

Restoration & Enhancement of Beachfront Shoreline Access: Final Programmatic Report (AMENDED)

Recipient Organization/Agency: Marine Science Institute Date Submitted: July 30, 2019 (Final Submission) Award Amount: \$120,000 Matching Contributions: \$825.67 Total Disbursements: \$120,000 Project Number: 8006.12.033634

1. Summary of Accomplishments

Marine Science Institute (MSI) at 500 Discovery Parkway in Redwood City is one of the few public access beachfronts on the Bay. Our site offers a beautiful setting for numerous forms of public enjoyment of the Bay, including vista viewing, photography, wildlife observation, nature study, canoe & kayak launching, wading, and picnicking. We enrich these activities with programs that offer guided viewing and touching of live marine animals and excursions on the water.

We proposed to use the Cosco Busan Oil Spill Settlement grant of \$120,000 to increase and enhance shoreline recreation. We carried out our proposal, and used this funding to 1) Improve access to the bay by restoring the beach, 2) Enhance visitor safety and education experience by replacing the pier handrails and installing interpretation panels, 3) Installing eco-friendly paved paths throughout the site to improve access especially for mobility-challenged visitors, 4) Providing a comfortable staging area for play and relaxation by replacing our raised, uneven grass area with leveled-out, ecofriendly, synthetic turf, and 5) Further protect the shoreline by installing a dedicated boat wash station away from the beach.

2. Project Activities & Outcomes

2.1. Project Activities

2.1.1. Description of Primary Activities

• *Restoration of the oyster shell beach*

Proposed Activity: Over the decades our beach had eroded to the point that it was severely limiting safe access to the water. Pipes, concrete blocks, and remnants of previous structures were surfacing through the beach area and causing safety hazards for visitors. The disappearing shells made launching boats and enjoyment of the shoreline difficult. San Francisco Bay Conservation and Development Committee (BCDC) had originally advised us that they supported us going forward with this project to restore the beach using the substrate that was originally at the beach. We proposed that we would restore the eroded beach back to its original dimensions, using locally mined oyster shells provided by Jericho Products who are experts in shoreline restoration.

Actual Activity: We hired Lind Marine to restore our eroded beach to its original dimensions. BCDC disallowed the use of oyster shells for restoration material despite their original recommendation. Per the

final BCDC permit instructions, the beach was restored using sand from the bay. (See 2.1.2. Primary Activities Discrepancies)

• Installation of new interpretive handrails on our pier

Proposed Activity: On our pier, there was no signage (1) letting visitors know that they are adjacent to a wildlife refuge, (2) identifying the wildlife frequently seen, or (3) noting the historical and ecological significance of Redwood Creek on which MSI is directly located. We proposed that new handrails would function as both a safety handrail and interpretive signs to help visitors identify and better appreciate the historical, cultural, and environmental significance of the waterscape before them.

Actual Activity: We replaced our dilapidated wooden dock handrails with sturdy vinyl railings and metal reinforcements. On these rails, as well as on our wildlife viewing deck, we installed interpretive panels so visitors may learn about the surrounding ecosystem at their leisure.

• Installation of ecofriendly paved paths throughout the site to increase shoreline access for all including families with strollers and people with disabilities.

Proposed Activity: At the time of this proposal, MSI's buildings including restrooms were all accessible, but the paths between the bathrooms, buildings, wildlife viewing deck were gravel. This limited access and enjoyment for some visitors. We had received feedback from visitors in wheelchairs requesting we install paved paths so that they could freely access all parts of the site. As part of this paving project, we proposed to: (1) level and pave the dirt parking lot which was nearly untenable for disabled visitors particularly during and after rain, and (2) establish handicapped parking spots in the parking lot.

Actual Activity: We complied with ADA regulations by completing the paving and joining eco-friendly paths to each area of our site. The parking lot has been leveled, potholes filled, new gravel laid down, cement parking stops installed, and handicapped parking spots are established.

• Renovation of the raised bed grass area upland from the beach

Proposed Activity: We proposed to replace our raised-bed grass area with a people-friendly surface that is ground level and will stand up to heavy use.

Actual Activity: We took out the raised-bed grass structure. We then flattened and rebuilt the grass area and installed new synthetic turf.

• Construction of a designated boat wash station for recreational boaters

Proposed Activity: At the time of this proposal, the dozens of recreational boaters who were launching weekly from our beach were washing their kayaks, canoes, outriggers, and other small vessels directly on the beach because they had no other option. We proposed to construct and designate a new boat wash station in a sectioned-off area of the property.

Actual Activity: We created a boat washing station on the side of our building. The station is positioned a sufficient distance from the beach, preventing further beach erosion.

2.1.2. Discrepancies

• Restoration of the oyster shell beach

After a 6-year struggle to obtain the BDCD permit for the beach restoration, and after numerous time extension requests to NFWF, the beach restoration finally took place March 25-27, 2019. The primary discrepancy in the beach restoration activity is that BDCD rescinded their recommendation of use of oyster shells for the restoration. They instead permitted the beach restoration with the use of sand.

