DRAFT DO NOT QUOTE

Draft Preliminary Report

NOAA Research Review Team

December 18, 2003

Berrien Moore III
University of New Hampshire

Richard Rosen
NOAA Office of Oceanic and Atmospheric Research

Richard Spinrad
NOAA National Ocean Service

Warren Washington
National Center for Atmospheric Research

Richard West
Consortium for Oceanographic Research and Education

Draft

Preliminary Report of the NOAA Research Review Team

I. Introduction

On October 3, 1970, the National Oceanic and Atmospheric Administration (NOAA) was created and incorporated into the Department of Commerce to serve a national need "...for better protection of life and property from natural hazards...for a better understanding of the total environment...[and] for exploration and development leading to the intelligent use of our marine resources." Research is essential to NOAA's development of products and services that protect life and property and promote sustainable economic growth. A focal point for NOAA research is the Office of Oceanic and Atmospheric Research (OAR), one of six NOAA line offices.

The FY 2004 House and Senate Appropriations Committee Reports contain language specific to NOAA research in OAR, and this language is included by reference in the Conference Report accompanying the Consolidated Appropriations Bill. The House Report accompanying the FY 2004 Commerce, Justice, State, and Judiciary, and related Agencies Appropriations Bill directs NOAA to develop a laboratory consolidation plan: "In recognition of current resource limitations the Committee is forced to operate within, the Committee directs NOAA to review the continued requirements for twelve separate laboratories, six of which are located in Boulder, Colorado. The Committee directs NOAA to submit a laboratory consolidation plan to the Committee by March 15, 2004." The Senate Report accompanying the FY 2004 Appropriations Commerce, Justice, State, and Judiciary, and related Agencies Appropriations Bill states, in part: "NOAA is directed to report to the Committee on Appropriations on the costs and benefits of breaking OAR up into its constituent parts and distributing those parts as desirable to the other line offices. The report should specifically address how the newly configured research sector will directly assist line offices in developing timely solutions to problems confronting NOAA now and in the next 5 years."

In response to these Congressional directives, NOAA asked its Science Advisory Board (SAB) to establish a Research Review Team (Attachment 1) to address five primary issues:

- Does the research conducted by the Office of Oceanic and Atmospheric Research provide effective support and vision for NOAA by enabling it to improve products and services, and to introduce new products and services through the transfer of technology and the development and application of scientific understanding?
- Is OAR adequately linked to NOAA's other line offices (National Weather Service, National Environmental Satellite Data and Information Service, National Marine Fisheries Service, National Ocean Service, Program Planning and

Integration) and are the research programs relevant to the needs of these organizations? If so, what are the benefits? If not, what changes would the Team recommend?

- How do the management structure and processes of OAR compare to those of other agencies managing research? Based on that analysis, should OAR be dissolved into its constituent components and distributed across NOAA, should it be left as is, or should NOAA consolidate all of its research activities into a single organization?
- Focusing specifically on the OAR labs, would consolidation of the labs yield a more effective scientific program? If so, what would the Team recommend?
- Would lab consolidation yield a more efficient structure, by reducing administrative overhead and infrastructure/manpower? If so, what would the Team recommend?

The broad task to the NOAA Research Review Team is to conduct a review of OAR "for the purpose of improving the effectiveness and efficiency of its research enterprise. The review will provide findings and recommendations that will be used by NOAA to enhance its research organization and connectivity to operational activities."[1] Additionally, the Team's recommendations will assist NOAA in responding to the Senate and House language.

II. Approach

Because of the scope of this review and the implicit requirement to report initial findings to the SAB in January, the Review Team established a phased approach to address the task.

- **Preliminary Report**
  - Organizational and Operational Principles to guide research management;
  - Initial Findings and Recommendations that address the five primary issues that constitute the Review Team's charge and hence the Senate and House language; and
  - The future focus of the Research Review Team and its path to the final report.

  This report will be delivered to the SAB on January 6, 2004.

