

**DELIVERY OF RESOURCE INFORMATION
TO
LOCAL ENTITIES IN RURAL AREAS AND SMALL TOWNS**

Bruce Ransom
Associate Professor and
Strom Thurmond Institute Associate
Clemson University

Prepared for the National Rural Economic Development Institute at the University of Wisconsin
and the South Carolina Rural Economic Development Council

Produced by the Strom Thurmond Institute of Government and Public Affairs,
Clemson University, Clemson, South Carolina 29634-5203

May 1998

ACKNOWLEDGEMENTS

The author is grateful to many individuals for who shared information and insights during the research phase of this report. Their ideas and concerns were essential in determining how the developments in information management may be transferred to rural counties and small towns. Special thanks are offered to Sara Bagby and Jeffrey Allen of the Strom Thurmond Institute. Personnel at the various Councils of Government in South Carolina, plus the members of the Statewide Council of Governments' Executive Directors Organization, are also extended special thanks.

TABLE OF CONTENTS

	Page
I. Acknowledgements	i
II. Introduction	1
III. Affordable Public Access to Internet Service Providers	3
IV. On Line Services	5
V. Innovative Applications	6
VI. Education and Training	12
VII. Recommendations	17
VIII. Sources Consulted	19

INTRODUCTION

Computers have become indispensable tools in the information age. In the mid-1970s many state and local governments were using computers, usually in-house stand alone systems, in management and operations in functional areas such as finance, utilities, personnel, and law enforcement (Henry 1995, 166; Scoggins, Tidrick, and Auerback 1986, 34). In the mid 1980s, the major applications supported by in-house computer systems and joint/cooperative systems with other governments (Scoggins, Tidrick, and Auerback 1986, 354) were spreadsheets, word processing, graphics, and budgeting (Scoggins, Tidrick, and Auerback, 1986, 41). By the mid-1990s, the International City/County Management Association reported that the use of computers in local governments of all sizes was phenomenal.

We have seen a movement away from centralized batch-style computing on large systems performed upon request by technical-information-systems staff, to decentralized end-user computing. Stand-alone computers are gradually giving way to computers linked by local area and wide area networks and to distributed computing, in which jobs are routed to computers that have processing capacity available, and “massively parallel” computing, in which one PC has five chips that can be used simultaneously to process different jobs. These technologies allow PCs to handle processing that previously have required a mainframe (Cahill and Overman 1995, 36).

The advances in computer technology have allowed management information systems to move beyond using computers to process information to assisting in planning and community development. The movement has been away from only interconnected systems suitable for data accumulation storage and retrieval to the creation and development of analytical decision support systems such as geographic information systems (Henry 1995, 167). The use of geographic information systems (GIS) to guide decisions about where to build roads, water and sewer lines, health care facilities, and so on is dependent on computer technology and customized data bases. Unfortunately, the availability and uses of computers in local governments is uneven.

Across the United States in some localities citizens are able to sign on to their computers and access the agenda for the next council meeting, find out upcoming parks and recreation activities, and obtain property assessment information. In other local governments, personal computers are a recent acquisition and funds for on-line services are not available. As one local government practitioner described it, her small town uses computers only for administrative personnel functions. Another practitioner remarked that he had hoped that information technology would level the playing field for smaller, poorer local governments such as his. Unfortunately, he explained, if anything the unevenness is increasing because of costs and lack of trained personnel (Moulder and Huffman 1996, 24).

Rural areas and small towns in South Carolina can overcome some of the gaps in the access and use of information technology. The use of personal computer is expanding and data bases are mushrooming. The South Carolina Information Highway (SCIway) offers links to a wealth of web sites and other useful online resources and services. The South Carolina Rural Development Council's (SCRDC) web site also offers links to far-reaching Internet resources for communities, businesses, and individuals.

The SCRDC reports that regional council of governments (COGs) are the first source for financial assistance and technical assistance information in many rural communities and small towns. Although these communities may have access to personal computers, the availability of on line services is limited, leading most of them to prefer to receive financial and technical assistance information by hard copy rather than through the use of computers and technology. In practical terms, this process also means officials at COGs are expected to have the primary responsibility for searching data bases and customizing those queries to the specific requests and information needs of individual communities.

