The Evaluation of NOAA's Response to the Research Review Report

A Report to the NOAA Science Advisory Board

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TABLE OF CONTENTS

Preface.....3
1. Research Plan and NOAA's Mission……4
2. Research Organization within NOAA…… 4
3. Transitioning NOAA Research to Operations and Information Services.....6
4. Research Location within NOAA.....7
5. The Importance and Role of Extramural Research in NOAA 7
6. Cooperative Research in NOAA.....8
7. Reimbursable Research in NOAA 9
8. Research Organization within OAR 10
9. Research Organization within OAR Boulder Laboratories 11
10. Research Organization within the Air Resources Laboratory 12
11. Continuing Oversight of NOAA Research 13
Additional Recommendations.....13

Appendix I Terms of Reference: Panel to Evaluate NOAA's Response to the Research Review, August 16-17, 2005……15

Appendix II Summary of Research Review Recommendations and NOAA Response…...17

Appendix III NOAA Administrative Order on Cooperative Institutes…….....33

DRAFT

Preface

The FY 2004 House and Senate Appropriations Committee Reports contain language regarding the role and organization of research in the Office of Oceanic and Atmospheric Research (OAR), one of six line offices in the National Oceanic and Atmospheric Administration (NOAA), implicitly raising the issue of how research should best serve NOAA and the nation. As a corollary, since OAR was conceived to be cross-cutting in the extent of its research, this issue necessitated examination of research across the entire NOAA landscape and thus, the other line offices.

In response to these Congressional concerns, NOAA asked its Science Advisory Board (SAB) to establish a Research Review Team (RRT) with the broad task of providing "findings and recommendations that will be used by NOAA to enhance its research organization and connectivity to operational activities." The RRT conducted its task from roughly October 2003 to August 2004, issuing its Report in August 2004.

The Research Review Team Report proposed operational and organizational principles for guiding research, provided findings and recommendations to enhance NOAA's research organization and connectivity to operational activities, and responded directly to the Charge of the SAB. This Report (hereafter called the RRT Report) is available at the SAB web site at http://www.sab.noaa.gov/Reports/Reports.html

The RRT Report contains 11 areas in which the RRT made Findings and Recommendations. The final Recommendation stated that:

> "To ensure that NOAA takes appropriate action, the Review Team believes an Executive Committee should be established to review this report and previous reviews and to report directly to the NOAA Administrator on progress in reforming the research enterprise in NOAA."

In response to this Recommendation, the SAB appointed an *ad hoc* Panel to review the NOAA-wide application of RRT recommendations over the last year. The Panel convened in Silver Spring, Md. on August 16-17, 2005. Following detailed presentations by NOAA and comments from other constituencies the Panel had extensive private discussions and subsequently developed its advice. This report presents the Panel's assessments of NOAA's response to date. The report is structured in keeping with the 11 Recommendations of the RRT Report. The original Finding-Recommendation is briefly summarized as is NOAA's response. (A more complete description of NOAA's response to each recommendation is provided in Appendix II). The Panel hereby presents its Assessment of NOAA's response.

To summarize the overall assessment of the NOAA response, the Panel was very favorably impressed with the progress made in implementing recommendations in just one year. While many NOAA staff were involved in these efforts, the Panel would like to acknowledge the leadership of several key people: Dr. Jim Mahoney, Deputy Administrator, who provided high level guidance for this effort; Rick Rosen, Assistant Administrator for OAR and Chair of the Research Council that worked through many of these actions; and Louisa Koch, Deputy

Assistant Administrator for OAR who provided day-to-day oversight of this multifaceted effort. The Panel is deeply appreciative of the support provided by Mary Anne Whitcomb.

1. The Research Plan and NOAA's Mission

RRT Recommendation and Response. The RRT found that NOAA's Strategic Plan published in September 2004 was a valuable guide for the future of the Agency. However, the RRT also found that NOAA lacked both a Research Vision and Research Plan, which would connect research with the Strategic Plan. Furthermore this lack contributed significantly to a communication problem between NOAA (and particularly OAR) and Congress, the Office of Management and Budget (OMB), and the external community. The RRT recommended that NOAA should develop a Vision for Research that supports the Strategic Plan and that NOAA should also develop a NOAA-wide Research Plan that provides guidance for implementing the Research Vision, including specific programmatic actions, performance measures, and milestones (RRT report, pages 11-12).

In response to this recommendation, NOAA has developed and published both a Research Vision with a 20-year horizon and a Research Plan with a five-year horizon. This Vision and Plan were well vetted in the external community (Appendix II, number 1).

Assessment. The Panel is pleased with both the Research Vision and Plan. They are responsive to the RRT's recommendation and believe both should prove valuable to NOAA as well as better meeting the needs of Congress, the OMB, and the external community. The Vision is very forward thinking; however, it needs to be even more aggressive in pursuing innovation and high risk elements. Innovation in the science that the agency pursues and innovation in the procedures of adoption and development of new technologies will be required.

The external community (and perhaps others in government) would be better served if the Research Plan included contact points for the various milestones; in other words, a more transparent presentation of just who or which program was going to achieve the various milestones. Finally, though we recognize and applaud the effort of NOAA in so successfully engaging the external community in this important initial effort as the RRT recommended (see again Appendix II), future Plans and Research Visions will benefit in their formulation from even greater involvement of the external community,

The Panel believes that these suggestions would improve the already excellent Research Vision and Plan as well as the process by which they are produced.

2. Research Organization Within NOAA

RRT Recommendation and Response. NOAA needs a stronger and more coherent research management structure to execute a NOAA-wide Research Plan. The RRT believed that there needed to be higher-level budgetary and programmatic oversight for all research within NOAA, and that this oversight should have a clear and forceful research voice. A senior

DRAFT

leadership position would take NOAA a step toward finding that needed voice. In this vein, the RRT recommended that NOAA should establish the position of Associate Administrator for Research, reporting directly to the NOAA Administrator, and that position should have budgetary authority for research across NOAA. The recommendation also proposed two formal bodies to manage NOAA Research: a Research Board, Chaired by the AA for Research and a Research Council, Chaired by the AA for OAR. Each Line Office should have a senior manager for the research program reporting directly to the AA, and these senior managers would form the Research Council (RRT report, pages 12 and 13).

NOAA administration recognizes the value of the RRT recommendations, but believes that NOAA's new goal oriented structure, along with its Planning, Programming, Budgeting, and Execution System (PPBES) effectively accomplishes the intent of the management structure advocated by the RRT. The PPBES is an on-line, existing, implemented and functioning structure, working in concert with the Deputy Administrator, the Research Council and the Executive Council. The PPBES system is now through its second cycle and has, in effect, allocated authority over the research budget to the PPBES goal teams. NOAA administration believes the PPBES procedure is addressing the fundamental concerns of the RRT, and that little value would be added by re-reorganizing NOAA Research as recommended by the RRT (Appendix II, number 2).

NOAA has therefore proposed an alternative to the RRT Recommendation:

- NOAA Deputy Administrator serves as the senior management official for research in NOAA.
- NOAA Executive Council (NEC) will provide active oversight of NOAA's research.
- NOAA Research Council will support the NEC.

Assessment. The Panel recognizes the PPBES structure may be effectively addressing the fundamental concerns of the RRT by providing an equivalent research management structure to execute a NOAA-wide Research Plan. In fact, the RRT highlighted the importance of PPBES (RRT report, pages 11 and 28). As the PPBES has been in place for only two years and appears to be contributing significantly to the goals advocated by the RRT, the Panel (as was the RRT) is faced with a work in progress, and time will be required to determine if the PPBES is in fact a sufficient and equivalent management structure to accomplish the research goals of NOAA. However, it is not clear to the Panel how the PPBES process would unfold in alignment with the NOAA 20 Year Research vision or how it would affect it (see again Appendix II). NOAA needs to explain more clearly how the PPBES process deals with new opportunities, new developments, innovative ideas, high-risk science, and generally longer-term research and development issues. The Panel has concerns about the utility and viability of the PPBES process over longer time scales and with respect to NOAA's interactions with other agencies. In particular, the PPBES structure will need to address NOAA's long term research goals to embrace fully the long term research vision described above.

