

**Marine Recreational Information Program (MRIP)
Fishing Effort Survey (FES) Calibration Review**

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

**By
Patrick J. Sullivan
Cornell University
NEFMC SSC**

July 18, 2017

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Executive Summary

A sophisticated statistical model for providing temporally consistent estimates of fishing effort, based on data gathered from two different survey sampling modes (CHTS telephone survey vs. FES mail survey), was presented to the MRIP Calibration Review Panel during a meeting that took place in Silver Spring, MD, on June 27-29, 2017. The proposed statistical model does not estimate a single calibration factor, in that it does not provide a single constant multiplier that can be applied to an entire time series in order to put everything into the same units. Instead, the method defines a statistical relationship between the two survey modes and predicts fishing effort based on the type of survey information available (taken from one mode, the other, or both) while including other factors such as the state and seasonal wave in which the survey took place, population size and the degree of cell phone coverage. The model proposed by Breidt, Liu and Opsomer (2017) is an elegant and state-of-the-art statistical procedure that appears to me to be a valid method for providing a consistent time series of fishing effort estimates. However, explaining how the model works to scientists, managers and stakeholders will prove challenging. Furthermore, the sizable differences in fishing effort estimated under the two survey sampling modes indicates to me that a good introduction and explanation of the overall statistical application will be sought after. The proposed model does not itself identify which fishing effort estimates, those derived by telephone or those derived by mail, are more representative of actual fishing effort. However, the model can be used to derive fishing effort estimates in the context of either the telephone survey or the mail survey. Previous reviews confirm what was foreseen by the 2006 NAS review, namely that, with a better sampling frame, greater coverage and more up-to-date statistical methods, a statistical procedure such as the current mail survey method would result in an estimator with greater precision. But, it must be pointed out that one cannot necessarily draw the conclusion from this alone that the FES mode of estimation is the more accurate of the two (precision represented by the variance is different than accuracy as represented by lack of bias). The time period during which both survey methods were simultaneously applied is short (3 years), which is not much time for identifying all the factors critical to understanding this system given that so many of the components are changing. The move towards implementing the new fishing effort calculations would benefit greatly from further analysis into the causes of the differences between fishing effort estimates from the two survey modes. It was indicated at the review meeting that some data exploration had been done to examine this issue, but no single factor could conclusively be said to be the cause of the difference. The Testing Report by Andrews et al. (2014) would seem to indicate that the FES method is both more precise (more efficient statistically) and more accurate. I would encourage the MRIP team to develop additional inroads to resolving this concern about causes by examining further how the different components (e.g. coverage, population demographic differences, cell-phone response rates) incrementally contribute to the differences in estimates and how this affects the quality of the estimates. Elucidating more fully and clearly the reasons for the differences will aid in the acceptance of the new survey mode and effort estimation methods as well as provide insight on how best to interpret and use the data at hand.

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 MRIP 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 of MRIP acted as rapporteurs. Other staff from the Office of the Science and Technology, notably Karen Pianka, assisted in the handling of documents via a web-based application. Jason Didden of the Mid Atlantic Fishery Management Council provided support for the webinar. Approximately 35 people participated in the open sessions of the meeting.

Terms of Reference for the Peer Review

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.
 - 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 model can be used to characterize private boat and shore fishing effort either entirely in terms of CHTS or entirely in terms of FES. The Terms of Reference question about “accounting for differences” is difficult to address. The method does not provide a global calibration factor that can easily be applied as a multiplier, but instead uses a model to predict fishing effort from the two modes of survey estimates while incorporating other auxiliary information. The model itself cannot provide an explanation for the difference, nor should it be expected to. And, because auxiliary information beyond the information contained in side-by-side estimates is being used, side-by-side estimates cannot be compared directly in any kind of global sense using this model as currently constructed. Still, some simpler statistical analyses that compare “side-by-side” estimates on a pairwise basis have been done outside of this modeling context and might be used to facilitate greater understanding and interpretation of the data outside of and in conjunction with the model. We were not provided any side-by-side comparative statistical analyses for this review.

- 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?

In theory, yes, provided the assumptions of the model hold over the entire time series. Unfortunately, we have not observed the behavior of the system throughout its operation historically and so may be missing some important components that would better capture and explain biases. Further work should be done in this area. Possible directions would be independent validation of effort metrics as well as gathering historic information where available (e.g. demographic changes, population attitudes towards fishing as a leisure activity, historical coverage) that might shed greater light on calibration differences.

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

Because the MRIP team and collaborators were not provided with the Terms of Reference beforehand the Panel had to inquire about what other approaches were explored during the meeting. Methods such as Bayesian hierarchical modeling, state-space modeling, time-varying ratio estimation and expanded versions of the proposed Fay-Herriot approach were all raised for consideration by the Panel, but the CSU contractors indicated that these and other approaches were explored with the research focus converging to the current version of the model. Had the CSU scientists known of the Terms of Reference they might have been able to provide a more comprehensive report on what models they had explored and why the current one was selected. That said, the model reviewed, in its current form, is a reasonable means for estimating fishing effort over the time series where the survey modes have changed.