A minor discrepancy is that the company we originally proposed to use for the beach restoration was Jerico Products. Jerico Products became Lind Marine either through a merger or a purchase. We used Lind Marine for our beach restoration contractor. Chris Lind was our contractor for this project from the beginning in 2012 to the finish in 2019.

• Renovation of the raised bed grass area upland from the beach

Prior to 2012, MSI had some outdoor flower boxes filled with native plants. Over time, these wooden boxes had gotten old and had broken down. When we drafted the budget for this grant during 2012, we had planned to restore these flower boxes.

During the execution of this grant from 2013-2019, on the Lawn Renovation project, we overspent by \$3,700. Because of this, we are unable to use the Cosco Busan grant to pay for the Native Plant Restoration project which has a budgeted cost of \$2,412.

Fortunately for MSI, during 2016, a volunteer and donor, Karen Thrift, offered to help us with the Native Plant Restoration project. Her teenage son, Alex Thrift, volunteered to help MSI with a special project in order to fulfill his Eagle Scout requirement. Alex completed the installation part of the Native Plant Restoration project, and Mrs. Thrift donated the supplies and materials to MSI as an in-kind donation.

• *Construction of a designated boat wash station for recreational boaters and water fountains* When MSI drafted the grant proposal in 2012, we intended to install one wash station for recreational boats and multiple water fountains for human consumption. We have successfully installed the wash station. However, due to cost constraint, we are only able to one water fountains rather than multiple ones.

2.2. Project Benefits

2.2.1. Recreational Benefits Achievements

• Restoration of the beach

MSI's new beach is stunningly beautiful! Beach access to the San Francisco Bay for recreation, kayak/canoe launching, and human enjoyment is rare, especially in San Mateo County. By restoring our beach, which had eroded significantly and become a trepidatious 3-foot cliff drop, the public (and the thousands of students who come to our beach annually to engage in marine science) now have direct and safe access to the bay at all tide levels. The sand has made it easier for people to launch their canoes, kayaks and row boats than from the previous bay mud. This has expanded the water access for all humans, and immediately there was an increase in boating activity from local rowing paddling and kayaking clubs, solo rowers, and schools. MSI has the only beach stretch of San Mateo County bay shoreline that is accessed via Seaport Blvd. It is the closest boat launch for exploration of the Bair Island Refuge National Wildlife Refuge. This Refuge will surely report more paddlers exploring their marshes.

• Installation of new interpretive handrails on our pier

The primary benefits of the pier handrail activity were (1) to ensure visitor safety and (2) to enhance visitor education experience by replacing aging handrails and installing interpretive handrails. We proposed that the inclusion of interpretive material would illustrate the importance of wildlife conservation and for protecting open space areas for outdoor recreation. The signage was proposed to include information on (1) Redwood Creek and its watershed, (2) Bair Island National Wildlife Refuge, (3) the Port of Redwood City, (4) the wildlife supported by the immediate marsh and creek, (5) information about the Bay that lies just outside of the Redwood Creek channel, and (6) the story of the restoration itself.

The new handrails are of metal and plastic composite. Now that they've been installed and in use for 6 years, we have witnessed that our pier visitors are safer and splinter-free. Four interpretive panels were professionally designed and installed. Hundreds of students, teachers and visitors come to our campus every day. They linger on the pier and read the panels as they look out over the water to Bair Island and the

Port of Redwood City. They are getting a deeper story as they read and witness the human and natural activity at this busy intersection with the Bay. This is a teachable moment for all adults and children.

• Installation of ecofriendly paved paths throughout the site to increase shoreline access for all including families with strollers and people with disabilities

The primary benefit of installing paved paths throughout our site is to provide safe and unobstructed access for all visitors to all sections of our campus. We achieved this benefit by using ADA regulations as a starting point. We provided further ease for our visitors by leveling and laying out new gravel, thereby removing the cause of potholes in our parking lot. We provided protection for visitors' cars by installing cement parking stops. We established handicapped parking spots.

Parking problems have been noticeably reduced in space-restricted area for dedicated for vehicles, making access for all guests much less of a burden. And the dust billows which were ever-present have been markedly reduced, which means cleaner air for all.

• Renovation of the raised bed grass area upland from the beach

The new turf area is now level to the ground providing all visitors with unobstructed access to the lawn, and it is now a level playground for children and picnic area for families. This is a synthetic turf that no longer requires watering. This has severely cut down our use of water, which is essential during the drought seasons. Since water is no longer necessary, there is no more run-off to add to the beach erosion. The lawn no longer requires the use of fertilizer and is weed-free.

• Construction of a dedicated boat wash station for recreational boats.

With the installations of the dedicated boat wash station with pressure washer far away from the beach, we have witnessed measurably reduced run-off and associated erosion to the beach. The boat wash activity no longer conflicts with recreation activities as it is now located on the boat storage side of the campus. There is more room to spread out both activities which greatly enhances the experience for all. Fresh water is now available to visitors via the newly installed water fountain that replaced what was once the hose that served both purposes of boat washing and drinking.

