Abstract. US research libraries have run out of collection-growth space and moved materials to off-site storage facilities. Issues relating to the use of off-site storage facilities are examined, including operational considerations, decision-making and planning, selection criteria, implementation strategies, advantages and disadvantages, impacts on user services and measures taken to counteract them.

Keywords: Library Spaces, Off-site Storage

1. Introduction

In recent years, a new trend in library collection management has emerged, in which many research libraries, having run out of collection-growth space, have chosen to move significant portions of their collections to off-site storage facilities. In this paper, issues relating to the use of off-site storage facilities in academic libraries are examined, including operational considerations, decision making and planning, selection criteria, implementation strategies, advantages and disadvantages of off-site storage, impacts on user services, and measures taken to counteract them. The paper does not deal with physical or technical aspects of design and environmental planning for off-site storage, but rather focuses on issues of collection management, access and user services.

2. Definition and Background

Libraries store and maintain their collections in a number of different ways. For the purpose of this study, we use the term "off-site storage" to refer to "collections of more than 50,000 items housed in a facility away from the rest of the collection to which the materials belong". (Merrill-Oldham and Reed-Scott: page i).

How and why have libraries come to store their collections away from their main campus? In 1902, the idea of a secondary storage facility for Harvard University Library was proposed by William Eliot, then President of Harvard University. On the other hand, William Coolidge Lane, the Library Director at the time, proposed a cooperative repository to be operated by Harvard, the Massachusetts State Library, and others. These proposals were controversial at the time, and it was not until 40 years later that the New England Repository was opened as a cooperative research facility. (Block: page 185).

Another cooperative storage facility was the Midwest Interlibrary Center, which opened in Chicago in 1949, and later became the Center for Research Libraries. This was a cooperative shared-storage venture of 13 research libraries. (Block: page 186).

During the 1960s and 1970s, there was a boom in academic libraries, with ample funding and rapidly growing collections. (Paquette: page 3). From 1975 onward, librarians began to notice that this trend was creating a shortage of space in their libraries. At a 1975 library meeting in San Francisco, a panel discussion was held on the topic "Running out of Space: What are the Alternatives?" One of the alternatives raised at this meeting was the idea of off-site storage. (Boll 1980: page 7). Urban academic libraries have more specific problems relating to space and physical environment than academic libraries in general. As a result of the problems facing urban libraries, such as scarcity of land, capital costs of purchasing more urban land, overcrowding, security and land use restrictions, etc., managing space in these
urban settings poses complex challenges (Pearson and Rapp: p. 232). The space crunch of the 1980s led to a new trend in major academic libraries, with the emergence of high-density off-site storage facilities, such as the Harvard Depository Library in 1986. For the urban libraries, these off-site storage facilities have typically been located beyond the city in suburban regions with less expensive land and greater flexibility for construction, zoning and land-use. Of course, the farther away the storage facility is from the user, the more challenging it is to get the materials quickly back to the users who need them.

3. Rationale, Goals and Strategies of Off-site Storage

These days, there are many popular misconceptions about electronic information, most notably the myth that printed books (or even libraries!) are no longer needed and will shortly cease to exist. But the reality is that, in spite of the availability of vast and increasing quantities of electronic information in many formats, books and printed materials have not lost their place in scholarly communication and in academic libraries. There are many reasons for this, which have nothing to do with the supposed "generation gap" or the "old fashionedness" of senior researchers and their research habits. The fact is that much of the world's intellectual output is still being produced only in analog form, and its research use is not frequent enough to make a commercial digital conversion or republication commercially viable.

Much has been written on the persistence of print in research libraries and on the necessity of preserving it and keeping it accessible to scholars. This topic, however, will not be treated further here. It is sufficient for purposes of this paper to point out that electronic information, in itself, has not provided a solution to the library space crunch. "Remote storage provides a compelling solution", says Dan Hazen (page 176).

