Data Management at NCDDC

Sharon Mesick  
Deputy Chief Scientist  
National Coastal Data Development Center

Abstract

The National Coastal Data Development Center is NOAA’s newest data center, providing Internet based discovery, display and delivery of coastal data from distributed sources. This presentation will focus on NCDDC’s information technology infrastructure, which facilitates remote access to data collections maintained by a variety of Federal, State, Academic, and other organizations. Data collected and maintained by NCDDC for eco-system based management within the Gulf of Mexico, in collaboration with NMFS offices, will also be presented.
NOAA Coastal Data Development Center
Overview of Data Management Activities

Workshop on
GIS Tools Supporting Ecosystem Approaches to Management

September 8-10 2004

Sharon M. Mesick
Presentation Overview

– About NCDDC
– Meeting Data Management Requirements
– Questions
NCDDC:

Who we are

Director
Joe Stinus

Customer Service
M. Crane

Science Operations
R. Beard

IT Operations
S. Starke

Total Personnel
Federal: 12   Contractor: 26
NCDDC: Location

- Located at the Stennis Space Center
  - 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 . . .
Regional Offices

• Represent NCDDC at regional meetings and workshops.

• Provide assistance in ecosystem data access, archival and retrieval.

• Facilitate data management efforts in each region.

• Sponsored partnerships, e.g., NCCOS-Charleston.
Tactical Organization: NOAA Mission Goals

- Ecosystems
- Climate
- Weather & Water
- Commerce & Transportation
- Organizational Excellence & Mission Support

- 9 Programs

✓ Ecosystem Observing Program
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
Presentation Overview

- About NCDDC

- Meeting Data Management Requirements
  - Examples
  - Future Directions
  - Data Summary

- Questions
Data Management Schematic

Authenticated User

Public Web

Text

GIS

Metadata Catalog

Middleware Data Access/Distribution

Remote Data Repository

Local Data Repository

MERMAid

Project/Intranet GroupWare

Secure Web

Public User
Data Management Schematic

Authenticated User

Secure Web

MERMAid

Project/Intranet GroupWare

Public Web

Public User

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Metadata Catalog

Middleware Data Access/Distribution

Remote Data Repository

Local Data Repository
Project Organization and Management

Working Groups

This is a central access point to the various working groups. Local roles are set within each group to control access by community members.

- Video and Photo
  Contains documents and files pertinent to the work of the IPT Video and Photo Working Group

- Digital Atlas
  Contains documents, files, etc., pertinent to the OE Pilot Project/Digital Atlas Working Group

- Metadata
  Contains documents and other pertinent information to support the Metadata Working Group.

- Data Manager
  A repository for the Data Manager Working Group.

- Data Management Process
  Contains documents, files, etc., for the Data Management Process Working Group

- Cruise Reports
  Contains documents, files, etc., pertinent to the Cruise Reports Working Group
MERMAid: Metadata Creation and Management
Data Management Schematic

Authenticated User

Secure Web

MERMAid

Project/Intranet GroupWare

Remote Data Repository

Local Data Repository

Metadata Catalog

Middleware Data Access/Distribution

Text

GIS

Public Web

Public User
Internet Accessible Capabilities

Coastal ecological systems are units – such as estuaries, coral reefs, islands, or regions like the Gulf of Mexico – within which all organisms interact among themselves and with the physical environment. A clearly defined structure, diversity, and energy flow. Any change to these systems is fundamental, as it affects the entire ecosystem, from plants to animals. Coastal systems are highly vulnerable due to climate change and other anthropogenic factors. Monitoring these systems is essential for understanding the impact of these changes and for developing strategies to mitigate them.

Coastal ecosystems are complex and interconnected, making it challenging to study them comprehensively. However, advancements in technology, such as remote sensing and geographic information systems (GIS), have made it possible to collect and analyze data from these systems. This data can be used to assess the health and resilience of coastal ecosystems and to develop strategies for their conservation.

The National Oceanic and Atmospheric Administration (NOAA) has been working to improve access to this data through initiatives like the Coastal Data Information Program (CDIP) and the Coastal Data Information Program (CDIP). These programs provide a platform for sharing and accessing data, allowing scientists, managers, and the public to access the information they need to make informed decisions.

By making this data accessible, the NOAA aims to support research, inform policy decisions, and enhance public understanding of coastal ecosystems. This access is crucial for addressing the challenges facing coastal areas, such as climate change, overfishing, and pollution. With improved access to data, we can better manage and protect these vital ecosystems for future generations.

