

Report on visits to Bay Area Museums as part of the interpretive planning effort for the Alameda Creek Watershed Center



**Submitted by The Acorn Group
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Bay Area Discovery Museum Sausalito

The mission of the Discovery Museum is to “engage, delight and educate children through exploration of and connection with the local environment and the diverse communities that live here.” This bustling museum campus is situated at Fort Baker within the National Park Service’s Golden Gate National Recreation Area. This museum was selected for our tour because of the water elements found in the Tot Spot, an exploratory outdoor exhibit area organized as four different habitats: wetlands, woodlands, stream, and meadow. Although the Tot Spot is designed exclusively for infants and toddlers, we wanted to study the interactions of young visitors and water, particularly within the context of suitable exterior exhibits at the Alameda Creek Watershed Center.

We found this water play exhibit to be nicely designed and well executed. Assuming a care giver is present and on-task at all times, the streambed beckons the child to the water’s edge. At its maximum height, the stream is raised to the level of a toddler’s waist, making it difficult to fall “up” into the water. The water flows from a simulated waterfall in a tall grouping of artificial rocks and descends step by step as it meanders across the patio. Play objects float in the water and regulatory signs focus on the positive.

Our conversation with the Director of Exhibitions revealed the following. Seventy-five percent of the museum’s 300,000 annual visitors go to the Tot Spot. The entrance is tightly controlled to ensure that only very little children enter. Scientific Art Studio, Inc. constructed the graduated streambed which slopes from very shallow water accessible to crawlers and early walkers to deeper water in a narrower channel. This portion is designed to encourage social play among toddlers.

The water is treated with bromine. The water is not skimmed, although staff scoop out eucalyptus debris on a regular basis. They do not have a problem with sand or wood chips in this play area, although they have a tremendous problem with these materials in the tidepool exhibit.



The most attractive aspect of the exhibit is its immersiveness. Children are transported to the world of a pond, a hill, and an underground burrow. They are free to be silly, as well as brave, as they venture into unchartered territory. They particularly enjoy the frog bubbles, the crawl-through waterfall, and the crawl-through root burrow. Optimally, they return on a regular basis. Since they are rapidly developing both physically and intellectually, they encounter new stimuli, challenges , and opportunities each time they do.

The museum budgets \$600 per square foot for design and construction, but not evaluation. The original design resulted in having to walk entirely around the long, linear streambed to get to the other side. The bridge was an afterthought to accommodate adults. Toddlers have difficulty climbing the stairs and staff realize the bridge probably should have been built with a sloped ramp instead.



Bay Model Visitor Center Sausalito

The Bay Model is a three-dimensional, scaled working model of the San Francisco Bay and Sacramento-San Joaquin River Delta system that was created in 1957 as a scientific tool by the US Army Corps of Engineers. The manipulated ebb and flow of water simulates currents and tides, enabling researchers to predict the consequences of realigning or deepening channels, constructing wharfs, breakwaters, and landfills, and other activity that likely would influence the hydraulics of the Bay and its waterways. Computer-based modeling has replaced the Bay Model; it now serves as an educational tool.

Our first impressions of the Bay Model Visitor Center were very favorable. As we arrived in the introductory foyer upstairs, called *From the Mountains to the Sea*, we were surrounded by snow-covered artificial rock work that represents the high peaks of the Sierra Nevada. Beautifully painted murals show the mountains to the sea, the diverse landscape that water traverses on its way to the San Francisco Bay and Pacific Ocean. With text depicted on reading rails, visitors were reminded of the significance of the Sierra snowpack as a critical water resource for the State's residents and industries and as the ultimate source of the Bay's fresh water.

Beyond the dimensional rock work and well crafted graphic railings, more murals and a central topographic interactive model of the State comprise the exhibits in this wing of the visitor center. The interactive topographic map shows the flow of water from the Sierra Nevada to the Central Valley and then to the Bay-Delta using push button-activated fiber optics. It is simple, but effective. The visitor center ranger we spoke with indicated this is a favorite stop among visitors. Visitors also compliment staff for the mural, an oil done on canvas. We all agreed that this exhibit is a clever use of a very small space.



