Draft Proposed Outline
Terms of Reference for the Groundfish Stock Assessment Review Process

This outline highlights proposed changes to the 2025-2026 stock assessment review process Terms of Reference (TOR) for development of the 2027-2028 TOR. Most of the content has been retained but with:

- an explicit consideration and document alignment of all assessment review types (not only STAR) and associated roles/responsibilities;
- rearrangement and streamlining of some text and tables;
- rearrangement of Appendix A, outline for stock assessment documents, to align with national assessment document guidelines;
- additional clarifications and removal of duplication;
- the addition of workflow diagrams for assessment review and opportunities for engagement processes;
- the addition of an explicit assessment review on-ramp/off-ramp section; and
- an expansion of assessment types and their review process.

After receiving feedback on the outline from the Council in June, the SSC's groundfish subcommittee (GFSC) will be developing a full draft of the 2027-2028 stock assessment review process TOR for feedback from the SSC in September to inform the draft brought forward for Council consideration and adoption in November 2026. To assist with interpreting the anticipated changes from the 2025-2026 TOR to the 2027-2028 TOR, the outline includes color-coded annotations to indicate whether any given section will generally remain the **same**, be considerably **refined**, or is newly **proposed**. Major discussion points around newly proposed specifications or questions specifically posed to Council and advisory bodies are **flagged**. The only section at this time being put forth to be removed is the Stock Assessment Prioritization (section 2 in the 2025-2026 TOR), because it is not related to the stock assessment review process. While a critically important precursor for determining biennial stock assessment reviews, the stock assessment prioritization process is more aligned with Council Operating Procedures (COPs) or some other mechanism.

Outline

0. Preface

1. Acronyms Used in the Document **same**

1. Introduction

A. Purpose of the document
   a. Ensure purpose is inclusive of all assessment reviews (not just STAR) **refine**
      i. **Refinement: describe all assessment review processes that are part of the process**
   b. Specifically describe external reviews as they relate to NS2, where existing STAR review text would stay the same and proposed peer review panel, which may

include a **CIE reviewer** may only arise IF research assessment tracks are included in the Council assessment type specifications. **same/proposed**

i. **Proposed: include an external (non-SSC) review approach, such as a CIE peer review, that could be used to address data/modeling changes that require significant research and extensive evaluation, much greater than could be done during a biennial management cycle. It is recommended that identification of such materials is done consistent with COP25 Groundfish Methodology Reviews (proposed Sept of odd years, reviews completed by March of even years). This would apply to the research track assessment type and is envisioned to not be commonly used (special circumstances only; e.g., changes in stock structure). CIE reviews may be a separate review process or as part of a SSC methodology review, depending on the situation. Either way, the SSC comments on review reports, per usual.**

B. Overview of parties involved in the assessment technical review process **same**

C. Version of TOR

a. What it includes and what it doesn't **same**

b. Include links to associated documents **refine**

i. **Refinement: ensure appropriate links are updated, such as stock assessment Accepted Practices Guidelines, other relevant TORs, and stock prioritization in order to be comprehensive.**

2. Stock Assessment Review Goals and Objectives

A. Goals and objectives of review, outcomes working towards (not just STAR) **refine**

a. Clearly identify as a technical evaluation of model configuration, outputs, etc.

b. Stakeholder and public engagement is important and should be focused on data, model decisions, interpretation of results, and other technical aspects

B. Stock assessment purpose/definition **same**

a. **Note: moved out of TOR Introduction to here**

C. Definitions of basic assessment types **refine**

a. **Refinement: short descriptions of the types of assessments in plain language, including reconsideration and clarification of the rules and limitations of update assessments and where lines are drawn between benchmark/data moderate/data poor assessments. [Pathways to move among assessment approaches is 3E.]**

D. Expectations and major objectives for GFSC or SSC reviews

a. Identify errors

b. Recommend changes intended for now or future iterations (i.e., research and data needs)

c. Add management justifications for additional requests or recommendations

d. Criteria for overturning an earlier review

E. Assessment categories and uncertainty **same**

F. **Review of risk tables made explicit as part of assessment review process proposed (risk table instructions to assessors are currently found in the Accepted Practices Guidelines and are proposed to be moved to the TOR)**

3. Stock Assessment Review Process

A. Overview **refine**

a. Types of assessment and who reviews them (move all assessment category descriptions/details here, including sections 6-11)

b. All descriptions below follow the format of definition, identification of assessment needs, relative required resources to complete, what the base review process entails, and who does the review

B. **Pre-assessment Workshops** **Proposed**

a. Proposed: description of the main objectives, who participates, opportunities for stakeholder engagement

b. Note: These workshops are primarily for benchmark and update assessments (but may include data-moderate assessments as necessary) to gain a better understanding of data availability and potential use, stock and planned model structures, and to discuss aspects of the fishery and how it has changed over time and space (among other topics).

