

Gulf G.A.M.E. (Geospatial Assessment of Marine Ecosystems)

– Data Discovery



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Presentation Outline

- **Introduction:**

- Ocean governance and Ecosystem-Based Management

- **The Gulf of Mexico Alliance**

- Habitat Identification and Characterization

- **The Gulf GAME project**

- **MERMAid and PHINS**

- **Results & Conclusions**

- **What's next?**

- Gap maps

- **Examples**

Ocean Governance

The diagram is a funnel shape composed of five horizontal trapezoidal sections, each containing a text label. The sections are stacked vertically, with the widest at the top and the narrowest at the bottom. The background is dark with a repeating watermark of a wave and the text 'G.A.M.E. Geospatial Assessment of Marine Ecosystems'.

Marine Ecosystem-Based Management

Geospatial Assessment
and Monitoring

Marine Spatial Planning

Ocean Zoning

Permits

Ecosystem-Based Management

The escalating crisis in the ocean, from loss of biodiversity to marine pollution to global climate change, is in large part a failure of governance.

There is an emerging scientific and policy consensus that the holistic approach of ecosystem-based management can reform ocean governance through the identification of ecologically coherent regions and the demarcation of zones that take into account biophysical, socioeconomic, and jurisdictional considerations.

The Gulf of Mexico Alliance is a partnership of the states of Alabama, Florida, Louisiana, Mississippi, and Texas, with the goal of significantly increasing regional collaboration to enhance the ecological and economic health of the Gulf of Mexico.

The Alliance has identified 5 issues that are regionally significant and can be effectively addressed through increased collaboration at the local, state and federal levels. These priorities represent an initial focus for action through the Alliance:

- Water quality for healthy beaches and shellfish beds;
- Wetland and coastal conservation and restoration;
- Environmental education;
- **Identification and characterization of Gulf habitats, and**
- Reductions in nutrient inputs to coastal ecosystems.

Identification and Characterization of



Gulf Habitats

Habitat Characterization Challenges and How the Gulf Alliance Can Help

The Gulf Coast supports a diverse array of coastal, estuarine, nearshore and offshore ecosystems, including sea grass beds, wetlands and marshes, mangroves, barrier islands, sand dunes, coral reefs, maritime forests, bays, streams and rivers. These ecosystems provide numerous ecological and economic benefits including improved water quality, nurseries for fish, wildlife habitat, hurricane and flood buffers, erosion prevention, stabilized shorelines, tourism, jobs and recreation. The Gulf of Mexico contributes almost 20 percent of U.S. commercial fish landings, with an estimated annual value of more than \$1 billion and as much as 30 percent of U.S. saltwater recreational fishing trips. The coastal habitat that supports these fisheries is a vital resource to the regional economy and the quality of life for Gulf residents. The ability to evaluate the extent and quality of these habitats is critical to successfully managing these for sustainability, as well as better determining threats from hurricanes and storm surge.

Long-term Partnership Goal:

Identify, inventory and assess the current state of and trends in priority coastal, estuarine, nearshore and offshore Gulf of Mexico habitats to inform resource management decisions.

How does this support Gulf recovery and build resilience to future hurricanes?

An accurate and comprehensive inventory of Gulf coastal habitats, such as barrier islands and coastal wetlands, will allow resource managers to target conservation and restoration projects to maximize flood and storm surge protection benefits. In addition, this information will allow rapid impact assessments immediately following hurricanes and other coastal hazards.

Long-term Partnership Goal:
Identify, inventory and assess the current state of and trends in priority coastal, estuarine, nearshore and off shore Gulf of Mexico habitats to inform resource management decisions.

Gulf GAME - Objectives

The aim of the project is to develop an inventory of habitat-related data within the Gulf of Mexico. This will serve as a foundation to develop a spatial framework for Ecosystem-Based Management associated with regulatory and planning programs and areas of government coordination.

The data inventory will have both a regional and local scope and will focus on gathering data and mapping coastal habitats from the estuaries onshore to the edge of the continental shelf offshore to a depth of 200 m.

