

## map library bulletin board

### The Map Library's Future

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#### Abstract

The status quo of map libraries is challenged by the digital information revolution. Map libraries must strategize and act to make the transition into the virtual world. What are the issue to think about and how to proceed?

#### Changing Times

Map libraries were constructed to facilitate the dominant paradigm of geographic information management. But, the dominant paradigm of geographic information management has changed. When reviewing today's map library operations and when planning for the future, we therefore must focus attention on the relationship between map libraries and the new paradigm, and we should not be afraid to be bold in our vision. Perhaps, using an analogy, instead of reviewing the operations of a stable to manage horses while planning to make allowance to accommodate some motorcars, we should rather commence planning a completely new garage for the arrival of the motorcar, but that will continue to accommodate some horses.

The paper map emerged through time as the dominant paradigm of spatial representation and the primary tool by which to store and communicate geographic information. Map libraries became very important and

flourished during the *Golden Days* of the paper map, facilitating their physical storage, organized access, and use. Society needed map libraries to reign, to administrate, and to explore the world. During these *Golden Days* paper maps, globes and map libraries were associated with wealth, opportunity and power; with emperors and others aspiring to an image of leadership insisting on being photographed with a globe or map in the background.

These *Golden Days* are over. Times have changed, and so have the role and importance of the paper map and their stables. Today, we live in the *Technology Society*, the *Information Society*, and the era of *Globalization*. We find ourselves in the middle of uncertain times, somewhere between the *Pre-technology* and the *Post-technology* era. Today, those wishing to be associated with status and power no longer insist on having their picture taken next to a map or globe. Instead they opt to pose with images of computing hardware displaying information.

Knowledge gained during the ongoing technology and information revolutions is allowing us to challenge centuries of cartographic excellence by picking at the paper map's fundamental weaknesses (Goodchild, 1999). Namely, the paper map:

- is static (snapshot in time);
- is fixed in what it shows ;
- is unconnected to other information sources about space and place;
- is awkward and expensive to use for measurement and information retrieval;
- usually is 2D or at best 2.5D;
- requires a flat medium;
- often is too generic; and
- carries an air of authority often not justified.

So the traditional paper map

does not meet the information requirements of today's high technology world. Challenged by GIS and the database concept, we are busy re-thinking the map. We are changing the focus away from the map as a form of representation and as an end-product towards the map as part of an information infrastructure, as a means of communication, as a stage in process, and as a tool to facilitate analysis and decision-making (MacEachren, 1995). The GIS and cartographic research agendas therefore are advocating a new paradigm of spatial representation that embraces communication, and that facilitates a geographic information environment where the map equivalent of the future must:

- not be an end-product, but a database;
- not only facilitate "final communication" but offer communication of a "stage in process";
- be fully connected to other data sources about space and place;
- no longer be a physical but a virtual (digital) medium;
- support fully digital measurement and analyses;
- be dynamic;
- be a multi-media concept;
- be flexible and 'customizable'; and
- seek to represent reality and the truth.

The primary implication of all this to map libraries is that today's users of geographic information no longer think of the traditional map library as a primary resource. They think of the map library as the traditional "stable" for paper maps, looking somewhere else to find the "garage" housing the digital mapping environment. This implies that map libraries face risk of being perceived obsolete by the present and future geographic information user community.

As we enter the post-technology society, it is only where a map library can establish a reputation as a serious player in the virtual information world that it will remain competitive and viable. So we must work hard to move the traditional map library to fit the new paradigm of geographic information, in the process giving it a new image.

### Visions for a Future

Let us role the clock forward, therefore, to a few decades down the road. What will the map library equivalent of the future look like? The primary mandate for such a facility will continue to be to "facilitate access and use of geographic information", but the mandate will have broadened to include "access and use of information associated with geographic information". The mandate will have expanded in this direction to meet the requirement that the map of the future should be fully connected to other data sources about space and place. 'Storage' of geographic information, on the other hand, will in the future be dropped from the mandate since this will become increasingly less of an issue in a digitally networked world.

So the foci of the mandate of the future will be on "access" and "use" of geographic and associated attribute information. This implies that in order to plan for the future map library facility, we must understand the nature and format of tomorrow's information needs, how tomorrow's clients will wish to use the information made accessible, and what the 'facilitating' role of the future map librarian should be.

