

## MARC AND ARC: GEOSPATIALLY ENABLING BIBLIOGRAPHIC RECORDS

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Geography is an intrinsic factor in many fields of research. In restoration ecology, the first rule is “Think geographically, whenever possible.” A sense of place gives meaning to our everyday lives. Imagine how difficult it would be to get to Mazatlan using a map without names.

Traditionally, libraries have used the 651 field in MARC records to record geographic information. As invaluable as MARC records have proven in joint cataloging projects and bibliographic information exchange around the world, the advent of geographic information systems (GIS) has exposed the limitations of MARC to function in a geospatial reality.

Three projects offer different approaches to creating geospatial interfaces to bibliographic records: the first developed at the University of Florida as a result of an IMLS grant used Z39.50 to tie together museum specimen records and bibliographic graphics; the second was developed at the University of Hawaii to create a spatially referenced bibliography to the island of Oahu; and the third is a collaborative partnership between MBL/WHOI and the U.S.G.S. to create a Marine Realms Information Bank.

### **Creating Databases within ArcView: Linking Florida’s Natural Heritage/ Spatially Referencing Oahu**

Funded in 1997, the goal of the “Linking Florida’s Natural Heritage” was to use a Z39.50 interface to tie specimen records to bibliographic records. The geographic information contained in specimen records often contains hierarchical information concerning the capture location of a specimen, e.g., country, state, county, named place, drainage basin, etc. In order to provide a similar level of granularity, bibliographic records were enhanced with several additional fields based on data available through the Geographic Names Information System [<http://www-nmd.usgs.gov/www/gnis/index.html>] of the U.S. Geological Survey. Latitude and longitude coordinates associated with names were included in the 034 field. Additional standardized geographic authorities used included the hydrological unit codes (HUC) [[http://wwwrvares.er.usgs.gov/wqn96cd/wqn/wq/huc\\_name.txt](http://wwwrvares.er.usgs.gov/wqn96cd/wqn/wq/huc_name.txt)] of the U.S.G.S. and the FIPS codes from the National Institute of Standards and Technology. These consist of

coded numbers for states and counties. Summarily, the following MARC fields were adapted:

034: : |d Western latitude in decimal degrees  
|f Northern longitude in decimal degrees  
752: : |a Country |b State |c County |d Named Place  
651: 4: |a County |z HUC# |x HUC  
651: 4: |a County |z FIPS# |x FIPS

The MARC fields used in a geographically-enhanced record are shown below:

034:1 : |d -82.5725 |f 27.68833  
100:1 : |a Motta, P. J.  
245:10: |a Feeding relationships among nine species of seagrass fishes in **Tampa Bay**, Florida.  
651: 4: |a **Tampa Bay** |z 3100206 |x HUC  
650: 4: |a Fishes  
650: 4: |a Feeding behavior  
650: 4: |a Seagrasses  
651: 4: |a Hillsborough |z 12057 |x FIPS  
752: : |a United States |b Florida |c Hillsborough |d **Tampa Bay**  
773:0 : |t Bulletin of marine science |g (1995) |g 56(1): |g 185-200.

