

# 2013 GULF OF MEXICO RESEARCH PLAN INTERIM REPORT



## Executive Summary

During the past seven years there has been ongoing Gulf-wide research planning, and the first phase of the planning process culminated with the release of the 2009 Gulf of Mexico Research Plan (GMRP). The Deepwater Horizon Oil Spill (DWHOS) occurred just six months later and dramatically changed the research landscape and research interest in the region. Throughout the summer of 2010, people from around the world became focused on the Gulf of Mexico while scientists, resource managers and others began identifying the short-, mid- and long-term research, monitoring and other needs associated with the spill.

More than 1,200 people from more than 260 organizations participated in workshops, symposia and other events to help develop the 2009 GMRP. After the DWHOS, thousands of people participated in workshops, public meetings and online surveys regarding research needs. Numerous groups organized the meetings, and the results were used to identify how GMRP priorities changed since the initial release of the GMRP. This interim report provides an analysis of input gathered after the oil spill and how it relates to the 2009 GMRP. There have been significant changes in the ratings of some priorities. The results also identify engagement, data, monitoring, mapping and modeling needs. The top five most identified GMRP research priorities based on post-DWHOS input are included in Table 1. There are many new research priorities also emerging with the “oil and dispersant detection, transport and budgets” category having 309 priorities and “public health needs” category having 49 priorities. More details about this preliminary analysis and the results can be provided upon request.

This interim report was prepared as a service to the Gulf of Mexico region and to inform future stakeholder engagement sessions. Many of the barriers to implementing a regional research plan are identified in this report. Competition, lack of resources and lack of coordination are the primary barriers. The 2009 GMRP and 2013 GMRP update obtained the broadest level of input from academia, NGOs, local governments and industry within the Gulf of Mexico region. Therefore, it is a powerful tool for building consensus and prioritizing research investments.

Table 1. The GMRP research priorities with the most primary linkages to research needs identified at post-Deepwater Horizon Oil Spill input sessions.

Original GMRP Research Priority	Number of Primary Links to Priorities Identified Post-Deepwater Horizon Oil Spill
Model resource stability and sustainability and include interactions between fisheries, habitat, threatened and endangered species, ecosystem processes and stressors to assist with making ecosystem-based management decisions	55
Determine and predict the physical impacts of climate change on coastal and upland areas in terms of sea-level change, rate of elevation change, shoreline change, loss of barrier islands, role of coastal development in preventing migration of marshes and other habitats, and change in inland, coastal and ocean hydrology and apply this knowledge in habitat restoration efforts	24
Examine the public’s perception of sea level change; evaluate hazard-related communications and people’s change in behavior in relation to hazard mitigation; and identify approaches that local governments are employing to adapt to sea level change	23
Identify the relationships between nutrient loading, eutrophication, hypoxia and harmful algal blooms; examine their impacts on ecosystem health, seagrasses and higher trophic organisms; and determine the effects of freshwater diversion on hypoxia	23
Determine how storm surge, subsidence and sea-level change affects ecosystems, native coastal habitat, wetland composition, saltwater intrusion, coastal flooding, cultures, agriculture and human health	19

## **Introduction**

The National Sea Grant Office initiated the Gulf of Mexico Research Plan (GMRP) in 2006 with the purpose of identifying and addressing regional research needs for the Gulf of Mexico. The effort, while coordinated by the four Gulf of Mexico Sea Grant College programs, involved many contributors and leaders from a variety of disciplines and affiliations. The national Ocean Research Priorities Plan and Implementation Strategy served as the foundation of the effort to identify Gulf of Mexico research priorities. The first GMRP was released in September 2009, which incorporated input from more than 1,200 people. After the Deepwater Horizon Oil Spill (DWHOS), there was an immediate need to identify 1) emerging research priorities and 2) whether the existing priorities shifted from the original GMRP. There have been numerous workshops and meetings to identify research needs post-DWHOS. The reports from those meetings and the input from more than 1,300 people that participated in GMRP-organized input sessions and surveys during 2010-2012 are summarized in this interim report and will be included in the updated GMRP.

The results of the stakeholder engagement sessions are highlighted in this report to assist in identifying Gulf of Mexico priorities and associated challenges impeding the research necessary to address these priorities. The purpose of the GMRP effort remains the same: to provide a service to the Gulf of Mexico region by identifying research priorities and supporting strategies to address these priorities. To date, input from more than 2,800 people participating in workshops and surveys (Appendix I) have been provided through GMRP-coordinated meetings and surveys. The results from many additional input sessions led by others also have been incorporated.

