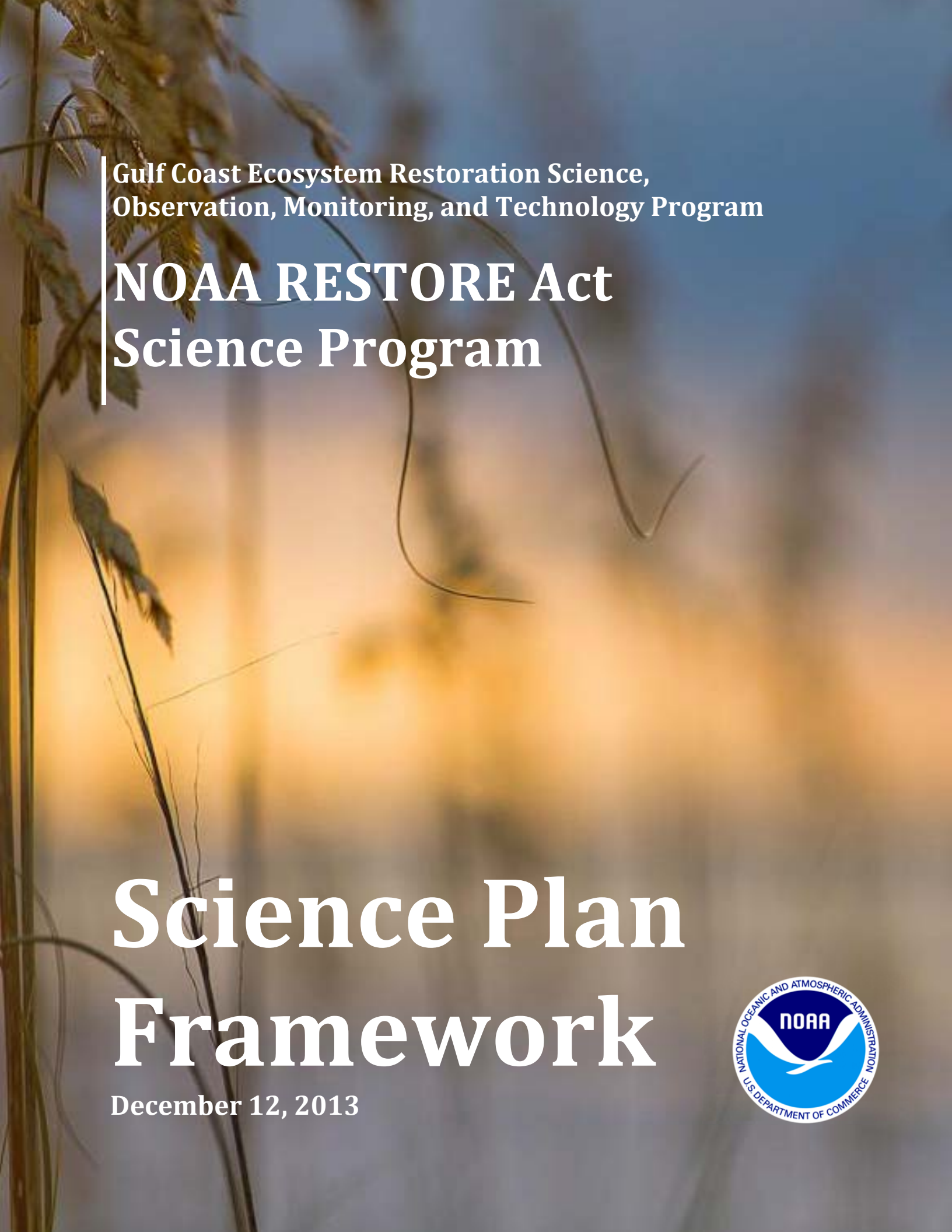

Gulf Coast Ecosystem Restoration Science,
Observation, Monitoring, and Technology Program

NOAA RESTORE Act Science Program

Science Plan Framework

December 12, 2013

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Framework Outline

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1.0 INTRODUCTION

1.1 Background

In 2012, the U.S. Congress passed (Pub.L. 112-141) the "Resources and Ecosystem Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act" (RESTORE Act). The RESTORE Act transfers 80% of all administrative and civil penalties paid by responsible parties in connection with the *Deepwater Horizon* incident to a Gulf Coast Restoration Trust Fund. The RESTORE Act also establishes several programs, funded by the Trust Fund, to aid in the ecological and economic recovery of the Gulf Coast states. Under Section 1604 of the RESTORE Act, the National Oceanic and Atmospheric Administration (NOAA) was directed to establish a Gulf Coast Ecosystem Restoration Science, Observation, Monitoring, and Technology Program (NOAA RESTORE Act Science Program). This program is to be funded by 2.5% of the Gulf Coast Ecosystem Restoration Trust Fund plus 25% of the Trust Fund accrued interest.

