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Role	Name	Organisation	Date	File suffix ³
Authors	Michaela Aschan, Kåre N. Nielsen, Petter Holm,	University of Tromsø (UiT)		
WP leader	Michaela Aschan	UiT	4 th December 2012	MA
Administrative Officer	Oddur M. Gunnarsson	MATIS		OMG
Coordinator	Anna K. Daniélsdóttir	MATIS	20 th February 2013	AK

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² PU: Public, PP: Restricted to other programme participants (including the Commission Services), RE: Restricted to a group specified by the consortium (including the Commission Services), CO: Confidential, only for members of the consortium (including the Commission Services)

³ The initials of the revising individual in capital letters

Summary

This work draws on the insights from 1) the development of the first management plan (MP) for the lump sucker fishery in Iceland and the lessons learned in the process; 2) the assessor's (WP6) response on the evaluation of this MP; 3) discussions with stakeholders and external advisors at the EcoFishMan meeting in Edinburgh, UK in the year 2012 and 4) experiences with results based management like systems in fisheries elsewhere (e.g. New Zealand).

The previously proposed model for the Responsive Fisheries Management System (RFMS) prototype 1 was developed into RFMS prototype 2. Few additions and adjustments were made in this process: There could be more than one authority, operator and assessor in the RFMS, and the resulting RFMS can be designed as/within a nested system, for instance in order to reflect the different levels that typically are involved in decision making in a EU context. A public hearing, including an evaluation of the MP by the assessor, is to be held before the Authority gives the final approval of the MP. To ensure that the assessor is in the position to evaluate the MP development process, a log of this process should be provided by the authority. In addition to provide documentation and monitor the fishery, the operators in RFMS are formally made responsible for delivering assessments of stocks. It is proposed that a certain level of cost recovery is included in the RFMS in order to motivate the operators to take responsibility of documentation, monitoring and assessment tasks. In practice, the extent to which responsibility is delegated to operators will vary between cases, depending on the capacity and interests of the operators in charge.

The RFMS prototype 2 will be further developed based on further experiences with specific RFMS designs in case studies. Two more rounds of RFMS development and evaluation with associated MP invitations and guidelines will respectively result in RFMS prototype 3 and the final RFMS prototype 4.

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1. Background

This deliverable builds on D 4.1 RFMS Prototype 1, and further develops the Responsive Fisheries Management System (RFMS) concept and the RFMS Prototype 2.

The document consists of two separate texts: 1) task 4.1: Conceptualization of the Responsive Fisheries Management system (RFMS) – Prototype 2, and 2) task 4.2: Design and further development of guidelines for making a general management plan (MP) in accordance with prototype 2. It should be kept in mind that the RFMS prototype (task 4.1) and the guidelines for making a general management plan (task 4.2) are continuously developed throughout the progress of the EcoFishMan project.

2. Task 4.1: Conceptualization of RFMS – prototype 2

The initial conceptual model the prototype 1 of the Responsive Fisheries Management Systems (RFMS), based on the notion of Results Based Management (RBM), was defined in deliverable D 4.1. We recommend readers to become familiar with this document. In this section we introduce new entities of RFMS that are included into a more advanced and applicable RFMS prototype 2.

2.1 Lessons learnt when developing the RFMS

This work draws on the insights from 1) through the development of the first management plan for the lump sucker fishery in Iceland and the lessons learned in the process; 2) discussions with stakeholders and external evaluators at EcoFishMan stakeholder meeting in Edinburgh, UK 2012 and 3) the assessor's (WP6) evaluation of this management plan for the Iceland lump sucker fishery; and 4) further experiences with results based management like systems in fisheries elsewhere (e.g. New Zealand). The proposed model of prototype 1 has thereby been developed to prototype 2 (Fig. 1).

2.1.1 Results based management like systems in fisheries

Although literature studies were made prior to the development of prototype 1 (D1.1), we found it necessary to conduct some further studies of existing RBM like systems in fisheries – especially in New Zealand where results-based approaches to fisheries have been applied in some cases. Therefore interviews with representatives of fishing organisations and ministry employees were conducted. In particular, a field study of the rock lobster fishery in New Zealand has been rewarding as this represents a case in which a commercial stakeholder organisation, the operator (OP) has successfully taken considerable responsibility for research and management functions⁴ (Yandle 2008). One of the lessons learned from this case relates to the importance of having strong leadership and an organised and dedicated group of fishermen within the OP's organisation. This is not surprising as leadership and good organisation is known to be an important factor for other management systems as well. The point is that these dimensions should be devoted attention when one seeks to implement significant organisational changes. For this reason we recommend that the organisational structure of the OP is defined and that the leader and a co-leader responsible for the MP development named.

⁴ Observations by Kåre Nolde Nielsen based on extensive interviews (in 2012) with the director of the New Zealand Rock Lobster Industry Council, and on various documents informing about management and research relating to Rock Lobsters in New Zealand.

The RBM principle depends on the authority to take action if the outcome targets in the MP are not met. Field studies indicate that the authority may not act if it is: 1) politically dependent on the

fishers⁵, or 2) has left the responsibility to the OPs and thereby does not follow up on the outcome targets (OTs), and does not react if the OTs will not be met⁶. We suggest that the responsible department within the authorities' organization and also the person in charge of the department are identified by name. When organising a RFMS in a fishery one should avoid having a local authority in charge in cases where the authority is dependent on the OP.

The study of the case of Rock Lobster management in New Zealand indicated the importance of establishing clear resource boundaries in order to motivate operators to enter into RFMS arrangements⁷. In accordance with standard resource economic theory, a clear definition of property rights can motivate resource owners to invest and take care of their property (i.e. the resource⁸).

OPs may be interested in RBM in fisheries and also be willing to take over the burden of proof without direct incentives in terms of increasing cost effectiveness of management of research (e.g. reflecting cost-recovery demands). The wish of fishermen to become empowered and/or to enhance the effectiveness of the management system may alone comprise sufficient driving forces. However, in the upcoming case studies, EcoFishMan research will aim at identifying taxes and other contributions to the society paid by the fishers and/or the OPs. This will contribute to an assessment of OPs capacity for cost-recovery and/or for restructuring the former types of payments into cost recovery arrangements when developing the MP. The cost recovery issue needs to be addressed in any MP relating to the RFMS.

2.1.2 Lessons learned in developing MP1 in the Icelandic lump sucker case

The RFMS prototype 1 has been successfully discussed and applied in cooperation with NASBO (National association of small boat owners) to the Icelandic lump sucker case. The lump sucker MP was developed followed the RFMS prototype 1. A ban on discard was introduced for this fishery as part of the plan. Yet, in this case we found it hard to introduce new approaches as both fishers, representatives of the ministry, and scientists tended to remain within the framework of the existing system when developing solutions. While being realistic and strongly nested within the existing framework, the resulting management plan was perhaps not as innovative as we would have liked with regards to the exploratory purposes of this research project. Upcoming case studies will therefore be framed as "what if" scenarios in order to encourage the parties to "play the game" and to get more creative and innovative in the MP development process.

