Lloyd Reeds Map Collection:

Organizational Review

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THE REVIEW

University Librarian Jeffrey Trzeciak commissioned a comprehensive review of McMaster University Library's Lloyd Reeds Map Collection following the retirement of the Director, Cathy Moulder, after many years of exemplary service. Patrick DeLuca, certified GIS Professional (GISP), lecturer and Systems Administrator in the campus' GIS Lab, and Vivian Lewis, Associate University Librarian for Organizational Development, were invited to conduct the review. The process was envisioned as an opportunity to recognize the unit's strengths, to address shortcomings and to set a clear path for future success.

The two reviewers conducted 21 interviews with staff members, campus users and recognized experts in the maps, data and GIS fields. Interviews were supplemented by a careful review of local usage statistics and current literature in the field.

The review comes at a good time as the unit has recently moved into newly renovated space. The remodeled facility has opened up new opportunities for service delivery and technology. Close proximity to the Lewis & Ruth Sherman Centre for Digital Scholarship is expected to help forge relationships with new campus partners, far beyond the traditional bounds of Geography & Earth Sciences.

Recognized Value

The reviewers were struck by the high value placed on geospatial literacy by respondents from across campus. Whether spurred on by new technologies such as Google Earth and Google Maps (as suggested by some writers) or not, most viewed a basic understanding of maps and spatial data as an essential life skill in the 21st century (Moore, 2012). One faculty member from Humanities noted, "Unless you know the geography of a place, you can't write about it."

The support for McMaster's Maps Collection was also very strong. Participants spoke with passion about the collections, the services and the staff. Another described the unit as one of the pivotal teaching and learning spaces on campus. The review became seen very early on as an opportunity to build upon strengths and lay the groundwork for future successes.

CLIENTELLE

The Map Collection serves a wide spectrum of users. McMaster students and faculty make up a significant proportion of the department's clientele, but environmental consultants, biologists, engineers and archeologists are also regular visitors. During the summer months, many genealogists and other members of the public visit the unit. Many of these external users are McMaster alumni returning to a space they used and loved when they were students. This strong community emphasis is imperative: to maintain the Map Collection's depository status, it must make its collections available to the general public. (This depository designation provides the department with 9,000 maps – valued at approximately $140,000.)

Although users come from many disciplines, a large segment of the Map Collection's business comes from the School of Geography and Earth Sciences (SGES). This strong linkage between the Map Collection and Geography is logical and very common. As with many research libraries, McMaster's Map Collection originally grew out of the Geography Department (as it was then known), and did not actually move into the main library until the early 1990's.

Based on experiences at other research libraries, the reviewers surmise that the proportion of visitors from outside Geography will grow over time as the GIS service is built out. The broad interdisciplinary applicability of GIS skills will draw users from many fields (especially other social sciences and business). As much as the Library enjoys the close relationship with the faculty, the broadening of the user base must be considered a positive development.

COLLECTIONS

The Continuing Importance of the Print Map

Despite significant advances in digital mapping, the recognition of the ongoing importance of the print map is unwavering. Although use is definitely down from five years ago, demand for print maps shows no sign of disappearing anytime soon. Demand for topographic maps, soil and geology maps are particularly strong. One staff member described the topographical maps as "the workhorse of the collection."

An increasing number of maps are becoming available in digital form, but that number still represents a small fraction of the print universe and accessing specific digital maps is challenging. Campbell (2000), noted that the web serves as "a series of unconnected shop windows, whose purpose is more to promote the institution concerned than to serve the international community." Although written over a decade ago, the statement still holds true.

Some materials, such as historical topographical maps and roadmaps, are still only available in paper. As noted by more than one participant, the Canadian government is not investing heavily in historical cartography. Rather, it relies on libraries to maintain the historical record. With respect to map production, one Natural Resource Canada representative noted, the federal government talked some years ago about closing down paper map production, but very wisely reversed that decision. Additionally, many gazetteers and thematic atlases are still not available digitally.

One staff member noted that some tasks are simply easier to do with a print map – taking measurements, finding latitude and longitude, etc.   One Geography faculty member reported that print maps are still the most appropriate tools for topographical cross sections. She indicated that print maps are critical when going out into the field or traveling to areas of the world without good Internet service. Another faculty member from Geography concurred, noting that "a complete and extensive collection of Canadian maps is imperative and, at this point, that still means a combination of print and digital." The Director of the Life Sciences program notes the importance of print maps for introducing GIS: "For students not trained in GIS, a print map is simply the easiest place to start".

McMaster holds rich collections of rare print maps, many of them acquired through donations by the former Director. We heard strong interest in continuing to build this collection. We also heard of the importance of exposing the collection more effectively on our public website.

