)	Revenue/ Break Even Revenue	Net Profit Margin	Return On Investment	Income (mln)	GVA (mln)	Revenue/ Break Even Revenue	Net Profit Margin	Return On Investment	Income (mln)	GVA (mln)	Revenue/ Break Even Revenue	Net Profit Margin	Return On Investment
Indicator		7	8	9	10		7	8	9	10		7	8	9	10
0012	741	453	1.40	19%	13%	739	469	1.43	21%	15%	739	485	1.46	24%	19%
1224	1213	529	1.10	3%	2%	1227	585	1.12	5%	4%	1231	627	1.14	7%	6%
2440	1260	372	1.02	-4%	-2%	1265	426	1.04	-2%	-1%	1283	503	1.06	0%	0%
40XX	1285	561	1.25	9%	4%	1313	625	1.30	13%	6%	1318	656	1.33	16%	8%
TOTAL	**4499**	**1916**	**1.15**	**5%**	**3%**	**4545**	**2105**	**1.18**	**8%**	**5%**	**4572**	**2270**	**1.20**	**10%**	**7%**
Increase over 2012						1%	10%	2%	3%	2%	2%	19%	4%	5%	4%

Table 9 Status Quo social results of the EIAA model by fleet segment

	2012					2017					2022				
	Fleet size (no)	Employment (FTE)	Employment (FTE) per vessel	Value added per employee (€)	Crew wage (€) per FTE	Fleet size (no)	Employment (FTE)	Employment (FTE) per vessel	Value added per employee (€)	Crew wage (€) per FTE	Fleet size (no)	Employment (FTE)	Employment (FTE) per vessel	Value added per employee (€)	Crew wage (€) per FTE
Indicator	a2	13	13a	16	17	a2	13	13a	16	17	a2	13	13a	16	17
0012	19189	22718	1	19962	9862	17877	21562	1	21731	10619	16212	20490	1	23648	11403
1224	4437	16341	4	32368	27208	4189	15432	4	37912	30897	3830	14593	4	42960	34231
2440	1351	16929	13	21992	20595	1269	16243	13	26247	23287	1153	15177	13	33129	28685
40XX	421	7063	17	79461	42718	395	6820	17	91676	47772	364	6676	18	98296	49502
TOTAL	**25398**	**63050**	**2**	**30387**	**20920**	**23731**	**60057**	**3**	**35053**	**23474**	**21559**	**56935**	**3**	**39878**	**26328**
Increase over 2012						-7%	-5%	2%	15%	12%	-15%	-10%	6%	31%	26%

Table 10 Status quo results of the EIAA model for the percentage of modelled fleet segments achieving performance targets for profitability, return on investment and revenue: break even revenue.

	2012			2017			2022		
	Prop prof > 0.05	Prop ROI > 0.15	Prop Rev/Break Even Rev > 1	Prop prof > 0.05	Prop ROI > 0.15	Prop Rev/Break Even Rev > 1	Prop prof > 0.05	Prop ROI > 0.15	Prop Rev/Break Even Rev > 1
SSF	60%	40%	93%	67%	60%	93%	73%	60%	93%
1224*	40%	7%	87%	73%	13%	87%	73%	27%	93%
2440	38%	31%	56%	50%	31%	63%	56%	38%	63%
40XX	64%	27%	100%	82%	27%	100%	82%	45%	100%
TOTAL	**49%**	**26%**	**82%**	**67%**	**33%**	**84%**	**70%**	**42%**	**86%**
Increase over 2012				18%	7%	2%	21%	16%	4%

Table 11 Projections of number of vessels by fleet segment in Sicily under Status Quo

Fleet segment	2008	2012	2017	2022	2017 var %	2022 var %
Demersal trawlers	573	501	413	373	-18%	-26%
Purse seiners	121	121	104	94	-14%	-22%
Small scale fishery	2,135	2,082	1,948	1,761	-6%	-15%
Polyvalent	49	48	45	40	-6%	-15%
Polyvalent passive	144	140	131	119	-6%	-15%
Longlines	174	170	159	144	-6%	-15%
Total	**3,196**	**3,062**	**2,800**	**2,531**	**-9%**	**-17%**

Table 12 Projections of gross value added (mln €) by fleet segment for catching sector in Sicily 16 under Status Quo

Fleet segment	2008	2012	2017	2022	2017 var %	2022 var %
Demersal trawlers	47.25	48.76	46.28	45.38	-5%	-7%
Purse seiners	16.85	12.47	14.35	14.38	15%	15%
Small scale fishery	31.60	33.57	34.65	34.43	3%	3%
Polyvalent	0.53	0.21	0.25	0.31	20%	48%
Polyvalent passive	8.83	7.02	7.18	7.37	2%	5%
Longlines	21.62	15.54	16.47	17.15	6%	10%
Total	**126.68**	**117.57**	**119.19**	**119.01**	**1%**	**1%**

Table 13 Projections of ratio of revenues to break even revenue by fleet segment for catching sector in Sicily under Status Quo

Fleet segment	2008	2012	2017	2022	2017 var %	2022 var %
Demersal trawlers	1.18	1.15	1.18	1.20	3%	4%
Purse seiners	1.54	1.38	1.45	1.48	6%	8%
Small scale fishery	1.47	1.45	1.47	1.50	2%	3%
Polyvalent	1.17	0.97	1.00	1.04	3%	8%
Polyvalent passive	1.64	1.49	1.51	1.55	2%	4%
Longlines	1.65	1.47	1.51	1.55	3%	6%
Total	**1.33**	**1.28**	**1.32**	**1.35**	**3%**	**5%**

Table 14 Projections of net profit margin by fleet segment for catching sector in Sicily under Status Quo

Fleet segment	2008	2012	2017	2022	2017 var	2022 var
Demersal trawlers	-12.6%	2.7%	6.3%	8.3%	3.6%	5.6%
Purse seiners	8.2%	4.0%	11.7%	14.3%	7.7%	10.3%
Small scale fishery	13.8%	30.9%	32.7%	34.4%	1.8%	3.4%
Polyvalent	-5.2%	-9.5%	-5.4%	0.3%	4.1%	9.8%
Polyvalent passive	14.1%	18.1%	20.5%	23.7%	2.4%	5.7%
Longlines	21.1%	18.7%	22.0%	25.6%	3.4%	6.9%
Total	**0.7%**	**10.4%**	**14.5%**	**16.8%**	**4.0%**	**6.3%**

Table 15 Projections of return on investment by fleet segment for catching sector in Sicily under Status Quo

Fleet segment	2008	2012	2017	2022	**2017 var**	**2022 var**
Demersal trawlers	14.7%	17.7%	20.6%	22.5%	3.0%	4.9%
Purse seiners	31.6%	22.3%	31.1%	34.9%	8.8%	12.6%
Small scale fishery	54.1%	59.3%	65.7%	72.5%	6.4%	13.3%
Polyvalent	20.4%	6.9%	9.5%	13.8%	2.6%	6.9%
Polyvalent passive	43.6%	35.1%	38.6%	44.1%	3.5%	9.0%
Longlines	62.9%	45.7%	52.1%	60.4%	6.4%	14.7%
Total	**28.2%**	**30.4%**	**36.1%**	**39.9%**	**5.6%**	**9.5%**

Table 16 Projections of number of employees (FTE) by fleet segment for catching sector in Sicily under Status Quo

Fleet segment	2008	2012	2017	2022	2017 var %	2022 var %
Demersal trawlers	2,644	2,313	1,904	1,721	-18%	-26%
Purse seiners	550	550	474	428	-14%	-22%
Small scale fishery	2,531	2,468	2,310	2,088	-6%	-15%
Polyvalent	136	133	125	113	-6%	-15%
Polyvalent passive	470	459	429	388	-6%	-15%
Longlines	644	628	588	531	-6%	-15%
Total	**6,977**	**6,552**	**5,829**	**5,269**	**-11%**	**-20%**

Table 17 Projections of GVA per employee (000 €) by fleet segment for catching sector in Sicily under Status Quo

Fleet segment	2008	2012	2017	2022	2017 var %	2022 var %
Demersal trawlers	17.87	21.08	24.30	26.36	15%	25%
Purse seiners	30.62	22.67	30.30	33.58	34%	48%
Small scale fishery	12.48	13.60	15.00	16.49	10%	21%
Polyvalent	3.87	1.57	2.02	2.75	29%	75%
Polyvalent passive	18.76	15.30	16.74	18.99	9%	24%
Longlines	33.56	24.73	28.02	32.27	13%	30%
Total	**18.16**	**18.90**	**21.27**	**23.35**	**13%**	**24%**

Table 18 Projections of average crew wage per employee (000 €) by fleet segment for catching sector in Sicily under Status Quo

Fleet segment	2008	2012	2017	2022	2017 var %	2022 var %
Demersal trawlers	9.58	11.09	12.61	13.58	14%	22%
Purse seiners	11.09	8.59	11.03	12.07	28%	40%
Small scale fishery	5.42	5.87	6.42	7.02	9%	20%
Polyvalent	1.32	0.65	0.78	1.00	20%	52%
Polyvalent passive	6.92	5.73	6.23	7.00	9%	22%
Longlines	9.82	7.42	8.30	9.45	12%	27%
Total	**7.87**	**8.16**	**9.04**	**9.83**	**11%**	**20%**

GSA17 STATUS QUO SUMMARY RESULTS

Table 19 Projections of number of vessels by fleet segment in GSA 17 under Status Quo

Fishing technique	LOA class	2008	2012	2017	2022	2017 var %	2022 var %
Dredges	12-24	588	574	537	485	-6%	-15%
Demersal trawlers	<12	52	50	46	42	-8%	-17%
Demersal trawlers	12-24	574	551	508	459	-8%	-17%
Demersal trawlers	24-40	56	54	49	45	-8%	-17%
Vessels using hooks	12-24	7	7	6	5	-6%	-15%
Polyvalent passive	<12	1911	1863	1744	1576	-6%	-15%
Beam trawlers	12-24	39	38	35	31	-8%	-17%
Beam trawlers	24-40	35	34	31	28	-8%	-17%
Pelagic trawlers and seiners	12-24	77	76	72	65	-5%	-15%
Pelagic trawlers and seiners	24-40	70	69	65	59	-5%	-15%
Total		**3409**	**3314**	**3092**	**2795**	**-7%**	**-16%**

Table 20 Projections of gross value added (mln €) by fleet segment for catching sector in GSA 17 under Status Quo

Fishing technique	LOA class	2008	2012	2017	2022	2017 var %	2022 var %
Dredges	12-24	41.34	36.76	37.94	39.60	3%	8%
Demersal trawlers	<12	1.45	1.21	1.40	1.56	15%	28%
Demersal trawlers	12-24	63.66	56.53	58.09	58.84	3%	4%
Demersal trawlers	24-40	14.50	11.53	11.70	11.70	1%	1%
Vessels using hooks	12-24	0.17	0.10	0.11	0.12	6%	15%
Polyvalent passive	<12	47.23	57.97	62.10	64.76	7%	12%
Beam trawlers	12-24	3.21	3.22	4.46	5.63	38%	75%
Beam trawlers	24-40	5.87	5.91	7.74	9.48	31%	61%
Pelagic trawlers and seiners	12-24	5.99	9.85	9.80	9.60	0%	-3%
Pelagic trawlers and seiners	24-40	16.70	18.81	18.72	18.33	0%	-3%
Total		**200.12**	**201.89**	**212.05**	**219.61**	**5%**	**9%**

Table 21 Projections of ratio of revenues to break even revenue by fleet segment for catching sector in GSA 17 under Status Quo

Fishing technique	LOA class	2008	2012	2017	2022	2017 var %	2022 var %
Dredges	12-24	1.65	1.53	1.56	1.61	2%	5%
Demersal trawlers	<12	1.31	1.21	1.26	1.30	4%	8%
Demersal trawlers	12-24	1.38	1.28	1.31	1.34	2%	4%
Demersal trawlers	24-40	1.45	1.30	1.33	1.36	2%	4%
Vessels using hooks	12-24	1.76	1.43	1.48	1.55	3%	8%
Polyvalent passive	<12	1.73	1.73	1.78	1.83	3%	6%
Beam trawlers	12-24	1.28	1.23	1.33	1.44	9%	17%
Beam trawlers	24-40	1.32	1.27	1.36	1.43	7%	13%
Pelagic trawlers and seiners	12-24	1.27	1.32	1.33	1.35	1%	2%
Pelagic trawlers and seiners	24-40	1.36	1.37	1.38	1.41	1%	3%
Total		**1.47**	**1.40**	**1.44**	**1.48**	**3%**	**6%**

Table 22 Projections of net profit margin by fleet segment for catching sector in GSA 17 under Status Quo

Fishing technique	LOA class	2008	2012	2017	2022	2017 var	2022 var
Dredges	12-24	22%	18%	20%	23%	2%	6%
Demersal trawlers	<12	23%	9%	13%	16%	4%	7%
Demersal trawlers	12-24	18%	10%	12%	14%	2%	4%
Demersal trawlers	24-40	11%	3%	5%	7%	2%	5%
Vessels using hooks	12-24	-14%	-31%	-24%	-16%	6%	15%
Polyvalent passive	<12	31%	33%	36%	38%	2%	5%
Beam trawlers	12-24	22%	1%	10%	18%	9%	17%
Beam trawlers	24-40	24%	-4%	5%	12%	9%	17%
Pelagic trawlers and seiners	12-24	10%	15%	16%	17%	1%	3%
Pelagic trawlers and seiners	24-40	16%	11%	13%	14%	1%	3%
Total		**33%**	**15%**	**18%**	**21%**	**3%**	**6%**

Table 23 Projections of return on investment by fleet segment for catching sector in GSA 17 under Status Quo

Fishing technique	LOA class	2008	2012	2017	2022	2017 var	2022 var
Dredges	12-24	34%	56%	62%	72%	6%	16%
Demersal trawlers	<12	77%	60%	77%	96%	17%	36%
Demersal trawlers	12-24	36%	48%	55%	62%	6%	13%
Demersal trawlers	24-40	13%	29%	32%	36%	3%	7%
Vessels using hooks	12-24	-6%	13%	15%	19%	2%	5%
Polyvalent passive	<12	78%	137%	158%	183%	21%	46%
Beam trawlers	12-24	27%	29%	46%	66%	17%	37%
Beam trawlers	24-40	21%	22%	32%	44%	10%	22%
Pelagic trawlers and seiners	12-24	18%	68%	72%	79%	4%	11%
Pelagic trawlers and seiners	24-40	23%	46%	49%	54%	3%	7%
Total		**58%**	**57%**	**65%**	**75%**	**8%**	**18%**

Table 24 Projections of number of employees (FTE) by fleet segment for catching sector in GSA 17 under Status Quo

Fishing technique	LOA class	2008	2012	2017	2022	2017 var %	2022 var %
Dredges	12-24	607	592	554	500	-6%	-15%
Demersal trawlers	<12	69	66	61	55	-8%	-17%
Demersal trawlers	12-24	1715	1646	1515	1370	-8%	-17%
Demersal trawlers	24-40	249	239	220	199	-8%	-17%
Vessels using hooks	12-24	7	7	7	6	-6%	-15%
Polyvalent passive	<12	1563	1524	1426	1289	-6%	-15%
Beam trawlers	12-24	155	149	137	124	-8%	-17%
Beam trawlers	24-40	151	145	134	121	-8%	-17%
Pelagic trawlers and seiners	12-24	198	195	184	166	-5%	-15%
Pelagic trawlers and seiners	24-40	410	404	382	345	-5%	-15%
Total		**5123**	**4966**	**4619**	**4175**	**-7%**	**-16%**

Table 25 Projections of GVA per employee (000 €) by fleet segment for catching sector in GSA 17 under Status Quo

Fishing technique	LOA class	2008	2012	2017	2022	2017 var %	2022 var %
Dredges	12-24	68.12	62.12	68.52	79.12	10%	27%
Demersal trawlers	<12	21.01	18.29	22.93	28.23	25%	54%
Demersal trawlers	12-24	37.12	34.34	38.34	42.96	12%	25%
Demersal trawlers	24-40	58.33	48.29	53.24	58.91	10%	22%
Vessels using hooks	12-24	23.47	14.57	16.53	19.78	13%	36%
Polyvalent passive	<12	30.22	38.04	43.54	50.24	14%	32%
Beam trawlers	12-24	20.75	21.70	32.59	45.57	50%	110%
Beam trawlers	24-40	38.77	40.63	57.90	78.44	42%	93%
Pelagic trawlers and seiners	12-24	30.28	50.58	53.23	57.64	5%	14%
Pelagic trawlers and seiners	24-40	40.76	46.60	49.04	53.13	5%	14%
Total		**39.06**	**40.65**	**45.91**	**52.60**	**13%**	**29%**

Table 26 Projections of average crew wage per employee (000 €) by fleet segment for catching sector in GSA 17 under Status Quo

Fishing technique	LOA class	2008	2012	2017	2022	2017 var %	2022 var %
Dredges	12-24	29.84	27.38	30.00	34.35	10%	25%
Demersal trawlers	<12	8.26	7.34	8.90	10.67	21%	45%
Demersal trawlers	12-24	17.61	16.43	18.13	20.09	10%	22%
Demersal trawlers	24-40	23.74	19.99	21.84	23.96	9%	20%
Vessels using hooks	12-24	9.56	5.51	6.13	7.17	11%	30%
Polyvalent passive	<12	12.44	15.33	17.36	19.82	13%	29%
Beam trawlers	12-24	8.59	8.88	12.24	16.24	38%	83%
Beam trawlers	24-40	18.93	19.74	27.16	36.00	38%	82%
Pelagic trawlers and seiners	12-24	17.58	26.71	27.90	29.89	4%	12%
Pelagic trawlers and seiners	24-40	20.85	22.18	23.17	24.83	4%	12%
Total		**17.67**	**18.17**	**20.25**	**22.89**	**11%**	**26%**

4.6. Alternative Option 1 Impact Assessment

4.6.1. Environmental indicators

Indicator 1 Stocks under MSY and Indicator 3: size of fish

Single species considerations

Out of the 89 shallow water stocks recognised by ICES working groups, only 3 are currently being managed at fishing mortalities that equate to Fmsy. Under the status quo, which includes LTMPs for 26 by 2017, we predicted that there would be 8 stocks managed at Fmsy.

Under Option 1 we anticipate that all "northern" stocks will eventually reach Fmsy by 2022. The way in which these stocks will reach Fmsy will depend critically on the rate at which information improves to deliver assessments and scientific advice. Currently 32 EU shallow water stocks are assessed by ICES and have Fmsy reference points; 20 have a weak assessment but have reference points; 13 are close to achieving an assessment and 24 are some way off having an assessment (Table 27).

For unassessed or poorly assessed stocks to move to Fmsy it will be necessary to develop assessments or assessment proxies which can be used to implement appropriate harvest control rules. In Option 1 these assessments will be developed gradually, and within the capacity of the current data collection framework and assessment process. Thus we anticipate no additional scientific research cost associated with this option (see indicator 19 below). "Northern" and "southern" unassessed stocks will have Fmsy management gradually implemented starting in 2013 thorough to 2017 at a rate of 1/3 of the total number of unassessed stocks every two years and an implementation timescale of 4 years per stock. This will deliver Fmsy for all assessed and weakly assessed stocks in 2017, and all other stocks in 2022.

Although our modelling suggests that all the assessed stocks will reach Fmsy by 2017, this is not the same as them reaching Bmsy. Figure 2 and Figure 3 show that for most stocks, although they reach Fmsy within 4 years of the implementation of the new policy, their biomass does not reach Bmsy until some 6-7 years after this – i.e. 2022 or 2023 (some 10-11 years after the implementation of the new policy in 2013). A faster rebuild could be achieved using a harvest control rule that included a reduction in fishing mortality to zero at some level of biomass depletion, such as the rule suggested for Baltic pelagic species by ICES[20]. The speed of stock rebuild under this style of harvest control rule was examined for North Sea saithe and North Atlantic mackerel, which under the Option 1 HCR reach Bmsy within 8 and 12 years of implementation respectively. These stocks were chosen as representative of fast and slow rebuilding stocks under Option 1. Under a modified HCR (fishing mortality reducing linearly from Fmsy at Bmsy to 0 at 0.5*Bmsy, retaining the 25% interannual TAC variation rule). Under this harvest control rule North Sea saithe and North Atlantic mackerel recovered within 7 and 4 years of implementation respectively. This is at the expense of significantly reduced catches over the same period, averaging approximately 50 % and 30 % respectively of catch levels under option 1.

[20] ICES specialist Workshop on Multi-annual management of Pelagic Fish Stocks in the Baltic (WKMAMPEL) examined a HCR in which F reduced from F=Fmsy when biomass B≥Bmsy, linearly to F = zero when B≤ Blim, which is approximately at 50% of Bmsy. This sort of HCR is commonly applied in other (non-EU) countries.

In the Mediterranean only 4 stocks are currently exploited sustainably: sardine (GSA 16), anchovy (GSA 17 and 22), and pink shrimp in GSA 09. It is important to note that the sustainability of the exploitation of the pelagic species is assessed against a proposed rate which is used as an Fmsy proxy, yet according to the assessment reports there are still strong data requirements to ensure the robustness of these forecasts. Nevertheless, it is likely that assessments for the rest of these species will be developed within the same time frame as for "northern" stocks.

With respect to the Black Sea stocks, the latest SGMED (2009) report states that no conclusive results in terms of management reference points were obtained for both sprat and turbot. The main reason why no decisive results were obtained is because the supporting fisheries data were very poor and inconsistent. As such, it was not possible to make long term predictions or indeed estimate credible reference points for these fisheries. More effort into data collection coupled with renewed scientific advice will be necessary before forecasts can be made for these stocks. These two stocks are included in the "southern" component below.

Table 27 Assessment status of EU stocks (Annex C Appendix 4 provides stock descriptions)

	Assessed stocks (known Fmsy or F0.1)	Weak assessment stocks (known Fmsy or F0.1)	Assessment close to completion (still great data requirements)	Non-assessed stocks (no information on the stock and/or little commercial interest)	Total number of stocks
"northern" stocks (ICES assessments)	32	20	13	24	89
"deepwater" stocks (ICES assessments)			26	3	29
"southern" stocks (SGMED assessments)	11	6	2[21]	1	20
total					**138**

Source: 2009 ICES and SGMED reports

With respect to the deep water species, the current level of uncertainty related to the status of stocks is very high. In fact, there are no feasible assessments for the vast majority of these stocks mainly due to the difficulties in acquiring deep-sea fisheries data. Only through a significant increase in the data collection effort targeting these species in particular could improvement be achieved. The DEEPFISHMAN (FP7) project may provide some new methods and ways to approach the various data related problems.

At present 29 deep water stocks have been clearly identified. These stocks can be divided into 2 groups, i.e. the group for which there are some data, yet still insufficient to support a stock assessment exercise (26 species), and the group for which there are no data whatsoever (3 species). Even for the 26 species, good mortality, growth, maturity and

[21] Bluefin tuna and swordfish

recruitment data are rarely available[22]. Assessments often rely on simple indicator based approaches that track resource status over time[23] (Large and Bergstad 2003; Large et al. 2003). As the data collection effort increases at MS level, better and more reliable data will become increasingly available. Assessments for tusks, ling and black scabbardfish may become available within a 5 year time frame, and roundnose grenadier and blue ling within 10 years, but the others (deepwater sharks, argentines, forkbeards and redspot seabream) may not reach sufficient status to be assessed within even this extended time frame. We therefore assume that only 50% of them will reach this level.

Multispecies considerations

Considering that a large number of the European fisheries are effectively mixed fisheries, changing F for a certain target species will in actual fact impact on a group of species rather than on a single one. Single species management limits may be suited for highly selective fisheries and gears yet it does not provide the best response in terms of managing those which have a very high level of interaction between them.

Option 1 includes the assumption that in multispecies situations, management limits will be optimised to deliver MSY for the most valuable species – referred to as the maximisation of "socio-economic considerations". What this will mean is that other species in the multispecies complex will be under-exploited, if they are more robust to fishing pressure than the most valuable species, or over-exploited, if they are less robust to fishing pressure.

The impact of this policy on achieving Fmsy for EU fish stocks will depend on the number of stocks likely to be exploited in mixed fisheries, and the proportion of stocks within a mixed fishery complex that will be under-, over- or fully exploited under Option 1 policy.

The proportion of North Sea stocks in multispecies complexes that may be under-, over-, or fully exploited under different management scenarios has been examined by ICES (Working Group on Mixed fisheries, WKMIXFISH). The group carried out simulations of North Sea fisheries and the status of cod, haddock, whiting, saithe, plaice and sole, using Fcube software. The period modelled was one in which North Sea cod was severely constrained by low catches under a recovery programme. The results (Table 28) demonstrate that under a "socio-economic optimum" two stocks would be fully exploited, two under exploited and two overexploited (cod and haddock). Under an alternative, "conservation optimum" (in which the most sensitive species was prioritised, in this case cod), four stocks were underexploited, and two (cod and haddock) fully exploited.

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[22] ICES. 2009. Report of the Working Group on the biology and assessment of deep-sea fisheries resources (WGDEEP).

[23] Large, P. A., and O. A. Bergstad. 2003. Deepwater fish resources in the Northeast Atlantic: fisheries, state of knowledge on biology and ecology and recent developments in stock assessment and management. In *Deep Sea 2003: Conference on the Governance and Management of Deep-sea Fisheries*, edited by R. Shotton. Queenstown, New Zealand: FAO.

Table 28 Fcube catch projections relative to single-stock forecasts (ICES WKMIXFISH, 2008)

	COD	HADDOCK	PLAICE	POLLOCK	SOLE	WHITING
TAC 2009 baseline	34600	44600	55500	139000	14000	19200
Socio-economic optimum	46111	53428	60087	102438	14670	16353
Relative to baseline TAC	**33%**	**20%**	**8%**	-26%	**5%**	-15%
Conservation optimum	38211	43891	47786	69391	11793	11973
Relative to baseline TAC	**10%**	-2%	-14%	-50%	-16%	-38%

Source: ICES - WKMIXFISH, 2009[24]

This simulation was slightly artificial because of the extremely depleted status of cod. A similar analysis using the BIRDMOD bio-economic model of GSA16 in the Mediterranean produces similar results, such that under Option 1 (achieving MSY for the most valuable species, giant red shrimp, achieved here by reducing the fishing effort of the 12-40m demersal trawler segment) would mean that out of the 6 stocks one would be fully exploited, two underexploited and three overexploited (Table 29).

Table 29 Projections of fishing mortality for demersal species in GSA 16

Species	Area	F 0.1	F current (2008)	F proj (2012)	F proj (2017)	F proj (2022)
European hake	GSA 16	0.16	0.84	0.80	0.33	0.33
Norway lobster	GSA 16	0.10	0.14	0.14	0.07	0.07
Striped mullet	GSA 16	0.37	0.34	0.32	0.17	0.16
Deepwater rose shrimp	GSA 16	0.83	3.44	3.28	1.52	1.52
Giant red shrimp*	GSA 16	0.35	0.73	0.71	**0.35**	0.35
Red mullet	GSA 16	0.37	1.12	1.08	0.55	0.54

*the most valuable species for which the socio-economic optimum defines management

Clearly in terms of environmental impact, moving individual fisheries to Fmsy will most likely result in a significant net gain for the marine ecosystems as the various stocks will probably grow to levels that allow exploitation to be carried out in a sustainable fashion, but this environmental gain will not be realised under Option 1 due to socio-economic multi-species considerations.

Implementing these approaches to multispecies fisheries will be a significantly challenging task, because economic optima can only be reached by creating winners and losers between fleet sectors. Indeed, if effort limitations are estimated using the mixed-fisheries approach, factors such as profit maximization and fleet interoperability will have to be factored in together and coupled with minimization of the environmental impacts so that a compromise exploitation level is reached.

We estimate that some 30% of the stocks in the northern category[25], 80% in deepwater and 50% in southern may be present in multispecies fisheries that will lead to the sorts of compromises demonstrated in Table 28 and Table 30, and resulting in the overexploitation of about 30% of them, and the under exploitation of about 30% of them, under Option 1.

[24] (ICES. 2009. Report of the Workshop on Mixed Fisheries Advice for the North Sea - WKMIXFISH, 26-28 August 2009, Copenhagen, Denmark. ICES CM 2009\ACOM:47. 62 pp)

[25] Note that in the EIAA, which does not cover the same set of stocks as listed here, we estimate that some 50% are in multispecies complexes.

Modifying the expectation of achieving Fmsy by year, explained in the previous section, would produce the trajectory of stock status shown in Table 30

Table 30 Option 1 Total number of EU stocks at Fmsy. In Option 1, it is assumed that 40% of stocks in multispecies complexes would be overexploited, i.e. have F > Fmsy, and that 30% of EU stocks are effectively in multispecies fisheries.

	Total number of stocks	2008	2012	2017	2022
Single species considerations					
"northern" stocks at Fmsy	89	3	3	52	89
"deepwater" stocks at Fmsy	29	0	0	7	14
"southern" stocks at Fmsy	18	4	4	11	18
Multispecies considerations					
"northern" stocks at Fmsy	89	3	3	47	81
"deepwater" stocks at Fmsy	29	0	0	5	11
"southern" stocks at Fmsy	18	4	4	9	15

Discarding

Although there is no direct discard policy associated with Option 1, we anticipate that several of the policy innovations will have some direct or indirect on discarding.

In respect of indicator 3 (average size and age of fish), with the increasing number of species managed at Fmsy, and the increases in biomass that are predicted, we anticipate that the average age of most stocks, and the size and age in the catch, will increase. The level of this increase will depend on the stock (Table 31). However, this would lead to less discarding of undersized fish. The introduction of quota pooling with ITRs, and management plans developed by RegBods will, in some small way, reduce the incentive for discarding.

Table 31 Option 1 Percent change in proportion of large fish by stock by 2017 and 2022, relative to 2012, modelled stocks only.

Stock	2017	2022	Stock	2017	2022
herring west&central IIIbcd	0	0	sol_VIIa	1	14
herring IIIbcd MU 3	0	0	sol_VIId	0	7
herr_NS	0	0	sol_VIIfg	0	9
cod_NEA	2	-2	sol_VIIIab	2	23
cod_2532	16	17	whb_com	-2	3
cod_NS	8	9	baltic sprat	0	0
had_NS	0	0	hom_WS	0	0
hke_N	4	17	sai_NS	-4	10
hke_S	2	6	mac_NEA	-1	-1
plc_IV	2	10			

There may be the expectation that implementing ITRs will cause more discarding and high-grading towards the end of quota for vessels – particularly in mixed fisheries. That is, as a vessel is approaching the end of its quota, if the fish hauled are not a suitable quality, these

will be discarded. In Denmark[26] and the UK discarding has been reduced through the concept of quota pooling; which could also be applicable to high-grading. If a fisher accidentally fishes over their quota, they are able to contact another fishery participant and buy or lease quota to ensure they do not fish beyond their allowable quota.

Clearly the use of quota pools in this way can only work effectively where an ITR system uses quota. ITR systems using effort will not be able to work this way. Their impact on discarding will be negligible.

Finally, the additional responsibility given to fishers within the RegBod structure, and the requirement for their engagement in the decision making process, taken together with the implementation of ITRs will, we suggest, reduce the level of unreported catches to 5% of its current level, in fisheries in which there is significant unreported fishing at the current time.

Taken together, we have assumed that these combined positive impacts would act to reduce the level of discarding by 50% over its current levels, and this would have a significant positive impact on both indicators 1 and 3.

Summary of model outputs

Taking all of the above discussion, our projected trends for all EIAA stocks is presented in Table 32.

Table 32 Option 1 Total SSB and TAC by year for EU quota stocks included in the EIAA model, with a breakdown by projection type.

	SSB (t)			TAC (t)		
Projection type	**2012**	**2017**	**2022**	**2012**	**2017**	**2022**
FLR	14,128,878	21,282,060	26,681,863	1,703,147	1,892,211	2,211,471
Others*	8,313,196	10,290,910	11,516,811	1,534,028	1,475,217	1,613,512
Total	**22,442,074**	**31,572,970**	**38,198,674**	**3,237,174**	**3,367,428**	**3,824,983**

* Projections for stocks that are not explicitly modelled. Trends in SSB and TAC for these stocks are interpolated using projections from appropriate explicitly modelled stocks, based on stock characteristics and likely current stock status. Note that in Option 1, the assumption is that there will be approximately equal numbers of under- and over- exploited stocks in multispecies fisheries.

Subsidies

Both indicators 1 (fishing mortality in relation to MSY) and 3 (average size (length and weight) of fish) would be indirectly and positively effected in the long-term through the abolition of those subsidies under the status quo which may contribute to excess fleet capacity (thereby impacting on stock status through preventing a balance between fleet capacity and fishing opportunities) and the introduction of ITR systems that may reduce capacity further.

Relevant subsidy funds that would disappear would include Axis 1 measures on temporary cessation, funds received by individuals for scrapping which may be re-invested in the fleet, and modernisation. As noted above, temporary cessation and modernisation funds may prevent those vessels in a financially precarious position from withdrawing from the fleet. And while Council Regulation 2792/1999 allows aid for a range of vessel modernisation actions "as long as modernisation does not result in an increase in capacity", it seems

[26]Eliasen, S., Sverdrup-Jensen, S., Holm, P. & Johnsen, J. P. (2009) *Nordic Experience of Fisheries Management: Seen in Relation to the Reform of the EU Common Fisheries Policy*, Nordic Council of Ministers, Copenhagen.

almost certain that previous funds have resulted in increases in fishing capacity and catching efficiency with negative impacts on stocks, for example through more efficient engine management systems, increased on-board storage and other means to extend the range and efficiency of a vessel.

While historical levels of FIFG/EFF expenditure are not necessarily reflective of future allocations of funds under the status quo option (because fleets/vessels already modernised or which have been the subject of scrapping may not be the principal recipients under the current EFF under the status quo), they do nevertheless reveal a pattern of allocations which shows which countries, and fleets within those countries, have received priority focus in the past and have been the recipients of highest levels of funding. By considering the main target stocks of such fleets (by linking FIFG and Community Fleet Register databases), and assuming that a similar focus of funds would continue under the status quo option, it is possible to make a linkage between historical levels of subsidies and impacts on particular stocks. This in turn can be used to suggest which stocks under Option 1 might benefit most from a reduction of those subsidies under Axis 1 currently having a negative impact on stocks. The following table provides information on key fleets assisted by FIFG (2000-2006) for which the combined construction and modernisation funds exceeded scrapping funds, and for which one can make the tentative assumption that FIFG may have contributed to excess fleet capacity. By implication, and noting the above caveats about historical levels of funding being continued under the status quo, it can be assumed that the abolition of such funds under Option 1 would have particularly positive impacts on the key target stocks shown in the table.

Table 33 Key fleets assisted by FIFG (2000-2006) where construction and modernisation funds exceeded scrapping funds, and the stocks they target which are overfished

Fleet / gear	Main Member States & NUTS 2 regions	Key target stocks known to be overfished
Biscay & Iberian bottom-set gillnet (GNS)	ES: ES61, ES11 (Andalucia & Galicia)	Hake (Southern VIIIc and IXa) Monkfish (VIIIc & IXa)
Biscay & Iberian mixed whitefish bottom trawl (OTB)	ES: ES61, ES11 (Andalucia & Galicia)	Hake (Southern VIIIc and IXa) Monkfish (VIIIc & IXa) Megrim (VIIIc & IXa) Demersal elasmobranchs (VIII & IXa) Nephrops (VIIIc & IXa)
Western Mediterranean hake gillnet (GNS)	ES: ES52, ES51 (Valencia & Catalonia)	Hake (GFCM GSA 06; FAO 37.1.1)
Western Mediterranean hake bottom trawl (OTB)	ES: ES52, ES51 (Valencia & Catalonia)	Hake (GFCM GSA 06, FAO 37.1.1)
	FR: FR8 (Languedoc-Rousillon)	Hake (GFCM GSA 07; FAO 37.1.1)
Western Mediterranean tuna gillnet (GNS)	ES: ES52, ES51 (Valencia & Catalonia)	Bluefin tuna (FAO 37.1 & ICES IXa)
	FR: FR8 (Languedoc-Rousillon)	Bluefin tuna (FAO 37.1)
Biscay & Iberian small pelagic purse seine (PS)	ES: ES21, ES61 (Basque, Andalucia)	Anchovy (VIIIbc; IXa) (note this stock 'at risk' rather than already overfished)

Source: FIFG and CFR databases, ICES stock reports, GFCM stock reports

Regionalisation

RegBods will have direct influence on the Commission's environmental sustainability objectives - namely bringing all fish stocks under MSY. With access to scientific and stock assessment information, provided by the scientific advisory bodies (e.g. ICES and STECF),

Regional Bodies are required to develop proposals for the Commission which outline how these environmental objectives are to be met within that region through appropriate conservation and technical measures.

With the introduction of this new decision making process, the likely impact of RegBods upon the number of stocks managed under Fmsy is positive, although this impact is difficult to quantify. RegBods permit greater responsibility to the sector, and by definition allow the formulation of regionally relevant conservation and technical measures. Proposals generated by RegBods, following their acceptance and legal translation by the Commission, are therefore likely to produce the effective management of fish stocks which is necessary to achieve Fmsy targets, with greater support from within the sector.

Regional Bodies also influence the timing of the decision making process, with the new structure likely to speed up the process. This is described under Indicator 29.

Indicator 2 LTMPs

The development of a default harvest control rule within the 2012 CFP regulation will require the Commission, as advised by its scientific, economic and management advisory bodies, to develop management plans that can deliver this approach. One such set of rules was identified in the annex to the Commission's 2009 communication[27]. Furthermore, under Option 1 the single species Fmsy targets advised by science will have to be modified in multispecies fisheries. The provision of RegBods will make this approach possible, but it will still require significant input of resources and we anticipate that LTMPs, or similar, will still be required for all stocks or multispecies stock complexes. Thus, we would anticipate that for all stocks LTMPs will be developed along the time frame outlined above, and certainly by 2022.

Subsidies policy under Option 1 is not expected to impact on indicator 2.

Indicator 4 Evolution of the fleet

Access rights policy

With the introduction of mandatory ITRs for the large scale fleet we expect there to be a direct impact on the number of vessels and capacity within applicable fleets. Fleets that are currently unprofitable, or are working at very low capacity (i.e. they are fishing for very few of the days of the year, even if this is a result of effort restrictions, itself an indication of overcapacity) can be expected to undergo significant reductions immediately that they enter ITR. The proportion of the large scale and small scale fleets in ITRs is shown in Table 34.

Table 34 Option 1 ITR fleet size in number of vessels and % for the a) large scale fleet, b) the small scale fleet.

a)	2007	2012	2017	2022
ITR fleet	836	1056	5051	4391
Total fleet	6755	6227	5051	4391
ITR %	12.4	17.0	100.0	100.0
b)				
ITR fleet	879	795	4619	3969
Total fleet	21115	19211	17195	16549
ITR %	4.2	4.1	26.9	24.0

[27] Communication from the Commission: Consultation on Fishing Opportunities for 2010 Brussels, 12 May 2009, COM(2009) 224

Another important factor to consider is the direct impact of implementing ITRs on balancing fishing capacity from an environmental perspective to fishing opportunity. Although vessel numbers will be reduced, average vessel capacity may increase through inefficient vessels being forced out of the fishery and more efficient and higher capacity vessels remaining[28,29]. This means that from an environmental perspective, the balancing of fishing capacity with fishing opportunity will not occur purely through vessel number reductions, and we have assumed a reduction in capacity (i.e. fishing efficiency) of only 8% compared to the 10% reduction in fleet size over the first three years following the introduction of ITRs and thereafter a 7% reduction.

