

Recommendations for a National Catch Monitoring Policy

Bycatch is a serious conservation concern globally and a significant factor limiting the rebuilding of fisheries. It is a persistent problem in fisheries and is hard to remedy due to a lack of accurate catch monitoring and reporting (Kelleher 2005), which limits our understanding of the scale of the issue and our ability to resolve and to monitor improvements (Boudreau et al. 2017, Gavaris et al. 2010, Fuller et al. 2008).

At-sea observers are often only required to report on discarded species of commercial value. Non-commercial discards are frequently ignored, particularly in Atlantic Canada (Gavaris et al. 2010). As a result, information on ecosystem-level impacts is lacking in many Canadian fisheries. Furthermore, a recent federal audit found that a lack of timely access to catch monitoring data in several regions of Canada has compromised the ability of fisheries managers to make timely decisions (OAG 2016).

Fisheries monitoring and reporting requires better design, defined goals, increased resources and long-term planning and commitments. This would allow for the collection of meaningful and robust data to effectively manage bycatch and strengthen information required for fisheries management decision-making. However, there are currently no national standards or even a clear rationale for the levels of fisheries monitoring at sea, leaving most fleets with under-sampled and under-represented catch statistics. The lack of standardization and consideration of cumulative impacts on the ecosystem is a significant failure of fisheries management. A national monitoring policy should ensure there are accurate estimates of all fishery catch, including all non-target species, allowing for estimates of cumulative impacts.

There is no single monitoring solution, making a national policy challenging to develop. The literature on the specific design of monitoring programs is extremely limited, with minimal detail on implementation to apply a broad policy that is applicable across fisheries. Additionally, there is little information available for evaluating the effectiveness of these programs.

A national policy currently being drafted by Fisheries and Oceans Canada (DFO), and is expected to build on the Pacific Region's *Strategic Framework for Fishery Monitoring and Catch Reporting in the Pacific Fisheries* (Strategic Framework; DFO 2012), while improving upon it by addressing its weaknesses and ensuring international best practices are followed. Oceana Canada reviewed these best practices, identifying strengths and weaknesses of the existing Strategic Framework, and outlining minimum requirements of a national policy (see Appendix I for details). Considerations for monitoring and reporting requirements should be made on a fishery-by-fishery basis but developed under a standardized national framework and in a transparent process.

Oceana Canada recommends that the DFO's national catch monitoring policy should:

1. Define the purpose of catch monitoring, including the collection of accurate and timely information necessary to sustainably manage fish stocks and broader fisheries impacts;
2. Allow for the determination of fishery-specific monitoring objectives;
3. Require that data on the entire catch is collected – both bycatch and target species – in all fisheries;
4. Require that monitoring methods and minimum thresholds for both frequency and coverage are determined for all catch within a fishery;
5. Provide timelines for when fishery-specific monitoring plans, protocols, implementation and reporting are required to be developed; and
6. Outline the process for reviewing policy effectiveness, including a requirement for an annual national bycatch status report, with statistics on catch monitoring compliance against targets and an assessment of cumulative impacts for rare or species of concern.

Appendix I: Minimum requirements and best practices review

Here we outline minimum requirements of a national policy, provide an overview of international best practices and a review of the strengths and weaknesses of the existing Strategic Framework.

Minimum content requirements of a national catch monitoring policy

1. Define Purpose and Measurable Objectives of the Policy

- Defining the purpose and objectives of a national policy will promote buy-in, frame expectations regarding the level and needs of monitoring within specific fisheries and will provide a measurable benchmark against which to assess the effectiveness of the policy.
- Primary objectives of fisheries monitoring programs include catch estimation, contribution to science, quota management, vessel-specific performance and compliance necessary to sustain and protect fishery resources. Monitoring should include information on all catch: retained and released target species, retained and released bycatch and other pertinent information on the ecosystem.

2. Develop Criteria for Monitoring

A nationwide policy on catch monitoring should enable cross-fishery comparisons while also accounting for the unique characteristics of fisheries themselves. To support this flexibility, the policy should provide standardized criteria and processes to be implemented in a transparent way while meeting the needs of each fishery.

a. Minimum Data Collection

- Minimum data collection requirements should be outlined for all fisheries to enable cross-fisheries comparisons and an assessment of cumulative impacts, using at least one monitoring tool to collect:
 - Catch data, ideally in weight or numbers, of the entire catch – both bycatch and target species; and
 - Vessel and fishing gear information, including time and location of fishing activity.

b. Standardized and Transparent Process for Determination of Data Needs

- A standardized and transparent process should be outlined to assess fishery requirements regarding monitoring tool selection, data quality and frequency of collection and verifiability and ensure:
 - Frequency of monitoring and coverage levels respond to the complexity and degree of risk associated with a fishery (higher monitoring where fishery is more complex with higher biological, socioeconomic and other risks);
 - Monitoring tool choice, frequency of monitoring and coverage levels are determined through a risk assessment or fishery review with rationale made publicly available;
 - Minimum thresholds are determined that establish the frequency of monitoring and coverage levels and ensure statistically meaningful conclusions regarding objectives; and
 - Methods of independent verification of catch information are established.

