



# How Do Rural Western Counties Use GIS?

Research Report by Theresa Selfa and Tyrell Bailey

## Introduction

In May 2002, the Western Rural Development Center surveyed all rural counties (those with populations under 50,000) in the 12 western states (Alaska, Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming).<sup>1</sup> Specific survey objectives were to ascertain what percentage of rural county planning departments in the West used Geographic Information Systems (GIS), the primary applications of GIS in these counties, and the major barriers that rural counties face.

GIS is an information system designed to work with data referenced by spatial or geographic coordinates. GIS is used by many planning departments to spatially display land use, socioeconomic, and natural resource data within a given boundary. GIS is both a database system with specific capabilities for spatially-referenced data, and a set of operations for analysis and display of the data (Star and Estes, 1990).

A total of 292 rural county offices were contacted, of which 171 responded. Twelve counties declined to participate, and 109 surveys were not returned. The overall valid response rate was 59%. Detail on survey methodology and a copy of the survey instrument with summary data are included in the Appendices.

## Summary of Findings

### Land Use Distribution

Fifty-one percent of the total land in the 171 rural counties is public (owned by federal, state, and municipal governments). Another 33% of the total land is private agricultural land, with the remaining 16% devoted to commercial, residential and other land uses (Figure 1).

### Land Use Planning

Figure 2 shows that land use planning was rated a medium or high priority for 80% of the counties. About 88% of the counties sampled have planning and/or zoning offices, and nearly 75% of the counties are required

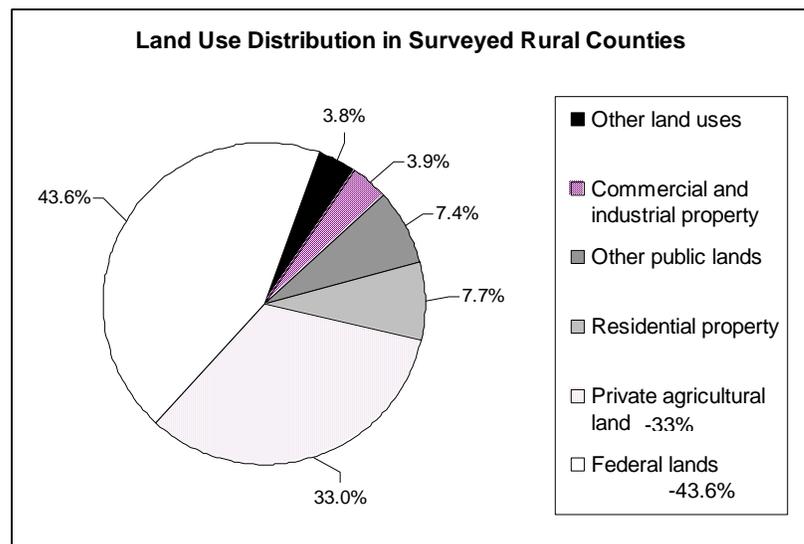


Figure 1. Land Use Distribution in Surveyed Rural Counties. Source: *County Governments' Use of GIS in the Rural West*. Western Rural Development Center. 2002.

<sup>1</sup> Hawaii was excluded from the survey because the only Hawaiian county with less than 50,000 people had only 147 people and lacked its own form of government.

to have a master plan and/or zoning ordinance in effect. Over 65% of the survey respondents work in administrative positions in county planning departments, and about 50% have worked for their county for 6 or more years.

### GIS Ownership and Use

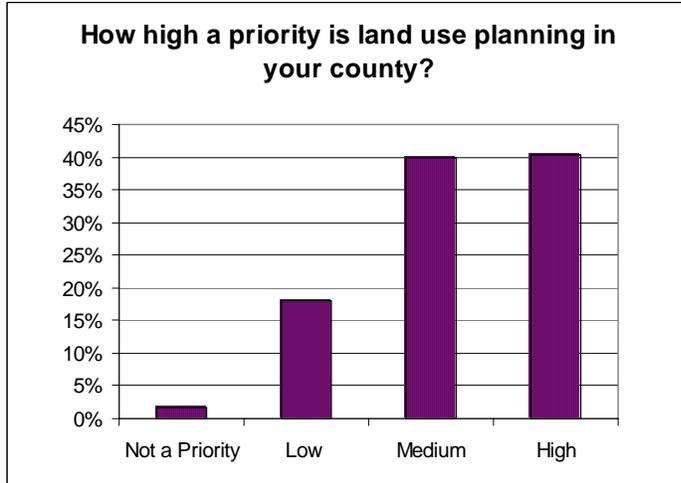


Figure 2. How high a priority is land use planning in your county? Source: *County Governments' Use of GIS in the Rural West*. Western Rural Development Center. 2002.

