

Estuary Action Challenge Environmental Education Program

Project Information

1. Proposal Title:

Estuary Action Challenge Environmental Education Program

2. Proposal applicants:

Mandi Billinge, Estuary Action Challenge/Earth Island Institute

Brenda Salgado, Estuary Action Challenge

Shefali Shah, Estuary Action Challenge

Sheela Shankar, Estuary Action Challenge

3. Corresponding Contact Person:

Mandi Billinge

Estuary Action Challenge/Earth Island Institute

1771 Alcatraz Avenue Berkeley, CA 94703

510 985-1602

eaceii@aol.com

4. Project Keywords:

Environmental Education

Human Health

Urban Stream Restoration

5. Type of project:

Education

6. Does the project involve land acquisition, either in fee or through a conservation easement?

No

7. Topic Area:

Environmental Education

8. Type of applicant:

Private non-profit

9. Location - GIS coordinates:

Latitude: 37.8488

Longitude: -122.2720

Datum:

Describe project location using information such as water bodies, river miles, road intersections, landmarks, and size in acres.

Wildcat Creek in Richmond and San Pablo, Rheem Creek in San Pablo, Strawberry Creek and Harwood Creek in Berkeley, Sausal and Rainbow Creeks in Oakland. Arrowhead Marsh in Oakland, Shorebird Park in Berkeley, McCullough's Beach in Richmond. Elementary Schools in Richmond and San Pablo, Contra Costa County and Oakland and Berkeley, Alameda County.

10. Location - Ecozone:

Code 16: Inside ERP Geographic Scope, but outside ERP Ecozones

11. Location - County:

Alameda, Contra Costa

12. Location - City:

Does your project fall within a city jurisdiction?

Yes

If yes, please list the city: Richmond, San Pablo, Berkeley, Oakland

13. Location - Tribal Lands:

Does your project fall on or adjacent to tribal lands?

No

14. Location - Congressional District:

7, 9

15. Location:

California State Senate District Number: 9,

California Assembly District Number: 14, 16

16. How many years of funding are you requesting?

1

17. Requested Funds:

a) Are your overhead rates different depending on whether funds are state or federal?

No

If no, list single overhead rate and total requested funds:

Single Overhead Rate: 30

Total Requested Funds: 120,000

b) Do you have cost share partners already identified?

Yes

If yes, list partners and amount contributed by each:

Goldman Fund \$25,000

Haas Fund \$20,000

Dean Witter Foundation \$15,000

Tides Foundation \$15,000

Sierra Club Youth In Wilderness \$25,000

c) Do you have potential cost share partners?

Yes

If yes, list partners and amount contributed by each:

National Fish and Wildlife Foundation \$30,000

d) Are you specifically seeking non-federal cost share funds through this solicitation?

No

If the total non-federal cost share funds requested above does not match the total state funds requested in 17a, please explain the difference:

18. Is this proposal for next-phase funding of an ongoing project funded by CALFED?

Yes

If yes, identify project number(s), title(s) and CALFED program (e.g., ERP, Watershed, WUE, Drinking Water):

01-N34 Estuary Action Challenge Environmental Education Program ERP

Have you previously received funding from CALFED for other projects not listed above?

No

19. Is this proposal for next-phase funding of an ongoing project funded by CVPIA?

No

Have you previously received funding from CVPIA for other projects not listed above?

No

20. Is this proposal for next-phase funding of an ongoing project funded by an entity other than CALFED or CVPIA?

No

Please list suggested reviewers for your proposal. (optional)

21. Comments:

Environmental Compliance Checklist

Estuary Action Challenge Environmental Education Program

1. CEQA or NEPA Compliance

a) Will this project require compliance with CEQA?

No

b) Will this project require compliance with NEPA?

No

c) If neither CEQA or NEPA compliance is required, please explain why compliance is not required for the actions in this proposal.

There are no endangered species present. There is no significant structural work involved.

2. If the project will require CEQA and/or NEPA compliance, identify the lead agency(ies). If not applicable, put "None".

CEQA Lead Agency:

NEPA Lead Agency (or co-lead:)

NEPA Co-Lead Agency (if applicable):

3. Please check which type of CEQA/NEPA documentation is anticipated.

CEQA

-Categorical Exemption

-Negative Declaration or Mitigated Negative Declaration

-EIR

Xnone

NEPA

-Categorical Exclusion

-Environmental Assessment/FONSI

-EIS

Xnone

If you anticipate relying on either the Categorical Exemption or Categorical Exclusion for this project, please specifically identify the exemption and/or exclusion that you believe covers this project.

4. CEQA/NEPA Process

a) Is the CEQA/NEPA process complete?

Not Applicable

b) If the CEQA/NEPA document has been completed, please list document name(s):

5. Environmental Permitting and Approvals (If a permit is not required, leave both Required? and Obtained? check boxes blank.)

LOCAL PERMITS AND APPROVALS

Conditional use permit

Variance

Subdivision Map Act

Grading Permit

General Plan Amendment

Specific Plan Approval

Rezone

Williamson Act Contract Cancellation

Other

STATE PERMITS AND APPROVALS

Scientific Collecting Permit

CESA Compliance: 2081

CESA Compliance: NCCP

1601/03

CWA 401 certification

Coastal Development Permit

Reclamation Board Approval

Notification of DPC or BCDC

Other

FEDERAL PERMITS AND APPROVALS

ESA Compliance Section 7 Consultation

ESA Compliance Section 10 Permit

Rivers and Harbors Act

CWA 404

Other

PERMISSION TO ACCESS PROPERTY

Permission to access city, county or other local agency land.

Agency Name:

Permission to access state land.

Agency Name:

Permission to access federal land.

Agency Name:

Permission to access private land.

Landowner Name:

6. Comments.

Land Use Checklist

Estuary Action Challenge Environmental Education Program

1. **Does the project involve land acquisition, either in fee or through a conservation easement?**

No

2. **Will the applicant require access across public or private property that the applicant does not own to accomplish the activities in the proposal?**

No

3. **Do the actions in the proposal involve physical changes in the land use?**

No

If you answered no to #3, explain what type of actions are involved in the proposal (i.e., research only, planning only).

Education programs

4. **Comments.**

Conflict of Interest Checklist

Estuary Action Challenge Environmental Education Program

Please list below the full names and organizations of all individuals in the following categories:

- Applicants listed in the proposal who wrote the proposal, will be performing the tasks listed in the proposal or who will benefit financially if the proposal is funded.
- Subcontractors listed in the proposal who will perform some tasks listed in the proposal and will benefit financially if the proposal is funded.
- Individuals not listed in the proposal who helped with proposal development, for example by reviewing drafts, or by providing critical suggestions or ideas contained within the proposal.

The information provided on this form will be used to select appropriate and unbiased reviewers for your proposal.

Applicant(s):

Mandi Billinge, Estuary Action Challenge/Earth Island Institute
Brenda Salgado, Estuary Action Challenge
Shefali Shah, Estuary Action Challenge
Sheela Shankar, Estuary Action Challenge

Subcontractor(s):

Are specific subcontractors identified in this proposal? No

Helped with proposal development:

Are there persons who helped with proposal development?

No

Comments:

None

Budget Summary

Estuary Action Challenge Environmental Education Program

Please provide a detailed budget for each year of requested funds, indicating on the form whether the indirect costs are based on the Federal overhead rate, State overhead rate, or are independent of fund source.

Independent of Fund Source

Year 1												
Task No.	Task Description	Direct Labor Hours	Salary (per year)	Benefits (per year)	Travel	Supplies & Expendables	Services or Consultants	Equipment	Other Direct Costs	Total Direct Costs	Indirect Costs	Total Cost
1	2 School Wide Creek Education Programs + web site development	870	24800	0	0	2000	0	0	0	26800.0	10300	37100.00
2	1 Community Creek Clean Up Program	120	3000	0	0	400	0	0	0	3400.0	2500	5900.00
3	10 Urban Creek Restoration Programs + web site development	505	14000	0	0	1000	0	0	0	15000.0	6800	21800.00
4	20 Bay Estuary Scientist Workshops	160	4000	0	0	1000	0	0	0	5000.0	2500	7500.00
5	10 Pollution Reduction/Safe Bay Food Consumption Programs	505	14000	0	0	1000	0	0	0	15000.0	6800	21800.00
6	20 Bay and Creek Field Trip Explorations	160	4000	0	0	600	0	0	0	4600.0	2500	7100.00
7	Project management	370	12000	0	0	2200	0	0	0	14200.0	4600	18800.00
		2690	75800.00	0.00	0.00	8200.00	0.00	0.00	0.00	84000.00	36000.00	120000.00

Year 2												
Task No.	Task Description	Direct Labor Hours	Salary (per year)	Benefits (per year)	Travel	Supplies & Expendables	Services or Consultants	Equipment	Other Direct Costs	Total Direct Costs	Indirect Costs	Total Cost
		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Year 3												
Task No.	Task Description	Direct Labor Hours	Salary (per year)	Benefits (per year)	Travel	Supplies & Expendables	Services or Consultants	Equipment	Other Direct Costs	Total Direct Costs	Indirect Costs	Total Cost
		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Grand Total=120000.00

Comments.

Budget Justification

Estuary Action Challenge Environmental Education Program

Direct Labor Hours. Provide estimated hours proposed for each individual.

Mandi Billinge, Executive Director, est. 750 hours Sheela Shankar, Program Director, est. 690 hours
Shefali Shah, Program Director, est. 690 hours Brenda Salgado, Program Director, est. 560 hours

Salary. Provide estimated rate of compensation proposed for each individual.

