

## New legal requirements for rebuilding Canada's fisheries and priorities for depleted and "uncertain" stocks

Rebecca Schijns and Robert Rangeley  
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### Introduction

The legal landscape for managing Canada's fisheries has changed substantially in recent years in response to Canada's decades-long fishery crisis. Notably, for the first time since it was created more than 150 years ago, the *Fisheries Act* was amended in 2019 to include a requirement in Section 6.2 to rebuild depleted stocks prescribed in the regulations (Legislative Services Branch, 2019). However, the key details on how stocks would be rebuilt still needed to be developed in regulations to support the Act. In January 2021, the proposed regulations, and a list of the first batch of major stocks that would be subject to them, were published in the Canada Gazette I for a period of public consultation (Public Works and Government Services Canada, 2021). The draft regulations were criticized for not meeting international best practices such as including clear and scientifically robust targets to rebuilt stocks to the healthy zone, timelines for all targets, and milestones to measure progress towards targets (Elmslie, 2021).

In April 2022, the finalized rebuilding regulations came into force upon publication in the Canada Gazette II (Public Works and Government Services Canada, 2022). The regulations require rebuilding plans to have measurable objectives to rebuild prescribed critical stocks, timelines for achieving objectives and targets, a method to track progress, and a schedule for reviewing the efficacy of the plan (DFO, 2022a, 2022b). A plan must be developed within 24 months after the Minister is informed that a prescribed stock has declined to or below its Limit Reference Point (LRP), with the possibility to extend to 36 months. New transparency requirements state that the Fisheries Minister must publish the rationale for any decision to extend rebuilding timelines. Additionally, the regulations stipulate that any fishing allowed during development of a plan must promote recovery of the stocks from the critical zone.

Despite these key elements, the regulations still fall short with respect to international standards,<sup>1</sup> as they lack rebuilding targets in the healthy zone and maximum rebuilding timelines, and they do not yet apply to all stocks. Even so, the regulations provide a clear direction and a detailed process that were previously lacking and set the foundation to rebuild fish populations to abundance.

### The roadmap to rebuilding

#### 1) Batch 1 stocks prescribed in April 2022

The first batch of major fish stocks was published alongside the regulations and includes 28 stocks, including WCVI Chinook salmon, from the 180 identified by the Department of Fisheries and Oceans (DFO) in its Sustainable Survey for Fisheries (SSF) (DFO, 2016a) and two additional Pacific salmon

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<sup>1</sup> United Nations Convention on the Law of the Sea

stocks, for a total of 30 prescribed stocks (Table 1). Of these, 16 were identified as being below their respective LRPs and in the critical zone under the Precautionary Approach (PA) Policy (DFO, 2009) or “Red” zone under the Wild Salmon Policy (WSP) (DFO, 2005). Five of the 16 have existing rebuilding plans, but since two stocks<sup>2</sup> are now considered to be rebuilt above the LRP according to the latest documents (DFO, 2020a; Starr and Haigh, 2022), the three<sup>3</sup> plans in effect will need to be revised in order to comply with the Fish Stock Provisions (FSP). When a stock is rebuilt above its LRP, it is managed according to Section 6.1 of the *Fishery Act*, which sets out to maintain the stock at or above the level needed for a sustainable population. The three existing plans (DFO, 2018, 2020b, 2020c) currently fail to meet the legal terms for rebuilding (Hutchings et al., 2021) and are missing key components from Oceana Canada’s expectations (Archibald and Rangeley, 2019b; Levesque et al., 2021). They now require revisions. Meanwhile, an additional 11 new plans need to be developed within the 24-month timeframe. Seven of these plans have a projected date of completion by the end of 2022/2023 fiscal year (DFO, 2022c). The rebuilding plans for three salmon management units (Chinook salmon, West Coast Vancouver Island and Okanagan and Coho salmon, Interior Fraser) are slated for completion by 2023/2024. One stock, Atlantic cod in NAFO 3Pn4RS, had a plan developed in 2013 that is not publicly available, and the targeted new rebuilding plan completion date is anticipated by the end of 2023/2024.

Since the updated *Fisheries Act* went into effect in 2019 (Legislative Services Branch, 2019), and the proposed timeline for developing rebuilding plans is up to three years, this means that some of the currently prescribed critical zone stocks will be without rebuilding plans for six and a half years after the provisions of the *Act* are first enacted (Elmslie, 2021). To avoid further delays (Archibald et al., 2021a, 2021b), developing and implementing rebuilding plans as soon as possible is essential for effecting change on the water whilst maintaining conservative fisheries management throughout the planning process (DFO, 2021a).

