Windows into the World

GIS Map Services, Data Portals and Other Sources of GIS Data

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Geographic Information Systems provide hydrologists with an important tool for displaying, manipulating, and analyzing large amounts of data; however, acquiring that data is an essential first step. Data are accessed primarily through downloads and map services. Downloads are usually accomplished using a File Transfer Protocol (FTP) program, which transfers a copy of the data to the user's site.

Map services provide access to data without actually transferring it, using commercial software produced by ESRI and through customized Web browser programs. Many agencies now use this technology to make their data available. Rather than providing data for download, map services offer data as a "Web service" to the ESRI desktop, either ArcGIS or ArcExplorer, or to other browser-based clients that support the technology. Advantages of map services are that users do not need to be concerned with data maintenance since the data come directly from the source, and no data storage space is required on the user's end.

GIS Data Portals

Prior to accessing the data by download or map services, it must be located. GIS portals organize data and services such as directories, search tools, community information, support resources, and applications. They provide capabilities to query metadata (data about data) for relevant data and services, then link directly to the online sites that host content services. GIS portals often do not contain any data, but only point to where they can be found. Many public and private agencies have or are developing GIS data portals of their own; several are listed below.

The Geography Network
www.geographynetwork.com
A data portal maintained by ESRI, a leading manufacturer of GIS software.

Geodata.gov
www.geodata.gov/gos
Part of the Geospatial One-Stop E-Government initiative, providing portal access to geospatial data and information. The portal is supported by collaborative partnerships with local, state, and federal agencies as well as commercial and noncommercial sources. An extensive amount of information is offered, including map images, map services, geographic datasets, geographic activities, spatial solutions, clearinghouses, and land references. Searches can be made by place name or geographic area, and further refined by content type, such as map service, geographic dataset, data theme, keyword, or date range. Categories of data include land use, geography, cultural and recreational features, water bodies, geology, geophysics, climate, biology, ecology, economics, demographics, utilities and transportation networks, elevation, cadastral coordinates, imagery and base maps, and much more.

The Geospatial Data Clearinghouse
clearinghouse1.fgdc.gov
A collection of more than 250 spatial data servers that have digital geographic data primarily for use in GIS, image processing systems, and other modeling software. These data collections can be searched through a single interface based on their metadata.

Users can select from one of several Clearinghouse Gateways. Clicking on the "FGDC" node on the displayed map will take you to instructions for searching geospatial servers in a variety of ways. A very useful link here is the one that checks server status. It provides the up/down status of a long list of servers around the world. Click the icon for a server under the "View Website" column to link to it.

The California Environmental Information Catalog
gis.ca.gov/catalog
An online directory of information resources for California. Participants include cities, counties, utilities, state and federal agencies, private businesses, and academic institutions that have spatial and other data resources.

GIS Data Downloads

The following Web sites provide direct data downloads useful to hydrologists:

The National Map Seamless Data Distribution System
seamless.usgs.gov
Provides custom-generated digital products based on user-specified geographic extents and datasets. Among the more useful elevation and imagery layers available are High-Resolution Orthoimagery for Urban Areas, the National Elevation Dataset 10-meter resolution digital elevation model (DEM), and Shuttle Radar Topography Mission (SRTM) data, a high-resolution digital topographic database covering most of the world.

The USGS National Hydrography Dataset (NHD)
nhd.usgs.gov/index.html
The NHD is a comprehensive dataset of information about surface water features such as lakes, ponds, streams, rivers, springs, and wells. NHD is based on linework from the USGS Digital Line Graph hydrography datasets, combined with reach-related information retrieved from the EPA's Reach File Version 3 (RF3) data. The original scale of this data was 1:100,000.

NHD is undergoing changes, and a new NHDinGEO model was scheduled for completion in April 2004. Data for download is accessible using subbasin references. To determine what data are available for a specific subbasin, check the NHS Status Map at webhosts.cr.usgs. gov/nhdstatus/viewer.htm. You can also use the EPA "Surf Your Watershed" website for additional information at www.epa.gov/surf.

The Arizona Regional Image Archive
aria.arizona.edu
This is an interdisciplinary resource system for digital images and map data for the Southwest, including Arizona, New Mexico, Utah, Colorado, and other states, as well as northern Mexico. Among the data available at this site are digital ortho quarter quads, georeferenced quad maps (DRGs) at various scales, and DEMs.

The Arizona Land Resource Information System (ALRIS)
www.land.state.az.us/alris/index.html
Lists datasets and associated metadata available for Arizona. Once ordered, the data are placed on an ftp site for download free of charge to public and nonprofit agencies. Private organizations can receive free data if they are contracting with a public entity; otherwise a reasonable fee is charged. Among the available GIS datasets are faults, geology, natural vegetation, hydrologic unit codes, lakes and other hydro polygon features, and riparian vegetation.

The State of Colorado – Decision Support Systems (CDSS)
cdss.state.co.us/ftp/gis.asp
Offers a wealth of information and data, much of which has a hydrologic focus.

Data layers are available by download individually or in bundles, organized by geographically defined divisions. Example datasets in the bundle include cities, climate stations, diversions, evaporation, flow stations, HUC codes, lakes, rivers, land use, precipitation, and soils. Downloading is free and simple. The site also offers the StateView Java Applet, which provides data viewing capabilities inside a browser for water resources data.

Clark County, Nevada – GIS Management Office (GISMO)
gisgate.co.clark.nv.us/gismo/freedata.htm
Provides GIS data for southern Nevada. Many local agencies contribute to the site, including Las Vegas, Boulder City, Clark County Water Reclamation District, Las Vegas Valley Water District, and the Regional Flood Control District, among others. Data available through download include land use, soils, fault buffers, wash buffers, rain gauge and weather stations, and various base data layers. Additional data are available through the Southern Nevada GIS Data Warehouse.

The GeoCommunity Data Depot
data.geocomm.com
Offers free downloadable data from all over the world, as well as data that must be purchased, either by download or CD. Although this site includes a fair amount of advertising, it also has useful information such as news relevant to spatial data users, software information, and links. Much of the data on this site also can be directly downloaded from the original data provider at no cost. Note that much more USGS data are available than

are listed here. The data can, however, be conveniently accessed by the country-state-county file structure.

The New Mexico State Information Systems Division
New Mexico does not currently offer any Web services or geographic datasets on their state Web site. General information and contact information related to GIS can be found at: www.state.nm.us/gsd/isd/services/geo_info.html

In closing...
We have barely scratched the surface of Internet resources for hydrologic data. Clicking on any of the portal sites mentioned in this article will take you on an odyssey of data research that is limited only by the time you have to gather data. Add the sites you find useful to your browser's Bookmarks or Favorites list and soon you will build an extensive and competent library to assist you in your work.

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