Gulf of Mexico Research Planning Workshop Report

For the workshop held in

Baton Rouge, Louisiana

on

February 26, 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 **Louisiana State University Energy, Coast and Environment Building, Baton Rouge, Louisiana**.

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.

You can also learn more about the GMRP at the project's web site at: 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

Due to the large number of participants in the "Stewardship of Natural and Cultural Ocean Resources" there were two separate breakout groups that performed a brainstorming session. After the brainstorming session the two groups merged and combined topics. Members of both breakout groups voted for the combined topics. The table below is the combined topics that were discussed and voting results.

Research Needs

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

Research Topic	Votes
Long term restoration and ecosystem trajectories from different perspectives	12
Valuation of key aquatic indicator species and non-market resources in coastal areas. Economic incentives for landowners and public	10
Effects of river diversions (site specific)	9
Freshwater quantity and quality around Gulf of Mexico (ex: TX vs. MS) and relationship to health of estuary and ripple to cultural/coastal community	8
Benefits and costs of restoration (including modeling)	8
Impact of trawling on cultural resources and where they are	7
Borrow areas—effect on: -Water quality -Fisheries -Sediment processes	6
Placement of fine sediment -Water quality -Marshes -Processes/habitat utilization	6
Understand adaptation to habitat loss and archiving and understanding lost cultural resources (socio/cultural)	6
Research historic and prehistoric past human densities in coastal zones	6
Local social understanding of benefits/burdens of restoration efforts	6
Human use patterns Relationship of oyster reef structure, biomass, and health to water quality as it relates to oyster fisheries industry throughout Gulf (at a regional scale)	5
Impacts of hypoxia to fisheries and non-consumptive species	5
How large structures (leaky levees) affect coastal processes in restoration	5
Re-assess mass-wasting of sediments-fluidized mud	5
Response of Lake Pontchartrain and Mississippi Sound to closure of MRGO (Mississippi River Gulf Outlet)	4

Table 1 (continued). Research topics identified by the "Stewardship of Natural and Cultural Ocean Resources" breakout groups and voting results from the breakout group voting session.

Fisheries: access, ownership, allocation -How do we allocate: cultural, social, or economic	3
Corrosion/leaking rate and effect of depth of ships sunk during World War II	3
Determine legacy of organic loading in hypoxia	3
Long and short term responses of coastal processes to large storms	3
Update understanding of land/water linkages in Mississippi Basin and Gulf—local policies to reflect this	3
Research maritime history/inventory cultural sites	3
Flux of freshwater/saltwater in geological materials	3
Feasibility of revitalizing low salinity estuaries	2
Effect on water quality from industrial processes (oil and gas) (strategic reserve)	1
Natural history of Gulf of Mexico benthic habitats (are they still viable)	0
Identify the genomes within a species that are salt tolerant as we move inland	0
Results of human use of resources extraction or change and the influence on future job markets	0
Downline affects of restoration efforts, etc.	0
Quantify/qualify migratory bird habitat in relation to recovery efforts	0
Best avenues for determining behavioral and economic impacts of environmental practices	0
Implications of hardening shorelines	0
Alternative energy sources	0
Diversion and hurricane impact on invasive species	0
Valuation of human use activities in coastal zones	0
~~Non market valuation innovation research~~	0
~~Sediment what happens to marshes and other estuarine habitats with movement of sediment~~	0
~~What happens to the borrow areas extraction/dump sites to water quality~~	0
~~Effect of cave (salt brine water) clearing on Pascagoula and Gulf of Mexico salinity~~	0
~~How to model (help manage) "living" ecology and the resulting economics~~	0
~~Models that predict what animals need and the resulting restoration economics~~	0

Table 1 (continued). Research topics identified by the "Stewardship of Natural and Cultural Ocean Resources" breakout groups and voting results from the breakout group voting session.

~~System changes due to finer particulate movement by dredging and placement~~	0
~~How does the extraction site fill up and how does it move (quality of the material)~~	0
~~What is the impact of pulling water from Gulf to cool natural gas plans and LNG~~	0
~~Response of community freshwater resources to coastal changes~~	0
~~Impacts to water quality and fisheries of deep borrow areas produced by sediment mining~~	0
~~Impacts of leveling oyster reef on mitigating storm effects~~	0
~~Research on Pleistocene spread of humans~~	0
~~Long term eutrophication impacts and restoration trajectories~~	0

Stewardship of Natural and Cultural Ocean Resources

The information needs and policy, management and education related topics described below came from both breakout groups that discussed issues related to "Stewardship of Natural and Cultural Ocean Resources."