## 2) Proposed priority stocks for Batch 2

The first batch of stocks was determined through departmental review and stakeholder consultation. A key stock was considered for the first batch based on whether it had a status according to the PA framework (DFO, 2009); whether it had an accepted LRP; other economic, cultural, and/or ecological factors; and departmental capacity to develop plans and measures accordingly. The specific rationale for the first batching is not entirely clear but states that excluding the remaining critical stocks is supported by “a number of reasons” such as departmental capacity, lack of data, and existing international arrangements dedicated to rebuilding (Public Works and Government Services Canada, 2022).

The rebuilding regulations state the expectation that DFO commits to prescribing the majority of the 180 major stocks in the SSF (Public Works and Government Services Canada, 2022). The next batch of stocks will be added to the regulations through the Canada Gazette process, which includes a draft publication, public consultation period for a minimum of 30 days and up to 90 days, and further departmental review before final publication in Canada Gazette II. In order to maximize chances of

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<sup>2</sup> Bocaccio rockfish and Yelloweye rockfish, inside waters

<sup>3</sup> Northern cod in NAFO 2J3KL, Atlantic mackerel and Northern shrimp in SFA 6

rebuilding success, it is imperative that the upcoming batch includes all stocks that are below their LRP and is much larger than the initial 30 listed. Requiring rebuilding plans for all critical stocks follows DFO's own recommendations outlined in the *Fisheries Act* (Legislative Services Branch, 2019).

There are a multitude of ways to prioritize rebuilding when operating by a single-stock approach, which is the way Canada's fisheries management regime is currently structured. Ecological, economic, and cultural values are important considerations to include in order to rebuild not only healthy fish populations but also healthy ocean ecosystems that support the wellbeing and livelihoods of coastal communities. Oceana Canada's proposed Batch 2, shown in Table 2, is based on priorities for rebuilding an abundant ocean through a multidimensional lens, while still following the "one stock, one LRP, one status" approach of the Fish Stock Provisions.

#### i) Stock status and depletion relative to LRP

The proposed second batch includes all critical and cautious stocks with an official status in the most recent Fishery Audit (2022) for a total of 56 stocks (25 critical, 31 cautious). The list also includes three Pacific salmon Stock Management Units (SMUs) with overall "Red" zone status under the Wild Salmon Policy (DFO, 2005) and the majority of Conservation Units (CUs) with Endangered status according to COSEWIC assessments. In terms of stock status, we included additional considerations for prioritizing rebuilding with respect to how far the stock has declined beyond the LRP, expressed as a percentage, and how many years the stock has been in the critical zone, quantified using six years of Fishery Audit data (Oceana Canada, 2017, 2018, 2019, 2020, 2021, 2022). While we are accounting for status over the span of the Audit, it is important to note that many stocks have been in the critical zone for longer timeframes (i.e., Atlantic cod in 4X5Y has been in the critical zone since 2008). The proposed list also includes capelin in northeast Newfoundland (NAFO areas 2J3KL). This currently has an "uncertain" stock status, but DFO reports its population size at only at six per cent of its abundance before stock collapse (CSAS, 2021). In order to assign a provisional health status, Oceana Canada conducted an assessment that indicates capelin are in the critical zone (Schijns, 2022) and in need of precautionary management (Jubenville et al, 2022). The capelin LRP is under development and expected to be determined by DFO scientists by spring 2023 in the upcoming assessment.

#### ii) Economic value

There are a number of highly profitable Canadian fisheries that are now critically depleted or close to declining below sustainable levels. However, the process of rebuilding fish stocks is frequently slowed down or even prevented by socioeconomic concerns (Teh and Sumaila, 2020). According to studies, rebuilding major Canadian stocks would yield economic gains that are more than 11 times greater than maintaining current catches on depleted populations (Sumaila and Teh, 2019; Teh and Sumaila, 2020). Therefore, the short-term economic costs of rebuilding can be offset by long-term financial gains that are greater than maintaining the status quo.

The economic value of Canadian landings, expressed generally as less than or greater than one million dollars, was estimated per stock based on the volume of reported landings and the most recent value per metric tonne of the taxa group and region to which the stock belongs in the DFO seafisheries landings website dataset (DFO, 2016b). Given that the taxa level reported on the seafisheries landings

website differ in resolution and that actual ex-vessel prices differ by quality, region, and time of year, this information is categorized at a higher level. The proposed next batch consists of 13 stocks that each contributed more than one million dollars in landed value in recent years.

