

**Performance Work Statement**  
**National Oceanic and Atmospheric Administration (NOAA)**  
**National Marine Fisheries Service (NMFS)**  
**Center for Independent Experts (CIE) Program**  
**External Independent Peer Review**

**Gulf of Alaska Walleye Pollock Stock Assessment**

**Background**

The National Marine Fisheries Service (NMFS) is mandated by the Magnuson-Stevens Fishery Conservation and Management Act, Endangered Species Act, and Marine Mammal Protection Act to conserve, protect, and manage our nation's marine living resources based upon the best scientific information available (BSIA). NMFS science products, including scientific advice, are often controversial and may require timely scientific peer reviews that are strictly independent of all outside influences. A formal external process for independent expert reviews of the agency's scientific products and programs ensures their credibility. Therefore, external scientific peer reviews have been, and continue to be essential to strengthening scientific quality assurance for fishery conservation and management actions.

Scientific peer review is defined as the organized review process where one or more qualified experts review scientific information to ensure quality and credibility. These expert(s) must conduct their peer review impartially, objectively, and without conflicts of interest. Each reviewer must also be independent from the development of the science, without influence from any position that the agency or constituent groups may have. Furthermore, the Office of Management and Budget (OMB), authorized by the Information Quality Act, requires all federal agencies to conduct peer reviews of highly influential and controversial science before dissemination, and that peer reviewers must be deemed qualified based on the OMB Peer Review Bulletin standards<sup>1</sup>. Further information on the Center for Independent Experts (CIE) program may be obtained from [www.ciereviews.org](http://www.ciereviews.org).

**Scope**

Walleye pollock (*Gadus chalcogrammus*) is a semi-pelagic species widely distributed throughout the North Pacific Ocean. Pollock in Alaska federal waters are managed as three distinct stocks: the Bering Sea, Aleutian Islands, and Gulf of Alaska (GOA). Pollock represent a key species in the food web ecology of the GOA, and sustain a valuable commercial fishery of about 130 kt annual catches with an ex-vessel value of around 35 million USD. A custom statistical catch at age model is used to provide management advice. The assessment is fit to four distinct fishery-independent surveys: (1) an acoustic survey targeting a pre-spawning aggregation of fish in Shelikof Strait (March), (2) a gulf-wide acoustic summer survey, (3) a gulf-wide acoustic bottom trawl survey, and (4) an inshore summer crab survey. Historical fits to the survey data had been good, but have degraded in recent years. For instance, there were unexpected divergent trends in indices of abundance between the acoustic and bottom trawl surveys from 2016 to 2019 that the model was not able to fit. The 2023 assessment also showed concerning signs of misfit to some recent survey indices.

GOA pollock exhibit large annual variation in both growth (represented as empirical weight at age) and maturity (as measured from the pre-spawning survey). For instance, fish at a given age were about half the weight in 2020 compared to 2010. It is unclear how to best model this variation within the assessment, as well as how to account for it in the management reference points. In 2023 the operational stock assessment was converted from AD Model Builder (ADMB) to Template Model Builder (TMB) which allows for more sophisticated statistical approaches to modeling time variation. TMB's capabilities allow for a wide range of new model configurations to better model both growth and maturity variation, among other processes.

The goals of this review process are to:

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<sup>1</sup> <https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/memoranda/2005/m05-03.pdf>

1. ensure that stock assessments represent the best available scientific information and facilitate the use of this information by the North Pacific Fishery Management Council;
2. provide an independent external review of this stock assessment that meets the mandates of the Magnuson-Stevens Fisheries Conservation and Management Act (MSA) and other legal requirements;
3. understand and appropriately account for model misfit to key data sources (indices and age compositions);
4. provide advice on how to best model annual variation in growth variation within the assessment, as well as how to account for it in the management reference points;
5. provide advice on how to best configure and utilize the TMB framework;
6. identify research needed to improve the assessment and advice for fishery managers.

### Requirements

NMFS requires three reviewers to conduct an impartial and independent review in accordance with this Performance Work Statement (PWS), OMB Guidelines, and the ToRs below. The CIE reviewers shall be active and engaged participants throughout panel discussions and able to voice concerns, suggestions, and improvements, while respectfully interacting with other review panel members, advisors, stock assessment technical teams, and other participants. The CIE reviewers shall have excellent communication skills in addition to working knowledge and recent experience in fish population dynamics; with experience in the integrated-analysis modeling approach, using age- and size- (and possibly spatially-) structured models, how to weight data (survey index, age composition data, and fishery catch at age data), and methods for quantifying uncertainty. Familiarity with environmental, ecosystem and climatic effects on population dynamics and distribution may also be beneficial. The CIE reviewers shall also have expertise in age-structured state-space stock assessments as implemented in TMB, including AR(1), 2d AR(1), and other time series models applied to processes like growth, maturity, or catchability. Each CIE reviewer's duties shall not exceed a maximum of 10 days to complete all work tasks of the peer review described herein.

