

# A beginner's guide to fisheries management

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## Abstract

This document was prepared for the governing council on Tristan da Cunha to inform internal discussions on management of the lobster (*Jasus tristani*) resource.

## The management

The first step in any management process involves the setting of objectives. Fisheries management is no different. Targets for the resource need to be agreed upon and specified so that appropriate management actions can be devised. Such targets could include a requirement that the resource is healthy (or that it has returned to a healthy state within a certain time frame), that it is producing close to its optimal yield, and that these returns are stable in the short term and sustainable in the long term. Objectives for the fishery are generally set by the responsible governing body, taking into account social and economic considerations.

Besides government, other stakeholders in the fishery include management and the fishing industry itself. Access to the resource must be rights based, so parties that make up the fishing industry body need to be defined. Once those parties that are allowed to harvest are specified, it is then up to the management body to control this harvest so that the targets set by government can be met.

Regulating extraction of the resource is generally achieved through the limitation of catch by setting a Total Allowable Catch (TAC) or limiting the fishing effort. The TAC or proportion of total effort can be distributed to members of

the fishing industry through a quota system. This is reviewed annually, based on the status of the resource as established through scientific assessment.

## **The science**

The basic science of fisheries stock assessment involves constructing a mathematical representation of the resource. This model is fed primarily with data collected from the fishery by fishermen. Data includes the catch rate and the size composition of the catch. Another important source is provided by fishery independent monitoring data collected by management, which could for example provide an estimate of resource biomass.

Catch rate data is a good indicator of resource status. If less is caught per unit of effort, then this suggests there are less fish to catch. Size composition is also a good indicator, with larger individuals associated with a healthy resource.

A model of the resource provides an indication of its status and the management action required to meet the management objectives. It cannot be over-emphasised that any model is grounded in data, and poor data quality will lead to an unreliable perspective of the resource and possibly inappropriate management.

How a mathematical representation of the resource is turned into management action is itself a science and can be assessed in a scientific manner.

## **The management science**

The goal of management science is to assess the likely outcome of different management decisions and establish an optimum rule for management. Once management objectives have been set, and the possible regulatory measures that could be taken established, it is possible to model the outcome of those regulatory actions. Resource dynamics are projected into the future assuming that management decisions are each year based on a control rule that responds to the status of the resource. For example, a control rule might specify that the TAC is set equal to the estimated growth of the resource for that year. Projecting into the future one might expect that such a rule would keep the resource at its current level. If this were the objective of management then it might be appropriate. If on the other hand the objective is to rebuild the resource, then a better alternative would be one that sets the TAC at a lower level. By investigating the ability of different rules to meet the specified objectives, the optimum rule can be selected as the best course of action to follow.

The application of management science in a fisheries context is intended

to result in an Operational Management Procedure (OMP), which includes a specification of the management rule to follow. Establishment of an OMP is considered the ultimate objective for fisheries management, being recognised globally as the course of action most likely to lead to long-term sustainable resource use.

## What is needed

**Consensus:** Management objectives should as far as possible be agreed upon by all stakeholders in the fishery. Importantly, this ensures cooperation between management and the fishing industry.

**Compliance:** Management decisions must be followed. This does not necessarily require enforcement, provided consensus has been reached and there is agreement between all parties on objectives for the fishery.

**Independence:** Management must be given a free hand to make decisions based on the best available science.

**Transparency:** The management process must be transparent, so that decisions made by the fishery manager on behalf of all stakeholders can be subjected to an independent objective assessment should this be required.

**Data:** The science that underpins management requires good data, otherwise future prospects for the resource will be threatened.

## What is not needed

**Short-termism:** All stakeholders in the fishery must be able to take a long-term view of the resource. In particular, it is important that the fishing industry has an interest in complying with management advice to ensure that sustainable returns are made. A fisherman with a quota for a short time only, has no interest in following management advice.

**Open access:** If the fishery is open, with no control on who is able to fish, then an individual in the fishing industry has no interest in limiting catch if someone else is likely to catch what is left behind.

**Politics:** The setting of management targets is (and should be) an inclusive political process. However, management decisions should be free from political interference. Decisions must be based on a scientific assessment of the resource only, if the chance of resource sustainability is to be maximised.