Mandi Billinge, \$36/hour, \$27,000 Sheela Shankar, \$25/hour, \$17,250 Shefali Shah, \$25/hour, \$17,250
Brenda Salgado, \$25/hour, \$14,000

Benefits. Provide the overall benefit rate applicable to each category of employee proposed in the project.

Benefits are not requested for this contract.

Travel. Provide purpose and estimate costs for all non-local travel.

No non-local travel is involved in this contract.

Supplies & Expendables. Indicate separately the amounts proposed for office, laboratory, computing, and field supplies.

\$2,200 for office supplies \$6,000 for field supplies, including educational and restoration equipment

Services or Consultants. Identify the specific tasks for which these services would be used. Estimate amount of time required and the hourly or daily rate.

No consultants will be used for this contract.

Equipment. Identify non-expendable personal property having a useful life of more than one (1) year and an acquisition cost of more than \$5,000 per unit. If fabrication of equipment is proposed, list parts and materials required for each, and show costs separately from the other items.

No equipment is required for this contract.

Project Management. Describe the specific costs associated with insuring accomplishment of a specific project, such as inspection of work in progress, validation of costs, report preparation, giving presentations, response to project specific questions and necessary costs directly associated with specific project oversight.

Project management is identified as a separate task, with subtasks involving planning with teachers, principals and collaborators, curriculum development and evaluations and reports.

Other Direct Costs. Provide any other direct costs not already covered.

No other direct costs.

Indirect Costs. Explain what is encompassed in the overhead rate (indirect costs). Overhead should include costs associated with general office requirements such as rent, phones, furniture, general office staff, etc., generally distributed by a predetermined percentage (or surcharge) of specific costs.

Overhead is allocated at 30%. This includes rent, communications, technology, local travel, administration and accounting.

Executive Summary

Estuary Action Challenge Environmental Education Program

Estuary Action Challenge Environmental Education Project Geographic Location This project will be located in low income, urban schools in Richmond and San Pablo in Contra Costa County and Berkeley and Oakland in Alameda County. We will focus on urban streams and bay habitats in these areas.

Project Type This is a hands on environmental education project, focusing on local water resources and environmental justice issues in underserved urban communities. **Objectives** 1) Increase the number of teachers, using the local estuary environment, to stimulate students' learning. 2) Empower students to help solve local water resource/environmental justice problems. 3) Increase community environmental health through long term behavior changes. 4) Make environmental education equally accessible to girls and boys from all cultural backgrounds. **Approach** Estuary Action Challenge partners with teachers and students to study, clean up and restore urban creek and bay habitats, reduce urban runoff pollution and address issues of water quality and safe bay food consumption. **Students in EAC programs:** plant trees and wildflowers along urban creeks organize community creek and bay habitat clean ups raise Pacific Chorus Frogs in classrooms to release back into creek homes design and distribute creative outreach materials to inform school communities about reducing urban runoff pollution express concerns about pollution and environmental justice issues using letter writing campaigns, interviews with politicians and play performances interview people fishing on bay piers about safe bay food consumption and distribute informational flyers in seven different languages demonstrate safe bay fish cooking to families at school-community events and teach safety precautions that reduce health risks. **Hypothesis** Does effective environmental education lead to: increased, active involvement with estuary habitat conservation projects? increased appreciation for estuary resources? increased understanding of restoration activities? **Expected Outcome** A goal of EAC is to change the field of environmental education to focus on education through action including restoration, pollution reduction and community outreach, incorporating urban, environmental justice issues. **Relationship To CALFED ERP Goals** The EAC projects furthers the CALFED Environmental Education goals for K - 12.

Proposal

Estuary Action Challenge/Earth Island Institute

Estuary Action Challenge Environmental Education Program

Mandi Billinge, Estuary Action Challenge/Earth Island Institute

Brenda Salgado, Estuary Action Challenge

Shefali Shah, Estuary Action Challenge

Sheela Shankar, Estuary Action Challenge

ESTUARY ACTION CHALLENGE



Estuary Action Challenge collaborates with teachers to inspire environmental consciousness in children and cultivate a love of learning.

ESTUARY ACTION CHALLENGE ENVIRONMENTAL EDUCATION PROGRAM

A. Project Description: Project Goals and Scope of Work

1. Problem Statement

Environmental education, providing integrated instruction focusing on the local environment, helps students achieve in all subject areas. In 1999, the State Education and Environment Round Table (www.seer.org) published a report, Closing The Achievement Gap. The report was based on a study of schools that use the local school environment and community to stimulate learning in all subject areas. Students in these environmental education programs performed better in language arts, math, science and social studies than their peers taught by traditional methods. They also retained more of what they learned, produced greater quantities of higher quality writing and had fewer discipline problems

Over 80% of teachers in EAC programs tell us that teacher-training workshops in environmental science education have been difficult to implement in the classroom. This is due to a lack of confidence in teaching hands-on activities in the classroom and outdoors. There is also a lack of resources available to teachers for this work. There is a need to provide hands-on training for teachers, which provides the opportunity for them to learn alongside their students and gain the skills required to manage hands-on activities both in the classroom and in the local environment.

"I have been in several workshops where educators train the teachers to then go teach our students without direct support. Somehow it never translates into the classroom experience. Working with Estuary Action Challenge has allowed me to teach with terrific teachers while learning along with my students. Therefore the experience is easy to repeat, extend and enrich."
Sharon Strachan, Fifth Grade Teacher, Thousand Oaks School, Berkeley

In low-income, urban areas there are particular problems affecting local water resources and community environmental health. Estuary Action Challenge focuses particularly on the following environmental justice issues:

1. degraded urban creek habitats, used as trash dumping sites, overgrown with invasive plants and lacking native plants and animals. If cleaned up and restored, these creeks become valuable community recreational and educational resources.
2. pollution entering local waterways as effluent from factories and refineries, pesticide runoff from farms and gardens and direct dumping of household toxins into storm drains. Pollutants poison the water we drink and the food we eat.
3. many families fishing from the San Francisco Bay depend on the food caught as a major part of their diet, but fish and shell fish in the S.F. Bay are contaminated with pollutants including: methylmercury, polychlorinated biphenyls, dioxins and pesticides. Consumption of these pollutants increases the risk of neurotoxicity and cancer, especially in children.

In the fields of science and environmental activism, there are very few women and people of color holding high level, leadership positions. This problem reflects lower achievement levels of girls and children of color in science and environmental education. In national assessment tests measuring science proficiency levels in elementary, middle and high school students, girls consistently score lower than boys. African American and Latino-Chicano students score significantly lower than white students (National Center For Education Statistics, 1996).

Objectives

1. Increase the number of teachers using the local estuary environment as a key educational resource to stimulate students' learning.
2. Empower students to help solve local water resource/environmental health and justice problems.
3. Increase community environmental health in the following environmental justice areas:
 - adopt urban creeks in school neighborhoods, decrease the amount of trash and increase the numbers of indigenous trees, wildflowers and animals in adopted creeks, increasing the value of creeks as educational and recreational community resources;
 - increase the awareness of families and school communities of personal life style choices that reduce the amount of pollution entering storm drains and ground water that drains to creeks and the bay;
 - increase the awareness of local factories, refineries, and politicians of local people's concerns for their environmental health and the need to reduce pollution;
 - increase the number of people using smart bay fishing and safe cooking practices to improve long-term health.
4. Develop long term behavior changes that have a positive impact on local water resources and community environmental health.
5. Make environmental/science education equally accessible to girls and boys from all cultures.

Hypothesis

Does effective environmental education lead to:

- increased, active involvement with estuary habitat conservation projects?
- increased appreciation for estuary resources?
- increased understanding of restoration activities?

Location and/or Geographic Boundaries of the Project

The project will take place in the central San Francisco Bay, an area largely underserved by CALFED. EAC partner schools are located in Richmond and San Pablo in Contra Costa County and Oakland and Berkeley in Alameda County. Our schools are low income, urban schools with 80 - 100% children of color, receiving free or reduced school lunch. In some cases, less than 1% of children's families attended college. We target urban schools, which are within walking distance of a target urban creek and/or where a high percentage of children's families fish from the bay and shop at local fish markets. These schools include African American, Latino-Chicano, Phillipino, Chinese, Laotian and Mien children and their families. Adopted creek habitats are Wildcat Creek in Richmond and San Pablo, Rheem Creek in San Pablo, Strawberry Creek and Harwood Creek in Berkeley and Sausal Creek and Rainbow Creek in Oakland. Adopted bay habitats are Arrowhead Marsh in Oakland and Shorebird Park in Berkeley, near Berkeley Marina.

2. Justification

Adaptive Management

Estuary Action Challenge works to create effective, on-going environmental education programs in target schools. Our approach, perfected through years of experience, is to:

- promote active, hands-on restoration and stewardship of local habitats
- provide long-term, in-depth, experiential training for teachers
- partner with strong teams of teachers and school principals
- involve parents and the wider community
- collaborate with ongoing restoration efforts of local agencies.

The EAC approach is education through action. The students learn about environmental issues and are given the tools and skills needed to problem solve and take action. They adopt local habitats, for example an urban creek near their school, and help to clean up and restore them. They work on issues that impact their daily lives, for example pollution, environmental justice and safe bay food consumption. In EAC programs, students connect with the water resources around them and are empowered to help restore a healthier environment. They make long term behavior changes that have a positive impact on their environment and their health.

