Overview of GCOOS Activities to Date

Don Roman
University of Southern Mississippi

Meeting of GCOOS Parties
Mobile, AL
January 11, 2006
Outline

- Background
- Existing Capabilities in the Gulf of Mexico
- Actions to date in building the Gulf of Mexico Coastal Ocean Observing System
Background
U.S. IOOS
Two Interdependent Components

Global Ocean Climate Component
GOOS/GCOS

Coastal Ocean Component

Regional Observing Systems

National Backbone

Low Resolution

High Resolution

NE

MAB

SE

Go Mex

Caribbean

GLs

GoA

C Cal

S Cal

NW

Cal

H Isl

Low
Coastal Component

Regional COOSs

- Operated by Regional Associations
- Involve private & public sectors
- Inform Federal Agencies of user needs
- Enhance the backbone based on user needs
- Incorporate Sub-regional systems

National Backbone

- Operated by Federal Agencies
- EEZ & Great Lakes
- Core variables required by regions & Federal Agencies
- Networks of sentinel & reference stations
- Standards/Protocols
Existing Capabilities in the Gulf of Mexico
Building Blocks 1: In situ observations
Gulf of Mexico observations
TCOON Station 031: Seadrift

28° 24.4’ N, 96° 42.7’ W
San Antonio Bay, Texas
Houston/Galveston PORTS observation locations

http://co-ops.nos.noaa.gov/images/hgports.gif
MMS NDBC buoy data
Cajun Express
Walker Ridge 29
BAYWATCH - Louisiana State University
Nan Walker
Currently 5 stations

Full suite meteorological

3 Hydrographic Values

Samples are taken every 10 seconds

Minute, hourly, and daily summaries are recorded

Data display is updated on the web every minute

Archive Data available
Long-Term Estuary Assessment Group (LEAG)

NOAA:
Science in Service of Policy in the Mississippi River / Gulf of Mexico Estuary

USGS:
Nexus of Science in the Lower Mississippi River and Gulf of Mexico

Modeling and Processes
Technical Working Group

Tier 1. Processes
1. Acoustic Mapping (Allison, TU)
2. Biogeochemical Material Fluxes (Mckee, TU)
3. Nitrate Monitoring (Dagg, LUMCON)
4. Geochemical Sampling (Bianchi, TU)
5. Strontium Geochemistry (Marcantonio, TU)
6. Pharmacologically Active Compounds (Wang, XU)
7. Research Cruises (Dagg, LUMCON)

Tier Two: Modeling
1. Sediment Transport (Michaelides, TU)
2. Mixing and Transport (Eschenazi, XU)
3. Modeling Transport in Rivers, Estuaries and Coastal Environments (Jobst, NRL/NAVO)

Tier Three: Linkages
1. Data Management and Linkages Among Models, Monitoring and Processes (Dagg, LUMCON)

Sensors, Platforms, and Markers
Technical Working Group

Tier 1. Biosensors and Platforms
Development, integration, test, and evaluation of biosensor in autonomous underwater vehicle (Rey, COTS; Blake, TU; Blake, XU)

Tier 2. Biomarkers in the Environment
1. Trace Gases of Microbial Flora as a Biomarker of Pollution (Boopathy, Nicholls)
2. Reproductive Status of Amphibians as a Biomarker of Pollution (Lafleur, Nicholls)
3. Molting in Fiddler Crabs as a Biomarker of Pollution (Zou, Nicholls)

Informatics
Technical Working Group

Tasks
• Spatial analysis of Mississippi bathymetry
• GIS data development for other TWGs
• Mapping/analysis of AUV pollutant data
• Online GIS
• Support Education TWG in GIS training
• Develop maps and cartographic products in support of all project efforts.
(Meffert, CBR)

1. Integration of environmental sciences into high school curriculum
2. Students participate in field research
3. Students as Teachers (Wilson, CBR)

Education
Technical Working Group

Center for Bioenvironmental Research
at Tulane and Xavier Universities
WAVCIS - Wave-Current Surge Information System For Coastal Louisiana

http://csi.lsu.edu/
Move your mouse over the dots on the map to get more information on each station. Click on the dots to open the web page for that station in a new window.