Information Needs

- Additional survey/testing of cultural resources
- Experiments set up but we are not monitoring--right people and right parameters
- Increase interaction among governments at all levels and include landowners
- Inventory of coastal infrastructure
- Large group behaviors/interactions--social trap of large groups in response to various issues
- Modeling the environment
- Need to monitor parameters (i.e. oyster monitoring only 2 parameters)
- Where are we catching fish
    - How are they moving to respond to hypoxia

Policy, Management or Education Topics

- Assess populations to assess sustainability
- Create more marine reserves and long-term research sites
- Legal protection for cultural sites beyond state waters
- Need monitoring information so that we can educate communities on the effect of management changes
- Protect and maintain extant habitats
- Protection of shipwrecks and relic sites that are not protected
    - Educate that these are non-renewable
- Public needs to understand ramifications to land use violations for rebuilding
- Public understands how these changes to fisheries and habitats impact/benefit
- Re-introduce lost species: bear, wolves, manatees, birds
- University president's forums (land use and zoning)

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
Real Time - Predicting Systems -Predict response of built environment to hazards modeling -Improve boundary effects, forcing bottom vs. surface, consider predicting surface waves, compare responses from different topographic/ landscape vegetated features, vegetated cover (modeling)	17
How do preservation, restoration actions impact communities and economic activities? What is 30 year impact of constructing a levee? How do levees alter natural flow patters of storm surge? (modeling)	14
Measure people's (citizens and decision makers) understanding of vulnerability & what they can do to reduce impact -Explore behavioral science -Partnership to translate & communicate technical data for improved risk based decisions -How to measure a community's resiliency	11
Protection of critical infrastructure - highways, bridges, utilities, hospitals, shelters - research on reducing vulnerability	10
Understand, quantify, predict impacts to first line of natural defense - barrier island, shoreline	10
Effects of natural hazards on water quality & living resources - Field work & remote sensing techniques & modeling	9
What makes habitat more resilient? Are restored habitats more or less resilient?	8
What is relationship/impacts to community leaders careers RE: land use decisions in hazard areas and to past case study decisions where good decisions were made	5
Research toward "believable" scientific projections of future coastal conditions	4
Predictive models for marine debris -Industrial -What goes where & what are best methods to secure - (under development by NOAA) -Improved mapping of debris fields	1
What are best ways to mitigate damage to natural systems?	1

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

Are certain coastal forests more resilient than others? (fresh vs. salt habitats) -What improved species can be used? -What are critical aspects of these habitats?	0
Development of coastal flooding or tidal real time predicting system - more meteorology data…not limited to surge or seasons or extreme events (modeling)	0
How does altered hydrology affect future impacts of storms - look at interaction of different development types	0
Social modeling of impacts	0
What is level of vulnerability of (built environment) critical infrastructure? Assessment of baseline conditions compared to different level events	0

Information Needs

- Compile recovery knowledge - lessons learned
- Get post Katrina baseline data then follow with regular data collection

Policy, Management or Education Topics

(none provided)

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.

Research Topic	Votes
Research into alternative (to reefs) sustainable "use" of de-commissioned platforms (alternate energy; aquaculture; eco-tourism; weather meteorological stations) -Assumes "left in place"	10
Documentation of significant verses perceived impacts of off-shore aquaculture (biological and ecological); -Structure type -Mariculture on Gulf of Mexico -Must precede permitting (e.g. permitting issues) onsite analyses; small demonstration -Learning curve here	9
Strategic planning on regional transport linkages (port barge-rail-track) -"Intermodal" -Maximum economic and environmental efficiencies (transport mileage-include metrics = carbon footprint)	8
Socio-economic characterization of the coast fishing communities research and economic alternatives (transitioning aquaculture)	7
Potential impacts of oil-gas activities in deepwater (>1000 meter) habitats	7
Research into aquaculture "grow-out" technologies (net pens; recirculation systems (land)) Goal: stock enhancement and food security	6
Identify "candidate" species -Species selection for Gulf of Mexico aquaculture (land-based or offshore) -Economic/marketing/production/genetics	5

Table 3 (continued). Research topics identified by the "Enabling Marine Operations" breakout group and voting results from the breakout group voting session.

Develop operational hydrodynamic outcast / forecast or models system for Gulf of Mexico -Waves -Currents -Temperature -Salinity -More weather stations? -Deal with existing data limitations -Goal: more accurate predictions -Mariners; management	4
Identification and characterization of legal pathways for "reliable" predictable/ "use" of marine service center / facilities e.g. - staging areas, heavy equipment public / private ownership Goal: expedited recovery	4
Investigation into ballast water and aquatic invasive species (AIS) -Quantify releases, species, harbors -Source of ballast -How much / what type, etc. -Monitoring	2
Research into physical minimization alternatives / legal utilization of use / food banks of commercial fishing bycatch legal and physical	1
~~Develop metrics that documents carbon footprint of shipping (lower carbon costs; transport miles; etc.)~~	0
~~Research into emergency use of marine support services and facilities~~ ~~Example: Publicly owned and operated marinas (define legal pathways for reliable emergency use marine service center)~~ ~~Staging area (heavy equipment)~~	0
~~Research into incorporating existing community fishermen into aquaculture~~	0

Enabling Marine Operations

Information Needs

- Gulf of Mexico (GMFMC) does not have good info on socio economic (fishing community)
- Identify and define legal pathways for reliable emergency marine services center use
- Lack of species selection information for land-based and offshore aquaculture
- Need a better understanding about stake holders in marine operations (IOOS; GCOOS; etc.)
- Need better "regime" on ocean "use"
    - Re: aquaculture, shellfish
- Quality of "safe harbors" (harbors of refuge) for foul weather protection

Policy, Management or Education Topics

- Awareness RE: "carbon footprint" or transport miles of environmental benefit of shipping (decrease carbon costs)
- Increase education and outreach for the general public
    - RE: aquaculture (offshore)
- Increase outreach into incorporating existing communication of fishermen into aquaculture
- Policy
    - RE: permitting for offshore aquaculture
    - need a way to permit this…
    - "offbottom" aquaculture too

