

SOME KEY ISSUES IN PEER REVIEWS OF STOCK ASSESSMENTS: LESSONS FROM THE US CENTER OF INDEPENDENT EXPERTS

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SUMMARY

The Center for Independent Experts (CIE) was created to provide independent and timely peer review of the science conducted by the United States National Marine Fisheries Service (NMFS). Of the more than one hundred and fifty reviews conducted by the CIE from its inception in 1999 to the present, the majority of the reviews have pertained to stock assessments; however, many other topics, ranging from population ecology of endangered species to fishery economics, have also been reviewed. The process of selecting reviewers consists of matching the skills required for the review, with the ability of suitable experts subject to constraints set up to avoid picking candidates with potential conflicts of interest. This process is conducted by the CIE independently of the client, the NMFS. We here discuss how lessons learn from operating the CIE can benefit the peer review process for stock assessments in ICCAT. We also provide recommendations on how to modify the ICCAT process to develop an appropriate list of reviewers ensure clarity of reviewer's roles and independence in the reviewer selection process.

RÉSUMÉ

Le Centre pour les experts indépendants (CIE) a été créé pour fournir un examen par des pairs indépendant et opportun des programmes de recherche menés par le National Marine Fisheries Service (NMFS) des États-Unis. Sur plus de 150 examens réalisés par le CIE depuis sa création en 1999 jusqu'à l'heure actuelle, la majorité des examens ont porté sur les évaluations des stocks ; or, de nombreux autres thèmes, passant de l'écologie des populations d'espèces menacées à l'économie des pêcheries, ont également fait l'objet d'examen. Le processus de sélection des examinateurs consiste à faire coïncider les compétences requises pour l'examen avec la capacité d'experts adéquats soumis à des contraintes établies afin d'éviter de sélectionner des candidats qui pourraient avoir des conflits d'intérêts. Ce processus est réalisé par le CIE indépendamment du client, le NMFS. Nous expliquons dans le présent document la façon dont les leçons acquises du fonctionnement du CIE peuvent bénéficier au processus d'examen par les pairs pour les évaluations des stocks au sein de l'ICCAT. Nous formulons aussi des recommandations sur la façon de modifier le processus de l'ICCAT en vue de dresser une liste d'examineurs appropriée qui garantirait la clarté des rôles et l'indépendance des examinateurs dans le processus de sélection des examinateurs.

RESUMEN

El Centro de Expertos Independientes (CIE) fue creado para proporcionar una revisión por pares independiente y oportuna de los trabajos científicos llevados a cabo por el National Marine Fisheries Service (NMFS) de Estados Unidos. De las más de ciento cincuenta revisiones llevadas a cabo por el CIE desde sus comienzos, en 1999, hasta el presente, la mayoría de las revisiones han estado relacionadas con evaluaciones de stock, sin embargo, se han revisado otros muchos temas, desde la ecología de la población de las especies en peligro hasta la economía pesquera. El proceso de selección de revisores consiste en hacer coincidir las capacidades requeridas para la revisión con las capacidades de expertos adecuados, y está sujeto a las restricciones establecidas para evitar la selección de candidatos con potenciales conflictos de intereses. Este proceso lo realiza el CIE de un modo independiente del cliente, a saber, el NMFS. Aquí se explica cómo puede beneficiarse el proceso de revisión por pares de las evaluaciones de stock en ICCAT de las lecciones aprendidas en las operaciones del CIE. Asimismo, facilitamos recomendaciones sobre cómo modificar el proceso de ICCAT para desarrollar una lista adecuada de revisores, asegurar la claridad en el papel de los revisores y la independencia en el proceso de selección de revisores.