- **Final Report**
  - Findings and Recommendations based on a detailed review of NOAA's research infrastructure and operational requirements, including specific answers to the questions that constitute the charge to the Research Review Team;
  - An assessment of changes and initiatives made by NOAA as a result of the recommendations made in the preliminary report; and

[1] Letter from Vice Admiral Conrad C. Lautenbacher, NOAA Administrator, to Dr. Leonard J. Pietrafesa, chair NOAA Science Advisory Board, October 6, 2003

- A recommended formal and independent process to monitor NOAA research for a multi-year period.

This report will be delivered to the SAB on or before May 1, 2004.

The findings and recommendations in this preliminary report are based on extensive internal NOAA interviews, discussions with the SAB, and interviews and discussions with representatives of NOAA's external community (Attachment 2). There were, however, no visits to NOAA laboratories, joint institutes, or centers because of time constraints in this initial phase. In the next phase, and based on findings in the preliminary report, the Review Team will expand its discussions with NOAA and with the broad spectrum of external agencies and communities that deal with NOAA in the execution of NOAA's research initiatives. In addition, the Review Team will visit some of the laboratories and other facilities that support NOAA research. The Review Team notes that research is spread across NOAA; there are 44 NOAA laboratories and centers and 19 joint institutes associated with research in NOAA. In this first phase, we had brief, focused discussions with eleven OAR Laboratory Directors and with Assistant Administrators of NOAA's line offices (Attachment 2); however, additional discussions are needed before detailed organizational recommendations can be made.

III. Principles, and Preliminary Findings and Recommendations

1. **Principles**

NOAA is a science-based agency with operational and information service responsibilities. The Review Team established a set of principles to guide recommendations focused upon ensuring research excellence, a vigorous program of the transition of research to operations, and the enhancement of NOAA information services including NOAA research management.

- **Operational Principles for Guiding Research Focus and Prioritization**
  - Research priorities should be consistent with the overall mission and goals of an organization, and the strategy for ensuring that consistency must be explicit. These priorities must be formally expressed in an enterprise-wide Research Plan.
  - Research focus should be balanced across a spectrum of temporal frames: short-term time frame (<2 years), mid-term time frame (2-5 years), and long-term time frame (>5 years). A plan of action and milestones is necessary to ensure continuity across this spectrum.
  - Research responsibilities include identification, in collaboration with operational lines, of relevant operational requirements and efficient transitioning of research into operations.
  - A culture of risk tolerance commensurate with a robust investment in long-term research with potentially high programmatic payoff must be established and maintained.

- **Organizational Principles for Guiding Research Location and Management**
  - There must be a single point of accountability for all research and this needs to be at the highest levels of the organization.
  - There must be a formal, consistent, and effective coordinative mechanism at the Assistant Administrator level and above directing the overall research plan agency-wide.
  - Formal mechanisms (with clearly defined responsibilities) for transitioning research into operations, which include clear statements about resources being committed, must be agreed to and understood by all parties involved.
  - Organization must follow function; therefore, if the transition of research into operations, services, and information is to be successful, then this function must be reflected clearly in the organization and in its processes.
  - Research should be located within the organization according to its function; research that is tightly coupled to near-term operational needs should be located closely to the operational activity, whereas research that is focused on mid- to longer-term operational needs generally should be located within a research office. However, because of historical development and other constraints on the research program, there may be some exceptions to this principle.

These principles are consistent with the need of moving NOAA from an amalgamation to becoming a single focused entity—in business terms, NOAA needs to move from being a "holding company" to becoming a "corporation." We note that in most successful technologically advanced corporations, the research and development function reports to the "front office," and there is a corporate plan for research and development.

2. **Summary of Findings and Recommendations**

- **Strategic Plan and NOAA's Research Mission**

  Finding: The NOAA Strategic Plan is excellent and valuable, and the identified six crosscutting priorities are essential for NOAA to meet its mission responsibilities. One of these priorities is *Sound, State-of-the-Art Research*. A core activity is NOAA's recently instituted Planning, Programming and Budgeting System (PPBS), which will help "in developing timely solutions to problems confronting NOAA now and in the next 5 years." We find, however, that there is not a supporting research strategy that supports this strategic plan. We also find that this lack contributes significantly to a severe *communication problem* between NOAA (and particularly OAR) and Congress, the Office of Management and Budget, and the external community. It also contributes to an internal communication problem regarding research priorities and objectives. In addition, absent a research strategy and roadmap (i.e., plan of action and

milestones), the current focus on relatively short timescales (less than 5 years) in the PPBS process will undermine NOAA's future operational and informational services capabilities.

