CIE Reviewer's Independent Report on the 2008 assessment of Alaskan sablefish (*Anoplopoma fimbria*).

Prepared by

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Prepared for

Center for Independent Experts

Review Meeting
Alaska Fisheries Science Center
Auke Bay Laboratories
Ted Stevens Marine Research Institute
17109 Pt. Lena Loop Rd.
Juneau, Alaska
March 17th – 19th, 2009

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Executive Summary

The Sablefish Stock Assessment Review met in Auke Bay, Alaska, from Tuesday, March 17, through Thursday, March 19, 2009, to review the assessment of Alaskan sablefish *Anoplopoma fimbria*.

The Review Panel was composed of three scientists affiliated with the Center for Independent Experts (CIE): Dr. Mike Armstrong, Dr. John Casey, and Dr. Neil Klaer. The Review Meeting was chaired by the Gulf of Alaska (GoA) Plan Team Chair, Dr. Jim Ianelli. Staff of the Auke Bay Laboratories, Alaska Fisheries Science Center made presentations and assisted with the meeting proceedings.

The meeting format included presentations mixed with questions and open discussion, and public comments were also accepted. Activities of the reviewers were shared during the meeting.

Findings by term of reference

1. Evaluation, findings, and recommendations on quality of input data and methods used to process them for inclusion in the assessment.

    - In general, the input data and methods used to process them for inclusion in the assessment were adequate and appropriate. The fishery and survey data were extensive and well documented.
    - A single document should be developed that describes reference data for catches, abundance indices and age/size composition and how they were created. Those reference sets should also be electronically archived at a single location.
    - Generalized Linear Models should be used to standardize fishery CPUE data, and possibly other abundance indices used in the assessment.

2. Evaluation, findings, and recommendations on the level and adequacy of knowledge and incorporation of life history, ecology and habitat requirements.

    - Knowledge of stock structure, natural mortality and sex-related maturity and growth parameters are adequately represented in the assessment.
    - Efforts to quantify ecosystem and environmental effects on sablefish dynamics should continue to be encouraged.

3. Evaluation, findings, and recommendations of the analytical approach used to assess stock condition and stock status.

    - The analytical approach was appropriate and provides an acceptable basis for management advice.
    - For future assessments, spatial structure could be implemented simply within the current assessment using area-specific selectivity by fishing method. A fully

spatially structured assessment model that includes movement among areas could be implemented in parallel with the current assessment to test whether the additional complexity is justified.

- Stock Synthesis 3 should be considered as a candidate model to use for the implementation of spatial structure.
- Improved documentation of projection methods is required. Bias correction should be examined.
- Uncertainty in assessment results should be more fully explored using alternative model structures, and this uncertainty should be communicated to management.
- Simulation testing should be used to verify the assessment models, compare among alternative assessment model structures, and to test the robustness of harvest strategies and apportionment schemes to uncertainty. Implementation of a MSE framework for Alaskan sablefish would achieve all of these goals.

4. Evaluation, findings, recommendations of areal apportionment of harvest strategy as related to optimizing spawning stock biomass.

    - The current apportionment scheme is difficult to evaluate given the information presented, particularly since there are unstated socio-economic objectives that play a role. A set of objectives should be clearly identified.
    - The approach of distributing ABC values, taking into account regional biomass levels, appears an appropriate way of attaining equivalent fishing mortality in the different regions.

5. Recommendations for further improvements.

    - Recommended actions based on notes on each term of reference above are itemized in the report.

1 Introduction

1.1 Background

The Sablefish Stock Assessment Review met in Auke Bay, Alaska, from Tuesday, March 17, through Thursday, March 19, 2009, to review the assessment of Alaskan sablefish *Anoplopoma fimbria*.

The Review Panel was composed of three scientists affiliated with the Center for Independent Experts, University of Miami: Dr. Mike Armstrong, Dr. John Casey, and Dr. Neil Klaer. The Review Meeting was chaired by the Gulf of Alaska (GoA) Plan Team Chair, Dr. Jim Ianelli. Staff of the Auke Bay Laboratories, Alaska Fisheries Science Center made presentations and assisted with the meeting proceedings.

