Stakeholder comments on IPHC Fishery Regulations or published regulatory proposals

PREPARED BY: IPHC SECRETARIAT (B. HUTNICZAK; 13, 27 DECEMBER 2024 & 26 JANUARY 2025)

PURPOSE

To provide the Commission with a consolidated document containing comments from stakeholders on IPHC Fishery Regulations or published regulatory proposals submitted to the Commission for its consideration at the 101st Session of the IPHC Annual Meeting (AM101).

BACKGROUND

The IPHC Secretariat has continued to make improvements to the Fishery Regulations portal on the IPHC website, which includes instructions for stakeholders to submit comments to the Commission for its consideration. Specifically:

> "*Informal statements or comments on IPHC Fishery Regulations or published regulatory proposals can be submitted using the form below up until the day before the IPHC Session. Submitted comments will be collated into a single document and provided to the Commissioners at the IPHC Session.*"

Comments may be submitted using the IPHC Stakeholder Comment Form.

DISCUSSION

Table 1 provides a list of the stakeholder comments which are provided in full in the Appendices. The IPHC Secretariat does not provide commentary on the statements, but simply collates them in this document for the Commission's consideration.

Table 1. Statements from stakeholders received by noon on 13 December 2024.

Appendix No.	Title and author	Date received
Appendix I	James Kearns, Halibut Forever	24 October 2024
Appendix II	Buck Laukitis, commercial fisher	27 December 2024
Appendix III	Eric Wickham, retired commercial fisher	28 December 2024
Appendix IV	Buck Laukitis, commercial fisher	23 January 2025
Appendix V	Malcolm Milne, president, North Pacific Fisheries Association	24 January 2025

RECOMMENDATION

That the Commission:

1) **NOTE** paper IPHC-2025-AM101-INF01 Rev_2 that provides the Commission with a consolidated list of comments from stakeholders on IPHC Fishery Regulations or published regulatory proposals submitted to the Commission for its consideration at the 101st Session of the IPHC Annual Meeting (AM101).

Appendices

As listed in Table 1.

APPENDIX I

Statement by James Kearns (Halibut Forever)

Section of IPHC Fishery Regulations or regulatory proposal reference the comment will refer to	Section 28: Recreational (Sport) Fishing for Pacific Halibut—IPHC Regulatory Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, 4E
Submitted comment	There are three kinds of halibut fishermen: 1 commercial, 2 recreational, 3 subsistence. Commercial fishermen do it to make a living by selling their catch. Recreational fishermen do it for fun, for entertainment, and to enjoy some of the bounty of the sea. Subsistence fishermen do it to feed their families Because of the different reasons that these 3 groups fish for halibut, I encourage this body to set three different allocations for the halibut resource, one for each group. A commercial allocation (currently the only one); a recreational allocation that includes all recreational fishermen (both guided and unguided recreational halibut anglers); and a subsistence allocation that provides for those who depend on halibut to feed their families. I propose that you determine the percentage of the annual TCEY that should be allocated to each of those three groups and manage the halibut fishery within those allocations. Further I propose that the recreational only allocation be set at the average of the last 24 years combined guided/unguided halibut removals for each area. Then manage the recreational fishery for each area within that allocation with a 1 fish of any size daily bag limit (to help reduce handling mortality), an annual limit, and a requirement that any recreational halibut kept that is 60 inches or greater in length be counted as two fish on the fishermen's annual limit. Additionally, provide that the RQE stamp be required for every recreational halibut fisherman and that it be used as a monitoring mechanism with a requirement to fill in the size, gender, and location of every halibut kept. That means that the RQE stamp fee would be based annually on the annual limit. And since it will most likely be a $20 per day flat fee-it would be one stamp per fish and the stamp would have to be turned in when used or by Dec 1 of each year. This proposal will give an accurate accounting of annual recreational halibut removals. It will give size, gender, and location data for halibut abundance studies. It will treat all recreational halibut fishermen equally and fairly-the old idea of "same license same rules" unless there is a resident/nonresident application. It will support the RQE concept of no uncompensated re-allocation of the resource. It will not promote killing the larger fecund halibut.

