

STAFF WHITE PAPER ON RISK MANAGEMENT FRAMEWORK

Over the last few years, the Pacific Fishery Management Council (Council) has started to have conversations revolving around the risk management of its fisheries. Risk is the possibility that a decision or action leads to an outcome that differs from what was intended and with consequences that matter. Risk can be managed in many ways, for example, through establishing harvest specifications and implementing management measures, and, sometimes the approaches do not match the risk. Most recently, these questions arose in the context of the widow rockfish harvest control rule and the setting of harvest specifications for the 2027-2028 biennium. In 2025, the widow rockfish assessment showed a substantial change in the stock status and projections that would have resulted in significant socio-economic impacts under the default harvest policy that are disproportionate to the stock status which was expected to stay above the management target. The Council therefore considered an alternative harvest policy that would continue to prevent overfishing while moderating the socio-economic impacts.

Based on the Council's conversations and statements from the advisory bodies, and as highlighted in the Problem Statement for the "Harvest Specifications and Management Measures Flexibility" ("Spex Flex") agenda item (Agenda Item G.7, Attachment 1), two main issues appear to be impacting the groundfish fishery that stakeholders and the Council hope to address through this risk management action:

1. Instability in harvest specifications and fishing opportunities
2. Underutilization of the resource, specifically due to constraining or choke stocks

A discussion of these items can be found under the Spex Flex analytical document (Agenda Item G.7, Attachment 1) under "Additional Background." While the Spex Flex agenda item is focused on making targeted improvements within the current framework in the Groundfish Fishery Management Plan (FMP), including incorporating measures introduced through the 2016 National Standard (NS) 1 Revisions, this item takes a broader look at the groundfish management framework, how it addresses risk, and how the Council's adaptive management framework could be modified.

The "Spex Flex" agenda item also identified the need to develop efficiencies that could be built into the overall groundfish process to provide additional capacity to work on other new management measures. In looking at the Council's risk management framework, the Council may want to review and potentially revise its overall framework based on the fishery conditions being experienced today rather than the ones that were in place at the time most of the framework was implemented (early 2010s). At that time, the groundfish fishery was dealing with several overfished species, new NS 1 guidelines that required a change to our specifications framework, along with the recent implementation of the trawl catch share program. The fishery is now facing different primary challenges, including a lack of reaching the FMP's economic goals and objectives and the impacts of changing ocean conditions. The framework that the Council has been operating under for the last couple of decades has achieved conservation success under multiple, overlapping stressors. The Council is now looking to reconsider that framework in order to allow its management of the groundfish fishery to be more adaptable and flexible, while still meeting its Magnuson-Stevens Fishery Conservation and Management (MSA) mandates.

The system by which the Council manages groundfish can be thought of in three distinct, but connected categories: assessments, harvest policy, and then management measures/catch controls. These three areas feed into each other with stock assessments endorsed as best scientific information available (BSIA) by the Council's Scientific and Statistical Committee (SSC) providing the information used within the harvest policy to set harvest specifications and reference points (overfishing limits (OFLs), acceptable biological catch (ABCs), and annual catch limits (ACLs)) and the management measures/catch controls being what the Council uses to keep catch within those specifications. Each of these areas contains different types of risk or uncertainty: assessments have inherent scientific uncertainty, with typical groundfish assessments providing the likelihood of various outcomes occurring based on differing assumptions; specifications are set based on scientific and/or management uncertainty; and the management measures/catch controls are based on expected fishery performance, including the likelihood of low probability events (e.g., lightning strikes or unanticipated effort shifts) that may occur due to the nature of the groundfish fishery.

The Groundfish FMP's management framework is an adaptive management system and these three categories (assessments, harvest specifications, and management measures) are key components of that system. The Council receives information (whether through assessments or inseason) and can use that information to inform its management decisions. Adaptive management in general is a way of making uncertainty manageable by connecting management decisions to monitoring, evaluation, and adjustment processes. Where scientific and management guardrails are in place (i.e., MSA), reviewing the Council's adaptive management approach could help the Council consider greater flexibility in its approach to risk management while maintaining a structured way of identifying and responding to adverse outcomes.

The Council and its advisory bodies have discussed several ideas pertaining to assessments, harvest policy, and management measures that could be considered in this agenda item. At this scoping stage, Council staff are proposing a systematic approach to work through the proposed ideas in the context of other timing considerations (e.g., 2029-2030 specifications), capacity, and order of operations.

Summary of Proposed Action Items

The following is a brief summary of the proposed action items considered in this white paper.

Proposed Assessment-Related Actions

Explore Alternative Stock Assessment Approaches

- Request additional information and consideration from NOAA Science Centers and the SSC regarding the use of alternative models (such as those used in assessing Pacific halibut and Pacific whiting) to better understand uncertainty and risk associated with management decisions.
- Consider a more adaptive approach to addressing uncertainty and research and data needs identified in assessments

Proposed Harvest Policy Actions

Review and Potentially Revise OFL Harvest Policy:

- Review and evaluate the current FMP provisions and consider whether greater use of constant catch OFLs could improve stability, recognizing the potential for increased biological risk.
- Evaluate whether existing proxies for determining OFLs remain appropriate given advances in scientific understanding of stock productivity and life history.
- Explore whether stock-specific proxies tied to biomass management targets (e.g., B40%) could better achieve management objectives for select stocks, as demonstrated by the recent widow rockfish decision.

Evaluate a Multi-Year Catch Policy

- Consider adding the NS 1 Guideline provision that allows for evaluation of overfishing determination or implementation of accountability measures over a multi-year period

Reevaluate the P*/Sigma Framework

- Consider increasing the current maximum P* value of 0.45 to a maximum of 0.5
- Review and potential revise the current P*/sigma framework to better account for biological, economic, and management considerations when setting ABCs.

Formalize Use of Risk Tables:

- Adopt an FMP amendment to formalize the use of risk tables in setting of baseline sigma
- Consider additional uses of risk tables, including supporting more adaptive management as environmental conditions or fishery conditions change.

Modify ACL Projection Assumptions

- Evaluate alternatives to current stock assessment projections that assume 100% ACL attainment, including using expected mortality or historical attainment rates in projections.

Proposed Management Measure Actions

Investigate Use of the Mixed-Stock Exception

- Examine whether the NS 1 Guideline mixed-stock exception could increase access to healthy stocks that are constrained by low-ACL species and provide flexibility while preventing stocks from becoming overfished.

Review Allocation and Harvest Guideline Frameworks

- Consider how the Council sets allocations/HGs/etc. and if the currently identified AM is the appropriate tool for response, or what the management response should be.
- Consider reallocation or the development of a framework to reallocate allocations inseason.
- Consider other changes to its management framework intended to increase attainment, such as those proposed in the WDFW proposal for canary ([Agenda Item C.7.a., WDFW Report 1, April 2026](#)). The WDFW would need further development based on comments from NMFS ([Agenda Item C.7.a, Supplemental NMFS Report 1, April 2026](#)).in that NMFS identified concerns with the proposal as potentially running counter to the SSC's role in setting ABCs under the MSA and the application of a post-ABC attainment factor could result in the overallocation of the fishery resource above that ABC.

Reconsider At-Sea Set-Aside Management

- Evaluate whether current management of non-whiting groundfish in the at-sea whiting sector should continue as functioning as estimates of expected bycatch via set asides or be converted to alternative accountability structures such as harvest guidelines or performance standards.

Develop If/Then Management Frameworks

- Explore use of pre-established management responses that would trigger automatically when specified biological, fishery, or environmental conditions occur.

Assessments

The Council stock assessment process involves multiple steps including development, review, and implementation, each of which include the consideration of various factors including risk. Assessments can provide alternative views of uncertainty that could be used in management, which is related to risk, but changes to assessment methodologies or the actual changing of assessment models falls to the National Marine Fisheries Service (NMFS) Science Centers, with guidance from the SSC. If the Council is interested in further investigating the following or additional stock assessment methodologies, the Council should request the Science Centers bring back additional information on how and if these types of assessments could be used for West Coast groundfish. This report back may be more appropriately aligned with the biennial stock assessment prioritization agenda item, in concert with NOAA capacity discussions typically brought to the Council in the spring of even years, or during the methodology review process for stock assessments brought in the fall of even years.

