

## Archival Products

# NEWS

## Encapsulation: Beyond the Island

by Lynn Ann Davis

**E**NCAPSULATION IS A COMMON preservation practice in archives and libraries to stabilize and protect fragile, valuable, or high-use printed items. The University of Hawaii at Manoa (UHM) Library's collection sustained extensive water and mud damage in October 2004. Because of the damage caused to encapsulated maps, there was a clearly established need to review best practices for encapsulation.

### Disaster at UHM

Within 42 hours of the flash flood, irreplaceable priority maps of Hawaii and the Pacific region were removed and placed into freezer containers to stabilize the materials and prevent mold growth.<sup>1</sup> Due to the magnitude of the disaster at UHM Library (approximately 10,000 maps of Hawaii, 40,000 maps of the Pacific Region and 75,000 aerial photographs), UHM contracted with experts in the field to contribute to development of a treatment protocol to provide treatment services, training and consultation. Beginning in December 2004, to expedite treatment, 40,000 20th



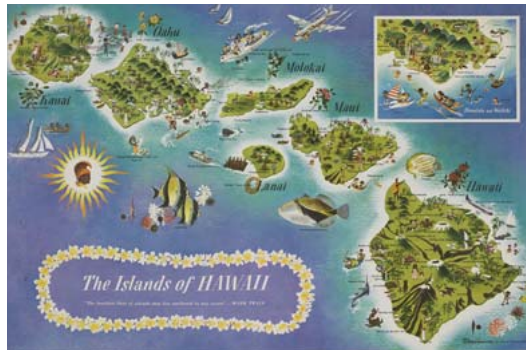
The UHM Library Map Room, October 31, 2004. Photo by Susan Murata.

century non-encapsulated printed maps of the Pacific were sent to Belfor U.S. (a Fort Worth, TX document recovery company) for treatment. All of these maps have been returned to the UHM Library.

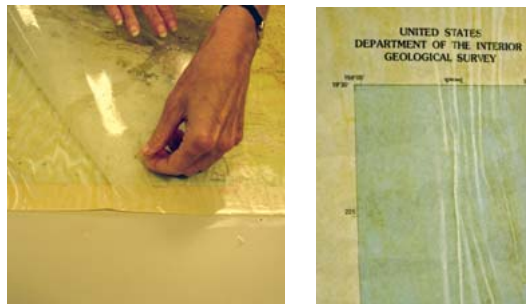
In January 2005, consultants were invited to assess damage, make treatment recommendations for the 10,000 water and mud damaged frozen maps to be treated at the UHM Library's Preservation Lab and to train staff.<sup>2</sup> This was the first time any of the maps had been examined since the disaster. Maps were removed directly from the freezer and

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*The importance of encapsulation as a preventative treatment is that it is reversible.*



Encapsulated map post conservation treatment (rinsing and flattening). Photo by Christine Takata (UHM Preservation Department Digital Photographer).



Dramatic damage to map caused by expansion of the wet map within the encapsulation enclosure. As the map expanded the paper cockled. In some cases the friction between the polyester and the paper caused loss of printed color or data on the map surface. Photos by Lynn Davis and Kyle Hamada.

examined as soon as the maps on top could be removed from the frozen block. To add to the recovery challenge, there was no inventory for the map collection and map drawers containing over 100 maps. Every new drawer brought up for treatment was anticipated with a certain excitement because of the variety of problems. After nearly three years, it is difficult to recall how shocking it was to see that some of the most damaged maps were encapsulated. How had mud and water penetrated the polyester structure causing mud staining and cockling of the paper as it expanded within enclosure?

The Federal Emergency Management Agency (FEMA) joined the UHM team in February 2005. A protocol for treatment of maps was developed and specified conservation procedures, as well as digital documentation

to return the maps to a “functional” level so that they could be used by researchers.<sup>3</sup> This included re-encapsulating, at the request of the UHM Map Collection, the heavily used maps of the Hawaiian Islands. It was essential to develop procedures for encapsulation “to decrease the probability of damage by the seal breaking.”

### Best Practice and Encapsulation

The importance of encapsulation as a preventative treatment is that it is reversible. An item can be removed by trimming away the seal. To encapsulate an item, the document is placed between two sheets of polyester (widely known as Mylar® or Melinex®) and the edges are sealed. The most commonly accepted method to seal the edges is the ultrasonic welder developed by William Minter, a book conservator, in 1978.<sup>4</sup> Double sided tape, as a seal, continues to be used by institutions without access to the welder.