### Tasks for reviewers

Each CIE reviewer shall complete the following tasks in accordance with the PWS and Schedule of Milestones and Deliverables herein.

1. **Pre-review Background Documents:** A minimum of two weeks before the peer review, the NMFS Project Contact will send by electronic mail or make available at an FTP site to the CIE reviewer all necessary background information and reports for the peer review. The CIE reviewer shall read all documents in preparation for the peer review including the background materials and reports below.
  1. The 2023 stock assessment report (SAFE): [https://apps-afsc.fisheries.noaa.gov/Plan\\_Team/2023/GOApollock.pdf](https://apps-afsc.fisheries.noaa.gov/Plan_Team/2023/GOApollock.pdf)
  2. The 2023 Plan Team report that documents the process for bridging from ADMB to TMB and the application of non-parametric fisheries selectivities to improve fits to catch at age data: [https://meetings.npfmc.org/CommentReview/DownloadFile?p=721c1ab7-0d6f-4c9a-a859-2f49d3f63d80.pdf&fileName=GOA%20pollock\\_Sept2023.pdf](https://meetings.npfmc.org/CommentReview/DownloadFile?p=721c1ab7-0d6f-4c9a-a859-2f49d3f63d80.pdf&fileName=GOA%20pollock_Sept2023.pdf)
  3. The 2023 Plan Team presentation of the 2023 Plan Team report: <https://meetings.npfmc.org/CommentReview/DownloadFile?p=9871c950-b1c0-499f-b384-ad64abf903a3.pdf&fileName=GOA%20pollock%20PRESENTATION.pdf>
  4. Rogers et al. (in press) that describes an approach linking survey timing to catchability through an AR(1) process in a WHAM version of the assessment. <https://doi.org/10.1093/icesjms/fsae005>

5. A presentation by Urmy et al. to the Plan Team on estimating total uncertainty in acoustic trawl indices.  
<https://meetings.npfmc.org/CommentReview/DownloadFile?p=7bc71bd0-7437-43a0-8bdb-92c972de85b3.pdf&fileName=Acoustic%20trawl%20survey%20uncertainty%20PRESENTATION.pdf>
  6. Hulson and Williams (2024) method for estimating input sample sizes for age composition data.  
<https://doi.org/10.1016/j.fishres.2023.106894>
  7. Additional supporting documents as available.
  8. A summary document of proposed changes to the model for the CIE review
  9. An electronic copy of the data, the parameters, and the model used for the assessments can be found online at: <https://github.com/afsc-assessments/GOApollock/tree/main/data/2023>
  10. The meeting agenda.
2. **Attend and Participate in Panel Review Meeting Review:** Each CIE reviewer shall conduct the independent peer review in accordance with the PWS and ToRs, and shall not serve in any other role unless specified herein. Modifications to the PWS and ToRs can not be made during the peer review, and any PWS or ToRs modifications prior to the peer review shall be approved by the Contracting Officer's Representative (COR) and the CIE contractor. Each CIE reviewer shall actively participate in a professional and respectful manner as a member of the review panel's virtual meeting, and their peer review tasks shall be focused on the ToRs as specified herein. The NMFS Project Contact is responsible for any facility arrangements (e.g., video or teleconference arrangements).
  3. **Contract Deliverables - Independent CIE Peer Review Reports:** Each CIE reviewer shall complete an independent peer review report in accordance with the SOW. Reviewers are not required to reach a consensus. Each CIE reviewer shall complete the independent peer review according to required format and content as described in Annex 1. Each CIE reviewer shall complete the independent peer review addressing each ToR as described in Annex 2. Each CIE reviewer will deliver their reports according to the specified milestone dates.

### **Place of Performance**

The CIE reviewers shall conduct an independent peer review during the panel review meeting scheduled for the dates of May 7-9, 2024. The place of performance shall be at the contractor's facilities, and at the Alaska Fisheries Science Center, Seattle, Washington, USA.

If the SoW specifies that the CIE reviewers shall participate in a panel review meeting requiring foreign travel, then the CIE shall provide the necessary information (e.g., first and last name, contact information, gender, birth date, passport number, country of passport, travel dates, country of citizenship, country of current residence, and home country) for each CIE reviewer to the Contracting Officer Representative (COTR) who will forward this information to the Project Contact. The Project Contact is responsible for the completion and submission of required Foreign National Clearance forms with sufficient lead-time (30 days) in accordance with the NOAA Deemed Export Technology Control Program NAO 207-12 regulations at the Deemed Exports NAO link <http://deemedexports.noaa.gov/sponsor.html>

### **Period of Performance**

The period of performance shall be from the time of award through June 2024. Each reviewer's duties shall not exceed 10 days to complete all required tasks.

