Position statement on fisheries monitoring

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Institute of Fisheries Management

Executive Summary

Fisheries monitoring is undertaken by a number of organisations. These include regulators, river and wildlife trusts, academics, environmental consultants and angling bodies. The evidence collected from suitably designed monitoring programmes can have an important influence on government, regulators and other decision makers. Monitoring is essential to understand the status of fisheries, to deliver effective management and for conservation and is vital for protecting and managing our resource.

Fisheries are part of highly complex ecosystems and are in themselves highly complex. To intervene suitably with fisheries management therefore requires a great deal of knowledge about how the ecosystems 'work' and the uncertainties involved with the data patterns found.

The IFM would like to see improved collaboration between those involved in design of fisheries monitoring; programmes with clear objectives and methodologies; a commitment to continued funding to achieve design objectives; and a re-focus towards the transparent analysis, interpretation and communication of these data.

Introduction

Fisheries monitoring is undertaken by a number of organisations; regulators, river and wildlife trusts, academics, environmental consultants and angling bodies. It is imperative that such programmes are fit for purpose and focused on delivering their objectives.

Effective management and conservation of fisheries requires some form of monitoring that periodically reviews the fishery, determines the effectiveness of any management action and leads to improved fisheries management in the future. There are numerous statutory and non-statutory drivers for management, and monitoring programmes may be required to:

- Report on the status of a fishery e.g.
    - identify the conservation status of a particular species (e.g. Habitats Directive, Eel Regulation)
    - determine the stock of an exploited species and appropriate levels of yield (e.g. Common Fisheries Policy)
    - use fish communities as an indicator of the status of the wider aquatic environment (e.g. good ecological status in the Water Framework Directive (WFD))
    - detect how fisheries and environments are changing naturally (e.g. in response to climate change).

- Measure the success of management actions and policies e.g.
    - understand the impacts of human activities (e.g. on exploited fisheries and on ecosystem services)
    - to ensure the sustainable exploitation of fisheries
    - report on conservation measures (e.g. Eel Regulation, salmon action plans)
    - identify the effectiveness of habitat restoration and environmental management
    - identification of constraints to enable resources to be focused to deliver better environmental outcomes

Irrespective of the multitude of drivers and objectives, all monitoring programmes should follow a scientific approach that is fundamentally able to 1) detect changes in status of the resource/environment over time and 2) be able to detect with appropriate confidence the impact of management measures against the objective for the fishery (e.g. be able to confidently detect no deterioration in conservation status for the Habitats Directive or improvement towards good ecological status under the WFD).

Essential Principles

An effective monitoring programme needs to be designed around clearly defined objectives. An essential feature is the formulation of specific hypotheses prior to the collection of any data, related to the characteristics and management objectives of the fishery. These then allow statistical testing of the data collected against the hypotheses. However, fish are often difficult to detect or catch; they often have considerable natural variations in numbers and their spatial and temporal distributions; their population limits are often ill-defined and representative sampling of them can be difficult.

The numerous sources of variation in sampling results mean that it is not normally possible to design an effective fisheries monitoring programme without having a prior understanding of the natural temporal and spatial variation in a fishery. Therefore, this may require a trial programme that allows an analysis of sources of variance in the fishery and error in the sampling methods chosen. An appropriate trial should enable estimation of the number and temporal and spatial distributions of samples and determine the choice of sampling method and effort required to provide evidence for managers with the desired level of confidence that the results truly reflect the fishery. Hence, considerable effort is required to undertake appropriate monitoring to detect the response to management actions within a fishery. Consequently, effective monitoring programmes can be resource intensive and, therefore, require prior design in order to be cost-effective.

Programme Design

Fisheries are highly complex ecosystems interacting with the wider aquatic environment. Suitable intervention with fisheries management therefore requires an extensive knowledge of fish populations, environmental factors impacting on them and uncertainties involved within the data. For this reason, it is important that fisheries monitoring is not undertaken in isolation.

Long term data collection and analyses have shown that fish communities exhibit great spatial and temporal variability. Therefore, surveys need to be designed to ensure that underlying patterns within data can be determined with the confidence required. Accuracy and precision are important considerations in the design, with accuracy usually more important, and should lead to the determination of sampling parameters and ultimately the survey method.

Any planned monitoring must have clear aims and objectives, a description of the data to be collected, details of the methods and the effort required and have a specified analysis and end-point. Monitoring programmes are often costly, so a risk-based strategic framework usually needs to be deployed to balance the biological, socio-economic, management and other needs of any programme.

Conclusion

The IFM would like to see:

- improved collaboration between those involved in design of fisheries monitoring;
- programmes with clear objectives and methodologies (from data collection to analysis);
- a commitment to continued funding for the term required to complete the programme and sufficient to achieve the design objectives; and
- a re-focus towards the transparent analysis, interpretation and communication of these data.