NOAA Administrative Order (NAO) 216-115: Strengthening NOAA's Research and Development Enterprise

Procedural Handbook Appendices

Table of Contents

Appendix 1.1: Glossary for NAO Procedural Handbook

Activity: Activities are the processes through which NOAA uses assets to generate outputs. NOAA's activities represent what NOAA needs to do in order to achieve its corporate strategic objectives.

Conflict of Interest: Any financial or other interest which conflicts with the service of the individual on the review panel because it (1) could significantly impair the individual's objectivity or (2) could create an unfair competitive advantage for any person or organization.

Core Evaluation Criterion: A major category by which the research program is judged (e.g., quality, relevance, performance).

Effectiveness: A project or program produces the intended results or strategic objectives.

Efficiency: Achieving the desired objective while minimizing the expenditure of resources, i.e., time, funding, labor, and materials/equipment.

Enterprise: an entity comprised of interdependent resources (e.g., people, processes, organizations, technology, funding) that interact with each other (to, e.g., coordinate functions, share information, allocate funding) and their environment to achieve goals. Enterprise and its boundary are virtual constructs that depend on the make-up, authority, and roles of the participating actors in a community of interest. Enterprises exhibit attributes of a complex adaptive system: they are evolutionary, emergent, adaptive, self-organizing, competitive and cooperative.

Function: Functions are required to execute the mission, consistent with the NOAA Functional Model. NOAA's functions are the highest-level categorization of NOAA's activities and are comprehensive—that is, all activities conducted by NOAA can be traced to a function. In this manner, all contributors to NOAA's mission can see how their activities support the plan. While activities are the particular things that NOAA does, functions are broad categories of these activities.

Goal: Goals specify the components of NOAA's vision, translating the vision into a limited number of high-level results that NOAA will seek to achieve. NOAA's strategic goals are outcome-oriented—that is, they specify future social, economic, and environmental conditions that the agency is committed to achieving, and how society will benefit from NOAA's success. The timeframe for NOAA's strategic goals is multi-decadal.

Mission: NOAA's mission summarizes the agency's fundamental mandates and responsibilities. It is a succinct and distinctive statement of what NOAA does. The mission statement encapsulates the set of statutory requirements that drive NOAA's functions, and is assumed to be stable over the planning period.

Objective: Objectives further describe strategic goals or enterprises by detailing the societal, environmental, or organizational benefits that NOAA seeks to achieve in the five year time

frame. Objectives toward goals are outcomes for society and the environment, whereas objectives toward enterprises are outcomes for NOAA to achieve its goals. Objectives should be specific, measureable, attainable, realistic, and time-bound (SMART).

Peer Review: A widely used, time-honored practice in the scientific and engineering community for judging and potentially improving a scientific or technical plan, proposal, activity, program or work product through documented critical evaluation by individuals or groups with relevant expertise who had no involvement in developing the object under review (NRC, 2000).

Performance: Described in terms of both effectiveness (the ability to achieve useful results) and efficiency (the ability to achieve quality, relevance and effectiveness in a timely fashion and with little waste) [NAO]. Operational definition for research: The core evaluation criterion that considers how research activities are progressing relative to milestones and benchmarks as well as all aspects of how research is conducted, including all components that feed into creating a high quality research enterprise (e.g., leadership, innovation, planning, monitoring, efficiency and effectiveness of processes, resource utilization, reporting).

Planning: The formal process of establishing missions, goals and objectives (strategic planning) and describing how the goals and objectives are to be achieved by establishing performance expectations and resource requirements (implementation planning).

Portfolio: A set of investments that yield benefits, have costs and associated risks. Through management of a portfolio, NOAA can explicitly assess the tradeoffs among competing investment opportunities in terms of their benefits, costs, and risks.

Portfolio Balance: The proportion of research projects (or resources) in a portfolio that are allocated among categories (e.g., among strategic goals, topics, risk, research horizon, investment). Such an analysis is used to evaluate whether research priorities are being adequately addressed.

Program: Throughout the evaluation chapter, the term "Program" is inclusive of laboratories, science centers, programs (e.g., OAR's Office of Weather and Air Quality), and matrix organizations (e.g., Coral Reef Conservation Program).

Quality: A measure of the novelty, soundness, accuracy, and reproducibility of a specific body of research [NAO]. Operational definition for research: The core evaluation criterion that establishes the relative merit and repeatability of the research or program relative to that of contemporaries in the community of practice. This is a measure of the outputs (i.e., all products and services) delivered by the project or program, whether the scientific methodologies were adhered to and appropriate, and the thoroughness of methodology documentation.

Relevance: A measure of how well a specific body of research supports NOAA's mission and the needs of users and the broader society [NAO]. Operational definition for research: The core evaluation criterion that establishes how the research aligns with the strategic plan and priorities of the agency as demonstrated by links to validated agency requirements, key

legislative mandates, administration priorities and societal benefits.

Strategic plan: a plan that identifies what NOAA should produce in the future (i.e., outputs), and why those are important (i.e., outcomes). Distinguishing between outcomes and outputs gives flexibility to change agency activities while staying true to its overall purpose.

Strategy: explains what the agency intends to do and why it intends to do it. It relates a statement of output (e.g., mission, functions or activities) to a statement of outcome (e.g., vision, long-term strategic goals or objectives) to succinctly convey NOAA's fundamental purpose, direction, and value to society.

Vision: An envisioned future state of society and the environment that, implicitly, cannot be achieved without NOAA. The vision describes long-term success in terms of the value that NOAA will generate for society—in effect, why the agency exists. The timeframe for NOAA's vision is multi-decadal.

Appendix 1.2: References for NAO Procedural Handbook

Moore, Rosen, Rosenberg, Spinrad, Washington, & West (2004): *Review of the organization and management of research in NOAA: A report to the NOAA science advisory board by the research review team.* Silver Spring, MD: National Oceanic and Atmospheric Administration (NOAA) Science Advisory Board. Retrieved from www.sab.noaa.gov/Reports/RRT_Report-080604.pdf

National Oceanic and Atmospheric Administration (NOAA), US Department of Commerce (2010): *NOAA's next generation strategic plan.* Silver Spring, MD. Retrieved from http://www.ppi.noaa.gov/wp-content/uploads/NOAA_NGSP.pdf

NOAA: NOAA Administrative Order NAO 200-3: The NOAA Administrative Order Series

NOAA (2008): NOAA Administrative Order 216-105: Policy on transition of research to application. Retrieved from http://www.corporateservices.noaa.gov/ames/administrative_orders/chapter_216/216-105.html

NOAA (2011): NOAA FY 2012 Budget Blue Book

NOAA Research and Development Enterprise Project Database

NOAA National Ocean Service (NOS) (2009): NOS Science Review Guidelines draft.

