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Standards for the effective management of fisheries bycatch

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ABSTRACT

Mitigating the environmental impact of commercial fishing, by avoiding, minimizing and compensating for adverse effects, is core business for fisheries management authorities globally. The complex interplay of ecological, economic, and social considerations has often resulted in bycatch management being reactive, confrontational and costly. In many cases it has been difficult to demonstrate success and to establish whether bycatch management has been efficient or effective. This article proposes standards for bycatch management following reviews of literature, international agreements and Australian domestic fishery management policies, and consideration by many technical experts and several stakeholder representatives. The standards have been developed using Australian Commonwealth fisheries – and the international fisheries agreements to which Australia is party – as a baseline, but should be applicable to both domestic and regional/international governance systems. The proposed standards involve quantifying fisheries bycatch, agreeing on operational objectives, assessing the effects of fishing on bycatch populations, establishing the cost-effectiveness of mitigation measures, and evaluating performance. The standards encourage domestic management measures that are consistent with the guidance and requirements of international agreements and regional fisheries management organisations. The importance of engaging stakeholders throughout the process is recognised. The standards provide a framework for measuring performance and a checklist of actions for managing bycatch at a fishery level. They have the potential to facilitate the development of more strategic and effective approaches to bycatch management, with defined goals, monitoring systems, and adaptive decision-making. This review of past bycatch management, including the application of the proposed standards to the mitigation of shark bycatch in an Australian longline fishery, demonstrates that the proposed standards are operationally feasible but that they have not always been applied. Specifically, monitoring the performance of bycatch management measures has not always followed their implementation.

1. Introduction

Unacceptable levels of bycatch have the potential to close major fisheries and to affect markets for seafood, regardless of the fishery's economic importance and the status of key commercial fish stocks. One of the earliest and most dramatic examples of the significance of bycatch was the mid-1990s decline of the United States purse seine fishery for tuna in the eastern Pacific because of dolphin bycatch and the subsequent refusal of many markets to accept tuna unless is was certified as 'Dolphin Safe' [1,2]. Other examples include closures of much of New Zealand's coastal waters to various fisheries to reduce Maui dolphin mortality [3], closures and bycatch limits to reduce the United States pelagic longline fishery's impact on loggerhead turtle and Laysan albatross in the North Pacific [4] and closures of large areas off southern Australia to prevent Australian sea lions and dolphins being caught in gillnets [5].

In addition to fishery closures and catch limits, bycatch management has often required modifications to fishing practices or gear. Examples include bycatch reduction devices (BRDs) in prawn or shrimp trawl nets [6], circle hooks to reduce turtle bycatch [7] and nylon-leaders/traces on longlines to reduce shark bycatch [8].

Bycatch generally refers to the incidental capture of species that do not have a commercial value and which are not retained by fishers. Around the world, different jurisdictions have adopted various definitions of bycatch. International arrangements based on the 1982 UN Law of the Sea Convention [9] provide a clear duty to determine the impacts of fishing on non-target species and to ensure that populations of such species are not threatened by fishing. States are required to 'take into consideration the effects on species associated with or dependent upon harvested species with a view to maintaining or restoring populations… above levels at which their reproduction may become seriously threatened' (Article 61, para. 4). Further, the 1995 FAO Code of Conduct on

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Responsible Fisheries affirms that 'States and users of living aquatic resources should conserve aquatic ecosystems' (Article 6.1) and 'maintain biodiversity' (Article 6.6) of aquatic habitats [10].

This article reports the development of standards for bycatch management through reviews of literature, policies and legislation, and through broad stakeholder input. Earlier studies on wildlife bycatch in Australia [11] concluded that the management of fisheries bycatch has often been reactive rather than proactive, sometimes confusing and often confrontational; it has been difficult to demonstrate success and it is unlikely to have been cost-effective. Application of the proposed standards may allow more strategic and effective approaches to bycatch management to be developed, with defined goals, monitoring systems and decision making. The potential benefits of adopting a more systematic approach include reducing bycatch, sustaining populations of bycatch species, cost-effective bycatch mitigation measures that do not unnecessarily reduce the profitability of commercial fisheries and an increased demand for sustainable seafood products through consumer recognition of the fishing industry's environmental performance. The proposed standards are intended as a framework for measuring performance and a checklist of actions for managing bycatch.