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
Sea-level rise & storm surge interaction: areas of concern: As a result in seal level rise: -Salt water intrusion -Cultural -~~Improve understanding of storm surge~~ -Change ecosystems -Change in coastal flooding: improve elevation -Infrastructure -Tax base -Agriculture -Human health -Changing wetland composition	9
As climate change is occurring (i.e. rainfall patterns/distribution, river flows) improve understanding of freshwater inflows, distribution, and use (past, present and future) including river flows and rainfall in the coast --- physical and biological changes. -Historic geologic history of river flow patterns in past. How did it bring us to today and where will this take us?	8
Improve understanding of carbon flux and implications; properties of Gulf of Mexico change and impact methane/carbon dioxide	7
Interaction of loop current with weather: how does it change with changes in the ocean (salinity, upwellings, coastal interactions, ocean temperatures)? How is the loop current affected by ENSO: Northern Atlantic Oscillation?	7
Hypoxia: Improve understanding of hypoxia: How will climate change interact (more or less?) in conjunction with temperature, nitrogen, phosphorus, endocrine disruptions, algal blooms?	6
Improving knowledge of the effects of storms due to climate change (i.e. number, frequency strength) path	6

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

Economic impacts of climate change, i.e.: -Maritime commerce -Oil / gas activities -Fisheries -Levees / barrier islands -Infrastructure tax base	5
Improve understanding of how organisms and plants will change with climate change (physical, geographic regions)	4
Quantify the rate of change or melt (glacier and snow) and where (Antarctic and Arctic)	2
Climate, ocean, coastal interaction; coastal surface and water interactions	0
Quantify the impacts of radiation effects on biota due to global climate change	0
~~As a result in seal level rise need research on change: salt water intrusion, change in sediment deposition; coastal flooding (temp; permanent)~~	0
~~Better models for elevations improved methods~~	0
~~Change of storm surge / wetland interaction~~	0
~~Improving knowledge of hurricane frequency and strength and path ocean / atmosphere interaction enter into Gulf and play~~	0
~~Interaction of storm system with the coast~~ ~~Effects of storms due to climate change (i.e. #, frequency, strength)~~	0
~~Under ocean temperatures as relates to climate change~~ ~~Improve understanding of ocean temperatures~~	0

The Ocean's Role in Climate

Information Needs

- Continuous data
- Expand elevation data knowledge - more frequent surveys and more density
- Higher and higher resolution bathymetry / LIDAR (better data)
- More sensors in Gulf of Mexico
- Need more coastal and subsurface geological data
- Pool evaluation data

Policy, Management or Education Topics

- Data consistencies from ocean to land
- Effects of climate change on coastal restoration and coastal development
- Engage other agencies
- Engagement of local, state, regional governance (on climate change (multi-disciplinary)
  - How use this information to mitigate?
- Heavy participation by Army Corps of Engineers
- Hypoxia prediction
- National policies on flood insurance
  - Should we rebuild here?
  - Draft policy on climate change & how to mitigate
- What to do with private property?

Improving Ecosystem Health

Due to the large number of participants in the "Improving Ecosystem Health" there were two separate breakout groups that performed a brainstorming session. After the brainstorming session the two groups merged and combined topics. Members of both breakout groups voted for the combined topics. The table below is the combined topics that were discussed and voting results.

Research Needs

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

Research Topic	Votes
What is ecosystem health -Need to figure out how to measure -Need larger suite of indicators and better understanding of how it relates -Indicators of ecosystem health -Have many metrics, but not ecosystem functions -Further define metrics for evaluation - broad ecosystems (e.g. fish communities)	17
River diversions/ sediment management -Shoaling impacts -Sediment impacts on habitats & species -ID optimal use & allocation of sediment -Diversion effects on water quality, marshland populations	13
Ecosystem significance of shifts in habitat types (especially vegetative changes) that are occurring in Louisiana -Define factors causing these shifts	11
Evaluate total potential of Mississippi River for restoration: including management/inputs basin, especially sediment, freshwater volume, nutrients - Atchafalaya/Miss optimal distribution	11
Understanding hydrologic requirements of healthy marsh ecosystems -Freshwater influence flotant (floating marsh) -Hydrology other coastal wetlands	11
Non-native species -Impacts on coastal systems -Modeling effects, potential pathways of introduction -Risk analysis & control potential -Inventory threats -ID sources/ vectors, pathways	10
Impacts of global climate change on local ecosystems -Range extensions of ecosystem -Develop flexible ecosystem models to predict local impacts	9
Research on forested wetlands/coastal forests to understand ecosystem function & resilience (e.g. to hurricanes)	8