## **Priorities from GMRP I**

The Planning and Review Council (PRC) was formed to provide guidance for the process and the development of the plan. A series of workshops and a survey resulted in input from people representing more than 260 organizations.

The 2009 GMRP included five research themes and 17 “top tier” research priorities. The five themes were:

- Ecosystem Health Indicators
- Freshwater Input and Hydrology
- Habitats and Living Resources
- Sea Level Change, Subsidence and Storm Surge
- Water Quality and Nutrients

The themes and research priorities were derived from an analysis of 117 strategic plans, input from more than 1,200 people who completed a survey in 2007 and contributions from approximately 300 people who participated in one of five regional workshops in 2008.

More than 15 groups have incorporated the GMRP priorities into their strategic plans and/or requests for proposals. In addition, several research sponsors, such as the EPA Gulf of Mexico Program, four Gulf of Mexico Sea Grant college programs, National Oceanic and Atmospheric Administration (NOAA) Coastal Services Center, NOAA Coastal Storms Program and a NOAA Cooperative Institute (Northern Gulf Institute), pooled resources to sponsor and conduct regional research competitions to fund GMRP priorities.

## **Post-Deepwater Horizon Oil Spill Update**

A GMRP-coordinated survey to identify economic, environmental and social science research priorities was released to the PRC and other leading scientists about two months after the DWHOS. The results of the survey were incorporated into questions as part of a larger survey released in the summer of 2010. The survey included questions about oil-spill-related research priorities and the Ocean Research Priorities Plan priorities that were posed in the 2007 survey. In addition, stakeholder input was collected from 255 people through GMRP-coordinated efforts using interactive response cards and open-ended questions at regional workshops and meetings, such as the 2011 Gulf of Mexico Alliance All Hands Meeting, the 2012 NOAA Gulf of Mexico Regional

Team meeting and the 2012 Bays and Bayous Symposium. The information from these GMRP input sessions was analyzed using a matrix that also included workshop results from numerous meetings sponsored by organizations, such as the Subcommittee on Ocean Science and Technology, Gulf Coast Ecosystem Restoration Task Force (GCERTF), Consortium for Ocean Leadership, Coastal Response and Restoration Center and others.

A three-step process identified linkages between newly identified priorities and shifts in the original GMRP priorities.

Step 1. The results from numerous input gathering sessions (Appendix II) including the GCERTF Science Plan and GMRP-coordinated surveys and workshops were cross-referenced with the original GMRP priorities and several new priorities or categories. Both “primary links” and “secondary links” were used. “Secondary links” are post-DWHOS priorities that are similar to the original GMRP priorities but that may not be as similar as “primary links.” A 28,014-cell matrix with 1,218 priorities was created for primary and secondary links to the GMRP and is summarized in Table 2. (Regular updates to this matrix will be incorporated as more workshop results become available.)

Step 2. The results from three workshops (2011 Gulf of Mexico Alliance All Hands Meeting, 2012 NOAA Regional Team meeting, 2012 Bays and Bayous Symposium) that included questions about the GMRP themes were analyzed. Generally, people still believed the theme areas were appropriate with 80% of people indicating that the original GMRP themes link to their research priorities from “neutral” to “very well,” while 20% believed that the themes link to their priorities “not well” or “not very well.” Considering the five presented GMRP themes, 74% of people thought all five should remain in the top five while 13% indicated that “Freshwater Input and Hydrology” should not remain in the top five. Six percent or less people thought the other themes should not be in the top five. The appropriateness of the theme names is also reflected in the links that respondents made between their research priorities to the original GMRP themes, which is shared in Table 3.

Step 3. Finally, a separate analysis of the 2007 and 2010 GMRP survey results was completed. There were 1,000 responses to the 2010 survey, and 252 of these responses could be directly linked to the person who also completed the survey in 2007. A Wilcoxon signed-ranks test ( $P=0.05$ ) was used to compare individual responses in 2007 versus 2010. When comparing the 2007 and 2010 responses, the ratings for 14 of the twenty research priorities significantly decreased, while the remaining six did not significantly change (Appendix III). These results could indicate that the priorities that did not significantly decrease in their ratings experienced a relative rise in their overall ranking. The change in overall rankings based on all respondents, although not able to be tested for significance, appeared consistent with the results from the subset of 252 responses that could be linked to each other.