C. **Management Track Assessments** **refine**

a. Benchmark Assessments **refine**

- Identify assessment needs
- Relative resource requirements
- Review process
- Who reviews: STAR panel then GFSC/SSC
- **Refinement: aggregate each aspect from section 2 and 6**

b. Update Assessments **refine**

- Identify assessment needs
- Relative resource requirements
- Review process
- Who reviews: GFSC/SSC
- **Refinement: aggregate each aspect from section 2 and 7 and consider updating specifications for how update assessments are handled (including relative to on/off ramps)**

c. Data-Moderate Assessments **refine**

- Identify assessment needs
- Relative resource requirements
- Review process
- Who reviews: GFSC/SSC (some situations may call for a STAR panel)
- **Refinement: aggregate each aspect from section 2 and 9**

d. Data-Limited Assessments **refine**

- Identify assessment needs
- Relative resource requirements

- Review process
- Who reviews: SSC
- **Refinement: aggregate each aspect from section 2 and 10**

e. Catch-Only Projections **refine/proposed**
- Identify assessment needs
- Relative resource requirements
- Review process
- Who reviews: SSC
- **Refinement: aggregate each aspect from section 1 and 8**
- **Proposed: drop the climate-only projections language here because this has yet to be an assessment type/process**

f. Supplemental Technical Reviews **Proposed**
   a. Establish criteria for identifying the need for these

g. Empirical Indicators (Catch Reports or Other Indicators) **refine/proposed**
- Definition
- Identify assessment needs
- Relative resource requirements
- Review process
- Who reviews: SSC
- **Refinement: aggregate each aspect from section 1 and 11**
- **Proposed: Add text related to other indicator approaches (e.g., survey index)**

D. **Research Track Assessments** **proposed**
   a. **Proposed: New section that would support the need for a research-intensive assessment for a particular single stock or multi-species complex that requires extensive analysis well beyond the scope of the biennial management process. Further information on an example of this process can be found here. It is anticipated that this assessment type would be implemented in very few, specific instances.**
   b. **May require CIE/STAR (or other review) prior to moving to management track assessment review options/process**
- **Definition**
- **Identify assessment needs**
- **Relative resource requirements**
- **Review process**
- **Who reviews: CIE/STAR/SSC (TBD)**

E. **Assessment Review On/Off-Ramps** **proposed**
   a. **Proposed: New section based on experience with recent stock assessments. These sections would generalize the information needed to change the assessment type, and thus the review process and the appropriate steps to make those changes.**
   b. **Overview and definitions**
- **Ramps between research track and management track**

- **Ramps within management track from one assessment type to another (e.g., benchmarks and updates)**

4. Roles and Responsibilities

A. Overview of responsibilities and assessment review engagement opportunities **proposed**
   a. Shared responsibilities
      i. **Proposed: Add text about research assessment track responsibilities being CIE or other external body**

B. General overview of role in preparing for, conducting, and reporting of scientific review for all stock assessments and describe review roles **refine**

Refine: shorten these sections for clarity

   a. STAR
   b. GFSC
   c. SSC
   d. Council
   e. NMFS

C. Roles and responsibilities by group type (need to be clear which assessments pertain to which review path and where advisory bodies/public can interact)
   a. STAR Panel **refine**

Refine: shorten for clarity

   - General
   - Uncertainty and decision tables
   - Assessment model uncertainty determination
   - Areas of panel disagreement
   - Report

1. STAR chair **same**
2. STAT **same/refine**
   a. General **same**
   b. **Refine: Engage in the pre-assessment workshop (i.e., at least one data/stakeholder workshop), with additional engagement opportunities as appropriate (e.g., pre-Council briefs, development of at-a-glace one-pagers)**
   c. **Refine: Attend review panel and relevant review meetings (e.g., GFSC/SSC)**
3. NMFS **same**
4. Council Staff **same/proposed**
   a. General **same**
   b. Meeting notices and scheduling **same**
   c. Manage assessment database
      i. House final stock assessment report **same**
      ii. House 'base' model(s) files **same**
      iii. House supplemental documentation **proposed**
         1. **Proposed: Such documents include forecast or projection reports applicable to the stock assessment that are produced for management decisions that come after publication of the**

final assessment report and critical files not found in the assessment report itself.

