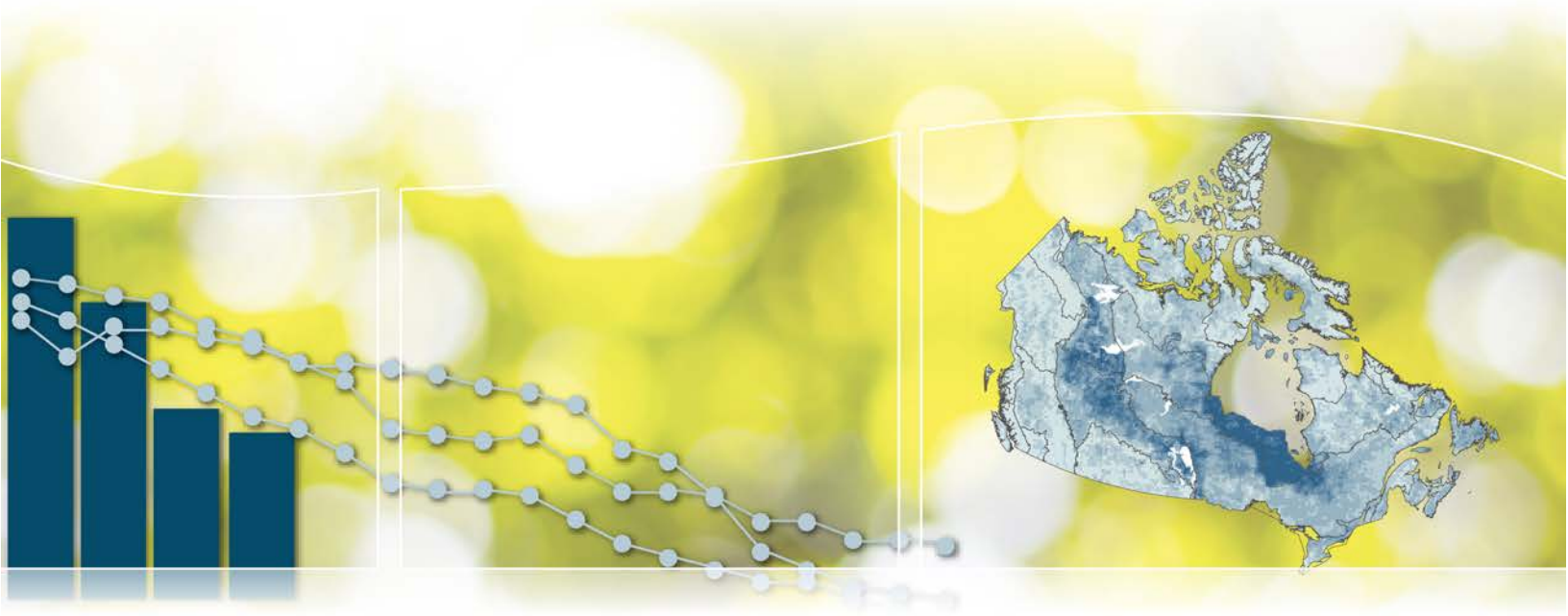
Environment and Climate Change Canada
Environnement et Changement climatique Canada

Canadian Environmental Sustainability Indicators

Status of Major Fish Stocks



Canada

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Canadian Environmental Sustainability Indicators

