

Trends in Data Sharing

Presentation to the FL Water Resources Monitoring Council

By Kathleen O'Keife



Data Management 101

- Metadata
- Data Definitions
- Discovery
- Access and Integration
- Archive

**All Require
Standards!!!**

**And This
Requires
Cooperation**



Standards

In September, 1999, NASA suffered a major setback to its Mars exploration program when the \$125 million Mars Polar Orbiter crashed onto the planet surface.

An inquiry determined that the spacecraft crashed because one engineering team used metric units while another used English units for a key spacecraft operation, namely descent into a stable planetary orbit.

Engineers on the ground calculated the size of the rocket-firing using feet-per-second of thrust, a value based on the English measure of feet and inches.

However, the spacecraft computer interpreted the instructions in Newtons-per-second, a metric measure of thrust. The difference is 1.3 metres a second.



Challenges

- **Loosely federated organizations:** No top-down corporate **management structure** exists to effectively manage major shifts in data management strategy (and the resulting dislocations) in order **to achieve interoperability**.
- **Physically distributed repositories:** **Data must** reside and **be managed at many distinct locations** (some of which contain vast volumes of data).
- **Heterogeneous data:** **Classes of data** vary; from huge satellite track records, to multi-dimensional model outputs, to Lagrangian drifters, to polygonal geographic regions and point measurements. Variables **are from diverse disciplines and are unevenly distributed in time and space**.
- **Funding is limited.** **Many projects** begin and then **lose funding prior to fruition**.

Interoperable Data Discovery, Access and Archive
Ocean.US Pub. No. 6, DMAC, 2005



Metadata

➤ Data about data.

- Describes the content, quality, condition, and other **characteristics of the data**. The metadata describes the who, what, when, where, why, and how about a data set. Without proper documentation, a data set is incomplete.
- Under Executive Order No. 12906, all federal agencies and **organizations receiving federal funds** must document their geospatial data using the Federal Geographic Data Committee's (FGDC) *Content Standard for Digital Geospatial Metadata* and **must publish that metadata through the clearinghouse system**.

Coastal Services Center



Data Definitions

- **Review** datasets to determine data that are common (e.g. location coordinates, water quality parameters, date and time...)
- **Use existing standards** such as adopted by FGDC and Geospatial OneStop.
- **Build data dictionaries** that includes definition for each piece of data
- Make definitions easily accessible and **create templates** where appropriate
- Establish and enforce minimum **QA guidelines**



Discovery

- Publish metadata through clearinghouses such as FGDC. Florida data found in UF GeoPlan site.
- Publish through other Government directories such as NOAA's Coastal Information Directory.
- Work within publicly available search engines – Google, Yahoo, MSN
- Develop targeted web crawlers (way to harvest data)



Accessibility and Integration

- The ability to pull heterogeneous **data and applications from multiple sources** onto your desktop
- **Platform and Operating System Independent**
- Distributed Data Systems
 - Search, retrieve, and view data in a client-server environment.
- Web Services
 - Self-contained, self describing, web-served applications
 - **Connect to broad range of data suppliers and applications**
 - Reduce complexity, cost, and expertise-need
- Take advantage of Open Geospatial Consortium movement



