

# **Gulf of Mexico Research Planning Workshop Report**

For the workshop held in  
**Biloxi, Mississippi**  
on  
**January 17, 2008**

Workshops were partially funded through a grant provided by the  
National Sea Grant College Program to:  
Mississippi-Alabama Sea Grant Consortium  
Florida Sea Grant College Program  
Louisiana Sea Grant College Program  
Texas Sea Grant College Program

## Background

The purpose of the Gulf of Mexico Research Plan (GMRP) is to identify regional research and information needs and develop a strategy to address these needs through collaboration with agencies and organizations that conduct and use Gulf of Mexico-related research. The project is sponsored by the National Sea Grant College Program and Gulf of Mexico Sea Grant College Programs. The GMRP is rooted in stakeholder input, and workshops were one of the primary methods used to collect this input. Workshops were held in each Gulf of Mexico state and supported by numerous individuals (see acknowledgements section). This report provides the results from the workshop at the **Mississippi State University Coastal Research and Extension Center**.

The workshop agenda (appendix A) was designed to identify high-priority research topics related to the six societal themes described in the Joint Subcommittee on Ocean Science and Technology's 2007 document "Charting the Course for Ocean Science in the United States for the Next Decade—An Ocean Research Priorities Plan and Implementation Strategy." The themes included:

- stewardship of natural and cultural ocean resources,
- increasing resilience to natural hazards,
- enabling marine operations,
- the ocean's role in climate,
- improving ecosystem health, and
- enhancing human health.

A process (appendix B) was developed to allow workshop participants (appendix C) to efficiently develop a list of research priorities in a limited amount of time. Participants were divided into breakout groups by theme area to discuss specific research topics, information needs, and other topics that related to their theme area. Individuals in the breakout group then voted for the research topics discussed in their session that they believed were most important. The eight to ten topics with the highest votes were then presented to all workshop participants. All workshop participants then voted for these top research topics across all theme areas.

This report presents 1) the results of the breakout group voting for each theme area, 2) the non-research topics discussed in each breakout group, and 3) the results of the large group voting session across all theme areas.

If you will be using the information provided in this report for planning or other purposes we would like to hear from you. For more information about the Gulf of Mexico Research Planning effort or to share how you will be using the results of the GMRP workshop(s) please contact Steve Sempier, Gulf of Mexico Research Planning Coordinator, at [stephen.sempier@usm.edu](mailto:stephen.sempier@usm.edu).

You can also learn more about the GMRP at the project's web site at: [masgc.org/gmrp](http://masgc.org/gmrp).

## **Breakout Group Results**

Participants in each themed breakout group identified research needs and voted for the research topics they believed were most important. Each participant was provided eight votes and they could place up to two votes on an individual research topic.

Prior to the voting session some breakout groups combined multiple ideas that were mentioned during the brainstorming session, and therefore crossed out similar ideas so that they would not be available during the voting session. The tables below include all comments written on the flip chart paper, and those topics that were crossed out on the flip chart paper are indicated with a strike through in the table.

Information needs and policy, management, and education related topics were also captured in the breakout group sessions but were not voted on for the prioritization process. The results of these discussions are also included under each themed heading.

Stewardship of Natural and Cultural Ocean Resources

**Research Needs**

Table 1. Research topics identified by the “Stewardship of Natural and Cultural Ocean Resources” breakout group and voting results from the breakout group voting session.

<b>Research Topic</b>	<b>Votes</b>
Measure of valuation of depletable/renewable resources (ecosystem services)	8
Impact of reduced freshwater/sediment discharge on northern Gulf estuaries	7
Model impact of sea-level rise on coastal habitat/fauna/flora and humans	7
Threshold of quantity and quality of habitat for sustainable populations	7
Comparative analysis of freshwater and marine influence systems (abiotic and biotics) as they respond to natural and anthropogenic effects	6
Examine tradeoff between cultural gains and losses vs. economic/ecological gains	6
New dynamic modeling that addresses non-equilibrium ecosystems resiliency	6
Synergistic impact of multiple stressors on ecosystems (Investigate natural + anthropogenic)	6
Interaction of habitat degradation modification upon behavior and distribution of biota	4
Large scale ecosystem thresholds/regime change-replacement (ecosystem change)	4
Impact of invasive species and associated management strategies on ecosystem services	3