The main reasons for research libraries to send their books for off-site storage are: to make the most cost-effective use of limited space, to make sure they can continue to add new books and journals while preserving older or less-used collections and keeping them easily accessible when needed, and to repurpose some of the space in the library for new uses according to changing trends in how library patrons do their work. Examples of the latter include reader space and study rooms, group study and research spaces, instructional spaces, consultation and reference spaces, zones for providing new library services (such as digital humanities research needs, digitization on demand, statistical and data research support, etc.), multimedia viewing spaces, spaces with infrastructure and equipment for working with new information technologies, etc.

"As a research library, we are adding collections; if we have to add more books, we need to get space for them. Unless we move the less used books elsewhere to a cost-effective, controlled-environment off-site storage facility, we cannot acquire the books that our users want as we do not have space to put them" says Michael Stoller, Director of Collections and Services, Bobst Library, New York University (personal interview). "People understand that we need to make room for new collections" says Robert Wolven, Associate University Librarian for Bibliographic Services and Collection Development at Columbia University Libraries, "and that's a key -- that we're still building our collections". The bigger the collection, the greater the amount of storage it's going to need, on campus or off. (Howard).

In planning for off-site storage facilities, the goal is to create a cost-effective, high-density facility, serving preservation needs and providing effective user services, while also resolving the space-crunch problem. For example, the mission statement for the Harvard Depository library states, "The mission of the Harvard Depository is to support the University's commitment to housing library and archive collections and administrative records in an efficient, secure, environmentally sound space: and to provide access to those materials through timely and reliable retrieval systems" (Merrill-Oldham and Reed-Scott: p. 77). Likewise, the goals of the University of Texas Austin Library Storage facility (formerly referred to as "the Library Storage Warehouse") are, "...for planned remote storage of permanent, important, but little used library materials, including archives and records, from the general Libraries of The University of Texas at Austin. The Warehouse was designed and constructed to provide high density shelving for library materials, an excellent environment for preserving materials, and an inventory and retrieval system for easy and sure access to materials for library users". [Merrill-Oldham and Reed-Scott: page 44].
In seeking "quality academic library space", two major areas of consideration are user space and material storage space, in addition to space for staff, display areas, special access for the disabled, etc. But there is no single space solution for best storage of materials. According to Miller (p. 1-2), all libraries must address the need for maintaining most convenient access to traditional materials.

According to Cohen (page 15), three elements vital for effective planning of useful library space are function (goals and services to support the goals), content (collections of materials), and behavior (interactions between staff, users and content). He fears that the library building might become just a storage facility, where service elements get sidelined due to conflicts between content and function when collections increase enormously. Cohen (page 15) also feels that removing content to off-campus storage, in many cases, actually helps provide better access to the content that remains on campus in the library. This can be seen particularly in the case of open-stacks libraries with vastly overcrowded shelves, books frequently misplaced or shoved into corners (where they can never be found), and books piled onto temporary shelves or rolling book-trucks because there is no room to re-shelve them after use in their proper sequence in the stacks. (David Magier, personal interview). And it can be taken for granted that removing lesser used books to closed-stacks off-site storage facilities will decrease their likelihood of getting misplaced.

4. Shared Repositories and cooperative storage

Shared and cooperative off-site storage projects, where a common space for storing their off-site materials is shared by partnering institutions, have been taken up by various research libraries in the US. Examples include RECAP (a high-density storage facility in New Jersey shared by Princeton University, Columbia University, and New York Public Library), a facility shared by the Texas A&M University and the University of Texas-Austin, and another high-density storage facility shared by Kansas State University and University of Kansas.

The reasoning behind having a shared repository can range from simple economy of scale and cost savings on the construction and operation of the shared facility, to an integrated vision of sharing the remotely stored-collections themselves. The complexity of providing appropriate bibliographic access and timely delivery of the materials to the users multiplies dramatically with the number of participating institutions in the shared collection model. On the other hand, the potential benefits, from access to broader collections of materials, and the economics of coordinated collection development, can make this approach attractive. Princeton University, Columbia University and New York Public Library are currently exploring the feasibility of transitioning their ReCAP facility from a shared off-site facility to a shared-collection model. (David Magier, personal interview).

After examining the challenges in implementing the “resource in common model” of the Texas A&M University Library and the University of Texas-Austin Libraries, a case-study of this implementation found that “increased communication” and “early participation in the decision-making stages” are crucial. (VanDuinkerken: page 65).