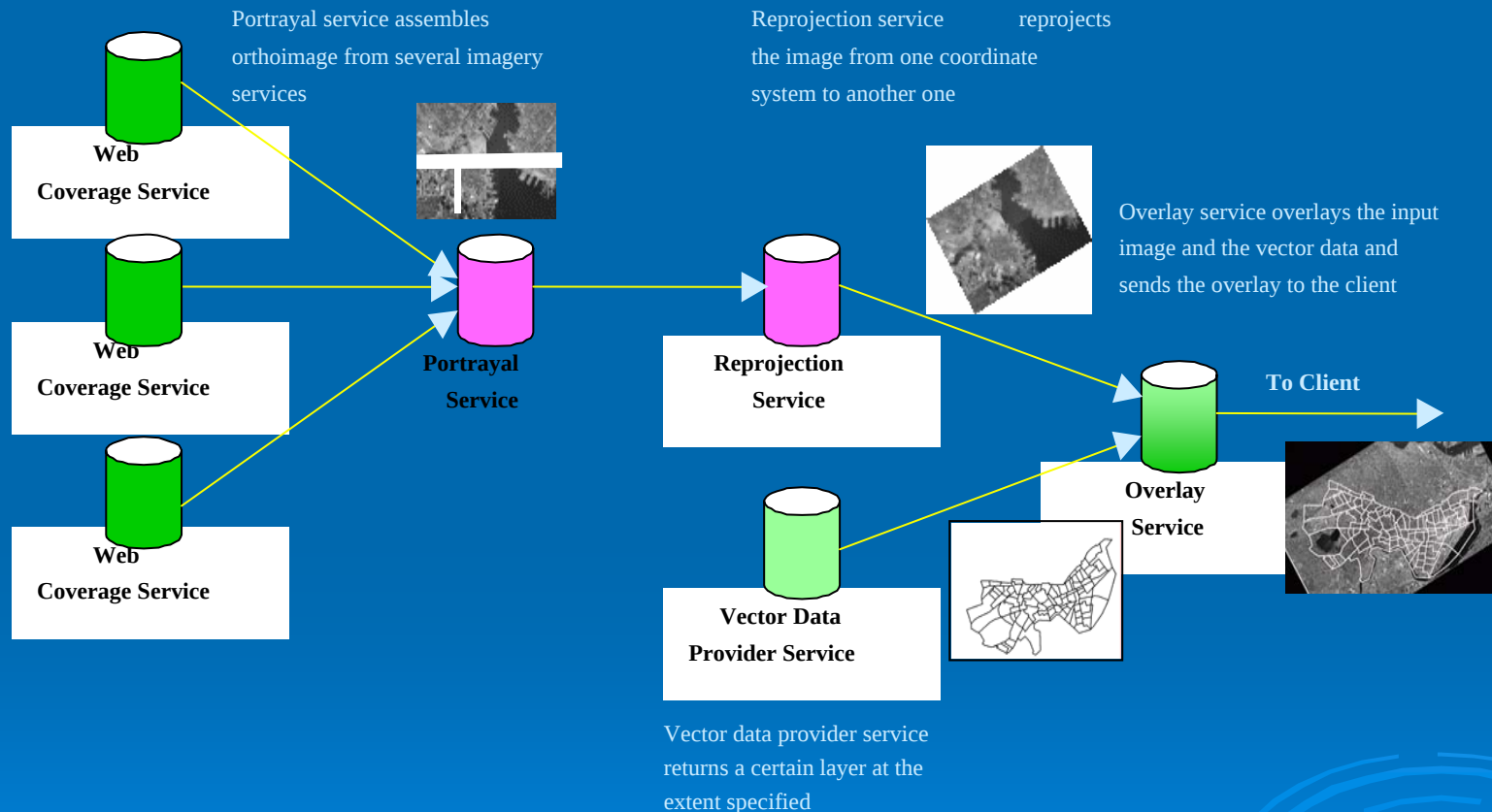
Archive

- **Who's Responsibility?**
- Where do the data go? **Data Stewardship**
 - NODC, EROS, STORET, UF GeoPlan...
- **Format** (Raw Data, Processed Data, PDF)
- Duration (**How long do we hold it?**)
- Completeness & Value (**How to Decide what's worth keeping?**)
- Accessible - **Media currency** (migration)
 - Tape → CD → DVD → ????



Web Service Chaining

- Combining multiple services for a client.



From presentation by Nadine Alameh, 2002



Metadata-based Project Finder

- Click anywhere on the map of Florida to see what projects we have ongoing in the area.
- Or select project using query tool (key word, project manager, status, etc) and see where the project is taking place and read the metadata for other information

FWC Research Project Internet Map Server
Introduction | Disclaimer | Help | Layers | Charts | Contact

FWC Employee Report: Williges, Kent

Names: Williges, Kent
Locations: Research Lab: Gainesville
Divisions: Fish and Wildlife Research Institute
Sections: Ecosystem Assessment and Restoration
Sub-Sections: Habitat Research
Job Title: Biological Scientist III
Job Class: FTE
Education: Master of Science in Biology at the Texas Agriculture and Industry
Job Description: Kent coordinates and conducts plant community monitoring on FWC managed Wildlife Management Areas and Wildlife Environmental Areas including ongoing monitoring associated with flatwoods, scrub and cattle grazing studies. Kent procures and maintains sampling equipment, analyzes plant community data, and generates reports.
Principal Investigator (PI) of:
Gulf Island National Research and Monitoring - Patuxent Management

NAVIGATION
Zoom In Zoom Out Full Extent Last Extent Pan Identify Tabular Query Spatial Query1 Spatial Query2 Clear Selection Layers/Legend Toggle Overview