## Stewardship of Natural and Cultural Ocean Resources

### **Information Needs**

- Better data on marine species migration patterns
- How to better utilize riverine discharge
- Approach all research with a long-term appreciation
  - What is the underlying natural foundation
- Research needs to account for major changes in the future rather than assume present

### **Policy, Management or Education Topics**

- Educate public on our own resources and their importance to the economy
- Need better coordination of management operations
- Conflict resolution between research vs. policy, i.e. MS River management
- Understand that coastal systems are dynamic

Increasing Resilience to Natural Hazards

**Research Needs**

Table 2. Research topics identified by the “Increasing Resilience to Natural Hazards” breakout group and voting results from the breakout group voting session.

Research Topic	Votes
Develop model of what a successful resilient community is -Are there three or four elements in reconstruction plan that are essential? -Transportation vs. schools -What needs to be in place before so that it comes back quickly (design of community) -Hazards -Hurricanes— wind and surge -Drought -Flood -Sea-level rise -Saltwater intrusion/canals -Fire -Urban/rural interface -Research into rebound from natural or man-induced hazards	17
Economic research into whether it costs more to harden utilities (bury power lines) than to bring crews in after the storm -How to make structures survive? -How much will it cost in 30 years if community is still using existing infrastructure?	9
What are the cultural and demographic broad differences in how people view place and resiliency? -How do these differences affect community resiliency? -Traditions? -How does age/gender/economic affect resiliency? -How much do these affect decisions to stay? -Why evacuate or don't?	9
Do formal or informal communications work better in certain situations? -Church response vs. Red Cross	7
In communities which are more resilient -Is there a connection to education? -How much does community invest? -What subjects?	6

Table 2 (continued). Research topics identified by the “Increasing Resilience to Natural Hazards” breakout group and voting results from the breakout group voting session.

Insurance – makes it harder to come back -What are the business aspects -Commercial vs. government products -What is the water dependency of those?	6
Which is the best wetland habitat remediation strategy? -Buffers, reduction of existing problem -How successful projects will be	5
Have tidal datums reflected sea-level rise? If so, what is the cause? -Subsidence?	4
What are the regional differences in response, and why?	4
What could we replace abandoned areas with to make things work better next time?	3
How demographics or religious or value systems of community affect ability of community to respond?	2
How do community dynamics play into the response to hazards?	2
If put more water into wetlands, will it cause more algal blooms? -Can wetlands even absorb additional water?	2
What approach do we take—education, regulation, incentives?	2
How do people learn about their homes and flood/hazard risk?	1
How high comfort level affects response?	1
Hypoxia could affect how economically viable community is	1
Are communities at risk from earthquakes and tsunamis?	0
Are there differences in first responders? Do some things work better? -E.g., Coast Guard vs. Red Cross	0
Determine develop evaluation technique for individual sites to determine best strategy	0
Freshwater resources	0
How do you determine what is the best look (historical/natural) for the location?	0
How do you get nutrients out of river?	0
How solid is the communications system?	0
How do fisheries systems rebound?	0
If we changed government policies, would more people stay? Should they?	0

Table 2 (continued). Research topics identified by the “Increasing Resilience to Natural Hazards” breakout group and voting results from the breakout group voting session.

Other hazards -Drought -Hypoxia -Fisheries	0
Should first responders invest in connections to churches?	0
What impact will sea-level rise have on local communities? -How do you communicate that?	0
What is in place that works well? -Combined with demographics	0
What procedures need to be in place?	0
What was the response of the bulkheads?	0
Why would Salvation Army or Red Cross have different levels of success in different areas?	0

### **Information Needs**

- Develop model of what a successful resilient community is
- Economic research into costs of hardening infrastructure versus continuing with existing and rebuilding after
- Have tidal datums in Gulf detected a rise in sea levels? If so, why?
- How do demographics of a community affect how the community responds?
- How does the insurance situation (commercial vs. government policies) affect resilience of community?
- Is there a link between investment in education and community resilience?
- Research into how formal and informal communication come into play and which works better and when
- Which approach—education, regulation, incentives—is more effective in increasing resiliency?
- Which is the best habitat remediation technique to increase resiliency?