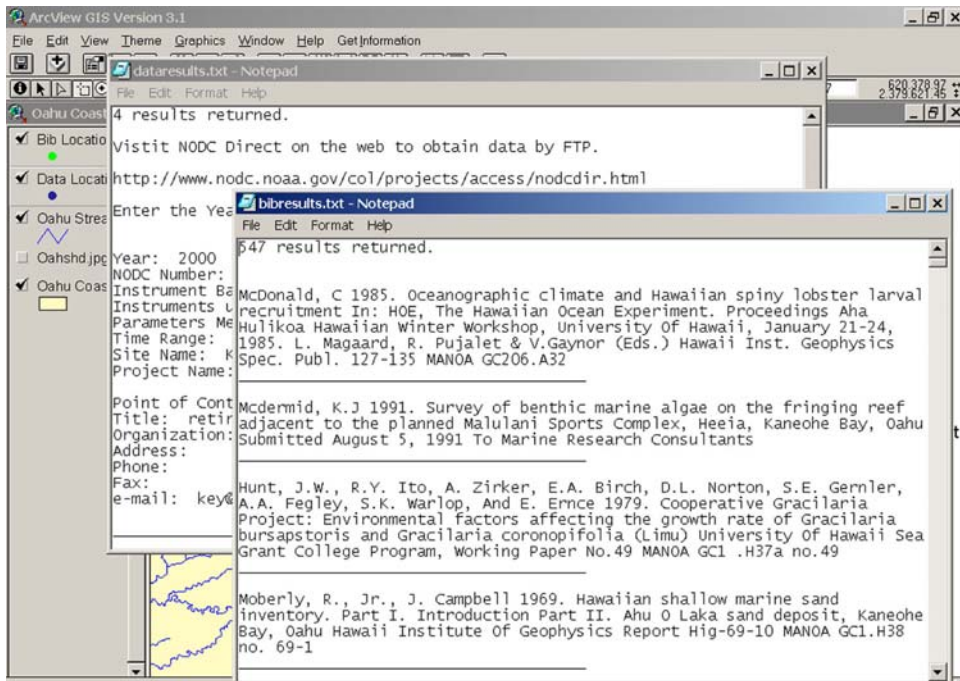
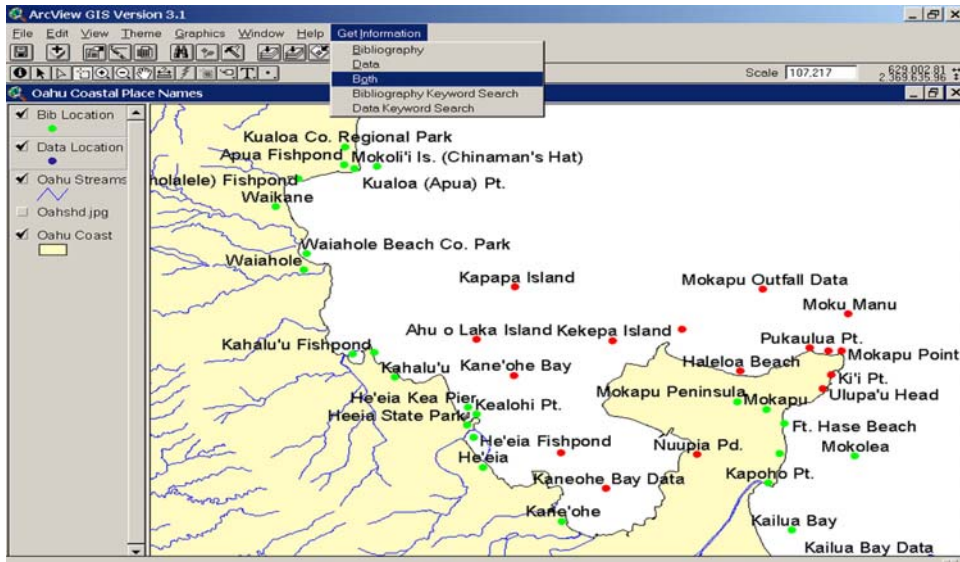
Although all the information needed for display in a GIS system are extant, the ArcView system works off of internal databases so some method of importing data into ArcView was needed.

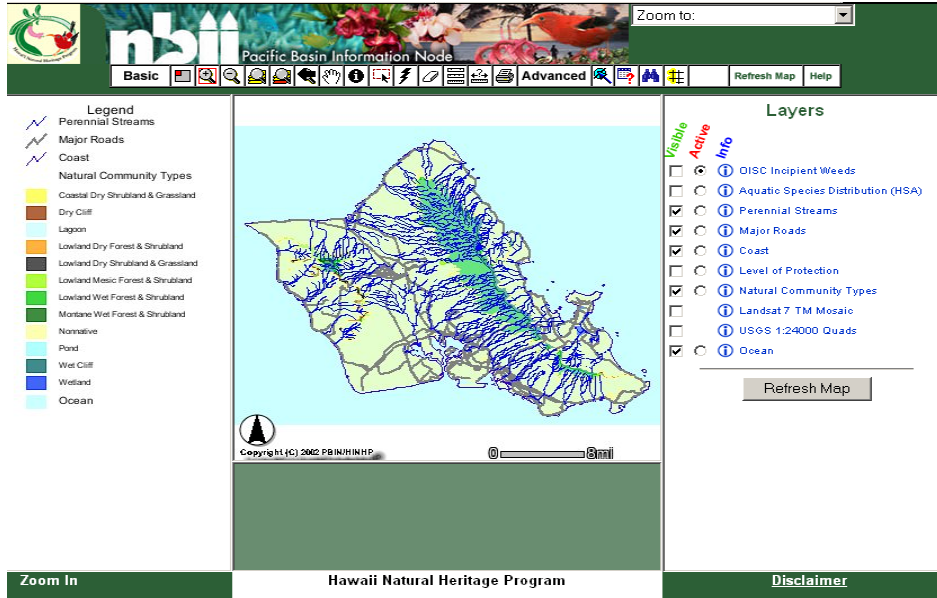
Initially, Joe Aufmuth and Stephanie Haas used a convoluted process of retrieving MARC records using the Z39.50 functionality of ProCite to export a minimal number of data fields in a tab-delimited format into ArcView. From there additional manipulation was done to create a dBase database and properly structure the data for display. While some of the richness of MARC records was lost (the taxonomic field being the most critical), the fields retained included:

034 |d latitude |f Longitude (in degrees decimal)  
100 Author  
245 Title  
773/260: Source: either Place/Publisher/Date or Journal citation  
651 HUC codes  
752 GNIS Place Name Hierarchy  
856 URL

David Coleman used the same approach of creating a database within ArcView in his geospatially-referenced bibliography to the island of Oahu. David created an Access

database by cutting and pasting fields from the regular online catalog into an input template and then importing the database into ArcView. Green dots on this Oahu map represent areas where bibliographic references exist.



