

A short history of funding and accomplishments post-Deepwater Horizon

By

Jessica R. Henkel¹ and Alyssa Dausman²

1) Gulf Coast Ecosystem Restoration Council, New Orleans, Louisiana; jessica.henkel@restorethegulf.gov

2) Water Institute of the Gulf, Baton Rouge, Louisiana; adausman@waterinstitute.org

It has been a decade since BP's Deepwater Horizon (DWH) oil rig exploded and sank on 20 April 2010, killing eleven workers and spreading at least 3.19 million barrels of crude into the Gulf of Mexico (Graham *et al.* 2011; Trustees Council 2016). In response to the spill, an estimated 1.84 million gallons of dispersant was utilized (OSAT-1 2010). Initial efforts to stop the spill failed, and the DWH oil spill lasted for 87 days, resulting in the largest spill in United States history, the contamination of more than 43,000 square miles of Gulf waters, and the oiling of at least 1,300 miles of coastal shoreline from Texas to Florida (US DOJ 2015).

As a result of the DWH spill, Gulf of Mexico ecosystems were devastated and coastal economies were disrupted. For example, natural resources such as coastal wetlands, sandy beaches, fish and shellfish, sea turtles, birds, deep-sea corals, and other living coastal and marine life were greatly injured (Baker *et al.* 2017; NCRL 2019). As many as 105,400 sea birds, 167,000 sea turtles, and 8.3 billion oysters were lost and over 5,000 vertical feet of water column was exposed to oil and/or dispersant. Investigations into public health effects on coastal residents and responders are ongoing (US DOJ 2015; Trustees Council 2016).

The oil spill triggered several criminal and civil suits (Figure 1), including the largest environmental settlement in U.S. history — \$20.8 billion — on 4 April 2016 (Cruden *et al.* 2016), termed the “Global” settlement. The 2016 Global settlement ended all civil and criminal penalty claims against the owners and operators of the rig — BP, Anadarko, TransOcean and Halliburton — under the Clean Water Act and the Oil Pollution Act. It also included economic damage claims submitted by the five Gulf states and their local governments (US DOJ 2015). The 2016 Global settlement, to be paid out by BP over 15 years, was in addition to other investments and

settlements in research and restoration in the Gulf. For example, the \$500 million BP voluntarily dedicated to research through the Gulf of Mexico Research Initiative (GOMRI); the \$500 million awarded to the National Academy of Sciences, Engineering, and Medicine, Gulf Research Program (NASEM-GRP) resulting from two criminal settlements; the \$100 million to the North American Wetlands Conservation Fund related to fines from violation of the Migratory Bird Treaty Act; as well as other settlements for billions in restoration to the National Fish and Wildlife Foundation's Gulf Environmental Benefit Fund (NFWF-GEBF) (Figure 1).

With these dollars, the DWH tragedy has given way to an unparalleled opportunity to research, restore, and preserve the ecosystems of the Gulf of Mexico. This paper provides a short review of the history and accomplishments of the largest funding allocations for research and restoration that have been made as a result of the DWH oil spill. This history provides an important context for the publications included in this 10-year commemoration issue dedicated to Deepwater Horizon.

RESTORATION FUNDING National Fish and Wildlife Foundation Gulf Environmental Benefit Fund (NFWF-GEBF)

Background

The National Fish and Wildlife Foundation (NFWF), a nonprofit “dedicated to sustaining, restoring and enhancing the nation's fish, wildlife, plants and habitats for current and future generations,” has been a conservation leader in the Gulf of Mexico for more than two decades. Following the DWH oil spill, NFWF responded quickly, investing nearly \$23 million between 2010 and 2012 through the Recovered Oil Fund for Wildlife to benefit the natural resources of the Gulf Coast (NFWF-GEBF 2018). NFWF then launched the Gulf Environmental Benefit Fund (GEBF) in 2013 in response to remedial orders contained in plea

