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Data Integration Issues in the Gulf of Mexico

**The North Pacific Marine Science Organization Annual Meeting
Honolulu, Hawaii
October 15, 2004**

Jeanne Allen





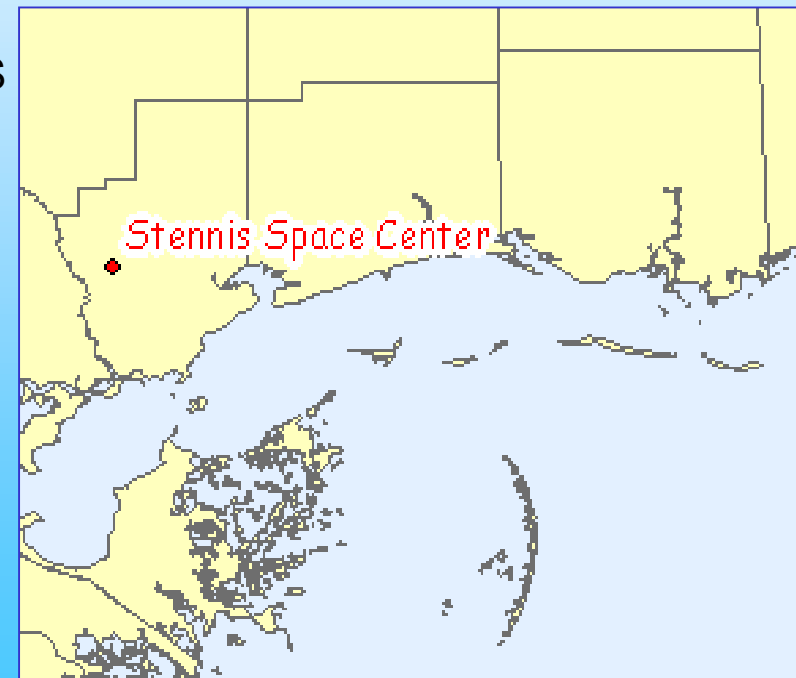
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About NCDDC

- Located at the Stennis Space Center, Mississippi
 - A unique 'Federal City'
 - Home to more than 40 Federal & State Agencies
 - NOAA
 - NWS, NMFS, NESDIS, NOS
 - NASA, Navy, Coast Guard
 - EPA, USGS
 - Contractors & Vendors
 - Small Business Incubator
 - Universities
 - Many others . . .





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NCDDC Mission

- To support ecosystem stewardship and to provide access to the Nation's coastal and marine data resources

NCDDC Capabilities

- Practical implementation of Data Management services
 - Dynamic web capabilities and services
 - Metadata management via training, creation and publication
 - Software development to facilitate data access and retrieval
 - Geospatially enabling data for display, query and analysis



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About HABSOS

- **Design a HAB data management system and communication system**
 - Network government agencies and coastal research labs
 - Provide timely access to data and information
- **More effective use of collective resources on a regional scale**
 - Leads to more timely detection, tracking and forecasting
- **Gather data from Gulf of Mexico states for 1996, 1997 and 2000**
- **HABSOS Working Group**
 - EPA Gulf of Mexico Program Office
 - NOAA NCDDC
 - NOAA CSC
 - Florida Marine Research Institute
 - Dauphin Island Sea Lab
 - Alabama Dept of Public Health
 - University of Southern Mississippi
 - Louisiana Universities Marine Consortium
 - Texas Dept of Parks & Wildlife
 - University of Texas Marine Science Institute

Major Question: With the relevant data and communication infrastructure in place, can we forecast or predict the development, transport and impacts of *K. brevis* ?