The Panel encourages NOAA's Administration to manage diligently the PPBES research management structure to pursue aggressively the NOAA 5-year research plan and the 20-year

research vision. The Panel recommends that PPBES should continue to be monitored and modified as appropriate to ensure it provides the strong and coherent research management structure required to execute a NOAA-wide Research Plan. In sum, research should be managed to encourage innovation.

3. Transitioning NOAA Research to Operations and Providing Information Services

RRT Recommendation and Response: The RRT recommended that more attention be directed to the transition of research to operational products and the provision of information services. It appeared that there was a lack of adequate appreciation of the need for "push" toward use of research results in operations and information services and a "pull" from the management and administration in demand for research results to improve operations and to provide decision support for management. The RRT recommended that each of the mission line offices should have a formal structure at the senior level to manage the research transitioning process and that process should include regular evaluation of programs. Greater oversight of this research to operations and information services process by the Research Board and the Research Council was needed (RRT report, pages 15 and 16).

NOAA established an agency-wide policy on transition of research to applications (http://www.rdc.noaa.gov/~nao/216-105.html), which provides a mechanism for annual systematic review of all research in order to identify research to be transitioned, manage research and delineate roles and responsibilities in NOAA to accomplish the transitions. A Research Transition Board was designated and staff was hired to support development and implementation of a transition plan that identifies the activities necessary to transition research results, including criteria for when a project would be transitioned, identification of stakeholders, funding profiles for operational implementation and information service delivery, and follow-on research as appropriate. NOAA is using this plan for transitioning selected areas of research in FY 2006 with the expectation that by FY 2007 all research projects would be covered in the plan (Appendix II, number 3).

Assessment: The Panel was impressed by the early development of a transitioning policy, the designation of a formal structure for planning transitions and for continuous monitoring of implementation. The phase-in approach was seen as an appropriate way to prioritize implementation and to gain experience that could be applied agency-wide in future iterations. The Panel advises that in further iterations of transition planning, 1) more explicit linkage to the Research Plan would be desirable and 2) more consideration should be given to how research results can be translated more quickly into information services to support management decisions.

DRAFT

4. Research Location in NOAA

RRT Recommendation and Response: The RRT recommended that NOAA needed to develop a clear set of criteria for determining where research programs are located in NOAA. Moreover, the criteria should be applied to existing and proposed research activities and opportunities for potential migration should be identified. Partly as a path-finding activity for trans-office research and also in recognition of the significant challenge of ecosystem-based management, the RRT recommended that NOAA should establish an external Task Team to evaluate and strengthen the structure and function of ecosystem research programs (RRT report, pages 16-18).

In response, NOAA has charged its Research Council with the responsibility of overseeing the development of criteria to determine the location of research in NOAA. NOAA has asked the SAB to establish an external Ecosystem Task Team (eETT) to identify criteria, which determine where ecosystems research should be located (see http://www.sab.noaa.gov/workinggoups/Working_Groups.htm for Ecosystem Task Team membership and framework document). In parallel with this effort, NOAA's Research Council will develop criteria to determine the location of other research in NOAA. Details of NOAA Response include: the establishment of separate but complementary internal and external ecosystems task teams to review ecosystem programs and an internal team to review the physical and social sciences research programs. NOAA has established a Physical and Social sciences Task Team (PSTT), which has drafted criteria for determining research location based on: time scale to fruition; mission and discipline critical mass; geographical proximity to other related institutions, internal vs. external laboratory partnerships, specialized infrastructure and facilities, regional operations and stakeholder needs and applications; and a balance of low and high risk research (Appendix II, number 4).

Assessment: The Panel believes that NOAA is on the correct trajectory here. The history of a perceived unwillingness to cooperate and collaborate with both internal and external entities and the lack of a well conceived plan for location and infrastructure of agency facilities are all being confronted and addressed. Optimizing intellectual and physical resources is the right thing to do. The plan for the re-competition of agency institutes on a periodic basis (see Section 6 below) is a major step in the right direction. The plan to address the combining of internal assets, in the context of external partnerships, will result in an economy of scale and help advance and build enabling capacity for the agency. All of that said, the results of the agency response are yet to be seen or even determined, but again the trajectory is correct.

5. The Importance and Role of Extramural Research in NOAA

RRT Recommendation and Response. The Research Review Team found that extramural research was critical to NOAA' s mission in that it provided external expertise, connectivity to a much larger scientific community, leveraging of external funding to advance NOAA's

mission, access to research facilities outside of NOAA, and access to the next generation of scientists and engineers. The Team noted that the importance of extramural research requires documentation and articulation to the DOC, to OMB, and to Congress. In keeping with this the RRT recommended that NOAA should formalize the involvement of the extramural community in the assessment and evaluation of the Agency's overall research activity (RRT report, pages 18-20).

Though grants management is still a problem in NOAA, the agency is acutely aware of its shortcomings and their associated inconveniences and has recently improved the administration of awards to the outside community. NOAA has developed more formal definitions for research and development activities, which will allow a better tracking and accountability of the NOAA funding. NOAA now has in place a paperless "Grants Online" process as well as explicit information in the extramural budgets submitted to the Administration and Congress. The agency is also taking steps to better inform the outside community about research and development opportunities. For example, NOAA management has increased its efforts to enlist the extramural community by making presentations at key scientific meetings such as the Cooperative Institute Directors meeting, and at Sea Grant PIs meetings (Appendix II, number 5). In addition, the new NOAA 20 year Vision and Research Plan are important statements of the importance of research to the NOAA mission (see again #1).

Assessment. NOAA still needs to improve its ability to get grant awards out the door, but the implementation of a process that allows on-line submission and tracking of proposals, and better apprises prospective PIs of grant acceptances or rejections, is a significant step forward.

However, *all of this will be an empty promise to the external community if the total extramural funding requested in the Administration budget submissions continues to decrease.* The amount of funds requested for extramural research has become less over time. This is a serious impediment to engaging the extramural community, and if it persists, it will discourage increased extramural involvement in NOAA's research programs. Further, the loss of NOAA's ability to leverage external funds in support of mission-oriented research could prove substantial. On the more positive side there is a strong effort of long term planning. NOAA has prepared a 5-year Research Plan and a 20-year Vision for Research (see #1 above), both of which explicitly include involving the extramural research community.

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6. Cooperative Research in NOAA

RRT Recommendation and Response. NOAA has established many productive research partners, including the Joint Institutes, Cooperative Institutes (CIs), and Joint Centers. The scope of research conducted with these agencies is very broad and serves a wide variety of objectives and programs within NOAA. However, there are no clear guidelines or processes by which these partnerships are created and managed. The RRT recommended that NOAA should establish a process by which Joint Institutes and other cooperative arrangements with extramural partners are established and maintained. This process should include approach-

specific criteria and should define review processes, renewal processes, and sunset clauses (RRT report, pages 20 and 21).

In response, NOAA's Research Council formed a Cooperative Institutes Working Group, which developed guidelines for awarding and operating CIs across NOAA, including provisions for periodic performance reviews and re-competition. This policy has undergone extensive review and on 6 July 2005, the final Cooperative Institute Policy was approved (Appendix II, number 6). This new NOAA Cooperative Institute Policy clearly establishes the goals of cooperative institutes in accomplishing NOAA research goals, defines the terms of establishment and competition, defines the terms of award and renewal, and defines the rules of termination (Appendix III- NOAA Cooperative Institute Policy)

The NOAA CI policy handbook is scheduled for completion in September 2005, with a final CI report due to the SAB for approval in November 2005. It is planned that the first CI under this new policy will be awarded for 2007, and that all current CIs will follow the new procedures established by the CI policy to the maximum extent possible.

Assessment. The RRT Panel commends NOAA for the exceptional and timely development, review, and completion of the new NOAA Cooperative Institute Policy. As presented and discussed during the review, this new policy sets forth clear guidelines to establish, maintain, evaluate, renew, modify, and terminate CI partnership agreements. The RRT Panel recognizes the need to phase in new CIs under this policy in order to reduce the impact on existing CI agreements, which enable important ongoing research. All new CIs will be established under the new policy.

The RRT Panel notes that the new CI Policy also provides to NOAA a good vehicle to encourage innovative and fundamental research through the use of calculated risk management, aggressive project assessment, and project termination where appropriate. The Panel also recommends that NOAA develop a common, cross-cutting institute evaluation process that includes a common set of metrics so that the relative strengths of the institutes can be revealed in a normalized fashion. The Sea Grant programmatic review process may provide the basis for a template.