The RESTORE Act specifies that NOAA may expend funds for marine and estuarine research; marine and estuarine ecosystem monitoring and ocean observation; data collection and stock assessments; pilot programs for fishery independent data and reduction of exploitation of spawning aggregations; and cooperative research. In addition, the Act states that the priority for fund expenditure should be given to integrated, long-term projects that: (1) build on, or are coordinated with, related research ac-tivities; and (2) address current or anticipated marine ecosystem, fish-ery, or wildlife management information needs.

In response to this directive by Congress, NOAA has developed this Science Framework to communicate its intent, purpose, and rationale for execution of the NOAA RESTORE Act Science Program, according to its responsibilities under Section 1604 of the RESTORE Act. This Science Framework will provide the foundation for the development of a more robust Science Plan, which will guide program implementation and evolve as the program matures and new information becomes available.

The NOAA RESTORE Act Science Program represents an opportunity and capacity to help integrate the disparate science efforts across the Gulf into something that would consider the connectivity and entirety of the Gulf of Mexico ecosystem and advance overall understanding as an integrated system-***not business as usual***.

1.2 Vision

Long-term sustainability of the Gulf of Mexico ecosystem and the communities that depend on it.

1.3 Mission

The mission of the NOAA RESTORE Act Science Program, as directed in the RESTORE Act, is to initiate and sustain an integrative, holistic understanding of the Gulf of Mexico ecosystem and support, to the maximum extent practicable, restoration efforts and the long-term sustainability of the ecosystem, including its fish stocks, fishing industries, habitat, and wildlife through ecosystem research, observation, monitoring, and technology development.

1.4 Desired Outcomes

Following from this mission, the desired outcomes of the NOAA RESTORE Act Science Program are:

- The Gulf of Mexico Ecosystem is better understood in an integrative, holistic manner;
- Restoration activities are guided by this ecosystem understanding;
- Management of the Gulf of Mexico ecosystem is guided by this ecosystem understanding;
- Long-term sustainability of the Gulf of Mexico ecosystem is achieved, supporting the communities and economies that depend on this ecosystem.

1.5 Goals

Numerous documents have been developed in recent years that identify science needs in the Gulf of Mexico. Many of these documents were produced with extensive stakeholder input and in consultation with resource managers throughout the Gulf states. In developing the Goals for this program, these documents were referenced to ensure high priority and recurring needs were captured (see reference section 10.0). Section 1604 of the Act states that funds should be expended for marine and estuarine research; marine and estuarine ecosystem monitoring and ocean observation; data collection and stock assessments; pilot programs for fisheries independent data and reduction of exploitation of spawning aggregations; and cooperative research. The goals presented here were constructed to be responsive to this language and consistent with science needs identified previously for the region. The NOAA RESTORE Act Science Program will enable the collection and dissemination of scientific information to better inform decision making related to the following goal:

> ***Support the science necessary for better understanding and management of the Gulf of Mexico ecosystem, specifically:***
>
> - ***healthy, diverse, sustainable, and resilient estuarine, coastal and marine habitats***
> - ***healthy, diverse, sustainable, and resilient coastal and marine resources, including fisheries***
> - ***resilient and adaptive coastal communities.***

2.0 SCIENCE PROGRAM DEVELOPMENT

Development of the NOAA RESTORE Act Science Program will be guided by application of the language of the Act to the science needs of the region as articulated by resource managers, researchers, residents, and other stakeholders. Therefore, engagement with these partners and stakeholders will be a critical component of the development and execution of the Science Plan to identify priorities for investment. This Framework forms the beginning of the Science Plan, and serves as a basis for dialog. Management of the NOAA RESTORE Act Science Program is further described in Section 4.1.1 of this document. An Engagement Plan is also being developed to guide discourse with partners and stakeholders during the life of the NOAA RESTORE Act Science Program. The Science Plan will evolve as we gain greater understanding of the current and future science needs of the Gulf of Mexico ecosystem. While this document refers to engaging partners and stakeholders in the Gulf of Mexico region, it is acknowledged that expertise related to the science and management of Gulf of Mexico ecosystems may also be found outside of the region.