It is important to note the potential problem with DFO's definition that fish stocks are generally considered "major" if they contribute an annual landed value greater than one million dollars or landed weight more than 2,000 tonnes (DFO, 2020d). By this definition, future potential economic value from depleted stocks may be disregarded. Therefore, economic value should be considered across timescales, especially considering the potential value of rebuilt populations.

### iii) Indigenous food, social, and ceremonial purposes

Ensuring priority access for food, social, and ceremonial (FSC) purposes for Indigenous communities is an essential component of the government's commitment to reconciliation (Government of Canada, 2019). Therefore, considering fish populations with FSC allocations is a critical input for prioritizing rebuilding. According to the latest SSF, over half of the stocks (55% or 15/27) with FSC allocations are in the critical or cautious zone (DFO, 2022e). Eight of these stocks are in the critical zone and are listed in the first batch, which leaves seven stocks in the cautious zone. There are also stocks with FSC allocations whose health status continues to be uncertain.

Indigenous organizations recommended that the *Fisheries Act* regulations define mechanisms for providing Indigenous knowledge and identifying cultural impacts to the Minister (Public Works and Government Services Canada, 2022). To support these recommendations, DFO should work with Indigenous Peoples to develop an appropriate way to mobilize Indigenous Knowledge Systems in management practices as a complement (Reid et al., 2021) to Western science-based approaches to decision-making and development of rebuilding plans (Paul, 2022).

### iv) Climate change vulnerability

Rebuilding the abundance of those populations most vulnerable to climate change will strengthen their resilience and provide a buffer for the greater risks of management errors in an era of increasing uncertainty. Unfortunately, climate change and ecosystem approaches are currently the least frequently considered in the science and management of Canada's fisheries (Boyce et al., 2020). In 2014, the Aquatic Climate Change Adaptation Services Program (ACCASP) started development of a Fish Stock Climate Vulnerability Assessment Tool (FSCVAT) with the goal of helping fisheries managers determine which commercially valuable species are most vulnerable to climate change. Select pilot studies exist, but the tool was never made public, and without ongoing funding, some of the underlying data is out of date and the tools are underutilized (DFO, 2020e).

While a national indicator for climate vulnerability on a single-stock basis is currently lacking in fisheries management, a wide variety of studies and tools are available in peer-reviewed literature to support vulnerability indicators. We used two main sources for assigning a climate vulnerability category to stocks. Climate vulnerability scores were primarily sourced from FishBase (Froese and Pauly, 2022) according to analyses done by Jones and Cheung (2018) on 1,074 species of marine fishes and invertebrates throughout the world's oceans. Scores and qualitative ranges were calculated based on sensitivity, adaptive capacity, and exposure to climate hazards. Of the stocks in Oceana Canada's stock

list, vulnerability scores were available for 42 species, corresponding to 98 stocks. The remaining species were cross-referenced with NOAA's Climate Vulnerability Assessments published by Hare et al. (2016), and qualitative ranges were extracted when available for species in the same or neighbouring regions (Northeast Atlantic, Bering Sea, and California Current Ecosystems). Relevant information was available for 17 of the remaining species not included in the Jones and Cheung (2018) dataset, which covered 62 stocks. Vulnerability scores for the last 29 species were inferred when ranges for species in the same genus or family were available, resulting in information for 54 stocks. There were 9 species, corresponding to 16 stocks (all invertebrates), where an "unknown" category was assigned when the three approaches failed to reveal vulnerability information.

Overall, large-bodied endemic species, diadromous fish, and benthic invertebrate species are predicted to be more vulnerable and pelagic species to be less vulnerable to climate effects in the ecosystem (Jones and Cheung, 2018; Hare et al., 2016). Only four of the 19 critically depleted stocks with very high to medium/high vulnerability scores are included in the first batch prescribed under the Fish Stock Provisions. Of the ten stocks in the cautious zone with high/moderately high vulnerability, just two are currently listed in the first batch. To have a better chance of recovery and to allocate funds towards restoration, stocks that are at greatest risk from climate change effects and depleted below sustainable limits should be included in upcoming batches.

### 3) *Remaining stocks*

The regulations are understood to require a stock status and LRP in order to trigger a rebuilding plan when a prescribed stock declines to or below its LRP (FSP s 6.2). Unfortunately, one third of Canada's fish stocks do not meet the "one stock, one LRP, one status" requirement as their health status is deemed to be "uncertain" under the Precautionary Approach (DFO, 2009; Oceana Canada, 2022). The proportion of stocks without a defined status has not changed significantly over the past six years (Oceana Canada, 2022). In June 2022, DFO held a workshop on "Science Advice on Guidance for Limit Reference Points under the Fish Stocks Provisions" to develop a set of best practices for estimating LRPs and stock status across the data spectrum (DFO, 2022d). The Department is currently developing a work plan to develop reference points and status for "uncertain" stocks, but this process is internal, and timelines are currently unknown.

