The Gulf of Mexico
Coastal Ocean Observing System: Status and Plans

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Texas A&M University

Meetings in Mexico
June 2006
Outline

• Background
• Existing Capabilities in the Gulf of Mexico
• Actions to date in building the Gulf of Mexico Coastal Ocean Observing System
• Next steps in that development
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

H Isl
NW
GoA
C Cal
S Cal
GLs
NE
MAB
SE
GoMex
Caribbean

Cal
Mex
S
S Cal
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
Gulf of Mexico Coastal Ocean Observing System (GCOOS)

Source: USGS
Existing Capabilities in the Gulf of Mexico
• Many existing elements are being used as the initial building blocks for a regional ocean observing system for the Gulf of Mexico.

• These include continuing observations, satellite products, models, and other data products.

• They are supported by local, state and federal government, private industry, NGOs, and academia.

• They provide information that will have broader uses when they are integrated and enhanced.
Building Blocks 1: In situ observations
Gulf of Mexico observations
TCOON Network

http://tcoon.cbi.tamucc.edu/TCOON/ HomePage
TCOON Station 031: Seadrift

28° 24.4’ N, 96° 42.7’ W
San Antonio Bay, Texas
Houston/Galveston PORTS observation locations
MMS NDBC buoy data
- 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
WAVCIS - Wave-Current Surge Information System
For Coastal Louisiana

http://csi.lsu.edu/
The University of Southern Mississippi

Central Gulf Ocean Observing System

CenGOOS.org

Meteorological and Oceanographic Observations in the Coastal Gulf of Mexico

At the Southern Miss Buoy:
- Current Conditions
- Archives
- Instrument Metadata
- Contact information

IOOS Organizations
- ocean.us
- GCOOS
- SEACOOS
- NOAA's NDBC

This site a product of this scientific partnership:

Hurricane Katrina Update: Our buoy is back at the Geochemical and Environmental Research Group at Texas A&M University, where it will be fully repaired. All sensors that could be repaired have been both repaired and calibrated. Instruments that needed replacement have been received and calibrated or had their calibrations verified. We thank the National Data Buoy Center and the National Weather Service Calibration Facility in Sterling, VA for instrument calibration services.

Current conditions at the CenGOOS buoy USM3M01 operated by the Department of Marine Science of the University of Southern Mississippi.
CODAR Coverage

Gulfport Station

Gulf Shores Station

Offshore Transmitting Station

The University of Southern Mississippi
Tampa Bay PORTS observation locations
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.

<table>
<thead>
<tr>
<th>Product</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMaRS MODIS image</td>
<td>3/23/2003</td>
</tr>
<tr>
<td>Color Thermal Imagery LSU Earth Scan Lab</td>
<td></td>
</tr>
</tbody>
</table>
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
- FSU COAPS Winds and SSH Simulations

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.

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.
<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>
</tr>
<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>
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<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>

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.
Actions to date in building the Gulf of Mexico Coastal Ocean Observing System
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, was signed by some 70 individuals representing themselves or institutions. This represented a great first step in developing the regional observing system.
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 (concluded)

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.
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

GCOOS Activities
- News Board
- Calendar
- Timelines

GCOOS Reports
- Meeting Reports
- Councils & Committees
  - Stakeholder Council
  - Education & Outreach Council
  - Data Management & Communication Committee
  - Observing System Committee
  - Products & Services Committee
- Other Documents

Regional Association
- Mission Statement
- Resolution
- Memorandum of Agreement
- Parties to the MOA
- Parties' Minutes
- Board of Directors
- Board of Directors' Minutes
- Councils/Committees

GCOOS System
- Overview graphic of Gulf of Mexico
- Texas
- Louisiana/Mississippi/Alabama
- Florida
- Data
  - In Situ Observations
  - Satellite Observations
  - Model Output & Products
  - Inventory
- Stakeholder Priorities
  - HABs workshop (pdf)
  - Oil & Gas workshop (pdf)
- Operations
  - Post-hurricane Survey
  - Regional Operations Center

Education & Outreach
- Publications relevant to GCOOS

Other Links
- Contact Us
- Ocean.US
- NIFR
- SECOORA
- FLCOOS
- Education & Workplace Opportunities

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. 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 social-economic 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.

http://www.gcoos.org
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)
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
A Memorandum of Agreement has been selected as the initial governance structure for the GCOOS Regional Association.

