# Summary Report
# Marine Recreational Information Program (MRIP)
# Fishing Effort Survey (FES) Calibration Review

## Calibration Model Review Meeting
## June 27-29, 2017
## Sheraton Hotel
## Silver Spring, MD

**December 5, 2017**

***Final***

## Panel Members

**Paul J. Rago (Chair)**
**Ali Arab**
**Robert L. Hicks**
**Cynthia M. Jones**
**Jason McNamee**
**Fredric M. Serchuk**
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# Executive Summary

A primary objective of the Marine Recreation Information Program (MRIP) is the improvement of the statistical basis of methods for estimating catches of recreationally caught fish in the coastal US. MRIP has implemented a new program for estimating fishing effort that relies on a mail-based survey rather than a historical telephone survey. This report summarizes a technical review of a calibration model to interrelate estimates of recreational shore and private boat fishing effort derived from the Coastal Household Telephone Survey (CHTS) with estimates derived from the new Fishing Effort Survey (FES). The FES is a mail survey that utilizes address-based sampling and a national angler registry. A panel of seven independent scientists met with consultant statisticians and MRIP staff to review a proposed methodology that could express historical estimates of fishing effort in terms of the new FES. A side-by-side experiment of the two methods, conducted in 2015 and 2106, served as the basis for this review.

The proposed methodology builds upon known properties of the CHTS and FES sampling designs, and an extensive time series of historical data. The calibration model relies on standard and highly-regarded methodology known as the Fay-Herriot method for small area estimation. Alternative modeling approaches might have been considered, but the proposed method was reasonable and scientificallydefensible. The authors are commended for introducing several innovations to estimate variances and to achieve analytical consistency. The final estimators have desirable properties and can be implemented with readily available software. The proposed model was considered an elegant approach for dynamic predictions of recreational fishing effort. Particularly notable was the property that allowed for forward and backward estimation by alternate survey modes (i.e., CHTS vs FES). The proposed method preserves design aspects of historical and current surveys and incorporates important differences among states, waves (i.e., two-month calendar periods) and fishing modes. The processes of model identification and variable selection (i.e., consideration of potential predictive covariates) were well done.

The Panel expressed concern on several topics, none of which was considered as sufficient to preclude implementation of the Fay-Herriot model. Comparison of estimates of effort derived from the side-by-side CHTS and FES surveys (2015 and 2016) resulted in large differences (2 to 11-fold). While many hypotheses were considered that might account for these differences, data analyses and the proposed model revealed no single hypothesis (or covariate) was sufficient. Further refinement of the modeling approach, particularly when the results of the 2017 side-by-side experiment are available, is recommended. Refinements include further simulation testing and cross-validation comparisons with the first two years of data. As more information is acquired about the FES there may be additional opportunities to consider alternative models for calibration. Given the importance of such changes for many stock assessments and management decisions, future modifications must be able to demonstrate significant advantages over the proposed small-area estimation model prior to consideration for implementation. The Panel recommended additional efforts to improve communication of these results to scientists, statisticians, fishery managers, and the general public. Each will require varying levels of detail. The Panel also suggests that renewed attention be given to the communication recommendations of two previous NAS reviews of the recreational statistics programs.

# 1. Introduction

## *1.1 Background*

The Review Panel for the MRIP-FES Calibration Model Review met from June 27 to June 29 to review a statistical model developed by F. Jay Breidt, Teng Liu and Jean D. Opsomer, of Colorado State University. The review committee was composed of three scientists appointed by the Center for Independent Experts (CIE): Robert Hicks, The College of William and Mary, Cynthia Jones, Old Dominion University and Ali Arab, Georgetown University. In addition, representatives from the New England (Patrick Sullivan) and South Atlantic (Fredric Serchuk) Scientific and Statistical Committees, and the Atlantic States Marine Fisheries Commission (Jason McNamee) served on the review panel. The meeting was chaired by Paul Rago as a member of the Mid-Atlantic Fishery Management Council Scientific and Statistical Committee.

The panel reviewed supporting documentation and presentations prepared by NOAA Fisheries' Office of Science and Technology (OST) staff, led by Dave Van Voorhees, and their contractors from the Department of Statistics at Colorado State University. John Foster, Ryan Kitts-Jensen, and Richard Cody acted as rapporteurs, providing valuable daily summaries for the Panel. Other staff and contractors from the OST, notably Karen Pianka, assisted in the efficient handling of documents via a web-based application. Jason Didden of the Mid Atlantic Fishery Management Council provided extensive support for the webinar. Approximately 35 people participated in the open sessions of the meeting. The meeting followed the agenda in Appendix 2 with respect to the sequence but not necessarily the timing of the events. Adjustments were made for differences in the duration of presentations and follow-up questions.

## *1.2 Review of Activities*

About ten days before the meeting the panel was given access to a comprehensive working paper summarizing the proposed statistical model. Prior to the meeting, the chair met with the presenters and MRIP staff via a conference call to discuss the scope of the contributions, presentation format and draft agenda. All supporting documents and presentations were made available to reviewers via a web-based application known as Confluence. In addition, the MRIP staff added a web page to their site that provided members of the public and other managers with access to key papers and presentations. The meetings were broadcast via webinar with the able assistance of Jason Didden of the Mid-Atlantic Fishery Management Council. Mr. Didden also managed all of the in-room computer and audio visual equipment.

The meeting opened on the morning of Tuesday June 27, 2017, with welcoming remarks and comments on the agenda by Van Voorhees and Rago. Participants and audience members introduced themselves. Following introductions, sessions on June 27 were devoted to presentation and initial discussions of five agenda topics. Rob Andrews provided an overview of the pilot study work that led to the development of a new mail survey design (the Fishing Effort Survey, or FES) as a replacement for the legacy telephone survey design (the Coastal Household Telephone Survey, or CHTS). Richard Methot addressed the importance of properly calibrated effort for estimation of catch in stock assessments. Andy Strelcheck addressed the importance of

catch information as a basis for fisheries management policies and decisions, such as allocation. Jean Opsomer provided an overview of the challenges of applying calibration methods to historical time series. Jay Breidt led the presentation of the proposed statistical calibration model.

Each presentation was followed by a question and answer period by panel members and as appropriate, by other meeting attendees. Questions from web participants were also addressed at opportune times. A formal public comment period was reserved on each day of the meeting.

The Panel met in closed session at the end of each day to discuss the day's presentations, progress toward answering the agenda, and to make plans for the following day.

Follow-up discussions on the first day presentations were held on Wednesday June 28. The Panel requested additional data and clarification from the presenters, including greater details on the model results. Day two began with an overview of the activities of Day One and an overview of the day's work plan. Most of the Panel's efforts were devoted to questions on the statistical calibration model. Material provided by Jay Breidt and colleagues enhanced the Panel's understanding of the model and its performance. A short presentation by Paul Rago used the results of model predictions to compare results over states and fishing modes (i.e., shore vs private boat).