As computer technology becomes universal and a maze of data bases become available on line, many local officials require assistance in determining their data needs, surfing targeted data bases, and arranging data in an efficient form to aid planning and decision making. This report will offer suggestions and recommendations for how COGs and SCRDC in conjunction with the Strom Thurmond Institute at Clemson University can assist small towns and rural areas in the successful uses of computers and the Internet to determine local data needs and customize

data compilation. In particular, the focus is on affordable public access to the information super-highway, on line services, innovative applications such as GIS applications, and the role of education and training for reducing the frustration of searching through data bases and managing information. These recommendations will be useful to all rural settings, but they are especially germane to assisting rural communities and small towns in the lower part of South Carolina. In particular, the state's lone federal enterprise community and the eight non-designated champion communities would find information management systems beneficial as they engage in revising and implementing their strategic plans. In addition, the strategic planning mandates outlined in the state's Rural Development Act, especially for many of least developed and under developed counties, and the second round of competition for the federal empowerment zone and enterprise community competition increase the need for less well-off communities to make efficient use of information management through the use of on line services and GIS.

AFFORDABLE PUBLIC ACCESS TO INTERNET SERVICE PROVIDERS

The availability of cheap Internet access for local entities such as schools, libraries, health care clinics, counties, and municipalities is a concern in many rural areas. The Telecommunications Act of 1996 mandated that telecommunications service providers furnish affordable Internet access to schools across the United States, but the act did not make the same provisions for local governments (Bower 1998, 44). Unlike their urban counterpart, for many rural communities e-mail and Internet access require a long-distance phone call. Poor local phone service is a problem, meaning long distance phone lines may be the only means of providing some communities with telecommunications services. These services along high-speed phone lines may cost as much as \$2,000 per month (Bower 1998, 45). For many rural communities in South Carolina, Internet service means a long distance phone call to Columbia, Aiken, Charleston, Florence, Georgetown, or another urban location.

Beyond to the need to secure affordable Internet service provision, is the desire to im-

prove computer literacy. Although these needs are uneven, in general rural areas have a need for computer service and literacy. Computer technology and know-how in small towns and rural communities is uneven within and across COG regions. Some rural communities and small towns have computers and are connected to the Internet, some do not. Cheap Internet access and an investment in computer literacy training programs for many employees of local entities in rural areas must be made available on a widespread basis if these communities are going to capture the many benefits of Internet use. Universal access at an affordable price is a key factor for enabling small towns and rural communities to join the information superhighway.

One suggestion is for Councils of Governments to assume the role of local Internet service provider for their regions through an 800 telephone phone number. As a web site host, Central Midlands Council of Governments, for example, offers such a similar service. An 800 phone number, for instance, operated by the Pee Dee COG and the Waccamaw Regional Planning and Development Council would improve access to affordable Internet access to remote communities. The Appalachian Council of Governments and the Central Midlands Council of Governments are models for COGs serving rural counties to emulate. They demonstrate how COGs may assist rural areas in securing affordable regional Internet services. Central Midlands COG, for example, offers services from designing web sites to web site hosting on a fee basis and Appalachian COG also serves as a local service provider on a subscription basis and provides hands-on and class room training in computer literacy.

ON LINE SERVICES

Affordable public access to Internet service is important because the most dramatic growth in the use of computer technology is occurring in on line services. On line service permits direct access to the Internet, the gateway to a huge amount of data and information in public and private databases around the globe. SCRDC's comprehensive home page with link-ages to government resources, small business information, laws and regulations, community resources, family and children's information, statistical information, and general information

requires direct access to the Internet or access through a commercial or other provider. In order to view web pages and surf the Internet, users must run a software program such as Netscape Communicator and Microsoft Explorer.

SCRDC, Central Midlands COG, Appalachian COG, The Strom Thurmond Institute, utility companies, and others should create partnerships around the state to assist rural communities in web site development and on line services to allow these communities to move toward the variety of resources and services available through the Internet. Central Midlands COG, as mentioned already, offers a variety of services in home page development. Its web site hosting services includes 10 megabytes of space on the COG's web server, which includes a World Wide Web address for the town or county. Central Midlands COG will design a web site to meet the needs of a particular community, including access to search engines. Central Midlands COG is an illustrative model of the services that COGs serving largely rural areas may provide to local entities in the areas of home page development, networking, and access to on line services.

