The Quality of Recent Rebuilding Plans in Canada

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Introduction

As part of its initial policy under the Sustainable Fisheries Framework, the Department of Fisheries and Oceans (DFO) committed to implementing rebuilding plans for critically depleted stocks starting in 2009 (DFO, 2009). Given that only 28.4% of Canada's fisheries are in a healthy state, with little improvement over seven years of Oceana Canada's annual Fishery Audit, the rebuilding process is long overdue for many important fish populations. Over the past 14 years, only 13 rebuilding plans have been published and, unfortunately, many existing plans fall short of meeting national and international standards (Archibald et al., 2017; Archibald and Rangeley, 2018, 2019; Levesque et al., 2021). In 2017, DFO committed to implementing 19 rebuilding plans by March 2021 and to keep on track by publishing annual workplans (CESD, 2016; DFO, 2017). Despite the commitment, every year rebuilding plans are delayed and work plan timelines are extended. This year, only six of 28 critically depleted stocks have rebuilding plans in place and with no new rebuilding plans published this year, the concerning trend continues.

In 2019, the *Fisheries Act* was amended for the first time in its 150-year history to include a requirement in Section 6.2 to develop and implement plans to rebuild depleted stocks prescribed by regulation (Legislative Services Branch, 2019). However, the specific details on how to rebuild these stocks needed to be developed through accompanying regulations. In April 2022, the updated Fishery (General) Regulations came into force, requiring 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 (Table 1) (Public Works and Government Services Canada, 2022). The plans must be developed within 24 months (extendable to 36 months) after a prescribed stock declines to or below its Limit Reference Point (LRP). The regulations also introduce transparency requirements, where the Minister must publish the reason why the timeline to develop a rebuilding plan has been extended from 24 to 36-months. The legislation sets the requirement for DFO to publish the rationale if it amends a rebuilding plan or extends the rebuilding plan's timeline in order to mitigate adverse socio-economic or cultural impacts. Furthermore, fishing activities allowed during plan development must prioritize stock recovery from the critical zone.

The new regulations are expected to accelerate the development of rebuilding plans. All 13 critical stocks listed in the regulations must have a plan that adheres to these criteria (Table 1) (DFO, 2022a). Previous plans that were developed before the regulations came into effect do not meet the new legal requirements and need to be updated. Notably, the existing plans for Northern cod and Atlantic mackerel (DFO, 2020a, 2020b) fall short of meeting even half of the minimum criteria, necessitating revisions. According to the Departmental work plan (DFO, 2022b), it was anticipated that at least eight new rebuilding plans would be published between 2022 and 2023. However, consistent with the historical record of failing to meet annual objectives in departmental work plans (Archibald and Rangeley, 2021), the latest (DFO, 2023) has been postponed to the end of 2023-2024. The 24-month timeline for developing the plans concludes on April 3, 2024. If deemed necessary by the Minister, an extension of up to 12 months could extend the deadline to April 3, 2025.

While the regulations represent progress by providing a clear direction and detailed process, they still fall short of international standards. Notably, they lack rebuilding targets in the healthy zone, maximum rebuilding timelines, and do not yet cover all critical stocks. Oceana Canada developed a set of comprehensive criteria and content for rebuilding plans based on DFO's policy guidelines for rebuilding plans (DFO 2022a) and international best practices (Garcia et al., 2018; OECD, 2012).

Rebuilding plan developments this year

While there have not yet been any new rebuilding plans published this year, important developments have occurred that will result in published materials in the near future. Two draft rebuilding plans for Haida Gwaii Pacific herring and Atlantic herring in NAFO Division 4T (spring spawner component) finished their consultation periods, while plans for four Gulf groundfish, two Chinook salmon, three Atlantic cod stocks, Northern shrimp in SFA 6 and Atlantic mackerel plans are in development.

A draft plan for **Haida Gwaii Pacific herring**, "Haida Gwaii ′íináang | iinang Pacific Herring: An Ecosystem Overview and Ecosystem-based Rebuilding Plan", was co-developed by the Council of the Haida Nation (CHN), Parks Canada Agency (PCA) and DFO (CHN, PCA & DFO, 2022). It offers a comprehensive overview of the attributes of the Pacific herring ecosystem in Haida Gwaii and fulfills the requirements under the new Fish Stocks provisions in the amended *Fisheries Act* (Table 1) while adhering to the principles outlined in the Policy on New Fisheries for Forage Species. The draft plan goes well beyond DFO's rebuilding plan guidelines and embraces an ecosystem-based management approach and incorporates Haida traditional knowledge, aligning with the objectives and targets outlined in the Gwaii Haanas Gina 'Waadluxan KilGuhlGa Land-Sea-People Management Plan.