Current conditions at the CenGOOS buoy USM3M01 operated by the Department of Marine Science of the University of Southern Mississippi.
Example of product available from COAPS website

http://www.coaps.fsu.edu/
Tampa Bay PORTS observation locations

Instrument Key:
- WL: Water Levels (Tide Gauge)
- CU: Current Meter
- Met: Meteorological Sensors
University of South Florida
COMPS
Building Blocks 2: Remotely sensed data and products
Satellite Products

Satellite products are available from the USF Institute for Marine Remote Sensing, Colorado Center for Astrodynamics Research, Johns Hopkins University, LSU Earth Scan Laboratory, and Naval Research Laboratory. Below are some examples of products available.

- IMaRS MODIS image
  3/23/2003

- CCAR TOPEX/ERS-2 Analysis
  3/23/2003

- Color Thermal Imagery LSU Earth Scan Lab
  03/03/26 21:37:01 Z
  GOES-8 GVAR Ch4 (IR)
Model Products

Sustained Model Products Available include those from:

- USF Nowcast and Forecast System for Eastern Gulf of Mexico
- TGLO/TAMU Surface Current Forecast for Northwestern Gulf of Mexico
- Naval Research Laboratory
- Naval Oceanographic Office
- Texas Water Development Board

Forecast current vector field (at 2m depth) from POM (barotropic 3D) using forecast wind for 0100 (UTC) March 27, 2003. Locations of NDBC (triangle) and TABS (circle) stations indicated.
Products

At present, there are only a limited number of products derived from measurements being made in the Gulf. Some were mentioned earlier.

As expected, most of these products are derived from specific observations for purposes specified by the entities paying for the observations. (Exceptions include satellite products.)

If the observations were combined with one another, many new data-products could be produced that would benefit additional sectors of users.
Order of magnitude estimates of potential economic benefits of the GCOOS to eleven sectors in the Gulf of Mexico as estimated by Charles Colgan and Hauke Kite-Powell (2004). Estimates do not include the west coast of Florida.

<table>
<thead>
<tr>
<th>User Sector</th>
<th>Users</th>
<th>Estimated Economic Effects ($M/Y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recreational Activities</td>
<td>Recreational Fishing</td>
<td>$6.7-34.0</td>
</tr>
<tr>
<td></td>
<td>Recreational Boating</td>
<td>$4.0</td>
</tr>
<tr>
<td>Transportation</td>
<td>Freight</td>
<td>$30.7</td>
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<tr>
<td>Health and Safety</td>
<td>Search and Rescue</td>
<td>$28.0</td>
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<tr>
<td></td>
<td>Oil Spills</td>
<td>$0.8</td>
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<tr>
<td></td>
<td>Tropical Storm Prediction</td>
<td>$15.6</td>
</tr>
<tr>
<td>Energy</td>
<td>Oil and Gas Development</td>
<td>$14.1-26.3</td>
</tr>
<tr>
<td>Commercial Fisheries</td>
<td>Commercial Fisheries</td>
<td>$2.1</td>
</tr>
</tbody>
</table>
Actions to date in building the Gulf of Mexico Coastal Ocean Observing System
Overview of GCOOS Status

Formal MoA established in January, 2005
Currently 43 signatories to the MoA
Board of Directors elected in June, 2005
First BoD meeting in Houston in August, 2005
Business Plan Reviewed by Board
Boards and Committees now being established
Actions 1: GCOOS Workshops Held

Integrated Data Systems for Oceanography, 31 October-2 November 2000, Stennis Space Center, MS
NVODS Workshop for Managers of Coastal Observing Systems, 14-15 January 2003, Stennis Space Center, MS
Exploration of Private Sector Interests in IOOS: Focus on GOM and Southeast U.S. 2-4 March 2004, Houston, TX
Harmful Algal Blooms: GCOOS Role in Detection, Monitoring, and Prediction 13-15 April, 2004, St Petersburg, FL
Next Steps in the Gulf of Mexico; Needed Underpinning Research 7-8 July 2004, College Station, TX
Formation of a GCOOS Education and Outreach Council, 29-30 November 2004, Biloxi, MS
GCOOS and the Private Sector; Oil and Gas and Related Industry, 2-4 November 1005, Houston, TX
A GCOOS Mission Statement has been adopted.