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

Economics research -Economics of habitat loss and restoration -Economics important for identifying trade-offs, can also be part of incentives for behavior change -Model economics of ecosystem shifts -Look at benefit, costs, distribution across interests -"Atlantis" model from Australia good (e.g. of one that includes economics)	7
Understanding human/public attitudes and perceptions -Incorporate into models -Important for identifying trade-offs -Research what incentives/motivations will work, e.g.: -Get landowners to participate in eco-friendly development) -Social science research into what people think about restoration, their understanding	7
Define outer boundaries anthropogenic input to Gulf & assess cultural impacts for example as they relate to: -Oil platforms -Impacts of ecosystem health & production -Fishing	5
Hypoxia effects distribution, abundance, recruitment & mortality in fish and invertebrates – North Gulf – especially impacts in the Gulf east of Mississippi River	5
Impacts/connections re: -Discharges & run-off (impacts to freshwater & coastal waters) & research into ways to control metals -Impacts on sediment, bacteria -Ultimate fate & transport of pollutants (nutrients) inland to the Gulf -Efficacy of different run-off management strategies/structures -Effectiveness of Best Management Practices	5
Natural variability – still don't know how much variability is natural in a healthy system (e.g. brown marsh)	5

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

Coastal plains land use/ land cover -Understand impacts to estuarine and Gulf (conveyance from riparian to other two systems) -Systems approach to 3 systems -Look at riverine as well	4
Need to create an analysis framework based on existing and future quantitative and predictive models -Weave models together to look at large scale and evaluate scenarios -Combine individual models of marsh states and use by species (use to inform) - Hydrodynamic modeling -"Ecospace" model (will be able to evaluate restoration alternatives on basin scale) -Check applicability of existing models to Louisiana (may need to tweak a bit) -"LACES" model might be one to look at (discussed in Louisiana during CPRA process)	4
Offshore aquaculture -Impacts of releases, nutrients, metals from structures, other toxics -Look at new user conflicts	4
Research potential beneficial use of discharge (e.g. wastewater to wetlands work and New Orleans sewage board) -Look at ecological, economic, technological (e.g. active project in Hammond)	4
Characterize structure & function of offshore (deepwater) biology -Define "health" -Status -Regional baseline -Soft sediment -Hard sediment -Water column -Estimate indicators	3

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

Barrier Islands -Separating natural dynamics from anthropogenic influences to better manage anthropogenic inputs -Analysis of previous & current restoration	2
Develop methods to address disturbances to bottom community structure from fisheries activities -Mitigate active fishing gear impacts	2
Develop real-time 3-D model of Gulf circulation	2
Flows between systems -Offshore to freshwater (across coastal system) -Movement of species, carbon flows (e.g. Atchafalaya good place to do this study)	2
New measures of coastal wetland productivity -Especially anthropogenic effects	2
Impacts of wind power (e.g. on flyways) -Wind patterns -Feasibility (should we pursue) -Look at new user conflicts (trade-offs, socioeconomic issues)	0
Integration of coastal observing systems & technologies to facilitate ecosystem approach - there is some going on, but need more information	0
Need to define historical baselines for ecosystems -Use historical information to define targets -Identify trade-offs in management alternatives (affect different users in different ways)	0
Role of Mississippi River flow in isolating populations	0
Understand function of habitats -Highlighting production, fish condition -Impacts of habitat loss plus impacts of restoration (e.g. marshland , oyster, natural ridges)	0

Improving Ecosystem Health

The information needs described below came from both breakout groups that discussed issues related to "Improving Ecosystem Health."

Information Needs

- Better bathymetric data for region
- Centralized database for existing data & models
    - Inventory of existing data (e.g. fishing licenses, alligator catch data, to bldg permits)
- Expand collection baseline data - OOS
- Forested wetlands
- Information on availability of sediments - where & when
- Monitoring data
    - Gulf wide database
- Need standards, metadata process to help organize & manage data (e.g. NASA working on "COAST" (coastal online assessment & synthesis tool) intended to facilitate harmonization of data, synthesis)
- Role of oyster/shell reefs on water quality & how it affects whole system

Policy, Management or Education Topics

(none provided)

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
Discovery of drugs and natural products from marine and coastal environments -Can you synthesize these compounds? -Phytoplankton waste processing turn into value added products	11
~~Warming~~ Changing temperature, effect on seafood/ marine resources and content, seafood distribution (microbial, safety)	8
Consumption of fish and shellfish -Chronic health/hazard or benefits - Is it creating inclusion of known at risk groups?	5
~~Determining~~ Enhancing, incorporating the health impacts of omega-3 fatty acid in seafood that is normally low	5
Research to devise antibody based assay for biotoxins for fish/shellfish - Cheap, quick for restaurants	5
Stimulate coastal development to maximize "health / lifestyle" benefits and minimize risk/hazard (e.g. bike path, vegetable path) -Resilience (designing infrastructure to withstand hazards) -"Healthy sustainable coastal growth"	5
Determine amount of ~~mercury~~ pollutants (biological / chemical) contaminant of seafood -Is it a problem in the Gulf of Mexico?	4
Determining / quantify human benefits of coastal living -Mental health benefits of recreational activities: sailing, swimming - When does overuse become detrimental?	4
Identify alternative resources for energy (e.g. wind, wave, current). -Identify potential impacts -Green versus oil industry and human impacts?	4
Improve our understanding of the spatial aspects of health resource locations and delivery in coastal areas (hospitals, clinics, community-based schools, etc.) ~~during post storm conditions~~	4
Verification of vibrio risk assessment (~~risk assessment has not been completed yet~~)	4
Educating inland residents about coastal health hazards	3
Health services infrastructure during storms	3