The draft plan suggests several significant modifications to herring management in Haida Gwaii. These changes encompass implementing a more detailed spatial stock structure for managing Haida Gwaii herring, establishing rebuilding targets that consider the broader ecosystem, prioritizing low-impact fisheries during the rebuilding phase, proposing essential monitoring and research priorities, and laying the groundwork for an ecosystem-based management approach. While both the short- and long-term projections show that even with no fishing mortality, prospects for rebuilding above the LRP in 3 generations time or 15 years is unlikely under current recruitment and environmental conditions, other rebuilding objectives aim to restore the Haida Gwaii herring ecosystem, including ecological, cultural, social and economic, governance and management components (Table 2). The finalized plan is expected to be published before the end of 2023.

In January of this year, DFO circulated a draft rebuilding plan **Atlantic herring (NAFO Division 4T), spring spawner component,** for consultation and feedback. The plan as it stands meets the legal criteria (Table 1) and invokes Section 70(6) of the Fishery (General) Regulations where rationale must be provided if it is not feasible to establish a timeline to the rebuilding target. Long term population projections models (2020 to 2069) under different scenarios of recruitment and environment conditions suggest that the spring spawner stock is unlikely to rebuild under prevailing conditions. As a result, a timeline to the rebuilding target cannot be calculated at this time. The plan lacks in other key areas such as associated probability estimates for meeting targets along timelines, milestones or interim targets, and additional objectives such as maintaining social or cultural value or restoring economic benefits (Table 2). A special meeting

of the Gulf Small Pelagic Advisory Committee (GSPAC) is scheduled to take place in November to allow members of the Committee to ask questions regarding the science behind the stock assessment of the herring spring spawner component and the draft Rebuilding Plan. Worryingly, the fall spawner component of this stock, which is presently not prescribed to the FSP, is presently in the lower cautious zone and has been declining towards the critical zone since 2011. Under this situation, management actions must arrest declines in the short term or immediately and initiate a rebuilding plan for the fall component as well.

New simulations have been conducted to inform the upcoming rebuilding plans of **Atlantic cod in NAFO subdivision 3Ps** and **Atlantic mackerel** (DFO, 2023b; 2023c). Under prevailing conditions, it is estimated that it will take approximately 6-7 years (by 2028/29) to rebuild mackerel to the proposed target level (above the LRP with a 75% probability) in the absence of fishing (Tmin). On the other hand, 3Ps Atlantic cod is projected to take 14 years to reach the rebuilding target (by 2036). In the mackerel fishery, if the United States removes up to 3,639 tonnes annually (based on the 2023 TAC) while Canada refrains from mackerel fishing, including recreational fishing, the rebuilding time would extend to approximately 7-9 years. This highlights the significance of collaborative efforts in implementing rebuilding measures. DFO has expressed its commitment to developing a Rebuilding Plan for 3Ps Atlantic cod to guide the management decision in 2023 (DFO 2023c). However, the plan has not been released yet. The latest advisory report includes four essential elements that are required to inform the rebuilding plan: measurable objectives, causes of decline, timelines for achieving the proposed target, and methods for tracking progress (Table 1). Finalized plans for these critical stocks must be published by April 2024 (extendable to April 2025 if the Minister deems necessary)

Four new rebuilding plans for Gulf groundfish stocks, **American plaice, white hake and winter flounder stocks in NAFO division 4T and Atlantic cod in NAFO division 4T and subdivision 4Vn**, are also being developed. A working group was established in 2020, and draft plans are currently undergoing internal review. Once preliminary internal approvals have been received, the plans will be shared with stakeholders and Indigenous partners for their input.

