

**Overview of Current Spatial Data Cataloging Practices from Selected Academic Libraries
Spatial Data Catalog Subcommittee Final Report – November 27, 2012
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The Spatial Data Catalog Subcommittee was established by the GeoTech Committee in September 2010 to explore spatial data catalogs with the goal of providing recommendations to MAGIRT on technology, staffing needs etc. needed to develop a spatial data catalog.

Our approach was to:

- Develop an inventory of spatial data catalogs to investigate
- Develop questions to use as we investigate each catalog
- Review websites identified in the inventory, answering as many questions as possible
- Review our findings and decide which spatial data catalog managers to interview
- Conduct interviews of selected spatial data catalogs
- Compile information and provide recommendations to the GeoTech Committee

We initially reviewed spatial data catalogs at 21 institutions. A wide variety of organizations maintain spatial data catalogs. Our main criterion for inclusion in the inventory was they needed to be located at an academic institution, preferably managed by the library.

In our initial review, we looked at the following institutions and websites:

- Columbia University -- Spatial Data Catalog
- Cornell University -- Geospatial Information Repository (CUGIR)
- George Mason University -- GeoBrain and GEOSS
- Harvard University -- Harvard Geospatial Library
- Massachusetts Institute of Technology -- Geodata Repository
- North Carolina State University -- Find GIS Data and GIS Data Download Sites
- Oregon State University -- Oregon Explorer
- Ontario Council of University Libraries (OCUL) -- Scholars GeoPortal
- Purdue University -- MADA@P
- Tufts University -- The Open Geoportal: GeoData@Tufts
- University of Alaska, Fairbanks -- Bonanza Creek LTER Geospatial Data Server
- University of Alaska, Southeast -- Southeast Alaska GIS Library
- University of Arkansas -- Arkansas GeoLibrary
- University of Connecticut -- MAGIC's Connecticut GIS Data
- University of Edinburgh -- GoGeo and ShareGeo
- University of Maryland -- GIS Data Repository
- University of Nevada, Reno -- W.M. Keck Earth Sciences & Mining Research Information Center
- University of North Carolina -- GIS Data Finder
- University of Idaho -- Inside Idaho
- University of Wisconsin -- Wisconsin Digital Spatial Data Catalog and North Temperate Lakes LTER

Our questions included:

- Institution, Site Name, and Website Address
- What data do they have?
- How current is the data?
- What tools do they use to search or browse?

- What keyword search do they provide?
- What schema do they use for their metadata?
- Can you download data?
- Do they have publicly available data? How much is available?

We used the following criteria to decide if we wanted to interview the spatial data catalog manager:

- Is there a broad geographic representation of the collection (or is it only local data)?
- Does it provide the ability to search and browse?
- Does it have publicly available data?
- Can you download data?

The following are the institutions we interviewed for additional information:

- Columbia University -- Spatial Data Catalog <http://gis.columbia.edu/data.html>
- Cornell University -- Geospatial Information Repository (CUGIR) <http://cugir.mannlib.cornell.edu>
- Ontario Council of University Libraries -- Scholars GeoPortal <http://gis1.scholarsportal.info/>
- Oregon State University -- Oregon Explorer <http://oregonexplorer.info/>
- Tufts University – The Open Geoportal: GeoData@Tufts <http://geodata.tufts.edu/>
- University of Connecticut -- MAGIC's Connecticut GIS Data http://magic.lib.uconn.edu/connecticut_data.html
- University of Edinburgh -- GoGeo and ShareGeo <http://www.gogeo.ac.uk/gogeo/>
- University of Idaho -- Inside Idaho <http://inside.uidaho.edu>
- University of Maryland -- GIS Data Repository <http://libraries.umd.edu/gis/>
- University of North Carolina – GIS Data Finder <http://www.lib.unc.edu/reference/gis/datafinder/index.html>
- Harvard, Harvard Geospatial Library <http://calvert.hul.harvard.edu:8080/opengeoportal/> (one of the main institutions involved with the OpenGeoportal, as is Tufts. Did not interview them separately)

Interview questions included:

- What resources do they need, staffing and other funding needs?
- What technology are they using?
- What functionality or resources are a must-have and what are nice to have?
- Do they have a formal collection development policy for geospatial data?
- Is there a focus on a specific geographic area?
- Do they have a preference for a specific type of data?
- If relevant, is there a goal to build up the geospatial data collection at their university or to provide access to what other universities have?