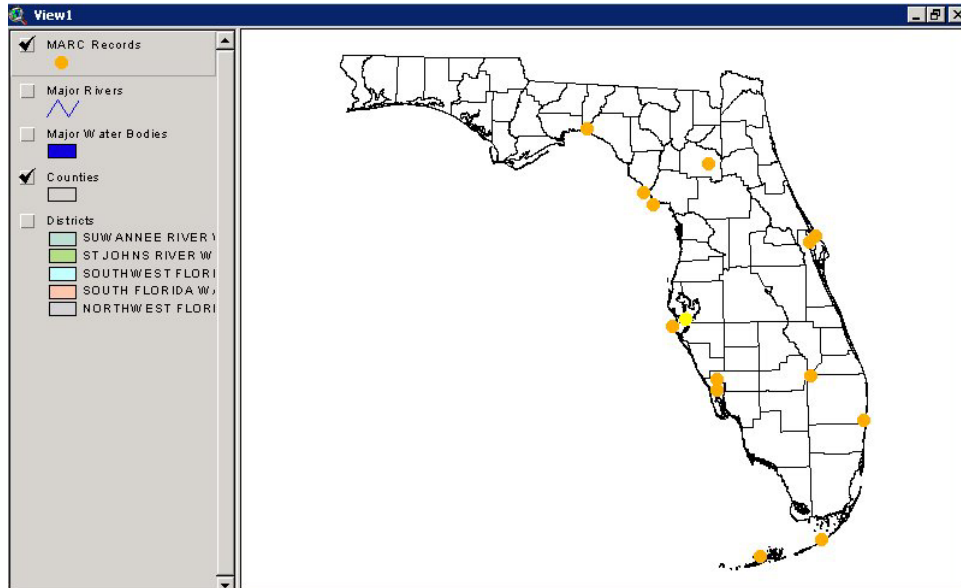


### ArcView©'s “Hotlink” TOOL

Currently at UF, we are exploring ArcView©'s “Hotlink” tool that permits linking to external data. This graphical tool uses programmed scripts to initiate external data displays. Individual point features in a map theme, e.g., named places such as Lake Wauberg, Florida, are associated with relational fields that contain a link (in this instance a search URL) to specific external files. Basically, a graphical interface can be created from just three Geographic Names Information System fields (named place, latitude, and longitude) and a fourth relational field: a search URL into the Florida Environments Online database. Utilizing ArcView© a point for each of the place names is created from the associated latitude and longitude fields. The Hotlink tool activates a user-defined script associated with a given URL attribute field of the point, launches a web browser, and initiates a search of that place name in the database.

Feature Name	County	Longitude	Latitude	Search URL
Tuscawilla Lake	Alachua	-82.2675	29.49361	http://webi.us.fda.edu/cgi-bin/cgiwrap/fc/wv3/DBCO/DGdlib/SGfih/FGfih/SSKIPK%3dtuscawilla_lake/DBO1/DBP3/CM33/DB11
Wauberg Lake	Alachua	-82.30139	29.53139	http://webi.us.fda.edu/cgi-bin/cgiwrap/fc/wv3/DBCO/DGdlib/SGfih/FGfih/SSKIPK%3dlake_wauberg/DBO1/DBP3/CM33/DB11
Tampa Bay	Hillsborough	-82.5725	27.68833	http://webi.us.fda.edu/cgi-bin/cgiwrap/fc/wv3/DBCO/DGdlib/SGfih/FGfih/SSKIPK%3dtampa-bay/RO1/RP33/CM33/P11

The Hotlink tool is used to activate the search URL associated with each point.



Clicking on the Tampa Bay dot on the map above will return appropriate bibliographic records. Although this particular URL searches only the Florida Environments Online database, URLs can be created to search OPACs and other specialized databases. The possibilities are literally endless.