Recommendation: NOAA must develop a research strategy that supports the strategic plan; this strategy must extend outward to 20 years. NOAA must also develop a NOAA-wide research roadmap that provides explicit guidance including specific programmatic actions and milestones for implementing the research strategy. The research roadmap must be based upon the direction of the current strategic plan, the research strategy, the Annual Guidance Memorandum, and the developing goal-specific implementation plans.

- **Research Organization within NOAA**

Finding: NOAA needs a stronger and more coherent research management structure to execute any NOAA-wide research roadmap. The NOAA Research Council can play a vital role in defining NOAA's research mission, and the role of the OAR Assistant Administrator, as its chair, could provide important control over the needed research strategy and associated roadmap. However, because NOAA's research investment is spread across all operational line offices as well as OAR, the current Research Council does not function as an agency-wide body to manage research. There needs to be higher-level budgetary and programmatic oversight for all research in NOAA.

Recommendation: NOAA must establish a Research Board chaired by an individual reporting directly to the NOAA Administrator. This "front office" position in charge of NOAA-wide research and Chair of the Research Board should be a career appointment position. The membership of the Research Board would be the NOAA Assistant Administrators. The current Research Council would be an implementing arm of the Research Board. The Research Board would be responsible for execution of the NOAA research strategy and for timely progress along the research roadmap. The Research Board would conduct regular formal reviews of all of NOAA's research and would determine and monitor the overall NOAA research program including ensuring the steady transition of research advances to operational realizations and needed information services. *The Chair of the Research Board would exercise budget authority over research in NOAA.* The Chair of the Research Board would also serve as a primary point of contact for NOAA's external research relationships.

Finding: NOAA conducts research in all operational line offices as well as OAR. There is no clear rationale for where research is located in NOAA and why it is there.

Recommendation: There should be a reallocation of research activities between OAR and the other line offices that rationalizes the placement of research in NOAA. The placement of research should be determined in part by the temporal focus of the research being conducted and by the maturity of the effort. Shorter-term research, more closely connected to operational requirements, should be conducted in the operational line offices. Longer-term research and research supporting emerging services should be conducted in OAR.

- **Research Organization within OAR**

  Finding: The directors of the 12 OAR laboratories and the 13 joint institutes have substantial independence in setting the research agendas for their laboratories and institutes. While there are some positive aspects of this independence, it is obvious to the Review Team that there has not been sufficiently strong leadership and processes in OAR to ensure that the OAR laboratory activities are well focused and integrated into NOAA's mission and that their research transitions into the operational parts of NOAA are dynamic and successful.

  Recommendation: There should be a laboratory consolidation within OAR and perhaps within NOAA. The consolidation would ensure better coordination across NOAA and OAR and enhance the visibility and responsiveness of research to NOAA's operational and information service needs. In addition, there should be a single authority for OAR laboratory programs who would have budgetary authority over the OAR laboratories and joint institutes and who would report directly to the OAR Assistant Administrator. The individual in this position would also establish partnerships with other agencies and universities.

- **NOAA Research to Operations and Information Services**

  Finding: The transition of research to operations occurs at many levels and through many channels, particularly between OAR and NWS, and there have been major successful transfers of research into operations. Similarly, research also provides a direct service to the public and user community, and there are numerous examples of important information services being derived from NOAA research. However, NOAA does not have an agency-wide plan to guide the transition of its research investment into its operational mission. The Review Team notes the development of a Science and Technology Infusion Plan within the NWS, and finds that this could be a valuable model for a NOAA-wide effort that could contribute significantly to guiding the transition of research to operations and information services. There are other examples of transition from research to operations in the other line offices. In addition, there are valuable lessons and structures within the Department of Defense (DoD)

formalization of research across a gradient of operational maturity (e.g., its 6.1 – 6.7 structure).

