

# **Bay-Delta Invasive Species Education Outreach: Developing and Piloting an Invasive Species Tool Kit**

## **Project Information**

### **1. Proposal Title:**

Bay-Delta Invasive Species Education Outreach: Developing and Piloting an Invasive Species Tool Kit

### **2. Proposal applicants:**

Carri Benefield, California Department of Food and Agriculture  
Carla Bossard, Calif. Exotic Pest Plant Council

### **3. Corresponding Contact Person:**

Carri Benefield  
Calif. Dept. of Food and Agriculture  
1220 N Street, Room A-357 Sacramento, CA 95814  
916 654-0768  
cbenefield@cdfa.ca.gov

### **4. Project Keywords:**

**Environmental Education**  
**Nonnative Invasive Species**  
**Weed Science**

### **5. Type of project:**

Education

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

No

### **7. Topic Area:**

Non-Native Invasive Species

### **8. Type of applicant:**

State Agency

### **9. Location - GIS coordinates:**

Latitude:

Longitude:

Datum:

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

This is an Education Outreach Project, so essentially the project "location" is Statewide--- in terms of expected span of outreach efforts.

**10. Location - Ecozone:**

Code 15: Landscape, Code 16: Inside ERP Geographic Scope, but outside ERP Ecozones

**11. Location - County:**

Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Imperial, Inyo, Kern, Kings, Lake, Lassen, Los Angeles, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Mono, Monterey, Napa, Nevada, Orange, Placer, Plumas, Riverside, Sacramento, San Benito, San Bernardino, San Diego, San Francisco, San Joaquin, San Luis Obispo, San Mateo, Santa Barbara, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Ventura, Yolo, Yuba, Other

**12. Location - City:**

Does your project fall within a city jurisdiction?

No

**13. Location - Tribal Lands:**

Does your project fall on or adjacent to tribal lands?

No

**14. Location - Congressional District:**

ALL Districts in California

**15. Location:**

**California State Senate District Number:** All Districts in California

**California Assembly District Number:** All Districts in California

**16. How many years of funding are you requesting?**

3

**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: 21.19%

Total Requested Funds: \$174,209

b) Do you have cost share partners already identified?

Yes

If yes, list partners and amount contributed by each:

**California Exotic Pest Plant Council (CalEPPC) In KIND**

**Local Weed Management Areas (WMAs) IN KIND**

**California Environmental Educators Interagency Network (CEEIN) IN KIND**

**Northeast region of California Regional Environmental Education  
Community Network (CREEC); San Joaquin School District IN  
KIND**

**Sacramento and American River Watershed Groups IN KIND**

c) Do you have potential cost share partners?

No

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?

No

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

Yes

If yes, identify project number(s), title(s) and CALFED program.

**99-F08 Purple Loosestrife Prevention, Detection, and Control Actions for the  
Sacramento-San Joaquin Delta and Associated Hydrological Units ERP**

**99-N11 Purple Loosestrife Prevention, Detection, and Control Actions for the  
Sacramento-San Joaquin Delta System and Associated Hydrological  
Units ERP**

**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)**

**Kim Webb   U.S. Fish and Wildlife Services   209-946-6400   kwebb@delta.dfg.ca.gov**

**21. Comments:**

**none at this time.**

# Environmental Compliance Checklist

## **Bay-Delta Invasive Species Education Outreach: Developing and Piloting an Invasive Species Tool Kit**

### **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.

This is an Education Outreach Project and therefore NO CEQA or NEPA are required.

### **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.**

None at this time.

# **Land Use Checklist**

## **Bay-Delta Invasive Species Education Outreach: Developing and Piloting an Invasive Species Tool Kit**

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 outreach only.

4. **Comments.**

None at this time.



# **Conflict of Interest Checklist**

## **Bay-Delta Invasive Species Education Outreach: Developing and Piloting an Invasive Species Tool Kit**

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):**

Carri Benefield, California Department of Food and Agriculture  
Carla Bossard, Calif. Exotic Pest Plant Council

### **Subcontractor(s):**

Are specific subcontractors identified in this proposal? No

### **Helped with proposal development:**

Are there persons who helped with proposal development?

Yes

If yes, please list the name(s) and organization(s):

**Carla Bossard     California Exotic Pest Plant Council (CalEPPC)**

### **Comments:**

None at this time.

# Budget Summary

## Bay-Delta Invasive Species Education Outreach: Developing and Piloting an Invasive Species Tool Kit

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	Sponsor Cooperative Meeting	61	1442.15	413.82	0.00	200.00	0.00	0.00	0.00	2055.97	435.66	2491.63
2	Build Tool Kits	310	6893.30	1929.16	0.00	20000.00	30000.00	0.00	0.00	58822.46	12464.48	71286.94
3	Build and Launch Website	310	5158.30	1183.54	0.00	500.00	0.00	0.00	0.00	6841.84	1449.79	8291.63
4	Curriculum refinement and expansion	240	5930.00	1755.19	0.00	0.00	10000.00	0.00	0.00	17685.19	3747.49	21432.68
		921	19423.75	5281.71	0.00	20700.00	40000.00	0.00	0.00	85405.46	18097.42	103502.88

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
5	Assessment Meeting	61	1442.15	413.82	0.00	200.00	0.00	0.00	0.00	2055.97	435.66	2491.63
6	Partner with Teachers in Pilot Communities	350	8691.30	2569.64	500.00	200.00	0.00	0.00	0.00	11960.94	2534.52	14495.46
7	Training Sessions for Pilot Teachers	245	5981.25	1760.69	100.00	300.00	0.00	0.00	0.00	8141.94	1725.28	9867.22
8	Tool Kit Refinement	255	5650.00	1585.29	0.00	1000.00	0.00	0.00	0.00	8235.29	1745.06	9980.35
		911	21764.70	6329.44	600.00	1700.00	0.00	0.00	0.00	30394.14	6440.52	36834.66

<b>Year 3</b>												
<b>Task No.</b>	<b>Task Description</b>	<b>Direct Labor Hours</b>	<b>Salary (per year)</b>	<b>Benefits (per year)</b>	<b>Travel</b>	<b>Supplies &amp; Expendables</b>	<b>Services or Consultants</b>	<b>Equipment</b>	<b>Other Direct Costs</b>	<b>Total Direct Costs</b>	<b>Indirect Costs</b>	<b>Total Cost</b>
9	Assessment Meeting	61	1442.15	413.82	0.00	200.00	0.00	0.00	0.00	2055.97	435.66	2491.63
10	Training Session(s) for Pilot Teachers	280	6340.00	1799.19	300.00	300.00	0.00	0.00	0.00	8739.19	1851.83	10591.02
11	Promote Project/Tool Kit	230	5726.30	1692.05	500.00	1000.00	0.00	0.00	0.00	8918.35	1889.80	10808.15
12	Tool Kit Refinement	255	5650.00	1585.29	0.00	1000.00	0.00	0.00	0.00	8235.29	1745.06	9980.35
		826	19158.45	5490.35	800.00	2500.00	0.00	0.00	0.00	27948.80	5922.35	33871.15

**Grand Total=174208.69**

**Comments.**

# Budget Justification

## Bay-Delta Invasive Species Education Outreach: Developing and Piloting an Invasive Species Tool Kit

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

There will be a consistent pattern to the staffing on the project. A Senior Environmental Research Scientist will provide formal management and oversight, Labor hours: 25hrs for the first year and 15hrs for the second and third years of project. An Associate Agricultural Biologist will be a lead person on the project, coordinator coordination, Tool Kit development, Curriculum refinement, and project promoting/training. Labor hours: 540hrs for year 1, 695hrs for year 2, and 595hrs for year 3 of the project. A Scientific Aid will assist in tool kit development, meeting/training assistant, website desing/development, Kit assembly, and overall project support. Labor hours: 356hrs for year 1, 201hrs for year 2, and 216 hours for year 3 of the project

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

Senior Environmental Research Scientist, \$34.83/hr An Associate Agricultural Biologist, \$27.60/hr Scientific Aid \$10.25/hr

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

Senior Environmental Research Scientist @ 31% benefits An Associate Agricultural Biologist @ 31% benefits Scientific Aid @ 10.73% benefits

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

Some meetings and training will be located beyond a day's commute and therefore require overnight travel. Travel costs are typically \$100/day (\$60 accommodation at State rate + \$40 per diem). Travel costs based on Associate traveling to give training support and to promote the project.