2.1 Determining Investment Priorities

NOAA will identify science priorities for investment to achieve the mission of the NOAA RESTORE Act Science Program and meet its requirements under Section 1604 of the Act, in collaboration with the US Fish and Wildlife Service, and in consultation with the Gulf of Mexico Fishery Management Council (GMFMC), the Gulf States Marine Fisheries Commission (GSMFC), and other partners.

Given that the amount of funds to be made available and the science priorities of other programs established under the Act have yet to be defined, NOAA envisions that its Science Plan will evolve over time, adapting to changing information and knowledge. Nevertheless, considerable work to identify science needs has been conducted in the region and provides an opportune starting point to frame an investment strategy. With additional engagement of partners in the region, NOAA will develop a science plan that seeks to achieve a holistic understanding (i.e., understanding of the complex interrelationships that exist across climate, weather, ocean and coastal domains) of the Gulf of Mexico ecosystem that will contribute significantly to the science needed for its long-term sustainability, including fisheries and wildlife, and help inform restoration and management efforts. The Program's emphasis on an holistic understanding of the Gulf of Mexico will complement science conducted to support specific restoration projects. However, the Program is not intended to fulfill all science requirements anticipated during implementation of the other RESTORE Act components.

This Framework proposes the following steps to implement the NOAA RESTORE Act Science Program (these steps are mostly, but not entirely, sequential and multiple steps may be underway at any given time):

1. Conduct a review and assessment of science needs for the region that have been determined previously;
2. Establish an initial set of focus areas to guide planning;
3. Develop a Science Framework (this document) that describes the program and lists a set of draft Goals for consideration to assist engagement with partners and stakeholders;
4. Develop and implement an engagement strategy for engaging partners to identify and prioritize ecosystem and management science requirements and gaps, including but not limited to coordination with other Trust Fund recipients;
5. Identify strategic early investments to assist the integration and synthesis of existing observations and data to support science priorities and address known priority gaps;
6. Announce a Federal Funding Opportunity to achieve the early investments noted in step 5;
7. Utilize the information gleaned in previous steps to identify priority research, observation, monitoring, modeling and technology needs (i.e., science needs) for the Gulf of Mexico;
8. Develop a full Science Plan to guide near- and long-term investment;
9. Conduct a competitive process to issue awards for addressing the science needs identified in the full Science Plan;
10. Refine the Science Plan as warranted given progress under this Program, progress under other RESTORE programs and additional scientific efforts in the Gulf, guidance from oversight and consultation bodies, and other changing conditions in the region;

11. Continue investment and refinement of the Science Plan in coordination with partners through the life of the NOAA RESTORE Act Science Program.

3.0 SCIENCE PROGRAM SCOPE

3.1 Focus Areas

Research categories are broadly articulated in the RESTORE Act. In order to ensure this research program addresses known regional priorities and expends funding judiciously, four focus areas (i.e., types of science) have been identified to guide investment. Focusing the activities supported by this program will help ensure that the research, observations, science, and technology are coordinated, complement existing and future science efforts and address, in an integrated and holistic manner, the critical knowledge needed for Gulf of Mexico ecosystem restoration and management. These focus areas were developed to consider the ecosystem as a whole and help describe the elements essential for understanding and sustaining a healthy Gulf ecosystem in the future. The focus areas do not define specific science needs, but rather encompass a suite of approaches of scientific study which, when taken together, will meet the desired outcome of improved holistic understanding of the Gulf of Mexico ecosystem. The focus areas are:

- *Ecosystem structure, functioning and connectivity* through integrative field and laboratory studies; for example,
    - Support research and analysis to understand interconnections between the ecosystem, its living resources, and the human element to inform the ecosystem perspective and support ecosystem management;
    - Provide contextual information to support fisheries and wildlife sciences and restoration planning and implementation;
    - Develop ecosystem-based scenario forecast and integrated assessment models to inform goal-setting and evaluate effectiveness of management and restoration strategies, including climate-related and other drivers of change.
- *Holistic approaches to observing and monitoring* with advanced and innovative technologies to monitor fisheries, Federal trust species, and other natural resources, and data integration tools focused on the observing needs in the Gulf of Mexico; for example, support development of
    - Observation and monitoring efforts to identify, map, and assess habitats, including poorly known deep-water habitats, including relevant physical and biochemical parameters;
    - Observation assets to monitor resources, including fisheries and protected species, and to enhance and improve fishery and wildlife management in the Gulf.
- *Integrated analysis and synthesis of existing and new data* to advance the state of ecological knowledge through the search for patterns and principles; for example,
    - Organize, synthesize and present ecological information in a manner useful to researchers and resource managers;
    - Support meta-analyses, data mining, policy research, development and application of science-based measures of ecosystem integrity, productivity, resiliency, recovery, and restoration.
- *Periodic state of health assessments,* incorporating environmental, socio-economic, and human well-being benefits and elements; for example,