The Council's current stock assessments typically consider identifying alternative models and sensitivities, use the "best" model (aka the base model) that represents the best estimate of stock biomass, and are considered risk neutral. Current groundfish assessments contain a two-way decision table which illustrates the repercussions of uncertainty to management decisions. One of the axes of the decision table is the alternative model, usually based on either the current year spawning biomass or based on the likelihood profile of an estimated parameter. The "low" and "high" states of nature are reflected as being half as likely as the base model (i.e., probability of 25:50:25 across the low:base:high states of nature). The other axis is the management decision, which may show different catch streams or P^* assumptions. Further details can be found in the Groundfish Terms of Reference (TOR).

While the current decision table is a type of ensemble model for describing uncertainty, there is potential interest in looking at other ensemble model types. One alternative approach that could be examined is an ensemble model such as that used in the Pacific halibut assessment conducted by the International Pacific Halibut Commission (IPHC). An ensemble model is a set of multiple stock assessment models run together, whose results are combined to produce more comprehensive estimates of a fish stock's status and advice for management. In the IPHC process, the stock assessment authors use an ensemble of four different stock synthesis models.

"The current ensemble explicitly captures two critically important dimensions of uncertainty: how the time-series data are used via short and long models, and how the spatial information is treated in the models via data aggregation to the level of Biological

Regions treated as separate fleets (AAF) or to the coastwide level. Inclusion of these sources of structural uncertainty results in wider confidence intervals than are commonly seen in single-model stock assessments (Stewart and Hicks 2019a).” (IPHC, 2026) A full description of the model can be found in IPHC, 2026.

While the ensemble method for stock assessments could provide a path to a broader understanding of stock status and uncertainty, it requires more resources (time, modelers, etc.) than the Council’s current approach to determining stock status and does not always result in an improved prediction (Dormann et al. 2018). There would also be a learning curve for the Council, advisory body members, and the public to understand how to interpret the results of these models and how they apply to management compared to the current modelling approach.

Another type of assessment process that could be investigated is the one used in the U.S.- Canada management of Pacific whiting. Instead of an ensemble model, one or two potential base models are proposed (based on an investigation of multiple possible models) and included in the assessment document, however, only one model is selected for use for direct management application. Compared to groundfish assessments, the Pacific whiting assessment uses a statistical catch-at-age model applying a Bayesian estimation approach. In short, a Bayesian approach allows estimation of an unknown parameter(s) by combining known information with observed data. The assessment model applies alternative removals (i.e., fishery harvest) assumptions in the projection period and reports the probabilities of the projected spawning biomass, fishing intensity, and projected catches relative to management proxies based on the alternative removal assumptions during the projection period. The different catch scenarios used in the projections are defined by specified catch levels for the stock for the next three years (shorter timeline than in other groundfish assessments because Pacific whiting is assessed annually). The goal of this method is to better allow managers and assessment authors to adjust catch levels to achieve specific probabilities of exceeding specific reference points within a single model, for example.

While some stocks are managed with model-based assessments with high degree of certainty, some groundfish stocks may have limited data or assessments with substantial uncertainty, or assessment results that provide limited stakeholder confidence in estimates of status or yield. The Council and its SSC therefore may want to reconsider its current process for addressing the uncertainties or data needs coming from an assessment. For example, currently, stock assessments note areas of uncertainty and identify research and data needs. Those uncertainties and needs are then taken into consideration when the SSC determines the category of the assessment, when the Science Centers begin development of the next stock assessment, and may influence future research and data collection efforts by the Science Centers. However, in the case of an assessment that is highly uncertain with a wide range of possible stock conditions or resulting catch levels, the Science Centers, SSC, and the Council may want to consider developing a more adaptive approach. This approach could not only identify the sources of that uncertainty and research and data needs (what currently occurs), but also establishes a plan to collect additional information to close the uncertainty gap. Additionally, consideration of a more adaptive management approach includes an alternative, but a scientifically justified method, for establishing specifications outside of applying the default policy to the assessment, that could be developed. While this affects the harvest policy, it is discussed here as it is related to developing this more adaptive approach in response to assessments and uncertainty and overall risk. As information is gained, the Council, SSC, and management staff could evaluate that information and determine whether the information improves the understanding of appropriate catch levels.

Harvest Policy

The Council's groundfish harvest policy contained in the FMP describes the framework by which stock assessment information is used to develop reference points through a series of sequential steps that takes into account scientific and/or management uncertainty. The SSC recommends the status determination criteria (OFLs) to the Council and the Council and its SSC use harvest control rules (HCRs) to establish ABCs and ACLs for managed stocks from the OFL.¹ There are currently several key status determination criteria and reference points in the FMP, which are defined in Section 3 in Agenda Item G.7., Attachment 1 and can be found in the glossary of terms.

Potential Action Items Related to the Harvest Policy

Based on prior comments, recommendations, and other feedback from the Council and its advisory bodies, Council staff have identified the following as potential action items related to the Council's harvest policy that could potentially address some of the problems described above.

Overfishing Limit

The NS1 Guidelines (50 CFR 600.310(e)(2)) define the OFL as:

Overfishing limit (OFL) means the annual amount of catch that corresponds to the estimate of MFMT applied to a stock or stock complex's abundance and is expressed in terms of numbers or weight of fish.

Where MFMT is:

Maximum fishing mortality threshold (MFMT) means the level of fishing mortality (i.e. F), on an annual basis, above which overfishing is occurring. The MFMT or reasonable proxy may be expressed either as a single number (a fishing mortality rate or F value), or as a function of spawning biomass or other measure of reproductive potential.

The groundfish FMP defines the OFL for managed stocks as the maximum sustainable yield (MSY) harvest level associated with the current stock abundance. MSY is defined at 50 CFR 600.310(e)(1)(i)(A) as "the largest long-term average catch or yield that can be taken from a stock or stock complex under prevailing ecological, environmental conditions and fishery technological characteristics (e.g., gear selectivity), and the distribution of catch among fleets." Over the long-term, if OFLs were fully harvested, the average of the OFLs would equal MSY. The Council uses a FMSY (fishing mortality rate to achieve MSY) approach to determine the OFL rather than the estimated MSY. Specifically, the groundfish FMP uses a proxy for FMSY to set the OFL for managed stocks (where possible). These FMY proxies have changed over time as new information on the recruitment and life history of groundfish has been learned.

As described in Section 4.3.1 of the FMP, in the 1990s, the Council began using a standard harvest rate of F35% as the F proxy, whereas previously it had used different F rates depending on the information then available. However, studies in the late 1990s showed that this rate was likely too aggressive for some groundfish stocks and that the productivity and recruitment within these stocks

¹ The OFLs and ABCs for managed groundfish stocks are science-based reference points set by the SSC, and which are set to account for scientific uncertainty. The Council sets a stock's ACL. In setting the ACL, which cannot be higher than the ABC, the Council accounts for management uncertainty and other factors.

was too low in some periods to support this fishing level. This resulted in steep declines of some of the FMP-managed stocks. Therefore, the SSC recommended, and the Council adopted, a new set of FMSY proxies in 2001: F40% for flatfish and whiting, F50% for rockfish (including thornyheads), and F45% for other groundfish such as sablefish and lingcod. New scientific analyses and information then supported the SSC recommending that the Council change the FMSY proxy harvest rate again to F30% for flatfish in 2009 and F50% for elasmobranchs in 2014. Since the development of these harvest policies in the early 2000s, there has continued to be an increased scientific understanding of rockfish productivity and life history. For example, there has been further analysis regarding steepness (h), or the strength of recruitment compensation; in other words how survival of larval and juvenile fish responds to changes in population sizes. The value of h “represents the proportion of average unfished recruitment achieved on average at 20% of unfished spawning output, where $h = 0.2$ represents no recruitment compensation and $h = 1.0$ represents constant recruitment for all levels of spawning output” (Thorson, et. al 2019). It is difficult to estimate steepness for most stocks; therefore, the SSC has endorsed use of a proxy for stocks where steepness is not estimated in the assessment. Thorson, et. al 2019 notes that “While the regional meta-analysis has been successful in ensuring a consistent approach to treatment of steepness across assessments, the estimates of mean steepness have been unexpectedly variable as the meta-analysis has been updated.” The initial value of 0.58 was first adopted in 2005, with updated estimates ranging from 0.69 to 0.78 (current estimate is 0.72 as noted in Thorson et. al 2019 and documented in the [Groundfish Accepted Practices Guidelines](#)).

Under the default harvest policy, the OFL is set at the SPR X% applied to the current and projected estimated biomass where SPR is the spawning potential ratio and X is a determined percentage.