Summary of findings (representing ten spatial data catalogs):

- Six of ten catalogs include state-wide or province-wide geospatial data, in addition to U.S., international, and local data, on a wide range of topics
- Two of the institutions mainly provide local data for their institution
- Two institutions provides a repository for researchers to share their geospatial data and a separate discovery portal
- One institution provides a discovery portal for data they own and to other institutions

The majority of the data available is both historic and current.

Tools provided range from search engine (searching various fields) to browsing datasets available to searching data tables to spatial browse and spatial search. Spatial search can be combined with keyword and advanced search criteria. At Tufts and Harvard, you can set the basemap for the WMS to Google Hybrid, Google Satellite, Google Streets, Google Physical, or Open Street Map.

The majority of the catalogs use FGDC, ISO 19115, or ISO 19115 North American Profile schema for their metadata, one used Dublin Core extended with DCMI box.

There is quite a bit of variation on how many catalogs have publicly available data. Some have all of their data openly available; others have both openly available data and data that is restricted to their campus.

People affiliated with an OCUL (Ontario Council of University Libraries) university may access Scholars GeoPortal with Google, Facebook, Yahoo, Twitter or OpenID.

A variety of issues were identified in creating and maintaining these catalogs.

- Quality metadata and lack of standards (for example, no controlled vocabulary for keywords)
- Handling different metadata schemes (discovery portals)
- Technology is getting old
- Determining workflows for adding records
- Keeping the site up-to-date
- Creating their own metadata editor took time but should give them flexibility in the future
- Adding data takes more time, they are able to load less data than first anticipated.
- Data providers do not update documentation and/or metadata.

The staffing needed varied by institution, ranging from 1 FTE GIS librarian with systems support to 4 ½-5 full-time employees. During the project phase, Scholars Portal had eight staff (project manager, system specialist, GIS analyst, metadata librarian, and 4 programmers).

Technology used varied from ArcGIS software products, DSpace, Geonetwork, Java, MySQL, SQLServer, Cadcorp GeognoSIS, Solr/Lucene, GeoServer, Ektron Content Management System (CMS) and PHP.

Functionality or resources that are a must and what are nice to have:

Must have:

- Easy and intuitive to use
- Search and discover
- Place name look up
- Metadata
- Define geographic area of interest on a map
- Web mapping/preview
- Download data
- Retrieve rapidly
- ArcGIS Server

Nice to have:

- Semantic mapping – search for a term that doesn't appear in the metadata, but is relevant
- Metadata editors
- Open source software
- Improved ability to visualize maps
- Easily generate map and tables from census data
- Web mapping components, custom web services
- Streaming of layers

Some of the institutions have a formal collection development policy for geospatial data. Others do not have a formal policy. For these institutions, data is added as it becomes available. Most institutions focus on the state or region they are located in. In addition, many have data in the geographic areas that their researchers are doing work. Most institutions prefer raster and vector data, some also include scanned maps and tabular spreadsheets.

The Open Geoportal (GeoData@Tufts and Harvard Geospatial Library) is open to other interested libraries. Open Geoportal can be implemented at three different levels:

- Locally hosted Enterprise – setup and maintain own servers and do own database administration. At this level, you need to have some programming experience to be able to read the code.
- Middle – host own data and create metadata. Users share non-locally hosted interface
- Lowest – completely cloud-hosted, by subscription. The institution will need to create metadata for their local data.

Three of the institutions interviewed mentioned that they are planning on moving to Open Geoportal. One institution mentioned that they want to take a different approach and will be making their geospatial data available in their library catalog.

Conclusion

There's a wide range of resources used in the development, management, and maintenance of spatial data catalogs. Instead of recommending a particular approach, technology or staffing needed, this conclusion will provide guidance as academic libraries investigate what will work in their situation that addresses the needs on their campus. We have developed the following questions that can be used by academic libraries that are interested in developing a spatial data catalog. These questions can be used as a starting point that will help determine what avenues and approaches to investigate:

- Who are your primary spatial data customers?
- What type of data do your customers need?
- How do your customers want to access the data?
- Why do you need to setup a spatial data catalog? For example:
 - The data isn't available anywhere else
 - The data is difficult to access
 - The data is difficult to use (for example, the data is not in the datum or projection used on campus)
- What preservation issues do you need to consider?
- Do you have support from library administration?
- What technology and staffing resources do you have in the Library or on campus

- Do you have servers currently that could be used to host data; will you be able to obtain funding to purchase servers?
- What level of technical staff do you have -- maintain servers, programming skills?
- Can you obtain funding from the Library or other units on campus?