Day Two also included a formal public comment period and an initial summary of the Panel's findings. This was done to ensure that all participants were aware of the general outcomes of the review. The Panel stressed that this summary was not to be considered a consensus report. Instead it represented a summary of the perspectives of the Panel.

Following the initial presentation of findings, the Panel met in closed session to begin writing the Summary Report. Day Three consisted of a half day meeting for Panelists only. The purpose of the meeting was to summarize the various viewpoints herein with respect to the Terms of Reference.

The Panel completed drafting this Summary Report by correspondence, evaluating each ToR. The Chair compiled and edited the draft Panel Summary Report, which was distributed to the Panel for final review before being submitted to the MRIP. Each Panelist also provided an independent summary of their perspectives and as appropriate, with details on potential improvements to the calibration model and its application. Individual panelist reports for CIE participants were sent to the Center for Independent Experts for initial editing for completeness. Reports of Panelists supported directly by the Agency via contract were sent to the Chair. All reports were made available to MRIP staff for fact checking but were not altered for content.

The Panel agreed that scientific and statistical analyses conducted by the presenters were thorough, statistically sound, and innovative. Specific comments on the details of the analyses are provided below.

# 2. Review of MRIP FES Calibration Model

## *2.1 Synopsis of Panel Review*

The Panel commented that the proposed methodology builds upon known properties of the existing sampling design, the proposed new method, and extensive time series of historical data. A review of calibration approaches in other disciplines revealed no comparable attempts to adjust a historical times series forward or backward in time in response to new information from a side-by-side comparative surveys. The proposed model was considered to be an elegant approach for dynamic predictions of recreational fishing effort. Particularly notable was the property that allowed for forward and backward estimation by alternate survey modes (i.e., CHTS vs FES). Notably, the proposed method preserves design aspects of historical and current surveys and incorporates important differences among states, waves (i.e., two-month calendar periods) and fishing modes. The Panel acknowledged the extensive exploratory data analyses on model development, alternatives, and testing performed by the MRIP scientific staff and consultants. The processes of model identification and variable selection (i.e., consideration of potential predictive covariates) were well done.

Although the Panel identified several alternative modeling approaches and other candidate covariates that might have been considered, the Panel acknowledged that the proposed method was a reasonable and scientifically defensible estimation approach.

The calibration model relies on standard, well known, and highly regarded methodology. The authors are commended for introducing several innovations to estimate variances and to achieve analytical consistency. The final estimators have desirable properties and can be implemented with readily available software.

The Panel expressed concern on several topics, none of which was considered as sufficient to preclude implementation of the model. Comparison of estimates of effort derived from the side-by-side CHTS and FES surveys (2015 and 2016) resulted in large differences (2 to 11-fold). While many hypotheses were considered that might account for these differences, data analyses and the proposed model revealed no single hypothesis (or covariate) was sufficient.

Model performance was partially assessed by sensitivity analysis of specific alternative hypotheses on the distribution of the "irregular" random effect (an effort effect not accounted for explicitly in the model). However, additional simulation work may be necessary to more thoroughly test overall model performance. As additional information becomes available by the end of the 2017 side-by-side surveys, it is recommended that a series of cross-validation exercises be conducted to compare model results based on the first two years of model results. Other permutations of cross calibration comparisons may be instructive with respect to stability of model parameter estimates and prediction error induced by various data rarefaction methods. As more information is acquired about the FES there may be additional opportunities to consider models for calibration that include alternative causal factors. Given the importance of such changes for many stock assessments and management decisions, future modifications must be

able to demonstrate significant advantages over the proposed small-area estimation model prior to consideration for implementation.

The Panel spent considerable time discussing the communication of results. It was recognized that at least three distinct audiences must be addressed: scientists and statisticians, fishery managers, and the general public. Each will require varying levels of detail without compromising the integrity of the model or its underlying principles. A "lay person's" version of the methods would be valuable for communicating results to multiple audiences. Model results, in combination with a similar calibration exercise for the APAIS, have significant downstream impacts for assessments and management. The Panel also suggests that renewed attention be given to the recommendations concerning communications of two previous NAS reviews of the recreational statistics programs.

Despite progress in improving communication with stakeholders, the some members of the Panel, working directly with fishermen, are aware of important misconceptions among the angling communities regarding the transition to the new mail-based survey mode. The new MRIP website is a considerable improvement but direct, pro-active communication and dialogue with fishing groups, perhaps with downloadable podcasts, YouTubes etc. and in-person presentations to the angling community would be valuable.

## *2.2 Evaluation of Terms of Reference*

### *2.2.1 Term of Reference 1*

***Evaluate the suitability of the proposed model for converting historical estimates of private boat and shore fishing effort produced by the CHTS design to estimates that best represent what would have been produced had the new FES design been used prior to 2017.***

- The Panel concurs that this TOR and its subcomponents listed below (1a,1b, 1c, 1d, 1e) were met.

a) Does the proposed model adequately account for differences observed in the estimates produced by the CHTS and FES designs when conducted side-by-side in 2015-2016?

- The results of the side-by-side surveys are central to the development of the proposed model. The model parameterization accounts for these changes but does not provide insight into the underlying mechanisms resulting in differences in estimated angling effort.
- The new mail survey mode has advantages relative to issues of comprehensiveness of angler coverage within households, efficiency of the estimate, a better sampling frame, a more thoughtful consideration of individual angler effort, improved demographic information, better identification of angler residence and enhanced follow-up with respondents to reduce non-response. Collectively these features are thought to yield more reliable metrics of angling effort and serve as a basis for improved understanding in the future as the new survey continues. These advantages are relevant to 2015 and onward but do not necessarily extend back to historical estimates.

b) Is the proposed model robust enough to account for potential differences that would have been observed if the two designs had been conducted side-by-side in years prior to 2015 with regards to time trending biases?

- The Panel had difficulty formulating a response to this TOR as it required conjecture about unidentified underlying causal mechanisms contributing to observed differences and hypothetical comparisons of survey mode responses in the past.
- Insufficient information was provided to inform this decision either before or during the meeting.
- Although the proposed model allows for inclusion of other causal mechanisms, neither the investigators nor the Panel were able to identify covariates that vary over time and meet the criteria necessary for expansion to total angling effort estimates. Furthermore, data collection procedures during the CHTS did not collect information that in retrospect (e. g., demography, gender of angler), might have allowed such inference.

c) How does the approach used in developing the proposed FES/CHTS calibration model compare in terms of strengths or weaknesses with other potential approaches?

