

2021 Program Review Summary

November 16-18, 2021

Virtual

Nov. 16: 9:30 am ET to 5:00 pm ET
Nov. 17: 1:00 pm ET to 5:00 pm ET
Nov. 18: 1:00 pm ET to 5:00 pm ET

Meeting Link
Or dial:
(US) +1 567-318-0186
PIN: 936 693 559#

Executive Session Link
Or dial:
(US) +1 608-879-0736
PIN: 904 840 338#

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GUIDE TO READING THIS DOCUMENT

The NOAA RESTORE Science Program has assembled this document as an introduction to the Science Program and as a reference for the review panel in addressing the scope and charge for the program review.

The Science Program would like to highlight these sections in order of importance:

1. The NOAA RESTORE Science Program was authorized by the U.S. Congress in 2012 by section 1604 “Resources and Ecosystem Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act” (RESTORE Act), which was passed in the wake of the 2010 Deepwater Horizon oil spill.
2. This timeline captures the complete history of the Science Program.
3. In total, the Science Program has issued four federal funding opportunities (FFOs). The request for proposals and awards are summarized here for FFOs 2015, 2017, 2019, and 2021 with ‘learn more’ links after each project if you would like additional information on a particular project.
4. The Science Program published a program report, *Science to Action in the Gulf of Mexico*, that covers program activities from 2013-2018.
5. The Science Program uses a set of performance metrics to assess its research, application, and coordination activities. It also uses ecosystem tracking measures to understand the state of the Gulf of Mexico ecosystem.
6. The Science Program maintains budget tracking measures to summarize how program funding is spent.
7. The Science Program has emphasized the value of co-production through conference sessions, a nascent seminar series, and a pilot co-production workshop to train state and federal management agencies, funding entities, nonprofits, and academic institutions how to effectively implement co-production strategies.
8. The Science Program chairs the coordination forum, which is composed of the entities funded as a result of the Deepwater Horizon oil spill, and uses this venue for regular communication and coordination on Gulf of Mexico restoration and science.
9. In 2013, the Science Program developed a Science Plan that captured the program’s assessment of research and application priorities in the Gulf of Mexico.
10. The Science Program maintains a website where it posts the announcements it sends out to its ~4,000-person subscriber list, hosts stories and videos that communicate the impact of its work, and shares recordings of webinars it has hosted.

During the three-day review, the Science Program will share presentations that unpack and provide context for the information captured in this document as well as provide a venue for discussion through questions and answer periods as well as several roundtables.

PROGRAM REVIEW AGENDA

November 16-18, 2021

Day 1: 9:30 am ET to 5:00 pm ET
Day 2: 1:00 pm ET to 5:00 pm ET
Day 3: 1:00 pm ET to 5:00 pm ET

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DAY 1: TUESDAY, NOVEMBER 16

9:30 am ET **Welcome and Introductions**
- Opening, Group Norms & Google Meet orientation
- Welcome - NCCOS Director
- Welcome - Chair of Executive Oversight Board
- Overview of agenda

10:00 am ET **Program Overview**
- Program overview
- Q&A

10:40 am ET **Funding Competitions - Development and Selection**
- Development overview
- Selection overview
- Q&A

11:20 am ET **Project Management**
- Project management
- Technical monitor roundtable

12:00 pm ET - BREAK FOR LUNCH

12:50 pm ET **Research and its Application - 2015 projects**
- 2015 projects overview
- Example project
- Q&A

1:20 pm ET **Research and its Application - 2017 projects**

- 2017 projects overview
- Example project - research I
- Example project - research II
- Roundtable (research projects)
- Example project - decision-support tool I
- Example project - decision-support tool II
- Roundtable (decision-support tools)

3:10 pm ET - 10-MINUTE BREAK

3:20 pm ET **Research and its Application - 2019 projects**

- 2019 projects overview
- Example project I
- Example project II
- Roundtable

4:20 pm ET **Day 1 Wrap-Up**

- Summary of Day 1
- Preview of Day 2

4:30 pm ET **Executive Session I**

- Panelists meet in breakout room to discuss Day 1
- Requests for information are shared with chair, who will share with facilitator

5:00 pm ET - END OF DAY 1

DAY 2: WEDNESDAY, NOVEMBER 17

1:00 pm ET **Welcome and Day 2 Agenda**

- Welcome
- Day 2 agenda

1:10 pm ET **Evaluating Application**

- Evaluation metrics
- Case studies
- Q&A

2:05 pm ET **Promoting Co-Production**

- Co-production
- Q&A

2:35 pm ET - 15-MINUTE BREAK

2:50 pm ET **Coordination and Collaboration**
- Coordination and collaboration
- Q&A
- Roundtable with partner programs

3:50 pm ET **Day 2 Wrap-Up**
- Summary of Day 2
- Preview of Day 3

4:00 pm ET **Executive Session II**
- Panelists meet in breakout room to discuss Day 2

5:00 pm ET - END OF DAY 2

DAY 3: THURSDAY, NOVEMBER 18

1:00 pm ET **Welcome and Day 3 Agenda**
- Welcome
- Day 2 agenda

1:10 pm ET **Future Opportunities - Communications and Engagement**
- Communications and engagement
- Q&A

1:35 pm ET **Future Opportunities - Planning & Executing Actionable Science**
- Overview of planning and executing actionable science
- Example 2021 Project I
- Example 2021 Project II
- Q&A

2:20 pm ET **Future Opportunities - Synthesis Initiative**
- Synthesis initiative
- Q&A

2:45 pm ET - 15-MINUTE BREAK

3:00 pm ET **Future Opportunities - Long-Term Budget and Project Outlook**
- Overview of budget and project outlook
- Q&A

3:25 pm ET **Day 3 Wrap-Up**

- Summary of Day 3
- Next steps

3:30 pm ET **Executive Session III**

- Follow-up conversations at the request of the panel
- Discussion of overall quality, relevance, and performance of the Science Program
- Writing time

4:30 pm ET **Review Panel Report**

- Discussion of preliminary findings and recommendation

5:00 pm ET - END OF DAY 3

REVIEW PANEL

Chair

Mary Walker
Executive Director, Gulf Coast Ecosystem Restoration Council

Panel Members

Patrick Banks
Assistant Secretary/Fisheries, Louisiana Department of Wildlife and Fisheries

Thomas (Tom) Frazer, PhD
Dean of the College of Marine Science, University of South Florida
Chair, Gulf of Mexico Fishery Management Council

William (Monty) Graham, PhD
Director, Florida Institute of Oceanography

Jonathan (Jon) Porthouse
Director, Coastal Habitat Restoration
National Fish and Wildlife Foundation, Gulf Environmental Benefit Fund

Jennifer (Jen) Read, PhD
Director, University of Michigan Water Center

PROGRAM REVIEW SCOPE AND CHARGE

Program Evaluation Criteria

Following enactment of the Government Performance and Results Act in 1993, the National Academies' Committee on Science, Engineering, and Public Policy produced a report on the unique purpose of federal research programs and inherent challenges in their evaluation. The committee concluded that federal research programs could be evaluated using three criteria: quality, relevance, and leadership, and noted that such evaluations should consider factors beyond peer review of research publications by scholars in the field (National Academy of Sciences, 2001).

In its 2008 Guide to the Program Assessment Rating Tool, and citing the National Academies report, the US Office of Management and Budget identified relevance, performance, and quality as criteria that can be used to assess the effectiveness of federal research and development programs. This approach was further endorsed in a 2008 NRC report, which stated that research program efficiency must be evaluated in the context of relevance, effectiveness, and quality.

NOAA, through an Administrative Order (NAO 216-115A, dated October 3, 2016), has adopted Quality, Relevance and Performance as core evaluation criteria. The NAO also calls for a periodic evaluation of research, development, and transition activities as well as outreach efforts and stakeholder engagement.

In the context of this review, these criteria may be described in the following terms:

***Quality*:** This refers to the merit of research and development within the scientific and resource management community. Assessing the quality of scientific and technical work done involves the time honored tradition of peer review. Bibliometric data on peer-reviewed publications and citations, as well as awards and other professional recognitions, are critical to understanding the research quality of individuals and organizations, particularly for benchmarking against other organizations of similar size and scope. Quality is measured by the novelty, soundness, accuracy, and reproducibility of a specific body of research, as represented by the outputs (i.e., findings and products) delivered by the project or program. This evaluation criterion establishes the relative merit and repeatability of the research or program relative to that of contemporaries in the community of practice, whether the scientific methodologies were appropriate, adhered to, and thoroughly documented.

***Relevance*:** This refers to the value of research and development to users beyond the scientific community. Relevance includes not only hypothetical value, but actual impact. Assessing a project or program's relevance involves measuring the broader benefits of the work. It answers the question, "What would not have happened if research and development did not exist, and how much would society have missed?" The impact of research and development can be realized through the application of scientific knowledge to policy decisions, through the

improvement of operational capabilities, or by patenting and licensing of inventions for commercial use. Relevance is measured by how well a specific body of research supports NOAA's mission and the needs of users and the broader society. At a minimum, this evaluation criterion establishes how the research aligns with a program's priorities, as demonstrated by links to validated requirements, key legislative mandates, and societal benefits. Relevance is more reliably established by evidence of actual impact and retrospective (or concurrent) analysis of how research and development causes measurable improvements in operational performance and social and economic value.

***Performance*:** Assessing performance involves evaluating the effectiveness and efficiency with which tasks are executed, as well as the adequacy of the leadership, workforce, and infrastructure needed to achieve the designated goals. This evaluation criterion considers how research activities are progressing relative to milestones and benchmarks. Performance evaluation also includes all aspects of how research is conducted, including all components that feed into creating a high quality research enterprise (e.g., leadership, innovation, planning, monitoring, efficiency and effectiveness of processes, resource utilization, reporting).

Quality

Scientifically Sound Findings and Products
1 - How would you characterize the scientific quality of the findings and products generated by projects supported by the Science Program?

Comprehensive Understanding
2 - How and to what extent is research supported by the Science Program increasing our comprehensive understanding of the Gulf of Mexico ecosystem?

Relevance

Legislative Mandate
3 - How and to what extent are the Science Program's activities aligned with its legislative mandate and priorities? What actions would improve this alignment?

Use of Outputs to Inform Decisions
4 - To what extent do those beyond the scientific community, including resource managers, use findings and products generated by Science Program funded projects to inform decision-making? How can the utility of findings and products be improved at the scale of individual projects and within the larger Gulf of Mexico community?

Portfolio Changes
5 - Should the Science Program's funded projects portfolio change in the future? If so, why, how, and with what tradeoffs?

Performance

Design and Execution of FFOs
6 - How well does the Science Program identify and articulate clear priorities for research and its application in its funding competitions? To what extent does the funded research match those priorities?

Project Management
7 - How would you describe the quality and caliber of the Science Program's administration of its funded projects? What value has been added by the Program's active approach to management and tracking the progress of projects?

Coordination and Collaboration
8 - How successfully did coordination and collaboration efforts with other entities generate returns for the Science Program and increase overall return on investment or strengthen the impacts or reach of activities supported by the Science Program?

Prior to the review, the reviewers may suggest additional criteria, and at the review, each reviewer will be free to ask additional questions as appropriate. Given the scope of planned presentations as well as anticipated use of the panel's recommendations, the "Relevance" criterion is the most important one.

Anticipated Products
Each member of the review panel will use their scientific expertise and professional judgement to provide independent observations, evaluation, and recommendations on different aspects of the NOAA RESTORE Science Program portfolio. Each member of the Review Panel will also prepare notes on his/her findings and recommendations that, at a minimum, address the three core evaluation criteria: Quality, Relevance, and Performance.

Panel members will present their preliminary findings to the Science Program and NCCOS leadership on Day 3 of the review. Individual written reports will be due within 60 days after the review. No consensus report will be submitted. The Review Panel chair may summarize findings from the review (*e.g.*, salient points, recurring themes, or notable exceptions) in the Review Panel's presentation to the Science Program and NCCOS and in their written report (due within 60 days after the review).

Review Report
Individual reviewer reports will be compiled in a document for use by the Science Program. The document will be used for planning of future activities and improving the performance of current and near-term projects. Individual review reports will not be made public and will only be used as background for the final report. Internal distribution of the individual reports will be limited.

AUTHORIZING LEGISLATION

In 2012, Congress passed the "Resources and Ecosystem Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act" (Pub. L. 112-141, RESTORE Act). The RESTORE Act specifies that 80% of administrative and civil Clean Water Act penalties paid by responsible parties in connection with the *Deepwater Horizon* incident be deposited into the Gulf Coast Restoration Trust Fund. The remaining 20% is directed to the Oil Spill Liability Trust Fund. The RESTORE Act also establishes several programs, which will be funded by the Trust Fund, to aid in the ecological and economic recovery of the Gulf of Mexico and its coastal states. Under section 1604 of the RESTORE Act, NOAA, in consultation with the U.S. Fish and Wildlife Service (USFWS), is directed to establish a Gulf Coast Ecosystem Restoration Science, Observation, Monitoring, and Technology Program ("NOAA RESTORE Act Science Program"). NOAA and USFWS have drafted this science plan to guide implementation of this section of the Act.

The RESTORE Act Science Program will be funded by 2.5% of the funds deposited into the Trust Fund plus 25% of the Trust Fund's accrued interest. Appendices I and II provide funding information for Deepwater Horizon Gulf of Mexico restoration initiatives. The mission of this new Program, as defined in the Act [Section 1604(b)(1)], is to:

> **"*Carry out research, observation, and monitoring to support, to the maximum extent practicable, the long-term sustainability of the ecosystem, fish stocks, fish habitat, and the recreational, commercial, and charter-fishing industry in the Gulf of Mexico.*"**

Section 1604 in its entirety is included below:

SEC. 1604. GULF COAST ECOSYSTEM RESTORATION SCIENCE, OBSERVATION, MONITORING, AND TECHNOLOGY PROGRAM.

(a) DEFINITIONS.—In this section:

(1) ADMINISTRATOR.—The term ''Administrator'' means the Administrator of the National Oceanic and Atmospheric Administration.

(2) COMMISSION.—The term ''Commission'' means the Gulf States Marine Fisheries Commission.

(3) DIRECTOR.—The term ''Director'' means the Director of the United States Fish and Wildlife Service.

(4) PROGRAM.—The term ''program'' means the Gulf Coast Ecosystem Restoration Science, Observation, Monitoring, and Technology program established under this section.

(b) ESTABLISHMENT OF PROGRAM.—

(1) IN GENERAL.—Not later than 180 days after the date of enactment of this Act, the Administrator, in consultation with the Director, shall establish the Gulf Coast Ecosystem Restoration Science, Observation, Monitoring, and Technology program to carry out research, observation, and monitoring to support, to the

maximum extent practicable, the long-term sustainability of the ecosystem, fish stocks, fish habitat, and the recreational, commercial, and charter fishing industry in the Gulf of Mexico.

(2) EXPENDITURE OF FUNDS.—For each fiscal year, amounts made available to carry out this subsection may be expended for, with respect to the Gulf of Mexico—

(A) marine and estuarine research;

(B) marine and estuarine ecosystem monitoring and ocean observation;

(C) data collection and stock assessments;

(D) pilot programs for—

(i) fishery independent data; and

(ii) reduction of exploitation of spawning aggregations; and

(E) cooperative research.

(3) COOPERATION WITH THE COMMISSION.—For each fiscal year, amounts made available to carry out this subsection may be transferred to the Commission to establish a fisheries monitoring and research program, with respect to the Gulf of Mexico.

(4) CONSULTATION.—The Administrator and the Director shall consult with the Regional Gulf of Mexico Fishery Management Council and the Commission in carrying out the program.

(c) 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.

(d) 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 management information needs.

(e) DUPLICATION.—In carrying out this section, the Administrator, in consultation with the Director, shall seek to avoid duplication of other research and monitoring activities.

(f) COORDINATION WITH OTHER PROGRAMS.—The Administrator, in consultation with the Director, shall develop a plan for the coordination of projects and activities between the program and 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.

(g) LIMITATION ON EXPENDITURES.—

(1) IN GENERAL.—Not more than 3 percent of funds provided in subsection (h) shall be used for administrative expenses.

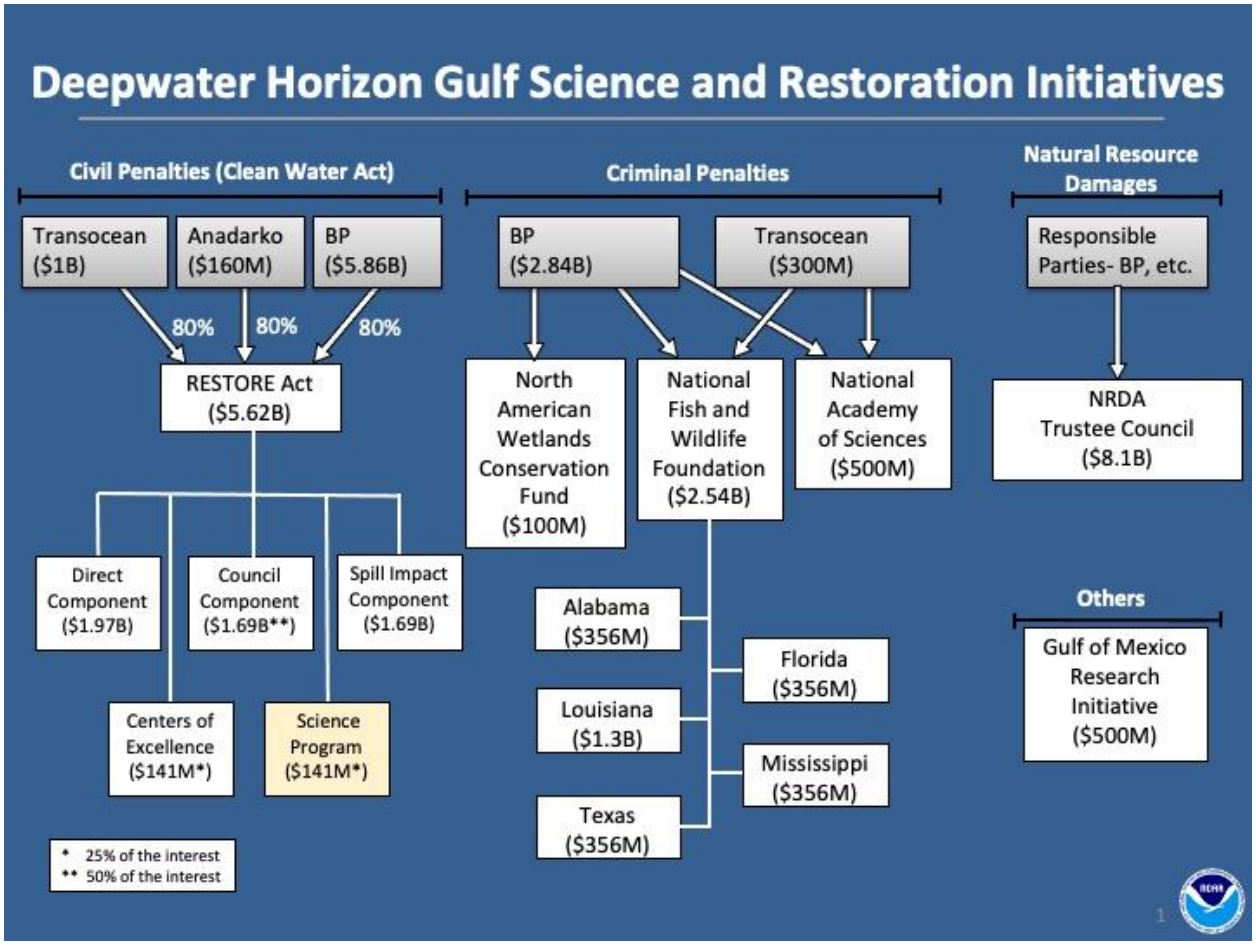
(2) NOAA.—The funds provided in subsection (h) may not be used—

(A) for any existing or planned research led by the National Oceanic and Atmospheric Administration, unless agreed to in writing by the grant recipient;
(B) to implement existing regulations or initiate new regulations promulgated or proposed by the National Oceanic and Atmospheric Administration; or
(C) to develop or approve a new limited access privilege program (as that term is used in section 303A of the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1853a)) for any fishery under the jurisdiction of the South Atlantic, Mid-Atlantic, New England, or Gulf of Mexico Fishery Management Councils.

(h) FUNDING.—Of the total amount made available for each fiscal year for the Gulf Coast Restoration Trust Fund established under section 1602, 2.5 percent shall be available to carry out the program.

(i) SUNSET.—The program shall cease operations when all funds in the Gulf Coast Restoration Trust Fund established under section 1602 have been expended.

DEEPWATER HORIZON GULF SCIENCE AND RESTORATION INITIATIVES



PROGRAM HISTORY

July 6, 2012	President Obama signs RESTORE Act into law.
August 16, 2012	Science program framework team is established.
October 29, 2012	NOAA Research Council approves program framework.
November 27, 2012	NOAA leadership approves Science Program framework. ***Official start of the Science Program***
January 07, 2013	NOAA transmits Science Program framework to Congress.
March 4, 2013	NOAA Research Council approves the terms of reference for the Executive Oversight Board.
April 17, 2013	Russ Beard named acting director for the program.
March 21, 2013	Science program organizational structure approved by Executive Oversight Board and NOAA Research Council.
June 20, 2013	Program website launched: http://restoreactscienceprogram.noaa.gov.
June 20, 2013	Draft science plan framework released.
June 24, 2013	Program held first, in-person open engagement session at Gulf of Mexico Alliance meeting in Tampa, FL.
July 24, 2013	Gulf Coast Ecosystem Restoration Science Program Advisory Working Group (RSPAWG) is formally approved by NOAA's Science Advisory Board as one of their standing working groups.
August 16, 2013	Federal register notice announcing program is released.
August - September 2013	Program holds virtual engagement sessions to introduce the program and gather input on science plan framework.
September 6, 2013	Treasury Department releases draft regulations for RESTORE Act for 60-day public comment period.
September 9, 2013	NOAA's Science Advisory Board publishes a request for nominations for Gulf Coast Ecosystem Restoration Science Program Advisory Working Group in the Federal Register.
September 26, 2013	Program announces search for director with release of position announcement on USAjobs.gov.
December 12, 2013	Program releases completed science plan framework.

January 23, 2014	NOAA Science Advisory Board establishes Gulf Coast Ecosystem Restoration Science Program Advisory Working Group to advise the Program.
January 29, 2014	Program holds an information session at the Gulf of Mexico Oil Spill and Ecosystem Science Conference in Mobile, AL.
June 18-20, 2014	Gulf Coast Ecosystem Restoration Science Program Advisory Working Group holds its first meeting in Long Beach, MS.
August 15, 2014	Treasury Department issues interim final rule for the RESTORE Act on August 15, 2014 (effective date is October 14, 2014).
September 2, 2014	Russ Beard steps down as acting director of the program to become interim science coordinator for the Gulf Coast Ecosystem Restoration Council.
September 19, 2014	Becky Allee is named acting director for the program.
October 6, 2014	Frank Parker is named associate director for the program.
October 7, 2014	The US Department of the Treasury Office of the Inspector General releases an audit report, *NOAA's Establishment of the Science Program Under RESTORE Act (OIG-15-002)*, that includes no findings or recommendations for NOAA or the Science Program.
October 30, 2014	Draft science plan is released for a 45-day public comment period.
December 17, 2014	Program's first federal funding opportunity (FFO-2015) is released.
May 6, 2015	Final version of the Program's science plan is released.
May 6, 2015	Julien Lartigue is announced as first permanent director (intergovernmental personnel act agreement) for the program.
June 10-12, 2015	Gulf Coast Ecosystem Restoration Science Program Advisory Working Group holds its second meeting in St. Petersburg, FL.
July 21, 2015	Rebecca Allee (NOS), Todd Davison (NOS), Laura Golden (NOS), Alan Lewitus (NOS), Rob Magnien (NOS), Scott Cross (NESDIS), Marjorie Elizabeth Clarke (NMFS), Steve Giordano (NMFS), Kristen Laursen (NMFS), Doug Lipton (NMFS), Susan Baker (NOS), Shannon McArthur (NWS), Paula Davidson (NWS), Nicole Kurkowski (NWS), Shelby Walker (OAR), and Tracy Rouleau (PPI) are awarded NOAA Administrator's Award "for completing NOAA RESTORE Act Science Program's Science Plan — a shared vision for applying science to

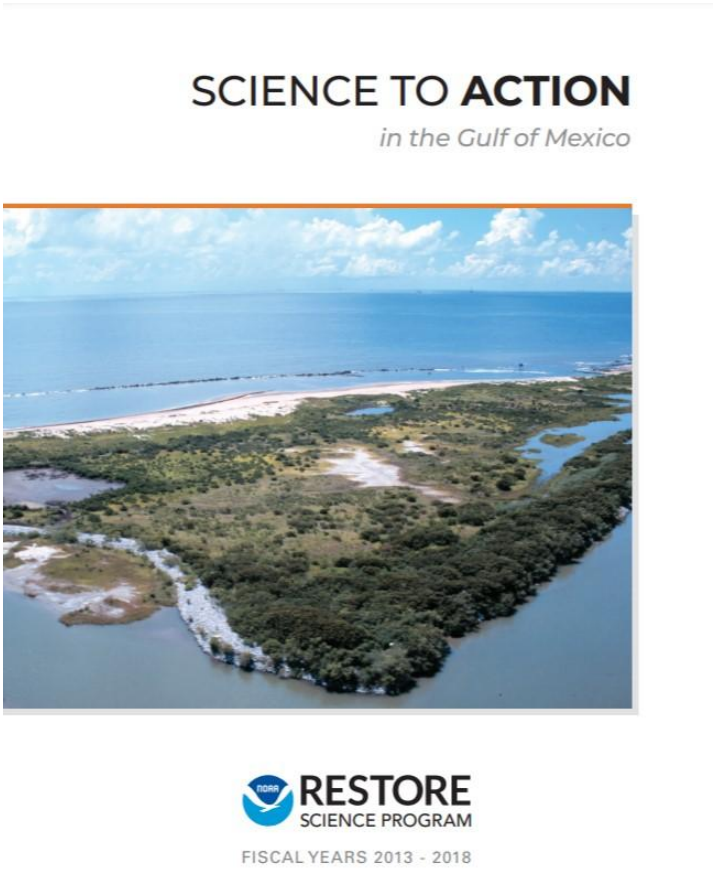
	shape the future Gulf of Mexico ecosystem."
September 1, 2015	Science Program officially announces its first set of awards ($2.7M to seven projects) selected through FFO-2015.
June 1, 2016	Science Program releases its second funding opportunity (FFO-2017) which is focused on living coastal and marine resources and their habitat through a research and decision-support tool priority.
December 1, 2016	The US Government Accountability Office General releases an audit report, *Permanent funding authorities (GAO-17-59)*, that includes no findings or recommendations for NOAA or the Science Program.
February 9, 2017	Richard Merrick (NMFS), Bonnie Ponwith (NMFS), Russ Beard (NESDIS), Mary Erickson (NOS), Frank Parker (NOS), Rebecca Allee (NOS), Gary Matlock (OAR), Lois Schiffer (OGC), Chauncey Kelly (OGC) and Stephen Smith (CFO) are awarded a NOAA Bronze Medal for "establishing the RESTORE Act Science Program, an integrated partnership focused on Gulf of Mexico sustainability through applied ecosystem science."
July 12, 2017	Science Program announces its second set of awards ($16.7M to 15 projects) selected through FFO-2017.
August 11, 2017	The Gulf Coast Ecosystem Restoration Science Program Advisory Working Group is terminated by agreement between NOAA and its Science Advisory Board.
February 1, 2018	The US Department of the Treasury Office of the Inspector General releases an audit report, *NOAA's Administration of the Science Program (OIG-18-036)*, that includes no findings or recommendations for NOAA or the Science Program.
June 5, 2018	Science Program releases its third funding opportunity (FFO-2019), which is the first dedicated to supporting integrated, long-term projects. The priority for the competition is identifying, tracking, understanding, and/or predicting trends and variability in the Gulf of Mexico´s living coastal and marine resources and the processes driving them. Applicants must propose work that addresses this priority in one or more of these areas of emphasis: 1) exploring trends in multiple species, 2) investigating the link between weather and/or climate and trends, and 3) examining the relationship between trends and economic activity.
September 11, 2019	Science Program releases its first program report covering fiscal year

	2013 to 2018.
September 16, 2019	Julien Lartigue becomes the Science Program's first permanent federal Director.
September 24-25, 2019	The Science Program in partnership with the Texas OneGulf RESTORE Act Center of Excellence hosted its first co-production workshop (*Using Co-Production to Engage Stakeholders and Create Effective Science-to-Management Solutions*) at the Meadows Center for Water and the Environment in San Marcos, Texas.
October 2, 2019	The Science Program announces its third set of awards ($15.6M to 4 projects) selected through FFO-2019. This is the Science Program's first set of five year awards with the option of a five year non-competitive renewal.
April 7, 2020	The Science Program announces a fifth award from FFO-2019. The award is for $3.6M to a project team that will characterize seasonal, annual, and decadal trends in marine mammal species in the Gulf of Mexico.
May 26, 2020	Caitlin Young is hired as the first permanent federal science coordinator for the Science Program. She is the third permanent federal employee hired by the Science Program.
August 11, 2020	The Science Program announces its fourth funding opportunity (FFO-2021), which provides natural resource managers, researchers, and other stakeholders with the chance to compete for funding to plan a research project that informs a specific management decision impacting natural resources in the Gulf of Mexico.
June 21, 2021	Hannah Brown is hired as a contractor to support the Science Program as its first communications and engagement specialist for the Science Program.
September 15, 2021	The Science Program announces its fourth set of awards ($2.3M to 20 projects) selected through FFO-2021. This is the Science Program's first set of one-year planning awards for actionable science.

2013-2018 PROGRAM REPORT

Click here to access the report.

The NOAA RESTORE Science Program's first program report covers the start of the program in 2013 through 2018. The report, *Science to Action,* provides an overview of the projects the Science Program has supported, touches on our science and application accomplishments, and looks forward to what's to come. The report also explains why we think investing in researcher and resource manager partnerships and the co-production of science is the best way to accomplish our mission and some steps we are taking to facilitate these types of partnerships.