7. Reimbursable Research in NOAA

RRT Recommendation and Response: The RTT requested that NOAA review its policies and procedures for reimbursable research to ensure that such practices were consistent with and not in conflict with its corporate mission. NOAA should develop and apply clear guidelines to better manage reimbursable research across the agency (RRT report, pages 21 and 22).

NOAA appointed a Reimbursable Work Group (RWG) to review NOAA-wide reimbursable policy for research and non-research activities. This involved examination of NOAA Budget Handbook guidance and assessment of current and best practices in NOAA's approach to

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reimbursable funding. Building on existing NOAA guidelines and policy, the RWG proposed recommendations on management of reimbursable research. Implementation of these recommendations provides for line office assistant administrators to conduct periodic reviews of reimbursable funding, and includes the identification of threshold levels for external funding and FTEs, which will trigger additional oversight by the Research Council and the Assistant Secretary. These recommendations will form the basis for a NOAA Administrative Order that will establish a reimbursable research policy (Appendix II, number 7).

Assessment: The Panel was pleased with the rapid and thorough response by NOAA to not only review reimbursable funding for research but also non-research funding. From the NOAA-wide analysis performed, it appears that there are relatively few places where reimbursable funding is a significant portion of the total budget or support of FTEs. These examples can be explained by history or circumstances and do not pose obvious conflicts relative to the mission of the agency. The action taken to develop a policy and a procedure for regularly monitoring use of reimbursable funding should be adequate to monitor and avoid problems.

8. Research Organization within OAR

RRT Recommendation and Response. The Research Review Team recommended that each laboratory within OAR have a clearly defined mission statement setting forth priorities that are clearly linked to the NOAA Strategic Plan, research Vision, and Research Plan. It also recommended that there be a single authority for OAR laboratory programs and Joint Institutes (RRT report, page 22).

OAR has proposed to establish the position of Deputy Assistant Administrator for the Laboratories and Cooperative Institutes, which will be located in Boulder. The person occupying this position would also serve as the Director of the proposed Earth System Research Laboratory (Appendix II, number 8). For more detail on the Earth System Research Laboratory, see #9 below. OAR has also proposed a Senior Executive Service (SES) Director who will oversee the Office of Policy, Planning, and Evaluation (PPE) to plan and evaluate an integrated research program. PPE will oversee the development and evaluation of all OAR research programs and the process of transitioning research to operations and informative services. A small Communications office, similar to those in other Line Offices, is proposed to better communicate research results.

Assessment. The Panel supports the establishment of the Deputy Assistant Administrator for the Laboratories and Cooperative Institutes, and notes that it is responsive to the RRT's recommendation. The Panel believes that coupling this to the Directorship of the proposed Earth System Research Laboratory (ESRL) in Boulder helps avoid layering of management; however, it presents the challenge of having the Director of ESRL being a first amongst equals (the other OAR laboratory Directors) and it presents a very full plate of responsibilities.

DRAFT

The Panel supports the changes in the research organization at OAR. This support includes the merging of the headquarters-based climate programs (e.g., the Office of Global Programs, Climate Observations and Services, and the Arctic Research Program) as well as the merging of certain ocean-oriented programs including the NOAA's Undersea Research Program (NURP; http://www.nurp.noaa.gov/) and NOAA's Office of Ocean Exploration (OE; http://explore.noaa.gov/). In regards to the former, we strongly support a strengthened and expanded (the downward budgets of the recent past for Global Change have been very worrisome) global change research effort, and we believe that this merger will facilitate that path. The successful demonstration of capabilities of the NURP development along fairly narrow and geographically limited scope makes it appropriate to broaden the scope and better integrate it with the Ocean Exploration program. The research and development activities within this new combined program should be based upon competitive assessments and selection.

Except for the major restatement of mission for the new Earth System Research Laboratory in Boulder, the Panel did not receive an adequate presentation regarding the recommendation that "each laboratory within OAR have a clearly defined mission statement setting forth priorities that are clearly linked to the NOAA Strategic Plan, Research Vision, and Research Plan. Now that a well-developed mission statement has been prepared for the new Earth System Research Laboratory, similar statements should be done for other OAR laboratories.

9. Research Organization within the OAR Boulder Laboratories

RRT Recommendation and Response. It was apparent to the RRT that five OAR laboratories in Boulder would substantially improve their research and its execution by having a more effective and coordinated management structure. Independent and loosely connected laboratories would not facilitate the development of the internationally recognized center of excellence that it should be. As a consequence, the RRT recommended that there be a laboratory consolidation of the five NOAA OAR laboratories in Boulder into a single Center (RRT report, pages 22-24).

NOAA has responded to this recommendation through the development of a proposal for a new research organization of the OAR Boulder Laboratories: The Earth System Research Laboratory (ESRL). The ESRL mission is "to observe and understand the Earth system and to develop products through a commitment to research that will advance NOAA's environmental information and service on global-to-local scales." The proposed Laboratory will be composed of four Divisions: Global Monitoring, Physical Sciences, Chemical Sciences, and the Global System. A new Director and office will be created to provide strong leadership and centralized support functions. This consolidation will result in more integration of science in Boulder through the development of integrating research and technology themes that will be developed across divisions. As part of this consolidation, the Global Monitoring Division also subsumed the Boulder-based Surface Radiation Research Branch of the Air Resources Laboratory (ARL).

DRAFT

Assessment. The Panel is pleased to see the RRT recommendation being implemented into the Boulder Earth System Research Laboratory. The Panel acknowledges the superb job of the Boulder Planning and Transition Team, under the superb leadership of Dr. Dan Albritton, in the development of an integrated reorganization plan that gives emphasis to a focus on continental-to-global scale phenomena research issues of importance to NOAA. They have the capabilities to work locally, regionally, and globally. The consolidation plan shows well-defined and easy to understand divisional units that will contribute to the whole. The organizers have taken special care to preserve excellent ongoing activities and capabilities. The Panel also noted that there are in-house capability gaps in several areas of a whole Earth system; for example, the biosphere and the oceans. Albeit, this should not be viewed as a deficiency in core capability but rather as an opportunity for the Boulder ESRL to partner with external constituencies or other NOAA laboratories who can represent those areas of expertise.

The Panel listened carefully to specific aspects of the plan such as the new role of the overall Director of the Laboratory and its Divisions. The specifics of the plan make sense to the panel. Another key element of the plan is that the Director of ESRL would also assume the proposed position of Deputy Assistant Administrator for the Laboratories and Cooperative Institutes, which will be located in Boulder (see #8 above). The Review team did not make specific recommendations with respect to a specific structure. The Panel did not have an opportunity to discuss with other components of the NOAA research community whether having the Deputy Assistant Administrator is the optimum management arrangement. However, we certainly did not see major problems with such an arrangement.

Finally, the Panel noted that there were some additional benefits from a more thought-out reorganization, such as better coordinated planning and execution, more efficient use of resources, and more emphasis on multidisciplinary collaboration in areas such as climate and ecological research.

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10. Research Organization within the Air Resources Laboratory

RRT Recommendation and Response. The Research Review Team recommended that the Air Resources Laboratory (ARL) be better aligned with NOAA's mission and the emerging needs of Homeland Security. It also recommended that NOAA conduct a core capability analysis to determine areas of most effective mission alignment and to identify opportunities for improved organizational coordination (RRT report, page 25).

NOAA has conducted a core capability analysis of ARL and found five areas of capabilities: Core Capabilities:

- Air Quality Modeling
- Atmospheric Transport and Diffusion
- Climate Variability and Trends
- Air-Surface Exchange
- Observational Support and Analysis

Air Quality Modeling, Atmospheric Transport and Diffusion, and Climate Variability and Trends were judged quite strong. Activities associated with Air -Surface Exchange are primarily devoted to the collection of monitoring data, with science leadership often coming from outside of NOAA. Observational Support and Analysis was viewed to be primarily a service role (Appendix II, number 10)

The Research Review Team also noted that the NOAA-EPA collaboration in Air Quality Modeling in Research Triangle Park (RTP), while strong, tended to underplay NOAA's role. More specifically, NOAA's role was often viewed as if it were part of EPA.