- The investigators conducted an extensive analysis of within-model comparisons of reduced model parameterizations using the model selection procedure known as the Akaike Information Criterion. One sub-model included a simple ratio with random effects that had much lower explanatory power. A preliminary analysis was conducted and reviewed by the Panel that corroborated the inappropriateness of the simple ratio estimator.
- Other models exist that could be used, including Bayesian Hierarchical modeling, state-space modeling, and time-varying ratio estimation. The investigators provided the panel with a summary of their experiences with some of these alternatives but the results of these comparisons were not available to the Panel. Given the responses of the investigators, the Panel concurred with the conclusion to focus on the modified Fay-Herriot approach.

d) Does the proposed calibration model help to explain how different factors would have contributed to changes in differences between CHTS and FES results **over time**?

- As noted above a complete set of causal mechanisms resulting in differences between survey estimates remain elusive.
- Raw survey data in the CHTS (rather than aggregated data provided by contractors) could be examined more carefully but it is unknown whether such data exist over a sufficient span of years to support such analyses
    - As presently configured the model is limited in terms of what can be explored but alternative calibration models may be useful.
    - Within the existing data, there do not appear to be covariates, other than log(Population) that would explain the major differences seen between survey modes (i.e., CHTS vs FES). The wireless effect

captures a minor component of the contrast. The Panel and Investigators agreed that the wireless effect may be a proxy for a wide range of factors.
    - Demographic information in the CHTS would have been instructive and is essential for proper historical analyses. However, it is uncertain that such data exist over a sufficient span of years to support such analyses.
    - Consideration of spatially differentiated data that has been collected historically at a finer scale (e.g., Census tract) may yet contain information sufficient to illuminate explanatory factors related to this TOR.
- The "Gatekeeper" effect has been proposed as a major influence in the CHTS but a complete understanding remains difficult to identify.

e) Is it reasonable to conclude that revised 1981-2016 private boat and shore fishing effort estimates based on the application of the proposed FES/CHTS calibration model would be more accurate than the estimates that are currently available? Does evidence provided for this determination include an assessment of model uncertainty?

- No conclusions can be reached regarding the accuracy of calibrating self-reported data from one survey mode to the other. However, the Panel noted that bias in the historical CHTS may not be as large as observed in contemporary CHTS samples due to degradation of survey coverage and other temporal trends in other factors such as privacy concerns.
- Gatekeeper effect, recall bias, response rate etc. indicate that the mail survey is preferred to a phone survey, particularly in relation to statistical and operational efficiency. This conclusion was supported by the 2006 and 2017 NRC reports, and also in a separate review conducted by independently selected members of the American Statistical Association's Survey Research Methods Section.

- Response rate per se is not a problem unless differences in fishing activity differ between respondents and non-respondents

### *2.2.2 Term of Reference 2*

***Briefly describe the panel review proceedings highlighting pertinent discussions, issues, effectiveness, and recommendations.***

The following sections highlight the Panel's concerns about the peer review meeting, including preparations before the meeting and follow-up activities. The Panel recognizes the complexity of the revisions of MRIP transition process and the need to satisfy many different audiences. The following recommendations are offered in the context of constructive criticism to improve the

quality of future peer-review panels. While there is some redundancy in this section with the Panel's comments in section 2.1, the text below provides additional clarification of issues and more broadly reflects the diversity of the Panelist's opinions. The text below draws heavily from comments provided by the Panelists via correspondence after the meeting. Therefore some sections below may be reflected in part or their entirety in the Panelist's individual reports.

Pre-Meeting Preparations

Four background documents (Section 5 , Working Papers) were provided to Panel members two weeks prior to the meeting, and all additional documents and presentation were made available to the Panel during the meeting via a web-site (i.e., Confluence). The Panel Chair provided each of the reviewers with a proposed meeting Agenda a day prior to the start of the meeting, requesting that any comments and possible changes be provided back to him before the meeting opened. As the proposed Agenda was satisfactory to all of the Panel members, no changes to the Agenda were needed.

Panelists expressed concerns about pre-meeting preparations, noting an inadequate assembly of all the pieces needed to address the terms of reference. Greater overall coordination among presenters would have been desirable to ensure that all the relevant information was covered. Additional background documents would have been useful for the review; for example, the MRIP Handbook should have been provided before to provide more information about the telephone and mail surveys. Comprehensive previous reviews of the MRIP, such as those from the National Academy of Sciences should have been brought to the attention of the Panel, not all of whom had extensive knowledge of the history of MRIP. In this context, basic details about the surveys including similarities and differences in definitions of effort (notably, the definition of angling households), questions on the questionnaires, etc. would have helped the Panel to more effectively conduct the review A valuable adjunct to future technical reviews might be a targeted guide to relevant resources available on the extensive MRIP website.

Proceedings

The review panel proceedings went smoothly. Operationally, the meeting room had sufficient space for the Panel, presenters, and meeting attendees. The sound and projection systems worked well, as did the webinar link. Representatives from the Office of Science and Technology served as Rapporteurs and provided comprehensive summary notes to the Panel.

Discussions during the 2½ day MRIP Calibration Review illuminated various issues related to the results provided in the background documents and the PowerPoint presentations. Many of the concerns involved clarification of the information provided and/or requests for additional data and analyses. Additional data, model outputs and documents were made available to the Panel during the meeting. In all cases, these requests were satisfactorily fulfilled allowing the Panel to gain fuller insight on:

- Sampling designs, strengths, and shortcomings of the telephone (CHTS) and mail (FES) survey methods, including their relative performance and sources of error.

- Development, design, statistical properties, testing, and application of the proposed MRIP FES calibration model. This included consideration of alternative modeling approaches, cross-validation of the modeling framework to examine the stability of model parameter estimates (as well as prediction errors), the sufficiency and explanatory power of the model's covariates, and the possible underlying mechanism(s) affecting the distribution of the "irregular" random effect, which is not explicitly accounted for within the proposed small-area estimation approach.

- Potential impacts of the calibrated recreational fishing effort estimates during 1981-2016 on future stock assessments, and on subsequent fishery management policies and practices.

- Need to effectively communicate the results of the calibration work (as well as the basis and need for continuing only the mail-based survey method in the future) to various constituency groups (i.e., the recreational and commercial fishing communities; scientists; fishery managers; the lay public) so that these groups fully understand and accept the calibration results and their subsequent use in deriving recreational catch estimates for application in stock assessments and in the fishery management process.

The Review Panel acknowledged that the proposed MRIP FES calibration model developed by Breidt *et al.* was a well-suited and statistically-appropriate approach to obtain calibrated estimates of recreational fishing effort (by state and 2-month calendar quarter for shore-based and private boat anglers) during 1982-2016.

Utility of Presentations

The presentations on the implications of revised recreational catch estimates on stock assessments and on management measures and regulatory protocols were instructive, but the Panel would have appreciated more quantitative examples. For example, implications for stock assessment models could have been drawn from the previously completed scoping exercises conducted by the Northeast and Southeast Fisheries Science Centers. Similarly, the Panel noted that detailed simulation exercises would also have been instructive.