Table 2. Number of linkages between the priorities that were identified at numerous post-DWHOS workshops, conferences and symposia\* and the original Gulf of Mexico Research Plan themes, research priorities and other categories.

Original GMRP Theme or Broad Category	Original GMRP Research Priority	Number of primary links	Number of secondary links	Total number of links
<b>Ecosystem Health Indicators</b>	Determine the correct variables to use as indicators of ecosystem health, identify the optimal methods to measure the indicators, and design better-defined indices with more indicators to evaluate the status of ecosystems	18	11	29
<b>Freshwater Input and Hydrology</b>	Examine how river diversions and the placement of sediment impact water quality, sediment processes, shoaling, coastal processes, fisheries, habitat utilization by organisms, and marshes and other habitats	10	32	42
	Analyze the role of freshwater input on coastal wetlands and habitat change over time to determine the hydrologic requirements of healthy marsh systems and quantify effects of sediment discharge reduction on erosion rates and habitat loss	6	24	30
	Examine the impacts of reduced freshwater input and temperature change on water stratification, biodiversity, species composition and production, benthic communities, trophic interactions, fisheries, the range of native and nonnative species, emergent coastal habitats, sediment transport, and shoreline erosion	3	22	25
	Predict the impacts of current building and permitting practices on freshwater inflow and examine the effects of human manipulation (e.g. upstream impoundments, causeways, placing processed water into confined areas) on the amount, timing, and type of freshwater inflows and their impacts on natural resources and the environment	3	17	20
	Determine changes in freshwater, nutrient, pollution, groundwater and sediment input due to changes in pattern and quantity of precipitation and predict the subsequent impact of these inputs on geochemical and physical coastal processes and biological (including benthic and epibenthic) communities	1	24	25
<b>Habitats and Living Resources</b>	Model resource stability and sustainability and include interactions between fisheries, habitat, threatened and endangered species, ecosystem processes, and stressors to assist with making ecosystem-based management decisions	55	53	108
	Examine changes in habitat quality and quantity over time and identify the effects of changes on marine organisms including the threshold level of habitat quality and quantity required to support sustainable populations of living resources	17	35	52
	Identify connections among habitats and connections between habitats and living marine resources	11	22	33

Table 2. (continued)

Original GMRP Theme or Broad Category	Original GMRP Research Priority	Number of primary links	Number of secondary links	Total number of links
<b>Sea Level Change, Subsidence, and Storm Surge</b>	Determine and predict the physical impacts of climate change on coastal and upland areas in terms of sea level change, rate of elevation change, shoreline change, loss of barrier islands, role of coastal development in preventing migration of marshes and other habitats, and change in inland, coastal, and ocean hydrology and apply this knowledge in habitat restoration efforts	24	35	59
	Examine the public's perception of sea level change; evaluate hazard-related communications and people's change in behavior in relation to hazard mitigation; and identify approaches that local governments are employing to adapt to sea level change	23	14	37
	Determine how storm surge, subsidence and sea level change affects ecosystems, native coastal habitat, wetland composition, saltwater intrusion, coastal flooding, cultures, agriculture, and human health	19	42	61
	Identify the optimal use and allocation of sediment and evaluate the rates of shoreline change from anthropogenic and natural impacts including sediment mobilization, transport, and deposition from major storm events	9	19	28
	Predict socioeconomic impacts of climate and sea level change on population dynamics, community infrastructure, short- and long-term community demographic shifts, social capital, and commerce and shipping centers	5	11	16
<b>Water Quality and Nutrients</b>	Identify the relationships between nutrient loading, eutrophication, hypoxia, and harmful algal blooms; examine their impacts on ecosystem health, seagrasses, and higher trophic organisms; and determine the effects of freshwater diversion on hypoxia	23	14	37
	Evaluate the impacts of coastal development, land use, land cover, stormwater management, and wastewater management on eutrophication, nutrient loading, water quality, and the environment	13	28	41
	Model the impacts of non-point source pollution on coastal resources	3	32	35
<b>Research Priorities not in Original GMRP</b>	Miscellaneous research needs	309	30	339
	Oil and dispersant detection, transport and budgets	120	36	156
	Public Health	49	7	56
<b>Non-Research Needs</b>	Data, Monitoring, Mapping, Modeling Needs	227	127	354
	Engagement Needs (Coordination, Education, Legal and Communication Needs)	122	35	157
	Policy and Management Needs	68	33	101
<b>Totals</b>		<b>1,138</b>	<b>703</b>	<b>1,841</b>

\*The complete list of documents from the post-DWHOS workshops, conferences and symposia and other efforts that were used to create this table are listed in Appendix II.

