Forage Fish and Ecosystem Approaches to Rebuilding

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Introduction

Fisheries and Oceans Canada (DFO) has incorporated the Precautionary Approach (PA) in fisheries management since at least the early 2000's, with formal integration into departmental decision making occurring in 2009 under the umbrella of the Sustainable Fisheries Framework (SFF) (DFO 2009d).[1] The SFF embeds a precautionary approach into fisheries management and provides the basis for an ecosystem approach. The precautionary approach is formally recognized in section 2.5(a) of the *Fisheries Act*, which allows the Minister to take it into account when making decisions under the *Act*. The SFF is intended to help DFO keep fish stocks healthy, protect biodiversity, protect fisheries habitats, and ensure productive fisheries to support economic prosperity in the fishing industry. The suite of policies within the SFF include the Fishery Monitoring Policy (FMP) and the Policy on New Fisheries for Forage Species (forage policy) among others. Central to the implementation of the SFF is the Precautionary Approach framework (PA framework) which guides fisheries decision making and is most effective when fish stocks have reference points that establish stock status zones and clear harvest strategies and harvest decision rules (DFO 2009a).

In 2025, 68.0% of index stocks have Limit Reference Points (LRPs) and 58.2% have Upper Stock References (USRs). These reference points are the thresholds needed to establish stock status zones which provide the basis for the implementation of the PA framework. Having such a large amount of exploited fish stocks fall into the 'uncertain' category leaves Canada's fisheries managers in the dark and their subsequent management decisions out of compliance with the PA framework. This directly undermines the SFF's intention to both keep fish stocks healthy and ensure productive fisheries to support economic prosperity. The SFF's additional purpose of protecting biodiversity is undermined when looking to the subset of fish stocks categorized as forage fish – of which only 50.0% of have the necessary reference points for the implementation of the PA.

Forage fish are defined in Canadian policy as being species which sit below the top of an aquatic food chain, is an important food source for some predators, and experiences high predation mortality (DFO 2009b). The health of forage fish is essential to the SFF's goals to maintain healthy fish stocks and protect biodiversity as forage fish support dependent predators that can include commercially important fish stocks as well as marine mammals and seabirds. Oceana Canada has sounded the alarm on forage fish management in Canada in recent years, advocating for the full implementation of the PA framework for forage fish and for Canada to follow international best practices to rebuild these populations (McIver et al. 2021, Jubinville et al. 2022, Oceana Canada 2023). For the 2025 Fishery Audit, Oceana Canada pursued three research questions to gauge the state of forage fish stocks across Canada:

[1] Canada signed the United Nations Fish Stocks Agreement (UNFA) in 1995, requiring signatories to apply the PA. Canada ratified the Agreement in 1999 and it came into force in 2001. At the same time as Canada signed UNFA, it also made the decision to abide by the FAO voluntary Code of Conduct for Responsible Fisheries, which requires fisheries management decisions to err on the side of caution and low risk of serious harm to stocks.

1. Is the PA framework implemented for major forage fish stocks in Canada?
2. Is the PA framework resulting in stocks being in the healthy zone or on a positive trajectory towards the healthy zone?
3. Are recent management decisions in line with ecosystem-informed science advice?

To answer these questions, data from the 2025 Fishery Audit, publicly available fisheries landings and quotas for the years 2020-2024, the most recent science assessments, and the 2025 quota decision and rationale were collected and analysed in July and August 2025. The following sections outline the extent to which the PA framework is implemented for 16 major forage fish stocks, a scoring of the 2025 management decisions against science advice, and a discussion regarding the implications of these findings. Following this, policy opportunities and recommendations are outlined.

1. Is the PA framework implemented for major forage fish stocks in Canada?

There are 17 major forage fish stocks (categorized as small pelagics) in Canada as captured by DFO's Sustainability Survey for Fisheries. In this report, 16 major forage fish stocks are analyzed for the extent to which the PA framework is implemented in their science and management. The Georges Bank herring component (NAFO Zones 5YZ) is excluded from this analysis due to a lack of recent assessment or management documents.

Stock Details &Stock Status	LRP	USR	HCRs	FSP	FMP
Capelin 4RST - Gulf of St. Lawrence	No	No	No	No status	No
Capelin SA2+3KLPs	Yes	No	No	Proposed	Yes
Herring 2J3IKLPs	No	No	No	No status	No
Herring 4R (Fall Spawner)	No	No	No	No status	No
Herring 4R (Spring Spawner)	No	No	No	No status	No
Herring 4S	No	No	No	No status	No
Herring 4T (Fall Spawner)	Yes	Yes	No	Proposed	Yes
Herring 4T (Spring Spawner)	Yes	Yes	No	Prescribed	Yes
Herring 4VWX	Yes	No	No	Proposed	No
Herring Central Coast (Pacific)	Yes	Yes	Yes	Proposed	No
Herring Haida Gwaii (Pacific)	Yes	Yes	Yes	Prescribed	No
Herring Prince Rupert District (Pacific)	Yes	Yes	Yes	Proposed	No
Herring Strait of Georgia (Pacific)	Yes	Yes	Yes	Proposed	No
Herring WCVI (Pacific)	Yes	Yes	Yes	Proposed	No
Mackerel (Atlantic) NAFO 3-4	Yes	Yes	No	Prescribed	Yes
Sardine (Pacific)	No	No	Yes	No status	No