FUNDING COMPETITIONS

The NOAA RESTORE Science Program supports research, observation, and monitoring in the Gulf of Mexico to address regional science and management needs. The Science Program periodically announces federal funding opportunities (FFOs) to which eligible applicants can apply and compete for funding. The Science Program generally uses competitive, peer-review approaches when selecting projects for funding and rely most often on cooperative agreements to make awards. The Program may also use other means, including contracts, to ensure the flexibility needed to do the work required and involve appropriate partners.

FFO-2015

Request for Proposals

The NOAA RESTORE Science Program awarded approximately $2.7 million to seven research teams for its first competition. These teams and their projects were selected following a rigorous and highly competitive process which included a review by a panel of outside experts.

Each of the research teams addressed one or more of the Science Program's short-term priorities which focus on assessing ecosystem modeling, evaluating indicators for ecosystem conditions, and assessing and developing recommendations for monitoring and observing in the Gulf of Mexico.

These projects synthesized scientific understandings and management needs, informing the direction of the NOAA RESTORE Science Program as well as the other science and restoration initiatives in the region. The results from these projects also informed the development of management strategies that support the sustainability of the Gulf of Mexico ecosystem, including its fisheries.

The seven funded teams drew researchers from 17 institutions including universities, federal and state agencies, non-governmental organizations, and the private sector. In total, 31 researchers served as investigators on these teams, with 28 of them located in the Gulf of Mexico region. These awards, which were initially funded for two years, ranged in size from $309,000 to $400,000.

Click to review the full announcement and web announcement.

Funded Projects

Title: Indicators and assessment framework for ecological health and ecosystem services
Lead Investigator: Larry D. McKinney
Lead Institution: Harte Research Institute for Gulf of Mexico Studies at Texas A&M University Corpus Christi
Award Amount: $398,349
Learn more

Title: Inventory of Gulf of Mexico ecosystem indicators using an ecological resilience framework
Lead Investigator: Kathleen Goodin
Lead Institution: NatureServe
Award Amount: $399,955
Learn more

Title: Evaluation of Gulf of Mexico oceanographic observation networks impact assessment on ecosystem management and recommendation
Lead Investigator: Matthew Le Henaff
Lead Institution: Cooperative Institute for Marine and Atmospheric Studies at the University of Miami
Award Amount: $398,812
Learn more

Title: Ecosystem modeling efforts in the Gulf of Mexico: Current status and future needs to address management and restoration activities
Lead Investigator: James Simons
Lead Institution: Texas A&M University Corpus Christi
Award Amount: $395,000
Learn more

Title: Cooperative monitoring program for spawning aggregations in the Gulf of Mexico: An assessment of existing information, data gaps, and research priorities
Lead Investigator: Brad Erisman
Lead Institution: The University of Texas at Austin
Award Amount: $391,021
Learn more

Title: The central role of the Mississippi River and its delta in the oceanography and ecology of the Gulf of Mexico large marine ecosystem
Lead Investigator: Alexander Kolker
Lead Institution: Louisiana Universities Marine Consortium
Award Amount: $309,276
Learn more

Title: Defining abnormal events of oceanographic, biological, and physical properties in the Gulf of Mexico to identify data gaps
Lead Investigator: Robert Arnone
Lead Institution: The University of Southern Mississippi
Award Amount: $366,787
Learn more

2015 Project Recommendations

The recommendations and next steps came from the project final reports, analysis by the Science Program, or publications associated with the project.

Summary

The recommendations on next steps for ecosystem modeling offer several general recommendations that would benefit all ecosystem modeling activities and then a series of specific recommendations for particular types of models or ecosystem questions. The need for data to facilitate model calibration and validation and the need to integrate resource managers and other end users into the development process emerge as important general recommendations.

The recommendation regarding indicators is to apply the frameworks that were developed. It is the application and wider adoption of indicators that seems to be the most significant challenge in this area of research.

The observing recommendations are divided among satellites and physical oceanography models, fish spawning aggregations, and the Mississippi River and Delta. One of the two satellite and physical oceanography projects (the project lead by Matthieu Le Henaff) has yet to submit a final report and the other did not offer recommendations for future work. Both projects have demonstrated that it is possible to package satellite and ocean circulation modeling outputs to identify anomalous conditions in the Gulf of Mexico and even share this information in near real time with natural resource managers. The recommendations on fish spawning aggregation offer a roadmap with specific targeted actions to gather important information on aggregations and to integrate that information into stock assessments. The recommendations on the Mississippi River and Delta are general and for the most part point to processes where we don't know enough without explaining how the new knowledge will inform decision-making.

Ecosystem Modeling (from O'Farrell et al. 2017)

General

- There are several issues related to ecosystem modeling that span all modeling efforts whose careful attention would benefit the use of ecosystem modeling as it goes forward in the GOM. These issues are: (1) enhancing the calibration and validation processes of ecosystem models of the GOM and examining the behavior of these models in more detail; (2) allowing empiricists, resource managers and other stakeholders to properly understand and review the strengths and limitations of ecosystem models and to contribute to these models, which requires detailed descriptions of model assumptions; and (3) fostering capacity building and the maintenance of ecosystem models.
- Several ecosystem components were underrepresented in the current ecosystem models of the GOM and should be given more consideration in future ecosystem modeling efforts. These ecosystem components include marine mammals, sea turtles and seabirds (i.e., very-high-trophic-level organisms), which can all have a very large impact on food web dynamics in the GOM (Rose et al. 2010). Humans are other "very-high-trophic-level organisms" that can have a very large impact on food webs and

should be given more consideration in ecosystem models of the GOM in the future (Fulton 2010; Rose et al. 2010; Fulton et al. 2011b).

- It is important to emphasize that a major pressing need to improve ecosystem modeling capabilities in the GOM is the collection of data for model development (e.g., parameterizing trophic interactions from diet studies), calibration (e.g., fitting model predictions of biomass to observed biomass trends), and validation (e.g., comparing model predictions of biomass with observed trends).
- Whether ecosystem models are conceptual or of higher complexity, each modeling framework integrates various sources of data and, as a result, model outputs are only as reliable and as realistic as the process formulations, input data, and spatial and temporal assumptions. Key data limitations within the GOM include estimates of absolute or relative abundance, spatial distributions, environmental and habitat associations and diet compositions.

Conceptual and qualitative models

- To address the specific questions of habitat and water quality restoration and marine mammal recovery that are central in the state of Alabama (Online Resource 1), an EBM-DPSER model or a loop analysis with the following components could be employed: ‘‘Oil activities’’, ‘‘Invasive species’’, ‘‘Fishing’’, ‘‘Marsh’’, ‘‘Barrier island’’, ‘‘Oyster reef’’, ‘‘Seagrass’’, ‘‘Marine mammal’’, ‘‘Fish’’, ‘‘Water quality’’, ‘‘Storm protection’’, ‘‘Marsh restoration’’, ‘‘Barrier island restoration’’, ‘‘Oyster reef restoration’’, ‘‘Seagrass restoration’’, ‘‘Marine mammal recovery program’’, ‘‘Water quality restoration’’, and ‘‘Fisheries management’’.

Integration of ecosystem considerations into stock assessments

- ESAMs (single species assessment models) have the potential to improve the accuracy of stock assessment outcomes for many species of the U.S. GOM and should, therefore, see more widespread use in the GOM in the future. However, ESAMs require careful consideration as to whether the added complexity from environmental linkages is justified. In general, including an environmental driver because of a hypothesized mechanism for the impact is preferable to testing many variables looking for correlations (Punt et al. 2014). Further, it is necessary to also conduct simulation analyses to determine: (1) for which species of the U.S. GOM ecosystem considerations are necessary (i.e., how are ecosystem factors already captured in modeled processes?); (2) how best to parameterize ecosystem considerations; and (3) the cost of a false positive relationship and including an ecosystem covariate in an assessment model when no such relationship exist in reality (e.g., Hare et al. 2015). Ecosystem models more complex than ESAMs have the potential to provide ecosystem parameters to ESAMs if they represent species and processes that can yield outputs constituting relevant inputs to ESAMs.

Management strategy evaluation integrating ecosystem considerations

- NOAA Fisheries recently laid out a Gulf of Mexico Regional Action Plan (GMRAP) in accordance with NOAA Fisheries Climate Science Strategy (Link et al. 2015), which calls, among other things, for MSE studies evaluating the impacts of harvest control rules implemented for individual species under climate change scenarios. The ecosystem models used for conducting these kinds of MSE studies should simulate the

population dynamics of the species of interest over multiple years, and represent (either explicitly or implicitly) the influence of climatic changes on the vital rates of the species of interest. If an MSE is needed to evaluate the impacts of harvest control rules for a specific species under the assumption that climatic changes affect the survival of that species, then it would be relevant to employ an ESAM representing the effects of climatic changes on natural mortality to conduct that MSE. If it is assumed that climate change affects vital rates other than survival rates (i.e., growth, reproduction or movement rates), then it will be appropriate to use an ecosystem model other than an ESAM (e.g., an ESIBM, a MICE or a more complex ecosystem model, depending on the requirements of the MSE study). For example, to investigate the performance of harvest control rules implemented for red grouper or gag grouper in the face of climate change, the MSE framework developed for OSMOSE-WFS and reported in Gru¨ss et al. (2016b) could be employed, provided that new capacities are introduced into the OSMOSE modeling platform to allow abiotic environmental parameters to affect relevant vital grouper rates. The Atlantis-GOM model integrates MSE capabilities and could be enhanced to more accurately simulate climate change scenarios either using adjusted oceanographic data or output from climate models with sufficient variation to capture inter-annual variation (Ainsworth et al. 2015).

Fisheries management in a context of red tides

- In addition to using ecosystem models to evaluate how red tides would affect the inputs (e.g., natural mortality rates) of single-species models, ecosystem models can also be used to examine how red tides would affect community and food web responses. Such a model could also be used to examine food web and fisheries responses to red tide, and could be expanded into an Ecospace model to incorporate the spatio-temporal patterns of red tides.

Bycatch reduction

- The ecosystem model developed by Walters et al. (2008, 2010) is appropriate for reexamining the issue of reducing bycatch in the GOM shrimp fisheries in that it models all the necessary system components including detritus from shrimp trawl bycatch. However, the diet matrix of Walters et al. (2008)'s EwE model should be improved, with additional diet data stemming from genetics and dietary studies and using probabilistic approaches such as those employed by Sagarese et al. (2016a) and Tarnecki et al. (2016) to represent more accurate trophic interactions. Size spectrum models are another potential means to reexamine the consequences of measures aiming to reduce bycatch in U.S. GOM shrimp fisheries (Houle et al. 2012). The issue of bycatch in the menhaden purse seine fishery also deserves some attention in future ecosystem modeling efforts in the GOM (Rester and Condrey 1999; Vaughan et al. 2007; Karp et al. 2011; Sagarese et al. 2016b).

Marine protected areas

- The GOM Fishery Management Council frequently requests investigations of the potential impacts of MPAs, particularly of whether MPAs can rebuild stocks without reducing fisheries yields and whether they can have some indirect negative effects on fish and fisheries. An ecosystem model suited for addressing these issues should: (1) consider spatial heterogeneity in habitat quality; (2) have the potential to simulate the

movements of marine organisms (to represent ‘‘spillover’’ from MPAs) and spatial age structure; and (3) represent fishing fleet dynamics to be able to simulate reasonable spatial patterns of fishing effort following the implementation of MPAs.

Mitigation of the impacts of invasive species

- Additional ecosystem models that simulate spatial overlap between predators and prey, and can represent the pressure exerted on the lionfish populations by the sponsored derbies and culling programs are needed in many other regions of the GOM impacted by the invasion (e.g., the western GOM, the Florida Keys).

Mitigation of oil spill effects

- The DWH oil spill has been shown to have affected the vital rates of the different life stages of marine organisms of the GOM, including the survival of fish larvae (Goodbody-Gringley et al. 2013). Therefore, ecosystem models addressing the issue of the mitigation of oil spill effects should ideally simulate the full life cycle of marine organisms.

Habitat restoration

- Ecosystem models guiding habitat restoration efforts necessarily need to be dynamic and spatial and must have the capacity to simulate changes in the structure and surface area of the physical habitat through time. The currency of these models (e.g., age or size-structured for some species) is dependent upon the life stages using the habitat of interest.

Artificial reefs

- The GOM Fishery Management Council also requested studies assessing the effects of artificial reefs, especially their potential to improve fisheries yields without substantially decreasing the biomasses of some marine species. Ideally, an ecosystem model addressing these issues should represent fishing fleet dynamics to be able to simulate how fishers reallocate their fishing effort as new artificial reefs are created and fish re-distribute themselves.

Nutrient loading/hypoxia mitigation

- To guide efforts to mitigate nutrient loading/hypoxia in the northwestern GOM, spatially-explicit ecosystem models with a fine temporal resolution (i.e., with a monthly or smaller time step) should be employed, with the ability to simulate the impacts of varying dissolved oxygen levels on the vital rates of juveniles and adults of species or functional groups.

Freshwater diversion

- Dynamic spatial ecosystem models with a fine temporal resolution (e.g., with a daily or monthly time step) are preferred to be able to analyze the effects of freshwater diversion under different gradients of salinity just after, during, and post releases. These models should be age-, size- or stage-structured to capture the differing effects of changes in salinity on the vital rates of juveniles of some fish and shellfish species that inhabit estuarine systems and their adults that occur in marine habitats.

Indicators

- The set of indicators, metrics, and assessment points identified by Natureserve were recommended to be implemented by monitoring communities of practice throughout the Gulf to test the validity and practicality of application (e.g. seagrass monitoring

community of practice, the Florida Statewide Assessment of Coastal and Aquatic Resources (SEACAR) project and the RESTORE Council-funded Gulf of Mexico Monitoring Community of Practice.

- The Drivers-Pressures-State-Impacts-Response 4 (DPSIR4) framework is adaptable to the management of any ecosystem of the coastal Gulf of Mexico. The next step is to apply it to other management needs of concern to NOAA, especially environmental management activities aimed at the restoration of the Gulf of Mexico and assessing its ecological health and sustainability.

Observing

Satellites and physical oceanography models

- Satellite imagery and ocean circulation models can be used to identify anomalous conditions in the Gulf of Mexico and track the entrainment and advection of river plumes and shelf waters over considerable distances. A next step would be to have biologists and physical oceanographers work in concert to develop tools to track specific anomalies or circulation patterns of interest to resource managers.
- Near real-time alerts for anomalous conditions (i.e. low salinity) in the Gulf of Mexico can be automated and shared with managers of resources that could be negatively impacted by the anomalous conditions.

Fish spawning aggregations

- The next step for research is to locate, characterize, and monitor actual transient FSA sites in the U.S. GOM by surveying within the coastal waters surrounding major bay systems, particularly those of Texas and Louisiana, and portions of the continental shelf edge (e.g. the Flower Garden Banks area and the West Florida shelf edge).
- A suite of behavioral traits associated with spawning are consistently associated with high vulnerability to fishing pressure during spawning periods, but these data are rarely incorporated into stock assessments or fishery management regulations.
- Improved metrics that allow for integration of productivity parameters associated with spawning aggregations (e.g. spawning potential ratio estimates that include non-fatal impacts of fishing on reproductive output) with stock assessments.
- A unified bathymetric coverage for the Gulf of Mexico is still lacking but would greatly enhance our ability to predict, identify, monitor, assess, and manage important spawning aggregation sites, particularly those sites that house multiple species of commercial or recreational importance.
- Expanded efforts are needed to characterize and monitor key and multi-species FSA sites using cooperative research methods with fishers as a means to leverage their expert knowledge and to build stakeholder support for managing aggregation fishing and protecting multi-species FSA sites including the establishment of a network of important multi-species FSA “sentinel” sites.

Mississippi River and Delta

Human Communities

- The interactions between physical and biological processes and human communities in the river and delta-dominated regions of the Gulf of Mexico are understudied.

Ecosystem Services

- While some ecosystem services are well known, such as fisheries production, further research is needed to evaluate the ecosystem services the river and delta provide.

Coastal Currents

- The hydrology of the river and delta-influenced regions of the Gulf of Mexico is highly complex and variable. More research is needed to fully understand the physics driving coastal current and to predict how they will change over time.

Salinity Dynamics

- Salinity is one of the most poorly understood physical oceanographic parameters in the Mississippi River-influenced regions of the Gulf of Mexico. This is important because salinity affects stratification and coastal currents. However, salinity is particularly difficult to study because it cannot readily be determined from satellites (though recent advances have been made) and because there are no regularly collected discharge measurements in the Mississippi River south of Belle Chasse, Louisiana.

Climate Change and Relative Sea Level Rise

- Climate change and relative sea level rise are likely to strongly impact the Mississippi River and its delta, resulting in widespread submergence, and potentially changes to the location and magnitude of the river's distributaries. While much research is underway to understand how climate change and relative sea level rise will impact the Mississippi River Delta, relatively little research is currently being conducted to understand how these shifts in the river-delta system will impact the Gulf of Mexico.

River Diversions

- In an effort to address land loss, the State of Louisiana plans to substantially shift the outlets of the Mississippi River northward, as part of its Coastal Master Plan. An accidental shift northward could also occur as a result of sea-level rise and erosional processes in the lower Mississippi River. The impacts of these planned and unplanned diversions on the Gulf of Mexico are only beginning to be understood and must be monitored and studied as Louisiana moves forward with its coastal restoration plans.

Contaminant Fluxes

- The Mississippi River drains over 40% of the contiguous 48 states, draining large areas used for industry and agriculture. While some contaminants have been well studied (i.e. fertilizer-based nutrients) many other contaminants have not.

Organic Nutrients

- The Mississippi River and its delta are the largest sources of organic matter to the Gulf of Mexico, and yet relatively little is known about how this organic matter contributes to nutrient budgets, relative to other sources in the Gulf of Mexico. More research is needed to understand the source of organic nutrients, their budgets and their fate in the Gulf.

Carbon Cycle and Ocean Acidification

- Ocean acidification could become particularly important in the river-dominated coastal margins of the Gulf of Mexico given the large organic carbon inputs provided by the Mississippi River. Thus, the dynamics of CO_2 in Gulf waters need to be studied.

Biogeochemical Rates and Processes

- The scientific community's understanding of the rates of biogeochemical processes in the river and delta influenced regions of the Gulf of Mexico are limited. These limitations

impact our ability to study and predict hypoxia, fisheries and other ecosystem functions in the Gulf.

Linking River, Estuarine, and Ocean Models

- At present, many of the models used to study the impacts of the Mississippi River and its delta on the Gulf of Mexico are based on a single system; they cover either the river, the delta and its estuaries or the Gulf of Mexico. More work on model development is needed to link these models and to develop integrated modes that unite the river, its delta and the Gulf of Mexico.

Development of Food Web and Multi-Species Ecosystem Models

- At present, food web models do not fully capture and predict the complex interactions that exist in Gulf ecosystems. Improvements to food web models will help inform restoration and recovery from the Deepwater Horizon oil spill.

FFO-2017

Request for Proposals

The Science Program's FFO-2017 announcement called for research focused on living coastal and marine resources and their habitats, continuing the Science Program's commitment to producing timely and high-quality scientific findings and products to support the management and sustainability of the Gulf of Mexico ecosystem, including its fisheries.

This funding competition had two priorities. A research priority directed at six specific areas of living coastal and marine resource research and a decision-support tool priority directed at improving the tools available for resource management. To receive funding, applicants were required to directly address a resource management need and have a clear plan for how their research findings or decision support tool would be used by specific resource managers. Proposals were initially funded between one to three years.

Proposals addressing this competition's research priority were designed to increase understanding of living coastal and marine resources and their habitats in the Gulf of Mexico in one or more of these six specific areas of research:

- Movement of living coastal and marine resources between and among habitats;
- Use of habitat by living coastal and marine resources;
- Recruitment of juvenile fish to fisheries;
- Food web structure and dynamics, trophic linkages, and/or predator-prey relationships;
- Impact of multiple stressors on food web structure and dynamics and/or habitat quality and quantity; and
- Connections between restored habitat and surrounding habitats and the living coastal and marine resources and wildlife that use those habitats.

Proposals that clearly described how the research will be applied, related to a challenge facing resource managers, and detailed a path for communicating their research results to the management community were given priority.

Proposals that addressed this competition's decision-support tool priority were designed to improve decision-support tools for the management of living coastal and marine resources and their habitats in the Gulf of Mexico. The tools were required to inform a current or near-term management decision or challenge identified as a priority by the management community. In addition, there had to be a clear path forward for the use of the tool by resource managers.

These decision-support tools could take the form of a data integration platform; models for identifying and predicting the impacts of stressors or interactions among components of the ecosystem; and/or structured approaches for making decisions which develop and evaluate alternatives. Proposals focused on improving an existing decision-support tool actively being used by a resource manager were given priority.

Click to review the full announcement and web announcement.

Funded Projects

Decision-Support Tools

Title: Living shoreline site suitability model transfer for selected water bodies within the Gulf of Mexico: A GIS & remote sensing-based approach
Lead Investigator: Chris Boyd
Lead Institution: Troy University
Award Amount: $519,853
Learn more

Title: Ecosystem modeling to improve fisheries management in the Gulf of Mexico
Lead Investigator: David Chagaris
Lead Institution: University of Florida
Award Amount: $1,167,586
Learn more

Title: Expansion of www.mymobilebay.com [now known as ARCOS] for coastal Alabama resource management
Lead Investigators: Brian Dzwonkowski and Renee Collini
Lead Institution: Dauphin Island Sea Lab
Award Amount: $720,000
Learn more

Title: SPAT: Shellfish portfolio assessment tool
Lead Investigator: Daniel R. Petrolia
Lead Institution: Mississippi State University
Award Amount: $590,143
Learn more

Title: A web-based interactive decision-support tool for adaptation of coastal urban and natural ecosystems (ACUNE) in Southwest Florida
Lead Investigator: Y. Peter Sheng
Lead Institution: University of Florida
Award Amount: $995,487
Learn more

Title: A decision support tool for evaluating the impacts of short- and long-term management decisions on the Gulf of Mexico red snapper resource
Lead Investigator: Yuying Zhang
Lead Institution: Florida International University
Award Amount: $528,945
Learn more

Research

Title: Assessment of movement patterns and critical habitat for coastal and continental shelf small cetaceans in the Gulf of Mexico using newly developed remote satellite tagging techniques
Lead Investigator: Michael Moore
Lead Institution: Woods Hole Oceanographic Institution
Award Amount: $407,128
Learn more

Title: Use of elemental signatures to detect and trace contaminant entry to the northern Gulf of Mexico coastal food web: managing multiple stressors
Lead Investigator: Ruth Carmichael
Lead Institution: Dauphin Island Sea Lab, University of South Alabama
Award Amount: $231,671
Learn more

Title: Gulf-wide assessment of habitat use and habitat-specific production estimates of nekton in turtlegrass (*Thalassia testudinum*)
Lead Investigator: Kelly M. Darnell
Lead Institution: The University of Southern Mississippi
Award Amount: $992,136
Learn more

Title: Trophic interactions and habitat requirements of Gulf of Mexico Rice's whales
Lead Investigator: Lance P. Garrison
Lead Institution: NOAA
Award Amount: $2,312,275
Learn more and **Watch the Rice's whales video**

Title: Linking habitat to recruitment: evaluating the importance of pelagic sargassum to fisheries management in the Gulf of Mexico
Lead Investigator: Frank Hernandez
Lead Institution: The University of Southern Mississippi
Award Amount: $1,770,853
Learn more

Title: Population connectivity of deepwater corals in the northern Gulf of Mexico
Lead Investigator: Santiago Herrera
Lead Institution: Lehigh University
Award Amount: $1,338,193
Learn more

Title: Effects of nitrogen sources and plankton food-web dynamics on habitat quality for the larvae of Atlantic bluefin tuna in the Gulf of Mexico
Lead Investigator: Trika Gerard
Lead Institution: NOAA Southeast Fisheries Science Center
Award Amount: $1,613,288
Learn more

Title: Linking community and food-web approaches to restoration: An ecological assessment of created and natural marshes influenced by river diversions
Lead Investigator: Michael J. Polito
Lead Institution: Louisiana State University
Award Amount: $2,057,684
Learn more and **Watch the Marsh food web video**

Title: A multiscale approach to understanding migratory land bird habitat use of functional stopover habitat types and management efforts
Lead Investigator: Theodore J. Zenzal, Jr.
Lead Institution: The University of Southern Mississippi
Award Amount: $1,492,151
Learn more

FFO-2019

Request for Proposals

The priority for the 2019 competition was to identify, track, understand, and/or predict trends and variability in the Gulf of Mexico's living coastal and marine resources and the processes driving them. Projects were initially funded for a five-year period.

Applicants were asked to propose work that addressed this priority in one or more of these areas of emphasis: 1) exploring trends in multiple species, 2) investigating the link between weather and/or climate and trends, 3) and examining the relationship between trends and economic activity.

1. Exploring trends in multiple species could include, but was not limited to, the investigation of how the trends and variability in multiple species respond to the same driver, trends and variability in food web dynamics, or multi-species stock assessments.
2. Investigating the link between weather and/or climate and trends could include, but was not limited to, the impact of hurricanes, precipitation events, winter storms, heat waves, drought, shifting temperature regimes, changes in sea level, and fluctuations in atmospheric or ocean circulation.
3. Examining the relationship between trends and economic activity could include, but was not limited to changes in economic activity measured as expenditures and revenues; income and employment generated; direct, indirect, and induced economic output, and changes in economic value.

Click to review the full announcement and web announcement.

Funded Projects

Title: Fire effects in Gulf of Mexico marshes: Historical perspectives, management, and monitoring of mottled ducks and black and yellow rails
Lead Investigator: Auriel M.V. Fournier
Lead Institution: Mississippi State University
Award Amount: $3,922,699
Learn more **and** **Read the Firebird feature story**

Title: Building resilience for oysters, blue crabs, and spotted seatrout to environmental trends and variability in the Gulf of Mexico
Lead Investigator: John C. Lehrter
Lead Institution: University of South Alabama
Award Amount: $2,887,250
Learn more

Title: Trends and drivers of faunal abundance of the offshore Gulf of Mexico: Narrowing the data gap in the Gulf's largest ecosystem component
Lead Investigator: Tracey T. Sutton
Lead Institution: Nova Southeastern University
Award Amount: $2,794,147
Learn more

Title: Optimization and expansion of Gulf-wide video survey efforts to better characterize temporal and spatial variability in reef fish assemblages in response to drivers at multiple scales: The G-FISHER (Gulf Fishery Independent Survey of Habitat and Ecosystem Resources) program
Lead Investigator: Theodore Switzer
Lead Institution: Florida Fish and Wildlife Conservation Commission, Fish and Wildlife Research Institute
Award Amount: $6,018,538
Learn more

Title: Assessing long-term trends and processes driving variability in cetacean density throughout the Gulf of Mexico using passive acoustic monitoring and habitat modeling
Lead Investigator: Melissa S. Soldevilla
Lead Institution: NOAA National Marine Fisheries Southeast Fisheries Science Center
Award Amount: $3,588,922
Learn more

FFO-2021

Request for Proposals

This 2021 FFO provided natural resource managers, researchers, and other stakeholders with the chance to compete for funding to plan a research project that informs a specific management decision impacting natural resources in the Gulf of Mexico.

This funding opportunity laid the foundation for the co-production of actionable science in two ways. One way is by focusing on the creation of partnerships between natural resource managers and researchers. The second way is by providing those partnerships with funding to jointly scope and design a research project that informs a future natural resource management decision. At least one natural resource manager was required to either lead or be on each project team.

Projects were initially funded for a one-year period. As the planning projects awarded in this competition conclude, the Science Program expects to release a second competition for funding to execute and apply actionable science in the Gulf of Mexico.

Click to review the full announcement and web announcement.

Funded Projects

Title: Characterizing cryptic mortality in Gulf of Mexico reef fish: Evaluating the nature and extent of depredation
Lead Investigator: Marcus Drymon
Lead Institution: Mississippi State University and Mississippi-Alabama Sea Grant
Award Amount: $118,023
Learn more

Title: Integrating socioeconomic impacts into fisheries restoration decisions
Lead Investigator: Lydia Olander
Lead Institution: Duke University
Award Amount: $121,735
Learn more

Title: Knowledge co-production for place-based recreational fishery conservation in Charlotte Harbor, Florida
Lead Investigator: Corey Anderson
Lead Institution: Fish & Wildlife Foundation of Florida, Inc.
Award Amount: $114,058
Learn more

Title: Is the Bahia Grande currently functioning as a fishes nursery, and what are the associated resource management implications?
Lead Investigator: Carlos E. Cintra Buenrostro
Lead Institution: The University of Texas Rio Grande Valley
Award Amount: $126,663
Learn more

Title: Planning a next-generation forecasting platform to achieve stock assessment and management objectives
Lead Investigator: Nathan Ronald Vaughan
Lead Institution: Vaughan Analytics
Award Amount: $81,047
Learn more

Title: A decision-driven integrated ecosystem approach to maximize benefits of barrier island restoration and management of the Chandeleur Islands for seagrass and associated communities
Lead Investigator: Kelly Darnell
Lead Institution: University of Southern Mississippi
Award Amount: $127,065
Learn more

Title: Restoration of Gulf of Mexico islands and beaches for wildlife: Reducing the uncertainty
Lead Investigator: James Nelson
Lead Institution: University of Louisiana at Lafayette
Award Amount: $102,694
Learn more

Title: Decision support for multi-species coastal habitat management on properties with multi-use objectives
Lead Investigator: Sara Zeigler
Lead Institution: United States Geological Survey
Award Amount: $97,200
Learn more

Title: Structured decision making to co-produce an actionable science plan in support of Louisiana, Mississippi, Alabama Coastal System water quality management
Lead Investigator: George Ramseur
Lead Institution: Mississippi Department of Marine Resources
Award Amount: $126,646
Learn more

Title: Co-production of a water flow decision tool to support resource management
Lead Investigator: David Yoskowitz
Lead Institution: Texas A&M University - Corpus Christi
Award Amount: $124,998
Learn more

Title: From planning to adaptive management: Natural resources decision making in response to the allocation of riverine inflows in the Northern Gulf of Mexico
Lead Investigator: Ehab Meselhe
Lead Institution: Tulane University
Award Amount: $124,926
Learn more

Title: Incorporating co-benefits and costs to coastal hazard mitigation decision making
Lead Investigator: Rachelle Sanderson
Lead Institution: Capital Region Planning Commission
Award Amount: $115,482
Learn more

Title: Restoring coastal wetlands for shorebirds: Leveraging lessons learned to identify research priorities and strategies to maximize future success
Lead Investigator: Anna R. Armitage
Lead Institution: Texas A&M University - Galveston
Award Amount: $122,346
Learn more

Title: Designing effective stewardship and post-restoration management plans through co-production to protect vulnerable Gulf of Mexico coastal birds
Lead Investigator: Nicole Michel
Lead Institution: National Audubon Society
Award Amount: $99,758
Learn more

Title: Creating secure warm-water habitat networks for manatees along Florida's Gulf Coast: Developing a vision, identifying gaps, and prioritizing restoration sites
Lead Investigator: Charles J. Deutsch
Lead Institution: Florida Fish and Wildlife Conservation Commission

Award Amount: $124,996
Learn more

Title: Developing a research framework to support assessments of cumulative effects from multiple stressors on dolphins in the Houston area under CERCLA and OPA
Lead Investigator: Ryan Takeshita
Lead Institution: National Marine Mammal Foundation, Inc.
Award Amount: $65,113
Learn more

Title: The potential for conservation grazing in coastal uplands
Lead Investigator: Eric Sparks
Lead Institution: Mississippi State University
Award Amount: $130,200
Learn more

Title: Building resilience into seagrass bed restoration: The role of genetic variation
Lead Investigator: T. Erin Cox
Lead Institution: University of New Orleans
Award Amount: $121,081
Learn more

Title: Tampa Bay restoration and Pyrodinium bahamense blooms dynamics: Filling knowledge gaps to enhance recovery
Lead Investigators: Cary Lopez and Sugandha Shankar
Lead Institution: Florida Fish and Wildlife Conservation Commission, Fish and Wildlife Research Institute
Award Amount: $103,503
Learn more

Title: Planning for a future of marsh creation: Evaluating the decision to continue to create high elevation confined marshes
Lead Investigator: Tracy Quirk
Lead Institution: Louisiana State University
Award Amount: $78,260
Learn more

Synthesis Initiative

Anticipated to Announce in April 2022

Request for Proposals

The NOAA RESTORE Science Program plans to propose a Synthesis Initiative focused on Gulf of Mexico environmental resources. The objectives for this initiative are to: a) improve our understanding of the ecological processes operating in the Gulf of Mexico ecosystem, including its watersheds and connecting waters; b) to provide support for ecosystem-based management and ecosystem-based fishery management (EBM and EBFM, respectively) applications; and c) develop the capacity for conducting synthesis on the Gulf of Mexico ecosystem, which can include workforce development, promoting use of open source data, and increased access to computing capacity for synthesis within the U.S. Gulf States.