Assessment. The core capability analysis was first rate, and responded directly to the RRT's recommendation. However, there now needs to be action by OAR in response to the analysis. Moreover, there will remain a question of increasing the visibility of the ARL contributions in atmospheric chemistry at RTP. The ownership of ARL by NOAA and the presence of NOAA personnel at ARL need to become better known. ARL should not be viewed as a part of EPA but rather, more properly and correctly, as the lab within which NOAA staff conduct EPA funded research and development. This may simply be an issue of inattention to the details of interagency relationships and a lack of promotion, marketing and taking appropriate credit on the part of NOAA.

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11. Continuing Oversight of NOAA Research

RRT Recommendation and Response. As noted in the beginning of this report, the final recommendation of the Research Review Team was:

> "To ensure that NOAA takes appropriate action, the Review Team believes an Executive Committee should be established to review this report and previous reviews and to report directly to the NOAA Administrator on progress in reforming the research enterprise in NOAA."[1]

As noted, NOAA has responded positively in asking the SAB to establish a Panel to assess NOAA's response.

Assessment. The Panel has been briefed on NOAA's actions in response to the RRT Report. This constructive dialogue is in keeping with the specifics of the recommendation; however, the Panel believes that a single review is only the first step, and it believes that now it is important that the SAB take this charge from the RRT as a central item for its future role.

Additional Recommendations on Improving the Efficiency and Effectiveness of the Research Organization based on this 2005 Review

In considering the second charge to the Panel, we present six additional recommendations that either elaborate upon our Assessments above or reflect other areas of importance to the research enterprise at NOAA:

[1] RRT report, page 25

- As noted in the initial recommendation of the RRT and throughout their report, it is essential that NOAA have a spectrum of research that includes very innovative and high-risk initiatives as part of its short and long term portfolio.

- We believe that the Research Plan and Research Vision should be used to guide and expand the activities of OAR's (and other Line Offices) research and development programs. Specifically, we recommend that NOAA should seek to expand its program of broad competitive awards in addition to its current institutional programs (Cooperative Institutes, Sea Grant, etc) and to focus on and better coordinate these programs with respect to the priorities articulated in the Research Plan ands Vision.

- NOAA's Research Vision would benefit from added specificity across its two-decade temporal scope. In particular, the Panel suggests that future versions of the Vision document be divided into five-year segments with incremental objectives; working backward from 20 to 15 to 10 to 5 years at which point in time the two documents, the 5 year Plan and the 20 year Vision, should meld. (Alternatively one could move from the Plan's five year horizon out to the Vision through a set of five year objectives and milestones). Thus the more distant Vision would be retained, but there would be a clear sequence of conceptual steps toward the 20-year Vision with milestones along the way.

- In view of the emerging understanding gained from expanded observations and modeling of oceans and the atmosphere, deliberate efforts of an external working group to move this understanding into operations and management offer potential to improve NOAA's research and science products as well as decision-support. We support NOAA's establishment an agency-wide policy on transition of research to applications (see #3 above, **Transitioning NOAA Research to Operations and Providing Information Services**); moreover, we encourage NOAA to be even more demanding in asking for useful results from extramural research and even more aggressive in incorporating results from extramural research into its operational and information services responsibilities.

- Given NOAA's ongoing and planned observing systems, with exponential growth and data volumes, and its ability to generate considerable data products, NOAA should, at the earliest opportunity, address what must be archived and made accessible vs. what does not have to be permanently saved. This is a critical distinction and requires knowledgeable experts who can provide innovative thinking in the context of laws and obligations that NOAA must adhere to.

- We applaud NOAA becoming a more transparent and open agency and urge NOAA to continue taking advantage of its Science Advisory Board in forming Working Groups to provide the agency with external expert advice.

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Appendix I

Terms of Reference
NOAA Science Advisory Board
Panel to Evaluate NOAA's Response to the Research Review
August 16-17, 2005

Background

- The FY 2004 House and Senate Appropriations Reports contained language that challenged the organization of research in NOAA's Office of Oceanic and Atmospheric Research (OAR) and raised the issue of how should research best serve NOAA and the nation. In response to these Congressional concerns NOAA asked its Science Advisory Board to conduct a review of research and provide findings and recommendations for NOAA to use to enhance its research organization.
- The SAB delivered its report, "Review of the Organization and Management of Research in NOAA" on August 6, 2004. The final recommendation in the report stated: "To ensure that NOAA takes appropriate action, the Review Team believes that an External Committee should be established to review this report and previous relevant reviews and to report directly to the NOAA Administrator on progress in reforming the research enterprise in NOAA."
- The Administration provided its response to Congress on plans to implement the report recommendations on December 20, 2004. In that response, NOAA stated that it would ask its Science Advisory Board to appoint an external team to evaluate progress in implementing recommendations from the report in August 2005, one year after completion of the final report.

Charge to the Panel

- Evaluate the effectiveness and appropriateness of the actions taken by NOAA in response to the Research Review. Discuss whether the actions taken are sufficient to address the questions and issues raised in the report.
- Provide additional recommendations to the Administrator to improve the efficiency and effectiveness of the research organization.

Term

- The Panel will meet in person on August 16-17 and may have additional meetings/conference calls as needed to complete their work. A report will be provided to the SAB at its November meeting.
- The panel will be disbanded following the transmittal of its final report by the SAB to the Undersecretary.

Panel Membership

The member of this panel are: Berrien Moore III, University of New Hampshire, Chair; David Blaskovich, IBM Corporation; David Fluharty, University of Washington; Leonard

DRAFT

J. Pietrafesa, North Carolina State University; and Warren M. Washington, National Center for Atmospheric Research.

Support

- As part of the Review on August 16 – 17, NOAA will provide a summary of actions completed for each of the Research Review report recommendations. Background information will be sent to the Review Team prior to the Review including documentation of actions completed. NOAA management and key personnel implementing the recommendations from the report will be available to meet with the panel. Mary Anne Whitcomb will provide staff support to the panel.

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Appendix II: Summary of Research Review Recommendations and NOAA Response

1) Research Plan and NOAA's Mission: NOAA should develop a 20-year Research Vision and 5-year Research Plan

a) Summary of Recommendation: NOAA should develop a Vision for Research that supports the Strategic Plan that extends outward to 20 years and provides broad guidance for the agency. NOAA should develop a NOAA-wide Research Plan that provides explicit guidance and clearly articulates research goals, projects, and required capabilities for the next 5 years as well as provides a blueprint for external community to interact with NOAA.

b) Summary of NOAA Response: Research Plan and Vision published in January 2005 after changes incorporated from a 30 day public comment period. Documents have been briefed to a number of stakeholders and this effort will continue. The 5-Year Research Plan will be revised in January 2007 and the 20-Year Vision will be revised in January 2010.

i. Details of NOAA Response:

<u>NOAA's 20-year Vision</u>:
"An informed society that uses a comprehensive understanding of the role of the oceans, coasts, and atmosphere in the global ecosystem to make the best social and economic decisions."

- Provides a high-level view of the underlying research needed to create the products and information services the nation will need to meet the environmental demands in the decades ahead

- Highlights importance of external partners in achieving NOAA's Vision

- Identifies impacts from population growth, globalization, and associated trends that research needs to address:

  – Increasing pollution resulting from work, transportation, and recreation

  – Increasing releases of carbon dioxide and other greenhouse gas into the atmosphere

DRAFT

  - Increasing potential for accidental or purposeful releases of biological, chemical, or radiation toxins into the environment

  - Growing economic significance of longer-term climate predictions for agriculture, manufacturing, recreation…

- Technology and NOAA in the 21st Century

  - Sensors - Rugged and low cost, allowing large numbers to deployed as situations demand

  - Platforms - Mobile, unmanned aerial and autonomous undersea vehicles; adaptive observations

  - Information technology - Computer processing speed will double every 18 months; better data management and analysis tools

  - Telecommunications - Global networks will link modeling centers seamlessly and effortlessly with service providers and users

  - The above technologies will be exploited in developing an integrated Global Earth Observation System of Systems (GEOSS) and holistic, high resolution Earth system models

<u>NOAA's 5-year Research Plan</u>:

- Focuses primarily on short- and mid-term research needed to realize the 20-year Research Vision