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Introduction

The Center for Independent Experts (CIE), a process funded by the US National Oceanographic and Atmospheric Administration (NOAA) provides peer reviews for the US National Marine Fisheries Service (NMFS). The CIE has provided peer reviews of the most important scientific products of the NMFS over the last 14 years, during which over one hundred and fifty reviews have been conducted on topics ranging from fish stock assessments, protected species management (Brainard et al 2013), socio-economics and many other subjects (Brown et al 2006). The selection process for peer reviewers is driven by two main goals, providing the best quality experts and making sure that they do not have any perceived conflict of interest on the subject matter been reviewed. Because many of the reviews been conducted have direct consequences on the management advice provided by the NMFS the conflict of interest guidelines (Table 1) established by the CIE are more restrictive than those typically used in the peer review journal process (Brown et al 2006). Many of these guidelines refer to having obtained, or planning to obtain any non-competitive funds from NOAA or any other stakeholder of the resources been managed by the NMFS. Given that NOAA is the main source of funding for much of the fishery work in the US this places strong constraints against the selection of US-based fishery scientists.

Although the CIE conducts reviews on a variety of topics, thus uses experts on many different marine science disciplines, many of them relate to fisheries stock assessments. Expertise on stock assessment is therefore the most common skill sought by the CIE and as a result the recruitment and selection of stock assessment experts is a core business of the center. Reviewers hired for such stock assessment reviews are typically contracted for 14 days (2 days travel, 5 days stock assessment meeting, 4 days preparation of review and 3 days report writing). The relative small pool of experts that exists throughout the world combined with the conflict of interest guidelines adopted by the CIE makes the job of recruitment and selection for CIE reviews a difficult one (Brown et al 2006). As the number of stock assessment reviews has continued to increase the list of CIE reviewers has also increased. The worldwide pool of stock assessment scientists is relatively small, therefore the CIE has had to maintain a competitive daily salary rate for its reviewers. Currently this rate is around US\$800 a day.

Santiago et al (2013) reviewed the history of independent peer review processes in ICCAT which started with the review of the white marlin assessment in 2002 and briefly describes the processes used by other tuna RFMOs. The most recent peer review was the one for the 2012 white marlin stock assessment (ICCAT 2013, Table 2). The billfish working group and the SCRS discussed some of the issues that the billfish working group faced in taking advantage of the input provided by the review whilst attempting to complete the assessment. These issues (Table 3) were briefly summarized in the SCRS report (ICCAT 2013).

Given these issues the SCRS requested that the ICCAT methods and subcommittee to examine the proposed Terms Of Reference (TOR) for the peer review of the upcoming peer review of the Albacore assessments to be conducted in 2013. This paper presents some of the lessons learned by the CIE to inform the discussions on the TOR for the 2013 peer review of the upcoming albacore assessment.

Reviewer pool

The CIE depends on maintaining a reviewer pool of experts that can be tapped into as reviews are requested. This pool needs to be managed to make sure that the material required to match experts to reviews and evaluate for the possible presence of conflict of interests is kept up to date. Reviewers are included in the pool if they have skills and knowledge of the kind required by the CIE and if they fulfill the conflict of interest guidelines. Once in the pool the reviewers are asked to periodically update their CVs and inform the CIE technical team of any work they do that may change their eligibility because of possible new conflict of interest.

The pool is one of the main assets of the CIE and, as the Center is funded through a competitive process, is actively protected by the current lead institution of the CIE, Northern Taiga Ventures Inc. (NTVI). The reason for this protection is that it is not in the interest of NTVI and its partners, the University of Miami and Oregon State University to share the reviewer pool to possible funding competitors. The CIE, however, has in the past shared some limited information about individual reviewers to other organizations. In addition the names of CIE reviewers are in the public domain, as CIE reports are available through the various parts of NOAA that are clients to the CIE process.

Recommendation: ICCAT may consider, in collaboration with other tuna RFMOs, to develop a reviewer pool for experts with knowledge relevant to tuna stock assessments so as to maintain a list of possible reviewers for tuna assessments.