2. What is a standard?

A standard is 'a level of quality that is regarded as normal, adequate, or acceptable' [12]. Process standards provide guidance about the consistent use of agreed procedures. Performance standards provide guidance on expected levels of performance. Generally speaking, standards should be operational, rather than aspirational, i.e. performance measures should be met and procedures should be followed. Standards therefore reflect what is expected in the present rather than at some time in the future. They are fundamentally different to strategic or medium-term management plans, which normally identify long- or medium-term goals.

The standards proposed in this article are statements of principle providing a management framework that reflects the requirements of current international instruments for managing fishery bycatch. We provide examples from fisheries managed by the Australian Government, but the standards are intended to be relevant to other jurisdictions and to a broad range of fishing gear types operating in diverse natural environments. Each standard should be supported by guidelines that illustrate how the standards might be implemented. Examples of such guidelines are provided in the project report [13].

Several systems of standards for fishery management have been implemented by third-party accreditation groups. The Marine Stewardship Council (MSC) principles and criteria for sustainable fishing, for example, require the maintenance of ecosystems, including habitat and associated dependent and ecologically related species, on which fisheries depend [14].

Standards may be established as supplementary measures to regulation, like the MSC system, or they may be incorporated as components of regulations. For example, the recently re-authorised *Magnuson–Stevens Fishery Conservation and Management Act 1996* [15] includes 10 national standards that establish the framework for US federal fisheries management—US National Standard 9 relates to fisheries bycatch [16]. Each US National Standard has accompanying guidelines that expand on the issues to be addressed and approaches for implementing the standard.

3. Literature review

The bycatch standards proposed in this article are based on literature on bycatch management, international codes of practice, national policies and legislation, and consultation with experts in Australia. There are several global reviews of the management of fisheries bycatch. A review of international trends and initiatives in mitigating non-fish ('marine wildlife') bycatch [17] stresses that the specific characteristics of each fishery—physical, biological and socio-economic—dictate the combination of measures most likely to lead to successful management outcomes for marine wildlife. Management success is also affected by external factors, such as political context and policy priorities, government financing and legislative constraints. The key conclusions of a review of the performance of regional fisheries management organisations in managing bycatch [18] were that most bycatch mitigation measures fall short of best practice, performance standards were lacking, observer coverage and data collection was inadequate, and compliance is likely to be low because of inadequate surveillance and enforcement.

An instructive study has been done on the perceptions and attitudes of various stakeholders, including government, recreational fishing, and conservation non-government organisations (NGOs) in an Australian fishery [19]. Perceptions included that 'bycatch levels were too high', there was 'a lack of reporting by the fishery', and 'a lack of transparency in the industry's actions'. Half the respondents were not aware of the bycatch mitigation measures used in the fishery. Many also felt that industry was suspicious of embracing new technology and that, 'due to the lack of monitoring data and benchmarks, it is not possible to demonstrate the effectiveness of these measures'. The study concluded that the implementation of bycatch mitigation measures must be embraced by industry as a continual process if industry is to be seen positively by the broader community.

A survey of 74 individuals with declared interests in Australian fisheries, including industry, economists, policy and management officers, recreational fishers, scientists, social scientists, and representatives of conservation NGOs has recently been published [20]. The authors developed an explicit hierarchy of management objectives and established the relative weighting given by stakeholder groups for objectives at each level of the hierarchy. There was consensus on high level objectives, reflecting a 'triple bottom-line' approach to ensuring economic performance, sustaining the harvested resource and the environment, and minimising social externalities. However, the relative importance each group placed on the different objectives varied considerably. Economic performance was more important to economists and industry. Environmental objectives were most important to environmental NGOs. Sustaining commercial fish stocks was consistently important across groups and it was the most important objective to fisheries managers and scientists. For most groups, the importance of minimising externalities (such as spill-over effects to other industries) was relatively low. The results of this study suggest: that there is a reasonable chance of reaching agreement among stakeholders on the most important objectives of fishery management; that transparent, evidence-based processes open to all stakeholders may help reconcile diverse objectives; and that better bycatch management can be integrated into the core business of fisheries management.

In developing the bycatch standards presented here, international arrangements and instruments were also considered. These included bycatch management measures agreed by regional fisheries management organisations, including the Western and Central Pacific Fisheries Commission (WCPFC), Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), and Indian Ocean Tuna Commission (IOTC). Guidelines, codes of practice, and arrangements established by intergovernmental bodies, such as the Food and Agriculture Organization of the United Nations [10], the Agreement on the Conservation of Albatrosses and Petrels, and the International Union for the Conservation of Nature, were all considered.