Results of Ocean and Coastal Inventory Survey

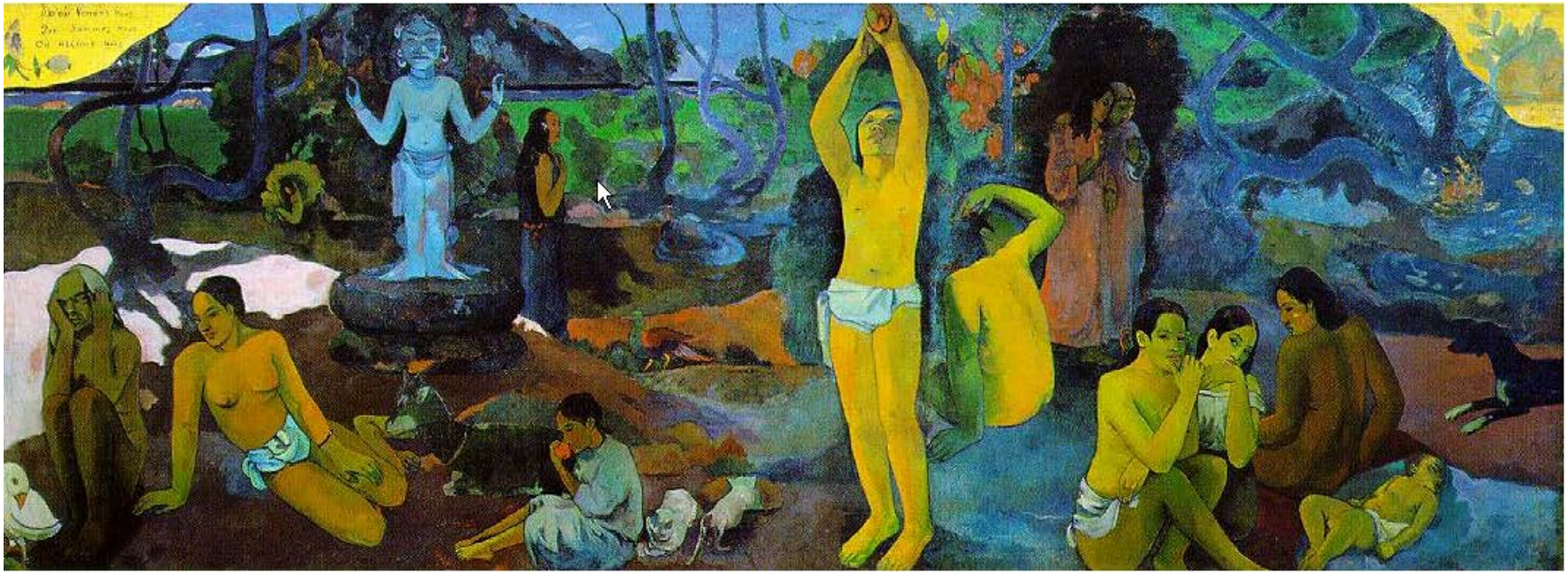
Robby Wilson NOAA,

IOCM Technical Workshop, DC

June 7-8th, 2011

Where Do We Come From. What Are We. Where Are We Going.

Paul Gauguin, 1897, Museum of Fine Art, Boston



Purpose of OCM Inventory Survey:

- Discover the current level of compatibility among federal mapping agencies (e.g. NOAA, USACE, USGS, BOMRE) .
- Assess existing federal systems, data/metadata standards, business models, best practices, technology, resources to to better share and coordinate OCM data (does one exist?) ….do we need to build our own Portal?
- Initial focus on ocean and coastal **elevation** data (bathymetry, topography, shoreline, LIDAR, imagery)…leverage off existing federal CMSP data mining activities
- To determine a best fit technology strategy for data discovery, inventory, access, preview, filter, and, data download via **web mapping services,** portal technology, metadata search engines, WAF, Google, MetaCarta, and ArcGIS 10 server services.

Results of OCM Inventory Survey:

IOCM Federal Mapping Survey:	Question 3: Maintained by federal agency?	Question 4: Data types in repository: (1)topo, (2)coastal elevation, (3)coastline position, (4)bathymetry,	Question 5: Methods for discovering metadata: (1) WMS, (2) web mapping application or service, (3) as a xml file	Question 6: Metadata elements : (1) FGDC field, (2) links to on-line data, (3) topical discussion, (4) time stamp, (5) spatial coverage (bounding box), (6) keywords, (7) title, (8) purpose, (9) access constraints, (10) use constraints, (11) contact info, (12) browse graphic, (13) polygon showing spatial coverage, (14) spatial resolution, (15) measurement details, (16) accuracy
USGS: The Coastal Marine Geosciences Data System (Miller)	YES	coastal elevation, bathymetry	**WMS** and website (but no url provided)	met all FGDC elements (sections 1,5,6,8), displayed via a **WMS** and at web site, **no citation** or controlled vocabulary provided
USGS: The Coastal Marine Geosciences Data System (Degnan)	YES	topography, coastal elevation, coastline position, bathymetry	via home website (Infobank) and GOS, also available as a XML file	met all FGDC elements (sections 1,4,5, 6,8) , available via a **WMS**, at **web site, used internally,** citation of controlled vocabulary or standards is provided
USGS: National Elevation Database (Mauck)	YES	topography, coastal elevation	via web mapping application **(National Map)**	met all FGDC elements (sections 1,4,5,6,8,9), displayed via a web site, **no WMS**, citation information provided FGDC-STD-001-1998
USGS: Center for LIDAR Information Coordination and Knowledge (Heidenann)	YES	coastal elevation	via web site (http://lidar.cr usgs.gov/)	met all FGDC elements (sections 1,4,5,6,8), displayed via a web site, **no WMS**, no citation information provided
NOAA: National Geophysical Data Center (Illg)	YES	coastal elevation, bathymetry	via metadata catalog: http://www.ng dc.noaa.gov/m etadata	met all FGDC elements (sections 1,4,5 6,8), displayed at web site, **no WMS**, citation information provided
USACE: USACE/JALBTCX (Sylvester)	YES	topography, coastal elevation, coastline position,	WMS (via web viewer hosted at USACE Mobile (TBD))	met all FGDC requirements (sections 1,5,6,8) displayed via web site, **no WMS**, limited citations

http://cmgds.marine.usgs.gov/

(Miller)

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Coastal and Marine Geoscience Data System (Single point of access to geoscience data)

This page uses a Google Earth plugin to display data as tracklines. If your browser is not capable of supporting this plugin, go to the Global Map Search page to download a KMZ file to display in the Google Map application. References to non-U.S. Department of Interior (DOI) products do not constitute an endorsement by the DOI. By viewing the Google Maps API on this web site the user agrees to these Terms of Service set forth by Google

This web site provides data services for the published data of the The U.S. Geological Survey, Coastal and Marine Geology Program (CMGP). Access to CMGP data is provided via Open Geospatial Consortium (OGC) standards services; serving CMGP data to GeoMapApp and Virtual Ocean 2-D and 3-D earth browsing tools, for data integration, visualization and analysis; and a metadata catalog.

- Global Search provides a simple map interface to locate data geographically. Using a Google Earth plug-in, track lines are displayed for each data set. Click on the track maps for a popup window with links to the data, publication, and field activity information.
- Data Publications is a publication bibliography divided up geographically. Each reference provides links to the data and to the publication.
- Metadata search is a database driven collection of the metadata for each data set.
- Data Set Status is a field activity based table of available data sets with links to field activity information and data access.
- THREDDS provides OpenDAP-based access to gridded data sets.
- Geospatial Geophysical Digital Data is also available through an Open GIS Consortium (OGC) Web Map Service (WMS). The WMS address is http://cmgds.marine.usgs.gov/geoserver/wms?request=GetCapabilities (Clicking the link will show our current capabilities). Some data is available using Web Coverage Service. The WCS address is http://cmgds.marine.usgs.gov/geoserver/wcs?request=GetCapabilities (Clicking the link will show our current capabilities).

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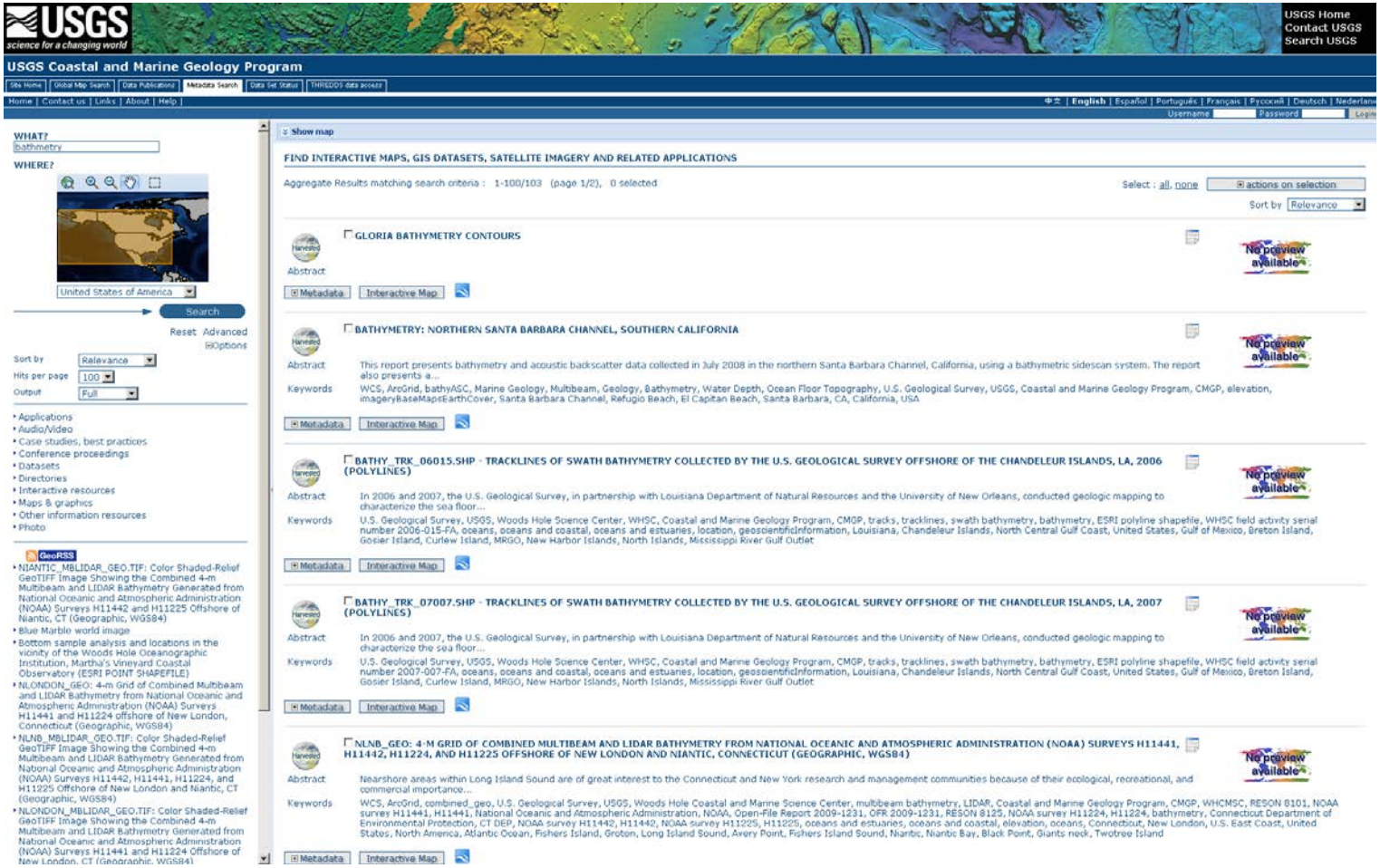