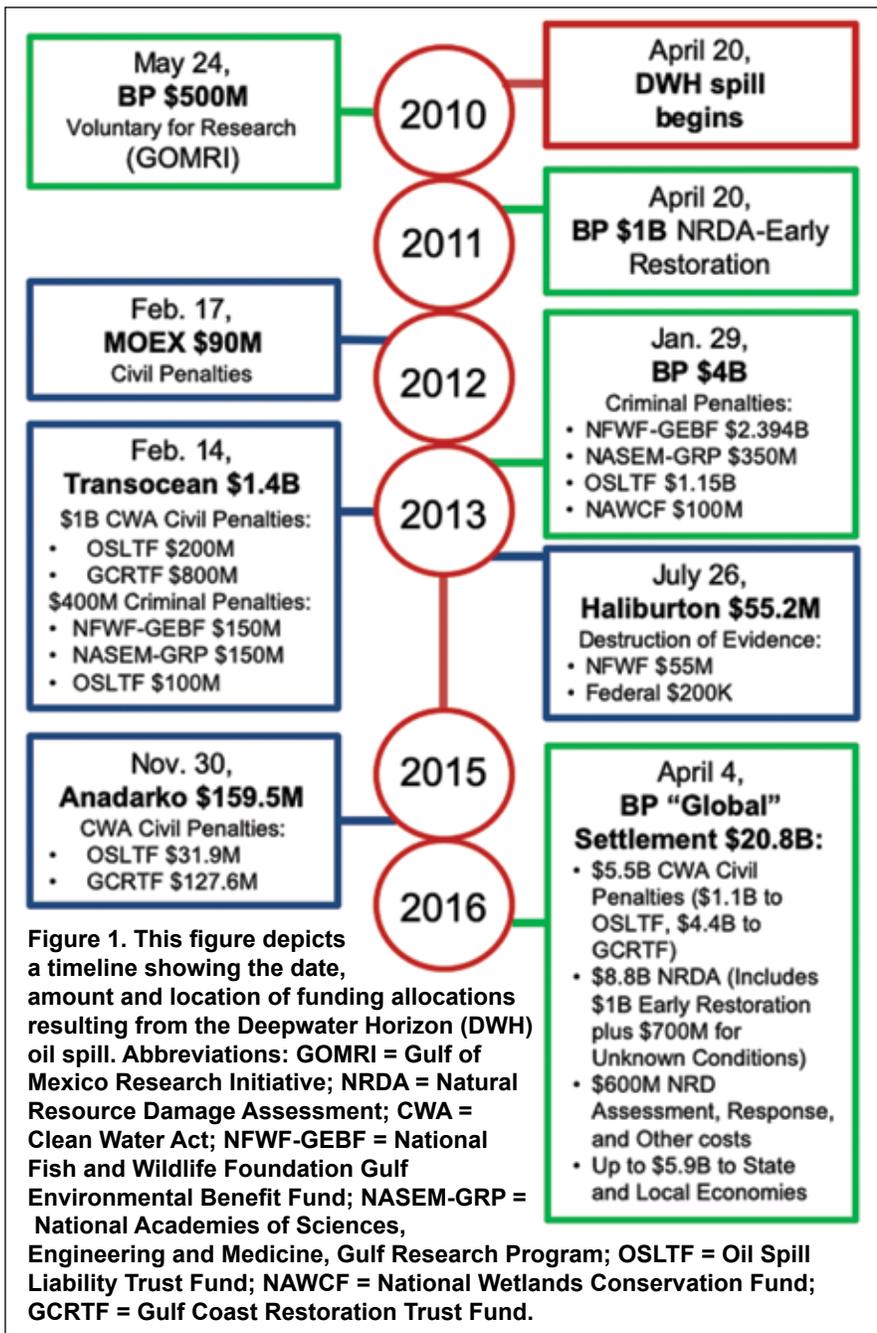
agreements related to criminal penalties between BP (\$2.394 billion) and Transocean (\$150 million) and the U.S. Department of Justice. Provisions within the plea agreements directed a total of \$2.544 billion to NFWF over a five-year period to be used to support natural resource projects in the five Gulf of Mexico states (Figure 1).