A Resolution to develop GCOOS, beginning with sharing of non-proprietary, non-commercial data, has been signed by some 60 individuals representing themselves or institutions.
Mission Statement: Vision

We seek to establish a sustained observing system for the Gulf of Mexico to provide observations and products needed by users in this region for the purposes of

- Detecting and predicting climate variability and consequences,
- Preserving and restoring healthy marine ecosystems,
- Ensuring human health,
- Managing resources,
- Facilitating safe and efficient marine transportation,
- Enhancing national security, and
- Predicting and mitigating against coastal hazards.
Mission Statement
(continued)

We envision sharing of non-commercial, non-proprietary data, models, and products via the internet for the common benefit of all participants, including industry, NGOs, academia, and federal, state, regional, and local government agencies. It is understood that this Gulf of Mexico observing system will be integrated with other regional coastal ocean observing systems, in particular to create an integrated and sustained U.S. component of the ocean observing system.
Mission Statement
(continued)

We recognize that the system will require sustained financial support from a combination of government, private, and non-governmental organizations. That will be possible only if the system is built and remains responsive to the needs of these organizations and to the public. Thus, the system will be subject to continuing oversight by representatives of such organizations and of the public.

Collaboration with other nations bordering the Gulf of Mexico is to be actively sought in the design and implementation of this regional observing system.
Resolution

The implementation sections reads:

The Signatories hereby resolve to work together toward establishment of a Gulf of Mexico Regional Coastal Ocean Observing System (GCOOS); to work toward development of regional governance structures and coordination; to work towards common data management standards; and to openly share non-proprietary data and metadata, non-commercial data and products, model code, and related information. … Signatories will actively seek collaborations with other nations bordering the Gulf of Mexico in the design and implementation of this regional observing system. The Signatories will work toward implementation of specific action items decided upon at the workshop held at Stennis Space Center, MS, January 14-15, 2003.
<table>
<thead>
<tr>
<th>Name</th>
<th>Title/Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>L.G. Adams</td>
<td>Weeks Bay NERR</td>
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<tr>
<td>Kim Adams</td>
<td>President, Essi Corporation</td>
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<tr>
<td>Vernon Asper</td>
<td>for College of Marine Sciences, University of Southern Mississippi</td>
</tr>
<tr>
<td>Peter R. Betzer</td>
<td>for University of South Florida (USF) College of Marine Science</td>
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<tr>
<td>John Blaha</td>
<td>Naval Oceanographic Office</td>
</tr>
<tr>
<td>Jim Byous</td>
<td>Ocean Specialist Services, for Gulf Fiber Corporation</td>
</tr>
<tr>
<td>Lisa Campbell</td>
<td>Texas A&amp;M University</td>
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<tr>
<td>Jim Cato</td>
<td>Florida Sea Grant</td>
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<tr>
<td>Billy D. Causey</td>
<td>Superintendent of the Florida Keys National Marine Sanctuary</td>
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<tr>
<td>Robert Cohen</td>
<td>Weathernews Americas Inc.</td>
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<tr>
<td>H. D. Covert</td>
<td>Coastal Operations Institute</td>
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<tr>
<td>George Crozier</td>
<td>for Dauphin Island Sea Lab and Mobile Bay National Estuary Program</td>
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<tr>
<td>Steven F. DiMarco</td>
<td>Texas A&amp;M University</td>
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<tr>
<td>Richard E. Dodge</td>
<td>Nova Southeastern University Oceanographic Center</td>
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<tr>
<td>Dean A. Dunn</td>
<td>for National Coastal Data Development Center (NCCDC)</td>
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<tr>
<td>Wilford Gardner</td>
<td>Head, Department of Oceanography, Texas A&amp;M University</td>
</tr>
<tr>
<td>Bryon O. Griffith</td>
<td>Deputy Director, EPA Gulf of Mexico Program Office</td>
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<tr>
<td>D. Jay Grimes</td>
<td>Provost, Gulf Coast and Director, Gulf Coast Research Laboratory, The University of Southern Mississippi</td>
</tr>
<tr>
<td>Norman L. Guinasso</td>
<td>Geochemical and Environmental Research Group, Texas A&amp;M University, for Texas Automated Buoy System (TABS)</td>
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<tr>
<td>Robert Hetland</td>
<td>Texas A&amp;M University</td>
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<td>Matthew Howard</td>
<td>Texas A&amp;M University</td>
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<td>Ann Jochens</td>
<td>Texas A&amp;M University</td>
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<tr>
<td>Gregg Jacobs</td>
<td>NRL Stennis Space Center</td>
</tr>
<tr>
<td>Gary Jeffress</td>
<td>Texas A&amp;M University - Corpus Christi, for Texas Coastal Ocean Observing Network (TCOON)</td>
</tr>
<tr>
<td>Mark Luther</td>
<td>representing both the Coastal Ocean Monitoring and Prediction System (COMPS) and the Tampa Bay Physical Oceanographic Real-Time System (TBPORTS), USF College of Marine Science</td>
</tr>
<tr>
<td>Robert (Buzz) Martin</td>
<td>for Texas General Land Office</td>
</tr>
<tr>
<td>Gil McRae</td>
<td>Florida Fish &amp; Wildlife Conservation Commission, Florida Marine Research Institute</td>
</tr>
<tr>
<td>Douglas J. Meffert</td>
<td>Center for Bioenvironmental Research, Tulane and Xavier Universities, for Long-term Estuary Assessment Group (LEAG)</td>
</tr>
<tr>
<td>29.Avichal Mehra</td>
<td>Engineering Research Center, Mississippi State University, for DMEFS</td>
</tr>
<tr>
<td>Patrick Michaud</td>
<td>Texas A&amp;M University - Corpus Christi</td>
</tr>
<tr>
<td>Paul Moersdorf</td>
<td>Director, NOAA's National Data Buoy Center (NDBC)</td>
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<tr>
<td>Christopher N. K. Mooers</td>
<td>Rosenstiel School of Marine and Atmospheric Science</td>
</tr>
<tr>
<td>Frank Muller-Karger</td>
<td>Institute for Marine Remote Sensing, University of South Florida</td>
</tr>
<tr>
<td>Worth D. Nowlin, Jr.</td>
<td>Distinguished Professor, Texas A&amp;M University</td>
</tr>
</tbody>
</table>
Signatories (continued)