On 20 February assessment documents and supporting materials were made available to the Panel via a secure webserver. During the meeting, all documents were available electronically via the same webserver, and notes and presentations were uploaded as these became available.

The meeting format included presentations mixed with questions and open discussion. The Panel participated in the review of each term of reference. The meeting was open to the public and public comments were also accepted.

1.2 Review Activities

A brief description of presentations, Panel requests and responses are given in the summary report. Activities of the reviewers were shared during the meeting. The Panel decided to complete the first draft of the summary report during the Review Meeting. At the end of the second and third days, the Panel made general notes related to sub-items of the Terms of Reference (TORs) with the assistance of the meeting chair. Refining the notes was shared among the Panel, with John Casey working on TOR1, Mike Armstrong on TOR2, and myself on TOR3. TOR4 was drafted by all Panel members on the final day of the meeting. The Panel met again on Friday March 20 so that the various texts were brought into a single summary report document. During the next week I reformatted and edited the report, added the background and review activities sections, and distributed the second draft on Friday March 27. Editing was shared during the following week, John Casey added an executive summary, and a final draft of the summary report was prepared for submission on the due date of 2 April.

2 Review of Alaskan sablefish assessment

2.1 Terms of reference

The Panel considered the sablefish assessment in light of the terms of reference provided as follows:

1. Evaluation, findings, and recommendations on quality of input data and methods used to process them for inclusion in the assessment.

2. Evaluation, findings, and recommendations on the level and adequacy of knowledge and incorporation of life history, ecology and habitat requirements.

3. Evaluation, findings, and recommendations of the analytical approach used to assess stock condition and stock status.

4. Evaluation, findings, recommendations of areal apportionment of harvest strategy as related to optimizing spawning stock biomass.

5. Recommendations for further improvements.

2.2 Findings by term of reference

2.2.1 TOR1 Evaluation, findings, and recommendations on quality of input data and methods used to process them for inclusion in the assessment.

In general, the input data and methods used to process them for inclusion in the assessment were adequate and appropriate. The fishery and survey data were extensive and well documented. I agree with the points made in the summary report.

Historic data documentation and archive

There are a large number of data sources for catches, abundance indices and age/size composition for Alaskan sablefish. The development of a single document that describes each of these sources and summarizes important details has some value. Ideally, a data group would update the document periodically, and reference data sets would be archived electronically. Such a system would allow the precise specification of the procedures used to create reference data sets from the raw data, to help avoid future data loss or misuse.

Longline fishery catch rate analysis

The longline fishery logbook data were used to construct the Derby and IFQ fishery abundance indices used in the assessment. The assessment document notes that such fishery indices are often biased, and that the IFQ fishery CPUE trend indicates hyperstability. The logbook data were examined for obvious trends or patterns in space and time of effort and catch rates and none were evident. Statistical procedures such as generalized linear models (GLMs) are normally used to standardize annual abundance trends from fishery logbook data, and should be considered for the longline fishery logbook. Standardization does not deal with hyperstability if it is present, but would at least objectively remove any effects of changes in effort distribution, usually at least by area/depth/time/vessel.

Indices not used for stock assessment

A main issue with indices that are available but not used in the current assessment is whether those indices are representative of the Alaska-wide stock. Examples are the east Bering Sea slope survey, and State surveys. Should the current stock assessment move towards modeling a spatial disaggregated population, the use of the additional indices may be possible, and probably informative in terms of area-specific abundance, age/size composition and sex ratios.

2.2.2 TOR2 Evaluation, findings, and recommendations on the level and adequacy of knowledge and incorporation of life history, ecology and habitat requirements.

Knowledge of stock structure, natural mortality and sex-related maturity and growth parameters are adequately represented in the assessment although there are some issues regarding the handling of sex ratio in the model that need to be resolved for future assessments. Efforts to quantify ecosystem and environmental effects on sablefish dynamics should continue to be encouraged. I agree with the comments and recommendations in the summary report.