“SPR is defined as the spawning output at a given fishing rate relative to that of an unfished stock. It can be expressed as a ratio or as a percentage, but, in either case, it is a declining function of the fishing rate (F) with a peak value at $F = 0$. A fishing rate of $F = F_x$ corresponds to $SPR = X\%$, i.e., SPR that is X% of the unfished stock. When SPR reference points are used as proxies for MSY reference points, the current rate of fishing is compared to a pre-specified F_x to measure whether overfishing is occurring.” (Shertzer, et al 2024)

So, in the case of rockfish in the groundfish FMP, the current OFL is based on SPR50, which corresponds to the F50% rate. This F rate was designed to achieve the management target of spawning biomass at 40% (or B40% or SB40).

The constant F policy is one of the three most common types of policies or HCRs (if referring to an ABC or ACL) used by regional fishery management councils, with the other two being constant catch and constant escapement. Free, et al. (2022) describes the pros and cons of each type of HCR:

“Constant catch rules avoid the need for stock assessments and theoretically facilitate stable catches; however, establishing an appropriate level of constant catch is challenging as constant catches lead to high exploitation rates at low stock sizes. Constant escapement rules hold stock size as close to the target size as possible by setting catches equal to the difference between the current and target sizes. They are generally thought to maximize long-term yields, but result in highly variable catch limits, including years with zero harvests. As a result, these rules are generally only viable for fisheries that exploit a large number of independent stocks and are therefore buffered against the economic impacts of high catch variability (e.g., salmon fisheries on the west coast of the United States and

Canada). Constant F rules set the catch equal to a fixed proportion of the current stock size [*as modified by selectivity*]; thus, they limit catch variability while also being responsive to fluctuations in stock size (i.e., lower catch limits at lower stock sizes).”

Table 1 below is a summary table of the three main types of policies/HCRs. Note that, generally, these HCRs are applied at the ABC or ACL level. However, examples are provided where that type of policy is used to determine OFLs.

Table 1. Summary of common harvest policies

Policy	Description	Advantages	Disadvantages	Example
Constant F	F applied to stock size	Responsive to stock fluctuations	Instability to fishery	Most Pacific Coast FMP GF stocks
Constant Catch	Constant value, regardless of stock size	Stability	Increased risk to stocks	Atlantic Wolfish, Ocean Pout (NE), some Category 3 Pacific Coast FMP GF stocks
Constant Escapement	Catch = difference between target and current stock size	Maximizes long term yields	Highly variable limits (including zeros)	West Coast Salmon

While constant escapement rules may not be applicable to the groundfish stocks managed under the FMP, through this action the Council and its SSC may want to consider reviewing and potentially further utilizing the provision for constant catch OFLs as outlined in the FMP for Category 1 stocks:

“In general, OFL will be calculated by applying F45% (or F40%, F50%, or other established MSY proxy) to the best estimate of current biomass. This current biomass estimate may be for a single year or the average of the present and several future years. Thus, OFL may be intended to remain constant over a period of two or more years.”

Constant OFLs are already used for several Category 3 stocks (as noted above) and further review and consideration could be made for Category 2 stocks with further development of the FMP to describe these approaches.

The potential review of the current FMP language for defining OFLs would be related to the use of constant ABCs/ACLs, which can currently be recommended. While the Council already has the ability to recommend constant catch ABCs (subject to SSC recommendation) and ACLs, the use of the constant catch ABC/ACL may be limited depending on the OFLs’ year-to-year variation (i.e., the constant catch ABC/ACL may result in a larger buffer one year between the OFL and ABC and minimal buffer the next year between the OFL and ABC). As noted in Agenda Item G.7., Attachment 1,

“...management strategy evaluations have shown that increasing catch limits can lead to more fishery instability and that reducing the interannual variability in catches may be best

achieved by lowering harvest rates if stability is the goal (Deroba and Bence 2008, Wetzel and Punt 2017)”.

Therefore, while the SSC can recommend an OFL value based on the BSIA, at their discretion, the framework within the FMP could be reviewed and examined to create additional clarity and flexibility for the SSC on how to define the OFL for groundfish.

As noted in Table 1, an F rate approach, which is used for most West Coast groundfish stocks, is sensitive to fluctuations in stock size; meaning the constant F policy can create instability in the fishery associated with variability in stock assessment outcomes. While fluctuations in stock size are inherent in the stock assessment process (due to changes in scientific understanding of the stock or changes in climate as examples), several recent assessments (e.g., widow rockfish, California quillback rockfish, sablefish, etc.) have highlighted the downside to the F rate approach because the results of those assessments, while BSIA, have represented significant changes in the scientific understanding of stock status and thus have resulted in large changes (increases and decreases) in available yield to the fishery between biennia. These changes dramatically impact the operation of the fishery and create instability for the fleets, in the markets and otherwise.

In comparison to an F rate approach, a constant catch policy could create stability by allowing for better long-term harvest planning and allow commercial businesses to create more stable selling opportunities to markets. While an F rate approach does allow fisheries to harvest higher amounts and have greater opportunities when the population is larger, a constant catch policy could restrict catches in certain years (including when large swings in recruitments may result in higher encounter rates). A constant catch OFL could also result in higher risk to the stock (as it could result in a high exploitation rate at low stock sizes). Constant catch OFLs (and ABCs) are used in other U.S. fisheries, such as Ocean Pout, Gulf of Maine winter flounder, and Atlantic wolffish (NEFMC, 2025). However, these stocks are assessed using an index method and the New England Fishery Management Council (NEFMC) notes that it is not possible to project stock sizes for those stocks. Accordingly, a constant catch OFL may be a better approach for stocks without frequent assessments (which is how most of the Category 3 stocks under the groundfish FMP are currently managed).

In addition to reviewing and potentially clarifying the OFL harvest policies available, the Council and the SSC may also want to consider reviewing and potentially updating the current F proxies being used in the constant F rate OFL harvest policy to reflect any new science available. For example, the current F proxies for some stocks or guilds may be too high (as is thought to be the case for elasmobranchs) and not aligned with the management target that they are intended to match. Additionally, the Council and the SSC may consider if additional OFL proxies should be added to the FMP, such as a change from an FMSY proxy to a proxy associated with spawning stock biomass at the target level (e.g., SB40 proxy for rockfish) in certain cases. As described above, the Council’s management goal (BMSY) is B40% for all non-flatfish species and the current F proxies (i.e., F50 for rockfish) were designed to hit that goal. However, application of the FMSY proxy could result in a trajectory that is higher or lower than the management target. One example of such a mismatch in the FMSY proxy and the management target was observed recently during the widow rockfish harvest specifications for the 2027-2028 biennium. In that case, the default OFL HCR for rockfish (using the SPR50 aka F50% proxy) resulted in an OFL of 4,916 mt for 2027. As shown in the widow rockfish assessment (Kinneen, et. al, 2026), a slightly more aggressive FSPR of 0.458, based on the SB40 proxy (i.e., the SPR rate needed to achieve BMSY

target, or B40, for this stock), would result in the OFL of 6,239 mt in 2027. The SSC endorsed the higher OFL based on the SB40 proxy for use in management for widow rockfish for the 2027-2028 biennium ([Agenda Item E.6.a, Supplemental SSC Report 1, June 2026](#)). In the case of widow rockfish, where spawning output is estimated in the most recent assessment, the SSC endorsed the use of the alternative proxy for determining the OFL based on the *NOAA Technical Guidance for Estimating Reference Points Used for Stock Status Determination in Accordance with the National Standard 1 Guidelines* (March 2026, Informational Report 4, hereafter referred to as the NOAA Technical Guidance). In the NOAA Technical Guidance, it recommended the use of a proxy for BMSY (B40% in this example) when unfished biomass (B0) can be estimated more reliably than the biomass that corresponds to MSY (BMSY). The SSC also noted in its statement that the widow rockfish assessment estimates total egg production rather than spawning biomass and therefore “it is appropriate to base the FMSY proxy on the F that achieves that BMSY proxy rather than on the FMSY proxy for rockfish (F50%).” At the time when the F proxies were determined for the groundfish FMP, stock assessments used spawning stock biomass; therefore, in this case when spawning output is used (i.e. egg production), as implied in the NOAA technical guidance, using the F rate that achieves the BMSY proxy may be more appropriate. Ultimately, the SSC noted that the approach recommended for widow rockfish for the 2027-28 biennium is not appropriate for all assessed stocks. It further recommended that additional analyses and reviews should be conducted to evaluate harvest strategies that depart from currently used default HCRs, which have been previously evaluated for risk.