http://walrus.wr.usgs.gov/infobank/

(InfoBank is a field data catalog) **(Degnan)**

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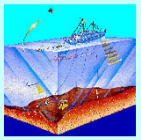
- **InfoBank**, KnowledgeBank's field data catalog, is a structured information storage scheme of databases and software that provide organized access to USGS Coastal and Marine data and metadata.

FACS



The CMG Field Activity Collection System (FACS) can be used to aid in the collection of metadata about a field activity, such as: overviews, crew lists, equipment lists, and events.

Field Activities

Information and data about specific data collection activities, such as: date, place, crew, equipment used, data collected, publications.

Atlas

Atlas maps show data for geographic areas and information and data about specific types of data within the area: such as bathymetry, gravity, magnetics, samples, seismic.

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Oceans and Coasts

The Digital Coast is a partnership and community resource in developed to address the needs of its users by providing a si

National Geophysical Data Center (NGDC) - NOAA

National Geophysical Data Center (NGDC) — NOAA Satellite and Information Service

NGDC archives and distributes geophysical data to the public

Coastal and Marine Geology (CMG) InfoBank - USGS

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InfoBank, KnowledgeBank's field data catalog, is a structured metadata.

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Publishing Organization: DOC/NOAA/NESDIS/NGDC > National Geophysical Data Cent

No luck finding "Infobank:

http://shoals.sam.usace.army.mil/Future_Data.aspx

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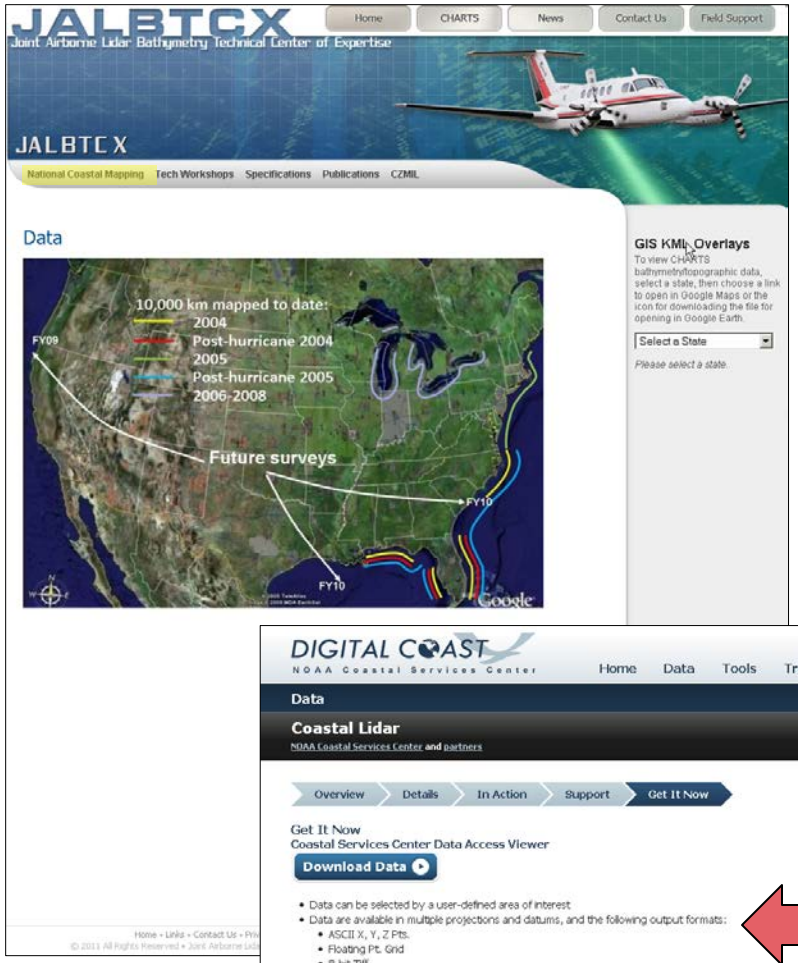
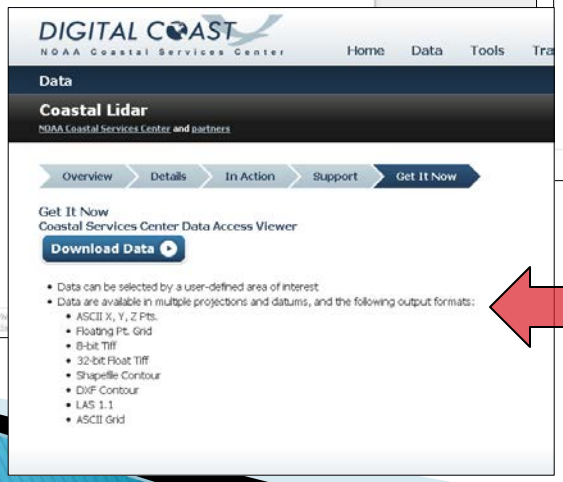
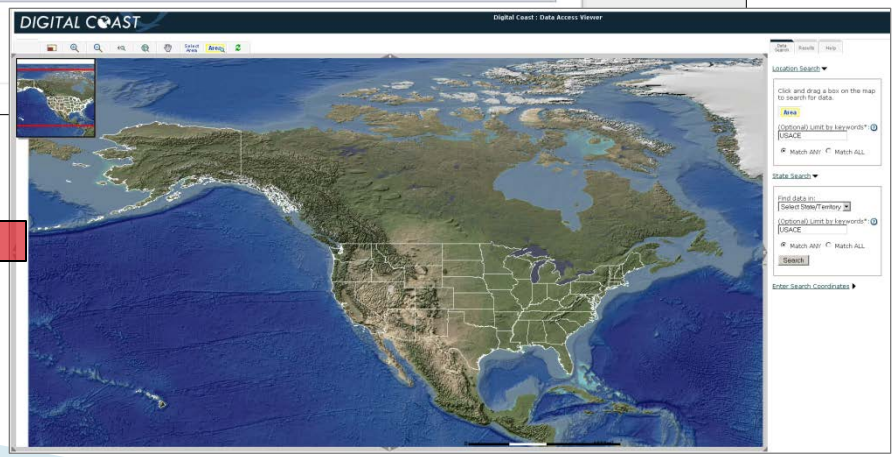
(Sylvester)







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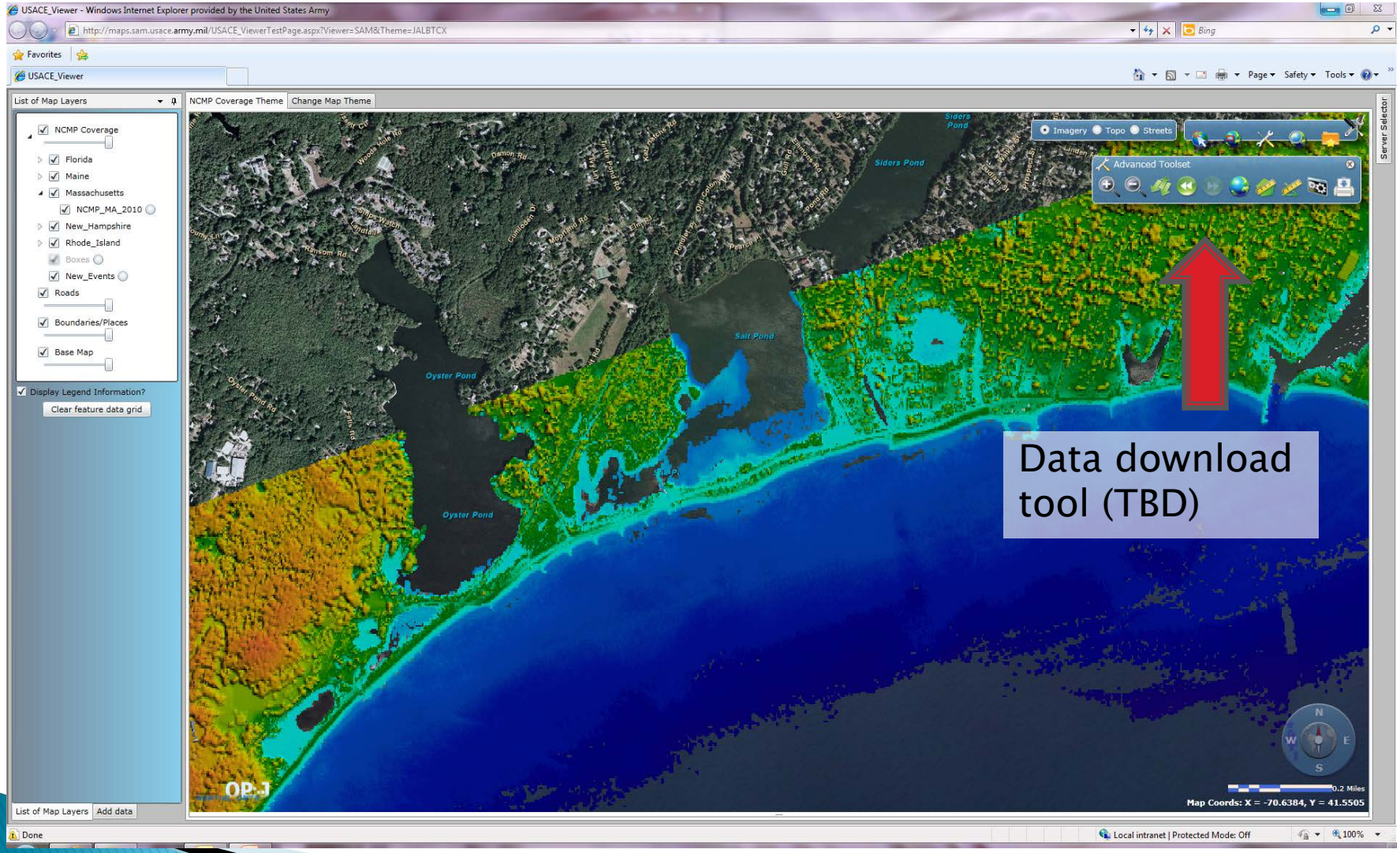