Recommendation: The recommended research roadmap must address directly the transition of research to operational products and services. The recommended Research Board must assure that this aspect of the roadmap is well executed. An individual responsible for transitions of OAR research should be established to provide oversight and focus for the transition of OAR research to operations and services. This position would work closely with the individual responsible for laboratory programs to ensure a successful pursuit of both a quality research program and a research program that is appropriately focused on operations and information services. We note, also, that this responsibility for transitioning should not rest exclusively within OAR, but that the research roadmap should make clear that both research and operations activities share management, programmatic, and fiscal responsibilities for transition.

The Congress has raised two important, coupled challenges for NOAA: i) to study and report the costs and benefits of reallocating research activities in OAR to the operational line offices and ii) to submit an OAR laboratory consolidation plan. In this Preliminary Report, we have sought to assist NOAA by providing:

- A set of Organizational and Operational Principles appropriate to a science-based enterprise with operational and information service responsibilities, and
- Initial Findings and Recommendations that should guide near-term actions, that are directly relevant to the Congressional challenge, and that provide the foundation for more explicit recommendations in our Final Report.

More specifically, as stated in the Findings and Recommendations, we agree that some reallocation of research activities in OAR to the operational line offices should occur, but we are uncertain at present on the details of the recommended reallocation, and we sense that the reallocation could be a two-way street. Further, we agree that there should be a laboratory consolidation within OAR and perhaps within NOAA, but again, we are not yet in a position to make a credible recommendation about the structure of this consolidation. Providing this next level of detail as well as addressing more fully the five primary issues that constitute the charge to the Research Review Team will be the subject of our efforts over the next five months.

IV. The Way Ahead

Strong fiscal constraints for the foreseeable future mean that the Congress, the Office of Management and Budget, and NOAA leadership must seek ways to prioritize more effectively research activities.

The Research Review Team recognizes and appreciates that the language in the Senate report speaks only about the need for research to assist "line offices in

developing timely solutions to problems confronting NOAA now and in the next 5 years." Meeting the near-term, unmet operational needs of NOAA must be a high priority. However, producing significant advances in weather and environmental forecasting, providing well-reasoned prognostic climate information, and anticipating and meeting the information service needs for commerce and transportation and ecosystem management require that NOAA address an array of increasingly complex scientific issues as well as deal with ever more complex organizational elements. This reality is unavoidable, and it must be wisely balanced against pressing very near-term operational needs.

We strongly believe that a guiding mid-to-long-term view is essential for cost effective research management. It is the longer-term view of OAR that creates the foundation needed to supply the products of the future. For example, NOAA's climate research (on both climate variability and change) started about 30 years ago. Greatly enhanced operational benefits of climate change research still lie 10-20 years in the future, and for seasonal forecasting, 5-10 years will still be needed to reach the maturity comparable to that for numerical weather prediction. The Review Team firmly supports the tenet that long-term purposeful research is a required dimension in NOAA's overall research program. The Review Team is likewise aware of the need for near-term operational products and information services. Unfortunately, as discussed in Section III, the Team found that NOAA does not have an agency–wide research plan or research management structure let alone a roadmap or formal process to guide the transition of its research investment into its operational mission. Filling this void is essential and creating a "front office" research management structure and authoritative process are fundamental for success.

We believe that there are programmatic migration steps that need to take place both within OAR and within NOAA. The issue is, however, complex. There are important products and services that do not have a clear operational line office home (e.g., climate-relevant observations) or a singular line home (e.g., ecosystems research supporting both fisheries operations and coastal zone management activities). Consequently, if these elements are migrated to a line office, then there is a danger that these critically important activities might be compromised. In addition, the near-term pressure inherent in the operational line offices raises serious questions about their viability as appropriate homes for developing the operational products of the future. In a similar vein, a vital and important part of research at NOAA is the development and delivery of products and information services. Hence, there are observations and research products that are produced routinely (e.g., measurements of greenhouse gas concentrations for climate studies) but are not routine—namely the quality of the observations and the sensitivity required to monitor and constantly upgrade them requires a research environment. Also, if NOAA is to continue to attract "the best and the brightest" scientists available, a viable, vibrant, and visible research enterprise must be sustained. In general, the OAR research focus appears to be the appropriate home for these activities and people.

