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National Sea Grant Advisory Board Futures Committee
Report to the Board

Submitted by Mayor Jeremy Harris - Chairman

August 27th, 2009

Committee Formation

The Futures Committee of the National Sea Grant Advisory Board was established by Board action at its November meeting in Baton Rouge, Louisiana. Mayor Jeremy Harris was selected by the Board to serve as Chairman. The Committee was formed as a Committee of the Whole and, as such, all Board members are on the Committee. The first meeting of the Futures Committee was on January 20 & 21, 2009 at the Sea Grant Office at the University of Hawaii.

Statement of Task

The National Sea Grant College Program was established by Congress in 1966. Since that time the program has produced an admirable record of accomplishment in marine research, education and extension services. Despite this fact, the program has failed to grow to realize its full potential.

The task of the Futures Committee is to examine why this has occurred, to assess the successes and failures of the program and to help chart a new course of growth for the program at this time of transition for our country.

The Committee will examine Sea Grant's relationship with NOAA and the Department of Commerce and make recommendations to the Board about Sea Grant's future position and role in the Federal government.

The Futures Committee will also explore Sea Grant's image and brand and make recommendations to the Board on how these important assets can be enhanced.

Finally, the Committee will examine opportunities for Sea Grant to be immediately responsive to the severe environmental and economic challenges that confront our nation by developing initiatives that fully utilize its superb nationwide research and extension talents.

The Committee will also assume any other responsibilities assigned by the Board.

Tenure

The Futures Committee will complete all its work by January 2010.

Futures Committee Recommendations to the Board

Sea Grant Funding

The Committee believes that Sea Grant has faced funding stagnation because it lacks the support it deserves in Congress and within Commerce. The unique value of Sea Grant is not recognized. Sea Grant's clients perceive real benefit from the program but that has not translated into enhanced funding support. It's clear more effort needs to go into organizing Sea Grant clientele into a more vocal advocacy constituency. More effort also needs to go into helping NOAA appreciate the value of Sea Grant and the asset it represents to NOAA.

Recommendation to the Board

The National Sea Grant Office should pursue a renewed, vigorous, outreach effort to strengthen its relationships with the NOAA Administration and with other NOAA agencies. In this context, the NSGO should work to better define its role in the overall NOAA charter of responsibilities and to better articulate its potential as a NOAA asset. It should be noted that NSGO management is already aggressively pursuing these actions with the new NOAA administration.

The National Sea Grant Office, in coordination with the Sea Grant Association (SGA), should expand its efforts to identify its clientele and other public audiences who benefit from Sea Grant research, education, and extension services, and should develop expanded educational initiatives to inform these constituency groups about Sea Grant programs, funding, and resource needs.

Sea Grant's Image

In general, it appears that the Department of Commerce has little knowledge of the Sea Grant Program. The Committee believes that NOAA's view of Sea Grant is generally positive but that Sea Grant is viewed as largely irrelevant to the rest of NOAA. Many in NOAA view Sea Grant as a competitor for funding.

In Congress, Sea Grant is on the radar screen, especially of coastal community Congressional delegations. Despite this, Sea Grant has no real champions in Congress.

Recommendation to the Board

The committee recommends that Congressional champions be sought in both the Senate and House. Meetings should be initiated with selected Representatives and Senators who have been involved with the Sea Grant Program to seek their advice on strengthening the Congressional/Sea Grant relationship.

The Committee recommends that the SGA and the Board be approached for suggestions/contacts in the new Obama White House who should also be approached as potential Sea Grant supporters.

Sea Grant's Structure and Location

It has been suggested that the effectiveness of Sea Grant could be enhanced if it was located in a different federal department or agency. The organizational position of the Sea Grant Program within the Federal government has been reviewed in the past, but the committee believes it should be reviewed again.

Recommendation to the Board

The Committee's recommendation is for the National Sea Grant Office to determine its optimum position within the federal governmental framework and be ready to advocate for that proposal should a major restructuring of Federal research and scientific functions be undertaken by the Obama administration. The committee does not recommend that Sea Grant unilaterally attempt to reposition itself within the bureaucracy absent a major agency shake-up.

The Brand - The Sea Grant Name

While the Sea Grant Program has earned a respectable brand over the last 40 years, the word "grant" continues to cause confusion and a misunderstanding of the Program's mandate.

Recommendation to the Board

The Committee recommends that the name Sea Grant be "enhanced" by adding two or three descriptor words that help define the program's mission in relationship to the urgent challenges the nation faces. An example would be –"NOAA Sea Grant – Helping Build Sustainable Coastal Communities".

The committee recommends that a brochure be developed that highlights the existing capabilities and successes of Sea Grant to illustrate its track

record in tackling the issues highlighted by the new brand. This publication would be distributed primarily to elected policy makers at all levels.

Building Relevancy

The Committee believes that Sea Grant should seize the current period of opportunity to establish itself as an important asset to the nation in meeting some of the country's most urgent challenges.

While mitigation efforts to reduce the impacts of climate change are ramping up, it's clear that many impacts from climate change are unavoidable. With sea level rise and an increased intensity of coastal storms threatening coastal infrastructure and population centers, America's coastal cities are facing perhaps the greatest challenges as a result of this unfolding environmental disaster. These cities are in great need of assistance in planning for and adapting to these climate change impacts.

It's clear that NOAA, with its wide array of expertise in climate related issues, should and will play a major role in the Obama administration's comprehensive climate change strategy. There is a growing consensus within the many agencies within the federal government that are developing the climate change strategy that there is a critical need for a national extension network to work with cities on these pressing issues and other related sustainability challenges.

The Sea Grant Program has an invaluable asset at its disposal that can make an enormous contribution to this effort in its nation-wide extension network. Sea Grant Extension has been actively working with America's coastal communities for decades. Sea Grant Extension professionals have developed relationships with coastal community leaders and government officials, and they have a proven track-record of accomplishment.

While Sea Grant Extension alone probably cannot meet all of the nation's climate change mitigation and adaptation extension needs, Sea Grant can position itself to play a major role and make a major contribution to this staggering national challenge.

Recommendation to the Board

The committee recommends that Sea Grant establish a new pilot program focusing on coastal city sustainability and climate change mitigation and adaptation, and that it develop this program into a full-scale national initiative over the next three years.

Since it is unlikely that a second wide-ranging stimulus package will be sent to Congress this year that could provide the immediate full funding that

this initiative deserves, the committee recommends that this vital program be rapidly ramped-up over the next three years as the Obama administration forges its Climate Change Mitigation and Adaptation Strategy.

Climate Change Mitigation and Adaptation Initiative

Coastal cities all across the nation are just beginning to realize the scope of the challenge they face with climate change and rising sea levels. Currently, city leaders have nowhere to turn for an assessment of their vulnerabilities and for recommendations on what they need to begin doing to adapt to this challenge. Our proposal is for Sea Grant to develop a "Climate Change Mitigation and Adaptation Initiative" on a pilot basis using existing resources and to scale-up the initiative to a major national program over the next three years.

Under our proposal, Sea Grant would help local coastal community governments develop their plans for mitigating and adapting to climate change. The national office would hire a small cadre of specialists in the areas pertinent to this initiative (coastal land use planning, coastal urban infrastructure, etc) who would coordinate the pilot program from Washington. NOAA's extensive expertise in climate related fields would be mobilized, and Sea Grant programs from around the country would identify expertise within their extension programs, as well as within their research and broader University communities in multi-disciplinary fields.

This national reservoir of experts would be available to advise local governments in the assessment of their climate change vulnerabilities and in planning to meet their adaptation challenges. (Preliminary discussions with the SGA suggest that this proposal or some variation thereof would have good support from the Sea Grant College Programs.)

In the current year, the National Sea Grant Office should utilize existing funds to develop a pilot project to demonstrate the proof of concept for this initiative. Following that, the second year funding should be in the $5 million dollar range, allowing Sea Grant to develop a regional pilot project and begin the work of capacity buildings to broaden its extension expertise into the broad array of coastal climate change mitigation and adaptation issues that coastal communities are facing.

Over the first three years, funding for this initiative should grow to approximately $50 million annually. This would allow Sea Grant Extension to staff-up to meet the demand for climate change extension services that will be demanded from the nation's thousands of coastal communities.

This initiative, if developed, would take best advantage of Sea Grant's unique and invaluable resource…its national network of extension agents and programs.

While organizing to enhance its ability to provide climate change adaptation informational services to decision makers, Sea Grant needs to consider how it will complement related extension and training assets contained within NOAA and in other federal agencies. Sea Grant will also need to develop new organizational mechanisms to harness NOAA research and technical services and connect these services to public need.

NOAA currently conducts a wide range of engagement activities in communications, education, extension and training, and regional collaboration. Based on recommendations made by the NOAA Science Advisory Board, NOAA has recently created a new organizational structure to coordinate and provide oversight for its engagement activities, the Executive Committee on Engagement (ECE). The ECE membership is composed of the Chair of the Education Council, the Director of Communications, the Chair of the Regional Collaboration Executive Oversight Group and the Chair of the Extension and Training Services Committee (NETS). The ECE provides corporate guidance and recommends actions to promote a strong dialog and two-way relationship with society that enables NOAA to identify, develop and improve products and services to meet society's needs.

NETS capabilities encompass a broad range of programmatic and geographic assets that, when employed in a coordinated manner, will assist NOAA in its efforts to fully engage its constituents. NETS provides an integrated national leadership and coordination function for NOAA's sizable and locally placed extension and training assets nation-wide. This function helps to underpin NOAA's Regional Collaboration structure, with a focus on bringing together NOAA assets on the ground in a coordinated manner. This new approach enables the full range of NOAA's extension and training assets to focus on thematic priorities identified by NOAA leadership or by local or regional stakeholders and constituent feedback. The principles underlying this new approach include; national guidance and coordination, regional planning and strategy development, flexible regional, state and local implementation and accountability through collection and analysis of national extension and training metrics. Engaging the public on climate issues is a current priority of ECE and NETS and a Sea Grant climate adaptation initiative should utilize the ECE and NETS structures to help lead, coordinate and enlist relevant NOAA programs to provide needed climate adaptation expertise and technical services.

In addition, other agencies, notably USDA's Land Grant system which employs more than 14,000 Cooperative Extension Service staff nationwide, have important expertise that can be utilized to support a Sea Grant led climate adaptation initiative. Under the auspices of the Association of Land Grant and Public Universities (APLU), recent high level meetings have been held between the NOAA and USDA leadership for the purpose of collaborating on climate extension issues. Adding USDA extension capabilities to those of NOAA's would significantly expand the breadth of technical expertise available to help communities adapt to climate change. NOAA should be encouraged to continue its work to strengthen and formalize its relationship with USDA's Land Grant community and to nurture the formation of a national climate extension service.

TOPICAL ADVISORY TEAM REPORT

NATIONAL SEA GRANT LAW CENTER REVIEW

March 20-24, 2006
Oxford, Mississippi

Jeffrey R. Stephan
Chair, Topical Advisory Team

November 16, 2006

Date

Report of the Topical Advisory Team
Review of the
National Sea Grant Law Center

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TOPICAL ADVISORY TEAM REPORT

NATIONAL SEA GRANT LAW CENTER REVIEW

I. INTRODUCTION

This report summarizes the deliberations of the Topical Advisory Team (TAT) that visited the University of Mississippi School of Law in Oxford, MS on March 20-24, 2006. The purpose of the visit, at the request of the Director of the National Sea Grant College Program, was to review the National Sea Grant Law Center (NSGLC). (Appendix B, Charge Letter for the TAT).

The principal issues for the review team to address included the following:
1. During its first three years of existence, has the program been effective?
2. Is the NSGLC structured in a manner that allows it to meet its goals?
3. Are resources adequate to allow the NSGLC to make a significant impact? What would a reasonable build-out plan look like?
4. Can effectiveness of the NSGLC be improved by establishing new and creative partnerships?
5. Given limited resources, what are the most appropriate target audiences for the NSGLC?
6. Are there opportunities for the NSGLC to strengthen its role within NOAA?
7. As NOAA and NSGO move toward a regional approach to ecosystem management, how can the priorities of the NSGLC become better aligned with this approach?
8. What types of performance measures would be appropriate for measuring the effectiveness of the NSGLC in the future? Should it be reviewed as part of the Mississippi-Alabama Sea Grant PAT or separately?
9. Other recommendations to improve the program.

Topical Advisory Team reviews are one of several components of the on-going program evaluation process used within the Sea Grant network. TAT reviews provide the opportunity for a program to receive outside advice by a small team of experts knowledgeable in a specific area or areas of a Sea Grant program. The TAT is responsible for providing a focused, intensive review of one or more specific program elements and for rendering observations and recommendations in a written report in an effort to improve the element or elements reviewed.

This report is the first review of the NSGLC since it was established in February 2002. The University of Mississippi School of Law was selected to serve as the host institution for the NSGLC through a competitive process managed by the National Sea Grant Office. The major objectives of the NSGLC are to provide legal research and advisory services to

Sea Grant Programs and their constituents, conduct legal research on timely marine law topics affecting U.S. coastal areas and disseminate research findings to the ocean and coastal law and policy community, and to educate and train law students in research and writing in ocean and coastal law.

The TAT review began with a dinner meeting with Ms. Stephanie Showalter, Director of the NSGLC, on March 20. The agenda for the four-day visit (Appendix C) included discussions with a wide range of individuals, including members of the NSGLC Advisory Committee, internal and external stakeholders, individuals in the Sea Grant network (directors, extension leaders, legal community), law school students, and high-level University officials. The visitation concluded with presentations of the Team's observations and recommendations to the Director of the NSGLC and the Director and the Associate Director of the Mississippi Law Research Institute.

The TAT consisted of the following members:

Mr. Jeffrey Stephan (Chair)
Member, National Sea Grant Review Panel
Manager
United Fishermen's Marketing Association, Inc.
Kodiak, AK

Mr. Richard Hildreth
Director, Ocean and Coastal Law Center
University of Oregon School of Law
Eugene, OR

Ms. Megan Agy
Program Officer
National Sea Grant College Program
Silver Spring, MD

Dr. James Murray
Program Officer
National Sea Grant College Program
Silver Spring, MD

II. RESPONSES TO QUESTIONS POSED IN THE CHARGE LETTER

Question 1. During its first three years of existence, has the program been effective?

A. General Structure and Performance

The Topical Advisory Team (TAT) finds that the National Sea Grant Law Center (NSGLC) has been effective during its first three years of existence. There is an expectation the NSGLC will continue to evolve in the manner in which it addresses regional, national, and international audiences through the provision of national context and leadership in the area of legal scholarship and outreach that is related to coastal and ocean law issues. Coupled with this expectation is recognition by the Sea Grant Network that the recent and significant increment in the appropriation of public funds to the NSGLC comes at the same time that recent trends in appropriated funds for the NSGCP cause other elements of the Sea Grant Network to face significant funding challenges.

The TAT suggests that it may be worthwhile for the NSGLC to examine and pursue opportunities to expand, advance, re-examine and adjust the structure, operation, products, services, and accountability of the NSGLC to meet the opportunities and responsibilities that are presented by the recent increase in the appropriation to the NSGLC, and the expectations for the NSGLC that exist within the Sea Grant Network.

During the first three years of its existence, the NSGLC has been effective in researching and delivering high quality legal analyses to a variety of Sea Grant and non-Sea Grant users. NSGLC products and services have included hard copy and electronic analyses for general distribution, and letter opinions and research memoranda for individuals and entities with very specific requests. The TAT received comment from several individuals who were appreciative and satisfied with NSGLC products and services, including federal agency staff, a Navy attorney, Sea Grant Extension agents, and an attorney in private practice.

The NSGLC entered into a major research contract with the United States Commission on Ocean Policy (USCOP) that encountered some problems. USCOP staff was not satisfied with some of the work products that were submitted by the NSGLC, and, therefore, sought additional help for their completion. While the TAT was not provided with documentation that addressed the successful completion of the NSGLC contribution to the USCOP Report, it was reported that the final product, Appendix 6 to the Commission's report, was ultimately successfully completed, included several chapters that were completed by the NSGLC, and found by USCOP peer reviewers to be of high quality.

The NSGLC has been effective in developing support within the University of Mississippi (UM), the UM School of Law, and the Mississippi Law Research Institute.

The TAT was informed that when the above-mentioned problems developed with the USCOP contract, both the UM and the UM School of Law each agreed to substitute their own funds for federal funds. This substitution of funds contributed to the successful completion of the USCOP project. Moreover, the TAT was informed that the UM School of Law and UM itself are including the NSGLC with two other federally funded UM School of Law research centers in their efforts to renew federal funding.

The NSGLC has been effective in developing support from the Mississippi-Alabama Sea Grant Consortium (MASGC). MASGC staff indicated that they have been assisted by NSGLC legal analyses, and MASGC staff has assisted the NSGLC with the integration of the NSGLC into national and regional Sea Grant networks.

The TAT notes that the information that was provided in the TAT Briefing Book, or otherwise provided prior to the TAT visit, was adequate to provide the TAT with a reasonable opportunity to prepare for, understand, document and recommend with respect to the effectiveness of the NSGLC. However, the TAT may have benefited from more comprehensive, complete and detailed information and documentation. For example, only two, 2-page documents that consisted of a copy of the "MASGC Project Summary Form" for years 2 and 3 of the current grant were provided as the NSGLC Annual Reports. Moreover, information that would permit the TAT to track professional staff levels and responsibilities during the past three years was not easily evident. Nevertheless, indicators of the effectiveness of the NSGLC became reasonably evident during the course of the on-site TAT visit. That is, during the course of the on-site visit, the TAT received a reasonably adequate information base and understanding of the indicators of NSGLC effectiveness in the areas of management, operation, productivity, impact, accomplishments and other performance measures and characteristics. This understanding came as a consequence of the interaction of the TAT with panels, general discussions and scheduled presentations, of comments that were provided to the TAT by NSGLC customers and audiences, and from on-site increased awareness of NSGLC publications and other products and services.

The TAT recommends that the National Sea Grant Office (NSGO) should continue to require that an Annual Report be submitted by the NSGLC. The TAT recommends that the NSGO should clearly stipulate the format and topical content that should be incorporated in the NSGLC Annual Report. Further, the TAT recommends that the NSGO should require that the NSGLC Annual Report include an expansion of relevant, meaningful and detailed information for the purpose of providing an improved understanding and accountability with respect to the investment of public funds in the NSGLC enterprise, and a more complete understanding of the benefits, impacts, outcomes, accomplishments, usage, utility and general performance of this investment. A rigorous, broad and comprehensive NSGLC Annual Report is per se essential; however, it is especially important in light of the significant increment in public funds that are appropriated to the NSGLC, and the expectation of the Sea Grant Network that

the NSGLC will further expand its contribution and service to the Network in the area of coastal and ocean law issues.

It was not evident to the TAT that the NSGLC utilizes the National Sea Grant Law Center Advisory Committee, either in the manner that was originally intended, or as part of a strategy that recognizes the need and seeks to acquire the obvious benefits that are customarily understood and proven to result from effective and efficient use of an advisory committee. The TAT notes that the meaningful involvement of the NSGLC Advisory Committee in strategic planning, determining programmatic priorities, providing accountability, conducting program evaluation, etc. would have proven beneficial to the management and operation of the NSGLC, provided for a more effective connection with the Sea Grant Network, significantly extended the accomplishments and function of the NSGLC outreach effort, and generally added significant value to the NSGLC.

B. Products, Services, and Outreach:

The TAT received comment from a diversity of current and potential NSGLC customers and audiences who represent a variety of needs, responsibilities, and opportunities (e.g. for partnerships), and who utilize or otherwise benefit from, or who have desire to benefit from, NSGLC products and services. These comments were generally favorable and approving, and indicated that the NSGLC provides products and services that were judged as relevant, professional, competent, and helpful. Additionally, the TAT received comments that suggested the desire for improved and expanded consultation and inclusion, a diversification and enhancement of NSGLC products and services, and a general enhancement of performance.

The TAT makes favorable note of the means of communication and interaction that is utilized by the NSGLC to serve their customers and audiences, of their general success in advancing legal scholarship and outreach in the area of coastal and ocean law issues, and on the diversity, comprehensiveness, and utility of their publications; for example:

- The SandBar (quarterly national legal reporter)
- The Law and Policy Digest (bi-annual)
- Coastal News (weekly updated marine-related news stories)
- Ocean and Coastal Case Alert
- Federal Legislative and Regulatory Fact Sheets
- Sea Grant Law Center Websites (<http://www.olemiss.edu/orgs/SGLC>, and <http://www.olemiss.edu/orgs/SGLC/lawcenterhome.htm>)
- The Sea Grant Law Center Advisory Service (a legal research service that is provided free of charge to the Sea Grant College Program and its constituents)
- Water Log (A quarterly legal reporter; while Water Log is a publication of the Mississippi-Alabama Sea Grant Consortium (MASGC), it still carries value for

advancing legal scholarship and outreach to a national audience, and is readily available on the Sea Grant Law Center Website)

One of the strengths of the NSGLC is their training and support of law students in ocean and coastal law. Under the supervision of the NSGLC staff, law students conduct research and write articles for the SandBar and other publications. Training the next generation of coastal legal scholars is a value to the nation which will be enhanced by the expansion of the NSGLC in the future.

As previously noted, the Sea Grant Law Center Advisory Service is a legal research service that is provided free of charge to the Sea Grant College Program and its constituents. The TAT reviewed the "National Sea Grant Law Center Advisory Service Guidelines" that are applied by the NSGLC to govern the process of evaluating the (1) subject matter of requests for identifiable legal questions; (2) the manner and process of submitting requests; (3) the considerations that impact response time to requests; and (4) the format, distribution and use of any research that is produced by the NSGLC in response to requests. The TAT notes that these guidelines appear to be relevant, necessary and reasonable.

The TAT received comment from several individuals who have used the services provided by the Sea Grant Law Center Advisory Service, and also reviewed several examples of responses to requests for NSGLC Advisory Service assistance. The TAT was favorably impressed with the professionalism, content, and quality of those Advisory Service work products that were available to the TAT, and with the positive comment provided by several of those individuals and entities who have received Advisory Service assistance.

While specific statistical tracking and measurement data was not provided, the TAT received anecdotal indications that appear to confirm the distribution, usage, and application of NSGLC publications and other products and services. One indicator of the effectiveness of the NSGLC in addressing the needs of its partners, customers, and audiences is the number and identity of repeat users that occur for NSGLC legal analyses, products, and services.

The TAT notes that there exists an expectation that the increase of appropriated funds to the NSGLC should result in favorable impacts and modifications to the format, distribution, utility, and impact of NSGLC publications and other products and services. The TAT recommends that the NSGLC would benefit from developing or adopting a reasonably straightforward tracking mechanism that seeks to account for the distribution, usage, utility, and application of NSGLC products and services. The NSGLC may wish to seek assistance in this regard from individual Sea Grant Programs, many of which utilize and benefit from such tracking mechanisms.

The NSGLC, in consultation with the NSGLC Advisory Committee and the NSGO, should design and conduct a survey of those who the NSGLC considers as their partners, customers, and audiences. Such a survey should evaluate the utility, usage, and application of NSGLC products and services, and identify the partner, target user, and audience communities who currently utilize such products and services. Such a survey should inform a re-evaluation and re-determination of NSGLC products and services, the target audiences who most need, desire, and benefit from the products and services of the NSGLC, and the manner in which such products and services are delivered. Moreover, this survey should serve to assist a strategic planning effort that should be undertaken by the NSGLC at an early and reasonable opportunity. A survey of this sort should be conducted on a periodic basis.

The TAT recommends that the NSGLC should continue progress toward aligning its extension and outreach initiatives, to the extent possible, with the principles that are included in the publications "Regional and National Sea Grant Extension Programming" (September 2000) and "A Mandate to Engage Coastal Users" (November 2000)."

C. Strategic Planning:

It was not evident to the TAT that the NSGLC utilized any reasonably formal process or mechanism to guide and determine the direction of the NSGLC investment. The focus of the investment of NSGLC human and financial resources, and NSGLC products and services, appear to be generally determined by the Director of the NSGLC, and by the nature and topic of requests for information and assistance that are received by the NSGLC. This practice appears to have generally and beneficially aligned with staffing and funding levels that have heretofore been experienced by the NSGLC. The TAT notes that while NSGLC products, services, customers, and audiences appear to be within reasonable balance, the rationale for the choice and prioritization of the NSGLC investment in such elements should be aligned to a strategic plan, and to an implementation plan. The TAT will provide additional discussion and recommendations that address strategic planning under its comments that address Question 2 (i.e., "Is the National Sea Grant Law Center structured in a manner that allows it to meet its goals?"). However, with respect to Question 1, the TAT recommends that the NSGLC engage in a strategic planning process and develop a strategic plan and an implementation plan.

Question 2. Is the National Sea Grant Law Center structured in a manner that allows it to meet its goals?

A. General

The TAT was impressed with the level of understanding, commitment and support of senior executives of the University of Mississippi and the Mississippi-Alabama Sea Grant Consortium with respect to the mission, goals, management, programmatic outcomes,

responsibility, expectations and promise of the NSGLC. These individuals include Dr. Alice M. Clark (Vice Chancellor for Research and Sponsored Programs), Mr. Patrick S. Brown (Assistant Vice Chancellor for Research and Sponsored Programs), Mr. Samuel M. Davis (Dean, School of Law), Mr. William Hooper, Jr. (Director, Mississippi Law Research Institute), Mr. William T. Wilkins (Director, Mississippi Law Research Institute), Dr. LaDon Swann (Director, Mississippi-Alabama Sea Grant Consortium), and Ms. Stephanie Showalter (Director, National Sea Grant Law Center). The TAT provides a special note of recognition and appreciation to Mr. William Hooper, Mr. William Wilkins and Dr. LaDon Swann for having invested their complete and entire attention to the on-site activities of the TAT, and, importantly, for their sincere effort to rigorously examine opportunities and mechanisms to establish high expectations and exemplary performance for the NSGLC. The dedicated participation of these individuals during the TAT initiative to gather information, understanding and insight will certainly provide these individuals with the ability to provide positive and informed support to the future success of the NSGLC.

The TAT recommends that the University of Mississippi, within the operational and management structure and responsibility of the Mississippi Law Research Institute, and in continuing association with the Mississippi-Alabama Sea Grant Consortium (MASGC), is a favorable placement for the NSGLC. The TAT views the Mississippi Law Research Institute as a logical and practical location to headquarter and associate the NSGLC, especially given the evident awareness of and commitment to the NSGLC that is demonstrated by both the recently retired and incoming Directors of the Mississippi Law Research Institute. Moreover, within the context of the recommended reporting relationship between the NSGLC and the Mississippi Law Research Institute, the TAT recommends that attention be invested to further develop the association and interaction between the NSGLC and the University of Mississippi School of Law.

The TAT recommends that funding for the NSGLC should continue to be treated as a supplemental, pass-through and add-on component of the MASGC. Moreover, the TAT recommends that a continued official and working relationship with the MASGC will provide many benefits to the NSGLC and to the University of Mississippi, including (1) utilization of existing and proven management resources and methodology to assist the NSGLC in the development and distribution of an RFP (in conjunction with the involvement of the NSGLC Advisory Committee); (2) administration, management, and operation of the competition, including pre-proposal review, peer review, technical panel review, final proposal review, proposal selection, etc.; and (3) continuing association with the MASGC Program Officer. This relationship provides the benefit and efficiency of an already established and proven process and mechanism to address reporting, fiscal and competition-related responsibilities. Moreover, a continued and direct association with MASGC will provide a beneficial, necessary, and important link with and to the Sea Grant Network. It was apparent from those who provided comment to the TAT that there existed a prevalent desire for the NSGLC to develop a mechanism to implement expanded connectivity with the Sea Grant Network. Such connectivity is important, not

only for assisting the NSGLC in maintaining relevancy to the greater mission of the NSGCP, but also to the expansion and maintenance of support from the Network. The TAT notes that a continued and official working relationship and connectivity with the MASGC is important to the success of achieving this important objective and purpose.

The TAT notes that the structure of the NSGLC allows it to be flexible and responsive, and that expertise is shared cooperatively to avoid reinventing the wheel in the production of NSGLC legal analyses.

To meet its goals under the build-out plan described in Questions 4 through 9 below, NSGLC staff would increase from 3 to 5 as described in the draft NSGLC budget. The NSGLC Director's FTE would increase from 0.375 to 0.9. A recent law graduate would be selected annually to serve as a fellow to assist with research and outreach. The draft budget shows the Regional Coordinator position as 1.0 FTE.

The NSGLC Director holds the position of MASGC Associate Director for Outreach. The TAT received comment in support of the assertion that the NSGLC would best serve its mission, and best meet the challenges of its responsibilities, if the NSGLC Director were able to focus entirely on the tasks that are directly associated with management and operation of the NSGLC, and not also carry the additional responsibility and distraction of meeting the responsibilities that are associated with the position of MASGC Associate Director for Outreach.

The TAT recommends that the NSGLC Director and the MASGC Director should consult, at the earliest opportunity, to develop a reasonable plan that would allow the NSGLC Director to phase-out of the MASGC Associate Director for Outreach position. The demands of the NSGLC per se, especially in light of the additional NSGLC funding, the need for the efficient deployment of such funds, the expectation for an expanded delivery of NSGLC goods and services as a result of such funds, and the general expectations of the Network, all converge to indicate that the NSGLC Director should not attempt to perform both responsibilities. Nevertheless, as previously suggested, the TAT suggests that opportunities for the Directors of the MASGC and the NSGLC to work together on programmatic issues are important, and can be accomplished through other means. The maintenance and possible redesign of the professional link and working relationship that exists between the NSGLC and the MASGC provides the NSGLC with the important and essential connection to the Sea Grant Network, in addition to providing other benefits to each of the two respective entities, and also to the Network.

The TAT received comment in support of the expectation that the availability of additional funds for the NSGLC will permit it to adjust its organizational and management structure to more rigorously pursue the complimentary objectives of serving as a "law center" and as a "network resource". That is, it is anticipated that the NSGCP will now have adequate funding to expand the reach and impact of its mission and core responsibility, including, (1) to disseminate information about ocean and coastal law and

policies; (2) to provide the Sea Grant Network and coastal citizens with critical analyses that are pursued with the same vigor as the other research, education and outreach components of the Sea Grant Network; (3) to coordinate and enhance Sea Grant's activities in legal scholarship and outreach that are related to coastal and ocean law issues (i.e., to serve as a focal point for Sea Grant law-related issues, and to integrate the efforts of ocean and coastal law researchers and users in the Sea Grant Network); (4) to more fully involve the components of the Sea Grant Network; and (5) to combine and coordinate the activities of additional regional centers in order to promote the growth of a "virtual" Sea Grant legal network.

The TAT notes the expectation that the increase in the appropriated funds that are available to the NSGLC should result in favorable impacts and modifications to the format, distribution, utility, and impact of NSGLC publications and other products and services.

The National Sea Grant Law Center Advisory Committee, established in 2004, includes 12 individuals who possess broad and diverse perspectives and experience with respect to issues that pertain to the National Sea Grant College Program, marine and coastal law and policy, and other related subjects and areas. Moreover, the membership of the NSGLC Advisory Committee includes four individuals who are directly involved in the National Sea Grant College Program (three Sea Grant Directors and one Sea Grant Extension Leader), representatives of Federal and State resource and management entities, representatives of non-governmental organizations, industry representatives, representatives of academic institutions, and individuals with experience in marine and coastal law and policy. As previously indicated, it was not evident to the TAT that the NSGLC utilizes the NSGLC Advisory Committee in a meaningful fashion. The TAT notes that the NSGLC would benefit in meeting its future goals and challenges if it were to incorporate the meaningful involvement and participation of the NSGLC Advisory Committee. Moreover, the TAT believes that the NSGLC Advisory Committee would greatly assist the NSGLC in meeting the important goal of advancing its relationship and interaction with the audience of users, researchers, and decision makers that are intended to benefit from, and have potential to contribute to, Sea Grant's activities in legal scholarship and outreach that are related to coastal and ocean law issues.

B. Strategic Planning

The TAT recommends that the NSGLC engage in a strategic planning process and develop a strategic plan and an implementation plan. The NSGCP should be expected to plan strategically, set goals, define performance objectives, and develop mechanisms for achieving such goals and performance objectives. The NSGLC should, at the earliest opportunity, engage in a meaningful strategic planning initiative that includes the integral and active involvement of the NSGLC Advisory Committee, and that is tailored to address the vision and mission of the NSGCP.

The TAT recommends that the NSGLC, to the most reasonable extent possible, should follow the general principles that are indicated for strategic planning in the guidelines, requirements and programmatic expectations that are stipulated for individual Sea Grant programs in the Program Assessment Team (PAT) Manual (or that is generally in keeping with any successor process or protocol that may be utilized for individual Sea Grant programs). Individual Sea Grant programs are evaluated in four general categories; one of those being "Effective and Aggressive Long Range Planning." The effectiveness of performance under this category is measured under three established "Evaluation Criteria" (i.e., "Strategic Planning Process", "Strategic Plan Quality", "Implementation Plan"). The effectiveness of performance under each of these three Evaluation Criteria is measured by adherence to standards that have been established for "Expected Performance Benchmarks", "Indicators of Performance", and "Suggested Considerations for Evaluators." There are obviously differences in the structure, expectations, and mission of the NSGLC when compared to those of individual Sea Grant programs. Nevertheless, the PAT strategic planning experience, and the objectives that are included therein, provides many important and meaningful lessons, and significantly useful and applicable guidance.

The TAT suggests that the NSGLC seek assistance in developing a strategic planning process, a strategic plan, and an implementation plan. The NSGLC should examine whether the National Sea Grant Office, the Sea Grant Network, or the National Sea Grant Review Panel may be available to provide assistance and expertise in this regard. Moreover, the Mississippi-Alabama Sea Grant Consortium (MASGC) could probably provide relevant and knowledgeable experience and assistance with respect to strategic planning. Involvement of the MASGC could be beneficial because of the history and relationship between the NSGLC and the MASGC, and that which is anticipated for the future. Additionally, MASGC has extensive experience and a sound strategic planning framework that is aligned to the principles of strategic planning for individual Sea Grant programs.

The NSGLC may wish to consider that the School of Business Administration at the University of Mississippi (UM), or a program within such school, or some other academic unit at UM, may have a member of the faculty, or an academic program, that carries some level of expertise, knowledge, focus, concentration, or familiarity with strategic planning that could be brought to bear in support of the NSGLC need to strategically plan.

The TAT understands that the time frame for the development of a programmatic and budgetary plan for FY 2006 does not provide for the realization of those benefits that result from a strategic planning exercise. Neither does the time frame for an FY 2007 programmatic and budgetary plan seem to provide for the realization of benefits and structure that would otherwise derive from a strategic planning exercise. Nevertheless, the NSGLC should, at the earliest opportunity, begin the process of integrating strategic planning into its enterprise.

To the extent possible, a NSGLC Strategic planning protocol should attempt to draw some alignment to the NSGCP and NOAA strategic plans, e.g. NOAA's strategic priorities and Annual Guidance Memorandum for FY 2009-2013 (in particular, its Ecosystems Goal), and should also attempt to demonstrate, within reason, its alignment to Sea Grant Network Themes.

Question 3. Are resources adequate to allow the National Sea Grant Law Center to make a significant impact? What would a reasonable build-out plan look like?

Many individuals who provided comment to the TAT were impressed with how much has been accomplished nationally by the NSGLC on a budget that is more typical of a state legal program (i.e., ~ $100,000). The NSGLC has made very efficient use of electronic communications, and has a very good Website which provides ready access to the full text of its in-house publications. The NSGLC Director has traveled extensively to deliver the results of NSGLC research, and to establish associations, contact and communication with legal and non-legal Sea Grant staff. As discussed under Questions 4 through 8 below, the NSGLC has developed creditable plans to utilize the increased allocation of Sea Grant funding to the NSGLC (from $100,000 to $1 Million) to strengthen both the central operations of the NSGLC, and the provision of legal research throughout the Sea Grant Network. By the end of FY 2006, NSGLC staff has indicated that they plan to develop a 5-year strategic plan for circulation and comment to all the stakeholders described in Questions 4 through 8 below.

The NSGLC made an impressive impact at their prior funding levels of approximately $100,000. The TAT is confident that the NSGLC is capable of making a significant impact with an approximate $1 Million funding level.

The TAT recommends that staffing needs of the NSGLC should be addressed at an early opportunity, and with the objective of providing the professional and administrative services that were promised, anticipated, and expected since the onset of the establishment and funding of the NSGLC. While a clearly substantiated accounting of the level of NSGLC professional and administrative staffing on a year-to-year basis since the creation of the NSGLC was not available to the TAT, anecdotal information provided to the TAT indicates that the NSGLC has only been fully staffed during approximately six months of its existence.

Prior to its arrival to the University of Mississippi campus, the TAT was provided with a 4-page document, apparently produced on or about January, 2005, that was titled "Sea Grant Law Center, The University of Mississippi School of Law." This document was apparently intended to provide the programmatic and funding plan, guidance, and detail with respect to a vision that would fund the NSGLC at an approximate $1.1M level (an anticipated match amount was not provided). Upon arriving at the UM campus, the TAT

was provided with a 2-page document titled "National Sea Grant Law Center Congressional Appropriation One-Pager" (Appendix F). This document provided the most recent vision for a programmatic and funding plan for the NSGLC in the amount of $1M of federal funds (with a provision for an additional $416,347 match). Reasonable differences existed between these two visions.

Given the level of detail and explanation that was provided to the TAT with respect to the anticipated build-out plan for the NSGLC at an approximate federal investment of $1M, the TAT is unable to provide specific judgments or recommendations with respect to the programmatic and funding plan that would intend to spend an approximate federal allocation of $1M.

The TAT also notes that it participated in discussions that address the relationship between, and the manner in which the NSGO will determine, the allocation and distribution of the approximate $100,000 that has previously been allocated to the MASGC as part of their Omnibus Proposal, and the recent approximate $1M Congressional Appropriation to the NSGLC. The TAT was provided with a letter (February 21, 2006) from then-NSGO Director Ron Baird to Dr. LaDon Swann (Director, MASGC) that made mention of the relationship between these two categories of funds, and the manner of allocation and distribution of such funds to the NSGLC. The TAT notes that this determination may be important to the level of federal investment and associated matching funds that the NSGLC builds into their programmatic planning for FY 2006 and beyond. The TAT was not requested to provide comment or recommendations about this matter.

Question 4. Can effectiveness of the National Sea Grant Law Center be improved by establishing new and creative partnerships?

The NSGLC informed the TAT that they have initiated the establishment of several useful partnerships. The most obvious NSGLC partners are the existing state Sea Grant Legal Programs (e.g., Louisiana, North Carolina, Mississippi-Alabama, and Rhode Island), and the several law school-affiliated non-Sea Grant marine law institutes. The NSGLC informed the TAT that it plans to provide competitive funding opportunities for legal research initiatives that are relevant to the Sea Grant mission, and further, that these funding opportunities will be available to both the Sea Grant Legal Programs, and the law school-affiliated non-Sea Grant marine law institutes. The TAT supports and encourages this competitive funding initiative.

The TAT recommends, as appropriate, and where time allows, that NSGLC partners be afforded an opportunity to review, comment, and advise with respect to draft legal analyses that are produced by either NSGLC staff, or by NSGLC partners.

The TAT recommends that an important goal of the NSGLC should be to strengthen and expand the provision of relevant legal research that is funded with Sea Grant funds, and administered by the NSGLC. The Mississippi-Alabama Sea Grant Consortium has indicated that they are willing and able to assist the NSGLC in this endeavor.

The NSGLC indicated that they have established useful relationships with professional staff at NOAA and several other federal agencies through the provision of NSGLC legal analyses. Further, the NSGLC indicated that they plan to explore formal partnering opportunities with these agencies; e.g., by co-sponsoring workshops and conferences that schedule discussions of the legal implications of agency missions, including scientific research, on such workshop and conference agendas.

The TAT recommends that the NSGLC should attempt to establish a partnership with the Congressional Research Service (CRS). The NSGLC should explore opportunities that make the results of NSGLC research available to CRS staff in a timely manner. Over the longer term, the NSGLC should explore ways in which they may facilitate the provision of CRS research, within the rules that govern how CRS operates, to and through the Sea Grant Network.

The TAT recommends that the NSGLC may wish to explore the opportunity to partner with the U.S. Department of Interior Minerals Management Service with respect to their emerging outer continental shelf renewable energy activities program

The TAT notes that the NSGLC Advisory Committee includes individuals who have relevant understanding, knowledge, and expertise in the area of coastal and marine law and policy. Many of these NSGLC Advisory Committee members could contribute as useful advisors and partners.

The TAT recommends that the NSGLC should act to promote and improve interdisciplinary communication by taking advantage of opportunities that may be available to the NSGLC to participate on relevant Sea Grant Network Theme Teams.

Question 5. Given limited resources, what are the most appropriate target audiences for the National Sea Grant Law Center?

Several individuals who provided comment to the TAT suggested that the target audience for NSGLC legal analyses be expanded to include:

- Staff members of the Sea Grant Extension Network who have identified legal issues that are relevant to their work. These Sea Grant Extension staff in turn can help to communicate and distribute the results of NSGLC legal research and other products and services to relevant public, private, and NGO sectors;

- Individual representatives of federal and state agencies who request NSGLC legal research and other products and services. The NSGLC could consider providing a priority to those requests where there appears to be a likelihood to establish future mutually beneficial partnering opportunities as mentioned in Question 4 above; and

- Local decision makers in the public, private, and NGO sectors who request NSGLC assistance with understanding applicable state and federal law.

The TAT recommends that the NSGLC, in their role as the administrative principal and leader of a "Sea Grant Legal Partner Network", should consider establishing a formal process to refer requests that are received by the NSGLC to partners of such a "Sea Grant Legal Partner Network" on a case-by-case basis.

Question 6. Are there opportunities for the National Sea Grant Law Center to strengthen its role within NOAA?

The TAT received several comments that addressed the opportunities and means that may exist for strengthening the role of the NSGLC within NOAA. A recurring theme emerged that cautioned the NSGLC to guardedly consider the possibility that once NOAA becomes familiar with the NSGLC as a beneficial asset that possesses valuable personnel, expertise, knowledge, experience, and credibility in several subject areas in which NOAA may be involved, or otherwise interested, the NSGLC may find itself responding to an inordinate number of requests for products and services that address legal, regulatory, historical, scientific, and management issues, and other needs that may exist at the many NOAA line offices. While it is anticipated that the interaction between the NSGLC and NOAA would occur at the level of the NOAA Office of the General Counsel, it is likely that other line offices and elements of NOAA would soon recognize the utility of the NSGLC for purposes of assisting them with their specific responsibilities. While the TAT is not in a position to suggest the amount of NSGLC effort, or the subjects or issues of interest, or at what NOAA administrative or line-office level cooperation would best occur, it can suggest that the NSGLC should consider that balance and proportionality should be maintained between the possible developing needs and demands of NOAA and other federal agencies, and those of the other partners, customers and audiences that are primarily envisioned as beneficiaries of the products and services of the NSGLC. When considering the type and amount of assets that the NSGLC may wish to invest toward strengthening its role within NOAA, the NSGLC should review the mission, goals and objectives of NOAA as they compare to those of their non-NOAA audiences and customers. Moreover, when determining the fraction of available resources that the NSGLC may wish to invest toward strengthening its role within NOAA, or with any other federal agency, the NSGLC should consider and compare NOAA assets and capabilities with those of other non-NOAA audiences and customers, including (1) availability of human, financial, and legal resources; (2) geographical and functional proximity to problems, issues, locales, impacted entities,

needs, and decision makers; and (3) differences of impacts and added-value that derive from the contribution and assistance of the NSGLC.

The TAT recommends that the NSGLC investigate opportunities to expand their interaction with NOAA, offer targeted assistance to NOAA on specific issues, respond favorably to NOAA requests for assistance, and create opportunities to demonstrate the value of the NSGLC and the NSGCP to NOAA.

The TAT suggests that the issues of marine aquaculture and ocean-based wind power generation offer a propitious opportunity for the NSGLC and NOAA to interact. NOAA is becoming more and more involved with respect to ever-emerging activities that are proposed and anticipated to take place in the oceans, including marine aquaculture and ocean-based wind power generation. The TAT notes that these issues are likely to be of interest to many components of the NSGLC customer, audience and partner base, including individual Sea Grant programs, customers of individual Sea Grant Programs, Sea Grant Legal Programs and other marine and coastal non-Sea Grant legal programs. These issues may offer the NSGLC with the option to provide significant value added assistance to several diverse entities, including NOAA, while at the same time providing awareness of the value and impact of both the NSGLC and the NSGCP to NOAA.

Question 7. As NOAA and NSGO move toward a regional approach to ecosystem management, how can the priorities of the National Sea Grant Law Center be better aligned with this approach?

The TAT recommends, as a means to assist NOAA and the NSGO, that the NSGLC should prepare a comprehensive review of the rapidly expanding legal and policy literature that is focused on implementing ecosystem-based management (EBM) at the regional, national, and international levels, including the outputs of the October 19-20, 2006, Rhode Island Sea Grant sponsored conference, "The Evolution of Ecosystem Based Management.: From Theory to Practice." The implementation of EBM at the international level is a priority of the December, 2004, U.S. Ocean Action Plan as advanced by President George W. Bush. This Action Plan is based on recommendations that are contained in the September, 2004, final report of the U.S. Commission on Ocean Policy.

The TAT recommends that the NSGLC may wish to offer technical assistance to Congressional initiatives in both Houses of Congress that propose the inclusion of provisions that mandate the application of EBM principles in federal statute, including ongoing initiatives to reauthorize the Magnuson-Stevens Fisheries Conservation and Management Act. A NSGLC contribution to an informed Congressional initiative in the area of EBM could also serve to increase the awareness and visibility of the mission, value and impact of the NSGLC. The TAT notes that several diverse Congressional and public constituencies possess respectively distinct and sometimes contradictory

interpretations of the concept, principals and application of EBM. Therefore, the NSGLC must exercise caution in maintaining their reputation of providing unbiased, fair and impartial legal analysis with respect to this and similar legislative initiatives.

The TAT recommends that the NSGLC RFP include a specific solicitation of one or more EBM proposals as part of its request for legal research and outreach projects that are related to coastal and ocean law issues. The inclusion of one or more proposals for EMB funding in the NSGLC RFP supports the emerging NOAA-wide initiative to develop an ecosystem approach to management "… that is adaptive, specified geographically, takes into account ecosystem knowledge and uncertainties, considers multiple external influences, and strives to balance diverse social objectives." Moreover, NSGLC funding of EMB proposals may partially and effectively connect the intended future NSGLC funding of regional law centers with the regional research planning initiatives that have recently been funded by the NSGCP in eight regions. In addition to having relevance under Question 7, funding one or more EBM proposals may also have relevance with respect to "Question 4. Can effectiveness of the National Sea Grant Law Center be improved by establishing new and creative partnerships?", "Question 5. Given limited resources, what are the most appropriate target audiences for the National Sea Grant Law Center?", and "Question 6. Are there opportunities for the National Sea Grant Law Center to strengthen its role within NOAA?"

8. What types of performance measures would be appropriate for measuring the effectiveness of the National Sea Grant Law Center in the future? Should it be reviewed as part of the Mississippi-Alabama PAT or separately?

The TAT notes that the NSGLC does not appear to be part of a periodic evaluation process that applies performance evaluation standards and criteria that are prescribed by the National Sea Grant Review Panel (NSGRP) or the National Sea Grant Office (NSGO) for the purpose of measuring accountability and performance with respect to the mission of the National Sea Grant College Program (NSGCP), or of the NSGLC itself. Therefore, it does not appear that the NSGLC is officially required to be in conformity with any principles of performance evaluation that may be expected by the NSGRP, NSGO or the NSGCP, and that are otherwise generally applied to individual Sea Grant programs, or that are generally seen as justification of public investments of this sort.

The TAT recommends that the performance of the NSGLC should be evaluated separately from the performance of the Mississippi-Alabama Sea Grant Consortium. This recommendation is supported by a significant number of comments that were provided to the TAT.

The TAT recommends that the performance of the NSGLC should be periodically evaluated in accordance with a standards-based evaluation protocol that is primarily and specifically tailored to the mission of the NSGLC and the NSGCP, while also including

those broader elements of considerations that are customarily used in performance-based evaluations. The TAT visit provided insights that point clearly to the necessity to implement a periodic evaluation of the NSGLC. This TAT recommendation becomes more relevant when considering the level of funding that is now available to the NSGLC, how such funding relates to funding levels of individual Sea Grant programs, the advertised significance of the NSGLC mission, and the general responsibility to validate public investments of this sort. Comments and expectations that were provided to the TAT by representatives of the Sea Grant Network and others expressed that a standards-based performance evaluation of the NSGLC is important to ensuring that the NSGLC will maintain ongoing support for its mission and funding from its customers and clients, provide the NSGLC with an opportunity to demonstrate that its products, services, customers, audiences, outcomes, impacts and accomplishments are relevant to its mission, and offer a necessary pathway for recommendations that continually improve program performance.

The TAT recommends that the National Sea Grant Review Panel (NSGRP) and the NSGO, in consultation with NSGLC personnel and the NSGLC Advisory Committee, should develop a standards-based performance evaluation process that addresses the unique characteristics of the mission and operational structure of the NSGLC. The NSGRP and the NSGO should be charged with organizing and developing an evaluation process for the NSGLC at an early opportunity. Specific target dates for submission of a final draft of such an evaluation protocol to the NSGO and the full NSGRP, and for final NSGO and NSGRP approval, should be established.

The performance evaluation measures that are utilized for the NSGLC should intend objectives that are similar to those that exist for program evaluation of individual Sea Grant Programs by a Program Assessment Team (PAT). There are obvious and significant differences in the mission, and in the management and operational structure of the NSGLC, as compared to those of individual Sea Grant programs. Nevertheless, the PAT experience, taken together with the principles that are embodied in the PAT Manual, provides many important, meaningful, applicable and significantly useful lessons and guidance.

The TAT recommends that an evaluation protocol for the NSGLC should include a PAT that is similar in structure and function to a PAT that is assigned to evaluate an individual Sea Grant Program. For example, such a NSGLC PAT could include four individuals, would be led by a member of the National Sea Grant Review Panel (NSGRP), would include two members of the NSGRP, and in addition include two other individuals who hold administrative and management experience, or other relevant knowledge and experience, from academia or the public or private sector, and who have familiarity with topics and issues that have significance, similarity or other relevance to the mission and objectives of the NSGLC. Such a NSGLC PAT should include the NSGO Program Officer and other appropriate NSGO staff as ex-officio participants. A four-year cycle for an external PAT-type performance review of the NSGLC appears to be reasonable.

The TAT notes that similar national-context programmatic investments exist within the NSGCP. These investments are intended to provide national context and leadership in addressing large regional, national, and international audiences that are generally beyond the capability and programmatic objectives of any one Sea Grant Program (e.g., the NSGLC, the National Ports and Harbors Extension Program, the Coastal Community Development Program, etc.). As an aside, but still within the context of this element of the NSGLC TAT report, it may be worthwhile to consider the possible necessity to develop an evaluation protocol for all national-context investments. Since the nature and missions of these national-context investments are respectively different and diverse, such an evaluation protocol should not only include a "common set" of evaluation criteria that would be applied to all national-context investments (i.e., organization and management of the program, connections with users, strategic planning, production of significant results), but also include a "program-specific set" of criteria that would be individually suited to the specific mission of each national-context investment. The "common set" of evaluation criteria would be much less detailed than those used in the PAT process for evaluating individual Sea Grant programs; nevertheless, the above-indicated specific general categories would be useful (i.e., organization and management of the program, etc.). The August, 2005, charge letters that requested the NSGRP to convene Task Groups to conduct reviews of the three above-indicated national-context programmatic investments, including the NSGLC, included respectively distinct "… 'Principle issues' for the review to address …" for each of these three investments; similar "principle issues" could become the "program-specific set" of criteria that would add to the "common set" of evaluation criteria. There is no doubt that the level of performance evaluation that is directed to national-context programs must be balanced in view of the lesser funding levels and significantly different missions that categorize such programs. As previously indicated, the level of funding that is now available to the NSGLC, together with the advertised significance of its mission, appears to justify a careful and comprehensive programmatic evaluation.

The TAT recommends that the Director of the NSGLC should be invited, at an early opportunity, to participate in a PAT visit to an individual Sea Grant Program. This experience should provide a meaningful context to any initiative that seeks to formalize a periodic standards-based evaluation protocol that is specifically tailored to the mission of the NSGLC. Moreover, the Director of the NSGLC should be somehow included in the ongoing initiative that addresses the response of the Sea Grant Network to the recent National Research Council Report titled, "Evaluation of the Sea Grant Program Review Process."

Question 9. Other recommendations to improve the program

The NSGLC is an essential and unique element of the greater Sea Grant Network, and should make a concerted effort to reach out to and communicate with such Network. The

TAT recommends that the NSGLC and the Sea Grant Network would mutually benefit from and should mutually commit to the development of a mechanism to enhance opportunities for frequent communication and meaningful engagement with each other. This may include the provision of a regular opportunity for the NSGLC to address the Sea Grant Association at each of their major meetings, of some form of written or in-person report to meetings of the National Sea Grant Review Panel, and of an opportunity to address the entire Sea Grant Network at one of the all-hands general assemblies that occur during Sea Grant Week. Additionally, the NSGLC should develop a process by which it engages and communicates with the Sea Grant Communications Network, the Assembly of Sea Grant Extension Leaders, and the Sea Grant Educators Network.

APPENDIX A

RECOMMENDATIONS

Recommendation #1. The TAT recommends that the National Sea Grant Office (NSGO) should continue to require that an Annual Report be submitted by the NSGLC. The TAT recommends that the NSGO should clearly stipulate the format and topical content that should be incorporated in the NSGLC Annual Report. Further, the TAT recommends that the NSGO should require that the NSGLC Annual Report include an expansion of relevant, meaningful and detailed information for the purpose of providing an improved understanding and accountability with respect to the investment of public funds in the NSGLC enterprise, and a more complete understanding of the benefits, impacts, outcomes, accomplishments, usage, utility and general performance of this investment.

Recommendation #2. The TAT recommends that the NSGLC would benefit from developing or adopting a reasonably straightforward tracking mechanism that seeks to account for the distribution, usage, utility, and application of NSGLC products and services. The NSGLC may wish to seek assistance in this regard from individual Sea Grant Programs, many of which utilize and benefit from such tracking mechanisms.

Recommendation #3. The TAT recommends that the NSGLC should continue progress toward aligning its extension and outreach initiatives, to the extent possible, with the principles that are included in the publications “Regional and National Sea Grant Extension Programming” (September 2000) and “A Mandate to Engage Coastal Users” (November 2000)."

Recommendation #4. The TAT recommends that the NSGLC engage in a strategic planning process and develop a strategic plan and an implementation plan.

Recommendation #5. The TAT recommends that the University of Mississippi, within the operational and management structure and responsibility of the Mississippi Law Research Institute, and in continuing association with the Mississippi-Alabama Sea Grant Consortium (MASGC), is a favorable placement for the NSGLC.

Recommendation #6. Within the context of the recommended reporting relationship between the NSGLC and the Mississippi Law Research Institute, the TAT recommends that attention be invested to further develop the association and interaction between the NSGLC and the University of Mississippi School of Law.

Recommendation #7. The TAT recommends that funding for the NSGLC should continue to be treated as a supplemental, pass-through and add-on component of the MASGC. Moreover, the TAT recommends that a continued official and working relationship with the MASGC will provide many benefits to the NSGLC and to the

University of Mississippi, including (1) utilization of existing and proven management resources and methodology to assist the NSGLC in the development and distribution of an RFP (in conjunction with the involvement of the NSGLC Advisory Committee); (2) administration, management, and operation of the competition, including pre-proposal review, peer review, technical panel review, final proposal review, proposal selection, etc.; and (3) continuing association with the MASGC Program Officer.

Recommendation #8. The TAT recommends that the NSGLC Director and the MASGC Director should consult, at the earliest opportunity, to develop a reasonable plan that would allow the NSGLC Director to phase-out of the MASGC Associate Director for Outreach position.

Recommendation #9. The TAT recommends that the NSGLC, to the most reasonable extent possible, should follow the general principles that are indicated for strategic planning in the guidelines, requirements and programmatic expectations that are stipulated for individual Sea Grant programs in the Program Assessment Team (PAT) Manual (or that is generally in keeping with any successor process or protocol that may be utilized for individual Sea Grant programs).

Recommendation #10. The TAT recommends that staffing needs of the NSGLC should be addressed at an early opportunity, and with the objective of providing the professional and administrative services that were promised, anticipated, and expected since the onset of the establishment and funding of the NSGLC.

Recommendation #11. The TAT recommends, as appropriate, and where time allows, that NSGLC partners be afforded an opportunity to review, comment, and advise with respect to draft legal analyses that are produced by either NSGLC staff, or by NSGLC partners.

Recommendation #12. The TAT recommends that an important goal of the NSGLC should be to strengthen and expand the provision of relevant legal research that is funded with Sea Grant funds, and administered by the NSGLC.

Recommendation #13. The TAT recommends that the NSGLC should attempt to establish a partnership with the Congressional Research Service (CRS).

Recommendation #14. The TAT recommends that the NSGLC may wish to explore the opportunity to partner with the U.S. Department of Interior Minerals Management Service with respect to their emerging outer continental shelf renewable energy activities program.

Recommendation #15. The TAT recommends that the NSGLC should act to promote and improve interdisciplinary communication by taking advantage of opportunities that

may be available to the NSGLC to participate on relevant Sea Grant Network Theme Teams.

Recommendation #16. The TAT recommends that the NSGLC, in their role as the administrative principal and leader of a "Sea Grant Legal Partner Network", should consider establishing a formal process to refer requests that are received by the NSGLC to partners of such a "Sea Grant Legal Partner Network" on a case-by-case basis.

Recommendation #17. The TAT recommends that the NSGLC investigate opportunities to expand their interaction with NOAA, offer targeted assistance to NOAA on specific issues, respond favorably to NOAA requests for assistance, and create opportunities to demonstrate the value of the NSGLC and the NSGCP to NOAA.

Recommendation #18. The TAT recommends, as a means to assist NOAA and the NSGO, that the NSGLC should prepare a comprehensive review of the rapidly expanding legal and policy literature that is focused on implementing ecosystem-based management (EBM) at the regional, national, and international levels.

Recommendation #19. The TAT recommends that the NSGLC may wish to offer technical assistance to Congressional initiatives in both Houses of Congress that propose the inclusion of provisions that mandate the application of EBM principles in federal statute, including ongoing initiatives to reauthorize the Magnuson-Stevens Fisheries Conservation and Management Act.

Recommendation #20. The TAT recommends that the NSGLC RFP include a specific solicitation of one or more EBM proposals as part of its request for legal research and outreach projects that are related to coastal and ocean law issues.

Recommendation #21. The TAT recommends that the performance of the NSGLC should be evaluated separately from the performance of the Mississippi-Alabama Sea Grant Consortium.

Recommendation #22. The TAT recommends that the performance of the NSGLC should be periodically evaluated in accordance with a standards-based evaluation protocol that is primarily and specifically tailored to the mission of the NSGLC and the NSGCP, while also including those broader elements of considerations that are customarily used in performance-based evaluations.

Recommendation #23. The TAT recommends that the National Sea Grant Review Panel (NSGRP) and the NSGO, in consultation with NSGLC personnel and the NSGLC Advisory Committee, should develop a standards-based performance evaluation process that addresses the unique characteristics of the mission and operational structure of the NSGLC.

Recommendation #24. The TAT recommends that an evaluation protocol for the NSGLC should include a PAT that is similar in structure and function to a PAT that is assigned to evaluate an individual Sea Grant Program.

Recommendation #25. The TAT recommends that the Director of the NSGLC should be invited, at an early opportunity, to participate in a PAT visit to an individual Sea Grant Program.

Recommendation #26. The TAT recommends that the NSGLC and the Sea Grant Network would mutually benefit from and should mutually commit to the development of a mechanism to enhance opportunities for frequent communication and meaningful engagement with each other.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Sea Grant College Program
1315 East-West Highway
Silver Spring, Maryland 20910

AUG 1 2005

Dr. Jerry R. Schubel (Chair)
National Sea Grant Review Panel
Aquarium of the Pacific
320 Golden Shore, Suite 100
Long Beach, California 90802

Dear Jerry:

As follow-up to the recent Panel meeting, this is a formal request to the National Panel to convene a Task Group to conduct a review of the National Sea Grant Law Center. Under current FACA regulations, it is incumbent that at least one panel member be a member of the Task Group. In this instance, I note that Jeff Stephan is a member of the Law Center's advisory committee, but there are several other Panel members who would also be good candidates for such an undertaking.

I would envision a small group of three individuals. From the academic side, possible external members you may wish to consider include; Craig Allen, University of Washington School of Law, who was formerly with the Coast Guard and works on maritime and shipping issues; Dick Hildreth, University of Oregon, co-author of the ocean and coastal law textbook and well-respected in the field; and Casey Jarmin, University of Hawaii, who was formerly with the University of Mississippi's maritime law program. On the non-academic side, Tim Eichenberg, now a private consultant, was formerly at the Ocean Conservancy and then Oceana; Mike Helmsley, Ocean.US has used the services of the National Sea Grant Law Center and could provide a user perspective and Braxton Davis, currently with the Baruch Institute at the University of South Carolina, utilized the services of the Law Center while he was with NOAA's Coastal Service Center and could provide a NOAA perspective.

The charge is to complete a preliminary review of the National Sea Grant Law Center prior to the November meeting of the Panel, with a final report submitted by January 1. The principal issues for the review to address include the following:

1) During its first three years of existence, has the program been effective?
2) Is the National Sea Grant Law Center structured in a manner that allows it to meet its goals?
3) Are resources adequate to allow the National Sea Grant Law Center to make a significant impact? What would a reasonable build-out plan look like?

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4) Can effectiveness of the National Sea Grant Law Center be improved by establishing new and creative partnerships?
5) Given limited resources, what are the most appropriate target audiences for the National Sea Grant Law Center?
6) Are there opportunities for the National Sea Grant Law Center to strengthen its role within NOAA?
7) As NOAA and NSGO move toward a regional approach to ecosystem management, how can the priorities of the National Sea Grant Law Center be better aligned with this approach
8) What types of performance measures would be appropriate for measuring the effectiveness of the National Sea Grant Law Center in the future? Should it be reviewed as part of the Mississippi-Alabama PAT or separately?
9) Other recommendations to improve the program.

Note that there is a $1M plus up in the '06 Senate language for the law center. Plans for Law Center expansion should be an integral part of this discussion.

Jim Murray, assisted by Megan Agy, will act as the NSGO liaison to the Committee. When a Chair has been chosen, please ask him/her to call Jim to discuss next steps and determine needs for staff support to the Panel.

With best regards,

Ronald C. Baird
Director

cc: J. Murray
M. Agy
S. Showater
L. Swann
N. Robinson

Overview: National Sea Grant Law Center Review

Background

- National Sea Grant Law Center officially established at the University of Mississippi in February 2001 through a competitive process managed by the National Sea Grant Office
- Mississippi-Alabama Sea Grant Legal Program (created in 1972) is operated in conjunction with the National Sea Grant Law Center
- Provides legal research through outreach and advisory services to the National Sea Grant College Program and its constituents
- $100,000 provided to the Law Center annually, which is administered through the Mississippi-Alabama Sea Grant Consortium
- Matching funds are contributed by the state of Mississippi, the MS-AL Legal Program and the University of Mississippi
- Staff: Director (Stephanie Showalter), Research Counsel (Jason Savarese) and Media Coordinator (Waurene Roberson)
- Law Center activities include 1) Coordinating the research and outreach efforts from existing Sea Grant Legal Programs, Sea Grant-funded marine policy researchers, and marine law institutes across the country; 2) Publishing a law digest, a quarterly legal reporter, and an Internet site; 3) Conducting research on legal issues affecting the nation's oceans and coasts and disseminating research results through publications, presentations, and on-line resources; and, 4) Preparing answers to law and policy questions of federal and state agencies and Sea Grant College Programs.
- Has appointed a 14 member Advisory Committee

NSGO will provide the Panel with the following background information:

- Request for Proposals for the National Sea Grant Law Center competition in 2000
- Progress reports from the National Sea Grant Law Center for activities from February 2002 to present, including areas of emphasis, leveraged funds, partnerships and accomplishments
- Expansion plan which includes proposed future initiatives for the National Sea Grant Law Center
- Other information as requested by the Panel

Issues for Review Panel to Consider

1) During its first three years of existence, has the program been effective?
2) Is the National Sea Grant Law Center structured in a manner that allows it to meet its goals?
3) Are resources adequate to allow the National Sea Grant Law Center to make a significant impact? What would a reasonable build-out plan look like?
4) Can effectiveness of the National Sea Grant Law Center be improved by establishing new and creative partnerships?

5) Given limited resources, what are the most appropriate target audiences for the National Sea Grant Law Center?
6) Are there opportunities for the National Sea Grant Law Center to strengthen its role within NOAA?
7) As NOAA and NSGO move toward a regional approach to ecosystem management, how can the priorities of the National Sea Grant Law Center be better aligned with this approach
8) What types of performance measures would be appropriate for measuring the effectiveness of the National Sea Grant Law Center in the future? Should it be reviewed as part of the Mississippi-Alabama PAT or separately?
9) Other recommendations to enhance the program.

APPENDIX C

AGENDA
National Sea Grant Law Center Topical Advisory Team Visit (TAT)
March 20 – 24, 2006

Monday, March 20: Travel and arrival day

5:00 PM: Meet in the lobby of the Inn at Ole Miss (Jeff, Dick, Megan, Stephanie)

5:00 – 8:00 PM: Dinner for TAT
8:00 – 9:00 PM: Executive Session for TAT

Tuesday, March 21

7:15 – 8:00 AM: Breakfast at hotel with Stephanie and William Hooper, Jr., current director of Mississippi Law Research Institute

8:00 AM: Depart for meeting - *Lyceum, Room 110*

8:15 – 10:30 AM: Meeting with Stephanie Showalter, Director of the National Sea Grant Law Center (NSGLC)

- History of Law Center, description (plan of work), proposals, staff management hierarchy, institutional structure, network relations, impacts, relationship to University of MS, Advisory Board

10:30 – 10:45 AM: Break

10:45 - 11:30 AM: Meeting with LaDon Swann, Director of the Mississippi-Alabama Sea Grant Consortium

- Overview of Mississippi-Alabama Sea Grant Consortium
- Focus on how NSGLC fits into Sea Grant at present
- Thoughts on future of NSGLC

11:30 -12:15 PM: Meeting with Dean Samuel Davis, University of Mississippi School of Law

- Overview of the University of Mississippi School of Law
- Perspective on NSGLC and how it fits into the School of Law
- Thoughts on future of NSGLC

12:30 – 1:40 PM: Lunch with invited guests from the morning meetings (catered)

1:45 – 2:45 PM: Meeting with NSGLC Advisory Committee

- Gene Buck, Congressional Research Service
- Margaret Davidson, NOAA Coastal Services Center
- Ed Sheppard, Thompson Coburn LLP

2:45 – 3:45 PM: Meeting with External Stakeholders (non-Sea Grant)

- Mike Helmsley (Ocean.US)
- Mark Van Waes (NOAA Coast Survey)
- Richard Barfield (Navy)
- Braxton Davis (Baruch Institute)

3:45 – 4:00 PM: Break

4:00 – 5:00 PM: Meeting with Internal Stakeholders (Sea Grant)

- Leigh Johnson (California Sea Grant)
- Frank Lichtkoppler (Ohio Sea Grant)
- Jeff Gunderson (Minnesota Sea Grant)
- Jim Fawcett (USC Sea Grant)
- Bill Walton (WHOI Sea Grant)

5:00 – 5:15 PM: Briefing with Stephanie

5:30 – 7:00 PM: Reception at the Memory House

7:00 – 8:30 PM: Dinner for TAT

Wednesday, March 22

7:15 – 8:15 AM: Breakfast at hotel with Stephanie and William Wilkins, incoming director of Mississippi Law Research Institute

8:15 AM: Depart for meeting - *Lyceum, Room 200*

8:30 –9:00 AM: Assembly of Extension Sea Grant Program Leaders

- Nancy Balcom, Chair of Assembly and CT SG Extension Leader
- Ralph Rayburn, Past Chair of Assembly and TX SG Extension Leader
- Jack Thigpen, Chair-elect of Assembly and NC SG Extension Leader

9:00 – 9:30 AM: Sea Grant Directors

- Barry Costa-Pierce, RI Sea Grant Director
- Jeff Reutter, OH Sea Grant Director

- Paul Anderson, ME Sea Grant Director

9:30 – 10:15 AM: Sea Grant Legal Community
- Walter Clark, Policy Specialist for NC Sea Grant
- Jim Wilkins, Director of LA Sea Grant Legal Advisory Service
- Josh Clemons, Research Counsel for MS-AL Sea Grant Legal Program
- Kristen Fletcher, Director of RI Sea Grant Legal Program

10:15 – 10:30 AM: Break

10:30 – 12:00 PM: Discussion with a focus on the new Congressional appropriation
- Stephanie and University people

12:00 – 1:15 PM: Lunch with Stephanie and University people (catered)

1:15 – 2:30 PM: Continue discussion with a focus on the new Congressional appropriation

2:30 – 2:45 PM: Break

2:45 – 5:00 PM: Executive Session for TAT

5:00 – 5:30 PM: Briefing with Stephanie

6:00 – 8:00 PM: Dinner for TAT

8:00 PM: Writing time

Thursday, March 23

7:30 – 8:30 AM: Breakfast (optional)

9:00 AM: Depart for meeting – *Lyceum 123*

9:30 – 10:00 AM: Meeting with Chancellor Robert Khayat

10:00 – 12:00 PM: Writing time for TAT - *Eastland Room, Law School Library*

12:00 – 1:00 PM: Lunch

1:00 – 5:00 PM: Writing time for TAT

5:00 – 5:30 PM: Briefing with Stephanie

6:00 – 8:00 PM: Dinner for TAT

8:00 – 10:00 PM: Editing of TAT Report

Friday, March 24

7:30– 8:30 AM: Breakfast for TAT and debriefing rehearsal

8:45 AM: Depart for debriefing - *Eastland Room, Law School Library*

9:00 – 10:30AM: Final debriefing

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Sea Grant College Program
1315 East-West Highway
Silver Spring, Maryland 20910

MAY 21 2001

MEMORANDUM FOR: Sea Grant Directors

FROM: Ronald C. Baird
Director

SUBJECT: Request for Proposals for Two New Programmatic Investments

The National Sea Grant College Program is requesting proposals for two new programmatic investments that will be funded in FY 2002: a Sea Grant National Ports and Harbors Specialist and a Sea Grant Law Center. The specific requests are attached. These initiatives were first proposed in my memorandum of Oct 17, 2000, and subsequently were discussed in several Sea Grant forums. The intent of the investments is to be able to address large regional, national, and international audiences that are generally beyond the capability and programmatic objectives of any one Sea Grant Program, by providing national context and leadership. They will increase the visibility of Sea Grant and provide the framework for expanding the Sea Grant resource base. In addition, products and services developed by the two new programs will be made available to augment individual efforts within the network.

Attachments

cc: Sea Grant Review Panel
Christophe Tulou
National Sea Grant Office

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Attachment 2.

Request for Proposals
Sea Grant Law Center

Introduction

The National Sea Grant College Program plays a leading role in the sustainable development of the Nation's marine resources. It accomplishes this through an extensive program of research, education, and outreach. Sea Grant meets national needs by providing information to citizens pertaining to a diverse set of concerns ranging from how best to educate K-12 children on coastal issues to advanced scientific research. However, as the development of various marine resources evolves, matures, and receives greater attention nationally and worldwide, it becomes increasingly important to address the legal issues that pertain to such development. Efforts to disseminate information about ocean and coastal law and policies, and to provide the Sea Grant College Programs and coastal citizens with critical analyses need to be pursued with the same vigor as the other research, education, and outreach components of Sea Grant.

This announcement calls for the creation of a law center to coordinate and enhance Sea Grant's activities in legal scholarship and outreach related to coastal and ocean law issues. It is envisaged that such a center will ultimately involve a number of state Sea Grant Programs organized as a "virtual" center. It is designed to combine and coordinate the activities of additional regional centers in order to create a "virtual" network for nationwide law efforts. The major responsibilities of such a center would be:

1) To integrate the efforts of ocean and coastal law researchers and users in the Sea Grant network nationwide;

2) to conduct research on current national ocean, coastal, and Great Lakes law issues;

3) to provide outreach and advisory services to the Sea Grant Network and NOAA;

4) to disseminate information and analysis through periodic workshops and conferences as well as publications;

5) to serve as a focal point for Sea Grant's law-related issues, and to promote the growth and development of a "virtual" Sea Grant legal network.

These activities are intended to ensure that Sea Grant is actively involved in legal research on timely issues of ocean and coastal law at the state, regional and federal levels. Such issues might include, for example, statutes and amendments to coastal laws and regulations, case law as it affects coastal resources, and trends in marine resource use and conservation.

Request for Proposals

Proposals are requested from current Sea Grant College and Institutional Programs (or consortia of programs) to provide a center to perform the above tasks. A minimum of $100,000 will be available for the Law Center in FY2002; outyear funding can be expected to continue for a minimum of four years, depending on appropriation levels. Funding beyond that time will be dependent on an evaluation of the Center's benefits to the NSGCP. Proposals are due at the National Sea Grant Office on August 15, 2001, and will be evaluated by a panel of reviewers. The criteria used to evaluate the proposals will be:

1) The potential for the proposed effort to meet or exceed the objectives stated above;

2) the qualifications of the personnel involved, including institutional experience in marine resource law and outreach;

3) the adequacy and efficiency of the proposed organizational structure; and

4) the commitment of the host institution(s) to the center, as shown by cost-sharing or leveraging of other resources and personnel.

Proposal Guidelines and Instructions for Submission

Only current Sea Grant Colleges and Institutional Programs are eligible for these awards. Proposals for the program described above must be received by the National Sea Grant Office by August 15, 2001. Projects may be for a maximum of four years' duration. Awards will be amended to the FY 2002 omnibus award of the successful applicants, for an amount not to exceed $100,000 of Federal funds per year. Matching funds do not have to be allocated specifically to these projects, but there must be sufficient matching funds available in the omnibus award. However, as noted above, the commitment of the host institution, as shown by cost-sharing or leveraging of other resources and personnel, will be considered in proposal selection.

Each proposal should have a title page signed by the Principal Investigator and the appropriate institutional representative, and a project summary (SG Form 90-2). The project description should not exceed 15 pages and should be written in at least a 10-point font. Tables and visual materials, literature citations, CV's, letters of support, and other appendices may be included in addition to the project description. There should be separate budgets (SG Form 90-4) for each year of the project as well as a cumulative annual budget and budget description for the entire project. Subcontracts should have a separate budget page.

Proposals should be addressed to: National Sea Grant Office, NOAA-R/SG, Room 11708, 1315 East-West Highway, Silver Spring, MD 20910, Attn: R. Randall Schneider.

APPENDIX E

Grant Document for the National Sea Grant Law Center (FY2006)

National Sea Grant Law Center
Project Abstract

In 2001, the National Sea Grant Office issued an RFP calling for "the creation of a law center to coordinate and enhance Sea Grant's activities in legal scholarship and outreach related to coastal and ocean law issues." Founded in 2002 to provide legal research to the Sea Grant community and its constituents, the Sea Grant Law Center conducts research on marine laws and policies, coordinates ocean and coastal law researchers, and disseminates information to coastal and ocean policy-makers. For the past four years, the Sea Grant Law Center has effectively addressed the legal needs of the Sea Grant community. The need for these services continues.

U.S. ocean and coastal law is a complicated matrix of international, federal, state, tribal, and local law. Sea Grant extension agents and their constituents need to understand the legal system in order to successfully navigate the permitting processes and comply with the law. With the release of the final report of the U.S. Commission on Ocean Policy and the Bush Administration's *U.S. Ocean Action Plan* in late 2004, significant legislative activity related to the management of the U.S. oceans and coasts is expected over the next several years. The Sea Grant community and its constituents need to stay informed of legislative and regulatory changes.

The Sea Grant Law Center currently provides a number of services, which are in great demand and utilized by a wide range of organizations inside and outside of the Sea Grant community. Law Center attorneys conduct scholarly research on a variety of developing ocean and coastal policy issues including aquaculture, access to public beaches, and invasive species, and research findings are frequently published in leading legal publications such as the Environmental Law Reporter and Vermont Law Review. The Law Center's quarterly legal newsletter, *The SandBar*, informs over 1,200 subscribers about new court cases and legislation affecting coastal resource management. The Law Center's website is a source of critical information about marine law and is a tool for the integration of marine law and policy into the National Sea Grant network. The demand for these services will only increase as Congress passes laws and administrative agencies develop new regulatory programs for emerging coastal activities. Through its advisory service, the Law Center has provided legal research and assistance to a wide range of entities, but the vast majority of advisory requests come from Sea Grant College Programs.

The Law Center requests support to continue to fulfill its three primary components: 1. Outreach efforts through advisory research, national and regional presentations, and the publication of *The SandBar*, now in its fourth year; 2. Research of timely marine law topics affecting the coastal areas of the United States; and 3. Education and training of law students in research and writing in ocean and coastal law. The activities proposed by the Law Center are vital elements in helping the National Sea Grant College Program achieve the national priorities outlined in its 2003-2008 Strategic Plan, *Sea Grant in the New Century*.

National Sea Grant Law Center
Project Narrative

Introduction

In 2001, the National Sea Grant Office issued an RFP calling for "the creation of a law center to coordinate and enhance Sea Grant's activities in legal scholarship and outreach related to coastal and ocean law issues." Founded in 2002 to provide legal research to the Sea Grant community and its constituents, the Sea Grant Law Center conducts research on marine laws and policies, coordinates ocean and coastal law researchers, and disseminates information to coastal and ocean policy-makers. For the past four years, the Sea Grant Law Center has effectively addressed the legal needs of the Sea Grant community.

The need for these services continues. In fact, it has never been greater. Significant legislative activity related to the management of the U.S. oceans and coasts is expected over the next several years. The reports of the U.S. Commission on Ocean Policy and the Pew Oceans Commission called attention to numerous problems with the current management regimes governing ocean and coastal resources. The U.S. Ocean Commission in its final report, *An Ocean Blueprint for the 21st Century*, urged Congress to amend the Coastal Zone Management Act (CZMA), the Magnuson-Stevens Fishery Conservation and Management Act, the National Aquaculture Act, the Marine Mammal Protection Act (MMPA) and several other ocean and coastal statutes. In its *U.S. Ocean Action Plan* issued in December 2004, the Bush Administration committed to a number of legislative initiatives including a NOAA Organic Act, reauthorization of the MMPA and CZMA, and statutory regimes for offshore aquaculture and non-traditional offshore energy projects such as wind and wave energy. Congress will be examining ocean and coastal issues at a level unheard of in decades.

U.S. ocean and coastal law is a complicated matrix of international, federal, state, tribal, and local law. Few coastal activities fall under the jurisdiction of one single agency and permitting process. On the federal level alone, there are 20 agencies (administrating over 140 laws) with some authority over ocean waters and resources. Individuals seeking to conduct offshore aquaculture, for example, must secure permits from five federal agencies – the Coast Guard, the Minerals Management Service, the Environmental Protection Agency, the National Marine Fisheries Service, and the Army Corps of Engineers. Sea Grant extension agents and their constituents need to understand the legal system in order to successfully navigate the permitting processes and comply with the law.

Sea Grant extension agents, coastal managers, fishermen, developers, oil companies – everyone involved with coastal resources – will be confronted with new laws and regulations in the coming years. Activities which are currently legal may be deemed illegal or be severely restricted by Congress. Offshore projects, such as wind farms and liquefied natural gas terminals, might be permitted by a different federal agency or prohibited entirely. As the U.S. aquaculture industry develops, new laws and regulations are inevitable. Numerous other coastal industries and resource users will also be impacted by legislative and regulatory changes.

While the activities falling within some Sea Grant thematic areas, such as aquaculture and fisheries, are heavily regulated, others, such as development of robots, sensors, and ocean observing systems, are not. Technology often outpaces regulatory regimes, whose adaptability is hindered by the legislative process and administrative agency resources. Autonomous Underwater Vehicles, or AUVs, are an example. AUVs are the cutting edge of technology used to explore the world's oceans and recent advances have made AUVs, once the exclusive purview of the U.S. Navy and academic institutions, more accessible to the private sector. Unlike tethered and remotely operated vehicles, which are simple extensions of the research vessel, AUVs are separate entities. The AUV's autonomous nature creates a regulatory gap. No legal framework currently exists to regulate the use of AUVs. AUVs may or may not be vessels as defined by U.S. maritime laws and their use is virtually unregulated by the federal government.

Legal research is currently needed to determine whether AUVs are vessels under U.S. law and to explore other legal questions arising from the widespread use of AUVs, such as liability and salvage rights. A comprehensive study on the law governing the operation of AUVs was published by the Society for Underwater Technology in 2000, but the report focused on the legal regimes applicable to a UK operator. NOAA's Office of Ocean Exploration, MIT Sea Grant, and other institutions owning and operating AUVs need legal research support to explore the issues mentioned above and identify policy options for addressing legal gaps and conflicts.

Ocean.US and the newly formed National Federation of Regional Associations (NFRA) are encountering similar problems as they embark on the implementation phase of the Integrated Ocean Observing System (IOOS). In addition to the basic questions of liability associated with government or academic institutions producing charts or streaming data via the web, there are a number of unanswered legal questions regarding proper formation of regional associations, intellectual property rights, and salvage.

In 2004, the Sea Grant Law Center received an advisory request from Ocean.US seeking information about the legality of federal agencies participating in 501(c)(3) organizations. Since that initial contact, the Law Center has provided on-going research support to Ocean.US, NFRA, and other affiliated organizations, answering a number of legal questions related to such topics as the Federal Tort Claims Act and the enforceability of memoranda of understanding. Additional legal issues will arise as IOOS moves forward.

The Sea Grant Law Center currently provides a number of services, which are in great demand and utilized by a wide range of organizations inside and outside of the Sea Grant community. This demand will only increase as Congress passes laws and agencies develop regulatory programs for emerging coastal activities, such as offshore wind and wave energy projects. Law Center attorneys conduct scholarly research on a variety of developing ocean and coastal policy issues including aquaculture, public access, and invasive species, and research findings are frequently published in leading legal publications such as the Environmental Law Reporter and Vermont Law Review. The Law Center's website (http://www.olemiss.edu/orgs/SGLC) is a source of critical information about marine law and is a tool for the integration of marine law and policy into the National Sea Grant network. Law Center fact sheets update Sea Grant College Programs and coastal managers on legislative developments on both a national and state level.

The Law Center's quarterly legal newsletter, *The SandBar*, informs over 1,200 subscribers about new court cases and legislation affecting coastal resource management. *The SandBar* is published in both electronic and print format. Hard copies are provided to subscribers free of charge. A recent issue featured articles on the following topics: whether a dredge is a vessel under federal law; the Massachusetts offshore windfarm project; the legality of a court-order wetlands excavation to mitigate pollution; the voiding of a development lease in Hawaii for lack of sufficient environmental review; the U.S. Supreme Court's extension of federal admiralty jurisdiction inland; the applicability of the National Historic Preservation Act to the construction of a U.S. military base in Japan; the right of the Makah Indian Tribe to a percentage of the Pacific whiting harvest; the responsibilities of an online fish auctioneer to Alaskan fishermen; and the liability of the Corps of Engineers for placement of dredge material on a Puerto Rican beach. *The SandBar* mailing list has steadily increased over the years and is distributed to attorneys, coastal managers, and private citizens across the nation and around the globe. International subscribers include organizations and individuals in Saipan, Singapore, South Korea, Russia, Japan, Italy, France, Australia, Canada and England.

The Sea Grant Law Center Advisory Service is a legal research service provided free of charge to the Sea Grant College Program and its constituents. While the Law Center is prohibited from providing legal advice or becoming involved in litigation, Law Center attorneys provide the Sea Grant community and its constituents with the background information needed to understand the law and determine whether to seek independent legal counsel. The advisory request process involves four main steps. First, a constituent (federal or state management agency, Sea Grant extension agent, private citizen, etc.) contacts the Law Center. The Law Center attorneys then work with the constituent to identify the discrete legal question and the type of final product needed. Legal research and analysis is then conducted by the assigned attorney and law students. Finally, a final product prepared. Advisory requests result in a variety of products including memoranda of law, white papers, joint publications with extension agents, and conference presentations.

Through its advisory service, the Law Center has provided legal research and assistance to a wide range of entities, but the vast majority of advisory requests come from Sea Grant College Programs. In 2004 the Law Center had 12 major advisory requests, with eight submitted by Sea Grant Programs. The Extension Leader for California Sea Grant asked whether California Assembly Bill 1805, which attempted to ban the possession, purchase or sale of farm-raised salmon in California, would survive a court challenge if passed. The Associate Director of Minnesota Sea Grant sought information about Minnesota and Wisconsin laws regulating the interstate sale and transportation of bait minnows. The Associate Director of Rhode Island Sea Grant was concerned about the potential liability of a Sea Grant program arising from the publication of ocean observing system data on the Web. The Program Leader for Washington Sea Grant's Marine Advisory Service wondered whether there were any legal barriers in Washington State which would prevent commercial fishermen from taking tourists out on their boats.

The Law Center also assisted with the publication of a marine extension bulletin on the potential liability of shellfish farmers in Massachusetts for WHOI Sea Grant. The bulletin was

mailed to over 250 shellfish aquaculturists in Massachusetts. As a result of this joint project, shellfish aquaculturists are better informed about their potential liability and the extension service is better prepared to address community concerns as they arise.

For Alaska Sea Grant, the Law Center examined the effect of glacio-isostatic uplift on the public-private property boundary of the Mendenhall Wetlands State Game Refuge in Juneau. The California Sea Grant Extension Program commissioned a white paper on the legal regime to control hull fouling and the transport of invasive species via ships' hulls to support the Program's ongoing aquatic invasive species research, education, and outreach activities. Finally, Law Center attorneys provided Ohio Sea Grant with ongoing legal research support related to a property dispute between the state of Ohio and Lake Erie shorefront property owners.

Additionally in 2004, the Law Center provided NOAA Coastal Services Center with information on enforcement actions related to U.S. marine protected areas and assisted the Southern Division of Naval Facilities Engineering Command with interpreting Essential Fish Habitat regulations. The Law Center also compiled information on 501(c)(3) organizations and lobbying for the National Association of Marine Laboratories and answered the questions of Ocean.US related to federal agency participation in the Regional Associations (RAs) that are forming to implement the integrated and sustained ocean observing system (IOOS).

The large number of advisory requests and the wide array of topics reflect the broad range of activities undertaken by Sea Grant programs and the increasing use and exploitation of U.S. ocean and coastal resources. The need for non-biased legal information is overwhelming. Although all universities have a general counsel's office, to which Sea Grant Programs have access, few university attorneys are familiar with marine law or have the time to conduct the background research and answer the questions of extension agents or researchers. Furthermore, lawyers are trained as advocates to vigorously argue a position on behalf of their clients. While this is a valuable skill in the courtroom, it can cause problems for Sea Grant agents who must remain neutral when designing and conducting outreach programs for their constituents. The Law Center advisory service provides an essential service to the Sea Grant community. The increased understanding of the law gained by Sea Grant extension agents and their constituents improves the regulated communities' relationships with management agencies and increases compliance with existing law, as individuals are more likely to follow laws and regulations they understand.

The Law Center is also actively involved in educating and training law students in research and writing on ocean and coastal law topics and enhancing the marine law curriculum. The PI lectures as adjunct faculty at a number of institutions and recently designed and taught a seminar at the University of Mississippi School of Law entitled *Developing Issues in Ocean and Coastal Law*. Students were encouraged to study and analyze, in-depth, several emerging issues in ocean and coastal law. The PI covered a variety of issues, including offshore aquaculture, windfarms, private property rights in fisheries, preservation of underwater cultural heritage, and liquefied natural gas terminals. The jurisdictional and management issues associated with each subject were examined, as were environmental and public policy concerns. The PI also teaches a freshman composition course in which students explore the challenges facing today's fisheries managers by writing about past, present, and developing fisheries management conflicts.

In addition to its formal education activities, the Law Center enhances the educational experiences of law students in Mississippi and across the nation by providing opportunities to gain invaluable experience working on "real world" marine legal issues. Sea Grant Law Center Research Associates (RAs) work closely with Law Center attorneys on research projects and regularly contribute articles to Law Center publications. Over the past four years, RAs have co-authored law review articles, researched advisory requests, and assisted with conference and workshop preparation. One student recently presented the results of Law Center invasive species research to the Mississippi Aquatic Invasive Species Task Force. This was a wonderful professional development experience rarely available to law students studying ocean and coastal law. During the course of their employment, RAs hone critical thinking, research, and writing skills highly valued by future employers, be they law firms, federal agencies, state governments, or private sector companies.

The Sea Grant Law Center proposes to build on the above mentioned services by continuing to conduct legal research, formal and informal educational activities, and outreach projects that assist the Sea Grant community and its constituents in understanding the legal issues that surround the use of coastal and marine resources and the options for resolving conflicts. The activities proposed by the Law Center are vital elements in helping the National Sea Grant College Program achieve the national priorities outlined in its 2003-2008 Strategic Plan, *Sea Grant in the New Century*. The Law Center proposes to emphasize certain thematic areas and priority areas during the 2006-2010 timeframe. They are (1) Sea Grant Theme Area # 1: Aquaculture; National Priority # 6: Public Policy and Law; (2) Sea Grant Theme Area # 5: Digital Ocean; National Priority # 4: Supporting Offshore Industry; and (3) Sea Grant Theme Area # 10: Urban Coasts; National Priority # 3: Managing Coastal Resources.

Research/Outreach Plan

Objectives

For the 2006-2010 time period, the major objectives of the Sea Grant Law Center are to:

1. Provide legal research and advisory services to the National Sea Grant Office, the Sea Grant College Programs, and their constituents;

2. Help ensure that Sea Grant extension agents understand the existing legal regimes governing coastal resources and activities and are fully aware of any legislative and regulatory developments;

3. Conduct legal research on timely marine law topics affecting U.S. coastal areas and disseminate research findings to the ocean and coastal law and policy community; and

4. Educate and train law students in research and writing in ocean and coastal law and facilitate the incorporation of developing ocean and coastal legal issues into the curriculums of leading legal education institutions;

Approach and Methodology

The Sea Grant Law Center meets its objectives by using a four-step approach. First, the investigators gain a thorough understanding of the factual elements. Second, the attorneys locate and analyze relevant federal and state statutes authorizing or requiring regulation of activities under review to determine legislative intent and to assess the authority and responsibilities of the government agencies involved. Third, the attorneys analyze the administrative regulations issued under authority of the legislative mandate. Finally, the attorneys review judicial decisions interpreting the statute and the regulations for their effect on the development of law and policy decisions.

Program investigators complete their work at the University of Mississippi Law School and Mississippi Law Research Institute which provides the largest law library in the state, computer-based research tools, and faculty expertise to draw upon. Staff and managerial support is provided by the Law Research Institute, and publications and the web site are designed in-house by a full-time Publications Designer. In February 2002 the Mississippi-Alabama Sea Grant Legal Program began operating in conjunction with the National Sea Grant Law Center, established that year to coordinate and enhance Sea Grant's activities in legal scholarship and outreach related to coastal and ocean law issues. The Legal Program employs upper level law students drawn from the University of Mississippi Law School student body on a competitive basis to contribute to the research.