Geographic information requirements of the future will consist primarily, if not completely, of digital information. There will continue to be demand for access to historical analogue maps and

other analogue maps stored in map libraries today. However, it is only a question of time and organization before scanning techniques become sufficiently cost effective to scan historical and contemporary analogue geographic information without any loss of detail. This will allow us to facilitate digital access to these traditional analog sources, thereby broadening access to them, while facilitating cheaper storage of the original analogue sources by archiving them somewhere off-site. The move towards digitizing the analog world already has commenced.

The sceptic may point out that viewing a scanned facsimile of a paper map on a computer screen is not the same as having access to the real thing. Given today's technology solutions, this is correct. But advances in digital display capabilities will allow tomorrow's users to view even large map information digitally in full size and in as much detail as the source. As well, advances in printing technology will allow tomorrow's users to be able to print and take away a hard copy of a digital facsimile in full size and exceptional quality, if desirable. The technology to do all this exists today.

There can exist little doubt that tomorrow's computer solutions will allow us to view and print a full size map digitally the same way or better than we can view a full size analogue map today. But given the size and likely expense of such large format display and printing devices, access to them will continue to be the exception, not the norm. The majority of readily accessible personal and corporate computing facilities of the future will continue to be compact, therefore not facilitating the digital display and printing of full size map sheets. Large display and printing devices thus likely will remain a unique

requirement offered by a specialized facility, such as a map library.

It would appear, therefore, that a map library that exists today simply because it stores and makes accessible paper maps will risk becoming obsolete. In order to survive, the map library of the future must focus on expertise in and access to digital geographic and associated attribute information, and hardware and software required to view, use and print everything in large dimensions.

Beyond this, the future map library must argue its existence on the basis of diverse geographic information services it can offer to clients. These services will fall into two broad categories:

- assistance finding and understanding information; and
- assistance with access and actual usage of the information.

The first category contains filter functions. Clients will turn to a map library of the future to receive help finding and understanding information to meet a specific need. They will want advice on the quality of this information, to learn of any legal requirements that apply, and to obtain assistance with the process of down-loading and possibly processing of this information.

Some will argue that these information 'gate keeper' or 'filter' functions can be offered outside the domain of a human and/or a physical library by telephone tree services, digital data browsers, or on-line help features, and that these browsers and on-line help features are getting better by the day. Examples exist in the real world today to validate this point of view. We have evidence today that, in most cases, a computational solution can be found that will replicate or outperform a human solution when confronted with a standard information

request. However, computational solutions are unlikely ever to outperform the insights of real human experts who make it part of their business to study the flaws of the data browsers and on-line help systems available, building their personal skills on from there.

Map libraries of the future offering human filter functions or gatekeeper services that exceed the capabilities of data browsers and on-line help functions therefore will have grounds to justify continued existence. On the other hand, map libraries of the future that cannot develop a reputation for offering excellence in this area must excel somewhere else, or face eventual closure.

The second category of services noted above deals with help a client may receive with the use of digital geographic and associate attribute information once the information has been found and accessed. Some map librarians of the future will argue that is it good enough for a map library simply to help a client find and view data, and to down-load or print them for use elsewhere? But others will recognize and aim to capitalize on opportunity.

A map library's aggressive expansion into facilitating "usage" of geographic information can be justified by arguing that we live in a period of history associated with globalization. Today, it is acceptable that a supermarket can also be a liquor store, bookstore, post office and banking outlet. Some banks today are allowed to sell insurance and to trade shares and stocks. So why should globalization not extend to the map library of the future? Why should map libraries not be encouraged to:

- conduct locational searches;
- consult in business geographics and other geographic information analysis;

- assist with navigation and vacation planning;
- assist in housing searches;
- teach classes in geographic information related subjects;
- consult in cartographic communication and offer map design and production services; or
- offer assistance with the interpretation and understanding of space and place?

As far-fetched as this may seem, there already exist map libraries today that have globalized by branching out to become geographic information service providers, including government and university map libraries. Examples include the Pennsylvania State University Map Library, the Montana State Library's National Resource Information Center (NRIS), and the University of Virginia Alderman Library (Adler and Larsgaard, 1999).