Kansas State University leases space at the Library Annex, an off-site storage facility owned and operated by the University of Kansas. The challenges involved in maintaining access to remotely stored materials for resource sharing and document delivery purposes, and the variables affecting access in a cooperative storage model are discussed in an article by staff members of the Interlibrary Services Unit at Kansas State University. They stressed that the effective functionality of a document delivery system and interlibrary loan operation is an essential factor in determining the impact on library users and success in meeting the library's service goals. (Bailey and Radnor: p. 232)

5. Operational Considerations

There are many operational issues to be considered once the decision has been made to implement offsite storage, such as whether it is to be a permanent or temporary arrangement, new construction vs renovation of existing facilities, single-institution or cooperative storage facility (and, if cooperative, how the costs and governance responsibilities are to be divided, as well as ownership in last-copy retention agreements), and issues of security, environmental control (temperature, humidity and lighting), disaster preparedness planning, specialized storage for non-print material, position of offsite storage operations in the overall library budget, etc. (Stockton: page 60; Merrill-Oldham and Reed-Scott: page 4). In this section, the focus is on the operational issues relating to selection, and access and user services.
A library must decide which materials to move to off-site storage. In this kind of selection process, various complexities arise:

- How to create or implement a clear-cut selection policy?
- Who does the selection? (Bibliographer, subject specialist or faculty?)
- Format of material to be relegated? (Print, microform, maps, recordings, etc.)
- General collection materials vs rare/special collections?
- Basic criteria for selection of material? (E.g. level of usage vs date of last usage; cut off date for serials, etc.)

The overall issue of usage as a selection criterion has been addressed by Boll (1985) as follows:

"Since a large percentage of an academic library's resources receive no use, since resources tend to be less used with age, and since past circulation is a reliable indicator of likely future use, the librarian can relegate with confidence a high percentage (25% to 45%) of an academic library's resources while causing delayed retrieval for a very small percentage of requests (1%, 2%, 3%)."

Once selection has been made, a number of collections-management questions must be resolved: shelving of books at the off-site facility (by size, by title, or by call number?), policies regarding shelving of duplicate copies (Stockton: p. 66-67), inventory control systems (e.g. Barcoding), and integration versus separation of inventory control systems as part of the library management system. (Merrill-Oldham and Reed-Scott: p. 9-10).

Access and user services comprise another important aspect to be considered in the management and handling of materials for off-site storage. An effective access and retrieval policy should state clearly the procedures for request, retrieval and delivery, as well as modes of discovery, bibliographic and physical access. If there is provision for transferring material back to the main campus (i.e. reversing an initial offset selection decision), attention should be paid to devising an off-site deaccession policy that would state the circumstances under which materials can be relocated back to campus stacks (e.g. for usage by faculty for research, and for frequent use by others), and specifying the necessary changes to be made in inventory control and bibliographic records. (Merrill-Oldham and Reed-Scott: page 10).

6. Selection in Practice

A few details are given here about the processes of selection adopted by various research libraries that use off-site storage facilities. At George Washington University Library, an academic library which is a part of the WRLC (Washington Research Library Consortium), bibliographers used to do a title-by-title selection of material for off-site storage from among those that had not circulated for the preceding 10 years. This turned out to be very time consuming and has been discontinued. (Alexander: p. 129). At Johns Hopkins University, importance was given to the removal of material that would have "the least impact" on users and selectors (Alexander: page 130).

Regarding the faculty role in the selection of material for off-site storage, George Washington University Libraries resorted to a public relations campaign to recruit faculty involvement. Although the removal of journal runs from campus met with some resistance, the library administration made it clear that there is simply no more stack space on the main campus to shelve recently purchased materials, and the faculty were placated with promises of efficient services such as document delivery of copies of articles. (Alexander: p. 129). At New York University, according to Michael Stoller (personal interview), bibliographers "keep their ears to the ground" to closely monitor and understand faculty needs. For selecting journals, this led them to select only indexed journals for off-site, since the article - level discovery and paging is facilitated by the existing indexes. At Johns Hopkins University, faculty members were allowed to select a few titles as exceptions to the general relegation policies, as a trade off for transferring the others (Alexander: page 130). At Columbia University, where offsite storage facilities have been in use for many years, faculty resistance
to off-site storage was diminishing, as faculty members discussed their personal access experiences with their colleagues. (Kendrick: personal interview).