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

Task 2: Build Tool Kits Associated Costs per tool kit: Teacher enrichment Packet- (Handouts: photocopying costs, reprint costs for originals): \$1.00 Curriculum- (photocopying; cutting of CD Roms: \$5.00 Brochures- (Reprint costs; some in-kind): \$3.00 I.D. Guide- (printing costs), bids at: \$4.00 Fact Sheet- (photocopying and printing costs): \$0.50 Invasives Magazine (\*Elementary Age kits only) -OR- Invasives Newspaper (\*Highshool Age Kits only)- Order reprints of Magazine from Cobblestone Publishing; Order newspaper from Dept. of Interior, D.C.: \$5.00 Video- (cost to purchase videos):\$20.00 Coloring Book- (\*Elementary Age kits only)(reprint costs through Forest Service): \$0.50 List of Local Contacts- (photocopying costs): \$0.50 List of Web Resources- (photocopying costs): \$0.50 \_\_\_\_\_ Cost per Kit \$40.00  
\$40.00 x 500 Kits = 20,000 Task 3: Build and Launch Websie supply costs for upgrades to necessary software, etc. Tasks: 1,5,6,7,9 and 10 Supply costs: paper, printer supplies, photocopying, handouts and materials at meetings, trainings and in pilot efforts. Tasks 8, 11, 12: supplies necessary to include more, misc. items in tool kits as they are made avaiable; costs to reprint/photocopy updated materials, etc.

**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.

Task 2: Build Tool Kits- \$30,000.00 A. \$15,000.00 for I.D. Guides- 1. Contract out the printing of guides, bid received at: \$4/guide x 500 = \$2000 2. Rights to Photos and Text Development, \$13,000 Pay for rights to high quality aquatic photos (very difficult shots to take, need professional level expertise for quality photos) Contract out for rights from UC Davis photographer Joe DiTomaso and Jack Kelly Clark B. \$15,000 for Development of Fact Sheet(s) Contract out the development of a comprehensive fact sheet on invasive species, The California Foundation for Agriculture in The Classroom has a lot of experience in fact sheet development and has been approached to develop one for invasive species for the project; a bid was obtained at \$15,000. The Ag in the Classroom also has a very widespread outreach and distribution capability--- and can help reach classrooms across the state. Task 4: Curriculum refinement and expansion- \$10,000 We plan to solicit help with curriculum from Project leaders of well established Environmental Education Programs such as, Project Learning Tree (CA Dept. of Forestry and Fire Protection) and Project WILD (CA Dept. of Fish and Game). We cooperate with both project leaders on the CA Environmental Educators Interagency Network on a monthly basis--- and both are very interested in helping to develop Invasive species curriculum/tool kits--- as it could be a tool in their already established programs. \$5,000 each for consultant fees.

**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 costs included in the budget.

**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 conducted by both Associate and Senior Scientists. Costs are associated per task, included in personnel costs.

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

No "other direct costs" included in budget.

**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.

Indirect costs include all of the above mentioned, all cost needed in operating a state program, general office requirements, administration, contracting, etc. Note: The Department submits a proposal/memo each year to determine what overhead needs are--- a set rate is determined/set each year for all agencies. All forms can be filled out as requested.

# **Executive Summary**

## **Bay-Delta Invasive Species Education Outreach: Developing and Piloting an Invasive Species Tool Kit**

Threats to California's natural resources by the invasion of non-native plant and animal species have recently been recognized as a close second to urbanization-development in loss of biodiversity. Invasive species quietly displace native species and negatively impact wildlife. In California, Arundo and yellow starthistle are taking over our riparian and grassland communities; non-native invertebrates, such as the Chinese mitten crab and zebra mussel, also threaten our waterways. Invasive species minimize biodiversity, disrupt natural resources, and impact the economy. Education is one of our best tools in winning the battle against invasive species. We will develop invasive species tool kits, partner with teachers in a pilot communities, and guide teachers through implementation of the unit. Currently available invasive species curriculum will be refined and expanded. The curriculum will emphasize the importance of overall watershed health, from removing invasive species to restoring with native plants. The project will facilitate project learning beyond the classroom and into the local watershed. Beyond the initial pilot phase of the project, we expect there to be a demand for this curriculum throughout the Bay-Delta. A Hypothesis: Education outreach is one of our best tools in preventing new introductions and further spread of invasive species in the Bay-Delta. The development, piloting, and distribution of an invasive species tool kit will greatly increase the knowledge and involvement of students and teachers about this serious threat to the Bay-Delta. Teachers will educate students, students will inform family members, family members will share with friends--- and the flow of information sharing will be tremendous. A Pilot Project-Objectives Five Fold: PHASE I: 1.Develop Invasive Species Tool Kits. 2.Web Site Design and Development. PHASE II: 3.Partner with teachers in pilot communities. 4.Taking it beyond the classroom. PHASE III: 5.Watershed/Statewide Availability and Outreach. Relationship to CALFED ERP Goals: Invasive species and Education Outreach are mentioned repeatedly as priorities. Restoration priorities for the Multi-Regional Bay-Delta Areas [MR-PRIORITY #1] Sacramento Region [SR-PRIORITY #5] San Joaquin Region [SJ-PRIORITY #1] Delta Region [DR-PRIORITY #5] Bay Region [BR-PRIORITY #3]

# **Proposal**

**California Department of Food and Agriculture**

## **Bay-Delta Invasive Species Education Outreach: Developing and Piloting an Invasive Species Tool Kit**

Carri Benefield, California Department of Food and Agriculture  
Carla Bossard, Calif. Exotic Pest Plant Council

**Bay-Delta Invasive Species Education Outreach:  
*Developing and Piloting an Invasive Species Tool Kit***

## **Executive Summary**

Threats to California's natural resources by the invasion of non-native plant and animal species have recently been recognized as a close second to urbanization-development in loss of biodiversity. Invasive species quietly displace native species and negatively impact wildlife. In California, Arundo and yellow starthistle are taking over our riparian and grassland communities; non-native invertebrates, such as the Chinese mitten crab and zebra mussel, also threaten our waterways. Invasive species minimize biodiversity, disrupt natural resources, and impact the economy.