- Support iterative gap analysis to identify priority needs to support broader ecosystem understanding;
- Support development of ecological and socio-economic indicators, including those specifically related to fisheries in both state and federal waters, as well as Federal trust species such as migratory birds, threatened and endangered species, and marine mammals, to inform regular assessment activities and evaluate success of restoration projects and management activities.

3.2 Short-term investment priorities

As the NOAA RESTORE Act Science Program works with stakeholders to further identify science priorities, a few areas of short-term strategic investment are proposed to help inform the science plan. The intent of these short-term investments is to provide additional information for framing Gulf of Mexico ecosystem science priorities, such as ecosystem linkages, processes, and gaps.

- Comprehensive inventory and assessment (i.e., strengths/weaknesses) of ongoing ecosystem modeling efforts (conceptual and quantitative);
- Identification of currently available health/condition indicators of Gulf of Mexico ecosystem components, including humans, followed by comparative analysis of strengths and weaknesses and design/testing of additional indicators;
- Assessment of monitoring and observation needs and development of recommendations to build off existing assets to establish a Gulf wide monitoring and observation network.

4.0 SCIENCE PROGRAM IMPLEMENTATION

The NOAA RESTORE Act Science Program is the responsibility of NOAA in collaboration with the U.S. Fish and Wildlife Service (USFWS). Within NOAA, the National Ocean Service has responsibility for program planning and implementation, under the supervision of an Executive Oversight Board composed of senior executives representing all NOAA Line Offices and the USFWS.

4.1 Program Management

4.1.1 NOAA RESTORE Act Science Program Support Team

Led by the RESTORE Act Science Program Director and Associate Director, the Support Team has responsibility to develop short and long term goals and priorities for the NOAA RESTORE Act Science Program, in consultation with partners and stakeholders, and for program implementation. The team has representation from the USFWS and from across NOAA. The Support Team developed this Science Framework and will be developing a more expansive Science Plan, along with an Engagement Plan. The Engagement Plan will guide two-way communication with partners and stakeholders during the life of the program. The Science Plan will identify science priorities for investment and establish data management requirements.

4.1.2 Executive Oversight Board

The NOAA RESTORE Act Science Program was developed by NOAA in consultation with the USFWS. This consultation was formalized with a Memorandum of Understanding and the establishment of the

Program Executive Oversight Board which oversees development and implementation of the program, providing strategic and programmatic guidance to the Program Support Team and eventual approval of the Science and Engagement Plans developed by the Support Team. The Executive Oversight Board will consult with the Gulf Coast Ecosystem Restoration Council, science advisory bodies that may be established pursuant to the Act, and other entities as deemed appropriate by NOAA or the Department of Commerce.

4.1.3 Gulf Coast Ecosystem Restoration Science Program Advisory Working Group

The Gulf Coast Ecosystem Restoration Science Program Advisory Working Group (RSPAWG), established under NOAA's Science Advisory Board, will provide independent guidance and review of the program. The RSPAWG will focus on the broad research, monitoring, and management components of the NOAA RESTORE Act Science Program, advising NOAA's Science Advisory Board on capabilities and conditions of the program. The RSPAWG will also provide a mechanism for formal coordination among the multiple organizations conducting restoration and ecosystem science in the Gulf of Mexico (including RESTORE-related science, as required by Section 1604).

4.1.4 Independent Review Board

The NOAA RESTORE Act Science Program proposes to periodically conduct an independent, external review of the program to assess its effectiveness. While still in the concept stage, it is envisioned that such an independent review would be conducted on a regular basis, such as initially after the first three years of the NOAA RESTORE Act Science Program and then every 4-5 years. This periodic independent review will also be important in monitoring coordination across the Trust Fund recipients and other partners.