NOAA Office of Oceanic and Atmospheric Research (OAR) (2010): Laboratory Science Review Implementation Plan.

NOAA OAR Research and Development Project Database

NOAA Performance Measure Working Group (2005): Performance Measure Guidelines.

NOAA Research Council (2008): *Research in NOAA: Toward understanding and predicting earth's environment, A five year plan: Fiscal years 2008-2012.* Retrieved from http://www.nrc.noaa.gov/plans_docs/5yrp_2008_2012_final.pdf

NOAA Research Council (2008): NOAA 20 year research vision: Understanding global ecosystems to support informed decision-making. Retrieved from http://www.nrc.noaa.gov/plans_docs/new_noaa.pdf

Office of Management and Budget (OMB) (2003): FY 2005 Interagency Research and Development Priorities.

OMB (2004): Final Information Quality Bulletin for Peer Review.

OMB (2009): Increased Emphasis on Program Evaluations, Memorandum for the Heads of Executive Departments and Agencies from Peter R. Orzag, Director of the Office of Management and Budget (M-10-01). Retrieved from http://www.whitehouse.gov/omb/assets/memoranda_2010/m10-01.pdf

Sandifer, & Dole (2010): *Strengthening NOAA science: Findings from the NOAA science workshop, April 20-22, 2010.* National Oceanic and Atmospheric Administration, US Department of Commerce. Retrieved from http://www.nrc.noaa.gov/plans_docs/2010/Science_Workshop_WP_FINAL.pdf

U.S. Government Accountability Office (GAO) (1999): Federal Research: Peer Review Practices at Federal Science Agencies Vary. Retrieved from http://www.er.doe.gov/bes/rc99099.pdf

Appendix 1.3: Abbreviations Used in NAO Procedural Handbook

AA   Assistant Administrator

AOP   Annual Operating Plan

BSC   Balanced Scorecard

CMR   Committee for Monitoring Research

CRADA   Cooperative Research and Development Agreement

CS   NOAA Chief Scientist

FACA   Federal Advisory Committee Act

FY   Fiscal Year

LO   Line Office

NAO   NOAA Administrative Order

NOAA   National Oceanic and Atmospheric Administration

NOS   National Ocean Service

OAR   Office of Oceanic and Atmospheric Research

OMB   Office of Management and Budget

R&D   Research and Development

RC   NOAA Research Council

SAB   NOAA Science Advisory Board

SBIR   Small Business Innovation Research

SEE   Strategy, Evaluation, and Execution

SO   Staff Office

SONR   State of NOAA Research Report

Appendix 1.4: Maintenance, Updating and Distribution of the Handbook

The appendix establishes the procedure for maintaining, updating and distributing the Handbook for NAO 216-115: Strengthening NOAA's R&D Enterprise. The NOAA Research Council (RC) will be responsible for implementing this procedure. The Handbook will be reviewed and revised regularly on an annual basis.

A. The RC will establish and maintain an email list of subscribers that are interested in receiving the future changes to the Handbook.

B. The users of the Handbook are advised to direct questions, comments and suggestions to a permanent email address NAO.Strengthening.Science@noaa.gov. The RC's Committee for Monitoring Research (CMR) will collect the feedback and address questions throughout each Fiscal Year (FY).

C. At the end of the second Quarter of each FY, the CMR will brief the RC on the opportunities to improve the handbook based upon issues identified during usage and NOAA feedback that has been collected during the previous year. The RC will determine appropriate revisions.

D. At the end of the third Quarter of each FY, the CMR will brief the RC on the Handbook update, and provide the revised Handbook for review.

E. In September, the RC will provide formal approval, and post the final updated version of the Handbook on the RC Website.

F. At the beginning of the first Quarter of each FY, the RC will distribute notices of any updates to the Handbook via the email subscriber list and other available platforms.

In addition to these planned annual updates, the Handbook can be updated at other times by the RC if warranted by compelling issues and opportunities identified by leadership requests, NAO revision, or significant changes to the Strategic Execution and Evaluation (SEE) process. Any updates to the Handbook must be reviewed and approved by the RC.

APPENDIX 3.1

(Of Chapter 3: Monitoring)

National Oceanic and Atmospheric Administration (NOAA)

Research Committee

Committee for Monitoring Research (CMR)

Drivers, Benefits, and Functional Requirements Definition

For

NOAA Enterprise

Research and Development (R&D)

Projects Portfolio Management System (PPMS)

1   INTRODUCTION

1.1 Why Manage R&D projects?

The ability to develop and manage R&D projects is essential to successfully achieving program outcomes and providing NOAA's mandated services to the American people. To communicate and prioritize research investments, management must have a clear understanding of projects, what functions they will perform, and how new capabilities, products, or information will integrate into the larger NOAA enterprise and its mission. Additionally, management must understand how projects are performing relative to approved milestones, and timelines for completion or transition of project deliverables to operations or applications.

Effective management of science R&D investments starts with a clear expectation of the project its outcomes and/or deliverables, and its budget. Lack of initial clarity will likely lead to disappointment as management sees the science R&D project they thought they understood looking different, costing more or taking longer than expected to complete.

This *Enterprise R&D Project Portfolio Management System (PPMS) Requirements Definition (RD)* is intended to serve as a bridge, enabling R&D project managers/leads to establish clear mutual expectations and agreement with management.

1.2   Purpose of the Functional Requirements Definition Document

The intended audience of the Functional Requirements Definition is the R&D project manager/lead, R&D project sponsor, R&D project team, management, client/user, and any stakeholder whose input/approval into the requirements definitions process is needed.

This RD document establishes NOAA's management expectations, and captures the organizational agreement, and criteria for the R&D PPM project success. It will ensure that the affected organizations are engaged and aligned around a common vision.

2   BUSINESS REQUIREMENTS OVERVIEW

2.1   BACKGROUND

2.1.1   Workshop on Strengthening NOAA Science

On April 20-22, 2010, seventy scientists and science manager from across NOAA's Line and Staff Offices attended the "Workshop on Strengthening NOAA Science." The purpose of this workshop was to brainstorm and discuss both the grand science challenges facing NOAA and opportunities to improve how NOAA conducts its science. The findings from the workshop are documented in the "Strengthening NOAA Science Findings from the NOAA Science Workshop April 20-22, 2010" whitepaper prepared by the NOAA Science Workshop Program Committee. Several identified challenges are discussed in the section that follows.

