Initial Results
from the 2013 Gulf of Mexico Research Plan Survey

A customized report prepared for the:

Gulf of Mexico Alliance
Water Quality for Healthy Beaches and Seafood
Priority Issue Team

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Introduction

The four Sea Grant College Programs in the Gulf of Mexico region released surveys in 2007, 2010 and 2013 that asked about regional research and related needs. This was part of an effort to develop and update the Gulf of Mexico Research Plan (GMRP). For the 2013 GMRP survey, **1,668 people** answered at least a portion of the survey. Hundreds of people from each of the Gulf of Mexico states and beyond completed the survey, and they represented a broad cross section of people from government, universities, business/industry, NGOs and other groups. Charts that illustrate demographic information about the people who completed the survey are included in the Appendix. This is one of six separate reports created for each of the GOMA Priority Issue Teams (PITs).

The report

This report contains two sections that were developed based on the open-ended questions from the 2013 GMRP survey. The questions asked respondents to describe Gulf of Mexico research priorities, stressors and barriers to implementing a regional research plan.

Section I: Word Trees

The first section contains word trees that were developed using keywords related to each PIT. Word trees provide a quick way to provide some context on the keywords people used answering the questions. Most of the word trees only contain the first four or five words before and after the keyword in order to be readable in this document.

Section II: Research Priorities by subcategory

The second section is an analysis of open-ended research priorities through the lens of the PIT. The 2013 GMRP survey presented a standardized list of research priorities. It also asked people to identify up to three additional research priorities in open-ended text boxes. There were a total of **1,003 research priorities described**. These research priorities were linked to PITs. In some cases the same research priority could connect to a topic that is covered by more than one PIT. In addition, subcategories were created to better organize similar or related research priorities within a PIT and in many cases subcategories were based on PIT focus areas. The priorities were alphabetized within each subcategory. Table 1 in the Appendix summarizes the number of research priorities linked to each PIT and subcategory.

The research priorities are listed as bullets that are organized by PIT and subcategory. In many cases people's response to the question was not a true research priority. However, these bullets were retained so that readers can see the scope and breadth of input that was provided. Finally, the bullets are **unedited, actual responses** that survey respondents provided.

Next steps

Significant survey analysis and reporting still needs to be completed for the 2013 GMRP survey, which closed in November 2013. Additional details will be shared in the coming months along with a comparison between responses in the 2007, 2010 and 2013 GMRP surveys. For more information, please contact Steve Sempier, Mississippi-Alabama Sea Grant, at stephen.sempier@usm.edu.

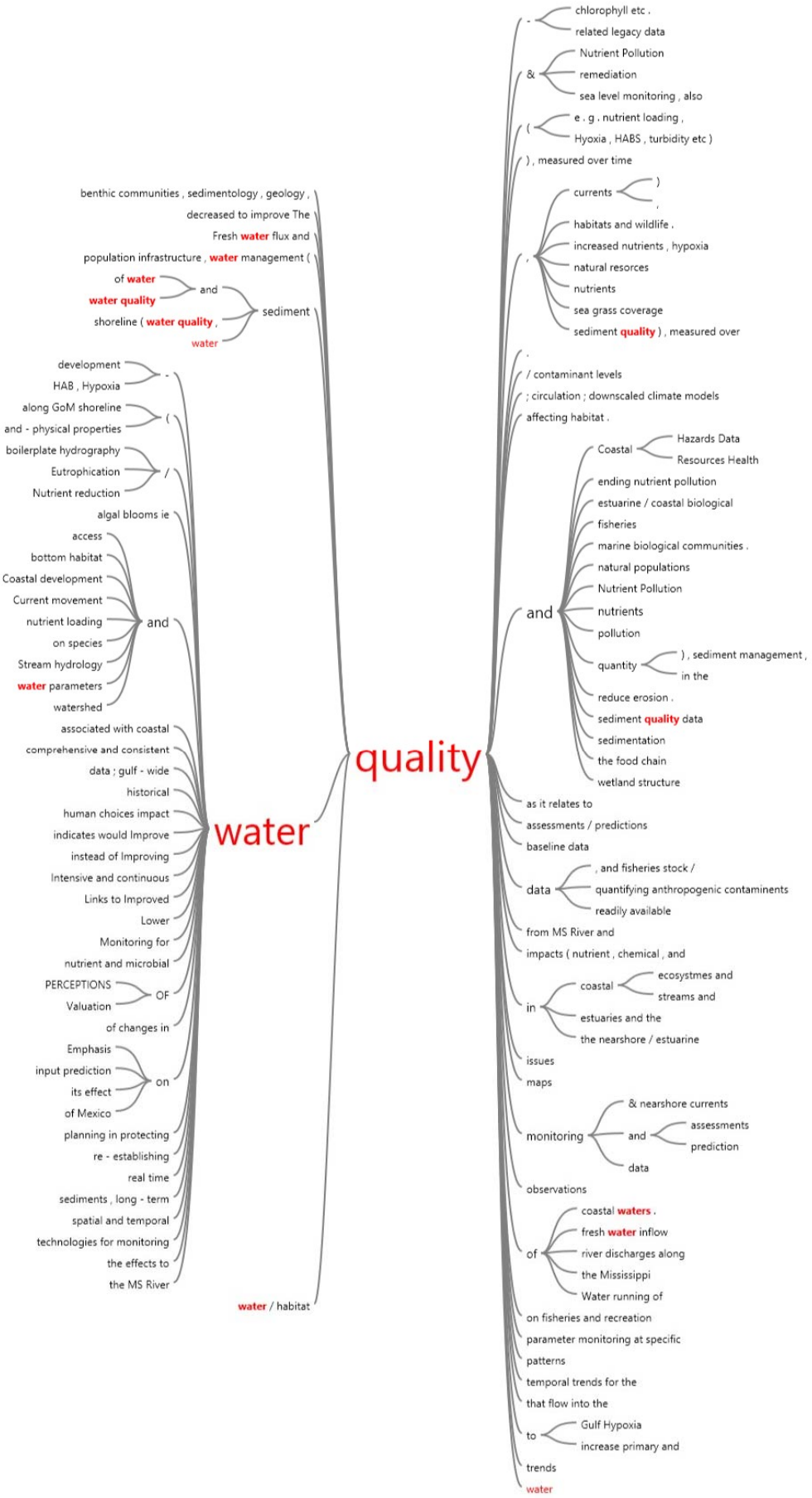
Cover: The 50 most frequently used words by people who completed the 2013 GMRP survey. Word size reflects the frequency the word was used with larger words being used more frequently.

