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LAND INFORMATION *Bulletin*

from the National Consortium for Rural Geospatial Innovations
South Georgia Regional Development Center

Ben Hill County, Georgia Reaps Benefits From GIS

A Case Study

Ben Hill County and the city of Fitzgerald, Georgia teamed up with the National Consortium for Rural Geospatial Innovations—South Georgia to transform hard-copy maps into a fully automated geographic information system (GIS). Now, the county, the city, and all citizens are reaping the benefits.



About RGIS

The National Consortium for Rural Geospatial Innovations—South Georgia (RGIS-SG) is located on the grounds of the South Georgia Regional Development Center in Valdosta, Georgia. It is a USDA program designed to promote the use of geospatial information and technologies by communities in rural America. RGIS-SG is dedicated to helping communities understand the concepts and benefits of using geospatial data as well as assist the communities in all aspects of GIS development.

In the early 1990s, Ben Hill County and the city of Fitzgerald, Georgia were faced with developing and adopting a comprehensive growth-management plan and enforcing the plan per a state mandate. From the bottom up, local officials, including the city of Fitzgerald zoning administrators, recognized that there must be an easier way to effectively enforce their zoning ordinances. During this time, the local tax office and emergency services were beginning to experience similar growing pains.

The county needed a comprehensive, easy-to-use, automated database. They turned to Rural Geospatial Innovations—South Georgia (RGIS) in Valdosta for direction. It was to be more than a one-shot deal. The goal was to develop a base that could “mature” and eventually contain diverse information layers—from election districts to emergency routing and parcel ownership. RGIS-SG recommended that Ben Hill County start with the basics: develop an **accurate roads database**.

The Process Begins

RGIS-SG and local staff first used GPS (global positioning systems) technology to locate each county- and city-maintained road, alley and right-of-way. The GPS positions were then converted to road and rights-of-way coverages in the county’s GIS. Attribute information such as street name and surface type were encoded in the field using GPS. Since most services such as water, sewer and zoning are usually located in the same proximity as streets, the capture of these data was a great tool when geo-referencing future layers. Once the road database had been verified and was being regularly maintained, the county proceeded with additional GIS projects.

Next on the agenda: the **Ben Hill County Tax Office**. Up to that point, the office had been using hard-copy aerial photography with mylar overlays depicting parcel boundaries. This method had become difficult to manage and update and was cumbersome for assessment purposes. In fact, assessing properties based on soil types (an issue in agri-

**Sample GIS data sets available to city of
Fitzgerald and Ben Hill County users.
Approximate dates of acquisition are noted.**

Road Centerlines: With address ranges, names, right-of-way widths, surface types and road-name annotation subclasses. **1995–1998**

Land Parcels: With parcel identification, tax digest information such as owner, value, assessment notes, legal acreage, etc. **1995–1996**

Soil Type Boundaries: With soil type classification and tax office base value coding. **1998**

Land Zoning Boundaries: With zoning classification and notes relating to site-specific conditional zoning. **1996**

Digital Rectified Aerial Photography: One-foot resolution, 8-bit gray, TIFF format. **1998**

Board of Election District/Precinct Boundaries
With district / precinct number. Point locations of registered voters also available. **1999**

Point Locations of City/County Facilities
Hospitals, Sheriff's Office, Fire Departments, Airports, Landfills, Schools, Wells, etc. **1994**

Existing and Future Land Use Polygons: With land use classification. **1993**

Tree Canopy Coverage: Polygons with attributes denoting areas covered by tree canopy. **1992**

Groundwater Recharge Areas: Polygons with attributes denoting areas in and out of designated groundwater recharge areas. **1992**

Census Block Groups and Tracts: With typical census-count data from **1993**.

City / County Boundaries: Polygons with attributes illustrating areas within each community's territory. **1996**

cultural communities) was difficult. RGIS-SG converted the hard-copy maps to a GIS data set by means of scanning, digitizing and attribution of each parcel polygon. After the parcels data set was completed, the ownership and assessment database, known as "GAP," was then related to the data set using parcel identification numbers. This single step allowed for multiple capabilities not previously available to the county. Assessors could use their digital-rectified aerial photography to identify properties that may need reassessment as well as properties whose acreage and features were not proportional to currently assessed values.

The next step for improved appraisal came with the digitization of soil-type boundaries. The source for these data was the hard-copy mylar maps available from the Natural Resources Conservation Service (NRCS). Once the soil-type polygons were converted, the county could more accurately assess properties based on the soil in and around each property.

Adding Data and Keeping It Up-to-Date

While the tax office additions were ongoing, zoning administrators from Fitzgerald and Ben Hill County began encoding their **planning and zoning boundaries**. Also, **emergency services** proceeded with entering county-wide address information into the roads database. For emergency dispatching in Ben Hill County, this database has increased response time and accuracy of emergency-vehicle routing. This functionality is available to dispatchers via a workstation at the communications center.

The latest interest in GIS is coming from the **local development authority**. With the addition of utility features along with building footprints and other features important to industrial development, the city of Fitzgerald will have a valuable tool for recruiting industry as well as a tool for infrastructure management and planning. As the database grows so does the need for keeping it accurate and up-to-date. The county and city of Fitzgerald have a contract with South Georgia Regional Development Center's GIS Department for almost all aspects of data maintenance. Users receive the new information as it becomes available via digital file-transfer methods.

