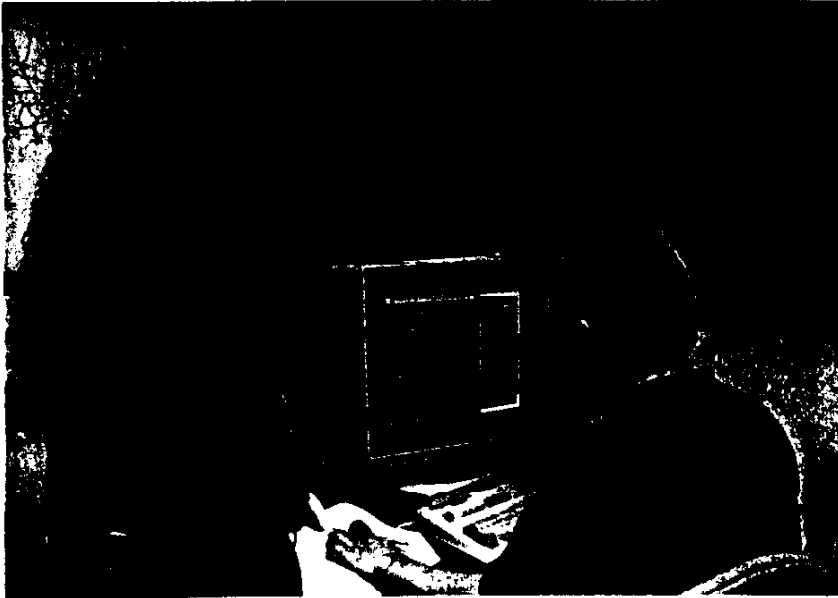


Public Access Drives Lincoln County's GIS Mapping Program

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Parcels in Lincoln County, North Carolina, USA, except for a few in an urban area, were unmapped before a digital data collection and geographic information system project was initiated in 1985. Previously, some acreage figures used for tax collection purposes dated back to the 1700s and 1800s. With the help of a consulting firm, the county has modernized its records and, during the past year, made GIS-based parcel maps available to the general public.

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Public access to GIS parcel tax maps is a hot issue among property tax assessors these days. In North Carolina's Lincoln County, public access has been a top priority for some time and was the driving force behind creating a data base of land information to look at parcels, roads, waterways, and other attributes. The public can view and, for a minimal fee, print maps and information from a monitor located in the county tax assessor's office. So far, more than 15,000 maps have been distributed by this service.

Of the state's 100 counties — 40 of which are involved in using or building a geographic information system (GIS) — Lincoln County is the only one providing members of the public with a way to find and use maps and data.

CREATING THE DATA BASE

Lincoln County was formed in 1779. It was named for General Benjamin Lincoln, the general whom George Washington

assigned to receive the surrender sword from General Charles Cornwallis during the Revolutionary War.

In 1847, the county was split into four sections. It now measures about 300 square miles — 34 miles long and 10 miles deep — which is an average-size county for the state. Except for about 2,000 parcels in the city of Lincolnton, parcels were unmapped. Many of the taxable acreage figures used for tax collection purposes dated back to the 1700s and 1800s, and it was feared that many of them were off from one acre up to many acres. Those discrepancies affected the property tax dollars collected each year by the county.

To rectify the county's acreage figures and, at the same time, create the public-access GIS data base, the county's board of commissioners signed a contract with L. Robert Kimball & Associates — a photogrammetry, engineering, and architectural firm (Ebensburg, Pennsylvania, USA) — in 1985 to fully map the county. Under its five-year contract, Kimball created a turn-key orthophoto cadastral GIS with GIS software.

To compile the data base, Kimball produced their own aerial photographs (orthophotos) and digitized soil, forest, and land use maps from various government agencies.

The county received the first hard-copy files from Kimball in March 1990, and began receiving digital data in August of that year.

In February 1990, administrators sent out a request for proposal for GIS software and hardware. In June 1990, they selected ARC/INFO GIS software (Environmental Systems Research Institute, Inc., [ESRI], Redlands, California, USA) running on IBM (International Business Machines, Armonk, New York) hosts, terminals and peripherals. They also purchased CalComp 9300 and 9500 (CalComp, Anaheim, California) digitizers for adding information to the electronic maps.

During August 1990, the first hardware and software were delivered to project organizers; that same month Kimball loaded the first township data base (about 8,000 parcels of land), which had been built by the consultants in ARC/INFO format. Within a couple of hours, operators were looking at about 130 maps that were fully joined and had all of the ownership data attached.