c. Fisheries-Specific Criteria

- Further fishery-specific criteria should be identified in part via a risk assessment process or similar fishery review, and include:
 - Stock-specific monitoring objectives;
 - Determination of whether whole or part of fishery should be monitored;
 - Evaluation of costs of proposed monitoring protocols, such as initial set-up, operational costs, processing and timelines;
 - A level of industry acceptance and buy-in to the monitoring tools selected; and

- Capacity and investment for implementing the monitoring plan.

d. Enforceability and Accountability

The policy should outline how it will be enforced within fisheries, and should:

- Designate and outline the roles and responsibilities of stakeholders within monitoring and reporting processes; and
- Outline the potential use of harvester incentives and enforcement to promote compliance

3. Requirements for Implementation

- Identify priority fisheries (e.g. reducing impacts to species at risk and critical stocks) for catch monitoring and reporting plan development;
- Provide timelines for developing the monitoring plan, protocols, reporting requirements and overall implementation of the policy within and across fisheries;
- Set regulations and licensing conditions in consultation with industry;
- Identify data system needs to allow timely dissemination of catch monitoring data;
- Assess costs, particularly for potential fishery-dependent monitoring tools;
- Outline the process for reviewing the national monitoring policy and fishery specific catch monitoring protocol effectiveness; and
- Provide an annual national bycatch status report, including statistics on catch monitoring compliance against targets.

4. Participation and Outreach

- Outline the role of stakeholders, including government, harvesters, First Nations and others in developing a national policy and fishery-specific monitoring protocols;
- Incorporate education and outreach of the importance of monitoring and reporting for the sustainability of fisheries; and
- Enable the dissemination and accessibility of collected information where appropriate.

Best practices overview

The following pages provide a brief overview of international catch monitoring best practices.

Guiding Principles for Effective Monitoring Programs (adapted from Zollett et al. 2011)

- Goals and objectives of a monitoring program should be established at the outset;
- Transparency and stakeholder engagement is critical for the support and successful implementation of monitoring programs, including data collection methods;
- Consistent, standardized formats for collecting data should be developed;
- The characteristics of each fishery and the temporal and spatial scale of the fishery will determine coverage levels on a case-by-case basis, and may include a formal threat assessment;
- Monitoring programs should respond to the changing needs of a fishery;
- Program effectiveness should be assessed regularly, adapted as necessary and adequately enforced;
- Costs, benefits and the accuracy required should inform the level of data collected; and
- Incentives and cost-sharing arrangements should be considered.

UN Food and Agricultural Organization

Broad suggestions for fisheries monitoring have been put forward by the FAO:

- Monitoring systems should include clear management and science objectives linked to both government and industry requirements, designed at the outset of planning and design phases (Nolan 1999);
- A basic requirement in all programs is for independent, verifiable data and some at-sea monitoring capacity that can be provided in a cost-effective manner (Nolan 1999);

- Communication between stakeholders and clients is recognized as essential to set clear and achievable objectives in monitoring programs and in reviewing the cost-effective operation and temporal relevance (Nolan 1999);
- Confidentiality of information requires that a protocol for handling and distribution of data collected must be established (Nolan 1999); and
- Consider the fishery, legal framework, available resources, practical solutions given political climate and interested parties (Bergh & Davies 2002).

Monitoring the Gulf of Mexico commercial reef fish fishery (Stebbins, Trumble & Turris 2009)

The most important component to guiding monitoring program design is a clear statement of minimum data requirements to fully support fishery management. Other critical issues to consider and include are:

- Level of accuracy and reliability desired in data products;
- Level of accountability desired (individual, sector, fleet);
- Biological characteristics (species and stock diversity, life-history);
- Fleet characteristics (number, size, gear);
- Fishery characteristics (number and size of landings, landing locations, effort);
- Market characteristics (product types, value, seasonality);
- Funding alternatives; and
- Compliance levels.

United States

Collecting bycatch data in a particular fishery depends on (NMFS 2011):

- Completeness: data coverage range (temporal, spatial, depth, vessel attributes, etc.) of the fishery or fisheries that interact with the species of concern;
- Cost: cost effectiveness of method;
- Timeliness: availability of data to fisheries scientists, managers, and fishers;
- Safety: of data-collection method compared to other monitoring methods, and safeguards in place to ensure the safety of the data collectors;
- Logistics: of implementation and maintenance of program; and
- Planned use of data: what is the level of detail, quality, and timeliness required from the data sources?