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HABSOS User Requirements

- **State managers make decisions regarding**
 - **Public health issues**
 - fish/shellfish consumption
 - shellfish bed closures
 - beach advisories
 - **Aquaculture issues**
 - sites
 - disease
 - mortality
 - **Economic issues**
 - tourism
 - beach clean-up
 - monitoring
 - fisheries
 - **Dissemination of information to public**

24 hour advance notice is a high priority

- **An alert that an event is in progress**
- **A forecast of where/when movement landfall**



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NCDCC Approach

- Create website
 - Connect partners
 - Connect users to data
- Online mapping
 - Graphical presentation of data
 - Secure site – case study
 - Public site – general info



HABSOS - Harmful Algal Blooms Observing System

[Credits](#)[Help](#)**Restart**

Restarting the site will clear the query

FLORIDA

Visible Active

☐ ☒ FL Artificial Reefs**ALABAMA**

Visible Active

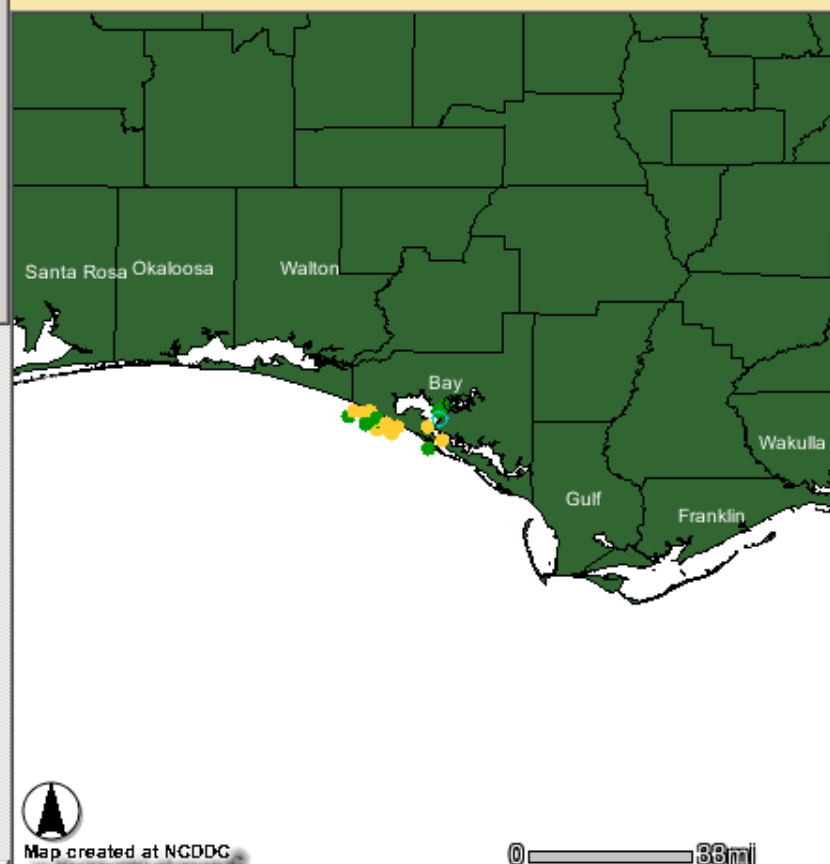
☐ ☒ AL Artificial Reefs**MISSISSIPPI**

Visible Active

- ☐ ☒ MS Boat Launches
☐ ☒ MS Marina Pumpouts
☐ ☒ MS Public Beach Access Points
☐ ☒ MS Artificial Reefs
☐ ☒ MS Oyster Reefs
☐ ☒ MS Oyster Zones

LOUISIANA**Refresh**

Legend Zoom In Zoom Out Full Extent Active Last Pan Identify Clear Print Extract



Map created at NCDDC

U.S. States

Florida

Go

Mexican States

-All States-

Go

Query Functions

Begin Year

2000

End Year

2000

Begin Month

September

End Month

October

Begin Day

25

End Day

5

Salinity (ppt)

>=

Temperature (C)

>=

Submit**Imagery****Add it****Delete it**☐ SST☒ Chlorophyll

<<

<<

9-27-2000

>>

>>



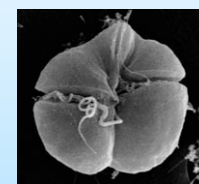
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About Data Integration Issues