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Table of Contents

List of Figures

List of Tables

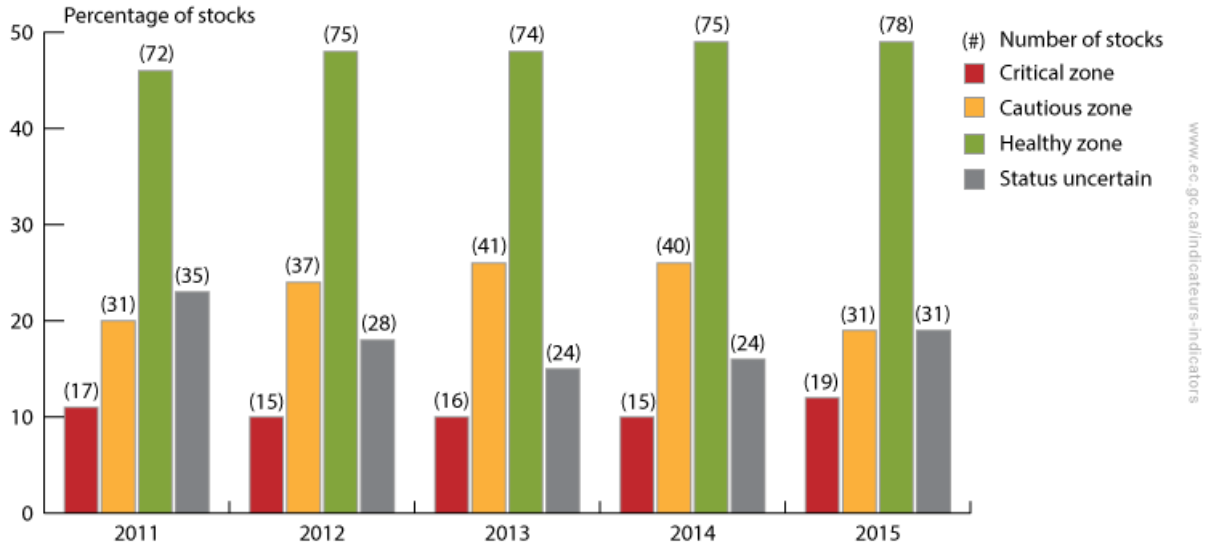
Part 1. Status of Major Fish Stocks Indicator

Of 159 major fish stocks assessed in 2015:

- 78 stocks (49%) were classified as Healthy;
- 31 stocks (19%) were classified as Cautious;
- 19 stocks (12%) were classified as Critical;
- 31 stocks (19%) were uncertain.[1]

Changes in stock status happen slowly. It may take many years for biological systems to respond to changes in management. Environmental changes such as shifts in climate and ocean currents may also cause some stocks to reproduce more slowly. There has been little change in the overall status of stocks since 2011, as expected over a short time frame.

Figure 1. Status of major fish stocks, Canada, 2011 to 2015



Data for Figure 1

Note: Labels refer to the number of stocks in each category. Fish stocks are classified by comparing the size of stocks to reference points, which are established based on the productivity of the stock. See the Data Sources and Methods section for details. Stocks include a variety of harvested marine animal species, not only finfish. Comparisons between years should be made with caution as some changes to the list of major stocks were made in 2014 and 2015.
Source: Fisheries and Oceans Canada (2016) 2015 Sustainability Survey for Fisheries.

Assessing the state of fish stocks is essential for conservation and to maintain prosperous commercial fisheries. Fisheries and Oceans Canada uses a variety of scientific methods to assess fish stock levels, and assigns one of three stock classifications (Healthy, Cautious, or Critical) by comparing the size of the stocks to reference points. Harvest rates are adjusted to help rebuild stocks that are not in the Healthy zone. The results of the stock assessments for major stocks are peer-reviewed and published on-line.[2] The stock status is reported as part of the Sustainability Survey for Fisheries, which is a key planning and monitoring tool.

[1] If stock status zones cannot be determined with current information, the stock is assigned an uncertain status.

[2] Peer-reviewed stock assessments are published by the Canadian Science Advisory Secretariat in Science Advisory Reports.