Answering these questions will help you decide whether or not you want to pursue developing a spatial data catalog. The summary of findings in this report will give you an idea of how other academic libraries have approached developing spatial data catalogs for their institution or their state and provide you with ideas on what software and hardware you may want to investigate further.

For example, the University of Idaho (Inside Idaho), is the official geospatial data clearinghouse for the State of Idaho. As such, they receive geospatial data from Idaho state agencies as well as the state universities. Their staffing includes a metadata specialist, computer support specialist, and main programmer. They use ArcGIS products, a home-grown metadata catalog, and SQLServer for database management.

Another example is OpenGeoportal, a consortial spatial data catalog. OpenGeoportal uses several different open source software products. Libraries can become involved at three different levels, depending on the amount of resources and staffing they have available.

At the Supporting Geospatial Search and Discover: Geoportals Unconference held at the Western Association of Map Libraries Fall 2012 conference, Tom Brittnacher (one of the unconference organizers) in a phone conversation about the unconference said that the most important component is your own database, it makes sense to use open geoportal standards. You could put your data into an open source database such as postGIS, don't lock yourself into proprietary software. As you have more time and money, you could plug-in additional modules (interface etc.). Developing a geoportal is very difficult to do on your own, unless you have someone full-time, there is too much technology, too much customization. Everything is going so fast. If you put your data into an open source system, in 1-2 years as you add modules for additional functionality, everything will continue to be compatible.

Appendix -- Consolidated Responses

Institution, Site Name, and Website Address

- a. Columbia University, CU Spatial Data Catalog, <http://gis.columbia.edu/data.html>
- b. Cornell University, Cornell University Geospatial Information Repository (CUGIR), <http://cugir.mannlib.cornell.edu/>
- c. University of Idaho , Inside Idaho, <http://inside.uidaho.edu/>
- d. Oregon State University, Oregon Explorer, <http://oregonexplorer.info>, note: focus on Imagery Explorer and Oregon Spatial Data Library
- e. University of Connecticut, MAGIC's Connecticut GIS Data, http://magic.lib.uconn.edu/connecticut_data.html
- f. University of Edinburgh, GoGeo and ShareGeo, <http://www.gogeo.ac.uk/gogeo/>
- g. University of Maryland , GIS Data Repository, <http://libraries.umd.edu/gis/>
- h. University of North Carolina, University of North Carolina, <http://www.lib.unc.edu/reference/gis/datafinder/index.html>
- i. University of Ottawa, Scholars Geoportal, <http://gis1.scholarsportal.info/>
- j. Tufts University, GeoData@Tufts, <http://geodata.tufts.edu/>

What data do they have?

- a. library GIS data collection for the CU community (varies, currently only 22 title layers including Africa data, US census data boundary (historical census boundary), Sanborn map, NY city planning, USGS Aerial cartography)-
- b. NYS, county agriculture districts, freshwater wetlands, tax parcels, topographic contours, census (new and old) hydrography, landmarks, soils, large scale watershed, national land cover, national atlas, agriculture minerals, breeding bird survey, butterfly distribution, , construction minerals, crushed stones, selected amphibians,...plant distributions, aquifers, cropland, geology etc.
- c. 1970-1994 3.4m Color infrared aerial imagery, historic air photos, elevation (1 arc sec/30 m National Elevation Dataset), historic maps, Moscow Green Map, ortho imagery, topo maps, UI campus map, 2011 NAIP imagery
- d. Imagery data -- Oregon for 1995, 2000, 2005, 2009, 2011; 2009, 2011 includes color infrared (view, stream to GIS, or download 2005 only). Oregon Spatial Data Library -- admin boundaries, bioscience, cadastral, climate, geoscience, hazards, hydrography, imagery, transportation, reference
- e. Boundaries, Census, Education, Election, GeoScience/Environmental, Hydrography, Indexes, Places, Roads & Transportation
- f. You are correct in that ShareGeo is a data repository where members of the UK HEFE community are able to deposit geospatial datasets they have created as a result of their research/studies. That data is then available for anyone to download. Currently there are 176 datasets within ShareGeo. While downloads from ShareGeo are high, we find it difficult to encourage data deposit. While ShareGeo provides direct access to geospatial data, GoGeo is a discovery portal. So we, EDINA, do not host any data rather we harvest metadata records (about geospatial data) from other metadata catalogues (government, research centres, other academic institutions) and aggregate that into one discovery portal – so it's a single place where researchers/students within UK academia (and anyone else on the web) can visit to discover what geospatial data exists. In addition to the metadata records we harvest from external metadata catalogues, we also publish onto GoGeo metadata records that members of UK HEFE have created using GeoDoc, our geospatial metadata creation tool.

