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NPDES No: CA 0024333

Supplemental Environmental Project Proposal

"Interpretive Mesocosm Display Upgrade and Repair"

27 October 2009

for

UC Davis, Bodega Marine Laboratory

2099 Westside Road

Bodega Bay, California 94923

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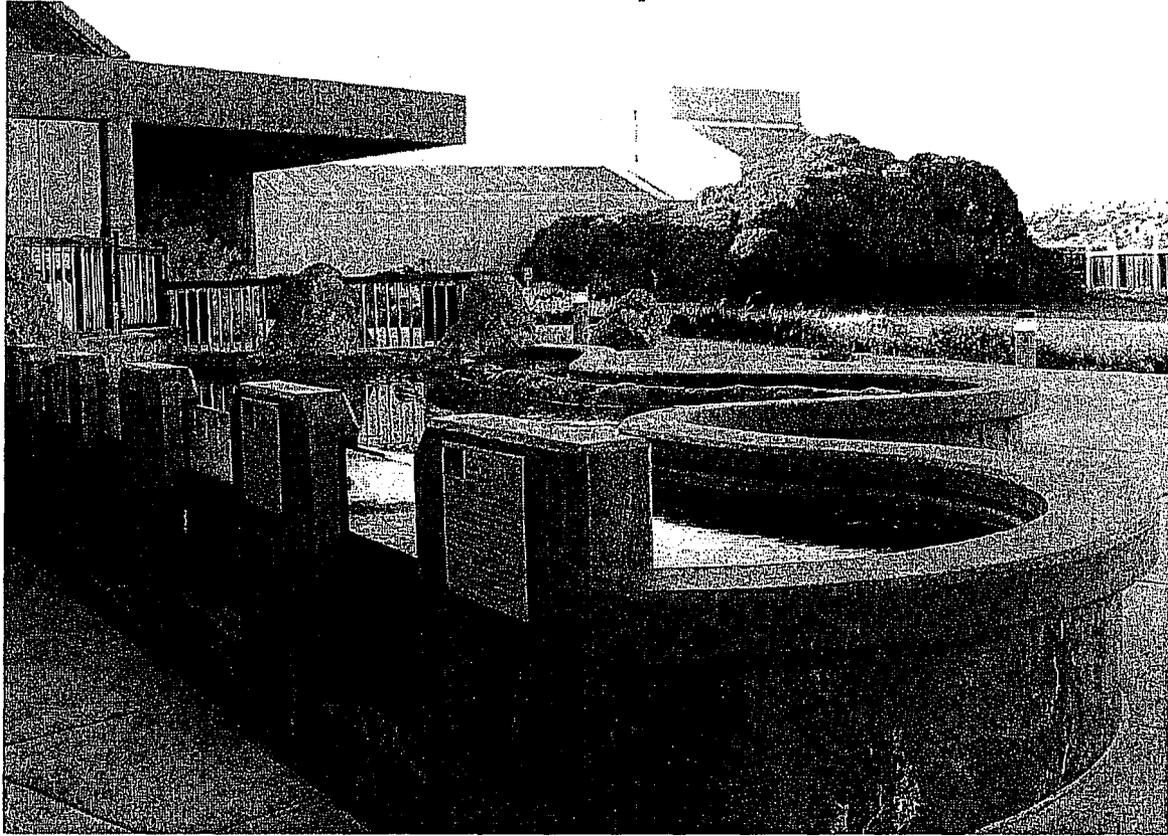
BACKGROUND:

The **UC Davis Bodega Marine Laboratory** is the premier marine research and education facility on the north central coast of California. Located on a 362-acre natural reserve, it hosts approximately 10,000 visitors a year from throughout the state



who participate in docent led tours that focus on our unique coastal environment. Tour highlights include interpretive materials, dry exhibits (whale bones, shells), a visit to our research wetlabs, aquaria with native fish and invertebrates, and most significantly, a tidepool mesocosm that serves as an interpretive touch tank. This tidepool mesocosm, inaugurated in 2000, was originally funded by a benefactor who understood the value of BML's public education program. Public outreach and education, while core to BML's mission, are not funded by our base budget; the program and displays are supported largely by occasional donations and subsidized by BML staff time.

The tidepool mesocosm display was designed to replicate a local intertidal pool, populated with native species and subject to ebb and flood tides, driven from a sensor in the adjacent Horseshoe Cove. The display is fitted with a 'surge' feature that introduces a rush of cold seawater to the pool.



The mesocosm is rimmed with a shallow shelf where intertidal organisms are within range to be gently handled under supervision. With this display, school children can be introduced to local intertidal and nearshore fauna without (1) trampling the intertidal habitats they come from (2) having to plan their visit around low tides, or (3) being subjected to safety hazards of visiting natural tidepools. Interpretive lectures led by docents and graduate students use the display to discuss marine conservation, biodiversity and public stewardship of coastal habitats.