Habitat-related Data

- **Bathymetry**

- **Benthic habitats:**

- seagrass beds (*EPA's critical need*)
- oyster reefs
- coral reefs

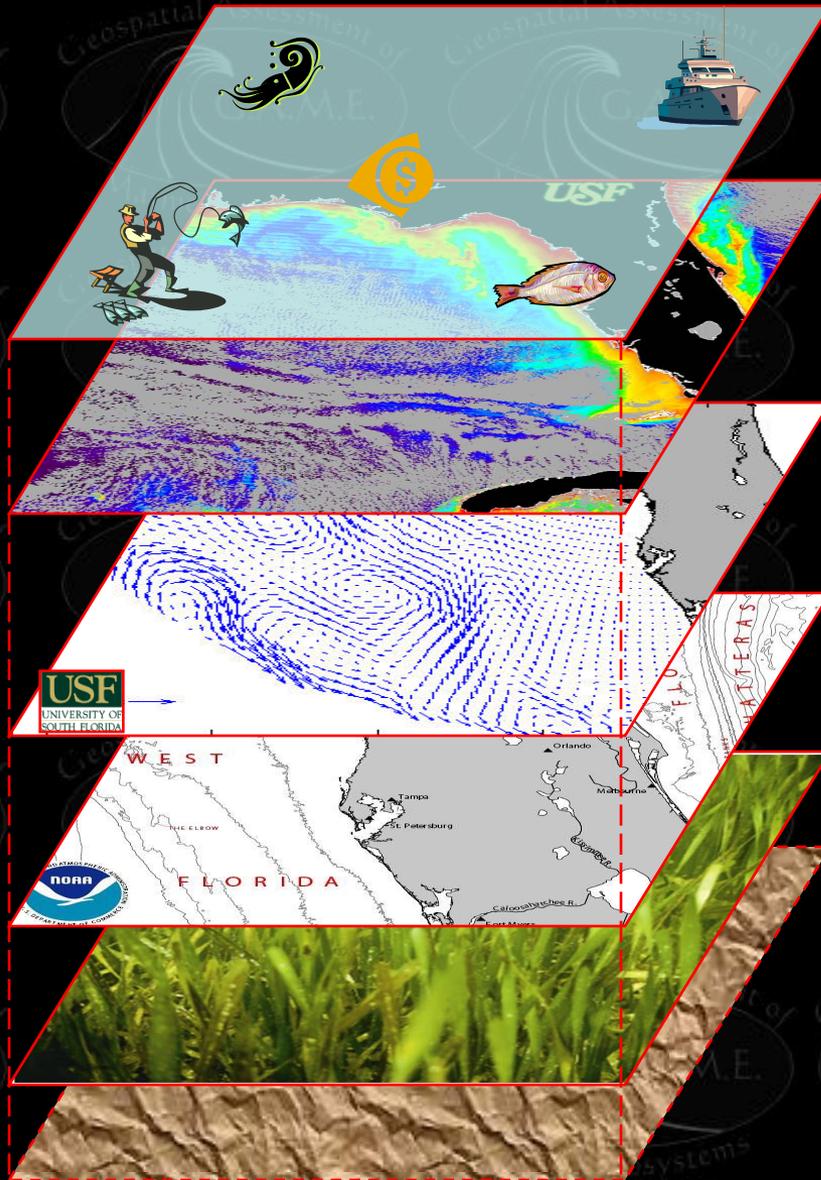
- **Oceanography:**

- circulation patterns
- salinity
- temperature

- **Geomorphology:**

- topography
- sediment characteristics

GIS Data Layers



Socioeconomic data

Chlorophyll distribution

Ocean Currents

Bathymetry

Habitat Type

Topography

What one piece of information can answer all of these questions?

Who?

METADATA

Where?

What?

When?

Why?



Methods – The GAME Catalog

- A relational database describing key features (metadata-lite) for each data set
- Highly compatible database for multiple applications
- Broad definition of each class; detailed information can be found in associated metadata
- Federal Geographic Data Committee (FGDC) concurrent
 - The utility of the catalog is that it will point to data sets of interest

GAME Survey



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FISH AND WILDLIFE RESEARCH INSTITUTE



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GAME Survey

Welcome!

Information Survey – seeks to locate, catalog, and acquire existing data on marine habitats. This includes near-shore, coastal and shelf areas as well as the human uses of our waters. The project will assemble the many sources of physical, geomorphological, biological, chemical, and ecological data in a Geographic Information Systems (GIS) format.

Please complete our short survey. All data are important – we may help digitize your data at no cost. Your data are critical to our efforts.

An * (asterisk) indicates a required field.

*Data set name:

*Data set description:

Keywords: (Please select all that apply)

To select make multiple selections hold down the CTRL button while making a selection

