GIS Resources
for Local Governments

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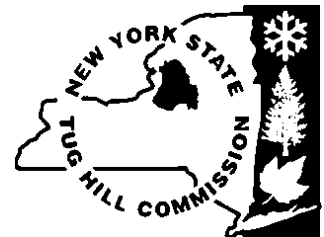
GIS RESOURCES FOR LOCAL GOVERNMENTS

WHAT IS GIS?

A Geographic Information System (GIS) is a computer system capable of capturing, storing, analyzing, and displaying geographically referenced information; that is, data identified according to location. Practitioners also define a GIS as including the procedures, operating personnel, and geographic data that go into the system.

Digital geographic data is stored in layers. Each layer represents a single feature (e.g., one road in a town) or a set of features (e.g., all the roads in a town). Unlike a paper map which is a cartographer's fixed representation of a certain set of geographic features, a GIS creates a dynamic map on a computer screen. Because each set of features is stored as a separate layer, the user has the ability to turn features on and off. Where a paper map might depict roads, bridges, streams and elevation contours, the same features in a GIS could be displayed in different combinations. If the user is only interested in displaying roads, bridges and streams (and not elevation contours), he or she would only add these layers to the map. Users can also add features to a layer (a new road can be added to a road layer) and change the way in which features are displayed (roads can be displayed as red dashed lines as opposed to black solid lines, etc.).

While GIS can be (and often is) used to create paper maps, its real power is its ability to integrate attribute or descriptive information with geographic or spatial information. For example, this allows graphic tax parcel polygons to be connected to data in a table that describes the tax parcels with text, such as the owner's name, land use code, and assessed value. A user is able to point and click on a particular tax parcel on the computer screen and immediately access all of the attribute data associated with that parcel. This power enables a user to "query" the data and extract certain features that share similar characteristics or that meet certain requirements. For instance, using a tax parcel layer, a user could select from the data all tax parcels that are assessed as dairy farms. These parcels can then be displayed differently on a map (perhaps in a different color) to distinguish them from parcels that aren't dairy farms. It is also possible to select all tax parcels that are a within a specified distance of a particular geographic feature such as a wetland or water body.

WHERE TO START

Help in developing a GIS is available from the Tug Hill Commission, county planning departments and the NYS Office of Cyber Security and Critical Infrastructure (CSCIC) (http://www.cscic.state.ny.us/). A number of private GIS consulting firms also offer help ranging from needs assessments to application development to training. Training is also available from time to time from CSCIC and at local colleges, such as SUNY ESF. Extensive online resources can be found at the NYS GIS Clearinghouse website at www.nysgis.state.ny.us.

HARDWARE

Basic hardware requirements for GIS include a PC and monitor. A color printer and/or plotter can be added to print maps. Recommended hardware requirements are a 2 GHz processor, 4 GB of random access memory (RAM), and 240 GB of hard drive memory for storing data. It is worth noting that the

faster the processor and the more memory – the better. Windows XP or Windows 7 is highly suggested. Internet access has become more of a necessity rather than an option in today's world with GIS mapping, so hardware should be ready to connect to the internet.

Once hardware has been purchased and set up, a GIS user has two options: purchase commercial software to install on the computer to start doing GIS work, or using free online mapping websites. Both options are discussed below.

CONSULTANT SERVICES

Private consulting firms offer a wide variety of GIS development and maintenance services. Many of these firms are especially useful for advanced tasks, such as the creation of digital data unique to a community (such as sewer and water infrastructure mapping) and the development of Internet-based GIS applications.

FREE MAPPING RESOURCES

GIS software is now more available to everyday users at no cost, because of web-based products like Google Earth, Google Maps, Bing Maps, ESRI ArcGIS Explorer, and other organizational web-based GIS sites. Also, there is ESRI ArcExplorer and Google SketchUp that are more of desktop software applications. Things have changed a lot in the last 5 years and GIS technology continues to evolve and become more readily available. In most cases these free mapping resources will lack the tools to do extensive GIS analysis and large scale map production, but for most people it is all they need.

Bing Maps is a web-based GIS data viewer produced by Microsoft. It allows you to view street maps, satellite images, Pictometry (Bird's Eye View) images, 360 degree views at selected street views, 3D maps, terrain views, driving directions, user points of interest, drawing on maps, etc.

ESRI ArcExplorer is the free GIS data viewer developed by ESRI. ArcExplorer is used for a variety of display, query, and data retrieval applications and supports a wide variety of standard data sources. It can be used on its own with local data sets or as a client to Internet data and map servers.

ESRI ArcGIS Explorer is the web-based GIS data viewer. You can access ready-to-use online base maps and layers, add your local data to maps services to create custom maps, and perform spatial analysis (e.g., visibility, modeling, proximity search). Also, you can add photos, reports, videos, and other information to your map.
Google Maps is a web-based GIS data viewer. It allows you to view street maps, satellite images, 360 degree views at selected street views, terrain views, driving directions, user points of interest, drawing on maps, Google Map API (used to incorporate Google Maps into your own website), etc.