It is important to note however that in the absence of an effective ITR policy, the removal of EFF scrapping/decommissioning schemes would not be available to fund a reduction in fleet capacity. While these schemes have certainly not succeeded in balancing fleet capacity with fishing opportunities, in many cases they have at least made a contribution to doing so.

MSY policy

We anticipate that the single largest effects on fleet size will come from a) the continuation of EFF decommissioning subsidies up to 2015 and b) the introduction of ITRs for the large scale, and for parts of the small scale, fleet. We have assumed that, because of the continuation of the EFF subsidy to 2015 that even fleets entering ITRs will not undergo significant *additional* restructuring until 2016.

Another factor to consider, however, is the short term reduction in catches in the early stages of implementation of the Fmsy policy, particularly in 2013, 2014 and 2015 (see Figure 11 for anticipated TAC trends). This may force some of the fleets entering into ITR to undergo their fleet reductions sooner than we anticipate. This would have no practical impact on our results, since the monitoring periods are 2012 and 2017. However, the reduction in catches in the early stages of a move to Fmsy could cause some other fleets, which appear to be profitable in 2012 and be operating at >70% of their optimum days fishing, to become unprofitable and therefore to be attracted to early implementation of ITRs and restructuring.

[28] Danielsen, J F. (2010) *Introduction of RBM in Norway* [workshop presentation]. Brussels, DG MARE.
[29] MRAG Consortium (2007) *An Analysis of Existing Rights Based Management (RBM) Instruments in Member States and on Setting up Best Practices in the EU: Part 2.* London, EC – MRAG.

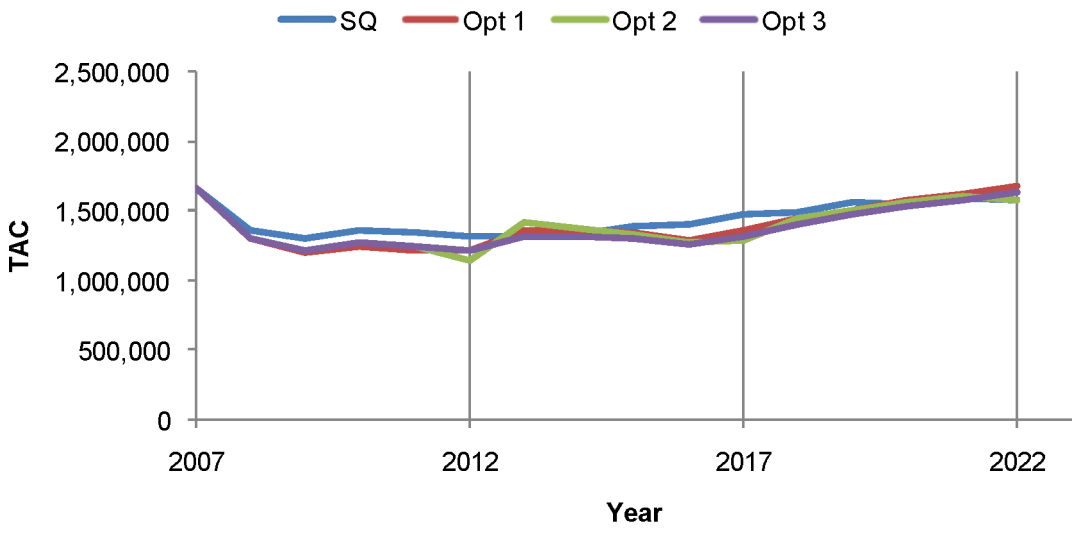

Figure 11 Anticipated trends in TAC corresponding to modelled stock projections under the four Options.

Examination of Table 35 suggests that two fleets may find themselves in this position, FRA DFN0012 and FRA DFN1224 (both SSF). Both fleets operate at or around maximum effort, but with profitability of 10% in 2012. Thus in reality the fleet may undergo some additional ITR-based reductions in capacity beyond those assumed in our modelling, but these additional reductions are likely to be quite small.

The other consequence of Fmsy policy will be to stabilise and increase catches in the long term. This will have the effect of slowing the restructuring of the fleets in the period 2017-2022. This is currently well-represented in the model results.

Table 35 Option 1, model predictions of major economic outputs (see also Annex B), including net profit margin and proportion of days spent fishing. Note that although the introduction of ITRs makes most fleets profitable, some unprofitability does remain. SSF= small scale fleet, LSF = large scale fleet.

			2012				2017		2022		
SSF/LSF	Segment	Country	Fleet size (no)	Net Profit Margin	Proportion of available days spent fishing	ITR buyout (2016 - 2018)	Fleet size (no)	Net Profit Margin	Proportion of available days spent fishing	Fleet size (no)	Net Profit Margin	Proportion of available days spent fishing
SSF	DFN0012	FRA	930	10.6%	100%	0	831	14.1%	81%	831	18.0%	72%
SSF	DFN1224	DEU	24	31.5%	**57%**	1	21	37.9%	**54%**	20	39.8%	**50%**
SSF	DFN1224	FRA	167	11.8%	100%	0	143	16.3%	78%	143	20.8%	**69%**
SSF	FPO0012	FRA	443	14.2%	100%	0	421	19.6%	100%	401	20.6%	100%
SSF	FPO0012	GBR	1482	**2.7%**	**43%**	1	1343	16.4%	**43%**	1283	19.1%	**43%**
SSF	FPO1224	GBR	78	**2.6%**	81%	1	70	12.2%	85%	67	13.8%	84%
SSF	HOK0012	ESP	986	**-12.3%**	**45%**	1	879	**-1.7%**	**40%**	839	**9.2%**	**37%**
SSF	PG0012	EST	795	**-4.7%**	**45%**	0	748	**-0.2%**	**46%**	748	**0.2%**	**44%**
SSF	PG0012	LVA	676	**-123.9%**	**22%**	1	600	30.9%	**24%**	573	58.5%	**24%**
SSF	PG0012	POL	528	50.9%	**41%**	1	469	58.3%	**41%**	447	59.7%	**41%**
SSF	PG0012	SWE	759	43.6%	**31%**	1	614	58.6%	**34%**	587	60.6%	**33%**
SSF	PGP0012	FIN	1232	**-37.4%**	**54%**	1	1093	**-5.0%**	**49%**	1044	**3.4%**	**48%**
SSF	PGP0012	PRT	2129	31.6%	**41%**	1	1890	38.3%	**43%**	1805	39.2%	**43%**
SSF	PMP0012	ESP	7769	30.5%	**49%**	1	6927	37.3%	**51%**	6616	38.5%	**51%**
SSF	PMP0012	IRL	1215	21.7%	**44%**	0	1143	29.4%	**45%**	1143	30.1%	**43%**
LSF	DTS0012	FRA	362	**7.3%**	**48%**	1	283	16.5%	**51%**	235	21.0%	**56%**
LSF	DTS0012	GBR	804	14.8%	**37%**	1	626	31.3%	**38%**	520	36.7%	**43%**
LSF	DTS1224	DEU	71	20.4%	**37%**	1	54	29.3%	**40%**	45	32.5%	**43%**
LSF	DTS1224	DNK	217	**4.4%**	**55%**	0	208	11.5%	**47%**	188	14.2%	**48%**
LSF	DTS1224	ESP	847	**-5.4%**	**65%**	1	648	**3.2%**	**62%**	538	10.5%	**66%**
LSF	DTS1224	FRA	449	**1.4%**	100%	1	386	10.8%	100%	360	13.3%	100%
LSF	DTS1224	GBR	461	**3.3%**	74%	1	359	16.6%	**70%**	298	21.1%	78%
LSF	DTS1224	IRL	134	**6.5%**	77%	1	102	19.1%	82%	85	22.6%	91%
LSF	DTS1224	POL	84	**10.0%**	**30%**	0	55	23.5%	**40%**	46	26.1%	**44%**
LSF	DTS2440	DEU	23	48.2%	**58%**	1	17	56.2%	**60%**	14	58.7%	**64%**

LSF	DTS2440	ESP	480	**-11.5%**	**63%**	1	367	**-4.1%**	**53%**	305	**1.7%**	**56%**
LSF	DTS2440	FRA	98	17.6%	100%	1	91	26.7%	96%	82	29.6%	99%
LSF	DTS2440	GBR	99	**4.4%**	84%	1	77	21.1%	71%	64	27.2%	77%
LSF	DTS2440	LTU	19	15.5%	**19%**	1	14	26.7%	**22%**	12	29.0%	**25%**
LSF	DTS2440	PRT	72	**-30.9%**	93%	1	60	**-18.5%**	100%	56	**-14.9%**	100%
LSF	DTS40XX	ESP	72	**2.5%**	**43%**	1	55	**6.0%**	**49%**	46	**8.9%**	**52%**
LSF	DTS40XX	EST	5	13.7%	89%	0	5	29.3%	100%	4	32.3%	100%
LSF	DTS40XX	PRT	12	43.0%	**44%**	0	11	46.2%	**44%**	10	49.4%	**44%**
LSF	HOK2440	ESP	221	**-13.4%**	80%	0	201	**-10.1%**	**68%**	182	**-4.6%**	**65%**
LSF	HOK2440	PRT	33	**-63.2%**	**54%**	0	30	**-111.2%**	**57%**	27	**-119.6%**	**60%**
LSF	PTS1224	DNK	78	**3.7%**	72%	0	75	11.5%	**67%**	68	14.2%	**69%**
LSF	PTS1224	ESP	488	**3.6%**	90%	1	401	**8.7%**	100%	388	**9.6%**	100%
LSF	PTS1224	FRA	82	**4.3%**	100%	1	76	11.1%	100%	72	12.5%	100%
LSF	PTS2440	DNK	61	**0.3%**	94%	0	59	10.3%	88%	53	13.4%	91%
LSF	PTS2440	FIN	16	**-43.8%**	**53%**	1	12	**-31.7%**	**60%**	10	**-28.0%**	**66%**
LSF	PTS2440	IRL	7	20.0%	**65%**	1	6	27.3%	75%	5	29.9%	90%
LSF	PTS2440	LVA	61	31.4%	**46%**	1	46	44.3%	**57%**	38	47.1%	**65%**
LSF	PTS2440	POL	44	**1.1%**	**49%**	1	34	16.5%	**64%**	28	20.1%	73%
LSF	PTS2440	SWE	24	14.8%	**65%**	1	17	28.0%	87%	14	30.7%	99%
LSF	PTS40XX	DNK	44	**5.9%**	**61%**	0	42	19.2%	**60%**	38	24.4%	**65%**
LSF	PTS40XX	ESP	110	**2.8%**	100%	0	105	13.9%	100%	100	16.0%	100%
LSF	PTS40XX	FRA	31	**-0.7%**	100%	1	29	10.3%	100%	27	12.5%	100%
LSF	PTS40XX	GBR	30	23.0%	**32%**	1	23	35.4%	**38%**	19	39.8%	**46%**
LSF	PTS40XX	IRL	16	20.5%	**34%**	1	12	34.0%	**39%**	10	39.3%	**47%**
LSF	PTS40XX	NLD	13	**-1.4%**	84%	0	12	15.0%	90%	11	18.9%	96%
LSF	PTS40XX	SWE	10	**5.9%**	73%	1	7	24.2%	98%	7	27.2%	100%
LSF	TBB1224	BEL	37	**-26.1%**	70%	1	27	**-30.3%**	**63%**	22	**-31.2%**	**65%**
LSF	TBB1224	DEU	200	**4.4%**	**52%**	1	152	14.0%	**46%**	126	19.2%	**47%**
LSF	TBB1224	NLD	144	**-8.2%**	**61%**	0	123	**2.8%**	**64%**	111	**6.5%**	**65%**
LSF	TBB2440	BEL	45	**-9.7%**	100%	1	32	**-5.2%**	89%	27	**-2.6%**	91%
LSF	TBB2440	NLD	46	**-21.2%**	**47%**	0	42	**-9.1%**	**36%**	38	**-0.9%**	**34%**
LSF	TBB40XX	NLD	76	10.3%	**58%**	0	69	26.4%	**41%**	62	35.1%	**39%**

The results indicate that of the 30 fleets that are currently not operating profitably (using the AER definition of >5% profitability = "profitable"), 20 would return to profitability under the reductions assumed for ITRs. Only 4 would continue to make a loss (profitability <-5%) in 2022.

None of the small scale fleet would be operating unprofitably in 2022. Under this option, the small scale fleet may optionally decide to enter ITRs. Experiences from regions that have implemented ITRs indicate hesitancy from participants. It is for this reason that it cannot be assumed that small scale fleets will act purely on economic factors. Furthermore, the small scale fleet sectors which target exclusively non-quota species will have no incentive to move to an ITR (effort) system. On the other hand, there is evidence from the Danish case study that a small scale fleet, when offered ITRs, may decide to take it up entirely. Our assumption of only 30% of the SSF moving to ITRs may therefore be an underestimate.

There are other aspects of the assumptions that we have made that may bear scrutiny. We have assumed that all fleets with low (<10%) profitability or low (<70%) useage of available fishing days (whether this is created by effort restrictions or not) would engage in fleet reductions of 30% over 3 years (10% per year). However, as Table 35 above shows there is significant variability in the performance of different fleets, and it is quite plausible that individual fleets would undergo different levels of buy-out during the first phases of an ITR. Equally, there are some vessels –for instance UK and Irish pelagic vessels – which have high profitability with low levels of fishing. These would probably not undergo the level of buy-out and fleet reduction that we have assumed.

The level of reduction in fleet size that would be required to bring the 4 remaining unprofitable fleets into profitability was examined. These segments, and their net profit margins, are insensitive to reductions in vessel costs through reduction in vessel numbers. A 98% reduction in vessel numbers, compared to 2007 levels, would be required for Portugal's DTS2440 segment to achieve profitability in 2022. It was not possible to achieve profitability for the other 3 segments (Portugal's HOK2440, Finland PTS2440 and Belgium TBB1224) through reduction in vessel numbers.

In the situation where ITRs for the large scale fleet is mandatory their effectiveness may be lower in the Mediterranean than in northern waters. Current management systems in the Mediterranean, as well as the higher proportion of mixed species fisheries and the diversity of fish species within these catches (for instance, in the North Sea the top 5 species comprise over 70% of the landings, but in Italy they comprise just over 45% of the total landings[30]) mean that rights based systems will probably be based on effort (input) control rather than catch (output) control. However, we anticipate that to obtain the best value from an ITR system in the Mediterranean the current system of limitation, based on licenses, would have to be replaced by one based on days or hours of effort.

Currently most Sicilian fleets are fishing for less than half the available days in a year. Moving to days at sea limitations and a system of tradeable days would allow the fleet to start to concentrate its activity in fewer vessels. However, effort based management systems suffer from the ability of fishers to be relatively flexible in their application, in space and time, of effort restrictions, and from the need to continually adjust targets as the fishing efficiency of vessels improves (through technological progress. Thus although we anticipate that the profitability of the Mediterranean large scale fleet is such that an ITR system would result in significant reductions in capacity, the management plans currently being developed in the Mediterranean would still be essential to ensure that stocks are managed, in multispecies complexes, most effectively.

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[30] M. Spagnollo, presentation given to the Commission, January 2010.

In the Mediterranean case, as modelled in GSA 10/16 and GSA 17, the response of the large scale fleet size to ITRs is similar to that seen elsewhere in Europe, although the mechanism may be different (see Case Study report for Sicily), and would likely lead to reductions in fleet only for unprofitable fleets in the years in which they are unprofitable. ITRs would need to be implemented alongside a limitation of effort (days or hours at sea) and would probably be transferrable through licence transfer. The difference between GSA10/16 and GSA 17 is due to the current lack of apparent overcapacity, and profitable operations, in that area. The reductions in the fleet operating in GSA 17 are similar to those expected under Status Quo. As the most valuable species results underexploited, the conservation policy directed to achieve MSY for that species would not determine any significant change in fishing effort or fleet size. Furthermore, fisheries are profitable in this area and the ITR system would not determine the exit of vessels from the fleet.

The decline in the small scale fleet is limited due to relatively high profitability acting as a disincentive to fishers to move to ITRs.

Table 36 Option 1 Projections of number of vessels by fleet segment in the Mediterranean (Sicily).

Fleet segment	2008	2012	2017	2022	2017 var %	2022 var %
Demersal trawlers	573	501	310	280	-38%	-44%
Purse seiners	121	121	104	94	-14%	-22%
Small scale fishery	2,135	2,082	1,948	1,761	-6%	-15%
Polyvalent	49	48	45	40	-6%	-15%
Polyvalent passive	144	140	131	119	-6%	-15%
Longlines	174	170	159	144	-6%	-15%
Total	**3,196**	**3,062**	**2,697**	**2,438**	**-12%**	**-20%**

Table 37 Option 1 Projections of number of vessels by fleet segment in the Mediterranean (GSA 17).

Fishing technique	LOA class	2008	2012	2017	2022	2017 var %	2022 var %
Dredges	12-24	588	574	537	485	-6%	-15%
Demersal trawlers	<12	52	50	46	42	-8%	-17%
Demersal trawlers	12-24	574	551	528	478	-4%	-13%
Demersal trawlers	24-40	56	54	51	46	-4%	-13%
Vessels using hooks	12-24	7	7	6	5	-6%	-15%
Polyvalent passive	<12	1911	1863	1744	1576	-6%	-15%
Beam trawlers	12-24	39	38	36	33	-4%	-13%
Beam trawlers	24-40	35	34	32	29	-4%	-13%
Pelagic trawlers and seiners	12-24	77	76	72	65	-5%	-15%
Pelagic trawlers and seiners	24-40	70	69	65	59	-5%	-15%
Total		**3409**	**3314**	**3117**	**2818**	**-6%**	**-15%**

Subsidies

With respect to indicator 4 (fleet evolution), as explained above in Section 3 which outlines the main differences with the status quo option, Option 1 would eliminate many items currently eligible under the current Axis 1 of the EFF. The primary justification for this is the perceived direct link between the use of FIFG and EFF funds and fleet capacity. The abolition of scrapping funds, and funds for temporary cessation and modernisation would have short- and long-term impacts of a direct nature on indicator 4 (fleet capacity). Member States would no longer be able to use scrapping funds as a means of reducing fleet capacity, and this could result in a negative impact on indicator 4 (fleet capacity). On the other hand, the abolition of temporary cessation and modernisation funds could result in a

positive change in the indicator as such funds may serve to artificially support financial viability for vessels that might otherwise be unviable and which would leave the fleet. In addition, we should note that the potentially negative impact of abolishing scrapping funds is expected to be more than counter-balanced by positive impacts on this indicator of the ITR policy described above which will reduce fleet size through rationalisation i.e. the access rights policy would take-over the role of subsidies in reducing fleet capacity given that previous FIFG/EFF policy has not been especially effective at doing do.

With respect to the current EFF, it is noteworthy that countries representing more than 10% of total planned expenditure under Axis 1 (Eur 1.17bn) across the whole of the EU (Eur 1.17bn) are: Spain (Eur 400 million 34% of total); Poland (Eur 168 million, 14% of total); and Italy (Eur 161 million, 14% of total). These countries would be the most significantly impacted under Option 1 given that a principal difference between the status quo option and Option 1 would be changes to, and reductions in, levels of funding for the items eligible under the current EFF axis 1.

Likewise, we could expect those countries with a high percentage of their total planned EFF funds under Axis 1 (see table below – countries in bold plan to spend more than 25% of their total EFF allocations on Axis 1), to be more affected under Option 1 than other countries, given that the abolition of many eligible items under the current EFF is a key feature of policy reform under Option 1. The current/planned balance of Axis 1 funds for each Member State between different measures/actions is not known, and because some of these measures/actions may have a positive impact on the indicator while others may have a negative impact, it is therefore difficult to assess overall impacts with confidence.

Table 38 Option 1 Percentage of MS EFF funding expected on Axis 1

Country	Axis 1	Country	Axis 1
AT	0.00%	**IE**	**82.25%**
BE	**28.79%**	**IT**	**38.00%**
BG	10.00%	LT	24.98%
CY	11.15%	LV	16.69%
CZ	0.00%	**MT**	**25.98%**
DE	5.23%	**NL**	**34.82%**
DK	**30.20%**	PL	23.00%
EE	18.05%	**PT**	**25.50%**
ES	**35.61%**	RO	4.32%
FI	8.73%	**SE**	**25.00%**
FR	**27.60%**	SI	10.00%
GR	**37.18%**	SK	0.00%
HU	0.00%	**UK**	**28.76%**

It is noteworthy also to recall that Option 1 provides for two scenarios. Firstly a main scenario under which 2/3 of its allocation goes to small-scale fisheries. And a second scenario where the amounts for small-scale fisheries are not ring fenced. Examination of historical levels of FIFG funding under Axis 1 for different vessel sizes (through linking the FIFG and Community Fleet Register databases and assuming that the historical focus/balance of funds would continue under the status quo option), suggests that the proposed ring-fencing of funds for small-scale fleets would have very significant direct short- and long-term impacts in all of the Member States given that the allocations of axis 1 funds in the past have been very strongly skewed in favour of over 12m vessels [Annex C Appendix 3].

Indicator 6 Areas of protection

Indicator 6 (area covered by protection regimes) might show positive impacts given the greater emphasis in Option 1 on environmental issues than under the status quo.

4.6.2. Economic indicators

Indicators 7-10 Economic performance

Under Option 1, MSY and ITR policy will have the largest impact on economic indicators for the fleets. Broadly speaking the impacts that we expect are the following:

- MSY policy (discussed in detail in Section **Error! Reference source not found.**) will create initial declines in catch, particularly of species and stocks that are currently overexploited (in particular the whitefish stocks, both those that are assessed and those that are unassessed), followed by increases in catch as stocks recover. This decline and subsequent increase should result in lower overall income from fishing in the early period of the CFP reform, followed by increasing income.

- The increase in the number of stocks fished sustainably, the increase in mean size of fish in the catch, the decrease in discarding and the increase in public perception of the industry that this should create, should increase the price of fish. We postulate that this may be in the order of 10%, which will combine with the market policy (CMO) price increase (see below) to deliver 20% higher prices for fishermen by 2017.

- The decline in vessel numbers and fishing capacity, resulting from the implementation of ITRs in the large scale fleet and in 30% of the small scale fleet, should increase the individual performance of vessels, and the profitability of the sector. A secondary impact of ITRs should be that possession of long term quota rights should allow for negotiation of long term deals with suppliers, and may lead to increased fish prices. On the other hand, the proposal under Option 1 is that quota rights should revert to the Member State after 10 years. Restrictions in right duration may slightly devalue the right and counteract the price increase effect[31].

- Although the current EFF funding, continuing to 2015, will continue to create reductions in fleet size, its removal in 2015 will mean that the reduction in fleet capacity after this time will be entirely generated by ITRs. The removal of subsidies will also be expected to have some direct impacts on vessel costs and earnings, which are discussed in detail below.

- Implications for processing sector will be positive, with the increase in catches expected in 2017 and beyond; and for the ancillary sector will be negative, with a reduction in the number of vessels through the ITR programme.

[31] Scott, A. (1988) 'Development of Property in the Fishery', Marine Resource Economics vol. 5, pp. 289-311 and Scott, A. (2000) 'Introducing Property in Fishery Management', in *Use of Property Right in Fisheries Management*, Proceedings of the FishRights99 Conference, Fremantle, Western Australia, 11-19 November 1999, FAO 2000.

The results of the EIAA model are summarised in Table 39 and Table 40.

As expected income over the whole of the EU fleet increases steadily from 2012 onwards due to increasing prices following the trajectories of stock recoveries. This increase in income, along with changes to fleet structure, result in increasing GVA, revenue to break even revenue, profitability and RoI. The small scale sector remains very profitable, despite the relatively low effort per vessel, and this supports the assumption that relatively few vessels will seek to enter ITR arrangements.

Table 39 Option 1 Economic results of the EIAA model by Member State

	2012					2017					2022				
Indicator	Income (mln)	GVA (mln) 7	Revenue/ Break Even Revenue 8	Net Profit Margin 9	Return On Investment 10	Income (mln)	GVA (mln) 7	Revenue/ Break Even Revenue 8	Net Profit Margin 9	Return On Investment 10	Income (mln)	GVA (mln) 7	Revenue/ Break Even Revenue 8	Net Profit Margin 9	Return On Investment 10
BEL	83	17	0.93	-13%	-17%	85	42	0.94	-10%	-18%	97	60	0.95	-8%	-20%
DEU	138	100	1.49	29%	158%	170	142	1.69	38%	338%	190	166	1.75	41%	482%
DNK	292	173	1.30	4%	2%	368	259	1.41	14%	12%	387	284	1.44	18%	17%
EST	26	7	1.22	12%	16%	31	14	1.44	26%	50%	31	15	1.49	29%	57%
ESP	1401	444	1.02	-2%	-1%	1507	759	1.10	6%	3%	1722	1050	1.13	9%	6%
FIN	14	2	0.92	-41%	-46%	16	6	1.05	-20%	-29%	16	7	1.10	-13%	-21%
FRA	948	472	1.19	6%	6%	1067	653	1.28	14%	17%	1113	726	1.31	17%	23%
GBR	660	282	1.22	10%	4%	794	496	1.41	24%	15%	876	599	1.48	28%	24%
IRL	213	111	1.31	16%	12%	249	162	1.47	27%	28%	259	176	1.53	30%	37%
LTU	4	3	1.22	16%	30%	6	5	1.39	27%	98%	7	6	1.43	29%	135%
LVA	12	5	1.36	24%	63%	16	9	1.81	44%	174%	16	9	1.95	48%	217%
NLD	336	122	1.16	0%	0%	397	225	1.33	15%	30%	438	283	1.43	22%	52%
POL	31	17	1.41	21%	10%	41	28	1.61	33%	25%	42	30	1.66	36%	32%
PRT	249	140	1.34	17%	12%	288	188	1.31	17%	16%	294	201	1.32	18%	19%
SWE	59	24	1.43	20%	10%	74	42	1.71	36%	30%	75	44	1.78	38%	36%
TOTAL	**4469**	**1920**	**1.15**	**5%**	**3%**	**5108**	**3029**	**1.27**	**15%**	**12%**	**5561**	**3657**	**1.31**	**18%**	**18%**
Increase over 2012						14%	58%	10%	10%	9%	24%	90%	13%	13%	15%

Table 40 Option 1 Economic results of the EIAA model by vessel length

	2012					2017					2022				
Indicator	Income (mln)	GVA (mln)	Revenue/ Break Even Revenue	Net Profit Margin	Return On Investment	Income (mln)	GVA (mln)	Revenue/ Break Even Revenue	Net Profit Margin	Return On Investment	Income (mln)	GVA (mln)	Revenue/ Break Even Revenue	Net Profit Margin	Return On Investment
		7	8	9	10		7	8	9	10		7	8	9	10
SSF	738	451	1.39	19%	13%	831	580	1.54	28%	25%	866	629	1.58	30%	29%
1224*	1196	524	1.10	2%	2%	1397	854	1.20	12%	12%	1509	1013	1.24	15%	19%
2440	1249	380	1.02	-4%	-2%	1382	739	1.10	5%	4%	1603	1032	1.14	9%	10%
40XX	1285	564	1.25	9%	4%	1497	856	1.40	21%	12%	1584	983	1.47	25%	18%
TOTAL	**4469**	**1920**	**1.15**	**5%**	**3%**	**5108**	**3029**	**1.27**	**15%**	**12%**	**5561**	**3657**	**1.31**	**18%**	**18%**
Increase over 2012						14%	58%	10%	10%	9%	24%	90%	13%	13%	15%

* The 1224 segment also includes semi-industrial vessels between 0 and 12m *e.g.* DTS0012

Table 41 Option 1 results of the EIAA model for the percentage of modelled fleet segments achieving performance targets for profitability, return on investment and revenue: break even revenue.

	2012			2017			2022		
	Prop prof > 0.05	Prop ROI > 0.15	Prop Rev/Break Even Rev > 1	Prop prof > 0.05	Prop ROI > 0.15	Prop Rev/Break Even Rev > 1	Prop prof > 0.05	Prop ROI > 0.15	Prop Rev/Break Even Rev > 1
SSF	60%	47%	93%	80%	60%	100%	87%	80%	100%
1224*	33%	7%	87%	80%	60%	93%	93%	80%	93%
2440	38%	31%	56%	56%	44%	63%	56%	56%	69%
40XX	64%	27%	100%	100%	45%	100%	100%	64%	100%
TOTAL	**47%**	**28%**	**82%**	**77%**	**53%**	**88%**	**82%**	**70%**	**89%**
Increase over 2012				30%	25%	5%	35%	42%	7%

In the Mediterranean, multi-species considerations are expected to have a significant although heterogeneous impact on the economic performance of fleets segments.

BIRDMOD projections for Sicily, presented below, show that with the reduction of effort in the demersal trawl fleet, required to generate Fmsy for the giant red shrimp (Table 29) the catches of other species and other sectors improves, increasing GVA markedly for all fleets except demersal trawlers (Table 42). This segment is most affected by the multi-species considerations, where a combination of fleet reductions (Table 36) and curtailment of effort, where days at sea would need to be reduced by 45% in order to achieve Fmsy for the most valuable species (giant red shrimp). Nevertheless, the reduction in fleet size of the demersal trawlers results means that those vessels remaining in the fleet after fleet reductions under ITR will see an increase in the other economic indicators, and subsequently the profitability of this sector improves substantially.

Table 42 Option 1 Projections of gross value added (mln €) by fleet segment for catching sector in the Mediterranean (Sicily). "2017 var%" and all similar references indicates the improvement of the indicator in 2017 compared to 2012, in percentage terms.

Fleet segment	2008	2012	2017	2022	2017 var %	2022 var %
Demersal trawlers	47.25	48.76	41.78	42.33	-14%	-13%
Purse seiners	16.85	12.47	18.83	18.73	51%	50%
Small scale fishery	31.60	33.57	53.50	51.25	59%	53%
Polyvalent	0.53	0.21	0.44	0.50	112%	140%
Polyvalent passive	8.83	7.02	9.51	9.62	36%	37%
Longlines	21.62	15.54	21.43	22.12	38%	42%
Total	**126.68**	**117.57**	**145.50**	**144.54**	**24%**	**23%**

Table 43 Option 1 Projections of ratio of revenues to break even revenue by fleet segment for catching sector in the Mediterranean (Sicily).

Fleet segment	2008	2012	2017	2022	2017 var %	2022 var %
Demersal trawlers	1.18	1.15	1.30	1.31	13%	14%
Purse seiners	1.54	1.38	1.53	1.56	11%	13%
Small scale fishery	1.47	1.45	1.57	1.58	9%	9%
Polyvalent	1.17	0.97	1.09	1.14	13%	18%
Polyvalent passive	1.64	1.49	1.59	1.62	7%	9%
Longlines	1.65	1.47	1.59	1.63	8%	11%
Total	**1.33**	**1.28**	**1.47**	**1.48**	**15%**	**16%**

Table 44 Option 1 Projections of net profit margin by fleet segment for catching sector in the Mediterranean (Sicily).

Fleet segment	2008	2012	2017	2022	2017 var	2022 var
Demersal trawlers	-12.6%	2.7%	13.6%	16.1%	10.9%	13.4%
Purse seiners	8.2%	4.0%	18.3%	20.4%	14.3%	16.4%
Small scale fishery	13.8%	30.9%	39.4%	40.2%	8.5%	9.2%
Polyvalent	-5.2%	-9.5%	5.5%	10.1%	15.0%	19.6%
Polyvalent passive	14.1%	18.1%	27.3%	29.8%	9.3%	11.7%
Longlines	21.1%	18.7%	28.4%	31.3%	9.7%	12.6%
Total	**0.7%**	**10.4%**	**24.8%**	**26.4%**	**14.4%**	**16.0%**

Table 45 Option 1 Projections of return on investment by fleet segment for catching sector in the Mediterranean (Sicily).

Fleet segment	2008	2012	2017	2022	2017 var	2022 var
Demersal trawlers	14.7%	17.7%	26.8%	30.2%	9.1%	12.6%
Purse seiners	31.6%	22.3%	42.1%	46.7%	19.7%	24.3%
Small scale fishery	54.1%	59.3%	103.1%	109.5%	43.9%	50.2%
Polyvalent	20.4%	6.9%	18.5%	23.8%	11.7%	16.9%
Polyvalent passive	43.6%	35.1%	51.8%	58.2%	16.7%	23.1%
Longlines	62.9%	45.7%	68.5%	78.6%	22.8%	32.9%
Total	**28.2%**	**30.4%**	**54.2%**	**59.6%**	**23.8%**	**29.2%**

Regarding GSA17, the most profitable stock is currently underexploited, and there appears to be under-utilisation of effort by the primary fleet. Under Option 1, this is unlikely to change. Indeed, MSY for that stock should be achieved by an increase in fishing effort, but this cannot be determined through management decisions. As a consequence, the fleet would not change compared with Status Quo scenario. However, the economic performance would be better under Option 1 than Status Quo for all fleet segments. This is due to the increase in fish price assumed in 2013 and 2017. As under Status Quo, beam trawlers are the vessels benefiting the most by the reduction in fleet size due to the Italian management plans.

Table 46 Option 1 Projections of gross value added (mln €) by fleet segment for catching sector in the Mediterranean (GSA 17). "2017 var%" and all similar references indicates the improvement of the indicator in 2017 compared to 2012, in percentage terms.

Fishing technique	LOA class	2008	2012	2017	2022	2017 var %	2022 var %
Dredges	12-24	41.34	36.76	49.53	51.19	35%	39%
Demersal trawlers	<12	1.45	1.21	1.96	2.14	62%	77%
Demersal trawlers	12-24	63.66	56.53	82.91	83.18	47%	47%
Demersal trawlers	24-40	14.50	11.53	17.28	17.09	50%	48%
Vessels using hooks	12-24	0.17	0.10	0.15	0.16	47%	56%
Polyvalent passive	<12	47.23	57.97	75.66	79.08	31%	36%
Beam trawlers	12-24	3.21	3.22	6.21	7.69	93%	139%
Beam trawlers	24-40	5.87	5.91	10.12	12.37	71%	109%
Pelagic trawlers and seiners	12-24	5.99	9.85	13.29	12.90	35%	31%
Pelagic trawlers and seiners	24-40	16.70	18.81	25.25	24.53	34%	30%
Total		**200.12**	**201.89**	**282.36**	**290.32**	**40%**	**44%**

Table 47 Option 1 Projections of ratio of revenues to break even revenue by fleet segment for catching sector in the Mediterranean (GSA 17).

Fishing technique	LOA class	2008	2012	2017	2022	2017 var %	2022 var %
Dredges	12-24	1.65	1.53	1.65	1.69	8%	10%
Demersal trawlers	<12	1.31	1.21	1.33	1.38	10%	14%
Demersal trawlers	12-24	1.38	1.28	1.39	1.41	8%	10%
Demersal trawlers	24-40	1.45	1.30	1.43	1.46	10%	12%
Vessels using hooks	12-24	1.76	1.43	1.61	1.68	13%	18%
Polyvalent passive	<12	1.73	1.73	1.85	1.90	7%	10%
Beam trawlers	12-24	1.28	1.23	1.42	1.54	16%	26%
Beam trawlers	24-40	1.32	1.27	1.41	1.50	11%	18%
Pelagic trawlers and seiners	12-24	1.27	1.32	1.41	1.43	7%	8%
Pelagic trawlers and seiners	24-40	1.36	1.37	1.47	1.49	7%	9%
Total		**1.47**	**1.40**	**1.52**	**1.56**	**8%**	**11%**

Table 48 Option 1 Projections of net profit margin by fleet segment for catching sector in the Mediterranean (GSA 17).

Fishing technique	LOA class	2008	2012	2017	2022	2017 var	2022 var
Dredges	12-24	22%	18%	26%	29%	8%	11%
Demersal trawlers	<12	23%	9%	18%	22%	10%	13%
Demersal trawlers	12-24	18%	10%	18%	20%	8%	10%
Demersal trawlers	24-40	11%	3%	14%	16%	11%	13%
Vessels using hooks	12-24	-14%	-31%	-9%	-2%	22%	29%
Polyvalent passive	<12	31%	33%	39%	41%	6%	8%
Beam trawlers	12-24	22%	1%	17%	24%	16%	23%
Beam trawlers	24-40	24%	-4%	10%	18%	15%	22%
Pelagic trawlers and seiners	12-24	10%	15%	22%	23%	7%	8%
Pelagic trawlers and seiners	24-40	16%	11%	19%	21%	8%	10%
Total		**33%**	**15%**	**23%**	**26%**	**8%**	**11%**

Table 49 Option 1 Projections of return on investment by fleet segment for catching sector in the Mediterranean (GSA 17).

Fishing technique	LOA class	2008	2012	2017	2022	2017 var	2022 var
Dredges	12-24	34%	56%	82%	94%	26%	38%
Demersal trawlers	<12	77%	60%	110%	134%	51%	75%
Demersal trawlers	12-24	36%	48%	77%	86%	28%	37%
Demersal trawlers	24-40	13%	29%	47%	51%	18%	22%
Vessels using hooks	12-24	-6%	13%	22%	26%	8%	12%
Polyvalent passive	<12	78%	137%	194%	225%	57%	89%
Beam trawlers	12-24	27%	29%	63%	88%	34%	59%
Beam trawlers	24-40	21%	22%	41%	56%	19%	34%
Pelagic trawlers and seiners	12-24	18%	68%	102%	111%	34%	42%
Pelagic trawlers and seiners	24-40	23%	46%	68%	74%	22%	28%
Total		**58%**	**57%**	**86%**	**99%**	**29%**	**42%**

Access rights policy for the catching sub-sector it is likely to have significant impacts on both upstream and downstream economic indicators. With respect to both the ancillary and processing sectors, these can be explored through multiplier impacts using the same methodology outlined in the status quo report. Ancillary sector economic performance (and related economic indicators) will be most strongly determined by vessel numbers, while processing sector economic performance (and related indicators) will be affected primarily by changes in landings. Table 50 shows that ITR policy for the fleet will result in negative impacts on ancillary sector GVA in both the short- and longer-term with falling vessel numbers. Conversely, positive long-term impacts are expected in processing sector GVA in line with increases in stocks, although the sector may experience short-term declines before stock recovery[32].

[32] As noted in the status quo report it has not been possible to model other economic indicators (BER, NPM, and RoI) due a lack of trend data for both ancillary and processing sectors.