Preservation is of key concern. Dr. Michael Goodchild, one of the leading experts in GIS (a former McMaster graduate student, now Director of the Center for Spatial Studies at the University of California, Santa Barbara), noted, "I think it would be

utterly foolish to move away from paper without a long-term preservation system in place for digital materials."   Dan Duda, current President of the Association of Canadian Map Libraries and Archives, concurred. He stated, "Digitization is not a form of preservation yet. Migration is the issue. Will you be able to open the file with new hardware? In many cases the digital image is simply the teaser. Users review digital images, and then want to see the real thing. "

One faculty member commended the Map Collection staff for their flexibility and willingness to seek out new materials as needed. Another expressed some concern that the Library's interest in reducing the map cabinet footprint would reduce its willingness to acquire print maps in situations where they were the most appropriate tools for the job.

Local Collections

Many participants commented on the need to continue building local collections of maps, air photos and other geospatial information. Air photos were considered especially important. Class assignments are often built around these specialized collections. The collection is in use every day by a wide spectrum of users (not just independent consultants but biologists, museum staff, etc.) Given the cost, one staff member suggested that it would be preferable for Ontario libraries to negotiate a consortial deal rather than paying top market dollar for a McMaster-only solution.

Metadata and Discovery

Some staff members expressed concern about users' ability to discover the department's rich resources. The Rare Maps, stored in Research Collections for preservation purposes, are described only in a stand-alone database created many years ago. While it reflects the digital expertise of that time, it is an isolated resource that does not integrate with the Library Catalogue or other discovery tools and is not indexed by internet search engines. Searchability is poor and though the source follows standards, it desperately needs to be updated.–Pushing the rare maps descriptions into other Library search tools and supporting Google indexing of the database would increase discoverability of the Rare Maps collection.

Similarly, the existing print map collection held in the department is only partially catalogued. As a result, many items in these extensive holdings are not discoverable except through on-site use of lists and finding aids.

The Future is Digitization

Usage patterns in the department have changed dramatically in the last five years. Although demand is still there for print maps, the volume of use has diminished in

favour of digital images. Researchers appreciate the convenience of accessing materials 24/7, as well as the powerful flexibility associated with digital files. Several participants encouraged the Library to purchase more digital maps. One faculty member recommended that the Library focus non-North American purchases on digital formats.

Many libraries are becoming actively engaged in digitizing their local map collections. Digitizing existing maps dramatically enhances access and use. As well, in the case of less unique or lower value materials, the process opens up tremendous possibilities for discarding materials and dramatically reducing the footprint of the print collections.

The reviewers were very interested in learning of a project being led by Barb Cloutier, from Natural Resources Canada, to digitize Canadian historical topographical maps. Since this initiative is historical, it could involve as many as 100,000 maps. The project, proposed at the 2011 ACMLA conference, is being framed as grassroots collaboration: Library Archives Canada and Natural Resources Canada will supply the scanning and metadata standards, but need individual libraries to gather and digitize the maps. Geo-referencing the files would come at a later stage. The community reaction to the proposal was enthusiastic. Some universities already have digitization labs and will have no difficulty contributing scans. The harder part will be completing the metadata. Many sites are confident that the metadata could be completed by students with guidance from map professionals. The opportunities for participating in this national initiative are extremely exciting. One staff member noted that we own many of the maps being targeted for inclusion in the national collection. Digitizing and geo-referencing these maps could free up as many as 10 map cabinets.

The amount of material available for digitizing at McMaster is, as one participant noted, almost "paralyzing." The Library owns many valuable maps that aren't being used because they have not been catalogued and made available for use. Digitizing and fully describing such material would dramatically increase the apparent size of our collections. Geo-referencing the maps at the same time would be even more beneficial. (We acknowledge that many outsourcing vendors are not interested in cartographic material, so the work would need to be done in-house, either with existing or project staff.)

Choosing digitization targets is of key concern. One Natural Resource Canada representative recommended that we focus on collections that are rare, unusual or heavily used. An excellent example is the Library's WWI trench map collection, which has been digitized and is considered a tremendous success story. The Library receives questions about this collection every week. One staff member noted that the Library owns other collections of equal importance but needs additional resources to digitize them. Local material is another area of great interest. City directories and Hamilton Conservation Authority material were identified a few times as strong candidates for digitization.

Map digitization at McMaster is now a viable solution. The Library has recently purchased a Colortrac Smartlf Gx +T56 scanner. Staff members within the Map Collection have had many fruitful discussions regarding digitization possibilities with the former Digital Preservation Librarian. The Interim Manager estimates that 2,000 maps will be digitized over the course of summer 2012.