2.1.2   Workshop Findings –Science Challenges

2.1.2.1   NOAA's Science Goal

The workshop described NOAA's grand science challenge as "(to) develop and apply holistic, integrated Earth system approaches to understand the processes that connect changes in the atmosphere, ocean, space, land surface, and cryosphere with ecosystems, organisms and humans over different scales" (i.e., A holistic understanding of the Earth system through research). The overarching grand challenge is referred to in this document as *NOAA's Science Goal.*

2.1.2.2   The Problems (Major Science Challenges)

In addition to the overarching grand challenge (*NOAA's Science Goal*), several major science challenges and science risks and uncertainties were identified. To meet NOAA's Science Goal the major science challenges must be addressed, and their risks and uncertainties must be tracked and managed. The science challenges are to:

- Acquire and incorporate knowledge of human behavior, societal values, and economics into our weather, climate, and ecosystem assessments to enhance our understanding of the interaction between human activities and the Earth system;

- Understand and quantify the interactions between atmospheric composition and climate variations and change;

- Understand and characterize the role of the oceans in climate change and variability and the effects of climate change on the ocean and coasts, including biological, chemical, and geophysical effects (e.g., sea level rise, ocean acidification, living marine resources);

- Assess and understand the roles of ecosystem processes and biodiversity in sustaining ecosystem services and the connections among ecosystem condition, resilience, and the health of marine organisms, humans, and communities;

- Improve understanding and predictions of the water cycle from global to local scales to improve our ability to forecast weather, climate, water resources and ecosystem health;

- Develop and evaluate approaches to substantially reduce environmental degradation, overfishing, and climate change in ways that maximize benefits and minimize adverse impacts; and

- Sustain and enhance atmosphere-ocean-land-biology and human observing systems, and their long-term data sets, and develop and transition new observing technologies.

2.1.3   Project Needs Statement (purpose and use)

The "Strengthening NOAA Science Findings from the NOAA Science Workshop April 20-22, 2010" document stated "To achieve NOAA's overarching grand challenge, NOAA science must improve understanding of the causes and consequences of climate variations and change, including

the interactions between atmospheric composition and climate, and the physical, chemical, biological and ecological impacts" It also stated that this " is critical to NOAA's mission and mandates and will require many partners, both nationally and internationally. At the same time, the agency has unmatched and distinguished capabilities in its core areas of science expertise."

NOAA's science goal will be achieved through improved collaboration with a wide array of partners both internal and external (government, private, academia. etc). NOAA must provide information that will improve the public well- being while supporting and protecting the planet's life system. There is a need for improved communication between NOAA and society so that the benefits of its science-based outcomes are known and understood.

High capacity computing capabilities are necessary to support the NOAA science goal and NOAA's global scientific leadership. Enterprise standards should be implemented to ensure the integrity of scientific information. For example, an "enterprise-wide NOAA science dictionary for ecosystems, earth system, climate, weather, variability, uncertainty, social science and its subcategories would improve communication and collaborations among scientists from different disciplines and backgrounds."

Finally, there is a need for an Enterprise Database for collaboration, analysis of information for decisions, tracking and monitoring, alignment of funds, and easy retrieval of information about all of NOAA's R&D projects. Systematic monitoring of NOAA R&D is needed to:

- Inform investment decisions;
- Articulate the value of R&D;
- Improve quality and performance;
- Ensure adequate peer reviews; and
- Develop enhanced communication, collaboration, and transparency across NOAA's Line and Staff Offices.

2.2   CURRENT METHODS AND PROCEDURES

Currently, each individual Line and Staff Office has distinct processes/methods for collecting, storing, tracking, monitoring, and sharing information about their R&D and funding among their areas to satisfy the NOAA Science Goal (database system, spread sheet, etc). There is some communication, collaboration, and information sharing among internal (i.e. NOAA Line and Staff Offices) and external partners, usually ad hoc.

2.3 DEFICIENCIES

Tracking and analyzing NOAA's R&D funding and performance data is a fundamental premise of the Research Council charter and essential to managing NOAA's R&D portfolio. The Committee for Monitoring Research (CMR), a subcommittee of NOAA's Research Council, was established, in part, to develop and implement a corporate R&D data management strategy.

NOAA's success is often hampered by erratic funding processes, inability to make long-term funding commitments, and the administrative burden of MOUs that make NOAA an unattractive partner for collaboration.

Current methods and procedures employed to satisfy the NOAA Science Goal through collaboration and information sharing are lacking. There are disparate and inconsistent processes and systems among the NOAA enterprise.

The current methods do not provide a holistic assessment of the R&D portfolio across NOAA based on performance and benefits due to these disparate processes.

2.4 BENEFITS

There are many benefits to having a NOAA R&D Projects Enterprise Database System. The benefits are the ability to:

- Identify, track and facilitate transition projects (i.e. research-to-applications using NOAA-adopted technical readiness levels (as recommended by SAB, 2004)
- Track and align Funds
- Share information across NOAA's enterprise
- Provide Corporate Reporting
  - GPRA
  - Balanced Score Card (BSC)
  - Annual Performance Plan (APP)
  - Annual Operating Plan (AOP)
  - Others
- Direct input and access into decision making process. Help Directors make better informed decisions
- Plan, schedule, and track execution and evaluation
- Improve communication, collaboration, coordination and planning across NOAA
- Decrease project redundancy while increasing alignment across NOAA
- Identify, assess, and mitigate risk
- Capture trends in R&D investments

- Answer strategic portfolio questions to determine if NOAA is investing the right amount of money in the right applications at the right time to best accomplish its R&D and mission goals
- Better assess the impact of NOAA science and technology (S&T) investments
- Document outcomes and milestones
- Market NOAA's successes and societal benefits via dashboards and reports with online/public access

2.5   PROJECT ASSUMPTIONS / CONSTRAINTS

Assumptions

Below is a list of assumptions required to ensure the success of the R&D PPM project

- *Resource Assumptions*
  - Project staff resources will be available when and as they are needed.
  - Required hardware resources will be available when and as they are needed.
  - Required customer resources will be available when and as they are needed.
  - Partners and stakeholder resources will be available when and as they are needed.
- *Environment Assumptions*
  - Access to industry experts and specialized skills will occur as needed.
  - A "full-time" resource implies at least 35 hours productive work per week.
- *Organizational Assumptions*
  - No industrial action will be taken that will affect the project.
  - No Federal mandates, policies, laws will be enacted that will affect the project
  - Issues will be resolved in a timely manner.
  - The project team described in the project plan will be put in place.
  - All Line and Staff Offices buy-into and support the project
  - Systems components will be capable of being integrated with minimum rework.
- *Funding Assumptions*
  - Fully funded
  - On schedule and at the cost specified
- *Functionality Assumptions*
  - The scope of the project is limited to that described in the project charter.
  - Formal charter and scope change procedures will be followed.