Overall, the Council and its SSC may want to consider whether changing the default proxy used to set the OFL from a constant F to a SB proxy may better achieve the Council’s management goals for some groundfish stocks. While the mismatch between the FMSY proxy and the management target was recently seen in widow rockfish (and is likely present in other rockfish), the Council and the SSC may want to examine if other guilds (such as roundfish or flatfish) are experiencing the same issue. It is worth noting, however, that a shift to this approach would result in each stock having its own F proxy, rather than a constant across all species, and therefore may be more appropriate as an additional policy rather than a replacement for the current policy. While the Council could consider updating the FMSY proxy, as has previously done in the past to align with the more recent science, the same issues currently facing the policy would likely continue in the future as our scientific understanding of groundfish species changes.

Multi-Year Average Catch Policy

As a part of the Spex Flex action, Council staff was tasked in June 2025 to begin a dialogue with the SSC around preventing and evaluating overfishing on a multi-year time scale through ideas such as looking at average catch compared to multi-year ABCs/ACLs. In November 2025 (when the Spex Flex item was brought forward for a range of alternatives and preliminary preferred alternative), Council staff flagged that this conversation had yet to occur due to timing and workload constraints and may be better suited for the Risk Management agenda item.

Currently, the NS1 guidelines have a multi-year average catch policy related to (1) determining if a stock was subject to overfishing, and (2) inseason management response if an ACL is projected to be/is exceeded. This item is included in the Harvest Policy section of this paper as the determination of overfishing is related to the specification of status determination criteria (i.e., OFL). While the application of the multi-year average catch policy to inseason management

responses may better fit within the management measures/catch control category below, it is included here in order to allow for a full discussion of the multi-year average catch policy.

For an overfishing determination, the final rule for the 2016 NS1 Guidelines (81 FR 71858, 10/18/2016) states:

“Small amounts of excess effort or catch in a single year may not jeopardize a stock's ability to produce [maximum sustainable yield] MSY over the long term, thus an overfishing stock status determination based on that single year's reference point may not be the most appropriate characterization of stock status. To address this issue, the proposed revisions introduced a multi year approach (that may not exceed 3 years) to allow Councils to examine whether the extent to which a stock has surpassed its overfishing threshold actually jeopardizes the stock's ability to produce MSY on a continuing basis. See § 600.310(e)(2)(ii)(A)(3) of the proposed action. Using a multi-year approach to determine overfishing stock status is best used when managers believe the most recent year's data point may not reflect the overall status of the stock.” (p. 71859)

A multiyear approach is used to determine overfishing by other Councils, including the South Atlantic Fishery Management Council (SAFMC) and the Gulf Fishery Management Council (GPMC). Some Councils use a three-year average F compared to FMSY (or a proxy) from a stock assessment to determine whether overfishing is occurring, while others use three-year average of catch compared to an OFL (derived from the results of a stock assessment). Some Councils use a multiyear approach in data-limited situations, where either fishery dependent, fishery independent, or any data that could inform stock status is limited.

The *NOAA Technical Guidance* states that:

“This multi-year approach allows managers to reduce fluctuations in overfishing status determinations by using a more stable basis. The downside of such an approach is that it is less responsive to real changes of F, so it should be used only where justified...While a multi-year approach can be used for determining and reporting on stock status, it cannot be used as a basis to specify future ACLs at levels that would result in overfishing.”

For accountability measures (AM), the NS1 Guidelines at 50 CFR 600.310(g)(5) state:

“Some fisheries have highly variable annual catches and lack reliable inseason or annual data on which to base AMs. If there are insufficient data upon which to compare catch to ACL, AMs could be based on comparisons of average catch to average ACL over a three-year moving average period or, if supported by analysis, some other appropriate multi-year period. Councils should explain why basing AMs on a multi-year period is appropriate. Evaluation of the moving average catch to the average ACL must be conducted annually, and if the average catch exceeds the average ACL, appropriate AMs should be implemented consistent with paragraph (g)(3) of this section.”

In most of the cases where this provision has been applied by Councils around the U.S., it has been for the recreational sector.

The Council has looked at incorporating these provisions establishing multiyear approaches into the FMP in the past, as described in [Agenda Item E.7, Supplemental Attachment 1, June 2025](#). Most recently, the Council decided not to pursue looking at adding a multiyear approach to

overfishing determinations or the implementation of AMs to the groundfish FMP during scoping on the Spex Flex action. As noted in Supplemental Attachment 1, “This potential action could temper reactivity within the fishery if an OFL or ACL is exceeded. However, staff identified limited applicability of this policy, given the relative confidence of inseason tracking of groundfish catches compared to ACLs. Any multi-year policy would not obviate the need for inseason action to prevent exceeding an ACL. In addition, the multi-year policy is intended for fisheries with highly variable annual catches, lacking inseason information, or lacking annual fishery data. Certain groundfish sectors may meet one or more of these criteria, occasionally, but the fishery overall does not.”

In addition to having the dialogue with the SSC as outlined in the Council motion from June 2025 around multi-year evaluation of overfishing as a part of this action item, it is possible it may be useful in a more broad application of the AM provision could be evaluated as well. Reviewing the specific text from the NS1 Guidelines above, particularly the guidance at 50 CFR 600.310(g)(5) regarding AMs, for example, a multiyear policy could change the need for inseason action to “prevent” a single-year ACL overage and be in the line with the NS1 Guideline revisions from 2016.

An example situation of the potential need for a management response that could develop under a multiyear approach is shown in Table 2 below. Hypothetically, in 2029, if there were a projected exceedance of the ACL (projected harvest of 1100 mt, as compared to a 1000 mt ACL), then under the current FMP provisions the Council would need to look at the available AMs and potentially implement an AM to prevent (or limit) the ACL overage. However, if a multi-year catch policy were in place, the Council could compare the overall average mortality (projected and actual) for the stock over three years to the average ACL over that same period and if the average harvest is less than the average ACL then the Council may not need to implement AMs to constrain catch (or otherwise).

This may be an appropriate policy for Pacific Coast groundfish because, even if an ACL is exceeded once in a three year period, there may not be a biological concern for the stock, particularly in the case of those long-lived groundfish stocks managed under the FMP. However, there could be concerns with a multiyear policy if the management system is set up to potentially exceed an ABC (rather than such an exceedance occurring unexpectedly). Additionally, considering that the NS1 Guidelines refer to a multiyear approach as a means to determine overfishing or implement AMs for stocks with “highly variable catches”, this approach could be effective for certain stocks managed in the groundfish FMP that have the potential to share this characteristic. For example, some sectors in the groundfish fishery are characterized by lightning strike events, and while this variability in catch may occur on a smaller scale (at the sector level), the impacts could accumulate up to the fishery (or ACL) level, and thus a multiyear policy could be an effective way to manage an overage that occurs due to lightning strike (or series of lightning strikes) that occurs within a three year period.

Table 2. Example of mortalities (actual and projected) compared to ACL for use in multi-year catch policy

Year	ACL	Mortality
2027	1100	950 (actual)

2028	900	880 (actual)
2029	1000	1100 (projected)
Average	1000	977

P*/sigma

As described in the NS1 Guidelines (50 CFR 600.310(f)(2)), the ABC for a stock is typically set by the SSC below the OFL to account for scientific uncertainty, and the ACL is set by the Council at or below the ABC to prevent overfishing. The ABC HCR most consistently used by the Council and its SSC is the application of P^* and sigma (σ) values to an estimate of the OFL for a stock. As described in ([Wetzel and Hamel 2023](#)), “The scientific uncertainty around the estimated OFL in the final year of the assessment model is represented by σ .” The SSC has specified default σ values (i.e., baseline values) that serve as lower limits applied to data-rich, data-moderate, and data-limited assessments of West Coast groundfish species. In addition to baseline sigma, which typically is associated with the category of the assessment, the SSC also recommended and the Council formally implemented the use of a time-varying sigma for use beginning in the 2021-2022 biennium. Time-varying sigma accounts for increased scientific uncertainty as the stock assessment ages. It was presented to the Council and SSC as [Agenda Item G.3.a, Supplemental REVISED Attachment 3, March 2019](#) and formalized as Wetzel and Hamel 2023.

Note that the time-varying sigma was not incorporated into the Groundfish FMP and only exists in the groundfish stock assessment Terms of Reference (TOR). Additionally, staff have yet to discover other Councils that use a formal time varying sigma when determining harvest specifications. Some other Councils’ SSCs use ad-hoc methods (such as risk tables) to change their determination of the ABC/sigma.