Such considerations make the reallocation of research activities an exceedingly complex issue requiring much more study to make specific recommendations that would lead to a more effective NOAA.

Similarly, in this Preliminary Report we are not able to provide a consolidation plan for the OAR laboratories. However, as stated in Section III, it is clear to the Review Team that there should be a laboratory consolidation within OAR and perhaps within NOAA. For example, consolidating the six Boulder laboratories into a truly nationally recognized center of excellence focused upon achieving and synthesizing critically important long-term measurements of the atmosphere could serve several positive ends. Unfortunately, we have not had sufficient time to make this recommendation with conviction. The objectives and methodologies of the current Boulder laboratories span a wide range of topics that might prove problematic to integrate into a single laboratory with an identifiable focus. The Review Team simply needs more time to reach a considered position.

The appropriate way forward will require both a reasoned consolidation plan coupled with a recommendation for programmatically moving laboratories or elements within laboratories to the operational line offices. Correspondingly, to achieve proper NOAA-wide balance may require elements to move from operational line offices to OAR. The Research Review Team needs greater insight into *what is where, and why* before it can make credible recommendations at the laboratory or program level. This insight will be obtained through targeted site visits and specific discussions with associated individuals. Obtaining and synthesizing this insight will be the focus for the Team in its next and final round of review.

Attachment 1

Request to Establish NOAA Research Review Team and Terms of Reference for Team

Dr. Len Pietrafesa
Interim Chair, NOAA Science Advisory Board
Director of External Affairs
College of Physical & Mathematical Sciences
North Carolina State University
Box 8201, 118 Cox
Raleigh, NC 27695-8201

Dear Dr. Pietrafesa:

I request the NOAA Science Advisory Board (SAB) conduct a review of NOAA Research for the purpose of improving the effectiveness and efficiency of its research enterprise. The review will provide findings and recommendations that will be used by NOAA to enhance its research organization and connectivity to operational activities. Specific instructions to the review panel, hereafter referred to as the NOAA Research Review Team, or Review Team, are contained in the enclosed Terms of Reference, A Strategy to Respond to Congressional Language Pertaining to the NOAA Office of Oceanic and Atmospheric Research.

I propose an Ad Hoc Working Group of the SAB, consisting of five members, and which will be disbanded after the review. I request your concurrence on the suggested panel members. These are distinguished individuals who represent a diverse range of expertise and perspectives on the organization, structure and management of research. Three of the members are past or future members of the SAB. I further propose that the panel be chaired by Dr. Moore.

We have contacted Dr. Berrien Moore III, Dr. Richard D. Rosen, Dr. Richard W. Spinrad, Dr. Warren Washington, and RADM Richard West and they are willing and able to serve on the Review Team. I would like your thoughts on all these potential panelists.

Berrien Moore III

Dr. Moore is a Professor of Systems Research and has been the Director of the Institute for the Study of Earth, Oceans, and Space at the University of New Hampshire since

1987. Actively involved on panels and committees at the National Academy of Science, he ended his Chairmanship of the National Academy's Committee on Global Change Research with the publication of Global Environmental Change: Research Pathways for the Next Decade in 1999. From January 1998 through January 2003, Professor Moore served as Chair of the overarching Scientific Committee of the International Geosphere-Biosphere Programme (IGBP) and also served as a lead author within the Intergovernmental Panel on Climate Change's (IPCC) Third Assessment Report. In July 2001 he chaired the Global Change Open Science Conference in Amsterdam and is one of the four architects of the Amsterdam Declaration on Global Change. Professor Moore is the author of numerous scholarly publications on the carbon cycle and related topics and over the years has been called upon by the United States Congress to give testimony on the results of research regarding the carbon cycle and global climate change.