Selection of reviewers

The process used by the CIE in selecting reviewers (Brown et al 2006) is driven by the need to maintain reviewer selection at an arm length from the client, NOAA. Candidate reviewers are selected by the CIE technical team from the reviewer pool by matching the skills and knowledge required for each review with those of the experts in the pool. After candidates are asked whether they are available for the dates of the review, the CIE technical team produces a short list with the list of names of available candidates. This list is provided to the CIE advisory committee that has the responsibility to select the final candidates. Once informed of the selection NOAA has to accept the reviewers unless it can raise objections to the selection process under some narrow guidelines. These guidelines establish that NOAA can provide the CIE with information they may not have had to re-evaluate their selection specifically in regards to the presence of a possible conflict of interest and/or the appropriateness of the skill set of the reviewer. It is important to note that NOAA can only provide information to the CIE; ultimately it is for the CIE to decide whether the information changes their selection reviewers or not. Under the CIE process NOAA has to accept the final selection of CIE reviewers.

Recommendation: ICCAT may consider, in collaboration with other tuna RFMOs, preparing guidelines for conflict of interest for reviewers and developing a process for reviewer selection that is as removed as possible from ICCAT. A possible solution could be to establish a peer review advisory committee for all RFMOs that would be in charge of selecting reviewers from the short list of reviewers developed by each RFMO. This committee could have representatives of each RFMO. It would be best if the member of each RFMO was asked to recuse herself or himself whenever a selection is conducted for a review for an assessment corresponding to their RFMO.

Reviewer's role

CIE reviewers are charged with producing independent reviews of the scientific material that they have been provided, as documents, presentations at meetings or both. These reviews are meant to reflect exclusively the opinion of each reviewer. The content of the report is explicitly defined in the terms of reference of the review (Tables 2 and 4). In the US CIE reports are public documents, however, the principal clients of the reports are the authors of the scientific material that was reviewed, the scientific advisory committees collating results for fishery managers and the fishery management councils (FMC) themselves (Carmichael and Fenske 2010).

In cases where CIE reviews include participation in an assessment meeting reviewers are often faced with the challenge of contributing to the assessment work being conducted at the meeting to help improve the outputs of the work at the same time as they are preparing a review report. This challenge can be facilitated or hindered by the meeting chair and by the capacity of the assessment teams present at the meeting. The chair needs to avoid allowing the reviewer to be charged with leading components of the analysis, or to allow the reviewer to direct the assessment team's work in such a way that the output of the analysis can be seen to bear the authorship of the reviewer. In some instances, like in the US North Pacific Fishery Management Council, recommendations originating from CIE reviews are only considered for the next assessment cycle so as not to interfere with the current assessment cycle (Carmichael and Fenske 2010).

In the assessment process of the US Fishery Management Councils the units that are charged to produce assessments are required to produce a consensus report which is often the main output of the meetings attended by the CIE reviewers. It is not the CIE reviewer's role to facilitate consensus. Under the current framework of the CIE, reviewers are there to provide individual opinions on the science reviewed. This independent role is not always the role that the Statistics and Scientific Committees of the FMCs would like CIE reviewers to fulfill because the committees' main task is to produce a consensus assessment report (Carmichael and Fenske 2010).

The presence of the CIE reviewer at the meetings, however, will inevitably lead to some unknown contribution from the CIE reviewer to the consensus reports. It is the responsibility of the chair of the assessment meeting to draw the line when necessary to make sure that the contribution of the reviewer to the consensus report does not exceed their independent advisory role in the process.

Most often CIE reviews are conducted on FMCs benchmark assessments and not on simple assessment updates (Crosson 2013). This reflects the higher standards of review that such benchmark assessments have because they are more likely to be associated with management changes than assessment updates. It is NMFS Division of Science and Technology in consultation with the Directors of NMFS Science centers that develops the list of priorities for CIE reviews each year.

CIE reviewers that are stock assessment experts tend to participate in a number of reviews through the years. As a result they acquire experience in the CIE process in a way that helps making their contributions as reviewers to be of high quality and to satisfy the constraints related to independence requirements. Unfortunately, the more reviewers participate in CIE reviews the more they can be seen as losing independence from the process. This is a direct result of the fact that, unlike other peer review processes, the CIE reviewers are not anonymous. To minimize this, the same reviewer is not used in subsequent assessments of the same stock.