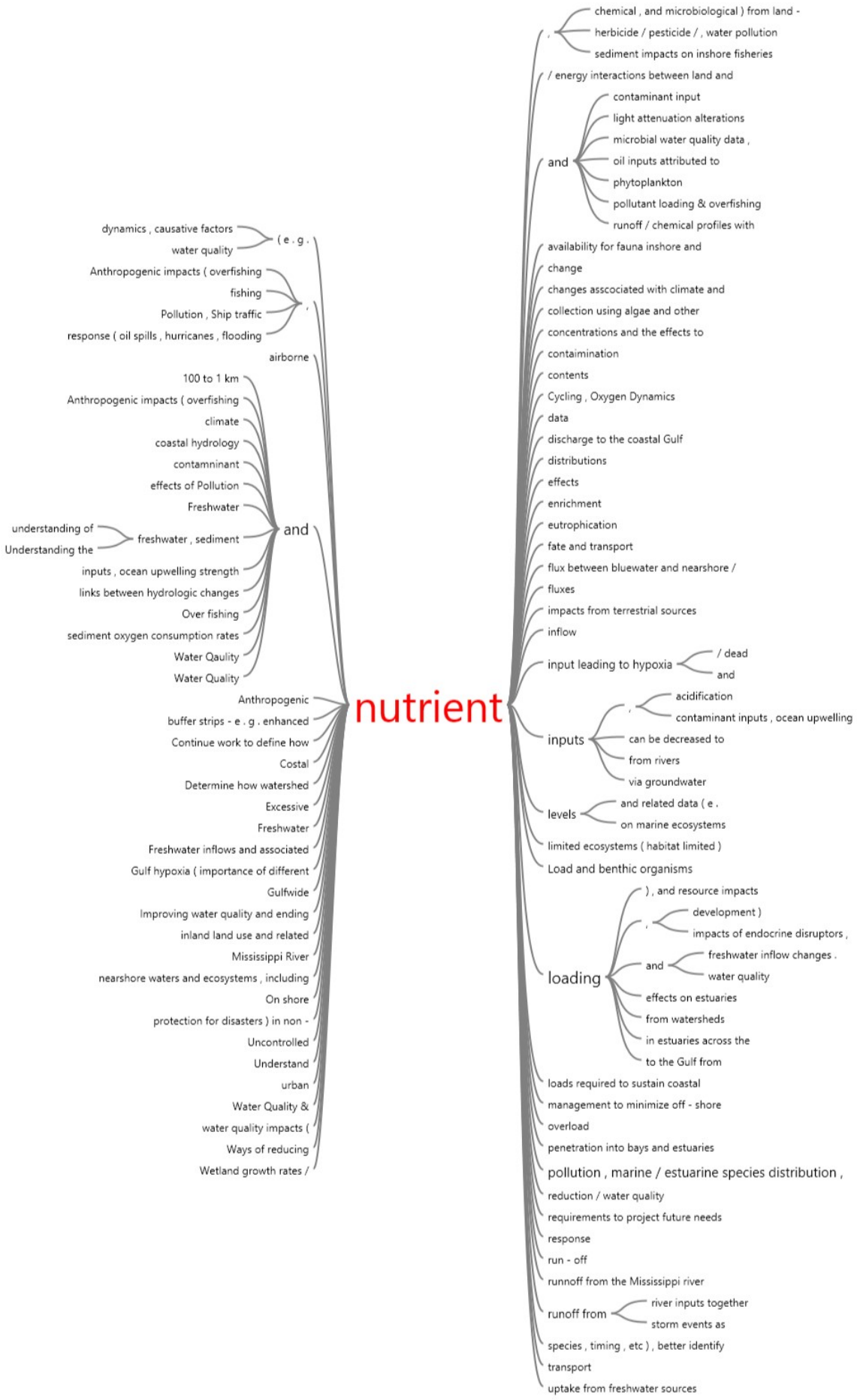
Section I: Word Trees

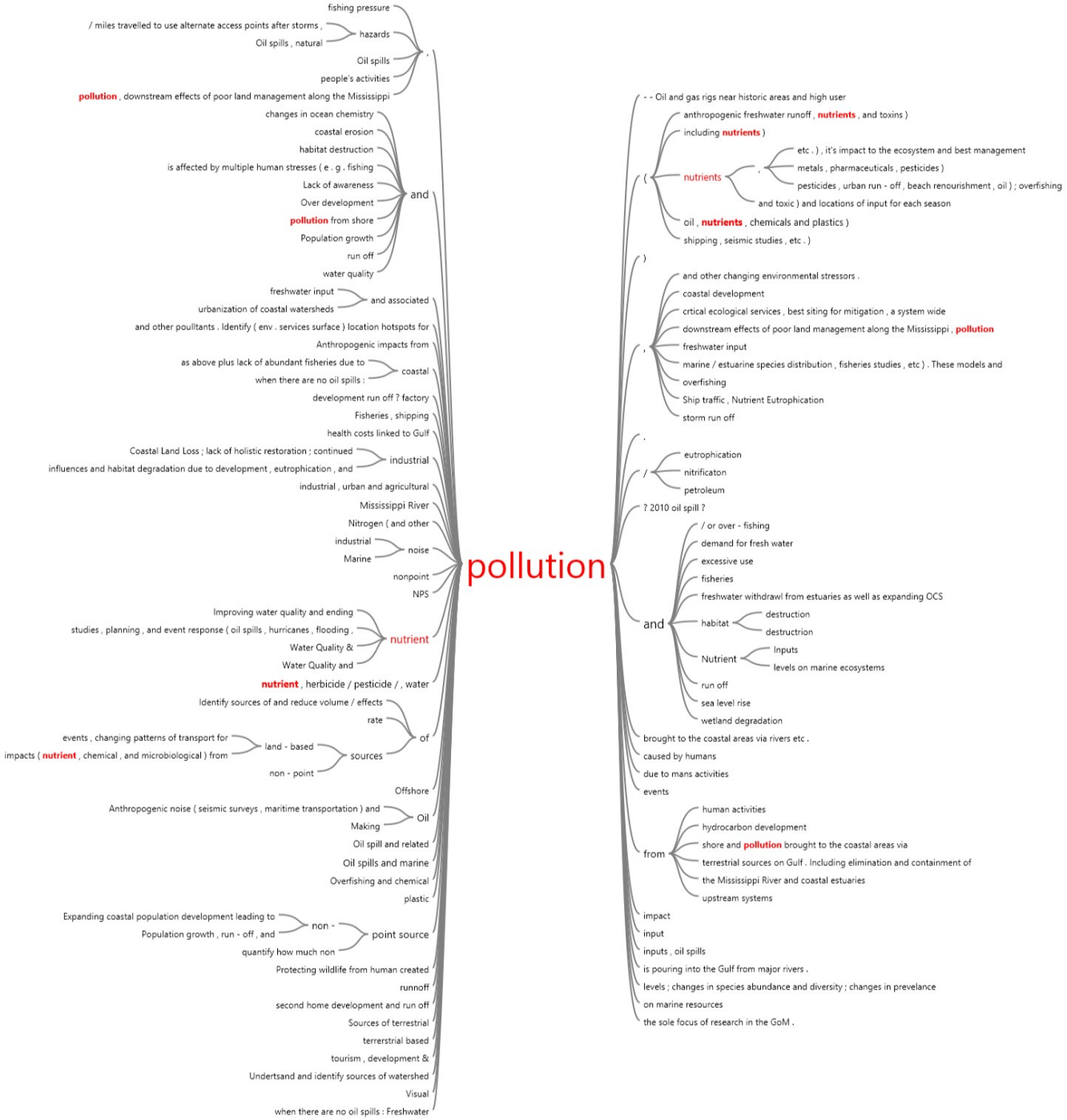
Word trees were created for several keywords related to the **GOMA Water Quality for