Accomplishments

Since 2013, NFWF-GEBF has awarded over \$1.4 billion for 164 projects (NFWF-GEBF 2020). NFWF has worked closely with state and federal resource agencies to focus their restoration investments where they would do the most good for fish, oysters, birds, marine mammals, sea turtles and other wildlife populations.

The awards NFWF-GEBF have made to date are expected to enhance more than 100,000 acres of coastal habitats, that include more than 40 miles of shoreline, 800 acres of oyster beds, 2,750 acres of each and dune habitat, and more than 36,000 acres of marsh habitat (NFWF-GEBF 2018). These activities have worked to conserve coastal habitats and artificial reef systems important to many species of Gulf fish, address light pollution and protect important sea turtle nesting habitats, and protect critical rookery islands and beach nesting sites for birds. In addition to the wildlife benefits of the NFWF-GEBF investments, these projects also have generated immediate and long-term benefits to coastal communities that rely on the natural resources that were impacted by the spill. For example, several NFWF-GEBF projects provide restoration and protection for barrier islands, beaches and marshes that protect coastal communities from the effects of hurricanes (NFWF-GEBF 2018).

The NFWF-GEBF represents one of the first major conservation and restoration funding sources that arose as a result of the DWH spill. Many of the activities funded by the NFWF-GEBF since 2013



will serve as a springboard for larger restoration investments and ecological improvement in the Gulf in the years to come.

RESTORE Act: Restoration Background

On 5 October 2010, President Barack Obama established the Gulf Coast Ecosystem Restoration Task Force at the recommendation of Ray Mabus, then Secretary of the Navy and former Governor of the State of Mississippi (Mabus 2010). Secretary Mabus also recommended that Congress dedicate Clean Water Act (CWA) civil penalties collected as a result of the DWH spill to the Gulf

coast (Mabus 2010). Congress ultimately passed the Resources and Ecosystem Sustainability, Tourist Opportunities and Revived Economies of the Gulf Coast States Act (RESTORE Act) in 2012. The RESTORE Act dedicates 80% of any civil and administrative penalties paid under the CWA, after the date of enactment, by responsible parties in connection with the Deepwater Horizon oil spill to the Gulf Coast Restoration Trust Fund (GCRTF) for ecosystem restoration, economic recovery, and tourism promotion in the Gulf Coast region (RESTORE Act 2012). The remaining 20% (or \$1.33 billion) went to the Oil Spill Liability Trust Fund (listed as "OSLTF" in Figure 1), a general

government fund established in 1986 to aid in oil spill removal and damage assessment.

In addition to creating the Gulf Coast Restoration Trust Fund, the RESTORE Act established a new federal entity — the Gulf Coast Ecosystem Restoration Council (RESTORE Council or Council). The Council includes the governors of the states of Alabama, Florida, Louisiana, Mississippi, and Texas, and the secretaries of the U.S. Departments of Agriculture, Army, Commerce, Homeland Security, and the Interior, and is currently chaired by the administrator of the U.S. Environmental Protection Agency.

A total of \$5.33 billion dollars resulted from 80% of the CWA penalties going to the Gulf Coast Restoration Trust Fund (from a total penalty amount of \$6.659 billion [plus interest], based on CWA penalties of \$1 billion [plus interest] from Transocean Deepwater Inc. and related entities; \$159.5 million from Anadarko Petroleum Corporation; and \$5.5 billion [plus interest] from BP). These funds are dedicated to five priorities, commonly referred to as "funding buckets". Details of each of these buckets are listed below:

- A "Direct Component," managed by the U.S. Treasury, for natural resource restoration or economic improvement efforts in the five Gulf states (35%, \$1.86 billion) (Bucket 1);

- A "Council Selected Restoration Component" for a region-wide restoration effort to restore, protect and revitalize the Gulf Coast according to the RESTORE Council's Comprehensive Plan (Council 2016) (30%, \$1.6 billion + 50% interest) (Bucket 2);

- A "Spill Impact Component" for planning and implementing approved state projects, programs, and activities (30%, \$1.6 billion) (Bucket 3);

- The "NOAA Restore Science Program" for research to support the long-term sustainability of the Gulf ecosystem, and the recreational, commercial, and charter fishing industry in the Gulf of Mexico (2.5%, \$133.3 million + 25% interest) (Bucket 4); (Discussed under "Research Funding") and,

- Establishing "Centers of Excellence" in each Gulf state through competitive subawards to nongovernmental organizations and academic institutions in

the Gulf for science, monitoring, and technology (2.5%, \$133.3 million + 25% interest) (Bucket 5) (Discussed under “Research Funding”).