In addition to Atlantic mackerel, two stocks with existing plans will require revisions: **Atlantic cod in NAFO divisions 2J3KL** and **Northern shrimp in SFA 6** (DFO, 2018, 2020a) as they currently fail to meet legal terms for rebuilding (Hutchings et al., 2021). **Atlantic cod in NAFO divisions 3Pn4RS** requires a new plan since its previous one expired in May 2018 and was never made available online. As well, two salmon stocks, **Chinook in the Okanagan Area and the West Coast of Vancouver Island (WCVI) Area,** require new rebuilding plans. The WCVI Chinook plan is being developed jointly with Nuu-chah-nulth Nation. So far, a series of 15 workshops were conducted from February to October 2022 to gather input and expertise in order to update limit reference point (LRP) values and conduct a risk assessment of factors that limit productive capacity to inform rebuilding targets (DFO 2023a).

Conclusion

Currently, only six out of 28 critically depleted stocks in Canada have established rebuilding plans. The updated *Fisheries Act*, which came into effect in 2019, and new regulations prescribing 13 critical stocks in 2022, allow for a timeline of up to three years to develop these plans (i.e., by April 2025 at the latest). This means that some of the prescribed stocks designated in the critical

zone may remain without rebuilding plans up to three years. Meanwhile, other critical stocks not prescribed by regulations do not initiate rebuilding plan timelines, even though many of them have been critically depleted for decades.

To address this delay, it is crucial to take action by 2024. By next year, there should be 13 new rebuilding plans in place and the next batch of stocks prescribed by regulation. At least four new rebuilding plans should be initiated for proposed stocks such as capelin in 2J3KL, Yellowtail flounder in 4T, Atlantic cod in 4X5Y, and Atlantic herring in 4X5Y (Southwest Nova Scotia/Bay of Fundy Spawning Components). This comprehensive approach would ensure that more than half of Canada's most depleted stocks have robust pathways to recovery. Furthermore, all critically depleted stocks must be prescribed in future batches.

The timely development and implementation of rebuilding plans must be reinforced by maintaining a precautionary approach to fisheries management throughout the planning process (DFO, 2022a). In order to address the social impacts of rebuilding, stakeholder participation is essential throughout the entire rebuilding process. Equitable access and distribution of the benefits of rebuilt fish populations is a priority, especially for Indigenous Peoples and rural coastal communities that have suffered economic setbacks due to unfair policies (Ecotrust, 2004; Haas et al., 2018). Rebuilding plans offer an opportunity for collaborative fisheries management to actively involve Indigenous communities and organizations in decision-making processes and center Indigenous Knowledge Systems. The draft plan for Haida Gwaii Pacific herring serves as a clear example of the advantages derived from genuine collaboration, to rebuild not only fish populations but also entire ecosystems that sustain coastal communities for generations to come.

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Tables

Table 1. Evaluation of the presence of the elements that rebuilding plans for prescribed stocks must contain to meet the requirements of the Fish Stocks provisions s. 6.2 in the amended Fisheries Act (2019) and in the Fishery (General) Regulations (FGR), and quality of elements as set out in the Rebuilding Plan Guidelines with draft plans for Pacific herring in Haida Gwaii, Atlantic herring – 4T (spring spawning component) and a new Science Advisory Report for Atlantic cod – 3Ps.

To meet regulatory requirements, the plan *must at a minimum contain*:	**Pacific herring – Haida Gwaii**	**Atlantic herring – 4T (spring spawning component)**	**Atlantic cod – 3Ps**
	DRAFT PLAN	**DRAFT PLAN**	**ADVISORY REPORT**
The stock status and trends.	Yes - Section 5.2.1.4 describes stock status and trends at the aggregate level for the Major and Minor Stock Assessment Regions (SAR), as well as at the sub-stock level. The DFO assessment of the aggregate Major SAR has been at a low biomass state since 2000, and until recently, below the LRP (30% unfished biomass).	Yes - Section 2 states the stock has been in the critical zone since 2002 and was 77% of LRP in 2021.	Yes - states that the stock has been in the critical zone since 2000 and is 48% of the LRP.
The probable causes for the stock's decline.	Yes - Section 3 covers management issues and causes of decline including past commercial fisheries catches such as during the reduction fishery period and changing oceanographic and climatic conditions that have resulted in changes in prey quality, prey availability, and predation pressure.	Yes - Section 3 states the probable causes for the stock's decline including overfishing from 1994-2004, poor recruitment driven by environmental effects, changes in the natural environment (warm water trend), and natural mortality associated with the abundance of Grey seal, Atlantic Bluefin tuna and Northern gannets.	NA – Not available in current document
Measurable objectives aimed at rebuilding the stock, including a target for rebuilding the stock.	Yes - Section 4.2 identifies six main objectives including ecological, cultural, social and economic, governance, and management objectives. Section 7.1.2 identifies the long-term target for all sub-stocks is the average biomass from 1982-1992.	Yes - Section 4.1 states the objective is to get the stock above the LRP, with a target of 46,340 tonnes with a high likelihood (≥75%).	Yes - Table 1 includes milestones and short-term objectives. The short-term objective is to increase the SSB above the LRP within 25 years (2.5 generation time) with a 75% probability.

