



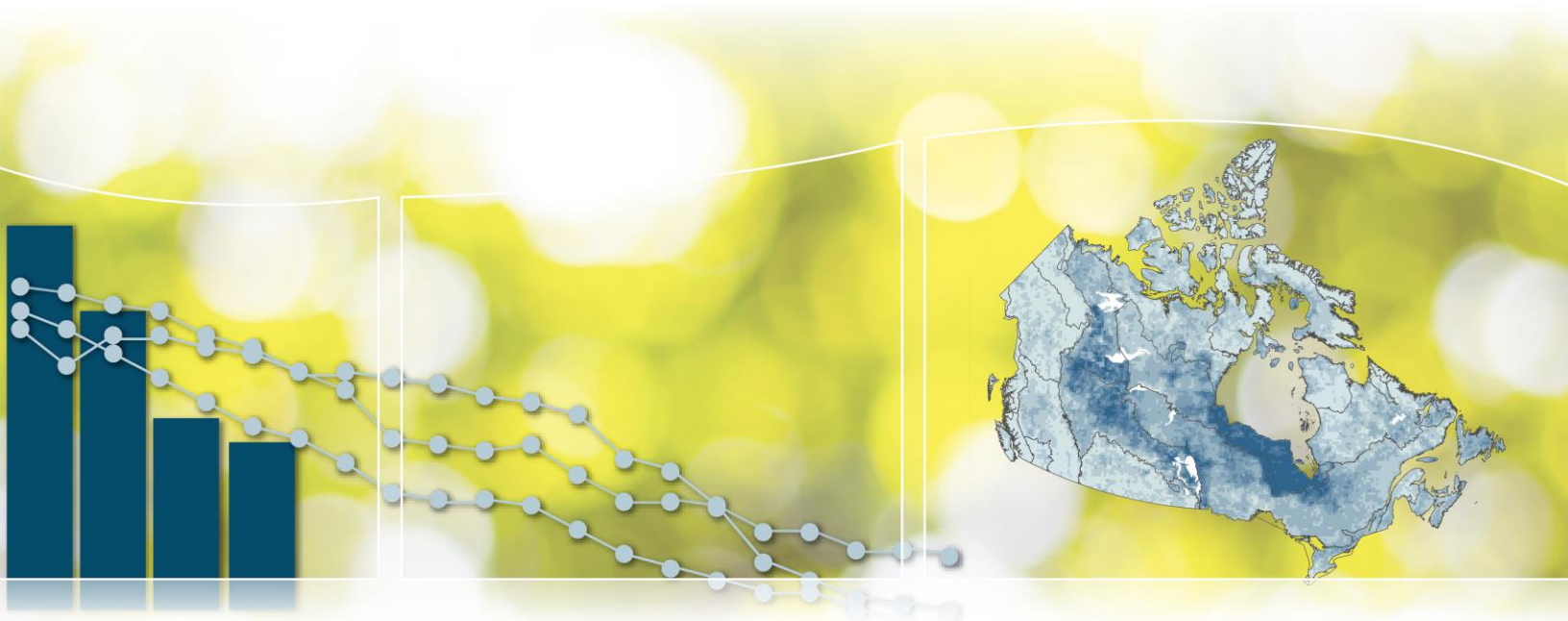
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Canadian Environmental Sustainability Indicators

Status of Major Fish Stocks



Suggested citation for this document: Environment and Climate Change Canada (2016) Canadian Environmental Sustainability Indicators: Status of Major Fish Stocks. Consulted on *day Month, year*.
Available at: www.ec.gc.ca/indicateurs-indicators/default.asp?lang=en&n=1BCD421B-1.

Cat. No.: En4-144/33-1-2015E-PDF
ISBN: 978-0-660-03718-9

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Canadian Environmental Sustainability Indicators

Status of Major Fish Stocks

February 2016

Table of Contents

Part 1. Status of Major Fish Stocks Indicator.....	4
Status of major fish stocks, by stock group	5
Part 2. Data Sources and Methods for the Status of Major Fish Stocks Indicator	7
Introduction.....	7
Description and rationale of the Status of Major Fish Stocks indicator	7
Data	8
Methods	9
Caveats and limitations	9
Part 3. Annexes	10
Annex A. Data tables for the figures presented in this document	10
Annex B. References and additional information	12