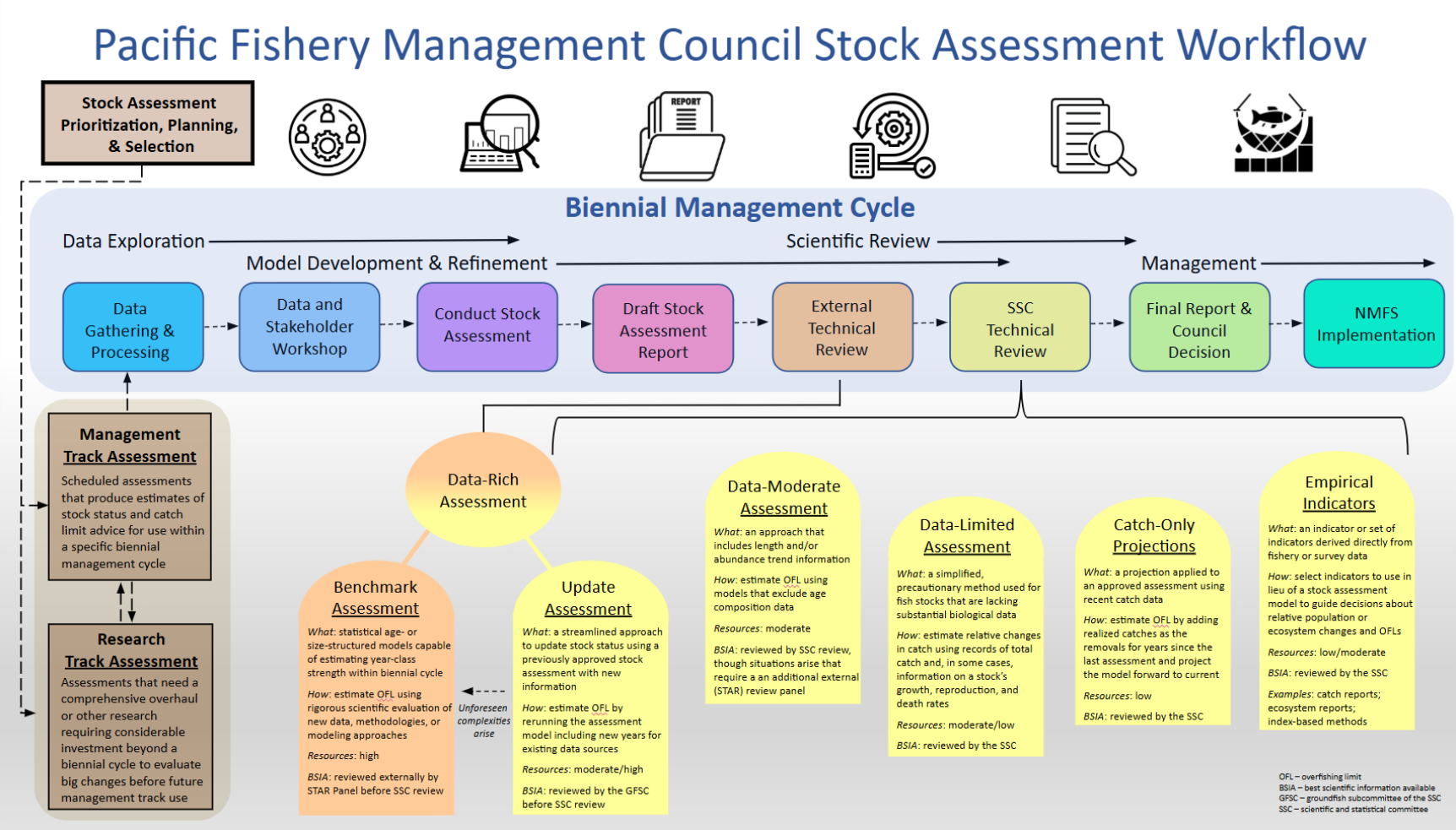
5. GMT
    a. General **same**
    b. Explicit opportunities to engage with STAT **proposed**
        i. **Proposed: from pre-assessment workshop to Council decision (see Figure B)**
        ii. **Proposed: pathways for not only alternative projection catch streams but also alternative harvest controls (how/when)**
6. GAP
    a. General **same**
    b. Explicit opportunities to engage with STAT **proposed**
        i. **Proposed: pre-assessment workshop to Council decision**
        ii. **Proposed: lead or otherwise organize a written appendix highlighting stakeholder perspectives specific to the fishery and stock for benchmark and update assessment documents**
7. State/Tribal
    a. General **same**
    b. Explicit opportunities to engage with STAT **proposed**
        i. **Proposed: pre-assessment workshop to Council decision**
        ii. **Make explicit data deadlines (12/1 vs 12-week) and clarify the decision process for dealing with late or overdue submissions.**
8. SSC and GFSC/SSC **same**
9. **CIE panel and chair** **proposed**
    a. **Proposed: consider the explicit use of CIE for research assessments where the review generally follows STAR panel format with specific terms of reference for the particular situation (this is expected to be used sparingly)**