ACTIVE TOOL: Zoom In

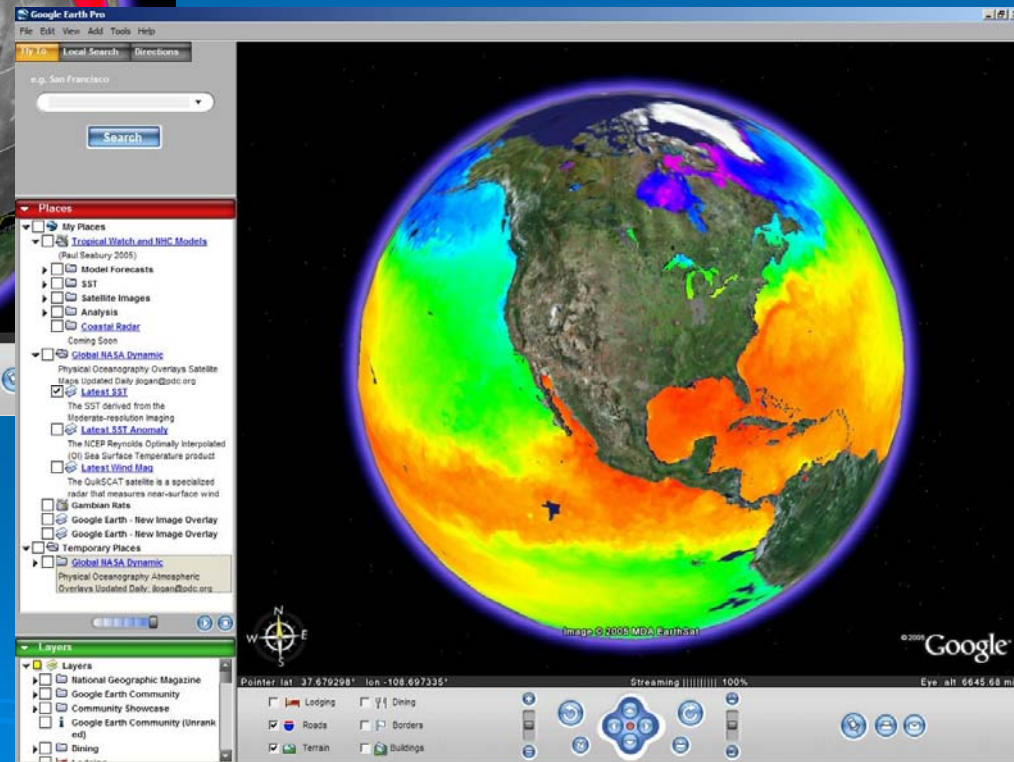
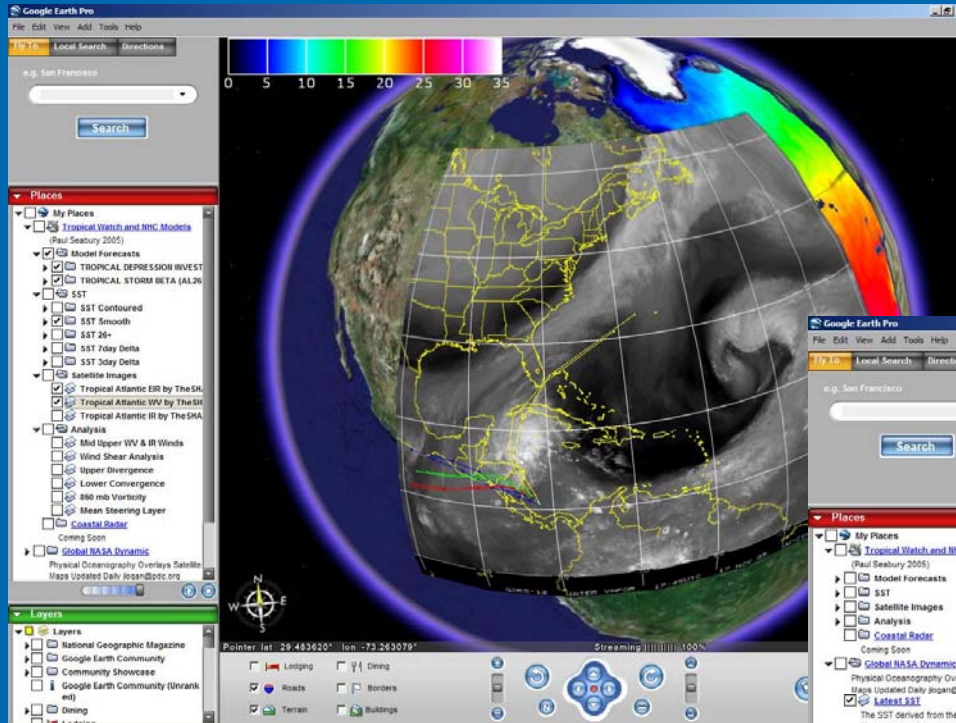
Layers
Visible
☒ FWC Offices
☒ Interstates
☒ Research Projects
☒ Wildlife Management
☒ FWC Regions
☒ Water Management
☒ State Senate Districts
☒ State House Districts
☒ Fish Management
☒ Counties