Synthesis has the potential to improve our integrated understanding of the Gulf of Mexico ecosystem. Synthesis is defined as the integration of distinct elements to generate novel insights, address critical questions, or develop new approaches to interpreting and using data. Scientific synthesis has four common methodologies (Sidlauskas et al., 2009):
1) Data integration, which aggregates two or more disparate datasets into an integral whole and typically is used to add new dimensions to existing information, address specific questions, support new types of research or scale up research, or develop new technologies;
2) Enhanced use of findings from different sources (e.g. distinct research disciplines or methodologies) in new contexts;
3) Integration of two or more methods to create a new analytical pathway; and
4) Conceptual synthesis, which bridges theories and paradigms that underpin previous studies.

By investing in synthesis in the Gulf of Mexico, the Science Program aims for one or more of the following types of impacts: conceptual, relationships, strategic, instrumental, or capacity (Wyborn et al., 2018). Conceptual impacts are characterized by utilizing synthesized knowledge to change the understanding of a system or phenomenon. Relationship impacts use synthesis products to change the understanding of the interconnections between actors, sectors, or systems. Strategic synthesis impacts inform policy or activities by using the synthesized knowledge to support a new perspective on a problem. Instrumental impacts utilize models, planning tools, or organizational norms to inform policy change. Finally, capacity impacts utilize synthesis products to build capacity for sharing and use of scientific information

The Science Program anticipates synthesis projects will produce multiple products that generate one or more of these types of impacts. By funding a multi-year Synthesis Initiative, the Science Program intends to generate impacts that ultimately improve our understanding and management of the Gulf of Mexico ecosystem as an integrative whole.

PERFORMANCE MANAGEMENT

The NOAA RESTORE Science Program uses performance metrics to assess progress towards the program's expected outcomes. These performance metrics are the result of a process that began in the spring of 2015, when the Science Program developed an initial set of performance metrics using a logic model approach that drew on the link between the activities, outputs, and outcomes for each of the ten long-term priorities in the Program's science plan. These proposed metrics were reviewed by the Executive Oversight Board for the Science Program, refined, and then shared with NOAA's Science Advisory Board's (SAB's) Gulf Coast Restoration Science Program Advisory Working Group (RSPAWG) in June 2015.

The RSPAWG developed both overarching and specific recommendations on the metrics that were reviewed and approved by the SAB and transmitted to NOAA in December 2015. The overarching recommendations were to develop 1) both qualitative and quantitative metrics and 2) metrics that can be adapted to the specific objectives of future funding opportunities from the Science Program. The specific recommendations focused on metrics or questions to be addressed in progress reports for projects and other activities funded by the Science Program.

The Science Program partnered with the Performance, Risk, and Social Science Office of NOAA's Chief Financial Office to strengthen the performance metrics for the program based on the recommendations of the SAB and a review of the performance management practices of other science-driven programs. The resulting metrics aim to measure meaningful progress using a manageable amount of data collection. The metrics assess long-, medium-, and short-term outcomes and outputs expected from Science Program activities. The metrics also consider both the quantity and quality of the outcomes and outputs.

The metrics address both of the overarching recommendations from the RSPAWG. The RSPAWG's specific recommendations have been integrated into the progress reporting process for individual projects funded by the Science Program.

Performance Metrics Summary

The RESTORE Science Program has developed a performance management plan for assessing the program's progress. The metrics are designed to track both outputs and outcomes from the Science Program's activities. The start date for the Science Program is considered to be November 27, 2012, when NOAA leadership approved the Science Program framework. The Science Program has tabulated metrics from that point forward (i.e. federal fiscal year 2013).

Joint Activities (Output)

This metric is defined as any activity involving Science Program investments or activities conducted in concert with another program. This may include, but is not limited to, funding competitions, workshops, funded-project collaborations, conference panels or sessions, and publications, such as review articles. Only investments made or activities performed by the Science Program, as opposed to funded projects, are eligible to be considered joint activities.

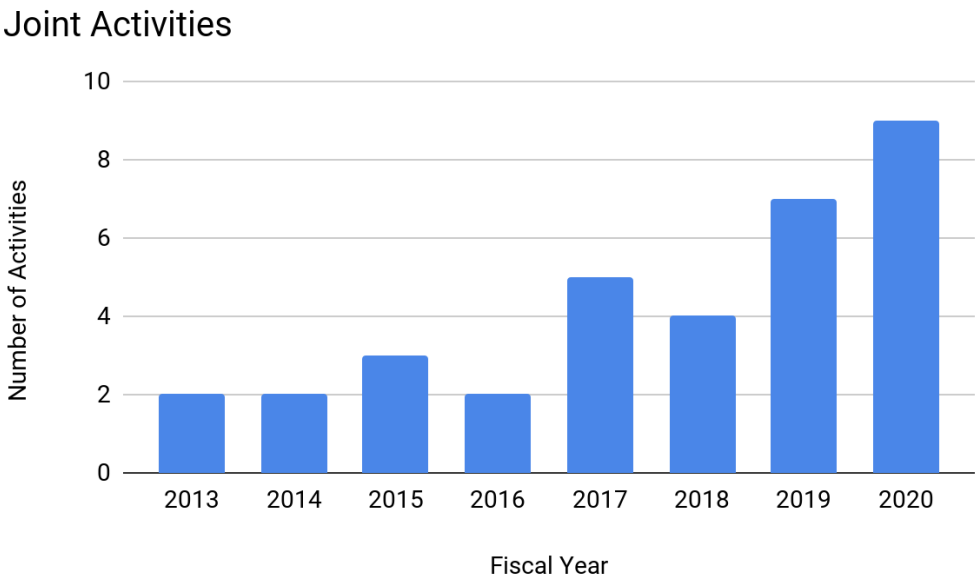


Figure 1. Number of joint activities in each fiscal year.

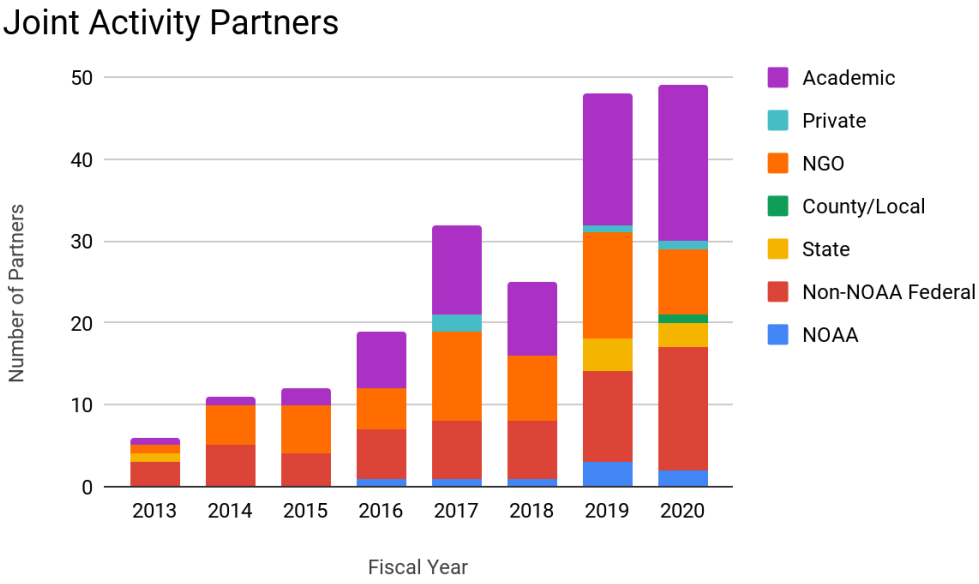


Figure 2. Number of joint activities performed each fiscal year according to organization type. In some cases a joint activity was undertaken with multiple partners.

Leveraged Funds (Output)

The metric for leveraged funds is defined as 'amount of funding leveraged by the Science Program (including awardees) with one or more entities for Gulf of Mexico science and/or restoration.' The program has leveraged funds in each FY to date.

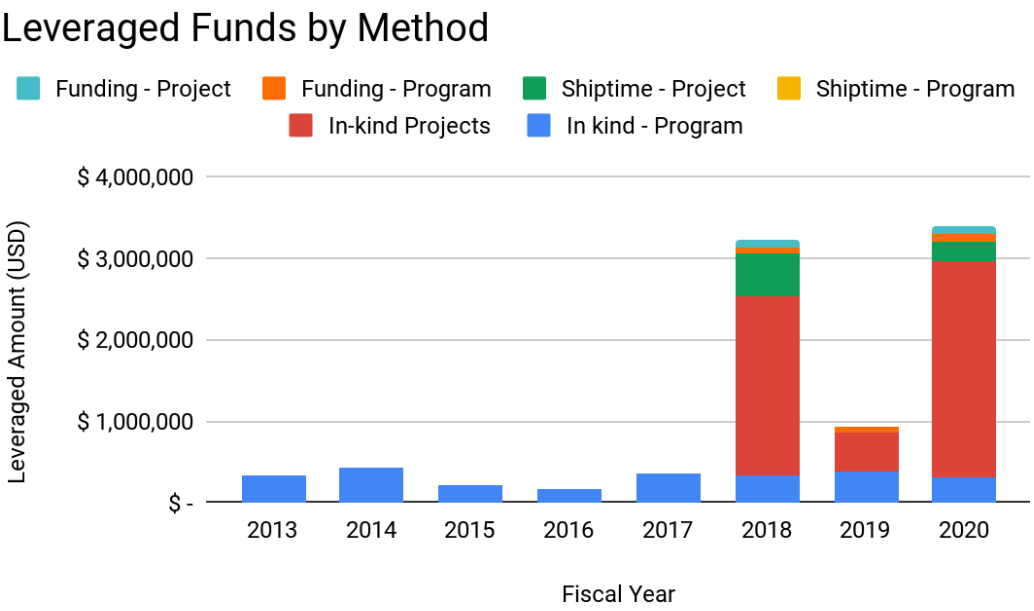


Figure 3. Amount of leveraged funds by method for each fiscal year, inclusive of Program and funded project leveraging.

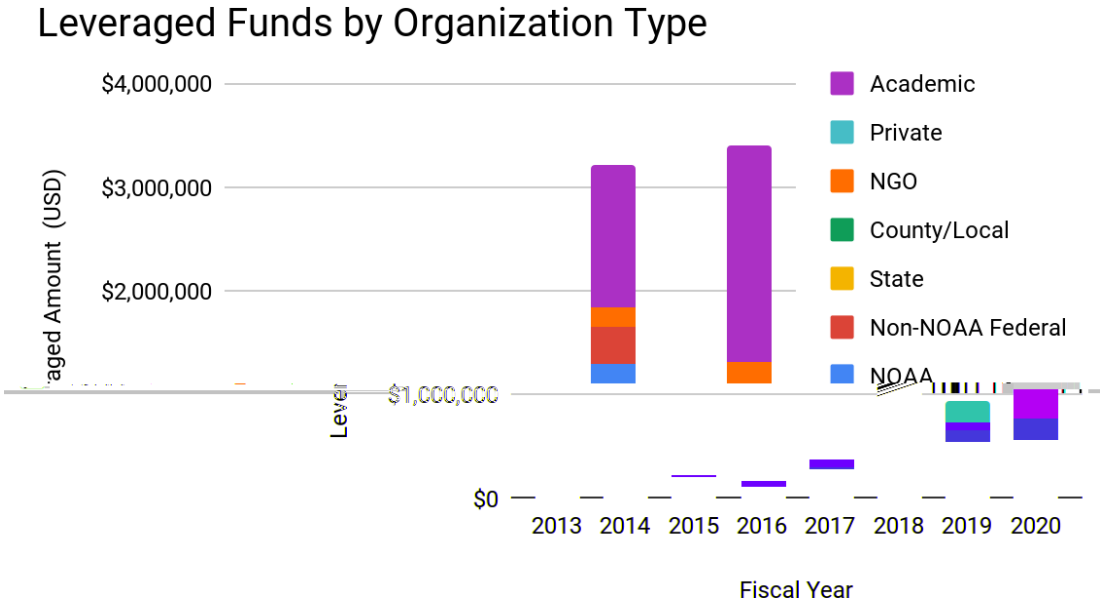


Figure 4. Amount of leveraged funds by type of organization providing the leverage.

High Impact Journal Publications (Output) and Citations (Short-term Outcome)
The metrics for Science Program-supported, peer-reviewed publications are 1) the percent published in high impact journals (high impact = Google Journal h-5 index greater than 35) and 2) number of citations.

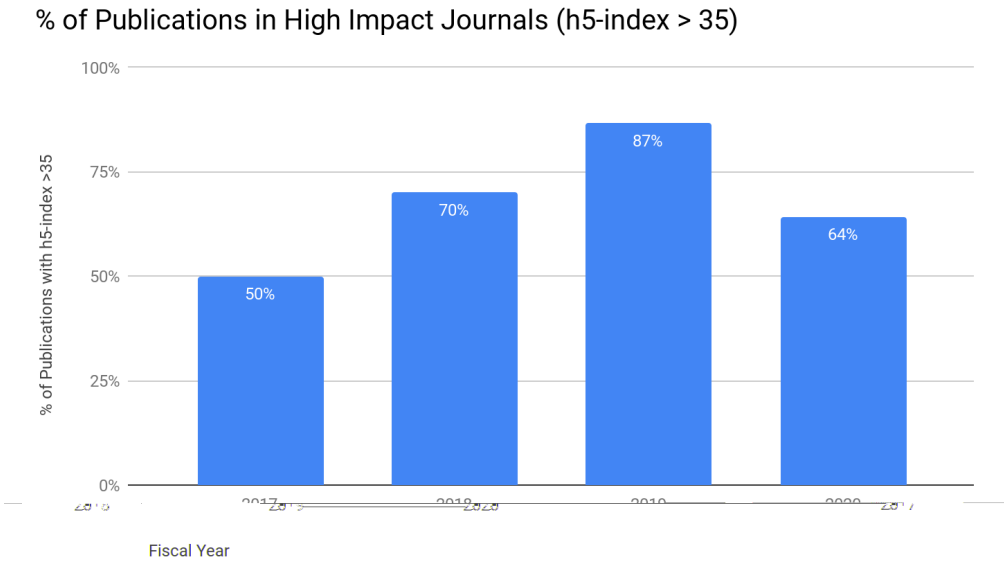


Figure 5. Percent of publications appearing in high impact journals.

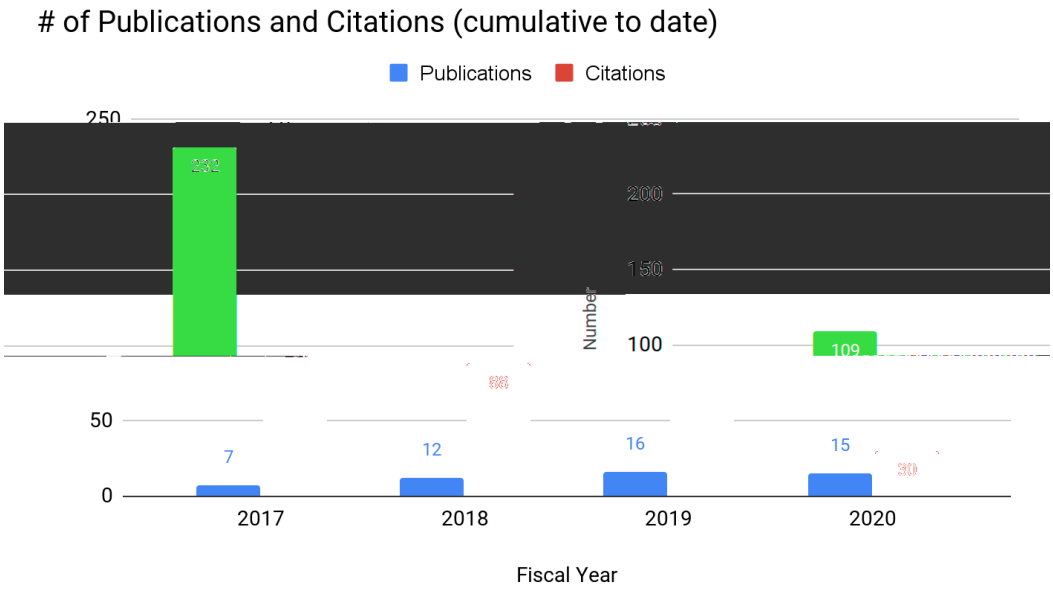


Figure 6. Number of publications in each year and the cumulative citations for that set of publications. The first publications were in 2017 from the first projects which were awarded in 2015.

Sharing (Output)

This metric measures the number of Gulf of Mexico resource management organizations with whom Science Program-supported research findings or products have been shared. Sharing requires a documented exchange of information where it is possible to identify the management

organization, a point of contact for the organization, and the date information was exchanged. A verbal exchange absent an exchange of written information does not count as sharing.

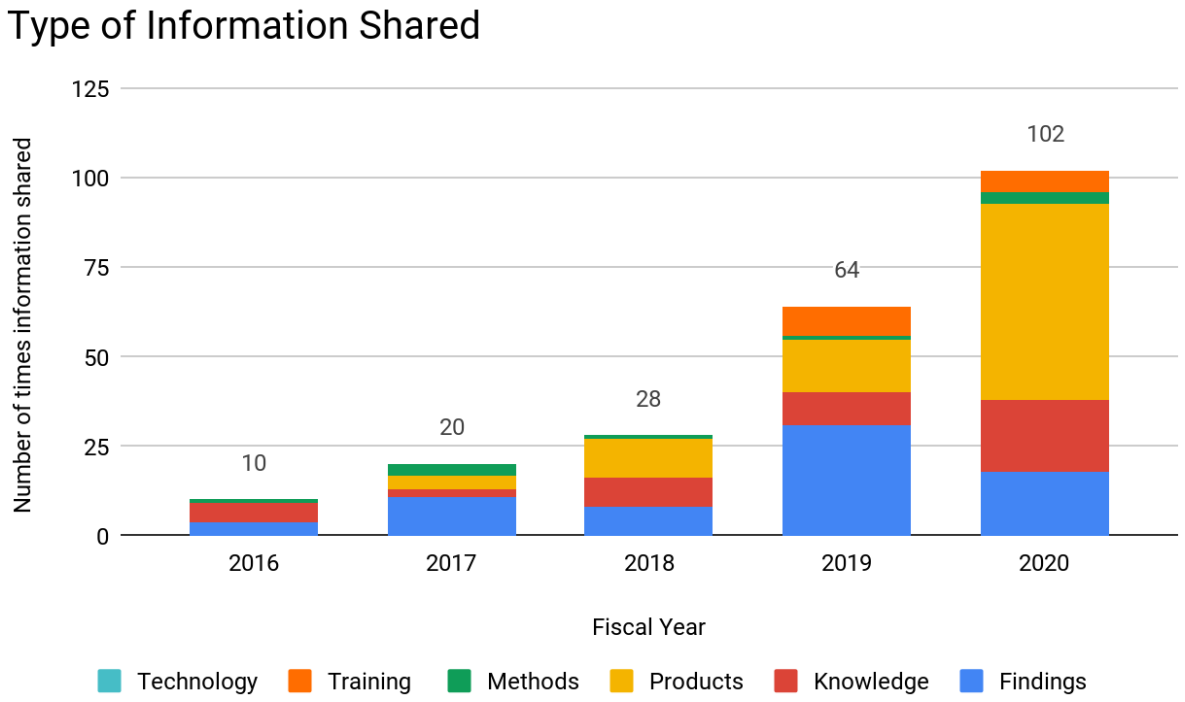


Figure 7. Type of information shared with resource management organizations by fiscal year. The first sharing of information was in FY16 from the first set of projects the program funded in FY15.

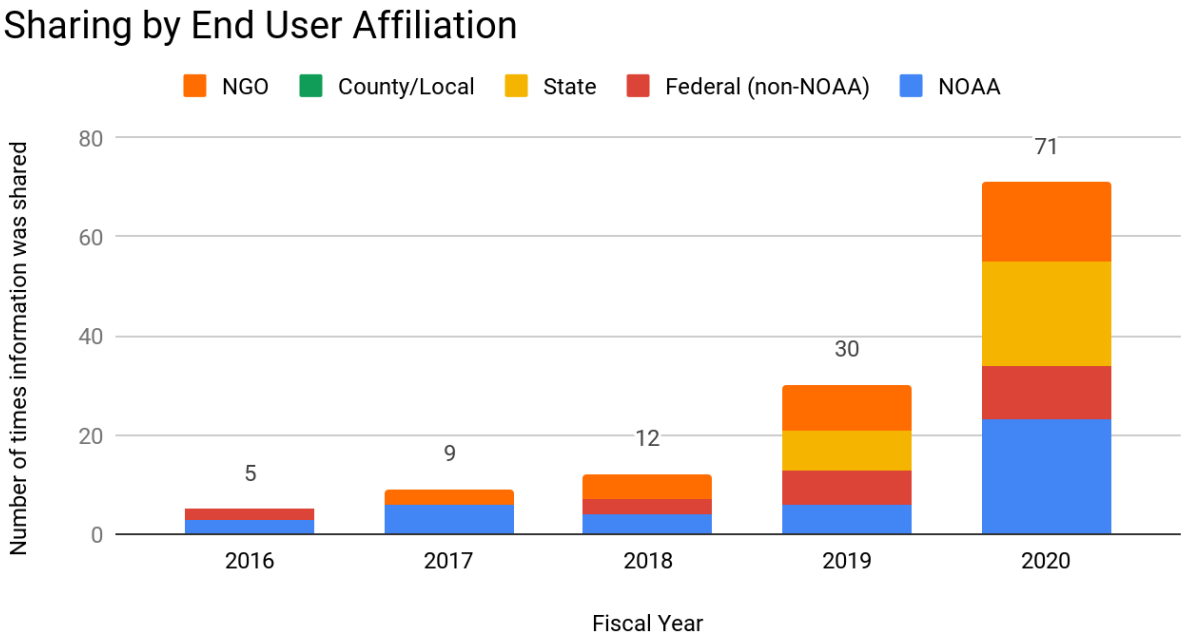


Figure 8. Type of organization with whom information was shared by fiscal year. The Science Program first funded projects in FY15 and the first sharing of information from these projects was in FY16. In some cases information was shared with multiple partners, therefore data is not additive.

Utility and Quality (Short-Term Outcome)

This metric measures the number of Gulf of Mexico resource managers who have used research findings or products originating from Science Program investments or activities and found them to be of high utility and quality.

The Science Program has developed a five-question survey that is sent to end users with whom research findings and products have been shared.

At the conclusion of a project, the project team identifies end users with whom they have shared their findings and products. The Science Program then shares this information with a social scientist at Florida State University who administers the survey.

The only set of projects to have been completed are from the 2015 funding competition. The survey was administered electronically to a sample of 15 end users identified across the seven 2015 projects. Each survey solicitation email referenced the project name, project team lead, and the approximate date when the findings or products were shared.

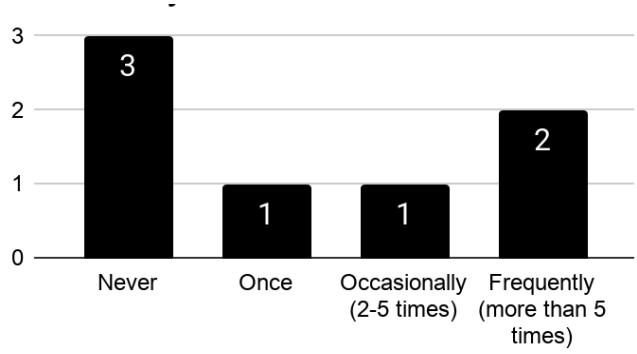
Results

Of the 15 end users solicited, eight responded (six end users had email addresses that were no longer functional).

Question 1: Do you remember the exchange of information referenced in the email? Yes/No. If yes, please proceed to questions 2 - 5.

Seven of the end users indicated that they remembered the exchange of information.

Question 2: Have you used the information?

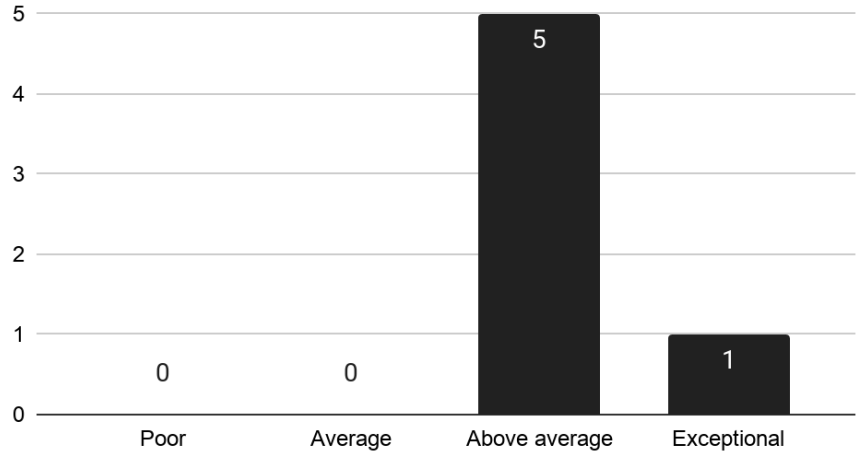


Examples of use given by participants:

- "Examined differences between local buoy data"

- “The data are used in a variety of ways--in education and outreach activities; as supporting documentation for proposals supporting MBON and the US Animal Telemetry Network; to gather species profile information; quick reference for images of important Gulf of Mexico species; and more”
- “We've routinely been referring to this site prior to going offshore, and after a cruise, if we see specific oceanographic conditions, to confirm whether or not it aligns with the satellite imagery and early warning products.”

Question 3: Please rate the quality of the product or information you have used on a scale of 1 to 4. Quality is defined as the degree to which the product or information fulfills the requirements of the end user and is valued equally or more than similar products.

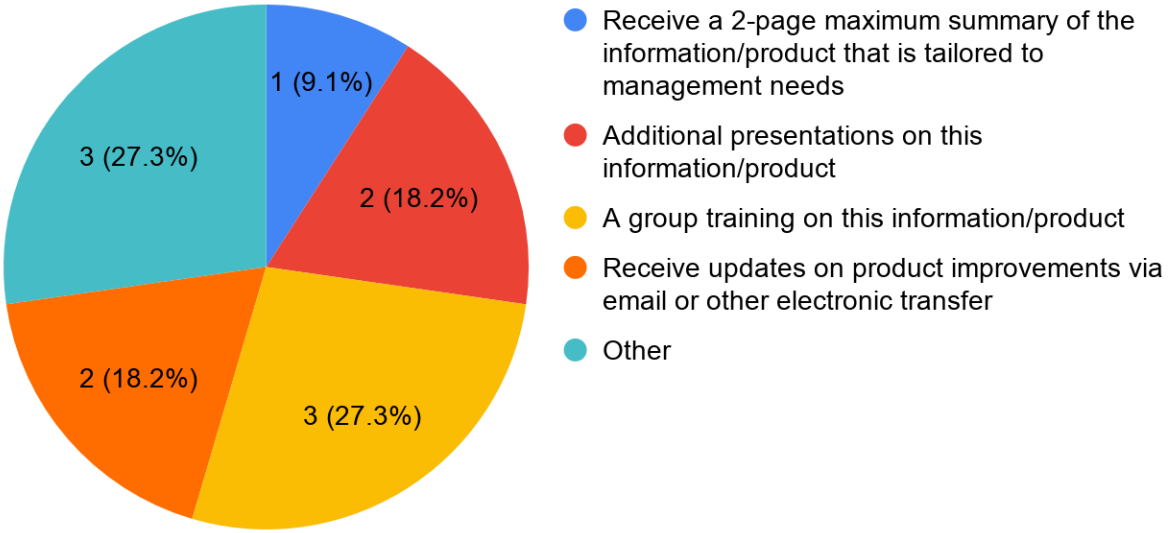


Question 4: Has your organization made any management decisions informed partially or wholly by this information or product? Y/N
If Yes, what decision(s) was/were made

One participant indicated that the information was used to inform natural resource management decisions. The participant wrote the following regarding the decision:
“I believe certain instruments were installed to track specific aspects of water quality as a result of this work. But a more reliable answer will come from people at the Flower Garden Banks National Marine Sanctuary.”