**Schedule of Milestones and Deliverables:** The contractor shall complete the tasks and deliverables in accordance with the following schedule.

Within two weeks of award	Contractor selects and confirms reviewers. This information is sent to the COR, who then transmits this to the NMFS Project Contact.
Two weeks prior to the review	Contractor provides the pre-review documents to the CIE reviewers.
<b>May 7-9</b>	CIE review panel meeting in Seattle, Washington.
Within two weeks after review	Contractor receives draft reports .
Within two weeks of receiving draft reports	Contractor submits final reports to CIE independent peer review reports to the COR.

**Applicable Performance Standards**

The acceptance of the contract deliverables shall be based on three performance standards:

(1) The reports shall be completed in accordance with the required formatting and content (2) The reports shall address each ToR as specified (3) The reports shall be delivered as specified in the schedule of milestones and deliverables.

**Travel**

All travel expenses shall be reimbursable in accordance with Federal Travel Regulations. International travel is authorized for this contract.

**Restricted or Limited Use of Data**

The contractors may be required to sign and adhere to a non-disclosure agreement.

**NMFS Project Contacts:**

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## **Annex 1: Peer Review Report Requirements**

1. Each report must be prefaced with an Executive Summary providing a concise summary of the findings and recommendations, and specify whether the science reviewed is the best scientific information available.
2. The main body of the reviewer report shall consist of a Background, Description of the Individual Reviewer's Role in the Review Activities, Summary of Findings for each ToR in which the weaknesses and strengths are described, and Conclusions and Recommendations in accordance with the ToRs.
  - a. Reviewers should describe in their own words the review activities completed during the panel review meeting, including providing a brief summary of findings, of the science, conclusions, and recommendations.
  - b. Reviewers should discuss their independent views on each ToR even if these were consistent with those of other panelists, and especially where there were divergent views.
  - c. Reviewers shall provide a critique of the NMFS review process, including suggestions for improvements of both process and products.
  - d. The CIE independent report shall be a stand-alone document for others to understand the weaknesses and strengths of the science reviewed, regardless of whether or not they read the summary report. The CIE independent report shall be an independent peer review of each ToRs, and shall not simply repeat the contents of the summary report.
3. The reviewer report shall include the following appendices:
  - a. Appendix 1: Bibliography of materials provided for review
  - b. Appendix 2: A copy of the CIE Performance Work Statement
  - c. Appendix 3: Panel Membership or other pertinent information from the panel review meeting.

## **Annex 2: Terms of Reference for the Peer Review**

### **Gulf of Alaska Walleye Pollock Stock Assessment**

CIE reviewers are contracted to complete their independent peer review based on the ToRs. Therefore, the CIE-NMFS review and approval process is based on whether the CIE independent reports addressed each of the ToRs. The AFSC requests an in person CIE review from May 6-10, 2024 to review the current operational age-structured stock assessment. CIE reviewers shall address the following Terms of Reference (ToR) during the peer review and in the CIE reports. The specific responsibilities of the CIE review are to:

- 1) Become familiar with the stock assessment documents, data inputs, and analytical models along with other pertinent information prior to the review panel meeting.
- 2) Evaluate the adequacy of the 2023 operational assessment's model assumptions, estimates, fits to data (survey indices and age compositions, and fishery catch at age data), model diagnostics, and major sources of uncertainty.
- 3) Review and critique the methods used to weight data
  - a) The approach used to get initial sample sizes for age compositions (survey and fishery) and the tuning approach used to get effective sample sizes.
  - b) The methods for determining the uncertainties (CVs) of indices. In particular a new Monte Carlo "total uncertainty" approach developed internally by Urmy et al. for acoustic indices.
- 4) Provide constructive suggestions for model improvements approaches and technical issues, differentiating between the short-term and longer-term time frame.
- 5) Evaluate and advise on good practices to incorporate random effects in the operational assessment.
  - a) Which processes should be modeled? Weight at age, maturity, and fishery selectivity are proposed.
  - b) Is Rogers et al. (2024)'s approach to link catchability to survey timing appropriate for operational use?
  - c) What are appropriate forms? Random walks, AR(1), 2D AR(1), and 3D AR(1) (Cheng et al. 2023) are available.
  - d) How to select and validate the structures chosen? Is AIC appropriate and reliable?
- 6) Determine whether the science reviewed is considered to be the best scientific information available.
- 7) Provide a brief description on review proceedings highlighting pertinent discussions, issues, effectiveness, and recommendations.