2.2.3 TOR3 Evaluation, findings, and recommendations of the analytical approach used to assess stock condition and stock status.

The analytical approach was appropriate and provides an acceptable basis for management advice. I agree with the comments and recommendations in the summary report.

Staged implementation of spatial structure – selectivity, then tagging

The 2007 Sablefish workshop in Seattle noted that “complex models that integrate inconsistent data may be unstable due to a flat likelihood surface” and that “frequent changes to the structural components of the assessment model should be avoided to minimize confusion for fishery managers and stakeholders”. I agree with these sentiments. If the evolution of the assessment is to be gradual, then potential changes need to be prioritized according to the increase in accuracy of stock indicators used by management and the ease of implementation and communication.

Much of the input data for the Alaskan sablefish is resolved spatially. Tagging studies have provided information on movement of different size classes by area. Apportionment of the TAC uses assumptions about the spatial distribution of the stock biomass. The development of a spatially disaggregated population model should make best use of the available data, may incorporate movement patterns, and could also better estimate the population spatial distribution for apportionment. However, such a

model would be complex, greatly different to the current simple model, and perhaps difficult to explain to management and stakeholders.

My own advice would be to implement a staged approach in moving to a spatial model in the future. Some aspects of spatial resolution can be implemented using the current single population model. Catches by the different fishing methods in different areas can be modeled using separate selectivity patterns. This would allow, for example, the longline fishery to catch smaller fish in the west of the fishery, as observed. Such a first step would require that at least the commercial fishery catch and length/age composition data be separated by area. The same spatial separation may also be applied to survey data as an additional step, or concurrently.

A fully spatially disaggregated model that incorporates movement between areas informed by the tagging data might be developed in parallel with the single population model. A comparison would then be required to determine whether the fully spatial version is superior to the simpler model for the provision of management advice, and whether a switch to the more complex model is justified.

Recommend examining stock synthesis

A number of the recommendations made about the assessment point towards the development of a more complex assessment model in parallel with the current simple assessment. In my opinion, the assessment team should consider using Stock Synthesis 3 (SS3) for the more complex model for the following reasons:

- The basic dynamics and many of the options in stock synthesis have been simulation tested and verified. As a model becomes more complex, the chance of simple coding errors becomes more likely.

- It has been recommended that the effect of selectivity on fitted growth be examined, and that options other than a simple single-step change in growth through time be considered. SS3 allows growth curves to be fitted within the assessment model accounting for selectivity effects, and allows various options for changing various parameters including growth through time.

- The possible use of size-based selectivity has been recommended, and this is a standard option in SS3.

- Spatial disaggregation of the population and the estimation of movement patterns among areas based on the tagging data within the assessment have been suggested. This is also possible using SS3.

- Inclusion of data sources such as length frequencies for combined genders is standard.

- SS3 output includes all of the diagnostics that might be examined routinely. An R procedure is included that produces a full range of graphics showing the model fit and diagnostics for inclusion in an assessment document.

It should be possible to construct an SS3 model that compares closely to the current assessment, and then separately add components of additional complexity for evaluation. I believe that creating an implementation of a complex model using SS3 would require less time, and is less prone to error than the construction of a purpose-built model.

Projections

The method used for stock projection is described briefly in the assessment document. Future recruitment is drawn from "an inverse Gaussian distribution whose parameters consist of maximum likelihood estimates determined from recruitments estimated in the assessments." The projection procedure should be documented using equations. Future recruitment values are log-normally distributed as in the assessment model, but a bias correction factor may not have been applied when drawing future recruitment values. If bias correction has not been accounted for, then future recruitment will be overestimated on average, and this will be seen in stochastic long-term projections that overshoot the target on-average. The projection figure given in the assessment document suggests such behavior.

Uncertainty

Uncertainty in a selection of base model parameters was estimated from the Hessian or by MCMC. This within-model uncertainty was also propagated into projections. However, between-model uncertainty is normally greater in magnitude. The current assessment presents a single base case set of results upon which to make management decisions. Plausible alternative models are often used to better estimate the true uncertainty in the assessment results. Such plausible alternative models for the Alaskan sablefish assessment could be across alternative values for *M*, different assumptions for growth change through time, and with models that include area specific selectivity or a spatially disaggregated population. The apparent precision of the current model results due to the underestimation of uncertainty may create difficulties in the future should results change due to structural changes in the model.

