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Submerged: How a California library was invaded by rising groundwater — and survived.

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SUBMERGED!

(How a library was invaded by rising groundwater and survived)

by Tacock Kim and Leanna Goodwater

“The Library Blues!” “Plagued by water!” Imagine your library getting this kind of headline in campus newspapers. It happened to us. The opinion editor of the student newspaper summed up the situation when she complained about students “having to battle lung disease or ruining their leather shoes in the basement swamp.... When it’s a health hazard to find a book for class what message is that sending students?”

How did our library get into this condition? It was a combination of heavier rainfall than normal, a high water table, and a library whose main book collection, approximately 500,000 volumes, was in the basement. Michel Orradre Library is the main campus library for Santa Clara University, a comprehensive Jesuit university located at the southern end of San Francisco Bay in what is nicknamed Silicon Valley. Only a few feet above sea level, the area is traversed by underground streams, one of which caused flooding problems in the basements of several buildings on our campus. For nearly two years we hovered on the edge of disaster. We could have lost the entire collection, but we did not. And therein lies a tale....

Our story begins in the spring of 1997, when we discovered dirty groundwater seeping up in the basement around several support columns of the building. Attempts were made to seal the bases of the columns, by drilling holes and injecting a silicone substance to block further seepage. At the time, this treatment appeared to solve the problem. However, in February of 1998, the

waters returned much worse than before. The contractor returned and applied the same technique. However, once the seepage was stopped around one pillar, the water migrated and began to seep up in adjacent areas. Eventually, it returned to areas that had been sealed the year before. It was now apparent that the bandage treatment we had been using was not working, and a new approach to the problem would be needed. As Elizabeth Salzer, the University Librarian, notes, "Although, in retrospect, it may seem that the University was too slow to pursue a solution to the Library's water problems, there was from the very beginning a desire to solve the problem quickly, with minimal disruption to users, and at a manageable cost. The initial work to seal the columns seemed to be successful and to meet the Library's goal for minimal disruption of services."

Standing water now covered the floor in many spots throughout the basement and at the foot of the elevator shaft. As water was absorbed by the concrete slab underneath, the adhesive of the linoleum tiles softened and expanded, oozing out around the edges. Many wet floor and carpet tiles had to be removed, and the terrazzo floor in the lobby was badly cracked. The book stacks remained open for use, but caution was advised because of the dangers of slipping.

This was not the only danger, however. The air was smelling moldy, and we began to worry about the collection. Visible fungal growth began to appear on walls throughout the basement, particularly in small, enclosed rooms such as the restrooms, electrical room, and personal offices. There were also risks to human health. Several staff members began complaining of health problems caused by conditions in the basement; three had problems so severe that they filed workers' compensation claims and had to work outside the building on doctors' orders for months. Upon advice from OSHA, signs were posted warning of the presence

of mold and advising people with asthma or allergies not to go into the basement. We offered to retrieve books for anyone concerned about these dangers, and this new paging service imposed extra burdens upon our Circulation Department.

In April a plan was proposed which would have required total evacuation of all the contents of the basement in order to install a new floor eight inches above the current level, with the resulting space underneath used to prevent groundwater from reaching the surface. This plan would have permanently reduced the shelving capacity of the basement drastically. Moreover, during the time the basement was being repaired, it would have resulted in serious reductions in service. Expensive warehouse space would have been necessary to store most of our collection off site, where it might have been totally inaccessible for a year or more.

This proposal would have cost \$3 to 4 million, and no one was sure that it would solve the problem. Consequently, an alternate plan was proposed, and ultimately approved by the university administration, to dig wells at the four corners of the building and install a dewatering system, which would pump out the groundwater automatically when it reached a certain level. As Joseph Sugg, the Assistant Vice-President for University Operations, explains it, "We made the decision to put wells outside the building for several reasons: there was a \$1 million difference in cost, it didn't require the removal of the books from the basement, and we thought it would work better." So, three pumping wells and one monitoring well were installed. Regular pumping began in March of 1999, removing water at a rate of up to 50 gallons per minute. Soon thereafter all groundwater receded from the basement.

Now began the remediation stage of our project. An environmental management company was hired and, closing the basement, began to clean the book collection and shelves, and to

remove contaminants from the floors, wallboards, support columns, etc. Books were paged upon request, but this service quickly overwhelmed our Circulation staff. So, after a week, limited public access to the basement was permitted via an obscure emergency exit. People could get to the bookstacks only by following narrow routes which snaked around the stacks and were defined on each side by plastic sheeting which reached from the floor to the ceiling, preventing access to the areas which had already been cleaned. Within those closed-off areas, loud industrial-sized air pumps were running constantly, to maintain a higher air pressure to prevent contaminated air from the uncleaned areas from getting in. For those who went down at this time to get books, the experience was almost surreal.