INNOVATIVE APPLICATIONS

Advances in technology enable the strategic use of information technology to ensure the linkage between local governments and strategic planning. Public decision-makers are now able to explore integrating information technology needs into the strategic planning process (Kraemer 1996, 582). Geographic Information System, or GIS, is a major innovation for this undertaking.

A geographic information system is a location-related computer program that combines data and, typically, maps for a variety of uses. Urban centers usually derive the greatest benefits from GIS, particularly in the areas of public works, code enforcement, and fire control. Geographic information systems produce superior quality maps, promote data integration from a variety of government data bases, and increasingly are being used for streamlining economic development, planning, land use, zoning, reapportionment, solid waste collection, libraries, housing, and health policy development (Henry 1995, 167-168).

Rural counties and communities in South Carolina, particularly those preparing strategic plans and planning to use them as decision making and policy tools, may use GIS to display parcels of developable land, roads, water and sewer lines, topography, fire stations, wetlands, road mainte-

nance schedules, parkland, and so on. GIS is a powerful tool for guiding decisions concerning economic development activities such as where to build roads and extend water and sewer lines (Morgan and England 1996, 165).

Economic development professionals in each local government search for its unique combination of attributes that give it a competitive advantage. Yet there is a common process for designing, implementing, expanding, and managing a local government geographic information system.

The model for most city and county systems is a multipurpose, enterprise-wide system, based on large-scale map data, centered on parcel information with overlays and linkages to other land-related data and databases. Ultimately most local governments need large-scale, parcel-based data to serve all their GIS needs...Variations on the local government GIS model take into account the urban or rural characteristics of the land, available data and initial application needs. The specific accuracy of the base map and parcel data may vary, and the applications overlays and land databases will differ, particularly in the early stages of GIS development (Somers 1998, 25).

Local governments, especially rural communities, need assistance in “designing, acquiring, installing and implementing the necessary data, software and hardware, and ensuring that the correct people and procedures are involved” (Somers 1998, 25). The Strom Thurmond Institute in partnership with COGS such as the Appalachian COG, Central Midlands COG, and Lower Savannah COG can become the collaborative nucleus for assisting rural counties and small towns in customizing the implementation of GIS through a process that involves:

1. project planning,
2. system design,
3. data acquisition,
4. installation and implementation of data,
5. hardware and software acquisition,
6. operation and maintenance of the system,
7. personnel training,

8. on-going technical assistance.

The Appalachian Council of Governments maintains a computerized regional data base with wide ranging information. Its Economic Development Information System (EDIS) plays a central role in transferring information to local entities. EDIS is a model that may be transferred to COGS serving rural communities to help them meet future goals and objectives. Appalachian COG maintains a regional web site (SC-Upstate-Info.org) for this purpose. A public/private consortium of local governments, utility providers, and other businesses along with the Appalachian COG created EDIS, a GIS system, as a tool for economic development in the region. EDIS, which is designed and maintained by the COG, provides readily accessible high quality data, graphs, and maps of areas in the region. Through links to the Internet, EDIS opens the Upstate to domestic and foreign investors. The computerized system permits the managing and updating of maps, graphs, and other data that would be beyond the reach of many individual smaller entities acting on their own trying to manage a GIS-based system. The flexibility of the system allows quick access to detailed information on a local and regional basis. The system allows the user to generate customized elements of socio-economic data disseminated in GIS mapping and colorful written reports. Potential investment opportunities maybe visualized by viewing the interrelationship of many variables and factors in one comprehensive view.

The Government Services Division and the Information Services Division of the Appalachian Council of Governments respond to the information and resource requests of a six-county constituency. If the COG cannot supply the information, it refers the entity to someone who can. The COG responds to the variety of needs for information from local entities. Those information needs include questions surrounding home rule, state code questions, planning, economic development, taxation, technology, legislative issues, aging, grants personnel, and training, to name a few. The Appalachian COG, through a partnership of public and private sector entities, has positioned itself to respond to information resource needs of localities accurately and quickly. Further, the COG's Government Services Division provides hands-on and class room training

and technical assistance on using computers (hardware and software); the Information Services Division provides training and technical assistance related to geographic information systems, networking, and the Internet.