The Icelandic scientists at MATIS have long working relationships with NASBO, allowing for a development of a trustful relationship and effective dialogue. Although there hence is good cooperation between the fishers' organisations and the scientists in this case, we experienced some problems in getting into touch with the key persons representing the OPs. This was mainly due to turbulent conditions in the national fish quota negotiations in the summer of 2012. This pointed to that previous cooperation between fishers and scientists on a personal and institutional level is needed to facilitate a well working RFMS planning process. It also indicated that a highly turbulent

⁵ There are indications of this being the case in relation to some Cofradias in North Galicia (Macho, G., Naya, I., Freire, J., Molares, J. (2010) The key role of the barefoot ecologists in the co-managed turf system of Galician (Nw Spain) artisanal shellfisheries. World Small-Scale Fisheries Congress (WSFC), Kasetsart University, Bangkok, Thailand (October 18-22nd, 2010).

⁶ Observation by Kåre Nolde Nielsen based on an interview in 2012 with the chief scientific advisor at the New Zealand Ministry for Primary Industries.

⁷ See previous footnote.

⁸ Advances in Fisheries Economics, 2007. Editors: T, Bjørndalen, D.Von Goron, R.Arnason and U.R. Sumaila. Blackwell Publishers Ltd.

political climate, while offering potential opportunities for developing management alternatives, can obstruct the planning process.

The development of relevant Outcome Targets (OT) has turned out to be challenging in many ways. Objectives defined by authority (fisheries policy) often include social goals, e.g. relating to employment and settlement patterns. However, these can typically not be translated into meaningful OTs that the operators are made responsible for to achieve. Operators may, however, want to define measures as to make a positive contribution to such objectives. This may for instance be done by agreeing on distribution of catches to landing sites, landing of by-catch and by-products to a local industry, contributing to recruitment by providing training to newcomers and the younger generation. When implementing RFMS in a fishery, the OPs should be made aware of the social objectives of the authority and possible social OTs, but one has to be careful to only include OTs in the MP that the fishers can affect directly by their actions.

Economic objectives may also be hard to define and agree on. Yet, in Iceland where there are no subsidies to the fisheries, the fishers were keen on including a level of minimum profitability. Therefore EBIDTA (Earnings Before Interest Depreciation Taxes and Amortization) was used when applying RFMS prototype 1 to the Icelandic lump sucker MP. In addition to be a burden for public budgets, subsidies to the fisheries should be avoided because they tend to imply that the fisheries effort is artificially kept on a higher level than the stock or stocks can sustain (Sumaila et al. 2007). Therefore any scenario where RFMS is applied to a case fishery one should avoid subsidies and preferably include some profitability indicator e.g. EBIDTA. This will ensure that Ops have an income that can allow for some degree of cost-recovery, and may also result in a higher focus on profitability within the OPs. In practice, a operators could make a budget that establishes to what extent and how they wish to contribute to cost recovery, e.g. by collecting samples, providing data, financing control or hiring scientists. Such considerations are case dependent and should be discussed in the pre MP invitation meeting between the OPs and the authority. In this case, trust between Matís and NASBO and a threat from the government of resource tax increased the willingness of OPs to contribute to cost-recovery approaches and solutions (for details see MP1 for the Icelandic lump sucker fishery in D 5.2 EC RFMS prototype 1 tested in case study 1).

As biological OTs are already present in existing MPs, it is convenient to provide a list of OTs for species where annual assessments of the stocks are available. The choice of indicators to include will affect e.g. how often the MP has to be revisited. If a certain value for acceptable fishing mortality (F) is agreed upon and is taken to comprise an OT, it will allow the MP to have a long durability. Conversely, if a total available catch (TAC) value is used as OT, this value would have to be revisited for each stock when a new assessment is available. An additional advantage of defining an OT in terms of F instead of TAC is that this leaves it open whether the OT should be achieved through quotas or through other management means. In principle, the OT should be defined in terms as closely related to what one seeks to achieve. With respect to a policy seeking to achieve biological sustainability of a resource, it might for this reason be better to define OTs in terms of spawning stock biomass (SSB) than in terms of F .

Often little information is available for by-catch species. Here total by-catch quota, maximum by-catch levels and closed areas may be applied in the MP. The introduction of a catch quota system may solve some of the by-catch problems (Kindt-Larsen et al. 2011). In the cases where RFMS has so far been explored within the frame of EcoFishMan, there has not been assessments available of a quality sufficient for defining MSY, and MSY could hence not be used as a OT for these cases.

We intend to draw on the above lessons in the further development of the RFMS prototype, which will subsequently be applied to new case studies.

2.1.3 Input from stakeholders and experts

At the stakeholder meeting in Edinburgh, UK in 2012, a multi voting technique was conducted to identify the most proper institution or organization to respectively perform as the authority, operator and assessor (see report from the meetings for details⁹). The main results are presented below:

Authority:	Member State (Country, and/or national fisheries ministry) 40% European Union (Council, Parliament and/or DG-Mare) 37%;
Operator:	Fisher's association or organization 54%, Regional advisory committee (RAC) 29%;
Assessor:	Expert consultants 19%, Marine Scotland 16%, The International Council for Exploration of the Seas (ICES) 13%; Certification body (e.g. MSC) 13%, Independent body/institution 13% and RACs 13%.

Main conclusions from discussions:

The meetings concluded that the implementation of RFMS in EU would require a nested system, where the Member State (MS) could perform as the authority at the national level. It seems relevant to set OTs defining ecological and stock sustainability at an EU level. In turn, social and economic OTs may be set on MS level, while others issues could be dealt with at a regional level, e.g. North Sea level. The meeting concluded that too many OTs may just result in a new form of micromanagement. Research should not be dealt with at a national level but on the regional and EU level. Lucia Fanning, Director of Marine Affairs Programme at Dalhousie University, Canada and member of the EcoFishMan external advisory panel, pointed out that a relevant theoretical approach to social-ecological-systems was described by Elinor Ostrom¹⁰.

MPs proposed by the operator/s should be subjected to a public hearing facilitated by the authority before a final decision is made on whether the MP can be approved by the authority. This is in order to invite feedback from other stakeholders than those invited to submit the MPs (e.g. NGOs, fish processing associations, fish sales organizations and municipalities).

There is an ultimate need to ensure that the RFMS is developed within the legal framework of the CFP and member states.

Stakeholders stressed that training/education of fishermen about the RFMS would be important as it would also allow for improved capacity within the fishers organizations. Enhancing operators understanding of the fisheries system could be a specific governance objective.

