DRAFT 20130612

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

Framework Outline

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1.0 INTRODUCTION

1.1 Background

In 2012, the U.S. Congress passed (PL112-141) 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) has been designated with responsibilities 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 twenty-five percent 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 how it will execute 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 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). The goals presented here were constructed to be responsive to Section 1604 of the Act 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 goals:

- Support Healthy, Diverse and Resilient Coastal Habitats
- Support Healthy, Diverse and Sustainable Living Coastal and Marine Resources
- Support Sustainably Managed Fisheries
- Support Healthy and Well-managed Offshore Environments
- Support Healthy, Sustainable, and Resilient Coastal Communities able to adapt to a changing environment

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

Following congressional direction in 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, the Gulf States Marine Fisheries Commission, and other partners, NOAA will identify science priorities for

investment to achieve the mission of the NOAA RESTORE Act Science Program and meet its requirements under the Act.

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 of the Gulf of Mexico ecosystem that will contribute significantly to the science needed for the long-term sustainability of the Gulf of Mexico ecosystem, including its fisheries and wildlife, and help inform restoration and management efforts.

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 (completed and delivered to Congress);
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 science priorities and to 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, modeling and technology needs for the Gulf of Mexico;
8. Develop a full Science Plan for guiding near- and long-term investment;
9. Conduct a competitive process for issuing awards for addressing the science needs;
10. Refine the 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 plan in coordination with partners through the life of the NOAA RESTORE Act Science Program.

3.0 SCIENCE PROGRAM SCOPE

3.1 Focus Areas

To achieve the broad categories articulated in the RESTORE Act, four focus areas (i.e., types of science) have been identified. 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. 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:

- *Periodic "State of health" assessments,* incorporating environmental, socio-economic, and human well-being benefits and elements; for example,
    - Support iterative gap analysis to assure priority needs to support broader ecosystem understanding;
    - Support development, monitoring, and modeling of ecosystem 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;
- *"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 and synthesize 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, resiliency, recovery, and restoration.
- "*Ecosystem processes, functioning and connectivity"* through integrative field and laboratory studies; for example,
    - Support research and analysis to understand interconnections and inform ecosystem perspective which support ecosystem management;
    - Provide foundational information to support fisheries and wildlife sciences and restoration planning and implementation;
- *"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 tools, observations, and monitoring efforts to identify, map, and assess habitats, including poorly known deep-water habitats;
    - Support development of tools and observation assets to monitor resources, including fisheries and protected species, and to enhance and improve fishery and wildlife management in the Gulf;
    - Support development of tools to enhance integration and dissemination of data and information;
    - Support development of applied ecosystem modeling techniques, tools, and products that inform resource management actions.

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. This initial list of short-term priorities will be adjusted following input from our partners.

- Synthesis of current scientific understanding and management needs, such as
    - Identification of currently available indicators of health/condition to GoM ecosystem components, including humans, followed by comparative analysis of strengths and weaknesses and design/testing of additional indicators;
    - Development of a plan for initial State of Health Assessment for the GoM;
- Conceptual models of the Gulf of Mexico ecosystem showing linkages among the system components, such as
    - Identification and characterization of the most important available ecosystem and component models for the Gulf of Mexico, assessing the strengths and weaknesses of these models;
- Initial needs/requirements assessment for a robust GoM observing system, building upon currently available observing assets and requirements in the Gulf, such as
    - Observation and modeling requirements to predict the transport of HABs, pollutants, larvae, etc.

3.3 Science Priorities

The following table frames an approach to developing science priorities consistent with the Goals and focus areas that have been articulated, and with previous efforts in the region to identify science priorities. The NOAA RESTORE Act Science Program priorities will leverage the many science planning efforts conducted for the Gulf of Mexico and be further refined and vetted through an extensive stakeholder engagement process.

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Example Matrix of Program Goals and Focus Areas: The actions provided within this matrix are intended to illustrate the types of research priorities the NOAA RESTORE Act Science Program *might* address. This table does not represent a comprehensive list of research actions. These example actions were modified from the reference documents listed below the table.