Question 5: What suggestions do you have for improving the way that the information or product was communicated to you? (select all that apply)

- *Receive a 2-page maximum summary of the information/product that is tailored to management needs*
- *Additional presentations on this information/product*
- *A group training on this information/product*
- *Individual training(s) on this information/product*
- *Receive updates on product improvements via email or other electronic transfer*
- *Other (please specify) -*



Examples of how the communication of results could be improved:

- "Maybe provide species highlights in magazines of interest to fishermen and conservation groups; they are the ones who will ultimately influence policy so need to be in the dialogue."
- "Integrate email alerts of anomalous conditions to refer us to the site"

Next Steps

The projects the Science Program funded in 2017 have begun to complete their periods of performance. This same survey will be administered to a subset of the end users identified by these projects in their final reports within one year of the completion of the project.

Management Actions (Medium-Term Outcome)

This metric measures the number of local, state, federal, or regional strategies, plans, regulations, policies, laws, or funding initiatives addressing Gulf of Mexico ecosystem science or management changed or adopted as a result of Science Program activities.

Management Actions - Completed

Alabama Center of Excellence funding of the Alabama Real-time Coastal Observing System (ARCOS) - May 2021

- The Alabama Center of Excellence (ALCOE) funded by the RESTORE Act made the decision to support the Alabama Real-time Coastal Observing System (ARCOS) immediately following the end of the Science Program's project focused on the observing system. The support for ARCOS went into effect at the end of May 2021. The decision by the ALCOE to support ARCOS ensured that its station remained in operation and its end users would continue to have access to its data to inform their actions in a variety of sectors including coastal management, shipping, commercial and recreational fishing, and tourism. In addition, the Gulf of Mexico Coastal Ocean Observing System has expressed interest in investing in advanced biological monitoring at station sites. Hence,

the long-term sustainability of ARCOS and its continued expansion was made possible through the RESTORE Science Program's investment in 2017 to improve and expand the observing system.

Further regulating fishing in the Madison Swanson Sites and Steamboat Lumps to protect spawning aggregations - June 2020

- The Science Program's 2015 project on Spawning Aggregations worked extensively with the teams responsible for providing the science to inform the management of the Madison-Swanson Sites and Steamboat Lumps Marine Protected Areas which were established in June 2000. The Gulf of Mexico Fisheries Management Council has progressively limited fishing activity in these areas to protect gag grouper spawning aggregations. The latest recommendation by the Council made on June 18, 2020 was to prohibit trolling and possession of reef fish year-round in Madison-Swanson and Steamboat Lumps Marine Protected Areas. Previously, no bottom fishing had been allowed in those areas, but surface trolling had been permitted from May 1 – October 31. The reports and publications produced by the Science Program project were used in supporting the continued designation of these areas as Essential Fish Habitat (EFH) and critical multi-species spawning aggregation sites. This work supported the extended protection of these two areas, which are critical spawning grounds for many species of groupers, snappers, and other reef fishes. The decision to further limit fishing in these two marine protected areas was primarily driven by the recognition that it is difficult to enforce the no-bottom-fishing regulation when surface trolling is allowed. The Council heard concerns that illegal recreational bottom fishing was regularly occurring in the areas. The Science Program's work confirmed the importance of these marine protected areas and was presented to the Council, but alone did not drive the new management action.

Boundary Expansion of the Flower Garden Banks National Marine Sanctuary - January 2021

- The Science Program's 2015 project on Observing Systems and Ecosystem Management visualized information on ocean circulation and the movement of water from the nearshore to the offshore, and this information fed into considerations of boundary expansion.
- The Science Program's 2017 project on Deepwater Corals produced information on the connectivity of deep and mesophotic coral communities in the northern Gulf of Mexico, and this information fed into considerations of boundary expansion.

National Academies' Gulf Research Program funding opportunity on coupled human and natural systems - March 2019

- The lead investigator from the Science Program's 2015 project, Impacts of Mississippi River on the Gulf of Mexico, was a member of the committee that authored the report from the National Academies titled "Understanding the Long-Term Evolution of the Coupled Natural-Human Coastal System". The study drew information from many sources including the investigator's work supported by the Science Program, which

investigated the influence of the Mississippi River and its delta on the oceanography, ecology, and economy of the Gulf of Mexico. Ultimately, the study informed a funding opportunity released by the National Academies' Gulf Research Program in 2019 that focused on advancing understanding of coastal ecosystem function and dynamics in the coupled natural-human system of the Gulf Coast.

Management Actions - Pending

The Science Program is tracking several other pending management actions where the results of Science Program activities may inform a resulting action.

Independent Rating of the Science Program (Medium-term Outcome)
The Science Program's first independent review has been scheduled for November 16-18, 2021. It will follow the guidance in NOAA Administrative Order 216-115A covering research and development in NOAA.

Ecosystem-Based Management Knowledge and Practice (Long-term Outcome)
This metric measures Gulf of Mexico resource managers' knowledge of and capacity for taking an ecosystem-based approach to management.

The Science Program partnered with Dr. Kassie Ernst, a social scientist at Florida State University and Florida A&M University, to conduct a survey of state and federal marine and coastal resource managers and managers from boundary organizations, who are actively involved in managing resources in the U.S. Gulf of Mexico. The survey instrument was designed to measure community knowledge of and capacity for taking an ecosystem-based approach to management.

Ecosystem-Based Management Practices in the Gulf of Mexico: A Summary of Survey Results

Kassie Ernst and Tia Maxwell October 5, 2021

This document provides an overview of preliminary results derived from the first dissemination of the NOAA RESTORE Science Program "State of Resource Management Practices in the Gulf of Mexico" survey. This survey was distributed from February-May 2021 to resource managers in the United States Gulf of Mexico region to gauge their familiarity with, and application of, ecosystem-based management (EBM).

Respondents were asked to identify their role as it relates to resource management, self-report their familiarity with EBM, and respond to short-answer survey questions that investigate the specifics of whether/how they use EBM. The survey included a definition of EBM as "an integrated management approach that recognizes the full array of interactions within an ecosystem, including humans, rather than considering single issues, species, or ecosystem

services in isolation" and linked to a brief overview of the concept (EBM 101, NOAA). Respondents were identified by the Science Program and existing professional contacts. An email was sent by Kassie Ernst (Principal Investigator) to potential respondents with a survey link. The survey was carefully distributed to presumed resource managers in an attempt to capture a majority of responses from resource managers who participate in planning and implementation, rather than responses from individuals who participate in ancillary resource management actions. All but 10 respondents chose either resource management planning *or* implementation as their primary professional role, while only one respondent did not choose either resource management planning *or* implementation as their primary or secondary professional role, indicating that responses primarily came from the target resource management population (see Table 1). In total, 54 respondents took approximately nine minutes to participate in the survey. Subjects were not monitored, so it is likely other tasks were being completed simultaneously, indicating the survey took, on average, 5-10 minutes to complete.

Table 1. Professional roles identified by survey respondents (by counts)

Type of Professional Role	Primary Role	Secondary Role	Tertiary Role
Resource Management Planning	20	21	6
Resource Management Implementation	18	20	8
Policy	3	6	16
Research	5	2	7
Extension/Boundary Spanner	2	0	4
Other	5	0	0

The goal of administering this survey is to develop a baseline understanding for how EBM is used and applied by resource managers in the Gulf region. This effort provides foundational information on the application of EBM in the Gulf region and on the progress made towards the Science Program's goal of improving the use and uptake of EBM throughout Gulf region resource management institutions. A high-level overview of results is provided next.

Results

Of the 54 respondents, 39% work in state government while 35% work in federal government (see Table 2). Other participants came from nonprofit, local government, and university/primary research institutions. No respondents selected a role in a tribal agency indicating an opportunity to assess outreach and communication to tribal communities in the Gulf region.

Table 2. Respondent institutional affiliation.

Responses by breakdown of organization	Percent	Count
Local Government	3.7%	2
State Government	38.9%	21
Federal Government	35.2%	19
Non-profit Institution	9.3%	5
University/Primary Research Institution	3.7%	2
Private Industry	1.9%	1
Other (e.g., respondents indicated multi-state agency, regional government, National Estuarine Research Reserve System as their affiliations)	7.4%	4

Respondents were well-distributed based on their primary geographic areas of focus across all five Gulf region states (Table 3). Respondents could choose multiple geographic areas of work (e.g., Alabama and Mississippi), although only eight respondents did so. Florida was the most well-represented state, with 18 respondents indicating that they conducted some work there. Of the ten respondents who selected either the entire Gulf region or the southeastern U.S. as a primary geographic area of focus, seven work in the federal government, two work in universities/primary research institutions, and one works for a multi-state agency (as indicated in their “Other” response to the question about institutional affiliation).

Table 3. Primary geographic region(s) of focus

Primary geographic area(s) where work is focused	Count
Alabama	7
Florida	18
Louisiana	9
Mississippi	9
Texas	10
Gulf of Mexico region	6
Southeastern United States	6

Most respondents reported at least a working knowledge of EBM. Only two respondents, both from nonprofit organizations, indicated that they did not have a working knowledge of EBM. When asked to choose the option that most accurately explains their familiarity with EBM, 88% of all respondents indicated they either regularly engage with, or actively practice, EBM. Local, state and federal government respondents overwhelmingly indicated that they have at least a working knowledge of EBM (Table 4). Next, we dive into some themes that emerged across the survey data.

Table 4. Reported individual familiarity with EBM across local, federal, and state government respondents (by counts)

Familiarity with EBM	I understand EBM, but not how to apply it at my work.	I engage in EBM practices.	I actively practice EBM and regularly apply it at work.
Local Government	0	2	0
State Government	0	11	9
Federal Government	1	10	6

EBM efforts are occurring throughout the Gulf region, and for a majority of respondents, these efforts are increasing

Overall, 92% of respondents report that EBM practices stayed the same or increased over the past five years (Table 5). When broken down by organization, respondents who work for state and federal governments indicated the greatest level of interaction with EBM and indicated the greatest increase in EBM practices in their local office with 36.4% of federal government respondents reporting an increase of 50% or more in EBM practices over the past five years. State government respondents were most likely to report a slight increase in EBM efforts over the past five years. Alabama and Texas respondents largely indicated a slight increase in the application of EBM, Florida respondents largely reported that EBM practices remained the same or were increased slightly, and Louisiana and Mississippi responses were evenly mixed across staying the same, slightly increasing, and increasing over the past five years. These variations across states may indicate a more recent increase in interest/adoption of EBM practices (Alabama and Texas), a longer-term commitment to EBM (Florida), or an increased focus on EBM that has already been practiced for five or more years (Louisiana and Mississippi) although more data is needed to fully understand the differences at the state level.

Table 5. Office EBM efforts organized by institutional scale (by counts)

In the past five years, your office's EBM efforts have:	Remained the same	Slightly increased (<50% increase)	Increased (≥50% increase)	Not applicable
Local Government	1	0	1	0
State Government	6	11	3	0
Federal Government	7	7	4	0
Non-profit Institution	1	0	2	2
University/Primary Research Institution	1	0	0	1
Private Industry	1	0	0	0
Other	0	2	1	1

NOTE: EBM decreased by ≥50% and slightly decreased by <50% were options that no respondents chose.

EBM use varies across Gulf of Mexico states

Respondents who selected Alabama as their primary work location indicated the lowest percentage of resource managers in their local offices who use EBM (46% while other state respondents averaged 69% and above). Alabama respondents also primarily noted that progress on EBM efforts would be lost if their office's primary EBM practitioner were to leave (Table 6).

Alternatively, all respondents who selected Florida as their primary work location indicated the highest percentage of recourse managers in their local offices who use EBM (79%). Also, the only respondents who indicated that everyone in their local office engages in EBM selected Florida as their primary work location (seven respondents). Resource managers working primarily within Florida were also less concerned that the use of EBM would be impacted if their primary EBM practitioner were to leave. After Florida, Louisiana had the second highest use and institutionalization of EBM followed by Texas, Mississippi, and Alabama. Future research efforts should consider whether, and if, EBM is more accessible to resource managers from specific states, and why.

Table 6. EBM institutionalization within a local office (by counts)

If the primary person focused on EBM in your local office were to leave/retire, how would EBM efforts be impacted?	Very much so, we would lose significant progress	Somewhat so, some progress would be lost but not too much	Not at all, others are trained in ecosystem-based management and can carry the work forward	Not applicable, no one in my office practices ecosystem-based management
Alabama	2	1	2	0
Florida	2	8	6	1
Louisiana	2	5	1	1
Mississippi	2	1	2	1
Texas	2	3	3	0
Southeastern U.S.	0	3	2	1
Other	0	0	0	1

Opportunities for science and research

Eight respondents indicated that they have not worked directly with external scientists or researchers on EBM in the past five years: five from state government, two from nonprofit institutions, and one from a university/research institution. These results indicate that opportunities exist to increase scientific collaboration in state and nonprofit resource management institutions.

Some respondents noted issues or projects that would benefit from, but are not currently using, EBM. These projects include (edited for clarity):

- Pervasive natural resource management issues including: harmful algal blooms, imperiled species research, invasive species management;
- Integration of habitat needs and tackling root sources of stress to fisheries management;
- Easier to use and widely accepted tools that help to practice EBM more frequently;
- Urban/natural resources co-development with greater consideration for native habitats and wetland protections while improving nonpoint source mitigation and flooding;
- Evaluating management practices in consideration of climate change uncertainties; and
- Coastal development management and planning.

Barriers to EBM planning and implementation

General analysis of survey text responses reveal that a lack of funding, support, and time hinders the implementation of EBM (Table 7). Respondents also indicated that EBM was not adequately incorporated into policy and regulatory frameworks. These results suggest that EBM is used in an effort to consider best practices, but that effectively integrating EBM throughout resource management is hindered by a lack of supporting policies/regulations, or the presence

of limiting policies/regulations. Additionally, **resource management planners** largely indicated a lack of data to bolster models and a lack of funding as primary barriers to EBM application; while **resource management implementers** largely indicated staffing limitations and demanding projects as primary barriers to EBM application.

Table 7. Summary of barriers identified by survey respondents

Barrier Identified	Identified By	Relevant Response
Nonexistent, unavailable, not readily available data	Federal (6), state (2), local (1)	
Overworked/short-staffed	Federal (4), state (5)	Need triple the staff to be effective (state, FL).
Lack of supporting/presence of limiting policies/regulations (e.g., EBM not integrated into policy/regulatory frameworks)	Federal (3), state (3)	Clean Water Act Section 404 permit process needs to be recalibrated to separate resource consumptive from restorative uses (state AL, LA, MS)
Lack of Funding (e.g., needs to be multi-year, consistent, well time)	Federal (4), state (3)	No funding dedicated to EBM until this year, and I've been here since 2006 (state, AL, LA, MS).
Lack of political will/public opinion	State (3), local (1)	Hard to compete with hardened structures/tax revenue (state, TX).
Lack of decision-making authority	State (3)	
Inadequate modeling	Federal (2), Research (1)	Focus on single-species assessments, lack of models at appropriate scales.
Timing restrictions	Federal (1), State (1)	Funding/policy timelines do not support EBM timelines (state, FL).

Next steps

The results of this research provide a foundational baseline for understanding the use and practice of ecosystem-based management (EBM) among resource managers in the Gulf region. Results indicate that EBM practices in general are remaining the same or slightly increasing over time across the region; that the practice of EBM differs across states; and that specific opportunities exist for science and research efforts at the state and nonprofit levels to support EBM uptake with a particular focus on pervasive natural resource management issues and multi-level/institutional planning efforts. Opportunities also may exist to connect with tribal organizations and institutions on EBM efforts.

Future work will include further analyzing the text responses to the EBM survey and conducting interviews of state-level and nonprofit resource managers equally distributed across the Gulf

region states. Interviews will focus on understanding resource management practices on the ground and identifying specific actions that are occurring that can be directly related to EBM. After interviews are completed, results will be analyzed, compared, and contrasted with survey results with plans to publish a short, accessible white paper and a peer-reviewed article presenting findings in greater detail. Ideally, the Science Program will continue these efforts to develop long-term analysis on the use and application of ecosystem-based management practices within resource management efforts in the Gulf of Mexico region to provide detailed data, findings, and information that will support resource management efforts that are considerate of the many dynamic and complex interactions within an ecosystem, in consideration of human impacts, and beyond a single issue, species, or service.

Output Metric Table

Table 1. Output based short-term performance metrics. All output based metrics are summarized in this report.

Type	Metric	Data Source	Frequency
Output	Percent of Science Program-supported, peer-reviewed publications in high impact journals (high impact = Google Journal h-5 index greater than 35)	Project progress reports, NOAA library	Semi-annual
	Primarily Assesses: ✔ Research		
	Number of Gulf of Mexico resource managers with whom Science Program-supported research findings or products have been shared	Project progress reports and technical monitors	Semi-annual
	Primarily Assesses: ✔ Application		
	Number of joint activities conducted with other programs (e.g., workshops, funding competitions)	Science Program	Semi-annual
	Primarily Assesses: ✔ Coordination		
	Amount of funding leveraged by the Science Program (including awardees) with one or more entities for Gulf of Mexico science and/or restoration	Science Program and project progress reports	Semi-annual
	Primarily Assesses: ✔ Coordination		

Outcome Metric Table

Table 2. Outcome-based performance metrics for the RESTORE Science Program. Only the short term outcome of citations of peer reviewed publications originating from Science Program awards are summarized in this report.

Type	Metric	Data Source	Frequency
Outcome long-term	The management of the Gulf of Mexico ecosystem and its resources is informed by a comprehensive understanding of the dynamic linkages between the components of the ecosystem and there is growing confidence in, and capacity for, taking an ecosystem-based approach to management.	Survey of state and federal management agencies in the Gulf of Mexico	Every 5 years (beginning no later than FY 2021)
	Primarily Assesses: ✔ Research ✔ Application		
Outcome medium-term	Number of local, state, federal, or regional strategies, plans, regulations, policies, laws, or funding initiatives addressing Gulf of Mexico ecosystem science or management changed or adopted as a result of Science Program activities	Project progress reports, technical monitors, and Science Program	Annual
	Primarily Assesses: ✔ Application ✔ Coordination		
	Rating of Science Program by independent and external review board for the quality of the science supported by the Program, the application of that science to management decisions/challenges, and the strength of coordination and collaboration with other entities	Independent review board	Every 5 years (beginning in FY 2021)[1]
	Primarily Assesses: ✔ Research ✔ Application ✔ Coordination		
Outcome short-term	Number of citations for peer-reviewed publications originating from Science Program activities	NOAA library	Semi-annual
	Primarily Assesses: ✔ Research ✔ Application ✔ Coordination		
	Number of Gulf of Mexico resource managers who have used research findings or products originating from Science Program investments or activities and found them to be of high utility and quality	Project progress reports and technical monitors	Semi-annual
	Primarily Assesses: ✔ Application		

[1] Roughly five years after first awards were made in September 1, 2015

Gulf of Mexico Ecosystem Tracking Metrics

The Science Program works to be aware of the status of the Gulf of Mexico ecosystem, which includes the environmental, social, and economic conditions under which management decisions are being made, so it can make informed decisions on the types of science and science application it supports. More information can be found in Table 3 of the Performance Management Plan.

2017 ECOSYSTEM STATUS REPORT UPDATE FOR THE GULF OF MEXICO

What it is:
This report was created by NOAA's Gulf of Mexico Integrated Ecosystem Assessment Program with the aim of supporting Ecosystem-Based Management. The purpose of the report was to provide a broad-level overview of the current state of the Gulf of Mexico (GoM) with respect to recent and historical trends. A suite of indicators were developed to represent key components of the GoM; and, an integrated socioecological conceptual framework was used to guide indicator development for the GoM by establishing links between humans, the coastal environments, and the species that inhabit these places.

What was found:
The findings in the 56-page report are as follows:

1. The Atlantic Multidecadal Oscillation, which was consistently on an increasing trend from the 1980s to 2010, has begun to slightly decline in recent years but is still in its positive phase.
2. Sea surface temperature and sea level rise, which have consistently increased over the past three decades, are now increasing at even faster rates in some areas. Ocean acidification has also increased over time. Hypoxia has recently become more severe off the coasts of Texas, but less severe in waters off the Louisiana coast.
3. Areal coverage of natural habitats, such as seagrasses and wetlands, are generally on the decline in the region. On the contrary, numbers of artificial habitats, such as artificial reefs and oil platforms, have generally increased over time.
4. Primary productivity measures and zooplankton biovolume estimates are highly variable, but generally stable over time. Primary productivity has increased slightly in recent years relative to the long-term average.
5. Mean trophic level of the commercial catch has remained stable in recent years. Nearly all fish species of primary or secondary economic importance are at biomass levels at or above the mean biomass over the last three decades. The proportion of stocks undergoing overfishing is at an all-time low.
6. Total fish and invertebrate commercial landings and revenues, which were generally declining or stable in past decades, have increased in recent years. Recreational fishing effort has also recently increased substantially after having decreased from 1980 to 2010.
7. The conversion of other land cover types into developed land has continued across the region. This process has progressed at a much faster rate in urban centers such as Houston, Texas and Tampa, Florida.

8. Indicators of human dimensions throughout the Gulf counties show an increase in urbanization and migration to urban areas. External shocks to the system, such as Hurricane Katrina, show how populations in low-lying areas may be more susceptible and less resilient to environmental change.

The report concludes with research recommendations as follows: 1) several of the indicators could potentially be improved through enhanced data discovery, standardization, and analysis; 2) information is lacking on protected species such as corals, sea turtles, and marine mammals due to fragmented and sporadic monitoring programs; 3) standardization and centrality of data collection, archiving, and access is needed to improve the ability to accurately assess the status of the GoM ecosystem; 4) and the information contained in the indicators used to create the report would be more meaningful if accompanied by associated measures of uncertainty.

NATIONAL COASTAL CONDITION ASSESSMENT 2015

What it is:
This National Coastal Condition Assessment 2015 (NCCA 2015) was published in 2021 and is the sixth in a series produced by the U.S. Environmental Protection Agency. The NCCA 2015 answers questions such as: What is the condition of the nation's coastal waters and is that condition getting better or worse? What is the extent of the stressors affecting them? This report examined four indices: a benthic index, a eutrophication index, a sediment quality index, and an ecological fish tissue contaminant index. The NCCA 2015 used data collected in the summer of 2015 from EPA and its partners who visited 1,060 randomly selected sites in 28 coastal states to evaluate coastal condition.

What was found:
The full report (86 pages) covered all the coastal waters of the U.S. The condition of the Gulf of Mexico was contained in pages 29 – 37 and page 41. The report's main emphasis is on the Great Lakes. For the Gulf of Mexico, 237 sites were sampled once in the summer of 2015. An overview of the findings are as follows:

1. Benthic Index: Biological quality is rated good in 68% of Gulf Coast waters, fair biological quality occurs in 20% of these waters, and poor biological quality occurs in 7%. Changes in the benthic index over time were variable. The Gulf Coast improved from 36% good in 2005 to 65% in 2010 to 68% in 2015.
2. Eutrophication index: 18% of Gulf Coast waters are in good condition, 55% are rated fair, and 28% are rated poor. The Gulf had the greatest area in poor condition. Phosphorus and chlorophyll-a contribute most to the fair and poor water quality index scores in this region. Percent good condition has decreased from 24% in 2005 to 16% in 2010 to 18% in 2015.
3. Sediment quality index: 75% of Gulf Coast waters are in good condition, 23% are in fair condition, and 2% are in poor condition. Sediment quality fluctuated from 72% good in 2005 to 48% good in 2010 to 75% good in 2021.

4. Ecological fish tissue contaminant index: 9% of the Gulf Coast area is in good condition, 15% is in fair condition, and 74% is in poor condition. The contaminants that most often exceeded the lowest observed adverse effect level (LOAEL) (poor) thresholds in the Gulf Coast were selenium, mercury, and arsenic. Fish contamination changes from 0% good in 2005 to 11% in 2010 to 9% in 2021. A rating of poor here does not equate to a human health risk.

This report also highlighted other Gulf of Mexico data:

1. Estuarine Enterococci Condition: 98% of Gulf sites sampled were at or below EPA benchmark.
2. Estuarine Microcystins Condition: 100% of Gulf sites sampled were at or below EPA benchmark.
3. Estuarine Condition Based on Mercury in Plugs from Fish Fillets: 66% of Gulf sites sampled were at or below the EPA benchmark. 4% were above the benchmark.

FISH STOCK SUSTAINABILITY INDEX

What it is:
This is a NOAA Fisheries website that is a search result on the "Status of Stocks" of fish in the US. It is not specific to the Gulf of Mexico, but such information can be found.

What was found:
Links to web based documents or websites are listed below with fishery information given for the Gulf of Mexico. The documents and websites may overlap in information.

1. 2020 Report to Congress on the Status of U.S. Fisheries

- The 2020 report highlights NOAA's 50 years of science, service, and stewardship of our nation's fisheries.
- In the Gulf, two fish species were removed from the Overfishing (annual rate of catch is too high) list: Gray Triggerfish and Greater Amberjack.
- In the Gulf, three fish species were added to the Overfishing List for 2020: Jacks complex, Cobia, and Lane Snapper.
- In the Gulf, these fish species remained on the Overfished List (population size is too small) for 2020: Greater Amberjack, Jacks complex, Cobia, and Lane Snapper.
- In 2018, NOAA Fisheries released the new Stock Assessment Improvement Plan, which provides strategic guidance for the agency's stock assessment enterprise.
- A document listed under Rebuilding Trends, "Trends Analysis for Fish Stocks in Rebuilding Plans in 2020," reported on fish stocks in rebuilding plans as of December 31, 2020.
    - "Not Subject to Overfishing/Biomass Increasing": Greater Amberjack, Red Snapper

- “Not Subject to Overfishing/ Biomass Not Increasing”: Gray Triggerfish, Sandbar Shark
- “Subject to Overfishing/Biomass Not increasing”: Dusky Shark

2. Fisheries of the United States, 2019

- The annual Fisheries of the United States report is a yearbook of fisheries statistics for the nation. It provides data on commercial landings and value and recreational catch.
- In 2019 in the Gulf of Mexico region, landings decreased 9% and value decreased by 10%.
- Up to date Commercial Landings Queries can be found at this website.
- Current Recreational Fisheries Statistics Queries can be found at this website.

3. Fishery Stock Status Updates

- NOAA Fisheries updates the status of fish stocks managed under federal fishery management plans quarterly based on stock assessments completed during that quarter. A link to quarterly updates is given.
- In 2020, NOAA Fisheries made updates to the Fish Stock Sustainability Index (FSSI) used to measure fishery performance (version 3.0). The index tracks a total of 175 fish stocks, down from 199 stocks in previous versions.

GULF OF MEXICO REPORT CARD

What it is:
The Gulf of Mexico Report Card is a website supported by the Harte Research Institute for Gulf of Mexico Studies at Texas A&M University-Corpus Christi. It is promoted as “a scientifically-based representation of the environmental condition of the Gulf designed to be widely accessible and readily understandable by policy-makers, stakeholders, scientists, and most importantly, the American public.” It is using a “team of experts in a multi-year effort to develop a process to assess the health of the Gulf of Mexico on an ongoing basis, examining the status of some of the Gulf’s most important species and habitats, including shrimp, crabs, sportfish, oysters, birds and seagrasses as environmental indicators.”

What was found:
A full Gulf of Mexico Report Card has not yet been produced. However, a Texas Coast Report Card has been released for 2019. The link is found in a text box labeled “The Harte Solution.” There are two reports available - one is a two page summary and the other is a seven page “expanded document.” This expanded report goes into greater detail on the indicators used to assess the condition of the Texas coast and shows how these indicators were measured. The Texas coast was divided into four sections and each section was given a letter grade based on the health of seagrasses, oysters, fisheries, birds, and water quality.

A summary is as follows:

1. Overall, the Texas coast was graded B- and considered “moderately healthy.”
2. Along the entire coastline, fisheries were the highest scoring indicator, demonstrating consistently healthy populations of the indicator species despite increasing demand from humans.
3. The Texas coast had generally good water quality results, with good dissolved oxygen and chlorophyll concentrations. Mid-coast estuaries showed a drop in overall health due to increasing salinity and nutrient pollution.
4. Despite overall high scores for Texas Coast fisheries, southern flounder and blue crab populations are struggling in Laguna Madre due to both high demand from human populations and living near the edge of their natural range.
5. Seagrasses in the Upper Laguna Madre suffered losses to overall coverage due to a series of high salinity events in 2012 and 2013.
6. Oysters and seagrasses were the lowest scoring indicators. For oysters, this result could be attributed to low abundance in the mid-coast bays.
7. Bird species were chosen to represent specific bird communities during the winter/migration and breeding seasons. Bird scores in the mid coast region and south scored moderately along the Texas Coastline, maintaining stable populations despite habitat losses to sea-level rise and urbanization.

ESSENTIAL FISH HABITAT 5-YEAR REVIEW, INCLUDING REVIEW OF HABITAT AREAS OF PARTICULAR CONCERN AND ADVERSE EFFECTS OF FISHING AND NON-FISHING IN THE FISHERY MANAGEMENT PLANS OF THE GULF OF MEXICO

What it is:
This report documents the second 5-year essential fish habitat (EFH) review (2010 - 2015) from the Gulf of Mexico Fishery Management Council (Council) and is the first time in the Gulf that maps have been created depicting habitat use by species and life stage for those species managed by the Council. Essential fish habitats are delineated as areas of higher species density, based on the NOAA Atlas (1985) and functional relationships analysis for the Red Drum; Reef Fish and coastal migratory pelagic (CMP) fishery management plans (FMP); Shrimp, Stone Crab, and Spiny Lobster FMPs; and on known distributions for the Coral FMP.

The objectives of this 5-year review included:
• Refine existing habitat association tables
• Conduct an exhaustive literature review
• Create the mapped representations of EFH by species and/or life stage (where applicable)
• Create species profiles
• Review of fishing and non-fishing impacts on EFH
• Review role of artificial reefs as a management tool
• Develop supplementary web-based resources

What was found:
The report is a 502-page document. An extensive literature review was conducted on both published research and gray literature from 2004 - 2016. The report has species profiles for 35 fish, 4 shrimp, spiny lobster, and coral. The profiles highlight information regarding species distribution, briefly discuss new literature that contributes to the identification and description of EFH, habitat information by life stage, a map depicting benthic habitat use for all life stages, and a graph of age and growth information if available. In addition, two appendices add further information for each species. Appendix A contains habitat association tables for each profiled species which lists life stage, eco-region, habitat zone, habitat type, season, temperature, depth, prey, predators, mortality, and growth. Appendix B contains benthic use maps for each profiled species.

