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GIS use in Wisconsin's public planning agencies

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This article is the first in a series exploring GIS implementation among Wisconsin's municipal, county, and regional planning agencies for planning purposes.

Coming articles will explore topics such as geospatial data, GIS-related planning applications, and the benefits and challenges of GIS use among Wisconsin public agencies' planning efforts.

Nowadays, it is hard to imagine many local government practitioners in land-related fields who have not heard about geographic information systems (GIS), even if they are not implementing it in their jurisdiction. Particularly in the last decade, GIS has gained more popularity in local government operations partly due to decreased costs associated with the technology, availability of geospatial datasets, trained staff, better coordination and communication between departments and organizations, and increased awareness of the availability and capabilities of these technologies to aid with the large proportion of local governments' workload related to land-based activities.

Wisconsin has a long and rich history of public sector involvement in land and geographic information systems. In particular, land records modernization has been underway since the late 1980s through the Wisconsin Land Information Program (WLIP), which provides financial and technical support to county governments in their efforts relating to land records modernization. Counties have been creating GIS resources needed to support land use planning for nearly two decades, and a 1999 state law requiring them to create comprehensive land use plans provided another impetus to move in this direction.

UW researchers tracked adoption and use of public sector GIS for planning purposes in the 1990s (Kuhlman, 1994; Tulloch, 1997; Tulloch and Niemann, 1996), and until 2003, an annual inventory of county activities was conducted for the WLIP. These studies focused on county systems. Systematic documentation of the extent that GIS has reached municipal governments and regional planning commissions (RPCs), the types of GIS planning applications used, and the benefits and challenges to effective GIS use in planning-related activities would be helpful for promoting the use of these tools and directing technology transfer efforts.

The survey and the respondents

To address questions about recent trends in local and regional government use of GIS, we designed and administered a web-based survey in the spring and summer of 2007. A total of 256 organizations were identified as local agencies with potential for GIS and planning activities, and were included in our sampling pool. These organizations included all of the regional planning commissions (N=8), counties (N=72), and the 176 municipalities with populations greater than 5,000.¹ Of these 176 municipalities, 141 were invited to participate since we were unable to obtain contact information for the others.

¹For the purposes of this study, Capitol Area Regional Planning Commission was not considered an active RPC.

Practitioners were initially approached by personal communication at the 2007 Wisconsin Land Information Association's annual meeting.

We contacted many practitioners via phone or e-mail to obtain additional contact information and encourage participation in the survey. Additional contacts were obtained from the Wisconsin Land Information Association and the Wisconsin Chapter of the American Planning Association. Those invited were reminded three times to take the survey. By phone contact or by reviewing their online information, we were able to complete a basic inventory of in-house GIS and planning among the organizations that did not respond to our survey and the 35 municipalities that we were unable to invite. Through these phone calls, we were able to document reasons for non-participation as well.

Figure 1a. Respondents by type of positions

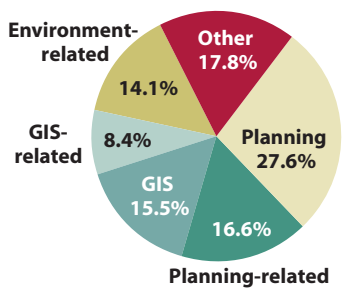
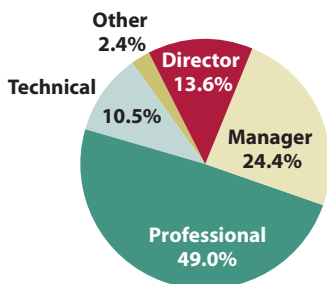


Figure 1b. Respondents by rank of position



At least one individual from the planning department of each surveyed organization was invited to participate. If the organization did not have a planning department, individuals from planning-related departments (e.g., zoning administration, public works, engineering, or land conservation) were invited. Additionally, many county Land Information Officers (LIOs) and GIS professionals were sent the survey. We obtained a response rate of 43.5%, with 537 responses from these organizations including 521 valid responses.² The organizational response rate was even higher at 83.7%. This included all RPCs, close to the entire population of counties (95.8%), and around three-quarters (76.6%) of municipalities in our sample. Around half of the respondents to our survey practiced in county governments (52.8%), while around 40% (39.2%) were in municipal governments and 8% in RPCs.