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

Impact of coastal development on coastal heritage / communities / culture	2
Understand and identify problems -Coastal process, wetland processes (and how Louisiana is loosing theirs), land loss and how it impacts human health	2
Understand consumer demand ~~analysis~~ changes for ocean products in the face of adverse events	2
Clearer understanding of blue-green algae (versus HAB) other diatoms	1
Does length of tenure living in coast impact your stewardship?	0
How do we prioritize what we look for regarding pharmaceutical products?	0
Think more than products we get from ocean: tourism	0
Where do we look for pharmaceutical products in the ocean?	0

Information Needs

(none provided)

Policy, Management or Education Topics

- Avoid consumer misconception-conception
- Educating inland resident about health hazard at coast
- Effective education on HAB's
- Improve education regarding individual responsibility for water quality
- Improve federal matching funding for rural and urban sewage treatment and non-point source pollution

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
Sea-level rise & storm surge interactions Areas of concern: -Salt water intrusion -Cultural change -Change in ecosystems -Change in coastal flooding; improve elevation -Agriculture -Human health -Wetland composition	40	Climate
Benefits & costs of restoration (including modeling)	36	Stewardship
River diversion / sediment management -Shoaling impacts -Sediment impacts on habitats & species -Identify optimal use & allocation of sediment -Diversion effects on water quality & marshland populations	36	Ecosystem
Discovery of pharmaceuticals & natural (bio) products from marine and coastal environments	31	Human
Evaluate total potential of Mississippi River for restoration: management & inputs from Mississippi basin -Sediment, freshwater volume, nutrients -Optimal distribution of Atchafalaya / Mississippi rivers	31	Ecosystem
Understanding hydrologic requirements of healthy marsh ecosystems -Freshwater influence on flow time -Hydrology of other coastal wetlands	29	Ecosystem

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

Research into alternative (to reefs) sustainable "use" of de-commissioned platforms -e.g. Alternative energy -Aquaculture -Eco-tourism -Weather stations	28	Operations
Development of real time predictive model that includes meteorological data, appropriate land use / land cover and improved boundary data (not just hurricanes)	26	Resilience
Ecosystem health indicators -Need to figure out how to measure -More indicators needed -Better define metrics for ecosystem evaluations	26	Ecosystem
Placement of fine sediment -Water quality -Marshes -Habitat utilization -Processes	22	Stewardship
Research into aquaculture "grow-out" technologies… net pens, re-circulation systems, etc. -Goal = stock enhancement, food security	22	Operations
Borrow areas effect on -Water quality -Fisheries -Sediment processes	21	Stewardship
Measure citizens' and decision makers' understanding of vulnerability and how to translate / communicate technical data to improve decisions	21	Resilience
Economic impacts of climate change i.e. maritime / commerce -Oil / gas activities -Fisheries -Levees / barrier islands -Infrastructure -Tax base	20	Climate
Research historic sites & prehistoric human densities in coastal zones	19	Stewardship
Socio-economic characterization of Gulf coast fishing communities -Research into economic alternatives, e.g. transitioning or aquaculture	19	Operations

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

Non-native species -Impacts on coastal systems -Modeling pathways of introduction -Risk analysis & control potential -Inventory & prioritize threats -Identify source, vectors	18	Ecosystem
Long term restoration & ecosystem trajectories from different perspectives	17	Stewardship
Documentation of biological/ecological impacts of offshore aquaculture on Gulf of Mexico -Significant / perceived -Precedes individual permitting issues -Small demonstration project (on-site analyses)	16	Operations
Assess level of vulnerability of built environment, baseline condition, and research how to reduce losses	15	Resilience
Impacts of global climate change on local ecosystems -Range extensions -Develop flexible ecosystem models to predict local impacts	15	Ecosystem
Ecosystem significance of shifts in habitat type (especially vegetative) that are occurring in Louisiana -Define factors causing these shifts and impacts on ecosystem function	14	Ecosystem
Strategic planning on regional transportation linkages -Port - barge - rail - truck -Increase maximum economic & environmental efficiencies -Including metrics (e.g. carbon footprint)	14	Operations
Impacts of trawling & location of cultural resources	13	Stewardship
Effects of river diversions	12	Stewardship
Pollutant / nutrient dynamics & efficacy of pollutant management strategies -Fate & transport of pollutants, nutrients - inland to the Gulf -Impacts / connections of freshwater discharge -Efficacy of BMPs / management techniques (including controlling structures)	12	Ecosystem
Understand adaptation to habitat loss & archive lost cultural resources (social & cultural)	12	Stewardship
Understand, quantify, predict impacts to first line of natural defense (e.g. islands)	12	Resilience
Valuation of key non-market aquatic resources & indicator species	12	Stewardship
Potential impact of oil & gas activities in deepwater habitats (>1000 m)	11	Operations