Warren Washington

Dr. Washington is an internationally recognized expert in atmospheric science and climate research specializing in computer modeling of the Earth's climate and has published more than 100 papers in professional journals. He is a senior scientist and head of the Climate Change Research Section in the Climate and Global Dynamics Division at the National Center for Atmospheric Research (NCAR) and is the current Chair of the National Science Board. In 1999 he was elected by the Woods Hole Oceanographic Institution Board of Trustees as a member of the corporation for a three-year term; he was appointed by the U. S. Secretary of Energy to the DOE Biological and Environmental Research Advisory Committee (BERAC) and the Advanced Scientific Computing Advisory Committee; and in February of 2002 he was elected to the National Academy of Engineering. Also in 2002, he was appointed to the Science Advisory Panel of the U.S. Commission on Ocean Policy and the National Academies of Science Coordinating Committee on Global Change

Richard Rosen

Dr. Richard Rosen is the incoming Assistant Administrator for Oceanic and Atmospheric Research at the National Oceanic and Atmospheric Administration. He previously served as Vice President and Chief Scientist of the Research and Development Division of Atmospheric and Environmental Research, Inc. Dr. Rosen is a Senior Lecturer at M.I.T. and past President of the American Meteorological Society. He has published over 60 scientific papers on many different aspects of large-scale atmospheric behavior.

Richard Spinrad

Dr. Spinrad is the Assistant Administrator of the National Ocean Service. Before joining NOAA, he served as Technical Director in the Office of the Oceanographer of the Navy where he served as the senior civilian technical advisor to the Navy's meteorological and oceanographic command (METOC). Dr. Spinrad had previously served as Executive Director for Research and Education at the Consortium for Oceanographic Research and Education (CORE). He has worked as a research scientist and is the past President of Sea Tech, Inc., a major manufacturer of oceanographic sensors. Dr. Spinrad received a

Ph.D. in marine geology from Oregon State University. He has published more than 50 technical articles and is the editor of one textbook and several special issues of marine-oriented journals. He serves as Editor-in-Chief of Oceanography magazine and has been an elected member of the Council of The Oceanography Society. Dr. Spinrad also serves on the faculty of the U.S. Naval Academy.

Richard West

Rear Admiral West is President of the Consortium for Oceanographic Research and Education (CORE). Before joining CORE, RADM West served as Oceanographer and Navigator of the Navy. He held a variety of ship and shore commands during his naval service including Commanding Officer of the Surface Warfare Officers School. RADM West graduated from the University of Rochester, receiving his commission through the ROTC program. He holds Master's degrees in management and national security.

NOAA Research headquarters staff will work with you and the SAB as needed to plan and conduct the review. Administrative and technical support for the review will be provided by Mary Anne Whitcomb at (301) 713-2454, extension 173. Please contact Michael Uhart at (301) 713-9121, extension 159, for any issues regarding the SAB.

Sincerely,

VADM Lautenbacher

Enclosure

cc: (w/enclosure) J. Kelly
S. Rayder
L. Koch
M. Uhart

STRATEGY TO RESPOND TO CONGRESSIONAL LANGUAGE PERTAINING TO THE NOAA OFFICE OF OCEANIC AND ATMOSPHERIC RESEARCH

1. Purpose: The 2003 House and Senate Appropriations Subcommittee Reports have language pertaining to the Office of Oceanic and Atmospheric Research (NOAA Research). The 2003 House Appropriations Commerce Justice State (CJS) Subcommittee Report has requested that NOAA develop a laboratory consolidation plan. The report accompanying the House CJS Appropriations Subcommittee mark states: "In recognition of current resource limitations the Committee is forced to operate within, the Committee directs NOAA to review the continued requirements for twelve separate laboratories, six of which are located in Boulder, Colorado. The Committee directs NOAA to submit a laboratory consolidation plan to the Committee by March 15, 2004." The Senate report language states: "NOAA is directed to report to the Committee on Appropriations on the costs and benefits of breaking OAR up into its constituent parts and distributing those parts as desirable to the other line offices. The report should specifically address how the newly configured research sector will directly assist line offices in developing timely solutions to problems confronting NOAA now and in the next 5 years."
2. Review Team: NOAA will appoint a Blue Ribbon Review Team, under the auspices of the Science Advisory Board (SAB), to conduct the review. The confirmed team members are: Dr. Berrien Moore III (UNH), Chair, Dr. Richard D. Rosen (AER, Inc), Dr. Richard W. Spinrad (NOS AA - NOAA), Dr. Warren Washington (NCAR), RADM Richard West (CORE).
3. Review Team Support: Background information will be compiled including line office administrative costs, data for each lab on staffing, costs, facilities, and programs. Program data will include information such as: description of programs, requirements for programs and users of program results, performance measures and relationship to similar programs in other laboratories or in NOAA. Relevant material from earlier studies of laboratories, results from the program baseline assessments that will be completed this fall, laboratory reviews, and other existing data will also be assembled. NOAA will also provide information on the costs of integrating the constituent parts of NOAA Research to the appropriate line offices. Mary Anne Whitcomb (Mary.Anne.Whitcomb@noaa.gov, (301) 713-2454 X173) is the lead NOAA contact person providing support for the review team