It will simplify enforcement.

And it will totally solve the concerns of the expanding removals for the rental unguided recreational halibut fishery.

And finally, while it is true that resident Alaskan unguided halibut fishermen will have to also abide an annual limit, it is imperative that all recreational halibut fishermen participate in helping maintain the resource. I am an Alaskan resident and I eat a lot of halibut, but I can certainly get enough halibut to enjoy eating within an annual limit. And if an Alaskan resident lives in a rural area or is an indigenous Alaskan who relies on wild meat resources to provide for their family, they would be eligible for a subsistence permit and be able to harvest under the subsistence allocation.

Now there may be some who are still concerned about the charter boat operators who make a living by taking recreational halibut fishermen out to the fishing areas. The whole guided vs unguided issue came about trying to control the increasing fleet of such operators and the resulting increase of recreational halibut removals. Because of the commercial nature of the business (taking money in trade for services), those operators were put into a catch sharing plan with commercial fishermen. Most of you know that I have always felt like that was inappropriate because the charter boat operators were not paid by the pound of fish taken, but rather by the number of persons who paid for their Coast Guard licensed expertise to safely pilot a charter vessel. Definitely not commercial fishing.

But that has already been managed by limiting the entry into that occupation, the CHP program.

I propose that the IPHC recommend to the NPFMC that Alaska halibut fishermen be given an allocation that is not a CSP (Catch Sharing Program) with the commercial sector. I further propose that you recommend that all recreational halibut anglers who fish in Alaska participate in maintaining a healthy halibut stock by establishing a daily bag limit of just 1 halibut of any size with an annual limit that will keep the recreational removals within their allocation. Additionally, that any halibut retained that is 60 inches or more in length be counted as 2 fish on the angler’s annual limit.

APPENDIX II

Statement by Buck Laukitis (commercial fisher)

Section of IPHC Fishery Regulations or regulatory proposal reference the comment will refer to	NA
Submitted comment	**Proposal for Implementing a Risk-Averse Model for Pacific Halibut Stock Assessment**

Title: Enhancing Pacific Halibut Management with a Risk-Averse Stock Assessment Model

Introduction:

The International Pacific Halibut Commission (IPHC) currently employs an ensemble model for assessing the stock of Pacific halibut across its extensive range. While this approach has served to integrate various sources of uncertainty, there are concerns that current risk assessments might underestimate conservation challenges. This proposal suggests the development and implementation of a supplementary, risk-averse model to coexist with the existing assessment framework, offering a more precautionary perspective to guide management decisions.

Rationale for Risk-Averse Modeling:

- Conservation Over Economic Yield: With the Pacific halibut facing pressures from climate change, habitat alteration, and potentially underestimated natural threats, a risk-averse model focuses on long-term sustainability rather than short-term economic gains.
- Public Trust and Transparency: Providing an alternative, more conservative model can enhance public trust by demonstrating a commitment to precautionary management. It also offers decision-makers a spectrum of scenarios to consider, fostering more informed decision-making.

Proposed Risk Factors and Their Implications:

1. High Harvest Rate:

- Current Issue: The use of a 20% harvest rate might be too aggressive for a long-lived species like halibut, especially considering that over 80% of the commercial catch has been female for over a decade.

- Risk: This could lead to a decline in spawning biomass, as the removal of a large number of mature females might disrupt reproductive success.

- Proposal: Incorporate a model scenario where the harvest rate is reduced to 10% or less, examining the impacts on stock recovery and population structure.

2. Underestimated Natural Mortality:

- Current Issue: The natural mortality rate used in assessments might not account for significant but unmeasured factors like:

- Whale Depredation: Killer whales and other predators might be taking a larger share of halibut than currently estimated.

- Bycatch: Unreported or underestimated bycatch in other fisheries could be higher, especially in non-target fisheries like trawling.