One of the most interesting survey findings was the high rate of ownership and use of GIS software in rural western counties. About 84% of the counties own GIS software, and 85% of those counties are currently using GIS. Of the counties that do not own and are not currently using GIS (16% of total counties surveyed), 95% are interested in developing GIS capabilities in the future, and 54% currently have plans to develop GIS capabilities. In sum, GIS appears to be a broadly utilized technology.

Respondents evaluated the utility of GIS for their own county in terms of current and future applications for planning. Fifty-one percent stated that GIS has been “very useful” to their county, while another 32%

stated it has been “useful.” Most respondents thought that GIS would become an even greater resource for county governments in the future, while acknowledging that use of GIS will require additional human and financial resources and training that may be difficult for many rural counties to obtain.

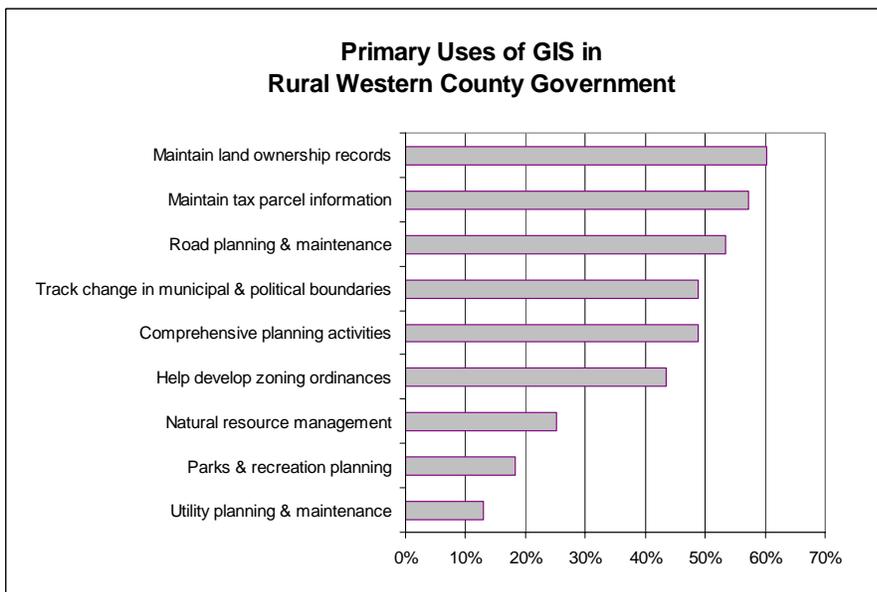


Figure 3. Primary Uses of GIS in Rural Western County Government. Source: *County Governments' Use of GIS in the Rural West*. Western Rural Development Center. 2002.

**Figure 3** shows that county governments use GIS in diverse ways:

- Maintain land ownership records (60.3%)
- Maintain tax parcel information (57.3%)
- Road planning & maintenance (53.4%)
- Track change in municipal & political boundaries (48.9%)
- Comprehensive planning activities (48.9%)
- Help develop zoning ordinances (43.5%)
- Natural resource management (25.2%)
- Parks & recreation management (18.3%)
- Utility planning & maintenance (13.1%)

### **Data Layers Maintained by Counties**

Respondents were asked to identify the data layers maintained by their counties within four major categories: land and infrastructure records; political boundaries; planning and zoning information; and biophysical and natural resources information. Results show that counties have digitized GIS information across a wide range of categories, but the most commonly maintained data layers across all counties are:

- Municipal boundaries – maintained by 78.5% of counties
- County roads – maintained by 75.4% of counties
- Ownership parcel boundaries or property lines – maintained by 74.6% of counties
- Political boundaries (i.e. legislative/voting districts) – maintained by 70.8% of counties
- Other roads – maintained by 62.3% of counties

In terms of planning applications, only 51.5% of the counties maintain zoning district boundaries, and 31% maintain land use inventory data layers. Counties are most interested in acquiring the following data layers: county roads; utility lines, location of wetlands and swamps; building footprints; and ownership parcel boundaries. Of the data layers not yet attained, the most sought-after data layers relate to utility lines, location of wetlands, and building footprints.