http://www.ngdc.noaa.gov/mgg/bathymetry/relief.html

(IIIg)

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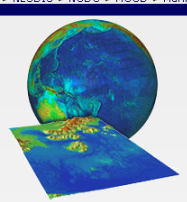

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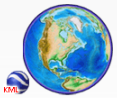


Download ETOPO1 KMZ
Educational Resources
Posters, DVDs & CDs

Bathymetry & Global Relief

Scientific stewardship, products, and services for ocean depth data and derived digital elevation models

Bathymetry (Ocean Depths)

- Bathymetric & Fishing Maps
- Great Lakes
- IHO Data Center for Digital Bathymetry (IHO DCDB)
- International Ocean Mapping Projects
- Multibeam Data
- NOS Hydrographic Survey Data
- Satellite-derived Data
- Trackline Data

Combined Bathymetry & Topography

- Coastal Relief & Tsunami Inundation
- Coastlines & Coastline Extractor
- Digital Elevation Model (DEM) Discovery Portal
- Global Relief (ETOPO1, ETOPO2, ETOPO5)

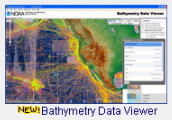
Topography (Land Elevations)

- All Topography
- Global Land 1-km Base Elevation Project (GLOBE)
- U.S. State images of 30-second Topographic Data
- Lidar Archive

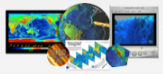
NGDC compiles, archives, and distributes bathymetric data from coastal and open ocean areas, inclu
collected in support of charting and navigation.

NGDC compiles the global ETOPO1 1-minute relief database, coastal relief models for US coastal are
gridded topographic data from the GLOBE project.

NGDC participates in numerous international ocean mapping projects, and operates the Internation
behalf of the member nations.



NEW! Bathymetry Data Viewer
NEW! Autochart Multibeam Map Generator



Images & Animations

GEBCO
International Ocean Mapping

Related Data at NGDC: Marine Geology & Geophysics
Sediment Thickness
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Bathymetry and Global Relief | ngdc.noaa.gov
NGDC compiles, archives, and distributes bathymetric data from coastal and open ocean areas, including acting as the long-term archive for NOAA National Ocean Service ...
http://www.ngdc.noaa.gov/.../relief.html - Cached

Great Lakes **Bathymetry** | ngdc.noaa.gov
Great Lakes Data Rescue Project. A cooperative project between the NOAA National Geophysical Data Center (NGDC) Marine Geology & Geophysics Division and collocated ...
http://www.ngdc.noaa.gov/.../greatlakes.html - Cached

Multibeam **Bathymetry**
Multibeam **Bathymetry** Multibeam bathymetric data at NGDC can now be selected via an interactive map (ArcIMS) Web interface. Data selections are downloadable for free.
http://www.ngdc.noaa.gov/.../multibeam.html - Cached

Bathymetry of Lake Huron | ngdc.noaa.gov
Open a larger (2.2 Mbyte) JPEG image of Lake Huron **bathymetry**/topography. Open a full-resolution (18 Mbyte) .PDF of Lake Huron **bathymetry**/topography.
http://www.ngdc.noaa.gov/.../huron.html - Cached

Bathymetry of Lake Erie and Lake Saint Clair | ngdc.noaa.gov
Bathymetry of Lake Erie and Lake Saint Clair has been compiled as a component of a NOAA project to rescue Great Lakes lake floor geological and geophysical data and ...
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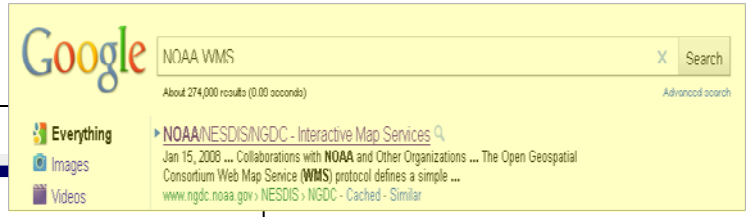
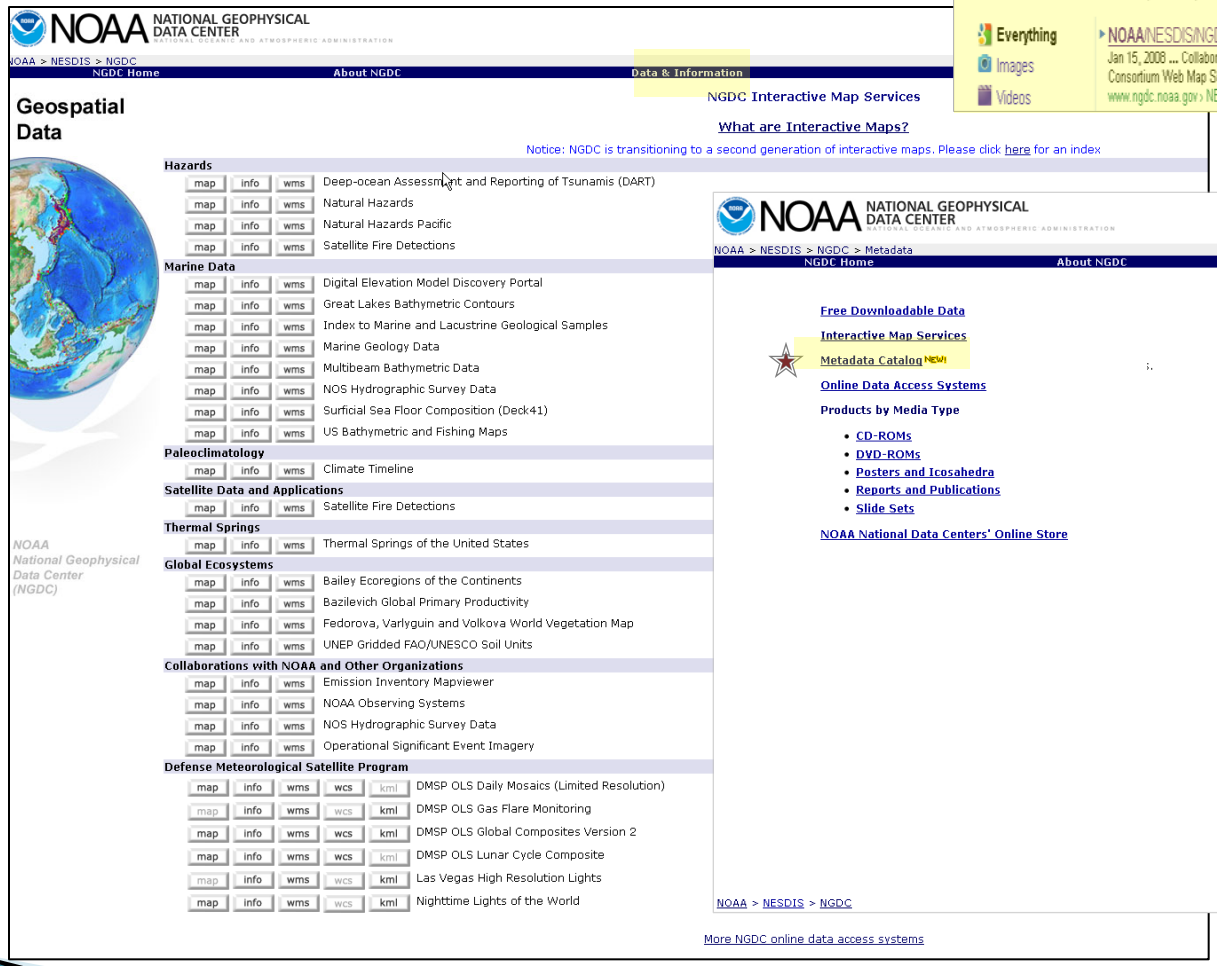
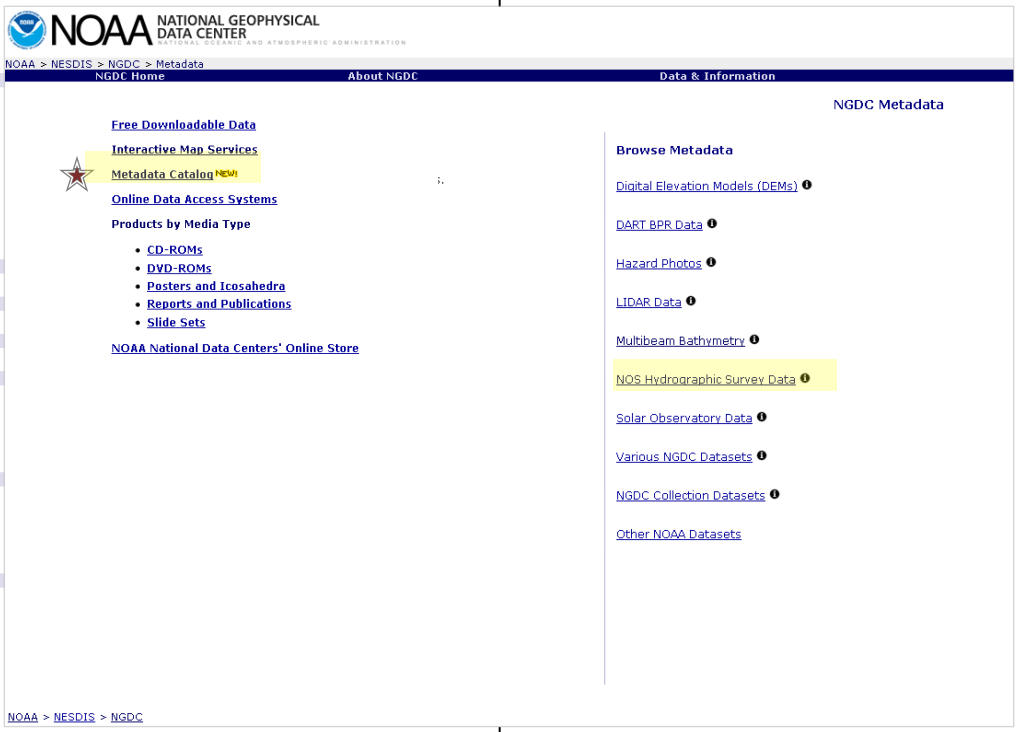
http://www.ngdc.noaa.gov/maps/interactivemaps.html