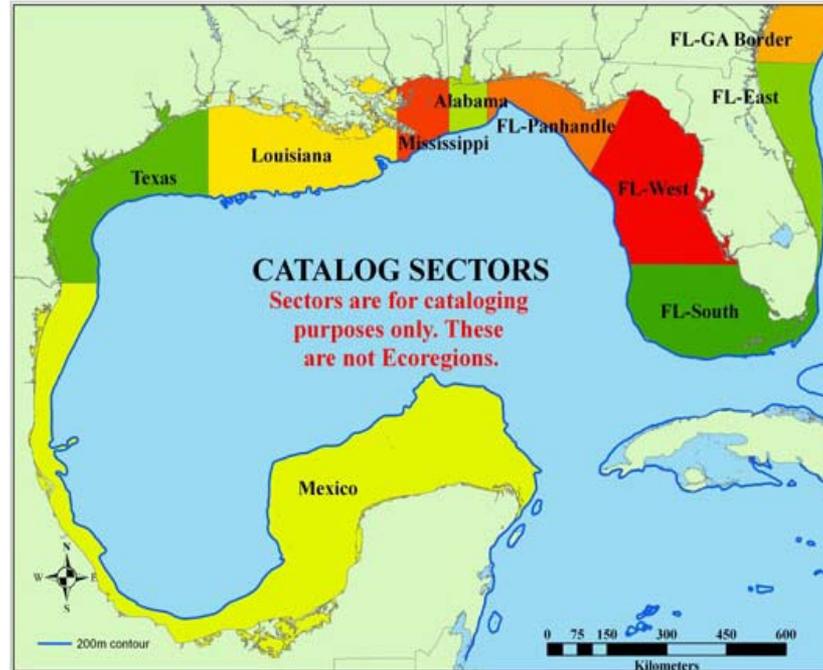
- Aerial photography
- Air-sea fluxes
- Algae
- Aquatic preserves
- Artificial Reefs
- Attenuation
- Bathymetry
- Beach renourishment
- Beaches
- Benthic communities

<http://research.myfwc.com/game/survey.asp>

GAME Survey

*Sectors: (Please select all that apply)

- Alabama
- FL East
- FL East (Georgia border)
- FL Panhandle
- FL South
- FL Statewide
- FL West
- Gulfwide
- Louisiana
- Mexico
- Mississippi
- Texas



*Place keyword:
(Study area)

Interactive Web page

Do you already have complete FGDC compliant metadata?

YES

NO

Click here to upload existing FGDC compliant metadata records in MERMAid

Click here to create new metadata records using the GAME Survey

Click here to create new FGDC compliant metadata records in MERMAid

Want to know how to use MERMAid? Download PDF (1MB)

Your metadata records will be uploaded into the PHINS database by checking the PHINS box in MERMAid

Your metadata records will be uploaded into the PHINS database by checking the PHINS box in MERMAid

Brief overview of PHINS and MERMAID Download PDF (29 KB)

GAME records will be automatically uploaded in PHINS (link)

Records can be searched in the Priority Habitat Information System (PHINS) Digital Library

Email: Gulf_Habitat@myfwc.com

Image provided by Geography Network Services hosted by ESRI

From this page users are directed to

- the GAME survey to create metadata “lite”
- MERMAid to upload existing and/or create new FGDC compliant metadata records
- the PHINS Digital Library

MERMAid Web Site



NATIONAL COASTAL DATA DEVELOPMENT CENTER
Providing Access to the Nation's Coastal and Ocean Data Resources

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Metadata Tools



Access and information about various tools, including tools such as the Metadata Enterprise Resource Management Aid (MERMAid), used for creation, validation, management or publication of metadata.

Metadata Enterprise Resource Management Aid (MERMAid)

NCDDC provides coastal data resources (organizations and individuals) with a web-based tool to develop, validate, manage and publish metadata records via secure internet access. The Metadata Enterprise Resource Management Aid (MERMAid) allows users/data providers to establish unlimited metadata databases to organize their metadata records any way they see fit (i.e. by program, project, data type, personnel).



Key features in MERMAid include

(1) user-defined roles and permissions at the metadata management and database levels; (2) change tracking; and (3) enhanced validation. Also, your existing FGDC compliant metadata (in XML format) can be ingested into and managed through MERMAid.

In the near future, NCDDC will be shifting from its current metadata catalog to a knowledge base catalog. MERMAid will play an integral role in this transition. To better leverage these new capabilities, enhanced search and discovery tools will be made available to the public and metadata managers that will provide powerful drill-down features.

Additional Tools

NOTE: Some links on this page take you to offsite locations

Additional tools to assist in metadata creation and metadata management are available for download and for use online. The following tools provide a means to create FGDC compliant metadata. NCDDC does not endorse the tools named.