### **Impact of GIS on County Government Activities**

About 62% of respondents thought that GIS is currently a valuable resource for most rural county governments, and 95% thought it would become a valuable resource in the future. However, GIS has yet to be fully integrated into the planning activities of many county governments. Table 1 shows that

STATEMENT	RESPONSE (%)				
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
• GIS <u>is currently</u> a valuable resource for most rural county governments	4.8	16.2	16.8	33.5	28.7
• GIS <u>will become</u> a valuable resource for most rural county governments	0.6	0.0	3.6	39.2	56.6
• Most rural county governments have enough resources to use GIS effectively	20.2	41.1	20.2	17.3	1.2
• GIS is too costly for most rural counties	3.6	19.2	22.8	40.7	13.8
• Using GIS in most rural counties requires new employees	0.0	22.8	22.2	41.3	13.8
• Most rural county employees do not have time to be trained in GIS	2.4	29.8	21.4	36.9	9.5

Table 1. Opinions about the utility and cost of GIS for county government. Source: *County Governments' Use of GIS in the Rural West*. Western Rural Development Center. 2002.

54% of respondents thought GIS was too costly for most rural counties, and only 18% thought rural counties had sufficient resources to use GIS effectively. Fifty-five percent of respondents thought that using GIS would require new employees, while 47% thought that county employees do not have time to be trained in GIS. In short, most respondents thought that GIS would become a valuable resource in the future but are concerned about having the resources needed to take advantage of GIS capabilities.

However, of the counties currently using GIS, 97% would like to increase its use—and indicated that increased use of GIS would likely be made possible by training current employees rather than hiring new ones. This suggests an interesting paradox between the current non-users’ interest in hiring new employees for GIS work, and the reality that counties who currently use GIS have trained and plan to train existing employees.

**Impact of GIS on County Government Activities**

Respondents were asked to describe how the use of GIS has impacted county government activities and productivity. Responses ranged from those who thought GIS would have no impact to those who thought it would have a great impact on productivity for county governments. For example, in terms of time spent keeping records, 14% thought GIS would bring a small decrease; 34% thought it would have no impact; 33% thought it would make a small increase; and 14% thought it would bring a big increase (Table 2). The wide range of responses suggests that GIS has yet to be fully integrated into the planning activities of many county governments.

GOVERNMENT ACTIVITY	RESPONSE (%)				
	Big Decrease	Small Decrease	No Impact	Small Increase	Big Increase
• Productivity of county employees	0.8	2.5	27.7	43.7	25.2
• Time spent keeping records	4.2	14.4	33.9	33.1	14.4
• Ability to make decisions	0.0	0.8	18.3	45.8	35.0
• Ability to locate records	0.0	0.8	23.3	35.8	40.0
• Amount of paperwork	5.9	20.3	43.2	22.9	6.8
• Other (specify: _____)	0.8	0.0	1.7	0.8	4.1

Table 2. Opinions about the impact of GIS on county government activities. Source: *County Governments’ Use of GIS in the Rural West*. Western Rural Development Center. 2002.

**State Support for GIS**

About 78% of respondents viewed their state’s support as low or non-existent for hiring or staffing GIS work in the counties. Sixty-four percent said that there was either no state support—or low support—for the purchase of GIS hardware and software, or for technical support for GIS work. However, about 66% of respondents said they had medium to high state support for accessing state GIS databases.

**Major Barriers to GIS Adoption and Use**

Respondents in counties that were not currently using GIS were asked several questions regarding barriers to the use of GIS. The major barriers reported relate to the cost of acquiring hardware and software, as well as to the cost and availability of GIS training for employees (Table 3).

BARRIER	RESPONSE (%)			
	Not a Barrier	Slight Barrier	Moderate Barrier	Major Barrier
▪ Uncertainty about what to use GIS for	40.5	35.1	16.2	8.1
▪ Cost of acquiring computer hardware	5.1	17.9	33.3	43.6
▪ Cost of acquiring computer software	2.6	12.8	41.0	43.6
▪ Cost of GIS training for employees	0.0	10.3	41.0	48.7
▪ Availability of GIS training for employees	12.8	7.7	43.6	35.9
▪ Cost of digitizing county records	5.1	12.8	28.2	53.8
▪ Availability of needed GIS data	15.4	30.8	33.3	20.5
▪ More important issues to deal with	10.8	21.6	35.1	32.4
▪ Time used in day-to-day operations	19.4	19.4	38.9	22.2
▪ Lack of cooperation in county government	30.8	30.8	17.9	20.5

Table 3. Barriers to GIS adoption and use. Source: *County Governments' Use of GIS in the Rural West*. Western Rural Development Center. 2002.

