
The scholarly communication crisis has been a chronic problem affecting libraries and publishing for the last quarter century. The current transition into a new information age presents a new set of concerns with the proliferation of electronic resources. Digital preservation, or the archiving of electronic resources for preservation and access, is an issue that must be resolved to ensure the retention of human heritage in perpetuity.

This paper explores the potential role of consortia in digital preservation. An overview of the status of digital preservation precedes an examination of the consortial licensing landscape. A case study of the Triangle Research Libraries Network (TRLN), a consortium beginning to address digital preservation concerns, license agreements explores the presence, content, and provisions of archival statements. Based on the results and current digital preservation environment, this paper concludes with a proposed method for a successful consortial digital preservation project.

Headings:

Cooperation – College and university libraries

Cooperation – Research libraries

Electronic data archives – Conservation and restoration

Electronic journal archives – Conservation and restoration

Triangle Research Libraries Network
DIGITAL PRESERVATION AND ACADEMIC LIBRARY CONSORTIA:
A CASE STUDY OF THE
TRIANGLE RESEARCH LIBRARIES NETWORK CONSORTIAL LICENSES

by
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Approved by

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INTRODUCTION

The rise of the availability, use, and popularity of electronic resources over the past two decades has affected dramatic changes in access to information. Electronic resources (ERs), which include both electronic journals and electronic indexes and databases, have become an integral part of a library’s collection as have traditional monographs and print serials. Younger (2002) asserts that ERs have taken over in importance to research collections. In fact, as new generations of users enter colleges and universities, the level of expectation regarding the availability and options for electronic information increases.

Archiving of digital information resources is the elephant in the middle of the room for libraries and information professionals for several reasons: First, libraries have only been handling electronic resources on a large scale for less than a decade. Second, the discussion surrounding electronic resources has focused on the licensing and other legal aspects of digital information. Third, the quandary of retaining the integrity of electronic resources over the long term is yet to be resolved. Lastly, libraries have traditionally been trusted custodians of information and the record of humanity, and in the current online environment, libraries do not own information, they merely pay for access to it. As the current period of transition from print to a predominantly electronic environment progresses, the need for a solution to this problem becomes increasingly evident.
A plethora of librarians, publishers, and other information professionals are researching preservation issues surrounding ERs including access to and preservation of electronic resources. Libraries eagerly anticipate some resolution so that the debate whether or not to cease print subscriptions in favor of their electronic counterparts can be put to rest. Resolutions for other questions of pricing, immediate access, document delivery, and interlibrary loan – all central to the mission of university libraries – have been addressed by standard clauses appearing regularly in electronic resource licenses. However, standards for archiving or perpetual access clauses are among the last to appear consistently in licenses, yet digital preservation is one of the most important issues facing libraries.

As libraries strive to provide a broad, in-depth collection of ERs within their restricted budgets, several strategies for dealing with the unresolved status of digital archives have emerged. Two strategies have particular relevance to this paper and will be discussed in more detail below: First, the reallocation of budget monies as a result of the scholarly communication crisis; and second, the increased participation in library consortia as a way of pooling resources, mitigating expenses, and exceeding user expectations.

**Scholarly Communication Crisis Strategy**

The combination of increasing journal prices and static or decreasing library budgets has affected the scholarly information crisis over the last quarter century. Because access to current and past research is paramount, preservation of online content of these journals presents another hurdle for libraries to overcome. In academic libraries,
expanding information needs were the impetus for change. Research published in peer-reviewed, scholarly journals is the most important form of scholarly communication and serves to propel disciplines further through global dissemination of research to peers. University faculty have broadened their scope of research to subjects of worldwide interest. Because journal publications serve as a symbol of peer acceptance and as a permanent record of results through the archiving of print journals by libraries, faculty insist that the most current and reputable information be available at their own institutions for use in personal research as well as for their students’ needs.

With the proliferation of new journals in many disciplines, university libraries employed a new strategy to meet information needs and to respond to the need for immediate access to a diversified core collection by reallocating collection budgets. To compensate, libraries cut monograph budgets. Meanwhile, scholarly journal pricing increased by 13.5% annually beginning in the 1980s (Mezaros, 2002). Even with the sacrifice of the monographic budget, however, total library acquisition budgets did not match the pace of rising journal costs.

For publishers, costs increased as research proliferated. A simple examination of journal runs spanning twenty to thirty years reveals an enlargement of volumes, both in number of issues and number of pages, as time passes. Also, new journals were created for new areas of specialization. The advent of the internet and the World Wide Web also affected pricing models. During the 1990s journal aggregators, publishers, and vendors began offering electronic access to their journals at even higher prices than the print subscription alone. As libraries began to offer electronic access to patrons, the transition
to electronic resources catapulted libraries out of the realm of copyright law and into that of contract law.

Contracts are binding agreements for both the licensor and the licensee and require some degree of legal expertise to comprehend and negotiate. Now, operating under the provisions of the contract has taken precedence for academic libraries, rather than educating patrons on fair use and restrictions of copyright. The scholarly information crisis expanded from the print to the digital world.

With both publishers and libraries still experimenting in the short-term with business models that enable users to access resources, many issues remain to be dealt with on a daily basis. Shrinking or stable library budgets meant that costs could not be met. So, similar to solutions used with print resources, libraries have reallocated budgets to accommodate varying pricing models of electronic resources. Gerhard (2003) reports that according to the Association of Research Libraries (ARL) annual statistics, member libraries have spent an increasing percentage of their collection budget on serials and electronic resources over the past decade: Expenditures of budgets for online content rose from 3.6% in 1992-93 to 12.9% in 1999-2000 (Gerhard, 2003). Another approach has been to cancel print subscriptions to journals and retain only the electronic version, a tenuous solution at best due to the unresolved quandary of long-term access and preservation of digital information.

**Consortium Strategy**

The consortium strategy has meant that such drastic responses to the scholarly communication crisis have not been inevitable. Libraries of all types have banded
together in consortia to support increasingly diverse patronage without starving their collections. Different types of consortia offer different benefits for their members. In a study of 125 academic library consortia with their nascence in the 1960s, Kopp (1998) identifies four types of academic library consortia: (1) large consortia whose purpose is to distribute computer processing of information; (2) small consortia whose purpose is to enhance public service and alleviate daily operational issues; (3) consortia developed to address a specific problem or serve a particular purpose; and (4) consortia developed to address interlibrary loan or reference processes.

These four types still exist, albeit with contemporary technological issues. One benefit all share is the ability to wield buying power to expand collections and resources for each member library’s patrons. While many consortia formed in response to the scholarly communication crisis, other consortia such as the Triangle Research Libraries Network (TRLN) were founded on other principles and have repurposed their goals to remain relevant in changing environments.

TRLN is composed of three research universities and one historically black institution in North Carolina. From its inception, the consortium has been a vehicle to promote cooperation and the sharing of resources among campuses. In their article on the history of TRLN, Dominguez and Swindler (1993) enumerate the reasons for collaboration such as the need to pool funds, resources, and expand collections to promote research for faculty. They also chronicle the history of this collaboration, its mistakes and triumphs through trial-and-error in collaborative collection methods. TRLN still adheres to the collaborative methods, especially in the realm of electronic resources.
The consortium has adopted the practice of licensing ERs on behalf of its members, when their goals align.

**Consortia, Electronic Resources, and the Scholarly Communication Crisis**

The most recent development in the scholarly information crisis, electronic resources, has facilitated the progression of focus from copyright to contract law. When negotiating with publishers and vendors, a small consortium similar to TRLN struggles with licensing issues for ERs while attempting to simultaneously meet the needs of its members. Examples of such issues include the definition of authorized users, access to resources via a proxy server versus login and password, and the definition of a site to account for noncontiguous campuses. Many of the issues arise because “rights and restrictions covered in license agreements are in direct conflict with traditional library process and procedures” (Davis, 1997, p. 19). For instance, one of the most persistent research library concerns is the archiving of electronic resources for access and use in perpetuity.

Questions, discussions, and proposed solutions to the problem of long-term preservation of digital information or archiving abound. The purpose of this paper is to examine the role of consortia in preserving digital information. Mark Rowse (2003) concludes that consortia “composed of libraries of similar type and purpose” will negotiate the most successful licenses in the future (p. 10). The presence of clauses addressing preservation or perpetual access issues in consortial licenses – archival statements – is an essential first step for consortia toward addressing the digital preservation problem.
The study will specifically address potential consortial effects on retaining digital information achieved through licensing. This paper asks: (1) What steps are taken by consortia or member libraries to ensure access to electronic resources in perpetuity? (2) What happens to material if a license is not renewed for any reason? (3) What stipulations, if any, exist that address the access to or ownership of the information that remains available to libraries after a license agreement is terminated? (4) Does a standard exist for archival statements among consortial licenses? The remainder of this study is composed of two parts. The first is an examination of the state of research in digital preservation, and the second is a study evaluating the role consortia can play in the future of digital preservation.
LITERATURE REVIEW

Part I: Digital Preservation

Archiving of digital information addresses both preservation and access. Preservation of digital information is the retention of the electronic information, while access to digital information is the ability to retrieve, comprehend, and use digital resources. A tension between the two aims exists because as technology changes, software becomes extinct and hardware is replaced. Consequently, resources must be migrated, or transformed, into data readable by new technology. Each time a resource is altered, the newer version strays farther from the original, thereby confounding preservation efforts. The converse is true for preservation’s effects on access. As time passes, technology, hardware, and software change, and access to original work is compromised. Although the term digital preservation connotes the preservation aspect of archiving, for the purposes of this study, the term is used to describe both the preservation of the resource and the preservation of access to the resource.