Due to the increased use of the boat washing station over the last several years, the amount of rinse water became too much for the French drains that were originally installed with the wash station. Excess rinse water would begin to overflow from the rinse station and run downhill towards the shoreline where it began to slowly erode the beach. If left unresolved, this problem would present a serious erosion problem to our new beach in the near future.

The pressure washer was purchased from watercannon.com, who specialize in commercial pressure washers for various applications. We spoke extensively with Water Cannon's tech support team before deciding on the specifications of the pressure washer we purchased. Our main objectives were to conserve as much water as possible while making sure not to operate at such a high pressure that we would damage a boat's gelcoat or paint. The pressure washer we purchased operates at an extremely efficient 1.0 gallons per minute, which is a huge improvement over the 25+ gallons per minute that we were using directly from the garden hose before. Less water being used to rinse boats means less water that will run off and make its way down to the shoreline to cause erosion problems.

2.2.2. Recreational Benefits Discrepancies

There were no recreational benefits discrepancies.

2.2.3. Unexpected Benefits

We have come to realize that MSI now has three generations of families who have been educated by us about the wonders of marine life in our region. Many older folks are now dropping in, or bringing their children or grandchildren for our programs and for recreation. They marvel at the positive changes and beautification to our campus that have been made possible by this grant. Their access and egress throughout the campus is made easier because of the paved paths. They relax on the new level turf area. They walk down the dock, pointing at the sites and reading to their children. And they play on our new beach. This place is a treasure, and we can't say thank you enough to National Fish and Wildlife Foundation and other funders/donors who support this important conservation effort.

3. The Future

This project was proposed as an expansion of the restroom project that had been funded by NFWF in 2012. The restroom project was completed. Final reporting was done in 2014. Now that this Restoration & Enhancement of Beachfront Shoreline Access project is completed, the entire project is considered to be at termination.

3.1 Restoration of the beach

MSI has a Beach Restoration Monitoring Plan that was approved by BCDC. The Monitoring Plan will help to determine any necessary future maintenance or restoration. The monitoring plan is included with this report. There are no plans to conduct maintenance or further restoration in the immediate future.

3.2 Installation of new interpretive handrails on our pier

Interpretive handrails were constructed with non-corrosive and UV stable materials so require no maintenance except the occasional wiping down with a wet sponge.

3.3 Installation of ecofriendly paved paths

Paved pathways were installed by mixing an ecofriendly soil binder with decomposed granite and compacting to form a solid surface. These require only occasional work to repair minor damage caused by high traffic. A substantial supply of both soil binder and pathway fines are kept on site to perform any necessary repairs or maintenance to the pathways.

3.4 Renovation of the raised bed grass area

The artificial grass is serviced once a month using a special motorized bristle brush attachment on a weedwhacking motor. Brushing the grass helps to both lift the individual grass blades, as well as remove a lot of the sand and shell that accumulates within the grass blades.

3.5 Construction of a dedicated boat wash station

Because of the simple design of the boat wash station no regular maintenance or repair is required.

4. Lessons Learned

Most important lesson learned: It is challenging to work with the government permitting agencies (Army Corps of Engineers and Bay Conservation and Development Commission). It took more than 6 years of applications, reviews, and submitting multiple re-applications because either the originals were lost, or new restrictions or oversights were imposed that did not exist at the time of the initial permit application. These two agencies are understaffed to begin with and both had staff and leadership turnover during this time.

At one point, they lost our application, and they repeatedly requested information from us in piecemeal processes. In addition, there are several larger Bay projects which took priority over our small project. We finally had to bring in the services of our local congressional and state representatives offices, and support groups. The office staff of our local representatives persevered doggedly to assist us with communicating with these two agencies. We learned that there were many other permit applicants that were experiencing frustrations similar to ours, or worse. We learned that it is very important to get permit support prior to and at the point of application submission to ensure that the permit process goes smoothly and project finishes according to the projected timeline.

5. Project Documents

• Photos included below.

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Image 1: Eroded beach and old pier railing, BEFORE PROJECT (photo by Marine Science Institute)



Image 2: Restored beach, AFTER PROJECT (Photo by Marine Science Institute)



Image 3: New interpretive signage on new protective pier railing, AFTER PROJECT (Photo by Marine Science Institute)



Image 4: New paved pathway leading to restroom facilities (Photo by Marine Science Institute)



Image 5: Upgraded parking lot with cement parking stops (Photo by Marine Science Institute)



Image 6: New, level synthetic lawn and one section of newly paved pathway leading to MSI's Discovery Aquarium and Marine Science Center (Photo by Marine Science Institute)



Image 7: New, level synthetic lawn (Photo by Marine Science Institute)



Image 8: Newly installed water fountain, located on a paved walkway near restrooms (Photo by Marine Science Institute)



Image 9: New boat wash station with pressure washer (Photo by Marine Science Institute)