## Conclusions

The survey revealed that a higher percentage of rural counties own and are using GIS than might have been expected. In most counties, GIS appears to be used more for record keeping than for analysis or planning. GIS is most frequently used to maintain land ownership and tax parcel information and for road planning and maintenance, but less frequently for land use planning. Although a large percentage of rural western counties identified land use planning as a priority, only one third of the counties maintain data layers on land use. One half of the counties maintain zoning district information, yet neither of these data layers was identified as a high priority for future data acquisition. Nearly every respondent thought that GIS would become a valuable resource for county governments in the future, but most expressed concern about the cost of training existing employees or hiring new ones. The challenge for rural counties will be to find sufficient resources to acquire additional data layers and to train personnel to make use of GIS capabilities.

## Sources

- Dillman, D.A. 1978. *Mail and Telephone Surveys: The Total Design Method*. New York: John Wiley and Sons
- Star, J. and J. Estes. 1990. *Geographic Information Systems: An Introduction*. Englewood Cliffs, NJ: Prentice-Hall
- Western Rural Development Center. 2002. Survey, *County Governments' Use of GIS in the Rural West*.

# Appendices

1. Survey Methods
2. Survey: *County Governments' Use of GIS in the Rural West*  
(With Data Summary)

# Appendix 1

## Survey Methods

In Alaska, the county equivalent is referred to as a borough, or borough census area. Thirteen Alaskan borough census areas were excluded from the survey because they have no form of functioning government. This left a total of 13 boroughs participating in Alaska. The State of Hawaii was excluded from the survey because the only Hawaiian county with less than 50,000 people had only 147 people and lacked its own form of government. After making these adjustments, the research sample included 292 counties in 12 western states.

Mailing addresses and phone numbers for county offices were located on the website of the National Association of Counties ([www.naco.org](http://www.naco.org)). After contact information had been entered into a Microsoft Access database, county offices were contacted by phone and asked for the name of the person responsible for land use decisions in their county. In cases in which phone numbers were no longer current, new numbers were acquired at [www.anywho.com](http://www.anywho.com).

Following the Total Design Method for mail surveys (Dillman 1978), contact letters were sent to county employees that had been identified by county offices. Contact letters stated that a survey would soon arrive, and encouraged participation. Two weeks after contact letters had been sent, surveys were mailed with a cover letter and stamped business reply envelope. Two weeks later, a follow-up letter and another copy of the survey were sent to those counties that had not yet responded. As a final reminder that it was the last chance to participate because survey responses would soon be analyzed, a third letter was sent two weeks later.

As survey responses were received they were coded and entered into the database for analysis with Statistical Package for Social Sciences (SPSS).

# Appendix 2

## Survey: County Governments' Use of GIS in the Rural West With Data Summary<sup>2</sup>

### SECTION A: DESCRIPTION OF YOUR COUNTY

We would like to begin this survey by learning about your county.

**A1. Approximately what percent of your county land area is in the following categories?**

*(Note that the categories should include incorporated and unincorporated land and add up to 100%)*

a. Private agricultural land	33.0 %
b. Residential property	7.7 %
c. Commercial and industrial property	3.9 %
d. Federal lands (BLM, Forest Service, etc.)	43.6 %
e. Other public lands (state, county, municipal)	7.4 %
f. Other land uses (specify: _____)	3.8 %
TOTAL	____%

**A2. About how many employees does your county employ full time?** 153

**A3. What was your county's approximate annual operating budget in the year 2001?** \$ 19,025,120

**A4. Do you have a county planning and/or zoning office?**

12.3% NO → skip to question A5

87.7% YES → How many full time employees work in your planning/zoning office? 3

**A5. Does your state require your county to have a master plan and/or zoning ordinance?**

25.5% NO → skip to question A6

74.5% YES → When was that plan/ordinance last updated or completed? year: 1995

**A6. Approximately how many miles is your county from a 4-year college?**

10.5% 0-20 miles

14.0% 21-40 miles

14.0% 41-60 miles

15.2% 61-80 miles

46.2% more than 80 miles

**A7. How high a priority is land use planning in your county?**

1.8% Not a priority

18.1% Low

39.8% Medium

40.4% High

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<sup>2</sup> A data summary for each question is shown. Due to rounding, percentages of responses in each category may not total 100%.