In the meantime, Oceana Canada conducted research using a widely applied assessment tool (Froese et al., 2017, 2019; Palomares et al., 2021) designed to overcome data limitations and estimate stock status to provide a fuller picture of the state of Canada's fisheries (Schijns, 2022). Around a hundred fish stocks were examined using this approach, resulting in 84 new stock assessments. The previously "uncertain" stocks can be categorized according to the Sustainable Fisheries Framework into 30% (n=30) healthy, 32% (n=32) cautious, 22% (n=22) critical, and 15% (n=15) uncertain. The majority (83%, n=70) of the new assessments can be considered "data-rich" since they used both catch and biomass time series (Froese et al., 2017). Salmon were outside of these analyses, but we assembled a supplementary dataset to identify all conservation units and management units with integrated statuses according to the Wild Salmon Policy and COSEWIC assessments. As well, information on management targets, reference points/benchmarks, catches, Integrated Fisheries Management Plans, and habitat risk were harmonized into a suite of indicators.

There are 16 priority stocks that are provisionally assessed to have current biomass depleted below their respective LRP with high reliability (Table 3). These stocks are subject to cumulative effects that may be impacting their ability to maintain healthy levels. Over half of these populations (n=9) may have been subject to overfishing in recent years ( $F > F_{MSY}$ ). Some of the 16 priority stocks have high economic value (n=7) and/or high/moderate vulnerability to climate change (n=10). Invertebrates are especially vulnerable to ocean acidification and warming, and species like lobster and crab are Canada's most economically valuable stocks (Government of Canada, 2020). The depleted populations in the priority list include forage fish such as capelin, which are significantly important for both maintaining healthy ecosystems and contributing towards cultural and social values held by coastal communities (McIver et al., 2021).

Overall, stocks currently categorized as "uncertain" by DFO require urgent improvement in fisheries management as a greater number are likely critically depleted than the government recognizes (Schijns, 2022). Oceana Canada recommends prioritizing the development of reference points and stock status for provisionally assessed critical stocks to determine the best plan for recovery. Specifically prioritizing invertebrates and forage fish such as capelin and snow crab will have long-term benefits for the ecosystem, economy, and socio-cultural underpinnings of coastal communities. Without further research to define stock status for data-limited populations, stocks that may be considered critically depleted will remain in the "uncertain" category, and the provisions under the *Fisheries Act* rebuilding regulations will not apply, risking further decline instead of intercepting with recovery measures.

## Conclusion

The new rebuilding regulations provide an opportunity to enable restorative actions that may have otherwise been absent, delayed, or inconsistent with best practices under status quo management (Elmslie, 2021). To protect critical stocks, 11 of the first 30 stocks prescribed in the Fish Stock Provisions will need new rebuilding plans developed and three existing plans will need revision within 24 months (Table 1). The second batch of stocks should include all fish stocks in the critical and cautious zones and all endangered salmon management units. There is strong case to be made for prioritizing stocks with ecological, social, economic, and cultural values, and Oceana Canada suggests 60 stocks that meet these criteria (Table 2). The remaining populations are either healthy or "uncertain," with the latter at risk of mismanagement due to the absence of accepted reference points and ineligibility to be prescribed in the Provisions. Within these "uncertain" stocks, provisional assessments suggest that over half may be depleted below sustainable limits. Sixteen priority stocks are suggested for Departmental development of reference points and status as soon as possible (Table 3). Managing the remaining stocks appropriately requires meeting work plan objectives on time (Archibald and Rangeley, 2021) to define reference points using best practices and data-limited methodologies. These actions will give Canada the best chance to rebuild fish populations that support sustainable and prosperous fisheries, healthy coastal communities, and a more resilient, abundant ocean.