As a measure to promote building trust and to make library operations more transparent to users, there are instances where patrons are involved in the process of choosing the materials to be sent off-site and are encouraged to work closely with their librarians in this task. An example of this is where the librarians at the Stephen Chan Library of the Institute of Fine Arts, New York University directly engaged their primary users in this endeavor. (Lucker, pages 295-286).

Off-site deaccession policies (whereby materials are relocated back to campus from off-site storage) can play an important role in affecting faculty attitudes. Since decisions on what to transfer to off-site are often essentially based on educated predictions about lower levels of future usage, a policy that can reverse those decisions in specific cases where the predictions did not pan out can go a long way to restoring faith in the library among its users. An example would be the policies adopted by the UCSRLF (University of California Southern Regional Library Facility), a shared facility which serves five campuses of the University of California system. Flexibility is applied at UCSRLF in the sense that they withdraw from the off-site facility any item recalled back to campus by the depositing library or by an individual collection development officer. (Hickey). Libraries can monitor how often given types of materials (by subject, narrow call number ranges, journal runs, or even specific items) are paged back to campus by users, and they have the ability to establish usage thresholds above which the item can be permanently relocated back to campus. The policy operates on the assumption that the academic interests change over time and there is a possibility for "honest mistakes." This approach makes the task of getting faculty to accept and use off-site storage facilities easier. (Alexander: page 130).

7. Advantages and Disadvantages of Off-site Storage

A range of specific library advantages of off-site storage has been identified in the literature on this topic. This includes preservation, since preservation-oriented environmental controls are easier to maintain at high-density closed-stacks off-site storage facilities than at open stacks used by patrons on campus. Despite this clear advantage,

"Preservation librarians face both practical and fundamental challenges when moving preservation operations from the main library to an off-campus location. Practical issues include transporting materials and staff safely and securely between facilities, hiring and retaining student employees, and communicating effectively between geographically dispersed library units. Fundamental concerns include how to continue providing high-quality services and maintain productivity in the remote location". [Martyniak: page 183]

Other advantages usually mentioned are cost effectiveness (since the unit cost of maintaining books at off-site storage, where they are only infrequently handled or moved, can be much less than on campus), efficient use of space (since removing little-used materials from campus stacks allows the latter to be more efficiently organized and operated), and the freeing up of additional space on campus which can be allocated for other important uses. Kendrick (personal interview) points to the dramatic renovation of Columbia University's Butler Library – with its more efficient and broader range of uses of space – as a clear example of the value of freeing up campus library space by utilizing off-site storage.

On the other hand, there are many disadvantages as well. The idea of off-site storage itself can reduce users' motivation to make use of the valuable materials stored there. (Pacquette: p. 5). Sometimes, under urgent pressure to create more space on the overcrowded main campus, libraries are forced to implement their off-site storage facilities very rapidly, and these short-term priorities can conflict with the overall mission of the library, leading to a sacrifice of appropriate bibliographic access to the off-site collection. (Stockton: p. 60).

Bibliographic access to off-site collections can be a general problem, especially with regard to browsability. For monographs, as long as they are cataloged, basic bibliographic access can be provided, but off-site storage can make it
much more difficult to browse a collection. To the extent that users rely on the ability to browse among physically adjacent materials to find what they need, off-site storage puts them at a disadvantage by making browsing impossible. Likewise, for serials not represented in full-text databases and which are not included in indexing and abstracting services, article-level bibliographic access is a general problem, which is usually addressed by patrons physically browsing the tables of contents. But when such serials are removed to off-site storage, access to articles is seriously hampered. On the other hand, with regard to the often-cited need for browsing, Pacquette (page 15) agrees with Boll (1980) that for large research collections, browsing is often not very valuable for research anyway, and she points out that removing low-use items can itself render campus collections more browsable. Many open-stack library users are familiar with the experience of browsing a collection, and consider the loss of browsability as a drawback. This is why programmers and library discovery systems designers have been developing innovative capabilities to replicate that experience through "virtual browsing" (Lynema, Lown and Woodbury).