The report discusses impacts from fishing and non-fishing. Highlights include the following:

1. The report stated no new information was produced on how current fisheries in the Gulf are impacting habitat since an environmental impact statement report was published in 2004 (see GMFMC 2004).
2. Non-fishing impacts since the last EFH 5 year review in 2010 included Deepwater Horizon oil spill, three invasive species (lionfish, Asian tiger shrimp, orange cup coral), and offshore aquaculture.
3. There were no additions, removals, or changes in regulations pertaining to habitat areas of particular concern between the 5-year review completed in 2010 and the current review.
4. There was a section on artificial reefs that stated “artificial structures (including petroleum related structures) have not been recognized as a habitat type that is necessary for the identification and description of essential fish habitat.”
5. The report concludes with improvements needed for updating EFH information, some of which includes some species inhabit greater depths than the extent of the eco-regions, habitat zones can be challenging to define in some areas, the GIS data used to describe reef habitat in the Gulf is poor, and NMFS has expressed concern that the inland boundaries are poorly defined causing challenges during the consultation process.

NOAA NATIONAL MARINE ECOSYSTEM STATUS

What it is:
As stated on the introductory web page, “This website provides data on major marine ecosystem indicators, capturing the status and trends of seven U.S. ecosystem regions, as well as an overall national status. It also directs users to more detailed sources of NOAA data and information….This reporting is meant to allow the U.S. population to see the performance of their marine ecosystems.”

This is a website developed by NOAA to provide a snapshot of major U.S. marine ecosystem indicators. The U.S. Gulf of Mexico is one of the seven regions highlighted in this website. The site pulls together status and trends from various NOAA sources into one convenient location.

What was found:
Each of the seven regions contain information divided into four categories: Climatological, Physical-chemical, Biological, and Human Dimensions. Each of these categories are divided further into themes showing the latest data in a graphical form. There are 19 themes in all ranging from Chlorophyll-A to Billion-Dollar Disasters.

Fishery data for the Gulf of Mexico region consists of zooplankton biomass; coral reef scores for Flower Garden Banks and Florida; menhaden biomass; seabird abundance; numbers of overfished stocks; numbers of marine mammal stocks; and marine species distributions. The data presented is linked to the originating source. There are also links to 12 other Gulf of Mexico reports and NOAA and non-NOAA organizations that deal with Gulf of Mexico data.

Highlights of the data are as follows:

1. Between 2016 and 2020 the average number of overfished stocks in Gulf of Mexico waters was greater than 19% of the average of overfished stocks between 2000 to 2020.
2. Between 2015 and 2019 the average concentration of zooplankton biomass in the Gulf of Mexico was much higher than the median value of all zooplankton biomass concentration levels between 1982 and 2019.
3. Between 2011 and 2015 the biomass of Menhaden forage fish in the Gulf of Mexico was much greater than the median value of all Menhaden forage fish biomass between 1980 and 2015.
4. Overall coral reef ecosystem score for the Flower Garden Banks region is 89%, meaning it is ranked good with most indicators meeting reference values.
5. Overall coral reef ecosystem score for the Florida region is 69%, meaning it is ranked impaired with very few indicators meeting reference values.

PROGRAM MANAGEMENT

Budget Tracking Measures

Budget Definitions

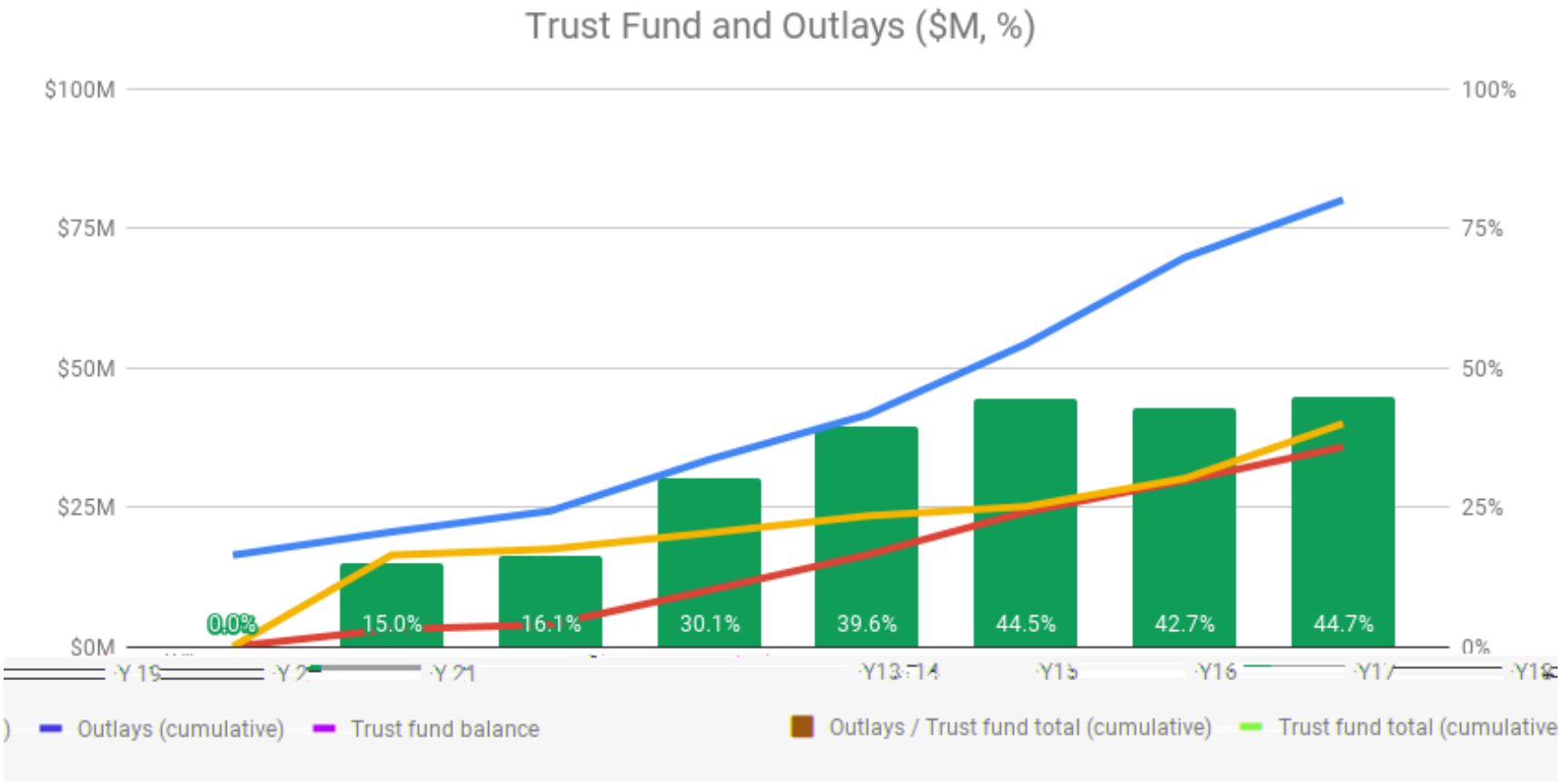
Administrative Expenses - U.S. Department of Treasury RESTORE Act Final Rule - Administrative expenses means those expenses incurred for administration by the Council or NOAA, including expenses for general management functions, general ledger accounting, budgeting, human resource services, general procurement services, and general legal services. Administrative expenses do not include expenses that are identified specifically with, or readily assignable to: (1) Facilities; (2) Eligible projects, programs, or planning activities; (3) Activities related to grant applications, awards, audit requirements, or post-award management, including payments and collections; (4) The Council's development, publication, and implementation of the Comprehensive Plan and any subsequent amendments; (5) The Council's development and publication of regulations and procedures for implementing the Spill Impact Component, and the review of State Expenditure Plans submitted under the Spill Impact Component; (6) Preparation of reports required by the Act; (7) Establishment and operation of advisory committees; or (8) Collection and consideration of scientific and other research associated with restoration of the Gulf Coast ecosystem.

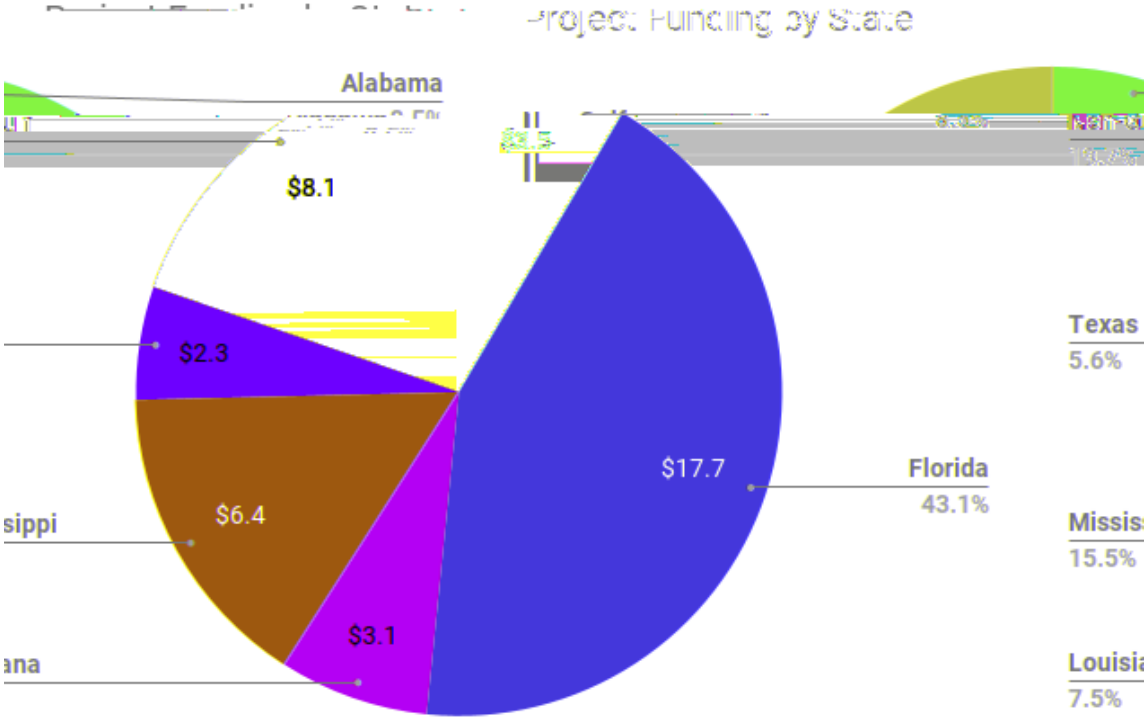
NOAA RESTORE Act Science Program. (a) Of the amounts received by NOAA under the NOAA RESTORE Act Science Program, not more than three percent may be used for administrative expenses. (b) The three percent limit is applied to the total amount of funds received by NOAA, beginning with the first fiscal year it receives funds through the end of the fourth, or most recent fiscal year, whichever is later.

Operational Expenses - Operational expenses mean those expenses incurred for the operation of the program by NOAA, including expenses for labor; travel; rents, communications, and utilities; printing and reproduction; training; supplies and materials; and equipment. These expenses can be identified specifically with, or readily assignable to: (1) facilities; (2) planning activities; (3) activities related to grant applications, awards, audit requirements, and post-award management; (4) establishment and operation of advisory committees; and (5) collection and consideration of scientific and other research associated with the Gulf of Mexico ecosystem. Operational expenses do not include the cost of grants, cooperative agreements, contracts, or intra- or inter-agency transfers for research or its application.

Obligated - A definite commitment that creates a legal liability of the government for the payment of goods and services ordered or received, or a legal duty on the part of the United States that could mature into a legal liability by virtue of actions on the part of the other party beyond the control of the United States. Payment may be made immediately or in the future. An agency incurs an obligation, for example, when it places an order, signs a contract, awards a grant, purchases a service, or takes other actions that require the government to make payments to the public or from one government account to another.

	Budget Measures	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20	FY 21	Σ FY 15-21	Budget Measure Definitions
	Expenditures ($M)	$3.1	$0.4	$6.2	$6.1	$7.8	$5.6	$6.6	$35.7	Total expenditures each FY
1	**Administrative (%)**	0.8%	6.9%	0.2%	0.3%	0.2%	0.2%	0.3%	0.4%	Percent of funding used for administrative expenses (< 3% target per authorizing legislation)
2	**Operational (%)**	13.9%	100.0%	6.9%	9.2%	8.2%	8.4%	11.6%	10.3%	Percent of funding used for operational expenses
3	**Projects (%)**	86.1%	0.0%	93.1%	90.8%	91.8%	91.6%	88.4%	89.7%	Percent of funding for grants, cooperative agreements, contracts, or intra- or inter-agency transfers for research or its application
3a	**Projects (fed; %)**	2.2%	0.0%	12.4%	12.1%	17.4%	20.3%	12.0%	13.8%	Percent of projects for federal entities
3b	**Projects (non-fed; %)**	97.8%	0.0%	87.6%	87.9%	82.6%	79.7%	88.0%	86.2%	Percent of projects for non-federal entities
4	**Gulf (total; %)**	84.5%	73.1%	70.8%	79.6%	89.3%	73.2%	79.8%	79.6%	Percent of funding that is obligated within the Gulf of Mexico region
5	**Outlays / Trust Fund (%, cumulative)**	15.0%	16.1%	30.1%	39.6%	44.5%	42.7%	44.7%	44.7%	Amount of funding obligated by the Science Program relative to the funding deposited in the Trust Fund and available to the Science Program


Trust Fund and Outlays ($M, %)
$100M
$75M
$50M
$25M
$0M
100%
75%
50%
25%
0%
0.0%
15.0%
16.1%
30.1%
39.6%
44.5%
42.7%
44.7%
Y 19
Y 20
Y 21
Y13-14
Y15
Y16
Y17
Y18
Outlays (cumulative)
Trust fund balance
Outlays / Trust fund total (cumulative)
Trust fund total (cumulative



Σ FY 15-21 Total Project Funding by State	$M	%	
Alabama	$3.5	8.5%	
Florida	$17.7	43.1%	
Louisiana	$3.1	7.5%	
Mississippi	$6.4	15.5%	
Texas	$2.3	5.6%	
Non-Gulf	$8.1	19.7%	
Gulf (total)	$32.9	80.3%	
TOTAL All Projects	$41.0	100.0%	NOTE: Includes $8.95M committed to projects from FY 22-24

2021 Program Management Council Presentation

PROGRAM MANAGEMENT COUNCIL
NOAA RESTORE Science Program

NCCOS Director: Steve Thur
Program Director: Julien Lartigue
Associate Program Director: Frank Parker
Executive Oversight Board Chair: Cisco Werner (NMFS)

March 11, 2021
Annual Desk Check Review

Last presentation: March 5, 2020 (desk check)

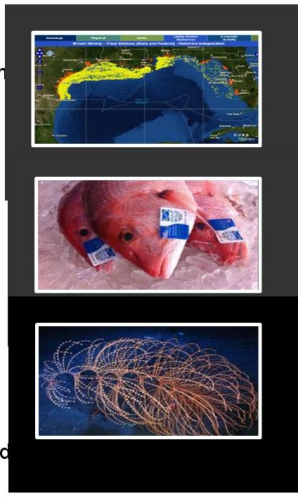
AGENDA

1. Overview
2. Executive Dashboard
3. Overall Status
4. Status Dashboards
5. Accomplishments / Key Events
6. Budget
7. Performance / Technical
8. Schedule
9. Risk Management
10. Issue Management
11. Action Items
12. Opportunities and Challenges - Where Can the PMC Help?
13. Backup Slides
    a. Deepwater Horizon Gulf Science and Restoration Initiatives
    b. Project Status Dashboards
    c. FY 20 Performance Metrics Highlights
    d. Trust Fund Balance and FY 15-22 Spend Plans
    e. Long-term Budget Outlook
    f. Risks Summary
14. Acronyms

OVERVIEW

What we do → Support the application of an ecosystem approach to science and management in the Gulf of Mexico

- Long-term Outcomes
  - → The Gulf of Mexico ecosystem is understood in an integrative, holistic manner
  - → Management of, and restoration activities within, the Gulf of Mexico ecosystem is guided by this ecosystem understanding
- Approach
  - → Emphasize connections within the ecosystem
  - → Build relationships between researchers and resource managers
  - → Prioritize science application through the practice of co-production
- Deliverables
  - → A growing community of researchers and resource managers committed to working together
  - → Tangible examples of science supported by the Science Program informing decision making
- Administration
  - → NOAA-level program administratively housed in NOS/NCCOS with Executive Oversight Board (cross-NOAA membership + 1 USFWS representative)
  - → Fully funded by Deepwater Horizon penalty dollars from a Trust Fund managed by the US Treasury; no-year funds



EXECUTIVE DASHBOARD - RESTORE SCIENCE PROGRAM

Last Update: 2/22/2021

OVERALL STATUS

	DEC	JAN	FEB	MAR
Budget	G/Y	G/Y	G/Y	G/Y
Performance / Technical	G	G	G	G
Schedule	G/Y	G/Y	G/Y	G/Y
Overall	G	G	G	G

RISK MANAGEMENT

ID	SCORE	TITLE	APPROACH
RSP-10	19	Certain awarded projects behind schedule	Mitigate
RSP-08	15	Lack of transition of project outputs into management decision-making processes	Mitigate
RSP-07	10	Significant delays in personnel actions	Watch
RSP-09	10	Environmental compliance lags	Watch
RSP-05	10	Data management structures not in place in time to handle project outputs	Mitigate

ISSUE MANAGEMENT

ID	SCORE	TITLE
RSP-15	20	COVID and grants

CHANGES

- Many grant projects are behind due to COVID impacts (schedule) and two have requested funds for sunk costs (budget).

OPPORTUNITIES & CHALLENGES

- OPPORTUNITY: Grow awareness of the Science Program's approaches to 'science to action' and 'co-production' throughout NOAA via webinars and other opportunities
- OPPORTUNITY: Continue to build upon coordination and collaboration efforts across Deepwater Horizon programs leveraging the Coordination Forum (*e.g.*, shared performance metrics)
- CHALLENGE: COVID has slowed progress in our funded projects and limited in-person engagement, which is an impediment to application

PMC ASSISTANCE

- Updated guidance on COVID considerations for extramural grants
- Continued support for coordination efforts between Science Program and Budget Office staff
- Continued in-kind support by NOAA offices and programs
- Continued support for long term awards (~10 years) given our legislation and budget flexibility

OVERALL STATUS

Overall, the Science Program is GREEN presently, however, we have some challenges that should be solvable within NOAA and program resources (YELLOW):

- **Budget**
  - → We carried over $1.6M from FY 20 to FY 21 mainly from funded projects and operational cost overestimates (see slides 8 and 9); recall this is no-year $; these funds are being expended in FY 21: **GREEN**
  - → Transfer of FY 21 funds from the Trust Fund to NOAA was straightforward due to the support and coordination provided by NOAA budget in developing SOPs and flowcharts to guide the process: **GREEN**
  - → Two projects started in 2017 (FFO-2017 projects) have requested funds for sunk costs due to COVID; one entered their first no-cost extension during this period of time: **YELLOW**
- **Performance / Technical**
  - → No significant issues; funded projects generally proceeding as planned with typical research project related issues; one project with machine shop challenges due to COVID (see slides 6, 10, 16-18): **GREEN**
- **Schedule**
  - → Projects are behind schedule due to COVID. Impacts to fieldwork schedules, laboratory access, and in-person meetings have slowed or altered nearly all of the FFO-2017 and FFO-2019 projects. Many FFO-2017 projects will need a second no-cost extension: **YELLOW**
  - → FFO-2021 was published on schedule (6/1/2020), feedback to letters of intent was provided on schedule (within four weeks), and the merit review process is on schedule: **GREEN**
  - → Personnel: We used the direct hire authority for a ZP-III/IV physical scientist (5/2020) and interviews are underway for a communications and engagement specialist contractor: **GREEN**
- **Program level "RED" Issues**
  - → None

STATUS DASHBOARDS

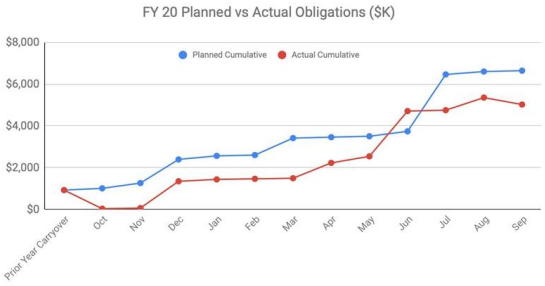
			Current (Mar 11, 2021)				Prior (Mar 5, 2020)			
Task ID	Main Tasks	Lead	Performance / Technical	Budget	Schedule	Overall	Performance / Technical	Budget	Schedule	Overall
1.0	Program administration	F. Parker	G	G	G	G	G	G	G	G
2.0	Personnel management	J. Lartigue	G	G	G	G	G	G	G/Y	G/Y
3.0	Funding opportunities	J. Lartigue	G	G	G	G	G	G	G/Y	G
4.0	Managing funded projects	F. Parker	G	G/Y	G/Y	G/Y	G	G	G	G
5.0	Engagement and coordination	J. Lartigue	G	G	G	G	G	G	G	G

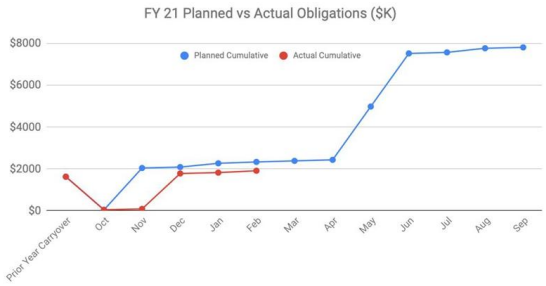
NOTE: see backup slides 16-18 for project management dashboards and see backup slide 19 for FY 20 performance metrics highlights

ACCOMPLISHMENTS / KEY EVENTS

1. FFO-2021: *Science to Action* planning competition published 6/1/2020 (~$2.5M total for ~20 projects over 12 months)
   - → Provided feedback on 165 letters of intent and held 1-on-1 calls with >70 project teams for full proposal development
   - → Merit review process on schedule: Panelists selected, written reviews underway, virtual panel scheduled (3/30-4/1)
2. FFO-2019: Five long-term trends projects are making progress in spite of COVID ($19.2M total over 5-years)
   - → Projects focus on a variety of topics relevant for management of Gulf living coastal and marine resources
   - → Projects may be renewed pending external review for an additional five years
   - → Two projects completed scaled back fieldwork during COVID, others slowed due to pandemic
3. FFO-2017 awards: 15 projects focused on living coastal and marine resources management ($16.9M over 3-years)
   - → At least six projects seeking second no-cost extensions mainly due to COVID impacts on laboratory access
   - → At least two projects seeking recovery for sunk costs due to COVID impacts (per GMD memos 3/27 and 6/30/2020)
   - → Dolphin tagging project slowed by COVID at machine shop (no additional funding until proof of concept; Y on slide 16)
4. OneNOAA Seminar Series':
   - → *Actionable Science* series: 12 of 15 FFO-2017 projects presented their findings at OneNOAA seminars (1,345 attendees)
   - → *Co-production of Science Case Studies* series: The first seminar was held 11/2020 and several others anticipated
5. FY 21 funds received on schedule from Treasury using the SOP and flowcharts for moving funds developed by NOAA Budget
6. Hired permanent federal ZP III/IV physical scientist using the direct hire authority
7. Advertised for communications and engagement specialist contractor (at second interview stage)
8. Host for two National Academies Gulf Research Program fellows (one in FY 20 and one in FY 21)
9. Published *Gulf of Mexico Science and Restoration Programs 3-Year Funding Calendar* on Feb 18
10. Continue to chair Gulf of Mexico Science and Restoration Programs Coordination Forum

BUDGET (ORF)





		PRIOR YEAR CARRY-OVER	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	EST CARRY-OVER
FY 20 ($K)	PLANNED CUMULATIVE	926	1,010	1,263	2,394	2,566	2,604	3,417	3,461	3,505	3,740	6,465	6,604	6,646	0
	ACTUAL CUMULATIVE	926	35	64	1,349	1,438	1,466	1,495	2,229	2,543	4,711	4,754	5,356	5,025	1,621
FY 21 ($K)	PLANNED CUMULATIVE	1,621	39	2,038	2,081	2,262	2,327	2,377	2,427	4,971	7,508	7,559	7,756	7,798	0
	ACTUAL CUMULATIVE	1,621	42	83	1,776	1,817	1,907								

Notes:
1. Majority of carryover from FY 20 to 21 was project funds to be obligated in FY 21
2. See slide 20 for details on the Trust Fund Balance and FY15-22 spend plans

PERFORMANCE / TECHNICAL

Gulf Coast Trust Fund Updates: non-appropriated, no-year, penalty funds; disbursed and obligated through an FY spend plan approach

- NOAA received FY 21 funds on schedule (greatly aided by NOAA Budget Office)
  - → FY 21 spend plan: $7,798K ($765K for operations, $7,033K for projects)
- Science Program receives 25% of the interest for the entire Trust Fund
  - → Updated investment strategy (Nov 2018) provided significant return in FY 18-20: $4.3M (FY 18), $5.1M (FY 19), $7.9M (FY 20). FY 21 projections are much lower due to COVID impacts on interest rates.
- BP Year 5 (of 15) payment of $7.6M anticipated in April 2021 (Year 4 fully paid April 2020)
- Currently no audits underway or expected near-term
- Carryover from FY 20 to FY 21: $1,621K
  - → The funds were from: Dolphin tagging project ($284K), deobligated funds for NOAA-led projects that were re-obligated in early FY 21 ($428K), an overestimate on FY 20 funds needed for new passive acoustic monitoring project ($465K), and overestimates in operating costs (~$444K; mainly unspent funds for contractors, travel, a workshop we planned to host, and federal salary)

Note: See backup slide 20 for details on the Trust Fund Balance and FY 15-22 spend plans

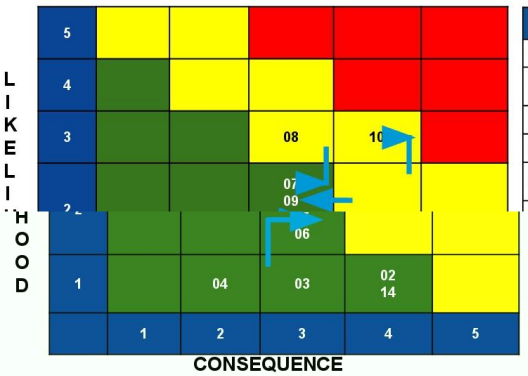
SCHEDULE

Legend — Looking back: Delive complete; Delive delayed; Task c ng / on target — Looking forward: Deliverable due; Deliverable expe to be delayed; Task expected to ngoing / on target

TASK ID	TASK DESCRIPTION	TASK OWNER	STATUS	START DATE / FREQUENCY	DUE DATE
1.0	***Program Administration***				
1.1	Treasury OIG audit of NOAA program administration	F. Parker	Complete	4/1/2016	2/1/2018
1.2	NOAA annual funding from Trust Fund	F. Parker	Complete	Annual	10/1/2018
1.3	Annual spend plan development and approval	F. Parker	Complete	Annual	5/1/2018
1.4	Annual assessment of performance metrics	J. Lartigue	Complete	Annual	12/1/2018
1.5	Independent external program review	J. Lartigue	On target	Every 5 years	9/30/2021
2.0	***Personnel Management***				
2.1	Hire permanent federal director	S. Thur	Complete	3/1/2018	5/1/2019
2.2	Hire federal ZP-1301-III/IV	S. Thur	Complete	2/1/2019	12/1/2019
2.3	Recruit and manage Gulf Research Program fellow	J. Lartigue	On target	Annual	10/1/2019
2.6	Hire communications and engagement specialist via contract	J. Lartigue	On target	10/1/2020	6/1/2021
3.0	***Federal funding opportunity (FFO) Competitions***				
3.9	Complete FFO-2019 awards	F. Parker	Complete	7/1/2019	1/1/2020
3.10	Determine technical monitors for FFO-2019 projects	F. Parker	Complete	7/1/2019	9/1/2019
3.11	Gather stakeholder input for FFO-2021	J. Lartigue	Complete	6/1/2019	12/31/2019
3.12	Develop and publish FFO-2021 on *planning for actionable science*	J. Lartigue / F. Parker	Complete	9/15/2019	3/1/2020
3.13	Webinars on FFO-2021	J. Lartigue	Complete	6/1/2020	6/30/2020
3.14	Complete FFO-2021 letter of intent reviews	F. Parker	Complete	9/1/2020	9/31/2020
3.15	Complete FFO-2021 written and panel merit reviews	F. Parker	On target	12/1/2020	3/30/2021
3.16	Complete FFO-2021 selections and negotiations	F. Parker	Pending	4/1/2021	4/15/2021
3.18	Environmental compliance for FFO-2021	F. Parker	Pending	4/15/2021	6/1/2021
3.19	Finalize FFO-2021 awards	F. Parker	Pending	6/1/2021	8/30/2021
3.21	Develop and publish data synthesis funding competition	C. Young	On target	9/1/2020	2/1/2022
3.22	Develop and publish FFO-2023 on *actionable science*	J. Lartigue / F. Parker	Pending	4/1/2021	7/1/2022
4.0	***Manage funded projects***				
4.2	Review progress reports for FFO-2017 projects	F. Parker	On target	Every 6 mos	9/30/2022
4.3	Complete annual site visits for FFO-2017 awards	F. Parker	Complete	Annual	5/30/2021
4.4	Provide funding for FFO-2017 projects	F. Parker	On target	5/1/2017	6/30/2021
4.5	Review final reports for FFO-2017 awards	F. Parker	Pending	4/1/2021	11/30/2022
4.6	Review progress reports for FFO-2019 projects	F. Parker	On target	Every 6 mos	8/30/2024
4.7	Complete annual site visits for FFO-2019 awards	F. Parker	On target	Annual	3/1/2024
5.0	***Engagement and Coordination***				
5.1	Lead the Gulf Restoration and Science Programs Coordination Forum	J. Lartigue	Ongoing	Every 2 months	N/A
5.2	Data management coordination across DWH programs	J. Lartigue / F. Parker	Ongoing	As needed	N/A
5.3	Develop and publish funding calendar for DWH programs	J. Lartigue	Complete	Annual	2/1/2020
5.4	Participate in regional and national meetings with partners	J. Lartigue / F. Parker	Ongoing	As needed	N/A
5.7	*Actionable Science* seminar series (FFO-2017 projects)	A. Lade	Complete	3/1/2020	10/28/2020
5.8	*Co-production of Science* seminar series	C. Young	Ongoing	10/1/2020	N/A

FY 19 | FY 20 | FY 21 | FY 22 | FY 23 — Q1 Q2 Q3 Q4

RISK MANAGEMENT



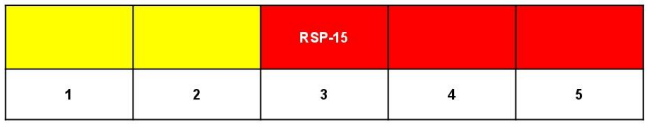
ID	Score	Trend	TITLE	APPROACH
RSP-10	19	↑	Certain awarded projects behind schedule	Mitigate
RSP-08	15	⇔	Lack of transition of project outputs into management decision-making processes	Mitigate
RSP-07	10	↓	Significant delays in personnel actions	Watch
RSP-09	10	↓	Environmental compliance lags	Watch
RSP-05	10	↑	Data management structures not in place in time to handle project outputs	Mitigate
RSP-06	10	⇔	Inadequate coordination between science programs active in the Gulf of Mexico	Mitigate
RSP-14	8	⇔	Administrative home shifts from NCCOS	Watch
RSP-02	8	⇔	BP penalties unpaid	Watch
RSP-03	5	⇔	Treasury audits challenge financial approach and controls	Watch
RSP-04	3	⇔	Congressional oversight challenges program direction	Watch

Severity	Trend	Approach
High	↑ Increasing (Worsening)	Mitigate
Mod	⇔ Unchanged	Watch
Low	↓ Decreasing (Improving)	Accept
		Share
		New

Risk Score					
5	11	16	20	23	25
4	7	13	18	22	24
3	4	9	15	19	21
2	2	6	10	14	17
1	1	3	5	8	12
	1	2	3	4	5

- See backup slide 22 for a Risk Summary that includes mitigation strategies
- See notes below for the rationales supporting changes to risk management scores

ISSUE MANAGEMENT



ID	SCORE	TREND	TITLE
RSP-15	20	⇔	COVID and grants

- **RSP-15**: Extramural grant projects are behind schedule due to COVID. Many continued to support staff through the initial months of the COVID shutdown based on OMB and GMD guidance (updated 6/30/2020). At least two FFO-2017 projects have requested funds for these sunk costs (~$160K total); one entered their first no-cost extension during this period of time. The Science Program has the resources to cover sunk costs and we are working with NOS and GMD to provide funds that would make these projects "whole" so that they can complete their milestones and deliverables. Updated guidance on COVID impacts for extramural grants that addresses extensions and additional funding considerations from GMD would facilitate the process.
- No issues were reported in FY 20 PMC brief and the three provided in FY 19 were resolved.

