

## Surveying the Lay of the Land Information Systems

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A 123 question annual survey, required by state law! At least this year, Wisconsin counties didn't groan. What had been a daunting task (taking up to 25 hours to complete, involving up to six county employees) became manageable. On average, the 1999 survey took less than six hours to complete. In this paper, we describe a survey and tools to:

- conduct the annual Wisconsin Land Information Program inventory of county land information system status through a Web-based interface;
- directly update a database with details of counties' progress on fourteen "foundational elements;"
- support queries of the database with tabular and graphical display of results.

### The Wisconsin Land Information Program (WLIP)

In 1989, Wisconsin passed a law promoting modernization of land records in county governments. All those old maps and documents gathering dust in the drawers of county surveyors and registers-of-deeds were to become part of modern land information systems based on GIS and related technologies. A governing body was put in place – the Wisconsin Land Information Board (WLIB). The following year, a funding mechanism based on recording fees at the registers-of-deeds offices was enacted (see Tulloch and Niemann, 1996).

As part of this landmark legislation, the WLIB is required to conduct an annual survey of the program status, asking how much progress counties had made on nine (now fourteen) "foundational elements." Foundational elements are similar to the Federal Geographic Data Committee's (FGDC) framework layers, but also include three organizational goals – public access, institutional arrangements, and communication/education/training.

The survey requirement has generated a decade's worth of measurements showing steady progress. We continue to provide the evidence to convince politicians and other decision-makers

that the WLIP provides benefits to the citizens of the State. We can even extrapolate from the survey to predict when elements will be completed statewide, for example, parcels by 2005 (figure 1).

[[ figure 1 –trends in modernization: parcel completion date bar chart]]

Although the survey has been very useful to document the success of the WLIP, counties said it created a significant reporting burden. Complaints were heard at meetings of the Wisconsin Land Information Association (WLIA) and in response to questions about this on the survey itself. In 1997, a strategic visioning process (WLIB, 1997) identified the need for a Web-based process that would update a database of county status to replace the annual encoding of paper surveys. As a result, the WLIB contracted with the Land Information and Computer Graphics Facility (LICGF) at the University of Wisconsin-Madison to develop, test, and implement a new approach.

### Building the Survey

The first step in any survey is to determine what information is desired. This was relatively easy, as we had previous surveys as a starting point. Documentation of program status through the years required similar questions about progress on automation of Foundational Elements. We also wanted better contact information with county staff and continuation of feedback on the Wisconsin Land Information Program as a whole. The WLIB, their staff (Office of Land Information Services (OLIS), Wisconsin Department of Administration), and LICGF staff refined these questions, and added some new ones.

At the inception of the project in early 1999, the “annual” survey was a couple of years overdue. It wasn’t advisable to wait until the automated survey was fully developed and tested, and so we conducted another paper survey. This permitted us to evaluate the usefulness of the questions, and more importantly, to populate the database of responses and test the “update” functions of the automated survey. Most questions were essentially the same between the 1999 paper survey (covering activities in calendar year 1998) and the 2000 on-line survey. This first on-line survey also included around 25 detailed questions added to help the Wisconsin Department of

Transportation design their “local roads” database. Many of these will not be necessary in future surveys, so the time-savings between paper and on-line approaches should be even more dramatic in the future.

The on-line survey is based on active server pages (ASPs). ASPs extend the functionality of Web-pages. In this case, they provide greater interaction with the user and support connections between the database, the questionnaire, and the results generation module. Initially, we used Microsoft’s FrontPage® to build the Web interface, but it has been enhanced and further developed using a variety of ASP and HTML tools, along with ActiveX Data Objects (ADO), Visual Basic scripts and Java scripts. The database is supported in Microsoft’s Access2000®, though the scripts to write from ASP forms to the database and vice versa are generic and could be adapted to other database management systems. Additional scripts manage and verify county passwords, build forms for adding additional questions, generate summary and completion status data, and handle database queries.

The survey website (<http://www.lic.wisc.edu/wlip>) is currently hosted at the University of Wisconsin-Madison, on a Windows NT 4.0 Server, running IIS (Internet Information Server). Long term plans call for it to be managed by OLIS on State of Wisconsin NT servers. Additional technical details about how the survey was implemented are available in the *Technical* section of the Website.

Before full deployment, the survey was tested internally and by several counties. Land information professionals also provided feedback on the look and functions of the survey at the annual meeting of the WLIA. Of course, a number of bugs were discovered and rectified.

OLIS sent each county a letter requesting completion in June 2000, when the survey was ready to go on-line (figure 2). The land information officer in each county was given instructions and a password that provided exclusive read/write access to only their county in the database. In many counties, the password was shared with other county employees. In this way, employees with expertise in particular Foundational Elements could use a Web browser on their own desk, with records nearby, to complete individual sections of the survey.

