

**National Oceanic and Atmospheric
Administration**

**Office of
Oceanic and Atmospheric Research**

**Guidelines for ESRL Physical Sciences Review
Team Members**



Updated February 22, 2010

1. Introduction

Laboratory scientific reviews are conducted every four years to evaluate the **quality, relevance, and performance** of research conducted in Oceanic and Atmospheric Research (OAR) laboratories to both internal and external interests, and to help strategically position the laboratory in its planning of its future science. These reviews are intended to ensure that OAR laboratory research is linked to the National Oceanic and Atmospheric Administration (NOAA) Strategic Plan, relevant to NOAA Research mission and priorities, and consistent with NOAA planning, programming, and budgeting.

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 team. The guidelines cover the process from when you receive the invitation letter to participate on the review team to submission of the summary report of the review team.

2. Science Areas in Review and Charge to the Review Team

Each member of the review team should have received the “charge to the reviewers” document. The charge covers the following topics: purpose of the review, scope of the review, focus areas for the review including questions to be addressed by the review team, proposed schedule including the dates of the review and time frame for delivery of the review report as well as the time commitment for reviewers and review team resources. Each member is asked to complete an individual review report on two or more review areas and provide the reviews to the Chair. The Chair, as a federal review team member, will summarize the individual reports of the review team, but will not attempt to seek a consensus of the review team on any findings or recommendations. We are asking for a summary, not consensus, report to conform to the Federal Advisory Committee Act (FACA) regulations. FACA regulations allow consensus reports only from external groups established under FACA, and our short-term review teams do not meet these criteria.

Each member of the review team should also have received a conflict of interest disclosure form which should be returned to OAR headquarters.

A description of the science areas is included on pages 10-11.

3. Resources for the Review Team

Craig McLean, Deputy Assistant Administrator of OAR, will provide the resources necessary for you and the review team to complete its work. 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 Research 5-Year Plan) and background data on the lab, including several “indicators of preeminence” (e.g., publications, awards, scientific leadership, patents). The presentation files will be provided to review team members on the first day of the review. In addition,

reviewers will be asked if they would like to receive a binder with printed copies of presentations in advance of the review. You will also be provided a template (form) on which to complete your review observations, findings, and recommendations.

4. Logistics and Agenda for the Review

Laboratory staff will contact you to arrange travel to the review and all travel arrangements will be paid for by OAR. Please provide the laboratory with your intended dates of travel and other particulars by the requested due dates to ensure all arrangements can be 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 number for your bank account for direct deposit of the reimbursement check. 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. The review agenda will include presentations and discussions that will provide information on the science areas to be reviewed and the questions to be addressed by the review team.

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 approximately two months and one month prior to the review. In addition to the review team 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 team and the draft agenda for the review will be discussed as well as any other questions reviewers may have on the process. The focus for the second call will include information provided on the website, presentation materials, the final review agenda, and the review reports. It is at this time that the review team should ask for any additional information on the website or changes in the final agenda, such as scheduling meetings with additional groups or individuals,

6. During the Review

Reviews are held over a four 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. Material is then presented for each of the primary science areas of the laboratory. These presentations may include PowerPoint presentations, poster sessions 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. The laboratory will facilitate separate sessions with bench scientists and the laboratory management team that are designed for you to address the research **quality, relevance, and performance**. A session with affiliated NOAA cooperative institute directors will also be arranged, if possible. Please use these closed sessions to probe more deeply into the operations of the laboratory.

Time will also be set aside for reviewers-only closed session. The goal of the reviewers-only sessions is to provide time for the review team 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 discuss the process/timeline for preparing reports and feedback 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 report on two or more science areas covered in the review. A reporting form is attached that provides the questions to be assessed for each science area in the review and expandable text boxes for you to enter your observations/findings as well as specific, actionable recommendations based on your findings for the laboratory to review and consider incorporating in its research and operations. Time will be provided on the agenda for you to draft your individual reports. Prior to the review, the review team should decide if at least draft individual reports will be submitted to the Chair prior to leaving the review.

The Chair will compile a summary report from the individual reports. The summary report should highlight the reviewers' findings on the quality, relevance and performance of the science and relevant laboratory functions, integrating and/or summarizing pertinent reviewer comments as necessary. Additionally it should provide a context for and outline/prioritize specific actionable recommendations for the laboratory and/or OAR management. The summary report is requested within 45 days of the review and should be submitted by the Chair to the Deputy Assistant Administrator and the Laboratories and Cooperative Institutes (LCI) coordinator. OAR will have 30 days from the submission of the draft report to review it for technical/factual corrections. Any technical/factual corrections will be sent back by OAR to the review team members to make adjustments,

as appropriate, to the final individual and summary reports. A copy of the summary report from the Geophysical Fluid Dynamics Laboratory Review will be provided to the review team for their information.

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 strategically position the laboratory in planning its future science and to ensure that laboratory research is linked to the National Oceanic and Atmospheric Administration (NOAA) Strategic Plan, relevant to NOAA Research mission and priorities, and consistent with NOAA planning, programming, and budgeting. After submission of the final report by the review team, 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 summary report will be a 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 summary report. Internal distribution of the individual reports will be limited.