Education is one of our best tools in winning the battle against invasive species. We will develop invasive species tool kits, partner with teachers in a pilot communities, and guide teachers through implementation of the unit. Currently available invasive species curriculum will be refined and expanded. The curriculum will emphasize the importance of overall watershed health, from removing invasive species to restoring with native plants. The project will facilitate project learning beyond the classroom and into the local watershed. Beyond the initial pilot phase of the project, we expect there to be a demand for this curriculum throughout the Bay-Delta.

### **A Hypothesis**

Education outreach is one of our best tools in preventing new introductions and further spread of invasive species in the Bay-Delta. The development, piloting, and distribution of an invasive species tool kit will greatly increase the knowledge and involvement of students and teachers about this serious threat to the Bay-Delta. Teachers will educate students, students will inform family members, family members will share with friends--- and the flow of information sharing will be tremendous.

### **A Pilot Project-Objectives Five Fold:**

#### **PHASE I:**

1. **Develop Invasive Species Tool Kits.**
2. **Web Site Design and Development.**

#### **PHASE II:**

3. **Partner with teachers in pilot communities.**
4. **Taking it beyond the classroom.**

#### **PHASE III:**

5. **Watershed/Statewide Availability and Outreach.**

### **Relationship to CALFED ERP Goals:**

*Invasive species and Education Outreach are mentioned repeatedly as priorities.*

*Restoration priorities for the Multi-Regional Bay-Delta Areas [MR-PRIORITY #1]*

*Sacramento Region [SR-PRIORITY #5]*

*San Joaquin Region [SJ-PRIORITY #1]*

*Delta Region [DR-PRIORITY #5]*

*Bay Region [BR-PRIORITY #3]*



## **A. Project Description: Project Goals and Scope of Work**

### ***1. Problem:***

Threats to California's natural resources by the invasion of non-native plant and animal species have recently been recognized as a close second to urbanization-development in loss of biodiversity. Noxious and invasive species quietly displace our native species and negatively impact wildlife. In California, Arundo and yellow starthistle are taking over our riparian and grassland communities; non-native invertebrates, such as the Chinese mitten crab and zebra mussel, also threaten our waterways. Invasive species minimize biodiversity, disrupt natural resources, and impact the economy. Invasive species do not stop at arbitrary boundaries, rather are area-wide problems, demanding watershed solutions. Education is one of our best tools in winning the battle against noxious and invasive species.

Over the past few years, Environmental Education has been receiving more attention throughout the state and nation. Studies show that environmental education helps engage students in learning and that they actually learn more effectively when traditional subjects (mathematics, social sciences, language arts, etc.) are encompassed in a larger framework--- the environment, a framework in which they live. Two organizations, The California Environmental Educators Interagency Network (CEEIN) and California Regional Environmental Educator Coordinator (CREEC) Network have formed to help provide environmental education resources to teachers and educators across the state. There are several very successful Environmental Education Programs already up and running: Project WILD, Fish and Game; Project Learning Tree, Forestry and Fire Protection; Project WET, Water Education for Teachers. However, lacking in these existing programs are tools for incorporating invasive species awareness into the curriculum. Classrooms across the state could benefit from a TOOL KIT that would focus on invasive species awareness.

### ***A Pilot Project- Goals are Five Fold:***

#### **PHASE I:**

**1. Develop Invasive Species Tool Kits.** We will build a tool kit that is easy for teachers to use both in and outside the classroom. Tie-in to Bay-Delta watershed health will be critical in refinement and expansion of available invasive species curriculum. The curriculum will emphasize the importance of overall watershed health, from removing invasive species to restoring with native plants. At the heart of the tool kit, will be a collection of available invasive species curriculum that will be refined and expanded. Several groups, including a group out of Monterey State University and the San Joaquin School District have developed curriculum (lesson plans, activities for the classroom and beyond) focused on invasive species in California's natural areas. The San Joaquin curriculum has a Bay-Delta focus. Other sections of curriculum from out of state can also be adapted and refined for California. Project coordinators will work with other environmental education project coordinators [Project WILD (Fish and Game); Project Learning Tree (Forestry and Fire Protection); Project WET (A non-profit promoting Water Education for Teachers)] to make larger environmental/watershed connections.

The project will facilitate project learning beyond the classroom and into the local watershed, providing an opportunity for students to earn service-learning credit. In addition, the curriculum will meet California State Standards, a necessity in getting teachers to use the tool kit in their classrooms. Another key to successful promotion of the toolkit will be that professionals in the invasive species arena will partner with teachers and assist in introducing the material. Beyond the initial pilot phase of the project, we expect there to be a demand for this curriculum in other parts of the Bay-Delta Watershed.

Several established groups will help in the implementation of the project. California Regional Environmental Education Community Network (CREEC) regions have direct links to local teachers.

Watershed and invasive species expertise will be provided through Weed Management Area groups, Watershed groups (Sacramento River and American River Watershed Groups have already shown an interest), and the California Exotic Pest Plant Council. All groups have unique education outreach expertise to lend--- these interests will serve to focus the group's mission.

**Kits will include:** a teacher enrichment resource packet (background information to help educate them about invasive species issues), curriculum (activities/lesson plans), brochures, I.D. Guide, fact sheets, Invasive Magazine or Newspaper, a video, a coloring book, a list of local contacts, and a list of web resources. Kit Contents will be packaged in a fun and catchy container designed by cooperators. A total of 500 kits will be developed, 400 targeted toward Elementary age students and 100 targeted toward High School aged students.

<b>Building A Tool Kit</b>	
<b>Teacher Enrichment Packet</b>	Background materials about the problem, issues, and topic.
<b>Curriculum</b>	Many lesson plans, activities, and some curriculum have been developed, including a Bay-Delta curriculum from the San Joaquin School District. Others can be adapted to meet needs of tool kit.
<b>Brochures</b>	A wide variety of brochures are available to include in the kit.
<b>I.D. Guide</b>	A spiral bound, full color photo identification guide for aquatics in the Delta will be developed.
<b>Fact Sheet</b>	An invasive species fact sheet will be developed in collaboration with project cooperators.
<b>Invasives Magazine</b> <b>*Elementary Kits Only.</b> <b>Invasives Newspaper</b> <b>**Highschool Kits Only.</b>	*An elementary level kids magazine (Cobblestone Publishing) published an issue (April, 2000) issue dedicated to the topic of Invasive Species. **The US Dept. of the Interior's People Land and Water publication/Newspaper (July/August 2000) issue was dedicated to Invasive species--- a great overview appropriate for high school aged students. It is available to be reprinted in large quantities.
<b>Video</b>	Several videos are available, the most appropriate video(s) will be selected to target the different age groups.
<b>Coloring Book</b> <b>*Elementary Only.</b>	Several coloring books have been developed, one by a Forest Service Botanist and others by Weed Management Area groups.
<b>List of Local Contacts</b>	A list of local Watershed/Weed Management Area professional will be compiled for local teachers--- resources to assist in the classroom and provide local field project ideas.
<b>List of Web Resources</b>	A list of helpful web sites for invasive species and EE will be compiled.

**2. Web Site Design and Development.** A web-site that is accessible from the classroom will provide a web-based invasive species quiz and access to additional resources.

## **PHASE II:**

**3. Partner with teachers in pilot communities.** We will advertise the invasive species curriculum project through the California Regional Environmental Education Community Network (CREEC) mailings and through local Weed Management Area groups to promote its use. Once we have a group of teachers interested in the curriculum, we will arrange for a short training session to provide background information and show teachers how to use the curriculum. Local Weed Management Area and Watershed group members will then be available to go into classrooms to help implement the curriculum.

