National Oceanic and Atmospheric Administration

Office of Oceanic and Atmospheric Research

Atlantic Oceanographic and Meteorological Laboratory Science Review

March 4-6, 2014

Guidelines for Review Panel Members

January 2014

1. Introduction

Laboratory science reviews are conducted every five years to evaluate the **quality**, **relevance**, and **performance** of research conducted in Oceanic and Atmospheric Research (OAR) laboratories. This review is for both internal OAR/NOAA use for planning, programming, and budgeting, and external interests. It helps the Laboratory in its strategic planning of its future science. These reviews are also intended to ensure that OAR laboratory research is linked to the National Oceanic and Atmospheric Administration (NOAA) Strategic Plan, is relevant to NOAA Research mission and priorities, is of high quality as judged by preeminence criteria, and is carried out with a high level of performance.

These guidelines have been prepared using experience gained from previous laboratory reviews. The goal of the guidelines is to clarify your role and assist in the organization of the work of the review panel. The guidelines cover the process from when you receive the invitation letter to participate on the review panel to submission of the summary report of the review panel.

2. Research Areas in Review and Charge to the Review Panel

Each member of the review panel should have received the "charge to the reviewers" document. The charge covers the following topics: purpose of the review, scope of the review, research areas for the review, evaluation guidelines including questions to be addressed by the review panel, proposed schedule including the dates of the review, time frame for delivery of the final review report as well as the time commitment for reviewers, and review panel resources. Each member is asked to complete a review report (using an Evaluation Worksheet, Appendix C) so that each research area will be reviewed by at least two panel members; members will provide those reviews to the Chair. The Chair will summarize the recommendations and ratings of individual reports of the review panel, but will not attempt to seek a consensus of the review panel on any findings or recommendations. Each member of the review panel received a conflict of interest disclosure form; thanks for returning the completed form. A description of the Laboratory's research areas is in Appendix A.

3. Resources for the Review Panel

Steven Fine, Deputy Assistant Administrator (DAA) of OAR for Laboratories and Cooperative Institutes, will provide the resources necessary for you and the review panel to complete its work. A list of OAR contacts for the review is in Appendix D. All Laboratory review materials and presentations for the review will be posted to a website in advance of the review. The web site will contain background documents from NOAA (e.g., NOAA Strategic Plan, NOAA Research 5-Year Plan); background data on the Laboratory, including several "indicators of preeminence" (e.g., publications, awards, scientific leadership, patents); the Laboratory Strategic Plan and presentation files. Please let us know if you would like to receive a binder with printed copies of presentations in advance of the review. You are also provided a template (form) on

which to complete your review observations, findings, and recommendations and to provide your overall evaluation of the research areas (Appendix C).

4. Logistics and Agenda for the Review

Travel arrangements for the onsite review will be made and paid for by OAR. Laboratory staff will contact you to arrange travel to the review. If you have not already done so, please provide the Laboratory travel coordinator (listed in Appendix D) with your intended dates of travel and other particulars by the requested due dates to ensure all arrangements are made satisfactorily. The laboratory will reserve a block of hotel rooms for the reviewers, but you will be asked to cover all your travel expenses (except air fare) upfront and will be reimbursed, usually through direct deposit to your bank, after laboratory staff complete the travel reimbursement forms with your help. Some receipts may be needed for reimbursement. If you have not been the recipient of federal travel reimbursement before, you will need to register as a U.S. government vendor to receive your travel reimbursement. The Laboratory travel staff will do that for you, but you will have to provide them with some personal identifying information, including the routing and account numbers for your bank account for direct deposit of the reimbursement. For non-U.S. reviewers, you will be sent a check for travel cost reimbursement. Travel schedules should be chosen to allow you to attend all scheduled review sessions.

Laboratory staff may also ask for information for building security in advance of the review, particularly for reviewers who are not U.S. citizens. In any case, bring photo identification.