Table 3. Percent of research priorities that link to GMRP themes based on input from three regional input sessions conducted in 2011 and 2012.

Original GMRP Theme	Percent of respondent's research priorities that linked to the GMRP theme*
Habitats and Living Resources	38%
Sea Level Change, Subsidence, and Storm Surge	22%
Water Quality and Nutrients	20%
Ecosystem Health Indicators	15%
Freshwater Input and Hydrology	4%
<b>Total</b>	<b>100%</b>

\*Twenty percent of respondents at the 2012 NOAA regional team meeting and 2012 Bays and Bayous meeting indicated that their research priority did not link to any of the original GMRP themes.

### Identifying Barriers to Implementing a Gulf of Mexico Research Plan

In 2012, participants at the NOAA Gulf of Mexico Regional team meeting and the Bays and Bayous Symposium were asked to identify barriers to implementing a regional research plan for the Gulf of Mexico. A total of 164 people provided their input, mostly anonymously. The results are summarized in Table 4, and their specific responses are organized by category in Appendix IV.

Table 4. Barriers to implementing a Gulf of Mexico Research Plan based on Gulf-wide input at two regional meetings. (N=164)

Type of Barrier	Count
Lack of Resources	57
Lack of Coordination/Cooperation	25
Competition/Territoriality	17
Lack of Multi-Agency Collaboration	16
Differing Priorities	14
Politics	9
Lack of Coordinated Data Management/Data Gaps	7
Lack of Communication	5
Other	34
<b>Total number of barriers</b>	<b>184</b>

The same barriers were identified by numerous people. The barrier referencing lack of resources may be partially overcome with anticipated research investments outlined in the RESTORE Act and by others, but many barriers still remain and must be addressed cooperatively. Competition, lack of coordination and lack of cooperation appear to be impeding implementation of regional efforts. There are opportunities to overcome many of these barriers through being more transparent, fostering linkages with others and overcoming "turf" issues. No single entity can remove these barriers, but these are priorities to be addressed in order to have a successful regional program(s).

## Next steps

The Gulf of Mexico research community now has an opportunity to conduct a longitudinal study of regional-scale research priorities. The 2007 and 2010 surveys will be followed up with a 2013 survey to identify whether there have been significant changes in people's ratings of priorities over time. The survey also will provide research sponsors an opportunity to ask specific questions to assist them in their research planning and funding efforts.

There appears to have been a shift in research priorities in the past three years, and the feedback through surveys and workshops indicate that some of the original GMRP themes and research priorities should be revisited. This update will be accomplished through examining the matrix and forthcoming survey results.

Finally, as stated in the original GMRP in 2009:

"The region is well prepared to address Gulf of Mexico research priorities. The next step is to develop an implementation plan to address the highest priority needs identified in the GMRP. There are well-established research entities throughout the Gulf of Mexico and new collaborative regional frameworks have been established over the last five years. These frameworks include cooperation with local, state, federal, academic, NGO, and private entities. The GMRP provides an outline of regional priorities that can be used to bolster and support local, regional, national, and international research programs. To be successful, it is essential that members of the research community identify how their work can complement each other's work. This collaboration will optimize the use of expertise and limited resources."

This statement remains true, and coordination of relatively larger investments in Gulf of Mexico research is more essential than ever before. A substantial number of people and organizations have already contributed to the GMRP effort, and we hope they will remain engaged as new partners join this effort.

## Acknowledgements

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This effort would not be possible without the direct support of the four Gulf of Mexico Sea Grant college programs, their directors who serve as Principal Investigators on the project and the Sea Grant extension programs, which have supported several key components of this initiative. Cathy Tortorici and Buck Sutter were instrumental in building support for the update to the Gulf of Mexico Research Plan.

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The GMRP principal investigators and coordinator would like to thank the Planning and Review Council for serving as liaisons to stakeholder groups, providing feedback on the planning process, participating in planning events and commenting on planning documents.