Accomplishments

The variety of funding types available through the RESTORE Act has resulted in multiple areas of restoration accomplishments, but is also limited by the 15-year timeline of the BP payout (e.g. not eligible for large lump-sum investments). The U.S. Treasury has awarded more than \$335 million to activities in the five Gulf states via Direct Component funding (Bucket 1) (U.S. Department of Treasury 2019). These funds have gone towards the planning and implementation of activities such as stormwater and wastewater improvement, county resiliency planning, coral reef restoration, as well as several education and economic development projects.

The RESTORE Council has awarded more than \$250 million for projects and programs across the five Gulf States through its two funding buckets (Bucket 2 and 3) (Council 2019a). To date, these activities have resulted in the conservation of almost 7,500 acres of coastal habitat, the restoration of more than 1,800 acres of wetlands, and provided funding for multiple restoration planning studies, monitoring coordination, and education and engagement activities (Council 2019b).

Natural Resources Damages Assessment and Restoration Program Background

The oil spill also triggered a multi-agency, multi-government regulatory administrative process known as a natural resource damages assessment (NRDA). Under the Oil Pollution Act, the NRDA process has the goal of restoring natural resources and services to the condition they would have been had the oil spill not occurred (H.R. 1465 1990). This process involves assessing the extent of harm to natural resources, and the amount of money necessary to fund projects to replace or restore those resources and the services they provide (H.R. 1465 1990). The natural resource damage assessment and restoration process is implemented by federal, state, and tribal natural resource “trustees”¹ acting on behalf of the public.

On 20 April 2011 (one year after the date of the spill), the government came to a

“framework agreement” which BP termed “Early Restoration” (Figure 1). BP made \$1 billion available for restoration projects and planning to begin restoring injured resources while injury and damage assessment was ongoing (with no agreement yet on a final settlement). This was the first agreement of its type in the history of the damage assessment in the United States. Seven trustees — the five Gulf states, the U.S. Department of the Interior (DOI) and the National Oceanographic and Atmospheric Administration (NOAA) — collaboratively worked together, with public involvement, to select and implement projects with the \$1 billion from Early Restoration funding resulting in five draft and final Early Restoration plans. (The Environmental Protection Agency [EPA] and the U.S. Department of Agriculture [USDA] were later added as trustees.)

In April 2016, there was a final DWH consent decree where BP agreed to pay the DWH Trustee Council up to \$8.8 billion (US DOJ 2016, this includes the \$1 billion allocated in Early Restoration, and \$7.1 billion for restoration to be paid out over 15 years). In addition, up to an additional \$700 million will be provided for adaptive management and to respond to natural resource damages unknown at the time of the consent decree. Following the Global settlement, the Trustee Council established seven restoration areas of focus, and a Trustee Implementation Group (TIG) for each area. The restoration areas include each of the five Gulf states, plus region-wide and the open ocean.²

Accomplishments

Early Restoration activities under NRDA were intended to accelerate the restoration of natural resources injured by the DWH spill, but not fully compensate the public for all resulting injuries and losses. Sixty-five projects with a total cost of approximately \$877 million were selected by Early Restoration, intended to partially address injuries to nearshore resources, birds, fish, sea turtles, and recreational (Trustees Council 2016). These projects included coastal habitat restoration, resource-specific restoration, education, and infrastructure projects.

Following a five-year evaluation of the damage, the Trustees issued a program-

1) Trustees are selected by the President and the governors of the relevant states. 33 U.S.C. 2706(b).