Table 50 Option 1: Expected GVA multiplier effects in 2012, 2017 and 2022

	2012		2017		2022	
Indicator	GVA Processing (million euro) 7c	GVA Ancillary (million euro) 7d	GVA Processing (million euro) 7c	GVA Ancillary (million euro) 7d	GVA Processing (million euro) 7c	GVA Ancillary (million euro) 7d
BEL	18	10	18	8	18	6
DEU	71	15	77	14	95	11
DNK	55	50	58	50	72	48
EST	2	3	2	2	2	2
ESP	228	18	230	17	248	15
FIN	1	0	1	0	1	0
FRA	232	114	236	104	265	91
GBR	262	52	269	49	323	41
IRL	102	33	108	30	126	27
LTU	3	1	4	1	6	1
LVA	13	3	11	3	14	3
NLD	61	45	56	39	66	34
POL	5	1	5	1	7	1
PRT	38	11	39	11	45	10
SWE	5	4	5	3	6	3
TOTAL	1095	361	1117	331	1294	292
Increase over 2012			16%	-12%	26%	-18%

How these upstream and downstream effects will be realised will vary. One aspect that will be likely to affect it is the buying and selling arrangements that vessels and processors enter into. Where there are direct contracts, a popular arrangement in Scotland, processors may be better able to benefit from the increases in stocks but vessels may be more vulnerable should the processors be affected in the short term.

Additional qualitative comment on impacts is necessary with regards to what may be termed 'tipping points'. It can be expected that in specific locations, the success/maintenance of a particular sub-sector (be it a fleet segment, ancillary sector activity, or processing, marketing or transportation activity) may require a critical mass in order to remain both economically and culturally viable. For example, if fleet numbers in a particular vessel segment based at a port decline below a certain point, depending on the importance of that segment in terms of contributions to overall earnings of specific ancillary and processing sector businesses (through the demand by the fleet segment for inputs, and its sales of fish/outputs), it may be that declines in fleet numbers push economic performance of businesses in related sectors beyond the point at which they remain viable. Likewise, if fleet numbers decline below some critical tipping point, vessel owners may chose to either relocate the base of their operations to other ports with greater concentrations of vessels of a similar nature, or to switch their economic activity either to another fleet segment, or out with the fishing sector altogether. This may be partly the result of economic motivations (e.g. fewer ancillary sector businesses supporting them and fewer sales opportunities to processing/marketing businesses) but also due to cultural/sociological factors with owners wanting to be based at ports with other vessels of a similar nature, or feeling encouraged to change activity based on perceptions that their vessel segment is in long-term decline.

These considerations mean that with regards to both the catching and processing/marketing sector, short-term declines in landings (e.g. at 2017) may push some activities out of business before they have the opportunity of benefitting from longer-term increases in landings (e.g. at 2022). Such issues have great relevance to impacts on economic and

social indicators (e.g. indicator 14), and are explored in more detail in the regional case study report.

Subsidies

EFF support can impact in a direct way on the short term on economic performance and thus on economic indicators 7-10 in a variety of ways as follows:

- contributions to income (e.g. temporary cessation payments, processing sector funds used for new value-addition, collective marketing initiatives impact on demand and prices, product and hygiene improvements leading to increased prices, aquaculture funds supporting innovation and diversification into new species, vessel modernisation enabling vessels to stay at sea for longer periods and improve catch rates)

- reductions in costs (e.g. fuel costs and repair and maintenance costs with engine upgrades, harbour developments or processing establishment improvements)

- changes to investment and depreciation values (through new investments)

Option 1 provides for a significant reduction in the level of subsidies which will be allocated to individual enterprises (in all sub-sectors e.g. catching, processing, aquaculture). In particular some items (such as modernisation actions and temporary cessation) which can be expected to impact directly on costs and earnings structures under the status quo option will be abolished. Instead, the emphasis will be on funds to support innovation and environmental improvements (smart green fisheries axis 1), and territorial developments (axis 2), which will generate collective benefits for the many rather than the few, especially through improvements to prices. [Annex C Appendix 3] provides some relevant data on the percentage of the fleet receiving funding under FIFG 2000-2006, and shows that in the 10 Member States receiving the most FIFG funds, on average only 14% of the fleet received some form of FIFG support. This varied between Member States from a quarter of the Spanish and French fleets to only 5-6% of the UK, Portuguese and German fleets. As the analysis presents average funding levels across the whole catching sector, the actual funding for some vessel owners in receipt of that funding is likely to represent considerable economic benefit, with beneficial impacts on economic indicators for those that received public support. The approach under policy reform of subsidies would be to ensure that all those in the sector benefited from public sector support, and this represents a key impact of Option 1 when compared to the status quo. The change might mean a negative impact on the economic indicators for some individual enterprises, but would ensure that positive impacts would be distributed more evenly throughout the sector (noting the comments below about special support for the small-scale sector).

Thus in the short-term, some direct negative impacts would be felt by some individual vessels in different fleet segments, with negative impacts on all 4 economic indicators (7-10) as a result of a reduction in axis 1 subsidies which could increase costs and reduce incomes. This applies to catching sector primarily, but potentially also to processing and aquaculture sectors if re-packaging of eligible measures into new axes excludes some forms of processing and aquaculture sector subsidies and a more collective approach to the use of funds. However, the focus on innovation and collective measures under both the smart green fisheries axis and the territorial development axis could serve to increase value-added in the short- and long-term, generating direct positive improvements in the indicators across the sector more generally.

Assessing the scale of these impacts quantitatively is difficult. For a variety of reasons, as explained in [Annex C Appendix 3] it has not been possible to do so through incorporation of

changes in subsidies to the EIAA model. However [Annex C Appendix 3] provides some quantitative analysis of an illustrative (rather than comprehensive) nature to show the sort of impacts on costs and earnings, and therefore economic indicators, which could take place under Options 1 (and 2 and 3). The analysis suggests that Option 1 would be preferable to the status quo option.

Given the very strong historical focus of FIFG support on vessels over 12m (as already noted and as described in [Annex C Appendix 3]), the ring-fencing of two-thirds of subsidies under axis 1 for small-scale fleets, coupled with a focus in the territorial development axis on small-scale fisheries as well, certainly means that in the short- to medium term, Option 1 could be expected to have direct negative impacts on many of the larger-scale fleet segments that would otherwise have been the recipients of funds under a status quo option. On the basis of historic levels of funding this will apply to all Member States, and in absolute terms would have a very significant in Spain given that Spain absorbs such a large percentage of total FIFG/EFF funds, and these funds are strongly distributed in favour of the large-scale fleets. In the longer-term one would expect the economic performance of the larger scale fleet segments to improve with stock recovery, in part brought about by the fact that under Option 1 subsidies would not contribute to artificially maintaining sector performance and therefore excess fleet capacity i.e. some short-term pain will result in long-term gains.

Indicator 11 Fish prices

Fish prices are generally agreed to respond mostly to externalities. For instance, the increase and subsequent decline in fish prices over the last 6 years (Status Quo report) was not triggered by any particular policy of the EU, but by external factors such as global economics and demand for fish within the EU. It also disguised different trends by different species and in different regions.

Nevertheless, the policies suggested under Option 1 may have additional, generally positive, impacts on prices. The removal of subsidies under Option1 have the potential to result in indirect and long-term positive impacts on the fish price indicator and benefits for both the catching and processing sectors, through a better balancing of capacity with fishing opportunities and a stronger focus in EFF-2 on innovation and environmental improvements. The rationale for this assumption is that these improvements should in turn result in positive impacts on indicator 3 as already discussed, and market prices are generally higher for larger sized fish. In addition, the increase in the number of stocks fished sustainably, the increase in mean size of fish in the catch, the decrease in discarding and the increase in public perception of the industry that this should create, should increase the price of fish. This mechanism may be direct – through recognition by the public of better environmental stewardship – or could be expressed through increased use of market-based certification programmes, such as the MSC, which have proven, generally, to provide a 5-10% increase in fish price for certified fish.

Short- to long-term direct positive impacts should also be experienced through the focus under subsidy and market (CMO) policy on innovation and value-addition, and on common marketing/promotion measures.

Long-term improvements in fish stocks, in part brought about by changes in subsidies policy (better balance of capacity and fishing opportunity, greater selectivity and environmental emphasis of an EFF-2 under Option 1) could result in long-term indirect impacts on fish prices of a negative nature if unit prices of fish fall as landed volumes increase with stock recovery. However, long-term growth in demand is expected to mean that such falls in unit prices do not occur. An important caveat to all assumptions about short- and long-term

impacts of subsidies on prices, are that determinants of fish prices are numerous, and the relative impacts of changes in subsidies compared to other factors is likely to be very small.

Our conclusion is that the combination of policies acting in Option 1 may increase fish prices, beyond those achieved through external forces, by 20%.

Indicator 12 Subsidies as a % of landed values

The impacts of subsidies reform will result in direct short- and long-term positive impacts on this indicator in terms of the levels of subsidies as a percentage of landed values. As discussed in the presentation of the options, Option 1 will result in a reduction in overall levels of subsidies to no more than 70% of their current levels. This would result in a positive change in the indicator from 11% to 7% as a result of the change in the numerator. But in addition, long-term indirect positive impacts can also be expected as a result of stock recovery resulting from a better balancing of capacity with fishing opportunities, in turn leading to increases in landed values of 5% by 2022 i.e. the denominator (see model results for additional information on increases in landed values by Member State).

4.6.3. Social indicators

Indicator 13, 16 and 17 Employment, Social Sustainability and Attractiveness of the sector

Under Option 1, the major social impacts will arise, as with the economic impacts, as a result of stock recoveries (the MSY policy) and fleet reductions, the latter resulting mostly from the adoption of ITRs and secondarily from reductions in fleet size under the remnants of the EFF programme.

The results of the EIAA modelling exercise (Table 51) confirm the anticipated changes to social indicators. Employment will continue to decline in the catching sector as the fleet size continues to decline, particularly so under the ITR reductions in the first 5 years of the programme. But because income and GVA will increase, from 2017 and 2012 respectively (Table 40) so will GVA per employee and crew wages. However, the attractiveness of the sector should continue to improve with crew wage increases. The small increase in employment per vessel is a result of increasing fishing opportunities (days at sea) accompanying the reduction in the fleet at the same time as increasing catches.

Note the marked differences in the model results for the small scale fleet compared to the large scale fleet. The small scale fleet has a very small gain in crew wage in 2017 – 38% compared to the EU average of 76% - because of the few quota stocks that it takes, and because of the much lower reductions in fleet size consequent on lower uptake of ITRs in the small scale sector.

Table 51 Option 1: Trends in social indicators by Member State

	2012					2017					2022				
Indicator	Fleet size (no) a2	Employment (FTE) 13	Employment (FTE) per vessel 13a	Value added per employee (€) 16	Crew wage (€) per FTE 17	Fleet size (no) a2	Employment (FTE) 13	Employment (FTE) per vessel 13a	Value added per employee (€) 16	Crew wage (€) per FTE 17	Fleet size (no) a2	Employment (FTE) 13	Employment (FTE) per vessel 13a	Value added per employee (€) 16	Crew wage (€) per FTE 17
BEL	81	457	6	36815	50958	59	294	5	142649	160771	49	251	5	241290	261949
DEU	317	688	2	144797	79039	244	510	2	277857	141666	205	447	2	371393	188427
DNK	400	1279	3	135517	82131	384	1132	3	229007	135296	347	1067	3	266445	156048
EST	800	2475	3	2918	1039	752	2393	3	5794	1813	752	2278	3	6531	2012
ESP	10974	25799	2	17219	16048	9585	20362	2	37271	30586	9014	18520	2	56688	45958
FIN	1248	1640	1	1448	2158	1105	1338	1	4572	3976	1054	1242	1	5597	4397
FRA	2562	8643	3	54621	37490	2261	7184	3	90889	58744	2152	6634	3	109493	69702
GBR	2954	4930	2	57267	33466	2499	3888	2	127560	68491	2251	3624	2	165233	86977
IRL	1372	2437	2	45393	24555	1263	2197	2	73589	37195	1243	2089	2	84392	41767
LTU	19	40	2	73899	54300	14	35	2	149286	98533	12	33	3	168796	109084
LVA	737	1212	2	4161	1481	646	1160	2	7569	1553	611	1101	2	8480	1564
NLD	279	1454	5	84225	52885	245	1190	5	189398	105693	222	1088	5	259880	139567
POL	656	1396	2	11949	5488	557	1269	2	21820	9685	521	1194	2	24974	11002
PRT	2247	8412	4	16584	9021	1991	7803	4	24087	15268	1898	7325	4	27452	17616
SWE	793	1001	1	24267	6461	638	908	1	45847	12018	607	854	1	51749	13597
TOTAL	**25439**	**61863**	**2**	**31030**	**21379**	**22246**	**51664**	**2**	**58631**	**37717**	**20940**	**47746**	**2**	**76584**	**49289**
Increase over 2012						-13%	-16%	-4%	89%	76%	-18%	-23%	-6%	147%	131%

Table 52 Option 1: Trends in social indicators by vessel length

	2012					2017					2022				
Indicator	Fleet size (no) a2	Employment (FTE) 13	Employment (FTE) per vessel 13a	Value added per employee (€) 16	Crew wage (€) per FTE 17	Fleet size (no) a2	Employment (FTE) 13	Employment (FTE) per vessel 13a	Value added per employee (€) 16	Crew wage (€) per FTE 17	Fleet size (no) a2	Employment (FTE) 13	Employment (FTE) per vessel 13a	Value added per employee (€) 16	Crew wage (€) per FTE 17
SSF	19211	22535	1	20014	9929	17195	20277	1	28595	13700	16549	19027	1	33053	15613
1224*	4456	15755	4	33283	27984	3576	12918	4	66135	49271	3102	11987	4	84507	61945
2440	1350	16515	12	23017	21429	1104	12104	11	61046	50316	954	10799	11	95558	77320
40XX	421	7058	17	79925	43078	370	6364	17	134506	66821	335	5932	18	165660	80697
TOTAL	**25439**	**61863**	**2**	**31030**	**21379**	**22246**	**51664**	**2**	**58631**	**37717**	**20940**	**47746**	**2**	**76584**	**49289**
Increase over 2012						-13%	-16%	-4%	89%	76%	-18%	-23%	-6%	147%	131%

* The 1224 segment also includes semi-industrial vessels between 0 and 12m *e.g.* DTS0012

Table 53 Option 1: Average days at sea per vessel, by vessel length

Length	2012	2017	2022
SSF	92	93	91
1224*	164	162	169
2440	179	166	173
40XX	198	200	208
TOTAL	108	107	106
Increase over 2012		**-1%**	**-2%**

From a social perspective, one negative impact expected through the implementation of ITRs is the reduction in employment figures. While vessels become more profitable and this is reflected in crew share (or salary), with the decrease in vessel numbers and an increase in efficiency there will also be the reduction in catching sector employment. Furthermore, the reduction in vessel numbers will lead to a reduction in ancillary employment (Table 54). However, in the long-term as stocks and subsequently catches increase, an increase in processing employment will occur.

Table 54 Option 1: Expected employment multiplier effects in 2012, 2017 and 2022

	2012		2017		2022	
Indicator	Employment Processing 7c	Employment Ancillary 7d	Employment Processing 7c	Employment Ancillary 7d	Employment Processing 7c	Employment Ancillary 7d
BEL	293	177	250	128	285	107
DEU	832	164	856	126	957	106
DNK	1264	475	1324	457	1393	413
EST	128	725	128	681	128	681
ESP	8130	1125	7289	983	8328	924
FIN	67	0	62	0	62	0
FRA	7469	1928	7001	1702	7303	1620
GBR	5786	920	5799	779	6397	701
IRL	2230	721	2172	664	2254	654
LTU	149	153	181	117	191	97
LVA	1518	691	1589	606	1597	574
NLD	1081	469	1063	411	1174	372
POL	447	147	490	125	505	117
PRT	975	699	937	619	957	590
SWE	167	189	173	152	175	145
TOTAL	30535	8584	29315	7551	31708	7100
Increase over 2012			-4%	-12%	4%	-17%

Aspects such as decrease in employment figures could also be considered as the reasoning behind the hesitancy of SSF and non-industrialised communities voluntarily moving to ITR. As experienced in Norway, small scale communities are not as willing to move to ITRs and may only do so with sufficient backing against external factors – such as economic down-turns or natural disasters. The sinking of Prestige in 2002 and its related consequences are an example of such an event. In general the magnitude of the impact on social indicators for the small scale fleet segments is much less than those for the large scale fleet segments.

In the Mediterranean case, the decline in employment will be greatest in the large scale fleets for which ITRs are compulsory. The small scale fleet is expected to continue to be profitable and so reductions in vessel numbers and employment will be limited. GVA per employee will increase, as will crew wage (see Table 56 and Table 57), in all fleet segments through a combination of fleet rationalisation, mainly in the LSF, and general increase in quantity and quality of landings due to improvement in stock size.

Table 55 Option 1 Projections of number of employees (FTE) by fleet segment for catching sector in the Mediterranean (Sicily).

Fleet segment	2008	2012	2017	2022	2017 var %	2022 var %
Demersal trawlers	2,644	2,313	1,391	1,257	-40%	-46%
Purse seiners	550	550	474	428	-14%	-22%
Small scale fishery	2,531	2,468	2,310	2,088	-6%	-15%
Polyvalent	136	133	125	113	-6%	-15%
Polyvalent passive	470	459	429	388	-6%	-15%
Longlines	644	628	588	531	-6%	-15%
Total	**6,977**	**6,552**	**5,316**	**4,805**	**-19%**	**-27%**

Table 56 Option 1 Projections of GVA per employee (000 €) by fleet segment for catching sector in the Mediterranean (Sicily).

Fleet segment	2008	2012	2017	2022	2017 var %	2022 var %
Demersal trawlers	17.87	21.08	30.04	33.67	43%	60%
Purse seiners	30.62	22.67	39.76	43.73	75%	93%
Small scale fishery	12.48	13.60	23.16	24.55	70%	80%
Polyvalent	3.87	1.57	3.55	4.44	127%	183%
Polyvalent passive	18.76	15.30	22.16	24.79	45%	62%
Longlines	33.56	24.73	36.45	41.63	47%	68%
Total	**18.16**	**18.90**	**27.54**	**30.19**	**46%**	**60%**

Table 57 Option 1 Projections of average crew wage per employee (000 €) by fleet segment for catching sector in the Mediterranean (Sicily).

Fleet segment	2008	2012	2017	2022	2017 var %	2022 var %
Demersal trawlers	9.58	11.09	15.30	17.02	38%	53%
Purse seiners	11.09	8.59	14.04	15.31	63%	78%
Small scale fishery	5.42	5.87	9.67	10.22	65%	74%
Polyvalent	1.32	0.65	1.23	1.49	88%	127%
Polyvalent passive	6.92	5.73	8.10	9.00	41%	57%
Longlines	9.82	7.42	10.60	12.00	43%	62%
Total	**7.87**	**8.16**	**11.22**	**12.24**	**37%**	**50%**

Regarding GSA17, the most valuable stock is currently underexploited and fisheries are profitable. Therefore, as reported above, it is not expected a change in the fleet significantly different than that assumed under the Status Quo. The same is likely for the number of employees given the dependency of this indicator on the number of vessels. GVA per employee and crew wage (Table 59 and Table 60) will increase as a result of the fleet rationalization due to the Italian management plans. However, the stronger increase compared with the Status Quo scenario is due to the increase in fish price assumed in 2013 and 2017.

Table 58 Option 1 Projections of number of employees (FTE) by fleet segment for catching sector in the Mediterranean (GSA 17).

Fishing technique	LOA class	2008	2012	2017	2022	2017 var %	2022 var %
Dredges	12-24	607	592	554	500	-6%	-15%
Demersal trawlers	<12	69	66	61	55	-8%	-17%
Demersal trawlers	12-24	1715	1646	1578	1426	-4%	-13%
Demersal trawlers	24-40	249	239	229	207	-4%	-13%
Vessels using hooks	12-24	7	7	7	6	-6%	-15%
Polyvalent passive	<12	1563	1524	1426	1289	-6%	-15%
Beam trawlers	12-24	155	149	142	129	-4%	-13%
Beam trawlers	24-40	151	145	139	126	-4%	-13%
Pelagic trawlers and seiners	12-24	198	195	184	166	-5%	-15%
Pelagic trawlers and seiners	24-40	410	404	382	345	-5%	-15%
Total		**5123**	**4966**	**4701**	**4250**	**-5%**	**-14%**

Table 59 Option 1 Projections of GVA per employee (000 €) by fleet segment for catching sector in the Mediterranean (GSA 17).

Fishing technique	LOA class	2008	2012	2017	2022	2017 var %	2022 var %
Dredges	12-24	68.12	62.12	89.45	102.27	44%	65%
Demersal trawlers	<12	21.01	18.29	32.20	38.83	76%	112%
Demersal trawlers	12-24	37.12	34.34	52.55	58.32	53%	70%
Demersal trawlers	24-40	58.33	48.29	75.54	82.65	56%	71%
Vessels using hooks	12-24	23.47	14.57	22.95	26.89	58%	85%
Polyvalent passive	<12	30.22	38.04	53.06	61.35	39%	61%
Beam trawlers	12-24	20.75	21.70	43.62	59.75	101%	175%
Beam trawlers	24-40	38.77	40.63	72.69	98.23	79%	142%
Pelagic trawlers and seiners	12-24	30.28	50.58	72.14	77.49	43%	53%
Pelagic trawlers and seiners	24-40	40.76	46.60	66.14	71.09	42%	53%
Total		**39.06**	**40.65**	**60.06**	**68.32**	**48%**	**68%**

Table 60 Option 1 Projections of average crew wage per employee (000 €) by fleet segment for catching sector (GSA 17).

Fishing technique	LOA class	2008	2012	2017	2022	2017 var %	2022 var %
Dredges	12-24	29.84	27.38	38.59	43.85	41%	60%
Demersal trawlers	<12	8.26	7.34	12.00	14.21	63%	94%
Demersal trawlers	12-24	17.61	16.43	24.16	26.62	47%	62%
Demersal trawlers	24-40	23.74	19.99	30.16	32.81	51%	64%
Vessels using hooks	12-24	9.56	5.51	8.17	9.42	48%	71%
Polyvalent passive	<12	12.44	15.33	20.86	23.92	36%	56%
Beam trawlers	12-24	8.59	8.88	15.64	20.61	76%	132%
Beam trawlers	24-40	18.93	19.74	33.53	44.51	70%	126%
Pelagic trawlers and seiners	12-24	17.58	26.71	36.41	38.81	36%	45%
Pelagic trawlers and seiners	24-40	20.85	22.18	30.11	32.12	36%	45%
Total		**17.67**	**18.17**	**25.96**	**29.22**	**43%**	**61%**

For indicators 13-17, Option 1 policy in relation to subsidies will provide a far greater focus on, and increased level of funding for, development of territorial areas dependent on fishing. This will result in direct short- and longer-term positive impacts on all sub-sectors from the better targeting of subsidies on such areas. This of course assumes that the Fisheries Local Area Groups (FLAGs) work as planned in such areas. The status quo report provides additional information on socially dependent areas. However, given the intended focus on the territorial development axis on small-scale fisheries, and indeed of the smart green fisheries axis on small-scale fleets, while we can expect positive improvements in indicators for areas highly dependent on small-scale fishing activities, while other areas more

dependent on larger-scale activities could experience some negative impacts in social indicators in the short-term, especially when coupled with other aspects of Option 1 reform e.g. compulsory introduction of ITRs in large-scale fleets.

There will also be indirect short- and long-term impacts to social indicators 13-17 in all sub-sectors from changes in subsidies policy which will follow changes in environmental and economic indicators described above e.g. declining fleet capacity and financial support to all sub-sectors in the short-term may reduce employment, GVA, attractiveness of the sector. Over the longer-term employment levels should be greater than would otherwise be the case under the status quo option, with improving stock status and economic performance.

Indicators 14 and 16 community status and social sustainability

The most significant concern attending the introduction of ITR systems is generally social sustainability – the potential for highly profitable, big businesses to buy out smaller players, which clearly has economic impacts for those smaller players but, most importantly, may threaten particularly vulnerable communities. This can be a concern within countries and regions and also across borders and some areas may be more vulnerable to the introduction of ITQs than others depending upon the historical development of the fleets. This was an issue identified in Iceland so, to counter social concern, a safeguard was implemented. Vessels less than 15GT are not able to transfer quota to vessels greater than 15GT[33]. Additionally in Norway safeguards are in place to discourage transfers from SSF communities in the north to the industrialised fleets in southern Norway. When quota is transferred from the north to the south 40% of the quota is lost but only 5% when transferred in the opposite direction[34].

Option 1 includes the following protection:

- Ceilings on the concentration of rights to three times current catches (implemented in our model by limiting fleet reductions to 40% of their current size);

- Ring fencing the small scale fleet. There are some different methods by which this could occur, but one option is to allow transfers in to small scale fleet ITR sectors but prohibit transfers out, as is the case with the Danish ITQ system;

This is unlikely to significantly affect the efficiency of ITR implementation more than the restriction of transfers within MS. The latter will preserve relative stability and act as a very significant safeguard for the vulnerability of coastal communities. However, some transfers within MS may still be anticipated. Recent experience with the Spanish 300 fleet has shown that ITQ systems will almost certainly lead to some regional transfer of quota, with concomitant impacts on the communities and ancillary services these communities provide (Box 1). For some fishery dependent regions, which might see their quota acquired by more powerful regions, this could be a negative impact. However, in the Spanish case shown the most fishery dependent region is Galicia, which gained from the transfers (Box 1), whereas the communities in the Basque region, in which fishing is only a very minor part of the economy, probably did not suffer much from the transfer of their opportunities to Galicia.

[33]Lindebo, E 2010, pers. comm., March 26.
[34]Hannesson, R. (2009) *Norway's Experience with ITQs*, Norwegian School of Economics and Business Administration, Norway.

Box 1

In 1992 the Spanish Ministry of Agriculture and Fisheries passed an order which allowed the accumulation of fishing rights. Coupled with the continuing scrapping scheme, these attractive conditions lead to a large restructuring of the Gran Sole (300) fleet. Due to the higher efficiency of vessels in the Galician regions, vessels were beginning to concentrate in Galicia. In 1996 there was a relatively even split in vessel numbers between Galicia and Basque – 53% and 47% respectively. However by 2006 this proportion of vessel numbers had broadened to 74% of vessels in Galicia and 23% in Basque.

Galicia and Basque conduct similar operations with respect to the size of their vessels and stocks targeted. The experiences of these two regions give a clear indication of what is expected in option 1 when multiple regions have similar circumstances. With the possibility of inter-MS transferability, situations where communities dissipate through buy-outs from heavier capitalised fleets are expected.

4.6.4. Governance indicators

Indicator 18 Departure from quotas

The departure of quotas from scientific advice seen under the status quo scenario (SQ report Figure 18) arises from two sources: departure from the scientific advice by the Commission, particularly when the scientific advice has been based on a precautionary approach and not on a management approach agreed by the EU, such as MSY policy, and in situations where the Commission has used socio-economic considerations to modify purely scientific advice to achieve an appropriate outcome for EU fisheries. In future, the adoption of a formal objective for Fmsy management by Council, the development of regional management objectives and strategies by RegBods, the adoption of HCRs designed by the RegBods in LTMPs, and the formal request for scientific advice associated with these objectives, should lead to there being much less departure from scientific advice and recommendations on TACs.

RegBods will also have a significant role in designing management plans (LTMPs) which incorporate workable HCRs and strategies. This will be essential if agreement is to be reached on appropriate management strategies in multispecies fisheries which seek to maximise socio-economic objectives (expressed here as achieving Fmsy for the most socio-economically valuable species). There are no objective solutions to such strategies, as there are to single-species stock management strategies, because they involve pay-offs between multiple fleets and stakeholders. Designing such strategies without the input of RegBods would be difficult, and we suggest impossible without either them or the RACs.

The second aspect of departure from quotas is the decisions by Council to set quotas higher than advised by the Commission. Again, due to the development of management plans by RegBods, acceptance of such plans by all members of the RegBod should result in speedy adoption by the Council and the European Parliament

Indicator 19 Management Costs

There are two significant areas of impact which imply increasing management costs under Option 1; the administration costs associated with the regional bodies (RegBod) and the additional science research costs required to bring all stocks under Fmsy management.

RegBods

Under Option 1 RegBod structure will include an executive committee made up of relevant Member States and the Commission. Four RegBods are envisaged at this point: Baltic, North Sea, Western Waters and Mediterranean. RegBods would consult widely with RACs, ICES, STECF, NGOs, and other stakeholders.

RACs are open to producer and NGO organisations having the approval of the "Member States Concerned", meaning "States with a fishing interest in the area or fisheries covered by a regional advisory council" (Council Decision 2004/585/EC). To be effective RegBods will need to include all regional Member States, i.e. those with control and management responsibilities in an area. This may include Member States with fishing interests, and therefore flag state responsibilities, rather than simply regional EEZ responsibilities. While these two categories of MS may appear rather similar under the current relative stability allocation of fishing opportunities, under an ITR system that was freely transferrable within the EU the size of these bodies would increase rapidly, and their ability to make decisions may decrease concomitantly. This would be a significant increase in cost – in time and money.

Currently budgets for the RACs are €2.3 million annually (Table 61). At least a similar individual cost might be expected for the RegBods, and probably higher, given that the membership of the western waters RAC would be bigger than either the NWW or SWW RAC. Thus with 4 RegBods the total cost may be in the region of €1.2 – 1.5 million, with the retention of all current costs associated with the RACs.

Table 61 RAC total eligible budgets (2008-2009, except MedRac which is 2009 calendar year)

Year	2007		2008		2009	
RAC	Total EUR (1)	Non-EC %	Total EUR (1)	Non-EC %	Total EUR (1)	Non-EC %
Baltic Sea	279,913	0.30	268,826	0.20	269,590	0.26
Long Distance	250,098	0.57	337,985	0.46	366,945	0.50
North Sea	202,739	0.28	288,500	0.13	268,261	0.12
North-western Waters	346,560	0.28	292,938	0.21	274,336	0.18
Pelagic Stocks	182,205	0.31	256,629	0.18	289,875	0.14
South-western Waters	287,547	0.34	342,629	0.37	309,275	0.19
Total	1,549,062	0.34	1,787,506	0.27	1,778,282	0.24

Source: EC

On the other hand, as a consequence of including consultation with a very wide range of stakeholders, with a statutory framework, RegBods are likely to be able to generate higher levels of agreement on appropriate management plans at Council and European Parliament level. It is also common to find that proposals are adopted within 61 to 120 days (~ 2-4 months) and 121 to 180 days (4 – 6 months). This is likely to stay the same.

Science

In 1997the OECD[1] estimated the total annual cost of EU fisheries management at €345 million. Adjusting this value for inflation (assuming a mean inflation rate of 2.5% p.a.) this would correspond to a total expenditure of around €470 million in 2009. These costs are proportionally distributed as follows: research costs – 30.7%, management costs – 23.3% and enforcement costs – 46.1%. These estimates indicate that in terms of research the EU may be currently spending around €145 million per year.

[1] http://www.oecd.org/dataoecd/2/52/1917868.pdf

Throughout Europe, most of the data needed for stock assessment is acquired under the DCF (DCR up until 2008) which budget, in 2008, was roughly €64 million (including both EC and MS contributions). Adding to this, there are other additional costs of doing assessment research for instance in running assessment meetings and doing associated research (for instance, the ICES budget is €4m million p.a). The total cost of research leading to stock assessments is therefore greater than the DCF budget. The EASE[2] project estimated the costs of scientific advisory work (e.g. scientific surveys, sampling landings and discards, stock assessments) and related research activities in Europe in 2002 at about 59 million Euros and 19 million Euros, respectively. this would include, in todays terms, the DCF budget. Taking into account that these data refer back to 2002, a current estimate, adjusted for inflation, could be just over €100 million. This is consistent with the OECD estimates sited above.

As a general conclusion, the estimated overall investment in the provision of advice is equivalent to around 2% of first sale value of landings.

ICES and SGMED are currently working with the increased data generated by the DCF, and there are some existing projects, such as DEEPFISHMAN[35], which will already generate additional stock assessments. Although this may cover the 26 stocks in column 3 of Table 27 there remain a large number of stocks whose assessments are much less well advanced. Even though, under Option 1, the expectation is that assessments would be developed for these stocks over the first 8 years of the revised CFP rather than at the beginning, it will still be necessary to accelerate data collection and assessment programmes for these stocks in order to deliver against even a delayed timetable. The justification for this stems from that fact that robust information into the dynamics of the fish populations under study is not obtained immediately but in a gradual fashion, often taking more than 3 years even if adequate effort is put into obtaining data.

We estimate that the development of assessments for the 67 stocks (50% of the total) that are in columns 4 and 5 of Table 27 would require an increase in the existing planned research effort, from 2013, by around 20% in order to gradually improve the knowledge into the species for which there is presently little or no information. The increase in research effort could represent adding an additional €20 million to the MS overall research budget.

The increase in budget should be roughly the same for policy option 2 as the same number of species will have to be dealt with from the implementation of the policy. It is, nonetheless, likely that the high level of uncertainty associated with some of the stocks will affect the degree of efficiency of the organisation as a whole. In actual fact, it is unlikely that in such a short time period it will be possible to produce scientific advice sufficiently robust to support all the necessary management decisions to meet the requirements stated in option 2. Furthermore, the capacity of scientific stock assessment personnel in the EU is limited, and may not allow for such a rapid increase in scientific advice provision in the short time available (3 years).

There may be some efficiencies to be gained through the use of risk-based methodologies when using the socio-economic optima in Options 1 and 3, which would require analytical assessments for only the most valuable and most sensitive species in a multispecies fishery. This is further explored in Section 5.1. Such possibilities would be unavailable for Option 2.

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[2] European Advisory System Evaluation project, EU Concerted Action, contract Q5CA-2002-01693

[35] http://wwz.ifremer.fr/deepfishman

Other costs

Management costs for the sector not are expected to increase as a consequence of moving to ITRs. Although there will be a requirement to monitor quota holdings, and strict administrative rules will be required to identify where quota is registered, the fact that the industry will be required to maintain most of these records should decrease management administrative cost overall, even if there is some initial administrative cost with setting up the ITR systems. The reduced overall levels of subsidies in Option 1 should also mean that there are direct short- and long-term positive impacts on management costs consequent on there being less subsidy to manage, in fewer categories.

Finally, positive longer-term impacts could also be generated if a better balance of fleet capacity with fishing opportunities, in part due to changes in subsidy policy and the introduction of ITRs, generates stock recovery and increased compliance, thereby reducing MCS costs.

Nevertheless the introduction of ITRs will have a significant short term economic/administrative cost for the Member States as well as the EU. This would comprise the cost of consultation on the introduction of an ITR regime, including as necessary the adoption of national legislation, the administrative costs of setting up the new system (such as the establishment of appropriate registers), the cost of making a provisional allocation of ITRs and thereafter revising that initial allocation.

The experience of third countries that have introduced long term ITRs shows the importance of extensive consultation together with the provision of administrative review/appeal and revision mechanisms following the initial allocation together, in a appropriate cases with some form *ex-post facto* review and as necessary 'tweaking' of initial allocations, again on the basis of objective criteria. Such review mechanisms may not only reduce the likelihood of successful legal challenges but will also facilitate the process of reform. Clearly though they will have an economic cost. Moreover the degree of consultation will likely vary from Member State to Member State, with those countries where ITQs are already accepted presumably requiring less consultation.

One essential element of an ITR regime will be a mechanism, such as a register at national level, to record the initial allocation of ITRs and thereafter any transfers.

Indicator 20 Rights based management systems

The introduction of ITR systems as compulsory for the LSF and voluntary for the SSF should lead to a rapid expansion of the use of these systems in the fleet. Table 62 show our model output for the number of vessels in the 57 fleet sectors in our EIAA model, showing how fleet numbers are likely to develop under Option 1.

Table 62 Option 1: The number, and percentage, of vessels under ITR schemes in LSF and SSF in 2007, 2012, 2017 and 2022

SSF	2007	2012	2017	2022
ITR fleet	879	795	4619	3969
Total fleet	21115	19211	17195	16549
ITR %	4.2	4.1	26.9	24.0
LSF	**2007**	**2012**	**2017**	**2022**
ITR fleet	836	1056	5051	4391
Total fleet	6755	6227	5051	4391
ITR %	12.4	17.0	100.0	100.0

Indicator 21 Data provided by MS

Under Option 1 (and 2) there will be a requirement for improved assessment, which we estimate will require an increase in spending on science, particularly stock assessments. This will be required even though the current DCF is contributing enhanced data quality and quantity (under Status Quo) and ICES and SGMED have a continuing programme of improved stock assessments. The primary reason for this is the rapidity with which the assessments of the (majority) of currently unassessed stocks will have to be brought under MSY management. This increase in science requirement will, inevitably, lead to a positive improvement and increase in the data collected and provided by MS.

Under Option 1 it is also expected that the level of compliance of fishers will increase, resulting from two policy interventions – the introduction of ITRs and the RegBods. The evidence for the former is limited, but at least in principle the allocation of rights to a fisher, and their investment in more rights through acquisition, should provide an incentive to them to conserve resources and not overfish.

This was experienced in NZ when fisheries were moved to ITQs. ITQs, coupled with consumer-side taxes on landings (which supported management for fisheries), provided an incentive for fishers to land all catch legally. Failing to do so would result in less sales tax injected to the management of fisheries leading to requirement of additional financial inputs from fishers[36].

The assumption on the impact of RegBods is due to the fact that the proposal which would have been developed in consultation with all advisory bodies – RAC, STECF and ICES – including significant stakeholder input, but once again evidence is not necessarily strong on this point. It is, however, more likely that RegBods, being composed of Member States, would act more cooperatively in issues of compliance, and identify early on the need for additional cooperation with, for instance as is the case with the development of Joing Deployment Plans (JDPs).

Indicator 22 Rate of Utilisation of quotas

The rate of utilisation is expected to increase. Given that rights have been purchased, there is little evidence to suggest participants will not fish their full rights. However, there will still be some inefficiencies in the system by restricting quota exchanges between MS, and we would therefore not expect entirely efficient utilisation.

Indicator 23 Transfer of quotas

Since under the ITR system proposed for Option 1 rights would not be transferable across the EU there will remain a need for MS quota exchanges. The situation, therefore, would not differ substantially from the Status Quo.

Indicator 24 Coherence with WTO/EC policy

Since the preparation of the Status Quo Report, there has been little substantive progress as regards WTO fisheries subsidies negotiations. Nevertheless it seems likely that under Option 1, subsidies policy under the CFP will exhibit greater levels of compliance likely new WTO policy on subsidies, and therefore short- and long-term positive impacts under this indicator in terms of policy coherence, including as regards the subsidy element of access

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[36] McGarvey, R. (2003) *Demand-Side Fishery Management : Integrating Two Forms of Input Control*. Marine Policy 27 2003, pp 207-218.

agreements. A question mark would remain against the continuation of price support mechanisms under CMO policy, however. Moreover, within the ongoing WTO negotiations the prohibition of subsidies relating to operating costs have been proposed: the continuation of tax exemptions for fuel and social security derogations may not be coherent in this respect.

In terms of other policies the use of Fmsy is coherent with the objective of good environmental status foreseen by the Marine Strategy Framework Directive (MSFD)37 as well as the objectives for fisheries management accepted by the EU at the World Summit on Sustainable Development in 2002. In terms of coherence with the EU's development objectives an extension in the use of Tuna only agreements will further reduce the prospect of competition between EU and local artisanal fishing fleets.

Indicator 25 Administrative burden on industry

Management costs for the sector in terms of data collection is likely to increase, as there is an expectation that the above mentioned proposals will be based on robust assessments at the regional level. Furthermore, given that only some of the costs of RegBod and RAC meetings will be met by either the EC or by MS governments (Table 61), an increasing cost of meeting will be placed on industry. This is, however, still a very small proportion of overall income from capture fisheries – less than 1%, so its overall effect will be close to negligible.