- Identifies research that will support the NOAA Strategic Plan and the outcomes and performance objectives for each of NOAA's Mission Goals

- Addresses analysis and testing needed to transition research to application

- Helps external stakeholders identify opportunities for participation and collaboration with NOAA

- Sections for each of the 4 Mission Goals:

  - Ecosystems
  - Climate
  - Weather and Water
  - Commerce and Transportation

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- Mission Goal sections organized around:

  - high-level outcomes from the NOAA Strategic Plan
  - performance objectives from the NOAA Strategic Plan
  - research themes
  - research milestones (mapped to milestones from the NOAA program annual operating plans)

Town Hall Meetings and briefings held to communicate the Vision and Plan and get feedback from a broad range of stakeholders:

- January 2005, American Meteorological Society Annual Meeting
- February 2005, ASLO Aquatic Sciences Meeting
- March 2005, NOAA National Stakeholder Forum
- March 2005, Sea Grant Directors Meeting
- April 2005, The National Academies, Board on Atmospheric Sciences and Climate
- May 2005, American Geophysical Union Joint Assembly
- June 2005, Capitol Hill Oceans Week
- July 2005, The National Academies, Ocean Studies Board

2) Research Organization in NOAA: NOAA should establish an Associate Administrator for Research and a Research Board

a. Summary of Recommendation: NOAA should establish the position of Associate Administrator for Research reporting directly to the NOAA Administrator who would have budget authority for research across NOAA. We recommend two formal bodies to manage NOAA's research enterprise. The first is a Research Board, chaired by the Associate Administrator for Research; the second is a Research Council, chaired by the Assistant Administrator for OAR.

b. Summary of NOAA Response: NOAA Alternative: the Deputy Assistant Secretary serves as the senior management official for research in NOAA
To further strengthen NOAA's research enterprise, the NOAA Executive Council (NEC) will provide active oversight of NOAA's research.
The Research Council will support the NEC.

3) Transitioning Research: NOAA should formalize the process to transition research to operations and information services.

a) Summary of Recommendation: The Research Plan should address directly the transition of research to operational products and the provision of services. The Research Plan should address directly the transition of research to operational products and the provision of services. The (recommended) Associate Administrator, in collaboration with the Assistant Administrators, must ensure that there is a vigorous and articulated "pull" from operations and information service products. NOAA's research entities are instrumental in maintaining a healthy

DRAFT

research "push". There should be a continuing formal process for evaluating these elements of an agency-wide research investment.

b) Summary of NOAA Response: To ensure we recognize the breadth and uniqueness of these research activities, and to ensure the most effective processes, NOAA will develop a policy for transferring research to operations and information services. The policy will include migration of research to NOAA operations from other agencies and will be developed by December 2004, under the direction of the NOAA Executive Council and the Deputy Administrator

i) Details of NOAA Response:

- Established Policy on Transition of Research to Application - (http://www.rdc.noaa.gov/~nao/216-105.html)
- Established Transition Board and hired staff to support it
- Review TAO Transition and provided recommendations
- Reviewing all research as part of FY 08 planning to identify Transition Activities and organize into Transition Projects
- Developing criteria for Transition Plans

Transition Plan provides a mechanism for systematically reviewing all research annually in order to identify research to be transferred; establish a structure for managing research; delineate the roles and responsibilities for those at NOAA to accomplish such transfers
Transition Plan identifies the comprehensive activities necessary to transfer a research result. It will identify stakeholders; define criteria for when a project will be transferred; provide funding profiles for operational implementation and include information service delivery and/or follow on research

Next Steps:
- Selected initial transition projects for corporate oversight in FY06
- Develop transition procedures and Transition Plan criteria
- FY07- expand to encompass all transition projects

4) Research Location in NOAA: Criteria should be developed to determine where research is located in NOAA

a) Summary of Recommendation: Criteria should be developed to determine where research is located within NOAA. Criteria should be applied to existing and proposed research activities and, opportunities for potential migration should be identified.

DRAFT

NOAA should establish an External Task Team to evaluate and strengthen the structure and function of ecosystem research programs.

b) Summary of NOAA Response: NOAA's Research Council will oversee development of criteria to determine the location of research in NOAA. The Ecosystem Task Team will identify criteria to determine where ecosystems research should be located. In parallel with this effort, NOAA's Research Council will develop criteria to determine the location of other research in NOAA.

i) Details of NOAA Response:

NOAA has established two teams to implement this recommendation: an external ecosystems task team (eETT) to review ecosystem programs and an internal team to review the physical and social sciences research programs (PSTT). The PSTT has drafted the following criteria for determining research location:

PSTT Preliminary Criteria for Research and Development Location

- Time scale to fruition (0-2, 2-5, 5-20, 20 +) - Research on longer time scales needs to be organizationally distinct from operations to protect longer time scale efforts. Research and development coming to fruition on short time scales, directly connected to operations, should be located within the operational organization

- Mission and Discipline Critical Mass – NOAA should organize its research and development so that the organization follows its functions and attains critical mass of technical expertise in crucial mission areas

- Geographical Proximity to Other Related Institutions - NOAA can enhance its research and development by locating it near similar research, development and operational organizations, which encourages diverse and useful interactions

- Infrastructure Requirements – NOAA should locate its research to take advantage of specialized infrastructure such as ships, data facilities, specialized laboratories, etc.

- Internal vs. External – Internal laboratories, academia and industry have different capabilities and suitability for different types of research and development. NOAA should assure that it considers each of these in determining the location of its research efforts

- Linkage to NOAA and its Constituents – If research and development is oriented toward a NOAA operational entity, this should be considered when determining where it should be located. Similarly, if the research and development are oriented toward a particular NOAA constituent,

DRAFT

this should be factored into location considerations

- Balance of High Risk and Low Risk – The research enterprise must be organizationally structured to allow the right balance of high risk/high payoff research with lower risk efforts.

NOAA has established an External Ecosystem Task Team (eETT) comprised of eight eminent scientists, managers and users of ecosystem science (Federal Register Call for Nominations) with SAB Selection

- eETT Chaired by Dr. David Fluharty (UW), & Dr. Jake Rice, DFO, Canada, with Dr. Mark Abbott, Dr. Terry Quinn, Dr. Russ Davis, Dr. Jon Sutinen, Ms. Stephanie Madsen, Dr. Michael Donahue

- A NOAA Internal Ecosystem Task Team (iETT) supports the eETT, and consists of NOAA Line Office representatives

- A Framework Document was developed to guide the ecosystem review, consisting of terms of reference, principles and guidance on scope

- NOAA has broadened the original RRT charge: this Task Team will evaluate the entire Ecosystem Research <u>and Science</u> Enterprise

The eETT is concentrating on two fundamental questions:

- Is NOAA doing the right kind of ecosystem science to meet its current and future management needs?

- How should NOAA organize its research and science enterprise? (e.g., location)

The eETT and PSTT will work to coordinate criteria for research location and timelines for reports. The preliminary report is targeted for the end of 2005.

5) Extramural Research in NOAA

a) Summary of Recommendation: NOAA should articulate clearly the importance of extramural research throughout the budget process; increase involvement of the extramural community in NOAA's research planning; and improve the administration of awards to the extramural community.

b) Summary of NOAA Response: NOAA will track funding for extramural research and provide an estimate of the funds proposed for the extramural community in budget requests to Congress. NOAA will engage with external research community to ensure

DRAFT

they understand how and when they can provide input to NOAA's fiscal planning. NOAA will implement a full grants lifecycle automated system, "Grants Online," in March 2005 to streamline the grants process.

i) Details of NOAA Response:

Extramural Funds Tracking:

- Adopted formal definitions for research and development
- Included information on extramural research and funding in the 06 budget roll-out
- Developed an overview briefing of Research highlighting extramural research and briefed NOAA and Commerce officials

Improving Grants Processing:

- NOAA Grants Online began full implementation in March 2005. With this new system, reductions are expected in grant processing times.