The UHM Library Preservation Department organized a symposium on encapsulation to explore the possible cause of damage to encapsulated materials during the disaster. The symposium participants were Jeanne Drewes (Library of Congress), William Minter (Book Conservator), Marshall Oliver (Technical Director, Belfor Canada), Julie Page (University of California, San Diego), and the Preservation Department staff.<sup>5</sup> The symposium lasted five days and provided time for observation, testing and discussion.

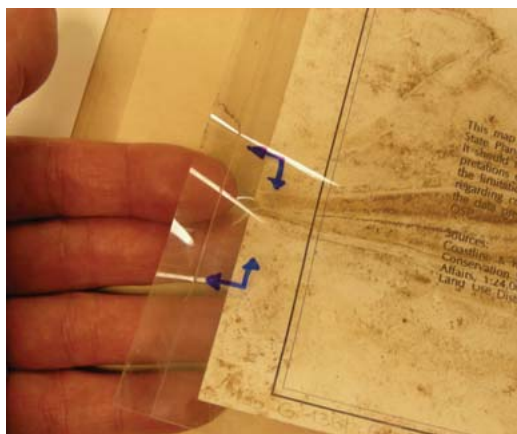
### Symposium Findings

After examining several drawers the following observations were agreed upon:

- Based on location within map drawers, the damage to encapsulated maps was random.
- Non-encapsulated maps (located on the top and bottom of the drawer) had greater mud damage; those in the middle were often protected and mud staining was primarily on the map edges.
- Non-encapsulated maps on the top of



Encapsulated map with failed weld. Symposium at UHM Library Preservation Department. Left-to-right, Jeanne Drewes (Library of Congress), Marshall Oliver (Belfor Canada), William Minter (Book Conservator and developer of ultra sonic welder), Julie Page (University of California, San Diego) Angelica Anguiano (UHM Library Paper Conservator). Photo by Lynn Ann Davis.



Close up of right corner of map; arrows indicate where the weld broke. Photo by Marshall Oliver.

drawers were permanently damaged by staining from the water; soluble dyes in the cloth covers were used to hold materials in place.

- Folders absorbed some of the trauma, protecting both encapsulated and non-encapsulated maps.
- Folders were not consistently used in the map drawers.
- Interleaving paper used irregularly between maps contributed to damage of fragile maps or maps printed on coated paper. The interleaving paper wicked water and kept the map surface constantly wet/damp until the items were frozen.

To develop revised encapsulation procedures for UHM, the symposium needed to determine the cause of the failure of the encapsulation. The UHM Library used double stick tape for encapsulation prior to acquiring Bill Minter's ultrasonic welder around 1993. Bill came to Hawaii to install the welder and train staff. Three years later in 1996, the Preservation Department had no consistent procedures or policy for encapsulation. When water penetrated any opening in the encapsulation, the paper absorbed the water and expanded within the sealed enclosure:

- All encapsulation using double stick tape failed and as the waterlogged paper expanded it adhered to the edges of the adhesive.
- Although the practice was not consistent, openings were left at the corner of welds when items were encapsulated.
- The breaks in the ultrasonic weld were near the corners of encapsulated items; they were usually small, between ¼–1 inch.
- Tears in the polyester on the inside of the weld was more unusual, but also provided an opening for water and mud to enter the capsule.

### **Causes of Failure of the Welds**

There are two causes for the failure of the weld: 1) lack of consistent policy and procedures for encapsulation; and 2) inadequate training of staff and student workers who encapsulate materials. The responsibility lies with the UHM Preservation Department, not the ultrasonic welder or the materials used. Bill Minter identified several procedures that could contribute to failure of the weld. The UHM sequence for encapsulation welding was to move the item in a clockwise direction; this can cause puckering in the polyester which will cause the weld to fail. The recommended method is to seal parallel edges first. Another problem was that UHM did not test the welds at the beginning of

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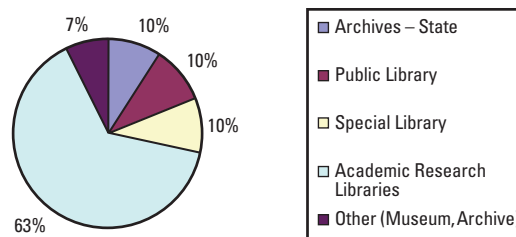
every batch for strength. To test the weld the polyester is pulled in opposite directions.