5. References **refine**

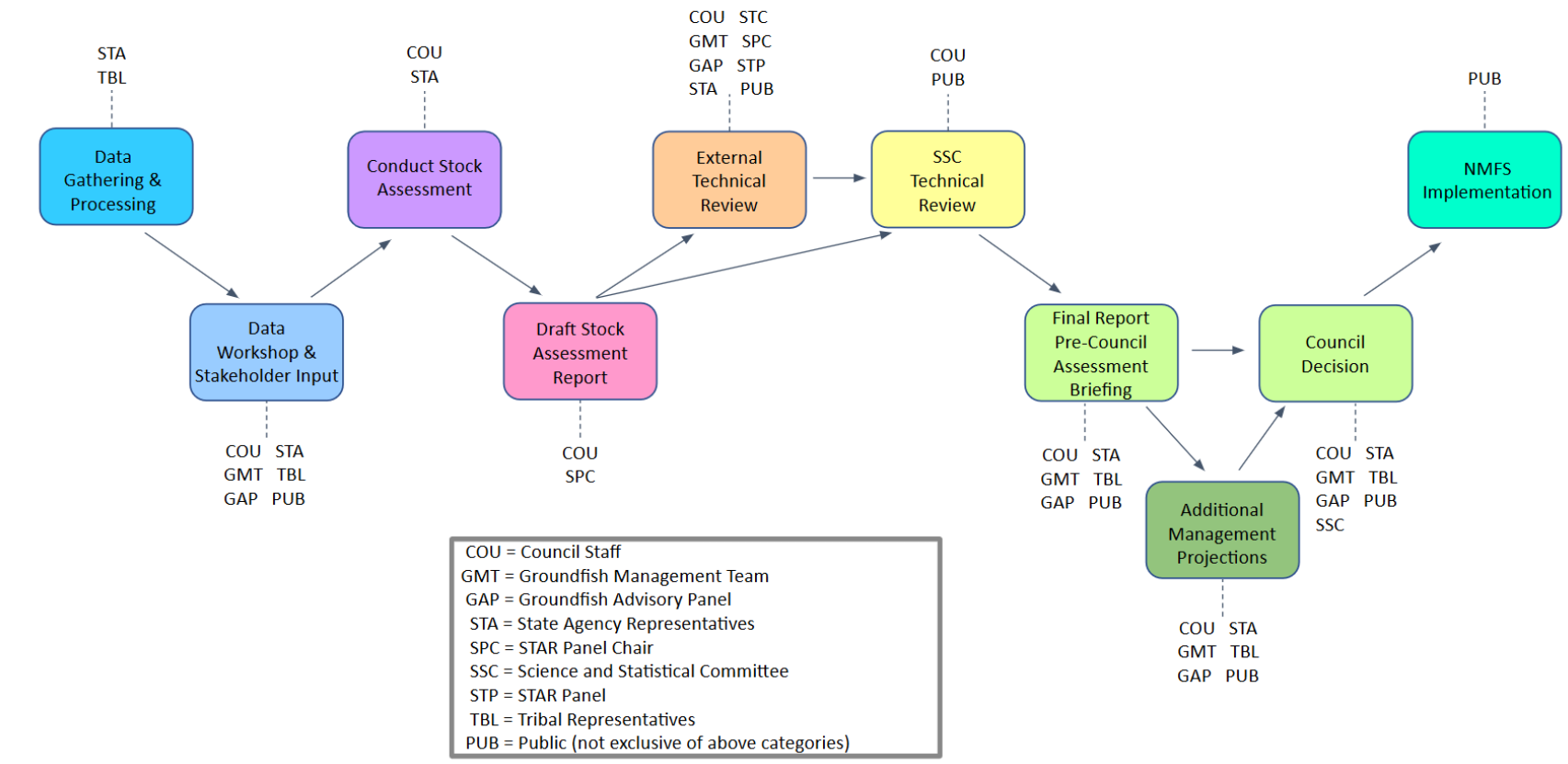
A. **Update as needed**

6. Figures/Tables **proposed**

A. **Proposed: add a new figure to highlight how the review process fits into the broader stock assessment workflow by assessment type.**
B. **Proposed: add a new figure to highlight opportunities for engaging in the stock assessment process leading up to (e.g., data workshop), including (review meetings), and after the technical review (Council).**



[**placeholder Figure A**]. Overview of the stock assessment process for the Pacific Fishery Management Council from planning and prioritization to review to implementation.



[**placeholder Figure B**]. Explicit opportunities for engagement during the biennial stock assessment development and review process.

Appendix A: Outline for stock assessment documents **refine**

This appendix will continue to highlight the expected major sections to be included in stock assessment documents. **While the existing content is not changing, it will be restructured to follow the national guidelines.** Effectively this means that the current requirements will be fit into the following new major headings (i.e., the 0 - 11 major headings below). In addition, **a new appendix** for assessments that are assigned a dedicated GAP advisor(s) (e.g., those that go through a STAR panel) is being proposed as a dedicated space for industry and stakeholder views of the fishery to be expressed in the stock assessment and thus considered during the technical review. The development of this appendix may begin during the Pre-assessment Workshop and continue throughout the STAR Panel process to acknowledge stakeholder input and considerations. A **new section on risk tables** is being proposed. At this point, the **one-pager at-a-glance summaries are not specifically added** as an assessment document requirement.

The following outline represents the requirements for benchmark assessments. For other management track assessment types, Appendix C can be referenced to further delineate what sections of this outline are required (e.g., update or data-moderate).

0. Title Page and List of Preparers
1. Executive Summary (see Appendix B for specifics)
2. Introduction (expected to be concise: 2-3 pages)
    a. Stock ID
        i. Basic life history information
        ii. Use of a map to show boundaries
    b. Management history and performance: Briefly describe the management history of the stock and status. Please only touch on historical policies that would have impacted modeling decisions or would be critical knowledge about the species that might affect its population dynamics.
    c. Assessment history
    d. Fishery Description: Short summary of fleet composition (i.e., boat types), gear types, species targeted, and fishing grounds (one paragraph)
    e. Ecosystem Considerations: If this section is not relevant, please ignore; however the default will state “Ecosystem considerations and/or climate indicators were not included in this assessment.”
3. Data
    a. Life History (growth, maturity, fecundity, natural mortality, meristics, etc.)
    b. Catch (retained and discarded)