2) Details regarding funding allocation and restoration areas are available at <https://www.gulfspillrestoration.noaa.gov/restoration-areas>.

matic damage assessment and restoration plan and programmatic environmental impact statement in 2016 to restore the Gulf and allocate funds from the settlement with BP (Trustees Council 2016). This document set five goals:

- Restore and conserve habitat: \$4.7 billion
- Restore water quality: \$410 million
- Replenish and protect coastal living resources: \$1.8 billion
- Provide and enhance recreational opportunities: \$420 million
- Monitoring, adaptive management and oversight: \$1.5 billion

Since the Global settlement, each TIG has been working to finalize restoration plans and implement projects that will restore the natural resources injured by the DWH spill. As of December 2018, the TIGs had expended approximately \$555.3 million for restoration activities (Trustees Council 2019a). The Trustees have been working to implement similar restoration type projects across the broad geographies of the Gulf of Mexico through coordinated and leveraged restoration activities.³ In addition, the Trustees continue to develop project-level guidelines for monitoring and adaptive management of their funded projects (Trustees Council 2019b). Assessment and restoration data generated by NRDA TIGs are available through the Data Integration, Visualization, Exploration, and Reporting (DIVER) and Environmental Response Management Application (ERMA[®]) tools.⁴ A Cross-TIG Monitoring and Adaptive Management work group with representation by the nine Trustees was established in part to synthesize and evaluate monitoring information across TIGs (Trustees Council 2019c).

RESEARCH FUNDING Gulf of Mexico Research Initiative (GOMRI)

Background

Approximately one month after the oil spill began, while oil was still pouring into the Gulf of Mexico, BP voluntarily committed \$500 million over 10 years to initiate a research program primarily focused

3) Project level information, reports, and downloadable data are available at www.gulfspillrestoration.noaa.gov.

4) Additional information and searchable data available at <https://www.diver.orr.noaa.gov>, and <https://erma.noaa.gov/gulfofmexico/erma.html>.

on funding researchers in the five Gulf states (Figure 1). The program, the Gulf of Mexico Research Initiative (GOMRI), administered by the Gulf of Mexico Alliance, has 20 board members and is completely independent of BP. GOMRI objectives include the investigation of the impacts of the oil and dispersants on the ecosystems of the Gulf within the context of improving our fundamental understanding of the dynamics of oil spills and the associated environmental stresses and public health implications (GOMRI 2019a).

Accomplishments

Moving into 2020, the 10-year research program will be sunsetting in the near future. GOMRI has made significant accomplishments in eight Core Areas:

- Core Area 1: Plume & Circulation Observations & Modeling

- Core Area 2: Fate of Oil & Weathering: Biological & Physical-Chemical Degradation

- Core Area 3: Ecological/Ecosystem Impacts

- Core Area 4: Human Health and Socioeconomic Impacts

- Core Area 5: Ecosystem Services, Human Health and Socioeconomic Impacts

- Core Area 6: Microbiology, Metagenomics & Bioinformatics

- Core Area 7: Integrated/Linked Modeling System

- Core Area 8: Knowledge Exchange with User Communities: Lessons Learned and Operational Advice

GOMRI has funded almost \$400 million in research, brought together over 2,500 scientists, has produced over 1,000 peer-reviewed journal publications, and resulted in over 2,100 datasets all made publicly available through the Gulf of Mexico Research Initiative Information and Data Cooperative (GRIIDC) (GOMRI 2019b). GOMRI founded GRIIDC with the requirement that all GOMRI-funded research data is uploaded and available to other researchers and the public, becoming a resource to many around the Gulf of Mexico and the world. GRIIDC also accepts data from other funded research programs. GRIIDC is currently a repository for almost 2,700 datasets from 292 research groups.⁵

In addition to establishing an unprecedented source of research data and analysis for Gulf of Mexico habitats, GOMRI has also funded public outreach efforts to translate and communicate research findings to local communities, and trained the next generation of scientists across the Gulf and beyond.

National Academies of Sciences, Engineering and Medicine Gulf Research Program (NASEM GRP)

Background

The National Academies of Sciences, Engineering and Medicine Gulf Research Program (NASEM-GRP) was funded \$500 million total from two criminal settlements in 2013 (Figure 1) to enhance offshore energy system safety, human health, and environmental resources in the Gulf of Mexico region and other U.S. outer continental shelf regions that support offshore energy production. The settlement funds are to be expended over a 30-year time period.