- **James J. O'Brien**, Center for Ocean-Atmospheric Prediction Studies, Florida State University
- **John C. Ogden**, as Director, Florida Institute of Oceanography
- **Alejandro Orsi**, Texas A&M University
- **Chris Oynes**, Minerals Management Service, Gulf of Mexico Region
- **Shirley Pomponi**, Vice-President and Director of Research, for Harbor Branch Oceanographic Institution
- **David Prior**, Executive Vice-President and Provost for Texas A&M University
- **Nancy N. Rabalais**, Louisiana Universities Marine Consortium (LUMCON), for NGOMEX Hypoxia Studies
- **Mary Jo Richardson**, Interim Dean for the College of Geosciences, Texas A&M University
- **Mitchell A. Roffer**, President, Roffer's Ocean Fishing Forecasting Service, Inc. (ROFFS)
- **Kerry St. Pe**, Interim Administrator, for Louisiana Universities Marine Consortium (LUMCON)
- **Ken Schaudt** for Schaudt.US
- **William Seitz**, Department Head, Marine Sciences, Texas A&M University Galveston
- **Thomas M. Soniat**, Professor, Nicholls State University, for DermoWatch
- **Robert Stewart**, Department of Oceanography, Texas A&M University
- **Robert Stickney**, Director, Texas Sea Grant Program, Texas A&M University
- **Gregory Stone**, Louisiana State University
- **LaDon Swann**, Director, Mississippi-Alabama Sea Grant Consortium, Auburn University
- **Raymond F. Toll, Jr.**, Assistant Vice President, Earth Space and Atmospheric Sciences Operations; Space, Earth and Aviation Sciences Business Unit of the Science Applications International Corporation, Hampton, VA
- **John W. (Wes) Tunnell, Jr.**, Research Scientist and Professor, Texas A&M University - Corpus Christi, for Center for Coastal Studies and Harte Research Institute for Gulf of Mexico Studies
- **Jan van Smirren**, Fugro Global Environmental & Ocean Sciences, Inc.
- **Nan Walker**, Director, Earth Scan Laboratory, Coastal Studies Institute and Dept. of Oceanography and Coastal Sciences, Louisiana State University
- **Robert H. Weisberg**, representing both the Coastal Ocean Monitoring and Prediction System (COMPS) and the Tampa Bay Physical Oceanographic Real-Time System (TBPORTS), USF College of Marine Science
- **Chuck Wilson**, Vice Provost Academic Affairs, Louisiana State University, for Louisiana Sea Grant College Program
- **James Robert Woolsey**, Director, MS Mineral Resources Institute, University of Mississippi, for Gulf of Mexico Hydrates Research Consortium and its Hydrates Sea Floor Observatory Program
Actions 3