List of Figures

Figure 1. Status of major fish stocks, Canada, 2011 to 2014	4
Figure 2. Status of major fish stocks, by stock group, Canada, 2014	5

List of Tables

Table A.1. Data for Figure 1. Status of major fish stocks, Canada, 2011 to 2014	10
Table A.2. Data for Figure 2. Status of major fish stocks, by stock group, Canada, 2014	10

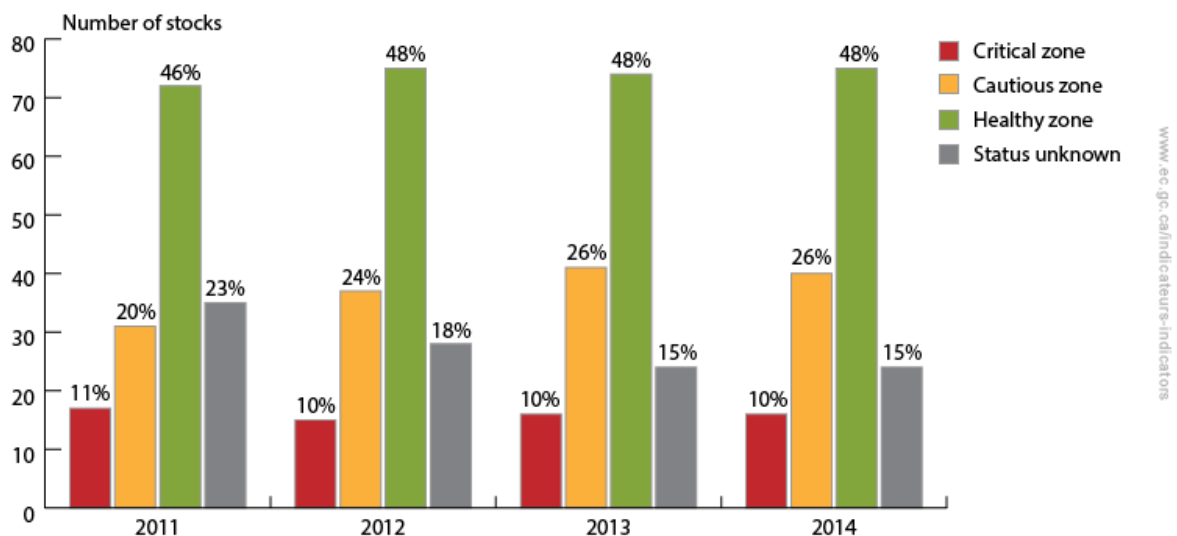
Part 1. Status of Major Fish Stocks Indicator

Of 155 major fish stocks assessed in 2014, 75 stocks (48%) were classified as *healthy*, 40 stocks (26%) were classified as *cautious*, and 16 stocks (10%) were classified as *critical*.¹ The status of 24 stocks (15%) was unknown.

It may take many years for biological systems to respond to changes in management. If considering the group of stocks that had a known status in 2011, the net change by 2014 was that two more stocks were in the cautious zone and two fewer were in the critical zone. The number of stocks in the healthy zone remained the same.

In addition, knowledge about the state of the stocks has improved since 2011, with 11 fewer stocks in the unknown category.

Figure 1. Status of major fish stocks, Canada, 2011 to 2014



[Data for Figure 1](#)

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.

Source: Fisheries and Oceans Canada (2015) Fishery Checklist version 4.

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 status zones (healthy, cautious or critical) based on these scientific assessments. The [precautionary approach](#)² is used to manage these fish stocks in such a way that the amount of allowed fish harvesting or approved removal rates are adjusted to keep stocks in the healthy zone, progressively lowered if the stock is in the cautious zone, and kept to the lowest possible level if the stock is in the critical zone. The adjustment of removal rates when stocks are below the healthy zone allows stocks to rebuild. The results of the stock assessments for major stocks are peer-

¹ Stocks in the critical zone have a level of productivity that may result in serious harm to the resource.

² The Precautionary Approach Framework provides guidance for the management of fish stocks. The components of the precautionary approach are: reference points (upper stock reference, limit reference and removal reference) and harvest decision rules for each of the three zones (critical, cautious and healthy).

reviewed and published on-line.³ The status of the fish stocks is reported as part of the Fishery Checklist, which is a key planning and monitoring tool.