Google Earth is a web-based 3D GIS data viewer. This viewer allows you to simulate flying over the earth with the ability to look at different vector datasets, imagery and view 3D buildings. This can be very powerful when combined with the free software Google SketchUp.

Google SketchUp is a desktop application that can be used to create 3D buildings. It gives you the ability to reconstruct downtowns, project areas, etc. Also, it allows you to attach coordinates for the buildings location, so that it can be displayed in Google Earth. Google SketchUp can be used for more than just creating 3D buildings; you'll need to explore it to see all the different ways it can be used. This product is

free, but you can upgrade to Google SketchUp Pro (fee-based), which gives you the ability to convert buildings into ESRI 3D buildings, allows you to print 2D architectural drawings of buildings, etc.

GIS VIEWER WEBSITES

You can view these links and others at http://www.thram.org/index_files/Links.htm .

- THRAM (Tug Hill Regional Atlas Mapper): www.thram.org

- Jefferson County Map Viewer: www.jeffcountymaps.com

- Lewis County Map Viewer: http://www.thram.org/LewisCounty

- Oswego County Map Viewer: http://rptsgisweb.oswegocounty.com/webmap/default.aspx

- NYS Interactive Mapping Gateway: http://www.nysgis.state.ny.us/gateway/mg/

- NYS DEC Interactive Online Maps: http://www.dec.ny.gov/pubs/42937.html

- NYS OPRHP GIS: http://www.oprhp.state.ny.us/nr/main.asp

- Google Earth: http://earth.google.com

- Google SketchUp: http://sketchup.google.com

- Google Maps: http://maps.google.com

- Bing Maps: http://www.bing.com/maps

- ESRI ArcGIS Explorer: http://www.esri.com/software/arcgis/explorer/index.html

HIGHER END SOFTWARE

Local governments wishing to extend the power of their GIS may consider purchasing a higher-end software package. The three most popular packages presently are ESRI's ArcGIS, MapInfo, and Manifold GIS. All provide more GIS capabilities then the free software or web-based GIS services, allowing the user to create, edit, and reproject data into different coordinate systems. They also allow the user to perform complex spatial analysis tasks and to create complex and visually appealing maps. ArcGIS retails for about $1500 for ArcView license (basic package). Manifold GIS sells for about $250 for their basic software package. Manifold GIS can be a cost effective GIS software for small organizations that cannot handle the high upfront cost and maintenance of other software. Both of these products can be made more powerful by adding software extensions (sold separately) that allow users to perform more complex tasks, such as analysis of three-dimensional data and image data. The different software packages and their extensions provide tools for different needs. Check to see what your needs are and choose which software and/or extensions will best meet those needs. Much more information regarding these packages is available online at www.esri.com or www.manifold.net.

DATA AVAILABILITY

A wide variety of digital geographic data is available for Tug Hill communities. Data available includes, but not limited to: municipal boundaries; tax parcels; parcel centroids; roads; elevation contours; steep slopes; streams; flood hazard areas; Department of Environmental Conservation regulated wetlands; hydric soils; agricultural districts; school districts; zoning districts; NYS Department of Transportation quadrangles; United States Geological Survey quadrangles; and the NYS atlas map. This data is typically available free of charge through the NYS GIS Data Sharing Co-operative. The Cooperative is a group of governmental entities and not-for-profit organizations that have executed Data Sharing Agreements for the purpose of improving access to GIS data among members. The Data Sharing Cooperative was primarily developed to encourage public agencies in New York to share in the creation, use, and maintenance of GIS data sets at the least possible cost. Extensive data resources can be found at the NYS GIS Clearinghouse website at www.nysgis.state.ny.us.

Users can also create their own data. Anything on the ground can be mapped – from recreational trails to building footprints to street trees. This data can be "digitized" either on a digitizing table or by tracing scanned features on a computer screen. Data can also be directly captured in the field with a global positioning system (GPS) receiver.

GRANTS AVAILABLE

Many Northern New York communities have commenced their GIS programs with a "needs assessment" funded by the NYS Archives' Local Government Records Management Improvement Fund (LGRMIF). A needs assessment includes recommendations on system hardware and software options, conversion of current data and long term GIS objectives. For information on this program, see:
 www.archives.nysed.gov.

ESRI provides grants to users and they are listed on their website at:
 http://www.esri.com/grants/index.html. The grant categories do change so check back occasionally to see if there are any useful additions.

Also, checkout the NYS GIS Clearinghouse site dedicated to GIS funding opportunities at:
http://www.nysgis.state.ny.us/coordinationprogram/reports/funding/index.cfm. This site has links to possible funding sources from different organizations.

In many cases a grant may not specify GIS specifically for funding, but if a grant states equipment or tools needed, GIS could fall under that category. It all depends on whether GIS technology is needed as a tool to successfully complete a grant project.