Maps/Data/GIS staff members have already created a work flow chart and a set of criteria for choosing digitization targets. The reviewers encourage the team to continue work on refining and communicating the maps digitization strategy outlining how the scanner will be used, by whom, and under what circumstances. That plan should be fully integrated into the Library's larger digitization program. Early indications suggest that the focus will be placed on digitizing library content and supporting recognized university programs rather than on delivering a cost-recovery service to end users. (Note that the two are not mutually exclusive.) The plan should account for all components of the digitization cycle (from scan to metadata to storage in repository). As well, the plan needs to be set within the context of the Library's larger digitization program. In particular, the team needs to identify how the scanning operation will be resourced. For example, the Library does not currently have a scanning technician. If students are used for metadata work, can the Access Specialist be charged with supervising this work?

RECOMMENDATIONS

1.1 Continue to purchase a combination of print and digital maps, but with an increasing emphasis on digital over the near future. Purchase print when necessary to support faculty and student field work.

1.2 Enhance the Hamilton collection with the purchase of additional maps, air photos, spatial data and satellite imagery. Cost out key collections and propose as one-time purchases or donor opportunities.

1.3 Propose and cost out a series of projects to digitize rare maps deemed to be of significant research use. Budget for contract staff and/or students as appropriate.

1.4 Continue to develop, refine and communicate a clear strategy for map digitization and ensure that the plan if fully integrated with the Library's larger digitization efforts. What materials will be digitized and by whom? How will work be funded? How will the Library charge back for requests from users or the campus community? How will metadata be managed? How does this work relate to the activities in the Digitization Lab?

1.5 Work with the GIS Lab to select and purchase LIDAR (light detection and ranging) data. Consider a section of the Hamilton downtown. Seek out grants and donations to fund purchase.

SERVICES

Research Assistance

Map Collection staff currently provide research assistance on a drop-in basis. The staff opt not to maintain a formal service point, but to deliver assistance on an as-needed basis from the staff office. Sight lines in the new space were designed to facilitate this informal approach. The volume of business is such that this model works well.

The research service is essential. As in other research library map collections, users are not encouraged to retrieve their own materials from the cabinets, but to wait for assistance from a staff member. The volume of traffic is generally reasonable. In 2010/11, departmental staff answered 1,940 map questions and 1,136 data questions.

Finding the material is merely the beginning. Many participants noted the challenges associated with using geospatial materials (projections, scale, etc.). As the President of ACMLA reported, cartography is a "new language" to many people. Interpreting what they are seeing and relating it to the real world can be extremely hard for novice users.

Maps Collection staff currently collect statistics separately from other service points. The reviewers encourage them to collect their data in the LibStats system currently being implemented.

Instruction

Historically, the unit delivered a significant amount of face-to-face instruction. (In 2010/11, staff conducted 101 sessions for 3,332 participants.) Students descended on the unit in large numbers in September and January. Staff delivered a relatively scripted presentation, including both theory and practical instruction, to each group. Many faculty spoke with great enthusiasm about the quality of the instruction delivered by Map Collection staff.

During the course of the review, the Maps/Data/GIS unit became active participants in the Library's Blended Learning pilot. Online modules were written for two large undergraduate geography classes in place of the face-to-face experience. Staff provided training sessions for the TA's, who then delivered sessions for the students. Staff set up the materials, and were available to answer questions during the sessions.

In December 2011, a focus group and interviews were conducted with faculty involved in the blended learning pilot. Analysis of that data suggest that the move to

blended learning has been generally positive. Some Geography faculty members had some reservations about moving the learning online and found some components of the module "dry," but are none-the-less satisfied with the overall product.

Staff members appreciate being released from the exhausting and repetitive sessions, but feel some loss in terms of the relationship with the faculty and students. As well, staff members report some frustration with the short turnaround time and resultant limited amount of input they had into the modules – and hope that future work will allow more time for feedback. (Revisions are being made to the modules in response to assessment results in summer 2012.)

Interest in face-to-face instruction for upper level courses continues. One faculty member noted that she was interested in bringing her 4th year class in. Another noted that he still needs someone capable of coming into his 3rd and 4th year courses. He wants someone accessible to assist students with their projects. He also wants someone to consult with regarding data availability.

At many institutions, map collection staff members offer generic maps/GIS training sessions outside of specific courses. The University of Waterloo offers two-hour sessions on simple applications such as "using Google Earth" or "Mapping Your House." (Dodsworth, 2010) A participant from Memorial noted that such sessions "dramatically expand interest in GIS" to students who would otherwise not have an opportunity to learn.