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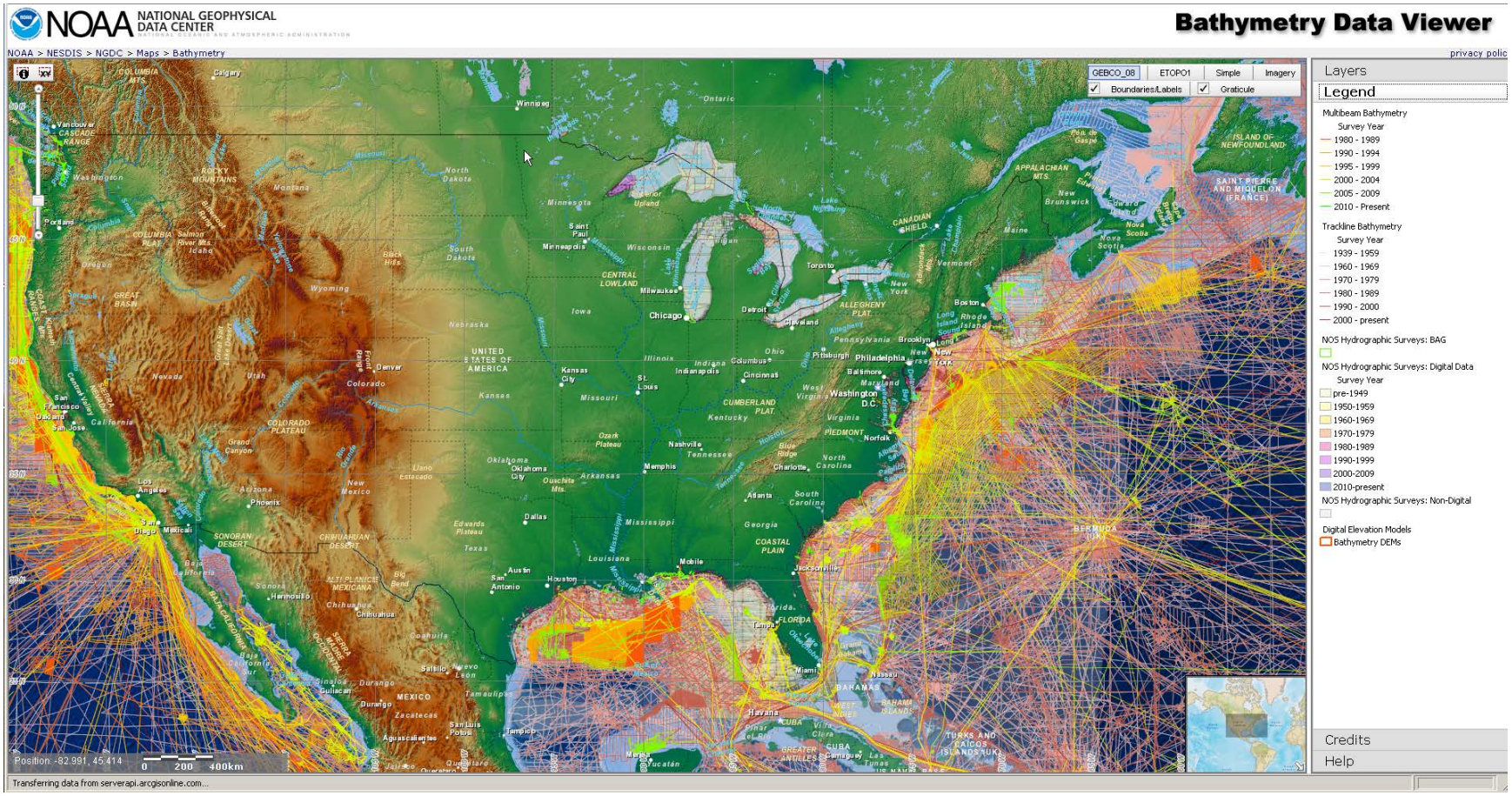

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National Elevation Dataset

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Seamless Data Distribution System - Enhanced

The National Elevation Dataset (NED) is the primary elevation data product of the USGS. The NED is a seamless dataset with the best available raster elevation data of the conterminous United States, Alaska, Hawaii, and territorial islands. The NED is updated on a nominal two month cycle to integrate newly available, improved elevation source data. All NED data are public domain. The NED is derived from diverse source data that are processed to a common coordinate system and unit of vertical measure. NED data are distributed in geographic coordinates in units of decimal degrees, and in conformance with the North American Datum of 1983 (NAD 83). All elevation values are in meters and, over the conterminous United States, are referenced to the North American Vertical Datum of 1988 (NAVD 88). The vertical reference will vary in other areas. NED data are available nationally (except for Alaska) at resolutions of 1 arc-second (about 30 meters) and 1/3 arc-second (about 10 meters), and in limited areas at 1/9 arc-second (about 3 meters). In most of Alaska, only lower resolution source data are available. As a result, most NED data for Alaska are at 2-arc-second (about 60 meters) grid spacing, Part of Alaska is available at the 1- and 1/3-arc-second resolution, and plans are in development for a significant improvement in elevation data coverage of the state.

The NED serves as the elevation layer of The National Map, and provides basic elevation information for earth science studies and mapping applications in the United States. Scientists and resource managers use NED data for global change research, hydrologic modeling, resource monitoring, mapping and visualization, and many other applications.

The Seamless Data Distribution System (SDDS) offers seamless data for a user-defined area, in a variety of formats, for online download or media delivery.

Historic Digital Elevation Models (DEMs) are now available.

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Accessing National Elevation Datase

Open Geospatial Consortium Web Map Serv
machines. This saves greatly on end user sys

Keyhole Markup Language (KML) was devel
on a 3D globe. The index is then the access p

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http://imselev.cr.usgs.gov/WMS_Capabilities/USGS_EDC_Elev_NED/capabilities_1_3_0.xml