Healthy Beaches and Seafood Priority Issue Team**. The keywords used in the diagrams below are:

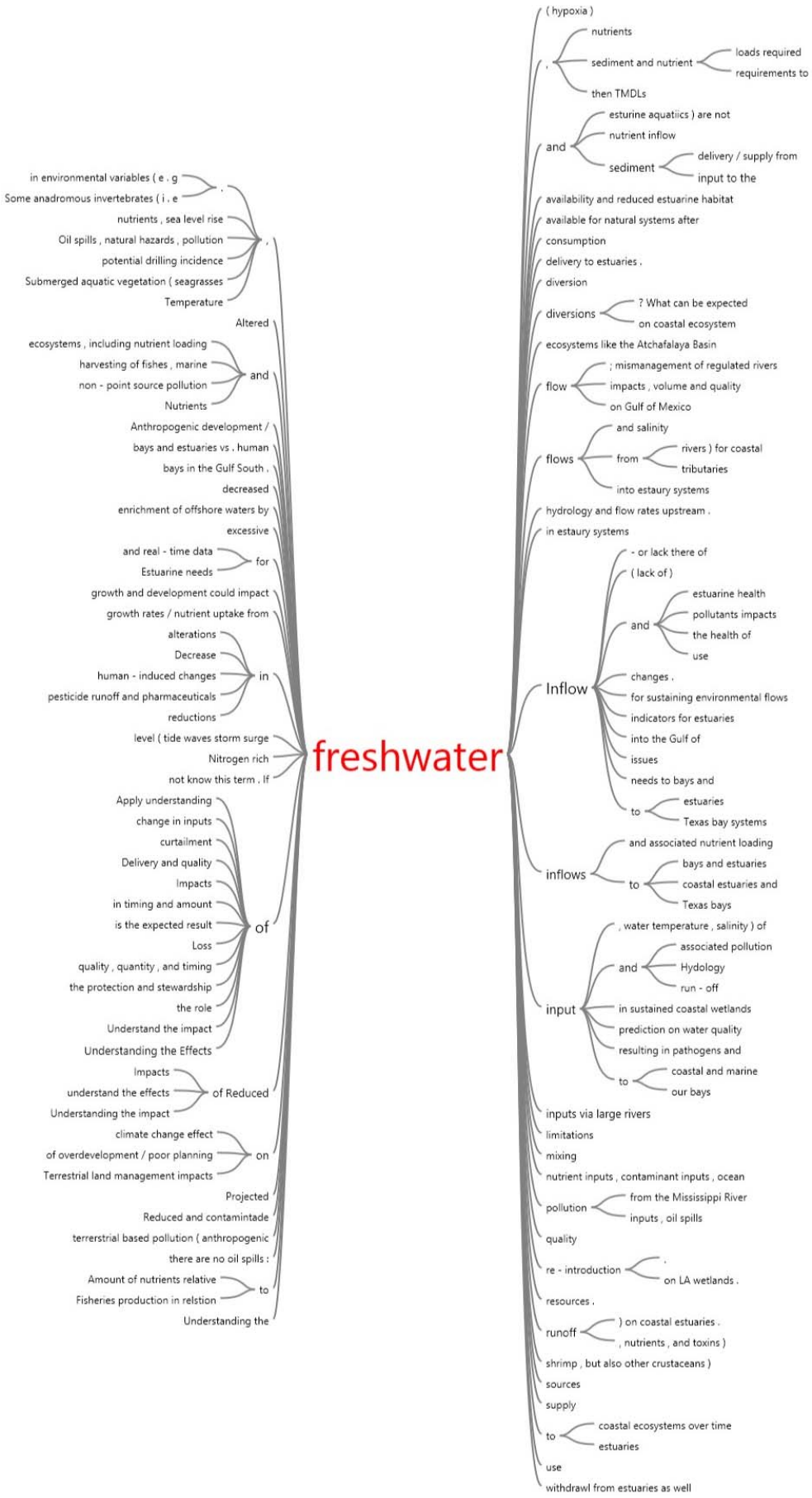
- Water quality
- Nutrient
- Pollution
- Freshwater