Figure 1. Visualization of 16 major forage fish stocks' health status, Limit Reference Point (LRP), Upper Stock Reference (USR), Harvest Control Rules (HCRs), Fish Stocks provisions (FSP) status, and Fishery Monitoring Policy (FMP) status. The first column lists forage fish stocks and is coloured to indicate their health status, with green being healthy, yellow being cautious, red being critical, and grey being uncertain. Detailed rationale for each score are available in a separate spreadsheet: A3. Supplementary Table.

Reference points and Harvest Control Rules

The implementation of the PA framework starts with establishing a stock health status, with the primary threshold being the Limit Reference Point (LRP) which is used by management to avoid serious harm to fish stocks (DFO 2009). LRPs are typically defined in terms of biomass or a proxy of biomass but can be developed in different ways based on different data (DFO 2023c). The analysis presented in this section is not on the validity or robustness of LRPs, but rather an absence/presence review.

As shown in Figure 1, of the 16 major forage fish stocks reviewed, 62.5 % have LRPs, with 50.0% having both LRPs and Upper Stock Reference points (USRs) which delineate between the cautious and healthy zones of the PA framework. Harvest Control Rules (HCRs), also referred to as Harvest Decision Rules, are in place for 37.5% of stocks. HCRs are necessary for sustainable management as they outline pre-agreed harvest rates and management actions for each health zone. While most stocks only have HCRs when they have both a LRP and USR, Pacific sardine is unique in that this migratory stock does not have reference points but does have a suite of HCRs based on biomass estimates that have resulted in the stock not being exploited in Canada since 2012 (DFO 2013, DFO 2024a). HCRs are most effective when paired with stock status to determine whether to increase, stabilize, or decrease fishing pressure.

Stock Status

Only 10 out 16 forage fish stocks have the necessary reference points to establish a stock status. That leaves 37.5% of forage fish stocks without a health status resulting in them falling into the 'uncertain' category where they risk being overexploited due to the lack of management thresholds. When combining the uncertain, critical and cautious stocks, 81.3% of forage fish stocks in Canada are not classified as healthy. The only three forage fish stocks considered healthy are in the Pacific Region – none of which fulfill their annually allocated quota.

Monitoring

Oceana Canada's annual Fishery Audit has documented an increase in both dockside monitoring and logbooks between 2017 and 2025, but gaps remain. Following the Office of the Auditor General of Canada's 2023 report highlighting DFO's failure to implement the FMP, the department has responded with funding and prioritization of select stocks for the policy to be fully implemented for. Four forage stocks have been prioritized: two critical stocks (i.e., Atlantic mackerel, southern Gulf of St. Lawrence herring spring spawning component) and two cautious stocks (i.e., northeast Newfoundland and Labrador capelin and southern Gulf of St. Lawrence herring fall spawning component). In response to the report's findings, DFO stated that they will focus on implementing the policy for stocks currently suffering from data issues, including "key forage species and thus keystones to in the ecosystem" (OAG 2019). Filling data gaps such as the monitoring of all sources of fishing mortality are key to bringing fish stocks in line with the SFF and assigning much needed stock statuses to uncertain stocks.

Fish Stocks provisions

The PA framework is bolstered by legislative protection offered by the Fish Stocks provisions (FSP) of the *Fisheries Act* which obliges DFO to manage fish stocks to promote sustainability and implement rebuilding plans for stocks to grow above their LRP if they are in the critical zone. These provisions apply to prescribed stocks, of which only three forage fish stocks are listed (i.e., Atlantic mackerel, southern Gulf of St. Lawrence herring spring spawning component, and Haida Gwaii Pacific herring). The prescribed stocks all fall within the critical zone and are being managed towards recovery with *Fisheries Act* compliant rebuilding plans. Seven other forage fish stocks are proposed to be added to the FSP, including the three healthy Pacific herring stocks, the critically depleted Bay of Fundy/Scotian shelf Atlantic herring stock,

and three cautious zone stocks (i.e., northeast Newfoundland and Labrador capelin, southern Gulf of St. Lawrence herring fall spawning component, and central coast Pacific herring). These stocks must be listed under the FSP as soon as possible to initiate a rebuilding plan for the largest commercial forage fish fishery in Canada (i.e., Bay of Fundy/Scotian shelf herring) and begin to manage the three cautious stocks towards a sustainable trajectory.