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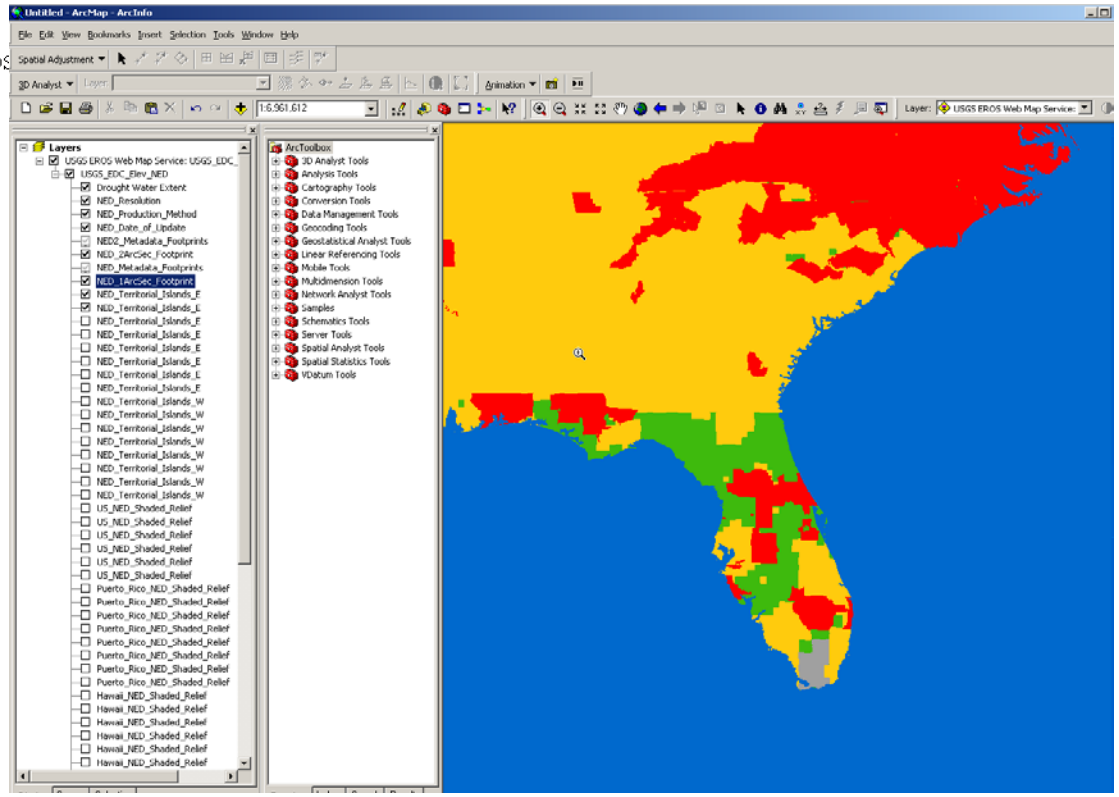
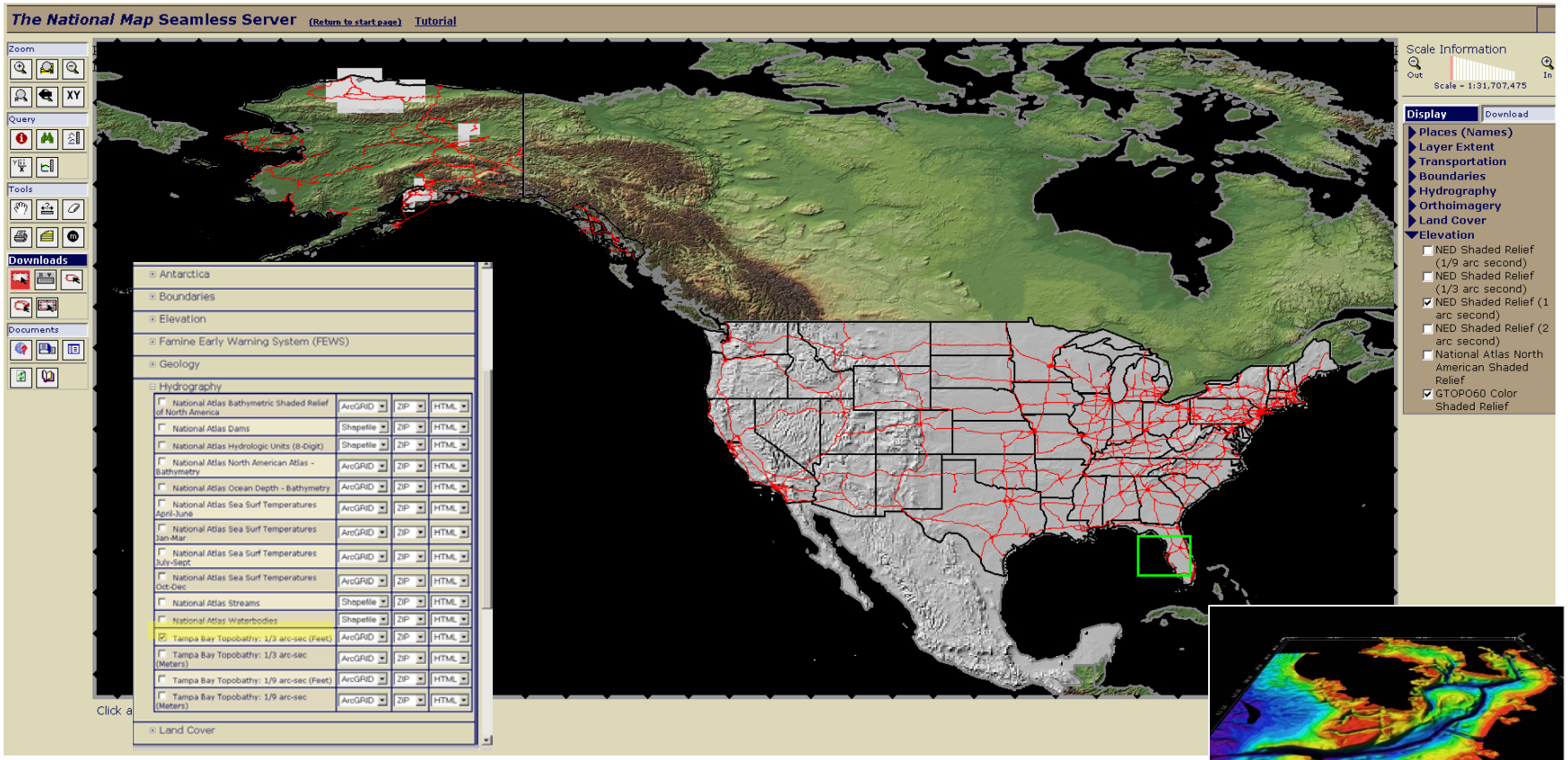


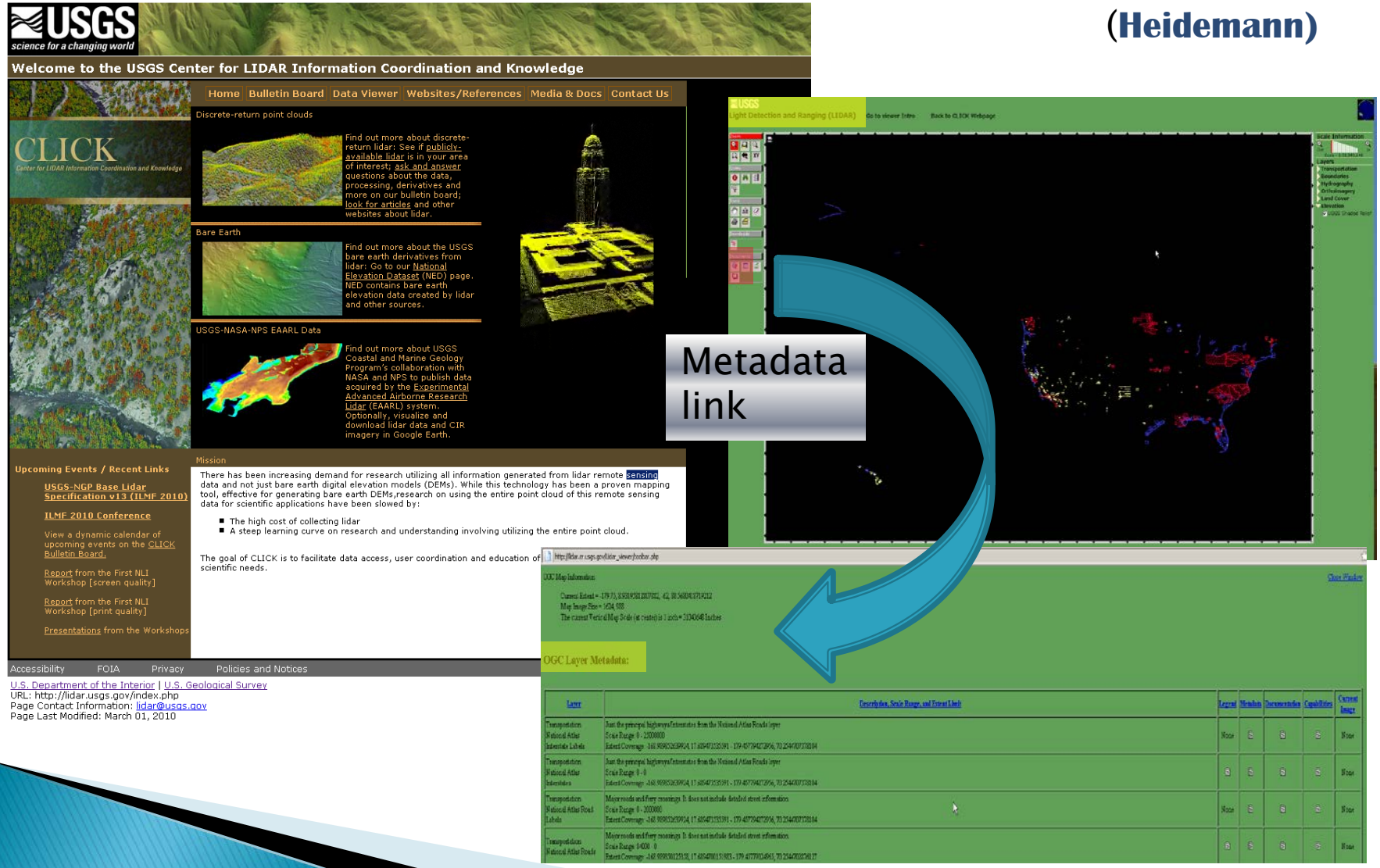
http://seamless.usgs.gov/website/seamless/viewer.htm



Data download capability built into viewer

http://lidar.cr.usgs.gov/

(Heidemann)

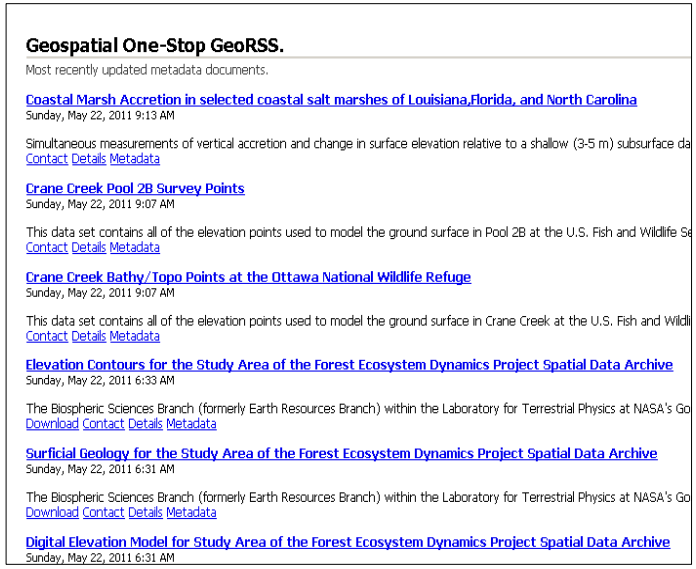


Conclusions:

- Did we ask the right questions?
- Did we reach out to the right folks?
- Data/metadata discovery linked from agency public web site/web mapping application (in many cases still need to know what, where and who, to find OCM data).
- No single federated search capability exits… other than using the REST.api to search for elevation data in Geospatial One-Stop (GOS), Google.
- Discovery of key OCM data links are posted on GOS Oceans and Coasts community page (action from Sept. 2007 OCM Technical Workshop at CSC).
- Discovering and previewing data as web mapping services is evolving but not widely practiced.
- Not all WMS are equal and no common data viewer exists to preview both Server Services and WMS (next release of ArcGIS.com viewer may have that capability)
- Metadata is loosely coupled to the data …not available on REST page..Why not?