The timelines for achieving the objectives. If the Minister determines that it is not feasible to establish a timeline for achieving the target for rebuilding the major fish stock, the plan shall include, instead of such a timeline, the reasons why it is not feasible to do so.	Yes, invokes section 70(6) of the FGR in lieu of s. 70(1d) - Section 7.2 Models estimate the time frame for rebuilding is expected to be greater than 15 years (under current ecosystem conditions). Simulation evaluation results indicated little difference in stock growth toward rebuilding targets and the expected timeline for rebuilding under the no fishing procedure when compared to the rebuilding procedures that allowed fishing. This suggests that rebuilding performance of Haida Gwaii Herring populations is dominated by the population and ecosystem dynamics represented in the operating model scenarios, not the impacts of the fisheries allocations simulated in the analysis.	Yes, invokes section 70(6) of the FGR in lieu of s. 70(1d) – Section 4.1 states "Long term population projections models (2020 to 2069) under different scenarios of recruitment and environment relationship suggest that the spring spawner stock is unlikely to rebuild under prevailing conditions. As a result, a rebuilding timeline to the rebuilding target cannot be calculated at this time." Management objective 3 aims to estimate generation time and expected to be published before the next review of the plan (2026).	Yes - Under prevailing conditions, the minimum time to rebuild to the proposed target in the absence of fishing (Tmin) is expected to reach the proposed rebuilding target (above the LRP with a 75% probability) in 2036 (in 14 years)
The management measures aimed at achieving the objectives, including the target.	Yes - Section 7.1 presents SAR and sub-stock scale management recommendations. Since there is a low probability of maintaining the stock above the LRP over 15 years (three herring generations) under current of historical natural mortality trends, management measures aim to foster signs of rebuilding and provide opportunities to meet cultural, social and economic objectives.	Yes - Section 5, Table 7 shows management measures for each objective. Since the stock is unlikely to rebuild under prevailing conditions, the objectives are aimed at preserving the stock such that should the prevailing conditions limiting the stock's recovery change, the stock retains the potential to rebuild.	Yes – Candidate Management Procedures (MPs) are evaluated in closed-loop simulation framework to inform the Rebuilding Plan.
A method to track progress towards achieving the objectives**.**	Yes - Table 23-27 shows ecological, cultural, socio-economic, governance, management monitoring priorities and measures.	Yes - Section 7, Table 8 shows performance metrics and frequency of measurement associated with each objective.	Yes - Performance Metrics are available to track whether future stock levels and fishery yields calculated under various proposed MPs achieve the objectives as defined by the working group.

A schedule for a periodic review of the plan to assess progress towards the objectives, and to determine whether an adjustment to the plan is needed.	Yes - Section 7.3 states that population status and progress towards short and long-term objectives will be assessed annually and review of the rebuilding plan is expected to take place every five years.	Yes - Section 8 states review period of four years (every 2 stock assessment cycles).	NA – Not available in current document
Be **developed within 24 months** after the day on which the Minister first had knowledge that the major fish stock had declined to or below its limit reference point. If the Minister extends the time period by maximum 12 months, the reasons for doing so are published on the Internet site of the Department.[1]	NA – Not available in current document	NA – Not available in current document	NA – Not available in current document
Publish plan and the results of any periodic review of the plan on the Internet site of the Department.	NA – Not available in current document	NA – Not available in current document	NA – Not available in current document

Table 2. Evaluation of the presence (Yes, Partial, No) and quality (see description) of Oceana Canada's ten recommended comprehensive requirements with draft rebuilding plans for Pacific herring in Haida Gwaii and Atlantic herring – 4T (spring spawning component).