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*Table 1. First batch of stocks (n=30) prescribed in the Fish Stock Provisions in April 2022 by depletion relative to Limit Reference Point, including region and status. Depletion relative to Limit and Upper Stock Reference points is expressed as percentages, and rough values are based on the latest data in the Fishery Audit (Oceana Canada, 2022). Number of years in critical zone is calculated using the past six years of Audit data. Climate vulnerability scores were extracted from Jones and Cheung (2018) or Hare et al. (2016), inferred, or remain unknown. Food, Social, and Ceremonial allocations were based on DFO's latest Sustainability Survey for Fisheries (DFO, 2022e).*

Stock name	Region	Status	% relative to LRP	% relative to USR	Years in Critical Zone (2017-2022)	Rough value	Climate vulnerability	FSC allocation	Status or targeted Rebuilding Plan completion date

									(Fiscal Year)
Cod, Southern Gulf of St. Lawrence - 4TVn	Gulf	Critical	11%	6%	6	Less than \$1M	Moderate	Yes	By end of 2022/2023
American plaice, Southern Gulf of St. Lawrence - 4T	Gulf	Critical	14%	7%	6	Less than \$1M	Moderate to high	Yes	By end of 2022/2023
Winter flounder - 4T	Gulf	Critical	17%	8%	5	Less than \$1M	High	Yes	By end of 2022/2023
White hake, Southern Gulf of St. Lawrence - 4T	Gulf	Critical	44%	22%	6	Less than \$1M	Moderate to high	Yes	By end of 2022/2023
Cod - 3Ps	Newfoundland and Labrador	Critical	52%	26%	3	Greater than \$1M	Moderate	No	By end of 2022/2023
Atlantic herring - 4T (spring spawner)	Gulf	Critical	77%	27%	6	Less than \$1M	Low to moderate	Yes	By end of 2022/2023
Pacific herring - Haida Gwaii and Queen Charlotte Island	Pacific	Critical <sup>4</sup>	195%	97%	4	Less than \$1M	Low	Yes	By end of 2022/2023
Chinook salmon - Okanagan	Pacific	Red Zone	NA	NA	NA	NA	Moderate to high	Yes	By end of 2023/2024
Chinook salmon - West Coast of Vancouver Island	Pacific	Red Zone	NA	NA	NA	NA	Moderate to high	Yes	By end of 2023/2024
Coho salmon - Interior Fraser	Pacific	Red Zone	NA	NA	NA	NA	High to very high	Yes	By end of 2023/2024
Cod, Northern Gulf of St. Lawrence - 3Pn, 4RS	Quebec	Critical	10%	7%	6	Greater than \$1M	Moderate	Yes	By end of 2023/2024
Bocaccio rockfish	Pacific	Healthy	365%	183%	5	Less than \$1M	Moderate	Yes	Completed

<sup>4</sup> Based on the latest stock status update for Pacific herring in British Columbia, the Haida Gwaii and Queen Charlotte Island population's spawning stock biomass is around 58 per cent of historical levels and estimated to be above the LRP with 97.2 per cent probability (DFO, 2021b). However, this stock is now prescribed in the rebuilding regulations as being below its LRP and subject to having a rebuilding plan developed (Public Works and Government Services Canada, 2022). The stock is also listed as Critical, determined by expert judgement, in the 2020 Sustainable Survey for Fisheries (DFO, 2022e). Based on this information, the stock is listed here as Critical.

Yelloweye rockfish - Inside Population	Pacific	Healthy	NA	NA	4	Less than \$1M	Moderate	No	Completed
Cod, Northern - 2J3KL	Newfoundland and Labrador	Critical	48%	24%	6	Greater than \$1M	Moderate	Yes	Completed, requires revision
Atlantic mackerel - NAFO 3-4	National Capital Region	Critical	75%	38%	6	Greater than \$1M	Low	No	Completed, requires revision
Northern shrimp - SFA 6	National Capital Region	Critical	92%	34%	5	Greater than \$1M	High	No	Completed, requires revision
Northern shrimp - SFA 12	Quebec	Healthy	174%	101%	0	Greater than \$1M	High	No	NA
Sablefish	Pacific	Cautious <sup>5</sup>	200%	100%	0	Greater than \$1M	High	Yes	NA
Northern shrimp - SFA 9	Quebec	Healthy	200%	102%	0	Greater than \$1M	High	No	NA
Northern shrimp - SFA 10	Quebec	Cautious	217%	86%	0	Greater than \$1M	High	No	NA
Snow crab, Scotian Shelf - ENS-N	Maritimes	Healthy	263%	132%	0	Greater than \$1M	Low	No	NA
Snow crab, Scotian Shelf - ENS-S	Maritimes	Healthy	285%	143%	0	Greater than \$1M	Low	No	NA
Northern shrimp - SFA 8	Quebec	Healthy	302%	101%	0	Greater than \$1M	High	No	NA
Yelloweye rockfish - outside population	Pacific	Healthy	310%	154%	3	Less than \$1M	Moderate	Yes	NA
Snow crab, Southern Gulf of St. Lawrence - CFA 12 (12, 18, 25, 26), 12E, 12F and 19	Gulf	Healthy	810%	196%	0	Greater than \$1M	Low	No	NA
Acadian redfish, Unit 3	Maritimes	Healthy	NA	NA	0	Greater than \$1M	Moderate to high	No	NA

<sup>5</sup> Based on the latest science response for sablefish in the Pacific region, the stock biomass in 2018 was around twice the limit reference point (DFO, 2020f), indicating that is likely at the upper stock reference point. While the stock is listed as Healthy in the 2020 Sustainable Survey for Fisheries (DFO, 2022e), the stock is listed here as Cautious, since the biomass relative to the upper stock reference was not explicitly mentioned in the most recent report and as a precautionary measure.