In reviewing whether the PA framework is being implemented for major forage fish stocks in Canada, indicators such as reference points, HCRs, monitoring and regulatory batching rates provide a clear answer. As of 2025, forage fish stocks lack the basic building blocks necessary for full implementation of the PA framework. Only 18.8% of forage fish are protected under the *Fisheries Act*, and 37.5% lack a stock status. Although policy implementation is limited, it is equally important to consider the-on-the-water consequences for ecosystems and fish harvesters from coast to coast.

2. Is the PA framework resulting in stocks being in the healthy zone or on a positive trajectory towards the healthy zone?

Assessing the implementation of policy and legislation is just the first step to understand the management of forage fish in Canada. Quotas, landings, and health trends in relation to stock status are examined to determine whether there are different outcomes for stocks who have the basic components of the PA framework or not.

Quotas and landings

Total landings of forage fish have fallen in the past few years from almost 100,000 tonnes in 2020 to around 70,000 tonnes in 2024, reflecting changes in management such as moratoriums for depleted stocks to lower landings for stocks whose quotas have remained the same (Figure 2). For example, quotas in 2020 totalled over 140,000 tonnes, while landings that same year totalled almost 100,000 tonnes. Most recently quotas and landings have had a smaller, yet still significant discrepancy of quotas totalling almost 100,000 tonnes in 2024 with landings reaching almost 70,000 tonnes. Although it is positive that landings are not exceeding quotas, having such large differences between quotas and landings indicates a mismatch between management expectations and the reality on the water.

More concerning though is that in 2024 only 10.7% of total landings came from stocks which are assessed as being in the healthy zone, with more than double the number of landings coming from stocks in the critical zone (23.7%). The largest number of landings came from stocks in the uncertain category at 28,001 tonnes (40.3%) with the second largest number of landings coming from cautious zone stocks (25.9%). These results should be inversed if the PA framework was working correctly, with the highest number of landings coming from stocks in the healthy zone, with the least number of landings coming from stocks in the critical and uncertain zones.

Between 2020 and 2024, landings have declined for critical and cautious stocks, increased for uncertain stocks, and remained stable for healthy stocks. Fish stocks that do not have the basic building blocks of the PA framework therefore are being managed largely in the dark with the least precautionary quotas when compared to stocks with a stock status. Although these stocks do not have a stock status, research and science updates are still conducted and can tell us whether these stocks are healthy and growing, or stagnant and declining.