Discussion on the roles of authority, operator and assessor:

Authority: EU would remain the top authority level, and ecological as well as stock health OTs need to be decided upon at this level. Some authority functions may be executed at a lower level, e.g. Member State level or one may consider a Regional Council of Ministers. RACs should remain in an advisory role. Member States should present MP invitation to EU top level to ensure some level of consistency within EU.

⁹ D 7.4 EcoFishMan Report on Seminar on RFMS, Edinburgh, November 2012.

¹⁰ Ostrom, E. et al. 2007. Going Beyond Panaceas Special Feature: Going beyond panaceas PNAS 104 (39) 15176-15178.

Operator: Operators could be producer's organizations, or the fishers themselves. The operators could also be appointed as teams (e.g. FMAC¹¹). In addition to fishermen, such a team could include scientists and NGO representatives. There was a common understanding that fishers would take an active role in the work of the Operator. There could be an overall common frame for MPs, but one should seek to develop the MP at a regional level to ensure local adjustments. The regional level could be characterized in terms of gear type or geographical region.

Assessor: Criteria for appointing an assessor has to be set within the guidelines of RFMS as this is more important than naming particular candidate agencies that could take on the role as assessors. As long as these criteria are met the assessor may well be a private company or consultancy. Assessors should demonstrate proven knowledge/competence in relevant fields. The procedure of Marine Stewardship Council, which opens for the use of approved certification agencies, was considered a potential model. The assessor's credibility and independence to ensure trust were also addressed.

The RFMS needs to define at which public administrative level the assessor should be placed and standards for making assessments should be authorized. There is a need for harmonized assessments across countries to ensure a common practice within the CFP.

The industry representatives claim that they are not in the position to pay for assessments and there by reluctant to enter into a cost recovery scheme. However, SEAFISH was mentioned as an assessment candidate as it already receives money from the industry.

2.1.4 Response to evaluation of RFMS prototype1 and management plan 1

Here we aimed at applying the most important recommendations given in the Assessment of the MP for the Icelandic lumpish fishery based on RFMS¹². The RFMS prototype 2 and the associated MP invitation were expanded and further developed according to this evaluation and associated recommendations.

In addition to documentation, monitoring as well as stock assessments of pertinent ecosystem aspects (if appropriate) are now included as a part of the RFMS. The role of science in the system is defined as the necessary provider of knowledge to ensure that the right OTs will be set and then met.

The assessor considers it to be critical that the "approval stage" of the MP is detailed within the system. In this sense, an assessment of the MP before its approval (ex-ante) seems recommendable. This assessment is different to the one assigned to the assessor (WP6), which is limited to the evaluation of whether or not outcome targets have been met. In RFMS prototype 2 it is suggested that the assessor takes part in the hearing of the MP before the authority makes the final approval.

The authority may consider if it is necessary to identify essential requirements for the MP, i.e., basic elements that if not present in a MP will mean that the plan not eligible to go on to the hearing or to the final approval stage¹³. Such criteria should be developed and stated in the final MP-invitation. The authority (WP4) needs to decide on such requirements in cooperation with the assessor (WP6).

Whenever a MP involves institutional arrangements that are not part of the plan as such, but yet are relevant for the plan (for instance decision making processes within a fishermen organization) this should be clearly stated in the plan in order to enable the assessment. Overall, governance issues

¹¹ FMAC stands for Fisheries Management and Conservation group. See:

<http://www.scotland.gov.uk/Topics/marine/Sea-Fisheries/FMAC> (last visited 12.02.2013)

¹² WP6: INTERNAL NOTE TO WP4: Assessment of the Management Plan for the Icelandic lumpish fishery based on RFMS. 14pp

¹³ See for example page 8 in WP6: INTERNAL NOTE TO WP4: Assessment of the Management Plan for the Icelandic lumpish fishery based on RFMS.

have now been more clearly reflected in the MP invitation. Although good governance is a must in the RFMS, it is not specifically defined in the RFMS in order to allow for different organizational approaches within the institutions.

Fishers' participation in the OP and the details of how members are committed/obligated to follow the MP should be described. The MP needs to establish rules for how OP members can join or leave the MP. This depends on how the operator is organized and has to be stated in each MP. This dimension has therefore been included in the MP invitation.

The assessor needs confirmation from the authority regarding transitional periods. If the MP is designed for transition from micro-management towards RFMS (but not yet a complete RFMS system) the assessment framework would need to be flexible enough to ensure appropriate evaluation, using criteria that takes the transition period into consideration. In the MP, the operator should define when in the transition period certain criteria will be met; otherwise the assessor may itself suggest criteria and set the time limit for accomplishment.

The authority should keep a log of the planning process from the pre MP-invitation meeting, through the meetings for the development of the MP, the hearing, and up to and including the response from the assessor and the final approval letter. The log should briefly mention/outline these planning events and specify at what time they took place.

Description of the documentation systems to be used to follow the fishery should be available also if not a part of the MP. A list of documentation systems with references or links should be provided with the MP.

There is a need to provide information relevant for the cost-benefit analysis. Yet, this is not necessary a task within the MP development if the information is not relevant for the OTs. Recommendations on this issue will be given after the EcoFishMan Second Annual meeting in Ancona, Italy in March 2013 where this issue will be discussed.

To ensure that the operator responds on all necessary requirements of the RFMS asked for in the MP invitation, a checklist has been included in the MP invitation.

2.1.5 Concluding comments on lessons learned

The fact that Iceland is a small country, with a low level of hierarchy in the public administration and a positive and constructive attitude to new challenges, seem to ease the work in developing new realistic approaches. One may argue that the MP could have been more innovative, however, the good cooperation with the OP suggest that such advancement will be done in the next interaction when developing MP2 for the mixed demersal fishery.

The development of MPs with the stakeholders (fishers' organisation) through "pre MP-invitation meetings", working meetings on the MP and continuous dialogue with the fishers' organisation (operator) has turned out to be successful. This is probably due to the very practical approach where the fishers are given freedom and responsibility in designing the MP according to the invitation and the agreed outcome targets. The process works like a role game where the fishers, assisted by Icelandic WP5 partners, are operating in results based management (RBM) system.

Drawing on experiences with RBM like arrangements in fisheries outside our project, we observe that good organisation and leadership in the fishers' organisation seem to be precondition for RBM to work. We also find examples where the authority does not intervene although the fishers do not meet the conditions defined in the MP. This may happen if the authority is dependent on political support from the operator (votes from the fishers organised) or when the authority trusts that the operator is acting according to MP and does not respond to discrepancies identified by the assessor.

Within the cases we address in our project, we observe how the institutional contexts differ between case studies. This will provide us a comparative basis for evaluating the potential for RFMS arrangements across cases. Through the interaction with stakeholders on local, member state and EU level, we expect gain further insights into these aspects during the remaining project time.