5. Teleconferences Prior to the Review

Two teleconferences will be scheduled to discuss the review process and answer any questions you may have. The first of these teleconferences will occur approximately two months prior to the review, and the second will occur approximately two weeks prior to the review. In addition to the review panel members, attendees will include the OAR Deputy Assistant Administrator (DAA), the OAR Headquarters coordinator, and management from the Laboratory. On the first call, the charge to the review panel and the draft agenda for the review will be discussed as well as any other questions reviewers may have on the process or on the preliminary materials on the website. The second call will cover information provided on the website, presentation materials, the final review agenda, the review reports, and resolution of last-minute details. During this call, we ask that you identify any additional information needs. All relevant information requested by the review panel will be provided on the review website at least two weeks before the review and prior to the second teleconference with the review panel.

6. During the Review

Reviews are held over a three-day period. On the morning of the first day, you will meet at breakfast with the OAR Assistant Administrator (AA) and DAA to discuss any final issues before the review. Generally the first morning will include an overview presented by the Laboratory director and other senior management staff. The review agenda includes presentations and discussions that will provide information on the research areas to be reviewed and the questions to be addressed by the review panel. These presentations may include PowerPoint presentations, poster sessions, demonstrations, and/or facility tours. Time will be built into the review schedules for questions and discussion following presentations. Interactive dialogue and discussion during all of the sessions is strongly encouraged.

As time permits, reviewers will meet in closed sessions with Laboratory management, as well as with laboratory scientists, visiting scientists, and/or Post Docs, without management present. A separate session has been arranged for teleconference discussions with the Laboratory's key stakeholders. While you will receive answers to stakeholder questions provided in advance, this is an opportunity to get input about the Laboratory's science, products and services from key customers. Please use these closed sessions to probe more deeply into the science and operations of the Laboratory.

Time will also be set aside for reviewers-only, closed sessions. The goals of the reviewers-only sessions are to provide time for the review panel to discuss any presentations or information provided and to identify additional information needed or issues that need to be clarified. The closed sessions also provide an opportunity to work on the individual evaluations and to prepare for the preliminary report to laboratory management at the end of the third day. At any time during the review, you should feel free to request additional information or clarifications from Laboratory staff.

7. Preparation and Submission of the Review Report

We ask that you complete your individual reports providing a rating—Outstanding, Satisfactory or Needs Improvement -- as outlined on the form. The evaluation guidelines (Appendix B) provide a description of what constitutes these ratings and evaluation questions to consider in providing a rating. For the convenience of the panel, a fillable Evaluation Worksheet is provided in Appendix C for entry of findings and recommendations for each research area assessed as well as the overall rating discussed above. We ask that, based on your findings, you provide recommendations that are specific and actionable by the laboratory. The Chair will compile a final summary report from the individual reports. In order to be compliant with the Federal Advisory Committee Act, the Chair is asked not to seek consensus, but to summarize or otherwise combine the individual evaluations.

We suggest that the final summary report include the following elements:

Cover Page: Please include a title page with the title-Summary Report of the Review of the NOAA Atlantic Oceanographic and Meteorological Laboratory, date of review, and names of reviewers and their organizational affiliations.

Overview Section: Please include details of the location and date of review and the research areas covered in the report.

Summary of Laboratory-Wide Findings and Recommendations: Include in this section, findings and recommendations relevant to the entire Laboratory. These could include points that arose in multiple Research Areas; during the presentations, discussions, lab tours, or other aspects of the review agenda; or in discussions during the work sessions of the review panel. Also include a listing/table that summarizes each reviewer's overall evaluation (outstanding, satisfactory, needs improvement) for each research area they reviewed. It is helpful for the Laboratory to understand the findings and recommendations, and that the recommendations are worded so they are actionable.

Findings and Recommendations by Research Area: Include findings and recommendations for each research area; also include the overall rating for each area (outstanding, satisfactory, needs improvement). For ratings of "needs improvements" please suggest specific actions the Laboratory could to take to make improvements.