Attachments:
Evaluation Forms
Contact Information

Earth System Research Laboratory

Physical Science Research Review
March 9-12, 2010
Boulder, Colorado

Evaluation Forms

Evaluation Focus
(from “Charge to Reviewers” document)

1. **Quality:** Assess 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.”

- 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?

Indicators of Preeminence: Types of Indicators can include the following; not all may be relevant to each laboratory.

- a. A lab’s total number of refereed publications per unit time and/or per scientific Full Time Equivalent staff (FTE).
- b. 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.
- c. The number of citations for a lab’s scientific staff by individual or some aggregate.
- d. A list of awards won by groups and individuals for research, development, and/or application.
- e. Memberships and involvement 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.).
- f. Service of individuals in technical and scientific societies such as journal editorships, election to boards or executive level offices, service on U.S. interagency groups, service of individuals on boards and committees of international research-coordination organizations.
- g. 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.
- h. 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.
- i. Significance and impact of involvement with patents, Cooperative Research and Development Agreements (CRADAs) and other activities with industry, other sectors, etc.

- j. Other forms of recognition from NOAA information customers such as decision makers in government, private industry, the media, education communities, and the public.
- k. Contributions of data to national and Global Earth Observing System of Systems (GEOSS)-related data bases and programs, and involvement in international quality-control activities to ensure accuracy, precision, inter-comparability, and accessibility of global data sets.

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

- Does the research address existing (or future) societally-relevant needs (national and international)?
- How well does it address issues identified in the NOAA research plans or other policy or guiding documents?
- Are customers engaged to ensure relevance of the research?
- 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?

3. **Performance:** Assess 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: research leadership and planning, effectiveness, and transition of research to applications.

3a. Research Leadership and Planning. Assess whether the laboratory has clearly defined objectives, scope, and methodologies for its key projects.

- Does the laboratory have clearly defined and documented scientific objectives, rationale and methodologies for key projects?
- Has the scope of key projects been identified including methods for determining when areas of investigation should end or be transitioned to operations or information services?

3b. 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.

- Does the laboratory execute its research in an efficient and effective manner?
- 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 planning and execution activities? Are there adequate inputs to the planning process of NOAA's Programming, Planning and Budgeting and Execution System (PPBES)?

- Is the proportion of the external funding appropriate relative to its NOAA funding?
- Are human resources adequate to meet current and future needs? Is the laboratory organized and managed to ensure diversity in its workforce?
- Are appropriate resources and support services available?

3c. Transition: How well has the laboratory delivered products? Assess laboratory's effectiveness in transitioning and/or disseminating its research into applications (operations and /or information services).

- How well is the transition of research to applications and/or dissemination of knowledge planned and executed?
- Are there appropriate interactions with stakeholders and customers? Are end users of the research and development involved in the planning and delivery of applications and/or information services?
- Are the research results communicated to stakeholders and the public?

More Detailed Description of Review Areas/Themes

Theme #1: Climate, Weather, and Water Physics:

Supporting NOAA's mission to provide better projections of future climate as well as short term forecasts of extreme events, requires improved understanding of physical processes in the Earth system. These include: 1) quantifying air-sea interactions, particularly those associated with high-wind situations; 2) quantifying the land-atmosphere-cloud processes that control energy budgets in the rapidly changing Arctic; 3) improving the representation of boundary layer processes, which mediate the exchange of carbon dioxide with the surface and influence air quality; 4) quantifying the roles of key physical processes in modulating the water vapor budget, including transport and precipitation; 5) examining global teleconnections, particularly from tropical regions that influence regional climate; and 6) assessing mechanisms that govern the regional and global transport of atmospheric chemical species and black carbon, which affect regional air quality, precipitation processes, and climate.

Theme #2: Modeling, Data Assimilation, and Advanced Computing

Linking observations and physical processes through data assimilation is the foundation for numerical modeling. NOAA's Earth System Research Laboratory (ESRL) produces global and regional modeling and data assimilation systems coupling atmospheric, ocean, chemistry, land-use, and other earth system components of the NOAA operational suite running at the National Centers for Environmental Prediction and at Weather Forecast Offices. These models support NOAA's broad weather warning and forecast mission as well as other federal, state, and local agencies for such applications as fire weather, the nation's space program, and defense tactical operations. ESRL also develops advanced, high-performance computer architectures as the means for handling the enormous computational demands of global-scale environmental models. This modeling, assimilation, and advanced computing research are critical for NOAA's role in environmental monitoring and for producing forecast guidance from minutes to millennia.