To meet Oceana's comprehensive requirements, the plan *should contain*:	**Pacific herring - Haida Gwaii**	**Atlantic herring – 4T (spring spawning component)**
	DRAFT PLAN	**DRAFT PLAN**
An overview of all fisheries interacting with the stock, including all directed commercial fisheries and all other fisheries (including	Yes - Section 5.2 describes the Haida Gwaii herring ecosystem, including ecology, culture, social, economic, management and	Yes - the rebuilding plan gives an overview of the history of the fishery, differences and interactions with the fall fishery and mobile

[1] The Fishery (General) Regulations do not specify how a stock is determined to be at or below its LRP or specify a probability of being below an LRP. The Rebuilding Plan Guidelines specify that DFO Science will determine the stock's status, and if there is a 50% or greater probability the stock is at or below its LRP, it will be deemed "at or below its LRP" and thus subject to 6.2 of the FSP. In the case for currently prescribed stocks, the deadline is April 2024 unless the Minister extends the time period by maximum 12 months and publishes the reasons for doing so on the Internet site of the Department. Available at: https://laws-lois.justice.gc.ca/eng/regulations/SOR-93-53/page-5.html

bycatch, recreational, bait, and food, social, ceremonial), with a summary of socioeconomic and cultural importance; history of management and assessment; and an overview of all contributions to fishing mortality. Otherwise, reference to an IFMP that contains the information above is provided.	governance systems. Seven types of herring fisheries have occurred in BC and Haida Gwaii, and four are contemporary on Haida Gwaii: traditional Haida, recreational, commercial roe herring and commercial Spawn on Kelp (SOK) fisheries.	fleet and outlines a brief socioeconomic analysis (s. 6) and the socioeconomic and cultural importance (s. 1.6).
A review of impediments to successfully rebuilding the stock, including considerations of the biology of the species, any recent evolutionary changes, climate change impacts, multispecies interactions, other fisheries impacts, and the levels of uncertainty and risk.	Yes - Section 3.6 outlines issues that influence rebuilding and are described in further depth in Sections 4-7. Climate change effects are detailed in Sections 5.2.1.7.1, 6.1 and 6.3.	Yes – The rebuilding plan goes into detail regarding limitations of our current understanding of the stock as well as the impacts of environmental conditions on stock rebuilding with a focus on natural mortality and predation.
Specific objectives that include: • Target abundance to ecologically restored levels (i.e.. Maintain biomass of all species at or above 0.6B0 to support food webs, which requires F≤0.5M). • Probability estimate of at least 75 per cent that the target abundance will be met within the timeframe. • Associated milestones - specific and measurable interim targets that represent the steps towards rebuilding. • Other stock - specific objectives, such as target size or age structure, restoring historical distribution, maintaining social or cultural value, restoring economic benefits, restoring habitat, monitoring and compliance with respect to the Fishery Monitoring Policy, or resolving knowledge gaps.	Yes - Short and long-term rebuilding targets were identified for the Major SAR based on percentages of the average estimated abundance during the reference period in order to incorporate ecosystem considerations and uncertainties (Figure 20). Long-term rebuilding targets were determined for some sub-stocks in the Minor SAR, and no rebuilding targets have been identified for other Haida Gwaii sub-stocks due to data limitations.	Partial - Table 6 shows secondary objectives for bycatch, monitoring, compliance, resolving knowledge gaps. We recommend including other stock-specific objectives, such as target size or age structure, restoring historical distribution, maintaining social or cultural value or restoring economic benefits
The timeline for achieving the target (between Tmin and 2-3 x Tmin, 1.5-2 generations, otherwise based on expert judgement) and	Partial - Table 4, 8 shows that no management procedures tested in this analysis for Haida Gwaii, including a no fishing procedure, could meet the conservation	No - There are no estimated timelines or associated probability estimates for meeting targets. We recommend including a summary and figures of both short- and long-term