Clemson University, through the Decision and Communication Technologies Team at the Strom Thurmond Institute, also maintains an innovative approach to information management; its focus is rural communities and small towns. Many rural public managers and policy makers are interested in responsible resource management in order to meet economic development goals and objectives. Because an efficient response to fulfilling these needs requires information in a computer compatible form along with a means for reviewing and using information easily, the Strom Thurmond Institute has developed Fast Access Statistical Trends and Maps, or FAST-MAP. FAST-MAP is a prototype method for efficiently identifying and producing custom-built information that will allow the novice user in rural areas and small towns to enjoy the capacity to produce charts, graphs, and meaningful maps using basic Internet computer tools.

The rationale for FAST-MAP is similar to EDIS. There is a critical need for “information managers”, those who will provide a value-added filtering process in sifting and managing information to make it meaningful to users. FAST-MAP implements a GIS that is accessed through the Internet at county Cooperative Extension Service offices. Its purpose is to search numerous data bases and create a customized system that meets the information needs of rural development planner and others who are typically restricted in gaining access to these types of technologies and resources. FAST-MAP gives local planners and other officials in rural communities the ability to tie demographic data to digital maps of the road network and census tracts/blocks. These data and maps empower the local officials to perform more meaningful types of analyses. Local entities in rural areas, in particular, have been very slow in gaining access to data bases that have been available for years and utilizing them in productive ways. The objective is sift through the many data bases and create a customized system that is cost effective and user friendly.

FAST-MAP has access to many types of data that are germane to planners and decision

makers in rural areas. The types of data include political boundaries, congressional districts, demographic data tagged to geographic coordinates, transportation networks, utility and infrastructure networks, hydrology, land use and land cover, agriculture data, zoning, special interest districts, and much more. Most of these data are easily obtainable, but unless the requesting party has access to geographic information system software, they generally cannot use the data. In addition, unless the computer user is trained in GIS, the data are often not in a form than can be quickly and easily accessed or interpreted.

An important attribute of FAST-MAP is that it permits individuals to wade through numerous data bases in order to get all of the data to get useful information in an easy, time efficient manner. FAST-MAP enables easy use of large amounts of information available in computer compatible form; it is also a means for reviewing and using the information easily. FAST-MAP has a simple front-end interface for data that is accessible through the Internet. The interface allows users, even novice ones, with access to the Internet and the world wide web to browse an assortment of map layers and data types associated with a particular data set. An individual queries the data by selecting an area and data layer of interest. Then a script is executed by Arc/Info (a batch file running in the background for 1-2 minutes depending on the complexity of the question asked) to create a file which is sent to the user's computer, printer, or fax machine.

The state Department of Commerce's Office of Information Management also recognizes the growing demand for accurate and timely information, particularly about industrial sites. According to Martin Roche (1997, 28-31), the department developed InSite (InSite has been renamed siteSCope), a comprehensive statewide database to aid industrial site selections. The siteSCope database is a partnership of the departments of Commerce, Health and Environmental Control, Natural Resources, Education, along with COGs and others. This resource is in a GIS format and it is available to COGs, economic development offices, local governments, chambers of commerce, colleges, public utilities, and other similar entities at no cost. The user only needs to purchase ArcView software. Currently, the program has 64 active users; it is available only on

CD-ROM. To ensure the successful implementation of siteSCOPE by its users, the Office of Information Management offers training sessions on installing the system and using the software.

- Water and sewer line location;
- Available industrial sites and parks;
- Available industrial building and manufacturing facilities;
- Community and labor profiles;
- Water and electric power capacity;
- Transportation infrastructure;
- Political unit boundaries (cities, counties, etc.);
- Census demographic information (Roche 1997, 28).

Community profiles for marketing and other purposes may be easily and quickly constructed by using information depicting labor availability, median wages, education and training services, tax rates, cultural and recreational amenities, infrastructure availability, and so on. GIS allows the data base user to customize the data and display selected factors in colorful map formats. These data, which are beneficial to planners and decision makers when they pursue economic development and non-industrial prospects as well as for comprehensive community, planning, are updated quarterly.