**4. Taking it beyond the classroom.** Classrooms will be invited to work in the watershed through local weed-pull days, restoration planting activities, or other watershed events. This field-based cooperative project will be an opportunity for students to gain state required, service learning credit.

### **PHASE III:**

**5. Watershed/Statewide Availability and Outreach.** Local distribution of the tool kit will serve as the pilot phase of the project. We will establish an evaluation team, including teachers from pilot schools, that will provide feedback before the project is promoted Bay-Delta-wide. Within one to two school years, we expect there to be a demand for this curriculum in other parts of the Bay-Delta watershed, as well as across the state.

### **A Hypothesis**

Education outreach is one of the most environmentally and economically sound tools in preventing new introductions and further spread of invasive species in the Bay-Delta. The development, piloting, and distribution of an invasive species tool kit will greatly increase the knowledge and involvement of students and teachers about this serious threat to the CALFED Bay-Delta Watershed. Teachers will educate students, students will inform family members, family members will share with friends--- and the flow of information sharing will be tremendous.

### **2. Justification:**

As the world shrinks and travel and trade boom, plant and animal species have become globetrotters too. It is almost impossible to find communities that have not been affected by invading organisms. The western United States is overrun by grasses and herbs from Europe and Africa, clams from Asia, or even less distant immigrants from the eastern United States such as bullfrogs, cowbirds, and sunfish. Since the gold rush era, California's Sacramento-San Joaquin Estuary has been bombarded with the introduction of at least 212 species, a combination of zooplankton, clams, amphipods, crabs, fish and plants. Invasive plants in California are horribly difficult to manage; government and private agencies simply do not have the resources to effectively combat the problem. Meanwhile our grossly uninformed public not only provides little assistance, but may also unknowingly promote invasive plant problems, whether by transplanting whole plants or toting seed on cars, pets and clothing.

Invasive species often get by without notice. They quietly displace our native species, out-compete crops, and negatively impact wildlife. In California, Arundo, Scotch Broom, purple loosestrife, and yellow starthistle, for example, take over areas otherwise occupied by a mix of riparian vegetation or grasses and forbs; non-indigenous invertebrates, such as the Chinese mitten crab and zebra mussel, threaten to greedily out-compete our native fish communities. Unfortunately, even the most noxious invader may be "too pretty" to stimulate alarm, despite the fact it is minimizing biodiversity, disrupting our natural resources, and impacting our economy. Education is what is needed to bring attention to such impacts of otherwise attractive or overlooked invasive species.

### **Need for project; Why critical to the Bay-Delta**

Tie-in to Bay-Delta watershed health will be critical in development and expansion of an invasive species curriculum. The curriculum will emphasize the importance of overall watershed health, from removing invasive species to restoring with native plants. Project coordinators will work with other environmental education project coordinators to make larger environmental/watershed connections. Both education outreach and invasive species projects are key components associated with a long-term, comprehensive plan that will restore overall ecological health of the Bay-Delta system.

### **Implement specific watershed conservation, maintenance, and restoration actions:**

The project will be taken into outdoor classroom. Classrooms will be involved in weed-pull, replanting of natives, and like workshops in the CALFED Bay-Delta Watershed. Invasive species serve as a great hands-on watershed and environmental education teaching opportunity. The dramatic impacts of weeds can easily be seen, measured, and studied by anybody. By using the environment to study science principles and

concepts, students can gain a better understanding of their parks, forests, and wildlands, while also learning about the impacts of urbanization, fragmentation, and invasive species. Involving students in a project to eradicate invasive species and restore natural areas can give them a chance to provide community service, as well as "learn by doing." Weeds also serve as a great model because short-term activities, such as weed-pulling and native replanting result in dramatic, immediate improvements. The result is great participant/cooperator satisfaction, demonstrating that everybody can improve watershed health.

It is no secret that public awareness can be effectively generated by teaching our youth. Kids are our future stewards of California's lands and will be our next generation of voters. Kids get excited about invasive species and draw-in the interest of their parents, friends, and neighbors. A strong, thorough curriculum relating the significance of invasive species, will trickle up from youth to adults. Our outreach will start locally and eventually invade school districts around the state.

### **Ecological/Biological Objectives**

Both education outreach and invasive species projects are key components associated with a long-term, comprehensive plan that will restore overall ecological health of the Bay-Delta system.

Invasive species do not obey watershed or county boundaries. Truly the only approach to weed prevention, management, and eradication is on a watershed level. Efforts made in only one part of the watershed would be futile without addressing the watershed in its entirety. Holistic, watershed management is the key.

The displacement of valued flora and fauna and the diminishment of critical fish and wildlife habitats by invasive species have been well documented. The continued introduction and spread of invasive species jeopardize various threatened and endangered native wetland plants and wildlife. The complex interface between farm land and water in the Bay-Delta estuary that provides rich and varied habitat for wildlife, especially birds is threatened by the spread of invasive species. On a larger scale, invasive species have been documented to interfere with wetland functions, including productivity and nutrient cycling by replacing mosaics of submergent and emergent vegetation.

This invasive species education outreach project will increase an overall awareness about the threat that invasive species pose to the health of the Bay-Delta. Invasive species threats are currently neglected in existing Environmental Education outreach programs and curricula. This project will incorporate invasive species into local classroom curricula.

### **Compatibility with Non-Ecosystem Objectives**

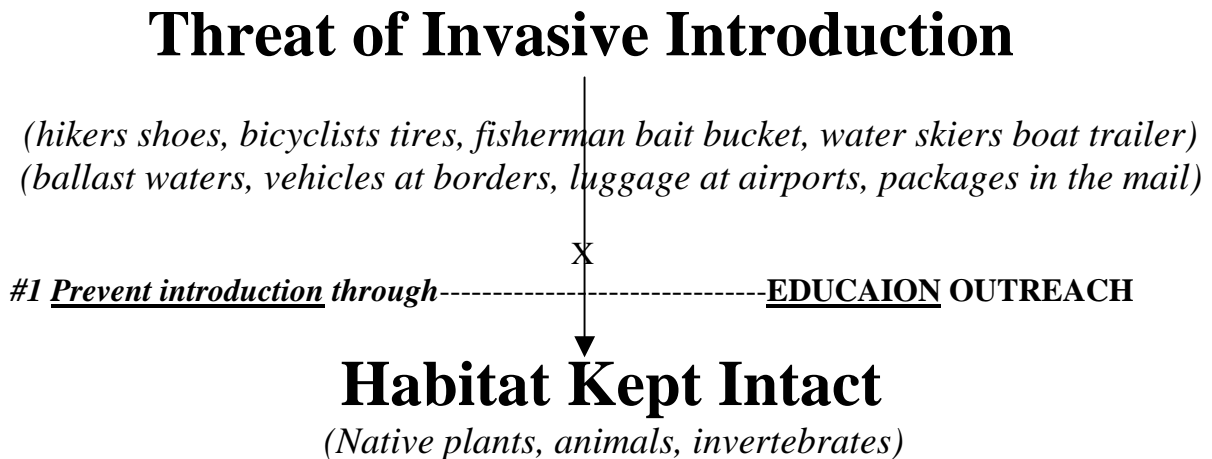
Invasive species can interfere with wetland functions, including *productivity* and *nutrient cycling* by replacing mosaics of submergent and emergent vegetation. Suppression of the resident plant community eventually leads to the alteration of wetland structure, chemistry, and function. The fact that many aquatics impede the rate of natural *water flow*, causing increased silt deposition and reduction in *water quality* has generated substantial concern in western states. Infestations also decrease storage capacities of impounded water bodies.