While analyzing the open-ended survey responses “freshwater” and similar concepts were mentioned numerous times. Often this related to freshwater input. This may be an area that is not explicitly addressed by the GOMA PITs so the word tree was included here. Additional details can be provided upon request.


water
quality
benthic communities , sedimentology , geology ,
decreased to improve The
Fresh water flux and
population infrastructure , water management (
of water
water quality
and
shoreline (water quality ,
water
sediment
development
HAB , Hypoxia
-
along GoM shoreline
and - physical properties
(
boilerplate hydrography
Eutrophication
Nutrient reduction
/
algal blooms ie
access
bottom habitat
Coastal development
Current movement
nutrient loading
on species
Stream hydrology
water parameters
watershed
and
associated with coastal
comprehensive and consistent
data ; gulf - wide
historical
human choices impact
indicates would Improve
instead of Improving
Intensive and continuous
Links to Improved
Lower
Monitoring for
nutrient and microbial
PERCEPTIONS
Valuation
OF
of changes in
Emphasis
input prediction
its effect
of Mexico
on
planning in protecting
re - establishing
real time
sediments , long - term
spatial and temporal
technologies for monitoring
the effects to
the MS River
water / habitat
-
chlorophyll etc .
related legacy data
&
Nutrient Pollution
remediation
sea level monitoring , also
(
e . g . nutrient loading ,
Hyoxia , HABS , turbidity etc)
) , measured over time
,
currents
)
habitats and wildlife .
increased nutrients , hypoxia
natural resorces
nutrients
sea grass coverage
sediment quality) , measured over
.
/ contaminant levels
; circulation ; downscaled climate models
affecting habitat .
and
Coastal
Hazards Data
Resources Health
ending nutrient pollution
estuarine / coastal biological
fisheries
marine biological communities .
natural populations
Nutrient Pollution
nutrients
pollution
quantity
) , sediment management ,
in the
reduce erosion .
sediment quality data
sedimentation
the food chain
wetland structure
as it relates to
assessments / predictions
baseline data
data
, and fisheries stock /
quantifying anthropogenic contaminents
readily available
from MS River and
impacts (nutrient , chemical , and
in
coastal
ecosystmes and
streams and
estuaries and the
the nearshore / estuarine
issues
maps
monitoring
& nearshore currents
and
assessments
prediction
data
observations
of
coastal waters .
fresh water inflow
river discharges along
the Mississippi
Water running of
on fisheries and recreation
parameter monitoring at specific
patterns
temporal trends for the
that flow into the
to
Gulf Hypoxia
increase primary and
trends
water


nutrient
(e . g .
dynamics , causative factors
water quality
,
Anthropogenic impacts (overfishing
fishing
Pollution , Ship traffic
response (oil spills , hurricanes , flooding
airborne
and
100 to 1 km
Anthropogenic impacts (overfishing
climate
coastal hydrology
contamninant
effects of Pollution
Freshwater
freshwater , sediment
understanding of
Understanding the
inputs , ocean upwelling strength
links between hydrologic changes
Over fishing
sediment oxygen consumption rates
Water Qaulity
Water Quality
Anthropogenic
buffer strips - e . g . enhanced
Continue work to define how
Costal
Determine how watershed
Excessive
Freshwater
Freshwater inflows and associated
Gulf hypoxia (importance of different
Gulfwide
Improving water quality and ending
inland land use and related
Mississippi River
nearshore waters and ecosystems , including
On shore
protection for disasters) in non -
Uncontrolled
Understand
urban
Water Quality &
water quality impacts (
Ways of reducing
Wetland growth rates /
,
chemical , and microbiological) from land -
herbicide / pesticide / , water pollution
sediment impacts on inshore fisheries
/ energy interactions between land and
and
contaminant input
light attenuation alterations
microbial water quality data ,
oil inputs attributed to
phytoplankton
pollutant loading & overfishing
runoff / chemical profiles with
availability for fauna inshore and
change
changes asscociated with climate and
collection using algae and other
concentrations and the effects to
contaimination
contents
Cycling , Oxygen Dynamics
data
discharge to the coastal Gulf
distributions
effects
enrichment
eutrophication
fate and transport
flux between bluewater and nearshore /
fluxes
impacts from terrestrial sources
inflow
input leading to hypoxia
/ dead
and
inputs
,
acidification
contaminant inputs , ocean upwelling
can be decreased to
from rivers
via groundwater
levels
and related data (e .
on marine ecosystems
limited ecosystems (habitat limited)
Load and benthic organisms
loading
) , and resource impacts
,
development)
impacts of endocrine disruptors ,
and
freshwater inflow changes .
water quality
effects on estuaries
from watersheds
in estuaries across the
to the Gulf from
loads required to sustain coastal
management to minimize off - shore
overload
penetration into bays and estuaries
pollution , marine / estuarine species distribution ,
reduction / water quality
requirements to project future needs
response
run - off
runnoff from the Mississippi river
runoff from
river inputs together
storm events as
species , timing , etc) , better identify
transport
uptake from freshwater sources


