The ARL GIS Literacy Project: Support for Government Data Services in the Digital Library

*by Mary French**

Abstract
This paper describes the ARL GIS Literacy Project and its role in providing support for continued access to government data which is increasingly distributed only in digital form. In particular, it will address the University of Missouri's (MU) experience in the broad context of the ARL GIS Literacy Project goals as well as in comparison to the reported experiences of other participating institutions. It will discuss what MU has produced in terms of GIS services and what has been learned about broadening awareness of GIS. The MU experience will be examined as an example of the creation of support mechanisms for integration of GIS into the digital library environment.

Introduction
When geographic information systems (GIS) moved beyond the domain of professional geographers and into "mainstream" technology in the early 1990s, libraries began seeking effective ways to utilize this powerful research tool. A particular focus has been on the ability of GIS to deal with government data that is crucial to social science research (as well as many other disciplines) and which is increasingly distributed only in digital form. In the midst of this, the Association of Research Libraries (ARL) established the GIS Literacy Project as a support mechanism for libraries interested in learning about and introducing GIS into their services.

As a graduate student in the University of Missouri's (MU) library and information science program, I became intrigued when I learned in a government information course that GIS was being integrated into library services in order to provide access to digital spatial data. I was particularly interested when I learned that MU had been an early participant in the ARL project and set out to find out more about the topic through a literature review of library GIS services and the ARL project, as well as interviews with staff members of MU's Ellis library regarding the institution's experience with the project and the current state of the library's GIS services.

This paper is thus a summary of my initial exploration into the world of library GIS services. It provides an overview of the ARL GIS Literacy Project and addresses MU's experience in the broad context of the Project goals as well as in comparison to the reported experiences of other participating institutions. And it discusses what MU has produced in terms of GIS services, what has been learned about broadening awareness of GIS, and MU's experiences with creating support mechanisms for integration of GIS services into the digital library environment.

ARL GIS Literacy Project
The ARL GIS Literacy Project was initiated in 1992 as a multi-phased project in partnership with ESRI (the leading producer of GIS software) and other public and private partners. The goals of the Project are designed to meet the current needs of libraries and users while addressing the changes libraries are undergoing as they enter the 21st century, and to provide the tools and expertise necessary to insure that digital government information can be used effectively and remain in the public domain. These goals include:

- introduction of GIS to a variety of libraries (e.g., public, state-based, academic, and university libraries in public and private institutions) to address diverse user information needs;
- development of a team of GIS professionals in the research library community willing to lend time and expertise to applications, user training, and education programs;
- encouragement of connections among federal, state, and local GIS users and information;
- promotion of research, education, and the public right-to-know through improved access to government information;
- initiation of library projects to explore new applications of spatially referenced data and evaluate the introduction of these services in research libraries; and
- implementation of programs to allow institutions that have invested in networking capabilities to leverage the sharing of resources via networks.

The Project seeks to provide a forum for libraries to experiment and engage in GIS activities by introducing, educating, and equipping librarians with the skills needed

to provide access to digital spatial data. In cooperation with GIS vendors and foundations, ARL organizes training sessions for Project participants, sponsors an electronic mail list, and works with government agencies on GIS programs and related issues. Financial support, data, software, hardware, and expertise to assist in the Project goals have been provided by GIS vendors and foundations. The Project is still active, although the focus has shifted more towards enhancement of programs at institutions with GIS services now in place rather than the earlier focus on introduction of these services. Occasional training sessions are still provided, as are other types of support for institutions wishing to develop GIS services.

Participant Experiences

In 1997, ARL conducted a survey to determine how, in the years since the Project began, participants have organized their delivery of GIS (Davie et al, 1999). The survey addressed four main categories of GIS service: 1) general information about the library's role in delivering GIS, 2) the number, level and academic preparation of other training of staff involved, 3) the amount and kind of equipment, software, and data files that support GIS in the library, and 4) the kind of service offered and by whom it is used. Seventy-two of the 121 Project participants responded to the survey. The following summarizes the survey results:

General Information

- 89% of the responding institutions reported that they provide GIS services.
- GIS services were administered by the library at 83% of the institutions and by academic departments offering GIS courses at 70% of the institutions (both the library and academic departments administer GIS services at many institutions).
- Only 5% of the libraries reported having discrete GIS units; most library GIS services were found to be located in the government documents center (48%) or map center (52%).

Staffing

- At 81% of the libraries with GIS services, the services were directed by a librarian with an MLS; 54% of those librarians held at least one additional graduate degree.
- The most common GIS training for respondents was through ARL's GIS Literacy Project; others had received training through GIS software providers or GIS coursework.

Infrastructure

- 78% of the libraries with GIS services utilized ESRI's ArcView software.
- 58% operated their GIS on Windows95/NP platforms, 56% on Windows 3.1; the remainder operated on DOS, UNIX, and Macintosh platforms.
- 61% utilize computer networks for their GIS services.
- The Government Printing Office depository program provided digital data files used for GIS services in 83% of the libraries; 67% supplement those files through purchases (70% of those libraries had funding of less than $2000 for such purchases).