The EAC model of working directly with teachers and students works because it provides in-depth support and hands-on training for teachers. An EAC Leader works with each class throughout the school year, for eight two-hour sessions, modeling activities and developing projects. Sessions are spread out to allow teachers time for extensive follow-up activities with students. Teachers also have four planning meetings with the EAC Leader. Once trained in EAC, teachers continue programs year after year, using the activities they have learned, our curriculum guides, educational resources and equipment.

In the year following their training, teachers meet with EAC staff to plan the implementation of the programs they have learned. EAC provides any additional resources needed and observes some lessons for each teacher, to give feedback and support. In April, past teachers come together for an EAC sharing of the work they have completed with their students. CALFED staff are invited to this annual event and celebration of our students' and teachers' work. In 2001, Carrie Libeau, the Program Officer with the National Fish and Wildlife Foundation, and the CALFED contact for the implementation of the EAC 2000 CALFED grant, attended our event. She was extremely impressed with our work and we encourage more CALFED staff to join us for future events.

EAC staff meet with school principals at target schools to discuss the level of commitment to the proposed program. When a principal is excited about having an EAC program become an on-going, important feature of the school curriculum, we identify ways in which she will support the participation of her teachers. EAC targets teams of teachers at schools with principal buy-in. Teachers in these teams support one another and share resources.

Parent involvement and support helps ensure success of EAC students' action projects. The students invite their families to participate in special educational events about pollution reduction and safe bay food consumption, to come on field trips and to help with restoration projects. Parents become excited about EAC programs and help ensure that they continue in schools and in the community.

EAC collaborates with local agencies, for example City Clean Water Programs, Regional Park Supervisors, Watershed Land Managers and nonprofit environmental groups, to involve students in ongoing restoration efforts. This increases community involvement and helps to ensure project success.

Conceptual Model

Pollution Reduction/Safe Bay Food Consumption Program

EAC partners with fourth grade teachers and students to study bay-delta issues that particularly affect communities of color in the San Francisco Bay Area. In seven two-hour EAC lessons and four planning meetings, teachers and students learn about the unique physical, biological and geographical features of

the estuary. They study problems of urban runoff pollution, industrial pollution, pesticide runoff and how toxins accumulate in bay estuary food chains. In action projects, students:

- organize neighborhood storm drain clean-up projects,
- teach peer classes about reducing urban runoff pollution problems,
- express concerns about industrial pollution issues using letter writing campaigns, interviews with politicians and play performances,
- interview people fishing on bay piers about safe bay food consumption and distribute informational flyers in seven different languages,
- demonstrate safe bay fish cooking to families at school-community events and teach the safety precautions that reduce health risks.

Urban Creek Restoration Program

EAC partners with third grade teachers and students to adopt urban creeks within walking distance of targeted schools. In eight two-hour EAC lessons and four planning meetings, teachers learn to teach hands-on ecology lessons focusing on the plant and animal life of the local creek. Teachers and students work with EAC staff to plan and implement creek clean-up, pollution reduction and restoration projects for their local creeks, including:

- planting trees and wildflowers along creeks,
- organizing community creek clean-up projects,
- raising native Pacific Chorus Frogs in classrooms to release back into creek homes,
- designing and distributing creative outreach materials to inform peer classes and students' communities about reducing urban runoff pollution.

These projects are coordinated with local agencies managing urban creek habitats. These include: East Bay Regional Park District Supervisors, East Bay Municipal Utility District Ranger-Naturalists, City Clean Water Program Coordinators, Friends of Sausal Creek, Friends of Baxter Creek and the Urban Creeks Council. EAC has ongoing relationships with these groups. For every restoration project EAC collaborates with one of the environmental organizations listed above. EAC students and families work with the agency to help implement the restoration. Collaborating with these organizations ensures community involvement for the organization and success of the restoration effort for EAC participants, since the project is part of a larger, watershed effort.

School-Wide Creek Restoration Program

EAC works with every class and grade level, in target schools, to implement a kindergarten through fifth grade creek curriculum. Students, teachers and parents work with EAC in a school-wide effort to study, clean up and restore the adopted creek habitat. In 2002 we will continue to expand this program at John Muir School focusing on Harwood Creek in Berkeley, and Stege School focusing on Baxter Creek in Richmond. As described for the urban creek program above we collaborate with local environmental agencies for restoration projects.

Creek And Bay Field Trip Exploration Program

EAC partners with kindergarten - fifth grade classes to lead one-day field trips at creek and bay habitats. Students and teachers study the physical and biological properties of the particular habitat and learn about conservation issues affecting the ecosystem. EAC provides a field trip preparation and follow-up activity package.

Bay Estuary Scientist Program

EAC partners with kindergarten -fifth grade classes to study the features of the bay estuary in three-hour classroom workshops. Students and teachers are engaged in hands-on science activities and learn about bay conservation issues. EAC provides a workshop preparation and follow-up activity package.

Community Creek Clean-Up Program

EAC partners with teachers, students, their families and the City Of San Pablo Clean Water Program, to organize a community clean up for Wildcat Creek, which flows through Davis Park in San Pablo. Davis Park is the only open space in the low-income community of San Pablo. This annual event unites the community around a common goal of cleaning up and celebrating their local water resource.

Hypothesis

Does effective environmental education lead to:

- increased, active involvement with estuary habitat conservation projects?
- increased appreciation for estuary resources?
- increased understanding of restoration activities?

To test this hypothesis, we will analyze the sustained level of active participation of target school communities in environmental action and restoration projects

Model Success And Sustainability

There are many examples of the success and sustainability of the work of Estuary Action Challenge, in terms of increasing community involvement in restoration projects, increasing appreciation of estuary resources and increasing understanding of restoration activities. **One example is the Harwood Creek Program at John Muir School in Berkeley.**

EAC directs this project focusing on the section of Harwood Creek flowing through John Muir School grounds in Berkeley, and coordinates the educational, community organizing and fundraising components. A creek committee formed of teachers, environmental experts and community leaders has helped to increase support for and publicize the project. Monthly community creek workdays attract students and their families, teachers and volunteer teams from local businesses and academic institutions. Over 10 tones of ivy, acacia trees and other invasive plants have been removed from the restoration site. Ongoing maintenance focuses on continuing to cut back and remove non-native plants from the site. Students have planted over 500 native plants. California Native Plant Society experts helped to select plants to replicate the upstream, natural plant communities. Teams of volunteers are responsible for watering the plants and helping them to become established. Approximately 70% of native plants EAC students have planted are thriving and the creek site closely resembles the natural plant communities upstream.

A school-wide creek education program developed by EAC provides training for teachers and academic enrichment for students. Every child in kindergarten through fifth grade of John Muir School (over 250 students) completes a series of hands-on investigations and action projects, focused on Harwood Creek, each year. The Creek Education Curriculum used teaches the latest California Science Standards and is articulated, building concepts and skills through grade levels.

John Muir students complete grade level specific creek action projects each year. These include planting projects, weeding and maintenance, raising native butterflies and Pacific Chorus Frogs, and pollution reduction projects. All storm drains in the creek watershed have been stenciled by John Muir students with the message, “No Dumping: Drains To Bay”. Students have distributed brochures to local residents, providing information on reducing urban runoff pollution to the creek. Students monitor water quality and EAC works with the City Of Berkeley to clean-up sources of pollution.

In October 1993, EAC organized an opening ceremony for the Harwood Creek restoration project site. Over 400 supporters of the project including the school community, environmentalists, funders, local business people and local residents attended the ceremony. A ceremonial red alder tree was planted beside the creek. Eight years later, the tree has grown to over 30 feet tall. The native plants are well established and the site resembles a natural creek habitat.

The John Muir School community recently worked with EAC to develop a five-year plan for the creek site and the creek education program. The creek project has become an integral part of the school community, curriculum and culture. It is used as a significant educational resource and is a source of pride to all those who helped to restore it.

“I really appreciate your work with the faculty to develop the vision and plan for the creek work. You involved everyone and drew out their ideas to build the future of the creek program.”

Nancy D. Waters, Principal, John Muir School, Berkeley

3. Approach

EAC targets teams of teachers who commit to integrating a program into their school curriculum. An EAC Leader works with teachers and students throughout the school year, meeting each class for eight two-hour sessions, modeling activities and developing projects. Sessions are spread out to allow teachers time for extensive follow up activities with students. Teachers also have four planning meetings with the EAC Leader. Once trained in EAC, teachers continue programs year after year, using the activities they have learned, our curriculum guides, educational resources and equipment. The EAC model of working directly with teachers and students in classroom and field situations works because it provides hands-on training for teachers.

“The EAC program was an amazing hands-on journey in our local environment. Student achievement evidently increased due to this program. Having the lessons modeled for me by Ms. Manuel gave me the skills necessary to continue this program myself.”

Drew Elliot Smith, Teacher, Highland School, Oakland

Programs are advertised to target schools using flyers, letters and brochures, telephone conversations with interested teachers and informational meetings. Teachers complete a written application form that is used to assess level of commitment. They must apply in grade level teams to be considered for a program. Those selected to participate attend an orientation meeting with EAC staff prior to beginning a program and sign a contract that outlines joint expectations of EAC and teacher participants. Teachers also attend evaluation meetings and complete written evaluation forms.

EAC curricula use a mix of approaches to teaching in order to engage students' visual, auditory and kinesthetic learning styles, including: hands-on investigations, experiments, games, colorful maps and posters, sections of videos and group discussions. This approach makes lessons accessible to all students. EAC staff are trained to create equal opportunity learning situations. For example, we do not allow girls and children of color to sit quietly without participating in discussions. We regularly call on them to answer questions and encourage them in their responses. We make sure that everyone is participating equally in group activities. Sometimes we create separate gender groupings, or friendship groupings to facilitate this. Our programs include activities to break down stereotypes associated with scientists and environmentalists and encourage all children to achieve in these disciplines. As women and people of color, EAC staff are role models in science and environmental education.

