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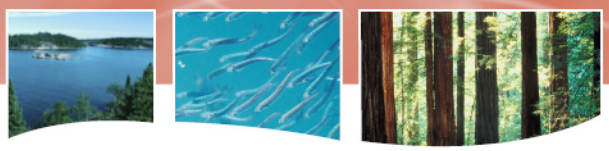

Data Sources and Methods: Status of Major Fish Stocks Indicator

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1 Introduction

The Status of Major Fish Stocks indicator is a part of the Canadian Environmental Sustainability Indicators (CESI) program, which provides data and information to track Canada's performance on key environmental sustainability issues.

It is the goal of Fisheries and Oceans Canada (DFO) to ensure conservation, sustainability and economic prosperity by managing Canada's fisheries using the precautionary approach. The long-term maintenance of the ecological, social and economic value of fish stocks requires an understanding of the status (biological health) of those stocks. This indicator measures the status of major fish stocks.

2 Description and rationale of the Status of Major Fish Stocks indicator

2.1 Description

The Fish Stock Status classifies stocks into "healthy", "cautious" and "critical" categories, as outlined in the precautionary approach (http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/fish-ren-peche/sff-cpd/precaution-back-fiche-eng.htm). For those stocks in the healthy zone (*i.e.,* above the "upper stock reference point", a point that is determined by the productivity objectives of the fisheries), fisheries management decisions and harvest strategies are designed to maintain fish stocks within this zone, while providing sustainable economic, social and cultural benefits. For fish stocks in the cautious zone (*i.e.,* between the upper stock reference point and the limit reference point), decisions and strategies promote stock rebuilding to the healthy zone. In the critical zone (*i.e.*, below the "limit reference point" which is the stock level below which productivity is sufficiently impaired to cause serious harm to the resource but above the level where risk of extinction becomes a concern), stock growth is promoted and removals are kept to the lowest possible level.

2.2 Rationale

The status of fish stocks provides the fundamental piece of information required to evaluate the impacts of past fishing and to manage present and future fishing pressure.

3 Data

3.1 Data sources

Data are drawn from evaluations of stock status that are reported in the Fishery Checklist; the same Checklist is also used for the Sustainable Fish Harvest indicator.

The Fishery Checklist, an internal tool applied to each major stock or fishery, provides a systematic review of progress on conservation and sustainable-use objectives, including assessments or updates of the status of the stock(s). DFO reports on the status and management of major fish stocks each year. This comprehensive checklist assesses fish harvest rates, bycatch, ecological impacts, stakeholder consultation and other activities, and includes the impacts of commercial, recreational and Aboriginal fisheries. The data provide a snapshot of a stock or fishery in time, capturing how a fishery is addressing a range of factors considered

necessary for sustainable management. The data with respect to stock status was drawn from the Fishery Checklist v.3.

3.2 Spatial coverage

Coverage is national, for all major fish stocks.

3.3 Temporal coverage

The Fishery Checklist was first introduced in 2007. Checklist questions have been refined over this time and data from previous years is not comparable because changes have been made in the content and the stocks covered by Checklists. Therefore, data reported in 2011 represent a baseline year against which future reporting can be compared.

3.4 Data completeness

All 136 major stocks were included in the checklist for 2010.

Major stocks are determined by regional managers and include all stocks that meet at least one of the following criteria:

- have an annual landed value greater than $1 million;
- have an annual landed weight greater than 2,000 tonnes;
- have an Integrated Fisheries Management Plan available from: http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/ifmp-gmp/index-eng.htm;
- are highly migratory or are transboundary stocks that are internationally managed;
- have been assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC, available from http://www.cosewic.gc.ca/) as being of special concern and are subject to a directed fishery; and/or
- are deemed to be of regional significance.

These stocks include finfish, shellfish, marine mammals and other marine invertebrates.

3.5 Data timeliness

Data for the Fishery Checklist in a given year are reported by April 1 of the following year; the indicator is current to the end of 2010. The "year" is defined variably, depending on how fishing seasons and closures are set for individual stocks, and may not align with the calendar year.

4 Methods

The indicator is a tabulation of the number of stocks in each status zone: healthy, critical or cautious. Stocks are "healthy" when the spawning biomass[1] is above the "upper stock reference point", which is determined by DFO productivity objectives for the fisheries. If stocks fall below the "lower stock reference point" (the stock level below which productivity is impaired but well above the level where the risk of extinction becomes a concern), they are in the "critical" zone. Between these two points, the stock is classified as "cautionary". If

[1] The spawning biomass is the total weight of all the fish that engage in reproductive activity in a given season. It is a measure of the size and number of mature adult fish.

reference points have not yet been established, zones are based on the best available information on the biology and the historic levels of the fish.

Stock assessments are conducted in a variety of ways and use many types of data including abundance estimates and spawning biomass estimates. Many sources of data contribute to assessments, including data from monitoring fisheries (*e.g.,* catch rates and fish body size distribution) research surveys, community knowledge and directed research.

Stocks are subpopulations of a particular species of fish, for which factors such as growth, recruitment, and natural and fishing mortality are the only significant factors in determining population dynamics, while other factors such as immigration and emigration are considered to be insignificant.

Stock groups used for reporting on this indicator are marine mammals, salmonids, groundfish, large pelagics, small pelagics, crustaceans (lobster, crab, shrimp), molluscs and others. Each group comprises species with similar life history characteristics. For example, groundfish spend their adult life at or near the bottom of the ocean. These same groupings are used in the Sustainable Fish Harvest Indicator.

5 Caveats and limitations

- The Fishery Checklist program was initiated in 2007. A number of changes have been made as the program has developed. In particular, the stocks included in the Checklist program have been changed and questions have been revised. A standard list of stocks and Checklist questions have now been established. Year-to-year comparisons should not be made until further data are collected using the standard stock list and questions.
- Fish populations are difficult to monitor. DFO uses a variety of scientific methods to assess stock levels, and the precautionary approach prescribes three "stock status zones" (healthy, cautious and critical) based on these scientific assessments of the stock level. However, information is sometimes incomplete.
- The Fishery Checklist summarizes information across a wide variety of species, management regimes, types of fisheries, geographic regions, and socio-economic contexts. Results should be interpreted with this in mind.

6 References and further reading

Fisheries and Oceans Canada (2009) A fishery decision-making framework incorporating the Precautionary Approach (http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/fish-ren-peche/sff-cpd/precaution-eng.htm)