Plan of Work

<u>Cross-Cutting Projects</u>

- Information on developing ocean and coastal legal issues impacting U.S. coastal communities will be disseminated through the quarterly publication of *The SandBar*, the legal reporter of the National Sea Grant Law Center. *The SandBar* will publish analyses of state and federal case law from across the nation. *The SandBar* will be organized on a regional basis, currently covering legal developments in New England, Mid-Atlantic, Southeast, the Great Lakes, Alaska, the Pacific Northwest, California, Hawaii, and Puerto Rico.

- 5 – 6 fact sheets will be developed each year to educate the Sea Grant community and its constituents about federal legislative developments.

- One Congressional briefing for senators and representatives and their staffs on a pending legislative issue will be organized and hosted each year.

- Fifteen organizations within the Sea Grant Community (Sea Grant programs, extension agents, constituents, federal and state agencies) will receive timely legal research and advice

on legal problems related to ocean and coastal resources every year. An emphasis will be placed on increasing the number of requests by 20 % in each of the next two years.

- Ten students from law schools other than the University of Mississippi will receive training in writing and research on ocean and coastal issues each year. Special efforts will be made to provide non-monetary compensation for the students through independent study programs. An emphasis will also be placed on increasing the number of students participating in the Law Center's remote research associate program. The goal of these efforts is to increase the number of students trained each year by 30 %.

- Each year, 5 case studies will be developed and disseminated to marine law faculty at law schools throughout the country to facilitate the incorporation of legal issues related to Sea Grant research activities into the curriculum of the leading legal institutions. A database of the case studies will be maintained on the Law Center's website.

Aquaculture

- A Law Center attorney will become a member of the Aquaculture Theme Team to improve knowledge of Sea Grant aquaculture research, education, and outreach projects and provide legal information and research support to the Theme Team and its members.

- Thirty Sea Grant extension agents will be educated about the legal issues surrounding offshore aquaculture, including barriers associated with utilizing decommissioned oil rigs.

- Fact sheets will be prepared as aquaculture-related laws are passed by Congress and state legislatures and regulations are promulgated by federal and state management agencies.

Digital Ocean

- A Law Center attorney will become a member of the Digital Ocean Theme Team to improve familiarity with Sea Grant research, education, and outreach projects in this area and provide legal information and research support to the Theme Team and its members.

- Ocean.US, the National Federation of Regional Associations, and related organizations will receive information on the legal issues associated with the implementation of the Integrated Ocean Observing System (IOOS). A workshop will be conducted in 2006 to educate the IOOS community about the legal issues, facilitate communication between scientists and lawyers, and develop strategies to address legal conflicts and risks.

- Coordinating with NOAA's Office of Exploration, the Marine Technology Society, and related organizations, Law Center attorneys will increase awareness and understanding of the legal issues surrounding the use of Autonomous Underwater Vehicles and similar research devices. Law Center attorneys will publish articles on the management challenges posed by these cutting-edge technologies, make presentations at national and international conferences, and host and organize a workshop or panel at a major conference in 2007.

Urban Coast

- A Law Center attorney will become a member of the Urban Coast Theme Team to improve familiarity with Sea Grant research, education, and outreach projects in this area and provide legal information and research support to the Theme Team and its members.

- On May 19, 2005, international regulations to control harmful emissions from ships' exhausts contained in Annex VI of the MARPOL Convention entered into force. Information will be provided to Sea Grant ports and harbor specialists, port authorities, and other interested individuals on the International Maritime Organization's treaty negotiation process, the implementation obligations of member nations, and the new regulations.

- Research will be conducted regarding the level of responsibility that individual municipalities, as opposed to dischargers, have for limiting nonpoint source discharges under the Clean Water Act. Research findings will be published in law review format.

- The public and coastal community leaders in 2 states will gain increased knowledge on the latest developments in the regulation of cruise ships. Fact sheets and other educational material will be developed to disseminate information. Presentations at meetings with interested parties will be conducted as needed.

Project Personnel

The team of three individuals associated with the Sea Grant Law Center is outlined below with the position titled of each team member and the amount of time devoted to the Center in man-months for each year. (*Note: Brief CV's for each staff member are included as attachments*).

Stephanie Showalter	Director	4 man-months
Jason Savarese	Staff Attorney	12 man-months
Waurene Roberson	Publications Editor	6 man-months

Anticipated Benefits and Outcomes

It is anticipated that the increased knowledge and heightened public awareness of marine legal issues will improve the management of the nation's ocean and coastal resources. Greater understanding of federal and state legal regimes will reduce confusion and increase compliance. Identification of conflicts and gaps in state and federal laws through scholarly legal research will facilitate the adoption of more effective laws and regulations. Law students at the University of Mississippi and other law schools will gain a greater understanding of the legal framework governing our ocean and coasts and valuable work experience, thereby preparing them to work in the ocean and coastal law and policy field.

2300 Clarendon Boulevard • Suite 1350 • Arlington, VA 22201-3667 • USA
tel: 703-588-0855 • fax: 703-588-0872 • www.ocean.us.net
The National Office for Integrated and Sustained Ocean Observations

April 21, 2005

Ms. Stephanie Showalter
Director, MS-AL Sea Grant Legal Program
Kinard Hall, Wing E, Room 254
PO Box 1848
University, MS 38677-1848

Dear Ms. Showalter:

Ocean.US and the regional groups working to form Regional Associations have undertaken the establishment of an integrated and sustained ocean observing system (IOOS) for the United States. Since no one has tried to do this before, we are often exploring the unknown. This is especially true when trying to unravel the intricate legal issues associated with forming organizations comprised of federal, state, and local agencies, educational institutions, tribal governments, non-governmental organizations, and the private sector. It is a daunting process.

On several occasions over the last few months, the Law Center has done research to suggest answers to the questions we face. That research has kept us from being stymied and has helped to continue moving us toward our goal of a truly integrated system.

It is my understanding that you are proposing to organize a workshop that would provide a forum for legal experts, federal agencies and regional associations to develop a strategy for addressing legal issues confronting the formation of partnerships among government agencies, private sectors, and academia, as well as liability issues related to IOOS operations and the use of IOOS data. Ocean.US strongly supports this proposal and looks forward to working with you to further develop the concept.

Thank you for the work you and your team have done for Ocean.US and our regional groups. I look forward to working with you in the future to help us understand and address the legal issues associated with implementing and operating a sustained system of integration ocean observations, analysis and applications.

Sincerely,

Thomas C. Malone
Director

NATIONAL FEDERATION OF REGIONAL ASSOCIATIONS

Alaska Ocean Observing System (AOOS) ♦ Northwest Association of Networked Ocean Observing Systems (NANOOS) ♦Central and Northern California Ocean Observing System (CeNCOOS) ♦Southern California Coastal Ocean Observing System (SCCOOS)♦Pacific Island Integrated Ocean Observing System (PacIOOS)♦ Gulf of Mexico Coastal Ocean Observing System (GCOOS) ♦ Caribbean Integrated Ocean Observing System (CarIOOS) ♦ Southeast Coastal Ocean Observing Regional Association (SECOORA) ♦Mid-Atlantic Coastal Ocean Observing Regional Association (MACOORA) ♦ Gulf of Maine Ocean Observing System (GOMOOS) ♦ Great Lakes Observing System (GLOS)

c/o Dr. David L. Martin, Chair
1013 NE 40th Street
Seattle, WA 98105-6698

Providing the Regional Teamwork to Develop an Integrated Ocean Observing System

Ms. Stephanie Showalter
Director, MS-AL Sea Grant Legal Program
Kinard Hall, Wing E, Room 254
PO Box 1848
University, MS 38677-1848

Dear Ms. Showalter:

On behalf of the National Federation of Regional Associations (NFRA), I offer our strong support for your proposal to renew funding for your law center for the next four years. The NFRA is a new organization that represents Regional Associations from eleven regions of our country that are being formed to bring relevant ocean information to users through an integrated ocean observing system.

The development and integration of coastal ocean observation systems represents a significant step forward in providing our society with high-quality, timely information on our nation's coastal waters and, as this is a new endeavor involving Regional Associations comprised of federal, state, and local agencies, educational institutions, tribal governments, non-governmental organizations, and the private sector, some of the legal issues we have been faced with have been quite complex. We greatly appreciate and value the assistance your law center has been able to provide to us and look forward to a continuing relationship with you including participation in Workshops focusing on legal issues relevant to the NFRA.

Thank you for the work you and your team have done for the NFRA and our Regional Associations. We look forward to continuing to work with you in the future as we mutually explore and solve legal issues relevant to this national enterprise.

Sincerely,

David L. Martin, Co-Chair
National Federation of Regional Associations Governing Committee

Sea Grant
Texas

May 19, 2005

Ms. Stephanie Showalter
Director, Sea Grant Legal Program
MS-AL Sea Grant Legal Program
The University of Mississippi
262 Kinard Hall, Wing E
University, MS 38677

Dear Stephanie:

As both Extension Program Leader for the Texas Sea Grant College Program and the Assembly of Sea Grant Extension Program Leaders chair for this year, I wish to express gratitude for your leadership and the contributions being made by the Sea Grant Legal Program.

I have found the publications and advisory services provided by the program to be of the highest caliber. These elements help ensure that Sea Grant extension agents understand the existing legal regimes governing coastal resources and activities and are fully aware of any legislative and regulatory developments. A mark of success I recently noted was the response to your participation in the Gulf of Mexico and Caribbean Regional Sea Grant Extension Program meeting, which continues to have a positive resonance.

Your organization and utilization of the Sea Grant Legal Program Advisory Committee has also proven a useful and proactive initiative for contributing to the program's continued success.

Thank you again for the fine work you and the Legal Program are doing in support of the Sea Grant Extension Programs. It has been a positive addition to the resources available to us.

Best wishes,

Ralph Rayburn
Associate Director and
Extension Program Leader

2700 Earl Rudder Frwy S., Suite 1800 • College Station, Texas 77845 • (979) 845-3854 • FAX (979) 845-7525 • http://texas-sea-grant.tamu.edu

THE OHIO STATE UNIVERSITY

Ohio Sea Grant College Program

Franz Theodore Stone Laboratory
Great Lakes Aquatic Ecosystem Research Consortium (GLAERC)
Center for Lake Erie Area Research (CLEAR)
Area 100 Research Center
1314 Kinnear Road
Columbus, OH 43212-1194

Phone (614) 292-8949
Fax (614) 292-4364
www.sg.ohio-state.edu

20 May 2005

Stephanie Showalter, Director
National Sea Grant Law Center
Kinard Hall, Wing E - Room 256
P.O. Box 1848
University, MS 38677-1848

Dear Stephanie,

I am writing to support your proposal for continued funding for the Sea Grant Law Center. I have been very pleased with the support and advisory services you have provided to Ohio Sea Grant, the National GOOS Steering Committee, Ocean.US, the National Federation of Regional Associations (NFRA), and the National Association of Marine Laboratories (NAML).

With regard to Ohio Sea Grant, your assistance has been invaluable as our state struggles with defining the boundary of coastal property ownership of private lands. Your insight and review of case history was very helpful. I hope you will be able to continue to provide assistance as various bills addressing this issue move through our state legislature.

I serve on the GOOS Steering Committee. We were struggling with a number of issues regarding formation of IOOS and the NFRA. I called and asked if you could help and forwarded your contact information to Ocean.US, the GOOS Chair, and the NFRA leadership. I have heard nothing but glowing reports from all three groups about the advise and guidance you have provided.

Finally, as President of NAML, I have been very pleased with the advice you have provided as we have moved to enhance our capabilities and impact in governmental affairs. This was quite a complex issue because we are a 501(C)3 organization with federal, academic and private sector partners.

Bottom line, I have called on you several times during the past 2 years for a variety of reasons and I have always been very pleased with the quality and speed of the response. You have been an asset to our program and you have represented the National Sea Grant College Program very well. You have made Sea Grant look good in the eyes of many outside groups. Continuing the Law Center should be a high priority for Sea Grant!

Sincerely, Jeffrey M. Reutter

Jeffrey M. Reutter, Ph.D.
Director

MASGC Form 02

PROJECT SCHEDULE FORM

National Sea Grant Law Center

MISSISSIPPI-ALABAMA SEA GRANT COLLEGE PROGRAM

	Year 1												Year 2												Year 3											
Tasks:	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J
Major objective 1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X												
Major objective 2	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X												
Major objective 3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X												
Major objective 4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X												

Updated: 11/07/02

OMB Control No. 0648-0362
Expiration Date 09-30-2004

Form 90-4 (Adapted)

MASGC BUDGET FORM

PROJECT STATUS: New ☒ Continuing ☐ Check if separate project grant ☐

GRANTEE: Mississippi-Alabama Sea Grant Consortium **PROJECT NUMBER:**

PROJECT TITLE: National Sea Grant Law Center

PRINCIPAL INVESTIGATOR(S): Stephanie Showalter **DURATION:** 12 months 2007

A. SALARIES & WAGES	NO. OF PERSONNEL	MAN MONTHS	SEA GRANT FUNDS	GRANTEE SHARE
1. SENIOR PERSONNEL				
a. (Co) Principal Investigator:	1	4.0		20,433
b. Associates (Faculty/Staff):	1	12.0	40,098	
Sub Total:	2	16.0	40,098	20,433
2. OTHER PERSONNEL				
a. Professionals:				
b. Research associates:				
c. Research asst. grad. students:				
d. Prof. school students:				
e. Pre-Bac. student(s):				
f. Secretarial-clerical:	1	6.0	12,600	
g. Technicians:				
h. Other:				
Total Salaries and Wages: (A1 through A2h)			52,698	20,433
B. FRINGE BENEFITS (Charged as direct cost):			13,643	5,290
Total Salaries (A and B):			66,341	25,723
C. PERMANENT EQUIPMENT				
D. EXPENDABLE SUPPLIES AND EQUIPMENT				
E. TRAVEL				
1. Domestic U.S.			2,103	3,000
2. International				
Total Travel:			2,103	3,000
F. PUBLICATION & DOCUMENTATION COSTS:			1,000	5,500
G. OTHER COSTS:				
1. Computer Costs				
2. Telephone/Postage/Fax				500
3. Reference Materials				
4. Professional Fees				
5. Support Services				
6.				
7.				
8. Scholarships/Awards/Tuitions				
9. Sub-contracts				
TOTAL OTHER COSTS (G1 through G9)			0	500
TOTAL DIRECT COSTS (A through G)			69,444	34,723
H. F & A COST 1. On Campus 44% of			30,556	15,277
2. Off Campus % of				
TOTAL F & A COST (H1 + H2)			30,556	15,277
TOTAL COSTS (A through H)			100,000	50,000

BUDGET JUSTIFICATION

2007

		SG FUNDS	GRANTEE
A. SALARIES AND WAGES:			
S. Showalter, .25 FTE x $82,400			20,433
J. Savarese, 1 FTE x $40,098		40,098	
Publications Editor, .5 FTE x $25,200		12,600	
B. FRINGE BENEFITS			
S. Showalter $5,290 (25.89% of $20,433)			5,290
J. Savarese $10,381 (25.89% of $40,098)		10,381	
Publications Editor $3,262 (25.89% of $12,600)		3,262	
C. PERMANENT EQUIPMENT			
D. EXPENDABLE SUPPLIES & EQUIPMENT (itemize)	amount		
E. TRAVEL (itemize)	amount		
SGA Meetings - 2 at $1,500		2,103	3,000
Nat'l and Int'l Conferences - $2,103			
F. PUBLICATIONS & DOCUMENTATIONS COSTS (itemize)	amount		
The SandBar - 4 issues at $1,500	6,000	1,000	5,000
Law Review Articles	500		500
G. OTHER COSTS (itemize)	amount		
Postage/Telephone	500		500
TOTAL DIRECT COSTS		69,444	34,723
H. FACILITIES & ADMINISTRATIVE COSTS			
On Campus _44__ % of $ _____		30,556	15,277
Off Campus _____ % of $ _____			
	Totals:	100,000	50,000

Updated: April 2005

Updated: 11/07/02

OMB Control No. 0648-0362
Expiration Date 09-30-2004

Form 90-4 (Adapted)

MASGC BUDGET FORM

PROJECT STATUS: New ☒ Continuing ☐ Check if separate project grant ☐

GRANTEE: Mississippi-Alabama Sea Grant Consortium **PROJECT NUMBER:**

PROJECT TITLE: National Sea Grant Law Center

PRINCIPAL INVESTIGATOR(S): Stephanie Showalter **DURATION:** 12 months 2006

A. SALARIES & WAGES	NO. OF PERSONNEL	MAN MONTHS	SEA GRANT FUNDS	GRANTEE SHARE
1. SENIOR PERSONNEL				
a. (Co) Principal Investigator:	1	4.0		20,433
b. Associates (Faculty/Staff):	1	12.0	40,098	
Sub Total:	2	16.0	40,098	20,433
2. OTHER PERSONNEL				
a. Professionals:				
b. Research associates:				
c. Research asst. grad. students:				
d. Prof. school students:				
e. Pre-Bac. student(s):				
f. Secretarial-clerical:	1	6.0	12,600	
g. Technicians:				
h. Other:				
Total Salaries and Wages: (A1 through A2h)			52,698	20,433
B. FRINGE BENEFITS (Charged as direct cost):			13,643	5,290
Total Salaries (A and B):			66,341	25,723
C. PERMANENT EQUIPMENT				
D. EXPENDABLE SUPPLIES AND EQUIPMENT				
E. TRAVEL				
1. Domestic U.S.			2,103	3,000
2. International				
Total Travel:			2,103	3,000
F. PUBLICATION & DOCUMENTATION COSTS:			1,000	5,500
G. OTHER COSTS:				
1. Computer Costs				
2. Telephone/Postage/Fax				500
3. Reference Materials				
4. Professional Fees				
5. Support Services				
6.				
7.				
8. Scholarships/Awards/Tuitions				
9. Sub-contracts				
TOTAL OTHER COSTS (G1 through G9)			0	500
TOTAL DIRECT COSTS (A through G)			69,444	34,723
H. F & A COST 1. On Campus 44% of			30,556	15,277
2. Off Campus % of				
TOTAL F & A COST (H1 + H2)			30,556	15,277
TOTAL COSTS (A through H)			100,000	50,000

BUDGET JUSTIFICATION

		SG FUNDS	2006 GRANTEE
A. SALARIES AND WAGES:			
S. Showalter, .25 FTE x $82,400			20,433
J. Savarese, 1 FTE x $40,098		40,098	
Publications Editor, .5 FTE x $25,200		12,600	
B. FRINGE BENEFITS			
S. Showalter $5,290 (25.89% of $20,433)			5,290
J. Savarese $10,381 (25.89% of $40,098)		10,381	
Publications Editor $3,262 (25.89% of $12,600)		3,262	
C. PERMANENT EQUIPMENT			
D. EXPENDABLE SUPPLIES & EQUIPMENT (itemize)	amount		
E. TRAVEL (itemize)	amount		
SGA Meetings - 2 at $1,500		2,103	3,000
Nat'l and Int'l Conferences - $2,103			
F. PUBLICATIONS & DOCUMENTATIONS COSTS (itemize)	amount		
The SandBar - 4 issues at $1,500	6,000	1,000	5,000
Law Review Articles	500		500
G. OTHER COSTS (itemize)	amount		
Postage/Telephone	500		500
TOTAL DIRECT COSTS		69,444	34,723
H. FACILITIES & ADMINISTRATIVE COSTS			
On Campus _44__ % of $ _____		30,556	15,277
Off Campus _____ % of $ _____			
	Totals:	100,000	50,000

APPENDIX F

March 2006

National Sea Grant Law Center Congressional Appropriation One-Pager

For FY 06, Congress appropriated a $1 million earmark for the National Sea Grant Law Center. The earmark provides the National Sea Grant College Program with an unprecedented opportunity to rapidly build the legal capacity of the Sea Grant Network. The additional funding will benefit the entire Sea Grant network as the Law Center expands the scope of its services and establishes a funding mechanism to encourage the development of new Sea Grant legal programs. In addition to the above activities, the Law Center will continue to produce its quarterly legal newsletter, THE SANDBAR, and to provide legal research to its constituents through our Advisory Service.

Approximately 65 percent of the appropriation will be dedicated to expanding the Law Center's core program located at the University of Mississippi. First, the staff of the Law Center will increase from three to five. A Regional Projects Coordinator will be added to manage the grant competition and provide support to the regional PIs. The Law Center will also create a Sea Grant Legal Fellowship Program. Each Fellow will work at the Law Center for one year, assisting staff attorneys with publications and outreach activities in addition to conducting his/her own scholarly research.

Second, the Law Center will develop and host a number of workshops on a yearly basis. The Law Center will work with the National Sea Grant Office to design an orientation workshop for incoming classes of Knauss Fellows to familiarize them with the major ocean and coastal law statutes. Although some Knauss Fellows are attorneys, many are not familiar with the federal laws and regulations governing the U.S. oceans and coasts. Particular attention will be paid to statutes which will be the subject of Congressional action that year. The Law Center will also increase the number of workshops it organizes, either as stand-alone events or as part of larger conferences and meetings, on legal topics such as the Endangered Species Act, the Public Trust Doctrine, and liability. Participants will be informed of the applicable legal regime and opportunities to avoid and/or mitigate conflicts.

The remaining funds will be used to competitively fund legal research projects/programs at other Sea Grant institutions. In FY 06, with the stability of the earmark remaining unknown, 5 – 7 legal research projects will be funded for a total of $350,000. The amount of funding ultimately available will depend on whether the Law Center's base funding of $100,000 is subsumed by the Congressional appropriation. If it is, less money will be available for the grant program. Proposals will be requested for legal, not policy, research. Examples of competitive projects would include the legal ramifications of pending federal or state legislation, the impacts of existing or new agency interpretations, or an analysis of a proposed permitting regime. Project outcomes could include law review articles and workshop proceedings.

If the Congressional appropriation proves stable, in FY 07 the Law Center will seek to fund three legal programs modeled after the Mississippi-Alabama Sea Grant Legal Program. This grant program will provide seed money to Sea Grant programs to enhance their legal capacity with the expectation that funded programs will be self-sustaining after four years. Selected programs will be fully funded for the first two years with funding gradually decreasing over the next two years. For example, approximately $125,000 would be provided to a Sea Grant program to fund a staff attorney and associated travel and publications costs each year for two years. In Year 3, funding would decrease to $90,000, and in Year 4, to $75,000. As funding decreases for the original grantees, additional proposals will be funded. This rotational structure will allow the Law Center to involve more of the Sea Grant Network in a shorter period of time. By the end of the first cycle, a total of five legal programs will have participated or will be participating in the grant program. It is anticipated that of those five, 2 – 3 will be self-sustaining.

Budget Justification - Hypothetical

		SG FUNDS	MATCH
A. SALARIES AND WAGES:			
S. Showalter, .9 FTE x $90,000		32,400	48,600
Staff Attorney, 1 FTE x $50,000		50,000	
Webmaster, 1 FTE x $35,000		35,000	
Regional Coordinator, 1 FTE x $35,000		35,000	
SGLC Fellow, 1 FTE x. $40,000		40,000	
B. FRINGE BENEFITS			
S. Showalter $24,675 (30.8% of $81,000)		9,979	14,969
Staff Attorney, $15,400 (30.8% of $50,000)		15,400	
Webmaster, $10,780 (30.8% of $35,000)		10,780	
Regional Coordinator, $10,780 (30.8% of $35,000)		10,780	
SGLC Fellow, $12,320 (30.8% of $40,000)		12,320	
C. PERMANENT EQUIPMENT			
D. EXPENDABLE SUPPLIES & EQUIPMENT (itemize)	amount	1,569	
E. TRAVEL (itemize)	amount	20,000	
F. PUBLICATIONS & DOCUMENTATIONS COSTS (itemize)	amount	10,000	
G. OTHER COSTS (itemize)	amount		
Telephone/Postage		1,216	
Workshops		10,000	
Regional Competition		400,000	200,000
TOTAL DIRECT COSTS		694,444	263,569
H. FACILITIES & ADMINISTRATIVE COSTS			
On Campus _44__ % of $ _____		305,556	152,778
Off Campus _____ % of $ _____			
	Totals:	1,000,000	416,347

Updated: April 2005

THE WHITE HOUSE COUNCIL ON ENVIRONMENTAL QUALITY

Final Recommendations Of The Interagency Ocean Policy Task Force

July 19, 2010

Nothing in this document is intended to create private rights of action or other enforceable individual legal rights.

Photographs courtesy of the Department of the Interior, Department of the Navy, National Oceanic and Atmospheric Administration, U.S. Coast Guard, U.S. Department of Agriculture, and U.S. Environmental Protection Agency.

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EXECUTIVE SUMMARY

I. Introduction

In order to better meet our Nation's stewardship responsibilities for the ocean, our coasts, and the Great Lakes, President Obama established the Interagency Ocean Policy Task Force (Task Force) on June 12, 2009. The Task Force is composed of 24 senior-level officials from executive departments, agencies, and offices across the Federal government and led by the Chair of the Council on Environmental Quality (CEQ). The President charged the Task Force with developing recommendations to enhance our ability to maintain healthy, resilient, and sustainable ocean, coasts, and Great Lakes resources for the benefit of present and future generations.

The Deepwater Horizon-BP oil spill in the Gulf of Mexico and resulting environmental crisis is a stark reminder of how vulnerable our marine environments are, and how much communities and our Nation rely on healthy and resilient ocean and coastal ecosystems. The ocean, our coasts, and the Great Lakes deeply impact the lives of all Americans, whether we live and work in the country's heartland or along its shores. America's rich and productive coastal regions and waters support tens of millions of jobs and contribute trillions of dollars to the national economy each year. They also host a growing number of important activities, including recreation, science, commerce, transportation, energy development, and national security and they provide a wealth of natural resources and ecological benefits.

Nearly half of the country's population lives in coastal counties, and millions of visitors enjoy our Nation's seashores each year. The ocean, our coasts, and the Great Lakes are vital places for recreation, including boating, fishing, swimming, nature watching, and diving. These activities not only help fuel our economy, but also are critical to the social and cultural fabric of our country. In addition, coastal ecosystems provide essential ecological services. Barrier islands, coral reefs, mangroves, and coastal wetlands help to protect our coastal communities from damaging floods and storms. Coastal wetlands shelter recreational and commercial fish species, provide critical habitat for migratory birds and mammals, and serve as a natural filter to help keep our waters clean.

Despite the critical importance of these areas to our health and well-being, the ocean, coasts and Great Lakes face a wide range of threats from human activities. Overfishing, pollution, coastal development and the impacts of climate change are altering ecosystems, reducing biological diversity, and

placing more stress on wildlife and natural resources, as well as on people and coastal communities. Compounding these threats, human uses of the ocean, coasts, and Great Lakes are expanding at a rate that challenges our ability to plan and manage significant and often competing demands. Demands for energy development, shipping, aquaculture, emerging security requirements and other new and existing uses are expected to grow. Overlapping uses and differing views about which activities should occur where can generate conflicts and misunderstandings. As we work to accommodate these multiple uses, we must also ensure continued public access for recreation and other pursuits, and sustain and preserve the abundant marine resources and healthy ecosystems that are critical to the well-being and prosperity of our Nation.

The challenges we face in the stewardship of the ocean, our coasts, and the Great Lakes lie not only within the ecosystems themselves, but also in the laws, authorities, and governance structures intended to manage our use and conservation of them. United States governance and management of these areas span hundreds of domestic policies, laws, and regulations covering international, Federal, State, tribal, and local interests. Challenges and gaps arise from the complexity and structure of this regime.

The time has come for a comprehensive national policy for the stewardship of the ocean, our coasts, and the Great Lakes. Today, as never before, we better comprehend the links among land, air, fresh water, ocean, ice, and human activities. Advances in science and technology provide better and timelier information to guide decision-making. By applying the principles of ecosystem-based management (which integrates ecological, social, economic, commerce, health, and security goals, and which recognizes both that humans are key components of ecosystems and also that healthy ecosystems are essential to human welfare) and of adaptive management (which calls for routine reassessment of management actions to allow for better informed and improved future decisions) in a coordinated and collaborative approach, the Nation will more effectively address the challenges facing the ocean, our coasts, and the Great Lakes and ensure their continued health for this and future generations.

II. Summary of the Final Recommendations of the Task Force

To develop its recommendations, the Task Force reviewed Federal, State, and foreign policies and models, past and pending legislation, the recommendations contained in the two earlier Ocean Commissions' reports, and public comments.

The Task Force also initiated a robust public engagement process to receive input from a diversity of voices across the country. On behalf of the Task Force, CEQ hosted 38 expert roundtables to hear from a broad range of stakeholder groups. The Task Force also hosted six regional public meetings, and created a website to accept public comments through CEQ. The Task Force received more than 5,000 public comments, with many of the groups commenting representing constituencies of hundreds or thousands of members.

The Task Force recommendations set a new direction for improved stewardship of the ocean, our coasts, and the Great Lakes. They provide: (1) our Nation's first ever *National Policy for the Stewardship of the*

*Ocean, Our Coasts, and the Great Lakes (*National Policy); (2) a strengthened governance structure to provide sustained, high-level, and coordinated attention to ocean, coastal, and Great Lakes issues; (3) a targeted implementation strategy that identifies and prioritizes nine categories for action that the United States should pursue; and (4) a framework for effective coastal and marine spatial planning (CMSP) that establishes a comprehensive, integrated, ecosystem-based approach to address conservation, economic activity, user conflict, and sustainable use of ocean, coastal, and Great Lakes resources.

National Policy for the Stewardship of the Ocean, Our Coasts, and the Great Lakes

It is the Policy of the United States to:

- Protect, maintain, and restore the health and biological diversity of ocean, coastal, and Great Lakes ecosystems and resources;
- Improve the resiliency of ocean, coastal, and Great Lakes ecosystems, communities, and economies;
- Bolster the conservation and sustainable uses of land in ways that will improve the health of ocean, coastal, and Great Lakes ecosystems;
- Use the best available science and knowledge to inform decisions affecting the ocean, our coasts, and the Great Lakes, and enhance humanity's capacity to understand, respond, and adapt to a changing global environment;
- Support sustainable, safe, secure, and productive access to, and uses of the ocean, our coasts, and the Great Lakes;
- Respect and preserve our Nation's maritime heritage, including our social, cultural, recreational, and historical values;
- Exercise rights and jurisdiction and perform duties in accordance with applicable international law, including respect for and preservation of navigational rights and freedoms, which are essential for the global economy and international peace and security;
- Increase scientific understanding of ocean, coastal, and Great Lakes ecosystems as part of the global interconnected systems of air, land, ice, and water, including their relationships to humans and their activities;
- Improve our understanding and awareness of changing environmental conditions, trends, and their causes, and of human activities taking place in ocean, coastal, and Great Lakes waters; and
- Foster a public understanding of the value of the ocean, our coasts, and the Great Lakes to build a foundation for improved stewardship.

The recommended National Policy establishes a comprehensive national approach to uphold our stewardship responsibilities; ensures accountability for our actions; and serves as a model of balanced,

productive, efficient, sustainable, and informed ocean, coastal, and Great Lakes use, management, and conservation within the global community. The National Policy recognizes that America's stewardship of the ocean, our coasts, and the Great Lakes is intrinsically and intimately linked to environmental sustainability, human health and well-being, national prosperity, adaptation to climate and other environmental change, social justice, foreign policy, and national and homeland security. It sets forth overarching guiding principles for United States management decisions and actions affecting the ocean, our coasts, and the Great Lakes.

Policy Coordination Framework to Improve the Stewardship of the Ocean, Our Coasts, and the Great Lakes

No single agency can successfully resolve the complex and pressing problems facing the ocean, our coasts, and the Great Lakes. Successful stewardship will require an effective governance structure with sustained leadership and broad interagency coordination to effectively manage the many uses of these resources. A coordinated Federal effort, proactively guided by a senior-level interagency body, will ensure that the hundreds of domestic policies, laws, and regulations governing the management of the ocean, our coasts, and the Great Lakes are implemented in a meaningful way.

The Task Force recommends a combination of modifications to the structure of the existing Committee on Ocean Policy[1], a stronger mandate and direction, and renewed and sustained high-level engagement. Subject to later refinements, the Task Force recommends:

1. Establishing a new National Ocean Council (NOC) which consolidates and strengthens the Principal- and Deputy-level components of the existing Committee on Ocean Policy within a single structure;

2. Strengthening the decision-making and dispute-resolution processes by defining clear roles for the NOC and the NOC leadership;

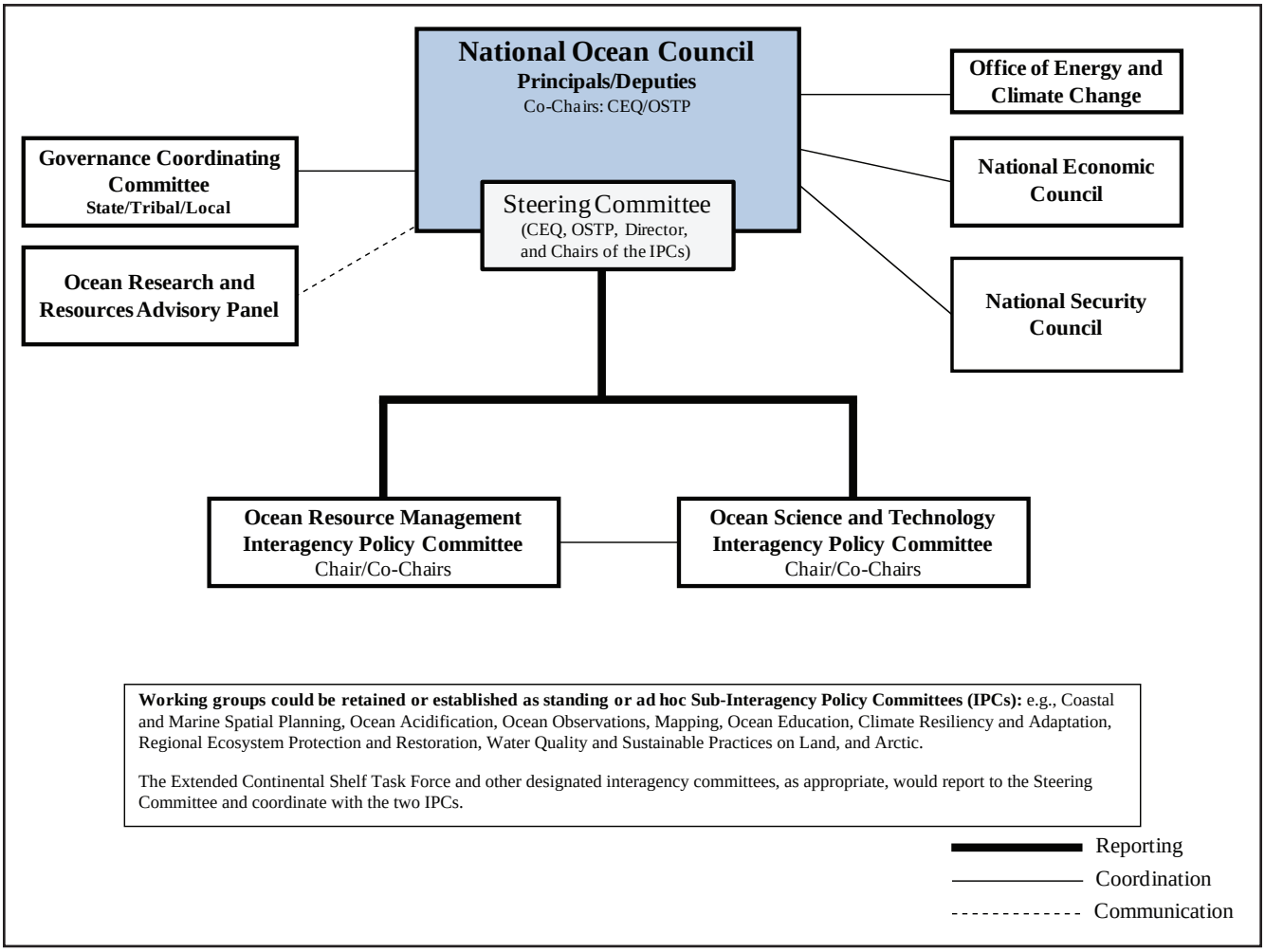
3. Formally engaging with State, tribal, and local authorities to address relevant issues through the creation of a new committee comprised of their designated representatives;

4. Strengthening the link between science and management through a new NOC Steering Committee; and

5. Strengthening coordination between the NOC, the National Security Council, the National Economic Council, the Office of Energy and Climate Change, the Council on Environmental Quality, the Office of Science and Technology Policy, the Office of Management and Budget, and other White House entities.

[1] The Committee on Ocean Policy was established by Executive Order 13366 in 2004 and has only been moderately effective in establishing forums for bringing Federal agencies together to coordinate on ocean-related matters.

Policy Coordination Framework



These recommendations establish high-level direction and policy guidance from a clearly designated and identifiable authority. They also call for more consistent and sustained senior-level participation and attention on ocean-related issues from all member agencies and departments essential to effective management. The Task Force is confident that this combination of improvements provides a framework for more successful policy coordination to improve the stewardship of the ocean, our coasts, and the Great Lakes.

Implementation Strategy

The Task Force recommends an implementation strategy that identifies nine priority objectives (i.e., categories for action) that our Nation should pursue. These priority objectives provide a bridge between policy and specific actions, but do not prescribe in detail how individual entities will undertake their responsibilities, leaving those details to be determined through the development of strategic action plans. The Task Force recommends the following nine priority objectives:

National Priority Objectives

1. **Ecosystem-Based Management:** Adopt ecosystem-based management as a foundational principle for the comprehensive management of the ocean, our coasts, and the Great Lakes.
2. **Coastal and Marine Spatial Planning:** Implement comprehensive, integrated, ecosystem-based coastal and marine spatial planning and management in the United States.
3. **Inform Decisions and Improve Understanding:** Increase knowledge to continually inform and improve management and policy decisions and the capacity to respond to change and challenges. Better educate the public through formal and informal programs about the ocean, our coasts, and the Great Lakes.
4. **Coordinate and Support:** Better coordinate and support Federal, State, tribal, local, and regional management of the ocean, our coasts, and the Great Lakes. Improve coordination and integration across the Federal Government, and as appropriate, engage with the international community.
5. **Resiliency and Adaptation to Climate Change and Ocean Acidification:** Strengthen resiliency of coastal communities and marine and Great Lakes environments and their abilities to adapt to climate change impacts and ocean acidification.
6. **Regional Ecosystem Protection and Restoration:** Establish and implement an integrated ecosystem protection and restoration strategy that is science-based and aligns conservation and restoration goals at the Federal, State, tribal, local, and regional levels.
7. **Water Quality and Sustainable Practices on Land:** Enhance water quality in the ocean, along our coasts, and in the Great Lakes by promoting and implementing sustainable practices on land.
8. **Changing Conditions in the Arctic:** Address environmental stewardship needs in the Arctic Ocean and adjacent coastal areas in the face of climate-induced and other environmental changes.
9. **Ocean, Coastal, and Great Lakes Observations, Mapping, and Infrastructure:** Strengthen and integrate Federal and non-Federal ocean observing systems, sensors, data collection platforms, data management, and mapping capabilities into a national system, and integrate that system into international observation efforts.

The NOC would develop strategic action plans for each of the priority objectives, focusing on key areas identified by the Task Force. Each strategic action plan would identify specific and measurable near-term, mid-term, and long-term actions, with appropriate milestones, performance measures, and outcomes to meet each objective. In addition, each plan would explicitly identify key lead and participating agencies; gaps and needs in science and technology; potential resource requirements and efficiencies; and steps for integrating or coordinating current and out-year budgets. This strategy would allow adequate time to fully consider the necessary details for implementation, and, as appropriate, to coordinate and collaborate with States, tribal, and local authorities, regional governance structures, academic institutions, non-governmental organizations, recreational users, and private enterprise.

Framework for Effective Coastal and Marine Spatial Planning

As called for in President Obama's June 12, 2009 memorandum, the Task Force recommendations provide a framework for CMSP that offers a new, comprehensive, integrated, regionally-based approach to planning and managing uses and activities. The recommended framework places sound science and the best available information at the heart of decision-making and would bring Federal, State, and tribal partners together in an unprecedented manner to cooperatively develop coastal and marine spatial plans (CMS Plans). This process is designed to decrease user conflict, improve planning and regulatory efficiencies, decrease associated costs and delays, engage affected communities and stakeholders, and preserve critical ecosystem functions and services. The recommendations emphasize

The National Goals of Coastal and Marine Spatial Planning

1. Support sustainable, safe, secure, efficient, and productive uses of the ocean, our coasts, and the Great Lakes, including those that contribute to the economy, commerce, recreation, conservation, homeland and national security, human health, safety, and welfare;
2. Protect, maintain, and restore the Nation's ocean, coastal, and Great Lakes resources and ensure resilient ecosystems and their ability to provide sustained delivery of ecosystem services;
3. Provide for and maintain public access to the ocean, coasts, and Great Lakes;
4. Promote compatibility among uses and reduce user conflicts and environmental impacts;
5. Improve the rigor, coherence, and consistency of decision-making and regulatory processes;
6. Increase certainty and predictability in planning for and implementing new investments for ocean, coastal, and Great Lakes uses; and
7. Enhance interagency, intergovernmental, and international communication and collaboration.

the importance of frequent and robust stakeholder, scientific, and public engagement throughout the planning process.

The recommended framework includes a unified definition of CMSP, identifies the reasons for engaging in the process, and describes the proposed geographic scope of the planning areas. The framework articulates national goals and guiding principles that would be followed in CMSP efforts and the development and implementation of CMS Plans. Under this framework, the United States will be subdivided into nine regional planning areas: Northeast, Mid-Atlantic, South Atlantic, Great Lakes, Caribbean, Gulf of Mexico, West Coast, Pacific Islands, and Alaska/Arctic regions. Each region will have a corresponding regional planning body consisting of Federal, State, and tribal representatives to develop regional goals, objectives, and ultimately regional CMS plans. To provide for national consistency and support, the framework establishes and describes planning steps and elements, a process by which the NOC would guide and certify the development of regional CMS Plans, a method to address CMS Plan adherence and compliance, a robust information management system to allow easy access to and transparency of data and information necessary for planning, and mechanisms for frequent stakeholder and public input. In addition, the framework describes an implementation approach that maximizes flexibility among the regions, addresses regional capacity, and aims to have CMS Plans for all regions by 2015.

III. Support for Joining the Law of the Sea Convention

The Task Force strongly and unanimously supports United States accession to the Convention on the Law of the Sea and ratification of its 1994 Implementing Agreement. The Law of the Sea Convention is the bedrock legal instrument governing activities on, over, and under the world's oceans. United States accession to the Convention will further our national security, environmental, economic, and diplomatic interests.

Key reasons for accession include:

- The Convention has garnered the unequivocal support of our national security leadership under both Republican and Democratic administrations, because, among other things, it codifies essential navigational rights and freedoms upon which our Armed Forces rely.
- The Convention sets forth the rights and responsibilities of nations to prevent, reduce, and control pollution of the marine environment and to protect and preserve resources off their shores.
- By becoming a party to the Convention, U.S. legal rights to our extended continental shelf can be put on the strongest legal foundation.
- As a party to the Law of the Sea Convention, the United States would have the ability to participate formally and more effectively in the interpretation and development of the Convention.

- Joining the Law of the Sea Convention would reaffirm and enhance United States leadership in global ocean affairs.

IV. Conclusion

In response to President Obama's June 12, 2009 memorandum, and after careful consideration of thousands of valuable comments from political leaders, public and private organizations, and citizens, the Task Force is pleased to submit these final recommendations. Once implemented, these final recommendations will provide the first-ever comprehensive national policy of the United States to improve stewardship of the ocean, our coasts, and the Great Lakes.

The Task Force is unanimous in its call for the Nation to set a new course for improved stewardship of the ocean, our coasts, and the Great Lakes. This must include a comprehensive, integrated, transparent, science-based, and ecosystem-based planning process to achieve the sustainable use of the ocean, our coasts, and the Great Lakes. The Task Force is mindful that these recommendations may create a level of uncertainty and anxiety among those who rely on these resources and may generate questions about how they align with existing processes, authorities, and budget challenges. The NOC will address questions and specifics as implementation progresses. Meaningful and frequent opportunities for stakeholder and public engagement throughout the implementation of the National Policy and implementation of coastal and marine spatial planning will be an essential component of cooperatively addressing these uncertainties head-on, and the Task Force recommendations embrace this approach. The Task Force is confident that the investments and improvements described in these final recommendations will advance the economic interests of the United States through sustainable and productive ocean uses; significantly improve our capacity to address the long-term challenges and impacts of climate and environmental changes; and provide a lasting foundation for improving the stewardship of and further enhancing the many vital benefits our Nation can derive from these resources.

With a clear National Policy and a revitalized, empowered, unified, and comprehensive framework to coordinate efforts set forth in these recommendations, we can achieve an America whose stewardship ensures that the ocean, our coasts, and the Great Lakes are healthy and resilient, safe and productive, and understood and treasured so as to promote the well-being, prosperity, and security of present and future generations.

RECOMMENDATIONS

PART ONE. NATIONAL POLICY FOR THE STEWARDSHIP OF THE OCEAN, OUR COASTS, AND THE GREAT LAKES

I. Vision

An America whose stewardship ensures that the ocean, our coasts, and the Great Lakes are healthy and resilient, safe and productive, and understood and treasured so as to promote the well-being, prosperity, and security of present and future generations.

II. National Policy Context

The Value of the Ocean, Our Coasts, and the Great Lakes

America is intricately connected to and directly reliant on the ocean, our coasts, and the Great Lakes. Each of us – whether living and working in the country's heartland or along its coasts – affects and is affected by these places. Their beauty inspires us, and their bounty contributes to our national well-being and security. Nearly half of our population is located in coastal counties. Our rich and productive coastal regions and waters account for the great majority of the national economy, totaling trillions of dollars each year, and support distant communities that may not even be aware of the connection between the land and sea. Millions of visitors enjoy our Nation's seashores each year, contributing not only to the economy, but also to personal and communal satisfaction and fulfillment. The sea is both a refuge for spiritual reflection and a powerhouse of excitement for educating students of all ages and interests.

With over 95,000 miles of coastline and the largest Exclusive Economic Zone (EEZ) in the world, our Nation benefits from a wealth of goods and services derived from the ocean, our coasts, and the Great Lakes. They provide food, fresh water, minerals, energy, and other natural resources and ecological benefits. They support tens of millions of jobs and

play a critical role in our Nation's transportation, economy, and trade, as well as in the global mobility and readiness of our Armed Forces and the maintenance of international peace and security. They are also vital places for recreation, including boating, fishing, swimming, nature watching, and diving, which are critical to the economic, social, and cultural fabric of our country.

The ocean supports human health and well-being in myriad ways, including as a source of healthy foods, pharmaceuticals, and other beneficial compounds. The ocean is a source of existing energy and offers numerous opportunities for renewable energy, which can help to secure our energy independence and mitigate climate change.

The ocean and Great Lakes exert significant influence over how our planet functions. Covering over 70 percent of the Earth, the ocean plays a primary role in our planet's environment and natural operations, including weather and climate. The ocean's ability to absorb and store heat from the atmosphere and transport it to other parts of the globe keeps daily temperatures within a livable range. The Great Lakes are the largest freshwater system on Earth, with 10,000 miles of shoreline and some 95 percent of the Nation's fresh surface water. While we commonly refer to different oceans (Atlantic, Pacific, Arctic, etc.), it is important to recognize that all of these bodies of water are connected and influenced by each other. These linkages require our Nation to recognize that we benefit from and affect one global ocean.

The ocean shapes and sustains all life on Earth. We are dependent on the ocean for the air we breathe, the food we eat, and the water we drink. Though we may not think about it, processes on land and in the water, including biological processes, are intricately linked so that changes in one can have profound effects on the other. The ocean is both the beginning and the end of the Earth's water cycle. Water that evaporates from the surface of the ocean becomes rain that falls on our fields and fills our aquifers. Much of this precipitation eventually finds rivers which flow back to the sea, starting the cycle once more. Half of the oxygen we breathe comes from microscopic plants living in the ocean. Coastal barrier islands, coral reefs, mangroves, and wetlands serve as buffers between coastal communities and damaging floods and storms. Coastal wetlands are a nursery for many recreational and commercial fish species, provide essential habitat for many migratory birds and mammals, and serve as a natural filter helping to keep our waters clean. Ocean and coastal ecosystems absorb and detoxify many pollutants,

recycle nutrients, and help control pests and pathogens. Marine ecosystems house biological diversity exceeding that found in the world's rain forests.

Challenges Facing the Ocean, Our Coasts, and the Great Lakes

The importance of ocean, coastal, and Great Lakes ecosystems cannot be overstated; simply put, we need them to survive. It is clear that these invaluable and life-sustaining assets are vulnerable to human activities and, at the same time, human communities are rendered more vulnerable when these resources are degraded. Yet ocean, coastal, and Great Lakes ecosystems are experiencing an unprecedented rate of change due to human activities. We are only now beginning to understand the full extent of the direct and indirect consequences of our actions on these systems.

Climate change is impacting the ocean, our coasts, and the Great Lakes. Increasing water temperatures are altering habitats, migratory patterns, and ecosystem structure and function. Coastal communities are facing sea-level rise, inundation, increased threats from storms, erosion, and significant loss of coastal wetlands. The ocean's ability to absorb carbon dioxide from the atmosphere buffers the impacts of climate change, but also causes the ocean to become more acidic, threatening not only the survival of individual species of marine life, but also entire marine ecosystems. The ocean buffers increased global temperatures by absorbing heat, but increasing temperatures are causing sea levels to rise by expanding seawater volume and melting land-based ice. Increased temperatures may eventually reduce the ocean's ability to absorb carbon dioxide. Conversely, climate change is predicted to lower the water levels of the Great Lakes, thereby altering water cycles, habitats, and economic uses of the lakes.

Along many areas of our coasts and within the Great Lakes, biological diversity is in decline due to overfishing, introduction of invasive species, and loss and degradation of essential habitats from coastal development and associated human activities. The introduction of non-native species can carry significant ecological and economic costs. Human and marine ecosystem health are threatened by a range of challenges, including increased levels of exposure to toxins from harmful algal blooms and other sources, and greater contact with infectious agents. Areas in numerous bays, estuaries, gulfs, and the Great Lakes are now consistently low in or lacking oxygen, creating dead zones along our bays and coasts. Unsustainable fishing (e.g., overfishing) remains a serious concern with consequences for marine ecosystems and human communities. In the Arctic, environmental changes are revealing the vulnerability of its ecosystems. These changes are increasing stressors and impacts on the ecosystems, people, and communities in the region and are presenting new domestic and international management challenges.

Many of these concerns are attributable not only to activities within ocean, coastal, and Great Lakes ecosystems, but also to actions that take place in our Nation's interior. For example, our industries, agricultural and transportation operations, cities, and suburbs generate various forms of pollution. Industrial operations emit pollutants, such as nitrogen and mercury, into the atmosphere that often find their way into the ocean and Great Lakes. Rain washes residues, chemicals, and oily runoff from our roadways into our estuaries and coastal waters. Heavy rainfall events can wash sediment, pesticides, debris, and nutrients from our fields, lawns, and agricultural operations into our waters. Urban and suburban development, including the construction of roads, highways, and other infrastructure, as well as modification to rivers and streams, can adversely affect the habitats of aquatic and terrestrial species.

Demands on the ocean, our coasts, and the Great Lakes are intensifying, spurred by population growth, migration to coastal areas, and economic activities. Human uses of the ocean, coasts, and the Great Lakes are expanding at a rate that challenges our ability to plan and manage them under the current sector-by-sector approach. New and expanding uses—including energy development, shipping, aquaculture, and emerging security requirements—are expected to place increasing demands on our ocean, coastal, and Great Lakes ecosystems. There is also increasing demand for access to these places for recreational, cultural, and other societal pursuits. As these demands increase, overlapping uses and differing views about which activities should occur where can generate conflicts and misunderstandings. At the same time, there is an overarching need to sustain and preserve abundant marine resources and healthy ecosystems that are critical to the well-being and continued prosperity of our Nation.

The State of the National Framework for Policy Coordination

The challenges we face in the stewardship of the ocean, our coasts, and the Great Lakes lie not only within the ecosystems themselves, but also in the laws, authorities, and governance structures intended to manage our use and conservation of them. United States governance and management of these areas span hundreds of domestic policies, laws, and regulations covering international, Federal, State, tribal, and local interests. These issues range from stewardship and resource use, to maritime safety and commerce, national security, water quality, ports and other transportation infrastructure, and energy. Challenges and gaps arise from the complexity and structure of this regime.

These challenges are not limited to our domestic governance and management regimes. Our Nation, as a major maritime power and coastal State, has a large stake in the development and interpretation

of international law and policy applicable to the ocean, our coasts, and the Great Lakes. Our national security interests are tightly linked to navigational rights and freedoms, as well as to operational flexibility. Our national security and economic interests are also linked to our ability to secure U.S. sovereign rights over resources in extensive marine areas off our coasts, to promote and protect U.S. interests in the marine environment, and to ensure that our maritime interests are respected and considered internationally. The Administration's support for accession to the 1982 United Nations Convention on the Law of the Sea (the Law of the Sea Convention) reflects several important objectives, including strengthening our Nation's ability to participate in and influence international law and policy related to the ocean.

Time to Act

The time has come for a national policy to uphold our stewardship responsibilities, ensure accountability for our actions, and serve as a model of balanced, productive, efficient, sustainable, and informed ocean, coastal, and Great Lakes use, management, and conservation within the global community. Today, as never before, we better comprehend the linkages among land, air, fresh water, ocean, ice, and human activities. We recognize that change is occurring rapidly and must be addressed. Advances in science and technology provide better and timelier information and understanding to guide decision-making. By applying the principles of ecosystem-based management (in which we integrate ecological, social, economic, commerce, health, and security goals, and recognize humans as key components of the ecosystem and healthy ecosystems as essential to human well-being) and adaptive management (whereby we routinely assess management actions to allow for better informed and improved future decisions) in a coordinated and collaborative approach, the Nation can improve its response to environmental, social, economic, and security challenges. With a clear national policy and a revitalized, empowered, unifying, and comprehensive framework to coordinate efforts among Federal, State, tribal, and local authorities, including regional governance structures, non-governmental organizations, the private sector, and the public, we can work together toward the changes needed to secure the health and prosperity of the ocean, our coasts, and the Great Lakes.

III. Policy

America's stewardship of the ocean, our coasts, and the Great Lakes is intrinsically and intimately linked to environmental sustainability, human health and well-being, national prosperity, adaptation to climate and other environmental changes, social justice, international diplomacy, and national and homeland security. Therefore, it is the policy of the United States to:

1. Healthy and Resilient Ocean, Coasts, and Great Lakes

   - Protect, maintain, and restore the health and biological diversity of ocean, coastal, and Great Lakes ecosystems and resources;

   - Improve the resiliency of ocean, coastal, and Great Lakes ecosystems, communities, and economies;

- Bolster the conservation and sustainable uses of land in ways that will improve the health of ocean, coastal, and Great Lakes ecosystems; and

- Use the best available science and knowledge to inform decisions affecting the ocean, our coasts, and the Great Lakes, and enhance humanity's capacity to understand, respond, and adapt to a changing global environment.

2. Safe and Productive Ocean, Coasts, and Great Lakes

- Support sustainable, safe, secure, and productive access to, and uses of, the ocean, our coasts, and the Great Lakes;

- Respect and preserve our Nation's maritime heritage, including our social, cultural, recreational, and historical values; and

- Exercise rights and jurisdiction and perform duties in accordance with applicable international law, including respect for and preservation of navigational rights and freedoms, which are essential for the global economy and international peace and security.

3. Understood and Treasured Ocean, Coasts, and Great Lakes

- Increase scientific understanding of ocean, coastal, and Great Lakes ecosystems as part of the global interconnected systems of air, land, ice, and water, including their relationships to humans and their activities;

- Improve our understanding and awareness of changing environmental conditions, trends, and their causes, and of human activities taking place in ocean, coastal, and Great Lakes waters; and

- Foster a public understanding of the value of the ocean, our coasts, and the Great Lakes to build a foundation for improved stewardship.

The United States will promote the objectives of this policy by:

- Ensuring a comprehensive and collaborative framework for the stewardship of the ocean, our coasts, and the Great Lakes that facilitates cohesive actions across the Federal Government, as well as participation of State, tribal, and local authorities, regional governance structures, non-governmental organizations, the public, and the private sector;

- Cooperating and exercising leadership at the international level, including by joining the Law of the Sea Convention; and

- Supporting ocean stewardship in a fiscally responsible manner.

IV. Principles

1. United States management decisions and actions affecting the ocean, our coasts, and the Great Lakes will be guided by the following stewardship principles to further this policy:

   a. As responsible environmental stewards we will protect, maintain, and restore the health, productivity, and resiliency of ocean, coastal, and Great Lakes ecosystems (including their waters and resources). Policies, programs, and activities of the United States should be

managed and conducted in a manner that seeks to prevent or minimize adverse environmental impacts to the ocean, our coasts, and the Great Lakes ecosystems and resources, including cumulative impacts, and to ensure and improve their integrity. They should be managed and conducted in a manner that does not undermine efforts to protect, maintain, and restore healthy and biologically diverse ecosystems and the full range of services they provide;

b. Decisions affecting the ocean, our coasts, and the Great Lakes should be informed by and consistent with the best available science. Decision-making will also be guided by a precautionary approach as reflected in the Rio Declaration of 1992, which states in pertinent part, "[w]here there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation;" and

c. Actions taken to protect the ocean, our coasts, and the Great Lakes should endeavor to promote the principles that environmental damage should be avoided wherever practicable and that environmental costs should be internalized, taking into account the approach that those who cause environmental damage should generally bear the cost of that damage.

2. Human activities that may affect ocean, coastal, and Great Lakes ecosystems should be managed using ecosystem-based management and adaptive management, through an integrated framework that accounts for the interdependence of the land, air, water, ice, and the interconnectedness between human populations and these environments. Management should include monitoring and have the flexibility to adapt to evolving knowledge and understanding, changes in the global environment, and emerging uses.

3. Current and future uses of ocean, coastal, and Great Lakes ecosystems and resources should be managed and effectively balanced in a way that:

   a. Maintains and enhances the environmental sustainability of multiple uses, including those that contribute to the economy, commerce, recreation, security, and human health;

   b. Harmonizes competing and complementary uses effectively;

   c. Integrates efforts to protect, maintain, and restore the health, productivity, and resiliency of ocean, coastal, and Great Lakes ecosystems and the services they provide; and

   d. Recognizes environmental changes and impacts, including those associated with an increasingly ice-diminished Arctic, sea-level rise, and ocean acidification.

4. The United States should support disciplinary and interdisciplinary science, research, monitoring, mapping, modeling, forecasting, exploration, and assessment to continually improve understanding of ocean, coastal, and Great Lakes ecosystems. These efforts should include improving understanding of physical, biological, ecological, and chemical processes and changes,

their interconnectedness with other parts of the Earth system and with human populations, and the potential social and economic consequences of management decisions on the long-term health and well-being of the population, including human health and safety. This knowledge, along with traditional knowledge, should be applied through ecosystem-based management and adaptive management. Information resulting from these efforts should be easily accessible to the public.

5. The United States should develop an improved awareness of changing environmental conditions and trends, and their causes, and of human activities that take place in the ocean, coastal, and Great Lakes environments.

6. United States policies, programs, and activities should enhance formal and informal education about the ocean, our coasts, and the Great Lakes and their uses to build a foundation for greater understanding and improved stewardship, and build capacity to produce future scientists, managers, and members of a dynamic and innovative workforce.

7. The United States should cooperate and provide leadership internationally in the protection, management, and sustainable use of the world's ocean, coastal regions, and the Great Lakes in keeping with applicable conventions and agreements, and with customary international law, as reflected in the Law of the Sea Convention.

8. United States programs, policies, and activities that may impact ocean, coastal, or Great Lakes ecosystems, or engage the use of their resources, should be designed to meet measurable benchmarks in support of clear goals and objectives related to stewardship of these ecosystems.

    a. These goals and objectives of programs and activities should be periodically reevaluated and their effectiveness assessed. This information should be used to adjust management priorities and guide future management and resource decisions; and

    b. The United States should develop appropriate standards and methods for measurement and assessment of parameters associated with the health of ocean, coastal and Great Lakes ecosystems.

9. United States policies, programs, and activities that may impact ocean, coastal, or Great Lakes ecosystems, or engage the use of their resources, should be assessed and conducted within an integrated and comprehensive interagency planning framework that:

a. Considers and addresses the full suite of impacts on resources, biological diversity, and ecosystems;

b. Is based on the best available scientific knowledge;

c. Considers and addresses potential use conflicts;

d. Ensures and advances coordination and collaboration across federal, state, tribal, and local jurisdictional lines, and with regional governance structures, the private sector, foreign governments, and international organizations, as appropriate;

e. Is coordinated and promotes consistency with our homeland and national security and foreign policy interests;

f. Is coordinated and promotes consistency with other national strategies that include environmental stewardship components relevant to the ocean, our coasts, and the Great Lakes;

g. Considers and respects our nation's maritime heritage, including our social, cultural, historical, recreational, and aesthetic values;

h. Aims to maximize long-term net benefits to society by considering a range of reasonable alternatives that balance potential economic, environmental, public health and safety, and other advantages; distributive impacts; and social justice and equity;

i. Operates through an open and transparent approach that encourages broad public participation;

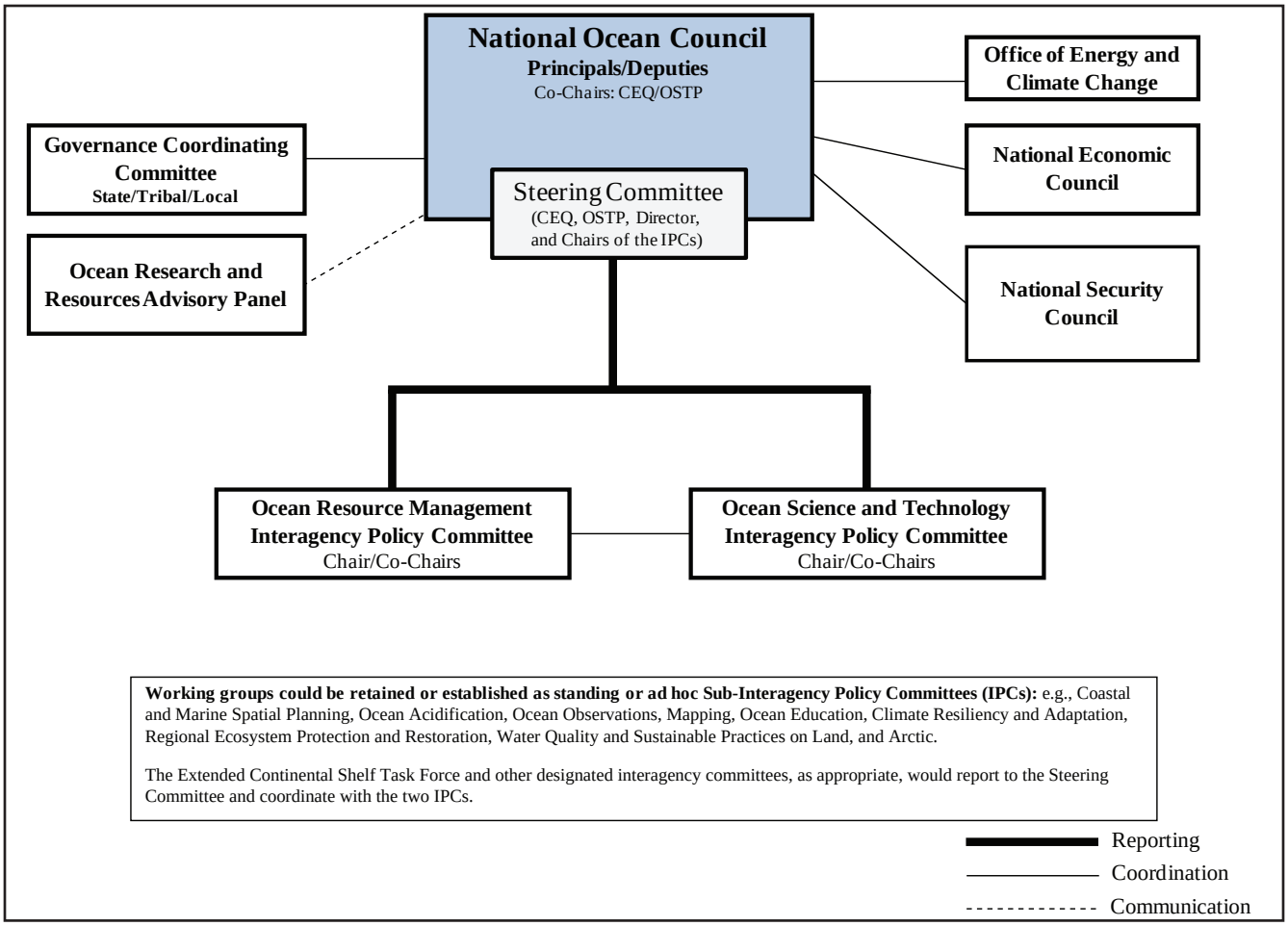
j. Ensures consistency with management and budgetary goals and compliance with relevant legal requirements;

k. Seeks to eliminate redundancy and encourage efficiencies and synergies; and

l. Includes a reporting and accountability mechanism.

Implementing a number of the policy elements and principles directed above will require appropriate resources and assets. Departments and agencies shall work to identify future budgetary, administrative, regulatory, or legislative proposal requirements to implement these elements within the budgetary and management guidelines of the President's budget.

PART TWO. POLICY COORDINATION FRAMEWORK



The recommended policy coordination framework provides a combination of modifications to the structure of the existing Committee on Ocean Policy, a stronger mandate and direction, and renewed and sustained high-level engagement. This combination of improvements provides a framework for more successful policy coordination to improve the stewardship of the ocean, our coasts, and the Great Lakes. The recommended policy coordination framework would provide a reinvigorated structure that would strengthen ocean governance and coordination by providing clear and visible leadership and sustained high-level engagement within the Federal Government. Additionally, the structure would provide for greater participation by, and coordination of State, tribal, and local authorities, and regional governance structures. The linkage between management and science would be strengthened, as would coordination with other senior level entities on relevant economic, climate, and security matters. This combination of improvements would enhance the stewardship of the ocean, our coasts, and the Great Lakes.

I. National Ocean Council

Structure

The National Ocean Council (NOC) would be a dual Principal- and Deputy-level committee. Membership of the NOC would include: the Secretaries of State, Defense, the Interior, Agriculture, Health and Human Services, Commerce, Labor, Transportation, Energy, and Homeland Security; the Attorney General; the Administrator of the Environmental Protection Agency; the Chair of the Council on Environmental Quality (CEQ); the Director of the Office of Management and Budget (OMB); the Administrator of the National Aeronautics and Space Administration; the Director of National Intelligence; the Director of the Office of Science and Technology Policy (OSTP); the Director of the National Science Foundation; the Chairman of the Federal Energy Regulatory Commission;[2] the Chairman of the Joint Chiefs of Staff; the Assistants to the President for National Security Affairs, Homeland Security and Counterterrorism, Domestic Policy, Energy and Climate Change, and Economic Policy; an employee of the United States designated by the Vice President; the Under Secretary of Commerce for Oceans and Atmosphere (NOAA Administrator); and such other officers or employees of the United States as the Co-Chairs may from time to time designate.

Co-Chairs

The NOC would be co-chaired by the Chair of the CEQ and the Director of OSTP. This construct would provide the NOC with the balance of equities at the most senior level of its leadership and better facilitate interagency cooperation and collaboration.

Function

Subject to the direction of the President and unless as otherwise provided for by law, the NOC would perform the following functions:

1. **Tier-one functions of the NOC (Principal-level)**. The NOC has overall responsibility for implementation of the National Policy, including coastal and marine spatial planning. Functions

[2] Federal Energy Regulatory Commission and other independent regulatory agencies participate on the NOC by invitation of the Co-Chairs.

would include: (1) periodically update and set national priority objectives; (2) review and provide annual direction on National Policy implementation objectives based on Administration priorities and recommendations from the Deputy-level; and (3) be a forum for dispute resolution and decision-making of issues that could not be resolved at the Deputy-level. The NOC would be required to meet a minimum of twice per year, but the Co-Chairs could call additional meetings as necessary for dispute resolution or other purposes.

2. **Tier Two (Deputy-level) functions would include**: (1) ensure execution of National Policy implementation objectives; (2) ensure implementation of coastal and marine spatial planning; (3) transmit Administration priorities to the Ocean Resource Management Interagency Policy Committee (ORM-IPC) and Ocean Science and Technology Interagency Policy Committee (OST-IPC); (4) ensure activities of and products from the ORM-IPC and OST-IPC are consistent with Administration policy; (5) coordinate with the National Security Council (NSC), National Economic Council (NEC),[3] Office of Energy and Climate Change (OECC), and other offices, as appropriate; (6) provide direction and feedback to, and receive external input and advice from, its advisory bodies; and (7) assist with dispute resolution and decision-making, and if unable to do so, to forward the issues to the Principal-level. This group would also assume the duties of the statutorily mandated National Ocean Research Leadership Council (NORLC) under 10 U.S.C. § 7902.

The Deputies would be required to meet a minimum of quarterly.

II. Authorities and Responsibilities of the National Ocean Council Co-Chairs

1. Advise the President on the Implementation of the National Policy for the Stewardship of the Ocean, Our Coasts, and the Great Lakes

The Co-Chairs would advise the President on matters regarding implementation of the *National Policy for the Stewardship of the Ocean, Our Coasts, and the Great Lakes* (National Policy), consistent with the consensus views of the NOC. If consensus cannot be achieved, the Co-Chairs would provide their own views equally with the views of each member of the NOC.

2. Implementation of the National Policy

On behalf of the NOC, the Co-Chairs would have overall responsibility for coordinating and facilitating the implementation of the National Policy, subject to the direction of the NOC and the President, including the following:

- **Development of Strategic Action Plans –** The Co-Chairs would facilitate development by the NOC of strategic action plans to further the National Policy and identify progress

[3] The existing Committee on the Marine Transportation System's coordination with the NOC governance structure would be done through the National Economic Council, at both the Principal-level and Deputy-level. Coordination with the ORM-IPC and OST-IPC would also be developed, as appropriate.

toward meeting defined goals and objectives.

- **Implementation of Coastal and Marine Spatial Planning –** The Co-Chairs would facilitate implementation of coastal and marine spatial planning in accordance with Part 4 below.

- **Reporting and Accountability –** The Co-Chairs would be responsible for: (1) coordinating interagency reporting on implementation and progress; (2) monitoring and ensuring effective implementation of policy decisions; (3) providing oversight and accountability for document preparation; and (4) coordinating and expediting interagency review and clearance of documents and reports within the NOC purview.

- **Budget –** The Co-Chairs would coordinate the development of an annual budget guidance memorandum on ocean priorities consistent with the goals and objectives of the National Policy. While it is understood that the Co-Chairs' authority would not be construed to impair or otherwise affect the function of the Director of OMB, they would work with OMB to issue interagency budget guidance consistent with annual priorities, develop crosscuts to inform the annual priorities on ocean, coastal, and Great Lakes stewardship, and consult with OMB and the NOC to identify programs that contribute significantly to the National Policy. The Co-Chairs also would work with OMB to coordinate preparation of the biennial Federal Ocean and Coastal Activities Report mandated by Section 5 of the Oceans Act of 2000.

- **Emerging Issues –** The Co-Chairs would bring any Presidential ocean actions or priorities to the NOC, as appropriate, for action and implementation and would coordinate proper management of and response to emerging issues of relevance to the National Policy.

- **International –** In implementing this policy, the Co-Chairs would coordinate with the Secretary of State and the heads of other relevant agencies on matters related to the policy issues that arise within the Intergovernmental Oceanographic Commission, International Whaling Commission, Arctic Council, International Maritime Organization, regional fishery management organizations, and other similar international organizations.

3. Co-Chairs of the NOC

- The Co-Chairs shall have authority to call NOC meetings, draft the agenda, prioritize issues, and call Deputies' meetings.

4. Coordination and Integration

- The Co-Chairs would be the point of contact to coordinate with the National Security Advisor (NSA), NEC Director, and Assistant to the President for Energy and Climate Change (APECC), and other senior White House officials, as appropriate. The Co-Chairs would have authority to request meetings with these entities for the purposes of coordination and resolution of issues of overlapping responsibility.

5. Decision-Making and Dispute Resolution

- The Co-Chairs would seek to encourage decisions and recommendations based on consensus of the NOC.

- Disputes that could not be resolved at the Deputy-level would be referred to the Co-Chairs. The Co-Chairs would facilitate resolution among the Principals.

- With respect to those matters in which resolutions or consensus could not be reached, the Co-Chairs would coordinate with the APECC, NEC Director, and NSA, as appropriate, to frame the disputed issue or issues for decision by the President.

- The establishment of the NOC would not be construed to impair or otherwise affect: (1) authority granted by law to an executive department or agency or the head thereof; or (2) functions assigned by the President to the NSC (or subordinate bodies) relating to matters affecting foreign affairs, national security, homeland security, or intelligence – any of these matters that are not resolved by consensus within the NOC will be forwarded to the NSC for resolution.

III. Steering Committee

Structure

The Steering Committee would be a high-level, streamlined body of five members from OSTP, CEQ, and one Chair each of the ORM-IPC and OST-IPC, and the Director of the NOC Staff. The Steering Committee would meet at least every other month, but more often as issues require, and work in consultation with NSC, NEC, and OMB to ensure their respective input on relevant matters, as appropriate. NOC staff would attend these meetings and be responsible for ensuring the implementation of agreed-upon actions.

Function

The Steering Committee would be the key forum for ensuring integration and coordination on priority areas within the NOC. In particular, it would ensure that there is coordination of management and science issues and that the activities of the ORM-IPC and OST-IPC are aligned to fully support implementation of the National Policy and priorities agreed upon by the NOC. The Steering Committee would identify key issues and assist in developing the agenda for the NOC. The NOC staff would be responsible for ensuring the implementation of agreed upon actions. In addition, the Extended Continental Shelf Task Force and other designated interagency committees, as appropriate, would report to the Steering Committee.

IV. National Ocean Council Staff Leadership and Support

Structure

Two senior-level staff members, a Director of the NOC Staff, and a Deputy Director, would support the Co-Chairs in the implementation of the National Policy. On a day-to-day basis they would be responsible for ensuring the execution of the functions of the full-time staff supporting the NOC. They would be charged with ensuring the effective operation of the NOC, and the efficient implementation of the National Policy, under the guidance of the Co-Chairs. In addition, the NOC would initially be supported by an ocean policy office consisting of a minimum of six to eight dedicated staff comprised of interagency representatives on staggered two-year assignments from departments, agencies, and offices represented on the NOC. These full-time NOC staff personnel would report to the staff Director and Deputy Director.

Function

The staff Director and Deputy Director, as appropriate, would represent the Co-Chairs at policy-level meetings and forums, external events, and interaction with Congress. They would work with the IPC Co-Chairs to also ensure policy coordination and integration of the IPCs and facilitate close coordination between the NOC and its Ocean Research and Resources Advisory Panel (ORRAP) and Governance Coordinating Committee (GCC). They would oversee the NOC staff on a day-to-day basis and serve as the points of contact to coordinate at a staff level with CEQ, NSC, NEC, OSTP, OECC, and other offices, as appropriate. The staff Director, Deputy Director, and other NOC staff personnel would serve as the core support to the NOC in its operations and in implementation of the National Policy. Each member of the NOC staff would be required to have programmatic experience and analytical skills. Each staff member would work to provide administrative support to, and ensure coordination among, the NOC and the IPCs, GCC, and other appropriate entities.

V. Ocean Resource Management Interagency Policy Committee

Structure

The ORM-IPC is the successor to the current Subcommittee on Integrated Management of Ocean Resources. Chairs of the ORM-IPC are designated by the NOC. The group would consist of Deputy Assistant Secretaries or comparable representatives, or appropriate senior-level representatives with decision-making authority from departments, agencies and offices represented on the NOC. The ORM-IPC reports to the NOC. The ORM-IPC may establish Sub-IPCs as necessary, as approved by the NOC.

Function

The ORM-IPC would function as the ocean resource management body of the NOC, with an emphasis on ensuring the interagency implementation of the National Policy, national priority objectives, and other priorities defined or approved by the NOC. This would include the development of strategic plans, in coordination with the OST-IPC, for the implementation of priority management objectives,

with clear outcomes, milestones, deadlines, designated agencies, and performance measures with an adaptive review process. The ORM-IPC Chairs would develop a charter for the operation of the body, to be approved by the NOC, including, but not limited to, membership, meetings (e.g., requiring that it meet at least every two months), development of a new or updated work plan based on direction from the NOC, and a process for external input (e.g., State, tribal, local, regional, and the public).

VI. Ocean Science and Technology Interagency Policy Committee

Structure

The National Science and Technology Council's (NSTC) Joint Subcommittee on Ocean Science and Technology (JSOST) would serve as the OST-IPC. Chairs of the OST-IPC would be appointed through NSTC procedures in consultation with the NOC. The group would consist of Deputy Assistant Secretaries or comparable representatives, or appropriate senior-level representatives with decision-making authority from departments, agencies, and offices represented on the NOC. The NSTC would direct the OST-IPC to advise and assist the NOC in consonance with this National Policy and to work with associated bodies (e.g., the ORM-IPC) accordingly.

Function

The OST-IPC would function as the ocean science and technology body of the NOC, with an emphasis on ensuring the interagency implementation of the National Policy, national priority objectives, and other priorities for science and technology objectives. This would include the development of strategic

plans (e.g., the Ocean Research Priorities Plan and Implementation Strategy), in coordination with the ORM-IPC, for interagency implementation of priority science and technology objectives, with clear outcomes, milestones, deadlines, designated agencies, and performance measures with an adaptive review process. The OST-IPC Chairs, in close coordination with the NOC, would develop a charter for the operation of the body, to be approved by the NSTC, and would include, but not be limited to, membership, meetings (e.g., requiring that it meet at least every two months), development of a new or updated work plan based on input from the NOC, and a process for external input (e.g., State, tribal, regional, and public). The OST-IPC would also retain the legislatively mandated functions of JSOST, report to the NSTC's Committee on Environment and Natural Resources, and maintain a close operational relationship with the NOC. It would continue to adhere to the rules and regulations of the NSTC. The OST-IPC may establish Sub-IPCs, as necessary, and will do so under NSTC procedures and in close coordination with the NOC.

VII. Governance Coordinating Committee

Structure

The NOC, in consultation with the White House Office of Intergovernmental Affairs, would establish the GCC that would consist of eighteen members from States, federally-recognized tribes, and local governments. Members would be chosen by the NOC and would be comprised of: (1) one State representative each from the Great Lakes Region, Gulf of Mexico Region, Mid-Atlantic Region, Northeast Region, South Atlantic Region, and West Coast Region, chosen in consultation with the Governors represented on the existing regional governance structures;[4] (2) one State representative each from Alaska, the Pacific Islands,[5] and the Caribbean,[6] chosen in consultation with respective Governors; (3) two at-large representatives from inland States, chosen in consultation with the National Governors Association; (4) one State legislative representative, chosen in consultation with the National Conference of State Legislatures; (5) three at-large tribal representatives, chosen in consultation with tribal councils, national and regional tribal organizations (e.g., the National Congress of American Indians); and (6) three local government representatives from coastal States (i.e., two mayors and one county official), chosen in consultation with the U.S. Conference of Mayors, the National League of Cities, and the National Association of Counties. Representatives would serve for staggered two-year terms. These representatives would select a Chair and Vice-Chair from their members. In addition, the GCC may establish subcommittees chaired by representatives of the GCC. These subcommittees would include additional representation, as appropriate, from State, tribal, and local governments, respectively, to provide for greater collaboration and expanded exchange of views. The GCC would be supported by the NOC staff.

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[4] Existing regional governance structures include the Great Lakes Commission, the Governors' South Atlantic Alliance, the Gulf of Mexico Alliance, the Mid-Atlantic Regional Council on the Ocean, the Northeast Regional Ocean Council, and the West Coast Governors' Agreement on Ocean Health.

[5] For purposes of this section "Pacific Islands" include Hawaii, Guam, the Commonwealth of the Northern Mariana Islands, and American Samoa.

[6] For purposes of this section "Caribbean" includes the Commonwealth of Puerto Rico and the U.S. Virgin Islands.

Function

The role of the GCC would be to serve as a formal body for State, tribal, and local government representatives to deliberate and coordinate with the NOC on issues of inter-jurisdictional collaboration and cooperation on the National Policy and related matters. These matters would include coordinating on the development of a uniform procedure to facilitate resolution at the regional level of disputes regarding the development of coastal and marine spatial plans (CMS Plans) prior to elevation to the NOC and providing advice on long-term strategic management and research priorities. The GCC would submit to the IPCs and the Steering Committee ocean and coastal related issues for potential discussion by the NOC and provide input on issues at the request of the Steering Committee. The GCC would also have regular and continued communication with the IPCs, via the NOC Steering Committee, throughout the development of the strategic action plans and implementation of the National Policy.

The United States has a unique legal relationship with federally recognized American Indian and Alaska Native tribal governments (tribes) as set forth in United States treaties, statutes, Executive Orders, and court decisions. These instruments establish a framework for the Federal Government's recognition of and support for tribal sovereignty and tribal self-government and self-determination, consistent with applicable Federal law, but not necessarily with State law. While the GCC includes three tribal representatives, the function of the GCC and these representatives would not replace Government-to-Government consultations with tribes under existing authorities.

VIII. Ocean Research and Resources Advisory Panel

Structure

The ORRAP is a legislatively established body that advises the NORLC under the Federal Advisory Committee Act (FACA).

Function

The ORRAP would provide independent advice and guidance to the NOC. Current membership is comprised of individuals from the National Academies, State governments, academia, and ocean industries, representing marine science, marine policy, and other related fields. However, ORRAP membership would be reviewed to determine whether to include additional representatives to broaden the level of expertise in support of the goals of the National Policy. The NOC would routinely provide guidance and direction on the areas for which it seeks advice and recommendations from the ORRAP.

IX. Review and Evaluation

After 12 months of operation, the NOC would conduct a review of the governance structure to evaluate its effectiveness and make any necessary changes or improvements.

PART THREE. IMPLEMENTATION STRATEGY

National Priority Objectives

HOW WE DO BUSINESS

1. **Ecosystem-Based Management:** Adopt ecosystem-based management as a foundational principle for the comprehensive management of the ocean, our coasts, and the Great Lakes.
2. **Coastal and Marine Spatial Planning:** Implement comprehensive, integrated, ecosystem-based coastal and marine spatial planning and management in the United States.
3. **Inform Decisions and Improve Understanding:** Increase knowledge to continually inform and improve management and policy decisions and the capacity to respond to change and challenges. Better educate the public through formal and informal programs about the ocean, our coasts, and the Great Lakes.
4. **Coordinate and Support:** Better coordinate and support Federal, State, tribal, local, and regional management of the ocean, our coasts, and the Great Lakes. Improve coordination and integration across the Federal Government and, as appropriate, engage with the international community.

AREAS OF SPECIAL EMPHASIS

1. **Resiliency and Adaptation to Climate Change and Ocean Acidification:** Strengthen resiliency of coastal communities and marine and Great Lakes environments and their abilities to adapt to climate change impacts and ocean acidification.
2. **Regional Ecosystem Protection and Restoration:** Establish and implement an integrated ecosystem protection and restoration strategy that is science-based and aligns conservation and restoration goals at the Federal, State, tribal, local, and regional levels.
3. **Water Quality and Sustainable Practices on Land:** Enhance water quality in the ocean, along our coasts, and in the Great Lakes by promoting and implementing sustainable practices on land.
4. **Changing Conditions in the Arctic:** Address environmental stewardship needs in the Arctic Ocean and adjacent coastal areas in the face of climate-induced and other environmental changes.
5. **Ocean, Coastal, and Great Lakes Observations, Mapping, and Infrastructure:** Strengthen and integrate Federal and non-Federal ocean observing systems, sensors, data collection platforms, data management, and mapping capabilities into a national system and integrate that system into international observation efforts.

I. Introduction

The National Policy would provide our Nation with a comprehensive approach, solidly based on science and technology, to uphold our stewardship responsibilities, and ensure accountability for our actions to present and future generations. Furthermore, the United States intends, through the National Policy, to serve as a model of balanced, productive, efficient, sustainable, and informed ocean, coastal, and Great Lakes use, management, and conservation within the global community. This implementation strategy recommends a clear set of priority objectives that our Nation should pursue to further the National Policy.

Overview of National Priority Objectives

This implementation strategy recommends nine priority objectives. The first four, which together frame *How We Do Business,* represent overarching ways in which the Federal Government must operate differently or better to improve stewardship of the ocean, our coasts, and the Great Lakes. The implementation of ecosystem-based management embodies a fundamental shift in how the United States manages these resources, and provides a foundation for how the remaining objectives would be implemented. Within that construct, the implementation of coastal and marine spatial planning and management would mark the beginning of a new era of comprehensive, integrated techniques to address conservation, economic activity, user conflict, and sustainable use of ocean, coastal, and Great Lakes resources. The other overarching objectives – to better inform decisions and improve understanding by the public through a strengthened ability to obtain and use science and information and to better coordinate and support science-based management across various authorities and governance structures are, in and of themselves, not new concepts. However, these efforts have suffered from the lack of a clear National Policy and a comprehensive framework within which to achieve desired outcomes.

The implementation strategy also identifies five *Areas of Special Emphasis,* each of which represents a substantive area of particular importance to achieving the National Policy. These priority areas of work seek to address some of the most pressing challenges facing the ocean, our coasts, and the Great Lakes. For many years, scientists, resource managers, private industry, and others have been wrestling with these issues with a variety of existing Federal Government programs in place to address them. While those efforts have delivered their share of results, in each of these critical areas more can – and must –

be done. In many cases, we have lacked the capability and understanding – both scientific and technical – to affect the type of change required. In the last several years, however, science has significantly evolved and advanced, and our capacity to respond to environmental and technological changes in these five areas has improved substantially. With this strategy, these specific areas of work should be viewed as national priorities with a renewed and coordinated effort at finding and implementing solutions. Over time, the NOC will assess the progress on these areas and also identify other areas to be addressed.

Planning

Together, these nine priority objectives provide a bridge between the National Policy and action on the ground and in the water, but do not prescribe in detail how individual entities would undertake these responsibilities. For each priority objective, the NOC would be responsible for, and oversee development of, a strategic action plan within six to twelve months from its establishment. The NOC's ORM-IPC and OST-IPC would be charged with developing these plans. The plans would address the *Obstacles* and *Opportunities* identified for each objective and would focus on, but not be limited to, the key areas identified under each objective. In addition, each plan would:

- Identify specific and measurable near-term, mid-term, and long-term actions, with appropriate milestones, performance measures, and outcomes to fulfill each objective;
- Consider smaller-scale, incremental, and opportunistic efforts that build upon existing activities, as well as more complex, larger-scale actions that have the potential to be truly transformative;
- Explicitly identify key lead and participating agencies;
- Identify gaps and needs in science and technology; and
- Identify potential resource requirements and efficiencies; and steps for integrating or coordinating current and out-year budgets.

The plans would be adaptive to allow for modification and addition of new actions based on new information or changing conditions. Their effective implementation would also require clear and easily understood requirements and regulations, where appropriate, that include enforcement as a critical component. Implementation of the National Policy for the stewardship of the ocean, our coasts, and the Great Lakes will recognize that different legal regimes, with their associated freedoms, rights, and duties, apply in different maritime zones. The plans would be implemented in a manner consistent with applicable international conventions and agreements and with customary international law as reflected in the Law of the Sea Convention. The plans and their implementation would be assessed and reviewed annually by the NOC and modified as needed based on the success or failure of the agreed upon actions. Upon identification and finalization of plans, the NOC Co-Chairs, in collaboration with OMB, would develop an annual interagency ocean budget guidance memorandum. Recognizing the reality of the limited availability of new resources, each of the Federal agencies engaged in the implementation

of strategic action plans would re-evaluate how resources should best be allocated in light of their statutory and regulatory mandates.

While these plans are under development, any agency that is conducting an activity that supports or furthers one of the objectives would bring them to the attention of the NOC. The NOC – working with the agency – would review the activity to determine how it might best contribute to overall implementation of the priority objectives, including being incorporated into the relevant strategic action plan.

Transparency and Collaboration

Transparency in developing strategic action plans and implementing the National Policy is critical. As the NOC develops and revises the plans, it will ensure substantial opportunity for public participation. Final plans, revisions, and reports of how well plan performance measures are being met would be made publicly available.

The effective implementation of this far-reaching and comprehensive National Policy would require active collaboration of the Federal Government with State, tribal, and local authorities, regional governance structures, academic institutions, non-governmental organizations, recreational interests, and private enterprise. In developing and revising the plans, the NOC would reach out to these interested parties, as appropriate, through the NOC's GCC, the ORRAP, workshops, and by other means. Furthermore, international collaboration on a broad range of ocean issues is an important component of these objectives. The Nation plays a leadership role in various international forums that deal with these issues, such as the Arctic Council, the International Maritime Organization, the Intergovernmental Oceanographic Commission, regional fisheries management organizations, and the International Whaling Commission. By joining the Law of the Sea Convention now, we can reaffirm and enhance United States leadership in the development and interpretation of international law applicable to the ocean. The Convention's provisions are highly favorable to the national security, environmental, and economic interests of the United States. Becoming a party would give the United States the ability to participate formally and more effectively in the interpretation and development of the Convention.

II. National Priority Objectives

How We Do Business

1. **Ecosystem-Based Management: Adopt ecosystem-based management as a foundational principle for the comprehensive management of the ocean, our coasts, and the Great Lakes.**

Obstacles and Opportunities

Traditional management of resource use and other activities in the ocean, along our coasts, and in the Great Lakes has focused on individual species, resources, areas, or actions with limited consideration for how the management practices of one might impact the sustainability of another. This has often led to disjointed management approaches resulting in loss of resources, economic hardship, and environments at risk. To ensure healthier, more resilient, and productive ocean, coastal, and Great Lakes environments, comprehensive management systems are needed that fully integrate ecological, social, economic, and security goals into decisions. Embedding ecosystem-based management, grounded in science, as an overarching principle would be a fundamental shift in the traditional way the Federal Government approaches management of the ocean, our coasts, and the Great Lakes. It would provide the opportunity to ensure proactive and holistic approaches to better manage the use and conservation of these valuable resources. This broad-based application of ecosystem-based management would provide a framework for the management of our resources, and allow for such benefits as helping to restore fish populations, control invasive species, support healthy coastal and Great Lakes communities and ecosystems, restore sensitive species and habitats, protect human health, and rationally allow for emerging uses of the ocean, including new energy production.

The Plan Should Address:

- "Best practices" for developing and implementing effective ecosystem-based management systems;
- Identification and prioritization of geographic areas of special sensitivity or in greatest need for ecosystem-based management;
- Establishment of a process for working with States, tribal, and local authorities and regional governance structures to apply the most successful approaches in these areas of the greatest need; and
- Measures to ensure that decisions about ocean, coastal, and Great Lakes activities, uses, and goals are made based on the best available science and incorporate principles of ecosystem-based management.