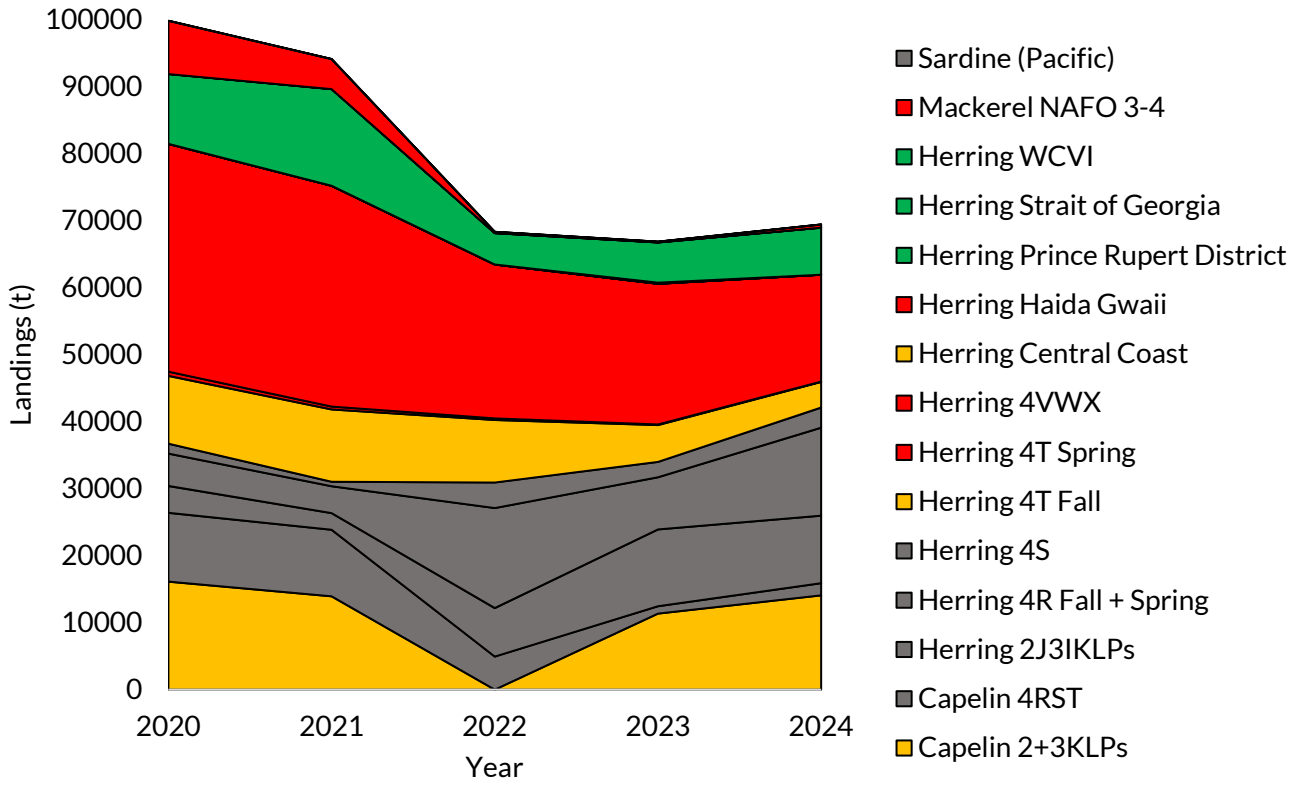

Figure 2 Landings of forage fish from 2020-2024 with stocks coloured to reflect their stock status. Red indicates the critical zone, yellow being the cautious zone, green being the healthy zone, and grey being the uncertain zone. Landings were identified from publicly available data sources, with select landings that were not publicly available from DFO Staff with the caveat that final numbers are subject to modification.

Health direction

The health direction of forage fish stocks was qualitatively scored using the following four categories: **increasing**, **decreasing**, **stable** (for stocks that are neither increasing nor decreasing but remain in the healthy zone), and **stagnant** (for stocks that are neither increasing nor decreasing but remain in the cautious, critical, or uncertain zones). The 'stagnant' category was developed to differentiate from stable healthy zone stocks as it is not a requirement of the PA framework for healthy zone stocks to continue to increase, but it is a goal of the framework and legislation for stocks to be managed sustainably. Stocks that are not increasing but are in the critical, cautious or uncertain zones are out of compliance with the PA framework and are therefore 'stagnant' rather than 'stable'.

Qualitative health scores were developed by looking to the most recent publicly available Canadian Science Advisory Secretariat (CSAS) Science Advisory Reports, Research Documents, and Science Response or rebuilding plan published by July 1st, 2025.

Most stocks were scored as 'stagnant' in line with most stocks falling into the cautious, critical and uncertain categories. The southern Gulf of St. Lawrence herring fall spawning component is the only stock that was clearly identified as declining. Although this herring stock is not projected to decline to the

critical zone in the next two years, the SAR cautions against interpreting the SSB projections as they suggest "unrealistically optimistic trends" (DFO 2024). Only the Strait of Georgia herring stock was classified as stable as it remains in the healthy zone and has fluctuated around the unfished spawning biomass for several years. The three stocks classified as increasing have had little to no commercial landings in recent years. Among these, the Atlantic mackerel SSB is projected to increase at current low fishing levels, while two Pacific herring stocks are showing increases in abundance, biomass estimates and productivity (i.e., West Coast Vancouver Island herring, Prince Rupert District herring).