Communicating with Extramural Community on Fiscal Planning: FY08

Planning and Budget Schedule advertised in January 2005

- April 2005 Stakeholders Forum – a dedicated session on research
- Outreach efforts to research partners on NOAA's Planning and Budget
- Review and Discussion of Annual Guidance Memorandum with Science Advisory Board

Next Steps:

- Strengthen on-going outreach efforts
- Integrate Grant efforts in Annual Operating Plans and Reports
- Engage research partners in detailed planning (e.g., regional ecosystem science plans)

6) Cooperative Research: NOAA should standardize processes for Cooperative Institutes and other cooperative arrangements

a) Summary of Recommendation: NOAA should establish a process by which Joint Institutes and other cooperative arrangements with extramural partners are established and maintained. The process should include approach-specific criteria and should define review process, renewal process, and sunset clauses.

b) Summary of NOAA Response: NOAA's Research Council will develop guidelines for awarding and operating Cooperative Institutes across NOAA, including provisions for periodic performance reviews and re-competition.

i) Details of NOAA Response:

NOAA developed an administrative order on Cooperative Institute Policy Sets forth basic principles to be applied in making decisions regarding

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NOAA CIs

- Establishes a CI Committee under the NOAA Research Council

- Calls for a CI Handbook, written and maintained by the CI Committee, that contains all the procedures for implementing this policy NOAA supports CIs:

- to promote research, education, training and outreach aligned with NOAA's mission

- to obtain research capabilities that do not exist internally, and/or to expand research capacity in NOAA-related sciences

CIs can be composed of one or more research institutions (e.g., universities, non-profit research organizations) that: can demonstrate outstanding research performance

- have strong education programs with established degree programs in NOAA-related sciences

- can provide significant coordination of resources among government and non-government partners

All CIs are established with an open competition and peer review process.

- Initial award period is 5 years, with one non-competitive renewal up to 5 additional years at a funding level commensurate with the final rating of a peer review near the beginning of the 4th year

NOAA encourages collocation of federal and CI employees to foster collaborations.

All current CIs not established competitively will be continued for up to 5 additional years beyond the end of the current agreement to reduce the impact of a new competition on important ongoing research.
Factors considered for determining continuation period:

- level of funding

- number of NOAA-funded employees

- age of CI

- outcome of previous reviews

DRAFT

NOAA and current CIs will follow all new procedures established by the CI policy to the maximum extent possible.

Next Steps:

- Finalize continuation schedule: Aug. 2005
- Complete draft of CI Handbook: Sept. 2005
- Submit report to SAB on continuation schedule and update of CI Handbook development: Sept 2005
- Present final report to SAB: November 2005
- Award first CI through new process: 2007

7) Reimbursable Research in NOAA

a) Summary of Recommendation: NOAA should establish clear guidelines for the management of reimbursable funding to better manage this complex issue. Reimbursable funds should only be used to support NOAA research activities when that research relates directly to NOAA's mission.

b) Summary of NOAA Response: The Research Council will undertake a rigorous assessment of reimbursable work done by its research organizations and have proposed revisions to current policy. Actions to bring all parts of NOAA's research enterprise into compliance with the revised policy will begin immediately thereafter.

i) Detail of NOAA Response:

A Reimbursable Work Group, formed by the CFO Council, was established to develop NOAA-wide reimbursable policy for research & non-research reimbursable funding. This group reviewed the NOAA Budget Handbook guidance and current and best practices in NOAA reimbursable funding and made recommendations on reimbursable research work that builds on existing NOAA guidelines and policy.

To ensure that reimbursable research supports NOAA's mission, the following oversight mechanisms are being established:

-- Line Office Assistant Administrators to conduct periodic reviews of reimbursable research at their laboratories

-- Additional oversight required by Research Council and Assistant Secretary if level of reimbursable research exceeds 49% or 125% of Federal salaries/benefits are not covered by NOAA appropriations

NOAA Administrative Order (NAO) was developed to provide guidance on reimbursable research. This document establishes reimbursable research policy that applies to NOAA laboratories and programs.

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Next Steps:

- Reimbursable NAO under final review by NOAA senior management.
- As part of the Air Resources Laboratory Core Capabilities Analysis review, OAR will request an exemption from this policy for that laboratory.

8) Research Organization within OAR

a) Summary of Recommendation: OAR should strengthen its management processes to ensure all OAR laboratory activities are focused and integrated into NOAA's mission. There should be a single authority for OAR laboratories and Joint Institutes, who would report directly to the OAR Assistant Administrator.

b) Summary of NOAA Response: NOAA agrees OAR should strengthen management processes to ensure all OAR laboratory activities are focused and integrated into NOAA's mission. NOAA further agrees there should be a single individual who would provide vision, integration, and ongoing oversight of OAR laboratories. NOAA will review its headquarters functions in OAR to identify appropriate actions necessary to strengthen the leadership and oversight over research activities in labs and programs.

i) Detail of NOAA Response:

NOAA has prepared a request to reorganize management functions in OAR. Some highlights include:

- A single authority (DAA) for OAR laboratory programs and Cooperative Institutes. This position will serve a dual role as DAA and Director, Earth System Research Laboratory (ESRL).

- Senior Executive Service (SES) Director will oversee the Office of Policy, Planning, and Evaluation (PPE) to plan and evaluate an integrated research program. PPE will oversee the development and evaluation of all OAR research programs and the process of transitioning research to operations and informative services

- Establish a Communications Office similar to those of other NOAA Line Offices

- Creation of a Climate Program Office which combines the Office of Global Programs, Climate Observations and Services, and Arctic Research Program

- Combine Ocean Exploration and National Undersea Research Program into the Office of Ocean Exploration and Research

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Actions to Date:

- Reprogramming proposal to reorganize OAR & consolidate Boulder Labs was approved by NOAA (March), DOC (April) & OMB (July) and is awaiting approval by Hill

- Targeted "buy outs" for selected positions in Boulder laboratories - approved by OMB and OPM-are open August 3-19

9) Research Organization within the OAR Boulder Laboratories

a) Summary of Recommendation: There should be a consolidation of the OAR laboratories in Boulder into a single center. The unifying theme of the Boulder Laboratories is a research focus on continental-to-global phenomena and issues, with capabilities to work locally and regionally. The consolidation should be constructed around clear, easily understood functional capabilities.

b) Summary of NOAA Response: NOAA believes consolidation of the Boulder laboratories would lead to improved quality of research planning and execution, more efficient use of resources, and increased opportunities for multidisciplinary collaboration. A Boulder Planning and Transition Team is working to define a new consolidated structure for the staff working in its Boulder laboratories. Implementation of the consolidation plan will commence after appropriate Congressional notifications have been made.

i) Detail of Response:
The Goals and Approach of the Boulder Planning and Transition Team
Leadership & managerial effectiveness:
A Laboratory Director with overall responsibility and authority
Scientific effectiveness: Integration of research foci to better capitalize on the co-location of broad-scoped expertise: Unique breadth $\Rightarrow$ unique whole-Earth capabilities.
"One story … not six stories"
Research efficiencies: Consolidation of support infrastructure that is common to all:

- Central budget, administrative, and information technologies that best serve all FTE and $$$ savings

Broad input to meeting goals:

- Boulder Planning & Transition Team
- NOAA-wide review and comments
- Input/involvement of all of OAR Boulder staff

The Bottom Line: All Boulder laboratories will be consolidated into the "Earth System Research Laboratory" (ESRL). ESRL will have a Director and four divisions: Global Monitoring Division, Physical Sciences Division, Chemical Sciences Division, and Global Systems Division. The laboratory

DRAFT

will have 575 staff (federal, joint institute, and contractors) with a budget of $88M (FY04 funding).

Key points about this structure:

- An integrated research focus to support NOAA's "whole earth" operational and information-service mission
- ESRL Mission: "To observe and understand the Earth system and to develop products through a commitment to research that will advance NOAA's environmental information and service on global-to-local scales
- A new Director and office to create strong leadership and centralized support functions.
- Four scientific Divisions, with Directors, point-of-service support, and research staff.

Key points about filling positions in the Director's Office:

The Deputy Assistant Administrator (DAA) for Laboratories and Cooperative Institutes will also serve as the ESRL Director and will be located in Boulder.

All other positions will be filled by permanent reassignments form the current Boulder laboratories.

The filling of these reassigned positions will be done through an internal advertisement and selection process.