Constraints

Below is a list of constraints or project limits.

- *Resource Constraints*
  - Key stakeholders/partner resources will be available on a limited basis.
  - The customer has limited staff capable of adequately describing in detail the functional requirements of the system.

- o The customer has limited staff capable of adequately describing in detail the operational requirements of the system.

- o A significant percentage of the project team will not be experienced with implementing the database requirements,

- *Organizational Constraints*
  - o Approval of all Line and Staff Offices Key decision-makers will require time

- *Functionality Constraints*
  - o The project depends upon receiving data from other, external applications.

- *Federal Laws/Mandates/Policies Constraints*
  - o The project and system must adhered to all Federal mandates, laws, policies including security

2.6 SCOPE

Develop and use a NOAA Enterprise R&D Projects Portfolio Management System (PPMS) to meet the challenges by implementing process changes and creating a management tool to collect, track, analyze, and monitor R&D projects and money, manage the transition portfolio, provide reporting capability, and increase collaboration among both internal and external partners.

2.7 PROJECT OVERSIGHT

The project is major and is a necessity to improve and support strengthening of NOAA's science. The project oversight authority is the NOAA Research Council lead by NOAA's Chief Scientist.

2.8 PROJECT MANAGEMENT

The Office of Oceanic and Atmospheric Research (OAR) will provide project management. The Line and Staff Offices are responsible for collaboration, providing and sharing information, and attending meetings.

3 FUNCTIONAL REQUIREMENTS

The Functional Requirements captured below specify intended behavior of the R&D project portfolio management system. System calculations, data manipulation and processing, user interface, interaction with the application, and other specific functionality showing how the user requirements are satisfied are listed.

NOAA R&D must meet the highest standards, and this system is a tool to capture and calculate a

variety of metrics that can be used to analyze and demonstrate the performance (P), quality (Q), and relevance (R) of NOAA's projects and programs.

GENERAL

FIELDS AND RECORDS

3.1.1   The system shall allow for unique identifiers (P, Q, R)

3.1.2   The system shall allow permission/accessibility level – when entering data, performing edits, reviewing, public access, Line Offices access, field restrictions (P, Q, R)

3.1.3   The system shall allow new windows for data entry/updates (P, Q, R)

3.1.4   The system shall allow *Yes/No* checkbox (P, Q, R)

3.1.5   The system shall have *Drop-Down* lists/menus, check boxes, radio buttons capability (P, Q, R)

3.1.6   The system shall have date fields (P, Q, R)

3.1.7   The system shall allow for time, date, name stamp (user) (P, Q, R)

3.1.8   The system shall allow free text such as for descriptions and comments (P, Q, R)

3.1.9   The system shall have a public interface with select fields (Q, R)

3.1.10 The system shall allow multiple users to access records without overwriting (Q, R)

3.1.11 The system shall allow phased-in core/required fields (P, Q, R)

3.1.12 The system shall allow field locking (P, Q, R)

3.1.13 The system shall allow version control capability (P, Q, R)

3.1.14 The system shall allow data to be archived (P, Q, R)

3.1.15 The system shall allow for trends/historical extrapolation (P, Q, R)

3.1.16 The system shall allow replacing/updating field data while keeping a record of the old information such as POC and Project Manager (P, Q, R)

3.1.17 The system shall have the capability to automatically populate fields based on known criteria or cases or business rules (R)

3.1.18 The system shall allow mapping (ex. research project to milestone to performance measure to goal/objective) (P, Q, R)

3.1.19 The system shall have the capability for different menus for different organization components (P, Q, R)

REPORTS, GRAPHS, SPREADSHEETS

3.1.20 The system shall have reporting capability of the R&D projects (P, Q, R)

3.1.21 The system shall provide "sample" reports and input (P, Q, R)

3.1.22 The system shall provide standard reports templates such as annual operating plan (AOP) (P, Q, R)

3.1.23 The system shall have spreadsheets, column, and row specific order (P, Q, R)

3.1.24 The system shall allow export / import to word, excel, .pdf, e-mail (P, Q, R)

3.1.25 The system shall create reports that include both text and charts (pie, bar, line, etc.) graphing/charting capability (P, Q, R)

3.1.26 The system shall allow ad-hoc reports, charts, graphs, dashboard, text (P, Q, R)

SEARCHES AND SORTS

3.1.27 The system shall have the capability to open/link to documents, websites, images, SharePoint in new window (R)

3.1.28 The system shall have repeatable search capability (P, Q, R)

3.1.29 The system shall have word search across all fields (P, Q, R)

3.1.30 The system shall have selection of search fields capability (P, Q, R)

3.1.31 The system shall have character string search capability (P, Q, R)

3.1.32 The system shall have the capability to review search results, edit-live the results, change/modify search, refine – filtering function (P, Q, R)

3.1.33 The system shall have the capability to search by keywords provided for an abstract for a peer-reviewed journal (Q, R)

3.1.34 The system shall allow customizable (ad-hoc) search capability (Q, R)

3.1.35 The system shall have all fields sort capability (P, Q, R)

3.1.36 The system shall have tiered sorting by field (P, Q, R)

PRINTS

3.1.37 The system shall have printing capability (P, Q, R)

WORKFLOW, DATES, E-MAIL AND CALCULATIONS

3.1.38 The system shall have workflow capability with review, authorization, and approval mechanism (P, Q, R)

3.1.39 The system shall allow tasking (ex. within workflow) of system users to perform data entry (P, Q, R)

3.1.40 The system shall allow notification to POC that data/information/project is ready for review or approval (P, Q)

3.1.41 The system shall allow management review of entered data before data are accepted and becomes part of the official data set (P, Q, R)

3.1.42 The system shall calculate missed project, milestone, deliverable end/due date and flag the project (P, Q)

3.1.43 The system shall have the capability to send flags/alerts of missed project, milestone, deliverable end/due date to POC (P, Q)

3.1.44 The system shall have the capability to send e-mail notifications (ex. if a due date is missed) (P, Q)

3.1.45 The system shall have repeatable calculation capability (P, Q, R)

LINE OFFICES

3.1.46 The system shall provide flexibility for each Line Office to customize report contents (Q, R)

3.1.47 The system shall allow Line Offices to customize the contents of Drop-Down lists by including only relevant items for lists that have an officially mandated set of items (Q, R)

3.1.48 The system shall allow Line Offices to customize the contents of Drop-Down lists by using an alternate set of items for lists that do not have an officially mandated set of items (Q, R)