    c. Indices and standardization (Fishery dependent and independent)
    d. Composition data - age, length (Description, aging error, reweighting)
    e. Absolute abundance (if applicable)
    f. Environmental/ecosystem indicator data, including a summary and reference to the risk table.
4. Assessment

a. Current modeling approach: short general overview of modeling platform including the reference to model paper or online reference.
    i. History of modeling approaches used for this stock.
    ii. Response to the most recent previous STAR panel and SSC recommendations for remedying deficiencies in the most recent previous full assessment.
    iii. For groundfish update assessments, point by point responses to any formal SSC Groundfish Subcommittee requests made during the subcommittee review.
b. Configuration of the Base Model: please describe the setup of the stock assessment model. Please also include any environmental relationships/hypotheses that informed the configuration of the base model.
    i. General model specifications: Assessment program and its version used for the assessment (i.e., date executable program file was compiled), description of model structure, definitions of fleets and areas. Description of how the first year that is included in the model was selected and how the population state at the time is defined (e.g., B_0, stable age structure).
    ii. Model parameters: estimated and fixed parameters, constraints on parameters, selectivity assumptions, natural mortality, treatment of age reading bias and/or imprecision, and other fixed parameters, description of stock-recruitment constraints or components, critical assumptions, and consequences of assumption failures.
    iii. Evidence of search for balance between model realism and parsimony. Key model assumptions and structural choices (e.g., asymptotic vs. domed selectivities, constant vs. time-varying selectivities). Summary of alternate model configurations that were examined but rejected. This is not required for an update assessment.
c. Bridging Analysis: Briefly describe the bridging analysis performed to the previous assessment.
    i. Description of new modeling approaches and changes made from the last assessment, with rationale. This should include bridging analyses that highlight the data and model changes that were most influential with respect to changes between the assessment being reviewed and the most recent adopted assessment.
d. Modeling Results: for each of the following please describe the results for the base model.
    i. Parameter Estimates
        1. Table listing all explicit parameters in the stock assessment model used for base model, their purpose (e.g., recruitment parameter, selectivity parameter) and whether or not the parameter was actually estimated in the stock assessment model. Include the associated asymptotic standard error estimates.
        2. Selectivity estimates (if not included elsewhere).
        3. Stock-recruitment relationship.
        4. Clear description of units for all outputs.
        5. Description of how discard is included in yield estimates.
        6. Parameter uncertainty (variance estimation conditioned on a given