A need exists for a cooperative effort to educate youth about invasive species. Few cross-watershed groups, coordinated invasive species management and restoration projects have been implemented. This project proposes a more coordinated effort between local Watershed groups, Weed Management Area groups and teachers/students to further promote invasive species awareness, removal, and restoration activities. **Cooperators to date:** California Department of Food and Agriculture, California Exotic Pest Plant Council, Weed Management Area groups, Sacramento River Watershed Group, American River Watershed Group, Northeast region California Regional Environmental

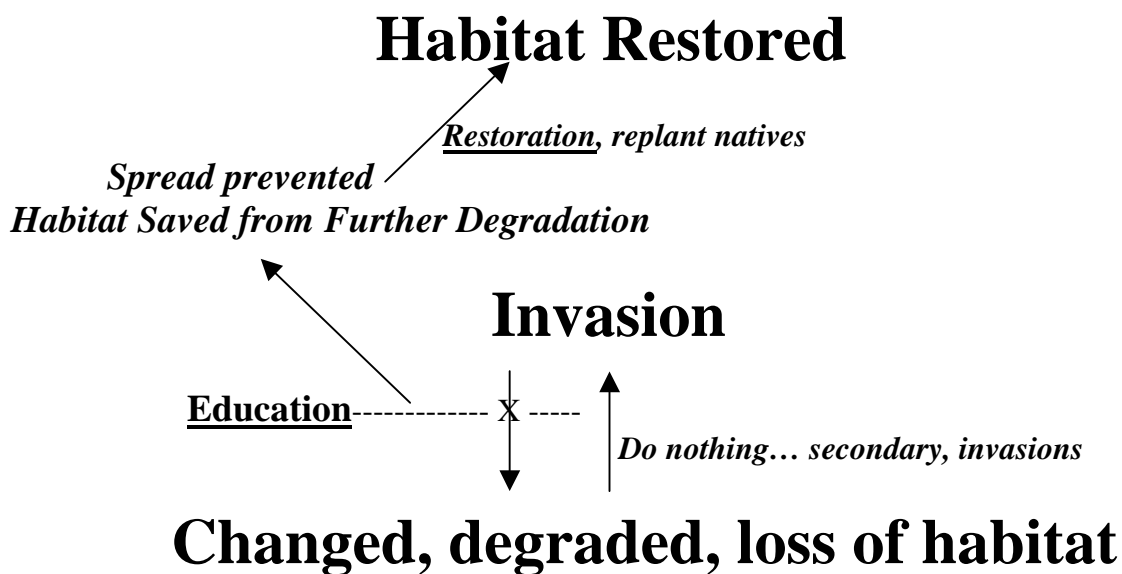
Education Community Network (CREEC), San Joaquin School District; Botanists and Land Managers from the Forest Service, Bureau of Land Management, and Resource Conservation Districts.

**Conceptual Model:**

**#1 Prevent introduction through Education:**



**#2 Prevent further spread and habitat degradation through Education and Restoration:**



*(loss of native plants, animals, invertebrates)*

## **A Hypothesis**

Education outreach is one of the most environmentally and economically sound tools in preventing new introductions and further spread of invasive species in the Bay-Delta. The development, piloting, and distribution of an invasive species tool kit will greatly increase the knowledge and involvement of students and teachers about this serious threat to the CALFED Bay-Delta Watershed. Teachers will educate students, students will inform family members, family members will share with friends--- and the flow of information sharing will be tremendous.

## **Project Type: Education**

**A three year, three phase pilot education project.**

### ***3. Approach:***

<b>Approach and Flow of Work Planned</b>	
<b><i>Task</i></b>	<b><i>Description of Task</i></b>
<b>PHASE I:</b> <u><b>TIMEFRAME:</b> Year 1</u>	
<b>Task 1 – Sponsor Cooperators Meeting</b> <b><i>Fall/winter</i></b>	Organize and hold a meeting of all project cooperators to discuss tool kit contents and outreach mechanisms.
<b>Task 2 – Build Tool Kits</b> <b><i>Winter/Spring/Summer</i></b>	Work to get copies/duplicates of each product for the kit; work to order container to hold materials. Assemble tool kits.
<b>Task 3- Build and Launch Website</b> <b><i>Winter/Spring/Summer</i></b>	Build a web site that will serve as a resource for teachers using the kit.
<b>Task 4- Curriculum Refinement and Expansion</b> <b><i>Fall//Winter/Spring</i></b>	Collect all currently available curriculum; Work to tailor to California and CALFED emphasis; work to ensure meet California State Standards
<b>PHASE II:</b> <u><b>TIMEFRAME:</b> Year 2</u>	
<b>Task 5 – Assessment Meeting</b> <b><i>Summer/Fall</i></b>	Gather all project cooperators to assess first year activities and develop plan for cooperation in pilot communities.

<b>Task 6- Partner with Teachers in Pilot Communities</b> <i>Fall/winter/Spring</i>	Partner WMAs, Watershed leads, and other Professionals with local teachers to help integrated the kit into the classroom.
<b>Task 7- Training Session for Pilot Teachers</b> <i>Summer/Fall</i>	Hold a training session for pilot project teachers, providing an overview of the topic of invasive species and teaching them how to use the kit in the classroom.
<b>Task 8- Tool Kit Refinement</b> <i>Fall/winter/Spring</i>	Add to or modify kits as deemed necessary, as new materials are made available.
<b>PHASE III:</b> <u>TIMEFRAME:</u> Year 3	
<b>Task 9 – Assessment Meeting</b> <i>Summer/Fall</i>	Gather all project cooperators to assess second year activities and develop plan for wider tool kit distribution and promotion.
<b>Task 10- Training Session(s) for Pilot Teachers</b> <i>Summer/Fall</i>	Hold training session(s) for pilot project teachers, providing an overview of the topic of invasive species and teaching them how to use the kit in the classroom.
<b>Task 11– Promote Project/Tool Kit</b> <i>Fall/Winter/Spring/Summer</i>	At appropriate conferences, meetings, and summer sessions the tool kit will be promoted and advertised.
<b>Task 12- Tool Kit Refinement</b> <i>Fall/winter/Spring</i>	Add to or modify kits as deemed necessary, as new materials are made available.

### **Planning**

Annual planning and assessment meetings will be used to coordinate amongst cooperators, California Department of Food and Agriculture will take the lead on this project.

### **Equipment and facilities**

There are no formal facilities required, nor are there any equipment needs for this education outreach project.

### **Project Monitoring:**

Educating teachers and students from the local community is essential in promoting sustaining, active watershed participation. A curriculum based on California State Standards will further promote teacher participation in the project. An opportunity for students to earn service-learning credit should also provide incentive for local school adoption. Local Watershed groups, Weed Management Area groups, and Resource Conservation Districts are eager to reach out to teachers and students in the community.

Each year of the project an assessment meeting will be held to help monitor project successes and failures. In addition, first year participants will serve as our evaluation team before the project is promoted throughout the Bay-Delta watershed. We will work closely with our evaluation team to ascertain that we are distributing a product teachers can easily implement without intimidation or confusion. Following the first year pilot phase of the project, we will also invite and expect



cooperators from other Bay-Delta school districts, watershed groups, and weed management areas to attend the training so they may expand the curriculum in their local areas.