8. Strategies for Reducing the Impact of Off-site-Storage Disadvantages

The disadvantages cited above have been evident to the librarians and administrators involved in planning for off-site storage facilities, and they have been seeking measures to reduce their impact on users and library operations. According to the 1999 Yale University Library Shelving Facility website, off-site storage facilities must

"Accommodate future collection growth as cost effectively as possible, provide sound environmental conditions for collections, provide excellent online bibliographic access to all of the library collection, and maintain browsable shelving on campus of the most frequently-used parts of the collections".

To counteract the disadvantages that result from loss of direct physical browsing, additional efforts are being made to provide enhanced bibliographic access in various ways. Some libraries (e.g. Yale) have determined that only materials that have been fully cataloged in their OPACs (Online Public Access Catalogs) may be removed to off-site storage. (Yale University Library Shelving Facility: website). Some OPAC systems allow a type of "online browsing" in which adjacent call numbered items are displayed, so that one can find other books on similar topics to the one that has been searched. Library instructional programs for assisting users in enhancing their abilities to locate materials can also alleviate some of their problems. A further trade-off for browsability is efficient delivery service. For example, at Princeton University, patrons can request 24-hour electronic document delivery of articles and book chapters from the ReCAP facility. (ReCAP website; ReCAP PowerPoint presentation).

9. What Else needs to be done?

To expand means of "online browsability", several measures can be taken. For monographs and edited volumes, full analytic data (including full table of contents information) should be included in the bibliographic record itself. For unindexed serials at off-site storage, some members of the ReCAP consortium have begun preliminary explorations in creating their own low-cost table-of-contents database. This is being accomplished through simple scanning of tables of contents, and mounting the page images in a website browsable by serial title. (David Magier, personal interview). For newspapers and special collections, good detailed finding aids should be devised before. Digital technologies can also be used to add searchable title pages, tables of contents and keywords to bibliographic databases. (Hazen: page 182). As an example of how this kind of data can be deployed to improve discovery and retrieval, see this record for a Korean language journal from Columbia University's OPAC:

http://clio.cul.columbia.edu:7018/vwebv/holdingsInfo?bibId=4803953

And the "Table of Contents" link it contains:

http://www.columbia.edu/cgi-bin/cul/toc.pl?4803953

By delivering "user-centered" services that are fast, reliable, economical, sustainable, convenient and accurate, libraries can partially 'compensate' users for the inconvenience caused by off-site shelving. (Nitecki and Kendrick: p. 2).
Options to improve delivery services to make offsite storage more palatable to users would include technologies for expediting delivery, such as transmitting text directly to the user's computer. To the extent that it is possible to treat the off-site facility as a kind of branch library, rather than an inaccessible warehouse, it will improve the users' attitude. (Seeds: p. 108). In particular, faculty and students should not get the impression that the collections and materials they care about are being "banished" or "exiled". Given the pristine, enhanced the preservation environment typical of such closed-stacks facilities, and their much tighter inventory control to prevent the loss, theft or misplacement of materials, thoughtful library patrons can be helped to understand that the materials selected for off-site are actually more "privileged", getting the real "red carpet treatment" (David Magier, personal interview).

10. Conclusion

It should be expected that research libraries will make more and more use of off-site storage arrangements as time goes on. In order to counteract the accumulation of disadvantages and negative politics that would result, libraries will become more and more creative in finding new solutions and technological approaches to improve bibliographic access, integrated discovery, browsability and delivery services. It can also be expected that as libraries gain more experience with off-site storage, and learn from earlier ventures, such as the Harvard Depository Library (which, in its inception, had no earlier model to work from [Kendrick: personal interview]), they will become better at engaging all components of the university community in the development of the concepts, planning and implementation, right from the beginning of the process. In this regard, publicity will be a growing consideration, not only to reduce resistance to the idea of off-site storage, but also to promote efficient usage, and active patron involvement.

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