The presentation on the Fay-Herriot model was lucid and effective, but the Panel would have appreciated more details on the model components and the model building process. Also, a summary of candidate modeling approaches —and details on the process that led to the proposed model—would have been very useful. Such details, as provided on the second day of the review, were greatly appreciated.

Greater detail would have been appreciated on the survey methodologies in the phone and mail surveys. The simulation exercise was an important start, but further simulation testing beyond those conducted would have lent greater support to the applicability of the Fay-Herriot model to the CHTS vs FES calibration. Further work on simulated data sets is suggested during the third-year comparisons (i.e., when the 2017 telephone and mail survey data are fully available).

Terms of Reference

The presenters did not address the TORs directly, which made it harder for the Panel to assess the relevance of some of the information presented with regard to the TORs. Consequently, the Panel spent a substantial portion of the question/answer periods (and discussion time) on obtaining the requisite information to address the TORs. It was evident during these interactions that the model developers had conducted additional work relevant to the TORs (such as investigation of additional modeling approaches). However, because the developers were unaware of the TORs, neither the primary report nor the presentations specifically addressed the TORs. Follow-up work accomplished by the developers during the meeting and subsequently shared with the Panel gave the Panel confidence that sufficient model scoping had been performed.

The TORs presume that converting CHTS to FES is the appropriate way to standardize the MRIP effort data. However, the statistical work available for the review primarily focused on the mathematical aspects of the calibration and not on which set of estimates reflects a truer representation of fishing effort. Lacking a sufficient statistical justification for standardizing the MRIP data to the FES estimates created problems both during the review and in addressing the TORs.

TOR1e seeks the Panel's opinion concerning the accuracy of effort estimates obtained from the CHTS and the FES. The Panel understands that any survey conducted offsite of the fishery, such as mail or telephone surveys, rely on angler self-reported data which is not subject to verification. Self-reported data is subject to a variety of biases including recall problems which can result in misremembered time and number of trips. Without an external measure of fishing from an onsite survey covering the same population in space and time, angler self-reported data cannot be verified. While the Panel comments on the calibration from CHTS to FES, there is no basis to comment on accuracy of either survey.

Documentation for Meeting

It would have been helpful for the Panel to have been provided (several weeks before the review) additional background documents (available from the MRIP Team and/or the MRIP Website) to enhance a collaborative understanding by Panel members of various aspects of the MRIP program and of recent analyses using MRIP data. For example, the *MRIP Data User Handbook,* and the October 2016 report, '*Possible Effects of Calibration Scenarios on Stock Assessments Planned for the MRIP Fishing Effort Survey*

*Transition'* would have especially useful for Panel members to have had and read before the actual peer review occurred.

Prior to the presentation and discussion of the Breidt *et al.* report at the Peer Review, this report was difficult to understand for anyone other than a highly-trained statistician. Although a more complete understanding of this report was fostered by distribution of a PowerPoint presentation a week or so before the Review Meeting (and subsequently enhanced at the meeting by direct dialogue and interaction with the authors of the paper who clarified and responded to many issues raised by the Panel), it is recommended that in any future reviews in which a highly technical paper is seminal to the crux of such reviews that efforts be made by the paper authors to present the essence of their work in a manner that facilitates full appreciation and understanding of the import of such work by educated non-specialists. This becomes especially critical when the methods/approach provided in a paper will have significant downstream effects. This matter should be recognized in the future APAIS peer review.

Ancillary Analyses

The Panel appreciated the opportunity to investigate the details of the statistical calibration/prediction model on day 2. The model and assumptions were well thought out, but the Panel needed to better understand model inputs, parameter definitions, and nuances of the Fay-Herriot model. Similarly, the Panel appreciated the opportunity to solicit more information on model development and model selection beyond what was initially available at the meeting. Panelists received model parameter estimates upon request but did not have time at the meeting to explore them fully. Access to more detailed model outputs and the estimation code in R would have been valuable.

Also, apparently, several independent data analyses existed too, separate from the model, and it would have been good to have had a presentation and some discussion on that. Exploratory analyses of the pairwise calibration data was considered useful and should be considered for summarization when the analyses of the 2017 data are conducted.

Communication

Panelists expressed concerns about the need for improved communication at several different levels:

- to the Panel prior to the meeting,
- within the various analytical components,
- to the members of the Transition Team,
- to broader audience of stake holders.

An advantage of the current review was the inclusion of several external independent experts having expertise beyond fisheries science. This helped ensure that the methods were critically evaluated and represented state of the art, but increased the burden during pre-meeting preparations to ensure that all relevant contextual documents were available

and fully comprehensible. Concerns were expressed that information essential for the review was not provided at level of detail that the Panel members expected.

The transition from the MRFSS to MRIP has required a massive restructuring of the data collection procedures while maintaining a continuous time series of reliable catch data. Continuity of data has required coordination with governmental, academic, and industry stakeholders. Likewise, the process has involved multiple experiments and survey tests to demonstrate the value of proposed changes and development of advanced calibration approaches. This review constituted one component of this transition. Despite enormous improvements in the MRIP website and availability of raw and processed data at varying degrees of resolution, the Panel recommended greater coordination among the diverse analytical groups. The complexity of the transition requires that technical reviews are both sequential and interdependent. As such the review of any single technical issue (e.g., calibration between CHTS and FES) must rely upon and recognize the conclusions of earlier Panels. In the present review, this Panel relied on the conclusions of the ASA reviewers who noted the superiority of the FES over CHTS. Independent panels of scientists rarely accept prior reviews without questioning. Indeed, this is the nature of science. Hence it essential that each Panel in future reviews be provided with a summary of the full set of previous reviews and their relationship to the current review.

There is a strong need to effectively communicate the results of the calibration work (as well as the basis and need for continuing only the mail-based survey method in the future) to various constituency groups (i.e., the recreational and commercial fishing communities; scientists; fishery managers; the lay public) so that these groups fully understand and accept the calibration results and their subsequent use in deriving recreational catch estimates for application in stock assessments and in the fishery management process. Consideration should be given to a variety of communication approaches including but not limited to public meetings, seminars, podcasts, YouTube, and use of skilled educators.

Finally, it is recommended that an updated report/timetable/chart be prepared to illustrate current progress in meeting the tasks and timelines identified in the FES Transition Plan. This undertaking should also take note of how the recommendations tendered in all previous peer reviews of the MRIP Program (including the 2006 and 2016 NAS Reviews) have been addressed.

