How to Manage A Fishery
A simple guide to writing a Fishery Management Plan

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CEE
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Preface

Who is this guide for?

This guide is one of a two-part set written to help fishery managers and those involved in fishery management.

- This 'Managers Guide' describes a simple, step by step process for writing and implementing a fishery management plan.
- The companion 'Stock Assessment Guide' shows how stock assessment tools can support fishery managers in designing their management plans and in managing the fishery. In particular, it refers to those stock assessment tools developed under the Fisheries Management Science Programme (FMSP).

These guides have been written for those with a responsibility for monitoring, assessing and managing fish stocks. The aim is to help better collection and use of fisheries data and to support fishery managers in using these data to create better management plans.

What is the purpose of the guide?

The purpose of this Managers Guide is to describe a step by step approach to the development of an effective fishery management plan. The guide has a number of distinctive features:

- It is aimed at busy fisheries managers - so we have kept it short and tried to make it easy to read.
- It focuses on the need for stock assessment scientists to provide fishery managers with better information about their fish stocks to allow good management plans to be written and action taken.
- It emphasises the need to be able to predict the impact of different management measures through using specific stock assessment tools.
- It stresses the importance of fishery managers working closely with those responsible for data collection, monitoring and data analysis.
- It provides examples of recently developed tools that will allow stock assessment personnel to make good estimates of fish stocks.

These two guides should be used as a pair to show how managers and scientists (and any co-management partners) need to work together to manage a fishery.

This guide and the complementary Stock Assessment Guide have been written to help fishery managers use the tools developed by the FMSP to
improve the management of their fish stocks. The management planning processes recommended are generally compatible with the management framework currently promoted by FAO in the Code of Conduct for Responsible Fisheries and the UN Fish Stocks Agreement. However, in a number of places we have tried to make the process shorter and simpler. Both guides, like the Code of Conduct, stress the need for participation and for proactive and precautionary management in the face of uncertainty.

The guide can be read and used on its own. However, there are other publications that you may find useful when preparing and implementing your plan. These include:

- The Stock Assessment Guide or 'SA Guide' - the partner book to this guide.
- Publications produced by the United Nation's Food and Agriculture Organisation (FAO) such as the FAO Code of Conduct for Responsible Fisheries, the series of Technical Guidelines for Responsible Fisheries, and FAO Fisheries Technical Paper 424 - A Fishery Managers Guidebook.
- Detailed guidance on the use of the FMSP tools, recently published as FAO Fisheries Technical Paper (FTP) 487 (Hoggarth et al., 2005). This document and the other FAO documents are available on the FAO web site.
- Outputs from other FMSP projects, especially the guidelines for adaptive management produced by project R8292 (see http://www.adaptivelearning.info/); and the guidelines for data collection produced by project R8462 (see http://www.fmsp.org.uk/r8462.htm).

These publications are referenced along with some others at the end of this guide. We recommend that you have them available during the writing of your management plan.

Who has written the guide?

This guide is one of the outputs of the Fisheries Management Science Programme (FMSP see http://www.fmsp.org.uk). The FMSP was established by the UK Government's Department for International Development (DFID) to generate improved livelihood benefits for poor people through the application of new knowledge about fishery management. Since 1992, the FMSP has produced a series of outputs about the assessment and management of fish stocks. These range from new methodologies and
software for assessing fish stocks and providing guidance to fishery managers, to applied research on specific country fisheries. This guide has been written by a team from the United Kingdom, India and the Caribbean and has also been read and tested by practising fishery managers in India.

**What are the steps in developing a management plan?**

The guide is structured around a process of writing a management plan for a fishery. The four main phases in developing the plan are illustrated in Figure 1. The detailed stages involved in each of the four phases are outlined in Table 1. This guide will take you through each of these phases and stages step by step.