Boundaries, Census, Education, Election, GeoScience/Environmental, Hydrography, Indexes, Places, Roads & Transportation
- g. Varies : 29 data sets of the libraries data collection that are in cd and make them accessible through a server: covers from the university GIS workshop tutorial data sets to world for the campus community (DRG DOQ (usgs), Baltimore data, world development indicator)
- h. All spatial data held by the UNC libraries are included(for the university community) including biota data, boundary data, economy, elevation, environmental, hydrogarphy, transportation)

- i. Boundaries, transportation inland waters, imagery, base maps, land cover, geoscientific info, environment, elevation, location, society, utilities, communications etc.
- j. Topics include: Agriculture and Farming, Biology & Ecology, Admin & Political Boundaries, Atmospheric & Climatic, Business & Economic, Elevation, Environment & Conservation, Geological & Geophysical, Human Health & Disease, Imagery & base maps, Military, Inland Water Resources, Locations & Geodetic Networks, Oceans & Estuaries, Cadastral, Cultural, Society & Demographics, Facilities & Structure, Transportation, Utilities & Communication. Data is vector, raster, and scanned maps.

Key:

- a. Columbia University Spatial Data Catalog, <http://gis.columbia.edu/data.html>
- b. Cornell University Geospatial Information Repository, <http://cugir.mannlib.cornell.edu>
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- d. Oregon State University, Oregon Explorer, <http://oregonexplorer.info> (Imagery Explorer and Oregon Spatial Data Library)
- e. University of Connecticut, MAGIC's Connecticut GIS Data, http://magic.lib.uconn.edu/connecticut_data.html
- f. University of Edinburgh, GoGeo and ShareGeo, <http://www.gogeo.ac.uk/gogeo/>
- g. University of Maryland , GIS Data Repository, <http://libraries.umd.edu/gis/>
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How current is the data?

- a. Varies
- b. Some is very current, some is 8 years old or more.
- c. current and historic
- d. Varies, some are very recent (2010 or 2011), others are a bit older. In general, the data is up-to-date. When data is updated, they archive the older data.
- e. As current as possible, do not discard any data; also have historic data
- f. The metadata records in GoGeo are as current as when they were harvested. That is really dependent upon the update cycle of the external metadata catalogue, it is variable. In terms of currency of data in ShareGeo – it is current as to the date of deposit.
- g. The most current is aerial image data for Baltimore
- h. Varies
- i. Current
- j. We have very current data and historical data. Varies, for example from 1776 (historical scanned map) to 2000 land cover data to 2012 Boston parcels.

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What tools do they use to search or browse?

- a. Search engine with Basic and Advanced (free text, title, author, abstract, keyword, location), View A-Z, Basic /Advanced (free text, title, author, abstract, keyword, location (limit by overlaps, fully outside, enclosed; by country), Also “view all records” link
- b. Topic lists, data provider list, spatial series list, quick links, map browse, full listing of CUGIR data, shopping basket, NYS data tree
- c. Spatial search by overlap, within, same extent; OpenDAP Server; ArcGIS Image Service; and suite of OGC services. They use ArcGIS api for flex, and a server in the cloud.
- d. Keyword, geographic (graphic or search by geographic place)
- e. Categories, Alphabetical, keyword; also some data uses a spatial map index (aerial photography) where you can search by location
- f. Simple search by keyword and geographic area (uses a gazetteer); Advanced search by keyword, title, abstract, keywords, map type (digital, hard copy, interactive, downloadable), search accuracy (precise to imprecise), where (map or latitude/longitude), region (country), and when (anytime, metadata changes, temporal extent).
- g. Basic (free text search) box and browse data by datasets, category, and layers
- h. A) Three Keyword search boxes (free text, country, state (us)) + limit search data available on the campus network
B) Search by Location—drawing a box on the map (interactive map interface)
View all datasets (A-Z) or View all data layers (A-Z)-can be sort by year function or by title.
- i. will be provided
- j. Broad topic, keyword, originator, years, data type, data repository; can limit to visible map area and include restricted data.
Spatial browse provides results relevant to what you are looking at on the map view. Spatial search can be combined with keyword and advanced search criteria.

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What keyword search do they provide?