- **Data collection**
- **What constitutes a harmful algal bloom?**
- **Monitoring different toxins**
- **Geo-referenced data**
- **Shellfish monitoring**





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Data Collection

- **Poor communication**
 - Between state agencies
 - Between state and federal agencies
 - Between government and coastal research labs
- **No comprehensive inventory of existing/available data/metadata**
 - Where is the data
 - What is the format of the data
 - Who to contact for the data
- **Managers vs. Researchers**
 - Managers do not want public to have access to raw data
 - Researchers want to be first to publish their findings

Data accessibility is key



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Little consistency among programs – states operate differently



**Received one
data set from
Veracruz, Mexico**



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What constitutes a harmful algal bloom?

“Scientists now prefer the term, HAB, to refer to bloom phenomenon that contain toxins or that cause negative impacts.”
<http://www.whoi.edu/redtide/whathabs/whathabs.html>

- **US (cell counts)**
Mouse bioassay – only approved FDA method
Gulf of Mexico – *Karenia brevis* with 5000 cells/L results in closure of shellbeds
- **Mexico**
Mexico does not use same standards as US
- **Recommendations for standards need to be agreed upon**

Integrated international efforts should be made to monitor all species



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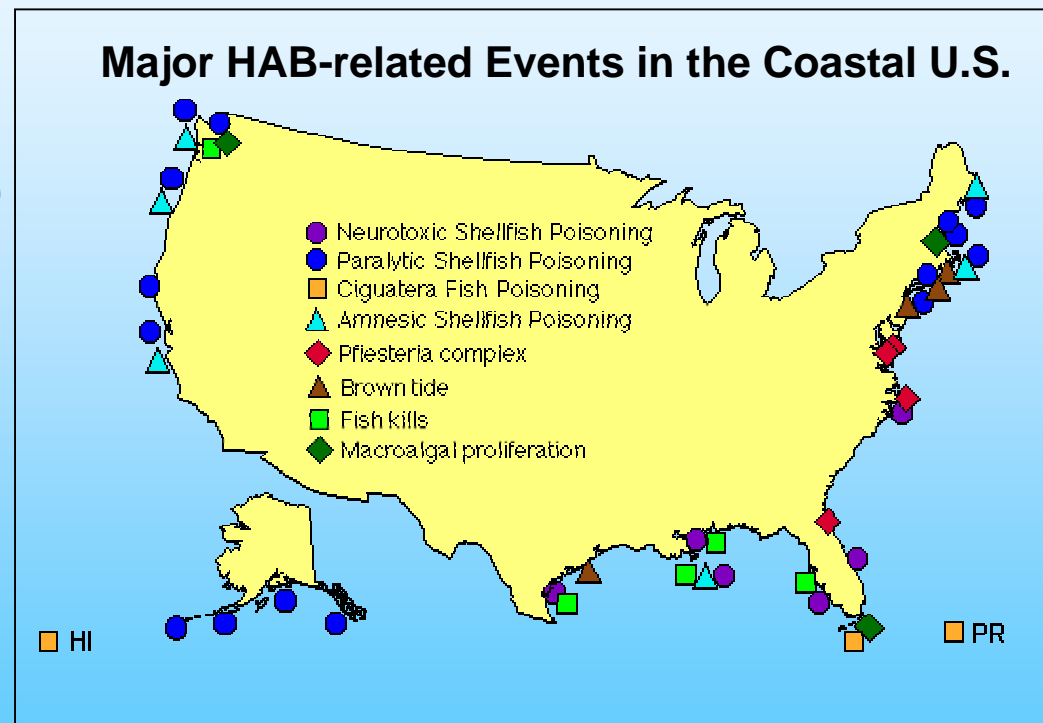
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Monitoring different toxins

- **Gulf of Mexico**
 - **Karenia brevis**
- **Northern Pacific (Washington)**
 - **Alexandrium**
 - **Dinophysis**
 - **Pseudo nitzschia**
- **Atlantic**
 - **Pfiesteria**

If other species exist, can they be monitored as well?