Several faculty members commented on the benefits to be achieved from offering these drop-in non-course-specific sessions. Such sessions could focus on taking E-STAT data and creating a simple map. One faculty member noted that such an initiative spoke to the interdisciplinary aspect of the University President's recent message on community engagement and student learning. (Deane, 2012)

Many outside experts referred to a certain natural resistance to learning GIS. As noted by Michael Goodchild, "learning ArcGIS to make a (simple) map is hardly worth it." It's better to deliver the casual user to a simple source such as Google maps. A representative from Natural Resource Canada noted that students were very happy to receive the final product from GIS, but were not always interested in learning the art and science of producing it. They simply did not want to invest the time.

Faculty appreciated the learning guides created by former director Cathy Moulder and her team. These guides covered the "how to" questions very well.

Data Delivery

Data services are currently provided by Data Specialist Vivek Jadon. Jadon's services currently focus on the Data Liberation Initiative (DLI) and Interuniversity Consortium for Political and Social Research (ICPSR) data. The DLI files receive the heaviest use of the two. The files cover broad subject areas and are available in both the micro-data and aggregate level. Aggregate data is becoming increasingly popular. Jadon noted that requests come in primarily from students and faculty in Social Sciences. He is very interested in receiving requests from Business.

Many faculty participants expressed interest in expanding the range of data sets available through the Library's data service. As one individual noted, we need to "push the walls out" beyond the two key sources. One individual strongly encouraged the Library to purchase LIDAR (light detection and ranging) data, although he recognized that the cost could be prohibitive. Another identified critical water well data sets that could prove useful to many students and researchers on campus.

Scholars Portal's ODESI (Ontario Data Documentation, Extraction Service and Infrastructure Initiative) provides McMaster students and other researchers with quick, easy (web-based) access to many common social science data sets. Users can search, subset and download data in various file formats. (For details, see http://search2.odesi.ca/.)

Data Curation

McMaster, like many other research-intensive universities, does not have a solution for data management and archiving. Faculty members, graduate students and, in some cases, undergraduate students, acquire, produce and store vast quantities of data. Without doubt, McMaster researchers are purchasing and storing the same data sets over and over again. Storage practices are inadequate – with much data being housed on USB drives and hard drives – without backup. When faculty members retire or when graduate students leave the university, no plan is in place for sharing their data. The need for an enterprise-wide solution is clear and growing. Across North America, research libraries are holding their breath and jumping into this void – or at least standing on the precipice, weighing their options. The Canadian Association of Research Libraries is drawing the Academy's attention to the situation.

As noted by several authors, the issue is not so much one of preservation but of curation. The role involves selecting, sharing, enabling use – all within the context of digital rights. (Gold, *Data Curation and Libraries*, 5)

Some Libraries have made significant inroads into data management. MIT Libraries provides assistance in data management and teaches Data Management 101 workshops to researchers.

John Maclachlan, the interim manager of the Maps/Data/GIS area, expressed a strong interest in the Library assuming a lead role (in conjunction with the Office of Research, UTS, etc.) on a campus plan for managing research data. He also proposed the creation of an online journal of data (where the data is the article). The concept is exciting but, as Maclachlan notes, could require significant server space.

Maclachlan, along with Dale Askey, AUL for Library Learning Technologies, participated in the ARL / DLF e-Science Institute. Preliminary work is ongoing to frame out a strategy for supporting e-science as part of that Institute experience. (For details about the institute objectives and framework, see: http://www.arl.org/rtl/eresearch/escien/escieninstitute/index.shtml). Askey noted that the Library is prepared to take part in the CARL Canadian National Collaborative Data Infrastructure initiative, should it re-emerge as a funding opportunity.

The reviewers endorse the concept of the Library assuming a central role in data curation on campus, with the hub of activity potentially located in the Lewis & Ruth Sherman Centre for Digital Scholarship. Key initiatives could include metadata assistance, technical support, end-user training, long-term file preservation, etc.

Faculty members noted significant interest in having the Library take on this role. The Chair of the Geography Department noted that some data sets are purchased for exclusive use – but others are not. The GIS Lab and Centre for Spatial Analysis is fortunate to have an administrator manage their data on secure servers, but other departments are not so lucky. Could the Library, either through the Data Service or through the Sherman Centre, create a mandate and an infrastructure to ensure safe deposit? Such a requirement would ensure that the University's resources are being used efficiently and "propel" research activity to new levels.

One faculty member from Geography called upon the Library to endorse a policy mandating deposit. The reviewers agree with the sentiment, but anticipate that such a mandate would be met with resistance from many researchers.