**SECTION B: COUNTY RECORD KEEPING SYSTEMS**

This section asks how various records are maintained by your county.

**B1. How are the following types of records updated and maintained by your county?**

TYPE OF RECORD	How do you update and maintain these kinds of records? (CHECK ALL THAT APPLY)			
	On handmade maps and paper files	On computer databases	On digital computerized maps	These records <u>are not maintained</u> by our county
• Land parcel ownership information	13.1%	31.5%	50.0%	5.4%
• County maintained streets and road improvements	29.4%	22.7%	44.2%	3.7%
• Utilities and other infrastructure	19.7%	11.6%	15.6%	53.1%
• County zoning map information	26.6%	13.6%	42.9%	16.9%

**B2. How would you describe the use of computers among your county employees?**

- 0.0% None of the county employees use computers on a regular basis
- 7.7% Less than half of county employees use computers on a regular basis
- 64.3% More than half of county employees use computers on a regular basis
- 28.0% All of our county employees use computers on a regular basis

**B3. Which operating system does the majority of your county employees use?**

- 58.1% Microsoft Windows 95 or 98
- 35.9% Microsoft Windows 2000 or NT
- 0.6% Macintosh (all versions)
- 0.6% Linux
- 2.4% Unix
- 1.2% Other: (specify: \_\_\_\_\_)
- 1.2% Not sure

**B4. What kinds of computer database software are used by your county? (check all that apply)**

- 3.6% Our county **does not** use a database to maintain any records
- 41.6% AS/400
- 57.2% Microsoft Access
- 66.9% Microsoft Excel
- 15.1% Microsoft SQL
- 16.9% QuatroPro
- 9.6% Lotus 1-2-3
- 4.2% Paradox
- 0.0% Reflex
- 15.1% DBASE
- 30.7% Other (specify: \_\_\_\_\_)
- 4.8% Not sure

## **SECTION C: YOUR VIEWS ABOUT THE USE OF GIS FOR COUNTY GOVERNMENT**

This section asks your opinion about Geographic Information Systems (GIS). In general, GIS refers to the use of computer databases to organize various records with geographic references and display them on computer-generated maps.

**C1. For each of the following statements, please check the box that best represents your opinion.**

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
• GIS is <u>currently</u> a valuable resource for most rural county governments	4.8%	16.2%	16.8%	33.5%	28.7%
• GIS <u>will become</u> a valuable resource for most rural county governments	0.6%	0.0%	3.6%	39.2%	56.6%
• Most rural county governments have enough resources to use GIS effectively	20.2%	41.1%	20.2%	17.3%	1.2%
• GIS is too costly for most rural counties	3.6%	19.2%	22.8%	40.7%	13.8%
• Using GIS in most rural counties requires new employees	0.0%	22.8%	22.2%	41.3%	13.8%
• Most rural county employees do not have time to be trained in GIS	2.4%	29.8%	21.4%	36.9%	9.5%

**C2. For each of the following areas, please check the box that best describes your state government's level of support for GIS activities to your county.**

	No support	Low	Medium	High
• For GIS hiring / staffing	53.4%	24.5%	14.7%	7.4%
• With GIS hardware / software	35.8%	28.4%	21.6%	14.2%
• Access to state GIS databases	11.6%	22.0%	39.0%	27.4%
• Tech support for GIS work	34.0%	34.0%	22.8%	8.6%
• GIS training	35.8%	27.2%	28.4%	8.6%

The next question asks whether or not your county uses Geographic Information Systems (GIS). If your county uses any type of GIS, you will be asked to fill out section D. If your county does not use GIS, you will be asked to skip section D and fill out section E. Both sections take about the same amount of time and at the end of each section you will be directed to the final section (F).

**C3. Does your county currently have GIS software?**

16.2% **NO** → Skip to section E on page 6  
 83.8% **YES** → Continue to question C4.