**Figure 1. The four main phases in writing a fishery management plan.**
Table 1. Phases and stages in the process of developing a fishery management plan

<table>
<thead>
<tr>
<th>Phase</th>
<th>Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Preparation for developing the management plan</td>
<td>1 Define&lt;br&gt;Define the fishery your management plan is for</td>
</tr>
<tr>
<td></td>
<td>2 Stakeholder analysis&lt;br&gt;Carry out a stakeholder analysis and decide how you are going to involve the stakeholders</td>
</tr>
<tr>
<td></td>
<td>3 Situation analysis&lt;br&gt;Carry out a situation analysis and list the problems faced by your fishery</td>
</tr>
<tr>
<td></td>
<td>4 Management approach&lt;br&gt;Decide on your management approach</td>
</tr>
<tr>
<td>II. Developing the management plan</td>
<td>5 Purpose&lt;br&gt;Agree the overall purpose of your plan</td>
</tr>
<tr>
<td></td>
<td>6 Goals&lt;br&gt;Decide on the biological, ecological, social and economic goals needed to achieve your purpose</td>
</tr>
<tr>
<td></td>
<td>7 Objectives&lt;br&gt;Define objectives for each goal</td>
</tr>
<tr>
<td></td>
<td>8 Management standards&lt;br&gt;Agree the management standards – the reference points and indicators for each objective. In other words – what and how you are going to measure to show that you are achieving your objectives</td>
</tr>
<tr>
<td>III. Developing the management plan</td>
<td>9 Management measures&lt;br&gt;Decide the management measures – in other words, the actions you are going to take to achieve the objectives</td>
</tr>
<tr>
<td></td>
<td>10 Control rules&lt;br&gt;Agree a set of decision control rules stating which measures and which levels of measures will be applied depending on the status of the fishery</td>
</tr>
<tr>
<td></td>
<td>11 Resources&lt;br&gt;Decide what resources you will need to put your plan into action</td>
</tr>
<tr>
<td>IV. Planning to implement, evaluate and review the management plan</td>
<td>12 Implementation&lt;br&gt;Make an action plan to implement your management plan</td>
</tr>
<tr>
<td></td>
<td>13 Monitoring&lt;br&gt;Monitor regularly how well your plan is achieving your objectives</td>
</tr>
<tr>
<td></td>
<td>14 Reviewing&lt;br&gt;Review your plan every few years</td>
</tr>
</tbody>
</table>
It is important to emphasise right at the start of the process that writing a management plan is usually not the neat step by step process suggested by Table 1. You will often have to go back by a stage or two and review your ideas in the light of decisions you make at a later stage. This is especially true at certain stages, as shown in the example arrows in Figure 2. For example, you might have to reconsider the definition of your fishery after you have done the stakeholder and situation analysis. When you consider the management standards (indicators and reference points) in Stage 8, this might also cause you to go back and rethink your goals and objectives.

**Figure 2. Illustration of management planning as a cyclic process.**

In designing the plan, you will need to think ahead quite often, and you will also need to go back at times to review and revise an earlier stage. Places where this may occur are shown by the solid blue arrows. In the implementation stages, as shown by the light shaded arrows, the management measures may also need to be adjusted based on the monitoring process, and the whole plan may need to be revised occasionally based on the reviewing process.
The role of stock assessment in management planning

One distinctive feature of the approach to developing a management plan recommended in this guide is an emphasis on the role of stock assessment tools.

Stock assessment tools (SA tools) are ways of calculating different properties of your fish stocks. You can then use them to help make decisions about different management actions. SA tools are introduced in detail in the companion Stock Assessment Guide. They often involve mathematical models and use the data that are collected by your fisheries officers. If this sounds complicated, don’t worry. As a fisheries manager you don’t need to know exactly how these tools work – unless you want to. This is the job of your fisheries scientists. However, what you do have to know is that these tools can provide very useful (if not ‘essential’) information that you can use in management – and you have to know the kinds of questions that you should be asking your fisheries officers.

Table 2 below shows the information that your fisheries scientists should provide you with at different stages in the management planning process. It also shows the information that you need to provide to the scientists to guide their work. Fishery managers and scientists should be meeting on a regular basis during the development of a management plan to exchange information and ideas.