The vision that emerges is of a map library whose justification and reputation are based not on what maps and related information it stores in its collection, but on how it can help you find and access geographic and associated information in the virtual world, and how it can facilitate you to achieve the final goal for which you sought this information. It will be a facility people turn to to seek order in a bewildering information plethora, where they can receive help how to understand the galloping technology world surrounding the virtual map, and where they can gain insight into a digital map's reputation, quality and legal status. A primary focus will be on "just-in-time" service. Perhaps humans will continue to staff these facilities. Their roles will be to instruct in how to obtain maximum advantage of digital data browsers, to answer general questions concerning geographic and associated information, and to offer consulting services. Of course, in

today's world of "user pays", it is highly likely that there will be pressure to levy fees for information access and user services. This will imply a shift in thinking away from a facility attempting to support universal access to geographic information to a more elitist environment.

### **Bridging Future Vision with Today's Status Quo**

How to make the transition from today's map library to tomorrow's vision? Two primary questions stand out, namely who is likely to champion the transition, and what are the key issues these champions must deal with?

Today's map libraries need to find champions who believe strongly in the continued demand for a physical facility specializing in access to and use of geographic information. Such dedicated individuals already have come forward from within today's map libraries. Their excellent work and progress can be followed through the professional associations they belong to, including the *Association of Canadian Map Libraries and Archives* (ACMLA) at <http://www.sscl.uwo.ca/assoc/acml/acmla.html>, the *International Federation of Library Associations, Section of Geography and Map Libraries* at [http://www-map.lib.umn.edu/map\\_libraries.html](http://www-map.lib.umn.edu/map_libraries.html), the *Special Libraries Association, Geography and Map Division* at <http://www.sla.org/>, the *Western Association of Map Libraries* at <http://gort.uscd.edu/mw/waml/waml.html>, or the *Digital Librarian (Maps and Geography Australian Library Association)* at <http://www.ala.au>. However, not all map librarians and/or map library administrators have the skills or the motivation to take on the role of champions, leaving some map libraries in trouble.

Other places where champions already can be found

are amongst politicians with a vision, the geographic information user community, and within the corporate world. An example of a politically championed initiative is the American Digital Earth vision for a global geo-spatial information network <<http://digitalearth.gsfc.nasa.gov>>. Champions also have stepped forward from within the digital geographic information user community, in some cases teaming up with map librarians, as in the case of the Alexandria Project <<http://alexandria.sdc.ucsb.edu>>, and for example at the University of Connecticut's MAGIC (Map and Geographic Information Center) initiative <<http://magic.lib.uconn.edu/>>. These efforts must be complimented for their excellent vision, work and leadership. But today's map libraries need far more energy from the digital geographic information user community. Too many of today's geographic information users simply are abandoning map libraries, turning elsewhere in their struggle to satisfy their geographic information needs.

There also is activity from within the corporate GIS world. Corporations offer give-away and special deals on their software and training in an attempt to move map libraries into the digital era, challenging map libraries to answer the following questions:

- how can map librarians become literate in today's GIS solutions; and
- how can today's GIS solutions be integrated into map libraries?

These corporate initiatives must be applauded, as must corporate efforts to package digital geographic data for use by libraries. However, the transition agenda is far bigger than installing today's GIS solutions in map

libraries and making map librarians GIS literate. Indeed, today's GIS solutions are very complex and may not be a workable answer for map libraries. As well, some would argue that corporate efforts invariably are driven by corporate agendas, agendas that may distract from the real transition questions that need to be answered.

The bottom line: Those map libraries that can find a champion will most likely make the transition to a map library of the future, while those without vision and leadership will fade into the backwater and face eventual closure. The task ahead looks daunting. Many of those suitable to champion the transition are shying away from serving because of the sheer work and effort involved. The good news is that there already exist dedicated champions paving the way forward. Some of these initiatives have been identified above. Others can learn a lot from these initiatives, making their own task easier.

Those willing to take up the challenge of leading a map library's transition into the virtual world must find answers to a number of key issues phrased below as questions:

- Who are the present and future clients? What are their present and future geographic and associated information needs?
- Are there logical partnership opportunities or collaborators to team up with, for example other libraries, spatial analysis laboratories, Geography Departments, . . . ?
- What geographic and associated information services should my library offer in the future? Where are the opportunities and how can these opportunities be delivered?
- How does one go about negotiating and facilitating access to

digital geographic and associated information that resides off-site somewhere in the virtual world?