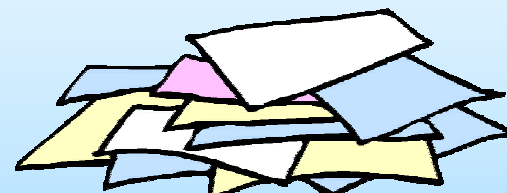


Natural phenomena do not recognize political boundaries



Geo-referenced data

- Data is stored in spreadsheets or on paper
- No spatial data to accompany data
- Data not always available online
- Data is discarded





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Overview of HABSOS Raw Data Collections

1996,1997, 2000	Florida	Alabama		Mississippi	Louisiana	Texas	
	FMRI	ADPH	DISL	USM	LUMCON	TPWD	UTMSI
Data Types							
- DO	X						X
- Salinity	X	X	X	X	X	X	X
- Temperature	X	X	X	X	X	X	X
- Chlorophyll							X
- Cell Counts	X	X	X	X	X	X	X
Data Formats							
- Excel			X	X	X	X	X
- Access	X	X					
Metadata	X						

Data availability does NOT mean that data are useable



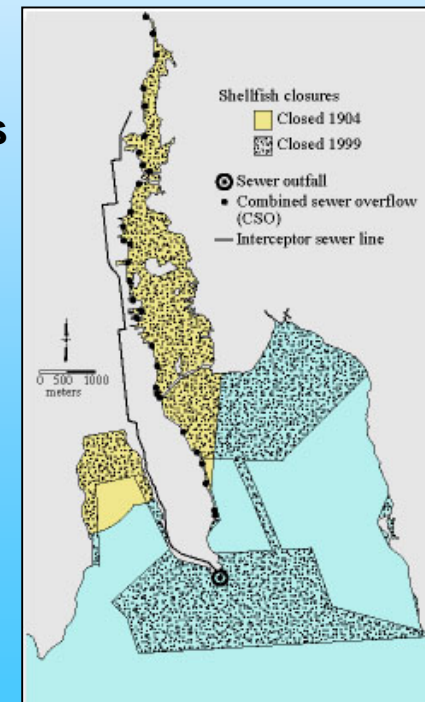
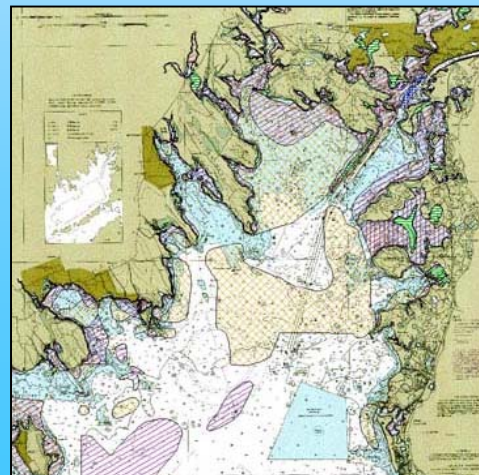
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Shellfish monitoring

- Health of shell beds is key
- Many times shellfish closures are recorded for a region, not for a specific site
- Monitoring resources directed to areas with high incidence
- Lessons learned from monitoring could be applied to other areas





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Shellfish monitoring programs

Risk Analysis and Information Management

SIMS: Shellfish Information Management System

WHAT: Integrated database of shellfish resource and water quality information with GIS functionality

WHY: Improve information sharing to promote shellfish safety, management, and habitat restoration