Observation of use and handling of map collections contributed to understanding the common failure of welds at the corners of maps. When staff or a user opens a map drawer they lift the corner edges of the maps to locate the item they wish to see. For heavily used maps that are encapsulated this common handling method is repeated on a regular basis, weakening the weld. Bill Minter was inspired to conceptualize a tool like a “pizza paddle” be used in lifting map folders in drawers. In honor of the island environment this tool has been named the “sting-ray.”

### Paper Backing and Folders

For all libraries and archives, cost is the greatest factor in determining preservation policy. While deacidifying materials prior to encapsulation is the ideal, at UHM, staff size and conservation expertise has meant that buffered paper was placed in the encapsulation enclosure instead of deacidification. In cases where both sides of the item (such as a newspaper) were important, a strip of buffered paper was sealed on the edge. It was interesting to observe the affect of grain orientation of the backing paper in relationship to the document when the item got wet and expanded within the encapsulation pocket. Jeanne Drewes pointed out that when the grain was perpendicular there was less cockling of the map. The tension between the expansions of the papers in two different directions within the enclosure possibly prevented more severe damage. The common practice for encapsulation is that the paper grain of the backing should follow the grain of the item. More research needs to be done on this issue.

It can come as no surprise that folders protected maps. The cost of folders for a large map collection meant that even some rare maps at UHM were not housed in folders. In one instance, a folder had been inadvertently placed in a drawer with the fold facing



Types of institutions that participated in the 2007 survey on encapsulation.

the drawer opening; in this case, the maps suffered minor damage.

### Survey

The initial survey on encapsulation, created by William Minter, was designed to gather information for the symposium. To expand the information on current practice, the same survey was placed on the Preservation Administrators Discussion Group (PADG) list serve.<sup>6</sup> A total of 42 institutions responded; 63% of the respondents to the encapsulation survey were Academic Research Libraries. The comments and questions demonstrated the need for further discussion and research and further discussion on encapsulation.

There is intense disagreement in the field about the only major accelerated aging research on permanence and encapsulation.<sup>7</sup> Several survey participants noted that their observations, made over time, indicate that encapsulated items do not deteriorate at the same rate as similar items exposed to normal conditions of humidity, temperature, and light.

In addition, participants were interested in selection criteria, the use of polypropylene instead of polyester, use of polyester L-sleeves, and approaches to deacidification prior to encapsulation and/or the use of backing paper for buffering.

### UHM Changes Procedure and Policy

After review of disaster related experiences, the symposium and the survey, the Preservation Department has made two significant changes in procedure. 1) New procedures



were developed for encapsulation.<sup>8</sup> 2) Encapsulated items have been added as a priority in the UHM Library Collection Disaster Plan. In the case of a water disaster, they will be immediately air dried or frozen and air dried as soon as possible to prevent damage due to cockling.<sup>9</sup> This decision was based upon encapsulated items that received immediate treatment and had no damage.<sup>10</sup>

After nearly three years, the UHM Library Preservation Department continues conservation treatment on Hawaii and Pacific region maps. The disaster has opened a Pandora's box of issues that need to be explored. The literature does not reflect the pragmatic concerns about the use of encapsulation as well as the huge physical benefits of encapsulation as a preventative measure for collection management. No library or archive is an island that can function in isolation to preserve cultural resources. There is a need to create a new sustainable model for research, training and exchange. As a first step towards a new approach, UHM, along with other partners in Hawaii and the Pacific region, is participating in the NEH-funded Western States and Territories Preservation Assistance Program (WESTPAS).

### Acknowledgements

*Mahalo nui* to conservators and preservation colleagues for their generosity in sharing their expertise; and to the UHM Library Preservation Department staff: Angelica Anguiano, Deborah Dunn, Darnell Gamiao, Kyle Hamada, Nadine Little, Sarah Mesina, Nathan Napoka, Ann Rabinko, Christine Takata, Phyllis Wilhoite-Nakasone.