2.2 A conceptual model for Responsive Fisheries Management System – prototype 2

As RFMS prototype 2 builds on RFMS prototype 1 we have decided to keep previous descriptions and definitions (grey) and insert new or modified paragraphs (black) in our work towards the final RFMS.

Drawing on the definition of RBM in the EcoFishMan and on experiences with RBM in fisheries management as well as in other contexts, we now propose a conceptual model of Responsive Fisheries Management System (RFMS) (Fig. 1a). The model will at this stage be kept at a rather abstract level; the elaboration and contextualisation of the RBM concept in EcoFishMan will be a collaborative outcome, which will be nourished and shaped though outcomes of the projects different work packages.

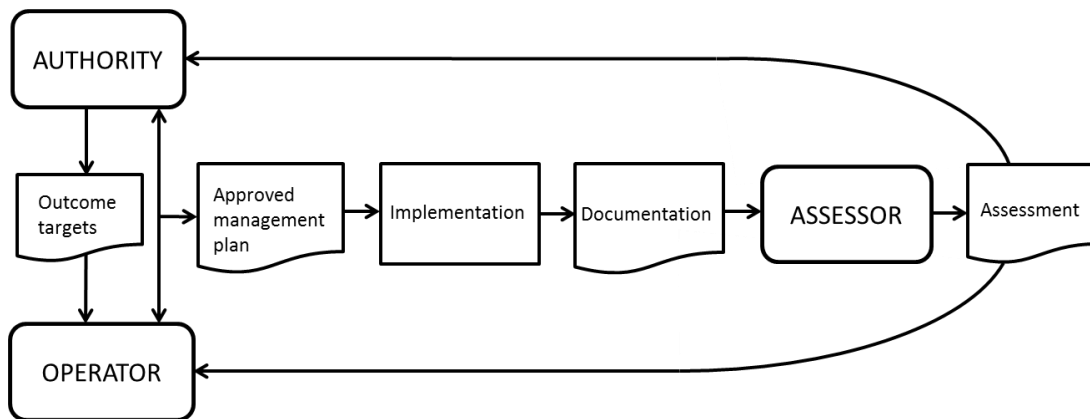


Figure 1a) - Responsive Fisheries Management System (RFMS), prototype 1

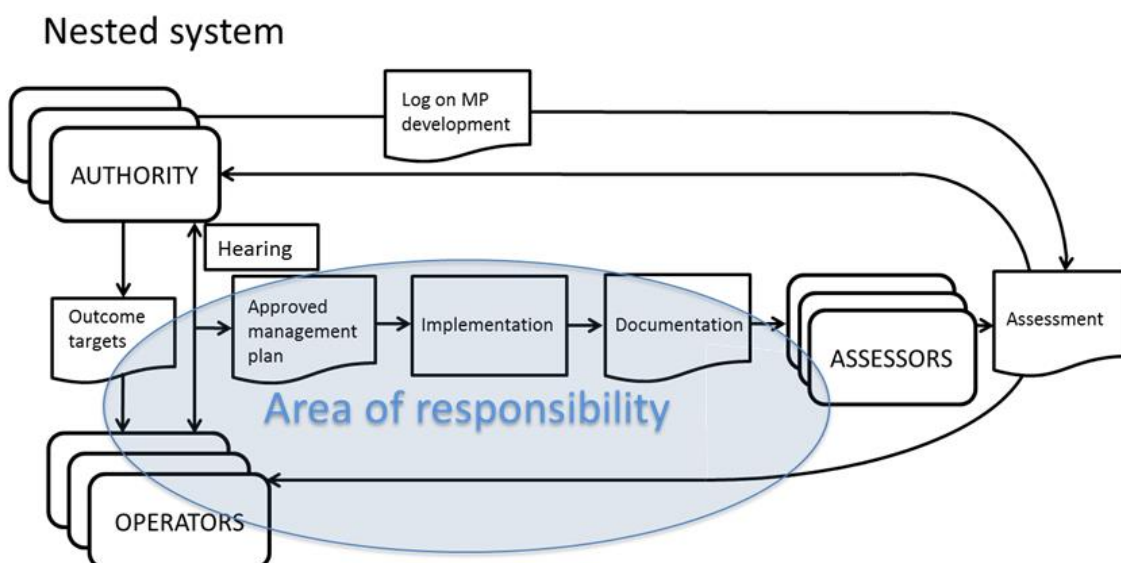


Figure 1b) - Responsive Fisheries Management System (RFMS), prototype 2

Figure 1 describes the conceptual model of a Responsive Fisheries Management System (RFMS).

Fig. 1a) Prototype 1. The model includes three key agencies. The *Authority* has the final responsibility for resource management. The authority specifies outcome targets to be reached in a specific context. The *Operator* proposes a MP, which documents that the outcome targets are achievable through a suggested set of management measures. The Operator may cooperate with the authority about the development of the plan, but the required quality of documentation is decided upon by the Authority. If a MP is approved by the Authority, the Operator can proceed with its implementation. Also at this stage the Operator may cooperate with the Authority (the Authority may for instance supply enforcement services). While implementing the plan, the Operator is responsible for collecting information required for assessing whether or not the Outcome Targets were (or will be) achieved. The Operator may contract research services to this end. The documentation provided by the Operator is reviewed by an *Assessor*, which is institutionally independent from the both Authority and the Operator. The Assessor assesses whether or not (or the extent to which) the outcome targets are achieved. For the Operator, the assessment will provide a basis for drafting modified MPs. For the Authority, the assessment may be a basis for implementing sanctions (if outcome targets were not achieved), for rewarding achievements, or for revising outcome targets.

Fig. 1b) Prototype 2 builds on prototype 1. There may be more than one authority, operator and assessor in the RFMS, and the resulting RFMS may be designed as a nested system, for instance in order to reflect the different levels that typically are involved in decision-making in an EU context. A public hearing is to be held before the Authority gives the final approval of the MP. As part of the task of providing documentation of the fishery, the operators in RFMS are formally made responsible for delivering assessments of stocks, but in collaboration with relevant scientific expertise. As part of the implementation stage, the operator should establish how the fisheries will be monitored and controlled. The operators may wish to achieve this in cooperation with the authority. It is advisable to include a certain level of cost recovery in the RFMS in order to motivate the operators to take charge of documentation, monitoring and assessment tasks. In practice, the extent to which responsibility for specific RFMS functions are delegated to operators, will vary between cases, depending on the capacity and interests of the operators in charge. In the figure, this is illustrated by the ellipse with the text “areas of responsibility”: the responsibility for the RFMS functions within this area can be divided differently between operators, the authority or other agencies. But in any case, the division of responsibility should be made explicit in the MP. To ensure that the assessor is in the position to evaluate the MP development process a log should be provided by the authority.