- Habitat Loss: Fishing activities might degrade habitat, reducing juvenile survival rates and overall productivity.

- Risk: Overlooking these can lead to an overestimation of stock resilience and productivity.

- Proposal: Increase the natural mortality rate in model scenarios to reflect these potential increases, perhaps by 20-30%, to simulate these additional pressures and assess their impact on stock forecasts.

3. Poorly Understood Factors:

- Current Issue: There are likely many factors affecting halibut populations that are not well understood or quantified, such as: changes in oceanographic conditions, fecundity, maturation schedule, Russian fishery impacts, etc.

- Risk: Without accounting for these, the stock assessment might be overly optimistic about recovery and sustainability.

- Proposal: Establish a comprehensive research program focusing on:

    - Environmental impacts on halibut life stages.

    - Disease prevalence and impact.

    - Interactions with other marine species and ecosystems.

4. Recruitment and growth rates. The slow growth of halibut (compared to previous epochs) is pretty well understood, but perhaps the risks of slow growth, a minimum size limit and having a predominantly female commercial fishery vs. a predominantly u26 bycatch fishery are not well understood.

- more precaution is needed because of the lag time between spawning and maturity

5.In addition: this approach may require modeling of broad separate geographic management areas

    -separate risk adverse models for area 2, area 3 and, area 4.

Differentiation from Current IPHC Risk Assessment:

- Scope of Risk: While the IPHC's risk table considers various management scenarios and their probabilities of leading to overfishing or stock decline, this proposal expands the scope by incorporating risks that are currently less emphasized or quantified, such as those related to sex-specific harvest and natural mortality.

- Precautionary Principle: This model would be explicitly designed to prioritize conservation outcomes, potentially recommending lower catch limits or more restrictive management measures than the current ensemble model.

- This risk adverse model could be used by the public and decision makers and applied to the risk tables to show alternative probabilities of stock decline or growth.

Implementation:

- Parallel Use: Continue using the current ensemble model but introduce the risk-averse model as a parallel assessment tool during annual reviews and management meetings.

- Education and Communication: Clearly communicate to stakeholders how this model complements rather than replaces the current model, emphasizing its role in precautionary management.

- Research Investment: Allocate funds for the research program to better understand and quantify the proposed risk factors, ensuring that the model's assumptions are as robust as possible.

Conclusion:

By adopting a risk-averse model alongside the existing ensemble approach, the IPHC can provide a broader spectrum of management options that prioritize the long-term health of the Pacific halibut stock. This proposal does not seek to discount the current model but rather to enhance the management framework with a more conservative lens, ensuring sustainable fishing practices in the face of uncertainty and environmental change.

Research Proposal: Assessing the Impact of Fishing Intensity on Pacific Halibut Spawning Success in the Bering Sea

Title:

Evaluating the Effects of Year-Round Fishing on Spawning Success of Pacific Halibut in the Bering Sea

Background:

The Pacific halibut (*Hippoglossus stenolepis*) in the Bering Sea is subject to fishing pressure from various fleets under a predominantly rationalized, cooperative, year-round fishing regime. This continuous fishing intensity might disrupt the natural spawning behavior and success of halibut, potentially preventing them from schooling up in sufficient numbers to spawn effectively.

Hypothesis:

The constant fishing activity throughout the year, particularly in spawning months, does not allow Pacific halibut in the Bering Sea to aggregate in sufficient numbers for successful reproduction.

Objectives:

1. Historical Analysis of IPHC Longline Fleet Activity:

- Examine changes in the length of the fishing season over time, focusing on the intensity of fishing during the spawning months (March, November, December).

- Map and analyze where and how much harvest occurs across all months, U26 and O32.

2. Impact of NMFS Fleets on Pacific halibut:

- Assess fishing intensity by other National Marine Fisheries Service (NMFS) fleets (trawl, longline, pot) during the spawning season using observer data and other sources. U26 and O32.

- Evaluate encounter rates, assigned mortality rates, and identify areas with high CPUE (catch per unit effort) for halibut bycatch - all 12 months, U26 and O32.