P^* , or the probability of overfishing, which under the groundfish FMP is currently bounded at the upper limit of 0.45, is the Council’s degree of risk tolerance. It is the probability that the ABC for a stock is being set higher than the true, but unknowable, OFL, or that catching the ABC would result in biological overfishing of the stock. For the maximum value of 0.45, this represents a 45 percent chance that the ABC was set too high and that exceedance of that ABC would result in biological overfishing in a given year. Under the current management framework, the SSC sets the sigma value and the Council sets the P^* value; however, the SSC can also recommend an alternative ABC value outside the $P^*/sigma$ framework. This latter situation typically has arisen when the Council proposes alternative HCRs during the biennial harvest specifications process and the SSC reviews and approves the alternative ABCs. Under the default framework, P^* is bounded by a value of 0.45, which the Council adopted as its maximum during the 2011-2012 harvest specifications cycle in response to the NS1 Guideline Revisions (Amendment 16-5 to the Groundfish FMP). The Council elected to have a more risk-adverse policy (setting a maximum P^* less than the allowable maximum of 0.5), which would have the ABC set equal to the OFL. While the Final Rule for Amending the NS1 Guidelines ([74 FR 3178](#)) describes how the definition framework allows the OFL to be equal to the ABC and the ACL, NMFS notes that there are few fisheries where that would be appropriate.

The Council has considered changes to the existing P^*/σ framework in the past (see summary in Agenda Item E.7., Supplemental Attachment 1, June 2025), most recently in the scoping of the Spex Flex agenda item. An increase in the Council's maximum P^* would reduce the buffer between OFL and ABC, potentially increasing ABCs, and thus provide more fishery yield available for harvest. The measure could therefore allow the Council to be less risk-averse for some stocks, when attempting to balance socioeconomic benefits with preventing overfishing. However, an increase in the Council's maximum P^* could also result in less stability in the fishery as noted above. This action would revise the harvest specifications framework in the FMP (i.e., would require an FMP amendment). It would also take time and resources up front to consider how a new P^* upper bound would fit in with σ , including time to engage the SSC to develop and endorse an updated P^*/σ table with revised buffer amounts. A higher P^* would be less risk-averse and thus would modify the harvest specifications framework to be less risk-averse. Due to the SSC's authority under the MSA to set the ABC, the SSC would need to confirm that raising the P^* upper bound would not necessitate changes to the σ bounds in response (i.e., in a way that would negate the intended effect of the P^* change).

While the Council could look at increasing the P^* bound within the current P^*/σ framework, the Council may also want to consider a broader reconsideration of the P^*/σ framework. This was suggested by the Council's Groundfish Advisory Subpanel (GAP), which recommended the Council look holistically at the ABC HCR in June 2025 ([Agenda Item E.7.a, Supplemental GAP Report 1, June 2025](#)). Currently, all but 13 stocks managed under the FMP use a P^* of 0.45, with the other stocks' P^* being set at 0.4 in 2026. There have only been limited instances of a P^* of less than 0.45 being used to set groundfish catch limits, and no instances where a P^* below 0.4 has been applied since 2017² (noting that rebuilding plans typically do not use the P^*/σ framework). In fact, several stocks have had a P^* of 0.4 since the implementation of the P^*/σ framework in the 2011-2012 harvest specifications and have never changed. During the 2011-2012 specifications, the Council adopted a general policy of using a P^* of 0.4 for category 2 and 3 stocks. Some stocks, such as arrowtooth flounder, have remained a P^* of 0.4 since then. This could be interpreted as the Council assuming that there is the same risk of overfishing across all stocks because of the same P^* applied across all stocks. However, there is likely a different risk across stocks due to a variety of factors.

The Council therefore may want to consider whether there should be change in its P^*/σ framework for setting its ABCs that would allow the P^* to vary more across stocks to account for the actual risk of overfishing. For example, the Mid-Atlantic Fishery Management Council (MAFMC) recently modified their current risk policy in their Omnibus ABC and Risk Policy Framework Adjustment (MAFMC, 2020). In that action, the MAFMC identified two main reasons for changing its risk policy: 1) that the policy did not consider potential social and economic implications and socioeconomic objectives, and 2) that the policy applied the same level of risk for a stock that is well above target as compared to those stocks that are just above the target, resulting in foregone yield.

² At the time of development of this document, only P^* values back to 2017 were readily available. Further investigation from 2011-2016 could occur if the Council elects to move this item forward.

The MAFMC original risk policy was that the P^* (probability of overfishing) was based on the current stock biomass (B) relative to the biomass at BMSY and the life history of the species. As noted in the MAFMC, 2020,

“...the amount of scientific uncertainty that the SSC assigns to any OFL estimate also impacts the amount of the buffer and resulting ABC. The more uncertainty an OFL is deemed to have, the greater the buffer. The SSC can use the amount of uncertainty in the OFL as produced by a stock assessment... However, to date the SSC has always expanded the produced uncertainty measures (CV) because not all uncertainties are fully captured in the assessment calculations.... This expansion increases the buffers and decreases ABCs. Thus a buffer can be larger (and ABC smaller) either because the Council wants a lower risk of overfishing (P^*) and/or because the SSC determines that to actually achieve a given risk a higher degree of scientific uncertainty must be assumed and catch must be lowered.”

Ultimately, the MAFMC recommended a new approach for the ABC HCR where there was linear ramping up with a maximum P^* of 0.45 when the B/BMSY ratio is less than or equal to 1.0; a linear ramping up to a maximum of 0.49 when the B/BMSY ratio is equal to or greater than 1.5; and a stock replenishment threshold (i.e., no fishing, P^* equal to 0) when the B/BMSY ratio is less than or equal to 0.1.

Again, while the Council does not need to shift its entire system for applying its P^*/σ framework to reconsider how it determines risk of overfishing by looking at its ABC HCRs, the concept adopted by the MAFMC might be something for the Council to consider as an adjustment to how it implements P^* .

Risk Tables

As a part of Fishery Ecosystem Plan (FEP) Initiative 4, the Council recommended the exploration of the use of risk tables for setting ABCs based on those developed in the North Pacific Fishery Management Council (NPFMC). Risk tables in the NPFMC are used by the NPFMC’s SSC to assess uncertainties that exist for a stock outside of the assessment. However, the use of the risk tables is qualitative rather than quantitative (i.e., a score in a category does not result in a specific increase in the buffer). The Council most recently considered using risk tables in the application of σ for new assessments, in a parallel track, with the 2027-2028 harvest specifications process ([September 2025 Decision Summary Document](#)). The 2027 assessment documents included these “pilot” risk tables and were discussed by the SSC during the specifications process in terms of what would have been recommended for the baseline σ if the risk tables were approved for use in management (see examples in [Agenda Item G.3.a, Supplemental SSC Report 1, September 2025](#)). However, there are multiple pathways that have been preliminarily discussed for the use of risk tables, including in adjustments to P^* and/or in the application of the time-varying σ ([Agenda Item H.1.a, CCIEA Team Report 1, September 2024](#)).

The Council has yet to formalize an approach for the use of risk tables within the groundfish harvest specifications process, which would require an FMP amendment and could be considered as part of this action. Each risk table has three categories (Ecosystem and Environmental Conditions, Assessment Data, and Assessment Model Fits and Structural Uncertainty), which are assigned a level (1=favorable, 2=neutral, 3=unfavorable). During the last stock assessment cycle, there were different processes for developing the risk tables and there were no formal criteria

around how the levels were determined for each of the three categories in a risk table. In some situations, the stock assessment team (STAT) proposed the risk table, whereas in others the STAT and the stock assessment review (STAR) panel members worked on the risk table at the STAR panel. Under Agenda Item G.5 (Stock Assessment TOR) at this Council meeting, the Council is considering language around standardizing factors included in the risk tables across assessments and how they will be reviewed and developed.

Currently, at the September or November Council meeting in odd years, the SSC reviews the assessment and the STAR panel report, and determines whether or not the assessment is BSIA. If risk tables were adopted into the biennial specifications process, the SSC would also provide a recommendation on what the overall level for the risk table would be (favorable, neutral, unfavorable) and on the resulting baseline sigma. However, currently there are no formal criteria on how a combination of levels may impact the sigma for a stock. For example, would 3 level 2s equate to a level 1, level 2, and a level 3 or some other combination? While the SSC is fully responsible for identification of the sigma value, and for determining the ABC for a stock as stated in MSA, the use of potential risk tables would still need to be formalized by the Council. This would require an FMP amendment to specify the use of risk tables in determination of sigma if that is the route the Council recommends. The Council may also wish to continue investigating the use of risk tables for addressing time-varying sigma, as an example (see [Agenda Item H.1.a, CCIEA Team Report 1, September 2024](#)).