### **Policy, Management or Education Topics**

- Education
- Insurance
  - Government policies
  - Enabling risk
- Resiliency index
- State and local incentives to developers to build better mandates
- Tie tidal datums together across Gulf

Enabling Marine Operations

**Research Needs**

Table 3. Research topics identified by the “Enabling Marine Operations” breakout group and voting results from the breakout group voting session.

<b>Research Topic</b>	<b>Votes</b>
Impact of next (e.g., super Panama) shallow draft vessels on coastal land and waterborne environments and transport	6
Study impact of shallow water dredging for small marinas on water quality, SED, transport, and circulation Research on non-dredging and sediment management in ports and channels	6
Research on environmental/economic impacts of marine aquaculture in Gulf of Mexico region	4
What are attributes of a resilient port?	4
Air/water quality advantages of marine transportation	3
Baseline study of aquatic species in major ports/waterways -Need to study and define boundaries between marine and inland waters and the various environmental prediction systems that apply to them <del>-Regional impacts of land/water use on the marine environment</del> <del>-Research needed in improved dredging and construction (illegible) and management practices</del>	3
Economic/cultural impacts of a working waterfront community to regional economics	3
How much waterfront is required for necessary marine operations (how much, what type, and where) and impacts?	3
Assessment of unmanned vehicles (air/surface/underwater), machine operations, and research on homeland security	2
Impact of shoreline changes on marine operations	2
Quantitative relationships of the biotic effects of sediments	2
Beneficial uses and other issues concerned with dredged material management	1
Baseline acoustic survey of marine mammals in Gulf of Mexico	0
<del>Inventory economic/environmental impacts of all Gulf of Mexico marine industries</del>	0

## Enabling Marine Operations

### **Information Needs**

- Inventory of marine establishments/services/operations in the Gulf of Mexico (GIS)
  - Aquaculture/seafood/fisheries
  - Transport/shipping
  - Recreational
  - Government operations
  - Economic impact
  - Water/non-water dependent

### **Policy, Management or Education Topics**

- Need for marine information systems in inland waters (AIS)
- Regional (Gulf of Mexico) strategic maritime business plan

The Ocean's Role in Climate

**Research Needs**

Table 4. Research topics identified by the “Ocean’s Role in Climate” breakout group and voting results from the breakout group voting session.

Research Topic	Votes
<ul style="list-style-type: none"> <li>-Changes in demographics building in coastal areas – lack of insurance, etc.</li> <li>-Affects of changing insurance rates on population demographics – upstate as well</li> <li>-Predict long term changes in commerce/industrial centers/shipping changes due to SL change and potential locations</li> <li>-Watershed development, coastal metabolism, acidification and climate, AL and barriers to marsh migration</li> <li>-Social economic impacts of climate change and sea-level change               <ul style="list-style-type: none"> <li>-Population dynamics</li> <li>-Infrastructure (large vs. individual home)</li> <li>-Demographic shifts</li> <li>-Coastal resilience</li> <li>-Commerce changes</li> </ul> </li> </ul>	<p>Did not vote</p>
<ul style="list-style-type: none"> <li>-Possible change in species distribution with climate change in currents/temp change/freshwater influx               <ul style="list-style-type: none"> <li>-Effects on fisheries stocks/populations/habitats</li> </ul> </li> <li>-Measures of actual sea-level change air and water temps in local areas over time and applications to better predict</li> <li>-Investigate pedagogical techniques to better educate public and principal officials to <del>be concerned with long term changes as opposed to anomalous events</del> about climate change and coastal ocean ecosystems</li> <li>-Rates of elevation changes in marshes &amp; reasons for change (subsidence, plate tectonics)</li> <li>-Basic background – is climate change human induced?</li> <li>-Measure changes in ocean surface temps</li> </ul>	<p>Did not vote</p>

Table 4 (continued). Research topics identified by the “Ocean’s Role in Climate” breakout group and voting results from the breakout group voting session.