3. Whale Interactions and Bycatch Mortality:

- Investigate the interaction rates between halibut and whales, especially during the spawning season, using data from both the directed halibut fleet and other NMFS fleets.

- Special emphasis should be on comparing assigned observer mortality rates at the time of release from the vessel when killer whales are in the proximity. Are viable halibut eaten by whales before they get to the bottom? Are estimated mortality values correct?

- Conduct a mark-recapture tagging study to reassess halibut bycatch mortality rates, with a focus on the catcher-processor vessels and the A80 trawl fleet's deck sorting practices.

Methods:

- Data Collection:

    - Historical Data: Compile data from IPHC on fishing seasons, areas, and harvest amounts from 1990 to present, with emphasis on spawning months.

    - Observer Data: Use NMFS observer programs data to analyze halibut bycatch in other fisheries, focusing on mortality rates, encounter rates, and CPUE.

    - Tagging Study: Implement a mark-recapture study where halibut are tagged during bycatch events, with special attention to those sorted on the deck of A80 trawlers. Monitor tag returns to estimate true survival rates post-capture.

- Analysis:

    - Spatial and Temporal Analysis: Map and analyze the spatial distribution and temporal patterns of fishing activities, correlating these with spawning grounds.

    - Bycatch and Interaction Analysis: Use statistical models to assess the relationship between fishing intensity, whale interactions, and halibut mortality.

    - Survival Rate Revision: Use mark-recapture data to revise existing estimates of halibut mortality from bycatch, considering deck sorting practices.

Expected Outcomes:

- Understanding of how extended fishing seasons impact halibut spawning aggregations.

- Quantification of the effects of bycatch and whale predation on halibut during critical spawning periods.

- Recommendations for fishery management adjustments, potentially including changes to season lengths or area restrictions to protect spawning.

Significance:

This research will provide critical insights into whether current management practices are sustainable for Pacific halibut in the Bering Sea, potentially guiding policy changes to enhance spawning success and stock recovery. It will also contribute to the broader understanding of how cooperative, rationalized fisheries can affect long-lived species.

Budget and Timeline:

- Budget: Estimated at $xxxx, covering data acquisition, tagging, analysis, and personnel.

- Timeline: 2 years - Year 1 for data collection and initial tagging; Year 2 for data analysis, fieldwork continuation, and report compilation.

Deliverables:

- A comprehensive report detailing findings and policy recommendations.

- Scientific publications on the impact of fishing regimes on halibut spawning success.

- Data sets and models that can be used for future research or management decisions.

Footnote: Please stop all cost recovery/ fund raising research projects.

APPENDIX III

Statement by Eric Wickham (retired commercial fisher)

Section of IPHC Fishery Regulations or regulatory proposal reference the comment will refer to	NA
Submitted comment	**Reflections on a Persistent Challenge: A Study on the Impact of Draggers on Halibut Grounds** I am a retired halibut fisherman from British Columbia, though my early years of fishing—about 40 years ago—were spent in Alaska. I retired early and sold my Pacific halibut quota out of frustration with the lack of political will, both in the USA and Canada, to address the issue of draggers operating on halibut grounds. Unfortunately, this problem persists, and there seems to be little resolve among fishermen to apply meaningful pressure to tackle it. From what I understand, there are now only a few remaining locations in British Columbia where halibut can be commercially fished at sustainable levels. Yet, draggers continue to operate in these areas, causing significant damage to the ecosystem—and seemingly, no one is taking action to address it. I recognize that different terms are used to describe these bottom-trawling vessels that devastate marine habitats, but the issue remains critical regardless of terminology. As someone who has long respected the Commission, I am left wondering why the Commission has yet to address this long-standing and pressing challenge

APPENDIX IV

Statement by Buck Laukitis (commercial fisher)

Section of IPHC Fishery Regulations or regulatory proposal reference the comment will refer to	IPHC-2025-AM101-PropC4 IPHC-2025-AM101-PropC5