The MOA builds on the GCOOS Mission Statement to provide a management framework for accomplishing GCOOS objectives.
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
- Thomas McGee, Gulf of Mexico Hydrates Research Consortium, University of Mississippi
- Christopher McPherson, Ocean Design, Inc.
- Gil McRae, Fish & Wildlife Conservation Commission (Florida)
- Douglas Meffert, Tulane/Xavier Center for Bioenvironmental Research & LEAG
- Clifford R. Merz, Ocean Design, Inc.
- Christopher N. K. Mooers, Individual
- 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
- Chris C. Oynes, Minerals Management Service GoM Region
- Nancy Rabalais, LUMCON
- Sammy Ray, DermoWatch
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- Mike Spranger, Florida Sea Grant Program
- Robert Stickney, Texas Sea Grant College Program
- Joseph W. Swaykos, Center of Higher Learning, University of Southern Mississippi
- David Szabo, Woods Hole Group, Inc.
- Raymond F. Toll, Jr., Science Applications International Corporation
- Neil Trenaman, RD Instruments
- Jan van Smirren, Fugro GEOS
- Michael J. Vogel, Shell International E&P Inc.
- Sharon Walker, J. L. Scott Marine Education Center & Aquarium
- William W. Walker, Mississippi Department of Marine Resources
- Robert H. Weisberg, Individual
GCOOS Organizational Structure

![Organizational Structure Diagram](image-url)

- The Parties to the MOA
  - GCOOS-RA Board of Directors
    - Exec. Committee
  - GCOOS Office
  - Operations Center

- Committees
  - Data Management and Communications Committee (DMAC)
  - Observing Systems Committee
  - Products and Services Committee
  - Membership Committee

- Education and Outreach Council
- Stakeholder Council
The Membership Committee arranged for election in 2005 of initial members of the Board of Directors for the GCOOS Regional Association.

The Board held semi-annual meetings in August 2005 and January 2006. It meets via teleconference every two months.
Membership Committee

Landry Bernard, University of Southern Mississippi/NDBC (A/G)

Jerry Boatman, PSI (P)

Terry McPherson, National Aeronautics & Space Administration (G)
GCOOS Board Members

- Raymond Toll, Science Applications International Corporation (Chair)
- 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
- Don Roman, University of Southern Mississippi
- Mike Spranger, Florida Sea Grant Program
- Jan van Smirren, Fugro GEOS
- Sharon Walker, J. L. Scott Marine Education Center & Aquarium
Actions 8

The initial meeting of the GCOOS Stakeholder Council was held in January 2006. Many recommendations resulted—most related to improving communications and outreach and to pilot projects.
GCOOS Stakeholder Council

Vernon Asper (A)  University of Southern Mississippi
Bart Bibler (G) FL Dept. of Health
Stuart Burbach (P)  Retired, Pogo Oil
David Buzan (G)  TX Parks & Wildlife Department
Thomas Chance (P)  C&C Technologies, Inc.
Tricia Clark (P)  Skaugen Petro Trans
Cort Cooper (P)  Chevron (Liaison to GCOOS Board)
David M. Donaldson (G) Gulf States Marine Fisheries Commission
Jim Feeney (P)  Horizon Marine
Tom Fry (P)  NOIA
Tom Gustafson (A)  Nova Southeastern University
Paul Kelly (P)  Rowan Industries
Chris Oynes (G)  Minerals Management Service
Robert Stickney (A/G) Texas Sea Grant (Council Chair)
Kerry St. Pé (G)  Barataria-Terrebonne Estuary Program
Dave Yeager (G)  Mobile Bay Estuary Program
The initial meetings of the GCOOS Education and Outreach Council, Products and Services Committee, Data Management and Communication Committee, and Observing Systems Committee were held in Ocean Springs, Mississippi during 24-27 April 2006.
GCOOS Education and Outreach Council