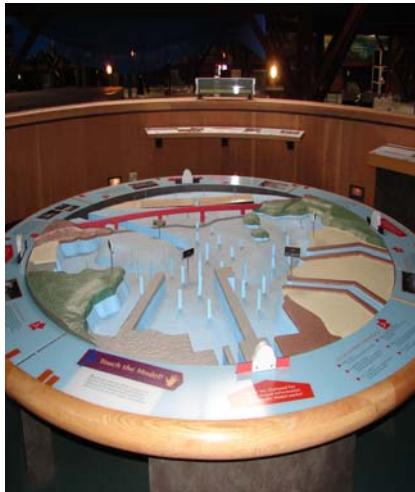
This individual remarked that the one improvement he would have liked to make is labeling the streams depicted in the carpeting. Visitors hardly notice this detail. It is, however, pointed out to school groups.

From there, the visitor is led to a round gallery to watch an orientation video on the Bay Model. After exiting the short video presentation, the visitor encounters several good interactive exhibits on the upper deck above the Bay Model. Featuring a variety of multi-modality displays (pull-up panels, touchable objects, recorded audio, to name a few) this deck serves to orient the visitor to the function and history of the Bay Model. This history includes the human story. One of the more interesting kiosks features audio recordings of Bay Model employees, from scientists to concrete masons.

This well crafted look comes to an abrupt end once the visitor makes it down to the main floor, labeled "sea level." Here, there is a mash-up of exhibit styles from the 1970s, 80s and 90s, and quite a few interactive exhibits that either do not work or are very tired looking.

The exhibition ends with a nicely done exhibit that tells the story of Marinship, the company that built transport and tanker ships for the WWII effort on this site between 1942-1945.

The staff member we spoke with did not know the cost of the *Mountains to Sea* exhibit. The visitor center has an exhibit technician on staff, so there rarely is a maintenance issue.



California Academy of Sciences San Francisco

Our visit to California Academy of Sciences was motivated by our interest in studying the freshwater aquaria. The most impressive of Steinhart Aquarium's exhibits are those that present multilevel views. They aren't simply beautiful to study; they're accessible and engaging to a highly diverse, multi-age audience. Bubble windows and walk-through tunnels in particular create intimate immersive experiences for the visitor. While a Cal Academy-scale aquarium is neither practical nor appropriate for the Alameda Creek Watershed Center, a smaller-scale aquarium that displays freshwater species and offers both a fish-eye submerged view and another from above could be a hallmark of the new interpretive center. This feature could be crucial for capturing the interest of visitors who will not see the flow of water in either creek corridor because of accessibility issues or seasonal timing of their visit.



Our other reason to study Cal Academy was to examine how green architecture and green practices are interpreted for the public. In 2008, Cal Academy released the publication, *California Academy of Sciences, Architecture in Harmony with Nature*. Green practices, for those who aren't reading the book or watching the DVD, *Under the Living Roof*, are most effectively showcased on the roof and in the Academy Café. Visitors have access to the famed living roof where interpretive panels highlight the functions of various roof components—the native plants that constitute the green roof, skylights, drainage system, and stormwater filter fabric. Museum food, heralded as multicultural, local, seasonable, and organic, is literally “curated” through placards, menus, labels, and other media under the exhibit name of *The Anthropology of Food*.



California Museum Sacramento

Home to California's Hall of Fame, the California Museum offers exhibits that showcase the uniqueness of the State's people and places. The facility is relatively new. It opened in 1998 for the purpose of displaying material from the State's archives. Since then, its directives have shifted. In addition to permanent exhibits, at least six special exhibits are curated annually.

Our reason to visit the California Museum was to examine one of these special exhibits, *Extreme Engineering: The California State Water Project Past, Present and Future*. The museum website states, "This hands-on, interactive exhibit explores the complexities of water in California. Visitors will discover the world's largest manmade water system and the people behind its creation, and be challenged to actively consider the choices facing policy makers today."

In summary, this exhibits lacked good organization, both in terms of content and visual information. Its most interesting feature is found in the first room the visitor encounters, an orientation theater in the round. Large projected video images on the curved walls tell the story of the California State Water Project. The program talks about engineering feats and was augmented with workers and engineers telling their story. The video image quality on the center image is good, but less so on the two outer flanking projections, due to longer throw distances. The acoustics were acceptable.

From here, the experience begins to decline. Exhibits were lackluster and painfully text-heavy. Several of the interactive exhibits were not working (something we need to keep in mind when designing interactive exhibits). It will be essential to have a line item for exhibit maintenance built into the Alameda Creek Watershed Center budget.