pollution
fishing pressure
/ miles travelled to use alternate access points after storms ,
hazards
Oil spills , natural
Oil spills
people's activities
,
pollution , downstream effects of poor land management along the Mississippi
changes in ocean chemistry
coastal erosion
habitat destruction
is affected by multiple human stresses (e . g . fishing
Lack of awareness
Over development
pollution from shore
Population growth
run off
water quality
and
freshwater input
urbanization of coastal watersheds
and associated
and other poulltants . Identify (env . services surface) location hotspots for
Anthropogenic impacts from
as above plus lack of abundant fisheries due to
when there are no oil spills :
coastal
development run off ? factory
Fisheries , shipping
health costs linked to Gulf
Coastal Land Loss ; lack of holistic restoration ; continued
influences and habitat degradation due to development , eutrophication , and
industrial
industrial , urban and agricultural
Mississippi River
Nitrogen (and other
industrial
Marine
noise
nonpoint
NPS
Improving water quality and ending
studies , planning , and event response (oil spills , hurricanes , flooding ,
Water Quality &
Water Quality and
nutrient
nutrient , herbicide / pesticide / , water
Identify sources of and reduce volume / effects
rate
of
events , changing patterns of transport for
impacts (nutrient , chemical , and microbiological) from
land - based
non - point
sources
Offshore
Anthropogenic noise (seismic surveys , maritime transportation) and
Making
Oil
Oil spill and related
Oil spills and marine
Overfishing and chemical
plastic
Expanding coastal population development leading to
Population growth , run - off , and
quantify how much non
non -
point source
Protecting wildlife from human created
runnoff
second home development and run off
Sources of terrestrial
terrerstrial based
tourism , development &
Undertsand and identify sources of watershed
Visual
when there are no oil spills : Freshwater
- - Oil and gas rigs near historic areas and high user
(
anthropogenic freshwater runoff , nutrients , and toxins)
including nutrients)
nutrients
,
etc .) , it's impact to the ecosystem and best management
metals , pharmaceuticals , pesticides)
pesticides , urban run - off , beach renourishment , oil) ; overfishing
and toxic) and locations of input for each season
oil , nutrients , chemicals and plastics)
shipping , seismic studies , etc .)
)
,
and other changing environmental stressors .
coastal development
crtical ecological services , best siting for mitigation , a system wide
downstream effects of poor land management along the Mississippi , pollution
freshwater input
marine / estuarine species distribution , fisheries studies , etc) . These models and
overfishing
Ship traffic , Nutrient Eutrophication
storm run off
.
/
eutrophication
nitrificaton
petroleum
? 2010 oil spill ?
and
/ or over - fishing
demand for fresh water
excessive use
fisheries
freshwater withdrawl from estuaries as well as expanding OCS
habitat
destruction
destructrion
Nutrient
Inputs
levels on marine ecosystems
run off
sea level rise
wetland degradation
brought to the coastal areas via rivers etc .
caused by humans
due to mans activities
events
from
human activities
hydrocarbon development
shore and pollution brought to the coastal areas via
terrestrial sources on Gulf . Including elimination and containment of
the Mississippi River and coastal estuaries
upstream systems
impact
input
inputs , oil spills
is pouring into the Gulf from major rivers .
levels ; changes in species abundance and diversity ; changes in prevelance
on marine resources
the sole focus of research in the GoM .


freshwater
(hypoxia)
nutrients
,
sediment and nutrient
loads required
requirements to
then TMDLs
and
esturine aquatiics) are not
nutrient inflow
sediment
delivery / supply from
input to the
availability and reduced estuarine habitat
available for natural systems after
consumption
delivery to estuaries .
diversion
diversions
? What can be expected
on coastal ecosystem
ecosystems like the Atchafalaya Basin
flow
; mismanagement of regulated rivers
impacts , volume and quality
on Gulf of Mexico
flows
and salinity
from
rivers) for coastal
tributaries
into estaury systems
hydrology and flow rates upstream .
in estaury systems
Inflow
- or lack there of
(lack of)
and
estuarine health
pollutants impacts
the health of
use
changes .
for sustaining environmental flows
indicators for estuaries
into the Gulf of
issues
needs to bays and
to
estuaries
Texas bay systems
inflows
and associated nutrient loading
to
bays and estuaries
coastal estuaries and
Texas bays
input
, water temperature , salinity) of
and
associated pollution
Hydology
run - off
in sustained coastal wetlands
prediction on water quality
resulting in pathogens and
to
coastal and marine
our bays
inputs via large rivers
limitations
mixing
nutrient inputs , contaminant inputs , ocean
pollution
from the Mississippi River
inputs , oil spills
quality
re - introduction
.
on LA wetlands .
resources .
runoff
) on coastal estuaries .
, nutrients , and toxins)
shrimp , but also other crustaceans)
sources
supply
to
coastal ecosystems over time
estuaries
use
withdrawl from estuaries as well
in environmental variables (e . g
Some anadromous invertebrates (i . e
.
nutrients , sea level rise
Oil spills , natural hazards , pollution
potential drilling incidence
Submerged aquatic vegetation (seagrasses
Temperature
,
Altered
ecosystems , including nutrient loading
harvesting of fishes , marine
non - point source pollution
Nutrients
and
Anthropogenic development /
bays and estuaries vs . human
bays in the Gulf South .
decreased
enrichment of offshore waters by
excessive
and real - time data
Estuarine needs
for
growth and development could impact
growth rates / nutrient uptake from
alterations
Decrease
human - induced changes
pesticide runoff and pharmaceuticals
reductions
in
level (tide waves storm surge
Nitrogen rich
not know this term . If
Apply understanding
change in inputs
curtailment
Delivery and quality
Impacts
in timing and amount
is the expected result
Loss
quality , quantity , and timing
the protection and stewardship
the role
Understand the impact
Understanding the Effects
of
Impacts
understand the effects
Understanding the impact
of Reduced
climate change effect
of overdevelopment / poor planning
Terrestrial land management impacts
on
Projected
Reduced and contamintade
terrerstrial based pollution (anthropogenic
there are no oil spills :
Amount of nutrients relative
Fisheries production in relstion
to
Understanding the

Section II: Research Priorities by subcategory

Open-ended Research Priorities arranged by subcategory

The bullets below are **unedited responses** to the 2013 GMRP Survey questions that asked people to identify their top three research priorities for the Gulf of Mexico over the next 5-15 years.