Like in ICCAT, some of the US assessment processes such as the South East Data Assessment and Review process (SEDAR) are conducted over a series of steps. It is clear that each step of the process can benefit from peer review, however, in the US different CIE reviewers are used for each step. The reasoning for this is a desire to avoid reviewers reviewing outputs that have been partially vetted or influenced previously by them. This has a drawback, as reviewers to the assessment part of the process could benefit from having participated in the data preparation process. There is an exception to this in the CIE process. In the STAR process, which pertains to NW Pacific assessments, assessments are conducted in a bi-annual cycle so that every two years a large number of stocks are assessed through a series of assessment meetings. The CIE provides independent reviewers for each assessment; however, it also provides a “primary reviewer” who attends all the assessments in that year. This primary reviewer is designated to provide consistency of review across assessments and also facilitate the communication of the review of assessment results to the North Pacific Fishery Management Council. The reviewer’s role is therefore distinct from that of the other CIE reviewers present at the assessment meeting (Table 2). The primary reviewer is charged to present to the North Pacific Fishery Management Council at the end of the assessment year, a consolidated presentation of the conclusions reached by all reviewers and of the review process.

Recommendation. ICCAT may consider, to define guidelines for individual reviewer’s participation in assessments:

- *the same reviewer should not participate in subsequent assessments of the same stock*
- *the same reviewer should not participate in data preparation meetings and assessment meetings for the same stock*

In summary, through its history, the CIE has faced many of the challenges that ICCAT is facing to design, maintain and implement a peer review system that improves the quality of scientific outputs that support fisheries management (Carmichael and Fenske 2010, Cordue 2007) and marine ecosystem management (Brainard et al 2013). The CIE has adopted a set of operating guidelines that match the specific goals of the NMFS quality control program. Some of such guidelines may be appropriate for ICCAT, but others may not. In designing such guidelines ICCAT has to define how it balances the competing objectives of providing independent and efficient reviews.

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Table 1. Conflict of interest guidelines for the US Center of Independent Experts.

To maintain the highest level of independence in the peer review process, the CIE utilizes a rigorous process to ensure that no participant has any conflicts that would preclude the participant's effectiveness, either real or perceived.

Candidates are selected only after the CIE Coordination Team has ascertained that the candidates possess the necessary expertise, the preferred experience, and the demonstrated ability to address the issues pertinent to the review. Then, each candidate is provided with a standard conflict of interest form. The candidate must expert advice free from the influence of Government managers, the fishing industry, or any other interest group. Any candidate who has conducted any of the following is considered ineligible as a participant in a CIE review:

- Received in the past (1-2 years) substantial funds from industry or environmental groups with vested interests in resources for which NMFS has stewardship responsibilities;
 - Received in the recent past substantial funds from NMFS via a sole-source contracts; or
 - A history of an advocacy role for a specific viewpoint.
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Table 2. Statement of work and format of report for CIE review of assessment of Stock Assessment of Striped Marlin.

Statement of work

1. Review of the assessment methods: determine if they are reliable, properly applied, and adequate and appropriate for the species, fisheries, and available data.
2. Evaluate the assessment model configuration, assumptions, and input data and parameters (fishery, life history, and spawner recruit relationships): determine if data are properly used, input parameters seem reasonable, models are appropriately configured, assumptions are reasonably satisfied, and primary sources of uncertainty accounted for.
3. Comment on the proposed population benchmarks and management parameters (e.g., MSY, Fmsy, Bmsy, MSST, MFMT); if necessary, recommended values for alternative management benchmarks (or appropriate proxies) and clear statements of stock status.
4. Evaluate the adequacy, appropriateness, and application of the methods used to project future population status.
5. Suggest research priorities to improve our understanding of essential population and fishery dynamics necessary to formulate best management practices.

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, 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.
3. The reviewer report shall include the following appendices:

Appendix 1. Bibliography of materials provided for review.