Service

- 53% of the responding libraries offered GIS support service 20 hours a week or less, 24% offered more, and three institutions offered no support at all.
- The typical number of users of library GIS services was about seven per week; students comprised about half of those users, while faculty, staff, businesses, local government, and the general public fairly equally comprised the remainder of the users.

Also in 1997, ARL published *Transforming Libraries: Issues and Innovations in Geographic Information Systems*. This publication presents a number of case reports that provide an overview of experiences and lessons learned in attempting to develop support mechanisms for GIS services in libraries. Included is a set of questions for library planners to answer in designing or rethinking GIS-based services:

Key Questions for Planners

- What Kind of Service Should We Provide?
- How Will Collections Be Built?
- Who Will Staff the GIS-Based Services?
- How Will We Learn – and Educate Others – about GIS?
- With Whom Will We Collaborate?
- How and Where Will We Store Data?
- What Will It Cost?

These questions point to the critical themes that emerged from the case reports – themes such as GIS service planning, partnering, policy development, staff training and expertise, resource allocation, and user support. Following is a summary of three case reports presented in *Transforming Libraries*. These cases are selected for discussion because they provide good examples of ways in which institutions have successfully addressed particular issues in their efforts to provide support for GIS services. Specifically, the University of Georgia is noted for its planning efforts, Penn State for its extensive partnerships, and North Carolina State University for addressing issues of staff training and expertise.

Planning – University of Georgia Libraries

Careful planning proved crucial in the development of GIS services at the University of Georgia Libraries. In 1994, a comprehensive survey commissioned by university administration and issued by a campus-wide committee identified current and future campus GIS instructional and research activities, GIS software needs, and a host of potential GIS services. The results of this survey, which

are available on ARL's Transforming Libraries GIS Website (http://www.arl.org/transform/gis/) along with the survey developed by the University of Georgia, allowed the University's Map Library to create a small GIS Lab and design focused and responsive services which provide patron access to the library's digital spatial data as well as to spatial data available on the Internet.

Partnerships – The Pennsylvania State University Libraries

Penn State University Libraries began to plan for GIS services in 1995 with a brief analysis of existing resources that revealed a lack of appropriate coordination of GIS data and its use. A new mission was drafted to create GIS services which would provide for acquisition, organization, and archiving spatially referenced data and make it available to the widest number of users through in-house facilities and the Internet. Partnership development and/or enhancement of existing relationships with the campus' geography department, cartography lab, computing center, and a semi-independent research group proved crucial in fulfilling this mission. These partnerships resulted in the creation of an in-house GIS Center at the University Libraries with trained, continued student staffing provided by an internship program with the Geography Department and hardware and software support provided by the campus computing center. Additionally, partnering with the campus cartography lab and a semi-independent research group with GIS expertise resulted in the development of a Web interface which distributes Pennsylvania-based spatial information both within and beyond campus via the Internet.

Training and Expertise – North Carolina State University Libraries

In the early 1990s, North Carolina State University organized a small team, consisting of librarians and a computer center staff member in liaison with a faculty member with GIS expertise, to initiate the Libraries' GIS start-up effort. The team quickly identified staff and user training and expertise as key challenges in providing support for GIS-based services. To tackle the problem of a staff with little GIS expertise, members of the team who acquired training began to offer sessions in basic GIS skills to other staff to provide them with an understanding of the scope of the services and enable them to assist in user support. The GIS team also developed introductory GIS workshops and classes for campus faculty, staff, and students which would enable users to work more independently with the data and software. Additionally, a position of Librarian for Spatial and Numeric Data Services was created to provide a professional staff member with the appropriate experience and proficiencies to carry the responsibility for development and management of the libraries' GIS and other spatial and numeric data resources and services. Providing in-house training and expertise for GIS services was an important component in the development of significant and successful GIS services at North Carolina State.

The MU Experience

Project Participation

The University of Missouri-Columbia was an early participant in the ARL GIS Literacy Project, assigning two professional staff members to participate in the program in addition to their other duties. These staff members attended training sessions and the library's data services center received a computer and software to begin experimentation in developing GIS services. Staff members found it to be an extremely time-consuming service to offer and time and staffing restraints have prevented the development of these services. The data services center has received only a small number of requests that utilized the GIS tools, and has not yet been able to allocate the staff time and other resources to maintain the requisite hardware and software, develop the policies and expertise necessary to support GIS services in-house, and enable them to publicize these tools to potential users. Although development of GIS services remains in the library's long-term plans, it is not currently experiencing the demand that would establish development of these services as a high priority. The staff members assigned to the ARL Project remain aware of GIS activities, but are not currently actively participating in the Project.