Jadon is also interested in exploring the use of Dataverse for research data management. For details on this product, see http://www.dataverse.com.

Data Instruction

The Data Specialist does a small amount of instruction. He is interested in doing more, but resists due to concerns about his capacity to deliver data to a larger population, especially to individuals with greater needs for assistance. He expressed strong interest in expanding his service to students in the Faculty of Business, but noted a clear lack of capacity to deal with increased demand.

He is interested in the creation of learning objects to facilitate instruction to local and remote users. He recommends that students be hired to create objects to demonstrate key statistical operations.

GIS

The delivery of effective GIS service took a very prominent role within the review. The Director of the School of Geography & Earth Sciences, as well as many individual faculty members, described GIS, not as a tool, but as a multidisciplinary literacy. Geospatial skills were considered as a critical component of a good undergraduate education in many fields. Michael Goodchild reflects this same sentiment in his 2010 article:

> *In essence, the education question has changed over the past two decades, from how to educate an elite group of professional experts, to how to provide a basic understanding of GIScience principles to everyone. Moreover, even for the expert the ground has shifted, from an earlier emphasis on GIS as a somewhat mechanical process, to the kinds of critical thinking skills necessary to manipulate an easy-to-use GIS intelligently.* (Goodchild, Twenty Years of Progress, 15)

As on many academic campuses, a decentralized GIS model has emerged at McMaster, with the GIS Lab (a unit of Geography & Earth Sciences) supporting the more sophisticated needs of GIS-enrolled students and the Library ostensibly serving the needs of more casual users from elsewhere on campus.

The model makes sense, at least on paper. The GIS Lab is a teaching and research centre. It currently supports about 600 students per year and provides a large amount of service teaching for other departments. The Lab has limited opportunities to train campus users in low-level applications or to assist with production of small maps for assignments. In this model, the Library becomes the "neutral ground" where a student with little or no background in GIS can learn enough GIS to produce a simple map to include in an assignment. The GIS Lab stays involved, for example, by partnering with the Library on the delivery of short courses to support novice users and promote enrolment into their programs.

The McMaster model avoids the competition existent on some campuses where the Geography Department and the Library are offering similar services and software or vying for the same customers. (Aufmuth, 2012)

Both library staff and campus faculty expressed strong interest in the concept of supporting the needs of novice GIS users – but also considerable and understandable concern. McMaster is graduating an exemplary cadre of GIS students but the rest of the campus population is getting very little exposure. GIS is not mandatory in all geography programs (currently only in Honours Geography) and graduate students have an especially significant need for assistance. Other areas that could benefit from exposure to GIS are Life Sciences, Engineering, Health Sciences and Business among others.

Library Support for novice GIS users is no simple task. Although the software has become much simpler to use, the learning curve is still steep. Research consultations on GIS-related matters are typically longer and more complex than traditional questions. The end user can be easily deceived by "glossy results [with] a click of a button." (Houser, 2006) Supporting the needs of, for example, hundreds of Commerce students working on small-group projects, while laudable, is not viable on a large-scale with existing staffing and delivery models.

The reviewers feel strongly that a clear staffing and service model is required for supporting GIS. This service model would provide a clear statement of what the Library can and can't provide. Attention should be given to the service model created by the University of Arizona Library. (Mount et al, 1998)

Significant attention needs to be paid to OCUL's new Scholars GeoPortal project (released March 2012). The portal, which runs on ESRI's ArcGIS suite, serves up a designated set of large geospatial data sets. As noted by Scholars Portal Director, Alan Darnell, the project aims to a) enhance discovery through metadata; b) provide the ability to preview data before pulling it into a desktop GIS application; c) make GIS more understandable to general reference librarians. If successful, the designers hope to extend the pilot to include the creation of simple maps and to link the product with ODESI.

Staff members noted the difficulty they sometimes face with software upgrades within the department. Library IT staff are facing a heavy workload and sometimes aren't able to install software upgrades in a timely fashion. Authorized licenses sometimes sit for lengthy periods waiting for installation. Map Collection staff members are encouraged to discuss strategies for expediting installs and upgrades with the Library Learning Technologies division

RECOMMENDATIONS

2.1   Start compiling reference statistics in the Library's new LibStats database. *(Note: Started in June 2012.)*

2.2   Revisit departmental hours to reflect usage patterns and maximize staff resources (in process).

2.3   Track Scholars GeoPortal statistics as a new indicator of use.

2.4   Continue to refine online instruction modules for large 1st year courses. Involve departmental staff in the revisions. Continue to use a train-the-trainer model to handle the hands-on components necessary for these large classes. Reserve face-to-face instruction for upper year courses or where more customized content is required.