Four initiatives advance the Gulf Research Program:

- Healthy Ecosystems

- Thriving Communities

- Safer Offshore Energy Systems

- Capacity Building

The NASEM-GRP advances these initiatives through grant opportunities, fellowship programs, consensus studies, and collaboration and outreach efforts. The NASEM-GRP includes an Advisory Board of 20-25 appointed experts that provide intellectual and strategic leadership to the NASEM-GRP staff and fellows (NASEM-GRP 2018).

Accomplishments

In 2014 the NASEM-GRP developed a strategic vision to guide its future in implementing the program (NASEM-GRP 2014). By 2015, the program began implementing the vision and granted over \$6.5 million through investments in capacity building and exploratory, synthesis, capacity building, research-practice, and research and development grants. The program continued increasing research investments in 2016, including a joint venture with the Robert Wood Johnson Foundation to enhance community resilience, as well as 20 fellowships to advance early career scientists. In 2017,

⁵ Additional information and searchable data available at <https://data.gulfresearchinitiative.org>.

the program granted approximately \$25 million through 25 awards as well as 19 fellowships, and in 2018 the program funded 50 grants totaling almost \$20 million with 30 fellowships. Since its inception, the program has funded over \$62 million total in research and fellowships (DWH Project Tracker 2020). In addition, the NASEM-GRP has funded several consensus studies to help inform their work and advance their goals. In 2018, the program funded studies to improve understanding of community resilience, chemical dispersant use in oil spill response, effective mentoring, the coupled natural-human system, and the Gulf of Mexico Loop Current System (NASEM-GRP 2018).

Because of the diverse nature of the program, the NASEM-GRP supports interdisciplinary research and engages a wide variety of researchers from academic, industry, government, and non-profits. The program also has robust data management and delivery requirements ensuring that all funded grants make all data publicly available in approved repositories. Given the 30(+) year lifespan of the NASEM-GRP, the program will continue to play a critical role in training future scientists and supporting interdisciplinary research and activities that advance oil systems safety, community resilience, and healthy ecosystems in the Gulf for several decades.

RESTORE Act: Research

Background

As mentioned above, a total of \$5.3 billion dollars resulted from 80 percent of the CWA penalties going to the Gulf Coast Ecosystem Restoration Trust Fund. In addition to on-the-ground restoration planning and implementation, the RESTORE Act allocated funding for research and innovation via the NOAA RESTORE Science Program and Centers of Excellence funding (Buckets 4 and 5):

The NOAA RESTORE Science Program for research to support the long-term sustainability of the Gulf ecosystem, and the recreational, commercial, and charter fishing industry in the Gulf of Mexico (2.5%, \$133.3 million + 25% interest) (Bucket 4); and

Establishing “Centers of Excellence” in each Gulf state through competitive subawards to nongovernmental organizations and academic institutions in the Gulf for science, monitoring, and

technology (2.5%, \$133.3 million + 25% interest) (Bucket 5).

Accomplishments

Beginning in 2015, the NOAA RESTORE Science Program has conducted three funding competitions which have provided \$35 million to 26 teams of researchers and resource managers for activities aimed to support the science and coordination necessary for a better understanding and management of the Gulf of Mexico ecosystem (NOAA RESTORE 2019). These teams and their projects were selected using a competitive selection process that includes review by panels of outside experts, and feedback from resource managers and other end users (NOAA RESTORE 2018). Collectively, these awards demonstrate the NOAA RESTORE 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.

The RESTORE Act Centers of Excellence (COE) have research grant programs stood up in Texas, Louisiana, Mississippi, Alabama and Florida. While each state is allocated \$26.66 million in settlement funds for the COE (subject to the BP payout), every state's COE is slightly different, for example there are two established in Texas. The research grant programs are set up to essentially support each state in filling research gaps related to their restoration and management decisions around the Gulf of Mexico. Up until now, 50 grants have been funded in the five states totaling more than \$14.5 million and leveraging more than \$350,000 (DWH Project Tracker 2020).