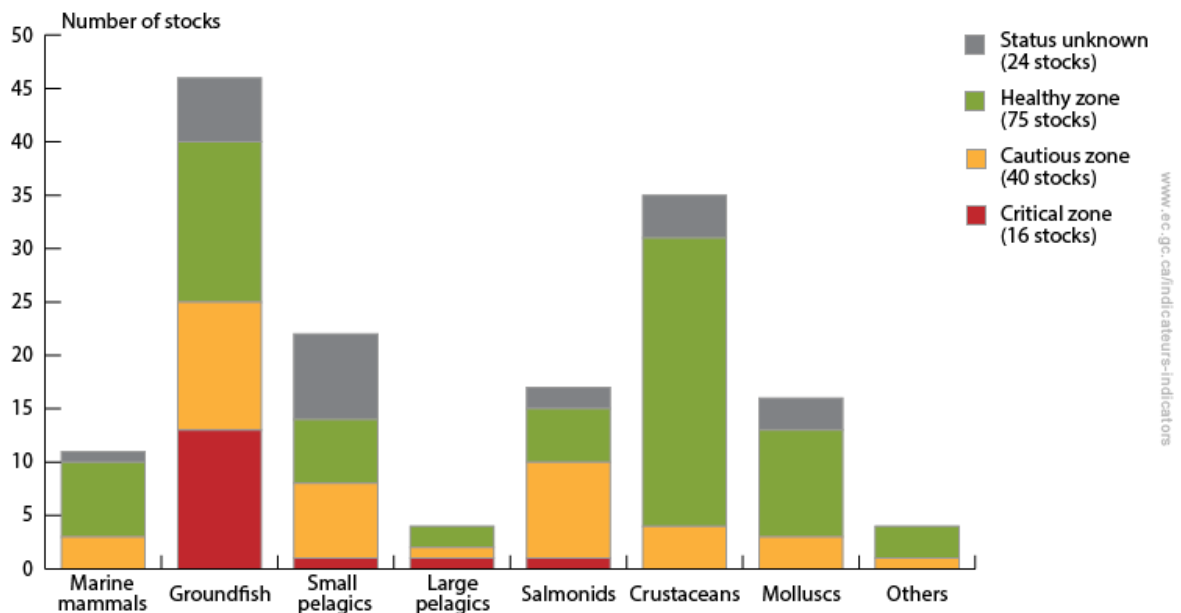
Fish stocks are classified as *major* based on a set of criteria that considers economic, social and ecological values. All stocks with a landed value of more than \$1 million or landed weight of more than 2000 tonnes are included, as are other important stocks (see the [Data Sources and Methods](#) for details).

Status of major fish stocks, by stock group

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

Crustacean stocks are the most likely to be 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. Groundfish stocks are the most likely to be in the critical zone, in part due to historical harvest patterns and unfavourable environmental conditions in the 1990's, but they are showing improvement. Recent improvements in groundfish stocks are likely due to environmental conditions that are favourable for them, such as increasing ocean temperatures, while harvest levels have been kept low. While warmer conditions are favourable for groundfish production, they can negatively affect other species like crustaceans such as shrimp and crab.

Figure 2. Status of major fish stocks, by stock group, Canada, 2014



[Data for Figure 2](#)

Note: The species in each stock group are listed with the chart data. 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 (2015) Fishery Checklist version 4.

³ Scientific stock assessments are peer-reviewed and published as Canadian Science Advisory Secretariat [Science Advisory Reports](#).

Differences among groups in the proportion of populations classified as *unknown* reflect differences in the information available for their assessment. For example, many of the marine mammal populations are found in the Arctic, where information is limited. Fisheries and Oceans Canada and its partners have many programs in place to increase the knowledge base for assessing the status of such stocks. As a result, of the five marine mammals with an unknown status in 2011, only one still had unknown status in 2014.



This indicator is used to measure progress toward [Goal 5: Biological Resources, Efficient economic and ecological use of resources – Production and consumption of biological resources are sustainable](#) of the [Federal Sustainable Development Strategy 2013–2016](#).

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 measure progress towards the goals and targets of the [Federal Sustainable Development Strategy](#).

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* categories, 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 but above the level where risk of extinction becomes a concern), stock growth is promoted and removals are kept to the lowest possible level.