The following overview is a report on the current status of digital preservation. Issues surrounding the ability to preserve digital resources, including cost and legal ramifications will be addressed. Additionally, a survey of national and international strategies either in process or being developed will conclude the section.

Preservation Concerns
What are the issues associated with preservation of digital materials? To begin, digital preservation requires active management and continuous vigilance to retain digital objects and their meaning (Lynch, 2003; Poynder, 2003, Russell, 2002). Unlike traditional preservation methods employed in libraries and archives, records for electronic objects must be maintained continually due to rapid changes in the current digital environment. Deanna Marcum and Amy Friedlander (2003) assert that “archiving must be considered at the time the material is created rather than at the end of the distribution chain,” which is opposite of the traditional book and paper preservation practice in which preservation is considered only after the material has been acquired for access (Why Digital is Different section, para. 3).

With the advent of the Internet and desktop publishing phenomena, more material is being produced. And as individuals who were once patrons of the library now create and publish their own material, libraries are faced with another issue in archiving digital information not only from traditional publishers but from individuals as well.

In general, the creator of digital resources is neither concerned nor invested in long-term preservation of their materials initially (see, for example, Smith, 2003). Further, Lynch (2003) goes on to describe libraries as a secondary market for digital information with little control over the creation, proliferation, and accessibility of digital resources. As a result, the onus falls on libraries, publishers, and other scholarly communication entities to resolve tension and document humanity in a manner that serves both posterity and scholarship.

Jeff Rothenberg, a prominent researcher in digital preservation, outlines other guiding factors involved in digital preservation activities: first, the resource should be
able to be copied perfectly; second, individuals should have access to materials without respect to geographic location; third, information should be machine-readable; and fourth, the process should preserve the unique functionality of the original item (Teper & Kraemer, 2002). With these factors – a lack of knowledge of preservation issues and the resource-intensive, proactive nature of digital preservation – libraries and information professionals face a difficult task.

**What, Who, and Whose Wallet?**

The three most important questions in digital preservation are: What should be preserved? Who should accept responsibility for preservation? Who should pay for it? Selecting which resources that will record human history requires an evaluation extending from the practices associated with archiving print resources. Bearman (1996) simply states that “we will continue to dispose of well over 95% of all records and 99% of information in any intelligent system of archiving,” in an archivist’s response to the Final Report of the Task Force on Archiving of Digital Information (p. 150). Moreover, Anderson (2003) discusses how art professionals define “which…works [are] most deserving of perpetuation” (p. 164). In both cases, a selection process is performed on collections to assess the hallmarks of culture meriting preservation. Mitigation of cost and responsibility through careful identification of resources to be preserved could perhaps be an outcome of a digital preservation initiative. But, who would be accountable for the task?

Responsibility for archiving of electronic information, similar to other aspects of any project, is assigned based on perspective. Morris (2000), Secretary-General of a
society publisher, and Zellmer (2003), an academic librarian, believe that libraries and archivists should accept responsibility, while Hunter (Thomas, Ingoldsby, Hunter, & Smith, 2003), vice president of a major publisher, believes that both publishers and libraries should bear the responsibility in a relationship mediated by trust. Hunter continues to suggest that libraries focus on archiving the wealth of information that publishers are not archiving, including institutional repositories and the like (Hunter, 2000). Terrio (2002) cautions however, “should we [librarians] expect them [publishers] to maintain their archives, even when it compromises their motives for profit?” (p. 36). Many libraries share Terrio’s reluctance. So much so that Hunter (Thomas et al., 2003) addressed those concerns in a panel discussion in which she assured those present of her company’s sincere desire to preserve their products for the sake of knowledge.

Libraries and publishers must work together to overcome the digital preservation problem. Exploiting their traditional strengths to maximize efforts (i.e. library and archival preservation practices and publishers’ assembling and dissemination of current research) and compensating for disadvantages by utilizing trusted third parties to preserve selected materials is the most acceptable solution. In this manner, expertise is concentrated and the information community remains intimately involved in current trends.

Two additional suggestions for digital preservation responsibilities include the government or national library (Poynder, 2003) and a trusted third party or custodian (Fleischhauer, 2003; McKay, 1999). In any case, the responsible party must have the unwavering support of its governing organization for any digital preservation project to
succeed (Stephens & Wallace, 2003). Financial resources, in particular, are integral to success.

The price for a typical digital preservation project, if such a thing exists at this time, has not been explicitly stated. In fact, Hunter (Thomas et al., 2003) simply states that digital preservation will be “expensive.” Who, then, should be responsible for paying? Poynder (2003) and Morris (2000) feel that the government should provide funding. Hunter, on the other hand, feels that the major stakeholders in digital preservation, both publishers and libraries, should share costs. Currently, various third parties such as the National Science Foundation (NSF) and the Andrew Mellon Foundation are supporting digital preservation initiatives to investigate associated costs. However, these third party funds could be reallocated to other pressing research concerns. For the long term, a combination of publishers and libraries, the predominant stakeholders in digital preservation, should find a way to shoulder the costs. In addition to these three questions, factors of hardware and software, legislation, and costs of digital preservation are yet to be resolved.

**Hardware and Software Issues**

Achieving marked improvement in standards is made more difficult by the rate at which technology is changing. A basic question that could seemingly be answered quickly is: On what media is information stored? Woods (2002) offers three criteria that a media must meet before it can be utilized in digital preservation: (1) Does the medium protect the original document? (2) Does the medium have integrity so that the digital resource cannot be altered or modified? and (3) Is the medium easily accessible? Implicit
in the answer to those questions is the assumption that both intellectual property and the software and hardware used to access the resource be preserved. Thomas (2002), writing specifically about social sciences data, proposes preserving the intellectual content only, and developing software to read and access the data separately. Even though his solution would remove many variables from the preservation equation, the idea is not applicable globally (e.g. interactive media resources). The array of media available for use in preservation offers options for various institutions.

Stephens and Wallace (2003) define two important aspects of any medium, life expectancy and media stability, as follows: The life expectancy of a medium is the minimum length of time that information is predicted to be retrievable. Media stability is the ability of various records media to retain their information content in usable form over a given period of time. Table 1 shows the life expectancy and stability of different types of media.

<table>
<thead>
<tr>
<th>Media</th>
<th>Type</th>
<th>Life Expectancy (yrs)</th>
<th>Stability</th>
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<tbody>
<tr>
<td>Paper</td>
<td>ANSI/NISO Permanent</td>
<td>200-300</td>
<td>Good</td>
</tr>
<tr>
<td>Microforms</td>
<td>Microfilm</td>
<td>500</td>
<td>Best</td>
</tr>
<tr>
<td></td>
<td>Microfiche</td>
<td>100</td>
<td>Good</td>
</tr>
<tr>
<td>Optical Media</td>
<td>WORM (write once, read many)</td>
<td>25</td>
<td>Poor</td>
</tr>
<tr>
<td></td>
<td>CD-R</td>
<td>100</td>
<td>Good</td>
</tr>
<tr>
<td></td>
<td>CD-ROM</td>
<td>25</td>
<td>Poor</td>
</tr>
<tr>
<td>Magnetic Media</td>
<td>Magnetic Diskettes</td>
<td>5</td>
<td>Poor</td>
</tr>
<tr>
<td></td>
<td>Magnetic Tapes</td>
<td>10-20</td>
<td>Poor</td>
</tr>
</tbody>
</table>

*adapted from Stephens and Wallace (2003)

Advantages and disadvantages exist for each media type. Marcum and Friedlander (2003) accurately state that the preservation of new media is even more
problematic than preservation of earlier ones, as evidenced by Table 1. So, the exchange of newer, easier to use media equals a loss in both the durability and longevity of resources. Additionally, the type of data being preserved on any media adds an element of evaluation. For example, magnetic tapes are the “predominant storage media for the retention of inactive computer data,” though they are only expected to last 10-20 years (Stephens & Wallace, 2003, p. 67). The durability of media also affects other aspects of digital preservation because, according to Stephens and Wallace (2003), “software required to read [nondurable media] is even less durable than the media on which the records have been recorded” (p. 65).

Software issues present more problems than hardware concerns. Dukart (2002) explores the most promising electronic formats for digital resources, eXtensible Markup Language (XML) and Portable Document Format (PDF). Both formats offer advantages and disadvantages; however, the United States Government Printing Office’s adoption of the PDF format for its electronic documents has fostered the notion that PDF is a safe middle ground for digital preservation projects (Teper & Kraemer, 2002). Neither of these options, however, is immune to technological obsolescence. Terrio (2002) supports research into non-proprietary formats because licenses do not allow for access to the hardware or software needed to represent data, which could leave libraries with raw data and no system to search and retrieve data, even though publishers may provide archival copies of leased information. On the other end of the continuum of software solutions, DSpace at MIT “maintains a list of supported formats that are to be kept available and readable for the future” (Falk, 2003, p. 376). The adoption of either non-proprietary
formats or simply saving the intellectual content of a resource is a strategy various methodologies employ to resolve digital preservation problems.