Theme #3: Climate, Weather, and Water Services:

Bridging the gaps between science and decision-making is critical for an informed society to anticipate and respond to weather and climate extremes and their impacts. Successful climate, weather, and water services must fully utilize the capacity of the nation's physical science research enterprise to meet the environmental challenges posed by climate variability and change, particularly with respect to extreme events. Observations, process studies and applications-research are combined at ESRL to advance the delivery of climate, weather and water information by NOAA to support policy and decision making. This is aided by ESRL's hosting of the National Integrated Drought Information System (NIDIS) program office and the Western Water Assessment (WWA), which allows close interaction of ESRL scientists with their staff who are addressing the immediate needs of decision makers. ESRL's investments in attribution research helps inform society on how to invest in critical infrastructure in risk-prone areas, and puts current climate

extremes in the context of long-term change. Many of ESRL's efforts focus at the watershed scale, where the impact on people and the economy are the greatest. In supporting these efforts, ESRL has created a delivery system of research products that utilizes and adds value to routine reanalysis data and develops new methods to improve predictions, such as Reforecasting, applying Ensemble Kalman Filter methods to historic data and operating the Hydrometeorology Testbed (HMT) program to deliver information at watershed scales.

Theme #4: Technology Transfer and Outreach

Research and development advances are essential to enhancing more sophisticated and informed services. ESRL's mission includes the transfer of research developments to operations and applications in order to fill the gaps identified by the stakeholders and decision makers using NOAA's weather and water products and services. The formalized transition of validated models, verification and information systems, data analysis tools, information products, and observing systems into operational use by public and private sector forecasters and decision makers for the protection of life and property is at the heart of ESRL science and technology activities. ESRL develops sophisticated tools for improving the weather forecast process, operates and participates in research testbeds for providing the infrastructural and testing bridge between research and operations, develops and improves specific services for high impact weather decision support (such as to the aviation community), and conducts outreach and education programs employing their technologies (such as Science On a Sphere and Virtual Worlds) to provide the public with a better understanding of NOAA's scientific research.

Theme #5: Earth System Observation and Analysis:

At the heart of better understanding the Earth system are reliable observations of critical processes from watershed to global scales and from minutes to years. ESRL's observational efforts seek to improve the characterization of physical processes in its coupled modeling systems and provide improved statistical and conceptual models of the Earth system. To this end, ESRL supports an array of ground- and ship-based observing systems deployed in polar regions, at sea, and across the U.S. In addition ESRL maintains a climate diagnostics capability that produces a suite of products used by the climate research community and has led to the development of a new historical reanalysis using only surface pressure observations. The ability of individual observing systems and analyses to improve our understanding and modeling of the earth system must be evaluated within the context of currently available observations. ESRL develops, tests, and evaluates newly emerging observing systems such as piloted and unmanned airborne systems. ESRL examines the relative impact of existing data systems using Observing System Experiments (OSEs) and conducts Observing System Simulation Experiments (OSSEs) to estimate the potential impact of proposed new observing systems.

Evaluation Worksheet
(Note in WORD the boxes below will expand to fit the text)

Research Area: Climate, Weather and Water Physics

Reviewer:

QUALITY (Reference material provided at web site and in the binders provided.)
Comments and observations/findings:

RELEVANCE (Reference material provided during the briefings.)
Comments and observations/findings:

PERFORMANCE (Reference material provided during the briefings.)
Comments and observations/findings:

Recommendations for Climate Weather and Water Physics
Please provide specific, actionable recommendations based on your
observations/findings

Evaluation Worksheet

Research Area: Modeling, Data Assimilation and Advanced Computing

Reviewer:

QUALITY (Reference material provided at web site.)
Comments and observations/findings:

RELEVANCE (Reference material provided during the briefings.)
Comments and observations/findings:

PERFORMANCE (Reference material provided during the briefings.)
Comments and observations/findings:

Recommendations for Modeling, Data Assimilation & Advanced Computing
Please provide specific, actionable recommendations based on your observations/findings

Evaluation Worksheet

Research Area: Climate, Weather and Water Services

Reviewer:

QUALITY (Reference material provided at web site)
Comments and observations/findings:

RELEVANCE (Reference material provided during the briefings.)
Comments and observations/findings:

PERFORMANCE (Reference material provided during the briefings.)
Comments and observations/findings:

Recommendations for Climate Weather and Water Services
Please provide specific, actionable recommendations based on your observations/findings

Evaluation Worksheet

Research Area: Technology Transfer and Outreach

Reviewer:

QUALITY (Reference material provided at web site.)
Comments and observations/findings:

RELEVANCE (Reference material provided during the briefings.)
Comments and observations/findings:

PERFORMANCE (Reference material provided during the briefings.)
Comments and observations/findings:

Recommendations for Technology Transfer and Outreach
Please provide specific, actionable recommendations for your observations/findings

Evaluation Worksheet

Research Area: Earth System Observation and Analysis

Reviewer:

QUALITY (Reference material provided at web site)
Comments and observations/findings:

RELEVANCE (Reference material provided during the briefings.)
Comments and observations/findings:

PERFORMANCE (Reference material provided during the briefings.)
Comments and observations/findings:

Recommendations for Earth System Observation and Analysis
Please provide specific, actionable recommendations based on your observations/findings

Evaluation Worksheet – Additional Comments and Recommendations

Reviewer:

Additional comments for OAR and laboratory management

Additional comments and suggestions on conduct of the review for use in future laboratory reviews

Recommendations
Please provide specific recommendations for your observations/findings

Contact Information for the ESRL Science Review

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