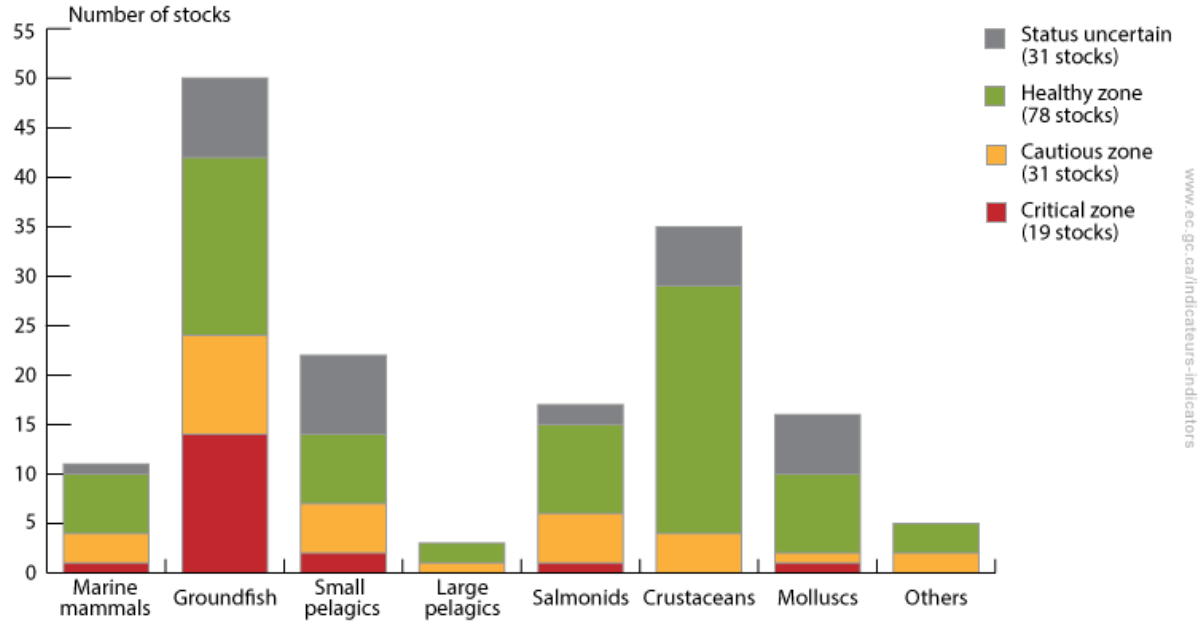
Status of major fish stocks, by stock group

The status of different groups varies due to differences in population productivity, historical exploitation and resilience, among other factors. Environmental conditions also affect different groups in different ways.

Groundfish stocks (e.g., cod, halibut and haddock) have the highest proportion of stocks in the Critical zone, in part due to historical harvest patterns and unfavourable environmental conditions in the 1990's. Recent improvements in some groundfish stocks may be attributable to warmer conditions that are favourable for them and the fact that harvest levels have been kept low.

Crustacean stocks (e.g., crab, lobster and shrimp) have the highest proportion of stocks in the Healthy zone, due to factors such as favourable environmental conditions in the 2000's and low predation rates, as well as effective stock management. However, unfavorable warmer conditions in recent years have negatively impacted many stocks of shrimp and Snow Crab.

Figure 2. Status of major fish stocks, by stock group, Canada, 2015



Data for Figure 2

Note: The species in each stock group are listed in the figure's data table. Pelagic fish live in midwater or close to the surface, in contrast to groundfish, which are usually caught near the ocean bottom. Crustaceans are shelled animals with joints, such as lobster, crab and shrimp. Molluscs include bivalve shellfish species such as clams, oysters and mussels, which we commonly think of as shellfish.
Source: Fisheries and Oceans Canada (2016) 2015 Sustainability Survey for Fisheries.

Healthy coasts and oceans

This indicator supports the measurement of progress towards the long-term goal of the Federal Sustainable Development Strategy 2016–2019: Coasts and oceans support healthy, resilient and productive ecosystems.

Part 2. Data Sources and Methods for the Status of Major Fish Stocks Indicator

Introduction

The Status of Major Fish Stocks indicator is part of the Canadian Environmental Sustainability Indicators (CESI) program, which provides data and information to track Canada's performance on key environmental sustainability issues. This indicator is also used to report and measure progress towards the goals of the Federal Sustainable Development Strategy 2016–2019.

Description and rationale of the Status of Major Fish Stocks indicator

Description

A biological fish stock is a group of fish of a single species that live in the same geographic area and mix enough to breed with each other when mature. A management stock may refer to a biological stock, or a multispecies complex that is managed as a single unit.

The Status of Major Fish Stock indicator classifies management stocks into Healthy, Cautious and Critical zones, as outlined in the Fishery Decision-Making Framework Incorporating the Precautionary Approach (2009) (hereafter referred to as the precautionary approach).