Simulation testing

Simulation testing can be used to verify assessments models, compare alternative assessment model structures, and to test the robustness of harvest control rules and apportionment procedures. An often used framework for such testing is Management Strategy Evaluation (MSE). Although the implementation of a MSE system requires a fairly large resource commitment initially, once the system has been developed the ongoing maintenance can be minimal.

2.2.4 TOR4 Evaluation, findings, recommendations of areal apportionment of harvest strategy as related to optimizing spawning stock biomass.

The current apportionment scheme is difficult to evaluate given the information presented, particularly since there are unstated socio-economic objectives that play a role. The Panel recommends that a set of objectives be clearly identified. While recognizing that there are uncertainties in regional abundance and productivity, the approach of distributing ABC values taking into account regional biomass levels appears an appropriate way of attaining equivalent fishing mortality in the different regions.

Improvement if biomass differences accounted for in the assessment

Apportionment is currently an additional process following the determination of a TAC. Should a spatially disaggregated assessment be developed, then biomass by age class within the various areas would be estimated by the model. That would potentially allow better testing of various apportionment schemes within the assessment and stock projections. It may also lead to the consideration of new apportionment schemes that use the estimated biomass by area, rather than the current system that directly uses the longline and fishery indices by area.

Support the use of the best available information in making adjustments for whale depredation

My own preference for dealing with the sperm whale depredation effect on the longline survey is to apply correction factors based on the best available information. There is an existing study that estimates the effect on depredated sets from 1998 to 2004 (Sigler *et al.* 2007), and those results could be applied. Concerns are that the effect may be underestimated, or has recently increased. If such concerns are justified, then another study is warranted.

2.2.5 TOR5 Recommendations for further improvements.

I agree with the recommendations made in the summary report. The following are additional recommendations related to this individual review report:

- A single document should be developed that describes reference data for catches, abundance indices and age/size composition and how they were created. Those reference sets should also be electronically archived at a single location.

- Generalized Linear Models should be used to standardize fishery CPUE data, and possibly other abundance indices used in the assessment.

- Spatial structure can be implemented simply within the current assessment using area-specific selectivity by fishing method. A fully spatially structured assessment model that includes movement among areas could be implemented in parallel with the current assessment to test whether the additional complexity is justified.

- Stock Synthesis 3 should be considered as a candidate model to use for the implementation of spatial structure.

- Projection methods require improved documentation. Bias correction may not have been applied.

- Uncertainty in assessment results should be more fully explored using alternative model structures, and this uncertainty should be communicated to management.

- Simulation testing should be used to verify the assessment models, compare among alternative assessment model structures, and to test the robustness of harvest strategies and apportionment schemes to uncertainty. Implementation of a MSE framework for Alaskan sablefish would achieve all of these goals.

- The best available information on sperm whale depredation should be used to adjust catch rates of depredated sets in the longline survey.

3 Critique of the review process

I found the review process for Alaskan sablefish to be effective. The meeting venue was comfortable and the staff of the AFSC warmly welcomed the participants and assisted throughout the meeting. The meeting was attended by assessment scientists and also stakeholder representatives who were encouraged to contribute to the proceedings. This open form of meeting worked well for the participants that were present.

It was unclear whether a Review Panel Chair was required, separate from the Review Meeting Chair. In this case, the summary report first draft was produced during the meeting with the assistance of the Review Meeting Chair, and no Review Panel chair was appointed. Points were generally raised by the Panel for the summary report, and the Review Meeting Chair provided clarification during the drafting. Drafting of the summary report with the assistance of someone with a long-term association with the stock assessment is very useful, to help ensure that the Panel has properly understood the documentation, and are making feasible recommendations. It is also of great benefit for the reviewers to have discussed the main points for the summary report during or just after Review Meeting, rather than coordinating by email later.