2. **Coastal and Marine Spatial Planning: Implement comprehensive, integrated, ecosystem-based coastal and marine spatial planning and management in the United States.**

Obstacles and Opportunities

The ocean, our coasts, and the Great Lakes are host to countless commercial, recreational, scientific, energy, and security activities, which often occur in or near areas set aside and managed for

conservation and resource protection goals. Overlapping uses and differing views, about what activities should occur and where, can generate conflicts and misunderstandings. Coastal and marine spatial planning (CMSP) that fully incorporates the principles of ecosystem-based management will provide a means to objectively and transparently guide and balance allocation decisions for use of ocean, coastal, and Great Lakes waters and resources. It would allow for the reduction of cumulative impacts from human uses on marine ecosystems, provide greater certainty for the public and private sector in planning new investments, and reduce conflicts among uses and between using and preserving the environment to sustain critical ecological, economic, recreational, and cultural services for this and future generations.

The Plan Should Address:

- Implementation and expansion of the Framework for Effective Coastal and Marine Spatial Planning as described later in this document.

3. **<u>Inform Decisions and Improve Understanding:</u> Increase knowledge to continually inform and improve management and policy decisions and the capacity to respond to change and challenges. Better educate the public through formal and informal programs about the ocean, our coasts, and the Great Lakes.**

Obstacles and Opportunities

A broad program of basic and applied disciplinary and interdisciplinary scientific research, mapping, monitoring, observation, and assessment, coupled with development of forecasts, models, and other decision-support tools, is required to build knowledge of ocean, coastal, and Great Lakes ecosystems and processes and ensure that management and policies are based on sound science. Increased understanding of watershed processes and the linkages with our coasts will be necessary to develop better decision-support tools to adequately manage human uses, human impacts, including disproportionate impacts on minority or low income populations, and watershed conservation activities that affect our ocean and coasts. In addition, increased scientific knowledge and a more comprehensive awareness and a detailed understanding of current and emerging human activities taking place in and around our waters are essential to sound ocean planning and management. However, there are significant gaps in our understanding of ocean ecosystem dynamics, ocean conditions and trends, and the complex links between these conditions and human health, economic opportunities, national and homeland security, and social justice. There is significant opportunity to improve how and what information we gather to better understand change and respond

to challenges, better integrate current scientific knowledge (natural, social and traditional/cultural) and real-time data into decision-making, improve the management and integration of data supporting science and decision-making, and identify and close knowledge gaps necessary to adequately understand the impacts of human activities on the ocean, our coasts, and the Great Lakes. A diverse, interdisciplinary, ocean-literate workforce that has the appropriate skills and training to capitalize on these opportunities is needed. In addition, formal and informal education programs developed and implemented to target grades K-12 and beyond would create opportunities for enhanced appreciation of coastal and ocean issues, and better prepare the workforce of the future. Robust education programs already exist in many NOC member agencies and can serve as the foundation for increasing knowledge on ocean, coastal, and Great Lakes issues. Success in building our knowledge and applying it to improve management also relies on an engaged and informed public. Many Americans do not realize the importance of the ocean, our coasts, and the Great Lakes to their daily lives, the benefits they provide, or the possibilities they present for further discovery. There is great opportunity to raise awareness and identify ways we can help protect our waters and their resources.

Inform and Improve

The Plan Should Address:

- Identification of priority issues in addressing emerging topics and changes in ocean, coastal, and Great Lakes ecosystems and processes;

- Specific scientific requirements and research needs, including the need for reconciling inconsistent standards, physical infrastructure, research platforms, organizations, and data management, to identify critical gaps, ensure high quality data, and provide information necessary to inform management, including mechanisms to transition research results into information products and tools for management;

- The development of a more comprehensive awareness of environmental conditions and trends and human activities that take place in the ocean, coastal, and Great Lakes environments; and

- Requirements for routine integrated ecosystem assessments and forecasts, including impacts related to climate change, to address vulnerability, risks, and resiliency, and inform tradeoffs and priority-setting.

Educate

The Plan Should Address:

- Challenges, gaps, opportunities, and effective strategies for training and recruiting the current and next generation of disciplinary and interdisciplinary scientists, technicians, operators, managers, and policy-makers, with a particular focus on the needs of disadvantaged or under-served communities; and

- Identification of successful formal and informal education and public outreach approaches, including their application toward a focused nation-wide campaign to build public awareness, engagement, understanding, and informed decision-making, with specific emphasis on the state of ecosystems.

4. **Coordinate and Support: Better coordinate and support Federal, State, tribal, local, and regional management of the ocean, our coasts, and the Great Lakes. Improve coordination and integration across the Federal Government and, as appropriate, engage with the international community.**

Obstacles and Opportunities

One of the significant obstacles to effective management of the ocean, our coasts, and the Great Lakes is the complex set of Federal, State, tribal, and local laws, authorities, mandates, and governance structures intended to manage their use and conservation. Consistent approaches to the management of resources, including ecosystem-based and adaptive management, are difficult to achieve given this shared, piece-meal, and overlapping jurisdictional model. Furthermore, the United States is party to numerous international agreements and subject to customary international law regarding use and protection of the ocean and the Great Lakes. The United States should engage with international partners bilaterally and multilaterally to achieve increased cooperation and coordination on ocean issues. Through increased communication, coordination, and integration across all levels of government, we can streamline processes, reduce duplicative efforts, leverage resources, resolve disparities, and enhance synergy. A set of shared principles and objectives coordinated among all levels of government would translate into effective outcomes consistent with the National Policy.

Coordinate

The Plan Should Address:

- Identification of gaps, inconsistencies, and duplications in statutory authorities, policies, and regulations, and taking necessary and appropriate actions to address them;

- Procedures to identify and align mutual and consistent management objectives and actions across jurisdictions;

- Tangible tools and procedures to prevent and resolve conflicts across jurisdictions and disagreements concerning jointly managed ocean, coastal, and Great Lakes resources; and
- Opportunities for engaging the international community to further the objectives of the policy, as appropriate.

Support

The Plan Should Address:

- Actions to assist the States in advancing the network of regional alliances to protect ocean, coastal, and Great Lakes health;
- Evaluation of existing or new funding sources and options to protect, maintain, and restore ocean resources; and
- Legislative or regulatory changes necessary to simplify the sharing and transfer of resources among Federal, State, tribal, and local agencies.

Areas of Special Emphasis

1. **Resiliency and Adaptation to Climate Change and Ocean Acidification: Strengthen resiliency of coastal communities and marine and Great Lakes environments and their abilities to adapt to climate change impacts and ocean acidification.**

Obstacles and Opportunities

The ocean plays a central role in shaping the Earth's climate and influencing climate variability. Because of this important relationship and the ecosystem services that the ocean, our coasts, and Great Lakes provide, global climate change and its associated impacts as well as ocean acidification pose some of the most serious threats to these ecosystems and coastal communities. Warming ocean temperatures have a profound impact on the distribution of rainfall over land, the melting of ice sheets, and the distribution and productivity of species. Sea-level rise, increased severe storm events, rapid erosion, and salt water intrusion threaten low-lying coastal communities with the destruction of infrastructure, flood inundation, the potential displacement of millions of people, and the loss of key species and habitats. At the same time, climate change is predicted to lower the water levels of the Great Lakes, thereby altering water cycles and supply, habitat, and economic uses of the Lakes. In addition, ocean acidification is expected to have significant and largely negative impacts on the marine food web, ocean ecosystems as a whole, and biological diversity in general. Since climate change and ocean acidification may have widespread impacts,

increased coordination of monitoring and mapping efforts and improved understanding of the changes in the ocean are vital to minimizing these impacts on our marine and Great Lakes ecosystems and coastal communities. We have an opportunity and a responsibility to develop strategies for reducing the vulnerability, increasing the resilience, and improving adaptation of human and natural systems to climate change impacts, as well as for mitigating the effects of climate change itself.

The Plan Should Address:

- Research, observations and modeling needed to forecast regional and local scale climate change impacts and related vulnerabilities for natural resources, health, infrastructure, and livelihoods, including social and economic impacts;
- Better integration of ocean and coastal science into the broader climate dialogue and measures to improve understanding of the connections among land, water, air, ice, and human activities;
- Evaluation of potential social and economic costs related to sea-level rise, such as accelerating erosion, increased saltwater intrusion, and more severe coastal and inland flooding;
- Adaptive actions to identified climate change impacts and related vulnerabilities, such as ocean acidification, and the development of ecological and economic resilience strategies and priorities for research and monitoring to address these strategies;
- Changes to local and regional ocean and lake management systems that incorporate changing climate risks and elements of resilient systems; and
- A comprehensive approach to understanding human health implications of policies for the ocean, our coasts, and Great Lakes, and for identifying opportunities for the protection and enhancement of human health.

2. **Regional Ecosystem Protection and Restoration: Establish and implement an integrated ecosystem protection and restoration strategy that is science-based and aligns conservation and restoration goals at the Federal, State, tribal, local, and regional levels.**

Obstacles and Opportunities

Along our coasts and the Great Lakes, essential habitats continue to suffer significant losses and degradation due to coastal development, sea-level rise, and associated human activities. Impacts on these ecosystems and the people and communities in these areas are presenting new management challenges. Additionally, external stressors, including invasive species, are impacting native species and habitat. While progress has been made in addressing some of these challenges through ecosystem-based management, the threat of critical habitat loss and degradation of ecosystem services is still apparent in the Gulf Coast, the Chesapeake Bay, Puget Sound, South Florida, San Francisco Bay, and the Great Lakes. By addressing coastal and ocean challenges that cross jurisdictional boundaries and sectors on a regional and ecosystem scale, we can more effectively manage these resources. Because climate change is impacting our coastlines, it has become even more important to assess and place priorities on ecosystem restoration projects. These experiences provide valuable lessons for other coastal ecosystems.

The Plan Should Address:

- Prioritization of the locations and geographic scope of coastal and Great Lakes ecosystem restoration projects, including implementation of the Great Lakes Restoration Initiative;
- Interim and longer term goals and mechanisms to facilitate collaboration among stakeholders to implement projects;
- Best practices for collaborative science-based planning to achieve ecosystem restoration goals building on the lessons learned in ongoing ecosystem restoration efforts;
- Impacts of invasive species on ocean, coastal, and Great Lakes ecosystems, and a range of methodologies for control and prevention of these species; and
- Protection, maintenance, and restoration of populations and essential habitats supporting fisheries, protected species, ecosystems, and biological diversity.

3. **Water Quality and Sustainable Practices on Land: Enhance water quality in the ocean, along our coasts, and in the Great Lakes by promoting and implementing sustainable practices on land.**

Obstacles and Opportunities

Nonpoint source pollution (pollution that comes from diffuse sources instead of one specific point), caused by poor land management practices, is the leading cause of water quality problems in the United States and a major cause of rapidly declining ocean and coastal ecosystem health. Runoff from suburban streets and lawns, agricultural and industrial uses, transportation activities, and urban development – even hundreds of miles away – negatively impacts water quality, resulting in deleterious effects on ocean, coastal, and Great Lakes systems as evidenced by harmful algal blooms, expansive dead zones, marine debris, and increased incidents of human illness. Areas with particularly poor water quality are known to experience frequent beach closures, massive fish kills, and areas of toxic sediments. Since this pollution comes from many diffuse sources throughout the country, addressing it requires a strong commitment to coordination and cooperation between multiple sectors and among Federal, State, tribal, local authorities, and regional governance structures. Fortunately, a number of point and non-point source prevention programs are available to Federal, State, tribal, local, regional, and private entities to reduce the amount of pollutants that are transported from our Nation's watersheds and into our coastal waters. There are opportunities to achieve significant reductions in these inputs to our coasts and ocean through concrete mechanisms that integrate and coordinate land-based pollution reduction programs.

The Plan Should Address:

- The major impacts of urban and suburban development and agriculture, including forestry and animal feedlots, on ocean, coastal, and Great Lakes waters;
- The relative contributions of significant land-based sources of pollutants, sediments, and nutrients to receiving coastal waters and ways to address them, including recommendations of how to integrate and improve existing land-based conservation and pollution programs;
- Best management practices, use of conservation programs, and other approaches for controlling the most significant land-based sources of nutrients, sediments, pathogens, toxic chemicals, solid waste, marine debris, and invasive species; and
- The establishment of a comprehensive monitoring framework and integration with State monitoring programs.

4. **Changing Conditions in the Arctic: Address environmental stewardship needs in the Arctic Ocean and adjacent coastal areas in the face of climate-induced and other environmental changes.**

Obstacles and Opportunities

Climate change is having a disproportionally greater impact on polar regions than elsewhere, and the Arctic region is faced with serious problems. Permafrost is thawing at an accelerated rate, which leads to the release of large amounts of methane. Multi-seasonal sea ice is rapidly deteriorating. Much of the Alaskan Arctic seashore is threatened by coastal erosion and other environmental challenges. Increased human activity in the area is bringing additional stressors to the Arctic environment, with serious implications for Arctic communities and ecosystems. At the same time, the diminishing ice presents opportunities and pressures for increased development of living and non-living resources and for increased commerce and transportation. Working with all of the stakeholders, including the indigenous communities, we have the opportunity to develop proactive plans, informed by the best science available, to manage and encourage use while protecting the fragile Arctic environment.

The Plan Should Address:

- Better ways to conserve, protect, and sustainably manage Arctic coastal and ocean resources, effectively respond to the risk of increased pollution and other environmental degradation on humans and marine species, and adequately safeguard living marine resources;

- New collaborations and partnerships to better monitor and assess environmental conditions and devise early warning and emergency response systems and procedures to be prepared for and respond to emerging events in the Arctic region, such as environmental disasters;

- Consistency and coordination with the implementation of United States Arctic Region Policy as promulgated in National Security Presidential Directive 66/Homeland Security Presidential Directive 25 (2009); and

- Improvement of the scientific understanding of the Arctic system and how it is changing in response to climate-induced and other changes.

5. **Ocean, Coastal, and Great Lakes Observations, Mapping, and Infrastructure: Strengthen and integrate Federal and non-Federal ocean observing systems, sensors, data collection platforms, data management, and mapping capabilities into a national system and integrate that system into international observation efforts.**

Obstacles and Opportunities

Our ability to understand weather, climate, and ocean conditions, to forecast key environmental processes, and to strengthen ocean management decision-making at all levels is informed by a sound knowledge base. Efficient and effective coordination of the many available tools, continued development of new tools and infrastructure, and integration of them into a cohesive, unified, robust system is becoming increasingly difficult as an ever increasing number of data collection and processing systems come on line. New ground-breaking observation technologies give us the ability to observe and study global processes at all scales. These new tools, if fully integrated, will significantly advance our knowledge and understanding of the ocean, our coasts, and the Great Lakes. Furthermore, successful integration of new tools and data will improve our ability to engage in science-based decision-making and ecosystem-based management by ensuring that biological, ecological, and social data and processes are included in the calculus.

The Plan Should Address:

- A nationally integrated system of ocean, coastal, and Great Lakes observing systems, comprised of Federal and non-Federal components, and cooperation with international partners and organizations, as appropriate;

- Regional and national needs for ocean information, to gather specific data on key ocean, coastal, and Great Lakes variables that are required to support the areas of special emphasis and other national needs;

- The use of unmanned vehicles and remote sensing platforms and satellites to gather data on the health and productivity of the ocean, our coasts, and the Great Lakes;

- The capabilities and gaps of the National Oceanographic Fleet of ships and related facilities; and

- Data management, communication, access, and modeling systems for the timely integration and dissemination of data and information products.

PART FOUR. THE FRAMEWORK FOR EFFECTIVE COASTAL AND MARINE SPATIAL PLANNING

I. Introduction

Coastal and marine spatial planning is one of the nine priority objectives in the recommendations. This framework for CMSP in the United States provides a definition of CMSP, identifies the reasons for engaging in CMSP, and describes its geographic scope. It articulates national CMSP goals and guiding principles that would be adhered to in CMSP efforts and the eventual development and implementation of coastal and marine spatial plans. In addition, this framework describes how CMSP and CMS Plans would be regional in scope and developed cooperatively among Federal, State, tribal, local authorities, and regional governance structures, with substantial stakeholder and public input.

II. What is Coastal and Marine Spatial Planning?

CMSP is a comprehensive, adaptive, integrated, ecosystem-based, and transparent spatial planning process, based on sound science, for analyzing current and anticipated uses of ocean, coastal, and Great Lakes areas. CMSP identifies areas most suitable for various types or classes of activities in order to reduce conflicts among uses, reduce environmental impacts, facilitate compatible uses, and preserve critical ecosystem services to meet economic, environmental, security, and social objectives. In practical terms, CMSP provides a public policy process for society to better determine how the ocean, coasts, and Great Lakes are sustainably used and protected - now and for future generations.

III. Why Coastal and Marine Spatial Planning?

The Nation's interests in the ocean, our coasts, and the Great Lakes support a growing number of significant and often competing uses and activities, including commercial, recreational, cultural, energy, scientific, conservation, and homeland and national security activities. Combined, these activities profoundly influence and benefit coastal, regional, and national economies and cultures. However, human uses of our ocean, coasts, and the Great Lakes are expanding at a rate that challenges our ability to plan and manage them under the current sector-by-sector approach. While many existing permitting processes include aspects of cross-sectoral planning (through, for example, the process governed by the National Environmental Policy Act), most focus solely on a limited range of management tools and outcomes (e.g., oil and gas leases, fishery management plans, and marine protected areas). Missing from this picture is a more integrated, comprehensive, ecosystem-based, flexible, and proactive approach to planning and managing these uses and activities. This new approach would be national in scope to address national interests, but also scalable and specific to regional and local needs. Without such an improved approach, we risk an increase in user conflicts, continued planning and regulatory inefficiencies with their associated costs and delays, and the potential loss of critical economic, ecosystem, social, and cultural services for present and future generations.

Traditional, New, and Expanding Ocean, Coastal, And Great Lakes Uses

The ocean, our coasts, and the Great Lakes are home to and support myriad important human uses. CMSP provides an effective process to better manage a range of social, economic, and cultural uses, including:

- Aquaculture (fish, shellfish, and seaweed farming)
- Commerce and Transportation (e.g., cargo and cruise ships, tankers, and ferries)
- Commercial Fishing
- Environmental/Conservation (e.g., marine sanctuaries, reserves, national parks, and wildlife refuges)
- Maritime Heritage and Archeology
- Mining (e.g., sand and gravel)
- Oil and Gas Exploration and Development
- Ports and Harbors
- Recreational Fishing
- Renewable Energy (e.g., wind, wave, tidal, current, and thermal)
- Other Recreation (e.g., boating, beach access, swimming, surfing, nature and whale watching, and diving)
- Scientific Research and Exploration
- Security, Emergency Response, and Military Readiness Activities
- Subsistence Uses
- Tourism
- Traditional Hunting, Fishing, and Gathering
- Working Waterfronts

Recent scientific and ocean policy assessments have demonstrated that a fundamental change in our current management system is required to achieve the long-term health of our ocean, coasts, and Great Lakes in order to sustain the services and benefits they provide to society. The present way we

manage these areas cannot properly account for cumulative effects, sustaining multiple ecosystem services, and holistically and explicitly evaluating the tradeoffs associated with proposed alternative human uses.

Scientific understanding and information are central to achieving an integrated and transparent planning process. Natural and social sciences can inform decisions about how to achieve societal objectives from the Nation's ocean, coastal, and Great Lakes waters, both now and into the future, while maintaining ecosystem integrity. Built on this foundation of sound science, this new system for planning should facilitate maintenance of essential ecosystem services, encourage compatible uses, minimize conflicts, evaluate tradeoffs in an open and transparent manner, and include significant and meaningful stakeholder involvement.

The Benefits of CMSP

As recommended in this framework, CMSP is intended to yield substantial economic, ecological, and social benefits. To do so, it must fully incorporate the principles of sound science for ecosystem-based and adaptive management, be transparent, and be informed by stakeholders and the public. Many have raised concerns regarding whether CMSP would result in additional layers of regulatory review or delays in decision-making. To the contrary, CMSP is intended to build upon and significantly improve existing Federal, State, tribal, local, and regional decision-making and planning processes. Thus, while the development of CMSP would require significant initial investments of both human and financial resources, these investments are expected to result in substantial benefits. Several States, regions, and other nations have already recognized the many advantages of marine spatial planning, undertaken the planning process, and are eager to take positive steps to realize those advantages.

CMSP can facilitate sustainable economic growth. For instance:

In the Netherlands-
A "preferred sand mining area" has been identified within its territorial sea. This use allocation through marine spatial planning will allow sand extraction closer to shore at less cost to both the private sector and the government, especially in the next 20 years when it is used for coastal adaptation to anticipated climate change.

In Germany-
An environmental assessment for a wind farm permit costs about €1 million (US$1.5 million) to prepare. Because the federal government has already prepared a Strategic Environmental Assessment for its marine spatial plan that includes priority areas for wind farms, costs of preparing and reviewing an environmental assessment for every permit proposed in a "Priority Wind Farm Area" will be reduced or avoided.

Examples Courtesy of Dr. Charles Ehler, UNESCO

CMSP is intended to facilitate sustainable economic growth in coastal communities by providing transparency and predictability for economic investments in coastal, marine, and Great Lakes industries, transportation, public infrastructure, and related businesses. CMSP could promote national objectives such as enhanced national energy security and trade and provide specific economic incentives (e.g., cost savings and more predictable and faster project implementation) for commercial users.

CMSP allows proactive planning to integrate a wide range of ecosystem services. For instance:

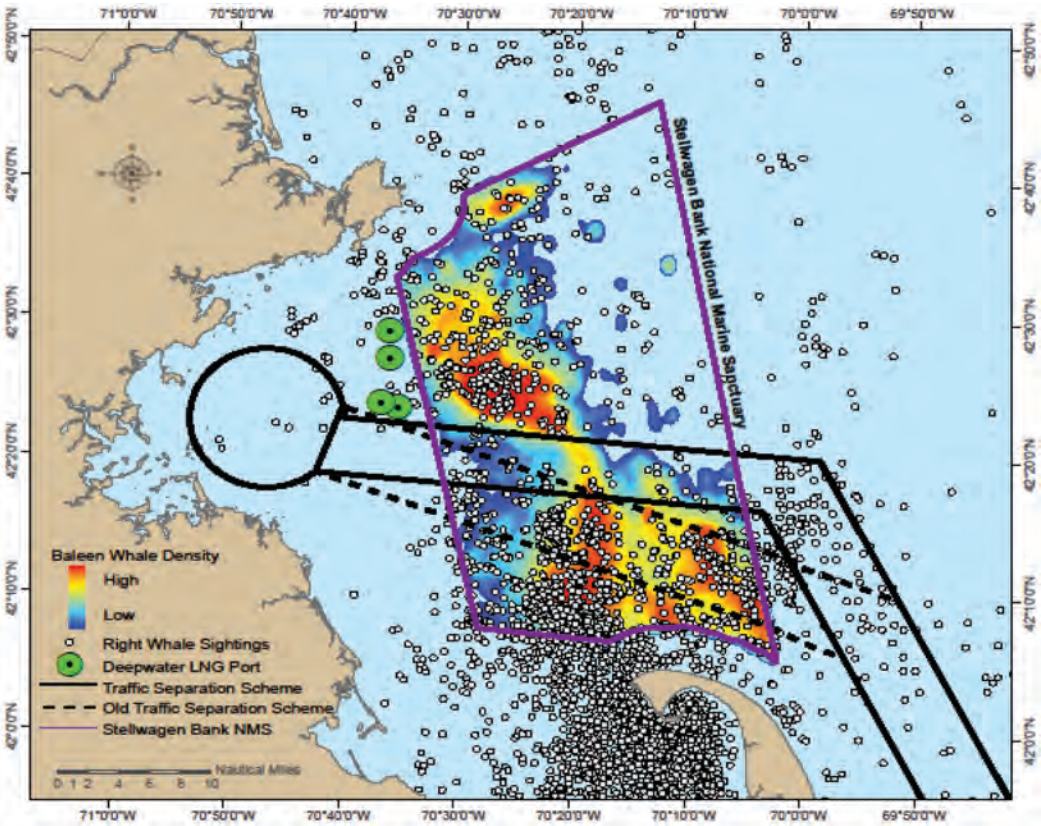
Provisioning
Energy, Seafood, Biomedical

Regulating and Supporting
Flood Prevention, Biological Diversity Maintenance, Climate Regulation, Erosion Control, Control of Pests and Pathogens, Nutrient Recycling, and Primary Production

Cultural Services
Education, Recreational, Heritage, and Spiritual

CMSP is intended to improve ecosystem health and services by planning human uses in concert with the conservation of important ecological areas, such as areas of high productivity and biological diversity; areas and key species that are critical to ecosystem function and resiliency; areas of spawning, breeding, and feeding; areas of rare or functionally vulnerable marine resources; and migratory corridors. Enhanced ecosystem services and benefits can be attained through CMSP because they are centrally incorporated into the CMS Plan as desired outcomes of the process and not just evaluated in the context of individual Federal or State agency action. CMSP allows for a comprehensive look at multiple sector demands which would provide a more complete evaluation of cumulative effects. This ultimately is intended to result in protection of areas that are essential for the resiliency and maintenance of healthy ecosystem services and biological diversity, and to maximize the ability of marine resources to continue to support a wide variety of human uses.

Example of the Potential Benefits of CMSP: Stellwagen Bank National Marine Sanctuary



Comprehensive planning enabled NOAA, the United States Coast Guard, and several other government agencies and stakeholders to examine shipping needs, proposed deepwater liquefied natural gas port locations, and endangered whale distribution in a successful effort to reconfigure the Boston Traffic Separation Scheme (TSS) to reduce the risk of whale mortality due to collisions with ships in the Stellwagen Bank National Marine Sanctuary. The reconfigured TSS reduced risk of collision by an estimated 81% for all baleen whales and 58% for endangered right whales. Industry TSS transit times increased by only 9 – 22 minutes (depending on speed) and conflict with deepwater ports was eliminated. In addition, the new route decreased the overlap between ships using the TSS, commercial fishing vessels, and whale watch vessels, thereby increasing maritime safety. CMSP has the significant potential of applying this integrated, multi-objective, multi-sector approach on a broader and sustained scale.

Diagram Courtesy of NOAA/Stellwagen Bank National Marine Sanctuary

From a societal perspective, CMSP would improve opportunities for community and citizen participation in open planning processes that would determine the future of the ocean, our coasts, and the Great Lakes. For example, the CMSP process would recognize the social, economic, public health, and conservation benefits of sustainable recreational use of ocean, coastal, and Great Lakes resources (e.g., fishing, boating, swimming, and diving), by providing improved coordination with recreational users to ensure consideration of continued access and opportunities to experience and enjoy these activities consistent with safety and conservation goals. Integrated engagement and coordination should result in stronger and more diverse ocean, coastal, and Great Lakes stewardship, economies, and communities. Moreover, CMSP can assist managers in planning activities to sustain cultural and recreational uses, human health and safety, and the continued security of the United States. For

instance, CMSP would help to ensure that planning areas identified as important for public use and recreation are not subject to increased risk of harmful algal blooms, infectious disease agents, chemical pollution, or unsustainable growth of industrial uses.

IV. Integration, Cooperation, and Coordination

Strong partnerships among Federal, State, tribal, and local authorities, and regional governance structures would be essential to a truly forward-looking, comprehensive CMSP effort. One of the significant benefits of CMSP is to improve the ability of these authorities to seamlessly coordinate their objectives with broader planning efforts by participating in the CMSP process for areas within and beyond their jurisdictional waters. Many States and regional governance structures have already engaged in some form of comprehensive marine planning and CMSP would build upon and incorporate these efforts. Also, the United States has a unique legal relationship with federally-recognized American Indian and Alaska Native tribal governments. These tribal governments, and the indigenous populations in Hawaii and the United States Commonwealths and Territories, are integrally linked to the maritime realm and would play an important role in CMSP.

The United States shares maritime and Great Lakes boundaries with a number of countries and has the world's largest EEZ and an extensive Continental Shelf. The development of CMSP provides opportunities for engagement with other countries, in coordination with the Department of State and other relevant agencies. The views and decisions of relevant international fora should be taken into account, where appropriate, in CMSP and the development of CMS Plans.

The ability for States and tribes to participate in the CMSP process for areas within and beyond their respective jurisdictions can afford the following potential opportunities and incentives:

- Encourage and inform the Federal government to better manage resources or address processes that transcend jurisdictional boundaries;
- Define local and regional objectives and develop and implement CMSP in a way that is meaningful to regionally specific concerns;
- Leverage, strengthen, and magnify local planning objectives through integration with regional and national planning efforts;
- Proactively address concerns over proposed activities impacting State and tribal interests and minimize use conflicts before they escalate;
- Leverage support from the Federal government to build CMSP capacity, access CMSP data, and acquire scientific, technical, and financial assistance;
- Access data through CMSP portal(s) and utilize science tools developed, established, and maintained for CMSP efforts;
- Benefit from sustained Federal participation on the regional planning bodies that consist of representatives empowered to make decisions and commitments on behalf of their respective agencies, in turn helping to integrate and improve decision-making;
- Provide a clearer and easier point of access for all Federal agencies with regard to ocean, coastal, and Great Lakes issues; and
- Achieve regulatory efficiencies, reduction in administrative delays, and cost savings.

Similarly, as the United States is a leader in various international fora that deal with marine issues, the United States should introduce relevant aspects of CMSP for consideration by such bodies.

V. Public and Stakeholder Engagement

In addition to coordination and cooperation among all levels of government, robust public and stakeholder engagement is integral to a successful CMSP process. Given the multi-objective nature of CMSP it is critical to ensure there are numerous opportunities for a broad range of input to gain a better understanding of the human uses and influences on the planning area, and expectations, interests, and requirements for the future. Including a broad range of interests throughout the planning and implementation of CMSP is necessary to strengthen mutual and shared understanding about relevant problems and opportunities and will better inform the process and its outcomes.

VI. The Authority for Coastal and Marine Spatial Planning

Federal statutes often include authorizing language that explicitly gives agencies the responsibility to plan and implement the objectives of the statutes. Moreover, several Federal statutes specifically authorize agency planning with respect to the ocean, coastal, and Great Lakes environments. Federal agencies and departments also administer a range of statutes and authorized programs that provide a legal basis to implement CMSP. These statutory and regulatory authorities may govern the process for making decisions (e.g., through Administrative Procedure Act rulemaking and adjudications) and not just the ultimate decisions made. The processes and decision-making CMSP envisions would be carried out consistent with and under the authority of these statutes. State, tribal, and local authorities also have a range of existing authorities to implement CMSP, although this will vary among and within regions. This framework for CMSP is to provide all agencies with agreed upon principles and goals to guide their actions under these authorities, and to develop mechanisms so that Federal, State, tribal, and local authorities, and regional governance structures can proactively and cooperatively work together to exercise their respective authorities.

An agency or department's capacity to internalize the elements of any particular CMS Plan would vary depending on the nature of applicable statutes. CMSP is intended to provide a better framework for application of these existing laws and agency authorities, but is not intended to supersede them. Where pre-existing legal constraints, either procedural or substantive, are identified for any Federal agency, the NOC would work with the agency to evaluate necessary and appropriate legislative solutions or changes to regulations to address the constraints. In the interim, agencies would comply with existing legal requirements but should endeavor, to the maximum extent possible, to integrate their actions with those of other partners to a CMS Plan.

VII. The National Goals of Coastal and Marine Spatial Planning

For CMSP to be successful, it must be based on clear, broad-based goals that define the desired outcomes to be achieved. CMSP in the United States would be developed and implemented to further the following goals:

1. Support sustainable, safe, secure, efficient, and productive uses of the ocean, our coasts, and the Great Lakes, including those that contribute to the economy, commerce, recreation, conservation, homeland and national security, human health, safety, and welfare;

2. Protect, maintain, and restore the Nation's ocean, coastal, and Great Lakes resources and ensure resilient ecosystems and their ability to provide sustained delivery of ecosystem services;

3. Provide for and maintain public access to the ocean, coasts, and Great Lakes;

4. Promote compatibility among uses and reduce user conflicts and environmental impacts;

5. Improve the rigor, coherence, efficiency, and consistency of decision-making and regulatory processes;

6. Increase certainty and predictability in planning for and implementing new investments for ocean, coastal, and Great Lakes uses; and

7. Enhance interagency, intergovernmental, and international communication and collaboration.

VIII. The National Guiding Principles for Coastal and Marine Spatial Planning

In order to achieve the national goals of CMSP, planning efforts are to be guided by the following principles:

1. CMSP would use an ecosystem-based management approach that addresses cumulative effects to ensure the protection, integrity, maintenance, resilience, and restoration of ocean, coastal, and Great Lakes ecosystems, while promoting multiple sustainable uses.

2. Multiple existing uses (e.g., commercial fishing, recreational fishing and boating, subsistence uses, marine transportation, sand and gravel mining, and oil and gas operations) and emerging uses (e.g., off-shore renewable energy and aquaculture) would be managed in a manner that reduces conflict, enhances compatibility among uses and with sustained ecosystem functions and services, provides for public access, and increases certainty and predictability for economic investments.

3. CMSP development and implementation would ensure frequent and transparent broad-based, inclusive engagement of partners, the public, and stakeholders, including with those most impacted (or potentially impacted) by the planning process and with underserved communities.

4. CMSP would take into account and build upon the existing marine spatial planning efforts at the regional, State, tribal, and local level.

5. CMS Plans and the standards and methods used to evaluate alternatives, tradeoffs, cumulative effects, and sustainable uses in the planning process would be based on clearly stated objectives.

6. Development, implementation, and evaluation of CMS Plans would be informed by

sound science and the best available information, including the natural and social sciences, and relevant local and traditional knowledge.

7. CMSP would be guided by the precautionary approach as reflected in Principle 15 of the Rio Declaration, "Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."

8. CMSP would be adaptive and flexible to accommodate changing environmental conditions and impacts, including those associated with global climate change, sea-level rise, and ocean acidification; and new and emerging uses, advances in science and technology, and policy changes.

9. CMSP objectives and progress toward those objectives would be evaluated in a regular and systematic manner, with public input, and adapted to ensure that the desired environmental, economic, and societal outcomes are achieved.

10. The development of CMS Plans would be coordinated and compatible with homeland and national security interests, energy needs, foreign policy interests, emergency response and preparedness plans and frameworks, and other national strategies, including the flexibility to meet current and future needs.

11. CMS Plans would be implemented in accordance with customary international law, including as reflected in the Law of the Sea Convention, and with treaties and other international agreements to which the U.S. is a party.

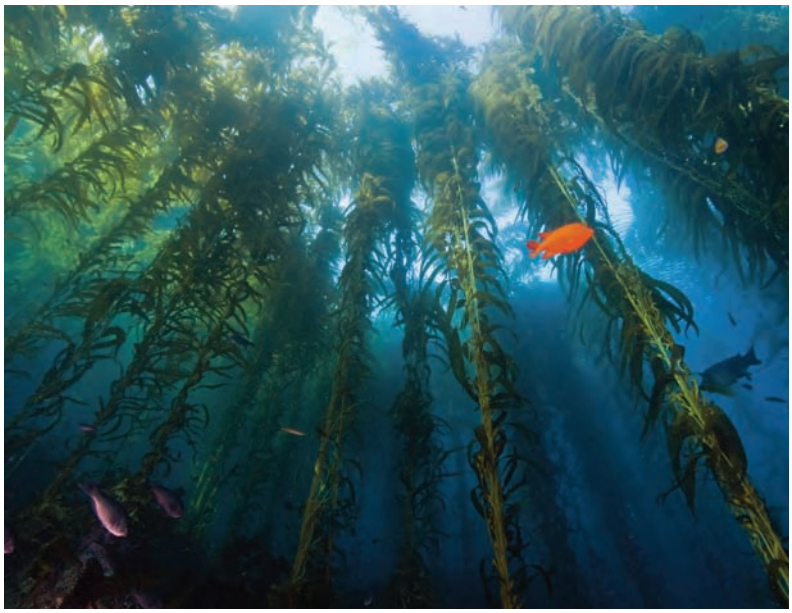
12. CMS Plans would be implemented in accordance with applicable Federal and State laws, regulations, and Executive Orders.

IX. Geographic Scope of Coastal and Marine Spatial Planning

The geographic scope of the planning area for CMSP in the United States includes the territorial sea, the EEZ, and the Continental Shelf. The geographic scope of the planning area would extend landward to the mean high-water line. The geographic scope for the Great Lakes would extend from the ordinary high-water mark and include the lakebed, subsoil, and water column to the limit of the United States and Canada international boundary, as maintained by the International Boundary Commission, and includes Lake St. Clair and the connecting channels between lakes. Privately owned lands as defined by law would be excluded from the geographic scope.

The geographic scope would include inland bays and estuaries in both coastal and Great Lakes settings. Inclusion of inland bays and estuaries is essential because of the significant ecological, social, and economic linkages between these areas with offshore areas. Additional inland areas may be included in the planning area as the regional planning bodies, described in Section X of this Part, deem appropriate. Regardless, consideration of inland activities would be necessary to account for the significant interaction between upstream activities and ocean, coastal, and Great Lakes uses and ecosystem health. Likewise, consideration would also be given to activities occurring beyond the EEZ and continental shelf that may influence resources or activities within the planning area.

The Great Lakes and CMSP



Great Lakes resources are governed in part by a body of law, treaties, and regional policy that is distinct from our ocean and other coastal areas. Of paramount significance is the Great Lakes Water Quality Agreement (GLWQA) with Canada and its implementation under various Federal laws that commit each country to restore and maintain the chemical, physical, and biological integrity of the Great Lakes through use of ecosystem-based management. However, while various Federal regulatory authorities apply in the United States Great Lakes, the submerged lands underlying them are largely under the jurisdiction and ownership of the Great Lakes States.

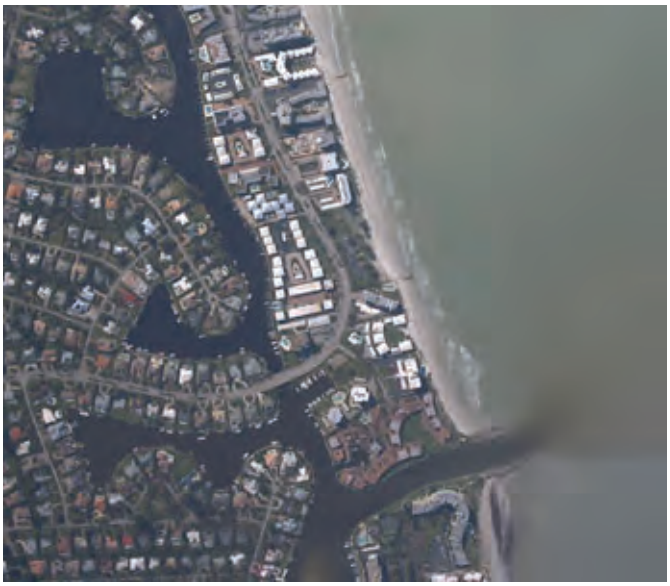
CMSP efforts in the Great Lakes would be complementary to and closely coordinated with the GLWQA and other Great Lakes initiatives and authorities, such as the President's Great Lakes Restoration Initiative and Executive Order 13340, which established a cabinet-level Great Lakes Interagency Task Force, its Regional Working Group, and a multi-stakeholder Great Lakes Regional Collaboration.

Land-based Activities and Their Relation to CMSP

Although the geographic scope of the CMSP area in the United States would not include upland areas unless a regional planning body determines to include them, the health and well-being of the ocean, our coasts, and the Great Lakes are in large part the result of the interrelationships among land, water, air, and human activities. Effective management of environmental health and services, maritime economies, commerce, national and homeland security interests, and public access necessitate connecting land-based planning efforts with ocean, coastal, and Great Lakes planning. Thus, successful implementation of CMSP would ultimately depend upon a better integration of coastal planning that considers influences from, and activities within, coastal watersheds and other contributing land areas. Land-based watershed planning efforts (e.g., components of the Great Lakes Restoration Initiative Action Plan) should inform and influence CMSP within each region. Similarly, ocean, coastal, and Great Lakes activities that affect land-based ecosystems should be considered and accounted for during CMSP efforts using the existing State and Federal programs including the Coastal Zone Management Act (CZMA), Clean Water Act, Clean Air Act, and other relevant authorities. It is the intent of the CMSP process to better understand how current mandates and programs interact towards the common goals of CMSP and, in doing so, to better coordinate, and where appropriate, strengthen their collective

benefits. In addition, watershed monitoring, terrestrial observation activities, and ocean, coastal, and Great Lakes observation systems should be linked to provide the necessary information on interactions and impacts across the land-sea boundary.

X. Development and Implementation of Coastal and Marine Spatial Planning

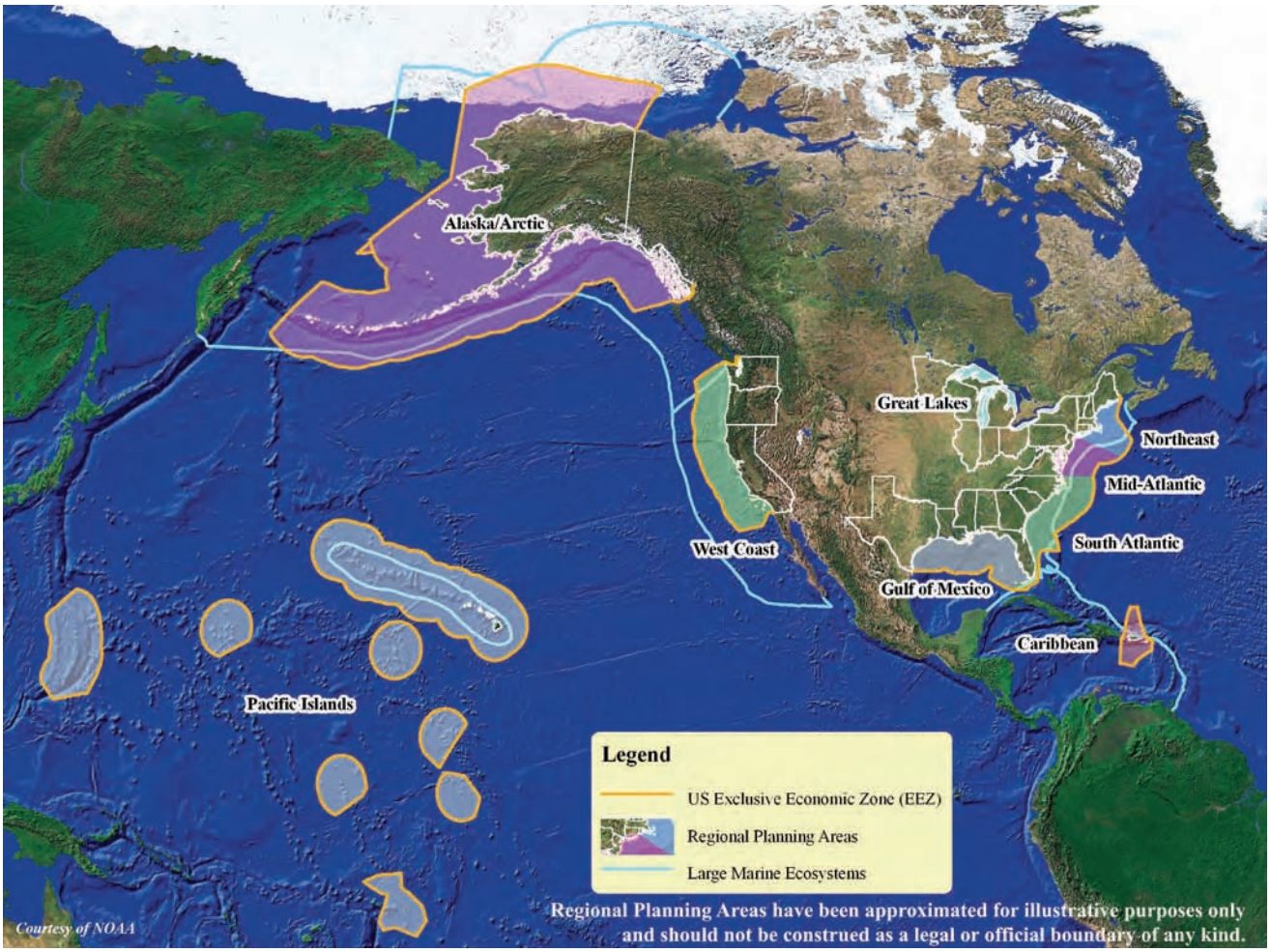


CMSP would be developed and implemented using a regional approach to allow for the variability of economic, environmental, and social aspects among different areas of the United States. This section describes the regional approach, recommended steps, and the essential elements to be included in the development and implementation of CMSP.

Given the importance of conducting CMSP from an ecosystem-based perspective, combined with the likely involvement of existing regional governance structures in developing plans, a consistent planning scale with which to initiate CMSP is at the large marine ecosystem (LME) scale.[7] These recognized LMEs were defined on the basis of consistent ecological conditions and other factors. Overall, the boundaries of regional governance structures for the Northeast, Mid-Atlantic, South Atlantic, Gulf Coast, and West Coast lie within LME boundaries. This regional approach, consistent with the LMEs, would also be applied to the Great Lakes, Alaska, the Pacific Islands, and the Caribbean. Therefore, for CMSP purposes, the United States would be subdivided into nine regional planning areas based on LMEs, with modifications as necessary to ensure inclusion of the entire U.S. EEZ and Continental Shelf and to allow for incorporation of existing state or regional ocean governance bodies. The NOC would facilitate the development of regional CMS Plans for those areas.

[7] The U.S. ocean and coastal waters hold all or parts of eleven LMEs: the West Bering Sea, East Bering Sea, Chukchi Sea, Beaufort Sea, Gulf of Alaska, California Current, Gulf of Mexico, Southeast U.S. Continental Shelf, Northeast U.S. Continental Shelf, Insular Pacific-Hawaiian, and the Caribbean Sea. For representational purposes only, the five Alaskan LMEs are depicted as a single complex in the map on page 52. Although, as a large fresh-water system, the Great Lakes are not usually considered an LME, they do represent a large regional ecosystem of similar scale and are considered as such for this framework. Further detail on LMEs can be found at: http://www.lme.noaa.gov.

Large Marine Ecosystems and Regional Planning Areas



Regional Planning Body

The NOC would work with the States[8] and federally-recognized tribes, including Alaska Native Villages, to create regional planning bodies – coinciding with the regional planning areas – for the development of regional CMS Plans. The membership of each of the nine regional planning bodies would consist of Federal, State, and tribal authorities relevant to CMSP for that region (e.g., resource management, including coastal zone management and fisheries management, science, homeland and national security, transportation, and public health). Members would be of an appropriate level of responsibility within their respective governing body to be able to make decisions and commitments throughout the process. Each regional planning body would identify Federal and non-Federal co-leads.[9] Appropriate State and tribal representation would be determined by applicable States and tribes, consistent with the types of representation described by the NOC per Section XVI of this Part. Regional planning bodies would develop a mechanism to engage other indigenous community representatives

[8] For purposes of this framework, "States" also include the Commonwealth of Puerto Rico, the U.S. Virgin Islands, Guam, the Commonwealth of the Northern Mariana Islands, and American Samoa.

[9] Each regional planning body would have one Federal co-lead, one State co-lead, and, as appropriate, one tribal co-lead. The co-leads would be responsible for guiding and facilitating the timely progress of the CMSP process, but would not have final decision-making authority.

with jurisdictional responsibilities or interests relevant to CMSP, as well as coordinate with appropriate local authorities throughout the CMSP process. In addition, the regional planning bodies would provide a formal mechanism for consultation with the Regional Fishery Management Councils (RFMCs) across their respective regions on fishery related issues given their unique statutory responsibilities under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) and quasi-regulatory role in fisheries management.[10] The NOC would prepare guidance for regional planning bodies in meeting these consultative process requirements in order to ensure consistency across regions. In the future, if other statutorily-mandated or quasi-regulatory groups are identified, the NOC would determine whether a formal mechanism for consultation should be developed for such groups and, if necessary, provide guidance for regional planning bodies on the development of such a process.

Nine Proposed Regional Planning Areas and Corresponding Minimum State Representation

1. **Alaska /Arctic Region:** Alaska
2. **Caribbean Region:** Puerto Rico and U.S Virgin Islands
3. **Great Lakes Region:** Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin
4. **Gulf of Mexico Region:** Alabama, Florida, Louisiana, Mississippi, and Texas
5. **Mid-Atlantic Region:** Delaware, Maryland, New Jersey, New York, Pennsylvania, and Virginia
6. **Northeast Region:** Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont
7. **Pacific Islands Region:** Hawaii, Commonwealth of the Northern Mariana Islands, American Samoa, and Guam
8. **South Atlantic Region:** Florida, Georgia, North Carolina, and South Carolina
9. **West Coast Region:** California, Oregon, and Washington

Each regional planning body[11] should make every effort to ensure representation from all States within a region, ideally through, or as part of, the existing regional governance structures created by or including the States to address cross-cutting issues, including regional planning. Given that activities that happen outside of the planning area of each regional planning body may affect CMSP decisions in that area, ex officio membership on these bodies could be extended to adjacent coastal States to help integrate and enhance consistency among regions. Inland States may also be afforded membership, as determined appropriate by the regional planning body. It is also recognized that the United States shares maritime boundaries with other nations (e.g., Canada and Mexico) and the regional planning bodies for those respective areas may include ex officio representatives or observers from these nations.

[10] There are no Regional Fishery Management Councils in the Great Lakes Region, but the Great Lakes regional planning body should work with the Great Lakes Fishery Commission and other relevant entities, as appropriate.

[11] The Task Force based the State membership of the nine regional planning areas in part on the membership of the existing regional governance structures, where they exist, with the following one exception: Pennsylvania was added to the Mid-Atlantic Region, in addition to the Great Lakes Region, because Pennsylvania has a coastline on the Delaware River that would, under the defined geographic scope, be included in the CMSP regional planning area.

Furthermore, there would be flexibility to develop sub-regional plans provided that these plans are encompassed in an overarching regional CMS Plan and overseen by the regional planning body. This construct may be particularly useful in the Alaska/Arctic and Pacific Islands Regions given the geographic breadth, the logistical constraints of coordinating resources across a region that spans the international dateline, and that multiple LMEs are encompassed by the Alaska/Arctic Region.

CMSP Development Agreement

The members of each regional planning body (the "partners") would prepare and execute a CMSP Development Agreement, a model of which the NOC would develop as described in Section XVI of this Part. The Development Agreement would be an express commitment to work cooperatively to engage in CMSP and develop eventual CMS Plans, identify the regional planning body members for each of the partners, and define ground rules, roles, and responsibilities of the partners.

Dispute Resolution Process

CMSP would provide a process for resolving conflicts should members of the regional planning bodies disagree during the development or modification of CMS Plans and in the interpretation of NOC-certified CMS Plans. The NOC would develop this process, in cooperation with the GCC, to ensure consistency from region to region. This process would be designed in a way to ensure that most disputes would be resolved at the regional level. If a conflict cannot be resolved at the regional level, the regional planning body leads would elevate the issue to the NOC for resolution, via the NOC resolution process outlined earlier. In those instances in which such a conflict reflects a dispute between Federal and non-Federal members at the regional level, the NOC would consult with the GCC as part of this process. Disputes regarding a specific agency's decisions pursuant to its statutory authority would be addressed through the various procedures and mechanisms available under that authority or other relevant authorities (e.g., Administrative Procedure Act).

Work Plan

Each regional planning body would develop a formal regional work plan that describes the agreed-upon process for CMSP and development of CMS Plans (including all essential elements), specifies members, identifies co-leads, establishes key milestones, identifies resources, specifies time frames, and addresses the essential elements required for the planning process, as defined below. The work plan would allow flexibility to account for the particular circumstances of a given region (e.g., if a region has existing State plans). In addition, each work plan would specify a formal mechanism for consultation to engage the RFMCs within the region as well as a mechanism to engage the indigenous community representatives. The work plan should also describe how the regional planning body would coordinate with appropriate local authorities. The NOC would review and approve each regional work plan prior to its implementation.

Essential Elements of the CMSP Process

Essential Elements of the CMSP Process

- Identify Regional Objectives
- Identify Existing Efforts that Should Help Shape the Plan throughout the Process
- Engage Stakeholders and the Public at Key Points throughout the Process
- Consult Scientists and Technical and Other Experts
- Analyze Data, Uses, Services, and Impacts
- Develop and Evaluate Alternative Future Spatial Management Scenarios and Tradeoffs
- Prepare and Release for Public Comment a Draft CMS Plan with Supporting Environmental Impact Analysis Documentation
- Create a Final CMS Plan and Submit for NOC Review
- Implement, Monitor, Evaluate, and Modify (as needed) the NOC-certified CMS Plan

The CMSP process consists of a series of steps that would eventually lead to the development of a comprehensive, multi-sectoral, and multi-objective CMS Plan. Although the CMSP process envisions optimum flexibility among and within regions, the following essential elements – and how the partners plan to accomplish them – would need to be addressed in the work plan in order to ensure a level of national consistency across regions. The process would be adaptive and refined as regions gain experience with CMSP.

- **Identify Regional Objectives:** Each region would define and agree upon a set of specific and measurable regional objectives that provide clear direction, outcomes, and timeframes for completion. These regional objectives would be consistent with the national goals and principles identified in this framework and with any national objectives the NOC has articulated for purposes of CMSP. These objectives would serve as a statement of purpose and need for action to guide the planning process and eventual development of an ecosystem-based, comprehensive, integrated CMS Plan.

- **Identify Existing Efforts that Should Help Shape the Plan throughout the Process:** The regional planning body would identify existing efforts (e.g., State and Federal ocean plans, data management efforts, and CMSP decision products) that would allow the regional plan to build on existing work. This work should be leveraged and expanded to enable a more

organic and holistic approach that would advance the region as a whole while not duplicating or hindering existing and ongoing efforts. These existing efforts can include those that are region-wide, State focused, or more site-specific marine spatial plans or efforts (e.g., Great Lakes Restoration Initiative Action Plan, Massachusetts Ocean Plan, Rhode Island Ocean Special Area Management Plan, or National Marine Sanctuary management plans), as well as issue-specific plans that seek to incorporate some aspects of CMSP approaches and principles (e.g., ocean energy and fishery management plans), as appropriate.

- **Engage Stakeholders and the Public at Key Points throughout the Process:** The regional planning body would ensure there is frequent and regular stakeholder engagement throughout all phases of the CMSP process, including development, adoption, implementation, evaluation, and adaptive management phases. To better ensure all concerns and ideas are considered, stakeholder engagement should be emphasized with those most impacted (or potentially impacted) by the planning process. Considerations should also be given to ensuring inclusion of underserved communities. Regions would establish an inclusive and transparent process for stakeholder participation (or, if applicable, utilizing an existing process) that ensures engagement with a representative balance of major social, cultural, economic, environmental, recreational, human health, and security interests. The regional planning body should also identify previous stakeholder input to regional or State CMSP efforts including the existing documentation on their input and needs. Stakeholder and public participation would be sought through a variety of robust participatory mechanisms that may include, but are not limited to, workshops, town halls, public hearings, public comment processes, and other appropriate means. Stakeholder and public engagement would be consistent with existing requirements for public notice and input under applicable laws. Additionally, regional planning bodies would operate with the maximum amount of transparency, participation, and collaboration to the extent permissible by law. The NOC would provide guidance on such operating procedures including methods that ensure effective public and stakeholder participation, encourage diversity of opinions, and contribute to the accountability of the CMSP process (e.g., public meetings, document availability, and timely public notification).

- **Consult Scientists and Technical and Other Experts:** The regional planning body would consult scientists, technical experts, and those with traditional knowledge of or expertise in coastal and marine sciences and other relevant disciplines throughout the process to ensure that CMSP is based on sound science and the best available information. To this end, the regional planning body would establish regional scientific participation and consultation mechanisms to ensure that the regional planning body obtains relevant information. Such consultation could take the form of regional private-public technology and science partnerships. In addition, the regional planning bodies would work with existing science and technical entities, such as the regional ocean observation organizations, and other organizations with relevant physical, biological, ecological, and social science expertise. Scientific participation and consultation mechanisms would provide scientific and technical oversight and support to the regional planning body throughout the CMS Plan development, implementation, and evaluation phases.

- **Analyze Data, Uses, Services, and Impacts:** With assistance from scientific and technical experts, the regional planning body would investigate, assess, forecast, and analyze the following:

  - Important physical and ecological patterns and processes (e.g., basic habitat distributions and critical habitat functions) that occur in the planning area, including their response to changing conditions;

  - The ecological condition and relative ecological importance or values of areas within the planning area, including identification of areas of particular ecological importance, using regionally-developed evaluation and prioritization schemes that are consistent with national guidance provided by the NOC;

  - The economic and environmental benefits and impacts of ocean, coastal, and Great Lakes uses in the region;

  - The relationships and linkages within and among regional ecosystems, including neighboring regions both within and outside the planning area, and the impacts of anticipated human uses on those connections;

  - The spatial distribution of, and conflicts and compatibilities among, current and emerging ocean uses in the area;

  - Important ecosystem services in the planning area and their vulnerability or resilience to the effects of human uses, natural hazards, and global climate change;

  - The contributions of existing placed-based management measures and authorities; and

  - Future requirements of existing and emerging ocean, coastal, and Great Lakes uses.

  This analysis would form the basis of the Regional Assessment described in the Essential Elements of the CMS Plan below. The regional planning body would identify and leverage existing approaches and efforts to collect information as well as clearly identify where there are gaps in data and information and what assumptions are made in the assessments, forecasts, and analyses to 'compensate' for lack of information and data.

- **Develop and Evaluate Alternative Future Spatial Management Scenarios and Tradeoffs:** The regional planning body would identify a range of alternative future spatial management scenarios based upon the information gathered on current, emerging, and proposed human uses, ecosystem conditions, and ecosystem services. Comparative analyses would assess, forecast, and analyze the tradeoffs and cumulative effects and benefits among multiple human use alternatives. The alternatives and the supporting analyses would provide the basis for a draft CMS Plan.

- **Prepare and Release for Public Comment a Draft CMS Plan with Supporting Environmental Impact Analysis Documentation:** Once a draft CMS plan and supporting environmental impact analyses, including alternatives, are completed, the regional planning body would release it for

appropriate public review and comment. During the development of a CMS Plan and before formal adoption of a final CMS Plan, regional planning bodies would also have the flexibility to move forward with CMSP efforts and agreements to address ongoing issues and regional coordination. It is recognized that these agreements would likely become part of the final CMS Plan. In drafting the CMS Plan, the regional planning body would resolve disputes using the process developed by the NOC, as discussed above in this Section.

- **Create a Final CMS Plan and Submit for NOC Review:** Based on public review of the draft plan and alternatives, the regional planning body would develop the final CMS Plan and environmental impact analysis that includes elements detailed in the Essential Elements of the Plan. The regional planning body would submit the final CMS Plan to the NOC for national consistency certification, as described in Section XII of this Part. Certification by the NOC would not occur until after release of the final CMS Plan for 30 days of public notice. These CMS Plans are intended to be iterative and are expected to be modified through the adaptive process described below.

- **Implement, Monitor, Evaluate, and Modify (as needed) the NOC-Certified CMS Plan:** The regional planning body would have an ongoing responsibility to monitor and assess the effectiveness of the CMS Plan. The regional planning body would adapt the CMS Plan, as necessary, based on relevant changes in ecological, economic, human health, safety, security, or social conditions and information. During implementation, each region would integrate new data and scientific findings to refine regional objectives and their respective goals. As new technologies are developed to observe and monitor ocean, coastal, and Great Lakes environments and their uses, they would be considered for application in regional CMSP monitoring and evaluation efforts.

Essential Elements of the CMS Plan

Essential Elements of the CMS Plan

- Regional Overview and Scope of Planning Area
- Regulatory Context
- Regional Assessment
- Objectives, Strategies, Methods, and Mechanisms for CMSP
- Compliance Mechanisms
- Monitoring and Evaluation Mechanisms
- Incorporation of the Dispute Resolution Process

CMS Plans are expected to vary from region to region according to the specific needs, capacity, and issues particular to each region. A completed CMS Plan would contain the following essential elements in order to ensure national consistency across regions and certification by the NOC. Scientific data, information, and knowledge, as well as relevant traditional knowledge would underpin each of these essential elements.

- **Regional Overview and Scope of Planning Area:** The CMS Plan would include a regional overview of the planning area. This overview would include a description of the planning area's ecosystems and their biological, chemical, and physical environments; social, recreational, human health, safety, security, and economic uses; ecological and conservation considerations, including identification of important ecological areas, habitats, flora, and fauna; and other concerns of the region. The overview would describe how the CMS Plan relates to and furthers the National Policy, CMSP national goals and principles, any national objectives developed by the NOC, regional objectives, and other relevant national, regional, State, and other policies. The CMS Plan would also define the geographic scope of the planning area.

- **Regulatory Context:** The CMS Plan would describe the statutes, rules, and regulations relevant to implementing CMSP throughout all levels of government. It would also describe, as appropriate, the principal existing planning processes (e.g., Great Lakes Restoration Initiative Action Plan or State marine spatial plans) that may be relied on or incorporated as part of the regional CMS Plan.

- **Regional Assessment:** The CMS Plan would include a regional assessment, based on environmental, social, economic, and other necessary data and knowledge, describing the existing and predicted future conditions, uses, and characteristics of the ocean, coastal, or Great Lakes areas covered in the CMS Plan. The regional assessment would include: relevant biological, chemical, ecological, physical, cultural, and historical characteristics of the planning area; ecologically important or sensitive species/habitats/ecosystems; and areas of human activities. The assessment would also include an analysis of ecological condition or health and of cumulative risks as well as forecasts and models of cumulative impacts. The regional assessment would explain the information obtained and analyses conducted during the planning process and how they were used to help determine management decisions and plan alternatives.

- **Objectives, Strategies, Methods, and Mechanisms for CMSP:** This section would describe the regional objectives and proposed strategies, methods, and mechanisms for CMSP for the region. It would provide the analysis, evaluation of options, and the basis for the conclusions made in the CMS Plan. It would describe the spatial determinations for conservation and uses, at the appropriate scale, and include any necessary visual representations. The CMS Plan would describe the strategies, methods, and mechanisms for integrated or coordinated decision-making, including addressing use conflicts. The CMS Plan would further describe the continuing processes by which implementation would proceed, including mechanisms to ensure that individual partner and collaborative decision-making are reviewed for consistency with plan priorities and objectives. The CMS Plan would describe continued opportunities for stakeholder and public engagement. It would provide the flexibility needed to accommodate activities and operations in preparation for and response to disasters, emergencies, and similar incidents. The CMS Plan would also consider a regional process for requesting variances and amendments.

- **Compliance Mechanisms:** The CMS Plan would specify mechanisms to enhance coordination and cooperation among decision-makers and promote consistency in each agency's interpretation and application of its respective existing laws and regulations used for implementation and enforcement of CMS Plans.

- **Monitoring and Evaluation Mechanisms:** The CMS Plan would specify the monitoring and evaluation mechanisms, including a reporting mechanism, to be employed to assess the effectiveness of the CMS Plan and identify where and when changes need to be considered. As part of monitoring and evaluation, regional planning bodies would define a clear set of regional performance measures to be used to assess whether or not the region is meeting national and regional objectives and goals.

Additionally, regional planning bodies would participate in the periodic execution of regional ecosystem assessments to evaluate impacts of management actions from economic, ecological, and social perspectives in order to inform the CMS Plan. Monitoring and evaluation will follow from and build upon the original regional assessment, consistent with national guidance provided by the NOC.

- **Incorporation of the Dispute Resolution Process:** The CMS Plan would incorporate the dispute resolution process, as described in Section X of this Part.

XI. The Nature of the Planning Process and National Ocean Council-Certified Coastal and Marine Spatial Plans

CMSP is intended to provide Federal, State, tribal, and regional bodies, stakeholders, and the public with a meaningful forum within which to develop a plan to better manage multiple sustainable uses, resolve conflicts, and support ecosystem-based management of the ocean, coasts, and Great Lakes in accordance with shared goals, guiding principles, and applicable legal authorities. In this way, regional objectives and national objectives, goals, and guiding principles can be considered in a single, comprehensive, and integrated process. In order to be successful, the outcome of CMSP would have to result in meaningful improvements in the way that Federal, State, tribal, local, and regional bodies, stakeholders, and the public participate in the use and conservation of these areas.

While the goal of this framework is to move toward comprehensive, integrated, flexible, proactive, ecosystem-based CMSP, this would not happen instantaneously. CMSP must be initiated and developed thoughtfully, allowing for time to address the myriad complexities and challenges that would undoubtedly arise as the process moves forward. Moreover, while this framework identifies some of the incentives and benefits for a coordinated Federal, State, tribal, and regional effort and envisions a fully coordinated planning process, there would be substantial flexibility to determine how best to develop and implement CMSP for each particular region. In the event that a particular State or tribe opts not to participate in the development or implementation of a CMS Plan, the development or implementation of the CMS Plan would continue. While this is not optimal because it would not result in a fully integrated CMS Plan, the benefits of coordinated planning among the participating partners warrant its completion.

Development and implementation of CMS Plans would be an iterative process leading to a comprehensive, multi-objective, multi-sectoral plan within the first five years. Since each region may have different drivers and capabilities for CMSP, regions may choose to prioritize initial development and implementation steps. While CMSP should help resolve many use conflicts, it is not realistic to expect that all such conflicts would be resolved. Further, partners might agree not to resolve certain issues in a CMS Plan at a particular time, but rather to acknowledge these issues and indicate how the parties would continue to work on them as part of the iterative CMSP process. Such issues may be resolved as data gaps are filled, new information is developed, or as State or Federal legal authorities are enacted, changed, or updated.

To ensure that CMSP is effective and has a positive overall impact, each partner participating in CMSP would need to commit in good faith to: (1) a cooperative, open, and transparent CMSP process leading to the development and implementation of CMS Plans, acknowledging that each partner may have different authorities and non-discretionary mission objectives that must be fully addressed; (2) ensure that consideration of the National Policy, national CMSP goals, objectives, and principles, and regional CMSP objectives are incorporated into the decision-making process of all the partners consistent with existing statutory, regulatory, and other authorities, and the critical needs of emergency response, and homeland and national security activities; and (3) dispute resolution processes that enable concerns and issues not resolved through the cooperative planning process to be resolved quickly, rationally, and fairly.

Signing onto the CMS Plan would be an express commitment by the partners to act in accordance with the CMS Plan, within the limits of applicable statutory, regulatory, and other authorities, and respecting critical emergency response and homeland and national security needs. Thus, State and Federal regulatory authorities would adhere to, for example, the processes for improved and more efficient permitting, environmental reviews, and other decision-making identified in the CMS Plan to the extent these actions do not conflict with existing legal obligations. State and Federal authorities with programs relevant to the CMS Plan would in a timely manner review and modify programs, as appropriate, to ensure their respective activities, including discretionary spending (e.g., grants and cooperative agreements), adhere to the CMS Plan to the extent possible. State and Federal agencies

would also be expected to formally incorporate relevant components of the CMS Plan into their ongoing operations or activities consistent with existing law. This may be implemented in a variety of ways. For example, agencies could enter into memoranda of understanding (MOUs) to coordinate or unify permit reviews and decision-making processes. Where existing regulatory or statutory requirements impose constraints on the ability of an agency to fully implement the CMS Plan, the agency would seek, as appropriate, regulatory or legislative changes to fully implement the CMS Plan.

Relationship of CMSP to Existing Authorities

CMSP under this framework would not vest the NOC or regional planning bodies with new or independent legal authority to supersede existing Federal, State, or tribal authorities. Rather, the NOC would facilitate the development of CMSP and provide national context and guidance within which bottom-up, flexible, regionally-based CMS Plans would be developed and implemented. Regional planning bodies would function as convening and planning bodies that comprise Federal, State, and tribal representatives responsible for implementing existing authorities to create a process, and ultimately a plan, to better apply such existing authorities to achieve agreed upon regional goals and objectives.

In and of themselves, CMS Plans, would not be regulatory or necessarily constitute final agency decision-making. However, they are intended to guide agency decision-making and agencies would adhere to the final CMS Plans to the extent possible, consistent with existing authorities, as described in Section XIV of this Part. Adherence to and implementation of the CMS Plan would be the result of a multi-year planning process by which regional planning body members would openly discuss their respective legal authorities, requirements, and processes and how they can be better applied in the CMSP context. Once a CMS Plan is approved, Federal, State, and tribal authorities would implement them through their respective legal authorities. Thus, for example, State permitting decisions remain within the purview and are the responsibility of the relevant State agency, not the NOC, regional planning body, or any of its other members. Also, as described earlier, disputes regarding a specific agency's decisions pursuant to its statutory authority would be addressed through the various procedures and mechanisms available under that authority or other relevant authorities (e.g., Administrative Procedure Act).

One example of the potential relationship between CMSP and existing authorities is the application of CZMA Federal consistency. Since there will be multiple Federal agencies and States involved in any one CMS Plan, the Federal agencies would need to determine how CZMA review would occur as

Federal agencies adopt the plan. For example, if a State works with the Federal agencies to develop a CMS Plan, the CMS Plan could include measures to ensure that it is consistent to the maximum extent practicable with the enforceable policies of a State's CZMA program. The relevant State could consider potential changes to the State's enforceable policies to achieve agreed upon regional CMSP objectives. Also, a CMS Plan might include CZMA Federal consistency administrative efficiencies so that CZMA review would not be needed for some activities. Finally, if a State incorporates a CMS Plan into its federally approved CZMA program, then it is likely that the CMS Plan would not need a CZMA Federal consistency review.

Relationship of CMSP to Existing Regional Entities

As mentioned above, the regional planning bodies would build upon the efforts of the existing regional governance structures. The regional planning bodies in conjunction with the NOC and the GCC would establish formal mechanisms or consultative processes to engage entities with statutorily-mandated or quasi-regulatory bodies that have an express role in the management and regulation of ocean, coastal, and Great Lakes resources. Specifically, as discussed earlier in Section X, a formal mechanism for consultation with the RFMCs would be incorporated into the CMSP process. In addition, regional planning bodies would coordinate with other existing regional entities and bodies such as Harbor Safety Committees, Regional Aquatic Nuisance Species Panels, and Area Maritime Security Committees, as appropriate.

Relationship of CMSP to Existing Plans and Projects

CMSP is not meant to delay or halt existing or pending plans and projects related to marine and Great Lakes environments or their uses. However, those responsible for making decisions on such plans and projects would be expected to take into account the national CMSP goals and principles, national policies, and any identified national and regional CMSP objectives in future decision-making to the extent possible under existing law. Once a CMS Plan is put into effect following NOC certification, its implementation would be phased in to avoid undue disruption or delay of projects with pending permits or other applications. The NOC would provide additional guidance on how best to accomplish this phased-in approach.

XII National Consistency

Certification by the NOC for National Consistency

The NOC would review each regional CMS Plan to ensure it is consistent with the National Policy, CMSP goals and principles as provided in this framework, any national objectives, performance measures, or guidance the NOC has articulated, and any other relevant national priorities. The NOC's review would ensure that the CMS Plans include all the essential elements described in this framework. The NOC would also consider the CMS Plan's compatibility with an adjacent region's CMS plan regarding issues that cross regional boundaries. Certification by the NOC would not occur until after release of the final CMS Plan for 30 days of public notice. The NOC would review and make a

decision on certification within six months of receipt of the CMS Plan. If a regional CMS Plan does not meet certification requirements, the NOC would work with the regional planning body to address issues with the CMS Plan and could allow for approval of those parts of a CMS Plan that do meet such requirements. Upon certification by the NOC, a decision document adopting the CMS Plan would be co-signed by senior State officials (e.g., Governors), tribal representatives, as appropriate, and senior officials of the Federal agencies represented on the regional planning body. Upon signature by the partners, the CMS Plan would be considered "in effect" and implementation would begin.[12]

National CMSP Objectives, Performance Measures, and Guidance

The NOC would establish national objectives, national outcome-based performance measures, and guidance to promote national consistency in the development and implementation of CMS Plans. Because the intent of CMSP is integration across sectors, the NOC would develop a range of national objectives. These may include: economic, conservation, security, and social objectives. The NOC would also develop national performance measures to evaluate, monitor, and report on progress towards implementing national CMSP objectives. As specified in the *Essential Elements of the CMSP Process* and the *Essential Elements of the Plan*, regional planning bodies would develop region-specific objectives and associated performance measures, as part of the regional CMSP process. Regional performance measures developed by the regional planning bodies would be used to track improvements towards stated CMS Plan objectives. These regional measures and objectives would be consistent with the nationally established objectives and measures.

Regional and national performance measures should directly relate to the stated national and regional objectives established in the CMSP process. Performance measures would assess both conservation and socio-economic objectives of the CMS Plan. Measures of conservation may include, but are not limited to, indicators of ecosystem health such as the status of native species diversity and abundance, habitat diversity and connectivity, and key species (*i.e.,* species known to drive the structure and function of ecosystems). In addition, socio-economic measures would be developed and may include, but are not limited to: the economic value or productivity of certain economic sectors, such as commercial and recreational fisheries, aquaculture, and offshore energy; the number of recreation days; and the time

[12] If the NOC does not certify a plan, it would provide to the regional planning body the specific reasons for its decision. The regional planning body would then have continued opportunity to address the NOC's reasons and resubmit the plan.

required for permit applications to complete the regulatory process. Performance measures would provide a means of demonstrating results of and provide accountability for the CMSP process to stakeholders, the general public, and decision-makers.

The NOC would develop guidance in conjunction with the regional planning bodies for regional objectives and concomitant performance measures to ensure that they are cost-effective, measurable, interpretable, grounded in theory, responsive, and specific. The NOC would develop consistent guidance for these ecological and socio-economic approaches and tools to assist regional planning bodies in these efforts in order to provide for nationally applicable common scales of assessment. This will ensure that regional planning bodies are given the independence and flexibility to develop regionally meaningful objectives and measures, but also assure that regional measures and reporting are consistent with a national CMSP performance system.

XIII. Consistency with International Law

CMS Plans would be implemented in accordance with customary international law, including as reflected in the Law of the Sea Convention, and with treaties and other international agreements to which the United States is a party. Seaward of the baseline, development and implementation of CMS Plans are to be consistent with the extent to which the United States exercises its rights and jurisdiction and performs duties in its territorial sea, EEZ, and Continental Shelf. CMS Plans would not change the rights, duties, and jurisdiction of the United States under international law, including with respect to navigational rights and freedoms. Nothing in this document or in CMS Plans developed pursuant to it would create private rights of action or other enforceable individual legal rights regarding the meaning and applicability of international law.

XIV. Adherence to and Compliance with National Ocean Council-Certified Coastal and Marine Spatial Plans

Signatories and all NOC member agencies would adhere to a NOC-certified CMS Plan, within the limits of their existing statutory and regulatory authorities. If a signatory intends to take an action that does not substantially adhere to a certified CMS Plan, it would need to provide advance notice to the regional planning body and the NOC, including justification (e.g., new statutory requirement) for the non-adherence. The CMS Plan signatories and the NOC would periodically evaluate the reasons requiring deviation from a NOC-certified CMS Plan, and, as appropriate, develop recommendations for minimizing these deviations in the future, including CMS Plan modification or underlying regulatory or statutory changes. Disputes regarding agency interpretation of a CMS Plan would be resolved according to the dispute resolution process developed by the NOC, as described above.

Agencies would incorporate components of the CMS Plan into their respective regulations to the extent possible. Adherence with CMSP would be achieved through Federal and State agencies and tribal authorities incorporating CMS Plans into their pre-planning, planning, and permitting processes, to the extent consistent with existing laws and regulations. The CMS Plan signatories would periodically

review these processes, and where legal constraints are identified, would seek to remedy these constraints, including by working with the NOC to evaluate whether a legislative solution or changes to regulations are necessary and appropriate.

The effectiveness of the CMSP process depends, in-part, on the willingness and the ability of Federal, State, and tribal authorities to ensure that activities of third-parties are in compliance with relevant laws and regulations. The Nation would not achieve the benefits of comprehensive and integrated CMSP if there were inconsistent use or violation of the applicable laws and regulations. Successful enforcement, carried out by agencies exercising their individual enforcement authorities and responsibilities, must be based upon clear, concise, and easily understood requirements that reflect the practical realities of compliance and enforcement.

CMS Plans would provide a framework for improved coordination and cooperation among Federal, State, tribal, and local enforcement agencies as they work together to enforce existing regulations in accordance with their respective authorities in support of regional goals that often extend beyond individual agency jurisdictions. To the extent permitted by existing laws and regulations, this cooperative regional approach should build productive partnerships that encourage sharing of information and best practices, help foster mutually agreed upon enforcement priorities and strategies, and make more effective use of scarce enforcement resources by focusing those resources on the highest regional enforcement priorities. A cooperative enforcement approach for Federal, State, and tribal CMSP-related laws could also facilitate more consistent interpretation and application of regulations across agencies and jurisdictions, resulting in greater certainty and understanding for ocean, coastal, and Great Lakes users, which in turn could foster improved compliance and overall effectiveness. The NOC and CMS Plan signatories would periodically review enforcement effectiveness and seek to remedy any conflicts or gaps in existing Federal-State-tribal coordinated enforcement mechanisms.

XV. Scientific Knowledge and Data Integration, Research, Management, and Access

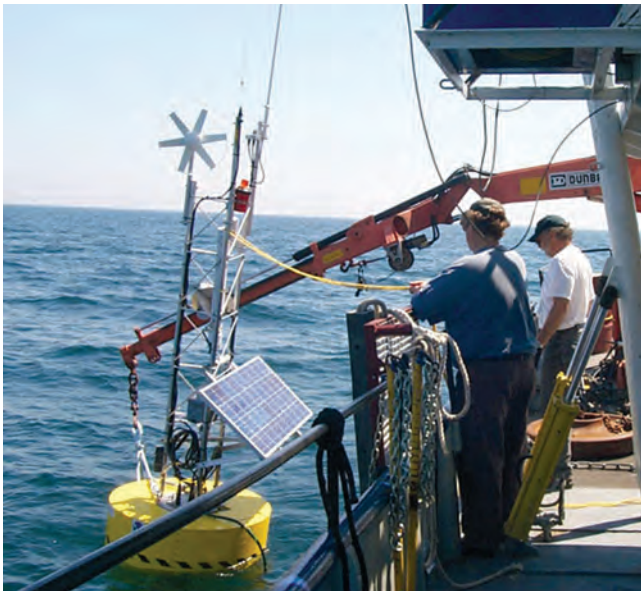
CMSP is fundamentally science-based and adaptive in response to new evidence, technology, and understanding. Essential to CMSP are scientific knowledge and data, collectively referred to here as *information*. Information is necessary to comprehensively, consistently, and continually investigate, assess, forecast, and analyze human uses, ecosystem conditions, management alternatives, information and data gaps, and CMS Plan effectiveness. Reflecting our long history of ocean science and exploration, the United States holds vast stores of natural and social science information about ocean, coastal, and Great Lakes ecosystems and their uses which can immediately be used to begin informing CMS Plan development. However, data and knowledge gaps, particularly regarding the complexities of these ecosystems, human use patterns, and the relationship between the two, indicate the need for continuing research to supplement existing information, especially in the context of changing environmental conditions and societal needs. Additional CMSP research will provide new information, including on specific and cumulative effects, ecosystems processes and resiliency, and the assessment and valuation of ecosystem services.

Relevant and credible information is critical for successful planning and, in turn, must be accessible to Federal, State, and local managers, tribes, academics, the private sector, and the public. A robust national information management system dedicated to coastal and marine scientific data and information products is required to meet the diverse data and application requirements of CMSP, and the varying technical capabilities of users. The NOC, working with the regional planning bodies, would create a system that is compatible with existing Federal information systems, captures relevant Federal information resources, has effective governance and accountability across agencies, and preserves data confidentiality, where appropriate. The NOC would leverage and build upon existing national data systems and initiatives (e.g., ocean observation), where appropriate. Within this construct, Federal agencies and the other regional partners would make relevant data, metadata, and derived products available and web accessible using recognized national and international standards and protocols to the extent permitted by law and regulation. In addition, State agencies, tribes, academia, the private sector, stakeholders, and other non-governmental sources would be encouraged to make their relevant information and knowledge, including local and traditional knowledge, available through this system. Exceptions would include sensitive but unclassified information that cannot be synthesized and modified into a format that is appropriate for broader distribution, pursuant to CMSP needs and information that is proprietary, statutorily confidential, or classified information.

Principles to Manage and Disseminate CMSP Information

- CMSP information is a national strategic asset and must be developed and managed on an ongoing basis to meet planning needs.
- CMSP information would be made available and accessible with nationally compliant "information about information" (i.e., metadata) to stakeholders.
- Federal agencies would improve metadata to make information easier to discover, retrieve, use, and manage.
- CMSP information that is collected, produced, or disseminated by Federal agencies, including information obtained from non-Federal sources, would meet government-wide information quality standards, and any other additional minimum standards adopted by the NOC.

To provide easy user access to agency CMSP-related information, a national information management system with either a central portal or regional portals that connect to CMSP information would be developed. The NOC would identify a Federal lead agency or collaborative entity to manage, implement, and update the CMSP portal(s) and components of the information management system. System interoperability, information exchange, and information and application technologies are intrinsically linked and would be developed and implemented together within the CMSP portal(s). To ensure national consistency, minimum data standards for CMSP information would be adopted and include standards for information quality. All information management and provision activities would be developed and updated with participation from existing and appropriate Federal data centers and initiatives. The NOC would ensure that the information is publicly available and easy-to-access



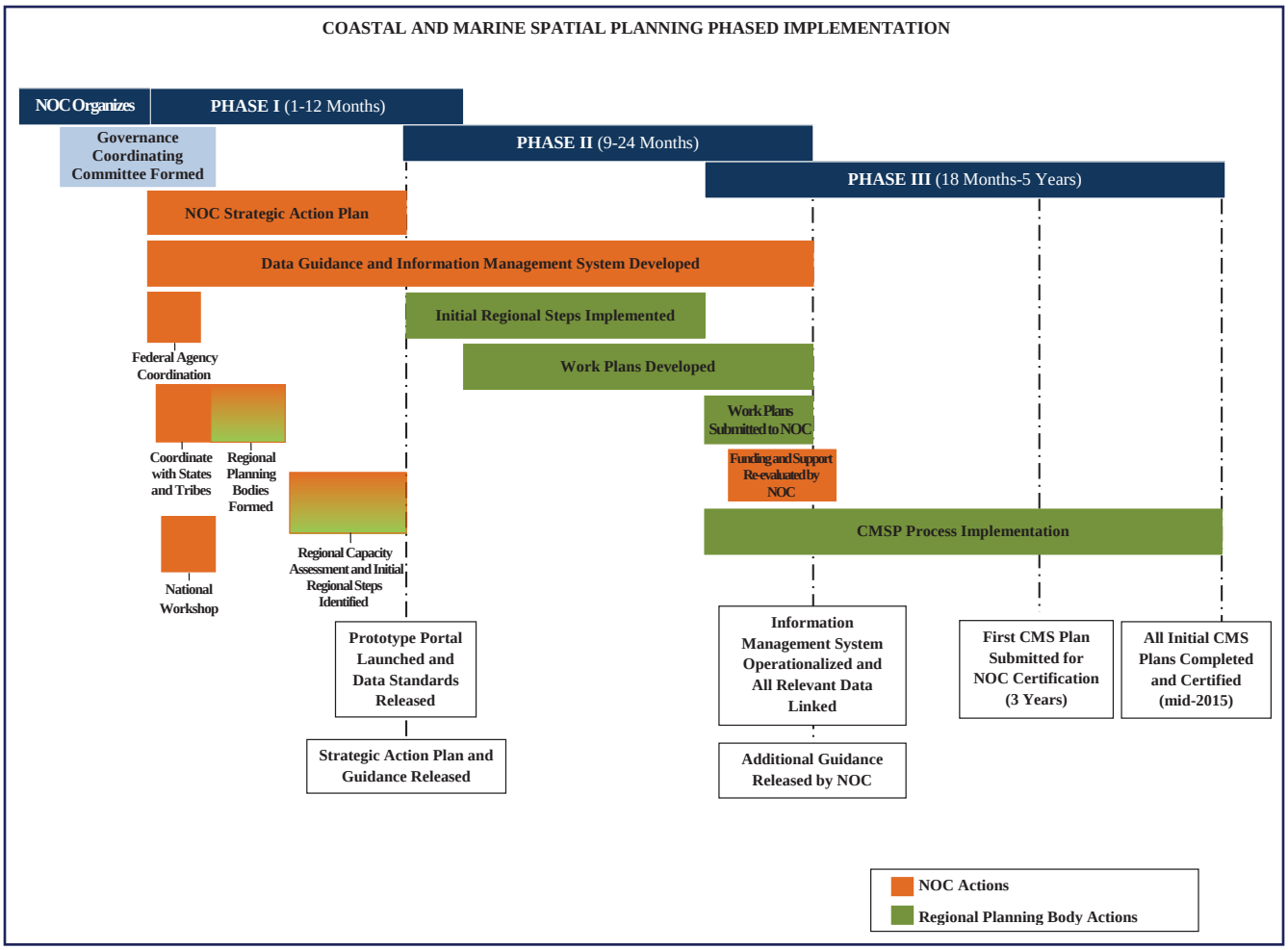
through computer readable files and web service formats that support a variety of CMSP and user needs. This could include web browsers, geospatial web services, and other web-based collaborative resources. The CMSP portal would leverage emerging web technologies, including private sector partnerships, to increase transparency and promote public engagement.

In order to build upon the existing CMSP scientific foundation, the NOC would establish mechanisms to identify and address priority CMSP science needs. This would include identification of priority CMSP research, data acquisition and information synthesis gaps, and new tools that would be required to apply science more effectively in the CMSP process. Identification of data, information, and research needs would be conducted on a regular basis as part of the adaptive and iterative process to improve the development and application of CMSP over time.

Additionally, nationally consistent, derived data products, ranging from consistent habitat maps as data layers to specialized decision-support tools, would be developed to provide a consistent framework for regional assessments and alternative future spatial management scenarios. The NOC may provide further guidance for using such information in decision-making, for example, how to decide which areas are of particular ecological importance or value. Designed or adapted specifically for CMSP, these science-based decision-support tools, including models, assessments, and visualization capabilities,

would enable the regional planning bodies to synthesize information most relevant to CMSP decisions in ways that produce robust comprehensive CMS Plans. These tools would offer a shared knowledge base for meaningful stakeholder engagement, objective assessment of alternative and future scenarios, identification of the types of uses that are consistent with societal objectives, and regular evaluation of CMS Plans. They would be developed and made accessible in a way that regional and State efforts could build upon or add regional specific data and information to leverage these efforts and analyze the regionally-specific aspects of their planning within the broader national framework.

XVI. Implementation



Implementation of this framework would occur in multiple phases through the NOC and among the regions. As a first step, the NOC would undertake initial actions to develop and build a foundation for the national CMSP efforts. Concurrently, the NOC would directly engage States and tribes to discuss cooperative strategies to move forward with CMSP. Recognizing the extensive scope of the task of developing and implementing CMSP, it is important for Federal, State, tribal, and other partners to prioritize efforts in this initial implementation period. Each of the regions could have different priorities and be at varying stages in the development of the data, analyses, and the relevant issues for

policy-makers. With these differences in mind, the phased approach outlined below would enable the NOC and the regions sufficient time to develop capacity, build on existing efforts, and leverage and gain efficiencies from lessons learned. In order to best achieve the completion of CMS Plans in all regions by 2015, the NOC would have the flexibility to make minor adjustments or modifications to this implementation schedule.

Phase I (1-12 months)

Many of the actions the NOC and State, tribal, and regional representatives commence in Phase I would serve as the foundation to implement CMSP on a national scale.

Develop NOC Internal Organization and Begin Strategic Action Plan (Months 1-9)

In the first month of Phase I, building on the initial establishment and organization period of the NOC, the NOC would determine how best to incorporate CMSP into the NOC governance structure (e.g., establish a CMSP Interagency Policy Sub-Committee), decide on the roles of individual agencies in implementing specific elements of the CMSP framework, including identification of a lead Federal agency for each regional planning body that would serve with non-Federal co-lead(s), and assess resource needs including personnel, financial, and technical CMSP support.

The NOC would then begin development of a strategic action plan to address specific areas that require additional consideration, analysis, and elaboration. The strategic action plan would be released in six to nine months and include: national objectives; national performance measures; guidance regarding the development of a national information management system, including identification of additional CMSP information and research needs; legal analysis and recommendations for legislative changes, if necessary; description of a dispute resolution mechanism, as described previously; and any additional guidance the NOC deems appropriate for CMSP. The NOC would also further assess the relationship between RFMCs and regional planning bodies and determine the most effective mechanism for engagement in the CMSP process, including whether representation on the regional planning bodies is the best method for such engagement. The NOC would ensure opportunity for the GCC, existing regional governance organizations, and public participation as it develops the strategic action plan for coastal and marine spatial planning. The NOC, in cooperation with the GCC, would provide for a mechanism for resolving disputes if they occur among the members of the regional planning bodies during the development of CMS Plans, as described in Section X of this Part.

Develop and Implement Public and Stakeholder Engagement

Early and meaningful steps to facilitate public and stakeholder outreach and education regarding CMSP and its implementation are vital to advance national CMSP efforts. As discussed above, the NOC would ensure substantial opportunity for public participation as it develops all nine strategic action plans, including the strategic action plan for coastal and marine spatial planning. Also, to better inform all participants and the public, the NOC would work with Federal agencies and the regional planning bodies, when established, to guide the drafting and production of educational materials, guidebooks,

manuals, and other materials. These materials would be developed keeping in mind that the content should reflect the issues, language, and methods that would be meaningful in a particular region. These materials would include a glossary of key CMSP terms in order to reduce potential misunderstandings that could result in an inconsistent or ineffective CMSP process. The NOC, in coordination with the regional planning bodies, when established, would hold additional informational workshops for stakeholders to discuss the CMSP process and potential ways stakeholder participation would take place. Additional stakeholder engagement would be conducted by the regional planning bodies throughout the CMSP process.

National Objectives and National Performance Measures

As part of the strategic action plan, the NOC would establish national objectives for CMSP consistent with, and in furtherance of, the National Policy, CMSP goals and principles, and other relevant national goals and priorities. These national objectives would serve as additional direction for the development of regional objectives and to help to maintain national and regional consistency of CMSP. Along with these objectives, national outcome-based performance measures would be established to help define success and measure results.

Guidance Regarding the Development of a National Information Management System

While overarching objectives and measures would help direct CMSP efforts, guidance on data, technology, and tools would also be developed. During the first six to nine months, initial actions to coordinate, integrate, and manage data would be necessary. The NOC would begin development of a national information management system and CMSP portal(s), adopt minimum data standards consistent with government-wide information quality standards, identify a Federal lead agency or entity to manage, implement, and update the CMSP portal(s), identify and begin development of any new standard tools or models needed for CMSP in all regions, and identify additional CMSP information and research needs. At the end of nine months, guidance on these fundamentals would be released as part of the strategic action plan and a prototype CMSP portal(s) would be operational. However, building the information management system and linking the relevant data may take up to two years and would be ongoing as new information becomes available.

Legal Analysis and Recommendations of Legislative Changes, if Necessary

Also, as part of the strategic action plan, the NOC would oversee efforts to identify gaps and conflicts in Federal authorities and recommend potential steps to reconcile them. This effort would examine how various statutory authorities of particular agencies can be harmonized in order to support comprehensive, integrated CMSP. Further, the NOC would consider how legal authorities of Federal, State, tribal, and local entities might collectively be used to support implementation of regional CMSP efforts. In doing so, the NOC should identify objective priorities and existing grant or other assistance programs that can support CMSP, consistent with relevant authorities.

Convene and Organize Federal Agency Representatives in the Regions (Months 1-2)

National and regional Federal agency representatives would convene to discuss current and improved methods for communicating, sharing data and products, exploring regulatory efficiencies, and determining how best to work with State and tribal partners to achieve a CMS Plan. Due diligence is necessary on the part of the Federal community to self organize and coordinate among agencies before engaging State and tribal partners to ensure that a service is being provided in a way that meets considerations unique to each region.