- a. see previous question
- b. query box
- c. Keyword browse, publisher browse, topic browse and what's new?
- d. Title, Abstract and Keywords (Theme and Place) are indexed for searching.
- e. Customized google search, searches anything or everything it can – metadata, documents, datasets
- f. Keyword search – it's quite crude – we're parsing the metadata for any occurrence of the keyword in any part of the metadata record.
- g. No info
- h. No info
- i. keyword, title, abstract, series, or bounding box by data or by "Place or address"
- j. Harvest all metadata into the cloud, search SOLR. Keywords in metadata depends on the relevance.

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What schema do they use for their metadata?

- a. FGDC_ISO
- b. FGDC-STD-001-1998 required. Recognizes ISO Std 19115: 2003
- c. FGDC Content Std for Digital Geospatial Metadata, version. 2, FGDC-STD-001-1998
- d. FGDC and Details (basic information). The Details view is essentially a subset of the FGDC metadata that is transformed dynamically through xslt.
- e. FGDC is their goal, is what they currently use, some of the older data uses MARC
- f. Metadata Schema – ShareGeo it's Dublin Core extended with DCMI Box. GoGeo the metadata schema varies. So for those metadata records created via our GeoDoc tool, the metadata schema is our UK Academic Profile of ISO 19115, known as AGMAP www.gogeo.ac.uk/gogeo/metadata/agmap.htm – Tony is author. For metadata records harvested from elsewhere there are GEMINI records (UK Gov profile of ISO19115), INSPIRE (for European geoportals), DIF format (for NERC data catalogues) and Dublin Core for a few others. As GoGeo is a metadata aggregator it has to deal with a variety of different metadata schemas
- g. No info
- h. The GIS Data Finder does not use a standard schema. We have been cataloging/convertting metadata to MARC format more recently.
- i. ISO-19139 and Scholars Portal Metadata
- j. FGDC slimmed down version, 12 fields, incorporates MARC and ISO 19115. Also use CSW (Catalog Services for the Web) – protocol for web services (standard out of Open Geospatial Consortium).

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Can you download data?

- a. Some can. Some are restricted
- b. Yes. Mostly direct download. Some direction to other sites.
- c. Yes
- d. The majority of data can be downloaded, although some is accessible as WMS (did have issues with getting access). This is a known bug that they hope to resolve soon. Also some of the URLs may be out-of-date.
- e. Yes, all data; historic scanned maps and aerial photography have full .tiff files that can be downloaded
- f. ShareGeo can, GoGeo need to look at metadata (data seems to be harvested from other collections).
Reponse: You're correct. ShareGeo yes directly. GoGeo no you have to read the metadata and follow the access information from there. Ideally as we move to a landscape of more web services, the url link to the web service would be embedded within the metadata record hence providing instant access but for the majority of metadata records they are still really only providing contact details for the relevant organisation or data custodian.
- g. No info
- h. Some are in public domain some are restricted for the UN community only. 8-12) required calls. NEED To contact.
- i. Yes by area of interest or entire datasets
- j. Yes

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- j. Tufts University, The Open Geoportal: GeoData@Tufts, <http://geodata.tufts.edu/>

Do they have publicly available data? How much is available?

- a. About half and half
- b. All
- c. All by individual file or bulk download.
- d. Yes, all is publicly available. They have one transportation layer that is not public and requires a special login to view, otherwise yes, all data is public.
- e. Yes, everything they provide is publicly available
- f. All of the ShareGeo data is publicly accessible (only UK HE/FE institutions can add data); GoGeo data depends on the government agency.
Response: Correct again. Anyone can download from ShareGeo. GoGeo is a discovery portal – each metadata record has information about access constraints.
- g. It is a little difficult to determine this but I will take a stab at it! I've asked our IT person for a rundown on how many bytes of data are in the "public" versus the "licensed" folder but in the meantime I've done a rough manual count.

Of the 216 total layers in the data catalog, 211 are restricted and 5 are publicly downloadable (the vast majority if not all of these layers came from a couple of datasets: ESRI 2009 Data, University of Maryland data, and the City of Baltimore GIS Data).

Of the 27 total datasets in the catalog, 5 are restricted. Many of the dataset records point to CDs in our collection so they could be considered restricted in that to use the CD you would come into the library, but at the same time many of those CDs have become obsolete because the data is now available through a public website, and I've indicated that in the dataset record and provided the link to where you can get the data.

In looking at the datasets I remembered something I had not mentioned before - one of the most useful aspects of this data catalog has been for teaching - you'll see that there are a couple of datasets for specific classes or labs, and it has made life much easier to have the data for a course up on this site and then students can download it directly during the course.