Several subcategories were created for the **GOMA Water Quality for Healthy Beaches and Seafood Priority Issue Team.** These were organized around the GOMA PIT focus areas of:

- Monitoring
- Pathogens
- Mercury
- Harmful Algal Blooms

Monitoring

- Apply understanding of freshwater, sediment and nutrient requirements to project future needs in light of climate change
- assessing land-based natural and anthropogenic impacts on estuarine and nearshore waters and ecosystems, including nutrient loading and freshwater inflow changes
- establish a better relationship between the flow of effluents from the water shed and the nitrogen content in the Gulf. determine how effective legislation on precision farming has change the algal bloom history through the use of historical satellite data
- Evaluate watershed (whole MS River, all 31 states, include 2 CA provinces) loading of nutrinets and other poulltants. Identify (env. services surface) location hotspots for pollution, crtical ecological services, best siting for mitigation, a system wide approach. To set actions for restoation, and potential for enhancement human valued services.
- HAB, Hypoxia - water quality monitoring and prediction
- Identify sources of and reduce volume/effects of pollution from terrestrial sources on Gulf. Including elimination and containment of homeowner used fertilizers, automobile oil, etc.
- Inputs, Fates and Effects (inlcuding human health) of chemicals of environmental concern for Gulf of Mexico Ecosystems.
- Large scale circulation and Gulf wide budgets for pollutants including GoM air sheds.
- Natural versus anthropogenic interventions - e.g. anrthropogenic N from Mississippi and other rivers v natural sources, oil from spills v oil from run-off v oil from accidents
- New technologies for monitoring water quality in coastal ecosystmes and data transmition in real time, including different forms of carbon.
- Quantifying the input of hydrocarbons to the Gulf of Mexico ecosystem.
- transport of pollutants in the Gulf of Mexico
- Understand the cost of changes in water quality in the nearshore/estuarine zone in the Gulf, how these changes vary across large areas, and whether in synergy spatially and under what forcing

Pathogens

- Better understanding of the environmental distribution, abundance, and persistence of pathogens and microbial contaminants in Gulf of Mexico habitats, and improve understanding of environmental reservoirs in the Gulf of Mexico that may harbor pathogens
- Human health effects of oceanic contaminants.

- Inputs, Fates and Effects (inlcuding human health) of chemicals of environmental concern for Gulf of Mexico Ecosystems.
- Making sure water is safe for people, animals, and the resources that sustain them.
- methods to track pathogens such as vibrios to improve predictive capabilities

Mercury

- fate and transport of anthropogenic sources of mercury vs non-anthropogenic mercury
- Mercury contamination in the Gulf of Mexico and associated human risks
- Mercury Reduction alternatives/improve understanding of /quantify presence of Mercury in our ecosystem
- Understanding mercury methylation from anoxic sediments and the pathways of accumulation to the base food web.

Harmful Algal Blooms

- Hypoxia, harmful algal blooms, excess nutrients and ocean acidification

Other research priorities related to Water Quality

- acid rain in the Gulf of Mexico -
- Air Quality
- Altered freshwater inflow to estuaries
- Anthropogenic impacts from pollution on marine resources
- Ballast Water Exchange in GoM
- Biochemistry of salinity increases in GoM
- Changes in ocean acidity and their effects on living marine and coastal resources
- Chemical discharge from the Mississippi River and from local sources.
- Contaminant body burden assessment of northern Gulf seafood species to include organics, metals and pesticides
- Determine how litter in the ocean is degrading, where it's going, what it's affecting, and how to remove it
- Develop state wide awareness throughout the gulf coast states and to implement continues cleanup of all rivers refuse Before it reaches the Gulf.
- economic values associated with coastal water quality
- Effect of increased urbanization (increases in pesticide runoff and pharmaceuticals in freshwater runoff) on coastal estuaries.
- Emphasis on water quality as it relates to Gulf of Mexico marine life.
- Engineered technologies to mitigate environmental impacts of pollutants
- Estuarine needs for freshwater inflow
- Explore the role of acidification aue to climate change on the Gulf of Mexico.
- Fresh water inflow on our bay and effects of high salinity.
- Freshwater and sediment delivery/supply from watersheds to the Gulf
- freshwater flow impacts, volume and quality
- Freshwater hydrology
- Freshwater inflow and the health of bay ecosystems
- Freshwater inflow and use
- freshwater quality
- Gulf, nearshore and estuary water qualtiy
- How much marine debris there is coming from the MS Sound into the Gulf of Mexico.