Summary of Recommendations: Please include a numbered list of all recommendations in your report.

The final report is requested within 45 days of the review and should be submitted by the Chair to the DAA and Laboratories and Cooperative Institutes (LCI) Coordinator. Once the report is received, OAR staff will have 30 days to review the report, identify any factual errors or necessary clarifications, and send the technical corrections to the review panel. The review panel will consider the suggested technical corrections and deliver the final report and individual evaluations (separate file) to the Assistant Administrator, OAR.

8. Uses for and Distribution of the Review Report

As outlined in the "purpose of the review" section of the "charge to reviewers," Laboratory scientific reviews are conducted to help the Laboratory in its strategic planning of its future science, and to ensure that Laboratory research is linked to the NOAA Strategic Plan, is relevant to OAR mission and priorities, is of high quality as judged by preeminence criteria, and is carried out with a high level of performance. After submission of the final report by the review panel, the laboratory will be asked to review the report and prepare a plan, to be discussed with OAR management, to incorporate recommendations into Laboratory research and operations.

The final report will be a standalone, public document and may be distributed to internal NOAA and external audiences. Your individual reports will not be made public, and will only be used by OAR as background for the final report. Internal distribution of the individual reports will be limited.

9. Schedule and Time Commitment for Reviewers

The on-site review will be conducted over a three-day period, March 4-6, 2014 in Miami, Florida. Two teleconferences are planned with the Deputy Assistant Administrator for OAR in advance of the review (~two months prior and ~2 weeks prior).

Each reviewer is asked to independently prepare his or her written evaluation on each of research areas assigned to them and provide these to the Chair as soon as possible after the completion of the review. The Chair will draft the final report summarizing the individual evaluations and transmit it to the Deputy Assistant Administrator and the OAR HQ LCI Coordinator (see Appendix D) within 45 days of completion of the review. Once the report is received, OAR staff will have 30 days to review the report, identify any factual errors or necessary clarifications, and send the technical corrections to the review panel. The review panel will consider the suggested technical corrections and deliver the final report and individual evaluations within 30 days to the Assistant Administrator, OAR.

Appendix A

Description of Research Areas for the Review

Mission Statement and Vision of the Atlantic Oceanographic and Meteorological Laboratory (AOML)

AOML conducts research to understand the physical, chemical, and biological characteristics and processes of the ocean and the atmosphere, both separately and as a coupled system. The principal focus of these investigations is to provide knowledge that leads to more accurate forecasting of severe storms, better use and management of marine resources, better understanding of the factors affecting both climate and environmental quality, and improved ocean and weather services for the nation. AOML strives to be recognized as a center of excellence in atmospheric and oceanic research and a sought-after resource to the community and the nation for expertise on hurricanes, coastal ecosystems, and the role of oceans in climate.

Core Competencies

- The development of scientific understanding of the physical oceanic processes that influence climate, and the atmospheric and oceanic processes that influence tropical cyclone lifecycles.
- The execution of intensive field campaigns involving the coordinated deployment of highly instrumented research aircraft to characterize and quantify atmospheric and oceanic processes that influence the hurricane lifecycle.
- The development and application of predictive computer models that accurate represent the hurricane environment and atmospheric steering conditions to improve predictions of storm intensity and track.
- The performance of field and laboratory studies to determine the composition, constituents, and transport of coastal waters and their impact on coastal ecosystems.
- The deployment, evaluation and processing of large components of the Global Ocean Observing System.
- Leadership of and contribution to national and international ocean observing programs designed to effectively asses and conduct missions that monitor the state of the oceans and their contribution to the state of the climate.

Key Products

Peer-reviewed publications – The scientific breakthroughs produced by AOML research are documented in groundbreaking peer-reviewed publications.

Improved hurricane models – State-of-the-art high-resolution hurricane models and associated aircraft data assimilation are developed to improve hurricane track and intensity forecasts.