QUERY DATABASE
Contact: Sargent, Bill
Section: Ecosystem Assessment and Restoration
Sub-Section: Biogeographic Assessment and Modeling
Theme Keyword: abundance, artificial reefs, assessment, baitfish, anchovies, sandines, mullet, s
Place Keyword: Alabama, Apalachicola, Apalachicola National Forest, Aquatic Preserve
County: Alachua, Baker, Bay, Bradford
FWC Region: North Central
Water Management District: Northwest Florida
Progress: Complete
Time Period (Include all NODATA records):
Between 1982 and 2005
Run Query Reset All Projects
Help Disclaimer



Web Services

Google Earth



Create kml & kmz files
For ease of use by public



[illegible]

Web Services

Welcome to www.OpenIOOS.org ...where standards enable innovation

This interoperability demonstration represents a coastal sciences community effort. Our partners include several federal agencies and dozens of the top research universities in the country. We rely heavily on [Open Geospatial Consortium \(OGC\)](#) standards. To learn about the project, [click here](#) for answers to some frequently asked questions. For detailed project information visit [the interoperability project wiki](#).

Storm Archives 6

[Katrina](#)
[Rita](#)

Latest water-level models and observations

Click on an observing station to see a time-series plot

[Go to dynamic map](#)

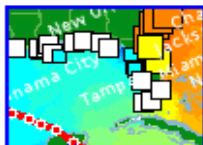
[Wave and water-level observations](#)



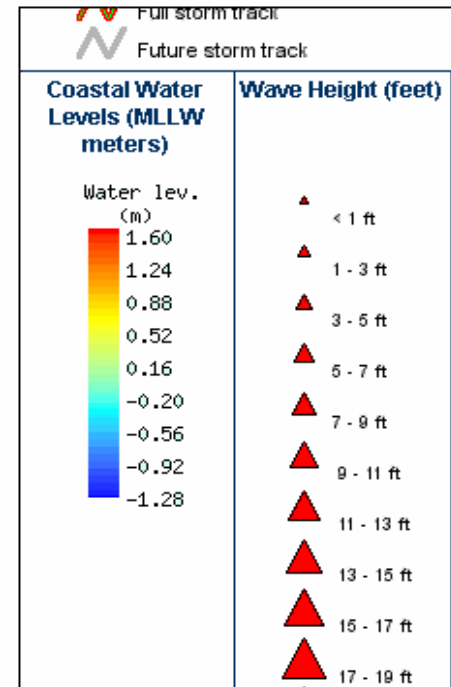
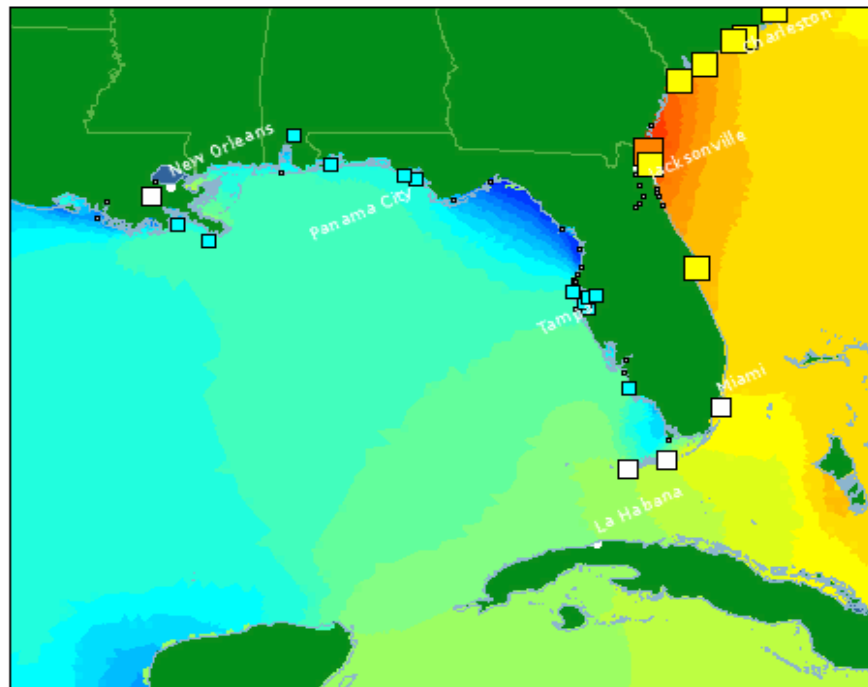
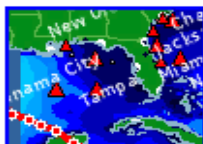
[Wind and visible satellite images](#)



[Water-level models and observations](#)



[Wave models and observations](#)



Data Sharing Initiatives

Provides
Data
Management
Guidance:
Standards
Ontology
Tools

<MMI /> Marine Metadata Interoperability

you are here: [home](#) -> for developers

How MMI will help developers meet their goals

MMI provides information, software, architectures, and solutions that help developers provide science solutions.