Using the Geospatial One-Stop Operational Portal API

- **REST API for search:**
- A user can search GOS catalog with its REST and the REST API provides three types of responses: GeoRSS, KML, and HTML



Geospatial One-Stop GeoRSS.

Most recently updated metadata documents.

Coastal Marsh Accretion in selected coastal salt marshes of Louisiana,Florida, and North Carolina
Sunday, May 22, 2011 9:13 AM

Simultaneous measurements of vertical accretion and change in surface elevation relative to a shallow (3-5 m) subsurface da
Contact Details Metadata

Crane Creek Pool 2B Survey Points
Sunday, May 22, 2011 9:07 AM

This data set contains all of the elevation points used to model the ground surface in Pool 2B at the U.S. Fish and Wildlife Se
Contact Details Metadata

Crane Creek Bathy/Topo Points at the Ottawa National Wildlife Refuge
Sunday, May 22, 2011 9:07 AM

This data set contains all of the elevation points used to model the ground surface in Crane Creek at the U.S. Fish and Wildli
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Elevation Contours for the Study Area of the Forest Ecosystem Dynamics Project Spatial Data Archive
Sunday, May 22, 2011 6:33 AM

The Biospheric Sciences Branch (formerly Earth Resources Branch) within the Laboratory for Terrestrial Physics at NASA's Go
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Surficial Geology for the Study Area of the Forest Ecosystem Dynamics Project Spatial Data Archive
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Digital Elevation Model for Study Area of the Forest Ecosystem Dynamics Project Spatial Data Archive
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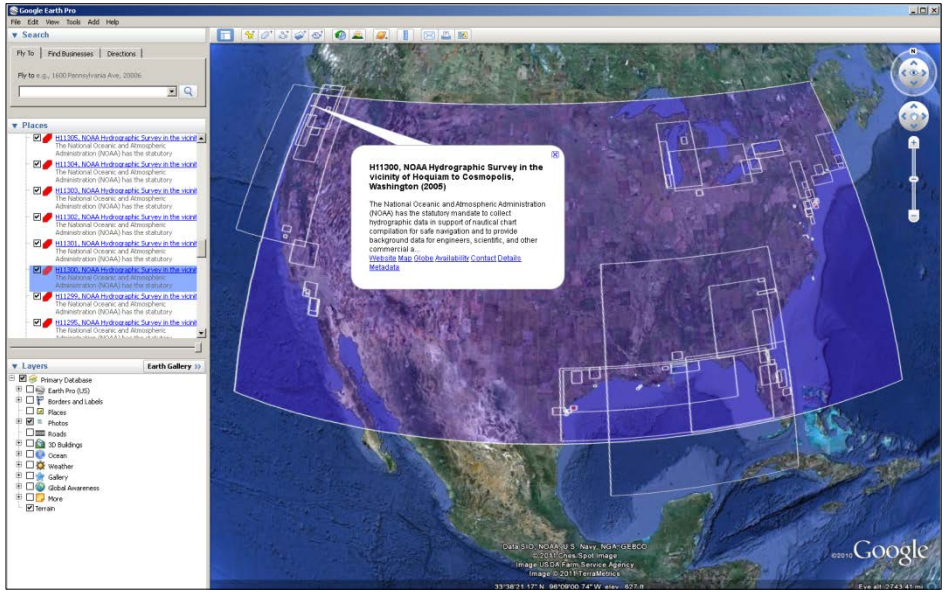

http://catalog.geodata.gov/geoportal/rest/find/document?ispartOf=ocm_intersects&marketplace%20&affiliation=199&dataCAtegory=elevation&start=1&max=100&f=georss OR kml

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noaa
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Santa Clara
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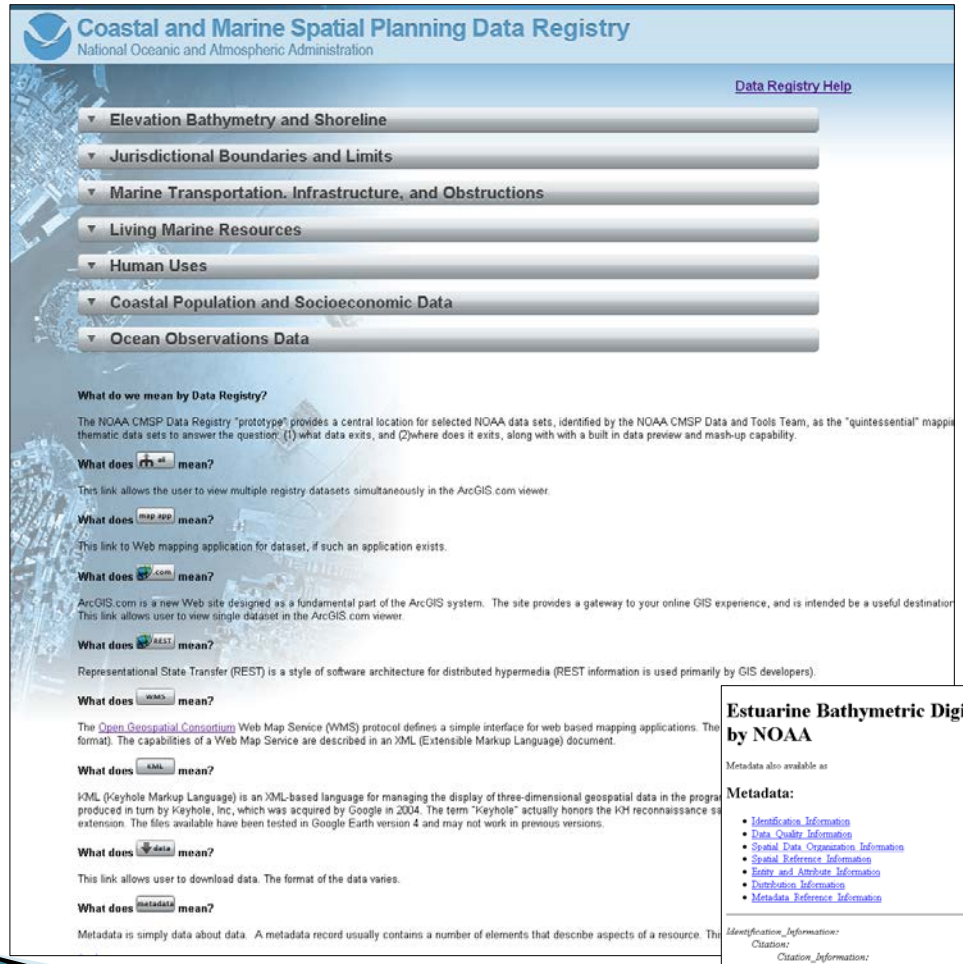
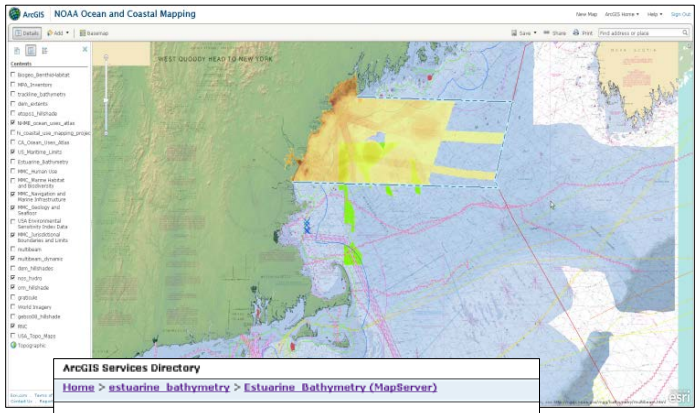
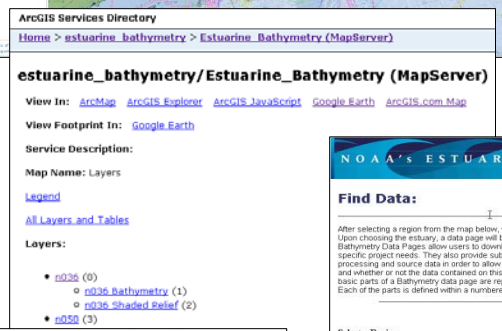
Ciego De Avila
Isla de la Juventud
Camaguey
Merida
Yucatan
Mexico
Holguin
Manzanillo
Pachuca
Jalapa
Campeche
Santiago De Cuba
500 km
300 mi
POWERED BY ESRI

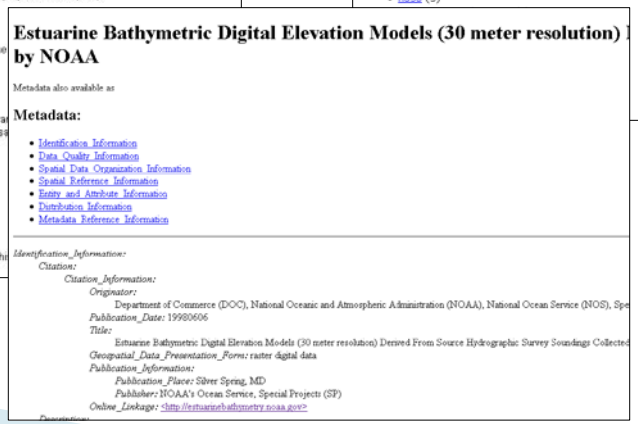
	Google results	**Pros:** already done **Cons**: poor results	Web searches	It's a Google Search …..
	Targeted Search of Hab Data Catalog	**Pros:** decent results **Cons:** no spatial context	NWRC metadata search PHINS prototype	Text based via PHINS metadata catalog, Uses key words to locate spatial and non-spatial data, maps ertc
	Single BBox from Metadata	**Pros:** decent results / spatial context / fairly easy to implement **Cons**: single spatial plot	NCDDC Metadata	Provides a spatial preview capability, based on metadata record, returns a Spatial footprint, with a URL or hotlink to data (1:1)
	Multiple BBoxes from Metadata	**Pros:** decent results / spatial context / fairly easy **Cons**: single spatial plot	NOS Data Explorer	Same as above but generates multiple spatial footprints (1:M)
	Cascading Map Services	**Pros:** good visual info / fairly easy **Cons:** Much data isn't in a map service / will have false gaps / will likely be very slow	PHINS prototype	**Distributed**, connects only to web mapping services (ArcIMS), potential performance issues, excessive data layers
	Local Data Collection	**Pros:** good visual info / local control of appearance / fast / easy data download **Cons:** hard to maintain/updates/false gaps	NCDDC Ecosystem	**Centralized** Map Services, Mapping services, data services mined for specific data layers, easy to download
	I feel like there's another one here…			Advanced system, with query and display capabilities, with data download, handle disparate formats, transformations, builds a single map on the fly
	Local data with crosswalk "Quilt"	**Pros:** provides consistent framework / retains original classification **Cons:** hard to maintain/ making some decisions for the user		Web Server Services, dynamic transformations, feature mapping services, seamless integration, analysis tools , regional perspective
	The Holy Grail	**Pros:** [illegible] / fully comprehensive **Cons:** very unlikely		

NOAA CMSP Data Registry









http://www.cartogis.org/docs/proceedings/2008/fulmer.pdf

Eventually, the goal is for each partner to establish web services that the viewer can consume. Also, a Z39.50 connection can be made to the Geospatial one-Stop that will enable the metadata for the project to be harvested.