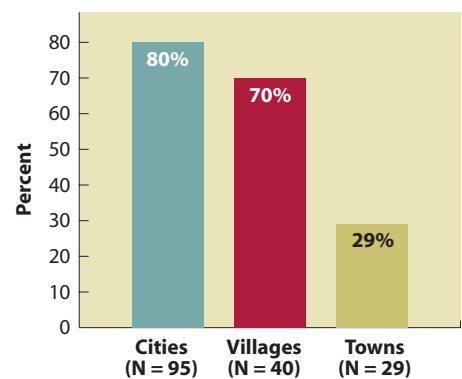
The respondents to the survey held positions primarily in planning as well as GIS and closely associated fields (figure 1a). As figure 1a shows, the plurality of the respondents (28%) held a planning position, which included self-identified positions of planner, land use planner, land use specialist, community planner, and similar. The planning-related positions included positions within community development and zoning. Positions in the areas of information systems or information technology, cartography and mapping, and land information were coded as GIS-related. Environment-related positions consisted of conservation and land management positions and the "other" category included positions in engineering, public works, and municipal technical operations, but was not restricted to these departments or categories. In several instances, the respondents to the survey held multiple positions; for analytical purposes, each position was coded as a separate position.

Further, the survey included respondents holding positions ranging from administrative assistants to directors of departments, while professionals made up the largest portion of the respondents (figure 1b). The professional category made up nearly half of the respondents (49%) and consisted of a wide range of positions including planners, land use specialists, and environment-related positions. The professional category also included an array of GIS-based positions (e.g., coordinator, analyst, and specialist) that are different in nature than technical positions such as a GIS technician or cartographer, which were captured within the technical positions category.

GIS use in Wisconsin's public planning agencies: An overview

The survey and our phone contacts found that all Wisconsin counties and RPCs have an in-house GIS and practice planning to some extent. GIS has not yet, however, reached all the municipalities in our sample: of the 176 municipalities in this group, 116 have in-house GIS, which is two-thirds of Wisconsin municipalities with a population greater than 5,000 (figure 2).

Figure 2. Municipalities with in-house GIS



²Sixteen responses were eliminated from the analysis because the participants to the survey had very incomplete surveys or were not the target respondents for the survey (e.g., administrative assistants). The sample pool included 1,302 practitioners, 67 of whose e-mail invitations could not be delivered.

Further, while the majority of cities within the sample have an in-house GIS, the percentage is much lower for villages and towns: in-house GIS has not yet reached even one-third of towns in the sample. Proximity to large metropolitan areas appears to have a slight increasing effect on GIS ownership; a greater percentage of municipalities within a close proximity (30 miles) of Milwaukee or Madison have in-house GIS than municipalities elsewhere in the state (figure 3).³

The majority (95.8%) of respondents to our survey indicated that at least one department in their organization uses GIS. For most respondents, GIS had been used in their organizations from anywhere between 3 and 20 years. The most common (40.1%) length of time for having had a GIS is 5–10 years (figure 4). When examined by type of agency, counties and RPCs reported having a longer history with GIS compared to their municipal counterparts.

More respondents reported that their organization has a long-term GIS plan compared to those reporting no plan, and among those with a plan, 60% stated that it was developed prior to GIS implementation (table 1). Our findings suggest that municipalities, and, in particular, villages and towns, lag behind counties and RPCs in GIS implementation. Nevertheless, the survey findings are encouraging. Our study confirmed that Wisconsin local governments have strong enthusiasm for GIS: a very high proportion (86.9%) of the respondents agreed or strongly agreed their organization had strong enthusiasm for GIS, and an even higher percentage, 90%,

agreed or strongly agreed that they themselves had strong enthusiasm for using GIS. An examination based on the type of government revealed that 96.8% of respondents from the RPCs, 89.7% of county respondents, and 88.2% of municipal respondents agreed or strongly agreed that they themselves had strong enthusiasm for using GIS. However, a similar investigation showed that municipalities lagged behind their county and RPC counterparts once again: all respondents from RPCs, 87.4% from counties, and 81.8% from the municipalities agreed or strongly agreed that there was strong enthusiasm for GIS in their organization.