Improvements to Future Peer Review Processes

The Panel noted that review process left little time for an intensive review of the data, the model, and the computer code used to develop the results. Such analyses are often part of a stock assessment review (e.g., SAW/SARC https://www.nefsc.noaa.gov/saw/, or SEDAR http://sedarweb.org/). In the spirit of improving future reviews, the Panel suggests consideration of more broadly based working groups based on scientific input within and outside NOAA Fisheries. In stock assessments working groups have a strong technical focus and meet several times prior to the final assessment. Working groups would have the opportunity to examine the proposed methodologies in greater detail,

including detailed reviews of the data and methods, and tests with simulated data. Exchanges of code, or reliance on standard packages in stock assessments provide both quality assurance and opportunities for improvements. Moreover, the products of working groups typically assure subsequent reviewers that the products under review are comprehensive and representative of diverse viewpoints. In particular, a working-group process would document the model building process and allay concerns of reviewers who will always wonder why a particular alternative was not considered. Having those prior decisions as a matter of record would enhance the efficiency and quality of the review process.

The Panel recognizes that this recommendation would need to be part of the overall transition from MRFSS to MRIP. Indeed, the current Transition Team process that has regular updates on progress, conversations with stock assessment scientists and various stakeholders, and plans for upcoming tasks, already includes the essential elements of a more focused working group approach. In view of the importance of upcoming technical decisions for stock assessments, managers and harvesters, the Panel strongly urges consideration of this proposal.

## 3. Bibliography

***Background Papers***

Many papers and documents on the existing and proposed survey methodology may be found at the following website:
http://www.st.nmfs.noaa.gov/recreational-fisheries/MRIP/effort-survey-improvements

Background on the MRIP Calibration Model Peer Review may be found at:
https://www.st.nmfs.noaa.gov/recreational-fisheries/MRIP/FES-Workshop/index.html

The National Academies of Sciences, Engineering, and Medicine. 2016. Review of the Marine Recreational Information Program (MRIP) Washington, DC: The National Academies Press. doi: 10.17226/24640
https://www.nap.edu/catalog/24640/review-of-the-marine-recreational-information-program

National Research Council. 2006. Review of Recreational Fisheries Survey Methods. Committee on the Review of Recreational Fisheries Survey Methods, ISBN: 0-309-66075-0, 202 pages. http://www.nap.edu/catalog/11616.html

***Working Papers***

Development and Testing of Recreational Fishing Effort Surveys Testing a Mail Survey Design: Final Report. Project Team Members: Rob Andrews, NOAA Fisheries, J. Michael Brick, Westat, Nancy A. Mathiowetz, University of Wisconsin-Milwaukee. July 31, 2014. https://www.st.nmfs.noaa.gov/recreational-fisheries/MRIP/FES-

Workshop/documents/Report_recommending_FES_to_replace_CHTS--Finalize_Design_of_Fishing_Effort_Surveys.pdf

Marine Recreational Information Program Fishing Effort Survey Transition Progress Report. October 28, 2016. https://www.st.nmfs.noaa.gov/recreational-fisheries/MRIP/FES-Workshop/documents/2015_benchmarking_progress_report.pdf

Marine Recreational Information Program Transition Plan for the Fishing Effort Survey Prepared by the Atlantic and Gulf Subgroup of the Marine Recreational Information Program Transition Team May 5, 2015. https://www.st.nmfs.noaa.gov/recreational-fisheries/MRIP/FES-Workshop/documents/MRIP_FES_Transition-Plan_FINAL.pdf

A Small Area Estimation Approach for Reconciling Mode Differences in Two Surveys of Recreational Fishing Effort draft: F. Jay Breidt, Teng Liu, Jean D. Opsomer Colorado State University June 10, 2017. https://www.st.nmfs.noaa.gov/recreational-fisheries/MRIP/FES-Workshop/documents/DRAFT-Report_of_Calibration_Model.pdf

***Presentations***

Calibration_Scenarios-20161115.pdf

MRIP FES website link

FES Errors.pptx

Model_Fits.txt

Mode_3_logeffort_poly_fixed.pdf

Mode_7_logeffort_poly_fixed.pdf

The following 4 files are available at https://www.st.nmfs.noaa.gov/recreational-fisheries/MRIP/FES-Workshop/pages/additional-materials.html:

EBLUPS.csv

EBLUPS_Variable_Names.csv

Eblup comparisons.docx

MRFSS Fish Hunt Comps.xlsx

## Webinar Links

All open sections of the meeting were recorded and available for viewing at the following links.

0 - Intro - Paul Rago

1 - MRIP Fishing Effort Survey - Rob Andrews

2- Catch and Assessments - Rick Methot

3 - Management Implications - Andy Strelcheck

4 - Calibrating Survey Estimates over Time - Jean Opsomer

5 - Calibration from CHTS to FES - Jay Breidt

6 - Initial Calibration Review Discussion - Tuesday Afternoon

7 - Day Two, AM Discussion

8 - Day Two, PM Discussion

9 - Day Two, Initial Findings Summary

## 4. Appendices

**Appendix 1. Terms of Reference for the MRIP FES Calibration Model Review**
T*he Review Panel shall assess whether or not the MRIP Working Group has reasonably and satisfactorily completed the following actions.*

**1.** Evaluate the suitability of the proposed model for converting historical estimates of private boat and shore fishing effort produced by the CHTS design to estimates that best represent what would have been produced had the new FES design been used prior to 2017.

   f) Does the proposed model adequately account for differences observed in the estimates produced by the CHTS and FES designs when conducted side-by-side in 2015-2016?

   g) Is the proposed model robust enough to account for potential differences that would have been observed if the two designs had been conducted side-by-side in years prior to 2015 with regards to time trending biases?

   h) How does the approach used in developing the proposed FES/CHTS calibration model compare in terms of strengths or weaknesses with other potential approaches?

   i) Does the proposed calibration model help to explain how different factors would have contributed to changes in differences between CHTS and FES results over time?

   j) Is it reasonable to conclude that revised 1981-2016 private boat and shore fishing effort estimates based on the application of the proposed FES/CHTS calibration model would be more accurate than the estimates that are currently available? Does evidence provided for this determination include an assessment of model uncertainty?

**2.** Briefly describe the panel review proceedings highlighting pertinent discussions, issues, effectiveness, and recommendations.