4.2 Consultation and Coordination

Pub. L. 112-141 Section 1604(b)(1) of the RESTORE Act specifies that NOAA shall consult with the Director of the USFWS, and coordinate (Section 1604(f)) with "other existing Federal and State science and technology programs in the States of Alabama, Florida, Louisiana, Mississippi, and Texas, as well as between the Centers of Excellence." Section 1604(b)(4) of the Act also requires that NOAA consult with the GMFMC and GSMFC "in carrying out the program". Although such a provision is not included in the guidance to the Centers of Excellence under Section 1605, or in the criminal settlement agreements, such as those funding the science programs for the National Academy of Sciences, these and other groups also have acknowledged the need for coordination.

Several other groups have or are anticipated to receive funding as a result of the Deepwater Horizon oil spill. NOAA believes it is imperative that all recipients of settlement funds derived from the spill money coordinate science activities to maximize the benefit to the environment and people of the Gulf of Mexico. These recipients include, but are not limited to:

- The National Fish and Wildlife Foundation (NFWF) received $2.5 billion from the Transocean and BP settlements with the U.S. Department of Justice. These funds are specifically focused on ecosystem restoration, including barrier island construction, in the Gulf States. Half of the funds are specifically dedicated to barrier island and river diversion projects in Louisiana.

- The National Academy of Sciences (NAS) received $500 million from the Transocean (January 2013) and BP (November 2012) settlements with the U.S. Department of Justice, and these funds are to be used for human health and environmental protection, including oil spill prevention and response, in the Gulf over a 30-year period.
- The North American Wetlands Conservation Fund (NAWCF) received $100 million from the BP criminal settlement (November 2012) to be used for wetlands restoration, conservation, and projects benefitting migratory birds.
- Gulf of Mexico Research Initiative (GOMRI) is receiving $500 million from BP over 10 years to fund an independent research program designed to study the impact of the oil spill and its associated response on the environment and public health in the Gulf of Mexico.
- The Deepwater Horizon Natural Resources Damage Assessment (conducted under OPA 90) Board of Trustees are mandated to restore, rehabilitate, replace, or acquire the equivalent of the injured natural resources with the goal of restoring injured resources and services to baseline (pre-spill) conditions, and to compensate the public for interim losses that occur during the time it takes those resources to recover.

In addition to those groups directly receiving funds from the Trust Fund (U.S. Treasury), an active dialog will be initiated with a broad array of interested partner and stakeholder groups during the planning and implementation of the NOAA RESTORE Act Science Program. Such groups include, but are not limited to:

- The Gulf of Mexico Alliance
- Gulf of Mexico Universities Research Consortium
- Gulf of Mexico Coastal Ocean Observing Systems
- Not-for-profit groups such as The Nature Conservancy, Ocean Conservancy, Audubon Society, and others
- Private sector interests (including, but not limited to: maritime commerce, oil and gas, commercial and recreational fishing, tourism, etc.)
- Local, State, and Federal agencies (including but not limited to natural resources, public health, land use planning, emergency management, etc.)
- The general public in the Gulf and community organizations

During development of the Science Plan and implementation of the NOAA RESTORE Act Science Program, NOAA will work to be sure that the program is addressing Gulf of Mexico ecosystem priorities and that the work addressed is well-coordinated with other science activities in the region. NOAA already works with most of these partners and stakeholders in various capacities and looks forward to continuing the dialog as related to this program.

NOAA is currently in discussions with the groups who have or will be receiving funds as a result of the Deepwater Horizon event supporting restoration and science. These discussions serve as fora to discuss priorities and help reduce duplication of effort.

4.3 Guiding Principles

The NOAA RESTORE Act Science Program, including development of the Science Plan, will be guided by the following principles:

4.3.1 Program Approach

- Be consistent with enabling legislation and transparent in execution;
- Address key research priorities, with emphasis on long-term sustainability of the ecosystem, including its fish stocks, fishing industries, wildlife, and habitat;
- Give priority to integrated, long-term projects that build upon past, current, and future science programs and address ecosystem information needs in the Gulf of Mexico;
- Be sufficiently flexible to adapt to new scientific findings and to evolve with resources allocated through the RESTORE Trust Fund;
- Be scalable and modular, to the extent possible, so the program can be adapted to the available funding and reflect changing needs;
- Avoid duplication with federal, state, academic, and NGO activities or NRDA science efforts;
- Leverage existing partnerships established among federal, state, academic, and NGO activities and develop new partnerships as appropriate;
- Limit investment in infrastructure with long-term O&M requirements given anticipated sunset of funding;
- Leverage investments by ensuring that all data collected during this program are openly and timely available as a condition of receiving grants or contracts;
- Make results from the NOAA RESTORE Act Science Program available to support timely decision-making by Gulf Coast Ecosystem Restoration Council, GMFMC, GSMFC, and other groups;
- Provide for rapid and effective scientific response to future catastrophic events including hurricanes, oil spills, and other natural and man-made extreme events.