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

Freshwater quantity & quality around Gulf of Mexico & relationship to health of estuary & ripple to cultural & coastal community	10	Stewardship
Identify species selection for Gulf of Mexico aquaculture -Land-based & offshore -Economics / production / genetics / etc.	10	Operations
As climate change is occurring (i.e. rainfall patterns, distribution, frequency, river flows) improve understanding of freshwater movement, distribution, & use - past / present / future	9	Climate
Hypoxia - improve understanding -How will climate change interact in conjunction with temperature, nitrogen, phosphate, & endocrine disruptors	8	Climate
Interaction of Loop Current with weather -How does it change with changes in the ocean (i.e. salinity, upwelling, coastal interaction, and ocean temperature)	8	Climate
Research looking at hypoxic effects on ecosystems	8	Stewardship
Improve knowledge of the effects of storms (i.e. number, frequency, strength, path) due to climate change	7	Climate
Determine what makes different habitats more resilient	6	Resilience
Improve understanding of how organisms / plants will change with climate change (physical & geographic regions); including quantify impacts of radiation effects on biota	6	Climate
Increase consumption / utilization of alternative energy resources that reduce environmental impact, thus increase human health benefits	6	Human
Local social understanding of benefits / burdens on restoration	6	Stewardship
Study impacts of natural hazards on water quality and living resources	6	Resilience
Develop a simple and rapid method to measure contaminants in seafood	5	Human
Improve understanding of carbon flux & implications (i.e. CO_2 and methane)	5	Climate
Effect of climate change on seafood quality and safety	4	Human
Determine amount of pollutants (biological & chemical) in seafood within the Gulf of Mexico	3	Human
How do preservation, restoration actions impact (intended and unintended) communities?	3	Resilience
How do previous land use decisions affect careers of community leaders, e.g. lack of regulations enforcement or positions re: limiting development	3	Resilience

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

Improve our understanding of the spatial aspects of our health service resources locations / delivery in coastal areas	3	Human
Research on "believable" scientific projections of future coastal conditions	3	Resilience
Stimulate coastal development to maximize health & minimize risk	3	Human
Verification of FDA Vibrio risk assessments	2	Human
Determine potential chronic health hazards / benefits due to the consumption of seafood, including known at-risk groups	1	Human
Quantify the rate of change of glacier & snow melt (i.e. Arctic & Antarctic) & where	1	Climate
Enhance seafood quality with omega-3 fatty acids	0	Human

Acknowledgements

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

Host:
Louisiana State University--Energy, Coast and Environment Building (Versa Stickle)

Sponsors and workshop support:
NOAA National Sea Grant College Program
Louisiana Sea Grant (Chuck Wilson and Dave Nieland)
Mississippi-Alabama Sea Grant Consortium (LaDon Swann, Kay Bruening, and John Grigsby)

Facilitation support:
Gulf Coast Services Center (Heidi Recksiek, Tina Sanchez, and Ann Weaver)
Louisiana Sea Grant (Dave Nieland, Justin Farrell, Glen Thomas)
NASA Stennis Space Center (Jean Ellis)
NOAA Sea Grant (Kola Garber)

Workshop participants:
See appendix C.

Gulf of Mexico Research Planning Principal Investigators:
LaDon Swann, Mississippi-Alabama Sea Grant Consortium
Charles Wilson, Louisiana Sea Grant College Program
Bob Stickney, Texas Sea Grant College Program
Karl Havens, Florida Sea Grant College Program

Transcription support:
Science Systems and Applications, Inc. (Kelly Knowlton)
Mississippi-Alabama Sea Grant Consortium (Kay Bruening, John Grigsby, Devaney Cheramie, Loretta Leist, Melissa Schneider, and Valerie Winn)

Appendix A:

Gulf of Mexico Research Planning Workshop Agenda

Louisiana State University Energy, Coast and Environment Building
Baton Rouge, Louisiana
February 26, 2008
10:00 a.m. – 2:45 p.m.

Workshop Agenda

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

10:15-10:40 **Welcome and Purpose of the GMRP workshop** (all participants)

10:40-10:45 **Small Group Session Goals and Objectives** (all participants)

10:45-11:45 **Identify Research Topics within Themes** (breakout group)

11:45-12:10 **Break and Pick-up Lunches**

12:10-1:30 **Refine and Prioritize Research Topics—includes breakout group voting session** (breakout group)