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### FOOTNOTES

1. For additional information on the UHM Library disaster see the case study, "Hamilton Library (University of Hawaii, Manoa)" part of the *Heritage Health Index Report*, <http://heritagepreservation.org/HHI/case91.html>.
2. January 2005 consultants: Mary Wood Lee (Paper Conservator, CT), Kirk Lively (Belfor U.S., Fort Worth, TX), Pam Najar-Simpson (National Library of New Zealand, Auckland), Julie Page (University of California, San Diego), Randy Silverman (University of Utah Marriot Library), and Graham Simpson (Photography Specialist, Auckland, New Zealand). Paper Conservator, Leslie Paisley was appointed to the UHM project by FEMA in February 2005; Debbie Evans (Head of Paper Conservation Fine Arts Museums of San Francisco) and Jeffrey Warda (Conservation Intern, Fine Arts Museums of San Francisco) worked on collections and trained staff in May 2005.
3. Davis, Lynn Ann, "Protocol for Conservation Treatment: Recovery of Hawaiian Maps and Unique Aerial Photographs from University of Hawaii, Manoa Flood Damage," Federal Emergency Management Agency, December 2005, <http://libweb.hawaii.edu/libdept/preservation/index.htm>.
4. Swartzburg, Susan G., "Preserving Library Materials: A Manual, Second Edition," Lanham, Md., & London: The Scarecrow Press, Inc., 1995, p. 150.
5. Symposium on Encapsulation, February 26–March 3, 2007, UHM Library Preservation Department staff included Angelica Anguiano, Deborah Dunn, and Kyle Hamada.
6. Encapsulation Survey and results, 2007. <http://libweb.hawaii.edu/libdept/preservation/index.htm>.
7. "Accelerated Aging of Paper: Can it Really Foretell the Permanence of Paper," Library of Congress, October 2006, [http://www.loc.gov/preserv/rt/age/age\\_5.html](http://www.loc.gov/preserv/rt/age/age_5.html).
8. Hamada, Kyle, "Encapsulation Guidelines," August 2007, <http://libweb.hawaii.edu/libdept/preservation/index.htm>.
9. Davis, Lynn Ann, "UHM Library Collection Disaster Response," August 2007, <http://libweb.hawaii.edu/libdept/preservation/index.htm>.
10. Monday November 1, 2004, thirty-five encapsulated maps were treated by removing the polyester and air drying them on blotting paper. Although water had penetrated the encapsulation seal, the maps had no cockling and sustained no permanent damage.

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# Preserving Cultural Collections in the West

by Kristen Kern

**A** CRITICALLY NEEDED PRESERVATION project—WESTPAS—is being instituted to address the unique circumstances of the Western and Pacific United States. To describe the project and its goals, the originators of the project were interviewed—Barclay Ogden, Head of the Preservation Department from the University of California, Berkeley and Julie Page, WESTPAS User Services Coordinator and former Head of Preservation at the University of California, San Diego. Already seasoned from their successful experiences with the California Preservation Program, Barclay and Julie perceived that the need for preservation education and assistance existed in neighboring states and throughout the West’s wide geographical expanse.



Barclay Ogden, Head of the Preservation Department from the University of California, Berkeley and WESTPAS Project Manager, with Julie Page, WESTPAS User Services Coordinator and former Head of Preservation, at the University of California, San Diego.

country are served by regional preservation field services. The Northeast, mid-Atlantic, Southeast, Southwest, and upper Midwest states are served by preservation education and training centers to help meet the needs of libraries and archives in these regions. The Western and Pacific regions need comparable services organized specifically to overcome obstacles created by large geographic distances between cultural centers in many parts of the regions.

For a description of the California Preservation Program’s services and resources, see: [calpreservation.org](http://calpreservation.org).

## What Does WESTPAS Stand For?

WESTPAS stands for Western States and Territories Preservation Assistance Service, i.e., the 14 Western and Pacific states and territories where the project will conduct disaster preparedness workshops. Specifically, the states and territories are Alaska, California, Colorado, Hawaii, Idaho, Montana, Nevada, Oregon, Utah, Washington, Wyoming; the territories are American Samoa, Guam, and the Northern Marianas.

## Why is WESTPAS Needed?

Results of the 2005 nationwide Heritage Health Index survey of the preservation needs of cultural collections indicated that 80% of collecting institutions in the Western and Pacific regions are not prepared to respond to a disaster involving their collections. They do not have a written disaster response plan with staff trained to carry it out. To help address this need, which is similarly experienced throughout the country, some regions in the

## WESTPAS = Western States and Territories Preservation Assistance Service

States:	Montana	Territories:
Alaska	Nevada	American
California	Oregon	Samoa
Colorado	Utah	Guam
Hawaii	Washington	Northern
Idaho	Wyoming	Marianas

See the WESTPAS website for information about the project and upcoming disaster planning workshops: <http://westpas.org/>

## The Heritage Health Index found that:

- 270 million rare and unique books, periodicals, and scrapbooks require immediate attention and care.
- 2.6 billion items of historic, cultural, and scientific significance are not protected by an emergency plan and are at risk should a disaster strike their institutions.
- 70% of institutions need additional training and expertise for staff caring for their collections.