Presenting standards, tools, and solutions

MMI is an information clearinghouse, pointing you to existing technologies that relate to your technical activities. We reference many metadata [solutions](#), providing contextual information on each, and will soon provide user ratings and personal experiences.

MMI describes three classes of technical metadata standards -- transport protocols, content standards, and vocabularies -- and provides pointers to key tools that are used to work with metadata. This information gives you a big head start on finding and understanding existing products and approaches to apply to your own metadata problems.

If you are providing environmental science data to customers, MMI can help you be more productive, providing scientifically valuable and technically sound advice. We are constantly working to improve on these goals, and invite you to share your expertise, your critiques, and your enthusiasm!

Identifying and addressing metadata challenges

Not every metadata challenge has an operational solution. In these cases, MMI serves as an advocate, a demonstrator, and a developer. We've provided [tools](#) to facilitate working with metadata, workshops to show some approaches in action, [ontologies](#) where none existed, and [prototype software](#) showing metadata used in an interoperable framework.

All of the software created by MMI is made publicly available (usually on SourceForge), our results are documented on the web site, and our [experiences in our workshops](#) are fully and openly described. The MMI community strives for transparency, even presenting some of its own projects on the MMI web site. Developers can easily reuse the solutions and ideas created by MMI in their own projects, and are encouraged to work with us to improve those results.

Guidance for your own data system development

MMI collects and develops [guides](#) on data management approaches. Starting with the most basic information, MMI is creating a comprehensive set of materials to help understand and work through metadata development challenges. This community effort is ongoing, and benefits from direct involvement of members of the community. If you would like to help us develop guides, or give us feedback on what is needed, please contact us.

Hosting and presenting your metadata-aware work (and work of your peers)

The best way to learn about technical material is from the work of others, and MMI represents this work in many places on the site. In addition to the standards and tools we document, MMI provides sections that publicly document the activities and progress of [projects in the metadata community](#).

Anyone can take advantage of those areas to document their own project, and share the work with members of the project team. MMI has been used by large and small projects to represent the projects' activities in the community. The resulting publicity benefits the project, and the

➤ <http://marinemetadata.org/>



Data Sharing Initiatives

geodata.gov
U.S. MAPS & DATA

Your One Stop for Federal, State & Local Geographic Data

Log in Sign up

Home Search Maps Marketplace Communities Statistics Help Center

Communities Help -

Special Interest

- [Earth Information Exchange](#)
- [Fire Mapping](#)
- [GIS for the Nation](#)
- [Geographic Names](#)
- [Homeland Security](#)
- [Indian Ocean Disaster](#)
- [Lewis and Clark](#)
- [Local Governments](#)
- [Recreation](#)
- [The National Atlas](#)
- [The National Map](#)

Data Categories

- [Administrative Boundaries](#)
- [Agriculture](#)
- [Atmosphere](#)
- [Biology](#)
- [Business](#)
- [Cadastral](#)
- [Demographic](#)
- [Elevation](#)
- [Environment](#)
- [Geology](#)
- [Health](#)
- [Imagery and Basemaps](#)
- [Inland Water](#)
- [Locations](#)
- [Oceans](#)
- [Transportation](#)
- [Utilities](#)

Hurricanes

- [General Information](#)
- [Hurricanes in 2005](#)
- [Hurricanes in 2006](#)

Search geodata.gov Help -

What: (e.g. River) Where: (e.g. Harrison, NY)

[Show Advanced Search Options](#)

Earth Information Exchange Gateway Help -

Earth Information Exchange Gateway

The Federation The Exchange Partners Featured ESIP Maps Search Education Demos Posters

 Federation of Earth Science Information Partners
MAKING DATA MATTER

ESIP FEDERATION



The Federation of Earth Science Information Partners is a Network That Includes NASA, NOAA and USGS Data Centers

ABOUT THE FEDERATION OF EARTH SCIENCE INFORMATION PARTNERS

The Federation of Earth Science Information Partners ("Federation") is a network of researchers and associated groups that interprets and develops applications for satellite-generated Earth observation information. Founded in 1998 under a grant, the consortium includes more than 90 member organizations, spanning [NASA's](#) and [NOAA's](#) data centers, government research universities, education resource providers, technology developers, and nonprofit and commercial enterprises.