## Appendix 2. Draft Review Meeting Agenda

MRIP FES Calibration Review

Sheraton Silver Spring Hotel

Silver Spring, MD

June 27-29, 2017

| *Day* | *Date* | *Time* | *Topic* | *Rapporteur* | *Presenter* |
|---|---|---|---|---|---|
| Tuesday | 27-Jun | 9:00 AM | Welcome and Opening Remarks | TBD | Van Voorhees |
| | | 9:20 AM | Introductions | | |
| | | 9:30 AM | Overview of Meeting | TBD | Rago |
| | | 9:45 AM | MRIP Fishing Effort Survey | TBD | Andrews |
| | | 10:15 AM | Importance of Calibrated Catch for Stock Assessments | TBD | Methot |
| | | 10:45 AM | Break | | |
| | | 11:00 AM | Importance of Calibrated Catch for Fisheries Management | TBD | Strelcheck |
| | | 11:30 AM | Calibrating Survey Estimates over Time | TBD | Opsomer |
| | | 12:00 PM | Lunch | | |
| | | 1:30 PM | A Calibration Methodology for CHTS to FES Transition | TBD | Breidt |
| | | 3:30 PM | Break | | |
| | | 3:45 PM | Public Comment | TBD | |
| | | 4:15 PM | Summary of Day 1 | TBD | Rago |
| | | 4:45 PM | Review Panel Coordination and Writing (closed) | | |
| | | 6:00 PM | Adjourn | | |
| Wednesday | 28-Jun | 9:00 AM | Overview of Day 1 and Preview of Day 2 | TBD | Rago |
| | | 9:10 AM | Follow-up Questions for Presenters | TBD | Various |
| | | 10:30 AM | Break | | |
| | | 10:45 AM | Follow-up Questions for Presenters (cont.) | TBD | Various |
| | | 12:00 PM | Lunch | | |
| | | 1:00 PM | Review Panel Coordination and Writing (closed) | | |
| | | 2:30 PM | Initial Summary Findings of Review Panel (open) | TBD | Panel |
| | | 3:30 PM | Public Comment | TBD | |
| | | 4:00 PM | Review Panel Coordination and Writing (closed) | | |
| | | 6:00 PM | Adjourn | | |
| Thursday | 29-Jun | 9:00 AM | Review Panel Coordination and Writing (closed) | | |
| | | 12:30 PM | Adjourn | | |
| | | | | | |
| | | | | | |
| | Closed sessions allow the panel to discuss and clarify technical issues, and begin initial writing of reports. | | | | |
| | Attendance of public, staff and presenters, if at all, is by invitation only and for purposes of clarification. | | | | |

## Appendix 3. Individual Independent Peer Review Report Requirements

**Statement of Work**

**National Oceanic and Atmospheric Administration (NOAA)**

**National Marine Fisheries Service (NMFS)**

**External Independent Peer Review**

*Calibration Model Accounting for a Recreational Fishery Survey Design Change*

### 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. (http://www.cio.noaa.gov/services_programs/pdfs/OMB_Peer_Review_Bulletin_m05-03.pdf).

### Scope

The Office of Science and Technology requests an independent peer review of a calibration model proposed for use in revising statistics produced by surveys of marine recreational fishing effort on the Atlantic coast and in the Gulf of Mexico. This calibration model is considered by the Marine Recreational Information Program (MRIP) to be very important to adjust historical time series of recreational effort and catch estimates in order to account for biases in past sampling and estimation methods that have become apparent with the development of a new, more statistically sound method. The calibration model is intended to account for past biases in private boat and shore fishing effort estimates that have resulted from the continued use of

a legacy random-digit-dial telephone survey design that has degraded over time and will be replaced with the implementation of a new mail survey design (the "Fishing Effort Survey", or FES) in 2018.

**Calibration Model for the Fishing Effort Survey**

In 2015, MRIP formed a Transition Team to collaboratively plan a transition from a legacy telephone survey design to a new mail survey design for estimating private boat and shore fishing effort by marine recreational anglers. Since 2008, MRIP had conducted six pilot studies to determine the most accurate and efficient survey method for this purpose on the Atlantic and Gulf coasts. The most recent study, conducted in four states in 2012-2013, compared a new mail survey design with the Coastal Household Telephone Survey (CHTS) design that has been used since 1979. MRIP subjected the final report from the pilot project to external peer review in 2014 and certified the new survey design, called the Fishing Effort Survey (FES), in February 2015 as a suitable replacement for the CHTS. The FES is much less susceptible to potential sources of bias than the CHTS because it can reach more anglers, achieve higher response rates, and is less prone to possible recall errors. The pilot project results indicated that FES estimates were substantially higher than CHTS estimates for both private boat fishing and shore fishing.

MRIP recognized the FES should not be implemented immediately as a replacement for the CHTS, and a well thought out transition plan was needed to ensure that the phase-in of the FES is appropriately integrated into ongoing stock assessments and fisheries management actions in a way that minimizes disruptions to these processes, which are based on input from multiple data sources over lengthy time series. The Transition Plan developed by the Transition Team called for side-by-side benchmarking of the FES against the CHTS for three years (2015-2017) with the development and application of a calibration model to enable adjustment of past estimates that account for biases in historical effort and catch statistics after the second year. With this timeline, revised estimates can be incorporated into stock assessments during 2018 using a peer reviewed calibration model, and new Annual Catch Limits (ACLs) can then be set in 2019 for at least some stocks.

**Requirements**

NMFS requires five reviewers to conduct an impartial and independent peer review in accordance with the SoW, OMB Guidelines, and the Terms of Reference (ToRs) below. The reviewers shall have working knowledge and recent experience in the design of sampling surveys, the evaluation of non-sampling errors (i.e., undercoverage, nonresponse, and response errors) associated with changes to survey designs over time, and the evaluation of differences between surveys using different modes of contact (e.g., mail *versus* telephone). In addition, they should have experience with complex, multi-stage sampling designs, time series analyses, regression estimators, and small domain estimation methods. Some recent knowledge and experience in current surveys of marine recreational fishing is desirable but not required.

NMFS will designate a Chair who has experience with U.S. fisheries stock assessments and their application to fisheries management. The Chair would ensure that reviewers understand the importance of maintaining a comparable time series of marine recreational fisheries catch statistics for use in stock assessments and their application to fisheries management. The Chair will not be selected by the contractor and will be responsible for facilitating the meeting, developing and finalizing a summary report and working with the reviewers to make sure that the ToRs are addressed in their independent reviews.

**Tasks for Reviewers**

**Pre-review Background Documents**

The following background materials and reports prior to the review meeting include:

Transition Plan for the FES:

https://www.st.nmfs.noaa.gov/Assets/recreational/pdf/MRIP%20FES%20Transition%20Plan%20FINAL.pdf

Report recommending the FES to replace the CHTS: *Finalize Design of Fishing Effort Surveys* (https://www.st.nmfs.noaa.gov/pims/main/public?method=DOWNLOAD_FR_PDF&record_id=1179)

2015 Benchmarking Progress Report:

https://www.st.nmfs.noaa.gov/recreational-fisheries/MRIP/FES-Workshop/documents/2015_benchmarking_progress_report.pdf

Report on FES/CHTS Calibration Model:

This report will be provided by ECS (via electronic mail or make available at an FTP site) to the reviewers.

**Panel Review Meeting**

Each 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. Each 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 meeting will consist of presentations by NOAA and other scientists to facilitate the review, to provide any additional information required by the reviewers, and to answer any questions from reviewers.

**Contract Deliverables - Independent CIE Peer Review Reports**

The reviewers shall complete an independent peer review report in accordance with the requirements specified in this SoW and OMB guidelines. Each reviewer shall complete the independent peer review according to the required format and content as described in **Annex**

**1**. Each reviewer shall complete the independent peer review addressing each ToR as described in **Annex 2**.

**Other Tasks – Contribution to Summary Report**

The reviewers 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 reviewers are not required to reach a consensus, and should provide a brief summary of each reviewer's views on the summary of findings and conclusions reached by the review panel in accordance with the ToRs.