In its next phase of development, the Office of Information Management at the department of Commerce will expand siteSCOPE's data, plus make it available on line. There is also an interest in attracting more users in rural communities.

EDUCATION AND TRAINING

The proliferation of data bases and advances in software development point to the realization that in the end the major cause of limited use of information technology is not technical, but the lack of computer education and training (Kraemer 1996, 579-581). The question or challenge is how can planners and others in rural areas wade through all the data bases purport-

ing to meet their needs and get information easily and quickly. EDIS, FAST-MAP, and siteSCOpe are answers to the challenge. EDIS offers a customized GIS program. The goal of EDIS is to enable the user to access information easily and promptly. The user will spend less time searching for data and spend more time using resources such as multiple layers of data, maps, and graphs. Similarly, FAST-MAP gives the novice user the capability to produce meaningful maps and browse the Internet for an assortment map layers and data types associated with a particular data set at the county, state, and regional scales. SiteSCOpe provides local planners and decision makers with comprehensive and accurate information in a GIS map format. These data include a variety of factors that aid in promoting a community to industrial prospects as well as ongoing community planning.

Both the Appalachian COG and the Strom Thurmond Institute realize that in addition to data collection, considerable more attention must be paid to data management and technical assistance. As local entities embark on accessing the vast reservoir of data resources, they should:

1. establish goals for their information systems;
2. decide how the data will be used;
3. define data in unique way;
4. create a data dictionary;
5. establish a schedule for updating data;
6. develop a budget for software, hardware, and training;
7. establish access to technical people;
8. create working partnerships between government agencies and business, particularly utility companies, in the region for planning, designing, funding, implementing, and maintaining information system.

The process which is being used by the Appalachian COG, is similar to a strategic planning process. It is based upon bringing public, private, and nonprofit organization leaders to-

gether for the purpose of conducting a needs assessment. Stakeholders, representing a broad base of information users, create a locally-driven process to determine information needs and then develop a budget based on those needs. For example, the focus maybe economic development, education and training, health care, infrastructure, general community development, and the like. The goals and objectives of the strategic focus will determine data needs, and how they will be to be integrated and implemented. In the end, needs and financial resources to meet those needs must be balanced and secured.

Information services personnel at the Appalachian COG are very interested in assisting rural communities in enhancing their information technology capacities. Through its Information Services Division and Government Services Division, the COG is prepared to share its system and expertise with councils of government in more rural regions, including related training. The opportunity of transferring the best practices of the Appalachian COG to rural communities is central to meeting the information resource needs in rural areas. The work plan for the COGs and the South Carolina Rural Development Council should be geared toward the following process:

1. engaging in a process to determine data needs;
2. recognizing the community's competitors;
3. exploring investing in an information system;
4. identifying assets;
5. identifying partners and funders;
6. bringing planning and technical personnel on board;
7. setting up directory and file names;
8. creating programs for providing technical support;
9. establishing a training component.

From the perspective of local governments, there must be a consensus around community

goals and objectives. For example, the strategic planning process may reveal that a priority goal is increasing the tax base. The partnership for the information system must be well integrated into a substantive agenda. Engaging in a needs assessment for substantive and technical matters is at the core of building a workable and friendly GIS. Community goals and objectives drive information management, and an agreement on goals and objectives aids in leveraging resources for decision making and implementation.

For FAST-MAP, the Clemson University Cooperative Extension Service will lead the training of personnel in the counties. Training will open to local officials and community members through a partnership between the county Extension Service, Strom Thurmond Institute, and the local COG. The partnership will help with data gathering and information sharing, statistical analyses, and technical support. A partnership between experts in the university community, the Extension Service, and COGs will allow an efficient way to accomplish technology and information transfers between the Clemson University and the rural areas of the state. FAST-MAP provides a utility for making information accessible to people and areas traditionally underserved by the technological community.