Develop Model Agreement (Months 1-3)

During the first three months of Phase I, the NOC would create and make available a model development agreement to be used by the regional planning bodies. This model would be used to foster efficiency and consistency in forming the regional planning bodies. As described in Section X of this Part, the development agreement would be an express commitment to work cooperatively to engage in CMSP and develop eventual CMS Plans, identify the lead representatives for each of the partners, and define ground rules, roles, and responsibilities of the partners.

Organize and Convene a National Workshop(s) and CMSP Simulation Exercise (Months 2-4)

Within the initial two to four months of Phase I, the NOC would also organize and convene, with input from the GCC, one or more workshops and a CMSP process simulation exercise for potential regional planning body representatives. The workshop(s) would be a forum to directly engage Federal, State, and tribal representatives, to give an overview of CMSP and the national framework, to demonstrate and test how this framework would work in a planning exercise, and to discuss collaborative strategies to move forward. The NOC would identify lessons learned and additional operational issues that were brought to light from the workshop(s) and exercise within two months of workshop completion.

Determine Composition of and Establish Regional Planning Bodies (Months 4-6)

After the workshop and exercise are held, the NOC, with advice from the GCC, would determine the additional types of representation needed for the composition of the regional planning bodies. Once the composition of the regional planning bodies is determined, the NOC would coordinate with the appropriate State authorities (e.g., Governors) and tribal representatives to establish regional planning bodies for each of the nine regions, identify specific members, and enter into a development agreement.

Capacity Assessment and Identification of Initial Regional Steps (Months 6-12)

During the latter six to twelve months of Phase I, the regional planning bodies would conduct a regional CMSP capacity assessment. The assessment would evaluate capabilities, expertise, and resources in each region available to develop and implement CMSP. In addition, the assessment would help to identify and prioritize initial regional steps described below in Phase II. The NOC, in coordination with the regional planning bodies, would make a determination on how best to meet the needs identified in the capacity assessment and to support the initial regional steps through existing mechanisms, and possibly new resources and/or funding mechanisms.

Develop Stakeholder and Scientific Participation Process (Months 6-18)

During Phase I, each regional planning body would begin to identify key stakeholders, scientific and technical experts, non-governmental organizations, and other partners to engage in the CMSP process. A formal mechanism for regular stakeholder, scientific, and technical input would be established and incorporated into the process. Additionally, regional planning bodies, in conjunction with the NOC, would establish procedures and methods to ensure transparency, participation, and collaboration in the planning process, such as public meetings, document availability, and timely public notification.

Phase II (9-24 months)

Building on Phase I's initial foundational steps of CMSP implementation, Phase II focuses on building capacity and testing specific issues or elements of the process.

Initial Regional Steps (Months 9-18) and Work Plan Development (Months 12-24)

During Phase II, the NOC would enable the regions to focus during the initial work plan development period on those issues that are of highest regional priority. In this way, these early steps in each region can serve as a test for the other regions for specific issues. For example, a region may select to begin CMSP efforts by organizing, gathering, and analyzing data, whereas another region may select to focus on developing regional CMS Plan objectives. The focus for each region's initial steps should be agreed upon after the capacity assessment is completed at the end of Phase I. After the initial regional steps are underway, the regional planning bodies would begin development of a full CMSP work plan, as detailed in Section X of this Part. In development of its work plan, each regional planning body should integrate the lessons learned from its and other regions' initial steps and also consider how to best integrate relevant ongoing regional planning initiatives.

Work Plan Submittal and Planning Process Preparation (Months 18-24)

Once initial regional steps are completed or in tandem with their completion, the regional planning bodies would submit to the NOC a package consisting of the proposed work plan. Once the work plan is submitted, the NOC would re-evaluate how best to support the regional CMSP effort through existing mechanisms, and possibly new resources or funding mechanisms to build on the lessons learned from the initial regional CMSP steps. For example, support might involve individual agencies

contributing staff or technical expertise to efforts coordinated through the NOC, or identifying existing grant programs to help support CMSP and achieve mutually agreed upon outcomes.

Phase III (18 months to 5 years)

While continuing to advance the actions and steps of Phases I and II, regional planning bodies would build out and scale up their efforts to establish a comprehensive CMSP process during Phase III to develop, multi-objective, multi-sectoral CMS Plans in all regions.

Develop and Carry Out CMSP Process and Provide Feedback from Initial Regional Steps (Months 18 and beyond)

After the initial regional steps are undertaken by each region, the regional planning bodies would transition into Phase III, developing and carrying out a CMSP process using the initial regional steps and the work of the NOC as a foundation. There is recognition that some regions' planning processes might be longer or more complicated than others. The timeframes for completion of the CMSP process are intended to be flexible to account for differing levels of resources, capacity, and other factors. During this process, regional planning bodies, in coordination with the NOC, would develop a mechanism for providing feedback and status reports to the NOC and appropriate State and tribal leadership to share lessons learned, best practices, and ensure routine and frequent communication nationally and among the regions. The regional planning bodies, in coordination with the NOC, would also ensure consistency, address questions and concerns, and adaptively manage the effort as appropriate. Although there would be flexibility in the framework to allow for variable CMSP process timeframes, regional planning bodies are encouraged to have final CMS Plans completed in three years and all regions would be expected to have final CMS Plans certified and implementation started by mid-2015. These final CMS Plans are intended to be iterative and are expected to be modified through the adaptive process beyond 2015.

XVII. Priorities for Financial and Other Support

Recognizing the reality of the limited availability of new resources, each of the Federal agencies engaged in this bold mission of developing and implementing CMSP would re-evaluate how resources are allocated in light of their statutory and regulatory mandates. Agencies would use the implementing actions of the President to recommend adjustments to their respective agency priorities to better align with the approved National Policy and CMSP goals. As CMSP is developed and implemented over time, the NOC would consider any additional resource needs through the budget prioritization process described earlier. Various Federal agencies would have differing roles to support the scientific basis and governance structures necessary to develop and implement CMSP. The following four areas should receive initial priority consideration for financial and other support for CMSP.

1. National Workshop(s) and Simulation Exercise

Priority: Hold a national workshop(s) and simulation exercise.

Rationale: The first step towards a constructive process for CMSP would be for the participants to engage in a forum that creates a common vision for implementing CMSP, to identify challenges and solutions for regional CMSP development, and to enhance the capacity of regions to implement CMSP. This priority also would include support to ensure widespread involvement of Federal, State, and tribal representatives.

2. Initial Support for Regional CMSP Processes

Priority: Support the development of regional CMSP, including the capacity for regional planning bodies and the NOC to carry out initial CMSP activities.

Rationale: A comprehensive and inclusive approach for regional CMSP planning processes would be based on each region engaging Federal, State, and tribal representatives to form the regional planning bodies. An effective process to sustain initial CMSP activities would necessitate regional planning bodies to organize and establish the necessary CMSP coordination (e.g., partnerships, interagency teams, and technical support staffing). To attain national and regional objectives, regional planning bodies would assess capacities, target resources, and begin implementing initial regional steps (e.g., stakeholder engagement, information acquisition, and CMS Plan development). This priority would also include support for the NOC to establish and carry out the necessary national CMSP steps (e.g., national objectives, national guidance, and building regional capacities), as described in Section XVI of this Part.

3. National Data and Information Management System, Prototype CMSP Portal(s) and Initial Development of Science and Information Needs

Priority: Improve and integrate the information (i.e., data and knowledge) used to inform CMSP; and identify additional scientific research to support CMSP information needs.

Rationale: Effective CMSP would utilize the best available data and objective analyses. Such information would be nationally consistent, publicly available, and easily accessible to promote public engagement and allow for a consistent framework for regional implementation. Priority would be given to developing the national information management system and a prototype CMSP data portal(s). Subsequent efforts would identify and fill key national information needs,[13] and develop CMSP decision-support tools and derived data products, including visualization tools, forecasting, and routine integrated ecosystem assessments. Additionally, scientific understanding is central to make informed CMSP decisions that reflect an integrated and transparent planning framework. To achieve this end would require a robust research foundation.

[13] Identification and filling information gaps, as previously presented in the framework, is an ongoing and iterative process. This framework recognizes that the acquisition of data and knowledge would proceed in tandem with developing CMS Plans using sound science and the best available information.

4. Public Outreach and Stakeholder Engagement

Priority: Build the knowledge, skills, and understanding of CMSP through regional planning bodies and stakeholder workshops, blogs, webinars, and other outreach methods.

Rationale: An informed and engaged public and stakeholder community is critical to the effective implementation of the CMS Plans. Effective CMSP is predicated on the building of knowledge, skills, and understanding of CMSP through a range of robust outreach approaches.

PART FIVE. CONCLUSION

In response to President Obama's June 12, 2009 memorandum, and after careful consideration of thousands of valuable comments from political leaders, public and private organizations, and citizens, the Task Force is pleased to submit these final recommendations for a comprehensive national ocean policy, an improved governance structure, a targeted implementation strategy, and a framework for effective coastal and marine spatial planning. Once implemented, these final recommendations will provide the first-ever comprehensive national policy of the United States to improve stewardship of the ocean, our coasts, and the Great Lakes.

The Task Force is unanimous in its call for the Nation to set a new course for improved stewardship of the ocean, our coasts, and the Great Lakes. This must include a comprehensive, integrated, transparent, science-based, and ecosystem-based planning process to achieve the sustainable uses of the ocean, our coasts and the Great Lakes. The Task Force is mindful that these recommendations may create a level of uncertainty and anxiety among those who rely on these resources and may generate questions about how they align with existing processes, authorities, and budget challenges. The NOC will address questions and specifics as implementation progresses. Meaningful and frequent opportunities for stakeholder and public engagement throughout the implementation of the National Policy and implementation of coastal and marine spatial planning will be an essential component of cooperatively addressing these uncertainties head-on, and the Task Force recommendations embrace this approach. The Task Force is confident that the investments and improvements described in these final recommendations will advance the economic interests of the United States through sustainable and productive ocean uses; significantly improve our capacity to address the long-term challenges and impacts of climate and environmental changes; and provide a lasting foundation for further enhancing the many vital benefits our Nation can derive from these areas.

With a clear National Policy and a revitalized, empowered, unified, and comprehensive framework to coordinate efforts set forth in these recommendations, we can achieve an America whose stewardship ensures that the ocean, our coasts, and the Great Lakes are healthy and resilient, safe and productive, and understood and treasured so as to promote the well-being, prosperity, and security of present and future generations.

APPENDIX A.
PRESIDENTIAL MEMORANDUM ON A NATIONAL POLICY FOR THE OCEAN, OUR COASTS, AND THE GREAT LAKES

THE WHITE HOUSE

Office of the Press Secretary

For Immediate Release June 12, 2009

June 12, 2009

MEMORANDUM FOR THE HEADS OF EXECUTIVE DEPARTMENTS AND AGENCIES

SUBJECT: NATIONAL POLICY FOR THE OCEANS, OUR COASTS, AND THE GREAT LAKES

The oceans, our coasts, and the Great Lakes provide jobs, food, energy resources, ecological services, recreation, and tourism opportunities, and play critical roles in our Nation's transportation, economy, and trade, as well as the global mobility of our Armed Forces and the maintenance of international peace and security. We have a stewardship responsibility to maintain healthy, resilient, and sustainable oceans, coasts, and Great Lakes resources for the benefit of this and future generations.

Yet, the oceans, coasts, and Great Lakes are subject to substantial pressures and face significant environmental challenges. Challenges include water pollution and degraded coastal water quality caused by industrial and commercial activities both onshore and offshore, habitat loss, fishing impacts, invasive species, disease, rising sea levels, and ocean acidification. Oceans both influence and are affected by climate change. They not only affect climate processes but they are also under stress from the impacts of climate change. Renewable energy, shipping, and aquaculture are also expected to place growing demands on ocean and Great Lakes resources. These resources therefore require protection through the numerous Federal, State, and local authorities with responsibility and jurisdiction over the oceans, coasts, and Great Lakes.

To succeed in protecting the oceans, coasts, and Great Lakes, the United States needs to act within a unifying framework under a clear national policy, including a comprehensive, ecosystem-based framework for the longterm conservation and use of our resources.

In order to better meet our Nation's stewardship responsibilities for the oceans, coasts, and Great Lakes, there is established an Interagency Ocean Policy Task Force (Task Force), to be led by the Chair of the Council on Environmental Quality. The Task Force shall be composed of senior policy-level officials from the executive departments, agencies, and offices represented on the Committee on Ocean Policy established by section 3 of Executive Order 13366 of December 17, 2004. This Task Force is not meant to duplicate that structure, but rather is intended to be a temporary entity with the following responsibilities:

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1. Within 90 days from the date of this memorandum, the Task Force shall develop recommendations that include:

a. A national policy that ensures the protection, maintenance, and restoration of the health of ocean, coastal, and Great Lakes ecosystems and resources, enhances the sustainability of ocean and coastal economies, preserves our maritime heritage, provides for adaptive management to enhance our understanding of and capacity to respond to climate change, and is coordinated with our national security and foreign policy interests. The recommendations should prioritize upholding our stewardship responsibilities and ensuring accountability for all of our actions affecting ocean, coastal, and Great Lakes resources, and be consistent with international law, including customary international law as reflected in the 1982 United Nations Convention on the Law of the Sea.

b. A United States framework for policy coordination of efforts to improve stewardship of the oceans, our coasts, and the Great Lakes. The Task Force should review the Federal Government's existing policy coordination framework to ensure integration and collaboration across jurisdictional lines in meeting the objectives of a national policy for the oceans, our coasts, and the Great Lakes. This will include coordination with the work of the National Security Council and Homeland Security Council as they formulate and coordinate policy involving national and homeland security, including maritime security. The framework should also address specific recommendations to improve coordination and collaboration among Federal, State, tribal, and local authorities, including regional governance structures.

c. An implementation strategy that identifies and prioritizes a set of objectives the United States should pursue to meet the objectives of a national policy for the oceans, our coasts, and the Great Lakes.

2. Within 180 days from the date of this memorandum, the Task Force shall develop, with appropriate public input, a recommended framework for effective coastal and marine spatial planning. This framework should be a comprehensive, integrated, ecosystem-based approach that addresses conservation, economic activity, user conflict, and sustainable use of ocean, coastal, and Great Lakes resources consistent with international law, including customary international law as reflected in the 1982 United Nations Convention on the Law of the Sea.

3. The Task Force shall terminate upon the completion of its duties.

The Task Force's recommendations and frameworks should be cost effective and improve coordination across Federal agencies.

This memorandum covers matters involving the oceans, the Great Lakes, the coasts of the United States (including its

more

territories and possessions), and related seabed, subsoil, and living and non-living resources.

This memorandum is not intended to, and does not, create any right or benefit, substantive or procedural, enforceable at law or in equity by any party against the United States, its departments, agencies, or entities, its officers, employees, or agents, or any other person. Nothing in this memorandum shall be construed to impair or otherwise affect the functions of the Director of the Office of Management and Budget relating to budgetary, administrative, regulatory, and legislative proposals.

The Chair of the Council on Environmental Quality is hereby authorized and directed to publish this memorandum in the *Federal Register*.

BARACK OBAMA

# # #

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APPENDIX B. INTERAGENCY OCEAN POLICY TASK FORCE MEMBERSHIP LIST

Task Force Chair
White House Council on Environmental Quality
Nancy Sutley
Chair

Department of Agriculture
Robert Bonnie
Senior Advisor to the Secretary

Department of Commerce
Dr. Jane Lubchenco
Undersecretary for Oceans and Atmosphere
NOAA Administrator

Department of Defense
Vice Admiral James Houck
Judge Advocate General of the Navy

Environmental Protection Agency
Peter Silva
Assistant Administrator for Water

Department of Energy
David Sandalow
Assistant Secretary for Policy and International Affairs

Federal Energy Regulatory Commission
John Katz
Deputy Associate General Counsel

Department of Health and Human Services
Dora Hughes
Counselor for Science & Public Health

Department of Homeland Security
Admiral Thad Allen
Commandant, U.S. Coast Guard

Department of the Interior
Laura Davis
Associate Deputy Secretary

Office of the Joint Chiefs of Staff
Major General Darren McDew
Vice Director for Strategic Plans and Policy, Joint Staff

Department of Justice
John Cruden
Acting Assistant Attorney General, Environment and Natural Resources Division

Department of Labor
Megan Uzzell
Senior Advisor to the Secretary

National Aeronautics and Space Administration
Dr. Michael Freilich
Director of the Earth Science Division

National Security Council
Ed Fendley
Director for International Environmental Issues

National Science Foundation
Timothy Killeen
Assistant Director for the Geosciences

Department of the Navy
Robert Work
Under Secretary of the Navy

Department of State
David Balton
Deputy Assistant Secretary for Oceans and Fisheries

Department of Transportation
Katie Thomson
Counselor to the Secretary of Transportation

Office of the Vice President
Terrell McSweeney
Deputy Assistant to VP & Domestic Policy Advisor

White House Office of Energy and Climate Change
Jody Freeman
Counselor for Energy and Climate

White House Office of Information and Regulatory Affairs
Michael Fitzpatrick
Associate Administrator

White House Office of Management and Budget
Sally Ericsson
Associate Director for Natural Resource Programs

White House Office of Management and Budget
Xavier Briggs
Associate Director for General Government Programs

White House Office of Science and Technology Policy
Shere Abbott
Associate Director of Environment

APPENDIX C. PUBLIC ENGAGEMENT

Below is a description of the methods and summary results from the Task Force's public engagement process. In addition, included is a summary of key public comments and how they were addressed by the Task Force in the Final Recommendation.

I. Overview

The Task Force carried out a public engagement process throughout the 180-day period to receive input for consideration as it developed these recommendations. This builds on the comprehensive reports of the U.S. Commission on Ocean Policy and the Pew Oceans Commission, which were based on significant scientific, public, and stakeholder input. CEQ, on behalf of the Task Force, organized and hosted thirty-eight expert roundtables to hear from a broad range of stakeholders and interest groups. The roundtables included representatives from sectors including energy, conservation, recreational fishing, commercial fishing, transportation, agriculture, human health, State, tribal, and local governments, ports, recreational boating, business, and national and homeland security. Task Force representatives attended each roundtable. There was robust participation and the Task Force received many valuable comments and perspectives for its consideration during each session.

On behalf of the Task Force, CEQ also set up a website to accept public comments. The Task Force received approximately five thousand comments from a range of affected parties, including academia, citizens, commercial and recreational interests, non-governmental organizations, and States, tribes, and regional governance structures. Many of the groups commenting represented constituencies of hundreds or thousands of members.

Additionally, the Task Force hosted six regional public meetings with over two thousand public participants, in which Task Force members were available to answer questions and the public was able to voice their concerns and opinions. These meetings took place in the following regions: Alaska (held in Anchorage, Alaska, August 21, 2009); West Coast (held in San Francisco, California, September 17, 2009); East Coast (held in Providence, Rhode Island, September 24, 2009); Pacific Islands (held in Honolulu, Hawaii and via satellite link, September 29, 2009); Gulf Coast (held in New Orleans, Louisiana, and via interactive video link October 19, 2009); and Great Lakes (held in Cleveland, Ohio, October 29, 2009).

The public meetings, roundtables, and website showcased a strong desire and enthusiasm among participants for a national policy that provides clarity and direction regarding how the Nation will better care for the ocean, our coasts, and the Great Lakes. A valuable and wide diversity of interests were represented, and several key themes emerged. While not exhaustive, these include:

- Support for adopting ecosystem-based management as a guiding principle, acknowledging regional differences, and practicing adaptive management in light of concerns about competing uses and growth of industrial uses;

- Support for embracing science-based decision-making and investing in ecosystem-based science, research, ocean observations, and mapping including comprehensive research on the linkages among ecosystem health, human health, economic opportunity, national and homeland security, social justice, and environmental change, including climate change;
- Desire for improved coordination and collaboration across Federal, State, tribal, and local governments, and regional governance structures, and for improved transparency and public participation, while avoiding new layers of bureaucracy and unnecessary costs;
- Support for improving both formal and informal education about the ocean, our coasts, and the Great Lakes;
- Support for ensuring that policies are adequately funded; and
- Support for joining the 1982 United Nations Convention on the Law of the Sea (the Law of the Sea Convention).

II. Summary of Public Comments on the Interim Report of the *Interagency Ocean Policy Task Force* and on the *Interim Framework for Effective Coastal and Marine Spatial Planning*

The Task Force reviewed the public comments received in response to the *Interim Report* and *Interim Framework* and determined whether substantive comments were adequately addressed, merited further consideration and resulting changes, or were more suited for further consideration by the National Ocean Council (NOC), if established, as it implements the National Policy, if adopted.

Comments on the Interim Report of the Interagency Ocean Policy Task Force

Substantive comments on the Interim Report ranged from general support for a national policy and improved Federal coordination, to concerns over the process, and concerns that the Interim Report did not adequately account for economic uses of the ocean, our coasts, and the Great Lakes, or specifically mention the benefits of certain types of activities. There also were comments on governance, and numerous specific comments on the nine priority objectives of the implementation strategy, and other specific recommendations (e.g., reauthorize certain laws). The following summarizes some of the key substantive comments received and how the Task Force addressed them:

1. Overall Tone and Balance

   Comments have suggested that the balance between conservation and ocean uses in the report was skewed too much toward stewardship, and failed to emphasize certain types of uses such as recreational fishing, aquaculture, or renewable energy. The Task Force determined that the overall tone and balance of the recommendations were consistent with the President's direction to recommend a stewardship policy for the ocean, our coasts, and the Great Lakes. Improved stewardship will support not only healthier and more resilient ocean, coastal, and Great Lakes ecosystems and services, but also benefit the economies (e.g., commercial and recreational activities) and communities that rely on them. The Task Force recognizes the

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significant role of recreation and other existing and emerging sustainable uses (e.g., renewable energy, aquaculture) of ocean, coasts, and Great Lakes resources. However, it did not single out individual sectors for discussion in the recommendations. Rather, the recommendations discuss better managing all uses of the ocean, coasts, and Great Lakes in a sustainable manner.

2. Recreational Users

Comments expressed a concern that recreational fishing interests and the unique distinction between recreational and commercial fishing were not adequately represented in the *Interim Report.* Additionally, the Task Force received comments to recognize that recreational users (e.g., anglers, boaters, and other outdoor enthusiasts) not only use and rely on the health of ocean, coastal, and Great Lakes resources, but have a long history of actively participating in their conservation and stewardship.

The Task Force made several changes in the recommendations to distinguish recreational and commercial fishing and to more expressly recognize the importance of access to the ocean, our coasts, and the Great Lakes for recreation. The Task Force recognizes the importance of recreation, including sustainable recreational fishing, and that Americans should continue to enjoy such outdoor experiences, which are also critical to the economic, social, and cultural fabric of our country. Recreational users have a long history of actively participating in the stewardship of the ocean, coastal, and Great Lakes resources. Ensuring healthier oceans, coasts, and Great Lakes will benefit all recreational activities and the communities and economies that rely on them.

3. Ecosystem-Based Management

A range of comments were received concerning the use of ecosystem-based management in the *Interim Report.* Some suggested that the language regarding ecosystem-based management be strengthened while others would like to ensure that ecosystem-based management, while a good principle, not be mandated. The Task Force determined that this principle, which was articulated in the President's June 12, 2009 memorandum, is critical to how we govern and manage our ocean, coasts, and Great Lakes and should remain as one of the nine priority objectives. How ecosystem-based management will be defined and implemented would be further addressed by the NOC as it develops a strategic action plan for this priority objective.

4. Precautionary Approach

A range of comments were received concerning the use of the precautionary approach as one of the National Principles. Application of a precautionary approach, as defined in the recommendations ("[w]here there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation"), is consistent with and essential for improved stewardship. Moreover, the United States has already affirmed this exact wording in the 1992

Rio Declaration on Environment and Development. Many comments supported its inclusion while others were concerned it would be used to prevent activities from occurring. These latter comments, however, may have misinterpreted the precautionary approach here as mandating, for example, the prohibition of activities that present an uncertain potential for significant harm unless the proponent of the activity shows that it presents no appreciable risk of harm. The Task Force has retained the precautionary approach as reflected in the Rio Declaration in its final recommendations, as it believes that we must be able to avail ourselves of timely, cost-effective stewardship measures, consistent with the approach articulated in the Rio Declaration. Some comments used the term "precautionary principle," but the United States has long taken the position that precaution is a tool or approach rather than a "principle," given the lack of a single definition or agreed formulation and the differing implications of its various forms.

5. National Ocean Council Membership

Comments were received on the role of the National Oceanic and Atmospheric Administration (NOAA) in the recommended governance structure, particularly that it should have a more prominent role on the NOC. The Department of Commerce would have a seat on the NOC. However, the Task Force recognizes that NOAA (an agency within the Department of Commerce) plays a particularly important role in coastal and ocean research, planning, and management. While the Task Force had always envisioned that NOAA would have a substantial role within the NOC and in the implementation of these recommendations, the Task Force has determined that the final recommendations should be more explicit by clarifying that the NOAA Administrator should also be added as a member of the NOC.

6. State, Tribal, and Local Government Role

A variety of comments were received pertaining to the role of State, tribal, and local governments in the recommended governance structure. Comments advocated for a greater role for State, tribal, and local governments and for more detail regarding the interplay of the Governance Advisory Committee with other entities in the NOC structure. The Task Force addressed these comments in five main areas: (1) changing the name of the Governance Advisory Committee to the Governance Coordinating Committee (GCC) to more accurately reflect its function; (2) modifying the composition of the GCC to include representation from local governments and State legislatures; (3) expressly acknowledging the unique legal relationship with federally recognized American Indian and Alaska Native tribal governments; (4) clarifying GCC functions and its relationship to other governance structure entities; and (5) strengthening coordination and collaboration between the GCC and various levels of the NOC.

7. Transparency and Public Input

   Comments suggested adding more detail on how the NOC will incorporate public input and keep the public informed about its actions. The Task Force addressed these comments throughout the recommendations, including adding new text that expressly identifies the need for the NOC to ensure substantial opportunity for public participation as it develops strategic action plans.

8. Additional Priority Objectives and Specificity of Implementation Strategy

   Comments suggested a range of additional priority objectives, including Community and Cultural Access, Protection of Culture and Traditions, Caribbean and the Pacific Islands, Antarctica, Coral Reefs, Marine Aquaculture, Recreational Fishing, Fisheries Management, Renewable Energy, Marine Transportation Safety, and Collaborative Environmental Problem Solving in Underserved Coastal Communities. While the Task Force strongly considered a wide array of priority objectives, the Task Force determined that the nine priority objectives, with some minor modifications, set out in these recommendations were the most appropriate initial priorities of the NOC. In addition, the NOC may always identify additional or different priority objectives in years to come. In fact, the functions of the NOC include updating and setting national priority objectives, as well as providing National Policy implementation objectives. Comments also advocated for more specificity in the implementation strategy, but the Task Force determined that further clarity and detail is best determined by the NOC and its component bodies.

Comments on the Interim Framework for Effective Coastal and Marine Spatial Planning

Substantive comments on the *Interim Framework* ranged from questioning the overall need for coastal and marine spatial planning (CMSP) to general support for a new, more efficient, ecosystem-based approach to managing sustainable uses of the ocean, our coasts, and the Great Lakes. Some comments also advocated for ensuring that CMSP provides a balance between economic uses and stewardship, while others raised questions or concerns over the relationship of CMSP to existing processes and authorities and specifics of how the process will work. Some comments were similar to those received on the *Interim Report* and are addressed in the previous section. The following summarizes some of the additional key substantive comments received on the Interim Framework and how the Task Force addressed them.

1. Why Coastal and Marine Spatial Planning

   Comments raised a variety of issues regarding the general nature of this effort. For example, it was suggested that the *Interim Framework* did not provide an adequate description of the problem trying to be solved; that existing processes are sufficient and only require improved coordination rather than a new top-down bureaucracy with too much authority vested in the National Ocean Council. Other comments strongly supported the need for CMSP and

the benefits to be derived from more proactive, multi-objective, multi-sectoral planning. Some comments raised concern that many processes in the *Interim Framework* were vague and required greater clarity and definition of terms (e.g., ecosystem-based management).

The recommendations describe a flexible, regionally based approach for the development of CMSP. The NOC would facilitate development of coastal and marine spatial plans (CMS Plans) and provide national guidance to ensure national consistency, as appropriate. The Task Force has made a number of changes to better clarify the processes described in the recommendations. The recommendations also describe that the NOC would provide further clarity through the development of a strategic action plan and national guidance documents, which would be developed with public and stakeholder input.

2. Overarching Goals, Principles, and Nature of Coastal and Marine Spatial Planning

Comments suggested that the *Interim Framework* should have as its primary overarching goal "protection, maintenance, and restoration" as this is a fundamental goal that supports all others (e.g., healthy ecosystems support the full range of ecosystem services). Other comments suggested that the *Interim Framework* should recognize benefits of commercial and recreational uses, and the significant economic benefits to be derived from the responsible production of energy resources, and other economic activities in Federal offshore waters.

The Task Force agrees that healthy ecosystems provide the foundation for the full range of ecological services the ocean, coasts, and Great Lakes provide, including economic, environmental, and societal benefits. CMSP is intended to result in better management of and planning for sustainable multiple uses (e.g., energy, recreation, and commercial and recreational fishing) across sectors as well as to improve conservation of the ocean, coasts, and Great Lakes. The Task Force believes that the recommendations adequately discuss the multi-objective nature of CMSP and the potential economic, environmental, and societal benefits.

3. Integration, Cooperation, and Coordination

Comments requested that the Task Force clarify that CMSP is intended to build off of and incorporate existing plans, processes, and authorities. Comments also requested that the Task Force recognize that certain decisions should be left to, or deference be given to, State decision-makers. There are a number of places throughout the *Interim Framework* (e.g., "Essential Elements of the CMSP Process") that expressly discuss the relationship of CMSP to existing processes. The Task Force has made additional clarifying changes to address these comments.

4. Geographic Scope

There were a number of comments on various aspects of the geographic scope for CMSP, including the treatment of private lands, inland areas, and bays and estuaries. The recommendations exclude private lands from the CMSP planning area; clarifying that the

exclusion applies to all private lands, not only private submerged lands. The Task Force decided to leave the regional planning bodies with the flexibility to include inland areas within the geographic scope, but has recommended that the NOC, in coordination with the GCC, develop guidance for the regional planning bodies to help determine whether to include inland areas. Finally, the Task Force determined to maintain the requirement to include bays and estuaries due to the strong linkages with ocean, coastal, and Great Lakes areas.

5. Development and Implementation of Coastal and Marine Spatial Planning

A number of comments raised questions regarding the role, composition, and operation of the regional planning bodies. The Task Force has maintained the core composition of regional planning bodies to include State, Federal, and tribal authorities, and has further articulated the types of representatives to be considered for inclusion. The Task Force did not add local governments to the regional planning bodies due to the numerous and wide variety of local authorities that could result in very disparate participation and representation across regions. However, the recommendations require regional planning bodies to coordinate with local governments, as appropriate, throughout the process.

Some comments suggested adding a Regional Fishery Management Council (RFMC) representative to the regional planning bodies given their unique quasi-regulatory role under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). The Task Force is interested in finding the most effective opportunity for sustained and meaningful engagement with the RFMCs as it is their statutory responsibility to develop fishery management plans and management measures for fisheries which NOAA then reviews and, if approves, implements through regulation. While the Task Force acknowledges the relatively unique role that RFMCs play, it did not want to prescribe a particular method for how RFMCs should be included in the CMSP process without more thoughtful consideration and analysis. The recommendations describe that the regional planning bodies would provide a formal mechanism for consultation with the RFMCs across their respective regions on fishery related issues and that the NOC would further assess if representation on the regional planning bodies is the best method for this engagement. In the future, if other statutorily-mandated or quasi-regulatory groups are identified, the NOC would determine whether a formal mechanism for consultation should be developed for such groups and, if necessary, provide guidance for regional planning bodies on the development of such a process.

Comments questioned how the regional planning bodies would operate, who would lead them, and how decisions would be made. Comments also suggested clarifying that the regions could create sub-regional planning bodies. The Task Force has clarified that the work plan to be developed by each regional planning body would specify the participants, Federal and non-Federal co-lead(s), timing, milestones, etc. The Task Force also clarified that there would be flexibility to develop sub-regional plans provided that these plans are encompassed in the

regional planning body's final CMS Plan. The Task Force recognized that this flexibility may be particularly useful in the Alaska/Arctic and Pacific Islands Regions.

There were a number of comments regarding strengthening involvement of stakeholders, the public, and scientific and technical experts in the CMSP process. The recommendations clarify and strengthen their role in CMSP, including requiring the development of inclusive and transparent stakeholder and scientific participation and consultation mechanisms in each region.

6. Nature of Planning Process and CMS Plans and Adherence to CMS Plans

Comments raised questions about whether CMS Plans would be comprehensive, multi-objective, and multi-sectoral. The Task Force has clarified that while there is flexibility as part of the CMSP process to address different priority issues at certain times, the final CMS Plans would be required to achieve this level of comprehensiveness in order to receive NOC certification. The Task Force also clarified that while it is recognized that CMSP is an iterative process and initial CMS Plans would likely identify gaps in understanding that may limit the ability to make informed decisions at a particular time, these gaps would be identified in the CMS Plan along with an implementation approach to how they would be addressed in future iterations of the CMS Plan.

A number of comments raised questions regarding the binding or non-binding nature of CMS Plans and the requirements to adhere to them. Comments also questioned the scope of the allowance for deviations from CMS Plans. The Task Force has clarified the language regarding the binding nature of CMS Plans to be consistent throughout the document. As it relates to deviations, the existing language allows for deviations from CMS Plans, but requires periodic reviews to determine why they are occurring and to identify remedies to minimize such deviations. The Task Force expects that as agencies gain experience with this process, any deviations would be minimized. The Task Force does not intend this language to be a broad exemption to CMS Plans.

Comments also expressed that the *Interim Framework* does not clearly establish the relationships between CMS Plans and existing regulatory authorities, including the Magnuson-Stevens Fishery Conservation and Management Act, Coastal Zone Management Act, and Outer Continental Shelf Lands Act. The Task Force has added language to better clarify the relationship between CMSP and existing authorities.

Comments suggested that the Task Force consider adding language that addresses what happens if a State opts out or a regional plan does not meet NOC certification requirements. The Task Force has added language clarifying that even if some States or tribes opt out of the CMS Process, the Federal, and participating State and tribal authorities would continue to develop and implement a regional CMS Plan.

7. National Consistency

Comments raised concerns that with nine different regions there could be different standards applied to the same activities (e.g., ballast water), or potential for other significant inconsistencies regarding commerce and other socio-economic sectors. The recommendations make clear that the NOC would develop national guidance and objectives to ensure national consistency and seek to minimize inconsistencies and conflicts across regions for cross-cutting or national issues. Development of this guidance would include opportunities for robust public and stakeholder participation.

8. Scientific Knowledge and Data Integration, Research, Management, and Access

Comments raised concerns over the complexities and resources needed to create a new information management system and encouraged adapting an existing system or search tool as an alternative. Comments also requested that the Interim Framework make clear that State, local, and other data would be included in the system, not only Federal data. Other comments requested a greater emphasis on local and traditional knowledge as data/information sources. These issues have been addressed in the recommendations.

9. Implementation

Comments on the length of the implementation process varied from the timeframe for development of CMS Plans being too short to excessively long. The Task Force determined that given the varied range of comments the phased, flexible approach recommended in the document provides an ambitious, but achievable timeline to develop CMSP in the United States.

10. Resources

While the Task Force is mindful of the national economic situation and budgetary challenges, it is confident that making the investments and improvements in these recommendations will advance the economic interests of the United States and facilitate greater efficiencies across the Federal Government. Recognizing the reality of the limited availability of new resources, Federal agencies would re-evaluate how resources are allocated in light of their statutory and regulatory mandates to further the recommended National Policy. Also, the President's Fiscal Year 2011 Budget Request includes funding that would support priority activities identified in these recommendations, such as coastal and marine spatial planning, geospatial modernization, regional ocean partnerships, water quality improvement, habitat restoration, integrated ecosystem assessments, coastal and estuarine land protection, research and development of ocean sensor technology, and environmental tools to support resilient coastal communities.

NOAA'S NEXT-GENERATION STRATEGIC PLAN

VERSION 4.0

Draft for Public Review
23 June 2010

Please provide your feedback at www.noaa.gov/ngsp

NOAA's Mission:
Science, Service & Stewardship

To understand and anticipate changes in climate, weather, oceans, and coasts,
Share that knowledge and information with others, and
To conserve and manage marine resources

Science & Technology Enterprise

- a holistic understanding of the earth system through research
- accurate, reliable data from integrated earth observations
- an integrated environmental modeling system

Climate Adaptation & Mitigation

- improved understanding of climate
- integrated climate assessments
- mitigation, adaptation from climate service
- a climate literate public

Weather Ready Nation

- reduced loss of life, property, disruption
- improved water management
- transportation efficiency, safety
- healthy people, communities
- secure, reliable infrastructure

NOAA's Vision of the Future: Resilient Ecosystems, Communities & Economies

Healthy ecosystems, communities, and economies that are resilient in the face of change

Resilient Coastal Communities & Economies

- resilient coastal communities
- ocean and coastal planning
- safe, efficient marine transportation
- improved coastal water quality
- arctic access, management

Healthy Oceans

- improved understanding of ecosystems
- recovered, rebuilt living marine resources
- healthy habitats
- safe, sustainable seafood

Engagement Enterprise

- an engaged, educated public for informed environmental decisions
- integrated services for evolving demands of regional stakeholders
- international partnerships and policy leadership

Organization & Administration Enterprise

- a modern information technology infrastructure
- diverse capabilities, evolving workforce
- sound management of capital investments

NOAA'S NEXT-GENERATION STRATEGIC PLAN

OVERVIEW OF NOAA'S STRATEGY

Through its longstanding mission of science, service, and stewardship, NOAA generates tremendous value for the nation – and the world – by advancing our understanding of and ability to anticipate changes in the Earth's environment, by improving society's ability to make scientifically-informed decisions, and by conserving and managing ocean and coastal resources.

NOAA's Mission: ***Science, Service, and Stewardship***
To understand and anticipate changes in climate, weather, oceans, and coasts,
Share that knowledge and information with others, and
To conserve and manage marine resources

NOAA's mission is central to many of today's greatest challenges. Climate change. Severe weather. Natural and human-induced disasters. Declining biodiversity. Ocean acidification. Threatened or degraded ocean and coastal resources. These challenges convey a common message: Human health, prosperity, and well-being depend upon the health and resilience of natural ecosystems. NOAA's vision of the future is one where societies and natural ecosystems reinforce each other and are mutually resilient in the face of sudden or prolonged change.

NOAA's Vision of the Future: **Resilient Ecosystems, Communities, and Economies**
Healthy ecosystems, communities, and economies that are resilient in the face of change

Resilient ecosystems, communities, and economies can maintain and improve their health and vitality over time by anticipating, absorbing, and diffusing change. This vision of resilience will guide NOAA and its partners in our collective effort to reduce the vulnerability of communities and ecological systems in the short term, while helping society avoid or adapt to long-term environmental, social, and economic changes. To this end, NOAA will focus on four long-term outcomes within its primary mission domains:

NOAA's Long-Term Goals:

Climate Adaptation and Mitigation:
An informed society anticipating and responding to climate and its impacts

Weather-Ready Nation:
Society is prepared for and responds to weather-related events

Healthy Oceans:
Marine fisheries, habitats, and biodiversity are sustained within healthy and productive ecosystems

Resilient Coastal Communities and Economies:
Coastal and Great Lakes communities are environmentally and economically sustainable

NOAA cannot achieve these goals on its own, but neither can society achieve them without NOAA. This Plan describes the long-term outcomes that NOAA will contribute to in each of these areas, along with the specific objectives that NOAA will pursue over the next five years. As a whole, NOAA's capacity to achieve these goals and objectives will depend upon the continued strengthening and integration of NOAA's enterprise-wide science and technology, stronger partnerships and stakeholder engagement, and effective organizational and administrative functions.

NOAA'S NEXT-GENERATION STRATEGIC PLAN

DRAFT 4.0
23 JUNE 2010

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Letter from the NOAA Administrator

We certainly live in interesting times, yet sometimes the most difficult times are ultimately the most rewarding. Significant threats to our oceans and coasts — ranging from the BP oil spill and severe storms to long-term demographic pressures and climate change — challenge us, test us, and I believe, bring out the best in us. And while there are and will continue to be challenges, considerable opportunities are ours to create and capture. Primary among these opportunities is the *National Policy for the Stewardship of our Oceans, Coasts, and Great Lakes*. This policy sets forth a completely new approach to managing our oceans and coasts. It is exciting and inspiring, and with NOAA's longstanding record of science, service, and stewardship, I am certain NOAA will continue to help lead the nation in ocean and coastal resource science and stewardship. In this and related areas, NOAA's **Next Generation Strategic Plan (NGSP)** charts a new and compelling future for NOAA and the nation.

The strategic goals and objectives outlined in this plan detail how we can achieve an overarching vision of healthy ecosystems, communities, and economies that are resilient in the face of change. The NGSP sets the stage for continued excellence and advancements in NOAA's core mission functions for weather forecasting, fisheries management, habitat restoration, and marine transportation. Similarly, NOAA must maintain a vibrant research enterprise— one that provides a holistic understanding of how weather, climate, ocean and coastal systems are inextricably interconnected with each other and with the welfare of human beings. Continued improvement in these areas will be essential to growth at NOAA in the next decade and beyond. At the same time, this plan introduces new strategic goals for NOAA. Significantly, the NGSP presents actions to sustain and enhance our ocean and coastal ecosystems, and to develop new capabilities to deliver the climate science and services that we so urgently need.

Sustaining Our Coasts and Enhancing Our Future. Our oceans and coasts are becoming crowded with increasing, competing demands for energy, aquaculture, fishing, shipping and recreational activities. In particular, our coastal areas — where more than half of Americans call home — are the frontlines where often seemingly conflicting goals related to resources, people, and our economy are expressed. We recognize that our success will depend on integrating actions that promote both the environmental and economic sustainability of our coastal communities. This is a major new focus of the NGSP.

A New Era for Climate Science and Services. Another new focus of this plan is NOAA's ability to provide climate services. Climate change trends are being documented nationwide, including rising temperatures, heavier precipitation, rising sea levels, longer growing seasons, reductions in snow and ice, and changes in river flows. NOAA climate science has been at the center of documenting these trends for decades, but we must now expand on this knowledge to provide the information that governments, businesses, and communities need in order to make scientifically-informed decisions. NOAA's commitment to improving climate services reflects our larger vision of resilience.

The Path Forward. This plan emerged from extensive consultations with NOAA's staff and the extended community of partners and collaborators in the public, private, and academic sectors. I look forward to continued engagement with these groups at the national, regional, and local level to guarantee NOAA's success in implementing the NGSP.

Thank you for engaging in NOAA's next generation strategy. Your continued involvement in NOAA is vital to the work of the agency and to creating resilient ecosystems, communities, and economies.

Dr. Jane Lubchenco
Undersecretary of Commerce for Oceans and Atmosphere

NOAA's Mission: Science, Service, and Stewardship

NOAA generates tremendous value for the nation – and the world – by advancing our ability to understand and anticipate changes in the Earth's environment, by improving society's ability to make scientifically-informed decisions, and by conserving and managing ocean and coastal resources. NOAA's world-class research and information services continuously advance our scientific understanding of a changing climate and its impacts. NOAA monitors and models the environment to forecast daily weather, warns us of hurricanes, tornados, and tsunamis, and supports private enterprise with information necessary for sustainable economic growth. NOAA is directly responsible for managing our nation's fisheries, and for supporting the responsible management of coastal habitats and species. NOAA is a global leader in understanding the processes by which ecosystems provide services crucial for human survival on Earth, and in helping to educate businesses and federal, state and local decision makers about how the health of human society and the health of the environment are interconnected.

NOAA's mission statement summarizes the agency's fundamental mission responsibilities.

> **NOAA's Mission: *Science, Service, and Stewardship***
> To understand and anticipate changes in climate, weather, oceans, and coasts,
> Share that knowledge and information with others, and
> To conserve and manage marine resources

Science at NOAA is the development of knowledge through research and analysis, observations and monitoring, and environmental modeling. NOAA science includes discoveries and new understanding of the oceans and atmosphere and the application of this understanding to such issues as the causes and consequences of climate change, the physical dynamics of high-impact weather events, the dynamics of complex ecosystems, and the ability to model and predict future states of these systems. Science provides the foundation and future promise of the service and stewardship elements of NOAA's mission.

Service is the communication of data, information, and knowledge to others for use in their businesses, communities, and daily lives. NOAA services include climate predictions and projections; weather and water reports, forecasts, and warnings; charts and navigational information; and the continuous delivery of an enormous range of earth observations and scientific data sets used throughout the public, private, and academic sectors.

Stewardship is NOAA's direct use of that knowledge to protect people and the environment, where NOAA exercises its direct authorities for regulating marine fisheries, protecting endangered marine species, restoring habitats, conserving marine sanctuaries and other protected places, responding to emergencies, and aiding in disaster recovery.

The foundation of NOAA's longstanding record of scientific, technical, and organizational excellence is its people. NOAA's diverse functions require an equally diverse set of skills and constantly evolving abilities in the workforce. Also underlying NOAA's continued success is its unique infrastructure: NOAA's core mission functions require satellite systems, ships, buoys, aircraft, research facilities, and high-performance computing. Furthermore, NOAA invests in and depends heavily upon the science, management, and engagement capabilities of its partners. Collectively, NOAA's people, infrastructure, and partnerships provide the foundation for NOAA's strategy: They provide the enterprise capabilities that will advance NOAA toward its long-term vision and goals.

NOAA's Vision of the Future: Resilient Ecosystems, Communities, and Economies

Through its mission of science, service, and stewardship, NOAA helps society address some of the most pressing questions of our time. Can we secure an economic future that is both prosperous and environmentally sound? Can we spare future generations the potential calamities foretold by unchecked greenhouse gas emissions? Can we improve public safety and security of our communities in the face of high-impact weather and water events? Can we both use and preserve the ocean and coastal ecosystem resources upon which the nation's communities and economy depend?

These challenges reveal the intimate connection between people and the natural environment. Human health, prosperity, and well-being depend upon the health and resilience of natural ecosystems. Earth's weather, climate, oceans, and coasts provide valuable services that support people, communities, and economies. Similarly, human well-being requires preparing for and responding to changes within these natural systems. NOAA's vision of the future is one where societies and natural ecosystems reinforce each other and are mutually resilient in the face of sudden and prolonged change.

> **NOAA's Vision:** ***Resilient Ecosystems, Communities, and Economies***
> Healthy ecosystems, communities, and economies that are resilient in the face of change.

Resilient ecosystems, communities, and economies can maintain or improve their health and vitality over time by anticipating, absorbing, and diffusing change. This vision of resilience will guide NOAA and its partners in our collective effort to reduce the vulnerability of communities and ecological systems in the short term, while helping society avoid or adapt to potential long-term environmental, social, and economic changes. Achieving this vision will require understanding current Earth system conditions, projecting future changes, and helping people make decisions to reduce their sensitivity to and ability to cope with environmental hazards and stresses that emerge over time.

A resilient ecosystem – including humans and their institutions – is environmentally sound and economically sustainable for generations to come. To this end, NOAA will focus on four long-term outcomes that are central determinants of resilient ecosystems, communities, and economies—and which cannot be achieved without the agency's distinctive mission capabilities:

> **NOAA's Strategic Goals:**
>
> ***Climate Adaptation and Mitigation:***
> An informed society anticipating and responding to climate and its impacts
>
> ***Weather-Ready Nation:***
> Society is prepared for and responds to weather-related events
>
> ***Healthy Oceans:***
> Marine fisheries, habitats, and biodiversity are sustained within healthy and productive ecosystems
>
> ***Resilient Coastal Communities and Economies:***
> Coastal and Great Lakes communities are environmentally and economically sustainable

Unified by an overarching vision of resilience, these goals are mutually supportive and complementary. Just as economic prosperity depends upon a healthy environment, the sustainability of ocean and coastal ecosystems depends upon society's ability to mitigate and adapt to climate change. Similarly, sustainable economic growth along the nation's coasts, in arid regions, and in countries around the world depends

upon regional-scale climate predictions and projections. Likewise, the resilience of coastal communities depends upon their understanding of and preparedness for sudden or prolonged weather and water conditions. By responding to these interconnections, NOAA can magnify the effect of each goal on its common vision of resilient ecosystems, communities, and economies.

As a science-based organization, NOAA's unique enterprise capabilities provide the foundation for achieving NOAA's long-term strategic goals: a world-class earth system research capability that spans natural and social science disciplines; accurate and sustained environmental observations and data on physical, chemical, and biological systems; and numerical models, projections, and predictions of possible future conditions of the earth's systems. Even more fundamentally, to address the interconnected and complex challenges associated with a changing climate, uncertain weather and water extremes, and overstressed ocean and coastal resources, NOAA must be agile and possess the ability to deploy highly trained scientific and technical experts and specialized infrastructure and information technology assets, as well as to collaborate effectively with a diverse network of global and local partners.

Long-term goal: Climate Adaptation and Mitigation

An informed society anticipating and responding to climate and its impacts

Climate-related changes projected for the future include increased global temperatures, melting sea ice and glaciers, rising sea levels, increased frequency of extreme precipitation events, increased acidification of the oceans, modifications of growing seasons, increased storm frequency and intensity, alterations in species' ranges and migration patterns, earlier snowmelt, increased drought, and altered river flow volumes. The impacts of these changes are regionally diverse and affect numerous sectors, including water, energy, transportation, forestry, tourism, fisheries, agriculture, and human health. A changing climate is anticipated to alter the distribution of water resources and exacerbate other human impacts on fisheries and marine ecosystems, such as overfishing, habitat destruction, pollution, and excess nutrients in coastal waters. Sea level rise is expected to amplify the effects of other coastal hazards, and rising temperatures are expected to increase invasions of non-native species. Climate change can also have a direct impact on commerce, transportation, and the economy. For example, in the Arctic retreating sea ice is allowing the northward expansion of commercial fisheries and providing increased access for regional oil and gas development, commerce and tourism.

These changes have profound implications for society, underscoring the need for scientific information to aid decision makers in developing and evaluating options for mitigating the human causes of climate change and adapting to foreseeable climate impacts. While the nation has made significant progress in our understanding of climate, more work is needed to specify the causes and effects of these changes, produce accurate predictions, identify risks and vulnerabilities, and inform decision-making. No single organization can do this alone: Building upon a strong scientific foundation and decades of engagement with interagency, academic, and private sector partners, NOAA will advance this long-term goal by strengthening our scientific understanding of climate, producing integrated climate assessments, developing and delivering climate services at global to regional scales, and improving public knowledge of a changing climate and its impacts. Given its stewardship responsibilities and expertise, NOAA will improve its capacity to understand and predict the impacts of a changing climate on weather patterns, water resources, and ocean and coastal ecosystems.

Objective: Improved scientific understanding of the changing climate system and its impacts

A pressing need exists to advance our understanding of the climate system and climate impacts to improve climate predictions and projections and to better inform adaptation and mitigation strategies. Key scientific uncertainties limit scientists' ability to understand and predict changes in the climate system. This is particularly true for the monthly to decadal timescales and at the regional and local levels, scales that are highly relevant for planning and decision making. Research on the connections between weather and climate, for example, is necessary to understand how a changing climate may affect severe weather, precipitation patterns, and hurricanes. On decadal to centennial timescales, research is needed to understand the feedbacks between atmospheric greenhouse gases and the rate of global-to-regional climate impacts (such as changes in sea level, heat waves, and droughts). International, national, state, and local efforts to limit greenhouse gases require reliable information to support emissions verification, as do efforts to track climate changes and mitigate impacts. Adaptation and mitigation strategies must also be informed by a solid scientific understanding of the climate system. For example, research is needed to understand how changes in the global ocean circulation affect the climate system and subsequent impacts on coastal regions, including sea level rise, ocean acidification, and living marine resources.

To achieve this objective, NOAA will continue its world-class observation, monitoring, research, and modeling efforts and increase efforts to close gaps remaining in our understanding of the climate system. This effort will require expanding and sustaining comprehensive, global and regional-scale climate observing and monitoring networks that provide high-resolution information; conducting and sponsoring fundamental physical, chemical, and biological research to discover new approaches and opportunities to understand the climate system, along with research to explore the effects of a changing climate on social and economic systems; conducting and sponsoring research on how climate variability and change affect selected regions that are especially vulnerable to climate impacts, such as the Arctic; characterizing key uncertainties (e.g., ocean variability, ocean circulation and heat content, clouds, aerosols, precipitation, ice sheets, global energy budget, biogeochemical cycles, and socio-economic parameters) and integrating this knowledge into models to improve predictive capabilities; increasing the number and quality of climate predictions through high performance computing and model advancements; and actively engaging the external research community through competitive research programs.

Over the next five years, evidence of progress toward this objective will include:

- More accurate, precise, and comprehensive knowledge of greenhouse gases and other climate forcing agents;
- Advanced understanding of key oceanic, atmospheric, hydrologic, biogeochemical, and socioeconomic climate uncertainties related to a changing climate;
- Improved predictive performance of global and regional climate models for monthly to centennial timescales;
- Reduced uncertainty in assessing and predicting climate impacts; and
- Quantitative, daily to decadal projections of Arctic sea ice extent, concentration, and type.

Objective: Integrated assessments of current and future states of the climate system that identify potential impacts and inform science, services, and decisions

Stakeholders and the general public need a clear understanding of the best available science describing the state of the climate and the likely impacts of climate change. Scientific assessments at the global, national, regional, and local levels integrate knowledge from many disciplines to provide decision-makers with authoritative information on climate impacts, identify gaps in understanding, and help prioritize future research and service development efforts to fill those gaps. When pursued on a sustained basis, assessments build relationships between researchers and users and provide context for climate services developed and delivered by NOAA and others.

To achieve this objective, NOAA will play a leading role in international and national assessments that survey and summarize current scientific understanding about the causes and consequences of global climate change and its impacts. NOAA will work closely with partner agencies and the external research community to ensure that these assessments are of the highest scientific quality. Internationally, this objective entails sustained contributions to and leadership of scientific assessments such as those of the Intergovernmental Panel on Climate Change (IPCC) and the international assessments of ozone layer depletion. Special attention will be given to generating state-of-the-art simulations of future climate conditions and ensuring model simulations and analyses are directed to informing an assessment of impacts, adaptation, and vulnerability. This objective requires continuing NOAA's work on assessing potential climate change impacts in the United States. NOAA will develop high-resolution climate information that identifies key vulnerabilities and informs the development of climate services to meet the needs of targeted audiences. To supplement its own work, NOAA will rely on and support efforts undertaken by partners at other agencies and research institutions around the world to understand economic, environmental, and social risks, and to communicate these findings. Given its stewardship responsibilities and expertise, NOAA will play a leading role with respect to assessing economic and environmental risks to ocean and coastal ecosystems, living marine resources, and water resources.

Over the next five years, evidence of progress toward this objective will include:

- Potential climate change impacts and key international, national, and regional vulnerabilities are identified and inform the development of useful climate services;
- Model simulations and analyses inform the IPCC assessments of climate impacts, adaptation, and vulnerabilities;
- Potential climate change impacts for the United States and key regional vulnerabilities are identified and inform climate service development; and
- National and regional assessments address particular needs of NOAA's unique stewardship responsibilities for ocean and coastal ecosystems, living marine resources, and water resources.

Objective: Mitigation and adaptation efforts supported by sustained, reliable, and timely climate services

Human-induced changes in Earth's climate, as well as natural climate variability, complicate our ability to effectively plan for the future, manage resources, support national security, and sustainably develop our economy. Resource managers, state, local and tribal governments, public and private businesses and organizations are recognizing that climate change complicates their ability to achieve their goals. Existing information is not readily available to those who need it or formatted in a way

that makes it easy to use. The nation needs a comprehensive, authoritative, and coordinated source of climate information to support adaptation and mitigation strategies and to incorporate into risk assessments and related decision-making processes.

To achieve this objective, NOAA will build upon its strong scientific foundation and external partnerships to develop and deliver climate services. These services will include up-to-date descriptions of the state of the climate; regional information derived from global climate models; useful predictions of likely climate impacts; and the timely delivery of climate information, short-term and long-term forecasts, and early warnings. These products will be accompanied by services that help decision makers use climate information and model output and understand the associated uncertainties. NOAA's initial service development efforts will focus on producing climate predictions, information, and ecosystem impact assessments for the water, coastal, and living marine resources sectors, including improved sea level rise and ocean acidification monitoring, predictions, and information on related ecosystem and infrastructure impacts. Over time, NOAA will also develop and improve similar services for other sectors such as health, traditional and renewable energy, agriculture, transportation, terrestrial resources, tourism, and national security. Developing services that meet these diverse needs will require increased coordination and collaboration across NOAA and with other government agencies, tribal governments, academia, non-governmental organizations, and the private sector. To ensure that a diverse community of customers can access and use NOAA's data products and information services, NOAA will produce new and improved data management and access systems—including a NOAA Climate Services Portal—that enhance the communication and dissemination of climate information and products.

Over the next five years, evidence of progress toward this objective will include:

- National, state, local, and tribal governments are more informed about drought, better prepared for fire seasons, and can more confidently manage water resources;
- Coastal and marine spatial planners incorporate a greater understanding of the risks of sea level rise as they manage ocean and coastal resources;
- Coastal decision-makers and marine resource managers understand ocean acidification trends and begin to adapt to changing conditions; and
- Decision-makers in the electricity, agriculture and other industries have better information regarding climate extremes, including deviations in temperatures and precipitation patterns.

Objective: A climate-literate public that understands its vulnerabilities to a changing climate and makes informed decisions

The success or failure of climate adaptation and mitigation in the United States and around the world will depend on the ability of leaders, organizations, institutions and the public to understand the challenges and opportunities climate change presents. The routine incorporation of climate information into decisions requires an awareness of how climate change may affect individuals, families, businesses, and communities. A society educated about climate change and actively engaged in dialog about its causes and effects will better address today's problems and plan for tomorrow.

To achieve this objective, NOAA will work with diverse partners in academia and elsewhere to increase understanding of the likely impacts of climate variability and change through investments in climate awareness efforts, capacity building, education, and outreach. NOAA will engage stakeholders at multiple levels, foster community dialog, and educate citizens and students both formally and informally. Engagement efforts will be highly adapted to meet the needs of various

segments of society. NOAA will work to ensure continuous and sustained dialogue among partners to understand capabilities and identify climate-related risks that are of the most urgent concern to decision makers and the public. This engagement will also help NOAA understand how user needs for climate services are changing, how users perceive climate risks and uncertainty, and consequently how to design future climate products and services. In addition to data and products, the NOAA Climate Services Portal will offer a broad array of climate communications and educational materials that stem from NOAA's climate research, observations, modeling, and services.

Over the next five years, evidence of progress toward this objective will include:

- Key segments of society understand climate risks and use that knowledge to increase resilience to likely climate impacts;
- Consumers of climate information understand climate uncertainty and utilize this knowledge in their decision-making processes; and
- Educators and other outreach professionals increase their use of climate science resources.

Long-term goal: Weather-Ready Nation
Society is prepared for and responds to weather-related events

The increasing concentration of people and businesses in weather-sensitive areas will elevate society's vulnerability to weather and water conditions. Tsunamis bring surge events, flooding, and debris flows, and hurricanes add strong winds to this mix of coastal threats. Tornadoes take lives and property at a more local and unpredictable scale. Communities along rivers and other inland waterways face increasing disruption from more frequent and devastating floods, while others face extreme drought, straining municipal water supplies and putting the sustainability of entire businesses and communities at risk. Winter storms paralyze metropolitan areas for days. Space weather, predicted to peak over the next few years, can radically disrupt communications and electricity transmission. As more people become vulnerable to these events, environmental information—including forecasts and warnings—will become ever more critical to the safety and well-being of those exposed to sudden or prolonged hazards.

Over the long-term, climate change may increase the intensity and even the frequency of adverse weather events, ranging from drought and flooding to wildfires, storms and hurricanes. Changing weather, water and climate conditions affect industry location, renewable energy generation, and transportation system efficiency and safety. Trusted and timely environmental information is essential for sustaining the nation's competitive advantage, expanding economic growth, and protecting lives and livelihoods. Achieving a weather-ready nation means that society will be able to prepare for and increase its resilience to environmental events that affect safety, health, the environment, the economy, or homeland security.

Objective: Reduced loss of life, property, and disruption from high-impact events

An essential component of a weather-ready nation is integrated, impact-based forecasts and information so citizens, businesses, communities, governments, and first responders are prepared, ready to act, and able to recover. To be effective, the information must clearly communicate risk, impacts, and uncertainties, and be delivered through multiple channels. Increased and enhanced availability and use of weather-related information by citizens, businesses and government can reduce the impact of weather-related events on lives and livelihoods.

To achieve this objective, NOAA will maximize the use of weather-related information and decision support services to promote actions that minimize adverse impacts from environmental events. Key requirements include improving and expanding information services for hurricanes, severe weather, and fire weather; providing consistent, reliable, and accessible forecasts and warnings focused on specific impacts, risks, and confidence levels; and leveraging new technologies to ensure data is available, accessible, and timely. In collaboration with its partners, NOAA will provide direct, interpretive support to public sector officials and emergency responders, and expand environmental education and weather safety programs. This objective also requires: research and development to quantify forecast uncertainty and to understand the weather-climate linkage as well as human behavior and decision-making; sustained and improved observation networks; high resolution Earth system models; the development and implementation of a four-dimensional weather information database; and next-generation "warn on forecast" capabilities for convective weather.

Over the next five years, evidence of progress toward this objective will include:

- Fewer weather-related fatalities;
- Decreased economic loss from unnecessary evacuations and property damage; and
- Increased number of communities certified as TsunamiReady™ or StormReady®.

Objective: Improved water resource management

Water resources are one of the most significant challenges facing the United States in the 21st century. Demands for water continue to escalate, driven by agricultural, energy, commercial and residential usage. Sustained growth requires viable long-term municipal water supplies and, by extension, sophisticated predictions and management practices. Through a federal consortium, NOAA provides water resources observations and forecasts to water resource managers. The nation's water managers need new and more integrated information to more effectively and efficiently manage limited water supplies in a changing and uncertain environment.

To achieve this objective, NOAA will enhance the integration and utility of services for weather and water forecasts and information. With partners such as the U.S. Geological Survey (USGS) and the Army Corps of Engineers (USACE), NOAA will develop integrated decision support tools and services, offering a seamless suite of high-resolution, summit-to-sea forecasts. NOAA will also expand services to provide forecasts for such parameters as water flow, temperature, quality, dissolved oxygen content, and soil moisture conditions for inland and coastal watersheds. Developing integrated water forecasts also will require new technologies to improve information access and dissemination, as well as research and development to improve understanding of cloud and precipitation processes, advance hydrologic and hydraulic models, and integrate long-range weather and water forecasting. NOAA also will develop high-resolution, coupled models for rivers, lakes, and estuaries within an Earth system framework, and better quantify hydrologic forecast uncertainty.

Over the next five years, evidence of progress toward this objective will include:

- Less economic loss and property damage from flooding as a result of impact-based decision support;
- More efficient and effective management of municipal water supplies using integrated water forecasts, and
- Economic benefits from increased efficiencies in water usage in the transportation, hydropower, and agriculture sectors.

Objective: Improved transportation efficiency and safety

Weather accounts for approximately 70 percent of all air traffic delays within the Unites States, costing billions of dollars to the U.S. economy. Winter storms can cripple surface transportation networks for days at a time and are a tremendous hazard to drivers. Marine transportation is disrupted by hurricanes and storms at sea causing delays and loss of cargo and lives. Volcanic ash can cause widespread flight cancellations. In partnership with local and state government as well as other federal agencies, NOAA can provide improved observations and services to minimize the impacts of weather-related events on the national transportation system.

To achieve this objective, NOAA will develop and deploy a four-dimensional environmental database to inform decisions, initially to support the next-generation air transportation system but ultimately to benefit all sectors, including marine and surface transportation. NOAA will provide consistent, reliable forecasts and warnings focused on transportation-related impacts and risks. This objective also requires better forecasts of low clouds, fog, turbulence, visibilities, and precipitation type and duration, as well as improved methods for quantifying forecast uncertainty. Research on human behavior and decision-making also is needed to improve forecast delivery. Modeling enhancements will improve storm prediction accuracy and coastal wave modeling. NOAA also will seek to increase the scope of available data by integrating observations from road, marine, aircraft, and other mobile sources, while seeking to improve data in remote areas such as the Arctic.

Over the next five years, evidence of progress toward this objective will include:

- Fewer aviation delays;
- Reduced grounding or sinking of cargo vessels; and
- A reduction in transportation fatalities and economic losses due to weather-related events.

Objective: Healthy people and communities through improved air and water quality

Poor air quality causes people to suffer from chronic respiratory illnesses and is responsible for up to 60,000 premature deaths in the United States each year, while clean, safe water is a growing concern for communities and ecosystems. Our rivers and estuaries –and the species living in them – are being affected by changing water temperatures and increases in salinity, nutrients, and other pollutants. Such pollutants impact fish and shellfish populations and lead to harmful algal blooms, expansive dead zones, and increased incidents of human illness. NOAA is in a unique position to combine predictive weather information with its understanding of weather, water, climate, oceans, and coasts to develop integrated environmental predictions and analyses that can improve the health of ecosystems and communities.

To achieve this objective, NOAA will develop and deploy a suite of integrated, nationwide health- and ecosystem-based weather and water information services to address regional needs. Key requirements include high-resolution ozone, smoke, and dust forecasts; data on extreme temperatures; and improved water quality forecasts. Enabling this objective are strong, collaborative partnerships with local, state, tribal, and national health, water, and environmental managers. NOAA scientists and partners will conduct research and development for health and ecological based predictions, scenarios, and projections for multiple time and space scales. Observations will be expanded in partnership with public health agencies to support environmental monitoring. NOAA will improve modeling and prediction capabilities within an Earth system framework for air and water quality and

initiate development of an ecological forecasting system, coupling air, land, water, and sea with biological, geological, chemical, and ecosystem processes.

Over the next five years, evidence of progress toward this objective will include:

- Broader understanding of the linkages among human health, weather, water and climate and the causes of air and water quality issues;
- Fewer fatalities attributable to air pollution; and
- Positive economic and ecological impacts from improved water quality forecasts.

Objective: Secure, reliable infrastructure for energy, communications, and agriculture through timely and accurate environmental information

Our capacity to increase renewable energy generation, which is fundamental for economic security and sustainable development, is based in part on our ability to predict and harness rainfall (for hydropower), and wind patterns (for wind energy generation). Geomagnetic storms affect electrical grid stability. And the productivity of U.S. agriculture requires weather and climate information over a wide range of time scales. Timely and accurate weather, climate and water information and forecasts can make a significant contribution to a secure, reliable infrastructure for energy, communications, and agriculture.

To achieve this objective, NOAA will develop integrated environmental information services for the unique needs of the energy, communications, and agriculture sectors, including solar, wind, and oceanographic information critical to the development, production, and transmission of renewable energy; forecasts and warnings of space weather and geomagnetic storms that are within the accuracy and confidence levels required for decision making; and enhanced modeling and prediction capabilities needed to address global food supply and security challenges. Through partnerships with other federal agencies, the United Nations, as well as the energy, communication, and agriculture industries, NOAA will support sector-specific planning and decision-making with the right environmental information. Key components include improving long-range forecasting and regional downscaling; increasing the accuracy of space weather models, predictions, and forecasts; expanding our ability to observe, understand, and model planetary boundary layer processes, especially in complex terrain and offshore; and providing easily-accessible, real-time environmental data and information.

Over the next five years, evidence of progress toward this objective will include:

- Production gains in renewable energy through better information;
- Mitigated economic loss due to advanced warning of geomagnetic storms; and
- An integrated suite of information targeted to food security needs.

Long-term goal: Healthy Oceans
Vibrant marine fisheries, habitats, and biodiversity sustained within healthy and productive ecosystems

Ocean and coastal resources are already stressed by human uses and habitat changes. This has resulted in depleted fish and shellfish stocks, increased numbers of species at-risk and declining marine and coastal biodiversity. As long term environmental, climate and population trends continue, global needs for

seafood, escalating recreational use of the marine environment, and other pressures on habitats and over-exploited species will increase. Concerns about the sustainability of ecosystems and safety of seafood will rise commensurately. Depleted fish stocks and declines in iconic species such as killer whales, salmon and sea turtles result in lost jobs and economic opportunities along the coasts. In addition, climate change impacts to the ocean—sea level rise, acidification, and warming—will alter habitats and the relative abundance and distribution of species as well as the productivity of coastal and marine ecosystems, affecting recreational, economic and conservation activities.

Responding to these challenges requires an ecosystem-based approach to management that accounts for the complex connections between organisms (including humans), their physical, biotic, cultural, and economic environments, and the wide range of processes that control their dynamics. Recovery of the marine environment and sustainable use of living marine resources are dependent upon one another, and effective management of these resources requires a better understanding of ecosystem processes. By working toward sustainability of all species, NOAA will also ensure, for present and future generations, that seafood is a safe, reliable, and affordable food source; that seafood harvests, recreational fishing opportunities and non-consumptive uses of living marine resources continue to support vibrant coastal communities and economies; and that species of cultural and economic value can flourish.

Objective: Improved understanding of ecosystems to inform resource management decisions

Fully implementing ecosystem approaches to management requires ongoing scientific exploration in our marine, coastal, and riverine systems, and increased understanding of the complex linkages among the human, biological, and physical components of the ecosystem. We do not yet fully understand how complex ecosystems will respond to a changing climate, or to many of the approaches that could be taken to manage living marine resources. Decision-makers in fishery management, protected species recovery, and coastal and marine spatial planning will need to consider the effects of alternative actions on ecosystems, individual species, and the human communities with which they interact.

To achieve this objective, NOAA will coordinate internal and external research on the linkages between biological, physical and human components of aquatic ecosystems. Key components include maintaining observations platforms to collect global, regional, and local ecosystem data and exploring innovative technologies such as genomics, ecosystem models, and alternative sampling techniques to improve our ability to accurately assess the status and health of living marine resources and the ecosystems on which they depend. Just as importantly, NOAA will work to enhance coordination and cooperation between scientists, policy-makers and stakeholders to ensure that this work is well understood and incorporated in management practices. NOAA also will support socioeconomic research and policy analyses to evaluate management strategies with respect to both ecological and social outcomes, and will assist partners in the development of ecosystem-based plans that include all aspects of the biological, social and economic environment. NOAA will ensure that this information is used in transparent regulatory and policy decision-making processes, and that it is well-communicated to a wide range of stakeholder communities.

Over the next five years, evidence of progress toward this objective will include:

- Increased use of ecosystem-based approaches, such as integrated ecosystem assessments, that incorporate climate considerations in fishery and protected resource decisions and in coastal and marine spatial planning processes;

- Next-generation fish and protected resource stock assessments incorporate habitat, ecosystem, and climate change information;
- Increased numbers of ecosystem assessments in aquatic and linked ecosystems; and
- Social and economic indicators are developed and used in management strategy evaluation.

Objective: Recovered, rebuilt, and sustained living marine resources

Living marine resources are already under pressure from human use and changes to the environment, including global climate change. NOAA has statutory responsibility for over 500 fish stocks or stock complexes under the reauthorized Magnuson-Stevens Fishery Conservation and Management Act (MSA), for marine mammals under the Marine Mammal Protection Act (MMPA), and for species and population segments that are threatened, endangered, or of concern under the Endangered Species Act (ESA). Yet our understanding of many of these species is limited; in many instances, we have virtually no data. Adequate assessments have been performed for less than 60 percent of the key fish stocks and complexes, less than 25 percent of all protected species, and an even smaller percentage of essential habitats for these species. To ensure the sustainability and resilience of living marine resources and the ecosystems that support them, federal, state, tribal and local governments, non-governmental organizations, and industry require science-based policy guidance, economic incentive programs, and sound regulations and enforcement.

To achieve this objective, NOAA will understand and reduce adverse impacts on at-risk species, eliminate overfishing, rebuild overfished and imperiled species, and improve the long-term economic stability of fisheries harvests through such practices as catch share programs. Central contributions to this objective include developing and implementing robust recovery, conservation and fisheries management plans for listed, at-risk, and overfished species. To ensure that the best plans are developed and implemented, NOAA will incorporate ecological knowledge in co-management regimes; improve our understanding of how populations and species respond to natural and human-induced threats, as well as to alternative management and conservation strategies; produce accurate status assessments for harvested, protected, and potentially at-risk species, based on enhanced, consistent, long-term observations; and conduct effective consultations, permitting processes and similar conservation efforts. The international dimensions of this objective require participation in international species management, such as anadromous and highly migratory species of fish, marine mammals worldwide, and fisheries in the Arctic and Antarctic.

Over the next five years, evidence of progress toward this objective will include:

- Increased abundance of species and stocks that are currently depleted, threatened, endangered, overfished or subject to overfishing;
- Increased numbers of assessed species and populations;
- Fewer fish stocks classified as overfished or subject to overfishing;
- Increased allowable catch levels as fish stocks reach rebuilt status;
- Decreased bycatch of target and non-target species; and
- Increased number of distinct population segments moved from endangered to threatened, and from threatened to de-listed.

Objective: Healthy habitats that sustain resilient and thriving marine resources and communities

Marine, coastal and riverine habitats are under increasing pressure from many human and natural threats including climate change, ocean acidification, fishing practices, human population growth, onshore and offshore development and extreme events like storm hazards and oil spills. NOAA has the responsibility to protect the critical habitat of species listed under the Endangered Species Act (ESA) as well as essential fish habitat, including Habitat Areas of Particular Concern, under the Magnuson-Stevens Fisheries Management and Conservation Act (MSA). Healthy habitats not only sustain healthy marine ecosystems, but also provide economically valuable services. For example, they have the capacity to filter water, and can buffer the impacts on communities of hurricanes and flooding. We must significantly increase the scale and effectiveness of habitat conservation to sustain and improve ecosystem services.

To achieve this objective, NOAA will increase the availability, quantity, and quality of marine, coastal, estuarine and freshwater habitats. This effort requires both scientific information and effective policy measures. NOAA and its partners will collect and synthesize information on the status and trends of marine, coastal and riverine habitats and the ecosystem services they provide; assess habitat condition to prioritize protection and restoration efforts; assess the socioeconomic impacts of habitat conservation and restoration efforts; and understand the likely effects of climate change and other anthropogenic perturbations on habitat conditions and the ecosystem services they provide. NOAA will coordinate habitat protection and restoration efforts, and will use economic incentive programs as well as Coastal Zone Management Act authorities to help local governments incorporate habitat conservation into coastal management plans and local development programs.

Over the next five years, evidence of progress toward this objective will include:

- Increased habitat quantity and quality achieved through strengthened habitat conservation policies, restoration programs, partnerships and on-the-ground habitat conservation;
- Habitat conservation targets set and priority areas identified for habitat protection and restoration;
- Increased assessment and use of habitat condition information in integrated ecosystem assessments and coastal and marine spatial planning efforts; and
- Habitat assessments address the quantity and condition of habitat and the links between habitat and the productivity of living marine resource stocks and result in management actions to protect and restore priority habitats.

Objective: Safe and sustainable seafood for healthy populations

As human populations grow, demand for protein sources, including seafood, will also increase. However, current demand is already depleting natural fish stocks, driving down harvest opportunities and reducing jobs along the coasts. Seafood-related health hazards, such as paralytic shellfish poisoning and industrial toxics in harvested species, are in the rise, yet only a very small percentage of seafood in the United States is inspected for toxics and disease. Imported seafood—more than 80 percent of the seafood consumed in the United States— typically is inspected less frequently. Improving opportunities for aquaculture and economically viable harvest strategies can help coastal communities and contribute to long-term food security for the nation.

To achieve this objective, NOAA will pursue science and policies that promote sustainable aquaculture practices, and will improve seafood inspection efforts. This will require strengthening the enforcement of regulations concerning international imports and exports; providing information and guidance to implement effective and ecologically-sustainable aquaculture; and improving the economic stability of harvest regimes. This objective also will require increasing the inspection of

seafood and the development of health hazard warning systems; characterizing ecological, social and economic impacts of seafood culture with state, tribal, and industry partners, and incorporating this information in harvest management planning and implementation; developing innovative land- and ocean-based feed technologies and evaluations of aquaculture production to improve best practices, siting guidelines and coastal and marine spatial planning processes; and supporting the use of eco-marketing and branding tools to promote sustainable seafood industries and raise public awareness of ocean sustainability.

Over the next five years, evidence of progress toward this objective will include:

- An aquaculture research program;
- Sustainable aquaculture facilities that do not adversely impact the larger ecosystem;
- Increased numbers of seafood monitoring programs for human health; and
- Increased proportion of inspected seafood.

Long-term goal: Resilient Coastal Communities and Economies

Coastal and Great Lakes communities that are environmentally and economically sustainable

The complex interdependence of ecosystems and economies will grow with increasing uses of land, marine, and coastal resources, generating economic and environmental pressures that bear particularly heavily on the nation's coastal communities. For example, continued growth in coastal populations, economic expansion, and global trade will further increase the nation's need for safe and efficient maritime transportation. Similarly, the nation's profound need for conventional and alternative energy presents many economic opportunities, but also will result in greater competition for ocean space, challenging our ability to make informed decisions that balance economic and environmental considerations. At the same time, the interdependence of ecosystems and economies makes coastal and Great Lakes communities increasingly vulnerable to chronic—and potentially catastrophic—impacts of natural and human-induced hazards, including climate change, oil spills, harmful algal blooms, and severe weather hazards.

NOAA's long-term coastal goal will invigorate coastal communities and economies, and lead to increased resiliency and productivity. Comprehensive planning will address competing uses to protect coastal communities and resources from the impacts of hazards and land-based pollution on vulnerable ecosystems, as well as to improve water quality and foster integrated management for sustainable uses. Geospatial services will support communities, navigation, and economic efficiency with accurate, useful characterizations, charts and maps, assessments, tools, and methods. Coastal decision makers will have the capacity to adaptively manage coastal communities and ecosystems with best available natural and social science. NOAA, our strategic partners in coastal communities, and the nation will understand the challenges we need to address, so the benefits, beauty, and heritage of our coasts can be appreciated by current and future generations.

Objective: Resilient coastal communities that can adapt to the impacts of hazards and climate change

Coastal communities contain over one half of the U.S. population, generate nearly 60 percent of U.S. economic output, and account for hundreds of millions of dollars in flood loss claims. Their vulnerability to coastal hazards increases with growing populations, declining coastal ecosystems, and

changing climate conditions. The overarching need is to improve the resilience capacity of the nation's coastal communities to 1) absorb impacts while maintaining an acceptable level of functioning; 2) reduce the amount of time and resources needed to return to full level of functioning; and 3) adapt to future risks by learning from past disasters and adopting risk reduction measures. Reducing vulnerabilities depends on healthy coastal economies; on proactively adapting to climate change impacts; on land use, conservation, hazard response and recovery planning; on mitigating chronic stressors; and on infrastructure decisions made at the federal, regional, state, and local levels. Coastal decision makers need current science-based information, accurate tools and technology, and the skills to apply them to effectively reduce their communities' vulnerabilities.

To achieve this objective, NOAA will develop and provide coastal decision makers with updated decision support tools, technical assistance, training, and management strategies related to adaptation, risk communication, hazard response and recovery, and resource conservation. Spatially relevant and integrated data, including social and economic data, will be delivered to support risk analyses, mapping, scenario analyses, adaptation planning, and implementation. State of the coast analyses and trend information on ecosystem status and valuation, along with community risk and vulnerability assessment methods as well as policy assistance, will be provided to support implementation of resilience adaptation strategies. Hydrodynamic models, forecasts, and visualization tools, based on an improved geospatial framework, will improve understanding of the impacts of coastal hazards and climate impacts on livelihoods and ecosystem services. NOAA will continue to work with partners to acquire, protect, and restore habitat and ecosystem services to support the resilience of both ecosystems and the built environment.

Over the next five years, evidence of progress toward this objective will include:

- An increase in the percentage of U.S. coastal states and territories demonstrating annual improvements in resilience to coastal weather and climate hazards;
- Coastal decision-makers and community leaders understand and use appropriate science-based tools and information for assessing hazard risk, vulnerability, and resilience;
- Effective community plans and strategies that improve community readiness to cope with natural and human-induced coastal hazards; and
- Healthy natural habitats, biodiversity, and ecosystem services support local economies and communities.

Objective: Comprehensive ocean and coastal planning and management

The nation's coastal zones are becoming busy places, with people living and recreating alongside a wide array of existing and emerging ocean-dependant industries. While an increasing range of uses will allow coastal communities to create diverse ocean-based economies, care must be taken to ensure continued access to coastal areas, sustained ecosystems, maintained cultural heritage, and limited cumulative impacts. A coastal and marine spatial planning framework is a comprehensive management approach that is designed to support sustainable uses and ensure healthy and resilient ocean and coastal ecosystems. Combined with its capacity to collaborate with state, territory, and federal partners, NOAA's expertise in ocean and coastal management and planning is needed to provide leadership and support for the development of regional and place-based spatial plans as well as the data streams, research, and tools necessary for implementation. In some areas, NOAA and its partners collaboratively protect and manage critical coastal and ocean ecosystems.

To achieve this objective, NOAA will promote sustainable resource use and stewardship by continuing to implement key NOAA mandates, including the National Marine Sanctuaries Act and

the Coastal Zone Management Act, and further its programmatic efforts to support coastal and marine spatial planning and management. In these efforts, NOAA will seek to balance the use of coastal and ocean resources with long-term conservation of special places in the planning and management of coastal and marine areas; support institutional infrastructure needed to coordinate and facilitate the planning process, engage stakeholders, and execute management actions; enhance geospatial data and visualization tools; require and sustain resource monitoring networks that are capable of integrating across spatial and temporal scales to determine the effectiveness of local management actions; develop and disseminate models, tools and best practices for long-term planning and management; and conduct social and economic studies needed to evaluate and improve the effectiveness of management decisions.

Over the next five years, evidence of progress toward this objective will include:

- National, regional, and local stakeholders engaged in the coastal and marine spatial planning process;
- Coastal and Great Lakes managers use new or enhanced models, data, tools, and best practices for informed spatial planning, management and stewardship of resources and ecosystems;
- Predictable and transparent regulatory mechanisms for ocean and coastal energy and other sectors; and
- An enhanced geospatial framework and data are available to underpin decision support tools.

Objective: Safe, efficient and environmentally sound marine transportation

The U.S. Marine Transportation System (MTS) reaches from our ports and inland waterways across our coastal waters and oceans to support commerce, recreation, and national security. The MTS is the backbone of the country's economy, with more than 77 percent by weight and 95 percent by volume of U.S. overseas trade carried by ship. By 2020, the value of domestic maritime freight is forecast to nearly double. An expanding MTS becomes increasingly vulnerable to natural and human-caused disruptions, potentially resulting in enormous losses to the U.S. economy. Increased maritime activity can also stress sensitive marine environments and increase the risk of marine accidents. Improving the reliability and resilience of the U.S. MTS will lessen risks to the economy and the environment.

To achieve this objective, NOAA will support operational decisions on our oceans and coasts with such fundamental services as marine weather forecasts, nautical charts, the underlying surveying and mapping data, real-time oceanographic information, oceanographic predictions and forecasts, and an accurate national positioning framework. NOAA will also bring its sciences and search and rescue functions to bear on emergency preparedness and response in the MTS to help save lives and mitigate the environmental and economic impacts of hazardous incidents, including oil spills. To ensure efficient and environmentally sound operations throughout the MTS, NOAA will continue to work with federal, state, and local partners on technology infusion and improvements to MTS products and services, including reducing the hydrographic survey backlog in navigationally significant areas. NOAA will also strengthen international partnerships to encourage the production and distribution of navigation information, and to ensure that global standards and policies are consistent with U.S. interests.

Over the next five years, evidence of progress toward this objective will include:

- Reduced maritime incidents in U.S. waters through timely and accurate navigational information;
- Increased capacity in the Marine Transportation System to promote greater efficiency and economic growth;
- Improved national geospatial framework for increased accuracy of navigation products and services;
- Reduced hydrographic survey backlog in navigationally significant areas;
- Increased percentage of national ports with access to real-time navigation products and services; and
- Increased preparedness and response to maritime incidents and emergencies.

Objective: Improved coastal water quality supporting human health and coastal ecosystem services

U.S. coastal communities and economies including tourism, recreation, and commercial fisheries rely on healthy coastal environments. Through work and recreation, over 70 percent of the U.S. population comes into contact with coastal waters that can contain a diverse array of chemical contaminants, excessive nutrients, pathogens, biotoxins, and marine debris that degrade habitat quality and can negatively impact human health and the services provided by ecosystems in the coastal zone. Beach advisory days due to biological contamination have more than tripled, levels of contaminants in coastal waters have risen, and marine debris has become one of the most widespread pollution problems in the world's oceans and waterways. More than 10 percent of coastal waters are considered unfit for designated uses, and over 50 percent of the nation's estuaries experience hypoxia. In the face of these trends, state, tribal, and federal partners need early warning networks to identify and predict threats to human and ecosystem health, and to implement effective and timely management efforts.

To achieve this objective, NOAA will research the fate and transport of chemicals, nutrients, sediments, pathogens, harmful algal blooms, toxins and marine debris in waterways; collect chemical, biological and economic and other social data; develop appropriate marine and biological sensors; and monitor, assess, and predict ecological and human health threats. Efforts to remove marine debris from coastal habitats will continue, and research will more clearly identify the damage marine debris causes to coastal economies and habitats. NOAA will develop, implement and improve advanced water quality protection programs for nationally significant areas and trust resources, and establish ecological forecasts and early warning networks to improve resource managers' knowledge of ecological stressors and management effectiveness. Additional contributions to this objective will include expanded coastal habitat characterizations; enhanced water quality monitoring and research activities, and improved early warning modeling and prediction efforts.

Over the next five years, evidence of progress toward this objective will include:

- Greater understanding of the effects of natural and human-induced contaminants on the health of humans and marine life;
- Reduced impacts to human health and ecosystem services due to degraded water quality;
- Faster detection of sediments and contaminants in coastal waters;
- Accelerated recovery and restoration of coastal resources and revitalization of coastal communities through improved water quality.

Objective: Safe, environmentally sound Arctic access and resource management

No single region better exemplifies the complex interdependence of communities and changing climate and ecosystem conditions than the Arctic. There is evidence of widespread, dramatic change in the Arctic region, with local to global implications. National security concerns are increasing as reductions in sea-ice bring opportunities for economic development and increased access to Arctic resources. These economic drivers can further threaten ecosystems and Arctic inhabitants already impacted by the rapidly changing climate. The breadth and complexity of the cultural, societal, economic, and environmental impacts within this region requires a concerted, systematic and rapid effort with partners from local to international levels.

To achieve this objective, NOAA will build on the capabilities noted in its other strategic objectives such as climate, marine weather, and increased observing capacity to support Arctic coastal communities and safe navigation to and through the Arctic. Modernizing the Arctic geospatial framework will provide the foundation for many of NOAA's activities in the region, including effective climate adaptation, community resilience, and coastal resource and marine spatial planning strategies. NOAA will support the Arctic region with accurate land and tidal elevations to monitor sea level and ice conditions, build flood protections, make infrastructure more resilient, ensure safe and efficient marine transportation, model storm surge, and support habitat restoration. Accurate weather and navigation tools, building the capacity to respond to natural and human-induced coastal hazards, and research to improve Arctic oil spill response and restoration capabilities are essential services NOAA will bring to the region. Arctic communities will also find NOAA a reliable source for climate information to inform decisions about moving communities, human health, and other adaptive strategies. Throughout this effort, NOAA will engage domestic and international partners to promote cooperation and sharing of data, observational platforms, and intellectual resources.

Over the next five years, evidence of progress toward this objective will include:

- Reduced risk and impact of maritime incidents on the Arctic environment;
- Arctic communities and ecosystems prepared for climate change and weather events with adaptation strategies and plans;
- A stronger foundational geospatial framework to better support economic and community resilience and inform policy options and coastal management responses to the unique challenges in the region; and
- Increased international collaboration to strengthen NOAA and U.S. policy objectives in the region.

NOAA's Enterprise Objectives

NOAA's strategy would be incomplete without detailing the enterprise-wide capabilities that will be required to achieve the environmental, social, and economic outcomes targeted by NOAA's strategic goals. NOAA's enterprise functions comprise three groups: the foundational science and technology functions that generate research and development, models, and environmental observations; the distinct functions for engaging partners and customers; and the underlying administration and management functions that support all of NOAA's work. These cross-cutting functions define NOAA's distinctive capabilities as an organization, and the objectives set forth below represent cross-cutting requirements for addressing NOAA's strategic goals as a whole.

NOAA's Science & Technology Enterprise

NOAA's vision centers on a holistic understanding of the interdependencies between human health and prosperity and the health and resilience of natural ecosystems. Achieving this level of understanding presents an overarching, long-term scientific and technical challenge to NOAA: *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.*

While developing this holistic and integrated understanding will require broad national and international collaborations, NOAA is uniquely positioned to address this challenge due to the diverse science requirements within and across its strategic goals and the distinctive research, observation, and modeling capabilities at the center of NOAA's scientific and technical enterprise. Understanding the connections between changes in the physical Earth system and its biological components, including human interactions, will drive NOAA's long-term progress toward climate mitigation and adaptation, a weather-ready nation, healthy oceans, and resilient coastal communities and economies. To address this long-term challenge and meet the science requirements within and across its strategic goals, NOAA must simultaneously pursue three objectives within its core scientific and technical enterprise: a holistic understanding of the Earth system; accurate and reliable data from sustained and integrated earth observing systems; and an integrated environmental modeling framework.

Objective: A holistic understanding of the Earth system through research

NOAA's strategic progress and future operational capacity will depend upon a strong and vibrant scientific enterprise that draws from NOAA research capabilities and the extended community of public, private, and academic researchers with whom NOAA collaborates routinely. NOAA's long-term goals hinge on an enhanced understanding of the complex interrelationships that exist across NOAA's climate, weather, ocean, and coastal domains. A holistic understanding of these interrelationships requires a rich, interdisciplinary characterization of the physical, chemical, geological, biological, and social components of the earth system. To explore, observe and understand ecosystem dynamics and enable the nation to make informed decisions about our changing environment, NOAA needs to advance innovative research that pushes the boundaries of scientific understanding and integrates information across scientific disciplines.

To achieve this objective, NOAA will need to build and maintain a reliable, accessible suite of climate, weather, marine ecosystem, living marine resource, and geospatial information; improve the understanding of key environmental processes; build capacity in the social, behavioral, and economic sciences to support the valuation of ecosystem services, risk and vulnerability assessments, and decision-support services; and develop advanced technologies in sensors, computing and networking, and user interfaces to better observe, understand, model, and communicate knowledge of complex systems. Connecting new capabilities to operations will require test-beds to accelerate the transition of these technologies to operational use. NOAA will balance technology development, deployment, and relatively low-risk applied research with an appropriate level of high-risk research to foster unpredictable, radical innovation that can transform our science and mission functions. Across all domains, NOAA will need to characterize the uncertainties associated with scientific information, and effectively communicate scientific information and its associated uncertainties to policy makers, the media, and the public.

Over the next five years, evidence of progress toward this objective will include:

- Acquiring and incorporating 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;
- Understanding and quantifying the interactions between atmospheric composition and climate variations and change, including the chemical, physical, and biological effects of these changes;
- Understanding and characterizing 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);
- Assessing and understanding 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;
- Improved understanding of the water cycle from global to local scales to improve our ability to forecast weather, climate, water resources and ecosystem health; and
- Developing and evaluating approaches to substantially reduce environmental degradation, overfishing, and climate change in ways that maximize benefits and minimize adverse impacts.