For those stocks in the Healthy zone (i.e., above the Upper stock reference point, which 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), stock growth is promoted and removals are kept to the lowest possible level.

Rationale

Globally, there are ongoing concerns regarding pressures on abundance, health and survival of fish stocks due to overfishing, pollution and other environmental factors. In order to protect fish stocks for future generations, it is important to track their health and condition, and to implement management decisions and harvest strategies accordingly. It is the goal of Fisheries and Oceans Canada to ensure conservation, sustainability and economic prosperity by managing the fisheries using the precautionary approach.

Stock status indicators are used to track progress on global targets such as Aichi Biodiversity Target 6 and the United Nations Sustainable Development Target 14.4.

Recent changes to the indicator

The data source for this indicator, the Sustainability Survey for Fisheries, formerly called the Fishery Checklist, has been revised over time to improve its usefulness as a management tool. In 2011, the Checklist and a set of 155 major stocks were finalized for the period 2011–2014, allowing comparability between years. The Porbeagle Shark was classified in the Critical zone in 2013 and the fishery was subsequently closed, resulting in the stock being removed from the list in 2014. Numbers reported for 2014 total 154 stocks.

Changes were made to the survey in 2015 and the list of major stocks was revised to a total of 159:

- Three Snow Crab stocks of healthy status were merged (-2) and ranked in the Healthy zone;
- One Northern Shrimp fishery was closed and the stock removed from the list (-1);
- Six stocks (three shrimp stocks with uncertain status, one Elver stock in the Cautious zone, one Redfish stock in the Healthy zone and one Witch Flounder stock in the Healthy zone) were added (+6); and
- One Pacific Ocean Perch in the Healthy zone was split into three stocks (+2): two of these were in the Healthy zone and one in the Cautious zone.

Data

Data source

Data were drawn from evaluations of stock status reported in the 2015 Sustainability Survey for Fisheries, formerly known as the Fishery Checklist. The Sustainability Survey for Fisheries is a tool that provides a systematic review of progress on conservation and sustainable-use policies and objectives. Different data are drawn from the same survey to generate the Sustainable Fish Harvest indicator.

Each year, Fisheries and Oceans Canada surveys how it manages major fish stocks. The survey includes commercial, recreational and Indigenous fisheries. These data provide a qualitative snapshot of a stock for a certain period, capturing how a fishery is addressing a range of factors considered necessary for sustainable management. The data also give an indication of progress being made to implement the department's sustainable fisheries policies.[3]

Spatial coverage

National, for all major fish stocks.

Temporal coverage

Annual from 2011 to 2015, inclusive.

Data completeness

Major stocks are identified by regional managers within Fisheries and Oceans Canada and include all stocks that meet one or more of the following criteria:

- have an annual landed value greater than $1 million;
- have an annual landed weight greater than 2000 tonnes;
- have an Integrated Fisheries Management Plan;
- are highly migratory or are a transboundary stock that is internationally managed;
- have been assessed by the Committee on the Status of Endangered Wildlife in Canada 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] Fisheries and Oceans Canada (2009) Sustainable Fisheries Framework. Retrieved on June 22, 2016.

Data timeliness

Data for the Sustainability Survey for Fisheries are reported in the spring for the previous year. A year is defined variably, depending on how fishing seasons and closures are defined for individual stocks, and may not align exactly with the calendar year. The indicator is current to the end of 2015.

Methods

The indicator is a simple tabulation of the stocks in each status zone: Healthy, Cautious, or Critical.

Stocks are Healthy when the biomass is above the Upper stock reference point, which is determined by the productivity objectives for the fisheries. If stocks fall below the Limit reference point (the stock level below which productivity is sufficiently impaired to cause serious harm), they are in the Critical zone. Between these two points, the stock is in the Cautious zone. If reference points have not yet been established, zones are assigned based on the best available information on the fish's biology and its historic levels. If zones cannot be determined with current information, the stock is assigned an uncertain status.

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

Stock groups used for reporting on this indicator are marine mammals, salmonids, groundfish, large pelagics, small pelagics, crustaceans (crab, lobster and 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. The same groupings are used in the Sustainable Fish Harvest indicator.