Table 2. Flows of information between the fishery managers and the stock assessment scientists or advisors

<table>
<thead>
<tr>
<th>Information that the fishery managers need to provide to fishery scientists</th>
<th>Phase</th>
<th>Stage</th>
<th>Information required by managers from fisheries scientists</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decision on what fishery the plan is for</td>
<td>I</td>
<td>Define the fishery</td>
<td>The unit stock for the target fishery based on the distribution of fish stocks and fishing activities. Information on the distribution of the fishers etc engaged in the fishery. Historical data on fishery effort and fish catch etc, showing fishery trends. Pros and cons of alternative approaches to decision making, allowing for uncertainty.</td>
</tr>
<tr>
<td>Stakeholders to be consulted</td>
<td>2</td>
<td>Stakeholder Analysis</td>
<td></td>
</tr>
<tr>
<td>Approach to precaution and uncertainty</td>
<td>3</td>
<td>Situation Analysis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Management Approach</td>
<td></td>
</tr>
</tbody>
</table>
It is difficult to write a guide to developing a management plan. The danger is that the guide can be too theoretical. We have tried to avoid this and we would strongly recommend that you read at least one example of a management plan from another fishery to give you an idea of what a management plan looks like. We have given a few web references, and some of the plans are quite short.

We recommend that you read some existing management plans to get ideas.
Finally, two words of caution at the end of this section of the guide.

Nearly all management plans use different structures and terms. You will find quite a range of terms in the plans we have referenced and you will notice that some management plans use different terms to those that we use in this guide. This can be quite confusing and where different words are used in examples, we have tried to point this out. The main thing to remember is that no matter what you call the different components of your plan, you should have a structured approach that shows what you propose to do, and why.

Secondly, in technical fisheries management books you will find a lot of mathematical formulae. These can also be confusing if you are not used to reading them and working in that way. In this Managers Guide we have not used formulae to any great extent – except in the case of a few examples. We have left this for the stock assessment experts in your team. More details are available in the SA Guide and in the other FMSP manual published as ‘FTP 487’ (Hoggarth et al., 2005).
Introduction

Why are management plans needed?

Management plans are needed for a number of very simple reasons. Just consider these facts. They all come from the FAO document “The State of World Fisheries 2004”, available on the FAO web site.

- Fish provide 2.6 billion people – around 40% of the world’s population – with at least 20% of their average animal protein;
- The world’s population is increasing faster than the total food fish supply;
- Capture fisheries are declining and aquaculture fisheries growing;
- Of the world’s fisheries:
  50% are fully exploited – there is no opportunity for catching more fish;
  25% are over exploited, depleted or recovering – this figure has risen from 10% in 1974; and
  25% are underexploited or moderately exploited – this figure has fallen from 40% in 1974;
- 97% of people who rely on fishing for income or food are found in developing countries;
- 50% of world fish catches are caught by small scale fishers.

At a global scale, many fisheries are in trouble. We need to manage these fisheries more carefully to reverse the current downward trend and to sustain fish production into the future. Fish populations are less resilient than we once imagined, and the recovery of populations once over fished can be much slower than we once thought. Firm actions towards good management are needed now.

Improved fishery management will have a big impact on our ability to achieve the Millennium Development Goals, especially to reduce by half the proportion of the human population that suffers from hunger and malnutrition, and to ensure environmental sustainability. Our response must be to manage our fisheries better – to ensure that fish stocks are sustainable and to ensure that people who depend on fish for food and livelihoods continue to get these important benefits.
What is a sustainable fishery?

Fishing can be said to be sustainable when it can be carried out over the long-term at an acceptable level of biological and economic productivity, without leading to ecological changes that reduce options for future generations. If there is too much fishing, the fishery will produce less than its maximum potential. If this continues for too long, the fishery may decline to the point of collapse. For simple discussions on the relationships between fishing and catches, see Section 2.1 of the SA Guide, and ‘Concept 2 – Fish Stock Dynamics’ of the ParFish Guidelines produced by FMSP Project R8397 (see [http://www.fmsp.org.uk/r8464.htm](http://www.fmsp.org.uk/r8464.htm)).

Although most parts of the world’s oceans are covered by different agreements to promote sustainable management, many fisheries in developing countries are either not managed, or are managed with only basic regulations and without any real assessment of the status of fish stocks. Many fisheries appear to be managed with short term economic and social goals as the top priority with the result that these fisheries are at serious risk of losing the many benefits they should provide. In managing a fishery sustainably, we need to consider three components – ecological, social and economic. Each of these must complement each other for the system as a whole to be sustainable.