<p>Understanding processes and effect on coastal marshes/upland areas over time - trade-offs</p> <ul style="list-style-type: none"> <li>-Response of marshes to SL change             <ul style="list-style-type: none"> <li>-With climate change</li> <li>-Barrier island</li> <li>-Elevations</li> <li>-SL change</li> </ul> </li> <li>-Response of marshes to severe storms             <ul style="list-style-type: none"> <li>-Barriers to marsh migration</li> <li>-Rates elevation change</li> <li>-Hydrology</li> </ul> </li> <li>-Response of marshes CO<sub>2</sub> uptake by marsh plants and what means to ecosystems-marsh elevation</li> <li>-Ability of marshes to migrate w/SL change</li> <li>-Loss of marsh and effect of ability to buffer &amp; filter pollutants</li> </ul>	<p>Did not vote</p>
<ul style="list-style-type: none"> <li>-Carbon cycling effects/sources/sinks GOM</li> <li>-Phytoplankton &amp; bacterial dynamics</li> <li>-Acidification (physical processes/biological effects) ocean uptake of CO<sub>2</sub></li> <li>-Impact of climate change on patterns that disperse larvae</li> <li>-Sea level change and working waterfronts</li> <li>-Applications to better predict climate change in GOM especially using NASA data) MODUS and other satellite info</li> <li>-Extrapolate long term impacts of SL change on infrastructure of coastal communities – increase structural resiliency</li> </ul>	<p>Did not vote</p>
<ul style="list-style-type: none"> <li>-Impact of watershed development &amp; sea level changes on coastal receiving waters &amp; ability to deal with CO<sub>2</sub> as result of nutrient inputs &amp; cascade impacts for tradeoffs for coastal climate</li> <li>-Impacts of more severe storms &amp; SL change on shallow aquifers (hydrology) in coastal area</li> </ul>	<p>Did not vote</p>

## The Ocean's Role in Climate

### **Information Needs**

- Habitat maps for the region-terrestrial/aquatic/marine
- Hydrodynamic models - sub-regional levels
- Local subsidence rates across region
- Enhance information networks

### **Policy, Management or Education Topics**

- Education/outreach on sea level change
- Incorporate science/models into local building codes
- Communicate science as changes to changing municipal officials
- ~~Incorporate~~ Implement smart growth policies

Improving Ecosystem Health

**Research Needs**

Table 5. Research topics identified by the “Improving Ecosystem Health” breakout group and voting results from the breakout group voting session.

<b>Research Topic</b>	<b>Votes</b>
Determining impacts of near coastal development	8
Eutrophication/nutrients/hypoxia	8
Habitat loss and effects on major fish species (coastal marsh loss), changes in amount/quality of habitat—impacts on fish, etc.	7
Better ecosystem-scale models (habitat-species connections (e.g., seabirds and sea turtle nesting habitats)	6
Develop appropriate indicators of ecosystem health for coastal/marine systems -Indicator species need to be ones that can be studied in large numbers (rare/endangered not good candidates)	6
Human manipulation including changing timing of freshwater inflows—impacts (e.g., oysters)	6
Marine debris	6
Research what variables need to be monitored and mapped to support ecosystem/scale work	6
Invasive species—pathways, prevention, and control -Invasive jellyfish in Gulf -Lionfish may be headed here -Understanding changes in plant communities and how Impacts ecosystem functions/services -Changing community structure of benthos too -Changes in particle size/inorganics	5
Impacts of commercial trawling and recreational fisheries on -The fisheries -The larger ecosystem (e.g., bottom)	4
Research on restoration techniques -What works for stability of projects? -What leads to greatest function? -Effective for mitigation	4
Harmful algal blooms—subsurface -Formation and inshore/offshore transport -Human health concerns -Shellfish -Sea grass -Marine mammal die-off's	3

Table 5 (continued). Research topics identified by the “Improving Ecosystem Health” breakout group and voting results from the breakout group voting session.