EAC programs integrate science, mathematics and language arts into the yearlong theme of the school's local environment. For example, students learn science process skills of predicting and testing as they experiment with mixing estuary water. They learn mathematics by measuring the width and depth of the local creek, calculating the velocity and discovering the relationships between these factors. Language arts is given a real life audience as students write to an oil refinery to protest the release of pollutants, which poison the fish they eat.

All EAC lessons teach the current state science standards, recently published in August 2000. EAC curriculum guides were written and developed by credentialed teacher/biologist Mandi Billinge. They have been developed over nine years, with extensive field-testing. They have been improved with feedback from hundreds of teachers who have learned to use the guides, by having them modeled in action, with their own students. These guides were created for teachers, by teachers, and have been used extensively and successfully. Many teachers have commented on how helpful and comprehensive the EAC curriculum guides are and how helpful it is to have the lessons modeled for them.

“Having Estuary Action Challenge in our class created a yearlong theme. The curriculum was very effective: all concepts were supported by concrete activities and students were actively engaged in making meaning. Our EAC experience was wonderful and I know the students will remember it for a lifetime because we did a brainstorm at the end of the year and they remembered every concept and activity from the program.”

Karen Cevallos, 4th Grade Teacher, Dover School (Winner of the 1997 Mason McDuffie Teacher's Award.)

Students learn to work cooperatively and apply new knowledge and skills to help solve community environmental health problems. Teachers learn to be facilitators in this process, helping students to put their ideas into action. Because students are working on culturally significant, local issues that affect their daily lives and are given responsibility to plan and implement environmental action projects themselves, they are excited and actively engaged in learning. The educational value of applying knowledge and skills learned to develop real environmental action projects, such as the examples described below, is tremendous.

Safe Bay Food Consumption Projects

In EAC programs, students and teachers address crucial issues that impact long-term community health. Over 70% of people fishing from the San Francisco Bay and eating the food are people of color. For many, English is not their first spoken language and bay food health warning information, already limited in scope, is not easily accessible. Student participants in the EAC Pollution Reduction/Safe Bay Food Consumption program are 100% children of color, whose families fish from the bay and shop at local fish markets.

EAC teaches students and teachers about the health risks associated with bay food and the safety precautions that reduce those risks. A safe bay fish cooking demonstration, games about biomagnification of pollutants in the food chain and informational flyers in seven different languages are some of the teaching tools used. Students then teach their communities what they have learned. They invite their families to their classrooms and present safe bay fish cooking demonstrations, translating into the languages of the community. Students make their own informational flyers to distribute. Families are always interested in what their children are doing, especially if the children are excited about it and inviting them to a special event. This creates a very effective outreach approach.

Students also interview people fishing on local bay piers about safe fishing and cooking practices. The students use their bilingual skills to provide information. Fishing people have responded to these interviews with interest and willingly read students' flyers.

Environmental Justice Projects

There is a disproportionately high concentration of factories and refineries located in the neighborhoods of low-income people and people of color. Pollution from these industries poisons local water and food from the San Francisco Bay, causing health problems including cancer and brain damage. EAC teaches about these issues and develops the tools and skills needed to engage in critical thinking and work toward change.

Students working with Estuary Action Challenge learn that they have an equal right to live in a clean and healthy environment. They learn that they have the right to clean water and food and that there are ways that they can speak up about their rights and let their voices be heard. We teach our students about the impact of writing letters, how the political system works and the importance of voting. Our students become inspired to write letters and they invite politicians to their schools to ask them what is being done about pollution problems in their neighborhoods. They also write to factory and refinery owners to assert their rights to live in a clean, healthy environment. To further educate their communities, students write and perform plays about pollution and environmental justice to their families and to other students.

Creek Restoration Projects

EAC helps create projects that continue year after year. For example, Dover School in San Pablo celebrated their seventh annual community creek clean-up event last year. Wildcat Creek, near the school, flows through Davis Park, the only open space area in the city of San Pablo. In an EAC Urban Creek Restoration program in 1993, Dover School teachers and students adopted Wildcat Creek. Exciting science investigations led by EAC connected students and teachers with their local creek.

Students learned how garbage can kill animals and spoil their creek habitat. They decided to host a creek clean-up event. Students solicited local businesses to donate gloves and garbage bags and wrote to San Pablo City officials to request collection of the garbage they removed from creek and park areas. Colorful posters and invitations recruited family members, friends and neighbors to help clean the creek. Every year over 100 community members help to clean Wildcat Creek and preserve this habitat as an educational and recreational resource.

“Estuary Action Challenge changed my way of teaching. We started with a problem (the trash and pollution in our creek) and the students were the ones to come up with the solutions. This is the best way of teaching, because it stimulates the students, they have ownership. I learned to act as a guide, helping them to figure out how to put their ideas into action and find resources. The students learned how to use the local political system and to work with the City of San Pablo to make change.”

Tony Ramirez, third grade teacher, Dover School, San Pablo.

An on-going partnership with the City of San Pablo arose out of this event. Working with EAC, Dover teachers and students learned to collect and grow creek-side trees from seeds in their classrooms. They had to create the perfect environment for seed germination and growth and maintain planned watering schedules. Students planted trees beside Wildcat Creek along trails developed by the City. Students learned the importance of creek-side trees in providing habitat for animals, shade and better air quality. They have helped to beautify and restore a local community resource.

Each year EAC student participants in our Urban Creek Restoration Program clean up and restore their local creeks, planting hundreds of trees annually in similar projects. EAC students help to restore the numbers of native animals in creeks and wetlands by raising native Pacific Chorus Frogs in the classroom and then releasing them safely back into their natural habitats. It is a wonderful experience for children to take care of the frogs, watch them metamorphose and see them in their natural habitat.

EAC partners with a number of schools along the Wildcat Creek Watershed. Each school adopts a different area of the creek to study, clean up and restore. This model is used for our schools in all EAC creek watersheds.

Scientific/Permit Concerns For Restoration Projects

EAC collaborates with several local agencies to implement restoration activities. These include the East Bay Municipal Utility District, East Bay Regional Park District, Urban Creeks Council, Friends of Sausal Creek and city Clean Water Programs. Each year our student participants plant hundreds of native trees and wildflowers on the public and private property managed by these agencies in collaborative restoration projects. These agencies assist EAC with seed/plant selection, collection, timing of planting and irrigation needs appropriate for each of the restoration projects we are collaborating on.

We work with Golden West Women Flyfishers on the Pacific Chorus Frog raise and release projects. This organization takes care of all permitting procedures for collection and release of wildlife. We educate students involved in these projects that there are rules governing when and where animals can be captured and released. They understand that this is a special school project, that we have special permission to carry out, and that they should not do this, or any similar project, by themselves.

Pollution Reduction Projects

In EAC pollution reduction projects, students conduct school neighborhood surveys and record evidence of pollutants that can drain into creeks and the bay. These include garbage, oil leaks, paint and gasoline spills. Students learn about the effects of these urban runoff pollutants on the estuary ecosystem and its food chains. They then plan neighborhood clean-ups and educational projects to teach others about personal actions that reduce urban runoff pollution. Personal actions include: not dumping in storm drains, fixing leaks from cars immediately, reducing use of cars and using alternative transportation, properly disposing of garbage and recycling. Students plan projects using their own ideas. This process involves brainstorming possibilities, selecting practical projects and working in groups to plan the steps involved. Student projects in the past have included:

- making informational books and reading them to younger classes of children,
- school-wide assemblies including plays, slide shows and presentations using an overhead projector,
- displaying educational posters around the school,
- forming neighborhood clean-up clubs and making T-Shirts with anti-pollution logos for participants to wear.

Equipment used includes: Educational materials: maps, posters, microscopes, dip nets, fish and crabs, steam cookers, videos, books, art supplies.

Restoration materials: plant pots, trowels, watering cans, shovels, seeds, garbage bags, gloves, aquariums.

Facilities: EAC programs will take place on site at partner schools, in creek and bay habitats and at the EAC offices.

Criteria to be used for testing hypothesis

Hypothesis

Does effective environmental education lead to:

- increased, active involvement with estuary habitat conservation projects?
- increased appreciation for estuary resources?
- increased understanding of restoration activities?

EAC staff will evaluate the sustained level of active participation of target school communities in environmental action and restoration projects. EAC works with grade level teams of teachers at our target schools and maintains an ongoing relationship with the teachers we have already trained in our

programs. These teachers act as resources and mentors to new teachers going through program training. We also maintain relationships with the principals at our target schools. Students and parents participate in EAC projects year after year as they move through a school. They even come back after they have left their elementary schools to participate in our restoration projects. The continued presence of EAC in target schools, working with new teachers and supporting previous participants, helps to ensure the sustainability of our programs. We will evaluate the long-term commitment to our restoration and environmental health programs of teachers, principals, students and parents in the school community.

4. Feasibility

Evaluation Of Teacher Training Approaches

Over the past nine years, Estuary Action Challenge has worked with many teachers who have already participated in Teacher Training Workshops for environmental education, but have done nothing as a result. They felt workshops did not translate into their classroom experience. In EAC programs, however, staff actually partner with teachers and students and work with them in their local environment modeling activities that work with a class of 30 plus students. Only after participating in EAC programs were teachers empowered to go on to teach environmental education programs themselves.