model, estimation framework, data set choice, and weighting scheme). This element for evaluating uncertainty includes expressing uncertainty in derived outputs of the model and estimating CVs using appropriate methods (e.g., bootstrap, asymptotic methods, Bayesian approaches, such as MCMC).

ii. Time Series

1. Population numbers and biomass at age × year × sex (if sex-specific *M*, growth, or selectivity) (may be provided as a text, csv, or spreadsheet file). Can be included in electronic appendices (SS report files), should be provided as supplementary material for assessments developed with alternative assessment platforms.
2. Time-series of total biomass, summary biomass, and spawning biomass (and/or spawning output), depletion relative to B_0, recruitment and fishing mortality (1-SPR) (or exploitation rate estimates if fishing mortality not available) (table and figures).

iii. Model Fits

1. Residual analysis for the base-run configuration, e.g., residual plots, time series plots of observed and predicted values, etc.

iv. Model Diagnostics

1. Evaluation of model parameters. Likelihood profile for the base model over key parameters (typically natural morality, stock-recruit steepness, and equilibrium recruitment, or R_0). The profile should indicate all likelihood values for individual components (e.g., indices by survey, compositional data for each type and fleet).
2. Convergence status and convergence criteria for the base-run model (or proposed base-run). Randomization of starting parameter value run (e.g., jitter) results or other evidence of search for global best estimates.
3. Retrospective analysis, where the model is fitted to a series of shortened input data sets, with the most recent years of input data being dropped.
4. Historical analysis (plot of actual estimates from current and previous assessments).

v.Evaluation of Scientific Uncertainty

1. Fully document the calculation of the base model's sigma associated with the current year's OFL value. **Add text describing how to determine baseline and time-varying aspects of sigma.**
2. If a range of model runs is used to characterize uncertainty, it is important to provide some qualitative or quantitative information about relative probability of each. If no statements about relative probability can be made, then it is important to state that all scenarios (or all scenarios between the bounds depicted by the runs) are equally likely.
3. If possible, ranges depicting uncertainty should include at least three runs: (a) one judged most probable; (b) at least one that depicts the range of uncertainty in the direction of lower current biomass levels;

and (c) one that depicts the range of uncertainty in the direction of higher current biomass levels. The entire range of uncertainty should be carried through stock projections and decision table analyses.

e. Sensitivity Analyses
   i. Sensitivity to assumptions about model structure, i.e., model specification uncertainty.
   ii. Sensitivity to data set choice (e.g., using emphasis factors to selectively remove data sources) and weighting schemes (e.g., MacAllister & Ianelli weighting versus Francis weighting vs. Dirichlet weighting for compositional data), which may also include a consideration of recent patterns in recruitment.

f. Management Benchmarks: decisions on management metrics/benchmarks
   i. Unfished spawning stock biomass, summary age biomass, and recruitment, along with unfished spawning stock output.
   ii. Reference points based on $B_{40\%}$ for rockfish and round fish and on $B_{25\%}$ for flatfish (spawning biomass and/or output, SPR, exploitation rate, equilibrium yield).
   iii. Reference points based on default SPR proxy (spawning biomass and/or output, SPR, exploitation rate, equilibrium yield).
   iv. Reference points based on MSY (if estimated) (spawning biomass and/or output, SPR, exploitation rate, equilibrium yield).
   v. Equilibrium yield curve showing various B_{MSY} proxies.