• An inventory of existing operational and product-producing components for the Gulf of Mexico, together with descriptions, costs, out-year budgets, and users is being maintained.

• A web portal to ongoing Gulf of Mexico activities has been created:

   http://www.gcoos.org
Welcome to GCOOS

What is GCOOS and the GCOOS-RA?

Many organizations and individuals are concerned with sustained observations and/or products and services based on such observations from the estuaries and Exclusive Economic Zone of the Gulf of Mexico. A group of these entities have signed a resolution agreeing to form a Gulf of Mexico Coastal Ocean Observing System (GCOOS) beginning with the integration of existing observing system elements and the sharing of non-commercial and non-proprietary data and products. You are welcome to join the signatories to this resolution. General agreement has been reached on a GCOOS mission statement or vision. This regional system will be a part of the U.S. sustained and Integrated Ocean Observing System (IOOS).

The Memorandum of Agreement for the GCOOS Regional Association (GCOOS-RA) became effective on 25 January 2005. Qualified individuals are encouraged to become Parties by signing the MOA either on behalf of their organizations or as an individual. This Regional Association provides formal governance of GCOOS. The GCOOS Business Plan is in preparation. On June 22, 2005, ballots were counted and the initial Board of Directors of the GCOOS-RA was elected. Members of the Board represent the distribution of private sector, government, academia, and education and outreach Parties to the MOA.

An ongoing series of meetings and workshops are being held as part of the development of this Gulf of Mexico Coastal Ocean Observing System. Key meetings held to date have dealt with: an integrated data system for the Gulf of Mexico; the mission, initial building blocks, and tentative organization for GCOOS; a meeting to consider next research activities in the Gulf to support socioeconomic needs; the private sectors' perspective of and roles in the ocean observing system; a meeting to consider GCOOS's role in detecting, monitoring and predicting harmful algal blooms in the Gulf; a meeting planning for the GCOOS Education and Outreach Council; and adoption of a Governance structure for the GCOOS Regional Association and consideration of a draft business plan. Reports of these meetings are available. Information regarding additional meetings now planned as well as other items of relevance may be viewed on the GCOOS News Board.

A large number of Gulf of Mexico observations, products, and services are now produced on an ongoing basis. The identification of ongoing activities and products which should be considered as the initial building blocks for GCOOS is being refined on a continuing basis. Efforts in developing GCOOS must now focus on: integrated additional observing system elements, improving model sharing and validation, developing requirements of users of data and products, and developing operational structures.

Disclaimer: The information contained on this website has been gathered from various sources and is not guaranteed to be up-to-date. Reliance on the information contained on this website is at the user's own risk.
Actions 4

• We are working to establish a data and information management system that is
  – Part of a national system; integrated with other regional coastal observing systems
  – Coordinated with observing system elements in Mexico and Cuba
  – Integrated with the global observing system module

Well along in dealing with real-time physical data
NDBC MODEM Kit
(Meteorological and Oceanographic Data Exchange Module)
National Coastal Data Development Center, IOOS-RA Support
“Gateway to Coastal Information”

Partnering with Regional Associations to enable:
- wider access to coastal data, observations, products
- data archive and retrieval through metadata/cataloging
- access to regional products
- education & outreach
- pilot projects

NCDDC – Serving the Nation’s Ecosystem Goals
Actions 5

- We have multi-year support from NOAA to develop the Regional Association to manage GCOOS.
- We have representatives from GCOOS to the National Federation of Regional Associations:
  - Robert (Buzz) Martin, TX General Land Office
  - Raymond Toll, Science Applications International Corporation
Actions 6

