

# PRISM

Software for Risk Assessment and Decision-making in Libraries

Barclay W. Ogden  
Director for Preservation  
UC Berkeley Library

This article, based on a talk given at the International Symposium on Risk Management for Cultural Property in Lisbon, September 2011, provides an overview and progress report on work underway at the University of California (UC) to apply principles of risk analysis and risk management to library collections owned by the University. UC has developed software to support analysis and decision-making, called PRISM (Preservation Risk Information System Model) that assists users to identify hazards, determine levels of risk, and compare the effectiveness, as well as cost effectiveness, of options for methods to mitigate recognized risks.

From a library preservation manager's perspective, risk management consists of three interrelated groups of actions: Identification-- what are the hazards to the collections and what has been overlooked; Assessment--how large are the risks associated with each hazard and how much risk is acceptable; and Management--how can unacceptable risks be reduced and how can the reduction be achieved cost effectively. Much of what we know about library risk management is based on "received knowledge," that is, perspectives learned in school and absorbed as practitioners in the cultural heritage community. However, a decision-making system based on received knowledge is problematic because received knowledge often has a very limited awareness of hazards and little more than anecdotal evidence. To manage risks wisely we need to move from received knowledge to "derived knowledge," illustrated in Figure 1 by the red arrow. We need a greater understanding of the range of risks to which collections are exposed and much more concrete evidence to improve decision-making to manage risks cost effectively.

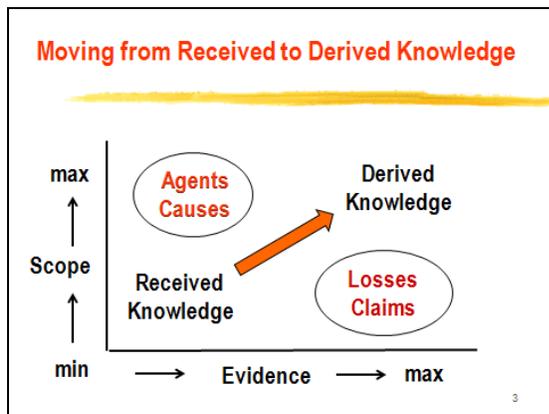


Figure 1.

The collective efforts to date of the cultural heritage community to increase its knowledge of risk management can be characterized as two kinds of explorations, those that focus on expanding our understanding of the range and relationships among risk factors, including agents and causes, "scope " in Figure 1, and those that pursue the available "evidence," including results of scientific studies, statistics on losses and claims, and expert opinion. The ongoing research led by the Canadian Conservation Institute and by Robert Waller at Protect Heritage importantly focuses on improving our understanding of the range, extent, and interplay of hazards and causes that put heritage collections at risk. To complement their work, UC has focused on available evidence to support risk management decision-making. Since decision-making is a political as well as an rational process, UC's goal is to have evidence play an increasingly large role in risk management decisions made on behalf of its research library collections.

PRISM follows on a history of preservation decision-making tools in research libraries in the United States. Prior to the 1970s, preservation decisions often were made based on inventories of the condition of the collection; every item in the collection was reviewed and the results tabulated. However, as collections grew in size, inventories became less affordable and findings became less accurate because multiple surveyors necessarily were involved to complete an inventory, making assessments less uniform and less reliable than when done by a single surveyor.

Random sampling was introduced in the 1970s to reduce the cost of assessing large collections and to increase accuracy. The focus of condition surveys was on current problems, that is, problems visible by inspecting the sample drawn from the collection. Costs came down for surveying collections and the precision of the estimates could be determined by the size of the sample. However, the findings proved to be scary; surveys were identifying preservation needs much too large to address with institutional resources, and the methodology used offered no way to set priorities for action.

After a generation of condition surveys, new preservation "needs assessment" instruments were developed in the 1990s (and continue to be developed today) to address the limitations of condition surveys. While building on the random sampling methods of condition surveys, needs assessment instruments also gathered data on the amount of use and the value of items in the collection in order to target limited resources to the highest priorities. Further, needs assessment instruments for the first time included questions about the prevention of damage and loss, for example does the institution have a disaster response and salvage plan for the collections, are the environmental conditions suitable for long-term preservation, is the collection adequately protected against theft, do materials in the collection need protective enclosures to reduce wear and tear?