Risk tables may also be a place in which to use adaptive management. Historical relationships between biomass, recruitment and fishing mortality promise to become less reliable as environmental and stock conditions change. In such cases, management that is based on historic relationships may not perform as anticipated. Risk tables could provide a framework for connecting management decisions to monitoring of appropriate biological and environmental factors that come in through risk tables, examining whether relationships between fishing, stock abundance are consistent with expectations, and improving management approaches as information is gathered and understanding improves.

Harvest Specifications Based on 100% ACL Attainment

Currently, all projections used for setting harvest specifications for groundfish managed under the FMP are based on full ACL attainment for the extent of the projection period. However, given that the majority of groundfish stocks are significantly underattained (i.e., 40% of stocks with less than 25% attainment since 2017; see Agenda Item G.7, Attachment 1), this assumption is not representative of the reality of the fishery. Two ideas are proposed for scoping under this item: 1) using an alternative catch projection reflective of expected mortality to use in place of a catch only projection at a future biennium (and continuing to use 100 percent attainment assumption for future years), and 2) using an alternative catch projection of expected mortality to set harvest specifications. While neither option impacts the harvest policy in terms of the actual HCRs used to set specifications, it does impact the projections used in setting those specifications.

In June 2025, the GAP recommended consideration of incorporating time series into stock assessments that were more reflective of the actual attainment ([Agenda Item E.7.a, Supplemental GAP Report 1, June 2025](#)). Specifically, the GAP referenced a [NMFS response letter to the CCC](#) (Council Coordination Committee) regarding the NS1 Guideline revisions related to carryover. In it, NMFS stated “One potential way to examine impacts of ACL underages on stock abundance is

through scenario planning within a stock assessment. For example, as part of the stock assessment process, the assessment model could be used to evaluate a wide range of ACL underages, resulting in ranges of OFL and ABC recommendations for each year within each scenario. This analysis could be summarized within the assessment report, and once actual catch levels are known, the SSC can use that information to make or revise their ABC recommendation.” While this NMFS comment was specific to Carryover, the idea behind looking at various ACL attainments could be used as an alternative to a catch only projection where there is limited capacity each biennium. For example, as allowed in the TOR, an additional projection could produce the specifications assuming average attainment (or some other projection) as proposed by the GAP and the Groundfish Management Team (GMT). At a following harvest specifications cycle, when the SSC is asked to recommend OFLs and ABCs for the next biennium, the SSC could use those projections to recommend OFLs and ABCs for the next biennium if the actual mortalities were less than or equal to the projected mortalities. This process is similar to what occurs during a catch only projection. However, an additional run would be needed to assume 100 percent attainment in the years following that biennium (as is done with a catch only projection). This could either be pre-planned during the initial assessment run or could be done as a part of the following specifications cycle.

Another idea that has been previously discussed at the Council is using expected catch to set specifications for that biennium, or in other words, not assuming 100 percent mortality in a catch projection and using those values to set specifications. While this could be considered as a catch stream within the groundfish TOR, the actual ability to use this in management has yet to be fully considered by the Council, the SSC, or NOAA General Counsel. This alternative catch stream may be more representative of actual trends in the fishery, but there also could be a risk to the stock if the long-term projections were less than the actual mortalities and the subsequent years were based on lower than actual mortality estimates. One potential solution to mitigate the impact of these assumptions is to increase the number of catch only projections, which replace assumed ACL attainments with actual mortalities to project new harvest specifications. However, there are limited resources to produce catch only projections and it still results in future harvest specifications that are potentially lower than needed. Additionally, whether and how this approach might be used is a question for the SSC in its role as a science advisor to the Council and based on its authority under the MSA and its implementing regulations to set OFLs and ABCs. The SSC would need to determine whether any probabilistic approach to forecasting expected catch and using this information within the model runs to set harvest specifications is consistent with BSIA, and thus an appropriate means to manage scientific uncertainty.

There may also be tradeoffs in terms of workload as the current practice of assuming 100 percent ACL attainment is taken into consideration in the evaluations of the fishery’s compliance with other laws. For example, required analyses (such as NEPA) for groundfish actions consistently refer to the current harvest specifications EA as the basis for not requiring additional analysis of how an action might affect attainment of the fishery because of the 100 percent ACL assumption. Therefore, a change in this assumption might change what types of actions may be able to be taken by the Council and NMFS without need for more in depth analysis.

Management Measures/Catch Controls

After the harvest specifications are set through the harvest policy, the Council then uses a series of management measures, catch controls, and projection tools to manage the groundfish fisheries both preseason (i.e., as developed during the biennial harvest specifications and management measures process) and inseason. Council staff provided [Agenda Item E.8, Attachment 2](#) in June 2025 to give an overview of the harvest specifications and management measures framework. A portion of that document is reproduced here to provide context for the action items.

The Council is required to use AMs to prevent overfishing and respond to ACL overages. However, the Council has the discretion on how to establish allocations, set-asides, harvest guidelines (HGs), and/or annual catch targets (ACTs) for a stock or stock complex. While each of these measures are used to reduce the risk of exceeding a harvest specification, each has different meanings in terms of regulatory action. NMFS provided a detailed paper on AMs in [Agenda Item H.4.a, Supplemental NMFS Report 2, March 2020](#).

Harvest Guideline

HGs are harvest objectives. As noted in the FMP:

An HG is a specified numerical harvest objective which is not a quota. Attainment of a HG does not require closure of a fishery. FMP page 11

All managed groundfish species and complexes currently have a fishery HG set at the value of the ACL minus the off-the-top deductions. Additionally, some stocks have sector-specific HGs. For example, yelloweye rockfish has both a fishery HG as well as non-trawl and recreational HGs. HGs are precautionary measures used to reduce the risk that an ACL or allocation is exceeded. Unlike formal allocations (“hard caps”), HGs are considered more of a “soft cap” and do not require the same action as if an allocation was projected to be exceeded. It is within the Council’s discretion whether to take any inseason action if an HG is exceeded or projected to be exceeded based on the fishery’s and sectors’ mortality.

Annual Catch Target

ACTs can be applied to ACLs, HGs, and/or to a complex’s component stocks’ ACLs. ACTs are considered a “soft cap” and do not require action if exceeded or projected to be exceeded and ACTs can be set at either the fishery or sector level. The FMP defines ACTs as:

ACT is a management target set below the ACL and may be used as an AM in cases where there is uncertainty in inseason catch monitoring to ensure against exceeding an ACL. Since the ACT is a target and not a limit it can be used in lieu of harvest guidelines or strategically to accomplish other management objectives. Sector-specific ACTs can also be specified to accomplish management objectives. FMP Page 9

ACTs can define a specific AM that is defined by the Council when the ACT is attained or projected to be attained. The Council currently has ACTs for several rockfishes, including the California stock of quillback rockfish. However, the ACTs do not necessarily result in a specific management action if attained. Similar to when an HG is exceeded, the Council has discretion as to whether to trigger a management response.

Allocations

The FMP (Section 6.3) provides a very generic definition of allocation.

Allocation is the apportionment of an item for a specific purpose or to a particular person or group of persons. Allocation of fishery resources may result from any type of management measure but is most commonly a numerical quota or HG³ for a specific gear or fishery sector. Most fishery management measures allocate fishery resources to some degree, because they invariably affect access to the resource by different fishery sectors by different amounts. These allocative impacts, if not the intentional purpose of the management measure, are considered to be indirect or unintentional allocations. Direct allocation occurs when numerical quotas, HGs, or other management measures are established with the specific intent of affecting a particular group's access to the fishery resource.

FMP 6.3

The Council has several different types of allocations, each with different management and AMss associated with them; FMP Section 6.3 provides detail. Trawl and non-trawl fisheries are allocated specific amounts of yield from the fishery HG for certain stocks and stock complexes. This includes allocations in the FMP for sablefish north of 36° N. lat. and the Amendment 21 trawl and non-trawl allocations. The Council also implements biennial trawl and non-trawl allocations. In general, the allocations are considered hard caps. In that, if a sector's allocation is projected to be exceeded or exceeded, the Council considers management actions including closing the sector. Beyond the trawl/non-trawl allocations, there can be within trawl and non-trawl allocations.