**Digital Preservation Methods**

Many methods for preserving digital materials have been proposed to combat the approaching disintegration of information. Although each method approaches the problem from a distinct viewpoint, two themes reverberate throughout each scheme. The first is that archival methods should be reassessed periodically (i.e. at 5 year intervals). The second is that preservation metadata should be utilized to supply the maximum amount of information possible (i.e. provenance, hardware and software requirements, origin, authenticity, etc.). Table 2 lists current archival methods under research or in practice, as well as their strengths and limitations.

Examination of the methods proposed uncovers another divide in the theories of digital preservation: Whether or not the aim is to preserve the content or the object (Morris, 2000). Change media, migration, mirroring, and emulation are concerned primarily with the preservation of the content of a digital resource, opting to keep the content accessible on current media, while technology preservation involves retention of the entire object and means to access. The plethora of archival theories is analogous to a reference librarian fulfilling a patron’s request without conducting the reference interview. Though the answer found may be sufficient, complementing the search with relevant context would, in theory, elicit the optimal information best suited to the information need. Rothenberg (1999) and Woods (2002) concur and propose a strategy
composed of complementary methods to resolve the unknowns in archiving online content.

### Table 2: Digital Preservation Methods

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
<th>Strengths</th>
<th>Limitations</th>
</tr>
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<tbody>
<tr>
<td>Change Media</td>
<td>Create hard copy of digital resource</td>
<td>Nullifies integrity concerns; long life expectancy</td>
<td>Does not accurately capture all ERs (i.e. interactive media)</td>
</tr>
<tr>
<td>Emulation or Encapsulation</td>
<td>Use preservation metadata to detail hardware and software requirements of preserved data</td>
<td>Do not lose original functionality because future technology “mimics” old technology</td>
<td>Thousands of software applications are on the market with limited hardware options</td>
</tr>
<tr>
<td>Migration or Refreshing</td>
<td>Transfer preserved resources to new generation technology</td>
<td>Most common practice, nullifies life expectancy concerns</td>
<td>Should undergo process every 5 years; lose some information during every migration</td>
</tr>
<tr>
<td>Mirroring or Redundancy</td>
<td>Keep an exact copy of an archive in geographically diverse locations</td>
<td>Can be used to back-up large databases</td>
<td>Maintenance costs</td>
</tr>
<tr>
<td>Technology Preservation</td>
<td>Preserving hardware and software used to create and access information (i.e. reel-to-reel film and eight-track tape machines)</td>
<td>May preserve data only and be assured to have the ability to read it</td>
<td>Costs and ability to maintain old technology decreases as rate of technological advances increases</td>
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**Legal Issues**

Aside from the technological challenges facing digital preservation as a viable practice, legal issues associated with archiving of electronic information also present obstacles. The following overview of legislation affecting the ability to archive digital resources will illustrate the issues libraries and other information institutions are combating in order to preserve a record of humanity. The continuing debate surrounding
copyright, current legislation in the United States, and an uncertain future are all addressed.

One of the foremost pieces of legislation barring libraries from actively archiving digital resources, especially electronic journals, is copyright. Even though libraries are treading the waters of contract law, copyright of materials still prohibits retaining copies for long-term preservation. Russell (2002) insists that the permission to access and accessibility of material are separate issues. Moreover, Studwell and Ghetu (2003) state that long-term preservation requires a combination of content, copyright, and metadata. A need for clear and concise laws exists because “the most fundamental problem facing [libraries] is the ability to obtain digital materials together with the sufficient legal rights to be able to preserve these materials and make them available to the public over the long term” (Lynch, 2003, p. 153). Unfortunately for libraries, several other laws have been passed that further complicate the situation.

The Sonny Bono Copyright Extension Act is named for its action and extends copyright terms. Due to the nature of electronic resources, technological obsolescence may have rendered resources unavailable, unusable, or irretrievable by the time copyright ends if they are not actively preserved, making the act disastrous for digital preservation efforts. Additionally, libraries are required to gain explicit permission from the rights-holder for preservation resulting in more responsibility and activity than libraries are used to and staffed for.

The Uniform Computer Information Transaction Act (UCITA) is another legal development that affects the active long-term retention of copyrighted digital materials. Lynch (2003) describes the act as one that has taken steps to “legitimize pay-per-view
access and licensing frameworks” (p. 153). According to the American Library Association (ALA), however, the frameworks proposed, namely non-negotiable, “shrink-wrap” or “click-through” licenses, are unfavorable to libraries (for further discussion, please see Tuttle, 1996 and ALA’s ”UCITA 101”, 2004). The act has only been adopted as law in two states since its introduction in 1999 and, in the twelve additional states in which the legislation was introduced, the act was not ratified.

The Digital Millennium Copyright Act (DMCA), unlike UCITA and the Copyright Extension Act, has advantages and disadvantages for libraries. Although the act contains an anti-circumvention clause keeping libraries from acting to preserve without explicit permission from rights-holder, up to three copies of eligible resources can be made for preservation and loans to other libraries (Muir, 2003). The authors of DMCA, which was incorporated into the existing copyright law in 1998, attempted to address the tension between copyright holders and those desiring to preserve their copyrighted information through updating current preservation provisions that allow resources whose technology is outdated to be preserved.

Even though the DMCA has flaws as ALA (2004) describes, the act takes steps to fill the lacunae with effective, concise laws addressing copyright and preservation such as what quantity of material will be eligible for preservation under the DMCA? In its seminal report on the status of digital preservation, the Task Force on Archiving of Digital Information (1996) called for legislation to allow for “rescuing” materials deemed worthy of preservation in spite of copyright legislation (Bearman, 1996, p.152). Some agree (i.e. Marcum, 1996), and others do not (i.e. Bearman, 1996). Hollaar (2002) argues that libraries, while correct in their opposition to DMCA and other copyright legislation,
should have spent more time “working to improve [the DMCA] with provisions that would… at least limit the problems that they perceived” (p. 226). UCITA and DMCA are steps along the path envisioned; however, the quandary persists. Rather than fight to oppose legislation, libraries may be better served to heed Hollaar’s words and work through education and collaboration with lawmakers for a compromise while simultaneously lobbying for better legislation.

Opinions on the future of digital preservation are optimistic. Ann Okerson (1999), Associate University Librarian at Yale University, asserts that in 2010, copyright “will simply cease to be the key issue” (p. 35). Fleischhauer (2003) believes that custodians should be bound legally to preserve information. Lynch (2003) says that “preservation is essential and … the appropriate permissions simply must be put in place to make it happen” (p. 156). Finally, some countries require published materials to be deposited in a repository (e.g. France and Sweden’s mandate that all web pages produced from within their respective country be archived). Whether through legislation or sheer necessity, long-term retention of digital resources will be resolved. In the short-term, however, the solution appears to be in sight, but out of reach.

Cost

The price of digital preservation initiatives is high and the sole issue pertaining to digital preservation on which all parties agree. Though many authors refrain or are unable to list specific costs, Shelby Sanett (2002) says that while predicting costs of digital preservation in perpetuity is difficult, those of storing and accessing electronic information are higher than those of traditional information. Several variables affect the
cost of digital preservation. Jack Scott, a member of AIIM’s Emerging Technology Advisory Group, argues that price and service level will depend on what a record is, how often the record is needed, the level of business interruption an institution can endure, level of performance, security, and amount of bandwidth (Duhon, 2002). Taking each factor into account, both Zellmer (2003) and Sanett (2002) express the need for a framework for developing cost estimates for digital preservation.

Sanett (2002) examined business models to develop a cost-benefit analysis for archiving online content. She scolds the information community for putting the cart before the horse when looking for technological solutions without first examining policy and cost analysis. Sanett suggests using tree analysis, which “combines decision points with probabilities and costs to produce better information,” and cost-benefit analysis, which “measures the relationship between anticipation returns and losses and the anticipated return on investment” (p. 401). The adage “better late than never” seems appropriate for libraries when renegotiating ER licenses, when libraries have the opportunity to thoroughly research prices associated with digital preservation before signing a new contract (Rowse, 2003). While legislation and technologies are in transition and research projects are funded externally, perhaps libraries could use the period to evaluate different pricing strategies.

**Current Research in Electronic Resource Preservation**

As a pervasive, costly problem, strategies for archiving electronic resources are in development in several arenas. Yale University and Elsevier Science, a major publisher of science, technology, and medicine titles, are partnering to create the Yale Electronic
Archive, which specifically aims to preserve Elsevier’s 1200+ titles. The Mellon Foundation and the NSF are supporting research initiatives as well. As each project begins, a solution becomes more lucid. Current strategies can be classified into four areas: institutional repositories and preprint archives, distributed systems, national and international initiatives, and those that are not geographically bound.