Now, some 20 years after the introduction of preservation needs assessment instruments, library preservation managers are asking themselves if they need a new tool to integrate library preservation concerns with the broader concerns and approaches of the university community, which uses a risk management approach. Would the library preservation community be more influential if library preservation allied its work with the risk management community? The answer likely will be “yes” because a preservation risk management methodology would complement needs assessment; the focus would be on potential losses rather than needs; the library collection would be seen as a business asset; and risks and controls could be systematically addressed in order to use limited resources for the maximum benefit of collections.

The PRISM project is informed by a perspective that the mission of its libraries is to provide access to information. Therefore, its libraries’ major business risk is failing to provide access to information needed by the community it serves. The traditional library risk management strategy is to own, rent, or borrow materials it anticipates its patrons will need, and to maintain the materials it acquires in serviceable condition. If materials in a collection are damaged or lost, the library suffers an interruption in business continuity. How can preservation managers use limited resources most effectively to help ensure business continuity?

Part of the answer already is operative in UC’s library preservation programs. In addition to repair and conservation of collections, library preservation has controls with which to reduce damage and loss:

- disaster preparedness to minimize catastrophic loss
- collection protection to minimize theft
- environmental control to extend service life
- protective enclosures to reduce wear and tear

However, UC preservation managers are missing some key information about when and how to implement these controls. For example, how severe are the risks the current controls address? How effective are the controls at reducing risk? Which controls are most cost effective? What risks are we overlooking?

Most recent among “hidden” risks are the risks associated with digital media. More than half of the UC Berkeley Library’s collection budget is spent on digital materials. Unlike paper and film, you can’t observe with the naked eye when the format is deteriorating, so you are not reminded in advance of information losses that action needs to be taken to ensure continuing access to digital documents. Further, deterioration of the media often is not the primary preservation problem; for many digital formats, the rate of obsolescence of the technology leaves unplayable media, e.g., reel-to-reel tapes and floppy discs, long before the media self-destruct. These risks need to be factored into library preservation planning.

A further incentive to develop a risk management instrument was the observation that even though preservation assessment tools have been quite influential with library administrators, library administrators in turn often are challenged to influence university decision makers with regard to effectively managing risks to collections--collections that often are the university's largest asset. So, UC risk managers and UC library preservation managers are collaborating to build PRISM; UC's Office of Risk Management has contracted with Bickmore Risk Services, the 2nd largest risk consulting firm in the United States, to undertake the programming work.

PRISM is a member of a suite of tools on the University of California's Enterprise Risk Management Information System (ERMIS) website, <http://www.ucop.edu/riskmgt/erm/libcollwb.html>. It is a Microsoft Excel workbook with customized screens to guide users through inputting data to characterize the elements of risk to their library collections and the controls used to manage those risks. PRISM tries to model reality as closely as possible, but is entirely dependent on the accuracy of the data entered; consequently, it is an important aid to risk analysis and decision-making, but cannot substitute for judgment.

The acronym PRISM is a play on words. Similarly to the way an optical prism breaks up light into its component colors, the PRISM risk management instrument breaks up risk into a range of common collection hazards. Further, the level of risk associated with each hazard is specific to the medium of the library records; consequently, PRISM considers several common library media as well (Figure 2).

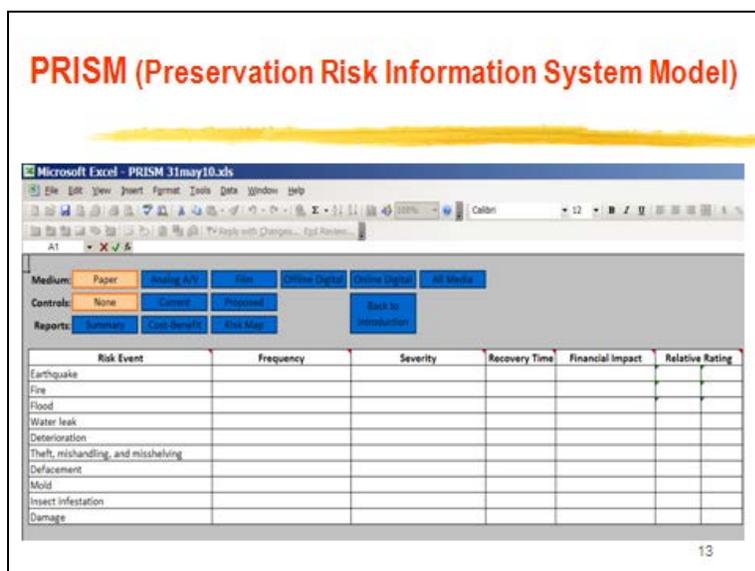


Figure 2.