Indicator 26 Implementation of the simplification process

There is already a commitment to simplification of the rules and as the RegBod becomes more organised and the data improves as a regional level. In addition to this commitment, it is expected that there will be an increase in simplification because of regionally applicable regulations.

Indicator 28 Safety

With respect to indicator 28 (safety) there should be no change in the short- or long-term from changes in subsidy policy as safety actions will be retained in EFF-2 under Option 1. However, positive indirect longer-term impacts should be experienced for all sub-sectors as reduced subsidies and ITR policy lead to better balance of capacity and fishing opportunities and improved stocks, and thereby better economic performance (itself linked to improved safety).

Indicator 29 Time taken to reach a decision

Under the current situation, the average time taken to reach a decision is nearly three years. With the introduction of the Lisbon Treaty, an additional 12 months is to be expected to be added to the process as the decision passes through the Commission and European Parliament [Annex A]. The RegBod process would be expected to extend the consultation period but with the benefit of achieving consensus in the EP/Co more rapidly.

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[37] Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy OJ L 164 25.6.2008. p 19.

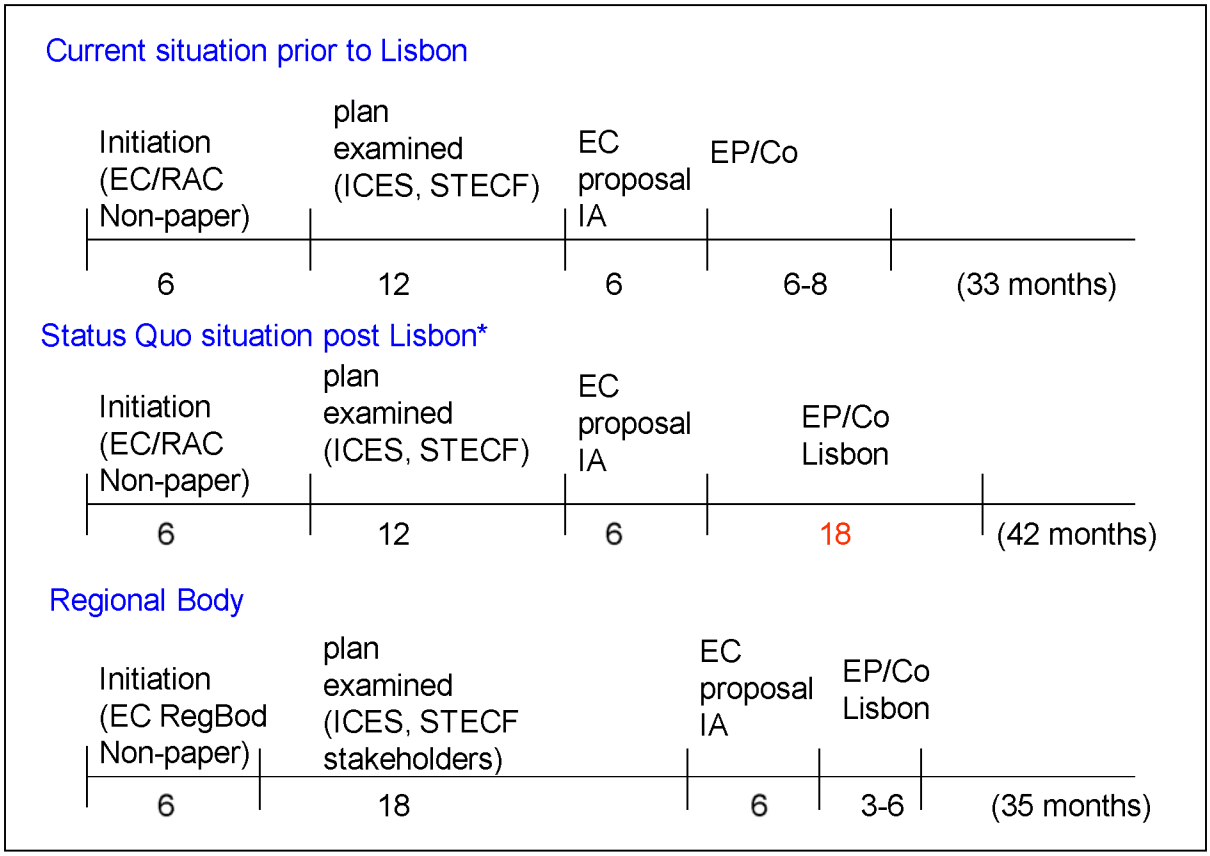

Figure 12 Schematic diagram of anticipated time to reach decisions under the governance proposals **that this is estimated time taken under the new Lisbon Treaty, as the data for 2010 is currently unavailable'*

Following the creation of Regional Bodies, three decision pathways are possible:

a) The Commission makes a decision on technical measures (e.g. HCRs, which follows the approved HCR format agreed in 2009). In this situation, the Commission decision would take around 6 months, and it would not enter the EP.

b) Technical measures are passed through both the Commission and the EP. Each process would take around 6 months.

c) Each year the generic management decisions are decided by the EP and the Council (in line with the Lisbon Treaty).

Depending upon the type of measure, and which pathway it takes, the time taken in co-decision making would be expected to vary between 3 and 6 months.

4.6.5. External and aquaculture

External policy under Options 1-3 has not yet been elaborated sufficiently to allow an impact assessment [Annex A].

The aquaculture indicator (aquaculture production versus capture production) can be expected under Option 1, and also under Options 2 and 3, to decrease as catches increase.

4.7. Alternative Option 2 Impact Assessment

4.7.1. Environmental indicators

Indicator 1 Stocks under MSY and Indicator 3 Average size of fish

There are two significant differences between Option 1 and Option 2.

- The target is for all stocks to reach MSY within 4 years of 2013, with no allowance for deviation from this trajectory for either assessed or unassessed stocks.
- The approach for multispecies fisheries will be to manage to the most biologically sensitive stock.

The first change will result in all stocks being, nominally, at Fmsy by 2017 rather than by 2022. Revisiting the analysis presented in Option 1, fishing at the conservation optimum would result in all stocks reaching Fmsy; in Option 1 some stocks continued to be overexploited, in multispecies complexes. But in terms of conservation status, the multispecies management option results in a maximum number of stocks exploited at Fmsy (Table 63).

The second change, again considering the analysis in Option 1, would imply that of the 30% of northern stocks in multispecies fisheries, 80% of deepwater and 50% of Mediterranean stocks, some 2/3 (66%) would be underexploited by at least 20% (and, in some cases, up to 50% - see Table 28 and Table 29). This will affect the total catch and revenue from these stocks, and is shown in the model outputs.

Table 63 Option 2 Total number of EU stocks at Fmsy.

Total number of stocks	2008	2012	2017	2022
Multispecies considerations				
"northern" stocks at Fmsy	89	3	3	89	89
"deepwater" stocks at Fmsy	29	0	0	14	14
"southern" stocks at Fmsy	18	4	4	18	18

In the Mediterranean (GSA 10 and 16), with fishing effort dictated by the most biologically sensitive species, and with no departure allowed from TAC constraints, F must be reduced by 70%, and the large scale fleet under ITRs would need to undergo a 20% reduction per year from 2016-2018. This dramatic reduction in capacity and effort would be necessary given the current state of stocks, notably European hake, in the Mediterranean, and would still not allow some stocks to reach MSY.

Table 64 shows projections based on the most realistic combinations for effort and capacity restrictions. Where stocks are still not expected to reach MSY, RegBods would need to propose alternative conservation and technical measures to promote recovery of these most vulnerable stocks. The move to catch quotas is not accounted for in the BIRDMOD projection within Table 64 but is expected to additionally reduce F.

Table 64 Option 2: Projections of fishing mortality for demersal species in GSA 16

Species	Area	F 0.1	F current (2008)	F proj (2012)	F proj (2017)	F proj (2022)
European hake	GSA 16	**0.16**	0.84	0.80	0.16	0.16
Norway lobster	GSA 16	**0.10**	0.14	0.14	0.03	0.03
Striped mullet	GSA 16	**0.37**	0.34	0.32	0.07	0.07
Deepwater rose shrimp	GSA 16	**0.83**	3.44	3.28	0.62	0.62
Giant red shrimp	GSA 16	**0.35**	0.73	0.71	0.14	0.14
Red mullet	GSA 16	**0.37**	1.12	1.08	0.23	0.23

There is some concern that the rapid implementation of Fmsy policy in Option 2, and the development of analytical assessments and reference points that this requires, is unfeasible for some stocks. For a few extremely problematic stocks (Table 65), despite many years of data collection and research into their population dynamics there is still no robust stock assessment for any of them. There are many underlying reasons why it has been so difficult to assess these species, including not only problems related to obtaining good quality fisheries data but also difficulties in fully understanding the species' biology. It is a fact that research laboratories throughout Europe have put a great deal of effort in collecting fisheries and biological data for all the species listed above, yet there are still many questions which remain unanswered. For example much work has been done in trying to determine that age of anglerfish yet despite a certain level of agreement between the various research bodies behind this work there is still a great deal of uncertainty and surely more work has to be carried out to ensure that the age readings do in fact approximate reality.

Table 65 Summary ICES advice for stocks for which development of an assessment is likely to be problematic in the short term.

Name of the stock	Summary of the ICES advice
Anchovy (IXa)	It is important that surveys are continued, in particular the spring acoustic survey and the recently initiated egg survey. It has not been possible to provide a reliable analytic assessment for this stock as a basis for management. A better alternative would be to consider management rules based directly on survey observations.
Southern Horse Mackerel (IXa)	In the absence of defined reference points, the state of this stock cannot be evaluated with regard to these. Catches decreased from the early 1960s but have been relatively stable since the early 1990s. There are no explicit management objectives for this stock. ICES considers that the assessment needs to be further evaluated before used as a basis for advice.
Anglerfish (IXa)	ICES advises on the basis of exploitation boundaries in relation to high long-term yield, low risk of depletion of production potential and considering ecosystem effects. In order to reach BMSY the 2010 catches should be zero or a management plan should be developed. The advice accounts for the poor condition of *L. piscatorius* stock.
Megrim (VIIIc, IXa)	There are no explicit management objectives for these stocks. The assessments are uncertain. There is a consistent retrospective pattern with an overestimation of SSB.
Dogfish (I-XIV)	No management objectives have been adopted. An EC Action Plan on elasmobranchs is being consulted on in 2008
Dab (22-32)	The available information is inadequate to evaluate stock trends. Therefore the state of the stock is unknown and there is no basis for an advice.

Another example is the anchovy; the amount of research effort needed for an adequate monitoring of the anchovy population far exceeds that which is possible given the limited

resources the various research bodies possess. Should the ICES recommendation be followed and more effort put into direct surveys of the anchovy population, research costs would increase significantly and this would still not constitute a guarantee that the relevant questions would be answered. The same applies for the southern horse mackerel stock which equally needs to be further evaluated in order for the assessments to be used as the basis for the management.

Another important aspect affecting the management of some these stocks, especially those of the demersal species, is the fact that they are caught in a mixed fishery. Anglerfish, megrim, dogfish and dab are all caught using very unselective fishing methods, therefore, even if management recommendations are for TAC=0 for any of them it would not be possible to eliminate the fishing impact on their population. In light of this, it is important to emphasize that a great deal more effort should not only be put into researching the species biology but also effort into further developing an ecosystem based approach for the management of demersal fish communities.

Given that advances in this field of biology are quite slow and results are seldom able to be tested in short periods of time it is highly unlikely that all these fisheries will become managed under Fmsy in the time span proposed in option 2, even if unlimited financial and staff resources were available. For this reason we present, as a sensitivity, a modification of Option 2 that allows for implementation of Fmsy for these stocks at a slower, phased rate.

Discarding

Option 2 includes a policy option to move to catch quotas, which combined with a change in mesh size and a change to minimum catch/landing size regulations would require all catches to be recorded and landed. There would be some management and industry costs associated with this option, that would include adjustment of the relevant legislation and provision for recording of all activities, and it would probably only be possible to implement it for the large scale fleet. These issues are addressed elsewhere. However, pilots are under way in some EU countries (Denmark, Germany) looking at options for catch quotas.

Discarding is currently quite high in some stocks. For example, estimates of the total catch of cod from different sectors points to significant discarding from the small mesh sector primarily targeting whitefish (Figure 13); [Annex C Appendix 4]. Clearly, increasing mesh sizes to 120mm would solve much of the discarding problem.

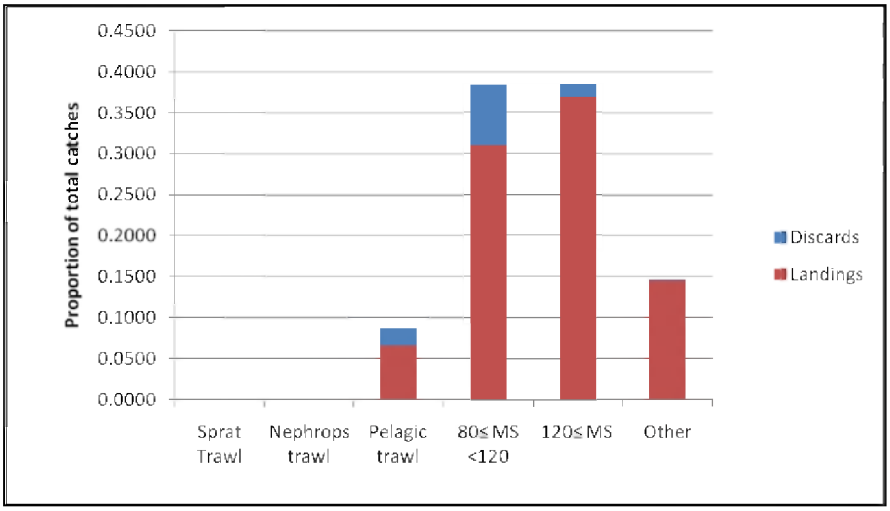

Figure 13 Option 2: Proportions of the total catch of cod landed and discarded by different mesh sizes segments in the North Sea fishery. Source: Commission data

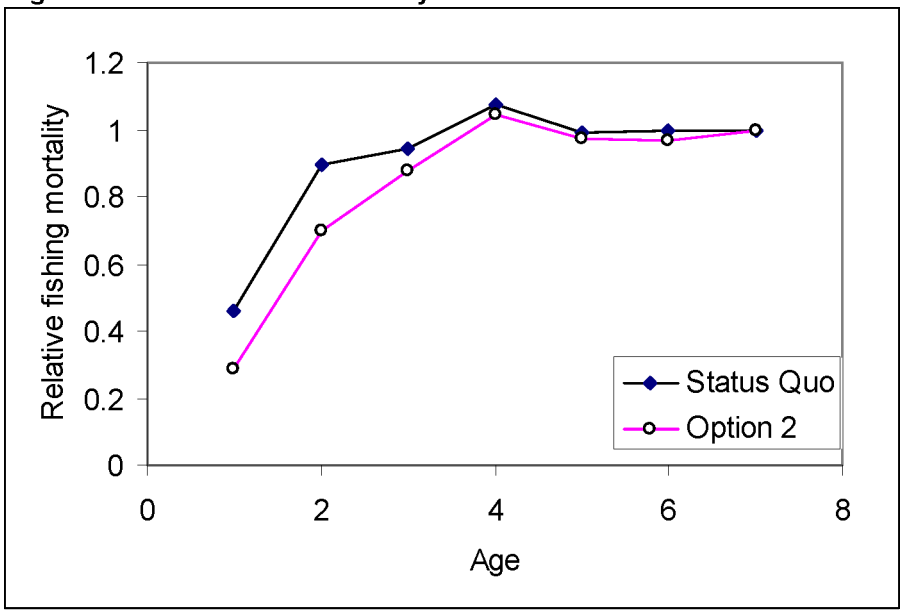

Figure 14 Option 2: Selectivity changes for all fisheries on cod, should the 80-120mm mesh size sector move to 120mm mesh, also with a move to retention of all cod caught, and no discarding.

Moving to a higher mesh size for the targeted fishery on cod, for instance, would lead to a reduction in total catches of cod by age as shown in Figure 15. Making this change in selectivity, and allowing for retention of all sizes of fish, would have the following impacts:

- Fmsy would be different from the Fmsy currently calculated for the stock;
- Growth in biomass would be the same as previously;
- Discarding would be reduced;
- Total catch retained, and catch value, would increase;
- Average age in the stock would increase beyond that indicated for Option 1.

For example, in the North Sea cod fishery, an increase in minimum mesh size to 120 mm would result in a slight increase in $F_{0.1}$ with substantial reductions in discards, an increase in retained catch and little impact on spawning stock biomass (Figure 15).

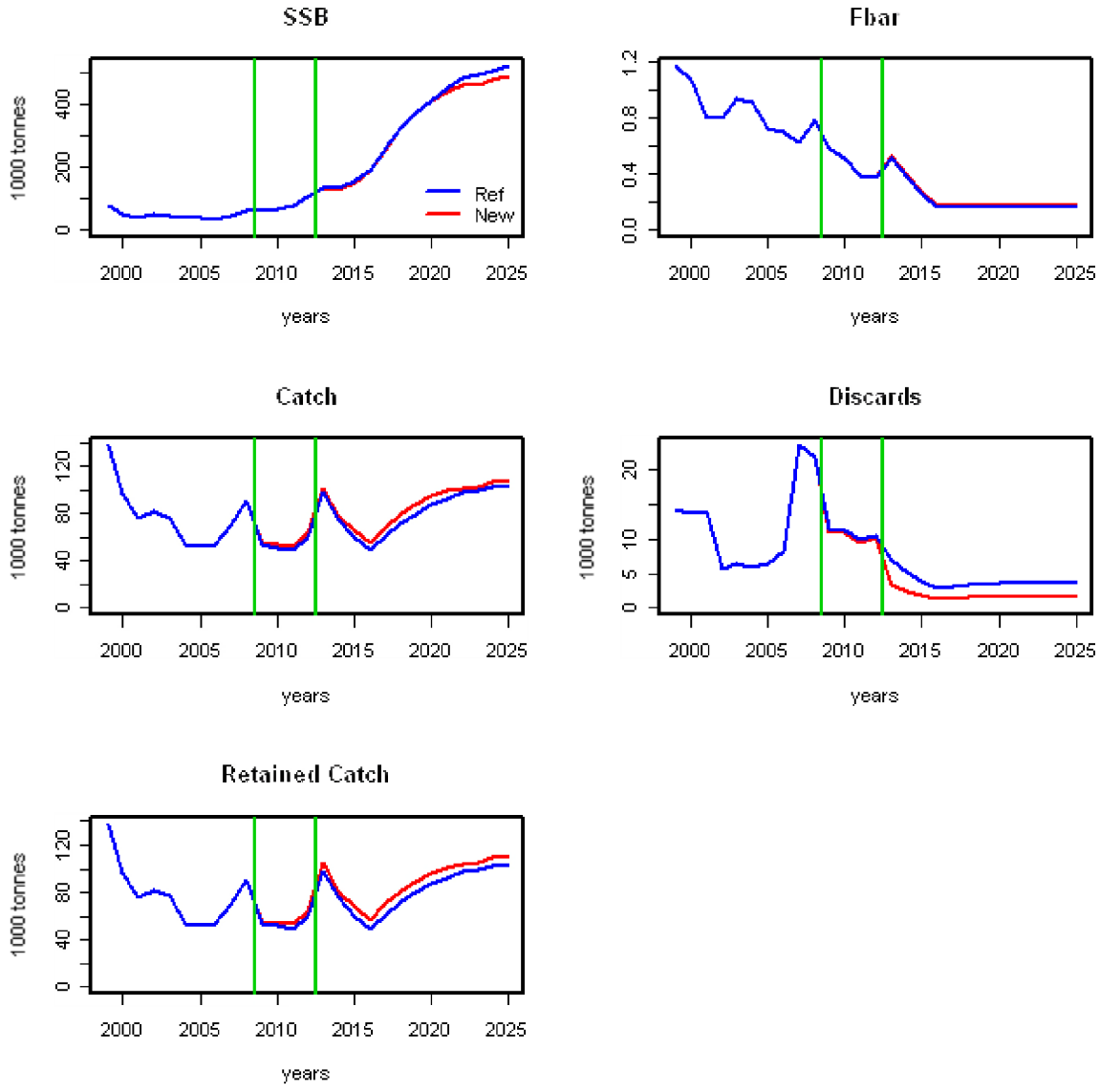

Figure 15 Option 2: Trends in selected stock characteristics for North Sea cod under management option 2 with (red) and without (blue) an increase in minimum mesh size to 120mm.

The impacts on Fmsy and discarding of ITR and regionalisation policy would remain effectively the same for Option 2 as for Option 1, i.e. they would contribute to improvements in discarding to 50% of previous levels and a reduction in unreported fishing to 5% of its previous level.

Summary of model outputs

Taking all of the above discussion, our projected trends for all EIAA stocks is presented in Table 66.

Table 66 Option 2: Total SSB and TAC by year for EU quota stocks included in the EIAA model, with a breakdown by projection type.

	SSB (t)			TAC (t)		
Projection type	**2012**	**2017**	**2022**	**2012**	**2017**	**2022**
FLR	14,247,218	20,917,406	26,685,134	1,633,816	1,818,528	2,110,381
Others*	8,313,196	10,432,552	11,664,494	1,492,126	1,399,920	1,599,265
Total	**22,560,414**	**31,349,959**	**38,349,628**	**3,125,942**	**3,218,448**	**3,709,646**

* Projections for stocks that are not explicitly modelled. Trends in SSB and TAC for these stocks are interpolated using projections from appropriate explicitly modelled stocks, based on stock characteristics and likely current stock status. Note that in Option 1, the assumption is that there will be approximately equal numbers of under- and over- exploited stocks in multispecies fisheries.

Subsidies

Under Option 1 the description of impacts of subsidies policy highlighted certain positive impacts on environmental indicators that would result from the ineligibility of some items which are eligible under the status quo and contributing to over-capacity and which would be abolished under Option 1, The abolition of these items e.g. modernisation actions, temporary cessation, etc would also apply under Option 2 with similar impacts to those described under Option 1. However, the retention of some subsidies under Option 1, and the re-focussing of eligible items under the smart green fisheries axis on areas related to innovation and environment, was also expected to result in some positive impacts (e.g. on selectivity, the creation of MPAs) from Option 1. With the complete abolition of EFF support under Option 2, there would be no potential for public support to contribute to environmental improvements expected to arise under Option 1, and which might not take place in the absence of public support (i.e. such developments can be assumed to be at least partly 'additional'[38] under Option 1). Subsidies policy under Option 2 can therefore be expected to result in less overall positive impacts on environmental indicators compared to Option 1.

Whether subsidies policy under Option 2 would create net benefits in environmental indicators when compared to the status quo option would depend largely on the impacts of the ITR policy under Option 2. There would probably be little benefit foregone under Option 2 in terms of a lack of funds for innovation, selectivity, etc, as the status quo policy is not expected to result in significant positive impacts (based on an assessment of the historic impacts of FIFG/EFF funding). And if it is assumed that ITR policy under Option 2 would be at least as effective in reducing capacity as decommissioning schemes funded through EFF under the status quo option (and it is), then the conclusion can be drawn that the combined Option 2 policies with regards to subsidies and ITRs should result in overall net benefits to environmental indicators when compared to the status quo.

In conclusion, the impacts of subsidies policy on environmental indicators (when coupled with ITR policy) under Option 2 can be assumed to be less favourable than Option 1, but more favourable than the Status Quo option.

[38] Additionality is the concept in which the extent to which developments which took place as a result of public sector support might be expected to have taken place even if such support was not provided i.e. would the private sector make such investments on its own.

Regionalisation

There is unlikely to be any change to the impacts expected under Option 1. RegBods will still be obligated to propose the appropriate conservation and technical measures required to achieve Fmsy management targets, although these proposals will need to respond to the more radical timeframe of the environmental objectives specified in Option 2.

Indicators 2 LTMPs

The number of LTMPs will be the same as in Option 1, since they will depend on the new HCR policy and RegBod activity, which is not expected to change substantially between Options 1 and 2. Thus we would expect to see the same improvements in decision-making and adoption of LTMPs as were shown in Figure 12.

Indicators 4 Fleet size

In Option 2 ITRs will be implemented to the same time scale for individual fleets, with the additional adoption of inter-EU transferability in Option 2. However, other features of Option 2, that differ from Option 1, include fish price and the rapidity of moving to Fmsy. This means that the outcome of Option 2 will have additional bearing on economic and social indicators. These in turn will have some consequences for likely additional fleet capacity changes.

Table 69 shows that in contrast with Option 1 (Table 35) more fleets are unprofitable in 2017 and 2022. We anticipate that this would have further consequences in terms of buy-outs within the fleet segments and reductions in capacity.

The level of reduction in fleet size that would be required to bring the 6 remaining unprofitable fleets into profitability was examined. These segments, and their net profit margins, are generally insensitive to reductions in vessel costs through reduction in vessel numbers. An exception to this is the Netherlands TBB2440 segment whose net profit margin is within 1% of that required for a stable profitability classification, and can achieve profitability with a 43% reduction in vessel numbers compared to 2007 levels, an additional 30% compared to the reduction under Option 2. A 98% reduction in vessel numbers, compared to 2007 levels, would be required for Portugal's DTS2440 segment to achieve profitability in 2022. It was not possible to achieve profitability for the other 3 segments (Portugal's HOK2440, Finland PTS2440 and Belgium TBB1224) through reduction in vessel numbers.

A second feature of Option 2 is the availability of inter-EU transfers and buy-outs. The shading in Table 69 groups segments of a similar class (small scale or large scale) and gear, which would probably be the subject of inter-EU quota transfers and fleet reductions. In other words the introduction of inter-EU transferability would effectively eliminate the nationality part of the segment definition. We would anticipated, under Option 2, that those segments within overall gear categories that remain unprofitable even after the initial reductions in fleet size associated with the introduction of ITRs in 2016 would be vulnerable to buy-outs from other, more profitable, segments in the same gear classes.

Within the Spanish DTS 2440, the fleet is operating at negative profitability, but only at 48% capacity in 2017. The equivalent Portuguese segment is operating at a much greater negative profitability but 100% capacity. This presents a scenario where it may be more efficient for Portuguese vessels to sell quota to Spain rather than the Portuguese restructure their entire fleet segment. This is also suggested in the consultation response to the EC's Green Paper from the Spanish government. If vessels are not only competing with vessels

from their own state, but targeting the same stocks as other states, the full potential of an ITR system on fleet reduction may not be realised.[39] We have not attempted to model these activities, because inter-EU transfers would be extremely difficult to predict. Nevertheless, we have calculated the additional fleet size reductions necessary to achieve profitability in some of the fleets with continuing unprofitable performance.

As described above, in order to meet Fmsy objectives in the Mediterranean within GSA 10 and 16, significant reductions in both effort and capacity would be necessary. Fishing effort is here driven by the most biologically sensitive species, which is represented by European hake. Fishing mortality should be reduced by more than 80%. Operating on only demersal trawlers, this objective should be obtained by a reduction of 99% in the total number of fishing days for this fleet segment. This reduction cannot be obtained by reducing the average days at sea per vessel as the limited fishing activity would not be able to cover the fixed costs. This would result in a reduction of 98% in the number of vessels (Table 67).

Within GSA 17, the most biological sensitive species is represented by common sole. To achieve Fmsy objective for this species, total fishing effort should be reduced by 34%. Operating on only demersal trawlers and beam trawlers, a reduction of 48% in the total number of fishing days for these fleet segments is needed. On the contrary of Sicily, the decrease in fishing effort can be obtained in GSA 17 by a reduction in the average days at sea per vessel as this reduction would not determine negative profits. This would result in a reduction in the number of vessels similar to that expected under the Status Quo (Table 68).

Table 67 Option 2 Projections of number of vessels by fleet segment in the Mediterranean (GSA 10 and 16).

Fleet segment	2008	2012	2017	2022	2017 var %	2022 var %
Demersal trawlers	573	501	12	11	-98%	-98%
Purse seiners	121	121	104	94	-14%	-22%
Small scale fishery	2,135	2,082	1,948	1,761	-6%	-15%
Polyvalent	49	48	45	40	-6%	-15%
Polyvalent passive	144	140	131	119	-6%	-15%
Longlines	174	170	159	144	-6%	-15%
Total	**3,196**	**3,062**	**2,399**	**2,169**	**-22%**	**-29%**

Table 68 Option 2 Projections of number of vessels by fleet segment in the Mediterranean (GSA 17).

Fishing technique	LOA class	2008	2012	2017	2022	2017 var %	2022 var %
Dredges	12-24	588	574	537	485	-6%	-15%
Demersal trawlers	<12	52	50	46	42	-8%	-17%
Demersal trawlers	12-24	574	551	528	478	-4%	-13%
Demersal trawlers	24-40	56	54	51	46	-4%	-13%
Vessels using hooks	12-24	7	7	6	5	-6%	-15%
Polyvalent passive	<12	1911	1863	1744	1576	-6%	-15%
Beam trawlers	12-24	39	38	36	33	-4%	-13%
Beam trawlers	24-40	35	34	32	29	-4%	-13%
Pelagic trawlers and seiners	12-24	77	76	72	65	-5%	-15%
Pelagic trawlers and seiners	24-40	70	69	65	59	-5%	-15%
Total		**3409**	**3314**	**3117**	**2818**	**-6%**	**-15%**

[39] MAPyA (2009) REVISIÓN DE LA POLÍTICA PESQUERA COMÚN (electronic). Available at URL: http://ec.europa.eu/fisheries/reform/docs/ministry_spain_es.pdf (accessed 26/04/10).

Table 69 Option 2: model predictions of major economic outputs (see also Annex B), including net profit margin and proportion of days spent fishing. Figures in bold identify fleets that would be vulnerable to quota buy-out by more profitable fleets. Shading is used to simply separate fleet sectors that may, internally, engage in buy-outs. For instance inter-EU transferability is likely within the DTS fleet, but not between the DTS and PTS fleet. SSF= small scale fleet, LSF = large scale fleet.

			2012				2017		2022		
SSF/LSF	Segment	Country	Fleet size (no)	Net Profit Margin	Proportion of available days spent fishing	ITR buyout (2016 - 2018)	Fleet size (no)	Net Profit Margin	Proportion of available days spent fishing	Fleet size (no)	Net Profit Margin	Proportion of available days spent fishing
SSF	DFN0012	FRA	911	10.8%	100%	0	831	11.6%	80%	831	15.9%	71%
SSF	DFN1224	DEU	24	31.4%	**57%**	1	21	36.2%	**54%**	20	38.3%	**51%**
SSF	DFN1224	FRA	159	11.9%	100%	0	143	12.9%	76%	143	18.1%	**67%**
SSF	FPO0012	FRA	443	14.2%	100%	0	421	17.7%	100%	401	18.8%	100%
SSF	FPO0012	GBR	1482	**2.7%**	**43%**	1	1343	12.4%	**43%**	1283	15.5%	**43%**
SSF	FPO1224	GBR	78	**2.6%**	81%	1	70	**9.2%**	85%	67	10.9%	84%
SSF	HOK0012	ESP	986	**-15.3%**	**43%**	1	879	**-8.7%**	**40%**	839	**2.8%**	**37%**
SSF	PG0012	EST	795	**-4.7%**	**45%**	0	748	**-1.6%**	**46%**	748	**-1.2%**	**44%**
SSF	PG0012	LVA	676	**-125.1%**	**22%**	1	600	**-7.9%**	**24%**	573	23.7%	**24%**
SSF	PG0012	POL	528	50.8%	**41%**	1	469	56.8%	**41%**	447	58.4%	**41%**
SSF	PG0012	SWE	759	43.4%	**31%**	1	614	56.0%	**34%**	587	58.3%	**33%**
SSF	PGP0012	FIN	1232	**-37.4%**	**54%**	1	1093	**-13.4%**	**49%**	1044	**-4.1%**	**48%**
SSF	PGP0012	PRT	2129	31.6%	**41%**	1	1890	36.4%	**43%**	1805	37.5%	**43%**
SSF	PMP0012	ESP	7769	30.5%	**49%**	1	6927	35.2%	**51%**	6616	36.5%	**51%**
SSF	PMP0012	IRL	1215	21.7%	**44%**	0	1143	26.7%	**45%**	1143	27.6%	**43%**
LSF	DTS0012	FRA	362	**7.3%**	**48%**	1	283	14.3%	**51%**	235	19.2%	**56%**
LSF	DTS0012	GBR	804	14.8%	**37%**	1	626	28.1%	**38%**	520	34.0%	**43%**
LSF	DTS1224	DEU	71	19.8%	**37%**	1	54	27.7%	**39%**	45	31.3%	**42%**
LSF	DTS1224	DNK	217	**3.9%**	**54%**	0	208	**9.5%**	**47%**	188	12.6%	**47%**
LSF	DTS1224	ESP	847	**-7.0%**	**60%**	1	648	**-0.3%**	**60%**	538	**7.9%**	**63%**
LSF	DTS1224	FRA	437	**1.3%**	100%	1	377	**8.2%**	100%	351	10.9%	100%
LSF	DTS1224	GBR	461	**2.9%**	72%	1	359	14.0%	**68%**	298	19.1%	76%
LSF	DTS1224	IRL	134	**5.7%**	73%	1	102	16.0%	79%	85	19.9%	88%
LSF	DTS1224	POL	84	**9.8%**	**30%**	0	55	21.8%	**40%**	46	24.9%	**44%**
LSF	DTS2440	DEU	23	48.1%	**57%**	1	17	55.0%	**60%**	14	57.8%	**64%**

LSF	DTS2440	ESP	480	**-13.5%**	**57%**	1	367	**-7.3%**	**48%**	305	**-0.5%**	**52%**
LSF	DTS2440	FRA	98	16.6%	96%	1	91	22.8%	93%	82	26.0%	96%
LSF	DTS2440	GBR	99	**3.2%**	78%	1	77	17.7%	**68%**	64	25.0%	72%
LSF	DTS2440	LTU	19	15.4%	**19%**	1	14	25.4%	**22%**	12	28.2%	**25%**
LSF	DTS2440	PRT	72	**-31.1%**	93%	1	60	**-21.2%**	100%	56	**-17.5%**	100%
LSF	DTS40XX	ESP	72	**2.5%**	**43%**	1	55	**4.7%**	**49%**	46	**7.8%**	**52%**
LSF	DTS40XX	EST	5	13.7%	89%	0	5	24.8%	100%	4	28.0%	100%
LSF	DTS40XX	PRT	12	43.0%	**44%**	0	11	44.3%	**44%**	10	47.7%	**44%**
LSF	HOK2440	ESP	221	**-14.9%**	75%	0	201	**-13.1%**	**67%**	182	**-7.2%**	**64%**
LSF	HOK2440	PRT	33	**-63.2%**	**54%**	0	30	**-94.2%**	**57%**	27	**-103.3%**	**60%**
LSF	PTS1224	DNK	78	**3.4%**	71%	0	75	**9.2%**	**67%**	68	12.2%	**69%**
LSF	PTS1224	ESP	488	**3.6%**	90%	1	401	**7.5%**	100%	388	**8.4%**	100%
LSF	PTS1224	FRA	82	**4.3%**	100%	1	76	**8.9%**	100%	72	10.4%	100%
LSF	PTS2440	DNK	61	**0.3%**	94%	0	59	**7.4%**	87%	53	11.0%	91%
LSF	PTS2440	FIN	16	**-43.8%**	**53%**	1	12	**-34.1%**	**60%**	10	**-29.9%**	**66%**
LSF	PTS2440	IRL	7	20.0%	**65%**	1	6	25.6%	75%	5	28.4%	90%
LSF	PTS2440	LVA	61	31.4%	**46%**	1	46	41.2%	**57%**	38	44.3%	**65%**
LSF	PTS2440	POL	44	**1.0%**	**49%**	1	34	13.6%	**64%**	28	17.5%	73%
LSF	PTS2440	SWE	24	14.7%	**65%**	1	17	24.8%	87%	14	27.8%	99%
LSF	PTS40XX	DNK	44	**5.9%**	**61%**	0	42	15.2%	**60%**	38	20.9%	**65%**
LSF	PTS40XX	ESP	110	**2.8%**	100%	0	105	10.0%	100%	100	12.3%	100%
LSF	PTS40XX	FRA	31	**-0.7%**	100%	1	29	**7.1%**	100%	27	**9.5%**	100%
LSF	PTS40XX	GBR	30	23.0%	**32%**	1	23	32.6%	**37%**	19	37.5%	**46%**
LSF	PTS40XX	IRL	16	20.4%	**34%**	1	12	31.0%	**39%**	10	36.8%	**47%**
LSF	PTS40XX	NLD	13	**-1.8%**	82%	0	12	11.0%	89%	11	15.2%	94%
LSF	PTS40XX	SWE	10	**5.9%**	73%	1	7	19.8%	98%	7	23.2%	100%
LSF	TBB1224	BEL	37	**-26.4%**	**69%**	1	27	**-29.8%**	**63%**	22	**-30.8%**	**64%**
LSF	TBB1224	DEU	200	**2.9%**	**50%**	1	152	11.0%	**45%**	126	17.0%	**46%**
LSF	TBB1224	NLD	144	**-8.6%**	**61%**	0	123	**-0.7%**	**64%**	111	**3.4%**	**66%**
LSF	TBB2440	BEL	43	**-9.9%**	100%	1	32	**-6.6%**	86%	27	**-3.5%**	89%
LSF	TBB2440	NLD	46	**-23.5%**	**46%**	0	42	**-15.3%**	**35%**	38	**-5.6%**	**33%**
LSF	TBB40XX	NLD	76	**8.3%**	**55%**	0	69	20.8%	**40%**	62	30.9%	**38%**

Indicators 6 MPAs

There may be some small negative impact on the speed of MPA designations arising from the removal of the smart green subsidy axis.

4.7.2. Economic indicators

Indicators 7-10 Economic performance

The Option 2 results of the EIAA model are summarised below. As expected income over the whole of the EU fleet increases steadily until 2022, following the trajectories of stock recoveries. Overall, economic indicators do not improve as rapidly as in Option 1 (see, e.g. Table 39, Table 40) because the multispecies requirements result in a significant number of stocks being under-exploited, which in our formulation we have interpreted as a reduction of 20% in catch for these stocks.