2.5   Consider dis-aggregating some of the geography Blended Learning modules to facilitate general use. Put the modules where students can find them (YouTube, public website…)

2.6   Market the Scholars GeoPortal to the campus community.

2.7   Once the GIS position is filled, formulate a clear service policy indicating the kind and level of service to be offered. (Teaching versus delivery? Appointment-based versus drop-in?)

2.8   Once the GIS position is filled, propose designing a series of "Introduction to GIS" courses for the general campus community. Collaborate with the GIS Lab on the offering as a means of promoting both services. Frame out the relationship with a written Memorandum of Understanding.

2.9   Conduct a survey of Geography faculty to determine a) what data sets are being used now; b) what are the top priorities for new data sets. Explore costing and ongoing support requirements. Explore donations or cost-sharing arrangements if necessary.

2.10   Establish the Lewis & Ruth Sherman Center for Digital Scholarship as the Library hub for data curation and archiving. Ensure that the Data Specialist is actively involved in these activities.

2.11   Work with Library & Learning Technologies to establish strategies for expediting software installs and upgrades

RELATIONSHIPS

All respondents noted the positive relationship between the Map Collection and the School of Geography and Earth Sciences. Individuals commented on the engagement of the faculty in the selection of new resources and the active involvement of the Map Collection staff in the Geography curriculum (through instruction sessions and guest lectures). Some drew special attention to the strength of the relationship with the GIS Lab. The Map Collection routinely forwards researchers with complex GIS questions to the Lab while non-GIS students are regularly directed to the Library for assistance. Both department staff and faculty described these relationships as "fruitful" and "useful."

The Department also has a positive though somewhat distant relationship with the Research Data Centre (RDC) and the Public Economics Data Analysis Lab (PEDAL). Due to the confidential nature of the data held within these units, referrals between the Library and these units is minimal.

The Department relies heavily on the expertise living in other universities, and often uses the ACMLA listserv as a conduit to information.

The previous director had a strong and long-standing track record working with donors. Ms. Moulder was successful in both attracting and stewarding donors. Through her efforts, the Library was able to secure some invaluable gifts from private collectors. The new manager will be expected to carry on this activity.

Some relationship areas need improvement:

a. The synergies with some library departments need work. Department staff noted interest in more interaction with the Library's Research Collections unit (where rare maps are held).

b. Others noted the importance of creating strong relationships with the Lewis & Ruth Sherman Centre for Digital Scholarship on the 1st floor of Mills. The new unit will be in close proximity to the Map Collection. The opportunities for digital scholarship to mesh with geospatial data are exciting and should be nurtured.

c. The relationship with GIS, although positive, could be much stronger. Several faculty participants noted the opportunities for joint programming (guest lectures, mini GIS courses, etc.) Such events would enhance awareness of both parties: The Map Collection as a source of resources and general expertise, and the GIS Lab for academic courses.

RECOMMENDATIONS

3.1 Identify some opportunities for staff from Research Collections to meet with the Map Collection staff to discuss areas of mutual concern.

3.2 Pursue opportunities for staff from the Lewis & Ruth Sherman Centre for Digitization to meet with the Map Collection staff to discuss areas of mutual concern.

3.3 Consider the establishment of a small guest lecture series in partnership with SGES for 2012/13.

STAFFING

The unit is currently staffed by an interim manager and three staff.

Position	Key Responsibilities
Interim manager	Oversee the general operations of the unit. Supervise staff. Represent the department on external committees.
Map Specialist	Acquire, organize and provide access to geographic information in multiple formats. Provide instruction. Work with faculty on assignments. Promote geospatial literacy.
Data Specialist	Acquire, organize and provide access to numeric data products. Provide instruction. Promote data literacy.
Digital Access Specialist	Provide researchers with optimum access to geospatial materials through cataloguing and public service.

Virtually all participants commented on the exemplary service delivered by the Maps/Data/GIS unit. Staff members were described as "professional," "knowledgeable" and passionate about their work. One geography faculty member noted that staff members are "fantastic on customer service."

Many participants took the opportunity to note the strengths of the previous director. Ms. Moulder was described as "dedicated," "practical" in her approach, and generous with both her time and expertise. Staff described her as a "strong force" within the department and a mentor to many staff over her career.

Core Competencies

The reviewers heard clearly that a core set of skills are required to be successful within any Maps/GIS/Data unit. Michael Goodchild probably said it best. The staff members need a "walk on water" skill set. A passion for geography and a general

understanding of cartography are absolutely essential. Teaching skills are also paramount. Individuals must be able to translate the complex concepts (projection, etc.) into meaningful terms for the novice user, as well as be able to converse with authority with sophisticated researchers. Technical skills are also key attributes: maps staff must be able to move data between different software packages and to liaise with organizations that provide spatial data. The passion is ultimately more important than the technical skills – although both are, of course, preferable.