Submitted comment

A Spatially Differentiated Control Rule for Rebuilding Pacific Halibut Across its Northern Pacific Region

Considering that the stock status is at one of its lowest levels in the history of the fishery, the logical first step in stock conservation would be to adopt an absolute lower limit on coastwide spawning stock biomass, below which all directed fishery removals would cease. (See comments to proposal C5 by NPFA IPHC-2025-AM101-PropC5) Using unfished biomass as the primary indicator of the health of the stock, while allowing that metric to be estimated over very short periods of time (annually) allows the stock to be fished down without any changes in target exploitation rates, as long as the models estimate that incoming recruitment has been low. In other words, as long as the models conclude that the primary reason for current poor stock status is the environment ("we're just going through a period of low productivity"), then this policy places no burden on fisheries to reduce their impacts.

First, this seems somewhat inconsistent with the basic philosophy of fishery management, which is typically designed to respond most strongly when stock status is poor. Second, it also rests on what may be a flawed assumption: that declining recruitment has little or nothing to do with declining stock status. Specifically, the assumption behind this policy is that there is no stock-recruitment relationship at any as-yet observed stock size and there will not be at the level to which the stock will be reduced (or held) at current harvest rates. For Pacific halibut, this has been suggested as a hypothesis. But, it would be an exaggeration to suggest that this is a known reality, especially at historically low spawning stock abundances. And, if this hypothesis is wrong, then continuing to fish the stock even lower could result in reduced recruitment potential from which the stock may not be able to easily recover.

The danger of damaging the stock's recruitment potential only increases when all sources of pre-recruit mortality are not known or cannot be accurately estimated in the models: that is, when the models have difficulty properly gaging early-age abundance and therefore have increased potential to errantly assume environmental causes as the reason for low recruitment at first fishable (or, surveyable) ages.

For Pacific halibut, true abundance on nursery grounds is simply unknown, causes of early natural mortality are not well understood, and juvenile mortality from bycatch fisheries is not easy to quantify. The latter has likely become more difficult with the adoption of expedited release in trawl fisheries (Deck sorting… see research needs), reducing the amount and quality of data on fish condition prior to release, and therefore associated discard mortality rates.

Again: the logical solution for preventing the spawning stock from being fished to critical levels – and for buffering assessment recommendations and underlying harvest policy against uncertainty about pre-recruit mortality – would be to adopt an absolute-abundance "floor" on spawning stock biomass.

This would be consistent with the SRB's recommendation. Below this floor, all targeted fishing should cease. At some level above that floor, fishing at "full" exploitation rates could resume. The IPHC once used such an approach. The model for doing this was developed by Bill Clark and Steven Hare, and could easily be adapted for current use: 1) use the current assessment ensemble to estimate the lowest coastwide spawning stock that has been observed during the history of the fishery; 2) close the fishery if and when the stock reaches that level in the future; 3) allow fishing to resume at full target exploitation rate at 1.5 times that level (or some other reasonable multiple of the minimum, as MSE exercises might suggest); 4) apply a sloping harvest control rule between those two points.

No allocation procedures should allow for removals that are forgone in one region (for example, as a result of reduced fishing pressure) to be reallocated to another region. In other words, the "zero sum game" should be prohibited. Moving removals from one area to another – on paper, after stock distribution has been determined via the assessment models – is not consistent with actual movement of fish among areas and should be expected to result in harvest rates in excess of target in the areas to which quota is "moved", potentially leading to local depletion. The intent of the proposed measure is to relieve the spawning stock from excessive directed fishing pressure, not simply move that pressure from one region to another.

Additionally, it would be helpful to take a closer look at stock demographics – perhaps by Regulatory Area or Bioregion – to look for additional signs of reduced stock health beyond simply biomass. For example, has there been an erosion of age structure or sex ratio in any region over the last decade or so? Reduced age structure can be a sign of having harvested at levels that are higher than optimal. Similarly, skewed sex ratios represent unnatural conditions in most stocks and tracking the amount of skew as cohorts progress can provide a logical check on the effects of harvest rates and the degree to which they may be mis-specified. Perhaps these analyses have already been conducted and their results simply need to be shared with the fleet? Simple plots of these types of information used to be part of stock assessment presentations (they were routinely presented by Bill Clark and Steven Hare) but seem largely absent in recent history.