	State of the Health	***Integrated Analysis and Synthesis***	***Ecosystem Connectivity, Processes and Function***	***Integrated approaches to observing & monitoring***
Goal: Support Healthy, Diverse and Resilient Coastal Habitats ***Key topics:*** - habitat sustainability - water quality and quantity - ecosystem services from habitats - habitat connectivity - ecosystem health - impact of pollutants on coastal habitats - impacts of climate change and extreme events on habitats	- Identify key factors or measures of ecosystem resilience for coastal wetland, seagrass and barrier shoreline habitats - Define and compile ecological indices or other tools that can be used to assess current conditions as it relates to sustainable state	- Develop models to predict ecosystem resilience under different stressor paradigms - Understand the role of freshwater and sediment input on coastal habitats, erosion rates and habitat loss	- Determine the relations among Gulf habitats, their processes and functions, and the quality of ecosystem services they provide - Understand the response of coastal ecosystems to natural and manmade hazards and apply that understanding to assessments of future vulnerability	- Establish a network of sites and a consistent set of parameters to monitor shoreline habitat characteristics and vulnerability - Inventory and classify all coastal habitat types and their historical and current distribution, and the processes/functions/services that they support

	State of the Health	***Integrated Analysis and Synthesis***	***Ecosystem Connectivity, Processes and Function***	***Integrated approaches to observing & monitoring***
Promote Healthy, Diverse and Sustainable Living Coastal and Marine Resources ***Key topics***: - ecosystem-based management - hypoxia - harmful algal blooms - resource use conflicts - water quality - ecosystem services - human health - impacts of climate change and extreme events	- Establish ecosystem health indicators to monitor ecosystem conditions, including sentinel sites, sentinel species, and Federal trust species. - Apply understanding of coastal and marine ecosystems to develop appropriate indicators and metrics for sustainable use and management	- Collect, compile and synthesize existing data, and prioritize data needed to undertake ecosystem assessments in the Gulf of Mexico - Conduct an Integrated Ecosystem Assessment of the Gulf ecosystem	- Understand and predict the impact of natural and anthropogenic processes on ecosystems - Understand human-use patterns that may influence resource stability and sustainability	- Understand the status and trends of resource abundance and distribution through more accurate, timely, and synoptic assessments - Gather baseline information on the abundance and distribution of seabirds, sea turtles, and marine mammals

	State of the Health	***Integrated Analysis and Synthesis***	***Ecosystem Connectivity, Processes and Function***	***Integrated approaches to observing & monitoring***
Support Sustainably Managed Fisheries ***Key topics:*** - sustainable fisheries - ecosystem based management - impacts of pollutants on fishery species - impacts of climate change and extreme events	- Assess risks from contaminants and the potential for bioaccumulation, including risks to humans through consumption - Identify measures and criteria to validate restoration effectiveness and thresholds that that trigger management actions.	- Develop up-to-date life history models that are based on recent data to model effects of ecosystem drivers on species - Develop ecosystem models to explore relations between and among management actions and responses of living marine resources	- Assess impacts of pollutants, changing environmental parameters, and climate change on life history characteristics of fished species - Understand interspecies and habitat-species relationships to support forecasting resource stability and sustainability	- Document essential/critical fish habitat for all life stages - Enhance fishery-independent survey capabilities to monitor changes in the status and dynamics of fish populations, including potential impacts from pollutants

	State of the Health	***Integrated Analysis and Synthesis***	***Ecosystem Connectivity, Processes and Function***	***Integrated approaches to observing & monitoring***
Support Healthy and Well-managed Offshore Environments ***Key topics:*** - impact of pollutants on ecosystem function - impacts of climate change and extreme events - ecosystem-based management - healthy deepwater communities	- Develop indicators for ecosystem integrity - Conduct an assessment of threats to the offshore environments of the Gulf of Mexico	- Determine opportunities for development/ implementation of an ensemble modeling approaches for the GoM ecosystem	- Understand ocean-climate interactions within and across regions - Understand the impact of climate variability and change on the biogeochemistry of the Gulf and implications for its ecosystems	- Implement a long-term, Gulf-wide integrated observation, monitoring, modeling, and research program to provide the basis for responsive management - Map deepwater and mesophotic coral communities, assess damage from pollutants, and understand reef connectivity