Human perceptions -Nutrients	3
Boating (commercial and recreational) increasing wave energy/wakes, causing erosion/need for armoring (understudied) Impacts of boat traffic (e.g., on marine mammals, birds, sea grass)	2
Economic valuation of habitats (e.g., marsh) and economic impacts of habitat losses	2
Effects of armored shorelines vs. natural	2
Offshore mariculture—how impacts ecosystem	2
Research into why existing laws to protect marine/coastal resources aren't being effective (e.g., loopholes, lack of enforcement)	2
Organismic health and disease (e.g., coral or sea urchin die-off's—learn a lot from these processes)	1
Remote sensing research (understanding the signal)	1
Study bottlenose dolphins in Gulf bays, sounds, and estuaries (unique groups with unique behaviors/cultures)	1
Connections between nearshore and offshore areas, and between watersheds (need for interdisciplinary research)	0
Eutrophication/nutrient inputs—how effects ecosystem health	0
How are human pathogens in seafood modified by ecosystem conditions, habitat/species interactions, etc.	0
Research origin of marine debris	0
Role of seabirds and sea turtles in the ecosystem (e.g., habitat needs, impacts on other species)	0
Coastal hypoxia—effects on biogeochemistry of estuaries	0
Effects of marine debris on ecosystems (habitats and species)	0
Essential fish habitat, connections to water quality	0
Freshwater inflow and timing	0
Human perceptions and understanding of ecosystem health and change —Research into how to effectively change behavior —How to interest folks who don't live on the coast	0
Human perceptions of and understanding of nutrient input (why need to follow fertilizer instructions)	0
Research why messages about/enforcement of marine debris laws haven't been effective	0

## Improving Ecosystem Health

### **Information Needs**

- Begin with inventory of existing research (before can truly know what research priorities are)
- Monitoring of coastal hypoxia—need regional assessment to understand magnitude of problem
- Regional coordination of sea grass mapping/EFH mapping

### **Policy, Management or Education Topics**

- Cash reward for recycling (instead of throwing overboard)
- Hard to enforce marine litter/debris laws
- Include Cuba and Mexico in Gulf of Mexico ecosystem work
- Marine mammals a good way to involve and interest the public
- More conservation of natural systems vs. mitigation restoration
- Need education about ecosystem health and change and the role of people
- Teacher workshops for inland teachers to share coastal/marine info
- Trash in Gulf of Mexico indicates connection with inland

## Enhancing Human Health

### Research Needs

Table 6. Research topics identified by the “Enhancing Human Health” breakout group and voting results from the breakout group voting session.

Research Topic	Votes
Vibrio – in seafood -Understand transport sources, process of contamination -Understand natural history, role, how humans facilitate roles to risk -Is it emerging threat? -How do humans facilitate risk?	5
New products? -Drugs -Bio-sensors/source tracking -Micro-arrays -Bio-remediation -Bio-materials -Sustainable as products -Various molecular probes -Bio	4
What are the best/new methods to process public seafood to decontaminate for consumption?	4
How to educate citizens as to good stewardship related to water quality and potential human health risks?	3
Industrial discharge impacts on human health and proliferation of harmful organisms	3
Understand biodiversity of the Gulf of Mexico to identify new products	2
What are economic impacts to human health from pathogen contamination?	2
What environmental conditions mediate biochemistry? Production of natural products?	2
What is natural history of potentially harmful organisms environmental attributes, risks, and impacts (Harmful Algal Blooms (HAB's), virus, bacteria)? -Modeling -Bloom dynamics	2
How do large-scale climate change and hurricanes affect: -Genetics? -Epidemiology?	1
How do oil spills impact health of environment and humans?	1

Table 6 (continued). Research topics identified by the “Enhancing Human Health” breakout group and voting results from the breakout group voting session.

Bird migration path and risk from avian flu, what diseases are transported by migratory birds and how climate change and human development impacts routes	0
Develop micro array for detection of beneficial and harmful organisms	0
Drugs from sea, biosensors	0
Effluent release practices affect pathogen concentration and spatial distribution	0
Epidemiological studies on impacts of bloom, virus pathogens, quantify risk	0
Gain a better understanding of genetic controls and gene expression	0
How do different levels of wastewater treatment affect pathogen concentrations?	0
How do large-scale events, such as climate change and hurricanes affect human exposure to pathogens? -Pathogen concentrations/prevalence -Bloom dynamics -Bird migration (avian flu) -Tropical disease	0
How to educate/awareness of risks of eating contaminated seafood -Public and health care providers	0
Increase seafood consumption education	0
Model harmful algal blooms and Vibrio - creation of bloom dynamics	0
Quantify/investigate risk of tropical disease migrating due to climate change	0
Understand environmental factors that cause harmful algal blooms and Vibrio virulence	0
What are new sources of bio-remediation <del>bacteria material</del> ?	0
What are best/alternate indicators for virus pathogens and how can pathogens be linked to sources?	0
What are human health impacts from hurricanes - large-scale events?	0
What are the roles of different sources?	0