### **Information dissemination**

All project products will be widely shared and distributed amongst project cooperators, pilot community teachers, and others interested in the project. Annual assessment meetings will also help to keep all cooperators on the same page and on track with project tasks/goals.

### ***4. Feasibility:***

With so many experienced and professional cooperators it is believed that the proposed education outreach project is feasible. The project is broken down into three distinct phases to help better ensure project success and meet project goals/bench marks. The California Environmental Educators Interagency Network lends great support in that members are already carrying out very successful environmental education programs (Project WILD, Learning Tree, WET, etc.). The California Department of Food and Agriculture is a member of this interagency educators group and has developed solid working relationships with these agency environmental education leaders. In addition both watershed groups and Weed Management Areas provide a more local connection to reaching interested teachers and educators. They also bring to the table vast experience in education outreach and in battling noxious and invasive species throughout the state. The California Exotic Pest Plant Council (CalEPPC), a non-profit group in California focuses specifically on Wildland weeds of California and therefore can offer a wide variety of expertise on the topic. CalEPPC also has a working education outreach committee that is eager to co-lead and cooperate on the project.

A need for a tool kit and training on the topic certainly exists. The California Department of Food and Agriculture receives phone calls and emails from interested educators each week. To date, only piecemeal information (information not necessarily tailored to a student/teacher level) was available for distribution. Other western states such as Montana have developed many outreach products, including a tool kit--- it has been very popular with educators. We have a copy of their tool kit and will improve upon their design, as well as tailor it to California's unique climate, ecosystems, and species. Other Western states will also be a valuable resource in successfully completing the project.

### ***5. Performance Measures:***

#### **Project Bench Marks:**

Educating teachers and students from the local community is essential in promoting sustaining, active watershed participation. A curriculum based on California State Standards will further promote teacher participation in the project. An opportunity for students to earn service-learning credit should also provide incentive for local school adoption. Local Watershed groups, Weed Management Area groups, and Resource Conservation Districts are eager to reach out to teachers and students in the community.

In the first year of tool kit adoption, we expect a minimum of 10 teachers to implement the Weed Awareness Curriculum; these first year participants will serve as our evaluation team before the project is promoted throughout the Bay-Delta watershed. We will work closely with our evaluation team to assure that we are distributing a product teachers can easily implement without extra work, intimidation, or confusion.

First year participants will serve as our evaluation team before the project is promoted throughout the Bay-Delta watershed. We will work closely with our evaluation team to ascertain that we are distributing a product teachers can easily implement without intimidation or confusion. Following the first year pilot project, we will also invite and expect cooperators from other Bay-Delta school districts, watershed groups, and weed management areas to attend the training so they may expand the curriculum in their local areas.

Following the first year pilot project, we expect there to be a demand for this curriculum in other parts of the Bay-Delta Watershed. Following the success of the pilot project, cooperators outside of the pilot project area will be made aware of this new curriculum. These cooperators will then be encouraged to contact school districts to promote the curriculum. Project members will follow up with the pursuant school districts to widely promote the curriculum. We will also invite and expect cooperators from other schools, watershed, and weed management area groups to attend the training so they may expand the curriculum in their local areas.

#### ***6. Information Handling and Storage:***

Since this is an education outreach project, the complex information (data) sharing required in most projects does not apply to this project. All products of the project will be widely shared amongst project collaborators, teachers cooperating, and other interested parties.

#### ***7. Expected Products/Outcomes:***

##### ***A Pilot Project- Goals are Five Fold:***

##### **PHASE I:**

**1. Develop Invasive Species Tool Kits.** We will build a tool kit that is easy for teachers to use both in and outside the classroom. Tie-in to Bay-Delta watershed health will be critical in refinement and expansion of available invasive species curriculum. The curriculum will emphasize the importance of overall watershed health, from removing invasive species to restoring with native plants. At the heart of the tool kit, will be a collection of available invasive species curriculum that will be refined and expanded. Several groups, including a group out of Monterey State University and the San Joaquin School District have developed curriculum (lesson plans, activities for the classroom and beyond) focused on invasive species in California's natural areas. The San Joaquin curriculum has a Bay-Delta focus. Other sections of curriculum from out of state can also be adapted and refined for California. Project coordinators will work with other environmental education project coordinators [Project WILD (Fish and Game); Project Learning Tree (Forestry and Fire Protection); Project WET (A non-profit promoting Water Education for Teachers)] to make larger environmental/watershed connections.

The project will facilitate project learning beyond the classroom and into the local watershed, providing an opportunity for students to earn service-learning credit. In addition, the curriculum will meet California State Standards, a necessity in getting teachers to use the tool kit in their classrooms. Another key to successful promotion of the toolkit will be that professionals in the invasive species arena will partner with teachers and assist in introducing the material. Beyond the initial pilot phase of the project, we expect there to be a demand for this curriculum in other parts of the Bay-Delta Watershed.

Several established groups will help in the implementation of the project. California Regional Environmental Education Community Network (CREEC) regions have direct links to local teachers. Watershed and invasive species expertise will be provided through Weed Management Area groups, Watershed groups (Sacramento River and American River Watershed Groups have already shown an interest), and the California Exotic Pest Plant Council. All groups have unique education outreach expertise to lend--- these interests will serve to focus the group's mission.

**Kits will include:** a teacher enrichment resource packet (background information to help educate them about invasive species issues), curriculum (activities/lesson plans), brochures, I.D. Guide, fact sheet, Invasive Magazine or Newspaper, a video, a coloring book, a list of local contacts, and a list of web resources. Kit Contents will be packaged in a fun and catchy container designed by cooperators. A total of 500 kits will be developed, 400 targeted toward Elementary age students and 100 targeted toward High School aged students.

<b>Building A Tool Kit</b>	
<b>Teacher Enrichment Packet</b>	Background materials about the problem, issues, and topic.
<b>Curriculum</b>	Many lesson plans, activities, and some curriculum have been developed, including a Bay-Delta curriculum from the San Joaquin School District. Others can be adapted to meet needs of tool kit.
<b>Brochures</b>	A wide variety of brochures are available to include in the kit.
<b>I.D. Guide</b>	A spiral bound, full color photo identification guide for aquatics in the Delta will be developed.
<b>Fact Sheet</b>	An invasive species fact sheet will be developed in collaboration with project cooperators.
<b>Invasives Magazine</b> <b>*Elementary Kits Only.</b> <b>Invasives Newspaper</b> <b>**Highschool Kits Only.</b>	*An elementary level kids magazine (Cobblestone Publishing) published an issue (April, 2000) issue dedicated to the topic of Invasive Species. **The US Dept. of the Interior's People Land and Water publication/Newspaper (July/August 2000) issue was dedicated to Invasive species--- a great overview appropriate for high school aged students. It is available to be reprinted in large quantities.
<b>Video</b>	Several videos are available, the most appropriate video(s) will be selected to target the different age groups.
<b>Coloring Book</b> <b>*Elementary Only.</b>	Several coloring books have been developed, one by a Forest Service Botanist and others by Weed Management Area groups.
<b>List of Local Contacts</b>	A list of local Watershed/Weed Management Area professional will be compiled for local teachers--- resources to assist in the classroom and provide local field project ideas.
<b>List of Web Resources</b>	A list of helpful web sites on invasive species and EE will be compiled.