- How will the new facility be financed? Should there be a fee-for-service? If yes, what should that fee be for access and for services/use?
- How to re-train existing staff and what should be the selection criteria for hiring future staff?
- What are the best ways to acquire, amortize, maintain and replace hardware and software?

In other words, every map library must understand its clients, its mandate, and its users' needs. It must invest efforts to understand what digital geographic and associated information is out there that may be of interest to its clients, how that information can be accessed from off-site and within the library, and if and how the information can be passed on to the user. Each library must develop a regulatory and physical environment to access and view these digital data. Each library must decide further how far it wishes to support usage of these data within the library.

Financial viability of tomorrow's map libraries will depend on the goodwill of those financing today's map libraries, the ability to negotiate or raise new funds, and the entrepreneurial skills on behalf of map libraries to become revenue generating. The notion of financing the future map library through revenue generation by charging a fee for service may be alien or despicable to many of us. However, there is opportunity here, and it may prove difficult to ignore a general societal trend towards fee-for-service.

Moving a map library from an analogue into a digital world is unlikely to happen without full cooperation from the map librarians. Those in charge of map

libraries cannot make the assumption that today's map librarians have the skill or will to participate in a digital geographic information world. Many map librarians opted for their career path because of their love for traditional librarianship and maps. Tomorrow's map librarians will require a new blend of skills, a blend that combines understanding of geographic information with skills in handling sophisticated digital information technologies. Managing this human resource transition will not be easy.

### Summary

The map is in rapid transition, moving from analog map sheets to virtual digital databases. Map libraries must embrace the virtual medium or risk becoming obsolete in the post-technology world. Map libraries will change to become "geographic and associated information resource centers". This implies little conceptual change if you think of the "map" as "geographic information", and of "libraries" as "resource centers". It does, however, imply considerable change in the physical nature of the facility and in its mode of operation.

Will we need map librarians in the future? The map librarian of the future will be the *expert* who knows best where to find what in a bewildering world, who can help us to understand the galloping technology surrounding the virtual map world, and who can shed insight on a digital map's reputation, quality and legal world. Digital browsers will become as good as a mediocre map librarian. But no digital data browser will match an expert map librarian who is up-to-date on what is going on in the geographic information world. So there will always be a continued need for *expert* map librarians. However, these experts could be accessed in tomorrow's sophisticated digital world without the

need for an elaborate physical map library facility.

So will we need physical map libraries in the future? The primary role of the physical map library will switch from storing paper maps to facilitating digital geographic and associated information search and access, with a focus on "just-in-time" service. The physical facility will specialize in hardware, software and network gadgets not easily accessible to the average home or office computing installation. While physical map libraries therefore have an opportunity to be an important part of tomorrow's geographic information service provision, they will not be essential. A map library's continued existence cannot be guaranteed, it must be earned.

To make a successful transition, map librarians and their map libraries must be pro-active and visionary in the provision of geographic and associated information access and services. They must be advocates of change and direction. In today's political, corporate and fiscal climates, map libraries need to find opportunities to team up, to form partnerships, and to diversify to achieve WIN/WIN situations. Those of us who know of map libraries and reading rooms face options. To do nothing implies the risk of a gradual demise of many of our traditional map libraries into oblivion.

### References Cited

- P.S. Adler and M.L. Larsgaard (1999). Applying GIS in libraries. Pages 901-908 in *Geographical Information Systems: Principles, Techniques, Applications and Management*, 2nd Edition, by P.A. Longley, M. F. Goodchild, David J. Maguire (Editors), 2 Volume Set, 1296 pages, John Wiley & Sons.
- M.F. Goodchild (1999). Cartographic Futures in a Digital World. Pages 5-14 in *Touch the Past, Visual-*

*ize the Future*, by C. P. Keller (Editor), Conference Proceedings of the 19<sup>th</sup> International Cartographic Conference, Ottawa ICA 1999, 1908 pages, Natural Resources Canada. (re-printed in *Cartographic Perspectives*, No. 36, Spring 2000)

A. MacEachren (1995). *How Maps Work*. 513 pages, Guilford Press.

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## online mapping

### Cyber Rights and Cyber Maps

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An examination of the articles in this and related journals quickly gives the impression of a number of exciting and cutting-edge developments in Web-based mapping. During the 1990s, as the Internet doubled in size every 18 months in compliance with Moore's Law, cartographers and GIS companies alike began to explore previously unrealizable goals of distributing maps and applications (such as ESRI's Ar-