- A Memorandum of Agreement has been selected as the initial governance structure for the GCOOS Regional Association.
Parties to GCOOS MOA

- Peter Betzer, University of South Florida
- Kendall L. Carder, Individual
- Michael Dagg, Individual
- William Dentel, Aquatrak Corporation
- Richard E. Dodge, Nova Southeastern University Oceanographic Center
- Richard Eckenrod, Tampa Bay Estuary Program
- James W. Feeney, Horizon Marine
- George Forristall, Forristall Ocean Engineering, Inc.
- Wilford Gardner, Texas A&M University
- Sherryl Gilbert, The Alliance for Coastal Technologies, Gulf of Mexico Partner
- Norman Guinasso, Texas Automated Buoy System (TABS); GERG
- Robert Hetland, Individual
- Roger R. Hoffman, The Boeing Company
- Patrick Hogan, Naval Research Laboratory
- Matthew Howard, Individual
- Stephan Howden, Individual
- Ann Jochens, Individual
- Björn Kjerfve, Individual
- Harvey Knull, Texas A&M University - Corpus Christi
- Steven E. Lohrenz, The University of Southern Mississippi
- Mark Luther, Tampa Bay PORTS
- John MacLeod, Evans Hamiltons, Inc.
- Kumar Mahadevan, Mote Marine Laboratory Inc.
- Robert “Buzz” Martin, Texas General Land Office
- Thomas McGee, Gulf of Mexico Hydrates Research Consortium, University of Mississippi
- Christopher McPherson, Ocean Design, Inc.
- Douglas Meffert, Tulane/Xavier Center for Bioenvironmental Research & LEAG
- Frank Muller-Karger, Individual
- Worth D. Nowlin, Jr., Individual
- James J. O’Brien, COAPS, Florida State University
- Chris C. Oynes, Minerals Management Service GoM Region
- Nancy Rabalais, LUMCON
- Sammy Ray, DermoWatch
- Mitchell Roffer, Roffer’s Ocean Fishing Forecasting Service
- Donald A. Roman, Individual
- Kerry St. Pe, Barataria-Terrebonne National Estuary Program
  Steve J. Smith, ChevronTexaco Energy Technology Company
- Mike Spranger, Florida Sea Grant Program
- Robert Stickney, Texas Sea Grant College Program
- Joseph W. Swaykos, Center of Higher Learning, University of Southern Mississippi
- Raymond F. Toll, Jr., Science Applications International Corporation
- Neil Trenaman, RD Instruments
- Jan van Smirren, Fugro GEOS
- Sharon Walker, J. L. Scott Marine Education Center & Aquarium
- William W. Walker, Mississippi Department of Marine Resources
A Board of Directors for the GCOOS Regional Association has been elected and has held its initial meeting in August 2005.
GCOOS Board Members

- Don Roman, University of Southern Mississippi (Chairman)
- Cortis Cooper, ChevronTexaco
- Mark Luther, University of South Florida
- Robert “Buzz” Martin, Texas General Land Office
- Worth Nowlin, Texas A&M University
- Chris Oynes, Minerals Management Service
- Alfredo Prelat, PAR Governments
- Nancy Rabalais, Louisiana Universities Marine Consortium
- Mike Spranger, Florida Sea Grant Program
- Raymond Toll, Science Applications International Corporation
- Jan van Smirren, Fugro GEOS
- Sharon Walker, J. L. Scott Marine Education Center & Aquarium
GCOOS Office Contact Information

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Matthew K. Howard            Susan R. Martin
DMAC Coordinator             Research Assistant and Webmistress
mhoward@tamu.edu             srmartin@tamu.edu
(979) 862-4169               (979) 845-3900

Website:  http://www.gcoos.org

Mailing address :  Department of Oceanography
                   3146 TAMU
                   College Station, TX 77843-3146

Fax number:    (979) 847-8879.
Thank You

Please visit our web site for further information.

http://www.gcoos.org

If you wish to become a signatory to the resolution, please send an email request to wnowlin@tamu.edu stating if you are signing as an individual or for an institution.

If you wish to become a Party to the Regional Association, download the Memorandum of Agreement from the GCOOS web site, sign and fax to Worth Nowlin (979-847-8879)