The fisheries monitoring roadmap and accompanied matrix were designed to support the implementation of monitoring programs that meet the needs of individual fisheries (NMFS 2011b). The roadmap highlights that:

- Stakeholders are to be engaged over the entire five phases of developing or revising a monitoring program;
- There should be ongoing review, refinement and revision of procedures; and
- Supportive infrastructure such as funding, equipment, training, etc. should be established.

The Fishery Monitoring Matrix aids stakeholders in identifying data needs for a specific fishery and provides a visual representation of the relative ability of various monitoring tools to meet those needs. The matrix evaluates tools individually instead of combining monitoring tools, which is a more appropriate approach.

The Standardized Bycatch Reporting Methodology under the *Magnuson-Stevens Act* is used to collect, record, and report bycatch data. Procedures are to be outlined along with cost, technical, and operational feasibility, acknowledging that different fisheries will have different methodology needs. The process for inclusion of a methodology within Fisheries Management Plans is limited in detail and as these plans do not need to include procedures until 2022 there has been no review of effectiveness of this practice to date.

Review of the Strategic Framework for Fishery Monitoring and Catch Reporting in the Pacific Fisheries (DFO 2012)

The approach put forward incorporates the 2002 Pacific Region Fishery Monitoring and Reporting Framework through application of a risk assessment to each fishery in determining monitoring and reporting requirements that reflect each fishery's unique characteristics.

- Vision: Improve confidence in fisheries.
 - Objectives: cost effective; accessible; improve confidence in all information and foster collaborative management; consistent standards for all fisheries; responsibilities are clarified and shared between harvesters and DFO.
- Aims to address deficiencies in information-gathering, such as coverage of the fisheries, missing or unreliable data (particularly on bycatch and discards), reporting delays and other issues.

Key leaders/experts

- Pacific Fisheries Monitoring and Compliance Panel
- Marine Resources Assessment Group (MRAG) Working Group Participants (see Zollett et al. 2011)

Strengths of the Strategic Framework

Overall, the Strategic Framework provides a vision and objectives that bring collaborative and responsible fisheries management to Pacific fisheries with the inclusion of government, harvesters and other stakeholders.

- Outlines collaborative management and ecosystems approaches;
- Aims to include a broader scope of information, including bycatch, sensitive habitat and other environmental impacts;
- Aims for users of fisheries information to have easy and secure access to timely, complete and consistent data of defined quality;
- Establishes that the information necessary to sustain and protect fishery resources and their habitat is the priority of monitoring and reporting;
- Data collected is to serve both local and broad (integrated) needs;
- Aims for data and technology management to have clear accountabilities and is cost-efficient and service-oriented;
- Broad scope of information to be collected including: discards, bycatch, sensitive habitat and other environmental impacts in support of an ecosystems approach;
- Calls for adaptability over time to meet the needs of the fishery through ongoing assessments of plans; and
- The integrated fisheries management plan (IFMP) guidance document requires that information concerning monitoring and reporting within a fishery be outlined within IFMP plans.

The risk assessment provides an initial starting point for determining the level of information to be collected.

Weaknesses of the Strategic Framework

Although the Strategic Framework provides a basis for collaborative approach to gathering a broad scope of information, the operationalization of the goals and approaches to consistency across fisheries are limited.

- Calls for consistency for determining information requirements and monitoring programs within but not across fisheries, which would facilitate estimations of cumulative catch effects;
- Although the Framework calls for collaborative efforts, it is unclear as to the extent to which stakeholders are involved in developing monitoring and reporting programs, and it appears that risk assessments are not publicly available;
- Timelines for determination of monitoring and reporting needs and implementation, are not provided;

- Enforceability procedures to ensure that the Framework is being implemented in the Region are not outlined;
- There is limited guidance on enforcement or how to ensure monitoring and reporting compliance within a fishery; and
- The framework does not support:
 - Cross-fishery comparisons and cumulative impact assessments;
 - Information accessibility, as there is no direction for use of information

It is unclear the extent to which the Strategic Framework is being implemented across all fisheries in the Pacific Region. This may be an issue of transparency and lack of communication to the general public of what is being implemented within fisheries – which would not meet the principles of consistency and transparency. Furthermore, there has been no review of the effectiveness of the Strategic Framework to ensuring the sustainability of fisheries.

Prior to the Strategic Framework, there were other assessments conducted in relation to establishing a monitoring program. These found inconsistencies across Pacific fisheries, catch monitoring and reporting is variable among fisheries in terms of coverage of the fisheries, missing and unreliable data (mostly on bycatch and discards), reporting delays and other issues. Specifically, they highlighted:

- A deficiency due to the storage of data across different systems. In order for data to be integrated with other data in a timely manner, a single data storage system is recommended (DFO, 2011); and
- Harvesters are responsible and accountable for providing accurate and complete information on their harvest. Final responsibility must continue to rest with DFO to ensure that public confidence in the management system is maintained (DFO 2003).

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