4.Charge to the Review Team: Using the information provided above, and any additional information garnered by the Review Team, please address the following questions:

a. NOAA is a science-based agency with operational responsibilities. Does the research conducted in the Office of Oceanic and Atmospheric Research (NOAA Research) provide effective support and vision for NOAA by enabling (i) the improvement of products and services, and (ii) the introduction of new products and services through the transfer of technology and the development and application of scientific understanding?

b. Is NOAA Research adequately linked to NOAA's service organizations (i.e., NWS, NESDIS, NMFS, NOS, etc.) and are the research programs relevant to the needs of these organizations? If so, what are the benefits? If not, what changes would you recommend?

c. How does the management structure and processes of NOAA Research compare to those of other agencies managing research? Based on that analysis, should NOAA Research be dissolved into its constituent components and distributed across NOAA, should it be left as is, or should NOAA consolidate all of its research activities in a single organization?

d. Focusing specifically on the NOAA Research labs, would consolidation of the labs yield a more effective scientific program? If so, what would you recommend?

e. Would consolidation of labs yield a more efficient structure, by reducing administrative overhead and infrastructure/manpower? If so, what would you recommend?

5. Timing: The consolidation plan is due to the Appropriations Committee on March 15, 2004. The report is due to the Commerce Department February 2, 2004. The Review Team should provide its draft report, including findings and recommendations, to the SAB by mid-December. A copy of the draft report will also be provided to NOAA for technical review. The SAB will meet early January to consider the draft report and deliver its Final Report to NOAA by mid-January to allow NOAA leadership time to develop its final consolidation plan by February 2.

Costs: NOAA Research will pay for all the costs associated with the development of this plan.

Attachment 2
Meetings Held By NOAA Research Review Team
September 26, 2003 - December 17, 2003

September 26, 2003,Washington D.C.

- Conrad C. Lautenbacher Jr.
  Vice Admiral, U.S. Navy (Ret.)
  Under Secretary of Commerce for Oceans and Atmosphere and NOAA Administrator

October 7, 2003, Silver Spring, Maryland

Informal meeting and discussions with OAR's Laboratory and Headquarters Staffs.

October 22-23, 2003, Silver Spring, Maryland

Individual meetings with:

- Louisa Koch - Deputy Assistant Administrator, Oceanic and Atmospheric Research
- Daniel L. Albritton - Director, Aeronomy Laboratory
- Bruce B. Hicks- Director, Air Resources Laboratory
- Peter B. Ortner - Acting Director, Atlantic Oceanographic & Meteorological Laboratory
- Randall Dole - Director, Climate Diagnostic Center
- David J. Hofmann - Director, Climate Monitoring & Diagnostics Laboratory
- William D. Neff - Director, Environmental Technology Laboratory
- Alexander E. MacDonald - Director, Forecast Systems Laboratory
- Ants Leetmaa - Director, Geophysical Fluid Dynamics Laboratory
- Stephen B. Brandt - Director, Great Lakes Environmental Research Laboratory
- James F. Kimpel - Director, National Severe Storms Laboratory
- Eddie N. Bernard - Director, Pacific Marine Environmental Laboratory
- Kenneth A. Mooney- Deputy Director, Office of Global Programs
- Ronald C. Baird - Director, National Sea Grant College Program
- Greg W. Withee - Assistant Administrator, National Environmental Satellite Data & Information Service
- John E. Jones - Acting Assistant Administrator, National Weather Service
- Michael P. Sissenwine - Director, Northeast Fisheries, Science Center National Marine Fisheries Service
- Donald Scavia - Senior Scientist, National Ocean Service
- Mary Glackin - Assistant Administrator, Program Planning and Integration