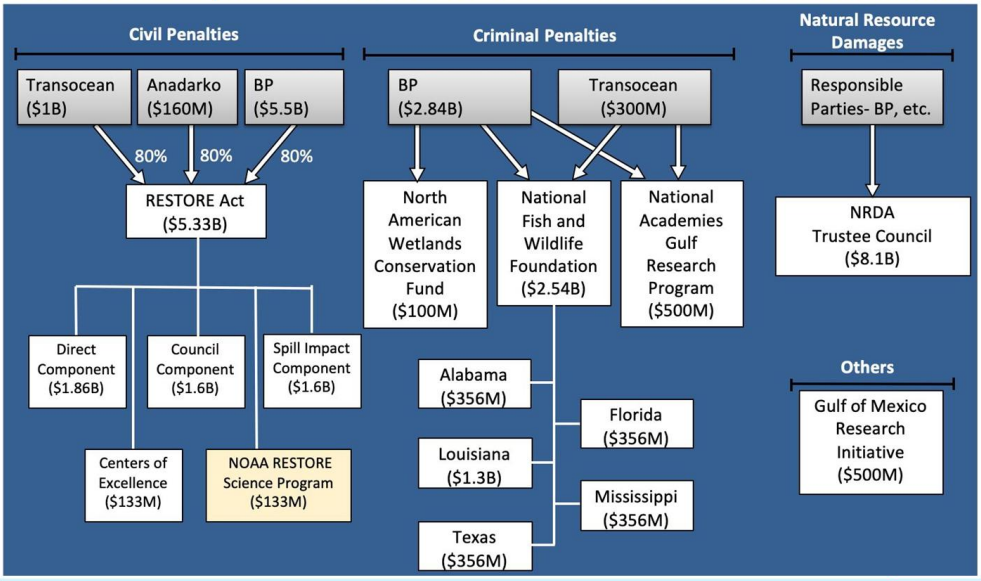
Issue Score				
11	16	20	23	25

Severity	Trend	Approach
High	↑ Increasing (Worsening)	Mitigate
Mod	⇔ Unchanged	Watch
	↓ Decreasing (Improving)	Accept
	NEW	Share or Transfer

OPPORTUNITIES AND CHALLENGES
- Where Can the PMC Help?

- SBIR: DOC and NOAA GC have determined that the RESTORE Science Program is subject to a tax on extramural grants for the SBIR program and are considering whether restrictions on the use of funds under the RESTORE Act must be adhered to by the SBIR program. SBIR is exploring with the SBA whether the Science Program could be exempt from the tax because these restrictions would be inconsistent with the model NOAA uses for the SBIR program.
- Work with AGO/GMD to provide updated guidance on COVID considerations (*e.g.*, extensions and additional funding) for extramural grants
- Continue to support coordination efforts between Science Program and NOAA Budget staff
- NOAA to continue to provide in-kind support (*e.g.*, technical monitors, NCCOS staff office support, *etc.*), which allows the Science Program to minimize administrative expenses (cap of 3%) and maintain a small program staff while effectively managing a diverse portfolio of projects
- Continued commitment to long term awards (~10 years), which is consistent with the Science Program's legislation that prioritizes long-term, interdisciplinary research and its application

BACKUP: Deepwater Horizon Gulf Science and Restoration Initiatives



BACKUP: PROJECT STATUS DASHBOARDS I

FFO-2017 Research Projects

Project ID	Lead Investigator, Institution	Project Title	Technical Monitors (Institution)	Current (March 2021)						Prior (March 2020)					
				Technical	Applica-tion	Schedule	Budget	Programmatic	Overall	Technical	Applica-tion	Schedule	Budget	Programmatic	Overall
2017- 01	Frank Hernandez, USM	Sargassum and recruitment	Mandy Karnauskas (NMFS)	G	G	Y	G	G	G	G	G	G	G	G	G
2017- 02	Brian Balmer, NMMF	Dolphin tagging	Laura Engleby, Jenny Litz (NMFS)	Y	G	Y	G	G	Y	Y	G	Y	G	G	Y
2017- 03	Trika Gerard, NMFS	Bluefin tuna larvae	Barb Muhling (NMFS)	G	G	G	G	G	G	G	G	G	G	G	G
2017- 04	Michael Polito, LSU	Marsh food webs	Melissa Carle, Shannon Martin (NMFS)	G	G	G	Y	G	G	G	G	G	G	G	G
2017- 05	Kelly Darnell, USM	Turtlegrass	Caitlin Young (NOS)	G	G	Y	Y	G	G	G	G	Y	G	G	G
2017- 06	T.J. Zenzal, USGS	Migratory bird habitat use	Jeff Gleason (USFWS)	G	G	G	G	G	G	G	G	G	G	G	G
2017- 07	Lance Garrison, NMFS	Bryde's whale ecology	Vicki Cornish (MMC), Barb Zoodsma (NMFS)	G	G	G	G	G	G	G	G	G	G	G	G
2017- 08	Santiago Herrera, Lehigh	Deepwater coral genetics	Cheryl Morrison (USGS), Janessy Frometa (NOS)	G	G	G	G	G	G	G	G	Y	G	G	G
2017- 09	Ruth Carmichael, DISL	Oyster contaminants	Dennis Apeti (NOS)	G	G	G	G	G	G	G	G	G	G	G	G

BACKUP: PROJECT STATUS DASHBOARDS II

FFO-2017 Decision Support Tool Projects

Project ID	Lead Investigator, Institution	Project Title	Technical Monitors (Institution)	Current (March 2021)						Prior (March 2020)					
				Technical	Applica-tion	Schedule	Budget	Programmatic	Overall	Technical	Applica-tion	Schedule	Budget	Programmatic	Overall
2017- 10	Peter Sheng, UF	SW Florida coastal tool	David Kidwell, Kassie Ernst (NOS)	G	G	G	G	G	G	G	G	G	G	G	G
2017- 11	Christopher Boyd, Troy	Living shorelines	Cynthia Meyer (USBR)	G	G	G	G	G	G	G	G	G/Y	G	G	G
2017- 12	Yuying Zhang, FIU	Red snapper tool	John Froeschke (GMFMC)	G	G	Y	G	G	G	G	G	Y	G	Y	Y
2017- 13	Dan Petrolia, MSU	Oyster planning tool	Becky Allee (NOS)	G	Y	G	G	G	G	G	G	Y	G	G	G
2017- 14	Brian Dzwonkowski, DISL	Mobile Bay tool	Grace Gray (NOS)	G	G	Y	G	G	G	G	G	Y	G	G	G
2017- 15	David Chagaris, UF	Fisheries ecosystem models	Nick Farmer (NMFS)	G	G	Y	G	G	G	G	G	G	G	G	G

Project 2017-01: Delays due to COVID impacts on laboratory access; needs second no-cost extension
Project 2017-02: Engineering challenges with versions 1-4 of tagging device; building version 5; significant delays due to COVID; needs second no-cost extension
Project 2017-04: Sunk costs due to COVID (paying staff)
Project 2017-05: Delays due to COVID impacts on laboratory access; sunk costs due to COVID (paying staff); needs second no-cost extension
Project 2017-12: Challenged by issues with red snapper stock assessment (recreational count; great red snapper count project); needs second no-cost extension
Project 2017-13: Challenges with non-responsive end users
Project 2017-14: Significant impacts on stations due to FY 20 hurricane season; needs second no-cost extension
Project 2017-15: Delays due to COVID impacts, needs second no-cost extension

BACKUP: PROJECT STATUS DASHBOARDS III

FFO-2019 Long-term Trends Projects

Project ID	Lead Investigator, Institution	Project Title	Technical Monitors (Institution)	Current (March 2021)						Prior (March 2020)					
				Technical	Applica-tion	Schedule	Budget	Programmatic	Overall	Technical	Applica-tion	Schedule	Budget	Programmatic	Overall
2019-01	Ted Switzer, FWRI	Reef fish survey	John Walter, Nick Farmer (NMFS)	G	G	Y	G	G	G	N/A (projects started 9/1/2019)					
2019-02	Tracey Sutton, NSU	Deep-pelagic fauna	Mandy Karnauskas, Kris Benson (NMFS)	G	G	Y	G	G	G						
2019-03	John Lehrter, USA	Oysters, blue crabs, seatrout	Eric Weissberger (NFMS), Kelly Samek (OAR)	G	G	Y	G	G	G						
2019-04	Auriel Fournier, UI (MSU)	Marsh birds and fire	Kevin Kalasz, John Tirpak (USFWS)	G	G	Y	G	G	G						
2019-05	Melissa Soldevilla, NMFS	Marine mammals and acoustics	Laura Engleby, Jason Gedamke (NMFS)	G	G	Y	G	Y	G						

Project 2019-01: Made significant progress on field work despite COVID (but still delays)

Project 2019-02: Rescheduled field work due to COVID impacts

Project 2019-03: Deployment of CO_2 monitoring instrumentation delayed due to COVID

Project 2019-04: High marsh data layers behind schedule; field work delays due to COVID

Project 2019-05: Delay in hiring project manager; made significant progress on field work despite COVID (but still delays)

BACKUP: FY 21 PERFORMANCE METRICS HIGHLIGHTS

- Output metrics
  - → Findings and products from projects were shared with 65 end users
  - → Projects leveraged over $3.5M
  - → Over 60% of publications appeared in high-impact journals
  - → 5 joint activities involving over 15 partners
- Outcome metrics
  - → At the end of FY 20, cumulative citations for all publications is 276
  - → Survey for gathering end user assessment of the quality and utility of findings and products was pilot tested with end users from the program's first seven projects
  - → Independent, external program review planned for fall 2021
  - → Informing management actions
    - Two Science Program projects produced information on the connectivity of coral communities in the northern Gulf of Mexico, which informed the recommendation to expand the Flower Garden Banks National Marine Sanctuary

BACKUP: TRUST FUND BALANCE and FY 15-22 SPEND PLANS

Trust Fund Balance ($)		
Gross Civil Fines and Penalties		50,147,773
Interest	FY 13	11,682
	FY 14	65,103
	FY 15	79,830
	FY 16	552,831
	FY 17	1,623,397
	FY 18	4,253,435
	FY 19	5,119,617
	FY 20	7,914,432
Gross Receipts		69,768,101
Disbursements	FY 15	(3,087,099)
	FY 16	(320,000)
	FY 17	(6,673,449)
	FY 18	(6,364,525)
	FY 19	(7,685,824)
	FY 20	(5,644,560)
	FY 21	(6,027,190)
Gross Disbursements		(35,802,647)
Available Fund Balance (2/20/21)		33,965,454

FY 15-22 Spend Plans ($K)							
	FY 15-17	FY 18	FY 19	FY 20	FY 21	FY 22	Total
Admin. Expenditures	65	19	18	10	11	12	135
Programmatic Costs	1,163	541	604	464	754	776	4,303
Operating Costs	1,229	560	622	474	765	788	4,438
Total Project Funding	8,436	5,676	7,256	4,551	7,033	5,117	38,069
% Administrative	0.7%	0.3%	0.2%	0.2%	0.1%	0.2%	0.3%
% Programmatic	12.0%	8.7%	7.7%	9.2%	9.7%	13.1%	10.1%
% Research Projects	87.3%	91.0%	92.1%	90.6%	90.2%	86.7%	**89.6%**

Trust Fund Balance

- No disbursements to NOAA in FY 13-14
- Earned interest available next FY
- Balance includes $7.6M payment from BP in FY 20
- FY 21 BP payment of $7.6M expected in April

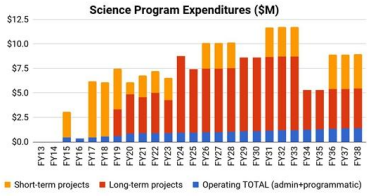
FY 15-22 Spend Plans

- Actuals for FY 20; estimates for FY 21-22
- Additional $8.8M committed to FFO-2019 projects from FY 22-24

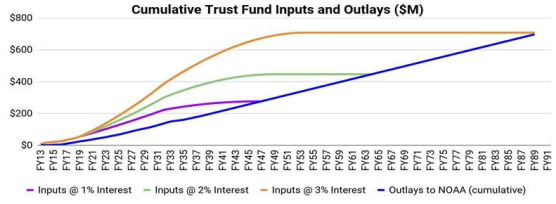
BACKUP: LONG-TERM BUDGET OUTLOOK

- In FY 17, we estimated $30-50M in interest for a total program value of $170-190M. We developed a long-term model commensurate with that funding amount. It included a series of competitions for short- and long-term projects with a sunset in ~2038.

Expense	Total ($K)	%
Administrative	$618	0.3%
Operational	$22,638	12.1%
Projects	$163,168	87.5%
Short-term	*$53,562*	*32.8%*
Long-term	*$109,605*	*67.2%*
Total	$186,423	100.0%



- Based on new drawdown estimates provided by the other RESTORE programs, interest earnings could significantly eclipse our FY 17 estimate (see 1, 2, and 3% interest rate scenarios in graph and table).



- Given these revised estimates and their inherent uncertainty, we plan a commensurate slow ramp up and slow ramp down that allows us to focus on high quality science and its application, while not swamping the capacity of the science or management communities in the Gulf region (*i.e.*, not diluting the quality of the science or the potential for its application).
- Our Executive Oversight Board endorsed this approach.

REVISED OUTLOOK ($M)	Interest Rates		
	1.0%	2.0%	3.0%
Total penalty payments	$138.5	$138.5	$138.5
Total interest	$136.7	$307.5	$568.8
Total program value	**$275.2**	**$446.0**	**$707.4**
Obligations to date	$45.1	$45.1	$45.1
Approx program sunset (spending ~$10M yr^{-1})	2047	2064	2091

BACKUP: RISKS SUMMARY

ID	Risk Category	Risk Description	Likelihood	Consequence	Priority	Mitigation Strategy
RSP-02	Resources, Requirements	IF BP penalties are unpaid THEN outcomes described in Science Plan will be difficult to achieve	1	4	Medium	• Develop a Science Plan that is scalable • Balance resources and communicate impacts based on resource capacity
RSP-03	Budget	IF Treasury audits challenge financial approach and controls THEN we may have to modify the program or delay disbursement of funds	1	3	Medium	• Continuous dialog with OIG • Include NOAA/NOS financial staff in design and execution of controls • Use project codes to track administrative and programmatic costs
RSP-04	Technical, Schedule	IF Congressional offices challenge program direction THEN the execution of funding competitions may be delayed during negotiation	1	2	Medium	• Continue proactive dialog with key Congressional staff • Track essential components of program that indicate direction and impact
RSP-05	Resources, Technical	IF data management structures are not in place to handle project outputs, or coordination across Deepwater Horizon funded activities is lacking THEN reach of work will be diminished	2	3	Medium	• Include continuous data management tracking for all funded projects to ensure alignment with NOAA/NOS/NCCOS data management policies • Work with partners on common approaches towards data management
RSP-06	Technical	IF science programs in the Gulf of Mexico do not coordinate THEN funding will not be efficiently distributed across regional needs	2	3	Medium	• Continue to lead a coordinating body of Gulf of Mexico science and restoration programs
RSP-07	Resources, Schedule	IF significant delays in personnel actions continue THEN we may have to modify our schedule for executing funding competitions	2	3	High	• Plan ahead and coordinate on personnel actions with NOS and OHCS • Use new *Direct Hire* authority as appropriate • Use contracting mechanisms to address short-term needs
RSP-08	Resources, Technical	IF outputs of funded research are not applied THEN the reach and impact of the work will be diminished	3	3	Medium	• Ensure plans are in place that describe how the work will be used, influence, or transferred to the management community for application • Ensure early and consistent engagement with project end-users • Encourage co-production approaches for proposing project ideas
RSP-09	Technical, Schedule	IF environmental compliance approvals lag THEN the execution of funding decisions may be delayed	2	3	Medium	• Continue to consult with agency expertise (*e.g.*, OGC, NOS, NMFS) to determine and execute appropriate plans that ensure we are in compliance with all applicable environmental legislation
RSP-10	Schedule, Budget	IF awardees are slow to complete projects and draw down funds THEN the impact of project outputs on management actions will be delayed	3	4	High	• Proactive monitoring of awards for cost, schedule, and performance through regular reporting and communication with project investigators • Develop mitigation steps (*e.g.*, revised timelines, NOAA support) early and hold investigators and institutions accountable
RSP-14	Resources, Budget	IF NCCOS is terminated (as proposed in previous Pres. Budgets) THEN the Science Program would be housed within another part of NOAA	1	4	High	• Identify options for a new administrative home with Executive Oversight Board. • Maintain level of in-kind support given administrative expenses cap of 3%. • If in-kind support lacking, mitigate through additional hires.

ACRONYMS

In order of appearance:

- RESTORE Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act (2012)
- NCCOS National Centers for Coastal Ocean Science
- NMFS National Marine Fisheries Service
- NOS National Ocean Service
- USFWS U.S. Fish and Wildlife Service
- RSP RESTORE Science Program
- SOP Standard operating procedure
- FFO Federal funding opportunity
- GMD Grants Management Division
- OIG Office of the Inspector General (U.S. Department of the Treasury)
- DWH Deepwater Horizon
- OMB Office of Management and Budget
- SBIR Small Business Innovation Research
- SBA Small Business Administration
- AGO Acquisition and Grants Office
- GC General Counsel
- NRDA Natural Resource Damage Assessment
- USM University of Southern Mississippi
- NMMF National Marine Mammal Foundation
- LSU Louisiana State University
- USGS U.S. Geological Survey
- MMC Marine Mammal Commission
- DISL Dauphin Island Sea Lab
- UF University of Florida
- USBR U.S. Bureau of Reclamation
- FIU Florida International University
- GMFMC Gulf of Mexico Fisheries Management Council
- MSU Mississippi State University
- FWRI Fish and Wildlife Research Institute (Florida)
- NSU Nova Southeastern University
- USA University of South Alabama
- OAR Office of Oceanic and Atmospheric Research

PILOT CO-PRODUCTION WORKSHOP

Executive Summary
In September 2019, the NOAA RESTORE Science Program and Texas OneGulf Center of Excellence held a co-production workshop in San Marcos, Texas. The workshop served to advance one of the core goals of these programs and to ensure that the management of, and restoration activities within the Gulf of Mexico, are driven by an integrative, holistic understanding of the ecosystem. The workshop outcomes can be broken into three parts: changes to the RESTORE Science Program and Texas OneGulf COE funding strategies, changes in Texas state management understanding of how to implement co-production, and changes in academic researcher perceptions of resource management needs and decision-making processes.

As a result of the workshop, the Science Program designed a federal funding opportunity that provides scoping grants to teams of researchers and resource managers to develop co-produced project proposals. The grants were distributed in September 2021.

Going forward, Texas OneGulf will host iterative interactive sessions for decision makers, research scientists, and boundary spanning organizations. Texas OneGulf also will meet with state agency leaders to establish a standardized process for gaining input on research priorities listed in its Strategic Research and Action Plan. Finally, the program sees value in acting as a 'matchmaker' between resource managers and interested researchers to come together and co-produce projects.

Texas managers identified five ways they can improve their current co-production practices including 1) implementing a more formalized project scoping phase with additional stakeholders, 2) increased consideration of specific end-product production during the planning phase, 3) incorporating explicit funding and proposal requirements requiring contractors (PIs) to generate communication materials to explain the project results, 4) listing state management agency research priorities on agency website, and 5) working to increase participation by all staff at local meetings and conferences.

Finally, academic researchers came away from the workshop with an enlarged network of resource manager contacts and an understanding of how to engage with those contacts during the project planning phase. In the post-workshop survey, researchers indicated that this network, along with the 'matchmaker' tools provided by Texas Onegulf and the scoping grant competitions from the Science Program, will increase their ability to co-produce science in the future.

Introduction
On September 24-25, 2019, the NOAA RESTORE Science Program and the Texas OneGulf Center of Excellence held a workshop entitled 'Using Co-Production to Engage Stakeholders and Create Effective Science-to-Management Solutions' at The Meadows Center for Water and the Environment in San Marcos, TX. The workshop had a total of 30 participants representing

Texas state management agencies, federal management agencies, funding agencies, nonprofits, and academic institutions (Figure 1).

The workshop objectives were designed to introduce participants to the concept of knowledge co-production and lead them through the process of using co-production in a mock project planning exercise. The workshop organizers also aimed to use results from activities to refine the workshop process, apply it to future co-production workshops, and establish a process in Texas for the continuation of this work. The objectives used to guide this workshop were as follows:

- Participants can define co-production and identify successful co-production methods and models.
- Participants have a better understanding of what co-production roadblocks exist for relevant stakeholder groups and identify ways that they may be able to overcome them.
- Participants have a better understanding of what tools exist for science communication and outreach.
- Participants work in teams on a project planning exercise that can be used as a template to respond to future funding opportunities.
- Participants contribute to pre- and post-workshop surveys, which provides additional insights to the sponsors of the workshop.

In advance of the workshop, participants were asked to read a journal article on the co-production process, “A How-to Guide for Coproduction of Actionable Science” by Beier et al., 2017[2]. This article breaks down the steps of co-production project planning and implementation into the following steps.

1. Project Scoping
2. Project Design
3. Engagement During Project
4. Communicating Project Results
5. Ensuring Project Data/Products are Used

These five steps were used as a framework for the interactive workshop sessions: Roadblocks and Challenges’ and Project Planning Exercise.

[2] Beier, P. , Hansen, L. J., Helbrecht, L. and Behar, D. (2017), A How‐to Guide for Coproduction of Actionable Science. CONSERVATION LETTERS, 10: 288-296. doi:10.1111/conl.12300

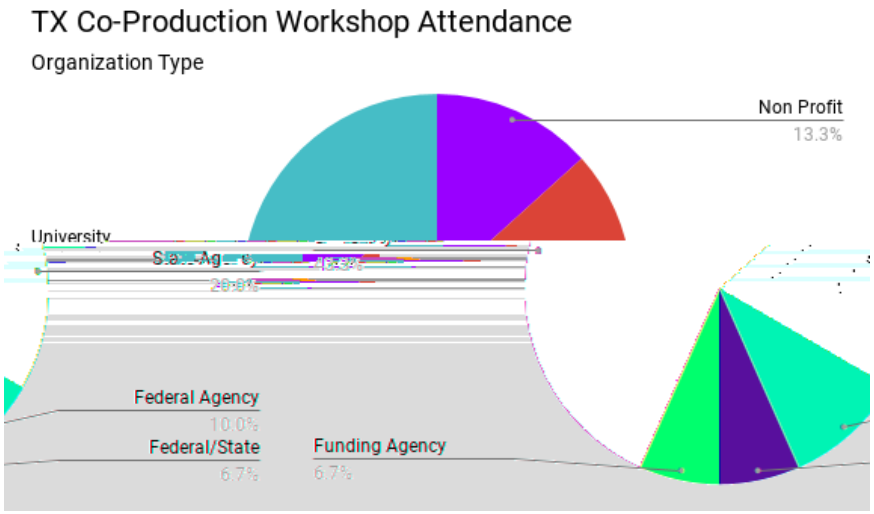


Figure 1. Distribution of organization types represented by 30 workshop participants

Workshop Sessions

Defining Co-Production

During this workshop session, participants established a common understanding of the definition of 'co-production' and gained insight into why co-production is a priority for funding agencies. Going around the room, each participant was asked to give their definition of co-production. Of the 30 definitions given, a number of common themes emerged including the need for building trust among stakeholders; early, active and frequent interaction with stakeholders; and the acknowledgement that co-production is a time-intensive process.

Figure 2. Word cloud of co-production definitions given by workshop participants. Key terms include trust, stakeholders, end-user, information, and time.

Workshop conveners offered the following definitions for terms to be used throughout the workshop.

Co-production	A collaborative process among scientists, end users (*e.g.*, resource managers), and other stakeholders to jointly develop, produce, and disseminate actionable science to inform specific management decisions. Elements of the process include: ● Identifying a specific management decision to be informed by science ● Jointly defining the scope and context of the problem, research questions, methods, and outputs ● Working together to produce the science in an iterative and adaptive manner ● Developing strategies for the appropriate use of the science
Stakeholder	A person, organization, or group with an interest or concern in a management issue
End User	A person, organization, or group that actively uses the outputs of the science
Actionable Science	Science and information (and guidance on the appropriate use of that information) that supports specific management decisions
Boundary Organization / Spanners	A person, organization, or group that facilitates collaboration and information flow between the research and resource management communities

Both workshop hosts spoke about the value that co-production adds to applied scientific research and highlighted how their respective programs incentivize co-production through funding opportunities, project oversight, and communication of project results. Full presentations are available upon request.

<u>Co-Production in Action</u>

The co-production in action session was designed to give workshop participants concrete examples of how co-production is done in practice and which co-production methods are successful for investigators from both academic and government backgrounds. The session included three speakers: Dr. Shin Kobara from Texas A&M University and the Gulf of Mexico Coastal Ocean Observing System, Dr. Dwight Trueblood from NOAA's Office for Coastal Management and Dr. John Froeshke from the Gulf of Mexico Fishery Management Council.

During this session, the speakers highlighted the need for scoping workshops either during the proposal writing stage of the project or within the first few months of the funded work. For example, Dr. Kobara discussed how initial workshops with commercial fishermen were crucial to establishing trust and generating buy-in from the community, which ultimately led to the project investigators being able to use local fishermen's knowledge in identifying fish spawning aggregation sites. Successful techniques employed during these workshops included the following:

- A trained facilitator who was seen as a neutral party

- An agreement among participants to not share sensitive information
- Information exchange between experts in the same discipline but from different locations
- A ban on jargon to promote an inclusive atmosphere for participants from different educational backgrounds
- Providing reimbursement for food and transportation

All three speakers acknowledged significant challenges in scoping workshops including lack of time in the typical 2-3 year grant cycle, insufficient funding for scoping meetings, and gaps in knowledge between stakeholders. Still, all successful co-production efforts emphasized a need for solid groundwork that incorporates differing stakeholder objectives and perspectives during the project scoping phase.

Dr. Trueblood provided evidence of how co-production has improved the overall uptake of science into resource management decision making for the National Estuarine Research Reserve System (NERRS) program. Since 1997, the NERRS program has changed it's programmatic method of science to action four times. An independent analysis of these changes indicates that the co-production approach is the most successful way for funded scientific research to be used by NERR's resource managers[3] (Figure 3).

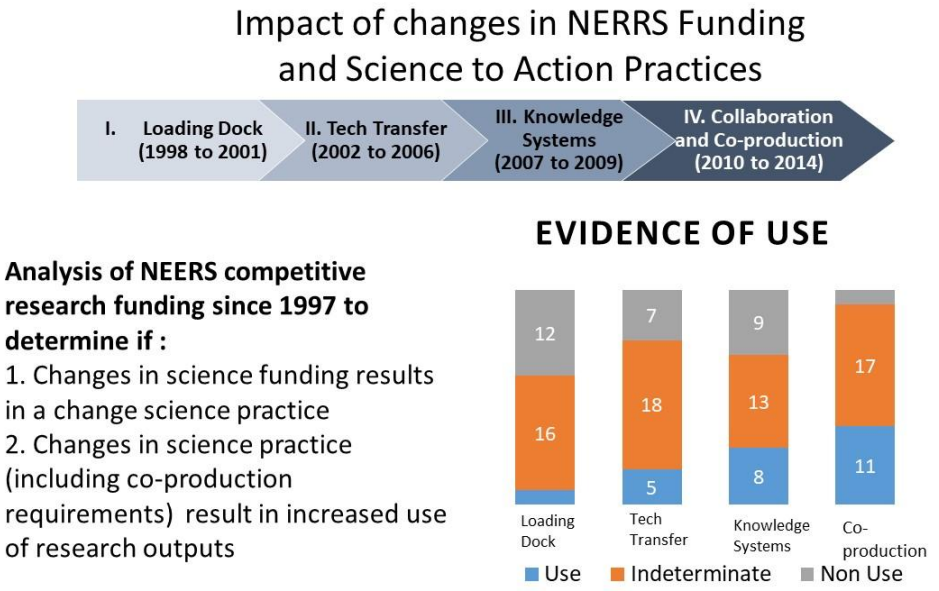


Figure 3. Impact of changes to NERRS funding and Science to Action practices from 1997 - 2014. Each successive change in research output transfer method resulted in an increase in the use of research products. Modified from Trueblood et al., 2019.