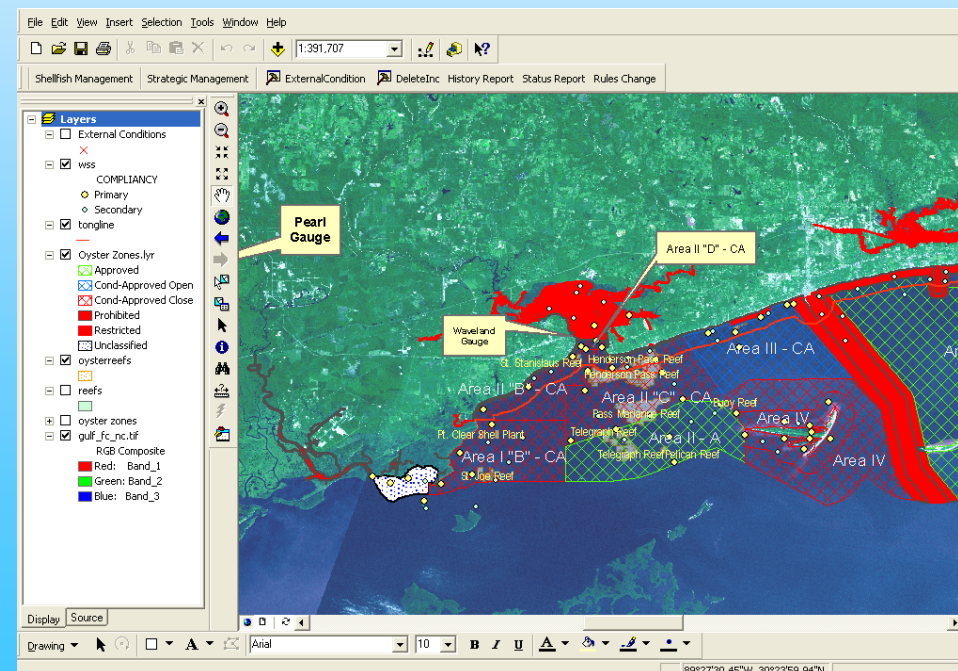


http://205.156.31.24/Sims_Web/SIMS_PUB/index.htm

NOAA

National Center for Coastal Ocean Science
Charleston, SC

Jackson State University
Jackson, MS





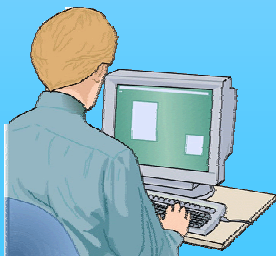
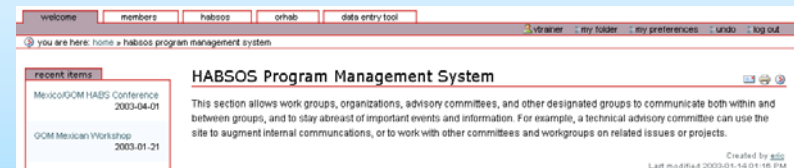
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Solutions

- **Groupware collaboration**
- **Common database**
- **Data entry tool**
- **Password protect sensitive data**
- **Store data in native format**



User Name

Password

☐ Remember my name.





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Ongoing Activities

- Migrated shapefiles to a relational database
- Using ESRI's ArcSDE to geospatially enable data for map display and near-real time applications
- Online data entry tool – under development

Algal Blooms Observing System

State:

Start Date: 2004 / / : :

Collection Date: 2004 / / : :

Latitude:

Units:

Longitude:

Units:

Publication Release Date & Time: 2004 / / : :

Sample Depth:

Chlorophyll (mg/L)
Please enter chlorophyll measurements in mg/L:

Water temperature:

Dissolved Oxygen (ppm)
Please enter dissolved oxygen measurements in ppm:

Genus Name:

Cell Count:

Units:

Salinity (ppt)
Please enter salinity measurements in ppt:

Temperature Units:

Species:

Cell Count Units:



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NOS Near Real-Time Bulletins