SCIENCE COOPERATION AND COORDINATION ACROSS FUNDING STREAMS AND ORGANIZATIONS

While each of the organizations and agencies funded as a result of the DWH oil spill settlement are addressing different research and restoration needs in the Gulf of Mexico, all of the funding agencies described here have taken part in active cooperation and collaboration efforts to ensure DWH funds are leveraged, and the potential for this funding is fully

realized. These collaborative efforts have been particularly active in working to align monitoring and data management efforts in the Gulf. Below we highlight a few of these efforts.

The Gulf of Mexico Restoration and Science Program Coordination Forum (GRSP), chaired by the NOAA RESTORE Science Program, serves as a venue for Gulf science programs to communicate on-going and future activities and promote coordination of joint activities that address shared issues across program (NOAA RESTORE 2018). The Coordination Forum also publishes an annual funding calendar that consolidates planned funding opportunities across all DWH programs.⁶

The DWH Long Term Data Management (LTDM) Coordination working group was established in 2017 to foster collaboration, data sharing and best management practices among the many groups working in coastal restoration and research in the Gulf of Mexico. This working group is facilitated by the Coastal Research Response Center at the University of New Hampshire in partnership with National Oceanic and Atmospheric Administration (NOAA).⁷

In 2015, the RESTORE Council funded the Council Monitoring and Assessment Program (CMAP). CMAP, which is administered jointly by NOAA and the U.S. Geological Survey (USGS), funded activities that include the development of basic, foundational components for Gulf-wide monitoring to measure beneficial impacts of investments in Gulf restoration by the Council (Council 2015). The program, in coordination with the Gulf of Mexico Alliance (GOMA) and through collaboration with the Gulf states, federal and local partners, academia, non-governmental organizations, and business and industry, has leveraged existing resources, capacities, and expertise and builds on existing monitoring data and programs. One of the highlights of the CMAP project is the development of the Council Monitoring and Assess-

6) Available at <https://restoreactscienceprogram.noaa.gov/funding-opportunities/funding-opportunities-2019-2021>.

7) Additional information on this working group available at https://crrc.unh.edu/data_management as well as elsewhere in this Journal issue.

ment Inventory of Existing Water Quality Monitoring, Habitat Monitoring, and Mapping Program Metadata in the Gulf of Mexico. This inventory integrated and expanded upon existing monitoring databases (i.e. Ocean Conservancy, Global Change Monitoring Portal, and GOMA) to develop a more comprehensive directory of active and inactive monitoring and mapping programs in the Gulf of Mexico. Ultimately the information collected will be made publicly accessible via a geo-referenced, quality assured and controlled inventory of key water quality and habitat monitoring metadata for Gulf programs. This feature is planned for completion in 2020 (NOAA and USGS 2019).

CONCLUSIONS

According to the Deepwater Horizon Project Tracker Tool⁸ which tracks all reported restoration, conservation, and science funding investments since the DWH oil spill, over 1,200 projects have been implemented totaling over \$4 billion and leveraging over \$500 million (DWH Project Tracker 2020). This is a significant investment considering the "Global" settlement was in 2016 and is limited by a 15-year payout from BP (the final payment is scheduled in 2032). By 2032 it is expected that more than \$17.5 billion will have been made available for restoration, conservation, and science to the Gulf of Mexico (this number does not include the economic settlements). While much has been accomplished 10 years post-spill, the Gulf of Mexico is still at the early stages of post-DWH recovery. Significant governance challenges – multiple responsible parties, settlements, and decision-making entities — have been met with a willing community around the Gulf of Mexico to coordinate and be good stewards of the funding and opportunity presented. Continued accomplishments in restoration and science are expected to be significant over the coming 10 years as funds are made available, moving the Gulf of Mexico towards recovery from the spill. In addition, the lessons learned in research, restoration and multi-agency coordination through DWH funded activities can provide lasting benefits to other large-scale, multi-agency efforts, restoration or otherwise, in the Gulf region and beyond for decades to come.

8) Available at: <https://dwhprojecttracker.org/>.

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