In summary, the NOAA’s efforts to make coastal data accessible are critical for understanding and conserving coastal ecosystems. Through their initiatives, they are taking a proactive approach to addressing the complex challenges faced by these systems, and their work is essential for the health and sustainability of our coastal environments.
Data Discovery and Delivery

- Southeast Area Monitoring and Assessment Program (SEAMAP) database
- See corresponding metadata file for definitions of parameters and ones references for codes
- Query parameters used:
  - startdate: 1990-01-01
  - enddate: 2002-08-31
  - lat: -81.1
  - lon: -37.6
  - species: Peneaus
  - species: S. setiferus
  - 2885 records returned out of a total of 2885.

Cruise Station Event Name Taxon Stock Gear Type Start End Time Zone Satellite Endabel Station
Data Management Schematic

Public Web

- Text
- GIS

Remote Data Repository

Authenticated User

Secure Web

MERMAid

Project/Intranet GroupWare

Metadata Catalog

Middleware Data Access/Distribution

Remote Data Repository

Local Data Repository
Internet Accessible Capabilities

Coastal ecosystems are defined as units—such as estuaries, coral reefs, islands, or regions like the Gulf of Mexico—within which all organisms interact among themselves and with the physical environment, develop a clearly definable structure, diversity, and energy flow. And since humans are fundamentally a part of most ecosystems, most coastal data—whether biological, physical, or human-related—are ecological in nature. Thus, the coastal ecological data record is very large, and, until the advent of computer and Internet technology, has been largely inaccessible to the coastal science and management community. Now that computer, Internet, and GIS-mapping technology have become capable of accessing, managing, transferring, and displaying tremendous quantities of data, it is feasible to greatly improve data management and access to the coastal ecosystem data record.
Gulf of Mexico Viewer:

This online mapping tool was created by NOAA's National Center in conjunction with NOAA's National Marine Fisheries Service. The purpose of this application is to combine fish habitat information with distribution for analysis. Coastal research and the customized interface can be used to select simple tools for data selection and mapping. The user can select higher region or state of interest, then further select offshore or nearshore (estuarine) locations. Scale dependent drawing is used extensively to control visualization of human impact, physical mapped in relationship to the available habitat information.

http://www.ncdce.noaa.gov/Habitat/GIS_mapping/ECOSYSTEM_Description_Layers
Data Management Schematic
Coastal Ocean Observing Systems

• Partners: NDBC, GoMOOS, COMPS, CO-OPS, TABS, TCOON, others…

• Data Sets
  – Surface Marine Weather
  – Chemical, Bio-optical
  – Physical Ocean Measurements

http://www.ncddc.noaa.gov/COOS/GIS_Mapping/COOS_Description_Layers
The software collects all data hourly. Data are converted to a universal format. The software collects all data weekly; data stored in NetCDF format, subset by date. The IMS points to SDE. IMS points to SDE.
Data Management Schematic
Harmful Algal BloomS Observing System

• Partners: More than 30 Federal, State, Academic, and Industry Organizations in the US and Mexico

• Data Sets
    • Florida, Alabama, Mississippi, Louisiana & Texas
  – Karenia Brevis toxicity data for 2001-2002
    • County of Veracruz, Mexico
  – Aquaculture sites, Shellfish beds, Oyster leases, artificial reefs
  – Beach access points, boat launches, marinas
  – Bathymetry, administrative boundaries, rivers, other framework layers

http://www.ncddc.noaa.gov/habsos/Mapping/HABSOS_Description_Layers
HABSOS Real-Time Observations & Models

- Partners: EPA, NASA, NRL-SSC, NOAA

Data Sets:
- Meteorological
- Oceanographic
- Imagery products

http://www.ncddc.noaa.gov/habsos/Mapping/HABSOS_NRT_Description_Layers
On-going Development

- Building the metadata catalog
  - Training, grants & contracts
- Connecting to additional data sources

Future Directions

- Building metadata on-the-fly
- Generating fused geospatial data products on-the-fly
- Application services
Data Summary

- Map Services
  - 508 compliant map services list all available data
  - FGDC metadata for all geospatial data
  - Most data downloadable

- Metadata catalog search
  - Geospatial, temporal &/or keyword search
  - Web link to data source
  - Many data sets downloadable from source
http://www.nceddc.noaa.gov
National Coastal Data Development Center
Stennis Space Center, Mississippi
228-688-2936