4.3.2 Program Scope

- Consider the full geographic scope of the Gulf of Mexico ecosystem;
- Integrate monitoring and research within a management and policy framework, focusing on understanding ecosystem processes and the factors that drive such processes, not just patterns of species and habitat abundance and distribution;
- Include socio-economic, as well as natural, sciences;
- Include cultural and traditional knowledge;
- Ensure monitoring of key ecosystem components to understand effectiveness of restoration and ecosystem responses;
- Ensure strongest focus on highest priority needs (“must do’s”) and synthesis of information into policy-relevant and usable summaries;
- Consider technology development as a means to meet program goals;
- Recognize that, while the research, monitoring, and technology development conducted under this program will be of value to National Resource Damage Assessment (NRDA) activities, the NOAA RESTORE Act Science Program is not intended to fund such restoration activities or scientific studies solely in support of such restoration activities.

4.4 Program Parameters

4.4.1 Eligible Activities

As stated in Section 1604 of the Act, funds may be expended for, with respect to the Gulf of Mexico:

- Marine and estuarine research;
- Marine and estuarine ecosystem monitoring and ocean observation;
- Data collection and stock assessments;
- Pilot programs for fishery independent data and reduction of exploitation of spawning aggregations;
- Cooperative research.

The Act also instructs NOAA as follows:

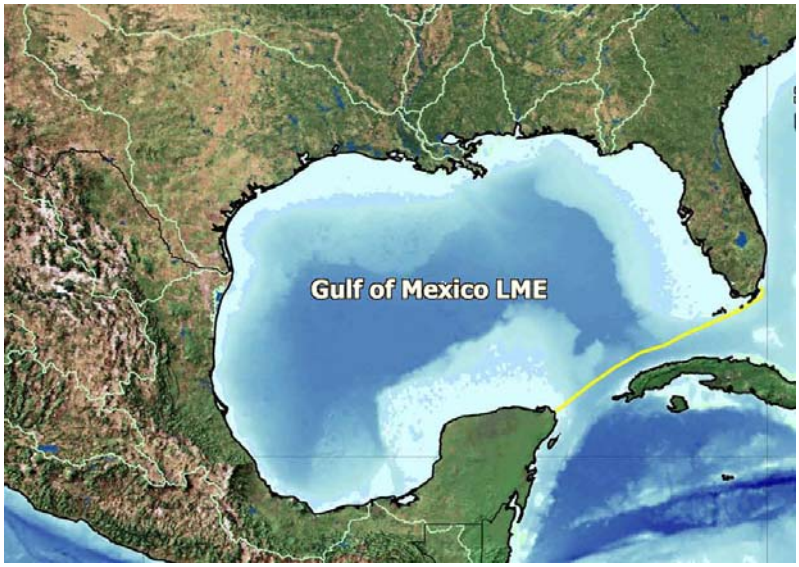
- Species included - The research, monitoring, assessment, and programs eligible for amounts made available under the program shall include all marine, estuarine, aquaculture, and fish species in State and Federal waters of the Gulf of Mexico.
- Research Priorities – In distributing funding under this subsection, priority shall be given to integrated, long-term projects that 1) build on, or are coordinated with, related research activities; and 2) address current or anticipated marine ecosystem, fishery, or wildlife information needs.

The Act also stipulates activities that are not eligible under this program. The funds provided may not be used:

- for any existing or planned research led by NOAA, unless agreed to in writing by the grant recipient;
- to implement existing regulations or initiate new regulations promulgated or proposed by the NOAA; or
- to develop or approve a new limited access privilege program for any fishery under the jurisdiction of the South Atlantic, Mid-Atlantic, New England, or Gulf of Mexico Fishery Management Councils.

4.4.2 Geographic scope

The Gulf of Mexico ecosystem, to which the NOAA RESTORE Act Science Program applies, is not defined in the RESTORE Act. In contrast, the Gulf Coast Region was defined by the Act and is applicable to the other elements under the RESTORE Act. For the purposes of this program, the Gulf of Mexico is defined as the Gulf of Mexico Large Marine Ecosystem (LME), with an emphasis on marine and estuarine environments. In general, LMEs are natural regions of ocean space encompassing coastal waters from river basins and estuaries to the seaward boundary of continental shelves and the outer margins of coastal currents. They are relatively large regions of 200,000 km^2 or greater, with natural boundaries based on four ecological criteria: bathymetry, hydrography, productivity, and trophically related populations. The Gulf of Mexico LME includes waters that extend beyond the U.S. State and Federal waters (i.e., international waters). The Program will support research conducted in the Gulf of Mexico LME or on processes which impact the Gulf of Mexico LME in a direct, significant, and quantifiable way.