Objective: Accurate and reliable data from sustained and integrated earth observing systems

NOAA's science, service, and stewardship mission is rooted in Earth and space observations. The nation's efforts to mitigate and adapt to a changing climate requires accurate and comprehensive climate data records. Weather forecasters require observations of the state of the atmosphere and oceans to initialize and verify the models and to make accurate forecasts. Fisheries cannot be sustained without data on current and historical states of the stocks and their living environment. Coastal communities need observations to understand changing coastal ecosystem conditions and sustainably manage coastal resources. Nautical charting and navigation activities require consistent observations of the ocean surface and floor. All of these capabilities draw upon the diverse observing system assets, including satellites, radar, manned and unmanned aircraft, ground stations, sea-going vessels, buoys, and submersibles. The varied and growing requirements levied upon these systems greatly exceed the current capacity. NOAA's observing system portfolio needs to balance growing demands with continuity concerns and implementation of emerging technologies. Over the long term, NOAA must sustain and enhance atmospheric-oceanic-terrestrial-biological and human observing systems—and their long-term data sets—and develop and transition new observing technologies.

To achieve this objective, NOAA will gather environmental data by developing, deploying, and operating systems to collect remote and in-situ observations, and manage and share data through partnerships and standards. To this end, NOAA will develop the next generation of satellites to serve future space-based observations and provide data continuity; launch and operate environmental observation satellites; maintain and develop the next generation of research vessels and aircraft to serve multiple observation requirements; deploy Autonomous Underwater Vehicles (AUVs) and Unmanned Aircraft Systems (UASs) to explore hard-to-observe regions such as deep oceans and the Arctic; calibrate climate sensors to maintain the integrity of NOAA's climate data records over time; integrate ground-based networks maintained by different domestic entities in the National Mesonet to maximize the effectiveness of ground-based weather observations; assimilate and fully exploit the observations data from the next generation of polar and geostationary satellites, space weather observing systems, ground based radars and in-situ sensors, airborne sensors, unmanned observing platforms, and ship-deployed systems such as buoys and submersibles. Throughout this effort,

NOAA will pre-plan the transition of research observing platforms to operations, and will maintain strong partnerships with domestic and foreign partners through agreements to share expertise, instrumentation, data, data processing, and related costs.

Over the next five years, evidence of progress toward this objective will include:

- Enhanced horizontal, vertical, and temporal coverage of the Earth from deep ocean to space;
- Integrated and sustained observing networks over larger domains;
- Improved data interoperability and usability through common standards, calibration methods, data storage and access solutions, and long-term stewardship; and
- Lower observing system life-cycle costs.

Objective: An Integrated environmental modeling system

To fulfill current and emerging science and service requirements toward all of NOAA's strategic goals over the long term, the agency ultimately must evolve toward a comprehensive Earth-system modeling enterprise that links atmospheric and oceanic models—and integrated modeling backbone that connects environmental models across time, space, and phenomenological scales. Developing and integrating information will require collaboration across all scientific disciplines: chemical, physical, geological, biological, social, behavioral, and economical. There is significant modeling research and development supported by NOAA and other federal agencies, and carried out by broad external research communities across the nation. The complexity of NOAA's modeling requirements and the challenges of transitioning research and development capabilities into operations will require extensive internal coordination within NOAA, interagency coordination for the effective utilization of national investments, and external collaboration with the environmental modeling community in the academic and private sectors.

To achieve this objective, NOAA will develop a comprehensive modeling backbone; integrate models, products, and services; and foster a culture of collaboration within and external to NOAA. To this end, NOAA will develop collaborative strategies involving internal and external partnerships and community-wide standards to ensure interoperability; integrate research monitoring and prediction plans for NOAA's strategic goals, including regional-scale climate models and integrated ecosystem modeling; and institute a well-functioning governance structure for NOAA's environmental modeling enterprise.

Over the next five years, evidence of progress toward this objective will include:

- Enhanced scope and predictive accuracy of models that integrate multiple components of the earth system (physical, biological and social) for global, national, and regional applications, and for specific phenomena;
- Increased volume and diversity of data and information assimilated into models, particularly at different global, national, regional and local scales; and
- Enhanced NOAA service capabilities such as greater access to, ease-of use of, and reliance upon NOAA's models.

NOAA's Engagement Enterprise

As the challenges NOAA addresses become more complex over time, NOAA will need increasingly sophisticated organizational mechanisms for understanding user needs and engaging stakeholders and customers across local, regional, and international levels. Many of the challenges that NOAA helps address do not stem from a lack of information, but from an uneven distribution of information. Often the best way for NOAA to meet the needs of its stakeholders is by better delivering the data and knowledge that we already possess to those who have not yet been able to use it. Conversely, the breakthrough research, development, operational improvement, or policy action that NOAA needs to achieve may depend upon the unique knowledge or needs of a partner or customer.

The capacity for NOAA to effectively engage individuals and other organizations will determine its success over the long-term. Scientists must engage with their peers, but also with colleagues in other disciplines and with the public at large. Managers of NOAA environmental data and information services must engage with the decision makers in local governments and industries. Regulators must engage with the communities they regulate, as well as with their regulatory counterparts in other nations.

Objective: An engaged and educated public with an improved capacity to make scientifically informed environmental decisions

Among the many environmental challenges facing the nation, responding to climate change and balanced use of coastal and marine resources are paramount. To address these challenges, NOAA must rely not only on its own capabilities, but also on the ability of leaders, organizations, institutions and the public to understand environmental conditions and the forces that affect them. Many stakeholders and the public face a considerable challenge of understanding climate and ecosystem dynamics, parsing estimates of potential impacts, and integrating environmental information, and uncertainties, into routine decision-making. Conversely, engagement is needed for NOAA's program development, which requires an intimate knowledge of its stakeholders, their particular information needs, and ways of doing business. Finally, there is a widening gap between the science most U.S. students learn in school and the knowledge they will need in the 21st-century to foster the nation's innovation and competitiveness. To support climate, weather, ocean, and coastal science and management needs of the next generation, NOAA must foster an environmentally literate society and the future environmental workforce.

To achieve this objective, NOAA will engage stakeholders and the public at multiple levels to build awareness of environmental science, services, and stewardship responsibilities, foster community dialog, and educate citizens and students. To this end, NOAA will work with partners to increase climate, weather and ocean literacy through investments in extension, training, education, outreach and communications; reach out to community leaders and decision makers; use innovative technologies to engage stakeholders and the public; develop strategic connections with science education communities to advance scientific and technical education opportunities and attract populations who are currently underrepresented in the science workforce; and coordinate with other agency's education and outreach initiatives, including those of other federal scientific and environmental agencies.

Over the next five years, evidence of progress toward this objective will include:

- Improved public understanding of climate change, weather, ocean and coastal environments through an integrated program of education, outreach, extension, training and communications;

- Stakeholder needs for NOAA science, service, and stewardship are continually and adequately assessed; and
- NOAA employees and partners are better prepared to effectively engage key stakeholders, and the public to enhance literacy of climate, weather, ocean and coastal environments.

Objective: Integrated services meeting the evolving demands of regional stakeholders

The challenges that NOAA's partners and customers face do not always fall neatly into the domain of a single NOAA business unit or strategic goal. However, they are often particular to communities within geographic regions. For example, the changing weather, water quality, and water quantity conditions in the Great Lakes will affect the region's livelihood including transportation, recreational, and extractive needs. Similarly, there are unique environmental, sociological, and economic conditions in the North Atlantic, Mid-Atlantic, West Coast, Central region, Gulf of Mexico, Southeast and Caribbean, as well as in Alaska and the Pacific Islands. NOAA's capacity to meet its strategic goals and objectives will require organizational flexibility to tailor its capabilities and services to meet distinctive regional needs. As regional and local conditions change, NOAA will need to quickly assess changes in user and stakeholder priorities and develop collaborative solutions that draw on the full range of capabilities available from NOAA and its community of partners.

To achieve this objective, NOAA will tailor services to meet regional demands by coordinating and integrating the capabilities of multiple line offices within that region. Through regional collaboration and engagement strategies, NOAA will seek to improve the use and usability of its services and adapt rapidly to changing local and regional conditions and requirements. In particular, NOAA will focus on supporting and collaborating with established and emerging regional ocean governance initiatives.

Over the next five years, evidence of progress toward this objective will include:

- Integrated, regional-scale information tailored to the decision needs of NOAA's stakeholders and customers;
- Organizational agility in providing products and services as user needs evolve;
- More effective decision support for state and local governments, drawing on the entirety of NOAA's mission capabilities; and
- Effective support for and collaboration with regional ocean governance initiatives.

Objective: Full and effective use of international partnerships and policy leadership to achieve NOAA's mission objectives

NOAA's mission extends far beyond the borders of this country: oceans, ecosystems, and the atmosphere do not conform to political boundaries. Global climate change has further drawn attention to the international nature of the many challenges and opportunities that the nation faces. NOAA plays a key leadership role in international ocean, fisheries, climate, space, and weather policies. For example, NOAA's stewardship responsibilities under the Magnuson-Stevens Fishery Conservation and Management Act encompass both domestic and international fisheries, and NOAA promotes stewardship of trans-boundary and other living marine resources and their ecosystems through leadership and participation in domestic and international activities. NOAA's many assets—including research programs, vessels, satellites, laboratories, and a vast pool of internationally recognized experts—make it an essential international resource. NOAA is well positioned to assist

other nations in improving their understanding and ability to predict changes in climate and other environmental conditions that will affect natural resources, population safety, and economic activity. In addition, with more countries launching their own satellites, and ocean- and ground-based observing networks, there are more opportunities to leverage investments made by foreign partners. As such, the need for common data standards, service level agreements, and memoranda of understanding have increased.

To achieve this objective, NOAA will leverage multilateral and bilateral partnerships to take full advantage of the research, observations, environmental science, and ecosystems management expertise and resources from outside the United States. Continued international engagement will enable NOAA, working on behalf of the United States, to promote goals and practices that can be adopted and adapted regionally or globally to advance NOAA's strategic goals. Through these efforts, NOAA will improve the standardization, availability, and utility of environmental data for the nation and our global partners.

Over the next five years, evidence of progress toward this objective will include:

- Full implementation of the provisions of the Magnuson-Stevens Fishery Conservation and Management Act to combat Illegal, Unregulated and Unreported fishing and bycatch of protected living marine resources in international fisheries;
- Fulfillment of the Coral Triangle Initiative objectives;
- An International Marine Mammal Conservation Action Plan;
- Expanded collaborations and partnerships on international climate observing systems, assessments, and services; and
- Fewer confrontations and litigations over violations of international law.

NOAA's Organization & Administration Enterprise

Supporting all of the functions above is the management of resources, an essential function of any organization. NOAA's managers, whether at headquarters or in the field, have common responsibilities to manage the investment of tax-payer dollars, deploy physical infrastructure, and retain a qualified workforce. NOAA's managerial efforts avail the rest of the agency of the staff, the infrastructure, and the financial capital it needs to get the job done. Effective management of these resources fosters an organizational environment in which core competencies can be realized and final products can reach their fullest potential.

Objective: Diverse and constantly evolving capabilities in NOAA's workforce

At the heart of NOAA operations is the creative work of scientists, engineers, technicians, managers, and administrative staff. It is only by building this stock of intellectual capital that NOAA can provide the public scientific knowledge, information services, and environmental stewardship capabilities that are the necessary ingredients for NOAA to achieve its strategic goals. As the challenges that face our nation develop, NOAA will increasingly require a workforce not only of top-tier scientists and leaders, but science communicators and science managers. Focusing on social and environmental outcomes will require not only the best skills in the scientific and engineering disciplines, but the best skills in interdisciplinary work. Understanding a dynamic ecosystem, which includes natural, social, and economic systems, will require expertise in the social and economic

sciences. And with a substantial portion of its workforce ready for or approaching retirement, NOAA will need to attract, hire, train, and retain the next generation of professionals needed to accomplish NOAA's strategic goals.

To achieve this objective, NOAA will recruit and maintain world class professionals with disciplinary, interdisciplinary, and managerial expertise. NOAA will conduct systematic analyses of current workforce capabilities and future workforce needs in order to recruit, retain and develop its workforce. NOAA will focus on hiring and developing people with expertise and developing performance plans that reflect NOAA priorities and NOAA strategic goals. We will strengthen the NOAA Corps and leverage the operational expertise and interdisciplinary experience of officers to lead implementation of new observation technologies. We will increase our collaboration with academia and create opportunities to support undergraduate and graduate students to participate in NOAA activities and foster their interest in NOAA related scientific study and future career consideration.

Over the next five years, evidence of progress toward this objective will include:

- Increased leadership and managerial training and certification in the career development of NOAA professionals and NOAA Corps Officers;
- Increased numbers of interdisciplinary professionals and science translators to enable functions of engagement and integration;
- Increased use of social scientists for research, service development, and operations;
- Increased capacity of the NOAA Corps to lead integration of advanced technologies into NOAA's missions; and
- Increased numbers of underrepresented groups in the NOAA workforce.

Objective: A modern IT infrastructure for a scientific enterprise

NOAA's evolving mission requires a transformed, agile and secure Information Technology (IT) infrastructure to propel its scientific and operational goals with advanced computing capabilities. World class delivery of reliable and scalable IT services is essential to meet growing demands to efficiently process and disseminate ever increasing volumes and types of environmental information. High Performance Computing (HPC) enables environmental modeling and thus all of NOAA's predictive products, such as weather forecasts, climate analyses, as well as the transfer into operations of mature research systems. Additionally, consumer and professional use of social networking sites is becoming increasingly (and inextricably) intertwined, and there is an increasing scale, scope, and geographic dispersal of NOAA's various scientific mission offices. Modern collaborative technologies are essential to enabling NOAA's diverse and distributed staff to more effectively share knowledge NOAA-wide, and to enable customers and stakeholders to transparently and effectively engage with the extended NOAA community.

To achieve this objective, NOAA will implement enterprise-wide solutions to gather, process, and disseminate environmental information, enable effective collaboration, and improve operational cost effectiveness, efficiency, and service quality. NOAA is committed to modernizing the IT infrastructure through the development of a common architecture and consistent approach to making decisions based upon the service needs of NOAA staff and stakeholders. NOAA will make available computing platforms, networks, data storage and information analytics to efficiently collect, analyze and disseminate the massive quantities of observational data needed by the public and our partners for reporting and warning. Significant and sustained investments will be required to establish and maintain an HPC architecture that meets NOAA's weather and climate modeling needs. Desktop

services will include cloud computing, virtualization, and state-of-art business intelligence products and tools. NOAA will provide secure and flexible social media environments, collaboration tools, and web portals to promote innovation across mission, line, stakeholder and user boundaries. The agency will support unified communications by efficiently and reliably switching traffic across formats, media and channels. It will support responsible and sustainable IT development in alignment with NOAA's overall sustainability efforts in "going green."

Over the next five years, evidence of progress toward this objective will include:

- A common architecture and framework for IT services and solutions;
- Evolving environmental modeling requirements are adequately supported by high performance computing;
- Enterprise-wide protection from cyber security threats; and
- A high-performing workforce of the future.

Objective: Sound, life-cycle management of capital investments

NOAA's unique mission is particularly capital intensive, and it requires equally unique capital investments in land, structures, satellites, ships, aircraft, unmanned systems, sensors, equipment, intellectual property (e.g., software), and information technology (including IT service contracts). NOAA must acquire and maintain special facilities and major systems, particularly for observing and modeling. Data collection functions require not only observation platforms and sensors, but also the installations to receive, transmit, store, and process the data. Weather forecasts depend upon a network of local forecasting stations around the country. Research functions require state-of-the-art laboratories and libraries. Oceanic and atmospheric observations require a fleet of technically advanced ships, aircraft, and unmanned systems. NOAA's entire workforce and its partners require safe, secure facilities to conduct their work. The responsible management of these systems requires a long-term perspective in order to operate them effectively and efficiently over their entire life cycle. Beyond physical infrastructure, a large part of NOAA's mission requires investing in the capabilities of its partners through grants and cooperative agreements, such as Cooperative Institutes. These investments, too, must be managed responsibly and for the long-term.

To achieve this objective, NOAA will validate mission requirements and establish consistent and systematic agency-wide reviews to ensure optimal solutions are identified for achieving NOAA's strategic goals and objectives. This effort will entail a mission requirements baseline, and a validation process that ensures that solutions continue to meet requirements throughout their life cycle. Consistent with this life-cycle approach, NOAA will set high standards for energy efficiency and the overall environmental performance of its facilities.

Over the next five years, evidence of progress toward this objective will include:

- Improved facility condition index;
- Increased percentage of building square footage certified by the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED); and
- Recapitalization of NOAA's fleet of ships and aircraft according to schedule to ensure technically advanced science platforms that meet the evolving needs of the agency.

Strategy Execution and Evaluation

The objectives identified in this plan are the basis for NOAA's corporate planning, performance management, and stakeholder engagement over the next five years. Objectives are specific outcomes NOAA can achieve on the path to broader, long-term goals and toward a more capable, flexible enterprise. They are measureable and can be affected by specified activities over a five year period. NOAA's Line and Staff offices will be accountable for executing the strategy laid out in this document. Where there are shared capabilities to achieve an objective, there will also be joint accountability for budgeting, executing, and performing toward that objective.

NOAA will systematically monitor and evaluate performance toward the outcome-oriented goals and objectives in this plan. Evaluating performance will allow NOAA to learn from its successes and failures and continually improve itself as an organization and better deliver on the promise of its mission of science, service, and stewardship. NOAA's performance measures, including those required under the Government Performance and Results Act, are published annually in the NOAA Annual Performance Plan and Performance Accountability Report.

The NOAA Strategic Plan supports the Department of Commerce (DOC) Strategic Plan and Annual Performance Plan. There is a direct relationship between NOAA's goals and objectives and the goals and performance measures included in the annual budget submission to DOC. DOC uses this information for its Annual Performance Plan and Performance and Accountability Report, which integrate outcomes and performance measures across the Department.

Strategic Partnerships

Integration among NOAA's Line and Staff offices alone cannot achieve the strategic outcomes set forth in this plan. External collaboration and partnerships are and will continue to be central to every aspect of NOAA's work. NOAA is part of an extended network of institutions in the public, private, and academic sectors that will collectively drive progress toward the vision of healthy ecosystems, communities, and economies that are resilient in the face of change. Major partners in NOAA's long-term strategy include:

Climate Adaptation & Mitigation

NOAA is a key part of international global climate enterprise that has already made significant progress in our understanding of climate variability and change. Sustained partnerships among federal agencies; international, state, local and tribal governments; academia; non-governmental organizations; and the private sector are needed to improve scientific understanding, produce more useful climate predictions, identify climate risks and vulnerabilities, deliver climate-relevant information to inform decision-making, and better inform society about climate variability, change, and their impacts. NOAA will build upon decades of engagement with external partners to improve its ability to develop and deliver climate products and services that meet needs at global to local scales. Given its stewardship responsibilities and expertise, NOAA will focus its collaboration activities on the impacts of a changing climate on the nation's ocean and coastal ecosystems, living marine resources, and salt and freshwater resources.

Weather-Ready Nation

The nation's weather enterprise is composed of unique partnerships among government, private sector entities, and the academic and research community. Their contributions are complementary and at times overlapping. NOAA provides information to support protecting life and property and enhancing the national economy. To carry out this mission, it develops and

maintains an infrastructure of observing, telecommunications, and prediction systems on which the public (federal, state, and local government agencies), private, and academic sectors rely. Academia advances the science and educates future generations of participants in the enterprise. The private sector (weather companies, meteorologists working for private companies or as private consultants, and broadcast meteorologists) creates products and services tailored to the needs of their company or clients and works with NOAA to communicate forecasts and warnings that may affect public safety.

Healthy Oceans

Achieving healthy oceans and sustainable ocean ecosystems will require strong coordination and integration across NOAA and with federal, state, local and tribal stakeholders. Collaboration with academic institutions, non-governmental organizations, federal agencies and NOAA's operational and research programs will help to provide the scientific foundation for ocean resource management decisions and strengthening ecosystem science. Strong partnerships and enhanced coordination and cooperation among our scientists, policy-makers, the Fishery Management Councils, our strategic partners in the commercial and recreational fishing industries, non-governmental organizations, and academic centers will ensure a transparent and effective approach to the management of ocean resources.

Resilient Coastal Communities & Economies

Resilient coastal communities and economies cannot be achieved without strong partnerships. NOAA will build on existing strategic partnerships with federal agencies, such as the U.S. Coast Guard, to help provide services to adapt to coastal hazards and provide safe conditions in the Arctic; with the Department of the Interior, to conserve special marine and coastal places; and with the Environmental Protection Agency, to improve coastal water quality and encourage smart growth. Comprehensive ocean and coastal planning will require an unprecedented level of engagement and collaboration with our federal, state, local and tribal partners, as well as a wide range of stakeholders in the private and academic sectors. The complex and interdependent vulnerabilities that the coasts face will require enduring partnerships to help to develop environmentally and economically sustainable community practices.

References

For further information on the consultations and analyses that NOAA used in developing this plan, including NOAA's *Scenarios for 2035* and the results of NOAA's extensive stakeholder consultations, please visit:

www.noaa.gov/ngsp

A Report by a Panel of the

NATIONAL ACADEMY OF PUBLIC ADMINISTRATION

For the U.S. Department of Commerce, National Oceanic and Atmospheric Administration and the U.S. Congress

September 13, 2010

Building Strong for Tomorrow: NOAA Climate Service

PANEL

Michael P. Jackson,* *Chair*
Mortimer L. Downey*
Gerald E. Galloway*
DeWitt John*
Jerry Melillo
James F. Murley*
Molly A. O'Neill*
Marcus C. Peacock*
Barry G. Rabe*
Shui-Yan Tang*

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Diane M. Disney, *Secretary*
John J. Callahan, *Treasurer*

Study Team

Lena Trudeau, *Vice President*
Lois Fu, *Program Area Director*
Jaime Zamora, *Project Director*
Stephanie Bailenson, *Senior Advisor*
Mark Hertko, *Senior Project Analyst*
Jonathan Tucker, *Project Advisor*
Laurie May, *Senior Advisor*
Stephanie Rowe, *Senior Advisor*
Joe Mitchell, *Project Advisor*
Keithan Hawley, *Research Associate*
Celeste Luna, *Project Assistant*

The views expressed in this report are those of the Panel. They do not necessarily reflect the views of the Academy as an institution.

National Academy of Public Administration
900 7th Street, N.W.
Suite 600
Washington, DC 20001-3888
www.napawash.org

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FOREWORD

Every day, public officials, business leaders and private citizens are making decisions that depend on understanding how climate will change over the course of the next 5, 10, 100 years and beyond. Decisions about land use, disaster preparedness, construction at ports, investments in heat- and pest-resistant crops, and energy infrastructure requirements will all benefit from improved understanding of likely changes in climate and its effects on water resources, public health, energy demands, and agriculture. The National Oceanic and Atmospheric Administration (NOAA) plays a pivotal role in our understanding of climate, climate variability and change. For decades, NOAA and its federal, state, local, tribal, academic and private sector partners have provided climate data and information essential to policy development, planning, and decision-making.

The idea of organizing NOAA's climate activities predates the passage of the 1978 National Climate Program Act. As understanding of climate has grown, so has demand for climate information and services, for better and more comprehensive information to assist governments at all levels as they consider options and make decisions about infrastructure, natural and managed ecosystems, and communities.

Standing up a NOAA Climate Service is the beginning of the journey, not the final destination. NOAA's climate research, observations, data stewardship, modeling and predictions are the foundation for a NOAA Climate Service. Tough challenges will be faced as NOAA aligns its critical climate functions to improve its research and services, its relationships with other federal partners, and ultimately the nation's ability to sustain environmental quality, minimize risks to life and property, and maintain economic strength.

The National Academy was privileged to conduct this review for Congress, the Department of Commerce, and the National Oceanic and Atmospheric Administration. We are grateful to the National Academy Panel for its excellent and diligent work and to the study team for its significant contributions. In addition, we wish to acknowledge the vital assistance provided by the Deputy Under Secretary for Operations and her staff, the NOAA line offices, and the Climate Program Office. Finally, our sincere appreciation goes to the many individuals, federal, state and local government partners, and other important stakeholders who provided information and contributed their insights through interviews, roundtables, and the online dialogue. Their engagement, knowledge, and dedication to meeting our nation's climate-related needs are truly remarkable.

Jennifer L. Dorn
President and Chief Executive Officer

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ACRONYMS

Academy	National Academy of Public Administration
CPC	Climate Prediction Center
CPO	Climate Program Office
CSD	Chemical Sciences Division
DOD	Department of Defense
ESRL	Earth System Research Laboratory
FEMA	Federal Emergency Management Agency
FY	Fiscal Year
GCRP	U.S. Global Change Research Program
GFDL	Geophysical Fluid Dynamics Laboratory
GMD	Global Monitoring Division
GOOS	Global Ocean Observing System
HCN-m	Historical Climate Network-Modernization
IOOS	Integrated Ocean Observing System
IPCC	Intergovernmental Panel on Climate Change
NASA	National Aeronautics and Space Administration
NCDC	National Climatic Data Center
NESDIS	National Environmental Satellite, Data, and Information Service
NGDC	National Geophysical Data Center
NIDIS	National Integrated Drought Information System
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NODC	National Oceanographic Data Center
NOS	National Ocean Service
NWS	National Weather Service
OAR	Office of Oceanic and Atmospheric Research
PMEL	Pacific Marine Environmental Laboratory
PPI	Office of Program Planning and Integration
PSD	Physical Sciences Division
RCC	Regional Climate Center
RISA	Regional Integrated Sciences and Assessments
SAB	NOAA Science Advisory Board
SES	Senior Executive Service
TAO	Tropical Atmosphere Ocean

EXECUTIVE SUMMARY

This Executive Summary lays out the purpose and method of this report, introduces core recommendations and discusses some of the major success factors needed to ensure an effective launch for the proposed National Oceanic and Atmospheric Administration (NOAA) Climate Service.

SCOPE OF WORK

The U.S. Congress asked an expert panel of the National Academy of Public Administration (the Academy) to assist NOAA with "a study and analysis of organizational options for a National Climate Service within NOAA, emphasizing maximum effectiveness and efficiency."[1] Five specific areas of focus were identified by the Conference Committee report. Specifically, the Panel was asked to assess how to:

1. provide information at the global, regional, and state levels over varying timescales.

2. support interaction among the government and various users, stakeholders, researchers, and information providers of climate information in both the private and public sectors.

3. develop and distribute products and information that will support decision-making to better prepare the Nation for climate variability and climate change.

4. coordinate and align existing programs and resources internal and external to NOAA to reduce duplications and leverage existing climate-related resources.

5. provide estimates on projected funding levels.

Further, NOAA formally asked the Panel to: provide an independent assessment of how NOAA should organize its climate capabilities; assess NOAA's proposed organizational structure in light of our independent assessment; and make recommendations for a Climate Service line office structure that will integrate NOAA's climate science and research with service delivery.[2]

It is important to understand how the Panel approached this undertaking. The Congressional report language calls for a study of a "*National* Climate Service within NOAA," and it requested the Panel's view about aligning "existing programs and resources *internal and external* to

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[1] U.S. Congress, House, *Conference Committee Report to Accompany Consolidated Appropriations Act, 2010* 11th Cong. 1st sess., 2009, Report 111-366 (Washington: GPO) p. 636.

[2] Throughout this text the word "service" is used repeatedly, of course even in the title of the proposed new organization: the NOAA Climate Service. This report will discuss below both what NOAA has recommended as its basic service offerings and what the Panel suggests may be manageable service objectives. The Panel encourages the new NOAA Climate Service to focus its services especially on providing impartial, scientific findings as requested by public officials who must make policy and investment decisions affected by climate variability and change.

NOAA" (emphasis added). The current Administration supports creating a NOAA Climate Service. The Administration has *not*, however, proposed a *National* Climate Service that would reorganize or transfer assets existing in other organizations into NOAA.

The contractual scope of this study does *not* include making recommendations about the internal structure of research and/or service organizations other than NOAA. ***The Panel strongly supports the creation of a NOAA Climate Service to be established as a line office within NOAA.*** From our perspective, it would be desirable that this office be titled the *National Climate Service*.[3]

The Panel recommends that the federal government substantially expand its delivery of regular, impartial and authoritative climate information services to state, local and tribal governments and to the public, by: (1) providing more robust and finer-grain information about possible impacts of climate variability and change to guide government and private sector decisions about adaptation; and (2) assisting others to access and effectively use models for understanding how mitigation efforts can avert or reduce climate change.

To be effective, a NOAA Climate Service should be a leader, working with other federal agencies to coordinate the gathering, stewardship and availability of climate information by all appropriate federal agencies as well as states, local governments, tribes, other nations and international bodies. Creation of a NOAA Climate Service vested with a strong mandate will not only strengthen NOAA's science and service deliverables, but it will likely also accelerate the work of making the broader federal climate enterprise more focused, cohesive and effective.

ADMINISTRATION SUPPORT NEEDED FOR THE NEW NOAA CLIMATE SERVICE

Interagency Coordination. The Panel acknowledges that substantial work and iteratively stronger coordination is taking place across the federal government (especially through the White House Office of Energy and Climate Change's working group on Climate and Energy, the National Science and Technology Council, its Committee on Environment and Natural Resources, the Interagency Climate Change Adaptation Task Force and the U.S. Global Change Research Program) as well as within and between particular Departments and agencies.

Capabilities of the federal government regarding climate should, however, be further integrated and strengthened on two interdependent but distinct levels: at the *strategic and policy level;* and at the *operational level*, where research, data collection and service delivery take place.

Without prejudice to existing dual-agency or multi-agency working-level mechanisms, a more senior-level federal interagency coordination mechanism with a broader mandate would be enormously valuable. ***The Panel recommends that the Administration strengthen and expand interagency coordination structures tasked with aligning Executive Branch climate resources. Specifically, the Panel recommends that the President empower a senior interagency group – led at the White House and convened at the Deputy Secretary or Secretary level – to provide***

[3] The report does not use the National Climate Service title throughout the document, instead uses NOAA Climate Service for consistency and statement of work compliance.

the President annually with a strategic plan for management of federal climate research and service delivery.

This group should be tasked with assessing the adequacy of ongoing federal climate research and service delivery efforts, recommending appropriate budget priorities and resolving as needed any interagency conflicts or policy issues associated with climate research or service delivery. This coordination role would most effectively be conducted through an established interagency policy council or other broad-based interagency body led by a senior Administration official (for example, at the rank of Assistant to the President).

In addition to its climate research and service delivery activities, the Executive Branch has an already large and growing climate change policy agenda (tax policy, legislative strategy, regulatory decisions, and other strategic policy and investment decisions). Although such matters are beyond the scope of this study, the Panel simply notes that the same senior interagency group needed to coordinate federal climate research and service delivery ideally could be configured to support the overarching Executive Branch climate policy agenda. This would likely bring beneficial synergy and focus on what is needed to support policy *and* operational decision-making.

Lead Federal Agency Designation. At the operational level, allocation of scarce federal resources for research, data collection and services should be managed aggressively to prioritize efforts that will have the greatest positive impact. ***It is not necessary, nor would it be wise, to force into a single organization all of the federal assets that might contribute to strengthening climate science or climate services.***

Nonetheless, it would be extremely valuable, indeed the Panel considers this essential, to have one federal agency designated to be the center of gravity for aggregating and rigorously providing an authoritative roadmap or portal to the best available science that can be harnessed to support public policy decision making.

Certainly no single agency could conduct all federal climate research. Nor will one agency have all the assets needed to support all constituencies or to deliver all services regarding climate. But somewhere in the federal government, the public needs an authoritative entity to identify what is known and what is not. It should be able to know what is being studied and by whom, what needs more study, who is developing what end-user products, and how or whether the federal government can help map resources and capabilities to specific needs. Similarly, international partners should not be compelled to shop among federal agencies when seeking to coordinate climate research or services.

In short, there is a much-needed role for one agency to serve as a day-to-day integrator of the overall federal effort regarding climate science and services. This is a job for an agency that can serve as a convener, a guide to valid science, an inveterate dot-connector that probes the interstices between climate-related disciplines, and a repository for the inventory of available federal services offered by the full list of federal climate service providers. This lead agency should embrace a decidedly non-bureaucratic culture of continuous innovation and impartiality. It should harness world-class technology and recruit expert analysts and communicators who can

assess needs and foster collaboration among researchers and policy makers in the public and private sectors. It will need a field liaison structure guided by boundary-spanning staff that can assist the lead agency to understand better and work more effectively with state and local officials.

After extensive consultation, ***the Panel concludes that a NOAA Climate Service, properly configured and implemented, would be uniquely qualified to serve the public and private sectors as a lead federal agency for climate research and services, and to provide an ongoing accessible, authoritative clearinghouse for all federal science and services related to climate.*** There is ample precedent for the President to make such a "lead agency" designation either by issuing an Executive Order or through less formal means. Of course, Congress could also ratify and make this designation permanent at some juncture through legislation.

Acceptance of this recommendation does *not* mean that NOAA would direct, conduct or archive all federal climate science. Nor does it mean that NOAA would be the exclusive federal provider of all climate services. NOAA would *not* usurp or replace other agency authorities, relationships or missions.

In no case should deliberation about authorizing such a "lead agency" status delay the stand-up of a NOAA Climate Service. NOAA Administrator Jane Lubchenco spoke to the Panel about her commitment to the essential first-order task at NOAA of "getting our house in order" regarding climate services, while working "in close partnership with other federal agencies."

Indeed, the new NOAA Climate Service deserves to know from the beginning the full scope and direction of its mission. ***An appropriately tailored lead federal agency designation would generate indispensable momentum for the new NOAA Climate Service. Moreover, it would simplify and accelerate federal efforts to harmonize, coordinate and strengthen overall climate research and service activities.***

STRUCTURE OF A NOAA CLIMATE SERVICE

NOAA's leadership has proposed, at least initially, to focus the NOAA Climate Service on five societal challenges, harnessing three core sets of existing NOAA capabilities. While it has not shared with the Panel a proposed organizational chart, NOAA has identified the components it proposes to transfer into the NOAA Climate Service.

Although the Panel was *not* constrained to consider only the approach the Administration has advanced, after considerable independent analysis the Panel is ***largely in agreement with the Administration about the core elements that should constitute a NOAA Climate Service.***

The design of this proposed line office logically begins with consideration of desired outcomes, outputs and program activities required to achieve these outcomes. Any reorganization must resist the temptation to focus excessively on existing organizational units, considering what can be built from them, rather than starting with desired outcomes and aggressively shaping institutions to deliver those outcomes.

The Panel finds that the new Climate Service should be organized around its principal desired outcomes and proposed deliverables – climate research and services. The new Climate Service must certainly be more than the sum of existing NOAA parts. The new line office should magnify and extend NOAA's contributions to climate science and services, creating a unified and nimble organization with broader reach than can be achieved today within NOAA's existing structure.

As depicted in Figure 1, the Panel proposes that the new line office be headed by a career Assistant Administrator, supported by a relatively small, but essential front-office team. Chapter 4 of this report addresses NOAA Climate Service organization issues in more detail.

START-UP CONSIDERATIONS

Balancing Mission Objectives. Managing any significant organizational change is challenging. Particularly during its start-up phase (the first 12-18 months), establishment of a NOAA Climate Service will present stiff challenges, some of which are unique to the federal operating environment.

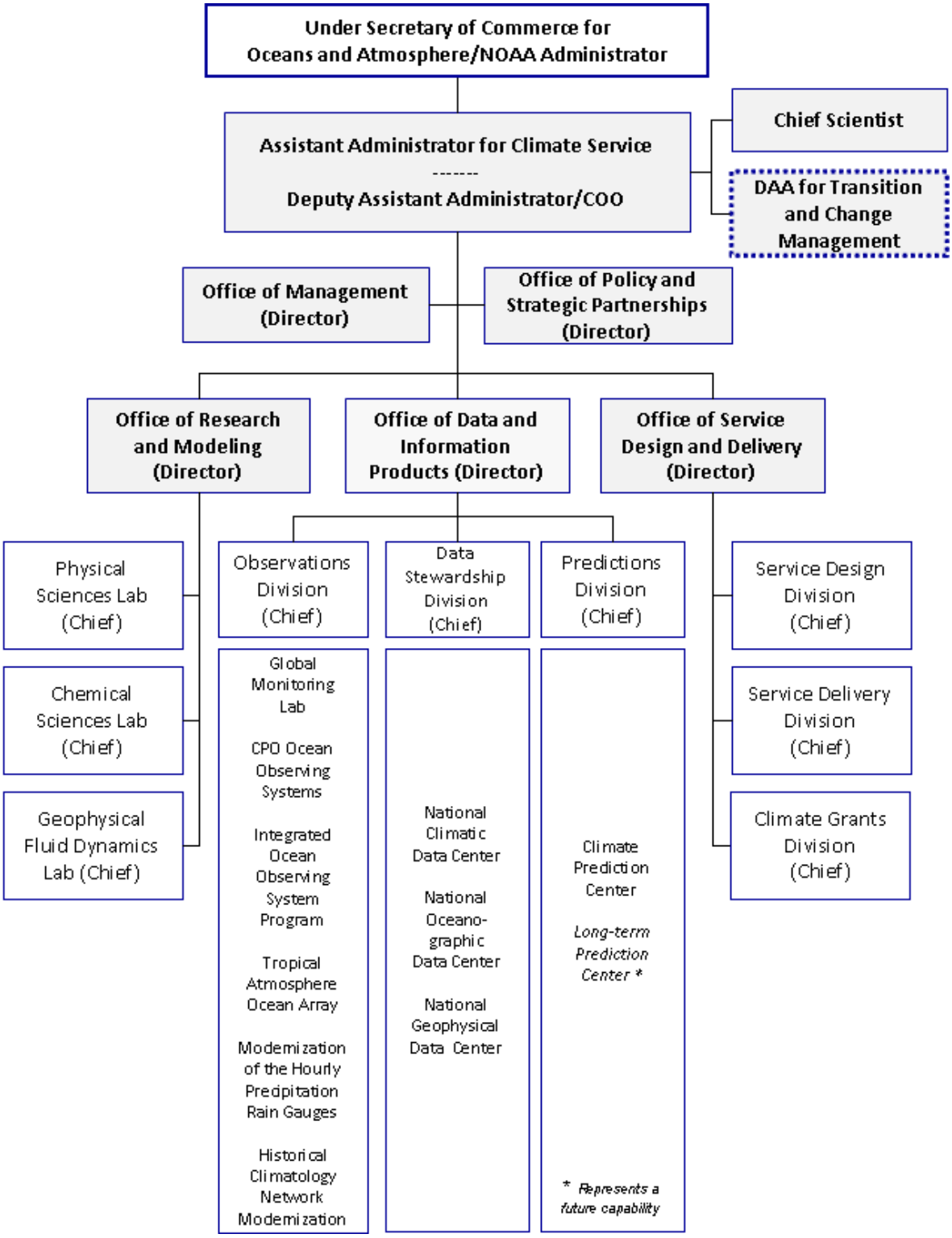
NOAA's deep reservoir of employee experience, professionalism and commitment to climate research and services is a strength upon which the new NOAA Climate Services organization can be built with confidence. It is difficult, however, to overestimate the importance of selecting the right Associate Administrator and senior management team to lead this new organization. ***In addition to the permanent leadership team, the Panel recommends that NOAA hire a term-limited, Deputy Assistant Administrator for Transition and Change to provide a full-time, systematic focus on managing start-up issues at the new line office.***

Presumably a large part, even the largest part, of the new senior management team may be selected from within NOAA. Nonetheless, ***the Panel recommends that senior management positions for the NOAA Climate Service be largely, if not exclusively, selected on the basis of open competition.***

In addition, the Panel recommends that each member of the senior management team have as their primary base of operations – at least for the initial year – the Washington, DC area headquarters facility. The importance of forging a cohesive management team is extraordinarily important; it is impossible to do so by telephone.

A thorny challenge for the new organization takes the form of an apparent contradiction: NOAA must be at once decidedly ambitious, yet cautious. On the one hand, it should be constructively impatient to deliver on a bold, innovative plan for what the new line office can accomplish. On the other hand, it must be careful about appearing to promise more than NOAA can deliver with its roughly 700 full-time employees and available budget.

Figure 1
Academy Panel's Recommended Structure for a NOAA Climate Service



NOAA's staff has shared with the Panel its provisional thoughts about the new agency's implementation strategy. This includes embracing an aspirational vision to support "an informed society anticipating and responding to climate and its impacts" and a mission statement for the NOAA Climate Service to "improve understanding and anticipation of changes in climate, and to promote a climate-resilient society and environment."[4]

The Panel recommends that NOAA's external and internal communications be clear about the fact that its new organization will grow steadily and progressively, yet more slowly than many would like. It will not be possible in the early months and years to satisfy all of NOAA's own ambitions, much less the many expectations of its external partners and service users. It will be essential that NOAA impose upon itself rigorous and systematic internal discipline to prioritize new research and service offerings.

For these reasons, ***the Panel recommends that the NOAA Climate Service place its highest priority on assisting government executives and managers at the federal, state, tribal and local levels, and on meeting the high priority needs of its federal climate enterprise partners.*** If the new agency tries to serve all possible stakeholders with equal focus in the earliest stages of its operations, it will likely serve none adequately.

From the outset, NOAA also should pay particular attention to how this new organization can best be configured to serve the information needs of the Congress. It may be obvious, but it is essential to the nation – and to the success of a NOAA Climate Service – that the NOAA Climate Service's external communications with Congress be especially transparent, routine and impartial. NOAA must also be candid about agency successes, failures and challenges.

The Panel recommends that the NOAA Climate Service utilize every practical strategy available to attract a diverse set of employees and partners to help with standing up the new agency and expanding its reach.

Despite the difficulty of working with so many diverse constituencies, the fact that NOAA has ambitious goals is a true virtue. Especially during its start-up phase, nurturing this ambition with a systematic focus on change management is essential to the success of a NOAA Climate Service. The new line office will need the strong support of the Secretary of Commerce and his senior management team, as well as that of other Cabinet and White House colleagues. Chapter 5 recommends a number of change management tools that have been used effectively in other large federal start-ups and mergers.

Budget Considerations. ***The Panel is skeptical that current funding levels (even as augmented at levels consistent with the President's FY 2011 budget request) will adequately sustain public and private sector expectations for climate services and research in the years ahead.***

It would be impossible for this Panel to propose a precise budget for this new Climate Service based on the limited information available to us, and choices still to be made by NOAA. Nonetheless, by its design and because of growing needs, the NOAA Climate Service can

[4] Information provided to the Panel by NOAA. The Panel recognizes this language is subject to change.

reasonably be expected to take on a great deal more than its current workload in the years ahead. It will have to prioritize its new research and service deliverables with tenacious discipline.

Certainly NOAA and Department of Commerce leadership should start with asking this blunt question: What is being done today within NOAA or the Department that might be stopped or dialed back in order to make possible a higher priority investment? As the NOAA Climate Service grows, the Congress and the Office of Management and Budget should allow the Secretary of Commerce maximum discretion to steer funds generated by cost avoidance measures at the Department of Commerce to nurture the fledgling NOAA Climate Service. Where fair and practical, NOAA should explore assessing fees for its climate services.

The Panel recommends that NOAA make general-use climate data and information products freely available, but that it consider charging fees for customized products and services to cover delivery costs. NOAA should also identify opportunities to refer requests for specialized services to non-government providers with the aim of stimulating the development of private capacity to provide value-added climate products. This matter may require further assessment by the Executive Branch and Congress and authorization of fee-for-service arrangements.

Even assuming extraordinary financial stewardship, it will be quite challenging to align performance expectations with today's federal budget resources. This budget challenge, we wish to make clear, would be a poor reason to oppose creation of the new NOAA line office. Instead, the new organization must rigorously assess trade-offs for how best to use all funds that Congress and the Administration make available. ***Managing scarce resources and making choices among competing priorities is likely to be one of the new organization's most difficult management challenges.***

ORGANIZATION OF THIS REPORT

This report has five chapters and a number of appendices that provide additional background about the Panel's work and recommendations. The five chapters are structured as follows:

- *Chapter1 – Introduction.* This chapter contains an overview of NOAA's vision for its Climate Service, summarizes the mandate given to the Panel and explains the method the Panel has employed to assess options and make recommendations.

- *Chapter 2 – Current Structure and NOAA's Climate Service Plan.* This chapter assesses NOAA's recent history and current capabilities regarding climate science and services. It summarizes NOAA's basic proposal regarding creation of a NOAA Climate Service.

- *Chapter 3 – Planning for Success.* This chapter contains the Panel's observations and recommendations regarding the larger federal climate enterprise, identifies key elements of support needed by the NOAA Climate Service and stresses the importance to the new organization of a clear strategic plan and a comprehensive implementation plan.

- *Chapter 4 – Recommended Organizational Structure*. This chapter presents the Panel's recommendations regarding how best to structure the NOAA Climate Service.

- *Chapter 5 – Change Management Challenges.* This chapter offers observations and suggestions regarding institutional change management in the federal sector, identifies several management recommendations for stand-up of the proposed agency and speaks to challenges regarding operational priorities and budget.

- *Chapter 6 – Recommendations.* This final chapter contains a concise recapitulation of Panel recommendations.

CHAPTER 1
INTRODUCTION

1.1 NOAA'S VISION FOR ITS CLIMATE SERVICE

The Conference Report conveying NOAA's FY 2010 appropriations guidance states, "the conferees provide additional support for activities appropriately conducted by a national climate service and direct the agency [NOAA] to accelerate its current efforts towards the creation of such an entity."[5] Pursuant to the Conference Report, and as further described in the Executive Summary above, in March 2010 NOAA contracted with the Academy to conduct "a study and analysis of organizational options for a National Climate Service within NOAA."

The contractual scope of this study does *not* include making recommendations about the internal structure of research and/or service organizations other than NOAA.

Climate variability and change present compelling challenges for our nation and the global community. Creation of a Climate Service at NOAA has been actively considered for a number of years and has been supported by the current and the prior Administration. On February 8, 2010, U.S. Commerce Secretary Gary Locke formally announced the Department's intent "to create a NOAA Climate Service line office dedicated to bringing together the agency's strong climate science and service delivery capabilities."[6]

Reduced to its essence, the Panel concludes that NOAA's plan consists of three imperatives: (1) consolidate existing NOAA assets associated with climate to create a new line office, the NOAA Climate Service; (2) provide authoritative and more comprehensive climate science and services to assist public and private sector adaptation and mitigation decisions;[7] and (3) support more systematic federal interagency collaboration to improve research and services needed to meet the nation's climate challenges.

The first of these imperatives is an organizational and instrumental objective. It is intended to facilitate the two other imperatives, both of which are core mission-centered objectives.

NOAA's vision of its future climate service mission builds upon three core capabilities:

1. *Observing Systems, Data Stewardship, and Climate Monitoring.* NOAA collects and preserves the historical record of the global environment for continuous climate monitoring and periodic assessments in support of climate services. This readily

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[5] U.S. Congress, House, *Conference Committee Report to Accompany Consolidated Appropriations Act, 2010* 11th Cong. 1st sess., 2009, Report 111-366 (Washington: GPO) p. 636.

[6] U.S. Department of Commerce, "Commerce Department Proposes Establishment of NOAA Climate Service," press release, February 8, 2010 accessed at www.noaanews.noaa.gov/stories2010/20100208_climate.html.

[7] NOAA's draft *NOAA Climate Service: Implementation Strategy* (July 27, 2010) defines adaptation as the "adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities." Mitigation is defined as "human intervention to reduce or eliminate the sources of human-caused changes in climate." The Panel recognizes that this is a draft and subject to change.

accessible long-term archive serves the Nation's need for trusted climate-related data and information about the current and changing state of the climate system. This provides the foundation for understanding the climate system and evaluation of climate and earth system models.

2. *Understanding and Modeling.* NOAA advances the understanding and prediction of climate variability and change, and informs climate mitigation and adaptation options. This capability delivers a comprehensive understanding and description of the current and future state of the climate system, and characterizes the uncertainties in our ability to measure and predict changes, natural variability and impacts.

3. *Integrated Services Development and Decision Support.* NOAA provides regional and global decision makers with timely and relevant climate information. NOAA supports partnerships to facilitate scientists and decision makers developing a shared understanding of changing climate conditions and using those insights to inform adaptation decisions and climate policy. NOAA also delivers data and information streams from which climate service providers can develop and deliver decision support tools and other applications.[8]

The third of these core capabilities, Integrated Services Development and Decision Support, is arguably the area that will require the most innovation. It is the element of the new organization's mandate that will stretch its historic capabilities the most. NOAA has repeatedly noted that its plans presuppose that other federal agencies will continue to play essential roles in all three areas outlined above. The NOAA Climate Service expects to integrate with and depend upon the larger pool of federal climate activities that delivers climate science and services, an enterprise that also must be strengthened collectively.

The agency's publicly stated timetable for standing up the new organization points to a formal launch in the upcoming Fall/Winter period. Supported in small measure by this study, and by its own extensive outreach and planning, NOAA expects to complete its organizational design and implementation strategy for the new organization in the weeks ahead, to consult with Congress, and then submit appropriate reprogramming requests to the Congress needed to move forward.[9]

1.2 ACADEMY PANEL REPORT – METHOD OF APPROACH

The Academy convened a ten-member panel – nine Academy Fellows and one additional subject matter expert suggested by NOAA – to review NOAA's plan for a Climate Service and offer recommendations to the Congress and NOAA. Some Panel members bring first-hand experience in federal, regional, state and local government; others have considerable scholarly expertise in fields directly related to this topic. Together they represent experience as senior executives, change management leaders and climate science experts. Appendix A provides biographical sketches for the Panel members and lists the Academy study team.

[8] The language of these three bullets is quoted directly from draft language provided to the Academy by NOAA. The Academy recognizes that this formulation is subject to change.

[9] See: www.noaa.gov/climate.html, accessed September 1, 2010.

The Panel met seven times as a group over the course of its six-month engagement (three formal meetings in Washington and four teleconferences). In addition, members provided numerous individual consultations with the study team. A significant part of each in-person Panel meeting was open to the public, at which Congressional staffs, NOAA leaders and others were invited to participate. Secretary Gary Locke, NOAA Administrator Jane Lubchenco, NOAA Deputy Under Secretary Mary Glackin, Transitional Director for the NOAA Climate Service Thomas Karl, and numerous other NOAA senior staff actively engaged with the Panel and study team members. With assistance from the Academy study team, the Panel refined its work plan, engaged extensively in the information gathering of the group, crafted recommendations, assisted with report drafting and approved this report.

Since there has been discussion of the idea of creating a Climate Service at NOAA almost from its inception in 1970, the study team began by reviewing an extensive collection of relevant historical documents and reports. These documents describe previously proposed ideas about the need for climate science and services work by NOAA and the larger federal community.

NOAA's external stakeholder community is large, and the Panel considered it important to engage as much as reasonably possible with these parties. The Panel employed three basic approaches for this outreach. First, the study team conducted interviews with NOAA staff, current and former government officials and external stakeholders. These interviews, which included over 40 persons, were conducted on a not-for-attribution basis. The results were aggregated into thematic observations and presented to the Panel. See Appendix C for a list of these participants.

Second, three roundtable discussions were held with key NOAA climate constituents: (1) federal agency partners; (2) state and local government leaders; and (3) academics and other subject matter experts. The roundtables, which included over 50 participants, were conducted on a not-for-attribution basis. The results were aggregated into thematic observations and presented to the Panel. For additional details see Appendices D, E, F and G.

Third, from June 14 to 28, 2010, the Panel conducted a national Online Dialogue that solicited ideas about how to structure and operate a NOAA Climate Service. This outreach, which was publicized widely to NOAA's staff and external partner organizations, used an Academy-designed online tool that presented information about the NOAA Climate Service proposal, and allowed participants to offer ideas and/or to comment on other participants' ideas. The Dialogue registered 3,353 total visits (1,342 unique visitors) and 134 individuals voluntarily registered to provide formal comments. Dialogue participants were not required to provide personal information. The results were aggregated into thematic observations and presented to the Panel. For additional details see Appendix H.

Collectively, this outreach generated a wealth of useful information about the state of climate science and services and valuable insights about NOAA and the needs of its partners. Table 1 contains a summary of notable observations and recommendations gleaned from this outreach. The Panel agrees with many of the comments that were received and is indebted to the participants.

Table 1
Summary of the Academy Panel's Outreach

VENUE	OBSERVATIONS / RECOMMENDATIONS
STAKEHOLDER INTERVIEWS	**1. Mission Requirements:** The NOAA Climate Service should organize to support transparency, accountability and collaboration.
	2. Proposed Structure: Some stakeholders expressed concerns that NOAA's proposed plan excludes key NOAA components that should be part of a climate service line office. Others thought the proposed inclusion of some components could threaten other NOAA missions. Some suggested that the NOAA proposal is organized too much around individuals and existing entities.
	3. User Needs and Engagement: The NOAA Climate Service must develop a systematic approach to engaging users at the regional, state and local levels. It should build capacity to adapt existing climate information and products to meet the needs of multiple users.
	4. Partnership and Coordination: The NOAA Climate Service must coordinate efforts by third parties for service development and delivery, improve coordination with federal partners, and both leverage and strengthen existing partnerships.
	5. Single Climate Voice: Lack of a single, authoritative voice on climate information too often compels users to struggle to assess the credibility of available information.
	6. Meaningful Access: The NOAA Climate Service should have a single entry point for users to access climate information, even if ultimately populated by multiple entities.
FEDERAL ROUNDTABLE	**1. Mission Alignment:** The NOAA Climate Service's mission must be aligned with the roles and responsibilities of other agencies within the interdependent federal climate enterprise. It should be structured to minimize disruption of existing partner relationships and services.
	2. Existing Partner Relationships: Given the role of other federal agencies regarding climate research and services, strong partner relationships between NOAA and other agencies will be a critical factor in determining the success of the Climate Service. The federal government has existing relationships to build upon to meet climate needs.
	3. Opportunities to Strengthen Partner Relationships: To promote stronger partner relationships, NOAA should work to remedy existing administrative impediments and cost-sharing impediments while instituting additional practices designed to foster collaboration.
	4. Future Climate Needs: Federal partner agencies have significant unmet needs in the areas of climate science, data, products and services to support their missions. Also, federal partners need to add capacity to be able to use this information.
STATE & LOCAL ROUNDTABLE	**1. Improving Access:** State and local governments do not always know how to access NOAA climate information and services. Development of a robust NOAA Climate Service web portal and establishing an adequate NOAA regional and state liaison staff will improve access.
	2. Coordination of Federal Climate Activities: State and local government participants believe that climate activities across the federal government are not effectively coordinated and that NOAA should also improve coordination of its internal climate activities.
	3. Establishing Standardized Models and Improving Data Usability: State and local representatives believe that the federal government provides useful climate data on many subjects. The most critical current needs are to: (1) establish standardized national models into which other levels of government can plug their specific regional, state and local data; and (2) increase the usability of existing climate data by, for example, making it more widely available online and "downscaling" it to the local or zip code level.

VENUE	OBSERVATIONS / RECOMMENDATIONS
(cont.)	**4. Tailoring the NOAA Climate Service to External Needs:** State and local representatives reported high regard for NOAA's technical expertise, but were unclear which federal agency is best suited to provide climate adaptation information services to state and local governments.
ACADEMIC/ EXPERTS ROUNDTABLE	**1. Improve External and Internal Communications:** NOAA has key roles as a science broker, and as a translator for climate issues. It needs to define and prioritize its climate goals and activities, establish a clear organization to support that direction, define a path for collaboration and communicate these decisions broadly.
	2. Focus on Users/Stakeholders at the Regional Level: Decisions about adaptation and mitigation must be made at the regional and local levels, because these areas face different climate stresses. NOAA's climate service should be driven by this reality and develop services to help regional and local decision-makers prepare for the range of likely climate scenarios.
	3. Assess and Capitalize on Effective Partnerships: NOAA has a role as an integrator for research organizations. NOAA must define its path in this regard and work to foster true collaboration to accomplish its mission and effectively leverage its limited resources.
	4. Provide Best Practices for Climate Data and Services: Some roundtable participants believe that NOAA can add true value by providing decision-makers with "best practices" or legally defensible certified data and models, with appropriate acknowledgment of uncertainties. This NOAA-provided data could help inform risk-management decisions and set a standard for how climate data and information are collected and presented.
	5. Develop a Modern Climate Structure and New Competencies: Roundtable participants believe that the new NOAA Climate Service needs to be broad, deep, innovative, flexible and evolutionary. Within this new structure, federal-university and other partnerships will be critical as will a host of new and enhanced competencies.
ONLINE DIALOGUE	**1. National Climate Enterprise:** The NOAA Climate Service's mission and activities must be aligned with the roles and responsibilities of other agencies within the interdependent national climate enterprise. The organization should be structured to minimize disruption of existing partner relationships and services with other federal, state and local agencies, academia and the private sector.
	2. Maintain and Foster Partnerships and Collaboration: A distributed climate enterprise requires partnerships and collaborations among public, private, academic and non-profit sectors. The NOAA Climate Service should maintain and strengthen existing partnership efforts and foster new ones to improve the provision of climate data, products and services.
	3. Single Climate Voice: NOAA Climate Service should be the authoritative voice on, and repository for, climate data, information and analysis.
	4. User Needs: NOAA Climate Service needs to conduct science to meet user needs. This requires sustained two-way communication to understand what users need and how they will use climate information.
	5. Meaningful Access to Data: NOAA Climate Service should provide easy access to climate data, and organize and present it in a manner that is useful to users at multiple scales.
	6. Data Management: NOAA Climate Service should become an effective clearinghouse for climate data.
	7. Communications: There is a critical need for "translation" services or better communications to bridge existing gaps between providers and owners of climate-related information and users, as well as between research and operations as it relates to climate

VENUE	OBSERVATIONS / RECOMMENDATIONS
(cont.)	change.
	8. Climate Literacy: The NOAA Climate Service must build climate literacy within NOAA's workforce and the public.
	9. NOAA Climate Service Structure: Dialogue participants had specific concerns and comments about what components NOAA has proposed to transfer into its Climate Service, and how these decisions would impact current and future operations across NOAA.

Most of the issues summarized above are discussed further in this report. Many recommendations surfaced in stakeholder outreach sessions are embraced in some form or another. Themes that the Panel heard often and found compellingly stated were: strong support for the concept of creating a NOAA (or a National) Climate Service; the need to improve federal interagency coordination of resources and service delivery; the importance of partnerships with the public and private sectors; a need for more localized and more accessible research; the potential positive impact of using innovative service delivery technologies and tools; and the importance of supporting a user community that is large and diverse.

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Chapter 2 describes a growing demand for climate research and services, explains how NOAA has managed existing assets and summarizes NOAA's proposal to create a NOAA Climate Service.

CHAPTER 2
CURRENT STRUCTURE AND NOAA'S CLIMATE SERVICE PLAN

2.1 CURRENT STATE OF NOAA CLIMATE SCIENCE AND SERVICES

Historical Growth of Climate Science and Services. The United States has been recording and archiving weather and climate data for over a century. These data serve as the foundation for climate research and services, and allow for analysts to determine patterns and trends.

Since its inception in 1970, NOAA has been engaged in a significant range of climate-related activities. Over time, NOAA has added more complex research activities, and modeling and observation systems using satellite, ground, air and ocean sensors. These efforts have been complemented by a number of services to help public sector decision makers incorporate climate data and modeling in support of adaptation and mitigation decision making. Today these activities are spread across a multiplicity of NOAA offices and separate budget accounts.

NOAA identifies its core capabilities supporting its climate mission as: (1) understanding and modeling; (2) observing systems, data stewardship and climate monitoring; and (3) integrated services development and decision support (see Table 2). These are also core capabilities central to other NOAA line offices and other NOAA missions.

Table 2
NOAA's Core Climate Capabilities[10]

Understanding and Modeling	Observing Systems, Data Stewardship and Climate Monitoring	Integrated Services Development and Decision Support
• Process-based research and understanding • Adaptation research • Applied research • Attribution • Earth system analysis • Modeling • Predictions • Projections	• Observations • Monitoring • Data mining • Data stewardship • Analysis	• Scientific assessments • Information assessments • Forecasting • Decision support • Quality assurance standards • Evaluation and improvement • Information access management • Delivery coordination

[10] Based on Accenture, *Climate Services: Final Compilation Report*, December 2008 (provided to Panel by NOAA). This list has been modified to incorporate NAPA analysis.

NOAA's climate research and its staff are highly regarded and sought after by public and private sector entities seeking climate information and assistance, domestically and abroad.[11] NOAA reports that it is experiencing growing demands for application of solid climate science to solve problems at sub-regional to local levels and to provide data on a more granular scale. These demands include information to support senior federal officials, local and regional public employees, natural resource managers, and the owners and operators of critical infrastructure affected by climate variability and change.

An issue raised by numerous parties advising the Panel concerned communication skills: how to take increasingly complex analyses of basic climate data and make them intelligible for users who lack advanced training in climate science. The Panel heard from many parties that they need clear, impartial and accurate "translations" of the best available climate science. The challenge for NOAA is that these demands are outpacing NOAA's ability to make existing research available in a user-friendly format, and its ability to conduct new research to answer questions at the scale and scope being requested. Certainly, not all of the climate services needed by the public from the federal government are best developed or delivered by NOAA.

NOAA's substantial work is, first of all, part of a larger federal community that supports, conducts and consumes climate research and services. It is also supported by and supports academic and private sector researchers and users. Clearly, the growing demand for climate science and services extends to a large number of federal agencies. The full extent of this federal climate work is commonly referred to as the *federal climate enterprise*. The Panel itself has used this expression, though we do so with some reluctance, noting that the federal climate enterprise is still today more aspirational than it is coherent, cohesive and systematic.

Discussion about how best to organize and optimize NOAA's work as part of the federal climate enterprise began early after the agency's formation and has become more focused and widespread over the last decade.[12] Support for a major reorganization and enhancement of climate science and services at NOAA has come from both the current and prior Administrations.

Integration Through Matrix Management. NOAA has used matrix management to coordinate its climate mission within the agency. A March 2000, Academy Panel study found that NOAA's overall "planning, budget formulation, and execution processes are not effectively integrated."[13]

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[11] Sixty-four percent of federal scientists contributing to the 2001 IPCC Assessment and seventy-three percent of federal scientists contributing to the 2007 IPCC Assessment were from NOAA. Data provided by NOAA: NOAA Science Advisory Board, Review of the *Climate Observations and Analysis Program*, Climate Working Group (May 20, 2007); NOAA Science Advisory Board, *Climate Research and Modeling Program Review*, Climate Working Group (October 23, 2008); NOAA Science Advisory Board, *Climate Information Products and Applications Program Review*, Climate Working Group (November 17, 2009).

[12] Three early documents of note are: Federal Coordinator for Meteorological Services and Supporting Research, *Federal Plan for National Climatic Services* (Washington: January 1974); National Research Council, *A Climate Services Vision: First Steps Toward the Future* (Washington: 2001); and NOAA, *A Strategy for the Development of Climate Information Services* (Washington: 2007). See Appendix B for other literature assessing options for how best to support climate research and services at NOAA.

[13] National Academy of Public Administration, *Improving the NOAA Budget and Financial Management Processes*, (Washington: March 2000).

In 2002, the then NOAA Deputy Under Secretary led a program review team comprised of line office and staff office deputies. That review concluded that there was not sufficient integration across NOAA's programs and proposed implementation of certain matrix management structures.

Matrix management at NOAA began with a few programs involving activities that spanned multiple line offices. "Climate Research and Services" was one of the original programs, as users and producers of climate data, products and services were organizationally dispersed throughout the agency. NOAA's "Goal Teams" are comprised of multiple programs – some matrixed, some located entirely within a single line office – that work together towards a common set of specified "mission goals."

As an extension of this matrix management approach, in 2003 NOAA created a Climate Goal Team, assigned to work across all NOAA's entities to identify strategies needed to achieve NOAA's climate mission goal, which is defined thusly: to "understand climate variability and change to enhance society's ability to plan and respond."[14] This goal is being refined as part of the development of NOAA's Next Generation Strategic Plan and also as part of the internal NOAA planning process guiding establishment of a NOAA Climate Service. The Climate Goal Team is composed of three programs, each of which is matrixed: (1) climate observations and monitoring; (2) climate research and modeling; and (3) climate information services.

A major challenge of the Climate Goal Team has ultimately been its lack of consolidated management control of personnel and budgets, and an understandable competition among various NOAA mission priorities for resources and management attention. This has limited NOAA's ability to meet strategic climate objectives, and the agency has cited it as an important reason for why it proposed creation of a Climate Service. NOAA's Deputy Under Secretary stated "NOAA's existing framework for climate was established before climate services were recognized as essential, [it] . . . is not optimized for climate service delivery."[15] A similar judgment can fairly be rendered about NOAA's research and other climate activities.

The introduction of matrix management and the creation of the Climate Goal Team were thoughtful and significant investments to respond to demand by improving performance across NOAA's distributed network of climate activities. Matrix management has helped improve alignment across a range of activities and organizational stovepipes. But based on its own assessments, and upon reviews from various outside bodies, NOAA and Department of Commerce leadership rightly concluded that the Climate Goal Team provided an incremental improvement, but that matrix management is not sufficient to meet current needs.[16]

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[14] NOAA, *National Oceanic and Atmospheric Administration Strategic Plan FY 2009-2014*, at www.ppi.noaa.gov.

[15] Presentation to the NOAA Science Advisory Board's Climate Working Group meeting by Deputy Under Secretary for Operations Mary Glackin, April 7, 2010.

[16] See especially: NOAA Science Advisory Board, Review of the *Climate Observations and Analysis Program*, Climate Working Group (May 20, 2007); NOAA Science Advisory Board, *Climate Research and Modeling Program Review*, Climate Working Group (October 23, 2008); and NOAA Science Advisory Board, *Climate Information Products and Applications Program Review*, Climate Working Group (November 17, 2009).

2.2 OVERVIEW: NOAA'S PROPOSED CLIMATE SERVICE

On February 8, 2010, U.S. Commerce Secretary Gary Locke announced the Department's "intent to create a NOAA Climate Service line office dedicated to bringing together the agency's strong climate science and service delivery capabilities."[17] The proposed reorganization is designed to integrate better NOAA's climate activities and to make them more accessible. The proposed NOAA Climate Service would have equivalent organizational standing with NOAA's other divisional structures, such as the National Weather Service, the National Ocean Service and the National Marine Fisheries Service.[18] These line offices have budget and personnel authority for greater accountability, operational flexibility and focus.

To refine its plan and prepare for its implementation, NOAA created a transition team led by its Deputy Under Secretary and supported by NOAA senior managers. The team has engaged in substantial internal and external consultation, both before and after the Secretary's February 2010 announcement. NOAA generously shared its vision and provisional plans with the Panel.

The NOAA team has drafted various presentations and other collateral material. It proposes to strengthen considerably a public-facing web page to support the new organization (www.climate.gov), explaining that "our goal is for the Portal to become the 'go-to' website for NOAA's climate data, products, and services for all users."[19] The NOAA team drafted and is iteratively polishing a NOAA Climate Service *Implementation Strategy*, a draft of which was presented to the Panel.

NOAA is finalizing its plan for how the new Climate Service line office will be organized and resourced. The Panel did not receive a detailed budget proposal for the new line office nor a draft of the budget amendment request that the Administration would submit to launch the Climate Service.

NOAA's current articulation of the "implementation architecture" for the NOAA Climate Service presents an organization focused on research and service. Its draft mission statement is "to improve understanding and anticipation of changes in climate, and to promote a climate-resilient society and environment."[20] Its core capabilities are as described in Table 2. NOAA advocates that the Climate Service "focus on achieving four interdependent strategic objectives." Since the new organization cannot at once be everything to everyone, it must focus resources and efforts. Therefore, it is the provisional intent of NOAA to build on the organization's core capabilities, focusing its own early research functions and service offerings particularly on meeting five "societal challenges."

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[17] NOAA, "Commerce Department Proposes Establishment of NOAA Climate Service" press release (February 8, 2010) at www.noaa.gov/climate.html, accessed August 26, 2010.

[18] For further analysis of divisional, functional and administrative structures at NOAA, see Appendix I.

[19] See www.climate.gov/about.html, accessed August 26, 2010.

[20] The information in this paragraph and Table 3 was provided to the Academy by NOAA. The Panel recognizes that this language is subject to change.

Table 3 offers a high level summary of NOAA's "implementation architecture" for the new organization, a plan that is intended to align existing NOAA capabilities.

Table 3
NOAA's Proposed Climate Service Implementation Architecture

ELEMENT	DETAIL
MISSION STATEMENT	To improve understanding and anticipation of changes in climate, and to promote a climate-resilient society and environment.
FOUR CORE OBJECTIVES	1. Improved understanding of the changing climate system and it impacts
	2. Integrated assessments across current and future states of the climate system that identify potential impacts and inform science, services, and decisions.
	3. Mitigation and adaptation choices supported by sustained, reliable, and timely climate services.
	4. A climate-literate public that understands the vulnerabilities to a changing climate and makes informed decisions.
MEETING FIVE SOCIETAL CHALLENGES	1. Sustainability of marine ecosystems.
	2. Coasts and climate resilience.
	3. Climate impacts on water resources.
	4. Changes in the extremes of weather and climate.
	5. Informing climate mitigation options.
BY BUILDING ON CORE NOAA CAPABILITIES	1. Understanding and modeling.
	2. Observing systems, data stewardship and climate monitoring.
	3. Integrated services development and decision support.

NOAA intends for the Climate Service to be an impartial, rigorous research and professional services organization. The draft mission statement, which subsumes many existing activities, allows the Climate Service to grow and evolve. NOAA's mission statement is also predicated on numerous relevant federal agencies successfully coordinating and strengthening their climate research capabilities and service delivery offerings.

2.3 ORGANIZATIONAL BUILDING BLOCKS FOR A CLIMATE SERVICE

NOAA has identified the existing NOAA organizational assets it proposes to move to the Climate Service, although it has not shared with the Panel an organization chart. As described by NOAA, the Climate Service will bring together many of the agency's existing climate assets including research laboratories, climate observing systems, modeling programs and integrated monitoring systems. It will incorporate certain other service delivery assets of the larger organization.[21]

Under NOAA's implementation timetable, the agency has time to receive the Panel's report before making final decisions about the structure of a Climate Service. Table 4 presents NOAA's proposed organizational "building blocks" for a Climate Service line office.

[21] Climate Service Q&A, August 18, 2010. See: www.noaa.gov/climateresources/qa.html#1.1, accessed August 27, 2010.

Table 4
NOAA's Proposed Climate Service Building Blocks[22]

NOAA "CONTRIBUTING" ORGANIZATIONS		
Office of Oceanic and Atmospheric Research	**National Environmental Satellite, Data, and Information Service**	**National Weather Service**
• Climate Program Office • Geophysical Fluid Dynamic s Laboratory • Earth System Research Laboratory (ESRL), Office of the Director • ESRL, Global Monitoring Division • ESRL, Chemical Sciences Division • ESRL, Physical Science Division	• National Climatic Data Center • National Oceanographic Data Center • National Geophysical Data Center -	• Tropical Atmosphere Ocean (TAO) Array • Historical Climate Network Modernization (HCN-m) • Modernization of the Hourly Precipitation Rain Gauges -

What follows provides a high level description of the components that are listed in Table 4 and proposed by NOAA for transfer to the Climate Service.

Office of Oceanic and Atmospheric Research

- Climate Program Office – funds and manages the competitive research program for high-priority climate science *(Silver Spring, MD).*
- Geophysical Fluid Dynamic Laboratory – develops and uses models and computer simulations to improve our understanding and prediction of the behavior of the atmosphere, the oceans and climate *(Princeton, NJ).*
- Earth System Research Laboratory (ESRL), Office of the Director – provides management and administrative support *(Boulder, CO).*
- ESRL, Global Monitoring Division – conducts sustained observations and research related to global distributions, trends, sources and sinks of atmospheric constituents that are capable of forcing change in the climate of the Earth *(Boulder, CO).*
- ESRL, Chemical Sciences Division – undertakes research concerned with discovering, understanding and quantifying the processes that control the chemical makeup of Earth's atmosphere *(Boulder, CO).*
- ESRL, Physical Science Division – conducts weather and climate research to observe and understand Earth's physical environment and to improve weather and climate predictions on global-to-local scales *(Boulder, CO).*

[22] NOAA, "NOAA Climate Service" www.noaa.gov/climateresources/resources/noaaclimateservice_org.pdf, accessed August 18, 2010.

National Environmental Satellite, Data, and Information Service

- National Climatic Data Center – the world's archive of weather and climate data. NCDC also operates the World Data Center for Meteorology and World Data Center for Paleo-climatology *(Asheville, NC).*
- National Oceanographic Data Center – operates the World Data Center for Oceanography, National Coastal Data Development Center and NOAA Central Library *(Silver Spring, MD).*
- National Geophysical Data Center – operates the World Data Center for Glaciology, World Data Center for Geophysics and Marine Geology and World Data Center for Solar-Terrestrial Physics *(Boulder, CO).*

National Weather Service

- Tropical Atmosphere Ocean (TAO) Array – consists of approximately 70 moorings in the Tropical Pacific Ocean. The array is a major component of the El Niño/Southern Oscillation Observing System, the Global Climate Observing System and the Global Ocean Observing System *(Seattle, WA).*
- Historical Climate Network Modernization – a sub-network of the Cooperative Observer network consisting of more than 1,200 stations that make a suite of climate measurements, e.g. temperature, precipitation and soil moisture *(Asheville, NC).*
- Modernization of the Hourly Precipitation Rain Gauges – a program to modernize hourly rain gauges that are part of the Cooperative Observer network *(Silver Spring, MD).*

* * *

This chapter has summarized management and organization matters that NOAA has presented to the Panel to inform the Panel's study. The next three chapters present the results of the Panel's study. The first of these, Chapter 3, contains the Panel's observations and recommendations regarding the larger federal climate enterprise, identifies key elements of support needed by the NOAA Climate Service and stresses the importance to the new organization of a clear strategic plan and a comprehensive implementation plan.

CHAPTER 3
PLANNING FOR SUCCESS

3.1 PART OF A LARGER ENTERPRISE

Climate variability and change will likely continue to require U.S. public and private sector leaders to make increasingly complex decisions. As our collective knowledge about climate variability and change gains greater certainty and predictive force, demand will grow for more research. Such authoritative, credible science will have to be delivered efficiently through many and diverse channels to support decisions regarding climate adaptation and mitigation.

The proposal to create a NOAA Climate Service is a product of the broader federal assessment of how federal roles and responsibilities regarding climate research and services should be shaped and supported. Today a large and loosely coordinated mix of climate research and services are being conducted or supported by numerous federal departments and agencies. Seeking context for our assessment of a new NOAA Climate Service, the Panel necessarily made an effort to map other federal climate activities with which a NOAA Climate Service must, in some way or another, interact. We identified at least eight other Departments, five agencies and six offices within the Executive Office of the President that have a climate research, services or policy role.[23]

The aggregation of activities and organizations active in this space has come to be known as the *federal climate enterprise*. This *enterprise* is not a unitary and focused enterprise, in the way that, for instance, a chain of local hardware stores or a complex multinational corporation is a true enterprise. The federal government has for several decades executed and supported a myriad of activities related to climate research and services. Still, the federal climate enterprise is, at best, in its infancy. [24]

The Panel recommends that capabilities of the federal government regarding climate need to be strengthened considerably on two interdependent but distinct levels: at the* strategic and policy level*; and at the* operational level*, where research, data collection and service delivery takes place. The NOAA Climate Service mandate would be focused on the latter category – operational activity related to research, data collection and services.

The Panel recommends that the federal government substantially expand its delivery of regular, impartial and authoritative climate information services to state, local and tribal governments and to the public, especially by: (1) providing more robust and finer-grain information about possible impacts of climate variability and change to guide local decisions

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[23] See Appendix D for a high level graphic produced by the Academy study team to illustrate at a high level the range of entities that constitute the federal climate enterprise. Although not formally vetted, it does capture a sense of the complex federal environment in which the NOAA Climate Service would operate.

[24] A recent National Academy of Sciences report suggests that existing coordination mechanisms have not adequately integrated the range of scientific disciplines to address adaptation and mitigation challenges. It identified needs for more comprehensive climate observation networks, stronger modeling and predictive capabilities, and better methods for providing climate information to decision makers. National Research Council, *Restructuring Federal Climate Research to Meet the Challenges of Climate Change* (Washington: 2009).

about adaptation; and (2) assisting others to access and effectively use models for understanding how mitigation efforts can avert or reduce climate change. The NOAA Climate Service would do such work, along with other federal partners.

The Panel strongly supports the creation of a NOAA Climate Service to be established as a line office within NOAA. In making specific recommendations about the Climate Service organization structure (see Chapter 4), we aim to satisfy the physician's maxim: first, do no harm. The Panel is convinced that the structural recommendations we make can be implemented without undermining NOAA's baseline performance regarding any other part of its mission.

The NOAA Climate Service should play a strong leadership role in working with other federal agencies to coordinate the gathering, stewardship and availability of climate information by all appropriate federal agencies as well as states, local governments, tribes, other nations and international bodies. This new NOAA organization would *not* absorb other federal department or agency responsibilities or assets. Rather, it would continue to be part of and help lead a larger enterprise.

A significant possible upside to consider is this: a NOAA Climate Service, vested with a strong mandate, can both strengthen its own science and service deliverables, and it can help accelerate the work of making the broader federal climate enterprise more focused, cohesive and effective. Federal agencies recognize this potential for doing even more together. A study co-authored by four federal agencies with natural resource responsibilities (U.S. Geological Survey, U.S. Army Corps of Engineers, Bureau of Reclamation and NOAA) describes the relationship among the four as "a symbiotic relationship, where the operating capabilities required by one agency may drive the direction of science inquiries for another, which in turn may result in improved knowledge and processes for operations. Similarly, the data collected and compiled by one agency for a specific purpose can be used by another agency to supplement other data and information for an entirely different purpose."[25]

The Panel concludes that, if properly resourced and supported, creation of the NOAA Climate Service can also ignite and then help sustain systemic improvements in a broad array of federal climate research and services. For this to happen, the NOAA Climate Service must respectfully and systematically seek such a role. It must make raising the bar for itself and its federal partners a core mission objective.

This would begin by NOAA asking how it can best help its other federal partners succeed. Doing this successfully will present compelling challenges, yet perhaps extraordinary opportunities in the near-term to achieve transformational and cost-effective successes for the new line office and the larger federal climate enterprise.

[25] U.S. Department of the Interior, U.S. Geological Survey, *Climate Change and Water Resources Management: A Federal Perspective*, Circular 1331(Reston, VA: 2009).

3.2 ADMINISTRATION SUPPORT NEEDED FOR THE NOAA CLIMATE SERVICE

Interagency Coordination. The NOAA Climate Service cannot be an effective agent for helping to coordinate climate research and services across the federal government unless the President and his senior team support such a role for the new agency. NOAA will need assistance along the way to achieve and sustain consensus, for example, about resource coordination and mission de-confliction. This is not a task that any one agency or Cabinet Department can be expected to manage.

The Panel acknowledges that substantial work and iteratively stronger coordination is taking place across the federal government (especially through the White House Office of Energy and Climate Change's working group on Climate and Energy, the National Science and Technology Council, its Committee on Environment and Natural Resources, the Interagency Climate Change Adaptation Task Force and the U.S. Global Change Research Program) as well as within and between particular Departments and agencies.

Without prejudice to existing dual-agency or multi-agency working-level mechanisms, a more senior-level federal interagency coordination mechanism with a broader mandate would be enormously valuable. ***The Panel recommends that the Administration strengthen and expand interagency coordination structures tasked with aligning Executive Branch climate resources. Specifically, the Panel recommends that the President empower a senior interagency group – led at the White House and convened at the Deputy Secretary or Secretary level – to provide the President annually with a strategic plan for management of federal climate research and service delivery.***

This group should be tasked with assessing the adequacy of ongoing federal climate research and service delivery efforts, recommending appropriate budget priorities and resolving as needed any interagency conflicts or policy issues associated with climate research or service delivery. This coordination role would most effectively be conducted through an established interagency policy council or other broad-based interagency body led by a senior Administration official (for example, at the rank of Assistant to the President).

In addition to its climate research and service delivery activities, the Executive Branch has an already large and growing climate change policy agenda (tax policy, legislative strategy, regulatory decisions, and other strategic policy and investment decisions). Although such matters are beyond the scope of this study, the Panel simply notes that the same senior interagency group needed to coordinate federal climate research and service delivery ideally could be configured to support the overarching Executive Branch climate policy agenda. This would likely bring beneficial synergy and focus on what is needed to support policy *and* operational decision-making.

Lead Federal Agency Designation. At the operational level, allocation of scarce federal resources for research, data collection and services should be managed aggressively to prioritize efforts that will have the greatest positive impact. ***It is not necessary, nor would it be wise, to force into a single organization all of the federal assets that might contribute to strengthening climate science or climate services.***

Nonetheless, ***the Panel recommends that it would be extremely valuable, indeed we consider this essential, to have one federal agency designated to be the center of gravity for aggregating and rigorously providing an authoritative roadmap or portal to the best available science that can be harnessed to support public policy decision making.***

Somewhere in the federal government, the public needs an authoritative entity to identify what is known and what is not. It should be able to know what is being studied and by whom, what needs more study, who is developing what end-user products, and how or whether the federal government can help map resources and capabilities to specific needs. Similarly, international partners should not be compelled to shop among federal agencies when seeking to coordinate climate research or services.

In short, there is a much-needed role for one agency to serve as a day-to-day integrator of the overall federal effort regarding climate science and services. This is a job for an agency that can serve as a convener, a guide to valid science, an inveterate dot-connector that probes the interstices between climate-related disciplines, and a repository for the inventory of available services offered by the full list of federal climate service providers. This lead agency should embrace a decidedly non-bureaucratic culture of continuous innovation and impartiality. It should harness world-class technology and recruit expert analysts and communicators who can assess needs and foster collaboration among researchers and policy makers in the public and private sectors. It will need a field liaison structure guided by boundary-spanning staff who can assist the lead agency to understand better and work more effectively with state and local officials.

After extensive consultation, ***the Panel recommends that a NOAA Climate Service, properly configured and implemented, would be uniquely qualified to serve the public and private sectors as a lead federal agency for climate research and services, and to provide an ongoing accessible, authoritative clearinghouse for all federal science and services related to climate.*** There is ample precedent for the President to make such a "lead agency" designation as proposed for the NOAA Climate Service either by issuing an Executive Order or through less formal means. Of course, Congress could also ratify and make this designation permanent at some juncture through legislation.[26]

Acceptance of this recommendation does *not* mean that NOAA would direct, conduct or archive all federal climate science. Nor does it mean that NOAA would be the exclusive federal provider of all climate services. NOAA would *not* usurp or replace other agency authorities, relationships or missions.

In no case should deliberation about authorizing such a "lead agency" status delay the stand-up of a NOAA Climate Service. NOAA Administrator Lubchenco spoke to the Panel about her commitment to the essential first-order task at NOAA of "getting our house in order" regarding climate services, while working "in close partnership with other federal agencies."

[26] This recommendation regarding lead agency status for research and federal service delivery is not to be confused with leadership regarding the Administration's overarching climate policy strategy or federal policies regarding adaptation and mitigation, which is the responsibility of the President and senior Administration officers. The NOAA Climate Service would, however, be a source for authoritative, impartial science to support all Administration and Congressional policy makers.

Indeed, the new NOAA Climate Service deserves to know from the beginning the full scope and direction of its mission. The NOAA Climate Service and the rest of its federal partners need clarity about whether and to what extent any one agency is tasked with leading the day-to-day details of exacting better unity of effort across the breadth of the federal climate science and services enterprise. Whether a NOAA Climate Service is given the mandate to be first among equals at the federal table is not an esoteric triviality. Rather, it is a necessary precondition for gaining and sustaining better coordination among federal departments and agencies responsible for climate for research and services.

The Panel suggests that an appropriately tailored lead federal agency designation would generate indispensible momentum for the new NOAA Climate Service. Moreover, it would simplify and accelerate federal efforts to harmonize, coordinate and strengthen its overall climate research and service activities.

3.3 ADOPTION OF STRATEGIC AND IMPLEMENTATION PLANS

Considerable planning and organizational discipline is needed to move from proposing the new organization to launching a NOAA Climate Service. The start-up phase (12-18 months) will set the table for long-term success. ***The Panel recommends that prior to the start-up of the new organization NOAA should complete and formally adopt two core plans of record for the new organization: (1) a strategic plan; and (2) an implementation plan.*** Properly constructed, these will bring discipline and focus to the new organization.

NOAA is working toward adoption of a strategic plan for the entire NOAA organization, the *Next Generation Strategic Plan*. In a video prepared for employees and the public, NOAA Administrator Lubchenco describes the NOAA strategic plan in this way: "We will reset the course for the agency. The plan will reassess and renew our mission, our vision and goals. And this, in turn, will drive our work and our partnerships."[27] NOAA has also put in place a considerable planning process to guide the launch of its new Climate Service. The Climate Service implementation team has drafted and is refining a *NOAA Climate Service Implementation Strategy*, which has been briefed to the Panel.

The Panel has been favorably impressed with the rigor and discipline that is reflected in NOAA's draft *Implementation Strategy*. This provisional document combines virtually all the work needed to complete a NOAA Climate Service strategic plan. It contains some elements of an *implementation plan*, but is incomplete.

There is a difference between an *implementation strategy* (a strategic plan) and an *implementation plan*. It's the difference between knowing where you want to go and what you want to do, versus having a detailed roadmap on how you will get there, to include the resources and sequence of events that ensure a successful journey. It may be premature to expect that NOAA already have a refined implementation plan, as an actual start-up likely is still months

[27] Panel transcription of video at www.ppi.noaa.gov/ngsp.html, accessed August 27, 2010. A draft of NOAA's *Next Generation Strategic Plan* is available at this site.

away. Nonetheless, it may be helpful to examine the scope and purpose of these two planning documents needed for start-up.

Strategic Plan. ***The Panel finds that NOAA has brought strong focus to the core elements of a strategic plan.*** Chapter 2, above, summarizes core elements of the nascent strategic plan for the NOAA Climate Service, including a mission statement, as well as the four objectives that will steer the agency to help meet five societal challenges using its three core capabilities. The implementation team's work has focused on goals, outcomes, requirements, capabilities and deliverables or potential services.

A strategic plan should give precision to assessing and prioritizing needs, expectations and investments. It will facilitate working effectively with NOAA's domestic strategic partners, its key stakeholders and the larger public. NOAA's primary focus will be providing services within the U.S., but its strategy will continue to acknowledge the significance of substantial interaction with international researchers and service providers.

Implementation Plan. ***NOAA should expand current planning efforts to craft a detailed implementation plan to guide effective stand-up of the Climate Service.*** While this recommendation certainly verges on stating the obvious, completing this task effectively is vital and doing so well is no simple matter.

Crafting the implementation plan for the NOAA Climate Service can be done in stages, allowing the organization first to nail down *what must be done*, then with increasing layers of detail identifying options for *how* to do it. Such planning and later implementation should be led by the Climate Service's management team, supported by the NOAA and Department of Commerce executive team. Particularly important will be the new line office's Assistant Administrator, its principal Deputy Assistant Administrator (chief operating officer) and the Deputy Assistant Administrator for Transition and Change Management. See Chapters 4 and 5 for further discussion of these roles and of change management in the new organization.

The initial focus should emphasize the *process* by which NOAA will organize itself to manage the predictably large number of implementation issues. This earliest focus is less about the organization chart, more about building the new organization's brain trust and start-up leadership, and putting them to work on the most compelling implementation priorities. The team that is responsible for drafting the NOAA Climate Service implementation plan should be in one place, devoted full time to these tasks well in advance of the actual start-up.

It would be most effective to start with a simple inventory of the major clusters or "buckets" of responsibilities, such as: recruiting and hiring key staff (including interagency detailees); planning external and internal communications; maintaining effective Congressional liaison; assessing budget needs; promoting federal partner outreach (to create seamless, coordinated service delivery plans); introducing climate portal enhancements; evaluating facility utilization issues; architecting stakeholder engagement; managing press relations; formalizing legal authorities associated with the reorganization; identifying data collection, storage policies and priorities; aligning grant programs to priorities; establishing performance measurement metrics for the organization; evaluating pay-for-service arrangements; creating financial and resource

agreements among federal climate agencies to facilitate mission coordination; and literally dozens of other matters large and small.

In short, NOAA must create a management issues "bucket list," one with a results-oriented focus. Populating the buckets with specific assignments and plans can be facilitated through disciplined change management tools. Service delivery should be a particular focus of innovation. How will the agency customize its products and services? What are the primary channels for service delivery? What role will technology play in service delivery – now and in the medium-term? What types of employee skills must NOAA secure to make the Climate Service a success? How will NOAA translate or make useable complex climate data and predictive models?

The Panel offers specific recommendations regarding two technology-related issues worthy of near-term NOAA scrutiny. In both cases, innovative, state-of-art expertise is found largely in the private sector. NOAA should, therefore, proactively seek informal and voluntary counsel from private sector businesses about these matters. ***The Panel recommends that: (1) NOAA should continue the development of its climate portal, and plan for investments necessary to operate a virtual clearinghouse for federal climate information; and (2) NOAA should prioritize opportunities for using state-of-art information technology to expand participation by partners and users in the development of climate products and services, both to leverage its own investments and to produce more robust products and services.*** These two buckets of work may in fact be barrel-sized, but innovation here can yield transformational tools for the new agency.

* * *

Chapter 4 contains the Panel's recommendations regarding the structure of a NOAA Climate Service and discussion about each of the main components of the new organization.

CHAPTER 4
RECOMMENDED ORGANIZATIONAL STRUCTURE

Form follows function. Our recommendations for the design of a NOAA Climate Service follow the function of the organization's mission – providing climate research and services.

The Panel's recommended structure would achieve a high degree of internal alignment by establishing three operating units that reflect NOAA's existing capabilities and anticipated deliverables. For example, the Panel proposes gathering into a single office all of the service design and delivery personnel under one Director, regardless of the employee's physical location. This is intended to help NOAA connect these essential user-facing functions, while accommodating co-location with other Climate Service functional teams. Such a structure should reinforce closer working relationships across all offices and increase unity of purpose within the new NOAA Climate Service.

NOAA is not building a new Climate Service from scratch. If it were, the bulk of the NOAA Climate Service assets might easily be located on a single campus. The Panel does not suggest, however, any significant relocation of assets, given the extensive inventory of physical and intellectual capital already in place. A lack of physical proximity will, however, require NOAA Climate Service leaders to communicate especially well with the entire workforce. The new organization has been in the incubation stage for a protracted period, and as opening day approaches consistent and candid communication with employees is essential. NOAA must be cognizant of what it takes to build a unified team and common culture among a highly technical and dispersed workforce. Doing so requires engaged, cohesive leadership that is decisive yet collegial.

The proposed organization would have a relatively flat management structure, one that aligns quite closely but not identically with what has been proposed by NOAA. The organization's senior management team would be comprised of nine key individuals who must work extraordinarily well together for the effort to succeed. The team would include the Assistant Administrator, two Deputy Assistant Administrators, a Chief Scientist and the lead executive of each of the organization's five office-level components (Management; Policy and Strategic Partnerships; Research and Modeling; Data and Information; and Service Design and Delivery).