**Place of Performance**

The place of performance shall be at the reviewers' facilities, and at the NMFS Headquarters in Silver Spring, Maryland.

**Period of Performance**

The period of performance shall be from the time of award through July 31, 2017. Each reviewer's duties shall not exceed 14 days to complete all required tasks.

**Travel**

All travel expenses shall be reimbursable in accordance with Federal Travel Regulations (http://www.gsa.gov/portal/content/104790).

**Restricted or Limited Use of Data**
The contractors may be required to sign and adhere to a non-disclosure agreement.

**NMFS Project Contact:**
Dave Van Voorhees
National Marine Fisheries Service
1315 East West Highway
Silver Spring, MD 20910
dave.van.voorhees@noaa.gov

## Annex I: Format and Contents of Independent Peer Review Report

1. The report must be prefaced with an Executive Summary providing a concise summary of the findings and recommendations, and specify whether or not the science reviewed is the best scientific information available.

2. The report must contain a background section, description of the individual reviewers' roles 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 must describe in their own words the review activities completed during the panel review meeting, including 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, but especially where there were divergent views.

   c. Reviewers should elaborate on any points raised in the summary report that they believe 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 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 report shall represent the peer review of each ToR, and shall not simply repeat the contents of the summary report.

3. The report shall include the following appendices:

   Appendix 1: Bibliography of materials provided for review

   Appendix 2: A copy of this 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**

*Calibration Model Accounting for a Recreational Fishery Survey Design Change*

1. Evaluate the suitability of the proposed model for converting historical estimates of private boat and shore fishing effort produced by the CHTS design to estimates that best represent what would have been produced had the new FES design been used prior to 2017.

   k) Does the proposed model adequately account for differences observed in the estimates produced by the CHTS and FES designs when conducted side-by-side in 2015-2016?

   l) Is the proposed model robust enough to account for potential differences that would have been observed if the two designs had been conducted side-by-side in years prior to 2015 with regards to time trending biases?

m) How does the approach used in developing the proposed FES/CHTS calibration model compare in terms of strengths or weaknesses with other potential approaches?

n) Does the proposed calibration model help to explain how different factors would have contributed to changes in differences between CHTS and FES results over time?

o) Is it reasonable to conclude that revised 1981-2016 private boat and shore fishing effort estimates based on the application of the proposed FES/CHTS calibration model would be more accurate than the estimates that are currently available? Does evidence provided for this determination include an assessment of model uncertainty?

2. Briefly describe the panel review proceedings highlighting pertinent discussions, issues, effectiveness, and recommendations.

**Appendix 4. CIE contract**

**Statement of Work**

**National Oceanic and Atmospheric Administration (NOAA)**

**National Marine Fisheries Service (NMFS)**

**Center for Independent Experts (CIE) Program**

**External Independent Peer Review**

*Calibration Model Accounting for a Recreational Fishery Survey Design Change*

**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. (http://www.cio.noaa.gov/services_programs/pdfs/OMB_Peer_Review_Bulletin_m05-03.pdf). Further information on the CIE program may be obtained from www.ciereviews.org.

**Scope**

The Office of Science and Technology requests an independent peer review of a calibration model proposed for use in revising statistics produced by surveys of marine recreational fishing effort on the Atlantic coast and in the Gulf of Mexico. This calibration model is considered by

the Marine Recreational Information Program (MRIP) to be very important to adjust historical time series of recreational effort and catch estimates in order to account for biases in past sampling and estimation methods that have become apparent with the development of a new, more statistically sound method. The calibration model is intended to account for past biases in private boat and shore fishing effort estimates that have resulted from the continued use of a legacy random-digit-dial telephone survey design that has degraded over time and will be replaced with the implementation of a new mail survey design (the "Fishing Effort Survey", or FES) in 2018.

**Calibration Model for the Fishing Effort Survey**

In 2015, MRIP formed a Transition Team to collaboratively plan a transition from a legacy telephone survey design to a new mail survey design for estimating private boat and shore fishing effort by marine recreational anglers. Since 2008, MRIP had conducted six pilot studies to determine the most accurate and efficient survey method for this purpose on the Atlantic and Gulf coasts. The most recent study, conducted in four states in 2012-2013, compared a new mail survey design with the Coastal Household Telephone Survey (CHTS) design that has been used since 1979. MRIP subjected the final report from the pilot project to external peer review in 2014 and certified the new survey design, called the Fishing Effort Survey (FES), in February 2015 as a suitable replacement for the CHTS. The FES is much less susceptible to potential sources of bias than the CHTS because it can reach more anglers, achieve higher response rates, and is less prone to possible recall errors. The pilot project results indicated that FES estimates were substantially higher than CHTS estimates for both private boat fishing and shore fishing.

MRIP recognized the FES should not be implemented immediately as a replacement for the CHTS, and a well thought out transition plan was needed to ensure that the phase-in of the FES is appropriately integrated into ongoing stock assessments and fisheries management actions in a way that minimizes disruptions to these processes, which are based on input from multiple data sources over lengthy time series. The Transition Plan developed by the Transition Team called for side-by-side benchmarking of the FES against the CHTS for three years (2015-2017) with the development and application of a calibration model to enable adjustment of past estimates that account for biases in historical effort and catch statistics after the second year. With this timeline, revised estimates can be incorporated into stock assessments during 2018 using a peer reviewed calibration model, and new Annual Catch Limits (ACLs) can then be set in 2019 for at least some stocks.

**Requirements**

NMFS requires three reviewers to conduct an impartial and independent peer review in accordance with the SoW, OMB Guidelines, and the Terms of Reference (ToRs) below. The CIE reviewers shall have working knowledge and recent experience in the design of sampling surveys, the evaluation of non-sampling errors (i.e., undercoverage, nonresponse, and response errors) associated with changes to survey designs over time, and the evaluation of differences

between surveys using different modes of contact (e.g., mail *versus* telephone). In addition, they should have experience with complex, multi-stage sampling designs, time series analyses, regression estimators, and small domain estimation methods. Some recent knowledge and experience in current surveys of marine recreational fishing is desirable but not required.

NMFS will provide a Chair who has experience with U.S. fisheries stock assessments and their application to fisheries management. The Chair would ensure that reviewers understand the importance of maintaining a comparable time series of marine recreational fisheries catch statistics for use in stock assessments and their application to fisheries management. The Chair will not be selected by the contractor and will be responsible for facilitating the meeting, developing and finalizing a summary report and working with the CIE reviewers to make sure that the ToRs are addressed in their independent reviews.