Once a lower limit on spawning stock biomass has been established, then take a harder look at spatial stock structure and how best to account for that. Halibut are known to occupy distinct spawning grounds along the shelf edge – generally in submarine canyons – and larvae settle into and are reared in specific nursery grounds that are located in shallow water along the coast. The pelagic larval phase connects spawning grounds to specific nurseries, which can only be populated by the limited number of spawning grounds that are "within reach of them" with respect to coastal currents. Because of this, not all spawning stock is equal in terms of its contribution to recruitment. And the loss of any spawning ground might result in the loss of an unknown number of nursery grounds. Throughout the history of the IPHC, a basic objective of the harvest policy has been to maintain spawning stock distribution over time, and one of the best reasons to pursue that objective is to make sure that recruitment potential – defined as nursery output – is maintained throughout the entire range of the stock. Calculating spawning stock biomass metrics based on a single, coastwide value cannot ultimately achieve this objective and should be reviewed and modified as soon as possible; after a coastwide minimum spawning stock biomass limit has been adopted.

Action:

The proposer requests that the Commission direct staff to develop spatial control rules by bioregion as well as an absolute overall minimum spawning biomass amount as NPFA proposes.

As a stakeholder we do not want to see SSB fall any further. We are willing to sacrifice the economics of the fishery to protect future spawning potential. We request the Commission adopt this as a policy:

"Maintain the coastwide female absolute spawning biomass above the level estimated for 2023."

"The MSAB noted that a new objective to maintain the coastwide TCEY above a threshold may also be useful" (IPHC-2024-MSAB020-R, para 16) A new objective related to fishery performance could be phrased as:

Maintain the coastwide female absolute spawning biomass (or FISS WPUE) above the level estimated for 2023."

https://www.iphc.int/uploads/2024/12/IPHC-2025-AM101-12-MSE-and-HSP.pdf

APPENDIX V

Statement by Malcolm Milne (President, North Pacific Fisheries Association)

Section of IPHC Fishery Regulations or regulatory proposal reference the comment will refer to	IPHC-2025-AM101-PropC5

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January 23, 2025

International Pacific Halibut Commissioners and Subsidiary Bodies,

The North Pacific Fisheries Association (NPFA) is a commercial fishing industry group based in Homer, Alaska. NPFA is comprised of around 70 members who fish multiple gear types for a variety of species throughout Alaska, many of whom are directed halibut fishermen. NPFA has a long history of participation on the IPHC Conference and at least two former Commissioners, Drew Scalzi and Don Lane, were members of our association.

NPFA introduced regulatory proposal C5 in response to our serious concerns with the state of the pacific halibut fishery.

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Additional risks not included in this analysis: Directed commercial fishery catch rates coastwide, and in nearly all IPHC Regulatory Areas were at or near the lowest observed in the last 40 years. The absolute level of spawning biomass is also estimated to be near the lowest observed since the 1970s. The directed commercial fishery transitioned from the 2005 year-class to the 2012 year-class in 2022, with the 2012 year-class again the most numerous in the landed catch in 2023-24. This shift from older to younger (and smaller fish) has contributed to observed reduced catch rates. The current spawning stock is heavily reliant on the 2012 and now 2016 year-classes. Environmental conditions continue to be unpredictable, with important deviations from historical patterns in both oceanographic and biological processes observed across the stock range in the last decade.

The anecdotal information from NPFA fishermen corroborates these concerns. Where a bad set used to be measured by a few hundred pounds it's now a few fish. IPHC-2025-AM101-08 Rev_1 Table 2 shows that Directed commercial fishery landings were only 82.6% compared to 95% in 2019 (iphc-2020-am096-05 Table 2). Red flags abound.