National and international assessments – AOML scientists play leadership roles and AOML science is featured prominently in national and international state of ocean and state of the climate assessments that are specifically designed to inform regional, national, and international policy development on the most pressing environmental issues that face us today.

Regional ecosystem reports – AOML scientists play leadership roles providing reports of the health of regional coastal ecosystems that are specifically designed to inform regional coastal managers.

Connection to the NOAA Mission
AOML aligns its research goals and activities with those of the broader NOAA mission and its Office of Oceanic and Atmospheric Research. Research at AOML is conducted in support of NOAA's Next Generation Strategic Plan (NGSP). AOML meets mission objectives through multi-disciplinary investigations in three theme areas, each of which directly map to NOAA's NGSP goals. AOML's oceans and climate research supports the Climate Adaptation and Mitigation goal by maintaining a critical ocean observing program and conducting ocean process studies that support an informed society that anticipates and responds to climate and its impacts. AOML's hurricane research supports the Weather Ready Nation goal by providing improved understanding and modeling of tropical systems that is the foundation of increasingly accurate forecasts that allow society to prepare for and respond to weather-related events. As recognized experts in coastal ocean and ecosystem monitoring and modeling, AOML research on the impacts of rising sea surface temperatures and ocean acidification on coral reefs as well as land-based sources of pollution and pathogens in the marine environment directly supports NOAA's Healthy Ocean and Resilient Coastal Communities and Economies goals. AOML also serves NOAA's Science and Technology Enterprise objective through our dedication and support of ocean -observing systems. We also meet NOAA's Engagement Enterprise objective through our public outreach and collaboration with regional, national, and international partners in academia, other governmental agencies, and non-governmental organizations.

Research Areas for Review

Oceans and Climate Research (including ocean observations**)**
Coastal Oceans and Ecosystems
Hurricanes and Tropical Meteorology

1. Oceans and Climate Research (including ocean observations**)**
Objective: ***Understand the physical processes and mechanisms that control global ocean circulation, how these mechanisms affect regional climate, and to monitor and model their long-term global variability.***
AOML conducts research based on models and observation analysis to understand and characterize the role of the oceans in climate variability and change. Techniques vary from shipboard-conducted process studies, models, long-term continuous time series, and

satellite-derived products. In support of these studies, AOML presently manages all or significant portions of NOAA's contribution to many Global Ocean Observing System activities, including the Global Drifter Program, U.S. Argo Consortium, Global Ship of Opportunity Program, the XBT Network, Global Ocean Ship-based Hydrographic Investigations Program, PIRATA (Prediction and Research Moored Array in the Tropical Atlantic) Program, and the Western Boundary Time Series Program.

The above programs supply data to NOAA and to national and international institutions that provide operational climate and weather forecasts and conduct climate variability research. AOML's research related to ocean dynamics includes the Meridional Overturning Circulation (MOC), western boundary currents, and Gulf of Mexico and Caribbean Sea oceanography. Satellite observations and numerical modeling are used to augment these hydrographic observation studies. AOML participates in national and international research projects directed at developing new methods to observe the ocean for climate studies. These programs focus on observing the intensity of the Atlantic MOC near 27ºN to evaluate the ocean's natural variability and to test and validate ocean-only and coupled ocean-atmosphere models. AOML's ocean and climate research also examines the magnitude of CO2 exchange and the quantification of uptake of CO2 by the ocean.

2. Coastal Oceans and Ecosystems

Objective: Provide sound science to support informed water-quality decision-making at national, state, and local levels.

AOML's coastal ocean and ecosystem research focuses on quantifying the impact of anthropogenic activities and management decisions on the health of tropical and subtropical coastal ecosystems. Our research includes comparative studies with more temperate coastal systems to enhance the context within which climate-induced changes in ecosystems can be interpreted. This research is conducted through a suite of sustained monitoring projects, targeted process studies, and both heuristic and mechanistic ecological models. The unifying goal of this research is to improve our management of coastal ecosystems, thereby maximizing ecosystem health and economic yield.