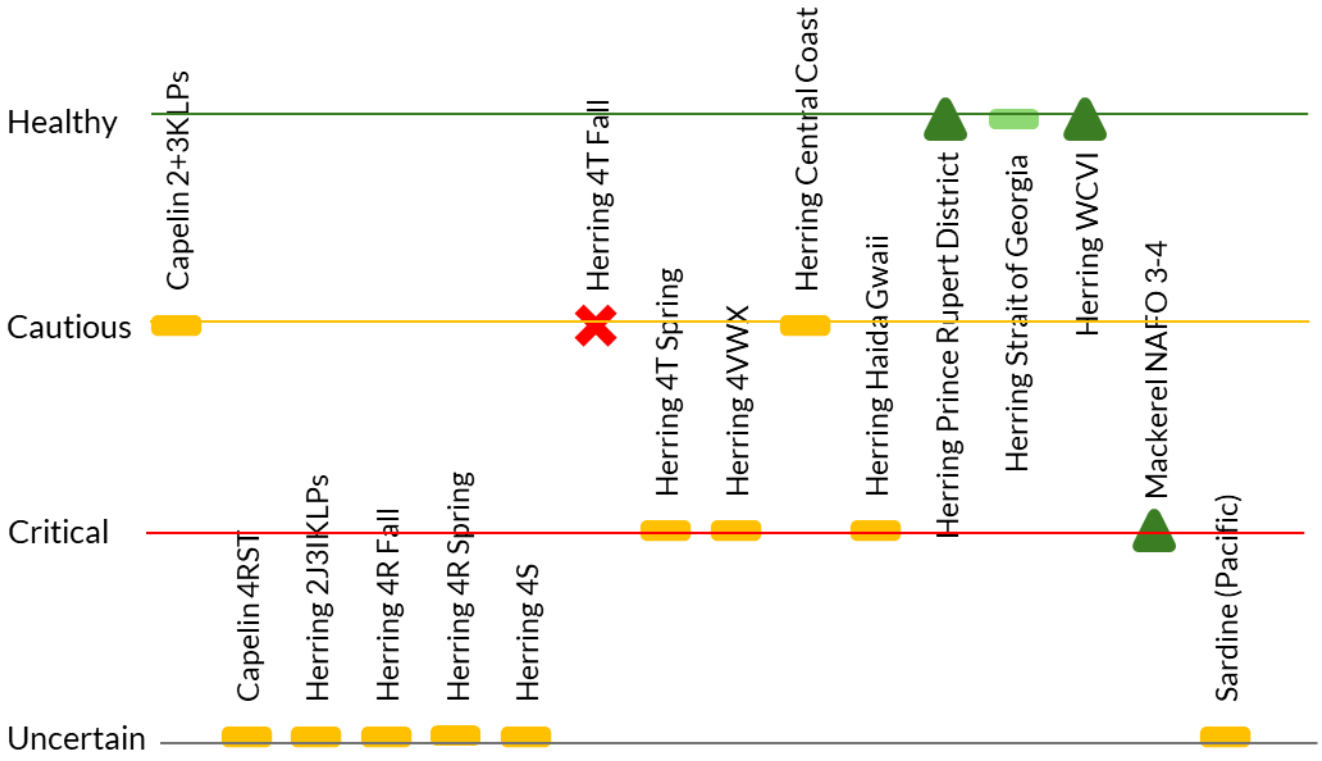

Figure 3 Figure depicting the PA framework health zones, with stocks scored with icons to indicate whether they are increasing (green arrow), stable (green bar), decreasing (red X), or stagnant (yellow bar) when looking at the most recent science advice which was published between 2024 and 2025 for all stocks with the exception of Pacific sardine of which the most recent science advice was published in 2022. Detailed rationale for each score are available in a separate spreadsheet: A3. Supplementary Table.

When the PA framework is fully implemented, stocks tend to be healthier and more stable as shown with Pacific herring stocks. When stocks are critically depleted with *Fisheries Act* compliant rebuilding plans informed by rigorous management thresholds, they can rebuild (i.e., Atlantic mackerel). Alternatively, stocks without PA framework requirements languish in the uncertain zone, experiencing declining quotas and stagnant health outcomes.

Although this analysis indicates that when implemented, the PA framework results in better outcomes, there are still some glaring gaps best explained when looking to the Bay of Fundy/Scotian shelf herring stock. Although this stock has been critically depleted since 2018 and with various management measures over the past few years including a rebuilding plan and management strategy evaluation, this

stock continues to have one of the highest forage fish quotas in Canada, with management decisions not reflecting science advice for the past decade. Further, although Pacific herring make-up the highest percentage of stocks with LRPs, USRs and HCRs, they face calls for management reform regarding concerns that their management framework doesn't fully consider their ecosystem role, historical biomass and spatial extent (Morin et al. 2023).

3. Are recent management decisions in line with ecosystem-informed science advice?

A subset of forage fish stocks were examined for management decisions that occurred for the 2025 fishing season. Stocks that have LRPs, landings in 2024, and decisions that were accessible were analysed. The 4RST Capelin stock was also included, as it has a provisional LRP that places it in the cautious zone, although this reference point has not yet been formally implemented. With the inclusion of 4RST Capelin, management decisions for two capelin stocks, three Atlantic herring stocks, three Pacific herring stocks, and Atlantic mackerel were scored against the most recent science advice. Theoretically, stocks with an LRP – the primary science-based threshold in the PA framework – should have management that is precautionary and science based.