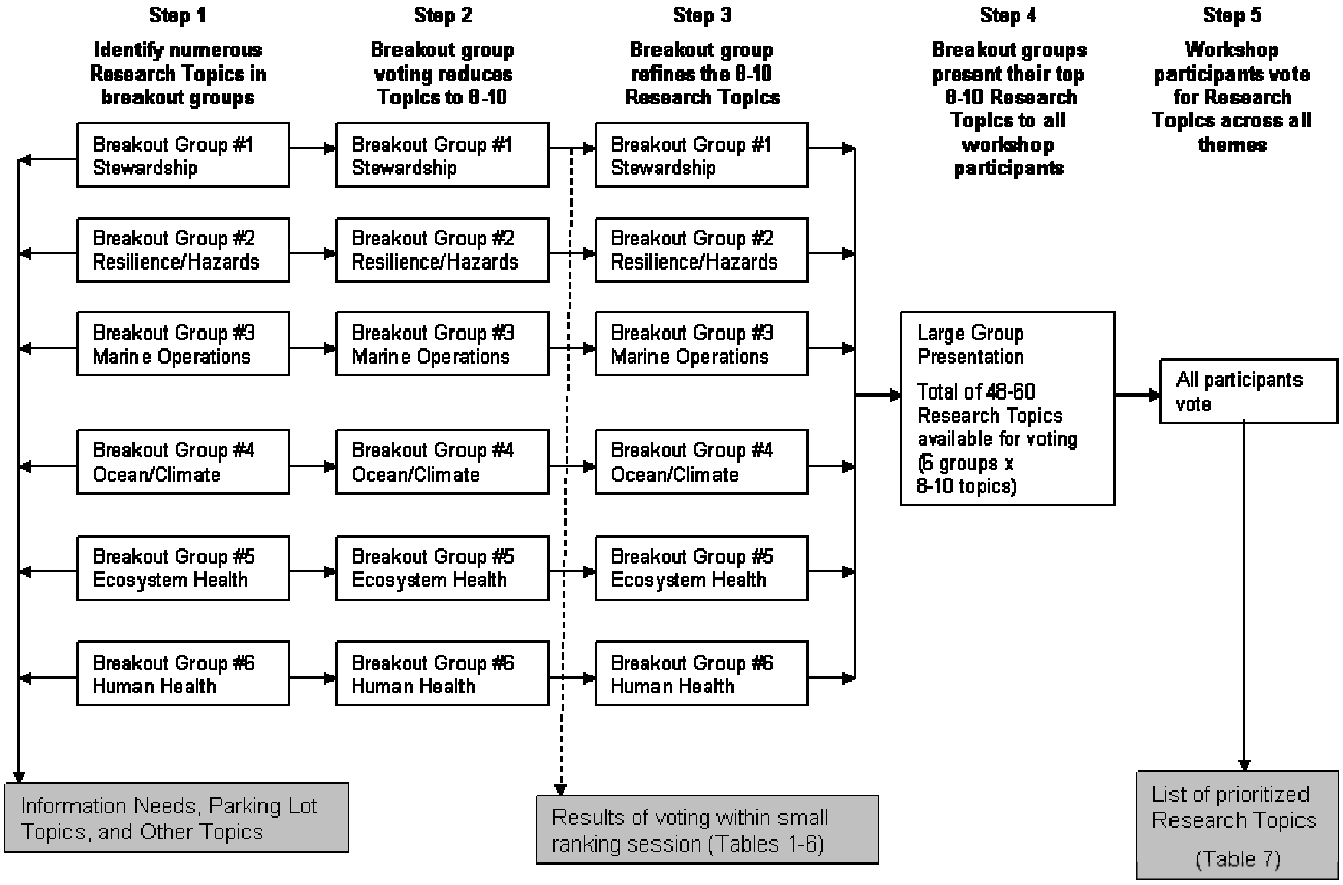
1:30-2:00 **Groups Present Top Research Topics for each Theme** (all participants)

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

First Name	Last Name	Affiliation	E-mail Address
Dave	Ball	Minerals Management Service	david.ball@mms.gov
Don	Baltz	LSU	dbaltz@lsu.edu
Ronald	Becker	LA Sea Grant	rbecker@lsu.edu
Mark	Benfield	LSU Oceanography & Coastal Sciences	mbenfie@lsu.edu
Pam	Blanchard	LSU Educational Theory, Policy, and Practice	PamB@LSU.EDU
Harry	Blanchet	La. Dept. of Wildlife & Fisheries	hblanchet@wlf.louisiana.gov
Kevin	Boswell	LSU- DOCS	kboswe1@lsu.edu
David	Bourgeois	LA Sea Grant Marine Extension Program	dbourgeois@agctr.lsu.edu
Rex	Caffey	LSU Sea Grant	rcaffey@agctr.lsu.edu
Rafael	Calderon	The Nature Conservancy	rafael_calderon@tnc.org
Q. Jim	Chen	LSU	qchen@lsu.edu
Jim	Cowan	LSU	jhcowan@lsu.edu
Doug	Daigle	CREST Program	dougdaigle@gmail.com
Todd	Davison	NOAA Gulf Coast Services Center	todd.davison@noaa.gov
Michele	Deshotels	Louisiana CPRA Implementation Team	michele.deshotels@la.gov
Douglas	Drennan	Aquaculture Systems Tech, LLC	douglas@beadfilters.com
Eurico	D'Sa	Louisiana State University	ejdsa@lsu.edu
James	Ebeling	Aquaculture Systems Technology, LLC	James@Beadfilters.com
Jean	Ellis*	NASA Stennis Space Center	jean.t.ellis@nasa.gov
Brooks	Ellwood	Louisiana State University	ellwood@lsu.edu
Deborah	Epperson	Minerals Management Service	deborah.epperson@mms.gov
Roger	Erickson	National Weather Service	roger.erickson@noaa.gov
Amanda	Evans	Tesla Offshore, LLC	evansa@teslaoffshore.com
Garen	Evans	Mississippi State University Extension Service	gevans@ext.msstate.edu
Justin	Farrell*	Louisiana Sea Grant	jfarrell@lsu.edu
John	Finley	Louisiana State University	jfinley@agcenter.lsu.edu
John	Foret	NOAA Fisheries Service	john.foret@noaa.gov
Carol	Franze	LSU Ag Center/Sea Grant Program	cfranze@agcenter.lsu.edu
Kola	Garber*	NOAA Sea Grant	nikola.garber@noaa.gov
M. E. Betsy	Garrison	LSU College of Agriculture	hcgarr@lsu.edu
Rusty	Gaude	LSU Sea Grant	agaude@agcenter.lsu.edu
Linda	Gauthier	St. Louis King of France School	lgauth1@lsu.edu
Tre	Glenn	MMS	tre.glenn@mms.gov
Bill	Graham	NASA	william.d.graham@nasa.gov