"I have been participating in environmental trainings for about four years. This is the first time that I will be able to actually teach concepts using meaningful lessons. I now have appropriate activities for my student's levels. I feel confident in creek environments because of the Estuary Action Challenge Program."

Diane Brown, Teacher, Riverside School, San Pablo.

In the urban schools we work in, there is a very limited budget for equipment and resources needed to teach effective environmental education. The EAC model of partnering with a class for the whole school year, modeling activities, providing equipment and resources and curriculum guides, provides the level of support that elementary school teachers need.

"The Estuary Action Challenge model has huge value in breaking down barriers and getting teachers to try hands-on science. It provides the stepping stone needed to get teachers using the resources available."

Craig Strung, Associate Director, Lawrence Hall Of Science.

Timing: EAC has nine years of experience implementing the programs described in the time line defined.

Permits/Access To Private Property Required: The EAC project will collaborate with local agencies for all restoration activities. *These agencies have ongoing restoration projects and have taken care of all permits and access issues required.* Therefore EAC does not require any permits – we will be working under the permits of our collaborating agencies. All educational activities take place on public lands. There are no other contingencies, requirements or outstanding implementation issues.

5. Performance Measures

Objective One

Increase the number of teachers using the local estuary environment as a key educational resource to stimulate students' learning.

Performance Measure

Evaluate the percentage of teachers continuing to teach EAC programs each year.

We follow up with our teachers each year. We observe teacher's lessons and give feed back and provide equipment and additional support, as needed. Our teachers come together each spring to share the work

they have continued with their students. The results of annual interviews show that 80 - 100% of our teachers continue teaching programs each year. Please see the quotes from our teachers and principals.

Objective Two

Empower students to help solve local water resource/environmental health and justice problems.

Performance Measure

Evaluate student's understanding of key local water resource/environmental justice issues before and after programs. Evaluate student's ability to apply this understanding to implement action projects addressing key issues.

Each student participant creates a portfolio of work used to assess understanding of concepts and skills learned. Students work in groups to plan environmental action projects using the knowledge and skills gained through the EAC program. The application of knowledge and skills to the successful implementation of an action project demonstrates the student's understanding and commitment to make changes. This is particularly clear in presentations to families planned and directed by students. They clearly articulate the concepts and skills they have learned with EAC as they teach them to others.

Objective Three

Make environmental/science education equally accessible to girls and boys from all cultures.

Performance Measure

Evaluate the level of participation of girls and boys from all cultures in all EAC environmental science projects. The level of equal and active participation of boys and girls and children of color is under continual assessment by observation of EAC staff. Teaching strategies and activities are adapted as needed to ensure equal access.

Objective Four

Increase community environmental health in the following environmental justice areas:

- adopt urban creeks in school neighborhoods, decrease the amount of trash and increase the numbers of indigenous trees, wildflowers and animals in adopted creeks, increasing the value of creeks as educational and recreational community resources;
- increase the awareness of families and school communities of personal life style choices that reduce the amount of pollution entering storm drains and ground water that drains to creeks and the bay;
- increase the awareness of local factories, refineries, and politicians of local people's concerns for their environmental health and the need to reduce pollution;
- increase the number of people using smart bay fishing and safe cooking practices to improve long-term health.

Performance Measures

Evaluate the successful completion of student action projects using the following criteria:

- amount of trash cleaned from an adopted creek;
number of trees and wildflowers planted;
amount of weeds removed;
numbers of native animals raised and released.
- quality and quantity of educational projects about reducing urban runoff pollution;
amount of garbage removed in neighborhood or beach clean up projects.

- quality and quantity of letters and interviews about reducing pollution to factory and refinery owners and politicians.
- quality and quantity of flyers about safe cooking and fishing practices circulated to the school community (including families) and people fishing on local piers; number of family members attending safe bay fish cooking demonstrations.

The evaluation of action projects is used to improve methods and problem solve for completing future projects.

Objective Five

Develop long term behavior changes that have a positive impact on local water resources and community environmental health.

Performance Measure

Evaluate students' behavior changes resulting from their involvement with EAC programs. Pre and post program surveys with students will evaluate behaviors that impact local water resources and environmental health and justice issues. EAC will evaluate changes in behavior, developed through our programs, by comparing behaviors before and after program participation. Behavior changes will include:

- participating in community restoration projects (We have tracked some EAC students who have continued to participate in community creek clean up and planting projects for the past six years.)
- not dumping in storm drains, not littering, using alternative means of transportation other than cars, encouraging families to fix oil leaks on cars
- encouraging families to be part of the political, decision making process, for example, by voting
- encouraging families to use safe bay fishing and cooking practices.

6. Data Handling and Storage

Teachers, students, principals and parents are surveyed each year and information collected is used to improve programs. We evaluate every lesson, project and program, with written and verbal comments and make recommended improvements. Evaluations take place throughout the school year and programs are continually improved using feedback. Final evaluations take place at the completion of each program to make improvements for future implementation. Pre and post program surveys with students will evaluate behaviors that impact local water resources and environmental health and justice issues. EAC will evaluate changes in behavior, developed through our programs, by comparing behaviors before and after program participation. Program reports describe how objectives were met and the knowledge gained through the evaluation process. Highlights of programs are communicated to all EAC participants and constituents in our newsletter. The EAC Newsletter contains articles that describe work accomplished in our programs and articles written by student participants. It is circulated to approximately 1,000 teachers, environmentalists and collaborators. EAC also publishes project articles in Earth Island Journal, distributed to approximately 15,000 members.

Estuary Action Community Links Web Site

With funding from CALFED, EAC will develop an interactive web site, linking our target schools to facilitate information exchange and community involvement. The web site will highlight environmental justice issues affecting communities of color, in regard to water resource issues and environmental education. Students working in EAC programs will input information they have learned about the San Francisco Bay, the urban creeks leading to the Bay, pollution problems and safe bay food consumption issues. Students will monitor their local urban creeks and input data on pollution sources, plant and animal life, water quality, restoration activities, the community members and organizations working on

the creek and e-mail contacts for information exchange. This web site will reach out to community members who would not otherwise have the opportunity to input data over the web and speak out about water issues of concern to their community.

7. Expected Products/Outcomes

Changing The Field Of Environmental Education

One goal of EAC is to change the field of environmental education to focus on education through action, including restoration, pollution reduction and community outreach. We work to empower students to become part of the solution to environmental problems. We are committed to diversity and environmental justice in our work. EAC will present at environmental education conferences and collaborative forums to educate other organizations about our effective, model programs. These will include: the Bay Area Environmental Education Resources Fair, the Sierra Club Youth in Wilderness Conference, the State Of The Estuary Conference, Brower Day in Berkeley, county Watershed Forums, Independent Documentary Group Film showings, Earth Island Institute's Party For The Planet event and others.

Program Results/Outcomes

- 3,000 elementary school students, 120 teachers and approximately 400 parents actively participate in habitat restoration, pollution reduction and safe bay food consumption activities
- 120 teachers trained to continue teaching EAC environmental education programs
- 25 community creek clean-up projects completed
- over 200 riparian plants planted along creeks by EAC students
- approximately 500 Pacific Chorus Frogs raised in classrooms and released into pond and creek habitats
- approximately 500 student-designed posters, brochures and T-shirts about reducing urban runoff pollution displayed and distributed to school communities
- 200 student letters about reducing pollution to the bay sent out to politicians
- politicians, including the Mayors of Richmond, Oakland and Berkeley, Council Members and Senators, visit our children's classrooms to answer questions on local environmental issues concerning water, pollution and environmental justice
- 10 classes of 30 students interview people fishing on bay piers and pass out informational flyers on safe bay food consumption in seven different languages
- 10 creative student presentations to families about reducing pollution to the bay and taking precautions in fishing for, cooking and eating bay fish, attended by an average of twenty parents for each presentation
- 1 interactive web site, linking our target schools to facilitate information exchange and community involvement around water resource, environmental education and environmental justice issues.

8. Work Schedule: Please see Table One for tasks and time line.

A \$120,000 CALFED Bay-Delta contract will help fund:

- 10 classes in the Urban Creek Restoration Program
- 10 classes in the Pollution Reduction/Safe Bay Food Consumption Program
- 38 classes in two School Wide Creek Action Programs
- 24 classes in the Bay Estuary Scientists Workshops Program
- 24 classes in the Creek and Bay Field Trip Exploration Program
- 16 classes in the Community Creek Clean Up Program
- Development of the Estuary Action Community Links Web Site

This funding will be matched by \$100,000 in grants from private foundations.

ESTUARY ACTION CHALLENGE PROJECT WORK SCHEDULE

Table One

Task	Start Date	To Be Completed By
Program Implementation		
1. 2 School-Wide Creek Restoration Programs + web site development	October 1, 2002	June 15, 2003
2. 1 Community Creek Clean-Up Program	October 1, 2002	October 31, 2002
3. 10 Urban Creek Restoration Programs + web site development	October 15, 2002	April 30, 2003
4. 20 Bay Estuary Scientist Workshops	November 1, 2002	March 31, 2003
5. 10 Pollution Reduction/Safe Bay Food Programs + web site dev.	December 1, 2002	May 31, 2003
6. 20 Bay & Creek Field Trip Explorations	April 15, 2003	June 10, 2003
7. Project Management		
<i>Sub Tasks</i>		
• Purchase Education & Restoration Supplies	October 1, 2002	March 15, 2003
• Recruit Teacher Participants	October 1, 2002	October 31, 2002
• Prepare Curriculum Guides	October 1, 2002	October 31, 2002
• Plan Projects With Collaborators	October 15, 2002	November 30, 2002
• Planning Meetings With Teachers	October 15, 2002	December 31, 2002
• Teacher Evaluation Meetings	May 1, 2003	June 10, 2003
• Program Evaluations	June 10, 2003	July 31, 2003
• Summer Newsletter Circulation	May 15, 2003	September 30, 2003
• Final Reports	August 1, 2003	September 30, 2003

B. Applicability to CALFED ERP Goals and Implementation Plan and CVPIA Priorities

1. ERP, Science Program and CVPIA Priorities

The EAC project focuses on MR Goal (3.) –“ Implement environmental education actions throughout the geographic scope”. The project specifically advances the goal for Education Programs - “Develop programs affiliated with conservation, restoration and monitoring efforts including curriculum development and hands-on educational activities for adults and K – 12. Programs should emphasize methods to build collaborative networks and community building projects that actually perform research and restoration.”