This design is intended, as much as possible, to facilitate a cohesive operating environment. It should reinforce already strong professional interdependencies among the three primary operational units. Each part of the organization builds upon and must be synchronous with the others. What is learned by the service design and delivery team from stakeholders must, for example, systematically animate development of the research planned. Contacts by the research and modeling team with other experts at home and abroad will, in turn, suggest possibilities for new service delivery tools. These two Climate Service organizations must collaborate continuously and rely upon each other. A similar partnership must be built between the Climate Service's data and information product professionals and the researchers and customer service specialists to promote the pass-off of strong, comprehensible and practical science. This creates a dynamic environment where collaboration creates value for all.

As a NOAA Climate Service is created, this same strong partnership internal to the NOAA Climate Service must also be aggressively nurtured among the multiple line offices within NOAA. Each NOAA line office depends upon other NOAA line offices. If nurtured, these relationships can greatly magnify what a single line office can achieve alone. Particularly important in the days leading up to formal creation of a NOAA Climate Service will be a need to make sure that the role of NOAA's Office of Oceanic and Atmospheric Research – a key incubator of new science and common-use tools for all of NOAA – is reinforced and widely understood. This line office provides particularly important institutional glue to support innovation across NOAA.

In recommending an organizational structure, the Panel was guided by a conviction that the new organization should join together all significant climate-related functions inside NOAA to provide for unity of climate focus, but to do so without adversely impacting other NOAA organizations. In other words, do all that was needed, nothing more. In the end, we asked these questions: Which essential elements should be brought together? What architecture would be practical to maintain? What design would be flexible enough to grow over time?

The Panel recommends aligning the Offices of the NOAA Climate Service around an outcome-based grouping of three core capabilities, which, like NOAA's own proposal, reflects the core capabilities from existing NOAA line offices that do climate work. For the Climate Service to succeed, the Panel finds that it is essential to include all three core capabilities in the new line office. ***Our recommendation is for a Climate Service with four primary organizational structures: (1) headquarters leadership and support functions; (2) an Office of Research and Modeling; (3) an Office of Data and Information Products; and (4) an Office of Service Design and Delivery.*** This Chapter explains each of these four organizational groupings.

Table 5 summarizes the Panel's recommendations regarding which offices from within NOAA should be migrated to the new NOAA Climate Service.

Table 5
Academy Panel's Proposed Climate Service -- Organizational Components

NOAA Assets Proposed for Inclusion with the NOAA Climate Service*	Current NOAA Location	Proposed Location in NOAA Climate Service
1. Earth System Research Lab (ESRL) Director's Office	OAR	Research & Modeling
2. ESRL, Physical Sciences Division	OAR	Research & Modeling
3. ESRL, Chemical Sciences Division	OAR	Research & Modeling
4. Geophysical Fluid Dynamics Laboratory	OAR	Research & Modeling
5. ESRL, Global Monitoring Division	OAR	Data & Info Products
6. Climate Program Office, Ocean Observing Systems	OAR	Data & Info Products
7. Integrated Ocean Observing System	*NOS*	*Data & Info Products*
8. Tropical Atmosphere Ocean Array	NWS	Data & Info Products
9. Modernization of the Hourly Precipitation Rain Gauges	NWS	Data & Info Products
10. Historical Climatology Network Modernization	NWS	Data & Info Products

NOAA Assets Proposed for Inclusion with the NOAA Climate Service*	Current NOAA Location	Proposed Location in NOAA Climate Service
11. National Climatic Data Center	NESDIS	Data & Info Products
12. National Oceanographic Data Center	NESDIS	Data & Info Products
13. National Geophysical Data Center	NESDIS	Data & Info Products
14. Climate Prediction Center	*NWS*	*Data & Info Products*
15. Regional Climate Liaison staff	NESDIS	Service Design & Delivery
16. Climate Program Office, Communications & Education staff	OAR	Service Design & Delivery
17. Regional Integrated Science Assessments program	OAR	Service Design & Delivery
18. National Integrated Drought Information System program	OAR	Service Design & Delivery
19. Cooperative Institutes program	OAR/NESDIS	Service Design & Delivery
20. Climate services staff from the three data centers	NESDIS	Service Design & Delivery
21. Regional Climate Centers	NESDIS	Service Design & Delivery
22. Climate Program Office, Grants and Contracts program	OAR	Service Design & Delivery

*Legend: OAR – Office of Oceanic and Atmospheric Research; NESDIS – National Environmental Satellite, Data & Information Service; NWS – National Weather Service; and NOS – National Ocean Service. Blue text italic = NOAA organization recommended by the Panel for inclusion within the Climate Service, but not included with the NOAA Proposal.

Presented from a different perspective, Figure 2 presents a proposed organization chart for aggregating and organizing NOAA Climate Service assets consistent with the Panel's recommendations regarding the basic organization structure.[28] What follows in this chapter is a discussion of the four primary organizational components.

4.1 HEADQUARTERS ORGANIZATION

Headquarters Leadership. ***The Panel recommends that the head of the NOAA Climate Service have rank, title and compensation equivalent to the heads of the other NOAA line offices. We further recommend that this individual, the Assistant Administrator, be selected from among the ranks of the career Senior Executive Service (SES) or be a candidate who can qualify for an appointment as a career SES executive.***[29] Looking forward, having a distinguished and experienced career Assistant Administrator will reinforce public confidence in the impartiality and authoritativeness of the NOAA Climate Service's work products. This will also provide for needed continuity and stability during future Administration transitions. As the proposed organization chart makes clear, the Assistant Administrator would be responsible for an eight-person senior management team: the principal Deputy Assistant Administrator; the Deputy Assistant Administrator for Transition and Change Management; the Office of Management; the Office and Policy and Strategic Partnerships; the Chief Scientist; the Office of

[28] Organization levels and titles are based on NOAA Administrative Order 200-7, *Procedures for Initiating and Processing Organizational Changes*. For clarity in reporting chains, the alternate title (Chief) for head of a division or laboratory is used. This chart does not convey structural recommendations below the division level.

[29] The SES includes most senior managerial, supervisory, and policy positions in the Executive Branch. Five of the current NOAA line office heads (Assistant Administrators) are career SES appointees, and one (National Marine Fisheries Service) is a political appointee. The head of NOAA is a Presidential appointee confirmed by the Senate. The Panel concluded that, as with the preponderance of other NOAA line offices, the Climate Service would be best served if its senior executive were a career status appointee rather than a political appointee.

Research and Modeling; the Office of Data and Information Products; and the Office of Service Design and Delivery.

The principal Deputy Assistant Administrator should be the NOAA Climate Service's Chief Operating Officer. Like his or her boss, the chief operating officer would have only a small staff, including one or two public affairs specialists. As chief operating officer, the principal Deputy should have direct line authority over the three operational offices: Research and Modeling; Data and Information products; and Service Design and Delivery. ***To balance the leadership team, the Panel suggests that at least one of the top two leadership positions be filled with an individual familiar with the culture and operation of NOAA, as well as the culture and history of the component pieces coming into the Climate Service.***

The headquarters team will account for six of the nine total senior management positions that would lead the new organization. Chapter 5 of this report offers further observations and recommendations about the NOAA Climate Service's senior management team – their recommended qualifications, responsibilities and selection – and on change management. Having touched on the top two positions, this section also elaborates briefly on the four other senior executives managing headquarters functions.

Deputy Assistant for Transition and Change Management. The Climate Service transition agenda should be developed in accord with an implementation plan containing detailed timelines, deliverables and performance objectives. ***The Deputy Assistant Administrator for Transition and Change Management should closely supervise the transition agenda on behalf of the Assistant Administrator and the senior management team.*** This is contemplated as a temporary, transitional position (12-24 months); additional recommendations regarding the position are contained in the next chapter of this report.

Chief Scientist. The Climate Service should include a Chief Scientist as a Career SES or what is known in the federal government as a Scientific or Professional position.[30] ***The Chief Scientist should be responsible for providing technical and scientific advice to the Climate Service, and NOAA leadership. He or she should be responsible for ensuring that the Climate Service's scientific activities are scrupulously objective, scientifically disciplined, transparent, collaborative and responsive to the needs of NOAA and its stakeholders.*** The Chief Scientist should be well positioned to help: the Assistant Administrator weigh competing demands from within the Climate Service and across NOAA; assess the scientific basis for proposed research; integrate various streams of climate research into products and services; and prioritize investments associated with climate science.

Office of Management. The Director for Management would oversee finance and budget matters, administrative functions and human resource responsibilities. A career SES appointment, this person would report to the Assistant Administrator through the Deputy Assistant Administrator/Chief Operating Officer.
This office will have close working relationships with NOAA's Chief Financial Officer, and other NOAA management offices. It must be designed to respect the appropriate line

[30] For details about federal Scientific or Professional (ST) positions see: www.opm.gov/ses/recruitment/stpositions.asp.

office/NOAA headquarters divisions of labor. ***The Panel recommends that the Office of the Director of Management have overall finance and budget responsibilities for all financial management and budget activities relating to the programs and operations of the Climate Service, including annual budget development.*** [31]

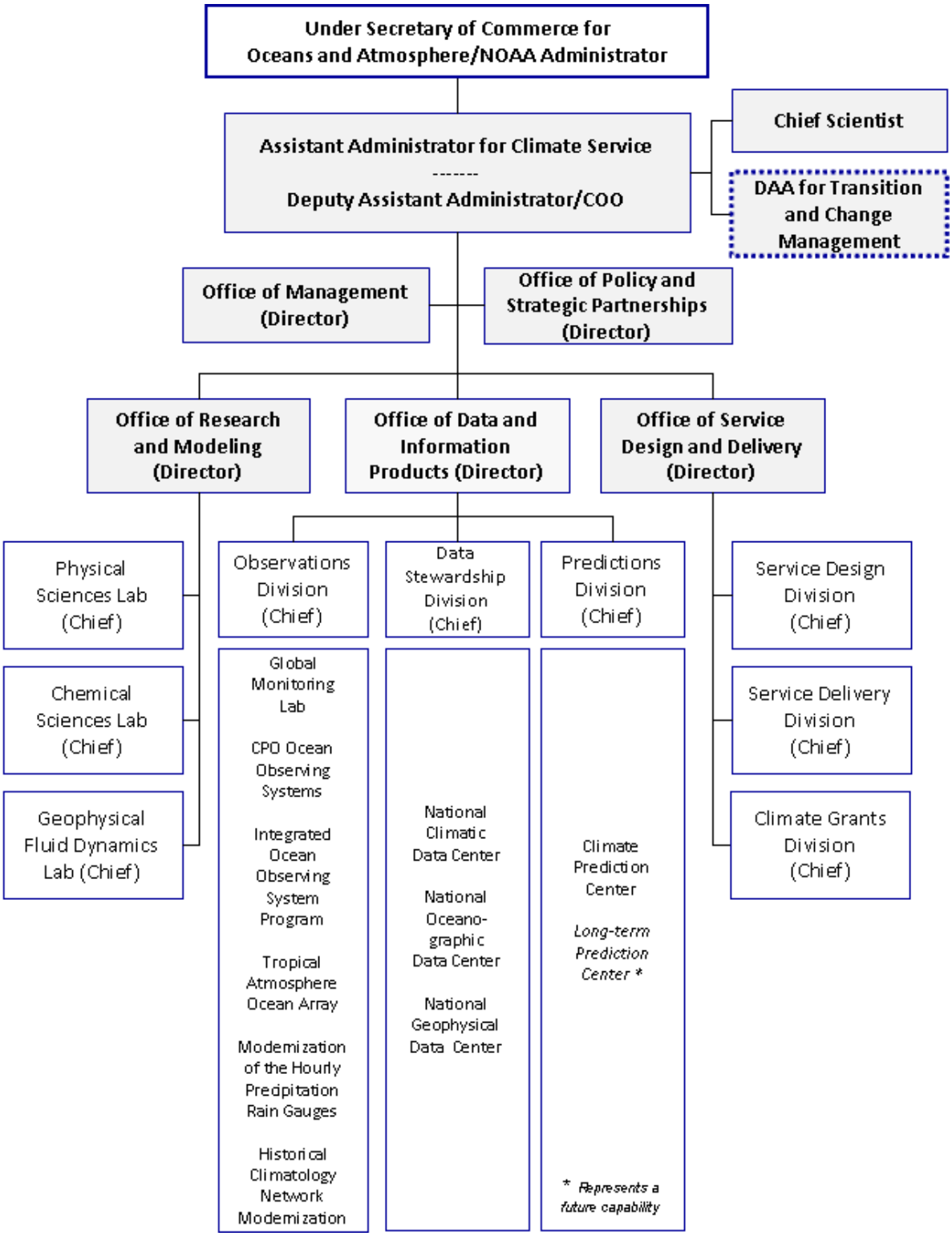
NOAA has proposed an arrangement whereby the NOAA Chief Information Officer would directly manage all information technology software and hardware acquisition, network security and maintenance functions for the Climate Service. The NOAA Chief Information Officer currently supports the NOAA staff offices. Unlike other NOAA line offices, the Climate Service would therefore not have a Chief Information Officer. If adequately resourced and responsive, this approach strikes the Panel as cost-effective, likely to ensure better network performance and therefore worth a try. If the NOAA Chief Information Officer is not given adequate resources, this approach will fail.

Office of Policy and Strategic Partnerships. ***The Director for Policy and Strategic Partnerships would oversee headquarters-level policy management, development and support for strategic partnerships (especially to architect robust federal interagency partnerships) and international affairs.*** A career SES appointment, this person would report to the Assistant Administrator through the Deputy Assistant Administrator/Chief Operating Officer.
This office would be responsible for *strategic* policy issues associated with federal, state, tribal and local governments. It would engage other agencies to define effective roles and responsibilities for climate functions, including negotiation of formal interagency cooperative agreements. A priority focus should be strengthening federal interagency partnerships. Careful delineation of duties assigned to this office would, however, be essential. This is especially true in relation to the Office of Service Design and Delivery. The Panel believes that day-to-day relationships with state and local officials would be handled best by the Service Design and Delivery team. The Office of Service Design and Delivery should, for example, be the institutional home for the Climate Service Liaisons as described in Section 4.4.

Primary responsibilities for international affairs activities should reside in this office. It would coordinate with appropriate international agencies (World Meteorological Organization and the Intergovernmental Panel on Climate Change, for instance) on collaborations and bilateral agreements involving the line office or its assets. This office would routinely draw on Climate Service program-level staff and would support NOAA's International Affairs Office as needed.

[31] The Panel assumes that the head of this line office would serve as the Climate Service CFO.

Figure 2
Academy Panel's Recommended Structure for a NOAA Climate Service



4.2 OFFICE OF RESEARCH AND MODELING

The Director of Research and Modeling would be responsible for managing the NOAA Climate Service's climate research enterprise, including priority research investments within the line office and contracted research from elsewhere within NOAA or outside NOAA. A career SES appointment, this person would report to the Assistant Administrator through the Deputy Assistant Administrator/Chief Operating Officer.

The Panel recommends that four existing NOAA components be incorporated into a proposed Office of Research and Modeling: (1) the Earth System Research Laboratory (ESRL) Director's Office; (2) ESRL, Physical Sciences Division; (3) ESRL, Chemical Sciences Division; and (4) the Geophysical Fluid Dynamics Laboratory (GFDL). The three ESRL assets are located in Boulder, Colorado; the GFDL is located in Princeton, New Jersey.

Research Functions. Credible and authoritative scientific research provides the foundation for making sound decisions about climate adaptation and mitigation. As science regarding climate variability and change gains greater certainty and predictive force, so too will it become more complex. Climate research will continue to rely on experienced scientific professionals, incorporate greater amounts of data, utilize increasingly robust analytical tools and research models, become more granular and localized in its focus, and continue to require access to high-performance computing.

NOAA has advanced the understanding of climate systems over the past 40 years through a combination of its own research and directed external research, which awards contracts and grants to its research partners. Today NOAA's climate research activities are dispersed across multiple NOAA organizations.

Typically, applied research yields tangible products or makes possible specific services. So too in the case of climate: research will enable development of many new products and services. Climate modeling is itself a research activity and is closely connected to other climate service research. Providing access to climate research is what a NOAA Climate Service is all about. From a functional perspective, a robust research capability concentrated within the NOAA Climate Service line office is essential. From a management perspective, having budget and personnel authority for these assets provides accountability for climate research choices.

The proposed Climate Service would incorporate a significant portion of NOAA's climate research capacity into an Office of Research and Modeling, the key elements of which are currently part of the Office of Oceanic and Atmospheric Research (OAR). Specifically, the Physical Sciences Division and the Chemical Sciences Division of the Earth System Research Laboratory (ESRL) conduct applied research that directly supports climate monitoring, modeling and services. These two OAR divisions (labeled as Labs on Figure 2) concentrate on atmospheric work. Although they are not wholly dedicated to climate, these are predominantly focused on climate matters.

The Panel finds that bringing the Physical Sciences Division and the Chemical Sciences Division into the Climate Service will allow the new line office to manage NOAA climate

research that is indispensable to success of the new enterprise. It would undermine the whole concept of an integrated NOAA Climate Service if these research assets were not an integral part of the new line office.

Two additional NOAA labs require discussion. OAR has two marine laboratories that also contribute to NOAA's climate science mission: the Pacific Marine Environmental Laboratory (PMEL) and Atlantic Oceanographic and Meteorological Laboratory (AOML). Both perform significant climate research work, yet both conduct a preponderance of non-climate work. The Panel concluded that it would be too disruptive to other NOAA missions, and to OAR's core mission within NOAA, to transfer these two organizations to the new NOAA Climate Service. As is discussed below (section 4.5), the Panel evaluated and rejected the idea of merging all OAR assets into a new Climate Service. Doing so would serve neither the interests of NOAA overall nor those of the Climate Service. The management challenge, therefore, is this: how to ensure that these two laboratories focus their climate-related activities in ways that contribute effectively to a seamless research function within NOAA regarding climate science. How should NOAA create the right incentives for integration of effort without merging these organizations into the Climate Service?

By NOAA's own experience, mere matrix management does not seem adequate. ***The Panel recommends to Congress and the Administration that all funds to support NOAA climate research – including climate research to be performed by PMEL and AOML – be appropriated annually to a single climate research budget account within the NOAA Climate Service.*** The Assistant Administrator would, in effect, annually purchase those research deliverables of PMEL and AOML that the Climate Service required. In this way the Climate Service would have greater discretion to fund NOAA's highest climate research priorities, irrespective of organizational boundaries within NOAA. PMEL and AOML would retain hiring authority and full management control of all their current personnel. Any research projects at PMEL and AMOL that would be commissioned and funded by the Climate Service would require approval and oversight by OAR's management. Early on, the Climate service should develop template memoranda of understanding or other appropriate agreements with OAR and other NOAA line offices to facilitate routine collaboration of this sort.

If a given OAR or Climate Service office could best provide a high priority climate research deliverable, that office could, with this approach, be more readily funded. If, on the other hand, a given stream of research is completed, other research priorities could then be more easily funded. If contracted research better satisfies priority needs, the Climate Service could invest accordingly. This important budget discipline would greatly strengthen accountability and would appropriately encourage systemic, effective cooperation among NOAA's assets devoted to research regarding climate.

Modeling Functions. The ability to model climate and to explain how it might change over time is an integral part of the Climate Service's research capabilities. Climate models cover shorter to longer timeframes, from days or weeks to years, from decades to centuries. Climate modeling experts help shape research and translate research findings into outputs that can be understood and used more readily by end-users. These functions are, by and large, more operational in nature, and result in the creation of operationally usable products. Aligning

climate modeling functions directly with climate research work will forge from the very outset of research design a closer integration of *what* is being learned with *how* it will be shared and utilized for practical decision making.

The Panel recommends incorporating the Geophysical Fluid Dynamics Laboratory (GFDL) into the Office of Research and Modeling. This organization has a high degree of interdependency with the work of the Physical Sciences Lab and the Chemical Sciences Lab. Climate stakeholders told the Panel that the episodic yet protracted periods when GFDL provides large-scale modeling runs to support the Intergovernmental Panel on Climate Change absorb an enormous amount of senior researcher time and GFDL computing resources. These commitments bring much of the Lab's ongoing modeling work to a virtual halt for months at a time, hampering research work and external collaboration. Finding a way to support national and international assessments without detracting from ongoing modeling research and development would be a good assignment for the new Climate Service leadership team. The solution may have future organizational structure implications.

4.3 OFFICE OF DATA AND INFORMATION PRODUCTS.

The Director of Data and Information Products would be responsible for managing NOAA Climate Service operational activities associated with climate observations, data stewardship and predictions – an integral set of capabilities that will help adapt the best science to support design and delivery of effective service offerings. A career SES appointment, this person would report to the Assistant Administrator through the Deputy Assistant Administrator/Chief Operating Officer.

The Panel recommends that ten existing NOAA components be incorporated into a proposed Office of Data and Information Products: (1) ESRL Global Monitoring Division; (2) Ocean Observing Systems (currently funded by the Climate Program Office); (3) National Ocean Service Integrated Ocean Observing System Program; (4) Tropical Atmosphere Ocean Array; (5) Modernization of the Hourly Precipitation Rain Gauges; (6) Historical Climatology Network Modernization; (7) National Climate Data Center; (8) National Oceanographic Data Center; (9) National Geophysical Data Center; and (10) Climate Prediction Center. These components are proposed to be organized into three divisions: an Observations Division; a Data and Information Products Division; and a Predictions Division. These components are managed out of Boulder, Colorado; Silver Spring, Maryland; Seattle, Washington; and Ashville, North Carolina.

Climate observations, data stewardship and predictions are closely aligned operational functions. To some degree their relation to each other is linear. Climate observation data is first gathered, then stored and formatted for ready access, finally assembled using authoritative research and climate models to yield predictions. Those predictions form the basis of climate services for end-users. The Office of Data and Information Products would aggregate data- and product-centered activities of the NOAA Climate Service. These activities should be aligned and managed collectively as each is informed by the needs of the other, and in some cases requires completion of activities by one before another can move forward. Their work is a bridge

between climate research and services, its mission supported by and supporting both other Climate Service operational Offices.

The Data and Products Division will be geographically dispersed and decidedly operational. They will also support other NOAA line offices. The leadership contingent must organize quickly to forge a cohesive, responsive team inside the new line office.

Observations Division. Numerous observation systems capture long-term trends in climate regarding air, land and sea climate variation and change. NOAA has a distributed array of observing systems used to gather a wide variety of climate and weather data. ***The Panel recommends that there should be an organizational unit within the Climate Service that manages climate observing assets, staff and budget.*** NOAA's proposed building blocks for this element of a new line office include: the Ocean Observing Systems (currently funded by the Climate Program Office); Tropical Atmosphere Ocean Array; Modernization of the Hourly Precipitation Rain Gauges; and Historical Climatology Network-Modernization.

We agree with NOAA that these assets should move to a Climate Service. The Panel proposes that one additional NOAA asset be moved to the Climate Service and housed within the Observations Division: the Integrated Ocean Observing System (IOOS) program.

IOOS is the U.S. contribution to the Global Ocean Observing System. IOOS was conceived to combine both open-ocean and coastal components. Over time NOAA has located the management for ocean observations across several NOAA line offices. These Ocean observing assets are essential to the mission of the Climate Service, although they also collect important non-climate data. NOAA has proposed to consolidate its open ocean observation assets and move them into the new Climate Service. The Panel agrees with this proposal***. The Panel further recommends that NOAA take advantage of this reorganization to consolidate more climate-related observation assets by moving into the Climate Service not just NOAA's open ocean observation components, but also its coastal observation components. To achieve this, the Panel recommends that NOAA move IOOS coastal observing assets currently managed by the National Ocean Service to the Climate Service Observations Division.***

Moving IOOS from National Ocean Service into the Climate Service should not have a negative impact either on the National Ocean Service or on cooperative relationships with the ocean observing Regional Associations. This move does have the potential to improve effectiveness by providing better observations and monitoring from multiple assets. Efficiency would be enhanced by consolidating management of related data collection and stewardship functions. Inclusion of IOOS provides the Climate Service with the full spectrum of marine and atmospheric observations. To the extent that observation and monitoring assets are also used for non-climate functions, the Climate Service will have to ensure that these observing platforms continue to serve well all NOAA missions.

NOAA has proposed to incorporate the Global Monitoring Division (GMD) of ESRL into the Climate Service and suggests it should be bundled with the Office that contains the research and modeling assets. ***The Panel agrees GMD should be included in the Climate Service, but***

recommends it be housed within the Observations Division with other observing and monitoring assets and programs.

GMD (called the Global Monitoring Lab, Figure 2) conducts atmospheric research, observation and monitoring activities. GMD also conducts applied research intended to improve GM's own observation and monitoring capabilities. The Panel finds GMD to be largely operational in nature, producing monitoring data and systems, and it will perform best if a part of the unit responsible for these other operational observation activities.

Data Stewardship Division. Data Stewardship, or what many in NOAA refer to as "data monitoring," includes multiple activities. Data stewardship includes archiving observational data sets from multiple sources – satellites, gauges, buoys, surveys and the like. Data stewardship also entails quality control and quality assurance regarding both current and historical datasets to be archived. These archives must be widely accessible and interoperable in order to conduct analyses that can identify patterns and trends across data sets that are of interest to researchers and decision makers.

NOAA's three data centers – the National Climatic Data Center, National Oceanographic Data Center and National Geophysical Data Center – conduct data stewardship activities and analyses. According to NOAA, the National Climatic Data Center conducts a variety of essential climate functions and is responsible for the stewardship of almost all of NOAA's archived data. The Panel concludes that it makes sense to include this organization within the Climate Service. For the sake of efficiency, the three data centers should continue to be managed in a single line office. There may be additional opportunities to streamline their policies, procedures and management. As all three data centers provide both climate and non-climate services, NOAA will need to institute business practices to make sure non-climate mission requirements are still fully met. These data centers also have dedicated climate services staff that will be discussed further under the Office of Service Design and Delivery.

Climate Predictions Division. Observation and monitoring activities allow us to know what is happening now. Decision makers need to understand what might happen over a longer time horizon, including certainly multi-decadal horizons. The nation needs authoritative short-term and long-term climate predictions and projections focused on all levels where adaptation and mitigation decisions are made – at the local, state, regional, national and global levels. The NOAA Climate Service needs to bring together and strengthen NOAA's climate prediction capabilities. [32]

[32] ***Climate prediction*** is the result of an attempt to produce an estimate of the actual evolution of the climate in the future, for example, at seasonal, inter-annual or long-term time scales. Since the future evolution of the climate system may be highly sensitive to initial conditions, such predictions are usually probabilistic in nature. ***Climate projection*** is an estimate of the climate system to emission or concentration scenarios of greenhouse gases and aerosols, or radiative forcing scenarios, often based upon simulations by climate models. Climate projections are distinguished from climate predictions in order to emphasize that climate projections depend upon the emission/concentration/radiative forcing scenario used, which are based on assumptions concerning, for example, future socioeconomic and technological developments that may or may not be realized and are therefore subject to substantial uncertainty. See: www.ipcc.ch/publications_and_data/ar4/wg1/en/annex1sglossary-a-d.html.

The Panel recommends that the cornerstone of the NOAA Climate Service Predictions Division be the National Weather Service's Climate Prediction Center. NOAA had not proposed that this asset be transferred to the new line office. The Climate Prediction Center (CPC) focuses on forecasts and predictions typically covering a period from two weeks to two years. These include such products as seasonal outlooks for temperature, precipitation and sea surface temperatures. These are applied to address issues such as drought, flooding, soil moisture and El Niño and La Niña cycles. CPC produces a number of periodic assessments, including Global Ocean Assessments, Hazard Assessments and Drought Assessments. CPC is the only NOAA organizational unit with these climate capabilities.

A large number of individuals interviewed by the Panel shared their concerns about the exclusion of CPC from NOAA's Climate Service proposal. CPC is a critical contributor to NOAA's climate efforts, and should be included in the Climate Service. CPC connects to the regional delivery infrastructure of the National Weather Service (NWS) through the NWS Climate Services Division.[33] The Panel carefully considered whether moving the CPC to the Climate Service would disrupt timely delivery of climate products to NWS users or imperil essential collaboration. The Panel is strongly convinced that CPC can more easily continue to meet its mission support commitments to NWS while operating from within the Climate Service than it could meet essential mission needs of the Climate Service operating from within NWS.

As part of the Climate Service, CPC would be a treasured and essential component of the new organization's success. As part of NWS, CPC would remain a valued component within a much larger and established structure, but comparatively less integral to NWS's success. Having CPC inside the Climate Service will underscore strongly that NOAA's leadership expects the Climate Service to meet important service objects both external to the line office and internal to NOAA. From the very beginning, inclusion of this asset within the Climate Service will oblige its leadership team to work even more closely with the NWS, and to prove it can be an excellent partner and manager of assets important to multiple NOAA line offices.

Finally, NOAA does not currently have an organizational component that is routinely and exclusively devoted to generating long term (beyond a two-year period) climate predictions. The Panel was told that NOAA's needs for such longer-term predictions have typically been met by assembling ad-hoc teams on an as-needed basis. Our assessment indicated a strong external demand for predictions and projections for the decadal, multi-decadal and even centennial timeframes at the appropriate scale.[34] ***The Panel recommends that in time, and subject to the availability of adequate resources, the Predictions Division create a new unit dedicated to long-term operational climate predictions and projections.***

[33] This division delivers CPC products to the Climate Focal Points at each Weather Forecast office for local dissemination. It provides feedback on how they are being used in the field and identifies areas where improvements are warranted. This relationship is symbiotic, as NWS is dependent on CPC's products, and CPC is dependent on NWS' field organization to deliver and help refine its products.

[34] NOAA has discussed creating an "Environmental Change Center" to meet these needs.

4.4 OFFICE OF SERVICE DESIGN AND DELIVERY.

The Director of Service Design and Delivery would be responsible for efforts both internally and externally with end-users to design and deliver innovative, effective climate services (including management of a climate portal that includes a roadmap to all federal climate services) to support adaptation and mitigation decisions nationwide. A career SES appointment, this person would report to the Assistant Administrator through the Deputy Assistant Administrator/Chief Operating Officer.

The Panel recommends that the following NOAA program offices be incorporated into the Service design and Delivery Office: (1) the Regional Climate Liaison staff;[35] (2) the Climate Program Office's Communications and Education staff; (3) Regional Integrated Sciences and Assessments; (4)National Integrated Drought Information System; (5) the Cooperative Institutes program; (6) the Regional Climate Centers; (7) the climate services staff currently associated with the National Climatic Data Center, National Oceanographic Data Center and the National Geophysical Data Center; and (8) all the Grants and Contracts units currently housed in the Climate Program Office. These assets are managed by offices in: Ashville, North Carolina; Boulder, Colorado; and Silver Spring, Maryland.

Today NOAA produces and offers a multiplicity of valuable climate services. They provide a good foundation for the new services organization, but the existing NOAA suite of climate services needs strengthening, modernization and expansion. Internal and external stakeholders have made a strong case that the new NOAA line office can be an invaluable aid to making decisions at all levels of society regarding climate adaptation and mitigation – if it can manage to raise the bar for service delivery performance not only by the new NOAA Climate Service, but also by the larger community of federal departments and agencies active in this space.

As proposed, the Office of Service Design and Delivery includes components for: (1) service design; (2) service delivery; and (3) a climate grants division to manage grant programs for external stakeholders and partners. This is the Climate Service office that would arguably have the most interaction with the largest number of climate partners and stakeholders in both public and private sectors. It will be comprised of a relatively small band of outward-facing staff and programs. Its team will drive the design and delivery of a new, more targeted and more robust suite of services. They will work with a toolkit that will certainly not be exclusively of NOAA's own design and execution. Yet this group can be the center of gravity for enormous creativity and innovation in leading a broad collection of actors that will work together to meet societal needs regarding climate. Their core mission is to make tangible the promise implicit in the new organization's title: to be a NOAA Climate *Service*.

Service Design and Service Delivery Divisions. Creation of truly effective Service Design and Service Delivery business units will require building teams that are unusually creative, consultative, responsive and non-bureaucratic. These individuals will often offer to the outside world the most visible face of the new line office. Their collective efforts will provide a constant pulse about Climate Service performance and stakeholder needs. These two divisions will be a switching point for timely information about what works and what does not. They should not

[35] Currently six individuals located within NWS offices and titled as Regional Climate Directors.

seek to "own" external relations in any way that limits access by the Climate Service's larger team to the consultative network that this office would mange on behalf of the line office.

The toolkit of services that the Service Design and Service Delivery divisions will help develop and deploy will certainly not be exclusively NOAA's work. Equally important is the role this team should play in helping to make the nascent federal climate enterprise more robust. Especially if the NOAA Climate Service obtains the lead federal agency role for climate research and services, as advocated by the Panel, this office will have a special obligation to help nurture a deeper portfolio of available services offered from across the federal climate enterprise. And it will have to develop and constantly maintain a comprehensive inventory of federal climate tools available for users at all levels.

This office will need to burnish existing relationships and create others to leverage multiple service distribution channels and networks. Obtaining the greatest value from the federal climate research and services enterprise is the most obvious focus, one that offers early opportunities for success. But strengthening helpful partnerships with state climate officials is also essential. So is continuing successful academic relationships can extend the reach and refine the focus of the Climate Service. Additionally, the Climate Service should invest serious energy to figure out how to help the private sector to access authoritative climate science, models and data so it can directly assist as many climate services users as possible.

The Climate Service need not re-invent the wheel when it comes to already successful ways of interacting with and supporting key stakeholders. It should leverage programs managed from within the new line office, from other NOAA line offices and, of course, from numerous other federal agencies. Just a few examples of such existing programs could include the Sea Grant program, State Climatologists, NWS's Climate Focal Points program, the Office of Ocean and Coastal Resource Management and the U.S. Department of Agriculture's Cooperative Extension agent program, among many others. The Climate Service must rely on partners to meet part of its mission requirements; it will have to dedicate staff to manage these relationships to ensure accurate, timely and consistent delivery of climate products and services.

It is not the intent of this Panel to offer excessively detailed organizational recommendations for this or any other Climate Service office. Although we have made clear which assets the Panel recommends for these two divisions, we have not herein sought to suggest a distribution of these assets within the two divisions. Some flexibility will be needed to balance size, budgets and organizational needs. Just a few additional observations may be helpful regarding certain NOAA assets that the Panel has recommended be incorporated into these two divisions.

In its first days, the Climate Service should act decisively to allocate resources to strengthen relationships with climate executives at the state and local levels. NOAA recently hired six Regional Climate Directors, co-located with the six NWS Regional Offices, to begin the regional engagement. This is a very sensible start, and an initiative that merits early expansion. (Chapter 5 also discusses the role of these individuals, and recommends expanding and refining this force).
If properly hired, trained, empowered and deployed, these individuals will provide an invaluable channel for feedback about what works and what is needed. They should have an important role

in assessing existing and proposed climate products designed for field deployment. Management will need to ensure that there are no gaps in coverage, but geographic assignments will likely flex as the new organization better maps itself to working with its external partners. As they are not *directing* climate activities within a fixed region, we recommend that these individuals have a title that somehow reflects their consultative role, such as *Climate Service Liaison.*

As discussed in Chapter 5, the Panel recommends an early and comprehensive look at the existing Federal Advisory Committee structures that the Climate Service might inherit. We suggest that the Climate Service should re-charter and tailor these tools to fit current needs. The Office of Service Design and Delivery would be an obvious home to manage these structures on behalf of the Climate Service. This might entail replacing or reconfiguring some of the current functions of the NOAA Science Advisory Board.

These engagement efforts should be augmented with more traditional communications, outreach and education efforts. ***The Panel has recommended that the front office have a small communications staff whose head reports to the Chief Operating Officer.*** The Office of Service Design and Delivery would coordinate with and support as needed those front-office capabilities.

The Climate Program Office's Communication and Education Program would be an integral asset of the Service Design and Delivery team. Their role should include public affairs activities aimed at traditional and non-traditional media. This group, with appropriate NOAA approvals, would facilitate climate-related communications across the Climate Service, as well as across NOAA's line offices. This Communications and Education unit also would include informal and formal education efforts, such the design and delivery of climate literacy materials, curricula standards and teaching materials, and support for professional development opportunities for NOAA employees. This division would be an obvious candidate to manage the content if not the network tools needed to support the line agency's web portal, www.climate.gov. The portal is intended to provide easy access to the climate data archived by the Data Stewardship Division and other information resources. Should the Climate Service be given a broader mandate to serve as a clearinghouse for all federal climate data and information, as recommended by this Panel, existing resources would have to be devoted to meeting these expectations.

The Climate Service will need boundary-spanning communications professionals who understand both the science and the user needs. They will need the capability to translate foundational products into audience-appropriate language and format, creating new products and services to meet stakeholder needs while maintaining scientific integrity. NOAA has a number of such professionals within the data centers, NIDIS program, and other parts of NOAA such as the Coastal Services Center. Additional staff with these skills will probably be needed over time to support stakeholder engagement efforts. Some of that new capacity should reside within the Climate Service, and some will reside in the other line offices.

The Panel recommends that the customer service employees at its three data centers be moved into this office. These individuals have experience working directly with customers to identify relevant data, provide data sets, package data sets and produce data products on request. They also provide active outreach to determine what data products NOAA can provide to government and business sectors. The Panel finds that these professionals are already providing climate products and services, and should add to core staff for delivery of climate services. Additionally, these staff will provide a strong bridge between the Service Design and Delivery Office and the Data and Information Products Offices.

The management of collaborations, such as the Regional Integrated Science Assessments (RISAs) and NIDIS programs, should be housed in the Service Delivery Division. RISAs provide region-specific products and climate services. NIDIS is a prototype that responds to the specific need for drought information. Both support stakeholder needs for specific information and ongoing, direct support.

NOAA has proposed that the Climate Service have the capacity to conduct at least three types of assessments on an ongoing basis: International and National Climate Science Assessments; Thematic Problem-focused Assessments; and Climate Information Stakeholder Needs Assessments.[36] The Panel finds that these assessments will enhance NOAA's ability to provide climate services that meet stakeholder needs. The assessments will draw upon experts from across the Climate Service and NOAA, as well as other federal climate professionals. ***The Panel recommends these climate assessment activities should be managed at least in part by Service Design Division professionals who can help guide these assets to ensure that the final products are responsive to user needs.*** Some of these assessments will be used to identify and deliver relevant climate information to support information policy, planning and decision-making; others would be used to inform the Climate Service's strategic plan, annual operating plans and priorities for future activities.

Climate Grants Division. NOAA has a strong history of partnering to supplement its own capacity. Ongoing collaborations occur, for example, through the Cooperative Institutes, the Regional Integrated Science Assessments and the Regional Climate Centers. The NOAA Climate Service would manage what today is already a substantial annual competitive grant program, supporting many parties external to NOAA with climate-related funding.

The Panel recommends that all competitive grant programs related to climate be administratively managed from a single Climate Grants Division located within the Office of Service Design and Delivery. This entity would be the manager for all Climate Service grant programs for external recipients. It would have the obligation to make sure that all appropriate financial discipline, independence and program integrity is maintained. Consistent with Congressional funding mandates, the grant program priorities would be developed and approved in conjunction with relevant Climate Service leaders and other NOAA subject matter experts.

The Climate Grants Division should be resourced to manage a disciplined and ethically scrupulous grant making *process*, not to substitute its views about program *priorities or substantive requirements* for those of the Climate Service leadership or Climate Service subject

[36] Information provided to the Academy by NOAA. The Academy recognizes that this is a draft subject to change

matter experts relevant to a given grant program. Climate Service management would be responsible for providing program funding priorities to the Climate Grants Division. After an award is made, for example under the Cooperative Institute program, a program office within the Office of Research and Modeling, would assume the lead programmatic support role for successful awardees. Not a substantial departure from current practice, this would assist the Climate Service in effective interaction with Cooperative Institute program participants. In other cases, a lead liaison role within the Climate Service might be assumed by a service team or a component of the Office of Data Information and Partnerships. In all cases, any issues associated with pure grant administration issues would be resolved by the Climate Grants Division.

The Climate Service competitive grant programs are not to be confused with internal resource allocation decisions made at the Climate Service. The Climate Service will presumably continue and may enlarge opportunities for its employees to pitch ideas that support multi-discipline collaboration across different organizational elements of the line office. This activity should, however, be accommodated as part of the annual budget cycle planning, and through other resource allocation mechanisms with the Climate Service as deemed relevant during the course of the year. No such resource allocation or contractual authority would be the responsibility of the externally-facing Climate Grants Division. Instead, such issues would be managed by the Office of Management.

4.5 OTHER OPTIONS CONSIDERED AND DISMISSED

The Panel did *not* find itself in any way constrained to consider only the Climate Service organizational structure that the current Administration has proffered (i.e., build a freestanding line office within NOAA). As part of our deliberations, the Panel considered several other conceptually distinct approaches to managing NOAA's climate research and service mission. Each had fundamental flaws. Three rejected concepts are worth mentioning briefly.

First, the Panel assessed whether the existing NOAA matrix management approach to supporting climate research and services was fundamentally effective, necessitating only incremental modifications. We rejected this notion, for many of the same reasons NOAA rejected this option, and as discussed in more detail in Chapter 2, above.

Second, the Panel assessed whether it might be desirable to establish a NOAA Climate Service through some type of merger with the National Weather Service (NWS) – a National Weather and Climate Service. The NWS is a mature organization with a long history and a rigorous operational pace. That pace is crucial to ensure that governments and the public get emergency warnings as quickly as possible to protect lives and property. The bulk of NWS energies are directed towards coordinating data and information from its field offices to produce operationally meaningful near-term weather forecasts, warnings and assessments.

The Panel concluded that weather services and climate services require fundamentally distinct research, operational focus, field structures, timeframes for delivery and professional skills. The user needs for each are vastly different. The NWS has extensive, effective partnerships with a

mature community of stakeholders, both government and for-profit. The proposed Climate Service must forge fundamentally more systematic and deeper partnerships with an expanded and quite different network of stakeholders. The Panel concluded that a forced marriage of weather and climate missions would serve neither well. The weight of NWS history and size would likely dilute and retard success that otherwise can be achieved with a Climate Service that is built as a freestanding line office. Yet clearly, there will be a strong need for close collaboration between the NWS and the proposed Climate Service.

Third, the Panel also assessed whether it might be desirable to establish a NOAA Climate Service through some type of merger with the Office of Oceanic and Atmospheric Research (OAR). This approach would have had the new line office focused on the development and delivery of climate products and services based perhaps largely on research conducted by OAR. OAR conducts world-class research on ocean and atmospheric systems, and research to advance the nation's understanding of the continuum of weather to climate. OAR does not, however, have compelling operational, production or service delivery assets/capabilities needed to support the climate research and service mission.

Again, the Panel concluded that a decision to combine these assets into one line office would serve neither OAR nor the primarily climate-related NOAA assets well. Compelling and thoroughly reasonable demands to strengthen climate research and services would, in this case, over time likely dilute and diminish OAR's unique abilities to support multiple NOAA line offices, including a NOAA Climate Service. All parts of NOAA benefit from OAR's work to incubate fundamentally new approaches to mission-centered science, a capability best sustained by maintaining a nimble, freestanding OAR line office.

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Chapter 5 contains observations and suggestions regarding institutional change management in the federal sector, identifies several management recommendations for stand-up of the proposed line office, and speaks to challenges regarding budget and setting operational priorities.

CHAPTER 5
CHANGE MANAGEMENT CHALLENGES

Managing any significant organizational change in the federal sector presents unique challenges. Establishment of a NOAA Climate Service is a good idea that, like any other organizational change, will present stiff demands during the new organization's start-up phase and in the early years. This chapter is intended to frame a few observations and recommendations that may be of use to NOAA as this new organization is formally launched.

5.1 CHANGE MANAGEMENT IN THE FEDERAL SECTOR

All start-ups have unique attributes and conditions for success. In the Panel's experience, ***three variables disproportionately drive the success of any significant start-up or merger by the federal government.***

First, the idea of the proposed organization has to make excellent sense to a broad public and private constituent base. The new organization has to fulfill an important need. The Panel agrees that the proposed NOAA Climate Service passes this threshold test.

Second, the organization and its mission must have unambiguous support from the Administration and the Department's top leadership team. The Panel is persuaded that the proposed NOAA Climate Service can likely meet this test as well. Yet we note that a number of recommendations presented herein – such as the lead agency designation – will test the degree to which the Administration considers this start-up an important priority. The most visible indication of Administration commitment will be found in the annual budget submissions for the agency. The Secretary of Commerce, the Deputy Secretary of Commerce, and the NOAA Administrator can make a tremendous difference by showing unwavering support and substantial personal commitment to helping the NOAA Climate Service succeed.

Third, the new organization itself must have capable leaders who can work together as a cohesive team to manage creatively the myriad of management challenges that go along with the start-up phase. Managing effectively the critical first weeks and the first year at the NOAA Climate Service can generate a strong reserve of good will to support future success. The team must communicate clearly and relentlessly, both internally and externally, and achieve highly visible, if incremental, successes.

The Panel recommends that the U.S. Department of Commerce leadership team study carefully recent government reorganizations and start-ups to absorb best practices and lessons learned regarding change management. This review should inform: (1) a rigorous NOAA Climate Service implementation plan; and (2) disciplined change management plans needed to stand-up and nurture the new NOAA line office.

Reorganizations within large federal Departments are not uncommon. In the last decade, however, three unusually large federal civilian organizations were created. Two were built from

scratch and one was a massive reorganization: (1) the Transportation Security Administration (created in 2001 to 2002); (2) the Department of Homeland Security (created in 2003); and (3) the Office of the Director of National Intelligence (created in 2005). The Department of Defense (DOD) also executed a number of significant reorganizations during this period, including stand-up of the United States Northern Command (created in 2002 to provide command and control of DOD homeland defense efforts and to coordinate defense support for civil authorities) and the United States Joint Forces Command (created in 1999 to focus on transformation of U.S. military capabilities).[37]

All five of these efforts were much larger and more complex than the proposed NOAA Climate Service. Yet each offers valuable lessons that will shed light on management challenges likely to face the new NOAA Climate Service. Why? Like the proposed NOAA Climate Service, all five stand-ups mentioned above were responsive to high-profile, important national needs. Like the proposed NOAA Climate Service, each of the five required creating a culture of continuous innovation, of iterative and progressive improvement in services. Not everything needed got done on day one. Like the proposed NOAA Climate Service, each of the five was animated by a widely shared sense of urgency regarding the core mission. This was internalized where it mattered most – at what the Coast Guard, Navy or NOAA mariners would call the deckplate level, namely, among the employees who make things happen in the enterprise on a daily basis. Finally, like the proposed Climate Service, each of the five was consciously designed to have extensive formal and informal coordination among numerous other public sector entities.

These five examples are drawn from relatively recent national security and homeland security agencies. It would also be valuable to seek lessons learned from other significant organizational efforts relating to natural resource and research agencies. Two suggestions from Panel members in this regard were the creation of the Environmental Protection Agency (1970) and the National Institutes of Health, which grew from ten components in 1960 to 27 institutes and centers by 1998.

Change management challenges are seldom new or terribly unique. They are, however, terribly important. If NOAA is puzzling through an organizational or management challenge, typically others have puzzled though the same or a similar dilemma. Scouring the recent history related to organizational change and interviewing current and former executives responsible for these agencies would be instructive.

5.2 MANAGING THE STAND-UP AT NOAA

This section offers a few observations to spur thought about how to institutionalize change management at the new line office, especially during the first 12-18 months.

Picking the Team. The Panel has confidence in the NOAA team helping to create the NOAA Climate Service, many of whom will be a part of the proposed new organization. NOAA's deep

[37] Defense Secretary Gates recently proposed to eliminate the U.S. Joint Forces Command as a cost containment measure. This suggests that this organization's history might yield a potentially rich source of management lessons learned, rather than the opposite.

reservoir of employee experience, professionalism and commitment to climate research and services is a strength upon which the new NOAA Climate Services organization can be built with confidence.

Selecting the right management team to lead this new organization is of paramount importance. Presumably a large part, even the largest part, of the new senior management team will be selected from within NOAA. Nonetheless, ***the Panel recommends that senior management positions for the NOAA Climate Service be largely, if not exclusively, selected on the basis of open competition.***

The senior management team should be drawn from the ranks of the career Senior Executive Service, with the exception perhaps of one limited term appointee (Deputy Assistant Administrator for Transition and Change), as discussed below. Doing so will reinforce public confidence regarding the impartiality and authoritativeness of the NOAA Climate Service's work products. The Panel emphasizes how important it is that filling each of these key positions not be an implied entitlement, but in each case awarded to the very best available candidate. It is imperative that each member of the senior management team must be a root-and-branch supporter of the new organization and its mission.

In addition, the Panel recommends that each member of the senior management team have as their primary base of operations – at least for the initial year – the Washington, DC area headquarters facility of the Climate Service. The importance of forging a cohesive management team is extraordinarily important. Certainly each such executive will have extensive travel commitments. But a high value should be placed on having a substantial part of each week available for the team to work together in person on the critical start-up activities. This is work that sets the pace and nature of the organization's future. It is impossible to forge a cohesive team by telephone.

Selection of the Assistant Administrator – the new organization's leader – is critical. ***The Panel simply underscores the need to appoint for the Climate Service an inspired and inspiring leader with terrific management skills.*** In the Academy's view, this person need not necessarily be selected from the ranks of current NOAA employees, but clearly this individual must have substantial experience as an executive, with luminous credentials as a climate expert.

The principal Deputy Assistant Administrator should have chief operating officer duties. This person will be equally important to the organization's success. It might make roles more clear if this position was simply titled "Chief Operating Officer." His or her management and professional credentials should be on a level equal to those of the Assistant Administrator. Clarity about the division of labor between the two top executives is vital, but the Deputy must have the unqualified confidence of the Assistant Administrator and an authoritative mandate to make key operational decisions, and have those decisions stick.

As discussed in Chapter 4, ***the Panel recommends that NOAA should hire a term-limited, Deputy Assistant Administrator for Transition and Change to provide a full-time, systematic focus on managing start-up issues at the new line office.*** This individual should, if possible, be

hired in advance of the launch date and in no case should this individual have any line management responsibilities other than change management at NOAA.

The Deputy Assistant Administrator for Transition and Change should closely supervise the transition agenda on behalf of the Assistant Administrator and the senior management team. This transition agenda must be developed in accordance with a strategic agenda for the line office, and an implementation plan with detailed timelines, deliverables and performance objectives.

This Deputy Assistant Administrator should be a seasoned manager of substantial renown from the private or public sector, having at least some senior federal leadership experience. He or she must have ready access to and enjoy the confidence of the head of the new Service, the NOAA Administrator, and other NOAA leaders. This executive need not be a climate science expert. If successful, this person will gracefully intrude into all parts of the new Service as an innovator, excellent communicator, coach, advisor, nudge, enforcer, performance scorekeeper and bureaucratic obstacle-crusher. It will take considerable personal skill and self-effacing confidence to succeed in this role.

This person should have a small staff, augmented by transition go-teams as described below. The staff should include high performance federal detailees from within the new Climate Service or from other parts of the Commerce Department or the Executive Branch. The Panel has represented this office on our proposed organizational chart (Figure 2) with a dotted-line box to convey our conviction that this should be a temporary appointment (probably hired as a term appointment) that disappears altogether sometime during the second year after the start-up.

In addition to the Assistant Administrator and two Deputy Assistant Administrators discussed above, the new organization's senior management team as proposed by the Panel would include six other executives: the Chief Scientist, and the lead executive of each of the organization's five Office-level components (Management; Policy and Strategic Partnerships; Research and Modeling; Data and Information; and Service Design and Delivery).

The Panel recommends that the NOAA Climate Service utilize every practical strategy available to attract a diverse set of employees and partners to help with standing up the new line office and expanding its reach. The Climate Service will in short order need some employees with new and substantially different experience and skills than may be found inside NOAA today. In building a workforce for the future, the Climate Service should aggressively cast a wide recruitment net.

For example, the Panel recommends that the Secretary of Commerce ask fellow Cabinet members and select governors or mayors active in the climate arena to detail one or more employees to NOAA on a temporary basis. The potential for NOAA of building a long-term program of such loaned executives is considerable. In time, serving a stint at the NOAA Climate Service should be viewed by federal and state climate scientists and senior managers as a career-enhancing and personally satisfying objective, not unlike the value of a joint forces assignment for military officers. Such persons can facilitate, for example, creation of a more robust portal

for aggregating and disseminating information about climate and they can help design federal climate service offerings or constituent liaison tools. [38]

Similarly, the agency should consider recruiting temporarily loaned executives from private sector firms with the technical and management skills needed to accelerate the design of core services. NOAA's Climate Service can achieve a significant boost by extending and diversifying an already rich employee base with new people and assets, especially those needed for the services design functions.

The Climate Service will need a field staff structure that can assist it to understand better state and local climate service needs. NOAA has made a good start by hiring a small cadre of field coordinators, the Climate Service Liaisons described above. ***The Panel recommends expanding the number of the field liaisons to include at least a dozen highly capable, entrepreneurial and mobile representatives. These personnel should focus particularly on meshing the needs of state and local climate officials or public sector users of climate data with the capabilities of the NOAA Climate Service and those of its federal partners.***

Focusing on building the NOAA team obviously entails much more than getting the organization chart right and hiring strong leaders. It is a truism, but nonetheless true, that the organization's employees are the linchpin of future success and that any significant change should be accompanied by extensive, candid and persistent communication with employees. A 2003 study by the Government Accountability Office on federal mergers and transformation put it this way:

> *At the center of any serious change management initiative are the people. Thus, the key to a successful merger and transformation is to recognize the "people" element and implement strategies to help individuals maximize their full potential in the new organization.*[39]

Tools for the Team. Many proven tools or techniques are readily available to the NOAA team to facilitate communications with employees and stakeholders. Looking externally toward its stakeholders, both formal and informal advisory structures will have value for the new organization.

The NOAA Climate Service should take a close look at any formal advisory committees it may inherit and require all formal advisory structures to be re-chartered, starting with a clean slate and fresh charters designed to fit the needs of the new organization. Then they should actively use such committees. This might entail replacing or reconfiguring some of the current functions of the NOAA Science Advisory Board.

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[38] The still-new National Counterterrorism Center has successfully embraced such a program involving key partners, and now routinely brings high performing intelligence community personnel, homeland security experts and federal and state law enforcement officers to the Center for rotational assignments that leverage the Center's workforce and its intellectual gene pool.

[39] U.S. Government Accountability Office, *Results Oriented Cultures: Implementation Steps to Assist Mergers & Organizational Transformations*, GAO-03-669 (Washington: GAO, July 2003), first page (no pagination).

In addition to formal advisory structures, an essential part of the successful launch will be conducting wide-ranging, informal sessions among employees, with federal partners and with NOAA Climate Service partners and stakeholders. These must be planned systematically and executed openly, with results and ideas appropriately captured and shared regularly with the new organization's senior staff.

Structured outreach should include discussions with exceptional leaders from public agencies and private businesses not directly tied to NOAA's mission, such as business executives who might contribute suggestions about relevant information technology or service design and delivery. It is not enough for NOAA to talk with people who have expertise or substantial interest in climate. For example, a small series of brainstorming sessions might be hosted by the Secretary of Commerce to engage technology luminaries and management experts in support of the line office's external communications mission. An objective for the Climate Service leadership team should be to take a portion of every day to support the start-up and help plan for the line office's future evolution.

It is vital to the success of a NOAA Climate Service that its external communications with Congress be especially transparent, routine and candid about line office successes, failures and challenges. Authorizers and appropriators in both chambers will rightfully expect as much. Department and NOAA leadership must make a special effort to make sure that this Congressional outreach occurs on a routine and bipartisan basis. In the years ahead it seems highly likely that Congress will increasingly need to access the best, most comprehensive state-of-art science regarding climate variability and change. ***In short, from the outset, NOAA should pay particular attention to how this new organization can best be configured also to serve essential needs of the Congress as a key stakeholder in its work.***

In its beginning months, the new line office will be compelled to work its way through a myriad of issues related to human resources policy, communications, technology, procurements, mission definition, investment priorities, portal design, partnership agreements and the like. One tested method that has worked with other federal-start-ups has been to create a series of short-term go-teams that orchestrate deep dives into specific decisions and challenges facing the new organization.

Such teams can be chartered to identify and assess options and to structure decision support data. They should be staffed by subject matter experts within the Department of Commerce, with short-term support from other agencies and even with help from private sector volunteers. They should be appointed for a specific task and then disband upon completion (typically lasting no more than four to six weeks).

In the first six months of the stand-up at the U.S. Transportation Security Administration, for example, some fifty such teams were commissioned, completed their tasks and submitted decision options memos to senior management. This process can be structured to use a common report format. The go-teams require only minimal overhead to manage an impressive array of activity. It is essential, however, that each team start out with clear charter, have rigorous milestone reporting obligations and conduct at least a mid-point progress brief with senior management.

The Panel recommends that the NOAA Climate Service make good use of temporary go-teams to help manage start-up issues and options. By spreading some of the work of the start-up in this way, the leadership team can directly involve its employees in the work of shaping the new enterprise. This will build upon the considerable good work already conducted by the NOAA implementation team. One matter ripe for consideration will be how best to preserve among components transferred to the Climate Service a number of important non-climate capabilities that support other parts of NOAA. These include but are not limited to, modeling by the Geophysical Fluid Dynamics Laboratory, geophysical data stewardship by the National Geophysical Data Center or coastal observations by the Integrated Ocean Observing Systems organization.

Absent management tools and techniques such as described above, the array of decisions that will face a relatively small team of NOAA leaders will make those leadership assignments seem like nothing less than a frenzied game of whack-a mole.

5.3 SETTING PRIORITIES AND MANAGING EXPECTATIONS

Balancing Mission Objectives. A significant challenge for the new organization takes the form of an apparent contradiction: NOAA must be at the same time ambitious, yet cautious. On the one hand, it should be constructively impatient to deliver on a bold, innovative plan for what the new line office can accomplish. On the other hand, it must be cautious about appearing to promise more than it can deliver with its existing staff of roughly 700 full-time employees and existing budget.

NOAA's staff has shared with the Panel its provisional thoughts about the new line office's implementation strategy. This includes an ambitious vision of supporting "an informed society anticipating and responding to climate and its impacts" and a mission for a NOAA Climate Service that can significantly help "improve understanding and anticipation of changes in climate, and to promote a climate-resilient society and environment."[40]

The Panel recommends that NOAA's external and internal communications be clear about the fact that its new organization will grow iteratively and progressively, yet more slowly than many would like. It will not be possible in the early months and years to satisfy all of NOAA's own ambitions, much less the many expectations of its external partners and service users. It will be essential that NOAA impose upon itself rigorous and systematic internal discipline to prioritize new research and service offerings.

For these reasons, ***the Panel recommends that the NOAA Climate Service place its highest priority on assisting government executives and managers at the federal, state, tribal and local levels, and on meeting the high priority needs of its federal climate enterprise partners.*** If the new line office tries to serve all possible stakeholders with equal focus in the earliest stages of its operations, it will likely serve none adequately.

[40] The Panel recognizes that this language is subject to change.

This last recommendation may be easily misunderstood. It does not suggest that the NOAA Climate Service suspend or downgrade existing partnerships and cooperative relationships. ***Early focus on strengthening "wholesale" distribution channels for NOAA climate services, as opposed to asset-absorbing "retail" distribution channels, will extend the line office's reach earliest. Such a strategy also will stimulate the private markets to use NOAA data and information to develop commercial climate applications.***

5.4 BUDGET CONSIDERATIONS

Budget Considerations. ***The Panel is skeptical that current funding levels (even as augmented at levels consistent with the President's FY 2011 budget request) will adequately sustain public and private sector needs for climate services and research in the years ahead.***

It would be impossible for this Panel to propose a precise budget for the new Climate Service based on the limited information available to us, and choices still to be made by NOAA. Nonetheless, by its design and because of growing needs, the NOAA Climate Service can reasonably be expected to take on a great deal more than its current workload in the years ahead. It will have to prioritize its new research and service deliverables with tenacious discipline.

Certainly NOAA and Department of Commerce leadership should start with asking this blunt question: What is being done today within NOAA or the Department that might be stopped or dialed back in order to make possible a higher priority investment? Where fair and practical, NOAA should explore assessing fees for its climate services. As the NOAA Climate Service grows, the Congress and the Office of Management and Budget should allow the Secretary of Commerce maximum discretion to steer funds generated by cost avoidance measures at Department of Commerce to nurture the fledgling NOAA Climate Service.

NOAA should determine whether and to what extent it can or should charge for climate products and services. Foundational or general-use products should be considered public goods and made freely available to encourage their use in scientific research and the development by private sector parties of value-added climate products and services. To the extent climate service products are substantially customized to the needs of particular users, they may be considered semi-private goods and some level of user fee may be charged.

The Panel recommends that NOAA make general-use climate data and information products freely available, but that it consider charging fees for customized products and services to cover at least the delivery costs. NOAA should also identify opportunities to refer requests for specialized services to a roster of qualified non-government providers with the aim of stimulating the development of private capacity to provide value-added climate products. This matter may require further assessment by the Executive Branch and Congress and authorization of fee-for-service arrangements.

Even assuming extraordinary financial stewardship, it will be quite challenging to align performance expectations with today's federal budget resources. This budget challenge, we wish to make clear, would be a poor reason to oppose creation of the new NOAA line office. Instead,

the new organization must rigorously assess trade-offs for how best to use all funds that Congress and the Administration make available. ***Managing scarce resources and making choices among competing priorities is likely to be one of the new organization's most difficult management challenges.***

CHAPTER 6
PANEL RECOMMENDATIONS

The Academy Panel makes the following recommendations in service of informing the organizational design and implementation support of the NOAA Climate Service.

PLANNING FOR SUCCESS

PART OF A LARGER ENTERPRISE (3.1)

1. The Panel recommends that capabilities of the federal government regarding climate need to be strengthened considerably on two interdependent but distinct levels: at the *strategic and policy level*; and at the *operational level*, where research, data collection and service delivery takes place. The NOAA Climate Service mandate would be focused on the latter category – operational activity related to research, data collection and services.

2. The Panel recommends that the federal government substantially expand its delivery of regular, impartial and authoritative climate information services to state, local and tribal governments and to the public, especially by: (1) providing more robust and finer-grain information about possible impacts of climate variability and change to guide local decisions about adaptation; and (2) assisting others to access and effectively use models for understanding how mitigation efforts can avert or reduce climate change.

3. The Panel strongly supports the creation of a NOAA Climate Service to be established as a line office within NOAA.

ADMINISTRATION SUPPORT NEEDED FOR THE NOAA CLIMATE SERVICE (3.2)

4. The Panel recommends that the Administration strengthen and expand interagency coordination structures tasked with aligning Executive Branch climate resources. Specifically, the Panel recommends that the President empower a senior interagency group – led at the White House and convened at the Deputy Secretary or Secretary level – to provide the President annually with a strategic plan for management of federal climate research and service delivery.

5. The Panel recommends that it would be extremely valuable, indeed we consider this essential, to have one federal agency designated to be the center of gravity for aggregating and rigorously providing an authoritative roadmap or portal to the best available science that can be harnessed to support public policy decision making.

6. The Panel recommends that a NOAA Climate Service, properly configured and implemented, would be uniquely qualified to serve the public and private sectors as a lead federal agency for climate research and services, and to provide an ongoing accessible, authoritative clearinghouse for all federal science and services related to climate.

ADOPTION OF STRATEGIC AND IMPLEMENTATION PLANS (3.3)

7. The Panel recommends that prior to the start-up of the new organization NOAA should complete and formally adopt two core plans of record for the new organization: (1) a strategic plan; and (2) an implementation plan.

8. The Panel recommends that NOAA should expand current planning efforts to craft a detailed implementation plan to guide effective stand-up of the Climate Service.

9. The Panel recommends that: (1) NOAA should continue the development of its climate portal, and plan for investments necessary to operate a virtual clearinghouse for federal climate information; and (2) NOAA should prioritize opportunities for using state-of-art information technology to expand participation by partners and users in the development of climate products and services, both to leverage its own investments and to produce more robust products and services.

RECOMMENDED ORGANIZATIONAL STRUCTURE

RECOMMENDED ORGANIZATIONAL STRUCTURE (4.0)

10. The Panel recommends aligning the Offices of the NOAA Climate Service around an outcome-based grouping of the organization's three core capabilities, which, like NOAA's own proposal, reflects the core capabilities from existing NOAA line offices that do climate work.

11. The Panel recommends a Climate Service with four primary organizational structures: (1) headquarters leadership and support functions; (2) an Office of Research and Modeling; (3) an Office of Data and Information Products; and (4) an Office of Service Design and Delivery.

HEADQUARTERS ORGANIZATION (4.1)

12. The Panel recommends that the head of the NOAA Climate Service have rank, title and compensation equivalent to the heads of the other NOAA line offices. We further recommend that this individual, the Assistant Administrator, be selected from among the ranks of the career Senior Executive Service (SES) or by a candidate who can qualify for an appointment as a career SES executive.

13. To balance the leadership team, the Panel suggests that at least one of the top two leadership positions be filled with an individual familiar with the culture and operation of NOAA, as well as the culture and history of the component pieces coming into the Climate Service.

14. The Panel recommends the following regarding headquarters leadership positions:
    - The principal Deputy Assistant Administrator should be the NOAA Climate Service's Chief Operating Officer.

- NOAA should hire a term-limited Deputy Assistant Administrator for Transition and Change to provide a full-time, systematic focus on managing start-up issues at the new line office (see section 5.2).
- The Chief Scientist should be responsible for providing technical and scientific advice to the Climate Service, and NOAA leadership. He or she should be responsible for ensuring that the Climate Service's scientific activities are scrupulously objective, scientifically disciplined, transparent, collaborative and responsive to the needs of NOAA and its stakeholders.
- The Office of the Director of Management shall have overall finance and budget responsibilities for all financial management and budget activities relating to the programs and operations of the Climate Service, including annual budget development
- The Director for Policy and Strategic Partnerships would oversee headquarters-level policy management, development and support for strategic partnerships (especially to architect interagency agreements that will support robust federal interagency partnerships) and international affairs.

OFFICE OF RESEARCH AND MODELING (4.2)

15. The Panel recommends that four existing NOAA components be incorporated into a proposed Office of Research and Modeling: (1) the Earth System Research Laboratory (ESRL) Director's Office; (2) ESRL, Physical Sciences Division; (3) ESRL, Chemical Sciences Division; and (4) the Geophysical Fluid Dynamics Laboratory.

16. The Panel finds that bringing the Physical Sciences Division and the Chemical Sciences Division into the Climate Service will allow the new line office to manage basic NOAA climate research that is indispensable to success of the new enterprise.

17. The Panel recommends to Congress and the Administration that all funds to support NOAA climate research – including climate research to be performed by PMEL and AOML – be appropriated annually to a single climate research budget account within the NOAA Climate Service.

18. The Panel recommends incorporating the Geophysical Fluid Dynamics Laboratory into the Office of Research and Modeling.

OFFICE OF DATA AND INFORMATION PRODUCTS (4.3)

19. The Panel recommends that ten existing NOAA components be incorporated into a proposed Office of Data and Information Products: (1) ESRL Global Monitoring Division; (2) Ocean Observing Systems (currently funded by the Climate Program Office); (3) National Ocean Service Integrated Ocean Observing System Program; (4) Tropical Atmosphere Ocean Array; (5) Modernization of the Hourly Precipitation Rain Gauges; (6) Historical Climatology Network Modernization; (7) National Climate Data Center; (8) National Oceanographic Data Center; (9) National Geophysical Data Center; and (10) Climate Prediction Center. These components are proposed to be organized into three divisions: an

Observations Division; a Data and Information Products Division; and a Predictions Division.

20. The Panel recommends that there should be an organizational unit within the Climate Service that manages climate observing assets, staff and budget. The Panel further recommends that NOAA take advantage of this reorganization to consolidate more climate-related observation assets by moving into the Climate Service not just NOAA's open ocean observation components, but also its coastal observation components.

21. The Panel agrees GMD should be included in the Climate Service, but recommends it be housed within the Observations Division with other observing and monitoring assets and programs.

22. The Panel recommends that the cornerstone of the NOAA Climate Service Predictions Division be the National Weather Service's Climate Prediction Center. NOAA had not proposed that this asset be transferred to the new line office.

23. The Panel recommends that in time, and subject to the availability of adequate resources, the Predictions Division create a new unit dedicated to long-term operational climate predictions and projections.

OFFICE OF SERVICE DESIGN AND DELIVERY (4.4)

24. The Panel recommends that the following NOAA program offices be incorporated into the Service Design and Delivery Office: (1) the Regional Climate Liaison staff; (2) the Climate Program Office's Communications and Education staff; (3) Regional Integrated Sciences and Assessments; (4) National Integrated Drought Information System; (5) the Cooperative Institutes program; (6) the Regional Climate Centers; (7) the climate services staff currently associated with the National Climatic Data Center, National Oceanographic Data Center and the National Geophysical Data Center; and (8) the Grants and Contracts unit currently housed in the Climate Program Office.

25. The Panel recommends that the customer service employees at NESDIS' three data centers be moved into the Office of Service Design and Delivery.

26. Panel recommends these climate assessment activities should be managed at least in part by Service Design Division professionals who can help guide these assets to ensure that the final products are responsive to user needs.

27. The Panel recommends that all competitive grant programs related to climate be administratively managed from a single Grants Division located within the Office of Service Design and Delivery. This entity would be the manager for all Climate Service grant programs for external recipients.

CHANGE MANAGEMENT CHALLENGES

CHANGE MANAGEMENT IN THE FEDERAL SECTOR (5.1)

28. The Panel recommends that the U.S. Department of Commerce leadership team study carefully recent government reorganizations and start-ups to absorb best practices and lessons learned regarding change management. This review should inform: (1) a rigorous NOAA Climate Service implementation plan; and (2) disciplined change management plans needed to stand-up and nurture the new NOAA line office.

MANAGING THE STAND-UP AT NOAA (5.2)

29. The Panel recommends that senior management positions for the NOAA Climate Service be largely, if not exclusively, selected on the basis of open competition.

30. The Panel recommends that each member of the senior management team have as their primary base of operations – at least for the initial year – the Washington, DC area headquarters facility of the Climate Service.

31. The Panel recommends that the NOAA Climate Service utilize every practical strategy available to attract a diverse set of employees and partners to help with standing up the new line office and expanding its reach. For example, the Panel recommends that the Secretary of Commerce ask fellow Cabinet members and select governors or mayors active in the climate arena to detail one or more employees to NOAA on a temporary basis. Similarly, the agency should consider recruiting temporarily loaned executives from private sector firms with the technical and management skills needed to accelerate the design of core services.

32. The Panel recommends expanding the number of the field liaisons [Regional Climate Directors] to include at least a dozen highly capable, entrepreneurial and mobile representatives. These personnel should focus particularly on meshing the needs of state and local climate officials or public sector users of climate data with the capabilities of the NOAA Climate Service and those of its federal partners.

33. The NOAA Climate Service should take a close look at any formal advisory committees it may inherit and require all formal advisory structures to be re-chartered, starting with a clean slate and fresh charters designed to fit the needs of the new organization.

34. It is vital to the success of a NOAA Climate Service that its external communications with Congress be especially transparent, routine and candid about line office successes, failures and challenges. From the outset, NOAA should pay particular attention to how this new organization can best be configured also to serve essential needs of the Congress as a key stakeholder in its work.

35. The Panel recommends that the NOAA Climate Service make good use of temporary go-teams to help manage start-up issues and options. By spreading some of the work of the start-up in this way, the leadership team can directly involve its employees in the work of shaping the new enterprise.

SETTING PRIORITIES AND MANAGING EXPECTATIONS (5.3)

36. The Panel recommends that NOAA's external and internal communications be clear about the fact that its new organization will grow iteratively and progressively, yet more slowly than many would like.

37. The Panel recommends that the NOAA Climate Service place its highest priority on assisting government executives and managers at the federal, state, tribal and local levels, and on meeting the high priority needs of its federal climate enterprise partners.

38. The Panel recommends that early focus on strengthening "wholesale" distribution channels for NOAA climate services, as opposed to asset-absorbing "retail" distribution channels, will extend the line office's reach earliest. Such a strategy also will stimulate the private markets to use NOAA data and information to develop commercial climate applications.

BUDGET CONSIDERATIONS (5.4)

39. The Panel recommends that NOAA make general-use climate data and information products freely available, but that it consider charging fees for customized products and services to cover at least the delivery costs. NOAA should also identify opportunities to refer requests for specialized services to a roster of qualified non-government providers with the aim of stimulating the development of private capacity to provide value-added climate products.

APPENDICES

APPENDIX A
PANEL AND STAFF

ACADEMY PANEL

Michael P. Jackson,* *Chair* **–** President, Firebreak Partners, LLC; Former Deputy Secretary, U.S. Department of Homeland Security; Senior Vice President, AECOM Technology Corporation; Deputy Secretary, the U.S. Department of Transportation; Chief Operating Officer, Lockheed Martin IMS Transportation Systems and Services; Member, the Board of Directors, Amtrak; Chief of Staff to the Secretary of Transportation; Special Assistant to the President for Cabinet Liaison, the White House; Senior Vice President, American Trucking Associations; Visiting Assistant Professor, University of Georgia; Researcher, the American Enterprise Institute; lecturer, Georgetown University.

Mortimer L. Downey* -- Chairman, PB Consult, Inc and President of Mort Downey Consulting, LLC. Former Deputy Secretary, U.S. Department of Transportation. Former positions with Metropolitan Transportation Authority (New York): Assistant Executive Director for Management and Budget; Deputy Executive Director for Capital Programs; Executive Director; Chief Financial Officer. Former Assistant Secretary for Budget and Programs, U.S. Department of Transportation; Budget Priorities Analyst, Committee on the Budget, U.S. House of Representatives; increasingly responsible positions with the Port Authority of New York and New Jersey.

Gerald E. Galloway* -- Glenn L. Martin Institute Professor of Engineering, Department of Civil and Environmental Engineering, and Affiliate Professor, School of Public Policy, University of Maryland, College Park; Visiting Scholar, U.S. Army Corps of Engineers Institute for Water Resources; consultant. Retired Brigadier General, U.S. Army. Former positions include Dean of the Academic Board, United States Military Academy, Dean of the Faculty, Industrial College of the Armed Forces; Executive Director, Interagency Floodplain Management Review, Executive Office of the President; Member, Mississippi River Commission; Secretary U.S. Section, U.S.-Canada International Joint Commission.

DeWitt John* -- Director, Environmental Studies Program and Lecturer in Government Bowdoin College. Led three broad studies of the Environmental Protection Agency - management, mission, and relationships with states and regulated parties-at the direction of the appropriations committees of Congress. The third study, Environment.gov: Transforming Environmental Protection for the 21st Century. National Governors' Association Policy Studies Director for Economics, Trade, and Agriculture, 1985-89. State of Colorado Director, Governor's Office of Policy, 1984-85. Assistant to the Director, Colorado Department of Natural Resources, 1979-84. Represented the state in dealings with federal land management and energy development agencies.

Jerry Melillo – Director Emeritus, The Ecosystems Center at the Marine Biological laboratory in Woods Hole, Massachusetts. Professor of Biology, Brown university; Honorary Professor, Institute of Geophysical Sciences and Natural Resources Research, Chinese Academy of Sciences. Former President: The Ecological Society of America; Scientific Committee on Problems of the Environment (SCOPE). Associate Director for Environment, US President's Office of Science and Technology Policy, 1996-1997; Fellow, American Academy of Arts and Sciences. Board of Directors: University Corporation for Atmospheric Research; H. John Heinz III Center for Science, Economics and the Environment. Lead author, Intergovernmental Panel on Climate Change, 1990 and 1995.

James F. Murley* -- Assistant Dean and Senior Associate for Energy and Climate Change, Florida Atlantic University. Chair, Florida Energy and Climate Commission; Chair, Sustainability Committee,

ULI's Southeast Florida/Caribbean District Council, and Member, Water Resources Advisory Commission of the South Florida Water Management District. Former Secretary of the Department of Community Affairs, State of Florida; Executive Director of 1000 Friends of Florida. Former positions with the National Oceanic and Atmospheric Administration, U.S. Department of Commerce: Director of Coastal Program Office, Congressional Officer and Gulf/Islands Regional Manager.

Molly A. O'Neill* -- Vice President, CGI Federal. Fellow, CGI Initiative for Collaborative Government. Former Assistant Administrator and Chief Information Officer, U.S. Environmental Protection Agency; State Director, National Environmental Information Exchange Network, Environmental Council of the States; Principal, Environmental Systems Group, American Management Systems, Inc.; Director, State Environmental Group, TechLaw, Inc.; Director, State Environmental Group, A.T. Kearney, Inc.; Environmental Biologist/Analyst, PEER Consultants, PC.

Marcus C. Peacock* -- Project Director, The Pew Charitable Trusts Subsidyscope. Former Deputy Administrator of the Environmental Protection Agency. Former positions with U.S. Office of Management and Budget: Associate Director for Natural Resources, Energy, and Science; Deputy Chief/Natural Resources Branch, Office of Information and Regulatory Affairs. Former positions with the U.S. House of Representatives: Subcommittee Staff Director, Oversight and Emergency Response Subcommittee of the Committee on Transportation and Infrastructure; Professional Staff Member, Water Resources and the Environment Subcommittee of the Committee on Transportation and Infrastructure. Former positions with R.R. Donnelley & Sons: Manufacturing Supervisor, Bindery Department; Industrial Engineer, Engineering Department.

Barry G. Rabe* -- Professor of Public Policy, Gerald Ford School of Public Policy, Professor of Environment, College of Literature, Science and the Arts, and Professor of Environmental Policy, School of Natural Resources and Environment, University of Michigan; Non-resident Senior Fellow, Governance Studies Program, Brookings Institution; Former visiting professor and scholar appointments: Miller Center of Public Affairs at the University of Virginia; University of Wisconsin-Madison; Dartmouth College; Stanford University President, Federalism Section, American Political Science Association. Former positions with the University of Michigan: Director, Program in the Environment, College of Literature, Science and the Arts; Interim Dean, School of Natural Resources and Environment. Former position with the American Political Science Association: President, Public Policy Section.

Shui-Yan Tang* -- Professor and Research Director, Bedrosian Center on Governance and the Public Enterprise, School of Policy, Planning, and Development, University of Southern California. Professor & Director, Master of Public Administration (MPA) Program, School of Policy, Planning, and Development, University of Southern California.

* *Academy Fellow*

PROJECT STAFF

Lena Trudeau, *Vice President*

Lois Fu, *Program Area Director*

Jaime Zamora, *Project Director*

Stephanie Bailenson, *Senior Advisor*

Mark Hertko, *Senior Project Analyst*

Jonathan Tucker, *Project Advisor*

Laurie May, *Senior Advisor*

Stephanie Rowe, *Senior Advisor*

Joe Mitchell, *Project Advisor*

Keithan Hawley, *Research Associate*

Celeste Luna, *Project Assistant*

APPENDIX B
INFORMATION SOURCES

Accenture. *Climate Services*. Final Compilation Report to NOAA. Washington D.C., December 17, 2008.

Climate Change Adaptation Task Force. *Interim Progress Report*. Washington, D.C.: Council on Environmental Quality, March 16, 2010.

Climate Change Science Program. *Revised Research Plan for the U.S. Climate Change Science Program.* Washington D.C.: Subcommittee on Global Change Research, May 2008.

Climate Science Watch. "Recommendations to the OSTP Transition Team on the Global Change Research Program and Climate Change Preparedness," January 15, 2010.

Coastal States Organization, Climate Change Work Group. *The Faces of Climate Change Adaptation: The Need for Proactive Protection of the Nation's Coasts.* Washington, D.C., May 2010.

Coastal States Organization, Climate Change Work Group. *The Role of Coastal Zone Management Programs in Adaptation to Climate Change.* Washington, D.C., September 2007.

Coastal States Organization, Climate Change Work Group. *The Role of Coastal Zone Management Programs in Adaptation to Climate Change*. Washington, D.C., September 2008.

Coastal Services Center. *Local Strategies for Addressing Climate Change*.: Special edition of *Coastal Services* magazine. Charleston, S.C.: National Oceanic and Atmospheric Administration, February 2009.

H.Rept. No. 111-366, page 636 (2009) (Conf. Rep.).

Department of Commerce. Department Administrative Order: *Department Organization Order Series. DAO 200-7*. Washington D.C., December 7, 1983.

Department of Commerce. Department Organization Order: *Under Secretary of Commerce for Oceans and Atmosphere and Administrator of the National Oceanic and Atmospheric Administration. D0O 10-15*. Washington D.C., May 28, 2004.

Department of Commerce. Department Organization Order: *National Oceanic and Atmospheric Administration. D0O 25-5*. Washington D.C., July 14, 2010.

Dilling, Lisa. "Creating Usable Science in an Uncertain World," presentation at the Center for Science and Technology Policy Research - Consortium for Science, Policy & Outcomes Briefing Workshop. Washington D.C., April 12, 2010.

Elbert W. Friday, Jr., Rapporteur. National Research Council. *Communicating Uncertainties in Weather and Climate Information: A Workshop Summary.* Washington D.C.: National Academies of Sciences, 2003.

Ernst and Young. *Action amid uncertainty: The Business Response to Climate Change.* 2010

Federal Coordinator for Meteorological Services and Supporting Research. *Federal Plan for National Climatic Service.* Washington D.C.: National Oceanic Atmospheric Administration, January 1974.

Federal Leadership In Environmental, Energy, and Economic Performance. Executive Order 13514, October 5, 2009.

Glackin, Mary M. "NOAA Climate Service: Science Serving Society," presentation to the Climate Working Group. Washington D.C., April 7, 2010.

Glackin, Mary M. "NOAA Climate Service: Science Serving Society," presentation to the National Academy of Public Administration Panel. Washington D.C., May 4, 2010.

Glackin, Mary M. "NOAA Climate Service: Science Serving Society," presentation to the American Association of State Climatologists. Washington D.C., July 13, 2010.

Global Change Research Act of 1990. Public Law 101–606; November 1990. Print.

Goodrich, David. "Climate Service FY 10-20 Priorities Climate Observations and Monitoring," to the Climate Working Group. Washington D.C., April 8, 2010.

Goold, Michael and Campbell, Andrew. "Do You Have a Well-Designed Organization?" Harvard Business Review, R0203K, March 2002.

Government Accountability Office. *Climate Change Research: Agencies Have Data-Sharing Policies but Could Do More to Enhance the Availability of Data from Federally Funded Research.* GAO-07-1172. Washington D.C., September 2007.

Government Accountability Office. *Results Oriented Cultures: Implementation Steps to Assist Mergers & Organizational Transformations.* GAO-03-669. Washington, D.C., July 2003.

General Accounting Office, Accounting and Financial Division. *The Chief Financial Officers Act: A Mandate for Federal Financial Management Reform.* GAO/AFMD-12.19.4. September 1991. p 8-10.

Herring, David. "NOAA Climate Services Portal Prototype: A collaborative, NOAA-wide prototyping initiative featuring CPC, CPO, CSC, and NCDC," presentation to the Climate Working Group. Washington D.C, April 7, 2010.

Hirn, Richard. General Counsel and Legislative Director, National Weather Service Employees Organization. *Testimony before the Subcommittee on Energy and the Environment of the Committee on Science and Technology.* U. S. House of Representatives. Washington D.C., May 5, 2009.

Intergovernmental Panel on Climate Change. Online glossary, accessed August 18, 2010, http://www.ipcc.ch/publications_and_data/ar4/wg1/en/annex1sglossary-a-d.html

Karl, T.R., Ravishankara, A.R, Ramaswamy, V., and Shea, E. "Integration of Science and Services (External and Internal)," presentation to the Climate Working Group. Washington D.C., April 7, 2010.

Karl, Thomas R. "Climate Science & Services 101: A case study about climate science in service to coastal communities," presentation to the National Academy of Public Administration Panel. Washington D.C., May 3, 2010.

Karl, Thomas R. "Climate Science & Services 101: A case study about climate science in service to communities facing drought & water issues," presentation to the National Academy of Public Administration Panel. Washington D.C., May 3, 2010.

Karl, Thomas R. "NOAA Climate Service: Working with Business," Webinar presentation. April 13, 2010.

Karl, Thomas R. "NOAA Climate Service (NCS) Private Sector Relations: Principles and Guidelines," presentation to the Climate Working Group. Washington D.C., April 7, 2010.

Klimavicz, Joseph F. "NOAA High Performance Computing Strategy for FY 2010-2015," presentation to the Climate Working Group. Washington D.C., April 8, 2010.

Koblinsky, Chet. "An Overview of 2010-2020 Climate Goal Priorities," presentation to the Climate Working Group. Washington D.C., April 8, 2010.

Locke, Gary F. Secretary of the Department of Commerce. Climate Services: *Solutions From Commerce to Communities.* Before the Committee on Commerce, Science, and Transportation, U.S. Senate. Washington D.C., July 30, 2009.

Logar, Nat. "Federal Institutions for Usable Science and Technology," presentation at the Center for Science and Technology Policy Research - Consortium for Science, Policy & Outcomes Briefing Workshop. Washington D.C., April 12, 2010.

Lubchenco, Jane. Under Secretary of Commerce for Oceans and Atmosphere and NOAA Administrator. *Expanding Climate Services at the National Oceanic and Atmospheric Administration (NOAA): Developing the National Climate Service.* Before the Subcommittee on Energy and Environment, Committee on Science and Technology, U.S. House of Representatives. Washington D.C., May 5, 2009.

Maricle, Genevieve. "Usable Science in Practice? A Contrast of Earthquake and Hurricane Research," presentation at the Center for Science and Technology Policy Research - Consortium for Science, Policy & Outcomes Briefing Workshop. Washington D.C., April 12, 2010.

McNie, Elizabeth, Pielke, Roger A., and Sarewitz, D, editors. *SPARC Reconciling Supply and Demand Workshop: Climate Science Policy: Lessons from the RISAs*, Workshop Report. Scholarly Publishing and Academic Resources Coalition. January 26, 2007.

McNie, Elizabeth. "Reconciling the supply of scientific information with user demands: an analysis of the problem and review of the literature." *Environmental Science & Policy* 10, no. 1 (2007): 17-38.

McNie, Elizabeth. "Delivering Usable Science: The Case of Climate Services," presentation at the Center for Science and Technology Policy Research - Consortium for Science, Policy & Outcomes Briefing Workshop. Washington D.C., April 12, 2010.

Miles, E.L., Snover, A.K, Whitley Binder, L.C., Sarachik, E.S., Mote, P.W., and Mantua, N. "An approach to designing a national climate service." *Proceedings of the National Academies of Sciences* 103 (2006) 19616-19623.

Moore III, Berrien, Rosen, Richard D., Rosenberg, Andrew A., Spinrad, Richard W., Washington, Warren M., and West, Richard D. *Review of the Organization and Management of Research in NOAA: A Report to the NOAA Science Advisory Board*. Washington D.C., August 6, 2004.

National Academy of Public Administration, *Improving the NOAA Budget and Financial Management Processes*. Washington, D.C., March 2000.

National Centers for Environmental Prediction. *Strategic Plan: FY 2009-2014*. Washington D.C.: National Oceanic Atmospheric Administration.

National Climate Program Act. Public Law 95-367, September 1978, as amended through Public Law 106–580; December 2000. Print.

National Oceanic and Atmospheric Administration, "Building Blocks of Proposed NOAA Climate Service," accessed August 18, 2010, http://www.noaa.gov/climateresources/resources/noaaclimateservice_org.pdf.

National Oceanic and Atmospheric Administration, "Climate Service Q&A," accessed August 18, 2010, http://www.noaa.gov/climateresources/resources/noaaclimateservice_org.pdf.

National Oceanic and Atmospheric Administration, "Commerce Department Proposes Establishment of NOAA Climate Service," press release, accessed March 2010, http://www.noaanews.noaa.gov/stories2010/20100208_climate.html

National Oceanic and Atmospheric Administration. *Program Review Report.* Washington D.C., May 22, 2002.

National Oceanic and Atmospheric Administration Science Advisory Board. Review of the *Climate Observations and Analysis Program.* Climate Working Group, Washington D.C, May 20, 2007.

National Oceanic and Atmospheric Administration Science Advisory Board. *Engaging NOAA's Constituents: A Report from the NOAA Science Advisory Board*. Extension Outreach and Education Working Group, March 18, 2008.

National Oceanic and Atmospheric Administration Science Advisory Board. *Climate Research and Modeling Program Review*. Climate Working Group, October 23, 2008.

National Oceanic and Atmospheric Administration Science Advisory Board. *Climate Information Products and Applications (CIPA) Program Review*. Climate Working Group, November 17, 2009.

National Oceanic and Atmospheric Administration Science Advisory Board. *Options for Developing a National Climate Service.* Climate Working Group, June 5, 2009.

National Oceanic and Atmospheric Administration. *Advancing NOAA's Priorities through Regional Collaboration.* Washington D.C, March 2007.

National Oceanic and Atmospheric Administration. *Budget Estimates Fiscal Year 2011 Congressional Submission*. Washington D.C., February 2010.

National Oceanic and Atmospheric Administration. *Climate Goal FY11-15 Program Plan*. Washington D.C., October 29, 2008.

National Oceanic and Atmospheric Administration. *Climate Goal Team Program Operating Plan: Research and Modeling Fiscal Year 2011*. Washington D.C.

National Oceanic and Atmospheric Administration. *Climate Goal Team Program Operating Plan: Observations and Monitoring Fiscal Year 2011*. Washington D.C.

National Oceanic and Atmospheric Administration. *Climate Goal Team Program Operating Plan: Service Development Fiscal year 2011*. Washington D.C.

National Oceanic and Atmospheric Administration. *NOAA Administrative Order Series: Initiating and Processing Organizational Changes*, NAO 200-7. Washington D.C., March 10, 2009.

National Oceanic and Atmospheric Administration. *NOAA Climate Service: Proposed to Meet Essential National Needs*. Washington D.C., March, 2010.

National Oceanic and Atmospheric Administration. NOAA Decision Memorandum: *Decisions and Actions from the August 3, 2007, Joint NEP/NEC*. Washington D.C., August 28, 2007.

National Oceanic and Atmospheric Administration. *NOAA'S Next-Generation Strategic Plan*, Version 4.0. Washington D.C., June 23, 2010.

National Atmospheric and Oceanic Administration. *Program Charter for Climate Observation and Monitoring Program*. Washington D.C., June 16, 2009.

National Oceanic and Atmospheric Administration. *Program Charter for Climate Research and Modeling Program*. Washington D.C., June 16, 2009.

National Oceanic and Atmospheric Administration. *Program Charter for Climate Service Development*. Washington D.C., June 16, 2009.

National Oceanic and Atmospheric Administration. *A Strategy for Climate Information Services*. Washington D.C., July 10, 2007.

National Oceanic and Atmospheric Administration. *Strategic Plan FY 2009-2014*. Washington D.C.

National Parks Service. The Inventory and Monitoring Program, Climate Change Monitoring Briefs, accessed March 2010, http://science.nature.nps.gov/im/index.cfm

National Research Council. *A Climate Services Vision: First Steps Toward the Future*. Washington DC: National Academies of Sciences, 2001.

National Research Council. *Fair Weather: Effective Partnerships in Weather and Climate Services*. Washington DC: National Academies of Sciences, 2003.

National Research Council. *Informing Decisions in a Changing Climate*. Washington D.C.: National Academies of Sciences, 2009.

National Research Council. *Restructuring Federal Climate Research to Meet the Challenges of Climate Change*. Washington D.C., National Academies of Sciences, 2009.

National Research Council. *Adapting to the Impacts of Climate Change*. Washington D.C.: National Academies of Sciences, 2010.

National Research Council. *Advancing the Science of Climate Change.* Washington D.C.: National Academies of Sciences, 2010.