Atlantic halibut - 3NOPs4VWX+5	Maritimes	Healthy	NA	NA	0	Greater than \$1M	Moderate	No	NA
Lobster - LFA 19, 20, 21	Quebec	Healthy	NA	NA	0	Greater than \$1M	Moderate to high	Yes	NA
Pacific hake	Pacific	Healthy	NA	NA	0	Greater than \$1M	Moderate to high	No	NA
Silver hake - 4VWX	Maritimes	Healthy	NA	NA	0	Greater than \$1M	Moderate to high	No	NA

Table 2. Oceana Canada's proposed second batch of stocks (n=60) to be prescribed in the Fish Stock Provisions by depletion relative to Limit Reference Point, including region and status. Depletion relative to Limit and Upper Stock Reference points is expressed as percentages, and rough values are based on the latest data in the Fishery Audit (Oceana Canada, 2022). Number of years in critical zone is calculated using the past 6 years of Audit data. Climate vulnerability scores were extracted from Jones and Cheung (2018) or Hare et al. (2016), inferred, or remain unknown. Food, Social, and Ceremonial allocations were based on DFO's latest Sustainability Survey for Fisheries (DFO, 2022e).

Stock name	Region	Status	% relative to LRP	% relative to USR	Years in Critical Zone (2017-2022)	Rough value	Climate vulnerability	FSC allocation
Winter skate - Gulf of St. Lawrence (NAFO 4T)	Gulf	Critical	3%	2%	6	Less than \$1M	Low	No
Sidestripe shrimp - SMA 14	Pacific	Critical	10%	5%	4	Less than \$1M	High	No
Cod, Southern Grand Banks - 3NO	Newfoundland and Labrador	Critical	17%	8%	6	Less than \$1M	Moderate	No
American plaice, Labrador NE Newfoundland - NAFO 23K	Newfoundland and Labrador	Critical	24%	12%	6	Less than \$1M	Moderate to high	No
American plaice, St. Pierre Bank - 3Ps	Newfoundland and Labrador	Critical	35%	18%	6	Less than \$1M	Moderate to high	No
Haddock - 3Ps	Newfoundland and Labrador	Critical	35%	18%	4	Less than \$1M	Moderate	No
Northern shrimp - SMA 16	Pacific	Critical	36%	18%	3	Less than \$1M	High	No
Sidestripe shrimp - SMA Georgia Strait East	Pacific	Critical	36%	18%	3	Less than \$1M	High	No
Yellowtail flounder, Southern Gulf of St. Lawrence - 4T	Gulf	Critical	39%	20%	6	Less than \$1M	High to very high	No
American plaice, Grand Banks - 3LNO	Newfoundland and Labrador	Critical	40%	8%	6	Greater than \$1M	Moderate to high	No
Cod, Eastern Georges Bank - 5Zjm	Maritimes	Critical	45%	20%	6	Less than \$1M	Moderate	No
Cod, Scotian Shelf and Bay of Fundy - 4X5Y	Maritimes	Critical	46%	21%	6	Less than \$1M	Moderate	No
White hake, Eastern Scotian Shelf - 4VW	Maritimes	Critical	50%	25%	6	Less than \$1M	Moderate to high	No