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. It is the goal of Fisheries and Oceans Canada to ensure conservation, sustainability and economic prosperity by managing the fisheries using the precautionary approach.

Recent changes to the indicator

This indicator uses the Fishery Checklist, which began in 2007 and was revised over time to improve its usefulness as a management tool. In 2011, the Fishery Checklist and the set of major stocks considered were finalized for the period 2011–2014, allowing comparability between years. Changes made prior to 2011 improved alignment with the Sustainable Fisheries Framework and other policies of Fisheries and Oceans Canada.

A standard set of 155 stocks established in 2011 is now part of the Fishery Checklist and will be used until at least the 2016 reporting year to ensure consistent reporting. All stocks meeting the criteria for *major stocks* in 2011 are included, and no stocks have been added.

However, dogfish were moved from the large pelagic group to the groundfish group in 2012, to be consistent with the Integrated Fisheries Management Plans.

Data

Data source

Data were drawn from evaluations of stock status that were reported in the Fishery Checklist version 4. The Fishery Checklist is an internal, self-diagnostic tool that provides a systematic review of progress on conservation and sustainable use objectives. The same Fishery Checklist is also used for the [Sustainable Fish Harvest](#) indicator.

The comprehensive Fishery 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.

Spatial coverage

Coverage is national, for all major fish stocks.

Temporal coverage

The Fishery Checklist has been completed annually since 2007. Checklist questions have been refined over this time period, and data from years prior to 2011 are not comparable. In 2011, the Fishery Checklist questions were finalized and comparisons over time can be made for years 2011–2014.

This indicator includes the status of stocks as assessed in 2014, and makes some comparisons to status in earlier years.

Data completeness

All 155 major stocks were included in the Fishery Checklist for reporting years from 2011 to 2014. 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 2000 tonnes,
- have an [Integrated Fisheries Management Plan](#),
- 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) 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 marine invertebrates.

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 2014. The year is defined variably, depending on how fishing seasons and closures are set for individual stocks, and may not align exactly with the calendar year.

Methods

The indicator is a tabulation of the number of stocks in each status zone: *healthy*, *critical* or *cautious*.

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 but above the level where the risk of extinction becomes a concern), 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 unknown 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, 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 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 Fishery Checklist program have been changed and questions have been revised. A standard list of stocks and checklist questions are now established.

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 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.

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 2014

Year	Critical zone (number of stocks)	Cautious zone (number of stocks)	Healthy zone (number of stocks)	Status unknown (number of stocks)
2011	17	31	72	35
2012	15	37	75	28
2013	16	41	74	24
2014	16	40	75	24

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.

Source: Fisheries and Oceans Canada (2015) Fishery Checklist version 4.

Table A.2. Data for Figure 2. Status of major fish stocks, by stock group, Canada, 2014

Stock group	Species included	Critical zone (number of stocks)	Cautious zone (number of stocks)	Healthy zone (number of stocks)	Status unknown (number of stocks)
Marine mammals	Whales, walrus	0	3	7	1
Groundfish	Halibut, rockfish, cod, flounder, hake, redfish, dogfish, haddock, lingcod, perch, plaice, pollock, sablefish, skate, thornyhead,	13	12	15	6
Small pelagics	Herring, mackerel, whitefish, capelin, sardine, striped bass, gaspereau, eulachon	1	7	6	8
Large pelagics	Tuna, shark, swordfish	1	1	2	0
Salmonids	Salmon, char, trout	1	9	5	2
Crustaceans	Crab, lobster, shrimp, prawn, krill	0	4	27	4
Molluscs	Clam, scallop, whelk, geoduck	0	3	10	3

Stock group	Species included	Critical zone (number of stocks)	Cautious zone (number of stocks)	Healthy zone (number of stocks)	Status unknown (number of stocks)
Others	Sea cucumber, sea urchin, eels	0	1	3	0
Total		16	40	75	24

Note: The species in each stock group are listed with the chart data. 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 (2015) Fishery Checklist version 4.

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 10 September, 2015.

Related information

[Fisheries and Oceans Canada – Aquatic Species](#)

[Fisheries and Oceans Canada – Fisheries](#)

[Fisheries and Oceans Canada – Science Advisory Reports](#) (includes Stock Status Reports)

[Fisheries and Oceans Canada – Underwater World](#)

www.ec.gc.ca

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