Access to Spatial Data

The University of Missouri-Columbia is a federal depository library, thus its Government Documents center receives digital spatial data that it must provide public access to. The Government Documents center has a computer that meets the minimum government standards for running GIS programs, but has only standard printing capabilities and limited staff expertise and time for supporting the users who wish to utilize and manipulate the data. The center currently only receives about six requests a semester for GIS-based data and these are primarily from experienced users to whom the materials can be loaned or who require minimal in-house support. The Government Documents staff finds they are least able to support the casual user who requires more intensive support to work with spatial data. The staff currently plans to attempt to increase awareness of these data resources in the user community, an effort which hasn't taken high priority in the past due to support limitations. The Government Documents center also has a loose agreement with the campus' Geographic Resources Center (a unit of the Department of Geography) to assist with GIS-related needs that can't be met by the library.

Impact of Project Participation

In my introduction, I note that MU's experience in the ARL Project would be examined in this paper as an example of the creation of support mechanisms for integration of GIS

into the digital library environment. Although MU clearly has not yet been able to achieve the well-developed services reported in some of the case reports, a level of support for GIS services has resulted from participation in the Project. GIS services have been introduced into the library, a level of staff experience in using the software and equipment has been achieved, there has been a broadening of awareness of the data and services that can be provided, and government distributed spatial data is accessible. In fact, looking at the status of GIS services at MU in comparison to the findings of ARL's 1997 survey suggests MU's experience may be typical of that of many other participating institutions. The following compares MU's status with the survey results. (Note: MU did not participate in the 1997 survey).

General Information

- MU is providing GIS services, as are 89% of the responding institutions.
- Like many of the responding institutions, GIS services are provided through both an academic department and the library.
- Library GIS services are currently offered primarily through the Government Documents center, like those at 48% of the responding institutions.

Staffing

- MU's library GIS services are supported by librarians with an MLS, as are those at 81% of the responding institutions.
- Like the majority of the responding institutions, library GIS training has been provided primarily through the ARL Project.

Infrastructure

- MU's library GIS services utilize ESRI's ArcView software, as do 78% of the responding institutions.
- MU's library GIS services are operated on a Windows platform, as are the majority of responding institutions.
- The GPO is the primary source of MU's digital spatial data files, as is the case at 83% of the responding institutions.

Service

- MU offers less than 20 hours per week of library GIS support service, as do many of the responding institutions
- MU currently experiences a very low demand for library GIS services – only a few requests per semester, as opposed to the seven per week which the survey found typical.

Future Possibilities

The achievements mentioned above provide the groundwork on which MU can continue to build their GIS services, particularly if they utilize the experiences and suggestions offered by other Project participants such as the three case previously summarized. Utilizing the University of Georgia's survey might assist in shaping GIS service planning efforts. Development of in-house workshops and expertise, like the North Carolina State example, could assist in addressing support issues.

Additionally, MU's existing interdisciplinary resources appear to hold great potential for exploration of partnerships like those that have been implemented to support library GIS services at Penn State. MU's Geographic Resources Center, a multidisciplinary applied research and teaching facility for geographic and remote sensing data analysis, already provides some support in meeting GIS-related requests received by the library. The Missouri Spatial Data Information Service, which provides GIS and Census data about Missouri via the Internet, is run in close association with the Geographic Resources Center and is another rich resource for creating service and resource partnerships. The MU Integrated Spatial Analysis of Environmental Systems Mission Enhancement Proposal, sponsored by the School of Natural Resources, Department of Geography, and College of Engineering, has received administrative funding and support. This proposal seeks to focus MU's efforts in the geographic information sciences and to enable participation in a global network of research and outreach in the analysis of geographic information integrated across traditional disciplinary boundaries. Although this mission enhancement area does not specifically include development of library GIS services, library staff do participate in meetings of the mission enhancement area group and the proposal and its support provide groundwork which the library can utilize in its own proposals to obtain support for GIS services.

Conclusion

There is a substantial subset of library literature which focuses on GIS services, much of which consists of accounts of institutions who have participated in the ARL GIS Literacy Project. In addition, there are email lists (e.g., gis4lib@u.washington.edu), websites

(e.g., www.mcmaster.ca/library/maps/gis_libr.htm), and conferences (e.g, ESRI's International Conference on GIS in Education and Libraries) which have focused on this topic. Having reviewed information from a variety of these resources, I've drawn the following conclusions:

- Libraries seem to achieve great success in developing their GIS services when they focus on the particular issues or areas that work best within their larger institutional context for creating support mechanisms for their services. These issues/areas include planning, partnering, policy development, staff training and expertise, resource allocation, and user support, all of which are essential to creation of support mechanisms but, as the case studies above

have illustrated, can have varying roles in developing support mechanisms.

- The ARL Project has offered important assistance in developing the support mechanisms which have enabled the creation of successful GIS services at many of the participating institutions; however, there are many institutions that have yet to be heard from. Only 72 of the Project's 121 participants responded to the 1997 survey and the literature tends to focus on those institutions who have been able to more fully develop their services. Gathering a wider range of case reports from those institutions that may still be struggling to implement their GIS services will be essential in continuing to find way s to further support mechanisms for these services.
- A variety of limitations have thus far prevented MU from achieving the same level of growth in their GIS services as some other institutions; however, participation in the Project has provided a forum for the library to experiment and engage in GIS activities and broaden awareness of the potential this tool may hold for the library's long-term plans to provide access to and support for digital data resources.

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