## Enhancing Human Health

### **Information Needs**

- Deep sea harvesting technology
- Generate baseline for many microorganisms
- Identify contaminant sources associated with large-scale events
- Need observing systems - presence, abundance, location & environmental conditions, and baseline oceanographic info
- Vibrio baseline data

### **Policy, Management or Education Topics**

- Encourage application of source tracking technology in Gulf of Mexico
- Encourage multi-disciplinary research & approaches
- Need a better-informed public related to pathogens

## Overall Results—Research Priorities Determined in Large Group Voting Session

The research topics presented in Table 7 were derived from the highest rated topics from each of the themed breakout groups. The column titled, “Theme,” in Table 7 corresponds to the breakout group from which the research topic originated. The following codes were used: stewardship of natural and cultural ocean resources (Stewardship), increasing resilience to natural hazards (Resilience), improving ecosystem health (Ecosystem), enabling marine operations (Operations), enhancing human health (Human), and the ocean’s role in climate (Climate).

Each participant had 12 votes for the large group voting session and could place up to two votes for any one research topic.

Note that in some cases research topics presented by different breakout groups were very similar. An in-depth analysis of similar topics identified within and between workshops will be discussed in a later report.

Table 7. Results of the large voting session for high-priority research topics across all theme areas.

Research Topic	Votes	Theme
Socioeconomic impacts of climate change and sea level change on: -Population dynamics -Infrastructure (large scale versus individual homes) -Demographic shifts -Coastal resilience -Commerce/shipping centers and needs-changes	32	Climate
Changes in habitat quantity and quality--impacts on fish species, etc. (all marine organisms)	28	Ecosystem
Understand processes, effects, and trade-offs of climate change on coastal and upland areas over time, including -Barrier islands -Elevations -Sea level change -Barriers to marsh migration -Rates of elevation change -Hydrology	28	Climate
Develop model of what a successful resilient community is	27	Resilience
Eutrophication/Nutrients -Impacts on ecosystem health -Coastal hypoxia and its impacts	22	Ecosystem
Research into shallow-water dredging and non-dredging sediment management and impacts on water quality, sediment transport, and circulation	21	Operations
Economic/cultural/intrinsic impacts of working waterfront communities (value-added perspective)	20	Operations

Table 7 (continued). Results of the large voting session for high-priority research topics across all theme areas.

Human manipulation of freshwater inflows (amount and timing) impacts on resources (e.g. oysters)	19	Ecosystem
Measure of valuation of depleted/renewable resources (ecosystem services)	19	Stewardship
Research on environmental/economic impacts of marine aquaculture in Gulf of Mexico	19	Operations
Better ecosystem-scale models showing habitat-species connections (e.g. sea birds' and sea turtles' nesting habitat)	17	Ecosystem
Examine tradeoff between cultural gains and losses versus economic/ecological gains and losses	17	Stewardship
Impacts of next-generation, shallow-draft PANAMAX (post) super-containers on land/water transport and environments (inland too)	17	Operations
Impact of reduced freshwater/sediment discharge on northern Gulf estuaries	16	Stewardship
What new products can be discovered/developed to serve as: drugs, bio-sensors/source tracking, micro-arrays, bio remediation, bio-materials, molecular probes?	16	Human
How do large scale events, such as climate change and hurricanes affect exposure to pathogens, pathogen concentrations (prevalence, bloom dynamics, bird migration (avian flu), and tropical disease?	14	Human
What are the affects of industrial discharge on human health and proliferation of harmful organisms?	14	Human
Economic research into cost of hardening infrastructure versus maintaining existing and rebuilding after	12	Resilience
Study thresholds of quantity and quality of habitats for sustainable populations	12	Stewardship
Baseline study of aquatic invasive species (AIS) in major ports/waterways	11	Operations
Marine Debris -Research on origins -Research on why education and enforcement of laws haven't been effective -Effects on ecosystems (habitats, species)	11	Ecosystem
New dynamic models that address non-equilibrium systems (models that don't assume some "natural"/steady state)	11	Stewardship

Table 7 (continued). Results of the large voting session for high-priority research topics across all theme areas.