At these low levels and uncertain times we urge the IPHC to be precautionary and adopt an absolute spawning biomass threshold to protect the Pacific halibut stock from unknown consequences.

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On the dangers of using "Dynamic B_0"as an SSB reference value, with no lower biomass bound:

The IPHC employs harvest control rules in which pre-established harvest rates are applied regionally if female spawning stock biomass (SSB) is above a specified reference level (i.e., "threshold"), then decline to zero as SSB approaches a critical minimum value (i.e., the "limit") below which fishery closure would occur. The rule is sound in principle. However, its real-time application is dependent upon the definition of an appropriate SSB reference level, the nature of which has changed over the last ~20 years. At one point threshold and limit levels were established as empirical values that referenced the lowest historically observed SSB, based on the logic that (Clark and Hare 2006): "*We can have some confidence … of stock dynamics at those spawning biomass levels, but not at lower levels. There is no compelling reason to allow spawning biomass to drop below the minimum limit. … If a stock has been monitored long enough to observe a descent to, and recovery from, a low point then that low point may be a "safe' minimum limit.*"

The minimum historical SSB level and yearly estimates were calculated solely within IPHC Regulatory Areas 2B+2C+3A (i.e., the "Core Areas"; Clark and Hare 2006). The limit (fishery closure) based on minimum observed Core Area SSB was estimated to be 64 million pounds of mature females (Clark and Hare 2006) and the threshold (i.e., resulting in reduced harvest rates) was set at 1.5 times the minimum observed SSB. From what we can tell, with the development of a coastwide stock assessment, the SSB reference level was broadened to be an estimate of coastwide "Unfished Biomass" (B_0): i.e., the estimated coastwide biomass of mature females that would theoretically occur in the absence of fishing mortality. Initially, this was calculated as a long-term average (Hare and Clark 2008), thereby representing an SSB equivalent of using Maximum Sustainable Yield (MSY) to estimate long-term stock productivity. The change to coastwide B_0 would theoretically achieve the same management result as the use of Core Area SSB; but, allow for the entire distribution of SSB in IPHC Convention Waters to be considered and conserved. In 2007, coastwide B_0 of mature females was estimated to be ~750 million pounds, with a "30-20" rule applied to derive the threshold and limit values (Hare and Clark 2008). That is, the threshold was defined as 30% of coastwide long-term B_0 (i.e., ~225M pounds) and the limit set at 20% of B_0 (i.e., ~150M pounds). By 2018, Management Strategy Evaluation included calculation of B_0 as a "dynamic" value that was annually recomputed, as opposed to simply representing a long term "static" average (Hicks and Stewart 2018). Since 2019 the reference points have "*been based on recent biological conditions rather than a long-term static average*" (Stewart and Hicks 2022). In theory, the use of static B_0 should work well in stocks that demonstrate at least some degree of stock-recruitment relationship, because reductions in fishing effort should then be expected to result in increases in spawning biomass that will translate into increased recruitment and stock productivity. Alternatively, in stocks whose recruitment levels and productivity are driven exclusively by environmental conditions, and in cases where changes in the ecosystem alter average productivity to such a degree that long-term averages (of both yield and SSB) do not reflect current conditions, static B_0 may not reflect the stock's current functioning. Using dynamic B_0 reference points in cases where stock status is governed by environmental drivers may improve management responses to changing biomass (Bessel-Browne et al 2022). However, "*where environmental drivers are not responsible for stock decline, the stock may be overfished to collapse as the limit reference point is allowed to decrease to low levels*" (Bessel-Browne et al. 2022). Prior analyses (Clark and Hare 2002) have suggested that recruitment variability in Pacific halibut may be governed by prevailing environmental conditions, such that dynamic B_0 may represent a logical choice for this species across at least some range of absolute abundances.