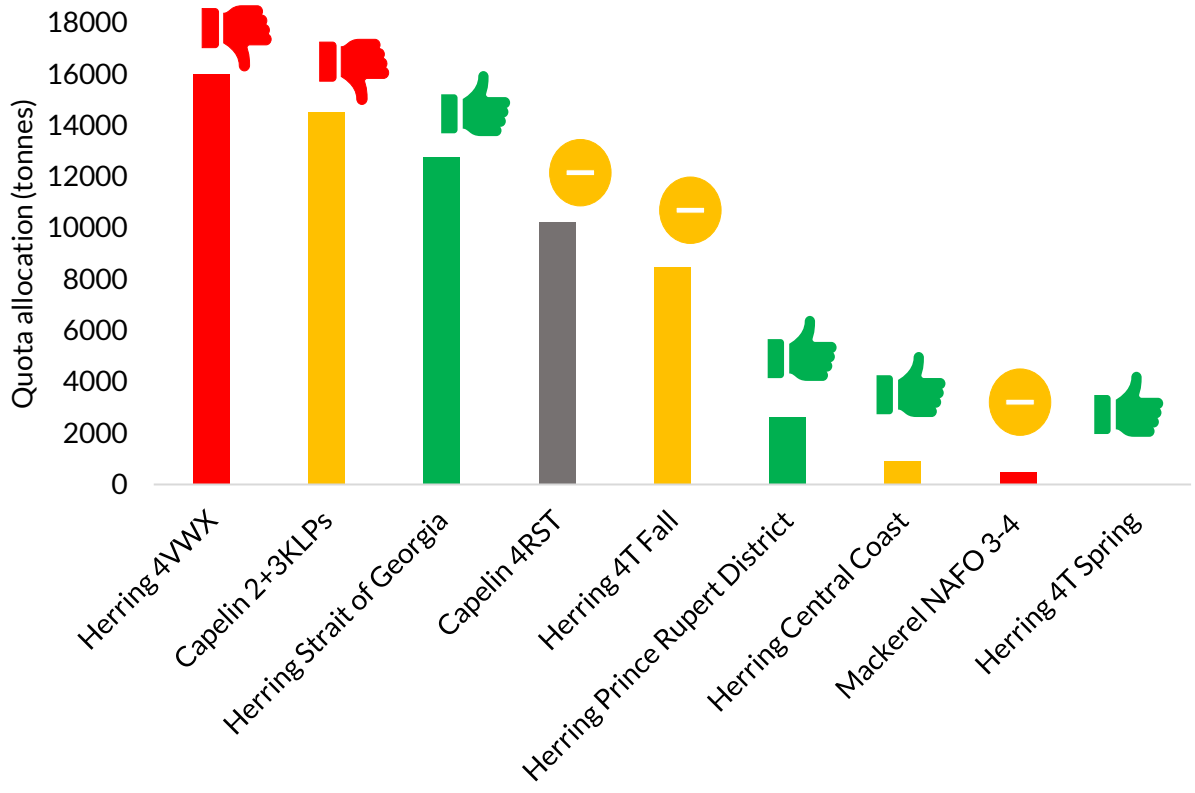

Figure 4 Scoring of management decisions for 2025 forage fish quotas. The Y axis indicates amount of quota in tonnes, with bars are coloured to indicate stock status with green being healthy, yellow being cautious, red being critical and gray being uncertain. Icons atop each bar show whether management decisions followed science advice, with a thumbs down indicating science advice was not followed, a thumbs up indicating that science advice was followed, and a circle indicating that science advice was partially followed. Detailed rationale for each score are available in a separate spreadsheet: A3. Supplementary Table.

Of the forage fish stocks analysed, only 44.4% (4 out of 9 stocks) of 2025 management decisions followed science advice, with the highest quotas allocated being against science advice to northeast Newfoundland and Labrador capelin and Bay of Fundy/Scotian shelf herring. The four largest quotas captured in Figure 4 are either quota roll-overs (no change in management in the face of new data) or increases from 2024. Some of the highest forage fish quotas in the country in 2025 were allocated to stocks without a stock status or robust science advice, including a roll-over of 20,000 tonnes for herring in western Newfoundland and almost 15,000 tonnes for herring on the northeast coast of Newfoundland and Labrador (not included in the above figure).

Is the ecosystem role of forage fish being accounted for?

Multiple analyses by DFO scientists over the past number of years have raised concerns regarding the extent to which ecosystem variables such as natural mortality, food availability, and climate change are incorporated into both science assessments and resulting advice (Pepin et al. 2022, Kulka et al. 2023). Research found that although there has been progress in the implementation of environmental variables in stock assessments, with small pelagics including forage fish tending to have higher rates of inclusion compared to other types of species, there is no cross-region guidance for the incorporation of these variables into stock assessments and resulting science advice.

Following Canada's commitment to the Kunming-Montreal Global Biodiversity Framework in 2022 (CBD 2022), the department recognized the need for further guidance to implement EAFM and began a project in 2022 to solicit feedback from rights and stakeholders to inform a Strategic Plan for the implementation of EAFM. Following outreach to solicit feedback on a high-level discussion document (DFO 2023a), DFO published a "What we heard report" in 2024 (DFO 2024c), followed by a draft Strategic Plan for further discussion (DFO 2024b). As part of this dialogue, Oceana Canada and other organizations submitted practical recommendations for the department's Strategic Plan to integrate EAFM with current departmental policies and regulations (i.e., SSF, Fish Stocks provisions), develop a definition of EAFM that is inclusive of IKS and supports knowledge paring, and define core EAFM components to be implemented in each DFO Region, among others (Driscoll et al, personal communication, June 14 2024). In 2025 the department released a second "What we heard report" that outlined broad perspectives focusing on implementation process, operational challenges, and how best to work with Indigenous partners, considering both Treaty Rights and Indigenous knowledge (DFO 2025b). It is currently unclear when the Strategic Plan for implementing EAFM will be approved, and if it will be public in line with the public consultation that informed the process. Regardless, research continues to show limitations in the department's implementation of EAFM.