Table 70 Option 2: Economic results of the EIAA model by Member State

	2012					2017					2022				
Indicator	Income (mln)	GVA (mln)	Revenue/ Break Even Revenue	Net Profit Margin	Return On Investment	Income (mln)	GVA (mln)	Revenue/ Break Even Revenue	Net Profit Margin	Return On Investment	Income (mln)	GVA (mln)	Revenue/ Break Even Revenue	Net Profit Margin	Return On Investment
		7	8	9	10		7	8	9	10		7	8	9	10
BEL	80	16	0.93	-13%	-17%	74	32	0.94	-11%	-18%	86	50	0.95	-9%	-20%
DEU	134	96	1.49	28%	153%	151	123	1.66	37%	290%	169	145	1.74	40%	419%
DNK	290	171	1.30	4%	2%	334	226	1.38	11%	8%	352	250	1.41	15%	13%
EST	26	7	1.22	12%	16%	29	11	1.36	22%	38%	29	12	1.41	25%	45%
ESP	1328	416	1.02	-2%	-1%	1320	593	1.08	3%	2%	1495	839	1.11	7%	4%
FIN	14	2	0.92	-41%	-46%	14	5	1.02	-25%	-33%	14	6	1.07	-18%	-25%
FRA	928	461	1.18	6%	6%	958	550	1.24	11%	12%	1000	619	1.28	15%	18%
GBR	643	275	1.22	10%	4%	708	414	1.36	21%	12%	783	510	1.44	26%	19%
IRL	209	109	1.31	16%	12%	224	138	1.43	24%	23%	234	152	1.48	28%	31%
LTU	4	3	1.22	15%	29%	6	5	1.37	25%	85%	6	5	1.42	28%	121%
LVA	12	5	1.35	24%	63%	14	7	1.67	39%	142%	14	8	1.80	43%	180%
NLD	323	114	1.15	-1%	-2%	346	177	1.28	10%	17%	382	228	1.37	18%	37%
POL	31	17	1.41	21%	10%	37	24	1.56	31%	22%	39	26	1.62	34%	28%
PRT	249	139	1.34	17%	12%	263	163	1.32	17%	15%	270	177	1.33	18%	17%
SWE	59	24	1.43	20%	10%	68	36	1.64	32%	25%	69	38	1.70	35%	31%
TOTAL	**4332**	**1856**	**1.15**	**5%**	**3%**	**4546**	**2504**	**1.24**	**12%**	**9%**	**4940**	**3066**	**1.28**	**16%**	**14%**
Increase over 2012						5%	35%	7%	7%	6%	14%	65%	11%	11%	11%

Table 71 Option 2: Economic results of the EIAA model by vessel length

	2012					2017					2022				
Indicator	Income (mln)	GVA (mln)	Revenue/ Break Even Revenue	Net Profit Margin	Return On Investment	Income (mln)	GVA (mln)	Revenue/ Break Even Revenue	Net Profit Margin	Return On Investment	Income (mln)	GVA (mln)	Revenue/ Break Even Revenue	Net Profit Margin	Return On Investment
		7	8	9	10		7	8	9	10		7	8	9	10
SSF	731	447	1.39	19%	13%	756	505	1.50	25%	21%	788	552	1.54	28%	25%
1224*	1159	505	1.10	2%	1%	1242	708	1.17	9%	9%	1339	852	1.22	13%	15%
2440	1168	346	1.02	-5%	-3%	1189	570	1.08	2%	2%	1377	825	1.12	7%	7%
40XX	1274	557	1.25	9%	4%	1359	720	1.36	17%	9%	1436	837	1.42	22%	14%
TOTAL	**4332**	**1856**	**1.15**	**5%**	**3%**	**4546**	**2504**	**1.24**	**12%**	**9%**	**4940**	**3066**	**1.28**	**16%**	**14%**
Increase over 2012						5%	35%	7%	7%	6%	14%	65%	11%	11%	11%

* The 1224 segment also includes semi-industrial vessels between 0 and 12m *e.g.* DTS0012

Table 72 Option 2 results of the EIAA model for the percentage of modelled fleet segments achieving performance targets for profitability, return on investment and revenue: break even revenue.

	2012			2017			2022		
	Prop prof > 0.05	Prop ROI > 0.15	Prop Rev/Break Even Rev > 1	Prop prof > 0.05	Prop ROI > 0.15	Prop Rev/Break Even Rev > 1	Prop prof > 0.05	Prop ROI > 0.15	Prop Rev/Break Even Rev > 1
SSF	60%	47%	93%	73%	60%	100%	80%	60%	100%
1224*	33%	7%	87%	80%	33%	93%	87%	60%	93%
2440	38%	31%	56%	56%	44%	63%	56%	50%	69%
40XX	64%	18%	100%	91%	36%	100%	100%	55%	100%
TOTAL	**47%**	**26%**	**82%**	**74%**	**44%**	**88%**	**79%**	**56%**	**89%**
Increase over 2012				26%	18%	5%	32%	30%	7%

These impacts on fleets will result in corresponding changes in impacts on the ancillary and processing sectors, as compared to Option 1. Ancillary sector performance will decline at a greater rate compared to Option 1, and the processing sector will see lower rates of increase than Option 1, though still positive increases compared to the situation in 2012. These impacts on both ancillary and processing sector *vis a vis* Option 1, mean that 'tipping points' of no return in both sectors are more likely to be reached in specific locations under Option 2 than under Option 1.

Table 73 Option 2: Expected GVA multiplier effects in 2012, 2017 and 2022

	2012		2017		2022	
Indicator	GVA Processing (million euro) 7c	GVA Ancillary (million euro) 7d	GVA Processing (million euro) 7c	GVA Ancillary (million euro) 7d	GVA Processing (million euro) 7c	GVA Ancillary (million euro) 7d
BEL	17	8	16	6	18	5
DEU	75	14	84	11	94	9
DNK	57	50	66	48	69	43
EST	2	2	2	2	2	2
ESP	218	17	217	15	246	14
FIN	1	0	1	0	1	0
FRA	231	102	238	91	249	87
GBR	262	49	288	41	318	37
IRL	106	30	113	27	118	27
LTU	4	1	5	1	5	1
LVA	11	3	13	3	13	3
NLD	54	39	57	34	63	31
POL	5	1	6	1	6	1
PRT	39	11	41	10	42	9
SWE	5	3	5	3	6	2
TOTAL	1086	329	1153	291	1252	270
Increase over 2012			6%	-11%	15%	-18%

In the Mediterranean, economic performance in GSA10/16 will be impacted heavily by setting of management targets on the most vulnerable species. As described above, the effort reductions required for stocks to recover and move towards MSY will be significant, and will consequently impact upon profitability, as shown in the following tables. However, in GSA 17, where the reduction in fishing effort to achieve the management objective is less than an half of that expected for the Sicilian demersal fisheries, profitability under Option 2 increases for the entire fleet as a whole and for the majority of fleet segments. The only fleet segments showing a decrease in GVA are demersal trawlers 12-24m and 24-40m (Table 78), while demersal trawlers <12m represent the fleet segment which benefits the most by the fleet rationalization.

Table 74 Option 2 Projections of gross value added (mln €) by fleet segment for catching sector in the Mediterranean (GSA 10 and 16).

Fleet segment	2008	2012	2017	2022	2017 var %	2022 var %
Demersal trawlers	47.25	48.76	1.65	1.67	-97%	-97%
Purse seiners	16.85	12.47	16.49	16.46	32%	32%
Small scale fishery	31.60	33.57	58.39	55.86	74%	66%
Polyvalent	0.53	0.21	0.36	0.42	74%	102%
Polyvalent passive	8.83	7.02	8.77	8.86	25%	26%
Longlines	21.62	15.54	19.24	19.94	24%	28%
Total	**126.68**	**117.57**	**104.91**	**103.21**	**-11%**	**-12%**

Table 75 Option 2 Projections of ratio of revenues to break even revenue by fleet segment for catching sector in the Mediterranean (GSA 10 and 16).

Fleet segment	2008	2012	2017	2022	2017 var %	2022 var %
Demersal trawlers	1.18	1.15	1.33	1.34	15%	16%
Purse seiners	1.54	1.38	1.49	1.52	9%	11%
Small scale fishery	1.47	1.45	1.59	1.60	10%	10%
Polyvalent	1.17	0.97	1.06	1.10	9%	14%
Polyvalent passive	1.64	1.49	1.57	1.60	5%	8%
Longlines	1.65	1.47	1.55	1.60	6%	9%
Total	**1.33**	**1.28**	**1.58**	**1.60**	**24%**	**25%**

Table 76 Option 2 Projections of net profit margin by fleet segment for catching sector in the Mediterranean (GSA 10 and 16).

Fleet segment	2008	2012	2017	2022	2017 var	2022 var
Demersal trawlers	-12.6%	2.7%	14.8%	17.3%	12.1%	14.6%
Purse seiners	8.2%	4.0%	15.2%	17.5%	11.2%	13.5%
Small scale fishery	13.8%	30.9%	40.5%	41.2%	9.6%	10.3%
Polyvalent	-5.2%	-9.5%	1.6%	6.6%	11.1%	16.1%
Polyvalent passive	14.1%	18.1%	25.4%	27.9%	7.3%	9.9%
Longlines	21.1%	18.7%	25.8%	29.0%	7.2%	10.4%
Total	**0.7%**	**10.4%**	**33.3%**	**34.5%**	**22.8%**	**24.1%**

Table 77 Option 2 Projections of return on investment by fleet segment for catching sector in the Mediterranean (GSA 10 and 16).

Fleet segment	2008	2012	2017	2022	2017 var	2022 var
Demersal trawlers	14.7%	17.7%	27.7%	31.2%	10.0%	13.6%
Purse seiners	31.6%	22.3%	36.4%	40.5%	14.0%	18.2%
Small scale fishery	54.1%	59.3%	112.8%	119.6%	53.6%	60.3%
Polyvalent	20.4%	6.9%	14.8%	19.7%	8.0%	12.8%
Polyvalent passive	43.6%	35.1%	47.6%	53.5%	12.5%	18.3%
Longlines	62.9%	45.7%	61.2%	70.5%	15.5%	24.8%
Total	**28.2%**	**30.4%**	**80.8%**	**87.4%**	**50.4%**	**57.0%**

Table 78 Option 2 Projections of gross value added (mln €) by fleet segment for catching sector in the Mediterranean (GSA 17).

Fishing technique	**LOA class**	**2008**	**2012**	**2017**	**2022**	**2017 var %**	**2022 var %**
Dredges	12-24	41.34	36.76	43.46	45.12	18%	23%
Demersal trawlers	<12	1.45	1.21	3.03	2.80	150%	131%
Demersal trawlers	12-24	63.66	56.53	51.84	53.38	-8%	-6%
Demersal trawlers	24-40	14.50	11.53	10.41	10.66	-10%	-8%
Vessels using hooks	12-24	0.17	0.10	0.13	0.14	26%	35%
Polyvalent passive	<12	47.23	57.97	97.36	92.04	68%	59%
Beam trawlers	12-24	3.21	3.22	5.93	6.40	84%	99%
Beam trawlers	24-40	5.87	5.91	9.99	10.63	69%	80%
Pelagic trawlers and seiners	12-24	5.99	9.85	11.48	11.19	17%	14%
Pelagic trawlers and seiners	24-40	16.70	18.81	21.87	21.31	16%	13%
Total		**200.12**	**201.89**	**255.50**	**253.66**	**27%**	**26%**

Table 79 Option 2 Projections of ratio of revenues to break even revenue by fleet segment for catching sector in the Mediterranean (GSA 17).

Fishing technique	LOA class	2008	2012	2017	2022	2017 var %	2022 var %
Dredges	12-24	1.65	1.53	1.61	1.65	5%	8%
Demersal trawlers	<12	1.31	1.21	1.45	1.45	20%	20%
Demersal trawlers	12-24	1.38	1.28	1.38	1.40	7%	9%
Demersal trawlers	24-40	1.45	1.30	1.42	1.44	9%	10%
Vessels using hooks	12-24	1.76	1.43	1.54	1.61	8%	13%
Polyvalent passive	<12	1.73	1.73	1.93	1.94	11%	12%
Beam trawlers	12-24	1.28	1.23	1.56	1.60	27%	31%
Beam trawlers	24-40	1.32	1.27	1.53	1.56	20%	22%
Pelagic trawlers and seiners	12-24	1.27	1.32	1.37	1.39	4%	5%
Pelagic trawlers and seiners	24-40	1.36	1.37	1.43	1.45	4%	6%
Total		**1.47**	**1.40**	**1.57**	**1.59**	**12%**	**13%**

Table 80 Option 2 Projections of net profit margin by fleet segment for catching sector in the Mediterranean (GSA 17).

Fishing technique	LOA class	2008	2012	2017	2022	2017 var	2022 var
Dredges	12-24	22%	18%	23%	26%	6%	9%
Demersal trawlers	<12	23%	9%	26%	26%	17%	17%
Demersal trawlers	12-24	18%	10%	11%	14%	2%	4%
Demersal trawlers	24-40	11%	3%	2%	5%	-1%	3%
Vessels using hooks	12-24	-14%	-31%	-16%	-9%	14%	22%
Polyvalent passive	<12	31%	33%	43%	43%	9%	10%
Beam trawlers	12-24	22%	1%	19%	23%	19%	23%
Beam trawlers	24-40	24%	-4%	12%	16%	16%	21%
Pelagic trawlers and seiners	12-24	10%	15%	19%	20%	4%	5%
Pelagic trawlers and seiners	24-40	16%	11%	16%	18%	5%	7%
Total		**33%**	**15%**	**24%**	**25%**	**9%**	**10%**

Table 81 Option 2 Projections of return on investment by fleet segment for catching sector in the Mediterranean (GSA 17).

Fishing technique	LOA class	2008	2012	2017	2022	2017 var	2022 var
Dredges	12-24	34%	56%	71%	82%	16%	27%
Demersal trawlers	<12	77%	60%	174%	178%	114%	118%
Demersal trawlers	12-24	36%	48%	46%	53%	-2%	5%
Demersal trawlers	24-40	13%	29%	27%	31%	-2%	2%
Vessels using hooks	12-24	-6%	13%	18%	22%	5%	9%
Polyvalent passive	<12	78%	137%	251%	263%	115%	127%
Beam trawlers	12-24	27%	29%	60%	72%	31%	43%
Beam trawlers	24-40	21%	22%	40%	48%	18%	26%
Pelagic trawlers and seiners	12-24	18%	68%	87%	95%	19%	26%
Pelagic trawlers and seiners	24-40	23%	46%	58%	64%	12%	17%
Total		**58%**	**57%**	**78%**	**86%**	**21%**	**29%**

Subsidies

As noted in the description of impacts provided for Option 1, in the short-term the abolition of some forms of EFF subsidies under Option would result in short-term negative impacts on the catching sector. These impacts would be similar under Option 2. However the abolition of all EFF support would also mean that the positive economic impacts attributed to some types of subsidies retained under Option 1 e.g. innovative aspects and territorial development leading to greater levels of value added, would not be realised. The illustrative

quantitative analysis provided in [Annex C Appendix 3] suggests that Option 2 would result in little overall change compared to the status quo option, but would result in negative impacts when compared Option 1. Given the strong emphasis on small-scale fisheries under Option 1, Option 2 is expected to have negative short-term impacts when compared to Option 1, especially with regards to small-scale fisheries.

The abolition of all EFF subsidies under Option 2 would ensure disproportionate short-term negative impacts on economic indicators for large scale fisheries when compared to the status quo option, given that historic levels of funding (and assumed levels of funding under the status quo) have strongly favoured larger-scale fleets. However, small-scale fleets would also benefit from EFF support under the status quo option, so could experience some short-term negative impacts on indicators 7-10 under Option 2. These changes would be especially significant for some enterprises and not for others, as under the status quo option it is assumed that only a relatively small proportion of enterprises in each Member State actually receive EFF support.

With respect to longer-term impacts of subsidies policy under Option 2, as with the impacts on environmental indicators described above, the ITR policy is expected to be at least as effective in removing over-capacity in the fleet as the status quo policy (which relies on EFF support to do so). Levels of over-capacity are seen as perhaps the critical driver of indicators 7-10 in the long-term. Thus the combined subsidies and ITR policies under Option 2 can be expected to result in net positive impacts in economic indicators 7-10 in the longer term as fleet capacity is reduced, stocks recover, and economic performance for those remaining vessels improves. It is important to note however that in the absence of an effective ITR policy, Option 2 could result in negative impacts as EFF support would not be available to fund scrapping/decommissioning schemes – while these schemes have certainly not succeeded in balancing fleet capacity with fishing opportunities, in many cases they have at least made a contribution to doing so.

Indicator 11 Fish prices

With respect to fish prices, under Option 2 certain items eligible for EFF support under both the status quo option and Option 1, and which might be expected to result in price increases e.g. market promotion, would no longer be available. However, given the relative impact of EFF support on prices and the large number of other determinants on prices which are far more significant, while Option 2 might be considered to have less short-term impact on prices than the status quo option, neither are expected to have a significant impact on fish prices.

In Option 2 there would be no CMO, and the loss of market promotions, and interventions. More significantly there would be a liberalisation of trade policy. This would mean, at the very least, a constant market price, and probably a reduction in fish prices.

Set against this is the expectation that the more rapid improvement of stock status and environmental health under Option 2 would feed through to support fish prices for the same reasons given in Option 2, including the increased use of environmental certification and market based schemes.

Indicator 12 Subsidies

With respect to indicator 12, the complete abolition of EFF support would result in immediate short-term and long-term positive improvements in this indicator compared to both the status quo option and Option 1 i.e. the numerator would fall to zero.

4.7.3. Social indicators

The results of the EIAA modelling exercise (Table 82) confirm the anticipated changes to social indicators. Employment will continue to decline in the catching sector as the fleet size continues to decline, particularly so under the ITR reductions in the first 5 years of the programme. But because income and GVA will increase, from 2017 and 2012 respectively so will GVA per employee and crew wages. However, the attractiveness of the sector should continue to improve with crew wage increases, although due to the reduction in income associated with the multispecies "conservation" optimum these increases in crew wage are not as high as in Option 1 (i.e. under Option 2 an increase of 98% in 2022 compared to 131% in Option 1 [compared to 2012]). However, the large scale fleet is most impacted by this multispecies effect. The small decrease in employment per vessel for the large scale fleet in 2017 is a result of small increases in fishing opportunities (days at sea) and reductions in the fleet being slightly outweighed by increases in fishing efficiency, with the small scale fleet remaining unchanged. By 2022 employment per vessel in the large scale fleet has increased with improving catching opportunities, though in the small scale fleet employment per vessel has decreased slightly due to insufficient increases in catch opportunities. The reduction in vessel numbers gives a reduction in ancillary employment, though the recovery of stocks gives an increase in processing employment.

Table 82 Option 2 Trends in social indicators by Member State

	2012					2017					2022				
Indicator	Fleet size (no) a2	Employment (FTE) 13	Employment (FTE) per vessel 13a	Value added per employee (€) 16	Crew wage (€) per FTE 17	Fleet size (no) a2	Employment (FTE) 13	Employment (FTE) per vessel 13a	Value added per employee (€) 16	Crew wage (€) per FTE 17	Fleet size (no) a2	Employment (FTE) 13	Employment (FTE) per vessel 13a	Value added per employee (€) 16	Crew wage (€) per FTE 17
BEL	80	444	6	35601	49883	59	289	5	110176	127953	49	247	5	201582	221510
DEU	317	674	2	142741	77600	244	506	2	242621	123779	205	441	2	327738	165615
DNK	400	1265	3	135285	81853	384	1125	3	200832	119429	347	1061	3	235909	138864
EST	800	2475	3	2918	1039	752	2393	3	4704	1512	752	2278	3	5385	1696
ESP	10974	24519	2	16947	15899	9584	19763	2	30005	25249	9015	18060	2	46461	38186
FIN	1248	1640	1	1449	2159	1105	1339	1	3571	3325	1054	1242	1	4546	3733
FRA	2523	8475	3	54435	37442	2252	7090	3	77564	51171	2143	6536	3	94722	61314
GBR	2954	4811	2	57127	33417	2499	3832	2	108027	58756	2251	3565	2	143033	75892
IRL	1372	2402	2	45260	24482	1263	2174	2	63520	32506	1243	2073	2	73485	36679
LTU	19	40	2	72980	53734	14	35	2	132263	88162	12	33	3	154612	100579
LVA	737	1212	2	4158	1484	646	1161	2	6447	1508	611	1100	2	7301	1514
NLD	279	1423	5	80264	51311	245	1173	5	150990	87064	222	1075	5	212122	116435
POL	656	1398	2	11872	5454	557	1272	2	19082	8492	521	1192	2	22208	9798
PRT	2247	8408	4	16576	9008	1991	7767	4	21046	12835	1898	7314	4	24163	14956
SWE	793	1002	1	24167	6443	638	911	1	38992	10144	607	853	1	44674	11659
TOTAL	**25399**	**60188**	**2**	**30829**	**21227**	**22236**	**50830**	**2**	**49261**	**31995**	**20931**	**47070**	**2**	**65128**	**42103**
Increase over 2012						-12%	-16%	-4%	60%	51%	-18%	-22%	-5%	111%	98%

Table 83 Option 2 Trends in social indicators by vessel length

	2012					2017					2022				
Indicator	Fleet size (no) a2	Employment (FTE) 13	Employment (FTE) per vessel 13a	Value added per employee (€) 16	Crew wage (€) per FTE 17	Fleet size (no) a2	Employment (FTE) 13	Employment (FTE) per vessel 13a	Value added per employee (€) 16	Crew wage (€) per FTE 17	Fleet size (no) a2	Employment (FTE) 13	Employment (FTE) per vessel 13a	Value added per employee (€) 16	Crew wage (€) per FTE 17
SSF	19186	22450	1	19916	9926	17195	20217	1	25002	12205	16549	18975	1	29117	13983
1224*	4444	15311	3	32978	27809	3567	12708	4	55724	42255	3094	11791	4	72235	53576
2440	1348	15395	11	22507	21287	1104	11557	10	49328	41390	954	10386	11	79388	64664
40XX	421	7032	17	79208	42844	370	6347	17	113470	57378	335	5918	18	141408	69813
TOTAL	**25399**	**60188**	**2**	**30829**	**21227**	**22236**	**50830**	**2**	**49261**	**31995**	**20931**	**47070**	**2**	**65128**	**42103**
Increase over 2012						-12%	-16%	-4%	60%	51%	-18%	-22%	-5%	111%	98%

* The 1224 segment also includes semi-industrial vessels between 0 and 12m *e.g.* DTS0012

Table 84 Option 2 Average days at sea per vessel, by vessel length

Length	2012	2017	2022
SSF	92	93	91
1224*	160	160	166
2440	169	160	167
40XX	196	199	207
TOTAL	107	107	106
Increase over 2012		0%	-1%

HDA-BIRDMOD projections show a similar reduction in employment and improvement in social indicators. As employment is likely to follow trend in vessels number, the reduction in employees is particularly severe in Sicily (particularly for demersal trawlers), while it is limited in GSA 17 and similar to that expected under the Status Quo scenario. GVA per employee and crew wage will increase as a result of the fleet rationalization in both Mediterranean areas.

Table 85 Option 2 Projections of number of employees (FTE) by fleet segment for catching sector (GSA 10/16)

Fleet segment	2008	2012	2017	2022	2017 var %	2022 var %
Demersal trawlers	2,644	2,313	54	49	-98%	-98%
Purse seiners	550	550	474	428	-14%	-22%
Small scale fishery	2,531	2,468	2,310	2,088	-6%	-15%
Polyvalent	136	133	125	113	-6%	-15%
Polyvalent passive	470	459	429	388	-6%	-15%
Longlines	644	628	588	531	-6%	-15%
Total	**6,977**	**6,552**	**3,979**	**3,597**	**-39%**	**-45%**

Table 86 Option 2 Projections of GVA per employee (000 €) by fleet segment for catching sector (GSA 10/16)

Fleet segment	2008	2012	2017	2022	2017 var %	2022 var %
Demersal trawlers	17.87	21.08	30.36	34.05	44%	62%
Purse seiners	30.62	22.67	34.82	38.43	54%	69%
Small scale fishery	12.48	13.60	25.28	26.76	86%	97%
Polyvalent	3.87	1.57	2.92	3.75	86%	139%
Polyvalent passive	18.76	15.30	20.43	22.84	33%	49%
Longlines	33.56	24.73	32.73	37.53	32%	52%
Total	**18.16**	**18.90**	**23.88**	**25.75**	**26%**	**36%**

Table 87 Option 2 Projections of average crew wage per employee (000 €) by fleet segment for catching sector (GSA 10/16)

Fleet segment	2008	2012	2017	2022	2017 var %	2022 var %
Demersal trawlers	9.58	11.09	15.45	17.18	39%	55%
Purse seiners	11.09	8.59	12.47	13.62	45%	58%
Small scale fishery	5.42	5.87	10.51	11.10	79%	89%
Polyvalent	1.32	0.65	1.05	1.29	60%	97%
Polyvalent passive	6.92	5.73	7.50	8.33	31%	45%
Longlines	9.82	7.42	9.60	10.91	29%	47%
Total	**7.87**	**8.16**	**9.11**	**9.79**	**12%**	**20%**

Table 88 Option 2 Projections of number of employees (FTE) by fleet segment for catching sector (GSA 17)

Fishing technique	LOA class	2008	2012	2017	2022	2017 var %	2022 var %
Dredges	12-24	607	592	554	500	-6%	-15%
Demersal trawlers	<12	69	66	61	55	-8%	-17%
Demersal trawlers	12-24	1715	1646	1578	1426	-4%	-13%
Demersal trawlers	24-40	249	239	229	207	-4%	-13%
Vessels using hooks	12-24	7	7	7	6	-6%	-15%
Polyvalent passive	<12	1563	1524	1426	1289	-6%	-15%
Beam trawlers	12-24	155	149	142	129	-4%	-13%
Beam trawlers	24-40	151	145	139	126	-4%	-13%
Pelagic trawlers and seiners	12-24	198	195	184	166	-5%	-15%
Pelagic trawlers and seiners	24-40	410	404	382	345	-5%	-15%
Total		**5123**	**4966**	**4701**	**4250**	**-5%**	**-14%**

Table 89 Option 2 Projections of GVA per employee (000 €) by fleet segment for catching sector (GSA 17)

Fishing technique	LOA class	2008	2012	2017	2022	2017 var %	2022 var %
Dredges	12-24	68.12	62.12	78.49	90.14	26%	45%
Demersal trawlers	<12	21.01	18.29	49.68	50.83	172%	178%
Demersal trawlers	12-24	37.12	34.34	32.85	37.43	-4%	9%
Demersal trawlers	24-40	58.33	48.29	45.50	51.53	-6%	7%
Vessels using hooks	12-24	23.47	14.57	19.59	23.17	34%	59%
Polyvalent passive	<12	30.22	38.04	68.27	71.40	79%	88%
Beam trawlers	12-24	20.75	21.70	41.69	49.74	92%	129%
Beam trawlers	24-40	38.77	40.63	71.74	84.41	77%	108%
Pelagic trawlers and seiners	12-24	30.28	50.58	62.36	67.20	23%	33%
Pelagic trawlers and seiners	24-40	40.76	46.60	57.29	61.77	23%	33%
Total		**39.06**	**40.65**	**54.35**	**59.69**	**34%**	**47%**

Table 90 Option 2 Projections of average crew wage per employee (000 €) by fleet segment for catching sector (GSA 17)

Fishing technique	LOA class	2008	2012	2017	2022	2017 var %	2022 var %
Dredges	12-24	29.84	27.38	34.09	38.87	25%	42%
Demersal trawlers	<12	8.26	7.34	17.84	18.23	143%	148%
Demersal trawlers	12-24	17.61	16.43	15.80	17.74	-4%	8%
Demersal trawlers	24-40	23.74	19.99	18.95	21.20	-5%	6%
Vessels using hooks	12-24	9.56	5.51	7.10	8.24	29%	50%
Polyvalent passive	<12	12.44	15.33	26.48	27.63	73%	80%
Beam trawlers	12-24	8.59	8.88	15.04	17.52	69%	97%
Beam trawlers	24-40	18.93	19.74	33.12	38.57	68%	95%
Pelagic trawlers and seiners	12-24	17.58	26.71	32.01	34.18	20%	28%
Pelagic trawlers and seiners	24-40	20.85	22.18	26.52	28.34	20%	28%
Total		**17.67**	**18.17**	**23.36**	**25.51**	**29%**	**40%**

Indicators 14 Community status

The most significant negative impact of Option 2 will be the transferability of rights within the EU. This may be exacerbated by the complete cessation of EFF support. This will mean that EFF funds are no longer available which can be used to support social objectives. Indeed, when coupled with ITR policy under Option 2, the lack of any sort of support under EFF to

support communities affected by short-term pain for the sake of long-term gain, could be expected to face significant levels of public opposition.

Option 2 includes the following protection:

- Ceilings on the concentration of rights to three times current catches (implemented in our model by limiting fleet reductions to 40% of their current size);
- Ring fencing the small scale fleet. There are some different methods by which this could occur, but one option is to allow transfers in to small scale fleet ITR sectors but prohibit transfers out, as is the case with the Danish ITQ system;
- The possibility of other safeguards being proposed at regional level.

The ability of the EU level to accept or reject the additional safeguards at the regional level will probably be seen by MS as a potentially negative aspect of Option 2. We can envisage that such safeguards might be constructed so as to:

- Restrict the transfer of rights between regions, possibly implemented as a restriction of the ability to purchase quota from stocks not traditionally fished by a fleet
- Restrict the transfer of rights within a region
- Restrict the transfer of rights between different sectors within a region, for instance allowing transfers between all pelagic sectors but not allowing transfers between the 12-24m and 40+ demersal gear categories
- Apply such restrictions differently for different regions

All such restrictions on the transfer of rights will have the potential to reduce the economic efficiencies expected of a free-flowing transfer market, to increase costs and to reduce the value of the rights. However, the payoff is that different sectors are protected. It should also be borne in mind that there may be unanticipated 'rule-bending' responses by sections of the industry to any restrictions imposed that may undermine their effectiveness.

If Option 2 was implemented solely with protection for the small scale fleet and concentration rules – i.e. with full EU transferability – there is no doubt that some transfers would take place. The scale of these transfers can only be supposed at this stage, but it would depend on the following:

- The interest that other MS fleets have in acquiring quota for stocks that they have not previously fished. There is little hard information that can be used to assess the level of this appetite, but it may be noted that currently 10% of the UK whitefish quota is foreign owned (by so-called quota-hopping vessels owned in other Member States and flagged to the UK[40]), and approximately 40 French vessels (1% of the fleet) are owned by Spanish and Dutch companies.
- The financing available to vessels to enable them to purchase rights to fish new quota. This may, in turn depend upon

[40] Marine Fisheries Agency (2007) *Fisheries: The Operation of the Economic Link Licence Condition in 2005.* DEFRA Publications, London.

  - The history of governmental subsidy to a fleet, and the extent to which this has created more financially stable or larger companies with greater access to capital

  - The general situation of access to capital in different Member States, itself dependent upon differing financial conditions in different MS

- The likely vulnerability of fleets to buy-out of quota. Following the logic of our modelling, this would include all large scale fleets, which must have ITR systems under Option 2, which, even after undergoing significant reductions in fleet size in the first few years of the ITR regime, remain unprofitable with low fishing effort (days/year). Table 69 shows the detailed results of the model; assuming that transfers will primarily take place within gear groups when profitability in one sector is low, we would expect there to be some potential interest in between-MS transfers in a number of fleets in each gear class.

The impact that transfers would have on local communities, particularly those dependent upon fishing, will largely depend on whether changing patterns of quota ownership would lead to changing patterns of landing, use of ancillary services and processing. For instance, even if the flag of the vessels catching a species changed it is arguable that landings of particular species will still be made close to the places where they are caught, for reasons of efficiency. However, currently some species (e.g. Nephrops and hake) are landed far from their markets (Spain) and have to be transported overland to these markets.

Even if transfers were restricted to within a region, without restricting transfers between Member States these regional shifts are likely to happen. For instance, it would be potentially possible for the entire Scottish whitefish fleet quota for cod/haddock to become owned by Danish vessels based in Denmark rather than in Peterhead.

Communities that may be vulnerable to the loss of services associated with fishing and processing, in addition to direct employment in the catching sector would include Northern Scotland, the Baltic, and France. Part of the fishing rights of the Brittany fleet in the Celtic Sea are attractive for Spanish operators, and transfers can be anticipated in the event the economic situation of the French DTS1224 segment does not improve and scrapping schemes are stopped. This could impact negatively the Brittany economy if there were fewer vessels supplying the local primary processing sector and generating taxes for port maintenance and modernisation. This happened in the past in the Aquitaine region when operators from Spain acquired French local vessels. On the other hand, there is evidence (4 case studies report) that Spanish vessels are already landing fish and paying taxes in Brittany, so the transfer of quota to Spanish vessels may not automatically lead to the loss of revenue from taxes, or fish for processing, from the Brittany region.

Thus whether a community will be significantly impacted will depend on a number of factors, including where the fish will be landed and whether the community gaining the rights is more or less dependent upon fishing than the looser. For instance, the impact of quota transfers in the Spanish case the most fishery dependent region was Galicia, which gained from the transfers (Box 1), whereas the communities in the Basque region, in which fishing is only a very minor part of the economy, probably did not suffer much from the transfer of their opportunities to Galicia.

Another issue to consider is that communities may experience “tipping points” in respect of the size of locally based fleets, such that the departure of only a few vessels in a small community creates a cascade of impacts through the loss of now unprofitable ancillary services. Such potential vulnerability has been identified, for instance, in Scotland.

The sensitivity of local communities to loss of fishing rights may be acute. In their to the consultation to the Green Report, the majority of Member States still view the concept of Relative Stability as a key factor to the current CFP (see Table 91) and do not view the introduction of inter-EU transferable quotas as a desirable move. It is particularly noteworthy that the three MS that express some enthusiasm for inter-EU transferability are those that have had working ITQ systems for longest. Some different interpretations can be placed on this. Positive views of MS to ITRs (especially for those who already have them), could reflect

- their view or experience that ITRs are demonstrated to be working; or
- a view that they expect their industries to gain from the introduction of ITRs, either because they already have significant external interests or because their efficiency has already been improved under existing ITRs to the extent that they would be able to compete effectively in the EU marketplace; or
- a view that their industries are well placed to compete in the EU marketplace for quota because of other support mechanisms, for instance a supportive banking sector or strong domestic economy
- a disconnect between industry and government views

Table 91 MS responses to EC's Green Paper

Country	Agree with ITRs	Agree with EU transferable ITRs	Agree with Relative Stability	Notes
Denmark	✓	✓	✓	- ITR implemented in 2007 and no subsidies - Fleet has reduced
Estonia	✓	×	-	- ITRs implemented in 2001 - Fleet has reduced
Finland	-	×	-	- Support SSF on different regime
France	×	×	✓	- Oppose privatisation of a what should remain a public wealth
Germany	-	×	✓	- Believe that current quota allocation system is best
Iceland	-	-	-	- Strongly suggest landing quota be shifted to catch quota - Phase out subsidies
Ireland	-	×	✓	- Do not believe effort based management would be any more beneficial
Netherlands	✓	✓	×	- Support quota swapping outside of EU - Swaps should be permanent to provide economic stability
Portugal	×	×	-	
Poland	✓	-	-	- ITRs not suitable for SSF - SSF should be managed regionally
Norway	✓	-	-	- Relative stability should be flexible to allow to fleet structure development

Country	Agree with ITRs	Agree with EU transferable ITRs	Agree with Relative Stability	Notes
Spain	✓	✓	-	- Current quota allocation does not allow profitability - ITRs not suitable for SSF
Sweden	-	-	-	- Relative stability should be reformed and not be a restrictive factor in CFP reform
UK	×	×	✓	- Suggests access arrangements continue as current

NB: Cells populated with "-" does not indicate an opinion either for or against; it indicates that the relevant category was not specifically addressed in the MS' responses.
Source: European Commission (2010) Reform of the Common Fisheries Policy – Consultations Contributions (internet). Available at URL: http://ec.europa.eu/fisheries/reform/consultation/received/index_en.htm (accessed 27/04/2010).

Inter-EU transferability in the Mediterranean

Although inter-EU transferability of ITRs has the potential to impact some communities dependent upon fishing in the north of the EU, this may not happen in the Mediterranean. This conclusion arises from the fact that the management system currently pertaining to the Mediterranean is largely limited to the Territorial Sea. The Italian fishing licence scheme does not define a specific distinction between fishing within 12nm zones and fishing in international waters. Four types of professional fishing activity are defined: local coastal fishing, in-shore coastal fishing, Mediterranean fishing, overseas and ocean-going fishing. *Local coastal fishing* takes place in maritime waters to a maximum of 6 miles from the coast. However, local coastal fishing of vessels conforming to specific safety norms included in the State Decree n. 435 of 8/11/1991 has been allowed to fish to a maximum of 12 miles from the national coast by the Ministerial Decree of 21/2/1994. *In-shore coastal fishing* takes place in maritime waters to a maximum of 30 miles from the coast. Since 1990, based on the Ministerial Decree of 21/2/1994, there has been an experiment to allow in-shore coastal fishing with boats of gross registered tonnage (GRT) of not less than 30 GRT conforming to the safety norms established by State Decree n. 435 of 8/11/1991 to fish to a maximum of 40 miles from the national coast. *Mediterranean fishing* takes place in Mediterranean waters, and *Ocean fishing* takes place overseas.

The coastal area included in the 12 miles limit is not reserved to boats licensed for local coastal fishing. *Mediterranean fishing* and *Ocean fishing* can fish also within the 12nm zones. Therefore, the only limitation is related to vessels authorised for local costal fishing, which cannot fish beyond 12nm from the coast, while the majority of Sicilian (and Italian) vessels can fish in both national and international waters.

In international waters there is no internationally agreed management plan for any species other than swordfish and bluefin tuna (which are managed under ICCAT). In national waters, various MS, Italy included, have developed their own management plans. Unless the non-ICCAT fishing activity of MS vessels in international Mediterranean waters was to become subject to international management plans, with objectives in terms of effort or catch control at least at EU level, in our view there would be no basis on which the rights to fish in these areas could be allocated on an EU wide basis and be subject to an international transfer market. Within the territorial sea, unless another MS has historical fishing rights, the access rules in article 17 of the current CFP Regulation, assuming no change is made, would restrict access by one MS to another's territorial sea. Thus the rights assigned by a MS for fishing within its territorial sea would have no inter-EU tradable value without a corresponding change to the access rules, as that MS would be entitled to exclude vessels

from MS that have not traditionally fished in those waters. As such a change does not appear to be foreseen in terms of the reform of the CFP, this latter point, of course, will also act as some protection for the small scale fleet fishing solely or predominantly within the territorial sea of any MS.

Thus inter-EU transferability in the Mediterranean would probably be limited to ICCAT species. Thus we conclude that Option 2 will not differ substantially from Option 1 and Option 3.

Indicator 16B Relative Stability

Our status quo reported did not include an indicator on relative stability. We provide an analysis of it here.

Relative Stability in fishing rights has long been established as a principle of the CFP. It is inefficient, in that it does not adequately meet the needs of the fleet, and each year has to be modified according to a system of MS quota exchanges. These exchanges will almost inevitably increase, as fishing industries change in different MS, as the demand for different fish alters, and not least as the distribution and abundance of some fish stocks alters in consequence of environmental changes brought about, inter alia, by global warming. However, it is regarded as a fundamental right of fishers, and MS, to own quota that they have had a historical right to.

Given that rights will be inter-MS transferable under Option 2 and that after 10 years the rights return to the vessel's flag state, it is expected that relative stability will erode. While the overall transfer of quotas remains at about 5%, suggesting that the initial allocation of quota under an ITR system would be adjusted from the relative stability allocation by this amount, some individual swaps have been much higher than this. Table 92 presents the top 30 swaps away from the current relative stability key. This provides additional evidence for of which fleets may be interested in buying additional quota under a transferable ITR system.

Table 92 Top 30 swaps information per stock 2008. Top 30 is sorted by highest percentage. Swaps are for each stock and total quota indicates total quota allocated for EU for this stock.