In addition, there has been a recent interest, at the CALFED agency, in addressing environmental justice issues. The EAC environmental education project partners with underserved, low-income communities of color and addresses environmental justice, water resource issues for these communities.

The EAC project will make progress toward the stated goals by actively engaging K – 5 children, their teachers and their families in hands-on restoration activities including: cleaning up creek habitats, planting creek-side trees and shrubs and raising and releasing Pacific Chorus Frogs, cleaning up neighborhoods around storm drains, educating school communities about ways to reduce urban runoff pollution and educating factory owners and politicians about reducing industrial and pesticide pollution to the bay-estuary ecosystem. EAC will provide crucial outreach and information on safety procedures to follow when eating fish from the bay to those most affected.

In all these activities, the students will take a leading role in planning and implementing the restoration and other environmental action projects, using the skills and knowledge gained in their work with EAC. They will reach out to and involve their families, building community around local estuary issues and resources. They will work cooperatively with local agencies and environmental organizations in collaborative partnerships. EAC schools and collaborators will be linked through the Estuary Action Community Links web site. This will facilitate information exchange and networking.

EAC will use our curriculum guides, written and developed by credentialed teacher/biologist Mandi Billinge. They have been developed over nine years, with extensive field-testing. They have been improved with feed back from hundreds of teachers who have learned to use the guides, by having them modeled in action with their own students. We will continue to upgrade curricula and develop new lessons, which teach the latest California Science standards, using feedback from our evaluation process.

2. Relationship to Other Ecosystem Restoration Projects

In both 1999 and 2000, Estuary Action Challenge received a \$50,000 grant from CALFED to implement and expand our environmental education programs described in this proposal. This funding helped us to partner with 100 teachers and 2,500 students in five programs and start two new school-wide creek programs. With continued funding from CALFED we will continue to expand the number of teachers and students we partner with, become more established in our target schools with grade level teams and school-wide programs and continue to work on our adopted habitats. We will also develop the Estuary Action Community Links web site.

Forty classes (1,200 students and 40 teachers) each year, participating in the EAC project, watch the movie, Kids By The Bay. This features EAC students in our programs, cleaning up and restoring habitats of the San Francisco Bay. Kids By The Bay was produced by Independent Documentary Group (IDG) Films and released in 1997 as an educational tool. IDG Films received CALFED funding in 1998, 1999 and 2000 to show Environmental Film Festivals in the nine counties of the San Francisco Bay Area and in the Delta. Kids By The Bay is part of this film festival and Estuary Action Challenge staff speak at these events.

3. Requests for Next-Phase Funding

Relationship To Previously Funded Phases Of The Project

This proposal requests funding to continue with the Estuary Action Challenge programs funded by CALFED from 1999 - 2001. With continued CALFED funding, EAC will increase the impact of all programs in our target schools. We will also expand these programs into new schools. Our unique model of providing long-term support and hands-on training for teachers, as they learn alongside their students, helps teachers to continue teaching our programs year after year. By working with grade level teams and encouraging buy-in from the school principal, we become established in schools that continue to use the curricula and equipment introduced in our professional development packages. There are teachers at our targeted schools on a waiting list to become part of the EAC school teams and new schools that are ready to begin working with us. Continued funding from CALFED will help us to partner with these schools and teachers and continue restoration efforts on our adopted bay and creek habitats, with our collaborative partners.

Current Status Of Project

The Estuary Action Challenge Environmental Education project, funded by CALFED and private foundations, is meeting set goals and objectives, progressing on schedule and all programs will be completed according to the set time line. The project is fully funded and there are no outstanding regulatory or implementation issues.

Progress And Accomplishments

Estuary Action Challenge is well established in many target schools and is becoming established in new target schools. Teachers are working together to continue programs, as a result of their EAC training, with the equipment packages and curriculum guides provided. School principals and parents are very supportive of expanding EAC programs in their schools. EAC has a strong presence in target schools and programs have become part of school culture and curricula. Many grade level teams are well established and two school wide programs are thriving.

Please see summary of existing project status, attached.

4. Previous Recipients of CALFED or CVPIA funding

Estuary Action Challenge/Earth Island Institute received CALFED funding in 1999 – 2000, and 2000 - 2001 for the Estuary Action Challenge Environmental Education Project.

The current project number is 01-N34

Current Status Of Project & Progress And Accomplishments To Date

- 4500 elementary school students, 190 teachers and approximately 800 parents actively participated in habitat restoration, pollution reduction and safe bay food consumption activities
- 50 community creek clean-up projects completed
- over 400 riparian plants planted along creeks by EAC students
- approximately 1000 Pacific Chorus Frogs raised in classrooms and released into pond and creek habitats
- approximately 1000 student designed posters, brochures and T-shirts about reducing urban runoff pollution, displayed and distributed to school communities
- 400 student letters about reducing pollution to the bay sent out to politicians
- 20 classes of 30 students interviewed people fishing on bay piers and passed out informational flyers on safe bay food consumption in seven different languages
- 20 creative student presentations to families about reducing pollution to the bay and taking precautions in fishing for, cooking and eating bay fish, attended by an average of twenty parents for each presentation

5. System-Wide Ecosystem Benefits

School Wide Benefits

The Estuary Action Challenge School Wide Impact approach means that we include every teacher and student in a target grade level and in some cases, every teacher and student in the school, in our programs. We work closely with school principals and involve parents and the wider community. EAC programs have a significant and long-term impact on the school-learning environment.

Watershed Benefits

EAC collaborates with environmental groups in the watersheds of our target schools to implement restoration and other environmental action projects. For example, our students and their families work with the Urban Creeks Council to restore Baxter Creek, providing the important element of community

involvement for this project. We also work with Friends of Sausal Creek and East Bay Municipal Utility District to restore creeks throughout their watersheds. We work with all the elementary, middle and high schools in the City of San Pablo to organize the annual Wildcat Creek Clean Up event.

Estuary Action Community Links Web Site

With funding from CALFED, EAC will develop an interactive web site, linking our target schools, to facilitate information exchange and community involvement. The web site will highlight environmental justice issues affecting communities of color, in regard to water resource issues and environmental education. Students working in EAC programs will input information they have learned about the San Francisco Bay, the urban creeks leading to the Bay, pollution problems and safe bay food consumption issues. Students will monitor their local urban creeks and input data on pollution sources, plant and animal life, water quality, restoration activities, the community members and organizations working on the creek, and e-mail contacts for information exchange. This web site will reach out to community members who would not otherwise have the opportunity to input data over the web and speak out about water issues of concern to their community.

C. Qualifications

Brief Biosketches

EAC Executive Director, Mandi Billinge, founded Estuary Action Challenge and has directed program development and organization expansion for the past nine years. Mandi has a B.S. Honors Degree in Biology from England, specializing in freshwater and estuarine ecology, a Teaching Credential from Leeds University, England and the Development Director's Certificate from the University Of San Francisco.

EAC Program Director, Jocelyn Manuel, holds a B.A. Honors Degrees in Education and a Teaching Credential. She has taught science and environmental education in elementary schools for three years and EAC programs for the past two years, and has received excellent feedback from principals, teachers, students and collaborators.

EAC Program Director, Shefali Shah, has three years of experience teaching environmental education programs in elementary schools and is in her second year teaching with Estuary Action Challenge. Shefali is Spanish bilingual and has recently translated EAC teaching materials into Spanish. She is currently studying for her teaching credential at New College in San Francisco.

EAC Program Director, Sheela Shankar, is also in her second year teaching with EAC. Sheela has a degree in Environmental Science from the University Of Oregon and has been teaching environmental education for the past three years.

Program Director, Brenda Salgado, joined EAC in July 2001. Brenda has an MS degree from the University of California at Davis. For the past 7 years she has worked with conservation and science education organizations in California and in Belize, Central America. Brenda is Spanish bilingual.

Teacher's Comments On EAC Staff

“Shefali Shah was a pleasure to work with. She had a great rapport with the students and exceptional classroom management skills. She went the extra mile to make sure that the teachers were well prepared for each lesson.”

Andre Brunetti, Teacher, Cesar Chavez School, Richmond

“This program, without a doubt, is the best I have ever seen! The instructor, Jocelyn Manuel, materials, experiments - everything was superb!”

EAC Staff As Community Role Models

There are very few people of color working in environmental education. EAC staff are from diverse ethnic and cultural backgrounds and two of our program staff are Spanish bilingual. As women and people of color teaching environmental education in diverse, urban schools, EAC staff are role models in the community. As educators, and credentialed teachers, they are welcomed into schools because they relate so well to the students and teachers and have exceptional classroom management skills. Many teachers have commented that EAC staff are excellent teachers and a joy to work with. This is compared to environmentalists/scientists who do not have a teaching background and often cannot deliver knowledge effectively to children.