Changes in species distribution with climate change, changes in currents, temperature change, and freshwater influx, and their effects on fisheries stocks, populations, and habitats	10	Climate
How do demographics of community affect how the community responds?	10	Resilience
Potentially harmful organisms-What is natural history, environmental attributes, risks, impacts, bloom dynamics, genetics, epidemiology, modeling	10	Human
Develop appropriate indicators of ecosystem health for coastal/marine systems	9	Ecosystem
Research which variables need to be monitored and mapped to support ecosystem-scale work	8	Ecosystem
Study synergistic impact of multiple stressors on ecosystems	8	Stewardship
Determining impacts of near coastal development	7	Ecosystem
Invasive species (e.g. jellyfish in Gulf, lionfish may enter Gulf) -Research pathways, prevention and control techniques -Research changes in communities (plant communities, benthos) and how these changes impact the ecosystem	7	Ecosystem
What attributes comprise a resilient port? Green port?	7	Operations
Comparative analysis of freshwater and marine influenced systems (abiotic and biotic) as they respond to natural and anthropogenic effects	6	Stewardship
Investigate techniques to better educate the public and municipal officials about climate change and coastal ocean ecosystems	6	Climate
Which approach—education, regulation, incentives—is more effective in increasing resiliency?	6	Resilience
What are anthropogenic forcing on pathogen concentrations, bloom dynamics and factors that affect them?	5	Human
How does the insurance make-up of community (self-insured, commercial, fed.) affect resiliency?	4	Resilience
How much/where/what type of ‘water front’ is necessary/required for marine operations? (10, 25, 50, 100 years)	4	Operations
Impacts of marine energy development (air, nuclear) on marine environment	4	Operations
Measures of actual sea level change and changes in air and water surface temperatures in local areas over time. Determine applications to better predict these factors	4	Climate
Model impacts of sea-level rise on coastal habitat, flora/fauna, and humans	4	Stewardship

Table 7 (continued). Results of the large voting session for high-priority research topics across all theme areas.

Conduct research into formal and informal communications network to determine which works better and in what situations	3	Resilience
Is there a link between education and resiliency?	3	Resilience
What are best/new methods to ensure seafood safety?	3	Human
Air/water quality advantage of marine transportation (e.g. short-sea shipping, or container on-barge)	2	Operations
How do we educate stakeholders regarding health risks from contaminated seafood and water quality; good stewardship?	2	Human
Watershed development, coastal metabolism/acidification, and climate	2	Climate
Have tidal datums in Gulf detected rise in sea level? If so, what is the reason?	1	Resilience
What is the biodiversity and environmental conditions of the Gulf that relate to production of natural products?	1	Human
What are the economic impacts to human health from pathogen contamination?	0	Human
What is the best habitat remediation strategy to increase resiliency?	0	Resilience

## **Acknowledgements**

This workshop would not have been possible without the support of numerous individuals. Thank you to all of the following:

Host:

Mississippi State University Coastal Research and Extension Center (Mary Dikes and Dave Burrage)

Sponsors and workshop support:

NOAA National Sea Grant College Program

Mississippi-Alabama Sea Grant Consortium (LaDon Swann, Kay Bruening, John Grigsby, Melissa Schneider, and Loretta Leist)

Facilitation support:

Gulf Coast Services Center (Heidi Recksiek and Tina Sanchez)

Mississippi-Alabama Sea Grant Consortium (Lou D' Abramo, Stephanie Showalter, and Jody Thompson)

Northern Gulf Institute (Michael Carron)

Workshop participants:

See appendix C.

Gulf of Mexico Research Planning Principal Investigators:

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**Appendix A:**

**Gulf of Mexico Research Planning Workshop Agenda**

**Mississippi State University Coastal Research and Extension Center**

**Biloxi, Mississippi**

**January 17, 2008**

**10:00 a.m. – 2:45 p.m.**

**Workshop Agenda**

10:00-10:15 **Check-in, coffee**

10:15-10:50 **Welcome and Purpose of the GMRP workshop** (all participants)

10:50-11:00 **Small Group Session Goals and Objectives** (all participants)

11:00-Noon **Identify Research Topics within Themes** (breakout group)

Noon-12:15 **Break and Pick-up Lunches**

12:15-1:30 **Refine and Prioritize Research Topics—working lunch** (breakout group)