- hazards: earthquake, fire, flood, water leak, deterioration, missing, defacement, mold, infestation, damage, machine failure, and operator failure

- media: print, film, analog audiovisual, offline digital, online digital

Each combination of hazard and medium is a potential “risk event” and has four “factors” that contribute to its relative risk rating: frequency, severity, recovery time, and financial impact. Values for each factor are expressed in stepped orders of magnitude. Frequency, for example, has several steps: once per year, once per decade, and once per century. The range can be changed if orders of magnitude prove to be too gross to be useful or the range is not large enough. The values for the four factors are combined by PRISM and mapped to a scale of 1-100 to create a relative rating.

PRISM has three stages of assessment for all the named risk events. The first stage assesses risk events and calculates ratings (relative risk) in the absence of controls in order to set a baseline against which all actions to control risks are evaluated. PRISM's second stage evaluates controls already in place to help manage risks to collection loss. With data on the impact of current controls, PRISM revises the relative levels of risk to evaluate the benefits derived from current controls and the financial commitments they represent. PRISM's third and final stage evaluates costs and benefits from proposed future commitments of resources. With data on cost and predicted effectiveness of proposed controls, two key questions can be answered prior to decision-making:

- Do the proposed controls reduce risk to an acceptable level?
- Among competing proposed controls, which proposed control most effectively reduces risk relative to its cost?

The calculation of cost effectiveness is represented in Figure 3; “marginal effectiveness” is defined as the amount of reduction in risk achieved by implementing a proposed control. Marginal effectiveness then is divided by the cost of a proposed control to arrive at a cost benefit figure, expressed as money spent per unit of risk reduction. Other things being equal, the proposed control with the lowest cost per unit of risk reduction becomes the top priority for implementation.

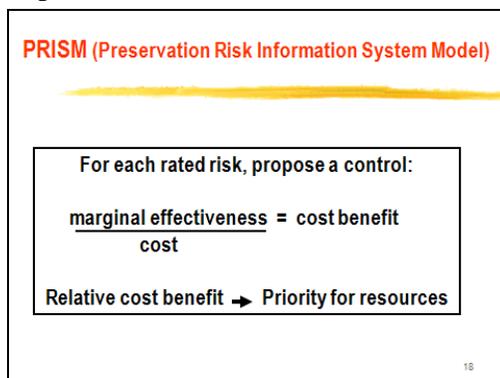


Figure 3.

PRISM quite intentionally is framed as a tool to predict disruptions to business continuity because business continuity is a goal that helps justify resource allocation at the University. PRISM uses loss and risk data to manage risk rather than eliminate it with a goal of long-term savings to the University. Consequently, PRISM speaks to several audiences: librarians and risk managers, who need to initiate the work of risk identification and assessment; university administrators, who need to relate risks to benefits to justify allocating resources to protect library collections; and insurance companies, who want to work with libraries to reduce their exposure to claims.

PRISM also points up the consequences of bad management decisions, characterized as business risks. The obvious and most critical risk is failure to provide access. A second risk is a costly recovery following a disaster, which could lead the University to reconsider a major reinvestment in libraries. A third risk is a lengthy time for recovery, which could lead to a loss of customers to other sources of information. The fourth and final risk, implicit rather than explicit in PRISM, is failure of due diligence, which could have legal implications for the University as well as harm its reputation for stewardship of public property.

PRISM very much is a work in progress. As of December 2011, data on collection risks, damage, and loss are being gathered to build a database to support PRISM users' estimates of risks to which their collections are exposed. Some of the data will come from the National Fire Protection Association, the Federal Emergency Management Agency, and the US Geological Survey. Additionally, UC will purchase data on library and museum insurance claims for the past five years in the United States. Finally, for risks lacking statistical data, the opinion of experts in analyzing and mitigating collection hazards will be surveyed and their responses compiled for the PRISM user.

After PRISM builds its evidence database, PRISM needs to be tested against experience to determine if it offers sensible recommendations. A nationwide field testing program will be proposed to ensure that PRISM works properly and has a broad application to libraries and archives. However, the ultimate application and value of PRISM will be its influence on risk managers and insurance companies with regard to how well library collections are protected. PRISM, and other similar instruments in the future, will help educate decision-makers to improve the protection of our cultural heritage.

December 15, 2011