During this session, the speakers emphasized the role that funders can take in facilitating co-production. Successful projects were backed by funders that specifically called for a scoping

[3] Trueblood, D., Almazán-Casali, S., Arnott, J., Brass, M., Lemos, M.C., Matso, K., Read, J., Vaccaro, L., Wondolleck, J., 2019. Advancing Knowledge for Use in Coastal and Estuarine Management: Competitive Research in the National Estuarine Research Reserve System. Coastal Management 47, 337–346. https://doi.org/10.1080/08920753.2019.1598221

phase in the request for proposals as well as funders that allowed for flexibility in project budgeting. This flexibility created opportunities for investigators to bring previously unidentified stakeholders to pre-planned workshops and for workshop timing to be driven by project outcomes.

Take Away: Participants were most interested in how researchers can engage in co-production with community members (commercial and recreational fishermen, tribes, etc) in addition to resource managers. The NERRS example provided participants with peer reviewed evidence of how co-production increases the uptake of scientific research in the resource management decision making process.

Making Co-Production Work: Understanding the Texas Management Landscape
During the session, workshop participants developed a better understanding of the motivations and roles that Texas natural resource managers have in co-production of science. Three Texas natural resource management agencies were represented: David Green from the Texas General Land Office, Robin Riechers of the Texas Parks & Wildlife Department, and Dr. Carla Guthrie of the Texas Water Development Board.

Texas resource managers clearly identified with the process of co-production and recognized it as a process that they undertake internally with their agencies as they seek scientific solutions to resource management needs that will be acceptable to lawmakers and the general public. Resource managers also identified a number of challenges posed by co-producing science with investigators outside of their own agencies. Identification of new researchers, constraints on agency funding, difficulty paying university overhead rates, and limited staff time were all universal issues among management agencies. Beyond these typical challenges, resource managers identified more nuanced issues. Fragmentation of authority for resources across state agencies, particularly freshwater allocation in Texas, was clearly defined as an issue. The delta between information collection and changes in the decision-making process is an issue that has come to prominence with the proliferation of online content and social media. As public awareness of resource management decisions increases due to social media, managers observe an equivalent increase in personal agendas that influence the decision-making process. Finally, a lack of staff time hampers manager's ability to synthesize new scientific information on longer scales, particularly the implications of the work and what next steps need to be taken in terms of research and decision making.

Texas resource managers identified ways that academics can engage with their organizations to co-produce science relevant to their decision-making process. First, among these recommendations is that researchers provide a management summary with their peer reviewed publications. Further, since access to scientific literature is limited by paywalls, resource managers recommend researchers send the full publication and management summary directly to the relevant agency.

Take Away: Texas state managers co-produce actionable science in house but struggle to include outside researchers due to time, financial, and (sometimes) political constraints. None of

the management agencies present listed their science priorities or needs in a clear public facing manner (website, meeting slides, etc). This was identified as an actionable area that could significantly improve both in house and external co-production.

Roadblocks and Solutions
During a co-production project process, stakeholders work together during the five stages of project planning and implementation as defined in the co-production literature. For this session on Roadblocks and Solutions, participants self-selected into small groups of 5-6 people and went around the room to fill out poster board sheets on potential roadblocks and solutions to those roadblocks that exist in each of the project stages. The project stages they worked on were: scoping, design, project lifecycle engagement, communication of results, and post-project result usage.

Take Away: Small group composition impacted how participants interacted with the project stage roadblocks. Groups composed of primarily academic researchers were reluctant to see access to peer-reviewed literature as a roadblock, groups composed of primarily managers saw their process as open to academic science despite their difficulties incorporating this science into decision making due to time constraints, and groups composed of diverse participant backgrounds were the fastest to identify solutions to roadblocks. Overall, this exercise demonstrated the importance of having all stakeholders working together in-person in order to properly work through challenges in each project phase.

Putting Co-Production into Practice - Project Design
The final workshop session was designed to allow participants to apply the knowledge and skills learned to a mock-project design exercise. Using the framework established in the read-ahead paper and used in the 'Roadblocks and Solutions' session, participants self-selected into four groups and worked through an entire project lifecycle. Participants selected one of four potential project areas;

1. Climate Change in Restoration Project Planning and Community Resilience
2. Freshwater Flows
3. Marine Protected Areas
4. Stock Assessments

These project areas were initially selected from the Science Program's Science Plan and later refined by participating resource managers through a pre-workshop survey.

The project planning exercise was broken into 30-minute segments for each of the project stages. At the end of each segment, each group was asked to summarize their groups' work. For example, at the end of the Project Scoping phase each group was asked to report out on the resource management need selected and the research question they would address. During the project design segment, participants were asked to fill out a mind map project design sheet and an associated project timeline.

Take Away: The results of the post workshop survey indicate this session was the most valuable and worthwhile part of the workshop. Three of the four groups were very successful in

completing the assigned tasks in each segment. The groups that found this exercise exciting had a good mix of participant backgrounds and a de-facto facilitator that helped the group stay on track. The group that struggled was composed of participants that had worked on the topic (Freshwater Flows) for decades and had a hard time finding common ground on how to build a project due to the political controversy that surrounds this topic in Texas. Overall, this session should be repeated in all future co-production workshops with some modifications to help participants work through perceived political roadblocks.

Post Workshop Survey Summary

A total of 18 workshop participants (60%) completed the post-workshop survey. The breakdown of survey respondents' professional roles is shown in Figure 4. Participants were asked about the effectiveness of the workshop in providing networking opportunities and their ability to do co-production in the future, as well as if they would recommend the workshop to a colleague. Results are provided in Figure 5 and indicate that a majority of participants found the workshop to be an excellent networking opportunity that will allow them to effectively engage in co-production in the future.

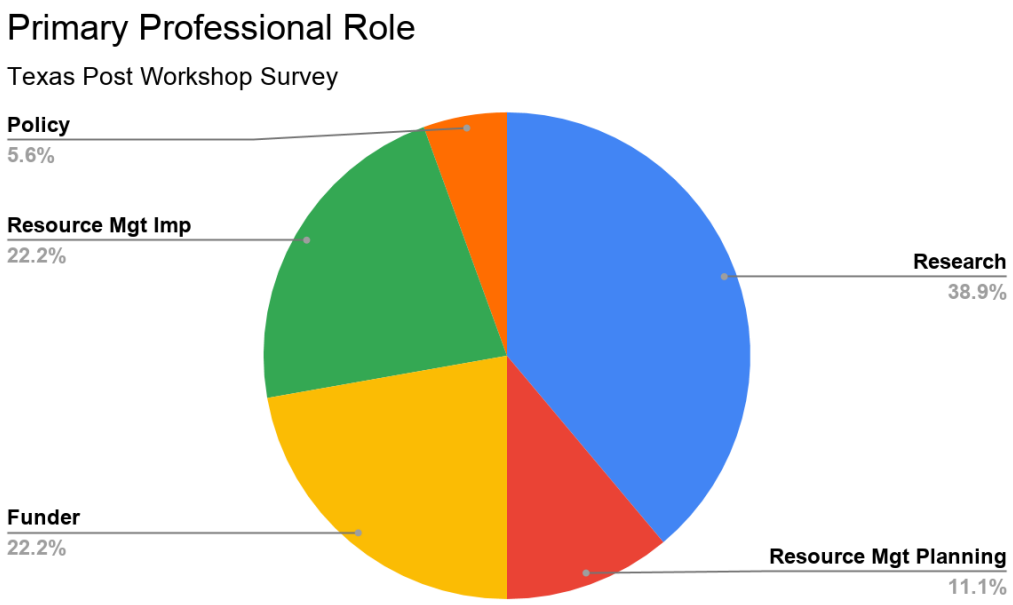


Figure 4. . Self-identified primary professional role distribution of post workshop survey respondents. The survey provided categories for participants to choose from, with resource managers broken into planning and implementation categories.

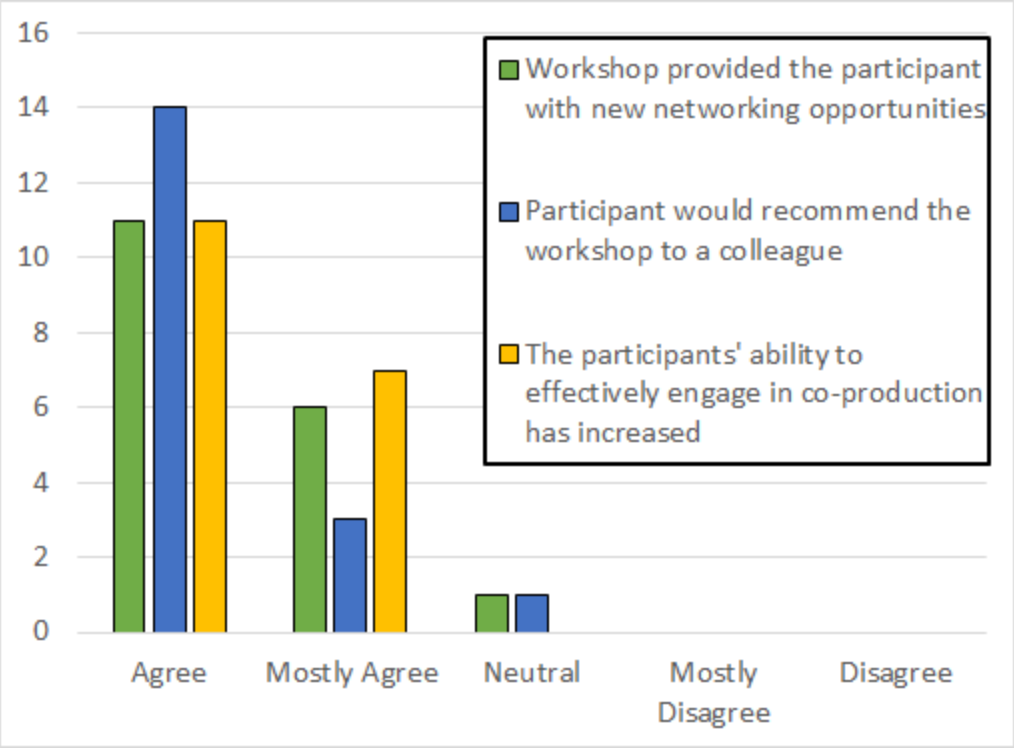


Figure 5. Survey response to questions regarding the workshop a) provided participants with networking opportunities, b) increased participant ability to effectively engage in co-production and c) potential value to a colleague.

Participants were asked which sessions were the most and least useful of the workshop. The survey allowed participants to list more than one session for each of these responses. As shown in Figure 6, the majority of the respondents found the interactive sessions to be the most valuable, which includes both the project planning activity and the Roadblocks and Solutions session. Although 'Networking' was not a specific session, many participants stated that this was one of the most useful portions of the workshop (Figure 6).

Lecture sessions, including defining co-production and co-production in action, were seen as the least valuable portions of the workshop. One respondent indicated that the reason for this was that the presenters were often 'in the weeds' of their individual projects and not focused on the co-production aspects of the work.

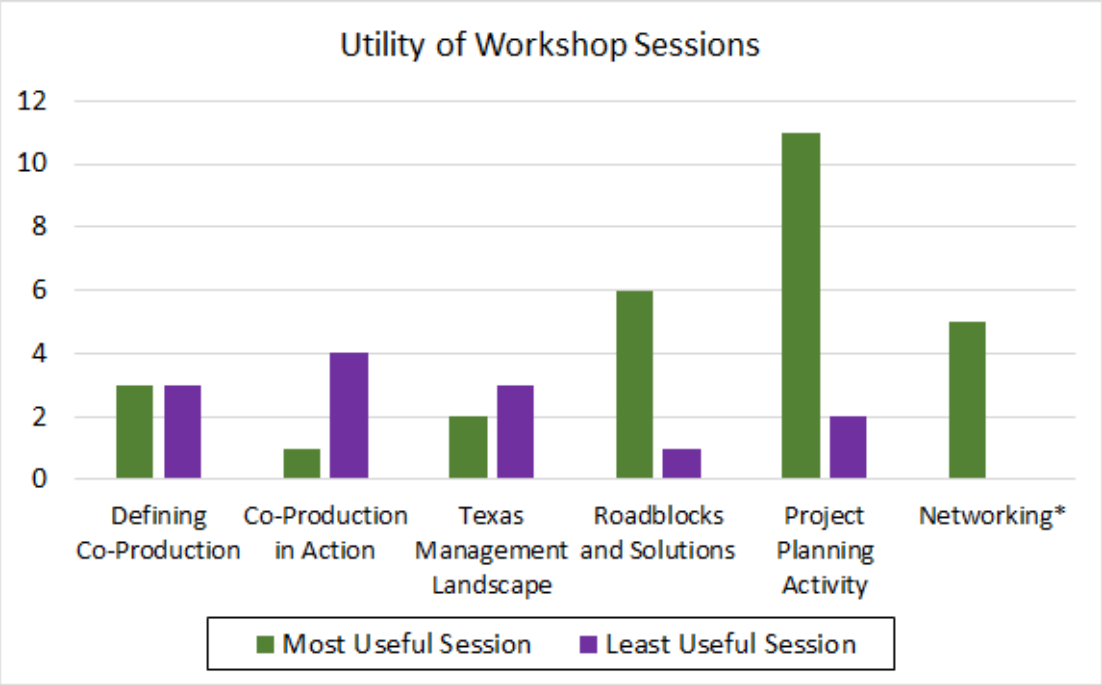


Figure 6. Participant response to which workshop sessions were the most and least useful. Although networking was not a specific session, many participants identified this as the most valuable part of the workshop.

Take Away: *Individual Survey Respondent Perspectives*

Academic Researcher Perspective: Of the seven academic researchers who completed the survey, five indicated that they would use the skills and network they gained during the workshop to improve their proposal writing. One researcher went further and stated that they would use the knowledge to produce scientific outputs that are more likely to be used by the resource management community.

Resource Manager Perspective: The workshop provided resource managers with a number of new ideas on how to improve the science to management decision making process within their agencies. One state manager clearly identified five ways they can improve their co-production process.

1. Implement a more formalized project scoping with additional stakeholders.
2. Take more consideration of end-products to be developed by a project.
3. Incorporate explicit funding and proposal requirements that requires contractors (PIs) to have stakeholder discussions and generate communication materials to explain the project results.
4. List state management agency research priorities on the agency website.
5. Work to increase participation by all staff at more local meetings and conferences.

Next Steps for Texas

Texas OneGulf is currently considering options to continue this work, including by hosting iterative interactive sessions for decision makers, research scientists, and boundary spanning organizations. Texas OneGulf also will be meeting with state agency leaders to establish a

standardized process for gaining input on research priorities listed in its Strategic Research and Action Plan.

Texas OneGulf also can serve as a conduit and ‘match-maker’ between research scientists, decision makers, and stakeholders. When considering a natural resource management or research project, the Center of Excellence encourages all stakeholders to reach out for potential connections. Advancing actionable science by way of knowledge co-production will remain a priority for the Center of Excellence.

GULF RESTORATION AND SCIENCE COORDINATION FORUM

Description

***Purpose**:* The purpose of this Coordination Forum is to provide regular communication and coordination on Gulf of Mexico restoration and science amongst the entities funded as a result of the Deepwater Horizon event to support science and restoration.

***Membership**:* In order to enhance coordination, a Gulf Restoration and Science Coordination Forum was established to promote communication between groups receiving funds for science and restoration as a result of the Deepwater Horizon event. Invitees to the forum include program leaders or their designees from the RESTORE Act programs including the NOAA RESTORE Act Science Program, Gulf Coast Ecosystem Restoration Council, and RESTORE Centers of Excellence (once designated by the Department of Treasury); US Department of the Treasury's Office of Gulf Coast Restoration; National Academy of Sciences Gulf Research Program; Gulf of Mexico Research Initiative; National Fish and Wildlife Foundation's Gulf Environmental Benefit Fund; North American Wetlands Conservation Fund; Natural Resource Damage Assessment program. The facilitator of this group will be selected from the membership and will be responsible for convening meetings.

Meetings: This Forum is carried out through teleconference every other month or webinar as needed, plus ad hoc face-to-face meetings as suggested by participants. Notice of the meetings and any materials will be distributed by email. Notes from each call will be provided to participants by the facilitator within one week of the meeting. Consensus opinions will not be sought during any discussion of this group.

Membership List

Organization	Primary Representative	Secondary Representative
Chair	Julien Lartigue Director, NOAA RESTORE Science Program	N/A
Gulf Coast Ecosystem Restoration Council	Jessica Henkel Science Advisor and Coordinator	Jean Cowan Director of Ecosystem Restoration Programs Allison Snider Fellow
United States Coast Guard (under Council)	Jamie Price Fellow	

Gulf of Mexico Research Initiative	Chuck Wilson Chief Scientific Officer	Mike Carron Program Director
National Academies - Gulf Research Program	Dan Burger Senior Program Manager	Don Boesch Environmental Senior Scholar
National Fish and Wildlife Foundation Gulf Environmental Benefit Fund	Jon Porthouse Director, Coastal Habitat Restoration	David Reeves Manager, Coastal Habitat Restoration
NOAA - Natural Resource Damage Assessment (NRDA) -- Restoration	Melissa Carle Monitoring and Adaptive Management Team Lead	Eric Weissberger Marine Habitat Specialist Rachel Sweeney Program Manager, Deepwater Horizon Restoration Program
Department of Interior - NRDA	Jon Hemming Science Data and Monitoring Advisor	Greg Steyer Science Advisor - Gulf of Mexico
NOAA RESTORE Science Program	Julien Lartigue Director	Frank Parker Associate Director
Gulf States Marine Fisheries Commission (under Science Program)	Jeff Rester Habitat and SEAMAP Coordinator	
US Fish and Wildlife Service (under Science Program)	Jon Hemming Science Data and Monitoring Advisor	
Treasury Department's Office of Gulf Coast Restoration	Bridget Cotti-Rausch Awards Program Analyst	Maureen Klovers Program Director
Florida RESTORE Act Centers of Excellence Program (at the Florida Institute of Oceanography (FIO))	Cam Ngo Assistant Director, FIO	Monty Graham Director, FIO

Alabama Center of Excellence (the Alabama RESTORE Act Center of Excellence at the Dauphin Island Sea Lab (DISL))	John Valentine Executive Director, DISL	Amy Hunter Deepwater Horizon Restoration Coordinator (Alabama Department of Natural Resources) Ken Heck Senior Marine Scientist III, emeritus Dottie Byron Program Manager
Mississippi Based RESTORE Act Center of Excellence (MBRACE) (at the University of Southern Mississippi)	Luke Fairbanks Deputy Director	Landry Bernard Chief Scientist Kelly Darnell Director
RESTORE Act Center of Excellence for Louisiana (at the Water Institute)	Alyssa Dausman Senior Vice President and Chief Scientist	Angelina Freeman Research Scientist (Louisiana Coastal Protection and Restoration Authority) Melissa Baustian Coastal Ecologist and Director of the Louisiana Center of Excellence Bingqing Liu Post-doctoral researcher and Deputy Director of the Louisiana Center of Excellence
Texas OneGulf Center of Excellence (a Texas RESTORE Act Center of Excellence at the Harte Research Institute)	Katya Wowk Director	Kara Coffey Project Coordinator II

Subsea Systems Institute (a Texas RESTORE Act Center of Excellence at the University of Houston)	Ramanan Krishnamoorti Professor	Stephanie Coates Program Director

TERMS OF REFERENCE OF THE EXECUTIVE OVERSIGHT BOARD

I. Official Designation

Under Section 1604 of PL112-141 (The RESTORE Act), NOAA has been designated with responsibilities to establish and administer a Gulf Coast Ecosystem Restoration Science, Observation, Monitoring, and Technology Program (NOAA RESTORE Science Program). The legislation specifies that the intent of the program is to carry out research, observation and monitoring, to support, to the maximum extent practicable, the long-term sustainability of the ecosystem, fish stocks, fish habitat, and the recreational, commercial, and charter fishing industry in the Gulf of Mexico. To partially fulfill the intent of this Act, NOAA has established an interagency executive group called the NOAA Restore Science Program Executive Oversight Board (hereafter Board) to oversee the scientific, programmatic, and financial aspects of implementation of Section 1604 of the RESTORE Act.

II. Purpose and Scope

The purpose of the Board is to oversee development and implementation of the NOAA RESTORE Science Program (hereafter Science Program) to be consistent with Section 1604 of the RESTORE Act. In this regard, it will provide oversight to NOAA's National Ocean Service (NOS), which has been designated by NOAA as the executing body of the Science Program, in the administration of the funds available under the program.

III. Functions

The Board will:

- Provide senior/executive level representation and points of contact;
- Provide scientific, programmatic, and financial oversight in the implementation of the program through its duration;
- Provide a forum for proposing, discussing, and approving strategic priorities;
- Support the NOAA Administrator in ensuring accountability for program execution;
- Ensure accountability for interagency partner agreements;
- Approve Federal Funding Opportunity (FFO) programmatic content;
- Provide portfolio review of proposed program investments;
- Consult/participate in program personnel selection as appropriate;
- Ensure the Science Program continues consultation with the Gulf States Marine Fishery Commission and the Gulf of Mexico Fishery Management Council, and coordination with other Gulf Coast ecosystem scientific entities and other stakeholders in carrying out the program; and
- Inform the NOAA Research Council on a periodic basis of its activities.

IV. Membership and Meetings

The Chair of the Board will be the Assistant Administrator (AA) (or a designee with corporate perspective) of the National Marine Fisheries Service, who will serve an annual term and will be replaced after one term by the AA of the Office of Oceanic and Atmospheric Research (OAR) or a designee for a

1-year term, to be replaced by the AA, or a designee of NOS for 1 term. The same rotation of AA's will follow in subsequent years. Each LO chair may be extended for a period of 1 year during their respective rotation upon the approval of the Board. Such extension will be discussed by the Board (initially without the sitting chair) no less than 2 months before the end of the first year of that chairs' tenure. The chair will represent NOAA, rather than their respective Line Office.

Membership of the Board shall consist of SES, SL, ST level staff or their designees:

- One senior science leader from NOAA's NMFS, OAR, NOS, National Environmental Satellite Data Information Service (NESDIS), and National Weather Service (NWS);
- One senior science leader from the US Fish and Wildlife Service; and
- One ex-officio (non-voting) member from NOAA Finance to ensure financial systems accountability and any necessary liaison with NOAA and DOC Budget Offices.

Each NOAA Line Office, the US Fish and Wildlife Service, and NOAA Finance will determine their own process for selecting their representative to the EOB. Once a representative has been selected that information will be communicated to the Chair of the Board. The AA of the NOAA Line Office, the Assistant Regional Director for Gulf Restoration of the US Fish and Wildlife Service, or the NOAA Chief Financial Officer, respectively, must either make the selection or be notified of the selection. In selecting a representative, the NOAA offices and the US Fish and Wildlife Service should seek an individual with knowledge of the Gulf of Mexico, interest or expertise in Science Program activities, and/or the time and professional network to connect the Science Program to other programs in their office or agency.

Meetings: The Board will meet monthly unless otherwise decided by the Board. Meetings may be virtual.

V. Decision Making Process

Voting members of the Board shall include the five NOAA Line Office representatives, and the one USFWS representative. To maintain neutrality, the Chair does not have a vote.

Programmatic decisions will be made by consensus among the Board members. Consensus is defined here as unanimity or full consent, where all agree to be able to "live" with the decision. The Chair will strive for consensus on every issue. If consensus cannot be reached on an issue, the decision will be made by simple majority vote. If a decision still cannot be made, the decision will be elevated to the NOAA Research Council for resolution.

Similar decision-making rules will apply to financial decisions except that when consensus and a simple majority cannot be reached, the issue will be elevated to the NOAA Deputy Under Secretary for Operations for resolution.

VI. Termination Date

The Research Council shall evaluate the need for the Board at least every five years.

VII. Determination

NOAA hereby determines that the formation of the Board is in the public interest in connection with the performance and duties imposed on the Executive Branch by law, and that such duties can best be performed through the advice and counsel of such a group.

Approved

_____ _____

Craig McLean, Chair NOAA Research Council Date

REPORTING FORMS

Standard Operating Procedure for Progress Report Reviews

I. Introduction

This document summarizes the processes used for NOAA RESTORE Science Program to review project progress reports. There are two types of progress reports utilized by the Science Program for tracking projects: semi-annual and final. Semi-annual progress reports are due 30 days after each six-month period of performance interval including the last six-month interval. A final progress report covering the entire project is due 90 days after the project's entire period of performance concludes. The Science Program requires that project teams submit a single progress report from the lead institution that integrates the contributions and accomplishments of all partner institutions rather than individual reports from each partner institution.
Non-federally led awards must use NOAA's Grants Online for submitting progress reports, whereas federally led awards should submit progress reports as attachments to an email to the federal program officer (FPO). NOAA has 90 days to respond to a progress report and may either accept it, accept it with comments and questions, or reject it and send it back for revisions. The Science Program may set its own deadlines for submission of revisions to progress reports; offering two weeks for minor revisions and 30 days for major revisions seems reasonable.

II. Relevant forms (blank templates)

- Semi-annual progress report form
- Gantt chart and end user workbook template
- Semi-annual progress report evaluation form
- Final report form
- Final report evaluation form

IV. Semi-annual reports

45-60 days prior to the deadline for a semi-annual progress report:

1. The FPO (or designee) should email a reminder to each lead investigator 45-60 days before a semi-annual progress report is due. The email should include a copy of the semi-annual progress report template (OMB Control No 0648-0384) and the latest version of the project's milestone Gantt chart and end user workbook (the final version from the previous reporting period ["*Milestones and end user workbook PR x final*", where *x* is the number for that report (in order 1, 2, 3, *etc.*)], which may be found in its progress report Google drive folder).

For each submitted semi-annual report:

1. Make a new Google Drive folder within the “Progress report” folder titled, “PR *x*”, where “*x*” is the number for that report (in order 1, 2, 3, *etc.*).
2. Make a copy of the semi-annual progress report evaluation form found in the “Progress report” folder, move the copy to the new “PR *x*” folder, open the file, rename it “Progress report #*x* evaluation - [insert lead investigator last name]”, where *x* is the number for that report (in order 1, 2, 3, *etc.*); add the evaluation due date (~3 weeks from now) and date interval for the report (*e.g.*, 12/1/2020-5/31/2021) to the top of the form.
3. Submitted semi-annual progress reports must include two files, (1) a progress report and (2) a milestone Gantt chart and end user workbook. They may also include other files (*e.g.*, publications, presentations, press articles, meeting agendas or summaries, *etc.*).
    - Non-federally led awards must use NOAA’s Grants Online for submitting progress reports, whereas federally led awards should submit progress reports as attachments to an email to the FPO.
    - For a non-federally led award, download all attachments to the semi-annual progress report from Grants Online. A list of submitted progress reports is in the FPO’s Grants Online task list. Do not download the Research Performance Progress Report (RPPR) form -- the Science Program does not use this form.
    - Return the progress report to the lead investigator if either of the required files are missing and ask them to resubmit the report including the missing files. If a report needs to be sent back for revisions, use both Grants Online and email for non-federally led awards, and use only email for federally led awards.
4. Upload all files associated with the semi-annual progress report to the new Google drive folder you made in Step 2.
5. Send an email to the technical monitor(s) with a Cc: to Science Program staff responsible for evaluating the items below asking the group to review the semi-annual progress report. See here for example text for these emails. Modify the email and include the linked documents as attachments for technical monitors that do not have access to our Google drive system. Cc list (as of Aug 2021):
    - Gantt chart review and updates - Miranda Madrid
    - Leveraged funds and peer-reviewed publications - Pete Key
    - Data management - Jessica Morgan
    - End users and sharing of findings and products - Caitlin Young
    - Management action outcomes - Caitlin Young
6. Additional staff may review the semi-annual progress reports for other purposes (*e.g.*, project dashboards).
7. In the “Progress Report” tab in the appropriate master workbook, fill in the “date submitted” and “technical monitor (TM) deadline” columns in the appropriate row. The program staff person listed in Step 5 should update the spreadsheet as their tasks are completed (milestone Gantt chart updated, publications reviewed, *etc.*) by coloring cells green, adding notations, and adding comments as warranted. Add a link to the completed evaluation.

8. Milestone Gantt chart updates:

- The lead investigator should have updated their Gantt chart from the previous version, which may have included adjusting tasks, task due dates and statuses, and perhaps milestones.
- Rename the progress report if needed using this form: *[Lead investigator last name] milestones and end users PRx*, where *x* is the progress report number.
- When evaluating a project's first progress report, confirm that the Gantt chart is well organized and has reasonable due dates.
- When evaluating an iterative progress report, review the previous evaluation form to check for resolution of previous issues.
- Check the progress report form for notes describing changes to the Gantt chart and ensure that all changes have been noted in the evaluation form. If a component of the Gantt, such as a status or due date, needs to be updated or requires clarification, make a highlighted note in the evaluation form so that the FPO is sure to include it when they craft the written reply to the lead investigator.
- Note necessary updates in the master workbook on the progress report tab. Be sure to update the "Revised gantt chart" column when you complete an evaluation.

Once reviews by technical monitors and program staff are completed:

1. For technical monitors that do not have Google drive access, copy their semi-annual progress report evaluation responses and paste them into the corresponding Google drive file so that there is one file that encompasses the feedback from all reviewers.
2. The FPO or program liaison drafts the '*Science Program written response*' to the progress report at the end of the appropriate evaluation form on the Google drive.
    - The lead author of the response for FFO-2017 projects is the FPO and for FFO-2019 projects is the program liaison. FFO-2021 progress report responses will be shared among program staff. <u>All progress report responses should be reviewed and cleared by the FPO before they are transmitted to the lead investigator.</u>
    - The lead author should pull from the comments in the evaluation provided by others and add their own comments as warranted. They should try to synthesize and integrate the information and generally be direct. Feedback should reflect the positive and negative aspects of what was provided in the progress report. Examples may be found in any evaluation form from the 2017 and 2019 projects. Questions should be used when the Science Program wants a written reply. The following outline may be used to frame the response:
        a. Introduction that thanks them for the report, includes overarching comments (often from section IV of the evaluation form), lets them know if the report is accepted or not using the three categories below, and provides clear next steps.
            1) "<u>Accepted</u>", which means the report is complete and good "as is"; there are no follow-up questions or comments from the Science Program that <u>require</u> a response from the lead investigator, however, the *Science Program written response* may include

comments or minor questions that do not require a written response or point out items that must be addressed in the next progress report.