Appendix 1: Bibliography of materials provided for review

Main documents

Fujioka, J.T., Heifetz, J., and Sigler, M.F. 1997. Choosing a harvest strategy for sablefish, *Anoplopoma fimbria*, based on uncertain lif-history strategies. *In* M. Saunders and J. Wilkins (eds.). Proceeding for the International Symposium on the Biology and Management of Sablefish. pp. 247-251. NOAA Tech. Rep. 130.

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Sigler, M.F., Lunsford, C.R., Straley, J.M. and Liddle, J.B. 2007. Sperm whale depredation of sablefish longline gear in the northeast Pacific Ocean. Mar. Mammal Sci. doi:10.1111/j.1748-7692.2007.00149.

Background

Anon. 2009. Longline survey calendar.

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Kimura, D.K., and Zenger, H.H. 1997. Standardizing sablefish (*Anoplopoma fimbria*) longline survey abundance indices by modeling the log-ratio of paired comparative fishing cpues. ICES J. Mar. Sci. 54:48-59.

Kimura, D.K., Shimada, A.M. and Shaw, F.R. 1998. Stock structure and movement of tagged sablefish, *Anoplopoma fimbria*, in offshore northeast Pacific waters and the effects of El Niño-Southern Oscillation on migration and growth. Fish. Bull. 96: 462-481.

Maloney, N.E. 2005. Sablefish, *Anoplopoma fimbria*, Populations on Gulf of Alaska Seamounts. Fisheries Review.

Maloney ,N.E. and Sigler, M.F. 2008. Age-specific movement patterns of sablefish (*Anoplopoma fimbria*) in Alaska. Fish. Bull. 106:305–316.

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Sigler, M.F., Rutecki, T.L., Courtney, D.L., Karinen, J.F. and Yang, M.-S. 2001. Young-of-the-year sablefish abundance, growth, and diet. Alaska Fish. Res. Bull. 8(1): 57-70.

Appendix 2: A copy of the CIE Statement of Work

Statement of Work

(Subtask T007-03, 5 December 2008)

External Independent Peer Review by the Center for Independent Experts

Review of Alaska Sablefish Stock Assessment

Scope of Work and CIE Process: The National Marine Fisheries Service's (NMFS) Office of Science and Technology coordinates and manages a contract to provide external expertise through the Center for Independent Experts (CIE) to conduct impartial and independent peer reviews of NMFS scientific projects. This Statement of Work (SoW) described herein was established by the NMFS Contracting Officer's Technical Representative (COTR) and CIE based on the peer review requirements submitted by NMFS Project Contact. CIE reviewers are selected by the CIE Coordination Team and Steering Committee to conduct the peer review of NMFS science with project specific Terms of Reference (ToRs). Each CIE reviewer shall produce a CIE independent peer review report with specific format and content requirements (**Annex 1**). This SoW describes the work tasks and deliverables of the CIE reviewers for conducting an independent peer review of the following NMFS project.

Project Description: Multiple changes have been implemented in the Alaska sablefish (*Anoplopoma fimbria*) assessment in the period since the last independent review. There are stakeholder concerns over areal apportionment of harvest and depredation of survey catches by whales. Therefore, NOAA Fisheries' Alaska Fisheries Science Center (AFSC) requests a thorough review of the Alaskan sablefish assessment.

Sablefish are assessed as a single population in Federal waters off Alaska because northern sablefish are highly migratory for at least part of their life. Sablefish are then managed by discrete regions to distribute exploitation throughout their wide geographical range. There are four management areas in the Gulf of Alaska: Western, Central, West Yakutat, and East Yakutat/Southeast Outside, and two management areas in the Bering Sea/Aleutian Islands: the Eastern Bering Sea and the Aleutian Islands region. The assessment is a split-sex, age, and length structured model coded in AD Model Builder. Important data are an annual AFSC sablefish-specific longline survey, a biennial AFSC trawl survey, fishery CPUE, and age/length data from all three sources.

The Terms of Reference (ToRs) of the peer review are attached in **Annex 2**. The tentative agenda of the panel review meeting is attached in **Annex 3**.