Institutional repositories and preprint archives are generally subject-specific collections. Peters (2002) believes that the role institutions of higher education and consortia in digital preservation should be to become digital repositories that provide authority control and cover a range of disciplines. For example, eScholarship is a pre-publication repository for University of California faculty (Falk, 2003). OhioLINK, a consortium composed of Ohio public colleges and universities, is “taking steps toward becoming a full-service digital [repository]” through “self-archiving information from aggregated databases of journal articles to electronic theses and dissertations from member libraries” (Peters, 2002, p. 415). However, two arguments against consortial and institutional repositories exist: first, some users are looking for subject information and do not know or care to know the author’s institution (see Hitchcock, 2003, for an example of the abundance of subject-specific archives); and second, a consortium’s member libraries are reluctant to surrender institutional proprietary information (Peters, 2002).

Distributed systems for digital preservation are one solution to institutional repository problems. Messerschmitt (2003) says that “there will be direct scientific returns for centralized and well organized repositories, as opposed to a proliferation of project-based repositories” such as those outlined in Hitchcock (2003) or a multitude of
university archives. Messerschmitt then goes on to outline a three-pronged approach in which libraries are the content curators of digital information, a role they have occupied for centuries. The first aspect calls for discipline-specific centers to house data. Second, those same centers would develop standards and policies to access the stored data (i.e. organization of repositories, metadata standards, etc.). The third aspect is to utilize universities and libraries to serve as gateways for searching the separate, discipline-specific centers (Messerschmitt, 2003).

Clifford Lynch (2003), Director of the Coalition of Networked Information, offers a slightly different opinion on distributed systems. He envisions a federated system of institutional archives, which are the keepers of short- and long-term scholarly information, rather than using third-party systems that Messerschmitt (2003) may employ. Deanna Marcum describes the ideal system “under which commercial, nonprofit and government agencies will work in collaboration with the Library of Congress, research libraries, archives, museums, and other institutions” (Younger, 2002). In all cases, collaboration across many different types of institutions not only distributes the effort, but also creates partnerships, educates those outside the information profession, and creates a platform for dialogue for further advances and cooperation.

In the United States, national initiatives have come from both the nation’s premier library and from institutions capitalizing on open archives. The former initiative is the National Digital Information Infrastructure and Preservation Program (NDIIPP) which is the Library of Congress’s digital preservation plan. The primary goal for the plan is to develop “a nationwide collection and preservation strategy for digital materials in cooperation with the information and technology industry, concerned federal agencies,
libraries, research institutions, and not-for-profit entities” (Fineberg, 75). The second initiative, LOCKSS, or Lots of Copies Keeps Stuff Safe, is a project at Stanford University in which institutions preserve bits of digital information themselves, access the bits, and create and maintain the ability to translate the bits. For example, institutions use software that keeps copies of the content of electronic serials on distributed sites, monitors those sites, and makes repairs if any of the files are damaged or removed (Day, 2003). So, if one copy is accessed and the authority or integrity is in question, the damaged file is compared to another intact file and any reconciliations of content are made.

International digital preservation initiatives are also prevalent. The National Library of Australia’s plan is Preserving Access to Digital Information. The Joint Information Systems Committee (JISC) Preservation Strategy is the United Kingdom’s action plan. A third example is the InterPARES project, or International Research on Permanent Authentic Records in Electronic Systems, which addresses the retention of the integrity of digital resources (Muir, 2003; Stephens & Wallace, 2003; Studwell & Ghetu, 2003). Please see Muir (2003) and Studwell & Ghetu (2003) for further discussion of international preservation initiatives.

Digital preservation projects that are geographically unbound include the Internet Archive, Digital Information Archiving System (DIAS), the HDROM and HD-Rosetta products and the Universal Virtual Computer. The first two are software solutions to the digital preservation problem and require creators to deposit their digital resources. The HD-ROM and HD-Rosetta products as described by Stephens & Wallace (2003) and Hedstrom (1998) use a computer to write microscopically on tiny chips. As a result, no
computer is needed to decode and interpret information. With the aid of a powerful microscope, humans may read the information. Finally, the Universal Virtual Computer or UVC is a proposed solution in which a copy of everything produced digitally would be sent to it and stored. These and other strategies for digital preservation are the result of many groups working separately to achieve the same goal.

As illustrated above, numerous factors affect the ability to successfully preserve digital information. In order to retain electronic resources in perpetuity, optimal hardware, software, and strategies should be employed. Currently, the solutions available have some desirable features. Perhaps the combination of encapsulation and technological preservation is the best strategy. Or maybe migrating information from one medium to another is the best method because the least amount of information is lost. Throughout the transition into the digital age, the long term remains uncertain. Mistakes will be made and information lost in addition to that already irretrievable or on the verge of loss. While institutional repositories are becoming popular, a typical end-user could not possibly know where the best information to suit their needs may reside. In addition, the sheer number of colleges and universities makes the problem even more daunting. Why not utilize consortia? Although they are not the panacea, most libraries are members of at least one consortium and could therefore be involved in joint digital preservation activities, whereas many could be left behind if each institution self-archived its own materials. Could the foundation for a distributed system be laid in consortia?
Part II: Consortia and Electronic Resources

Consortia have been evolving rapidly in conjunction with the rise in popularity of electronic resources. Libraries are aligning themselves with consortia, geographically and otherwise, in an effort to distribute the resources and expertise required for negotiation with aggregators, publishers, and vendors of online content. In fact, in 1997 the Consortium of Consortia (now the International Coalition of Library Consortia or ICOLC) met for the first time to address issues facing consortia in the electronic resources arena (ICOLC, 2003). Similar to the challenges faced in preserving digital information, consortia must overcome numerous obstacles as they seek to satiate escalating expectations regarding electronic resources. The following discussion explores the issues related to consortial licensing, how consortia make decisions, and what effects consortia may have on preservation of ERs.

Consortial Licensing

Libraries that want to provide the most information available for their users and publishers/vendors that would like to remain profitable desire to negotiate the best agreement for electronic information. To this end, Rowse (2003) asserts that “librarians and publishers alike think it highly unlikely that things will remain as they are and that consortia [sic] licenses will experience adaptation and development at the next stage of renewal” (p. 8). During the first concentrated phase of consortial licensing, consortia sought out and used their collective bargaining power to negotiate the Big Deal or a one-size-fits-all model license for electronic information. ALA, identifying a dearth of resources for libraries negotiating licenses, retained the services of John Cox and
Associates for a meeting at the 1999 annual conference to develop model licenses (Rogers, 1999). The resulting model licenses will be discussed in further detail later in the paper.

Libraries have learned valuable lessons from Big Deal licenses. As more money is spent on maintaining a core collection of information, library collections have become homogenized and lost many of their unique collection strengths. Wolf and Bloss (1998) deplore this trend and declare that libraries should be “a repository of selected information driven by a defined intellectual goal or even vision” rather than a series of duplicated core collections (p. 212). As the next round of licensing unfolds, consortia will be looking for different models to better address their individual members’ missions and support their collection strengths.

The whole-list approach is another frequent model for licensing and gives online access to all print journals held in the consortia member libraries (Rowse, 2003). While this approach maintains uniqueness in print collections, online access to information is still the same across member institutions. As consortia begin new iterations of renegotiating their license terms, long-term preservation and archiving concerns are deliberated, in addition to collection development goals, because the initial contracts did not automatically award archiving rights to libraries and other subscribing institutions (Anderson, 2002).

Russell (2002) and Muir (2003) both echo concerns among librarians, preservationists, and archivists that future licenses must address long-term archiving issues. While Okerson (1996) believes that “it is not thinkable that a library would invest significant funds in resources whose existence it cannot assure well beyond the licensing
period” (p. 69), Hunter (2000) asserts that that licensing’s effects on archiving will continue to diminish as the problem of long-term access becomes more apparent to the general community (p. 64). For-profit publishers and vendors protecting their products through restricted access and not addressing archival concerns will lead many to believe that suppliers of electronic information have a purely economic interest in their products. On the other hand, Karen Hunter (Thomas et al., 2003) and Morris (2000) believe that publishers should be responsible for archiving their material for the long-term. Although Hunter and Morris both agree that publishers should undertake the daunting task of preserving their electronic content, the issue of price remains a contested topic.

**Pricing**

For both publishers and libraries, price is the most important factor in digital preservation strategies and options. The pricing of electronic content licenses varies widely. Similar to the double-digit percentage rise in annual serial prices, the cost of leasing digital information is outpacing the increase in serials budgets for libraries. As a result of the “quirky pricing of electronic packages,” libraries have turned to consortial agreements to consolidate resources and combat rising costs (Doyle-Wilch & Tracy, 2000). Tom Sanville (1999), however, warned against libraries joining consortia to reduce costs because he believes that “licensing is a tool to better use costs,” rather than reduce them (p. 122). Marisa Scigliano (2002) conducted a cost-benefit analysis to evaluate data on consortial purchases. She found that from 2001 to 2002, the Ontario Council of University Libraries (OCUL) saved 0.03% or CA$8.70 to move from a two-thirds print, one-third electronic model, to full online access for all 14 member
institutions. In addition, patrons also saved time and their needs were met. In this instance, while costs were reduced by an almost imperceptible amount, funds were more effectively used to benefit all members of the OCUL consortium.

Cost-allocation models (the amount each member library will pay for a particular resource) allow member libraries to distribute the price of information based on mutually-agreed upon standards. For instance, one pricing model of electronic licenses is based on print holdings, which includes base price for a print subscription and electronic access. Another type uses characteristics of users, which could be based on number of students and faculty in the database subject area, total count of users, number of participating institutions, and/or the number of campuses of institutions (Anglada & Comellas, 2002). Anglada and Comellas go on to assert that the lack of new purchasing agreements is slowing the growth of new consortial agreements.