Downloadable and remote web-access tools (free)

Getting Started with MERMAid

- [Request an Account](#)
- [V1.2 Getting Started Guide \(PDF 5 MB\)](#)
- [V1.2 Getting Started Guide \(PPS 6.5 MB\)](#)
- [V1.2 PPS WinZip File \(ZIP 5.0 MB\)](#)

PHINS Digital Library & Map Viewer

GULF OF MEXICO ALLIANCE

Home | Action Plan | Leadership | Press Room | Events | File Library

The Gulf of Mexico Alliance Digital Library - Spatial Search [Standard Search](#)

Search

Keyword:

Types (No checks returns all)

- Document
- Map
- Spatial Data
- Presentation
- Photo
- Poster
- Tabular Data
- Aerial Photo
- Web Resource

[Search Database](#)

Digital Library to search for data and information

Map Viewer to build maps and view data by simultaneously pulling from PHINS participants

GULF OF MEXICO ALLIANCE Map Viewer

Main | Layers

- WEB MAP SERVICE: CBRS_WHS_00
- NAMED FEATURES
- USE POPULATED PLACES
- TRANSPORTATION - ROADS
- RIVERS CREEKS AND STREAMS
- RIVERS LAKES AND BAYS
- MUNICIPALITIES
- GULF COAST COUNTIES
- MEXICAN STATES
- US STATES
- WEB MAP SERVICE: MEX_WHS_EDGIS_WETLAND
- AVAILABLE WETLAND DATA
- WEB MAP SERVICE: GONEXL
- US RELIEF
- WEB MAP SERVICE: CBRS_WHS_01
- NOAA CHART: GULF OF MEXICO

Width of map: 6463000 FEET

State and Federal Collaboration

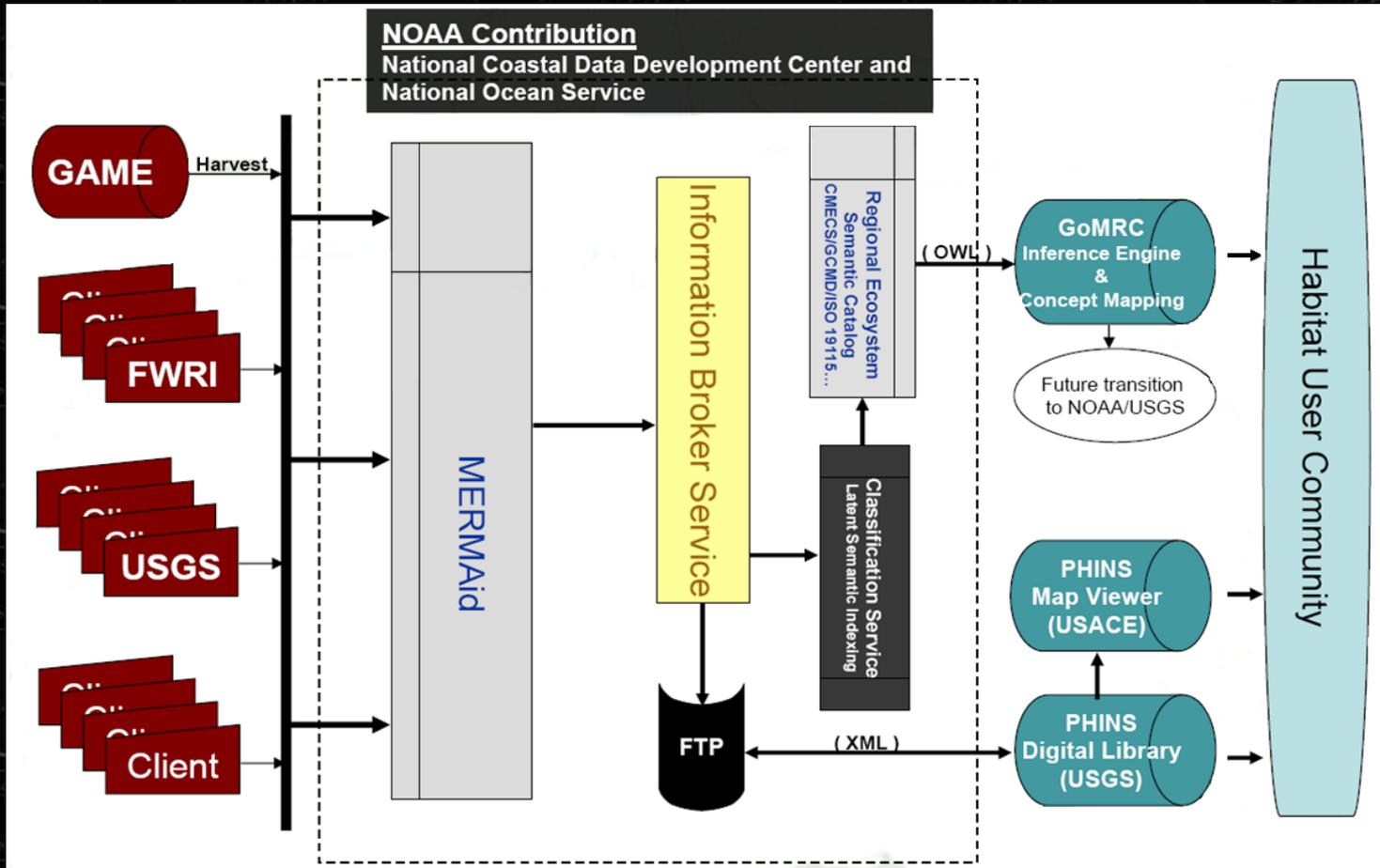


Diagram courtesy of Robert Wilson, NOAA

Results & Conclusions

- Prototype Web Portal to provide public access to and delivery of current and historic local, state and federal Gulf of Mexico habitat data
- The Portal allows users to search a Digital Library for habitat information by keyword or geographic location
- The Portal allows users to preview geospatial data

Making this project work is possible only through the sharing of knowledge and pooling of resources with properly prepared metadata.