Requirements for CIE Reviewers: Three CIE reviewers shall conduct an impartial and independent peer review in accordance with the SoW and ToRs herein. Each CIE reviewer's duties shall not exceed a maximum of 14 days to complete all work tasks of the peer review described herein. CIE reviewers shall have the expertise, background, and experience to complete an independent peer review in accordance with the SoW and ToRs herein. CIE reviewer expertise shall have expertise and work experience in analytical stock assessment,

including population dynamics, age/length based stock assessment models, uncertainty, survey design, and fisheries biology.

Location of Peer Review: Each CIE reviewer shall conduct an independent peer review during the panel review meeting scheduled during March 2009 in Juneau, Alaska.

Statement of Tasks: Each CIE reviewers shall complete the following tasks in accordance with the SoW and Schedule of Milestones and Deliverables herein.

Prior to the Peer Review: Upon completion of the CIE reviewer selection by the CIE Steering committee, the CIE shall provide the CIE reviewer information (name, affiliation, and contact details) to the COTR, who forwards this information to the NMFS Project Contact no later the date specified in the Schedule of Milestones and Deliverables. The CIE is responsible for providing the SoW and ToRs to the CIE reviewers. The NMFS Project Contact is responsible for providing the CIE reviewers with the background documents, reports, foreign national security clearance, and information concerning other pertinent meeting arrangements. The NMFS Project Contact is also responsible for providing the Chair a copy of the SoW in advance of the panel review meeting. Any changes to the SoW or ToRs must be made through the COTR prior to the commencement of the peer review.

Foreign National Security Clearance: When CIE reviewers participate during a panel review meeting at a government facility, the NMFS Project Contact is responsible for obtaining the Foreign National Security Clearance approval for CIE reviewers who are non-US citizens. For this reason, the CIE reviewers shall provide requested information (e.g., name, contact information, birth date, passport number, travel dates, and country of origin) to the NMFS Project Clearance for the purpose of their security clearance, and this information shall be submitted at least 30 days before the peer review in accordance with the NOAA Deemed Export Technology Control Program NAO 207-12 regulations (available at the Deemed Exports NAO website: http://deemedexports.noaa.gov/sponsor.html).

Pre-review Background Documents: Two weeks before the peer review, the NMFS Project Contact will send by electronic mail or make available at an FTP site the CIE reviewers all necessary background information and reports for the peer review. In the case where the documents need to be mailed, the NMFS Project Contact will consult with the CIE on where to send documents. The CIE reviewers shall read all documents in preparation for the peer review.

AFSC will provide copies of the statement of work, stock assessment documents, sablefish longline survey reports, and other background materials to include both primary and grey literature.

This list of pre-review documents may be updated up to two weeks before the peer review. Any delays in submission of pre-review documents for the CIE peer review will result in delays with the CIE peer review process, including a SoW modification to the schedule of milestones and deliverables. Furthermore, the CIE reviewers are responsible only for the pre-review documents that are delivered to the reviewer in accordance to the SoW scheduled deadlines specified herein.

Panel Review Meeting: Each CIE reviewers shall conduct the independent peer review in accordance with the SoW and ToRs. **Modifications to the SoW and ToRs can not be made during the peer review, and any SoW or ToRs modifications prior to the peer review shall be approved by the COTR and CIE Lead Coordinator.** Each CIE reviewer shall actively participate in a professional and respectful manner as a member of the meeting review panel, and their peer review tasks shall be focused on the ToRs as specified in the contract SoW. The NMFS Project Contact is responsible for any facility arrangements (e.g., conference room for panel review meetings or teleconference arrangements). The CIE Lead Coordinator can contact the Project Contact to confirm any peer review arrangements, including the meeting facility arrangements.

Contract Deliverables - Independent CIE Peer Review Reports: Each CIE reviewer shall complete an independent peer review report in accordance with the SoW. 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.

Other Tasks – Contribution to Summary Report: Each CIE reviewer will assist the Chair of the panel review meeting with contributions to the Summary Report. CIE reviewers are not required to reach a consensus, and should instead provide a brief summary of their views on the summary of findings and conclusions reached by the review panel in accordance with the ToRs.