White hake, Northern Gulf of St. Lawrence - 4RS	Quebec	Critical	55%	28%	6	Less than \$1M	Moderate to high	No
Snow crab, Scotian Shelf - 4X	Maritimes	Critical	79%	39%	3	Less than \$1M	Low	No
Sidestripe shrimp - SMA 16	Pacific	Critical	84%	42%	3	Less than \$1M	High	No
Atlantic herring - 4VWX	Maritimes	Critical	85%	43%	3	Greater than \$1M	Low to moderate	No
Northern shrimp - Fraser River SMA	Pacific	Critical	90%	45%	4	Less than \$1M	High	No
Sidestripe shrimp - SMA 18-19	Pacific	Critical	100%	50%	4	Less than \$1M	High	No
Intertidal clam (North Coast Haida Gwaii Razor)	Pacific	Critical	109%	54%	2	Greater than \$1M	Unknown	No
Northern shrimp - SMA 18-19	Pacific	Critical	125%	63%	6	Less than \$1M	High	No
Northern shrimp - SMA Georgia Strait East	Pacific	Critical	NA	NA	3	Less than \$1M	High	No
Northern shrimp - SFA 7	National Capital Region	Critical	NA	NA	4	Less than \$1M	High	No
Witch flounder - 23KL	Newfoundland and Labrador	Critical	NA	NA	5	Less than \$1M	Low to moderate	No
Winter skate - 4VW	Maritimes	Critical	NA	NA	5	Less than \$1M	Low	No
Chinook salmon, Fraser - Spring Run 42	Pacific	Critical	NA	NA	NA	NA	Moderate to high	Yes
Sockeye salmon, Fraser - Late Run	Pacific	Critical	NA	NA	NA	NA	High to very high	Yes
Chinook salmon, Fraser - Summer Run 52	Pacific	Critical	NA	NA	NA	NA	Moderate to high	Yes
Capelin - SA2+3KLPs	Newfoundland and Labrador	Critical (Provisional) <sup>6</sup>	43%	21%	NA	Greater than \$1M	Low	No

<sup>6</sup> Forage fish are recognized for their special role in the marine food web by the Policy on New Fisheries for Forage Species. There are currently no forage fish stocks in the healthy zone according to the latest SSF (DFO, 2022e). Capelin - SA2+3KLPs are included in Oceana Canada's proposed Batch 2 based on a provisional assessment (Schijns, 2022), recognizing the need for

White hake, Western Scotian Shelf, Bay of Fundy and Northern Georges Bank - 4X5Zc	Maritimes	Cautious	100%	50%	0	Less than \$1M	Moderate to high	No
Snow crab - Division 3K	Newfoundland and Labrador	Cautious	102%	96%	0	Greater than \$1M	Low	No
Cusk - 4VWX5Z	Maritimes	Cautious	118%	59%	0	Less than \$1M	Moderate	No
Snow crab - Division 2HJ	Newfoundland and Labrador	Cautious	121%	102%	0	Greater than \$1M	Low	No
Quillback rockfish (Inside)	Pacific	Cautious	122%	61%	0	Less than \$1M	Moderate	No
Acadian redfish, Unit 1 and Unit 2	National Capital Region	Cautious	123%	29%	1	Less than \$1M	Moderate to high	Yes
American plaice, Scotian Shelf - 4VWX	Maritimes	Cautious	124%	62%	0	Less than \$1M	Moderate to high	No
Cod, Eastern Scotian Shelf - 4VsW	Maritimes	Cautious	125%	63%	0	Less than \$1M	Moderate	No
Snow crab, St. Pierre Bank - 3Ps	Newfoundland and Labrador	Cautious	125%	110%	0	Greater than \$1M	Low	No
Lingcod, Strait of Georgia - 4B	Pacific	Cautious	128%	64%	0	Less than \$1M	Moderate to high	No
Spiny dogfish - 4VWNX -5	Maritimes	Cautious	134%	67%	0	Less than \$1M	High	No
Snow crab - 3L (Inshore)	Newfoundland and Labrador	Cautious	139%	137%	1	Greater than \$1M	Low	No
Witch flounder - 3NO	Newfoundland and Labrador	Cautious	147%	73%	0	Less than \$1M	Low to moderate	No
Pacific herring - Prince Rupert District	Pacific	Cautious	155%	83%	1	Less than \$1M	Low	No
Icelandic and sea scallop, Magdalen Islands - 20A, 20B, 20C, 20E and 20F	Quebec	Cautious	155%	93%	0	Less than \$1M	High	Yes

urgent intervention (Jubinville et al., 2022) and supporting evidence from the latest stock status update, which indicates this stock is 6 per cent of its historic abundance (CSAS, 2021).