2.2.1 Explaining the model of prototype 2

The RFMS model (Fig.1a) fundamentally conceptualises RBM as a contract between an Authority and an Operator. In the context of resource management, the operator would be a resource user, typically an organized group of fishermen. The contract, i.e. the MP, specifies the conditions under which the Authority can permit the Operator to use the resource in question. The model includes a third agency: the assessor. The role of the assessor is to evaluate whether the contract between the Authority and the Operator has been fulfilled.

The model is based on definition of the RBM:

“Defining an acceptable impact and leaving it to resource users to identify the means to meet the requirements and to document the effectiveness of the means, and ultimately achieve the requirements.”

The model’s key elements follow from this definition: The specification of acceptable impact (i.e. Outcome Targets); that operators are required to document the effectiveness of management means

(so that it can be expected that the Outcome Targets will be reached; and that operators are granted flexibility of choosing management means.

The basic intention of this model of RBM is captured in the Commission's Green paper on the reform of the Common Fisheries Policy, which explicitly links RBM to a shift in the burden of proof:

The industry can be given more responsibility through self-management. Results-based management could be a move in this direction: instead of establishing rules about how to fish, the rules focus on the outcome and the more detailed implementation decisions would be left to the industry. Public authorities would set the limits within which the industry must operate, such as a maximum catch or maximum by-catch of young fish, and then give industry the authority to develop the best solutions economically and technically.

Results-based management would relieve both the industry and policy-makers of part of the burden of detailed management of technical issues. It would have to be linked to a reversal of the burden of proof: it would be up to the industry to demonstrate that it operates responsibly in return for access to fishing (CEC 2009: 11-12).

How, and in which sense the burden of proof should be placed on the operator is not a straightforward question (Charles 2002; Fitzpatrick et al. 2011; Lassen et al. 2008), and the refinement of EcoFishMan's model of RBM in this respect will require further work. In the context of fisheries management there may for instance be legal barriers to shifting the burden of evidence in theory, but not to shifting a certain responsibility for outcomes in practice (Wakefield 2010).

The model depicted in figure 1 describes stages of a RBM process. In the following each of the stages, as well as the agencies responsible for their conduct, will be briefly introduced.

2.2.1.1 The RBM agencies: Authority, Operator and Assessor

The Authority is an organizational entity enacting authority in pursuit of the management objectives decided for a fishery. It represents the interests of the public, and it is ultimately responsible for the management. With regard to fisheries management in an EU context, one task in EcoFishMan will be to specify an appropriate agency of this kind: Is it the Council of Ministers, the Commission, or should the authority be exercised on a member state level? Or should the authority be some combination of these? Discussions with stakeholders suggest that a RFMS in EU will have to be adapted within a nested system where the authority that sets stock and ecosystem OTs is the Commission, while the authority that sets economic and social OTs is the member state. In any case, the department/s performing as assessors and persons in charge should be named to ensure a response on operator performance in relation to MP.

The Operator is an organizational unit with delegated authority to develop MPs and oversee or conduct fishing operations within the standards decided by a management authority. It is an organization that represents a group of similar resource users. It could be a group of fishermen fishing for the same type of resource and/or could be specified in terms of gear type or areas. A certain level of responsibility has to lie with the OP in a RFMS; however, the extent of this responsibility may vary depending on the capacity of the OP. It is foreseeable, that OPs over time can take on increasing levels of responsibility as they gain experience and develop capacity.

The Assessor is a scientific organization or certification body hiring experts capable of assessing and reviewing the documentation that the operator is responsible for delivering. While the operator may purchase a scientific service to help with preparing the required documentation, the Assessor should be institutionally independent from both the Operator and the Authority in order to facilitate objectivity. In the context of fisheries management in Europe, ICES would have the capacity to perform the role of such an assessor.

2.2.1.2 Outcome targets

Specified by the authority, the outcome targets reflect overall policy objectives. For instance, the stated objective of the current CFP is to “ensure exploitation of living aquatic resources that provides sustainable economic, environmental and social conditions” (Anon. 2002). Presently, the specific Outcome Target used in CFP context seems to be MSY, as it is a declared aim to bring all EU stocks to MSY levels by 2015 (Froese and Proelß 2010). In practice, however, the Precautionary reference points may remain negative Outcome Targets (negative in the sense that they are states one should avoid rather than aim for). One task in the EcoFishMan project is to propose appropriate forms of Outcome Targets. This work relies on the selection of a set of appropriate indicators (WP 2; Task 2.1 and 2.2) and indicators identified as relevant for the management objectives in each case study. Objectives related to stock sustainability seem rather easy to translate into commonly accepted OTs, mainly because of previous experience. Yet, economic and social objectives are harder to translate into relevant OTs that the fishers are in the position to take responsibility of. We recommend that OTs will be set so that the MP does not need to be annually revisited (e.g. define OTs in terms of SSB instead of in terms of TACs).

2.2.1.3 The management plan

The MP is a contract between the authority and the operator: it specifies the conditions under which the latter may operate. The plan will formally be proposed by the operator, although the authority may assist with the development of the plan (as it typically is the case with fisheries management plans in New Zealand and Australia). In practice, the draft plan may circulate between Operator and Authority until it is found acceptable to both parties. Certain criteria previously set by the authority and the assessor will have to be met before the MP is sent for a public hearing (which will include a pre-evaluation evaluation by the assessor).

In the proposed plan, the authority will pay attention to how the Outcome Targets are to be met, and to how the Operator will provide information that allows for an assessment of whether or not the targets have been met in practise once the plan has been implemented. As long as they appear to comprise a realistic way to achieve the Outcome Targets (and are within the laws), the authority will not interfere in the operator’s planning of management measures. Other stakeholders than the operator in question are accommodated into the planning process through the above mentioned public hearing.

The MP development will start with a formal pre MP invitation meeting, and the development process should be described in a log made available for the assessor when evaluating the MP in the hearing phase prior to final approval and implementation of the MP. A management plan may be proposed for a number of years. In this case, it may only be slightly revised, reflecting for instance information in (say) annual resource assessments.

2.2.1.4 Implementation of the management plan

Once the MP has been approved, it may be taken into implementation. Also at this stage, there may be different degrees of cooperation between authority and operator, depending on the organisational capacity of the latter. Often the authority may provide enforcement service, but the operator may prefer to monitor and ensure compliance itself.

2.2.1.5 The documentation system

During the implementation phase, the operator is responsible for gathering data required for the documentation process (documentation of fishery, monitoring and ecosystem including stock assessments). The operator may typically choose to do this in cooperation with a contracted research provider. Under a cost recovery regime (and when carrying the responsibility for documentation as a

condition for being allowed to use the resource), the operator has an incentive to find efficient ways to minimise research costs (Arbuckle and Drummond 2000; Harte 2001; Stokes et al. 2006). One way to achieve this might be that the resource users themselves participate in data-collection (Bjørkan 2011; Zacharin et al. 2008).