### Planning and Review Council Members and Alternates

Becky Allee, Gloria Car, Jean Cowan, Deborah Epperson, Jorge Euan-Avila, Carl Ferraro, Doug Frugé, Kola Garber, Callie Hall, Phillip Hinesley, Ann Jochens, Jack Kindinger, Richard Leard, Larry Massey, Bruce Moulton, Worth Nowlin, Mark Peters, Susan Rees, David Ruple, David Shaw, Tina Shumate, Larry Simpson, Gary Springer, Kerry St. Pé, Buck Sutter, Wayne Swingle, Wes Tunnell, Bill Walker, Steven Wolfe, Alejandro Yáñez-Arancibia and David Yeager.



### Workshop Facilitators and Support Staff

Kay Bruening, Michael Carron, Devaney Cheramie, Lou D'Abramo, Todd Davison, Jean Ellis, Justin Farrell, Kola Garber, John Grigsby, John Jacob, Jack Kindinger, Kelly Knowlton, Loretta Leist, Dave Nieland, Ralph Rayburn, Heidi Stiller, Logan Respass, Tina Sanchez, Melissa Schneider, Michael Shelton, Stephanie Showalter, Chris Simoniello, Betty Staugler, Roberta Swann, Glenn Thomas, Jody Thompson, Rick Wallace, Ann Weaver and Valerie Winn.

### Workshop Hosts

NOAA Fisheries Service, Galveston Laboratory, TX (Roger Zimmerman and Ronnie O'Toole); Louisiana State University, Baton Rouge, LA (Versa Stickle and Dave Nieland); Mississippi State University Coastal Research and Extension Center, Biloxi, MS (Mary Dikes and Dave Burrage); Alabama Department of Conservation and Natural Resources, 5 Rivers - Alabama's Delta Resource Center, Spanish Fort, AL (Philip Hinesley, Shonda Borden, Hank Burch and Carl Ferraro); USGS Florida Integrated Science Center, St. Petersburg, FL (Jack Kindinger, Sandy Coffman and Chris Simoniello); Gulf of Mexico Alliance, New Orleans, LA (Michael Carron, Phil Bass and Laura Bowie); NOAA Gulf of Mexico Regional team, NOAA Southeast Regional Office, St. Petersburg, FL (Kristen Laursen and Russ Beard); and Bays and Bayous Symposium, Biloxi, MS (Kay Bruening and LaDon Swann).

### External Reviewers for GMRP I

George Crozier, Michael Donahue, Marco Giardino, Christina Simoniello, Jody Thompson and Nancy Wallace.

### Participants

This effort would not be possible without the input provided by the thousands of people who have contributed their time and effort to share research and other priorities through workshops and surveys.

### Early Implementation of Plan

Several regional research competitions have been held to directly address GMRP research priorities, which represent millions of dollars of Gulf research. Specific partners to the GMRP-related Gulf of Mexico Research Initiative (a term now used by the BP-supported Gulf of Mexico Research Initiative) included the EPA Gulf of Mexico Program, NOAA Coastal Services Center, NOAA Coastal Storms Program, Texas Sea Grant College Program, Louisiana Sea Grant College Program, Mississippi-Alabama Sea Grant Consortium, Florida Sea Grant College Program and Northern Gulf Institute. In addition, NASA has used the GMRP to identify and fund research priorities through the Research Opportunities in Space and Earth Sciences (ROSES) program.



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## **Appendices**

## Appendix I: Overview of Respondents Contributing to the Gulf of Mexico Research Plan Effort

Table 1. Number of respondents from various GMRP input sessions and respondent's state, by percentage.

Input session	N	TX	LA	MS	AL	FL	Other
2007 GMRP Survey	1,252	17%	30%	15%	11%	18%	9%
2008 GMRP Workshops*	313	17%	28%	19%	17%	18%	0%
2010 GMRP Survey	1,000	14%	24%	17%	17%	18%	10%
2011 Gulf of Mexico Alliance Meeting	92	10%	27%	24%	13%	14%	12%
2012 NOAA Regional Team Meeting	24	25%	4%	8%	13%	29%	21%
2012 Bays and Bayous Symposium	188	2%	7%	45%	35%	4%	6%
<b>Totals</b>	<b>2,869</b>						

\*Percentages reflect the number of people that participated and facilitated that state's workshops. Participants may have originated from a different state but attended that state's workshop.