- Hypersalinity and the health of bay ecosystems
- Immediate stop poisoning (Chemicals, Biochemicals, Un-natural products,) outflow to Gulf.
- Impact of human activities on the cycling of trace elements in coastal systems.
- Impacts of reduced freshwater inflows to Texas bays
- Implementation of Best Management Practices and Sustainable Development Techniques and Links to Improved Water Quality and Coastal Resources Health
- Implementation of Restored Ecosystems and Links to Improved Water Quality and Coastal Resources Health
- Importance of and use of land use planning in protecting water quality
- Improve water quality to increase primary and secondary production
- Improving water quality and ending nutrient pollution
- Improving water quality in estuaries and the Everglades
- Marine systems and climate (warming, hypoxia)
- Nutrient reduction/ water quality
- Ocean acidification
- ocean otufalls
- plastic pollution
- Quality of Water running of the coostal landscape.
- Quantify and assess the impacts of plastics (marine debris) in the Gulf of Mexico on water quality, habitats and wildlife.
- re-establishing water quality and quantity in the marsh habitats of delta regions
- Research on Human Support of the species that support filtering and cleaning of Oceans and Bays
- Temperature increase and the health of bay ecosystems
- The quality of fresh water inflow into our bay and it effect.
- To understand how alterations of the Mississippi River outflow will effect the shelf and oceanic ecosystems in order to better predict the effects of large scale restoration of nearhshore resources.
- Uncontrolled nutrient discharge to the coastal Gulf of Mexico due to the lack of tertiary treatment in wastewater treatment.
- Understand how spatial/temporal variability in salinity affects the sensitivity and resilience of coastal wetlands.
- understand the effects of reduced freshwater flow on Gulf of Mexico coastal ecosystems
- Understand the impact of freshwater inflow into the Gulf of Mexico
- Understanding consequences of interactions between multiple stressors on ecosystem health (e.g., hypoxia, temperature, acidification and oil, etc.)
- Understanding the effects of freshwater re-introduction on LA wetlands.
- Understanding the freshwater, sediment and nutrient loads required to sustain coastal wetland ecosystems
- Understanding the impact of reduced freshwater inflows to coastal estuaries and near shore ecosystems
- understanding the links between hydrologic changes and nutrient enrichment
- Water Quality
- Water quality
- water quality
- Water quality
- Water quality & remediation
- Water Quality and Nutrient Pollution
- Water quality and nutrients

- Water quality in coastal streams and sensitive bay areas.
- Water quality monitoring and assessments

Appendix—Demographic Statistics from the 2013 Gulf of Mexico Research Plan Survey

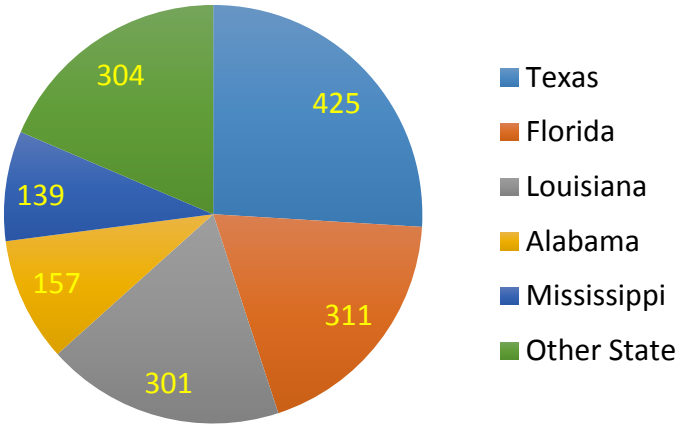


Figure 1. Number of respondents to the 2013 GMRP survey by state (N=1,637).

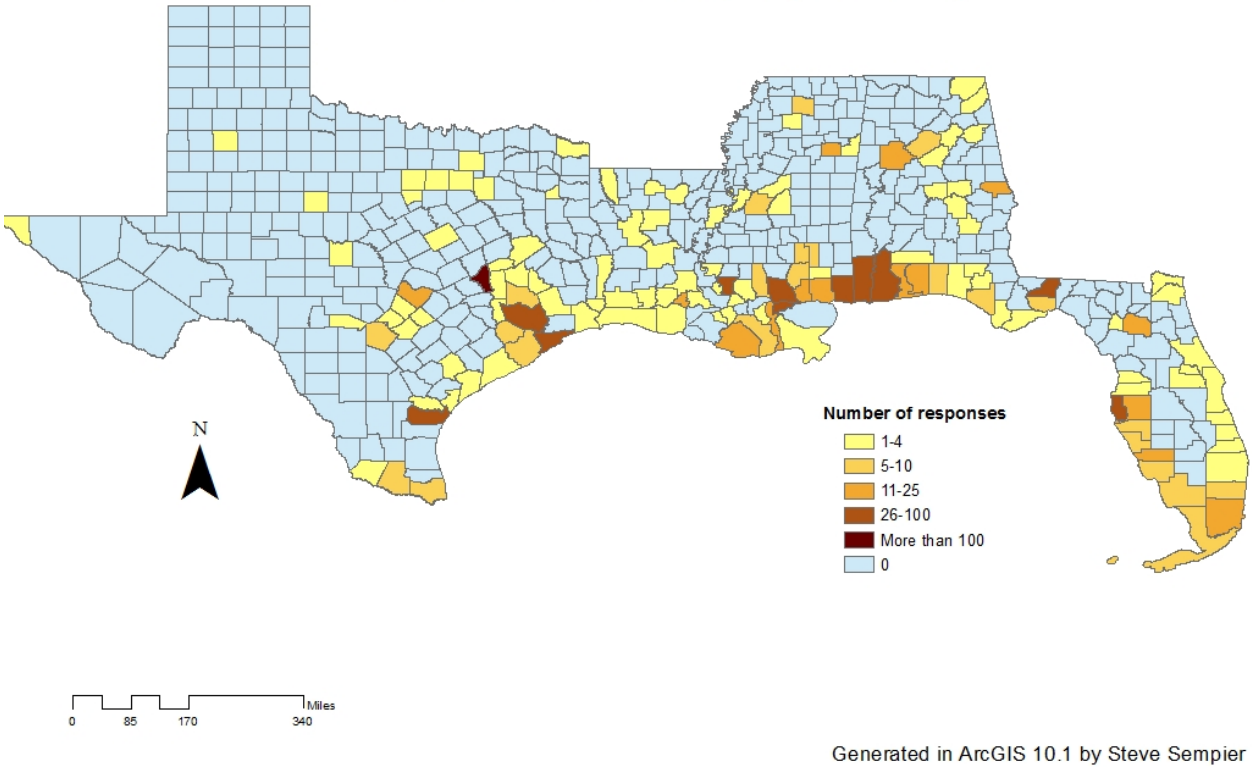


Figure 2. Number of responses to the 2013 GMRP survey by county for U.S. Gulf of Mexico states (N=1,315).