- h. No info
- i. DMTI, Min of Nat. Resources, Stats Can, Min. Of Northern Development, Mines and Forestry, Nat Resources Canada, Canadian Wildlife Service
- j. Yes, about 75% is open.

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What issues have they had with creating and maintaining the catalog?

- a. Not sure
- b. Some of their technology is 8 years old, when the Internet was not the same as it is today. Some data they broke into chunks for faster downloads. Now they would not do it that way.
- c. One problem persistent problem is that data providers do not update their documentation and/or metadata. That Inside Idaho has no control over the content is frustrating. They get support and funding from the library, the INSIDE Idaho Endowment fund, EPSCOR/NSF, Idaho BLM, NSDI FGDC CAP, Idaho Imagery Consortium.
- d. Determining workflows for adding records and keeping site up to date is the biggest ongoing challenge. They have a partnership with the State of Oregon Department of Administrative Services that can upload new records to the library. Metadata format changes with ArcGIS 10 caused some additional wrinkles. The implementation has become more difficult with subsequent versions of the software. In addition, they don't feel that they are the stewards of the data.
- e. This past year, they have been building a digital archive for all of their geospatial data, they now have plenty of storage space for the data. The only issues are related to staffing, bottlenecks are related to reviewing and developing metadata.
- f. Issues with creating and maintaining the catalogue. Many! Identifying open metadata catalogues with a harvestable API is one! But also, handling many different metadata schemas. Tony has spent many painful hours cross mapping different metadata schemas - a few of which are listed www.gogeo.ac.uk/files/metadata/agmap-crossmap.pdf Ultimately poor metadata is the biggest – I've heard it said poor/sparse metadata is more off-putting than no metadata!
- g. No info
- h. No info
- i. Will be provided
- j. Main issues are quality metadata and lack of standards. What keywords are entered needs a controlled vocabulary. Also different date formats are used.

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What resources do they need, staffing and other funding needs.

- a. One FTE GIS librarian with system dept help
- b. Metadata/GIS specialist, computer support specialist, and main programmer
- c. They have a metadata specialist, a GIS Specialist, a Web designer/programmer and a director.
- d. The original creation was a contract from the State of Oregon mainly funded through federal sources. They did the Oregon Imagery Explorer and the state was very happy with the results, so wanted them to develop the Oregon Spatial Data Catalog. They have relied on grant funding for enhancements and maintenance of the sites. Currently totals over \$100k in cost. Much of this funding is from the USGS.

Staffing includes program manager (Marc Rumpel) who is a programmer. There is also a project manager and a program manager. They are not programmers, but manage the project and work on obtaining additional grant funding. Also have graduate assts. and use interns -- most have GIS background, but some have had programming background. Also leverages the library's systems administrators.

- e. They approach MAGIC as a teaching lab, so they have an internship programs and do independent study for honors courses – helps grow the collection and helps the students gain some real experience.

They have 3 full-time staff (GIS librarian, Government Documents Librarian, and staff person who catalogs print maps and also works on developing collaborative relations with agencies and other campus units), 2 graduate assistantships, and modest student budget.

- f. To run both services we have a staff complement of about 4.5-5 full time employees. Both products are built upon open source software (Dspace for ShareGeo and Geonetwork for GoGeo) so actual purchase of software didn't incur cost but there were obviously development costs about ~6 months development time on Geonetwork and ~3-4 months on Dspace
- g. Someone who can do data entry and uploading for all new items added to the catalog. As the catalog grows, more server space may be needed. Also, sometimes large zipped files have been challenging to add to the CMS due to uploading timeouts. The person entering the data needs GIS software so that they can extract topic categories, data extents, and other information.
- h. This took a full time programmer a couple of months to build. It also takes a considerable amount of time to maintain, as the data are entered by hand.
- i. Will be provided
- j. OpenGeoportal can be implemented at different levels.
GeoData can be implemented at different levels.
Locally hosted Enterprise – need to setup and maintain your own servers, and do your own database administration. At this level, you need to have some programming experience be able to read the code.
Middle – host own data and create metadata (Columbia and UConn). User a shared non-locally hosted interface

Lowest – completely cloud-hosted, subscription – will need to create your own metadata.

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What technology are they using?