**2. Web Site Design and Development.** A web-site that is accessible from the classroom will provide a web-based invasive species quiz and access to additional resources.

**PHASE II:**

**3. Partner with teachers in pilot communities.** We will advertise the invasive species curriculum project through the California Regional Environmental Education Community Network (CREEC) mailings and through local Weed Management Area groups to promote its use. Once we have a group of teachers interested in the curriculum, we will arrange for a short training session to provide background information and show teachers how to use the curriculum. Local Weed Management Area and Watershed group members will then be available to go into classrooms to help implement the curriculum.

**4. Taking it beyond the classroom.** Classrooms will be invited to work in the watershed through local weed-pull days, restoration planting activities, or other watershed events. This field-based cooperative project will be an opportunity for students to gain state required, service learning credit.

**PHASE III:**

**5. Watershed/Statewide Availability and Outreach.** Local distribution of the tool kit will serve as the pilot phase of the project. We will establish an evaluation team, including teachers from pilot schools, that will provide feedback before the project is promoted Bay-Delta-wide. Within one to two school years, we expect there to be a demand for this curriculum in other parts of the Bay-Delta watershed, as well as across the state.

**8. Work Schedule:**

<b>Table 1- Proposed Work Schedule</b>	
<b><i>Task</i></b>	<b><i>Description of Task</i></b>
<b>PHASE I:</b> <b><u>TIMEFRAME:</u> Year 1</b>	
<b>Task 1 – Sponsor Cooperators Meeting</b> <b><i>Fall/winter</i></b>	Organize and hold a meeting of all project cooperators to discuss tool kit contents and outreach mechanisms.
<b>Task 2 – Build Tool Kits</b> <b><i>Winter/Spring/Summer</i></b>	Work to get copies/duplicates of each product for the kit; work to design and order container to hold materials. Assemble tool kits.
<b>Task 3- Build and Launch Website</b> <b><i>Winter/Spring/Summer</i></b>	Build a web site that will serve as a resource for teachers using the kit.
<b>Task 4- Curriculum Refinement and Expansion</b> <b><i>Fall//Winter/Spring</i></b>	Collect all currently available curriculum; Work to tailor to California and CALFED emphasis; work to ensure meet California State Standards.

<b>PHASE II:</b> <u>TIMEFRAME:</u> Year 2	
<b>Task 5 – Assessment Meeting</b> <i>Summer/Fall</i>	Gather all project cooperators to assess first year activities and develop plan for cooperation in pilot communities.
<b>Task 6- Partner with Teachers in Pilot Communities</b> <i>Fall/winter/Spring</i>	Partner WMAs, Watershed leads, and other Professionals with local teachers to help integrated the kit into the classroom.
<b>Task 7- Training Session for Pilot Teachers</b> <i>Summer/Fall</i>	Hold a training session for pilot project teachers, providing an overview of the topic of invasive species and teaching them how to use the kit in the classroom.
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<b>PHASE III:</b> <u>TIMEFRAME:</u> Year 3	
<b>Task 9 – Assessment Meeting</b> <i>Summer/Fall</i>	Gather all project cooperators to assess second year activities and develop plan for wider tool kit distribution and promotion.
<b>Task 10- Training Session(s) for Pilot Teachers</b> <i>Summer/Fall</i>	Hold training session(s) for pilot project teachers, providing an overview of the topic of invasive species and teaching them how to use the kit in the classroom.
<b>Task 11– Promote Project/Tool Kit</b> <i>Fall/Winter/Spring/Summer</i>	At appropriate conferences, meetings, and summer sessions the tool kit will be promoted and advertised.
<b>Task 12- Tool Kit Refinement</b> <i>Fall/winter/Spring</i>	Add to or modify kits as deemed necessary, as new materials are made available or changes/updates are required.

## **B. Applicability to CALFED ERP and Science Program Goals & Implementation Plan**

### **1. ERP, Science Program Priorities:**

*Invasive species, and Education Outreach are mentioned repeatedly as priorities in the Multi-Regional Bay-Delta Areas section, as well as specifically addressed in the: Sacramento, San Joaquin, Delta, and Bay Regions. All of these priorities would be met by this project proposal. Please see below sections for direct applicability---language taken directly from priority areas of PSP.*

#### **➤ Restoration priorities for the Multi-Regional Bay-Delta Areas [MR-PRIORITY #1]:**

**\*Develop hands-on projects and a traveling trunk of materials to promote K-12 NIS Education.**

This project will do just that--- develop a hands-on tool kit to promote K-12 NIS education.

\*Develop aggressive public information program to educate the public about the dangers of introducing nonnative organisms into natural areas.

\*Prevention: prevention of additional non-native invasive species--- education outreach is one of our best prevention tools.

➤ ***Sacramento Region [SR-PRIORITY #5]:***

\*Implement actions to prevent, control, and reduce impacts of non-native invasive species in the region. Again, education outreach goes hand-in-hand to meet this priority.

➤ ***San Joaquin Region [SJ-PRIORITY #1]:***

\*Non-native Invasive Species. Projects are needed to implement an eradication program for purple loosestrife along the Tuolumne River. Invasive species such as purple loosestrife will be incorporated into the kit.

➤ ***Delta Region [DR-PRIORITY #5]:***

\*Education efforts to help the public better understand the non-native species threat actions. A tool kit would target a large section of the public, teachers, educators, and students.

\*Implement actions to prevent, control and reduce impacts of non-native invasive species in the Delta-- prevention is key to accomplish this goal.

➤ ***Bay Region [BR-PRIORITY #3]:***

\*Implement actions to prevent, control and reduce impacts of non-native invasive species.

***2. Relationship to Other Ecosystem Restoration Projects:***

This project would directly relate to other funded invasive species projects (purple loosestrife, spartina, Arundo, Chinese Mitten Crab, zebra mussle, RIDNIS, etc.) in that education outreach is an aspect to all on-the-ground projects. Tool Kits would be made available to all other CALFED Project recipients for their use in their programs, as seen fit. The San Joaquin School District has received funding to work on a Bay-Delta curriculum, the topic of invasive species is included. This curriculum will be an important part of the curriculum refinement and expansion task.

***3. Requests for Next-Phase Funding:***

*Not Applicable to this Project.*

***4. Previous Recipients of CALFED Program Funding:***

*Not Applicable to this Project.*

***5. System-Wide Ecosystem Benefits:***

Both education outreach and invasive species projects are key components associated with a long-term, comprehensive plan that will restore overall ecological health of the Bay-Delta system.

Invasive species do not obey watershed or county boundaries. Truly the only approach to weed prevention, management, and eradication is on a watershed level. Efforts made in only one part of the watershed would be futile without addressing the watershed in its entirety. Holistic, watershed management is the key.

The displacement of valued flora and fauna and the diminishment of critical fish and wildlife habitats by invasive species have been well documented. The continued introduction and spread of invasive species jeopardize various threatened and endangered native wetland plants and wildlife. The complex interface between farm land and water in the Bay-Delta estuary that provides rich and varied habitat for wildlife, especially birds is threatened by the spread of invasive species. On a larger scale, invasive species have been documented to interfere with wetland functions, including productivity and nutrient cycling by replacing mosaics of submergent and emergent vegetation.