ESRL Research and Technology: Scientific Effectiveness

<u>More Integration Unique Goals Larger Payoff</u>

<u>Integrating Research and Technology Themes</u>

Characteristics:

- Partnerships among Divisions
- Broad-scoped goals
- Conceived and planned by staff
- An evolving roadmap and story line
- Useful in attracting a top-notch Director

Samples of Integrating Themes

Carbon cycle science
Aerosols: climate and air quality
Surface and planetary boundary layer processes
The climate-weather connection
Global weather assimilation and modeling
Hydrometeorology test bed
Observing system design, simulation, and demonstration
Advanced computing concepts

Efficiencies from Consolidation:

DRAFT

Personnel savings from Director's Office Consolidation: 5.5FTE, $0.6M

Personnel efficiencies in the Divisions:

- Based on an analysis of skills needed in ESRL compared to current skill set developed a Voluntary Separation Incentive Program-up to 20 positions in targeted skills.
- We expect procurement and other savings based on economies of scale.

Next Steps:

- Need for further approvals: Congress (August?)
- Implementation (Aiming for start-up on Monday, 3 October 2005)

The Accomplishment Toward Which We Are Moving

One "whole Earth" story and stronger national voice for Boulder.
Leadership role in OAR:" Lab. & CI Deputy".
Infrastructure support partnerships: Silver Spring and Boulder
Stronger integrated research functional foci (6 organizations ⇒ 4 Divisions)
Explicitly planned integrated research foci that … draw upon the uniquely broad multiple-Division expertise to improve the linkages with other NOAA organizations and Programs

Crafted by OAR Boulder Teams; Working Groups; research, technical, and support staff; and OAR Headquarters.

10) Core Capability Analysis of the Air Resources Laboratory (ARL)

a) Summary of Recommendation: ARL should be better aligned with the NOAA mission and the emerging needs of Homeland Security. There should be a core capability analysis conducted to determine areas of most effective mission alignment and to identify opportunities for improved organizational coordination.

b) Summary of NOAA Response: NOAA will conduct a core capability analysis of ARL to ensure proper focus of ARL activity. A draft report will be completed and provided to the Research Council and the NEC for review. NOAA will take appropriate action based on this analysis

DRAFT

i) Details of NOAA Response:
An internal team consisting of: Jim Meagher (OAR) – Chair, Paula Davidson (NWS), Howard Diamond (NESDIS), and John Schneider (OAR) was charged to conduct an in-depth assessment of ARL research and identify changes to better align with NOAA's mission and improve effectiveness and efficiency to answer the following questions:

1. What are ARL's core capabilities? Which are "world class" and most critical to NOAA's mission?

2. To what extent does ARL's dependence on reimbursables
    a) support NOAA's mission or
    b) serve as a distraction that diverts resources?

The team reviewed a variety of information sources, conducted interviews with ARL staff and customers and visited each ARL division during this review.

<u>Principal Findings</u>
ARL's Core Capabilities were identified as:
Air Quality Modeling
Atmospheric Transport and Diffusion
Climate Variability and Trends
Air-Surface Exchange
Observational Support and analysis
Air Quality Modeling, Atmospheric Transport and Diffusion and Climate Variability and Trends were judged to be "world class".

ARL customers are very satisfied

ARL's support to EPA directly benefits the missions of both agencies

ARL research activities are not optimally integrated or coordinated across divisions/locations
Some of the work performed at ARL (e.g., Las Vegas, and Idaho Falls) should be classified as services, not research.

The type of semi-operational meteorological support ARL provides at DOE facilities in Las Vegas and Idaho Falls is provided by private sector contractors at other DOE facilities.

ARL's dependence on reimbursable funds limits its ability to focus on NOAA's mission priorities.

DRAFT

Recommendations

1. ARL should focus on fewer research areas.
2. ARL should realign its strategic planning and annual implementation to focus on critical areas.
3. OAR should request an exception from reimbursable funding guidelines for the Atmospheric Sciences Modeling Division (North Carolina) and should more fully integrate this group with the rest of ARL, OAR, and NOAA's program structure.
4. OAR should find a more appropriate home for the observational support and analysis activities (Idaho Falls and Las Vegas).

In response to this report, OAR directed ARL to do the following:

-In the three primary research areas, identify a program manager, and provide a statement of scientific objectives and a spending plan

-Develop an options paper on the pros and cons of continuing ARL's homeland security work, in particular, the DCNet and urban dispersion programs

- Provide an options paper on the observational support and analysis activities (Idaho Falls and Las Vegas).
    -Option 1: If to be transferred, identify to whom they should go and how
    -Option 2: If not, identify how a research effort could be built to provide a connection to ARL's primary research areas

- Prepare a request for an exemption from the reimbursable funding requirements

ARL completed all the options papers in the action plan in July

Next steps:
    -Items are under review by OAR management.
    -Implementation of actions to begin in October 2005.

11) Continuing Oversight

a) Summary of Recommendation: NOAA should review progress in implementing the recommendations from the Research Review.

b) Summary of NOAA Response: To ensure NOAA responds conscientiously to the recommendations of the report, NOAA will ask its SAB to appoint an external team to review progress in implementing recommendations from the Research Review Team. The review will be done one year after the completion of the Research Review final report, in August 2005.

i) Details of NOAA Response:

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NOAA asked the SAB in June 2005 to appoint an external panel to review progress in implementing the Research Review Report. The panel met with NOAA officials on August 16-17, 2005 and this report is a result of their assessment.

DRAFT

Appendix III

NOAA ADMINISTRATIVE ORDER 216-207
NOAA POLICY ON COOPERATIVE INSTITUTES

Date of Issuance: September 16, 2005
Effective Date: September 2, 2005

SECTION 1. PURPOSE.

.01 This Order establishes a policy associated with National Oceanic and Atmospheric Administration (NOAA) Cooperative Institutes (CIs). This policy sets forth basic principles to be applied in making decisions regarding NOAA CIs. It supports NOAA's intent to maintain robust cooperative relationships with academic and non-profit research institutions that demonstrate the highest level of performance and conduct research that is consistent with the NOAA strategic plan and supporting research documents, and aligned with NOAA's mission goals.

.02 This Order establishes a Standing Committee for CIs (hereafter, the CI Committee) under the NOAA Research Council (RC). The CI Committee will include at least one representative from each NOAA Line Office (LO) and the NOAA Acquisition and Grants Office. The CI Committee shall ensure compliance with this Order and, when requested, will provide information to assist the RC with general CI program oversight.

.03 This Order authorizes and establishes NOAA's Cooperative Institutes Handbook (hereafter, the CI Handbook) to be written and maintained by the CI Committee. The CI Handbook will contain all the procedures for implementing this policy.

.04 NOAA CIs established under this Order are considered to be Institutional Awards for purposes of the Department of Commerce Grants and Cooperative Agreements Interim Manual (February 2002, as amended), and of NOAA's existing policies for grants and cooperative agreements implementing Institutional Programs and Awards.

SECTION 2. SCOPE.

.01 This Order covers the policy for establishing and maintaining all new NOAA CIs established after the effective date of the Order and those CIs established competitively prior to that date. All other CIs established prior to the effective date of this Order will continue to be maintained by the responsible LO under the terms of the existing cooperative agreement and extension thereto; such extension may not exceed a period of 5 years. If NOAA determines that a need exists for a CI, then the procedures described in the CI Handbook for competitively establishing a CI will be followed. The Order also

DRAFT

prescribes the responsibilities of the RC, LOs, and Goal Teams (GTs) in the implementation of this policy.

.02 This Order is intended to aid the internal management of NOAA and is not intended to create any right or benefit enforceable at law by a party against NOAA, the Department of Commerce, or its officers.

SECTION 3. POLICY.

.01 NOAA may establish a CI when NOAA determines that it will sponsor a long-term (5-10 years) collaborative partnership with one or more outstanding non-federal, non-profit research institutions. For NOAA, the purpose of this partnership is to promote research, education, training, and outreach aligned with NOAA's mission, to obtain research capabilities that do not exist internally, and/or to expand research capacity in NOAA-related sciences, in order:

a. to conduct collaborative, long-term research that involves NOAA scientists and those at the research institution(s) from one or more scientific disciplines of interest to NOAA;

b. to utilize the scientific, education, and outreach expertise at the research institution(s) that, depending on the research need determined by NOAA, may or may not be located near a NOAA facility;

c. to support student participation in NOAA-related research studies; and

d. to strengthen or expand research capacity within the research institution(s) in NOAA-related research by providing sufficient funding to support administrative and scientific research activities.