National Research Council. *Informing an Effective Response to Climate Change*. Washington D.C.: National Academies of Sciences, 2010.

National Research Council. *Limiting the Magnitude of Future Climate Change.* Washington D.C.: National Academies of Sciences, 2010.

Nohria, Nitin. "Note on Organization Structure," Harvard Business School Note 491-083, Rev. June 30, 1995.

Phillips, Brady and Koch, Louisa. "Engagement Strategy on Climate and Communications," presentation to the Climate Working Group; Washington D.C., April 8, 2010.

Ramaswamy, V. "Climate Service FY 10-20 Priorities Climate Research and Modeling," presentation to the Climate Working Group. Washington D.C., April 7, 2010.

Sea Grant Association. *NOAA Sea Grant's Role in Understanding and Preparing for Climate Change Along America's Coast.* November 3, 2007.

Shea, Eileen. "Climate Service FY 10-20 Priorities Climate Regional Services," presentation to the Climate Working Group. Washington D.C., April 8, 2010.

Smith, J .B., Vogel, J. M., Cruce, T. L., Seidel, S.; Holsinger, H. A. *Adapting to Climate Change: A Call for Federal Leadership.* Arlington, VA: Pew Center on Global Climate Change, March 2010.

Solomon, Susan, Dole, Randall, Feely, Richard, Held, Isaac, Higgins, Wayne, Payne, Jeff, Shea, Eileen, Varanasi, Usha, Westley, Marian. *A Vision For Climate Services In NOAA.* Washington D.C.: National Oceanic and Atmospheric Services, 2009.

U.S. Department of the Interior, U.S. Geological Survey, *Climate Change and Water Resources Management: A Federal Perspective*, Circular 1331, Reston, VA: 2009.

U.S. Global Change Research Program. *Our Changing Planet: The U.S. Climate Change Science Program for Fiscal Year 2010.* Washington D.C.: Subcommittee on Global Change Research, October 2009.

U.S. Global Change Research Program. *Program Overview*, accessed March 2010, http://www.globalchange.gov/about

APPENDIX C
PARTICIPATING INDIVIDUALS AND ORGANIZATIONS

The project team has conducted 40+ stakeholder interviews (through formal interviews, client update sessions, and focus group discussions) to gain a strategic understanding of the current state of NOAA's climate related activities and services.

- Ackerman, Thomas P.: Director, Cooperative Institute-Joint Institute for the Study of the Atmosphere and Ocean
- Andrews, Kacky: Chief, Coral Reef Conservation Division, National Ocean Service
- Armstrong, Thomas: Senior Advisor for Climate Change, Department of the Interior
- Atlas, Robert: Director, Atlantic Oceanographic and Meteorological Laboratory
- Avery, Susan: President: Woods Hole Oceanographic Institution
- Babick, Kristen: Executive Assistant: ICLEI-Local Governments for Sustainability
- Bailey, Jon: Director of Marine and Aviation Operations and NOAA Corps
- Baker, Charlie: Deputy Assistant Administrator, National Environmental Satellite, Data, and Information Service
- Balstad, Roberta: Special Research Scientist, Institute for Coastal Science and Policy; Center for Research on Environmental Decisions; Columbia University
- Behar, David: Deputy to the Assistant General Manager, San Francisco Public Utility Commission
- Benjamin, Georges C.: Executive Director, American Public Health Association
- Bernard, Eddie: Director, Pacific Marine Environmental Laboratory
- Brewer, Jennifer: Assistant Professor/Assistant Scientist, Institute for Coastal Science and Policy
- Brown, Mark: Chief Financial Officer, Oceanic and Atmospheric Research
- Brown, Otis: Director, Cooperative Institute for Climate Services; Ashville, NC
- Brown, Shanna: D.C. Representative, Western Governors' Association
- Brown, Tim: Director, Western Regional Climate Center
- Buja, Lawrence: Director, Climate Science and Applications Program; University Corporation for Atmospheric Research
- Burkett, Virginia: Chief Scientist for Global Change Research; U.S. Geological Survey
- Butler, Jim: Director, Global Monitoring Division, National Oceanic and Atmospheric Administration,
- Carter, David: DNREC, Delaware Coastal Program
- Collins, Dan: Meteorologist, Climate Prediction Center; National Weather Service
- Cooper, Anne: Professional Staff Member, U.S. House of Representatives Committee on Science and Technology
- Daniels, Amy: Climate Change Specialist, Office of Research and Development; Department of Agriculture
- Davidson, Margaret: Director, NOAA Coastal Services Center, National Ocean Service; and Program Manager for Climate Service Development
- DeCola, Phil: Former Senior Policy Analyst, White House Office of Science and Technology Policy; Current Chief Science Officer, Sigma Space Corporation
- Doesken, Nolan: Former President, American Association of State Climatologists; Current President, Colorado Climate Center
- Doremus, Paul: Acting Deputy Assistant Administrator and Director, Strategic Planning, Office of Program Planning and Integration
- Eubanks, Kari Lyons: Climate Change Workgroup Member; Denver Environmental Public Health Department

- Fleming, Paul: Manager of the Climate and Sustainability Group; Seattle Public Utilities
- Fletcher, Kristen: Executive Director, Costal States Organization
- Foley, Gary: Earth Observation Systems Executive, Office of the Science Advisor; Environmental Protection Agency
- Fox, Chris: Director, National Geophysical Data Center
- Fraser, Gerald: Chief, Optical Technology Division; National Institute of Standards and Technology
- Frizzera, Dorina: Environmental Scientist, Coastal Management Office, Commissioner's Office of Policy, Planning and Science; New Jersey Department of Environmental Protection
- Furgione, Laura: Assistant Administrator, Program Planning & Integration
- Glackin, Mary: Deputy Under Secretary for Operations
- Grape, Laura: Senior Environmental Planner and Coastal & Chesapeake Bay Program Manager; Northern Virginia Regional Commission
- Gregg, Margarita: Director, National Oceanographic Data Center
- Halpert, Mike: Deputy Director, Climate Prediction Center, National Weather Service
- Hausman, Scott: Acting Director, National Climatic Data Center
- Hayes, Jack: Assistant Administrator, National Weather Service
- Hazlewood, Catherine: Professional Staff Member, Senate Committee on Commerce, Science, and Transportation
- Higgins, Wayne: Director, Climate Prediction Center, National Weather Service
- Hiza Redsteer, Margaret: Project Chief, U.S. Geological Survey
- Hohenstein, William: Director, Climate Change Program Office; Department of Agriculture
- Horsfall, Fiona: Director, Climate Test Bed, Climate Services Division, National Weather Service
- Hooke, William: Senior Policy Fellow and Director, American Meteorological Society.
- Iseman, Tom: Program Director, Water Policy and Implementation; Western Governors' Association
- Jacobs, Katharine: Assistant Director for Climate Adaptation and Assessment, Energy and Environment Division, Office of Science and Technology Policy, Executive Office of the President
- Jessup, Christine: Science & Technology Policy Fellow, American Association for the Advancement of Science
- Johnson, Zoe: Maryland Department of Natural Resources
- Karl, Tom: Transition Director, NOAA Climate Service; Chair of the Subcommittee on Global Change Research
- Kennedy, David: Assistant Administrator for Ocean Services, National Ocean Service
- Kicza, Mary: Assistant Administrator, National Environmental Satellite, Data and Information Service
- Klimavicz, Joseph F.: Chief Information Officer, Office of the Chief Information Officer/High Performance Computing and Communications
- Koblinsky, Chet: Transitional Assistant Director, NOAA Climate Service; and Director, Climate Program Office
- Krauthamer, Judy: Executive Director, Mid-Atlantic Coastal Ocean Observing Regional Association
- Kulungara, Abraham: Director, Environmental Health; Association of State & Territorial Health Officials
- Lautenbacher, Conrad: Former Under Secretary of Commerce for Oceans and Atmosphere and NOAA Administrator; Current Vice President for Science Programs, CSC Corporation
- Lawson, Linda: Director, Office of Safety, Energy, and Environment; Department of Transportation
- Levenbach, Stuart: Program Examiner, Commerce Branch; Office of Management and Budget
- L'Heureux, Michelle: Meteorologist, Climate Prediction Center; National Weather Service
- Lindstrom, Eric: Program Scientist, Oceanography; Earth Science Division: Physical Oceanography; National Aeronautics and Space Administration
- Locke, Gary: Secretary of Commerce, United States Department of Commerce

- Lohrenz, Steven: Co-Chair, Board on Oceans and Atmosphere, Association of Public and Land Grant Universities; and Chair, Department of Marine Science, University of Southern Mississippi
- Long, Craig: Meteorologist, Climate Prediction Center; National Weather Service
- Lubchenco, Jane, Under Secretary of Commerce for Oceans and Atmosphere and NOAA Administrator
- Lulloff, Allen: Senior Project Manager; Association of State Floodplain Managers
- Lyon, Randy: Chief, Commerce Branch; Office of Management and Budget
- MacDonald, Sandy: Director, Earth System Research Laboratory; and Deputy Assistant Administrator for Research Laboratories and Cooperative Institutes, Office of Oceanic and Atmospheric Research
- Manous, Joe: Office of the Assistant Secretary of the Army for Civil Works; and Future Directions Team Leader for the Institute for Water Resources, US Army Corps of Engineers
- McBride, Blake: Arctic Affairs Officer, Task Force Climate Change; Department of the Navy
- McLean, Craig: Assistant Administrator (Acting), Oceanic and Atmospheric Research
- Miller, Jerry: Senior Policy Analyst, Energy and Environment Division; Office of Science and Technology Policy
- Mo, Kingtse: Senior Phys. Scientist, Climate Prediction Center, National Weather Service
- Murawski, Steve: Scientific Programs Director and Chief Science Advisor, National Marine Fisheries Service
- Murray, Jim: Deputy Director, National Sea Grant College Program
- Neff, Bill: Director, Physical Sciences Division
- Noakes, Scott: Assistant Research Scientist, The University of Georgia Center for Applied Isotope Studies
- Ortner, *Peter: Director*, Cooperative Institute *for Marine and Atmospheric Studies*
- Overpeck, Jonathan: Co-director, Institute of the Environment; and Professor of Geosciences/ Atmospheric Sciences, University of Arizona.
- Pulwarty, Roger: Director, National Integrated Drought Information Service Program Office
- Quintrell, Josie: Executive Director, National Federation of Regional Associations for Coastal and Ocean Observing
- Ramaswamy, Venkatachalam: Director, Geophysical Fluid Dynamics Laboratory, Office of Oceanic and Atmospheric Research
- Ravishankara, A.R.: Director, Chemical Sciences Division, Earth System Research Laboratory
- Rector, Lisa: Senior Policy Analyst, Northeast States for Coordinated Air Use Management
- Ribas, Eduardo: Senior Advisor to the Deputy Under Secretary, Workforce Management Office
- Rosen, Rick: Senior Advisor for Climate Research, Climate Program Office
- Rothschild, Tara: Professional Staff Member, U.S. House of Representatives Committee on Science and Technology
- Salt, Terrence “Rock”: Principle Deputy Assistant Secretary of the Army, US Army Civil Works
- Sarri, Kris: Former Professional Staff Member, Senate Committee on Commerce, Science, and Transportation; Current Deputy Director, Office of Policy and Strategic Planning, Office of the Chief of Staff; United States Department of Commerce
- Schwab, Eric: Assistant Administrator, National Marine Fisheries Service
- Shafer, Steven: Deputy Administrator, Natural Resources and Sustainable Agricultural Systems, Agricultural Resource Services; U.S. Department of Agriculture
- Shea, Eileen: Chief, Climate Services Division, National Climatic Data Center
- Spinrad, Richard, Former Assistant Administrator, Office of Oceanic and Atmospheric Research; Current Vice President for Research at Oregon State University
- Swallow, Danielle: Regional Coordinator for National Climatic Data Center, NOAA Climate Service Implementation Team
- Thomas, Gregg: Climate Change Workgroup Member; Denver Environmental Public Health Department

- Wake, Cameron: Research Associate Professor, Institute for the Study of Earth, Oceans, and Space; University of New Hampshire
- Walsh, Margaret: Ecologist, Climate Change Program Office, U.S. Department of Agriculture
- Weirich, Jeremy: Professional Staff Member, Senate Committee on Appropriations; Subcommittee on Commerce, Justice, Science, and Related Agencies
- Welling, Leigh: Climate Change Coordinator, National Park Service
- White, Kathleen: Civil Engineer, U.S. Army Corps of Engineers
- Williams, Shimere: Professional Staff Member, U.S. House of Representatives Committee on Science and Technology
- Willis, Zdenka: Director, Integrated Ocean Observing System, National Ocean Service
- Wylie, Maureen: Chief Financial Officer, Office of the Chief Financial Officer, National Oceanic and Atmospheric Administration
- Xie, Pingping: Research Meteorologist, Climate Prediction Center, National Weather Service
- Zborel, Tammy: Senior Program Associate, Sustainability, Research & Innovation; National League of Cities

APPENDIX D
FEDERAL CLIMATE NETWORK

Many of the stakeholders consulted by the Panel emphasized how difficult it was to understand *who* at the federal level was doing *what* regarding climate – at the operational level and at the overarching policy level. Stakeholders find it difficult to understand clearly which Departments or agencies might be able to offer real help with climate adaptation change and mitigation decisions. In its 2010 report, *Informing an Effective Response to Climate Change*, the National Academy of Sciences stated that "the federal response is difficult to evaluate as there is no clear, accessible, and coordinated roadmap on federal responsibilities and policies" (Report In Brief, page 1).

Figure 3 was drafted by the Academy study team in order to give the Panel a high-altitude graphic that captures key participants in the federal climate enterprise. It has not been reviewed by any of the agencies for accuracy and is offered simply to capture provisionally the scope and locus of work being done at the federal level.

Figure 3. Illustrative Representation of the Federal Climate "Network"

Executive Office of the President

OFFICE OF SCIENCE AND TECHNOLOGY POLICY
Leads interagency efforts to develop and implement sound science and technology policies and budgets and advises President. Co-chairs Climate Adaptation Task Force. Oversees USGCRP.

US GLOBAL CHANGE RESEARCH PROGRAM
Research: Coordinates and integrates federal research of 13 agencies on changes in the global environment and implications for society.

***Activities*: Synthesis and Assessment products, Global Change website.**

CEQ/CLIMATE ADAPTATION TASK FORCE
Federal recommendations for adapting to domestic/ international impacts with 300 representatives from 23 agencies. (Chaired by CEQ, OSTP and NOAA.)

CARBON CAPTURE AND STORAGE INTERAGENCY TASK FORCE
Activities: Coordinated Federal Strategy for clean coal technology (Chaired by DOE and EPA representatives; reports to President through CEQ Chair).

Cabinet Departments/Agencies

DOE
Research: Energy production and global climate system effects (regional greenhouse gas and aerosol concentrations). Joint Climate Prediction Program.

***Other Activities*:** Voluntary Reporting of Greenhouse Gases Program; US Climate Change Technology Program; Energy Efficiency and Renewable Energy; Fossil Energy; Electrical Delivery and Energy Reliability; Nuclear Energy; Climate VISION.

USDA
Research: Risk to natural resources, forestry/ agricultural activities, adaptation strategies. With DOE and NSF, Joint Climate Prediction Program. Forest Service Research Stations.

***Other Activities*:** Standards/incentive programs to reduce non-point pollution, preserve wildlife habitat, enhance carbon sequestration in soils, reduce greenhouse gas emissions; National Resources Conservation Service partnership with EPA on water quality credit trading market and on Coral Reef Task Force. Environmental Threat Assessment Centers.

DOT
Research: Improved decision-making tools; FHWA's transportation and climate change research.

***Other Activities*:** NHTSA's updating of Corporate Average Fuel Economy Standards; Transportation and Climate Change Clearinghouse; FHWA's emission reduction.; environmental foresting.

Commerce
Research: NOAA, climate variability and change; NIST, measurement science and standards of climate and greenhouse gas observations.

***Other Activities*:** EDA Global Climate Change Mitigation Incentive Fund; NIST Carbon Mitigation Project; Co-Chair Coral Reef Task Force. NOAA marine resource management, coastal management. ITA, Energy and Environmental Industries Teams. PTO, Green Technology Pilot Program.

NOAA CLIMATE SERVICE
Advance understanding and ability to predict climate in service of a resilient society.
- **Applied Science**
- **Climate.gov website**
- **Predictions/Projections**
  - **Seasonal**
  - **Annual**
  - **Inter-annual**
  - **Decadal**
  - **Centennial**
- **Data Stewardship & Analysis**
- **Climate Applications (scenario planning, training, education, evaluation, feedback)**

DOI
Research: Natural resources impacts; hydrologic variability; stationarity.

***Other Activities*:** Climate Change Response Council; Regional Climate Change Response Centers; Network of Landscape Conservation Cooperatives; Co-Chair of Coral Reef Task Force; NPS' Climate Friendly Parks ; FWS Climate Change Strategic Plan/5-Year Action Plan; Climate Change website. Bureau of Reclamation Colorado River Climate Change Research Program; Water SMART Research Grants; USGS Global Change Research; Climate Change and Water Resources Management.

HHS
Research: Environmental health/ health effects. NIH Challenge grants.

***Other Activities*:** CDC framework to anticipate, manage, remedy health effects; *A Human Health Perspective on Climate Change.* Interagency Working Group on Climate Change and Health led by NIEHS. NIEHS Climate Change and Human Heath Website.

State Department
Research: Financial contributor to UN Framework Convention on Climate Change and Intergovernmental Panel on Climate Change.

***Other Activities*:** Bali Action Plan, fifth *U.S. Climate Action Report,* MOU on Cooperation Regarding Climate Change; UN Framework; convention on Climate Change Energy and Climate Partnership of the Americas.

DOD
Research: Global climate change impacts affecting D)D assets/national security Climate and Water Resources; Cold Regions Climate.

***Other Activities*:** Under 2008 National Defense Authorization Act, assesses risk of climate change on armed forces mission; develops capabilities to reduce impacts; reduction of greenhouse gases, increase energy efficiency Corps of Engineers-Climate Variability Impacts Program, Non stationarity and Hydrologic frequency Analysis.

DHS
Research : National Security; climate and natural disasters.

Other Activities: FEMA Costal Construction Manual—mapping, assessment, and planning; impacts of climate on national security and stability; NFIP Change Impact Analysis; FEMA RiskMAP future conditions analysis.

Agencies/Other Organizations

EPA
Research: Supporting scientific information for response to risks/opportunities; Houses GCRP.

***Other Activities*:** Under Clean Air Act, regulation of greenhouse emissions; other regulations relating to energy and security; economic models and analytical tools supporting mitigation programs; Climate Protection Partnerships (Climate Leaders, Energy Star, Clean Energy Programs, Wastewise, methane programs, High Global Warning Potential Gas Programs); water quality impacts. Climate Change Indicators; website.

National Science Foundation
Research: Physical, chemical, biological, and human systems. Joint Climate Prediction Program.

***Other Activities*:** Climate Change Education Partnership Program; Decadal and Regional Climate Prediction System Models; Paleo Perspectives on Climate Change; Climate Process Modeling Team; Water Sustainability and Climate; Climate and Large-Scale Dynamics.

NASA
Research: Scientific questions about global and regional integrated Earth system.

***Other Activities*:** Global perspective on Earth's climate; solar activity, sea level rise, atmospheric and oceanic temperature; ozone layer; air pollution; sea ice; land ice; 17 earth observing space missions; conversion of satellite data from NOAA, DOD and other countries' satellites; global measurement of aerosols; *Global Climate Change: NASA's Eyes on the Earth* public website.

US Agency for International Development
Research: Application of high-quality climate information to decision-making.

***Other Activities*:** Greenhouse gas emission reduction; disaster response.

Smithsonian Institution
Research: Global climate change processes; repository for research.

***Other Activities*:** Education Academies for Teachers; National Zoological Park's Migratory Bird Center.

APPENDIX E
FEDERAL ROUNDTABLE SUMMARY

FEDERAL ROUNDTABLE ON THE NOAA CLIMATE SERVICE

On June 24, 2010, the National Academy of Public Administration hosted a two-hour roundtable with federal users and providers of climate information to determine:

- How they currently partner with NOAA in the areas of research and modeling, observations and monitoring, and service development and delivery.
- How they assess their current relationship with NOAA in each of these areas.
- What they need from a NOAA Climate Service in each area.

Sixteen people participated from eight federal departments/agencies:

1. Environmental Protection Agency
2. National Aeronautics and Space Administration
3. National Institute of Science and Technology
4. U.S. Department of Agriculture
5. U.S. Department of Defense
6. U.S. Department of the Interior
7. U.S. Department of Transportation
8. White House Office of Science and Technology Policy

This discussion yielded major observations, each of which is discussed in more detail below.

OBSERVATION 1—Mission Alignment:
The NOAA Climate Service's mission must be aligned with the roles and responsibilities of other agencies within the interdependent federal climate enterprise. The organization should be structured to minimize disruption of existing partner relationships and services.

The NOAA Climate Service is part of a larger network providing climate science, data, products, and services to the nation. Federal partners indicated that it was important for NOAA to "plug into" this existing network, not re-create it. Other federal agencies often have a dual role; they are users of NOAA services, as well as active contributors to climate science and providers of climate information. Given this interdependence, federal partners are especially concerned about the "boundaries" of the NOAA Climate Service—its mission, priorities, and intended services. Other agencies desire more information about NOAA's intended role to understand how they fit within this larger enterprise. By taking full account of other agencies' existing climate activities, NOAA will be able to develop its niche and minimize duplicative efforts across the federal government.

Federal partners need additional clarity on the NOAA Climate Service's primary focus. Will it concentrate primarily on services, or will it have a broader set of responsibilities? What products and services will NOAA be responsible for developing? What will be the responsibility of other agencies? Since NOAA has widely recognized expertise in the areas of oceans and coastal communities, should it play a more limited role in addressing inland climate issues? Federal partners acknowledged that NOAA

should have a leadership role within the broader climate enterprise, but expressed concerns about NOAA attempting to provide science and services for the broader ecosystem, especially since no components from the National Marine Fisheries Service are slated to be moved into the new line office.

At the same time, federal partners acknowledged that it will not be easy to define NOAA's mission because climate is an "emerging space" from a scientific and policy standpoint. There is tension between the desire to define the mission with great specificity and the need to ensure that it is flexible enough to evolve over time to meet new needs. Partners emphasized that development of a NOAA Climate Service will be an "evolutionary process."

From an organizational standpoint, federal partners expressed concerns about how moving NOAA components into this new line office will impact existing partner relationships and services. Particular concerns were that the Office of Oceans and Atmospheric Research may be left with significantly diminished capacity, which, in turn, may adversely affect existing federal partners. Similarly, there were concerns that moving NESDIS data centers may hinder NOAA's ability to consider climate requirements in satellite development.

Because some federal partners said it was not always clear what NOAA is authorized to do under existing statutes, they suggested it may be useful for Congress to provide specific statutory authorization for the NOAA Climate Service. This would allow Congress to weigh in on the mission of the new line office, provide it with specific authorities, and ensure that it has the legitimacy to perform its mission effectively.

OBSERVATION 2—Existing Partner Relationships:
Given the role of other federal agencies in generating climate data and providing products and services, strong partner relationships between NOAA and other agencies will be a critical factor in determining the success of the Climate Service. NOAA and its federal partners have existing relationships that can be built upon and further developed to meet climate needs.

As noted in Observation 1, other federal agencies besides NOAA have significant climate roles and responsibilities. These agencies have long had strong relationships with NOAA's National Weather Service in the area of weather impacts and forecasting. As an emerging field, some federal partners noted that relationships with NOAA's climate organizational units and personnel are still under development.

Several specific examples of existing relationships were cited at the roundtable:

- The U.S. Department of Transportation's Federal Highway Administration is working with NOAA to begin translating climate science for surface transportation providers.
- The U.S. Geological Survey works with NOAA on the ocean-inland interface, reporting that two agencies have worked to develop seamless mapping for Tampa Bay and have done a lot of joint coastal services work in Charleston.
- The U.S. Department of the Interior manages more than 25 percent of the land mass in the conterminous 50 states. As an agency within Interior, the National Park Service works with NOAA in research and modeling, observations and monitoring, and services.
- The U.S. Army Corps of Engineers operates on the regional and local scale. It has relied on NOAA for weather, climate and some hydrology information to help support decisions for its civil works and military programs missions.
- In the wake of the Deepwater Horizon disaster, USGS and NOAA not only have had conference calls about efforts in the Gulf of Mexico, but also conduct joint planning sessions. Additional coordination is needed at the ocean-inland interface between NOAA and USGS to ensure a healthy dialogue exists between the two agencies and prevent duplicative efforts.

- The U.S. Department of Agriculture and NOAA have strong existing partnerships. One example of a successful partnership cited was a Joint Agriculture-NWS facility. Although this is housed at Agriculture, NWS employees are co-located.

In supplemental written information provided to the Panel prior to the roundtable, one federal agency said NOAA has challenges in several key areas:

- Understanding user needs and overcoming the "if we provide it, they will come" mentality of some NOAA staff.
- Ensuring there is continual engagement between researchers and decision-makers to ensure that climate information and services are relevant.
- Administrative hurdles to true partnership development (discussed in more detail in Observation 3).

Some federal partners indicated that they need a clearly defined entry point or points to access the NOAA Climate Service.

OBSERVATION 3—Opportunities to Strengthen Partner Relationships:
To promote further partner relationships, NOAA should work to remedy existing administrative impediments and cost-sharing impediments while instituting additional practices designed to foster collaboration.

Federal roundtable participants emphasized the critical importance of establishing *meaningful collaboration* between them and the NOAA Climate Service on key decisions on climate research and development. Despite the significant effort required to establish meaningful collaboration, the federal partners said it pays significant dividends by ensuring a more seamless connection among agencies' activities.

In the future, some participants said they would like a shift in communications, with users coming to deliverers to identify their needs. It will be important for the NOAA Climate Service to have strong field-based connections and an understanding of its users operational needs. The following additional practices to foster collaboration were suggested:

- **"Umbrella contracts" to streamline administrative processes and decision-making.** Federal partners reported that it is difficult and time-consuming to transfer funds to NOAA components; this has completely derailed some agency partnerships. Administrative problems must be resolved to ensure that federal partners can interact effectively with NOAA for climate information and services. One or more "umbrella contracts" acceptable to NOAA and the partnering agency were suggested as a way to ensure that NOAA components have the authority needed to develop and implement agreements for specific tasks.
- **Co-location of NOAA Climate Service employees with federal partners.** In the past, the Environmental Protection Agency had nearly 100 NWS meteorologists working on-site in laboratories. This helped establish a two-way exchange of information: the agency learned more about NWS' capabilities; the meteorologists developed a greater understanding of user needs. Over time, the number of meteorologists on-site kept declining until it reached zero. As a way to establish meaningful collaboration, the NOAA Climate Service should consider co-locating some staff with their federal partners.
- **Integration of federal partner personnel on an interim basis with the NOAA Climate Service.** It was suggested that NOAA not only engage in "listening sessions" and high-level agency meetings, but also integrate other agency staff who receive the services, possibly on a part-time or rotating basis.

OBSERVATION 4—Future Climate Needs:
Federal partner agencies have significant unmet needs in the areas of climate science, data, products, and services.

To meet the nation's needs, federal partners believed that existing climate data must be improved. Although climate products and services will differ from weather, federal partners reported that the NOAA Climate Service could emulate NWS in the sense of providing usable information, but on a larger scale. Current climate information often is inconsistent across datasets/regions and not accessible in a user-friendly manner. Improvements should be made to the data systems by incorporating geospatial access and providing improved manuals to help users with utilization and navigation.

Federal partners reported that data services are "uneven" and strongest at the regional level; some regions provide more services than others. Climate services currently are largely delivered through soft money projects, not the base federal budget, hindering service development and capacity building.

Climate science and data must be translated for decision-makers. Especially in the vast western part of the nation, federal partners said data often are provided at a high level (such as for an entire state or region); this approach obscures the actual climate impacts (for example, drought or flooding) that individuals experience in their local communities. One federal partner said existing datasets were "too coarse for decision-making at the local level."

Over time, critical data and knowledge gaps must be filled. The U.S. Army Corps of Engineers needs more research on coastal hazards from a historical perspective, especially in the area of climate change impacts. It also needs improved ecological and biological observations. The Navy needs modeling on sea level rise impacts, precipitation, storms, tropical cyclones, Arctic sea ice, ocean circulation, temperature and salinity, and aerosols. This will require observational datasets and model projections on regional and sub-regional spatial scales (on the decadal and seasonal temporal scales), as well as advanced physics and data assimilation techniques. This information will be an input into mission planning, force structure and infrastructure investments, platform/personnel safety, and energy efficiency enhancements. Another federal partner cited wind erosion information as a critical need.

APPENDIX F
STATE AND LOCAL ROUNDTABLE SUMMARY

On July 15, 2010, the National Academy of Public Administration hosted a two-hour roundtable with NOAA's state and local partners in the climate service arena to determine:

- What climate information their organizations need.
- How they get this information.
- If they are getting the information in the most useful form.
- What the most optimal engagement with NOAA would be regarding climate service products/services.
- If their organizations would find it useful to have a single authoritative source for climate service products.

A total of eighteen people participated (six in person, twelve by phone) representing 16 organizations, including representatives of state, county and city governments and umbrella organizations. They were:

1. American Public Health Association
2. Association of State and Territorial Health Officials
3. Association of State Floodplain Mangers
4. California Air Resources Board
5. Denver Environmental Public Health Department
6. ICLEI-Local Governments for Sustainability
7. Maryland Department of Natural Resources
8. National League of Cities
9. National Association of County and City Health Officials
10. New Jersey Department of Environmental Protection
11. Northeast States for Coordinated Air Use Management
12. Northern Virginia Regional Commission
13. San Francisco Public Utility Commission
14. Seattle Public Utilities
15. Western Governors' Association
16. Western States Water Council

The discussion yielded several major observations, which are discussed in more detail below.

OBSERVATION 1—Improving Access to Federal Climate Information:
State and local governments do not always know how to access NOAA climate information and services. Developing a NOAA Climate Service web portal and establishing regional/state coordinators could improve access.

State and local roundtable participants recounted how they access NOAA data; many commented that they typically rely on past relationships, Internet searches and referrals. Depending on the level of government at which they work, they might go to a state agency, academic partner, RISA center, for which they generally have high regard, or a federal official they believed "owns" an issue. Some participants characterized the search for climate information as a "scavenger hunt" across the federal government and expressed a desire for a "single point of entry." Roundtable participants were not aware of a mechanism that assessed their needs. Although participants acknowledged the growth of regional services, particularly for fish and wildlife issues, neither NOAA nor other federal agencies have a state or regional officer to help with state or local climate information needs or challenges. Public health officials said they typically would go first to state officials and then to the federal level, but found NOAA lacking in ability to integrate public health issues with climate. Some regional officials noted that local decision-makers want state-sanctioned data and found state-customized data more useful in state-level decision-making.

State and local officials recognized that NOAA does not have a mandate to manage or control all federal climate information, but the participants agreed that the existing federal climate network lacks a sufficient institutional approach. The group recognized that other federal agencies besides NOAA have significant climate roles and responsibilities. Many have long-standing relationships with the Department of the Interior and Army Corps of Engineers. Several preferred an improved climate service web portal, hosted by NOAA and including historical data.

Participants supported a NOAA regional coordinator concept, where each region of the country would have a dedicated NOAA facilitator.

The regional coordinator could serve a multi-faceted role as it might:

- Facilitate the needs of states and local governments in their regional domain.
- Learn issues important to that region.
- Help customize models to meet local needs—and thus help state or local officials convert and apply NOAA's science to on-the-ground climate adaptation management.
- Become an important conduit for soliciting input from the region.
- Elevate regional concerns or new issues to NOAA management.
- Develop robust relationships that facilitate transmission of NOAA changes in priorities, new or improved products and services or quality assurance issues.
- Serve as a logical point of contact and coordination for regional activities of federal climate partners and thus improve effectiveness.

The NOAA reorganization proposal calls for a Regional Climate Coordinator in each NWS Regional Office, but it appears that the official's initial function would be to inventory regional climate information and develop a list of regional contacts. Participants desired a "circuit rider" to visit state and local counterparts, but the discussion included a reality check in terms of limited budgets. If budget and organizational structure did not permit, the geographic location of the officer might be less important than the ability to understand and assist in state or local climate issues.

OBSERVATION 2—Increasing Coordination of Federal and NOAA Climate Activities:
State and local government participants believe that climate activities across the federal government are not effectively coordinated and that NOAA also should improve coordination of its internal climate activities.

In this evolving space, participants noted the lack of coordination for state and local partners. In the federal climate network, there is little cross-agency coordination of services, as well. For example, NOAA funds numerous grants and projects from multiple sources, with frequent overlap and duplication. State and local officials said they communicate with each other informally and try to understand existing federal climate opportunities, but they believe improved NOAA coordination would add tremendous value and efficiency. One example was the need for federal coordination related to the Federal Emergency Management Agency's role in pre-disaster hazard mitigation plans; state officials noted that these plans do not integrate the potential impacts of future threats and conditions related to climate change.

In establishing the NOAA Climate Service, state and local participants urged the agency to not "just move the boxes," but rather make meaningful changes in business practices to:

- Increase internal NOAA coordination.
- Broaden outreach to governmental customers.
- Capitalize on NOAA's science strengths to make regional or local data collection, analysis and decision-making more science-based and consistent across the country.

A NOAA Climate Service line office would be a logical step in improving internal and external coordination, as would the coordinator concept, noted in Observation 1.

OBSERVATION 3—Establishing Standardized Models and Increasing the Usability of Existing Climate Data:
State and local representatives believe that NOAA and the federal government provide ample climate data on many subjects. The most critical current needs are to establish standardized national models into which other levels of government can plug specific regional, state and local data; and increase the usability of existing climate data by, for example, making it more widely available online and "downscaling" it to the local/zip code level.

NOAA and other federal agencies have a significant amount of climate data, but they often are collected inconsistently across the nation and not always readily usable for decision-making and planning. Although a large number of climate tools and approaches are available, users do not universally understand them. Existing climate change models have not been fully tested in the states. Because there is no consistency across the nation, cross-state analyses "compare apples to oranges." States want to know that neighboring states are using the same models (for example, in sea level rise). More instruction about the use of those tools would add significant value.

Ultimately, the state level needs:

- consistent, valid mathematical models into which they can plug regional and local data
- consistent standards for data collection—for example, they rely on some datasets from 20 years ago collected annually; others have data from 100 years ago collected monthly
- guidance on the appropriate way to use models. Given variations in regulations across states, it is most important for NOAA to provide sound and tested models to adapt to local variations, but sound enough to facilitate comparison and national analysis.

Participants said they need more explanation of, and two-way communication about the data, and they identified "data intermediation" as a major NOAA gap. Climate data should be accessible, transparent, free of technical jargon and translatable into actionable items for state and local jurisdictions. One participant characterized the need for a "reiterative quality"—that is, the ability to update data and replicate models to track trends in a manner that yields consistently higher quality data analysis. They asked for increased transparency of the science behind the data and sources and requested integration of data with Geographic Information Systems and hydrological models.

Examples of data needs include:

- data that cross-walk human health issues with environmental data for health practitioners
- presentation of data that state and local governments can use to plan for economic impacts and take needed actions
- explanation of data and data gaps to highlight what is important and how it can be useful to state and local governments
- routine updates to make climate predictions more iterative, not a "one-off" event
- updated FEMA models for estimating future flood flows. Current models predict the future based on past experience, but do not take into account the likely impact of climate change on the future of rainfall intensity, for example.
- "down-scaled" precipitation and other data to the local/zip code level

Based on this conversation, participants differed somewhat on the extent to which a federal entity, such as a NOAA Climate Service, should be involved in working directly with state/local officials to translate climate data. Some believed that NOAA needed to help states and local governments, particularly municipal planners, synthesize data and factor in future predictions. Others said states, not the federal government, should convert science into useable information for state decision-makers.

OBSERVATION 4—Tailoring the NOAA Climate Service to Existing Agency Expertise:
State and local representatives reported high regard for NOAA's technical expertise, but were unclear about which federal agency is best suited to provide climate adaptation services to state and local governments.

NOAA is a highly regarded source of technical expertise, particularly for weather and climate information. Participants see NOAA's ideal role as promoting fuller and more consistent state and local understanding of current science. Its most significant asset is its state-of-the-art science, which can be used to develop sound and tested climate models for use by state/local officials, RISAs and academic institutions. State and local governments can rely on this "trust factor" in seeking climate data they will use as the foundation for their decision-making. The participants were very supportive of the existing RISAs because they bring governmental stakeholders and academic partners together. Although NOAA is a credible source for certain information, it is not the best source for such issues as the public health impacts of heat waves.

Participants respect NOAA's science expertise, but they questioned whether the existing NOAA workforce has the skills set necessarily to provide significant "services" to state and local governments. Although they recognize that a federal entity should help states with climate adaptation, they were not certain that NOAA was the optimal agency to perform this role. They specifically mentioned the U.S. Department of the Interior—which is establishing Regional Climate Centers and Landscape Conservation Cooperatives across the country—as a likely candidate to fill this role. One participant did a Google search for "climate adaptation" and discovered that NOAA did not show up within the first four pages of results.

No matter the organizational structure, a federal climate service will operate within a context of significantly varying state and local capabilities:

- Some states need assistance in data analysis, while others have sufficient skills and resources to accomplish data analysis independently.
- Some local governments are very comfortable reaching out directly for federal data and working with it, while others do not have this capability.
- Some local government entities, such as emergency preparedness personnel, do not understand how climate change affects them. The federal government could help develop training explaining why climate change should be a focus for disaster preparedness and how it should be addressed.

Given these varying levels of capability, NOAA could leverage its resources to build state and local capacity. Some participants mentioned the desirability of NOAA webinars on key topics to help them update and develop broader and deeper skill sets. Currently, there is no central federal funding for state and local government capacity building, which is especially problematic given state budget challenges.

APPENDIX G
ACADEMIC ROUNDTABLE SUMMARY

On July 27, 2010, the National Academy of Public Administration hosted a two-hour roundtable with NOAA's academic partners in the climate service arena to determine:

- How these partners assess their relationships with NOAA in climate activities, such as what works well and what presents challenges.
- What academic partners need from NOAA with regard to research and modeling, observations and monitoring, and service development and delivery.
- What they believe academia's role should be in supporting a NOAA climate service.

Seventeen people participated (four in person, thirteen by phone) representing 21 organizations, including CIs, RCCs, the Sea Grant program, RISAs and umbrella organizations. In some instances, individuals wore multiple hats; for example, some spoke on behalf of both their university affiliation and a parallel organization. The organizations represented were:

1. American Association for State Climatologists
2. Association of Public and Land Grant Universities
3. Center for Research on Environmental Decisions, Columbia University
4. Climate Science and Applications Program
5. Climate Assessment for the Southwest
6. Colorado Climate Center
7. Cooperative Institute for Climate Applications and Research
8. Cooperative Institute for Climate and Satellites
9. Cooperative Institute for the North Atlantic Region
10. Cooperative Institute-Joint Institute for the Study of the Atmosphere and Oceans
11. Institute for Coastal Science and Policy
12. Institute for the Study of Earth, Oceans and Space
13. Mid-Atlantic Coastal Ocean Observing Regional Association
14. National Federation of Regional Associations for Coastal and Ocean Observing
15. Regional Integrated Science and Assessments
16. University of Arizona
17. The University of Georgia Center for Applied Isotope Studies
18. University of New Hampshire
19. Washington Department of Ecology
20. Western Regional Climate Center
21. Woods Hole Oceanographic Institution

OBSERVATION 1—Improving External and Internal Communications:
NOAA has a key role as a science broker, a translator for climate issues. It needs to define and prioritize its climate goals and activities, establish a clear organization to support that direction, define a path for collaboration, and communicate these decisions broadly.

Roundtable participants believed that lack of focus is a key part of NOAA's communications challenge. Internally, NOAA must first decide what it can do well. Then it needs to communicate its product and service commitments and priorities internally and externally. It must be clear and specific about what it can and will deliver and what it will not address in the foreseeable future.

From an **external** perspective, the participants observed that:

- Climate communication between NOAA and the public is lacking. Climate literacy, particularly at the regional level, is essential to public engagement. Participants believed that an important part of NOAA's mission is to educate the public and stakeholders about climate issues and create and prepare the next generation climate workforce.
- Communication with NOAA can be challenging for stakeholders and partners. Participants believed that this difficulty may be exacerbated by multiple sets of NOAA partners and what they perceive as strategic confusion within the agency about relationships, purpose and work processes. Participants expressed the desire for more substantive, data-driven, informal and less bureaucratic communications. They cited the re-competition process as an example of their frustration.
- Academics need primary liaisons within NOAA to facilitate communications. NOAA must frame research findings and disseminate them effectively.
- At the project level, external communication with partners is quite good.
- Higher level NOAA communications with stakeholders and partners are more challenging.

From an **internal** perspective, the participants observed that:

- NOAA needs to share information on what is working well. It is not capitalizing on its intelligence assets. For example, climate and inundation models work well in some states, but NOAA does not broadly or effectively communicate that information.
- Significant internal stovepipes lead to fragmented communications. It appears that parts of NOAA do not speak to each other and that, like in many bureaucracies, its "left hand does not know what its right hand is doing."

OBSERVATION 2—Focusing on Users and Stakeholders at the Regional Level:
Although global climate change is obviously a significant issue, decisions about adaptation and mitigation must be made at the regional and local levels, because these areas face different climate stressors. The organization and operation of NOAA's Climate Service should be driven by this recognition and have the capability to help local decision-makers prepare for a range of likely climate scenarios.

Climate information needs are broad and often poorly defined. Local decision-makers do not necessarily identify the information they need as being about climate, but rather about some other changing parameter (e.g. sea level rise, precipitation, wildfires). The knowledge about downscaling data and modeling output information from the large scale to the local and regional scale is relatively immature. Both physical and social scientists are necessary. To be successful, NOAA must make a long-term commitment to an ongoing dialogue between providers and users, focus on their climate service needs and help them cope with inevitable uncertainties. Participants urged NOAA to get out of the "linear loading-dock mentality" and co-generate knowledge.

OBSERVATION 3—Assessing and Capitalizing on Effective Partnerships:
NOAA has a role as an integrator for research organizations. It must define its path in this regard and foster true collaboration to accomplish its mission and effectively leverage its limited resources.

In its reorganization, NOAA must demonstrate that it has fully evaluated what has worked and what has not and to reorganize around its successes, strengths, regional needs and perhaps most important, climate stressors, not pre-existing organizational structures or individuals. Roundtable participants urged NOAA to focus on the delivery mechanism, not the bureaucracy.

Over the last 25 years, NOAA has had a long history of positive relationships with a diverse web of partners. However, participants stated it has become more complicated to work with NOAA over the last five to ten years. All parties must work collectively to bring regional efforts into context, with seamless data sharing and NOAA leading the critical data management and integration.

Among NOAA's partners are the RISAs, CIs, state climatologists and federal agencies. Roundtable participants shared their observations on these various partners:

- **RISAs:** The highly regarded RISAs pioneered local and regional dialogue and have proven to be very successful, even with limited funding. Their flexible and project-oriented workforce is a perfect match for NOAA's evolving climate mission. One roundtable participant noted that NOAA is not learning systemically from its RISA experiences.
- **State Climatologists:** The state climatologist network already exists. While this functional shift from federal to state responsibility resulted from a 1970s federal funding cut, the states found they were effective in this service delivery function geared to the local/personal level. Although highly variable from state to state, many offices do a very effective job disseminating climate data and products tailored to state needs and have the capability to provide data spanning a range of space and time scales, with a focus on climate variability and climate change. NOAA's climate structure needs to leverage this existing framework, increase regional collaboration, and avoid duplication of effort and expense.
- **Cooperative Institutes**: CIs were developed and intended to be the primary academic research partnership for NOAA, especially in the basic science of climate, atmosphere and ocean. Participants believed the relationship has deteriorated in the last few years, with NOAA using these institutes as a "contracted resource" rather than vital intellectual resources. These perceived changes have impacted negatively Cooperative Institute effectiveness and their ability to be responsive to NOAA's needs.
- **Federal Agencies**: Without a single national climate research center, NOAA's role as an integrator and interface between existing centers and federal agencies is critical. Participants observed the following:
  - NOAA's structure must be based on effective interagency partnership and the ability to work with multiple partners at all levels simultaneously.
  - NOAA should partner with other federal agencies through the US Climate Research Program to develop and maintain a vigorous research program associated with climate services and continually improve down-scaling methods and results.
  - NOAA is to be commended for identifying its climate reference network of 114 surface stations and including routine measurements of surface fluxes. However, it must expand this network in conjunction with other agencies, such as the U.S. Department of Energy.
  - NOAA must be part of climate collaboration. As an example, there was an earth systems modeling call among federal entities. NOAA did not participate.
  - Other federal agencies are key NOAA climate service customers; they need quality-assured, locally scaled data.

OBSERVATION 4—Providing Best Practices for Climate Data and Services:
Some roundtable participants believed that NOAA can add true value by providing decision-makers with best practices or legally defensible certified data and models, with appropriate acknowledgment of uncertainties. These NOAA-provided data could help inform risk-management decisions and set a standard for collecting and presenting climate data.

Global models are necessary to understand overall changes in the Earth's climate system. U.S. decision-makers, however, need NOAA to provide regional multi-model ensemble approaches, high resolution regional models and coupling model systems for sector decision support. One roundtable participant characterized the current climate data environment as the "Wild West," with a wide array of actors, including private sector consultants, peddling information to decision-makers. Within this context, it is challenging to determine which data and models are valid and reliable.

NOAA can provide observation baselines and information, identify the information sources, quantify and communicate major uncertainties associated with its data, and determine which products will be provided, at what intervals and with what metrics. Decision-makers need jargon-free, clear, and actionable data on the likely three- to five-year climate impacts. Users need higher resolution outputs—that is, more locally-based information to make on-the-ground, front-line decisions. NOAA is not providing data on the scale needed by those making expensive decisions for their regions. Participants also saw a role for NOAA in connecting existing public and private sector data and decision networks.

Within the academic community, participants noted a cultural shift in how climate services are viewed. In the past, climate service was a "bad word" because academics were expected to do climate science and research. More recently, the academic community has begun to place great value on climate services as a way to translate research into meaningful applications.

OBSERVATION 5—Developing a Modern Climate Structure and New Competencies:
Roundtable participants believed that the NOAA Climate Service must be broad, deep, innovative, flexible and evolutionary. Within this new structure, federal, university and other partnerships will be critical as will a host of new and enhanced competencies.

The NOAA Climate Service should be developed as a partnership where NOAA provides large-scale information—including data, model output, and interpretive guidance—to a national network of local partners. Many partners would be associated with academic institutions responsible for providing local down-scaling and interpretive guidance for local users. Although NOAA has made strides in leveraging partner resources, it should at a minimum work through the RCCs for more customized product development. At this point, NOAA is not widely using local scale data given the difficulties and expense. An important first step is to understand what is needed locally in terms of variability and seasonality.

NOAA also must build bridges between its highly valued research and operations. NWS has had success in translating its research and models into operations because they are very established and widely accepted. This has been more difficult in the climate arena because this field's science, research and models are at an earlier stage of development. NOAA is increasingly supporting knowledge-to-action networks and trending toward more integration across physical, biological, and social sciences. Yet, roundtable participants believed that it lacks a cohesive vision for how climate efforts come together.

When asked for feedback on the structuring of the NOAA Climate Service, roundtable participants had several comments:

- The structure should be driven by the needs of stakeholders and users, not existing NOAA organizations and personnel.
- It should move toward contextualizing climatological predictions within integrated/trans-disciplinary understanding of less predictable human-environment systems and have the capability to explain a range of likely climate scenarios.
- Some believe that NOAA's use of the existing NWS regional structure for climate is inappropriate. The Climate Service's regional boundary lines should be defined by the major climate stressors.

For example, the NWS regional office cannot effectively serve the needs of the Intermountain West and Pacific Coast from Canada to Mexico in terms of climate variability or projected climate change.

- The proposed structure does not adequately recognize that the academic community does most down-scaling and communication with the user community.
- Given the magnitude of the data delivery and data management climate service plan, it is appropriate to incorporate the NESDIS data centers in the new organization. However, the new organization also should include the NWS Climate Prediction Center to avoid disconnects in NOAA's climate modeling capabilities.
- NOAA's reorganization proposal should make clear that the long-term archiving of NASA satellite data is a priority. Roundtable participants were concerned that NOAA perpetuates the existing problem that NOAA satellite measurements primarily are devoted to weather goals and only tangentially to climate measurements.

Roundtable participants also identified workforce issues that NOAA must address as it develops the Climate Service:

- NOAA employees must be able to think more entrepreneurially, transfer technology to other sectors and develop strong stakeholder partnerships.
- Natural scientists must collaborate with social scientists and non-academic partners to make their work useful; this requires boundary-spanning, mutual learning and willingness of bio-physical scientists to accept the validity of qualitative, sociological findings.
- NOAA has developed strong expertise in ocean and coastal issues, but does not have the same level for atmospheric issues. To perform its climate mission, NOAA must develop additional internal expertise or leverage the expertise of federal and non-federal partners.
- The workforce must be flexible and project oriented, and shift rapidly as stakeholder needs evolve. Because academic institutes already function this way, they can be a useful partner in providing the necessary agility.
- Climate service employees need different education and training than weather service employees. Support staff would benefit from public sector and science backgrounds.
- NOAA does not have sufficient in-house resources to do the required product and service development for climate; employees need additional organizational and process skills to foster relationships and translation skills to ensure that climate science becomes usable information for decision-makers and the public.
- Additional interdisciplinary skills are needed. Partners do not make decisions on climate science alone, so NOAA must develop or leverage expertise in areas like social science, ecosystem issues, water issues, policy analysis, economics, law, and decision-science.
- NOAA employees must conduct multi-faceted assessments within an ongoing, iterative process and need to draw on local expertise on regional climate dynamics and influences.

APPENDIX H
ONLINE DIALOGUE SUMMARY

From June 14-28, 2010, the National Academy of Public Administration hosted an online dialogue with climate information users and providers to determine how the NOAA Climate Service should engage them.

Individuals across the nation discussed and recommended ideas, tools and approaches for how the Climate Service can best engage stakeholders over time to meet the need for climate information and services. Several questions were posed to participants to stimulate discussion on engagement, including:

- What is driving your need for climate information or services?
- What climate information and services do you find most useful currently and why? Who provides them?
- How could your access to climate information and services be improved?
- What mechanisms would you recommend to enable ongoing communication of your climate information and service needs to NOAA?
- How should the NOAA Climate Service engage with other providers of climate information and services to meet your information needs?

This discussion yielded several major observations discussed below.

OBSERVATION 1 - National Climate Enterprise:
The NOAA Climate Service's mission and activities must align with the roles and responsibilities of other agencies within the interdependent, national climate enterprise. The organization should be structured to minimize disruption of existing partner relationships and services with other federal, state, and local agencies, academia and the private sector.

The NOAA Climate Service is part of a larger network providing climate science, data, products, and services to the nation. Participants recommended that the Climate Service be integrated into this larger effort. They had various opinions about what this might mean, including:

- Agencies with existing expertise and capacity to collect, analyze and disseminate data, information, and services should continue to conduct these activities.
- Other agencies should have leadership roles with respect to their sectors. It was unclear what participants meant by sector in this context. It may be for an activity, such as a specific data collection effort or interaction with a specific group, such as an established relationship with states for certain issues.
- NOAA should not set mitigation policy, but can facilitate the infrastructure needed to produce greenhouse gas emissions and removal data.

Several participants emphasized the importance of clearly defining agency roles and responsibilities to avoid unnecessary duplication. This is critical for a system of various agencies to produce data sets, products and services in an integrated manner to meet user needs. Protocols and a system for quality assurance and quality control are needed to ensure that each partner meets its obligations, information can be aggregated regardless of source and decision-makers can have the confidence they need to use the outputs of the enterprise.

Additional roles for government agencies included maintaining and expanding observational platforms; maintaining data centers that archive and provide access to data; and providing services to end users that make use of the best available data and decision support systems. It was not clear whether these were to be a leadership role for the Climate Service or shared by the broader suite of agencies within the climate enterprise.

To have a cost-effective climate enterprise, participants indicated that public and private organizations must work together to provide value-added climate information, products and services. These would be provided to paying customers, saving taxpayers money and providing an opportunity for economic growth. There is a robust weather enterprise that already produces weather and climate products and services. To foster growth within this sector, it was suggested that NOAA open access to data, model predictions and other climate information in a manner similar to what already exists for weather.

OBSERVATION 2 - Maintaining and Fostering Partnerships and Collaboration:
A distributed climate enterprise requires partnerships and collaborations among public, private, academic and non-profit sectors. The NOAA Climate Service should maintain and strengthen existing partnership efforts and foster new ones to improve the provision of climate data, products and services.

As noted in Observation 1, the national climate enterprise is composed of a cross-section of federal, state and local government agencies working collaboratively with each other and with academia, non-profits and the private sector. Many participants indicated that these collaborations were critical. One stated that the NOAA Climate Service must be flexible, entrepreneurial and opportunistic in its approach to take advantage of opportunities as they arise. It also was recommended that resources be put in the hands of those working on problems at the ground level. Local governments were considered to be on the frontlines of climate change mitigation and adaptation efforts.

Another participant stated that there are major opportunities to increase cooperation to target important practical problems and issues. This will reduce inefficiencies that arise due to inadequate levels of cooperation and coordination. Several issues were mentioned as areas that would benefit from additional collaboration, including water resource management, agriculture, forest management, land use, pollutants, energy use and mapping of illness distribution.

It was suggested that NOAA go beyond traditional partnerships and seek strategic ones with affected sectors. It must make more compelling cases to encourage these non-traditional partners to engage. It also was suggested that NOAA leverage partners that people may relate to on a personal and community level, such as public gardens.

Several specific examples of existing partners or opportunities for new partners were cited in the dialogue:

- Other NOAA Components—NWS, NWS Storm Spotter Networks, Climate Prediction Center, Weather Forecast Offices, National Marine Fisheries Service, NOS, National Centers for Coastal Ocean Science, Office of Ocean and Atmospheric Research
- Sea Grant Extension
- Regional Integrated Science Assessments
- International Research Institute for Climate and Society
- Regional Climate Centers
- Cooperative Institute for Research in Environmental Sciences
- U.S. Climate Change Science Program/Adaptation Task Force
- National Institutes of Health
- Public Health Service
- U.S. Geological Survey
- NASA
- National Science Foundation
- U.S. Department of the Interior
- Environmental Protection Agency
- U.S. Fish and Wildlife Service
- U.S. Department of Agriculture
- U.S. Department of Transportation
- U.S. Department of Defense
- National Estuaries Program
- Cooperative Extension
- State Climate Offices
- State Agencies
- Southeast Climate Consortium
- Non-Government Organizations
- Cultural institutions, such as the American Public Gardens Association
- Private Sector
- Universities

OBSERVATION 3 - Single Climate Voice:
The NOAA Climate Service should be the authoritative voice on, and location for, climate data, information and analysis.

Dialogue participants said the NOAA Climate Service should be the single location for historical and predictive climate information; the authoritative voice on climate for the U.S. climate enterprise for regional and global scales; and the lead agency for collection and dissemination of climate information. One argued that NOAA should be the home of a National Climate Service given its "long track record providing climate information and significant institution capacity." Another stated that there should be no single voice, but multiple federal voices and approaches. Still another argued that climate forecasts are not reliable enough to warrant their continuation and establishment of a Climate Service.

One participant described the current U.S. climate enterprise as a "patchwork quilt" of uncoordinated effort and information by federal, state, local and non-government organizations. At the federal level, the "extent of climate information is overwhelming and often duplicative." One participant suggested a federal consolidation of climate activities and cessation of others to save money and improve climate information. Establishing a single voice and source would improve researchers' and decision-makers' ability to understand and communicate about climate.

OBSERVATION 4 - User Needs:
The NOAA Climate Service must conduct science to meet user needs. This requires sustained two-way communication to understand what users need and how they use the information.

Many participants emphasized the importance of ongoing interactions with people in their regions. Building this relationship takes time and commitment; it begins not by telling users what they need to know, but asking them about their goals, issues, concerns and values and understanding their motivation.

Climate Service services should be demand driven, with a robust two-way communication with end users and particular emphasis on the customer at the regional, state and local levels. Participation is not a one-time event; it is an ongoing dialogue—an essential feedback loop—about user needs for climate information, services and decision support at relevant scales. This feedback, coupled with formal evaluations, will enable the Climate Service to improve its science and service for users. Some municipalities will be very sophisticated, while others will need easily accessible data with a minimum of specific expertise interpretation.

Using existing infrastructure will be less expensive and more efficient than developing a new delivery system. This will allow climate services to make an immediate impact by taking advantage of trusted, existing relationships and partnerships. Additionally, it avoids the burden of stakeholders attending additional meetings with new people with whom they have no previous experience. Examples of existing partnerships and delivery mechanisms include the NWS Weather Forecast Offices, National Climatic Data Center, Regional Climate Centers and the State Climate Offices.

Meeting the users' needs will require the NOAA Climate Service to improve its knowledge of climate science. This includes strengthening its understanding of complex climate systems, enhancing climate models and improving the resolution of data at the scale and scope that decision makers need with specific emphasis on regional and sub-regional scales. It was suggested that NCS pursue research on the variability of climate impacts on diverse socioeconomic, racial/ethnic, age and gender groups; and the effects on these groups resulting from public and private planning for and response to climatic events.

OBSERVATION 5 - Meaningful Access to Data:
The NOAA Climate Service should provide easy access to climate data, and organize and present them in a useful manner to users at multiple scales.

Many participants believed that the NOAA Climate Service should provide easy and on-hand access to climate data, information and analysis. The data should include NOAA's efforts, as well as those of its partners and collaborators. Participants stated that data sets should be made available in standard formats where possible; however, others noted that standardization is challenging given the needs and parameters of individuals or groups. A common theme of the Dialogue was that the Climate Service provide "knowledge products," not just data tailored to users. For example, a participant suggested that it provide more web-based, visual products like NWS and National Hurricane Center.

OBSERVATION 6 - Data Management:
The NOAA Climate Service should become an effective clearinghouse for climate data.

The NOAA Climate Service should provide data that are credible, robust, unbiased, verified, timely and consistent over time. It should have clear quality assurance data standards for itself and its partners. Discussions about its role in the management of climate data varied. One participant felt that a Climate Service should lead the coordination of data information systems across the U.S. climate enterprise. Another focused more narrowly, stating that one should own all of the climate data within NOAA because it is currently fragmented across the organization. There was another suggestion that NOAA establish a single information technology solution for data archiving under the NOAA Chief Information Officer. NOAA should improve upon its "slow quality check out process" for releasing data.

OBSERVATION 7 - Translation:
There is a critical need for "translation" to bridge the gaps between providers and owners of climate-related information and those who need them; as well as between research and operations as they relate to climate change.

There is the need to provide a systematic approach, driven by user requirements, to sharing climate change science research and analysis that enable decision-makers to address adaptation and mitigation with valid, scientific data. However, many climate science data are in the "science domain", and the hands of academics and researchers in universities and government laboratories. Participants identified the need to translate science research into formats that are accessible and relevant to decision-makers. Understanding the needs of policy- and decision-makers, as well as behavioral responses to threats and consequences of climate events, have lagged behind the progress in forecasting and contributed significantly to this gap. The NOAA Climate Service should work with the non-science community to convert the data, models and information resources into knowledge in action for the benefit of society.

The Climate Service can help researchers and experts better communicate their research "how they know what they know" and demystify the science process. They can engage with communities through trusted sources, making climate science and solutions relevant and accessible in a local and regional context. Researchers can engage stakeholders by partnering with such boundary organizations as Cooperative Extension, Sea Grant Extension and appropriate NGOs. Investigators in the regions can work directly with boundary organizations to use climate information provided by NOAA and translate it to meet stakeholder needs, which differ among sectors.

OBSERVATION 8 - Climate Literacy:
The NOAA Climate Service must build climate literacy within NOAA's workforce and the public.

The NOAA Climate Service should increase its agency's climate literacy. Most NOAA program staff do not have adequate training in basic climate science, climate change impacts on natural resources their program manages, or climate resources that NOAA has developed for partners and the public. NOAA and the Climate Service should develop literacy training for all programs and regions, with emphasis on the human and environmental resources for each one.

To be effective, the Climate Service should spend as much time communicating how science can tell us as much about the solutions as it can the problems. Increasing climate literacy among decision-makers and the public will enhance their ability to understand and act on these issues. The Climate Service should expand "climate literacy" concepts to include approaches to address climate impacts on energy, transportation, food production, human systems and, architecture. By sharing potential solutions and suggesting actions to alleviate environmental stresses, it will inspire stewardship, not instill frustration or apathy.

Climate literacy can be achieved partly through education. Education, outreach and communication are a continuum that runs from formal to informal education, to outreach by scientists, to institutional communications. Participants offered examples of how this could work in practice. One suggested that educational efforts embrace best available practices in community education and social marketing. Another stated that state-level educators must be engaged in training efforts so that climate science and solutions can be shared in a more distributed fashion. The education efforts of federal climate partners should be coordinated. Finally, one argued for leveraging existing programs, such as the Storm Spotter Network, to raise awareness of climate change impacts and mobilize a mitigation and stewardship response.

OBSERVATION 9 - NOAA Climate Service Structure:
Dialogue participants had specific concerns and comments about what NOAA has proposed to include in its Climate Service and the impact on current and future operations across NOAA.

Climate activities crosscut every NOAA's line office. A concern was that these offices are "stove-piped" and historically have interacted poorly with each other. It was suggested that serious matrix management of climate activities would be preferable to establishment of a Climate Service, which only does pieces of

the job and inhibits the rest of the organization due to its construction. Others thought this reorganization logically should flow from various line office missions. The Climate Service should develop liaisons for all NOAA line offices that would coordinate within their respective lines. Finally, a Climate Service must be distributed, not located entirely inside the beltway.

Several participants had specific comments about what NOAA has proposed to include in the Climate Service and the resulting impact on NOAA's other components. Among them:

One said, much of NOAA's research—OAR—is fundamentally climate oriented, yet is being split in an arbitrary way. This could damage OAR in ways that cannot be compensated. The Climate Service should derive from all parts of NOAA, not primarily from OAR (40 percent of OAR's overhead costs).

It should be noted that much of the essential observational work is not slated to be part of the Climate Service. In particular, NOAA's Ocean Observations for Climate are done at Atlantic Oceanographic and Meteorological Laboratory and Pacific Marine Environmental Laboratory—neither of which are slated to transition to the Climate Service. However, the OAR Climate Program Office, which provides funding for observations, is proposed to move. Others were concerned about what happens to the remainder of OAR once half its programs and budget moves to the Climate Service. One suggested that unless OAR is disbanded and "ocean" programs are integrated into other line offices (an expensive proposition), there will be more government infrastructure.

Several participants were concerned that the Climate Prediction Center (CPC) is not included in the NOAA proposal. CPC is a well-known provider of science-based climate information, predictions and outlooks with an established set of products, customers and linkages to other government organizations and academia. Not including CPC in the Climate Service may result in cross-line office bureaucracy and a less effective research-to-operations process for weeks-to-seasons research. One suggested that CPC should move to the new line office, but remain physically co-located with the NWS at the National Centers for Environmental Prediction; this might serve as an efficient bridge between the two.

Whatever the structure, participants were concerned that a new line office was unrealistic absent new funding. One participant offered that additional monetary support of regional and local climate service providers would improve the level of service to stakeholders.

ONLINE DIALOGUE ENGAGEMENT AND PARTICIPATION ANALYSIS

More than 1,300 people visited the Dialogue site, and 134 people registered to participate. Of those registered participants, 45 people submitted 52 ideas and 117 ratings, and offered 72 comments related to those ideas. The Panel targeted a wide range of stakeholders, including both NOAA employees and those external parties. Participants self selected to engage in the Dialogue. This analysis focuses on two broad categories of metrics:

- ***Engagement metrics*** measure the amount of overall traffic to and activity on the site, including Unique Visitors, Total Visits and Page Views. An additional metric is the "bounce rate" – a measure indicating the "percentage of single-page visits or visits in which the person left [the] site from the entrance (landing) page."[41] The Dialogue team used a free Google Analytics tool to collect this information.

- ***Participation metrics*** measure active involvement in the Dialogue. Participation metrics collected here included registered users[42], users who submitted ideas, and those who participated by voting or commenting on another's idea.

Engagement Analysis

As Table 6 shows, the Dialogue website saw more than 2,300 visits from more than 1,300 unique visitors over the 15 days it was live. On average, visitors spent six minutes on the site and viewed about six pages per visit. The site's bounce rate was 35 percent, indicating that the majority of visitors clicked through the site to at least one additional page.

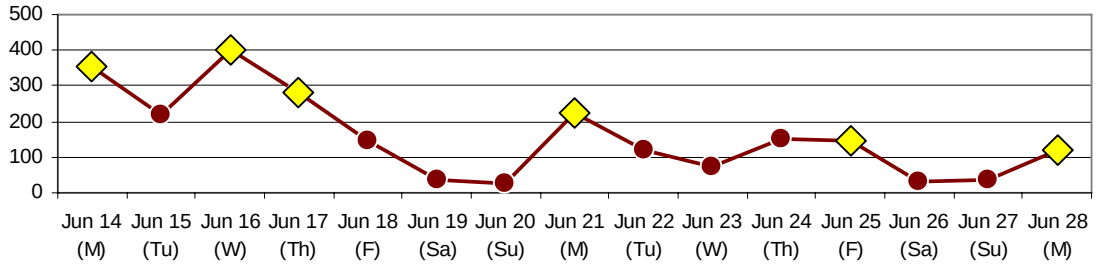
Table 6. Engagement Metrics

Dialogue on a NOAA Climate Service	
Live Dates	6/14/10 – 6/28/10
Visits	2,353 (157 per day)
Unique Visitors	1,342 (89 per day)
Page Views	13,729 (915 per day)
Avg. Page Views	5.83
Bounce Rate (%)	35.15%
Avg. Time on Site	5:39
Direct Traffic	1,971 (83.77%)

Benchmarking this Dialogue against past National Academy efforts suggests similar levels of engagement. The average page views and time on site are in line with past, public-facing dialogues. However, the low bounce rate indicates that the community was highly interested in the subject matter; this is not surprising given the narrowness of the topic.

[41] "What does Bounce Rate mean?" Google Analytics. http://www.google.com/support/analytics/bin/answer.py?hl=en&answer=81986 July 6, 2010.
[42] A registered user is any individual who creates a unique username on the Dialogue site; this step is necessary in order to submit, rate, or tag an idea, or to explore other users' profiles.

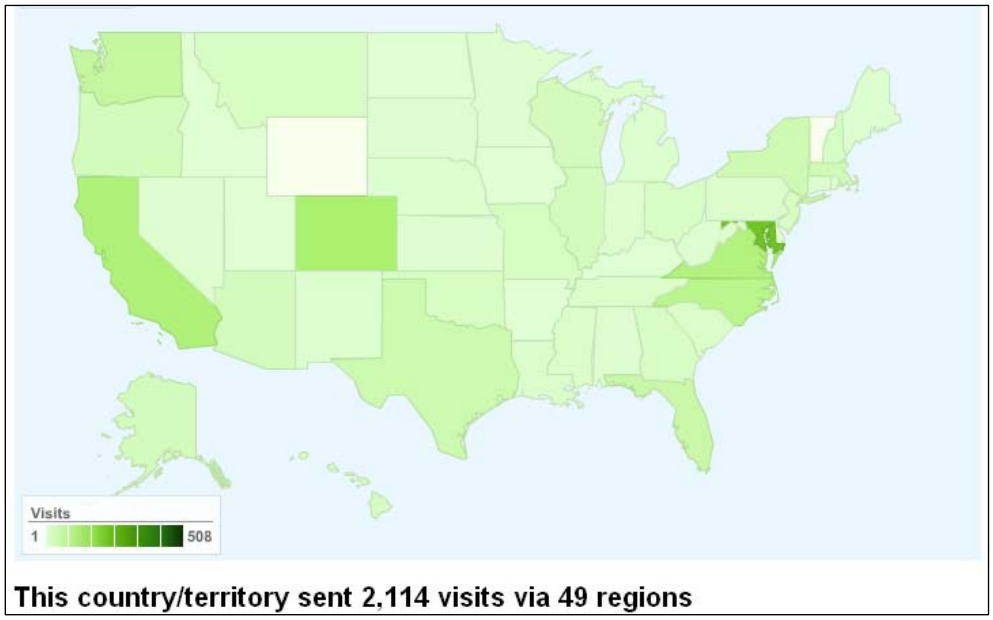
Figure 4. Visits to the Dialogue Site by Day



◆Denotes outreach email sent by either the National Academy or NOAA

As shown in Figure 4, visits to the site gradually decreased over the two-week span of the Dialogue, a pattern consistent with other National Academy efforts. As expected, visits decreased substantially over weekends and peaked after outreach e-mails were sent. Although there is a relationship between outreach and site traffic, a certain volume of visits undoubtedly came from word-of-mouth referral, such as e-mail forwards, among NOAA employees and other stakeholders. These are not traceable, but this "viral" outreach generally is a significant contributor to interest and site traffic.

Figure 5. Visits by U.S. State



The 2,353 visits to the Dialogue site came from 29 countries/territories, the vast majority of which were from the United States. As seen in Figure 5, the site received visits from 49 U.S. states and territories, including the District of Columbia. The largest source of visitors was the Mid-Atlantic region around Washington, DC, representing nearly one-half of all U.S. visits. Other states with large numbers of visits included Colorado, California, North Carolina, Washington, and Florida, all home to NOAA offices, research institutions or partners.

Participation Analysis

Table 7 illustrates the level of user participation in the Dialogue on a NOAA Climate Service. As shown in Table 2, the Dialogue site had 1,342 unique visitors. Nearly 10 percent of these registered to participate, a conversion rate in line with past National Academy Dialogues.

Forty-five of the 134 registered users authored an idea, a rate consistent with past efforts. These users offered 52 ideas for how a Climate Service can engage users and providers of climate information and services. Users then responded to ideas with comments, ratings and tags. As indicated in Table 4, there were less than ten responses to ideas per day.

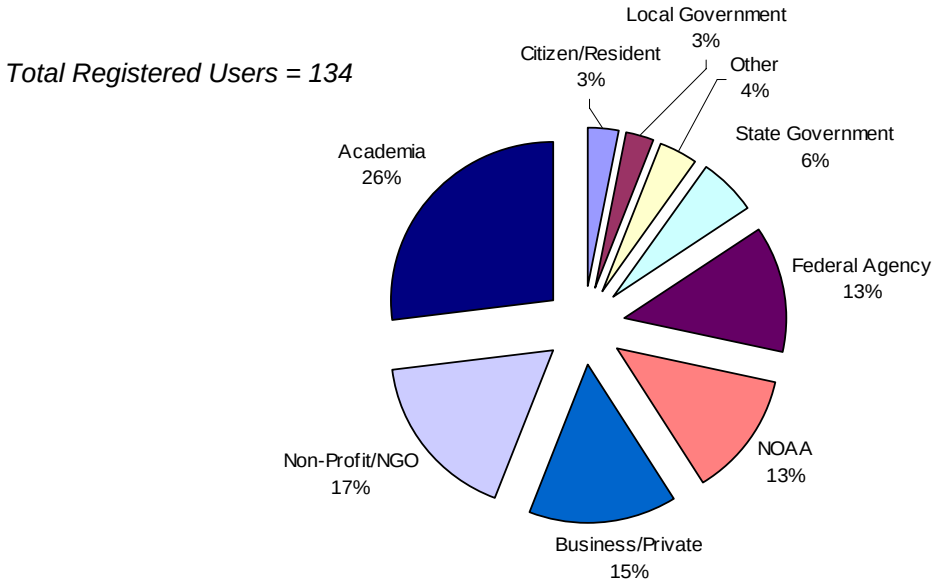
Table 7: Participation Metrics

Participation in the Dialogue	
Live Dates	6/14/10 – 6/28/10
Registered Users	134 (9 per day)
As Percent of Unique Visitors*	9.99%
Unique Ideas	52 (3 per day)
Users who posted an idea	45
Comments	72 (5 per day)
Ratings	117 (8 per day)
Tags	59 (4 per day)

*Percent of Unique Visitors is calculated by dividing the number of Registered Users by the number of Unique Visitors. This "conversion rate" is an indicator of what proportion of people saw enough value in the Dialogue to register, or to go from being "browsers" to "buyers."

Upon registering, users provided their sector (e.g., NOAA, federal government, academia) and primary areas of interest (e.g., environmental, public policy, science) for the purposes of analyzing the user population. Figure 6 displays the breakdown of registered users on these two questions.

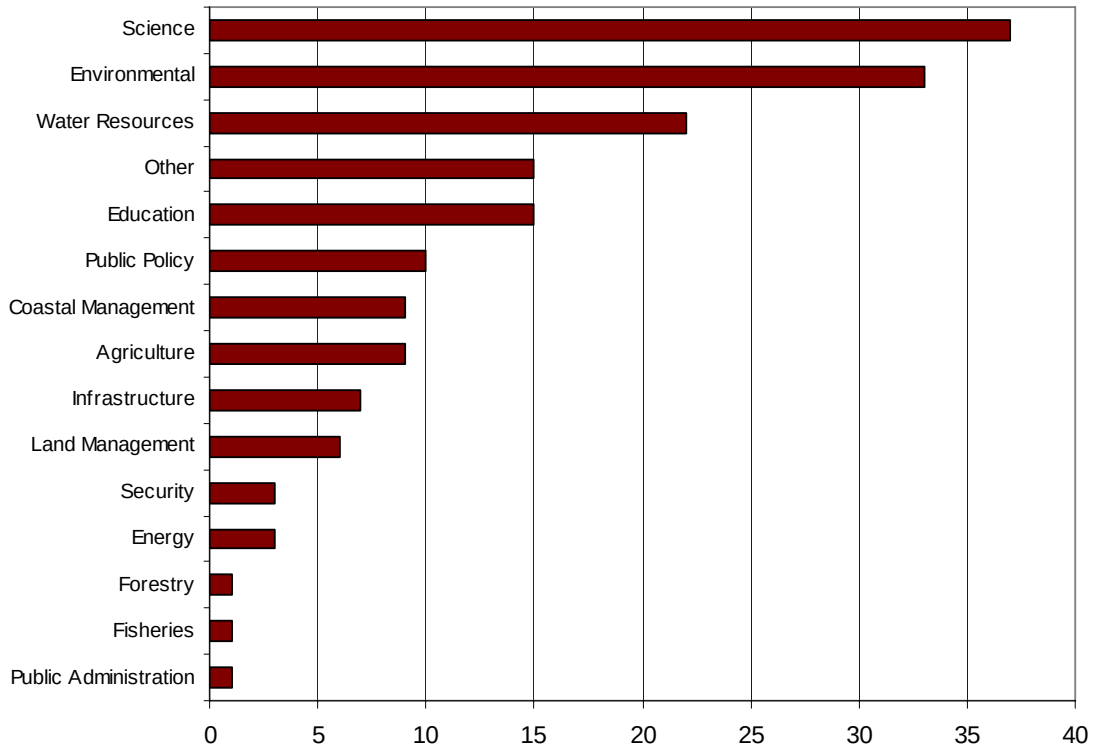
Figure 6. Registered Users by Sector



Not surprisingly, large portions of users came from academia (26 percent), the non-profit sector (17 percent), and the business sector (15 percent)—all of which have interest in creation of a Climate Service. NOAA employee participation was low. Seventeen users claimed NOAA as their sector; eight additional users registered with NOAA email accounts but identified federal government as their sector. When combining these groups, NOAA employees amount to 19 percent of registered users

Users also provided their top two primary areas of subject matter interest, the results of which are displayed in Figure 7.

Figure 7. Primary Areas of Interest



Note: "Other" responses included: Adaptation (3), Atmospheric (2), Climate and climate change (4), Communications and public engagement (2), Data management and information technology (4), Emergency management (3), Food security, GHG Monitoring, Intelligent Transportation Systems, Land use (2), Observations, Professional development

Not surprisingly, the Dialogue saw the greatest volume of participation from those in fields related to climate issues, namely the scientific, environmental and water resources areas. However, users identified with a wide variety of other areas as well, such as public policy, education and security.

APPENDIX I
NOAA'S ORGANIZATIONAL APPROACHES

The Study Team examined NOAA's organizational and operational approaches to gain an understanding of how NOAA is organized and operates. The Study Team sought to:

- Identify what and how many operating models exist across NOAA's Line offices.
- Analyze core capabilities and key support requirements across line offices.
- Understand the "inventory" of climate activity across line offices.

The first concept was whether line offices had specific functional or divisional areas of focus, and whether that characteristic makes them more similar than different. Figure 8 represents NOAA's major organizational categories. The red boxes group similar line office and headquarters functions and demonstrate that NOAA is operating multiple organizational models.

The Administration category represents the agency's executive and governance functions and includes the agency's leadership, chief support functions and selected programmatic leadership. This category is relatively standard in government organizations; it will continue to operate in its current state. It has little, if any, impact on the design of a NOAA Climate Service line office, except to the extent that certain functions need not be duplicated in the line office.

The two principal types of structures are "divisional" and "functional," neither one constructed or operating in a classic organizational design[43]. The two are differentiated or departmentalized, across a "product/market"—weather, oceans and fisheries or a "process"—data collection, analysis and planning.

Divisional Structures include NWS, NOS, and National Marine Fisheries Service (NMFS). Each line office is relatively large, geographically dispersed and/or produces wide range of services related to the overarching focus of its "market." Each is, first and foremost, accountable for the outcomes of its own office.

Functional Structures are high-level groupings that provide processes or capability to the rest of NOAA. The National Environmental Satellite, Data, and Information Service (NESDIS), and OAR, provide specific functional support to the divisional line offices; they also have broader mission sets and independent deliverables. The Program Planning and Integration (PPI) line office was established to integrate NOAA's divisional and functional structures into a cohesive agency. NOAA has proposed merging PPI with the Office of Program Analysis and Evaluation as a headquarters staff office, and eliminating it as a stand-alone line.[44]

[43] Nitin Nohria, "Note on Organization Structure", Harvard Business Review, February 1995.
[44] Pre-decisional, based on information provided to the NAPA study team by NOAA.

Figure 8. Representation of NOAA's Major Organizational Categories

Administration

- General Counsel
- Under Secretary for Oceans and Atmosphere and Administrator
- Chief of Staff
- Office of Policy

Communication and External Affairs
Legislative and External Affairs
Federal Coordinator for Meteorology
Office of Education
Office of International Affairs
Strategic Initiatives and Partnerships

Acquisitions and Grants
Chief Administrative Officer
Chief Financial Officer
Chief Information Officer/ HP Computing
Office of Marine and Aviation Operations
Program Analysis and Evaluation
Workforce Management

"Divisional" Structures

National Weather Service (NWS)

- Climate, Water, and Weather Services
- Science and Technology
- Hydrologic Development
- Operational Systems
- National Centers for Environment Prediction
  - Aviation Weather Center
  - Climate Prediction Center
  - Environmental Modeling Center
  - Hydrometeorological Prediction Center
  - NCEP Central Operations
  - National Hurricane Center
  - Ocean Prediction Center
  - Space Weather Prediction Center
  - Storm Prediction Center
- National Centers
- National Specialized Centers
- CFO/CAO
- CIO
- Strategic Planning
- EODM

National Ocean Service (NOS)

- Coastal Survey
- National Geodetic Survey
- Ocean and Coastal Resource Management
- Response and Restoration
- National Centers for Coastal Oceans Science
- National Marine Sanctuary
- NOAA Coastal Services Center
- Center for Operational Oceanographic Products and Services
- Integrated Ocean Observing System Program
- International Programs
- Management and Budget

National Marine Fisheries Service (NMFS)

- Regulatory Programs
  - Habitat Conservation
  - Protected Resources
  - Sustainable Fisheries
  - Regional Offices
- Operations
  - Law Enforcement
  - Seafood Inspection
  - CIO
  - Policy
  - Management of Budget
- Scientific Programs
  - Science and Technology
  - Regional Science Centers
- Constituent Services
- International Affairs

"Functional" Structures

National Environmental Satellite, Data, & Information Service (NESDIS)

- Satellite Operations
- Satellite Data Processing and Distribution
- Center for Satellite Applications and Research
- Systems Development
- National Climatic Data Center (NCDC)
- National Oceanographic Data Center (NODC)
- National Geophysical Data Center (NGDC)
- Space Commercialization
- GOES-R Program
- National Polar-orbiting Operational Environmental Satellite System (NPOESS)
- Commercial Remote Sensing Compliance and Monitoring Program (CRSCMP)
- International & Interagency affairs
- CIO
- CFO

Oceanic and Atmospheric Research (OAR)

- Climate Program
- National Sea Grant College Program
- Ocean Exploration & Research
- Weather and Air Quality
- Science Advisory board
- Air Resources Laboratory
- Atlantic Oceanographic & Meteorological Laboratory
- Earth System Research Laboratory
  - Global Monitoring Division (GMD)
  - Physical Sciences Division (PSD)
  - Chemical Sciences Division (CSD)
  - Global Systems Division (GSD)
- Geophysical Fluid Dynamics Laboratory
- Great Lakes Environmental Research Laboratory
- National Severe Storms Laboratory
- Pacific Marine Environmental Laboratory
- Policy, Planning, & Evaluation
- CFO/CAO
- CIO
- Communications
- International Activities

Program Planning and Integration (PPI)

- Strategic Planning
- Policy Integration
- Program Integration
- Performance Evaluation

CORE CAPABILITIES

NOAA identifies its core capabilities for climate as Research and Modeling; Observations and Monitoring; and Service Development. These core capabilities also exist across NOAA's line offices in support of different goals. Figure 9 illustrates[45] where these capabilities reside across the organization and demonstrates that they are not the responsibility of any one group within NOAA, but core to the mission of every line office. The figure reflects only that a capability is present or absent.

SUPPORT CAPABILITIES

All line offices share common support capabilities, including Finance and Administration; Information Technology; Planning and Policy; Communications; and International Activities. Although each line office's primary mission responsibilities differ, they appear to have a high level of consistency of support capabilities. This is illustrated by the blue text in Figure 9.

[45] "Figure 11: Illustrative Representation of Core Capabilities" is purely illustrative and intended to show only that the capabilities are present across the entire organization. The chart does not express the degree to which of the offices do these programs.

Figure 9. Illustrative Representation of Core and Support Capabilities Across NOAA

National Weather Service (NWS)

- Climate, Water, and Weather Services
- Science and Technology
- Hydrologic Development
- Operational Systems
  - NDBC – TAO Array
- National Centers for Environment Prediction
  - Aviation Weather Center
  - Climate Prediction Center
  - Environmental Modeling Center
  - Hydrometeorological Prediction Center
  - NCEP Central Operations
  - National Hurricane Center
  - Ocean Prediction Center
  - Space Weather Prediction Center
  - Storm Prediction Center
- Regional Offices
- CFO/CAO
- CIO
- Strategic Planning
- EODM

National Ocean Service (NOS)

- Coastal Survey
- National Geodetic Survey
- Ocean and Coastal Resource Management
- Response and Restoration
- National Centers for Coastal Oceans Science
- National Marine Sanctuary
- NOAA Coastal Services Center
- Center for Operational Oceanographic Products and Services
- Integrated Ocean Observing System Program
- International Programs
- Management and Budget

National Marine Fisheries Service (NMFS)

- Regulatory Programs
  - Habitat Conservation
  - Protected Resources
  - Sustainable Fisheries
  - Regional Offices
- Operations
  - Law Enforcement
  - Seafood Inspection
  - CIO
  - Policy
  - Management of Budget
- Scientific Programs
  - Regional Science Centers
- Constituent Services
- International Affairs

National Environmental Satellite, Data, & Information Service (NESDIS)

- Satellite Operations
- Satellite Data Processing and Distribution
- Center for Satellite Applications and Research
- Systems Development
- National Climatic Data Center (NCDC)
- National Oceanographic Data Center (NODC)
- National Geophysical Data Center (NGDC)
- Space Commercialization
- GOES-R Program
- Joint Polar Satellite System (JPSS)
- Commercial Remote Sensing Compliance and Monitoring Program (CRSCMP)
- International & Interagency affairs
- CIO
- CFO

Oceanic and Atmospheric Research (OAR)

- Climate Program
- National Sea Grant College Program
- Ocean Exploration & Research
- Weather and Air Quality
- Science Advisory board
- Air Resources Laboratory
- Atlantic Oceanographic & Meteorological Laboratory
- Earth System Research Laboratory
  - Global Monitoring Division (GMD)
  - Physical Sciences Division (PSD)
  - Chemical Sciences Division (CSD)
  - Global Systems Division (GSD)
- Geophysical Fluid Dynamics Laboratory
- Great Lakes Environmental Research Laboratory
- National Severe Storms Laboratory
- Pacific Marine Environmental Laboratory
- Policy, Planning, & Evaluation
- CFO/CAO
- CIO
- Communications
- International Activities

Program Planning and Integration (PPI)

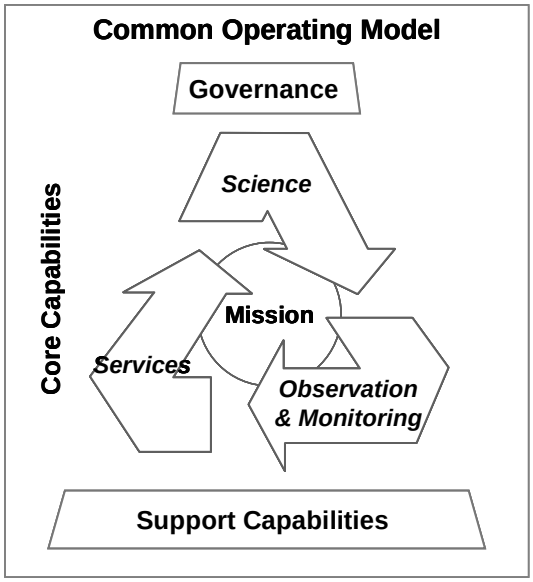
- Strategic Planning
- Policy Integration
- Program Integration
- Performance Evaluation

Research & modeling
Observation & monitoring
Services
Support capabilities/ enablers
Governance (AA and staff)

NOAA LINE OFFICE COMMON MODEL

NOAA has a generic line office model although the specifics of any one line office are tailored to its mission.[46] The generic model is not comprehensive, but it informs organizational design options by identifying major categories for consideration. All line offices include three broad components: governance, core capabilities and support capabilities.

Figure 10. NOAA's Common Operating Model



"Governance" is defined by leadership functions that provide guidance and direction that drive the execution of the organization's mission, including its operations and decision-making processes. Governance positions across each line office are fairly consistent, each with an Assistant Administrator (AA), one or two Deputy Assistant Administrators (DAA) and other staff responsible for the executive management and guidance of the execution of the line office's missions.

The Core Capabilities generate the desired outcomes through the production and/or delivery of products and services. Support Capabilities are the tools, processes and people that enable the operation of the organization—the organization essentials that fund, procure, plan, administer and link the organization's structure to function.

Users and producers of climate data, products and services reside throughout the agency. The organizations highlighted in red represent users and producers of climate information, and are presented to demonstrate the breadth of climate-related activities across NOAA. This is shown in Figure 11.

[46] The operating model is a visual description of how NOAA line offices operate at a high-level. It includes a description of core capabilities needed to fulfill their missions, and provides an approach to how an organization may need to work. This is not an organizational design, nor a comprehensive description of how every part of the organization fits together.

Figure 11. Inventory of NOAA Climate Activities

General Counsel

Under Secretary for Oceans and Atmosphere and Administrator

Chief of Staff

Office of Policy

FY11 Requested FTE & Budget($ million)

Communication and External Affairs
Legislative and External Affairs
Federal Coordinator for Meteorology
Office of Education

Office of International Affairs
Strategic Initiatives and Partnerships
Acquisitions and Grants
Chief Administrative Officer

Chief Financial Officer
Chief Information Officer/ HP Computing
Office of Marine and Aviation Operations
Program Analysis and Evaluation
Workforce Management

National Weather Service (NWS)
ORF $902 PAC $100 FTE 4649

- Climate, Water, and Weather Services
- Science and Technology
- Hydrologic Development
- Operational Systems
  - NDBC – TAO Array
- National Centers for Environment Prediction
  - Aviation Weather Center
  - Climate Prediction Center
  - Environmental Modeling Center
  - Hydrometeorological Prediction Center
  - NCEP Central Operations
  - National Hurricane Center
  - Ocean Prediction Center
  - Space Weather Prediction Center
  - Storm Prediction Center
- Regional Offices
- CFO/CAO
- CIO
- Strategic Planning
- EODM

National Ocean Service (NOS)
ORF $500 PAC $34 FTE 1259

- Coastal Survey
- National Geodetic Survey
- Ocean and Coastal Resource Management
- Response and Restoration
- National Centers for Coastal Oceans Science
- National Marine Sanctuary
- NOAA Coastal Services Center
- Center for Operational Oceanographic Products and Services
- Integrated Ocean Observing System Program
- International Programs
- Management and Budget

National Marine Fisheries Service (NMFS)
ORF $907 PAC $0 FTE 2882

- Regulatory Programs
  - Habitat Conservation
  - Protected Resources
  - Sustainable Fisheries
  - Regional Offices
- Operations
  - Law Enforcement
  - Seafood Inspection
  - CIO
  - Policy
  - Management of Budget
- Scientific Programs
  - Science and Technology
  - Regional Science Centers
- Constituent Services
- International Affairs

National Environmental Satellite, Data, & Information Service (NESDIS)
ORF $190 PAC$2018 FTE 835

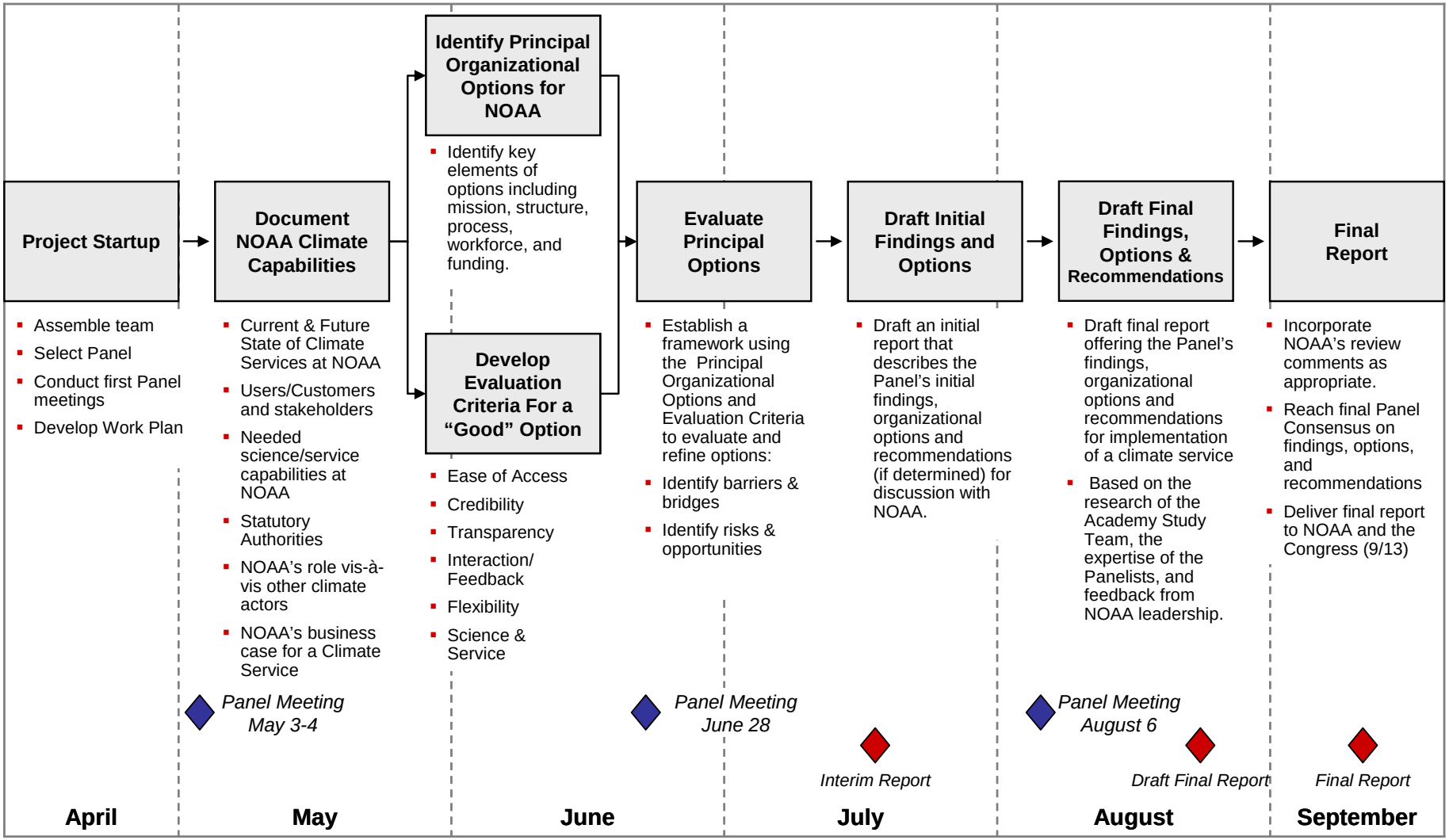
- Satellite Operations
- Satellite Data Processing and Distribution
- Center for Satellite Applications and Research
- Systems Development
- National Climatic Data Center (NCDC)
- National Oceanographic Data Center (NODC)
- National Geophysical Data Center (NGDC)
- Space Commercialization
- GOES-R Program
- Joint Polar Satellite System (JPSS)
- Commercial Remote Sensing Compliance and Monitoring Program (CRSCMP)
- International & Interagency affairs
- CIO
- CFO

Oceanic and Atmospheric Research (OAR)
ORF $454 PAC $10 FTE 773

- Climate Program
- National Sea Grant College Program
- Ocean Exploration & Research
- Weather and Air Quality
- Science Advisory board
- Air Resources Laboratory
- Atlantic Oceanographic & Meteorological Laboratory
- Earth System Research Laboratory
  - Global Monitoring Division (GMD)
  - Physical Sciences Division (PSD)
  - Chemical Sciences Division (CSD)
  - Global Systems Division (GSD)
- Geophysical Fluid Dynamics Laboratory
- Great Lakes Environmental Research Laboratory
- National Severe Storms Laboratory
- Pacific Marine Environmental Laboratory
- Policy, Planning, & Evaluation
- CFO/CAO
- CIO
- Communications
- International Activities

■ Climate-related research & modeling, observations & monitoring, and services activities

APPENDIX J
PROJECT MANAGEMENT



National Sea Grant College Program Evaluation

(November 13, 2009)

Overview

Early last year we put into motion the new integrated planning, implementation, and evaluation system for Sea Grant described in the November 2008 policy document, "The National Sea Grant College Program Planning, Implementation and Evaluation [PIE] System" (included here as Appendix C). The changes in the way Sea Grant operates were intended to enhance our impact as a national program, maximize efficiency at all levels, and make the best use of our limited resources.