What's next?

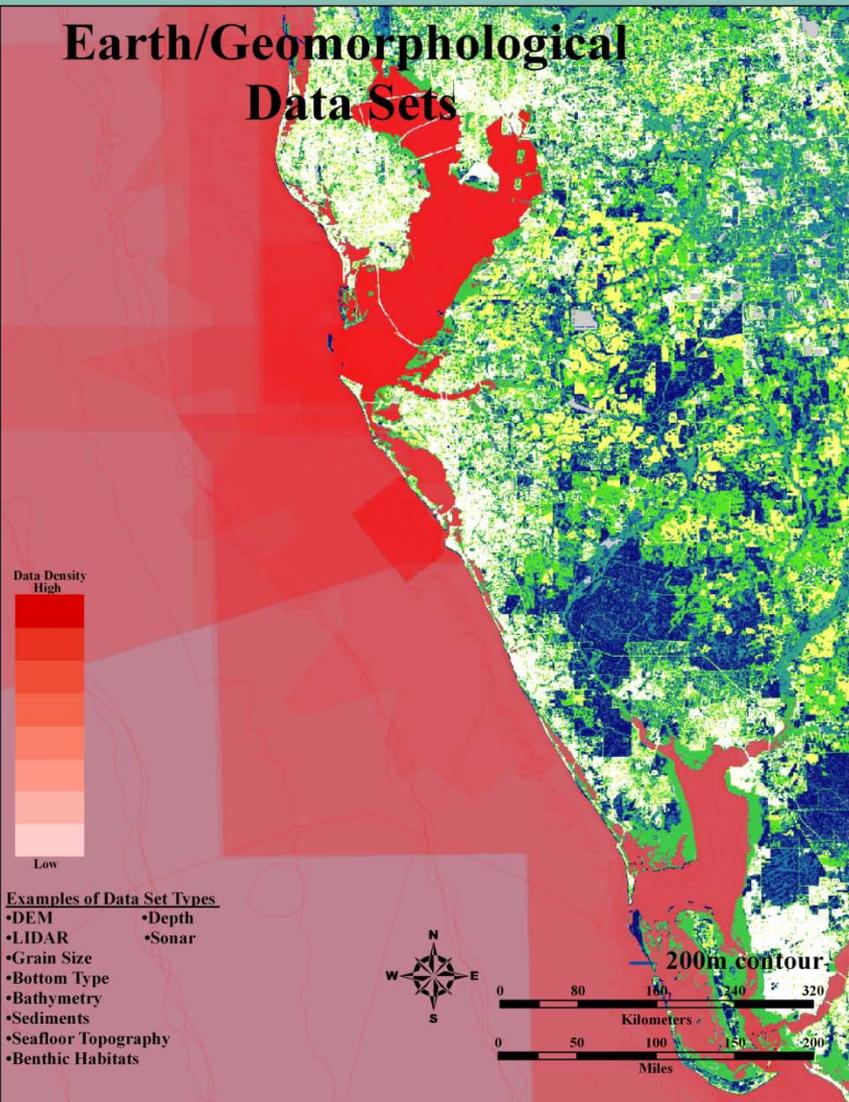
Phase II:

Gap analysis of existing habitat data in the region

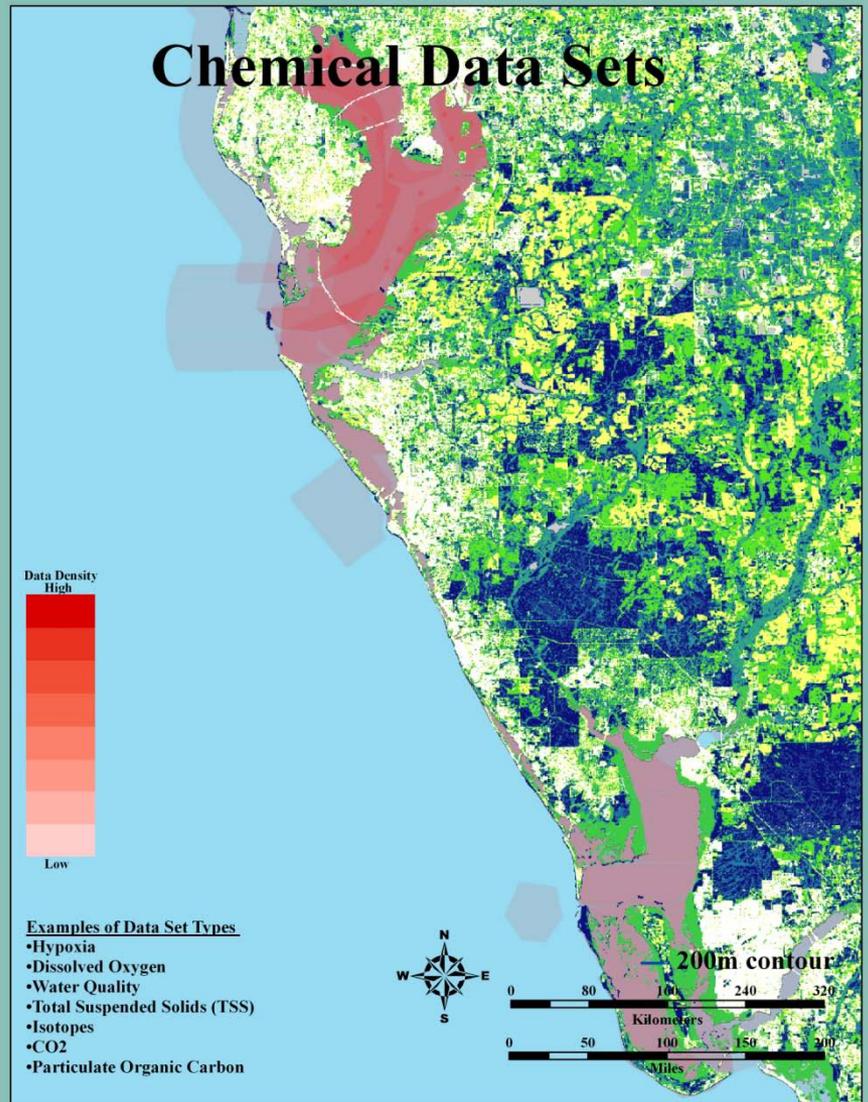
- Qualitative gap analysis of geospatial data compiled from all the Gulf States
- Design and implement a quantitative gap analysis for Florida that will serve as a pilot project for conducting gap analyses in other States