The consortium's work is dedicated to providing the most up-to-date, science-based information to researchers and decision-makers working to understand and address the environmental, economic and social challenges facing our planet. By increasing the usability of this unique data and linking it with decision-making tools, the Federation contributes significantly to creating a sustainable world.

The Federation's network fosters collaboration and innovation. It brings together partners to develop models and tools that

Quick Start Help -

Welcome to geodata.gov

Your One Stop for Finding and Using Geographic Data

geodata.gov will help you:

- [Find Data or Map Services](#)
- [Make a Map](#)
- [Browse Community Information](#)
- [Cooperate on Data Acquisitions](#)

Save searches, maps, and your favorite geography to re-use later. A simple [registration process](#) opens up these personalization options.

We invite you to explore ... or check out our [Quick Start Guide](#) to learn more about using the main features of geodata.gov.

This is a U.S. Federal Government computer system that is "FOR OFFICIAL USE ONLY". This system is subject to monitoring. Therefore, no expectation of privacy is to be assumed. Individuals found performing unauthorized activities are subject to disciplinary action including criminal prosecution.

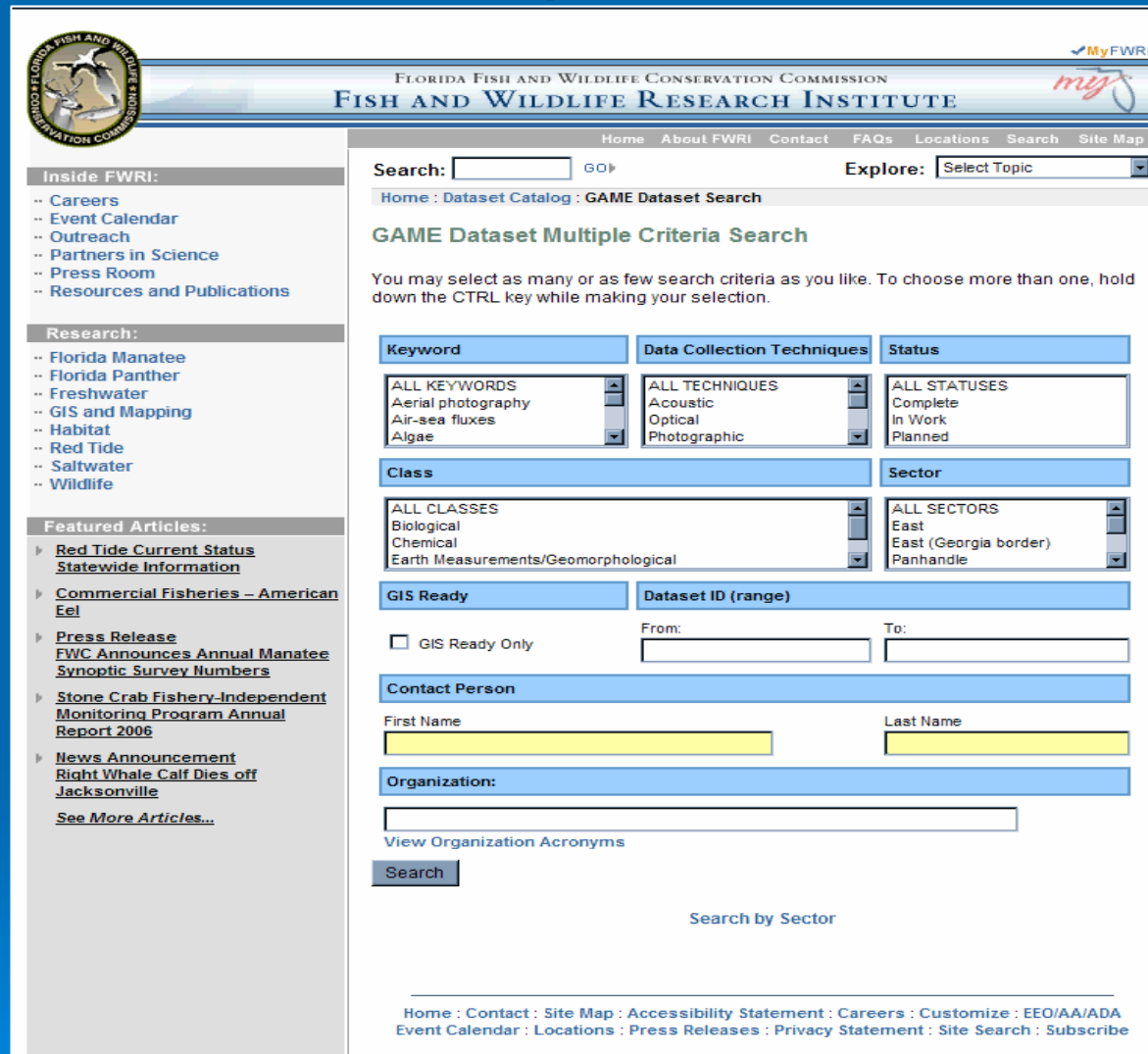
<http://gos2.geodata.gov/wps/portal/gos>