The display is run by multiple mechanical systems: pumps, filters, controls, motors and chillers, all requiring significant maintenance. Outside, the display requires cleaning and animals require care and feeding on an ongoing basis. Several months ago, critical pieces of the supporting system of the tidepool began to fail due to senescence, including pumps, the surge feature, and the tide controller. Presently, due to these failures, our tidepool mesocosm feature is offline. Animals have been relocated to interior wetlabs, and water has been drained. The display being out of order has negatively impacted the public education experience, particularly for school children; it was the primary 'hands on' interpretive, bilingual display at BML.

Though we do not have a reliable revenue stream to fund the support of the system, BML is dedicated to restoring the feature on behalf of the public who benefit from it.

PROPOSAL:

The UC/Bodega Marine Laboratory is proposing as a *Supplemental Environmental Project* to redesign, upgrade and restore its public education tidepool mesocosm display that is located at the same facility governed by the NPDES permit. Redesigning and upgrading the mechanical function with the goal to lower the carrying costs is essential. Further, upgrading the feature to include additional surge will increase the clarity and health of native algae, while reducing the staff hours required in cleaning. A single large sand filter instead of a bank of canister filters will be less expensive to maintain while providing the same service. Other changes, including the source of the surge water, will be an energy saving, cost effective solution as well. The physical labor to re-engineer and restore the tidepool will come from BML staff from two units: the Aquatic Resources Group who manage the display and care for the animals, and the Physical Plant who are responsible for the systems. Key goals for the repair of the tidepool include: (1) restore circulation flow, (2) restore the surge feature, and (3) restore tide control system.

The Bodega Marine Laboratory staff are ideally suited to perform all the mechanical, life support and maintenance of the display system. The display was designed and engineered by BML staff, and it has proven to be successful for years. Its present state of disrepair has been the result of funding latency and an accumulation of deferred maintenance, which the present plan intends to repair and upgrade.

The Bodega Marine Laboratory proposes to accomplish all the above work by the end of February 2010. By that time the mesocosm will be restored and operating at a more efficient level and maintaining higher level displays. Once operational, we will commit to seeking outside funding to support the display.



BML students study natural tidal pools in front of the laboratory. The mesocosm display will allow the public to benefit from similar, docent-led instruction at the laboratory facility without impacting the environment.

BUDGET & TIMELINE:

Tidepool Mesocosm Display: Redesign, Upgrade & Restore

	Materials	Time@40/hr	Date of Completion
<u>Physical Plant</u>			
Replace broken pump	\$2,800.00		DONE
Replumb sump water source			DONE
Restore tide tracking feature - PLC connections	\$1,000.00	1600.00*	5/15/10
Replace coupling band on the new surge line	\$200.00	640.00*	2/15/10
Replace cannister filters with sand filter and replumb	\$250.00	640.00*	3/15/10
Install bilge type pump in sump room	\$300.00	\$120.00	3/15/10
Restore circulation flow		\$320.00	3/15/10
Repair leaks to window seals		\$480.00	DONE
<u>Aquatic Resources</u>			
<u>Group</u>			
Drain tidepool and remove biologicals			DONE
Remove Sargassum			DONE
Pressure wash interior/ scrub biofouling		\$816.00	2/15/10
Clean out all silt and sediment from substructures		\$544.00	2/1/10
Modify/fix delivery manifolds		\$720.00	2/26/10
Clean out sumps in control room		\$544.00	2/26/10
Clean and polish windows	\$100.00	\$272.00	2/2/10
Collect organisms	\$168.00	\$544.00	4/15/10
Restore aquascaping	\$150.00	\$544.00	4/23/10
Fill and return biologicals		\$340.00	4/23/10
Prep and presentation		\$340.00	4/23/10
Purchase animal food	\$250.00		4/15/10
	\$5,218.00	\$5,584.00	

GRAND TOTAL	\$10,802.00
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*BML will contribute this labor toward the project.

The work proposed will take place in early spring 2010, with a completion date of 15 May 2010. BML is anxious to have this display completed in time for the spring undergraduate courses which are held at BML, as well as for the summer season when we are intensely visited by the public. We have begun preliminary work on this project, and will continue as time allows through the middle of May.

NEXUS CRITERIA:

The Bodega Marine Laboratory is a facility located on a 362-acre reserve managed by the University of California Natural Reserve System. The laboratory was built to promote marine research and education. Key to that mission is the flow-through seawater system that delivers water to various laboratories within the facility. The seawater system is fundamental to the research of resident faculty, visiting researchers, and graduate and undergraduate students. The seawater system is also critical to the public education displays.

BML discharges into an Area of Special Biological Significance and as such our effluent cannot have an environmental impact on this special coastline. BML continues to take steps to reduce the likelihood of a discharge exceedance, as we share the concern for keeping the ASBS pristine both for our mission and for future generations.

BML hosts over 10,000 public visitors each year who are educated about our mission, our responsibility as a steward of the reserve and adjacent coastal waters, and the facility. Enhancing the public experience *at the same location* where the discharge occurs, is an excellent opportunity to educate visitors about the marine environment and the compliance limits we are required to meet. Further, providing touch tanks and a tidepool display keeps the public from trampling and disrupting our fragile intertidal; maintaining the environmental integrity of the intertidal and surrounding waters is precisely why we have compliance/discharge limits.

