

Statement of Work

External Independent Peer Review by the Center for Independent Experts

Blue Crab Benchmark Stock Assessment - 2010

Scope of Work and CIE Process: The National Marine Fisheries Service's (NMFS) Office of Science and Technology coordinates and manages a contract providing external expertise through the Center for Independent Experts (CIE) to conduct independent peer reviews of NMFS scientific projects. The Statement of Work (SoW) described herein was established by the NMFS Project Contact and Contracting Officer's Technical Representative (COTR), and reviewed by CIE for compliance with their policy for providing independent expertise that can provide impartial and independent peer review without conflicts of interest. CIE reviewers are selected by the CIE Steering Committee and CIE Coordination Team to conduct the independent peer review of NMFS science in compliance the predetermined Terms of Reference (ToRs) of the peer review. Each CIE reviewer is contracted to deliver an independent peer review report to be approved by the CIE Steering Committee and the report is to be formatted with content requirements as specified in **Annex 1**. This SoW describes the work tasks and deliverables of the CIE reviewer for conducting an independent peer review of the following NMFS project. Further information on the CIE process can be obtained from www.ciereviews.com.

Project Description: The blue crab stock has been subject to Baywide stock assessments on two previous occasions: Rugolo et al. (1997) and Miller et al. (2005). In the years between benchmark assessments, updates on the stock status are provided by the NOAA Chesapeake Bay Office's Chesapeake Bay Stock Assessment Committee. The most recent update concluded that the stock was not overfished and was not then experiencing overfishing. Since the 2005 assessment, the three management jurisdictions have implemented a range of regulatory changes aimed at attaining the target exploitation rate of 46% of the available stock. Thus, it is appropriate that another, Baywide benchmark assessment be conducted. The blue crab resource, specifically for soft and peeler crabs, in Chesapeake Bay has recently been declared a fisheries resource disaster by the Secretary Commerce. In 2009 and 2010, annual updates (not peer-reviewed) have shown slight improvements in the resource. Blue crab is the most important commercial fishery in Chesapeake Bay with annual Baywide landings recently as low as 50 million pounds – roughly 25 million pounds below the long-term average. 2010 predicted landings (if fished at the target exploitation level) could top 100 million pounds. This is obviously a large fluctuation in landings and thus value of the resource to the Bay community.

The first Baywide stock assessment was conducted by Rugolo et al. (1997). This assessment used Hoenig's (1987) length-based approach to estimate exploitation, and an unweighted average of the four principal fishery-independent surveys to determine abundance. Consequently biological reference points were crude.

In 2001, the technical subcommittee of the Bi-State Blue Crab Advisory Committee (BBCAC) developed a new management framework that relied on exploitation and biomass threshold and

target reference points (Miller 2001). Threshold reference points were proposed based on a maintaining 10% of the virgin spawning potential and on the lowest observed abundance in the surveys. A target exploitation rate that would lead to an effective doubling of the spawning stock present in 2001 was also selected. In 2005, Miller et al. (2005) produced the most recent Baywide benchmark assessment for blue crab in the Chesapeake Bay. This assessment critically evaluated and revised estimates of the natural mortality rate (Hewitt et al. 2007), the impact of reporting changes on landings estimates (Fogarty and Miller 2004), and spawning potential ratio reference points (Bunnell and Miller 2005). The 2005 assessment, using data through 2003, recommended adopting the exploitation fraction, defined as the proportion of crabs available at the beginning of the season that are subsequently harvested, in place of less intuitive measures (F) used in previous assessments. Estimates of exploitation fractions were calculated based on the Baywide winter dredge survey (WDS) and within a modified catch-survey analysis (Collie and Sissenwine 1983) that permitted the use of multiple surveys (Miller et al. 2005). The approach used in the 2005 assessment was reviewed by a panel of international scientists with expertise in crustacean fisheries who found that it was a substantial improvement over previous assessments. However, the panel also identified issues to be addressed in future assessments (Haddon et al. 2005). In particular, the panel recommended exploration of the impact of density-dependent processes in life history traits, improvements to the fishery-independent surveys, particularly with regard to catchability, the possibility of developing a sex-specific assessment model and reference points, and a fuller analysis of the impacts of uncertainty on all aspects of the assessment.

Here, the 2010 assessment and targeted research program is a highly collaborative and integrated program to address specific concerns raised by the international review panel from 2005. The assessment activities are divided into eight specific Terms of Reference (TOR) that were developed based on the review comments received from panel of experts convened to review the 2005 assessment (Miller et al. 2005), and from extensive discussion with managers from MDNR, the Potomac River Fisheries Commission and the Virginia Marine Resources Commission, the three relevant management jurisdictions.

NOAA Fisheries is playing a significant role in coordinating disaster assistance to Maryland and Virginia to ensure a sustainable blue crab fishery in Chesapeake Bay. This 2010 Benchmark assessment and research program represents a large investment by NOAA and the state management agencies and should be reviewed internationally.