To this point we have been focusing our efforts primarily on the planning aspects of the new PIE system. That effort began with developing the National Plan and has continued through aligning and updating the state program plans. These plans will carry the entire Sea Grant network through FY 2013, covering the 4-year omnibus awards from February 1, 2010 to January 31, 2014. Within the next few months, the planning process will be completed and we will begin the second phase of the PIE system, implementing the programs described in those plans.

As we move ahead, it is important to understand the third aspect of the PIE system, program evaluation. The need for a new evaluation process stems from recommendations made in the National Research Council 2006 Report, "Evaluation of the Sea Grant Program Review Process." Although the PIE policy document outlined the evaluation process that will eventually be used to assess our success as a network, it did not go into detail. In order to further develop the evaluation, an Evaluation Criteria Working Group was formed with members from the Sea Grant Association (SGA), the National Sea Grant Advisory Board (Advisory Board), and the National Sea Grant Office (NSGO). The charge for this working group was to: (1) develop draft evaluation criteria for the review of state Sea Grant programs objectively; (2) provide guidance on how the NSGO should form an overall rating based on the reviews; (3) provide guidance on how this information may translate into funding for the programs; and, (4) explore how information collected for reviews could be used to support the national and state Sea Grant programs and be shared across the programs to help them learn from each others' experience.

After careful consideration, the working group offered a series of recommendations that included several options for some aspects of the evaluation process. The report was circulated among the SGA, the Advisory Board, and the NSGO for comment. Based on that report, the comments received, and further discussions with many members of the Sea Grant Network, the evaluation process described below expands on the evaluation section of the PIE policy document to explain how programs will be rated and how those ratings will translate into merit funding.

Principles of Evaluation

The basic principles underlying Sea Grant program evaluation are as follows:

- The primary goal of program evaluation is to ensure excellence throughout the Network
- The evaluation process should encourage collaboration among programs
- Evaluation should be a continuous process
- Each program should be evaluated against its own program plan
- All program activities and resources should be included in the evaluation
- Evaluation should be based on integrated program impacts, not on functional areas
- The evaluation process should be transparent and not burdensome

Evaluation Process

The general outline for the program evaluation process was presented in the November 2008 policy document; what follows builds on that discussion and is intended to offer further detail, primarily on the rating process and the subsequent allocation of funding. There are several related components to program evaluation within Sea Grant:

Annual Reports/Self-Evaluation – Annual reports will be used by programs to evaluate progress against their state program plans, national performance measures, and metrics over a one-year period. These reports will be used by the NSGO and programs to track and report progress. The individual programs' progress in meeting goals set forth in their plans and in producing accomplishments relative to those goals contributes to the Sea Grant network's progress toward meeting national goals set forth in the national plan.

Program Site Review Visits – Once every four years beginning in 2010, a site review team (SRT) will visit each Sea Grant program. Each SRT will be chaired by the NSGO program officer and co-chaired by a member of the Advisory Board with a Sea Grant Director as a review team member. Additional members of the teams may be drawn from the Advisory Board and/or outside experts as needed. The SRT will meet with the program management team, advisory committees, and university administration to review and discuss broad issues related to three of the four evaluation components: 1) program management and organization; 2) stakeholder engagement; and 3) collaborative network activities. The SRT will be provided with a limited and focused set of briefing materials and will prepare a site visit report with findings and recommendations to improve the Sea Grant program's performance. The SRT will not be responsible for providing a rating for the program. Appendix A provides a detailed description of the SRT process.

Performance Review Panel – Every four years, following the completion of all Sea Grant program site visits, a Performance Review Panel (PRP) will conduct a retrospective evaluation of all programs' overall impact on society from both an environmental and a socioeconomic perspective based on each program's four-year plan. Annual reports, combined with a brief four-year summary document prepared by the programs, will provide the basis for the review. PRP working groups will be responsible for providing a separate rating for each program's focus areas. The first PRP will take place in 2011 and will evaluate program performance based on the

progress in meeting the objectives of the 2010-2013 plan. Appendix B provides a detailed description of the PRP process.

NSGO Annual Review – The NSGO will meet in the fall of each year to discuss the progress of each state program relative to its plan, and to identify any aspects of the program that might need improvement. Once every four years, starting in 2011, the scope of the annual review will be expanded to include a full performance evaluation based upon the site visit report, the PRP report and the combined PRP working group ratings, and the state program's response to those reviews. The process is described fully below in the section on "Rating and Allocation of Funding."

Recertification – The four-year reviews will also constitute a program recertification process. A successful review will result in recertification of the state program for the next four years. However, if a program receives an *Unsuccessful* rating, the program will be placed on probationary status. During each succeeding NSGO Annual Review, the progress of any program currently on probation in addressing the issues that led to the *Unsuccessful* rating will be assessed by the NSGO. If progress is satisfactory, the program will be allowed to continue on probation until the next four-year review, and if at that time the program receives a *Successful* rating, the program will be considered recertified. However, if progress is still found to be unsatisfactory after two years, or if a program receives a second consecutive *Unsuccessful* rating during the four-year review, the program will be referred to the Advisory Board for consideration of a recommendation for decertification.

National "State of Sea Grant Program" – Once every two years, beginning in 2010, the Advisory Board will provide a review of the "State of the Sea Grant Program." This review will assess the progress of the Sea Grant Network in addressing the priority areas highlighted in the national plan, analogous to the manner in which state programs will be evaluated in addressing their respective plans. This review will rely extensively on information collected from state program annual reports and the subsequent analysis by the National Focus Teams, and will help inform the national strategic planning process. The national program review is central to the PIE system and will provide an assessment of the overall performance of the entire Sea Grant College Program, including the National Sea Grant Office, in achieving its local, regional, and national objectives while supporting NOAA's mission.

Rating and Allocation of Funding

One outcome of the program review process will be an overall rating for each state program. Ratings will be assigned by the NSGO based on the evaluations and assessments of the Site Review Team and the Performance Review Panel, and will be used to guide merit funding increases as explained below.

Site Visits

As indicated above, the site visit reviews will focus on 1) program management and organization; 2) stakeholder engagement; and 3) collaborative network activities. After all the site visits have taken place, the NSGO, as part of its annual review, will review the findings and

recommendations included in the site visit reports, and the subsequent response of the programs, if any, and will find those aspects of program management to be either *Successful* or *Unsuccessful*. An *Unsuccessful* rating would result if the SRT identified serious issues with program management that had not been resolved prior to the subsequent annual review. Any program rated as *Unsuccessful* will be given a clear explanation for the rating and will be required to work with its program officer to develop a corrective action plan. A program rated as *Unsuccessful* will be placed on probationary status. Once the problems have been addressed, programs may submit an appeal to change their rating during the next NSGO Annual Review.

Performance Review Panel

The Performance Review Panel (PRP) will assess each program's overall impact on society from both an environmental and a socioeconomic perspective based on its four-year plan. To facilitate the review, PRP members will form five working groups according to their expertise, four with responsibility for one of the four national focus areas and the fifth with responsibility for all other program focus areas. Each of the working groups will evaluate the performance of all the participating programs in their particular focus area based on how well the programs achieved the outcomes, objectives and performance measures stated in their four-year program plans. Programs will thus receive a separate rating for each focus area the program participates in. The rating scale is as follows:

a. *Highest Performance* – exceeds expectations by an exceptional margin in most areas/aspects (5)
b. *Exceeds Expectations* by a substantial margin in some areas/aspects (4)
c. *Successful* (3)
d. *Below Expectations* (2)
e. *Unsuccessful* (0)

After each of the four PRP working groups for the national focus areas has concluded its evaluation of program performance relative to the individual plans, they will then be asked to make an additional assessment of the overall performance of all programs within their focus area relative to the level of Sea Grant's federal investment. The intent of this second level of review is to identify for each of the national focus areas those programs with impacts well beyond the norm for their level of federal investment and/or those programs with particularly outstanding scientific or societal contributions on a local, regional, or national level. The *few* programs that are highlighted by this assessment will be rewarded by having one point added to their rating for the respective focus area.

The focus area ratings will then be weighted based on the proportion of funding resources allocated by the program to each of the focus areas and combined to provide an overall performance rating. "Funding resources" includes all NOAA federal, matching, and leveraged funds that are managed by, or within the direct influence of, the Sea Grant Program and used to meet the goals and objectives of the four-year plan. For example, if a program allocated 10% of its resources to the Sustainable Coastal Development (SCD) focus area and was rated *Highest Performance* (5) with an additional bonus point for outstanding scientific impact, and 90% of its

resources to Healthy Coastal Ecosystems (HCE) with a rating of *Exceeds Expectations* (4), it would receive an overall weighted rating of 4.2, calculated as follows:

$$\underbrace{[10\% * (5+1)]}_{\text{SCD}} + \underbrace{[90\% * 4]}_{\text{HCE}} = (0.6) + (3.6) = 4.2$$

There is no requirement that a program address all four of the national focus areas. Instead, the rating process is intended to emphasize those areas that each program considers most important based on the resources allocated by program management.

If a program receives an overall rating of less than 2, the program will be considered *Unsuccessful* and placed on probationary status.

Allocation of Merit Funds

Merit funding will be allocated based on the overall program rating from the PRP review starting with the 2012 award. Rather than grouping programs into a small number of rating categories and allocating the same funding to each program within the category (as was done with the previous Program Assessment system), the allocation for each individual program will be proportional to its overall rating. For example, if the total merit funding pool was $10M, and the sum of the individual ratings for all programs happened to be 100, each rating point would be worth approximately $100,000. The program in the example above with an overall rating of 4.2 would receive approximately $420,000 and a program with a rating of 2.4 would receive approximately $240,000.

Any program that is rated as *Unsuccessful* will not be eligible for merit funding.

Appendix A: Site Review Team Procedures Manual (March 2010)

I. Site Review Team Composition and Role

Once every four years, a site review team (SRT) will visit each Sea Grant Program. The SRT will review and discuss broad issues related to: 1) Program Management and Organization; 2) Stakeholder Engagement; and 3) Collaborative Network/NOAA Activities. These three categories encompass Sea Grant's regulations listed under *15CFR918.3: Eligibility, qualifications and responsibility of the Sea Grant College Program*. The SRT will then produce a site visit report. The report will be transmitted to the National Sea Grant Office (NSGO) and to the Sea Grant Program. The SRT will not be responsible for rating the Program on any of these three areas, but will report findings from the site visit as outlined in this manual.

SRT Composition

Each SRT will be chaired by the Federal Program Officer (FPO), co-chaired by a member of the National Sea Grant Advisory Board (Advisory Board), and include a Sea Grant Director as a review team member. The SRT co-chair will be selected by the National Sea Grant College Program (NSGCP) Director in consultation with the Chair of the National Sea Grant Advisory Board. The FPO will then work with the SRT co-chair to select two additional external members, who may include:

- Representatives of appropriate commercial and industrial entities;
- Directors of institutes, centers, and laboratories;
- Leaders of state and federal resource agencies and programs (including NOAA);
- Senior officials of other academic institutions;
- Directors of cooperative extension programs or experiment stations;
- National Sea Grant Advisory Board members; and
- Recognized practitioners in appropriate fields (research, extension, education, communications, etc.).

Working with the co-chair, the FPO should consider including an external member of the SRT to come from the program's region (as long as there are no conflicts of interest). Prior to their final appointment, the potential non-Sea Grant SRT members will be reviewed by the Sea Grant Program to assure there are no conflicts-of-interest. The SRT may also include non-participating observers (such as other Federal Program Officers from the NSGO).

Role of the SRT Chair

The duties and responsibilities of the SRT Chair are as follows:

A. Working with the co-chair, select and recruit SRT members.
B. Serve as primary spokesman for the SRT, communicating on the team's behalf to the Sea Grant Program, NSGO, officials of Sea Grant institutions, constituent organizations, and the general public.
C. Plan the site visit. Consulting with the co-chair and the Director of the Sea Grant Program being reviewed:
    1. Develop the overall management of the site visit;
    2. Formulate an agenda appropriate for the visit; and

3. Approve the public notice of the site visit, drafted and issued by the Program Director.

D. Brief the SRT concerning the conduct of the visit, and supervise the conduct of the SRT during the review.
E. Lead the preparation of draft findings and recommendations.
F. Together with the co-chair, conduct the exit interview with the Program Director and appropriate university officials.
G. Oversee the preparation, review, and issuance of the final SRT Report.

II. Public Notice of Site Visit

A minimum of thirty days prior to the site visit, the Director of the State Sea Grant Program under review shall draft and issue a public notice that the Program will be reviewed on [X dates] by a SRT convened by the Director of the NSGCP. The notice will invite such persons to email comments on the management aspect of the Program or its work at least one week before the site visit date. Comments should be sent to oar.sg.feedback@noaa.gov.

III. The Site Visit Structure

Sea Grant's regulations describe the characteristics and responsibilities of Sea Grant Institutional and College Programs. The SRT will be particularly interested in those aspects that fit within three broad categories:

- Program Management and Organization (leadership, organization, program team approach, and support),
- Stakeholder Engagement (relevance, advisory services and relationships), and
- Collaborative Network Activities (coordinated planning and cooperative work with other Sea Grant programs and other local, state and federal agencies/organizations).

During the site visit, the SRT will meet with the Sea Grant Program's management team, advisory committees, university administration, stakeholders and others as determined by the Sea Grant Program Director being reviewed.

Programs are encouraged to provide the SRT with an overview of the state Sea Grant Program at the start of the site visit. Following this introduction, the SRT will receive information largely from presentations and structured or unstructured discussions in a relatively informal setting.

The Site Visit Schedule

The site visit should be designed to be completed over a two-day period (e.g., Tuesday/Wednesday), with the first day and a half dedicated to assessing the Program. The last half day is devoted to drafting the site visit report and briefing the program management team and appropriate university officials on the team's conclusions and recommendations.

The Exit Interview

Prior to leaving, the SRT will conduct an exit interview with the Program Director and appropriate university officials to summarize the draft report. The SRT may choose to first brief the Program Director and other staff members, and then brief the university officials.

The Site Visit Report

The draft report produced before the end of the site visit will form the basis for the final site visit report. The FPO is responsible for finalizing the site visit report. The final site visit report will have a section highlighting findings, recommendations, and suggestions as well as any activities the SRT has identified as "best management practices." A *recommendation* is a formally prescribed course of action for which the Sea Grant Program is accountable. The Sea Grant Program is expected to respond to each recommendation, explaining how it *has* implemented, how it *plans* to implement, or why it *chooses not* to implement each course of action. A *suggestion* is an idea that is presented for consideration. The Sea Grant Program is not accountable for responding to suggestions, but is encouraged to consider implementing those deemed useful and appropriate by program leadership. The best management practices identified by the SRT will be shared with other Sea Grant Programs.

The SRT report will not include a rating for the Program. The report will be finalized and sent to the National Sea Grant College Program Director and to the state Program Director within 45 days of the review.

The Program Response

Once the Program receives the site visit report, they have the option to implement any recommended changes and/or may submit a written response to the NSGCP Director up to three weeks prior to the NSGO Annual Review.

Subsequent Rating by NSGO

The NSGO will review the findings, recommendations and suggestions included in the site visit report, and the subsequent response of the Program, if any. The NSGCP Director, in consultation with NSGO, will deem the Program to be either *Successful* or *Unsuccessful* based on the aspects of a program's management and organization, stakeholder engagement and collaborative network activities. Any program rated as *Unsuccessful* will be given a clear explanation for the rating and will be required to work with their FPO to develop a corrective action plan.

A program whose management is rated as *Unsuccessful* will be placed on probationary status and will not be eligible for merit funding. Once the problems have been addressed, programs may submit an appeal to change their rating during the next NSGO Annual Review.

IV. Site Visit Review Criteria

This section lists the Site Visit Review criteria, which are the same as those found in Sea Grant's regulations, and includes a list of questions the SRT may ask the programs.

Program Management and Organization

- **Leadership.** The Sea Grant College Program under review must have created the management organization to carry on a viable and productive Sea Grant Program, and must have the backing of its administration at a sufficiently high level to fulfill its multidisciplinary and multifaceted mandate.
- **Programmed team approach.** The Sea Grant College Program under review must have a programmed team approach to the solution of ocean/coast/watershed/Great Lakes problems

which includes relevant, high quality, multidisciplinary research with associated educational and advisory services capable of producing identifiable results.

- **Support.** The Sea Grant College Program under review must have the ability to obtain matching funds from non-Federal sources, such as state legislatures, university management, state agencies, business, and industry. A diversity of matching fund sources is encouraged as a sign of program vitality and the ability to meet the Sea Grant requirement that funds for the general programs be matched with at least one non-Federal dollar for every two Federal dollars.

Questions the SRT may consider

- Is the Program an intellectual and practical leader in ocean/coast/watershed/Great Lakes science, engineering, education, and advisory service in its state and region?
- Has the Program created the necessary management organization to carry on a viable and productive Sea Grant Program, and does the Program have backing of its administration at a sufficiently high level to fulfill its multidisciplinary and multifaceted mandate?
- Does the Program have a programmed team approach to solving ocean/coast/watershed/Great Lakes problems, which includes relevant, high quality, multidisciplinary research with associated educational and advisory services capable of producing identifiable results?
- Does the Program have the ability to obtain matching funds from non-Federal sources, such as state legislatures, university management, state agencies, business, and industry?
- Does the Program demonstrate the ability to continue the pursuit of excellence and sustain the following?
    - (i) leadership in ocean/coast/watershed/Great Lakes activities including coordinated planning and cooperative work with local, state, regional, and Federal agencies, other Sea Grant Programs, and non-Sea Grant universities;
    - (ii) effective management framework and application of institutional resources to the achievement of Sea Grant objectives;
    - (iii) long-term plans for research, education, training, and advisory services consistent with Sea Grant goals and objectives;
    - (iv) furtherance of the Sea Grant concept and the full development of its potential within the institution and the state;
    - (v) adequate and stable matching financial support for the Program from non-Federal sources; and
    - (vi) effective system to control the quality of its Sea Grant Programs
- Did the Program implement recommendations from the previous review?
- Does the program input usable information into the National Information Management System (NIMS) in a timely manner?
- Are publications sent to the library on a regular basis (several times per year)? Does the number of publications at the library match the number in NIMS?
- Is the Director sufficiently engaged with the Program?
- Is the host university sufficiently engaged with the Program?
- Is there an active advisory board?
- Does the advisory board contribute to the strategic plan?
- How much contact do advisory board members have with constituents of the Program?
- How often does the advisory board meet?
- How much opportunity exists for new membership (turnover)?
- Does the Program use its 4-year plan to guide its management and decision-making?
- Do RFPs reflect the objectives in the 4-year plan? Are RFPs effectively circulated to units of other institutions with relevant expertise?

- Is there ongoing interaction between the Sea Grant Program and representatives of other relevant research and education institutions within the state?
- Is there an overall balance of research, extension, and education within the Program and are the Program's functional areas integrated?
- Is the Program transparent (as to what gets funded)?
- Are peer reviews adequate and well designed with clearly identified criteria?
- Are results of funded projects appropriately measured and assessed?
- Are the Program's practices or projects promising and worth sharing?

Stakeholder Engagement

- **Extension/Advisory services.** The Sea Grant College Program under review must have a strong program through which information, techniques, and research results from any reliable source, domestic or international, may be communicated to and utilized by user communities. In addition to the educational and information dissemination role, the advisory service program must aid in the identification and communication of user communities' research and educational needs.
- **Relevance.** The Sea Grant College Program under review must be relevant to local, state, regional, or National opportunities and problems in the ocean/coast/watershed/Great Lakes environment. Important factors in evaluating relevance are the need for marine resource emphasis and the extent to which capabilities have been developed to be responsive to that need.
- **Relationships.** The Sea Grant College Program under review must have close ties with Federal agencies, state agencies and administrations, local authorities, business and industry, and other educational institutions. These ties are: (i) To ensure the relevance of its programmed activities, (ii) to give assistance to the broadest possible audience, (iii) to involve a broad pool of talent in providing this assistance (including universities and other administrative entities outside the Sea Grant College), and (iv) to assist others in developing research and management competence. The extent and quality of an institution's relationships are critical factors in evaluating the institutional/college program.

Questions the SRT may consider

- Does the Program have a system by which information, techniques and research results from any reliable source, domestic or international, are communicated to, and utilized by, user communities?
- In addition to the educational and information dissemination role, does extension help in the identification and communication of user communities' research and educational needs?
- Is the Program relevant to local, State, regional, or National opportunities and problems in the ocean/coast/watershed/Great Lakes environment?
- Does the Program have close ties with Federal agencies, State agencies and administrations, local authorities, business and industry, and other educational institutions? Do these ties:
  - (i) ensure the relevance of its programmed activities,
  - (ii) give assistance to the broadest possible audience,
  - (iii) involve a broad pool of talent in providing assistance, and
  - (iv) assist others in developing research and management competence?
- Is there coordination/cooperation with other Federal, State and local agencies in the state/region/nation?
- How has the Program chosen and developed partnerships?
  - How many and what quality of partnerships exist (including those with other NOAA programs)?

    - How many, if any, new partnerships have been formed?
  - Are appropriate stakeholders informed of Program results?
  - Do stakeholders support the Program?
  - Is the Program a trusted and immediate point of contact for information on ocean/coast/watershed/Great Lakes issues?

Collaborative Network Activities

- **Collaboration.** Provide leadership in ocean/coast/watershed/Great Lakes activities including coordinated planning and cooperative work with local, state, regional, and Federal agencies, other Sea Grant Programs, and non-Sea Grant universities.

  Questions the SRT may consider
  - Does the Program contribute to the cohesiveness of the Sea Grant network?
  - Is there effective communication and collaboration between the Program and other Sea Grant Programs and with the National Sea Grant Office?
  - Does the Program participate or lead activities that support the overall network?
  - Does the Program lead or participate in regional activities? National? Does this participation make effective use of Sea Grant network capabilities?
  - Does the Program support/assist other NOAA programs? Other Federal programs?

V. Site Visit Materials

Background Materials (Provided by the NSGO)

The NSGO will provide the following background materials to the SRT at least four weeks prior to the site visit:

1. Most recent site review report
2. Sea Grant Program's response to the last site review report
3. Sea Grant Program's most recent annual report (program introduction (if available), metrics and impacts)
4. Other material deemed to be relevant by the SRT chair

Program Briefing Book Materials (Provided by the Sea Grant Program)

The Sea Grant Program will provide the SRT with a limited and focused set of briefing materials and an agenda at least four weeks prior to the site visit. The briefing materials should include the Program's four-year plan (strategic/implementation plan) and a program site visit briefing book no longer than 20 pages. The briefing book should include a description of the Program Management and Organization (including leadership, organization, programmed team approach, and support), Stakeholder Engagement (including relevance, extension/advisory services, and relationships) and a description of the Program's Collaborative Network/NOAA Activities. At a minimum, the following list of items must be included for each broad category in the briefing book:

A. Program Management and Organization

Leadership

  - Management Team composition and brief description of their responsibilities
  - Percentage time Director and staff devote to SG (FTEs)

- Advisory Boards membership and function (expertise, meeting schedule, recommendations)
- Setting of the Program within the university or consortium organization and reporting structure (organization chart)

Recruiting Talent

- Brief description of the process used to develop RFP priorities
- Brief description of the review process including composition of review panels
- Number of pre-proposals and full proposals submitted, and institutions represented / institutions available in state
- New vs. continuing projects and Principle Investigators
- Recruitment of PI's/institutions
- Success in national competitions
- Regional/Multi-program projects

Funding

- Distribution of funds (research, extension, education, communications, program development, administration)
- Leveraged funding (funding that is managed by, or within the direct influence of, the Sea Grant Program) from partners (NOAA, other Federal, State, and local)
- National Strategic Investments

Stakeholder Engagement

- Leadership by staff on boards and committees
- Partnerships
- List of important stakeholders and how the Program involves its stakeholders

B. Collaborative Network/NOAA Activities

List of activities/projects the Program is collaborating on with other Sea Grant or NOAA partners

C. Program changes resulting from previous review

Appendix B

Site review team's
Review of the
XXXXX Sea Grant College Program

Dates of Review

_____ _____

Chair, Federal Program Officer **Date**

_____ _____

Co-Chair, National Sea Grant Advisory Board Member **Date**

INTRODUCTION

The Site review team (SRT) review of the *xxxx* Sea Grant (*XSG*) Program took place from *enter SRT visit dates*.

The SRT members included:

Name (Chair, NSGO Program Officer) Affiliation City, State	Name (Co-Chair, Advisory Board Member) Affiliation City, State
Name Affiliation City, State	Name Affiliation City, State

Prior to the beginning of the SRT visit, and in conformance with National Sea Grant Office and College Program guidelines, the *xxxx* Sea Grant issued a public notice of the upcoming SRT visit by inviting interested parties to send written comments to the SRT Chair. The public notice was distributed by means of *xxxxxxxxxxxxxxxxx*. The SRT Chair received *xxx* letters in response to the public notice. (*Characterize the letters e.g., "Most of the letters were highly supportive of the xxxx Program. A few letters raised issues, which were either covered in the course of the review or were deemed to be minor in consequence*.")

The SRT review took place *(describe the SRT location venues: campuses, site visit locations, etc.)*

During the review, the SRT met with *(brief description, e.g,. identify stakeholders, university administrators, researchers, management staff, etc.).* The SRT also benefited from poster sessions *(e.g,. name specific topics, or with researchers, extension staff, and graduate students).*
The report of the SRT follows the guidelines of the Site Review Team Procedures Manual. The SRT reviewed and discussed broad issues related to the xxxx Sea Grant Program's: 1) Organization and Management of the Program; 2) Stakeholder Engagement; and 3) Collaborative Network Activities. Within each of these areas, the SRT report presents the findings and recommendations of the SRT.

I. ORGANIZING AND MANAGING THE PROGRAM

Based on the criteria descriptions and considered questions, in this section, please explain how the Program addresses each of the following:

- Leadership
- Organization
- Programmed team approach
- Support

II. STAKEHOLDER ENGAGEMENT

Based on the criteria descriptions and the considered questions, in this section, please explain how the Program addresses each of the following:

- Extension/Advisory Service
- Relevance
- Relationships

III. COLLABORATIVE NETWORK/NOAA ACTIVITIES

IV. FINDINGS, RECOMMENDATIONS and SUGGESTIONS

NOTE: The SRT may not have any recommendations or suggestions.

Findings

- o
- o
- o
- o

Recommendations (items the Program must consider)

- o
- o
- o
- o

Suggestions (ideas the Program may want to consider)

- o
- o
- o
- o

V. BEST MANAGEMENT PRACTICES

- o
- o
- o
- o

SRT AGENDA

Appendix C: Performance Review Panel Procedures Manual

I. Performance Review Panel (PRP) Composition and Role

The Performance Review Panel (PRP) plays an important role in the overall evaluation process for each Sea Grant program. Once each four years, the PRP carries out a retrospective evaluation of each program's planned outcomes and overall impact on society from both an environmental and a socioeconomic perspective. Based on this evaluation, the PRP provides an assessment of the program's success in achieving its four-year state plan and in meeting the objectives of the National Sea Grant College Program.

The PRP will be appointed by the NSGCP Director, and he/she may seek nominations for members from the Sea Grant Network. The PRP will be comprised of 16-20 individuals including members drawn from the National Sea Grant Advisory Board as experts in their field. The remainder of the panel members will be drawn from senior-level academia, government and industry. PRP Meetings may take place at NOAA headquarters in Silver Spring, MD or at appropriate locations nationwide as determined by the NSGCP Director.

II. PRP Structure

The 31 Sea Grant programs will be evaluated over a one-week period. To facilitate the review, PRP members will form five working groups according to their expertise, four with responsibility for one of the four national focus areas and the fifth with responsibility for all other program focus areas. For each of the focus areas, the PRP working groups will review each program individually, and will evaluate the program against the goals, strategies, objectives, outcomes and performance measures articulated in the state plan. The PRP will also review the program metrics and other components of the annual report as well as the program summary.

Each panel member will be expected to review the annual reports and the program summary for every program with activities within their focus area and be prepared to discuss them during the review sessions. In addition, each panelist will be assigned as the primary, secondary or tertiary reviewer for a subset of programs. The primary reviewer will be responsible for leading the discussion on each program with substantive input from secondary and tertiary panelists. NSGO Program Officers will be available to answer any questions during the discussion of their respective programs.

The PRP working groups will assign an overall rating by majority vote for each program that participates in their focus area. The rating scale is as follows:

a. *Highest Performance* – exceeds expectations by an exceptional margin in most areas/aspects (5)
b. *Exceeds Expectations* by a substantial margin in some areas/aspects (4)
c. *Successful* (3)
d. *Below Expectations* (2)
e. *Unsuccessful* (0)

After each of the four PRP working groups for the national focus areas has concluded its evaluation of program performance relative to the individual plans, they will then be asked to

make an additional assessment of the overall performance of all programs within their focus area relative to the level of Sea Grant's federal investment. The intent of this second level of review is to identify for each of the national focus areas those programs with impacts well beyond the norm for their level of federal investment and/or those programs with particularly outstanding scientific or societal contributions on a local, regional, or national level. The *few* programs that are highlighted by this assessment will be rewarded by having one point added to their rating for the respective focus area.

The focus area ratings will then be weighted based on the proportion of funding resources allocated by the program to each of the focus areas and combined to provide an overall performance rating. "Funding resources" includes all NOAA federal, matching, and leveraged funds that are managed by, or within the direct influence of, the Sea Grant Program and used to meet the goals and objectives of the four-year plan. For example, if a program allocated 10% of its resources to the Sustainable Coastal Development (SCD) focus area and was rated *Highest Performance* (5) with an additional bonus point for outstanding scientific impact, and 90% of its resources to Healthy Coastal Ecosystems (HCE) with a rating of *Exceeds Expectations* (4), it would receive an overall weighted rating of 4.2, calculated as follows:

$$\underbrace{[10\% * (5+1)]}_{\text{SCD}} + \underbrace{[90\% * 4]}_{\text{HCE}} = (0.6) + (3.6) = 4.2$$

There is no requirement that a program address all four of the national focus areas. Instead, the rating process is intended to emphasize those areas that each program considers most important based on the resources allocated by program management.

Once discussions are completed, the primary reviewer for each program will prepare a report that includes an explanation for the rating, the program's weaknesses and strengths, recommendations for improvement, and best practices employed by the program.

III. PRP Materials

The PRP evaluation will be based on the program annual reports derived from the National Information Management System (NIMS) and each program will have the option of supplementing that information with a brief summary of the major accomplishments and impacts (which could include outstanding research results) that resulted from their four-year award. The annual reports will include program impacts, accomplishments and success stories related to achieving their planned goals, strategies, objectives, outcomes and performance measures, as well as annual program metrics.

As stated above, the emphasis for this review will be placed on the achievement of planned outcomes. However within the confines of the annual report format, programs will be able to describe how they have responded to state, regional and national priorities as well as emerging opportunities and unanticipated needs.

IV. After the PRP

Upon the completion of the review process, all scores will be provided to the NSGCP Director who will collate them and generate a final rating for each program. The summary rating and

written PRP Summary will be conveyed to each program director. The program director will have an opportunity to submit a memorandum to the NSGO responding to the findings in the PRP report. This information will be used as part of the NSGO annual review.

Appendix D: The National Sea Grant College Program Planning, Implementation and Evaluation System

(November 2008)

[Note: This document has been revised to be consistent with the 2008 Sea Grant Reauthorization as follows: 1) The National Sea Grant Review Panel is now the National Sea Grant Advisory Board; and 2) The National "State of Sea Grant Program" Review will now occur every two years starting in 2010 rather than every four years starting in 2012. In addition, the timeline at the end of the document has been adjusted to reflect the changes that have occurred during the planning phase.]

About Sea Grant

A partnership between universities and the federal government's National Oceanic and Atmospheric Administration (NOAA), the National Sea Grant College Program directs federal resources to pressing problems in local communities. For more than 40 years, the National Sea Grant College program has worked to create and maintain a healthy coastal environment and economy. The Sea Grant network includes more than 30 programs based at top universities in every coastal and Great Lakes state, Puerto Rico, and Guam. The programs of the Sea Grant network work together to help citizens understand, conserve, and better utilize America's coastal, ocean, and Great Lakes resources. By drawing on the experience of more than 3,000 scientists, engineers, public outreach experts, educators, and students from more than 300 institutions, Sea Grant is able to make an impact at local and state levels, and serve as a powerful national force for change.

Sea Grant invests in high-priority research, addressing issues such as population growth and development in coastal communities; preparation and response to hurricanes, coastal storms, and tsunamis; understanding our interactions with the marine environment; fish and shellfish farming; seafood safety; and, fisheries management. The results of this research are shared with the public through Sea Grant's integrated outreach program, which brings together the collective expertise of on-the-ground extension agents, educators, and communications specialists. The goal is to ensure that vital research results are shared with those who need it most and in ways that are timely, relevant, and meaningful.

The National Sea Grant College Program has developed a new five-year strategic plan, which is attached, in conjunction with an enhanced Planning, Implementation, and Evaluation system, which is described below, by which the Sea Grant programs will be evaluated. Both the plan and the new evaluation model respond to recommendations made by the National Research Council (NRC). Background on the NRC report is detailed below.

Background

In 1994, the NRC reviewed the NOAA National Sea Grant College Program (NSGCP). In its *Review of the NOAA National Sea Grant College Program* report, the NRC recommended several actions, including systematic, periodic reviews of each Sea Grant program. In response to the NRC, NSGCP developed the

program review and evaluation process used to review the Sea Grant programs by an external Program Assessment Team every four years since 1998.

The National Sea Grant College Program Act Amendments of 2002 (P.L. 107–299) directed NOAA to contract with the NRC a second time to review the evaluation process and make recommendations to improve its effectiveness.

The resulting NRC report, *Evaluation of the Sea Grant Review Process* (2006), included a total of 24 recommendations in the following categories: strategic planning; evaluation; periodic assessment and performance criteria; program assessment teams and site visits; and, improving program cohesion, coordination, and oversight.

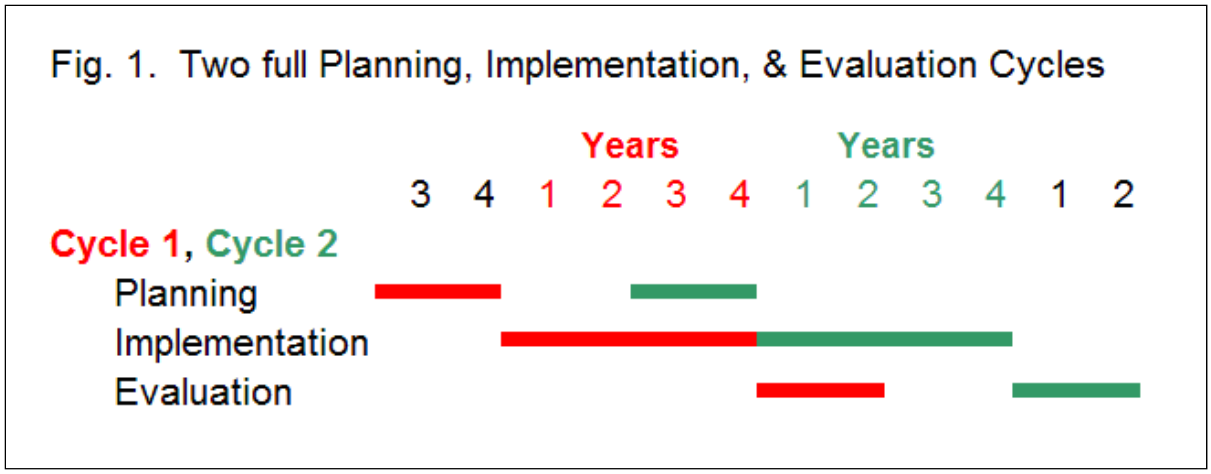
In order to address the NRC recommendations, the Director of the NSGCP sought advice from two sources: a Response Integration Team (RIT) and the National Sea Grant Review Panel (Review Panel). The RIT was comprised of representatives from the state Sea Grant programs and the National Sea Grant Office (NSGO), and was formed specifically to address the NRC recommendations and to provide guidance to the Director. The Review Panel [now the National Sea Grant Advisory Board] is a Federal Advisory Committee comprised of 15 individuals who advise the NSGCP Director on scientific and administrative policy. Following careful deliberation, each group produced a report; the RIT report was entitled, *An Enhanced and Integrated Strategic Planning and Program Assessment Strategy for the National Sea Grant College Program* and the Review Panels' report was entitled, *A Comprehensive Program Evaluation (COPE) Model for the National Sea Grant College Program*.

Here, we present a new, integrated model for strategic planning, implementation and evaluation that was developed based on the recommendations of the NRC along with those outlined in the RIT and Panel reports. The integrated planning and evaluation system outlined here is consistent with needs articulated by Congress, the Office of Management and Budget (OMB), and NOAA. It extends NOAA's Planning, Programming, Budgeting, and Execution System to the program level and ensures that Sea Grant's activities will support NOAA's mission as well as meeting local, state, and regional needs. As the implementation process begins, there will be a transition period which is discussed in the appendix of this document.

An Integrated Planning, Implementation, and Evaluation (PIE) System

The NSGCP places a premium on careful planning and rigorous evaluation at both the state program level and the national level to ensure that the program has both localized and broader impacts. Better integration of planning, implementation, and evaluation activities will maximize Sea Grant's efficiency and effectiveness at both levels and make the best use of limited resources.

The PIE system begins with rigorous strategic planning at both the national and state levels that lasts two years. The plans are then implemented with coordinated and collaborative research, outreach and education activities at the state level for four years. Once the activities are completed, there is an evaluation of the success of those efforts in meeting the objectives set forth in the strategic/implementation plans. The complete cycle, including planning, implementation, and evaluation will take eight years to complete (Fig. 1).



Sections I, II, and III, below, describe each component of the integrated PIE system—Planning, Implementation and Evaluation.

I. Planning

National Strategic/Implementation Plans (every four years): Every four years, the NSGCP will develop a new national strategic plan (the 2009-2013 national plan accompanies this document). Sea Grant's national plan will be done in concert with the development of strategic plans for the state programs in order to ensure that the state strategic plans reflect national priorities. Likewise, stakeholder input collected for state Sea Grant planning efforts will be included with other relevant local and regional plans to inform the national planning process. NOAA's strategic plan and NOAA's 5-year Research Plan will provide the national framework for Sea Grant's planning effort together with the Ocean Research Priorities Plan (and its successors) Sea Grant's national plan will identify a limited set of priorities that will help NOAA to achieve its strategic outcomes and will serve as the foci for Sea Grant's next four-year implementation cycle. Once the national strategic plan is completed, an implementation plan will be developed to provide more detail for each of the national priority areas and show how Sea Grant will work with other NOAA programs and local, regional, and national partners to achieve its mission.

Individual Sea Grant Program Strategic/Implementation Plans (every four years): The national strategic and implementation plans will serve as the basis for the states to complete the development of their four-year strategic plans. The state plans will include metrics and performance measures that align with and support national measures and metrics for the national priority areas. Since each state has its own unique set of local and regional stakeholders, partners and priorities, the individual program plans will not necessarily address all of the national priority areas; and, the plans may include additional emphases as appropriate. State plans will be developed with the federal program officer and reviewed and approved by the NSGO, in consultation with the National Sea Grant Advisory Board (Advisory Board). Sea Grant programs will use their plans to guide and inform requests for proposals. In addition, these plans will be used as the basis for subsequent program evaluation. With the understanding that these plans are living documents, programs may make changes to their plans, subject to approval by the federal program officer, so the changes are documented for eventual evaluation purposes.

II. Implementation

Sea Grant programs will consider the local, regional, and national priorities identified during the planning process as they implement their research, outreach and education activities. Each program will retain the authority to implement its program as it sees fit in order to achieve optimal results.

The PIE system and subsequent changes to program implementation will make it easier for programs to plan and act on a regional and national scale. For instance, project competitions, omnibus grant applications and awards will be synchronized to facilitate collaborative efforts among programs. There will be a common format for annual reports so that accomplishments of individual projects and state programs can more easily be synthesized into national impacts.

III. Evaluation

Goal: Sea Grant's program evaluation process will show how its research, outreach and education capabilities have local, regional and national impacts. Program evaluation also provides the opportunity to discover means by which the state programs, and in turn the National Program, can improve. The performance of state programs will be evaluated according to the priorities set forth in the national plan and the individual state plans, and programs will be held accountable for meeting the metrics and performance measures established in those plans. Evaluation will be a continual process, both internal and external, and will involve all facets of the Sea Grant network. Programs will be evaluated in three general areas: 1) on their approach to management; 2) on the scope and success of their engagement with stakeholders; and, 3) on the impact their program has on society from both an environmental and a socioeconomic perspective. Evaluation is based on the metrics and performance measures established in the national plan and reflected in their state plans, but the process is also intended to recognize that unplanned or rapid-response activities may also have significant impact.

The Office of Management and Budget, the Advisory Board and other entities have recommended that the Sea Grant programs be recertified on a reasonable and regular schedule. The PIE system will serve as the recertification process for the programs.

Annual Reports/Self-Evaluation: Annual reports will be used by programs to evaluate progress against their strategic plans, national performance measures, and metrics over a one-year period. These reports will be used by the NSGO and programs to track and report progress. The individual programs' progress in meeting goals set forth in their plans and in producing accomplishments relative to those goals contributes to the Sea Grant network's progress toward meeting national goals set forth in the national strategic and implementation plan.

Site Visits (every four years, beginning in FY2010): Once every four years, a review team will visit each Sea Grant program. The review teams will be chaired by the NSGO program officer and co-chaired by a member of the National Sea Grant Advisory Board (Advisory Board) with a Sea Grant Director as a review team member. Additional members of the teams may be drawn from the Advisory Board and/or outside experts as needed. The review team will meet with the program management team, advisory

committees, and university administration to review and discuss broad issues related to two of the three evaluation components: 1) program management and organization; and, 2) stakeholder engagement. The team will be provided with a limited and focused set of briefing materials. The team will prepare a site visit report with findings and recommendations to improve the Sea Grant program's performance but will not be responsible for rating the program.

Performance Review Panel (every four years, beginning in FY2011): Every four years, following the completion of all Sea Grant program site visits, a Performance Review Panel (PRP) will conduct a retrospective evaluation of the impact of the programs relative to their four-year strategic plans. The PRP will evaluate the programs' overall impact on society from both an environmental and a socioeconomic perspective. Annual reports, combined with a brief four-year summary document prepared by the programs, will provide the basis for the review. The PRP will be composed of 15 members with approximately half of the members drawn from the Advisory Board and the remainder drawn from senior-level academia, government, and industry.

State Program Response Memorandum (once every four years): State programs will have the opportunity to submit a memorandum to the NSGO responding to findings in both the site visit and PRP reports. This information will be used as part of the NSGO fall review.

Annual NSGO Fall Review (beginning in FY 2009): The NSGO will meet in the fall of each year to discuss the progress of each state program relative to its plan, and to identify potential areas for improvement.

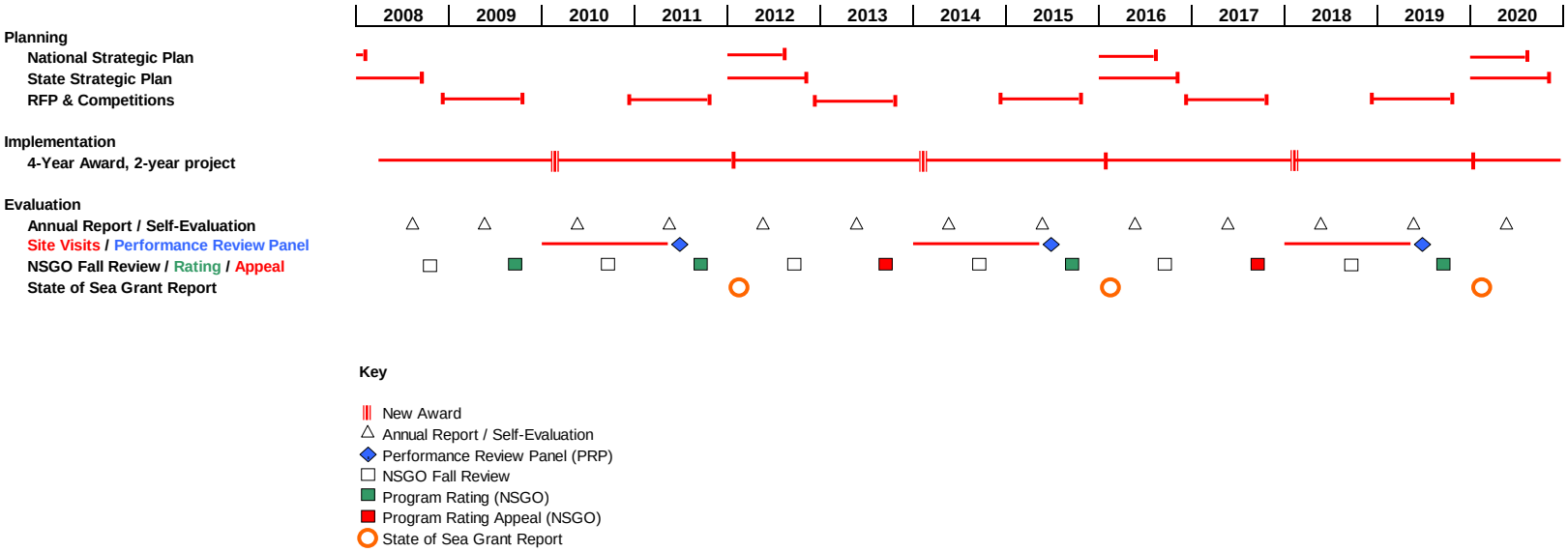
Once every four years, starting in 2011, the fall review will be expanded to include a performance evaluation and rating of all programs based upon the PRP Reports, the site visit reports, and the state programs' response memoranda. Programs will have the opportunity to appeal their rating two years later during the NSGO fall review by submitting a report to the NSGO of actions taken to improve the program since the previous four-year review.

Topical Assistance Team (TAT) Reviews (optional): At any time, programs and the NSGO may agree to conduct a TAT, which is an ad hoc program review of limited scope. The purpose of TAT reviews is for program improvement, either to address issues identified by previous reviews or to help the program identify and respond to new opportunities.

Recertification: The four-year reviews will constitute a recertification process. A successful review will result in recertification of a state program. If a program receives an unsuccessful rating, the program will be placed on a probationary period for at least two years. During the fall review of the second probationary year, the NSGO will assess the program's progress in addressing the issues that led to the unsuccessful rating based on the appeal issued by the state Sea Grant program in question. If the program has made satisfactory progress, the program will be allowed to continue on probation for the remaining two years. If the program then receives a successful rating during the next four-year review, the program will be recertified. However, if progress is deemed to be unsatisfactory after two years, or if a program receives a second consecutive unsuccessful rating during the four-year review, the program will be referred to the Advisory Board for consideration of a recommendation for decertification.

National "State of Sea Grant Program" Review (once every two years, beginning in 2010): Once every two years, the Advisory Board will provide a review of the "State of the Sea Grant Program." This review will assess the progress of the Sea Grant College Program in addressing the priority areas highlighted in the national plan, analogous to the manner in which state programs will be evaluated in addressing their respective plans. This review will rely extensively on information collected from state program reports and reviews, and will give an analysis that will help inform the subsequent national strategic planning process. This national program review is central to the PIE system and will provide an assessment of the overall performance of the entire Sea Grant College Program, including the National Sea Grant Office, in achieving its local, regional, and national objectives while supporting NOAA's mission.

Fig. 2 Transition and first full Planning, Implementation, & Evaluation Cycle



New Orleans 2010

SEA GRANT WEEK

Sea Grant Week 2010 – Agenda At a Glance

Thursday, October 14	**Focus Team Meetings**			
8am – 2pm	Registration for Focus Team, Toulouse Foyer			
ROOM	Toulouse A & B			
9am – Noon	Focus Area Plenary Session			
ROOM	Toulouse B	Toulouse A	Bourbon Room	Burgundy Room
1:30 – 5pm	Safe and Sustainable Seafood Focus Team	Sustainable Coastal Development Focus Team	Healthy Coastal Ecosystems Focus Team	Hazard Resilience Focus Team
5:30 – 7pm	Focus Team Reception at Tujague's Restaurant			

Friday, October 15	**Focus Team Meetings**			
ROOM	St. Louis Room	St. Ann Room	Bourbon Room	Burgundy Room
8:30am – 3:30pm	Safe and Sustainable Seafood Focus Team	Sustainable Coastal Development Focus Team	Healthy Coastal Ecosystems Focus Team	Hazard Resilience Focus Team
ROOM	Toulouse A&B			
4 – 5:30pm	Plenary Session – Report Out and Brain Storming			

Friday, October 15	**Sea Grant Week**
3 – 5pm	Registration, Lobby

Saturday, October 16				
8am – 4pm	Registration, Grand Foyer			
8:30am – 5pm	National Sea Grant Advisory Board, Astor Ballroom II			
ROOM	Astor Ballroom I	Grand Ballroom B	Astor Ballroom III	Grand Ballroom A
9am – Noon	Fiscal Officers	Legal Programs	Communicators	Educators
	Sea Grant National Office Workshops			
ROOM	Astor Ballroom III			
1:30 – 3:15pm	Sea Grant 101			
3:30 – 5pm	Annual Reporting Workshop			
	Topical Workshops			
1:30 – 3pm	Coastal Renewable Energy, Grand Ballroom D			
ROOM	Grand Ballroom C		Iberville Room	
1:30 – 5pm	Sustainable Coastal Tourism – Developing a Sea Grant Network		Management Systems for Reporting Sea Grant Research and Extension Activities and Accomplishments Workshop	
ROOM	Grand Ballroom D		Bienville Room	
3:30 – 5pm	Marine Spatial Planning		Aquaculture Research & Extension NSI	
4 – 5pm	Oil Spill Debriefing from the Gulf States, Astor Ballroom I			
	Committee Meetings			
ROOM	Grand Ballroom A		Grand Ballroom B	
1:30 – 2:30pm	Program Mission Committee (PMC)		External Relations Committee (ERC)	
ROOM	Grand Ballroom A			
2:30 – 3:30pm	Network Advisory Committee (NAC)			
4 – 5pm	PMC and ERC joint meeting			

Sunday, October 17	
8am – 5pm	Communicator Service Project
8am – 5pm	Legal Program Field Trip
8am – 5pm	Educator Field Trip
8am – 4pm	Registration, Grand Foyer
8 – 9:30am	SGA Board Meeting, Royal Board Room
8:30am – 5pm	National Sea Grant Advisory Board, Astor Ballroom II
9am – Noon	Fiscal Officers, Grand Ballroom D
9am – 5pm	Extension Assembly, Astor Ballroom I
9am – 4:30pm	Research Coordinators, Grand Ballroom C

9:30am – 4:30pm	SGA Delegates Meeting, Grand Ballroom A&B
1 – 4:30pm	Sea Grant International Symposium, Grand Ballroom D
2 – 5pm	NOAA / Sea Grant Regional Coordinators, Burgundy Room

Monday, October 18	
8am – 4pm	Registration, Grand Foyer
ROOM	Grand Ballroom C&D
7:30 – 8:15am	Informal Discussion: Social Science and Sea Grant
8:30 – 9am	Welcome
9 – 11:20am	**Plenary Session:** Rethinking the Sea Grant Model – Margaret Davidson, Paul Sandifer, and Craig McLean
11:20am – Noon	National Advisory Board Report
Noon – 1:00pm	Lunch, Abby Sallenger, Astor Ballroom I, II, III
ROOM	Grand Ballroom C&D
1 – 2pm	**Plenary Session:** Shifting Sands of Sea Grant in a Changing World
2 – 3pm	Break Out Session
3:30 – 5pm	Panel Discussion – The Sea Grant Model Today and 20 Years Into the Future, Grand Ballroom C&D
ROOM	St. Charles A & B
5:30 – 7:30pm	"Pralines, Promenade, and Posters" with cash bar

Tuesday, October 19			
8:00am – 4:30pm	International "Taste of Louisiana" field trip		
ROOM	Grand Ballroom C&D		
8:30am – Noon	**Plenary Session:** Moving Forward with and Adjusting the Focus Areas		
Noon – 1:30pm	Lunch, Don Davis, Astor Ballroom I, II, III		
	Focus Areas/Emerging Issues		
ROOM	Iberville Room	Bienville Room	Bourbon Room
1:30 – 5pm	Sustainable Coastal Development (Coastal Tourism/ Working Water Fronts)	Energy	Healthy Coastal Ecosystems
ROOM	Grand Ballroom A&B	Grand Ballroom C	Grand Ballroom D
1:30 – 5:00pm	Climate Change	Hazard Resilience (Sustainable Development Impacted Communities)	Safe Sustainable Seafood Supply (Sustainable Seafood and Changing Markets)
6:30 – 9pm	Awards Banquet, Astor Ballroom I, II, and III		

Wednesday, October 20	
ROOM	Grand Ballroom C&D
9 – 10:00am	Welcome, Larry Robinson
10 – Noon	**Plenary Session:** Wrap-up
Noon	Adjourn, Gordon Grau

SEA GRANT WEEK 2010
PLANNING COMMITTEE AND STAFF

Paul Anderson, Maine Sea Grant
Robert Bacon, South Carolina Sea Grant
Nikola Garber, National Sea Grant Office
Gordon Grau, Hawaii Sea Grant
Karl Havens, Florida Sea Grant
Teri Hock, Louisiana Sea Grant
James Hurley, Wisconsin Sea Grant
Katie Lea, Louisiana Sea Grant
Darren Lerner, Hawaii Sea Grant
David Nieland, Louisiana Sea Grant
Diana Payne, Connecticut Sea Grant
Jonathan Pennock, New Hampshire Sea Grant
Jessica Schexnayder, Louisiana Sea Grant
Stephen Sempier, Mississippi-Alabama Sea Grant Consortium
LaDon Swann, Mississippi-Alabama Sea Grant Consortium
Dick West, National Sea Grant Advisory Board
Chuck Wilson, Louisiana Sea Grant

Thank You

The Sea Grant network would like to extend its appreciation to the many speakers from around the country who came to share their talents and perspectives. Numerous other individuals also have given their time and efforts toward making Sea Grant Week 2010 successful. Though we cannot name them all here, we thank each one for their work.

Sea Grant

FOCUS TEAM WORKSHOPS
SEA GRANT WEEK 2010

WEDNESDAY, OCTOBER 13

4:00 – 5:00pm	Registration for Focus Team Members	Lobby

THURSDAY, OCTOBER 14

8:00 – 9:00am	Continental Breakfast	Toulouse Foyer
8:00am – 2:00pm	Registration for Focus Team Members	Toulouse Foyer
9:00am – Noon	Focus Area Plenary Session	Toulouse A&B
10:40 – 11:00am	AM Break	Toulouse Foyer
12:15 – 1:30pm	Lunch	St. Charles A
1:30 – 5:00pm	*Concurrent Sessions for Focus Area Teams*	
	Sustainable Coastal Development	Toulouse A
	Safe and Sustainable Seafood	Toulouse B
	Healthy Coastal Ecosystems	Bourbon Room
	Hazard Resilience	Burgundy Room
3:00 – 3:30pm	PM break	Toulouse Foyer
5:30 – 7:00pm	Focus Team Reception at Tujagues	Tujague's Restaurant

FRIDAY, OCTOBER 15

7:30 – 8:30am	Continental Breakfast	Toulouse Foyer
8:30am – Noon	*Concurrent Sessions for Focus Area Teams*	
	Sustainable Coastal Development	St. Ann Room
	Safe and Sustainable Seafood	St. Louis Room
	Healthy Coastal Ecosystems	Bourbon Room
	Hazard Resilience	Burgundy Room
10:00 – 10:15am	AM Break	Toulouse Foyer
Noon – 1:30pm	Lunch	St. Charles A
1:30 – 3:30pm	*Concurrent Sessions for Focus Area Teams*	
	Sustainable Coastal Development	St. Ann Room
	Safe and Sustainable Seafood	St. Louis Room
	Healthy Coastal Ecosystems	Bourbon Room
	Hazard Resilience	Burgundy Room
3:30 – 4:00pm	PM Break	Toulouse Foyer
4:00 – 5:30pm	**Plenary Session**: Report Out/Brain Storming	Toulouse A&B
	Dinner (on your own)	

SEA GRANT WEEK 2010 AGENDA

Astor Crowne Plaza, New Orleans, Louisiana

FRIDAY, OCTOBER 15

3:00 – 5:00pm	Registration	Lobby

SATURDAY, OCTOBER 16

8:00 – 9:00am	Continental Breakfast	Grand Ballroom Gallery
8:00am – 4:00pm	Registration	Grand Foyer
8:30am – 5:00pm	National Sea Grant Advisory Board	Astor Ballroom II
9:00am – Noon	*Network Group Meetings*	
	Fiscal Officers	Astor Ballroom I
	Educators	Grand Ballroom A
	Communicators	Astor Ballroom III
	Legal Program	Grand Ballroom B
10:30 – 10:45am	AM Break	Grand Ballroom Gallery
Noon – 1:30pm	Lunch (on your own)	
1:30 – 5:00pm	Workshops/Meetings (see below)	
	National Sea Grant Office Workshops	
1:30 – 3:15pm	Sea Grant 101	Astor Ballroom III
3:30 – 5:00pm	Annual Reporting	Astor Ballroom III
	Topical Workshops	
1:30 – 5:00pm	Management Systems for Reporting Sea Grant Research and Extension Activities and Accomplishments Workshop. (Mississippi-Alabama Sea Grant and Florida Sea Grant)	Iberville Room
1:30 – 5:00pm	Sustainable Coastal Tourism – Developing a Sea Grant Network (Hawaii Sea Grant and Delaware Sea Grant)	Grand Ballroom C
1:30 – 3:00pm	Coastal Renewable Energy (Oregon Sea Grant)	Grand Ballroom D
3:30 – 5:00pm	Marine Spatial Planning: Sea Grant's Role in this Train Charging Down the Track (Oregon Sea Grant and Rhode Island Sea Grant)	Grand Ballroom D
3:30 – 5:00pm	Aquaculture Research and Extension NSI Discussion	Bienville Room
4:00 – 5:00pm	Oil Spill Panel Discussion by Gulf States Directors and NOAA	Astor Ballroom I

	Committee Meetings	
1:30 – 2:30pm	Program Mission Committee (PMC)	Grand Ballroom A
	External Relations Committee (ERC)	Grand Ballroom B
2:30 – 3:30pm	Network Advisory Committee (NAC)	Grand Ballroom A
4:00 – 5:00pm	PMC and ERC Joint Meeting	Grand Ballroom A
3:00 – 3:30pm	PM Break	Grand Ballroom Gallery
6:30 – 9:00pm	Welcome Reception (Must provide ticket upon entering the Aquarium)	Aquarium of the Americas

SUNDAY, OCTOBER 17

Communicators – Full-Day Service Project
Legal Program – Full-Day Field Trip
Educators – Full-Day Field Trip

8:00 – 9:00am	Continental Breakfast	Grand Ballroom Gallery
8:00am – 4:00pm	Registration	Grand Foyer
8:00 – 9:30am	SGA Board Meeting	Royal Board Room
8:30am – 5:00pm	National Sea Grant Advisory Board Meeting	Astor Ballroom II
9:00am – Noon	Fiscal Officers Meeting	Grand Ballroom D
9:00am – 5:00pm	Extension Assembly Meeting	Astor Ballroom I
9:00am – 4:30pm	Research Coordinators Meeting	Grand Ballroom C
9:30am – 6:00pm	SGA Delegates Meeting	Grand Ballroom A&B
10:00 – 10:15am	AM Break	Grand Ballroom Gallery
11:30am – 1:00pm	Lunch (on your own)	
1:00 – 4:30pm	Sea Grant International Symposium	Grand Ballroom D
2:00 – 5:00pm	NOAA /Sea Grant Regional Coordinators Meet	Burgundy Room
3:00 – 3:30pm	PM Break	Grand Ballroom Gallery
	Dinner (on your own)	

MONDAY, OCTOBER 18

7:30 – 8:30am	Continental Breakfast	Grand Ballroom Gallery
7:30 – 8:15am	Discussion: Social Science & Sea Grant	Grand Ballroom C&D
8:00am – 4:00pm	Registration	Grand Foyer

8:30 – 9:00am	Welcome: – Chuck Wilson, Director, Louisiana Sea Grant – LaDon Swann, Director, Mississippi-Alabama Sea Grant – Gordon Grau, President, Sea Grant Association and Director, Hawaii Sea Grant – Nancy Rabalais, National Sea Grant Advisory Board and Executive Director, LUMCON	Grand Ballroom C&D
Plenary Session:	**Rethinking the Sea Grant Model**	Grand Ballroom C&D
9:00 – 10:00am	"**Shaking the Sea Grant Tree**" Margaret Davidson, Director, NOAA Coastal Services Center "**Science, the Next NOAA and Sea Grant**" Paul Sandifer, Senior Scientist, NOAA National Centers for Coastal Ocean Science	
10:00 –10:20am	AM Break	Grand Ballroom Gallery
10:20 – 10:50am	"**OAR Next and Sea Grant**" Craig McLean, Acting Assistant Administrator, NOAA Office of Oceanic and Atmospheric Research (OAR)	Grand Ballroom C&D
10:50 – 11:20am	Question and Answer for Morning Plenary	
11:20am – Noon	National Sea Grant Advisory Board Report: – A Brief on Biennial Report to Congress, John Byrne, National Sea Grant Advisory Board – Allocation Committee Update, Ross Heath, National Sea Grant Advisory Board	
Noon – 1:00pm	Lunch: Abby Sallenger, author of *Island in a Storm*	Astor Ballroom I, II, III
Plenary Session:	**Shifting Sands of Sea Grant in a Changing World**	Grand Ballroom C&D
1:00 –1:30pm	**"The Evolution of Sea Grant as a 'National' Program**" Leon Cammen, Director, National Sea Grant College Program	
1:30 – 2:00pm	**"Crisis du Jour, or Where is Sea Grant Going over the Next 20 Years"** Gordon Grau, President, Sea Grant Association and Director, Hawaii Sea Grant	
2:00 – 3:00pm	Break Out Sessions	

The Sea Grant sands are shifting under our feet but not many know what the future holds or how it is now being shaped. We begin by breaking up into smaller groups to develop questions for the Panel Discussion.

Breakout Session Objectives:

- Hear and discuss perspectives from the speakers and other attendees about Sea Grant's role and future within the broader context of NOAA.
- Think strategically about the desired future of Sea Grant, informed by speakers' perspectives and breakout group discussions on successes, unique capabilities, and collaboration opportunities.

3:00 – 3:30pm	PM Break	Grand Ballroom Gallery
3:30 - 5:00pm	Panel Discussion – The Sea Grant "Model" Today and 20 Years into the Future: Paul Anderson, Leon Cammen, Margaret Davidson, Gordon Grau, Craig McLean, Jon Pennock, Paul Sandifer, and John Woeste	Grand Ballroom C&D
5:30 – 7:30pm	"Pralines, Promenade and Posters" (cash bar) Dinner (on your own)	St. Charles A&B

TUESDAY, OCTOBER 19

7:30 – 8:30am	Continental Breakfast	Grand Ballroom Gallery
8am – 4:30pm	"Taste of Louisiana" Field Trip for International Visitors	
Plenary Session:	**Moving Forward with and Adjusting the Focus Areas**	Grand Ballroom C&D
8:30 – 9:15am	Focus Area Reports: – Sustainable Coastal Development – Safe and Sustainable Seafood – Healthy Coastal Ecosystems – Hazard Resilience	
9:15 – 10:15am	**Focus Areas: Moving Forward** – **Hazard Resilience** – Susanne Moser, Director and Principal Researcher, Susanne Moser Research and Consulting – **Safe and Sustainable Seafood** – Robin Alden, Executive Director, Penobscot East Resource Center	Grand Ballroom C&D
10:15 – 10:30am	AM Break	Grand Ballroom Gallery
10:30am – Noon	– **Sustainable Coastal Development** – Mayor Tom Murphy, Senior Resident Fellow, Urban Land Institute – **Healthy Coastal Ecosystems** – Robert Twilley, Vice Chancellor of Research	Grand Ballroom C&D

	University of Louisiana at Lafayette – **Climate Change** – Jeremy Harris, Former Mayor, Honolulu, Hawaii, National Sea Grant Advisory Board	
Noon – 1:30pm	Lunch: Don Davis, Director Emeritus of Oral Histories, Louisiana Sea Grant	Astor Ballroom I, II, III
1:30 – 5:00pm	*Focus Area/Emerging Issues*	
	– Sustainable Coastal Development (Coastal Tourism/Working Water Fronts)	Iberville Room
	– Energy	Bienville Room
	– Climate Change	Grand Ballroom A&B
	– Hazard Resilience (Sustainable Development/Impacted Communities)	Grand Ballroom C
	– Safe Sustainable Seafood Supply (Sustainable Seafood and Changing Markets)	Grand Ballroom D
	– Healthy Coastal Ecosystems	Bourbon Room

The Focus Area model has been in place for a year and is still evolving. Participants are asked to provide input into the Focus Area model and strategies that Sea Grant will use to address emerging issues.

Breakout Session Objectives:

- Hear and comment on the Focus Area model.
- Discuss and develop strategies on how the Sea Grant network can help to address emerging issues.

2:30 – 3:30pm	PM Break	Grand Ballroom Gallery
6:30 – 9:00pm	Banquet and Award Presentations	Astor Ballroom I, II, III

WEDNESDAY, OCTOBER 20

8:00 – 9:00am	Continental Breakfast	Grand Ballroom Gallery
Plenary Session:	**Wrap-Up**	
9:00 – 10:00am	Welcome: – Larry Robinson, Assistant Secretary of Commerce for Oceans and Atmosphere, NOAA	Grand Ballroom C&D
10:00 – 10:15am	AM Break	Grand Ballroom Gallery
10:00am – Noon	General Session Wrap-Up	Grand Ballroom C&D
	Focus Area Breakout Summary and Discussion	
	Group Reports	
Noon	Adjourn, Gordon Grau	

SEA GRANT WEEK 2010
ABSTRACTS FOR TOPICAL WORKSHOPS

SATURDAY, OCT. 16

Management Systems for Reporting Sea Grant Research and Extension Activities and Accomplishments Workshop

This session will present, through case studies and dialog, a variety of web-based information management systems that are being implemented by Sea Grant programs to streamline data collection, storage, and reporting.

Sustainable Coastal Tourism Workshop

Sustaining the natural, cultural, and social environment of coastal communities, while at the same time supporting a vibrant, healthy coastal tourism economy, represents a significant challenge. The goal of this workshop is to share Sea Grant's current efforts in addressing tourism-related issues and to plan for a 2011 National Sea Grant Coastal Marine Tourism Roundtable.

Marine Renewable Energy Workshop

Sea Grant programs engaged in offshore wind, wave, tidal, and current energy projects will share their past and ongoing involvement in these uses. Various types of Sea Grant roles will be identified and discussed. Goals and roles for the future will be shared and discussed.

Marine Spatial Planning: Sea Grant's Role in the Train Charging Down the Track Workshop

Demands on coastal/ocean resources are growing. Decision makers need tools/information to account for cumulative effects and the ecological/social/economic tradeoffs associated with alternative uses. Marine Spatial Planning (an adaptive, science-based approach) addresses this challenge by analyzing current and future uses, assessing tradeoffs between uses, and allocating space in a way that maximizes ecological and societal benefits.

Aquaculture Research and Extension NSI Discussion

This is a mutual discussion about the recent 2010 Sea Grant Aquaculture Research and Extension NSI. This includes: competition results, managing and reporting impacts, 2011 National Aquaculture Extension Conference, supporting the Sea Grant Strategic Plan and NOAA Aquaculture Policy, and data gaps and future research and extension needs.

SPEAKER BIOGRAPHIES

Robin Alden, Executive Director, Penobscot East Resource Center

Alden is Executive Director, Penobscot East Resource Center. She was Maine Commissioner of Marine Resources from 1995-1997, responsible for Maine‘s marine and anadromous fishery management and enforcement and for aquaculture in the state. For 20 years she was Publisher and Editor of *Commercial Fisheries News*, a regional fishing trade newspaper that she founded in 1973, and later became Publisher and Editor of *Fish Farming News*. She was instrumental in starting the annual Maine Fishermen's Forum in the mid-1970s and received the Gulf of Maine Council on the Marine Environment Visionary Award in 1997 and the Maine Initiatives Social Landscape Artist Award with her husband, Ted Ames, in 2007. She was a public member of the New England Fishery Management Council from 1979-1982 and a member again during her tenure as Commissioner. Alden was a member of the National Sea Grant Review Panel from 2000-2009. She earned a B.A. in economics from the University of Maine, and lives in Stonington with her husband and daughter.

Margaret Davidson, Director, NOAA Coastal Services Center

The Director of the NOAA Coastal Services Center is no stranger to the coast or its many challenges. Before joining NOAA, Davidson was Executive Director of the South Carolina Sea Grant Consortium from 1983-1995. She also served as Special Counsel and Assistant Attorney General for the Louisiana Department of Justice. An active participant in coastal resource management issues since 1978, Davidson earned her juris doctorate in natural resources law from Louisiana State University. She later earned a master's degree in marine policy and resource economics from the University of Rhode Island. Davidson holds a faculty appointment at the University of Charleston and serves on the adjunct faculties of Clemson University and the University of South Carolina. She has served on numerous local, state, and federal committees and has provided leadership for national professional societies. She has focused her professional work on environmentally sustainable aquaculture, mitigation of coastal hazards, and impacts of climate variability on coastal resources. Davidson served as the Acting Assistant Administrator for NOAA's National Ocean Service from 2000-2002.

Don Davis, Director Emeritus of Oral History, Louisiana Sea Grant

Davis, a geographer, completed his undergraduate degree at California University, Hayward. His Ph.D. in geography with a minor in marine science is from Louisiana State University. For 17 years, Davis was on the faculty at Nicholls State University in Thibodaux, La. In 1990, he joined LSU’s research faculty and remained there until his retirement in 2009. While at LSU he worked in the Center for Coastal, Energy, and Environment Resources for three years. In 1993 he became the Administrator for the Louisiana Oil Spill Research and Development Program. Davis’ professional career has focused on investigating various human/land issues in Louisiana's wetlands. He has written or co-authored numerous papers on these topics. Currently, he is involved in projects related to restoring Louisiana’s wetlands and understanding the wide array of human impacts on this environment. In addressing this challenge, he has just published *Washed Away: The Invisible People of Louisiana’s Wetlands*.

Jeremy Harris, National Sea Grant Advisory Board, Former Mayor, Honolulu, Hawaii

Harris began his career as a marine biologist serving as a Sea Grant Extension Agent at the University of Hawaii. His graduate training is as an environmental scientist specializing in urban ecosystems. Harris served as Managing Director of the City of Honolulu for nine years before

being elected Mayor for three terms from 1994-2005. During this time, he worked to develop Honolulu, the 12th largest city in the country, into a model of sustainability. While he was Chief Executive, the city and county of Honolulu received the Gold Award as the most livable large city in the world and was recognized as one of the best managed cities in the United States. Harris has received numerous awards, including the Outstanding Achievement Award for Sustainability from the U. S. Conference of Mayors and the Keystone Award from the American Architectural Foundation. Harris has served as visiting senior faculty at the Royal Institute of Technology in Stockholm, as a member of the Sustainability Roundtable for the National Academy of Sciences, and as Distinguished Irving Professor in the School of Architecture and Planning at Ball State University. He consults for governments and NGOs around the world on issues related to sustainable urban development, and he is currently on the Adaptation to Climate Change Panel of the National Academy of Science. Harris is a former member of the National Board of the AIA, and he is recognized as one of the leading urban strategists and foremost authorities on sustainable planning and growth. He is the author of *The Renaissance of Honolulu: The Sustainable Rebirth of an American City*.

Craig McLean, Acting Assistant Administrator, NOAA Office of Oceanic and Atmospheric Research (OAR)

McLean is the Assistant Director of Science for the National Evolutionary Synthesis Center, created to facilitate broadly synthetic research to address fundamental questions in evolutionary science. He has conducted deep-sea research for 11 years and published more than 30 papers in the area. He has participated in dozens of expeditions taking him to the Antarctic and the most remote regions of the Pacific and Atlantic. McLean's research focuses on the ecological and evolutionary drivers of marine invertebrate biodiversity and body size. He focuses primarily on deep-sea systems often looking at the consequences of food limitation on biological systems. He is the author and Editor of *Deep-Sea News*, a popular deep-sea themed blog, rated the number one ocean blog on the web, and winner of numerous awards. McLean's popular writing has been featured in *Cosmos, Science Illustrated, American Scientist,* and the *Open Lab: The Best Science Writing on the Web.*

Susanne Moser, Director and Principal Researcher, Susanne Moser Research and Consulting

Moser is a Research Scientist in the Institute for the Study of Society and Environment (ISSE) at NCAR. A geographer by training (Ph.D. 1997, Clark University), her research over the last 10 years has focused on the human dimensions of global change and environmental hazards, especially in U.S. coastal areas. She has researched the uncertainties in the human dimensions of global change (causes, vulnerability, impacts, and adaptive responses), and conducted studies on climate change impacts on coastal areas and human health. During a post-doc at Harvard's Kennedy School of Government in the Global Environmental Assessment Project, which examined the role and influence of science and assessments in policy and decision making, she became particularly interested in the science/policy interface. She also worked for the Heinz Center in Washington, D.C., on a congressionally mandated project on coastal erosion and management. From 1999-2003, she was the staff scientist for climate change for the Union of Concerned Scientists, managing climate change impacts projects and working in the trenches of effective climate change communication and social mobilization for change. Since September 2003, she has been back in the world of research. Her major research foci now are: (1) effective climate change communication and social change; (2) science policy/practice interactions, including the involvement of stakeholders; and (3) coastal impacts of climate change and effective adaptation strategies.

Tom Murphy, Senior Resident Fellow, Urban Land Institute

Murphy is a Senior Resident Fellow, ULI/Klingbeil Family Chair for urban development. Murphy, Former Mayor of Pittsburgh, joins six other ULI Senior Resident Fellows who specialize in public policy, retail/urban entertainment, transportation/infrastructure, housing, real estate finance, and environmental issues. His extensive experience in urban revitalization — what drives investment, what ensures long-lasting commitment — is a key addition to the Senior Resident Fellows' areas of expertise.

Since January 2006, Murphy served as ULI's Gulf Coast Liaison, helping to coordinate with the leadership of New Orleans and the public to advance the implementation of rebuilding recommendations made by ULI's advisory services panel. In addition, he worked with the Louisiana state leadership, as well as with leadership in hurricane-impacted areas in Mississippi, Alabama, and Florida, to identify areas appropriate for ULI involvement.

Prior to his service as the ULI Gulf Coast Liaison, Murphy served three terms as the Mayor of Pittsburgh from 1994-2005. During that time, he initiated a public-private partnership strategy that leveraged more than $4.5 billion in economic development in Pittsburgh. Murphy led efforts to secure and oversee $1 billion in funding for the development of two professional sports facilities and a new convention center that is the largest certified green building in the United States. He developed strategic partnerships to transform more than 1,000 acres of blighted, abandoned industrial properties into new commercial, residential, retail and public uses, and he oversaw the development of more than 25 miles of new riverfront trails and urban green space.

From 1979-1993, Murphy served eight terms in the Pennsylvania State General Assembly House of Representatives. He focused legislative activities on changing Western Pennsylvania's economy from industrial to entrepreneurial and authored legislation requiring the Commonwealth of Pennsylvania pension fund to invest in venture capital. In addition, he authored legislation creating the Ben Franklin Technology Partnership, which is dedicated to advancing Pennsylvania's focus on technology in the economy, and he authored legislation to encourage industrial land reuse and to transform abandoned rail rights-of-way into trails and green space.

Murphy served in the Peace Corps in Paraguay from 1970-1972. He is a 1993 graduate of the New Mayors Program offered by Harvard University's Kennedy School of Government. He holds a Master's of Science degree in urban studies from Hunter College, and a Bachelor's of Science degree in biology and chemistry from John Carroll University.

He is an honorary member of the American Society of Landscape Architects, a board member of the Pennsylvania League of Cities and Municipalities, and a board member of the National Rails to Trails Conservancy. He received the 2002 Outstanding Achievement of City Livability Award from the U.S. Conference of Mayors and was selected as the 2001 Pittsburgh Man of the Year by Vectors Pittsburgh.

Larry Robinson, Assistant Secretary of Commerce for Oceans and Atmosphere, NOAA

Robinson was the Vice President for Research and a Professor in the Environmental Sciences Institute at Florida A&M University (FAMU). Since 2001, he has served as Director of the NOAA Environmental Cooperative Science Center (ECSC), headquartered at FAMU, which consists of a broad, multi-institutional consortium of predominantly minority-serving institutions. ECSC's multifaceted program has made a significant contribution to the promotion of diversity in the scientific workforce — especially within NOAA — due, in large part, to Robinson's leadership.

From 1984-1997, Robinson served as a Research Scientist and Group Leader at Oak Ridge National Laboratory. His work there included detection and assessment of special nuclear materials and application of nuclear methods in nonproliferation, environmental science, forensic science, and the assessment of high-purity materials. From 1997-2003, Robinson directed FAMU's Environmental Sciences Institute where he led efforts to establish undergraduate and doctoral degree programs. In 2007, he became the first African-American to serve as the Science Advisor to the United States Department of Agriculture's Cooperative State Research, Education, and Extension Service.

Robinson graduated *summa cum laude* with a bachelor's degree in chemistry from Memphis State University in 1979 and earned a doctorate in nuclear chemistry from Washington University in St. Louis in 1984.

Asbury "Abby" Sallenger, USGS Storm Impact Research Group

Sallenger is an oceanographer who received his B.A. in geology and Ph.D. in marine science from the University of Virginia. He is the former Chief Scientist of the U.S. Geological Survey's Center for Coastal Geology and presently leads the USGS Storm Impact Research Group, investigating how the coast changes during extreme storms. His narrative nonfiction book *Island in a Storm* has been featured in the *New York Times* and on National Public Radio's *Morning Edition*. In 2007, Sallenger received the Shoemaker Award for Lifetime Achievement in Communications that "honors a USGS scientist who demonstrates great skill in presenting complex concepts to non-technical audiences." In 2009, Sallenger received a Special Award in Oceanography from the 2009 National Hurricane Conference "for revolutionizing the study of hurricane impacts."

Paul Sandifer, Senior Scientist, NOAA National Centers for Coastal Ocean Science

Sandifer is the Senior Scientist for Coastal Ecology for NOAA's National Ocean Service at the Hollings Marine Laboratory in Charleston, S.C. As the Senior Scientist, Sandifer is the principal researcher and scientific advisor on coastal issues. Before coming to NOAA, Sandifer was the Director of the South Carolina Department of Natural Resources (SCDNR) from 1997-2003. Following his start at SCDNR in 1972, Sandifer held various posts, including Assistant, Associate, and Senior Marine Scientist, and Assistant Director of the Marine Resources Research Institute. In 1984, he was named Director of the Marine Resources Division. While at the Marine Resources Division, he was responsible for developing the agency's aquaculture research and development program and establishing the James M. Waddell, Jr. Mariculture Research and Development Center. Sandifer is a Past President and Honorary Life Member of the World Aquaculture Society, a Fellow of the American Association for the Advancement of Science, and recipient of the Order of the Palmetto, South Carolina's highest civilian honor. He has authored and co-authored more than 120 scientific and technical publications in the fields of marine biology, aquaculture, and coastal ecology. From 2001-2004, Sandifer served as a member of the Congressionally mandated U.S. Commission on Ocean Policy and Chairman of the commission's Stewardship Working Group.

Robert Twilley, Vice President for Research, University of Louisiana at Lafayette

Twilley joined the UL Lafayette faculty in 1986 as an Assistant Professor in the Department of Biology, became an Associate Professor in 1988, and served as a Professor from 1995-2004. He was founder of UL Lafayette's Center for Ecology and Environmental Technology and served as its Director from 1999-2004, and he earned the UL Foundation's Distinguished Professor Award in 2000. At LSU, Twilley was a Professor in the Department of Oceanography

and Coastal Sciences from 2004-2010, and served as Associate Vice Chancellor of Research and Economic Development during the last three years of his tenure. He was a Distinguished Professor in the department of Louisiana Environmental Studies at LSU and a Fellow in the Northern Gulf Institute. Presently, he heads a program sponsored by the America's WETLAND Foundation, the "Coastal Sustainability Studio," to design resiliency in natural and built communities along coastal Louisiana. He also serves on the National Research Council Committee on Independent Scientific Review of the Everglades Restoration Progress (CISRERP), which reports on the status of ecosystem restoration in that region. Twilley's area of expertise is wetland ecology and rehabilitating damaged wetlands.

SEA GRANT WEEK 2010 GREEN INITIATIVES

- Maintaining a conference website to reduce distribution of printed materials.
- Providing Earth-friendly and useful conference items and encouraging reuse and recycling of materials whenever possible.
- The Astor Crowne Plaza Hotel supports sustainable business practices by providing eco-friendly products and services to reduce impact on the environment. The hotel promotes ecological consciousness by:
    - Recycling all cardboard, plastic, paper, and aluminum products
    - Paperless check-in services
    - Smoke -free environment throughout the hotel
    - 90 percent of the hotel's lighting is energy efficient
    - Towel and linen reuse program helps reduce water and energy use
    - For more information on green initiatives at the Astor Crowne Plaza go to: http://www.astorneworleans.com/greenInitiatives.php
- Water stations will be available for use during the conference to discourage the use of bottled water.
- Recycling bins will be available throughout the main conference areas for your convenience.
- All seafood served at both the hotel and the Aquarium reception is from local waters, with the exception of the lobster, which is from Maine.
- This agenda was printed on recycled paper.

SEA GRANT WEEK 2010
INTERNATIONAL SYMPOSIUM

SUNDAY, OCTOBER 17

GRAND BALLROOM D

1:00 – 1:10pm	Welcome
1:10 – 1:35pm	SPP and the New Paradigm of Marine and Fisheries Development in Indonesia – Mr. Ferianto Jais, Secretary of the Directorate General for Marine, Coastal and Small Islands, Indonesian Ministry for Marine Affairs and Fisheries
1:35 – 2:00pm	The Strategic Action Plan for the Implementation of Gyeonggi Sea Grant Program – Dr. Seung-Buhm Woo, Director, Gyeonggi Sea Grant and Assistant Professor, Inha University
2:00 – 2:25pm	The Habitation State of Wando Coastal Soft Coral and its Designation of Marine Protected Area – Dr. Jinman Kim, Researcher, Honam Sea Grant
2:25 – 2:50pm	Chungcheong Sea Grant Activities and Action Plan – Dr. Mansik Choi, Director, Chungcheong Sea Grant and Professor, Chungnam National University
2:50 – 3:15pm	Break
3:15 – 3:40pm	A Study on the Development of Korea-Style Mud Boats for Marine Tourism Resources – Dr. Dai Hee Kim, Chief, Honam Sea Grant
3:40 – 4:05pm	Yeongnam Sea Grant Activities and Strategic Plan – Dr. Hwacheol Song, Director, Yeongnam Sea Grant and Professor, Korea Maritime University
4:05 – 4:30pm	Activities in 2009 and Prospects of Jeju Sea Grant – Dr. Joon-Baek Lee, Director, Jeju Sea Grant and Professor, Jeju National University
4:30 – 4:55pm	Collaboration Between Indonesia SPP and Coremap II: Lessons Learned and Challenges for Future Program's Collaboration – Presenter to be announced

NOTES:

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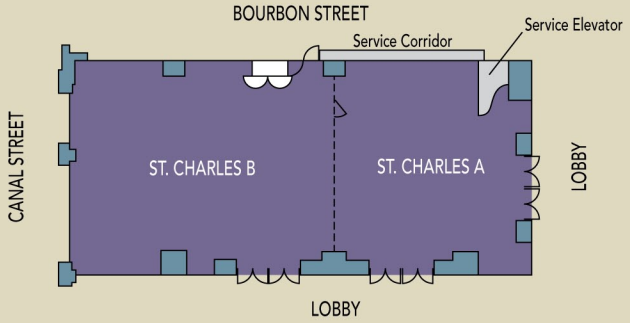
FIRST FLOOR/LOBBY



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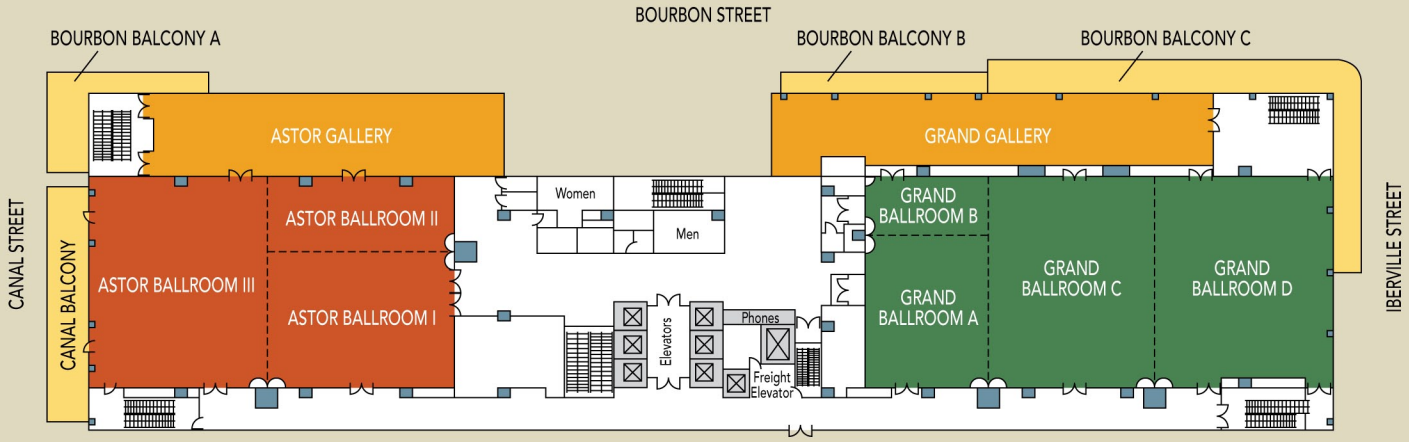

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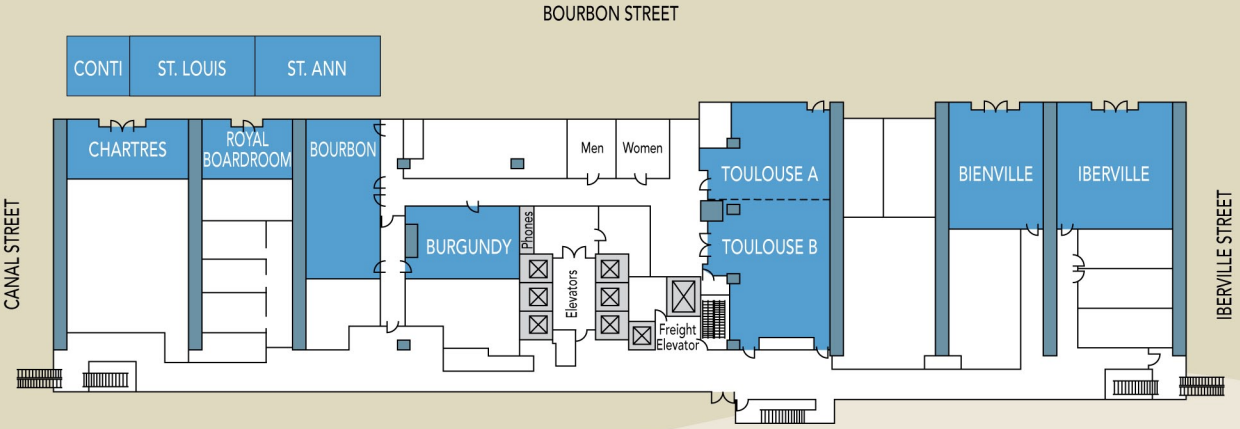

Sea Grant Week 2010 . October 16-20

New Orleans, Louisiana . Astor Crowne Plaza Hotel

Sea Grant LOUISIANA

NOAA NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION U.S. DEPARTMENT OF COMMERCE