3.1.49 The system shall allow the option to enter more than one line office and/or laboratory/program as appropriate (P, Q, R)

OTHER

3.1.50 The system shall allow entering more than one POC (primary and backup) (P, Q, R)

3.1.51 The system shall allow entering more than one Project Manager and Team Lead (primary and backup) (P, Q, R)

3.1.52 The system shall provide on-line help options such as definition of data elements, tutorial, etc. (P, Q, R)

3.1.53 The system shall have an on-line user and system documentation with the capability to print out (P, Q, R)

3.1.54 The system shall have the ability to enter the expected R&D outcomes/output/deliverables (P, Q, R)

3.1.55 The system shall track the outputs/deliverables, outcomes, and evaluations from the R&D projects (P, Q, R)

3.1.56 The system shall include expectations of each project of achievements/findings and implications, outcomes, and benefits for science, society, and/or management (P, R)

3.1.57 The system shall calculate total number of contractors, cooperative institute (CI) scientists, partners, in labs, science centers, program offices, and headquarters (HQ) for fiscal year (FY) (P, Q, R)

3.1.58 The system shall allow Congressional relations staff and internal affairs staff as needed to access the database (R)

3.1.59 The system shall allow entering multiple milestones and deliverables per project per FY (P, Q, R)

3.1.60 The system shall allow entering multiple milestones and deliverables per project per FY for multi-year grants (P, Q, R)

3.1.61 The system shall allow multiple requirements and constraints identified for each milestone for example: FY 2010 Appropriation; 24 CFR 1332 (a); best management practice; NOAA Government Performance and Results Act of 1993 (GPRA) report; legal requirement; Congress directed (only applicable if milestone level is financial management center (FMC)) (P, R)

3.2   FINANCIAL (P, R) (<u>EXACT REQUIREMENTS TBD</u>)

3.2.1 The system shall track funding for specific R&D projects

3.2.2 The system shall track the division of R&D funds between intramural and extramural R&D

3.2.3 The system shall track the total amount of National Oceanic and Atmospheric Administration (NOAA) funds transferred to the Lab/PO/HQ and executed (or planned for execution) for the project in the current FY and provide the NOAA transfer fund source(s)

3.2.4 The system shall track the NOAA transfer fund source(s)

3.2.5 The system shall track Non-NOAA reimbursable funds source(s)

3.2.6 The system shall indicate the deliverable towards which the reimbursable(s) is(are) being used

3.2.7 The system shall track total amount of base funds, excluding overhead, executed (or planned for execution) per project in the current FY (overhead)

3.2.8 The system shall automatically generate all costs executed in current FY for the project (= transfer funds + reimbursable funds + base funds)

3.2.9 The system shall allow selecting and tracking corresponding institution(s) and funding amount(s) for each separately

3.2.10 The system shall automatically generate percentage of financial resources spent within agencies of the Federal Government

3.2.11   **The system shall automatically generate percentage of financial resources spent outside of Federal Government agencies**

3.2.12   **The system shall track Current / Executed Funds**

3.2.13   **The system shall track Next Year's (projected) Funds**

3.2.14   **The system shall track Actual Funds received**

APPENDIX 3.2

(Of Chapter 3: Monitoring)

NOAA ENTERPRISE RESEARCH AND DEVELOPMENT PROJECTS PORTFOLIO MANAGEMENT

DATA FIELDS

Background:

The table below summarizes the proposed data fields to be included in the NOAA Enterprise Research and Development Database. It includes field names and their definitions.

Field ID #	Field Name (Main Fields)	Field Name (1st Sub Fields)	Field Name (2nd plus Sub Fields)	Definition	Comments

					CONTACT INFORMATION
	Project Unique Identifier				Core Field. This will be automatically generated for each project
	Line Office Specific Project Unique Identifier			An identifier that may be use by a Line Office to cross reference a project in another database.	Common Field. Entered manually
	NOAA POC First Name			The Point of Contact (POC), a NOAA staff, is the designated owner of the data. The POC will provide clarification and explanation and will contact PI, Partner, and others if necessary.	Core Field. Enter POC First Name in a Text Box.
	NOAA POC Last Name			The Point of Contact (POC), a NOAA staff is the designated owner of the data. The POC will provide clarification and explanation and will contact PI, Partner, and others if necessary.	Core Field. Enter POC Last Name in a Text Box
		POC email address		The email address is the address that will be used to contact the POC (from LDAP).	Core Field. Enter POC email in a Text Box
		POC telephone number		The office and/or cell telephone will be used to contact the POC (from LDAP).	Core Field. Enter POC telephone # in a Text Box (allow multiple entries - both office and cell numbers)
		POC Line or Staff Office		The official Line or Staff Office currently assigned to the POC (from LDAP).	Core Field. Enter POC Line or Staff Office in a Text Box
		POC Program Office/Lab		The official POC Program Office/Lab currently assigned to the POC (from LDAP).	Core Field. Enter POC Program Office/Lab in a Text Box

	PI/Team Lead First Name			The Principle Investigator (PI) is the lead investigator on the project. The PI provides clarification and explanation to the POC and guidance to the other Partners if necessary. Could be the same person as the POC	Core Field. Enter PI First Name in a Text Box (If the PI and POC are the same, all the POC information will be entered automatically.)
	PI/Team Lead Last Name			The Principle Investigator (PI) is the lead investigator on the project. The PI provides clarification and explanation to the POC and guidance to the other Partners if necessary.	Core Field. Enter PI Last Name in a Text Box
		PI email address		The email address is the address that will be used to contact the PI.	Core Field. Enter PI email in a Text Box
		PI Line or Staff Office (NOAA)		The PI affiliation internal.	Core Field. Enter PI Line or Staff Office in a drop-down.
		PI Affiliation (non-NOAA)		The PI affiliation, external.	Core Field. Enter PI Line or Staff Office in a Text Box Manually entered,
	Accountable Entity			The LO or Matrix Managed Science Program in which the project resides	Core field.
		Lab, Program Office, or Center		In which the project resides if not Matrixed.	Core field
PROJECT INFORMATION					
	R&D Project Title			The name of the Research and Development Project. This is the name the project will be known as and tracked by within the database system. Limit characters? Say 100?	Core Field. Enter the project tile in Text Box
		R&D Project Description		Summarize the *project* using layperson terminology addressing the following:	Core Field. Enter the project description in Text Box - Limit