In addition to taking full advantage of EDIS, FAST-MAP, or siteSCOPE teams of information management experts, at the request of COGS and the South Carolina Rural Development Council, should also consider a series of short courses and training sessions on computer applications for information management. These short courses and training sessions should be designed to meet both immediate and future information management goals and objectives. A series of workshops and training sessions covering the basic concepts and methods of web page development should be provided for local entities in regions around South Carolina. Some topics to be considered for the workshops and training sessions include:

1. Hardware and Software for Information Management;
2. The Internet;
3. Web Pages;

4. File Transfer Protocol (FTP), News, Telnet, and Gopher;
5. Photoshops;
6. Image Maps/Active Graphic Interchange Formats (GIFs);
7. Online Research;
8. Spreadsheet Graphics;
9. PowerPoint Slideshows;
10. JavaScript;
11. VBScript and Active X;
11. Tables and Forms;
12. Special Topics.

Adopting a program based on the EDIS model, FAST-MAP, or siteSCOpe does not preclude an introduction to a fully-blown Geographic Information Systems. Workshops and training sessions on the basic concepts and methods involved in applying Geographic Information Systems to local governments and nonprofit organizations should be held strategically in rural communities, particularly with an eye toward advanced future resource needs and uses. Emphasis should be placed on the integration of GIS packages with public and private sector data archives and the creation of thematic maps in spatial analysis. The Appalachian COG and the Decision and Communication Technologies Team at the Strom Thurmond Institute are willing to be a bridge and broker for this training. Topics to be considered for the workshops and training sessions include:

1. Introduction to GIS;
2. Clipmaps with Photoshop;
3. Downloading GIS Data;
4. Spreadsheet Maps;

5. Spreadsheet to ArcView;
6. On Line Census Mapping;
7. ArcView Tables and Charts;
8. ArcView Tables and Charts;
9. ArcView Geocoding and Spatial Queries;
10. ArchView Spatial Analysis;
11. IDRISI Cartographic System.

Workshops and training sessions on computer applications and GIS should be customized to local and regional needs, especially in determining data needs and developing a system for information management. Paramount concerns will always include cost effectiveness and user friendly sessions.

RECOMMENDATIONS

At the February 1998 statewide meeting of the COG executive directors, there was a consensus for working with the South Carolina Rural Development Council in assisting rural communities with information management in general, and GIS mapping for assisting rural counties with economic development in particular. In addition, officials at the Appalachian Council of Governments are interested in working with the SCRDC and local entities in rural areas by sharing their expertise and experience in information technology capacity building and delivering information to local entities. The SCRDC, with the Strom Thurmond Institute as broker, should position itself to draw upon the expertise and best practices of COGs such as Appalachian, Central Midlands, Catawba, Lower Savannah, and a few others in expanding information technology access and skill levels in small towns and rural communities. Recommendations for SCRDC's consideration are:

1. Form a working group on information technology capacity building for rural areas. The group should serve in an advisory capacity. A primary role for the group is to assist

COGs in conducting a needs assessment and a strategic planning process for information technology capacity building. Its charge is to assist in the brokering of talent and expertise in information technology. Its members should be drawn from COGs, colleges and universities, utility companies, government agencies, school districts, health care providers, business and industry, and others.

2. Work closely with the technology information specialists at several COGs, in particular Appalachian, Central Midlands, Lower Savannah, and Catawba in planning and developing information management systems for rural communities and small towns by emulating the best practices for resource delivery in those regions.
3. Convene a series of meetings with local officials, Internet service providers, COG officials, and representatives from phone companies to explore cost effective ways, such as COGs operating regional servers and an 800 number, for securing affordable Internet access in rural and remote communities.
4. Consider endorsing and recommending EDIS, FAST-MAP, and siteSCOpe as options for rural communities to adopt in pursuing their substantive and technological needs.
5. Consider designating the Strom Thurmond Institute, through its Decision and Communication Technologies Team and Community and Economic Development Team, as brokers for identifying specific needs for information and coordinating hands-on and class room technology assistance in computer use, data bases, the Internet, networking, and GIS on a statewide basis. Best practices and models should be identified and endorsed for consideration by communities in rural settings.
6. Develop a series of regional and statewide training sessions and workshop on computer applications for local governments, the Internet and data base access, GIS for local planning and decision making, and the like.
7. Explore the proposition that costs to communities for information technology services will be dependent on a needs assessment and a strategic plan for prioritizing local and regional information needs. The goals and objectives derived from this process drive decisions about financial needs for achieving objectives. With the working group on information technology capacity building in the lead, pursue funding options such as government grants, subscription, services and contributions from public utilities and other businesses.
8. Develop a demonstration project for delivering resources to local entities and information technology capacity building. The Waccamaw Regional Planning and Development Council, a COG, is an excellent candidate. Williamsburg County, a federal enterprise community, is a member of the Waccamaw COG. A demonstration project will show how to integrate strategic planning for community economic development and information technology capacity building. In particular, the smaller communities in Williamsburg and the enterprise community will benefit from using GIS mapping and