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. CIE reviewers shall have working knowledge and recent experience in the application of stock assessment and crustacean fisheries. Each CIE reviewer's duties shall not exceed a maximum of 14 days to complete all work tasks of the peer review described herein.

Location of Peer Review: Each CIE reviewer shall conduct an independent peer review during the panel review meeting scheduled in Annapolis, Maryland during the tentative dates of 29-31 March 2011.

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 (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.

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., 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) to the NMFS Project Contact 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) to the CIE reviewers 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. 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. The CIE reviewers shall read all documents in preparation for the peer review.

The project contact will provide a list of background material (with the number of pages) for the peer review by 22 November 2010.

Panel Review Meeting: Each 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.** 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 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 reviewers 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: 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 may assist the Chair of the panel review meeting with contributions to the Summary Report, based on the terms of reference of the review. Each 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 meeting in the Annapolis, Maryland during the tentative dates of 29-31 March 2011.
- 3) In Annapolis, Maryland during the tentative dates of 29-31 March 2011 as specified herein, and conduct an independent peer review in accordance with the ToRs (**Annex 2**).
- 4) No later than 14 April 2011, each CIE reviewer shall submit an independent peer review report addressed to the "Center for Independent Experts," and sent to Mr. Manoj Shrivani, CIE Lead Coordinator, via email to shivlanim@bellsouth.net, and CIE Regional Coordinator, via email to David Die ddie@rsmas.miami.edu or David Sampson david.sampson@oregonstate.edu. Each CIE report shall be written using the format and content requirements specified in Annex 1, and address each ToR in **Annex 2**.

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

The following dates are tentative, and the project contact will provide firm dates no later than 22 November 2011.

<i>22 February 2011</i>	CIE sends reviewer contact information to the COTR, who then sends this to the NMFS Project Contact
<i>15 March 2011</i>	NMFS Project Contact sends the CIE Reviewers the pre-review documents
<i>29-31 March 2011</i>	Each reviewer participates and conducts an independent peer review during the panel review meeting
<i>14 April 2011</i>	CIE reviewers submit draft CIE independent peer review reports to the CIE Lead Coordinator and CIE Regional Coordinator
<i>28 April 2011</i>	CIE submits CIE independent peer review reports to the COTR
<i>5 May 2011</i>	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 approved by the Contracting Officer at least 15 working days prior to making any permanent substitutions. The Contracting Officer will notify the COTR 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 ToRs within the SoW as long as the role and ability of the CIE reviewers to complete the deliverable in accordance with the SoW is not adversely impacted. The SoW and ToRs shall not 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 and ToRs. As specified in the Schedule of Milestones and Deliverables, the CIE shall send via e-mail the contract deliverables (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 be completed with 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 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 CIE reports to the NMFS Project Contact and Center Director.

Support Personnel:

William Michaels, Contracting Officer's Technical Representative (COTR)
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Key Personnel:

NMFS Project Contact:

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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, 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 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 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:
 - 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

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- 1. Evaluate the findings and recommendations of data collection operations and survey design;*
- 2. Evaluate and provide recommendations regarding data quality;*
- 3. Evaluate the strengths and weaknesses, and recommendations of the analytical methodologies employed;*
- 4. Evaluate and provide recommendations of model assumptions, estimates, and uncertainty;*
- 5. Evaluate the findings and recommendations of result interpretation and conclusions;*
- 6. Determine whether the science reviewed is considered to be the best scientific information available;*
- 7. Provide recommendations for further improvements to the stock assessment, research on vital rates, and monitoring needs.*
- 8. Provide a brief description on panel review proceedings highlighting pertinent discussions, issues, effectiveness, and recommendations*

The stock assessment itself has the following eight specific terms of reference:

- a) Critically assess and where necessary revise the life history and vital rates of blue crab in the Chesapeake Bay that are relevant to an assessment of the stock.
- b) Evaluate and recommend biological reference points for the Chesapeake Bay blue crab population. The potential for implementing sex-specific reference points should be evaluated.
- c) Describe and quantify patterns in fishery-independent surveys. Analyses should include an evaluation of the impacts of environmental and abiotic factors on survey catches, to maximize the information content of resultant survey time series.
- d) Describe and quantify patterns in catch, effort and survey-based estimates of exploitation by sector and region, including analyses that examine the impacts of reporting changes and trends in CPUE.
- e) Develop and implement assessment models for the Chesapeake blue crab fisheries. In particular, models that permit estimates of the trends and status of the crab population and fisheries on a sex-specific basis should be evaluated.
- f) Examine density-dependent exploitation patterns derived from survey-based and model-based approaches.
- g) Characterize scientific uncertainty with respect to assessment inputs and stock status.
- h) Evaluate stock status with respect to reference points.

The project contact will provide final terms of reference no later than 22 November 2010.

Annex 3: Tentative Agenda

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Annapolis, Maryland during the tentative dates of 29-31 March 2011

The project contact will provide the agenda no later than 22 November 2010.