Table 2. Affiliation of respondents from various GMRP input sessions, by percentage.

Input session	University	State/ Local Gov't	Federal Gov't	Industry	NGO	Other
2007 GMRP Survey	34%	18%	12%	17%	6%	13%
2010 GMRP Survey	51%	12%	11%	10%	6%	10%
2011 Gulf of Mexico Alliance Meeting	34%	20%	26%	7%	8%	6%
2012 NOAA Regional Team Meeting	21%	0%	79%	0%	0%	0%
2012 Bays and Bayous Symposium	54%	10%	15%	7%	8%	5%

Table 3. Respondent's primary relationship to Gulf of Mexico research from various GMRP input sessions, by percentage.

Input session	Conduct Research	Sponsor Research	Use for Work	Use for Recreation	Do Not Use Research	Other
2007 GMRP Survey	28%	7%	39%	13%	8%	5%
2010 GMRP Survey	42%	8%	39%	5%	7%	0%
2011 Gulf of Mexico Alliance Meeting	37%	10%	47%	3%	1%	2%
2012 NOAA Regional Team Meeting	21%	17%	58%	0%	0%	4%
2012 Bays and Bayous Symposium	45%	12%	34%	2%	2%	5%

**Appendix II: Plans and Workshop Results that were incorporated into the matrix that is summarized in Table 1.**  
 (Titles that are blue provide links directly to the document for downloading.)

Plans and Workshops Results	Organization	Year	N	Notes
<a href="#">Deepwater Horizon Oil Spill Scientific Symposium Meeting Summary, Louisiana State University</a>	Consortium for Ocean Leadership	2010	>200	Included all priorities listed in report.
<a href="#">GMRP oil spill survey</a>	GMRP	2010	1,000	Included research priority presented to respondent and at least 30% of respondents indicated it was a top priority (top 6 of 20 priorities presented).
<a href="#">Deepwater Horizon Oil Spill Principal Investigator (PI) Conference Final Report, St. Petersburg, Florida (2010)</a>	SOST	2010	155	Included overarching observations and recommendations from the breakout sessions and breakout research priorities listed in body of report.
<a href="#">Collaborative Scientific Research Opportunities Relative to the Gulf Oil Spill</a>	Louisiana Board of Regents	2010	380	Included research priorities identified in breakout groups.
<a href="#">Coordinating R&amp;D on Oil Spill Response In the Wake of Deepwater Horizon</a>	Coastal Response and Restoration Center	2011	~70	Included the top tier priorities that were summarized in the body of the report and not long lists in the appendices.
GOMA GMRP Workshop Results	GMRP	2011	91	Included workshop results that were the top two priorities from each plan as selected by respondents via turningpoint.
<a href="#">Deepwater Horizon Oil Spill Principal Investigator Workshop Final Report</a>	SOST	2011	~150	Included priorities that were ranked above "2" on the importance scale from 0 to 4 with 4 being very important and 0 being not important at all.
<a href="#">Gulf of Mexico Research Initiative Themes</a>	GOMRI	2011	N/A	Included priorities outlined in RFP.
NOAA Regional Team Workshop Results	GMRP	2012	24	Included priorities identified in open discussion.
<a href="#">Gulf Coast Ecosystem Restoration Task Force - Gulf of Mexico Ecosystem Science Assessment and Needs</a>	Gulf Coast Ecosystem Restoration Task Force	2012	N/A	Included research priorities within the body of the report (sections 2, 4, and 5); appendices were not included.
Bays and Bayous Symposium 2012	GMRP	2012	140	Open-ended responses of their top three research priorities.

**Appendix III: Comparison of Rankings of Ocean Research Priority Plan Research Priorities based on the 2007 versus 2010 Gulf of Mexico Research Plan Surveys and difference found within respondents that were known to take both of the surveys. (2010 GMRP Survey N=1,000; 2007 GMRP Survey N= 1,225; Known to complete both N=252.)**