This invasive species education outreach project will increase an overall awareness about the threat that invasive species pose to the health of the Bay-Delta. Invasive species threats are currently neglected in existing Environmental Education outreach programs and curricula. This project will incorporate invasive species into local classroom curricula.

#### ***6. Additional Information for Proposals Containing Land Acquisition:***

*Not Applicable to this project.*

### **C. Qualifications**

#### **California Department of Food and Agriculture**

The California Department of Food and Agriculture (CDFA) has statutory responsibility for the prevention of exotic agricultural and environmental pests from entering the State. The CDFA is concerned with invasive weeds, insects, animals, and diseases. The Department's pest prevention strategy consists of four major components:

- 1) *Exclusion*- preventing exotic pests from entering California
- 2) *Detection*- locating existing pest populations
- 3) *Eradication*- eliminating existing pest populations
- 4) *Education*, informing the public about the importance of keeping California pest-free.

#### **Integrated Pest Control Branch**

Pest prevention is a major part of the California Department of Food and Agriculture's many different functions, particularly in the Plant Health and Pest Prevention Service (PHPPS). PHPPS is divided into four branches, including the Integrated Pest Control Branch (IPC). The IPC has four major programs that are directly involved in weed control:

- 1) *Weed and Vertebrate Program*
- 2) *Hydrilla Eradication Program*
- 3) *Biological Control Program*
- 4) *Noxious Weed Information, Mapping, and GIS Project*

IPC works closely with the County Agricultural Commissioner Offices, local Weed Management Areas (local weed management action and coordination groups) and other State and Federal agencies in prevention, education, detection, and control efforts. The Integrated Pest Control Branch has a long

history of weed management actions and has taken the lead in noxious weed prevention, detection, education, and control in California. The Weed and Vertebrate Program is largely focused on the detection and eradication of A-rated, listed State Noxious Weeds. This group surveys the entire Delta annually (for hydrilla -at a time too late for loosestrife) and thus will serve as an invaluable resource in purple loosestrife detection and mapping. The Hydrilla Program is very similar, but focuses on a specific aquatic weed of special concern. The Biological Control Program, in cooperation with the USDA and the University of California, brings natural enemies of pests into the State to permanently reduce pest populations. The Noxious Weed Information, Mapping, and GIS Project has developed a GIS and database system for mapping and tracking A-rated weed populations. This group has also facilitated formation of local Weed Management Areas throughout the State and produces a quarterly interagency weed control newsletter sent to 1,800 subscribers, the "Noxious Times."

**California Exotic Pest Plant Council, Dr. Carla Bossard, Project Co-Coordinator**

Currently a professor and Director of the Environmental Sciences Department at St. Mary's College of California in Moraga. Has extensive research experience on a variety of invasive species. Received her doctorate from U.C. Davis in 1990. Formerly a FulBright Scholar to Sri Lanka where she studied invasive species interactions in rainforest systems. A founding member of the California Exotic Pest Plant Council (CalEPPC), a non-profit group that focuses on the California's wildland weeds. Bossard is currently chair of the outreach committee for CalEPPC. Has conducted countless presentations and trainings, published many manuscripts, and her latest book is entitled: "Invasive Plants of California's Wildlands" (2000, UC Press).

**Carri Benefield, Project Co-Coordinator**

Graduated in 1996 from Saint Mary's College of California with a B.S. in Biology. Spring of 1998 earned a Master's Degree in Plant Biology, emphasis in Weed Science, from UC Davis. Fall 1998 to Fall 1999, served as a Scientific Aid for the CDFA and as Field Crops Outreach Coordinator with the UC Sustainable Research and Education Program, Davis CA. From fall of 1999 to present serves as Associate Agricultural Biologist with CDFA. Associate Agricultural Biologist duties include: Purple Loosestrife Project Coordinator, Co-lead in promotion and development of Weed Management Area groups across the State, Weed Education and Outreach Coordinator, and Editor of the Noxious Times Newsletter. Has conducted, organized, and/or led research on yellow starthistle, cape ivy (formerly known as German ivy), Scotch thistle, and French broom. Currently a member of the California Exotic Pest Plant Council, California Environmental Educators Interagency Network, California Interagency Noxious Weed Coordinating Committee, California Weed Science Society, and Western Society of Weed Science. Has conducted over 50 presentations and trainings to regional working groups, agency staff, local watershed groups, Weed Management Area groups, as well as at the above mentioned Societies. Has two published manuscripts (California Agriculture and Weed Science), one manuscript under review (Weed Technology), and 20 abstracts. Was a contributor of a chapter on purple loosestrife to a book entitled: "Invasive Plants of California's Wildlands" (2000, UC Press).

**D. Cost**

**Budget:** Budget included on web forms as required. A nicely formatted Excel spreadsheet is available upon request.

**Cost Sharing:** The project is a highly cooperative effort and a good deal of in-kind support is provided by cooperators. No hard-dollar matches are anticipated at this time.



## **E. Local Involvement**

### **Partnerships**

Bay-Delta area teachers and educators will partner with land managers from local Watershed and Weed Management Area groups. These partnerships will play a key role in the facilitation and implementation of invasive species tool kits both inside and outside the classroom. Land managers, botanists and watershed cooperators will go into the classroom and help introduce the topic and aid in use of kit resources. Further, classrooms will work side-by-side with Watershed and Weed Management Areas in on-the-ground projects, such as weed-pull days and restoration workshops.

### **Building local community capacity:**

- (1) Expand and strengthen Bay-Delta Watershed Partnerships. To date little interaction occurs between local watershed and weed management area groups in the Bay-Delta. This project will create avenues toward an improved coordination between groups in the watershed.
- (2) Coordinate with existing Environmental Education Programs and other Western States. There are several very successful Environmental Education (EE) Programs already up and running: Project WILD (Fish and Game); Project Learning Tree (Forestry and Fire Protection); Project WET (A non-profit promoting Water Education for Teachers). Team members would work with other EE Programs in an effort to coordinate curricula, training, and outreach where possible.
- (3) Coordinate with other Invasive Species Education Projects Developing across the Western States. Invasive species youth education projects have been initiated in Montana, Oregon, and Colorado. Where possible, team members will coordinate resources.

### **Local Weed Management Areas**

The Integrated Pest Management Branch has taken a lead role in the promotion and coordination of county-wide Weed Management Areas (WMAs). They are local weed management groups made-up of concerned citizens, members from private groups and State, Federal, County Agencies. Groups sign memoranda of understanding, hold regular meetings, formulate weed management plans, and conduct a wide range of weed prevention, education, detection, and control projects. WMAs have been very supportive of the project to date and have expressed a real interest in continuing to do so.

### **State and Federal Agencies**

California Department of Fish and Game, California Department of Boating and Waterways, California State Parks and Recreation, US Bureau of Reclamation, US Fish and Wildlife Service, and US Department of Agriculture; Botanists and Land Managers from the Forest Service, Bureau of Land Management, and Resource Conservation Districts.

### **Other Supporters**

California Department of Food and Agriculture, Sacramento River Watershed Group, American River Watershed Group, California Exotic Pest Plant Council, Northeast region California Regional Environmental Education Community Network (CREEC), San Joaquin School District.

## **F. Compliance with Standard Terms and Conditions**

The California Department of Food and Agriculture WILL comply with (and has complied with a prior grant award in 1999) the standard State and Federal contract terms described in Attachments D and E.

## **G. Literature Cited**

No literature was cited in this proposal.