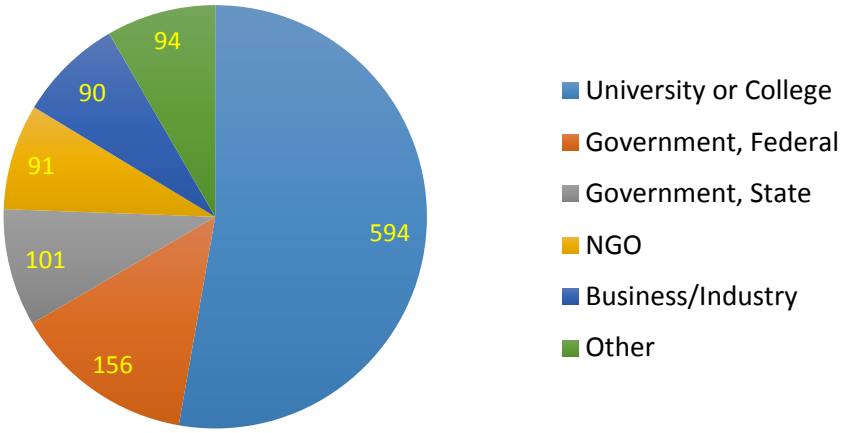


Figure 3. Number of 2013 GMRP survey respondents by affiliation (N=1,126).

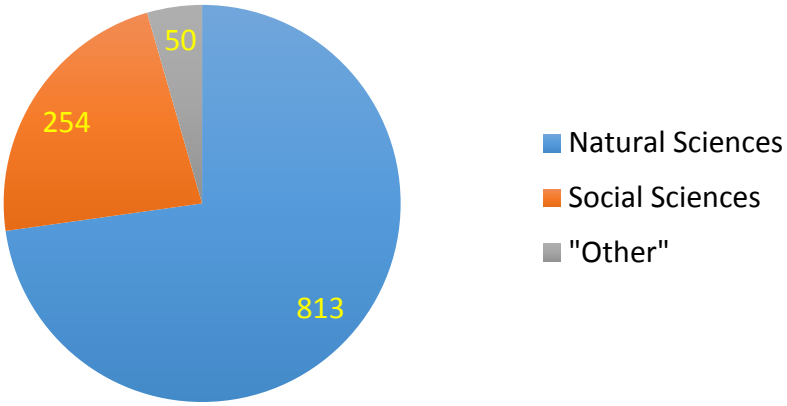


Figure 4. Number of 2013 GMRP survey respondents by area of expertise aggregated into “natural sciences,” “social sciences” and “other” (N=1,117).

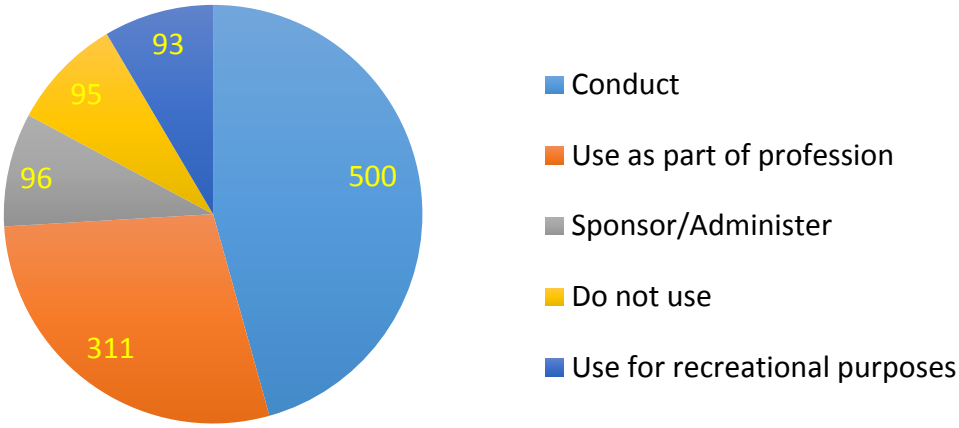


Figure 5. Number of 2013 GMRP survey respondents categorized by their primary relationship to Gulf of Mexico research (N=1,095).

Appendix—2013 GMRP Survey Demographic Statistics

Table 1. Number of research priorities identified in open-ended responses to the 2013 GMRP survey that related to GOMA PITs and subcategories. Note that the same research priority may have linked to multiple PITs and/or subcategories.

Priority Issue Team and Subcategories	Number of Research Priority References
Ecosystem Integration and Assessment	**55**
Ecosystem health	19
Ecosystem service valuation	15
Ecosystem connectivity	9
Ecosystem change over time	4
"Other" EIA	9
Education	**25**
Habitat Conservation and Restoration	**233**
Monitoring changes in habitat	68
Ecosystem services	32
Technological development	19
Regional sediment plan	17
Policy change	14
Expand partnerships	4
"Other" Habitat Conservation and Restoration	102
Nutrients	**48**
Hypoxia	13
Nutrient reduction	13
Nutrient characterization and criteria	11
"Other" Nutrients	12
Resilience	**144**
Climate or sea level-specific	52
Management	29
Assessment	26
Tropical Storm-specific	14
Communication	4
"Other" Resilience	37
Water Quality	**88**
Monitoring	13
Pathogens	5
Mercury	4
Harmful Algal Blooms	1
"Other" Water Quality	67
Other Topics	**583**

Appendix—2013 GMRP Survey Demographic Statistics