2) "Accepted with questions and comments", which means the report is complete and requires a written response over email from the lead investigator in reply to one or more questions or comments from the *Science Program written response*.
3) "Rejected and returned for revisions", which means the report is incomplete or has information that is factually incorrect; the report needs to be completed or revised and resubmitted using either Grants Online (for non-federally led awards) or email (for federally led awards).

b. The remainder of the *Science Program written response* should be organized by the sections in the progress report as follows:
    1) Milestones and timeline: provide comments relating to whether tasks and milestones due for a particular reporting period were completed or not and respond to proposed requests from the lead investigator to change timelines, milestones, tasks, *etc*., referencing the revised milestone Gantt chart as needed. This section could include reviewer feedback found in sections I, IV, VI, and VIII as appropriate.
    2) Outputs: provide comments and questions relating to updates on plans for outputs or feedback on actual outputs if provided. Feedback on this section often includes a request for copies of outputs such as presentations (note: there is no need to be exhaustive in collecting outputs like presentations; rather, seek exemplars).
    3) Data management: feedback on data management actions are generally driven by the comments and questions provided by the NCCOS data manager (section VII), and often include a request for a data management consultation. There is a data management tab in each master workbook for tracking these actions that is often maintained by the Science Program's fellow.
    4) End users: provide comments and questions on end user interactions and updates on the end user engagement spreadsheet. The spreadsheet is used to maintain a comprehensive and living list of planned end users, while each progress report should include specific end user interactions that took place during that reporting period. If end user updates lack enough detail for substantive analysis or feedback, request the lead investigator provide more detail and then provide feedback on the revised materials. Whether that falls into category 2) "Accepted with questions and comments" or 3)"Rejected and returned for revisions" is subjective.

5) Financial updates: provide comments and questions as needed. Feedback in this section often centers on leveraged funds and significant deviations from what was originally planned.

c. Conclude with a summary of next steps, including deadlines. If revisions to the report or responses to questions arising from our review of the report require a response, provide a deadline between two weeks and 30 days depending on the level of effort needed to respond.

3. The lead author of the progress report response will transmit (1) the final version of the response and (2) the updated version of the milestone Gantt and end user workbook via email to the lead investigator. cc: technical monitors, data manager, and Science Program staff that contributed to the review.
    - For non-federally led projects, the email should also Cc: the lead institution's authorized representative (found in Grants Online) or someone from their sponsored programs office.
4. The FPO will transmit the response via the task in Grants Online and modify the response in the "*comments*" box to refer to the milestone and end user workbook having been shared via email.
5. In the "Progress Report" tab in the appropriate master workbook, fill in the "Response from PI required?" column with a Y/N. Follow-up as needed with the lead investigator for responses that are overdue. Be sure to upload responses to the Google drive folder for that progress report (often as a PDF of an email exchange, for example). Once the response has been received and the action is complete, update the tracking sheet cell for "PI response received" and include a link to the PI's response if needed.

V. Final reports

Six months prior to the final report deadline:

1. The final report is due 90 days after the period of performance concludes. The FPO (or designee) should email a reminder to each lead investigator six months before the final report is due. The email should include a copy of the final report template (OMB Control No 0648-0384) and relevant information from this closeout letter. The email should also include an offer to the project team for informal review of the final report by the FPO, technical monitors, and others ahead of formal submission.

For each submitted final report:

1. Make a new Google drive folder within the project folder for each project titled, "Final report".
2. Make a copy of the final report evaluation form and move the copy to the new "Final report" folder, open the file, rename it "Final report evaluation - [insert lead investigator last name]"; add the evaluation due date (~30 days from now) and the full period of performance to the top of the form.
3. Non-federally led awards must use NOAA's Grants Online for submitting their final report, whereas federally led awards should submit their final report as an attachment to

an email to the FPO. For a non-federally led award, download all attachments to the final report from Grants Online.

4. Upload all files associated with the final report to the new Google drive folder you made in Step 1.
5. Send an email to the technical monitor(s) with a Cc: to Science Program staff responsible for evaluating the items below asking the group to review the final report (including any attachments to the report) using the Science Program's final report evaluation form. Modify the email and include the linked documents as attachments for technical monitors that do not have access to our Google drive system. Cc list (as of Aug 2021):
    - Project deliverables - Frank Parker
    - Peer-reviewed publications - Pete Key
    - Data management - Jessica Morgan
    - End users and sharing of findings and products - Caitlin Young
    - Management action outcomes - Julien Lartigue
6. In the "Progress Report" tab in the appropriate master workbook, fill in the "date submitted" and "TM deadline" (allow approximately one month for review) columns in the appropriate row. Update the spreadsheet as reviewer tasks are completed by coloring cells green, adding notations, and adding comments as warranted. Add a link to the completed evaluation. The Science Program has 90 days to respond to the report from the date it was submitted.

Once reviews by technical monitors and program staff are completed:

1. For technical monitors that do not have Google drive access, copy their final report evaluation responses and paste them into the corresponding Google drive file so that there is one file that encompasses the feedback from all reviewers.
2. The FPO or program liaison drafts the '*Science Program written response*' to the final report at the end of the evaluation form on the Google drive.
    - The lead author of the response for FFO-2017 projects is the FPO and for FFO-2019 projects is the program liaison. FFO-2021 progress report responses will be shared among program staff. <u>All progress report responses should be reviewed and cleared by the FPO before they are transmitted to the lead investigator.</u>
    - The lead author should pull from the comments in the evaluation provided by others and add their own comments as warranted. They should try to synthesize and integrate the information and generally be direct and specific in offering feedback. The final report should serve as a stand alone document that accurately emcompasses the project's entire period of performance. The following outline may be used to frame the response:
        a. Introduction that thanks them for the report, includes overarching comments, lets them know if the report is accepted or not using the three categories below, and provides clear next steps.
            1) "<u>Accepted</u>", which means the report is complete and acceptable to the Science program "as is" with no edits. The *Science Program*

written response may include comments or minor questions that do not require edits to the report.

2) "Accepted with edits", which means the report is mostly complete, but may require minor edits or clarifications; the report needs to be revised and resubmitted using either Grants Online (for non-federally led awards) or email (for federally led awards).
3) "Rejected and returned for revisions", which means the report is incomplete or has information that is factually incorrect; the report needs to be completed or revised and resubmitted using either Grants Online (for non-federally led awards) or email (for federally led awards).

b. The remainder of the response should be organized by the sections in the final report: *approach, evaluation, outputs (including data management),* and *end users*.
c. Conclude with a summary of next steps, including a deadline of 30 days for submitting final report revisions. If revisions are needed, request that they return the revised final report as an email attachment. Have the FPO, technical monitors, data manager, and others review the revised report to check whether the requested edits were made and whether the report is now acceptable. If additional edits are needed, work with the lead investigator and reviewers until all agree on a final version. The final version for non-federally led projects should then be submitted to Grants Online, at which point the FPO should confirm that it is the correct version and then accept the report via the Grants Online task.

3. The lead author of the final report response will transmit the final version of the response via email to the lead investigator. Cc: technical monitors, data manager, and Science Program staff that contributed to the review.
    - For non-federally led projects, the email should also Cc: the lead institution's authorized representative (found in Grants Online) or someone from their sponsored programs office.
4. The FPO will transmit the response via the task in Grants Online.
5. The final version of the final report should be uploaded to the appropriate Google Drive folder.
6. Update the final report entry on the "Progress Report" tab in the appropriate master workbook throughout the process and add a link to the final version of the final report.

Semi-Annual Progress Report Form

Award Number:
Amount of Award:
Project Title:
Lead Investigator:
Lead Institution:
Award Period (month/year): From _____ To _____
Period Covered by this Report (month/year): From _____To _____

Please complete each of the sections below, only including activities that took place during this reporting period.

I. ***Milestone Chart***
   a. Reference your *milestone chart* worksheet when completing the below sections.
   b. If your milestones or timeline have changed since your last progress report, update your *milestone chart* worksheet to reflect the changes and provide the following in your progress report: (1) a short summary of what was changed and why, (2) how the change(s) will impact progress toward achieving project objectives, and (3) how you plan to mitigate those impacts, especially to your timeline.
   c. Update the "Status" column (likely column F) in your *milestone chart* worksheet by selecting one of the options in the drop-down menu for each milestone or task with a listed start date (likely column D) prior to your progress report due date. Provide a succinct written update in your progress report for each milestone/task.
   d. Submit your updated *milestone chart* worksheet with your completed progress report to Grants Online.

II. ***Outputs*** are products (*e.g.*, publications, models) or activities that lead to outcomes. Outcomes are changes in user knowledge or action. Briefly describe project outputs under each of the following categories that were completed in this reporting period:
   a. Key scientific findings.
   b. New methods, technologies, or advanced tools (*e.g.*, models, biomarkers).
   c. Publications, including peer-reviewed journal articles, book chapters, NOAA Technical Memoranda, conference proceedings, *etc*. For each, list full citations including digital object identifiers (DOI) and append a copy to your report (for open access publications, attach the published PDF; for copyrighted publications, attach a pre-published PDF and the published PDF).
   d. Data: Provide the status (undergoing QA/QC, in preparation to be submitted to a data archive, submitted, publicly available, or limited release) and location (data archive, internet address, accession number, and/or DOI) of all datasets and data services. Append a copy of any metadata submitted to a non-NOAA data archive or web service provider.
   e. Non-digital data, including biological specimens, preserved samples, paper, or analog records, *etc*. (list all non-digital datasets and their disposition, and append a copy of the associated documentation).
   f. Patents (append a copy of each to your report).
   g. Workshops (append the agenda, attendees, workshop summary, and workshop outputs to your report).
   h. Presentations [list the venue (*e.g.*, conference name), authors, title, type (oral or poster), and date].

i. Outreach products (*e.g.*, website, newsletter articles; append a copy of the products or provide relevant website addresses).

III. ***End Users*** are resource managers or people involved in resource management. Resource management can take many forms including wildlife and fishery management, federal and state rulemaking and permitting, conservation practices by private landowners, place-based management, and restoration planning.

a. Summarize end user interactions (*e.g.*, we shared something) and management applications (*e.g.*, they did something with what we shared) that took place during this reporting period by answering the questions and populating the table below (add rows as necessary). Include end users in the table with whom you had regular, sustained interactions or a single significant interaction and then in prose answer the following two questions for each end user:

1. What was shared (*e.g.*, knowledge, findings, products, training, methods, technology, etc.) and with whom?
2. Was it used? If so, how (*e.g.*, management action, decision-making, strategic planning, issuance of regulations, policy-changes, public outreach, *etc.*)?

End User Name	Organization	Email Address

IV. ***Primary accomplishments***: Provide a short narrative of the KEY project accomplishment(s) in this reporting period **(100 words or less)**

V. ***Financial Updates***

a. Describe expenditures scheduled and actual expenditures this period and explain differences between them, if any.

b. Describe leveraged funding. Leveraged funding may be in the form of dollars or in-kind contributions to which a dollar value can be readily assigned, such as salary or use of equipment or a facility. Include planned (with agreements in place) or completed efforts during the current 6 month reporting period. Include the following details:

1. Identify the parties involved (names and affiliations)
2. Describe the planned or completed activities (activity type, timeframe for completion, location of event, *etc.*)
3. Describe the method of leveraging (additional funding or in-kind contribution)

_____ _____

Signature of Lead Investigator Date

NOTICE

All NOAA RESTORE Science Program award recipients with approved cooperative agreements are required to file a Progress Report in the specified format every six months. This progress report format will enable program staff to monitor each award.

Public reporting burden for this collection of information is estimated to average 300 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

Send comments regarding this burden estimate or any other aspects of this collection of information, including suggestions for reducing this burden, to the NOAA RESTORE Science Program Office, 1021 Balch Blvd., Suite 1003, Stennis Space Center, MS 39529 or email noaarestorescience@noaa.gov. All files associated with awards are subject to the Freedom of Information Act (FOIA). Confidentiality will not be maintained – the information will be made available to the public. However, unpublished research results shall not be published without prior permission from the award recipient.

Notwithstanding any other provision of the law, no person is required to respond to, nor shall any person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act, unless that collection of information displays a currently valid OMB Control Number.

Gantt Chart Template

Milestone	Task	Task Category	Task Start Date	Task Completion Date	2017				2018												2019									
					Q3	Q4			Q1			Q2			Q3			Q4			Q1			Q2			Q3		
					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
Milestone 1: Field Data					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X									
1.1	Expedition #1: Pre-Expedition Preparation	Cruise	6/1/2017	6/30/2017																									
1.2	Expedition #1: Full Depth Cruise	Cruise	7/1/2017	7/31/2017																									
1.3	Expedition #2: Pre-Expedition Preparation	Cruise	6/1/2017	7/31/2017																									
1.4	Expedition #2: Mesophotic Cruise 1	Cruise	10/1/2017	10/31/2017																									
1.5	Expedition #3: Pre-Expedition Preparation	Cruise	2/1/2018	5/31/2018																									
1.6	Expedition #3: Mesophotic Cruise 2	Cruise	6/1/2018	6/30/2018																									
Milestone 2: Field Data Processing					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X			
2.1	Voucher specimens curation	Data Processing	8/1/2017	7/31/2018																									
2.2	DNA extractions	Data Processing	9/1/2017	7/31/2018																									
2.3	DNA barcoding	Data Processing	9/1/2017	9/30/2018																									
2.4	Publication of DNA barcoding data on GenBank	Data Management	1/1/2018	11/30/2018																									
2.5	RAD Sequencing Contracting	Admin	9/1/2017	7/31/2018																									
2.6	RAD Sequencing	Data Processing	10/1/2017	11/30/2018																									
2.7	RADseq data QAQC and filtering	Data Processing	3/1/2018	12/31/2018																									
2.8	RAD loci clustering and SNP calling	Data Processing	5/1/2018	1/31/2019																									
2.9	Completion of Eulerian integrations for 2014-2016	Data Processing	6/1/2017	6/30/2018																									
Milestone 3: Data Interpretation					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
3.1	Analyses of spatial population genetic structuring	Data Analysis	7/1/2018	2/28/2019																									
3.2	Analyses of genetic connectivity rate and directionality	Data Analysis	9/1/2018	3/31/2019																									
3.3	Integration of population genetic and modeling data	Modeling	5/1/2018	5/31/2019																									
3.4	Larval Dispersal modeling	Modeling	1/1/2018	12/31/2018																									
Milestone 4: Publications					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
4.1	Cruise Reports	Publication	9/1/2017	7/31/2018																									
4.2	Dissemination of cruise metadata	Data Management	9/1/2017	8/31/2018																									
4.3	Completion of peer-reviewed publications	Publication	1/1/2019	5/31/2019																									
Milestone 5: Outreach					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
5.1	Reports to managers	Presentations	11/1/2017	5/31/2019																									
5.2	Scientific Meeting	Presentations	2/1/2019	2/28/2019																									
5.3	End of Project workshop	Workshop	5/1/2019	5/31/2019																									
Milestone 6: Reporting					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X
6.1	Progress reports	Data Management	11/1/2017	5/31/2019																									
6.2	Archive annotated video frames at DSCRTP w/in 6 months after cruise	Data Management	1/1/2018	12/31/2018																									
6.3	Archive coral specimens at NOAA/Harvey Mudd/Smithsonian within 1 yr from collection	Data Management	7/1/2018	6/30/2019																									
6.4	Archive CTD data at NCEI within 1 year from collection	Data Management	7/1/2018	6/30/2019																									
6.5	Archive video at NCEI at end of project	Data Management	1/1/2019	5/31/2019																									
6.6	Archive genetic data at NCBI/Dryad at time of publication	Data Management	5/1/2019	5/31/2020																									
6.7	Archive model output at NCEI at time of publication	Data Management	5/1/2019	5/31/2020																									
Milestone 7: Meetings					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	
7.1	Mid-Project PI meeting	Meetings	4/1/2018	4/30/2018																									
7.2	Annual meeting with technical monitors	Meetings	4/1/2018	11/30/2018																									
7.3	Conference calls with technical monitors	Meetings	6/1/2017	5/31/2019																									

* Final progress report is due 90 days after the end of the period of performance

Semi-Annual Progress Report Evaluation Form

Reviewer:
Review Due Date:
Award Number:
Lead Principal Investigator:
Period Covered by this Report (month/year): From _____To _____

Technical monitor(s) should fill in sections I - V. Technical monitors may also contribute to sections VI - IX as needed.

I. ***Milestone Chart*** **(reference the submitted *Milestones and Gantt timeline* worksheet)**
   a. Is the *milestone and Gantt timeline* consistent with your knowledge of the project?
   b. Did the PI provide an adequate rationale for any changes? Why or why not? Do you agree with the changes? Why or why not?
   c. Was the status for each milestone or task updated? Are the updates complete and accurate? Why or why not?
   d. What comments or advice do you have for the PI on the milestones and timeline?

II. ***Outputs***
   a. Did the PI provide adequate and complete updates to this section? What, if anything, is missing?
   b. Did the PI provide necessary attachments relevant to the outputs? What, if anything, is missing?
   c. What comments or advice do you have for the PI on outputs?

III. ***End Users*** **(reference the submitted *End User* worksheet)**
   a. Did the PI provide an adequate and complete update to the *End User* worksheet? What, if anything, is missing?
   b. Did the PI provide adequate and complete updates on end user interactions? What, if anything, is missing?
   c. What comments or advice do you have for the PI on end users?

IV. ***Primary Accomplishments***
   a. Do you have any comments or feedback on the response to this section?

V. ***Other Feedback***
   a. What other comments or feedback do you have for the PI about the report?

RESTORE Science Program staff should fill in sections VI-IX. Technical monitors may also contribute to these sections.

VI. ***Financial Updates (Frank Parker and Pete Key)***
   a. Did the PI provide an adequate rationale for any differences between scheduled and actual expenditures?
   b. What other (if any) comments do you have for the PI on their financial updates?
   c. What additional information is needed (if any) on reported leveraged funds?

VII. ***Data Management Review (Jessica Morgan)***

a. Are there any data management deliverables attached to this report?
b. Are any data management deliverables past due?
c. Are any data management deliverables coming due in the next six months?
d. Are there any data management action items outstanding?
e. Any additional data management comments?

VIII. ***Publications (Pete Key)***

a. Were peer-reviewed publications reported and if yes, were they added to the Science Program's publication tracker?

IX. ***Gantt Chart Notes (Miranda Madrid)***

a. List any edits to milestones, due dates, and status in addition to any questions or comments for the PI.

Final Report Form

Award Number:
Amount of Award:
Project Title:
Lead Investigator:
Lead Institution:
Award Period (month/year): From _____ To _____

Please complete the sections below, including all activities that took place during your project.

I. ***Executive Summary***

a. Provide a brief and succinct summary of the Final Report. Include key project accomplishments and one specific accomplishment you wish to showcase on the Science Program 's website.

II. ***Purpose***

a. Provide the overarching goals of the project.
b. Provide the hypotheses (if applicable) and objectives of the project.

III. ***Approach***

a. List the individuals and organizations that actually performed the work and collaborated with the awardee.
b. Describe the project work plans and the work that was completed.
c. Describe how you complied with the Data Management Plan provided in your proposal.

IV. ***Evaluation***

a. Describe the extent to which the project goals and objectives were or were not met.
b. Provide an explanation for any changes to the goals and objectives.
c. Describe the need or plans for additional work on this project.
d. Describe how you will prepare and submit any remaining data deliverables that are not yet completed.
e. Identify and discuss any significant problems or potential biases and how they may have affected your findings.

V. ***Outputs*** are products (*e.g.*, publications, models) or activities that lead to outcomes. Outcomes are changes in user knowledge or action. Briefly describe project outputs under each of the following categories:

a. Actual accomplishments and findings.
b. New methods, technologies, or advanced tools (*e.g.*, models, biomarkers).
c. Publications, including peer-reviewed journal articles, book chapters, NOAA Technical Memoranda, conference proceedings, *etc*. For each, list full citations including digital object identifiers (DOI) and append a copy to your report (for open access publications, attach the published PDF; for copyrighted publications, attach a pre-published PDF and the published PDF) if not already submitted to the Science Program.
d. Data: Provide the status (undergoing QA/QC, in preparation to be submitted to a

data archive, submitted, publicly available, or limited release) and location (data archive, internet address, accession number, and/or DOI) of all datasets and data services. Append a copy of any metadata submitted to a non-NOAA data archive or web service provider.

e. Non-digital data, including biological specimens, preserved samples, paper or analog records, *etc*. (list all non-digital datasets and their disposition, and append a copy of the associated documentation).
f. Patents (append a copy of each to your report).
g. Workshops (append the agendas, workshop summaries, and workshop outputs to your report).
h. Presentations [for each, list the venue (*e.g.*, conference name), authors, title, and date].
i. Outreach products (*e.g.*, website, newsletter articles; append a copy of the products or provide relevant website addresses)

VI. ***End Users*** are resource managers or people involved in resource management. Resource management can take many forms including wildlife and fishery management, federal and state rulemaking and permitting, conservation practices by private landowners, place-based management, and restoration planning.

a. Summarize end user interactions (*e.g.*, we shared something) and management applications (*e.g.*, they did something with what we shared) that took place during the project period by answering the questions and populating the table below (add rows as necessary). Include end users in the table with whom you had regular, sustained interactions or a single significant interaction and then in prose answer the following questions for each end user:
    1. What was shared (*e.g.*, knowledge, findings, products, training, methods, technology, etc.) and with whom?
    2. Was it used? If so, how (*e.g.*, management action, decision-making, strategic planning, issuance of regulations, policy-changes, public outreach, *etc*.)?
    3. Did the end user provide feedback and if yes, how was it addressed?
    4. What, if any, next steps or future use is being planned with or by the end user?

End User Name	Organization	Email Address

_____ _____

Signature of Lead Investigator Date

NOTICE

All NOAA RESTORE Science Program award recipients with approved cooperative agreements are required to file a Final Project Report within 120 days from expiration or termination of award support.

Public reporting burden for this collection of information is estimated to average 600 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

Send comments regarding this burden estimate or any other aspects of this collection of information, including suggestions for reducing this burden, to the NOAA RESTORE Science Program Office, 1021 Balch Blvd., Suite 1003, Stennis Space Center, MS 39529 or email noaarestorescience@noaa.gov. All files associated with awards are subject to the Freedom of Information Act (FOIA). Confidentiality will not be maintained – the information will be made available to the public. However, unpublished research results shall not be published without prior permission from the award recipient.

Notwithstanding any other provision of the law, no person is required to respond to, nor shall any person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act, unless that collection of information displays a currently valid OMB Control Number.

Final Report Evaluation Form

Reviewer:
Review Due Date:
Project Title:
Award number:
Lead Investigator:
Lead Institution:
Award Period (month/year): From _____ To _____

Technical monitor(s) should fill in I - VI; Science Program staff will address VII - IX.

I. ***Executive Summary***
   a. Is the executive summary consistent with your knowledge of the project? If not, what is missing or should be revised?
   b. What other comments or recommendations do you have on the Executive Summary section?

II. ***Purpose***
   a. What comments or recommendations do you have on the Purpose section?

III. ***Approach***
   a. Did they provide an adequate and complete list of individuals and organizations that performed the work and collaborated with the awardee?
   b. Is their description of the 'work plan' and 'work completed' consistent with your knowledge of the project?
   c. If you answered 'no' to either question above, please provide more information about what is missing or should be revised.
   d. What other comments or recommendations do you have on the Approach section?

IV. ***Evaluation***
   a. Was their description of the extent to which project goals were or were not met adequate?
   b. Did they provide an adequate explanation for any changes made to the project's goals and objectives?
   c. Did they provide an adequate description of the need or plans for additional work on the project?
   d. Did they provide plans for completing remaining data deliverables?
   e. Did they identify and discuss any significant problems or potential biases and how they may have affected their findings?
   f. If you answered 'no' to any of the five (5) questions above, please provide more information about what is missing or should be revised.
   g. What other comments or recommendations do you have on the Evaluation section?

V. ***Outputs***
   a. Did they provide adequate and complete responses to each of the items in this section? What, if anything, is missing?

b. Did they provide necessary attachments and documents? What, if anything, is missing?
c. What other comments or recommendations do you have on the Outputs section?

VI. End Users

a. Did they provide an adequate and complete response to the end user table?
b. Did they provide adequate and complete responses on end user interactions?
c. If you answered 'no' to either question above, please provide more information about what is missing or should be revised.
d. What other comments or recommendations do you have on the End Users section?

VII. Publications (Pete Key)

a. What comments or recommendations do you have regarding publications in the final report?

VIII. Data Management (Jessica Morgan)

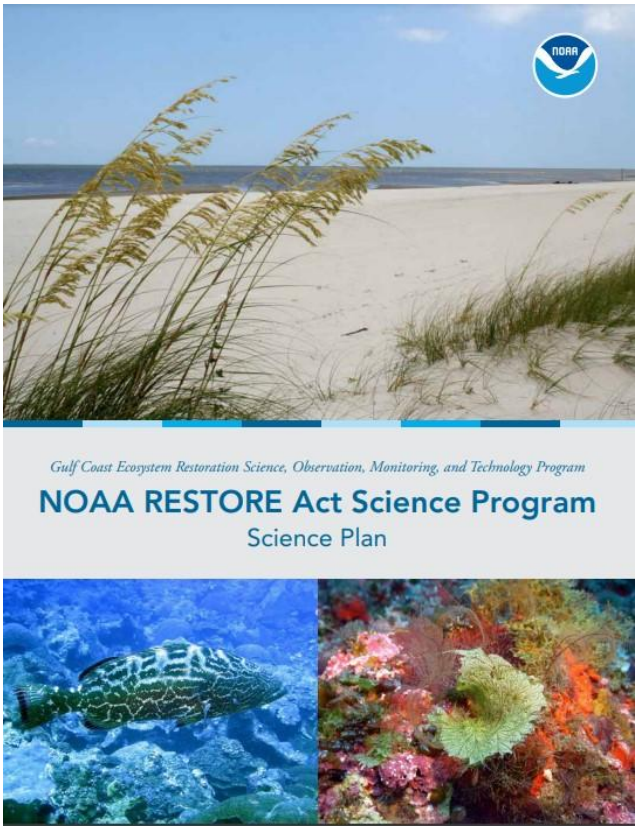
a. What comments or recommendations do you have for reporting on data management in the final report?

IX. Management Actions (Julien Lartigue)

a. What comments or recommendations do you have for reporting on management actions in the final report?

SCIENCE PLAN

Click here to access the full report.



This science plan, developed in 2013, lays out a path forward for the Science Program, beginning with a vision for 'the long-term sustainability of the Gulf of Mexico ecosystem and the communities that depend on it.' Its mission, as defined in the RESTORE Act, is 'to carry out research, observation, and monitoring to support, to the maximum extent practicable, the long-term sustainability of the ecosystem, fish stocks, fish habitat, and the recreational, commercial, and charter-fishing industry in the Gulf of Mexico.' The legislative requirements of the RESTORE Act also led to the Program's goal to support the science and coordination necessary for better understanding and management of the Gulf of Mexico ecosystem, leading to:

- Healthy, diverse, sustainable, and resilient estuarine, coastal and marine habitats, and living resources (including wildlife and fisheries); and
- Resilient and adaptive coastal communities.

By pursuing this mission and accomplishing this goal, the Science Program anticipates the following outcomes:

- The Gulf of Mexico Ecosystem is understood in an integrative, holistic manner; and
- Management of, and restoration activities within, the Gulf of Mexico ecosystem are guided by this ecosystem understanding.

The plan also establishes 10 long-term research priorities, which will guide how the Science Program invests its funds and explains the process by which these areas of investment were determined. Using the legislative requirements for the NOAA RESTORE Science Program as the boundaries, we reviewed numerous science needs assessments prepared for the Gulf of Mexico over the past several years to identify common priorities. We also hosted engagement events and held extensive meetings with stakeholders, including representatives from the Gulf States Marine Fisheries Commission, Gulf of Mexico Fishery Management Council, the academic community, federal and state agencies, and non-governmental organizations, to

gather additional input. This process resulted in the following set of long-term research priorities for the Gulf of Mexico ecosystem:

- Comprehensive understanding of ecosystem services, resilience, and vulnerabilities of coupled social and ecological systems;
- Construct management-ready and accessible ecosystem models;
- Improve monitoring, modeling, and forecasting of climate change and weather effects on the sustainability and resiliency of the ecosystem;
- Comprehensive understanding of freshwater, sediment, and nutrient flows and impacts on coastal ecology and habitats;
- Comprehensive understanding of living coastal and marine resources, food web dynamics, habitat utilization, protected areas, and carbon flow;
- Develop long-term trend and variability information on the status and health of the ecosystem, including humans;
- Develop, identify, and validate system-wide indicators of environmental and socioeconomic conditions;
- Develop decision-support tools to assist resource managers with management decisions planned to sustain habitats, living coastal and marine resources, and wildlife;
- Network and integrate existing and planned data and information from monitoring programs; and
- Develop and implement advanced technologies to improve monitoring.

These long-term research priorities serve as the basis for funding opportunities from the Science Program. We select the priorities to be addressed in each funding opportunity based on several factors including stakeholder input on critical regional science and management needs, the topics being addressed by other science initiatives, new research results and the potential for additional funding to expand the impact of new advancements, and the extent to which addressing a priority will advance the mission of the Science Program.

In its last section, the plan explains how NOAA is administering the Science Program and the structure and function of the bodies providing oversight and advice. We provide detail on who is eligible to compete for funding and describe the peer-review process that will be used to select projects for funding and the mechanisms available for making those awards. We also provide detail on the Science Program's commitment and approach to consultation and coordination. To achieve our outcomes, it is essential that we work with our partners, which includes the other science initiatives established in the wake of the Deepwater Horizon oil spill. We must share and integrate our scientific findings in a timely manner to both inform our partners and the broader scientific community of gaps and needs that warrant further scientific inquiry and arm the management community with the most current and comprehensive information to incorporate into their decision-making processes.