Country	Species	Area	Total Swaps for MS	Total Quota for Stock	% Swap
GBR	HKE	2AC4-C	1,819	6,063	30.00%
NLD	JAX	2AC4-C	16,760	115,848	14.47%
POL	GHL	514GRN	1,355	15,000	9.03%
GBR	HER	07A/MM	1,300	14,656	8.87%
BEL	PLE	07A	500	5,953	8.40%
GBR	SPR	7DE	1,400	18,433	7.60%
FRA	MAC	8C3411	5,852	81,015	7.22%
FRA	WHB	2X12-F	1,000	24,479	4.09%
DNK	HER	4AB	16,649	479,143	3.47%
BEL	PLE	7DE	475	15,150	3.14%
FRA	JAX	2AC4-C	3,065	115,848	2.65%
SWE	HER	4AB	11,396	479,143	2.38%
ESP	HKE	571214	2,273	97,046	2.34%
LTU	HKW	N3NO	400	18,500	2.16%
BEL	SOL	8AB	274	13,311	2.06%
IRL	HER	6AS7BC	775	37,680	2.06%
DEU	HER	4CXB7D	5,008	254,549	1.97%
NLD	WHB	1X14	35,101	1,800,174	1.95%
POL	COD	3DX32	1,239	76,730	1.61%
DNK	HER	3BC+24	2,250	143,842	1.56%
PRT	POK	1N2AB	115	7,664	1.50%
NLD	PLE	2A3AX4	1,889	145,855	1.30%
ESP	HKE	8ABDE	817	64,816	1.26%
DEU	JAX	578/14	6,329	537,710	1.18%
EST	HKW	N3NO	217	18,500	1.18%
FRA	JAX	578/14	5,900	537,710	1.10%
NLD	HER	1/2	18,378	1,715,073	1.07%
DNK	POK	2A34	3,506	337,032	1.04%
LTU	JAX	578/14	5,500	537,710	1.02%
LVA	COD	3DX32	761	76,730	0.99%

Indicator 13, 16 and 17 Employment, social sustainability and attractiveness of the sector

Indirect short- and long-term impacts to social indicators 13-17 in all sub-sectors will follow changes in environmental and economic indicators described above e.g. declining fleet capacity and financial support to all sub-sectors in the short-term may reduce employment, GVA, attractiveness of the sector. Over the longer-term employment levels should be greater than would otherwise be the case under the status quo option, with improving stock status and economic performance. The more rapid return to MSY will also have a positive impact. However, the fact that for the multispecies fisheries the most sensitive species is prioritised ("conservation optimum") means that a number of species are underexploited. This is good news for the stocks, but will reduce catches, values, employment and income.

Indicator 28 Safety

With respect to indicator 28 (safety) there would also be negative direct impacts in both the short- and long-term as safety actions under EFF would be abolished. However, as with Option 1, positive indirect longer-term impacts should be experienced for all sub-sectors as reduced subsidies and ITR policy lead to better balance of capacity and fishing opportunities and improved stocks, and thereby better economic performance (itself linked to improved safety). These gains would be probably lower in Option 2 due to the lower levels of increase in profitability associated with this option.

4.7.4. Governance indicators

Indicator 18 Departure from quotas

Given that RegBods will function in a similar fashion under both Options 1 and 2, the likely impact described under Option 1 – that is that high level engagement and input from stakeholders at the stage of developing proposals and measures should lead to much less departure from scientific advice and recommendations on TACs – is again valid.

There is a risk however that the more radical Fmsy targets outlined under Option 2, especially in multispecies situations, will destabilise RegBods with stakeholders and MS contesting certain proposals required to reduce fishing effort to Fmsy. Although this is likely to extend the process at the RegBod level, it should not impact the departure from quota at the Council and European Parliament levels.

There is a possibility that some of the stocks cannot be brought into Fmsy management as early as 4 years after the revision of the policy, because of limitations to the speed with which assessments of currently unassessed stocks can be undertaken. We have examined the impact of relaxing this requirement for unassessed stocks in a sensitivity (Option 2a, Table 119) and concluded that it has very little impact on fleet performance. By allowing a longer time to reach decisions on appropriate management plans, Option 2a would probably improve the performance of indicator 18.

Indicator 19 Management Costs

For Option 1, we estimated that the increase in research costs required to bring all stocks under analytical assessment during the next 10 years of the CFP would be €22 million.

The increase in budget should be roughly the same for policy option 2 as the same number of species will have to be dealt with from the implementation of the policy. It is, nonetheless, likely that the high level of uncertainty associated with some of the stocks will affect the degree of efficiency of the organisation as a whole. In actual fact, it is unlikely that in such a short time period it will be possible to produce scientific advice sufficiently robust to support all the necessary management decisions to meet the requirements stated in option 2.

Moreover, the capacity of scientific stock assessment personnel in the EU is limited, and may not allow for such a rapid increase in scientific advice provision in the short time available (3 years). There are also additional constraints linked to the need to reduce public expenses at Member State level, thereby freezing or reducing the financial and human resource capacity to collate, analyse and report data. . There is a significant risk that this option simply cannot be realised.

A move to catch quotas would, however, substantially and additionally raise management costs, associated with a need to adjust minimum mesh size legislation, minimum landing size legislation, the method of calculation and apportioning catch versus landing quotas, and the need to have improved surveillance and monitoring, either through the extensive use of observer schemes or through use of remote technologies such as cameras. It is difficult to estimate the cost of these additional measures until the results of the current pilots are known, but they may be substantial.

With respect to subsidies under Option 2, the abolition of EFF support would mean that there are direct positive impacts on management costs consequent on there being no subsidy to manage. These positive impacts would obviously be greater than under Option 1.

There will undoubtedly be differences in how RegBods reach proposal decisions due to the shortened timeframe to reach Fmsy targets (by 2015). RegBods, drawing on input from RACs, some of which are already more organised in terms of thematic working groups and input from external technical/scientific experts, may be able to draw up measures very quickly. However, in some circumstances, where RegBods will be obliged to generate tougher management proposals, such as moratoria, in order achieve formal Council objectives for Fmsy management, the time taken will be longer.

The costs of introducing and operating an ITR system at EU level, rather than at MS level, will involve some additional administrative costs. In order to protect the integrity of the system some form of EU level register will also likely be necessary to record inter-State transfers. Finally given the need to ensure that ITRs can effectively be transferred across the EU regardless of nationality, there will be a certain cost in terms of conformity checking and compliance monitoring to the EU in terms of ensuring the compatibility of Member State ITR systems.

Indicator 29 Time taken to reach a decision

The time taken to reach a decision is expected to be shortened, for the same reasons as discussed in Option 1, by the development of RegBods. However, as indicated above, the discussions at RegBod level about the development of management plans based on "conservation optima" for multispecies fisheries may well turn out to be more difficult than those on socio-economic optima because many more fleet segments will be "losers". This may also lead to lengthened decision making at EP level. Thus the tighter environmental targets under Option 2 may destabilise or lengthen the decision making process.

Indicator 24 Coherence with WTO/EC policy

With the abolition of EFF support coherence with WTO policy in terms of the eventual removal of fisheries subsidies can be expected including as regards the removal of price support mechanisms under CMO policy.

Indicator 25 Administrative burden on industry

With governance decentralised to RegBods, management costs for the sector are likely to increase to the same level as described under Option 1. However, the administrative burden associated with inter-EU transferability of ITRs, which was not applied in Option 1, is likely to be significantly increased.

4.7.5. External and aquaculture

External policy under Options 1-3 has not yet been elaborated sufficiently to allow an impact assessment [Annex A].

The aquaculture indicator (aquaculture production versus capture production) can be expected to decrease as catches increase, but to a lesser extent than in options 1 or 3 due to the reduction in catches expected from the adoption of the "conservation optimum" Fmsy policy in multispecies fisheries.

4.8. Alternative Option 3 Impact Assessment

Most of the differences between Options 1 and 3 relate to governance. The Mediterranean models (GSA 10/16 and GSA 17) did not demonstrate significant differences in fleet dynamics, economics or social indicators between Options 1 and 3. Tables for the BIRDMOD models have therefore not been reproduced in this section; please refer to the outputs under Option 1.

4.8.1. Environmental indicators

Indicator 1 Stocks under MSY

Both MSY and discarding policies are virtually identical in Option 3 to Option1. The only difference is that Option 3 is expected to bring about stock recovery that is slower than under Option 1 due to a -15% constraint on TAC yearly reductions.

Table 93 Option 3: Total SSB and TAC by year for EU quota stocks included in the EIAA model, with a breakdown by projection type.

	SSB (t)			TAC (t)		
Projection type	**2012**	**2017**	**2022**	**2012**	**2017**	**2022**
FLR	14,288,263	21,362,374	26,824,458	1,703,991	1,853,462	2,171,845
Others*	8,313,196	10,264,638	11,548,183	1,534,028	1,461,509	1,602,121
Total	**22,601,459**	**31,627,013**	**38,372,641**	**3,238,019**	**3,314,971**	**3,773,967**

* Projections for stocks that are not explicitly modelled. Trends in SSB and TAC for these stocks are interpolated using projections from appropriate explicitly modelled stocks, based on stock characteristics and likely current stock status. Note that in Option 1, the assumption is that there will be approximately equal numbers of under- and over- exploited stocks in multispecies fisheries.

The impacts of subsidies policy under Option 3 would mirror that of Option 1. Only very small changes in the quantum of short- and longer-term impacts would be experiences as a result of slightly reduced levels of funding available under axis 1 (smart green fisheries) given the allocation of some of the total funds available into a social and economic emergency fund.

Governance

RACs will remain, although they will become more representative in terms of stakeholder participation, and will be involved more in the delivery of scientific advice. As a result they will hold greater influence over management decisions made at EU level. A risk of this is that the decision making process will become blocked more frequently as incompatibility between RAC advice and MSY policy will increase through the greater number of stakeholder objectives. The net result is unlikely to dramatically affect the number of stocks brought under Fmsy, and will instead increase administrative burden within the decision making process.

Access rights

Given the slower implementation phase of ITRs in option 3, it is expected that any impacts (both positive and negative) expected in Option 1 and 2 will also occur under option 3 but not as rapidly.

Indicator 2 LTMPs

Under Option 3, as with Options 1 and 2, environmental MSY policy dictates a default harvest control rule and as such LTMPs, or similar, will be necessary for all stocks or multispecies complexes.

Indicator 4 Fleet evolution

The decline in fleet size is expected to be similar to that under Option 1.

4.8.2. Economic indicators

Indicators 7-10 Economic performance

Under Option 3, as under Option 1, MSY and ITR policy will have the largest impact on economic indicators for the fleets, and related ancillary and processing sectors.

The stock situation under Option 3 should follow that seen under Option 1, with a substantial long-term improvement in the resource base. The combination of improved landings and fleet rationalisation (as a result of ITRs) will result in an eventual improvement in economic performance. This improvement should occur toward the end of the CFP reform period when stocks have started recovering and ITRs have been established.

The Option 2 results of the EIAA model are summarised below (Table 94). Income over the whole of the EU fleet increases steadily until 2022, following the trajectories of stock recoveries. The economic impacts under Option 3 are greater than under Option 2 because of the adoption of the "socio-economic optimum" for multispecies fisheries. Like Option 1, this allows all stocks to, on average, be exploited at Fmsy, resulting in MSY levels of catch.

The fact that rights will only be transferable within Member States under Option 3 has a number of implications for impacts on economic indicators. On the one hand, it is likely to mean that overall levels of rationalisation (and economic gains) within the whole of the EU are smaller than under Options 1 and 2, which both provide for inter-country transferability. However, on the other hand, it also means that 'tipping points' in all sub-sectors (ancillary, catching, processing) in particular locations/countries are less likely to be reached, which may be socially desirable (i.e. there is a linkage/trade-off between Options with respect to economic and social objectives).

Table 94 Option 3 Economic results of the EIAA model by Member State

	2012					2017					2022				
Indicator	Income (mln)	GVA (mln)	Revenue/ Break Even Revenue	Net Profit Margin	Return On Investment	Income (mln)	GVA (mln)	Revenue/ Break Even Revenue	Net Profit Margin	Return On Investment	Income (mln)	GVA (mln)	Revenue/ Break Even Revenue	Net Profit Margin	Return On Investment
		7	8	9	10		7	8	9	10		7	8	9	10
BEL	83	17	0.93	-13%	-17%	79	35	0.94	-10%	-18%	88	52	0.95	-8%	-20%
DEU	138	100	1.49	29%	159%	154	126	1.66	37%	295%	173	149	1.73	40%	427%
DNK	292	173	1.30	4%	2%	335	227	1.38	11%	8%	353	251	1.41	15%	13%
EST	26	7	1.22	12%	16%	29	11	1.36	22%	38%	29	12	1.41	25%	45%
ESP	1400	444	1.02	-2%	-1%	1375	625	1.08	4%	2%	1540	871	1.11	7%	4%
FIN	14	2	0.92	-41%	-47%	15	5	1.02	-25%	-33%	14	6	1.07	-18%	-25%
FRA	948	472	1.18	6%	6%	985	570	1.25	12%	13%	1019	632	1.28	15%	18%
GBR	660	282	1.22	10%	4%	719	422	1.36	21%	12%	793	518	1.44	26%	20%
IRL	213	110	1.31	16%	12%	229	141	1.43	24%	23%	236	154	1.48	28%	31%
LTU	4	3	1.22	16%	30%	6	5	1.37	26%	86%	6	5	1.42	28%	120%
LVA	12	5	1.36	24%	63%	14	7	1.67	39%	142%	14	8	1.80	43%	180%
NLD	336	122	1.16	0%	0%	358	186	1.29	11%	20%	397	241	1.38	19%	40%
POL	31	17	1.41	21%	10%	37	24	1.56	31%	22%	39	26	1.62	34%	28%
PRT	249	139	1.34	17%	12%	264	164	1.32	17%	15%	269	176	1.33	18%	17%
SWE	59	24	1.43	20%	10%	68	36	1.64	33%	25%	68	38	1.70	35%	31%
TOTAL	**4466**	**1918**	**1.15**	**5%**	**3%**	**4666**	**2585**	**1.24**	**13%**	**9%**	**5039**	**3140**	**1.28**	**16%**	**14%**
Increase over 2012						4%	35%	7%	7%	6%	13%	64%	11%	11%	11%

Table 95 Option 3 Economic results of the EIAA model by vessel length

	2012					2017					2022				
Indicator	Income (mln)	GVA (mln) 7	Revenue/ Break Even Revenue 8	Net Profit Margin 9	Return On Investment 10	Income (mln)	GVA (mln) 7	Revenue/ Break Even Revenue 8	Net Profit Margin 9	Return On Investment 10	Income (mln)	GVA (mln) 7	Revenue/ Break Even Revenue 8	Net Profit Margin 9	Return On Investment 10
SSF	737	451	1.39	19%	13%	768	516	1.50	26%	21%	792	556	1.53	28%	25%
1224*	1196	525	1.10	2%	2%	1275	732	1.18	10%	9%	1370	875	1.22	13%	15%
2440	1249	380	1.02	-4%	-2%	1257	612	1.09	3%	2%	1431	864	1.13	7%	7%
40XX	1284	563	1.25	9%	4%	1366	725	1.36	17%	10%	1445	845	1.42	22%	14%
TOTAL	**4466**	**1918**	**1.15**	**5%**	**3%**	**4666**	**2585**	**1.24**	**13%**	**9%**	**5039**	**3140**	**1.28**	**16%**	**14%**
Increase over 2012						4%	35%	7%	7%	6%	13%	64%	11%	11%	11%

* The 1224 segment also includes semi-industrial vessels between 0 and 12m *e.g.* DTS0012

Table 96 Option 3 results of the EIAA model for the percentage of modelled fleet segments achieving performance targets for profitability, return on investment and revenue: break even revenue.

	2012			2017			2022		
	Prop prof > 0.05	Prop ROI > 0.15	Prop Rev/Break Even Rev > 1	Prop prof > 0.05	Prop ROI > 0.15	Prop Rev/Break Even Rev > 1	Prop prof > 0.05	Prop ROI > 0.15	Prop Rev/Break Even Rev > 1
SSF	60%	47%	93%	73%	60%	100%	80%	60%	100%
1224*	33%	7%	87%	80%	33%	93%	87%	60%	93%
2440	38%	31%	56%	56%	44%	63%	56%	50%	69%
40XX	64%	27%	100%	91%	45%	100%	100%	55%	100%
TOTAL	**47%**	**28%**	**82%**	**74%**	**46%**	**88%**	**79%**	**56%**	**89%**
Increase over 2012				26%	18%	5%	32%	28%	7%

For the Mediterranean, the economic and social results are very similar to Option 1, with a small reduction in profitability associated with the lower prices assumed for Option 3.

Stock recovery and overall sector performance give improvements to processing and ancillary sector indicators (Table 97) though slightly less pronounced than in Option 1 due to the comparatively lower improvement in fishing sector performance.

Table 97 Option 3 Expected GVA multiplier effects in 2012, 2017 and 2022

	2012		2017		2022	
Indicator	GVA Processing (million euro) 7c	GVA Ancillary (million euro) 7d	GVA Processing (million euro) 7c	GVA Ancillary (million euro) 7d	GVA Processing (million euro) 7c	GVA Ancillary (million euro) 7d
BEL	18	8	17	6	19	5
DEU	77	14	86	11	97	9
DNK	58	50	66	48	70	43
EST	2	2	2	2	2	2
ESP	230	17	226	15	253	14
FIN	1	0	1	0	1	0
FRA	236	104	245	91	253	87
GBR	268	49	293	41	323	37
IRL	108	30	116	27	119	27
LTU	4	1	5	1	5	1
LVA	11	3	13	3	13	3
NLD	56	39	59	34	66	31
POL	5	1	6	1	6	1
PRT	39	11	41	10	42	9
SWE	5	3	6	3	6	2
TOTAL	1116	331	1181	292	1275	270
Increase over 2012			6%	-12%	14%	-18%

Subsidies

Under Option 3, the impacts of subsidies policy on all economic indicators would mirror those described under Option 1. The only difference with Option 1 would be that a small emergency fund would be retained to support fleets in special difficulties as a result of either CFP reform processes under Option 3 and/or continuing problems of economic viability resulting from the fact that Option 3 is expected to bring about stock recovery that is slower than under Option 1. The implications of this special emergency support are that in the short-term, *those receiving support* would see their social indicators improve. However the amounts of money involved are small and the impacts across the EU as a whole can be expected to be negligible.

The illustrative analysis in [Annex C Appendix 3] suggests that Option 3 would result in positive impacts compared to the status quo option, and would also result in positive impacts when compared to Option 2.

Access rights

With the possibility of SSF safeguard implementation by MS, there is the potential for less fleet rationalisation. If LSF are not permitted to buy-out SSF quota, there is less potential for the entire fleet to become more efficient through a shift towards industrialisation. In Norway,

Governments have previously insisted that safeguards for SSF are in place to ensure a variety of vessel sizes in the MS's fleet[41]. It is expected then that while there will inevitably be buy-outs within fleets sections – leading to improvement in all economic indicators – this will not have as substantial positive impact on those indicators as would have occurred under Option 1 and 2.

4.8.3. Social indicators

Under Option 3, the main impacts on social indicators are likely to result from MSY policy and the move to ITRs under access rights policy. As already noted, these policies are almost identical under Options 1 and 3. However, because of the expected delay in the time it will take stocks will reach MSY the short term impacts to social indicators are likely to be less severe. The overall picture will be very similar however, and the (moderated) decline in employment figures may still invoke hesitancy in the SSF in voluntarily moving to ITRs.

The results of the EIAA modelling exercise (Table 82) confirm the anticipated changes to social indicators. Employment will continue to decline in the catching sector as the fleet size continues to decline, particularly so under the ITR reductions in the first 5 years of the programme. But because income and GVA will increase, from 2017 and 2012 respectively so will GVA per employee and crew wages. Crew wages are improved over those expected under Option 2 with the adoption of a socio-economic optimum applied to multi-species management (similar to that seen under Option 1).

[41] Hannesson, R. (2009) *Norway's Experience with ITQs*, Norwegian School of Economics and Business Administration, Norway.

Table 98 Option 3 Trends in social indicators of the EIAA model by Member State

	2012					2017					2022				
Indicator	Fleet size (no) a2	Employment (FTE) 13	Employment (FTE) per vessel 13a	Value added per employee (€) 16	Crew wage (€) per FTE 17	Fleet size (no) a2	Employment (FTE) 13	Employment (FTE) per vessel 13a	Value added per employee (€) 16	Crew wage (€) per FTE 17	Fleet size (no) a2	Employment (FTE) 13	Employment (FTE) per vessel 13a	Value added per employee (€) 16	Crew wage (€) per FTE 17
BEL	81	456	6	36375	50509	59	301	5	117248	134423	49	251	5	205497	225088
DEU	317	689	2	144588	78877	244	512	2	245494	126038	205	446	2	332719	169513
DNK	400	1280	3	135372	82100	384	1129	3	200862	119847	347	1064	3	235875	139270
EST	800	2475	3	2918	1039	752	2393	3	4704	1512	752	2278	3	5385	1696
ESP	10974	25770	2	17233	16062	9585	20418	2	30614	25772	9013	18409	2	47320	38933
FIN	1248	1641	1	1451	2161	1105	1340	1	3600	3360	1054	1241	1	4537	3732
FRA	2560	8639	3	54584	37469	2262	7231	3	78823	51791	2152	6639	3	95262	61499
GBR	2954	4931	2	57260	33484	2499	3878	2	108940	59375	2251	3609	2	143517	76363
IRL	1372	2437	2	45325	24530	1263	2198	2	64175	32886	1243	2085	2	73866	36993
LTU	19	40	2	73263	53828	14	35	2	132956	88580	12	32	3	156681	101974
LVA	737	1212	2	4159	1481	646	1161	2	6449	1506	611	1099	2	7305	1517
NLD	279	1452	5	84357	52960	245	1191	5	156300	89333	222	1089	5	221624	120714
POL	656	1399	2	11931	5479	557	1272	2	19135	8515	521	1188	2	22199	9796
PRT	2247	8413	4	16568	9014	1991	7800	4	21014	12811	1898	7322	4	24060	14886
SWE	793	1003	1	24225	6451	638	912	1	39245	10207	607	850	1	44721	11669
TOTAL	**25437**	**61836**	**2**	**31024**	**21378**	**22247**	**51771**	**2**	**49925**	**32508**	**20938**	**47604**	**2**	**65954**	**42721**
Increase over 2012						-13%	-16%	-4%	61%	52%	-18%	-23%	-6%	113%	100%

Table 99 Option 3 Trends in social indicators of the EIAA model by vessel length

	2012					2017					2022				
Indicator	Fleet size (no) a2	Employment (FTE) 13	Employment (FTE) per vessel 13a	Value added per employee (€) 16	Crew wage (€) per FTE 17	Fleet size (no) a2	Employment (FTE) 13	Employment (FTE) per vessel 13a	Value added per employee (€) 16	Crew wage (€) per FTE 17	Fleet size (no) a2	Employment (FTE) 13	Employment (FTE) per vessel 13a	Value added per employee (€) 16	Crew wage (€) per FTE 17
SSF	19210	22536	1	19997	9922	17195	20321	1	25386	12311	16549	19022	1	29204	13950
1224*	4456	15743	4	33326	28011	3578	12938	4	56569	42952	3101	11941	4	73278	54372
2440	1350	16501	12	23039	21442	1104	12150	11	50372	42070	954	10717	11	80594	65504
40XX	421	7056	17	79782	43018	370	6363	17	113938	57521	335	5924	18	142712	70405
TOTAL	**25437**	**61836**	**2**	**31024**	**21378**	**22247**	**51771**	**2**	**49925**	**32508**	**20938**	**47604**	**2**	**65954**	**42721**
Increase over 2012						-13%	-16%	-4%	61%	52%	-18%	-23%	-6%	113%	100%

* The 1224 segment also includes semi-industrial vessels between 0 and 12m *e.g.* DTS0012

The reductions in ancillary employment and changes in processing employment observed under Option 3 (Table 100) are almost identical to those for Option 1 due to the similarity in reductions in vessel numbers and changes in total landings respectively.

Table 100 Option 3 Expected employment multiplier effects in 2012, 2017 and 2022

	2012		2017		2022	
Indicator	Employment Processing 7c	Employment Ancillary 7d	Employment Processing 7c	Employment Ancillary 7d	Employment Processing 7c	Employment Ancillary 7d
BEL	292	176	254	128	283	107
DEU	832	164	846	126	949	106
DNK	1263	475	1315	457	1387	413
EST	128	725	128	681	128	681
ESP	8124	1125	7256	983	8123	924
FIN	68	0	63	0	62	0
FRA	7464	1927	7052	1703	7295	1620
GBR	5784	920	5731	779	6323	701
IRL	2227	721	2175	664	2245	654
LTU	149	153	182	117	191	97
LVA	1518	691	1589	606	1597	574
NLD	1081	469	1045	411	1160	372
POL	447	147	491	125	506	117
PRT	974	699	936	619	955	590
SWE	167	189	174	152	175	145
TOTAL	30519	8583	29238	7552	31380	7100
Increase over 2012			-4%	-12%	3%	-17%

Indicators 14 and 16 community status and social sustainability

Option 1 details the proposed safeguards which would maintain social sustainability in a market-based rights system, and under Option 3 these would be similar. The main difference would that the vulnerability of the SSF to transfer of rights to foreign MS would be removed. However, as discussed in Option 1 the scale, and therefore the impact, of these transfers can only be hypothesised at this stage.

With less rationalisation of fleets expected due to safeguards implemented by MS, there is expected to be fewer employment opportunities lost than in Option 2. Increases in the economic performance fleet segments, in the initial phases, will predominately occur through reductions in vessel numbers thus also job losses. Therefore, fewer buy-outs of vessels in SSF are expected to influence capture fisheries employment.

Sicily is an example of the influence SSF employment can have on all employment in capture fisheries. In 2008, 36% of all capture fisheries' FTE was in the SSF[42]. Greater stability of this fleet segment would provide further job security for smaller fishing communities.

In addition to SSF communities experiencing more stability due to SSF safeguards proposals in option 3, the transferability of quotas limited to within MS is also expected to increase SSF community stability. Without the potential of different MS being able to essentially buy-out an entire stock, already established communities are less likely to see a

[42] AER data 2009

shift in rights from the region. However, intra MS transferability will not completely protect communities from regional concentration as has been the case between Galicia and Basque in Spain[43]. Intra-MS transferability, to a certain extent, will safeguard SSF communities, but if there are already multiple established communities with similar operations, it is expected that there will still be some regionalisation of rights.

As with all other economic indicators, it is expected that without the ability for fleets to react purely with market factors, attractiveness of the sector will increase but not as sharply as with option 1 and 2. However, as more stocks move to Fmsy, catches are expected to increase in the long-term and thus also positively impacting attractiveness of the sector.

4.8.4. Governance indicators

Indicator 19 Management Costs

Option 3 would carry the same increase in the costs of research as Option 1; approximately €22 million pa.

With respect to subsidies, the impacts would be almost identical as those described under Option 1 as the total funds to be managed would be the same under Option 3. Some very small additional costs might be involved with managing the emergency fund included under Option 3, introducing a slight additional complexity to management of EFF funds that would not be present under Option 1.

The workload associated with RACs is, and therefore administration cost, likely to increase as they are opened up to greater stakeholder participation and become more involved with scientific advice. This increase in costs is likely to be in the region of 20-50%, although the total cost to industry depends on the proportion of EC funding, which has been increasing since 2007. Membership within RACs has decreased in recent years, from a 393 members in 2008 to 333 in 2009, although this is expected to reverse under Option 3.

Access rights

Management costs initially will be expected to increase with the implementation of ITRs under option 3. This will occur as despite regulations being set by the EC, there will still be a substantial amount of work required to from implement a suitable system.

Nevertheless given the lack of inter-state transferability these costs will be less than for Options 1 and 2 given that there will be less need to ensure compatibility or a central register of trades.1.

Additionally, costs are expected to increase through the extra requirement for MCS with quota swaps. In Denmark's quota swap system, it is required that all swaps' value and total tonnage are recorded to their directorate of fisheries[44]; this will also impact on administrative burden.

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[43] Proportion of vessel numbers in Galicia and Basque changed from respectively 53% and 47% in 1996 to 74% and 23% in 2006. RBM Report MRAG.

[44] The Danish Directorate of Fisheries (2010) *Danish Quotas and quota Utilization [sic] (internet) Ministry of Food, Agriculture and Fisheries. Available at URL: http://fd.fvm.dk/Quotas_2010.aspx?ID=44034 (accessed 20/04/2010).*

Indicator 21 Data provided by MS

Governance

Under Options 1 and 2, RegBods, being composed of Member States, would be expected act more cooperatively in issues of compliance. However, under Option 3, RegBods are not proposed. Currently, RACs have only limited dialogue in the data collection process. There may be some argument that with increased involvement in scientific advice, RACs will also have increased involvement in the data collection process and therefore will be more inclined to participate with MS data collection programmes and data calls.

Indicator 22 and 23 Rate of utilisation and transfer of quotas.

Option 3 limits the level of swaps done by vessels to within each MS. This system will require the continuation of a system at least comparable to the current relative stability allocation of quotas. To then match fishing opportunity with current actual fishing level for each MS, quota swapping will still be required. It is expected then that if relative stability is to remain, then there will be no change to level of quota transfers from the status quo.

As with the status quo, it is difficult to assess what is considered to be the ideal state for this indicator. However, it can be assumed that a reduction in the level of swaps indicates an effective relative stability allocation – achieving a suitable balance between relative stability and previous fishing catch.

Indicator 24 Coherence with WTO/EC policy

Under subsidies policy, the impacts would be the same as those described under Option 1.

Indicator 25 Administrative burden on industry

Increasing industry participation within RACs, and extending their involvement in scientific advice, is likely to increase administrative burden as RACs become more active. This is likely to be exacerbated by overarching environmental objectives.

4.8.5. External and aquaculture

External policy under Options 1-3 has not yet been elaborated sufficiently to allow an impact assessment [Annex A].

The aquaculture indicator (aquaculture production versus capture production) can be expected to decrease as catches increase, to a similar extent as in Option 1.

4.9. Alternative Option 4 Impact Assessment

4.9.1. Environmental indicators

Indicator 1 Stocks under MSY and Indicator 3 Size of fish

The MSY and discarding policies under Option 4 are identical to those under Option 1, with achievement of Fmsy within 4 years, subject to the constraint of a maximum of 25% inter-annual variability. However, despite having identical conservation policy, differences in ITR and subsidy policy are likely to differentiate the two options.

Under Option 4 fleet size will not be significantly reduced as ITRs will not be compulsory for any fleet and Axis 1 subsidies will be removed. Although some fleets are still likely to move to ITRs following the example of MS which have already implemented ITRs, the issue of overcapacity will remain, thus reducing compliance and the ability of management systems to achieve the necessary reduction in fishing mortality needed to reach Fmsy targets within 4 years (as is expected under Option 1).

With this in mind, MSY policy under Option 4 will create initial declines in catch, particularly of species and stocks that are currently overexploited, followed by increases in catch as stocks recover. However, this increase is likely to occur later than under Option 1 due to some amount of non-compliance (which may be inevitable given the remaining overcapacity of the EU fleet), and is more likely to follow the trajectory of stocks under Option 3 (in which TAC is allowed a variation of 15% per year) than Option 1.

Indicator 2 LTMPs

Option 4 should not differ from Option 1 in terms of the development of harvest control rules by RegBods Thus we would anticipate that for all stocks LTMPs will be developed by 2022.

Indicator 4 Evolution of the fleet

Under Option 4, ITRs will not be mandatory for either the small or large scale fleet, unlike the other three options with all have elements of compulsory uptake. It is assumed that some fleets might enter ITR on a MS basis, following the example of Denmark, Sweden, Estonia, Poland and the Netherlands, but that they will choose to do this later than if there was an EU policy for compulsory ITRs. We have here assumed that two MS may follow this path, Spain (in which some fleets are already in ITQ) and Germany.

In terms of removal of vessels through scrapping schemes, Option 4 would eliminate many items currently eligible under the current Axis 1 of the EFF, most notably funds for decommissioning. Consequently Member States would no longer be able to use scrapping funds as a means of reducing fleet capacity once the current EFF-funded Operation Plans end in 2016. It is possible however, that, given the aging fleet, there may be increasing demand for emergency scrapping subsidies, and so the fleet will undergo some small declines which are not accounted for in the model result presented below.

Therefore, through the combination of fleet and subsidy policy, the decline in vessel numbers will be rather less than that expected under the Status Quo (i.e. performance is worse than under the Status Quo because overcapacity remains high, even assuming the entry of some Spanish and German fleets into ITR). The expected reduction in fleet size is shown in Table 34.

Table 101 Option 4 Fleet size in number of vessels

Vessel length code	2007	2012	2017	2022
0012	22,117	19,966	18,687	16,892
1224	3,887	3,480	3,275	2,960
2440	1,491	1,349	1,268	1,146
40XX	375	342	319	289
Total	27,870	25,136	23,549	21,287

Indicator 6 Areas of protection

The area covered by protection regimes, or under which fishing is prohibited for management purposes, might show positive impacts given the greater emphasis on environmental issues than under the status quo.

4.9.2. Economic indicators

Indicators 7-10 Economic performance

Under Option 4, MSY policy will have the largest impact on economic indicators for the fleets. Unlike in Option 1 however, where ITR policy facilitated, or at least assisted in achieving MSY policy targets, the absence of mechanisms or incentives to reduce fleet size under Option 4 will reduce the magnitude of several of the expected gains in economic performance. Broadly speaking the impacts that we expect are the following:

- The expected decline and subsequent increase in stock size should result in lower overall income from fishing in the early period of the CFP reform, followed by increasing income.

- Although there will be an increase in the number of stocks fished sustainably, and an increase in mean size of fish in the catch, this is unlikely to exceed that expected under the status quo, and as such the only increase in fish prise will come from a market policy price increase, which will deliver 10% higher prices for fishermen by 2017.

- Implications for processing sector will be positive, although less so than under Option 1, with the increase in catches expected in 2017 and beyond; and for the ancillary sector will be negative, with a reduction in the number of vessels.

The results of the EIAA model are summarised in Table 102 and Table 103. Income over the whole of the EU fleet increases steadily from 2012 onwards due to increasing prices following the trajectories of stock recoveries. This increase in income will result in increasing GVA. Although there are also small increases in the ratio of revenue to break even revenue, ROI, and profitability these are likely to be small given the continued overcapacity. The small scale sector remains profitable, although the greatest increase in profitability is seen in the medium size fleet (12-24m), which moves from negative to positive profitability.

Table 102 Option 4 Economic results of the EIAA model by Member State

	2012					2017					2022				
Indicator	Income (mln)	GVA (mln) 7	Revenue/ Break Even Revenue 8	Net Profit Margin 9	Return On Investment 10	Income (mln)	GVA (mln) 7	Revenue/ Break Even Revenue 8	Net Profit Margin 9	Return On Investment 10	Income (mln)	GVA (mln) 7	Revenue/ Break Even Revenue 8	Net Profit Margin 9	Return On Investment 10
BEL	83	15	0.93	-13%	-17%	79	31	0.93	-12%	-17%	88	46	0.93	-12%	-18%
DEU	138	99	1.49	28%	158%	154	122	1.60	34%	224%	173	146	1.71	39%	399%
DNK	292	171	1.30	3%	2%	335	222	1.36	10%	8%	353	244	1.39	14%	13%
EST	26	7	1.20	10%	14%	29	10	1.32	19%	33%	29	11	1.35	21%	38%
ESP	1400	423	1.02	-2%	-1%	1375	566	1.05	1%	1%	1540	811	1.10	6%	3%
FIN	14	2	0.92	-42%	-47%	15	4	0.99	-31%	-38%	14	4	1.01	-29%	-35%
FRA	948	460	1.18	5%	5%	985	542	1.22	10%	10%	1019	592	1.25	12%	13%
GBR	660	275	1.21	9%	4%	719	395	1.32	17%	8%	793	475	1.36	20%	11%
IRL	213	108	1.30	16%	11%	229	133	1.38	21%	18%	236	142	1.40	22%	19%
LTU	4	3	1.22	15%	29%	6	4	1.33	23%	62%	6	5	1.35	24%	68%
LVA	12	5	1.33	23%	59%	14	7	1.55	34%	107%	14	7	1.59	36%	113%
NLD	336	118	1.15	0%	-1%	358	179	1.27	10%	18%	397	231	1.36	17%	37%
POL	31	16	1.40	21%	9%	37	23	1.52	28%	17%	39	25	1.54	30%	19%
PRT	249	137	1.35	17%	12%	264	158	1.32	17%	13%	269	167	1.33	18%	15%
SWE	59	23	1.41	19%	9%	68	33	1.57	29%	19%	68	35	1.60	30%	20%
TOTAL	**4466**	**1862**	**1.15**	**5%**	**3%**	**4666**	**2430**	**1.21**	**10%**	**7%**	**5039**	**2941**	**1.25**	**14%**	**10%**
Increase over 2012						4%	31%	6%	6%	4%	13%	58%	9%	9%	8%

Table 103 Option 4 Economic results of the EIAA model by vessel length

	2012					2017					2022				
Indicator	Income (mln)	GVA (mln) 7	Revenue/ Break Even Revenue 8	Net Profit Margin 9	Return On Investment 10	Income (mln)	GVA (mln) 7	Revenue/ Break Even Revenue 8	Net Profit Margin 9	Return On Investment 10	Income (mln)	GVA (mln) 7	Revenue/ Break Even Revenue 8	Net Profit Margin 9	Return On Investment 10
SSF	737	444	1.38	18%	12%	768	503	1.47	24%	18%	792	537	1.49	25%	19%
1224*	1196	510	1.10	2%	1%	1275	685	1.15	7%	6%	1370	813	1.19	11%	11%
2440	1249	361	1.02	-4%	-3%	1257	560	1.07	1%	0%	1431	804	1.11	6%	5%
40XX	1284	546	1.24	9%	4%	1366	683	1.32	15%	7%	1445	787	1.37	19%	10%
TOTAL	**4466**	**1862**	**1.15**	**5%**	**3%**	**4666**	**2430**	**1.21**	**10%**	**7%**	**5039**	**2941**	**1.25**	**14%**	**10%**
Increase over 2012						4%	31%	6%	6%	4%	13%	58%	9%	9%	8%

* The 1224 segment also includes semi-industrial vessels between 0 and 12m *e.g.* DTS0012

Table 104 Option 4 results of the EIAA model for the percentage of modelled fleet segments achieving performance targets for profitability, return on investment and revenue: break even revenue.

	2012			2017			2022		
	Prop prof > 0.05	Prop ROI > 0.15	Prop Rev/Break Even Rev > 1	Prop prof > 0.05	Prop ROI > 0.15	Prop Rev/Break Even Rev > 1	Prop prof > 0.05	Prop ROI > 0.15	Prop Rev/Break Even Rev > 1
SSF	60%	33%	93%	73%	60%	93%	73%	60%	100%
1224*	33%	7%	87%	80%	27%	87%	87%	33%	93%
2440	38%	31%	56%	56%	38%	63%	56%	44%	69%
40XX	55%	27%	100%	82%	27%	100%	100%	45%	100%
TOTAL	**46%**	**25%**	**82%**	**72%**	**39%**	**84%**	**77%**	**46%**	**89%**
Increase over 2012				26%	14%	2%	32%	21%	7%

BIRDMOD projections for Sicily, presented below, show a slightly more positive image of economic performance than seen for the EIAA fleets. Because the fleet is effort limited, the reduction in fleet size leads to an overall increase in GVA (Table 105), although remaining overcapacity in the Sicilian fleet moderates the increase in profitability (Table 107).