Set-Asides

The Council uses two categories of set-asides: ACL deductions (i.e., off the tops) and at-sea set-asides which are specific to the at-sea Pacific whiting fishery. Set-asides can be considered "soft-caps" as there are no specific management measures designed to keep a fishery within the set-aside and they are not managed inseason.

The FMP defines set-asides as:

Set-aside is the amount of yield of an actively managed stock or stock complex that is deducted from an ACL or sector allocation. A set-aside deducted from an ACL is designed to accommodate catch in Tribal fisheries, research fisheries, exempted fishing permit activities, and bycatch in non-groundfish fisheries. A set-aside deducted from a sector allocation is designed to accommodate catch for a portion of the sector where within-sector allocations are not specified (e.g., set-asides for the at-sea whiting sectors for many stocks are deducted from formal trawl allocations to accommodate expected bycatch).

FMP page 13

Items for Consideration

Mixed Stock Exception

The Council could explore the potential utility of the mixed-stock exception contained in the NS1 Guidelines as a mechanism to meet its management goals, including the goal of higher rates of

³ The inclusion of "HG" in this definition of allocation is because it may be allocative in nature. However, HGs are an objective and not a quota, as defined below on page 3.

ACL attainment. As outlined in the NS1 Guidelines at 50 CFR 600.310(l), the “mixed stock exception refers to”:

Exceptions to requirements to prevent overfishing. Exceptions to the requirement to prevent overfishing could apply under certain limited circumstances. Harvesting one stock at its optimum level may result in overfishing of another stock when the two stocks tend to be caught together (This can occur when the two stocks are part of the same fishery or if one is bycatch in the other's fishery). Before a Council may decide to allow this type of overfishing, an analysis must be performed and the analysis must contain a justification in terms of overall benefits, including a comparison of benefits under alternative management measures, and an analysis of the risk of any stock or stock complex falling below its MSST. The Council may decide to allow this type of overfishing if the fishery is not overfished and the analysis demonstrates that all of the following conditions are satisfied:

- (1) Such action will result in long-term net benefits to the Nation;
- (2) Mitigating measures have been considered and it has been demonstrated that a similar level of long-term net benefits cannot be achieved by modifying fleet behavior, gear selection/configuration, or other technical characteristics in a manner such that no overfishing would occur; and
- (3) The resulting rate of fishing mortality will not cause any stock or stock complex to fall below its MSST more than 50 percent of the time in the long term, although it is recognized that persistent overfishing is expected to cause the affected stock to fall below its BMSY more than 50 percent of the time in the long term.

Given the multi-species nature of the groundfish fishery, the potential use of the mixed stock exception in Council management may provide the fishery with additional flexibility to address the constraining stock problem as it could allow higher harvest levels (i.e., in excess of the OFL) for some stocks in order to increase the overall utilization of the fishery while ensuring that the stock for which overfishing is occurring does not become overfished. At the time of this report, Council staff are not aware of another Council or FMP that has utilized this provision. However, if the Council is interested, further exploration could occur prior to the next meeting where this agenda item is taken up.

Allocations/HGs

As described in Agenda Item G.7, Attachment 1, one of the causes of underattainment of ACLs and allocations can be attributed to the groundfish management framework. The management framework allocates the fishery HG to each non-Tribal sector of the groundfish fishery, on a rigid year-to-year basis, rather than allow quotas to flow to parts of the fishery with emergent needs in a timely or more equitable manner. Furthermore, management of stocks by the Council and its advisory bodies are based on projections during the harvest specifications or inseason processes. Yet, most of the groundfish projection models are a point estimate, with no estimates of uncertainty even though there is inherently uncertainty in that projection. The Council's management responses have historically been more risk adverse, in that things like HGs were not supposed to be exceeded and management measures were set to be lower than those values, even with little to no risk to the ACL. It is important to consider that in the NS1 Guidelines, the only management

responses that are specified are those relative to a projected exceedance or exceedance of an ACL. Specifically, the NS1 Guidelines state:

“On an annual basis, the Council must determine as soon as possible after the fishing year if an ACL was exceeded. If an ACL was exceeded, AMs must be implemented as soon as possible to correct the operational issue that caused the ACL overage, as well as any biological consequences to the stock or stock complex resulting from the overage when it is known.” (50 CFR 600.310(g)(3) and

“If catch exceeds the ACL for a given stock or stock complex more than once in the last four years, the system of ACLs and AMs should be reevaluated, and modified if necessary, to improve its performance and effectiveness” (50 CFR 600.310(g)(7))

Most recently in the 2027-2028 harvest specifications process, there have been discussions around the allocation framework, particularly that of canary rockfish which is constraining to all sectors as it is both targeted in some sectors (such as recreational or non-trawl fisheries) and used to access target species in other sectors (e.g., whiting). The Council may want to consider how it sets allocations/HGs/etc. and if the currently identified AM is the appropriate tool for response, or what the management response should be. On the simple end, the Council could consider how it manages its fisheries, assess its use of allocations and HGs, and make changes as appropriate. This could include the potential reallocation of the fishery resource to achieve increased attainment, or the development of a framework to reallocate allocations inseason, as described in [Agenda Item E.7, Supplemental Attachment 1, June 2025](#). Some of these adjustments would not require FMP changes.

The Council could also consider other changes to its management framework intended to increase attainment, such as those proposed in the WDFW proposal for canary ([Agenda Item C.7.a., WDFW Report 1, April 2026](#)), which needed further development based on comments from NMFS ([Agenda Item C.7.a, Supplemental NMFS Report 1, April 2026](#)). The WDFW proposal was aimed at providing increased access to canary rockfish for certain sectors, but is based on the probability that the overall ACL would not be exceeded. Specifically, the WDFW report proposed using a performance standard (described as an attainment factor) made up of two parts: using alternative planning amounts to give sectors increased amounts to plan seasons/management structures to, given the probability of ACL attainment, and if-then conditions for inseason actions. NMFS identified concerns with the proposal as potentially running counter to the SSC’s role in setting ABCs under the MSA; however, as the application of a post-ABC attainment factor could result in the overallocation of the fishery resource above that ABC. Therefore, questions about, and the potential application of factors regarding, the probabilities of ACL attainment may be better addressed by the SSC when setting stock-specific ABCs, assuming such a probabilistic approach is considered BSIA by the SSC, or by the Council through reallocation.

At-Sea Set Asides

Under the trawl follow-on item scoping in April 2026, the Council under recommendation from the GAP ([Agenda Item C.5.a., Supplemental GAP Report 1, April 2026](#)) and GMT ([Agenda Item C.5.a, Supplemental GMT Report 1, April 2026](#)) moved consideration of changes to the at-sea set asides into the broader discussion of risk management. Historically, management of select non-whiting groundfish species within the at-sea whiting sectors occurred as allocations. However, the Council took action in the late 2010s to move management of the four then-allocated species to

set asides. The set asides first were designated as sector specific, then as a combined at-sea set aside, which is how all other non-whiting species are managed (where applicable) in the at-sea whiting sectors. In recent years, there have been several discussions at the Council regarding potential at-sea set aside overages and the overall expectation that the sectors would stay within those set asides. Set asides were never intended to act as allocations, however. Instead, they were only intended to account for expected mortality (see [Agenda Item C.5, Supplemental Attachment 2, April 2026](#)).

As part of this action, the Council could consider whether it wishes to change the means by which groundfish stocks are accounted for or managed in the at-sea sectors. If there is an expectation that the at-sea sectors' bycatch is to remain within the set-aside values, then a different AM should be used to clarify that intent to the sectors, the Council, and the public (such as a HG). While the aforementioned WDFW proposal on canary rockfish includes a proposal to change at-sea set asides to a performance standard metric, which was not moved forward during the 2027-2028 harvest specifications process, that type of approach could be examined for all species with at-sea set asides, in combination with set aside management; noting that the proposal would need to be revised as described in Agenda Item C.7.a, Supplemental NMFS Report 1, April 2026. On the other hand, if there is not an expectation that the sectors' bycatch would remain within the set asides and that the set aside amounts are truly intended to be an estimate of the mortality expected to be taken in the at-sea whiting fishery, then the use of set asides may continue to be appropriate. Additionally, this determination may differ by species, similar to how the rationale used under Amendment 21 to create allocations (rather than set asides) differed by species; for example, for canary, darkblotched, and widow rockfish and Pacific ocean perch.