AOML's current interdisciplinary field efforts include: physical, biological, and chemical studies that support the south Florida Ecosystem Restoration effort and the underlying health of this ecosystem; the interconnectivity of ecosystems throughout the regional Intra-Americas Sea; land-based sources of pollution to coastal waters; the relationship between oceans and human health; the status and health of coral reef ecosystems worldwide; and the influence of climate change, ocean acidification, and anthropogenic activities on coastal and coral reef ecosystems.

3. Hurricanes and Tropical Meteorology

Objective: Improve the basic physical understanding and model forecasts of tropical cyclone intensity/structure change, with a focus on rapid intensity change.

AOML's hurricane research is based on analysis of *in situ* and remotely-sensed observations in the core of tropical cyclones and their surrounding environment. These analyses are used to improve our general understanding of tropical cyclones and provide valuable information for the initialization and evaluation of the next-generation of

numerical models. Observations are primarily collected during the hurricane season using the fleet of U.S. Air Force Reserve WC-130J aircraft and the two NOAA WP-3D - turboprop aircraft and Gulfstream-IV jet. In-house modeling and data assimilation capabilities, combined with AOML's observational leadership in the areas of air-sea interaction, atmospheric and oceanic boundary layers, vortex evolution, and convective structure, afford the laboratory a direct and unique connection between scientists who understand what hurricanes look like through observations and researchers assimilating these observations into high-resolution modeling systems.

Appendix B

OAR Laboratory Reviews
Evaluation Guidelines

Purpose of the Review: Laboratory science reviews are conducted every five years to evaluate the **quality**, **relevance**, and **performance** of research conducted in Oceanic and Atmospheric Research (OAR) laboratories. This review is for both internal OAR/NOAA use for planning, programming, and budgeting, and external interests. It helps the Laboratory in its strategic planning of its future science. These reviews are also intended to ensure that OAR laboratory research is linked to the National Oceanic and Atmospheric Administration (NOAA) Strategic Plan, is relevant to NOAA Research mission and priorities, is of high quality as judged by preeminence criteria, and is carried out with a high level of performance.

Each reviewer will independently prepare their written evaluations so that all research areas have at least two reviews. The Chair will create a report summarizing the individual evaluations. The Chair will not analyze individual comments or seek a consensus of the reviewers.

For each research area reviewed, each reviewer will provide one of the following overall ratings:

- *Outstanding*--Laboratory goes well beyond the Satisfactory level and is outstanding in all areas.
- *Satisfactory*--In general, Laboratory meets expectations and the criteria for a Satisfactory rating.
- *Needs Improvement*--In general, Laboratory does not reach expectations and does not meet the criteria for a Satisfactory rating. The reviewer will identify specific problem areas that need to be addressed.

1. **Quality:** Evaluate the quality of the Laboratory's research and development. Assess whether appropriate approaches are in place to ensure that high quality work will be performed in the future. Assess progress toward meeting OAR's goal to conduct preeminent research as listed in the "Indicators of Preeminence."

   - **Quality Rating Criteria:**

- *Satisfactory* rating -- Laboratory scientists and leadership are often recognized for excellence through collaborations, research accomplishments, and national and international leadership positions. While good work is done, Laboratory scientists are not usually recognized for leadership in their fields.
- *Outstanding* rating -- Laboratory goes well beyond the *Satisfactory* level and is outstanding in all areas.
- *Needs Improvement* rating -- In general, Laboratory does not reach expectations and does not meet the criteria for a *Satisfactory* rating. The reviewer will identify specific problem areas that need to be addressed.