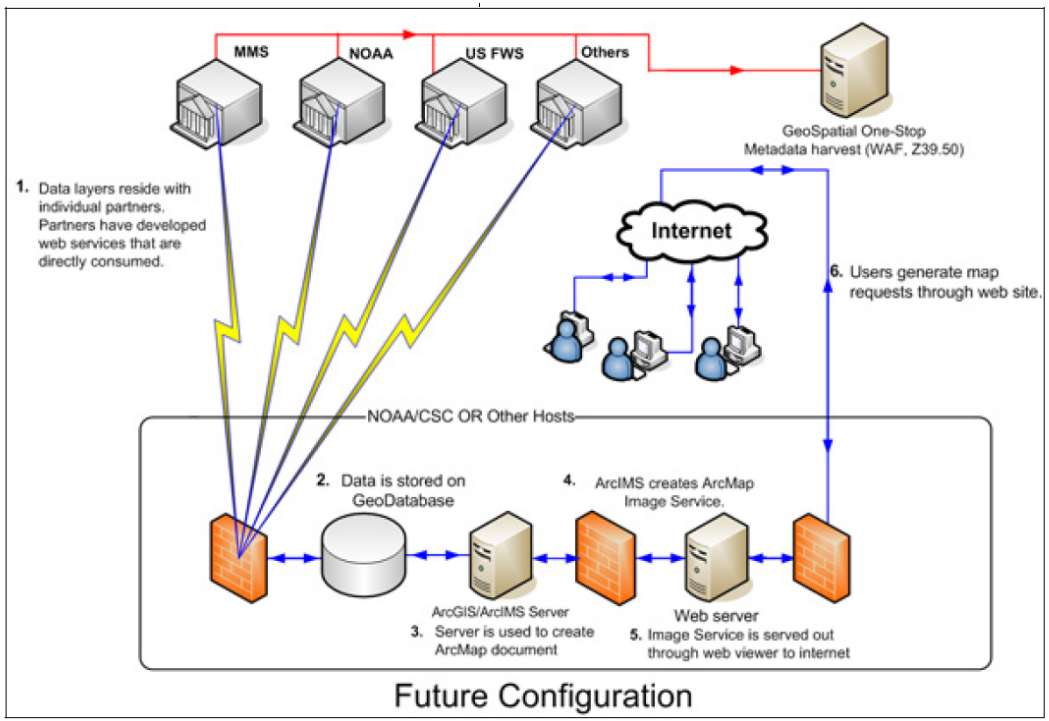
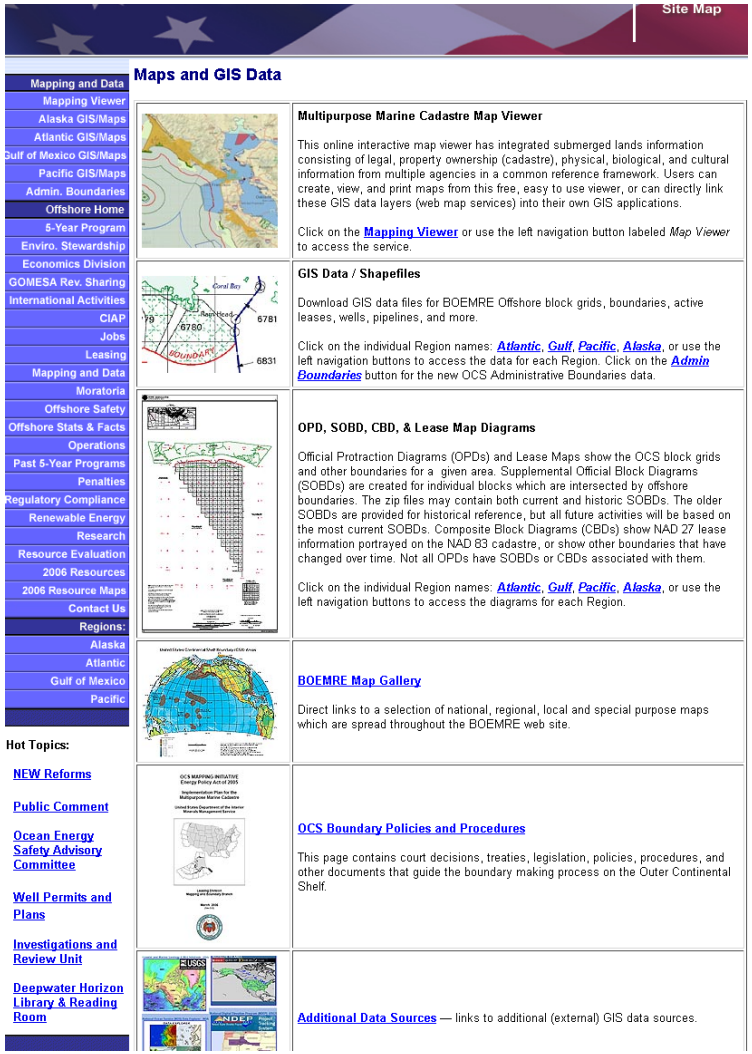
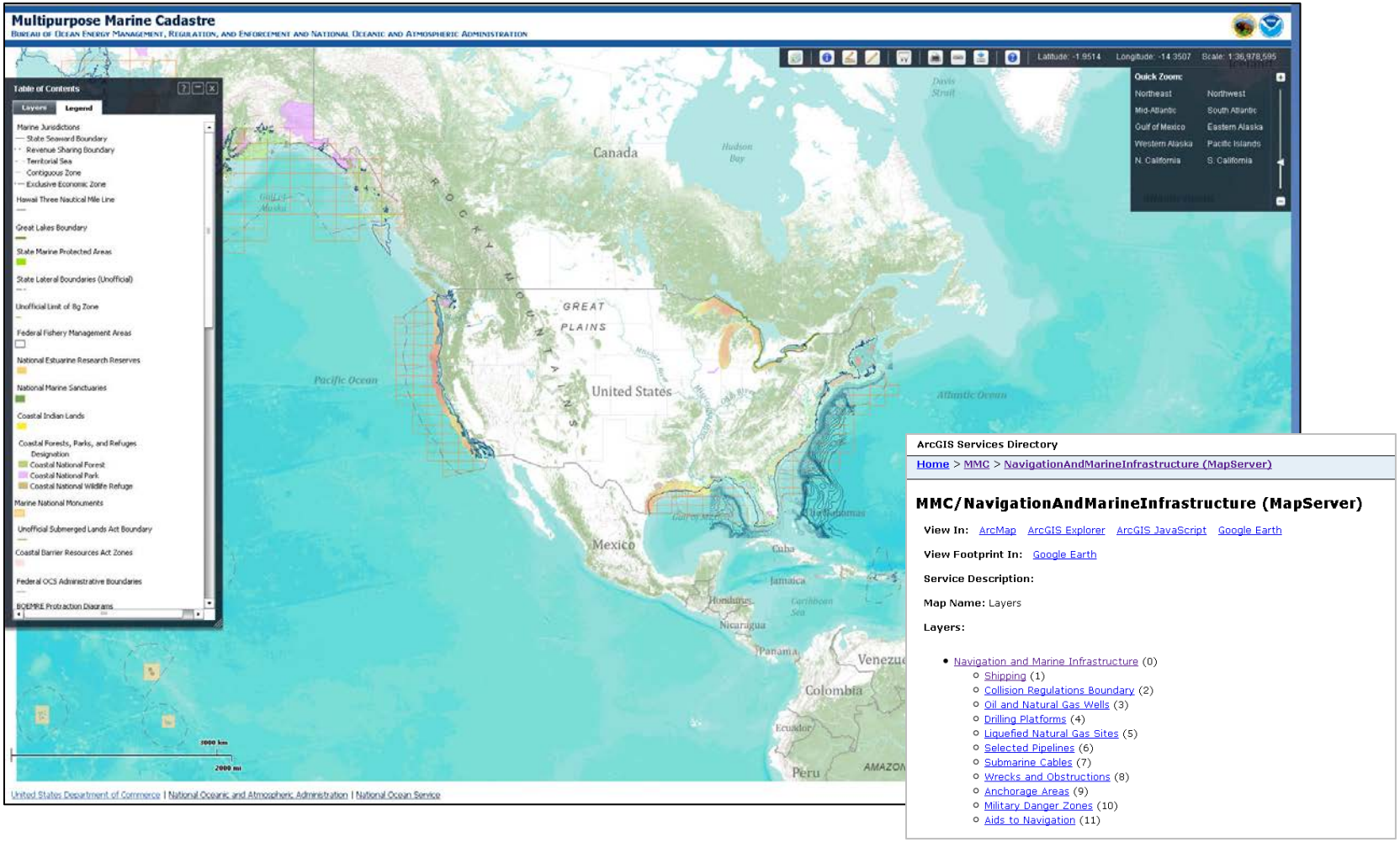


Figure 8: Future Configuration (Distributed web services

http://www.boemre.gov/



http://csc-s-web-p.csc.noaa.gov/MMC/#



ArcGIS Services Directory

Home > MMC > NavigationAndMarineInfrastructure (MapServer)