What is a management plan?

Putting it simply, a fishery management plan is a document that:

- Analyzes the current situation in a fishery;
- Sets out some principles that should be followed in management;
- Details goals and objectives for the fishery;
- Says how they are to be achieved; and
- Says how they are to be monitored.

The best management plans follow the KISS principle - Keep It Short and Simple! As an example, the Canadian plan for Atlantic Mackerel given in Box 1 is only around 16 pages long, excluding the appendices. Although to some extent the length of your management plan will depend on the complexity of your fishery it is well worth remembering that long management plans are rarely necessary. Successful management plans are working documents constantly referred to by fishery managers and open to changes in the future.

The best management plans follow the KISS principle - Keep It Short and Simple!
If you start looking in different books about management planning, you will find many different ways of writing management plans. As we said earlier, this can be quite confusing. Our approach to writing a management plan suggested in this guide has deliberately been kept simple, not only to make it easier to follow, but because complex structures are not needed. When writing your management plan we encourage you to have the confidence to try out ideas and be flexible. If something doesn’t work for you, don’t worry, just try another approach. Models are meant to be adapted.

**How do you start to write a management plan?**

Firstly, writing a fishery management plan has to be initiated by a fishery management authority or other responsible body. A management plan is a formal policy document and usually must be formally approved. Writing a management plan is not a one man show but will require enthusiasm, commitment and practical support.
enthusiasm, commitment and practical support both from the senior management levels and from the grass roots.

Secondly, the fishery management authority has to be convinced that having a management plan is important and that it will improve the management of the fishery. Management plans should be actively used documents, and are not only just for fisheries that are in trouble. We encourage the proactive and precautionary management of fisheries, as guided by the FAO Code of Conduct for Responsible Fisheries. You won’t know if you are making the most of your fishery until you have a management plan that defines its goals and guides how they are to be achieved.

The first steps – setting up a management planning team

One of the first steps to take after being given the green light is to set up a fishery management planning team. The people on this team should be nominated by your senior managers and should have the authority from them to create the management plan. You should set up a system for communication so that your senior managers are kept informed of the progress. The members of this management planning team should all be committed to the importance of management planning and should be given the time to participate in the work of the team. The team should also have the ‘right’ people on it – those who can get things done.

Membership of the management planning team will vary from fishery to fishery, but the process should be managed by a senior manager and the team should include good stakeholder representation. When putting together your management team it will be important to review the capacity of your fisheries organisation and to ask questions such as:

• Are there people in your organisation who can help write the plan?
• Do you need any training to write the plan - for example in data collection?
• Do you have the resources in your department to write the plan – and if not…
• Where could you get them from?

You might need some outside help in this process.

The first steps - making sure you have the data

If you are going to create an effective and workable management plan, then it will have to be based on the best available data. Most fisheries agencies collect some data about the nature of their fish stocks. A representative of the
team that collects and analyses fishery data should be on the management planning team. You should find out what data they have, and if they don’t have the data you need, systems should be set up to collect them.

Because of the importance of making decisions based on data, the SA Guide pays more attention to the types of data that can be collected and the tools that can be used to analyse data and provide management advice. Those steps in the management planning process that involve stock assessment tools and fishery data are noted in each of the following sections.
The first steps – getting key stakeholders on board

We describe the possible roles of stakeholders and how to involve them in the management planning process in some detail in the next chapter. Before we get there, there are two groups of stakeholders that you should consider getting involved before you even start to write your management plan.

Firstly, it is important to involve other departments of local and state administration that have an impact on your fishery. This is because:

• you might need to get information from them to include in your situation analysis;
• the actions you recommend in your management plan might have an effect on what they are managing; and
• the management plans they create might have an impact on the fishery you are managing.

Secondly, if your management plan involves fish stocks that cross national administrative or even international boundaries, then you will need to involve the fisheries agencies from those regions, states or countries right at the start of the process. Fish stocks don’t respect administrative boundaries created by people. This involvement should be done at the highest appropriate level and a system established to enable a joint management plan to be created.