- a. Web server, not sure
- b. Home grown using Java, MySQL database. It provides admin functions and tracks the number of downloads.
- c. ArcGIS products and a homegrown metadata catalog. They use SQLServer for database management.
- d. They are using the ESRI Geoportal Server 1.2 for the Spatial Data Library, it is now open source java application (mainly used by state clearinghouses). The Imagery Explorer uses software developed by ERMMapper/ERDAS for image extraction, although the State of Oregon is in the process of working with ESRI on a new imagery viewing tool.
- e. Cadcorp GeognoSIS (uses open standards, not open source), ArcGIS Server, ESRI ArcGIS suite. More information on GeognoSIS is at http://www.cadcorp.com/products_geographical_information_systems/geognosis.htm
- f. ShareGeo built on Dspace, GoGeo built on Geonetwork, both use openlayers (for map interfaces), postgres database and ebxml native database, xslt and a few other bits and bobs thrown in. I can provide more detail if required.
- g. The database field structure and on-site programming were done at the University of Maryland in a joint effort by the GIS Librarian and the Department of Technical Services. The GIS Data Repository uses the Ektron CMS400.Net content management system for web delivery. Details about the licensing requirements for GIS data sets are entered in the University of Maryland's in-house electronic resources licensing database. The search by category feature uses the topic categories from ISO Standard 19115 (Geographic information – metadata), with the punctuation standardized for easier readability. Our GIS repository was built using the Ektron Content Management System (CMS). This summer, we will migrate the site over to Hippo CMS. UMD Libraries do not have a GIS data server at present. For this site, the GIS Librarian in coordination with a GIS programmer and a project manager determined what metadata fields we would have for the “data set” and “data layer” categories, then the GIS programmer customized the CMS and the librarian entered the metadata, zipped the components of each shapefile, and uploaded the zipped files into the system. In this configuration, each layer must be individually added to its parent dataset.
- h. The GIS Data Finder is a database-driven website, and uses PHP and MySQL.
- i. ArcGIS products
- j. They are using the following:
 - Linux
 - Apache/Tomcat
 - Java
 - JSP
 - Solr/Lucene

- OpenLayers
JavaScript
 - JQuery with DataTables
 - GeoServer
 - GeoWebCache
 - OAICat (OAI-PMH protocol).
- There is also an API built around our Solr metadata instance that allows developer to access the metadata and data via code without fully implementing Open Geoportal.

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What functionality or resources are a must-have and what are nice to have?

- a. Not Sure
- b. Semantic mapping is nice but not essential. They would like to be able to search for a term that might not appear but is relevant to the search.
- c. ArcGIS Server is a must have. They are thinking of going with ESRI's Geoportal within a few years. Metadata editors are nice to have, and open source software would be nice to have.
- d. Search and download are necessary. Streaming of layers is becoming more important, but not a must-have. Data that is streamed has metadata records in the catalog. The data is mainly framework services (there are 5-6 framework services). One downside to streaming data is that you currently cannot change the cartography.
- e. Must-have: Ability to do web mapping; easy and intuitive (more like a Google map).
Nice to have: improved ability to visualize maps – easily generate maps and tables from census data; Open source when possible
- f. Must have functionality relates to searching by geography so place name look up (we use our own unlock place name gazetteer) plus by defining an area of interest on a map. Also providing information on the data format – vector/raster/GIS data format. But also providing lineage information – i.e. how the data was created allows the student/researcher to assess is this data really fit for my purpose.
- g. No info
- h. No info
- i. Will be provided
- j. Core – search, discover, preview, and retrieve rapidly over the net
Nice – web mapping components, custom web services.

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Do they have a formal collection development policy for geospatial data?

- a. No information
- b. They have a collection development policy, a data management policy , and a security assessment procedure.
- c. Yes
- d. No, do not. Data is added as it becomes available.
- e. Not formal policy, focus on what they can get for free, they have a very modest budget. Tend to rely on state and federal government agencies
- f. Formal geospatial collection policy? Not sure what you mean by that? In the UK there is certainly a strong driver for research data management – which our services sit within but I'm not sure if that's the sort of angle you're thinking of?
- g. We do not have a formal policy on what data is included in the catalog. It has all been informally decided basically by me. I have kind of been working from an inventory of our CD collection, trying to pick out the CDs that have GIS data on them and then trying to put into the GIS data catalog records for those CDs that I think would be most useful to our patrons. I have actually not been adding records to the catalog for some time because I knew that we were going to have to migrate the site and it was not clear how all that would go.
- h. The GIS Data Finder is for geospatial data we own, either via local government "donation", FDLP program, or purchase. I guides for finding data online data, but do not add these kinds of things to our spatial data catalog.
- i. Will be provided
- j. Yes, but they don't publish it. Collect at the local (municipal), state, and national levels. Also collect at the international data (have both open and restricted). They do coordinated data loading among institutions, so there isn't duplication.

