



**Morro Bay National Estuary Program
Community Grant Application Cover Sheet**

Project Title:

Applicant:

Address:

Contact Person(s):

Phone:

Fax:

Email:

Grant Amount Requested (cannot exceed \$5,000):

Total Estimated Project Cost:

Amount & Source of Other Funding (if relevant):

Project Description Summary (fill in here or attach additional document; word limit 300):



Check off the Comprehensive Conservation and Management Plan Priority Issue(s) addressed by the proposed project:

Sedimentation.

Bacterial contamination.

Elevated nutrient levels.

Toxic pollutants.

Scarce freshwater resources.

Preserving biodiversity.

Environmentally balanced uses.

Briefly describe how your project addresses the priority issue(s) you checked above.

The proposed project must work to implement at least one of the Action Plans that address the Priority Issues listed above. The Action Plans are detailed beginning on page 23 of the Management Plan, which can be found at MBNEP.org.

In the space below, please list the relevant Action Plan(s) and briefly describe how they will be addressed by this project.

Priority Issues

This project is aimed at educating students about sources of bacteria, nutrients, toxins flowing from the watershed to the bay. However, the primary focus is addressing the priority issue of sedimentation in the bay from the perspective of education for elementary-age students. Students will experiment with sediments in trays to investigate processes of erosion along with the practical behavior changes and experimentation with engineering solutions to reduce rate of erosion processes. Students will also be introduced to wetland organisms that are impacted by accelerated sedimentation issues.

Action Plans

This project addresses the Education and Outreach Action Plan EO-4 as a Formal Education Program to be designed with input from a coalition of veteran science teachers and tested at a Title 1 charter elementary school in Morro Bay and made available to other schools within the Morro Bay watershed in the form of curriculum PDFs housed on the MB NEP website and a kit of materials made available for schools to borrow as needed. The curriculum will include concepts integral to Action Plans Land Protection LP-4 by way of education about water-wise gardening practices as well as Best Management Practices BMP-1 Agricultural and Grazing BMPs and BMP-2 Rural Roads Erosion. Changes in eel grass distribution and thus biodiversity will also be discussed as students analyze data on maps from different years.

Title

Curriculum for Elementary-Age Morro Bay Watershed Stewardship

Full Project Description

There is an apparent absence of easily-accessible, organized, high-quality, elementary-aligned, in-depth teaching materials specific to watershed processes in the Morro Bay area. Existing activities and curricula may be modified to meet the needs of Morro Bay educators, Next Generation Science Standards (NGSS) and MB NEP goals, but that modification takes time and expertise. NGSS are relatively recently adopted and require a fresh look at existing science curricula. This document is a proposal for how this grant funding opportunity and Sarah Bryant's skill-set, along with her professional and community network, could come together to fill this unmet need.

The goal of this project is to promote life-long, bay-friendly practices in upland settings through hands-on, watershed-processes-related education of elementary-age students in the Morro Bay watershed. Activities will be designed to align with NEP goals as well as California- adopted Next Generation Science Standards (NGSS) and Science, Technology, Engineering, Art and Math (STEAM). The ongoing processes occurring in the Morro Bay watershed provide the perfect context for discussing human impact on the natural world and possible solutions for how to reduce that impact.

In addition to educating students at the Family Partnership Charter School Montessori Center in Morro Bay (FPCS MB) and Left Coast Art Studio (LCAS) Summer Camps, the curriculum developed this year will be designed, tested, and revised as needed before being documented for use by other elementary educators in the Morro Bay Watershed. FPCS is a Title One school due to its high percentage of students who qualify for a free or reduced-price lunch program. Sarah Bryant has coordinated the garden and taught science part -time at FPCS MB since 2015. The school has a weekly garden-science program and is primed to expand the science program to include hands-on, project-based study of additional natural processes.

The watershed investigation activities will include: exploration of land and water forms in Morro Bay watershed through photographs of local watershed features; experimentation with sediment-filled stream-table trays; design of investigations to test erosion-control models (riprap, straw waddles, vegetation, gravel, mulch, hardscape, etc.); interpretation of maps; study of diversity, adaptation and interconnectedness of organisms in the Morro Bay Watershed; and analysis of the interactions among geosphere, biosphere, hydrosphere and atmosphere. Activities will aim to emphasize student understanding of patterns, scale, cause and effect, system models, scientific process, using evidence in arguments, collecting, graphing, analyzing and evaluating data.

Deliverables will include:

- PDFs of class and small-group activities
 - Each PDF will be designed for use by educators in the Morro Bay Watershed and include:
 - Intended grade level
 - State-mandated Next Generation Science Standards (NGSS) alignment details
 - Supply list and budget for materials to collect or purchase

Proposal to MB NEP from Sarah Bryant for Elementary Watershed Stewardship Curriculum

- Step-by-step directions for preparing and delivering each activity/lesson
- Pre and post-assessment tools to measure effectiveness of activity and identify topics to revisit
- A kit of supplies for use by the FPCS Montessori Morro Bay Center and the Left Coast Art Studio Summer Camp programs for children age 6 to 12
- Additional kit of supplies to be housed at MB NEP office and made available for check out by other local teachers
- Photos of students engaged in project-based exploration of watershed processes and design of engineering solutions to watershed issues.