				• Purpose/Need/Scope, including research question or hypothesis to be tested, if applicable • Research Objectives • Issues and/or problems addressed • Other affiliated projects • Research methods (*e.g.*, field measurements, modeling)	Character for example 255?
		Project URL		Enter the URL link if one exists for this project.	Common Field
		Link to other affiliated projects			Common field
	Expected Project Start Date			The expected start date of the project based on expected funds and other resources (month and year)	Enter date drop-down calendar
	Expected Project Completion Date			The expected completion date of the project based on expected funds and other resources (month and year or uncertain)	Enter date drop-down calendar
	Actual Project Start Date			The actual start date of the project (month and year)	Enter date drop-down calendar
	Actual Project Completion Date			The actual completion date of the project (month and year)	Enter date drop-down calendar
	PROJECT			Basic definition: NAO #216-115 Additional attributes: • Defined budget • Defined timeline (generally up to 4 yrs, the length of an Implementation Plan, but can be extended • Addresses a single hypothesis • Clearly defined endpoint, objective(s), and	

				deliverable(s) • Independent and discrete • Identified by program manager or other higher authority	
	TYPE OF PROJECT			The definitions below have been taken directly from the NAO	Core
		Basic Research		In discovery or basic research the objective of the sponsoring agency is to gain fuller knowledge or understanding of the fundamental aspects of phenomena and of observable facts without specific applications towards processes or products in mind.	
		Applied Research		In applied research the objective of the sponsoring agency is to gain knowledge or understanding necessary for determining the means by which a recognized and specific need may be met	
			Demonstration	Demonstration activities that are part of research or development (i.e., that are intended to prove or test whether a technology or method does, in fact, work) should be included. Demonstrations intended primarily to make information available about new technologies or methods should not be included.	
			Development	Development is the systematic use of the knowledge or understanding gained from research, directed toward the production of useful materials, devices, and systems or methods, including design, development, and improvement of prototypes and new processes. It excludes quality control, routine product testing, and production.	
		Technology		Basic definition: NAO#216-115	Transition to

		Transfer (i.e., transition to operation or application)		The collective set of activities necessary to transfer a research result, or collection of research results to operational status or to an information service. Additional attributes: • Defined recipient/beneficiary • Agreement between researcher/developer • 5 years or less to transition (to reach full operational or application status)	operations/application
			Do you have a transition plan?		Yes/no
			R2O or R2A Agreement	Such as a transition plan, LOA, in the NWS OSIP process, etc.	Dropdown
			Estimated Time-Frame to Transition	Month and year	Dropdown calendar
			Recipient or beneficiary of transition		Open field
PROJECT OUTPUTS/MILESTONES/OUTCOMES					
	Milestone(s)/output(s)			Output (list any Product (ex. Publication name submitted) service or process) that may be associated with the milestone	Enter information about the milestone for measuring performance. Require at least one per year.
		Milestone(s)/output(s) Expected		Month and year	Enter date drop-down calendar

		Completion Date			
		Milestone(s)/output(s) Actual Completion Date		Month and year	Enter date drop-down calendar
		Milestones Met?			Enter (Yes/No) answer
		If "No" Then Why?		Document why the milestones/outputs goals were not met. They may be legitimate reason why a milestone goal is not met such as bad weather, loss of funding, etc. Include steps to mitigate the effects of the missed milestone.	Text Explanation
	Benefit(s)			Include all expectations of achievements/findings and implications, outcomes, including, if appropriate, improvements in efficiency and effectiveness	Enter Project intended outcome(s)
		Project Intended Outcome(s)			(Text Fields)
PROJECT PARTNERS
	Project Partners			**(Co- Investigators)** **Recipients of grants, cooperative agreements, contracts, IAAs, and IPAs will be tagged here with a checkbox asking if partner receives funds from project.**	(Multiple selections allowed for each project and type of partner)
		Partners Internal to			(Multiple selections allowed for each project)

			NOAA		Drop-down list; select the appropriate
			Collaborators Laboratories/Centers/Program Offices/Head Quarter	If within the project's LO	(Multiple selections allowed for each project) Drop-down list; select the appropriate
			Collaborators Line and Staff Offices	If outside of the project's LO	(Multiple selections allowed for each project) Drop-down list; select the appropriate
			Collaborators Laboratories/Centers/Program Offices/Head Quarter	If outside of the project's LO	(Multiple selections allowed for each project) Drop-down list; select the appropriate
		Partners External to NOAA			(Multiple selections allowed for each project)
			Federal Government Agencies		(Multiple selections)
			State Government Agencies		(Multiple selections)
			International Government Agencies		(Multiple selections)

				International Private		(Multiple selections)
				Cooperative Agreement		(Multiple selections)
				Academia		(Multiple selections)
				Enter Partner Manually		(Multiple values may be entered. Message will be sent to administrator to verify entry such as spelling)
				State		
				Country.		
				Cooperative Institute(s) (CI)		
				Cooperative Science Center		
				Sea Grant		
				International Schools		Open field. Multiple entries.
				Domestic Schools		
				Other domestic schools not listed		(Multiple values may be entered)
PROJECT COST/FUNDING						

	Project annual cost. **(NOAA PI)**			Incoming funds or other types of incoming support to the project. Estimated or planned cost entered initially, then updated for budget revisions during the year (e.g., CRs), and final actual entered at after the end of the fiscal year.	All amounts as precise as possible, but at least to the nearest $K.
		Incoming funds			
			NOAA base funds within LO	E.g., from a Project Office or LO/SO CFO	
			Other NOAA base	Other LO/SO sources	Dropdown for source(s)
			Reimbursable funds	Sources from outside of NOAA such as other federal agencies, private sector, academia	Dropdown for sources(s) (To be linked to partnership field)
		Leveraged costs			
			Matching funds	Matching funds from a partner, but no transfers directly to the project	Open field for source(s)
			Federal salaries	Paid for by some other program/project source, but applied to this project	
			Non-federal salaries	Such as contractors, IPAs, fellows, etc.	Dropdown for source(s)
			NOAA ship time	In days and translated into money	Dropdown for vessel name. This is a three-component field (days, money, vessel name).
			NOAA aircraft time	In hours translated into money	Dropdown for aircraft name. This is a three-component field (hours, money, aircraft name)
			NOAA high performance computer (HPC) time	In hours and translated in money	Dropdown for HPC name. This is a three-component field (hours, money, HPC name).