Table 1. Percentage of organizations with a long-term GIS plan (N=471)

Type of jurisdiction	Long-term plan prior to implementation	Long-term plan post-GIS implementation	No long-term GIS plan	Don't know
Municipality	14.1	15.8	39.0	31.1
County	31.1	17.7	17.3	33.9
RPC	20.0	5.0	35.0	40.0
Overall	23.8	15.9	27.0	33.3

Figure 3. Municipalities with in-house GIS, 2007*

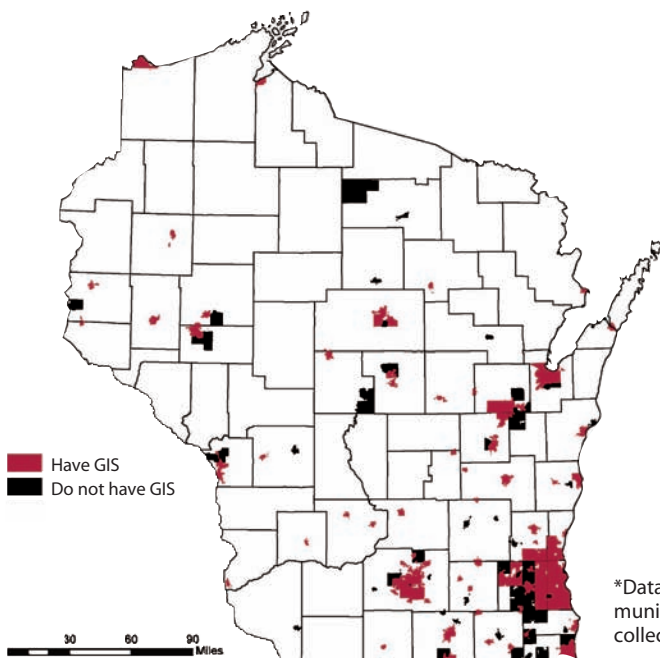
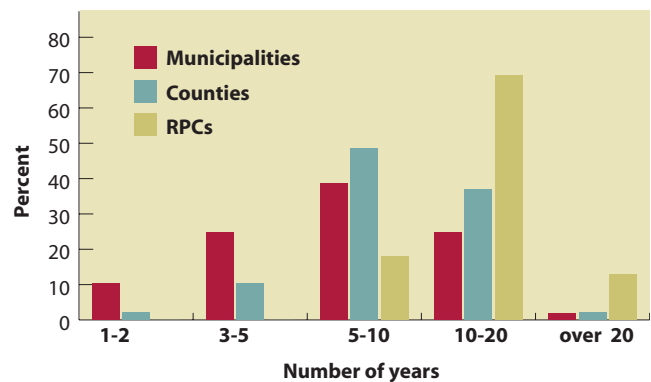


Figure 4. Length of GIS use in organization (N=474)



*Data is based on a survey of all Wisconsin municipalities with a population of 5000 or greater, collected between May and November 2007.

³ A GIS-based proximity analysis found that 68% (N=66) of municipalities 30 miles of Milwaukee or Madison have GIS, whereas 63% (N=50) of municipalities outside this area have an in-house GIS.

Implications for Extension educators and specialists

Accounts of GIS adoption consistently describe the role of a “champion” to help guide and inspire an organization’s implementation of GIS. Many technology transfer agents, including experienced county and RPC staff and Extension educators might play this role. UW-Extension in particular can take advantage of this strong individual and organizational enthusiasm by reaching out to municipal governments and helping build relations with counties and RPCs that have data and technology valuable to municipalities. In particular, Extension educators could reach out to those who have not yet invested in geospatial technologies in their communities.

More than being technical experts, Extension educators can serve as a source of information for local governments, sharing information on how these technologies and geospatial data can be used in planning and other activities that are fundamental to the effective functioning of these governments.

In the coming months, articles detailing our findings on specific topics such as geospatial data, planning applications of GIS, and the benefits and challenges of GIS use among Wisconsin local governments will be published and can help further inform the GIS-related outreach efforts of Extension educators and specialists.

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