assistance in economic development. Many rural counties like Williamsburg, do not have access to GIS and they would benefit from training about running GIS programs and hands-on training in Arc Information.

SOURCES CONSULTED

- Anderson, Carol (1997, December 11). Interview with the GIS Analyst, Appalachian Council of Governments, Greenville, SC.
- Bentley, Chip (1997, December 11). Interview with the Regional Environmental Planner, Appalachian Council of Governments, Greenville, SC.
- Bower, Brandi (1998, January). "www.localgovernment.com: Opening the Window to On Line Democracy." American City & County. 113, pp. 32-36 & 40-45.
- Bower, Brandi (1998, March). "Getting on the Information Country Road." American City & County. 113, pp. 44-46, 51-52 & 54-56.
- Brown, Johnny (1997, January 4). Telephone Interview with the Executive Director, Pee Dee Regional Regional Council of Governments, Florence, SC.
- Cahill, Anthony G. and Overman, E. Sam (1995). "Telecommunications in Local Government: Preparing for an Uncertain Future." In The Municipal Year Book 1995. Washington, DC: International City/County Management Association.
- Cohodas, Marilyn (1998, January). "Government and the Web Frontier." Governing. 11, pp.42-46.
- Henry, Nicholas (1995). Public Administration and Public Affairs. 6th Ed. Englewood Cliff, NJ: Prentice Hall, Inc.

- Kraemer, Kenneth L. (1996). "Managing Information Systems." In James L. Perry. Ed. Handbook of Public Administration. 2nd Ed. San Francisco: Jossey-Bass Publishers.
- Kraemer, Kenneth L. and Norris, Donald F. (1994). "Computers in Local Government." In The Municipal Year Book 1994. Washington, DC: International City/County Management Association.
- Moulder, Evelina and Huffman, Lisa A. (1996). "Connecting to the Future: Local Government On Line." In The Municipal Year Book 1996. Washington, DC: International City/County Management Association.
- Nedovic-Budic, Zorica and Godschalk, David R. (1996, November/December). "Human Factors in Adoption of Geographic Information Systems: A Local Government Case Study." Public Administration Review. 56: 554-567.
- Pelissier, Steve (1997, December 11). Interview with the Planning Services Manager, Appalachian Council of Governments, Greenville, SC.
- Roche, Martin (1997, Second Quarter). "Bringing InSite to S.C." South Carolina Commerce. pp. 28-31, and telephone conversation with Martin Roche, June 8, 1998.
- Rogers, F. Wayne (1998, January 21). Telephone Discussion with the Deputy Director, Lower Savannah Council of Governments, Aiken, SC.
- Schwartzkopf, Bill (1998, March 4). Letter from the Assistant Director, Waccamaw Regional Planning and Development Council, Georgetown, SC.
- Scoggins, John, Thomas H. Tidrick and Jill Auerback (1986). "Computer Use in Government." In The Municipal Year Book 1986. Washington, DC: International City Management Association.
- Shildeler, David W. (1996). "Local Government Use of Web Sites and Their Assessment: A Classification System." The Strom Thurmond Institute Working Paper Series. Clemson, SC: The Strom Thurmond Institute.
- Statewide Council of Governments' Executive Directors Organization (1998, February 25). Discussion with COG Executive Directors, COG Executive Directors Meeting, Columbia, SC.
- Somers, Rebecca (1998, April). "Building Your GIS From the Ground Up." American City & County. 113, pp. 24-31 & 36-41.
- Workman, Brenda H. (1997, December 11). Interview with the Information Services Manager, Appalachian Council of Governments, Greenville, SC.

Workman, Brenda H. (1998, March 18). Letter from the Information Services Director, Appalachian Council of Governments, Greenville, SC.