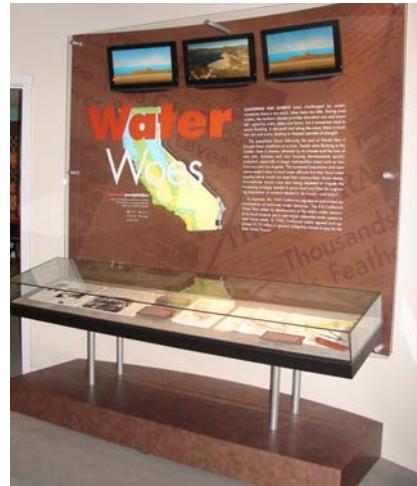
Large panels of clear acrylic were used in the graphics. (We later learned the reason for them.) This made for distracting reflections and difficult reading for the visitor. Overall, the historical context of the State Water Project was explained, but some of the content seemed unbalanced and self-serving to the project. There were few dissenting voices and alternative perspectives covered in this exhibit.

A conversation with one of the museums curators indicated this exhibit is owned by the Department of Water Resources (DWR). Its intent, he believes, is to “impress legislators here at the Capitol with the need for funding for system improvements.”

Over 1,500 visitors each month pass through this particular section of the second floor to see other exhibits. It is therefore safe to say that these individuals were at least exposed to *Extreme Engineering*. Interestingly enough, more visitors comment favorably about the museum’s own casework that displays Los Angeles Aqueduct artifacts in an adjacent exhibit area than they do about this exhibit.

DWR indicated Exhibitree fabricated and installed the *Extreme Engineering* exhibits at a cost somewhere between \$8,000 and \$15,000 per display area, excluding design. The museum curator we spoke with felt *Extreme Engineering* feels more like a trade show than a museum exhibit and is not suitable for children. He agrees with us: the most attractive aspect is the high-definition DVD projection on the center screen. It is certainly the most eye-catching element.

Younger visitors enjoy the water pump challenge due to the physical interaction. They also apparently enjoy touching the exhibit panels, now covered with acrylic overlays to protect fingers from being pinched and lettering from being marred. The water pump—the only exhibit actually designed by DWR staff—receives the most abuse and has withstood it better than other exhibits.



EcoCenter

Heron's Head Park, San Francisco

Despite visiting during posted hours of operation, the EcoCenter was closed when we arrived. Still, we were able to study some of the architectural features that make this building so noteworthy. These include an off-grid solar array, on-site blackwater wastewater treatment system; rainwater collection containers, and vegetative roof, designed by Rana Creek Nursery, the same firm that designed Cal Academy's living roof. The entry pathway is landscaped with native plants; site planning incorporates sustainable site landscape and land management solutions, such as subsurface irrigation to augment rainwater supplies. Interpretive panels, some permanent and others temporary, point out these features, making the walk from the parking lot to the building an interpretive experience onto itself.

Our concern with recently installed project, however, is maintenance. The wind was relentless during our visit and we expect that, given the weathered condition of the roof and plants, that material is constantly battered. Though new, the building and grounds looked tired.



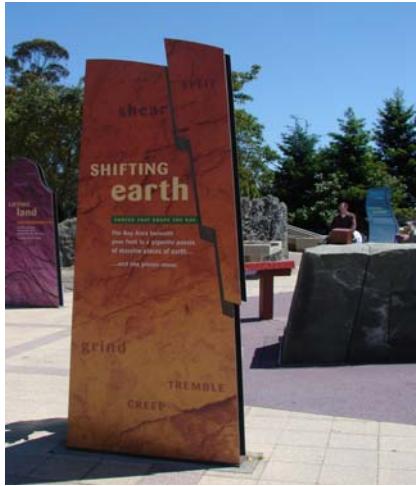
Lawrence Hall of Science Berkeley

Established in 1968, Lawrence Hall of Science serves as UC Berkeley's public science center. Our reason for visiting was to study the outdoor science park where the exhibit, *Forces That Shape the Bay*, is located. This exhibit invites visitors of all ages to explore the processes and forces of earthquakes, erosion, wind, and weather through an interactive exhibit experience. Unfortunately, some of the exhibits were not operating during our visit.

The main message, "The Bay Area beneath your feet is a gigantic puzzle of massive pieces of earth...and the pieces move," is provocative and enticing. The subthemes revolve around the concepts of faulting, earthquakes, erosion by wind and water, and big changes happening over time. Specific exhibit pods include an earthquake simulator, hands-on erosion tables, rockwork designed to simulate the Sierra Nevada over which water flows and is manipulated by visitors, and a time sequence of the bay's formation over 10,000 years.

The larger kiosk-style graphic panels were nicely designed. Though the content was dense, it was accessible and pertinent. The smaller graphic panels were very well written, but the graphic layout and odd background colors (bright intense pinks and purples) did not seem to complement the content. After speaking with staff, we learned these colors were chosen specifically to counteract the predominant earth tones seen in this space.