Table 105 Option 4 Projections of gross value added (mln €) by fleet segment for catching sector in the Mediterranean (Sicily). "2017 var%" and all similar references indicates the improvement of the indicator in 2017 compared to 2012, in percentage terms.

Fleet segment	2008	2012	2017	2022	2017 var %	2022 var %
Demersal trawlers	47.25	48.76	41.76	41.93	-14%	-14%
Purse seiners	16.85	12.47	19.14	19.70	53%	58%
Small scale fishery	31.60	33.57	54.73	55.12	63%	64%
Polyvalent	0.53	0.21	0.42	0.42	101%	102%
Polyvalent passive	8.83	7.02	9.47	9.48	35%	35%
Longlines	21.62	15.54	21.21	21.37	37%	38%
Total	**126.68**	**117.57**	**146.74**	**148.01**	**25%**	**26%**

Table 106 Option 4 Projections of ratio of revenues to break even revenue by fleet segment for catching sector in the Mediterranean (Sicily).

Fleet segment	2008	2012	2017	2022	2017 var %	2022 var %
Demersal trawlers	1.18	1.15	1.30	1.30	13%	13%
Purse seiners	1.54	1.38	1.52	1.53	11%	11%
Small scale fishery	1.47	1.45	1.57	1.57	8%	8%
Polyvalent	1.17	0.97	1.07	1.07	11%	11%
Polyvalent passive	1.64	1.49	1.58	1.58	6%	6%
Longlines	1.65	1.47	1.57	1.57	7%	7%
Total	**1.33**	**1.28**	**1.47**	**1.47**	**15%**	**15%**

Table 107 Option 4 Projections of net profit margin by fleet segment for catching sector in the Mediterranean (Sicily).

Fleet segment	2008	2012	2017	2022	2017 var	2022 var
Demersal trawlers	-12.6%	2.7%	13.6%	13.7%	10.9%	11.0%
Purse seiners	8.2%	4.0%	17.7%	18.4%	13.7%	14.4%
Small scale fishery	13.8%	30.9%	39.2%	39.3%	8.3%	8.4%
Polyvalent	-5.2%	-9.5%	3.6%	3.7%	13.1%	13.2%
Polyvalent passive	14.1%	18.1%	26.3%	26.3%	8.2%	8.2%
Longlines	21.1%	18.7%	27.2%	27.4%	8.6%	8.7%
Total	**0.7%**	**10.4%**	**24.7%**	**24.8%**	**14.2%**	**14.4%**

Table 108 Option 4 Projections of return on investment by fleet segment for catching sector in the Mediterranean (Sicily).

Fleet segment	2008	2012	2017	2022	2017 var	2022 var
Demersal trawlers	14.7%	17.7%	26.8%	26.9%	9.1%	9.2%
Purse seiners	31.6%	22.3%	41.0%	42.3%	18.6%	19.9%
Small scale fishery	54.1%	59.3%	101.3%	102.0%	42.0%	42.7%
Polyvalent	20.4%	6.9%	16.6%	16.7%	9.8%	9.9%
Polyvalent passive	43.6%	35.1%	49.5%	49.5%	14.3%	14.3%
Longlines	62.9%	45.7%	65.0%	65.5%	19.3%	19.8%
Total	**28.2%**	**30.4%**	**53.8%**	**54.2%**	**23.3%**	**23.8%**

Stock recovery results in improvements in the processing sector indicators (Table 109) though less pronounced than in Option 1 due to remaining overcapacity, and the comparatively lower improvement in fishing sector performance. The ancillary sector experiences a decline in the multiplier effect, which is linked to the decline in vessel numbers, although this is not as strong as under Option 1.

Table 109 Option 4: Expected GVA multiplier effects in 2012, 2017 and 2022

	2012		2017		2022	
Indicator	GVA Processing (million euro) 7c	GVA Ancillary (million euro) 7d	GVA Processing (million euro) 7c	GVA Ancillary (million euro) 7d	GVA Processing (million euro) 7c	GVA Ancillary (million euro) 7d
BEL	18	8	17	7	19	7
DEU	77	14	86	13	97	9
DNK	58	50	66	48	70	43
EST	2	2	2	2	2	2
ESP	230	17	226	16	253	15
FIN	1	0	1	0	1	0
FRA	236	106	245	97	253	95
GBR	268	49	293	47	323	47
IRL	108	30	116	28	119	28
LTU	4	1	5	1	5	1
LVA	11	3	13	3	13	3
NLD	56	39	59	34	66	31
POL	5	1	6	1	6	1
PRT	39	11	41	10	42	10
SWE	5	3	6	3	6	3
TOTAL	1116	333	1181	309	1275	296
Increase over 2012			6%	-7%	14%	-11%

Subsidies

In the short-term, as a result of a reduction in axis 1 subsidies which could increase costs and reduce incomes, some direct negative impacts would be felt by some individual vessels in different fleet segments, with negative impacts on all 4 economic indicators (7-10).

Indicator 11 Fish prices

Fish prices under Option 4 are likely to be significantly improved as a result of a shift in focus of the market policy (CMO) towards innovation and value-addition, and on common marketing/promotion measures. However, unlike in Option 1, prices are unlikely to improve significantly by 2022 as a result of an increase in fish size following stock recovery. This is because of remaining overcapacity restricting the speed at which stocks recover. Furthermore, the improved image of fishers following changes in behaviours such as discarding, which tends to improve fish prices, is likely to be subdued due to continued overcapacity and a consequent tendency to non-compliance.

Indicator 12 Subsidies as a % of landed values

The percentage of subsidies in relation to landed value is unlikely to change from that expected under Option 1.

4.9.3. Social indicators

Indicator 13, 16 and 17 Employment, social sustainability and attractiveness of the sector

Under Option 4, the major social impacts will arise, as with the economic impacts, as a result of stock recoveries (the MSY policy) and fleet reductions, although the former is likely to have considerably greater influence over social indicators.

Employment will continue to decline in the catching sector (Table 110), although only slowly and in line with declines in fleet size, but because income and GVA will increase, from 2017 and 2012 respectively so will GVA per employee and crew wages. However, the attractiveness of the sector will not improve to the extent expected under Option 1, despite the increase in crew wage, due to aging fleet and remaining overcapacity.

Table 110 Option 4: Trends in social indicators by Member State

	2012					2017					2022				
Indicator	Fleet size (no) a2	Employment (FTE) 13	Employment (FTE) per vessel 13a	Value added per employee (€) 16	Crew wage (€) per FTE 17	Fleet size (no) a2	Employment (FTE) 13	Employment (FTE) per vessel 13a	Value added per employee (€) 16	Crew wage (€) per FTE 17	Fleet size (no) a2	Employment (FTE) 13	Employment (FTE) per vessel 13a	Value added per employee (€) 16	Crew wage (€) per FTE 17
BEL	83	467	6	31947	45857	73	323	4	97185	116016	73	279	4	165431	188860
DEU	317	707	2	140156	76464	298	548	2	222311	116511	215	495	2	296101	151252
DNK	400	1312	3	130034	78997	384	1187	3	187026	111847	347	1147	3	212771	126000
EST	800	2538	3	2670	967	723	2517	3	4116	1349	654	2457	4	4470	1442
ESP	10976	26427	2	16003	15081	10374	21758	2	26032	22809	9923	20247	2	40043	33407
FIN	1248	1683	1	1275	2017	1174	1418	1	2805	2924	1174	1351	1	3213	3065
FRA	2616	8859	3	51871	35898	2390	7699	3	70400	46912	2361	7295	3	81131	53370
GBR	2954	5057	2	54296	31875	2840	4143	1	95249	53571	2840	3985	1	119133	66188
IRL	1372	2499	2	43389	23539	1291	2330	2	57202	30081	1291	2276	2	62344	32500
LTU	19	41	2	71025	52239	18	38	2	119674	81867	18	36	2	133723	90735
LVA	737	1243	2	3929	1469	693	1233	2	5565	1458	693	1204	2	5879	1445
NLD	279	1489	5	79165	50098	245	1253	5	142757	81990	222	1175	5	196619	107583
POL	656	1434	2	11422	5240	605	1349	2	17225	7759	599	1297	2	19050	8568
PRT	2247	8627	4	15880	8438	2113	8258	4	19101	11343	2110	7974	4	20983	12544
SWE	793	1028	1	22795	6047	680	969	1	34537	8928	680	931	1	37235	9640
TOTAL	**25497**	**63413**	**2**	**29357**	**20291**	**23903**	**55022**	**2**	**44173**	**29288**	**23201**	**52148**	**2**	**56397**	**37103**
Increase over 2012	83	467	6	31947	45857	-6%	-13%	-7%	50%	44%	-9%	-18%	-10%	92%	83%

Table 111 Option 4: Trends in social indicators by vessel length

	2012					2017					2022				
Indicator	Fleet size (no) a2	Employment (FTE) 13	Employment (FTE) per vessel 13a	Value added per employee (€) 16	Crew wage (€) per FTE 17	Fleet size (no) a2	Employment (FTE) 13	Employment (FTE) per vessel 13a	Value added per employee (€) 16	Crew wage (€) per FTE 17	Fleet size (no) a2	Employment (FTE) 13	Employment (FTE) per vessel 13a	Value added per employee (€) 16	Crew wage (€) per FTE 17
SSF	19249	23110	1	19222	9571	18028	21456	1	23453	11437	17948	20634	1	26029	12533
1224*	4470	16145	4	31585	26732	4211	13858	3	49397	38618	3801	13238	3	61438	46880
2440	1353	16922	13	21344	19960	1262	12951	10	43208	37146	1088	11796	11	68128	56081
40XX	425	7236	17	75490	40934	401	6756	17	101118	51785	365	6481	18	121434	60813
TOTAL	**25497**	**63413**	**2**	**29357**	**20291**	**23903**	**55022**	**2**	**44173**	**29288**	**23201**	**52148**	**2**	**56397**	**37103**
Increase over 2012						-6%	-13%	-7%	50%	44%	-9%	-18%	-10%	92%	83%

* The 1224 segment also includes semi-industrial vessels between 0 and 12m *e.g.* DTS0012

Table 112 Option 4 Average days at sea per vessel, by vessel length

Length	2012	2017	2022
SSF	94	93	90
1224*	167	152	164
2440	183	155	166
40XX	201	195	207
TOTAL	111	106	105
Increase over 2012		-4%	-6%

Option 4 is likely to be more aligned with the status quo than any of the alternative Options which include mandatory ITRs. The size of the fleet is still expected decline, albeit moderately, and vessels will become more profitable, which is reflected in an increase in crew share (Table 111).

Table 113 Option 4: Expected employment multiplier effects in 2012, 2017 and 2022

	2012		2017		2022	
Indicator	Employment Processing 7c	Employment Ancillary 7d	Employment Processing 7c	Employment Ancillary 7d	Employment Processing 7c	Employment Ancillary 7d
BEL	292	179	254	158	283	158
DEU	832	164	846	154	949	111
DNK	1263	475	1315	457	1387	413
EST	128	725	128	655	128	592
ESP	8124	1126	7256	1064	8123	1018
FIN	68	0	63	0	62	0
FRA	7464	1969	7052	1799	7295	1778
GBR	5784	920	5731	885	6323	885
IRL	2227	721	2175	679	2245	679
LTU	149	153	182	144	191	144
LVA	1518	691	1589	651	1597	651
NLD	1081	469	1045	411	1160	372
POL	447	147	491	136	506	134
PRT	974	699	936	657	955	656
SWE	167	189	174	162	175	162
TOTAL	30519	8628	29238	8012	31380	7753
Increase over 2012			-4%	-7%	3%	-10%

As is expected with the limited reduction in fleet size under Option 4, which remains the situation in the Mediterranean, employment does decrease slightly, although not as much as is expected under Option 1. However, in terms of GVA per employee and average crew wage, there is little difference between Options 1 and 4.

Table 114 Option 4 Projections of number of employees (FTE) by fleet segment for catching sector in the Mediterranean (Sicily).

Fleet segment	2008	2012	2017	2022	2017 var %	2022 var %
Demersal trawlers	2,644	2,313	1,391	1,391	-40%	-40%
Purse seiners	550	550	493	493	-10%	-10%
Small scale fishery	2,531	2,468	2,405	2,405	-3%	-3%
Polyvalent	136	133	130	130	-3%	-3%
Polyvalent passive	470	459	447	447	-3%	-3%
Longlines	644	628	612	612	-3%	-3%
Total	**6,977**	**6,552**	**5,478**	**5,478**	**-16%**	**-16%**

Table 115 Option 1 Projections of GVA per employee (000 €) by fleet segment for catching sector in the Mediterranean (Sicily).

Fleet segment	2008	2012	2017	2022	2017 var %	2022 var %
Demersal trawlers	17.87	21.08	30.03	30.15	42%	43%
Purse seiners	30.62	22.67	38.80	39.94	71%	76%
Small scale fishery	12.48	13.60	22.76	22.92	67%	69%
Polyvalent	3.87	1.57	3.23	3.25	106%	107%
Polyvalent passive	18.76	15.30	21.19	21.20	38%	39%
Longlines	33.56	24.73	34.65	34.91	40%	41%
Total	**18.16**	**18.90**	**27.00**	**27.21**	**43%**	**44%**

Table 116 Option 1 Projections of average crew wage per employee (000 €) by fleet segment for catching sector in the Mediterranean (Sicily).

Fleet segment	2008	2012	2017	2022	2017 var %	2022 var %
Demersal trawlers	9.58	11.09	15.30	15.35	38%	38%
Purse seiners	11.09	8.59	13.74	14.10	60%	64%
Small scale fishery	5.42	5.87	9.51	9.57	62%	63%
Polyvalent	1.32	0.65	1.14	1.14	74%	74%
Polyvalent passive	6.92	5.73	7.76	7.77	35%	35%
Longlines	9.82	7.42	10.11	10.18	36%	37%
Total	**7.87**	**8.16**	**11.00**	**11.08**	**35%**	**36%**

Indicators 14 and 16 community status and social sustainability

Under Option 4, there will be significant increases in stock status and catches as a result of MSY policy, and knock-on impacts on the status of some fisheries dependent areas, although this will be linked to decline in fleet size.

For those countries that have indicated an unwillingness to consider ITRs, the fleet sizes will remain high and small dependent communities may be protected from buy-outs. The most significant concern surrounding the introduction of ITR systems was the loss of community opportunities – buy-outs of small, community-based industries by large companies has economic impacts for those smaller players but, most importantly, may threaten particularly vulnerable communities. The lack of an ITR policy in Option 4 would therefore remove this negative impact, suggesting that Option 4 would perform well for social sustainability. However, for the fleets in some dependent communities, the lack of subsidies or ITRs will meant that the vessels will age, and the low wages and overcapacity may contribute to a less attractive local fishing industry. Option 4 would, however, allow MS to voluntarily choose

ITRs if this was thought necessary to mitigate the negative issues mentioned above. Thus it would allow both sensitive and dependent community issues to be addressed at a MS level.

In terms of social sustainability, there will be small improvements in GVA per employee, as shown in Table 51, although these will not be as great as the improvement expected under Option 1 because of the continue high employment.

4.9.4. Governance indicators

Indicator 18 Departure from quotas

Departure from quotas should be reduced, as expected under Options 1 and 2, due to the existence of RegBods**.**

Indicator 19 Management Costs

Under Option 4, management costs are expected to increase with the need for additional science costs to achieve Fmsy targets, which is the case in all Options. There will also be additional administration costs associated with RegBods, although there will be some savings made due to the smaller number of subsidies which require management and administration.

With continued overcapacity in the EU fleet, there is unlikely to be a decrease in costs associated with MCS, unlike under the other options where fleet size reduces more substantially.

Indicator 20 Rights based management systems

The introduction of ITRs is not compulsory under Option 4, although some MS or fleet segments may, in the later stages of the decade, decide to voluntarily develop ITRs. Even accounting for this, uptake will be lower than in Option 1.

Table 117 Option 4: The number, and percentage, of vessels under ITR schemes

	2007	2012	2017	2022
ITR fleet	1715	1853	1771	3158
Total fleet	27870	25497	23903	23201
ITR %	6.2	7.3	7.4	13.6

Indicator 21 Data provided by MS

Under Option 4 there will be a requirement for improved assessment, which will require an increase in spending on science, particularly stock assessments. This increase in science requirement will, inevitably, lead to a positive improvement and increase in the data collected and provided by MS.

However, unlike under Option 1, where it is expected that the level of compliance of fishers will increase resulting from two policy interventions – the introduction of ITRs, which in principal should incentivise fishers to conserve resources and not overfish, and the RegBods – the level of compliance under Option 4 is not expected to improve significantly due to the limited introduction of ITRs. Despite this, in general compliance will improve over the status quo as RegBods are expected to remain effective.

Indicator 22 Rate of Utilisation of quotas

Utilisation of quota is will be the same under Option 4 as under Option1.

Indicator 23 Transfer of quotas

With limited uptake of ITR systems the transfer of quotas between MS under will continue as under the Status Quo option.

Indicator 24 Coherence with WTO/EC policy

Coherence with WTO will be as described under Option 1.

Indicator 25 Administrative burden on industry

Management costs for the sector, and in particular those related to data, are likely to increase, as MSY policy will require the generation of management targets based on robust assessments at the regional level. Furthermore, there is expected to be greater stakeholder involvement in RegBods, which will increase administrative load, although the limited number of fleets moving to ITRs will result in little additional burden overall, thus being similar to the Status Quo option. Also, it can be expected that the smaller number of subsidies available will reduce administration burden somewhat.

Indicator 26 Implementation of the simplification process

As described under Option 1, there is already a commitment to simplification of the rules, and as the RegBod becomes more organised data is expected to improve at the regional level. It is also expected that there will be an increase in simplification because of regionally applicable regulations.

Indicator 28 Safety

Unlike the alternative options in which safety improves due to ITR policy bringing about a balance between capacity and fishing opportunities, Option 4 is likely to produce no such improvement. With the removal of scrapping funds vessels will age and become a greater risk, and with the poorer economic performance there will be less cash flow available for vessel owners to invest in their vessels and modernise. Also, the remaining overcapacity will do little to reduce competition within fisheries.

Indicator 29 Time taken to reach a decision

This indicator is expected to be the same as described under Option 1.

5. Identification of the risks, trade-offs/synergies, public opinion, and potential enhancing measures

5.1. Conservation and capacity policy

In Options 1 and 3, but particularly in Option 2, there is some question over whether there exists the capacity for the rapid expansion in scientific activity that is forseen, and whether even if this is increased whether the time allowed for data collection (4 years) will be adequate to develop robust stock assessments for stocks that are currently unassessed, even if additional funds are forthcoming. Some proxy assessment and management methods will undoubtedly be required.

There may, however, be short-cuts that can be taken with the assessments under Options 1 and 3. It probably would not be necessary to have an explicit assessment for least-sensitive species that are not the most economically valuable species. By the definition of the "socio-economic" optimum, the most valuable species would require an assessment. Further, to ensure that the most sensitive species, which are expected to be over-exploited under such an optimum, were not at significant risk of being depleted to the point where they were outside safe biological limits, it would be prudent to develop an assessment of them also. An assessment of the least-sensitive, non-valuable stocks, would not be necessary: it could be safely assumed that they would be fully- or under-exploited, and were not therefore in serious danger of being outside safe biological limits.

This would be a sensible trade-off akin to the risk based management approaches being developed elsewhere (for instance in the USA and Australia). It would allow research costs to be reduced, and the research task to become manageable in Options 1 and 3. Such possibilities would be unavailable for Option 2.

In options 1 and 3 there is a requirement to develop socio-economic optima as management solutions, leading to non-biological harvest control rules, in multispecies fisheries. Although additional power is given to RegBods to negotiate these, with increased involvement of stakeholders, these compromises will always disadvantage one set of fishermen relative to others, and this will be very difficult to negotiate. This may delay implementation beyond our assumptions.

The introduction of ITRs, together with new multispecies and MSY policy, will generate unpredictable outcomes. Fishermen will continue to seek the best fishing opportunities, whether through changes in gear or fishing area or, as anticipated in all new options, purchase of ITRs. It is very difficult to anticipate what these shifts would be, and we have not attempted to in our modelling above. However, such shifts have undermined management policy in the past, for instance the shift of many fishermen to Nephrops fishing to avoid the restrictive days at sea measures in the first Cod recovery plan (which were allowed because days at sea were not allocated on a sector basis). The lesson we can learn is that these shifts will also undermine management actions in the future, unless they are forseen and managed by the governance structure. This should be enhanced with the RegBods, and to a certain extent also with the strengthened RACs.

Relative stability will be eroded under Option 2. It will be difficult to protect relative stability if there is transferability across all EU regardless of MS and long-term rights, and several MS have indicated their continued attachment to it. This will particularly be the case when different MS have had greater capital injected through subsidies over a period of time, or if structural conditions within different MS – for instance the relative weakness of the banking sector in those countries currently being down-graded by ratings agencies (Greece, Portugal, Spain, Ireland), or effective subsidies or favourable tax regimes - make the sectors in some MS more competitive than in other MS.

As regards assumptions, it is assumed that the introduction of ITRs as a kind of quasi property right (a use right rather than an ownership right) that are transferable within the EU will be possible under EU law.

We have already demonstrated that there is considerable opposition in some MS, and in the industries of those MS, to inter-EU transferability of rights. This is the one issue where public opinion is likely to be most vociferous, and therefore needs to be considered to preclude it becoming a "killer issue". If inter-transferability is considered to be the ultimately desired outcome, and the outcome that most accords with overarching principles of the EU Treaties, – and there are certainly some efficiency gains to be made across the EU fleet with such

transferability – the legitimate concerns of MS to transferability will have to be met. Negotiations might consider the following requirements

- Considering the wide variability in fleet overcapacity and profitability amongst sectors and MS (see, for instance, Table 35), the desirability (or not) of a phase-in period to establish a "level playing field", during which the relative stability quotas allocated to individual MS fleets are safeguarded, and during which time the relative efficiency and performance of different MS fleets can be allowed to individually improve through MS-wide transferability;

- Considering what additional measures are required to safeguard or support vulnerable communities particularly dependent upon fishing, for instance Scotland and Brittany, including specific action under axis 2 of the proposed Subsidy reform

- The design of an ITR system that allows for application at MS in the short term (for instance the phase-in period described above, or the 10 year period envisaged in Option 3) without precluding, for instance through the adoption of incompatible legal status of rights between MS, the possibility of creating an EU-wide transferable scheme in the future.

For option 1, there is evidence that vessel numbers will not decrease as quickly when ITRs without decommissioning subsidies as would be the case of ITRs with decommissioning subsidies. The most significant reduction in vessel numbers after ITR implementation has been in the first 5 years. Keeping the Axis 1 for industrial fleets through the initial 5 year period will assist reducing vessel numbers at the maximum during this period. This has also been considered a risk for both options 2 and 3.

For option 1 where ITRs are voluntary for SSF, there is the expectation that there will be limited uptake of the system where SSF are already profitable. Many SSF under TURFs are already profitable and will not see the incentive to switch, particularly where there is no individual right at all, there will still be the yearly "race" for a common resource. However, most Member States have introduced autonomous licensing regime for the SFF coupled with specific technical measures, limiting therefore the Olympic status of the fisheries. Issues of discarding will still exist, thus placing risk on reaching stock and environmental objectives. This should also be considered a risk under option 2 and 3.

In option 1 where there are considered to be full separation safeguards, yet still subsidy assistance, there is the risk that SSF which are currently unprofitable will remain this way. If safeguards on the fishery exclude large scale vessels, the possibility of the necessary concentration of rights to transform the fleets into a profitable one will not be possible. Controls such as ITQ for large scale and ITE for small scale provide a safeguard of rights between small and large scale yet allow for required concentration.

If the intention is to reallocate rights after a certain period, this will potentially devalue the right and stall transfers and shifts to profitability.

For options 1 and 3, where there are no addressed concentration rules, as seen in Spain (between Galicia and Basque) there will be negative impact to the sustainability of less economical regions/communities.

In terms of the actual introduction of long term ITRs experience from third countries, including Iceland, suggests that there is a significant risk that ITR regimes may be subject to legal challenge, particularly in those countries where ITQs have not been used to date or

where there is political opposition to the notion.[45] In general terms ITR regimes have generally speaking not been found to be unlawful *per se:* instead procedural aspects of the manner in which they have been introduced have been criticized. Such challenges would most likely be against national implementing measures. Moreover, given that under option 1 and option 2 the effective the introduction of an ITR regime could be that rights are transferred out of a given jurisdiction the likelihood of sustained legal challenges may be considered to be greater for these options than for option 3.

One of the key trade-offs is between productivity and equity. There is a trade-off between fleet performance and the degree to which benefits from the fishery potentially accrue to fewer people. In fleets that have been able to rationalise and consolidate, such as the Scottish pelagic fleet, there have been significant gains in economic performance but this comes at the cost of the number of communities and people who can participate in the fishery and benefit from it. Consolidation in other segments will raise similar issues and also potentially give rise to 'tipping points' in other sub-sectors that will have knock-on impacts and affect the status of fishing dependent communities.

5.2. Subsidy policy

This impact assessment has made a number of assumptions about reform to EFF support which have a bearing on the impacts (both positive and negative) described in Section 4 above in relation to reform of subsidies policy. Key assumptions under both Options 1 and 3, as well as under the status quo option, which could have a bearing on the validity of our assessment of impacts include the level of total EFF support and the balance of expenditure between pillars measures and actions. *Planned expenditure* will be determined through a process of negotiation between the Commission and Member States, and will in part be affected by the expectations by Member States of being able to meet their associated contributions as well as by funds proposed by the Commission. Thus under Options 1 and 3 final EFF-2 planned expenditure could be more or less than the estimated Eur 3 bn.

The exact scope of the smart green fisheries pillar and the territorial development pillar in Options 1 and 3, along with the detailed specification of eligible measures/actions remain to be specified and is not known. It is thus impossible to state with certainty at the present time how coherent, effective and efficient potential measures and actions might be. The assumption is made however that the focus on innovation and environment, and territorial development, will bring about various benefits compared to the status quo, as revealed through the impacts described on the various indicators. In addition, once planned expenditure has been agreed, *actual disbursement* will depend on a variety of factors affecting final uptake of potential funds available such as the private sector contributions required, the interest of the private sector in the potential measures and actions, and administrative issues of the Operational Programmes by Member State administrations (e.g. speed, communication of opportunities to stakeholders, etc).

An additional assumption about our assessment of impacts when comparing the status quo with future policy Options 1 and 3 is that the pattern of expenditure under the status quo option will reflect historic patterns of expenditure, primarily under FIFG 2000-2006. This assumption has been necessary because the extent and impacts of expenditure under the current EFF programme is not yet known.

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[45] See Shotton, R. (ed.) *Case studies on the allocation of transferable quota rights in fisheries*, FAO Fisheries Technical Paper No. 411, 2001, FAO, Rome and FAO *Legislating for property rights in fisheries* FAO Legislative Study No. 83 2004 FAO, Rome.

In terms of trade-offs, it is clear that at the present time, EFF funds may be supporting short-term benefits, particularly of an economic nature, to those receiving them. The trade-offs that arise from reform to subsidies policy in both Options 1 and 3 in the form of a revised focus of eligible items in an EFF-2 are that:

- Individuals may benefit less, but that the benefits of EFF funds will be more evenly distributed through a greater focus on common measures benefitting the whole sector

- Short-term negative impacts on economic indicators are likely to generate longer-term positive environmental, economic and social impacts

- Small-scale fisheries are to receive preferential treatment under both Options 1 and 3. This implies a direct trade-off in terms of the benefits from EFF support pertaining to large- and small-scale fleets.

Given the above, the special support for small-scale fisheries appears questionable, and our recommendation for enhancing the policy proposals in relation to subsidies is that a greater level of justification be provided for this preferential support – justification that to date appears not to have provided based on any solid empirical evidence. If such justification cannot be provided it is recommended that a Regulation pertaining to EFF-2 does not specify preferential support for small-scale fisheries, and that subsidies policy, as implemented through Member State operational programmes, be more explicitly based on rational criteria for approving some applications for funding over others.

Policy under an EFF-2 in Option 1 and 3 would also strongly focus on territorial development. While this appears sensible (in terms of communities working together to specify a vision and potential supported needed to achieve that vision in support of the many rather than few), there is certainly a risk that public funds might be used in some areas to delay what might be inevitable declines in the sector and long-term diversification into other sectors. Some might argue over the justification of maintaining fisheries sector activity in some areas rather than fishing activities being shifted into other economically and socially productive activities with the sector which may offer greater long-term potential. Arguments may therefore be put forward in the future as to whether this represents good value for money.

An additional risk associated with subsidies policy under both Options 1 and 3 is that an EFF-2 may continue to lack coherence with WTO policy on fisheries subsidies. This may particularly apply under Option 3 due the inclusion of the emergency reserve in this Option.

Perhaps the biggest risk associated with subsidies reform however is the abolition of scrapping/decommissioning funds and the assumption that ITRs will work more effectively at removing capacity from the fleet. As noted in the main text to this report, previous decommissioning funds have not solved the problem of over-capacity, but they have certainly contributed to reducing it. It is clear from a review of stakeholder contributions to the Green Paper on subsidies, that most stakeholders agree that over-capacity remains one of, perhaps the, key problem issue in EU fisheries. The abolition of scrapping funds under a future EFF-2 is therefore associated with a risk that ITR policy will not be introduced or function as anticipated.

Finally, some comments on public opinion with respect to the respective policy options are appropriate. It is clear from stakeholder contributions/submissions on the Green Paper[46], that when considering whether any support should be provided at all under an EFF-2:

- Most stakeholders agree on preserving the EFF for the future
- Many reject a fisheries industry that *depends* on public support
- Many emphasize the need to prioritise innovation as well as social (jobs) and environmental aspects
- Preferential support for small-scale fleets is not universally supported

These views tend to lend support to Options 1 and 3 as specified, perhaps with the exception of preferential support for small-scale fisheries. However the total eradication of EFF support under Option 2, and the associated implications of no support for what might be termed 'positive' subsidies, would be likely to be poorly perceived not just by the industry itself but by other stakeholder as well.

5.3. Regionalisation policy

There is growing pressure to move towards a regionalised approach to the implementation of the CFP, building on the work of the RACs. This is reflected in the responses to the Commission's Green Paper on the CFP, particularly NGO and a limited number of MS who support delegation of powers for decision-making and regionalisation of the CFP.

Two options in this technical analysis respond directly to the need for a regionalised approach in the CFP post 2010 – Options 1 and 2. In both these cases, there is an assumption that Member States will agree to the formation of a new body, the RegBod. The risk is that this may not be supported by Member States who will not participate in specific RegBods as they may not have fishing activities or interests in those regions, and this is likely to lead to more fragmentation of management rather than a more coordinated approach to management, overall. In fact, the summary of responses to the Green Paper highlight that there is a limited group (notably some regional authorities) who oppose delegation of powers, with one MS argues that many 'technical' decisions may have clear political or social impact.

In relation to Option 2, in particular, there is also the legal constraint posed by the Lisbon Treaty where the role of the Commission, the Council of Ministers and the European Parliament in adopting conservation measures would have to be maintained which would restrict the ability to delegate decision-making powers to the RegBod

The trade-off in the case of both options however is that regionalised management would instil a sense of ownership and responsibility on each geographical scale.

In considering Options 1, 2 and 3 there is an assumption that there would be additional funds made available to facilitate the functioning of either the RegBod or the strengthening of existing RACs.

[46] 117 fisheries sector, 64 national or regional authorities or administrations, 63 NGOs, 14 other organisations (e.g. RACs), 11 third countries, 16 research groups, and 111 other public contributions

5.4. Sensitivities

The consequences of an additional 50 % increase in fuel price from 2012 to 2017 under option 1 result in reductions in economic performance for all fleet segments compared to the main run for option 1 with a 50 % increase in fuel price by 2012 (Table 118). This reduction in economic performance also leads to reductions in social indicators, with the exception of fleet size and employment which remain unaffected. However the impacts of the increase in fuel price are not sufficient to outweigh improvements caused by other factors, e.g. increased stock SSBs and catches. Consequently, economic performance of the fleet segments does still improve moving forward in time even with a 50 % increase in fuel price.

Note that the experience from 2008 (see Status Quo report) suggests that in addition to having lower profitability when the fuel price increases, many fleets will choose to lower their activity. This could affect their catches, and will certainly affect the area in which they fish, which may in turn have impacts on bycatch and ecosystems. The evidence is that the beam trawl fleet, in particular, having the highest cost of fuel per income or total cost, will be forced to reduce its trawling effort and undertake other measures to remain economical. The small scale fleet may also be impacted disproportionately, since normally this fleet expects to have relatively low fuel costs.

The impacts resulting from no future rise in fish price are much more severe. Economic performance of the fleet sectors is significantly reduced, due to reductions in income compared to that predicted with future increases in fish price (Table 118). This reduction in performance also leads to significant reductions for associated social indicators. However the impacts of a lack of increase in fish price are not sufficient to outweigh improvements caused by other factors, e.g. increased stock SSBs and catches. Consequently, economic performance of the fleet segments does still improve moving forward in time in the absence of an increase in fish price.

Table 118 Bio-economic model output for selected economic and social indicators in 2012, 2017 and 2022 for Option 1, Option 1 with an additional 50% increase in fuel price in 2017 and Option 1 with no future increase in fish price.

	Stocks at Fmsy	Income (mln)	GVA (mln)	Revenue/ Break Even Revenue	Net Profit Margin	Fleet size (no)	Employment (FTE)	Value added per employee (€)	Crew wage (€) per FTE
Indicator	**1**	**7**	**8**	**9**	**10**	**a2**	**13**	**16**	**17**
Option 1									
2012	3	4469	1920	1.15	5.3%	25439	61863	31030	21379
2017	47	5108	3029	1.27	15.0%	22246	51664	58631	37717
2022	81	5561	3657	1.31	18.3%	20940	47746	76584	49289
Fuel									
2012	3	4469	1920	1.15	5.3%	25439	61863	31030	21379
2017	47	5108	2639	1.23	12.4%	22246	51664	51080	32773
2022	81	5561	3298	1.27	16.1%	20940	47746	69081	44406
Price									
2012	3	4469	1920	1.15	5.3%	25439	61863	31030	21379
2017	47	4256	2178	1.21	9.9%	22246	51664	42154	27892
2022	81	4634	2730	1.25	14.0%	20940	47746	57171	37573

The consequences of an additional 50 % increase in fuel price from 2012 to 2017 under option 2 are essentially the same as for option 1 (Table 119). However the impacts of no future increase in fish price are less pronounced due to the lower expected increase in fish price for option 2 compared to option 1. The impacts of removing the fuel tax exemption for

fishing vessels are almost identical to the impacts of an additional 50 % increase in fuel price in 2017 due to the similarity in fuel cost increase likely to be experienced by the vessels.

It would require a substantial development of analytical assessments and reference points to achieve the rapid movement to Fmsy management for all un-assessed stocks within 4 years of implementation, as required for Option 2, and it is not clear whether this is actually feasible. Consequently the impacts of assuming the implementation of Option 2, but with un-assessed stocks moving to Fmsy management as under Option 1, were examined in order to investigate the impacts of a more feasible change to Fmsy policy for these stocks. This model run is referred to as Option 2a. The impacts of Option 2a are almost identical to Option 2, but with slightly better performance in 2017 due to a lesser reduction in catches (Table 119). However by 2022 the benefits of the quicker implementation of Fmsy policy under Option 2 leads to better performance compared with option 2a.

Table 119 Bio-economic model output for selected economic and social indicators in 2012, 2017 and 2022 for Option 2, Option 2a, Option 2 with an additional 50% increase in fuel price in 2017, Option 2 but with the removal of fuel tax exemption in 2017 and Option 2 with no future increase in fish price.

	Stocks at Fmsy	Income (mln)	GVA (mln)	Revenue/ Break Even Revenue	Net Profit Margin	Fleet size (no)	Employment (FTE)	Value added per employee (€)	Crew wage (€) per FTE
Indicator	**1**	**7**	**8**	**9**	**10**	**a2**	**13**	**16**	**17**
Option 2									
2012	3	4332	1856	1.15	5.0%	25399	60188	30829	21227
2017	47	4546	2504	1.24	12.4%	22236	50830	49261	31995
2022	81	4940	3066	1.28	16.2%	20931	47070	65128	42103
Option 2a									
2012	3	4332	1856	1.15	5.0%	25399	60188	30829	21227
2017	47	4550	2502	1.24	12.4%	22237	50982	49077	31864
2022	81	4933	3057	1.28	16.2%	20931	47104	64904	41940
Fuel increase									
2012	3	4332	1856	1.15	5.0%	25399	60188	30829	21227
2017	47	4546	2122	1.20	9.5%	22236	50830	41756	27093
2022	81	4940	2714	1.24	13.7%	20931	47070	57666	37257
Fuel tax									
2012	3	4332	1856	1.15	5.0%	25399	60188	30829	21227
2017	47	4546	2165	1.20	9.8%	22236	50830	42590	27638
2022	81	4940	2753	1.25	14.0%	20931	47070	58496	37795
Price									
2012	3	4332	1856	1.15	5.0%	25399	60188	30829	21227
2017	47	4132	2091	1.21	9.6%	22236	50830	41131	27172
2022	81	4491	2617	1.25	13.8%	20931	47070	55588	36380

The consequences of an additional 50% increase in fuel price from 2012 to 2017 under option 3 are essentially the same as for option 1 (Table 120). However the impacts of no increase in future fish price are less pronounced due to the lower expected increase in fish price for option 3 compared to option 1.

Table 120 Bio-economic model output for selected economic and social indicators in 2012, 2017 and 2022 for Option 3, Option 3 with a 50% increase in fuel price and Option 3 with no future increase in fish price.

	Stocks at Fmsy	Income (mln)	GVA (mln)	Revenue/ Break Even Revenue	Net Profit Margin	Fleet size (no)	Employment (FTE)	Value added per employee (€)	Crew wage (€) per FTE
Indicator	**1**	**7**	**8**	**9**	**10**	**a2**	**13**	**16**	**17**
Option 3									
2012	3	4466	1918	1.15	5.3%	25437	61836	31024	21378
2017	47	4666	2585	1.24	12.6%	22247	51771	49925	32508
2022	81	5039	3140	1.28	16.3%	20938	47604	65954	42721
Fuel									
2012	3	4466	1918	1.15	5.3%	25437	61836	31024	21378
2017	47	4666	2194	1.20	9.7%	22247	51771	42373	27561
2022	81	5039	2783	1.24	13.8%	20938	47604	58454	37842
Price									
2012	3	4466	1918	1.15	5.3%	25437	61836	31024	21378
2017	47	4242	2160	1.21	9.8%	22247	51771	41731	27622
2022	81	4581	2682	1.25	13.9%	20938	47604	56332	36930

6. Comparison of the five Options

The economic and social results from the EIAA and BIRDMOD models are presented in the following tables.