Leadership

Since the Director's retirement, the unit has been overseen by interim manager Dr. John Maclachlan. Maclachlan has a PhD in Geography from McMaster and originally came to the Library as a Postdoctoral Fellow under the Council of Library and Information Resources (CLIR) PDF program.

The reviewers heard many positive comments from both staff within the unit and from faculty (both in and outside of Geography) about the interim manager's skill set. Several participants noted that Dr. Maclachlan meets and exceeds their expectations for leadership within the unit – in terms of educational background (Geography), GIS skills and teaching skills. Dr. Maclachlan has established a positive working relationship with staff within the unit and has ably steered the unit through the last academic year.

Participants were very eager to comment on the skills required to lead the unit into the future. The following skills seemed almost universally endorsed as necessary to ensure success:

- A high-level competence in geospatial information in multiple formats.

- Good foundational knowledge of GIS

- Strong data management skills: the ability to manage data with spatial attributes.

- Strong relationship with faculty from across campus. The individual should be able to help build community, assist with grants, partner on research projects, etc.

- Proven teaching skills (including a good understanding of pedagogy). As one faculty member noted, the Maps collection has always been a key teaching space within the Library.

- Excellent communication skills (the ability to represent the unit effectively at OCUL and ACMLA meetings). Staff members, in particular, are looking for an "ambassador."

- Good management skills. The individual should be able to set clear priorities for the department, and to convey those strategic priorities to others. Should also be able to align resources and demand.

- Proven grant writing skills.

The reviewers examined various options for filling the leadership position on a permanent basis. Consideration was given to stipulating that the incumbent hold a MLIS degree (as held by the retired Director during the later part of her career). The reviewers saw the clear value of the designation in terms of collection development, shared user service philosophy and connections to the broader library community. That said, the reviewers ultimately determined that the MLIS degree, while certainly beneficial in any library-related role, was not essential to success in this highly-specialized, increasingly technology-focused position. The department would be better served by stipulating the specialized domain (maps, data and GIS) knowledge and passion without mandating a specific certification.

GIS

Virtually all participants noted the vital importance of filling the GIS void created by the departure of the GIS librarian.   The GIS expertise was described as "fundamental" given the Library's key role in serving the campus' novice GIS users. The reviewers endorse the need to fill this need as soon as funding becomes available.

Many recommended a GIS Technician or Specialist model – with the individual possibly holding a either a B.Sc with emphasis on GIS or a college diploma. Either model would deliver an individual capable of handling the vast majority of GIS queries that come into the department, plus take the lead on hardware and software issues that arise (although the Specialist would bring slightly higher skills). Either model would, as one library administrator noted, "meet the student at the place they want to have the conversation."

Some participants suggested we explore the notion of a part time specialist to start, possibly supplemented by a cadre of student assistants.

Rare Maps

We also heard some concern about rare map expertise. Some projects have stopped because we simply lack the expertise in that area. We consider this as an important gap, but secondary in importance to the manager and GIS roles.

Data Curation

Several participants noted the importance of developing data curation skills within the unit. Such skills are necessary to support the full life cycle of data and preserve the institution's digital assets.

The former University Librarian recently announced the creation of a new Postdoctoral fellowship to focus on digital curation as part of a six-university Alfred P. Sloan Foundation grant. We encourage a close tie between this new position and the Map Collection.

RECOMMENDATIONS

4.1   Hire a permanent Manager of the unit.

4.2   Consider incorporating "Maps, Data & GIS" into the name of department.

4.3   Hire a GIS Technician as funding becomes available. The position would require a BA or a BSc with specialization in GIS or more broadly, in Geomatics. Use students until such a time as a continuing position is possible.

4.4   Develop a close relationship between the Maps/Data/GIS department and the new Postdoctoral Fellow focusing on data curation.

CONCLUSION

The Lloyd Reeds Map Collection is, without question, one of the jewels of the McMaster University Library. The unit is highly valued by campus stakeholders as well as the broader maps / data / GIS community.   The unit has historically been limited more by resources than by ideas or enthusiasm.

Going forward, the reviewers believe that the first priority needs to be stabilizing the leadership. They fully endorse the need for a permanent manager. This individual should become a member of The Management Group (TMG). They also endorse filling the GIS void with a technician/specialist as funding becomes available.