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However, the use of dynamic reference points while a stock is trending downward, or using assessment models whose recruitment estimates rely on abundance data that are collected at ages that are older than the those at which the species is first subjected to fisheries-induced mortality (including non-directed fishing mortality), may fail to respond to fisheries-induced stock declines by continually downgrading the expectation of stock health: that is, by ratcheting B_0 downward every year, along with its associated threshold and limit values, and therefore assuming that further reductions in biomass would be inconsequential. Ultimately, stock failure can be expected even in stocks for which empirical stock-recruitment relationships cannot be defined, once spawning biomass is reduced to some, generally unknown, level. For example, the failure of Atlantic cod stocks in New England and eastern Canada to fully recover from accidentally prescribed overfishing in the 1980s is thought to have been the result of having depressed that stock below a critical level, at which recruitment potential remained chronically depressed due to a variety of ecological processes that the depleted stock could not overcome (for example, see: Lilly 2008, Sguotti et al. 2019). Additionally, continually fishing SSB downward in populations that are spatially structured (for example, are composed of a series of spawning grounds connected to distinct nursery areas; for Pacific halibut, see: St. Pierre 1984, Norcross et al. 1997, and Sadorus et al. 2020) runs the risk of eliminating spawning components and behavioral contingents to such a degree that stock components are eventually taken “off line” and recruitment is reduced to a greater degree than the observed decline in SSB (for example, see: Bui et al. 2011, Guan et al. 2018). **Unless it is clear that further declines in spawning biomass will have no impacts on recruitment potential or yield, then using dynamic B_0 in conjunction with no empirical lower limits may amount to an experiment whose result is to determine at what point the harvest strategy will fail, by causing recruitment and yield to decrease to a level from which the stock should not be expected to recover.**

<u>On use and computation of a fixed threshold and limit:</u>

It is unclear whether the reduction in coastwide halibut biomass over the last ~15 years represents a shift in the ecosystem that no longer supports high abundance, or the decrease is the result of having persistently fished the spawning biomass to a point where recruitment has finally been compromised. To account for the possibility of the latter, it would make sense to establish an empirical lower limit for coastwide spawning stock biomass (SSB), below which directed removals would cease, and above which the sloping harvest control rule (HCR) would be applied. The low-biomass HCR could take the same form as the current rule but would reference an empirical lower limit instead of short-term B_0. The existing ensemble of assessment models produces estimates of historical and current SSB (See: IPHC-2025-AM101-11, Figure 7) that should be appropriate for generating an empirical lower limit and the associated threshold above which harvests would return to maximum target levels. Using the logic of Clark and Hare (2006), the coastwide lower limit would be set at the coastwide SSB from the current ensemble (e.g., average the four models) that is estimated to have occurred in approximately 1974 (IPHC-2022-sa-01.pdf, Figure 5), noting that the even lower values estimated to have occurred around 1930 are likely to be imprecise due to lack of abundance data and directed halibut fisheries having not yet expanded westward. To account for uncertainty in the models, this empirical lower limit would be “buffered” (i.e., increased to become more conservative) by a proportion that is equivalent to no less than the magnitude of any retrospective bias currently observed in the recent models. For example, IPHC-2025-AM101-11, Figure 7, demonstrates that the SSB that was estimated for 2023 was downgraded in both the 2024 and 2025 assessments.

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Established 1955

The minimum proportional buffer (increase) to the lower limit, based on these observations, would then be the percentage that the estimated 2023 value decreased between the 2023 and 2025 model runs. This buffer might be increased further to account for additional uncertainties in stock status, such as current relative status of directed fishery CPUE, harvested age structure, shifts in spatial distribution of the stock, and concerns over the potential for "hyperstability" in model estimates due to incomplete survey coverage that is biased toward high-CPUE stations. Following Clark and Hare (2006), the threshold at which full target harvest levels would resume would be set at 1.5 times the buffered empirical lower limit. Harvest rates would decline linearly between that threshold and the empirical lower limit. When B_0 is estimated to be above the empirical lower limit, current harvest control rules (i.e., based on B_0) would apply.

Sincerely,

G Malcolm Milne

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President, North Pacific Fisheries Association