Table 121 Summary results from the EIAA modelling.

Indicator	Stocks at Fmsy 1	Income (mln) 7	GVA (mln) 8	Revenue/ Break Even Revenue 9	Net Profit Margin 10	Fleet size (no) a2	Employment (FTE) 13	Value added per employee (€) 16	Crew wage (€) per FTE 17
Reference Year	7	4412	1918	1.15	3.4%	27870	69390	27645	19552
Status Quo									
2012	3	4499	1916	1.15	5.3%	25398	63050	30387	20920
2017	8	4545	2105	1.18	7.8%	23731	60057	35053	23474
2022	8	4572	2270	1.20	10.1%	21559	56935	39878	26328
Option 1									
2012	3	4469	1920	1.15	5.3%	25439	61863	31030	21379
2017	47	5108	3029	1.27	15.0%	22246	51664	58631	37717
2022	81	5561	3657	1.31	18.3%	20940	47746	76584	49289
Option 2									
2012	3	4332	1856	1.15	5.0%	25399	60188	30829	21227
2017	89	4546	2504	1.24	12.4%	22236	50830	49261	31995
2022	89	4940	3066	1.28	16.2%	20931	47070	65128	42103
Option 3									
2012	3	4466	1918	1.15	5.3%	25437	61836	31024	21378
2017	47	4666	2585	1.24	12.6%	22247	51771	49925	32508
2022	81	5039	3140	1.28	16.3%	20938	47604	65954	42721
Option 4									
2012	3	4466	1862	1.15	4.7%	25497	63413	29357	20291
2017	47	4666	2430	1.21	10.3%	23903	55022	44173	29288
2022	81	5039	2941	1.25	13.6%	23201	52148	56397	37103

Table 122 Summary results from the BIRDMOD Sicily (GSA 10/16) modelling.

Indicator	Stocks at Fmsy 1	GVA (mln) 8	Revenue/ Break Even Revenue 9	Net Profit Margin 10	Fleet size (no) a2	Employment (FTE) 13	Value added per employee (€) 16	Crew wage (€) per FTE 17
Reference Year	0	127	1.33	0.71%	3,196	6,977	18,157	7,871
Status Quo								
2012	0	118	1.28	10.43%	3,062	6,552	18,898	8,162
2017	1	119	1.32	14.48%	2,800	5,829	21,273	9,038
2022	1	119	1.35	16.76%	2,531	5,269	23,352	9,832
Option 1								
2012	0	118	1.28	10.43%	3,062	6,552	18,898	8,162
2017	1	145	1.47	24.81%	2,697	5,316	27,541	11,217
2022	1	145	1.48	26.43%	2,438	4,805	30,190	12,239
Option 2								
2012	0	118	1.28	10.43%	3,062	6,552	18,898	8,162
2017	1	105	1.58	33.26%	2,399	3,979	23,877	9,112
2022	1	103	1.60	34.51%	2,169	3,597	25,753	9,785
Option 3								
2012	0	118	1.28	10.43%	3,062	6,552	18,898	8,162
2017	1	145	1.47	24.81%	2,697	5,316	27,541	11,217
2022	1	145	1.48	26.43%	2,438	4,805	30,190	12,239
Option 4								
2012	1	117.57	1.28	0.10	3062	6,552	18.90	8.16
2017	2	146.74	1.47	0.25	2795	5,478	27.00	11.00
2022	2	148.01	1.47	0.25	2795	5,478	27.21	11.08

Table 123 Summary results from the BIRDMOD GSA 17 modelling.

	Stocks at Fmsy	GVA (mln)	Revenue/ Break Even Revenue	Net Profit Margin	Fleet size (no)	Employment (FTE)	Value added per employee (€)	Crew wage (€) per FTE
Indicator	**1**	**8**	**9**	**10**	**a2**	**13**	**16**	**17**
Reference Year	0	200	1.47	33.14%	3,409	5,123	39,060	17,667
Status Quo								
2012	0	202	1.40	15.01%	3,314	4,966	40,652	18,172
2017	0	212	1.44	17.80%	3,092	4,619	45,912	20,245
2022	0	220	1.48	20.79%	2,795	4,175	52,603	22,888
Option 1								
2012	0	202	1.40	15.01%	3,314	4,966	40,652	18,172
2017	0	282	1.52	23.38%	3,117	4,701	60,060	25,955
2022	0	290	1.56	26.01%	2,818	4,250	68,317	29,218
Option 2								
2012	0	202	1.40	15.01%	3,314	4,966	40,652	18,172
2017	1	256	1.57	23.80%	3,117	4,701	54,347	23,356
2022	1	254	1.59	25.47%	2,818	4,250	59,689	25,506
Option 3								
2012	0	202	1.40	15.01%	3,314	4,966	40,652	18,172
2017	0	282	1.52	23.38%	3,117	4,701	60,060	25,955
2022	0	290	1.56	26.01%	2,818	4,250	68,317	29,218

A combined qualitative and quantitative assessment is presented in Table 124 to compare the impacts of the four different policy options. Each of the 26 indicators listed in the table was given a "smiley score" according to the following scheme:

- Double Frown: performance targets not met, and/or a significant worsening of the situation
- Frown: performance targets not met, and/or a worsening of the situation
- Neutral face: performance targets not met, but little change in the situation or only very small improvement
- Smile: performance targets substantially met, and/or significant improvement of the situation
- Double smile: performance targets met, and/or very significant improvements of the situation

In the absence of any new policy there is likely to be only a slow or very limited improvement in stock status. Without additional policy initiatives the Commission's ability to manage, and the EU's ability to develop and agree new LTMPs, is likely to be limited, and discarding will remain high. Although some improvement in stock status is anticipated, and this will flow through to improved incomes in the capture sector, static fish prices should lead to only modest improvements in fleet GVA. Some reductions in fleet size are expected from current EFF plans, and a continued reduction of about 2% per year would be expected from the provision of continued public subsidy for scrapping.

Under Option 1 the combined impacts of the adoption of a policy to move to Fmsy-based management plans, developed at RegBod level with the involvement of regionally appropriate industry involvement and scientific research, and a removal of dependency on subsidies and their replacement by ITRs, should act to improve stock status over the medium term and reduce discarding to moderate levels. This latter impact will be

complemented by proposed new smart green fisheries axis under an EFF-2 to support selectivity developments and other forms of innovation. While applying socio-economic optimum management to multispecies fisheries will mean that some remain overexploited, the majority will become fully exploited at MSY levels by 2020.

Fleet overcapacity may not immediately be eliminated, but capacity should balance opportunities by 2017. This will be achieved by a significant reduction in the size of unprofitable sectors, primarily the large scale fleet which would probably contract by more than 30% over the first 5 years of the programme as a result of quota transfers. The small scale sector, which is in any case more profitable than the large scale sector, would also reduce but we expect that the uptake of ITRs in this sector would be slower than in the large scale sector. GVA and profitability would improve, and although the size of capture fishery employment would decline with vessel numbers, GVA and crew wages per employee would rise in consequence. The largest fleet reductions are expected in the 12-40m sector, the largest crew wage gains are expected in the 24-40m sector, and the largest increases in utilisation of fishing time are expected in the 40+ sector.

According to our model, the biggest losses of employment would be in Belgium and Germany, with these countries plus the UK, Spain and the Netherlands seeing the largest rises in crew wage. Although all sectors would see a reduction in employment in the Mediterranean, because the demersal trawl fishery exerts by far the highest fishing mortality on stocks it would need to be reduced significantly to meet the Fmsy management requirements. Consequently it would suffer the highest reductions in crew size. Conversely the largest increases in GVA, profitability and crew wage in the Mediterranean would be seen in the small scale fleet (<12m and 12-24m passive polyvalent) and the 12-24m polyvalent fleet. Thus in both the northern fisheries and the Mediterranean the small scale fisheries would appear to benefit from the introduction of ITRs with protection for the small scale sector and the subsequent rationalisation of the large scale fishery.

Reduction in employment in the capture sector is inevitable with declines in vessel numbers, and such reductions might also be mirrored in the ancillary sector employment which is dependent on vessel numbers. However, there will be benefits to the processing sector flowing from increased volumes of catch.

Option 1 would see a significant improvement in governance with the introduction of RegBods and their management, which should improve the basis for management plans and their acceptance by all stakeholders. Management costs will, however, significantly increase both with the development of RegBods and the requirement for better scientific advice which will result in an improvement of the data available for management. Smart Green subsidies will support the development of ecosystem based fisheries management which should improve the image of EU fisheries. Some administrative savings will be made from the removal of any need for quota swaps although this cost will be transferred to the industry, but overall governance, and particularly the time taken to reach robust decisions, should improve under Option 1.

Under Option 2 a complete removal of subsidies may remove some 'positive' support to the fishing sector, particularly in areas related to innovation and value-added, and the environment e.g. responsible fishing methods. The abolition of EFF support may also have some small negative impacts on both income and costs for vessels –for those vessels that would otherwise receive support under a status quo option the impacts could be significant, but overall and when considering the EU fleet a whole these changes are not expected to be that significant. However, the largest impact under Option 2 is likely to come from the requirement to manage multispecies fisheries by the most sensitive species. This will result in major shifts in fishing activity which are difficult to predict, as fishermen attempt to maximise the fishing opportunities available to them, but available evidence suggests that a

significant number of stocks will be under-exploited under this management approach, with the result that the fleet foregoes some catch. This may be offset by the move to catch quotas which could lead to significant increases (10-40%) in retained and sold catch of some species currently subject to significant discarding, with no adverse impact on stocks.

As a result of the reduction in income in multispecies fisheries it is likely that the gains in GVA, vessel profitability and crew wage seen in Option 1 would not be realised in Option 2, although they would still be improved over the Status Quo.

In Option 2 there is a significant potential for negative impacts on some fishery dependent communities of allowing ITRs to be transferable across the EU. Some Member States (NLD, DNK, ESP) are more enthusiastic about this proposal than others, and it is likely to produce a number of "winner" and "looser" communities. Some small communities may experience tipping points, at which the loss of some small amount of quota to companies based in other EU states creates an unviable fishing and ancillary industry in that community. Communities in the Mediterranean are expected to be unaffected by inter-EU transferability, since there are few resources outside the 12nm territorial seas of MS that are managed as common resources and therefore could be subject to effort or quota transferability.

Of the 4 regions considered as case studies, Brittany and Northern Scotland are probably most vulnerable to aggressive buy-up of quota by other MS. Galicia would be a net winner, which could be seen as a positive outcome given the dependence of Galicia on fisheries. To guard against negative consequences for some communities, consideration should be given to a phase-in period, in which all MS large scale fleets are required to adopt ITRs but transfers are restricted (either within MS, or within regions) until such time as individual quota holders have developed a level playing field of financial capacity and robustness to allow open competition on an EU-wide basis. Note, however, that the acquisition of quota by some fisheries-dependent regions could improve their social sustainability, rather than erode it.

This option would involve some additional management costs, and in addition to the risks associated with inter-EU transferability of ITRs, there is a risk that scientific advice could not be developed in the much accelerated time-frame envisaged for this option. Nevertheless, ultimately this Option would prioritise the environment, and the scores shown in Table 124 demonstrate this.

Option 3 performs similarly to Option 1 in terms of the environment, but is significantly weaker on governance and economic benefits than Option 1. The return to a top-down governance structure utilising only RACs (although strengthened) at a regional level would probably significantly increase the time spent arriving at decisions, and might undermine the robustness of those decisions. Social performance is high, however, as in addition to providing similar increases in crew wage and attractiveness of the sector vulnerable communities would be protected from the inter-EU transferability rule adopted in Option 2.

Option 4 again performs similarly to Option 1 in terms of the environment and governance, although the performance of economic and social indicators is significantly weaker than Option1 due to the combination of a lack of subsidies for decommissioning and a limited uptake of voluntary ITRS, which will lead to continued overcapacity of the fleets. While stocks will recover and landings will increase as a result of MSY policy, the profitability of fleets will not show significant improvement and fisheries will remain overly competitive. As a result this Option is overall the most negative (Figure 16), although it still scores higher than the Status Quo. On the other hand, the flexibility allowed to MS to implement voluntary ITRs will benefit (or protect) fisheries dependent communities, although some may be left with aging fleets and only small improvement on wage increases, which will decrease the attractiveness of the sector.

Although our analysis (presented in Table 124) has been undertaken at the level of individual indicators, the objectives of the CFP are expressed as providing environmental, economic and social sustainability, within an efficient governance structure (Section 2). Figure 16 presents the results by these four major objectives. To construct this figure an average of the smiley scores presented in Table 124 was calculated for each CFP objective. The dividing lines between smileys corresponded approximately to

- Neutral or frowning face: 0% of individual scores reaching a smile or double smile;
- Smile: more than 50% of individual scores reaching a smile or double smile;
- Double smile: more than 80% of individual scores reaching a smile or double smile.

Our conclusion is that each Option performs best for one indicator group. Option 1 performs best for economic sustainability; Option 2 for environmental sustainability; and Option 3 for social sustainability. Options 1 and 2 perform equivalently for efficient governance (Figure 16). If the impacts on all objectives are taken together Option 1 performs better than Option 2, which performs better than Option 3. All potential options perform better than the status quo, although note that the detailed analysis shows that Options 1-3 may not perform better than the Status Quo for individual indicators.

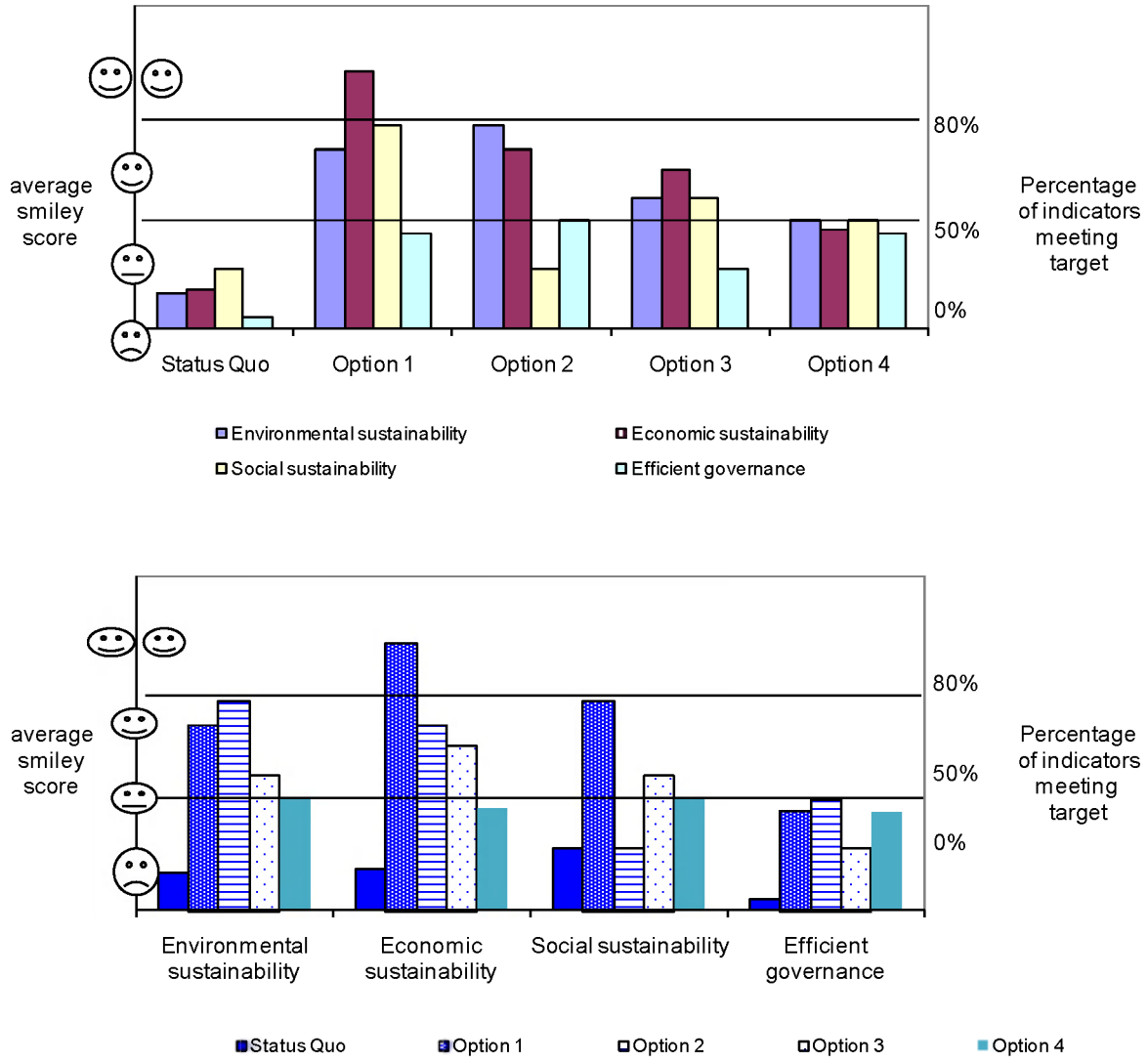

Figure 16 Results of the impact assessment, presented by CFP objective. Data presented are the average smiley score from Table 77. An indication of approximate percentage of indicators meeting the target is also given. In the Status Quo environment and governance indicators are in the frowning face area, and are not plotted. The two figures present the information in different category groupings.

Table 124 Summary of the impact of each option on Indicators. Key to smileys is:

Double Frown: performance targets not met, and/or a significant worsening of the situation
Frown: performance targets not met, and/or a worsening of the situation
Neutral: performance targets not met, but little change in the situation or only very small improvement
Smile: performance targets substantially met, and/or significant improvement of the situation
Double smile: performance targets met, and/or very significant improvements of the situation

	Indictor	Ideal state	Status Quo	Option 1	Option 2	Option 3	Option 4	Risks and assumptions
1	Stock situation in terms of fishing mortality in relation to MSY	All stocks at MSY	• Number of northern stocks at Fmsy increases from 3 (2009) to 8 by 2022; no improvement in Mediterranean stocks (4 at Fmsy). • Failure to set Fmsy targets in LTMPs and low uptake of LTMPs • Discarding at high levels. ☹	• Number of northern stocks at Fmsy increases from 3 (2009) to 81 by 2022; improvement in Mediterranean stocks 4 at Fmsy to 15 in 2022; • Only 40% (11) deep sea stocks reach Fmsy • 30% of stocks in multispecies complexes are overexploited • Discarding reduced by 50% due to quota pooling, regional body actions, technical measures ☺	• Number of northern stocks at Fmsy increases from 3 (2009) to 89 by 2017; improvement in Mediterranean stocks 4 at Fmsy to 18 in 2022. • Only 50%(14) deep sea stocks at Fmsy • All stocks in multispecies complexes are at Fmsy • Discarding almost eliminated with technical measures and introduction of catch quotas. ☺	• As with option 1 • Risk that lack of a RegBod will slow adoption of Fmsy management plans under **Option 3** 😐	• Although the objective is 25% interannual TAC variation, because the fleet will be overcapacity for longer it is likely that only 15% interannual TAC reductions are achieved. • Other results as with option 1 😐	• Significant risk that the accelerated Fmsy objectives of **Option 2** will not be supported by adequate science.

	Indictor	Ideal state	Status Quo	Option 1	Option 2	Option 3	Option 4	Risks and assumptions
2	% of stocks and/or catches covered by LTMP	All stocks with LTMP	• Only 27 out of 138 stocks covered by LTMPs ☹	• All stocks covered by LTMPs of some sort by 2017. • LTMPs will be accepted by Council and EP due to actions of RegBod, although they will be more complicated to negotiate with this multispecies policy ☺	• All stocks covered by LTMPs of some sort by 2017 • LTMPs will be accepted by Council and EP due to actions of RegBod, although they will be more complicated to negotiate with this multispecies policy ☺	• LTMPs will be accepted slowly due to dependence on RACs alone and the complex multispecies policy 😐	• As option 1; fleet overcapacity will have minimal impact on Regbod activities • ☺	• Risk that lack of a RegBod will slow adoption of LTMP plans under **Option 3** • Risk that LTMPs will prove difficult to negotiate under **Option 1 and 3** multispecies considerations
3	Average size (length and weight) of fish	Increase in mean size for all stocks	• Mean fish size increases only for the 62% of the 27 stocks covered by LTMPs • Gains undermined by continued discarding ☹	• Mean fish size increases significantly as a result a) increased number of stocks at Fmsy c) decreased discarding • Smart Green fisheries subsidy (i.e. modernisation) will facilitate increased selectivity. ☺	• Mean fish size increases most significantly as a result a) all stocks at Fmsy c) significantly reduced discarding associated with catch quotas; but undermined by high levels of underexploitation • Loss of Smart Green fisheries subsidy will have a small negative impact. ☺☺	• As with Option 1 ☺	• As option 1 ☺	• Significant risk of conflict between drive to discard reduction and underexploitation of a stocks under **Option 2**

	Indictor	Ideal state	Status Quo	Option 1	Option 2	Option 3	Option 4	Risks and assumptions
4	Fleet evolution	Decrease in fleet size to balance stock size, of at least 30% of 2007 levels by 2017 and 40% by 2022	• Decrease in fleets anticipated, but only at the existing rate reduction to 23% of 2007 levels by 2022. 😐	• Until 2015, fleet reduces in line with Operational Plans. • In 2022 following ITR introduction the total EU fleet has declined by 25% from 2007 levels, LSF 24% and SSF 25%. ☺	• Slight further decrease in fleet size over Option 1 due to reduced fish price stimulating more ITR reductions. • Reduction in fleets necessary to meet "conservation optimum" in multispecies situations • Additional small declines may result from inter-EU transfers ☺☺	• Equal decreases with Option 1 • No additional reductions anticipated from inter-EU transfers ☺	• The combination of lack of mandatory ITR and removal of scrapping and modernisation subsidies will mean that the fleet does not reduce much after the end of the operational plans in 2016. • Only some countries are expected to develop, later in the second decade, their own ITRs. ☹	• Current economic crisis may mean that current EFF plans are not met (i.e. anticipated declines to 2015 may not be realised) • Risk that ITR policy won't reduce fleet capacity as planned • Given the likely increasing age of some of the fleets, there may be increasing pressure for exceptional decommissioning subsidies or the development of targeted ITRs for some unprofitable fleet segments, beyond the assumptions here (DNK, EST, POL, SWE, NLD, DEU, ESP)
6	Area covered by protection regimes	Increase in protected areas to a maximum of 30% of fishable area	• Continuation of current trends leading potentially to 30% under area management by 2022 😐	• Slight improvement due to emphasis on smart green subsidy policies ☺	• As Status Quo 😐	• Slight improvement due to emphasis on smart green subsidy policies ☺	• As Option 1 ☺	• Overall, this indicator is unlikely to be strongly affected by the policies, perhaps with the exception of changed subsidies policy.

	Indictor	Ideal state	Status Quo	Option 1	Option 2	Option 3	Option 4	Risks and assumptions
7 8 9 10	• Gross valued added • Revenue to break even revenue > 1 • Net profit margin (NPM) • Return on investment	• Increase in GVA • All fleets have a ratio of >1 • All fleets have NPM of >5%) • All catching segments have RoI >15%; and all processing sectors have RoI >10%	• All indicators increase as stocks recover under existing LTMPs and fleet sizes reduce under EFF and anticipated EFF-2 • GVA increases from 1.9 to 2.3 bn from 2012 to 2022 • Overall profitability increases from 5.3% to 10.1%. 😐	• •Change of emphasis in subsidies towards innovation and common measures supporting positive improvement in long-term. • Through ITRs increasing stocks, economic performance will increase for the remaining participants. • GVA increases from 1.9 to 3.7 bn • Overall profitability increases from 5.3% to 18.3%. • Number of unprofitable segments decreases to 7% in 2022. • Increase in profitability much greater in the LSF: +29% compared to +9% in the SSF in 2017. ☺☺	• As Option 1, but removal of CMO reduces prices • Move to MSY earlier delivers some catch benefits but introduction of "conservation optimum" for multispecies fisheries leads to reduced catches for underexploited • Through ITRs increasing stocks, economic performance will increase for the remaining participants. • GVA increases from 1.9 bn in 2012 to 3.1 bn in 2022 • Overall profitability increases from 5.0% in 2012 to 16.2% in 2022. • Number of unprofitable segments decreases to 11% in 2022. ☺	• As Option 1, but removal of CMO reduces prices. • GVA increases from 1.9 in 2012 to 3.1 bn in 2022 • Overall profitability increases from 5.3% in 2012 to 16.3% in 2022. • Number of unprofitable segments decreases to 9% in 2022. ☺	• Similar to Option 1, with small increases in GVA, but profitability undermined by continued overcapacity • GVA increases from 1.9 bn in 2012 to 2.9 bn in 2022 • Overall profitability increases from 6% in 2012 to 9% in 2022. 😐	• Prices dependent upon externalities • Risk that ITR and subsidies policy won't work as, or have the impacts, expected

	Indictor	Ideal state	Status Quo	Option 1	Option 2	Option 3	Option 4	Risks and assumptions
11	Fish prices, market orientation	Fish prices remain stable	• Fish prices remain constant in real terms 😐	• Fish prices will increase as a result of improved status of stocks, better perceived marine stewardship and mean fish size. • Enhanced CMO policy and subsidies directed toward marketing and promotional measures are also likely to improve prices. ☺☺	• Fish prices will increase as a result of improved status of stocks, even better perceived marine stewardship and mean fish size. • Removal of CMO policy and subsidies directed toward marketing and promotional measures will depress prices ☺	• Fish prices will increase as a result of improved status of stocks, better perceived marine stewardship and mean fish size. • Retention of current CMO policy and subsidies directed toward marketing and promotional measures are also likely to improve prices. ☺	• Improvements in stock size and enhanced CMO policies will tend to increase fish prices. • Positive image of fishing industry will be undermined by continued overcapacity ☺	• Significant uncertainty until the CMO impact assessment is completed
12	Level of subsidies / value of landings	Reduced and more targeted 'good' subsidies	• Subsidies remain a significant contribution to the catching sector as EFF-2 continues ☹	• Long- and short-term, positive impacts as "bad" subsidies are reduced and "good" subsidies increased • Targeting of subsidies specifically on "smart green" issues, and removal of fleet subsidies, will be positive 😐	• Positive impacts on indicator (but note that potential negative impact on other indicators with reduction in "good" subsidies as well as "bad" subsidies) ☺	• As Option 1 • Improvement in "good" subsidies provided with "reserve" fund 😐	• As Option 1 😐	• Assumptions made about levels of funding and balance of funds between axes, measures and actions

	Indictor	Ideal state	Status Quo	Option 1	Option 2	Option 3	Option 4	Risks and assumptions
13	Employment	Improved employment	• Employment declines by 5% from 2012 to 2017 due to reduction in fleet size 😐	• Reduction in TACs will have short-term impacts on employment • Introduction of ITR reduces total employment in capture fisheries. • Declines are less in SSF than in LSS: decline of 10% in 2017, LSF: decline of 20% in 2017, SSF • Ancillary employment likely to decrease as fleet declines • processing employment likely to increase with increasing catches ☹	• As Option 1, but with greater declines ☹☹	• As Option 1 ☹	• Employment will decline less than Status Quo and much less than the other options. 😐	• Introduction of ITR reduces total employment in capture fisheries. • SSF: decline of 10% in 2017 • LSF: decline of 20% in 2017 • Employment likely to decrease in ancillary sector and increase in processing services.

	Indictor	Ideal state	Status Quo	Option 1	Option 2	Option 3	Option 4	Risks and assumptions
14	Status of fisheries dependent communities	Reversal of declining importance of fishing	• No major changes anticipated in some regions, but others where significant stock recoveries are anticipated (e.g. Scotland) will experience an increase in employment and income 😐	• There will be significant increases in stock status and catches, and knock-on impacts on the status of some areas. • Small Scale Fleet safeguards and Axis 2 diversification funds would be available to support any negative impacts of intra-MS quota transfers on communities ☺	• Increases in catches will be lower in multispecies fisheries than in Option 1 • Some dependent communities would be vulnerable to loss of fishing rights to other EU states. Key vulnerabilities are Brittany and Northern Scotland. Others would gain due to acquisition of new quota opportunities. • No subsidies available to support affected communities ☹	• As Option 1, except with compensation for affected fisheries dependent communities being provided for by existing EFF axes. ☺	• There will be significant increases in stock status and catches, and knock-on impacts on the status of some areas. • For those countries that have indicated an unwillingness to consider ITRs, the fleet sizes will remain high and small dependent communities may be protected. • For those countries that voluntarily choose to implement ITR at the MS level, this may be done to enhance local dependent communities. ☺☺	• Significant resistance from MS on EU transferability. Safeguards would need to be developed to protect vulnerable communities • Rationalisation of fleets and consolidation of quotas may affect the degree to which benefits are shared within communities
16	Social sustainability: GVA per employee	Increase in GVA per employee	• Small increases following increases in GVA per employee 😐	• Significant improvement in LSF following large improvements in GVA per employee; no change in SSF • Increases in GVA per employee significantly more in LSF than in SSF: • Increase of 43% in 2017 for SSF; increase of 92% in 2017 for LSF ☺☺	• As Option 1, but with less improvement for both SSF and LSF due to lower increase in landed value • Increase of 26% for SSF and increase of 62% for LSF in 2017 ☺	• As Option 1, but with less improvement for both SSF and LSF due to lower increase in landed value ☺	• Small improvements in GVA / employee compared to the SQ, but not as high as the other options. 😐	• Will largely follow impacts on economic indicators

	Indictor	Ideal state	Status Quo	Option 1	Option 2	Option 3	Option 4	Risks and assumptions
17	Attractiveness of the sector	Income at least 100% of national average	• Unlikely to change significantly. • Relatively small changes in crew wage: 13% in LSF, 8% in SSF. 😐	• Significant improvement in the LSF due to very significant improvements in average crew wage, no significant change in SSF • Increases in average crew wage significantly more in LSF than in SSF: increase of 38% in 2017, SSF; increase of 80% in 2017, LSF • Smart green increases attractiveness, as does environmental performance of fisheries ☺☺	• As Option 1, but with less improvement for both LSF and SSF due to lower profitability, through lower increase in fish prices and multispecies approach leading to slightly lower catches. • Removal of subsidies even in smart green may lead to lower education / awareness and lower attractiveness, although better environmental practices ☺	• As Option 1, but with less improvement for both LSF and SSF due to lower increase in profitability through lower increase in fish prices. • Continued investment in social activities increases attractiveness. ☺	• Very low wages generally with the continued overcapacity of the fleet. • Potential problems with safety, the ageing fleet, and lack of funds in some low profitability fleet sectors to implement vessel modernisation, may further reduce the attractiveness of the fleet. ☺	• Increase due to improvement in profitability. • Will largely follow impacts on economic indicators
28	Safety	The accident rate (accidents per FTE) should decrease to zero	• Current trends imply the non-fatal accident rate will continue to decline. • No indication that the fatal accident rate is declining 😐	• Positive for LSF because of reduced competition under ITR and significant improvements in profitability and GVA/vessel • Smaller increase for SSF due to smaller improvements in profitability and GVA/vessel ☺☺	• As Option 1 ☺	• As Option 1 ☺	• Safety compromised by the increasing age of the fleet and lack of funds in some unprofitable segments to engage in modernisation. ☹	• Positive because of reduced competition under ITR. • Will largely follow impacts on economic indicators because of link between safety and profitability

	Indictor	Ideal state	Status Quo	Option 1	Option 2	Option 3	Option 4	Risks and assumptions
18	Departure of quotas from Scientific advice	Deviation from advice should decline to zero.	• No indications of reversing the current situation where quotas are set 40% higher than scientific advice. The number of stocks for which scientific advice is zero TAC where the Council sets a positive TAC has increased significantly since 2003. ☹	• Regional Bodies obliged to propose appropriate conservation, technical and effort measures to deliver EU Fmsy targets • Much lower departure of quotas and scientific advice following improved agreement at EP/Co level ☺	• As Option 1. ☺	• Without RegBods likely to be continued disagreement about meeting "socioeconomic optima" for multispecies fisheries • Increased time to develop proposals and increased potential for discussion at EC/Co level. Perhaps no better than Status Quo, depending on "enhancement" ☹	• As Option 1 ☺	

	Indictor	Ideal state	Status Quo	Option 1	Option 2	Option 3	Option 4	Risks and assumptions
19	Management costs for the sector	Management costs should decline	• Unlikely to reduce in short-term • Reductions in enforcement expected of 42% and 35% by 2017 and 2022 • Management costs decrease with declining fleet size ☺	• Increased MS involvement in decision making process is likely to increase both financial and time costs through additional meetings, particularly negotiating LTMPs under "socio-economic optima" for multispecies fisheries • Additional science costs estimated at €20 million • Reductions in management costs compared to Status Quo with larger decline in fleet size, and reduction therefore in MCS task, • Slightly offset by increase in number of landings (catch increases) and number of new MS fishing under EU ITR transferability. 😐	• As Option 1 • Increased science burden (not necessarily costs) to deliver MSY in reduced timescale • Increased MCS costs associated with more rapid reduction in catches to Fmsy in 4 years for all stocks ☹	• As Option 1, but decreased costs associated with non-use of RegBods 😐	• As Option 1 ☹	• Significant risk that science capacity in the EU cannot deliver new assessments, even with additional funds

	Indictor	Ideal state	Status Quo	Option 1	Option 2	Option 3	Option 4	Risks and assumptions
20	Regions and MS having adopting RBM system	RBM systems uptake should increase to more than 50% [ITR uptake in 100% of unprofitable fleets]	• Adoption of additional RBM systems is likely, but will stay at a low level within the EU, about 20% of the modelled fleet. ☹	• ITR uptake will be 100% in LSF. • Uptake in SSF is likely to increase, although this is dependent on profitability. • SSF: ITR uptake increase of 24% by 2017 ☺	• As in option 1 ☺	• Uptake of ITRs may be lower due to individual MS operation, essentially a continuation of the SQ 😐	• Some MS or fleet segments may, in the later stages of the decade, decide to voluntarily develop ITRs, but uptake will be lower than in Option 1. 😐	• inter-transferability of ITR systems across the EU (Options 1 and 2) may lead to RegBods implementing significant safeguards, slowing down ITR implementation.
21	Data provided by MS	Full compliance by all MS with reporting obligations	• Number of infringements expected to decline as the Control Regulation takes effect, and the DCF will significantly improve data reporting 😐	• Increase in DCF data required to develop scientific advice for all stocks • Compliance may increase with RegBod involvement of all parties, and with ITRs ☺	• As in Option 1 ☺	• As in Option 1 ☺	• As Option 1; there may be a small decrease in compliance associated with overcapacity, but Regbods will still be effective. • ☺	• Assumption that impacts same across all options

	Indictor	Ideal state	Status Quo	Option 1	Option 2	Option 3	Option 4	Risks and assumptions
22	Rate of utilization of allocations (quotas)	Utilisation increases to 100%	• Likely to continue to decline unless fleets increase as stocks increase ☹	• Utilisation of quotas is likely to increase in those fleets which adopt ITR due to transfer/leasing of rights within MS • Swaps will still be required and the inefficiencies introduced will maintain some under-utilisation 😐	• Utilisation will improve even further with inter-EU transferability, and swaps will cease. • This will be undermined by under-utilisation of stocks in multispecies complexes. ☺	• As Option 1 😐	• As Option 1 • 😐	• If transfers are restricted between regions, utilisation may be reduced in Options 2 for same reasons as Options 1 and 3
23	Level of quotas exchanges	decrease in quota swaps[47]	• Likely to remain stable, at about 6% overall. A high level of swaps will continue for certain stocks, most particularly redfish, horse mackerel and blue whiting, indicating inefficiencies in allocation ☹	• Quota swaps will still be needed, but inter-MS transfers may lead to some easing of need for inter-EU swaps 😐	• Overall quota swaps will decline with uptake of ITR. Some swaps will continue with non-ITR fleets. ☺	• As Option 1 😐	• As Status Quo – the mitigation of some exchanges by intra-MS transfers would be less effective given the low uptake of ITR for most MS. • ☹	• Overall quota swaps will decline with uptake of ITR. Some swaps will continue with non-ITR fleets.

[47]. A reduction in swaps implies efficiency of the quota allocation system and decreasing administrative burden. A need for swaps implies individual fleet specialisation and economic efficiency that is not realised by the current allocation system.

	Indictor	Ideal state	Status Quo	Option 1	Option 2	Option 3	Option 4	Risks and assumptions
29	Time taken to reach a decision	Time taken should not increase significantly	• Time taken to reach decisions will increase significantly under EU co-decision of Lisbon treaty ☹	• Regional Bodies will reduce the time taken to reach a decision ☺	• Implementation of Fmsy policy will be difficult for some stocks in the short term due to lack of scientific data, which may lengthen time taken by RegBods to generate management plans • Implementation of "conservation optimum" for multispecies fisheries may lead to harder decision making in RegBods and Co/EP with many loosers 😐	• Lack of authority of RegBods will mean reliance on RACs and return to SQ decision making ☹	• As Option 1 • ☺	
24	Level of coherence with WTO & other EC policy	All policies coherent with the EU's WTO obligations	• Likely to remain coherent with current policy except on subsidies if agreement is reached at WTO ☹	• Improved coherence with Marine Strategy Framework Directive and WTO • Improved coherence with WTO subsidy rules ☺	• Improved coherence with Marine Strategy Framework Directive and likely WTO • Very significantly improved coherence with likely WTO subsidy rules ☺☺	• Improved coherence with Marine Strategy Framework Directive and WTO • Improved coherence with likely WTO subsidy rules ☺	• As Option 1 ☺	Risk/assumption as to final WTO decision on subsidies which is not yet known

	Indictor	Ideal state	Status Quo	Option 1	Option 2	Option 3	Option 4	Risks and assumptions
25	Impact for the private sector	Administrative cost and burden should decrease	• Administrative costs will decrease only slightly 😐	• Trading of rights within industry is likely to increase administrative costs to the sector. • Greater involvement of industry in Regional Bodies likely to increase sector administrative costs. ☹	• As Option 1, but with even more involvement of the industry in rights administration ☹☹	• As Option 1, but with reduced administrative burden without RegBods 😐	• Greater involvement of industry in Regbods, but little additional burden of administrative cost due to ITRs; closest, therefore, to the Status Quo 😐	
26	Level of implementation simplification process by MS & industry	Simplification of implementation should increase	• Increase in simplification, linked to improvement in electronic reporting. • Complexity of regulations remains 😐	• Development of LTMPs by RegBods should improve simplification for industry and MS • ITR will increase complexity • Subsidies simplified 😐	• Development of LTMPs by RegBods should improve simplification for industry and MS • Inter-EU transferable ITR will further increase complexity • Subsidy complexity removed ☹	• ITR will increase complexity, but to the same extent as Option 1 & 2 • Complexity of regulations remains, including subsidies 😐	• Development of LTMPs by RegBods should improve simplification for industry and MS ☺	
30	Aquaculture [$]	Aquaculture production / capture productoin	• No direct impact on ratio	• Ratio should decline as capture fishey catches increase during recovery	• Ratio should decline as capture fishey catches increase during recovery, but not as much as in Options 1 or 3	• Ratio should decline as capture fishey catches increase during recovery		Assumption that no specific aquaculture policy

$ No clear objective is apparent for this indicator, and it has not therefore been assigned face scores.