November 4, 2003, Rosslyn, Virginia

- Science Advisory Board Meeting - Open Forum
- Science Advisory Board Members
- Leonard J. Pietrafesa - Interim Chair, Director of External Affairs, College of Physical and Mathematical Sciences, North Carolina State University
- Vera Alexander - Dean School of Fisheries and Ocean Sciences, University of Alaska
- David Blaskovich - Sales and Marketing Executive, Weather and Environmental Markets, IBM Corporation
- Otis Brown – Dean, Rosenstiel School of Marine and Atmospheric Science University of Miami
- Peter M. Douglas - Executive Director, California Coastal Commission
- Susan Hanna - Professor, Oregon State University
- Arthur E. Maxwell - Professor Emeritus, University of Texas
- Jake Rice - Canadian Stock Assessment Secretariat, Fisheries and Oceans Canada
- John T. Snow - Dean, College of Geosciences, University of Oklahoma
- Denise Stephenson-Hawk - Chairman, The Stephenson Group

- NOAA Senior Staff in Attendance
  - Conrad Lautenbacher Jr.
    Vice Admiral, U.S. Navy (Ret.)
    Under Secretary of Commerce for Oceans and Atmosphere and NOAA Administrator
  - James R. Mahoney - Assistant Secretary of Commerce for Oceans and Atmosphere and Deputy Administrator, NOAA
  - John J. Kelly Jr. - Deputy Under Secretary, NOAA

November 25, 2003, Washington, D.C.

- Ronald D. McPherson – Executive Director, American Meteorological Society (AMS)
- John Orcutt – President-Elect, American Geophysical Union (AGU)
- Peter Folger – Outreach/Government Affairs, American Geophysical Union (AGU)

November 25, 2003, Washington, D.C.

- James R. Mahoney - Assistant Secretary of Commerce for Oceans and Atmosphere and Deputy Administrator, NOAA

December 4, 2003, Washington, D.C.

- Erin Wuchte - Budget Examiner for NOAA Atmospheric programs
- John Webb - Department of Commerce, Budget Office
- Everett Whiteley - NOAA, Budget Office

December 4, 2003, Washington, D.C.

- Telephone call with Thomas Kitsos, Executive Director, Ocean Commission

December 5, 2003, Washington, D.C.

- Carolyn Thoroughgood - Chairing the Board of Consortium for Oceanographic Research and Education (CORE)
- Mark R. Abbott - Dean, College of Oceanic Atmospheric Sciences, Oregon State University
- Penelope D. Dalton – Vice President and Technical Director, CORE

December 5, 2003, Washington, D.C.

- Conrad C. Lautenbacher Jr.
  Vice Admiral, U.S. Navy (Ret.)
  Under Secretary of Commerce for Oceans and Atmosphere and NOAA Administrator
- Leonard J. Pietrafesa – Interim Chair, Science Advisory Board, Director of External Affairs, College of Physical and Mathematical Sciences, North Carolina State University

December 5, 2003, Washington, D.C.

- Peter Bell - Chairman Sea Grant Review Panel, Retired Executive Vice President for Technology, St. Gobain Corporation
- Robert Stickney - Sea Grant Association, Director of Texas Sea Grant
- Ronald C. Baird - Director, National Sea Grant College Program

December 5, 2003, Washington, D.C.

- James D. Baker - former NOAA Administrator

December 10, 2003 San Francisco, California

- American Geophysical Union (AGU) Fall Meeting - Informal Public Comment Session. Nineteen people attended the session.

December 16, 2003, Washington, D.C

- Meeting with House and Senate Appropriations staff – Kevin Linskey, David Pomerantz
- Meeting with House Science committee staff - Amy Carroll, and Jean Fruci