Specific Tasks for CIE Reviewers: The following chronological list of tasks shall be completed by each CIE reviewer in a timely manner as specified in the **Schedule of Milestones and Deliverables**.

1) Conduct necessary pre-review preparations, including the review of background material and reports provided by the NMFS Project Contact in advance of the peer review;
2) Participate during the panel review meeting at the LOCATION and DATES as called for in the SoW, and conduct an independent peer review in accordance with the ToRs (Annex 2);
3) No later than REPORT SUBMISSION DATE, each CIE reviewer shall submit an independent peer review report addressed to the "Center for Independent Experts," and sent to Mr. Manoj Shivlani, CIE Lead Coordinator, via email to shivlanim@bellsouth.net, and CIE Regional Coordinator, via email to David Die ddie@rsmas.miami.edu. Each CIE report shall be written using the format and content requirements specified in Annex 1, and address each ToR in Annex 2;
4) CIE reviewers shall address changes as required by the CIE review in accordance with the schedule of milestones and deliverables.

Schedule of Milestones and Deliverables: CIE shall complete the tasks and deliverables described in this SoW in accordance with the following schedule.

February 10, 2009	CIE sends reviewer contact information to the COTR, who then sends this to the NMFS Project Contact
March 3, 2009	NMFS Project Contact sends the CIE Reviewers the pre-review documents
March 17-19, 2009	Each reviewer participates and conducts an independent peer review during the panel review meeting
April 2, 2009	CIE reviewers submit draft CIE independent peer review reports to the CIE Lead Coordinator and CIE Regional Coordinator
April 16, 2009	CIE submits CIE independent peer review reports to the COTR
April 23, 2009	The COTR distributes the final CIE reports to the NMFS Project Contact and regional Center Director

Modifications to the Statement of Work: Requests to modify this SoW must be made through the Contracting Officer's Technical Representative (COTR) who submits the modification for approval to the Contracting Officer at least 15 working days prior to making any permanent substitutions. The Contracting Officer will notify the CIE within 10 working days after receipt of all required information of the decision on substitutions. The COTR can approve changes to the milestone dates, list of pre-review documents, and Terms of Reference (ToR) of the SoW as long as the role and ability of the CIE reviewers to complete the SoW deliverable in accordance with the ToRs and deliverable schedule are not adversely impacted. The SoW and ToRs cannot be changed once the peer review has begun.

Acceptance of Deliverables: Upon review and acceptance of the CIE independent peer review reports by the CIE Lead Coordinator, Regional Coordinator, and Steering Committee, these reports shall be sent to the COTR for final approval as contract deliverables based on compliance with the SoW. As specified in the Schedule of Milestones and Deliverables, the CIE shall send via e-mail the contract deliverables (the CIE independent peer review reports) to the COTR (William Michaels, via William.Michaels@noaa.gov).

Applicable Performance Standards: The contract is successfully completed when the COTR provides final approval of the contract deliverables. The acceptance of the contract deliverables shall be based on three performance standards: (1) each CIE report shall have the format and content in accordance with Annex 1, (2) each CIE report shall address each ToR as specified in Annex 2, (3) the CIE reports shall be delivered in a timely manner as specified in the schedule of milestones and deliverables.

Distribution of Approved Deliverables: Upon notification of acceptance by the COTR, the CIE Lead Coordinator shall send via e-mail the final CIE reports in *.PDF format to the COTR.

The COTR will distribute the approved CIE reports to the NMFS Project Contact and regional Center Director.

Key Personnel:

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Annex 1: Format and Contents of CIE Independent Peer Review Report

1. The CIE independent report shall be prefaced with an Executive Summary providing a concise summary of the findings and recommendations.

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, 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 detailed summary of findings, 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 should elaborate on any points raised in the Summary Report that they feel might require further clarification.

   d. Reviewers shall provide a critique of the NMFS review process, including suggestions for improvements of both process and products.

   e. The CIE independent report shall be a stand-alone document for others to understand the proceedings and findings of the meeting, 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 as separate appendices as follows:

   Appendix 1: Bibliography of materials provided for review
   Appendix 2: A copy of the CIE Statement of Work
   Appendix 3: Panel Membership or other pertinent information from the panel review meeting.