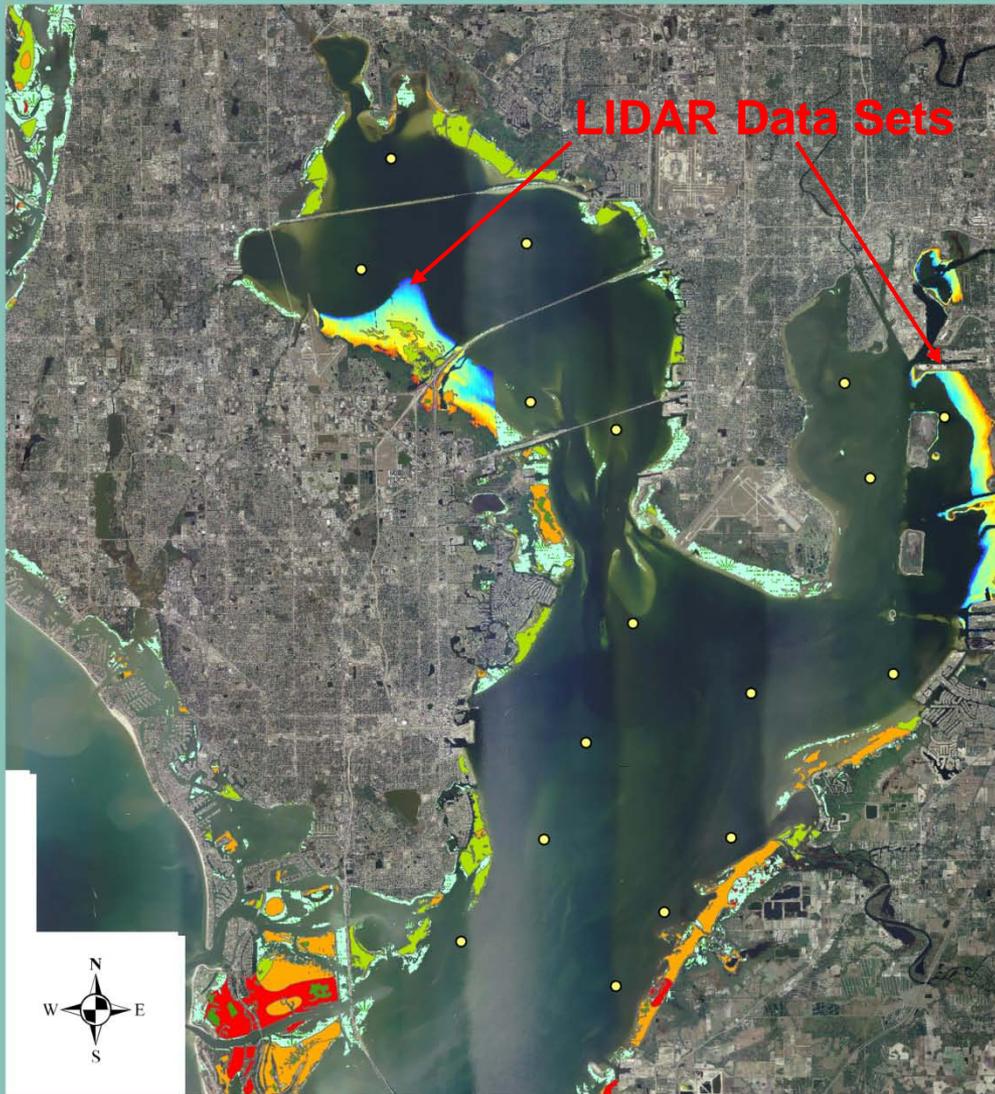
Gap Maps – Tampa Bay, FL

Earth/Geomorphological Data Sets



Chemical Data Sets





LIDAR Data Sets

This map show how a diverse overlay of information can be used by decision makers to assess the different types of data available.

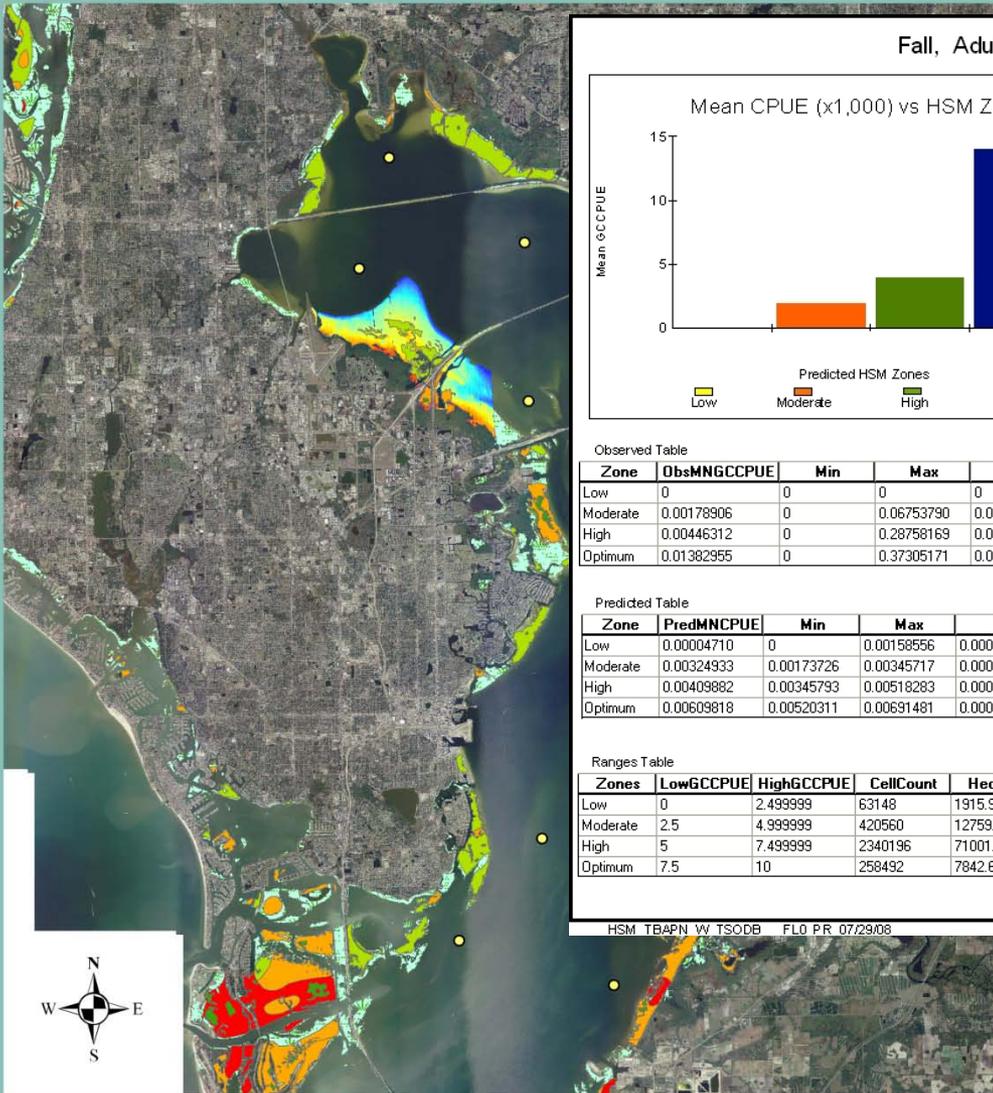
LIDAR, seagrass coverage, human influence (boat propeller scars) and chemical testing sites are shown over satellite imagery for Tampa Bay.