desired likelihood or probability of achieving the rebuilding target.	objective with at least 75% probability. Rebuilding timelines for meeting objectives (Tables 4 and 12, Section 4.2) will be added to the rebuilding plan as herring populations approach rebuilding targets.	projections (i.e. short-term projection to 2027 from Figure 28 by Rolland et al. (2022) and long-term projection to 2069 from Figure 12 in Turcotte (2022).
Management measures that have a high probability of success of meeting the objectives, including harvest decision or control rules that require removals from all sources at the lowest possible level; no tolerance for preventable decline, which is interpreted to mean that there is a very low likelihood (<5% probability) of preventable decline; and promote stock growth.	Partial - Section 7.1 presents SAR and sub-stock scale management recommendations. Harvest control rules include maintaining fisheries closures until stocks have been above the critical zone for two consecutive years.	No - Management measures do not include probabilities due to the lack of timelines. We recommend including measures that can achieve a milestone or specific and measurable interim targets, such as achieving a positive stock growth trajectory with a 75% probability over a five-year timeframe. When rebuilding to beyond the LRP is not expected to occur in a reasonable timeframe, milestones are helpful to direct efforts and decision making and monitor the trajectory of rebuilding.
An analysis of socio-economic, cultural and ecological impacts of the rebuilding plan to reduce surprises and allow for mitigation planning. Including a cost-effectiveness analysis of potential management measures, and for stocks unlikely to rebuild, calculate the benefits of preventing or slowing further decline of the stock.	Yes - Section 5.2.3. and Appendix E includes socio-economic summary and included in models (Table 19) and objectives.	Partial - Section 1.6 Overview of fishery's socio-economic and cultural importance. We recommend a more detailed discussion of research required to improve current knowledge and predict impacts of climate change (both directly through changing oceanographic conditions and indirectly through changes in trophic interactions). Since low recruitment, driven by environmental conditions often linked to climate change, is shown to be a primary factor keeping the stock in a critical zone, it is clear this gap needs to be filled
Development of the plan is initiated sufficiently in advance to ensure that the plan is ready to be implemented if a stock declines to its LRP. While this goes beyond legal requirements for rebuilding plans under the FSP, although this is aligned with DFO's 2009 PA Policy.	No - the herring populations around Haida Gwaii have been in decline for three decades.	No - Stock has been in critical zone for 21 years without a rebuilding plan.

Developed in consultation with Indigenous peoples when there is a legal duty to consult, collaborate to ensure plan is **compatible Indigenous Knowledge Systems** and ensure priority access for FSC fisheries.	Yes - The plan was co-developed by the Council of the Haida Nation (CHN), Parks Canada Agency (PCA) and the Department of Fisheries and Oceans (DFO) Canada and utilizes a precautionary approach that corresponds to the Haida principle of yahgudáng | yahguudang respect and takes an ecosystem-based management (EBM) approach, which are requirements of the Gwaii Haanas Gina 'Waadluxan KilGuhlGa Land-Sea-People Management Plan.	Partial - Section 1.7 summarizes the involvement of Indigenous groups in the development and required consultation of the plan; Section 2.2 on Indigenous Knowledge notes aspirations to incorporate Indigenous traditional knowledge and traditional ecological knowledge in science processes. No additional measures for FSC fisheries.
Published and implemented within 120 days from the date of the plan's approval by the Minister. Data is made publicly available (ie. in appendices).	Partial - Not yet published or implemented. Data is available in draft appendices.	No – Not yet published or implemented. Data is not publicly available.
Remain in effect until the stock reaches its rebuilding target with 50% probability and the IFMP includes management measures that have a low likelihood of the stock declining to its LRP in the short to medium term, taking into account the environmental conditions affecting the stock; and a high likelihood of acceptably meeting the obligations under s. 6.1 of the FSP, including continuing the prescribed major fish stock's growth above the USR or to the TRP.	Yes - The rebuilding plan process will remain in place until: • For the Major SAR, at least the short-term rebuilding target has been met for three consecutive years, and further simulation work and research has been completed. • For the Minor SAR, at least the rebuilding target has been met for three consecutive years for two of the three managed sub-stocks, and a collaborative monitoring program has been initiated; and 3. For all Haida Gwaii sub-stocks, a collaborative fisheries management plan has been developed and implementation initiated.	Partial - the plan states that once the target of getting the stock above the LRP, then the long-term management objectives under the IFMP will be to continue the stock's growth toward the healthy zone and toward maintaining the SSB in that zone. However, the previous IFMP is out of date and not available online.