			Other indirect costs	Sources of project support, but no actual funds coming into the project, such as in kind support	
		NOAA funds – selected outlays		A small subset of the outgoing financial support for the project to document external partnerships. The project partners (above) will be "tagged" with funding as appropriate to avoid double entries of partner names.	
			Federal FTEs		# of FTEs and their costs
			Non-Federal FTEs	Such as contractors, IPAs, fellows, etc.	# of FTEs and their costs Dropdown for source
			Contracts		
			NOAA ship time	In days and translated into money	Dropdown for vessel name. This is a three-component field (days, money, vessel name).
			NOAA aircraft time	In hours translated into money	Dropdown for aircraft name. This is a three-component field (hours, money, aircraft name)
			NOAA high performance computer (HPC) time	In hours and translated in money	Dropdown for HPC name. This is a three-component field (hours, money, HPC name).
	Project annual cost (non-NOA PI)				
		Financial award type		Grant, cooperative agreement, contract, interagency agreement	Dropdown
			Direct costs		Paid directly by the financial award
			FTEs		# and cost

			Subcontracts		Just the amount
			Other		Just the amount.
			Leveraged costs	Not paid directly from the financial award	
			Matching		
			FTEs		# and cost
			Equipment		Estimate cost No specification of type
			Travel		Estimate cost
			Other		Specify (open field) Estimate total cost
PROJECT PERFORMANCE					
	Next Generation Strategic Plan (NGSP), Evidence of Progress (EOPs)				Multiple selections allowed. Each EOP is aligned/associated with an objective. Objective(s) fields will be automatically populated and displayed, and stored in the database.
		Objectives		There are 28 objectives	Auto-filled
		Goals		There are 4 Goals and 3 Enterprise Objectives	Auto-filled
	NOAA Five Year Research Plan Milestone(s)				Milestone(s) associated with objective and will be automatically selected (This set of fields will be revised when the new NOAA Five-Year

				Research Plan is revised.)
		NOAA Five Year Research Plan Performance Objective			Objective associated with Area and will be automatically filled-in
		NOAA Five Year Research Plan Research Area			Drop-down list to select the research area that supports the NOAA Goal for the *project*
	Project Higher level Performance Measure(s)			To which the project partially or completely contributes	
		GPRA?		Government Performance Results Act	Dropdown with multiple selections allowed
		Balance Score Card?			Dropdown with multiple selections allowed
		Annual Performance Plan			Dropdown with multiple selections allowed
		Annual Operating Plan Milestone(s)			Will be a linked into the quarterly milestone field.

Appendix 4.1: Evaluation Descriptions for Quality, Relevance, and Performance of NOAA Research Programs

The following criteria descriptions are guidelines for developing policies in Line Office-specific implementation plans. Standard criteria listed below are used to establish the assessment baseline "Meets Expectations." Standard criteria for meeting expectations can be augmented with additional base expectations as appropriate. Not all evaluation questions listed below will be appropriate for every review.

A. Quality

Assess the relative strength of the Program's R&D. Evaluate the quality of the R&D outputs (and education/outreach, if applicable) of the program. Assess progress toward meeting the goal of conducting preeminent research.

Criteria for meeting expectations

- Program scientists and leadership are recognized for excellence through collaborations, research accomplishments, and national and international leadership positions.
- Programs have clear guidelines to ensure the quality of R&D products, including peer review, scientific integrity, data quality, and data management.
- … others as appropriate to the Program

Evaluation Questions to consider

- Does the Program conduct (or oversee/fund) preeminent research? Are the scientific products and/or services meritorious and significant contributions to the scientific community?
- How does the quality of the Program's R&D rank among programs in other U.S. Federal agencies? Other science agencies/institutions?
- Do Program researchers demonstrate scientific leadership and excellence in their respective fields (e.g., through collaborations, research accomplishments, externally funded grants, awards, societies)?
- (If applicable) What is the quality of outreach programming and products? How is the quality of communications and education programs maintained / improved?

The following Indicators of Preeminence may help assess these questions.

- o Bibliometric representation of scientific literature output
  - A Program's total number of refereed publications per unit time, per scientific Full Time Equivalent staff (FTE), and/or per dollar invested
  - The number of citations for scientific staff by individual or some aggregate
- o Technologies transferred to operations/application (e.g. observing systems, information technologies, numerical modeling algorithms)

- o Research products, information, and services delivered to and used by stakeholders
- o Patents, Cooperative Research and Development Agreements (CRADAs), and other activities with industry
- o Collaborations with national and international research groups, both inside and outside of NOAA, as well as reimbursable support from non-NOAA sponsors
- o Contributions of data and expertise to national and international databases, programs, and state-of-science assessments
- o Service of individuals to: technical and scientific societies (e.g., journal editorships, boards or executive-level offices), U.S. interagency groups, international research-coordination organizations, international quality-control activities (to ensure accuracy, precision, inter-comparability, and accessibility of global data sets)
- o Memberships or fellowships in prestigious science organizations (e.g., National Academies of Sciences or Engineering, American Meteorological Society, American Geophysical Union, or American Association for the Advancement of Science)
- o Awards or other recognition received by groups and individuals for research, development, application, and/or service

B. Relevance

Assess the degree to which the research and development (R&D) enterprise of the Program is relevant to NOAA's mission, current priorities, and of value to the nation.

Criteria for meeting expectations

- – The R&D enterprise of the Program is tied to NOAA's mission, Strategic Plan, and Research Plan, and is of value to the nation.
- – … others as appropriate to the Program

Evaluation Questions to consider

- How well do R&D activities address issues/areas identified in the NOAA strategic and research plans or other policy or guiding documents?
- Do the R&D activities address existing (or future) societally-relevant needs (national and/or international)? Are there R&D topics relevant to national needs that the Program should be pursuing, but is not? Are there R&D topics in NOAA, Line Office, or Program plans that the Program should be pursuing, but is not?
- Are users/customers engaged to ensure the relevance of the research?

C. Performance

Assess how R&D is conducted. Specifically, assess the Program's overall effectiveness and efficiency planning and conducting R&D, given the resources provided, to meet NOAA strategic plan objectives and the needs of the nation. Evaluate three sub-areas: research leadership and planning, efficiency and effectiveness, and transition of research to applications/operations.

Criteria for meeting expectations

- The Program has clearly documented scientific objectives and strategies through strategic and implementation plans (e.g., AOP) and a process for evaluating and prioritizing activities.
- The Program management functions as a true team and continuously strives to improve the operation of the Program.
- The Program demonstrates effectiveness in completing its established objectives, milestones, and products.
- The Program strives to increase efficiency (e.g., through leveraging partnerships).
- The Program is effective and efficient in delivering products/outputs to applications, operations or users.
- … others as appropriate to the Program

Evaluation Questions to consider

Research Leadership and Planning
- Does the Program have clearly defined and documented scientific objectives, rationale, and methodologies for key projects and a selection process for new projects?
- Does the Program have an evaluation process for research projects: selecting / continuing those projects with consistently high marks for merit, application, and priority fit; ending projects; or transitioning projects?
- Does the Program have the leadership and flexibility to respond to unanticipated events or opportunities that require new research and outreach activities (i.e. time and resources)?
- Does the Program provide effective scientific leadership to and interaction with NOAA and the external community on issues within its purview?
- Does the Program management function as a team and strive to improve operations?
- Has the Program effectively responded to and / or implemented previous formal recommendations?