➢ **Evaluation Questions to consider:**

- Does the Laboratory conduct preeminent research? Are the scientific products and/or technological advancements meritorious and significant contributions to the scientific community?
- How does the quality of the Laboratory's research and development rank among Research and Development (R&D) programs in other U.S. federal agencies? Other science agencies/institutions?
- Are appropriate approaches in place to ensure that high quality work will be done in the future?
- Do Laboratory researchers demonstrate scientific leadership and excellence in their respective fields (e.g., through collaborations, research accomplishments, externally funded grants, awards, membership and fellowship in societies)?

➢ **Indicators of Quality:** Indicators can include, but not be limited to the following (note: not all may be relevant to each Laboratory)

- A Laboratory's total number of refereed publications per unit time and/or per scientific Full Time Equivalent scientific staff (FTE).
- A list of technologies (e.g. observing systems, information technology, numerical modeling algorithms) transferred to operations/application and an assessment of their significance/impact on operations.
- The number of citations for a lab's scientific staff by individual or some aggregate.
- A list of awards won by groups and individuals for research, development, and/or application.
- Elected positions on boards or executive level offices in prestigious organizations (e.g., the National Academy of Sciences, National Academy of Engineering, or fellowship in the American Meteorological Society,

American Geophysical Union or the American Association for the Advancement of Science etc.).

- Service of individuals in technical and scientific societies such as journal editorships, service on U.S. interagency groups, service of individuals on boards and committees of international research-coordination organizations.
- A measure (often in the form of an index) that represents the value of either individual scientist or the Laboratory's integrated contribution of refereed publications to the advancement of knowledge (e.g., Hirsch Index).
- Evidence of collaboration with other national and international research groups, both inside and outside of NOAA including Cooperative Institutes and universities, as well as reimbursable support from non-NOAA sponsors.
- Significance and impact of involvement with patents, invention disclosures, Cooperative Research and Development Agreements and other activities with industry.
- Other forms of recognition from NOAA information customers such as decision-makers in government, private industry, the media, education communities, and the public.
- Contributions of data to national and international research, databases, and programs, and involvement in international quality-control activities to ensure accuracy, precision, inter-comparability, and accessibility of global data sets.

2. **Relevance**: Evaluate the degree to which the research and development is relevant to NOAA's mission and of value to the Nation.

   - **Relevance Rating Criteria:**
     - *Satisfactory* rating -- The R&D enterprise of the Laboratory shows linkages to NOAA's mission, Strategic Plan, and Research Plan, and is of value to the Nation. There are some efforts to work with customer needs but these are not consistent throughout the research area.
     - *Outstanding* rating -- Laboratory goes well beyond the *Satisfactory* level and is outstanding in all areas.
     - *Needs Improvement* rating -- In general, Laboratory does not reach expectations and does not meet the criteria for a *Satisfactory* rating. The reviewer will identify specific problem areas that need to be addressed.

   - **Evaluation Questions to consider:**

- Does the research address existing (or future) societally relevant needs (national and international)?
- How well does it address issues identified in the NOAA strategic plan and research plans or other policy or guiding documents?
- Are customers engaged to ensure relevance of the research? How does the Laboratory foster an environmentally literate society and the future environmental workforce? What is the quality of outreach and education programming and products?
- Are there R&D topics relevant to national needs that the Laboratory should be pursuing but is not? Are there R&D topics in NOAA and OAR plans that the Laboratory should be pursuing but is not?

➢ **Indicators of Relevance:** Indicators can include, but not be limited to the following (note: not all may be relevant to each Laboratory)

- Results of written customer survey and interviews
- A list of research products, information and services, models and model simulations, and an assessment of their impact by end users, including participation or leadership in national and international state-of-science assessments.

3. **Performance**: Evaluate the overall effectiveness with which the Laboratory plans and conducts its research and development, given the resources provided, to meet NOAA Strategic Plan objectives and the needs of the Nation. The evaluation will be conducted within the context of three sub-categories: **a) Research Leadership and Planning, b) Efficiency and Effectiveness, c) Transition of Research to Applications (when applicable and/or appropriate)**.