.02 A CI may consist of one or more research institutions that demonstrate outstanding performance within one or more established research programs in NOAA-related sciences. These institutions may include Minority Serving Institutions and universities with strong departments that can contribute to the proposed activities of the CI.

.03 NOAA will use an open competition and merit-based peer review for creating new CIs. A limited competition may be used when NOAA determines that it is in the best interest of the government to restrict the pool of qualified applicants. The rationale for such a restriction must be justified under existing DOC and NOAA-wide federal assistance policies; and the rationale shall be published in the Federal Register and the notice of Federal Funding Opportunity (FFO).

.04 New CIs may be proposed by one or more LOs, GTs, and/or the RC according to the procedures for establishing CIs described in the CI Handbook. Only the Under Secretary of Commerce for Oceans and Atmosphere (the Under Secretary) can approve the establishment of a new CI.

DRAFT

.05 To stress the collaborative nature and investment in a CI by both NOAA and the research institution, cost-sharing shall be required and will be considered as a factor when evaluating and selecting new CIs.

.06 NOAA shall encourage research institutions with existing CIs that are awarded a new CI to consolidate management, administrative and oversight activities into one CI, when possible.

.07 CIs will be established at research institutions that have a strong education program with established degree programs in NOAA-related sciences and that also encourage student participation in NOAA-related research studies.

.08 CIs are expected to provide significant coordination of resources among all non-government partners and to promote the involvement of students and postdoctoral scientists in NOAA-funded research.

.09 To foster collaborations, NOAA encourages the collocation of research institution(s) and government scientists.

.10 NOAA shall enter into a Memorandum of Agreement (MOA) with the research institutions(s) in order to formalize the working relationship between NOAA and the research institution(s). The MOA will include information on the use of an Executive Board and a Council of Fellows to provide management oversight and scientific guidance, respectively, for the CI. The MOA also shall address the use of facilities, administrative expectations of the CI, human resource relationships, procedures for review of projects and proposals, requirements for compliance with NOAA IT security policies, and intellectual property issues. The MOA will be incorporated into the award as an additional term and condition.

.11 To provide sufficient time to conduct long-term research and increase the research capacity at a CI, NOAA will provide adequate funding to support research and administrative activities for a period of 5 years with an option to renew the CI award for one additional period of up to 5 years.

.12 The decision to renew the CI will be based on the outcome of an extensive peer review near the beginning of the fourth year, to be conducted under the auspices of the NOAA Science Advisory Board. This review will include a measurement of CI performance relative to well-established, mutually agreed-upon performance measures defined by NOAA and the research institution. NOAA will use the peer review to determine the renewal period (1-5 years) and the level of funding commensurate with the final review rating. Annual performance also will be evaluated by the responsible LO using the same performance measures. These performance measures will be incorporated into the award as an additional term and condition.

.13 Funding for a CI can be terminated prior to the end of the current award period in accordance with 15 CFR 14.61. Reasons for termination may include poor research quality

DRAFT

due to failure to comply with a specific term of the award, poor CI management, poor fiscal management, inability to complete proposed research within the time proposed, and/or the unavailability of NOAA funding for any prospective research area(s) pursued by the CI.

.14 The Under Secretary is authorized to designate CIs and use the personnel, services, or facilities of the research institution under a cooperative agreement for NOAA research, education, training, and outreach to support NOAA's mission under the CI.

SECTION 4. DEFINITIONS.

.01 Cooperative Institute - A NOAA supported, non-federal, non-profit organization that has an established outstanding research program in one or more areas relevant to the NOAA mission. CIs are established at research institutions that have a strong education program with established degree programs in NOAA-related sciences. A CI engages in research directly related to NOAA's long-term mission needs that require substantial involvement of one or more research units within the parent organization or other organizations, and one or more NOAA programs. An individual CI can include multiple research institutions. The CI provides significant coordination of resources among all non-government partners and promotes the involvement of students and postdoctoral scientists in NOAA-funded research. The CI provides mutual benefits, with value provided by all parties. A CI is synonymous with a Joint Institute.

.02 Research Institution - The parent institution of a CI.

.03 Cooperative Agreement - The legal instrument reflecting a relationship between NOAA and a recipient whenever: (1) the principal purpose of the relationship is to transfer money, property, services, or anything of value to accomplish a public purpose of support or stimulation authorized by Federal statute; and (2) substantial involvement (e.g., collaboration, participation, or intervention by NOAA in the management of the project) is anticipated between NOAA and the recipient during performance of the contemplated activity. Cooperative agreements are subject to the same Office of Management and Budget, Treasury, and other federal laws and policies as grants. (See 31 U.S.C. 6305 and definition in the DOC Grants and Cooperative Agreements Manual.)

.04 Institutional Award - A grant or cooperative agreement under which funds should be initially awarded based on competition with the intent to maintain a long-term partnership between NOAA and the recipient so that new awards may be made on a noncompetitive basis if the recipient performs satisfactorily and submits the appropriate application document, and if the results of the periodic reviews validate the effectiveness and continued desirability of the use of institutional awards for the program. (See definition in the DOC Grants and Cooperative Agreements Manual.)

.05 NOAA Research Council - The RC provides corporate oversight and develops policy to ensure that NOAA research activities are of the highest scientific quality, meet long-range societal needs, take advantage of emerging scientific and technological opportunities, shape a forward-looking research agenda, and are accomplished in an efficient and cost

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effective manner. The RC consists of members who have been appointed by the Assistant Administrators of each of the NOAA Line Offices and other NOAA directors.

.06 Science Advisory Board - A Federal Advisory Committee with responsibility to advise the Under Secretary on long- and short-range strategies for research, education, and the application of science to resource management and environmental assessment and prediction. Composed of eminent scientists, engineers, resource managers, and educators, the diverse membership of the Board assures expertise reflecting the full breadth of NOAA's responsibilities as well as the ethnic and gender diversity of the United States.

.07 Goal Team - A NOAA team of employees, led by a GT Lead, that manages and oversees the activities under each of the NOAA goals in the NOAA Strategic Plan. The GTs are made up of multiple programs, each led by a program manager.

SECTION 5. AUTHORITY.

.01 NOAA is authorized (15 U.S.C. 1540) to enter into cooperative agreements and other financial agreements with any nonprofit organization:

a. to aid and promote scientific and educational activities to foster public understanding of NOAA or its programs; and

b. to solicit private donations for the support of such activities.

.02 NOAA also has been delegated specific authority given to the Secretary of Commerce to enter into cooperative agreements with the Joint and Cooperative Institutes as designated by NOAA to use the personnel, services, or facilities of such organizations for research, education, training, and outreach (118 STAT. 71).

03. NOAA has a number of other programmatic statutes that authorizes federal assistance for climate and global change; coastal oceans and management of marine resources; weather services; and worldwide environmental data.

SECTION 6. RESPONSIBILITIES.

.01 The LO assigned by the RC during the establishment process has the primary responsibility for administering the CI award(s). This responsibility includes oversight of the initial CI competition, CI performance, funding to the CI throughout the award period, and managing the renewal review process. If CI funding is provided by multiple LOs, the primary LO must involve the others when making any recommendations for reviewing, renewing or terminating the CI. If a CI links one or more NOAA entities with a nearby research institution, or if there is a particularly strong connection with one or more NOAA offices, then the directors of those offices and the LO CI program manager, or their representatives, should be involved jointly (with representatives of the parent institution) in setting the research goals of the CI and participating in the review process to establish or continue a CI.

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.02 The CI Committee is responsible for establishing and reviewing all procedures pertaining to NOAA CIs and the implementation of the CI policy. These procedures will be documented in the CI Handbook and posted on a NOAA website. The CI Committee will provide aggregate financial and performance information on the NOAA CIs upon request of the RC and/or any NOAA office.

.03 The RC is responsible for reviewing recommendations from LOs or the GTs for establishing CIs, designating the LO that is responsible for maintaining the CI, approving the review guidelines for the renewals, and overseeing the CI program.

SECTION 7. EFFECT ON OTHER ISSUANCES.

None.

(signed) Conrad C. Lautenbacher, Jr.

Under Secretary of Commerce
for Oceans and Atmosphere

Office of Primary Interest:
Office of Oceanic and Atmospheric Research
Cooperative Institutes Program Office

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