Experimental Gulf of Mexico Harmful Algal Bloom Bulletin

2 October 2002

National Ocean Service/NCCOS and CSC
NESDIS/CoastWatch and NDBC

Analysis

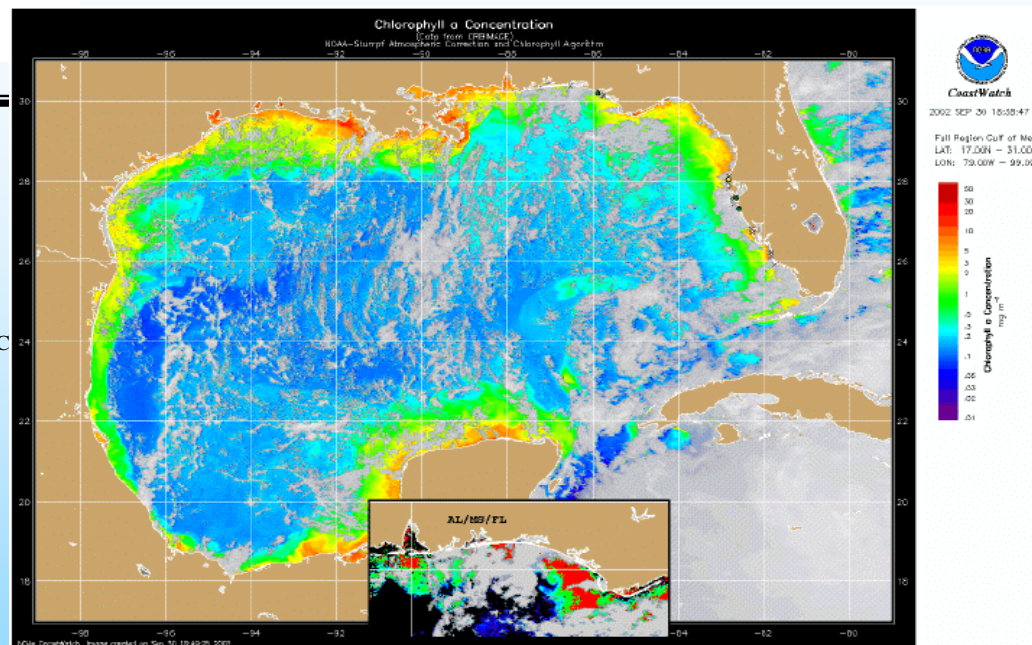
Last bulletin: September 19, 2002
Tropical Storm Hanna pass through on Sep 14,
Tropical Storm Isidore on Sep 26. Isidore
stirred up much of the eastern Gulf Coast. A
larger area of potential bloom is still identified
in the Florida Panhandle region. Field data
reports bloom around Cape St. Joe, it is likely
that some westward spread has occurred along
the Florida Panhandle. NE winds between
events has favored westward transport.

The major diatom bloom along the south Texas
coast is continuing.

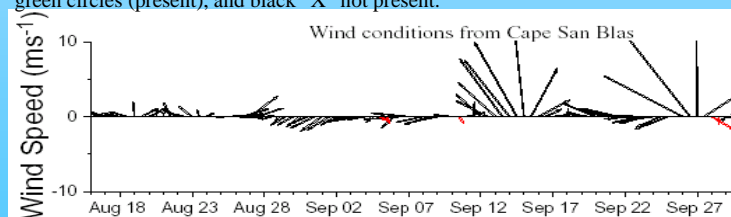
--Stumpf

Please note the following restrictions on all SeaWiFS imagery derived from CoastWatch:

1. These data are restricted to civil marine applications only; i.e. federal, state, and local government distribution is permitted.
2. Distribution for military, international, or commercial purposes is NOT permitted.
3. There are restrictions on Internet/Web public posting of these data.
4. These image products may be published in newspapers (any other publishing arrangements must receive OrbImage approval via the CoastWatch Program).



Chlorophyll concentration (above) and possible HAB areas shown in red (inset). Cell concentration sampling data from September 26, 2002 shown as red squares (high), red triangles (medium), red circles (low), orange circles (very low b), yellow circles (very low a), green circles (present), and black "X" not present.