Workshop Participants and Facilitators (continued)

First Name	Last Name	Affiliation	E-mail Address
Bren	Haase	Louisiana Department of Natural Resources	bren.haase@la.gov
Don	Hayes	University of Louisiana at Lafayette	hayes@louisiana.edu
Haosheng	Huang	LSU, Department of Oceanography and Coastal Sciences	hhuang7@lsu.edu
Thomas	Hymel	LA Sea Grant	thymel@agctr.lsu.edu
Jack	Irion	MMS	jack.irion@mms.gov
Kelly	Knowlton	SSAI	Kelly.Knowlton-1@nasa.gov
Roy	Kron	Louisiana Sea Grant	rkron@lsu.edu
Jerome	La Peyre	LSU Ag Center	jlapeyre@agctr.lsu.edu
Megan	La Peyre	USGS	mlapey@lsu.edu
Paul	LaRock	Louisiana State University	oclaro@lsu.edu
Dawn	Lavoie	USGS	dlavoie@usgs.gov
Edward	Laws	Louisiana State University	edlaws@lsu.edu
Brian	LeBlanc	LSU AgCenter/Sea Grant	bleblanc@agctr.lsu.edu
Jack	Losso	Department of Food Science	jlosso@lsu.edu
C. Greg	Lutz	LSU AgCenter / Sea Grant	glutz@agcenter.lsu.edu
Hassan	Mashriqui	Louisiana State University & Sea Grant	cemash@lsu.edu
Nelson	May	NOAA National Marine Fisheries Service	Nelson.May@noaa.gov
Terry	McPherson	NASA Applied Sciences	terry.r.mcpherson@nasa.gov
Riley	Milner	Louisiana Geological Survey	lmilne1@lsu.edu
Robert	Moreau	SLU-Turtle Cove ERS	rmoreau@selu.edu
Mike	Murphy	The Nature Conservancy	mike_murphy@tnc.org
Richard	Neill	USDA-NRCS	richard.neill@la.usda.gov
Dave	Nieland*	Louisiana Sea Grant	dniela@lsu.edu
Ebenezer	Ogunyinka	LA Department of Wildlife and Fisheries	eogunyinka@wlf.louisiana.gov
Paula	Ouder	Louisiana Sea Grant	pouder@lsu.edu
James	Pahl	Louisiana Department of Natural Resources	james.pahl@la.gov
Andy	Patrick	NOAA National Weather Service	Andy.Patrick@noaa.gov
Craig	Peterson	NASA SSC	Craig.A.Peterson@NASA.GOV
Aaron	Pierce	Nicholls State University	aaron.pierce@nicholls.edu
Rick	Raynie	LDNR Coastal Restoration	Richard.Raynie@LA.gov
Heidi	Recksiek*	NOAA Gulf Coast Services Center	heidi.recksiek@noaa.gov
David	Reed	NWS Lower Mississippi River Forecast Center	dave.reed@noaa.gov
Amitava	Roy	CAMD, Louisiana State University	reroy@lsu.edu
Lawrence	Rozas	NOAA Fisheries Service SEFSC	lawrence.rozas@noaa.gov

Workshop Participants and Facilitators (continued)

First Name	Last Name	Affiliation	E-mail Address
Paul W.	Sammarco	Louisiana Universities Marine Consortium (LUMCON)	psammarco@lumcon.edu
Tina	Sanchez*	NOAA Gulf Coast Services Center	tina.sanchez@noaa.gov
Kevin A.	Savoie	LSU AgCenter/Sea Grant	ksavoie@agcenter.lsu.edu
Mark	Schexnayder	LA Sea Grant	mschexnayder@agcenter.lsu.edu
Warren	Schulingkamp	Louisiana Geological Survey	warrenii@lsu.edu
Martha	Segura	NPS Gulf Coast Network	martha_segura@nps.gov
Steve	Sempier*	Mississippi-Alabama Sea Grant Consortium	stephen.sempier@usm.edu
Richard	Shaw	LSU	rshaw@lsu.edu
Mark	Shirley	LA Sea Grant	mshirley@agcenter.lsu.edu
Patricia	Skinner	LSU AgCenter and Sea Grant Extension	pskinner@agcenter.lsu.edu
Bob	Stewart	UL Lafayette	bob_stewart@louisiana.edu
John	Supan	LA Sea Grant College Program	jsupan@lsu.edu
Glenn	Thomas*	Louisiana State University	gthomas@lsu.edu
R. Eugene	Turner	Louisiana State University	euturne@lsu.edu
Thomas	Van Biersle	LGS-LSU	tvanbier@lsu.edu
Jenneke	Visser	Louisiana State University	comvss@lsu.edu
Michael	Wascom, JD	Dept. of Env. Studies, LSU	coewas@lsu.edu
Ann	Weaver*	NOAA Gulf Coast Services Center	ann.weaver@noaa.gov
Chuck	Wilson*	LA Sea Grant	cwilson@lsu.edu
Maurice	Wolcott	LA Sea Grant	mwolcott@agctr.lsu.edu
Jun	Xu	LSU	yjxu@lsu.edu

*Workshop facilitator or floater.