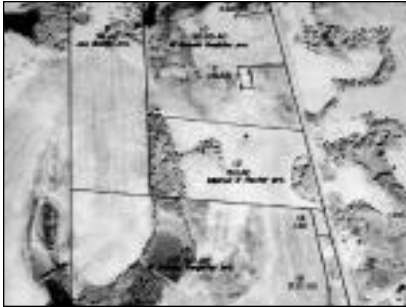
A Wise Investment

Since the advent of GIS in Ben Hill County and Fitzgerald, the system has been praised by growing numbers of users. Admittedly, Ben Hill County was hesitant to make the initial investment in the new technology. However, according to County Manager Jack Bryant, "it has become a tool we use on a daily basis as situations arise." Benefits reaped from the GIS go beyond the measure of dollars. The development of GIS in these communities has empowered the governments to make more-informed decisions regarding future planning, whether it be land use or infrastructure. And, it has had a positive effect on daily operations. Ben Hill County and the city of Fitzgerald know that what they have is not simply an automated mapping system; it is a tool for improving the quality of service provided by both governments, and ultimately, for improving the quality of life for Georgia's citizens.

RGIS-SG Helps Keep Costs Down

As with any project, both communities wanted to get the most for their dollar. The implementation of their GIS was carefully planned to avoid duplication of any efforts.

A typical hard-copy map used for in-house assessments and parcel information before GIS



Before constructing any databases, RGIS-SG searched other sites, such as state and federal databases, to determine what information might already be available. If no satisfactory data existed, then data construction proceeded.

Ben Hill County and Fitzgerald both benefited from the GIS and database experience available at RGIS-SG in Valdosta, Georgia. Both communities contract almost exclusively with South Georgia Regional Development Center / RGIS-SG for data development, data maintenance and technical support. Because RGIS is not-for-profit, both the city and county can continue to keep costs at a minimum while receiving needed assistance. RGIS-SG staff are available to any southeastern U.S. community interested in GIS development.

Some data sources and construction techniques that allowed Ben Hill County and the city of Fitzgerald, Georgia to build a low-cost, high-return database. Approximate costs are also listed.

DATA SET	METHOD OF CONSTRUCTION
Road Centerlines	Vehicles outfitted with global positioning hardware traversed every road and right-of-way identified by the community. While traveling, information such as surface type and road name were entered at the time of GPS collection. The output positions were then converted to a line coverage with attributes. Address ranges were added at a later time at the request of the 911 center using existing hard-copy maps and tabular information provided by the center. Cost: \$5,000
County-wide parcel boundaries and assessment information	Parcels were digitized from individual hard-copy mylars. These individual data sets were then appended to form one seamless polygon coverage. Parcel identification attributes (map, block, parcel, subparcel) were then assigned to each polygon. The concatenation of these four fields produced a unique code for each parcel. This concatenation was also performed on the GAPappraisal database. Then the two databases were “matched” to produce a polygon coverage with integrated assessment information. Cost: \$15,000.
County-wide zoning classification boundaries	Boundaries were digitized from hard-copy maps to create a polygon coverage. Zoning classification attributes were assigned as depicted on the hard-copy maps. Using past zoning case files and thorough research by both communities, zoning administrators proofed the database and noted corrections to be made thus bringing the accuracy of the database down to parcel level. Cost: \$2,000
Soil type boundaries	Hard-copy mylars of map pages from the USDA-SCS Soil Survey (1969) were obtained and scanned using a large format b/w scanner. Using GIS software, output raster files were registered, rectified and converted to GRID files. GRID files were then converted to line coverages. The coverages were appended and polygon topology was built. Attributes (soil type & abbreviation) were then assigned using GUI's, which completed the project. Cost: \$10,000
City / County facility locations	Per a contract with a state agency, South Georgia RDC collected facility locations, such as fire departments, schools, water/sewer facilities, jails, public-safety offices, etc. using GPS hardware. These positions were then converted to point type data sets and address attributes were then assigned in-house. Cost: Acquired at no cost from other sources
Election precincts and districts / Registered voter locations	Maps illustrating current election precincts and districts were delivered to staff. On-screen digitization yielded several polygon coverages that represented various electoral districts. From a database file provided by the Board of Elections, registered voter locations were mapped using the road address database. This voter-location data set will allow elections officials to better plan for the location of polling places as well as provide a means for ensuring that the Board of Elections continues to direct elections legally with regard to voter location and district boundaries. Cost: \$1,000

Summary of GIS Benefits in Ben Hill County

- **New, accurate and consolidated roads database throughout county**
- **New parcel database makes it easier to identify and assess properties**
- **Emergency services offer quicker arrival times, which can save lives**
- **Community governments making more-informed and equitable planning decisions**

Summary

While benefits can often be measured in dollars and cents, the long-term benefits of GIS development can mean a lot more to communities. With more accurate tax assessments based on soil types, the county or its citizens may collect or save dollars. For emergency services, faster arrival times may mean life or death, and that can't be measured in dollars. Thanks to GIS technology, governments are making more-informed and equitable decisions. Ultimately, that leads to better services and a higher quality of life.

Software

The GIS software currently used by Ben Hill County and Fitzgerald, Georgia includes ESRI's ArcView versions 3.1 and 3.2 with Network Analyst extensions at some sites. RGIS-SG and SGRDC developed, maintained and manipulated data using ARC/INFO version 7.2.1. Some database functions and services were performed in Oracle version 7. The communities currently use a Windows 98/NT semi-networked environment.

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