For example, the LRPs for northeast Newfoundland and Labrador capelin and Bay of Fundy/Scotian shelf herring consider the ecosystem role of forage fish but are limited in their efficacy toward rebuilding. The capelin LRP was drastically lowered when the assessment of northern cod (the predator it is linked to) was changed. The capelin stock is now considered to not be in the critical zone, although the number of fish in the water has not changed – showing a disconnect between the reference point and the health of the broader ecosystem. The Bay of Fundy/Scotian shelf herring LRP is set at a level higher than DFO's provisional default of 40% BMSY, although the HCRs for this stock are not followed in management, leading to the largest commercial forage fishery in Canada occurring on a stock in the critical zone.

The Haida Gwaii 'íináang | iinang Pacific Herring Rebuilding Plan is an isolated bright spot in the context of implementing an ecosystem approach in Canadian fisheries management due to both rigorous quantitative methods and a rebuilding plan which uses a conceptual model that is holistic and informed by

traditional knowledge which expands the understanding regarding spatial dynamics, historical baselines, and reference points among other factors. The rebuilding plan both shows how to implement ecosystem-informed reference points while also harmonizing multiple forms of knowledge (Fisheries and Oceans Canada, Council of the Haida Nation, Parks Canada 2025).

While Canada's commitment to implementing an ecosystem approach has existed for decades and largely informed by western science, Indigenous Peoples, including in Canada, have developed the knowledge and practices to manage interconnected relationships between people and marine ecosystems (Frid et al, 2023, Salomon et al, 2023). Indigenous Knowledge Systems (IKS) represent more than just knowledge but represent a way of life and consider relationships between people (past, present and into the future), all living things, and spiritual aspects of Indigenous cultures (McGregor 2021). When paired with western science in the implementation of EAFM, as in the case of the pacific herring rebuilding plan, the complementary differences between western science and IKS generate new knowledge and management structures. While both IKS and western science can document changes over time, IKS helps to provide insights on long-term dynamics of local ecosystems, with western science providing information on processes that are not directly observable (Ban et al. 2018, Moffat et al. 2025).

4. Policy Opportunities to Advance an Ecosystem Approach for Forage Fish

The PA framework is the key bedrock needed for forage fish, but 16 years after the policy was published, it is insufficient in guiding management. Our analysis shows that although progress has been made in the implementation of reference points and HCRs for some forage fish stocks, as a taxonomic group, forage fish lag in the implementation of the PA framework. In the absence of PA implementation, forage fish management is characterized by quota roll-overs and uncertain health statuses, while stocks with the necessary management thresholds continue to be overexploited in opposition to Canadian law and policy (i.e., Bay of Fundy/Scotian shelf herring). As the department's own science and policy guidance states, "In Canada and around the world, numerous examples show that scientific recommendations are overruled in favour of short-term social and economic considerations and doing so, jeopardise stock recovery and dependent fishery communities." (Guénette et al., 2014).

If this analysis focused on a random subset of the 194 index and 233 total stocks analyzed in the Fishery Audit, then this appendix would provide an interesting snapshot of the overall findings which have showed a lack of progress since 2017. In this analysis though, forage fish are shown to underperform in the implementation of the PA framework compared to the larger Fishery Audit dataset. Forage fish are not just any other fish though, they are keystones to the marine food webs in the Bay of Fundy, the Gulf of St. Lawrence, the northeast coast of Newfoundland and Labrador, and the Pacific bioregions and therefore require the safeguards provided by the full PA framework.

How does current management align with DFO's forage policy?

Since the publication of the SFF, a policy specific to forage species has been in place within the suite of policies and guidance. The Policy on New Fisheries for Forage Species (referred to hereafter as the forage policy), intended to complement the New Emerging Fisheries Policies, was developed to respond to "increasing domestic and international emphasis on the application of ecosystem and precautionary approaches to fisheries management" (DFO 2009c). Although the forage policy is intended to be triggered as new forage species fisheries proposals are brought forward to DFO, any significant changes proposed

to existing forage species require an assessment to determine whether they meet the objectives of the policy.

The forage policy is composed of objectives, principles and management prerequisites, thereby providing a framework "which ensures that fisheries on forage species are conducted in ways which are compatible with conservation of the full ecosystem, and that their sustainability is evaluated in that larger context" (DFO 2009c). Of the 10 principles set outs in the forage policy, the first seven are aligned with current DFO priorities related to implementing an ecosystem approach to fisheries management, including commitments to establishing pre-agreed harvest control rules and reference points (Principles 1 and 7), that exploitation rates should take account of both the productivity of the target stock, its dependent predators and its trophic role in the ecosystem (Principles 2, 4 and 5), and broader environmental considerations including concerns regarding local depletion and accounting for year class strength in management (Principles 3 and 6). Additional principles address legal and economic considerations such as the principle that Indigenous fisheries for food, social and ceremonial purposes have priority status in situations of reduced harvests (Principles 9), and principles 8 and 10 which require an economically self-reliant fishing industry that should be able to react to natural declines in abundance and share the costs in monitoring their catch.