Limitations of publishers also affect the availability of pricing models. One of the most alarming changes in the arena of electronic resources is that the traditional roles of both libraries and publishers have been absorbed by publishers. The library’s status as a repository of information has been usurped. Yet, publishers are still grappling with the change. As libraries embrace the new options electronic resources offer, publishers struggle to maintain the same level of service. For example, Eales & Wise (2002) reported that at the third European ICOLC meeting in 2002, librarians expressed their desire for electronic-only pricing models that would allow for cooperative archiving. However, as research progresses in digital preservation, accurate costs remain elusive. Therefore, publishers find it difficult to articulate baseline costs and other factors that make the electronic-only model a challenge.
Advantages and Disadvantages

Advantages and disadvantages exist for both libraries and vendors when consortia negotiate licenses. Each library must weigh these pros and cons before entering into a consortial arrangement. Moreover, publishers and vendors (Providers) must also decide on the most advantageous route for selling their products.

Advantages to consortial licensing for libraries include leveraging buying power to reduce the costs of electronic resources. Wolf and Bloss (1998) comment that research libraries cannot be self-sufficient and provide the amount of information available and desired by all users. Through consortia, libraries can provide access to a broader body of resources that are ordinarily unavailable. Consortia may also remind publishers of the need for varied pricing and economic models for different institutions within the consortium. For instance, SOLINET, the Southeastern Libraries Network, tailors licenses for the different types of libraries it represents (Baker, 2000). Lastly, through consortia, libraries can exert a certain amount of control over inflation because of the characteristic longer term agreements consortia negotiate.

The cost of negotiating licenses for Providers is reduced when dealing with consortia because there is only one contact or licensing team for the entire consortium. With the benefit of one contact, Providers achieve greater stability because the contracts are thoroughly studied and agreed upon. Borin (2000) notes that publishers and vendors receive greater leverage in pushing for “the need for stable archiving and for retaining the principles of fair use within the electronic environment” when negotiating with consortia (p. 42). Secondarily, publishers and vendors enjoy an increase in downloaded articles which in turn gives authors more exposure, which then increases the value of their
publications. Finally, consortial agreements are more likely to increase Providers’ revenue over the sum of separate licenses for each member library.

Disadvantages of consortial licensing for libraries include problems with member libraries not paying their allotted portion of the cost. Providers cause tension for consortia when they offer libraries outside of consortia a lower price than the consortia member libraries, thereby causing libraries to refrain from joining local or national consortia (Lindley, 2003). The Turkish National Site License initiative is facing this problem because of publishers offering lower prices to would-be members (Lindley, 2003). Within consortia several issues arise from their prevalence – the first being overlapping licenses operating under multiconsortial agreements. In large consortia, libraries may focus on smaller regional goals before those of the larger group and expect consortia to respond to those goals (Genoni, 2001).

Machovec (2000) enumerates two other challenges facing consortia: multiconsortial license surcharges that could total $100,000 or more and impractical thresholds publishers establish through negotiating with consortia that are not feasible for individual institutions. A final disadvantage to consortia not mentioned in the literature is that no solution to the problem of archiving of online content exists. As the problem of digital preservation becomes more lucid to the general population, libraries and other cultural heritage institutions will be expected to operate in their traditional roles and preserve elements of human history. With abundant research projects, might libraries desire to self-archive materials instead of pooling efforts and working through consortia?

Decision-Making in Consortia
A consortium’s goals and objectives guide the organizations’ actions and programs. According to Stevens (1994), Huxley (2000), and Muelen (2003) agreement on specific goals and objectives from each stakeholder is essential to a successful consortium. From its inception, TRLN was based on collaboration to expand the resources available to member libraries’ faculty, staff, and students (Dominguez & Swindler, 1993). Norton (1995), writing about a government consortium, and Schwartz and Levin (1990), who were writing about general group decision-making, concur that decisions made within a consortium facilitates actions. TRLN began to experience this in the late 1980’s and early 1990’s when the consortium instituted committees of librarians from each member library to develop and implement policy.

Long-term vision, goals, programming, and objectives will not lead to a successful partnership without the full participation of members. Complete integration of a consortium’s goals into each member library’s mission is integral to the survival of the partnership (TRLN, 2004; Stevens, 1994). Additionally, “making and maintaining long-term consortium commitments in a competitive environment can be difficult,” especially when dealing with issues of tenure and promotion among faculty and national library rankings (Stevens, 1994, p. 122). To effectively embody a role in digital preservation and create a distributed network of archives, consortia will have to collectively agree and align objectives for the common good. Is that feasible?

How can consortia affect archiving of digital information?

Peters (2002) has described OhioLINK’s methods for assisting in digital preservation through archiving articles downloaded from aggregator services and
electronic theses and dissertations from member institutions. Is there a more thorough method for the systematic preservation of electronic journals and other resources?

Various local, regional, national, and international groups have developed model licenses for electronic information in response to the electronic archiving crisis. In the United States, the LibLicense database at Yale University and the model licenses developed at the 1999 American Library Association conference are resources available for use. Though many negotiated contracts do not address perpetual archiving of digital information, each of the national and international model licenses researched emphasizes the importance of an archiving or perpetual access clause (Borin, 2000; Carpenter, 2001; Genoni, 2001; Lindley, 2003; Phelan, 2001; Wise, 2001). Even though all agree on the need for a clause, one of the most pervasive problems of electronic archiving is illustrated: no agreement exists on who should bear the responsibility of archiving.

The PA/JISC (Publisher’s Association/Joint Information Systems Committee) model license from the United Kingdom recommends “publishers should undertake to provide continued access by one means or another after termination” for journals at the very least, while Morris (2000) posits that “it is reasonable to ask publishers to ensure that someone carries out the archiving if they are not doing it themselves” (pp. 66-67). Anderson (2002) calls for a national strategy. Until then, “due to the uncertainties of perpetual archiving and its accessibility if the agreement is not renewed, many consortia still prefer the ‘print plus electronic’ option” (Anglada & Comellas, 2002, p. 230).

access or a publisher-supplied copy of licensed material upon termination of the license (Academic Consortium License, 2004). The standard license offered on the LibLicense database not only includes a clause that grants libraries the right to make an archival copy, but also includes a perpetual access clause that grants access to licensed materials in an equivalent manner that material was accessed under the terms of the license. These are only two examples of standard statements that address the same issues differently.

If a standard archival statement exists within a consortium’s electronic licenses, then the preservation process may be facilitated. The North East Research Libraries (NERL) consortium has specifically developed licensing principles and guidelines as a whole that address problems with both digital preservation and consortial licensing. NERL’s interpretation of preservation and access is composed of two parts: an archival or backup copy clause which enables libraries to retain a complete copy of online content during the term of agreement and a perpetual license clause which provides continuous access to licensed materials (NERL Generic License, 2001). In this manner LibLicense and NERL agree, while the www.licensingmodels.com clause – which was written from a publisher’s perspective – is not as specific about rights and form.

Though all three model license examples attempt to help standardize archival access, an admittedly difficult issue, the clauses may not go far enough to enable a consortium to commence a digital preservation project. What are some of the specific barriers to digital archiving for small consortia beginning to consider a possible role in the preservation process? To investigate, this paper will examine the status of archival clauses within TRLN’s ERs licenses on the basis of presence, content, and stipulations of archival statements.
METHOD

The presence and content of archival statements in electronic resources licenses are essential to any role consortia may play in digital preservation. Additionally, stipulations on use and access – or provisions – of a license directly affect the ability of consortia to play a role in digital preservation, including specification of the number of simultaneous users or amount of material available for use. This paper examines the Triangle Research Libraries Network (TRLN) licenses as a case study.

Manifest content analysis, an unobtrusive research model that objectively examines the content of texts for specific themes or concepts, will be employed to execute the analysis. Each electronic license from the consortium will be reviewed for the presence of an archival statement. If one is found, it will then be transcribed for further analysis. The examination should reveal whether or not trends are extant or becoming standardized in archival statements of a consortium’s electronic resource licenses.

Challenges

Several challenges exist in the examination of archival statements. A primary challenge of investigating license contracts is access to the information. Additionally, locating an archival statement within a license may or may not be difficult, as evidenced by the assortment of model licenses available for reference. A third challenge to analysis could be the interpretation and comparison of archival clauses. For example, much of the
literature discussing ER licenses asserts the disparity between publishers and other vendors in their licensing and pricing models. As a result, librarians such as Trisha Davis (1998) and attorneys such as Lesley Harris (2002) have written guides to negotiating licenses for librarians.

As a part of a research project for the Electronic Resources Committee of the consortium, I was given access to the consortial licenses and worked closely with a Serials and Electronic Resources Librarian (SERL) from one of TRLN’s member libraries to overcome the first challenge. Some licenses have associated non-disclosure agreements. Therefore, all licensors will be identified as Provider A, Provider B, etc. to maintain confidentiality. The review of licenses for archival statements should result in a comfort with the general arrangement and terminology used throughout the document. This familiarity will assist in combating the second challenge. The third obstacle, comprehension and comparison, will be addressed ad hoc during analysis of each license. If the language utilized seems incomprehensible in any way, the author will consult the SERL for further assistance.