For further information on the results of the Heritage Health Index, visit: [www.heritagepreservation.org/HHI/index.html](http://www.heritagepreservation.org/HHI/index.html)

### Is There an Overarching Vision For the Project?

Most institutions throughout the Western and Pacific regions are small. Their historical collections of books and documents provide rich insight into the particularity of life in their locales and contribute to an overall understanding of the history of the regions. In addition, they provide to the people who live there a strongly felt sense of place and community. People want to maintain cultural resources in local institutions to have access to the collective memory of their ancestors. There is a powerful pride of ownership of history, which has led to the establishment of many small local organizations rather than a few large regional ones. The vision of WESTPAS is to help these smaller, culturally essential institutions, by providing preservation education, training, and emergency assistance services.

### What is the Major Goal of the Project?

The major goal of the first phase of WESTPAS, January 2007-December 2008, is to deliver preservation education and training on disaster preparedness, emergency response, and collection salvage to 600 staff from smaller libraries and archives in the regions and produce written disaster response plans for all participating institutions.

### How is the Project Funded?

WESTPAS is funded in a large part through a National Endowment for the Humanities grant. BELFOR, the international disaster recovery service, and, of course, Archival Products, are helping to support the project. Further, all 14 states and territories through their state libraries and archives have provided staff liaisons to the project to help site, schedule, and promote the workshops to libraries and archives in their states.

### What Roles Did You Two Play in Developing This Project?

We sought funding (contributed by Preservation Technologies, LP) to conduct a planning meeting of the potential project trainers. From the planning meeting emerged a shared vision for how this group of trainers could work together to deliver preservation education and assistance services to libraries and archives in the Western and Pacific regions. The next step was to prepare a project plan that was awarded funding by the National Endowment for the Humanities.

### What is Your Background?

Julie, recently retired from the University of California, San Diego, served as Preservation Librarian at the University beginning in 1989, and Barclay has served in the same role for University of California, Berkeley since 1980. We have worked together for many years on University of California system-wide preservation projects, and since the late 1990s have served as co-chairs of the California Preservation Program (CalPreservation.org), an IMLS/LSTA (Institute of Museum and Library Services/Library Services Technology Act) state-funded preservation education and assistance program that became the organizational model for WESTPAS. Barclay is the Project Manager, and Julie is serving as User Services Coordinator for WESTPAS.

## WESTPAS Supporters:

National Endowment for the Humanities

Archival Products

BELFOR

Preservation Technologies, L.P.



Julie Page, WESTPAS User Services Coordinator, with Randy Silverman, Preservation Librarian at University of Utah, in conversation during a group planning session.

### **Are There Others Who Have Been Involved in Developing the Project?**

There are four other experienced preservation professionals who are involved in developing and carrying out the objectives of the project. They are: Lynn Davis, University of Hawaii at Manoa; Kristen Kern, Portland State University; Gary Menges, University of Washington; and Randy Silverman, University of Utah.

### **What Challenges Do You Foresee in Attaining the Project's Goal?**

The primary challenge to the project will be to reach out to many remotely located libraries and archives with very small staffs. Completing disaster response and collection salvage plans also is always a challenge; consequently the workshops have been designed to maximize the probability of participants completing disaster response plans within the project period.

### **What Will Success Look Like for the Project?**

Total success will be all institutions that participated in the training will have completed disaster plans and trained their staff in how to implement them.

### **What Do You Foresee in the Future for WESTPAS After the Funding Ends?**

The need for a preservation assistance service is so compelling in the Western and Pacific regions that we anticipate considerable support for continuing services with a combination of grant and institutional funding.

### **Afterward**

Even though the WESTPAS project has benefited greatly from the expertise gained through the process of developing and sustaining the California Preservation Program, much work has transpired to create the WESTPAS presence. The curriculum for the two-part disaster preparedness and response workshops has undergone several revisions tailoring the agenda, handouts and appendices to libraries and archives across the Western and Pacific states and territories. Discovering and modifying a suitably usable yet compact disaster plan was essential since it is crucial to fulfilling the grant's requirements that every participating institution successfully complete a customized plan. The Council of State Archivists (CoSA) Pocket Response Plan proved to be the perfect model, which was modified for WESTPAS and, with appendices, will serve as the template for the workshops.

At the time of publication, disaster planning workshops scheduled thus far for this upcoming fall include San Marino and Santa Barbara, CA; La Grande, OR; Seattle and Kennewick, WA; Honolulu, HI; Salt Lake City, UT.

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