Combined with the PA framework and the broader suite of SFF policies, the forage policy provides the necessary components for sustainable forage fishery management. Why then, are all but three forage fish stocks in the healthy zone over but 16 years after the policy was published? One answer is that there is no publicly available information to indicate that any of the 16 major forage fish stocks in Canada, (or the dozens of additional forage species stocks such as northern shrimp) have been managed to align with the principles of the forage policy.

Public reference of applying the forage policy includes its use to assess Atlantic saury and Atlantic silverside fisheries in the Gulf of St. Lawrence (DFO 2010), and its reference in the recent IFMP in the Pacific Region for euphausiids (krill) (DFO 2023b). The assessment for saury and silverside state that, based on the prerequisites in the forage policy, saury and silverside fisheries would not presently meet the conservation objectives due to a lack of reference points.

If forage fish populations were robust, supporting vibrant ecosystems against threats of climate change while providing economically sustainable fisheries, then the forage policy would have no use presently. Unfortunately, the current state of forage fish and Canadian marine ecosystems is vastly different from the above ideal. As shown in this analysis, forage fish health is largely stagnating, a minority of stocks assessed as healthy, and landings have declined over the past five years with implications for those who rely on these fish stocks for direct food, commercial or bait catch. This status quo will further be challenged by the panoply of pressures stemming from climate change on marine ecosystems in Canada, including extreme climatic events such as marine heatwaves (Starko et al. 2025), warming waters impacting forage fish behavior (Gauzens et al. 2024), changing ice flow patterns disrupting spring algal production (a key food source for forage fish) (Cyr et al 2024), and marine ecosystem regime shifts (Pedersen, Koen-Alonso & Tunney 2020). Many of these challenges can be addressed by the implementation of *existing* policies, while others, including Canada's new legal requirements to rebuild fish stocks and implement the *United Nations Rights of Indigenous Peoples Act* with implications for fisheries management, will require novel policy and science approaches.

Conclusion

The findings of this analysis indicate that the PA framework is not being implemented for forage fish stocks in Canada. With only 18.8% of forage fish protected under the modernized *Fisheries Act* and 37.5% of forage fish without a health status, the department is failing in following the PA framework over 15 years after its publication. When the PA framework is implemented for forage fish stocks, it is insufficient in guiding management, resulting in only 3 of 16 forage fish stocks safely in the healthy zone, with the highest quotas being allocated year after to year to stocks with critical, cautious and uncertain status.

Fortunately, DFO has the policies now to address current challenges, with novel approaches needed to prepare for future pressures. We recommend the following:

1. **Ensure Legal Safeguards: List the remaining 13 major forage fish stocks to the Fish Stocks provisions of the modernized *Fisheries Act*.** Providing these stocks with legal protection will put them on the fast track to developing health statuses and rebuilding plans when necessary. With the department having invested years and invaluable resources to the development of three legally compliant forage fish rebuilding plans, future work to rebuild stocks can build from these templates.
2. **Close PA Gaps: Establish LRPs for the six uncertain forage fish stocks.** Landings continue to increase for these ecologically essential populations while we manage them in the dark. As proposed commercial fisheries for krill, Atlantic saury, and Atlantic silverside were not pursued or expanded because they violated the forage policies requirement for reference points and harvest control rules, these stocks which collectively have removed tens of thousands of tonnes of fish from the ocean in the past five years require the most basic requirements in fishery management.
3. **Apply Best Practises: Modernize the forage policy to apply to existing stocks that do not have management thresholds, align with the department's own ecosystem approach to fisheries management strategy, and be inclusive of Indigenous Knowledge Systems (IKS).** As recommended above, legally protecting forage fish stocks and assigning LRPs would bring forage fish into compliance with the most basic elements of the PA framework but would not solve the inconsistencies presented in this analysis of stagnating stock health, reduced landings, and management decisions that only partially align with science advice. To initiate change, modernize the forage policy teeth by having it apply to currently exploited stocks, beginning with those stocks who do not currently have a health status. This change would also bring the policy closer to the department's EAFM strategy which is beginning with bringing more environmental variables into single-stock assessments, of which forage fish are prime targets considering their sensitivity to temperature, food availability, predation and fishing pressure. Finally, expanding the current section in the forage policy from one that prioritizes Indigenous access to forage fish to one that allows for the pairing of IKS into the management of forage fish, can set the most depleted stocks on a path towards rebuilding, as is seen in the exceptional Haid Gwaii herring rebuilding plan.

To address these tangible recommendations, Oceana Canada calls on DFO to accelerate progress on these key actions within the next year. This includes fulfilling current commitments such as listing the currently proposed seven additional forage fish stocks to the Fish Stocks provisions and establishing LRPs for four forage fish stocks as outlined in the 2025/26 DFO Sustainable Fisheries Framework Work Plan (DFO 2025a), and initiating further commitments to set LRPs and list six additional forage fish stocks currently not proposed to the FSP. Finally, modernizing the forage policy will be a milestone in DFO's

commitment to implement EAFM that is inclusive of IKS – and policy change that must begin with consultations in 2026.

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