**Sample**

The licenses in this study comprise a quota sample, in which the unit of analysis is the archival statement in ERs licenses. All of the consortium’s ERs licenses (n=20), as identified by the SERL, will be examined in the study. Additionally, the licenses all covered the fiscal year 2002-2003. All licenses are available in the member libraries’ acquisition departments. The TRLN licenses included electronic journals, aggregator databases, and publisher packages.
Operational Definitions

Specific definitions of terms used throughout this paper are as follows:

Archival Statement: Any sentence, paragraph, clause, or statement within a license that addresses access to leased information upon termination of license agreement.

Consortium License: Agreement negotiated and made between a group of libraries and a publisher/vendor/aggregator for access to digital information through a representative of the library group.

Content (of archival statements): Copy of data or continued access to licensed materials upon termination of license.

Licensee: The institution(s) to whom electronic materials are licensed.

Provider (or Licensor): Vendor, publisher, or other party that licenses ERs to libraries.

Provisions (of archival statements): The stipulations on the usage of, access to, and amount of ERs that licensees have upon termination of a license.

Termination (or Cancellation): The time at which an agreement between a consortium and publishers/vendors/aggregators ceases permanently.

Procedure

A checklist of items will be used to ensure a systematic evaluation of the consortium’s licenses. The checklist of questions was designed to assess every aspect of archival statements. Appearance of an archival statement is the first criterion licenses
must meet to help define a consortium’s role in digital preservation. The content of those statements that appear address the ability to access ERs. Provisions of ER licenses depend on factors such as the original amount of information licensed and the ownership of information. Answers to the following inquiries will be searched for and noted within each of the licenses:

Presence

1. Is there an archival statement?

   An archival statement may appear in differing forms among licenses. Also, nomenclature identifying archival statements varies. “Perpetual access,” “continual access,” and “archiving” are all headings that may appear to mark sections addressing digital preservation. If no archival statement appears, then the analysis of the license is complete. If an archival statement does appear, however, further evaluation of the statement will ensue.

Content

2. How will provider ensure access to the leased information?

   The norm for providing access to leased information has become either receiving a copy of data or providing continual access to data. The former enables libraries to preserve the ERs as they see fit, but the latter leaves the responsibility in the Provider’s arena. If the Provider is supplying a copy of the data, on what medium will it be given? In what format will data be supplied, if at all? Also, will the software used to access the information while the material was licensed be supplied?
If continual access to data is promised, a different set of questions is investigated. Continual access implies that libraries will remain outside the process of maintaining information for the long-term. First, what resources will be available for access? How will they be accessed? Who will host the server(s) and be responsible for maintenance of the data?

3. Will a fee be assessed for supplying data?

Charging fees (or not) for continual access or acquiring a copy of the licensed information presents a unique problem with several factors. One factor is that maintenance of ERs requires a heavy investment of time and resources. For that reason Hunter (2000), Messerchmidt (2003), Morris (2000), and Poynder (2003) all suggest that a third party or a combination of institutions should shoulder the cost.

Stipulations

4. Do any other stipulations exist surrounding access and use of licensed information?

The number of journal titles, citations, or other information available in each electronic index or database affects the amount of information available upon termination of a license agreement. Licensed backfiles to journals have a similar role. Ascertaining this information, without a listing of titles within or appended to the license agreement could be impossible.

Ownership of information is the crux of the problem of digital preservation. Does the archival statement provide libraries with their own copy of the licensed information? Are libraries able to use the ERs in any manner they wish? Or, are stipulations attached
limiting usage? Answers to these questions will depict the current state of one consortium’s archival statement practices. The illustration will also highlight the ability and feasibility of a small consortium to assume a place in the preservation of ERs for its partner institutions.

Analysis

The data gathered about archival statements of the consortium’s licenses should outline characteristics of the statements through a comparison of each license’s checklist. Will certain thematic elements extant in the clauses emerge upon evaluation?

Upon completion of the analysis, the data should provide a marker for the status of consortial licensing. If the data reveal any solidarity among archival statements, the next step could conceivably be to assess the archival clauses of regional consortia as a basis for cooperation. If the data reveal no general alignment, then perhaps further investigation of model licenses for consortia is warranted. A final, secondary assumption resulting from the analysis is whether or not Rowse (2003) is right in his assertion that consortia composed of similar libraries are the most viable consortial model, based on the provisions for digital preservation.
RESULTS

Table 3 provides an overview of the TRLN licensing landscape for fiscal year 2002-2003. Participation in a consortial license is denoted by an “X” in the column below the individual member. At least 3 of the 4 member libraries participated in the majority of licensing agreements. Results gleaned from exploration of the research questions are described below.

Table 3. Listing of the consortium’s ERs licenses for 2002-2003

<table>
<thead>
<tr>
<th>Provider</th>
<th>Member 1</th>
<th>Member 2</th>
<th>Member 3</th>
<th>Member 4</th>
<th>Archival Clause*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provider A</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Provider B</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
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<tr>
<td>Provider C</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
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<tr>
<td>Provider D</td>
<td>X</td>
<td></td>
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<td>X</td>
<td></td>
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<tr>
<td>Provider E</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
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<tr>
<td>Provider F</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>1</td>
<td></td>
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<tr>
<td>Provider G</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
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<tr>
<td>Provider H</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
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<tr>
<td>Provider I</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Provider J</td>
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<td>Provider K</td>
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<td>Provider L</td>
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<tr>
<td>Provider M</td>
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<td>Provider P</td>
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<td>Provider Q</td>
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<td>Provider S</td>
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<td>X</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Provider T</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

*a “1” in this column indicates an archival or digital preservation statement present*
**Presence**

1. Is there an archival statement?

As illustrated in Table 3, 7 of the 20 (35%) consortial licenses have a statement or clause addressing archival issues. Of the seven, two licenses had full member participation. Initially, archival statements were anticipated to have headings such as “Perpetual Access,” “Continual Access,” and “Archiving” because of the heading the archival statement was listed under in the LibLicense standard agreement – *Perpetual License* (Standard License Agreement, 2001). However, upon analysis of licenses, archival statements were found under several different headings. They included “Agreement” (n=2), “Term and (Early) Termination” (n=2), “Archival Access” (n=1), “Delivery of Database” (n=1), and “Mutual Obligations” (n=1). A full transcription of each archival statement appears in the Appendix.

**Content**

2. How will the Provider ensure access to the licensed information?

Within the seven licenses that comprise the analyzable sample, diverse methods exist for providing continual access to information after termination abound. Access to information can be achieved through ownership or the ability to retrieve information. These two means are somewhat nebulous and the boundaries distinguishing them are not well defined. In fact, most of the archival statements allow for either giving the library a copy of the data or providing continual access with the decision to do either to be decided upon at termination.
Copy of Data

Table 4 gives the scope of the contents of archival statements in ER licenses. Five of 7 archival statements do provide the consortium with a copy of the data. However, only one Provider, Provider L, specified a format – tape or CD-ROM. That particular provider also elicits another issue associated with providing a copy of the data: whether or not the software necessary to search and retrieve the resources is provided. This is an issue because much of the software used is proprietary. While Provider L is the only provider that specified a format, 4 of the 5 promised to provide “electronic files” or the licensed information on an “electronic medium.” In all cases, the library would, in theory, have a copy of the licensed digital content in-house.

<table>
<thead>
<tr>
<th>Provider</th>
<th>Copy of Data?</th>
<th>Format</th>
<th>Medium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provider F</td>
<td>Yes</td>
<td>Electronic files</td>
<td></td>
</tr>
<tr>
<td>Provider L</td>
<td>Yes</td>
<td>Current software and licensed databases by tape or CD-ROM</td>
<td>Electronic files</td>
</tr>
<tr>
<td>Provider N</td>
<td>Yes</td>
<td></td>
<td>Electronic files</td>
</tr>
<tr>
<td>Provider O</td>
<td>Yes</td>
<td></td>
<td>Electronic files</td>
</tr>
<tr>
<td>Provider Q</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provider S</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provider T</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Continual Access

Table 5 identifies those providers that offer continual access to licensed material upon termination of the license agreement. Because Providers have taken on the traditional custodial role of libraries in these early years of the digital age, it also falls to the Provider to supply and maintain access to materials. As shown below, 6 of the 7 Providers stated that continual access to licensed resources will be given when a license
is cancelled. Of those 5, 4 providers explicitly stated that the Provider or some other third party will host the licensed information on a third party’s server. Interestingly, only 3 of the 6 providers, Provider S and Provider T, stated that they would involve the licensee in identification of a third party or medium. Deducing responsibility statements for maintenance of the information was difficult because 4 of the 6 responding Providers did not explicitly state who would maintain the information (i.e. updates, migration, etc.). Both Provider L and Provider S placed the responsibility of providing continual access on the licensee and a third party respectively.