The Council may also wish to consider whether the non-whiting set asides (or other management measure values utilized to manage bycatch) should be set for the at-sea sector as a whole (as currently done for set asides) or for the individual at-sea co-ops (as was done for the Amendment 21 allocations). When the Council changed from allocations to set asides for Amendment 21-3 and 21-4, the Council elected to combine the once sector-specific values into a single value like the remainder of the set asides. With a single set aside value, there is additional flexibility that may help accommodate significant inter-annual variability in each sector's bycatch for various species.

If/Then Statements

As a part of Special Project 1, the Council prioritized looking at if/then statements for both the highly migratory species (HMS) and groundfish fisheries. If-then statements predefine specific actions that will be taken when certain conditions are met. They consist of predetermined, generalized responses (and the thresholds that trigger them) to different scenarios, where analysis and review of those responses are completed in advance. As such, if-then statements are designed to anticipate a range of potential scenarios and allow for much faster management responses, usually without a Council meeting or a regulatory change. These if/then statements are often codified in regulation, allowing for an "automatic" management response in the event certain conditions are met.

For groundfish, if/then statements were proposed to be considered as a part of the broader risk management agenda item. In September 2026, based on recommendations from the GAP (Agenda Item C.3., Supplemental GAP Report 1, September 2026) and as proposed by staff (Agenda Item C.3., Supplemental Attachment 5, September 2026), the Council adopted a plan to have initial

discussions regarding the potential development of if/then statements for groundfish management within the risk management item, but to defer further consideration or development of any specific if/then statements, if desired/feasible, to occur as part of other groundfish actions as appropriate. Under this action item, the Council could recommend the development of specific if/then statements for use in groundfish management and/or provide guidance on whether to potentially develop such if/then statements in the context of other, future groundfish actions.

Next Steps

Under this agenda item, the Council should provide guidance on its priorities on which items should be scoped for further analysis for this action. These could be items included in this white paper or other ideas presented by advisory bodies or other stakeholders. The Council should consider both short term and long term priorities.

Council staff are recommending that the Council identify and prioritize any items of interest at this meeting for further development. As noted above, changes to the assessment process, and understanding the risk/uncertainty within our assessments, is better suited through a different process (i.e., stock assessment prioritization). However, the Council could identify items of interest (such as exploring ensemble models) and ask the Science Centers to explore further.

For any items related to the harvest policy or management measures, it is possible that additional information could be brought back in March 2027 for further scoping to understand further details about the proposed items, pending the number of items moved forward, capacity of Council, NMFS, and Science Center staff, and the timing available for the March 2027 Council meeting. While the Council did previously identify Risk Management as its second priority behind Spex Flex under the groundfish workload and new management measure item in April 2026, it will need to consider the work needed on both short and long term items and the broader groundfish workload when scheduling further work on this action. Some items may need to be put on the new management measures list until such a time that harvest policy changes are completed.

Glossary of Terms

Accountability Measure (AM): Management actions required to prevent ACL exceedances and to respond when ACLs are exceeded. AMs may include closures, restrictions, or other corrective actions.

Acceptable Biological Catch (ABC): A harvest specification set by the SSC below the OFL, incorporating a precautionary scientific uncertainty buffer. The ABC HCR most consistently used by the Council and its SSC is the application of P^* and sigma (σ) values to an estimate of the OFL for a stock.

Annual Catch Limit (ACL): A harvest specification set by the Council at or below the ABC to prevent overfishing and achieve optimum yield.

Annual Catch Target (ACT): A management target established below an ACL, HG, or component stock limit to provide an additional buffer against exceeding ACLs. ACTs are considered "soft caps."

BMSY: Long term average biomass associated with fishing at Maximum Sustainable Yield (MSY).

F (Fishing Mortality Rate): The rate at which fish are removed from a population through fishing activities

FMSY: The fishing mortality rate that would produce Maximum Sustainable Yield over the long-term.

Harvest Guideline (HG): A harvest objective that is not a quota. Exceeding an HG does not automatically require fishery closure. HGs function as precautionary "soft caps."

Maximum Sustainable Yield (MSY): The largest long-term average catch that can be taken from a stock under prevailing environmental and fishery conditions.

Optimum Yield (OY): The amount of fish providing the greatest overall benefit to the nation while accounting for conservation requirements and ecosystem considerations.

Overfishing: Fishing mortality that exceeds the OFL.

Overfishing Limit (OFL): The MSY harvest level associated with the current stock abundance. Harvest above this level constitutes overfishing. This value is also known as the overfishing status determination reference point.

P*: The Council's chosen probability of overfishing, or the degree of risk tolerance, used in calculating ABCs from OFLs. It is the probability that the ABC for a stock is being set higher than the true, but unknowable OFL or that catching the ABC would result in biological overfishing of a stock. Bounded at a maximum of 0.45.

Spawning Biomass: The biomass of mature fish capable of reproducing, often used as a measure of stock productivity.

Spawning Potential Ratio (SPR): The spawning output under a given fishing rate relative to the spawning output of an unfished stock.

Steepness (h): A measure of recruitment compensation describing how juvenile survival changes as spawning stock size changes.

Time-Varying Sigma: An adjustment to sigma that increases scientific uncertainty as stock assessments age, resulting in more precautionary ABCs/ACLs.

Works Cited

- International Pacific Halibut Commission. (2026). *Development of the 2026 Pacific halibut (Hippoglossus stenolepis) stock assessment* (IPHC-2026-SRB028-07). [International Pacific Halibut Commission](#).
- Jardim, E., Azevedo, M., Brodziak, J., Brooks, E. N., Johnson, K. F., Klibansky, N., Millar, C. P., Minto, C., Mosqueira, I., Nash, R. D. M., Vasilakopoulos, P., & Wells, B. K. (2021). Operationalizing ensemble models for scientific advice to fisheries management. *ICES Journal of Marine Science*. <https://doi.org/10.1093/icesjms/fsab010>
- Kinneen, M., Goodman, M. C., Sulc, A., Balstad, L., Diaz, R., Randrup, K., Patrone, W., Spencer, L., Morell, A., Rovellini, A., Dedrick, A., Grunloh, N., Bargas, M., Hopkins, S., Gersteva, V., Oken, K., Taylor, I., Haltuch, M., & Hamel, O. (2025) Status of widow rockfish stock off the U.S. West Coast in 2025. Pacific Fishery Management Council, Portland, Oregon
- Free, C. M., Mangin, T., Wiedenmann, J., Smith, C., McVeigh, H., & Gaines, S. D. (2023). Harvest control rules used in US federal fisheries management and implications for climate resilience. *Fish and Fisheries*, 24, 248–262 <https://doi.org/10.1111/faf.12724>
- Mid-Atlantic Fishery Management Council. *Omnibus Acceptable Biological Catch and Risk Policy Framework Adjustment: Environmental Assessment*. Oct. 2020. [PDF](#).
- New England Fishery Management Council. (2025). *Framework Adjustment 72 to the Northeast Multispecies Fishery Management Plan: Appendix II. Calculation of Northeast Multispecies annual catch limits for FY2026-FY2030*. New England Fishery Management Council. https://d23h0vhsm26o6d.cloudfront.net/A2_260423_Groundfish_FW72_Appendix-II_Calculation-of-ACLs.pdf
- PFMC (Pacific Fishery Management Council) and NMFS (National Marine Fisheries Service). 2011. Proposed Harvest Specifications and Management Measures for the 2011-2012 Pacific Coast Groundfish Fishery and Amendment 16-5 to the Pacific Coast Groundfish Fishery Management Plan to Update Existing Rebuilding Plans and Adopt a Rebuilding Plan for Petrale Sole; Final Environmental Impact Statement. Pacific Fishery Management Council, Portland, OR. February 2011.
- Shertzer, K.W.; Damiano, M.D.; Williams, E.H. Spawning Potential Ratio Can Provide Reference Points for Fishery Management That Are Robust to Environmental Variability. *Fishes* 2024, 9, 497. <https://doi.org/10.3390/fishes9120497>
- Thorson, J.T, M.W. Dorn, and O.S. Hamel. 2019. Steepness for west coast rockfishes: results from a twelve-year experiment in iterative regional meta-analysis. *Fisheries Research* 217:11-20
- Wetzel, Chantel R., and Owen S. Hamel. “Applying a Probability Harvest Control Rule to Account for Increased Uncertainty in Setting Precautionary Harvest Limits from Past Stock Assessments.” *Fisheries Research*, vol. 262, 2023, article 106659. <https://doi.org/10.1016/j.fishres.2023.106659>.