Files for the remaining four townships were regularly received and loaded onto the GIS for a total of about 380 digital maps -- containing 31,000 parcels -- during the next six months. All of these maps were fully joined coverages with parcel lines, streams, railroad rights-of-way, road rights-of-way, centerlines, annotations for acreages and measurements, and PINs (12-digit parcel identification numbers). The digital files are kept updated on a daily basis by the four-member GIS Division of the Tax Department as changes are made in property lines or ownership.

In early 1991, the final township tape was received from Kimball, just in time for the completion of the countywide program for reappraising parcels. The new values were effective 1 January 1992. The department reconciled all 31,000 taxable parcels of land to the assessing data base with some expert assistance from Kimball, so the records matched the new maps within nine months. Some parcels were found to be larger than shown on the tax records; others were smaller. Most acreage tracts were off by as little as 1/100th, but some were off by many acres.

The nearly 6,000 owners of parcels affected by these changes were sent letters of the new calculated acreage. Each was invited to contact the department for an appointment so he or she could be shown the new information. Many taxpayers accepted the offer, traveling to the offices to view the maps and aerial photographs firsthand. For the most part, they were impressed with the new calculated acreages. Ninety-nine percent of our potential land problems were resolved at that point.

Calculated acreages were often different from those we had traditionally used because a ruling by North Carolina's attorney general in 1984 said the state couldn't tax residents on road rights-of-way. Under the old system, the department assessed acreages by the deed's land total and -- because the county was not previously mapped -- didn't subtract acreage for the road rights-of-way. With the new guidelines, the property owners still own those areas but aren't taxed for them.

SHARING THE WEALTH

In April 1992, the department set up a monitor for public use in its offices with the assistance of its new GIS coordinator,

Lew Harford. The system has an easy-to-use public menu written in ArcLibrarian, a module of the GIS software, by programmers working for Kimball and ESRI's regional office in Charlotte.

Using this system, the public can view their own maps and even print them, but they can't make changes to the data base. These maps show parcel lines, soil types, woods and cleared land, and structure symbol types, such as residential, commercial, government buildings, mobile homes, schools, and fire departments. The structure symbols were digitized from the orthophotos by Anderson & Associates, a civil engineering and planning firm (Blacksburg, Virginia, USA), which the county chose to complete its turnkey E-911 project during 1990-1992. Anderson personnel verified the type of structure during their door-to-door canvassing of all structures in the county, including all mobile homes. Symbols were digitized exactly on top of structures.

From the data base, the public can look at information attached to the map graphics, such as ownership (current owner plus the previous four owners), PINs, and the last five deed books and pages, plus approximately 20 more items of interest.

The public may print 8.5-inch x 11-inch maps on an IBM Model 4029 laser printer. Maps are priced at \$3 for a regular map, and \$5 for a more complex, multilayer map, such as one showing soils, woods, cleared land, and structures. The county can also plot black-and-white maps on its CalComp 5300 electrostatic plotter on paper or mylar.

OTHER APPLICATIONS

Lincoln County's Planning and Zoning Departments are linked to the GIS by two high-speed, T1 telephone-communication lines -- which allow for rapid communication and response -- and can build their own layers. The state's layer of watershed data is also linked to the GIS, as are tax applications data. These data are available for all county departments, as well as the public, to view and print maps.

SYSTEM BENEFITS

Using up-to-date records of who owns property and how much land they own gives the county a more accurate way to appraise land values and assists county officials in making land use decisions. The

mapping and reconciliation process has created tens of thousands of dollars in additional revenue for Lincoln County and provides the county a better way to record changes in acreage or ownership.

Overall, acreage changes were well received by the public. Property owners readily accepted changes to the property lines and acreage when they could see the aerial photography with the property lines drawn over. This let them view their properties in a new way. We could also print maps or give them 30-inch x 42-inch hard copies of the aerial orthophotos with the property lines drawn on top.

At the end of 1993, the county added three new data layers to the GIS data base. A digital orthophoto data base will let people view their properties from overhead and "zoom" to a level of detail in which they could see the diving board of a swimming pool. Two other files -- one of 20-foot contours, digitized from U.S. Geological Survey (USGS, Reston, Virginia) maps, and the other of 100-year flood zones, will also be made available. The county will consider digital, ground-level view photography in the near future.

Lincoln County is one of the first counties in North Carolina using GIS for land assessment and management. Naturally, the department receives a lot of queries about the system from other state jurisdictions. We've given numerous demonstrations and lectures on the system's development and how it might be used in the future. The greatest benefit of having the information has been in making it available to virtually anyone. They can come in and look at what we have free of charge, which has been a real hit with taxpayers and county officials alike.

When you're able to share good, accurate data with the public or other agencies, they tend to receive it with an open mind and understand it more fully.

The progress that Lincoln County has made during the past few years -- from no maps to a modern digitized data base -- has been made possible by the progressive management and commitment of County Manager A.R. Sharp Jr. and the Board of County Commissioners. ■