MMC/NavigationAndMarineInfrastructure (MapServer)

View In: ArcMap ArcGIS Explorer ArcGIS JavaScript Google Earth

View Footprint In: Google Earth

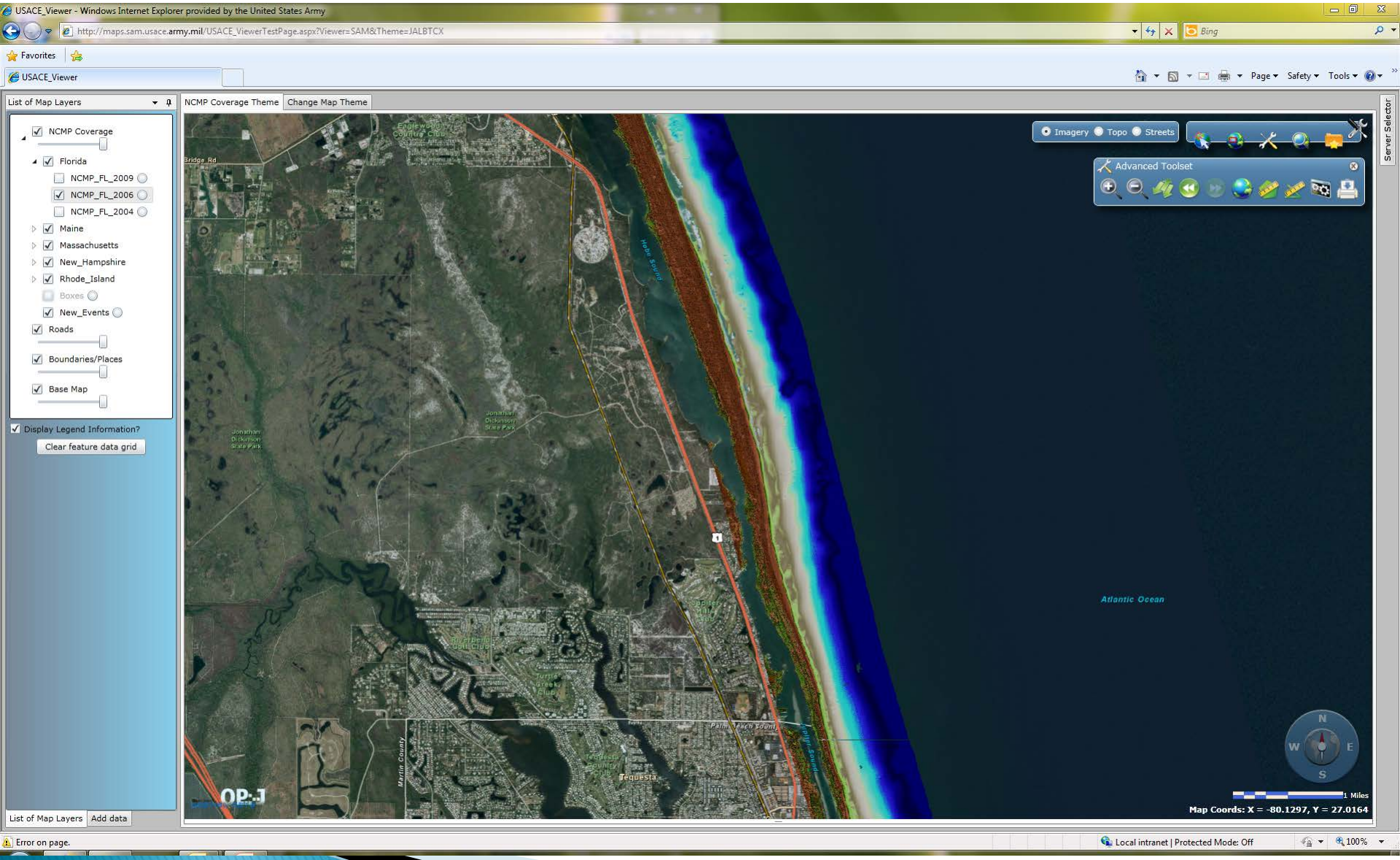
Service Description:

Map Name: Layers

Layers:

- Navigation and Marine Infrastructure (0)
  - Shipping (1)
  - Collision Regulations Boundary (2)
  - Oil and Natural Gas Wells (3)
  - Drilling Platforms (4)
  - Liquefied Natural Gas Sites (5)
  - Selected Pipelines (6)
  - Submarine Cables (7)
  - Wrecks and Obstructions (8)
  - Anchorage Areas (9)
  - Military Danger Zones (10)
  - Aids to Navigation (11)

http://csc-s-gissrv-p.csc.noaa.gov/ArcGIS/rest/services/MMC/NavigationAndMarineInfrastructure/MapServer


USACE_Viewer - Windows Internet Explorer provided by the United States Army
http://maps.sam.usace.army.mil/USACE_ViewerTestPage.aspx?Viewer=SAM&Theme=JALBTCX
Favorites
USACE_Viewer
Page
Safety
Tools
List of Map Layers
NCMP Coverage Theme
Change Map Theme
NCMP Coverage
Florida
NCMP_FL_2009
NCMP_FL_2006
NCMP_FL_2004
Maine
Massachusetts
New_Hampshire
Rhode_Island
Boxes
New_Events
Roads
Boundaries/Places
Base Map
Display Legend Information?
Clear feature data grid
Imagery
Topo
Streets
Advanced Toolset
Server Selector
Atlantic Ocean
Hobe Sound
Jupiter Sound
Jonathan Dickinson State Park
Palm Beach County
Martin County
Tequesta
Bridge Rd
1 Miles
Map Coords: X = -80.1297, Y = 27.0164
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Add data
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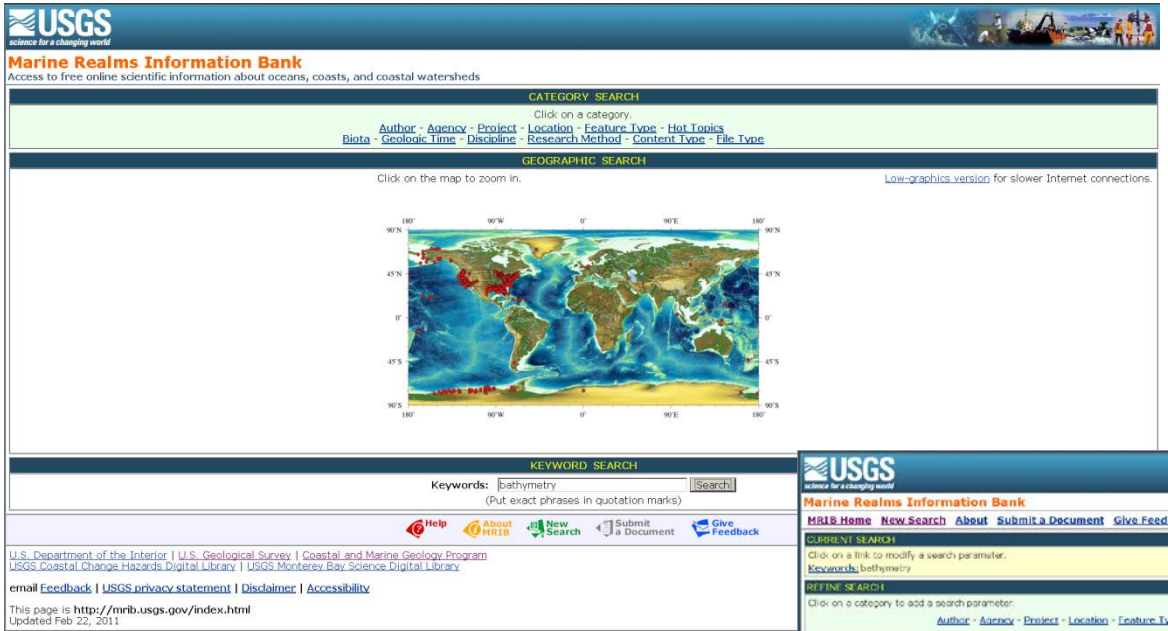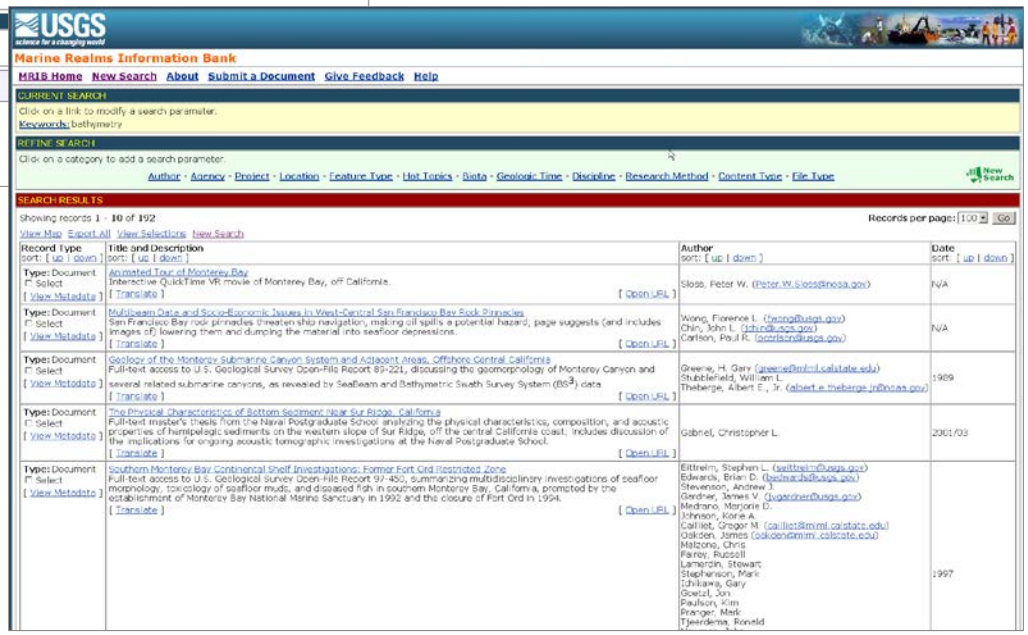
http://mrib.usgs.gov/