2.2.1.6 Assessment and feedback procedures

The main purpose of the assessment is to evaluate whether (or the extent to which) the Outcome Targets in question have been achieved. The quality of the submitted documentation will also be assessed as adequate documentation is part of the requirement for access to the resource. One question to be resolved is how the assessor can be funded without undermining its independence of the authority and the operator. The way ICES is funded may be a good example in this respect.

The assessment will be submitted to both the operator and the authority. For the operator, the assessment is a useful guideline when preparing a new/updated MP for the authority. For the authority, the assessment is the background for deciding whether previous Outcome Targets are still adequate (to represent the fisheries policy) or whether they should be revised.

If the assessment shows that the Outcome Targets are achieved, the operator may submit its previous MP with minor updates, and it may be immediately accepted by the authority. In turn, if the Outcome Targets are not met, the authority will implement sanctions for the operator, and it may also raise its requirements for subsequent MPs. More serious types of sanctions include suspension of privileges granted to an operator, or even withdrawal of access rights to the resource in question.

2.2.1.7 Area of responsibility

Note that RFMS can involve more or less delegation of responsibilities for specific management and data collection functions, including monitoring and stock assessments. This implies that the operator does not have to assume more responsibility than it is interested in or has the capacity to. It should also be noted that the operator can assume formal responsibility for a specific function (e.g. collection of certain types of data) but in practice cooperate with a research institution about achieving the objective for that function efficiently. Finally, the operator can choose to leave specific functions (e.g. data collection or control) carried out in the way that they are carried out in the established management system. In any case, the MP should describe which agencies are responsible for what (for instance with reference to the MPO).

2.3 How the transition towards a RFMS can be facilitated in practise

Because the RFMS presented here implies a rather radical shift from present fisheries management practises in a European context, it is important to think about how a transition to this model can be made feasible. A meaningful shift of responsibilities for documentation and management functions to resource users is conditioned on that the resource users develop capacity for executing these functions in a reliable and efficient manner. It is therefore worth noting that reported successful cases in which responsibilities for such management functions have been gradually shifted to resource users appear to have involved long time spans. To implement RFMS as the new general resource management system in one fell swoop may neither be politically feasible nor likely to work well in a transition phase.

One alternative would be to offer RFMS as an alternative to the existing management system. On a voluntary basis, organised operators could then propose MP for a specific fishery. Since the operators in RFMS systems have more responsibilities than they have within the existing management system, however, it may be difficult to motivate an RFMS alternative. In New Zealand

and Australia, much of the motivation for operators to organise management and research activities stems from that fisheries management in these countries is subjected to cost recovery. This makes it interesting for the operators to seek to reduce costs. Without a cost recovery regime it would seem unlikely that RFMS would be implemented widely on a voluntary basis in Europe. In order to motivate RFMS as a voluntary alternative, one option would therefore simply be to implement (full or partial) cost recovery, perhaps in combination with other incentive mechanisms (such as the catch quota bonus allocated to those that volunteer for the CQM system).

An alternative strategy would be to implement RFMS on a non-voluntary basis in a step-wise fashion. This could be done by preserving a certain share of the TAC for RFMS proposals. To be eligible for using the RFMS TAC share in a given fishery, resource users would need to get organised, to propose a MP, and to seek its approval from the authority. The TAC share reserved for RFMS could then be increased with time in pace with operators development of RFMS capacity.

In the Icelandic lump sucker case, the RFMS MP was introduced in one round. This was doable as the main change from MP0 to MP1 was the introduction of a discard ban. Special attention will be given to the realistic handling of the transition phase towards the RFMS to be described in the MP for upcoming cases.

Final Note

This report will be followed up by work dedicated to the specific design and development of an operational RFMS model. Two more rounds of MP development and assessment will be conducted and will respectively provide a basis for RFMS prototype 3 and the final RFMS prototype 4.

3. Task 4.2: Design and development of guidelines for making a general management plan

3.1 Introduction

The purpose of this text is to propose guidelines for making a general management plan (MP) within an RFMS context. As suggested in Task 4.1, the MP is a contract between an authority and an operator with regard to the management of a specific fishery for a limited period of time. While the plan formally is proposed by the operator, the authority will be responsible for supplying some of its key elements (i.e. outcome targets and planning guidelines), and may also assist with the development of the plan in different ways. In practice, the draft plan may circulate between an operator and an authority until it is found acceptable to both parties. Before final approval of MP by the authority the MP is subject to a public hearing, including the assessor and stakeholder groups not participating in the MP development.

The guidelines proposed here are general in scope and are intended to be used:

1. As a basis for the further development of the documented and tested Management Planning Procedures and Framework (D4.5). The guidelines for the general MP will be formulated on the basis of the conceptual model of the RFMS (Task 4.1), principles and experiences drawn from existing results based management systems (D1.1), and lessons learned through implementing RFMS in the different case studies.
2. As a framework for the development of a RFMS MP from the individual case fisheries within EcoFishMan. Since the implementation of RFMS procedures for these cases starts in an existing micro-

management regime, this framework will not be identical to one developed for a full-fledged RFMS regime.

The guidelines for the general MP developed here are organized as a list of specifications that must be addressed in order for the plan to be approved by the authority. Such specifications include, in addition to requirements with regard to the MP boundaries and the identity and responsibilities of the operator, a description of the fishery and the main management challenges; the outcome targets decided for the fishery; the harvest strategies proposed; the implementation strategy; the documentation system; planning procedures **that should follow good governance principles**; and monitoring and control system (see section 3.2.4 below). **A certain level of cost recovery should preferably be involved.**

The format and content of the MP, as well as the procedures for its development, are dependent of the properties of the RFMS system. The general guidelines proposed here (section 3.2.4) have been developed for a transformation scenario, where the starting point is a micro-management regime. This starting point is characterized by a lack of a legal framework to support an ideal RFMS (e.g. general ban on fishing as default, except in terms of approved MPs). If the authority and operators in a fishery agree to introduce the RFMS in one go the MP invitation and the MP should be designed accordingly. In any case the decision on a transformation phase contra immediate implementation has to be agreed upon in a pre-MP-invitation meeting between authority and operators.

In the pre-MP-invitation meeting the suggested invitation should be discussed and agreed upon. There should be an agreement on the identification of the fishery including operators involved, planning period, target species, geographical range, management objectives and conditions for approval of MP. Then outcome targets relevant for the management objectives should be identified and discussed before they are set by the authority in the final invitation for the MP of the fishery in case.

Another highly important constraint at this starting point is that potential operators are unlikely to hold the organizational capacity required to develop and implement a MP for large and complex fisheries. These constraints will be taken into close consideration in the planning of initial RFMS.