Table 5. Information in clauses that provides continual access to licensed data

<table>
<thead>
<tr>
<th>Provider</th>
<th>Continual Access?</th>
<th>Explanation</th>
<th>Duration of Access</th>
<th>Maintenance Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provider F</td>
<td>Yes</td>
<td>Provider F or third party server(s)</td>
<td>Silent</td>
<td><em>Implied</em> Provider F or third party</td>
</tr>
<tr>
<td>Provider L</td>
<td>No</td>
<td>Licensee</td>
<td>silence</td>
<td>Licensee</td>
</tr>
<tr>
<td>Provider N</td>
<td>Yes</td>
<td>Provider N or third party server</td>
<td>4 years after termination of license</td>
<td><em>Implied</em> Provider N or third party</td>
</tr>
<tr>
<td>Provider O</td>
<td>Yes</td>
<td>Provider Q will archive all materials. If Provider Q goes out of business, archive will be transferred to a third party mutually acceptable to publisher and independent library board.</td>
<td>silence</td>
<td><em>Implied</em> Provider O</td>
</tr>
<tr>
<td>Provider Q</td>
<td>Yes</td>
<td>Provider S will help library find a third party and will provide data to third party for access via third party’s server</td>
<td>Silent</td>
<td>Third party</td>
</tr>
<tr>
<td>Provider T</td>
<td>Yes</td>
<td>electronic medium agreed to by both parties</td>
<td>Silent</td>
<td><em>Implied</em> Provider T</td>
</tr>
</tbody>
</table>

3. Will a fee be assessed for supplying data?

Providers O, Q, and S are the only two who mentioned a fee for providing access to information. Provider O states that a “cost based fee to be mutually agreed upon” will
be assessed. Provider Q references a “Content Fee” discussed earlier in the license agreement that is an annual charge. Provider S, the Provider who will assist the licensee in finding a third party to host the licensed information, states that the cost of access and content conversion are the responsibility of the licensee. All other Providers remained silent on this issue.

**Provisions**

4. Do any other stipulations surround the access and use of licensed information?

An unexpected aspect of continual access to the licensed electronic material was uncovered in the analysis (please refer to Table 5, column 4). Provider N addresses archiving concerns in two different clauses. In the first the licensor specified a finite amount of time that previously licensed information would be available to the licensee. Essentially, regardless of the length of time material is licensed, Provider N takes on continual access responsibilities for an additional four years. Afterwards, the method of preservation mirrors other statements and will either be continuing access from the provider or a third party, or electronic files supplied to the licensee. Further, three Providers offered one option for licensees: The former will provide the licensee with a copy of the data on a CD-ROM and states that the licensee is responsible for the maintenance of data; and the latter two Providers will maintain control over licensed materials and only provide continuing access to content. The remaining 6 Providers offer both options for digital preservation.
DISCUSSION

The purpose of this study was to ascertain what role consortia may play in digital preservation of ERs. The methodology attempted to examine current archival statements within TRLN licenses that provide access to licensed information in perpetuity and to ascertain what stipulations affect the usage or access to information after termination of consortial licenses. The paper additionally explored any areas of standardization that may exist in archival statements.

Counting the number of TRLN licenses that contained archival statements depicts the status of archival statements that ensure perpetual access to digital information. According to the analysis, only 35% of the agreements addressed preservation concerns. The percentage illustrates that archival issues are a concern for the consortium, but for some reason, whether on the Provider’s or library’s side, archival statements did not appear in a majority of cases. As with other issues in licensing, if both parties do not agree on an issue, any mention of the disputed topic may be removed from the contract in order to reach an agreement. That course of action is sometimes taken with nonessential elements, as determined by the licensee. Archival clauses can fall within this category due to the lack of a viable digital preservation strategy.

From the seven licenses with archival statements, Providers employed two different methods of providing licensed information after an agreement is terminated: A Provider could give licensees a copy of the data or enable perpetual access to ERs. Upon closer examination, the boundaries between these options are somewhat blurred. Four
Providers specified that “electronic files or medium” would be available to licensees, though only one Provider, Provider L, actually gives the licensee a hard copy of the information. The majority of Providers offered the option of either providing “electronic files or medium” to the licensee or continuing access to materials. The difference between supplying a copy of the data and simply allowing continuing access symbolizes the tension between libraries and publishers’ traditional roles. Even when information is no longer under contract, Providers still retain control over their online information. Licensees should therefore request the option to receive the electronic files in order to digitally preserve materials.

Any stipulations or usage restrictions on electronic resources once a contract is terminated were not explicitly addressed in the sample statements. Any usage or other access restrictions are of particular importance to Providers, such as Provider L, who may potentially deliver a hard copy of licensed information to licensees. Moreover, any provisions may affect consortial concerns as well. For instance, can information remaining after termination of a license in which most of the member libraries participated be available to patrons in all member libraries? Without specifically addressing these issues, effective preservation of digital materials could be harder to achieve.

Most Providers also remained silent on one other primary factor in digital preservation – cost. Provider O will work with a licensee to agree upon a fee, Provider Q will charge a set fee established in the license, and Provider S will place all financial responsibility on the institution, effectively removing itself from the preservation process.
Consortia cannot make informed decisions about preservation because price in addition to standards is one of the most important factors for digital initiatives.

Any standardization between the archival statements does not appear to be coordinated or intentional. Placement of clauses appeared under different headings in different licenses. Provider Q even created a separate addendum to the original license. The trends most uniform among Providers are the provision of continual access to licensed information or supplying a copy of the data. The lack of standards within the archival statements, coupled with the irregular appearance of archival or perpetual access clauses, presents a major challenge to the role of consortia in digital preservation.
CONCLUSION

Consortia are plausible entities to lead digital preservation efforts because of the organizational nature and proclivity for cooperation to address the needs of many rather than individual institutions (e.g. NERL). Academic library consortia in particular are uniquely positioned to shoulder this responsibility. While not libraries, they are trusted, not-for-profit third parties which survive on the collaborative efforts of member institutions and involve entities that the public holds responsible for preserving the human record. The infrastructure of consortia – small staff coordinating and facilitating efforts of individual libraries – allows for collective decision-making, as well as realistic assessment of capabilities. Further, consortia also represent an aggregation of libraries and may serve as the coordinating body for groups of libraries in a national effort to preserve the digital record of humanity (e.g. the Library of Congress’s NDIIPP).

The goal for consortia is to combine aspects of Lynch’s (2003) distributed system theory, Messerschmidt’s (2003) third party vision, and Peters’ (2002) work with OhioLINK to distribute cost and responsibility of digital preservation. With the federated system of repositories, another preservation method, mirroring, will result as a consequence of the number of consortia participating. Based on the analysis of consortial licenses in this study, to effectively begin the first steps toward shouldering digital preservation responsibilities, consortia must establish and maintain an iterative program based on six principles: commitment, course of action, collaboration, cost, consequences, and continuity.
Commitment on the part of member libraries is an essential first step for consortial efforts in digital preservation. To secure the commitment from member libraries to undertake the role, ideally a national plan such as the NDIIPP will be in place and poised to coordinate preservation efforts. Using consortia as a contact team for groups of academic libraries would enable more efficient distribution of information. Moreover, member libraries would need to endow consortia with a certain amount of authority in order to help consortia make decisions on what portion of the preservation plan is best suited for the organization.

Course of action planning is a preliminary and inaugural task for consortia considering a digital preservation project. In order to commit to a plan, a consortium needs to identify preliminary goals and objectives. For example, TRLN libraries support numerous area studies programs and may commit to preserving a subset of those materials as a part of the national preservation plan. Additionally, consortia would need to agree on standard archival statements within a license that would permit preservation, such as requesting that electronic files of licensed materials be supplied to the licensee upon termination of the license agreement.

Once TRLN is charged with the task and licenses are negotiated, a targeted plan of action is needed within the consortium regarding the preservation of materials after a license is terminated. An accurate depiction of licensed materials available within TRLN institutions is critical to begin the process. Next, evaluation criteria to identify and select certain resources should be established to prevent the warehousing of all information. Effective selection relies on the decline of whole-list licenses from large publishers in both use and popularity and an increase in a-la-carte licensing of ERs. In the past year,
the beginnings of a shift back toward selective licensing appeared as some consortia did not renew contracts with large science, technology, and medicine publishers.

A consortium should next consider judgments for digital preservation methods. What method works best for preservation and access? How long will the electronic resources remain useful? What types of electronic resources are being preserved (e.g. text files, interactive resources, etc.)? Will the project support varying proprietary platforms to search and retrieve information? A combination of migration of data and encapsulation enables the optimum retrieval with the least cost. Using migration strategies, information will always be available on latest generation technology. Coupled with encapsulation, new hardware and software can be developed to view information in its original format.

**Collaboration** to exploit strengths of different member libraries and allocate responsibilities is necessary to commence digital preservation activities. Using the latest research and experience of TRLN libraries and other institutions will assist in securing necessary resources needed. Staff roles within member libraries and consortia may need to be reclassified to help contribute to the preservation of electronic resources. Or, if funds are available, the consortium may hire new staff to specifically manage the digital preservation project. Ultimately, member libraries should contribute to the staffing of the project from their own employee base or provide resources to enable the consortium to hire additional employees. Acquiring technological resources for digital preservation may be achieved in the same manner as staff resources. However, while staffing is an enduring investment, technological investments would most likely require irregular support.
Cost is a critical factor in digital preservation. Through consortia, many costs could be distributed. Additionally economies of scale would also affect cost. Larger consortia, such as OhioLINK for instance, may have more resources to devote to digital preservation efforts than smaller organizations such as TRLN. Also distributing costs for staff throughout member institutions would prevent a minority of member libraries from providing the majority of the project’s support. Cost may be affected in another way if consortia begin to factor preservation costs into the total price of licensing agreements to balance budgets, which may or may not slow the negotiating process.