**Tasks for Reviewers**

**Pre-review Background Documents**

The following background materials and reports prior to the review meeting include:

Transition Plan for the FES:

https://www.st.nmfs.noaa.gov/Assets/recreational/pdf/MRIP%20FES%20Transition%20Plan%20FINAL.pdf

Report recommending the FES to replace the CHTS: *Finalize Design of Fishing Effort Surveys* (https://www.st.nmfs.noaa.gov/pims/main/public?method=DOWNLOAD_FR_PDF&record_id=1179)

2015 Benchmarking Progress Report:

https://www.st.nmfs.noaa.gov/recreational-fisheries/MRIP/FES-Workshop/documents/2015_benchmarking_progress_report.pdf

Report on FES/CHTS Calibration Model:

This report will be provided by the contractor (via electronic mail or make available at an FTP site) to the CIE reviewers.

**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. 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 meeting will consist of presentations by NOAA and other scientists to facilitate the review, to provide any additional information required by the reviewers, and to answer any questions from reviewers.

**Contract Deliverables - Independent CIE Peer Review Reports**

The CIE reviewers shall complete an independent peer review report in accordance with the requirements specified in this SoW and OMB guidelines. 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**

The CIE reviewers 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 reviewers are not required to reach a consensus, and should provide a brief summary of each reviewer's views on the summary of findings and conclusions reached by the review panel in accordance with the ToRs.

**Foreign National Security Clearance**

When 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 reviewers who are non-US citizens. For this reason, the 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/ and http://deemedexports.noaa.gov/compliance_access_control_procedures/noaa-foreign-national-registration-system.html. The contractor is required to use all appropriate methods to safeguard Personally Identifiable Information (PII).

**Place of Performance**

The place of performance shall be at the contractor's facilities, and at the NMFS Headquarters in Silver Spring, Maryland.

**Period of Performance**

The period of performance shall be from the time of award through July 31, 2017. Each reviewer's duties shall not exceed 14 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 |
| Within four weeks of award | Contractor provides the pre-review documents to the reviewers |
| June, 2017 | each reviewer participates and conducts an independent peer review during the panel review meeting |
| Within two weeks of panel review meeting | Contractor receives draft reports |
| Within two weeks of receiving draft reports | Contractor submits final reports to the Government |

**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 (http://www.gsa.gov/portal/content/104790). International travel is authorized for this contract. Travel is not to exceed $15,000.

**Restricted or Limited Use of Data**

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

**NMFS Project Contact:**

Dave Van Voorhees
National Marine Fisheries Service
1315 East West Highway
Silver Spring, MD 20910
dave.van.voorhees@noaa.gov

**Annex I: Format and Contents of CIE Independent Peer Review Report**

1. The report must be prefaced with an Executive Summary providing a concise summary of the findings and recommendations, and specify whether or not the science reviewed is the best scientific information available.

2. The report must contain a background section, description of the individual reviewers' roles 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 must describe in their own words the review activities completed during the panel review meeting, including 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, but especially where there were divergent views.

   c. Reviewers should elaborate on any points raised in the summary report that they believe 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 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 report shall represent the peer review of each ToR, and shall not simply repeat the contents of the summary report.

3. The report shall include the following appendices:

   Appendix 1: Bibliography of materials provided for review

   Appendix 2: A copy of this 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

*Calibration Model Accounting for a Recreational Fishery Survey Design Change*

3. Evaluate the suitability of the proposed model for converting historical estimates of private boat and shore fishing effort produced by the CHTS design to estimates that best represent what would have been produced had the new FES design been used prior to 2017.
   p) Does the proposed model adequately account for differences observed in the estimates produced by the CHTS and FES designs when conducted side-by-side in 2015-2016?
   q) Is the proposed model robust enough to account for potential differences that would have been observed if the two designs had been conducted side-by-side in years prior to 2015 with regards to time trending biases?
   r) How does the approach used in developing the proposed FES/CHTS calibration model compare in terms of strengths or weaknesses with other potential approaches?
   s) Does the proposed calibration model help to explain how different factors would have contributed to changes in differences between CHTS and FES results over time?
   t) Is it reasonable to conclude that revised 1981-2016 private boat and shore fishing effort estimates based on the application of the proposed FES/CHTS calibration model would be more accurate than the estimates that are currently available? Does evidence provided for this determination include an assessment of model uncertainty?
4. Briefly describe the panel review proceedings highlighting pertinent discussions, issues, effectiveness, and recommendations.

**Tentative Agenda**

*Calibration Model Accounting for a Recreational Fishery Survey Design Change*

***TBD***

National Marine Fisheries Service

Office of Science and Technology

1315 East-West Highway

Silver Spring, MD

*June, 2017*

Point of contact: Front Desk

**Appendix 5: CALIBRATION MODEL REVIEW ATTENDEES**

MRIP Calibration Model Peer Review Workshop
Sheraton Silver Spring Hotel
Silver Spring, MD
June 27-29, 2017

# ATTENDANCE LIST

| # | NAME | AFFILIATION |
|---|---|---|
| 1 | Paul Rago | MAFMC SSC |
| 2 | Dave Van Voorhees | NOAA Fisheries |
| 3 | John Foster | NOAA Fisheries |
| 4 | Ali Arab | Georgetown University |
| 5 | Rob Hicks | College of William and Mary |
| 6 | Cynthia M. Jones | Old Dominion University |
| 7 | Richard Cody | NOAA support ECS |
| 8 | Teng Liu | Colorado State University |
| 9 | Thomas Sminkey | NOAA Fisheries/ST1 |
| 10 | Steve Turner | NOAA Fisheries SEFSC |
| 11 | Andy Strelcheck | NOAA Fisheries - SERO |
| 12 | Richard Methot | NOAA Fisheries - HQ |
| 13 | Karen Pianka | NOAA Fisheries – ST1 |
| 14 | Lauren Dolinger Few | NMFS ST1 |
| 15 | Chris Wright | NMFS - SF |
| 16 | Sabrina Lovell | NMFS ST |
| 17 | Patrick Lynch | NMFS ST |
| 18 | Melissa Karp | NMFS ST |
| 19 | Toni Kerns | ASMFC |
| 20 | Steve Ander | Gallup |
| 21 | Tommy Tran | Gallup |
| 22 | Melissa Niles | Fifth Estate/MRIP CET |
| 23 | Yong-Woo Lee | NOAA - Fisheries |
| 24 | Jay Breidt | Colorado State University |
| 25 | Jean Opsomer | Colorado State University |
| 26 | Rob Andrews | NOAA Fisheries |
| 27 | Ryan Kitts-Jensen | NOAA Fisheries |
| 28 | Fred Serchuk | SAFMC SSC |
| 29 | Jason McNamee | ASMFC |
| 30 | Patrick Sullivan | Cornell/NEFMC |
| 31 | Jason Didden | MAFMC |
| 32 | Daemian Schreiber | NMFS HQ |
| 33 | Laura Diederick | NOAA Fisheries |