**C4. Is your county currently using GIS for any purpose?**

15.3% **NO** → Skip to section E on page 6  
 84.7% **YES** → Continue to section D on page 4

**SECTION D: QUESTIONS FOR COUNTIES CURRENTLY USING GIS**

There are a number of GIS software packages. This section asks questions about the types of GIS currently used in your county and your county’s plans to expand the use of GIS in the future.

**D1. What kind of GIS software does your county use? (check all that apply)**

- 53.1% ArcInfo (by ESRI)
- 94.5% ArcView (by ESRI)
- 33.6% AutoCAD (by Autodesk)
- 25.0% AutoCAD Map (by Autodesk)
- 0.0% GenaMap (by Genesys II)
- 3.9% GeoMedia (by Intergraph)
- 2.3% Microstation (by Bentley Systems)
- 14.8% Other (specify: \_\_\_\_\_)

**D2. How many county employees are trained to use GIS software? 4 persons**

**D3. How is GIS used in your county? (check all that apply)**

- 60.3% To maintain land ownership records
- 57.3% To maintain tax parcel information
- 53.4% For road planning and maintenance
- 13.0% For utility planning and maintenance
- 43.5% To help develop zoning ordinances
- 48.9% For comprehensive planning activities
- 18.3% For parks and recreation planning
- 25.2% For natural resource management
- 48.9% To keep track of changes in municipal and political boundaries
- 35.9% Other 1 (specify: \_\_\_\_\_)
- 11.5% Other 2 (specify: \_\_\_\_\_)

**D4. Overall, how useful has GIS been to your county?**

1.6% Not useful    15.0% Somewhat useful    32.3% Useful    51.2% Very useful

**D5. For each of the following areas, please check the box that best describes the impact of GIS on your county government activities.**

	Big decrease	Small decrease	No impact	Small increase	Big increase
• Productivity of county employees	0.8%	2.5%	27.7%	43.7%	25.2%
• Time spent keeping records	4.2%	14.4%	33.9%	33.1%	14.4%
• Ability to make decisions	0.0%	0.8%	18.3%	45.8%	35.0%
• Ability to locate records	0.0%	0.8%	23.3%	35.8%	40.0%
• Amount of paperwork	5.9%	20.3%	43.2%	22.9%	6.8%
• Other (specify: _____)	0.8%	0.0%	1.7%	0.8%	4.1%

**D6. Would your county like to increase the use of GIS systems in the future?**

3.1% NO    96.9% YES

**D7. If you were to expand your use of GIS, how would you most likely get the GIS work done?**

- 76.2% Train current employees
- 30.5% Hire new GIS employees
- 21.4% Contract out GIS work
- 3.1% Other (specify: \_\_\_\_\_)

**D8. Which of the following kinds of digitized GIS information (or data layers) are maintained by your county? (Check all that apply. Do not check boxes for types of information you have but which are NOT DIGITIZED for GIS uses.)**

**Land and Infrastructure Records**

- 74.6% Ownership parcel boundaries or property lines
- 64.6% Tax parcel boundaries
- 75.4% County roads (centerlines, rights of way, etc.)
- 62.3% Other roads
- 13.1% Utility lines (power, sewer, gas, etc.)
- 12.3% Building footprints or centroids
- 15.4% Irrigation canals and systems
- 28.5% Parks and other county or city properties
- 58.5% Federal and state public lands
- 6.9% Other (specify: \_\_\_\_\_)

**Planning and Zoning Information**

- 24.6% Urban service area boundaries
- 51.5% Zoning district boundaries
- 30.8% Land use inventories
- 23.8% Long range planning & future growth modeling
- 6.2% Other (specify: \_\_\_\_\_)

**Political Boundaries**

- 78.5% Municipal boundaries (city, county)
- 70.8% Political boundaries (legislative/voting districts)
- 50.8% School districts
- 37.7% Census geographies (tracts/blocks)
- 14.6% Zip codes
- 3.1% Other (specify: \_\_\_\_\_)

**Biophysical & Natural Resource Information**

- 50.0% Topography (digital elevation models, etc.)
- 26.2% Land cover information
- 56.2% Bodies of water
- 26.2% Location of wetlands and swamps
- 29.2% Digital soil maps
- 10.8% Other (specify: \_\_\_\_\_)