Community Engagement

- Collaboration between Sarah Bryant, FPCS MB, LCAS, MB NEP, SLO Botanical Garden, Los Osos Library, CREEC Network (California Regional Environmental Education Community) Region 8, Cuesta Sustainability Resource Center, One Cool Earth, and science teachers at multiple schools in San Luis Obispo, Santa Barbara and Monterey Counties will make this project efficient and ensure that it will not be redundant with existing programs.
- The Whole Kids Foundation (the charitable arm of Whole Foods Market) helped FPCS MB and the Montessori Parent Network (MPN) fund the school garden program's raised beds, outdoor-classroom chalkboard, garden shades, a tool shed, soil and seeds. This area will be ideal for developing and testing proposed watershed investigation activities.
- NOAA Ocean Guardian School program has funded FPCS MB to carryout projects promoting ocean-friendly gardening and native plant restoration in the 2017-2018 school year. This program has goals that overlap with the MB NEP and is being coordinated at FPCS MB by Sarah Bryant.
- Costs for procuring materials and developing the proposed watershed-stewardship curriculum will be shared between MB NEP, FPCS MB, MPN, Whole Kids Foundation, NOAA Ocean Guardian School Program, and Sarah Bryant.
- Local library branches will provide a venue for sharing student-designed displays on watershed stewardship. This will serve to share best practices as well as spread the word about the proposed watershed-study kit and curriculum resources.
- Local weather data is a meaningful, relatable way to get students interested and engaged in measurement, data analysis, math and connection between hydrosphere, geosphere and biosphere. Rather than investing in a weather station at our school, we plan to access the Morro Bay Yacht Club and MB NEP weather station data for students to practice data collection, graphing and analysis skills in relation to watershed processes.
- Collaboration with Morro Bay Natural History Museum and National Estuary Program for use of maps and photos and to confirm that we are not recreating programs they have already created.
- Other groups to be contacted regarding possible collaboration include Morro Bay in Bloom, Science Discovery and the Watershed Stewards program.

Audience

Elementary students and educators in Morro Bay Watershed

Benefits

Proposal to MB NEP from Sarah Bryant for Elementary Watershed Stewardship Curriculum

The benefit of this project will be to not only educate students about the interconnectedness of upland activities and the health of Morro Bay but also provide a model and kit for other educators to use in their classrooms. Areas of focus will include accelerated sedimentation and possible planning/design solutions, bacterial sources and interventions, diversity and adaptations among organisms in Morro Bay Watershed and bay.

Budget

Item	Details	Provider	labor cost	Funding Source for Cost Sharing			
				MBNEP Proposal	FPCS MB	NOAA Grant	Donation
Materials for 2 watershed modeling and investigation kits	Including bins, trays, sives, funnels, graduated cylinders, watering cans, materials for engineering design investigations (plaster, sticks, stone, gravel, straw, etc.) Made up of mostly reusable items	Various		\$600	\$50		\$50
Printing of photos of Morro Bay Watershed Features		Costco		\$100			
PDFs of Morro Bay focused watershed project activities to post on NEP website	see below						
	Research and Design of NGSS aligned watershed activities, collaboration with other organizations and assembly of kits	Sarah Bryant with input from veteran science teachers	\$3,600	\$3,000	\$200	\$300	\$100
	preparation and testing of activities with students	Sarah Bryant at FPCS	\$600		\$150	\$300	\$150
	revision of activities based on experience with students	Sarah Bryant with input from veteran science teachers	\$600	\$500			\$100
	retesting of revised activities	Sarah Bryant at LCAS	\$600				\$600
	Finalize documentation of activities to share with other educators	Sarah Bryant and Red Ink Black Ink editing services	\$600	\$600			
			TOTAL	\$4,800	\$400	\$600	\$1,000
			% of total	71%	6%	9%	15%

Evaluation

Number of students reached at FPCS MB – 50

Number of students reached at LCAS – 15

Number of science teachers involved in reviewing curricula – 8

Number of local schools collaborating on review of curricula and possibly using curricula in future - 4

Activities will be designed and documented for other educators to access through NEP website

Number of kits available to local educators - 2

Number of student-designed displays at local libraries on the topic of watershed stewardship – 2

Average Number of visitors per month at library - 6500

Schedule

Winter 2017-2018 – Design and test watershed activities

Spring 2018 – Revise watershed activities

Summer 2018 – Retest activities at LCAS Summer Camp in Los Osos

Summer and Fall 2018 – Finalize PDFs and photos to deliver to MB NEP for use on website to share with other educators

Qualifications

The education and work experiences that qualify Sarah Bryant to complete this proposed project include:

- degree in geology and biology from Brown University in Providence, Rhode Island
- experience designing and teaching classroom and field-trip based Marine Biology Summer Camps for elementary-age students in Monterey, California
- teacher training and members' program work at the Monterey Bay Aquarium
- leading kayak natural history tours of Monterey Bay and Elkhorn Slough
- researching bird populations and behaviors for the Big Sur Ornithology Lab at Andrew Molera State Park and the Point Reyes Bird Observatory on Southeast Farallon Island
- training in Montessori teaching at the World Montessori Education Institute
- collaboration with Sea Education Association faculty on marine-policy course design and NOAA-funded Single Use Plastics Reduction program
- 15 years writing and editing science-education materials as well as facilitating State Department of Education sponsored teacher committees for McGraw-Hill, Houghton-Mifflin-Harcourt and other publishing companies
- 3 years coordinating the school garden and science activities at the FPCS Morro Bay Montessori Center
- 3 years designing and teaching Tinkering Classes and Camps in Los Osos, CA where children explore engineering, design, collaboration, science and art in a child-directed, free-flowing, fun atmosphere with a focus on recycling and found objects.

By collaborating with veteran teachers, biologists, geologists, NOAA Ocean Guardian School Program, Whole Kids Foundation, SLO Botanical Garden, SLO Libraries, Morro Bay Yacht Club, Sandprints Photography, the Left Coast Art Studio, the Montessori Parent Network, Morro Bay Natural History Museum, Red Ink Black Ink Editing Services, and a charter school, Sarah Bryant can stretch the MB NEP's funds to include research, design, development, testing, distribution and outreach for watershed-stewardship curriculum.