Annex 2: Terms of Reference for the Peer Review

Review of Alaska Sablefish Stock Assessment

CIE reviewers shall address the following Terms of Reference during the peer review and in the CIE reports.

a. Evaluation, findings, and recommendations on quality of input data and methods used to process them for inclusion in the assessment.
b. Evaluation, findings, and recommendations on the level and adequacy of knowledge and incorporation of life history, ecology and habitat requirements.
c. Evaluation, findings, and recommendations of the analytical approach used to assess stock condition and stock status.
d. Evaluation, findings, recommendations of areal apportionment of harvest strategy as related to optimizing spawning stock biomass.
e. Recommendations for further improvements

Annex 3: Tentative Agenda

Review of Alaska Sablefish Stock Assessment

Alaska Fisheries Science Center
Auke Bay Laboratories
Ted Stevens Marine Research Institute
17109 Pt. Lena Loop Rd.
Juneau, Alaska

March 17th – 19th, 2009

Contacts:
Security and check-in: Phil Rigby, Phillip.Rigby@noaa.gov, 907-789-6653
Additional documents, Dana Hanselman, Dana.Hanselman@noaa.gov, 907-789-6626

Tuesday, March 17th:
9:00 AM – 10:30 AM: **Introduction**
Topics:
Introductions and the agenda, overview of sablefish biology, fishery, and history of assessment.

10:30 AM – Break
10:45 AM – Discussions
12:00 PM – Lunch
1:00 PM -3:00 PM: **Input data**
Topics:
Survey data – abundance indices, ages, lengths, growth, ageing error
Fishery data – abundance indices, ages, lengths, logbooks and observer data

3:00 PM – Break
3:15 PM – **Discussions**
5:00 PM – Adjourn for day

Wednesday, March 18th:
9:00 AM – 10:30 AM: **Assessment model**
Topics:
Model structure, split-sex design, likelihood formulations, data weighting

10:30 AM – Break
10:45 AM – **Discussions**
12:00 PM – Lunch
1:00 PM -3:00 PM: **Parameters, priors, and ages**

Topics:
Catchabilities, selectivities, natural mortalities, recruitment variability, age reading

3:00 PM – Break
3:15 PM – Discussions
5:00 PM – Adjourn for day

Thursday, March 19th:
9:00 AM – 10:30 AM: **Current issues**
Topics:
Areal apportionment of catch, whale depredation

10:30 AM – Break
10:45 AM – Discussions
12:00 PM – Lunch
1:00 PM -3:00 PM: **Alternative model runs, further discussion as needed**
Topics:
TBA

3:00 PM – Break
3:15 PM – Further discussions and summarize
5:00 PM – Adjourn meeting

Appendix 3: List of participants

CIE Members of the Review Panel
Mike Armstrong (CEFAS)
John Casey (CEFAS)
Neil Klaer (CSIRO)

Meeting Chair
Jim Ianelli (AFSC, Seattle)

NMFS scientific participants:
Dana Hanselman (AFSC/ABL)
Jon Heifetz (AFSC/ABL)
Chris Lunsford (AFSC/ABL)
Cara Rodgveller (AFSC/ABL)
Jane DiCosimo (NPFMC)
Jeff Fujioka (AFSC/ABL)
Kalei Shotwell (AFSC/ABL)
Phil Rigby (AFSC/ABL)
Dave Clausen (AFSC/ABL)
Cindy Tribuzio (AFSC/ABL)

Industry
Dan Falvey (ALFA)
Jack Knutsen (FVOA)
Nick Delaney (Alaska Leader)
Peter Hochstoeger (AK Glacier Seafoods)
Tory O'Connell (ALFA)
Chris McDowell (McDowell Group)

Non-NMFS scientists
Juan Valero (IPHC)
Sherri Dressel (ADFG)
Dave Carlile (ADFG)