Data Sharing Initiatives

GAME

Searchable
catalog of
all datasets
collected in
FL



The screenshot displays the website of the Florida Fish and Wildlife Conservation Commission's Fish and Wildlife Research Institute. The header includes the commission's logo, name, and navigation links. The main content area is titled "GAME Dataset Multiple Criteria Search" and provides a search interface with various filters and a contact form.

Florida Fish and Wildlife Conservation Commission
FISH AND WILDLIFE RESEARCH INSTITUTE

Home About FWRI Contact FAQs Locations Search Site Map

Search: GO Explore:

Home : Dataset Catalog : **GAME Dataset Search**

GAME Dataset Multiple Criteria Search

You may select as many or as few search criteria as you like. To choose more than one, hold down the CTRL key while making your selection.

Keyword	Data Collection Techniques	Status
ALL KEYWORDS Aerial photography Air-sea fluxes Algae	ALL TECHNIQUES Acoustic Optical Photographic	ALL STATUSES Complete In Work Planned

Class	Sector
ALL CLASSES Biological Chemical Earth Measurements/Geomorphological	ALL SECTORS East East (Georgia border) Panhandle

GIS Ready ☐ GIS Ready Only

Dataset ID (range)
From: To:

Contact Person
First Name: Last Name:
Organization:
[View Organization Acronyms](#)

[Search by Sector](#)

Home : Contact : Site Map : Accessibility Statement : Careers : Customize : EEO/AA/ADA
Event Calendar : Locations : Press Releases : Privacy Statement : Site Search : Subscribe



Data Sharing Initiatives

Multi Agency approach to data Sharing



PHINS Now Available for Evaluation! Your comments are welcome and can be submitted to [Chris Cretini](#), USGS, Chair of the Technical Working Group.

The Priority Habitat Information System (PHINS) is a state/federal partnership intended to provide users with habitat information and foundation geospatial data supporting implementation of the Gulf of Mexico Alliance Governors' Action Plan. PHINS consist of two main components: the [Digital Library](#) and the [Map Viewer](#). The foundation of all habitat information provided by PHINS is based on Federal Geographic Data Committee (FGDC) Metadata. A metadata tool, Metadata Enterprise Resource Management Aid ([MERMAid](#)), is also available to PHINS users that will publish new or existing metadata records to the Digital Library as well as the Federal GeoSpatial One-Stop ([GOS](#)) and National Spatial Data Infrastructure ([NSDI](#)).

Digital Library: The PHINS digital library is a web-based data access and delivery system for data, reports, imagery, posters, presentations, and synthesis products related to the Gulf of Mexico Alliance.

Map Viewer: The Map Viewer generates online maps from data stored at participating agencies. The Viewer includes tools for navigating data, viewing and querying data attributes, overlaying layers, and printing maps. Note - Map Viewer works best with Internet Explorer.

Metadata Enterprise Resource Management Aid ([MERMAid](#)): MERMAid is a tool to develop, validate, manage and publish metadata records via secure internet access.

User Feedback Form (USGS Hosted) http://dl.cr.usgs.gov/gomex/phins_survey.aspx: This form allows for users to input feedback on each of the PHINS components listed above.