4.4.3 Program Duration

Recognizing that resolution of all administrative and civil penalties may be protracted, initial investments from the NOAA RESTORE Act Science Program (using penalties generated by the Transocean settlement) will be expended over a period of 7-10 years. However, the program is envisioned to have an operating timeline of approximately 20 years (assuming allocation to the NOAA RESTORE Act Science Program from the Trust Fund can be managed separately from other components of the Trust Fund). This timeline assumes a future settlement from civil penalties as a result of on-going litigation.

4.4.4 Project Duration

In keeping with the research priorities identified in the Act, priority shall be given to integrated, long-term projects. "Integrated" projects are defined as cross-disciplinary and may link observations/monitoring, modeling, and field/laboratory research. "Long-term" projects are defined as greater than three (3) years in duration, and will receive priority except in those instances where short-term awards may be required to support program execution or initial short-term investments.

4.4.5 Eligibility for Funding Opportunities

- Eligible applicants are institutions of higher education, other non-profits, state, local, Indian Tribal Governments, commercial organizations, and US Territories that possess the statutory authority to accept funding for this type of research.
- Federal agencies that possess the statutory authority to accept funding for this type of research may apply.
- Foreign researchers may apply as sub-awards through an eligible US entity.
- The NOAA RESTORE Act Science Program Funding Opportunities will not be used to hire and fund the salaries of any permanent Federal employees, but may fund travel, equipment, supplies, and contractual personnel costs associated with the proposed work.
- Principal investigators(PIs) are not required to be employed by an eligible entity that is based in one of the five Gulf of Mexico States (Florida, Alabama, Mississippi, Louisiana, Texas); however, PIs that are not from Gulf of Mexico-based eligible entities are encouraged to collaborate with partners from a Gulf of Mexico-based eligible entity.

4.4.6 Scientific Integrity

To ensure scientific integrity, the NOAA RESTORE Act Science Program will comply with the NOAA Administrative Order (NAO) on Scientific Integrity (NAO 202-735D). Independent reviews will be performed by scientific peers, not affiliated with institutions that propose projects, to avoid conflicts of interest in the selection of funded research, and in compliance with the NOAA Policy on Conflicts of Interest for Peer Review.

The Program will apply the rigorous, competitive, peer-review process established by NOAA's Center for Sponsored Coastal Ocean Research (CSCOR) to select research projects. This review process is extensive and well-documented, to make it as transparent as possible to applicants. In most, though not all, instances, the Program will utilize both mail reviews, to provide comments on individual proposals, and panel reviews, to look at the suite of proposals. The requirement for quality science will be carried through the entire project from concept to final products by including peer-review at all critical levels, seeking the advice of external experts, and initiating regular reviews of the programs.

4.4.7 Funding Mechanisms

The NOAA RESTORE Act Science Program will likely rely most heavily on grants as the funding mechanism. However, the program will allow for a mix of funding approaches that provide the flexibility needed to do the work required and involve appropriate institutions.

4.4.8 Partnerships

Recognizing the inherent complexity of the Gulf of Mexico ecosystem and the diversity of disciplines and expertise that will be required to advance current understanding and support long-term sustainability of the ecosystem, preference will be given to collaborative efforts.

4.4.9 Data and Information Sharing

4.4.9.1 Guiding Principles and General Data Policy

Spatial data are considered a national capital asset, and to that end, the National Spatial Data Infrastructure described in *Office of Management and Budget (OMB) Circular No. A-16* facilitates efficient collection, integration, sharing, and dissemination of spatial data among all levels of government institutions, academia, and the private sector. The White House Office of Science and Technology Policy (OSTP) consistently reaffirms requirements for open government and transparent access to digital data through a series of Memoranda and Policy Directives. The OSTP Memorandum *Open Data Policy – Managing Data as an Asset* issued May 9, 2013 directs that data and information collected or created with public funds should be managed "… in a way that supports downstream information processing and dissemination activities."