Witch flounder - 4RST	Gulf	Cautious	161%	81%	1	Less than \$1M	Low to moderate	No
Pacific herring - WCVI	Pacific	Cautious	169%	84%	0	Less than \$1M	Low	Yes
Quillback rockfish (Outside)	Pacific	Cautious	175%	88%	0	Less than \$1M	Moderate	Yes
Sidestripe shrimp - Fraser River SMA	Pacific	Cautious	180%	89%	0	Less than \$1M	High	Yes
Atlantic herring - 5Y, 5Z (weirs)	Maritimes	Cautious	188%	94%	0	Greater than \$1M	Low to moderate	No
Pacific herring - Central Coast	Pacific	Cautious	189%	95%	0	Less than \$1M	Low	No
Pacific cod, Hecate Strait - DFO 5CD	Pacific	Cautious	200%	59%	0	Less than \$1M	Moderate	Yes
Pacific cod, Queen Charlotte Sound - DFO 5AB	Pacific	Cautious	200%	59%	0	Less than \$1M	Moderate	No
Northern shrimp - SFA 4	National Capital Region	Cautious	211%	73%	0	Greater than \$1M	High	No
Canary rockfish	Pacific	Cautious	235%	118%	0	Less than \$1M	Moderate	No
Atlantic herring - 4T (Fall Spawner)	Gulf	Cautious	271%	47%	0	Greater than \$1M	Low to moderate	No
Greenland halibut, Gulf of St. Lawrence - 4RST	Quebec	Cautious	350%	93%	0	Greater than \$1M	Moderate	Yes
Monkfish - 3LNOPs	Newfoundland and Labrador	Cautious	NA	NA	0	Less than \$1M	Moderate	No
Pacific cod, West Coast Vancouver Island - DFO 3CD	Pacific	Cautious	NA	NA	0	Less than \$1M	Moderate	No
Longhorn sculpin - St. May's Bay	Maritimes	Cautious	NA	NA	0	NA	Moderate	No
Sea cucumber - Southwest New Brunswick	Maritimes	Cautious	NA	NA	0	Greater than \$1M	Unknown	No

Table 3. Sixteen priority stocks that currently have “uncertain” status but are provisionally assessed to be in the critical zone based on Schijns (2022). Depletion relative to Limit and Upper Stock Reference points is expressed as percentages based on assessment outputs (Schijns, 2022), and rough values are based on the latest data in the Fishery Audit (Oceana Canada, 2022). Climate vulnerability scores

were extracted from Jones and Cheung (2018) or Hare et al. (2016), inferred, or remain unknown. Food, Social, and Ceremonial allocations were based on DFO's latest Sustainability Survey for Fisheries (DFO, 2022e).

Stock name	Region	Provisional Status	% relative to LRP	% relative to USR	Overfishing status	Rough value	Climate vulnerability	FSC allocation
Grenadier - 23KL	Newfoundland and Labrador	Critical	13%	7%	No	Less than \$1M	Moderate	No
Haddock - 3LNO	Newfoundland and Labrador	Critical	23%	12%	No	Less than \$1M	Moderate	No
Capelin - SA2+3KLPs	Newfoundland and Labrador	Critical	43%	21%	Yes	Greater than \$1M	Low	No
Snow crab, Northern Gulf of St. Lawrence - CMA 12B	Quebec	Critical	52%	26%	Yes	Less than \$1M	Low	No
Atlantic herring, Newfoundland East and South coast - 2J3IKLPs - HFA 1-11	Newfoundland and Labrador	Critical	58%	29%	Yes	Greater than \$1M	Low to moderate	No
Sea scallop, St. Pierre Bank - 3PS	Newfoundland and Labrador	Critical	60%	30%	Yes	Greater than \$1M	High	No
Big skate, Hecate Strait - DFO 5CDE	Pacific	Critical	70%	35%	Yes	Less than \$1M	Moderate	No
White hake - 3NOPs	Newfoundland and Labrador	Critical	70%	35%	No	Less than \$1M	Moderate to high	No
Pollock, St. Pierre Banks - 3Ps	Newfoundland and Labrador	Critical	76%	38%	No	Less than \$1M	Moderate	No
Jonah crab - LFA 41 (Offshore)	Maritimes	Critical	79%	40%	No	Less than \$1M	Moderate to high	No
Big skate, Queen Charlotte Sound - DFO 5AB	Pacific	Critical	80%	40%	No	Less than \$1M	Moderate	No
Snow crab, Northern Gulf of St. Lawrence - CMA 12C	Quebec	Critical	84%	42%	Yes	Greater than \$1M	Low	No
Snow crab, Northern Gulf of St. Lawrence - CMA 16A	Quebec	Critical	86%	43%	Yes	Greater than \$1M	Low	No
Sea scallop, German, Browns Banks - SFA 26 (Offshore)	Maritimes	Critical	88%	44%	Yes	Greater than \$1M	High	No

Lobster, Avalon - LFA 7-10	Newfoundland and Labrador	Critical	95%	48%	No	Less than \$1M	Moderate to high	No
Snow crab, Northern Gulf of St. Lawrence - CMA 13	Quebec	Critical	96%	48%	Yes	Greater than \$1M	Low	No