Ocean Research Priority Plan Research Priorities (as stated in the GMRP survey)	2010 GMRP Survey Rank	2007 GMRP Survey Rank	Significant difference in 2007 versus 2010
Understand and predict the impact of natural and anthropogenic processes on the ecosystem	1	1	Significant decrease
Understand the response of coastal and marine systems to natural hazards and apply that understanding to assessments of future vulnerability to natural hazards	2	6	<b>No significant difference</b>
Apply understanding of marine ecosystems to develop appropriate indicators and metrics for sustainable use and effective management	2	3	Significant decrease
Understand interspecies and habitat/species relationships to support forecasting resource stability and sustainability	4	3	Significant decrease
Understand the status and trends of resource abundance and distribution through more accurate, timely and large scale assessments	5	5	Significant decrease
Understand the impact of climate variability and change on the biogeochemistry of the ocean and implication for its ecosystems	6	7	<b>No significant difference</b>
Understand human-use patterns that influence resource stability	7	2	Significant decrease
Understand ocean-climate interactions within and across regions	7	9	Significant decrease
Understand the interactions between marine operations and the environment	9	11	<b>No significant difference</b>
Apply understanding to develop multi-hazard risk assessments and support development of models, policies, and strategies for hazard mitigation	10	13	<b>No significant difference</b>
Apply understanding of the ocean to help project future climate changes and their impacts	11	10	Significant decrease
Apply understanding of natural and human caused processes to develop socioeconomic assessments and models to evaluate the impact of multiple human uses on ecosystems	11	8	Significant decrease
Understand how hazard events initiate and evolve and apply that understanding to improve forecasts of future hazard events	13	11	Significant decrease
Understand sources and processes contributing to ocean-related risks to human health	14	15	<b>No significant difference</b>
Understand human health risks associated with the ocean and potential benefits of ocean resources to human health	15	16	Significant decrease
Apply advanced understanding and technology to enhance benefits of various natural resources from the open ocean and coasts	16	14	Significant decrease
Apply understanding of environmental factors affecting marine operations to characterize and predict conditions in the maritime domain	18	18	<b>No significant difference</b>
Understand how human use and valuation of ocean resources can be affected by ocean-borne human health threats and how human activities can influence these threats	18	17	Significant decrease
Apply understanding of ocean ecosystems and biodiversity to develop products and biological models to enhance human well-being	19	19	Significant decrease
Apply understanding of environmental impacts and marine operations to enhance the marine transportation system	20	20	Significant decrease

## **Appendix IV: Individual responses to barriers to implementing a Gulf of Mexico Research Plan based on Gulf-wide input at two regional meetings. (N=164)**

### **Lack of Resources**

- Funding/Lack of Funding/Money (48 mentions)
- Financial resources
- Funding (more funding is necessary for regional projects)
- Funding is likely always a barrier
- Funding issues - federal? All State?
- Sufficient, consistent funding
- Declining budgets
- Limited staff time
- Enough personnel to conduct proper research
- Manpower

### **Lack of Coordination/Cooperation**

- Coordination/cooperation between universities
- Cooperation between research groups (reducing redundancy of effort), sharing tools and information being developed across the region
- Cooperation
- Cooperation
- Cooperation between researchers and agencies
- Collaborative research funding - needs to happen as money gets tight but it's hard to find mechanisms that work
- Barriers to collaboration
- Collaboration
- Collaboration between researchers
- Coordination (the lack thereof)
- Difficulties of intra-regional cooperation & interdisciplinary collaboration (e.g. the marginalization & caricature of the social sciences in this presentation, as in having no social research priority appear as a choice among the top 5)
- Disconnect between research groups, organization
- Disconnectedness of research organizations, NGO's, & government
- Finding common entities across disciplines - maybe check out Everglades restoration plan as example of good cooperation among agencies & researchers
- Governmental/community Support
- Lack of coordination/communication between group
- Lack of coordination between funding sources
- Lack of Gulf-wide cooperation
- Researchers from smaller institutions have difficulty in establishing collaborative partnerships outside home institution
- Too many entities to coordinate
- Lack of agreement of objective among politician, economists, and land scientist (ecologists, etc.,)
- A better way to distribute current research and to collaborate with colleagues
- Agreeing on approach
- Also creating and interdisciplinary atmosphere
- Traditional "silo" nature of research organizations and disciplines.