	State of the Health	***Integrated Analysis and Synthesis***	***Ecosystem Connectivity, Processes and Function***	***Integrated approaches to observing & monitoring***
Support Healthy, Sustainable, and Resilient Coastal Communities able to adapt to a changing environment ***Key topics:*** - ecosystem services - impacts of climate change and extreme events - sustainable coastal economies - impact of pollutants on coastal economies - resiliency	- Develop indicators of ecosystem goods and services - Conduct a baseline assessment and establish benchmarks for a socio- economic valuation of Gulf of Mexico non-use ecosystem services	- Assess impacts that climate change and sea level rise will have on ecosystem services that support community resilience - Develop socio-economic assessments and models to evaluate the impacts of human uses on ecosystems	- Integrate consideration of ecosystem services into the development of management plans - Understand the roles of resilient coastal and marine ecosystems in sustaining fisheries, tourism, and coastal communities	- Develop spatially-explicit data of "human uses" in the Gulf, including recreational and industrial uses - Conduct baseline and annual socio-economic valuations of Gulf of Mexico fisheries (commercial and recreational) using standardized methods

Sources:

(1) Gulf of Mexico Ecosystem Science Assessment and Needs. Gulf Coast Ecosystem Restoration Task Force Science Coordination Team (Walker et al., April 2012)

(2) Gulf of Mexico Research Plan. (Sempier et al., Sept 2009)

(3) Marine restoration priorities and science principles: results of an expert panel workshop in St. Petersburg, FL on April 24-25, 2012. Ocean Conservancy and the Gulf of Mexico Research Collaborative (2012).

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. An acting Program Director has been named and support staff identified.

4.1 Program Management

4.1.1 NOAA RESTORE Act Science Program Support Team

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 is developing a Science Framework and Plan and 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. The Support team reports to the Program Director.

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 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 RESTORE Act 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 NOAA Science Advisory Board Working Group

The NOAA RESTORE Act Science Program Advisory Working Group [proposed to be established under NOAA's Science Advisory Board (SAB)] will provide independent guidance and review of the program. The Working Group will focus on the broad research, monitoring, and management components of the NOAA RESTORE Act Science Program, advising NOAA's Scientific Advisory Board on capabilities and conditions of the program. The Working Group 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 also establish an independent Review Board of external partners which will assess the effectiveness of the program periodically. While still in the concept stage, it is envisioned that the Review Board would meet 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 after that. The Review Board will be important in monitoring coordination across the Trust Fund recipients and other partners.

4.2 Consultation and Coordination

Section 1604 of the RESTORE Act specifies that NOAA shall coordinate with the USFWS, and 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." The Act also requires that NOAA consult with the Gulf of Mexico Fishery Management Council (GMFMC) and Gulf States Marine Fisheries Commission (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 funding science programs for the National Academy of Sciences, these and other groups also have acknowledged the need for coordination.

Additionally, several other groups have or are anticipated to receive funding as a result of the Deepwater Horizon oil spill. NOAA believes that 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 $2.4 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:

- Gulf of Mexico Fisheries Management Council
- Gulf States Marine Fisheries Commission
- The Gulf of Mexico Alliance
- Gulf of Mexico Universities Research Consortium

- 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 & 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 we look forward to continuing the dialog as related to this program. NOAA's Gulf of Mexico Regional Collaboration Team is well-positioned to assist in this coordination role.

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 available as a condition of receiving grants or contracts;
- Make results from the NOAA RESTORE Act Science Program available to support decision-making by Gulf of Mexico Restoration Council, Gulf of Mexico Fishery Management Council, Gulf States Marine Fisheries Commission, 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 is not defined in the RESTORE Act, unlike the Gulf Coast Region, which was defined by the Act. For the purposes of this program, Gulf of Mexico is defined as the Gulf of Mexico Large Marine Ecosystem (LME). 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, the natural boundaries of which are 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. 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" is defined here as cross-disciplinary and may link observations/monitoring, modeling, and field/laboratory research. "Long-term" here is defined as greater than three (3) years in duration, except in those instances where short-term awards may be required to support program execution.

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 subawards through an eligible US entity.
- The NOAA RESTORE Act Science Program will not fund 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 Data and Information Sharing

All sponsored data, essential metadata, and information (including manuscripts) must be delivered to a National Data Center, such as the National Oceanographic Data Center (NODC), in a format to be determined by the institutions, the National Data Center, and the NOAA RESTORE Act Science Program, within a timeframe defined by the Federal Funding Opportunity.

4.4.7 Scientific Integrity

To ensure scientific integrity, the NOAA RESTORE Act Science Program will comply with the NOAA NAO on Scientific Integrity (202-735D). Independent reviews will be performed by scientific peers, not affiliated with institutions who 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.

4.4.8 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.

4.4.9 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.

5.0 REFERENCES

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