The unit is encouraged to maintain a mixed print/electronic map collection strategy, but to plan for an increasing emphasis on digital materials over the near- to long-term.

The importance of local collections and community engagement cannot be underestimated. The reviewers encourage the enhancement of our local map and aerial photo collections.

Digitizing unique collections must become a departmental priority. We applaud the recent purchase of a large-format scanner and encourage the ongoing articulation of a clear strategy for using it effectively.

Instruction has historically been a departmental strength. The reviewers strongly endorse the move to a blended learning model for large first year geography courses. Going forward, they encourage the dis-aggregation of modules to support general applications.   Once the GIS position is filled, the reviewers recommend partnering with the GIS Lab on a speaker series and workshops for novice GIS users.

The data service should be viewed as a potential growth area.   The unit is encouraged to expand the number of data files supported by the data service through careful collaboration with faculty.

The staff is encouraged to work very closely with the new Postdoctoral Fellow in data curation and with staff in the Lewis & Ruth Sherman Centre for Digital Scholarship to support the campus' growing need for an enterprise-wide data curation strategy.

The reviewers are confident that the Map Collections team has the skills and the passion necessary to achieve tremendous success in the coming years.

SUMMARY OF RECOMMENDATIONS

COLLECTIONS

1.1 Continue to purchase a combination of print and digital maps, but with an increasing emphasis on digital over the near future. Purchase print when necessary to support faculty and student field work.

1.2 Enhance the Hamilton collection with the purchase of additional maps, air photos, spatial data and satellite imagery. Cost out key collections and propose as one-time purchases or donor opportunities.

1.6 Propose and cost out a series of projects to digitize rare maps deemed to be of significant research use. Budget for contract staff and/or students as appropriate.

1.7 Continue to develop, refine and communicate a clear strategy for map digitization and ensure that the plan if fully integrated with the Library's larger digitization efforts. What materials will be digitized and by whom? How will work be funded? How will the Library charge back for requests from users or the campus community? How will metadata be managed?   How does this work relate to the activities in the Digitization Lab?

1.8 Work with the GIS Lab to select and purchase LIDAR (light detection and ranging) data. Consider a section of the Hamilton downtown. Seek out grants and donations to fund purchase.

SERVICES

2.1 Start compiling reference statistics in the Library's new LibStats database. *(Note: Started in June 2012.)*

2.2 Revisit departmental hours to reflect usage patterns and maximize staff resources (in process).

2.3 Track Scholars GeoPortal statistics as a new indicator of use.

2.4 Continue to refine online instruction modules for large 1st year courses. Involve departmental staff in the revisions. Continue to use a train-the-trainer model to handle the hands-on components necessary for these large classes. Reserve face-to-face instruction for upper year courses or where more customized content is required.

2.5   Consider dis-aggregating some of the geography Blended Learning modules to facilitate general use. Put the modules where students can find them (YouTube, public website...)

2.6   Market the Scholars GeoPortal to the campus community.

2.7   Once the GIS position is filled, formulate a clear service policy indicating the kind and level of service to be offered.   (Teaching versus delivery? Appointment-based versus drop-in?)

2.8   Once the GIS position is filled, propose designing a series of "Introduction to GIS" courses for the general campus community. Collaborate with the GIS Lab on the offering as a means of promoting both services. Frame out the relationship with a written Memorandum of Understanding.

2.9   Conduct a survey of Geography faculty to determine a) what data sets are being used now; b) what are the top priorities for new data sets. Explore costing and ongoing support requirements. Explore donations or cost-sharing arrangements if necessary.

2.10 Establish the Lewis & Ruth Sherman Center for Digital Scholarship as the Library hub for data curation and archiving. Ensure that the Data Specialist is actively involved in these activities.

2.11 Work with Library & Learning Technologies to establish strategies for expediting software installs and upgrades

RELATIONSHIPS

3.1   Identify some opportunities for staff from Research Collections to meet with the Map Collection staff to discuss areas of mutual concern.

3.2   Pursue opportunities for staff from the Lewis & Ruth Sherman Centre for Digitization to meet with the Map Collection staff to discuss areas of mutual concern.

3.2   Consider the establishment of a small guest lecture series in partnership with SGES for 2012/13.

STAFFING

4.1   Hire a permanent Manager of the unit.

4.2   Consider incorporating "Maps, Data & GIS" into the name of the department.

4.3   Hire a GIS Technician as funding becomes available.   The position would require a BA or a BSc with specialization in GIS or more broadly, in Geomatics.   Use students until such a time as a continuing position is possible.

4.4   Develop a close relationship between the Maps/Data/GIS department and the new Postdoctoral Fellow focusing on data curation.

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