### **Competition/Territoriality**

- Competing organizations
- Competition for research monies
- Competition for funds
- Lack of cooperation/coordination - territorial culture
- Lack of scientists who cooperate with one another
- Territorial researchers that don't think regionally or develop projects that don't have a transfer to applied plan
- Territoriality by state agencies
- "Empire building" by agencies, universities and organizations
- Turf
- Turf (both among researchers & between species)
- Turf and willingness to partner
- Turf building
- Turf issues - need more consortia, incentives for cooperation & data sharing
- Too many turf battles!
- Complexity of a large number of organizations who all want to write or lead regional research plan
- Many players in GoMex research - inherently difficult to coordinate due to amount of communication needed and competition for limited research dollars.
- Too many "organizations"/consortia communicating different meanings, priorities to Congressional leaders

### **Lack of Multi-agency Collaboration**

- Agency cooperation for multi-agency joint funding
- Different state regulations/states working together - who pays
- Inter-state agency coordination
- Interstate governmental policies
- Cooperation - complex issue with stakeholder & multi-level government interests, funding sources and money
- Cooperation between states
- Cooperation of other governmental/state agencies
- Cooperation of the five states
- Integration with state, local, and regional government entities
- Lack of support from states
- Need more interaction between Government agencies: EPA /ADEM/Dept. of Conservation/FDA/Board of Health/NOAA/National Marine Fisheries
- So many different agencies/governing bodies with overlapping mandates
- Communication among multiple agencies
- Agreement amongst the various state, fed, and NGO's on what to fund
- Conflicts between state and federal agencies
- Differing regulations

### **Differing Priorities**

- Diversity of interests and competing priorities for different sectors
- Need for greater federal agency coordination on RFP, for about priorities
- Lack of effectiveness reaching upper levels that set research priorities/RFPs. Smaller states with less economic value tied to the ocean consistently receive more research dollars

- Getting a consensus on what's highest priority to do in a limited resource environment
- Addressing diverse interests/priorities
- Differences in priorities among state
- Differing of priorities from one state to the next
- Diversity of ideas, opinions, needs, habitats, etc.
- Dysfunctional, conflicting priorities
- Multiple - often conflicting - economic interests & social values
- People have different priorities
- Special interest
- The human brain is only interested in "my own group" in this case "my own state"
- Agreement on regional plan, gulf-wide

### **Politics**

- Politics
- Political barriers that limit collaboration
- Political boundaries
- Political boundaries
- Bureaucracy
- Decisions made by politician
- Unbiased political views
- Lack of political will and lobbying to make change happen
- Lack political will

### **Lack of Coordinated Data Management/Data Gaps**

- Data management/availability
- Insufficient resources to coordinate & integrate legacy data. These will be lost if not captured prior to owners retiring... or worse!
- Data gaps
- Data gaps vary from state to state, county to county
- Lack of common database to share data
- Sharing data information
- Technical knowledge, software/cpu limitation

### **Lack of Communication**

- Communication burden - requires a lot of communications to coordinate, find efficiencies, avoid duplications, and overcome competition
- Communication
- Disseminating information to public
- Public awareness and participation
- Interstate communication

### **Other Barriers**

- Motivating people to use it/change (researchers, practitioners, communities, elected officials)
- Multiplicity of research organizations,
- Lack of input from social science other than economics
- Mixture of academics & commercial interest
- Common agency spearheading plan and maintain various interest commonly among partners
- Balancing conservation and economic development



- Differences in economic base and distance of travel
- Economic issues - how business / industry / stakeholders are impacted economically- No one wants to lose money or not make money and industries needed for economic viability at the area
- Far distance
- Physical limitations (safety, technology)
- Population, economic pressure
- Short-term planning
- Spatial variability
- Transportation
- Trans-regional programs

#### Education

- Effective environmental education (sea level change & coastal land loss) / social marketing of environmentally - beneficial or neutral behavior / attitude/ development
- Public education
- Public participation/education
- The barrier between the scientific/management company and the general public - lack of education (public) , lack of understanding/caring for the general public, esp. the commercial & recreational fishermen

#### Inclusion

- Diverse user groups
- Making sure you are involving the best planners in the whole region
- Need to be familiar with expertise available across the region
- Obtaining information/preferences from traditionally under-represented groups of people.
- There are so many universities, agencies, businesses, and NGOs involved in GOM research & technology. Some are often missed in planning research plans. How do all stakeholders get included in the planning phase?
- Willingness of program to work with the underprivileged

#### Methodology

- Process (poor or lacking)
- Close mind to new ways to doing things
- Institutional resistance to adopting or considerable new methods

#### Perception

- Public denial
- Public perception
- Public perception/valuation of environmental restoration/management

#### Time

- Time
- Time frame of implementing projects - from when they are awarded to - hydrological restoration project collecting
- Timeline