**D9. What three kinds of new GIS layers (from the list above) would you most like to acquire in the next 2-3 years?**

- 25.5% County roads (centerlines, rights of way, etc.)
- 25.5% Utility lines (power, sewer, gas, etc.)
- 22.7% Location of wetlands and swamps
- 21.8% Building footprints or centroids
- 20.0% Ownership parcel boundaries or property lines

**Please skip section E and continue to section F on page 7**

**SECTION E: QUESTIONS FOR COUNTIES *NOT CURRENTLY USING GIS***

**E1. How interested is your county in developing GIS capabilities in the future?**

5.1% Not interested      38.5% Interested      56.4% Very interested

**E2. Does your county have plans to develop GIS capabilities in the next few years?**

15.4% No      30.8% Maybe/not sure      53.8% Yes

**E3. How would your county most likely use GIS? (check all that apply)**

76.9%	To maintain land ownership records	84.6%	For comprehensive planning activities
76.9%	To maintain tax parcel information	35.9%	For parks and recreation planning
79.5%	For road planning and maintenance	35.9%	For natural resource management
30.8%	For utility planning and maintenance	56.4%	To keep track of municipal or political boundaries
61.5%	To help develop zoning ordinances	30.8%	Other 1 (specify: _____)
		12.8%	Other 2 (specify: _____)

**E4. What are the main barriers to using GIS in your county?**

TYPE OF BARRIER	Not a barrier	Slight barrier	Moderate barrier	Major barrier
▪ Uncertainty about what to use GIS for	40.5%	35.1%	16.2%	8.1%
▪ Cost of acquiring computer hardware	5.1%	17.9%	33.3%	43.6%
▪ Cost of acquiring computer software	2.6%	12.8%	41.0%	43.6%
▪ Cost of GIS training for employees	0.0%	10.3%	41.0%	48.7%
▪ Availability of GIS training for employees	12.8%	7.7%	43.6%	35.9%
▪ Cost of digitizing county records	5.1%	12.8%	28.2%	53.8%
▪ Availability of needed GIS data	15.4%	30.8%	33.3%	20.5%
▪ More important issues to deal with	10.8%	21.6%	35.1%	32.4%
▪ Time used in day-to-day operations	19.4%	19.4%	38.9%	22.2%
▪ Lack of cooperation in county government	30.8%	30.8%	17.9%	20.5%

**E5. For each of the following areas, please check the box that best describes the perceived impact GIS would have on your county government activities.**

	Big decrease	Small decrease	No impact	Small increase	Big increase
• Productivity of county employees	2.6%	2.6%	26.3%	28.9%	39.5%
• Time spent keeping records	7.9%	21.1%	10.5%	26.3%	34.2%
• Ability to make decisions	2.6%	2.6%	21.1%	36.8%	36.8%
• Ability to locate records	5.3%	0.0%	15.8%	23.7%	55.3%
• Amount of paperwork	15.8%	26.3%	15.8%	31.6%	10.5%
• Other (specify: )_____	0.0%	0.0%	2.6%	2.6%	2.6%

**Please continue to section F on page 7**

## **SECTION F: INFORMATION ABOUT THE PERSON WHO FILLED OUT THIS SURVEY**

(This section should be filled out by the person who filled out the majority of the survey)

**F1. What is your job title?** \_\_\_\_\_

**F2. Which of the following best describes your position in county government?**

(please check one box from columns A, B and C)

A	B	C
18.4% elected 24.5% appointed 57.1% hired 5.9% other (specify: _____)	65.8% administration 13.8% support staff 14.5% technician	89.7% full-time 9.0% part-time 1.3% seasonal

**F3. How many years have you worked for this county?**

- 7.2% 1-11 months
- 16.3% 1-2 years
- 25.9% 3-5 years
- 16.9% 6-10 years
- 33.7% 11 or more years

**F4. What is your highest level of formal education?**

- 17.7% high school/GED
- 18.3% two year college degree
- 41.5% four year college degree
- 22.0% masters degree
- 0.6% doctorate degree

**F5. What is your age?**

- 5.4% under 30
- 22.3% 31-40
- 34.9% 41-50
- 31.9% 51-60
- 5.4% 61 or more

**F6. Do you have any additional comments you feel are important to understand the use of Geographic Information Systems in your county?**

- 72.3% NO→ Skip to question F7 on page 8
- 27.7% YES→ Please write your comments in the lines provided on the next page