As mentioned, several of the electronic and mechanical interactive exhibits were not in working order, including the most interesting examples, the earthquake shake tables and sediment layer folding exhibits. So much was not working, in fact, that we are certain many visitors may feel the urge to ask for a refund.



The water diversion interactive water play area is a great idea, but the poor execution of design and maintenance issues lead to a less than satisfactory visitor experience. Visitors are admonished (via signs that look like afterthoughts) not to climb on the rocks of the inviting waterfall structure. There are not enough of the small “dams” available for effective use of the main interactive feature. Of the eight “dams” visible, only three were accessible, the other five were circling drains in the middle of the pond. Those could not be reached without getting your shoes wet.



While water is an attractive feature and we should consider water-based activities at the watershed center, we need to keep these elements somewhat simple, fully accessible, and in working order.

This exhibit opened in 2003. According to the director of exhibits and facility operations, the cost approached \$2.5 million and entailed substantial infrastructure, including construction of a new road. The exhibit portion cost between \$1.5 and \$2.0 million, funded through a National Science Foundation grant and with contributions by the class of 1948, Pacific Gas and Electric, East Bay Municipal Water District, and in-kind services.



From our interview with this staff member we learned the following. The most attractive aspect of exhibit is the water. Not surprisingly, children want to climb the waterfall. This is particularly problematic with students on field trips. Ideally, a monitor is posted outdoors, but often staff is not available to assume this position. It is nearly impossible to keep people off and out of the water feature. During hot summer months, the staff tend to be more accommodating in this realm. The surface of the water feature has a gripping texture to reduce the number of slips and falls. The maximum depth of water is 18 inches. The water is treated with bromine, skimmed one to two times a day, and drained several times a year. Infrastructure includes a pump house, hook-ups to the sanitary sewer, and heavy-duty, sand-tolerant filters.



The erosion tables are very popular. Children love them. This is an excellent exhibit for directed inquiry, led by an adult performing the role of interpreter.

There is actually a field guide to the rocks and native plants incorporated into the exhibits. The hand-selected rocks come from the Sierra Nevada, Central Valley, and Bay Area. It was the intent of staff of Lawrence Hall of Science and UC Berkeley to craft a blend of self-guided and interpreter-guided realistic geological experiences. The rock exhibit seen behind the earthquake simulation is modeled after the East Bay hills near Highway 24. The rocks in the grass area are intentionally offset to allow for an activity on faulting.

If given the opportunity to do things differently “next time,” the electronic components of the fault exhibit—a hydraulic ramp and computer—would be replaced with hand-operated cranks. Up until now, they have been fairly robust. Now they have exceeded their lifespan. Although not currently operating, the earthquake bench also has been reliable.

Staff feel the interpretive panels are content-heavy, largely due to “generous” contributions of information by faculty. Staff had hoped they would see repeat visitors who over time could really digest the information. Although formal evaluation has not taken place, it appears people who come again and again have learned a lot over time. With each visit, they tend to pick something new to talk to their child(ren) about.

The colors selected for the phenolic resin interpretive panels are calculatedly bright, warm hues that contrast against all the earthy tones. Dominated by reds, these colors tend to be the first to fade. Staff have had to replace them three times.



Taylor Creek Visitor Center South Lake Tahoe

Managed by the US Forest Service, Taylor Creek Visitor Center is located on Lake Tahoe's south shore. The visitor arrives here via Rainbow Trail, a meandering pathway through forest, meadow, and marsh. By the time the visitor reaches the building, they may have already seen the star of the exhibits, Kokanee salmon, spawning in the creek.

The main attraction of the visitor center is the stream profile chamber, built in the 1960s. Water diverted from Taylor Creek flows past tall aquarium windows, allowing for face to face (or rather, hair to scale) viewing of salmon, other fish, aquatic invertebrates, and even birds taking the plunge in search of a meal. A 180-degree curved diorama includes a mural that depicts seasonal life in this montane region. Taylor Creek Visitor Center receives between 250,000 and 300,000 visitors each year.

When asked about lessons learned from the stream profile chamber, the visitor center director emphasized the importance of preventative maintenance. Complete waterproofing of all displays, properly installed drains, and immediate access to a generator are essential in the event flooding occurs. Because algae accumulate daily on the viewing windows, a maintenance staff member needs to scrub the outer glass. Equipment for this task includes a safety harness (in the event this job involves leaning over the edge of a roof), a long pole, and a soft brush (hard bristles could scratch the glass).



Mark S. Bacon