Starting with a brief presentation of the RFMS and of the definitions of key RFMS terms (Complete EcoFishMan Glossary in chapter 4.), section 3.2.3 offers an outline of the RFMS planning procedure. An important part of this procedure is a template for the MP invitation issued by the authority to an operator. The MP invitation, together with the MP guidelines, establishes the framework within which the operator can develop the MP.

On the basis of the general planning guidelines proposed in Section 3.2.4, a practical procedure for developing an initial MP for case fisheries is proposed in Section 3.3. Within the EcoFishMan context, WP4 does not have previous access to information needed in order to develop an informed MP invitation to WP5. In advance of the MP invitation it is necessary to establish a "pre-invitation meeting" between the authority and potential operators in order to initiate the management planning process. Here the upcoming invitation is discussed to ensure that it is specific enough and has the acceptance of the operator. Attention is given to the identification of the fishery and the timeframe of the MPs as these issues are particularly relevant in the transition towards RFMS.

Since the purpose of the EcoFishMan project is to develop and test the RFMS model, the procedures and specifications proposed here are provisional and open for revision.

3.2 RFMS system specifications

RFMS is an adaptive management system that is results-based and ecosystem-based. The RFMS attempts to reduce micro-management by involving stakeholders and may include elements of rights-based management and co-management, as appropriate. A key idea in results-based management is that management authorities define acceptable impact and leave it to resource users to identify the means to meet the requirements and to document the effectiveness of the means, and ultimately achieve the requirements. In the RFMS model (see Task 4.1 Fig.1) the management plan (MP) is a contract between an authority and an operator. The MP specifies the conditions under which the authority can permit the operator to use the resource in question.

3.2.1 RFMS concepts

The Authority represents the interests of the public, and it is ultimately responsible for the management.

The Operator is an organization that represents a group of similar resource users. It could be a group of fishermen fishing for the same type of resource and/or could be specified in terms of gear type or areas.

The Assessor is an organization capable of assessing and reviewing the documentation that the operator is responsible for delivering in a RFMS. The assessor evaluates whether or not outcome targets have been met. To strengthen the objectivity and legitimacy of the assessments, the assessor should be institutionally independent from both the operator and the authority, and the assessment work should be financed in a way that allows for this.

A Management plan is a formal arrangement between a management authority and operators that specifies the partners in the fishery and their respective roles, the agreed objectives for the fishery, the management rules and regulations that apply, and provides other relevant details about the fishery. The formal responsibility for developing the MP is delegated to an operator.

Outcome targets are specific and measurable performance objectives defined for a fishery a management authority.

3.2.2 Basic institutional and legal RFMS conditions

An ideal RFMS model presupposes a general legal framework where access to harvest a resource is allowed on the conditions specified in a MP approved by an authority, and that an operator can be made responsible for developing and implementing this MP. In the case where such institutional and legal conditions are not fulfilled, the authority must develop an implementation plan that includes a preliminary RFMS model designed to work under micro-management conditions and a procedure by which ideal RFMS conditions can be developed and implemented. In the following, a transitional RFMS planning procedure is proposed, which invites operators to propose a MP for a limited fishery (e.g. lumpsucker) or a part of a fishery (e.g. 20%).

3.3 RFMS planning procedure and the management plan invitation

3.3.1 Defining the RFMS environment – role and duties of the authority

As some of the activities related to the RFMS cannot be included in the MP as they are not and should not be the duty of the OP we here define some of the necessary conditions, duties and tasks that have to be defined outside the MP.

The authority/authorities need to be defined by naming the agency (ministry/department and or the office) in charge including the person leading the office and the MP process on behalf of the authority. This is to ensure that the responsibility of the authority is properly located and defined throughout the RFMS process.

The authority invites to a pre MP invitation meeting with the OP/OPs, where the final MP invitation is agreed upon (see below).

The authority is in charge of providing the MP development log that accompanies the final and approved MP that is submitted to the assessor for evaluation in the public hearing process. This MP development log should document all important steps in the MP work, starting with the pre MP invitation, meeting dates, location, participants and a comment on decision/s made, until the final approval letter. The available minutes from the meetings should be attached as an appendix. Therefore the log should be limited to the list of events and actions. Negotiations by e-mail and significant physical meetings as well as e.g. Skype meetings should be listed. E-mail correspondence resulting in decisions on the MP in development should also be listed and attached.

Note also that MPs proposed by the operator/s will be subjected to a public hearing conducted by the authority before a final decision is made on whether or not the plan can be approved by the authority. This is in order to invite feedback from other stakeholders than those invited to submit the MPs (e.g. NGOs, fish processing associations, fish sales organisations and municipalities). Also the assessor will evaluate the MP in this phase before the authority decides on the final approval of the MP.

It is the duty of the authority to study the assessment report provided by the assessor and ensure that the authority acts if OTs will not be met.

3.3.2 RFMS planning procedure

The planning process starts when the authority issues an invitation for operators to propose a MP for a specific fishery for a limited period of time. The invitation should be finalized after a pre MP invitation meeting with authority and operator/s. The MP invitation is a formal document containing the elements suggested in the table below. The invitation must be read in conjunction with the MP guidelines suggested in section 3.2.4. In the final MP, key sections will be based directly on the MP invitation, or information within this invitation.

The Management Plan (MP) Invitation: Transition scenario	
Content	Comments
<p>1. IDENTIFICATION</p> <p>Introduction setting out the purpose of the MP invitation, including:</p> <ul style="list-style-type: none"> a. The identity of the fishery it is valid for (targets species; geography); b. The identity of operators qualified to respond (fleets; organizational requirements); c. The time frame; d. The main focus and purpose of the plan requested. e. Relevant elements of the transition plan 	<p>When RMFS systems are introduced within micro-management regimes, the legal (and political) conditions are not in place to make management planning a condition for access. While the authority may request approved MPs in before granting any access to limited and/or special cases of fisheries (such as the lump sucker case), potential operators will at the outset be unlikely to have the organizational capacity required to develop and implement MPs for larger and more complex fisheries such as Iceland’s demersal fisheries. In such cases, the MP invitation must initially be incentive-based and/or only consider a part of the fishery in question. In such cases we propose to set off (e.g.) 20% of the TAC for RFMS. This RFMS TAC can only be harvested on the basis of an approved MP. Note that the MP invitation should foresee</p>

	<p>and determine distributional issues relating to cases in which only some quota holders have developed an MP that has been approved by the authority. A transition towards RFMS can be achieved gradually though increasing the RFMS TAC in pace with operator's organizational capacity development.</p>
<p>2. OUTCOME TARGETS</p> <p>This section identifies the key management objectives and outcome targets, with indicators, that must be addressed by the MP. The Management objectives must address the following dimensions:</p> <ol style="list-style-type: none"> a. Biological and ecological b. Economic c. Social & cultural <p>In addition, this section may include a list of allowed management instruments.</p>	<p>In a transition scenario, there will be no general policy process for formulating management objectives and principles as outcome targets. This is a problem, but can also be turned into an advantage. Instead of a complete set of outcome targets, it is possible to accept the management goals in place, and on top of that focus on a select range of outcome targets for the RFMS fishery (the CQM model). For instance, the focus of the MP could be to eliminate discards by developing, selective fishing, flexible quota regimes & documentation systems. Alternatively, the focus of the MP could for instance be on energy efficiency and emissions.</p>

3.3.3 The management plan guidelines

The management plan (MP) guidelines will vary according to the implementation scenario as outlined above. If a MP invitation is issued for a transition scenario, as it is the case here, it will be up to the authority to devise a transition plan by way of the changing the specifications of the MP invitations through time. The planning task for the operator, in turn, will focus on meeting the issued MP invitations.