[[ figure 2 – screen shot of opening page of questionnaire ]]

Within one month, 34 counties out of 72 had completed the survey and another 18 had started the process. After some prompting, the entire inventory was completed by Fall. Judging from comments on the survey and at meetings, this was a much easier process for all involved. Is it a coincidence – we included questions about how well the WLIB is doing its job (table 1), and their approval rating went up!

Table 1. Evaluation of Wisconsin Land Information Board Performance

RESPONSE	1998 - paper	1999 - Web
Excellent	1	5
Very Good	10	18
Good	25	37
Fair	27	12
Poor	2	0
No response	7	0

### Results

Tools developed as part of the survey allow any user to retrieve data for individual counties or aggregate results for all 72 counties. A query page supports retrieval by county and/or by section of the survey. For example, a user could find out if county X has completed the automation of parcel data and then go to the “contact” section to find out who to congratulate or scold. A toggle between individual county responses and aggregate responses for all counties even allows users to compare their county’s situation with the state as a whole.

From the Wisconsin Land Information Board’s perspective, the most useful statistics are overall summaries and trends. Periodically, they are asked to report on progress of the Program or justify its existence. One good indicator is the progress by counties completing Foundational Elements, including county projections for completion. For example, Figure 3 shows a status

graphic generated from survey data, indicating when counties were or will be finished with automation of parcel data, a key Element for many local purposes. It is also useful to have statistical summaries of key questions. Because the Results generator is linked to the database, report forms have up-to-date summaries. Figure 4 shows aggregate information for several of the parcel related questions.

Figure 3 – Status map of parcel completion

Figure 4 – part of results page

The survey results are potentially very useful to others in addition to the Board and participating counties. We have used the surveys in our research to track adoption and diffusion of GIS related innovation in Wisconsin, and to gauge the reaction of the community to improvements in land records (Tulloch et al., 1996). Public access and related policy are of particular concern to us. In this survey, we learned that 49 counties distribute data on CDs, 37 have public access terminals, and 14 have web sites for this purpose. Table 2 shows the results of policies related questions. If nothing else, it points to the inconsistency in spatial data policy at the local level.

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Table 2 – Data policy questions

A. Has your county developed a formal information sharing policy that addresses issues such as pricing, copyright, privacy, liability, data sharing, etc.?

- 28** Yes
- 41** No, but we plan to in the future
- 1** No, we have no plans to do so

B. Does your county impose any restrictions on providing digital spatial data to other government agencies?

- 13** Yes. Copyright
- 10** Yes. License Agreement
- 31** Yes. Restrictions on dissemination of data to third parties
- 4** Yes. Other restrictions

C. Does your county charge a fee for providing digital spatial data to other government agencies?

- 30** Yes. Based on cost of duplication
- 6** Yes. Based on recovery of costs
- 10** Yes. Other basis
- 20** No.

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Another group that may be interested in results from the survey is vendors of GIS products and services. For example, they can see not only which software is in use, but also which departments in a county are using it. Questions such as “What methods are used for compilation of digital parcel mapping?” may be useful for targeting services (as well as providing an indication of the cost and quality of parcel maps, as shown by Vastag and Ventura, 1999).

In summary, the easy to use *Results* section of the on-line survey site provides access to a broad range of information about the status and trends in Wisconsin counties’ land records modernization efforts. If the pre-packaged summaries are not sufficient, users can create and download portions of the data base, or the entire set of raw data.

#### Future Plans and Implications

The online survey of the Wisconsin Land Information Program has become a very useful tool for administrators, researchers, and vendors in its first year of operation. It has provided a convenient way to direct organizations and citizens to local GIS contacts, and to provide a quick snapshot of what kind of data are available locally. The long-term vision is to have all of these local resources accessible through a single point of entry (WLIS Project Team, 2000). In the meantime, the survey and its results tools provide a useful companion to WiscLINC, the Wisconsin node of the FGDC clearinghouse.

In 1997-8, the Federal Geographic Data Committee, through an arrangement with the National States Geographic Information Council (NSGIC), conducted a nationwide survey of public agency GIS activities (citation). Although the survey generated some useful information and general patterns, it was hampered by inconsistent response rates and potential response biases. The survey was distributed across the Web as a download, but not filled out through a browser. It was essentially a paper survey -- not an intelligent *active server page* based approach.

Since information about the status and availability of state and locally generated data continue to be of substantial interest, it is worth considering an approach similar to this one successfully conducted in Wisconsin and a few other states. Surveys could be targeted to particular sectors with appropriate promotion and recruitment efforts. For example, in one year, the University Consortium for Geospatial Information Science might conduct a survey of academic units. The next year, the National Association of Counties could focus on county governments. These groups could repeat the activity on a cycle of several years to track trends.

Several states have followed up the FGDC/NSGIC with their own efforts. If states were able to agree on a general template and a subset of common questions (along with other questions that would be location-specific), results could be aggregated to higher levels to get at “the big picture.” Though it would take considerable additional work to serve as this kind of general model, we are certainly willing to provide the code for the Wisconsin survey to anyone that wants to adapt it to their own jurisdiction (provided as is, no support intended or possible!).

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