Program Efficiency and Effectiveness
- Does the Program execute its research in an efficient and effective manner, given the Program's goals, resources, and constraints? Are R&D investments being made in the right places (effectiveness)? Are the most economical R&D investments being made (efficiency)?

- Are research projects on track and meeting appropriate milestones and targets? If not, why, and how can effectiveness be improved?
- How well integrated is the work with NOAA's planning, budgeting, execution, and evaluation processes?
- Is the overall level of support provided by NOAA sufficient for efficient and effective operations? Are there institutional, managerial, resource, or other barriers to the team working effectively?
- Is the Program leveraging relationships with internal and external collaborators and stakeholders to maximize research outputs? Leveraging internal and external funds?
- Are human resources adequate to meet current and future needs? Does the Program provide professional development opportunities to its staff?
- Is infrastructure sufficient to support high quality research outputs?

Transition of Research to Operations/Applications/Users
- How well is the transition/dissemination of research to applications, operations and/or information services planned and executed?
- Does the Program's portfolio have an appropriate balance between transition and non-transition research?
- Has the Program defined who its stakeholders and end users are? Does it provide sufficient interactions/communication? Are end users of the R&D involved in the planning and delivery of applications and/or information services? Are they satisfied?

Appendix 4.2: Potential Evaluation Questions for NOAA Portfolio Reviews

A. Progress to Plan

Has NOAA made expected progress toward achieving Research Plan objectives? If not, why; and how can this be improved?

B. Relevance

Is the current set of NOAA R&D portfolio priorities relevant to its mission, strategic plan, administrator priorities, and the state of science and technology? If not, how should priorities be realigned?

Are there gaps that NOAA should be pursuing, but is not?

C. Portfolio Balance

Is the balance of the R&D portfolio aligned to expectations in the NOAA Research Plan?

- Mission balance: Does the relative balance of research among the strategic goals and objectives align with expectations? Among disciplines or topics? Are there portfolio gaps?
- Research type: Does the relative balance of basic research, applied research and development activities align with expectations?
- Research type: Does the relative balance of transformational vs. incremental (evolutionary) research align with expectations?
- Research timeframe: Does the relative balance of short term vs. long term research align with expectations?
- Research discipline: Does the relative balance of disciplinary vs. interdisciplinary align with expectations?
- Transition balance: Is there an appropriate balance of transition research that addresses priority user needs in the portfolio? What is the relative balance of science for understanding vs. science for application in the portfolio?
- Resources: Does NOAA provide sufficient resources for mission-critical R&D activities (financial, ship/air time)? Are resources appropriately apportioned among competing priorities?
- Extramural research: Does NOAA make appropriate use of extramural funding options (grants, contracts, cooperative agreements) to achieve mission objectives? Is intra vs. extramural research appropriately balanced; can greater efficiencies be achieved in research areas via external funding mechanisms?

Appendix 4.3: Supplemental Information for NOAA Benchmark Reviews

A. Sample of Peer Organizations for Comparison

Peer Organizations	Research Topics
Academic institutions	Various
Australian Department of Fisheries	Ecosystem Science & Fisheries
Department of Energy	Climate, Renewable Energy
Department of Fisheries and Oceans Canada	Ecosystem Science & Fisheries
Environmental Protection Agency	Atmospheric Science, Social Science
EUMETSAT	Climate, Weather, Satellites and Remote Sensing
European Severe Storms Laboratory	Weather
GEOSS	Satellites and Remote Sensing
International Panel on Climate Change	Climate
NASA	Climate & Weather
National Park Service	Social Science
National Science Foundation	Various
UK and Aus. Met offices	Weather
US Department of Agriculture	Ecosystem Science, Social Science
US Fish and Wildlife Service	Ecosystem Science & Fisheries
US Geological Survey	Climate, Ecosystem Science
Industry	Various

B. Potential Charge Questions for Benchmarking Evaluation Criteria

Relevance: NOAA Priorities and Outcomes

- What are high priority research issues that NOAA needs to address in the next 10 years to meeting anticipated societal needs?
- Does NOAA R&D effectively contribute to the agency's mission and the needs of society?
- Do NOAA R&D investments target appropriate areas to support NOAA's service mandates to the Nation?
- How well is NOAA achieving its mandated research responsibilities?
- Is there similar research that validates and corroborates NOAA research (useful redundancy)? Are there research areas that are unnecessarily duplicative that might drive an efficiency decision?
- What gaps does NOAA need to fill in its research portfolio? In the global research and scientific leadership communities?

Performance: Best Practices

- Does NOAA have effective and efficient processes to plan and manage its research portfolio?

- Are there best practices at other agencies that could improve NOAA's efficiency, effectiveness, scientific leadership, or performance management?
- Is infrastructure sufficient for a high-quality research enterprise?
- How well does NOAA manage its technology life cycle (end-to-end; research to operations/applications) relative to its peers?
- Is NOAA research effectively integrated across and collaborating with other agencies and partners to achieve our outcomes?

Appendix 4.4: Additional Documentation

Evaluating Federal Research Programs (NRC, 1999) (PDF)

Logic Model Development (NOAA, 2004) (DOC)

Performance Measure Guidelines (NOAA) (DOC)

Performance Measure Training: Fundamentals of Performance Measures (Grant Thorton/NOAA, 2006) (PPT)

Performance Plans: Selected Approaches for Verification and Validation of Agency Performance Information (GAO, 1999) (PDF)

Preparation and Submission of Strategic Plans, Annual Performance Plans, and Annual Program Performance Reports (OMB Circular No. A-11, Part 6, 2010) (PDF)

Thinking Strategically: The Appropriate Use of Metrics for the Climate Change Science program (NRC, 2005) (PDF)

Laboratory/Science Center/Program Review Documents

These documents were examined for best practices in creating the NAO Evaluation Handbook. With the approval of this handbook, these guidelines documents need to be updated to meet the requirements for enterprise-wide R&D evaluation.

Laboratory Science Review Implementation Plan: Guidelines for Planning, Conducting, and Implementing Recommendations from an OAR Laboratory Science Review (NOAA, 2010) (DOC)

National Sea Grant College Program Evaluation (NOAA, 2009) (PDF)

Proposal to Establish Systematic Processes for Regular Peer Review Of NCCOS' Intramural Research (NOAA, 2006) (PDF)