Consequences resulting from participation in a digital preservation project should be evaluated as much as possible in the planning stage. To prepare for digital preservation several questions should be addressed: What are the different, but equitable allocations of tasks and resources between the consortium and member libraries? What percentage of resources are member libraries willing to contribute? How large a project can the consortium support? How will the project affect other functions of the consortium?

For licensing, attempts to negotiate archival statements within every license may prolong an already slow process. A consortium must prioritize pending license agreements into those resources germane to the scope of the digital preservation project – and therefore require archival statements – and those that do not necessarily have to include an archival statement. Considering these questions and consciously making decisions will give consortia an additional vision and purpose for the future.

Continuity requires constant evaluation and is integral to lasting success of the digital preservation project. Periodic review of goals and objectives, processes, costs,
resources, and current research ensures an iterative, flexible project that assimilates and responds to change in member libraries and the digital preservation and consortial licensing environments. Because a digital preservation project necessitates targeted goals and adaptability to change, consortia composed of similar institutions with comparable goals may be better prepared to undertake the task. External factors such as funding and user populations and internal factors such as mission and service models are all possible causes of dissent, which could disrupt the solidarity needed to undertake successful archiving projects.

Utilizing a distributed system of consortia to assume responsibility for digital preservation has advantages and disadvantages. The advantages merge to produce a successful digital preservation program coordinated nationally to archive and provide access to digital information. As a result, storehouses of information remain in the realm of the government and libraries and other cultural heritage institutions, the traditional custodians of information, rather than in private, for-profit organizations. Another advantage is the distribution of cost and other resources across a nationwide network. Though libraries would share the cost, money is also a disadvantage of the consortial solution.

Libraries generally provide the majority of financial support for consortia of which they are members. The extra cost incurred from a digital preservation project would ultimately pass to individual libraries. As budgets remain the same or suffer from cuts, additional expenses may be a deterrent to participation. Another major hurdle for libraries is enlisting publishers to their plan. Without standard acceptance of archival statements that provide hard copies of information, preservation cannot effectively take
place. Enlisting publishers, in fact, may be the most substantial obstacle for a consortial
digital preservation project.

Disadvantages for the consortial model arise from the level of participation in
license agreements and copyright concerns. As illustrated in Table 3, a consortium’s
license participation may range from a few to all member libraries. After the online
content has been preserved, do those institutions that do not participate in a particular
license have access? Regarding copyright issues, do libraries own information once a
hard copy of electronic files is provided? If not, should consortia only archive those
materials from ERs licenses with full participation from members?

Limitations and Further Research

Limitations and challenges of this study stem from the sample size and limited
evaluation of one consortium over one fiscal year. Generalizing the presence, content,
and provisions of archival statements within the examined consortium’s licenses to other
consortia is difficult. While archival statements appeared in under half of the TRLN
licenses during the 2002-2003 fiscal year, the number could have fluctuated up or down
or remained the same before and after the sample year. A longitudinal study of the entire
licensing history or a sampling covering the temporal span of a consortium’s licenses will
elicit the trends in archival statements and provide a better foundation for evaluating the
feasibility of a consortial role in digital preservation.

The use of one consortium’s ERs licenses presents only one perspective on the
consortial licensing landscape. A study of a cross-section of consortial licenses would
also reveal the feasibility of a national preservation strategy and highlight the Providers
most receptive to compromise. Those Providers may participate in a pilot study for consortial efforts.

Further research may also supplement the evaluation of archival statements. Follow-up interviews with Providers regarding their language and intent would illustrate the true ramifications of archival statements. In what format will the copy of data arrive, if that option is available? If in a proprietary format, will a fee be charged for use? If the data arrives in a non-proprietary format, who decides what format to use? Will the Provider simply send the raw data with no search and retrieval function at all? That analysis may lead to a better composition of archival statements to which both parties can abide.

This study provided an overview of the problems associated with digital preservation and the status of consortial licensing. The examination of archival statements within the consortium’s ERs agreements revealed that in order to embody a role in digital preservation, a consortium must reach an understanding of how perpetual access will be achieved, create a plan of action to achieve it, and then write licensing language to guarantee legal implementation of the plan. Then the will and resources to make the standardized statements a necessary part of a license must exist. Once achieved, a consortium can follow the six principles outlined above to effectively establish and maintain a digital preservation project, a new role and purpose for the information age.
REFERENCES


## APPENDIX

<table>
<thead>
<tr>
<th>Provider</th>
<th>Archival Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provider F</td>
<td>On termination of the License, Provider F shall and Licensee may provide continuing access for Authorized Users to that part of the Licensed Material which was published or added to the License Material within the Subscription Period, either from Provider F’s server(s), or from a third party’s server, or by supplying electronic files to the Licensee. The terms governing access to his material shall be those in effect at the termination of the license.</td>
</tr>
<tr>
<td>Provider L</td>
<td>In the event either party chooses to cancel the Agreement, Licensor agrees to provide Licensee with the licensed Databases and the then current software by tape or CD-ROM.</td>
</tr>
</tbody>
</table>
| Provider N | Section 8.2: Upon termination of this Agreement because of expiration of the Subscription Year, Licensor shall provide continuing access to Licensee and its Authorized Users to that part of the Licensed Materials which was published within the Subscription Year(s) for four (4) further years, with continuing access in subsequent years to be arranged, either from the Licensor’s server, or through a third party, or by supplying electronic files to the Licensee, provided that Licensee continue to observe its obligations with respect to security and restrictions on usage by authorized users.  
Section 9.2: Upon termination of this Agreement for just cause, online access to the Licensed Materials by Licensee and Authorized Users shall be terminated. Licensor shall provide continuing access to Licensee and its Authorized Users to that part of the Licensed Material to which the Licensee was lawfully entitled until the breach occurred. Access will be provided either from the Licensor’s server, or through a third party, or by supplying electronic files to the Licensee, provided that Licensee continue to observe its obligations with respect to security and restrictions on usage by authorized users. |
| Provider O | After three years of continuous subscription, upon termination the Licensor will provide the Licensee access to the Licensed Materials published during the Term of this License, either by continuing online access to the same material on the Licensor’s server or in an archival copy in an electronic medium, at a cost based fee to be mutually agreed. |
| Provider Q | See document on next page |
| Provider S | On termination of this License, the Publisher shall, if so requested within 30 days of termination, provide the Licensee with assistance in obtaining continuing access for Authorised and Walk-in Users to that part of the Licensed Material which was published and paid for by the Licensee within the Subscription Period from a third party’s server provided that the third party shall be responsible for any content conversion from the format in which the Publisher provides the material. The Licensee will be responsible for any access fee due to the third party and for any fees associated with content conversion. |
| Provider T | Provider T will after termination of the License, provide the Licensee with access to the full text of the Licensed Electronic Journals listed in Appendix B and published during the Term of this License, either by continuing online access to the same material on Provider T’s server or in an archival copy in the electronic medium mutually agreed to by both parties. |
PROVIDER Q POLICY ON ELECTRONIC JOURNAL ARCHIVES
PROVIDED VIA THE SERVICE

NOTE: This policy applies only to journals published by Provider Q. Journals on the Service that are not published by Provider Q may have different terms and conditions.

**Basic Policy**

1. Provider Q (“PQ”) will maintain the digital archive of the journals it owns and makes available through the Service (“PQ Journals”).
2. It is PQ’s intention to maintain the digital files of PQ Journals in perpetuity, converting them as appropriate if the technology used for storage or access changes. The current format standards are SGML and PDF and most files are being retained in both formats.
3. PQ understands that the permanent availability of these archival files is of critical concern to its customers. Therefore, it makes the commitment that, in the unlikely event that neither it nor the Service can assume the responsibility for maintaining the archive, it will transfer the archive to one or more depositories mutually acceptable to PQ and an independent board of library advisors.
4. PQ publishes many journals owned by others (such as scientific societies). To the extent it has the right to do so, PQ will include these journals in the Service, and will maintain them in its digital archives in the same manner in which it maintains the PQ Journals. Should PQ cease to be the publisher for such a journal or cease to have electronic rights, it will use reasonable efforts to ensure that either the archives remain available through the Service or that their owner makes them available on the same access terms via a new host, PQ cannot guarantee the permanent availability of journals owned by others.
5. If PQ sells or otherwise transfers ownership of a PQ Journal to another publisher, it will use reasonable efforts to retain a non-exclusive copy of the digital archive for that title and make it available through the Service to existing Subscribers.
6. If PQ ceases publication of a PQ Journal, the digital archive will be maintained at PQ and be made available through the Service.

**Access Terms**

7. The Content Fee provides certain entitlements to the journal issues for that publication year (i.e., announced for that calendar year) for the subscribed titles. Under present policy, a Subscriber is also given (as a courtesy, not an entitlement) access to the archive of all available issues from previous unsubscribed years of the journals included in Subscribed Content. In all cases, the term “subscription” relates specifically to electronic, not paper, subscriptions.