➢ **Performance Rating Criteria:**
- *Satisfactory* rating --
    - The Laboratory generally has documented scientific objectives and strategies through strategic and implementation plans (e.g., Annual Operating Plan) and a process for evaluating and prioritizing activities.
    - The Laboratory management generally functions as a team and works to improve the operation of the Laboratory.
    - The Laboratory usually demonstrates effectiveness in completing its established objectives, milestones, and products.

- The Laboratory often works to increase efficiency (e.g., through leveraging partnerships).
- The Laboratory is generally effective and efficient in delivering most of its products/outputs to applications, operations or users.

- *Outstanding* rating -- Laboratory goes well beyond the *Satisfactory* level and is outstanding in all areas.
- *Needs Improvement* rating -- In general, Laboratory does not reach expectations and does not meet the criteria for a *Satisfactory* rating. The reviewer will identify specific problem areas that need to be addressed.

A. Research Leadership and Planning: Assess whether the Laboratory has clearly defined objectives, scope, and methodologies for its key projects.

➢ **Evaluation Questions to consider:**

- Does the Laboratory have clearly defined and documented scientific objectives, rationale and methodologies for key projects?
- Does the Laboratory have an evaluation process for projects: selecting/continuing those projects with consistently high marks for merit, application, and priority fit; ending projects; or transitioning projects?
- Does the laboratory have the leadership and flexibility (i.e., time and resources) to respond to unanticipated events or opportunities that require new research and development activities?
- Does the Laboratory provide effective scientific leadership to and interaction with NOAA and the external community on issues within its purview?
- Does Laboratory management function as a team and strive to improve operations? Are there institutional, managerial, resource, or other barriers to the team working effectively?
- Has the Laboratory effectively responded to and/or implemented recommendations from previous science reviews?

➢ **Indicators of Leadership and Planning:** Indicators can include, but not be limited to, the following (Note: Not all may be relevant to each Laboratory).

a. Laboratory Strategic Plan

b. Program/Project Implementation Plans.
c. Active involvement in NOAA planning and budgeting process.
d. Final report of implementation of recommendations from previous Laboratory review.

B. Efficiency and Effectiveness: Assess the efficiency and effectiveness of the Laboratory's research and development, given the Laboratory's goals, resources, and constraints and how effective the Laboratory is in obtaining needed resources through NOAA and other sources.

- **Evaluation Questions to consider:**

  - Does the Laboratory execute its research in an efficient and effective manner given the Laboratory goals, resources, and constraints?
  - Is the Laboratory organized and managed to optimize the conduct and planning of research, including the support of creativity? How well integrated is the work with NOAA's and OAR's planning and execution activities? Are there adequate inputs to NOAA's and OAR's planning and budgeting processes?
  - Is the proportion of the external funding appropriate relative to its NOAA base funding?
  - Is the Laboratory leveraging relationships with internal and external collaborators and stakeholders to maximize research outputs?
  - Are human resources adequate to meet current and future needs? Is the Laboratory organized and managed to ensure diversity in its workforce? Does the Laboratory provide professional development opportunities for staff?
  - Are appropriate resources and support services available? Are investments being made in the right places?
  - Is infrastructure sufficient to support high quality research and development?
  - Are projects on track and meeting appropriate milestones and targets? What processes does management employ to monitor the execution of projects?

- **Indicators of Efficiency and Effectiveness:** Indicators can include, but not be limited to, the following (Note: Not all may be relevant to each Laboratory).

a. List of active collaborations
b. Funding breakout by source
c. Lab demographics

C. Transition of Research to Applications: How well has the Laboratory delivered products and communicated the results of their research? Evaluate the Laboratory's effectiveness in transitioning and/or disseminating its research and development into applications (operations and/or information services).

- **Evaluation Questions to consider:**
  - How well is the transition of research to applications and/or dissemination of knowledge planned and executed?
  - Are end users of the research and development involved in the planning and delivery of applications and/or information services? Are they satisfied?
  - Are the research results communicated to stakeholders and the public?