During the cleanup, several ranges of bookstacks at a time were closed off entirely. It took at least a week to clean them and successfully pass an air quality test, and during that time there was absolutely no access to that part of our collection. This wrought havoc with our ability to serve our students and faculty, and it presented major public relations problems for us. We did our best to communicate the expected schedule for the closure of sections of the bookstacks. Articles were published in the student newspaper, the University Librarian sent regular e-mail updates to all faculty and staff, and academic departments were alerted when their sections were about to close and then again when they reopened. Within the library, signs were prominently displayed advising which sections were currently closed.

Even so, many of our users were unhappy. Anguished e-mail messages like this one from a history professor were sent out to all university faculty and staff: "I fear that little or nothing can be done now. It is like closing the barn door after the horse has escaped. My students must start this week on their term paper in historical interpretation and the basic history section has been

closed.... It's no easier for us: I needed a book right now; I called the library yesterday AM, was told the section I wanted had not yet closed, but when I got there in early PM, it was.... sigh.” Faced with such complaints, the University Librarian took great pains to explain the urgent need to resolve the basement problem while school was in session, and to reassure our users that everything possible was being done to lessen the negative impact upon them. In recognition of her efforts, the Chair of the Faculty Senate Council sent out a campuswide e-mail message congratulating her on her “succinct, prompt and completely reasonable response” and commenting that, “having followed your plans and progress over the last several months, I am convinced that you ... have handled this difficult problem with maximum efficiency and sensitivity to the needs of all concerned.”

Complicating all our efforts to keep our users informed was the fact that, once a schedule for closure of sections of the bookstacks was agreed upon with the environmental management company and widely publicized, the cleaning crew did not adhere to it. Once they had finished cleaning one section and reopened it for use, they immediately closed off the next and started cleaning it, often several days ahead of schedule. Worst of all, they did not tell us when they did this. The first our public services staff would learn of these closures was from irate users who had gone downstairs expecting the books they wanted to be available, only to find that they were not. Such failures of communication between the contractor, his workers, and us happened throughout the project and frustrated us greatly.

One positive result of the project progressing faster than originally anticipated, however, was that the basement as a whole was ready to reopen to the public much earlier than expected, before Memorial Day, in time to meet the needs of last-minute term paper writers. This was a

relief to us all. Fortunately, we had lost almost no books to water or mold damage. Over the summer we resumed providing service as usual, and library staff returned to their basement offices.

We thought that our water problems were behind us, but we were wrong. In April of 2001 we were distressed to find groundwater seeping once more into our basement. Upon investigation we discovered that the pumps that keep the water level at a manageable level beneath the building had failed to restart when the electricity was turned on again following a scheduled power outage the preceding weekend. As soon as the pumps were back in operation, the groundwater quickly receded, and our basement is dry once more. It is now part of our campus facilities procedures to check the dewatering system after all power outages, whether scheduled or not, to make sure that the pumps restart.

We learned several important lessons from this experience. They are as follows:

- We should have acted quicker to address the underlying problem, instead of spending so much time in the beginning on stopgap solutions.
- Having a disaster preparedness plan is essential, but that is not enough. It must be kept up to date, with current information on whom to contact.
- Collaborative relationships with nearby institutions should be established in advance. It is too late to try to establish them when the disaster strikes.
- It is essential to understand campus politics and to form partnerships with influential people on campus who can make things happen. We were able to act more quickly and decisively once the university's top administrators were involved in the decision-making process.

- Communication at all stages of the project and to all members of the user community is essential. Moreover, it must be centralized in one spokesperson who will maintain consistency in the message.
- Support from library users is vital. It was a great aid to us to have the Faculty Senate behind us.
- Facilities crews and contractors approach problems and work differently than library staff do. They focus exclusively on the task at hand, with absolutely no understanding of the needs of library users in a service environment.
- The people in charge must understand the human side of the problem. The task itself can be dealt with given the appropriate resources; the people aspects were actually the most difficult to handle.
- Continuous monitoring of the situation is necessary, long after you think the problem is behind you.

These were all good lessons to learn, and we have benefitted from them. This experience emphasized the importance of the library on our campus, gave us many strong and vocal supporters amongst our faculty and students, and helped us to form strategic partnerships with important campus officials which will prove valuable in the years ahead.



Photo #1. This office, which was identified as an "amplification site" for *Penicillium* and *Aspergillus* molds, shows how extensive the damage was. Dirty brown standing groundwater and white mold discoloration can be seen all over the floor. The bright cream-colored globs are the silicone substance that was originally injected into leaks to stanch the flow of water. Damp wallpaper is curling up away from where damaged baseboards have been removed.



Photo #2. The exposed concrete slab shows widespread fungal growth and water damage in this view looking into the same office. Across the lower left corner of the photo, groundwater can be seen seeping up through a crack in the terrazzo floor outside the office.