On behalf of the NOAA Observing System Council (NOSC) and the NOAA Chief Information Officer Council, the Environmental Data Management Committee (EDMC) coordinates the development of NOAA's environmental data management strategy and policy in compliance with National policy. *NOAA Administrative Order (NAO) 212-15 Management of Environmental Data and Information* provides high-level direction to guide consistent implementation of procedures, decisions and actions regarding environmental data and information management. Approved Procedural Directives provide detailed guidance on environmental data management lifecycle components.

The NAO 212-15 applies to all NOAA environmental data and to the personnel and organizations that manage these data, unless exempted by statutory or regulatory authority. The *NOAA Procedural Directive for Data Sharing Policy for Grants and Cooperative Agreements* states, in part:

> *All NOAA Grantees must share data produced under NOAA grants and cooperative agreements in a timely fashion, except where limited by law, regulation, policy or security requirements. Grantees must address this requirement formally by preparing a Data Sharing Plan as part of their grant project narrative.*

4.4.9.2 Application of Policy to RESTORE Act Science Program Awards

Eligible applicants awarded funding under the NOAA Restore Act Science Program will be required to comply with NAO 212-15 and the guidance provided in the Procedural Directives. Environmental data and information collected and/or created under an awarded grant/cooperative agreement will be made visible, accessible and independently understandable to users in a prescribed manner, i.e., near real time where appropriate and within two years after the data are collected or created, the data will have undergone quality assurance/quality control using community-accepted standards, protocols etc., free of charge or at minimal cost that is no more than the cost of distribution to the user, except where limited by law, regulation, policy or by security requirements.

1. A Data/Information Sharing Plan of no more than two pages shall be required as part of the Project Narrative.

a. A typical plan should include:
   - descriptions of the types of environmental data and information that will be collected/created during the course of the project;
   - the tentative date by which data will be shared and documentation of any proposed exceptions (e.g. data anticipated to have homeland/national security, cultural heritage, or protected resources value);
   - the standards to be used for data/metadata format and content;
   - policies addressing data stewardship and preservation;
   - procedures for providing access, sharing, and security; and
   - prior experience in publishing such data.

b. The Data/Information Sharing Plan will be reviewed as part of the NOAA Standard Evaluation Criteria, Item 1 -- *Importance and/or Relevance and Applicability of Proposed Project to the Mission Goals*.

c. If funded, grantees will be required to make the resulting data visible, accessible, and independently understandable to users in compliance with applicable provisions in NOAA PARR-related policies, developed in accordance with the OSTP directive.

2. The Data/Information Sharing Plan (and any subsequent revisions or updates) must be made publicly available at time of award and, thereafter, will be posted with the published data.

3. Failing to share environmental data and information in accordance with the submitted Data/Information Sharing Plan may lead to disallowed costs and be considered by NOAA when making future award decisions.

Further, NOAA will undertake specific activities to ensure compliance with the OSTP memorandum *Increasing Access to the Results of Federally Funded Scientific Research* issued February 22, 2013. The goal of the OSTP memo is to increase the public accessibility of publications and digital data produced by federal researchers or by recipients of federal funds. When implemented, the NOAA *Public Access to Research Results (PARR) Plan* will apply to research results produced either directly by NOAA or with NOAA funding. Research results are defined as environmental data or publications resulting from those data. Awardees will be expected to comply with applicable provisions in PARR-related policies.

In the Data/Information Sharing Plan, as well as in practice, Awardees shall also be encouraged to comply with community best practices, outlined below:

1. The Awardee or NOAA may elect to create and publish a formal metadata record of planned research activities based on information in the Data Sharing Plan. This will indicate the pending availability of new data. Post-cruise, the record can be updated to reflect the 'completed' status and any other applicable changes.

2. Awardees are encouraged to create and submit a complete data inventory to the NOAA National Data Centers, e.g., National Oceanographic, National Geophysical Data Center, National Climate

Data Center or other appropriate federal or NOAA-identified data centers within 15 days post-cruise. This will enable planning for long-term data preservation. Copies of the raw digital data collection can be provided to the data centers for off line preservation until the release date.

3. Data must be provided digitally to the NNDC in standard, preferably OGC compliant formats (e.g. ASCII, text, csv, NetCDF, GML; documents in PDF/A).

4. Data Quality Assurance/Quality Control policies and procedures must be fully documented.

5. Data must be validated, compared to a standard reference and documented.

6. Documentation should take the form of ISO standard metadata records.

When available in standard practice, Digital Object Identifiers (DOI) shall be applied to the data and referenced in the metadata and in the publications resulting from the data.

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