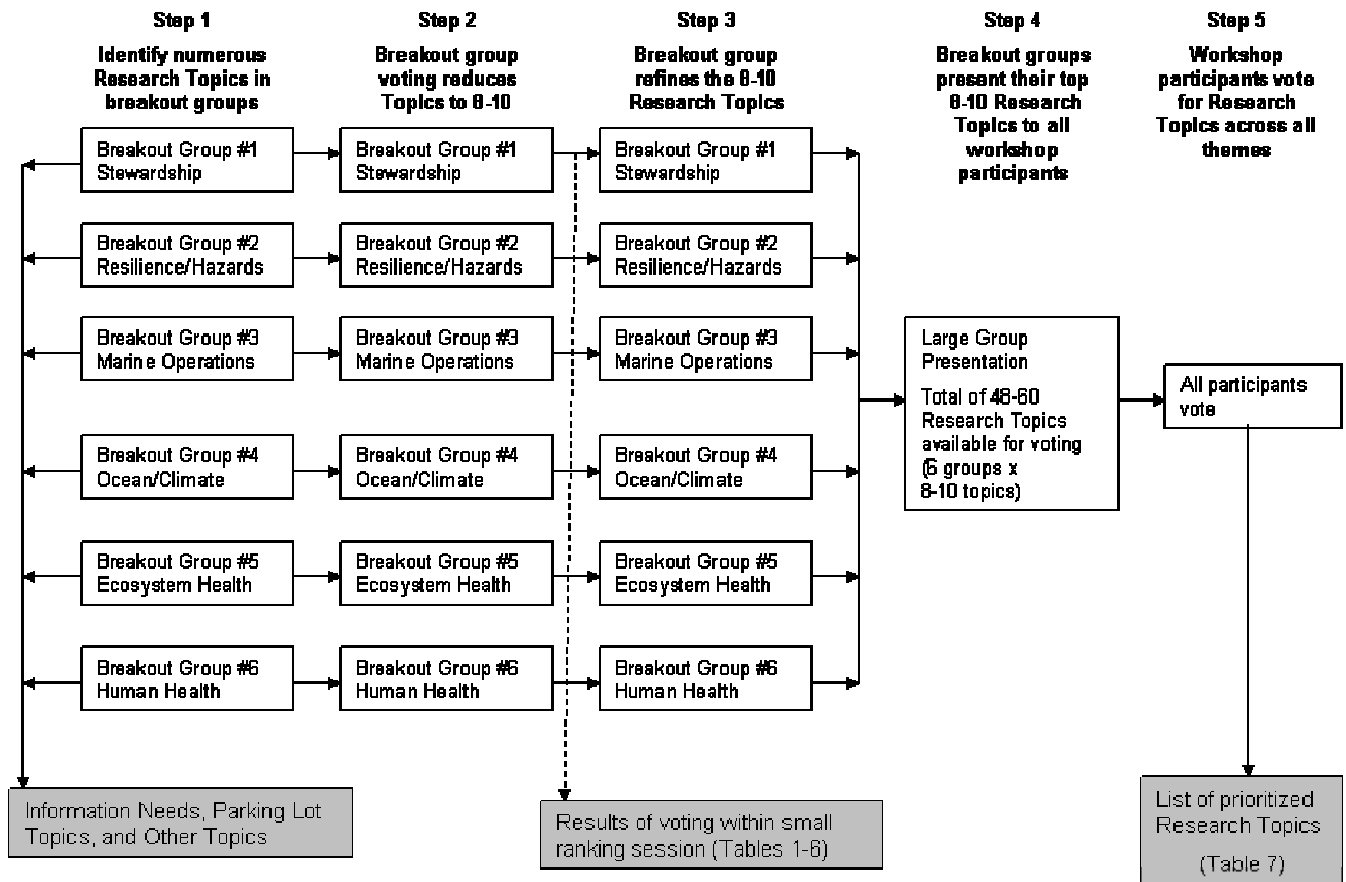
1:30-2:00 **Groups Present Top Research Topics for each Theme** (all participants)

2:00-2:30 **Voting Session of all Research Topics** (all participants)

2:30-2:45 **Wrap up** (all participants)

**Appendix B:**

**Process diagram to identify and prioritize research topics at the GMRP workshop**



## Appendix C:

### Workshop Participants and Facilitators

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