Data Sharing Initiatives



The screenshot shows the GoMRC website homepage. At the top, there is a navigation bar with links: Data Portal, MapMaker, Image Viewer, Downloads, Library, and MyGoMRC. Below this is the GoMRC logo and the tagline "The Gulf of Mexico Regional Collaborative". A secondary navigation bar lists: Home, Seagrasses, Wetlands, Algal Blooms, Estuaries, Restoration, Protected Areas, and News. The main content area is divided into several sections. On the left, there is a Google search bar with a "Search" button and radio buttons for "Search this site" and "Search the web". Below the search bar is a section titled "Eyes on the Gulf" with a link to "Check out the Gulf of Mexico by cam anytime of the day here! >>". Further down is the "GoMRC Photo Gallery" with a link to "A collection of images historic and current for your viewing pleasure here! >>". Below that is a section titled "Gulf Coast Current Conditions" which includes three sub-sections: "Sea Surface Temperature" (with a satellite image and a "Launch Viewer" link), "Shipping Lanes" (with a photo of a ship and a "Launch Viewer" link), and "GOES" (with a color-enhanced satellite image and a link to "Color enhanced imagery is a method meteorologists use to aid them with"). The central part of the page features a large image of a seagrass field. Below this image is the "ARTICLE FOCUS THIS WEEK" section titled "The GoMRC Project". The text in this section describes the critical role of the Gulf of Mexico in the economic health of the U.S. and Mexico, and mentions that GoMRC will assist both U.S. and Mexican Federal and State government agencies to develop an integrated Earth observation system. To the right of the central image is a section titled "AREAS OF INTEREST" listing Texas, Alabama, Florida, Louisiana, Mississippi, and Mexico. Below that is a section titled "THE GULF IN THE NEWS" featuring a headline "House moves to open Gulf area to oil and gas drilling; Senate action expected." and a sub-headline "WASHINGTON, Dec. 8, 2006 By H. JOSEF HEBERT Associated Press Writer". The text continues with a quote from (AP) about the House approving oil and gas drilling Friday in a vast area of the Gulf of Mexico south of Florida's Panhandle.

Data Portal MapMaker Image Viewer Downloads Library MyGoMRC

GoMRC

The Gulf of Mexico Regional Collaborative

Home Seagrasses Wetlands Algal Blooms Estuaries Restoration Protected Areas News

Google

Search

☐ Search this site
☐ Search the web

Eyes on the Gulf
Check out the Gulf of Mexico by cam anytime of the day here! >>

GoMRC Photo Gallery
A collection of images historic and current for your viewing pleasure here! >>

Gulf Coast Current Conditions

Sea Surface Temperature
Satellite derived SST products are an estimate of the radiating temperature of the top-most layer of the ocean surface.
Launch Viewer >

Shipping Lanes
NOAA Fisheries lengthens traditional commercial shipping routes while overhauling shipping lanes.
Launch Viewer >

GOES
Color enhanced imagery is a method meteorologists use to aid them with

ARTICLE FOCUS THIS WEEK

The GoMRC Project

The Gulf of Mexico plays a critical role in the economic health of both the U.S. and Mexico. Activities such as coastal development, aquaculture, recreation, oil and gas exploration, and the impacts of natural phenomena such as hurricanes are having significant impacts on Gulf ecosystems. The Gulf of Mexico Regional Collaborative (GoMRC) is designed to address environmental issues in the Gulf of Mexico at a regional, bi-national scale. GoMRC will assist both U.S. and Mexican Federal and State government agencies to develop an integrated Earth observation system capability that will support a broad understanding of the Gulf of Mexico's marine and coastal environments.

GoMRC will support NASA's strategic goal of advancing Earth science to understand and meet societal needs (e.g. land user assessment, natural hazard assessment, prediction and response). GoMRC will work with end users to extract value from existing NASA satellite missions and, in partnership with NASA scientists, will help to demonstrate the added value that instruments on future NASA missions could bring to

AREAS OF INTEREST

Texas
Alabama
Florida
Louisiana
Mississippi
Mexico

THE GULF IN THE NEWS

House moves to open Gulf area to oil and gas drilling; Senate action expected.

WASHINGTON, Dec. 8, 2006
By H. JOSEF HEBERT
Associated Press Writer

(AP) The House approved oil and gas drilling Friday in a vast area of the Gulf of Mexico south of Florida's Panhandle and agreed to steer hundreds of millions of dollars in royalty payments to Gulf states to restore coastal wetlands and repair hurricane damage.

[More here >>](#)

<http://www.gomrc.org/home.html>



Data Sharing Initiatives

GoMRC

Data/Models

PHINS

Metadata

GAME

Multi–agency
integrated
approach to
GOM
resource
management



Considerations

- **Appoint high-level data officer** supported by a few highly qualified data specialists such as: metadata coordinator, geospatial coordinator, and data structure expert.
- Form appropriate committees with experts from data user, provider and management arenas to **assess needs and develop standards**.
- **Coordinate and cooperate** with data management committees such as the regional Ocean Observing Systems and Regional Associations.



Abraham Lincoln
is attributed with remarking that
if the job of cutting down a tree
would take 8 hours,

then he would spend 6 hours
just sharpening his axe



*Thank You for Your Attention
and Stayed Tuned!*

Part 2 coming right up!