- 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?

The fishing effort estimation model accounts for differences by state and wave, population change, and degree of cell-phone coverage. While it also accounts for differences due to survey mode, it cannot be used to explain these differences. It is recommended that further research be put into quantifying the cumulative influence various factors contribute to current and past differences.

- 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?

Here I repeat what was stated in the Panel Summary report as that succinctly characterizes the issue of accuracy as raise in this Terms of Reference, which is really outside the scope of this review as structured by the information provided to the reviewers and the statistical methods available for review.

- 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 degradation of survey coverage and other factors.

- Gatekeeper, recall bias, response rate etc. indicate that the mail survey is preferred to a phone, 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 the ASA.
- Response rate per se is not a problem unless differences in fishing activity differ between respondents and non-respondents

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

One challenging problem that became apparent during the meeting, was that the presenters did not have the Terms of Reference prior to their preparation for the meeting. The Panel had to spend extra time with the presenters in order to get the information needed to achieve the Terms of Reference.

Several of the presentations did not provide enough informative depth relevant to their particular topic. It would have helped with the review to have had that knowledge. Greater coordination and communication between collaborators on this project would have benefited the quality of the information coming into the review, but would also have aided the MRIP overall.

I greatly appreciated the web space provided for the documents and that the documents as well as data were posted shortly after being requested. The staff support for this was great.

The documentation initially provided prior to the meeting was rather sparse, but the availability of the documents improved as the meeting progressed. It would have been beneficial, had it been possible to obtain records like the NAS reports and the MRIP user handbook prior to the meeting. Likewise, reports on model selection, model development and the auxiliary statistical analyses conducted outside the context of the model to enumerate and assess causal factors would have been good to have had available in advance, but certainly the overall process of implementing MRIP itself would benefit still from having such documents available.

The Terms of Reference presumed that converting CHTS to FES is the appropriate direction to go. Yet, the statistical work under review primarily focused on the mathematical aspects of the calibration and not on which set of estimates reflected a truer representation of fishing effort. Not recognizing this assumption in the preparation for this meeting created major challenges for the review and in addressing the Terms of Reference.

More information could have been provided on stock assessment modeling responses to data updates for this review. This could have been used to highlight which assumptions of the model were likely to have the greatest downstream influence on products such as population estimates and allocation.

I appreciated that we spent an hour or more on the second day going through the details of the statistical calibration/prediction model. The model and assumptions were well thought out, but the committee needed to better understand model inputs, parameter definitions and nuances of the Fay-Herriot estimator. Given the terms of reference, we needed to solicit more information on model development and model selection than was initially available at the meeting. Furthermore it appears that separate from the model several independent data analyses exist. It would have been good to have had a presentation and some discussion on those. This would also have been relevant to addressing the Terms of Reference. I welcomed MRIP Review Panel Chair Paul Rago's workup of the pairwise calibration data. Something like that should have been provided with an associated report prior to the meeting presumably by someone from the Fisheries Statistics staff. We received model parameter estimates upon request, however, we did not have time at the meeting to explore them fully. Now that I have time to look at them, I am not sure the entire set of estimates is provided in the output. Making the model code and estimates available will assist with future interpretation and potential acceptance of the estimation method.

In general, I thought the meeting was well organized, and run by Chair Paul Rago, as well as all the staff named in the Panel Summary Report, but for some reason pre-meeting preparation was poorly executed in terms of thoughtful assembly of all the pieces needed to address the Terms of Reference. Some overall coordination among presenters would have helped as well to have made sure that all the relevant information was covered. But what is even more disconcerting is that it appears that the different subgroups, i.e. data gatherers, CSU statistics folks, and end users such as modelers and managers, have not had much opportunity to communicate with each other. At least I saw very little evidence of this despite hearing all about the transition considerations. This, I find, worrisome. In the end, MRIP will be more than the sum of its parts. I'm convinced here, as when I led the earlier MRFSS review (NAS 2006), that the synthesis and communication of information must make or break the implementation of the program.

Appendix 1: 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.st.nmfs.noaa.gov/confluence/display/FESCALIB?preview=/73074985/73728799/NAS_MRIP_review.pdf

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](#)
[FESCALIBRATIONNOTESDay2.docx](#)
[EBLUPS.csv](#)
[EBLUPS Variable Names.csv](#)
[FESCALIBRATIONNOTESDay1.docx](#)
[Eblup comparisons.docx](#)
[MRFSS Fish Hunt Comps.xlsx](#)
[FES Errors.pptx](#)
[Model Fits.txt](#)
[Mode 3_logeffort_poly_fixed.pdf](#)
[Mode 7_logeffort_poly_fixed.pdf](#)

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](#)

Appendix 2: Statement of Work

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-test.nmfs.noaa.gov/Assets/recreational/pdf/2015_FES_Progress_Report-20161115.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.
 - 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?
 - 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?
 - 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?
 - 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?
 - 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?
2. Briefly describe the panel review proceedings highlighting pertinent discussions, issues, effectiveness, and recommendations.

Appendix 3: Calibration Model Review Attendees List

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 |