“I am not always thrilled about having special guests in my classroom, as I end up forcing the students to pay attention to something that does not capture their hearts and minds. This was not the case with the EAC program. It was really terrific! My children were enthralled. I learned alongside my students and we all loved it! Also, Sheela was a great role model.”

Kristine Fowler, Teacher, John Muir School, Berkeley.

Previous Accomplishments

Estuary Action Challenge is an environmental education project of Earth Island Institute, focusing on the San Francisco Bay Estuary. Earth Island is a nonprofit organization supporting a network of environmental projects. EAC was created in 1992 and in the past nine years 620 teachers and 15,000 students have participated in our programs. EAC curricula, restoration, pollution reduction and community outreach programs have been developed with high levels of input from teacher and student participants and collaborators.

Each year, for the past nine years, EAC students have:

- planted trees and wildflowers along urban creeks,
- organized community creek and bay habitat clean-ups,
- raised tree frogs in classrooms to release back into creek homes,
- designed and distributed creative outreach materials to inform school communities about reducing urban runoff pollution,
- expressed concerns about estuary pollution issues using letter writing campaigns, interviews with politicians and play performances,
- interviewed people fishing on bay piers about safe bay food consumption and distributed informational flyers in seven different languages,
- demonstrated safe bay fish cooking to families at school-community events and taught safety precautions that reduce health risks.

Planned Organization Of Staff

The EAC Executive Director and Program Directors will implement the EAC project. The Executive Director will work with school principals, teachers, students and family members to develop programs, supervise Directors, coordinate with collaborators, oversee the evaluation process, develop curricula and teaching strategies and publish the EAC Newsletter. The Program Directors will work with teachers, students, family members and collaborators to implement programs. They will also be responsible for managing equipment and resources.

Collaborating Participants

EAC collaborates with local agencies to implement restoration activities. These include Urban Creeks Council, East Bay Municipal Utility District, East Bay Regional Park District, Friends Of Sausal Creek, Friends Of Baxter Creek and city Clean Water Programs. Each year our student participants plant

hundreds of native trees and wildflowers on the public property managed by these agencies in collaborative restoration projects. City Clean Water Programs work with EAC to advertise community creek clean-up projects and promote public involvement.

Comments From EAC Partners

“We are proud to fund Estuary Action Challenge. This is an outstanding organization with absolutely wonderful, stellar programs. Please come to our press release party - we would love for everyone to hear the story of your work!”

Jackie McCort, Sierra Club Foundation Project Coordinator

“The teachers are very excited about the Estuary Action Challenge program at Caesar Chavez School. I want to support them and I want to support you. It was really an honor to have the Mayor of Richmond here and the children did a very good job of interviewing her. I would like for you to get more teachers involved to expand the program here next year.”

Marcos Gonzales, Principal, Cesar Chavez School, Richmond

“The EAC program was excellent. The field trip was superb. Interviewing fisher people was a great, real-life learning activity that had a purpose for the students. I liked the letter writing campaign and having the mayor to speak at our school. My students made excellent informational posters and the fish cooking demonstration was a huge success”

Bryan Brandow, Teacher, Cesar Chavez School, Richmond

“The EAC program is a real model of how hands on learning should be taught. Our creek side tree planting project was the absolute best!”

Charles Wilson, Teacher, Sequoia School, Oakland

“The EAC creek program was so successful at engaging my students in exploring their creek in a structured way. It was very meaningful and effective for the students because they learned to care for their local environment. They have real ownership in their creek behind our school. This program will help me to teach my current curriculum, without creating any extra burdens.”

Connie Granger, Teacher, Bay View School, San Pablo.

D. Cost

2. Cost Sharing

EAC will provide \$5,000 of in-kind equipment and resources for this project, including educational and restoration materials. Collaborators work with EAC as an in-kind contribution to the project. Four collaborators will donate 20 - 40 hours of work at \$50.00 per hour. This is a total of at least \$4,000.

Other Funding Commitments – Total \$100,000

EAC raises funds each year from private foundations. For 2002, funds already awarded include: Sierra Club Foundation, \$25,000; Goldman Fund, \$25,000; Haas Fund, \$20,000; Dean Witter Foundation, \$15,000; Tides Foundation, \$15,000

E. Local Involvement

Schools and School Districts Supporting Project

EAC was created in 1992 and in the past nine years 620 teachers and 18,000 students have participated in our programs. 80% of our students are children of color from low-income, urban schools in West Contra Costa County School District, Berkeley Unified and Oakland Unified School Districts. EAC has

an excellent reputation for delivering high quality, effective programs. There is a great deal of support in local schools for EAC programs and a waiting list of teachers hoping to work with us. **Please see the letters of commitment, attached, from EAC teachers and school principals.** From October 2002 – September 2003, with funding from CALFED and private foundations, EAC will partner with 120 teachers, 3,000 students, 400 parents and 20 school principals in our estuary education programs.

The Estuary Action Challenge School Wide Impact approach means that we include every teacher and student in a target grade level and in some cases, every teacher and student in the school, in our programs. We work closely with school principals and involve parents and the wider community. There are teachers in our current schools and new schools on our waiting lists. With funding support in 2002, EAC will expand to add new classes at our target schools and begin working with new schools.

Environmental Collaborators

EAC collaborates with local agencies to implement restoration activities. These include the East Bay Municipal Utility District, East Bay Regional Park District, Friends Of Sausal Creek, Friends Of Baxter Creek, Urban Creeks Council and city Clean Water Programs. Each year our student participants plant hundreds of native trees and hundreds of wildflowers on the public property managed by these agencies in collaborative restoration projects. City Clean Water Programs work with EAC to advertise community creek clean-up projects and promote public involvement. Collaborators are informed of the submission of this CALFED Bay-Delta proposal. For our collaborators, the participation of EAC students and their families is crucial because it ensures community involvement and buy-in to restoration projects.

Public Outreach

EAC publicizes programs at target schools by posting flyers, distributing brochures and letters and making phone calls. Interested principals and teachers contact EAC staff for informational meetings. Teachers complete application forms, demonstrating their commitment to integrating the EAC program into the ongoing school curriculum. EAC selects teams of teacher participants from target schools based on informational interviews and application forms.

EAC will present at environmental education conferences and collaborative forums to educate other organizations about our effective, model programs. These will include: the Bay Area Environmental Education Resources Fair, the Sierra Club Youth in Wilderness Conference, the State Of The Estuary Conference, Brower Day in Berkeley, county Watershed Forums, Independent Documentary Group Film showings, Earth Island Institute's Party For The Planet event and others. Our web site is easily accessible to the public, at www.earthisland.org/eac.

Third Party Impacts

Student's parents and other family members will benefit from involvement with the EAC project. Students will recruit their family members to participate in restoration, pollution reduction and safe bay food consumption projects and field trips.

F. Compliance with Standard Terms and Conditions (see forms)

Estuary Action Challenge and Earth Island Institute will comply with the state and federal standard terms and conditions.

Estuary Action Challenge Environmental Education Project

Summary Of Existing Project Status

Project Description

The Estuary Action Challenge (EAC) environmental education project focuses on the San Francisco Bay Estuary. EAC works with elementary school teachers and students to explore, clean up and restore creek and bay habitats, reduce urban runoff pollution and address issues of water quality and safe bay food consumption. CALFED has awarded \$100,000 to expand EAC programs from 1999 - 2001

Summary Of Scientific Merit

Hypothesis

Does effective environmental education lead directly to active participation in conservation programs.

Conceptual Model

EAC programs address the following environmental needs:

- Many of our East Bay Area urban creeks are trashed, smothered with weeds and lack indigenous plant and animal species.
- Toxins from factories, refineries, pesticide runoff and dumping in storm drains are polluting the bay-delta estuary ecosystem.
- Many people fish from the San Francisco Bay. The food caught is contaminated with pollutants that cause cancer and brain damage.

Each year EAC students:

- plant trees and wildflowers along urban creeks,
- organize community creek and bay habitat clean-ups,
- raise tree frogs in classrooms to release back into creek homes,
- design and distribute creative outreach materials to inform school communities about reducing urban runoff pollution,
- express concerns about estuary pollution issues using letter writing campaigns, interviews with politicians and play performances,
- interview people fishing on bay piers about safe bay food consumption and distribute informational flyers in seven different languages,
- demonstrate safe bay fish cooking to families at school-community events and teach safety precautions that reduce health risks.

Adaptive Management Framework

Estuary Action Challenge works to create effective, on-going environmental education programs in target schools. Our School Wide Impact approach is to:

- promote active, hands-on restoration and stewardship of local habitats
- provide long-term, in-depth, experiential training for teachers
- partner with strong teams of teachers and the school principal
- involve parents
- collaborate with ongoing efforts of local agencies.

Current status of project

The project is meeting set goals and objectives, progressing on schedule and all programs will be completed according to the set time line. All programs were fully funded. There are no outstanding regulatory or implementation issues.

Progress And Accomplishments

Estuary Action Challenge is well established in many target schools and is becoming established in new target schools. Teachers are working together to continue programs, as a result of their EAC training,

with the equipment packages and curriculum guides provided. School principals and parents are very supportive of expanding EAC programs in their schools. EAC has a strong presence in target schools and programs have become part of school culture and curricula. Many grade level teams are well established and two school wide programs are thriving.