Appendix 2. A copy of the CIE Statement of Work.

Table 3. Unresolved issues about ICCAT peer review system identified by the SCRS (ICCAT 2013).

Issue	Quotation from ICCAT 2013
Need for consistency in quality of the review	“...inconsistence in advice:... where you get different peer reviewers from one assessment to another.”
Dual Role of experts as reviewers and analysts	“...A potential problem was that when a reviewer actively participates in a meeting, he/she will also have part ownership of the results from the meeting... For example by participating in a data prep meeting they will have had responsibility for inputs into the assessment.”
Reviewers becoming part authors of the outputs in a multistage assessment process	“It was agreed that if there is a capacity problem then we there is a need to strengthen the stock assessment teams and not rely upon a peer reviewer to provide missing expertise.”

Table 4. Extract of terms of reference for primary CIE reviewer of the STAR process in 2013.

Requirements for CIE Reviewer: One CIE reviewer is requested to participate in all 2013 STAR panel meetings to provide scientific review and ensure consistency of analytical approaches among assessments, as appropriate. The reviewer shall be an active and engaged participant throughout panel discussions and able to voice concerns, suggestions, and improvements while respectfully interacting with other review panel members, advisors, and stock assessment technical teams. The CIE reviewer shall conduct an impartial and independent peer review in accordance with the SoW and ToRs herein. The CIE reviewer 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-structured models, use of MCMC to develop confidence intervals, and use of Generalized Linear Models in stock assessment models. The CIE reviewer's duties shall not exceed a maximum of 14 days for each panel meeting review to complete all work tasks of the peer review described herein.

Statement of Tasks: The CIE reviewer 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 (full name, title, affiliation, country, address, email) 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 other information concerning 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.

Pre-review Background Documents: Two weeks prior to the scheduled peer review meetings, the NMFS Project Contact will send (by electronic mail or make available at an FTP site) to the CIE reviewer the 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 Lead Coordinator on where to send documents. The CIE reviewer is responsible only for the pre-review documents that are delivered to the reviewer in accordance to the SoW scheduled deadlines specified herein. The CIE reviewer shall read all documents in preparation for the peer review. Documents to be provided to the CIE reviewer prior to the STAR Panel meeting include:

- The current draft stock assessment reports;
- Previous stock assessments and STAR Panel reports for the assessments to be reviewed;
- The Pacific Fishery Management Council's Scientific and Statistical Committee's Terms of Reference for Stock Assessments and STAR Panel Reviews;
- Stock Synthesis (SS) Documentation
- Additional supporting documents as available.
- An electronic copy of the data, the parameters, and the model used for the assessments (if requested by reviewer).

Panel Review Meeting: The CIE reviewer shall conduct the independent peer review in accordance with the SoW and ToRs, and shall not serve in any other role unless specified herein. 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. The 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 herein. The NMFS Project Contact is responsible for any facility arrangements (e.g., conference room for panel review meetings or teleconference arrangements). The NMFS Project Contact is responsible for ensuring that the Chair understands the contractual role of the CIE reviewer as specified herein. 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: The CIE reviewer shall complete an independent peer review report in accordance with the SoW. The CIE reviewer shall complete the independent peer review according to required format and content as described in Annex 1. The CIE reviewer shall complete the independent peer review addressing each ToR as described in Annex 2.

Other Tasks – Contribution to Summary Report: The CIE reviewer may assist the Chair of the panel review meeting with contributions to the Summary Report, based on the terms of reference of the review. The CIE reviewer is not required to reach a consensus, and should provide a brief summary of the reviewer's 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 meetings as scheduled between 22 April and 23 September, 2013 as specified herein, and conducts an independent peer review in accordance with the ToRs (Annex 2).
- 3) No later than XX, the 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 to Dr. David Die, CIE Regional Coordinator, via email to ddie@rsmas.miami.edu.
- 4) Each CIE report shall be written using the format and content requirements specified in Annex 1, and address each ToR in Annex 2.