Wind speed and direction are averaged over 12 hours from measurements made on NOAA buoys. Length of line indicates speed; angle indicates direction. Red vectors indicate that wind direction favors upwelling near the coast.

http://coastwatch.noaa.gov/hab/bulletins_ns.htm





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Buoys

Satellites

Tides

River Gages

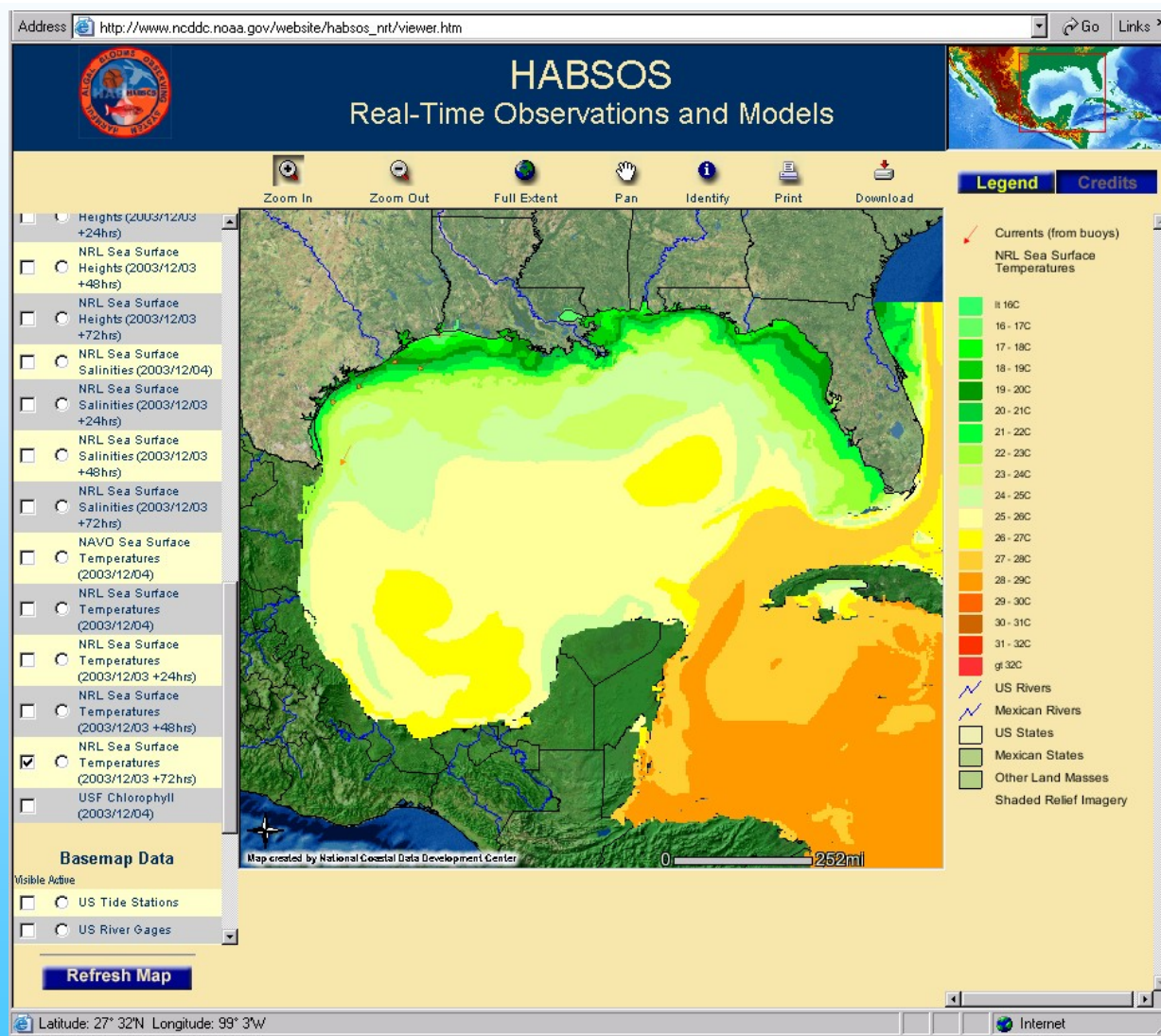
METAR Stations

Real-Time Observations



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3 Day Forecast of:

Surface Currents

Sea Surface Heights

Salinities

Sea Surface
Temperatures

Oceanography from Naval Research Laboratory



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Questions? / Contact Information

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