- **Indicators of Transition:** Indicators can include, but not be limited to, the following (Note: Not all may be relevant to each Laboratory).

  a. A list of technologies (e.g. observing systems, information technology, numerical modeling algorithms) transferred to operations/application and an assessment of their significance/impact on operations/applications.
  b. Significance and impact of involvement with patents, Cooperative Research and Development Agreements (CRADAs) and other activities with industry, other sectors, etc.
  c. Discussions or documentation from Laboratory stakeholders

Appendix C: Evaluation Forms
Evaluation Worksheet
(Note in WORD the boxes below will expand to fit the text)

Research Area: Oceans and Climate Research (including ocean observations)
Reviewer:
Overall Evaluation:

☐ Outstanding--Laboratory goes well beyond the satisfactory level and is outstanding in all areas

☐ Satisfactory--In general, Laboratory meets the expectations of the science criteria.

☐ Needs Improvement--In general, Laboratory does not reach expectations. The reviewer will identify specific problem areas that need improvement.

QUALITY **Comments and observations/findings:**
RELEVANCE **Comments and observations/findings:**
PERFORMANCE **Comments and observations/findings:**
Recommendations for Oceans and Climate Research (including ocean observations) **Please provide specific, actionable recommendations based on your observations/findings**

Evaluation Worksheet

Research Area: Coastal Oceans and Ecosystems

Reviewer:

Overall Evaluation:

☐ Outstanding--Laboratory goes well beyond the satisfactory level and is outstanding in all areas.
☐ Satisfactory--In general, Laboratory meets the expectations of the science criteria.
☐ Needs Improvement--In general, Laboratory does not reach expectations.

The reviewer will identify specific problem areas that need improvement.

QUALITY **Comments and observations/findings:**
RELEVANCE **Comments and observations/findings:**
PERFORMANCE **Comments and observations/findings:**
Recommendations for Coastal Oceans and Ecosystems **Please provide specific, actionable recommendations based on your observations/findings**

Evaluation Worksheet

Research Area: Connections: Hurricanes and Tropical Meteorology
Reviewer:
Overall Evaluation:

☐ Outstanding--Laboratory goes well beyond the satisfactory level and is outstanding in all areas.
☐ Satisfactory--In general, Laboratory meets the expectations of the science criteria.
☐ Needs Improvement--In general, Laboratory does not reach expectations.

The reviewer will identify specific problem areas that need to be improvement.
Reviewer:

QUALITY **Comments and observations/findings:**
RELEVANCE **Comments and observations/findings:**
PERFORMANCE **Comments and observations/findings:**
Recommendations for Connections: Hurricanes and Tropical Meteorology **Please provide specific, actionable recommendations based on your observations/findings**

Reviewer Feedback Worksheet – Additional Comments and Feedback on the Review Process

Reviewer:

Additional comments for OAR and laboratory management
Additional comments and suggestions on conduct of the review for use in future laboratory reviews Please help OAR improve our science review process by telling us what worked well and did not work well throughout the process. In order to reduce the burden on you and the Laboratory staff, we would like to provide only the useful background information. What information provided was especially useful or not useful in your evaluations? What additional information would have helped you in your evaluation? What information could have been omitted without impacting the quality of your review?

Appendix D

Contact Information for the AOML Science Review

OAR Assistant Administrator, Dr. Robert Detrick
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301-713-2458

OAR Deputy Assistant Administrator, Dr. Steve Fine
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301-713-2458

OAR HQ LCI Coordinator, Dr. Mike Uhart
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AOML Review Coordinator, Ms. Erica Rule
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305-361-4541

AOML Travel Coordinator for the Review Panel, Ms. Gladys Medina
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305-361-4300
With assistance from:
Ms. Carla Stephens
Carla.Stephens@noaa.gov
305-361-4535