g. Projections and decision tables: Description of stock status, biological reference points (BRPs), and trends for each scenario; rebuilding times (if appropriate)
   i. Decision tables (i.e., a matrix of alternative models (states of nature) versus management actions) should cover the plausible range of uncertainty about current stock biomass and a set of candidate fishing mortality targets used for the stock. See section "*Uncertainty and Decision Tables in Groundfish Stock Assessment"* (this document) on how to define alternative states of nature. Management decisions in most cases represent the sequence of catches including estimates of OFL based on F_{MSY} (or its proxy) and those obtained by applying the Council 40-10 or 25-5 harvest policy to each state of nature; however, the GMT may recommend other alternatives as being more relevant to Council decision making. OFL calculations should be based on the assumption that future catches equal ABCs and not OFLs.
   ii. Harvest projection information presented should include biomass / spawning output, stock depletion, and yield projections of OFL, ABC and ACL for the two years of the current biennial harvest specifications cycle plus ten years into the future. An example template for a table of harvest projections is provided below.
   iii. Include both years of the current biennium in projections / decision tables, so there is no gap shown in the tables between the current biennium and projection years. Do not report model-estimated OFLs and ABCs (and ACLs) for years in the current biennium that have management specifications in place. Instead use the OFLs and ABCs (and ACLs) specified in regulation. For assessed rockfish and roundfish stocks with estimated depletion greater than 40% the ABCs are equal to the ACLs; if

less then the 40-10 harvest control rule is applied. For assessed flatfish stocks with estimated depletion greater than 25% the ABCs are equal to the ACLs; if less then the 25-5 harvest control rule is applied.

5. Discussion
    a. Unresolved problems and major uncertainties
        i. Describe any special issues (e.g., unbalanced or questionable data, missing survey data) that complicate scientific assessment, questions about the best model scenario.
    b. Risk Tables
        i. Add existing language about the development of risk tables and reference further risk table guidelines in the Accepted Practices Guidelines document. Note that the Council will address the use of risk tables in the upcoming Risk Management Agenda Item in November 2026.
    c. Regional management considerations
        i. Discussion of whether there is biological evidence for a regional management approach. If a regional management approach is desirable for the stock, but there are insufficient data for it, what are the research and data needs to address this issue? For stocks where the current practice is to allocate harvests by management area, a standard data product (e.g., the proportion of the survey biomass in each management area) can be provided as the basis for GMT discussions regarding harvest allocation. The GMT advisor and Council staff should be consulted on the appropriate management areas and adopted allocation methods for each stock.
    d. Research and data needs
        i. Describe progress on Research and Data Needs items identified in the most recent previous stock assessment document and associated STAR panel report.
        ii. Describe new research and data needs and specify their priority (high, medium, low).
    e. Other
6. Acknowledgments
7. References
8. Auxiliary files
    a. A list naming the required text files (complete parameter and data files in the native code of the stock assessment program) and any other supplementary electronic files that will accompany the assessment document when archived with the PFMC. For assessments conducted using Stock Synthesis, the following files should be included and archived with the stock assessment document: starter.ss, forecast.ss, the control (.ctl), data (.dat) and report (Report.sso) files, and the Stock Synthesis model executable.
9. Tables
10. Figures
11. Appendices
    a. **GAP (industry/stakeholder) report on the fishery**

Appendix B: Template for an executive summary for stock assessment documents **same**

Consider shortening the executive summary as outlined in appendix B to follow national stock assessment guidelines.

Appendix C: Check list of elements to be included in full, update, and data-moderate assessment documents. **refine**

The content here will largely stay the same but be refined into a format that is easier to read and digest by assessment type. Additionally, it will be expanded to include tables and figures, thereby removing Appendix F. The adapted table will include Document Elements in column 1, following Appendix A, with subsequent columns including check boxes for each assessment type, as applicable.

Appendix D: Definitions of species categories for groundfish assessments and rules for making category assignments for full or update assessments **same**

No expected changes anticipated.

Appendix E: Timeline for groundfish stock assessment and review deadlines **refine**

Only small edits are anticipated that align with updated time frames.

Appendix F: Tables and figures to be included in groundfish stock assessment reports or in associated electronic indices **refine**

The content here will be moved to Appendix B so that all expected assessment document materials (text, tables, figures) are in one location. Thus, the current appendix F will be removed.

PFMC
5/22/25