**Alabama**
- John Dindo, Dauphin Island Sea Lab
- Lloyd Scott, Mobile Bay School District
- Margaret Sedlecky, Weeks Bay NERR
- Lee Yokel, Mobile Bay NEP

**Florida**
- Mike Spranger, UF/Florida Sea Grant (Liaison to GCOOS Board)
- Debbi Berger, The Florida Aquarium
- Gary Lytton, Rookery Bay NERR
- Charlene Mauro, Navarre High School
- Chris Verlinde, Santa Rosa County Extension

**Out of Region**
- Rusty Low, UCAR-DLESE

**Louisiana**
- Pam Blanchard, Louisiana State University
- Jessica Kastler, LUMCON
- Dianne Lindstedt, LSU Sea Grant
- Jean May-Brett, LA Dept. of Education

**Mississippi**
- Sharon Walker, J.L. Scott Marine Center (Liaison to GCOOS Board)
- Jennifer Buchanan, Grand Bay NERR
- Lashanda Colbert, Mississippi Dept. of Education
- Carol Lutken, University of Mississippi
- Joe Swaykos, Stennis Space Center

**Texas**
- Shelly Du Puy, Flower Garden Banks National Marine Sanctuary
- Ralph Rayburn, Texas Sea Grant
- Rob Smith, Shell Inc.
- Lisa Spence, NASA
- Pamela Terasaki, Twin Creeks Middle School (Spring ISD)
- Rick Tinnin, University of Texas
Observing Systems Committee

Jim Byous, Ocean Specialists (P)
Don Conlee, NDBC (G)
David Heil, Seafood Safety, FL Department of Agriculture (G)
Stephan Howden, University of Southern Mississippi (A)
Gary Jeffress, TAMU Corpus Christi (A)
Dawn Lavoie, USGS (G)
Linda Lillycrop, Mobile District, USACE (G)
Nick Shay, University of Miami (A)
Jan van Smirren, Fugro GEOS (P)
Neil Trenaman, RD Instruments (P)
Mike Vogel, Shell (P)
Nan Walker, LSU (A)
Buzz Martin, GCOOS Board Liaison
Mark Luther, GCOOS Board Liaison
Data Management and Communications Committee

Steve Anderson, Horizon Marine (P)
Brenda Babin, LUMCON (A)
Steve Beaudet, SAIC/NDBC (P/G)
Bill Burnett, NDBC (G)
Jennifer Colee, Mobile District, USACE (G)
Scott Duff, TAMU Corpus Christi (A)
Matthew Howard, TAMU (A)
Edward Kearns, South Florida Natural Resources Center (G)
Jay Ratcliff, New Orleans District, USACE (G)
Robert Raye, Shell (P)
Susan Starke, NCDDC (G)
Vembu Subramanian, USF (A)
Alfredo Prelat, GCOOS Board liaison
Jan van Smirren, GCOOS Board liaison
Products and Services Committee

Becky Allee, NOAA CSC (G)
Russell Beard, NCDDC (G)
Frank Bub, NAVOCEANO (G)
Richard Crout, National Data Buoy Center (G)
Mark Dortch, Vicksburg District, USACE (G)
Dave Driver, BP (P)
Robert Hetland, Texas A&M University (A)
Patrick Hogan, Naval Research Laboratory (G)
Alexis Lugo-Fernandez, Minerals Management Service (G)
Alistair MacNab, Greater Houston Port Authority
Frank Muller-Karger, University of South Florida (A)
Kathleen O'Keife, Florida Fish and Wildlife Conservation Commission (G)
Mitch Roffer, Roffer's Fishing Service (P)
Nancy Rabalais, GCOOS Board liaison
Raymond Toll, GCOOS Board liaison
Overview of GCOOS Status

• Formal MoA established in January, 2005
• Currently 47 signatories to the MoA
• Board of Directors elected in June, 2005
• First BoD meeting in Houston in August, 2005
• Business Plan under Review by Board
• First Stakeholder Council Meeting in Jan. 2006
• Other Council and Committees met April 2006
Next Steps in Developing GCOOS
Next Steps 1