<a href="#">Restart</a>	Search: <a href="#">Basic</a>   <a href="#">Advanced</a>   <a href="#">Command</a>   <a href="#">History</a>	<a href="#">Change Databases</a>
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Search: k752= tampa adj bay  
 Hit Count: 22  
 Records: 1 to 22

- [1Effects of live-bait shrimp trawling on seagrass beds and fish bycatch in Tampa Bay, Florida.](#)  
*(Fishery bulletin (1999) 97(1): 193-199.)*  
 Meyer, D. L.;
- [2Benthic infauna of Tampa Bay: Summer, 1993.](#)  
 Culter, J.K.; 1995  
 Full text <http://www.mote.org/techreps/> Acrobat reader required
- [3Feeding relationships among nine species of seagrass fishes in Tampa Bay, Florida.](#)  
*(Bulletin of marine science (1995) 56(1): 185-200.)*  
 Motta, P. J.;
- [4Bycatch and catch-release mortality of small sharks in the Gulf coast nursery grounds of Tampa Bay and Charlotte Harbor.](#)  
 Hueter, R.E.; 1994  
 Full text <http://www.mote.org/techreps/> Acrobat reader required

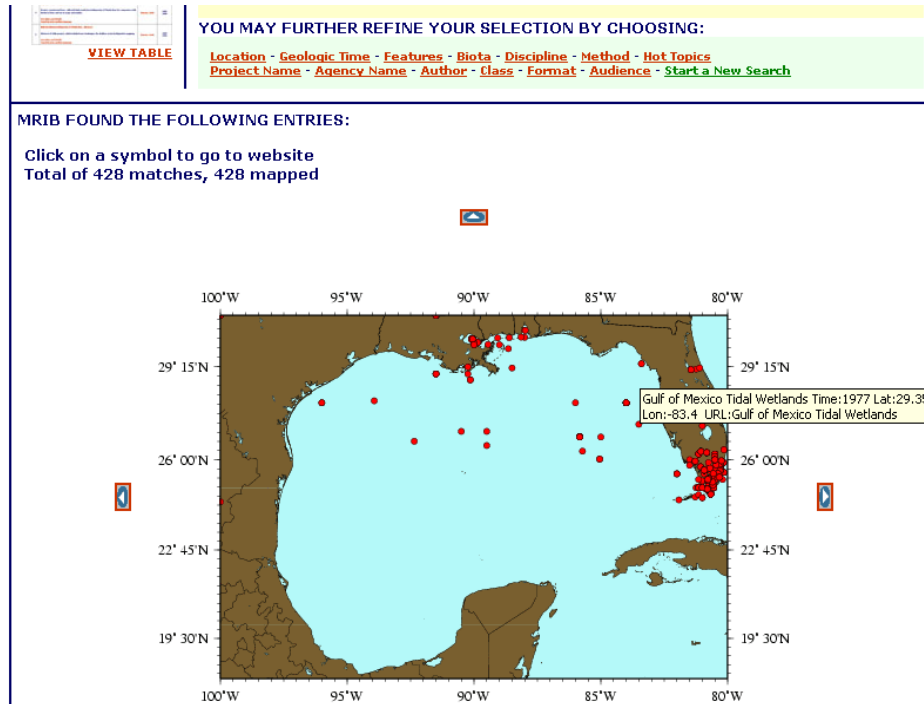
Further information on the spatially enhanced bibliography of Oahu can be found in "Better Document Management through Georeferencing," by David E. Coleman, Paul Jokiel, Eric Hill, and Naomi Bentivoglio. *ArcUser Online*, April-June 2002. [Online cite: <http://www.esri.com/news/arcuser/0402/docmanage1of3.html> ]

An extensive discussion of the enhancements for MARC records for the Linking Florida's Natural Heritage project was submitted to *Library Collections, Acquisitions and Technical Services*. The forthcoming article is entitled "DARWIN and MARC: a voyage of metadata discovery."

### MARINE REALMS INFORMATION BANK

Eleanor Uhlinger, MBL/WHOI, is consulting with the USGS, Woods Hole on the creation of a Marine Realms Information Bank. [Online URL: <http://mrib.usgs.gov>] This project is not a GIS application, but uses WHOI designed 4DGeoBrowser software. It is designed to facilitate access to multi-discipline, multi-media data sets and currently retrieves USGS documents, FGDC metadata, and project web sites.

Maps displayed are images with hotlinked shape files. Dots are linked to web sites, full text documents, etc. Moving the cursor over a dot will display the title.



As with all the projects discussed, Marine Realms is under development. Uses of the 4DGeoBrowser software are described in *4DGeoBrowser: A web-based data browser and server for accessing and analyzing multi-disciplinary data*, by Steven Lerner and Andrew Maffei. October 2001. 67pgs. Woods Hole Oceanographic Institution Technical Report WHOI-2001-13.

National Technical Information Service # ADA398546 OCLC #49210149 Please contact Eleanor Uhlinger at [euhlinger@mbi.edu](mailto:euhlinger@mbi.edu) for copies of this report.

The PowerPoint presentation that was given at the 28<sup>th</sup> Annual meeting in Mazatlan, Mexico may be found at <http://www.uflib.ufl.edu/digital/temporary/MARC&ARC.ppt>.