Current Status Of Project & Progress And Accomplishments To Date

- 4500 elementary school students, 190 teachers and approximately 800 parents actively participated in habitat restoration, pollution reduction and safe bay food consumption activities
- 50 community creek clean-up projects completed
- over 400 riparian plants planted along creeks by EAC students
- approximately 1000 Pacific tree frogs raised in classrooms and released into pond and creek habitats
- approximately 1000 student designed posters, brochures and T-shirts about reducing urban runoff pollution displayed and distributed to school communities
- 400 student letters about reducing pollution to the bay sent out to politicians
- 20 classes of 30 students interviewed people fishing on bay piers and passed out informational flyers on safe bay food consumption in seven different languages
- 20 creative student presentations to families about reducing pollution to the bay and taking precautions in fishing for, cooking and eating bay fish, attended by an average of twenty parents for each presentation

Summary of the existing data collection and monitoring program, EAC evaluates:

- the number of teachers, students and family members actively participating in EAC conservation programs
- the number of teachers trained who continue teaching programs
- student's understanding of key concepts and skills and their ability to apply them to planning restoration and conservation projects
- number of creek clean-up projects
- number of trees and wildflowers planted
- number of native animals raised and released
- quality and quantity of educational projects about reducing urban runoff pollution,
- quality and quantity of letters and interviews about reducing pollution to factory and refinery owners and politicians.
- quality and quantity of flyers about safe cooking and fishing practices circulated to the school community (including families) and people fishing on local piers and responses,
- # family members attending safe cooking demonstrations and responses.

Information Generated

- teacher evaluation meetings and written forms
- meetings with principals
- comments from parents attending events
- portfolios of students' work
- photographs of projects

EAC year EAC staff interviews teachers, principals and parents to find out how we can most effectively ensure ongoing programs in our target schools. The information generated helps us to improve our programs.

Berkeley Unified School District

City of Franklin Microsociety Magnet School

1150 Virginia Street, Berkeley, CA 94702

(510) 644-6260 Fax: (510) 644-6420

Barbara Penny James, Principal



Superintendent

Jack McLaughlin

March 27, 2001

Dear Ms. Billinge,

The Franklin Magnet School would like to thank you for designing such an outstanding academic and social experience for our students. Our fifth grade class was able to participate in the seven week "Pollution Reduction and Safe Bay Food Consumption" program with your generous funding grant.

Our student body can be described as a 91% minority population within a low socioeconomic level. Many students in our class have demonstrated severe academic and behavioral problems and require extremely engaging, hands-on curriculum in order to maintain motivation and focus. The Estuary Action Challenge Program was a huge success for our class in every way!

Our instructor, Sheela Shankar, went out of her way to solicit suggestions from us about the best way to move our students into groups, implement learning strategies, and maximize learning for every student. She was well prepared to deal with the challenges of our class and consistently produced high quality lessons in a variety of formats and learning styles.

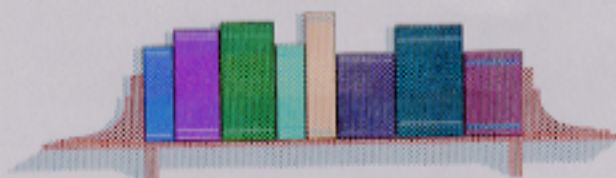
We were able to follow the lessons and integrate the Estuary Action Challenge Program into our other subject areas. An example is in language arts: at each session, we took digi-photos of Ms. Shankar doing presentations and students involved in the lessons. After printing them, the students worked in groups to use the learned vocabulary words from the session into a "Power writing" paragraph lesson. Each sentence is weighted (a 1 is the topic sentence, a 2 is a main point, and a 3 is a detail sentence). Students were very motivated to learn how to do exceptional expository writing through the Estuary Action Challenge experience.

Many students who failed the initial vocabulary quiz after session #1 brought home an "A" on the final test. Students brainstormed the most important learning from each session and used this information in their written assessment at the end of the program. They were scored on vocabulary words, knowledge of concepts, complete sentence structure, organization in writing, and effort on task so they certainly improved in more than one area. The students' level of motivation and understanding of concepts were incredible!

We believe parents became more involved in the children's learning by helping them with their fish recipes and attending the fish cooking demonstration. The students were able to show off their talents and deepen their learning through reciprocal teaching when they had the attention of the audience (4th graders, parents, and Mayor Shirley Dean). They loved conducting the demonstrations! We felt our students had a unique opportunity to engage in an exciting learning experience through the Estuary Action Challenge Program. Thank you so much!

Sincerely,

Liesl Wieneke and Lourdes Lejano
Co-Fifth grade teachers and curriculum coordinators



Stege Elementary School

"Literate and Loving It"

4949 Cypress Avenue Richmond, CA 94804

510.232-8442 510.235-7269 fax

Virginia E. Green, Principal

ggreen64@netscape.net

June 25, 2001

To Whom It May Concern,

I am thrilled that our school is working with Estuary Action Challenge. The Baxter Creek Action program is the hook we need to get our children working in the local community and environment, beyond the school borders. Environmental education, that connects children with their local natural environment, such as an urban creek, is especially important in low income, urban schools. When children have the opportunity to study, clean up and restore an important resource in their neighborhood it helps them to take pride and ownership in it. It empowers them to know that they can make a difference.

All twenty-four classes in our school have worked with EAC this year. We are very committed to continuing this environmental education experience for our students and teachers. Here are some of the comments our teachers at Stege wrote in their evaluations of the creek program:

"The EAC Baxter Creek program is excellent. The instructors worked really well with our students and were always prepared and organized."
Emily Sederholm, First Grade Teacher

"Ms. Manuel, the EAC Teacher, was fantastic! The creek lessons were perfect for this grade level. I feel confident to teach the lessons that have been modeled for me."
Barbara McCormick, Kindergarten Teacher

"The creek program was well organized and sensitive to the students' needs. The EAC Teachers have excellent group management skills. You have given me great ideas on how to bring more science and environmental education into my class."
Eliza Sorensen, First Grade Teacher

We look forward to continuing to work with Estuary Action challenge at Stege Elementary School

Sincerely,

Ginny Green, Principal

Berkeley Unified School District

JOHN MUIR ELEMENTARY SCHOOL
2955 Claremont Avenue, Berkeley, CA 94705
(510) 644-6411 Fax (510) 644-8643

August 8, 2001

To Whom It May Concern:

I am writing to express my commitment for the Estuary Action Challenge School Wide Creek Action Program at John Muir School. This is an excellent environmental education program that supports the use of the creek flowing through our school as a special education resource. Using the creek curriculum developed by EAC, our students are learning important concepts from the latest State Standards in Science. They are also empowered with the ability to help clean up and restore our creek habitat, and create and maintain new habitats, including a pond and hummingbird garden at the creek site.

The creek program integrates learning through subjects including language arts, math, and social studies. With the support of EAC, every child in our school has written creek poetry and had their work celebrated in displays around the school and in a school-wide assembly. In the next school year, we will work with EAC to develop a Creek Web Site that will profile our students' work on Harwood Creek and connect us with schools studying and restoring other urban creeks.

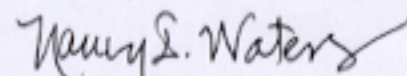
EAC has worked with our teachers to develop a shared plan and vision for our creek program to take us into the next five years. Every member of our teaching faculty participated in this process and gave their input to the design of the plan. Our teachers truly value the partnership with Estuary Action Challenge. Here are some of their comments on last year's program:

"The Creek Program is fantastic - meaningful, powerful and empowering for both teachers and students. Thank you for all your support. I especially appreciate the ethnic diversity of EAC staff, which makes them wonderful role models for our children." Kristine Fowler, Second Grade Teacher

"This program is an excellent, hands-on concept oriented service that focuses on students becoming part of our ecological community. I love having the lessons modeled for me. The curriculum is very effective and I feel confident to teach the content." Marina Franco, Third Grade Teacher

The support and expertise of Estuary Action Challenge is essential to the continued success of our School-Wide Creek Program and your funding support will help make their work possible.

Sincerely,



Nancy D. Waters

A BIG THANK YOU

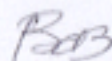
Thanks again for the *great work* you did along the East Bay MUD creeks this year. The willows are all happily sprouting dozens of new leaves. Frogs attached their egg sacks to willows this spring and were ribbeting excitedly about the improvements. Newts did the same (except for the ribbeting!). Even though most of the creeks are now dry on top, the willow roots are still growing in the moist soil below. While the frogs and newts have moved on, lizards now scurry along the creek bottoms looking for insects to eat. There already coyote, raccoon, great blue heron, and deer tracks in the mud from recent visitors.

The oaks and buckeyes are doing well too, although the long dry spells have made life hard for them. Classes that couldn't come early enough to plant, have just added mulch to the earlier plantings. They have also completed a survey along the creeks to see how many trees have survived. The first group of student tree counters on Nunes Creek found that 84% of the buckeyes (47 trees), 79% of the valley oaks (44 trees) and 62% of the live oaks (13 trees) were still alive! This is an *amazing percentage*. With some May rains and some classes coming to water the trees, most of them have a good chance of surviving until the next rainy season.

Another class is repeating the survey along Nunes Creek to check the first figures. Three more classes from Richmond are doing a survey of the Pavon Creeks. We will learn from these tree counts how we can help *even more trees* survive next year. I took some photos of the creeks and trees this week. Here they are for you to see. Thanks again to everyone whose teamwork helped make the creeks and our world healthier places for wildlife. In the process, you also protected reservoir drinking water quality and San Francisco Bay.

We hope to see you again next year.

Your friend,



Ranger Bob
EBMUD Natural Resources
500 San Pablo Dam Road
Orinda, CA 94563

510-287-2036