Caveats and limitations

The criteria used to determine stock status have changed over time as the implementation of the precautionary approach has improved. This has resulted in variation in the reported stock status between 2011 and 2015 and comparisons between years should be made with caution.

The Sustainability Survey for Fisheries, formerly known as the Fishery Checklist, was initiated in 2007. A number of changes have been made as the program has developed. In particular, the stocks included in the survey have changed and questions have been revised. A standard list of stocks and questions were established in 2011 and no changes were made to the set of stocks until the removal of Porbeagle Shark in 2014. In 2015, the survey was streamlined to track the implementation of policies under the Sustainability Survey for Fisheries.

Since the oceans are wide and deep, and fish migrate, their populations are difficult to monitor. Fisheries and Oceans Canada 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 often incomplete.

The Sustainability Survey 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.

The indicator does not account for stocks that are not part of a fishery, nor does it account for fished stocks that do not meet the criteria to be considered major.

Part 3. Annexes

Annex A. Data tables for the figures presented in this document

Table A.1. Data for Figure 1. Status of major fish stocks, Canada, 2011 to 2015

Year	Critical zone (number of stocks)	Cautious zone (number of stocks)	Healthy zone (number of stocks)	Status uncertain (number of stocks)	Total
2011	17	31	72	35	155
2012	15	37	75	28	155
2013	16	41	74	24	155
2014	15	40	75	24	154
2015	19	31	78	31	159

Note: Fish stocks are classified by comparing the size of stocks to reference points, which are established based on the productivity of the stock. See the Data Sources and Methods section for details. Stocks include a variety of harvested marine animal species, not only finfish. Comparisons between years should be made with caution as some changes to the list of major stocks were made in 2014 and 2015.
Source: Fisheries and Oceans Canada (2016) 2015 Sustainability Survey for Fisheries.

Table A.2. Data for Figure 2. Status of major fish stocks, by stock group, Canada, 2015

Stock group	Species included	Critical zone (number of stocks)	Cautious zone (number of stocks)	Healthy zone (number of stocks)	Status uncertain (number of stocks)
Marine mammals	Whale, walrus	1	3	6	1
Groundfish	Halibut, rockfish, cod, flounder, hake, redfish, dogfish, haddock, lingcod, perch, plaice, pollock, sablefish, skate, thornyhead	14	10	18	8
Small pelagics	Herring, mackerel, whitefish, capelin, sardine, striped bass, gaspereau, eulachon	2	5	7	8
Large pelagics	Tuna, swordfish	0	1	2	0
Salmonids	Salmon, char, trout	1	5	9	2

Stock group	Species included	Critical zone (number of stocks)	Cautious zone (number of stocks)	Healthy zone (number of stocks)	Status uncertain (number of stocks)
Crustaceans	Crab, lobster, shrimp, prawn, krill	0	4	25	6
Molluscs	Clam, scallop, whelk, geoduck	1	1	8	6
Others	Sea cucumber, sea urchin, eel and elver	0	2	3	0
Total		**19**	**31**	**78**	**31**

Note: Pelagic fish live in midwater or close to the surface, in contrast to groundfish, which are usually caught near the ocean bottom. Crustaceans are shelled animals with joints, such as lobster, crab and shrimp. Molluscs include bivalve shellfish species such as clams, oysters and mussels, which we commonly think of as shellfish.
Source: Fisheries and Oceans Canada (2016) 2015 Sustainability Survey for Fisheries.

Annex B. References and additional information

References and further reading

Fisheries and Oceans Canada (2009) A Fishery Decision-Making Framework Incorporating the Precautionary Approach. Retrieved on July 8, 2016.

Fisheries and Oceans Canada (2016) Sustainability Survey for Fisheries. Retrieved on January 27, 2017.

Related information

Fisheries and Oceans Canada – Aquatic Species
Fisheries and Oceans Canada – Fisheries
Fisheries and Oceans Canada – Science Advisory Reports (includes Stock Status Reports)
Sustainable Fish Harvest
Sustainable Fish and Seafood

www.ec.gc.ca

Additional information can be obtained at:

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