- We are working on the third draft of a Business Plan for the GCOOS-RA.
• We are working to refine priorities and plan pilot projects. We are using workshops focused on specific stakeholder sectors. We ask for identification of prioritized measurements and products, their economic benefits to the sector, and potential pilot projects.
Oil, Gas, and Related Sectors Workshop

On 2-4 November 2005, a workshop with the oil, gas and related sectors was held in Houston to prioritize their needs for observations and products.
Identified High Priority Needs

**Product Needs**

- Hurricane Severity Forecasts
- Surface current forecast maps
- Measurement & Product archive
- Operation maps of SSTs
- Forecast maps of 3-D deepwater currents
- Forecast maps of winds and waves
- 3-D current forecasts on shelf
- Probability maps of bottom hazards

**Measurement Needs**

- Hurricane severity model improvement
- Operational satellite altimeters (near real-time)
- Operational satellite radiometers (near real-time)
- Operational satellite wind (QuikSat)
- 2Hz wave data (not real-time)
- Improve hurricane severity forecasts (real-time)
- Offshore meteorology measurements (real-time)
- Upper column current and temp/salinity profiles
- Marine mammals and sea turtle sightings
- High resolution coastal bathymetry, topography, and subsidence rates
Future Focused Stakeholder Workshops

- **Fisheries Workshops**—Making presentations to the Gulf of Mexico Fisheries Management Council and Gulf States Marine Fisheries Commission to obtain guidance on how best to bring in all fisheries sectors: regulatory, commercial, recreational, and academic. Also working with NOAA Southeast Fisheries Research Center and State fisheries agencies to assess requirements for data and products.

- Emergency responders to **storm surge and flooding**; joint CSC/NOAA-SECOORA-GCOOS sponsorship. Steering Committee selected; workshop likely in February 2007.

- **Maritime transportation** elements—including tanker traffic, container ships, cruise ships, shipping agents, port authorities, pilots, LNG carriers, intercoastal waterway traffic, and commercial transportation of people.

- **Recreational boating**—including marina operators, power squadrons, yacht clubs, marina operators, and retailers.

- **Urban planners/developers**

- **Water quality**—Key on Gulf of Mexico Alliance Plans and on results of U.S. IOOS Public Health Workshop held 23-25 January 2006.
Next Steps 3

- We are preparing prospecti for a series of GCOOS pilot projects recommended by the Stakeholder Council and sector workshops and approved for action by the Board of Directors.
Pilot Projects Under Consideration by GCOOS-RA

- Instrument tankers that occupy regular tracks between Texas and Florida ports with flow-through surface parameters (T, S, Chlorophyll, nutrients, dissolved oxygen), ADCPs, and meteorological sensors with real-time telemetry.
- Most county/state health departments make regular water quality measurements for human pathogens. These observations are placed into databases that could be made internet-accessible and would be very useful to beach managers.
- Initiate a pilot GCOOS Operations Center.
- Project to develop proven forecasts of three-dimensional surface currents for the Gulf of Mexico.
- Development of a measurement and products archive for the deepwater Gulf of Mexico.
- Produce maps of marine mammals and endangered turtles in the Gulf of Mexico based on legacy information from the NMFS and MMS projects and real-time observations from the oil and gas industry.
- Produce probability maps of bottom hazards and of hydrocarbon seeps for the Gulf of Mexico.
- Improving forecasts of hurricane severity.
GCOOS Workshops and Meetings in the Coming Year

Board of Directors Meeting, August 2006, Site TBD

Gulf States Marine Fishery Commission, October 2006

Storm Surge and Flooding (GCOOS—SEACOOS—NOAA CSC) Workshop, Site TBD

Workshop to plan future research in Gulf between U.S. and Mexico, sponsored by MMS, early 2007

Meetings of GCOOS Board of Directors, Parties, and Stakeholder Council, January 2007

Meetings of GCOOS Education and Outreach Council and of DMAC, Operating Systems, and Products and Services Committees in April or May 2007
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Thank You

Please visit our web site for further information.

http://www.gcoos.org

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