All data shown here are located in the GAME Catalog.

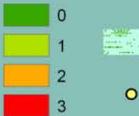
Human Use
FL. prop scars
Damage Code

- 0
 - 1
 - 2
 - 3
- Biological Seagrass**
- Chemical Isotopes locations**

Example of GAME Catalog Information



Human Use
FL. propcars
Damage Code

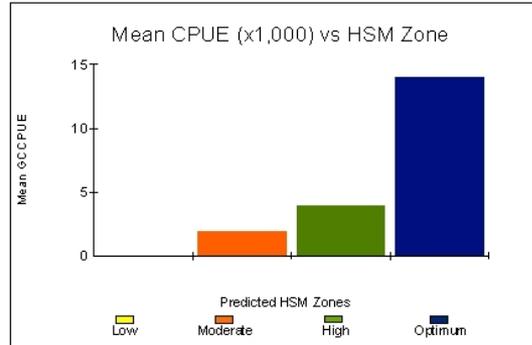


Biological
Seagrass

Chemical
Isotopes locations

Example of GAME Catalog Information

Fall, Adult Pinfish, ≥ 100 mm SL, Tampa Bay CPUE



Observed Table

Zone	ObsMNGCCPUE	Min	Max	Std	Count
Low	0	0	0	0	52
Moderate	0.00178906	0	0.06753790	0.00730723	262
High	0.00446312	0	0.28758169	0.01578575	1032
Optimum	0.01382955	0	0.37305171	0.03286298	277

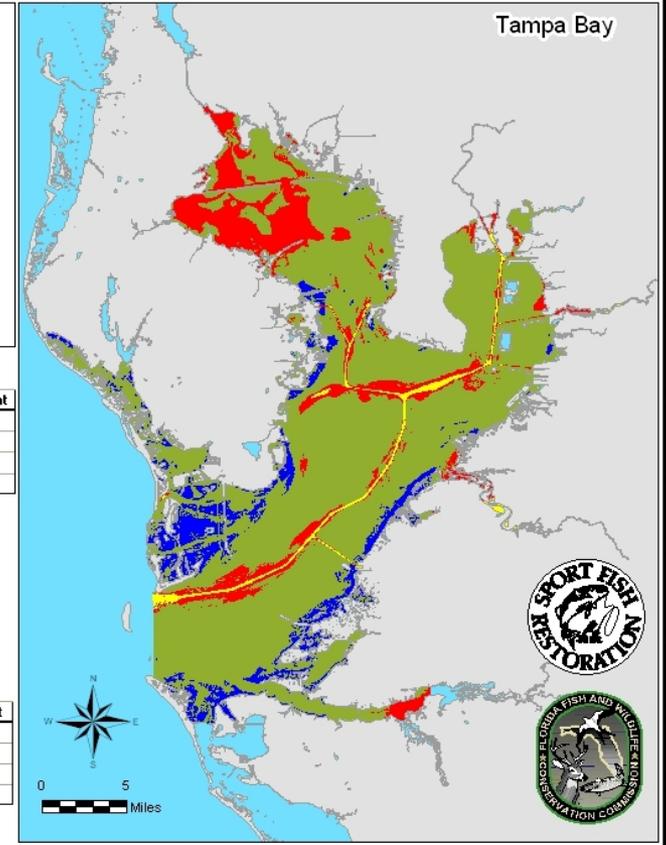
Predicted Table

Zone	PredMNCPPUE	Min	Max	Std
Low	0.00004710	0	0.00158556	0.00025160
Moderate	0.00324933	0.00173726	0.00345717	0.00019356
High	0.00409882	0.00345793	0.00518283	0.00039264
Optimum	0.00609818	0.00520311	0.00691481	0.00032013

Ranges Table

Zones	LowGCCPUE	HighGCCPUE	CellCount	Hectares	Percent
Low	0	2.499999	63148	1915.91032	2.04
Moderate	2.5	4.999999	420560	12759.7904	13.6
High	5	7.499999	2340196	71001.5466	75.9
Optimum	7.5	10	258492	7842.64728	8.38

HSM TB&PN W TSODB FL0 PR 07/29/08



The above maps uses data found in the GAME Catalog to predict Adult Pinfish locations based upon several environmental variables.

Thank you

Questions and Comments ?

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