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Is there a focus on a specific geographic area?

- a. No information
- b. NYS, and areas in the world where their researchers are doing work.
- c. Idaho, and areas around the world in which UI researchers are collecting data.
- d. Yes, Oregon, though they are expanding that to include region/western us data with a new Western Landscapes Explorer to be launched later this year.
- e. Connecticut and the NE (most of the faculty focus on the NE for their research)
- f. No. We naturally have more metadata records and geospatial data for the UK than elsewhere but we of course recognise that UK researchers carry out research across the world and therefore have an unbounded interest in geospatial data. Our international gateway www.gogeo.ac.uk/gogeo/international.htm is a very initial attempt at taking those looking for data to other places where their data searches might be satisfied, our vision would be to automate searches from GoGeo to cross search all other geoportals but that is someway off!
- g. No info
- h. No info
- i. Will be provided
- j. Yes

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If relevant -- Is there goal to build up the geospatial data collection at their university or to provide access to what other universities have?

- a. No information
- b. NYS. They do not do as many of the federal, county and municipal datasets as the NYS GIS Clearinghouse. It may be that their testing of the OpenGeoportal may provide a pilot of sorts for the State clearinghouse. Yet some of the clearinghouse data is restricted on the state site.
- c. They support data for Idaho, being an NSDI node.
- d. Yes, we have collaborated with the University of Oregon to train their staff in how to contribute metadata records to the Oregon Spatial Data Library, but none beyond that.
- e. They are planning on contributing to OpenGeoportal (Tufts, Purdue, Stanford etc. consortium). They currently are revising their digital archive to include handles. They should start contributing early next year.
- f. Indeed. Again within the UK there is a real push for institutional repositories – encourage the deposit of research outputs at the institutional level to demonstrate the good work done at universities. Where those IR's accept data deposits, we are always looking for geospatial metadata that we can harvest. A year or so ago we demonstrated with Leeds Institutional repository that we could harvest metadata from their institutional repository using OAI-PMH and filter only for geospatial metadata holdings. Likewise, here at Edinburgh University we have DataShare into which some geospatial data have been deposited that we can harvest.
- g. No info
- h. No info
- i. Will be provided
- j. Yes to both

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Do they have a preference for a specific type of data?

- a. No information
- b. No. they take it all. Some data types might be easier to handle, but they take it all.
- c. No
- d. Yes, Geospatial data (raster and vector data) vs reports and documents.
- e. Raster, Vector, and some numeric (for example, tabular spreadsheets)
- f. No info
- g. No info
- h. No info
- i. Will be provided
- j. Vector, raster, and scanned maps. There is little interest in scanned maps. Detailed local data and international data (open data). Tufts does not have much in the way of scanned maps; however many of our partner institutions do. Detailed local data and international data (open data).

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Notes

- a. Need to contact further.
- b. They are thinking of going to Open Geoportal in less than a year. They want to provide the best recent accurate data, and only provide historic data when it has archival value. They like the OGP's ability to rank results by relevance taking into account the search window.
- c. Contributors include counties, tribes, Idaho LiDAR consortium, Idaho State U., vendors, SPOT Image Corp; State agencies, federal agencies and Aerials Express
- d. No information
- e. No information
- f. No information
- g. No info
- h. Would you do different approaches if you want to build it now or any issues to maintain this catalog. Yes, I do not want our data to be in a silo. I would like to phase out the GIS Data Finder. I have been working very hard to get our geospatial data holdings in our online catalog and we have had some great success with that so far. Here are the results of a catalog search that limits to format: Geospatial data.
<http://search.lib.unc.edu/search?action=or:210943,false&Nty=1> The data that are available online are available for download from a password-protected portion of our web server. We have recently converted over 1600 FGDC metadata records to MARC format and uploaded them to OCLC so other GIS Librarians can use them. I'm hoping to write or present about this work.
- i. Will be provided
- j. How do you join Open Geoportal?
You can join the social aspect – working groups for metadata, developers, data, and best practices.
Join formally -- there are three tiers, see answers to question #9. At the middle tier, it depends. You need to determine what the level of support your institution needs.

If you are interested in the lowest tier, they recommend that you do the following:

- Initial needs assessment
 - What data is there?
 - Is there metadata available?
 - How is the data being stored?
- What is our capacity?
 - Can we put together web services here?
 - Would we want to host the interface here?
- What's the cost?

The Lowest Tier should be available in a few months.

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