The Management Plan (MP)	
Content	Example and comments
<p>1. INTRODUCTION</p> <p>Explanatory text, setting out the purpose of the MP, the identity of the fishery it is valid for, the parties that are bound by it, the time frame and the main focus and purpose of the plan.</p>	<p>The text can be developed on the basis of section 1 in the MP invitation. In addition, it can explain the practical details of the planning process.</p> <p>Example: Dixon & Sloan 2007: p8</p>
<p>2. FISHERY OVERVIEW</p> <p>A brief description of the fishery in question, including the target species and the condition of the resource, the fleet and technology, etc. This is largely contextual info. Nevertheless, this section can be used to give a general status report, and note recent development trends and specific issues and management challenges.</p>	<p>This is a section which can be updated and improved in each new version of the MP. It can be supplied by the operator, but must be reviewed by the authority. It may be a good idea for the authority to provide a template and page restrictions. But this must vary according to the complexity & scope of the fishery.</p> <p>Example: Dixon & Sloan 2007: 9-14</p> <p>Note that this section can be used to focus attention towards specific management challenges such as by-catch and discards.</p>
<p>3. OUTCOME TARGETS</p> <p>This section identifies the key management objectives and outcome targets, with indicators, that must be addressed by the MP. The management objectives must address the following dimensions:</p>	<p>The text here is provided by the authority as part of the MP invitation.</p> <p>In case of a transition strategy, the list of relevant outcome targets will be restricted unless they can be</p>

<p>Biological and ecological</p> <p>Economic</p> <p>Social & cultural</p>	<p>derived from the existing management framework (MPO).</p> <p>Examples:</p> <ul style="list-style-type: none"> • Dixon & Sloan 2007: 21-25 • MP for Icelandic cod (see appendix)
<p>4. HARVEST STRATEGIES</p> <p>This section reports the key decisions, where the operator is taking over responsibility from (old-style) management authorities. This section of the plan reports on the results of the planning exercise & negotiations (among members) undertaken by the operator. Ideally, each outcome target, linked to a performance indicator, is here made operational by linking specific indicator limits to specific management actions, for instance in the form of Harvest Control Rules.</p>	<p>This section should report on the strategies for each of the three dimensions (biological, economic and social), but also must comment on how these interact.</p> <p>See Dixon & Sloan 2007 (p 35-37) for a way to report the key propositions of a MP in table format. Here, each performance indicator is linked to an outcome target, which is a trigger linked to a management response list.</p> <p>See MP for Icelandic cod (appendix) for an example of a harvest strategy.</p>
<p>5. MONITORING, COMPLIANCE SANCTIONS</p> <p>The focus here is on the system that allows the plan to be implemented as intended. Specify how the responsibility for these functions is to be divided between authority and operator, and how these functions are to be financed.</p> <ol style="list-style-type: none"> Monitoring systems and instruments (e.g. stock assessment surveys, electronic logbooks, systems for accounting for by-catch & discards). Compliance & sanctions systems: In case of breaches, how will operators ensure that damage is repaired and prevented (exclusion of non-complying vessels/personnel) Identification of risk: The work undertaken to identify risk factors & situations and ensure that these get appropriate attention 	<p>This concerns the extent to which the operator can carry out operations in accordance with the plan, including how the operator is can make its members comply with the plan. While this concerns the capacity of the documentation system described below, it also concerns how the operator will deal with breaches, when such are detected (penalties; exclusion).</p>
<p>6. DOCUMENTATION</p> <p>The issue here is how reliable information is mobilized so that the authority can be confident that the MP is appropriately constructed and carried out and the outcome targets achieved. The documentation system must be designed so that it will be possible to measure the performance on relevant indicators, so that appropriate management responses are triggered. That is, if the outcome target is derived from an MSY criteria, and there is a harvest control rule that uses biomass level as trigger for TAC determination, there must be a documentation system (e.g. stock assessment) that allows timely and reliable production of stock biomass estimation.</p> <p>More specifically, it must be specified which agency/agencies will be responsible for collection, processing, and analysis (assessment) of data. It</p>	<p>Regarding the assessment of biological outcome targets, a transition scenario could take a starting point from the division of responsibility between national marine labs and ICES, so that the lab functions are left to the operator (or the operator purchases this service from an independent lab) and this work is reviewed and assessed by ICES (in the role of assessor).</p> <p>The documentation tasks along the other dimensions can be solved in the same way, either by setting up an internal system or hiring external consultancies.</p>

<p>must also be specified how the cost of the documentation system are to be covered.</p> <p>This section can follow the same outline as the previous, with description of the documentation systems for each of the three categories of outcome targets.</p>	
<p>7. PLANNING PROCESS</p> <p>This section reports on the planning process and decisions undertaken under 3 and 4 and 5 above. The main question concerns whether the plan was made with appropriate possibilities for all members to participate and influence the result (i.e. legitimate representation and decision-making processes). To promote public awareness and public discussions on MPs, a public hearing should be arranged, which allows comments to be raised by interested parties as wells as the wider public.</p> <p>In general, the MP plan should reflect good governance ideals¹⁴.</p>	

3.3.4 Management plan checklist for operators

Operators are advised to address the following list of questions to make sure that their management plan (MP) proposal is complete and therefore fulfils the formal requirements for acceptance:

1. Have you made a plan for achieving each of the outcome targets mentioned in section 3?
2. Do you have a strategy for monitoring and controlling the fisheries?
3. Do you have a strategy for obtaining information?
4. Have you explained how the members of your organization(s) have been informed and involved in decision-making regarding the MP development?
5. Is it clear which agencies will serve as “assessors”, “authority” and “operators”?
6. Is it clear how the division of responsibility will be divided between these agencies?
7. Is it clear when each agency is responsible for a specific action?
8. Is it clear who should pay the costs of this action?

¹⁴ A white paper written by the European Commission lists the following principles of good governance: openness, participation, accountability, effectiveness, and coherence. CEC. (2001). "European Governance: A White Paper". City: Commission of the European Communities: Brussels.

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